DEPARTMENT OF THE INTERIOR
Hubert Work, Secretary

U. S. GEOLOGICAL SURVEY
George Otis Smith, Director

WATER-SUPPLY PAPER 569

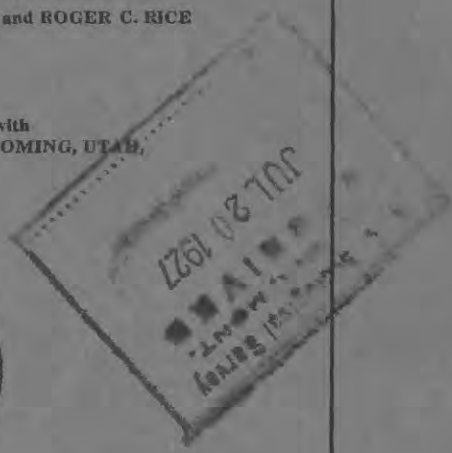
SURFACE WATER SUPPLY OF THE UNITED STATES

1923

PART IX. COLORADO RIVER BASIN

NATHAN C. GROVER, Chief Hydraulic Engineer
ROBERT FOLLANSBEE, A. B. PURTON, and ROGER C. RICE
District Engineers

Prepared in cooperation with
THE STATES OF COLORADO, WYOMING, UTAH, AND ARIZONA



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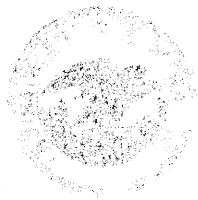

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SURFACE WATER SUPPLY OF COLORADO RIVER BASIN, 1923

AUTHORIZATION AND SCOPE OF WORK

This volume is one of a series of 14 reports presenting results of measurements of 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 authority implied in the organic law (20 Stat. L., p. 394), which contains the following paragraph:

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

The work was begun in 1888 in connection with special studies of water supply for irrigation. Since the fiscal year ending June 30, 1895, successive appropriation bills passed by Congress have carried the following item:

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 this work many private and State organizations have cooperated, either by furnishing records or by assisting in their collection. 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 4,800 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 the water-supply papers from time to time. Information in regard to publications relating to water resources is presented in the appendix of 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 work of a certain class. These terms may be divided into two groups—(1) those that represent a rate of flow, as second-feet, gallons per minute, miner's inches, and discharge in second-feet per square mile, and (2) those 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 a 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 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 given 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 years ending September 30, 1923. At the first 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 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

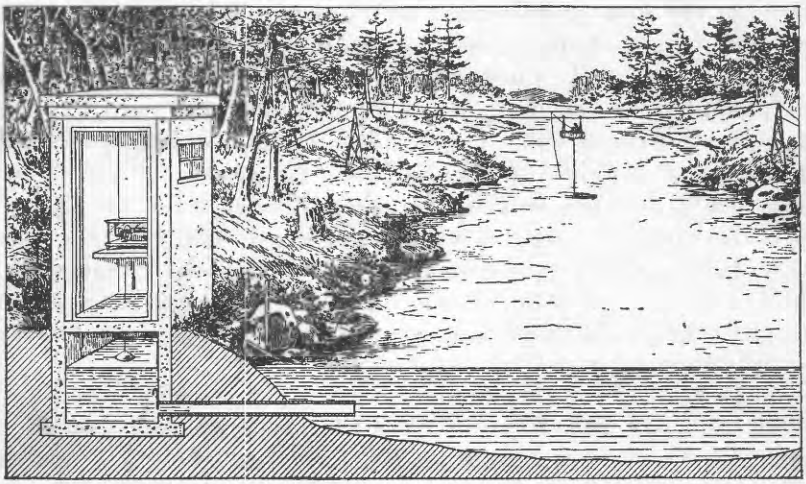

FIGURE 1.—Typical gaging station

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 gage or from a water-stage recorder that gives a continuous record of the fluctuations. Measurements of discharge are made with a current meter by the general methods 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 are computed.

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The data presented for each gaging station in the area covered by this report comprise a description of the station, a table giving results of discharge measurements, a table showing the daily discharge, 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 heights and results of discharge measurements are published.

The description of the station gives, in addition to statements regarding location and equipmemt, 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 channel, 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 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 fluctuation 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 weighting discharge for parts of the day or by use of 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 that given in the 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" gives the average flow in cubic feet for each 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 permanence of the stage-discharge relation and (2) on the accuracy of observations of stage, measurements of flow, and interpretation of records.

A paragraph in the description of the station or footnotes added to the tables 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 heights to the rating table to obtain the daily discharge.

For the rating curves "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 the depth of run-off in inches may be subject to gross errors caused by including 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, and 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" previously published 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 sections of the United States are located 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 table of monthly discharge gives 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 records previously published.

COOPERATION

The work in Arizona, Utah, and Wyoming was carried on under cooperative agreement between the United States Geological Survey and the States.

Special acknowledgments are due to the cooperating State officials, W. S. Norviel and Vernon Vaughn, State water commissioners of Arizona; R. E. Caldwell, State engineer of Utah; and C. D. Shawver, State engineer of Wyoming.

The State engineer of Colorado, A. J. McCune, paid the observers and furnished other assistance at several stations in Colorado.

The United States Forest Service furnished the gage-height records at five stations, and the services of a hydrographer for part of the winter for work in Colorado and Wyoming.

The United States Weather Bureau paid the gage observers for the stations on Colorado River near Fruita, Colo., and Green River at Green River, Wyo.

The Office of Indian Affairs assisted in the maintenance of stations in Utah and Arizona.

On Colorado River in Arizona the United States Bureau of Reclamation, the Federal Power Commission, the United States Weather Bureau, the State of California, and the city of Los Angeles furnished financial assistance for the construction and maintenance of the stations near Topock and in Grand Canyon. The entire cost of construction and maintenance of the station at Lees Ferry was borne by the Southern California Edison Co.

Assistance in the collection of data was rendered by the United States National Park Service, Utah Power & Light Co., Vernal Milling & Light Co., Redlands Co., Eden Irrigation & Land Co., and Mr. C. H. Beggs.

DIVISION OF WORK

Data for stations in Arizona were collected under the direction of Roger C. Rice, district engineer, who was assisted by D. A. Dudley; J. H. Gardiner; W. C. Chase; J. W. Johnson; H. D. Empie, water commissioner for Safford Valley; G. S. Hayes; and I. G. Cockroft and J. E. Klohr, hydrographer and assistant hydrographer, respectively, of the Southern California Edison Co. The records were compiled and prepared for publication under the direction of Roger C. Rice and W. E. Dickinson, district engineers, who were assisted by J. H. Gardiner, B. S. Barnes, R. G. Kasel, and W. E. Code.

Data for stations in Colorado and Wyoming were collected and prepared for publication under the direction of Robert Follansbee, district engineer, who was assisted by P. V. Hodges, M. B. Arthur, P. S. Parker, J. W. Mangan, and Miss Florence M. Hall.

Data for stations in Utah were collected and prepared for publication under the direction of A. B. Purton, district engineer, who was assisted by W. E. Dickinson, R. R. Rowe, B. A. Howell, H. W. Staats, J. W. Mangan, M. T. Wilson, D. M. Corbett, and Miss Lysle Christensen.

The records were reviewed and the manuscript assembled by H. C. Troxell and J. H. Morgan.

GAGING-STATION RECORDS

COLORADO RIVER BASIN

COLORADO RIVER AND TRIBUTARIES ABOVE GREEN RIVER

COLORADO RIVER AT HOT SULPHUR SPRINGS, COLO.

LOCATION.—In sec. 2, T. 1 N., R. 78 W., at highway bridge near Denver & Salt Lake Railroad station in Hot Sulphur Springs, Grand County.

DRAINAGE AREA.—785 square miles (revised measurement on map of Colorado, scale 1:500,000).

RECORDS AVAILABLE.—July 22, 1904, to September 30, 1909; September 23, 1910, to September 30, 1923.

GAGE.—Chain gage on downstream side of bridge; read by T. B. Jones. Prior to April 16, 1906, staff gage set to datum 6.07 feet lower was located 1,000 feet downstream.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of well-compacted gravel. Control 150 feet downstream; slightly shifting. Banks not subject to overflow.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 7.55 feet at 3 p. m. June 16 (discharge, 6,600 second-feet); minimum discharge occurred during winter.

1904-1909; 1910-1923: Maximum stage recorded, 8.7 feet at 5 a. m. June 15, 1921 (discharge, 10,300 second-feet); minimum discharge recorded, 63 second-feet, February 15 and 25-27, 1908.

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

DIVERSIONS.—Water diverted for irrigation of 18,000 acres from Colorado River and tributaries above station. In addition 12,600 acre-feet were diverted into Cache la Poudre drainage basin during 1923.

REGULATION.—Diurnal fluctuation during spring of year from alternate melting and freezing of mountain snow. No artificial regulation.

ACCURACY.—Stage-discharge relation slightly shifting; affected by ice during winter. Rating curve well defined. Gage read to hundredths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table. Records good.

Discharge measurements of Colorado River at Hot Sulphur Springs, Colo., 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.*
Oct. 4	Robert Follansbee	1.37	118	June 6	Robert Follansbee	5.71	3,040
Feb. 20	M. B. Arthur	[a]2.94	94	July 19	P. V. Hodges	3.78	1,350
May 1	P. V. Hodges	2.82	846				

[a] Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Colorado River at Hot Sulphur Springs, Colo., for the year ending September 30, 1923

Day	Oct.	Nov.	Apr.	May	June	July	Aug.	Sept.
1	132	117		888	3,410	2,360	905	401
2	126	117		834	3,560	2,160	850	423
3	123	86		888	3,410	2,060	905	358
4	117	123		1,000	3,410	2,060	795	338
5	123			1,220	3,410	1,880	740	338
6	123			1,630	3,060	1,880	690	338
7	117			1,470	2,820	1,710	615	294
8	112			1,400	3,200	1,880	540	272
9	112			1,550	3,340	2,260	540	251
10	109			1,630	3,480	2,060	540	238
11	112			2,060	3,340	2,020	690	223
12	106			1,550	3,340	1,930	565	204
13	109			1,330	3,340	1,670	590	200
14	109			1,210	3,640	1,590	740	285
15	112			1,210	4,130	1,750	740	255
16	117			1,120	6,220	1,750	740	281
17	117			1,120	5,090	1,590	640	302
18	114			1,180	4,500	1,430	615	358
19	106			1,430	4,130	1,300	540	358
20	103			1,750	4,130	1,430	516	401
21	103			2,110	4,130	1,590	516	358
22	103		454	1,840	4,040	1,430	540	338
23	95		345	1,840	3,710	1,300	468	358
24	98		328	2,060	3,710	1,180	445	358
25	95		345	2,700	3,870	1,070	423	358
26	100		525	3,060	3,710	1,120	401	358
27	95		600	3,640	3,710	1,070	380	358
28	98		600	3,640	3,270	960	315	401
29	106		625	3,060	2,530	905	315	380
30	100		778	2,820	2,640	850	294	380
31	106			3,200		740	336	

Monthly discharge of Colorado River at Hot Sulphur Springs, Colo., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	132	95	110	6,760
November 1-4	123	86	111	881
April 22-30	778	328	511	9,120
May	3,640	834	1,820	112,000
June	6,220	2,530	3680	219,000
July	2,360	740	1,580	97,200
August	905	294	578	35,500
September	423	200	326	19,400

COLORADO RIVER AT GLENWOOD SPRINGS, COLO.

LOCATION.—In sec. 9, T. 6 S., R. 89 W., in front of electric power house at Glenwood Springs, Garfield County. No Name Creek enters Colorado River 2 miles above station, and Roaring Fork enters half a mile below.

DRAINAGE AREA.—4,560 square miles (revised, measured on map of Colorado; scale, 1: 500,000).

RECORDS AVAILABLE.—January 1, 1900, to September 30, 1923; also May 12 to July 17, 1899, at point just above Roaring Fork.

GAGE.—Friez water-stage recorder on right bank in front of power house; inspected by C. H. Oberly.

DISCHARGE MEASUREMENTS.—Made from cable beneath State Street Bridge, a third of a mile below gage.

CHANNEL AND CONTROL.—Bed composed of well-compacted gravel, on which silt is deposited. Control at riffle 300 feet downstream; practically permanent. Banks not subject to overflow except at extreme high stages.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 10.3 feet from 2 to 6 p. m. June 17 (discharge. 20,400 second-feet); minimum stage, 1.94 feet at 7 a. m. January 15 (discharge, 140 second-feet).

1900–1923: Maximum stage recorded, 12.55 feet at noon June 14 and 15, 1918 (discharge, 30,100 second-feet); minimum stage, 1.6 feet at 5 p. m. February 6, 1921 (discharge, 80 second-feet).

ICE.—Stage-discharge relation not affected by ice; hot water from springs keeps river open.

DIVERSIONS.—Diversions for the irrigation of a few hundred acres between this station and Hot Sulphur Springs. In addition, the Public Service Co. of Denver has a decree for 1,250 second-feet for power. Water diverted for power is returned to river above Glenwood Springs.

REGULATION.—Shoshone power plant of Public Service Co. of Denver 7 miles upstream, controls flow during day at low water, but has insufficient pondage to control it for more than a few hours.

ACCURACY.—Stage-discharge relation shifted slightly during low stage. Rating curve well defined above 1,000 second-feet. Operation of water-stage recorder satisfactory, except as explained 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 excellent except for daily discharges below 1,000 second-feet, for which they are good.

Discharge measurements of Colorado River at Glenwood Springs, Colo., 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.*
Nov. 25	F. C. Snyder[a]	3.24	737	Mar. 12	T. J. Watkins	3.48	1,120
Jan. 18	M. B. Arthur	3.69	1,030	Apr. 18	Robert Follansbee	4.35	1,600
19	do	3.86	1,140	Sept. 25	do	4.36	1,590

[a] State hydrographer.

Daily discharge, in second-feet, of Colorado River at Glenwood Springs, Colo., for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1,030	880	858	828	777	791	1,020	3,090	14,800	9,910	3,290	2,070
2	971	940	895	828	763	749	1,150	3,290	15,200	9,230	3,840	2,220
3	955	1,020	791	763	805	910	1,100	3,500	15,300	8,570	3,950	2,070
4	963	1,030	770	898	594	858	1,030	4,070	15,200	8,250	3,720	1,930
5	940	1,000	798	835	535	613	858	4,840	15,200	7,930	3,400	1,860
6	895	955	770	791	639	626	895	5,960	15,200	7,610	3,190	1,800
7	940	865	763	835	756	700	1,060	6,990	14,900	7,300	2,810	1,740
8	918	791	932	910	714	652	1,040	6,690	14,700	7,610	2,460	1,680
9	880	932	749	880	763	679	1,060	6,990	14,800	7,930	2,380	1,570
10	888	865	700	749	742	700	1,110	7,610	15,700	8,570	2,300	1,520
11	872	1,020	714	749	574	805	1,060	8,570	16,100	8,570	2,460	1,470
12	850	940	798	791	742	653	1,200	8,570	16,100	8,250	2,810	1,470
13	880	820	805	613	574	749	1,370	7,300	16,100	7,610	3,190	1,470
14	865	728	842	415	828	728	1,520	6,390	17,000	7,300	3,720	1,420
15	880	812	858	580	835	721	1,470	5,810	17,800	6,990	4,840	1,470

Daily discharge, in second-feet, of Colorado River at Glenwood Springs, Colo., for the year ending September 30, 1923—Continued

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
16	895	756	672	620	842	646	1,470	5,390	18,700	7,300	4,440	1,570
17	872	812	820	672	880	798	1,570	5,110	20,000	7,300	3,840	1,570
18	895	888	785	728	693	796	1,740	5,530	19,100	6,990	3,500	1,570
19	880	918	750	948	721	794	2,000	6,100	16,500	6,390	3,610	1,740
20	910	910	721	835	763	791	2,640	7,610	15,200	6,390	3,290	1,800
21	948	888	777	770	763	686	2,380	9,230	15,700	6,690	3,090	1,860
22	910	850	646	652	770	763	2,070	10,200	14,800	6,390	3,000	1,800
23	940	805	763	686	763	714	1,930	9,570	13,200	5,810	2,810	1,680
24	902	820	749	728	805	714	1,740	9,570	12,800	5,250	2,720	1,620
25	895	763	686	798	728	805	1,570	10,200	13,200	4,700	2,550	1,620
26	888	805	865	812	880	735	1,620	12,400	13,200	4,970	2,380	1,680
27	880	756	932	842	721	756	1,930	14,800	13,200	4,970	2,300	1,680
28	940	798	880	791	735	791	2,300	15,700	12,400	4,570	2,140	1,680
29	872	842	842	763	-------	932	2,300	15,700	11,300	4,070	2,000	1,700
30	955	711	902	735	-------	979	2,640	14,400	10,200	3,500	1,860	1,780
31	963	-------	842	777	-------	1,050	-------	14,000	-------	3,190	1,930	-------

NOTE.—Recorder not in operation Dec. 18, 19, Jan. 29, Mar. 18, 19, June 3–9; discharge determined by comparison with flow of Colorado River at Hot Sulphur Springs.

Monthly discharge of Colorado River at Glenwood Springs, Colo., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	1,030	850	912	56,100
November	1,030	711	864	51,400
December	932	646	796	48,900
January	948	415	762	46,900
February	880	535	739	41,000
March	1,050	613	764	47,000
April	2,640	858	1,560	92,800
May	15,700	3,090	8,230	506,000
June	20,000	10,200	15,100	898,000
July	9,910	3,190	6,780	417,000
August	4,840	1,860	3,030	186,000
September	2,220	1,420	1,700	101,000
The year	20,000	415	3,450	2,490,000

COLORADO RIVER NEAR PALISADE, COLO.

LOCATION.—In sec. 2, T. 11 S., R. 98 W., at State bridge 2 miles above Palisade, Mesa County. Nearest important tributary, Plateau Creek, enters 6 miles above.

DRAINAGE AREA.—8,790 square miles (revised, measured on map of Colorado; scale, 1:500,000).

RECORDS AVAILABLE.—April 9, 1902, to September 30, 1923.

GAGE.—Chain gage on downstream side of bridge near midspan; read by A. Barnhisel.

DISCHARGE MEASUREMENTS.—Made from bridge, 2 miles below gage

CHANNEL AND CONTROL.—Bed composed of gravel, silt, and scattered boulders. Control is at rapids 300 feet downstream; practically permanent. Banks not subject to overflow.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 21.3 feet at 6 a. m. June 17 (discharge, 31,300 second-feet); minimum discharge occurred during winter.

ICE.—Stage-discharge relation affected by ice.

DIVERSIONS.—Principal diversion between Glenwood Springs and Palisade gaging station is the high line canal, of the Bureau of Reclamation which has a capacity of 1,425 second-feet. Some of the water diverted for power is returned to the river to supply a priority of 521 second-feet for the Grand Valley Canal.

REGULATION.—None.

COOPERATION.—Complete records furnished by the United States Bureau of Reclamation.

Daily discharge, in second-feet, of Colorado River near Palisade, Colo., for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1,530	1,480	1,700	1,580	1,820	1,580	1,940	5,360	25,500	17,800	4,700	3,300
2	1,370	1,530	1,580	1,530	1,700	1,820	2,060	5,480	26,300	17,400	5,600	3,390
3	1,420	1,530	1,640	1,480	1,370	1,940	2,180	6,210	27,100	16,200	6,470	3,480
4	1,580	1,760	1,640	1,480	1,420	1,940	2,120	7,160	28,200	15,000	5,960	3,210
5	1,530	2,060	1,700	1,530	1,190	1,640	1,880	8,480	26,600	14,700	5,600	3,030
6	1,480	1,940	1,640	1,480	1,190	1,820	1,760	10,200	24,800	14,500	5,140	2,860
7	1,530	1,880	1,820	1,370	1,280	1,940	1,940	11,500	22,800	13,800	4,810	2,860
8	1,480	1,880	1,880	1,640	1,420	2,000	2,120	12,400	22,100	14,300	4,280	2,700
9	1,320	1,940	1,940	1,480	1,580	1,940	2,060	12,900	23,000	14,300	3,880	2,460
10	1,530	1,940	1,760	1,700	1,580	1,940	2,120	14,500	23,800	14,700	3,780	2,250
11	1,640	2,000	1,580	1,760	1,370	1,940	2,060	15,800	23,800	15,200	3,780	2,120
12	1,530	2,120	1,700	1,480	1,480	1,880	2,060	16,400	24,500	14,100	4,180	2,120
13	1,580	2,000	1,760	1,420	1,420	1,760	2,460	14,800	24,800	13,400	5,030	2,250
14	1,480	1,820	1,940	1,820	1,370	1,640	2,860	12,900	26,300	13,100	6,080	2,250
15	1,420	1,700	1,880	1,640	1,420	1,580	3,120	11,200	27,600	12,400	7,880	2,180
16	1,480	1,640	1,760	1,370	1,480	1,530	2,940	10,400	29,000	12,200	7,590	2,250
17	1,420	1,640	1,580	1,280	1,480	1,640	2,860	10,400	30,400	11,700	7,160	2,320
18	1,420	1,820	1,420	1,530	1,530	1,820	3,210	10,200	29,900	11,700	6,210	2,390
19	1,420	1,820	1,420	1,700	1,580	1,760	4,080	11,400	26,800	10,900	5,840	2,860
20	1,480	1,760	1,480	1,880	1,530	1,700	5,030	13,900	25,000	10,600	6,340	2,780
21	1,530	1,760	1,480	1,880	1,580	1,820	4,920	16,800	24,300	11,400	5,720	2,860
22	1,420	1,760	1,530	1,760	1,700	1,760	4,810	18,600	24,300	10,700	5,140	2,860
23	1,420	1,760	1,480	1,640	1,700	1,580	3,980	17,800	23,000	10,100	4,920	2,860
24	1,580	1,700	1,420	1,530	1,700	1,420	3,580	17,000	22,600	9,260	4,700	3,120
25	1,580	1,640	1,420	1,700	1,640	1,580	3,120	18,400	23,000	7,740	4,280	2,860
26	1,580	1,700	1,420	1,530	1,580	1,480	2,940	22,100	23,300	7,440	4,080	2,860
27	1,640	1,700	1,420	1,580	1,580	1,320	3,390	25,500	23,300	7,880	3,680	2,860
28	1,640	1,640	1,370	1,530	1,530	1,370	3,980	27,400	22,600	7,160	3,780	2,860
29	1,580	1,760	1,640	1,480	-------	1,480	4,180	27,100	20,800	6,340	3,210	2,860
30	1,640	1,760	1,820	1,370	-------	1,640	4,700	25,300	18,600	5,600	2,940	3,030
31	1,530	-------	1,820	1,530	-------	1,760	-------	24,300	--------	5,030	2,860	-------

Monthly discharge of Colorado River near Palisade, Colo., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	1,640	1,320	1,510	92,800
November	2,120	1,480	1,780	106,000
December	1,940	1,370	1,630	100,000
January	1,880	1,280	1,570	96,500
February	1,820	1,190	1,510	83,900
March	2,000	1,320	1,710	105,000
April	5,030	1,760	3,020	180,000
May	27,400	5,360	14,900	916,000
June	30,400	18,600	24,800	1,480,000
July	17,800	5,030	11,800	726,000
August	7,880	2,860	5,020	309,000
September	3,480	2,120	2,740	163,000
The year	30,400	1,190	6,030	4,360,000

COLORADO RIVER NEAR FRUITA, COLO.

LOCATION.—In sec. 20, T. 1 N., R. 2 W., at highway bridge 1½ miles south of Fruita, Mesa County. Nearest important tributary, Little Salt Wash, enters 1 mile below station; Gunnison River enters at Grand Junction 12 miles above.

DRAINAGE AREA.—16,800 square miles (measured on map in Hayden's atlas).

RECORDS AVAILABLE.—April 1, 1911, to September 30, 1923, when station was discontinued; flood records during 1908, 1909, and 1910.

GAGE.—Chain gage on downstream side of left span; read by L. C. Jones.

DISCHARGE MEASUREMENTS.—Made from three-span highway bridge.

CHANNEL AND CONTROL.—Bed composed of silt and gravel which will scour out at high stages and fill in afterwards. Control is riffle 600 feet downstream; somewhat shifting. Banks subject to overflow at stage of 14 feet.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 12.2 feet at 8 a. m. May 29 (discharge, 51,100 second-feet); minimum stage, 3.0 feet on several days during October (discharge, 1,930 second-feet).

1908–1923: Maximum stage recorded during period, 15.2 feet June 16, 1921 (discharge, 81,000 second-feet); minimum stage, 1.9 feet August 26–30, 1919 (discharge, 1,270 second-feet).

Weather Bureau states that highest stage known was about 18.5 feet on July 4, 1884 (discharge estimated from extension of rating curve and levels across overflow, 125,000 second-feet).

ICE.—Stage-discharge relation not seriously affected by ice; daily discharge not determined during winter.

DIVERSIONS.—Only diversion between Palisade and Fruita stations is that of Grand Valley Canal, which has a decree for 521 second-feet.

REGULATION.—None.

ACCURACY.—Stage-discharge relation not permanent; affected by ice during winter. Rating curve fairly well defined. Gage read to tenths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table, except from October 1 to April 20, when shifting-control method was used. Records fair.

Discharge measurements of Colorado River near Fruita, Colo., during the period October 1, 1922, to October 13, 1923

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
Nov. 13	F. C. Snyder [a]	3.75	2,980	May 14	F. C. Snyder [a]	8.98	23,000
Feb. 10	do	[b]3.32	2,050	Oct. 13	C. E. Feetham [a]	4.35	3,800
Mar. 7	do	3.42	2,490				

[a] State hydrographer. [b] Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Colorado River near Fruita, Colo., for the year ending September 30, 1923

Day	Oct.	Nov.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1,930	2,600	2,270	2,600	8,440	40,200	24,000	5,830	4,100
2	1,930	2,760	2,340	2,840	8,780	43,100	22,300	7,160	4,220
3	1,930	2,760	2,410	3,280	9,660	43,100	21,900	7,940	4,100
4	1,930	2,760	2,710	3,380	11,400	43,100	21,000	8,440	4,100
5	2,050	2,840	2,630	2,840	14,900	43,100	18,800	8,270	3,990

Daily discharge, in second-feet, of Colorado River near Fruita, Colo., for the year ending September 30, 1923—Continued

Day	Oct.	Nov.	Mar.	Apr.	May	June	July	Aug.	Sept.
6	2,120	2,840	2,630	2,600	19,100	41,200	18,200	7,160	3,880
7	1,990	2,760	2,630	2,760	20,600	38,400	17,200	6,400	3,570
8	1,930	2,760	2,630	3,020	21,300	34,700	18,500	5,560	4,100
9	2,050	2,760	2,630	3,280	23,000	36,100	19,400	5,050	3,880
10	2,050	2,760	2,630	3,280	25,600	36,500	18,200	4,800	3,670
11	2,050	2,930	2,630	3,100	27,600	34,300	19,100	4,920	3,280
12	2,120	2,930	2,480	3,280	28,000	35,200	18,000	5,970	3,100
13	1,990	2,960	2,480	3,570	25,600	39,800	17,200	7,310	2,760
14	1,930	2,760	2,340	4,330	23,000	41,200	15,900	8,270	2,600
15	1,930	2,760	2,340	4,560	18,800	43,100	15,700	9,300	2,600
16	2,050	2,760	2,340	4,440	16,900	44,000	15,700	9,660	2,600
17	2,050	2,760	2,340	4,330	17,700	45,900	14,400	9,300	2,680
18	2,050	2,930	2,340	5,560	19,400	45,500	13,700	8,950	3,380
19	2,180	2,930	2,210	7,160	22,600	34,700	12,800	9,120	3,880
20	2,120	2,760	2,410	8,780	24,800	35,200	12,800	9,660	4,100
21	2,310	2,930	2,790	8,440	28,400	34,700	12,800	8,610	3,880
22	2,310	2,930	2,560	7,620	32,700	33,800	12,800	7,620	3,880
23	2,180	2,840	2,140	6,400	33,100	30,300	12,400	6,850	4,220
24	2,240	2,760	2,080	5,430	26,400	29,900	10,600	6,550	4,800
25	2,180	2,760	2,210	4,330	31,400	29,500	9,660	6,110	4,560
26	2,310	2,760	2,210	3,880	37,200	29,500	8,950	4,330	4,440
27	2,240	2,760	2,210	4,330	41,400	29,900	8,950	4,330	4,330
28	2,180	2,760	2,210	5,700	47,100	31,600	8,950	3,880	4,330
29	2,450	2,760	2,270	6,260	49,600	31,200	7,940	3,670	4,330
30	2,600	2,760	2,340	7,160	45,200	27,000	7,000	3,670	4,100
31	2,600	-------	2,480	-------	41,400	-------	6,110	3,670	-------

NOTE.—Stage-discharge relation affected by ice Dec. 16–20, Dec. 25 to Jan. 4, Jan. 26 to Feb. 4; discharge determined by comparison with temperature records.

Monthly discharge of Colorado River near Fruita, Colo., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	2,600	1,930	2,130	131,000
November	2,960	2,600	2,800	167,000
December	3,240	2,280	2,660	164,000
January	2,950	2,050	2,560	157,000
February	2,660	2,180	2,390	133,000
March	2,790	2,080	2,420	149,000
April	8,780	2,600	4,620	275,000
May	49,600	8,440	25,800	1,590,000
June	45,900	27,000	36,900	2,200,000
July	24,000	6,110	14,900	916,000
August	9,660	3,670	6,720	413,000
September	4,800	2,600	3,780	225,000
The year	49,600	1,930	8,990	6,520,000

COLORADO RIVER NEAR CISCO, UTAH

LOCATION.—In NW. ¼ sec. 17, T. 23 S., R. 24 E., 1 mile below mouth of Dolores River, 15 miles by road south of Cisco, Grand County, and 90 miles above confluence with Green River.

DRAINAGE AREA.—24,100 square miles (measured on General Land Office map).

RECORDS AVAILABLE.—November 10, 1914, to September 30, 1917, and October 1, 1922, to September 30, 1923; 25 miles downstream at Moab October 1, 1913, to November 10, 1914; flow about same at both places.

GAGE.—Au continuous water-stage recorder on left bank half mile above suspension highway bridge; installed December 7, 1922; inspected by G. C. Brown.

DISCHARGE MEASUREMENTS.—Made from cable 400 feet below gage.

CHANNEL AND CONTROL.—Channel straight for several hundred feet above and below station. Left bank high and not subject to overflow; right bank in extreme floods is overflowed half a mile below. Bed composed of sand and gravel. Control is believed to be ledge rock a quarter of a mile below gage; fairly permanent.

EXTREMES OF DISCHARGE.—Maximum stage during year, 14.10 feet from 3 to 7 a. m. May 29 (discharge, 47,500 second-feet); minimum discharge not determined.

1915–1917; 1923: Maximum stage, 19.7 feet at 9 p. m. June 19, 1917 (discharge, 76,800 second-feet); minimum stage, 1.55 feet September 10, 1915 (discharge, 1,460 second-feet).

ICE.—Stage-discharge relation affected by ice.

DIVERSIONS.—Below practically all diversions. A large amount of water is diverted in Colorado for irrigation.

REGULATION.—Station is too far below to be affected, except in a general way, by regulation in Colorado.

ACCURACY.—Stage-discharge relation changed slightly about latter part of July, about August 15, and again on September 25. Rating curve well defined. Operation of water-stage recorder satisfactory December 7 to September 30, except as stated in footnote to daily-discharge table. Temporary vertical staff read to hundredths once or more daily October 17 to December 6. Gage heights October 13 and 16 obtained from levels. Daily discharge determined by applying to rating table mean daily gage height ascertained from recorder graph, staff gage, or level readings. Shifting-control method used July 1–29, August 14 and 15, and September 24–26. Discharge for periods of missing gage height estimated by hydrographic comparison with the flow at Fruita. Records good.

Discharge measurements of Colorado River near Cisco, Utah, 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.*
Oct. 17	W. E. Dickinson	2.18	2,280	May 23	W. E. Dickinson	11.25	34,200
Dec. 9	do	2.64	3,000	June 14	Dickinson and Southerland[a]	12.03	37,800
Mar. 16	F. C. Snyder[a]	2.34	2,370				
Apr. 11	W. E. Dickinson	3.79	5,560	Aug. 9	W. E. Dickinson	4.26	6,340
May 2	Dickinson and Snyder[a]	5.97	12,100	30	Purton and Stevens	3.75	5,310

[a] Colorado State hydrographer.

Daily discharge, in second-feet, of Colorada River near Cisco, Utah, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1		2,940	3,120	4,000	2,760	2,790	3,330	11,900	40,500	27,100	7,260	4,950
2		2,870	3,160	3,400	2,920	2,720	3,750	12,200	41,900	25,900	8,710	5,330
3		3,090	3,050	2,900	2,780	2,830	4,340	12,800	41,900	24,600	9,040	5,470
4		3,220	3,070	2,920	2,650	3,090	4,670	14,900	42,800	22,300	9,930	5,540
5		3,550	3,260	2,950	2,280	3,220	4,360	18,000	43,100	20,500	9,290	5,130
6	2,000	3,330	3,220	2,980	2,200	3,010	3,790	21,600	40,500	19,900	8,860	4,900
7		3,590	3,090	3,000	2,340	2,850	3,450	24,800	37,000	18,800	8,060	4,740
8		3,280	3,019	2,900	2,460	2,670	3,940	27,100	34,900	18,600	7,250	4,630
9		3,160	3,140	3,200	2,650	3,070	4,760	28,800	34,000	20,600	6,450	4,900
10		2,970	3,240	3,500	2,850	3,030	5,040	30,800	34,500	20,400	5,670	4,610

Daily discharge, in second-feet, of Colorado River near Cisco, Utah, for the year ending September 30, 1923—Continued

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
11	2,000	3,330	3,050	3,400	2,740	2,920	5,520	32,500	34,200	20,700	6,250	4,340
12		3,390	2,900	3,250	2,790	2,990	5,990	34,100	34,000	20,600	6,170	4,020
13	2,150	3,470	3,050	3,100	2,560	2,990	6,400	31,500	35,800	18,900	7,710	3,900
14	2,210	3,330	3,430	2,900	2,850	2,780	8,320	27,800	38,100	17,500	9,360	3,770
15	2,280	3,200	3,650	2,700	2,720	2,780	8,860	24,500	40,700	17,300	12,400	4,130
16	2,340	2,920	3,690	2,600	2,810	2,760	8,860	21,600	42,100	17,200	13,300	4,020
17	2,340	3,050	3,590	2,520	2,810	2,650	8,650	20,700	43,800	17,200	12,500	3,830
18	2,340	2,940	3,370	2,480	2,880	2,600	9,480	21,800	44,200	16,000	11,900	4,060
19	2,310	3,180	3,050	2,400	2,900	2,530	10,700	22,900	41,200	15,700	11,200	5,280
20	2,330	3,310	2,670	2,900	2,870	2,460	11,800	26,100	37,200	15,100	11,100	5,130
21	2,380	3,200	2,450	3,430	2,880	2,600	12,200	30,800	35,800	14,900	11,000	5,330
22	2,400	3,140	2,560	3,300	2,830	2,920	11,200	34,200	35,200	15,100	9,930	5,350
23	2,340	3,200	2,450	3,100	3,050	2,780	10,100	34,500	33,300	14,300	9,170	5,210
24	2,510	3,160	2,400	2,950	3,030	2,740	8,590	31,000	31,500	13,600	8,680	7,040
25	2,430	3,050	2,500	2,800	3,010	2,580	7,620	30,800	31,700	12,700	7,910	6,060
26	2,340	2,920	2,600	2,830	3,050	2,500	7,040	35,800	32,400	11,900	7,210	5,790
27	2,480	3,030	2,800	3,030	3,070	2,560	7,210	41,200	33,500	11,000	6,530	5,890
28	2,510	3,090	3,000	2,920	2,990	2,630	8,170	45,600	34,500	10,200	5,790	5,540
29	2,780	2,900	3,250	2,780	-------	2,650	9,360	47,100	32,200	9,320	5,470	5,540
30	2,760	3,090	3,500	2,690	-------	2,790	10,100	44,200	29,500	8,350	5,300	5,660
31	2,620	------	3,770	2,810	-------	3,030	-------	40,700	-------	7,680	4,830	-------

NOTE.—No gage height; discharge estimated Oct. 1–12, 14, 15, Dec. 23–26, 28–30, Jan. 1–6, 8–14, 16–20, 22–25, July 25–28, Aug. 7 and 8. Stage-discharge relation affected by ice during latter part of December and first part of January.

Monthly discharge of Colorado River near Cisco, Utah, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	2,780	-------	2,250	138,000
November	3,590	2,870	3,160	188,000
December	3,770	2,400	3,070	189,000
January	4,000	2,400	2,990	184,000
February	3,070	2,200	2,780	154,000
March	3,220	2,460	2,790	172,000
April	12,200	3,330	7,250	432,000
May	47,100	11,900	28,500	1,750,000
June	44,200	29,500	37,100	2,210,000
July	27,100	7,680	16,900	1,040,000
August	13,300	4,830	8,520	524,000
September	7,040	3,770	5,000	298,000
The year	47,100	-------	10,000	7,280,000

COLORADO RIVER AT LEES FERRY, ARIZ.

LOCATION.—At Lees Ferry, just above mouth of Paria River, at head of Marble Gorge and lower end of Glen Canyon, Coconino County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—June 13, 1921, to September 30, 1923.

GAGE.—Continuous water-stage recorder installed January 19, 1923, on left bank at head of Paria riffle about 10 feet downstream from staff gage used previously and known as the Dugway gage. Gages read by I. G. Cockroft and J. E. Klohr, resident hydrographers of Southern California Edison Co. Datum is 3,106.35 feet above sea level.

DISCHARGE MEASUREMENTS.—Made from cable about 1 mile upstream from gage.

CHANNEL AND CONTROL.—Channel at measuring section varies in width from 350 feet at low water to 435 feet at high water. Bed is composed of sand and silt and is scoured several feet during each flood season. Control is

Paria riffle; composed of gravel and boulders and has remained practically permanent during period of record.

EXTREMES OF DISCHARGE.—Maximum stage during year, 17.5 feet at 12.30 a. m. May 31 (discharge, 101,000 second-feet); minimum stage during year, 6.65 feet October 13 and 14 (discharge, 4,420 second-feet).

1921–1923: Maximum stage recorded, 26.5 feet (Dugway gage) at 2 p. m. June 18, 1921 (discharge, about 190,000 second-feet); minimum stage, 6.4 feet January 14–15, 1922 (discharge, 3,700 second-feet).

The high-water mark of flood of 1884 at the ranch near mouth of Paria River, as identified by Jerry Johnson, is at elevation 3,137.1 feet above sea level.

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

DIVERSIONS.—Water is diverted from main river and tributaries above station for irrigation of about 1,500,000 acres.

REGULATION.—None.

ACCURACY.—Stage-discharge relation practically permanent during year. Records for October 1 to January 18, are based on twice daily readings on the Dugway gage and a rating curve defined by 46 measurements made during the period July 11 to January 18. Records for January 19 to September 30 are based on mean daily gage heights obtained from recorder graph and a new rating curve defined by 77 measurements made during the period. Records good.

COOPERATION.—Entire cost of operation and maintenance was borne by the Southern California Edison Co. until August 31, 1923. After that date the Geological Survey assumed direct control of the field work and the company furnished financial assistance in the operation of the station.

Daily discharge, in second-feet, of Colorado River at Lees Ferry, Ariz., for the year ending September 30, 1923

Date	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	4,660	5,170	7,130	5,720	6,260	7,530	8,690	21,900	94,200	58,800	25,200	21,100
2	4,540	5,300	6,640	5,870	6,090	7,340	13,100	23,100	90,700	55,400	22,700	19,400
3	4,540	5,580	7,130	6,320	6,090	7,340	16,100	27,000	89,600	51,900	22,700	15,000
4	4,540	6,020	7,130	5,720	6,090	6,980	19,400	31,200	87,800	49,600	21,500	13,600
5	4,660	6,480	6,960	5,440	6,090	6,980	21,100	31,600	85,500	47,200	20,800	13,100
6	4,660	6,480	6,800	5,870	6,090	6,980	20,800	34,600	83,100	43,800	20,800	12,600
7	4,790	6,480	6,640	5,170	5,920	7,340	20,400	38,800	85,500	41,000	20,400	12,100
8	4,790	6,640	6,960	5,300	5,400	7,910	18,300	43,800	80,300	40,400	19,000	11,100
9	4,660	6,960	7,130	5,300	5,230	7,910	17,000	46,700	75,100	39,400	17,700	10,600
10	4,540	7,130	7,130	5,580	5,230	7,530	15,800	51,300	73,900	40,400	16,400	10,400
11	4,540	7,130	6,960	6,020	5,060	7,160	15,800	55,900	71,600	42,100	17,700	9,740
12	4,540	6,960	6,800	6,170	5,060	7,160	17,700	61,200	70,400	42,100	16,700	9,740
13	4,420	6,960	6,640	6,020	5,060	7,160	19,000	64,100	69,900	41,000	22,300	9,960
14	4,420	6,960	6,800	6,170	5,230	7,530	19,000	67,500	72,800	40,400	23,500	9,960
15	4,540	7,130	6,320	6,320	5,230	7,910	18,600	65,800	77,400	38,800	28,800	9,520
16	4,540	7,130	6,170	6,480	5,400	7,720	19,000	63,500	82,000	38,200	27,900	8,690
17	4,540	7,300	5,870	6,480	5,740	7,720	21,100	60,000	85,500	39,400	27,400	8,300
18	4,540	7,300	6,170	6,320	5,920	7,720	23,100	56,500	87,800	35,600	28,400	9,310
19	4,540	6,960	6,960	6,260	6,090	7,720	24,800	54,200	87,800	35,600	29,200	15,000
20	4,540	6,640	7,130	6,260	6,260	7,720	24,800	54,200	84,400	34,100	32,100	47,800
21	4,790	6,480	7,130	6,260	6,800	7,340	25,600	55,400	79,700	32,100	29,200	28,400
22	4,790	6,480	7,130	6,090	6,800	7,160	28,400	58,800	74,500	31,600	25,200	16,700
23	4,790	6,640	7,130	6,090	6,980	6,980	30,700	64,600	70,400	31,200	22,700	13,300
24	4,790	6,800	6,480	6,090	6,980	6,980	31,200	69,900	67,500	34,100	21,500	12,100
25	4,790	6,960	6,020	6,260	7,160	6,980	32,100	70,400	64,600	31,600	19,000	14,100
26	4,790	6,960	4,920	6,260	7,340	6,980	29,700	68,100	61,200	28,400	18,000	19,000
27	4,920	6,960	4,920	6,440	7,530	6,800	26,100	69,900	59,400	27,000	16,700	17,700
28	4,920	7,130	4,920	6,620	7,530	6,620	23,100	78,600	60,000	25,600	15,300	16,100
29	5,170	6,960	4,920	6,440	-------	6,620	21,500	87,800	61,200	24,400	14,100	14,400
30	5,170	6,960	5,300	6,260	-------	6,440	20,800	96,000	62,300	24,000	18,600	14,100
31	5,170	-------	5,580	6,260	-------	6,980	-------	98,300	-------	26,600	18,300	-------

Monthly discharge of Colorado River at Lees Ferry, Ariz., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	5,170	4,420	4,700	289,000
November	7,300	5,170	6,700	399,000
December	7,130	4,920	6,450	397,000
January	6,620	5,170	6,060	373,000
February	7,530	5,060	6,100	339,000
March	7,910	6,440	7,270	447,000
April	32,100	8,690	21,400	1,270,000
May	98,300	21,900	57,100	3,510,000
June	94,200	59,400	76,600	4,560,000
July	58,800	24,000	37,800	2,320,000
August	32,100	14,100	21,900	1,350,000
September	47,800	8,300	14,800	881,000
The year	98,300	4,420	22,300	16,100,000

COLORADO RIVER AT BRIGHT ANGEL CREEK, GRAND CANYON, ARIZ.

LOCATION.—About 300 feet above Kaibab Bridge, Grand Canyon National Park, a quarter of a mile above Bright Angel Creek and 11 miles by trail northeast of Grand Canyon railroad station, Coconino County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—October 1, 1922, to September 30, 1923.

GAGE.—Stevens continuous water-stage recorder in concrete shelter and stilling well on right bank; inspected by J. W. Johnson, resident hydrographer. Zero of gage is 2,420.3 feet above sea level.

DISCHARGE MEASUREMENTS.—Made from cable about 20 feet upstream from gage.

CHANNEL AND CONTROL.—The channel at the measuring section is 275 feet wide at low water and 300 feet at high water. The bed is silt and gravel, which scours and fills each year. Control is Bright Angel Creek rapids and remained practically permanent during the year.

EXTREMES OF DISCHARGE.—Maximum stage during year, 28.5 feet at 6 p. m. September 19 (discharge, 112,000 second-feet); minimum stage, 3.7 feet at 9 a.m. December 27 (discharge, 5,520 second-feet).

Maximum stage during the spring rise was 26.5 feet at noon May 31 (discharge, 99,000 second-feet).

DIVERSIONS.—Water is diverted from main river and tributaries above station for irrigation of about 1,500,000 acres.

REGULATION.—None.

ACCURACY.—Stage-discharge relation practically permanent during year. Rating curve based on 124 discharge measurements made during the year. Gage heights from staff gage November 12 to December 9 and from recorder graph after that date. Daily discharge obtained by averaging hourly discharge during the flood of September 18–22. Records good.

Daily discharge, in second-feet, of Colorado River at Bright Angel Creek, Grand Canyon, Ariz., for the year ending September 30, 1923

Day	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1		7,580	5,960	6,850	8,400	8,640	20,900	95,100	61,200	26,600	20,400
2		7,660	6,100	6,850	8,400	10,900	22,200	91,500	56,100	24,300	27,500
3		7,280	6,500	6,780	8,180	16,000	24,500	89,900	52,600	22,600	18,800
4		7,730	6,570	6,570	7,960	18,800	29,000	89,600	49,600	21,700	15,100
5		7,660	6,260	6,500	7,730	22,000	30,800	87,400	47,300	20,600	13,700
6	6,600	7,360	6,160	6,500	7,730	23,600	33,000	86,700	44,800	20,000	12,900
7		7,500	5,960	6,570	7,880	22,200	38,000	86,700	41,900	20,100	12,200
8		7,500	5,840	6,360	8,480	20,100	43,300	83,900	40,700	19,500	11,600
9		7,660	5,840	6,030	8,720	19,200	47,300	79,000	39,800	18,100	10,800
10		7,580	5,960	5,900	8,400	18,500	50,700	75,900	38,900	17,200	10,600
11		7,660	6,100	5,900	8,030	17,400	55,800	73,500	39,800	17,000	10,500
12	7,660	7,500	6,430	5,840	8,260	18,000	61,800	72,600	40,500	20,600	9,730
13	7,430	7,280	6,640	5,770	9,040	19,700	67,100	71,100	40,200	24,700	11,800
14	7,500	7,280	6,570	5,840	8,720	20,700	71,700	72,900	39,600	28,100	11,700
15	7,500	7,360	6,710	5,900	8,640	19,800	72,300	77,400	39,300	31,200	10,900
16	7,660	6,920	6,780	5,770	8,640	19,400	68,800	82,100	37,500	32,000	10,800
17	7,580	6,570	6,990	5,900	8,640	20,400	65,400	86,100	38,000	28,800	9,380
18	7,730	6,850	6,920	6,220	8,330	22,600	59,600	88,000	36,600	30,200	42,800
19	7,660	7,730	6,850	6,430	8,330	23,800	55,000	88,300	34,700	33,000	98,500
20	7,280	8,260	6,710	6,500	8,260	25,200	54,400	87,400	34,700	33,200	87,800
21	7,060	8,480	6,710	6,850	8,100	25,200	54,700	83,000	32,200	33,400	47,800
22	6,990	8,330	6,570	7,280	7,960	27,000	57,700	77,400	32,600	27,900	26,100
23	6,990	7,660	6,500	7,360	7,800	29,600	65,100	73,200	32,400	24,800	17,700
24	7,060	6,920	6,570	7,500	7,500	31,000	72,000	69,600	34,500	22,300	14,200
25	7,360	6,160	6,570	7,880	7,500	32,000	74,400	65,900	33,600	20,600	13,000
26	7,500	5,700	6,710	7,880	7,780	31,400	72,900	62,400	29,400	18,800	17,300
27	7,580	5,520	6,780	8,180	7,580	27,900	72,600	60,400	26,600	17,600	18,900
28	7,580	5,640	6,990	8,330	7,430	24,500	78,700	60,200	25,400	16,900	18,000
29	7,500	5,700	7,130		7,360	22,300	87,400	60,700	24,500	15,200	15,700
30	7,360	5,840	6,850		7,960	20,700	94,400	62,900	23,600	15,400	14,600
31		5,900	6,780		7,960		97,300		24,300	23,600	

Monthly discharge of Colorado River at Bright Angel Creek, Grand Canyon, Ariz., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October			5,200	320,000
November	7,660		7,120	424,000
December	8,480	5,520	7,120	437,000
January	7,130	5,840	6,520	401,000
February	8,330	5,770	6,650	369,000
March	9,040	7,360	8,120	499,000
April	32,000	8,640	22,000	1,310,000
May	97,300	20,900	58,000	3,570,000
June	95,100	60,200	78,000	4,640,000
July	61,200	23,600	37,800	2,320,000
August	33,400	15,200	23,400	1,440,000
September	98,500	9,380	22,000	1,310,000
The year	98,500		23,500	17,000,000

NOTE.—Mean discharge for October and Nov. 1-11 estimated by comparison with records at Lees Ferry and Topock.

COLORADO RIVER NEAR TOPOCK, ARIZ.

LOCATION.—At lower end of a narrow section of Mohave Canyon, 3 miles below Topock, Mohave County. Prior to December 3, 1922, station was at mouth of Mohave Wash, about 1 mile above present location.

DRAINAGE AREA.—171,000 square miles.

RECORDS AVAILABLE.—February 1, 1917, to September 30, 1923.

GAGE.—Stevens water-stage recorder on left bank; inspected by D. A. Dudley and W. C. Chase, resident hydrographers. Zero of gage is 422.5 feet above sea level.

DISCHARGE MEASUREMENTS.—Made from cable about 20 feet upstream from gage.

CHANNEL AND CONTROL.—Channel is straight above and below gage. Banks are rock and have steep slopes. Bed is composed of sand and silt and is constantly shifting. The average depth of scour during high-water season of 1923 was about 12 feet. The width at the measuring section is 430 feet at high water. The control is indefinite.

EXTREMES OF DISCHARGE.—Maximum stage during year, from water-stage recorder, 18.6 feet at 8 a. m. June 3 (discharge, 103,000 second-feet); minimum discharge, 5,500 second-feet at 5 a. m. October 8.

1917–1923: Maximum stage recorded, 28.2 feet at 6 a. m. June 22, 1921 (discharge, 174,000 second-feet); minimum discharge, 4,100 second-feet on January 16, 1919.

DIVERSIONS.—Water is diverted from main river and tributaries above station for irrigation of about 1,500,000 acres.

ACCURACY.—Stage-discharge relation not permanent. During the year eight current-meter measurements were made at the old station during October and November and 112 measurements were made at the new station during the remainder of the year. Operation of water-stage recorders at both sites was satisfactory. Mean daily gage heights determined by inspecting recorder graphs. Daily discharge ascertained by shifting-control method. Records good.

Daily discharge, in second-feet, of Colorado River near Topock, Ariz., for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	6,100	6,120	9,000	6,250	8,200	8,300	8,500	25,500	94,500	63,800	26,000	17,300
2	6,000	6,380	9,000	6,750	8,150	8,800	8,500	24,000	100,000	65,000	26,500	21,200
3	5,900	6,500	8,500	6,800	8,100	9,250	8,800	23,200	102,000	65,000	29,300	26,000
4	5,800	6,620	8,100	6,700	7,700	9,550	9,250	23,200	102,000	60,800	30,000	27,700
5	5,800	6,750	8,650	6,750	7,650	9,450	11,500	24,700	98,200	57,500	27,400	27,000
6	5,700	6,750	8,850	7,100	7,400	9,400	16,900	28,500	95,700	54,700	24,500	18,800
7	5,700	6,620	8,850	7,500	7,250	9,100	21,200	32,700	92,700	51,900	23,100	16,000
8	5,600	6,750	9,400	7,650	7,400	8,800	24,100	34,800	91,800	48,900	22,500	14,900
9	5,700	7,000	9,600	7,550	7,750	8,650	24,700	38,800	94,200	46,600	22,400	14,000
10	5,800	7,480	8,850	6,950	7,850	8,500	23,200	43,300	93,900	43,500	22,200	13,800
11	6,000	8,000	8,550	6,750	7,550	8,850	21,500	49,000	87,000	43,200	20,800	13,300
12	6,220	8,200	8,300	6,650	7,200	9,200	20,900	51,400	83,000	43,200	20,000	12,300
13	6,480	8,400	8,650	6,700	6,900	9,350	20,200	55,700	81,500	43,400	19,500	11,800
14	6,350	8,600	8,850	7,000	7,150	9,000	18,800	62,200	77,000	43,400	20,000	12,300
15	6,220	8,600	8,850	7,150	7,150	8,200	19,100	65,400	74,500	43,900	24,400	11,500
16	6,220	8,400	9,700	7,400	6,750	8,750	20,900	69,200	75,400	43,400	28,600	13,000
17	6,000	8,600	9,300	7,700	6,350	9,750	22,300	73,300	77,800	43,000	30,500	13,500
18	5,900	8,800	9,100	7,400	6,150	9,550	22,100	72,200	80,000	41,300	34,600	12,100
19	6,000	9,200	8,400	7,600	6,700	9,200	21,500	69,700	87,600	40,300	32,000	12,000
20	6,150	9,700	7,950	7,600	6,650	9,350	22,600	63,200	93,500	41,200	31,400	23,000
21	6,300	10,000	7,100	7,750	6,900	9,300	24,100	56,800	96,500	38,300	33,700	74,700
22	6,550	9,200	7,700	7,750	6,900	8,600	25,300	55,200	96,800	37,800	35,000	82,500
23	6,320	8,700	9,150	7,350	7,100	8,950	25,600	56,200	93,800	36,000	35,700	59,200
24	6,000	8,000	9,650	7,500	7,800	8,950	26,600	58,700	88,400	36,000	32,000	35,300
25	5,800	7,550	9,650	7,450	8,500	8,750	28,500	62,600	81,100	37,500	27,600	23,700
26	5,700	7,400	9,200	7,050	8,700	8,750	30,900	67,500	76,200	38,100	25,100	18,000
27	5,700	7,500	8,650	6,950	8,500	8,000	32,000	70,500	72,200	37,300	23,300	15,300
28	5,700	8,000	7,900	6,800	8,100	8,100	32,700	73,700	68,600	34,000	22,000	15,600
29	5,700	8,400	7,150	7,000	-------	8,650	31,000	72,800	65,200	30,300	19,700	20,000
30	5,700	8,600	6,550	6,900	-------	8,900	28,400	74,700	63,300	28,700	18,200	21,800
31	6,000	-------	6,300	7,600	-------	8,750	-------	84,000	-------	27,500	18,400	-------

Monthly discharge of Colorado River near Topock, Ariz., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	6,550	5,600	5,970	367,000
November	10,000	6,120	7,890	469,000
December	9,700	6,300	8,560	526,000
January	7,750	6,250	7,160	440,000
February	8,700	6,150	7,450	414,000
March	9,750	8,000	8,930	549,000
April	32,700	8,500	21,700	1,290,000
May	84,000	23,200	53,700	3,300,000
June	102,000	63,300	86,100	5,120,000
July	65,000	27,500	44,000	2,710,000
August	35,700	18,400	26,000	1,600,000
September	82,500	11,500	23,300	1,390,000
The year	102,000	5,600	25,100	18,200,000

COLORADO RIVER AT YUMA, ARIZ.

LOCATION.—In NE. ¼ NE. ¼ sec. 35, T. 16 S., R. 22 E., San Bernardino base and meridian, 100 feet upstream from original Southern Pacific Railroad bridge and half a mile below highway bridge at Yuma, Yuma County. Since the change in channel on June 7, 1920, Gila River enters from the east 5 miles upstream from this station.

DRAINAGE AREA.—242,000 square miles (measured on map compiled from best available maps of the Colorado River basin).

RECORDS AVAILABLE.—April 1, 1878, to September 30, 1923. Gage heights only, prior to January 1, 1902.

GAGE.—Stevens long-distance water-stage recorder installed May 1, 1922. Sender in stilling well on left bank at the same point and datum as vertical staff gage formerly used. Continous recorder in office of Bureau of Reclamation. Sender and recorder inspected daily by D. Martinez. Zero of gage is 102.79 feet above mean sea level.

DISCHARGE MEASUREMENTS.—Made from cable 1,100 feet downstream from gage.

CHANNEL AND CONTROL.—Bed composed of shifting sand and silt; subject to much scour during high water. No well-defined control.

EXTREMES OF DISCHARGE.—Maximum mean daily discharge during the year, 100,000 second-feet on June 8; minimum mean daily discharge, 3,300 second-feet on October 18 and 24.

1902–1923: Maximum mean daily discharge, 240,000 second-feet January 22, 1916. Minimum mean daily discharge, 1,800 second-feet January 16, 1919.

DIVERSIONS.—Water is diverted for irrigation and power from main river and tributaries. The Yuma project of the United States Bureau of Reclamation diverts from right side of river at Laguna Dam 15 miles upstream. Canal siphons under river at Yuma between gage and cable. Wasteway from canal returns water to river on right side half a mile below cable. Imperial irrigation district diverts from river on right side 7 miles downstream from this station.

REGULATION.—Flow temporarily affected at times by sluicing at Laguna Dam. Storage on tributaries has very little effect on flow at this station.

ACCURACY.—During the year 162 discharge measurements were made at this station. Daily discharge determined by shifting-control method.

COOPERATION.—Complete records furnished by United States Bureau of Reclamation. The data have been slightly revised to conform to computation rules used by the United States Geological Survey.

Daily discharge, in second-feet, of Colorado River at Yuma, Ariz., for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	4,700	4,500	6,400	5,900	5,500	7,600	6,400	27,500	72,100	63,100	24,500	18,500
2	4,800	4,500	8,500	4,800	5,500	7,700	5,600	25,600	73,800	60,000	24,400	17,000
3	4,500	4,500	7,000	4,600	5,850	7,600	5,800	22,600	75,200	61,000	24,300	16,000
4	4,600	4,600	7,100	5,100	6,100	6,300	6,100	20,700	77,300	63,000	24,500	20,800
5	4,200	4,700	6,900	5,400	6,200	7,740	6,500	21,400	81,200	60,400	23,000	21,900
6	3,900	4,500	6,600	5,300	6,100	10,800	7,500	22,000	87,000	57,000	23,000	25,500
7	4,000	4,600	6,600	5,100	5,600	13,400	7,700	23,600	98,000	54,200	21,900	21,700
8	3,900	4,800	7,100	5,200	5,750	14,500	13,300	25,600	100,000	49,800	20,300	14,700
9	3,800	4,750	7,200	5,400	6,000	11,800	18,000	28,000	98,500	47,100	19,500	14,000
10	3,600	4,500	6,200	5,600	6,900	10,900	20,500	31,000	96,000	44,000	18,700	14,000
11	3,800	4,950	6,100	5,400	5,600	10,700	21,000	34,500	95,000	41,300	20,000	14,200
12	3,700	4,800	6,700	5,200	5,400	10,700	22,500	39,000	95,000	40,300	20,000	12,500
13	3,600	5,400	6,700	5,200	5,750	9,200	22,800	43,500	95,200	39,000	17,000	11,800
14	3,800	5,700	6,400	5,200	6,200	10,300	21,500	46,500	90,200	41,000	17,000	11,800
15	4,000	5,800	6,300	5,000	6,000	10,900	20,000	50,000	85,700	40,800	17,000	11,300
16	4,000	6,100	8,300	5,000	5,700	9,700	17,400	52,500	84,700	41,000	20,000	12,500
17	3,600	6,400	6,700	4,900	6,100	8,700	17,900	56,400	77,800	40,600	26,000	10,000
18	3,300	6,400	8,900	5,000	5,300	7,900	18,800	62,200	76,200	39,300	28,600	11,000
19	3,500	6,350	9,900	5,200	5,100	8,700	19,200	66,800	75,300	38,800	32,200	12,300
20	3,800	6,300	8,800	5,600	5,550	8,500	19,300	66,200	76,200	35,800	34,200	12,600
21	3,800	6,200	8,100	5,300	6,000	8,500	20,300	67,600	78,300	35,700	33,400	15,500
22	3,800	6,200	7,600	5,500	5,650	7,600	20,300	66,500	82,500	35,600	33,000	40,700
23	3,350	6,200	7,800	5,800	5,300	7,800	21,500	59,600	87,000	35,200	33,200	54,100
24	3,300	6,200	7,000	5,900	5,650	7,600	22,500	57,500	91,600	34,500	33,600	57,700
25	3,500	6,250	7,900	5,700	5,750	7,200	22,500	56,200	91,600	34,400	34,000	52,900
26	3,600	6,150	7,800	5,600	5,700	6,800	23,700	55,400	93,000	32,300	30,400	38,500
27	4,000	5,750	8,100	5,500	5,600	6,700	26,700	57,500	91,100	31,800	26,900	26,700
28	4,000	5,800	8,400	5,500	6,100	6,900	30,200	60,600	84,700	34,000	23,600	19,400
29	4,700	6,000	8,100	5,400	-------	7,000	29,000	65,300	78,200	34,000	21,000	15,000
30	3,900	5,600	7,900	5,500	-------	6,400	28,700	68,000	68,000	28,500	19,600	17,200
31	3,900	-------	6,450	5,300	-------	6,100	-------	69,600	-------	26,000	18,100	-------

Monthly discharge of Colorado River at Yuma, Ariz., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	4,800	3,300	3,900	240,000
November	6,400	4,500	5,480	326,000
December	9,900	6,100	7,400	455,000
January	5,900	4,600	5,330	328,000
February	6,900	5,100	5,780	321,000
March	14,500	6,100	8,780	540,000
April	30,200	5,600	18,100	1,080,000
May	69,600	20,700	46,800	2,880,000
June	100,000	68,000	85,200	5,070,000
July	63,100	26,000	42,600	2,620,000
August	34,200	17,000	24,600	1,510,000
September	57,200	10,000	21,400	1,270,000
The year	100,000	3,300	23,000	16,600,000

FRASER RIVER NEAR ARROW, COLO.

LOCATION.—In NE. ¼ sec. 4, T. 2 S., R. 75 W., a quarter of a mile from Vasquez siding on Denver & Salt Lake Railroad in Arapahoe National Forest, and 1½ miles southwest of Arrow, Grand County.

DRAINAGE AREA.—30 square miles (revised, measured on topographic map).

RECORDS AVAILABLE.—September 23, 1910, to September 30, 1923.

GAGE.—Friez water-stage recorder on left bank 300 feet upstream from old logging road crossing at Vasquez; inspected by forest ranger. During winter, readings taken from staff gage 1 mile upstream at railroad bridge.

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

CHANNEL AND CONTROL.—Bed composed of boulders and coarse gravel; fairly permanent. No well-defined control. Banks are not subject to overflow.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 2.33 feet at 4 a. m. June 16 (discharge, 442 second-feet); minimum discharge probably occurred during winter.

1911–1923: Maximum discharge recorded, 820 second-feet at 9 p. m. June 13, 1918; minimum discharge, 2 second-feet on March 30, 1912.

ICE.—Stage-discharge relation affected by ice.

DIVERSIONS.—Court decree for diversion of 53 second-feet across divide from headwaters of Fraser River into headwaters of Clear Creek. During 1923, 1,370 acre-feet were diverted. Below station, diversions for irrigation of 9,300 acres.

REGULATION.—Diurnal fluctuations during spring, caused by alternate melting and freezing of mountain snow. No artificial regulation.

ACCURACY.—Stage-discharge relation practically permanent for both regular and winter sections; affected by ice. Rating curves for both sections well defined. Operation of water-stage recorder satisfactory. Staff gage at winter section read to quarter-tenths once daily. Daily discharge ascertained by applying mean daily gage height to rating table. Records at regular section excellent, and at winter section fair.

Discharge measurements of Fraser River near Arrow, Colo., 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.*
May 3	P. V. Hodges	[a] 0.85	19.6	June 5	Robert Follansbee	1.57	191
3	do	.55	21.9	July 19	P. V. Hodges	1.11	103

[a] Made at winter station.

Daily discharge, in second-feet, of Fraser River near Arrow, Colo., for the year ending September 30, 1923

Day	Oct.	Nov.	Apr.	May	June	July	Aug.	Sept.
1	16	17		17	198	154	50	31
2	14	17		23	190	143	46	29
3	14	17	8	20	197	131	43	26
4	14	17		41	205	123	42	25
5	14	16		41	208	117	43	25
6	14	16	8	41	198	111	41	24
7	14	16	8	41	195	101	37	23
8	14	17	8	32	208	106	35	22
9	14		8	32	221	101	34	22
10	14		8	32	218	102	36	21
11	14		8	30	213	104	40	20
12	13		8	30	252	93	50	19
13	13		8	41	289	99	50	22
14	13		8	41	328	111	52	22
15	13	15	12	36	353	104	56	21
16	13		12	36	423	97	56	22
17	14		12	39	346	106	50	23
18	13		12	41	305	101	46	22
19	13		12	41	292	97	46	23
20	13		12	56	267	90	45	21

Daily discharge, in second-feet, of Fraser River near Arrow, Colo., for the year ending September 30, 1923—Continued

Day	Oct.	Nov.	Apr.	May	June	July	Aug.	Sept.
21	14	13	12	96	244	81	43	19
22	12	13	12	96	229	76	41	18
23	12	13	12	96	221	70	36	19
24	12	12	12	104	224	70	35	21
25	12	12	12	112	221	69	32	21
26	12	12	12	193	218	67	31	21
27	12	12	12	200	216	56	30	19
28	12	12	12	195	194	50	28	21
29	12	12	14	182	173	47	28	21
30	12	12	16	185	161	43	28	21
31	17	------	------	195	------	43	30	------

NOTE.—Records taken at winter section Oct. 22 to May 26. Stage-discharge relation affected by ice Nov. 9-20, 24, 25, Dec. 1 to Apr. 5. Braced figures represent mean discharge for periods indicated.

Monthly discharge of Fraser River near Arrow, Colo., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	17	12	13.3	818
November	17	------	14.5	863
December	------	------	9	553
January	------	------	8	492
February	------	------	8	444
March	------	------	7	430
April	16	------	10.3	613
May	200	17	76.3	4,690
June	423	161	240	14,300
July	154	43	92.4	5,680
August	56	28	40.6	2,500
September	31	18	22.1	1,320
The year	423	------	45.1	32,700

NOTE.—Monthly means estimated for December, January, February, and March.

WILLIAMS FORK NEAR PARSHALL, COLO.

LOCATION.—About sec. 36, T. 1 N., R. 79 W., at private bridge at Field ranch, 4 miles above mouth of river, and 4 miles south of Parshall, Grand County. Nearest tributary, Battle Creek, enters from west 2 miles below station.

DRAINAGE AREA.—185 square miles (measured on Forest Service atlas).

RECORDS AVAILABLE.—July 25, 1904, to September 30, 1923.

GAGE.—Bristol float type water-stage recorder at left end of bridge and referred to vertical staff on downstream side of bridge pier; inspected by F. A. Field.

DISCHARGE MEASUREMENTS.—Made from two-span bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of coarse gravel and small boulders; shifts. Control is gravel bar 50 feet downstream; slightly shifting at long intervals. Water will flow through small overflow channels at stage of 4.1 feet.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 4.38 feet 6 to 9 a. m. June 13 (discharge, 980 second-feet); minimum discharge probably occurred during winter.

1904-1923: Maximum stage recorded, 6.0 feet at 9.45 a. m. June 14, 1918 (discharge, 2,520 second-feet); minimum stage, 2.1 feet on November 7, 1919 (discharge, 15 second-feet).

ICE.—Stage-discharge relation affected by ice.

DIVERSIONS.—Water diverted for irrigation of 5,000 acres chiefly above station.

REGULATION.—Diurnal fluctuation during spring caused by alternate melting and freezing of mountain snow.

ACCURACY.—Stage-discharge relation permanent; affected by ice. Rating curve well defined below 1,500 second-feet. Operation of water-stage recorder satisfactory except during winter when staff gage was read twice daily. Daily discharge ascertained by applying to rating table mean daily gage height obtained by inspection of recorder graph. Records excellent except during winter, for which they are fair.

Discharge measurements of Williams Fork near Parshall, Colo., 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.*
Oct. 4	Robert Follansbee	2.54	48.4	May 2	P. V. Hodges	2.94	122
Feb. 20	M. B. Arthur	[a]2.70	44.4	July 20	do	3.66	398

[a] Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Williams Fork near Parshall, Colo., for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	58	51	44			34	40	124	612	604	244	145
2	57	52	43			35	39	124	604	596	196	140
3	55	42	40			36	37	130	580	556	185	126
4	52	52	38			38	33	148	612	532	150	126
5	50	48	42			39	35	176	580	516	145	130
				38	44							
6	52	40	42			39	40	213	580	500	142	122
7	54	44	47			40	39	167	580	486	135	105
8	54	42	47			40	44	176	660	524	130	91
9	51	42	44			39	48	210	740	532	140	76
10	52	34	42			45	44	220	780	580	161	89
11	54	34	36			40	50	252	740	516	192	91
12	52	34	38			43	61	185	865	472	192	95
13	54	32	40			48	63	150	955	444	240	100
14	55	34	40			37	66	138	910	444	358	113
15	55	38	42			41	69	135	865	458	328	102
				44	43							
16	57	45	34			50	72	130	865	406	316	104
17	57	51	32			43	74	145	865	406	252	107
18	55	47	33			45	71	161	820	370	224	113
19	55	44	34			41	55	199	820	322	213	128
20	54	47	35			42	58	228	820	295	202	122
21	55	55	36			40	55	260	820	260	188	124
22	55	61	38			39	44	270	780	260	179	135
23	51	51	39			39	52	252	780	240	167	142
24	47	55	40			33	60	248	780	240	170	132
25	47	55	37		39	40	68	346	780	260	155	117
				41								
26	47	64	34			43	76	430	780	290	150	117
27	48	58	40			38	89	500	780	236	142	109
28	45	58	44			40	86	516	740	228	135	126
29	50	44	42		------	40	86	486	700	199	130	98
30	45	44	40		-------	39	105	532	660	158	130	98
31	48	-------	38		-------	50	-------	548	------	192	148	------

NOTE.—Stage-discharge relation affected by ice Nov. 12 to Mar. 5; discharge determined from daily gage height, temperature records, and 1 measurement. Braced figures represent mean discharge for periods indicated.

Monthly discharge of Williams Fork near Parshall, Colo., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	58	45	52.3	3,220
November	64	32	46.6	2,770
December	47	32	39.4	2,420
January	----------	----------	41	2,520
February	----------	----------	42	2,330
March	50	33	40.5	2,490
April	105	33	58.6	3,490
May	548	124	252	15,500
June	955	580	748	44,500
July	604	158	391	24,000
August	358	130	188	11,600
September	145	76	114	6,780
The year	----------	----------	168	122,000

TROUBLESOME CREEK NEAR TROUBLESOME, COLO.

LOCATION.—In sec. 12, T. 1 N., R. 80 W., at highway bridge 1 mile north of Troublesome, Grand County. No tributary between station and mouth, 1½ miles below.

DRAINAGE AREA.—172 square miles.

RECORDS AVAILABLE.—April 26, 1922, to September 30, 1923. From July 22, 1904, to October 31, 1905, station maintained at practically same site.

GAGE.—Vertical staff fastened to piling near downstream side of left abutment; read by G. W. Lawrence.

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

CHANNEL AND CONTROL.—Bed composed of mud and gravel, probably shifting; control at gravel bar 75 feet downstream, which was permanent during year.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 3.32 feet at 7 a. m. May 27 and 28 (discharge, 672 second-feet); minimum stage, 1.54 feet at 5.30 p. m. October 4 (discharge, 15 second-feet).

1922–23: Maximum stage that of May 27 and 28; minimum stage, 1.28 feet at 5.30 p. m. July 30, 1922 (discharge, 1 second-foot).

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

DIVERSIONS.—Diversions above station for irrigation of 5,000 acres.

REGULATION.—None, except that diversion for irrigation uses most of summer flow.

ACCURACY.—Stage-discharge relation practically permanent. Rating curve well defined below 400 second-feet. Gage read to hundredths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table. Records good.

Discharge measurements of Troublesome Creek near Troublesome, Colo., 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.*
Oct. 4	Robert Follansbee	1.57	16.7	July 20	P. V. Hodges	1.83	55
May 2	P. V. Hodges	2.38	180	Aug. 13	J. H. Baily [a]	1.74	39.6
June 6	Robert Follansbee	2.65	294				

[a] State hydrographer.

Daily discharge, in second-feet, of Troublesome Creek near Troublesome, Colo., for the year ending September 30, 1923

Day	Oct.	Nov.	Apr.	May	June	July	Aug.	Sept.
1	18	25	------	181	495	46	59	26
2	16	27	------	203	440	42	43	25
3	16	27	------	207	412	38	40	27
4	16	31	------	244	412	38	37	25
5	16	31	------	305	358	38	38	25
6	16	------	------	330	305	30	43	24
7	17	------	------	305	262	30	40	22
8	16	------	------	330	276	36	35	22
9	16	------	------	358	495	40	35	22
10	20	------	------	412	550	61	35	22
11	18	------	------	440	522	57	43	22
12	16	------	------	358	468	57	40	24
13	17	------	------	305	440	45	38	22
14	16	------	------	280	412	42	42	22
15	16	------	91	271	330	64	38	25
16	16	------	123	244	305	86	42	24
17	18	------	138	240	276	66	38	22
18	18	------	149	305	235	64	38	24
19	18	------	167	305	203	61	37	32
20	18	------	126	412	178	52	38	32
21	18	------	116	468	160	53	42	26
22	20	------	102	468	138	43	38	25
23	19	------	91	468	123	38	40	25
24	18	------	80	495	111	30	35	25
25	18	------	84	550	98	27	32	25
26	18	------	116	605	231	35	30	25
27	18	------	133	660	468	28	30	25
28	18	------	146	632	72	28	27	27
29	22	------	149	550	61	28	26	27
30	26	------	184	495	57	26	25	32
31	22	------	------	468	------	26	27	------

Monthly discharge of Troublesome Creek near Troublesome, Colo., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	26	16	17.9	1,100
November 1–5	31	25	28.2	277
April 15–30	184	80	125	3,970
May	660	181	384	23,600
June	550	57	296	17,600
July	86	26	43.5	2,670
August	59	25	37.1	2,280
September	32	22	25.0	1,490

BLUE RIVER AT DILLON, COLO.

LOCATION.—In sec. 18, T. 5 S., R. 77 W., at highway bridge on edge of Dillon, Summit County. Nearest tributaries, Snake River and Tenmile Creek, enter a short distance below.

DRAINAGE AREA.—129 square miles (revised).

RECORDS AVAILABLE.—October 15, 1910, to September 30, 1923.

GAGE.—Gurley water-stage recorder installed April 21, 1920, referred to vertical staff on right abutment of bridge; inspected by Forest Service ranger.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of compact gravel upon which lodges débris from hydraulic dredges near Breckenridge. Control is riffle 50 feet downstream; shifts at intervals. Banks not subject to overflow.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 3.4 feet at 6 a.m. June 17 (discharge, 1,000 second-feet); minimum discharge occurred during winter.

1911–1923: Maximum stage recorded, 4.35 feet June 2, 1914 (discharge, 1,180 second-feet); minimum discharge, 14 second-feet on January 30 and February 9, 1915.

ICE.—Stage-discharge relation affected by ice.

DIVERSIONS.—Except for a small diversion across Boreas Pass, practically no diversions above station, which do not return water to river.

REGULATION.—Diurnal fluctuation during spring, caused by alternate melting and freezing of mountain snow. No artificial regulation.

ACCURACY.—Stage-discharge relation not permanent. Rating curve used October 1 to November 5 and curve used April 18 to September 30 are both fairly well defined. Operation of water-stage recorder satisfactory except as shown in footnote to daily-discharge table. Daily discharge acertained by applying to rating table mean daily gage height obtained by inspection of recorder graph. Records good.

Discharge measurements of Blue River at Dillon, Colo., during the year ending September 30, 1923

Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*
May 12	Robert Follansbee	2.14	218
June 7	....do....	2.74	512
July 31	P. S. Parker	2.08	200

Daily discharge, in second-feet, of Blue River at Dillon, Colo., for the year ending September 30, 1923

Day	Oct.	Nov.	Apr.	May	June	July	Aug.	Sept.
1	61	50	----	75	515	545	210	113
2	59	49	----	84	545	515	225	113
3	59	50	----	98	545	515	210	113
4	59	50	----	110	578	485	195	110
5	58	50	----	131	545	485	180	110
6	58	----	----	144	515	455	165	106
7	57	----	----	155	515	455	155	101
8	60	----	----	162	545	515	148	96
9	57	----	----	175	545	515	142	96
10	56	----	----	210	515	485	140	93
11	56	----	----	258	515	485	148	92
12	55	----	----	240	515	515	172	88
13	55	----	----	195	578	515	210	87
14	54	----	----	170	645	515	240	87
15	54	----	----	160	720	545	258	88
16	54	----	----	146	920	515	225	90
17	54	----	----	140	920	455	225	92
18	53	----	43	144	840	425	210	92
19	54	----	45	170	680	415	195	90
20	53	----	44	210	760	420	195	92
21	53	----	42	258	840	455	180	90
22	53	----	40	275	680	398	170	87
23	52	----	38	258	645	345	172	87
24	52	----	38	240	690	298	155	84
25	51	----	40	298	680	298	148	84

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Daily discharge, in second-feet, of Blue River at Dillon, Colo., for the year ending September 30, 1923—Continued

Day	Oct.	Nov.	Apr.	May	June	July	Aug.	Sept.
26	51	--------	50	398	680	320	142	82
27	51	--------	55	455	680	275	133	81
28	51	--------	60	485	645	258	127	80
29	51	--------	65	485	578	234	121	79
30	50	--------	69	425	578	210	115	80
31	50	--------	--------	455	--------	195	113	--------

NOTE.—No gage-height record Apr. 19–29, July 19–20, Sept. 17–18; discharge based on comparison with flow of Eagle River at Redcliff.

Monthly discharge of Blue River at Dillon, Colo., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	61	50	54.5	3,350
November 1–5	50	49	49.8	494
April 18–30	69	38	48.4	1,250
May	485	75	232	14,300
June	920	515	638	38,000
July	545	195	421	25,900
August	258	113	175	10,800
September	113	79	92.8	5,520

EAGLE RIVER AT REDCLIFF, COLO.

LOCATION.—In sec. 29, T. 6 S., R. 80 W., at footbridge in Redcliff, Eagle County. Nearest tributary, Turkey Creek, enters 100 yards below station. Homestake Creek enters 1 mile below.

DRAINAGE AREA.—74 square miles (measured on topographic map).

RECORDS AVAILABLE.—January 8, 1911, to September 30, 1923.

GAGE.—Chain gage on downstream side of footbridge; read by forest ranger. Staff gage in same section and referred to same datum, read during high water.

DISCHARGE MEASUREMENTS.—Made from highway bridge 300 yards above station or by wading.

CHANNEL AND CONTROL.—Bed composed of boulders and is very rough. Control short distance below gage; shifting at long intervals. Banks not subject to overflow.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 3.35 feet at 8 a. m. June 16 (discharge, 608 second-feet); minimum stage, 0.20 foot on several days in October (discharge, 5 second-feet).

1911–1923: Maximum stage, 4.0 feet June 5, 1912 (discharge, 1,010 second-feet); minimum stage, 0.01 foot at 7 a. m. October 15, 1917 (discharge 1 second-foot).

ICE.—Stage-discharge relation not affected by ice except for occasional short periods.

DIVERSIONS.—During 1923, 2,210 acre-feet diverted from headwaters of Eagle River to Arkansas River basin. Very little land irrigated above gaging station.

REGULATION.—Diurnal fluctuation during spring, caused by alternate melting and freezing of mountain snow. Filling of Pando ice pond in fall reduces flow for a few days.

ACCURACY.—Stage-discharge relation not permanent; affected by ice for short periods. 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 except during winter and period of missing gage heights, for which they are fair.

Discharge measurements of Eagle River at Redcliff, Colo., during the year ending September 30, 1923

Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*
June 27	Robert Follansbee	2.25	201
July 29	P. S. Parker	1.40	52
Sept. 24	Robert Follansbee	1.14	28.2

Daily discharge, in second-feet, of Eagle River at Redcliff, Colo., for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	17	10	11	9	17	16	17	89	380	142	55	28
2	16	15	14	10	15	16	16	92	400	138	58	32
3	15	15	14	10	15	17	18	101	420	133	51	28
4	16	15	14	11	17	16	17	109	430	133	49	40
5	15	14	14	11	17	17	16	110	420	122	44	28
6	15	15	8	12	17	16	19	120	400	112	40	25
7	15	15	8	13	17	16	18	125	400	110	40	22
8	16	15	8	13	17	17	19	130	420	117	39	20
9	15	15	8	14	17	16	19	150	430	120	37	20
10	14	13	8	15	17	17	20	170	420	120	39	20
11	15	12	8	16	17	17	23	200	420	120	43	22
12	15	12	11	16	17	18	26	180	420	114	43	20
13	16	12	12	14	17	17	27	170	428	104	48	32
14	16	14	12	14	17	17	26	140	468	92	50	20
15	16	14	14	14	18	15	30	130	488	99	56	20
16	16	12	14	16	18	16	33	120	528	93	57	25
17	17	15	12	16	18	16	48	110	488	92	58	25
18	15	14	14	16	18	16	65	120	408	89	51	25
19	14	12	14	17	17	15	75	130	369	90	48	25
20	15	12	12	16	17	14	64	170	408	85	44	20
21	15	12	14	16	17	14	57	210	408	86	44	25
22	13	14	14	16	18	15	50	240	279	86	41	25
23	13	15	14	16	18	16	44	240	215	88	41	25
24	13	14	14	16	18	18	44	200	246	80	39	26
25	6	14	12	14	18	16	50	230	231	85	37	26
26	6	12	14	13	17	17	56	280	215	82	36	26
27	5	14	13	12	17	18	70	330	209	68	35	26
28	5	14	13	14	16	17	80	370	169	59	34	25
29	5	14	11	17	------	18	86	360	161	58	31	25
30	6	12	10	17	------	16	89	330	150	52	25	26
31	7	------	10	17	------	15	------	350	------	51	22	------

NOTE.—Stage-discharge relation affected by ice for short periods during winter; discharge estimated. Gage not read May 8 to June 12; discharge determined by comparison with flow of neighboring streams. Shifting-control method used June 13 to Sept. 30

Monthly discharge of Eagle River at Redcliff, Colo., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	17	5	13.0	799
November	15	10	13.5	803
December	14	8	11.9	732
January	17	9	14.2	873
February	18	15	17.1	950
March	18	14	16.3	1,000
April	89	16	40.7	2,420
May	370	89	187	11,500
June	528	150	361	21,500
July	142	51	97.4	5,990
August	58	22	43.1	2,650
September	40	20	25.2	1,500
The year	528	5	70.1	50,700

EAGLE RIVER AT EAGLE, COLO.

LOCATION.—In sec. 33, T. 4 S., R. 84 W., at left bank 500 feet below highway bridge at Eagle, Eagle County. Nearest tributary, Brush Creek, enters three-quarters of a mile below station.

DRAINAGE AREA.—650 square miles (revised; measured on map of Colorado, scale 1:500,000).

RECORDS AVAILABLE.—January 17, 1911, to September 30, 1923. March 12, 1905, to February 10, 1907, station was maintained short distance below mouth of Brush Creek.

GAGE.—Gurley water-stage recorder; inspected by forest ranger.

DISCHARGE MEASUREMENTS.—Made from private bridge half a mile downstream.

CHANNEL AND CONTROL.—Bed composed of boulders. Control at rapids in which gage intake is located; somewhat shifting. Banks not subject to overflow.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 4.62 feet at 8 a. m. June 16 (discharge, 4,760 second-feet); minimum discharge occurred during winter.

1911-1923: Maximum discharge, 6,760 second-feet, June 3, 1914: minimum discharge recorded, 61 second-feet January 18, 1911.

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

DIVERSIONS.—Diversions for the irrigation of 2,900 acres between Redcliff and Eagle and for 13,000 acres from tributaries.

REGULATION.—Diurnal fluctuation during spring caused by alternate melting and freezing of mountain snow. No artificial regulation.

ACCURACY.—Stage-discharge relation not permanent. Rating curves fairly well defined. Operation of water-stage recorder satisfactory except as explained 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.

Discharge measurements of Eagle River at Eagle, Colo., 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.*
Nov. 7	M. B. Arthur	0.66	122	June 26	Robert Follansbee	3.84	3,170
Jan. 20	do	.66	120	July 30	P. S. Parker	1.90	604
Mar. 11	T. J. Watkins	.64	186	Sept. 26	Robert Follansbee	1.14	272
Apr. 19	Robert Follansbee	1.24	392				

Daily discharge, in second-feet, of Eagle River at Eagle, Colo., for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	154	128	125	180	274	520	3,860	2,340	770	372
2	154	130	130	185	242	600	3,860	2,140	785	394
3	152	132	128	190	225	630	4,070	2,000	785	394
4	147	147	126	188	211	700	4,070	1,940	690	360
5	144	130	121	198	200	950	3,470	1,940	642	332
6	144	110	132	196	245	1,150	3,200	1,810	616	332
7	144	126	152	178	270	1,140	3,040	1,810	554	332
8	149	135	140	186	236	1,100	3,200	2,140	480	321
9	154	132	135	183	233	1,200	3,200	2,000	460	310
10	154	135		188	286	1,300	2,790	2,140	480	300
11	152	126		186	258	1,450	2,870	1,810	622	290
12	149	117		167	292	1,350	3,040	1,690	648	280
13	147	115		162	302	1,230	3,380	1,570	808	260
14	149	126		181	278	1,070	3,660	1,630	1,080	255
15	149	128		165	267	992	3,860	1,520	1,130	255
16	149	142		165	278	906	4,280	1,430	1,080	260
17	148	147		172	292	922	4,280	1,360	992	264
18	146	132		165	336	1,060	3,660	1,280	914	267
19	145	128		162	394	1,370	3,380	1,320	880	298
20	143	126		186	416	1,640	3,470	1,550	816	317
21	142	124		178	380	1,880	3,860	1,310	636	313
22	140	123		176	352	1,750	3,200	1,140	636	298
23	140	122		169	320	1,690	2,870	1,120	610	288
24	132	121		169	300	1,690	3,200	1,050	578	281
25	135	120		183	280	2,410	3,290	906	536	278
26	126	120		176	290	3,040	3,290	974	486	274
27	121	121		176	310	3,560	3,290	856	450	264
28	121	122		190	400	3,660	2,950	755	407	267
29	126	123		222	475	3,380	2,630	697	380	274
30	126	124		248	500	3,120	2,480	629	356	274
31	123			278		3,660		584	364	

NOTE.—Recorder not in operation Oct. 16–21, Nov. 20 to Dec. 1, Apr. 23–28, Apr. 30 to May 5, May 7–11, Sept. 9–16; discharge determined by comparison with Colorado River at Glenwood Springs. Shifting-control method used July 1 to Sept. 30.

Monthly discharge of Eagle River at Eagle, Colo., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	154	121	142	8,730
November	147	110	127	7,560
December 1–9	152	121	132	2,360
March	278	162	185	11,400
April	500	200	303	18,000
May	3,660	520	1,650	101,000
June	4,280	2,480	3,400	202,000
July	2,340	584	1,470	90,400
August	1,130	356	667	41,000
September	394	255	300	17,900

ROARING FORK AT GLENWOOD SPRINGS, COLO.

LOCATION.—In sec. 9, T. 6 S., R. 89 W., 1,500 feet above mouth of river in Glenwood Springs, Garfield County.

DRAINAGE AREA.—1,460 square miles (revised; measured on map of Colorado, scale, 1:500,000).

RECORDS AVAILABLE.—April 6, 1906, to September 30, 1909; September 21, 1910, to September 30, 1923.

GAGE.—Gurley water-stage recorder; referred to inclined staff on left bank 800 feet above highway bridge; inspected by C. H. Oberly.

DISCHARGE MEASUREMENTS.—Made from single-span highway bridge.

CHANNEL AND CONTROL.—Bed composed of boulders and coarse gravel; shifting at long intervals. No well-defined control. Banks not subject to overflow.

EXTREMES OF DISCHARGE.—Maximum stage during year, from water-stage recorder, 5.85 feet at 8 a. m. June 17 (discharge, 9,580 second-feet); minimum stage, 0.72 foot at 10 p. m. February 24 (discharge, 320 second-feet).

1906–1909; 1910–1923: Maximum discharge, 17,600 second-feet June 14, 1918, and June 14, 1921; minimum discharge, 270 second-feet on January 23, 1911.

ICE.—Stage-discharge relation not seriously affected by ice except for short periods.

DIVERSIONS.—Water diverted for irrigation of 8,700 acres by Roaring Fork and 25,000 acres by tributaries, all above station.

REGULATION.—Diurnal fluctuation during spring, caused by alternate melting and freezing of mountain snow. No artificial regulation.

ACCURACY.—Stage-discharge relation practically permanent, except as affected by ice. Rating curve well defined. Operation of water-stage recorder satisfactory except for short periods. Daily discharge ascertained by applying to rating table, mean daily gage height obtained by inspection of recorder graph. Records excellent, except during period of ice, for which they are good.

Discharge measurements of Roaring Fork at Glenwood Springs, Colo., 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.*
Nov. 8	M. B. Arthur	1.09	565	Apr. 18	Robert Follansbee	1.64	966
Jan. 18	do	a 1.10	460	June 2	do	4.90	6,940
Mar. 12	T. J. Watkins	.81	372	Sept. 25	do	1.65	918

a Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Roaring Fork at Glenwood Springs, Colo., for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	699	571	536			392	606	1,120	6,500	6,080	1,840	1,260
2	692	564	564			432	599	1,150	6,640	5,800	2,240	1,140
3	684	578	578			439	578	1,350	7,300	5,010	2,040	1,060
4	677	635	571			419	564	1,650	7,450	4,880	2,040	1,030
5	670	599	536	490	358	385	543	1,970	7,400	5,010	1,900	1,020
6	670	571	522			352	571	2,400	7,000	4,760	1,650	998
7	663	578	571			385	656	2,450	6,400	4,880	1,590	989
8	663	599	543			352	677	2,400	6,100	5,530	1,420	929
9	663	606	536	494	367	372	642	2,590	5,270	4,520	1,360	887
10	649	614	529	501		366	649	2,740	4,760	4,760	1,470	847

Daily discharge, in second-feet, of Roaring Fork at Glenwood Springs, Colo., for the year ending September 30, 1923—Continued

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
11	649	614	571			366	684	3,070	4,760	5,010	1,440	807
12	649	606	543	487		359	778	2,820	5,270	4,400	1,500	791
13	656	599	550			350	902	3,590	5,940	4,180	1,700	799
14	649	599	564		367	370	880	2,240	6,920	4,400	2,000	815
15	649	606	536	487		390	850	2,040	7,620	4,180	2,250	815
16	649	592	550	508		410	836	1,900	8,600	3,850	2,000	847
17	642	585	529			426	865	1,970	8,600	3,640	1,900	871
18	628	564	474		352	412	972	2,170	7,480	3,440	1,840	920
19	621	557	480		352	412	1,110	2,900	6,920	3,440	1,970	938
20	614	536	585	480	359	439	1,120	4,290	7,200	3,440	1,900	946
21	606	550	529		352	419	972	4,880	6,920	3,440	1,600	938
22	614	536	508		333	412	880	5,140	6,640	3,160	1,600	912
23	606	536	529		340	399	799	4,180	6,500	2,980	1,550	904
24	599	536	564		346	412	741	4,400	6,640	2,660	1,450	972
25	592	522	564		372	494	713	6,220	7,200	2,440	1,280	972
26	585	522	578		406	446	756	7,200	7,480	2,380	1,260	938
27	578	529	557	412	372	467	850	7,600	7,200	2,170	1,170	920
28	578	550	564		385	487	910	6,220	6,640	2,040	1,110	1,020
29	571	543	569		-------	515	956	5,800	6,360	1,900	1,050	998
30	564	525	564		-------	536	1,100	5,530	6,220	1,780	1,050	998
31	571	-------	522		-------	578	-------	5,940	-------	1,650	1,090	-------

NOTE.—Recorder not in operation Mar. 12–16, May 6–8, 27, June 3–9, Aug. 12–17, 21–24; discharge determined by comparison with flow of Colorado River at Glenwood Springs. Stage-discharge relation affected by ice Jan. 1 to Feb. 17; discharge determined by daily gage heights, temperature records, and 1 measurement. Braced figures represent mean discharge for periods indicated.

Monthly discharge of Roaring Fork at Glenwood Springs, Colo., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	699	564	632	38,900
November	635	522	571	34,000
December	578	474	546	33,600
January	----------	----------	468	28,800
February	406	----------	362	20,100
March	578	350	419	25,800
April	1,120	543	792	47,100
May	7,600	1,120	3,550	218,000
June	8,600	4,760	6,730	400,000
July	6,080	1,650	3,800	234,000
August	2,250	1,050	1,620	99,600
September	1,260	791	943	56,100
The year	8,600	----------	1,710	1,240,000

PARACHUTE CREEK AT GRAND VALLEY, COLO.

LOCATION.—In NW. ¼ sec. 12, T. 7 S., R. 96 W., at Aplin ranch, half a mile northwest of Grand Valley, Garfield County. No tributary between station and mouth, 1 mile below.

DRAINAGE AREA.—196 square miles (measured on map of Colorado, scale 1:500,000).

RECORDS AVAILABLE.—April 7, 1921, to September 30, 1923.

GAGE.—Vertical staff attached to side of left abutment of private bridge; read by R. H. Aplin.

DISCHARGE MEASUREMENTS.—Made from single-span bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of compact silt on shale rock. Control at rapids 200 feet downstream; slightly shifting during high water. Banks not subject to overflow

EXTREMES OF DISCHARGE.—Maximum stage recorded, 1.95 feet on May 10, 11, 20, and 21 (discharge, 425 second-feet); minimum stage, 0.0 foot from November 19–26 and for several weeks during summer (discharge, 10 second-feet).

1921–1923: Maximum discharge, 795 second-feet, May 20 and 21, 1922; minimum discharge, 6 second-feet during the summer of 1922.

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

DIVERSIONS.—Diversions for the irrigation of 2,000 acres, all below station.

REGULATION.—Diurnal fluctuation during spring due to alternate melting and freezing of mountain snow. No artificial regulation.

COOPERATION.—Complete records furnished by State engineer.

Daily discharge, in second-feet, of Parachute Creek at Grand Valley, Colo., for the year ending September 30, 1923

Day	Oct.	Nov.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	12	18	15	24	142	155	18	10	10
2	12	18	18	27	168	155	14	10	10
3	12	18	24	32	220	130	13	10	10
4	12	18	20	24	265	118	11	10	10
5	12	18	15	21	299	118	10	10	10
6	12	18	14	24	356	93	10	10	10
7	12	18	18	27	384	93	12	10	10
8	14	18	20	27	404	78	11	10	10
9	14	18	18	27	404	78	20	10	10
10	14	15	15	29	412	64	24	10	10
11	12	15	15	34	425	61	27	10	10
12	12	15	15	45	364	51	18	10	10
13	12	14	16	50	347	47	11	10	10
14	12	14	15	54	310	38	10	10	10
15	12	14	16	54	292	42	10	10	10
16	12	14	16	61	275	36	10	10	10
17	12	14	16	61	299	42	10	10	10
18	12	14	20	78	372	36	10	10	10
19	14	10	20	93	396	36	10	10	11
20	15	10	15	97	396	34	10	10	12
21	15	10	15	97	412	34	10	10	12
22	15	10	18	93	347	34	10	10	12
23	18	10	18	73	299	32	10	10	18
24	18	10	18	88	310	32	10	10	27
25	18	10	18	75	310	29	10	10	20
26	18	10	18	78	285	27	14	10	20
27	18	12	18	82	252	26	11	10	20
28	18	12	24	88	242	24	10	10	20
29	18	12	24	97	211	18	10	10	20
30	15	12	24	142	190	18	10	10	15
31	15	------	24	------	174	------	10	10	------

Monthly discharge of Parachute Creek at Grand Valley, Colo., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	18	12	14.1	867
November	18	10	14.0	833
March	24	15	18.1	1,110
April	142	21	60.2	3,580
May	425	142	308	18,900
June	155	18	59.3	3,530
July	27	10	12.1	744
August	10	10	10.0	615
September	27	10	12.9	768

ROAN CREEK NEAR DE BEQUE, COLO.

LOCATION.—On line between secs. 10 and 15, T. 7 S., R. 98 W., at highway bridge 11 miles north of De Beque, Mesa County. Nearest tributary, Kimball Creek, enters half a mile above.

DRAINAGE AREA.—210 square miles (measured on base map of Colorado; scale 1: 500,000).

RECORDS AVAILABLE.—April 8, 1921, to September 30, 1923.

GAGE.—Chain gage attached to downstream side of bridge; read by J. D. Nethery.

DISCHARGE MEASUREMENTS.—Made from single-span bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of compact mud and gravel; shifting during high water. No well-defined control. Banks not subject to overflow.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 3.77 feet at 6.30 a. m. May 12 (discharge, 980 second-feet); minimum stage, 1.68 feet at 7.30 a. m. March 6 (discharge, 10 second-feet).

1921–1923: Maximum discharge, 1,110 second-feet, May 21, 1922; minimum stage, 1.67 feet at 7.30 p. m. August 4, 1922 (discharge, 8 second-feet).

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

DIVERSIONS.—Diversions for irrigation of 2,200 acres, chiefly below station; also diversions for 3,400 acres from tributaries.

REGULATION.—Diurnal fluctuation during spring from alternate melting and freezing of mountain snow. No artificial regulation.

COOPERATION.—Complete records furnished by State engineer

Daily discharge, in second-feet, of Roan Creek near De Beque, Colo., for the year ending September 30, 1923

Day	Oct.	Nov.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	38	38	28	54	266	328	82	30	60
2	37	38	37	52	290	312	82	28	40
3	37	41	43	50	330	297	80	28	40
4	36	38	26	43	379	286	78	28	45
5	36	40	27	46	471	272	69	26	45
6	36	38	17	49	528	248	61	26	46
7	34	38	26	49	584	241	58	28	43
8	37	36	30	47	709	215	58	28	43
9	38	36	34	49	614	208	56	34	43
10	30	38	30	52	697	191	60	34	43
11	30	37	29	52	753	191	64	39	43
12	30	38	22	72	883	169	61	37	43
13	30	33	26	94	709	158	64	38	42
14	28	26	28	99	584	161	61	44	40
15	28	26	24	102	464	148	64	43	40
16	28	25	18	114	440	134	61	43	40
17	27	28	28	125	407	136	58	40	40
18	29	28	18	154	452	129	56	38	42
19	30	28	26	177	563	124	51	39	50
20	33	28	26	180	674	115	50	40	40
21	36	29	25	180	674	109	48	45	40
22	33	30	24	154	570	111	46	51	38
23	33	28	25	139	549	111	48	48	56
24	30	30	26	130	549	106	48	48	61
25	30	29	27	130	528	111	51	48	45
26	33	30	27	142	502	106	34	48	45
27	38	29	26	160	502	102	36	44	43
28	41	29	40	180	440	92	34	39	42
29	41	29	38	202	407	86	32	36	40
30	38	30	40	257	378	84	32	43	43
31	38	------	41	------	340	------	30	43	------

Monthly discharge of Roan Creek near De Beque, Colo., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	41	27	33.6	2,070
November	41	25	32.4	1,930
March	41	17	28.5	1,750
April	257	43	111	6,600
May	883	266	524	32,200
June	328	84	169	10,100
July	82	30	55.3	3,400
August	51	26	38.2	2,350
September	61	38	44.1	2,620

TAYLOR RIVER AT ALMONT, COLO.

LOCATION.—In sec. 22, T. 51 N., R. 1 E., at highway bridge in Almont, Gunnison County, 300 feet above junction of Taylor and East Rivers.

DRAINAGE AREA.—440 square miles (revised; measured on map of Colorado, scale 1:500,000).

RECORDS AVAILABLE.—June 27, 1910, to September 30, 1923.

GAGE.—Bristol float type water-stage recorder on downstream end of center pier; inspected by J. W. Brittain.

DISCHARGE MEASUREMENTS.—Made from two-span bridge.

CHANNEL AND CONTROL.—Bed composed of small boulders and coarse gravel; slightly shifting. No well-defined control.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 4.1 feet from 7 to 9 a. m. June 16 and 4 to 7 a. m. June 17 (discharge, 2,270 second-feet); minimum discharge occurred during winter.

1910–1923: Maximum discharge, 3,760 second-feet, June 9, 1920; minimum stage, 1.2 feet, several days during August, 1913 (discharge, 50 second-feet).

ICE.—Stage-discharge relation affected by ice.

DIVERSIONS.—Diversions for the irrigation of 1,800 acres.

REGULATION.—None.

ACCURACY.—Stage-discharge relation not permanent; affected by ice. Rating curve well defined; method of shifting control used March 8 to September 30. Operation of water-stage recorder satisfactory except from October 29 to April 29 and August 6 to September 30, during which periods staff gage was read twice daily. Daily discharge ascertained by applying mean daily gage height to rating table. Records good.

Discharge measurements of Taylor River at Almont, Colo., 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.*
Mar. 8	T. J. Watkins	1.95	128	July 23	P. S. Parker	2.69	647
May 31	Robert Follansbee	3.73	1,580	Sept. 23	Robert Follansbee	2.22	315
June 25	do	3.73	1,790				

Daily discharge, in second-feet, of Taylor River at Almont, Colo., for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	163	172	142		95	256	1,730	1,340	589	362
2	166	172	142		95	314	1,740	1,240	735	362
3	163	172	137		93	387	1,780	1,140	605	362
4	166	182	137		91	465	1,800	1,120	549	362
5	185	179	137	125	91	605	1,740	1,070	494	350
6	179	172	137		95	630	1,640	1,030	490	320
7	175	172	134		95	622	1,630	1,170	475	303
8	175	172	131	124	100	708	1,620	1,180	460	303
9	169	172	131	121	100	807	1,430	1,000	440	292
10	163	172	129	121	104	906	1,270	1,020	470	292
11	166	172	126	119	109	861	1,290	1,180	480	281
12	172	172	126	109	121	735	1,560	1,050	500	281
13	175	169	126	104	140	664	1,670	942	530	281
14	172	172	121	109	140	573	1,850	1,150	600	281
15	166	172	119	121	142	541	1,910	980	750	281
16	166	172	116	121	145	533	2,030	825	740	281
17	163	172	116	126	145	525	1,980	816	760	320
18	159	172	116	100	159	565	1,740	816	810	413
19	169	169	116	74	205	639	1,590	906	834	450
20	166	172	116	91	193	771	1,740	798	573	413
21	159	172		91	175	888	1,760	807	494	375
22	153	166		82	166	825	1,590	690	437	331
23	159	166		91	148	726	1,530	605	432	314
24	156	159		78	175	861	1,670	565	426	310
25	156	153		78	175	1,160	1,700	541	426	300
26	166	153	120	87	205	1,290	1,740	549	413	310
27	182	153		95	205	1,610	1,840	541	400	315
28	182	153		95	209	1,720	1,590	525	400	318
29	185	148		100	205	1,600	1,480	486	387	320
30	172	145		100	266	1,550	1,380	437	375	320
31	172	-------		100	-------	1,660	-------	450	362	-------

NOTE.—Recorder not in operation Aug. 6-18 and Sept. 24-29; discharge determined by comparison with flow of Gunnison River near Gunnison. Stage-discharge relation affected by ice Dec. 21 to Mar. 7. Braced figures represent estimated mean discharge for periods indicated.

Monthly discharge of Taylor River at Almont, Colo., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	185	153	168	10,300
November	182	145	167	9,940
December	142	----------	125	7,690
March	126	78	107	6,580
April	266	91	146	8,690
May	1,720	256	839	51,600
June	2,030	1,270	1,670	99,400
July	1,340	437	870	53,500
August	834	362	530	32,600
September	450	281	327	19,500

GUNNISON RIVER NEAR GUNNISON, COLO.

LOCATION.—In sec. 3, T. 49 N., R. 1 W., at highway bridge 2 miles southwest of Gunnison, Gunnison County. Nearest tributary, Tomichi Creek, enters 1 mile below.

DRAINAGE AREA.—1,010 square miles (measured on map in Hayden's atlas).

RECORDS AVAILABLE.—November 27, 1910, to November 30, 1914; April 27, 1916, to September 30, 1923.

GAGE.—Chain gage on downstream side of bridge; read by C. W. Chinery.

DISCHARGE MEASUREMENTS.—Made from single-span bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of coarse gravel and small boulders. Control at well-defined rapids below bridge; somewhat shifting. Banks not subject to overflow except during extreme high stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 4.5 feet at 7 a. m. May 28 (discharge, 5,330 second-feet); minimum discharge occurred during winter.

1910–1914; 1916–1923: Maximum discharge, 11,400 second-feet at 8 a. m. June 13, 1918; minimum discharge, 126 second-feet on January 2, 1919.

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

DIVERSIONS.—Diversions for the irrigation of 8,800 acres between this station and forks at Almont.

REGULATION.—None.

ACCURACY.—Stage-discharge relation not permanent; affected by ice. Rating curve well defined; method of shifting control used March 30 to September 30. Gage read to half-tenths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table. Records fair.

Discharge measurements of Gunnison River near Gunnison, Colo., 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.*
Jan. 16	M. B. Arthur	[a] 1.87	194	May 31	Robert Follansbee	3.89	4,110
Mar. 9	T. J. Watkins	[a] 1.81	179	July 24	P. S. Parker	2.56	1,540
Apr. 21	Robert Follansbee	1.76	698	Sept. 23	Robert Follansbee	1.77	581

[a] Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Gunnison River near Gunnison, Colo., for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	197	222	174				290	984	4,310	3,190	1,110	713
2	181	217	167				265	995	4,410	3,050	1,310	731
3	181	213	170				255	1,330	4,610	2,910	1,290	695
4	181	227	170				250	1,720	4,870	2,860	1,100	668
5	189	232	170				255	1,960	4,750	2,910	1,100	704
6	197	232	174	166	174	184	250	2,490	4,110	2,860	1,040	659
7	197	236	174				260	2,620	3,670	2,860	1,020	610
8	197	236	170				270	2,630	4,030	2,870	984	578
9	197	236	178				270	2,840	3,570	2,690	929	555
10	189	232					275	3,230	2,970	2,710	973	495
11	189	232					290	3,330	3,130	2,670	973	481
12	185	241					305	2,670	3,630	2,560	995	467
13	185	232					338	2,560	3,870	2,470	1,040	474
14	181	222					354	2,330	4,330	2,560	1,170	540
15	181	222	164				432	2,090	4,330	2,420	1,210	518
16	181	227		182	189	159	453	2,000	4,690	2,300	1,210	525
17	181	222					532	2,350	4,390	2,010	1,220	594
18	185	222					634	2,250	3,890	2,080	1,240	668
19	181	222					759	2,350	3,790	2,090	1,330	731
20	181	222					650	2,870	3,950	2,090	1,170	677
21	181	222					677	3,130	3,750	2,160	1,240	634
22	181	213					677	3,190	3,450	1,800	1,210	594
23	181	204					618	2,650	3,450	1,660	1,200	570
24	181	200					555	2,910	3,310	1,470	995	586
25	181	181					525	3,830	3,650	1,410	898	602
26	181	170	179	161	162	243	532	4,130	3,750	1,400	898	626
27	189	167					634	4,730	3,850	1,210	806	626
28	204	167					650	4,930	3,350	1,160	806	642
29	204	170					797	4,830	3,350	1,060	722	642
30	213	170			-------	349	995	3,830	3,250	973	713	642
31	213	-------			-------	310	-------	4,630	-------	930	797	-------

NOTE.—Stage-discharge relation affected by ice Dec. 10 to Mar. 29; discharge determined from daily gage heights, temperature records, and 2 measurements.

Monthly discharge of Gunnison River near Gunnison, Colo., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	213	181	189	11,600
November	241	167	214	12,700
December	----------	----------	171	10,500
January	----------	----------	169	10,400
February	----------	----------	179	9,940
March	349		202	12,400
April	995	250	468	27,800
May	4,930	984	2,850	175,000
June	4,870	2,970	3,880	231,000
July	3,190	930	2,170	133,000
August	1,330	713	1,050	64,600
September	731	467	608	36,200
The year	4,930	----------	1,020	735,000

GUNNISON RIVER NEAR GRAND JUNCTION, COLO.

LOCATION.—In NW. ¼ sec. 35, T. 1 S., R. 1 W., a quarter of a mile below the Redlands Canal and 2 miles above mouth of Gunnison River, in Grand Junction, Mesa County; below all tributaries.

DRAINAGE AREA.—8,020 square miles (revised; measured on map of Colorado, scale 1:500,000).

RECORDS AVAILABLE.—April 1, 1917, to September 30, 1923. From October 19, 1894, to December 21, 1895, and May 2, 1897, to September 30, 1899, station maintained nearer mouth. Beginning October 1, 1922, only records of combined flow are published.

GAGE.—Vertical staff at left bank a quarter of a mile below canal intake; read by employee of Redlands Co.

DISCHARGE MEASUREMENTS.—Made from car and cable at gage section.

CHANNEL AND CONTROL.—Bed composed of well-compacted gravel; permanent. Control at rapids 500 feet downstream; somewhat shifting. Banks high and not subject to overflow.

EXTREMES OF DISCHARGE.—Combined flow: Maximum discharge, 18,400 second-feet, May 28; minimum discharge occurred during winter.

1917–1923: Maximum discharge, 35,700 second-feet May 23, 1920; minimum discharge, 275 second-feet on August 30 and 31, 1918.

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

DIVERSIONS.— Below all diversions from Gunnison River and tributaries. Most of water diverted through Redlands Canal is for pumping and is returned to Colorado River below mouth of the Gunnison.

COMBINED FLOW.—Combined flow of Gunnison River and Redlands Canal represents flow of Gunnison River which enters Colorado River, less about 25 second-feet, which is used during irrigation season.

ACCURACY.—Stage-discharge relation not permanent. Rating curve for river well defined; for canal fairly well defined. Gages read to half-tenths twice daily. Daily discharge obtained by applying rating table to mean daily gage height. Records good except during period of uncertain gage heights for which they are fair.

Discharge measurements of Gunnison River near Grand Junction, Colo., 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.*
Jan. 13	F. C. Snyder[a]	2.41	877	July 18	J. F. Sutherland[a]	4.90	3,930
Mar. 8	do	2.40	890	Aug. 25	do	3.75	2,130
May 13	do	7.88	10,200				

[a] State hydrographer.

Discharge measurements of Redlands Canal, during they ear ending September 30, 1923

Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*
June 9	F. C. Snyder[a]	5.18	549
Aug. 25	J. F. Sutherland[a]	4.50	469

[a] State hydrographer.

Combined daily discharge, in second-feet, of Gunnison River and Redlands Canal near Grand Junction, Colo., for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	452	1,110	1,030				1,280	4,180	14,800	7,550	2,110	2,820
2	472	1,110	1,030				1,300	3,880	14,100	7,550	2,700	2,330
3	472	1,110	1,030		850	810	1,350	3,310	14,100	7,090	3,170	2,330
4	516	1,120	1,030				1,370	6,230	14,600	6,060	3,590	2,100
5	472	1,150	962				1,190	8,020	14,000	5,690	3,450	2,000
6	472	1,150	962	895		865	979	9,610	12,800	5,510	2,880	2,000
7	472	1,030	962			880	1,460	10,500	11,400	5,160	2,610	2,150
8	472	1,030	962			890	1,440	11,400	11,500	5,870	2,480	2,460
9	472	1,030	962			880	1,480	12,400	11,200	6,250	2,480	2,350
10	537	1,030	962			860	1,570	13,400	10,500	5,690	2,340	2,150
11	537	1,030	843	880	755		1,650	14,700	8,810	5,330	2,390	2,150
12	586	1,030	824	880			1,600	13,400	8,810	5,160	2,340	2,150
13	630	1,030	824	880			2,130	11,100	11,400	4,800	3,120	1,960
14	667	1,030	1,030	872			2,390	10,900	12,700	4,640	3,090	1,730
15	697	1,030	1,180	872		855	2,390	9,060	13,500	4,990	3,370	1,200
16	697	1,030	1,280				2,310	8,020	13,800	5,170	3,810	1,040
17	697	962	1,200				2,430	8,790	13,500	4,500	4,110	1,020
18	727	962	1,200		830		2,880	10,200	12,800	4,270	3,980	1,050
19	803	962	1,230			873	4,260	11,400	11,500	3,890	3,840	1,250
20	1,040	962	1,020			827	4,400	13,400	10,900	3,750	3,990	1,290
21	1,040	1,030	980	890		831	3,590	15,400	10,200	3,890	4,120	1,360
22	904	1,030				835	3,060	14,700	9,630	4,200	2,980	1,360
23	904	1,030				870	2,880	12,700	8,810	4,040	3,000	1,400
24	904	1,030				800	1,740	11,400	8,550	3,010	2,700	1,520
25	996	1,030			835	653	1,570	13,400	8,790	3,040	2,460	1,520
26	1,040	1,030	940			664	1,480	16,000	9,040	3,590	2,340	1,520
27	1,040	1,030				752	1,800	18,000	10,200	3,870	2,400	1,740
28	1,040	995		900		752	2,800	18,100	10,500	2,910	2,570	1,740
29	1,040	1,010			-------	764	2,940	16,400	9,630	2,420	2,250	1,800
30	1,110	1,030			-------	829	3,130	14,700	8,040	2,420	2,250	1,640
31	1,110	-------			-------	946	-------	14,400	-------	2,330	2,250	-------

NOTE.—Gage-height record uncertain Dec. 22 to Mar. 18; discharge determined from temperature records, 2 measurements, and comparison with flow of Colorado River near Fruita.

Combined monthly discharge of Gunnison River and Redlands Canal near Grand Junction, Colo., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	1,110	452	743	45,700
November	1,150	962	1,040	61,900
December	1,280	----------	997	61,300
January	----------	----------	891	54,800
February	----------	----------	808	44,900
March	946	----------	828	50,900
April	4,400	979	2,160	129,000
May	18,100	3,310	11,600	713,000
June	14,800	8,040	11,300	672,000
July	7,550	2,330	4,670	287,000
August	4,120	2,110	2,940	181,000
September	2,820	1,020	1,770	105,000
The year	18,100	----------	3,330	2,410,000

LAKE FORK AT LAKE CITY, COLO.

LOCATION.—In sec. 34, T. 44 N., R. 4 W., at private bridge one-third of a mile above Henson Creek, in Lake City, Hinsdale County.

DRAINAGE AREA.—126 square miles (measured on topographic map).

RECORDS AVAILABLE.—April 21, 1918, to September 30, 1923.

GAGE.—Vertical staff fastened to downstream side of right bridge abutment; read by Eugene Otis.

DISCHARGE MEASUREMENTS.—Made by wading or from bridge.

CHANNEL AND CONTROL.—Bed of stream composed of coarse gravel well compacted. Control at small rapids 250 feet downstream; somewhat shifting at long intervals.

EXTREMES OF DISCHARGE.—Maximum stage recorded, 2.5 feet at 7 a. m. June 16 (discharge, 770 second-feet); minimum stage, 0.42 foot on October 15 (discharge, 10 second-feet).

1918–1923: Maximum discharge, 1,560 second-feet June 12 and 15, 1921; minimum discharge, 10 second-feet March 20, 1919, and October 15, 1922.

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

DIVERSIONS.—Practically none which do not return to stream above station.

REGULATION.—Flow regulated by Lake San Cristobal, located 4 miles upstream; area 1 square mile. During low water operation of power plant located 1 mile upstream may influence discharge slightly.

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

Discharge measurements of Lake Fork at Lake City, Colo., during the year ending September 30, 1923

Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*
May 30	Robert Follansbee	2.28	493
July 26	P. S. Parker	1.72	221
Sept. 22	Robert Follansbee	1.16	71

Daily discharge, in second-feet, of Lake Fork at Lake City, Colo., for the year ending September 30, 1923

Day	Oct.	Nov.	Apr.	May	June	July	Aug.	Sept.
1	21	12	12	44	530	498	150	92
2	20	14	12	48	540	460	150	92
3	20	13	12	51	570	433	150	92
4	19	14	12	84	635	415	150	90
5	18	22	12	153	620	380	153	84
6	18	15	12	180	590	375	136	82
7	17	13	84	184	570	365	118	80
8	17	12	44	162	505	409	116	77
9	15	12	26	198	468	370	114	69
10	17	12	20	240	409	345	118	67
11	17	11	16	243	452	340	123	64
12	17	11	18	266	580	360	134	61
13	15	12	19	254	650	365	165	64
14	15	13	20	226	710	370	212	64
15	10	14	20	190	740	415	226	64
16	15	13	26	165	755	403	258	67
17	36	15	24	159	635	375	258	67
18	33	15	23	159	550	340	270	67
19	27	15	28	174	512	350	335	69
20	24	15	32	236	520	415	335	72
21	22	15	35	278	468	409	299	75
22	20	15	40	312	452	350	254	74
23	17	15	42	317	439	299	215	84
24	15	15	42	326	498	266	177	98
25	14	20	40	340	540	250	153	98
26	14	23	38	403	590	232	131	105
27	14	23	36	482	610	215	121	100
28	14	20	36	540	610	204	112	100
29	15	20	36	550	590	184	102	96
30	14	20	39	540	570	168	98	96
31	12	------	------	600	------	153	92	------

NOTE.—Stage-discharge relation affected by ice Dec. 1 to Mar. 31; discharge not estimated.

Monthly discharge of Lake Fork at Lake City, Colo., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	36	10	18.1	1,110
November	23	11	15.3	910
April	84	12	28.5	1,700
May	600	44	261	16,000
June	755	409	564	33,600
July	498	153	339	20,800
August	335	92	175	10,800
September	105	61	80.3	4,780

LEROUX CREEK NEAR LAZEAR, COLO.

LOCATION.—In sec. 33, T. 13 S., R. 93 W., at highway bridge 8 miles north of Lazear, Delta County. No important tributary within several miles.

DRAINAGE AREA.—52 square miles (measured on Forest Service atlas).

RECORDS AVAILABLE.—May 15, 1917, to September 30, 1923.

GAGE.—Stevens water-stage recorder, referred to vertical staff fastened to face on left bridge abutment; inspected by G. H. Henderson.

DISCHARGE MEASUREMENTS.—Made from single-span bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of gravel and boulders; very rough. Control 50 feet downstream; shifts during high water.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 3.10 feet at 10 p. m. May 26 (discharge, 910 second-feet); minimum stage, practically dry during winter.

1917-1923; Maximum discharge, 1,420 second-feet, June 17, 1917, and May 29, 1921; minimum stage, creek practically dry during winter.

ICE.—No data. Flow very small as most of it is stored in reservoirs.

DIVERSIONS.—Diversions for the irrigation of 8,000 acres above station.

REGULATION.—Diurnal fluctuation during spring caused by alternate melting and freezing of mountain snow. Flow in nonirrigating season stored in reservoirs on headwaters. Court decrees for such storage amount to 606 acre-feet.

COOPERATION.—Complete records furnished by State engineer.

Daily discharge, in second-feet, of Leroux Creek near Lazear, Colo., for the year ending September 30, 1923

Day	Oct.	Nov.	May	June	July	Aug.	Sept.
1	3	1	49	416	42	34	36
2	3	1	91	373	42	37	34
3	3	2	107	385	46	33	33
4	3	2	154	313	41	34	30
5	3	2	171	232	37	14	26
6	3	3	205	295	33	26	25
7	3	3	288	171	85	35	25
8	3	2	403	134	35	25	27
9	3	2	421	123	36	30	27
10	3	3	463	141	38	27	26
11	3	2	416	158	38	27	25
12	3	2	340	200	30	30	24
13	3	3	278	192	27	27	24
14	3	3	197	158	39	27	24
15	3	4	164	143	37	88	37
16	4	4	151	113	31	52	32
17	4	4	169	100	30	38	27
18	3	4	262	84	30	32	26
19	2	4	348	78	28	27	26
20	2	4	472	58	25	27	26
21	2	3	425	47	25	30	26
22	2	3	332	46	32	30	26
23	3	3	227	68	32	33	27
24	3	3	381	71	29	34	27
25	2	3	515	76	30	32	27
26	1	4	540	81	30	33	28
27	2	3	612	82	32	34	29
28	2	3	515	70	38	35	29
29	1	3	434	51	37	35	30
30	1	4	458	46	35	35	30
31	1	------	515	------	33	36	------

NOTE.—No gage-height record Nov. 13-30; discharge estimated.

Monthly discharge of Leroux Creek near Lazear, Colo., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	4	1	2.58	159
November	4	1	2.90	173
May	612	49	326	20,000
June	416	46	159	8,480
July	46	25	34.0	2,090
August	88	14	33.8	2,080
September	36	24	28.0	1,670

SURFACE CREEK AT CEDAREDGE, COLO.

LOCATION.—About sec. 29, T. 13 S., R. 94 W., at Cedaredge, Delta County. Nearest tributary, Mill Creek, enters 4 miles above.

DRAINAGE AREA.—43 square miles (measured on Forest Service atlas).

RECORDS AVAILABLE.—May 16, 1917, to September 30, 1923.

GAGE.—Stevens water-stage recorder, referred to vertical staff fastened to concrete abutment of footbridge 400 feet upstream from highway bridge in Cedaredge; inspected by J. A. Bacon.

DISCHARGE MEASUREMENTS.—Made from footbridge at gage station.

CHANNEL AND CONTROL.—Bed composed of small boulders filled in behind control which is an old concrete weir, located 12 feet downstream. At high stages water flows through overflow channel which may shift somewhat.

EXTREMES OF DISCHARGE.—Maximum gage height during year from recording gage, 1.68 feet at 11 p. m. May 26 (discharge, 314 second-feet); minimum discharge, during winter when creek was practically dry.

1917–1923: Maximum stage, 1.8 feet at 7 a. m. May 24, 1920 (discharge, 715 second-feet); minimum stage during winter, when creek is practically dry.

ICE.—No data. Flow very small as most of it is stored during winter.

DIVERSIONS.—Diversions for irrigation of 18,000 acres above station.

REGULATION.—Alternate melting and freezing of snow in the mountains caused diurnal fluctuation during spring of year. Adjudicated decrees for storage of 8,140 acre-feet in headwaters. The storage and release of water regulates somewhat the natural flow.

COOPERATION.—Complete records furnished by State engineer.

Daily discharge, in second-feet, of Surface Creek at Cedaredge, Colo., for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	10	6	6	4	5	35	130	63	11	26
2	10	6	5	4	4	57	114	52	18	42
3	10	6	5	4	4	85	102	56	13	37
4	10	7	------	4	5	116	72	51	10	29
5	10	6	------	4	5	125	46	44	17	26
6	10	10	------	4	5	164	63	48	21	24
7	10	8	------	4	5	202	96	44	20	20
8	10	6	------	4	5	193	114	51	20	22
9	9	6	------	4	6	208	118	44	21	20
10	9	6	------	4	6	215	109	46	32	18
11	9	6	------	4	6	208	107	38	30	17
12	9	8	------	5	6	172	116	31	38	20
13	8	6	------	4	8	107	120	32	56	22
14	8	7	------	4	8	87	109	26	48	18
15	8	12	------	5	8	89	87	20	63	18
16	8	8	------	5	8	89	74	16	46	15
17	8	5	------	4	8	104	58	22	38	14
18	8	4	------	5	8	150	57	23	28	13
19	8	5	------	6	8	193	67	19	24	17
20	8	4	------	6	10	237	74	20	31	16
21	7	4	------	6	10	215	72	23	31	14
22	6	4	------	6	12	150	63	23	48	14
23	6	5	------	6	12	120	57	28	42	15
24	6	5	------	5	14	150	52	43	38	20
25	5	5	------	3	16	193	51	41	32	13
26	6	6	------	4	18	225	60	31	28	10
27	5	6	------	4	20	218	60	27	25	9
28	5	6	------	4	20	164	65	26	28	13
29	6	6	------	4	22	130	72	21	27	17
30	6	6	------	5	40	125	77	20	32	17
31	6	------	------	6	------	138	------	17	38	------

Note.—No gage-height record Mar. 1-8 and Apr. 7-28; discharge estimated.

Monthly discharge of Surface Creek at Cedaredge, Colo., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	10	5	7.87	484
November	10	4	6.17	367
December	----------	----------	3	184
January	----------	----------	3	184
February	----------	----------	3	167
March	6	3	4.55	280
April	40	4	10.4	619
May	225	35	150	9,220
June	130	46	82.1	4,890
July	63	16	33.7	2,070
August	63	11	30.8	1,890
September	42	9	19.2	1,140
The year	225	----------	29.7	21,500

NOTE.—Means for December, January, and February estimated.

UNCOMPAHGRE RIVER AT OURAY, COLO.

LOCATION.—River: In sec. 31, T. 44 N., R. 7 W., in box canyon a short distance upstream from highway bridge half a mile south of Ouray, Ouray County. Nearest tributary, Canyon Creek, enters 150 feet below; nearest tributary above is Bear Creek.

Power-house flume: In tailrace of power-house flume in Ouray about 100 feet upstream from entrance to river. Water diverted from Uncompahgre River above river station.

DRAINAGE AREA.—44 square miles (measured on topographic map).

RECORDS AVAILABLE.—January 25, 1911, to September 30, 1923, for river station, and February 25, 1916, to September 30, 1923, for power-house flume. From January 7 to March 17, 1908, records were kept at dam of Ouray Electric Light & Power Co., 1 mile south of present station.

GAGE.—River: Stevens water-stage recorder, referred to vertical staff attached to rock cliff at left side of stream 150 feet above mouth of Canyon Creek; inspected by F. A. Rice.

Power-house flume: Vertical staff fastened to side of wooden flume just below power house.

DISCHARGE MEASUREMENTS.—River: Made from footbridge at gage or by wading. Flume: Made from footbridge just below gage.

CHANNEL AND CONTROL.—River: Bed composed of small boulders. Control short distance downstream, shifting at intervals; station is in box canyon with high vertical walls.

Flume: Control is plank nailed across bottom of flume at lower end.

EXTREMES OF DISCHARGE.—Combined flow: Maximum discharge during year 685 second-feet, May 26; minimum discharge, 11 second-feet during part of March.

1911–1923: Maximum discharge, 1,980 second-feet, October 5, 1911; minimum discharge, 6 second-feet December 31, 1920, and January 19, 1921.

ICE.—Stage-discharge relation not affected by ice, as warm springs keep streams open.

DIVERSIONS.—No diversion above station other than pipe line, the flow through which is included in these records.

REGULATION.—Diurnal fluctuation during spring from alternate melting and freezing of mountain snow.

ACCURACY.—River: Stage-discharge relation practically permanent; not affected by ice during winter. Rating curve well defined below 400 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 excellent except during low-water period, for which they are good.

Flume: Daily discharge for October 15–31, November 4, 10–30, December 1–11, January 3–13, 29–30, April 1, 2, 7, determined from study of river charts which show effect of diversion. Records good. Daily discharge for remainder of year obtained by applying to poorly defined rating table the daily gage height.

Records for combined discharge of river and flume excellent during period from May to July, good during period from October to January, April, and August to September; and fair for February and March.

Discharge measurements of Uncompahgre River at Ouray, Colo., 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.*
Dec. 11	T. J. Watkins	0.22	0.7	June 24	Robert Follansbee	2.24	314
Mar. 27	do	.25	.8	July 25	P. S. Parker	1.37	91
May 29	Robert Follansbee	2.26	306				

Discharge measurements of power-house flume at Ouray, Colo., 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.*
Dec. 11	T. J. Watkins	1.55	15.0	May 29	Robert Follansbee	2.10	20
Mar. 27	do	1.50	9.6	June 24	do	.90	0

Daily discharge, in second-feet, of Uncompahgre River and power-house flume at Ouray, Colo., for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	28	25	16	18	14	13	19	74	375	289	73	66
2	28	25	16	18	14	14	19	75	400	248	73	65
3	26	24	16	18	14	14	19	88	434	216	73	62
4	25	22	16	19	14	13	14	103	431	208	68	55
5	25	24	15	17	14	13	14	105	369	186	64	55
6	22	26	15	18	14	13	14	88	382	170	58	52
7	22	26	16	22	15	13	15	114	289	226	54	50
8	22	27	16	15	14	13	16	156	279	218	49	45
9	24	27	17	17	14	13	19	260	296	213	54	50
10	24	27	17	19	14	13	15	354	214	170	51	49
11	24	29	17	16	14	12	16	244	293	158	51	48
12	22	29	18	15	14	12	27	196	420	163	58	52
13	23	29	18	15	14	12	39	168	456	165	75	55
14	26	27	18	14	14	12	35	135	462	148	67	57
15	28	29	18	14	14	12	32	120	490	163	93	54
16	26	27	18	15	14	11	43	122	392	136	95	53
17	26	26	18	19	14	11	61	150	315	117	90	55
18	27	29	19	19	14	11	75	196	357	111	106	64
19	24	25	16	17	14	11	75	241	378	107	100	64
20	26	26	20	17	16	15	58	244	345	121	82	60

Daily discharge, in second-feet, of Uncompahgre River and power-house flume at Ouray, Colo., for the year ending September 30, 1923—Continued

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
21	26	25	20	13	19	15	55	246	284	148	90	58
22	26	26	18	14	17	11	50	185	273	111	68	57
23	23	26	18	17	15	11	40	149	322	104	56	104
24	24	24	18	15	14	11	40	193	362	96	63	98
25	24	24	18	17	21	11	45	298	394	94	66	76
26	20	23	20	14	19	11	49	498	450	91	67	69
27	20	23	16	14	13	12	52	414	436	83	62	67
28	22	22	18	14	13	14	55	375	362	82	58	61
29	22	22	18	13	-------	14	62	345	331	83	58	58
30	23	16	16	19	-------	17	71	351	313	72	60	51
31	23	-------	16	18	-------	21	-------	396	-------	70	61	-------

Monthly discharge of Uncompahgre River and power-house flume at Ouray, Colo., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	28	20	24.2	1,490
November	29	16	25.3	1,510
December	20	15	17.3	1,060
January	22	13	16.5	1,010
February	21	13	14.8	822
March	21	11	12.9	793
April	75	14	38.0	2,260
May	498	74	216	13,300
June	490	214	365	21,700
July	289	70	147	9,040
August	106	49	69.1	4,250
September	104	45	60.3	3,590
The year	498	11	84.0	60,800

UNCOMPAHGRE RIVER BELOW OURAY, COLO.

LOCATION.—In sec. 30, T. 44 N., R. 7 W., near lowest bridge in Ouray, Ouray County, a third of a mile below railroad station. Below all tributaries in Ouray.

DRAINAGE AREA.—76 square miles (measured on topographic map).

RECORDS AVAILABLE.—May 12, 1913, to September 30, 1923.

GAGE.—Gurley water-stage recorder, referred to vertical staff attached to rock cliff 500 feet above bridge; inspected by F. A. Rice.

DISCHARGE MEASUREMENTS.—Made from single-span bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of coarse gravel and small boulders. Control is broken rock ledge 50 feet downstream on which mill tailings are alternately deposited and scoured out. Banks not subject to overflow except at extreme high-water stage of 6.5 feet.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 5.4 feet at 7 p. m. July 20 due to cloudburst in Skyrocket Gulch which enters at gage (discharge, 2,300 second-feet); minimum stage, 1.19 feet at 8 a. m. January 21 (discharge, 10 second-feet).

1913–1923: Maximum discharge, 2,530 second-feet at 1 a. m. June 14, 1918; minimum discharge, 10 second-feet on February 5 and 6, 1915, March 18, 1922, and January 21, 1923.

ICE.—Stage-discharge relation not affected by ice; warm springs keep river open.

DIVERSIONS.—Practically all diversions returned to river above station.

REGULATION.—Diurnal fluctuation during spring caused by alternate melting and freezing of mountain snow. No artificial regulation.

ACCURACY.—Stage-discharge relation not permanent. Rating curve used October 1 to June 30 well defined, and curve used July 16 to September 30 fairly well defined; shifting-control method used July 1–15. 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 good.

Discharge measurements of Uncompahgre River below Ouray, Colo., 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.*
Dec. 11	T. J. Watkins	1.50	28.3	June 24	Robert Follansbee	3.76	662
Mar. 27	do	1.43	28.7	July 25	P. S. Parker	2.35	207
May 28	Robert Follansbee	3.72	699				

Daily discharge, in second-feet, of Uncompahgre River below Ouray, Colo., for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	43	31	27	29	31	31	36	120	650	670	152	110
2	43	31	31	25	29	32	33	130	736	570	157	110
3	42	31	33	25	29	31	30	157	742	502	163	107
4	42	29	34	25	30	29	29	184	775	498	159	100
5	42	29	30	29	31	29	30	189	690	466	140	102
6	41	32	32	32	29	26	36	198	660	444	123	97
7	39	34	35	31	29	29	41	233	630	575	115	90
8	40	35	33	32	28	29	37	296	502	561	112	83
9	39	35	32	31	30	25	37	313	448	561	117	80
10	39	33	32	33	29	26	37	344	399	466	115	75
11	39	33	33	36	28	25	40	316	516	435	121	72
12	38	34	35	36	26	22	53	285	675	444	166	79
13	38	33	36	25	25	24	68	247	786	484	190	81
14	37	31	34	25	25	24	63	220	814	453	228	87
15	34	32	34	27	28	22	62	198	860	476	275	91
16	35	34	35	32	28	26	84	196	731	431	257	96
17	34	33	31	33	30	26	120	218	615	375	228	99
18	34	35	29	31	32	28	134	239	715	364	240	114
19	34	35	34	30	33	31	130	292	736	354	248	110
20	34	35	33	29	31	29	103	391	690	403	205	100
21	33	32	33	25	28	28	84	403	605	326	178	97
22	33	32	34	29	29	26	74	324	615	266	155	97
23	32	32	35	29	30	24	63	252	700	242	146	180
24	33	31	33	30	31	28	54	296	758	238	124	163
25	30	33	35	31	31	23	60	466	780	218	124	134
26	30	30	33	31	29	23	68	605	872	209	121	130
27	30	31	34	31	28	31	75	640	786	200	114	121
28	30	32	35	27	28	37	80	650	715	190	105	117
29	31	31	34	28	-------	42	102	610	670	170	105	102
30	29	28	31	34	-------	52	114	600	680	152	107	94
31	30	-------	29	34	-------	41	-------	655	-------	142	110	-------

Monthly discharge of Uncompahgre River below Ouray, Colo., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	43	29	35.7	2,200
November	35	28	32.2	1,920
December	36	27	32.9	2,020
January	36	25	29.8	1,830
February	33	25	29.1	1,620
March	52	22	29.0	1,780
April	134	29	65.9	3,920
May	655	120	331	20,400
June	872	399	685	40,800
July	670	142	383	23,600
August	275	105	158	9,720
September	180	72	104	6,190
The year	872	22	160	116,000

UNCOMPAHGRE RIVER NEAR COLONA, COLO.

LOCATION.—In sec. 5, T. 46 N., R. 8 W., just below highway bridge 4 miles south of Colona, Ouray County. Nearest tributary, Billy Creek, enters 1½ miles downstream.

DRAINAGE AREA.—403 square miles (measured on topographic map).

RECORDS AVAILABLE.—April 26, 1903, to June 10, 1906; April 6, 1917, to September 30, 1923.

GAGE.—Friez water-stage recorder located a short distance below highway bridge

DISCHARGE MEASUREMENTS.—Made from highway bridge.

CHANNEL AND CONTROL.—Shifts during high water.

EXTREMES OF DISCHARGE.—Maximum stage during year, from water-stage recorder, 3.00 feet on July 20 (discharge, 1,720 second-feet); minimum discharge occurred during winter.

ICE.—Station discontinued during winter.

DIVERSIONS.—Only a few small diversions above station.

COOPERATION.—Records of daily discharge furnished by United States Bureau of Reclamation.

Daily discharge, in second-feet, of Uncompahgre River near Colona, Colo., for the year ending September 30, 1923

Day	Oct.	Apr.	May	June	July	Aug.	Sept.
1	81	105	265	795	1,020	335	250
2	78	105	286	846	965	358	258
3	78	105	307	930	843	343	256
4	71	105	380	1,000	813	385	240
5	68	105	400	885	795	311	232
6	66	105	385	813	735	275	237
7	66	105	412	815	820	247	230
8	65	103	465	703	907	233	205
9	65	98	513	683	907	212	195
10	65	98	527	605	828	218	190
11	66	105	505	628	745	218	180
12	65	118	470	796	715	311	180
13	65	163	435	950	745	362	195
14	66	171	462	1,140	750	415	207
15	68	155	358	1,360	780	676	216
16	66	153	444	1,300	750	690	215
17	66	196	540	910	750	538	216
18	71	200	513	1,030	715	555	232
19	77	271	552	1,030	684	670	233
20	77	236	628	1,010	796	490	215

Daily discharge, in second-feet, of Uncompahgre River near Colona, Colo., for the year ending September 30, 1923—Continued

Day	Oct.	Apr.	May	June	July	Aug.	Sept.
21	77	200	640	870	945	455	207
22	80	200	580	845	730	403	205
23	79	163	514	930	600	360	250
24	81	146	530	1,060	560	330	330
25	81	146	648	1,150	535	292	248
26	77	184	850	1,270	505	260	232
27	80	211	998	1,380	447	241	230
28	84	189	998	1,240	444	228	230
29	82	214	858	1,270	368	213	217
30	82	277	804	1,070	330	224	210
31	82		830		320	250	

Monthly discharge of Uncompahgre River near Colona, Colo., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	84	65	73.4	4,510
April	277	98	158	9,400
May	998	265	552	33,900
June	1,380	605	977	58,100
July	1,020	320	705	43,300
August	690	212	358	22,000
September	330	180	225	13,400

UNCOMPAHGRE RIVER AT MONTROSE, COLO.

LOCATION.—In sec. 31, T. 49 N., R. 9 W., at highway bridge a quarter of a mile west of Montrose, Montrose County. Nearest important tributary, Happy Canyon Creek, enters about 2 miles below.

DRAINAGE AREA.—565 square miles.

RECORDS AVAILABLE.—April 22, 1903, to September 30, 1923.

GAGE.—Vertical staff attached to bridge; read at irregular intervals.

DISCHARGE MEASUREMENTS.—Made from bridge.

CHANNEL AND CONTROL.—Bed composed of sand and gravel; shifts occasionally.

EXTREMES OF DISCHARGE.—No data.

ICE.—Although ice forms along the banks during winter, river is not frozen over. Observations, however, are discontinued.

DIVERSIONS.—Uncompahgre River is so over-appropriated that the United States Bureau of Reclamation has constructed a tunnel and canal to divert 1,300 second-feet from Gunnison River into the Uncompahgre above Uncompahgre.

COOPERATION.—Daily discharge furnished by the United States Bureau of Reclamation.

Daily discharge, in second-feet, of Uncompahgre River at Montrose, Colo., for the year ending September 30, 1923

Day	Apr.	May	June	July	Aug.	Sept.	Day	Apr.	May	June	July	Aug.	Sept.
1	------	580	872	471	585	462	16	390	627	1,130	784	500	396
2	------	610	884	208	600	458	17	380	708	1,000	707	500	392
3	------	640	1,000	188	614	454	18	485	708	872	741	450	388
4	------	602	900	287	628	450	19	580	785	935	775	450	384
5	------	732	935	387	628	446	20	440	815	1,030	809	460	380
6	------	708	760	486	604	442	21	435	845	933	843	470	376
7	76	652	872	760	579	438	22	405	845	872	762	487	370
8	350	732	760	901	556	434	23	438	812	785	682	426	367
9	359	530	785	872	533	50	24	471	601	828	602	365	360
10	368	708	746	814	510	35	25	504	760	872	548	303	353
11	377	321	707	628	487	20	26	537	935	1,280	495	315	346
12	386	115	1,030	655	487	20	27	570	1,030	1,200	510	315	339
13	395	115	1,150	682	487	100	28	512	970	773	525	315	332
14	405	158	1,360	708	487	150	29	582	927	727	540	315	325
15	398	602	1,260	746	500	400	30	652	886	734	555	350	318
							31	------	845	------	570	390	------

Monthly discharge of Uncompahgre River at Montrose, Colo., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
April 7-30	652	76	437	20,800
May	1,030	115	674	41,460
June	1,360	707	933	55,500
July	901	188	621	38,200
August	628	303	474	29,100
September	462	20	326	19,400
The period				204,000

UNCOMPAHGRE RIVER NEAR DELTA, COLO.

LOCATION.—In T. 15 S., on line between Rs. 95 and 96 W., at highway bridge 2 miles south of Delta, Delta County. No tributaries below station and none for several miles above.

DRAINAGE AREA.—1,110 square miles (revised; measured on map of Colorado, scale 1:500,000).

RECORDS AVAILABLE.—April 29, 1903, to September 30, 1923.

GAGE.—Vertical staff; read by Miss Eva Helmick.

DISCHARGE MEASUREMENTS.—Made from bridge.

CHANNEL AND CONTROL.—Bed composed of silt and gravel. Control shifts at intervals. Banks are not subject to overflow.

EXTREMES OF DISCHARGE.—Maximum stage recorded, 4.00 feet at 7.30 a. m. May 17 (discharge, 1,530 second-feet); minimum stage, 1.22 feet at 4 p. m. April 7 (discharge, 46 second-feet).

ICE.—Although ice forms along banks and slush ice frequently occurs, the stage-discharge relation is probably not materially affected thereby; observations, however, are discontinued during winter.

DIVERSIONS.—Ditches above station divert the normal flow during irrigation season; records represent largely return seepage water.

REGULATION.—None.

COOPERATION.—Daily discharge furnished by the United States Bureau of Reclamation.

Daily discharge, in second-feet, of Uncompahgre River near Delta, Colo., for the year ending September 30, 1923

Day	Oct.	May	June	July	Aug.	Sept.	Day	Oct.	May	June	July	Aug.	Sept.
1	146	80	490	300	298	190	16	296	850	715	705	1,500	358
2	172	60	415	230	410	284	17	270	1,510	615	540	920	450
3	200	65	560	262	985	264	18	296	1,250	550	675	580	550
4	219	123	655	80	1,100	264	19	335	1,240	720	600	665	605
5	248	300	435	140	983	280	20	360	1,460	685	548	796	635
6	250	950	383	130	880	318	21	431	1,260	710	745	498	522
7	235	850	250	130	920	285	22	431	1,180	595	605	425	523
8	210	1,020	380	455	705	171	23	420	500	588	530	208	530
9	250	995	415	615	652	92	24	461	540	680	440	293	670
10	260	930	410	450	620	158	25	453	425	878	401	180	715
11	248	715	490	415	580	131	26	453	620	900	523	155	550
12	265	425	440	401	675	358	27	453	795	920	670	195	620
13	242	485	490	435	798	290	28	442	685	668	490	230	654
14	277	495	1,050	415	715	358	29	472	440	563	350	185	655
15	280	620	760	685	560	333	30	550	270	400	312	148	680
							31	550	280	-------	268	148	------

Monthly discharge of Uncompahgre River near Delta, Colo., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	550	146	328	20,200
May	1,510	60	691	42,500
June	1,050	250	594	35,300
July	745	80	437	26,900
August	1,500	148	581	35,700
September	715	92	416	24,800

SAN MIGUEL RIVER AT NATURITA, COLO.

LOCATION.—In T. 46 N., on line between Rs. 15 and 16 W., at highway bridge in Naturita, Montrose County. Nearest tributary, Basin Creek, enters half a mile downstream.

DRAINAGE AREA.—1,090 square miles (measured on map of Colorado; scale, 1:500,000).

RECORDS AVAILABLE.—April 26, 1918, to September 30, 1923.

GAGE.—Chain gage fastened to upstream side of bridge; read by Mrs. A. R. Payson.

DISCHARGE MEASUREMENTS.—Made from single-span bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of coarse gravel and small boulders and is rough. Control at rapids 300 feet downstream; practically permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 3.90 feet on May 27 and 28 (discharge, 1,760 second-feet); minimum stage, 0.35 foot on several days during October (discharge, 48 second-feet).

1918–1923: Maximum stage from high-water mark during night of May 4, 1921 (discharge, 6,000 second-feet); minimum discharge, 0.05 foot on August 31, 1918 (discharge, 38 second-feet).

ICE.—Stage-discharge relation affected by ice.

DIVERSIONS.—Diversions for irrigation of 8,100 acres, the greater part of which is above station. Also, 15,000 acres irrigated by tributaries above station.

REGULATION.—Diurnal fluctuation during spring from alternate melting and freezing of mountain snow.

COOPERATION.—Complete records furnished by State engineer.

Daily discharge, in second-feet, of San Miguel River at Naturita, Colo., for the year ending September 30, 1923

Day	Oct.	Nov.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	51	64	88	174	489	1,120	1,000	263	185
2	51	66	114	192	514	1,120	802	271	178
3	53	58	114	178	596	1,180	676	257	189
4	51	64	117	143	653	1,200	688	252	178
5	51	62	102	131	821	1.140	659	252	167
6	51	58	95	156	1,020	1,040	585	225	178
7	53	64	110	246	928	996	750	194	150
8	53	66	99	220	956	874	949	183	143
9	51	55	99	252	1,010	841	848	201	132
10	53	66	95	298	996	841	782	286	120
11	53	66	95	298	1,020	821	694	283	111
12	55	58	99	397	1,050	1,070	579	418	102
13	53	62	99	568	1,080	1,080	579	432	117
14	55	74	105	636	956	1,120	590	441	127
15	58	62	95	653	976	1,200	647	574	127
16	53	86	91	579	956	1,120	969	489	419
17	51	76	88	744	1,280	996	536	499	254
18	51	74	88	996	1,010	976	499	441	152
19	51	74	91	1,080	1,050	1,020	536	479	148
20	55	86	102	861	1.080	1,070	514	450	134
21	66	88	99	694	1,140	996	653	361	129
22	55	86	95	744	1,080	956	701	318	129
23	53	86	70	427	1,050	992	504	277	194
24	53	82	76	369	996	942	504	227	223
25	51	82	102	338	1,080	992	469	230	150
26	70	78	99	427	1,490	1,120	380	198	154
27	82	82	102	514	1,630	1,180	357	182	161
28	82	105	99	441	1,540	1.120	331	183	172
29	95	88	110	441	1,380	1,010	307	210	150
30	91	110	138	713	1.220	1,080	298	198	150
31	82	-------	178	-------	1,160	-------	283	170	-------

Monthly discharge of San Miguel River at Naturita, Colo., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	95	51	59.1	3,630
November	110	55	74.3	4,420
December	----------	----------	110	6,760
January	----------	----------	105	6,460
February	----------	----------	95	5,280
March	178	70	102	6,270
April	1,080	131	464	27,600
May	1,630	489	1,040	64,000
June	1,200	821	1,040	61,900
July	1,000	283	602	37,000
August	574	170	306	18,800
September	410	102	164	9,760
The year	1,630	51	348	252,000

NOTE.—Mean discharge estimated for December, January, and March.

GREEN RIVER AND TRIBUTARIES

GREEN RIVER NEAR DANIEL, WYO.

LOCATION.—Near line between Tps. 32 and 33 N., R. 110 W., at highway bridge 6 miles southeast of Daniel, Sublette County. No large tributary within several miles.

DRAINAGE AREA.—932 square miles (measured on United States Geological Survey map of Wyoming, scale 1:500,000).

RECORDS AVAILABLE.—April 1, 1915, to September 30 1923. State engineer maintained station at this point during 1913 and 1914.

GAGE.—Chain gage on downstream side of bridge; read by Ellis Price.

DISCHARGE MEASUREMENTS.—Made from two-span bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of coarse gravel and small boulders. Control 100 feet downstream at small rapids; shifts slightly. Banks are high and not subject to overflow.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 4.75 feet at 8 a. m. May 28 (discharge, 3,530 second-feet); minimum discharge occurred during winter.

1915–1923: Maximum stage, 7.0 feet at 10 a. m. June 16, 1918 (discharge, 8,750 second-feet); minimum discharge occurred during winter.

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

DIVERSIONS.—Adjudicated diversions for irrigation of 18,000 acres from Green River above Daniel station.

REGULATION.—None, except natural regulation of Green River lakes.

ACCURACY.—Stage-discharge relation not permanent; affected by ice. Rating curve well defined above 250 second-feet; shifting-control method used April 16 to September 30. Gage read to hundredths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table. Records fair.

The following discharge measurement was made by P. V. Hodges:
May 27, 1923: Gage height, 4.64 feet; discharge, 3,310 second-feet.

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

Day	Oct.	Nov.	Dec.	Apr.	May	June	July	Aug.	Sept.
1	258	254			1,200	2,170	1,800	1,120	450
2	256	264			1,340	1,860	1,960	1,140	430
3	254	274	235		1,420	1,600	2,170	1,020	425
4	251	285			1,670	1,560	2,290	986	425
5	260	264			1,860	1,730	2,420	1,070	420
6	260	289	213		2,070	1,860	2,290	890	420
7	254	270	210		2,370	1,820	2,290	801	415
8	251	278	216		2,290	1,920	2,140	763	400
9	254	274	221		2,400	1,960	2,220	725	375
10	248	270			2,530	2,200	2,110	698	330
11	235	278			2.500	2,480	2,260	655	310
12	241	278			1,860	2,820	2,140	640	300
13	241	270			1,670	3,220	2,000	610	290
14	248	270			1,670	3,330	2,160	590	280
15	251	270			1,640	3,220	2,400	570	270
16	251	275		1,820	1,440	3,000	2,140	560	270
17	251	270		1,440	1,480	2,820	1,820	560	270
18	251	281		1,110	1,640	2,790	1,560	560	270
19	251	275		910	1,670	2,290	1,420	550	270
20	251			1,120	1,670	1,860	1,340	618	280

Daily discharge, in second-feet, of Green River near Daniel, Wyo., for the year ending September 30, 1923—Continued

Day	Oct.	Nov.	Dec.	Apr.	May	June	July	Aug.	Sept.
21	251	275	--------	1,360	1,900	1,760	1,220	698	280
22	248		--------	850	2,180	1,890	1,210	671	290
23	241		--------	567	2,340	2,030	1,270	671	300
24	241		--------	490	2,620	1,820	1,850	653	293
25	235	270	--------	520	2,840	1,440	1,630	635	313
26	232	293	--------	576	3,090	1,400	1,960	585	336
27	235	289	--------	801	3,330	1,330	1,760	570	345
28	238	274	--------	1,040	3,430	1,400	1,560	520	382
29	248	267	--------	1,280	2,910	1,480	1,440	490	388
30	241	260	--------	1,430	2,400	1,630	1,340	480	388
31	244	--------	--------	--------	2,400	--------	1,210	465	--------

NOTE.—Stage-discharge relation affected by ice Nov. 13, 14, 19–24, 30, Dec. 1–5; discharge estimated. Braced figures represent mean discharge for periods indicated. Gage not read Oct. 1–3, July 13–17, Aug. 12–18, 26–31, Sept. 1–22; discharge determined by comparison with flow of Green River at Green River.

Monthly discharge of Green River near Daniel, Wyo., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	260	232	247	15,200
November	293	254	274	16,300
December 1–9	--------	210	226	4,030
April 16–30	1,820	490	1,020	30,300
May	3,430	1,200	2,120	130,000
June	3,330	1,330	2,090	124,000
July	2,420	1,210	1,850	114,000
August	1,140	465	696	42,800
September	450	270	340	20,200

GREEN RIVER AT GREEN RIVER, WYO.

LOCATION.—In sec. 22, T. 18 N., R. 107 W., at Union Pacific Railroad pumping station, 100 feet below railroad bridge at Green River, Sweetwater County. No tributary within several miles.

DRAINAGE AREA.—7,670 square miles (measured on United States Geological Survey map of Wyoming, scale 1:500,000).

RECORDS AVAILABLE.—May 2, 1895, to October 31, 1906; March 1, 1915, to September 30, 1923.

GAGE.—Chain gage on left bank at pumping station; read by Miss Alyce Craver.

DISCHARGE MEASUREMENTS.—Made from two-span highway bridge.

CHANNEL AND CONTROL.—Bed composed of small boulders. Control of well compacted small boulders 400 feet downstream; shifting at low stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 5.6 feet June 15 (discharge, 12,100 second-feet); minimum discharge occurred during winter.

1895–1906; 1915–1923: Maximum stage recorded, 12.3 feet at 5 p. m. June 19, 1918 (discharge, 22,200 second-feet); minimum discharge recorded, 160 second-feet November 17, 1898.

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

DIVERSIONS.—Adjudicated diversions for irrigation of 16,000 acres between this station and the one near Daniel.

REGULATION.—None.

ACCURACY.—Stage-discharge relation not permanent; affected by ice. Rating curve well defined above 3,000 second-feet. Gage read to hundredths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table. Records good except during low-water period, for which they are fair.

Discharge measurements of Green River at Green River, Wyo., during the year ending September 30, 1923

Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*
Oct. 5	M. B. Arthur	1.88	749
May 19	P. V. Hodges	3.48	3,740
29	do	5.29	10,700

Daily discharge, in second-feet, of Green River at Green River, Wyo., for the year ending September 30, 1923

Day	Oct.	Nov.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	770	770	-------	850	3,240	8,570	5,440	3,380	1,180
2	770	770	-------	950	3,110	7,760	5,810	3,240	1,180
3	770	770	-------	1,120	2,980	6,580	6,190	3,110	1,180
4	770	770	-------	1,060	2,980	5,810	5,440	2,980	1,180
5	770	730	-------	1,060	3,110	5,810	6,970	2,980	1,180
6	730	730	-------	1,180	4,090	6,580	7,360	2,720	1,180
7	730	690	-------	1,320	4,730	6,580	6,970	2,600	1,180
8	730	655	-------	1,400	4,910	6,580	6,580	2,600	1,180
9	730	655	-------	1,320	5,090	6,970	6,190	2,600	1,060
10	730	655	-------	1,470	5,260	6,970	6,190	2,600	1,000
11	690	655	-------	1,640	5,440	7,760	6,580	2,600	950
12	690	620	-------	1,830	5,440	8,980	6,190	2,250	950
13	690	620	-------	1,930	5,440	10,200	6,190	1,930	950
14	690	620	-------	2,040	5,080	11,100	5,810	1,830	950
15	730	620	-------	2,250	4,730	12,100	6,970	1,830	950
16	730	690	-------	2,250	4,730	11,100	7,760	1,740	950
17	730	850	-------	2,140	3,940	11,100	6,580	1,740	950
18	690	770	-------	3,510	3,650	10,200	5,810	1,740	950
19	730	655	-------	3,650	3,650	9,820	5,080	1,740	950
20	730	655	-------	3,510	4,400	8,570	4,730	1,740	950
21	730	655	-------	3,380	4,730	7,760	4,090	1,560	950
22	730	}	-------	2,980	5,080	6,970	3,790	1,400	950
23	730	}	-------	2,480	6,970	6,970	3,790	1,400	950
24	730	}	-------	2,250	6,970	6,580	4,730	1,400	950
25	730	}	-------	2,030	6,970	6,190	10,700	1,400	950
26	730	620	-------	1,830	7,760	5,440	7,760	1,320	950
27	730	}	-------	1,830	8,980	4,730	6,970	1,320	1,060
28	770	}	810	2,030	9,820	5,080	6,190	1,250	1,560
29	770	}	770	2,360	10,700	5,440	5,080	1,180	1,560
30	770	}	730	2,850	10,200	5,440	4,400	1,180	1,640
31	770	-------	730	-------	8,980	-------	3,650	1,180	-------

NOTE.—Stage-discharge relation affected by ice Nov. 22 to Mar. 27. Braced figure represents mean discharge for period indicated.

Monthly discharge of Green River at Green River, Wyo., for the year ending September 30, 1923

Month	Discharge in second-feet			Run off in acre-feet
	Maximum	Minimum	Mean	
October	770	690	735	45,200
November	850	----------	673	40,000
March 28–31	810	730	760	6,030
April	3,650	850	2,020	120,000
May	10,700	2,980	5,590	344,000
June	12,100	4,730	7,660	456,000
July	10,700	3,650	6,000	369,000
August	3,380	1,180	2,020	124,000
September	1,640	950	1,080	64,300

GREEN RIVER AT LITTLE VALLEY, NEAR GREEN RIVER, UTAH

LOCATION.—In sec. 4, T. 22 S., R. 16 E., 1 mile above old Little Valley ferry and 6 miles downstream from Green River, Emery County. San Rafael River enters Green River 16 miles downstream, in sec. 25, T. 23 S., R. 16 E.

DRAINAGE AREA.—41,000 square miles (measured in 1915, on best available maps of Colorada River basin).

RECORDS AVAILABLE.—December 18, 1910, to September 30, 1923. Records obtained at Green River (known also as Elgin or Blake) from 1894 to 1899, and 1905 to 1911, give practically the same flow.

GAGE.—Stevens continuous water-stage recorder on left bank 1 mile above old ferry; inspected by A. I. Anderson.

DISCHARGE MEASUREMENTS.—Made from cable a mile below gage at old ferry site.

CHANNEL AND CONTROL.—Bed composed of gravel and sand. Fairly permanent gravel riffle two-thirds of a mile below gage. Banks high and not subject to overflow.

EXTREMES OF DISCHARGE.—Maximum stage during year, 11.1 feet May 31 (discharge, 42,000 second-feet); minimum stage, 1.47 feet at 11 a. m. December 22 (discharge, 1,350 second-feet).

1894–1899; 1905–1923: Maximum discharge, 68,800 second-feet, May 29 1897; minimum stage, −0.95 foot December 1, 1919 (discharge, 510 second-feet).

ICE.—Stage-discharge relation affected by ice nearly every winter.

DIVERSIONS.—Station is below practically all diversions from Green River.

REGULATION.—None.

ACCURACY.—Stage-discharge relation changed slightly several times during the year; affected by ice December 24 to February 28. Rating curve well defined. Operation of water-stage recorder satisfactory except April 26 to May 2, June 3–9, July 1–10, August 6–11, and September 6–10. Daily discharge ascertained by applying mean daily gage height to rating table. Shifting-control method used March 27–30, May 8–18, 26–30, July 27, and 28. Discharge estimated by comparison with Ouray record April 26 to May 2, and June 3–9; and interpolated July 1–7, 9, August 6–11, September 6–10. Records good.

COOPERATION.—Since December 16, 1917, station has been maintained in cooperation with Utah Power & Light Co., which has made most of the discharge measurements.

Discharge measurements of Green River at Little Valley, near Green River, Utah, 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.*
Oct. 20	E. G. Thorum	1.15	2,000	May 25	E. G. Thorum	9.72	32,000
Dec. 13	W. E. Dickinson	1.85	1,700	July 10	do	6.17	14,200
Jan. 23	E. G. Thorum	2.38	2,230	Aug. 12	W. E. Dickinson	3.60	5,060
Feb. 23	do	2.39	2,280	Sept. 1	Purton and Stevens	3.14	3,980
Apr. 7	do	5.00	9,900				

Daily discharge, in second-feet, of Green River at Little Valley, near Green River, Utah, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1,980	2,690	2,400	1,930	2,160	2,560	12,700	13,400	41,500		9,750	4,410
2	2,130	2,560	2,470	1,810	2,220	2,750	14,600	14,000	39,800		9,100	4,200
3	2,040	2,550	2,600	1,880	2,280	3,050	16,300	14,700	37,000		8,640	3,990
4	2,020	2,660	2,680	1,940	2,270	3,010	14,500	15,400	35,800	16,800	8,330	3,830
5	2,000	2,660	2,690	1,960	2,280	2,710	12,200	15,300	35,600		8,160	3,810
6	1,980	2,740	2,660	2,040	2,080	2,680	11,100	15,700	34,100			
7	1,970	2,830	2,530	2,070	1,900	2,850	9,910	16,500	32,900			
8	1,980	2,810	2,500	2,080	1,750	3,070	8,990	18,500	32,200	15,300		3,410
9	2,010	2,810	2,500	2,070	1,760	3,320	9,400	22,200	31,400	14,600	6,680	
10	2,020	2,800	2,210	2,400	1,670	3,420	10,100	25,500	30,400	14,000		
11	2,020	2,780	2,020	2,600	1,850	3,340	10,200	26,300	29,700	13,600		3,010
12	2,010	2,810	1,960	2,610	1,960	3,320	9,440	28,100	30,700	13,400	5,200	2,870
13	2,000	2,800	1,660	2,500	2,040	3,380	8,640	29,400	33,300	13,400	5,450	2,760
14	1,970	2,730	1,940	2,360	2,060	3,650	8,570	29,700	35,300	12,800	6,110	2,710
15	1,960	2,580	2,360	2,400	1,960	3,650	8,680	27,900	37,600	12,400	5,000	2,730
16	1,980	2,470	2,740	2,410	2,040	3,570	9,400	25,100	37,800	12,200	5,040	2,900
17	2,000	2,470	2,610	2,340	2,060	3,530	10,000	23,600	37,500	12,500	5,690	2,850
18	2,010	2,460	2,270	2,240	2,080	3,260	9,910	22,600	36,900	11,800	5,450	2,900
19	2,020	2,460	1,970	2,090	2,110	3,070	9,910	21,100	35,200	11,200	5,040	2,830
20	2,020	2,470	1,830	2,020	2,120	3,160	10,200	21,400	33,000	11,900	5,100	2,800
21	2,030	2,470	1,680	2,000	2,120	3,050	11,400	23,900	29,900	11,400	5,020	2,800
22	2,040	2,420	1,540	2,090	2,170	2,870	14,000	27,300	27,300	10,400	4,850	3,010
23	2,060	2,420	1,590	2,240	2,220	2,940	16,400	29,900	25,800	9,590	4,670	3,160
24	2,090	2,470	1,640	2,290	2,350	3,090	15,000	31,700	23,300	9,250	4,510	3,220
25	2,120	2,560	1,690	2,310	2,460	3,240	13,200	32,000	21,400	9,400	4,290	3,140
26	2,130	2,560	1,730	2,250	2,520	3,340	12,500	32,800	20,500	9,210	4,240	3,360
27	2,140	2,500	1,730	2,250	2,420	4,180	11,600	35,100	20,500	9,480	4,060	3,570
28	2,170	2,380	1,900	2,250	2,410	4,870	11,400	38,100	20,900	10,600	3,880	3,550
29	2,180	2,340	2,020	2,360	-------	5,660	11,400	40,200	19,800	13,200	3,790	3,810
30	2,250	2,350	2,010	2,240	-------	7,260	12,400	41,400	18,400	11,600	3,570	3,810
31	2,580	-------	1,960	2,160	-------	10,000	-------	42,000	-------	10,400	4,240	-------

NOTE.—Braced figures show estimated mean discharge for periods indicated.

Monthly discharge of Green River at Little Valley, near Green River, Utah, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	2,580	1,960	2,060	127,000
November	2,830	2,340	2,590	154,000
December	2,740	1,540	2,130	131,000
January	2,610	1,810	2,200	135,000
February	2,520	1,670	2,120	118,000
March	10,000	2,560	3,670	226,000
April	16,400	8,570	11,500	682,000
May	42,000	13,400	25,800	1,590,000
June	41,500	18,400	30,800	1,830,000
July	-------	9,210	12,900	796,000
August	9,750	3,570	5,780	356,000
September	4,410	2,710	3,300	196,000
The year	42,000	1,540	8,760	6,340,000

EAST FORK AT EAST FORK CANAL, WYO.

LOCATION.—In sec. 10, T. 31 N., R. 106 W., 300 feet above intake of East Fork Canal, 18 miles southeast of Boulder, Sublette County. Nearest tributary, Canal Creek, enters just below.

DRAINAGE AREA.—106 square miles (measured on United States Geological Survey map of Wyoming, scale 1:500,000).

RECORDS AVAILABLE.—During irrigation seasons of 1916, 1917, 1921, 1922, and 1923, when station was discontinued.

GAGE.—Vertical staff on left bank; read by Robert Hawkins.

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

CHANNEL AND CONTROL.—Bed composed of small boulder; control 100 feet downstream, practically permanent.

EXTREMES OF DISCHARGE.—Maximum stage during irrigation season, 4.1 feet at 10 a. m. May 26 (discharge, 1,040 second-feet); minimum stage, 0.70 foot on October 11 and 12 (discharge, 4 second-feet).

1916–17; 1921–1923: Maximum stage recorded, 4.6 feet on June 23, 1917 (discharge, 1,400 second-feet); minimum stage that of October 11 and 12, 1922.

ICE.—No data, as records are discontinued during winter.

DIVERSIONS.—Adjudicated diversions for irrigation of 1,800 acres above station.

REGULATION.—Flow regulated to small extent by many small lakes at headwaters.

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 fair.

Daily discharge, in second-feet, of East Fork at East Fork Canal, Wyo., for the period October 1, 1922, to November 15, 1923

Day	Oct.	May	June	July	Aug.	Sept.	Oct.	Nov.
1	4.5	-------	362	500	101	10	46	20
2	4.5	-------	415	455	87	11	43	22
3	4.5	-------	550	415	78	10	38	22
4	5.0	-------	770	478	65	9	41	23
5	5.0	-------	600	330	59	8	46	22
6	5.0	-------	415	330	54	8	46	20
7	5.0	-------	500	415	43	8	43	22
8	5.0	-------	600	315	41	8	43	20
9	5.0	-------	770	315	43	7	46	18
10	5.0	-------	835	270	38	8	43	22
11	4.0	-------	900	270	36	7	36	23
12	4.0	-------	900	255	31	7	34	22
13	4.5	205	835	242	31	6	29	25
14	5.0	205	835	242	29	6	34	27
15	-------	205	655	230	25	6	34	29
16	-------	192	455	230	22	9	31	-------
17	-------	192	500	218	18	9	27	-------
18	-------	285	330	205	16	8	29	-------
19	-------	315	285	180	16	7	25	-------
20	-------	345	242	151	14	8	23	-------
21	-------	398	300	147	16	14	22	-------
22	-------	435	285	143	16	13	18	-------
23	-------	550	285	147	16	14	16	-------
24	-------	655	270	147	14	18	13	-------
25	-------	835	270	192	14	22	12	-------
26	-------	1,040	315	180	14	25	12	-------
27	-------	770	345	155	13	29	11	-------
28	-------	900	380	147	14	43	11	-------
29	-------	655	380	143	12	51	12	-------
30	-------	655	455	123	11	54	14	-------
31	-------	500	-------	108	10	-------	17	-------

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Monthly discharge of East Fork at East Fork Canal, Wyo., for the period October 1, 1923, to November 15, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October 1–14	5.0	4.0	4.7	131
May 13–31	1,040	192	491	18,500
June	900	242	501	29,800
July	500	108	248	15,200
August	101	10	32.2	1,980
September	54	6	14.8	881
October	46	11	28.9	1,780
November 1–15	29	18	22.5	669

EAST FORK AT NEWFORK, WYO.

LOCATION.—About sec. 33, T. 32 N., R. 108 W., at highway bridge a quarter of a mile south of Newfork, Sublette County. No tributary between station and mouth, 1 mile below.

DRAINAGE AREA.—348 square miles (measured on United States Geological Survey map of Wyoming; scale, 1:500,000).

RECORDS AVAILABLE.—April 1, 1905, to October 31, 1906; May 11, 1915, to September 30, 1923.

GAGE.—Vertical staff on downstream side of left abutment; read by J. W. Glaze.

DISCHARGE MEASUREMENTS.—Made from two-span highway bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of sand and gravel. Control 100 feet downstream at gravel bar which is slightly shifting. Banks subject to overflow at stage of 6 feet.

EXTREMES OF DISCHARGE.—Maximum stage recorded, 6.1 feet at 7 a. m. May 28 (discharge, 2,390 second-feet); minimum discharge occurred during winter.

1915–1923: Maximum discharge, 2,940 second-feet on June 19, 1917; minimum discharge, 25 second-feet at 6 p. m. April 4, 1920.

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

DIVERSIONS.—Adjudicated diversions for irrigation of 8,900 acres between this station and the one near East Fork Canal.

REGULATION.—Flow regulated to small extent by many small lakes at headwaters.

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

The following discharge measurement was made by P. V. Hodges:

May 26, 1923: Gage height, 5.44 feet; discharge, 1,880 second-feet.

Daily discharge, in second-feet, of East Fork at Newfork, Wyo., for the year ending September 30, 1923

Day	Oct.	Nov.	Apr.	May	June	July	Aug.	Sept.
1	51	55	98	122	740	580	111	57
2	51	56	92	115	660	545	113	57
3	51	54	72	109	825	510	111	57
4	51	54	54	120	1,230	510	104	57
5	51	52	63	144	1,100	440	97	57

Daily discharge, in second-feet, of East Fork at Newfork, Wyo., for the year ending September 30, 1923—Continued

Day	Oct.	Nov.	Apr.	May	June	July	Aug.	Sept.
6	51	51	56	169	825	388	90	57
7	51	51	70	182	930	372	86	57
8	51	51	76	220	985	356	84	57
9	51	51	82	263	1,300	340	90	56
10	51	52	68	340	1,560	324	76	56
11	51	52	65	388	1,700	324	74	56
12	51	50	72	372	1,840	324	71	56
13	51	45	67	324	1,920	263	71	56
14	51	45	63	294	1,420	278	71	56
15	52	45	72	309	1,160	309	71	54
16	52	46	76	278	985	294	71	54
17	52	46	88	263	825	234	70	54
18	52	48	130	324	700	194	68	54
19	52	48	153	475	545	169	65	51
20	52	50	109	580	388	146	63	51
21	51	49	118	700	340	136	62	49
22	51	48	104	930	580	128	62	49
23	49	46	88	930	545	148	60	47
24	49	45	87	1,100	510	234	60	47
25	49	45	84	1,560	422	248	60	47
26	49	45	97	1,840	440	207	57	47
27	51	46	126	2,310	309	220	57	55
28	51	48	130	2,230	194	182	57	61
29	51	48	142	1,420	194	148	57	63
30	52	50	144	1,230	580	128	57	63
31	52	------	------	1,100	------	118	57	------

NOTE.—Stage-discharge relation affected by ice Nov. 12–30; discharge estimated.

Monthly discharge of East Fork at Newfork, Wyo., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	52	49	51.0	3,140
November	56	45	49.1	2,920
April	153	54	91.5	5,440
May	2,310	109	669	41,100
June	1,920	194	858	51,100
July	580	118	284	17,500
August	113	57	74.0	4,550
September	63	47	54.6	3,250

NEW FORK NEAR BOULDER, WYO.

LOCATION.—About sec. 8, T. 32 N., R. 108 W., at highway bridge 1 mile west of Boulder, Sublette County. Nearest tributary, Boulder Creek, enters an eighth of a mile below.

DRAINAGE AREA.—578 square miles (measured on United States Geological Survey map of Wyoming, scale 1:500,000).

RECORDS AVAILABLE.—May 11, 1915, to September 30, 1923.

GAGE.—Vertical staff on downstream side of left abutment; read by Martin Brandt.

DISCHARGE MEASUREMENTS.—Made from two-span bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of sand and gravel underlain by slate; shifting at long intervals. No well-defined control. At high water there are two overflow channels, one around right end of bridge and other from New Fork to Boulder Creek.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 5.8 feet on June 14 (discharge, 2,890 second-feet); minimum discharge occurred during winter.

1915–1923: Maximum stage recorded, 8.7 feet at 6 a. m. June 17, 1918 (discharge, 12,300 second-feet); minimum discharge of 42 second-feet occurred from December 15 to 17, 1915.

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

DIVERSIONS.—Adjudicated diversions for irrigation of 13,400 acres above station.

REGULATION.—None.

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

The following discharge measurement was made by P. V. Hodges:
May 28, 1923: Gage height, 4.58 feet; discharge, 1,580 second-feet.

Daily discharge, in second-feet, of New Fork near Boulder, Wyo., for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Apr.	May	June	July	Aug.	Sept.
1	188	122	84	175	358	1,600	1,800	1,080	260
2	194	127	88	175	318	1,500	2,000	935	260
3	170	132	------	175	318	1,500	2,210	865	260
4	164	137	------	181	318	1,500	2,210	795	242
5	158	142	------	181	318	1,420	2,320	795	242
6	152	142	------	185	318	1,420	2,320	730	224
7	147	122	------	188	318	1,420	2,210	698	207
8	142	96	------	188	318	1,420	2,100	635	197
9	137	109	------	188	358	1,420	2,100	578	170
10	132	113	------	188	400	1,500	2,100	550	152
11	132	113	------	188	522	2,000	2,210	495	134
12	137	104	------	188	550	2,640	2,100	470	132
13	137	104	------	191	635	2,770	2,000	470	132
14	147	109	------	194	665	2,890	2,000	470	127
15	142	124	------	188	635	2,770	1,900	445	127
16	137	140	------	188	578	2,770	1,800	445	132
17	137	118	------	224	522	2,770	1,700	422	137
18	132	104	------	318	495	2,770	1,500	400	137
19	132	96	------	379	470	2,540	1,420	379	137
20	127	109	------	318	495	2,100	1,420	379	137
21	122	100	------	338	550	2,000	1,330	338	137
22	122	97	------	318	635	2,000	1,240	318	132
23	118	94	------	260	665	2,000	1,240	298	127
24	113	102	------	279	1,010	1,700	1,500	298	122
25	109	98	------	298	1,160	1,500	1,500	298	122
26	109	96	------	318	1,240	1,420	1,420	298	127
27	109	92	------	358	1,420	1,420	1,420	279	137
28	109	88	------	470	1,600	1,330	1,330	279	147
29	113	85	------	400	1,600	1,420	1,240	279	155
30	118	84	------	358	1,600	1,600	1,240	260	164
31	122	------	------	------	1,600	------	1,160	260	------

Monthly discharge of New Fork near Boulder, Wyo., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	194	109	136	8,360
November	142	84	110	6,550
April	470	175	253	15,100
May	1,600	318	709	43,600
June	2,890	1,330	1,900	113,000
July	2,320	1,160	1,740	107,000
August	1,080	260	492	30,300
September	260	122	164	9,760

PINE CREEK AT PINEDALE, WYO.

LOCATION.—In sec. 4, T. 33 N., R. 109 W., at highway bridge at Pinedale, Sublette County. No large tributary between station and mouth, 3 miles below.

DRAINAGE AREA.—128 square miles (measured on United States Geological Survey map of Wyoming, scale 1:500,000).

RECORDS AVAILABLE.—May 8, 1915, to September 30, 1923.

GAGE.—Vertical staff on downstream side of bridge pier; read by D. C. Carson.

DISCHARGE MEASUREMENTS.—Made from two-span bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of gravel. Control at rapids just below gage; slightly shifting. Banks subject to overflow at extreme high water.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 3.4 feet at 9.30 a. m. June 15 (discharge, 1,070 second-feet); minimum discharge occurred during winter.

1915–1923: Maximum stage, 5.0 feet June 17, 1918 (discharge, 2,310 second-feet); minimum discharge, 4 second-feet November 14–17, 1921.

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

DIVERSIONS.—Adjudicated diversions for irrigation of 5,100 acres above Pinedale and 280 acres below.

REGULATION.—Flow regulated by Fremont Lake, which has an area of approximately 8 square miles and drains 110 square miles.

ACCURACY.—Stage-discharge relation shifted slightly. Rating curve well defined below 600 second-feet. Gage read to hundredths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table except period October 1 to June 30 when shifting-control method was used. Records good.

The following discharge measurement was made by P. V. Hodges:
May 25, 1923: Gage height, 2.04 feet; discharge, 185 second-feet.

Daily discharge, in second-feet, of Pine Creek at Pinedale, Wyo., for the year ending September 30, 1923

Day	Oct.	Nov.	Apr.	May	June	July	Aug.	Sept.
1	50	24	20	32	535	678	550	90
2	48	23	20	34	528	758	542	90
3	47	24	20	36	490	870	528	87
4	45	24	20	38	454	900	512	87
5	42	23	21	38	475	950	252	82
6	40	24	22	38	482	950	241	76
7	39	24	23	40	482	990	215	70
8	38	23	24	40	482	1,030	215	58
9	38	23	25	44	482	1,000	237	48
10	38	22	26	54	600	980	215	47
11	37	22	27	62	720	950	203	44
12	35	------	27	73	860	920	215	44
13	33	------	25	83	950	900	215	44
14	33	------	25	87	990	870	173	43
15	32	------	25	90	1,070	870	168	42
16	32	------	25	88	1,050	780	162	42
17	32	------	25	88	1,020	700	157	42
18	32	------	25	88	990	630	152	41
19	31	------	25	90	920	630	146	40
20	30	------	25	100	850	574	140	38
21	30	------	25	110	780	542	134	37
22	27	------	25	122	726	512	128	37
23	27	------	25	140	694	520	126	37
24	26	------	25	157	646	512	115	37
25	26	------	25	176	574	393	115	37

Daily discharge, in second-feet, of Pine Creek at Pinedale, Wyo., for the year ending September 30, 1923—Continued

Day	Oct.	Nov.	Apr.	May	June	July	Aug.	Sept.
26	25	----	25	212	535	363	109	37
27	25	----	25	315	528	295	102	36
28	25	----	25	357	513	265	98	35
29	25	----	28	426	528	512	93	35
30	24	----	30	498	630	505	90	35
31	24	----	----	520	----	535	91	----

NOTE.—No gage-height record Apr. 1–11, 15–26, 29, 30, May 1–3, 19–21, June 8, 10–12, 16, 17, 19–21, July 4, 9, 10, 12, 13, 16, 17, August 16–23; discharge based on comparison with records of flow for New Fork near Boulder.

Monthly discharge of Pine Creek at Pinedale, Wyo., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	50	24	33.4	2,050
November 1–11	24	22	23.3	508
April	30	20	24.4	1,450
May	520	32	138	8,480
June	1,070	454	686	40,800
July	1,030	265	706	43,400
August	550	90	208	12,800
September	90	35	50.6	3,010

BOULDER CREEK NEAR BOULDER, WYO.

LOCATION.—In sec. 4, T. 32 N., R. 108 W., at Sandlin ranch 2 miles northwest of Boulder, Sublette County. No tributary between station and mouth, 2 miles below.

DRAINAGE AREA.—112 square miles (measured on United States Geological Survey map of Wyoming; scale 1:500,000).

RECORDS AVAILABLE.—April 23, 1904, to October 31, 1906; May 10, 1915, to September 30, 1923.

GAGE.—Chain gage; read by Mrs. M. M. Sandlin.

DISCHARGE MEASUREMENTS.—Made by wading or from bridge 1¾ miles downstream.

CHANNEL AND CONTROL.—Bed composed of gravel; deep pool at gage. Control 150 feet downstream at rapids which shifts slightly at intervals. Banks are high and not subject to overflow.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 5.7 feet on June 13 (discharge, 2,260 second-feet); minimum stage probably occurred during winter.

1904–1906; 1915–1923: Maximum stage, 6.8 feet at 7 a. m. June 14, 1918 (discharge, 3,240 second-feet); minimum discharge, 0.9 second-foot, August 31, 1915.

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

DIVERSIONS.—Adjudicated diversions for irrigation of 6,000 acres, all above station.

REGULATION.—Regulation by Boulder Lake. Low-water discharge affected by irrigation above station.

ACCURACY.—Stage-discharge relation apparently permanent during year. Rating curve well defined. Gage read to hundredths twice daily. Records good.

The following discharge measurement was made by P. V. Hodges:

May 26, 1923: Gage height, 4.10 feet; discharge, 1,080 second-feet.

Daily discharge, in second-feet, of Boulder Creek near Boulder, Wyo., for the year ending September 30, 1923

Day	Oct.	Nov.	May	June	July	Aug.	Sept.
1	7	6	32	785	1,280	143	16
2	7	6	37	580	1,340	99	15
3	7	6	40	625	1,340	91	15
4	7	6	43	785	1,280	82	15
5	7	6	50	900	1,140	71	15
6	6	6	59	840	1,140	62	15
7	6	6	66	785	1,020	55	15
8	6	6	83	840	960	49	14
9	6	6	75	1,140	900	43	13
10	6	6	63	1,280	785	38	12
11	6	6	98	1,620	785	33	11
12	6	6	120	2,090	675	30	11
13	6	6	122	2,260	675	28	11
14	6	6	119	2,090	625	27	11
15	6	6	119	1,850	625	24	11
16	6	6	111	1,700	580	22	11
17	6	6	113	1,560	580	22	11
18	6	6	122	1,140	535	22	11
19	6	6	176	840	495	22	10
20	6	6	226	580	415	22	10
21	6	6	284	580	335	21	10
22	6	6	435	580	335	19	10
23	6	6	455	580	355	18	10
24	6	6	580	535	375	18	10
25	6	6	785	580	355	18	11
26	6	6	1,080	580	415	18	11
27	6	6	1,420	580	415	18	11
28	6	6	1,420	675	335	17	12
29	6	6	1,210	785	254	16	15
30	6	6	1,080	960	187	16	15
31	6	------	1,020	------	164	16	------

Monthly discharge of Boulder Creek near Boulder, Wyo., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	7	6	6.2	381
November	6	6	6.0	357
May	1,420	32	376	23,100
June	2,260	535	1,020	60,700
July	1,340	164	668	41,100
August	143	16	38.1	2,340
September	16	10	12.3	732

BIG SANDY CREEK NEAR FARSON, WYO.

LOCATION.—In sec. 18, T. 27 N., R. 106 W., three-quarters of a mile below Ten Trees and 18 miles north of Farson, Sweetwater County. No tributary within several miles.

DRAINAGE AREA.—322 square miles (measured on United States Geological Survey map of Wyoming, scale, 1:500,000).

RECORDS AVAILABLE.—May 10, 1915, to September 30, 1917; April 28, 1921, to September 30, 1923.

GAGE.—Stevens eight-day water-stage recorder at left bank, half a mile above head gate of Eden Canal; inspected by employee of Eden Land & Irrigation Co.

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

CHANNEL AND CONTROL.—Bed composed of well-compacted sand; control 150 feet downstream, fairly permanent. Banks are overflowed at stage of 3.7 feet.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 4.8 feet at 6 a. m. June 13 (discharge, 774 second-feet); minimum stage, 1.50 feet from 6 to 8 p. m. October 5 (discharge, 4 second-feet).

1915–1917; 1921–1923: Maximum discharge, 1,160 second-feet on June 26, 1917; minimum discharge, 4 second-feet September 24, 1921, and October 5, 1922.

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

DIVERSIONS.—Adjudicated diversions for irrigation of 3,000 acres above station.

REGULATION.—None.

ACCURACY.—Stage-discharge relation permanent during year. Rating curve well defined below 600 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 excellent.

The following discharge measurement was made by P. V. Hodges:
May 24, 1923: Gage height, 3.62 feet; discharge, 452 second-feet.

Daily discharge, in second-feet, of Big Sandy Creek near Farson, Wyo., for the year ending September 30, 1923

Day	Oct.	Nov.	May	June	July	Aug.	Sept.
1	9	10	-------	441	451	140	17
2	11	14	-------	370	454	126	17
3	6	-------	-------	392	454	117	16
4	5	-------	-------	481	443	110	17
5	5	-------	-------	527	430	108	20
6	5	-------	-------	492	376	94	20
7	5	-------	-------	424	365	86	20
8	7	-------	-------	441	354	79	21
9	5	-------	-------	473	360	70	21
10	5	-------	-------	530	341	63	21
11	6	-------	-------	608	335	56	19
12	5	-------	-------	682	324	53	24
13	6	-------	245	701	308	47	26
14	6	-------	220	690	295	46	19
15	8	-------	222	632	438	42	15
16	11	-------	225	584	476	39	15
17	14	-------	200	527	416	39	19
18	14	-------	222	503	335	36	21
19	14	-------	308	419	301	34	20
20	14	-------	343	360	265	31	20
21	13	-------	378	333	235	30	19
22	12	-------	454	354	215	28	19
23	12	-------	478	376	282	26	18
24	13	-------	486	327	335	23	21
25	13	-------	538	290	370	21	23
26	13	-------	630	282	308	21	36
27	12	-------	670	316	268	20	40
28	12	-------	715	338	240	21	54
29	13	-------	597	352	205	20	66
30	13	-------	527	381	179	18	70
31	14	-------	511	-------	160	17	-------

Monthly discharge of Big Sandy Creek near Farson, Wyo., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	14	5	9.7	596
May 13–31	715	200	419	15,800
June	701	282	454	27,000
July	476	160	333	20,500
August	140	17	53.6	3,300
September	70	15	25.1	1,490

BLACKS FORK NEAR URIE, WYO.

LOCATION.—In sec. 23, T. 16 N., R. 115 W., at highway bridge, 4 miles northwest of Urie, Uinta County. No tributary within 10 miles.

DRAINAGE AREA.—261 square miles (measured on United States Geological Survey map of Wyoming, scale 1:500,000).

RECORDS AVAILABLE.—August 21, 1913, to September 30, 1923.

GAGE.—Vertical staff on downstream side of center pier; read by Miss Myrtle Anderson.

DISCHARGE MEASUREMENTS.—Made from two-span bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of well-compacted gravel. Control is small rapids just below bridge; shifts slightly. Right bank is high and is not overflowed; left bank is overflowed at stage of about 3 feet.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 4.42 feet at 4.30 p. m. May 27 (discharge, 2,280 second-feet); minimum stage, 0.60 foot from September 11 to 16 (discharge, 8 second-feet).

1913–1923: Maximum stage, 4.72 feet at 7 p. m. June 19 and 9 a. m. June 20, 1917 (discharge, 2,680 second-feet); minimum discharge, 1 second-foot September 17–22, 1916.

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

DIVERSIONS.—Adjudicated diversions for irrigation of 4,500 acres above station; practically none below.

REGULATION.—None.

ACCURACY.—Stage-discharge relation shifted slightly. Rating curve fairly well defined. Gage read to quarter-tenths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table; shifting-control method used during September. Records good, except during low-water period, for which they are fair.

The following discharge measurement was made by P. V. Hodges:

May 21, 1923: Gage height, 3.34 feet; discharge, 1,180 second-feet.

Daily discharge, in second-feet, of Blacks Fork near Urie, Wyo., for the year ending September 30, 1923

Day	Oct.	Nov.	Apr.	May	June	July	Aug.	Sept.
1	10	20	208	135	630	380	93	26
2	10	21	225	190	660	340	91	21
3	17	23	160	190	840	320	83	20
4	17	24	160	190	880	360	76	23
5	17	24	175	208	800	300	102	30
6	10	19	190	160	730	300	95	12
7	11	17	150	190	600	300	83	19
8	14	21	148	190	840	260	61	19
9	13	23	130	320	800	260	51	19
10	11	27	119	400	880	225	35	14

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Daily discharge, in second-feet, of Blacks Fork near Urie, Wyo., for the year ending September 30, 1923—Continued

Day	Oct.	Nov.	Apr.	May	June	July	Aug.	Sept.
11	11	25	97	540	1,060	242	25	8
12	11	17	138	540	1,330	260	21	8
13	11	17	150	540	1,720	225	102	8
14	14	------	130	430	1,240	225	48	8
15	11	------	140	380	1,060	225	23	8
16	11	------	155	360	800	208	25	8
17	11	------	190	340	970	190	21	31
18	11	------	242	630	730	160	25	23
19	11	------	190	660	405	140	21	20
20	11	------	138	880	340	108	21	14
21	11	------	135	1,330	360	102	21	14
22	11	------	138	1,330	260	112	21	15
23	11	------	130	1,520	208	117	21	17
24	11	------	130	1,420	730	101	21	25
25	11	------	130	1,520	510	102	21	21
26	11	------	160	1,930	430	93	21	19
27	13	------	280	2,260	455	97	21	27
28	13	------	300	1,240	480	112	21	24
29	13	------	280	880	380	112	24	24
30	17	------	260	765	340	97	23	24
31	17	------	------	660	------	112	21	------

Monthly discharge of Blacks Fork near Urie, Wyo., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	17	10	12.3	756
November 1–13	27	17	21.4	552
April	300	97	173	10,300
May	2,260	135	720	44,300
June	1,720	208	716	42,600
July	380	93	200	12,300
August	102	21	43.2	2,660
September	31	8	18.6	1,110

HAMS FORK AT DIAMONDVILLE, WYO.

LOCATION.—In SW. ¼ sec. 24, T. 21 N., R. 116 W., at highway bridge at Diamondville, Lincoln County. Nearest tributary, Willow Creek, enters 4 miles upstream.

DRAINAGE AREA.—383 square miles (measured on United States Geological Survey map of Wyoming, scale 1: 500,000).

RECORDS AVAILABLE.—October 1, 1918, to September 30, 1923. From May 1 to September 30, 1918, station maintained at Kemmerer 2 miles upstream; records at two points comparable.

GAGE.—Vertical staff fastened to downstream end of center pier; read by P. R. Thomassen.

DISCHARGE MEASUREMENTS.—Made from two-span bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of small boulders and well-compacted gravel. Control 200 feet downstream at small rapids composed of well-compacted gravel, which shift at long intervals.

EXTREMES OF DISCHARGE.—Maximum stage recorded, 4.55 feet at 8 a.m. May 11 (discharge, 3,250 second-feet); minimum discharge probably occurred during winter.

1918–1923: Maximum stage, that of May 11, 1923; minimum discharge, river dry August 29–31, 1919.

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

DIVERSIONS.—Adjudicated diversions for irrigation of 3,500 acres above station and 7,800 acres below.

REGULATION.—None.

ACCURACY.—Stage-discharge relation practically permanent. Rating curve well defined below 2,000 second-feet. Gage read to hundredths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table. Records excellent.

Discharge measurements of Hams Fork at Diamondville, Wyo., during the year ending September 30, 1923

Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*
Oct. 5	M. B. Arthur	1.72	28.6
May 20	P. V. Hodges	3.93	1,810

Daily discharge, in second-feet, of Hams Fork at Diamondville, Wyo., for the year ending September 30, 1923

Day	Oct.	Nov.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	30	50		42	705	1,050	370	79	33
2	30	50		42	855	975	370	77	34
3	30	54		42	975	855	370	70	32
4	34	57		47	1,120	802	342	68	29
5	33	56		47	1,290	855	342	66	26
6	33	52		44	1,700	855	305	56	26
7	32	43		50	1,700	855	275	54	26
8	32	36		50	2,170	855	256	47	26
9	32	38		47	2,410	855	260	44	25
10	32	40		57	2,410	855	229	44	24
11	32	38		57	3,130	855	212	44	24
12	32	34		75	3,010	802	220	44	23
13	32	34		108	1,380	802	242	45	22
14	32	34		126	1,480	855	256	42	22
15	36	34		126	1,290	750	247	42	22
16	39			152	1,050	750	205	43	22
17	39			182	1,050	802	167	40	32
18	39			256	1,200	750	152	38	35
19	39			290	1,700	705	130	34	39
20	39			285	1,820	660	119	32	39
21	39			265	1,700	575	108	32	38
22	39			229	1,930	575	108	30	34
23	39			174	1,820	575	105	31	38
24	38			182	1,820	538	115	30	79
25	36		20	212	1,590	500	140	30	75
26	34		20	285	1,700	468	152	28	68
27	34		25	370	1,700	402	130	26	75
28	39		28	435	1,700	370	112	24	105
29	50		34	660	1,590	370	102	23	122
30	54		42	802	1,200	370	79	33	102
31	52		54		1,200		79	33	

Monthly discharge of Hams Fork at Diamondville, Wyo., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	54	30	36.5	2,240
November 1–15	57	34	43.3	1,290
March 25–31	54	20	31.9	443
April	802	42	191	11,400
May	3,130	705	1,630	100,000
June	1,050	370	710	42,200
July	370	79	203	12,500
August	79	23	42.9	2,640
September	122	22	43.2	2,570

LITTLE SNAKE RIVER NEAR DIXON, WYO.

LOCATION.—In sec. 6, T. 12 N., R. 90 W., at highway bridge, 1 mile west of Dixon, Carbon County. No important tributary within several miles.

DRAINAGE AREA.—1,060 square miles (measured on United States Geological Survey map of Wyoming; scale, 1: 500,000).

RECORDS AVAILABLE.—May 27, 1910, to September 30, 1923.

GAGE.—Chain gage on upstream side of bridge; read by Mrs. J. E. Herold.

CHANNEL AND CONTROL.—Shifting during high water.

EXTREMES OF DISCHARGE.—Maximum gage height recorded, 6.2 feet at 6.30 a. m. May 26 (discharge, 4,360 second-feet); minimum stage, 0.80 foot October 9–11 (discharge, 28 second-feet).

1910–1923: Maximum mean daily stage recorded, 8.3 feet on May 23, 1920 (discharge, 8,960 second-feet); minimum stage recorded, 0.2 foot on August 6, 1911 (discharge, 5 second-feet).

DIVERSIONS.—Adjudicated diversions for irrigation of 4,800 acres in Wyoming and 1,200 acres in Colorado.

REGULATION.—None.

COOPERATION.—Complete records furnished by State engineer of Colorado.

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

Day	Oct.	Nov.	Apr.	May	June	July	Aug.	Sept.
1	45	34	100	874	3,420	422	40	40
2	37	34	110	874	3,210	358	40	40
3	34	40	120	1,050	2,620	318	40	40
4	34	40	130	1,340	2,560	318	40	40
5	34	45	140	2,060	2,490	264	40	40
6	34	50	150	2,430	2,370	204	40	37
7	31	50	160	2,940	2,250	204	37	34
8	31	45	170	3,000	2,310	204	34	34
9	28	45	180	3,120	2,370	204	34	31
10	28	40	190	3,070	2,490	248	34	31
11	28	40	190	3,350	2,680	233	31	31
12	31	40	280	1,820	2,680	218	31	34
13	31	40	299	1,700	2,680	233	31	34
14	31	40	248	1,700	2,620	218	34	37
15	34	40	299	1,760	2,250	233	108	37
16	34	40	338	1,760	2,120	218	158	40
17	34	40	400	1,940	1,820	218	96	40
18	34	40	640	2,430	1,470	218	74	45
19	34	40	750	2,810	1,210	190	64	45
20	34	40	640	3,070	1,050	190	57	40

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

Day	Oct.	Nov.	Apr.	May	June	July	Aug.	Sept.
21	34	40	490	3,630	942	162	50	40
22	34	40	444	3,490	874	148	40	40
23	34	40	318	3,210	874	162	40	40
24	34	40	358	3,210	810	176	40	45
25	34	40	318	3,490	780	148	40	64
26	34	40	444	4,140	694	121	40	64
27	34	40	588	3,770	640	74	40	74
28	34	40	694	3,770	538	64	40	74
29	34	40	750	3,560	514	57	40	64
30	34	40	942	3,350	444	57	40	74
31	34			3,490		50	40	

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

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	45	28	33.3	2,050
November	50	34	40.8	2,430
April	942	100	363	21,600
May	4,140	874	2,650	163,000
June	3,420	444	1,790	107,000
July	422	50	198	12,200
August	158	31	48.8	3,000
September	74	31	44.3	2,640

LITTLE SNAKE RIVER NEAR LILY, COLO.

LOCATION.—In sec. 20, T. 7 N., R. 98 W., at highway bridge near mouth of canyon, 6 miles above Lily, Moffat County. No tributary between station and mouth of river at Lily.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—May 1, 1922, to September 30, 1923.

GAGE.—Remodeled Bristol.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading.

CHANNEL AND CONTROL.—Fairly permanent.

EXTREMES OF DISCHARGE.—Maximum gage height recorded, 7.4 feet at noon May 28 (discharge, 5,350 second-feet); minimum stage, 0.90 foot from August 9–14 (discharge, 6 second-feet).

DIVERSIONS.—Adjudicated diversions for irrigation of 28,700 acres above station.

REGULATION.—None.

COOPERATION.—Complete records furnished by State engineer.

Daily discharge, in second-feet, of Little Snake River near Lily, Colo., for the year ending September 30, 1923

Day	Oct.	Nov.	May	June	July	Aug.	Sept.
1	20	59	2,590	3,580	598	10	89
2	24	52	2,370	3,450	532	8	104
3	24	52	2,370	3,450	511	8	122
4	24	52	2,420	3,260	532	8	127
5	28	46	2,820	3,320	490	8	134
6	28	46	3,930	3,320	450	8	134
7	34	52	3,450	3,060	370	8	146
8	28	46	3,320	2,700	262	8	134
9	34	40	3,060	2,480	215	6	127
10	34	46	3,580	2,940	172	6	122

Daily discharge, in second-feet, of Little Snake River near Lily, Colo., for the year ending September 30, 1923—Continued

Day	Oct.	Nov.	May	June	July	Aug.	Sept.
11	40	40	3,650	3,120	146	6	122
12	40	40	3,650	2,940	122	6	134
13	46	40	2,820	2,820	100	6	141
14	46	40	2,370	2,820	172	6	134
15	46	46	2,260	2,700	230	8	134
16	46	46	2,320	2,640	370	172	139
17	59	52	2,150	2,370	576	89	141
18	52	52	2,150	2,260	532	49	146
19	52	52	2,370	2,000	410	58	146
20	52	52	2,940	1,800	370	89	146
21	59	59	2,700	1,750	314	100	146
22	52	66	2,260	1,440	172	111	146
23	59	46	2,150	1,320	100	122	146
24	59	46	3,000	1,170	100	118	146
25	66	52	3,580	1,070	82	122	146
26	66	59	4,000	1,030	49	113	146
27	66	52	4,450	999	37	100	146
28	66	46	4,750	966	37	93	146
29	59	52	4,900	900	37	89	146
30	59	40	4,450	694	37	80	146
31	52	------	3,860	------	24	82	------

Monthly discharge of Little Snake River near Lily, Colo., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	66	20	45.8	2,820
November	59	40	49.0	2,920
May	4,900	2,150	3,120	192,000
June	3,580	694	2,280	136,000
July	598	24	263	16,200
August	122	6	54.7	3,360
September	146	89	136	8,090

ASHLEY CREEK NEAR VERNAL, UTAH

LOCATION.—In sec. 1, T. 3 S., R. 20 E., three-quarters of a mile above heading of power canal of Vernal Milling & Light Co., 4 miles above mouth of Dry Fork, and 12 miles northwest of Vernal, Uinta County.

DRAINAGE AREA.—101 square miles (measured on topographic map).

RECORDS AVAILABLE.—June 6, 1914, to September 30, 1923. From October 8, 1911, to June 5, 1914, fragmentary records were obtained at power plant.

GAGE.—Stevens continuous water-stage recorder on left bank.

DISCHARGE MEASUREMENTS.—Made from cable or by wading.

EXTREMES OF DISCHARGE.—Maximum stage during year, 8.47 feet at 8 p. m. May 25 (discharge, 1,250 second-feet); minimum discharge, 33 second-feet on March 27 and 28.

1911–1923: Maximum discharge, 2,050 second-feet at 9 p. m. May 29 1921; minimum discharge, 26 second-feet on February 7, 1920.

ACCURACY.—Stage-discharge relation changed during high water in May and again about August 11–23. Rating curves fairly well defined. Water-stage recorder operated 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 or weekly gage readings, except as noted in footnote to daily-discharge table. Shifting-control method used May 19–25 and August 12–23. Records fair.

Discharge measurements of Ashley Creek near Vernal, Utah, 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.*
Mar. 25	W. E. Dickinson	5.85	34.5	July 16	H. W. Staats	6.62	208
June 10	Staats and Dickinson	7.48	594	18	do	6.44	164
24	H. W. Staats	6.88	286				

Daily discharge, in second-feet, of Ashley Creek near Vernal, Utah, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	86	68	58	48	41	37	36	69	463	244	127	60
2	86	69	58	47	41	37	37	70	515	238	121	59
3	84	69	58	47	41	37	37	78	652	229	119	58
4	83	69	56	47	40	37	37	111	715	221	114	59
5	81	69	56	47	40	37	36	151	638	213	112	62
6	80	70	56	46	40	37	36	195	610	207	110	59
7	80	70	56	46	40	37	36	289	645	218	108	59
8	80	70	56	46	39	37	36	382	645	218	106	56
9	80	69	55	46	39	37	34	451	631	224	105	52
10	80	68	55	45	39	36	34	485	666	210	104	52
11	80	68	54	45	39	36	36	475	736	213	118	49
12	78	68	53	45	39	36	37	387	827	200	104	50
13	76	66	52	45	40	35	38	321	778	180	100	54
14	76	63	51	45	40	35	39	289	631	190	96	56
15	76	62	51	44	40	35	40	286	564	197	92	56
16	75	60	51	44	40	34	40	269	521	190	89	56
17	75	60	51	44	40	35	42	335	441	169	86	54
18	74	59	51	44	39	35	48	510	400	164	83	54
19	74	59	50	44	39	35	53	600	858	166	80	54
20	72	59	50	44	39	36	58	714	335	164	77	53
21	72	58	50	43	39	36	60	762	315	166	74	50
22	72	58	50	43	38	36	62	720	299	160	71	48
23	70	56	50	43	38	36	62	732	295	164	68	46
24	69	56	49	43	38	35	60	828	292	160	65	52
25	69	56	49	42	38	34	58	918	303	150	60	54
26	68	58	49	42	38	34	58	1,010	323	144	60	54
27	68	58	49	42	38	33	62	988	303	139	60	54
28	68	58	48	42	38	33	63	869	278	137	59	54
29	68	58	48	42	------	34	65	806	264	130	58	56
30	68	56	48	41	------	34	69	715	257	125	58	58
31	68	------	48	41	------	34	------	552	------	125	58	------

NOTE.—No gage-height record; discharge interpolated Dec. 9–14, 16–21, 23–28, 30, 31, Jan. 1–4, 6–11, 13–18, 20–25, 27–31, Feb. 1, 3–8, 10–15, 17–22, 24–28, Mar. 1, 3–8, 10–15, 17–22, 24, June 23, and Aug. 5–9.

Monthly discharge of Ashley Creek near Vernal, Utah, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	86	68	75.4	4,640
November	70	56	62.9	3,740
December	58	48	52.1	3,200
January	48	41	44.3	2,720
February	41	38	39.3	2,180
March	37	33	35.5	2,180
April	69	34	47.0	2,800
May	1,010	69	496	30,500
June	827	257	490	29,200
July	244	125	182	11,200
August	127	58	88.5	5,440
September	62	46	54.6	3,250
The year	1,010	33	140	101,000

VERNAL MILLING & LIGHT CO.'S TAILRACE NEAR VERNAL, UTAH

LOCATION.—In NW. ¼ sec. 18, T. 3 S., R. 21 E., at power plant of Vernal Milling & Light Co., 10 miles northwest of Vernal, Uinta County.

RECORDS AVAILABLE.—May 3 to September 30, 1917, and March 18, 1920, to September 30, 1923.

GAGE.—Indicating gage in office of power plant actuated by float in stilling well in tailrace beneath plant; read to hundredths by employees of power company.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—Channel straight for 50 feet below gage. Banks high; one channel at all stages. Bed composed of gravel and cobbles; shifts occasionally.

ICE.—None.

ACCURACY.—Stage-discharge relation changed about October 28 and again about June 10. Rating curves fairly well defined. Float gage read to hundredths hourly except June 19–24. Daily discharge ascertained by applying mean daily gage height to rating table except for days when plant was not operating continuously; for these days hourly discharge was used to determine the daily mean. Shifting-control method was used from June 11–16. Discharge interpolated June 19–22 and 24. Records fair.

COOPERATION.—Gage-height record furnished by Vernal Milling & Light Co.

Discharge measurements of Vernal Milling & Light Co.'s tailrace near Vernal, Utah, 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.*
Mar. 25	W. E. Dickinson	4.54	20.6	June 23	H. W. Staats	4.61	26.2
May 11	do	4.73	27.3	July 5	do	4.78	32.4
June 10	Staats and Dickinson	4.50	19.4				

Daily discharge, in second-feet, of Vernal Milling & Light Co.'s tailrace near Vernal, Utah, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	19	28	26	24	25	26	17	22	22	25	27	28
2	20	28	27	26	24	26	23	23	23	28	25	24
3	22	29	24	26	26	26	23	22	20	30	26	26
4	22	28	26	25	23	23	23	23	24	25	26	28
5	23	25	28	25	25	26	24	22	23	27	24	27
6	22	28	27	25	25	25	24	20	23	26	25	28
7	22	28	27	23	25	26	24	22	24	26	25	29
8	19	28	26	25	27	26	22	22	22	20	25	28
9	23	28	26	27	28	25	23	22	22	26	26	24
10	22	28	24	26	25	25	25	22	20	27	25	26
11	24	28	27	26	24	18	23	23	23	27	26	27
12	23	23	27	26	26	25	23	23	23	27	24	26
13	23	27	28	26	25	26	23	17	23	27	26	26
14	22	28	25	23	27	26	23	23	25	26	26	26
15	19	28	26	25	26	25	21	23	26	24	27	27
16	23	28	26	26	25	25	22	22	26	27	27	25
17	23	28	22	26	27	26	24	24	18	27	16	27
18	22	26	25	27	24	22	23	25	23	28	28	29
19	23	23	26	26	26	24	24	24	24	27	13	29
20	23	26	27	25	26	25	23	20	24	27	25	26
21	22	27	27	23	26	24	24	21	25	26	26	27
22	15	27	27	27	27	24	22	25	25	24	26	27
23	24	28	27	26	26	25	26	24	26	26	29	24
24	24	26	24	25	26	25	23	22	26	25	18	28
25	25	26	24	22	23	22	25	22	26	26	28	28

Daily discharge, in second-feet, of Vernal Milling & Light Co.'s tailrace near Vernal, Utah, for the year ending September 30, 1923—Continued

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
26	24	23	26	26	25	25	25	22	27	26	24	29
27	25	27	28	27	25	25	24	20	27	28	27	30
28	22	27	27	24	26	25	24	24	28	28	28	29
29	23	27	27	27	-------	25	21	22	28	24	26	29
30	27	24	26	25	-------	25	23	21	24	27	28	25
31	27	-------	23	25	-------	25	-------	23	-------	27	27	-------

Monthly discharge of Vernal Milling & Light Co.'s tailrace near Vernal, Utah, for the year ending September 30,1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	27	15	22.5	1,380
November	29	23	26.8	1,590
December	28	22	26.0	1,600
January	27	22	25.3	1,560
February	28	23	25.5	1,420
March	26	18	24.7	1,520
April	26	17	23.1	1,370
May	25	17	22.3	1,370
June	28	18	24.0	1,430
July	30	20	26.3	1,620
August	29	13	25.1	1,540
September	30	24	27.1	1,610
The year	30	13	24.9	18,000

NORTH FORK OF DUCHESNE RIVER NEAR HANNA, UTAH

LOCATION.—In NW. ¼ NE. ¼ sec. 35, T. 2 N., R. 9 W., Uinta special base and meridian, 250 feet below Hades Creek, 6 miles above confluence with West Fork, and 10 miles northwest of Hanna, Duchesne County.

DRAINAGE AREA.—75 square miles (measured on topographic map).

RECORDS AVAILABLE.—August 16, 1921, to September 30, 1923, when station was discontinued.

GAGE.—Vertical enamel staff on left bank 10 feet downstream from cable; read by V. R. Savage.

DISCHARGE MEASUREMENTS.—Made from cable or by wading.

CHANNEL AND CONTROL.—Channel straight for half a mile above gage; makes sharp turn to left 50 feet below gage. One channel at all stages. Bed composed of gravel and small boulders. Right bank high; left bank lower but probably not subject to overflow. Cobble riffle control immediately below gage. Stage of zero flow −0.8 foot; determined October 1, 1921.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 4.40 feet at 9 p. m. June 12 and 7 p. m. June 13 (discharge, 1,350 second-feet); minimum stage during winter.

1921–1923: Maximum stage, 4.65 feet at 8 p. m. June 8 and 9, 1922 (discharge, 1,490 second-feet); minimum stage during the winter.

ICE.—Stream freezes over each winter.

DIVERSIONS.—None.

REGULATION.—None.

ACCURACY.—Stage-discharge relation permanent, except as affected by ice. Rating curve well defined up to 1,000 second-feet; extended above. Gage read to hundredths once or twice daily except as stated in footnote to daily-discharge table. Daily discharge determined by applying mean daily gage height to rating table. Discharges for periods of missing gage heights estimated by hydrographic comparison with West Fork of Duchesne River. Records fair.

Discharge measurements of North Fork of Duchesne River near Hanna, Utah, 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.*
Mar. 30	W. E. Dickinson	[a] 0.89	27.6	June 29	H. W. Staats	2.84	557
May 10	do	2.25	329	July 13	do	1.84	222
June 6	Staats and Dickinson	2.59	458	26	Dickinson and Woolley	1.63	164
14	H. W. Staats	3.66	954				

[a] Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of North Fork of Duchesne River near Hanna, Utah, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	26	21	21	23					408	589	97	36
2	26	21	21						400	475	108	36
3	26	21	21						487	458	97	36
4	25	21	21						544	427	97	37
5	25	21	21					225	483	404	94	36
6	25	21		23			30		458	375	94	34
7	25	21							513	354	88	32
8	24	21							603	341	88	32
9	24	21							865		88	32
10	24	21		23				331	925	275	80	31
11	24	21		23				321	1,100		77	31
12	24	21		23				328	1,230		71	31
13	23	21						315	1,270	212	70	31
14	23	22						328	1,030	230	68	29
15	23	22			25	27	60	328	900	241	65	29
16	23	23						334	748	181	65	29
17	23	24						328	658	158	62	29
18	23	22	22					334	598	158	62	29
19	22	21						334	522	158	60	29
20	23	21						334	518	158	60	29
21	23	21		23				442	500	158	52	29
22	23	21						458	458	154	50	29
23	23	21						454	544	151	46	34
24	22	21						594	635	136	41	42
25	21	21					90	701	682	136	41	45
26	21	21						935	826	149	41	36
27	21	21						915	706	130	41	45
28	21	21						826	682	128	41	45
29	21	21			-------			739	576	122	41	43
30	21	21			-------	28		626	589	120	41	39
31	21	-------			-------	28	-------	487	-------	116	39	-------

NOTE.—No gage-height record; Dec. 6–31, Jan. 2–9, 13–31, Feb. 1 to May 9, and July 9–12; discharge estimated. Braced figures show estimated mean discharge for periods indicated.

Monthly discharge of North Fork of Duchesne River near Hanna, Utah, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	26	21	23.2	1,430
November	24	21	21.3	1,270
December	----------	----------	21.8	1,340
January	----------	----------	23.0	1,410
February	----------	----------	25.0	1,390
March	----------	----------	27.1	1,670
April	----------	----------	60.0	3,570
May	935	----------	413	25,400
June	1,270	400	682	40,600
July	589	116	243	14,900
August	108	39	66.6	4,100
September	45	29	34.2	2,040
The year	1,270	----------	137	99,100

DUCHESNE RIVER NEAR TABIONA, UTAH

LOCATION.—In SW. ¼ sec. 17, T. 2 S., R. 6 W., Uinta special base and meridian, at highway bridge 5½ miles above Rock Creek, and 8 miles southeast of Tabiona, Duchesne County.

DRAINAGE AREA.—352 square miles.

RECORDS AVAILABLE.—January 16, 1919, to September 30, 1923.

GAGE.—Stevens steel tape gage on downstream side of bridge; read by Lyman Duke and Leonard Brown.

DISCHARGE MEASUREMENTS.—Made by wading or from bridge.

CHANNEL AND CONTROL.—Channel composed of gravel and sand. Left bank high and not subject to overflow. Right bank overflowed at extreme high stage, allowing water to pass around bridge. Gravel riffle 100 feet below gage forms control.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 13.68 feet at 10 a. m. June 13 (discharge, measured by engineer, 2,010 second-feet); minimum discharge occurred during ice-affected period and not determined.

1919–1923: Maximum discharge, about 2,500 second-feet on June 13, 1921; minimum discharge probably less than 70 second-feet in January, 1919, when river was frozen over.

ICE.—River freezes over each winter.

DIVERSIONS.—Some small diversions for irrigation above station.

REGULATION.—None.

ACCURACY.—Stage-discharge relation permanent, except for ice effect. Rating curve well defined. Gage read to hundredths once daily throughout year. Daily discharge ascertained by applying daily gage height to rating table, except for periods of ice effect, December 18, 19, 31, and January 1 to February 28, when discharge was estimated from observer's notes, temperature records, and by comparison with flow of Duchesne River at Duchesne. Records good.

Discharge measurements of Duchesne River near Tabiona, Utah, 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.*
Mar. 19	W. E. Dickinson	9.57	109	June 13	H. W. Staats	13.65	2,010
May 9	do	11.60	663	28	do	12.29	1,010
June 5	Staats and Dickinson	12.19	949	July 12	do	11.17	495

Daily discharge, in second-feet, of Duchesne River near Tabiona, Utah, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	140	161	132			99	140	227	1,020	855	273	181
2	138	162	132			98	145	271	1,090	765	235	188
3	140	161	132			109	147	264	1,080	760	237	186
4	142	161	137			101	150	374	1,050	815	244	190
5	148	159	137			99	142	524	1,020	740	206	183
6	148	157	135			109	168	548	960	700	186	184
7	150	155	137			110	170	580	1,000	636	204	181
8	152	154	112			122	168	680	1,040	600	206	179
9	159	152	109			110	170	765	1,120	540	188	177
10	157	150	124			110	173	800	1,390	556	183	177
11	155	148	129			110	194	850	1,670	516	184	192
12	155	148	127			96	206	740	1,860	496	190	188
13	159	147	142			98	216	660	1,920	462	192	192
14	157	145	130			95	212	596	1,840	458	206	190
15	157	140	130		90	96	200	600	1,570	430	184	188
16	155	140	130	100		99	210	624	1,290	462	177	181
17	154	140	130			109	220	660	1,180	423	177	183
18	152	140	130			110	235	805	1,050	392	181	183
19	155	138	130			105	246	860	1,050	335	179	179
20	157	135	130			109	248	1,200	960	300	181	183
21	155	134	132			116	237	1,260	980	259	186	183
22	155	132	135			121	214	1,140	860	280	179	179
23	152	129	142			120	200	1,240	644	295	184	186
24	154	127	124			115	202	1,410	805	308	181	214
25	154	124	130			116	202	1,440	870	347	183	264
26	154	127	124			132	204	1,530	940	344	188	317
27	155	129	124			135	208	1,920	930	305	184	338
28	157	129	118			134	227	1,870	935	308	181	177
29	159	130	109		-------	140	248	1,670	920	300	179	179
30	159	130	103		-------	127	235	910	905	295	188	179
31	161	-------	100		-------	142	-------	975	-------	257	188	-------

Monthly discharge of Duchesne River near Tabiona, Utah, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	161	138	153	9,410
November	162	124	143	8,510
December	142	100	127	7,810
January	----------	----------	100	6,150
February	----------	----------	90	5,000
March	142	95	113	6,950
April	248	140	198	11,800
May	1,920	227	903	55,500
June	1,920	644	1,130	67,200
July	855	257	469	28,800
August	273	177	195	12,000
September	338	177	197	11,700
The year	1,920	----------	319	231,000

DUCHESNE RIVER AT DUCHESNE, UTAH

LOCATION.—In NE. ¼ NW. ¼ sec. 1, T. 4 S., R. 5 W., Uinta special base and meridian, at Seventh Street Bridge in Duchesne, Duchesne County, and 1 mile above mouth of Strawberry River.

DRAINAGE AREA.—660 square miles.

RECORDS AVAILABLE.—December 3, 1917, to September 30, 1923.

GAGE.—Chain gage on downstream handrail of bridge near right bank; read by E. S. Winslow.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading.

CHANNEL AND CONTROL.—Channel straight for 100 feet above and several hundred feet below gage. Bed composed of gravel and cobbles. The head of a long heavy gravel riffle is a short distance below gage. Banks are low but not subject to overflow. Stage of zero flow at gage height 2.6 feet; determined August 4 and 18, 1921.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 8.42 feet at noon June 12 and 13 (discharge, 3,530 second-feet); minimum discharge, probably less than 175 second-feet in February when stage-discharge relation was affected by ice.

1918–1923: Maximum stage, 8.65 feet at noon June 10, 1922 (discharge, 4,420 second-feet); minimum discharge, 53 second-feet July 29 and August 23–27, 1919.

ICE.—Stream freezes every winter.

DIVERSIONS.—Below all diversions above mouth of Strawberry River. Numerous diversions above and below station.

REGULATION.—None except by diversion.

ACCURACY.—Stage-discharge relation changed during ice-affected period, about May 28 and again about June 24; affected by ice December 19 to March 2. Rating curves fairly well defined. Gage read to half-tenths or hundredths once or twice daily throughout year. Daily discharge ascertained by applying mean daily gage height to rating table except for period of ice effect when discharge was estimated from temperature records, observer's notes, and hydrographic study of flow at this station in conjunction with that of Duchesne River at Myton, Strawberry River at Duchesne, and Lake Fork near Myton. Records fair.

Discharge measurements of Duchesne River at Duchesne, Utah, 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.*
Mar. 19	W. E. Dickinson	5.12	182	June 15	H. W. Staats	8.25	3,210
28	do	5.22	212	30	do	7.45	2,090
May 8	do	6.24	870	July 14	do	6.28	934
June 7	Staats and Dickinson	7.15	1,560				

Daily discharge, in second-feet, of Duchesne River at Duchesne, Utah., for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	245	220	270			185	225	305	1,420	1,710	570	330
2	245	270	270			190	240	355	1,260	1,980	610	280
3	220	300	270	200	175	195	280	380	1,370	1,660	440	260
4	220	300	245			210	225	410	1,640	1,550	500	260
5	220	245	245			225	210	570	1,480	1,660	470	260

Daily discharge, in second-feet, of Duchesne River at Duchesne, Utah, for the year ending September 30, 1923—Continued

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
6	220	270	220			210	240	610	1,480	1,500	500	240
7	220	270	220			210	225	785	1,480	1,450	470	240
8	200	270	200			225	240	875	1,750	1,400	355	225
9	200	270	200			210	260	938	1,920	1,400	330	225
10	200	270	200			210	210	983	2,570	1,250	330	225
11	200	270	220			210	195	1,220	3,130	1,300	470	225
12	200	270	300			210	240	1,070	3,530	1,100	500	210
13	200	270	330			210	305	1,030	3,530	1,010	650	210
14	220	270	270			210	260	938	3,430	965	440	240
15	220	270	300			195	260	938	2,930	965	330	260
16	220	300	270			225	305	893	2,320	1,010	305	240
17	220	300	270		175	210	280	893	2,030	965	280	240
18	200	300	270	200		210	330	1,220	1,860	875	355	225
19	180	270				180	410	1,420	1,750	830	410	240
20	180	245				210	380	1,570	1,640	875	380	240
21	180	270				195	410	1,730	1,640	830	380	225
22	200	270				195	380	1,680	1,480	785	410	225
23	180	270				180	305	1,420	1,370	920	380	240
24	180	270				210	280	1,710	1,480	1,010	380	330
25	200	270	225			210	260	2,140	1,820	1,200	355	330
26	200	270				180	280	2,290	2,260	830	355	330
27	180	245				180	330	2,370	2,640	740	355	330
28	245	220				195	305	2,750	2,330	650	330	330
29	245	245			-------	195	330	2,400	2,260	570	260	355
30	245	270			-------	210	330	2,170	2,160	535	355	330
31	220	-------			-------	225	-------	2,030	-------	440	380	-------

NOTE.—Braced figures show estimated mean discharge for periods indicated.

Monthly discharge of Duchesne River at Duchesne, Utah, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	245	180	210	12,900
November	300	220	268	15,900
December	330	----------	242	14,900
January	----------	----------	200	12,300
February	----------	----------	175	9,720
March	225	180	204	12,500
April	410	195	284	16,900
May	2,750	305	1,290	79,300
June	3,530	1,260	2,070	123,000
July	1,980	440	1,100	67,600
August	650	280	408	25,100
September	355	210	263	15,600
The year	3,530	----------	560	406,000

DUCHESNE RIVER AT MYTON, UTAH

LOCATION.—In NW. ¼ sec. 25, T. 3 S., R. 2 W., Uinta special base and meridian, at highway bridge at Myton, Duchesne County, 3 miles below mouth of Lake Fork and 15 miles above mouth of Uinta River.

DRAINAGE AREA.—2,750 square miles (measured on topographic maps).

RECORDS AVAILABLE.—October 26, 1899, to November 30, 1910, and July 26, 1911, to September 30, 1923.

GAGE.—Chain gage on upstream rail near left end of steel highway bridge; read by C. J. Preece.

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

CHANNEL AND CONTROL.—Bed composed of coarse gravel; banks comparatively low, but not likely to be overflowed, although they are subject to erosion during high water. Gravel riffle 200 feet below gage; shifts occasionally.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 6.93 feet at 5.30 p. m. June 13 (discharge, 7,120 second-feet); minimum stage, 1.96 feet September 12 and 13 (discharge, 258 second-feet).

1899–1923: Maximum stage, 7.94 feet at 8 a. m. June 10, 1922 (discharge, from extension of rating curve, 12,800 second-feet); minimum stage, 0.75 foot at 8.30 p. m. August 23 and 8 a. m. August 24, 1919 (discharge, 8 second-feet).

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

DIVERSIONS.—Much of the low-water flow of the river and its tributaries is diverted for irrigation above station.

REGULATION.—Annual run-off is affected by operation of the United States Bureau of Reclamation Reservoir on Strawberry River, one of the main tributaries.

ACCURACY.—Stage-discharge relation changed slightly about November 2, and again during ice-affected period; affected by ice December 8–14, 17, 19–29, 31, January 1 to March 15, March 17, and 18. Rating curve well defined after March 15. Gage read to hundredths once daily, except as stated in footnote to daily-discharge table. Daily discharge ascertained by applying daily gage height to rating table, except for periods of ice effect, when discharge was estimated from observer's notes, recorded gage heights, weather records, and hydrographic comparison with other stations on Duchesne River. Shifting-control method used October 1 to December 30. Discharge for days of missing gage height interpolated. Records fair.

Discharge measurements of Duchesne River at Myton, Utah, 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.*
Mar. 27	W. E. Dickinson	2.32	482	July 4	H. W. Staats	4.10	2,090
May 14	Dickinson and Preece[a]	4.38	2,330	16	do	3.51	1,410
June 9	Staats and Dickinson	5.31	3,510	21	do	3.00	917
16	H. W. Staats	5.88	4,370	Sept. 7	E. G. Thorum[b]	2.05	332
23	Staats and Preece	4.21	2,190				

[a] Engineer, Office of Indian Affairs. [b] Engineer, Utah Power & Light Co.

Daily discharge, in second-feet, of Duchesne River at Myton, Utah, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	386	450	488				768	854	3,390	2,950	806	456
2	403	507	546				814	854	3,030	2,820	720	432
3	323	553	573				798	926	3,090	2,390	755	409
4	323	533	601				699	1,030	3,300	2,070	720	334
5	290	550	482				664	1,310	3,320	2,160	640	340
6	301	567	594	425	400	425	741	1,610	3,160	2,070	560	345
7	397	608	540				741	1,910	3,130	2,080	520	312
8	400	636					685	2,150	3,460	1,970	500	290
9	403	615	525				629	2,390	3,650	1,860	494	282
10	397	513					657	2,660	4,410	1,730	478	274

Daily discharge, in second-feet, of Duchesne River at Myton, Utah, for the year ending September 30, 1923—Continued

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
11	385	601					629	2,820	5,200	1,960	463	269
12	409	562	525				601	2,880	6,260	1,660	614	258
13	409	522				425	664	2,600	7,120	1,400	762	258
14	409	482					643	2,310	6,070	1,290	650	328
15	403	385	533				650	2,150	5,490	1,350	567	397
16	432	444	540			409	657	2,260	4,390	1,400	520	380
17	432	553	524			405	727	2,200	3,850	1,310	500	363
18	438	520	507			405	806	2,390	3,320	1,260	456	345
19	435	507				409	886	2,830	2,950	1,080	469	340
20	432	494			400	513	926	3,260	2,750	1,080	482	340
21	438	482		425		482	908	3,790	2,730	958	513	334
22	441	553				475	889	3,850	2,510	1,130	463	328
23	444	553				456	870	3,440	2,190	1,300	580	398
24	374	706	475			533	822	3,620	2,520	1,160	438	469
25	374	553				530	734	4,160	2,850	1,030	456	450
26	385	553				526	727	4,780	3,310	1,040	392	438
27	397	553				463	806	5,440	3,520	919	328	580
28	482	567				540	822	5,220	3,170	798	328	546
29	587	587			-------	601	833	5,000	3,160	706	328	546
30	469	560	475		-------	678	844	4,450	3,130	615	323	533
31	444	-------	450		-------	723	-------	3,760	-------	615	513	-------

NOTE.—No gage-height record; Oct. 1, 8, 19, 22, 26, Nov. 5, 12, 13, 19, 20, 26, Dec. 3, Mar. 25, Apr. 1, 8, 15, 21, 22, 29, 30, May 6, 13, June 17, 24, July 1, 8, 15, 22, 24, 27, 29, Aug. 5, 10, 12, 19, 26, 28, Sept. 2, 5, 9, 14, 16, 17, 23, and 30, discharge interpolated. Braced figures show estimated mean discharge for periods indicated.

Monthly discharge of Duchesne River at Myton, Utah, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	587	290	408	25,100
November	706	385	542	32,300
December	601	----------	508	31,200
January	----------	----------	425	26,100
February	----------	----------	400	22,200
March	723	----------	468	28,800
April	926	601	755	44,900
May	5,440	854	2,870	176,000
June	7,120	2,190	3,680	219,000
July	2,950	615	1,490	91,600
August	806	323	527	32,400
September	580	258	379	22,600
The year	7,120	258	1,040	752,000

WEST FORK OF DUCHESNE RIVER NEAR HANNA, UTAH

LOCATION.—Near east line in SE. ¼ sec. 27, T. 1 N., R. 9 W., Uinta special base and meridian, a quarter of a mile above Wolf Creek, 3 miles above confluence with North Fork, and 6 miles northwest of Hanna, Duchesne County.

DRAINAGE AREA.—54 square miles.

RECORDS AVAILABLE.—August 16, 1921, to March 31, 1922, and October 1, 1922, to September 30, 1923, when station was discontinued.

GAGE.—Vertical enamel staff on left bank; read by J. T. Murdock.

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

CHANNEL AND CONTROL.—Channel straight for 200 feet above and below gage. One channel at all stages. Bed composed of gravel and cobbles. Left bank high. Right bank may be overflowed during extreme high water. Control, cobble riffle immediately below gage; shift occasionally. Stage of zero flow at gage height, −0.4 foot, determined September 29, 1921.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 2.70 feet at 2 p. m. June 12 (discharge, 534 second-feet); minimum stage not recorded.

ICE.—Stream usually freezes over at times each winter.

DIVERSIONS.—None.

REGULATION.—None.

ACCURACY.—Stage-discharge relation changed during winter and again about June 9. Rating curves well defined below 400 second-feet and extended above. Gage read to hundredths once daily, except as stated in footnote to daily-discharge table. Daily discharge determined by applying daily gage height to rating table. Shifting-control method used June 9–12. Records fair.

Discharge measurements of West Fork of Duchesne River near Hanna, Utah, 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.*
Mar. 29	W. E. Dickinson	0.56	22.0	June 28	H. W. Staats	1.44	135
May 9	do	1.58	158	July 12	do	1.20	84.1
June 5	Staats and Dickinson	2.14	309	27	Dickinson and Wooley	1.00	53.6
13	H. W. Staats	2.16	339				

Daily discharge, in second-feet, of West Fork of Duchesne River near Hanna, Utah, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	19	19					19	56	238	135	52	35
2	19	19					22	58	296	125	49	35
3	19	19					22	71	328	121	49	35
4	19	19					21	80	296	103	48	35
5	19	19					21	102	302	103	48	35
6	19	19					23	128	315	99	47	33
7	19	18					23	124	296	112	44	34
8	19	18					23	140	324	103	44	35
9	19	18					23	158	339	112	43	35
10	19	18					23	186	401	112	42	35
11	19	18					23	201	446	103	42	35
12	19	18					21	186	534	92	42	35
13	19	17					29	186	339	99	44	35
14	19	17				20	29	162	339	95	44	35
15	19	17			20		28	167	345	92	42	35
16	19	17	20	20			30	186	319	92	42	35
17	19	17					47	167	250	84	40	37
18	19	17					51	238	227	84	40	37
19	18	17					58	266	174	82	37	37
20	18	17					51	296	169	81	37	38
21	18	17					51	296	169	80	35	38
22	18	17					45	266	169	78	34	38
23	18	17					38	249	166	84	33	38
24	18	17					36	296	159	78	33	38
25	18	17					42	413	149	68	33	38
26	18	16					45	436	149	65	33	38
27	18	16				19	45	413	144	60	33	38
28	18	16				19	45	391	139	60	33	38
29	18	16			-------	22	51	362	135	57	33	38
30	18	16			-------	21	51	328	144	54	35	38
31	19	-------			-------	20	-------	290	-------	52	35	-------

NOTE.—No gage-height record; discharge interpolated Dec. 3–9, July 19–21, Sept. 3 and 4. Stage-discharge relation affected by ice Dec. 31 to Mar. 26. Braced figures show estimated mean discharge for periods indicat ed.

Monthly discharge of West Fork of Duchesne River near Hanna, Utah, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	19	18	18.6	1,140
November	19	16	17.4	1,040
December	------	------	20	1,230
January	------	------	20	1,230
February	------	------	20	1,110
March	------	------	20	1,230
April	58	19	34.5	2,050
May	436	56	223	13,700
June	534	135	260	15,500
July	135	52	89.2	5,480
August	52	33	40.2	2,470
September	38	33	36.2	2,150
The year	534	------	66.7	48,300

WOLF CREEK NEAR HANNA, UTAH

LOCATION.—Near west line, in SW. ¼ sec. 26, T. 1 N., R. 9 W., Uinta special base and meridian, 600 feet above mouth and 6 miles northwest of Hanna, Duchesne County.

DRAINAGE AREA.—19 square miles.

RECORDS AVAILABLE.—August 16, 1921, to March 31, 1922; and October 1, 1922, to September 30, 1923, when station was discontinued.

GAGE.—Vertical enamel staff on left bank; read by J. T. Murdock.

DISCHARGE MEASUREMENTS.—Made by wading or from bridge 150 feet downstream.

CHANNEL AND CONTROL.—Channel winding. Bed composed of sand and cobbles. Banks heavily covered with willows which trail in water. Natural open place on left bank at gage and riffle. Trailing willows on right bank cut away at this place. One channel at all stages. Banks may be overflowed during sudden floods. Cobble-riffle control 10 feet below gage, shifts occasionally. Stage of zero flow at gage height 0.0 foot, determined September 29, 1921.

EXTREMES OF DISCHARGE.—Maximum stage recorded during period of record, 1.54 feet at 2.30 p. m. May 26, 1923 (discharge, 54 second-feet); minimum discharge, 8 second-feet, at numerous times.

ICE.—Seldom forms at this station.

DIVERSIONS.—Small ditches divert water for use at Murdock ranch.

REGULATION.—None.

ACCURACY.—Stage-discharge relation changed slightly about June 10. Rating curves well defined. Gage read to hundredths once daily except December 3-9, July 19-21, September 3 and 4. Daily discharge determined by applying daily gage height to rating table and interpolating or estimating for period of backwater effect, March 26 to April 5, and other periods when readings were not made. Record good.

Discharge measurements of Wolf Creek near Hanna, Utah, 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.*
Mar. 29	W. E. Dickinson	[a]0.92	7.8	June 28	H. W. Staats	1.18	25.2
May 9	do	.99	11.7	July 12	do	1.15	23.7
June 5	Dickinson and Staats	1.34	35.6	27	Dickinson and Woolley	1.04	16.1
13	H. W. Staats	1.42	45.8				

[a] Stage-discharge relation slightly affected by willows in stream.

Daily discharge, in second-feet, of Wolf Creek near Hanna, Utah, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	13	14	11	9	8	8	8	8	34	30	15	11
2	13	13	11	9	8	8	8	8	34	27	14	11
3	13	14	11	9	8	8	8	9	32	29	14	11
4	13	13	11	9	8	8	8	9	32	27	13	10
5	13	13	11	9	8	8	8	10	34	26	13	10
6	13	13	10	9	8	8	9	10	37	27	13	9
7	13	13	10	9	8	8	9	11	37	26	13	9
8	13	13	10	9	8	8	9	11	34	26	12	9
9	13	13	10	9	8	8	9	12	34	24	12	9
10	13	13	10	9	8	8	9	12	41	32	13	9
11	13	13	10	9	8	8	9	13	40	27	13	11
12	13	13	10	9	8	8	9	24	44	24	13	11
13	13	12	10	9	8	8	9	23	35	23	15	11
14	13	12	10	9	8	8	10	21	33	23	15	11
15	13	12	10	9	8	8	9	20	33	24	14	11
16	13	12	10	9	8	8	10	21	32	24	14	11
17	13	12	10	9	8	8	11	21	33	23	14	12
18	13	12	10	8	8	8	11	24	30	23	14	12
19	13	11	10	8	8	8	11	24	27	23	13	12
20	13	11	10	9	8	8	10	32	27	23	12	13
21	13	11	10	8	9	8	11	36	26	24	13	13
22	13	11	10	8	9	8	10	32	26	24	13	13
23	13	11	10	8	9	8	10	29	26	23	12	13
24	13	11	10	8	9	8	10	36	26	19	12	13
25	13	11	10	8	8	8	10	47	26	18	12	13
26	13	11	10	8	8	8	8	54	26	16	11	13
27	13	11	9	8	8	8	8	49	26	15	11	13
28	13	11	9	8	8	8	8	50	26	16	11	13
29	13	11	9	8	------	8	8	47	26	16	11	13
30	13	11	9	8	------	8	8	41	29	16	11	13
31	14	------	9	8	------	8	------	37	------	14	11	------

Monthly discharge of Wolf Creek near Hanna, Utah, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	14	13	13.0	799
November	14	11	12.1	720
December	11	9	10.0	615
January	9	8	8.6	529
February	9	8	8.1	450
March	8	8	8.0	492
April	11	8	9.2	547
May	54	8	25.2	1,550
June	44	26	31.5	1,870
July	30	14	23.0	1,410
August	15	11	12.8	787
September	13	9	11.4	678
The year	54	8	14.4	10,400

STRAWBERRY RIVER AT DUCHESNE, UTAH

LOCATION.—In SW. ¼ NE. ¼ sec. 2, T. 4 S., R. 5 W., Uinta special base and meridian, at Winslow ranch, three-quarters of a mile west of post office at Duchesne, Duchesne County, three-quarters of a mile above mouth of Indian Canyon Creek, a small tributary entering from south, and 1½ miles above confluence of Strawberry and Duchesne Rivers.

DRAINAGE AREA.—1,040 square miles (measured on topographic map).

RECORDS AVAILABLE.—June 10, 1908, to November 30, 1910, and March 16, 1914, to September 30, 1923.

GAGE.—Vertical staff on downstream side of right abutment of bridge; read by E. S. Winslow.

DISCHARGE MEASUREMENTS.—Made from cable just below bridge or by wading.

CHANNEL AND CONTROL.—Channel straight for several hundred feet above and below gage. Bed composed of sand and fine gravel. Natural channel about 50 feet wide is constricted at bridge to 36 feet. Banks comparatively low; covered with underbrush; left bank subject to overflow at very high stages. Control formed by gravel riffle 200 feet below gage; fairly permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 8.5 feet at 7 p. m. May 27 (discharge, 1,670 second-feet); minimum discharge occurred during the winter.

1908–1923: Maximum discharge, 3,230 second-feet on May 27, 1922; minimum discharge, 30 second-feet, November 20, 1914. Records obtained prior to 1914 incomplete.

ICE.—Stage-discharge relation affected by ice.

DIVERSIONS.—Water stored in Strawberry Valley Reservoir (capacity, 250,000 acre-feet), about 40 miles above station, is diverted by tunnel to Spanish Fork drainage basin. Some water is also diverted from the upper end of Strawberry Valley to basin of Provo River.

REGULATION.—Since 1912 flow of river has been affected by operation of Strawberry Valley Reservoir.

ACCURACY.—Stage-discharge relation permanent during year; affected by ice December 8 to March 23. Rating curve well defined. Gage read to half-tenths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table except for period of ice effect. For this period discharge was estimated from temperature records, observer's notes, one measurement, and hydrographic comparison with all Duchesne River stations. Records good.

Discharge measurements of Strawberry River at Duchesne, Utah, 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.*
Mar. 19	W. E. Dickinson	[a] 5.12	94.3	June 15	H. W. Staats	6.63	740
27	do	4.80	151	30	do	5.58	347
May 8	do	7.44	1,070	July 14	do	5.37	294

[a] Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Strawberry River at Duchesne, Utah, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	158	147	123				280	442	1,320	348	193	198
2	158	151	113				297	453	1,200	333	193	193
3	158	158	123				288	502	1,150	333	198	158
4	151	164	127				246	558	1,140	327	193	151
5	147	158	118				206	690	1,110	318	193	147
6	147	147	118	100	90	90	280	822	1,100	309	193	147
7	147	143	118				268	960	1,080	369	193	147
8	137	158					219	1,040	1,050	333	193	147
9	137	158	120				224	1,120	878	318	181	137
10	137	158					224	1,240	838	303	174	137

Daily discharge, in second-feet, of Strawberry River at Duchesne, Utah, for the year ending September 30, 1923—Continued

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
11	137	158					224	1,360	810	318	169	137
12	137	158					214	1,310	798	309	174	137
13	137	131					214	1,220	782	297	333	137
14	147	131					252	1,190	770	419	453	165
15	147	151				90	214	1,160	730	357	219	151
16	147	158					219	1,110	710	327	198	137
17	147	147					297	1,150	702	297	169	137
18	147	158					318	1,200	607	268	169	137
19	147	158				94	363	1,380	593	252	169	137
20	147	158			90		399	1,490	582	252	169	131
21	147	164	120	100		125	419	1,550	502	246	169	127
22	147	158					409	1,600	495	246	169	127
23	147	158					357	1,440	467	369	327	127
24	147	158				252	297	1,360	442	363	169	174
25	147	151				181	297	1,430	425	309	169	143
26	147	131				143	303	1,600	425	260	158	127
27	147	131				137	363	1,620	419	252	147	127
28	164	127				147	399	1,580	393	224	147	127
29	174	123			-------	158	425	1,540	369	198	147	127
30	147	131			-------	181	432	1,480	363	193	318	137
31	147	-------			-------	232	-------	1,380	-------	193	214	-------

NOTE.—Gage heights affected by ice Dec. 8 to Mar. 23; braced figures show estimated mean discharge for periods indicated.

Monthly discharge of Strawberry River at Duchesne, Utah, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	174	137	148	9,100
November	164	123	149	8,870
December	----------	----------	120	7,380
January	----------	----------	100	6,150
February	----------	----------	90	5,000
March	252	----------	118	7,260
April	432	214	298	17,700
May	1,620	442	1,190	73,200
June	1,320	363	742	44,200
July	419	193	298	18,300
August	453	147	202	12,400
September	198	127	144	8,570
The year	1,620	----------	301	218,000

WEST FORK OF LAKE FORK NEAR MOUNTAIN HOME, UTAH

LOCATION.—In SE. ¼ sec. 18, T. 2 N., R. 5 W., Uinta special base and meridian, a quarter of a mile below Moon Lake and 13 miles northwest of Mountain Home, Duchesne County.

DRAINAGE AREA.—108 square miles (measured on topographic map).

RECORDS AVAILABLE.—September 18, 1921, to September 30, 1923.

GAGE.—Stevens continuous water-stage recorder on right bank; attended by engineers of United States Office of Indian Affairs and United States Geological Survey engineers.

DISCHARGE MEASUREMENTS.—Made from cable or by wading.

CHANNEL AND CONTROL.—Channel steep and rough. Bed composed of boulders and gravel. Right bank high; left bank low. One channel at all stages. Rock riffle control 25 feet below gage; practically permanent.

EXTREMES OF DISCHARGE.—Maximum stage for year, 3.50 feet at 1. p. m. June 13 (discharge, 2,120 second-feet); minimum stage not recorded.

1921–1923: Maximum stage that of June 13, 1923.

DIVERSIONS.—None above station.

REGULATION.—Flow affected by storage and release of water from Brown Duck Lake Reservoir.

ACCURACY.—Stage-discharge relation permanent. Rating curve well defined. Water-stage recorder operated satisfactorily except July 25 to August 26. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph, except for July 25 to August 26, when discharge was estimated. Records good for low water; fair for high water and estimated period.

Discharge measurements of West Fork of Lake Fork near Mountain Home, Utah, 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.*
May 10	C. J. Preece	1.36	302	July 9	Staats and Nebeker	1.92	495
June 7	do	2.00	592	Aug. 27	C. J. Preece	.97	160
14	do	2.99	1,580	28	do	.96	159
26	Staats and Preece	2.46	765				

Daily discharge, in second-feet, of West Fork of Lake Fork near Mountain Home, Utah, for the year ending September 30, 1923

Day	Oct.	Nov.	May	June	July	Aug.	Sept.
1	68	55	-------	577	824		167
2	66	56	-------	535	744		164
3	64	61	-------	571	634	160	156
4	61	62	-------	681	608		154
5	60	59	-------	647	589		151
6	59	59	-------	628	602	120	148
7	60	-------	-------	621	608	150	136
8	60	-------	-------	751	577	200	134
9	60	-------	-------	928	523		129
10	59	-------	301	1,190	529		124
11	59	-------	361	1,480	577		118
12	60	-------	356	1,790	481		116
13	60	-------	330	1,910	426		116
14	60	-------	289	1,590	436		116
15	59	-------	268	1,400	470		113
16	58	-------	274	1,120	395		98
17	57	-------	274	848	370		52
18	56	-------	334	765	343	180	45
19	54	-------	420	681	370		44
20	54	-------	523	614	366		44
21	54	-------	614	571	343		44
22	52	-------	634	493	334		43
23	52	-------	608	431	338		43
24	51	-------	681	547	321		43
25	50	-------	880	674			43
26	50	-------	1,050	808			42
27	50	-------	1,150	904	260	162	54
28	57	-------	1,060	864		159	74
29	59	-------	987	848		156	45
30	56	-------	872	848		162	43
31	54	-------	709	-------		167	-------

Braced figures show estimated mean discharge for periods indicated.

Monthly discharge of West Fork of Lake Fork near Mountain Home, Utah, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	68	50	57.4	3,530
November 1–6	62	55	58.7	698
May 10–31	1,150	268	590	25,700
June	1,910	431	877	52,200
July	824	----------	440	27,100
August	----------	----------	171	10,500
September	167	42	93.3	5,550

LAKE FORK NEAR MYTON, UTAH

LOCATION.—In sec. 21, T. 3 S., R. 2 W., Uinta special base and meridan, 100 yards below highway bridge, half a mile above confluence with Duchesne River, and 3½ miles northwest of Myton, Duchesne County.

DRAINAGE AREA.—468 square miles (measured on topographic maps).

RECORDS AVAILABLE.—July 3, 1900, to December 31, 1903; June 13, 1907, to November 30, 1910; July 26, 1911, to September 30, 1923.

GAGE.—Stevens continuous water-stage recorder on right bank; inspected by C. J. Preece.

DISCHARGE MEASUREMENTS.—Made from cable or by wading.

CHANNEL AND CONTROL.—Channel fairly straight for several hundred feet above and below gage. Banks high and not subject to overflow. Bed composed of silt and gravel. Control is gravel riffle about 300 feet below gage; fairly permanent. Point of zero flow, gage height 0.2 foot, determined July 29, 1922.

EXTREMES OF DISCHARGE.—Maximum stage during year, 7.10 feet at 2 p. m. June 13 (discharge, 2,790 second-feet); minimum stage, 1.02 feet from 9 p. m. August 4 to 6 a. m. August 5 (discharge, 11 second-feet).

1900–1903; 1907–1923: Maximum stage, 9.4 feet, June 22 and 23, 1917 (discharge, 4,350 second-feet); minimum discharge, July 24, 1916, probably zero.

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

DIVERSIONS.—No diversions below station; several canals of the United States Office of Indian Affairs and some privately owned canals divert above for irrigation. Some return water from irrigation enters a short distance above station.

REGULATION.—Flow affected by irrigation diversions above.

ACCURACY.—Stage-discharge relation changed about May 25; affected by ice December 6 to March 25. Rating curves well defined. Water-stage recorder operated satisfactorily except as stated in footnote to daily-discharge table. Daily discharge ascertained by applying mean daily gage height to rating table. Shifting-control method used May 20–25. Discharge for periods of missing gage height and periods of ice effect estimated from observer's notes, temperature records, one measurement, and by comparison with flow at all stations on Duchesne River. Records good except for winter for which they are fair.

Discharge measurements of Lake Fork near Myton, Utah, 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.*
Mar 22	Dickinson and Preece[b]	[a] 2.17	121	June 15	C. J. Preece[b]	5.40	1,680
27	do	2,01	115	22	Staats and Preece[b]	3.27	530
May 7	W. E. Dickinson	2.40	180	25	H. W. Staats	3.67	675
12	Dickinson and Preece[b]	2.78	270	July 2	do	3.93	841
26	C. J. Preece[b]	4.08	951	16	do	2.79	329
June 8	Staats and Dickinson	3.41	541	Aug. 25	C. J. Preece[b]	1.37	39.3

[a] Stage-discharge relation affected by ice. [b] Engineer, Office of Indian Affairs.

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

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	18	40	127				256	102	550	820	30	46
2	18	47	130				209	91	380	735	52	50
3	18	66	134				202	89	353	554	42	41
4	18	80	126				179	84	427	490	14	40
5	19	86	121				164	98	502	485	15	38
6	22	89					173	126	477	490	17	37
7	20	114					162	168	408	494	22	36
8	21	114					126	224	519	572	28	35
9	22	115					121	253	760	423	22	32
10	21	116					132	280	1,020	376	20	30
11	20	110				115	137	264	1,500	498	23	29
12	26	106					134	261	2,070	384	19	26
13	25	94					118	179	2,500	314	84	23
14	24	102					110	170	2,070	302	52	21
15	32	98			110		112	153	1,650	401	48	23
16	32	98		110			120	142	1,290	308	48	27
17	32	110					128	132	978	280	47	37
18	32	108					146	121	835	250	37	40
19	34	106	115				168	110	710	220	37	40
20	33	103					160	200	586	188	38	28
21	32	90					170	405	528	164	50	28
22	29	94				121	183	484	477	143	64	28
23	26	94				122	170	541	343	155	57	28
24	28	100				123	151	563	384	193	44	99
25	26	100				124	121	726	586	149	38	73
26	20	98				124	114	855	810	110	30	75
27	20	114				136	121	1,110	1,000	88	27	134
28	36	121				148	114	1,270	855	87	25	147
29	68	124			-------	158	98	1,110	825	70	25	130
30	44	132			-------	168	103	915	820	50	30	119
31	37	-------			-------	181	-------	760	-------	28	41	-------

NOTE.—No gage-height record Dec. 7-10, Dec. 12 to Mar. 21, Mar. 23-25, July 17-19, 29, and 30. Stage-discharge relation affected by ice Dec. 6 to Mar. 25; discharge estimated. Discharge interpolated July 17-19, 29, and 30. Braced figures show estimated mean discharge for periods indicated.

Monthly discharge of Lake Fork near Myton, Utah, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	68	18	27.5	1,690
November	132	40	99.0	5,890
December	----------	----------	117	7,190
January	----------	----------	110	6,760
February	----------	----------	110	6,110
March	181	----------	123	7,560
April	256	98	147	8,750
May	1,270	84	387	23,800
June	2,500	343	874	52,000
July	820	28	317	19,500
August	84	14	36.3	2,230
September	147	21	51.3	3,050
The year	2,500	14	200	145,000

UINTA RIVER NEAR NEOLA, UTAH

LOCATION.—In SE. ¼ sec. 26, T. 2 N., R. 2 W., Uinta special base and meridian, 800 feet above tailrace of Uinta Power & Light Co.'s plant (Pole Creek unit), 1½ miles above mouth of Pole Creek, and 9 miles north of Neola, Duchesne County.

DRAINAGE AREA.—181 square miles.

RECORDS AVAILABLE.—July 30, 1921, to September 30, 1923; fragmentary.

GAGE.—Vertical staff on left bank installed September 11, 1922; washed away June 14, 1923; new staff gage to new datum installed July 8, 1923, at same location; read by Jed Timothy.

DISCHARGE MEASUREMENTS.—Made by wading or from log bridge 1,000 feet below gage.

CHANNEL AND CONTROL.—Channel steep and rough. Bed composed of boulders and gravel. Banks fairly high and probably not subject to overflow unless channel changes, which may readily occur during high water.

EXTREMES OF DISCHARGE.—Not determined.

ICE.—River freezes over every winter.

DIVERSIONS.—None above station.

REGULATION.—None.

ACCURACY.—Stage-discharge relation changed during high water; affected by ice December 10-28. Rating curves fairly well defined for low water; poorly defined for high stages. Gage read to hundredths once or twice daily except as stated in footnote to daily-discharge table. Daily discharge ascertained by applying mean daily gage height to rating table. Records fair for low water; for other stages poor.

Discharge measurements of Uinta River near Neola, Utah, 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.*
Mar. 23	Dickinson and Hall[a]	0.83	103	Aug. 22	C. J. Preece[b]	1.78	279
Aug. 22	C. J. Preece[b]	1.78	271	Sept. 19	do	1.52	213

[a] General manager, Uinta Power & Light Co. [b] Hydrographer, Office of Indian Affairs.

NOTE.—Discharge includes flow of Uinta Power & Light Co.'s tailrace.

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Daily discharge, in second-feet, of Uinta River near Neola, Utah, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Apr.	May	June	July	Aug.	Sept.
1		118	96	82	107	642		450	257
2		122	98	78	112	570		403	265
3		126	94	69	117	660		372	244
4		126	96	66	122	1,050		334	249
5	153	122	124	67	122	885		325	235
6			98	69	124	794		313	244
7			98	67	178	708		298	249
8	135	120	112	74	190	885	755	278	217
9	135		87	77	201	955	780	270	204
10				63	204	1,060	685	287	194
11		118		74	243		685	331	196
12				77	250		670	296	190
13				85	270		730	290	186
14					250		755	284	196
15		106			246		805	283	196
16					224		710	282	194
17					250		655	281	196
18					270		635	287	206
19		94			318		615	284	217
20	126	106			426		594	281	206
21		98		96	465		538	278	206
22		97			490		530	276	198
23		95			460		518	270	196
24		94			515		530	265	190
25		98			801		566	252	196
26					1,020		558	242	190
27							534	281	188
28		97			1,300		514	265	186
29				108			490	259	188
30				102			506	268	181
31	118				934		482	254	

NOTE.—No gage-height record Oct. 1–7, 10–30, Nov. 6–10, 12–18, 22, 23, 26–30, Dec. 11, 17, 20, 22, Dec. 30 to Mar. 31, Apr. 14–28, May 1–3, 27–30, June 11 to July 7, Aug. 15, 16, 19–21, and 23. Stage-discharge relation affected by ice Dec. 10–29, and probably later periods. Water above top of gage May 27–30 and June 11–14. Gage washed away June 15. Braced figures show estimated mean discharge for periods indicated. Beginning Apr. 1 discharge includes flow of Uinta Power & Light Co.'s tailrace.

Monthly discharge of Uinta River near Neola, Utah, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October		118	132	8,120
November	126	94	108	6,430
December 1–9	124	87	100	1,790
April	108	63	86.6	5,150
May		107	455	28,000
June 1–10	1,060	570	821	16,300
July 8–31	805	482	618	29,400
August	450	242	295	18,100
September	265	181	209	12,400

WHITEROCKS CREEK NEAR WHITEROCKS, UTAH

LOCATION.—In sec. 18, T. 2 N., R. 1 E., Uinta special base and meridian, 8 miles north of Whiterocks, Uintah County. United States Whiterocks Canal diverts from left side and Farm Creek Canal from right side 2 miles below station.

DRAINAGE AREA.—118 square miles.

RECORDS AVAILABLE.—August 1, 1921, to November 18, 1921; May 1 to October 13, 1922, and May 1 to September 30, 1923, at present site. November 8, 1917, to June 2, 1921, at a point about 2 miles below diversion of United

States Whiterocks Canal and above Farm Creek Canal. 1899 to 1904 and 1907 to 1910 somewhere near present site. Records are comparable.

GAGE.—Stevens continuous water-stage recorder on left bank; inspected by C. J. Preece.

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

CHANNEL AND CONTROL.—Narrow box canyon. Stream bed is steep and rough; composed of boulders and gravel. Channel is subject to change by erosion during high water.

EXTREMES OF DISCHARGE.—Not determined for 1923.

1918–1923: Maximum stage recorded, 5.40 feet at 9 p. m. June 20 and 7 p. m. June 21, 1922 (discharge, 2,750 second-feet); minimum discharge occurred during winter of 1920–21

ICE.—Stream freezes over every winter.

DIVERSIONS.—None.

REGULATION.—None.

ACCURACY.—Stage-discharge relation probably changed during winter, when no records were obtained, during June 6–11, and again about August 18. Rating curves fairly well defined. Operation of water-stage recorder satisfactory except June 6–11. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph. Shifting-control method used August 19–22. Daily discharge May 1–7 and June 6–11 estimated by comparison with flow of Uinta River near Neola and Ashley Creek near Vernal. Records fair.

Discharge measurements of Whiterocks Creek near Whiterocks, Utah, 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.*
Apr. 19	C. J. Preece [a]	1.66	93.0	July 17	H. W. Staats	2.41	267
May 8	do	1.92	167	Aug. 14	C. J. Preece [a]	2.20	151
28	do	3.37	1,180	30	do	2.17	107
June 12	Staats and Preece [a]	3.61	1,370	30	do	2.17	106
21	do	2.70	472	Sept. 18	do	2.14	86.5
July 3	do	2.68	465				

[a] Engineer, Office of Indian Affairs.

Daily discharge, in second-feet, of Whiterocks Creek near Whiterocks, Utah, for the year ending September 30, 1923

Day	Oct.	May	June	July	Aug.	Sept.	Day	Oct.	May	June	July	Aug.	Sept.
1	100		726	538	182	115	16		250	930	293	151	91
2	98		750	513	176	105	17		250	731	267	142	96
3	95		929	455	166	96	18		340	668	248	138	91
4	92		1,150	431	156	91	19		463	589	254	138	86
5	90	110	1,110	407	156	91	20		600	546	248	151	76
6	88		1,080	392	151	91	21		702	504	231	151	71
7	88		1,070	439	151	86	22		702	496	237	133	67
8	85	164		439	147	81	23		670	455	355	132	71
9	85	227		392	142	76	24		742	546	280	110	105
10	82	301	1,420	341	147	76	25		980	659	273	105	120
11	82	352		326	156	76	26		1,180	740	267	100	110
12	82	329	1,770	306	147	76	27		1,330	704	208	96	105
13	85	307	1,650	273	147	81	28		1,250	598	197	96	105
14		275	1,350	286	151	96	29		1,200	580	182	91	96
15		250	1,120	341	166	91	30		1,070	572	176	100	91
							31		839		182	100	

NOTE.—Braced figures show estimated mean discharge for periods indicated.

Monthly discharge of Whiterocks Creek near Whiterocks, Utah, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
May	1,330		501	30,800
June		455	923	54,900
July	338	176	315	19,400
August	182	91	138	8,480
September	120	67	90.3	5,370

PRICE RIVER NEAR HELPER, UTAH

LOCATION.—In SE. ¼ sec. 36, T. 13 S., R. 9 E., at highway bridge three-quarters of a mile above diversion dam of Price River Irrigation Co., 2 miles south of Helper, Carbon County, and 3 miles below Spring Creek.

DRAINAGE AREA.—530 square miles (measured on topographic map).

RECORDS AVAILABLE.—February 21, 1904, to September 30, 1923.

GAGE.—Chain gage on highway bridge; read by D. S. Rowley.

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

CHANNEL AND CONTROL.—Bed of stream composed of gravel and sand. One channel at all stages. Control formed by a riffle of gravel and cobbles; shifts occasionally.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 9.66 feet May 21 (discharge, 1,660 second-feet); minimum stage, 6.95 feet February 27 and March 5 and 11 (discharge, 24 second-feet).

1904–1923: Summer floods occur nearly every year and often greatly exceed any recorded stage. Maximum stage recorded for which discharge was determined, 8.43 feet at 9 p. m. June 25, 1917 (discharge determined from extension of rating curve, 8,500 second-feet); minimum discharge, 4 second-feet during December, 1905, and January, 1906.

ICE.—Stage-discharge relation affected by ice nearly every winter.

DIVERSIONS.—Main diversions are below station.

REGULATION.—Practically none.

ACCURACY.—Stage-discharge relation changed during high water May 21; affected by ice as noted in footnote to daily-discharge table. Rating curves fairly well defined. Gages read to hundredths once a day with occasional omissions and twice daily during periods of rapidly changing stage. Daily discharge ascertained by applying mean daily gage height to rating table. Discharge for period of ice effect estimated from one measurement, temperature records, and observer's notes on ice conditions. Discharge interpolated or estimated for days when no gage heights were obtained. Small flood on July 23 estimated from observer's notes. Records good.

Discharge measurements of Price River near Helper, Utah, 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.*
Dec. 20	W. E. Dickinson	7.17	59.4	May 26	W. E. Dickinson	9.40	1,440
Apr. 4	do	7.35	103	July 24	H. W. Staats	7.39	137
30	do	8.39	514	Aug. 13	W. E. Dickinson	6.98	60.7

Daily discharge, in second-feet, of Price River near Helper, Utah, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	44	61	44				145	508	1,100	161	117	88
2	40	59	44				133	544	968	146	122	88
3	30	63	47			40	157	678	932	152	133	79
4	30	40	47				116	820	887	146	112	79
5	30	35	47			24	139	962	780	141	103	72
6	30	30	47			40	157	1,060	686	133	83	64
7	30	33	51			47	170	1,120	812	170	68	56
8	30	47	30		40	40	164	1,160	764	182	64	56
9	30	63	35			55	203	1,260	686	176	64	52
10	37	59	40			51	280	1,320	686	170	54	48
11	37	51	42			24	304	1,340	651	146	52	48
12	33	33	42			33	300	1,360	606	140	52	46
13	37	33	45			44	466	1,360	594	133	54	44
14	37	55	45	40		51	445	1,340	582	133	61	38
15	37	51	45			55	538	1,320	528	182	64	58
16	35	49	38		50	63	629	1,340	498	170	62	52
17	35	53	32			54	643	1,360	440	158	61	44
18	35	57	48			44	881	1,460	400	120	58	48
19	35	53	60		55	37	917	1,570	372	115	54	50
20	32	45	61		47	47	792	1,570	315	141	136	52
21	32	42	45		51	40	713	1,660	278	133	100	54
22	34	29			55	33	472	1,660	285	108	88	48
23	35	29		42	95	44	472	1,540	270	250	77	43
24	38	29		42	55	44	410	1,470	263	130	61	83
25	38	29		45	46	41	400	1,450	244	130	52	68
26	38	29	40	44	38	38	390	1,540	223	158	52	64
27	38	29		43	24	44	420	1,490	209	141	46	64
28	38	32		42	36	63	450	1,430	196	120	40	64
29	69	45		41	-------	78	544	1,410	182	100	40	64
30	65	45		40	-------	90	568	1,360	176	96	62	61
31	65	-------		49	-------	133	-------	1,220	-------	88	83	-------

NOTE.—Stage-discharge relation affected by ice and discharge estimated Nov. 13, Dec. 5, 9, 16, 18, 19, Dec. 22 to Jan. 22, 26, 27, 29, Feb. 1-17, Mar. 1-4. Braced figures show estimated mean discharge for periods indicated. No gage heights Oct. 22, Nov. 5, 26, Jan. 28, Feb. 18, 25, 28, Mar. 17, 21, 25, Apr. 27, May 4, 18, July 12, Aug. 16, 22, 30, Sept. 12, and 19; discharge interpolated.

Monthly discharge of Price River near Helper, Utah, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	69	30	37.9	2,330
November	63	29	43.6	2,590
December	61	-------	43.1	2,650
January	49	-------	40.9	2,510
February	95	-------	45.1	2,500
March	133	24	48.9	3,010
April	917	116	414	24,600
May	1,660	508	1,280	78,700
June	1,100	176	520	30,900
July	250	88	144	8,850
August	136	40	73.4	4,510
September	88	38	59.2	3,520
The year	1,660	-------	230	167,000

HUNTINGTON CREEK NEAR HUNTINGTON, UTAH

LOCATION.—In SE. ¼ sec. 6, T. 17 S., R. 8 E., at Cunha ranch 7 miles northwest of Huntington, Emery County. Below all main tributaries except Fish Creek.

DRAINAGE AREA.—188 square miles (measured on United States Forest Service map, 1920).

RECORDS AVAILABLE.—May 3, 1909, to September 30, 1923, fragmentary.

GAGE.—Stevens continuous water-stage recorder on right bank; inspected by Joseph Cunha.

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

CHANNEL AND CONTROL.—Bed composed of gravel and sand. Control of coarse gravel; shifts occasionally during high stages.

EXTREMES OF DISCHARGE.—Maximum stage for year, 4.7 feet at 10 p. m. May 20 (discharge, 907 second-feet); minimum discharge, 14 second-feet October 11–13.

1909–1923: Maximum discharge, 1,340 second-feet at 9.30 p. m. May 25, 1920, and at 11 p. m. May 25, 1922; minimum discharge, 12 second-feet March 20–23, 1912.

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

DIVERSIONS.—Several small ditches divert from tributaries above station.

REGULATION.—A small storage reservoir on Huntington Creek above station controls distribution of flow to a slight extent.

ACCURACY.—Stage-discharge relation changed April 21; affected by ice during January, February, and March. Rating curve well defined above 40 second-feet; extended below. Operation of water-stage recorder satisfactory except as noted in footnote to daily-discharge table. Weekly readings were made during winter. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph or weekly readings. Discharge estimated or interpolated for periods when recorder was not operating. Records good; estimated periods fair.

Discharge measurements of Huntington Creek near Huntington, Utah, during the year ending September 30, 1923

[Made by W. E. Dickinson]

Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Dec. 17	2.10	48.6	May 25	4.13	611
Apr. 3	2.15	55.6	Aug. 15	2.45	90.2
May 4	2.92	180			

Daily discharge, in second-feet, of Huntington Creek near Huntington, Utah, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1		19					56	99	394	181	121	56
2							56	123	390	174	125	56
3	22		43				56	159	420	170	127	53
4				46			54	200	432	174	131	53
5		23					53	264	420	165	125	52
6	16		49				56	330	432	152	121	49
7	16			49			57	401	432	152	116	47
8	16	27					56	459	451	198	108	47
9	16						57	509	459	208	105	45
10	15		49	49	45	50	61	610	476	198	105	44
11	14	27					62	619	451	188	103	44
12	14						68	530	472	179	99	48
13	14		49	49			73	476	435	179	96	52
14	16						78	428	390	212	96	58
15	16		49				81	435	337	264	92	59
16	17	27		49			92	447	292	193	87	58
17	16		49				114	496	270	172	86	57
18	17	32	48				133	648	262	163	94	59
19	18		46				131	712	242	186	101	59
20	17		44				135	759	236	188	89	58

Daily discharge, in second-feet, of Huntington Creek near Huntington, Utah, for the year ending September 30, 1923—Continued

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
21							127	687	234	195	76	56
22	17	32					108	574	223	215	79	57
23							94	569	218	234	70	52
24	16	37		49			79	648	231	198	70	57
25			43		45		75	712	223	198	69	53
26						50	82	743	228	184	68	51
27	18	37		49			84	717	223	161	65	50
28							82	638	208	146	61	49
29			42	49	-------		101	574	198	131	58	48
30		37	43		-------		108	526	190	120	62	47
31		-------	43		-------		-------	463	-------	120	59	-------

NOTE.—No gage-height record Oct. 1–5, 20–23, 25–31, Nov. 2–7, 9–15, 17–23, 25–29, Dec. 1–5, 7–12, 14–16, 18, 19, 21–28, 30, 31, Jan. 1–6, 8–12, 14–19, Apr. 23, and Sept. 26–29; discharge estimated. Gage heights affected by ice Jan. 20 to Apr. 3; discharge estimated. Braced figures show estimated mean discharge for periods indicated.

Monthly discharge of Huntington Creek near Huntington, Utah, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	-------	14	17.5	1,080
November	-------	-------	29.4	1,750
December	-------	-------	45.6	2,800
January	-------	-------	48.4	2,980
February	-------	-------	45	2,500
March	-------	-------	50	3,070
April	135	53	82.3	4,900
May	759	99	502	30,900
June	476	190	329	19,600
July	264	120	181	11,100
August	131	58	92.4	5,680
September	59	44	52.5	3,120
The year	759	14	124	89,500

COTTONWOOD CREEK NEAR ORANGEVILLE, UTAH

LOCATION.—In SW. ¼ sec. 10, T. 18 S., R. 7 E., at Sitterud ranch, 5 miles northwest of Orangeville, Emery County.

DRAINAGE AREA.—200 square miles (measured on United States Forest Service map, 1920).

RECORDS AVAILABLE.—May 1, 1909, to November 30, 1922; and April 1 to September 30, 1923.

GAGE.—Stevens continuous water-stage recorder on left bank near ranch house; inspected by George Sitterud.

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

CHANNEL AND CONTROL.—Bed rough; shifting. Banks fairly high but have been overflowed by sudden floods, to which the stream is subject. Control of gravel and sand; fairly permanent.

EXTREMES OF DISCHARGE.—Maximum stage during year, 8.35 feet at 6 p. m. July 26 (discharge from extension of rating, 2,140 second-feet); minimum discharge not determined.

1909–1923: Maximum stage, 9.1 feet at 10 p. m. August 22, 1922 (discharge from extension of rating, 2,500 second-feet); minimum discharge recorded, 5 second-feet September 21, 1910.

ICE.—Stage-discharge relation affected by ice.

DIVERSIONS.—Two or three small ditches divert water above station, but all the main ditches take out below.

REGULATION.—None.

ACCURACY.—Stage-discharge relation permanent for year. Rating curve well defined below 800 second-feet, and extended above. Water-stage recorder operated successfully except as stated in footnote to daily-discharge table. Daily discharge ascertained by applying mean daily gage height, or weekly readings, to rating table. Discharge for periods of missing gage heights interpolated or estimated. Records good.

Discharge measurements of Cottonwood Creek near Orangeville, Utah, during the year ending September 30, 1923

[Made by W. E. Dickinson]

Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Dec. 15	2.46	30.1	May 25	5.25	743
Apr. 3	2.55	38.1	Aug. 15	2.78	62.2
May 4	3.24	129			

Daily discharge, in second-feet, of Cottonwood Creek near Orangeville, Utah, for the year ending September 30, 1923

Day	Oct.	Nov.	Apr.	May	June	July	Aug.	Sept.
1	29	30	50	88	652	530	85	45
2	29	30	42	104	640	502	73	45
3	30	30	39	123	680	484	69	44
4	30	31	36	150		475	65	44
5	28	32	37	176	690	440	64	44
6	28	34	47	209		414	60	42
7	28	43	43	242	700	405	60	39
8	28	42	43	263		420	61	38
9	28	39	47	303		390	62	38
10	28		44	351	775	440	70	38
11	28	26	48	369		340	77	38
12	28		63	357	850	325	74	40
13	27	14	63	334	890	325	100	60
14	28		60	314	810	325	85	50
15	28		65	298	736	490	62	55
16	28	20	78	325	652	303	60	45
17	27		89	346	616	295	56	44
18	25		101	411	604	279	70	43
19	25		98	375	582	311	92	42
20	25	26	96	600	570	290	180	41
21	23		92	600	562	266	72	41
22	25		81	550	550	276	77	41
23	25		72	570	570	303	61	41
24	25	26	63	680	582	273	53	44
25	27		62	810	588	425	51	42
26	25		66	910	612	115	48	41
27	28	26	65	940	608	101	49	41
28	27		69	910	585	95	47	40
29	28	26	89	846	570	88	47	40
30	28		89	795	550	85	46	36
31	25			732		79	46	

NOTE.—No gage-height record Nov. 4, 5, 10–12, 14–19, 21–26, 28–30, June 4–11, 13, Aug. 29 to Sept. 4, Sept. 14, 16–19; discharge interpolated. Daily gage readings were used Nov. 13, 20, 27, Sept. 15. Braced figures show estimated mean discharge for periods indicated.

Monthly discharge of Cottonwood Creek near Orangeville, Utah, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	30	23	27.1	1,670
November	43	----------	27.0	1,610
April	101	36	64.6	3,840
May	940	88	457	28,100
June	890	550	664	39,500
July	530	79	319	19,600
August	180	46	68.5	4,210
September	60	36	42.7	2,540

FERRON CREEK (UPPER STATION) NEAR FERRON, UTAH

LOCATION.—Close to line between secs. 1 and 2, T. 20 S., R. 6 E., a quarter of a mile below house at Peterson ranch, 1½ miles above grist mill and 5 miles northwest of Ferron, Emery County.

DRAINAGE AREA.—140 square miles (measured on United States Forest Service map, 1920).

RECORDS AVAILABLE.—May 6, 1911, to September 30, 1923, when station was discontinued.

GAGE.—Inclined staff on right bank; read by Joseph Peterson.

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

CHANNEL AND CONTROL.—Banks high and not subject to overflow. Bed composed of sand and gravel. Current swift and has tendency to cut channel deeper. Stage of zero flow at gage height −0.5 foot, determined August 12, 1921.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 4.00 feet July 14 and August 11 (discharge, 698 second-feet); minimum discharge occurred during ice-affected period.

1911-1923: Maximum stage, 10.0 feet at 3 p. m. July 25, 1920 (discharge, probably 2,000 second-feet); minimum discharge, 1 second-foot March 22 and 23, 1912.

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

DIVERSIONS.—Above all diversions except a small ditch for the Peterson ranch.

REGULATION.—None.

ACCURACY.—Stage-discharge relation changed during ice-affected period and again about May 3. Rating curves fairly well defined. Gage read to hundredths once or twice daily except as stated in footnote to daily-discharge table. Daily discharge ascertained by applying mean daily gage height to rating table except for days of large fluctuation and periods when stage-discharge relation was affected by ice. For these periods discharge was estimated from measurements, observer's notes, recorded gage heights, and weather records. Discharge interpolated for days when gage was not read. Records fair.

Discharge measurements of Ferron Creek (upper station) near Ferron, Utah, 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.*
Dec. 16	W. E. Dickinson	[a]0.61	12.2	May 4	W. E. Dickinson	1.67	201
Apr. 3	do	.32	16.2	July 23	H. W. Staats	.80	84.1

[a] Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Ferron Creek (upper station) near Ferron, Utah, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	24	23					18	23	305	175	70	50
2	24	23					17	25	291	164	68	48
3	24	22					16	80	297	151	66	50
4	24	20					17	122	301	155	64	57
5	24	22					17	155	291	141	61	48
6	24	21					17	166	297	133	58	50
7	24	20					20	206	401	134	60	45
8	24	20	16				19	243	423	150	64	44
9	24	21					18	291	449	124	58	43
10	24	22				12	17	311	438	111	80	41
11	24	26					20	277	515	117	150	39
12	24	28					26	243	497	111	63	39
13	23	30					24	243	427	130	75	39
14	23	32					24	198	301	175	70	50
15	24	38	12		10		23	206	301	120	62	42
16	24	24		10			24	297	305	100	80	45
17	24	24					32	305	272	95	60	45
18	24	24					34	331	266	89	100	43
19	24	24				13	36	427	232	94	80	39
20	24	24				16	25	482	198	80	70	39
21	23	26				13	36	341	215	89	74	39
22	22	28				13	18	317	206	100	60	38
23	24	27				13	17	311	228	83	55	38
24	24	26	10			12	30	482	243	80	54	38
25	23	28				13	32	526	215	150	57	43
26	23	24				18	26	572	206	83	54	40
27	22	26				22	22	537	206	77	52	44
28	23	28				22	20	493	198	70	51	42
29	22	24				20	22	427	181	72	65	38
30	20	23				18	20	383	173	68	60	36
31	21	------				20	------	301	------	96	60	------

NOTE.—No gage heights Oct. 2, 5, 9, 13, 26, Nov. 3, 9, 12, 17, 19, 21, 23, 27, Apr. 4, 8, and Aug. 5; discharge estimated. Large daily fluctuation Apr. 10, 11, 13, 17, 21, 29, May 3, 7, 13, 14, 24, 25, 27, June 22, July 8, 13–17, 22, 25, Aug. 10, 11, 13, 14, 18, 19, 29–31, Sept. 14 and 16; discharge estimated. Stage-discharge relation affected by ice Dec. 1 to Mar. 18. Braced figures show estimated mean discharge for periods indicated.

Monthly discharge of Ferron Creek (upper station) near Ferron, Utah, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	24	20	23.4	1,440
November	38	20	24.9	1,480
December	----------	----------	13	799
January	----------	----------	10	615
February	----------	----------	10	555
March	22	----------	13.8	848
April	36	16	22.9	1,360
May	572	23	301	18,500
June	515	173	296	17,600
July	175	68	113	6,950
August	150	51	67.8	4,170
September	57	36	43.1	2,560
The year	572	----------	78.6	56,900

LITTLE COLORADO RIVER BASIN

ZUNI RIVER AT BLACKROCK, N. MEX.

LOCATION.—At reservoir on Zuni Indian Reservation at Blackrock, McKinley County. Rio de Los Nutrias, nearest large tributary, enters from north about 4 miles above.

DRAINAGE AREA.—About 660 square miles.

RECORDS AVAILABLE.—Yearly flow July 1, 1903, to June 30, 1905; July 1, 1908, to June 30, 1910. Monthly discharge October 1, 1910, to September 30, 1923. Record since July 1, 1908, shows inflow into reservoir.

METHOD OF COLLECTING DATA.—From July 1, 1903, to June 30, 1905, records were obtained by the ordinary stream-gaging methods. Reservoir completed in 1908. Record beginning July 1, 1908, obtained by means of gage in reservoir and capacity curve for reservoir, quantity of water released from the reservoir during the periods of inflow being taken into consideration.

EXTREMES OF DISCHARGE.—Channel dry greater part of the year below point where it leaves mountains, but stream is subject to sudden floods of considerable volume and usually of short duration.

DIVERSIONS.—Reservoir at Ramah, about 18 miles above station, capacity of which is given as 4,240 acre-feet is used to irrigate about 1,150 acres in T. 11 N., R. 16 W. There are other small ponds or reservoirs in drainage area.

COOPERATION.—Record furnished by the United States Office of Indian Affairs, through H. F. Robinson, supervising engineer, Albuquerque, N. Mex.

Monthly discharge of Zuni River at Blackrock, N. Mex., for the year ending September 30, 1923

Month	Run-off in acre-feet	Month	Run-off in acre-feet	Month	Run-off in acre-feet
October	153	March	1,380	August	5,740
November	46	April	101	September	8,580
December	198	May	0		
January	182	June	0	The year	17,700
February	821	July	493		

VIRGIN RIVER BASIN

VIRGIN RIVER AT VIRGIN, UTAH

LOCATION.—In NW. ¼ sec. 27, or NE. ¼ sec. 28, T. 41 S., R. 12 W., a few hundred feet above point where river enters a steep, narrow gorge, and three-quarters of a mile west of Virgin, Washington County. Station replaces one maintained prior to February 1915, half a mile above Virgin and gives practically the same record of flow.

DRAINAGE AREA.—1,010 square miles (measured on topographic maps).

RECORDS AVAILABLE.—April 18, 1909, to September 30, 1923; very fragmentary.

GAGE.—Chain on right bank near lower end of sandstone bluff; read by Lawrence Earl.

DISCHARGE MEASUREMENTS.—Made by wading or from highway bridge ¼ mile below gage.

CHANNEL AND CONTROL.—Bed consists of sand and gravel. Right bank high; left bank low and is overflowed. One channel at all stages. Principal control is a gravel bar a short distance below the gage; shifting.

EXTREMES OF DISCHARGE.—Not determined for current year.

1909–1918: Maximum stage recorded, 11.6 feet at upper station October 27, 1912 (discharge estimated, 12,000 second-feet); minimum discharge, 24 second-feet, July 1, 2, 4, and 5, 1909.

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

DIVERSIONS.—Above most important diversions.

REGULATION.—None.

ACCURACY.—Stage-discharge relation variable. Gage read to hundredths four or five times a week. Rating curves not sufficiently well defined from October 1 to March 31 to warrant publication of discharge. Daily discharge from April 1 to September 30 computed only for days when gage was read. Occasional floods of short duration occurred which do not appear in records. Records as published are believed to be accurate enough for general studies.

The following discharge measurement was made by A. B. Purton:

June 8, 1923: Gage height, 2.61 feet; discharge, 206 second-feet.

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

Day	Apr.	May	June	July	Aug.	Sept.	Day	Apr.	May	June	Jnly	Aug.	Sept.
1			287			71	16				61		
2	387		220	98			17	826					87
3		1,120			77	77	18			126	92	98	
4					66		19	639	639				
5	413	1,310		87		77	20			179			143
6			210				21	747	565		87		126
7		731	170	52	56	71	22			161			134
8			205	66			23		536	112	82	82	
9	594	1,020	189		61		24	426				92	126
10		922		58		82	25	440	624		82	71	
11	975		170		56		26		466	143			143
12		440		120		98	27		480				
13			179				28	624		76	76	71	102
14	639	453					29						
15		466	161		126	106	30	550		112		77	
							31		299		98		

NOTE.—Discharge from Oct. 1 to Mar. 31 not computed because of uncertainties in rating. Discharge from Apr. 1 to Sept. 30 computed only for days when gage was read. Floods occurred on July 22 and Aug. 12, discharge not determined.

Monthly discharge of Virgin River at Virgin, Utah, for the year ending September 30, 1923

Month	Discharge in second-feet (mean)	Run-off in acre-feet
April	587	34,900
May	650	40,000
June	164	9,760
September	102	6,070

NOTE.—Discharge from October to March not computed because of uncertainties in rating; discharge July and August not computed because of floods for which sufficient data were not obtained; discharge for other months estimated.

MUKUNTUWEAP RIVER NEAR SPRINGDALE, UTAH

LOCATION.—Near center of sec. 15, T. 41 S., R. 10 W., about 200 feet above highway bridge, half a mile north of south entrance to Zion National Park, 3 miles northeast of Springdale, Washington County, and 5 miles above confluence with Virgin River.

DRAINAGE AREA.—Not determined.

RECORDS AVAILABLE.—June 6 to November 6, 1923, when station was temporarily discontinued.

GAGE.—Vertical staff on left bank; read by Charles Crosby.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—Bed of stream composed of sand, gravel, and large boulders. Banks high and not subject to overflow; sparse growth of willows; one channel at all stages. Control is boulder riffle at head of rather steep section of channel; shifts occasionally.

EXTREMES OF DISCHARGE.—Maximum stage recorded during the period, 5.64 feet at 5 p. m. September 14 (discharge, 345 second-feet); minimum stage, 3.96 feet at 5 p. m. September 11 and 8 a. m. September 12 (discharge, 47 second-feet).

ICE.—None.

DIVERSIONS.—Two small canals with combined capacity of about 4 second-feet divert a short distance above gage.

REGULATION.—None.

ACCURACY.—Stage-discharge relation permanent during period. Rating curve well defined to 200 second-feet and extended above. Gage read to hundredths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table. Discharge interpolated for days of missing gage height. Records good.

Discharge measurements of Mukuntuweap River near Springdale, Utah, during the year ending September 30, 1923

[Made by A. B. Purton]

Date	Gage height	Discharge
	Feet	*Sec.-ft.*
June 6	4.89	189
8	4.83	187

Daily discharge, in second-feet, of Mukuntuweap River near Springdale, Utah, for the period June 6 to November 6, 1923

Day	June	July	Aug.	Sept.	Oct.	Nov.	Day	June	July	Aug.	Sept.	Oct.	Nov.
1	-------	91	83	70	62	63	16	137	102	70	90	68	------
2	-------	88	91	65	59	63	17	134	87	73	94	68	------
3	-------	85	94	171	57	63	18	130	80	94	136	65	------
4	-------	85	90	91	57	63	19	130	78	103	74	64	------
5	-------	80	73	77	57	63	20	143	76	87	68	64	------
6	194	80	67	65	54	62	21	157	85	80	65	64	------
7	186	85	69	157	53	-------	22	136	81	74	67	64	------
8	179	254	67	175	52	-------	23	127	77	68	80	67	------
9	179	104	184	62	80	-------	24	119	84	132	97	65	------
10	171	88	157	52	72	-------	25	116	186	68	74	69	------
11	164	80	262	48	78	-------	26	114	179	67	73	68	------
12	162	77	184	56	76	-------	27	108	76	69	64	65	------
13	153	103	109	161	67	-------	28	103	77	90	65	64	------
14	146	91	80	337	68	-------	29	100	74	175	64	64	------
15	139	103	72	278	69	-------	30	98	72	150	62	64	------
							31	-------	72	73	-------	64	------

NOTE.—No gage-height record, June 7, 27, Oct. 7, 14, 21, 28, and Nov. 3; discharge interpolated.

Monthly discharge of Mukuntuweap River near Springdale, Utah, for the period June 6 to November 6, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
June 6–30	194	98	141	6,990
July	254	72	96.1	5,910
August	262	67	102	6,270
September	337	48	101	6,010
October	80	52	64.8	3,980
November 1–6	63	62	62.8	747
The period				29,900

SANTA CLARA CREEK NEAR CENTRAL, UTAH

LOCATION.—In sec. 11, T. 39 S., R. 16 W., just above bridge at R. H. Hunt ranch, 1 mile southeast of Central, Washington County, on road to Pine Valley. Hunt's spring, which has fairly constant discharge of about 3 second-feet, enters 40 feet below gage.

DRAINAGE AREA.—84 square miles (measured on topographic map).

RECORDS AVAILABLE.—April 21, 1909, to September 30, 1923.

GAGE.—Vertical enamel staff nailed to cottonwood tree on left bank about 50 feet above bridge; read by Mrs. R. H. Hunt.

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

CHANNEL AND CONTROL.—Stream bed consists of gravel and sand. Banks fairly high but may be overflowed at extreme stage; one channel at all stages. A riffle formed by small boulders 40 feet below gage is fairly permanent. Point of zero flow at gage height, 0.7 foot ± 0.1 foot, determined June 9, 1923.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 2.12 feet at 8 a. m. May 19 (discharge, 138 second-feet); minimum discharge, 12 second-feet several days during January.

1909–1923: Maximum stage, 5.00 feet at 11 a. m. October 6, 1916 (discharge, 1,450 second-feet); minimum stage, 0.82 foot January 8, 1920 (discharge, 4 second-feet).

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

DIVERSIONS.—The New Castle Reclamation Co. have a reservoir on Grass Valley Creek that has a capacity of 23,000 acre-feet. Water is diverted into this reservoir from Santa Clara Creek above town of Pine Valley and released into tunnel through rim of the Great Basin for irrigation of lands outside the Colorado River Basin. The Central Canal diverts water about 2 miles above station for irrigation of lands near Central. This canal has been measured when it was carrying 16 second-feet.

REGULATION.—Flow affected by the diversions and storage above.

ACCURACY.—Stage-discharge relation permanent during year. Rating curve well defined between 8 and 30 second-feet and fairly well defined above. Gage read to hundredths once daily with frequent omissions of one to two days. Daily discharge ascertained by applying daily gage height to rating table or by interpolating discharge for days when gage was not read. Records probably good.

The following discharge measurement was made by A. B. Purton:
June 9, 1923: Gage height, 1.38 feet; discharge, 26.7 second-feet.

Daily discharge, in second-feet, of Santa Clara Creek near Central, Utah, for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	18	15	13	13	13	15	22	36	60	15	69	15
2	18	15	13	13	13	16	20	36	36	14	46	15
3	18	15	13	13	13	14	19	55	36	14	22	15
4	16	15	13	13	14	15	23	87	33	14	19	15
5	16	15	13	13	14	16	22	101	31	14	16	15
6	16	15	13	13	13	20	30	104	28	13	16	15
7	16	15	13	13	13	18	40	112	25	13	16	15
8	16	15	13	13	13	17	28	114	25	13	16	15
9	16	15	13	12	13	15	34	116	26	13	17	15
10	16	15	13	12	13	15	40	125	25	13	19	15
11	16	15	13	12	13	15	66	133	25	13	16	15
12	16	15	20	12	14	14	57	112	25	13	16	15
13	16	15	26	13	13	16	48	93	24	14	16	15
14	16	14	20	13	13	19	38	108	23	23	16	15
15	16	13	19	13	13	17	38	87	23	28	16	15
16	15	13	15	13	14	16	50	90	22	20	16	15
17	15	13	15	13	14	15	49	108	20	21	16	15
18	15	13	14	13	18	14	48	133	20	23	16	15
19	15	13	13	13	15	14	52	138	19	23	16	15
20	15	13	13	13	15	15	55	116	19	24	19	20
21	15	13	13	13	14	14	38	93	20	25	18	20
22	15	13	13	13	13	13	38	69	20	27	20	19
23	15	13	13	12	13	16	38	66	20	28	20	18
24	15	13	14	12	13	19	34	77	19	26	20	18
25	15	13	14	13	13	16	35	97	19	26	19	18
26	15	13	13	12	13	19	36	74	18	22	19	18
27	15	13	13	12	14	19	36	66	18	19	18	18
28	15	13	13	13	14	17	36	67	18	19	18	18
29	15	13	13	13	.....	15	35	69	17	19	16	18
30	15	13	14	13	.....	19	34	63	16	19	15	18
31	15	.....	14	13	.....	20	.....	62	.....	20	15	.....

Monthly discharge of Santa Clara Creek near Central, Utah, for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	18	15	15.7	965
November	15	13	13.9	827
December	26	13	14.4	885
January	13	12	12.7	781
February	18	13	13.6	755
March	20	13	16.2	996
April	66	19	38.0	2,260
May	138	36	90.5	5,560
June	60	16	24.3	1,450
July	28	13	19.0	1,170
August	69	15	19.9	1,220
September	20	15	16.3	970
The year	138	12	24.6	17,800

GILA RIVER BASIN

GILA RIVER NEAR DUNCAN, ARIZ.

LOCATION.—In SE. ¼ sec. 18, T. 19 S., R. 20 W. New Mexico principal meridian, in New Mexico, 1¾ miles below intake of Sunset Canal, 9 miles east of Arizona-New Mexico State line, and 14 miles east of Duncan, Greenlee County, Ariz.

DRAINAGE AREA.—3,280 square miles (measured on topographic map).

RECORDS AVAILABLE.—Discharge measurements only January 10 to September 30, 1923. Miscellaneous measurements were made near this point from April 24 to November 21, 1922. Recording gage station 2 miles upstream maintained May 1, 1914, to September 30, 1915.

GAGE.—None.

DISCHARGE MEASUREMENTS.—Made by wading near road crossing from old town of San Antonio.

CHANNEL AND CONTROL.—Bed composed of sand and silt. Banks not well defined; subject to overflow. No well-defined control.

DIVERSIONS.—Station is above diversions for irrigation in Duncan Valley, except Sunset Canal, which diverts water 1¾ miles above station for irrigating 1,800 acres. About 3,500 acres are irrigated from Gila River above Duncan Valley.

REGULATION.—Flow affected by diversion for Sunset Canal.

ACCURACY.—No gage heights obtained. Discharge measurements only. Records show inflow to Duncan Valley, except for water diverted by Sunset Canal.

Discharge measurements of Gila River near Duncan, Ariz., during the period January 10 to September 30, 1923

Date	Made by—	Discharge	Date	Made by—	Discharge
		Sec.-ft.			*Sec.-ft.*
Jan. 10	J. H. Gardiner	45.3	July 21	G. S. Hayes	87
Mar. 11	do	474	Aug. 3	do	11.9
May 14	do	72			

GILA RIVER NEAR SOLOMONSVILLE, ARIZ.

LOCATION.—In NE. ¼ sec. 31, T. 6 S., R. 28 E., 1 mile below intake of Brown Canal and 10 miles east of Solomonsville, Graham County. San Francisco River enters from right 10 miles upstream.

DRAINAGE AREA.—7,910 square miles (measured on topographic maps).

RECORDS AVAILABLE.—April 21, 1914, to September 30, 1923.

GAGE.—Stevens continuous water-stage recorder on left bank, directly opposite J. W. Earven ranch; inspected by J. W. Earven.

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

CHANNEL AND CONTROL.—Bed composed of gravel, sand, and silt. Banks well defined. Control formed by gravel riffle below gage.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 7.1 feet at 12.30 a. m. August 12 (discharge, 17,400 second-feet); minimum stage, 0.77 foot at 8 a. m. July 4 (discharge, 26 second-feet).

1914–1923: Maximum stage, determined from floodmarks on gage, 14.0 feet January 19, 1916 (discharge, about 100,000 second-feet, from extension of rating curve); minimum discharge, that of July 4, 1923.

DIVERSIONS.—Station is above diversions for irrigation in Safford Valley, except Brown Canal, which diverts water 1 mile above station for irrigating 820 acres. Brown Canal wasteway returns some water to river below this station. About 14,000 acres are irrigated from Gila River and tributaries above Safford Valley.

REGULATION.—None, except by diversions.

ACCURACY.—Stage-discharge relation constant October 1–31 and April 4 to July 6, fairly constant November 1 to April 3, continually changing July 7 to September 30. Rating curves well defined. Standard rating curve well defined below 8,000 second-feet; poorly defined above. Operation of water-stage recorder satisfactory except for period April 27 to May 5. Daily discharge ascertained by applying mean daily gage height to rating table. Shifting-control method used November 1 to April 3 and July 7 to September 30. Discharge interpolated April 27–30 and May 2–5. Staff gage reading used May 1. Records good.

Discharge measurements of Gila River near Solomonsville, Ariz., during the year ending September 30, 1923

[Made by H. D. Empie]

Date	Gage height	Discharge	Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Oct. 2	1.17	81	Mar. 18	1.70	331	June 15	0.94	50
14	1.16	75	Apr. 2	1.60	206	22	.92	49.0
Nov. 1	1.33	133	5	1.54	202	July 1	.84	35.6
15	1.42	143	23	1.46	174	15	1.61	303
Dec. 3	1.72	274	May 1	1.30	123	24	2.12	497
16	1.62	227	5	1.24	116	Aug. 1	1.65	291
Jan. 2	1.56	177	16	1.20	100	10	4.58	5,270
15	1.50	163	18	1.16	92	16	4.20	5,310
Feb. 1	1.46	150	June 1	1.04	69	Sept. 5	2.18	560
15	1.43	146	6	1.03	62	17	2.25	710
Mar. 1	1.73	263						

Daily discharge, in second-feet, of Gila River near Solomonsville, Ariz., for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	90	133	243	173	150	262	204	124	68	36	340	1,090
2	81	133	288	177	147	268	208	121	66	36	226	860
3	78	133	281	177	153	281	196	119	68	32	173	782
4	76	133	294	177	160	307	200	117	68	29	1,090	620
5	78	136	320	170	163	411	200	114	66	33	200	601
6	78	133	288	163	177	497	187	112	66	139	806	2,900
7	76	136	281	160	177	497	173	110	62	114	1,210	2,270
8	76	136	268	163	167	497	163	110	60	88	860	1,420
9	76	133	249	173	160	488	167	110	58	78	2,660	1,080
10	76	136	236	173	156	543	180	105	56	102	6,230	1,180
11	76	130	221	170	160	572	180	105	56	96	4,480	730
12	73	130	221	167	167	610	173	105	52	90	6,260	719
13	73	130	209	167	170	562	173	107	51	170	4,280	553
14	76	133	213	163	160	478	173	110	50	642	4,280	572
15	90	144	226	160	147	389	173	107	48	327	5,010	860
16	107	153	226	160	138	389	173	100	46	180	5,040	916
17	114	160	221	153	141	367	173	94	50	160	4,230	847
18	114	160	221	150	141	334	170	90	50	191	3,320	916
19	117	156	213	147	141	340	170	90	48	170	3,320	719
20	117	156	200	147	147	334	170	90	45	144	3,580	631
21	117	153	196	147	136	320	170	88	45	394	2,440	572
22	114	150	187	150	147	314	170	88	48	3,300	1,890	524
23	128	153	187	153	156	301	170	88	46	3,140	1,840	591
24	117	160	177	163	153	294	170	86	45	572	1,890	1,770
25	114	163	173	160	177	275	160	82	45	353	1,420	930
26	114	167	167	160	180	249	147	76	45	589	3,050	515
27	114	160	170	156	236	226	142	70	44	695	1,960	418
28	114	156	173	153	262	221	137	70	40	353	1,840	396
29	117	163	177	160	-------	221	133	70	39	262	1,210	389
30	124	226	180	156	-------	226	128	68	39	347	1,100	353
31	132	-------	177	153	-------	230	-------	68	-------	1,515	1,120	-------

Monthly discharge of Gila River near Solomonsville, Ariz., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	132	73	98.3	6,040
November	226	130	148	8,810
December	320	170	222	13,600
January	177	147	161	9,900
February	262	136	163	9,050
March	610	221	365	22,400
April	208	128	171	10,200
May	124	68	96.6	5,940
June	68	39	52.3	3,110
July	3,300	29	464	28,500
August	6,260	173	2,500	154,000
September	2,900	353	891	53,000
The year	6,260	29	448	325,000

GILA RIVER NEAR ASHURST, ARIZ.

LOCATION.—In sec. 30, T. 5 S., R. 24 E., below all canal headings in Safford Valley and 1½ miles southeast of Ashurst, Graham County.

DRAINAGE AREA.—10,900 square miles (measured on topographic maps).

RECORDS AVAILABLE.—December 24, 1920, to September 30, 1923. Discharge measurements only.

GAGE.—Vertical staff installed March 17, 1923. Physical conditions at this point have made the use of gage-height records impractical.

DISCHARGE MEASUREMENTS.—Made by wading near road crossing.

CHANNEL AND CONTROL.—Bed composed of sand and silt. Banks not well defined; subject to overflow. No well-defined control.

DIVERSIONS.—About 38,000 acres are irrigated from Gila River and tributaries above this station. Water for about 24,000 acres diverted by Safford Valley canals.

REGULATION.—Flow varies considerably with amount of water diverted by canals of Safford Valley.

ACCURACY.—Stage-discharge relation continually changing. Discharge measurements only. Records show outflow from Safford Valley.

Discharge measurements of Gila River near Ashurst, Ariz., during the year ending September 30, 1923

[Made by H. D. Empie]

Date	Gage height	Discharge	Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Oct. 3		1.2	Mar. 8		141	June 4	8.95	1.1
Nov. 2		5.3	17	9.82	131	July 2	8.97	1.2
Dec. 2		121	Apr. 3	8.95	2.9	18	9.80	291
Jan. 3		29.4	May 3	8.95	1.7	Aug. 2	9.59	198
31		1.9	23	8.92	1.3	Sept. 23	10.30	221
Mar. 3		6.6						

GILA RIVER NEAR SAN CARLOS, ARIZ.

LOCATION.—In T. 3 S., R. 18 E., unsurveyed, 1 mile above San Carlos dam site, on San Carlos Indian Reservation, and 6 miles west of San Carlos, Gila County. San Carlos River enters from the right 8 miles upstream.

DRAINAGE AREA.—12,900 square miles (measured on topographic maps).

RECORDS AVAILABLE.—April 29, 1914, to September 30, 1923, at present site. July 11, 1899, to November 27, 1905, at point half a mile south of San Carlos and below San Carlos River; August 17, 1910, to February 5, 1911, at point just below Arizona Eastern Railroad bridge, and half a mile above San Carlos River.

GAGE.—Stevens continuous water-stage recorder on left bank; inspected by Tecora Ketchayan.

DISCHARGE MEASUREMENTS.—Made from cable a mile above gage, from crossing cable at gage, or by wading.

CHANNEL AND CONTROL.—Bed composed of sand, gravel, and boulders; shifting. Banks not subject to overflow. Control is boulder riffle just below gage. At low stages gravel bar is formed on left bank around point of rock at gage, necessitating the maintenance of a ditch from channel to gage well. This low-water condition develops a changeable control, and frequent inspection of well and ditch, together with frequent measurements, are required to obtain the stage-discharge relation.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 10.5 feet at 11.59 p. m. August 10 (discharge, 13,500 second-feet); minimum discharge, 0.5 second-foot May 26 to July 7.

1914–1923: Maximum stage, 25.5 feet January 20, 1916 (discharge, estimated 130,000 second-feet); minimum stage, dry June 28 to July 1, 1919.

DIVERSIONS.—About 38,000 acres are irrigated from Gila River and tributaries above this station.

ACCURACY.—Stage-discharge relation continually changing. Rating curves well defined. Operation of water-stage recorder satisfactory, except for periods April 2–9, July 15 to August 14, August 22 to September 30. Staff readings used July 17, 21, 24, 26, 28, August 4, 7, 11, 25, 30, September 1, 4, 8, 12, 18, 22, 28, 29. Daily discharge ascertained by applying mean daily gage height to rating table. Discharge interpolated May 1–8 and May 15 to July 7. Discharge estimated July 15–16, 18–20, 22–23, 25, 27, 29–31, August 1–3, 5–6, 8–10, 12–14, 22–24, 26–29, 31, September 2–3, 5–7, 9–11, 13–14, 16–17, 19–21, 23–27, and 30. Records fair.

Discharge measurements of Gila River near San Carlos, Ariz., 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.*
Oct. 18	J. H. Gardiner	0.87	6.8	May 9	J. H. Gardiner	0.50	9.0
Nov. 16	do	1.30	23.4	20	do	1.10	2.9
24	do	1.38	30.6	June 21	do	1.00	.3
Dec. 20	do	1.93	182	July 13	do	2.30	258
Jan. 6	do	1.58	91	25	do	3.40	635
15	do	1.55	69	26	do	3.34	590
Feb. 6	do	1.50	66	Aug. 19	Gardiner and Rice	6.75	4,510
Mar. 8	do	2.32	311	20	do	6.10	3,730
18	do	1.94	177				

Daily discharge, in second-feet, of Gila River near San Carlos, Ariz., for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	13	16	119	92	58	58	53	17	0.5	0.5		1,040
2	13	16	119	100	58	65	53	15	.5	.5	450	900
3	13	16	144	100	65	72	53	15	.5	.5		780
4	13	16	144	100	65	95	45	14	.5	.5	84	660
5	13	18	144	92	58	259	41	13	.5	.5	350	1,400

Daily discharge, in second-feet, of Gila River near San Carlos, Ariz., for the year ending September 30, 1923—Continued

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
6	13	18	127	92	65	244	41	12	0.5	0.5	350	1,400
7	16	18	127	85	65	304	32	11	.5	.5	532	
8	18	18	127	85	65	304	32	10	.5	46	2,000	1,700
9	13	18	135	85	65	274	32	9	.5	26	3,500	
10	16	18	135	85	72	244	32	6	.5	18	5,000	1,000
11	18	18	135	65	72	244	53	5	.5	14	5,450	
12	18	22	144	65	65	320	47	4	.5	135		660
13	34	22	153	65	65	370	47	4	.5	324	2,000	
14	55	22	144	65	58	354	59	4	.5	280		
15	62	22	144	65	58	324	53	3	.5		775	900
16	62	25	144	58	58	280	41	3	.5	125	2,170	
17	44	25	153	52	58	240	41	3	.5	50	2,420	
18	12	25	153	52	52	184	28	3	.5		3,620	840
19	16	25	173	52	58	173	32	3	.5	150	3,780	
20	13	30	173	52	65	163	32	3	.5		3,780	550
21	13	25	163	58	58	153	32	3	.5	345	2,800	
22	13	25	153	52	65	144	19	2	.5	8,000		424
23	13	25	144	52	65	92	12	1.5	.5	2,000	2,300	
24	13	30	144	58	65	78	10	1	.5	1,470		
25	13	30	153	58	65	78	36	1	.5	632	2,170	420
26	13	30	163	65	58	72	23	.5	.5	605		
27	13	34	163	65	58	72	10	.5	.5	605	1,600	
28	16	39	153	58	58	72	10	.5	.5	632		464
29	18	55	144	52	-------	72	15	.5	.5			354
30	18	62	135	58	-------	72	23	.5	.5	650	1,115	300
31	18	-------	127	52	-------	*72	-------	.5	-------		1,080	-------

Monthly discharge of Gila River near San Carlos, Ariz., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	62	12	20.5	1,260
November	62	16	25.4	1,510
December	173	119	144	8,850
January	100	52	68.9	4,240
February	72	52	62.0	3,440
March	370	58	179	11,000
April	53	10	34.6	2,060
May	17	.5	5.47	336
June	.5	.5	.5	30
July	8,000	.5	575	35,400
August	5,450	84	1,990	122,000
September	1,700	300	786	46,800
The year	8,000	0.5	328	237,000

GILA RIVER AT KELVIN, ARIZ.

LOCATION.—In sec. 12, T. 4 S., R. 13 E., 1,000 feet below mouth of Mineral Creek, 15 miles below mouth of San Pedro River, a quarter of a mile below concrete highway bridge, 15 miles above Ashurst-Hayden Dam, and 1 mile west of Kelvin, Pinal County.

DRAINAGE AREA.—18,100 square miles (measured on topographic maps).

RECORDS AVAILABLE.—January 26, 1911, to September 30, 1923.

GAGE.—Stevens continuous water-stage recorder on left bank; inspected by Michael Duarte.

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

CHANNEL AND CONTROL.—Bed composed of sand, gravel, and silt; continually shifting. Banks well defined. Control is gravel riffle 300 feet below gage.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 6.9 feet at 9 a.m. July 14 (discharge, 11,700 second-feet); minimum stage, 1.55 feet June 30 to July 5 (discharge, 0.5 second-foot).

1911–1923: Maximum stage, 19.5 feet about noon, January 20, 1916, determined from floodmarks (discharge, from extension of rating curve, about 132,000 second-feet); no flow on June 29 to July 11, 1913.

DIVERSIONS.—Station is above diversions for Florence-Casa Grande Valley. About 38,000 acres are irrigated from Gila River above this station. Acreage irrigated from San Pedro River not known.

REGULATION.—None.

ACCURACY.—Stage-discharge relation continually changing. Standard rating curve well defined below 30,000 second-feet; poorly defined above. Several well-defined low-water rating curves used for short periods October 1 to May 31. Standard curve used with shifting-control method July 16 to September 30. Operation of water-stage recorder satisfactory except October 20 to November 7. Staff gage read October 29 and November 4. Gage-height record May 4–13 incorrect on account of channel conditions. Daily discharge ascertained by applying mean daily gage height to rating table. Discharge interpolated October 20–28, October 30 to November 3, November 5–7, May 4–13. Shifting-control method used November 16–24, January 6 to February 1, July 16 to September 30. Records good.

Discharge measurements of Gila River at Kelvin, Ariz., 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.*
Oct. 16	J. H. Gardiner	1.73	2.9	Apr. 18	J. H. Gardiner	2.08	41
19	do	1.73	2.9	May 8	do	1.94	9.3
Nov. 8	do	2.01	21.7	21	do	1.76	3.1
15	do	2.04	22.1	June 20	do	1.65	1.0
25	do	2.06	33.7	July 11	do	1.87	8.0
Dec. 19	do	2.47	191	15	R. C. Rice	4.25	2,850
21	do	2.48	183	16	do	3.36	882
Jan. 5	do	2.31	132	24	do	3.87	1,850
16	do	2.24	94	25	do	3.61	1,450
Feb. 5	do	2.34	116	27	J. H. Gardiner	2.85	388
7	do	2.32	104	Aug. 7	Rice and Gardiner	3.31	1,050
Mar. 7	do	2.76	318	21	do	4.40	3,410
19	do	2.54	196	Sept. 12	R. C. Rice	3.18	907
26	do	2.25	82				

Daily discharge, in second-feet, of Gila River at Kelvin, Ariz., for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	16.	15	267	160	99	67	55	17	1	0.5	876	1,630
2	16.	17	222	160	116	67	55	17	1	.5	620	1,290
3	12.	18	244	143	116	97	43	17	1	.5	430	1,140
4	7.5	20	267	143	116	312	43	17	1	.5	316	924
5	4.5	20	222	126	116	376	43	14	1	.5	560	796
6	4.5	20	199	138	116	410	43	14	1	.5	785	686
7	4.5	20	180	122	97	343	43	11	1	4	1,260	1,480
8	4.5	20	160	120	116	376	43	9	1	42	2,140	2,400
9	4.5	20	160	120	116	343	43	9	1	42	2,060	1,460
10	7.5	20	180	120	282	312	34	8	1	42	8,200	1,300

Daily discharge, in second-feet, of Gila River at Kelvin, Ariz., for the year ending September 30, 1923—Continued

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
11	7.5	20	180	102	227	282	34	8	1	11	6,750	1,210
12	7.5	20	180	102	178	282	55	7	1	20	6,920	1,610
13	7.5	20	180	100	116	376	43	7	1	2,100	6,310	1,290
14	7.5	25	199	86	116	482	43	5	1	4,800	7,000	940
15	7.5	25	199	84	97	410	34	5	1	2,820	5,040	763
16	4.5	26	180	97	97	376	34	5	1	818	6,720	940
17	4.5	26	180	97	82	312	34	5	1	330	6,600	1,530
18	4.5	34	199	97	82	254	43	5	1	232	4,530	1,000
19	4.5	34	199	80	67	302	43	3.5	1	348	3,360	820
20	5	36	199	80	67	302	43	3.5	1	218	3,510	720
21	6	36	199	76	67	178	34	3.5	1	190	3,280	510
22	6	38	199	76	67	156	34	3.5	1	167	2,280	460
23	7	31	180	76	67	134	34	3.5	1	8,480	1,780	411
24	7	33	180	76	67	97	34	3.5	1	2,200	1,870	366
25	8	33	180	88	67	82	24	3.5	1	1,860	2,040	664
26	8	40	180	122	67	82	24	2	1	697	2,140	829
27	9	40	180	122	67	67	24	2	1	386	2,840	510
28	9	40	199	122	67	67	24	2	1	550	2,620	420
29	10	82	180	99	-------	67	24	2	1	411	1,820	420
30	12	240	180	83	-------	67	24	2	.5	330	1,560	375
31	13	-------	180	83	-------	67	-------	1	-------	796	1,800	-------

Monthly discharge of Gila River at Kelvin Ariz., for the year ending September 30, 1923.

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	16	4.5	7.65	470
November	240	15	35.6	2,120
December	267	160	195	12,000
January	160	76	106	6,520
February	282	67	106	5,890
March	482	67	230	14,100
April	55	24	37.7	2,240
May	17	1	6.95	427
June	1	.5	.98	58
July	8,480	.5	900	55,300
August	7,000	316	3,160	194,000
September	2,400	375	963	57,300
The year	8,480	.5	485	350,000

GILA RIVER AT ASHURST-HAYDEN DAM, NEAR FLORENCE, ARIZ.

LOCATION.—In sec. 8, T. 4 S., R. 11 E., at Ashurst-Hayden Dam, 10 miles northeast of Florence, Pinal County. San Pedro River enters from left 30 miles upstream.

DRAINAGE AREA.—18,400 square miles (measured on topographic maps).

RECORDS AVAILABLE.—July 1 to September 30, 1923.

GAGE.—Chain gage on upstream wing wall at left end of Ashurst-Hayden Dam.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—Bed composed of sand and silt filled in about flush with crest of dam except on left bank, where bed is below crest of dam due to sluicing. Dam is 120 feet downstream from gage. There are four sluice gates in the dam with top of opening 6½ feet below crest of dam. One or more of these are open a large part of the time.

EXTREMES OF DISCHARGE.—Maximum stage recorded, 2.84 feet at noon on July 14; minimum stage, crest of dam dry on various days.

DIVERSIONS.—Water diverted from Gila River below gage by Ashurst-Hayden Dam. First canal gate opening is 22 feet below gage. About 38,000 acres are irrigated from Gila River above this dam.

REGULATION.—None except by irrigation diversions and by sluice gates of dam.

ACCURACY.—Stage-discharge relation not determined. No discharge measurements made. Only height of water on crest of dam determined. Gage read twice a day to hundredths. No determination of amount of water by-passed through sluice gates of dam.

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

Daily gage height, in feet, of Gila River at Ashurst-Hayden Dam, near Florence, Ariz., for the period July 1 to September 30, 1923

Day	July	Aug.	Sept.	Day	July	Aug.	Sept.	Day	July	Aug.	Sept.
1	-------	0.83	0.96	11	-------	2.26	0.70	21	[a]0.10	1.33	[a]0.10
2	-------	.36	.83	12	-------	2.18	.91	22	1.12	1.11	-------
3	-------	[a].18	.67	13	0.81	2.47	.27	23	1.95	.89	-------
4	-------	-------	.61	14	1.68	2.37	.20	24	1.24	.63	-------
5	-------	[b]1.02	.39	15	1.36	1.69	[a]1.30	25	.98	.52	[a].30
6	-------	.46	.28	16	.52	2.13	.25	26	.53	1.10	.15
7	-------	.72	.96	17	.34	2.05	.40	27	.27	1.36	[a].10
8	-------	1.53	1.51	18	.26	1.86	.32	28	.40	1.15	-------
9	[a]0.22	1.28	.87	19	[a].16	1.54	.28	29	.33	.82	-------
10	-------	1.99	.78	20	-------	1.87	.23	30	[a].02	.92	-------
								31	[b]1.08	.75	-------

[a] Flow for half a day. [b] Flow for one-fourth of a day.

NOTE.—No water over crest of dam on days when no record is given.

SUNSET CANAL NEAR DUNCAN, ARIZ.

LOCATION.—In NW. ¼ sec. 17, T. 19 S., R. 20 W. New Mexico principal meridian, in New Mexico, 1½ miles below intake, 9 miles east of Arizona-New Mexico State line, and 14 miles east of Duncan, Greenlee County.

RECORDS AVAILABLE.—October 1, 1914, to September 30, 1915; July 15, 1922, to September 30, 1923.

GAGE.—Vertical staff on right bank at Brook ranch; read by G. S. Hayes.

DISCHARGE MEASUREMENTS.—Made from footbridge at gage.

CHANNEL AND CONTROL.—Bed composed of silt. Banks vertical. No well-defined control.

DIVERSIONS.—About 35 acres irrigated above station.

ACCURACY.—Stage-discharge relation continually changing. Standard rating curve well defined. Gage read to nearest two-hundredths twice a day. Daily discharge ascertained by applying mean daily gage height to rating table. Shifting-control method used for entire year. Records good.

Canal diverts water from right side of Gila River in NW. ¼ sec. 20, T. 19 S., R. 20 W. New Mexico principal meridian, for irrigating 1,800 acres near Virden.

Discharge measurements of Sunset Canal near Duncan, Ariz., 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.*
Nov. 21	J. H. Gardiner	1.77	31.1	Mar. 14	J. H. Gardiner	0.26	1.5
Jan. 9	do	1.33	26.5	July 19	Gardiner and Hayes	1.85	36.4
10	do	1.30	25.8	Aug. 2	G. S. Hayes	1.82	37.9
Mar. 11	do	1.85	32.0	Sept. 15	do	2.17	31.9

Daily discharge, in second-feet, of Sunset Canal near Duncan, Ariz., for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	37	29	33	30	43	35	35	40	35	5.6	43	0
2	36	29	27	30	44	32	36	40	29	5.6	39	0
3	36	27	27	29	42	35	32	43	29	5.6	39	0
4	33	23	28	29	42	36	28	40	30	18	39	0
5	37	30	28	29	42	34	30	40	27	32	40	0
6	33	27	30	29	39	33	30	43	25	28	40	0
7	32	26	29	29	35	29	30	39	20	24	32	0
8	32	23	29	27	34	26	34	40	24	35	36	.8
9	33	22	29	26	36	25	39	40	22	32	40	6.1
10	35	24	29	27	39	26	30	36	21	35	36	8
11	33	27	29	30	40	33	30	38	22	29	33	0
12	34	28	28	29	41	32	28	38	19	30	20	0
13	35	28	28	29	42	30	31	22	19	44	7	6.9
14	36	29	28	29	40	1	32	0	17	46	0	31
15	42	29	29	28	38	0	32	16	8.8	40	0	30
16	34	30	30	28	34	12	32	39	7.2	39	0	20
17	34	30	28	26	39	26	38	34	9.8	40	0	11
18	33	30	28	24	40	26	42	44	8.1	35	0	9.1
19	31	30	28	38	39	25	40	42	8.1	35	0	21
20	28	30	28	50	39	22	40	42	8.2	25	0	8.8
21	28	30	28	49	37	23	40	40	7.4	38	0	18
22	26	30	30	52	37	25	40	40	8.2	20	0	17
23	28	31	30	51	36	23	34	44	7.4	16	0	19
24	30	31	29	47	34	22	25	41	6.7	6.4	0	14
25	32	30	29	44	34	22	31	37	12	5.9	0	17
26	25	31	28	41	37	14	36	38	10	12	0	29
27	25	31	28	42	38	9	36	41	5.4	30	0	30
28	32	30	28	46	38	30	38	44	7.7	33	0	31
29	30	32	28	26	-------	30	38	37	6.9	30	0	45
30	29	33	28	43	-------	34	40	41	6.9	28	0	34
31	30	-------	30	43	-------	32	-------	37	-------	36	0	-------

Monthly discharge of Sunset Canal near Duncan, Ariz., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre feet
	Maximum	Minimum	Mean	
October	37	25	32.2	1,980
November	33	22	28.7	1,710
December	33	27	28.7	1,760
January	52	24	34.8	2,140
February	44	34	38.5	2,140
March	36	0	25.2	1,550
April	42	25	34.2	2,040
May	44	0	37.3	2,290
June	35	5.4	15.6	928
July	46	5.6	27.4	1,680
August	43	0	14.3	879
September	45	0	13.3	791
The year	46	0	27.5	19,900

COSPER-WINDHAM CANAL NEAR DUNCAN, ARIZ.

LOCATION.—In NW. ¼ sec. 11, T. 19 S., R. 21 W. New Mexico principal meridian, in New Mexico, three-quarters of a mile below intake, 4 miles east of Arizona-New Mexico State line, and 9 miles east of Duncan, Greenlee County.

RECORDS AVAILABLE.—October 1, 1914, to September 30, 1915; July 18, 1922, to September 30, 1923.

GAGE.—Vertical staff on left bank at Foster ranch; read by W. F. Foster.

DISCHARGE MEASUREMENTS.—Made from footbridge at gage.

CHANNEL AND CONTROL.—Bed composed of silt. Banks vertical. No well-defined control.

DIVERSIONS.—About 60 acres are irrigated above gage.

ACCURACY.—Stage-discharge relation continually changing. Standard rating curve fairly well defined. Gage read twice a day to nearest two-hundredths, except for October 13, 22, and November 14. Daily discharge ascertained by applying mean daily gage height to rating table. Shifting-control method used for entire year. Discharge interpolated for days when gage was not read. Records fair.

Canal diverts water from right side of Gila River in SW. ¼ sec. 11, T. 19 S., R. 21 W. New Mexico principal meridian, for irrigating 800 acres near Virden.

Discharge measurements of Cosper-Windham Canal near Duncan, Ariz., 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.*
Nov. 21	J. H. Gardiner	1.10	3.6	May 15	J. H. Gardiner	1.72	18.6
Jan. 10	do	1.24	5.5	July 20	do	1.27	10.9
Mar. 12	do	1.22	4.6	Aug. 2	G. S. Hayes	.95	4.8
14	do	1.35	7.9	Sept. 15	do	1.75	12.2
May 14	do	1.72	18.9				

Daily discharge, in second-feet, of Cosper-Windham Canal near Duncan, Ariz., for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	5.6	0	5.3	5.6	9.4	7.2	11	17	7.2	2.7	3.3	0
2	5.3	0	5.1	5.6	8.7	0	16	18	6.6	2.7	5.0	0
3	5.2	6.0	4.9	5.6	8.7	0	16	16	6.6	2.7	2.3	0
4	3.6	6.2	4.9	5.0	8.9	0	16	19	7.2	2.7	.8	0
5	3.9	5.8	5.0	5.0	9.0	0	16	18	6.6	2.7	13	0
6	3.0	5.6	5.1	5.0	9.0	0	16	18	6.6	2.7	13	0
7	6.0	5.7	5.0	5.0	9.0	7.2	16	18	5.0	2.3	14	0
8	4.9	6.0	5.1	5.0	9.4	9.7	16	17	5.6	8.4	13	0
9	3.2	6.1	5.0	5.0	9.0	10	15	17	6.1	14	7.2	0
10	5.0	6.2	5.0	5.0	9.0	10	14	17	6.6	17	0	0
11	5.6	5.8	4.8	5.2	9.0	8.7	14	17	5.6	18	0	0
12	9.8	5.6	4.7	5.4	9.0	6.1	14	17	5.0	15	0	0
13	10	5.4	0	5.2	9.0	5.6	15	18	5.6	15	0	0
14	10	5.3	5.3	5.0	9.0	6.1	15	18	5.0	14	0	9.0
15	15	5.3	5.2	5.0	9.7	6.1	15	18	4.5	14	0	12
16	8.7	5.2	5.0	5.4	9.7	5.6	15	17	4.5	10	0	7.8
17	8.5	5.1	5.0	5.2	9.7	3.1	15	17	4.5	8.4	0	7.2
18	8.8	4.9	4.9	5.2	10	3.1	15	15	4.5	4.2	0	5.0
19	8.4	4.3	5.2	5.2	10	5.6	15	15	4.0	7.6	0	0
20	7.8	3.3	4.8	5.2	10	8.4	15	14	4.0	12	0	0
21	6.7	3.1	4.0	8.4	10	8.4	15	13	4.0	9.7	0	3.9
22	7.2	2.9	4.8	9.0	9.4	9.0	15	14	4.0	0	0	9.0
23	7.7	2.9	4.6	9.0	8.4	9.0	15	14	4.0	0	0	10
24	8.4	4.3	4.8	9.0	7.8	9.0	15	11	4.0	0	0	5.8
25	7.8	4.4	4.9	9.0	9.0	0	15	10	4.0	0	0	0
26	5.7	3.7	4.6	9.0	10	0	16	9.7	4.0	0	0	0
27	5.4	3.6	5.0	9.0	6.6	0	15	9.7	4.0	0	0	0
28	5.4	4.1	5.6	9.0	7.0	0	14	9.7	3.6	0	0	0
29	5.7	4.0	5.7	9.0	-------	0	14	7.2	3.1	0	0	0
30	6.4	4.6	5.9	9.0	-------	0	14	9.7	2.7	0	0	0
31	8.3	-------	5.6	9.0	-------	12	-------	7.2	-------	0	0	-------

Monthly discharge of Cosper-Windham Canal near Duncan, Ariz., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	15	3.0	6.87	422
November	6.2	0	4.51	268
December	5.9	0	4.87	299
January	9.0	5.0	6.52	401
February	10	6.6	9.05	503
March	12	0	484	298
April	16	11	14.9	887
May	19	7.2	14.7	904
June	7.2	2.7	4.96	295
July	18	0	5.99	368
August	14	0	2.31	142
September	12	0	2.32	138
The year	19	0	6.81	4,930

MODDLE CANAL NEAR DUNCAN, ARIZ.

LOCATION.—In NW. ¼ sec. 10, T. 19 S., R. 21 W. New Mexico principal meridian, in New Mexico, half a mile below intake, 4 miles east of Arizona-New Mexico State line, and 9 miles east of Duncan, Greenlee County.

RECORDS AVAILABLE.—October 1, 1914, to September 30, 1915; July 17, 1922, to September 30, 1923.

GAGE.—Vertical staff on left bank; read by W. W Loyd and F. E. Foster.

DISCHARGE MEASUREMENTS.—Made from footbridge at gage.

CHANNEL AND CONTROL.—Bed composed of silt. Banks vertical. No well-defined control.

DIVERSIONS.—None.

ACCURACY.—Stage-discharge relation continually changing. Standard rating curve fairly well defined. Gage read to hundredths twice a day. Daily discharge ascertained by applying mean daily gage height to rating table. Shifting-control method used for entire year. Records fair.

Canal diverts water from left side of Gila River in NW. ¼ sec. 11, T. 19 S., R. 21 W. New Mexico principal meridian, for irrigating 2,200 acres near Franklin.

Discharge measurements of Moddle Canal near Duncan, Ariz., 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.*
Nov. 21	J. H. Gardiner	2.01	31.6	May 14	J. H. Gardiner	2.57	49.4
Jan. 9	do	2.30	37.2	15	do	2.62	54
10	do	2.37	36.0	July 20	Gardiner and Hayes	2.82	52
Mar. 12	do	1.43	16.4	Aug. 1	G. S. Hayes	2.34	38.3
14	do	2.42	49.0	Sept. 17	do	2.35	29.1

Daily discharge, in second-feet, of Moddle Canal near Duncan, Ariz., for the yea ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	8.0	33	31	22	36	0	45	49	5	1	46	
2	5.4	33	19	22	41	0	45	44	5	2	25	
3	2.7	34	8.4	22	39	0	45	34	2	2	13	
4	1.6	36	0	24	41	0	45	21	2	2	10	
5	1.2	42	0	20	36	19	45	18	2	2	23	

Daily discharge, in second-feet, of Moddle Canal near Duncan, Ariz., for the year ending September 30, 1923—Continued

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
6	2.2	42	0	19	36	37	37	16	2	2	50	0
7	4.0	40	12	17	30	52	43	19	2	1	44	0
8	4.7	38	24	39	22	52	43	19	2	0	50	0
9	2.2	40	24	36	22	28	45	14	2	0	48	0
10	.4	42	22	37	41	14	41	11	2	0	44	0
11	.4	40	22	39	24	14	43	10	2	0	42	0
12	.4	42	21	39	28	14	45	11	2	0	44	0
13	3.4	42	21	39	24	9.7	50	28	2	0	26	0
14	5.4	19	21	37	27	52	25	53	2	0	0	27
15	55	26	21	36	27	46	0	57	1	0	0	0
16	49	28	21	36	25	34	0	19	2	0	0	25
17	40	28	19	34	30	24	49	12	2	0	0	30
18	36	28	19	32	32	18	57	9.0	1	18	0	28
19	33	29	18	27	32	14	60	8.0	1	36	0	24
20	29	29	19	22	30	18	59	4.0	1	51	0	9.7
21	24	31	18	30	32	24	60	4.0	2	57	0	25
22	22	31	18	37	36	50	49	8.0	2	0	0	22
23	22	29	18	37	34	48	51	8.0	2	0	0	34
24	16	29	16	45	36	46	42	9.0	2	0	0	24
25	21	29	16	34	46	48	42	7.0	2	0	0	22
26	28	26	16	34	46	50	42	7.0	2	0	0	28
27	31	24	15	41	50	45	38	7.0	2	0	0	24
28	29	31	0	43	39	45	38	6.5	2	0	0	19
29	36	34	14	41	-------	45	44	6.0	2	25	0	22
30	34	38	14	39	-------	45	57	5.5	2	42	0	32
31	33	-------	20	34	-------	45	-------	5.0	-------	50	0	-------

Monthly discharge of Moddle Canal near Duncan, Ariz., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	55	0.4	18.7	1,150
November	42	.24	33.1	1,970
December	31	0	16.4	1,010
January	43	17	32.7	2,010
February	50	22	33.6	1,870
March	50	0	30.2	1,860
April	60	0	42.8	2,550
May	57	4.0	17.1	1,050
June	5	1	2.1	125
July	57	0	9.4	578
August	50	0	15.0	922
September	34	0	13.2	786
The year	60	0	21.9	15,900

VALLEY CANAL NEAR DUNCAN, ARIZ.

LOCATION.—In SW. ¼ sec. 32, T. 18 S., R. 21 W. New Mexico principal meridian, in New Mexico, half a mile below intake, a mile east of Arizona-New Mexico State line, and 6 miles east of Duncan, Greenlee County.

RECORDS AVAILABLE.—October 1, 1914, to September 30, 1915; July 17 to September 30, 1923.

GAGE.—Vertical staff on left bank; read by G. L. Hatch.

DISCHARGE MEASUREMENTS.—Made from footbridge at gage.

CHANNEL AND CONTROL.—Bed composed of silt. Banks vertical. No well-defined control.

DIVERSIONS.—No diversions above gage.

ACCURACY.—Stage-discharge relation continually changing. Standard rating curve fairly well defined. Gage read to nearest two-hundredths twice a day. Daily discharge ascertained by applying mean daily gage height to rating table. Shifting-control method used for entire period. Records good.

Canal diverts water from right side of Gila River in NW. ¼ sec. 4, T. 19 S., R. 21 W. New Mexico principal meridian, in New Mexico, for irrigating 1,500 acres near Duncan.

Discharge measurements of Valley Canal near Duncan, Ariz., 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.*
July 20	Gardiner and Hayes	1.90	26.4	Sept. 2	G. S. Hayes	1.86	29.2
Aug. 1	G. S. Hayes	1.54	18.6	15	do	2.17	31.3

Daily discharge, in second-feet, of Valley Canal near Duncan, Ariz., for the period July 17 to September 30, 1923

Day	July	Aug.	Sept.	Day	July	Aug.	Sept.	Day	July	Aug.	Sept.
1		22	21	11		24	15	21	46	17	17
2		9	30	12		0	11	22	28	22	15
3		9	30	13		0	12	23	13	24	24
4		36	29	14		0	24	24	6	24	19
5		41	44	15		0	30	25	7	39	12
6		37	31	16		0	29	26	10	30	7
7		32	22	17	28	0	29	27	19	21	9
8		29	18	18	29	0	23	28	27	17	14
9		48	17	19	17	19	12	29	31	14	10
10		25	15	20	28	22	10	30	27	19	5
								31	27	17	

Monthly discharge of Valley Canal near Duncan, Ariz., for the period July 17 to September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
July 17–31	46	6	22.9	681
August	48	0	19.3	1,190
September	44	5	19.5	1,160
The period				3,030

DUNCAN CANAL NEAR DUNCAN, ARIZ.

LOCATION.—In NE. ¼ sec. 29, T. 8 S., R. 32 E., a mile below intake and 2 miles east of Duncan, Greenlee County.

RECORDS AVAILABLE.—July 17 to September 30, 1923.

GAGE.—Vertical staff on left bank; read by Mrs. W. D. O'Neal.

DISCHARGE MEASUREMENTS.—Made by wading at gage.

CHANNEL AND CONTROL.—Bed composed of silt. Banks not subject to overflow. No well-defined control.

DIVERSIONS.—No diversions above gage.

ACCURACY.—Stage-discharge relation fairly permanent for period. Rating curve fairly well defined. Gage read to nearest two-hundredths twice a day. Canal dry greater part of period. Daily discharge ascertained by applying mean daily gage height to rating table. Records fair.

Canal diverts water from left side of Gila River in SW. ¼ sec. 28, T. 8 S., R. 32 E., for irrigating 250 acres near Duncan.

Daily discharge, in second-feet, of Duncan Canal near Duncan, Ariz., for the period July 17 to September 30, 1923

Date	Discharge
July 21	1.3
22	1.3
Aug. 6	.5
9	3.4
10	4.6
11	3.0

NOTE.—Canal dry on days for which no discharge is given.

Monthly discharge of Duncan Canal near Duncan, Ariz., for the period July 17 to September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
July 17-31	1.3	0	0.17	5.0
August	4.6	0	.37	22.8
September	0	0	0	0
The period				28

BLACK-McCLESKY CANAL AT DUNCAN, ARIZ.

LOCATION.—In SE. ¼ sec. 19, T. 8 S., R. 32 E., a quarter of a mile below intake, at Duncan, Greenlee County.

RECORDS AVAILABLE.—April 16 to September 30, 1915; July 17 to September 30, 1923.

GAGE.—Vertical staff on right bank; read by F. M. Craig.

DISCHARGE MEASUREMENTS.—Made from footbridge at gage.

CHANNEL AND CONTROL.—Bed composed of salt. Banks vertical, not subject to overflow. No well-defined control.

DIVERSIONS.—No diversions above gage.

ACCURACY.—Stage-discharge relation continually changing. Standard rating curve fairly well defined. Gage read to nearest two-hundredths twice a day. Daily discharge ascertained by applying mean daily gage height to rating table. Shifting-control method used throughout period of record. Discharge estimated September 6. Records fair.

Canal diverts water from left side of Gila River in SE. ¼ sec. 19, T. 8 S., R. 32 E., for irrigating 400 acres near Duncan.

The following discharge measurement was made by Gardiner and Hayes:

July 20, 1923: Gage height, 1.36 feet; discharge, 3.58 second-feet.

Daily discharge, in second-feet, of Black-McClesky Canal at Duncan, Ariz., for the period July 17 to September 30, 1923

Day	July	Aug.	Sept.	Day	July	Aug.	Sept.	Day	July	Aug.	Sept.
1		0	0	11		9.9	0	21	8.6	0	0
2		0	0	12		7.0	0	22	5.0	0	0
3		1.3	0	13		14	0	23	11	0	0
4		2.7	0	14		0	0	24	3.9	0	0
5		2.2	0	15		0	0	25	2.7	0	0
6		.1	20	16		0	0	26	2.8	0	0
7		13	10	17	1.8	0	0	27	2.6	0	0
8		0	0	18	8.4	0	0	28	2.1	0	0
9		2.0	0	19	1.3	0	0	29	3.0	0	1.4
10		21	0	20	3.2	0	0	30	1.0	0	3.0
								31	0	0	

Monthly discharge of Black-McClesky Canal at Duncan, Ariz., for the period July 17 to September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
July 17-31	11	0	3.83	114
August	21	0	2.36	145
September	20	0	1.15	68.4
The period				327

COLMONERO CANAL NEAR DUNCAN, ARIZ.

LOCATION.—In SE. ¼ sec. 33, T. 7 S., R. 31 E., 2½ miles below intake and 6 miles northwest of Duncan, Greenlee County.

RECORDS AVAILABLE.—September 19, 1914, to September 30, 1915; July 20 to September 30, 1923.

GAGE.—Vertical staff gage on left bank; read by C. G. Elliott.

DISCHARGE MEASUREMENTS.—Made from footbridge at gage.

CHANNEL AND CONTROL.—Bed composed of silt. Banks vertical. No well-defined control.

DIVERSIONS.—No diversions above gage.

ACCURACY.—Stage-discharge relation continually changing. Rating curve poorly defined. Gage read to nearest two-hundredths twice a day. Daily discharge ascertained by applying mean daily gage height to rating table. Shifting-control method used for period. Records fair.

Canal diverts water from right side of Gila River in SE. ¼ sec. 11, T. 8 S., R. 31 E., for irrigating 460 acres near Sheldon.

Discharge measurements of Colmonero Canal near Duncan, Ariz., during the year ending September 30, 1923

Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*
July 21	Gardiner and Hayes	1.70	10
Sept. 15	G. S. Hayes	1.38	4.2

Daily discharge, in second-feet, of Colmonero Canal near Duncan, Ariz., for the period July 20 to September 30, 1923

Day	July	Aug.	Sept.	Day	July	Aug.	Sept.	Day	July	Aug.	Sept.
1		0	0	11		0	1.6	21	5.2	0	2.8
2		0	0	12		0	3.3	22	0	0	2.2
3		2.8	0	13		0	3.2	23	0	0	1.1
4		0	0	14		0	3.6	24	0	0	0
5		7.4	0	15		0	4.4	25	4.2	0	1.3
6		8.0	0	16		0	4.0	26	4.3	0	2.3
7		4.8	0	17		0	4.0	27	0	0	2.8
8		0	0	18		0	3.8	28	0	0	3.7
9		0	0	19		0	3.4	29	0	0	4.0
10		0	0	20	9.5	0	2.8	30	0	0	3.8
								31	0	0	

Monthly discharge of Colmonero Canal near Duncan, Ariz., for the period July 20 to September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
July 20–31	9.5	0	1.93	45.9
August	8.0	0	.74	45.5
September	4.4	0	1.94	115
The period				206

BROWN CANAL NEAR SOLOMONSVILLE, ARIZ.

LOCATION.—In SE. ¼ SE. ¼ sec. 30, T. 6 S., R. 28 E., near Earven ranch, a quarter of a mile below intake, and 10 miles east of Solomonsville, Graham County.

RECORDS AVAILABLE.—June 1, 1914, to September 30, 1915; December 20, 1920, to September 30, 1923.

GAGE.—Vertical enamel staff on right bank 10 feet below head gate; read by J. W. Earven.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—Bed composed of silt. Banks not subject to overflow. Control affected by periodic deposits from wash on right bank just below gage.

DIVERSIONS.—No diversions above gage.

ACCURACY.—Stage-discharge relation not permanent. Rating curves well defined. Gage read to half-tenths twice a day. Daily discharge ascertained by applying mean daily gage height to rating table. Shifting-control method used December 1 to April 18 and September 2–30. Records good.

Canal diverts water from right side of Gila River in the SE. ¼ sec. 30, T. 6 S., R. 28 E., for irrigating about 820 acres east of Solomonsville.

Discharge measurements of Brown Canal near Solomonsville, Ariz., during the year ending September 30, 1923

[Made by H. D. Empie]

Date	Gage height	Discharge	Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Oct. 2	4.80	6.8	Mar. 1	5.05	14.5	June 15	4.35	2.9
Nov. 1	5.00	9.9	Apr. 2	5.48	25.1	July 1	4.32	2.7
Dec. 3	5.00	8.9	May 1	5.25	20.6	Sept. 5	4.97	11.0
Jan. 2	5.15	9.7	16	4.95	13.8	17	4.75	3.6
Feb. 1	5.10	10.5	June 1	4.58	6.8			

Daily discharge, in second-feet, of Brown Canal near Solomonsville, Ariz., for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb..	Mar.	Apr.	May	June	July	Aug.	Sept.
1	6.8	9.9	9.7	11	10	14	24	20	3.9	2.7	6.4	------
2	6.8	9.9	11	11	10	14	24	20	3.9	2.7	.2	2.6
3	6.8	9.9	11	11	10	14	24	20	3.9	2.7	.2	4.5
4	6.8	9.9	8.9	11	4.8	14	23	19	3.9	2.7	2.6	5.9
5	6.8	9.9	8.9	11	------	4.5	23	17	3.9	2.7	.4	16
6	6.8	9.9	8.9	11	------	.3	22	15	3.9	3.3	19	22
7	6.8	9.9	8.9	11	------	.3	22	15	3.9	2.3	14	22
8	6.8	9.9	8.9	11	------	16	22	15	3.9	4.6	15	15
9	6.8	9.9	8.9	11	------	16	22	15	3.9	6.9	20	15
10	6.8	9.9	8.9	11	------	18	22	15	3.3	5.3	15	9.5
11	6.8	9.9	8.9	11	------	18	22	15	2.7	7.8	15	.1
12	6.8	9.9	8.9	11	------	18	22	15	2.7	7.8	5.3	2.1
13	6.8	11	8.9	11	------	15	22	15	3.9	8.7	7.4	.1
14	6.8	12	9.3	11	.2	12	22	14	4.6	8.7	------	.6
15	6.8	11	10	11	.3	12	22	14	3.9	13	------	.6
16	8.3	9.9	11	11	.3	9.5	21	9.7	4.6	4.6	------	2.1
17	8.3	9.9	11	11	.3	9.5	21	6.9	3.9	2.3	------	2.9
18	7.6	9.9	11	11	.3	9.5	21	6.9	3.9	2.0	------	2.9
19	6.8	9.9	11	10	.6	7.6	20	6.9	3.9	3.9	------	5.6
20	6.8	9.9	11	10	1.6	7.6	22	6.9	3.9	1.3	------	2.4
21	6.8	9.9	11	10	.3	7.6	22	6.9	3.9	2.0	------	4.2
22	6.8	9.9	11	10	.3	5.9	22	6.9	3.9	------	------	2.9
23	6.8	9.9	11	10	.3	5.9	22	6.9	3.9	------	------	.5
24	8.3	9.9	11	10	.3	4.5	22	6.9	3.9	------	------	8.2
25	8.3	9.9	11	10	.3	4.5	22	6.9	3.9	------	------	4.9
26	7.6	9.9	11	10	.3	7.6	22	6.9	3.9	------	------	3.5
27	6.8	9.9	11	9.6	.3	7.6	22	6.9	3.9	------	------	.7
28	9.9	9.9	11	10	4.5	7.6	22	6.1	3.9	------	------	.6
29	9.9	9.9	11	10	------	24	22	6.9	3.9	------	------	1.3
30	9.9	9.9	11	10	------	24	20	6.9	2.7	------	------	2.2
31	9.9	------	11	10	------	24	------	2.7	------	6.4	------	------

NOTE.—Dry for days on which no discharge is given.

Monthly discharge of Brown Canal near Solomonsville, Ariz., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	9.9	6.8	7.45	458
November	12	9.9	10.0	595
December	11	8.9	10.2	627
January	11	9.6	10.6	652
February	10	0	1.61	89.4
March	24	.3	11.4	701
April	24	20	22.0	1,310
May	20	2.7	11.4	701
June	4.6	2.7	3.81	227
July	13	0	3.37	207
August	20	0	3.89	239
September	22	0	5.36	319
The year	24	0	8.46	6,130

BROWN CANAL WASTEWAY NEAR SOLOMONSVILLE, ARIZ.

LOCATION.—In SE. ¼ NE. ¼ sec. 31, T. 6 S., R. 28 E., near Earven ranch, 10 miles east of Solomonsville, Graham County.

RECORDS AVAILABLE.—December 20, 1920, to September 30, 1923.

GAGE.—Vertical enamel staff on right bank 200 feet below waste gate; read by J. W. Earven.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—Bed composed of silt. Channel straight. Banks not subject to overflow.

DIVERSIONS.—None.

ACCURACY.—Stage-discharge relation not permanent. Standard rating curve fairly well defined. Gage read to half-tenths twice a day. Daily discharge ascertained by applying mean daily gage height to rating table. Shifting-control method used May 15-31 and July 18-21. Records good.

Wasteway returns water from Brown Canal to Gila River half a mile below station, "Gila River near Solomonsville."

Discharge measurements of Brown Canal wasteway near Solomonsville, Ariz., during the year ending September 30, 1923

[Made by H. D. Empie]

Date	Gage height	Discharge	Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Oct. 2	5.13	1.7	Feb. 1	5.15	0.8	June 1	5.05	1.9
Nov. 1	5.90	6.5	Mar. 1	4.66	.3	6	4.87	.8
Dec. 3	5.68	4.3	Apr. 2	5.68	10.1	22	5.10	1.7
Jan. 2	4.92	.2	May 1	5.72	10.6	July 1	4.98	1.0

Daily discharge, in second-feet, of Brown Canal wasteway near Solomonsville, Ariz., for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1.8	6.5	4.6	3.5	0.2	0.4	9.7	10	2.2	0.8	0.3	-------
2	2.1	3.5	4.9	.2	2.7	.4	9.7	10	1.6	.7	.4	-------
3	2.8	4.0	1.9	.2	2.7	.4	10	11	1.6	.8	-------	-------
4	2.8	3.5	.4	.2	1.4	.4	8.3	11	1.6	.7	-------	1.0
5	2.8	3.5	.3	.2	-------	1.0	8.3	6.5	1.5	.7	-------	2.1
6	2.8	3.7	.4	.2	-------	.2	7.1	2.9	.9	.8	.2	1.5
7	2.8	4.0	.4	.2	-------	.2	8.7	3.1	1.2	.6	-------	.8
8	2.8	4.0	1.0	.2	-------	6.0	10	2.7	.9	.8	-------	-------
9	2.8	4.0	1.0	.2	-------	6.0	11	2.4	.9	.2	.3	-------
10	2.8	4.0	1.0	.2	-------	6.0	11	2.7	1.0	.2	-------	-------
11	3.0	4.0	2.0	.2	-------	6.0	10	2.4	.9	.4	1.4	-------
12	3.2	3.1	3.5	.2	-------	6.0	10	2.7	1.0	.9	.2	-------
13	3.2	3.4	4.0	.2	-------	2.4	10	2.6	1.7	1.6	-------	-------
14	3.2	3.7	4.4	.2	.1	2.4	10	5.4	1.7	4.7	-------	-------
15	3.2	4.4	4.4	.2	.2	2.3	10	5.4	.9	1.9	-------	-------
16	3.6	6.5	4.4	.2	.2	2.6	10	5.3	.5	.3	-------	-------
17	4.5	6.5	4.4	.2	.2	2.6	10	5.2	1.4	-------	-------	-------
18	4.0	6.5	4.4	.2	.2	1.4	10	5.1	1.4	-------	-------	-------
19	3.6	4.0	4.4	.8	.2	.6	9.2	5.0	1.3	-------	-------	-------
20	3.0	5.4	4.4	2.7	.2	.6	10	4.9	1.2	-------	-------	-------
21	2.8	4.4	4.4	2.9	.2	.6	10	4.8	1.2	-------	-------	-------
22	2.8	4.4	4.4	2.4	.2	.6	10	4.7	1.2	-------	-------	-------
23	2.8	5.4	4.4	2.6	.2	.6	10	4.5	1.2	-------	-------	-------
24	2.8	6.5	4.0	2.6	.2	.6	11	4.4	1.2	-------	-------	-------
25	2.8	5.4	3.5	2.9	.2	.6	12	4.3	1.2	-------	-------	-------
26	2.8	5.4	3.5	2.7	.2	.6	12	4.2	1.2	-------	-------	-------
27	2.8	4.4	3.5	2.4	.2	.6	11	4.0	1.4	-------	-------	-------
28	6.5	4.4	3.5	2.7	.1	.6	11	4.0	1.4	-------	-------	-------
29	6.5	4.4	3.5	2.4	-------	1.0	11	4.0	1.2	-------	-------	-------
30	6.5	4.4	3.5	2.7	-------	7.8	9.7	3.7	.7	-------	-------	-------
31	6.5	-------	3.5	.2	-------	9.7	-------	3.1	-------	.8	-------	-------

NOTE.—Dry for days on which no discharge is given.

Monthly discharge of Brown Canal wasteway near Solomonsville, Ariz., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	6.5	1.8	3.43	211
November	6.5	3.1	4.58	273
December	4.9	.3	3.16	194
January	3.5	.2	1.19	73.2
February	2.7	0	.35	19.4
March	9.7	.2	2.3	141
April	12	7.1	10.0	595
May	11	2.4	4.90	301
June	2.2	.5	1.24	73.8
July	4.7	0	.55	34
August	1.4	0	.09	5.5
September	2.1	0	.18	10.7
The year	12	0	2.66	1,930

MICHELANA CANAL NEAR SOLOMONSVILLE, ARIZ.

LOCATION.—In NE. ¼ SW. ¼ sec. 3, T. 7 S., R. 27 E., at Moody ranch, a quarter of a mile below head gate and 6 miles northeast of Solomonsville Graham County.

RECORDS AVAILABLE.—October 1, 1914, to September 30, 1915; December 21, 1920, to September 30, 1923.

GAGE.—Vertical staff on right bank 30 feet below wagon bridge; read by Edwin Moody.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—Bed composed of silt. Banks vertical. No well-defined, control.

DIVERSIONS.—None.

ACCURACY.—Stage-discharge relation not permanent. Standard rating curve fairly well defined. Gage read to half-tenths twice a day. Daily discharge ascertained by applying mean daily gage height to rating table. Shifting-control method used for entire year. Records fair.

Canal diverts water from right side of Gila River in SW. ¼ sec. 31, T. 7 S., R. 28 E., for irrigating about 450 acres near Solomonsville.

Discharge measurements of Michelana Canal near Solomonsville, Ariz., during the year ending September 30, 1923

[Made by H. D. Empie]

Date	Gage height	Discharge	Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Oct. 2	4.03	2.3	Jan. 1	4.25	2.2	May 15	4.00	4.0
10	4.10	2.8	Feb. 1	4.50	4.3	June 1	3.96	3.6
Nov. 1	4.55	6.9	Mar. 1	4.17	6.0	6	4.00	3.8
10	4.35	3.8	Apr. 1	4.73	13.3	12	3.92	3.0
Dec. 4	4.40	3.8	5	4.42	9.6	July 1	3.82	1.8
11	4.38	3.8	May 1	4.00	4.3	Sept. 5	4.38	4.8
18	4.40	3.8						

Daily discharge, in second-feet, of Michelana Canal near Solomonsville, Ariz., for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	2	6	3	2	4	6	12	5	4	2	2	5
2	2	4	4	2	4	6	10	5	4	2	2	5
3	2	4	4	2	4	6	10	5	4	2	2	5
4	2	4	4	2	4	7	9	5	4	2	2	5
5	2	5	4	2	4	6	9	5	4	2	3	5
6	3	5	4	2	4	6	8	5	4	2	3	5
7	3	5	4	2	4	6	8	4	4	3	4	5
8	3	4	4	3	5	6	8	4	4	3	4	5
9	3	4	4	3	5	6	8	4	3	2	5	5
10	3	4	4	3	5	6	8	4	3	2	6	5
11	3	4	4	3	4	6	8	4	4	3	4	5
12	3	4	4	3	4	6	8	11	4	3	4	4
13	3	4	4	3	4	6	8	5	3	4	2	4
14	3	4	4	3	4	6	7	5	3	4	-------	4
15	3	5	4	4	4	6	7	5	3	5	-------	4
16	4	5	4	4	4	9	7	4	3	5	-------	4
17	4	5	4	4	3	9	7	4	3	4	-------	4
18	4	5	4	4	3	9	7	4	3	4	-------	4
19	5	5	4	4	3	9	6	4	3	4	-------	5
20	5	5	4	4	3	9	6	4	3	4	-------	5
21	5	5	4	4	3	9	6	4	2	5	-------	4
22	5	5	4	4	-------	9	6	4	2	5	-------	4
23	6	4	4	4	-------	10	6	4	2	5	2	4
24	6	4	4	4	-------	10	5	4	2	4	4	3
25	6	5	4	4	-------	10	5	4	2	4	2	3
26	6	5	4	4	3	10	11	4	2	4	3	3
27	6	5	3	4	6	10	11	4	2	2	4	4
28	6	6	3	4	6	10	6	4	2	2	4	4
29	6	4	3	4	-------	10	5	4	2	2	2	4
30	6	2	2	4	-------	12	6	4	2	2	4	4
31	6	-------	1	4	-------	12	-------	4	-------	2	5	-------

Monthly discharge of Michelana Canal near Solomonsville, Ariz., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	6	2	4.1	252
November	6	2	4.5	268
December	4	1	3.7	228
January	4	2	3.3	203
February	6	0	3.3	183
March	12	6	8.0	492
April	12	5	7.6	452
May	11	4	4.5	277
June	4	2	3.0	179
July	5	2	3.2	197
August	6	0	2.4	148
September	5	3	4.3	256
The year	12	0	4.3	3,140

FOURNESS CANAL NEAR SOLOMONSVILLE, ARIZ.

LOCATION.—In SE. ¼ SE. ¼ sec. 35, T. 6 S., R. 27 E., three-quarters of a mile below intake and 8 miles east of Solomonsville, Graham County.

RECORDS AVAILABLE.—October 1, 1914, to September 30, 1915; December 20, 1920, to September 30, 1923.

GAGE.—Vertical staff on right bank 300 feet below waste gate; read by David Jurado.

DISCHARGE MEASUREMENTS.—Made by wading at gage.

CHANNEL AND CONTROL.—Bed composed of silt. Channel small and uniform in cross section. No well-defined control.

DIVERSIONS.—No diversions above gage.

ACCURACY.—Stage-discharge relation not permanent. Rating curves fairly well defined. Gage read to half-tenths twice a day. Daily discharge ascertained by applying mean daily gage height to rating table. Records fair.

Canal diverts water from left side of Gila River in NE. ¼ sec. 1, T. 7 S., R. 27 E., for irrigating about 260 acres near Solomonsville.

Discharge measurements of Fourness Canal near Solomonsville, Ariz., during the year ending September 30, 1923

[Made by H. D. Empie]

Date	Gage height	Discharge	Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Oct. 2	4.60	1.5	Mar. 1	4.90	3.9	May 1	4.30	1.9
Dec. 4	4.98	5.1	Apr. 2	5.00	3.9	July 21	4.34	1.3
Jan. 2	4.74	2.8	23	4.87	8.4	Aug. 4	5.00	10.4
Feb. 1	4.67	2.1						

Daily discharge, in second-feet, of Fourness Canal near Solomonsville, Ariz., for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1.5	------	4.0	2.5	2.5	4.0	4.0	1.5	1.0	------	------	------
2	1.5	------	4.0	2.5	2.5	3.0	4.0	1.5	1.0	0.5	------	------
3	1.0	------	5.0	2.5	2.5	3.0	4.0	1.5	1.0	1.0	2.5	------
4	1.0	------	5.0	2.5	2.5	3.0	3.5	1.5	1.0	1.0	6.5	------
5	1.0	------	5.0	2.5	2.5	3.0	3.5	1.5	1.0	1.0	5.0	------
6	1.0	------	5.0	2.5	2.5	3.0	3.5	1.5	1.0	2.5	5.0	------
7	1.0	------	5.0	2.5	2.5	3.0	3.5	1.5	1.0	6.5	2.5	------
8	1.0	------	4.0	2.5	2.5	3.0	3.0	1.5	1.0	5.5	------	------
9	1.0	------	3.0	2.5	2.5	2.5	3.0	1.5	1.0	2.0	------	------
10	1.0	------	3.0	2.5	2.5	2.5	3.0	1.5	1.0	1.0	------	------
11	1.0	------	3.0	2.5	2.5	2.5	------	1.5	1.0	2.5	------	------
12	1.0	------	3.0	2.5	2.0	2.5	------	1.5	1.0	6.5	------	------
13	1.0	------	3.0	2.5	2.0	2.5	------	1.5	.5	6.5	------	------
14	1.0	------	3.0	2.5	2.0	3.0	------	1.5	------	1.0	------	------
15	1.0	------	3.0	2.5	2.0	3.0	------	1.5	------	2.0	------	------
16	1.0	------	3.0	2.5	2.0	2.5	------	1.5	------	2.0	------	------
17	1.5	------	2.5	2.0	2.0	2.5	------	1.5	1.0	1.0	------	------
18	1.5	------	2.5	2.0	2.5	2.5	6.5	1.5	1.0	------	------	------
19	1.0	1.5	2.5	2.0	3.0	3.0	5.5	1.5	1.0	------	------	------
20	1.0	3.0	2.5	2.0	3.5	3.0	5.5	1.5	1.0	------	------	------
21	1.0	3.0	2.5	2.0	4.0	4.0	5.5	1.5	1.0	3.5	------	------
22	1.0	3.0	3.0	2.0	4.0	5.0	5.5	1.5	1.0	------	------	------
23	.8	3.0	3.0	1.5	4.5	5.0	3.5	1.0	1.0	------	------	2.5
24	.8	2.5	2.5	1.5	5.0	5.0	2.0	1.0	1.0	------	------	3.0
25	.8	2.5	2.5	1.5	4.5	5.0	1.5	1.0	1.0	------	1.0	.7
26	.8	2.5	2.5	2.0	4.0	4.5	1.5	1.0	.9	------	6.5	------
27	.8	2.5	2.5	2.0	4.0	4.0	1.5	1.0	.5	------	2.0	------
28	.4	2.5	2.5	2.5	4.0	4.0	1.5	1.0	------	------	2.0	------
29	------	3.0	2.5	2.5	------	4.0	1.5	1.0	------	------	1.5	1.5
30	------	3.0	2.5	2.5	------	4.0	1.5	1.0	------	------	.8	.9
31	------	------	2.5	2.5	------	4.0	------	1.0	------	------	------	------

NOTE.—Dry on days for which no discharge is given.

Monthly discharge of Fourness Canal near Solomonsville, Ariz., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	1.5	0	0.92	57
November	3	0	1.07	64
December	5	2.5	3.21	197
January	2.5	1.5	2.27	140
February	5	2	2.95	164
March	5	2.5	3.40	209
April	6.5	0	2.60	155
May	1.5	1	1.36	84
June	1	0	.76	45
July	6.5	0	1.48	91
August	6.5	0	1.14	70
September	3	0	.29	17
The year	6.5	0	1.78	1,290

SAN JOSE CANAL NEAR SOLOMONSVILLE, ARIZ.

LOCATION.—In NW. ¼ NE. ¼ sec. 10, T. 7 S., R. 27 E., near Curtis ranch, 2 miles below intake, and 4 miles east of Solomonsville, Graham County.

RECORDS AVAILABLE.—April 1, 1914, to September 30, 1915; December 21, 1920, to September 30, 1923.

GAGE.—Stevens continuous water-stage recorder installed April 13, 1922, 50 feet above concrete drop, 200 feet below waste gate, and 2 miles below heading; read by H. D. Empie.

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

CHANNEL AND CONTROL.—Wide, uniform section. Well-defined banks. Principal control is formed by concrete drop 50 feet below gage.

DIVERSIONS.—One diversion above gage, irrigating 90 acres.

ACCURACY.—Stage-discharge relation permanent, except for periods August 13 to September 10 and September 24–30. Standard rating curve well defined. Operation of water-stage recorder satisfactory. Daily discharge ascertained by applying mean daily gage height to rating table. Shifting-control method used August 13 to September 10 and September 24–30. Records good.

Canal diverts water from left side of Gila River in the SW. ¼ sec. 36, T. 6 S., R. 27 E., for irrigating 3,000 acres near Solomonsville and Safford.

Discharge measurements of San Jose Canal near Solomonsville, Ariz., 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.*
Oct. 31	H. D. Empie	0.50	30.6	May 1	H. D. Empie	0.48	28.8
Dec. 4	do	.72	53	11	J. H. Gardiner	.46	27.7
Jan. 1	do	.53	31.8	June 1	H. D. Empie	.42	23.3
8	J. H. Gardiner	.87	74	21	do	.30	13.6
12	do	.91	79	July 1	do	.28	13.2
16	H. D. Empie	.90	78	21	do	.61	43.5
25	do	.545	35.0	Aug. 1	do	.835	71
Feb. 1	do	.62	41.8	15	do	.49	35.4
Mar. 1	do	.62	42.4	22	do	.49	33.8
10	J. H. Gardiner	.80	65	Sept. 1	do	.675	55
Apr 1	H. D. Empie	.68	48.6	20	do	.60	41.7

Daily discharge, in second-feet, of San Jose Canal near Solomonsville, Ariz., for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	27	28	43	33	43	47	48	28	23	13	59	50
2	27	28	51	37	43	55	50	22	22	12	63	47
3	28	28	56	40	43	56	51	29	23	13	63	51
4	31	28	48	40	39	55	48	28	22	13	61	68
5	31	29	39	44	37	56	48	27	22	13	52	72
6	30	30	34	46	36	60	45	27	20	26	56	68
7	29	31	35	46	36	70	43	26	22	28	31	68
8	28	31	33	63	34	68	40	26	23	32	6	65
9	28	31	32	55	33	71	37	26	23	28	0	55
10	24	28	31	77	32	72	42	25	16	30	0	56
11	25	28	30	81	30	68	46	26	16	28	0	37
12	25	28	29	82	24	65	44	26	18	28	0	34
13	24	22	34	82	29	77	40	27	17	39	1	27
14	24	23	33	79	31	81	42	28	16	70	15	28
15	28	30	42	79	34	78	43	21	15	67	38	42
16	32	32	43	79	32	79	37	25	15	55	37	37
17	30	34	38	79	32	75	37	25	17	47	37	32
18	29	34	42	52	33	78	40	25	16	37	32	36
19	30	33	45	35	35	81	42	25	15	46	32	47
20	30	33	44	34	36	78	39	25	15	45	37	43
21	24	33	37	34	35	74	34	25	15	36	42	42
22	27	31	34	34	35	68	34	25	16	27	32	59
23	28	28	35	35	35	67	35	26	13	36	40	61
24	28	29	35	36	37	68	37	25	20	27	45	85
25	28	30	36	34	39	30	37	24	15	38	33	75
26	27	28	35	32	42	0	37	24	15	52	40	65
27	26	24	35	31	44	0	37	18	14	56	55	68
28	27	29	34	37	45	0	37	24	13	47	64	78
29	28	38	33	44	-------	0	32	23	13	39	52	85
30	28	46	33	44	-------	38	29	22	12	60	44	84
31	29	-------	33	43	-------	59	-------	22	-------	30	40	-------

Monthly discharge of San Jose Canal near Solomonsville, Ariz., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	32	24	27.7	1,700
November	46	22	30.2	1,800
December	56	29	37.5	2,310
January	82	31	50.5	3,110
February	45	24	35.9	1,990
March	81	0	57.2	3,520
April	51	29	40.4	2,400
May	29	18	25.0	1,540
June	23	12	17.4	1,040
July	70	12	36.1	2,220
August	64	0	35.7	2,200
September	85	27	55.5	3,300
The year	85	0	37.5	27,100

MONTEZUMA CANAL NEAR SOLOMONSVILLE, ARIZ.

LOCATION.—In SE. ¼ NW. ¼ sec. 17, T. 7 S., R. 27 E., a mile below intake and 2 miles east of Solomonsville, Graham County.

RECORDS AVAILABLE.—April 1, 1914, to September 30, 1915; December 29, 1920, to September 30, 1923.

GAGE.—Stevens continuous water-stage recorder installed June 26, 1922, on left bank 200 feet below waste gate; inspected by H. D. Empie.

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

CHANNEL AND CONTROL.—Bed composed of silt. Banks vertical. No well-defined control.

DIVERSIONS.—None.

ACCURACY.—Stage-discharge relation continually changing. Standard rating curve well defined. Operation of water-stage recorder satisfactory. Daily discharge ascertained by applying mean daily gage height to rating table. Shifting-control method used for entire year. Records good.

Canal diverts water from left side of Gila River in NE. ¼ sec. 17, T. 7 S., R. 27 E., for irrigating 3,750 acres near Solomonsville and Safford.

Discharge measurements of Montezuma Canal near Solomonsville, Ariz., 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.*
Oct. 2	H. D. Empie	8.58	26.1	May 8	H. D. Empie	8.74	28.8
10	do	8.58	26.4	11	J. H. Gardiner	8.69	27.8
19	do	8.55	25.1	19	H. D. Empie	8.61	25.1
31	do	8.62	26.0	June 1	do	8.58	25.5
Nov. 8	do	8.65	27.8	13	do	8.60	24.4
17	do	8.75	31.4	16	do	8.47	20.8
Dec. 4	do	9.08	40.0	19	do	8.50	21.9
9	do	8.98	37.2	28	do	8.37	19.0
Jan. 1	do	9.32	47.4	July 1	do	8.21	14.2
8	J. H. Gardiner	9.20	43.4	17	do	9.50	52
Feb. 1	H. D. Empie	9.72	65	28	do	9.13	39.8
15	do	8.83	34.3	Aug. 1	do	7.88	38
Mar. 2	do	9.28	49.4	6	do	9.39	46.9
16	J. H. Gardiner	10.20	81	18	do	9.50	45.8
20	H. D. Empie	10.08	79	23	do	8.89	27.5
Apr. 1	do	9.35	53	Sept. 1	do	10.15	75
21	do	8.90	34.5	24	do	9.48	56
May 2	do	8.79	30.3				

Daily discharge, in second-feet, of Montezuma Canal near Solomonsville, Ariz., for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	28	26	46	47	65	53	53	32	25	16	4	63
2	28	26	44	46	66	52	55	30	24	16	16	41
3	26	25	41	46	58	60	55	29	22	15	43	16
4	26	26	41	44	40	60	53	29	22	15	33	23
5	26	29	40	44	38	64	53	29	24	16	43	45
6	26	28	36	46	38	65	53	29	24	33	54	45
7	26	28	38	46	38	67	51	29	24	29	58	61
8	26	28	36	46	38	78	46	28	24	31	59	56
9	26	28	36	40	37	76	45	28	25	26	68	44
10	26	28	36	16	37	80	45	28	24	27	73	47
11	26	29	36	0	36	81	45	26	24	25	64	39
12	25	29	36	0	36	83	46	26	24	25	26	45
13	25	29	38	0	36	87	46	26	25	36	21	42
14	25	28	35	0	36	77	45	26	23	58	30	30
15	25	29	32	0	35	68	45	26	22	53	36	54
16	26	29	40	0	35	73	45	26	21	58	40	55
17	25	32	46	14	35	77	45	26	23	50	32	52
18	25	32	46	32	37	77	44	25	22	45	36	57
19	25	32	46	44	38	89	41	25	23	44	33	58
20	25	32	44	43	40	76	38	24	22	42	36	61
21	25	32	44	43	38	76	38	24	22	57	25	62
22	25	32	44	43	38	76	39	24	22	23	28	69
23	26	30	44	43	34	78	39	25	22	36	32	80
24	26	32	44	44	34	78	39	25	21	36	36	67
25	26	32	44	43	43	73	38	25	22	40	29	63
26	28	33	44	44	46	76	36	24	22	47	53	44
27	29	40	44	44	50	78	35	22	21	64	54	56
28	26	44	44	54	53	76	36	24	20	50	46	58
29	25	44	46	65	-------	80	36	25	18	30	31	68
30	25	46	47	65	-------	71	33	25	17	39	38	62
31	26	-------	47	63	-------	60	-------	26	-------	32	53	-------

Monthly discharge of Montezuma Canal near Solomonsville, Ariz., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	29	25	25.9	1,590
November	46	25	31.3	1,860
December	47	32	41.5	2,550
January	65	0	35.6	2,190
February	66	35	41.2	2,290
March	89	52	73.1	4,490
April	55	33	43.9	2,610
May	32	22	26.3	1,620
June	25	17	22.5	1,340
July	64	15	35.9	2,210
August	73	4	39.7	2,440
September	80	16	52.1	3,100
The year	89	0	39.1	28,300

UNION CANAL NEAR SOLOMONSVILLE, ARIZ.

LOCATION.—In SE. ¼ NE. ¼ sec. 14, T. 7 S., R. 26 E., 1¾ miles below intake and 1½ miles northwest of Solomonsville, Graham County.

RECORDS AVAILABLE.—April 1, 1914, to September 30, 1915; January 1, 1921, to September 30, 1923.

GAGE.—Stevens continuous water-stage recorder on left bank; operated by H. D. Empie.

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

CHANNEL AND CONTROL.—Bed composed of silt and sand. Banks vertical. No well-defined control.

DIVERSIONS.—None.

ACCURACY.—Stage-discharge relation not permanent. Standard rating curve well defined. Operation of water-stage recorder satisfactory. Daily discharge ascertained by applying mean daily gage height to rating table. Shifting-control method used for entire year. Records good.

Canal diverts water from left side of Gila River in the NW. ¼ sec. 18, T. 7 S., R. 27 E., for irrigating 5,975 acres near Safford and Thatcher.

Discharge measurements of Union Canal near Solomonsville, Ariz., 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.*
Oct. 9	H. D. Empie	1.54	22.0	Apr. 23	H. D. Empie	2.57	88
23	do	2.39	53	30	do	2.025	65
31	do	2.59	65	May 2	do	2.00	64
Nov. 8	do	2.46	62	7	do	1.76	52
19	do	2.52	60	12	J. H. Gardiner	1.75	50
Dec. 4	do	2.56	60	20	H. D. Empie	1.34	35.4
23	do	2.26	49.9	24	do	1.26	30.3
Jan. 1	do	1.86	33.6	29	do	.79	16.8
8	J. H. Gardiner	3.65	106	June 4	do	.69	10.4
24	H. D. Empie	3.06	84	7	do	.66	10.2
Feb. 5	do	2.76	77	18	do	.38	3.6
16	do	2.53	71	23	do	.34	3.2
17	do	2.52	68	July 1	do	.18	1.1
21	do	2.70	79	16	do	2.36	70
Mar. 2	do	2.73	82	Aug. 1	do	2.63	80
16	J. H. Gardiner	2.55	80	13	do	1.57	40.4
13	H. D. Empie	2.91	102	20	do	2.56	89
22	do	3.21	114	Sept. 3	do	.98	18.4
Apr. 1	do	2.58	88	12	do	.92	15.8
6	do	2.465	81	26	do	1.93	53
12	do	2.47	78				

Daily discharge, in second-feet, of Union Canal near Solomonsville, Ariz., for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	26	73	85	33	0.3	90	88	62	14	1.4	78	47
2	24	71	49	31	0	86	88	63	13	1.7	66	34
3	24	68	61	28	1.9	92	90	61	10	1.5	49	18
4	23	66	60	43	48	93	81	58	9.4	1.4	78	12
5	28	63	64	74	78	84	81	52	7.0	1.4	87	7.6
6	26	63	62	97	83	74	81	51	7.2	20	86	38
7	24	64	61	106	85	79	73	50	9.6	49	96	54
8	23	63	59	91	81	82	65	49	8.0	47	95	69
9	21	61	55	63	79	84	71	47	6.2	22	90	38
10	22	58	53	72	80	89	78	46	5.8	50	86	50
11	23	52	50	90	84	90	77	45	5.3	47	75	21
12	22	57	49	93	84	81	74	46	5.5	35	45	16
13	22	67	47	90	89	94	77	47	5.3	69	28	15
14	21	67	53	85	84	104	79	49	5.1	78	5.3	40
15	24	73	59	87	76	92	81	46	5.3	87	5.7	51
16	38	82	54	87	71	79	80	45	4.3	68	48	54
17	48	74	51	79	69	77	84	42	4.0	61	75	56
18	51	62	50	76	69	77	80	39	3.6	55	70	82
19	58	64	45	75	75	90	72	37	3.5	61	57	90
20	58	73	48	79	81	90	69	35	3.2	57	74	82
21	55	75	49	79	77	100	84	33	2.2	71	101	36
22	55	77	49	75	79	109	80	32	2.1	63	82	95
23	58	75	50	77	80	111	88	33	2.8	62	65	106
24	56	80	50	86	82	113	90	31	2.5	63	45	108
25	53	84	49	82	85	109	84	28	2.2	45	51	79
26	52	88	45	87	64	103	79	26	1.9	21	53	59
27	52	77	39	86	83	109	71	23	1.7	40	74	52
28	56	69	37	37	89	119	66	20	1.6	56	73	93
29	58	70	36	3.3	-------	111	56	18	1.5	67	55	90
30	61	80	34	.4	-------	93	65	17	1.5	80	44	79
31	66	-------	34	.5	-------	92	-------	15	-------	73	40	-------

Monthly discharge of Union Canal near Solomonsville, Ariz., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	66	21	39.6	2,430
November	88	52	69.9	4,160
December	85	34	51.2	3,150
January	106	.4	67.5	4,150
February	89	0	69.9	3,880
March	119	74	93.4	5,740
April	90	56	77.7	4,620
May	63	15	40.2	2,470
June	14	1.5	5.18	308
July	87	1.4	46.9	2,880
August	101	5.3	63.8	3,920
September	108	7.6	55.7	3,310
The year	119	0	56.7	41,000

SAN SIMON CREEK NEAR RODEO, N. MEX.

LOCATION.—In SE. ¼ sec. 6, R. 21 W., T. 27 S., 10 miles north of Rodeo, Hidalgo County, N. Mex.

DRAINAGE AREA.—454 square miles (measured on typographic maps).

RECORDS AVAILABLE.—March 25, 1920, to September 30, 1923.

GAGE.—Vertical staff in midstream; read by A. J. Love.

DISCHARGE MEASUREMENTS.—Made by wading near gage.

CHANNEL AND CONTROL.—Uniform channel 300 feet wide, covered with sacaton grass and small mesquite.

18776—27†—WSP 569——10

EXTREMES OF DISCHARGE.—Maximum mean daily discharge for year, 520 second-feet September 13. Stream dry greater part of year.

1920–1923: Maximum mean daily discharge, 1,340 second-feet July 25, 1921. Stream dry during greater part of each year.

DIVERSIONS.—None.

REGULATION.—None.

ACCURACY.—Stage-discharge relation fairly permanent. Rating curve fairly well defined. Gage read four or more times daily during flood periods. Daily discharge ascertained from flood hydrographs. Records fair.

COOPERATION.—Records furnished by University of Arizona, Prof. G. E. P. Smith, irrigation engineer.

Daily discharge, in second-feet, of San Simon Creek near Rodeo, N. Mex., for the year ending September 30, 1923

Day	July	Aug.	Sept.	Day	July	Aug.	Sept.	Day	July	Aug.	Sept.
1				11		20		21			
2				12			7	22	105		
3				13			520	23	250	37	115
4				14			230	24	12	22	35
5			4	15			5	25		3	4
6			150	16				26		145	
7			1	17			12	27		25	
8				18			8	28		1	
9		1		19				29			
10		35		20				30			
								31			

NOTE.—Dry on days for which no discharge is given.

Monthly discharge of San Simon Creek near Rodeo, N. Mex., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
July	250	0	11.8	726
August	145	0	9.32	573
September	520	0	36.4	2,170
The year	520	0	4.79	3,470

SAN SIMON CREEK NEAR SAN SIMON, ARIZ.

LOCATION.—In SW. ¼ sec. 29, T. 13 S., R. 31 E., 1 mile east of San Simon, Cochise County.

DRAINAGE AREA.—938 square miles (measured on topographic maps).

RECORDS AVAILABLE.—August 1, 1919, to September 30, 1923.

GAGE.—Vertical enamel staff fastened to bridge, low-water section on right pier, high-water section on left pier; read by Ed Gentner.

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

CHANNEL AND CONTROL.—Bed composed of gravel, scouring to heavy clay at high water. Low-water control is a gravel bar 50 feet below gage. High-water control formed by right angle turn to right 400 feet below station.

EXTREMES OF DISCHARGE.—Maximum stage during year, 14.0 feet at 10.30 p. m. July 21 (discharge, 5,350 second-feet); minimum discharge, zero flow greater part of year.

1919–1923: Maximum stage, that of June 21, 1923; minimum discharge, zero flow greater part of each year.

DIVERSIONS.—None.

REGULATION.—None.

ACCURACY.—Stage-discharge relation fairly permanent. Rating curve fairly well defined. Gage read to tenths once a day and oftener during floods Daily discharge ascertained from discharge hydrographs prepared by applying each gage reading to rating table. Records fair.

COOPERATION.—Records furnished by University of Arizona, Prof. G. E. P. Smith, irrigation engineer.

Discharge measurements of San Simon Creek near San Simon, Ariz., during the year ending September 30, 1923

[Made by H. C. Schwalen]

Date	Gage height	Discharge	Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*		*Feet*	*Sec.-ft.*
July 13	5.15	120	July 17	4.25	4.4	Aug. 25	13.20	4,680
13	5.97	376	Aug. 24	5.50	289	26	5.88	430
14	4.00	2.7	24	4.98	107	27	5.42	266
15	6.05	476	24	4.40	12.4			

Daily discharge, in second-feet, of San Simon Creek near San Simon, Ariz., for the year ending September 30, 1923

Day	July	Aug.	Sept.	Day	July	Aug.	Sept.	Day	July	Aug.	Sept.
1				11		80		21	570		
2				12		140	175	22	580	70	
3	10			13	55		140	23	330	345	
4	18			14	10		220	24		240	40
5				15	150		25	25		410	35
6				16	25			26		800	2
7	55			17	5			27		30	1
8	10	80	8	18	1			28		1	
9		120	1	19	13			29		1	
10				20	5			30		1	
								31			

NOTE.—Dry for days on which no discharge is given, except Feb. 27, which had a mean daily discharge of 40 second-feet.

Monthly discharge of San Simon Creek near San Simon, Ariz., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
February	40	0	1.4	78
July	580	0	59.0	3,630
August	800	0	74.8	4,600
September	220	0	21.5	1,280
The year	800	0	13.3	9,590

CAVE CREEK NEAR PARADISE, ARIZ.

LOCATION.—In SW. ¼ SE. ¼ sec. 34, T. 17 S., R. 31 E., at Portal ranger station 8 miles by road southeast of Paradise, Cochise County.

DRAINAGE AREA.—39 square miles (measured on topographic map).

RECORDS AVAILABLE.—August 5, 1919, to September 30, 1923.

GAGE.—Vertical enamel staff on right bank 100 feet from ranger station; read by Mrs. Alice H. Scholefield.

DISCHARGE MEASUREMENTS.—Made by wading near gage.

CHANNEL AND CONTROL.—Channel composed of gravel and boulders. Channel fairly straight and uniform in cross section.

EXTREMES OF DISCHARGE.—Maximum stage recorded during the year, 2.62 feet on August 31 (discharge, 400 second-feet); dry during periods of October, November, December, June, and July.

1919–1923: Maximum stage recorded, 5.30 feet August 7, 1921 (discharge, 3,360 second-feet); dry during a part of each year.

DIVERSIONS.—Cave Creek Canal diverts water from left side 700 feet above station. Records of this canal are published in this report. Another canal diverts water above this station to irrigate about 7½ acres.

REGULATION.—None.

ACCURACY.—Stage-discharge relation fairly permanent. Rating curve fairly well defined. Gage read to two-hundredths once a day and oftener during floods. Daily discharge ascertained by applying mean daily gage height to rating table. Discharge hydrographs used during periods of flood. Records fair.

COOPERATION.—Records furnished by University of Arizona, Prof. G. E. P. Smith, irrigation engineer.

Discharge measurements of Cave Creek near Paradise, Ariz., during the year ending September 30, 1923

[Made by H. C. Schwalen]

Date	Gage height	Discharge
	Feet	*Sec.-ft.*
Jan. 10	0.72	0.38
Mar. 8	.91	2.57
Aug. 26	1.40	49.6

Daily discharge, in second-feet, of Cave Creek near Paradise, Ariz., for the year ending September 30, 1923

Day	Nov.	Dec.	Jan	Feb.	Mar.	Apr.	May	Aug.	Sept.
1		1	1	0.5	0.5	2	2	0.5	130
2		1	1	.5	.5	2	2	.5	38
3		1	1	.5	.5	2	2	.5	38
4		1	1	.5	.5	2	2	.5	38
5		.5	1	.5	2.5	2	2	.5	38
6		.5	1	.5	2.5	2	1.5	.5	38
7			1	.5	2.5	2	1	.5	95
8			1	.5	2.5	2.5	1	57	67
9			1	.5	1	2.5	1	49	67
10			1	.5	2.5	2.5	.5	49	38
11			1	.5	13	2.5	.5	41	38
12			1	.5	2	2.5	.5	24	18
13			1	.5	2	2.5	.5	15	18
14			.5	.5	2	2.5	.5	85	79
15			.5	.5	2	2.5	.5	75	52
16			.5	.5	2	2	.5	75	38
17			.5	.5	2	2.5	.5	17	18
18			.5	.5	2	2	.5	17	18
19			.5	.5	2	2	.5	17	18
20			.5	.5	2	2	.5	17	18
21			.5	.5	2	2	.5	17	12
22			.5	.5	2	2	.5	17	12
23			.5	.5	2	2	.5	27	29
24			.5	.5	2	2		75	29
25			.5	.5	2	2		85	29

Daily discharge, in second-feet, of Cave Creek near Paradise, Ariz., for the year ending September 30, 1923—Continued

Day	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Aug.	Sept.
26			0.5	0.5	2	2		50	29
27			.5	.5	2	2		41	29
28			.5	.5	2	2		41	19
29	1		.5		2	2		41	12
30	1		.5		2	2		49	8
31			.5		2			400	

NOTE.—Dry on days for which no discharge is given, except Oct. 8-26, Dec. 7-15, May 23 to June 9 which had a trace of water.

Monthly discharge of Cave Creek near Paradise, Ariz., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	[a] T.	0	0	0
November	1	0	0.07	4.2
December	1	0	.16	9.8
January	1	0.5	.71	43.7
February	.5	.5	.5	27.8
March	13	.5	2.21	136
April	2.5	2	2.15	128
May	2	T.	.70	43.0
June	T.	0	0	0
August	400	0.5	44.7	2750
September	130	8	37.0	2200
The year	400	0	7.38	5340

[a] Trace of water.

CAVE CREEK CANAL NEAR PARADISE, ARIZ.

LOCATION.—In SW. ¼ SE. ¼ sec. 34, T. 17 S., R. 31 E., at Portal ranger station of United States Forest Service, 750 feet below head of canal, and 8 miles by road southeast of Paradise, Cochise County.

RECORDS AVAILABLE.—October 14, 1919, to September 30, 1923.

GAGE.—Vertical staff on left bank; read by Mrs. Alice Scholefield.

DISCHARGE MEASUREMENTS.—Made by wading near gage.

CHANNEL AND CONTROL.—Earth section. Bed composed of small gravel.

DIVERSIONS.—Above all diversions from canal.

ACCURACY.—Stage-discharge relation continually changing. 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 fair.

COOPERATION.—Records furnished by University of Arizona, Prof. G. E. P. Smith, irrigation engineer.

Canal diverts water from left bank of Cave Creek in SE. ¼ SW. ¼ sec. 34, T. 17 S., R. 31 E., for irrigating 113 acres near Portal ranger station. When sufficient water is available, 176 additional acres are irrigated. A part of the water for this additional area is diverted from Cave Creek, below the gaging station on Cave Creek, to Cave Creek Canal through a secondary carrier known as Portal-Reay ditch. Water carried by Portal-Reay ditch does not pass the gaging station on Cave Creek Canal.

Discharge measurements of Cave Creek Canal near Paradise, Ariz., during the year ending September 30, 1923

[Made by H. C. Schwalen]

Date	Gage height	Discharge
	Feet	*Scc.-ft.*
Jan. 10	7.36	0.3
Mar. 8	7.30	.2
Aug. 26	7.55	2.76

Daily discharge, in second-feet, of Cave Creek Canal near Paradise, Ariz., for the year ending September 30, 1923

Day	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	July	Aug.	Sept.
1		4.5	0.5		1	2.5	2.5		2.5	
2		4.5	.5		1	2.5	2.5		2	1
3		4.5			1.5	2.5	2.5		1.5	1
4		4.5			1.5	2.5	2.5		1.5	1
5		4.5				2.5	2.5		3	1
6		4.5				2.5	2.5		5	1
7		5.5				2.5	2.5		6.5	
8		5.5			.5	4.5	2.5		10	
9		5.5			4	5.5	2.5		5	
10		5.5				5.5	2.5		5	
11		4.5				5.5	2.5		5	
12		2			1.5	5.5	2.5		3.5	
13		2.5			2	5.5	2.5		3.5	
14		2.5			4	5.5	4			
15		2.5			3	5.5	2.5			
16		2.5			2.5	5.5	2.5		3.5	
17		2			2.5	5.5	2.5		5	
18		2			2.5	5.5	2.5		6.5	
19		1			2.5	5.5	2.5		6.5	
20		1			2.5	5.5	1		6.5	
21		1			2.5	5.5	1		6.5	4
22		1		1	3	5.5	1		6.5	1.5
23		1		1	3	5.5	1		6.5	4
24		1		1	3	4			6.5	
25		.5		1	3	4				
26		.5		1	3	4			3.5	
27		.5		1	3	4			3.5	
28		.5		1	3	4			3.5	4
29		.5			3	4			3.5	4
30	5.5	.5			3	4		1	5	4
31		.5			2.5			3		

NOTE.—Trace of water only Jan. 3-27. Canal dry on other days where no record is given.

Monthly discharge of Cave Creek Canal near Paradise, Ariz., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
November	5.5	0	.18	11
December	5.5	.5	2.55	157
January	.5	0	.33	2
February	1	0	.25	14
March	4	0	2.08	128
April	5.5	2.5	4.41	262
May	4	0	1.71	105
July	3	0	.13	8
August	10	0	4.11	253
September	4	0	.88	52
The year	10	0	1.37	992

EAST TURKEY CREEK AT PARADISE, ARIZ.

LOCATION.—In SW. ¼ sec. 19, T. 17 S., R. 31 E., at Paradise, Cochise County.

DRAINAGE AREA.—8 square miles (measured on topographic map).

RECORDS AVAILABLE.—August 4, 1919, to September 30, 1923.

GAGE.—Vertical enamel staff on right bank 300 feet downstream from post office; read by John Hancock.

DISCHARGE MEASUREMENTS.—Made by wading near gage.

CHANNEL AND CONTROL.—Bed composed of boulders and gravel. Control formed by concrete wall extending at an angle across the channel. Channel fairly uniform in cross section.

EXTREMES OF DISCHARGE.—Maximum mean daily discharge for year, 60 second-feet, August 25; dry during greater part of year.

1919–1923: Maximum mean daily discharge, 170 second-feet, August 18, 1921; minimum discharge, dry for periods of each year.

DIVERSIONS.—Several small diversions above station, most of the water returning to the creek above station.

ACCURACY.—Stage-discharge relation fairly permanent. Rating curve poorly defined. Gage read to nearest two-hundredths twice a week and oftener during floods. Daily discharge ascertained by applying gage height to rating table and interpolating for days when gage was not read. Records fair.

COOPERATION.—Records furnished by University of Arizona, Prof. G. E. P. Smith, irrigation engineer.

Discharge measurements of East Turkey Creek at Paradise, Ariz., during the year ending September 30, 1923

[Made by H. C. Schwalen]

Date	Gage height	Discharge
	Feet	*Sec.-ft.*
Mar. 8	0.52	0.90
Aug. 26	.38	15.9

Daily discharge, in second-feet, of East Turkey Creek at Paradise, Ariz., for the year ending September 30, 1923

Day	Nov.	Dec.	Feb.	Mar.	July	Aug.	Sept.
1				1			16
2				2			13
3				2		8	16
4		6		1		.5	13
5		1		1		.5	50
6		.5		1		.5	20
7		.5		1	2	11	
8		.5		1			
9		.5		6		1	
10		.5		2		2	
11		.5		1		1	
12		.5		1		1	.5
13					3	.5	
14						.5	
15						2	
16					2	1	
17						1	
18						1	
19						.5	
20						.5	

Daily discharge, in second-feet, of East Turkey Creek at Paradise, Ariz., for the year ending September 30, 1923—Continued

Day	Nov.	Dec.	Feb.	Mar.	July	Aug.	Sept.
21						0.5	
22						.5	
23			2			.5	
24			1			.5	
25			3			60	
26			3			25	
27			1			13	
28			.5			16	
29						13	
30	0.5					16	
31						40	

NOTE.—Dry on days for which no discharge is given, except Dec. 1–3, 13–15, Mar. 13 to May 22, July 20–28, Aug. 8, Sept. 7–11, and 13–30 for which days there was a trace of water.

Monthly discharge of East Turkey Creek at Paradise, Ariz., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
November	0.5	0	0.02	1.2
December	6.0	0	0.34	20.9
February	3.0	0	0.37	20.5
March	6.0	(a)	0.64	39.4
July	3.0	0	0.23	14.1
August	60	0	7.02	432
September	50	(a)	4.28	255
The year	60	0	1.08	783

[a] Trace of water.

GRAHAM CANAL NEAR SAFFORD, ARIZ.

LOCATION.—In NE. ¼ SW. ¼ sec. 5, T. 7 S., R. 26 E., near Hatfield ranch, a mile below intake, and 2 miles north of Safford, Graham County.

RECORDS AVAILABLE.—October 1, 1914, to September 30, 1915; December 30, 1920, to September 30, 1923.

GAGE.—Vertical staff on left bank 600 feet below waste gate; read by J. M. Hatfield.

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

CHANNEL AND CONTROL.—Bed composed of silt; frequently covered by deposits of sand; shifting. No well-defined control.

DIVERSIONS.—One diversion just above gage, irrigating 52 acres.

ACCURACY.—Stage-discharge relation not permanent. Standard rating curve well defined. Gage read twice a day to hundredths. Daily discharge ascertained by applying mean daily gage height to rating table. Shifting-control method used for entire year. Records good.

Canal diverts water from right side of Gila River in the NW. ¼ sec. 9, T. 7 S., R. 26 E., for irrigating 2,577 acres near Safford.

Discharge measurements of Graham Canal near Safford, Ariz., during the year ending September 30, 1923

[Made by H. D. Empie]

Date	Gage height	Discharge	Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Oct. 4	4.84	7.1	Feb. 8	5.50	25.8	May 14	5.40	22.3
7	4.81	7.1	11	5.47	25.3	20	5.12	13.8
18	4.90	10.2	22	5.31	20.1	31	5.02	11.2
Nov. 3	4.90	8.5	Mar. 4	5.99	46.4	June 4	4.90	7.5
9	5.35	25.4	26	6.18	57	9	4.88	6.4
20	5.34	20.5	Apr. 1	5.76	38.1	20	4.72	3.3
Dec. 5	5.98	57	9	5.56	30.5	July 3	4.78	5.0
Jan. 4	6.26	66	25	5.52	30.9	Sept. 4	5.75	44.4
11	5.40	25.1	May 2	5.30	21.9			
Feb. 2	5.65	36.4	7	5.23	17.9			

Daily discharge, in second-feet, of Graham Canal near Safford, Ariz., for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	7	8	36	42	38	34	42	25	7	4	-------	42
2	6	8	29	42	36	38	36	20	7	4	-------	42
3	6	8	44	51	37	45	38	18	7	3	-------	47
4	4	10	45	64	32	47	36	17	7	3	-------	42
5	4	10	58	56	26	50	34	17	5	14	-------	40
6	5	12	55	46	11	52	36	16	5	14	-------	60
7	5	14	55	25	28	45	36	16	5	20	-------	47
8	4	20	57	37	28	45	30	15	4	28	-------	11
9	5	22	57	45	23	45	28	15	4	16	-------	-------
10	6	18	-------	32	26	50	26	15	4	8	-------	-------
11	6	20	-------	20	25	58	23	15	4	8	-------	-------
12	6	16	-------	25	23	58	21	15	5	16	-------	19
13	6	16	-------	30	23	50	20	16	5	26	-------	29
14	7	17	-------	30	23	47	29	16	5	-------	-------	56
15	6	18	-------	25	23	58	29	15	5	-------	-------	49
16	11	19	-------	25	23	58	29	15	5	-------	-------	51
17	10	19	-------	24	26	60	29	15	5	-------	-------	51
18	7	24	-------	24	23	66	29	11	5	-------	21	51
19	10	23	18	22	20	63	29	12	5	-------	47	49
20	10	21	44	19	21	60	29	12	5	-------	57	54
21	10	20	49	19	20	47	32	11	4	-------	42	54
22	10	20	51	19	21	40	30	12	4	-------	34	49
23	11	21	54	21	21	45	30	11	4	-------	48	46
24	12	23	51	21	20	32	30	11	4	-------	47	65
25	11	22	53	21	20	47	29	11	4	-------	40	46
26	11	24	53	19	32	58	30	9	4	-------	52	51
27	9	24	50	23	36	42	29	9	4	-------	47	46
28	9	23	50	34	34	38	29	9	4	-------	36	39
29	9	25	47	40	-------	39	26	9	3	-------	4	31
30	11	34	50	40	-------	46	26	9	3	-------	3	29
31	9	-------	49	38	-------	34	-------	8	-------	-------	62	-------

NOTE.—Dry on days for which no discharge is given.

Monthly discharge of Graham Canal near Safford, Ariz., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	12	4	7.8	480
November	34	8	18.6	1,110
December	58	0	34.0	2,090
January	64	19	31.6	1,940
February	38	11	25.7	1,430
March	66	32	48.3	2,970
April	42	20	30.0	1,790
May	25	8	13.7	842
June	7	3	4.7	280
July	28	0	5.3	326
August	62	0	17.4	1,070
September	65	0	39.9	2,370
The year	66	0	23.1	16,700

SMITHVILLE CANAL NEAR THATCHER, ARIZ.

LOCATION.—In NW. ¼ sec. 35, T. 6 S., R. 25 E., three-quarters of a mile below intake and 1½ miles north of Thatcher, Graham County.

RECORDS AVAILABLE.—October 1, 1914, to September 30, 1915; December 23, 1920, to September 30, 1923.

GAGE.—Vertical enamel staff on left bank 300 feet below waste gate; read by Patricia Vásquez.

DISCHARGE MEASUREMENTS.—Made from footbridge at gage.

CHANNEL AND CONTROL.—Uniform section. Banks vertical. No well-defined control.

DIVERSIONS.—None.

ACCURACY.—Stage-discharge relation not permanent. Standard rating curve well defined. Gage read to hundredths twice a day. Daily discharge ascertained by applying mean daily gage height to rating table; shifting-control method used for entire year. Records good.

Canal diverts water from left side of Gila River in NE. ¼ sec. 35, T. 6 S., R. 25 E., for irrigating 1,760 acres near Pima.

Discharge measurements of Smithville Canal near Thatcher, Ariz., during the year ending September 30, 1923

[Made by H. D. Empie]

Date	Gage height	Discharge	Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Oct. 3	5.22	6.4	Feb. 23	6.02	19.1	June 20	5.50	4.8
11	5.22	6.5	Mar. 6	6.76	36.5	July 2	5.40	3.3
20	5.50	11.7	27	6.66	32.9	6	5.41	3.3
Nov. 2	5.60	13.6	Apr. 3	6.46	29.8	16	6.23	18.3
9	6.00	26.7	10	6.56	33.4	Aug. 2	5.35	.4
21	5.78	20.7	May 2	5.90	14.4	8	6.22	19.6
Dec. 5	6.70	45.7	21	5.95	13.8	24	7.42	56
Jan. 3	6.15	28.9	June 2	5.70	8.8	Sept. 7	6.64	24.0
31	6.15	25.0	9	5.66	7.1	18	6.24	11.3
Feb. 6	6.14	24.2	14	5.60	5.9	28	6.56	23.6

Daily discharge, in second-feet, of Smithville Canal near Thatcher, Ariz., for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	6	16	45	37	27	27	21	17	8	3	0.4	29
2	6	14	50	34	26	26	26	17	7	3	.3	27
3	6	14	46	31	23	24	25	19	7	3	.3	21
4	7	16	44	32	27	26	25	16	8	3	4	15
5	8	18	46	30	23	26	27	16	8	3	.2	5
6	8	20	46	26	23	36	20	16	7	3	3	37
7	9	20	46	33	23	35	22	16	7	24	16	21
8	7	20	49	35	23	38	18	14	7	26	18	12
9	6	21	46	25	23	35	17	12	6	10	13	10
10	6	24	46	25	21	38	26	15	6	4	25	15
11	6	24	44	31	22	41	23	11	7	4	32	9
12	6	25	46	30	21	44	20	12	5	4	39	13
13	6	22	46	29	20	42	20	12	5	39	19	8
14	6	18	46	32	22	38	20	16	5	47	13	6
15	7	18	46	32	21	36	17	13	5	32	27	13
16	8	21	46	27	19	27	18	13	4	26	26	8
17	11	26	46	20	19	17	18	12	5	23	36	5
18	8	24	49	17	14	17	20	12	4	22	21	15
19	10	29	48	22	14	30	21	11	4	20	34	14
20	10	24	41	28	20	21	20	11	4	20	39	9

Daily discharge, in second-feet, of Smithville Canal near Thatcher, Ariz., for the year ending September 30, 1923—Continued

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
21	12	21	40	28	17	28	18	11	4	24	36	4
22	10	21	41	22	16	28	20	9	4	51	27	4
23	14	33	43	25	18	22	22	9	4	26	44	2
24	10	27	41	27	21	25	18	9	4	23	49	32
25	10	26	41	26	20	22	20	11	4	7	40	12
26	10	32	45	33	20	34	19	9	4	5	41	10
27	10	32	41	30	25	28	17	8	4	15	32	14
28	10	27	40	27	28	20	18	7	3	3	27	37
29	11	25	37	28	-------	19	18	7	3	13	26	28
30	12	31	34	27	-------	22	18	6	3	7	24	30
31	16	-------	34	27	-------	19	-------	7	-------	19	24	-------

Monthly discharge of Smithville Canal near Thatcher, Ariz., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	16	6	8.8	541
November	33	14	23.0	1,370
December	50	34	43.8	2,690
January	37	17	28.3	1,740
February	28	14	21.4	1,190
March	44	17	28.7	1,760
April	27	17	20.4	1,210
May	19	6	12.1	744
June	8	3	5.2	309
July	51	3	16.5	1,010
August	49	.2	23.7	1,460
September	37	2	15.5	922
The year	51	.2	20.7	14,900

DODGE-NEVADA CANAL NEAR PIMA, ARIZ.

LOCATION.—In NW. ¼ SE. ¼ sec. 18, T. 6 S., R. 25 E., a mile below intake and 1½ miles north of Pima, Graham County.

RECORDS AVAILABLE.—December 31, 1920, to September 30, 1923.

GAGE.—Vertical staff on right bank, half a mile below waste gate, and 200 feet upstream from siphon at county highway crossing; read by Hubert Crockett.

DISCHARGE MEASUREMENTS.—Made by wading at gage.

CHANNEL AND CONTROL.—Bed composed of silt. Banks vertical. Control affected by siphon 200 feet below gage.

DIVERSIONS.—One diversion above gage, irrigating 14½ acres.

ACCURACY.—Stage-discharge relation not permanent. Rating curves well defined. Gage read to nearest two-hundredths twice a day. Daily discharge ascertained by applying mean daily gage height to rating table. Records good.

Canal diverts water from left side of Gila River in the NW. ¼ sec. 20, T. 6 S., R. 25 E., for irrigating 1,250 acres near Pima.

Discharge measurements of Dodge-Nevada Canal near Pima, Ariz., during the year ending September 30, 1923

[Made by H. D. Empie]

Date	Gage height	Discharge	Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Oct. 3	0.86	3.7	Feb. 9	1.62	13.6	May 15	1.18	9.1
Nov. 2	1.06	6.2	24	1.91	28.8	June 2	1.16	6.4
11	1.32	12.3	Mar. 3	1.54	21.9	July 2	.88	2.3
Dec. 2	2.34	33.5	Apr. 3	1.38	17.8	Aug. 2	1.16	10.2
12	2.22	30.8	10	1.44	19.4	29	1.14	11.4
Jan. 3	1.68	19.5	24	1.33	16.0	Sept. 7	.72	.90
9	1.71	20.9	May 3	1.47	17.2	19	.72	.80
31	1.57	16.5	9	1.18	9.7			

Daily discharge, in second-feet, of Dodge-Nevada Canal near Pima, Ariz., for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	4	5	11	17	13	26	17	14	6	3	-------	5
2	4	5	33	17	18	26	18	12	6	3	-------	3
3	4	5	28	18	9	26	18	14	6	3	15	2
4	4	5	20	18	-------	29	19	14	6	3	21	1
5	4	5	24	19	-------	29	16	14	6	3	9	1
6	4	5	28	18	-------	25	17	11	6	3	6	2
7	4	6	29	17	2	24	17	10	5	8	14	2
8	4	7	33	16	3	24	17	9	5	4	30	2
9	4	7	33	14	7	24	17	9	5	4	48	2
10	4	7	32	13	13	27	16	12	6	3	43	2
11	4	8	29	14	14	32	16	11	6	3	27	2
12	4	7	28	19	14	53	14	10	5	4	-------	2
13	4	8	28	19	15	30	9	11	4	8	-------	2
14	4	8	28	19	15	29	10	12	4	5	-------	2
15	4	8	27	18	17	27	15	10	4	2	-------	2
16	5	8	27	18	15	27	19	9	3	-------	-------	2
17	5	8	28	16	13	30	21	9	3	-------	-------	2
18	4	8	29	17	14	31	21	9	3	-------	-------	2
19	4	8	21	16	8	33	20	11	3	-------	-------	2
20	4	8	23	17	8	26	16	11	3	-------	-------	2
21	4	8	22	17	14	26	16	12	4	-------	-------	2
22	4	9	23	23	23	29	16	12	4	-------	-------	2
23	4	9	24	30	24	30	16	9	4	-------	-------	2
24	4	8	30	34	24	31	16	8	3	-------	13	2
25	4	11	35	35	23	40	16	-------	3	-------	12	-------
26	4	11	29	32	22	43	16	-------	3	-------	12	-------
27	4	11	26	27	22	35	17	7	3	-------	12	-------
28	4	11	21	27	25	22	17	7	3	-------	12	-------
29	5	11	17	21	-------	19	18	7	3	-------	12	-------
30	5	11	16	19	-------	18	16	7	3	-------	11	-------
31	5	-------	17	16	-------	17	-------	8	-------	-------	8	-------

NOTE.—Dry on days for which no discharge is given.

Monthly discharge of Dodge-Nevada Canal near Pima, Ariz., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	5	4	4.2	258
November	11	5	7.9	470
December	35	11	25.8	1,590
January	35	14	20.0	1,230
February	25	0	13.4	744
March	53	17	28.6	1,760
April	20	9	16.6	988
May	14	0	9.6	590
June	6	3	4.3	256
July	8	0	1.9	117
August	48	0	9.8	603
September	5	0	1.7	101
The year	53	0	12.0	8,710

CURTIS-KEMPTON CANAL NEAR EDEN, ARIZ.

LOCATION.—In SE. ¼ NE. ¼ sec. 4, T. 6 S., R. 24 E., on Christensen ranch, 2 miles below intake, and 1½ miles southeast of Eden, Graham County.

RECORDS AVAILABLE.—December 26, 1920, to September 30, 1923.

GAGE.—Vertical staff on left bank at ranch house 600 feet below waste gate; read by Mrs. William Carpenter.

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

CHANNEL AND CONTROL.—Bed composed of silt. Banks vertical. Control affected by two checks just below gage.

DIVERSIONS.—Three diversions above gage, irrigating 87 acres.

ACCURACY.—Stage-discharge relation not permanent. Rating curves well defined. Gage read to half-tenths twice a day. Daily discharge ascertained by applying mean daily gage height to rating table. Record good.

Canal diverts water from right side of Gila River in the NW. ¼ sec. 12, T. 6 S., R. 24 E., for irrigating 1,650 acres near Eden.

Discharge measurements of Curtis-Kempton Canal near Eden, Ariz., during the year ending September 30, 1923

[Made by H. D. Empie]

Date	Gage height	Discharge	Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Oct. 3	4.20	6.2	Feb. 24	4.83	16.7	June 2	4.15	9.3
Nov. 2	5.18	8.2	Mar. 3	4.90	21.1	8	4.15	8.6
Dec. 2	5.58	32.7	29	4.90	21.2	July 2	3.87	4.9
Jan. 3	5.00	15.2	Apr. 3	6.15	7.6	Aug. 14	4.25	6.3
9	4.75	10.9	11	4.72	20.4	14	4.65	14.0
31	5.50	28.5	11	4.65	18.1	Sept. 7	5.64	38.5
Feb. 7	5.67	30.9	May 3	4.47	14.2	19	5.15	21.7
9	5.30	23.4	23	4.28	10.0			

Daily discharge, in second-feet, of Curtis-Kempton Canal near Eden, Ariz., for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	6	11	43	22	24	20	19	6	6	4	-------	-------
2	5	9	33	15	31	24	18	13	6	4	-------	-------
3	6	11	30	15	28	20	32	14	6	4	-------	-------
4	6	8	34	14	33	19	26	14	6	4	-------	-------
5	6	7	33	13	35	21	10	12	6	4	-------	5
6	6	9	28	13	32	19	16	14	6	4	-------	-------
7	6	13	24	13	28	18	19	12	6	7	-------	-------
8	6	9	21	13	26	20	17	13	6	13	-------	8
9	5	8	28	10	20	19	20	9	6	10	-------	-------
10	6	6	36	10	18	21	19	11	31	4	-------	-------
11	5	9	37	8	18	23	18	12	6	4	9	-------
12	6	9	32	8	16	34	16	10	6	4	18	-------
13	6	9	35	12	5	23	15	15	6	12	14	-------
14	6	9	32	15	-------	29	14	40	6	19	9	-------
15	6	8	26	18	-------	25	15	10	5	3	6	-------
16	6	11	26	19	-------	28	16	11	5	-------	13	-------
17	5	13	26	15	-------	32	33	13	5	-------	7	-------
18	11	16	19	20	-------	32	23	10	17	-------	6	-------
19	9	13	18	23	22	32	11	10	6	-------	4	21
20	8	9	26	20	24	32	15	10	5	-------	7	20
21	6	14	28	22	20	23	16	9	5	-------	2	-------
22	6	28	15	22	14	19	15	9	5	-------	-------	25
23	6	28	15	16	15	32	14	8	5	-------	-------	26
24	6	6	15	20	15	34	15	8	5	-------	-------	31
25	7	6	17	16	26	31	14	8	5	-------	18	24

Daily discharge, in second-feet, of Curtis-Kempton Canal near Eden, Ariz., for the year ending September 30, 1923—Continued

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
26	8	18	17	27	23	37	15	8	4	-------	-------	8
27	6	37	16	25	20	31	14	7	5	-------	-------	-------
28	6	37	15	12	28	28	14	12	4	-------	-------	-------
29	8	39	17	25	-------	22	14	6	4	-------	-------	-------
30	11	41	19	26	-------	21	12	6	4	-------	-------	-------
31	9	-------	22	25	-------	20	-------	6	-------	-------	-------	-------

NOTE.—Dry for days on which no discharge is given.

Monthly discharge of Curtis-Kempton Canal near Eden, Ariz., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	11	5	6.6	406
November	41	6	15.0	893
December	43	15	25.3	1,560
January	27	8	17.2	1,060
February	35	0	18.6	1,030
March	37	18	25.5	1,570
April	33	10	17.2	1,020
May	40	6	11.2	689
June	31	4	6.6	393
July	19	0	3.2	197
August	18	0	3.6	221
September	32	0	7.5	446
The year	43	0	13.1	9,480

FORT THOMAS CONSOLIDATED CANAL AT ASHURST, ARIZ.

LOCATION.—In NE. ¼ SE. ¼ sec. 30, T. 5 S., R. 24 E., 2 miles below intake, half a mile east of State highway, and 1 mile southeast of Ashurst, Graham County.

RECORDS AVAILABLE.—December 26, 1920, to September 30, 1923.

GAGE.—Vertical staff on right bank half a mile below waste gate; read by Tom Hundley.

DISCHARGE MEASUREMENTS.—Made from footbridge at gage.

CHANNEL AND CONTROL.—Bed consists of silt and frequently covered by moss; shifting. No well-defined control.

DIVERSIONS.—None.

ACCURACY.—Stage-discharge relation not permanent. Rating curves well defined. Gage read to half-tenths twice a day. Daily discharge ascertained by applying mean daily gage height to rating table. Records good.

Canal diverts water from left side of Gila River in the NW. ¼ sec. 4, T. 6 S., R. 24 E., for irrigating 2,236 acres near Fort Thomas.

Discharge measurements of Fort Thomas Consolidated Canal at Ashurst, Ariz., during the year ending September 30, 1923

[Made by H. D. Empie]

Date	Gage height	Discharge	Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Oct. 2	7.96	4.3	Mar. 3	9.50	49.1	June 8	8.60	3.7
16	7.96	3.6	18	9.82	63	July 2	8.30	2.1
Dec. 8	10.12	69	Apr. 3	8.32	11.4	18	8.71	23.1
Jan. 3	9.50	45.2	May 3	8.40	11.4	Aug. 4	7.66	2.4
9	9.20	35.4	23	8.50	7.3	Sept. 1	9.15	38.9
26	8.45	13.3	June 2	8.65	4.6	23	8.22	13.0
31	8.62	16.8						

Daily discharge, in second-feet, of Fort Thomas Consolidated Canal at Ashurst, Ariz., for the year ending September 30, 1923

Day	Oct.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	7	------	46	23	48	11	8	4	2	-------	39
2	6	-------	46	29	54	13	8	4	2	-------	33
3	5	-------	46	29	50	12	10	6	2	-------	23
4	5	29	43	31	56	13	12	6	2	-------	17
5	5	61	43	36	65	12	12	6	2	-------	23
6	5	63	39	31	65	20	12	6	1	-------	58
7	5	46	37	29	71	16	10	4	1	41	25
8	5	63	43	59	69	14	9	4	0.5	44	-------
9	5	63	36	26	69	14	7	4	4	8	-------
10	5	69	26	22	69	14	12	2	.5	17	28
11	5	69	20	23	73	17	8	2	.2	20	45
12	5	67	20	26	58	22	12	4	.8	31	31
13	3	67	23	50	29	17	10	2	69	31	39
14	4	65	23	56	25	20	12	2	38	2	41
15	4	65	21	45	43	17	10	2	-------	-------	37
16	5	59	23	46	36	17	9	4	5	-------	17
17	5	65	21	45	39	14	8	4	24	2	29
18	4	71	14	46	45	14	9	4	23	.3	31
19	4	65	12	33	39	13	7	4	-------	-------	34
20	4	57	14	26	36	12	7	4	-------	-------	26
21	5	55	10	24	38	13	6	4	36	24	21
22	7	55	9	20	39	12	6	2	28	28	27
23	17	54	10	20	36	12	2	2	-------	33	61
24	17	61	13	56	36	12	4	2	-------	20	70
25	31	61	10	34	36	12	4	2	-------	41	37
26	31	63	12	38	48	12	4	4	-------	56	17
27	31	59	12	33	54	12	4	4	-------	29	11
28	31	54	12	43	19	10	4	4	-------	31	8
29	2	52	17	-------	14	9	4	4	-------	28	6
30	-------	44	18	-------	16	15	4	2	-------	16	1
31	-------	46	20	-------	43	-------	2	-------	23	36	-------

NOTE.—Dry on days for which no discharge is given.

Monthly discharge of Fort Thomas Consolidated Canal at Ashurst, Ariz., for the year ending September 30 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	31	0	8.6	529
December	71	0	53.2	3,270
January	46	9	23.8	1,460
February	59	20	35.0	1,940
March	71	14	45.7	2,810
April	22	9	14.0	833
May	12	2	7.6	467
June	6	2	3.6	214
July	69	0	8.5	523
August	56	0	17.4	1,070
September	70	0	27.5	1,640
The year	71	0	20.4	14,800

SAN PEDRO RIVER NEAR FAIRBANK, ARIZ.

LOCATION.—In T. 20 S., R. 21 E., unsurveyed, on old Spanish grant at ranch house of Boquillas Land & Cattle Co., 1½ miles south of Fairbank, Cochise County, and 4 miles below Charleston dam site.

DRAINAGE AREA.— 1,300 square miles.

RECORDS AVAILABLE.—September 28, 1912, to September 30, 1923. January 27, 1904, to August 31, 1906, and October 8, 1910, to November 15, 1911, for station at Charleston. November 15, 1911, to September 28, 1912, for station at diversion dam of Boquillas Land & Cattle Co.

GAGE.—Vertical and inclined staff on right bank just upstream from ford leading to ranch house; read by Mrs. Fred Miller.

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

CHANNEL AND CONTROL.—Bed composed of sand and gravel; shifting. Banks high and steep. Channel fairly straight with considerable fall. At low stages channel bears away from gage, and a ditch has to be maintained from gage to river. No well-defined control.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 14.0 feet at 8.30 a. m. July 14 (discharge, 4,850 second-feet); minimum stage, 9.1 feet January 27 (discharge, 0.5 second-foot).

1912–1923: Maximum stage, 26.0 feet at 5 p. m. December 22, 1915 (discharge not determined); minimum discharge, that of January 27, 1923.

DIVERSIONS.—Boquillas Land & Cattle Co. divert at a dam a mile above station for irrigation. Total area irrigated not known.

REGULATION.—None.

ACCURACY.—Stage-discharge relation not permanent. Rating curves well defined below 2,000 second-feet; extended above. Gage read to hundredths once a day and oftener during flood periods. Daily discharge ascertained by applying mean daily gage height to rating table. Shifting-control method used for entire year. Records good.

Discharge measurements of San Pedro River near Fairbank, Ariz., 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.*
Oct. 13	J. H. Gardiner	9.26	3.4	May 17	H. C. Schwalen	9.29	2.1
Nov. 10	do	9.29	4.4	July 8	J. H. Gardiner	9.50	22.7
28	do	9.40	10.7	20	Rice and Schwalen	9.60	35.0
Jan. 3	do	9.42	22.7	Aug. 3	J. H. Gardiner	9.82	140
3	do	9.46	26.7	22	do	9.53	63
Feb. 3	do	9.35	6.5	23	do	9.51	56
Mar. 5	do	9.40	9.4	28	H. C. Schwalen	9.48	61
Apr. 16	do	9.20	4.4				

Daily discharge, in second-feet, of San Pedro River near Fairbank, Ariz., for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	4	8	20	26	10	10	15	6	2	7	46	121
2	4	5	20	26	10	14	8	6	2	7	42	61
3	4	5	20	33	10	14	8	2	2	7	96	81
4	4	5	21	33	7	10	8	2	2	7	81	59
5	4	5	21	26	7	10	8	2	2	7	133	27
6	4	5	21	32	3	10	8	2	2	23	373	21
7	4	5	22	31	5	7	9	3	3	36	178	46
8	4	5	17	25	5	10	9	3	3	18	105	20
9	4	5	17	29	7	11	9	3	3	14	1,720	15
10	4	5	18	29	7	11	10	4	3	10	964	15
11	3	5	18	28	10	5	13	4	3	14	373	52
12	3	5	18	28	5	5	10	3	3	1,220	562	605
13	2	5	19	9	7	8	10	2	3	1,120	1,160	81
14	2	5	19	9	7	8	10	4	3	3,080	431	50
15	2	5	19	11	7	8	5	4	3	468	401	78
16	2	8	20	11	7	8	5	2	3	72	562	58
17	2	8	20	11	5	9	5	3	3	44	527	65
18	2	8	20	11	5	9	5	3	3	36	163	65
19	2	5	21	14	5	9	4	3	4	36	92	63
20	3	8	21	10	5	12	4	3	4	36	81	54

Daily discharge, in second-feet, of San Pedro River near Fairbank, Ariz., for the year ending September 30, 1923—Continued

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
21	3	11	21	14	5	12	4	2	4	362	105	44
22	5	11	22	13	10	13	6	4	4	231	59	44
23	5	11	22	10	7	13	6	4	4	85	58	50
24	3	11	22	9	5	13	6	4	4	145	272	42
25	3	11	23	12	10	10	5	2	4	58	108	67
26	5	15	23	6	10	14	5	2	4	36	154	48
27	5	15	23	.5	10	14	5	2	2	100	88	39
28	15	11	25	4	10	14	5	2	2	69	58	32
29	15	15	25	5	-------	14	2	2	4	45	58	31
30	15	19	25	11	-------	15	2	2	7	67	46	19
31	11	-------	26	11	-------	15	-------	2	-------	44	38	-------

Monthly discharge of San Pedro River near Fairbank, Ariz., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	15	2	4.8	295
November	19	5	8.2	488
December	26	17	20.9	290
January	33	0.5	17.0	1,050
February	10	5	7.2	400
March	15	5	10.8	664
April	15	2	7.0	417
May	6	2	3.0	184
June	7	2	3.2	190
July	3,080	7	242	14,900
August	1,720	38	298	18,300
September	605	15	68.4	4,070
The year	3,080	0.5	58.3	41,200

SANTA CRUZ RIVER AT TUCSON, ARIZ.

LOCATION.—In sec. 14, T. 14 S., R. 13 E., at Congress Street Bridge at Tucson, Pima County, 7 miles above Rillito Creek.

DRAINAGE AREA.—2,260 square miles (measured on topographic maps).

RECORDS AVAILABLE.—October 15, 1905, to September 30, 1923.

GAGE.—Staff gages painted on downstream side of each bridge abutment; read by J. O. Kenny.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of sand. Channels wide and shallow. Control shifts badly at all stages.

EXTREMES OF DISCHARGE.—Maximum discharge during year, 900 second-feet on August 26; dry most of the time.

1905–1923: Maximum stage, 9.8 feet, December 24, 1914 (discharge, about 9,000 second-feet); dry most of each year at this point.

DIVERSIONS.—Diversions above the station for irrigation, amounts unknown.

REGULATION.—None.

ACCURACY.—Stage-discharge relation continually changing. Rating curves poorly defined. Gage read to tenths several times a day during periods of flow. Daily discharge ascertained from discharge hydrographs prepared by applying each gage reading to rating table. Records fair.

COOPERATION.—Records furnished by University of Arizona, Prof. G. E. P. Smith, irrigation engineer.

Discharge measurements of Santa Cruz River at Tucson, Ariz., 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.*
July 13	W. E. Code	4.95	438	Aug. 2	W. E. Code	4.55	36
13	do	4.62	269	13	H. C. Schwalen	4.50	35
13	R. C. Rice	4.62	198	14	do	4.78	190
14	W. E. Code	4.75	167	16	do	5.02	369
23	Schwalen and Code	4.60	91	16	do	5.70	875
27	do	4.95	327	17	do	5.48	803
Aug. 1	W. E. Code	4.49	123	18	Schwalen and Code	4.85	137
1	do	5.02	391				

Daily discharge, in second-feet, of Santa Cruz River at Tucson, Ariz., for the year ending September 30, 1923

Day	July	Aug.	Sept.	Day	July	ug.	Sept.	Day	July	Aug.	Sept.
1		480	3	11		250		21	88	20	
2		25	2	12	220	660		22	57	2	
3		20	5	13	640	165		23	66	3	
4		3		14	310	220		24	10	2	
5	125			15	20	330		25		70	
6		310		16	10	610		26		900	
7		88		17	5	850		27	100	7	
8		2		18	4	170		28		5	
9		67		19	3	8		29	27	4	
10		430		20	2	3		30	280	3	
								31	230	3	

NOTE.—Dry on days for which no discharge is given.

Monthly discharge of Santa Cruz River at Tucson, Ariz., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
July	640	0	70.9	4,360
August	900	0	184	11,300
September	5	0	.3	18
The year	900	0	21.7	15,700

RILLITO CREEK NEAR TUCSON, ARIZ.

LOCATION.—In sec. 23, T. 13 S., R. 13 E., at highway bridge on Oracle road, 4 miles above confluence with Santa Cruz River, and 4 miles north of Tucson, Pima County.

DRAINAGE AREA.—897 square miles (measured on topographic maps).

RECORDS AVAILABLE.—January 12, 1911, to September 30, 1923; fragmentary.

GAGE.—Staff gages painted on downstream side of several bridge piers, set to same datum; read by Morgan Mason.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of sand which is constantly shifting. Control not well defined.

EXTREMES OF DISCHARGE.—Maximum mean daily discharge during year, 500 second-feet on July 14 and August 26; dry greater part of year.

1911–1923: Maximum stage occurred December 23, 1914 (discharge, greater than 16,000 second-feet); dry greater part of each year.

DIVERSIONS.—Flood water is diverted for irrigation above station, amount unknown.

REGULATION.—None.

ACCURACY.—Stage-discharge relation continually changing. Rating curves poorly defined. Gage read to tenths several times a day during periods of flow. Daily discharge ascertained from discharge hydrographs prepared by applying each gage reading to rating table. Records fair.

COOPERATION.—Records furnished by University of Arizona, Prof. G. E. P. Smith, irrigation engineer.

Discharge measurements of Rillito Creek near Tucson, Ariz., 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.*
July 12	W. E. Code	3.98	76	Aug. 16	H. C. Schwalen	4.55	330
12	do	3.22	5.5	16	do	4.30	288
14	do	4.05	132	17	do	3.10	13.7
22	do	4.12	171				

Daily discharge, in second-feet, of Rillito Creek near Tucson, Ariz., for the year ending September 30, 1923

Day	July	Aug.	Sept.	Day	July	Aug.	Sept.	Day	July	Aug.	Sept.
1		2	31	11		47		21			
2				12	50	42		22	400		
3		22		13	7	8		23	1		
4				14	500	226		24			
5				15	26	125		25		20	
6	2	60		16		420		26		500	
7	8	98		17		82		27	110	4	
8		150		18	27	8		28			
9		78		19	1	1		29			
10		44		20	19	2		30	100		
								31	12	130	

NOTE.—Dry for days on which no discharge is given.

Monthly discharge of Rillito Creek near Tucson, Ariz., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
July	500	0	40.7	2,500
August	500	0	66.7	4,100
September	500	0	1.0	60
The year	500	0	9.2	6,660

SALT RIVER NEAR ROOSEVELT, ARIZ.

LOCATION.—At site of former diversion dam for power canal, 10 miles above upper end of Roosevelt Reservoir, and 20 miles east of Roosevelt, Gila County.

DRAINAGE AREA.—4,222 square miles (measured by United States Bureau of Reclamation).

RECORDS AVAILABLE.—October 1, 1913, to September 30, 1923 (including all water diverted for the development of power but not flow of Tonto Creek); February 7, 1901, to December 9, 1907, at site of Roosevelt Dam (including flow of Tonto Creek).

1910–1913: Discharge at Roosevelt Dam computed from records of flow into and out of the reservoir (representing natural flow of Salt River, including Tonto Creek and water diverted for development of power).

GAGE.—Principal gage is vertical staff on left bank, bolted to concrete wall at head of canal. Temporary gages are used from time to time on account of the channel shifting away from the main gage.

DISCHARGE MEASUREMENTS.—Made from cable at dam site or by wading near dam site. Prior to January 19, 1916, when the dam was destroyed by flood, low-water measurements were made by wading below dam. Above wading stage, discharge was determined from elevation of water surface in reservoir, taking into account known outflow and computed inflow from other sources besides Salt River.

CHANNEL AND CONTROL.—Shifting sand and gravel. Prior to its destruction by flood on January 19, 1916, the dam formed a permanent control.

EXTREMES OF DISCHARGE.—Maximum stage reported, 8.7 feet September 18 (discharge, 11,800 second-feet); minimum stage, 2.56 feet July 5 (discharge, 145 second-feet).

1913–1923: Maximum mean daily discharge, 79,200 second-feet January 15, 1916; minimum discharge, that of July 5, 1923.

DIVERSIONS.—None of importance.

REGULATION.—None.

COOPERATION.—Daily-discharge records furnished by Salt River Valley Water Users' Association.

Daily discharge, in second-feet, of Salt River near Roosevelt, Ariz., for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	209	242	394	295	254	600	1,100	830	443	157	358	1,220
2	200	237	436	289	338	589	1,100	833	375	157	400	1,330
3	185	235	351	283	350	640	1,120	830	362	154	292	1,160
4	185	214	341	260	350	1,620	1,150	788	351	150	266	895
5	185	232	430	244	343	3,720	1,080	775	341	145	244	712
6	185	244	412	242	279	3,120	1,130	788	330	212	240	658
7	180	223	402	240	260	2,300	1,100	800	305	164	244	710
8	182	230	348	240	225	2,150	1,450	800	290	672	479	1,620
9	182	230	341	240	273	2,000	1,600	783	292	732	588	1,010
10	182	230	348	240	325	2,270	1,610	713	285	352	592	790
11	181	230	330	240	350	2,890	1,660	716	275	275	620	745
12	181	230	340	240	397	1,680	1,640	685	270	228	1,150	698
13	181	223	302	244	348	1,480	1,670	685	260	210	1,230	1,030
14	177	223	322	244	345	1,200	1,440	677	219	258	1,260	690
15	177	223	2,680	244	345	1,120	1,480	665	235	340	1,160	658
16	177	221	1,110	233	415	970	1,430	665	220	560	950	675
17	177	221	738	233	650	865	1,380	620	220	295	1,400	4,740
18	186	219	548	233	645	762	1,320	587	205	257	1,850	11,800
19	183	224	450	233	685	642	1,290	565	205	282	1,400	5,800
20	183	214	412	233	692	620	1,180	560	200	257	1,180	4,210
21	183	217	420	233	692	600	1,200	540	190	275	1,040	2,680
22	188	217	380	247	715	600	1,200	545	182	457	1,060	2,110
23	188	224	370	320	733	658	1,100	540	181	616	970	1,640
24	188	234	353	298	915	670	1,150	530	180	516	820	1,560
25	188	234	337	338	900	620	940	508	180	595	1,260	1,510
26	193	220	322	381	750	657	900	490	167	328	1,520	1,400
27	198	220	320	380	723	720	830	480	157	312	1,260	1,110
28	201	217	312	350	692	900	830	455	178	660	938	900
29	200	230	305	320	-------	1,080	830	465	168	507	890	800
30	214	298	283	309	-------	1,220	830	450	157	650	685	700
31	227	-------	289	295	-------	1,180	-------	442	-------	407	990	-------

Monthly discharge of Salt River near Roosevelt, Ariz., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	227	177	189	11,600
November	298	214	228	13,600
December	2,680	283	475	29,200
January	381	233	272	16,700
February	915	225	500	27,800
March	3,720	589	1,290	79,300
April	1,670	830	1,220	72,600
May	833	442	639	39,300
June	443	157	247	14,700
July	732	145	361	22,200
August	1,850	240	882	54,200
September	11,800	658	1,850	114,000
The year	11,800	145	680	494,000

TONTO CREEK NEAR ROOSEVELT, ARIZ.

LOCATION.—In sec. 14, T. 6 N., R. 10 E., 6 miles above upper end of Roosevelt Reservoir, and 15 miles northwest of Roosevelt, Gila County.

DRAINAGE AREA.—1,004 square miles (measured by United States Bureau of Reclamation).

RECORDS AVAILABLE.—October 1, 1913, to September 30, 1923.

GAGE.—Vertical staff on right bank. Location of gage is changed from time to time owing to shifting of control.

DISCHARGE MEASUREMENTS.—Made by wading at low stages, and by slope method at high stages.

CHANNEL AND CONTROL.—Bed composed of boulders and gravel. Control shifts at high stages. Banks well defined.

EXTREMES OF DISCHARGE.—Maximum mean daily discharge during year, 6,380 second-feet, March 5; minimum mean daily discharge, 2 second-feet, July 2–7 and August 8.

1913–1923: Maximum mean daily discharge, 15,800 second-feet, January 19, 1916; minimum discharge, 1 second-foot, parts of September and October, 1918, and June and July, 1921.

DIVERSIONS.—None of importance. The entire flow is discharged into Roosevelt Reservoir.

REGULATION.—None.

COOPERATION.—Records of daily discharge furnished by Salt River Valley Water Users' Association.

Daily discharge, in second-feet, of Tonto Creek near Roosevelt, Ariz., for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	10	9	161	44	30	210	120	60	12	3	35	120
2	10	9	134	47	205	254	100	55	8	2	27	120
3	10	9	134	47	400	447	100	57	8	2	27	76
4	9	13	320	47	350	626	140	51	8	2	27	55
5	9	13	245	40	350	6,380	140	51	8	2	22	37
6	9	11	149	40	300	3,440	120	50	8	2	22	25
7	5	11	117	40	275	2,410	140	85	8	2	6	42
8	5	11	92	40	275	1,760	140	40	8	3	2	33
9	5	11	80	40	225	2,230	120	40	8	5	115	37
10	5	11	70	40	290	1,540	120	40	8	3	13	25

Daily discharge, in second-feet, of Tonto Creek near Roosevelt, Ariz., for the year ending September 30, 1923—Continued

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
11	5	11	52	40	300	1,360	120	35	5	3	55	21
12	5	11	52	40	400	1,120	120	30	5	3	150	18
13	5	11	45	35	500	982	120	30	5	3	130	200
14	5	11	194	35	450	1,030	108	25	5	290	75	55
15	5	11	320	36	343	302	108	21	5	350	57	145
16	5	14	1,312	36	640	594	108	30	5	426	53	83
17	5	12	629	36	713	454	100	30	5	125	42	67
18	5	12	467	36	928	485	90	30	5	36	42	1,000
19	5	12	465	36	530	452	97	25	5	36	87	550
20	6	12	300	30	600	400	90	25	5	25	80	115
21	5	11	200	30	360	250	90	20	5	28	43	75
22	5	10	175	30	346	325	90	20	5	166	33	55
23	5	10	141	30	435	175	78	20	3	75	40	43
24	5	10	107	30	202	280	80	20	3	166	28	33
25	5	12	100	30	273	245	96	15	3	75	390	28
26	5	12	90	30	275	200	75	15	3	60	700	25
27	5	12	75	44	243	400	75	13	3	34	310	25
28	5	12	56	44	243	415	76	13	3	145	55	25
29	6	31	56	44	------	290	76	10	3	185	67	18
30	6	152	44	30	------	200	76	10	3	43	42	16
31	9	------	44	30	------	140	------	12	------	35	55	------

Monthly discharge of Tonto Creek near Roosevelt, Ariz., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	10	5	6.1	375
November	152	9	16.6	988
December	1,312	44	207	12,700
January	47	30	37.3	2,290
February	928	30	374	20,800
March	6,380	140	948	58,300
April	140	75	104	6,190
May	60	10	29.9	1,840
June	12	3	5.6	333
July	426	2	75.3	4,630
August	700	2	91.3	5,610
September	1,000	16	106	6,310
The year	6,380	2	166	120,000

VERDE RIVER NEAR McDOWELL, ARIZ.

LOCATION.—At dam site on Salt River Indian Reservation, three-quarters of a mile above junction with Salt River and 5½ miles below McDowell, Maricopa County.

DRAINAGE AREA.—6,000 square miles (furnished by United States Bureau of Reclamation).

RECORDS AVAILABLE.—August 14 to September 30, 1889; April 20, 1897, to November 11, 1899; January 1, 1901, to April 19, 1902; July 23-26, 1902; January 1, 1903, to September 30, 1923.

GAGE.—Painted on granite rocks on right bank.

DISCHARGE MEASUREMENTS.—Made from cable at gage or by wading. Since November, 1913, measurements have been made regularly three or four times a week by a resident hydrographer.

CHANNEL AND CONTROL.—Bed composed of sand. No well-defined control.

EXTREMES OF DISCHARGE.—Maximum mean daily discharge during year, 25,300 second-feet, September 19; minimum mean daily discharge, 88 second-feet, July 3.

1897–1923: Maximum mean daily discharge, 61,500 second-feet, November 27, 1905; minimum mean daily discharge, 32 second-feet, July 19 and 20, 1904.

DIVERSIONS.—Water is diverted 5 miles above station for use on Indian Reservation.

COOPERATION.—Daily-discharge record furnished by Salt River Valley Water Users, Association.

Daily discharge, in second-feet, of Verde River near McDowell, Ariz., for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	186	246	850	375	354	1,720	1,250	296	138	90	232	3,050
2	186	252	775	375	433	1,120	1,150	296	140	90	232	2,020
3	160	252	750	387	750	962	1,340	298	138	88	305	1,480
4	160	252	675	345	687	1,780	1,350	269	138	96	285	1,020
5	156	247	860	345	686	5,680	1,260	250	142	100	240	655
6	168	241	935	345	605	4,840	1,050	236	132	98	213	537
7	157	258	700	351	520	3,290	972	232	127	100	192	490
8	157	261	580	357	468	2,890	1,010	232	128	98	148	442
9	157	276	538	345	456	3,160	1,320	218	135	100	142	425
10	177	290	546	348	610	3,480	1,200	200	132	180	156	397
11	172	266	592	345	680	4,800	1,000	204	130	425	170	360
12	182	266	552	339	598	3,800	920	182	124	288	170	335
13	182	266	478	336	549	3,150	850	194	123	402	158	300
14	187	273	470	334	490	2,680	809	199	120	242	268	282
15	184	267	6,800	334	551	2,820	809	180	117	195	282	438
16	182	279	7,020	340	682	2,380	780	190	115	202	328	623
17	182	293	3,380	350	1,200	1,700	675	180	105	210	325	575
18	200	279	2,150	334	1,940	1,400	565	185	97	220	212	500
19	194	286	1,620	311	1,940	1,280	565	180	100	225	278	25,300
20	200	279	1,360	306	2,140	1,290	593	175	98	220	248	9,550
21	206	279	1,070	350	2,280	1,300	500	172	92	202	230	2,650
22	200	273	905	355	2,130	1,330	460	166	95	222	250	1,730
23	182	279	750	350	2,250	1,480	565	155	97	212	300	1,190
24	178	279	612	350	2,250	1,260	480	140	102	195	342	750
25	182	279	538	350	2,320	1,020	430	132	106	180	342	565
26	184	286	517	355	2,280	887	460	140	100	235	368	535
27	182	286	495	333	2,220	1,090	381	145	105	262	305	510
28	206	292	426	370	2,160	1,500	385	138	98	235	290	425
29	214	310	400	370	-------	1,440	350	135	102	210	315	380
30	228	588	377	343	-------	1,380	330	135	100	282	270	360
31	235	-------	382	337	-------	1,520	-------	135	-------	256	282	-------

Monthly discharge of Verde River near McDowell, Ariz., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	235	156	185	11,400
November	588	241	283	16,800
December	7,020	377	1,230	75,600
January	387	306	347	21,300
February	2,320	354	1,220	67,800
March	5,680	887	2,210	136,000
April	1,350	330	794	47,200
May	298	132	193	11,900
June	142	92	116	6,900
July	425	88	199	12,200
August	368	142	254	15,600
September	25,300	282	1,930	115,000
The year	25,300	88	742	538,000

AGUA FRIA RIVER NEAR GLENDALE, ARIZ.

LOCATION.—In sec. 28, T. 6 N., R. 1 E., at uncompleted masonry diversion dam of Beardsley irrigation project at Camp Dyer, 4 miles below mouth of Castle Creek, and 22 miles northwest of Glendale, Maricopa County.

DRAINAGE AREA.—1,420 square miles (measured on topographic maps).

RECORDS AVAILABLE.—November 10, 1910, to September 30, 1923.

GAGE.—Staff gage fastened to damaged stilling well on right bank at upstream face of dam; read by Will Benson and J. F. Tannehill.

DISCHARGE MEASUREMENTS.—Made from cable about one-third of a mile below gage or by wading.

CHANNEL AND CONTROL.—Channel composed of gravel and shifting sand. Principal control is formed by the unfinished portion of the masonry diversion dam and ledge on which it is built. This dam has a large gap or opening near the right bank through which the low and medium flow passes, a scour gate opening, 4 feet by 7½ feet, in the base near the left bank through which flow from the left channel passes at higher stages, and another gap or opening near the left bank that carries flow at still higher stages. At extreme high stages the stream flows over the entire broad crest of the dam which is at elevation 28.2 feet on the gage. Sand fills in and scours out of the crevices in the right gap of the dam continually with each rise in the river. The stage-discharge relation, therefore, is not permanent.

EXTREMES OF STAGE—Maximum stage recorded during the year, 18.0 feet at 11 a. m. September 18; minimum stage, 1.7 feet September 28–30.

1910–1923: Maximum stage, 33 feet November 27, 1919, determined from floodmarks (discharge, about 105,000 second-feet); minimum discharge, 0.6 second-foot September 24 to 26, 1919.

DIVERSIONS.—Water is diverted above gage for irrigating two or three small ranches; amount not known.

ACCURACY.—Stage–discharge relation variable. Not enough discharge measurements were made to define any rating. Gage read twice a day to hundredths October 1 to January 31 and to half-tenths February 1 to September 30. Daily discharge not determined. Gage-height record good.

COOPERATION.—Gage-height record furnished by Robert O. Beardsley.

Discharge measurements of Agua Fria River near Glendale, Ariz., during the year ending September 30, 1923

[Made by Gardiner and Rice]

Date	Gage height	Discharge
	Feet	*Sec.-ft.*
Aug. 9	2.23	2.6
17	2.05	8.2

Daily gage height, in feet, of Agua Fria River near Glendale, Ariz., for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	2.42	2.30	2.80	2.20	2.4	2.2	3.1	2.7	2.45	2.5	2.45	4.35
2	2.42	2.30	2.64	2.19	2.5	2.15	3.15	2.65	2.45	2.5	2.55	3.25
3	2.40	2.30	2.59	2.19	2.45	2.65	3.05	2.7	2.45	2.5	2.4	2.75
4	2.40	2.30	2.55	2.20	2.6	[a]11.0	3.0	2.6	2.45	2.5	2.3	2.65
5	2.39	2.30	2.51	2.20	2.5	6.5	3.0	2.6	2.5	2.5	2.3	2.55

[a] One reading, 1.30 p. m.

Daily gage height, in feet, of Agua Fria River near Glendale, Ariz., for the year ending September 30, 1923—Continued

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
6	2.38	2.30	2.48	2.20	2.3	5.25	3.0	2.6	2.5	2.5	2.25	2.4
7	2.38	2.31	2.38	2.21	2.3	4.75	2.95	2.6	2.5	2.5	2.2	2.45
8	2.36	2.32	2.34	2.21	2.3	4.5	2.9	2.6	2.5	2.5	2.2	2.4
9	2.33	2.32	2.30	2.20	2.3	4.25	2.95	2.55	2.5	2.5	2.2	2.4
10	2.32	2.31	2.26	2.20	2.55	4.25	2.95	2.6	2.45	2.5	2.4	2.4
11	2.30	2.31	2.22	2.20	2.35	4.25	2.9	2.55	2.45	2.5	2.3	2.35
12	2.30	2.31	2.22	2.20	2.25	4.0	2.9	2.55	2.45	2.5	5.85	2.4
13	2.30	2.30	2.20	2.20	2.2	3.75	2.9	2.6	2.45	2.5	2.7	8.35
14	2.30	2.30	3.50	2.20	2.25	3.75	2.8	2.55	2.45	3.0	2.35	3.15
15	2.30	2.30	3.10	2.20	2.3	3.5	2.8	2.55	2.45	3.75	2.15	2.75
16	2.29	2.30	2.82	2.20	2.2	3.5	2.8	2.55	2.45	2.6	2.25	2.55
17	2.28	2.32	2.64	2.20	2.55	3.5	2.75	2.55	2.45	2.45	2.1	2.7
18	2.28	2.32	2.50	2.20	2.9	3.5	2.75	2.55	2.45	2.4	2.1	13.5
19	2.28	2.32	2.37	2.20	2.85	3.25	2.75	2.5	2.45	2.4	2.0	4.5
20	2.27	2.30	2.32	2.20	2.9	3.0	2.8	2.5	2.45	2.4	2.85	3.5
21	2.29	2.29	2.30	2.20	2.55	3.05	2.75	2.5	2.5	2.4	3.25	2.7
22	2.29	2.26	2.29	2.20	2.55	3.2	2.7	2.5	2.5	2.4	2.65	2.3
23	2.28	2.24	2.28	2.20	2.55	3.15	2.7	2.5	2.5	2.4	2.5	2.15
24	2.28	2.23	2.26	2.20	2.6	3.15	-------	-------	2.5	-------	2.4	-------
25	2.29	2.22	2.24	2.24	2.55	3.2	-------	-------	2.5	-------	2.65	-------
26	2.30	2.22	2.24	2.24	2.45	3.1	2.7	2.5	-------	2.55	2.55	1.8
27	2.30	2.22	2.22	2.30	2.2	-------	2.7	2.5	-------	2.35	-------	1.75
28	2.30	2.26	2.22	2.30	2.3	2.7	2.7	2.5	2.5	2.35	-------	1.7
29	2.32	2.83	2.20	2.30	-------	2.85	2.65	2.5	2.5	3.5	2.4	1.7
30	2.32	3.03	2.20	2.25	-------	3.0	2.65	2.5	2.5	3.2	2.35	1.7
31	2.32	-------	2.20	2.25	-------	3.0	-------	2.5	-------	2.55	3.1	-------

BARREN FLAT BASIN

WEST TURKEY CREEK NEAR LIGHT, ARIZ.

LOCATION.—In SW. ¼ sec. 17, T. 18 S., R. 29 E., at Sanders ranch, 2½ miles south and 9½ miles east of Light, Cochise County.

DRAINAGE AREA.—19 square miles (measured on topographic maps).

RECORDS AVAILABLE.—July 30, 1919, to September 30, 1923.

GAGE.—Vertical enamel staff on right bank directly north of Sanders ranch; read by Sybil Sanders.

DISCHARGE MEASUREMENTS.—Measurements made by wading near gage.

CHANNEL AND CONTROL.—Low-water control 20 feet below gage, high-water control 100 feet below gage. Banks high, not subject to overflow.

EXTREMES OF DISCHARGE.—Maximum mean daily gage height, 3.1 feet August 13 (discharge, 280 second-feet); dry October 1 to November 29, June 3–9.

1919–1923: Maximum mean daily discharge, 990 second-feet on July 31, 1921; dry at numerous times.

DIVERSIONS.—Minor diversions above and below station.

REGULATION.—None.

ACCURACY.—Stage-discharge relation fairly permanent. Rating curve fairly well defined between zero and 30 second-feet. Gage read once a day to nearest two-hundredths and oftener during periods of flood. Daily discharge ascertained by applying daily gage height to rating table, or by hydrograph for flood periods. Records fair.

COOPERATION.—Records furnished by University of Arizona, Prof. G. E. P. Smith, irrigation engineer.

18776—27†—WSP 569——11

Discharge measurements of West Turkey Creek near Light, Ariz., during the year ending September 30, 1923

[Made by H. C. Schwalen]

Date	Gage height	Discharge
	Feet	*Sec.-ft.*
Jan. 11	0.92	0.25
June 11	.71	.15
Aug. 27	2.02	48.5

Daily discharge, in second-feet, of West Turkey Creek near Light, Ariz., for the year ending September 30, 1923

Day	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1		1	0.5	0.5	2	1	0.5	0.5		8	62
2		1	.5	.5	1	1	.5	.5		5	145
3		1	.5	.5	1	1	.5			5	62
4		11	.5	.5	2	1	.5			5	62
5		11	.5	.5	2	1	.5			25	62
6		1	.5	.5	2	1	.5			11	48
7		1	.5	.5	2	1	.5		3	29	48
8		1	.5	.5	5	.5	.5		2	29	38
9		1	.5	.5	11	.5	.5		1	21	8
10		.5	.5	.5	16	1	.5		1	21	8
11		1	.5	.5	11	1	.5		1	34	10
12		.5	.5	.5	5	.5	.5		1	145	8
13		.5	.5	.5	5	.5	.5		4	280	6
14		.5	.5	.5	3	.5	.5		5	260	5
15		.5	.5	.5	3	.5	.5		1	80	5
16		.5	.5	.5	3	1	.5		1	71	8
17		.5	.5	.5	2	1	.5		16	2	5
18		.5	.5	.5	2	1	.5		18	2	5
19		.5	.5	.5	2	1	.5		11	7	5
20		.5	.5	.5	2	2	.5		8	21	5
21		.5	.5	.5	2	2	.5		48	21	5
22		.5	.5	.5	2	1	.5		43	21	5
23		.5	.5	.5	1	1	.5		25	21	11
24		.5	.5	.5	1	1	.5		16	43	11
25		.5	.5	2	1	1	.5		11	125	8
26		.5	.5	2	1	1	.5		10	190	8
27		.5	.5	2	1	1	.5		5	62	5
28		.5	.5	2	1	.5	.5		5	120	5
29		.5	.5		1	.5	.5		43	80	5
30	1	.5	.5		1	.5	.5		8	104	3
31		.5	.5		1		.5		8	62	

NOTE.—Dry for days on which no discharge is given, except for the period June 10 to July 6, which had a trace of water.

Monthly discharge of West Turkey Creek near Light, Ariz., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October				
November	1.0	0	0.03	1.8
December	11.0	.5	1.31	80.6
January	.5	.5	.50	30.7
February	2.0	.5	.71	39.4
March	16.0	1.0	3.06	188
April	2.0	.5	.92	54.7
May	.5	.5	.50	30.7
June	.5	0	.03	1.8
July	48	*T.	9.52	585
August	280	2	61.6	3,790
September	145	3	22.4	1,330
The year	280	0	8.47	6,130

* Trace of water.

WHITEWATER DRAW BASIN

WHITEWATER DRAW NEAR RUCKER, ARIZ.

LOCATION.—In sec. 29, T. 19 S., R. 29 E., at Heyne ranch, 6 miles east of Ruckér, Cochise County.

DRAINAGE AREA.—40 square miles (measured on topographic map).

RECORDS AVAILABLE.—August 7, 1919, to September 30, 1923.

GAGE.—Vertical enamel staff fastened to tree on left bank; read by F. W. Heyne.

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

CHANNEL AND CONTROL.—Channel composed of boulders, gravel, and bedrock, with pronounced drop 300 feet below gage. Channel fairly straight, and fairly uniform in cross section.

EXTREMES OF DISCHARGE.—Maximum mean daily discharge for year, 79 second-feet on August 26; minimum discharge, dry June 17 to July 19.

1919–1923: Maximum mean daily discharge, 1,240 second-feet November 23, 1919; minimum discharge, dry at numerous times.

DIVERSIONS.—Minor diversions above and below station.

REGULATION.—None.

ACCURACY.—Stage-discharge relation fairly permanent. Rating curve fairly well defined between 0 and 200 second-feet. Gage read once a day to nearest two-hundredths. Daily discharge ascertained by applying daily gage height to rating table. Records fair.

COOPERATION.—Records furnished by University of Arizona, Prof. G. E. P. Smith, irrigation engineer.

Discharge measurements of Whitewater Draw near Rucker, Ariz., during the year ending September 30, 1923

Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*
Jan. 11	H. C. Schwalen	0.70	0.92
June 13	G. E. P. Smith	.53	.02
Aug. 27	H. C. Schwalen	1.49	47.6

Daily discharge, in second-feet, of Whitewater Draw near Rucker, Ariz., for the year ending September 30, 1923

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	July	Aug.	Sept.
1	1	0.5		1	0.5	0.5	1	1		5	13
2	1	.5		1	.5	.5	1	1		4	12
3	1	.5		1	.5	.5	1	1		4	15
4	1	.5		1	.5	.5	1	1		3	30
5	1	.5	3	1	.5	.5	1	1		3	19
6	1	.5	3	1	.5	.5	1	1		4	15
7	.5	.5	2	1	.5	.5	1	1		16	11
8	.5		2	1	.5	.5	1	1		18	8
9	.5		1	1	.5	.5	1	1		22	7
10	.5		1	1	.5	13	1	1		22	6
11	.5		1	1	.5	11	1	1		38	5
12	.5		1	1	.5	7	1	1		25	5
13	.5		1	1	.5	4	1	.5		50	6
14	.5		1	1	.5	3	1	.5		60	5
15	.5		1	1	.5	3	1	.5		53	5
16	.5		1	1	.5	2	1	.5		50	13
17	.5		1	1	.5	2	1	.5		31	12
18	.5		1	1	.5	2	1	.5		21	7
19	.5		1	1	.5	2	1	.5		20	6
20	.5		1	1	.5	2	1	.5	1	23	4

Daily discharge, in second-feet, of Whitewater Draw near Rucker, Ariz., for the year ending September 30, 1923—Continued

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	July	Aug.	Sept.
21	0.5		1	1	0.5	1	1	0.5	8	19	4
22	.5		1	1	.5	1	1	.5	51	16	3
23	.5		1	1	.5	1	1	.5	44	15	11
24	.5		1	1	.5	1	1	.5	31	65	18
25	.5		1	1	.5	1	1	.5	20	52	15
26	.5		1	1	.5	1	1	.5	17	79	11
27	.5		1	1	.5	1	1	.5	10	55	8
28	.5		1	1	.5	1	1	.5	7	35	6
29	.5		1	1		1	1		6	24	6
30	.5		1	1		1	1		5	25	5
31	.5		1	.5		1			7	15	

NOTE.—Trace of water only on days for which no discharge is given, except for the period June 17 to July 19, which was dry.

Monthly discharge of Whitewater Draw near Rucker, Ariz., for the year ending September 30, 1923

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	1.0	0.5	0.60	36.9
November	.5	T.	.12	7.1
December	3.0	T.	1.1	67.6
January	1.0	.5	.98	60.3
February	0.5	.5	.50	27.8
March	13	.5	2.14	132
April	1.0	1.0	1.0	59.5
May	1.0	T.	.65	40.0
July	51	0	6.7	412
August	79	3	28.1	1,730
September	30	3	9.7	577
The year	79	0	4.35	3,150

MISCELLANEOUS DISCHARGE MEASUREMENTS

Discharge measurements of streams in the Colorado River Basin at points other than regular gaging stations, made during the year ending September 30, 1923, are listed in the following table:

Date	Stream	Tributary to or diverting from—	Locality	Gage height	Discharge
				Feet	*Sec.-ft.*
July 26	Hades Canyon Creek.	North Fork of Duchesne River.	In SE. ¼ sec. 26, T. 2 N., R. 9 W., Uinta special base and meridian, at mouth, at Savage ranch 10 miles northwest of Hanna, Duchesne County, Utah.		28
Aug. 27	Brown Duck Creek.	West Fork of Lake Fork.	In NE. ¼ sec. 13, T. 2 N., R. 6 W., at mouth at Moon Lake, 14 miles northwest of Mountain Home, Duchesne County, Utah.		58
23	East Fork of Lake Fork.	Lake Fork	In sec. 16, T. 1 N., R. 4 W., one-half a mile above Payne Canal and 7 miles northwest of Altonah, Duchesne County, Utah.		214
Mar. 23	Uinta Power & Light Co.'s tailrace.	Uinta River	In SW. ¼ sec. 25, T. 2 N., R. 2 W., at power plant 9 miles north of Neola, Duchesne County, Utah. This water is diverted from Pole Creek in SE. ¼ sec. 14, T. 2 N., R. 2 W.		7
Aug. 22	Pole Creek	do	In NE. ¼ sec. 36, T. 2 N., R. 2 W., at mouth, 8 miles north of Neola, Duchesne County, Utah.		15

Date	Stream	Tributary to or diverting from—	Locality	Gage height	Discharge
				Feet	*Sec.-ft.*
Aug. 14	United States Whiterocks Canal.	Whiterocks Creek.	In SE. ¼ sec. 19, T. 2 N., R. 1 E., at point of diversion 5 miles north of Whiterocks, Uinta County, Utah.	0.96	20
14	Farm Creek Canal	do	In NW. ¼ sec. 30, T. 2 N., R. 1 E., at point of diversion 5 miles north of Whiterocks, Uinta County, Utah.	.92	11
14	Whiterocks Irrigation Co.'s canal.	do	In SE. ¼ sec. 31, T. 2 N., R. 1 E., at point of diversion 4 miles north of Whiterocks, Uinta County, Utah.	.75	18
14	Deep Creek Canal	do	In sec. 5, T. 1 S., R. 1 E., at point of diversion 4 miles south of Whiterocks, Uinta County, Utah.	1.42	34
28	Price River	Green River	In SE. ¼ sec. 9, T. 18 S., R. 14 E., at highway bridge in Woodside, Emery County, Utah.	3.31	21
Nov. 21	Gila River	Colorado River	Above Duncan Valley diversions near Duncan, Ariz.		74
May 9	do	do	At San Carlos, Ariz		9.7
7	do	do	Above Winkleman, Ariz		15
21	do	do	do		4.3
Nov. 21	Cosper-Wilson Canal	Gila River	Near Duncan, Ariz		15.3
Jan. 10	do	do	do		14.5
Mar. 11	do	do	do		14.2
May 14	do	do	do		10.4
14	Shriver Canal	do	do		1
July 20	do	do	do		1
Nov. 21	Valley Canal	do	do	1.93	29.2
Jan. 10	do	do	do	1.40	18.8
Mar. 11	do	do	do	1.32	18.8
May 14	do	do	do	1.45	19.7
Nov. 21	Duncan Canal	do	do		4.1
Jan. 9	do	do	do		6.4
Mar. 12	do	do	do		5.2
May 14	do	do	do		5.3
Nov. 21	Black-McClesky Canal.	do	do		6.7
May 14	do	do	do		10.1
Nov. 22	Colmonero Canal	do	do		7.6
May 15	do	do	do		14.9
16	Sexton Canal	do	do		.5
July 21	do	do	do		2.0
May 16	Billingsley Canal	do	do		.5
Nov. 22	San Francisco River.	do	Clifton, Ariz		44
Jan. 11	do	do	do		75
Mar. 13	do	do	do		154
May 16	do	do	do		72
July 22	do	do	do		362
June 1	Brown Canal	do	Below wasteway near Solomonsville, Ariz.		1.7
22	do	do	do		1.4
May 21	Mineral Gulch	do	Kelvin, Ariz		.2
June 8	Gila Water Co.'s canal.	do	Near Gila Bend, Ariz		61
Aug. 15	do	do	do		195

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 power, 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 as follows:

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., care of 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., 106 College of Law Building, University of Arizona.
Austin, Tex., Capitol Building.
Honolulu, Hawaii, 25 Capitol 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.

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

Report	Character of data	Year
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.
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 65, 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.

18776—27†—WSP 569——12

Numbers of water-supply papers containing results of stream measurements, 1899–1923

[For basins included see p. 161]

Year	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII		
												A	B	C
1899 [a]	35	[b] 35, 36	36	36	36	[c] 36, 37	37	37	[d] 37, 38	38, [e] 39	38, [f] 39	38	38	38
1900 [c]	47, [h] 48	48	48, [i] 49	49	49	49, [j] 50	50	50	50	51	51	51	51	51
1901	65, 75	65, 75	65, 75	65, 75	[k] 65, 66, 75	66, 75	[k] 65, 66, 75	66, 75	66, 75	66, 75	66, 75	66, 75	66, 75	66, 75
1902	82	[b] 82, 83	83	[l] 82, 83	[k] 83, 85	84	[k] 83, 84	84	85	85	85	85	85	85
1903	97	[b] 97, 98	98	97	[k] 98, 99, [m] 100	99	[k] 98, 99	99	100	100	100	100	100	100
1904	[n] 124, [o] 125, [p] 126	[p] 126, 127	128	129	[k] 128, 130	130, [q] 131	[k] 128, 131	132	133	133, [r] 134	134	135	135	135
1905	[n] 165, [o] 166, [p] 167	[p] 167, 168	169	170	171	172	[k] 169, 173	174	175, [s] 177	176, [r] 177	177	178	178	[t] 177, 178
1906	[n] 201, [o] 202, [p] 203	[p] 203, 204	205	206	207	208	[k] 205, 209	210	211	212, [r] 213	213	214	214	214
1907–8	241	242	243	244	245	246	247	248	249	250, [r] 251	251	252	252	252
1909	261	262	263	264	265	266	267	268	269	270, [r] 271	271	272	272	272
1910	281	282	283	284	285	286	287	288	289	290	291	292	292	292
1911	301	302	303	304	305	306	307	308	309	310	311	312	312	312
1912	321	322	323	324	325	326	327	328	329	330	331	332-A	332-B	332-C
1913	351	352	353	354	355	356	357	358	359	360	361	362-A	362-B	362-C
1914	381	382	383	384	385	386	387	388	389	390	391	392	393	394
1915	401	402	403	404	405	406	407	408	409	410	411	412	413	414
1916	431	432	433	434	435	436	437	438	439	440	441	442	443	444
1917	451	452	453	454	455	456	457	458	459	460	461	462	463	464
1918	471	472	473	474	475	476	477	478	479	480	481	482	483	484
1919–20	501	502	503	504	505	506	507	508	509	510	511	512	513	514
1921	521	522	523	524	525	526	527	528	529	530	531	532	533	534
1922	541	542	543	544	545	546	547	548	549	550	551	552	553	554
1923	561	562	563	564	565	566	567	568	569	570	571	572	573	574

[a] Rating tables and index to Water-Supply Papers 35–39 contained in Water-Supply Paper 39. Tables for monthly discharge for 1899 in Twenty-first Annual Report, Part IV.
[b] James River only.
[c] Gallatin River.
[d] Green and Gunnison Rivers and Grand River above junction with Gunnison.
[e] Mohave River only.
[f] Kings and Kern Rivers and south Pacific slope basins.
[g] 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.
[h] Wissahickon and Schuylkill Rivers to James River.
[i] Scioto River.
[j] Loup and Platte Rivers near Columbus, Nebr., and all tributaries below junction with Platte.
[k] Tributaries of Mississippi from east.
[l] Lake Ontario and tributaries to St. Lawrence River proper.
[m] Hudson Bay only.
[n] New England rivers only.
[o] Hudson River to Delaware River, inclusive.
[p] Susquehanna River to Yadkin River, inclusive.
[q] Platte and Kansas Rivers.
[r] Great Basin in California, except Truckee and Carson River basins.
[s] Below junction with Gila.
[t] Rogue, Umpqua, and Siletz Rivers only.

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 161, and the records for large lakes are presented in order of the streams around the rim of the lake.

PRINCIPAL STREAMS

The largest tributaries of Colorado River are the Fraser, Williams Fork, Blue, Gunnison, Green, Dolores, San Juan, Little Colorado, Virgin, Williams, and Gila Rivers. These streams drain wholly or in part the States of Arizona, Colorado, Nevada, New Mexico, Utah, and Wyoming.

In addition to the annotated list of publications relating specifically to the section, these pages contain brief references to reports published by State and other organizations. (See p. 181.)

GAGING STATIONS

NOTE.—Dash following a date indicates that the station was being maintained September 30, 1923. Period after date indicates discontinuance.

COLORADO RIVER BASIN

Colorado River,[1] North Fork (head of Colorado River), near Grand Lake, Colo., 1904–1918.
Colorado River[1] near Granby, Colo., 1908–1911.
Colorado River[1] at Hot Sulphur Springs, Colo., 1904–
Colorado River[1] near Kremmling, Colo., 1904–1918.
Colorado River[1] near Wolcott, Colo., 1906–1908.
Colorodo River[1] near Shoshone, Colo., 1897.
Colorado River[1] at Glenwood Springs, Colo., 1899–
Colorado River[1] near Palisade, Colo., 1902–
Colorado River[1] at Grand Junction, Colo., 1894–1900.
Colorado River[1] near Fruita, Colo., 1911–1923.
Colorado River[1] near Cisco, Utah, 1914–1917, 1922–
Colorado River[1] near Moab, Utah, 1913–1914.
Colorado River at Lees Ferry, Ariz., 1921–
Colorado River at Bright Angel Creek, Grand Canyon, Ariz., 1922–
Colorado River at Bulls Head, near Mohave, Ariz., 1902–3.
Colorado River at Hardyville, Ariz., 1905–1907.
Colorado River near Topock, Ariz., 1917–

[1] Published as Grand River prior to 1919.

Colorado River at Yuma, Ariz., 1878–
North inlet to Grand Lake at Grand Lake, Colo., 1905–1912.
Grand Lake outlet at Grand Lake, Colo., 1904–1913.
South Fork of Colorado River near Lehman, Colo., 1907–8.
Fraser River near Arrow, Colo., 1910–
Fraser River at upper station, near Fraser, Colo., 1908–1911.
Fraser River at lower station, near Fraser, Colo., 1907–1909.
Fraser River at Granby (Coulter), Colo., 1904–1909.
Big Jim Creek near Fraser, Colo., 1907–1909.
Little Jim Creek near Fraser, Colo., 1907–1909.
Vasquez Creek at upper station, near Fraser, Colo., 1908–9.
Vasquez Creek at lower station, near Fraser, Colo., 1907–1909.
Elk Creek near Fraser, Colo., 1907–1909.
St. Louis Creek at upper station, near Fraser, Colo., 1908–9.
St. Louis Creek at lower station, near Fraser, Colo., 1908–9.
North Ranch Creek at upper station, near Rollins Pass, Colo., 1908–9.
North Ranch Creek at lower station, near Rollins Pass, Colo., 1907–1909.
Middle Ranch Creek at upper station, near Arrow, Colo., 1908–9.
Middle Ranch Creek at lower station, near Arrow, Colo., 1907–1909.
South Ranch Creek at upper station, near Arrow, Colo., 1908–9.
South Ranch Creek at lower station, near Arrow, Colo., 1907–1909.
Williams Fork near Scholl, Colo., 1910–1917.
Williams Fork near Parshall (Sulphur Springs), Colo., 1904–
Troublesome Creek near Troublesome, Colo., 1904–5; 1922–
Muddy Creek at Kremmling, Colo., 1904–5.
Blue River at Breckenridge, Colo., 1914–15
Blue River at Dillon, Colo., 1910–
Blue River near Kremmling, Colo., 1904–1908.
Spruce Creek (upper station) near Breckenridge, Colo., 1914–15.
Spruce Creek (lower station) near Breckenridge, Colo., 1914–15.
Crystal Creek near Breckenridge, Colo., 1914–15.
Snake River at Dillon, Colo., 1910–1919.
Tenmile Creek near Kokomo, Colo., 1904.
Tenmile Creek near Uneva Lake, Colo., 1903.
Tenmile Creek at Dillon, Colo., 1910–1919.
Eagle River at Redcliff, Colo., 1911–
Eagle River at Eagle, Colo., 1911–
Eagle River below Brush Creek, at Eagle, Colo., 1905–1907.
Eagle River at Gypsum, Colo., 1907–1909.
Turkey Creek at Redcliff, Colo., 1913–1921.
Homestake Creek at Redcliff, Colo., 1911–1918.
Gore Creek near Minturn, Colo., 1911–1914.
Beaver Creek at Avon, Colo., 1911–1914.
Brush Creek at Eagle, Colo., 1911–1913.
No Name Creek near Glenwood Springs, Colo., 1911–1914.
Glenwood Light & Power Co.'s flume near Glenwood Springs, Colo., 1911–1913.
Roaring Fork at Aspen, Colo., 1911–1921.
Roaring Fork below Aspen, Colo., 1913–1918.
Roaring Fork near Emma, Colo., 1908–9.

Colorado River tributaries—Continued.
Roaring Fork at Glenwood Springs, Colo., 1906–
Hunter Creek at Aspen, Colo., 1911–1913.
Castle Creek near Aspen, Colo., 1911–1920.
Maroon Creek near Aspen, Colo., 1911–1917.
Maroon Creek at lower station, near Aspen, Colo., 1914–15.
Snowmass Creek at Snowmass, Colo., 1911–1913.
Fryingpan Creek at Norrie, Colo., 1911–1917.
Fryingpan Creek at Thomasville, Colo., 1911–1920.
Fryingpan Creek at Basalt, Colo., 1908–9.
North Fork of Fryingpan Creek, near Norrie, Colo., 1911–1917.
Crystal River at Marble, Colo., 1910–1917.
Crystal River near Carbondale (Sewell), Colo., 1908–9.
Elk Creek, West Fork (head of Elk Creek), near Newcastle, Colo., 1911.
Middle Fork of Elk Creek near Newcastle, Colo., 1911–1914.
East Fork of Elk Creek near Newcastle, Colo., 1911–1915.
West Divide Creek (head of Divide Creek) at Hostetler ranch, near Raven, Colo., 1909.
West Divide Creek at Beard ranch, near Raven, Colo., 1910–11.
West Divide Creek at Raven, Colo., 1909–1911.
West Mann Creek near Rifle, Colo., 1909–10.
Parachute Creek at Grand Valley, Colo., 1921–
Roan River near DeBeque, Colo., 1921–
Taylor River (head of Gunnison River) near Almont, Colo., 1905.
Taylor River at Almont, Colo., 1910–
Gunnison River near Gunnison, Colo., 1910–1914, 1916–
Gunnison River near Iola, Colo., 1900–1903.
Gunnison River near Cimarron, Colo., 1903–1905.
Gunnison River at River Portal, Colo., 1905–1911.
Gunnison River near Cory, Colo., 1903–1905.
Gunnison River at Roubideau, Colo., 1897.
Gunnison River at Whitewater, Colo., 1897; 1901–1906.
Gunnison River near Grand Junction, Colo., 1894–95, 1897–1899, 1917–
East River at Almont, Colo., 1905, 1910–1922.
Cement Creek near Crested Butte, Colo., 1910–1913.
Tomichi Creek at Sargents, Colo., 1917–1922.
Tomichi Creek near Gunnison, Colo., 1910.
Quartz Creek near Pitkin, Colo., 1910–1913.
Sapinero Creek at Sapinero, Colo., 1911–1914.
Lake Fork at Lake City, Colo., 1918–
Henson Creek at Lake City, Colo., 1918–19.
Cimarron Creek at Cimarron, Colo., 1903–1905.
Crystal Creek near Maher, Colo., 1917–1919.
North Fork of Gunnison River near Hotchkiss, Colo., 1903–1906.
Leroux Creek near Lazear, Colo., 1917–
Surface Creek at Cedaredge, Colo., 1917–
Uncompahgre River at Ouray, Colo., 1908; 1911–
Uncompahgre River below Ouray, Colo., 1913–
Uncompahgre River near Colona, Colo., 1903–1906; 1917–
Uncompahgre River at Fort Crawford, Colo., 1895–1899; 1908–1910.
Uncompahgre River near Fort Crawford, Colo., 1910–11.
Uncompahgre River at Montrose, Colo., 1900; 1903–
Uncompahgre River near Delta, Colo., 1903–
Canyon Creek at Ouray, Colo., 1911–1915.
Kahnah Creek near Whitewater, Colo., 1917–1921.

Colorado River tributaries—Continued.
Dolores River at Rico, Colo., 1914; 1919–1921.
Dolores River at Dolores, Colo., 1895–1903; 1910–1912.
Dolores River at Bedrock, Colo., 1918–1922.
Rico Mining Co.'s tailrace at Rico, Colo., 1914.
San Miguel River at Fall Creek, Colo., 1895–1899; 1910.
San Miguel River at Placerville, Colo., 1910–1912.
San Miguel River at Naturita, Colo., 1918–
Mill Creek near Moab, Utah, 1914–1919.
Green River near Kendall, Wyo., 1910–1912; 1918.
Green River near Daniel, Wyo., 1915–
Green River at Green River, Wyo., 1895–1906; 1915–
Green River near Bridgeport, Utah, 1911–1915.
Green River at Jensen, near Vernal, Utah, 1903–1906; 1914–15.
Green River at Ouray, Utah, 1904–5.
Green River at Green River (formerly Blake), Utah, 1894–1899; 1905–1911.
Green River at Little Valley, near Green River, Utah, 1910–
Horse Creek at Daniel, Wyo., 1913–1918.
Cottonwood Creek near Big Piney, Wyo., 1916–1919.
East Fork at East Fork canal, Wyo., 1916–17; 1921–1923.
East Fork at Newfork, Wyo., 1905–6; 1915–
New Fork at Alexander's ranch, near Cora, Wyo., 1910–11.
New Fork at Pinedale crossing, near Cora, Wyo., 1905.
New Fork near Boulder, Wyo., 1915–
Pine Creek at Fremont Lake outlet, near Pinedale, Wyo., 1910–1912; 1915–1918.
Pine Creek near Pinedale, Wyo., 1905–1906
Pine Creek at Pinedale, Wyo., 1915–
Pole Creek near Fayette, Wyo., 1904–1906.
Pole Creek near Pinedale, Wyo., 1910.
Fall Creek at Fayette, Wyo., 1904–5.
Boulder Creek near Boulder (Newfork), Wyo., 1904–1906; 1915–
North Piney Creek near Marbleton, Wyo., 1915–16.
Middle Piney Creek near Big Piney, Wyo., 1915–1918.
Labarge Creek near Labarge, Wyo., 1913; 1915–16.
Fontenelle Creek near Fontenelle, Wyo., 1915–1919.
Big Sandy Creek at Leckie's ranch, near Big Sandy, Wyo., 1910–11.
Big Sandy Creek near Eden, Wyo., 1911–12.
Big Sandy Creek near Farson, Wyo., 1915–17; 1921–
Dutch Joe Creek near Big Sandy, Wyo., 1911–12.
Squaw Creek near Big Sandy, Wyo., 1911–12.
Little Sandy Creek near Eden, Wyo., 1911–12.
Blacks Fork near Urie, Wyo., 1913–
Blacks Fork above Hams Fork, near Granger, Wyo., 1896–97.
Blacks Fork below Hams Fork, at Granger, Wyo., 1897–1900; 1916.
Hams Fork at Kemmerer, Wyo., 1918.
Hams Fork near Diamondville, Wyo., 1918–
Henrys Fork near Linwood, Utah, 1916.
Beaver Creek near Ladore, Colo., 1910–11.
Vermilion Creek near Ladore, Colo., 1910–11.
Yampa River at Yampa Colo., 1910–13.
Yampa River at Steamboat Springs, Colo., 1904–1906; 1910–1913.
Yampa River at Craig, Colo., 1901–2; 1904–1906; 1910–1913.

Colorado River tributaries—Continued.
Green River tributaries—Continued.
Yampa River near Maybell, Colo., 1904–5; 1910–1912; 1916–17.
Soda Creek at Steamboat Springs, Colo., 1910–11.
Elk River at Hinman Park, Colo., 1912–13.
Elk River near Clark, Colo., 1910–1913.
Elk River near Trull, Colo., 1904–1906; 1910–1913.
Mad Creek near Steamboat Springs, Colo., 1912–13.
Trout Creek at Pinnacle, Colo., 1910–11.
Fish Creek at Dunkley, Colo., 1910–11.
Elkhead Creek near Craig, Colo., 1906; 1910–1913.
Fortification Creek at Craig, Colo., 1905–6; 1910–1913.
Williams Fork near Pyramid, Colo., 1910–11.
Williams Fork at Hamilton, Colo., 1904–1906; 1910–1913.
Milk Creek near Axial, Colo., 1904–5.
Little Snake River, Middle Fork, near Battle Creek, Colo., 1912–13.
Little Snake River near Dixon, Wyo., 1910–
Little Snake River near Lily, Colo., 1922–
Little Snake River near Maybell, Colo., 1904.
South Fork of Little Snake River near Battle Creek, Colo., 1912–13.
Slater Fork at Baxter ranch, near Slater, Colo., 1912–13.
Slater Fork near Slater, Colo., 1910–1912.
Savery Creek at Savery, Wyo., 1915–16; 1918–1922.
Willow Creek near Baggs, Wyo., 1912–13.
Muddy Creek near Baggs, Wyo., 1915–16; 1918.
Fourmile Creek near Baggs, Wyo., 1912–13.
Ashley Creek above Dry Fork, near Vernal, Utah, 1911–
Ashley Creek below Dry Fork, near Vernal, Utah, 1900–1904.
Vernal Milling & Light Co.'s tailrace near Vernal, Utah, 1917; 1920–
Dry Fork of Ashley Creek at Vernal, Utah, 1904.
Duchesne River, North Fork (head of Duchesne River), near Hanna, Utah, 1921–1923.
Duchesne River, North Fork, above Forks, Utah, 1904.
Duchesne River near Tabiona, Utah, 1919–
Duchesne River at Duchesne, Utah, 1917–
Duchesne River at Myton, Utah, 1899–
West Fork of Duchesne River near Hanna, Utah, 1904; 1921–1923.
Wolf Creek near Hanna, Utah, 1921–1923.
Rock Creek (East Creek), 10 miles above mouth, Utah, 1904.
Strawberry River above mouth of Indian Creek, in Strawberry Valley, Utah, 1903–1906; 1909–10.
Strawberry River below mouth of Indian Creek, in Strawberry Valley, Utah, 1908–9.
Strawberry River at Duchesne (Theodore), Utah, 1908–1910; 1914–
Indian Creek in Strawberry Valley, Utah, 1905–6; 1909–10.
Trail Hollow Creek in Strawberry Valley, Utah, 1909–10.
Current Creek, 13 miles above mouth, Utah, 1904.
Current Creek, 3 miles above mouth, Utah, 1904.
Red Creek near Fruitland, Utah, 1904; 1917–1922.
Antelope Creek near Myton, Utah, 1917–1921.
Lake Fork, West Fork (head of Lake Fork), near Mountain Home, Utah, 1904; 1921–

Colorado River tributaries—Continued.
Green River tributaries—Continued.
Duchesne River tributaries—Continued.
Lake Fork below Forks, near Altonah, Utah, 1904; 1907–1910; 1917–1920.
Lake Fork near Myton, Utah, 1900–1905; 1907–
East Fork of Lake Fork, 8 miles above Forks, Utah, 1904.
Uinta River near Neola, Utah, 1921–
Uinta River near Whiterocks, Utah, 1899–1904; 1907–1910; 1917–1920.
Uinta River at Fort Duchesne, Utah, 1899–1904; 1906–1910.
Uinta River near Fort Duchesne, Utah, 1917–1920.
Uinta River at Ouray School, Utah, 1899–1904.
Whiterocks River near Whiterocks, Utah, 1899–1904; 1907–1910; 1917–
White River near Buford,[2] Colo., 1903–1906; 1910–1913.
White River at Meeker, Colo., 1901–1906; 1910–1913.
White River at Whiteriver, Colo., 1895.
White River near Rangely, Colo., 1904–5.
White River near Dragon, Utah, 1906.
White River near Ouray, Utah, 1904.
Marvine Creek near Buford, Colo., 1903–1906.
South Fork of White River near Buford, Colo., 1903–1906; 1910–1913.
Fish Creek (head of Price River) near Scofield, Utah, 1917–1921.
Price River near Helper, Utah, 1894–95; 1904–
Price River at Woodside, Utah, 1909–1911.
Huntington Creek (head of San Rafael River) near Huntington, Utah, 1909–
Huntington Creek near Castledale, Utah, 1911–1921.
San Rafael River near Green River, Utah, 1909–1920.
Cottonwood Creek near Orangeville, Utah, 1909–
Ferron Creek (upper station) near Ferron, Utah, 1911–1923.
Ferron Creek near Ferron, Utah, 1909–1911.
Ferron Creek near Castledale, Utah, 1911–1914.
Fremont River (Dirty Devil River) near Thurber, Utah, 1909–1912.
Muddy River—
Muddy Creek near Emery, Utah, 1909–1914.
Muddy Creek (lower station) near Emery, Utah, 1911–1914.
Ivie Creek near Emery, Utah, 1911.
Escalante River near Escalante, Utah, 1909–1913.
San Juan River at Pagosa Springs, Colo., 1911–1914.
San Juan River at Arboles, Colo., 1895–1899; 1910–1914.
San Juan River at Turley, N. Mex., 1907–8.
San Juan River at Blanco, N. Mex., 1908–1910.
San Juan River near Bloomfield, N. Mex., 1909–1911.
San Juan River at Farmington, N. Mex., 1904–1906; 1912–1914.
San Juan River of Shiprock, N. Mex., 1911.
San Juan River near Bluff, Utah, 1914–1917.
Navajo River at Chromo, Colo., 1911–12.
Navajo River at Edith, Colo., 1912–1914.
Piedra River at Piedra, Colo., 1911–12.

[2] Records published as "North Fork of White River near Buford, Colo."

Colorado River tributaries—Continued.
San Juan River tributaries—Continued.
Piedra River at Arboles, Colo., 1895–1899; 1910–1914.
Los Pinos River near Ignacio, Colo., 1899–1903; 1910–1914.
Animas River at Silverton, Colo., 1903.
Animas River at Tacoma, Colo., 1908–9; 1911.
Animas River above Lightner Creek, at Durango, Colo., 1895–1905.
Animas River below Lightner Creek, at Durango, Colo., 1910–1914.
Animas River at Aztec, N. Mex., 1904; 1907–1914.
Animas River at Farmington, N. Mex., 1904–5; 1912–1914.
Evaporation at Farmington, N. Mex., 1914.
Hermosa Creek near Hermosa, Colo., 1911–1914.
Florida River near Durango, Colo., 1899; 1901–1903; 1910–1912.
La Plata River at Hesperus, Colo., 1904–1906; 1910.
La Plata River at La Plata, N. Mex., 1905–1914.
Mancos River at Mancos, Colo., 1898–1901.
West Mancos River near Mancos, Colo., 1910–11.
Montezuma Creek, North Fork (head of Montezuma Creek), at Monticello, Utah, 1914–1916.
Gorden canal near Montecello, Utah, 1914–15.
Wood high-line canal near Monticello, Utah, 1914–15.
North canal near Monticello, Utah, 1914–15.
Middle canal near Monticello, Utah, 1914–1916.
South Fork of Montezuma Creek at Monticello, Utah, 1914–15.
Pioneer canal near Monticello, Utah, 1914–15.
South canal near Monticello, Utah, 1914–1916.
Christensen canal near Monticello, Utah, 1915.
Spring (Vaga) Creek near Monticello, Utah, 1914–1916.
Davenport & Campbell canal near Monticello, Utah, 1914–15.
Green canal near Monticello, Utah, 1914–1916.
Verdure (South Montezuma) Creek near Verdure, Utah, 1914–15.
Little Colorado River at St. Johns, Ariz., 1906–1909.
Little Colorado River near Woodruff, Ariz., 1905–1908; 1915–1919.
Little Colorado River at Holbrook, Ariz., 1905–1909.
Evaporation at Holbrook, Ariz., 1905–1909.
Zuni River at Blackrock, N. Mex., 1903–1905; 1908–
Silver Creek at Snowflake, Ariz., 1906–1908; 1915–16.
Silver Creek at canyon station, near Snowflake, Ariz., 1906.
Woodruff ditch at Woodruff, Ariz., 1906.
Chevelon Fork near Winslow, Ariz., 1905–1908; 1915–1919.
Clear Creek near Winslow, Ariz., 1906–1909.
Virgin River at Virgin, Utah, 1909–
Mukuntuweap River[3] near Springdale, Utah, 1913–14; 1923–
Ash Creek at Toquerville, Utah, 1915.
Leeds (Quail) Creek near Leeds, Utah, 1915–1920.
Santa Clara Creek near Central, Utah, 1909–
Santa Clara Creek at Santa Clara. Utah, 1915–
Santa Clara Creek near St. George, Utah, 1909–1913.
Town canal at Santa Clara, Utah, 1915.
St. George and Santa Clara north canal at Santa Clara, Utah, 1915.
St. George and Santa Clara south canal at Santa Clara, Utah, 1915.

[3] Published as "Zion Creek" for the years 1913 and 1914.

Colorado River tributaries—Continued.
Virgin River tributaries—Continued.
Muddy River near Moapa, Nev., 1913–1917.
Muddy River above Moapa River Indian Reservation, near Moapa, Nev., 1914–1917.
Muddy River at railroad pumping plant, near Moapa, Nev., 1914–1917.
Muddy River at Weiser ranch, near Moapa, Nev., 1915–1917.
Muddy River near Logan (Moapa), Nev., 1904–1906; 1909–10;1913–14.
Muddy River near St. Thomas, Nev., 1913–1916.
Williams River near Swansea, Ariz., 1910–1915.
Gila River near Silver City, N. Mex., 1912–1914.
Gila River near Gila, N. Mex., 1914.
Gila River near Cliff, N. Mex., 1904–1907.
Gila River near Red Rock, N. Mex., 1908–1914.
Gila River near Duncan, Ariz., 1914–15; 1923–
Gila River at Guthrie, Ariz., 1910–1918.
Gila River near Solomonsville, Ariz., 1914–
Gila River at Ashurst, Ariz., 1920–
Gila River at San Carlos, Ariz., 1910–11.
Gila River near San Carlos, Ariz., 1899–1905.
Gila River near dam site, near San Carlos, Ariz., 1914–
Gila River at Winkelman, Ariz., 1917–18.
Gila River at Kelvin, Ariz., 1911–
Gila River near Buttes, Ariz., 1889–90; 1895–1899.
Gila River at Ashurst-Hayden dam, near Florence, Ariz., 1923–
Gila River near Florence, Ariz., 1914.
Gila River near Sentinel, Ariz.,1913–1917.
Gila River at Domè (Gila City), Ariz., 1903–1906.
Gila River at mouth, near Yuma, Ariz., 1903.
Sunset canal near Duncan, Ariz., 1914–15; 1922–
Cosper and Martin canal near Duncan, Ariz., 1914–15.
Cosper-Windham canal near Duncan, Ariz., 1914–15; 1922–
Moddle canal near Duncan, Ariz., 1914–15; 1922–
Valley canal near Duncan, Ariz., 1914–15; 1923–
Duncan canal near Duncan, Ariz., 1923–
Black-McClesky canal at Duncan, Ariz., 1915; 1923–
Colmonero canal near Duncan, Ariz., 1914–15; 1923–
York canal at York, Ariz., 1914–15.
San Francisco River near Alma, N. Mex., 1904–1907; 1909–1914.
San Francisco River at dam, above Clifton, Ariz., 1911–1912.
San Francisco River at Clifton, Ariz., 1910–1918.
Whitewater Creek near Mogollon, N. Mex., 1909–1914.
Brown canal above wasteway, near Solomonsville, Ariz., 1914–15; 1921–
Brown canal below wasteway, near Solomonsville, Ariz., 1914–15.
Brown canal wasteway near Solomonsville, Ariz., 1921–
Michelanna canal near Solomonsville, Ariz., 1914–15; 1921–
Fourness canal near Solomonsville, Ariz., 1914–15; 1921–
San Jose canal near Solomonsville, Ariz., 1914–15; 1921–
Montezuma canal near Solomonsville, Ariz., 1914–15; 1921–
Union canal near Solomonsville, Ariz., 1914–15; 1921–
San Simon Creek near Rodeo, N. Mex., 1920–

Colorado River tributaries—Continued.
Gila River tributaries—Continued.
San Simon Creek near San Simon, Ariz., 1919–
Cave Creek near Paradise, Ariz., 1919–
Cave Creek canal near Paradise, Ariz., 1919–
East Turkey Creek at Paradise, Ariz., 1919–
Graham canal near Safford, Ariz., 1914–15; 1921–
Oregon canal near Thatcher, Ariz., 1914–15.
Smithville canal near Thatcher, Ariz., 1914–15; 1921–
Bryce canal near Pima, Ariz., 1914–15.
Dodge canal near Pima, Ariz., 1914–15.
Dodge-Nevada canal near Pima, Ariz., 1921–
Nevada canal near Pima, Ariz., 1914–15.
Curtis canal near Fairview, Ariz., 1914–15.
Curtis-Kempton canal near Eden, Ariz., 1921–
Consolidated canal near Fairview, Ariz., 1914–15.
Fort Thomas Consolidated canal at Ashurst, Ariz., 1921–
San Carlos River at San Carlos, Ariz., 1910–11; 1914–15.
San Pedro River at Lewis Springs (Charleston), Ariz., 1904–1906; 1910–11.
San Pedro River at diversion dam, near Fairbank, Ariz., 1911–12.
San Pedro River near Fairbank, Ariz., 1912–
San Pedro River near Dudleyville, Ariz., 1890.
Aravaipa Creek near Feldman, Ariz., 1919–1921.
Florence canal near Florence, Ariz., 1914–15.
O. T. canal near Florence, Ariz., 1914–15.
Price & Powell ditch near Florence, Ariz., 1914–1915.
Pierson-Nicholas canal near Florence, Ariz., 1914–15.
Queen Creek at Whitlow's, near Superior, Ariz., 1896–1899; 1915–1920.
Santa Cruz River near Nogales, Ariz., 1907; 1909–1922.
Santa Cruz River at Tucson, Ariz., 1905–
Rillito Creek near Tucson, Ariz., 1909–
Black River (head of Salt River) near Fort Apache, Ariz., 1912–1918.
Salt River below mouth of Cherry Creek, near Roosevelt, Ariz., 1906.
Salt River near Roosevelt, Ariz., 1901–1907; 1911–
Salt River 50 miles above Phoenix, Ariz., 1890.
Salt River at McDowell, Ariz., 1897–1910.
Salt River at Arizona dam, Ariz., 1888–1891.
White River, North Fork (head of White River), Whiteriver, Ariz., 1916–1922.
White River at Fort Apache, Ariz., 1912–1922.
White River at Wanslee's ranch, near Fort Apache, Ariz., 1917–18.
East Fork of White River at Fort Apache, Ariz., 1912–1920.
Tonto Creek near Roosevelt, Ariz., 1901–1904; 1913–
Verde River near Clarkdale, Ariz., 1915–1921.
Verde River at Camp Verde, Ariz., 1912–1920.
Verde River at Childs, near Camp Verde, Ariz., 1911–1917.
Verde River near McDowell, Ariz., 1889; 1897–1899; 1901–
Beaver Creek at Camp Verde, Ariz., 1912–1920.
Fossil Creek near Camp Verde, Ariz., 1913.
Agua Fria River near Glendale, Ariz., 1910–
Hassayampa River near Wagoner (Walnut Grove), Ariz., 1912–1918.
Hassayampa River at Wickenburg, Ariz., 1910–1912.

Colorado River tributaries—Continued.
Imperial canal 10 miles below Yuma, Ariz., 1903–1905.
Imperial canal (main) near Calexico, Calif., 1904–5.
Boundary canal near Calexico, Calif., 1904–5.
Wisteria canal near Calexico, Calif., 1905.
Holt canal at Calexico, Calif., 1904–5.
Hemlock canal at Calexico, Calif., 1904–5.
Alamo channel near Calexico, Calif., 1904.
Alamitos canal near Calexico, Calif., 1904–5.

BARREN FLAT BASIN

Post Creek at Fort Grant, Ariz., 1920.
West Turkey Creek near Light, Ariz., 1919–

WHITEWATER BASIN[4]

Whitewater Draw near Rucker, Ariz., 1919–
Whitewater Draw near Douglas, Ariz., 1911–1922.

REPORTS ON WATER RESOURCES OF COLORADO RIVER BASIN

PUBLICATIONS OF THE 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.

*2. Irrigation near Phoenix, Ariz., by A. P. Davis. 1897. 98 pp., 31 pls.
Describes physiographic features, temperature, rainfall, stream flow, soils, and projected irrigation works in Gila River basin; discusses briefly possible use of ground water for irrigation and gives data concerning wells in Pinal and Maricopa counties. Chiefly of historic interest as indicated by the date of publication.

*33. Storage of water on Gila River, Arizona, by J. B. Lippincott. 1900. 98 pp., 33 pls.
Describes conditions existing in 1896–99, available water supply, silt, and reservoir sites (Buttes, Riverside, San Carlos, and Queen Creek); contains section on cement, and treats of irrigable land, distribution canals, and organization of irrigation. Interest chiefly historic.

*43. Conveyance of water in irrigation canals, flumes, and pipes, by Samuel Fortier. 1901. 86 pp., 15 pls.
Describes various types of canals for irrigation.

*44. Profiles of rivers in the United States, by Henry Gannett. 1901. 100 pp., 11 pls.
Gives elevations and distances along Colorado, Little Colorado, San Juan, Mancos, La Plata, Animas, Los Pinos, Grand, Gunnison, Dolores, Uncompahgre, Lake Fork, Roaring Fork, and Eagle rivers; also brief descriptions of several of the streams.

*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.
A second, revised, edition of Nos. 57 and 61 was published in 1905 as Water-Supply Paper 149 (q. v.).

73. Water storage on Salt River, Arizona, by A. P. Davis. 1903. 54 pp. 25 pls. 20c.
Discusses Verde and Salt River basins and McDowell and Salt River reservoirs.

74. Water resources of the State of Colorado, by A. L. Fellows. 1902. 151 pp., 14 pls. 25c.
Discusses drainage and irrigation; gives records of stream flow.

[4] Empties into the Gulf of California through Mexico.

*93. Proceedings of first conference of engineers of the Reclamation Service, with accompanying papers, compiled by F. H. Newell, chief engineer. 1904. 361 pp. Contains:

Investigations in Arizona, by A. P. Davis. Describes the proposed storage reservoir on Salt River at the mouth of Tonto Creek.

Salt River Valley Water Users' Association, by B. A. Fowler. Contains Judge Kibbey's address presenting a plan for the organization of the owners of lands to be irrigated.

Topographic work in the Grand Canyon of the Gunnison, by I. W. McConnell. Discusses the proposed diversion of water from Gunnison River into Uncompahgre Valley.

The Colorado River, by J. B. Lippincott.

Colorado River reclamation projects, by E. T. Perkins. Describes the site of the Yuma dam and summarizes the advantages of the Yuma site.

*103. A review of the laws forbidding pollution of inland waters in the United States, by E. B. Goodell. 1904. 120 pp. Superseded by 152.

Cites statutory restrictions of water pollution in Colorado, Nevada, Utah, New Mexico, and Wyoming.

104. The underground waters of Gila Valley, Arizona, by W. T. Lee. 1904. 71 pp., 5 pls. 10c.

Presents information concerning the topographic features and surficial geology of the area between The Buttes, 12 miles east of Florence, and the junction of the Gila and Salt rivers; treats of the source, amount, quality, and methods of securing the underflow.

*122. Relation of the law to underground waters, by D. W. Johnson. 1905. 55 pp.

Cites legislative acts relating to ground waters in Colorado, Nevada, New Mexico, Utah, and Wyoming.

136. Underground waters of Salt River valley, Arizona, by W. T. Lee. 1905. 196 pp., 23 pls. 25c.

Describes the physiography and geology of the Mesa and Phoenix regions, gives many well records, and discusses the amount and chemical character of the ground waters, duty of water, and cost of pumping.

147. Destructive floods in the United States in 1904, by E. C. Murphy and others. 1905. 206 pp., 18 pls. 15c. Contains:

Troxton Canyon flood, Arizona, by E. C. Murphy. Globe flood, Arizona, by O. T. Reedy. La Plata River flood, Colorado, from report of Theo. Tobish.

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 valuable 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 Colorado, Nevada, Utah, New Mexico, 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.

Contains accounts of floods on Colorado, Green, Grand, Gunnison, San Juan, Little Colorado, Gila, San Francisco, Verde, San Pedro, and Salt rivers, and of the flow of the Colorado into Salton Sink; gives index to literature on floods on American streams.

*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 analysis; discusses soap-consuming power of waters, water softening, boiler waters, and water for irrigation; gives results of analysis of waters of Colorado, Green, Grand, Gunnison, Animas, Little Colorado Gila, San Francisco, Salt, and Verde rivers.

*320. Geology and water resources of the Sulphur Spring Valley, Arizona, by O. E. Meinzer and F. C. Kelton, with a section on agriculture, by R. H. Forbes. 1913. 231 pp., 15 pls.

Describes the physiography and drainage of the region, geologic formations, and geologic history; discusses the seasonal and geographic distribution of rainfall, the occurrence and level of ground waters, the flowing and nonflowing wells, the quality of ground waters, the effect of alkali on plant life and on waters for irrigation, the relation of zones for vegetation to water supply and geographic controls, and the plants used for pumping water; treats also of the early history of agriculture and agricultural methods.

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 spring and well waters from Colorado and New Mexico and of mine waters from Dunton, Colo., and Tombstone, Ariz.

*365. Ground water in southeastern Nevada, by Everett Carpenter. 1915. 86 pp., 5 pls.

Describes an area in Clark, Lincoln, White Pine, and Nye counties, drained in part by streams tributary to Colorado River and in part by streams discharging into the Great Basin. Discusses stream, lake, and wind topography; vegetation, crops, and industrial development; rainfall; water in bedrock and unconsolidated sediments; source and permanence of artesian waters, and character and distribution of springs; also the quality of waters for domestic use and for irrigation, and gives analyses. Contains details of water supply by areas in Las Vegas and Virgin river basins and the Great Basin. Gives information in regard to watering places on routes of travel.

*375. Contributions to the hydrology of the United States, 1915; N. C. Grover, chief hydraulic engineer. 1916. 181 pp., 9 pls. Contains:

*(b) Ground water in Paradise Valley, Ariz., by O. E. Meinzer and A. J. Ellis, pp. 51-75, pls. 3-5. Describes an area north of Phoenix, in Maricopa County between Phoenix Mountains on the west and McDowell Mountains on the east, terminated on the north by a rocky upland, but on the south opening into the Salt River Valley. Discusses briefly physiography and drainage, soil and vegetation, climate, occurrence, source, and disposal of ground water artesian prospects, quality of water, wells, and irrigation.

*380. The Navajo country—a geographic and hydrographic reconnaissance of parts of Arizona, New Mexico, and Utah, by Herbert E. Gregory. 1916. 219 pp., 29 pls.

Contains a historical sketch of the Navajo country, and discusses geographic provinces, climate, soil, stream flow, the utilization of the streams, the source of the ground water, springs, wells, and artesian areas; gives a table of geographic names and a bibliography of books, and pamphlets examined in connection with the study.

395. Colorado River and its utilization, by E. C. La Rue. 1916. 231 pp., 25 pls. 50c.

Assembles the principal facts relating to the water resources and gives the result of a study of the "possibility of controlling the flow of the whole river by means of storage reservoirs in order to avoid further danger from overflow to the Salton Sink and to render available for profitable use the enormous quantity of water which now flows unused and largely unusable to the Gulf of California in the form of floods."

396. Profile surveys in the Colorado River basin in Wyoming, Utah, Colorado, and New Mexico, prepared under the direction of W. H. Herron, acting chief geographer, 1917. 6 pp., 43 pls. 50c.

Consists chiefly of maps showing outlines of river banks, islands, position of rapids, falls, and shoals, and existing dams. The streams to which the surveys relate are fully described in Water-Supply Paper 395.

*425. Contributions to the hydrology of the United States, 1917; N. C. Grover, chief hydraulic engineer. Contains:

*(a) Ground water in San Simon Valley, Arizona and New Mexico, by A. T. Schwennesen, with a section on agriculture, by R. H. Forbes, pp. 1-35, pls. 1-3. 1917.

450. Contributions to the hydrology of the United States, 1919; N. C. Grover, chief hydraulic engineer. 1921. iv, 86 pp., 11 pls. 40c. Contains:

*(a) Geology and water resources of the Gila and San Carlos Valleys in the San Carlos Indian Reservation, Ariz., by A. T. Swennesen, pp. 1-27, pls. i-v. Describes the physiography and drainage, geology, surface and ground water supply, and irrigation of these valleys.

469. Surface waters of Wyoming and their utilization, by Robert Follansbee. 1923. 331 pp., 1 pl. 40c.

Describes the physical features of Wyoming; discusses the locations and boundaries, topography, precipitation, forestation, principal streams, measured drainage areas, present and future irrigation, water power, and storage for Green River basin, and gives the gaging-station records for that basin. The other large river basins in Wyoming are discussed in a similar manner.

*498. The lower Gila region, Ariz., a geographic, geologic, and hydrologic reconnaissance, with a guide to desert watering places, by C. P. Ross. 1923. xiv, 237 pp., 23 pls.

Discusses the climate, history, industrial development, flora, fauna, topography, geology, ground water, and surface water supplies of the lower Gila region. Describes travel in this region and gives road logs for the various routes.

499. The Papago country, Ariz., a geographic, geologic, and hydrologic reconnaissance, with a guide to desert watering places by Kirk Bryan. 1925. xviii, 432 pp., 27 pls. 85c.

Discusses the climate, history, flora, fauna, geology, physiography, surface water, and ground water of this region. Describes the different types of roads and gives road logs for the various routes.

520. Contributions to the hydrology of the United States, 1923–24; N. C. Grover, chief hydraulic engineer. Contains:

(*a*) Variation in annual run-off in the Rocky Mountain region, by Robert Follansbee, pp. 1–14, pls. i–ii. 10c. Shows by States, by different drainage basins in same State, and by different streams in same drainage basin the variation in annual run-off and discusses the influence of topography upon this variation.

538. The San Juan Canyon, southeastern Utah, a geographic and hydrologic reconnaissance, by H. D. Miser. 1924. v, 80 pp., 22 pls. 30c.

Discusses the surface features, climate, soil, flora, animals, mineral resources, inhabitants, irrigation and agriculture, archeology, roads and trails, geology, and water supplies of the San Juan Canyon. Discusses at length San Juan River and tributary streams.

556. Water power and flood control of Colorado River below Green River, Utah, by E. C. La Rue. 1925. x, 176 pp., 79 pls. $1.

Discusses topography, climate, factors affecting hydraulic gradient, flood control, and water power in this region. The Glen Canyon, Boulder Canyon, and Mohave Canyon reservoir sites and the Cataract Canyon, Glen Canyon, Marble Gorge, Mineral Canyon, and other power sites are discussed at length. The report contains two appendixes, one deals with the water supply and the other with the geology of the region.

ANNUAL REPORTS

Each of the papers contained in the annual reports was also issued in separate form.

Annual reports may be purchased (at prices quoted below) from the SUPERINTENDENT OF DOCUMENTS, WASHINGTON, D. C. An asterisk (*) indicates that the report is out of print.

Ninth annual Report of the United States Geological Survey, 1887–88, J. W. Powell, Director. 1889. xiii, 717 pp. 88 pls. $2. Contains:

*On the geology and physiography of a portion of northwestern Colorado and adjacent parts of Utah and Wyoming, by C. A. White, pp. 677–712, pl. 8. Describes the canyons of Green, Yampa, Snake, and White rivers.

Tenth Annual Report 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 surveys in the Sun River basin and in the Arkansas, Rio Grande, California, Lahontan, Utah, and Snake River divisions.

*The arid lands, pp. 201–289. Includes statement of the Director to the House Committee on Irrigation, extracts from the constitutions of States relating to irrigation, and a report on artesian irrigation on the Great Plains, including a discussion of the general considerations affecting artesian water supply, the economic limit to the utilization of artesian water for irrigation, irrigation by artesian wells in various countries, and the geologic conditions and statistics of artesian wells on the Great Plains.

*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 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. 58–106. 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 drainage.

*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. 20c. 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 lands; discusses the streams, wells, and reservoirs as sources of water supply; gives details for each State.

*Eighteenth Annual Report of the United States Geological Survey, 1896–97, Charles D. Walcott, Director. 1897. (Pts. II and III, 1898.) 5 parts in 6 vols. Pt. IV, Hydrography, x ,756 pp., 102 pls. $1. 75. Contains:

*Reservoirs for irrigation, by J. D. Schuyler, pp. 617–740, pls. 48–102. Describes the Agua Fria dam, Arizona, and reservoir projects on Rio Verde, Salt River, Queen Creek, Hassayampa River, and Little Colorado River, Arizona, and in the Tonto basin; gives tables of reservoir capacities and areas.

*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:

*White River Plateau timberland reserve, by G. B. Sudworth, pp. 117–179, pls. 49–58. Battlement Mesa forest reserve, by G. B. Sudworth, pp. 181–243, pls. 59–75. Describes briefly the streams and lakes in the reserves.

PROFESSIONAL PAPERS

Professional papers may be purchased from the SUPERINTENDENT OF DOCUMENTS, WASHINGTON, D. C. An asterisk (*) indicates that the report is out of print. Professional papers are of quarto size.

*56. Geography and geology of a portion of southwestern Wyoming, with special reference to coal and oil, by A. C. Veatch. 1907. 178 pp., 26 pls.

Covers the southwest corner of Wyoming and a small adjacent portion of Utah. Gives a detailed description of the geology and a brief discussion of the water-bearing formations. Includes a geologic map with structure contours.

BULLETINS

Bulletins may be purchased (at prices 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.

*264. Record of deep-well drilling for 1904, by M. L. Fuller, E. F. Lines, and A. C. Veatch. 1905. 106 pp.

Discusses the importance of accurate well records to the driller, to owners of oil, gas, and water wells, and to geologists; describes the general methods of work; gives tabulated record of well in Sweetwater County, Wyo.

*298. Record of deep-well drilling for 1905, by M. L. Fuller and Samuel Sanford. 1906. 299 pp.

Gives an account of progress in the collection of well records and samples; contains tabulated records of wells in Arizona, California, Colorado, New Mexico, Utah, and Wyoming and detailed record of well near Phoenix, Maricopa County, Ariz. The well of which a detailed section is given was selected because it affords valuable stratigraphic information.

*350. Geology of the Rangely oil district, Rio Blanco County, Colo., with a section on the water supply, by H. S. Gale. 1908. 61 pp., 4 pls.

Discusses White River and its tributaries as sources of water supply and the possibility of obtaining artesian flows; treats of the quality of the water of White River and gives analyses.

352. Geologic reconnaissance of a part of western Arizona, by W. T. Lee, with notes on the igneous rocks of western Arizona, by Albert Johannsen. 1908. 99 pp., 11 pls. 25c.

Describes the geography and geology and contains a geologic sketch map of western Arizona north of longitude 33° 30′, including the valley of Colorado River and Hualpia, Big Sandy, Detrital-Sacramento, Williams, and McMullen valleys. Contains a section on water supplies which includes well data and discussion of ground-water prospects.

*531. Contributions to economic geology, 1911, Part II, Mineral fuels; M. R. Campbell, geologist in charge. 1913. 361 pp., 24 pls.

Issued also in separate chapters. The following papers contain information on ground water:

*(c) Geology and petroleum resources of the De Beque oil field, Colo., E. G. Woodruff (pp. 54–68, Pl. VI). Contains a description of the geology and a geologic map of a square area covering Tps. 7 and 8 S., Rs. 97 and 98 W., in the vicinity of De Beque in Mesa and Garfield counties. Includes a brief statement on artesian water in the area (p. 61).

*541. Contributions to economic geology, 1912, Part II, Mineral fuels; M. R. Campbell, geologist in charge. 1914. 532 pp., 29 pls.

Issued also in separate chapters. The following paper contains information on ground water,

*(d) Oil and gas near Green River, Grand County, Utah, by C. T. Lupton (pp. 115–133, Pl. VI). Describes the geology and contains a geologic map of an area of about 300 square miles southeast of the town of Green River. Contains meager data in regard to wells, water supplies, and artesian conditions (pp. 117–123).

*543. Geology and geography of a portion of Lincoln County, Wyo., by A. R. Schultz. 1914. 141 pp., 11 pls.

Describes the geology and contains a geologic map of an area in the central part of Lincoln County, between Green River and the Salt River Range (Tps. 22–39 N., Rs. 113–117 W.) Includes a brief discussion of ground water and artesian prospects (pp. 134, 135).

628. Geology and coal resources of Castle Valley, in Carbon, Emery, and Sevier counties, Utah, by C. T. Lupton. 1916. 88 pp., 12 pls. 20c.

Describes the geology and contains a geologic map of an area lying between the Wasatch Plateau and the San Rafael Swell, in east-central Utah, and extending from the vicinity of Mounds, on the Denver & Rio Grande Railroad, southwestward about 80 miles. Describes the drainage and water resources, including the prospects of finding water in the Dakota sandstone and underlying McElmo formation.

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.[5] The unit of survey is also the unit of

[5] Index maps showing areas in the Colorado River basin 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.

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 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 relation of the rocks to one another underground. The economic-geology map indicates the location of mineral deposites 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 80 or 90 per cent of the folios are usable. They will be 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. A discount of 40 per cent is allowed on an order for geologic folios amounting to $5 at the retail price—that is, 20 of the 25-cent folios (or their equivalent in higher priced folios) will be sold for $3. The discount is allowed on an order for folios alone, either of one kind or in any assortment, or for folios together with topographic maps but no discount is allowed on the damaged folios sold at 5 cents each.

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:

*111. Globe, Arizona.

112. Bisbee, Arizona. 25c. Reprinted in 1914.

*120. Silverton, Colorado.

*129. Clifton, Arizona.
Give analyses of spring water from San Francisco River.

*130. Rico, Colorado.

*153. Ouray, Colorado.
Describes the river waters used for irrigation, the underground waters, and the thermal springs, gives analyses of water from Hot Springs at Ouray.

*171. Engineer Mountain, Colorado.

199. Silver City, New Mexico. 25c.
"The Continental Divide passes through the quadrangle from its southwest to its northeast corner. All northerly drainage reaches Gila River and ultimately the Gulf of California and the Pacific Ocean. All southerly drainage flows toward the Rio Grande," but is lost in the sands of a desert region. The underground-water resources are discussed by N. H. Darton. The discussion of the surface waters is restricted to Mimbres River, one of the southward-flowing streams.

207. Deming, New Mexico. 25c.

217. Ray, Arizona. 25c.

MISCELLANEOUS REPORTS

Other Federal bureaus and State and other organizations have from time to time published reports relating to water resources of various sections of the country. Notable among those pertaining to the Colorado River Basin are the reports of the State engineers of Colorado, Nevada, New Mexico, and Wyoming, and the annual reports of the United States Bureau of Reclamation. The following reports deserve special mention:

Canyons of the Colorado, by J. W. Powell. 1895. A popular, revised, and enlarged edition of his original journal of exploration, which appeared as part of a report entitled "Exploration of the Colorado River of the West and its tributaries, explored in 1869, 1870, 1871, and 1872," published by the Smithsonian Institution in 1875.

A canyon voyage; the narrative of the second Powell expedition down the Green-Colorado River from Wyoming, and the explorations on land, in the years 1871–72, by Frederick S. Dellenbaugh, artist and assistant topographer of the expedition. 1908.

Preliminary examination of reservoir sites in Wyoming and Colorado; letter from the Secretary of War transmitting a letter from the chief of engineers, together with a report of Captain Chittenden. 55th Cong., 2d sess., House Doc. 141. 1898.

Irrigation pumping in Nevada, etc., by Charles A. Norcross: Nevada bureau of industry, agriculture, and irrigation Bull. 8, 1913.

Report of irrigation investigations in Utah under the direction of Elwood Mead: U. S. Dept. Agr. Office Exper. Sta., Bull. 124, 1903.

Irrigation in Utah, Utah Irrigation Commission, 1894.

Irrigation and agricultural practice in Arizona, by R. H. Forbes: Univ. Arizona Agr. Exper. Sta. Bull. 63, 1911.

Ground-water supply and irrigation in Rillito Valley, Arizona: Univ. Arizona, College of Agriculture, Exper. Sta., Bull. 64, 1910.

Oil engines for pump irrigation and the cost of pumping, by G. E. P. Smith: Univ. Arizona Exper. Sta. Bull. 74, 1915.

The lower Colorado River and the Salton Basin, by C. E. Grunsky: Am. Soc. Civil Eng. Trans., vol. 59, pp. 1–51; discussion, pp. 52–62, December, 1907.

Irrigation and river control in the Colorado River delta, by H. T. Cory: Am. Soc. Civil Eng. Trans., vol. 76, pp. 1204–1453; discussion, pp. 1454–1571, December, 1913.

AREAS AND PUBLICATIONS COVERED

A=Annual Reports; M=Monograph; B=Bulletin; P=Professional Paper; W=Water-Supply Paper; G F=Geologic folio]

[6]Many analyses of river, spring, and well waters are scattered through publications, as noted in abstract.

STREAMS ON WHICH GAGING STATIONS HAVE BEEN MAINTAINED

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