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

WATER-SUPPLY PAPER 307

SURFACE WATER SUPPLY OF THE UNITED STATES

1911

PART VII. LOWER MISSISSIPPI RIVER BASIN

PREPARED UNDER THE DIRECTION OF M. O. LEIGHTON

BY

W. B. FREEMAN AND H. J. DEAN

WASHINGTON
GOVERNMENT PRINTING OFFICE
1913

CONTENTS.

ILLUSTRATIONS.

SURFACE WATER SUPPLY OF THE LOWER MISSISSIPPI RIVER BASIN, 1911.

By W. B. FREEMAN and H. J. DEAN.

AUTHORIZATION OF WORK.

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

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

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

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

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

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

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

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

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

Annual appropriations for the fiscal year ending June 30—

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

In the execution of the work many private and State organizations have cooperated. Acknowledgement for such cooperation is made on page 13 and also in connection with the description of each station affected by the cooperative work.

PUBLICATIONS.

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

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

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

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

Report.	Character of data.	Year.
10th A, pt. 2	Descriptive information only	
11th A, pt. 2	Monthly discharge	1884 to Sept., 1890.
12th A, pt. 2	do	1884 to June 30, 1891.
13th A, pt. 3	Mean discharge in second-feet	1884 to Dec. 31, 1892.
14th A, pt. 2	Monthly discharge (long-time records, 1871 to 1893)	1888 to Dec. 31, 1893.
B 131	Descriptions, measurements, gage heights, and 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.
WS 11	Gage heights (also gage heights for earlier years)	1896.
18th A, pt. 4	Descriptions, measurements, ratings, and monthly discharge (also similar data for some earlier years).	1895 and 1896.
WS 15	Descriptions, measurements, and gage heights, eastern United States, eastern Mississippi River, and Missouri River above junction with Kansas.	1897.
WS 16	Descriptions, measurements, and gage heights, western Mississippi River below junction of Missouri and Platte, and western United States.	1897.
19th A, pt. 4	Descriptions, measurements, ratings, and monthly discharge (also some long-time records).	1897.
WS 27	Measurements, ratings, and gage heights, eastern United States, eastern Mississippi River, and Missouri River.	1898.
WS 28	Measurements, ratings, and gage heights, Arkansas River and western United States.	1898.
20th A, pt. 4	Monthly discharge (also for many earlier years)	1898.
WS 35 to 39	Descriptions, measurements, gage heights, and ratings	1899.
21st A, pt. 4	Monthly discharge	1899.
WS 47 to 52	Descriptions, measurements, gage heights, and ratings	1900.
22d A, pt. 4	Monthly discharge	1900.
WS C5, 66	Descriptions, measurements, gage heights, and ratings	1901.
WS 75	Monthly discharge	1901.
WS 82 to 85	Complete data	1902.
WS 97 to 100	do	1903.
WS 124 to 135	do	1904.
WS 165 to 178	do	1905.
WS 201 to 214	Complete data, except descriptions	1906.
WS 241 to 252	Complete data	1907–8.
WS 261 to 272	do	1909.
WS 281 to 292	do	1910.
WS 301 to 312	do	1911.

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

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

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

	1899 [a]	1900 [b]	1901	1902	1903	1904
North Atlantic coast (St. John River to York River)	35	47, [c] 48	65, 75	82	97	[d] 124, [e] 125, [f] 126
South Atlantic coast and eastern Gulf of Mexico (James River to the Mississippi)	[g] 35, 36	48	65, 75	[g] 82, 83	[g] 97, 98	[f] 126, 127
Ohio River basin	36	48, [h] 49	65, 75	83	98	128
St. Lawrence River and Great Lakes	36	49	65, 75	[i] 82, 83	97	129
Hudson Bay and upper Mississippi River	36	49	[j] 65, 66, 75	[j] 83, 85	[j] 98, 99, [k] 100	[j] 128, 130
Missouri River	[l] 36, 37	49, [m] 50	66, 75	84	99	130, [n] 131
Lower Mississippi River	37	50	[j] 65, 66, 75	[j] 83, 84	[j] 98, 99	[j] 128, 131
Western Gulf of Mexico	37	50	66, 75	84	99	132
Colorado River	[o] 37, 38	50	66, 75	85	100	133
Great Basin	38, [q] 39	51	66, 75	85	100	133, [r] 134
Pacific coast in California	38, [s] 30	51	66, 75	85	100	134
North Pacific coast	38	51	66, 75	85	100	135

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

[a] Rating tables and index to Water-Supply Papers 35–39 continued in Water-Supply Paper 39.
[b] Rating tables and index to Water-Supply Papers 47–52 and data on precipitation, wells, and irrigation in California and Utah contained in Water-Supply Paper 52.
[c] Wissahickon and Schuylkill rivers to James River.
[d] New England rivers only.
[e] Hudson River to Delaware River, inclusive.
[f] Susquehanna River to Yadkin River, inclusive.
[g] James River only.
[h] Scioto River.
[i] Lake Ontario and tributaries to St. Lawrence River proper.
[j] Tributaries of Mississippi from east.
[k] Hudson Bay only.
[l] Gallatin River.
[m] Loup and Platte rivers near Columbus, Nebr., and all tributaries below junction with Platte.
[n] Platte and Kansas rivers.
[o] Green and Gunnison rivers and Grand River above junction with Gunnison.
[p] Below junction with Gila.
[q] Mohave river only.
[r] Great Basin in California, excepting Truckee and Carson drainage basins.
[s] Kings and Kern rivers and south Pacific coast drainage basins.
[t] Rogue, Umpqua, and Siletz rivers only.

DEFINITION OF TERMS.

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

mile, run-off in depth in inches, and acre-feet. They may be defined as follows:

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

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

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

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

CONVENIENT EQUIVALENTS.

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

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

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

NOTE.—For partial month multiply the values for 1 day by the number of days.

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

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

NOTE.—For partial month multiply values for 1 day by the number of days.

1 second-foot equals 40 California miner's inches (law of March 23, 1901).
1 second-foot equals 38.4 Colorado miner's inches.
1 second-foot equals 40 Arizona miner's inches.
1 second-foot equals 7.48 United States gallons per second; equals 448.8 gallons per minute; equals 646,317 gallons for one day.
1 second-foot for one year covers 1 square mile 1.131 feet or 13.572 inches deep.
1 second-foot for one year equals 31,536,000 cubic feet.
1 second-foot equals about 1 acre-inch per hour.
1 second-foot for one day equals 86,400 cubic feet.
1,000,000,000 (1 United States billion) cubic feet equals 11,570 second-feet for one day.
1,000,000,000 cubic feet equals 414 second-feet for one 28-day month.
1,000,000,000 cubic feet equals 399 second-feet for one 29-day month.
1,000,000,000 cubic feet equals 386 second-feet for one 30-day month.
1,000,000,000 cubic feet equals 373 second-feet for one 31-day month.
100 California miner's inches equals 18.7 United States gallons per second.
100 California miner's inches for one day equals 4.96 acre-feet.
100 Colorado miner's inches equals 2.60 second-feet.
100 Colorado miner's inches equals 19.5 United States gallons per second.
100 Colorado miner's inches for one day equals 5.17 acre-feet.
100 United States gallons per minute equals 0.223 second-foot.
100 United States gallons per minute for one day equals 0.442 acre-foot.
1,000,000 United States gallons per day equals 1.55 second-feet.
1,000,000 United States gallons equals 3.07 acre-feet.
1,000,000 cubic feet equals 22.95 acre-feet.
1 acre-foot equals 325,850 gallons.
1 inch deep on 1 square mile equals 2,323,200 cubic feet.
1 inch deep on 1 square mile equals 0.0737 second-foot per year.
1 foot equals 0.3048 meter.
1 mile equals 1.60935 kilometers.
1 mile equals 5,280 feet.
1 acre equals 0.4047 hectare.
1 acre equals 43,560 square feet.
1 acre equals 209 feet square, nearly.
1 square mile equals 2.59 square kilometers.
1 cubic foot equals 0.0283 cubic meter.
1 cubic foot of water weighs 62.5 pounds.
1 cubic meter per minute equals 0.5886 second-foot.
1 horsepower equals 550 foot-pounds per second.
1 horsepower equals 76.0 kilogram-meters per second.
1 horsepower equals 746 watts.
1 horsepower equals 1 second-foot falling 8.80 feet.
1½ horsepower equal about 1 kilowatt.

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

EXPLANATION OF DATA.

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

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

The table of daily gage heights records the daily fluctuations of the surface of the river as found from the mean of the gage readings taken each day, usually in the morning and in the evening. The gage height given in the table represents the elevation of the surface of the water above the zero of the gage. All gage heights affected by the presence of ice in the streams or by backwater from obstructions are published as recorded, with suitable footnotes. The rating table is not applicable for such periods unless the proper corrections to the gage heights are known and applied. Attention is called to the fact that the zero of the gage is placed at an arbitrary datum and has no relation to zero flow or the bottom of the river. In general the zero is located somewhat below the lowest known flow, so that readings of negative values shall not occur.

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

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

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

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

In the table of monthly discharge the column headed "Maximum" gives the mean flow, as determined from the rating table, for the day

when the mean gage height was highest. As the gage height is the mean for the day, it does not indicate correctly the stage when the water surface was at crest height, and the corresponding discharge was consequently larger than given in the maximum column. Likewise in the column of "Minimum" the quantity given is the mean flow for the day when the mean gage height was lowest. The column headed "Mean" is the average flow in cubic feet for each second during the month. On this the computations for the remaining columns, which are defined on pages 8–9, are based.

The field methods used in the collection of the data presented in this series of reports are described in the introductory sections of Water-Supply Papers 261 to 272, inclusive, "Surface water supply of the United States, 1909."

Plates I and II show the average precipitation and run-off in the United States, as determined from the measurements of stream flow made by the Geological Survey and records of rainfall collected by the Weather Bureau.

Plate III shows typical gaging stations.

Plate IV shows current meters [1] used in the work.

ACCURACY AND RELIABILITY OF FIELD DATA AND COMPARATIVE RESULTS.

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

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

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

The accuracy column in the monthly discharge table does not apply to the maximum or minimum nor to any individual day, but to the monthly mean. It is based on the accuracy of the rating, the probable reliability of the observer, and knowledge of local conditions.

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

ENGRAVED AND PRINTED BY THE U.S. GEOLOGICAL SURVEY

MAP OF UNITED STATES, SHOWING MEAN ANNUAL PRECIPITATION

Blue lines and figures indicate average annual precipitation in depth in inches

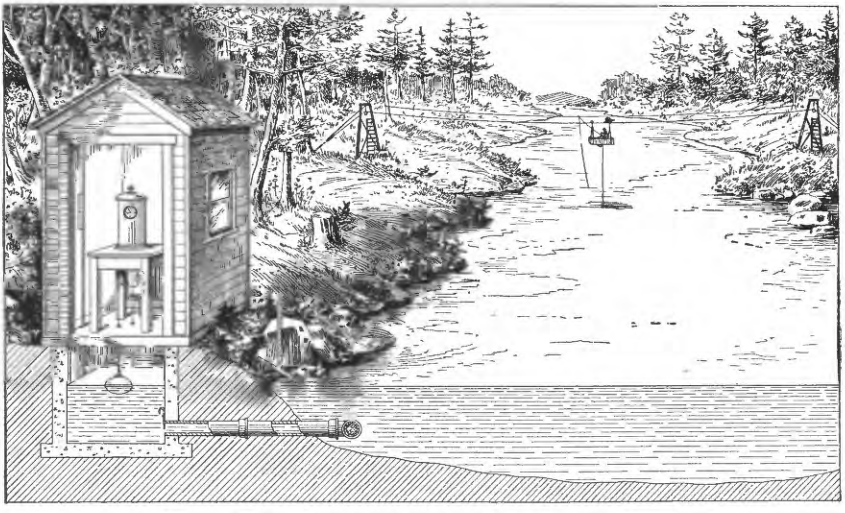
Prepared by Henry Gannett
mainly from data of the
United States Geological Survey
and United States Weather Bureau

ENGRAVED AND PRINTED BY THE U. S. GEOLOGICAL SURVEY

MAP OF UNITED STATES, SHOWING MEAN ANNUAL RUN-OFF

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

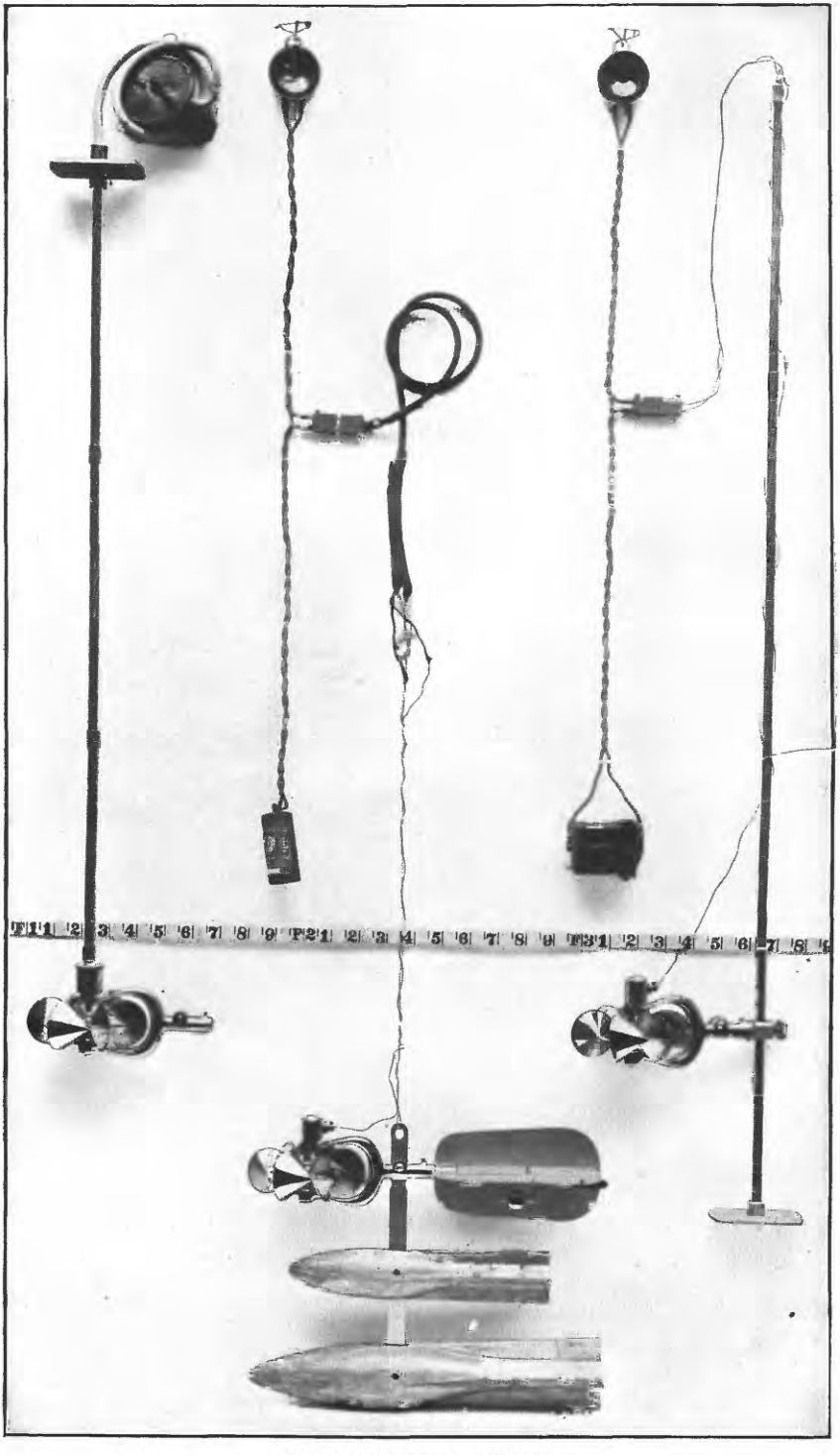
Prepared by Henry Gannett
mainly from data of the
United States Geological Survey



A. CABLE STATION, WITH AUTOMATIC GAGE.

B. FOR BRIDGE MEASUREMENT.

TYPICAL GAGING STATIONS



SMALL PRICE CURRENT METERS.

In this column A indicates that the mean monthly flow is probably accurate within 5 per cent; B, within 10 per cent; C, within 15 per cent; D, within 25 per cent. Special conditions are covered by footnotes.

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

In general the base data collected each year by the Survey engineers are published not only to comply with the law but to afford any engineer the means of examining and adjusting to his own needs the results of the computations. The table of monthly discharge is so arranged as to give only a general idea of the flow at the station and should not be used for other than preliminary estimates. The determinations of daily discharge allow more detailed studies of the variation in flow by which the period of deficiency may be determined.

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

COOPERATION AND ACKNOWLEDGMENTS.

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

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

Mr. C. W. Comstock, State engineer, furnished the field data on a number of stations on Arkansas River and cooperated in the maintenance of other stations. He also furnished complete records at several stations.

The Central Land & Irrigation Co. paid the field expenses incurred at the stations in the Big Sandy basin.

The work in New Mexico was carried on in cooperation with Mr. C. D. Miller, Territorial engineer, who paid the field expenses incurred at most of the stations. Cooperation with the Atchison, Topeka & Santa Fe Railway Co. and with individuals was arranged by the Territorial engineer.

The work in Mississippi was carried on in cooperation with the Tallahatchie Drainage Commission.

DIVISION OF WORK.

The field data in Colorado were collected under the direction of W. B. Freeman, district engineer, who was assisted by G. A. Gray, E. O. Christiansen, J. B. Stewart, G. H. Russell, O. M. Wimmer, and H. B. Waha. Assistance in New Mexico was also rendered by R. L. Cooper and C. B. Digby, of the Territorial engineer's office.

The field data in the Yazoo River basin were collected by engineers of the Tallahatchie Drainage Commission.

The rating curves, except those for certain stations, the data for which were furnished completely by the State of Colorado, were made by W. B. Freeman, M. R. Hall, and H. J. Dean. The computations were made by G. A. Gray, H. J. Dean, C. L. Batchelder, M. I. Walters, and G. A. Wallace.

The manuscript was edited by Mrs. B. D. Wood.

GAGING-STATION RECORDS.

ARKANSAS RIVER BASIN.

EAST FORK OF ARKANSAS RIVER NEAR LEADVILLE, COLO.

Location.—At highway bridge in sec. 16, T. 9 S., R. 80 W., about 300 yards above mouth of Tennessee Fork, in Leadville National Forest, 3 miles northwest of Leadville.

Records available.—April to August 31, 1890; June 18 to September 29, 1903; June 5, 1911, to December 31, 1911.

Drainage area.—52 square miles, measured from topographic sheet.

Gage.—Vertical staff.

Channel.—Apparently permanent.

Discharge measurements.—Made from bridge during high water and by wading at ordinary stages.

Winter flow.—Ice causes backwater during the winter months.

Diversions.—There is a court decree for a diversion of 2 second-feet above the station.

Accuracy.—Conditions are favorable for accurate results, and the estimates should be reliable.

Cooperation.—Station maintained in cooperation with the United States Forest Service.

Discharge measurements of East Fork of Arkansas River near Leadville, Colo., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
June 5	O. M. Wimmer	0.95	188
July 11	do	.65	106
Aug. 2	do	.35	38.9
Sept. 14	do	.20	14.2
Dec. 25	H. B. Waha[a]	1.30	10.2

[a] Ice on stream. Discharge obtained by subtracting the discharge of Tennessee Fork from the discharge of Arkansas River below the confluence with the Tennessee Fork.

Daily gage height, in feet, of East Fork of Arkansas River near Leadville, Colo., for 1911.

[M. F. Frey, observer.]

Day.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1							
2		0.85	0.45				
3						0.8	
4		.8					
5	1.0			0.2			
6					0.35		
7		.8					
8						.45	
9		.75					0.7
10			.4				
11		.65	.35				
12							
13	.85						
14			.3	.2	.2		
15							
16		.55	.3		.15		
17			.25			.5	
18	.8		.25				.6
19							
20							
21	.8					.6	
22		.6					
23		.6			.5		
24	.85						
25	.8						1.3
26		.45					
27	.45		.25				
28			.25				
29				.2			
30							
31							

NOTE.—Gage heights affected by ice from Oct. 23 to Dec. 31, 1911.

Daily discharge, in second feet, of East Fork of Arkansas River near Leadville, Colo., for 1911.

Day.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1							
2		162	60				
3							
4		148					
5	205			14			
6					40		
7		148					
8							
9		134					
10			49				
11		107	40				
12							
13	162						
14			30	14	14		
15							
16		82	30		9		
17			22				
18	148		22				
19							
20							
21	148						
22		94					
23		94					
24	162						
25	148						10
26		60					
27	60		22				
28			22				
29				14			
30							
31							

NOTE.—Daily discharge determined from a well-defined rating curve. Discharge Oct. 23 to Dec. 31, 1911, not determined on account of ice.

ARKANSAS RIVER AT GRANITE, COLO.

Location.—At Granite, in sec. 31, T. 11 S., R. 79 W.; below the mouth of Lake Creek and above Lost Canyon and Clear creeks.

Records available.—May 1, 1897, to September 10, 1899; April 6, 1910, to December 31, 1911.

Drainage area.—425 square miles.

Gage.—Automatic recording gage established in 1910; datum of recording gage bears no determined relation to that of the vertical staff gage which was used from 1897 to 1899 and which was located at the highway bridge near the railroad station.

Channel.—Practically permanent.

Discharge measurements.—Made from car and cable.

Winter flow.—Ice causes backwater during the winter months and the records are discontinued.

Artificial control.—The discharge is affected by the operation of the Twin Lakes reservoir and by a flume used to carry water from Lake Creek to a point below the station.

Diversions.—There are court decrees for diversions of 76 second-feet from the Arkansas between this station and the junction of Tennessee and East forks, and diversions of 22 second-feet from the intervening tributaries.

Cooperation.—Since 1910 this station has been maintained and records have been furnished by the State engineer of Colorado.

Discharge measurements of Arkansas River at Granite, Colo., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Jan. 27[a]	Grieve and Clayton	2.90	79	July 24	Thos. Grieve	2.75	667
Feb. 25[a]	Thos. Grieve	2.90	65	Aug. 10	Hezmalhalch and Bunger	2.30	399
Mar. 24	do	1.42	96	Sept. 12	do	1.85	206
Apr. 19	do	1.67	148	Oct. 11	M. E. Bunger	1.84	199
May 11	do	3.00	848	Dec. 12[a]	do	1.40	45
June 20	C. C. Hezmalhalch	3.60	1,400		do		

[a] Ice in stream.

Daily gage height, in feet, of Arkansas River at Granite, Colo., for 1911.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	.....	.....	1.5	2.45	3.3	3.15	2.85	2.0	1.9	1.65	1.6
2	.....	.....	.....	1.55	2.4	3.4	3.2	2.75	2.0	1.8	1.65	1.7
3	.....	.....	.....	1.55	2.3	3.4	3.45	2.75	2.0	1.75	1.55	1.6
4	.....	.....	.....	1.35	2.6	3.45	3.4	2.85	1.95	1.7	1.6	1.6
5	.....	.....	.....	1.4	2.6	3.6	3.5	2.7	1.9	2.0	1.6	1.65
6	.....	.....	.....	1.4	2.8	3.7	3.1	2.55	1.85	2.0	1.6	1.65
7	.....	.....	.....	1.4	2.85	3.7	2.85	2.5	1.8	1.85	1.55	1.6
8	.....	.....	.....	1.45	2.95	3.8	3.1	2.0	1.8	1.85	1.6	1.6
9	.....	.....	.....	1.45	3.2	3.85	3.25	2.15	1.85	1.9	1.55	1.6
10	.....	.....	.....	1.5	3.2	3.8	3.25	2.25	1.85	1.9	1.65	1.6
11	.....	.....	.....	1.5	2.9	3.7	3.1	2.45	1.85	1.9	1.6	1.6
12	.....	.....	1.5	1.5	2.7	3.75	2.95	2.3	1.9	1.8	1.55	1.6
13	.....	.....	1.5	1.4	2.65	3.6	2.9	2.45	2.05	1.85	1.8	1.6
14	.....	.....	1.5	1.45	2.7	3.6	2.85	2.4	2.05	1.95	1.75	.....
15	.....	.....	1.5	1.65	2.8	3.8	2.8	2.3	2.10	2.0	1.65	.....
16	.....	.....	1.45	1.6	2.7	3.65	2.75	2.15	2.05	1.95	1.7	.....
17	.....	.....	1.5	1.65	2.9	3.6	2.75	2.2	2.15	1.9	1.65	.....
18	.....	.....	1.4	1.65	2.85	3.55	2.85	2.15	2.05	1.9	1.65	.....
19	.....	.....	1.4	1.8	2.9	3.55	2.85	2.65	1.90	1.9	1.65	.....
20	.....	.....	1.45	1.8	2.7	3.6	2.8	2.75	1.95	1.9	1.65	.....
21	.....	.....	1.5	1.9	2.6	3.6	2.8	2.85	1.95	1.95	1.6	.....
22	.....	.....	1.45	1.9	2.5	3.6	2.75	2.85	1.9	1.95	1.55	.....
23	.....	.....	1.45	1.95	2.65	3.55	2.7	2.6	1.9	1.9	1.5	.....
24	.....	.....	1.5	1.9	2.7	3.4	2.7	2.6	1.85	1.85	1.5	.....
25	.....	.....	1.45	1.9	2.8	3.3	2.55	2.9	1.8	1.75	1.55	.....
26	.....	.....	1.35	1.8	3.0	3.25	2.55	2.3	1.75	1.7	1.65	.....
27	.....	.....	1.3	2.1	3.0	3.25	2.6	2.65	1.7	1.7	1.6	.....
28	.....	.....	1.35	2.2	3.1	3.4	2.65	2.15	1.65	1.65	1.55	.....
29	.....	.....	1.35	2.4	3.1	3.35	2.6	2.2	1.7	1.65	1.55	.....
30	.....	.....	1.4	2.45	3.15	3.2	2.55	2.3	1.8	1.65	1.55	.....
31	.....	.....	1.45	.....	3.1	.....	2.5	2.0	.....	1.65	.....	.....

NOTE.—Gage heights affected by ice Jan. 1 to Mar. 11 and Dec. 3 to 31, 1911.

Daily discharge, in second-feet, of Arkansas River at Granite, Colo., for 1911.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	75	75	70	100	470	1,140	995	740	255	215	135	70
2	75	75	70	110	440	1,240	1,040	665	255	180	135	70
3	75	75	70	110	390	1,240	1,290	665	255	165	110	70
4	75	75	75	72	560	1,290	1,240	740	235	150	120	60
5	75	75	75	80	560	1,450	1,340	630	215	255	120	60
6	75	75	85	80	700	1,560	950	530	198	255	120	60
7	75	75	85	80	740	1,560	740	500	180	198	110	60
8	75	75	85	90	820	1,670	950	255	180	198	120	45
9	75	75	95	90	1,040	1,730	1,090	318	198	215	110	45
10	75	75	95	100	1,040	1,670	1,090	365	198	215	135	45
11	75	75	95	100	780	1,560	950	470	198	215	120	45
12	75	70	100	100	630	1,615	820	390	215	180	110	45
13	75	70	100	80	595	1,450	780	470	275	198	180	45
14	75	70	100	90	630	1,450	740	440	275	235	165	45
15	75	70	100	135	700	1,670	700	390	295	255	135	45
16	75	70	90	120	630	1,505	665	318	275	235	150	45
17	80	70	100	135	780	1,450	665	340	318	215	135	45
18	80	70	80	135	740	1,395	740	318	275	215	135	45
19	80	70	80	180	780	1,395	740	595	215	215	135	45
20	80	65	90	180	630	1,450	700	665	235	215	135	45
21	80	65	100	215	560	1,450	700	740	235	235	120	45
22	80	65	90	215	500	1,450	665	740	215	235	110	45
23	80	65	90	235	595	1,395	630	560	215	215	100	45
24	80	65	100	215	630	1,240	630	560	198	198	100	45
25	80	65	90	215	700	1,140	530	780	180	165	90	45
26	80	65	72	180	860	1,090	530	390	165	150	90	45
27	80	65	65	295	860	1,090	560	595	150	150	90	45
28	80	65	72	340	950	1,240	595	318	135	135	80	45
29	80	.....	72	440	950	1,190	560	340	150	135	80	45
30	80	.....	80	470	995	1,040	530	390	180	135	80	45
31	80	.....	90	.....	950	.....	500	255	.....	135	.....	45

NOTE.—Daily discharge, Jan. 1 to Mar. 11 and Dec. 3 to 31, estimated on account of ice.

Monthly discharge of Arkansas River at Granite, Colo., for 1911.

[Drainage area, 425 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
January	80	75	77	0.181	0.21	4,740
February	75	65	70	.165	.17	3,890
March	100	65	86	.202	.23	5,290
April	470	72	166	.391	.44	9,890
May	1,040	390	716	1.68	1.94	43,700
June	1,730	1,040	1,290	3.04	3.39	82,900
July	1,340	500	795	1.87	2.16	48,700
August	780	255	499	1.17	1.35	30,700
September	318	135	219	.515	.57	13,000
October	255	135	197	.464	.53	12,100
November	180	80	118	.278	.31	7,050
December	70	45	49	.115	.13	3,040
The year	1,730	45	367	.864	11.43	265,000

NOTE.—No accuracy notes given, as the entire record was furnished by the State engineer of Colorado.

ARKANSAS RIVER AT SALIDA, COLO.

Location.—At Salida, Colo., some distance above the mouth of South Fork of Arkansas River, the nearest tributary of importance.

Records available.—April 11, 1895, to October 31, 1903; November 3, 1909, to December 31, 1911.

Drainage area.—1,160 square miles.

Gage.—Automatic recording gage. No determined relation between automatic gage and the gage used from 1895 to 1903.

Channel.—Rough; somewhat shifting.

Winter flow.—Springs keep the river open during the winter months.

Diversions.—There are court decrees for diversions of 148 second-feet from the Arkansas between this station and Granite, and diversions of 380 second-feet from intervening tributaries.

Cooperation.—Since 1909 this station has been maintained and records have been furnished by the State engineer of Colorado.

Discharge measurements of Arkansas River at Salida, Colo., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Jan. 27	Thos. Grieve	0.56	213	June 22	C. C. Hezmalhalch	4.79	2,990
28	B. S. Clayton	.58	209	Aug. 11	Hezmalhalch and Bunger	1.90	790
Feb. 25	Thos. Grieve	.62	226				
Mar. 24	.....do	.79	265	Sept. 13	M. E. Bunger	1.32	464
Apr. 20	.....do	.80	289	Oct. 12	.....do	1.70	657
May 12	.....do	2.55	1,020	Dec. 16	.....do	.55	233

Daily gage height, in feet, of Arkansas River at Salida, Colo., for 1911.

[Howard Sneddon, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.4	0.6	0.5	0.65	1.6	3.4	3.55	2.6	1.85	1.5	1.15	0.8
2	.35	.55	.5	.7	1.5	3.6	4.65	2.65	1.85	1.65	1.15	.85
3	.35	.55	.55	.7	1.35	3.65	4.8	2.45	1.75	1.6	1.25	.75
4	.35	1.25	.55	.75	1.85	3.6	4.8	2.55	1.7	1.6	1.3	.8
5	.3	1.3	.6	.7	1.9	3.85	4.9	2.35	1.6	2.05	1.2	.8
6	.4	.7	.6	.65	2.2	4.15	4.6	2.25	1.5	2.35	1.0	.9
7	.45	.7	.55	.6	2.5	4.15	3.75	2.25	1.3	1.9	1.05	.85
8	.55	.7	.55	.6	2.6	4.2	3.6	1.95	1.25	1.85	1.15	.75
9	.55	.7	.6	.6	2.8	4.45	3.8	1.75	1.25	1.85	1.15	.7
10	.6	.65	.8	.65	2.9	4.2	3.8	1.75	1.25	1.85	1.2	.75
11	.6	.6	.75	.6	2.8	4.15	3.7	1.9	1.3	1.8	1.2	.65
12	.5	.6	.6	.6	2.5	4.25	3.8	1.85	1.3	1.7	.9	.55
13	.5	.6	.6	.55	2.4	4.25	3.75	1.9	1.45	1.6	1.0	.6
14	.5	.6	.55	.5	2.35	4.2	3.7	1.85	1.45	1.6	1.1	.55
15	.5	.6	.6	.5	2.5	4.5	3.5	1.85	1.55	1.7	1.05	.5
16	.55	.6	.6	.55	2.35	4.5	3.3	1.75	1.55	1.6	1.05	.6
17	.55	.6	.7	.65	2.45	4.3	3.2	1.75	1.5	1.65	1.0	.55
18	.5	.6	.6	.65	2.5	4.3	3.2	1.75	1.4	1.55	1.0	.5
19	.5	.55	.6	.75	2.55	4.2	3.45	2.1	1.25	1.5	1.15	.6
20	.5	.5	.6	.85	2.4	4.3	3.35	2.35	1.3	1.5	1.1	.6
21	.55	.5	.65	.85	2.2	4.4	2.8	2.5	1.3	1.5	1.1	.5
22	.5	.45	.7	.9	2.15	4.6	3.15	2.6	1.2	1.5	1.0	.45
23	.45	.4	.65	.95	2.2	4.4	3.1	2.35	1.2	1.5	.9	.6
24	.5	.45	.65	1.0	2.35	4.2	3.05	2.55	1.3	1.5	.95	.6
25	.5	.55	.7	1.0	2.6	4.15	2.95	2.65	1.3	1.5	.9	.55
26	.5	.5	.6	.95	2.8	3.9	3.05	2.2	1.25	1.5	1.15	.5
27	.55	.5	.55	1.1	2.8	3.8	2.85	2.3	1.2	1.5	1.0	.5
28	.6	.5	.6	1.25	2.95	3.95	2.85	1.9	1.2	1.5	.8	.6
29	.6	.....	.55	1.4	3.1	3.85	2.75	1.95	1.1	1.2	.75	.6
30	.6	.....	.6	1.5	3.2	3.6	2.7	2.05	1.3	1.15	.85	.6
31	.6	.....	.6	.....	3.2	.....	2.45	1.9	.....	1.25	.....	.55

NOTE.—Gage heights Oct. 22 to 27, 1911, estimated.

Daily discharge, in second-feet, of Arkansas River at Salida, Colo., for 1911.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	175	215	195	228	540	1,680	1,815	1,110	758	555	395	280
2	168	205	195	240	500	1,860	2,860	1,175	758	635	395	295
3	168	205	205	240	440	1,905	3,010	1,040	695	605	435	265
4	168	402	205	252	655	1,860	3,010	1,130	665	605	455	280
5	160	420	215	240	680	2,085	3,110	1,000	605	888	415	280
6	175	240	215	228	830	2,360	2,810	960	555	1,110	340	310
7	185	240	205	215	1,000	2,360	1,995	970	455	790	358	295
8	205	240	205	215	1,070	2,410	1,860	790	435	758	395	265
9	205	240	215	215	1,210	2,660	2,040	680	435	758	395	250
10	215	228	265	228	1,280	2,410	2,040	690	435	758	415	265
11	215	215	252	215	1,210	2,360	1,950	790	455	725	415	238
12	195	215	215	215	1,000	2,460	2,040	758	455	665	310	215
13	195	215	215	205	940	2,460	1,995	790	530	605	340	225
14	195	215	205	195	912	2,410	1,950	758	530	605	375	215
15	195	215	215	195	1,000	2,710	1,770	758	580	665	358	205
16	205	215	215	205	912	2,710	1,600	695	580	605	358	225
17	205	215	240	228	970	2,510	1,520	695	555	635	340	215
18	195	215	215	228	1,000	2,510	1,520	695	505	580	340	205
19	195	205	215	252	1,035	2,410	1,725	920	435	555	395	225
20	195	195	215	278	940	2,510	1,640	1,110	455	555	375	225
21	205	195	228	278	830	2,610	1,210	1,230	455	555	375	205
22	195	185	240	290	805	2,810	1,480	1,315	415	555	340	195
23	185	175	228	305	830	2,610	1,440	1,110	415	555	310	225
24	195	185	228	320	912	2,410	1,400	1,272	455	555	325	225
25	195	205	240	320	1,070	2,360	1,320	1,358	455	555	310	215
26	195	195	215	305	1,210	2,130	1,400	995	435	555	395	205
27	205	195	205	350	1,210	2,040	1,245	1,070	415	555	340	205
28	215	195	215	402	1,320	2,175	1,245	790	415	555	280	225
29	215	.....	205	460	1,440	2,085	1,175	822	375	415	265	225
30	215	.....	215	500	1,520	1,860	1,140	888	455	395	295	225
31	215	.....	215	.....	1,520	.....	980	790	.....	435	.....	215

NOTE.—Daily discharge determined from well-defined rating curves applicable as follows: Jan. 1 to July 29 and Aug. 12 to Dec. 31. Discharge July 30 to Aug. 11 determined by indirect method for shifting channels.

Monthly discharge of Arkansas River at Salida, Colo., for 1911.

[Drainage area, 1,160 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
January	215	160	195	0.168	0.19	12,000
February	420	175	224	.193	.20	12,500
March	265	195	218	.188	.22	13,400
April	500	195	268	.231	.26	16,000
May	1,520	440	993	.856	.99	61,100
June	2,810	1,680	2,320	2.00	2.23	138,000
July	3,010	980	1,820	1.57	1.81	112,000
August	1,360	680	940	.810	.93	57,800
September	758	375	506	.436	.49	30,100
October	1,110	395	624	.538	.62	38,400
November	455	265	361	.311	.35	21,500
December	295	195	237	.204	.24	14,600
The year	3,010	160	728	.628	8.53	527,000

NOTE.—No accuracy notes given, as the entire record was furnished by the State engineer of Colorado.

ARKANSAS RIVER AT CANON CITY, COLO.

Location.—Just below the suspension bridge at Hot Springs Hotel, at the mouth of the canyon, and 1½ miles above Canon City. The nearest important tributary is Grape Creek, which enters above.

Records available.—May 1, 1888, to December 31, 1911.

Drainage area.—3,060 square miles.

Gage.—Automatic recording gage established by the State engineer in September, 1909. The original Geological Survey gage was established April 17, 1889. On October 4, 1895, a new staff gage was established on the left bank opposite the original gage and referred to the same datum. At low stages it read 0.4 foot lower than the original gage, but at high stages the readings were the same. On August 26, 1902, a gage was established on the right bank near the first gage, and referred to the same datum. The datum of the recording gage now used is 2.00 feet higher than that of the last gage.

Channel.—The channel shifts to such an extent during high water that at times it is necessary to move the gage in order to obtain the gage heights.

Discharge measurements.—Made from car and cable.

Winter flow.—Ice causes backwater during the winter months.

Diversions.—There are court decrees for diversions of 131 second-feet from the Arkansas between the stations at Canon City and Salida, and diversions of 2,286 second-feet from intervening tributaries.

Cooperation.—During 1911 this station was maintained and records were furnished by the State engineer of Colorado.

Discharge measurements of Arkansas River at Canon City, Colo., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Jan. 17	G. H. Russell	3.55	322	June 23	C. C. Hezmalhalch	6.65	2,930
29	Grieve and Clayton	3.44	277	July 23	Thos. Grieve	5.55	1,760
29	do	3.44	289	Aug. 13	Hezmalhalch and Bunger	4.42	676
Feb. 20	G. H. Russell	3.50	268	Sept. 13	M.E. Bunger	3.98	414
Mar. 23	Thos. Grieve	3.88	423	Oct. 13	do	6.96	1,210
Apr. 20	do	3.38	269	Nov. 21	B. S. Clayton	6.60	464
May 12	do	4.87	1,110	Dec. 17	M. E. Bunger	6.20	330

Daily gage height, in feet, of Arkansas River at Canon City, Colo., for 1911.

[S. R. McKissick, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.5	3.5	3.55	3.55	4.05	5.65	5.9	5.05	4.45	4.2	6.8	6.5
2	3.35	3.4	3.65	3.55	4.0	5.85	6.25	5.2	4.4	4.35	6.8	6.5
3	3.3	3.4	3.65	3.5	3.85	5.9	6.9	4.95	4.4	4.3	6.75	6.5
4	3.4	3.55	3.65	3.6	3.95	5.95	7.1	5.0	4.4	4.2	6.7	6.5
5	3.55	4.0	3.75	3.5	4.25	6.05	7.05	4.85	4.3	4.45	6.7	6.5
6	3.55	3.9	3.75	3.5	4.35	6.3	7.15	4.75	4.2	7.2	6.75	6.5
7	3.65	3.55	3.7	3.45	4.6	6.35	6.35	4.6	4.1	7.55	6.7	6.5
8	3.7	3.5	3.7	3.4	4.85	6.4	6.1	4.55	4.0	7.7	6.7	6.5
9	3.7	3.5	3.85	3.4	5.05	6.55	6.15	4.2	4.0	7.4	6.7	6.45
10	3.7	3.55	4.1	3.35	5.15	6.55	6.15	4.2	3.95	7.25	6.7	6.4
11	3.75	3.5	4.15	3.4	5.1	6.3	6.1	4.75	3.9	7.1	6.7	6.4
12	3.65	3.5	3.95	3.3	4.9	6.45	6.05	4.55	3.9	7.0	6.7	6.4
13	3.6	3.5	3.85	3.3	4.7	6.4	6.1	4.45	3.95	6.95	6.7	6.4
14	3.5	3.45	3.75	3.3	4.7	6.55	6.2	4.5	4.0	6.9	6.7	6.4
15	3.45	3.45	3.75	3.25	4.75	6.55	5.85	4.4	4.15	6.9	6.7	6.4
16	3.55	3.5	3.75	3.25	4.8	6.9	6.0	4.25	4.1	6.85	6.6	6.4
17	3.6	3.55	3.75	3.25	4.8	6.6	5.7	4.3	4.1	6.85	6.6	6.4
18	3.55	3.55	3.75	3.4	4.95	6.55	5.85	4.35	4.05	6.8	6.6	6.4
19	3.5	3.6	3.7	3.35	5.05	6.55	5.9	4.3	4.0	6.85	6.6	6.4
20	3.5	3.55	3.75	3.4	5.05	6.55	6.0	4.3	3.95	6.85	6.6	6.4
21	3.6	3.5	3.85	3.4	4.8	6.65	5.85	4.9	4.0	6.8	6.6	6.4
22	3.55	3.45	3.85	3.4	4.65	6.8	5.75	5.35	4.0	6.8	6.55	6.4
23	3.5	3.4	3.85	3.45	4.6	6.6	6.7	5.45	4.0	6.8	6.5	6.4
24	3.55	3.5	3.85	3.55	4.65	6.55	5.75	5.15	3.9	6.8	6.5	6.4
25	3.5	3.6	3.9	3.6	4.8	6.55	5.6	5.25	3.9	6.8	6.6	6.3
26	3.55	3.6	3.8	3.5	5.05	5.2	5.6	5.05	3.85	6.8	6.6	6.3
27	3.5	3.5	3.6	3.5	5.15	6.0	5.5	4.9	3.8	6.8	6.6	6.3
28	3.5	3.5	3.65	3.65	5.2	6.05	5.4	4.75	3.8	6.8	6.55	6.3
29	3.5	.....	3.65	3.75	5.35	6.05	5.3	4.65	3.8	6.8	6.5	6.3
30	3.5	.....	3.6	3.95	5.4	5.95	5.25	4.65	4.8	6.8	6.5	6.3
31	3.5	.....	3.65	.....	5.45	.....	5.05	4.6	.....	6.75	.....	6.3

Daily discharge, in second-feet, of Arkansas River at Canon City, Colo., for 1911.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	290	290	305	305	495	1,830	2,090	1,210	680	520	790	410
2	260	270	335	305	470	2,040	2,460	1,360	645	612	790	410
3	250	270	335	290	410	2,090	3,190	1,120	645	580	690	410
4	270	305	335	320	450	2,150	3,420	1,360	645	520	600	410
5	305	470	370	290	610	2,250	3,360	1,020	580	680	600	410
6	305	430	370	290	675	2,520	3,490	930	520	3,450	690	410
7	335	305	350	280	860	2,570	2,570	800	470	3,870	600	410
8	350	290	350	270	1,060	2,620	2,300	755	420	3,290	600	410
9	350	290	410	270	1,240	2,790	2,360	520	420	2,400	600	390
10	350	305	520	260	1,340	2,790	2,360	520	395	1,980	600	370
11	370	290	550	270	1,290	2,520	2,305	930	370	1,570	600	370
12	335	290	450	250	1,110	2,680	2,250	755	370	1,320	600	370
13	320	290	410	250	940	2,620	2,300	675	395	1,200	600	370
14	290	280	370	250	940	2,790	2,410	715	420	1,030	600	370
15	280	280	370	242	980	2,790	2,040	645	495	1,030	600	370
16	305	290	370	242	1,020	3,190	2,200	550	470	900	465	370
17	320	305	370	242	1,020	2,840	1,880	580	470	900	465	370
18	305	305	370	270	1,160	2,790	2,040	612	445	790	465	370
19	290	320	350	260	1,240	2,790	2,090	580	420	900	465	370
20	290	305	370	270	1,240	2,790	2,200	580	395	900	465	370
21	320	290	410	270	1,020	2,900	2,040	1,040	420	790	465	370
22	305	280	410	270	900	3,080	1,940	1,440	420	790	430	370
23	290	270	410	280	860	2,840	1,880	1,540	420	790	410	370
24	305	290	410	305	900	2,790	1,940	1,260	370	790	410	370
25	290	320	430	320	1,020	2,570	1,780	1,350	370	790	465	340
26	305	320	390	290	1,240	2,410	1,780	1,170	350	790	465	340
27	290	290	320	290	1,340	2,200	1,680	1,035	330	790	465	340
28	290	290	335	335	1,380	2,250	1,570	910	330	790	430	340
29	290	.....	335	370	1,530	2,250	1,460	830	330	790	410	340
30	290	.....	320	450	1,580	2,150	1,410	830	420	790	410	340
31	290	.....	335	.....	1,630	.....	1,210	790	.....	690	.....	340

NOTE.—Daily discharge determined from well-defined rating curves applicable as follows: Jan. 1 to July 23 and Aug. 14 to Oct. 7. Discharge July 24 to Aug. 13 determined by indirect method for shifting channels. Determinations Oct. 8 to Dec. 31 somewhat uncertain on account of the change in cross section during the flood in October.

Monthly discharge of Arkansas River at Canon City, Colo., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
January	370	250	304	18,700
February	470	270	305	16,900
March	550	305	380	23,300
April	450	242	287	17,000
May	1,630	410	1,030	63,300
June	3,190	1,830	2,560	152,000
July	3,490	1,210	2,190	135,000
August	1,540	520	917	56,400
September	680	330	448	26,600
October	3,870	520	1,200	73,500
November	790	410	542	32,200
December	410	340	374	23,000
The year	3,870	250	882	638,000

NOTE.—Accuracy notes are not given as the entire record was furnished by the State engineer of Colorado.

ARKANSAS RIVER AT PUEBLO COLO

Location.—At Main Street Bridge in Pueblo, 2 miles above the mouth of Fountain Creek, the nearest tributary.

Records available.—September 19, 1894, to December 31, 1911. From May 1, 1885, to September 30, 1886, a station was maintained at Pueblo by the State engineer. From June 1, 1887, to September 30, 1887, a station was maintained at a point 9 miles above Pueblo; from May 1, 1889, to August 31, 1889, the Geological Survey maintained the station 9 miles above Pueblo.

Drainage area.—4,600 square miles.

Gage.—An automatic gage located 150 feet below Main Street Bridge has been used since March 22, 1911. It is referred to the same datum as the chain gage on Main Street Bridge, which was installed July 7, 1905, but the slope of the river causes a difference in readings. A vertical staff placed at the Santa Fe Avenue Bridge on September 19, 1894, was used until July 10, 1898, when a second gage was placed at Main Street Bridge and used until March 3, 1900. From that date until July 14, 1902, a vertical staff near the Union Avenue Bridge was used. From that date until July 7, 1905, a staff gage referred to a different datum was used.

Channel.—The channel shifts to such an extent during high water that it has been necessary to move the gage in order to read the gage heights.

Discharge measurements.—Made from Main Street Bridge.

Winter flow.—Ice causes some slight backwater during the winter months.

Diversions.—There are court decrees for diversions of 637 second-feet from Arkansas River between the station at Canon City and Pueblo and diversions of 372 second-feet from intervening tributaries.

Cooperation.—From 1894 to 1908 this station was maintained by the United States Geological Survey. At present the station is maintained and records are furnished by the State engineer of Colorado.

Discharge measurements of Arkansas River at Pueblo, Colo., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Jan. 17	G. H. Russell	1.99	270	June 17	A. A. Weiland	4.83	2,750
30	Grieve and Clayton	1.90	194	22	C. C. Hezmalhalch	4.79	2,690
Feb. 19	G. H. Russell	2.03	283	July 1	A. A. Weiland	3.80	1,600
Mar. 21	C. L. Chatfield	2.11	278	5	....do	5.19	3,080
Apr. 13	....do	1.75	109	22	Thos. Grieve	3.88	1,650
15	A. A. Weiland	1.69	95.3	Aug. 14	Hezmalhalch and Bunger	2.82	661
17	C. L. Chatfield	1.70	105	Sept. 14	M. E. Bunger	2.46	352
May 30	A. A. Weiland	3.25	1,320	Oct. 13	....do	3.19	939

Daily gage height, in feet, of Arkansas River at Pueblo, Colo., for 1911.

[David J. Cox, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.15	1.95	2.05	2.0	2.4	3.65	3.85	3.45	3.05	2.65	2.9	2.7
2	2.5	1.9	2.1	2.05	2.4	3.85	4.1	3.6	3.0	2.95	2.95	2.7
3	2.05	1.95	2.15	2.1	2.4	3.85	4.7	3.5	2.85	2.9	2.95	2.7
4	2.6	1.8	2.05	2.05	2.25	3.85	5.15	3.35	2.95	2.75	2.95	2.6
5	2.75	2.1	2.1	2.05	2.5	4.0	5.2	3.4	2.9	2.85	2.95	2.55
6	2.55	2.25	2.05	2.0	2.7	4.05	5.25	3.2	2.75	4.15	2.95	2.55
7	2.65	2.15	2.1	1.95	2.7	4.3	5.2	3.05	2.65	5.10	2.9	2.5
8	2.6	1.85	2.05	1.75	3.1	4.4	4.45	3.05	2.5	4.05	2.85	2.5
9	2.75	1.9	2.1	1.8	3.25	4.45	4.35	2.8	2.55	3.6	2.85	2.5
10	2.7	1.95	2.2	1.7	3.3	4.75	4.25	2.6	2.45	3.45	2.9	2.5
11	2.6	1.95	2.5	1.8	3.5	4.4	4.25	2.65	2.4	3.3	2.95	2.5
12	2.25	1.95	2.4	1.75	3.35	4.4	4.15	3.2	2.45	3.25	2.85	2.65
13	2.05	1.95	2.15	1.8	3.0	4.4	4.15	2.95	2.4	3.35	2.8	2.65
14	2.05	2.00	2.05	1.7	3.1	4.45	4.25	2.95	2.5	3.05	2.7	2.7
15	2.1	1.9	2.05	1.7	3.0	4.5	4.2	2.9	2.65	3.05	2.8	2.65
16	2.05	1.95	2.10	1.65	3.1	5.2	4.6	2.9	2.7	3.2	2.8	2.65
17	2.05	2.0	2.05	1.7	3.05	4.9	4.05	2.75	2.7	3.15	2.8	2.65
18	1.9	2.05	2.1	1.6	3.05	4.75	3.95	2.85	2.7	3.25	2.8	2.65
19	1.95	2.0	2.05	1.8	3.2	4.6	4.5	2.7	2.45	3.2	2.9	2.65
20	1.9	2.05	2.1	1.8	3.4	4.55	4.2	3.15	2.5	3.25	2.9	2.7
21	1.95	2.1	2.05	1.8	3.15	4.7	4.35	3.25	2.5	3.2	2.75	2.65
22	1.9	2.1	2.2	1.9	3.05	4.8	4.3	3.7	2.55	3.2	2.7	2.6
23	2.05	2.0	2.15	1.95	2.95	4.8	4.1	3.95	2.55	3.2	2.65	2.6
24	2.0	2.05	2.2	2.15	3.0	4.6	4.05	3.55	2.55	3.2	2.65	2.7
25	2.0	2.05	2.05	2.15	3.05	4.35	3.9	3.75	2.45	3.25	2.6	2.8
26	1.95	2.2	2.1	2.1	3.2	4.25	3.9	3.75	2.45	3.2	2.6	2.75
27	1.95	2.1	2.1	2.0	3.35	4.1	3.8	3.4	2.45	3.25	2.7	2.6
28	1.95	2.2	2.05	2.0	3.95	3.95	3.75	3.35	2.4	3.15	2.7	2.6
29	1.9	.....	2.0	2.2	3.5	4.0	3.8	3.15	2.45	3.1	2.7	2.65
30	1.95	.....	1.95	2.25	3.7	3.95	3.55	3.15	2.35	2.95	2.7	2.65
31	1.9	.....	1.90	.....	3.6	.....	3.45	3.2	.....	2.9	.....	.....

NOTE.—Gage heights somewhat affected by ice Jan. 1 to 12 and Dec. 12 to 31, 1911.

Daily discharge, in second-feet, of Arkansas River at Pueblo, Colo., for 1911.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	265	235	295	265	535	1,550	1,620	1,200	822	500	700	540
2	250	205	325	295	535	1,750	1,890	1,350	780	740	740	540
3	250	235	358	325	535	1,750	2,540	1,240	660	700	740	540
4	250	150	295	295	425	1,740	3,030	1,100	740	580	740	460
5	250	325	325	295	610	1,880	3,080	1,140	700	660	740	425
6	275	425	295	265	770	1,930	3,140	955	580	1,950	740	425
7	275	358	325	235	770	2,190	3,080	822	500	2,980	700	390
8	275	178	295	125	1,130	2,290	2,280	822	390	1,840	660	390
9	290	205	325	150	1,280	2,340	2,170	620	425	1,350	660	390
10	290	235	390	100	1,320	2,670	2,060	460	355	1,200	700	390
11	290	235	610	150	1,520	2,260	2,060	500	320	1,050	740	390
12	290	235	535	125	1,380	2,250	1,950	955	355	1,000	660	400
13	295	235	358	150	1,040	2,240	1,950	740	320	1,100	620	400
14	295	265	295	100	1,130	2,280	2,060	740	390	822	540	400
15	325	205	295	100	1,040	2,320	2,000	700	500	822	620	400
16	295	235	325	82	1,130	3,120	2,440	700	540	955	620	400
17	295	265	295	100	1,080	2,760	1,840	580	540	910	620	400
18	205	295	325	65	1,080	2,600	1,740	660	540	1,000	620	400
19	235	265	295	150	1,220	2,440	2,330	540	355	955	700	400
20	205	295	325	150	1,420	2,380	2,000	910	390	1,000	700	400
21	235	325	295	150	1,160	2,540	2,170	1,000	390	955	580	350
22	205	325	390	205	1,060	2,660	2,120	1,460	425	955	540	350
23	295	265	358	235	960	2,660	1,890	1,740	425	955	500	350
24	265	295	390	358	1,000	2,440	1,840	1,300	425	955	500	350
25	265	295	295	358	1,040	2,170	1,680	1,520	355	1,000	460	350
26	235	390	325	325	1,170	2,060	1,680	1,520	355	955	460	350
27	235	325	325	265	1,310	1,890	1,570	1,140	355	1,000	540	350
28	235	390	295	265	1,910	1,740	1,520	1,100	320	910	540	350
29	205	.....	265	390	1,460	1,790	1,570	910	355	865	540	350
30	235	.....	235	425	1,620	1,740	1,300	910	290	740	540	350
31	205	.....	205	.....	1,510	.....	1,200	955	.....	700	.....	350

NOTE.—Daily discharge determined as follows: Jan. 1 to 12 estimated on account of ice; Jan. 13 to May 30, from a well-defined curve; May 21 to June 17, by the indirect method for shifting channels; June 18 to Dec. 11, from a well-defined curve. Discharge Dec. 12 to 31 estimated on account of ice.

Monthly discharge of Arkansas River at Pueblo, Colo., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
January	325	205	259	15,900
February	425	150	275	15,300
March	610	205	331	20,400
April	425	65	217	12,900
May	1,910	425	1,100	67,800
June	3,120	1,550	2,210	132,000
July	3,140	1,200	2,060	127,000
August	1,740	460	977	60,100
September	822	290	463	27,600
October	2,980	500	1,040	63,700
November	740	460	625	37,200
December	540	350	398	24,500
The year	3,140	65	834	604,000

NOTE.—Accuracy notes not given, as the entire record was furnished by the State engineer of Colorado.

ARKANSAS RIVER NEAR NEPESTA, COLO.

Location.—At the dam of the Oxford Farmers' Canal Co. in sec. 31, T. 21 S., R. 60 W., 1½ miles above Nepesta; about 6 miles below the mouth of Huerfano River, the nearest important tributary.

Records available.—September 8, 1897, to October 31, 1903; July 14, 1909, to December 15, 1911.

Drainage area.—9,130 square miles.

Gage.—An automatic recording gage with its zero coinciding with the lowest point of the diversion dam has been in use since 1910. There is no known relation between the present gage and that used in 1903.

Channel.—The diversion dam is the control point, and as the results show shifting conditions it is evident the dam is not permanent.

Discharge measurements.—Made from the bridge at Nepesta except during low water, when measurements are made by wading. Between the gage and the measuring section is a wasteway from the canal. The flow at this point is subtracted from the flow at the bridge in order to show the amount of water below the canal.

Winter flow.—Ice causes backwater during a portion of the winter months.

Diversions.—There are court decrees for diversions of 1,552 second-feet from the Arkansas between Pueblo and Nepesta, and approximately 1,600 second-feet from intervening tributaries. The records do not include the flow of the canal.

Cooperation.—Since 1909 this station has been maintained and records have been furnished by the State engineer of Colorado.

Discharge measurements of Arkansas River near Nepesta, Colo., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Feb. 1	Thos. Grieve	0.70	237	May 27	A. A. Weiland	1.42	1,146
Mar. 21	C. L. Chatfield	.82	229	June 8	do	1.6	1,633
Apr. 13	do	.33	67	16	do	1.9	2,016
May 12	A. A. Weiland	1.22	1,158	30	do	1.58	1,600
19	Thos. Grieve	1.25	1,034				

Daily gage height, in feet, of Arkansas River near Nepesta, Colo., for 1911.

[C. W. Cummings, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1			0.85	1.4	1.5	1.1	1.0	0.7	1.0	0.95
2			.9	1.45	1.75	1.1	.95	.8	1.05	.8
3		0.6	.85	1.55	1.9	.9	.95	.95	1.1	.75
4		.7	.8	1.4	2.05	1.0	1.05	.9	.5	.65
5		.7	.75	1.65	1.9	.8	1.0	.95	.85	.65
6		.7	.85	1.65	1.9	.8	.95	2.1	1.2	.6
7		.7	.8	1.6	2.25	.85	.9	1.7	1.1	.55
8		.7	1.15	1.75	1.75	.7	.9	1.3	1.1	.8
9			1.2	1.8	1.5	.5	.85	1.6	1.25	.75
10		.4	1.3	1.6	1.6	.9	.85	1.5	1.0	
11		.55	1.25	1.6	1.65	.9	.8	1.3	.95	.7
12		.4	1.2	1.45	1.65	.95	.8	1.1	1.1	.8
13		.45	1.15	1.7	1.75	.9	.8	1.0	1.25	.75
14		.4	1.0	1.7	1.85	.95	.8	1.0	1.0	.75
15		.4	.95	1.75	1.85	.85	.7	.9	.5	.7
16		.35	.95	1.8	1.65	.8	.8	1.1	.4	
17		.4	1.0	1.8	1.6	.7	.8	1.1	.3	
18		.5	1.05	1.45	1.5	.7	.8	1.15	1.1	
19		.5	1.15	1.6	1.55	.8	.85	1.2	1.1	
20		.5	1.25	1.7	1.4	.75	.75	1.1	1.0	
21	0.8	.5	1.35	1.8	1.6	.75	.75	1.4	1.0	
22	.8	.45	1.2	1.6	2.2	1.0	.75	1.0	.85	
23	.8	.55	1.2	1.6	1.3	1.15	.85	1.1	1.1	
24	.85	.6	1.15	1.55	1.25	1.2	.85	1.0	.9	
25	.7	.75	1.1	1.55	1.4	1.2	.85	1.1	.85	
26	.7	.7	1.25	1.55	1.45	1.1	.85	1.0	1.0	
27		.65	1.4	1.6	1.25	1.1	.85	.8	.8	
28		.7	1.5	1.7	1.5	1.1	.75	.8	.8	
29		.75	1.35	1.8	1.6	1.25	.7	.85	.85	
30		.8	1.4	1.55	1.4	1.2	.7	.9	.95	
31			1.4		1.3	1.1		1.25		

ARKANSAS RIVER AT NEW FORT LYONS, COLO.

Location.—At the United States Naval Hospital at New Fort Lyons, 6 miles east of Las Animas, 2 miles below mouth of Purgatory River, the nearest tributary.

Records available.—April 5 to December 25, 1911.

Gage.—Automatic recording gage.

Channel.—Shifting.

Discharge measurements.—Made from a car and cable, except during low water, when they are made by wading.

Winter flow.—Ice causes some backwater during the winter months.

Diversions.—There are court decrees for diversions of 2,760 second-feet from the Arkansas between Nepesta and New Fort Lyons, and about 1,000 second-feet from intervening tributaries.

Cooperation.—This station is maintained and records are furnished by the State engineer of Colorado.

Discharge measurements of Arkansas River at New Fort Lyons, Colo., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Mar. 23	C. L. Chatfield	1.15	55	July 15	H. C. Ogden	2.8	1,192
Apr. 4	do	1.35	86	Sept. 12	C. L. Patterson	1.6	50
15	do	.98	33	19	do	1.55	32
May 13	H. C. Ogden	1.98	383	27	do	1.6	34
18	Thos. Grieve	1.28	48	Oct. 8	do	2.05	518
July 10	A. A. Weiland	1.89	328				

Daily gage height, in feet, of Arkansas River at New Fort Lyons, Colo., for 1911.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	1.1	2.1	2.05	2.2	1.8	1.6	2.1	3.0
2	.....	1.1	1.95	2.1	2.05	1.85	1.6	2.15	3.0
3	.....	1.05	1.65	2.2	1.95	1.85	1.6	2.15	3.0
4	.....	1.2	1.85	2.3	2.1	1.5	1.55	1.95	2.7
5	1.3	1.1	2.25	2.0	1.95	1.5	1.65	1.7	2.0
6	1.15	1.1	2.25	2.4	1.55	1.6	1.8	1.7	1.8
7	1.1	1.0	2.25	2.9	1.4	1.5	2.4	2.1	2.1
8	1.15	1.0	2.0	2.6	1.4	1.55	2.2	2.1	2.1
9	1.25	1.15	1.8	2.15	1.3	1.65	2.4	1.7	2.2
10	.95	1.35	1.85	1.95	1.2	1.6	2.4	1.55	1.7
11	.8	1.9	1.9	2.1	1.2	1.65	2.5	1.6	1.7
12	.....	2.05	2.25	2.05	1.05	1.6	2.75	1.65	1.6
13	.....	2.0	1.75	2.55	1.1	1.55	2.5	1.7	1.95
14	.....	1.8	1.8	3.0	1.05	1.55	2.4	2.0	2.05
15	1.0	1.6	2.0	2.95	1.4	1.6	2.4	2.2	1.95
16	1.05	1.4	2.1	2.35	1.25	1.6	2.3	2.0	1.9
17	1.05	1.3	2.1	3.25	1.1	1.6	2.2	1.8	1.95
18	1.05	1.1	1.85	2.4	1.1	1.6	2.2	1.4	2.0
19	1.05	1.3	1.55	1.95	1.05	1.6	2.3	1.8	2.0
20	1.0	1.7	1.9	3.6	1.05	1.65	2.35	1.75	1.9
21	1.05	2.0	2.25	3.7	1.0	1.75	2.4	1.85	1.9
22	1.05	2.25	2.05	3.85	1.0	1.7	2.2	2.05	2.1
23	1.0	2.1	1.9	3.65	1.1	1.6	2.3	2.05	1.9
24	1.05	2.0	1.85	2.35	1.4	1.6	2.2	2.2	2.3
25	1.05	1.95	1.65	2.0	1.55	1.6	2.25	2.1	2.3
26	1.1	1.85	1.65	2.15	1.8	1.6	2.15	2.1	.....
27	1.15	1.7	1.95	2.05	2.0	1.6	2.0	1.9	.....
28	1.15	2.2	2.15	2.05	2.0	1.6	1.9	2.15	.....
29	1.05	3.75	2.25	2.2	1.8	1.6	1.75	2.9	.....
30	1.05	2.5	2.4	2.1	2.2	1.6	1.9	3.3	.....
31	.....	2.1	.....	2.1	1.85	.....	2.05	.....	.....

NOTE.—Gage heights somewhat affected by ice during the last part of November and throughout December.

Daily discharge, in second-feet, of Arkansas River at New Fort Lyons, Colo., for 1911.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	50	480	440	510	145	100	560	1,530
2	.....	50	365	480	390	165	110	600	1,530
3	.....	45	192	560	315	165	130	600	1,530
4	.....	60	300	650	410	60	120	440	1,170
5	75	50	605	400	300	60	175	390	460
6	55	50	605	750	115	70	270	390	340
7	50	40	605	1,310	70	50	810	560	560
8	55	40	400	970	70	55	655	560	560
9	68	55	270	520	55	60	840	390	650
10	35	88	300	365	40	50	840	220	290
11	25	330	330	480	40	45	950	240	290
12	.....	440	605	440	25	45	1,230	265	240
13	.....	400	242	915	30	30	950	290	440
14	.....	270	270	1,430	25	30	840	460	520
15	40	160	400	1,370	70	45	840	650	440
16	45	90	480	700	45	45	760	460	410
17	45	65	480	1,745	30	45	650	340	440
18	45	40	300	750	30	45	650	170	460
19	45	55	150	365	25	45	760	340	460
20	40	205	330	2,200	25	45	790	320	410
21	45	400	605	2,330	20	100	840	380	410
22	45	610	440	2,530	20	80	650	520	560
23	40	480	330	2,265	30	45	740	520	410
24	45	400	300	690	60	45	650	650	740
25	45	365	192	390	85	45	700	560	740
26	50	300	192	505	170	45	600	560	.....
27	55	215	365	415	260	45	460	410	.....
28	55	560	520	410	260	50	400	600	.....
29	45	2,395	605	530	150	70	310	1,400	.....
30	45	860	750	440	360	80	400	1,900	.....
31	.....	480	.....	440	175	.....	520	.....	.....

Monthly discharge of Arkansas River at New Fort Lyons, Colo., for 1901.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
April 15–30	55	40	45.6	1,450
May	2,400	40	311	19,100
June	750	150	400	23,800
July	2,530	365	896	55,100
August	510	20	136	8,350
September	165	30	64	3,780
October	1,230	100	605	37,200
November	650	170	436	26,000
December 1–25	650	240	426	21,100
The period				197,000

NOTE.—Accuracy notes not given, as the entire record was furnished by the State engineer of Colorado.

ARKANSAS RIVER AT HOLLY, COLO.

Location.—At highway bridge half a mile southeast of Holly, on line between secs. 14 and 15, T. 23 S., R. 42 W., 1 mile below the mouth of Wild Horse Creek, an intermittent stream.

Records available.—October 15, 1907, to December 31, 1911.

Drainage area.—Approximately 25,000 square miles.

Gage.—A number of gages have been used at the station, but the readings have all been referred to the same datum, except readings subsequent to October 25, 1911, when a different datum was used.

Channel.—Very shifting.

Discharge measurements.—Made from bridge during high water and by wading at low stages.

Winter flow.—Ice causes backwater during a portion of the winter months.

Diversions.—There are court decrees for diversions of 1,047 second-feet from Arkansas River between the stations at New Fort Lyons and Holly, and diversions of 753 second-feet from intervening tributaries. There are many diversions from Arkansas River below Holly, in Kansas.

Accuracy.—Owing to the shifting character of the channels, the estimates can not be considered better than fair.

Cooperation.—Station maintained and records furnished by the State engineer of Colorado.

Discharge measurements of Arkansas River at Holly, Colo., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Feb. 2	Thos. Grieve	1.20	58	Sept. 15	C. L. Patterson		4.1
28[a]	do		64	Oct. 3	do		2.27
Mar. 24	C. L. Chatfield	1.35	43	18	Thos. Grieve	1.50	21
Apr. 3	do	1.30	36	Dec. 2	W. F. Hicks	[c]1.50	1,000
15	do	1.20	6.1	4	do	[c]1.00	351
May 17	Thos. Grieve		[b]5.0	6	do	[c]1.18	521
July 16	do	2.60	645	8	do	[c].95	298
20	H. C. Ogden	2.10	179	9	do	[c].93	282
21	do	3.95	3,770	11	do	[c].95	290
Aug. 25	Thos. Grieve	1.30	[b]5.0				

[a] Ice in stream. [b] Estimated. [c] From a gage referred to a new datum.

Daily gage height, in feet, of Arkansas River at Holly, Colo., for 1911.

[S. W. Jones, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.2	1.2	1.4	1.5	1.2	1.9	1.4	1.75	1.3	1.3	0.65	0.95
2	1.2	1.2	1.6	1.4	1.2	1.9	1.5	1.7	1.3	1.3	.85	1.15
3	1.2	1.2	1.7	1.35	1.2	1.9	1.5	1.6	1.3	1.3	1.2	1.15
4	1.2	1.2	1.7	1.3	1.2	1.9	1.6	1.7	1.3	1.3	1.15	1.05
5	1.2	1.2	1.4	1.3	1.2	1.6	1.6	2.3	1.3	1.3	1.35	1.0
6	1.2	1.2	1.5	1.3	1.2	1.6	1.6	2.15	1.3	1.3	1.25	1.1
7	1.2	1.2	1.5	1.3	1.2	1.6	2.4	2.15	1.3	1.3	1.2	1.0
8	1.1	1.2	1.5	1.3	1.15	1.6	2.2	1.95	1.3	1.3	1.2	.....
9	1.1	1.2	1.5	1.3	1.05	1.6	2.1	1.8	1.3	1.3	1.4	.95
10	1.15	1.2	1.5	1.35	1.0	1.6	2.15	1.75	1.3	1.3	1.4	1.1
11	1.1	1.2	1.5	1.25	1.0	1.6	2.1	1.5	1.3	1.3	1.65	1.0
12	1.1	1.2	1.45	1.25	1.0	1.6	2.1	.....	1.3	1.3	.8	.95
13	1.1	1.2	1.4	1.2	1.0	1.6	2.2	1.3	1.3	1.3	.85	1.0
14	1.1	1.2	1.45	1.2	1.0	1.6	2.2	1.3	1.3	1.3	.95	1.15
15	1.1	1.2	1.5	1.2	1.0	1.6	2.2	1.3	1.3	1.3	1.15	1.45
16	1.1	1.2	1.45	1.2	1.0	1.6	2.2	1.25	1.3	1.3	1.15	1.45
17	1.1	1.2	1.5	1.2	1.0	1.6	2.3	1.25	1.3	1.3	.85	.....
18	1.1	1.2	1.4	1.2	1.0	1.4	2.35	1.25	1.3	1.3	.8	.....
19	1.1	1.2	1.4	1.2	1.0	1.4	2.45	1.2	1.3	1.3	.7	.....
20	1.1	1.2	1.4	1.2	1.0	1.4	2.7	1.2	1.3	1.3	.6	.....
21	1.1	1.2	1.4	1.2	1.1	1.4	3.45	1.2	1.3	1.3	.6	.....
22	1.1	1.2	1.4	1.2	1.05	1.4	3.3	1.2	1.3	1.3	.6	.....
23	1.1	1.2	1.4	1.2	1.05	1.4	4.0	1.2	1.3	1.3	.6	.....
24	1.1	1.2	1.4	1.2	1.05	1.4	3.4	1.35	1.3	1.4	.65	.....
25	1.1	1.25	1.4	1.2	1.05	1.4	2.7	1.3	1.3	1.4	.65	.....
26	1.1	1.3	1.5	1.2	1.0	1.4	2.3	1.3	1.3	1.5	.5	.....
27	1.1	1.3	1.5	1.2	1.0	1.4	2.05	1.3	1.3	1.6	.55	.....
28	1.1	1.3	1.5	1.2	1.25	1.5	2.0	1.3	1.3	1.35	.5	.....
29	1.1	.....	1.5	1.2	2.8	1.4	2.0	1.3	1.3	1.0	.5	.....
30	1.15	.....	1.5	1.2	3.55	1.4	2.0	1.3	1.3	1.0	.65	.....
31	1.1	.....	1.5	.....	2.45	.....	1.95	1.3	.....	1.05	.....	.....

NOTE.—Gage heights Oct. 25 to Dec. 16, 1911, are referred to a new datum.

Daily discharge, in second-feet, of Arkansas River at Holly, Colo., for 1911.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	58	58	70	54	6	102	13	62	5	5	135	302
2	58	58	90	45	6	102	21	50	5	2	235	490
3	58	58	118	42	6	102	21	33	5	2	545	490
4	58	58	118	37	6	102	33	50	5	2	490	388
5	58	58	67	35	6	33	33	320	5	2	752	340
6	58	58	75	33	6	33	33	210	5	5	610	435
7	58	58	75	31	6	33	410	210	5	5	545	340
8	52	58	75	30	5	33	240	140	5	5	545	302
9	52	58	70	28	3	33	180	73	5	5	830	302
10	55	58	70	30	2	33	210	62	5	5	830	435
11	52	58	70	17	2	33	180	21	5	5	1,340	340
12	52	58	64	15	2	33	180	2	5	5	205	302
13	52	58	58	8	2	33	240	8	5	5	235	340
14	52	58	60	6	2	33	240	8	5	21	302	400
15	52	58	68	6	2	33	240	8	5	21	490	400
16	52	58	60	6	2	33	240	7	5	21	490	400
17	52	58	65	6	2	33	320	7	5	21	235	400
18	52	58	52	6	2	13	365	7	5	21	205	400
19	52	58	52	6	2	13	465	6	5	21	155	400
20	52	58	50	6	2	13	790	6	5	21	115	400
21	52	58	48	6	4	13	2,400	6	5	25	115	450
22	52	58	48	6	3	13	2,020	6	5	35	115	450
23	52	58	46	6	3	13	3,940	6	5	30	115	450
24	52	58	45	6	3	13	2,270	10	5	35	135	450
25	52	61	45	6	3	13	790	8	5	35	135	450
26	52	65	54	6	2	13	320	8	5	90	80	450
27	52	65	54	6	2	13	159	8	5	100	98	450
28	52	65	54	6	7	21	138	8	5	90	80	450
29	52	.....	54	6	950	13	138	8	2	340	80	450
30	55	.....	54	6	2,666	13	138	8	5	340	135	450
31	52	.....	54	.....	465	.....	120	8	.....	388	.....	450

NOTE.—Daily discharge determined by indirect method for shifting channels. Discharge Aug. 12, Dec. 8, and Dec. 17-31 estimated.

Monthly discharge of Arkansas River at Holly, Colo., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
January	58	52	53.9	3,290
February	65	58	58.8	3,270
March	118	45	64.0	3,930
April	54	6	16.9	1,000
May	2,660	2	135	8,290
June	102	13	33.8	2,010
July	3,940	13	545	33,500
August	320	2	44.3	2,720
September	5	2	5.0	298
October	388	2	55.1	3,390
November	1,340	80	346	20,600
December	490	302	405	24,900
The year	3,940	2	148	107,000

NOTE.—Accuracy notes not given, as the entire record was furnished by the State engineer of Colorado.

TENNESSEE FORK NEAR LEADVILLE, COLO.

Location.—At highway bridge in sec. 16, T. 9 S., R. 80 W., a few hundred yards above the mouth of the stream and about 3 miles northwest of Leadville.

Records available.—February 8, 1911, to December 31, 1911.

Drainage area.—45 square miles, measured from topographic sheet.

Gage.—Vertical staff.

Channel.—Data too meager to determine.

Discharge measurements.—Made from bridge during high water and by wading at ordinary stages.

Winter flow.—Ice causes backwater during the winter months.

Diversions.—There are court decrees for diversions of 24 second-feet above the station.

Accuracy.—As the station has not been completely rated, no estimates of daily discharge have been made.

Cooperation.—Station is maintained in cooperation with the United States Forest Service.

Discharge measurements of Tennessee Fork near Leadville, Colo., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Feb. 8[a]	O. M. Wimmer	0.13	7.2	Aug. 2	O. M. Wimmer	0.15	22.4
Apr. 10[a]	do	.20	19.3	Sept. 14	do	.00	13.6
June 5	do	.80	169	Dec. 25	H. B. Waha	[b] −.2	11.6
July 11	do	.25	59.1				

[a] Slight ice affect.

[b] Approximate gage height affected by ice.

Daily gage height, in feet, of Tennessee Fork near Leadville, Colo., for 1911.

[M. F. Frey, observer.]

Day.	Feb.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1		0.1		0.65						
2			0.3		0.45	0.15				
3									0.15	
4			.7		.45					
5				.80			0			
6								0.2		
7					.35					
8	0.15								.2	
9					.3					0.5
10		.2				.15				
11			.6	.6	.25	.15				
12			.5							
13				.5						
14						.05	0	0		
15		0								
16			.6		.15	.05		−.1		
17						.05			.3	
18				.5		.05				.2
19			.9							
20										
21		0	.6	.45					.45	
22										
23								.15		
24		.4		.4						
25				.4						−.2
26		.8								
27		.4		.25		.05				
28						.05				
29		.7					.1			
30			.7							
31			.7							

NOTE.—Gage heights affected by ice Jan. 1 to Apr. 14 and Oct. 23 to Dec. 31, 1911.

HALF MOON CREEK NEAR LEADVILLE, COLO.

Location.—In sec. 6, T. 10 S., R. 80 W., 1 mile above mouth of stream and 6 miles southwest of Leadville; no tributaries between the two points.

Records available.—April 10, 1911, to December 12, 1911.

Drainage area.—30 square miles, measured from topographic sheet.

Gage.—Vertical staff.

Channel.—Rough, but apparently permanent.

Discharge measurements.—Made by wading.

Winter flow.—Ice causes backwater during the winter months and records are discontinued.

Diversions.—There are court decrees for diversions of 12 second-feet above the station.

Accuracy.—As the station has not been completely rated as yet, no estimates of discharge have been made.

Cooperation.—This station is maintained in cooperation with the United States Forest Service.

Discharge measurements of Half Moon Creek near Leadville, Colo., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Apr. 10[a]	O. M. Wimmer	0.20	4.7
June 5	do	.95	131
July 11	do	.70	68.5
Sept. 14	do	.55	19.3
Dec. 24[b]	H. B. Waha		3.0

[a] Gage height affected by ice. [b] Discharge estimated. Gage height could not be determined because of ice.

Daily gage height, in feet, of Half Moon Creek near Leadville, Colo., for 1911.

[M. F. Frey, observer.]

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1				0.8	0.6	0.6	0.5	0.5	
2				.95	.6	.6	.45	.5	
3		0.3	0.6	1.0	.6	.6	.45		
4				1.0	.6	.55	.5		
5		.4	.75	1.0	.6	.5	.5		
6				1.05	.5	.5	.6		
7				1.0	.5	.5	.6		
8		.6		1.05	.5	.5	.6		
9				1.0	.5	.5	.6	.4	
10	0.2	.5		.9	.5	.5	.6	.4	
11				.8	.6	.5	.6		
12			.65	.8	.6	.5	.5		1.6
13				.8		.5	.5		
14		.4		.8		.5	.5		
15		.4		.8		.5	.5		
16				.8		.5	.5		
17				.85			.5		
18				.9			.5	.5	
19	.3			.8			.6		
20				.8	.5		.6		
21				.7	.6		.6		
22			1.2	.75	.75		.6		
23			1.15	.8	.75		.6		
24	.2		1.15	.7	.75		.6		
25			1.05	.7	.65		.6		
26			1.05	.7	.65		.55		
27	.3		.9	.7	.6		.5		
28			1.0	.7	.6		.5		
29		.65	.95	.7	.6		.5		
30			.8	.7	.6		.5		
31		.7		.65	.6		.5		

NOTE.—Gage height Dec. 12 affected by ice.

COTTONWOOD CREEK NEAR BUENA VISTA, COLO.

Location.—In the Leadville National Forest, 1 mile west of Hot Springs Hotel, in sec. 21, T. 14 S., R. 79 W., and 7 miles west of Buena Vista; 1 mile below mouth of South Fork, the nearest tributary.

Records available.—September 25, 1910, to September 13, 1911.

Drainage area.—Not measured.

Gage.—Vertical staff; datum unchanged.

Channel.—Very rough, but apparently permanent. There is a small diversion dam 100 yards below, but the fall is so heavy that backwater from the dam does not affect the gage heights.

Discharge measurements.—Made by wading.

Winter flow.—Hot springs above the station keep the river open during the winter.

Diversions.—There are court decrees for diversions of 133 second-feet from Cottonwood Creek, nearly all below the station.

Accuracy.—As this station has not been fully rated no estimates have been made.

Cooperation.—Station maintained in cooperation with the United States Forest Service.

Discharge measurements of Cottonwood Creek near Buena Vista, Colo., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Feb. 6	O. M. Wimmer	1.00	13.6
Mar. 11	do	1.03	17.1
Apr. 7	do	1.08	21.4

Daily gage height, in feet, of Cottonwood Creek near Buena Vista, Colo., for 1911.

[C. A. Mack, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1						2.20		1.75	1.55
2						2.10		1.70	1.55
3						2.10	2.10		1.50
4						2.20			1.50
5							1.90	1.60	1.50
6		1.00			1.45	2.30	1.90	1.60	1.50
7				1.10	1.40	2.30		1.60	1.50
8							1.90	1.55	1.50
9						2.30		1.55	1.50
10					1.70	2.30	2.15	1.50	1.50
11			1.03		1.75			1.50	1.50
12				1.10		2.35	2.10	1.50	1.50
13	1.20		1.05		1.70			1.50	1.50
14				1.10				1.45	
15					1.65	2.35	2.05	1.45	
16						2.35	2.00	1.40	
17					1.72	2.30	2.00		
18	1.20						1.90	1.35	
19						2.30	1.90	1.30	
20							1.95	1.30	
21					1.50		1.95		
22				1.20	1.60	2.40	1.90	1.35	
23					1.60	2.40	1.90		
24				1.10	1.70	2.25	1.90	1.35	
25					1.90	2.20	1.90		
26				1.09	2.00	2.20	1.80	1.30	
27					1.90		1.80	1.50	
28	1.15			1.35	1.90		1.80	1.55	
29				1.38	2.00	2.10	1.80	1.55	
30			1.2		2.00		1.75	1.55	
31	1.25				2.10		1.75	1.55	

COTTONWOOD CREEK BELOW HOT SPRINGS, NEAR BUENA VISTA, COLO.

Location.—In the Leadville National Forest, at bridge in sec. 22, T. 14 S., R. 79 W., half a mile below Hot Springs Hotel, and 6 miles west of Buena Vista; 2 miles below mouth of South Fork, the nearest tributary.

Records available.—April 9, 1911, to December 31, 1911.

Drainage area.—72 square miles, measured from Forest atlas.

Gage.—Vertical staff.

Channel.—Probably permanent.

Discharge measurements.—Made from bridge or by wading.

Winter flow.—The river is open during the winter months on account of hot springs above.

Accuracy.—Owing to the very rough condition of the stream bed the estimates can not be considered other than fair or possibly good.

Cooperation.—Station is maintained in cooperation with the United States Forest Service.

Discharge measurements of Cottonwood Creek below Hot Springs, near Buena Vista, Colo., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Apr. 7	O. M. Wimmer	0.60	27.4	Sept. 13	O. M. Wimmer	0.90	52.3
June 12	do	2.00	240	Oct. 13	do	1.10	77.3
July 2	do	1.80	240	Dec. 28	H. B. Waha	.70	46.6
Aug. 1	do	1.40	105				

Daily gage height, in feet, of Cottonwood Creek below Hot Springs, near Buena Vista, Colo., for 1911.

[E. D. Masters, observer.]

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	0.75	1.95	2.0	1.5	1.1	1.1	0.8	0.8
2	.....	.7	2.0	2.2	1.45	1.1	1.1	.8	.8
3	.....	.7	2.0	2.2	1.4	1.1	1.0	.8	.8
4	.....	.7	2.0	2.1	1.3	1.1	1.0	.8	.8
5	.....	.9	2.1	2.1	1.3	1.05	2.0	.8	.8
6	.....	1.1	2.15	2.1	1.2	1.05	1.6	.8	.75
7	.6	1.1	2.2	2.1	1.2	1.0	1.4	.8	.75
8	.55	1.2	2.2	2.0	1.1	1.0	1.3	.8	.75
9	.6	1.3	2.2	2.0	1.1	1.0	1.2	.8	.75
10	.6	1.1	2.1	2.0	1.1	1.0	1.2	.85	.7
11	.65	1.1	2.2	1.9	1.1	1.0	1.1	.9	.7
12	.55	1.0	2.2	1.9	1.1	1.0	1.1	.9	.7
13	.4	1.1	2.2	1.95	1.1	1.0	1.0	.9	.7
14	.6	1.1	2.2	2.0	1.1	1.0	1.0	.85	.7
15	.55	1.1	2.1	1.9	1.05	.95	1.0	.85	.7
16	.55	1.3	2.1	1.8	1.05	.9	1.0	.8	.7
17	.6	1.3	2.1	1.8	1.0	.9	1.0	.8	.7
18	.6	1.4	2.1	1.8	1.0	.9	1.0	.8	.7
19	.6	1.5	2.1	1.8	1.0	.9	1.0	.8	.7
20	.55	1.3	2.1	2.1	1.0	.9	.9	.8	.7
21	.7	1.1	2.2	2.1	1.1	.9	.9	.8	.7
22	.65	1.2	2.2	2.0	1.1	.9	.9	.8	.7
23	.6	1.2	2.1	1.9	1.2	.9	.9	.8	.7
24	.6	1.3	2.0	1.9	1.2	.9	.9	.8	.7
25	.6	1.5	2.0	1.8	1.1	.9	.9	.8	.7
26	.7	1.7	2.0	1.75	1.1	.9	.9	.8	.7
27	.7	1.6	2.0	1.7	1.1	.9	.9	.8	.7
28	.8	1.5	2.0	1.6	1.1	.8	.9	.8	.7
29	.9	1.8	2.0	1.6	1.2	.8	.9	.8	.7
30	.8	1.85	2.0	1.55	1.2	1.1	.9	.8	.7
31	.....	1.8	.....	1.5	1.1	.....	.9	.....	.7

Daily discharge, in second-feet, of Cottonwood Creek below Hot Springs, near Buena Vista, Colo., for 1911.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	38	244	256	146	77	77	43	43
2	.....	34	256	304	136	77	77	43	43
3	.....	34	256	304	126	77	64	43	43
4	.....	34	256	280	108	77	64	43	43
5	.....	53	280	280	108	70	256	43	43
6	.....	77	292	280	92	70	166	43	38
7	27	77	304	280	92	64	126	43	38
8	24	92	304	256	77	64	108	43	38
9	27	108	304	256	77	64	92	43	38
10	27	77	280	256	77	64	92	48	34
11	30	77	304	232	77	64	77	53	34
12	24	64	304	232	77	64	77	53	34
13	16	77	304	244	77	64	64	53	34
14	27	77	304	256	77	64	64	48	34
15	24	77	280	232	70	58	64	48	34
16	24	108	280	210	70	53	64	43	34
17	27	108	280	210	64	53	64	43	34
18	27	126	280	210	64	53	64	43	34
19	27	146	280	210	64	53	64	43	34
20	24	108	280	280	64	53	53	43	34
21	34	77	304	280	77	53	53	43	34
22	30	92	304	256	77	53	53	43	34
23	27	92	280	232	92	53	53	43	34
24	27	108	256	232	92	53	53	43	34
25	27	146	256	210	77	53	53	43	34
26	34	188	256	199	77	53	53	43	34
27	34	166	256	188	77	53	53	43	34
28	43	146	256	166	77	43	53	43	34
29	53	210	256	166	92	43	53	43	34
30	43	221	256	156	92	77	53	43	34
31	.....	210	.....	146	77	.....	53	.....	34

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

Monthly discharge of Cottonwood Creek below Hot Springs, near Buena Vista, Colo., for 1911.

[Drainage area 72 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
April 7-30	53	16	29.5	0.410	0.37	1,400	B.
May	221	34	105	1.46	1.68	6,460	B.
June	304	244	278	3.86	4.31	16,500	C.
July	304	146	235	3.26	3.76	14,400	C.
August	146	64	85.5	1.19	1.37	5,260	B.
September	77	43	60.6	.842	.94	3,610	B.
October	256	53	76.1	1.06	1.22	4,680	B.
November	53	43	44.5	.618	.69	2,650	B.
December	43	34	36.0	.500	.58	2,210	C.
The period						57,200	

NORTH COTTONWOOD CREEK NEAR BUENA VISTA, COLO.

Location.—At highway bridge in sec. 10, T. 14 S., R. 79 W., 6 miles northwest of Buena Vista; just below a small stream entering from the west, and 1½ miles below mouth of Silver Creek.

Records available.—October 5, 1911, to December 31, 1911.

Drainage area.—50 square miles, measured from Forest atlas.

Gage.—Vertical staff.

Channel.—Apparently permanent.

Discharge measurements.—Made from the bridge during high water and by wading at ordinary stages.

Winter flow.—Data too meager to determine.

Diversions.—There are court decrees for diversions of 32 second-feet from North Cottonwood Creek.

Accuracy.—As the station has not been completely rated estimates of discharge can not be made.

Cooperation.—Station is maintained in cooperation with the United States Forest Service.

Discharge measurements of North Cottonwood Creek near Buena Vista, Colo., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Oct. 4	O. M. Wimmer	4.30	24.8
13	....do	4.40	29.4
Dec. 28	H. B. Waha	3.90	8.7

Daily gage height, in feet, of North Cottonwood Creek near Buena Vista, Colo., for 1911.

Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.
1		4.3	4.1	16			
2				17	4.2		
3		4.2		18			4.0
4	4.3			19			
5	4.4		4.05	20	4.35	4.2	
6		4.25		21			
7	4.6		4.05	22	4.35		3.9
8		4.25	4.05	23		4.2	
9				24			
10				25			
11		4.35		26	4.4		3.9
12		4.35	4.0	27		4.2	
13	4.4			28	4.4		3.9
14				29		4.15	
15	4.2	4.3	4.0	30	4.35		
				31			

NOTE.—Gage heights slightly affected by ice during the last of December.

CHALK CREEK NEAR ST. ELMO, COLO.

Location.—In the Leadville National Forest, at highway bridge in sec. 28, T. 15 S., R. 79 W., just below the cascades of Chalk Creek, and 6 miles east of St. Elmo. Nearest tributary is a small intermittent stream entering from the north just below the station.

Records available.—March 10 to December 25, 1911.

Drainage area.—75 square miles, measured from Forest atlas.

Gage.—Vertical staff.

Channel.—Permanent.

Discharge measurements.—Made from the bridge during high water and by wading at ordinary stages.

Winter flow.—Data too meager to determine.

Diversions.—There are no court decrees for diversions from Chalk Creek above the station, but below there are decrees for 132 second-feet.

Accuracy.—Conditions are favorable for accurate results and the estimates should be reliable.

Cooperation.—Station maintained in cooperation with the United States Forest Service.

Discharge measurements of Chalk Creek near St. Elmo, Colo., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Mar. 9 [a]	O. M. Wimmer	0.70	12.4	Aug. 3	O. M. Wimmer	1.45	112
Apr. 9	do	.82	16.0	Sept. 13	do	1.20	45.0
June 13	do	1.90	379	Oct. 12	do	1.40	89.0
July 3	do	1.80	321	Dec. 29 [a]	H. B. Waha	1.10	24.4

[a] Some ice on right bank.

Daily gage height, in feet, of Chalk Creek near St. Elmo, Colo., for 1911.

[A. J. Smith, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	.....	1.25	1.80	1.70	1.55	1.30	1.52	1.20	1.10
2	.....	0.72	1.28	1.82	.....	1.50	1.30	1.42	.....	1.10
3	.....	.74	1.30	1.82	.....	1.45	1.30	1.40	.....	1.10
4	.....	.75	1.30	1.85	.....	1.45	1.30	1.50	.....	1.00
5	.....	.75	1.38	1.90	1.80	1.40	1.28	1.90	.....	1.00
6	.....	.75	1.45	1.95	1.88	1.38	1.26	1.90	.....	1.00
7	.....	.75	1.50	2.00	1.80	1.35	1.25	1.80	.....	1.00
8	.....	.75	1.52	2.15	.....	1.30	1.20	.....	.....	1.00
9	0.70	.82	1.55	2.20	.....	1.30	1.20	.....	1.15	1.00
10	.70	.75	1.52	2.15	.....	1.30	1.20	1.50	1.15	1.00
11	.....	.74	1.44	2.00	.....	1.30	1.20	1.50	1.15	1.00
12	.....	.72	1.50	1.95	.....	1.30	1.20	1.45	1.20	1.00
13	.....	.72	.....	1.98	.....	1.30	1.20	1.40	1.50	1.00
14	1.05	.72	.....	1.98	1.70	1.30	1.20	1.40	1.40	1.00
15	.86	.72	1.50	1.98	1.68	1.30	1.20	1.40	1.15	1.00
16	.70	.72	1.58	1.98	1.65	1.30	1.20	1.40	1.10	1.00
17	.70	.72	1.62	1.98	1.65	1.30	1.20	1.40	1.10	1.00
18	.70	.70	1.66	1.98	1.65	1.30	1.20	1.40	1.10	1.00
19	.92	.....	1.66	1.92	1.65	1.30	1.20	1.40	1.10	1.00
20	.69	.....	1.58	1.92	1.65	1.30	1.20	1.40	1.10	1.00
21	.70	.90	1.50	.....	1.68	1.32	1.20	1.40	1.10	1.00
22	.70	.95	1.50	1.92	1.78	1.60	1.20	1.40	1.10	1.00
23	.70	1.00	1.55	1.92	.....	1.58	1.20	1.38	1.10	1.00
24	.70	.98	1.72	1.92	1.72	1.52	1.20	1.35	1.10	1.00
25	.70	.98	1.72	1.90	1.70	1.50	1.20	1.30	1.10	.95
26	1.30	.98	1.70	1.82	1.70	1.42	1.20	1.30	1.10	.....
27	.70	1.15	1.70	1.80	1.68	1.42	1.20	1.30	1.10	.....
28	.85	1.20	.....	1.75	1.65	1.38	1.20	1.30	1.10	.....
29	.70	1.30	.....	1.75	1.65	1.35	1.52	1.25	2.00	.....
30	.70	.....	1.75	1.75	1.62	1.32	1.52	1.22	2.00	.....
31	.....	.....	1.78	.....	1.58	1.30	.....	1.22	.....	.....

NOTE.—Gage heights affected by ice Mar. 14, 15, 19, 20, 26, 28, and Nov. 12 to 14, 29, and 30, 1911.

Daily discharge, in second-feet, of Chalk Creek near St. Elmo, Colo., for 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	14	50	315	250	162	60	146	40	29
2	.....	14	56	328	266	135	60	97	39	29
3	.....	14	60	328	282	112	60	88	38	29
4	.....	14	60	348	299	112	60	135	37	22
5	.....	14	82	380	315	88	56	380	37	22
6	.....	14	112	412	367	82	52	380	36	22
7	.....	14	135	445	315	74	50	315	36	22
8	.....	14	146	550	305	60	40	255	35	22
9	13	17	162	585	295	60	40	195	34	22
10	13	14	146	550	285	60	40	135	34	22
11	13	14	107	445	280	60	40	135	34	22
12	13	14	135	412	270	60	40	112	34	22
13	13	14	135	432	260	60	40	88	34	22
14	13	14	135	432	250	60	40	88	34	22
15	13	14	135	432	238	60	40	88	34	22
16	13	14	179	432	220	60	40	88	29	22
17	13	14	202	432	220	60	40	88	29	22
18	13	13	226	432	220	60	40	88	29	22
19	13	15	226	393	220	60	40	88	29	22
20	13	17	179	393	220	60	40	88	29	22
21	13	19	135	393	238	66	40	88	29	22
22	13	20	135	393	302	190	40	88	29	22
23	13	22	162	393	282	179	40	82	29	22
24	13	21	263	393	263	146	40	74	29	22
25	13	21	263	380	250	135	40	60	29	20
26	13	21	250	328	250	97	40	60	29	.....
27	13	34	250	315	238	97	40	60	29	.....
28	13	40	260	282	220	82	40	60	29	.....
29	13	60	270	282	220	74	146	50	29	.....
30	13	55	282	282	202	66	146	44	29	.....
31	13	.....	302	.....	179	60	.....	44	.....	.....

NOTE.—Daily discharge determined from a well-defined curve. Discharge estimated Mar. 14, 15, 19, 20, 26, 28, Nov. 12–14, 29, 30, and Dec. 26–31. Discharge interpolated on all other days for which gage heights are not published.

Monthly discharge of Chalk Creek near St. Elmo, Colo., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
Mar. 9-31	13	13	13.0	593	B.
April	60	13	20.0	1,190	A.
May	302	50	169	10,400	A.
June	585	282	397	23,600	A.
July	367	179	259	15,900	A.
August	190	60	88.3	5,430	A.
September	146	40	51.0	3,030	A.
October	380	44	122	7,500	A.
November	40	29	32.4	1,930	A.
December	29	.....	22.6	1,390	A.
The period	.....	.....	.....	71,000	

NOTE.—Discharge estimated at 22 second-feet during Dec. 26-31, 1911.

SOUTH FORK OF ARKANSAS RIVER AT PONCHA, COLO.

Location.—At highway bridge about half a mile from Poncha, in sec. 10, T. 49 N., R. 8 E. Nearest tributary, Poncha Creek, enters one-fourth mile below.

Records available.—January 14, 1911, to December 31, 1911.

Drainage area.—140 square miles, measured from Forest atlas.

Gage.—Vertical staff.

Channel.—Data too meager to determine.

Discharge measurements.—Made from bridge during high water and by wading at ordinary stages.

Winter flow.—Springs keep this stream open during the winter months.

Diversions.—There are court decrees for diversions of 113 second-feet from the South Fork above the station, and 66 second-feet below. There are also decrees for diversions of 76 second-feet from the North Fork, which enters above.

Accuracy.—As the station has not been completely rated no estimates of discharge have been made.

Cooperation.—Station maintained in cooperation with the United States Forest Service.

Discharge measurements of South Fork of Arkansas River at Poncha, Colo., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Jan. 14	O. W. Wimmer	0.40	31.0
Mar. 13	.....do	.33	31.1
Aug. 7	.....do	—.20	6.6
Dec. 12	H. B. Waha	.50	46.1

Daily gage height, in feet, of South Fork of Arkansas River at Poncha, Colo., for 1911.

[J. M. Cuenin, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	0.30	0.30	0.10	0.15	1.30	1.57	0.76	0.03	0.90	0.60	0.80
2	.....	.20	.....	.10	.23	1.47	1.76	.63	.06	1.40	.50	.60
3	.....	.30	.40	.20	.13	1.40	1.56	.46	— .10	1.16	.53	.56
4	.....	.30	.40	.12	.06	1.50	1.76	.26	— .13	1.43	.56	.53
5	.....	.40	.30	.00	— .15	1.77	[b]2.86	.23	— .26	1.36	.70	.53
6	.....	.20	.30	— .10	.20	1.70	[c]2.50	.....	— .13	1.33	.90	.53
7	.....	.20	.40	— .20	.57	1.97	2.10	— .20	— .20	.96	.86	.53
8	.....	.10	.30	— .25	.73	1.73	1.73	— .10	— .10	.96	.86	.53
9	.....	.20	.30	— .20	.83	[a]2.27	1.63	— .20	— .03	.86	.76	.53
10	.....	.50	.40	— .18	.90	1.90	1.33	— .23	.06	.90	.66	.50
11	.....	.50	.40	— .15	.43	1.73	1.26	— .13	— .03	.73	.63	.53
12	.....	.40	.30	— .22	.20	1.73	1.30	+ .03	— .13	.73	.70	.53
13	.....	.40	.30	— .25	.15	1.40	1.40	.03	— .03	.56	.66	.53
14	0.40	.20	.20	— .20	.15	1.60	1.36	.03	— .10	.60	.70	.46
15	.40	.20	.20	— .30	.35	2.23	1.33	— .16	.00	.66	.70	.50
16	.30	.30	.10	— .30	.35	2.00	1.43	— .16	.03	.60	.70	.46
17	.40	.30	.00	— .05	.50	1.83	1.43	— .16	.00	.63	.70	.35
18	.30	.30	.00	— .20	.68	1.73	1.62	.00	.10	.60	.83	.30
19	.40	.30	.10	— .25	1.26	1.80	1.63	— .13	.10	.56	.76	.40
20	.40	.30	.10	— .25	.68	1.87	1.59	— .13	.36	.56	.76	.30
21	.40	.30	.05	.20	.55	1.83	1.43	— .03	.23	.43	.70	.45
22	.40	.30	.10	.20	.47	1.77	1.40	1.16	.30	.56	.66	.40
23	.30	.30	.15	.28	.37	1.70	1.60	1.03	.20	.53	.93	.30
24	.30	.30	.05	.30	.60	1.50	1.46	.56	.13	.66	.80	.45
25	.40	.30	.05	.22	.67	1.57	1.26	.46	.20	.60	.76	.35
26	.30	.30	.00	.30	.73	1.22	1.36	.33	.36	.63	.76	.35
27	.30	.30	.00	.25	.83	1.00	1.33	.16	.16	.60	.73	.35
28	.30	.40	.05	.20	.97	.80	1.16	.23	.16	.53	.90	.40
29	.40	.....	.10	.33	1.17	.80	1.30	.26	.06	.43	1.00	.45
30	.40	.....	.05	.30	1.17	1.25	1.26	.60	.20	.50	.90	.35
31	.40	.....	.10	.....	1.20	1.00	.96	.46	.....	.66	.....	.40

[a] Maximum gage height 3 feet. [b] Maximum gage height, 4.2 feet. [c] Maximum gage height, 3.4 feet.

NOTE.—Negative readings during April are not reliable as they were not made at the gage.

PONCHA CREEK AT PONCHA, COLO.

Location.—At highway bridge in sec. 10, T. 49 N., R. 8 E., near Poncha, about one-fourth mile above the mouth of creek.

Records available.—January 14, 1911, to December 31, 1911.

Drainage area.—Not measured.

Gage.—Vertical staff.

Channel.—Shifting.

Discharge measurements.—Made from bridge during high water and by wading at ordinary stages.

Winter flow.—Springs prevent the creek from freezing to any considerable extent.

Diversions.—There are court decrees for diversions of 7 second-feet above the station, but none below.

Accuracy.—As the station has not been completely rated no estimates of discharge have been made.

Cooperation.—Station maintained in cooperation with the United States Forest Service.

Discharge measurements of Poncha Creek at Poncha, Colo., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Jan. 14	O. M. Wimmer	0.50	7.2
Mar. 13	....do	.35	2.7
Aug. 7	....do	.70	30.5
Dec. 12	H. B. Waha	.50	7.6

Daily gage height, in feet, of Poncha Creek at Poncha, Colo., for 1911.

[J. M. Cuenin, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	0.40	0.50	0.40	0.95	1.87	1.37	0.87	0.70	0.83	0.53	0.50
2	.....	.30	.....	.40	.93	1.73	1.60	.87	.73	.90	.46	.60
3	.....	.40	.50	.60	.85	1.77	1.46	.87	.80	.70	.42	.56
4	.....	.40	.50	.60	1.03	1.67	1.60	.80	.83	.73	.40	.66
5	.....	.50	.50	.55	1.13	1.70	1.50	.83	.73	.80	.66	.56
6	.....	.40	.50	.55	1.10	1.70	1.33	.93	.60	.86	.76	.56
7	.....	.30	.60	.55	1.57	1.43	1.30	.80	.63	.86	.70	.56
8	.....	.40	.50	.50	1.67	1.60	1.40	.77	.63	.76	.76	.56
9	.....	.40	.50	.55	1.77	1.50	1.23	.70	.60	.80	.73	.53
10	.....	.60	.60	.55	1.80	1.60	1.13	.87	.63	.86	.70	.53
11	.....	.50	.60	.58	1.57	1.57	.93	.67	.60	.80	.73	.56
12	.....	.50	.40	.52	1.53	1.40	.96	.77	.60	.76	.70	.56
13	.....	.50	.40	.50	1.40	1.50	.96	.77	.60	.80	.66	.53
14	0.50	.40	.35	.50	1.53	1.30	1.16	.77	.63	.83	.70	.43
15	.50	.40	.40	.55	1.70	1.53	1.20	.60	.60	.76	.70	.60
16	.50	.50	.55	.55	1.60	1.33	.96	.60	.57	.83	.73	.50
17	.50	.50	.60	.55	1.73	1.20	1.36	.83	.69	.86	.76	.35
18	.50	.50	.60	.70	1.93	1.23	1.33	.80	.60	.73	.60	.35
19	.50	.50	.40	.75	2.07	1.33	1.50	.83	.63	.63	.66	.35
20	.50	.50	.60	.70	1.73	1.13	1.43	.83	.57	.70	.70	.35
21	.50	.50	.50	.95	1.57	1.13	1.40	.80	.63	.56	.66	.35
22	.50	.50	.60	1.00	1.60	1.10	1.50	1.00	.63	.63	.56	.35
23	.50	.50	.55	1.00	1.47	.97	1.60	1.00	.60	.76	.70	.35
24	.50	.50	.50	1.00	1.60	.97	1.53	.97	.63	.70	.70	.45
25	.50	.50	.50	1.00	1.70	.97	1.40	.90	.60	.70	.66	.40
26	.50	.40	.30	1.10	1.67	1.13	1.53	.80	.67	.73	.66	.30
27	.50	.40	.20	1.10	1.80	1.10	1.23	.77	.60	.63	.63	.35
28	.50	.50	.30	1.10	1.73	1.03	1.16	.80	.53	.60	.53	.30
29	.50	.....	.40	1.10	1.83	1.07	1.10	.83	.60	.53	.56	.40
30	.50	.....	.40	1.23	1.80	1.07	1.43	.77	.73	.53	.70	.30
31	.50	.....	.40	.....	1.83	.....	1.13	.73	.....	.56	.....	.30

NOTE.—Gage heights affected by ice Dec. 17 to 31.

WEST BEAVER CREEK NEAR VICTOR, COLO.

Location.—At the Skagway power station of the Arkansas Valley Railway, Light & Power Co., in sec. 30, T. 16 S., R. 68 W., about 7 miles southeast of Victor.

Records available.—Monthly estimates from January 1, 1905, to December 31, 1911.

Drainage area.—70 square miles.

Method of compiling records.—The water used through the power house, which is brought by pipe line from the reservoir 3½ miles upstream, is measured hourly by weir. To this amount is added or subtracted a quantity representing the gain or loss in the reservoir during the period. The seepage through the reservoir is measured by weir and added to the above to obtain the final result. The record therefore represents the flow of the stream (less evaporation from the stored water) as if there were no reservoir.

Diversions.—Above the power reservoir the town of Victor has three reservoirs from which water is diverted for municipal purposes. Colorado Springs receives its water supply from four reservoirs in the upper basin. There are filings (which have not yet been adjudicated) for diversions from the basin of 52 second-feet by ditch and 5 second-feet by pipe line. This water is diverted into Lake Moraine, and thence by natural channels to Colorado Springs. The town of Altman, for municipal supply, has filed on five reservoir sites in the upper basin, having a combined capacity of 2,300 acre-feet. Below the power plant there are adjudicated decrees for diversions of 57 second-feet from Beaver Creek, which is formed by East and West Beaver creeks. In addition, there is an irrigation reservoir in operation which has a filing for 4,760 acre-feet.

Accuracy.—Company states that records are probably correct within 5 per cent.

Cooperation.—Records are furnished through courtesy of Arkansas Valley Railway, Light & Power Co.

Monthly discharge of West Beaver Creek near Victor, Colo. for 1905–1911.

Month	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1905.			1908.		
January	6.8	418	August	7.5	461
February	6.0	333	September	2.9	173
March	10.4	640	October	2.9	178
April	53.0	3,150	November	3.0	179
May	104	6,400	December	1.9	117
June	119	7,080			
July	41.4	2,550	The year	3.2	2,490
August	63.8	3,920			
September	24.2	1,440	1909.		
October	8.6	529	January	2.1	129
November	6.0	357	February	1.2	67
December	1.9	117	March	2.8	172
			April	14.1	839
The year	37.1	26,900	May	8.0	492
			June	9.3	553
1906.			July	8.8	541
January	1.4	86	August	27.3	1,680
February	3.7	206	September	53.2	3,170
March	5.4	332	October	12.2	750
April	13.2	786	November	8.7	518
May	15.9	978	December	12.9	793
June	22.9	1,360			
July	32.9	2,020	The year	13.3	9,700
August	20.2	1,240			
September	19.4	1,150	1910.		
October	84.2	5,180	January	8.5	523
November	55.9	3,330	February	5.9	328
December	9.2	566	March	25.8	1,590
			April	25.3	1,510
The year	23.6	17,200	May	41.2	2,530
			June	19.5	1,160
1907.			July	10.5	646
January	4.9	301	August	15.4	947
February	7.5	416	September	11.4	678
March	8.4	516	October	9.2	566
April	8.8	524	November	7.4	440
May	17.4	1,070	December	7.0	430
June	15.3	910			
July	17.6	1,080	The year	16.0	11,300
August	9.9	609			
September	5.4	321	1911.		
October	4.9	301	January	5.5	338
November	3.9	232	February	4.0	222
December	2.9	178	March	8.3	510
			April	12.2	726
The year	8.9	6,460	May	14.3	879
			June	6.6	393
1908.			July	18.8	1,160
January	2.0	123	August	19.2	1,180
February	2.2	126	September	11.2	666
March	5.1	314	October	9.3	572
April	5.8	345	November	5.6	333
May	4.1	252	December	4.1	252
June	1.1	66			
July	2.5	154	The year	9.9	7,230

PURGATORY RIVER AT TRINIDAD, COLO.

Location.—At Animas Street Bridge at Trinidad, Colo. Nearest perennial tributary, Gray Creek, enters about 4 miles below.

Records available.—May 1, 1896, to July 31, 1899; August 25, 1905, to December 31, 1905; November 1, 1906, to March 10, 1907; October 14, 1907, to December 31, 1911. From March 23, 1905, to October 31, 1906, a station was maintained at Alfalfa, about 25 miles east of Trinidad.

Drainage area.—742 square miles.

Gage.—A chain gage since August 25, 1905; referred to a datum 1.70 feet below that of the original staff gage.

Channel.—Somewhat shifting.

Discharge measurements.—Made from bridge during high water and by wading at ordinary stages.

Winter flow.—Ice causes some backwater during the winter period.

Diversions.—There are court decrees for diversions of 112 second-feet from Purgatory River above Trinidad and 348 second-feet below. There are decrees for diversions of 110 second-feet from tributaries entering above the station.

Accuracy.—Although the channel is somewhat shifting, sufficient measurements have been made to form a basis for estimates of flow, which may be considered good.

Cooperation.—Station maintained in cooperation with the State engineer of Colorado.

Discharge measurements of Purgatory River at Trinidad, Colo., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Jan. 18[a]	G. H. Russell	3.31	10.3	July 22	G. H. Russell	4.48	437
Feb. 18	do	3.41	4.5	Aug. 20	W. B. Freeman	3.48	38.2
Mar. 9	W. B. Freeman	3.41	15.6	24	Thos. Grieve	3.90	126
Apr. 10	Russell and Waha	3.06	2.1	Sept. 5	G. H. Russell	3.55	56.9
May 19	W. B. Freeman	3.86	69.0	Oct. 26	W. B. Freeman	3.88	67.2
July 1	G. H. Russell	3.60	54.7	Dec. 12	do	[b]3.78	7.0
21	do	9.50	6,100				

[a] Slight ice effect. [b] Estimated.

Daily gage height, in feet, of Purgatory River at Trinidad, Colo., for 1911.

[H. D. Albertson, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.38	3.4	3.55	3.3	3.52	4.4	3.8	3.85	3.55	3.3	3.9	3.63
2	3.38	3.4	3.72	3.3	3.5	3.95	3.82	3.8	3.55	3.5	3.9	3.68
3	3.35	3.4	3.85	3.3	3.5	3.92	3.9	3.77	3.55	3.5	4.0	3.78
4	3.38	3.4	3.58	3.4	3.42	3.92	4.4	3.7	3.5	3.5	4.0	3.86
5	3.38	3.4	3.65	3.18	3.52	3.95	5.02	3.65	3.5	6.0	4.0	3.86
6	3.38	3.4	3.65	3.15	3.72	3.98	6.33	3.65	3.45	4.9	3.9	3.86
7	3.38	3.38	3.52	3.12	3.78	3.98	4.0	3.6	3.45	4.6	3.85	3.8
8	3.42	3.38	3.42	3.05	3.98	4.0	4.45	3.55	3.45	4.5	3.8	3.78
9	3.42	3.38	3.38	3.0	4.08	4.0	4.05	3.55	3.45	4.5	3.75	3.78
10	3.4	3.38	3.35	3.0	4.1	4.06	4.0	3.75	3.45	4.45	3.7	3.78
11	3.4	3.38	3.35	3.05	4.08	4.01	3.9	3.75	3.45	4.35	3.7	3.88
12	3.4	3.38	3.35	3.05	4.0	4.0	4.45	3.73	3.45	4.3	3.7	3.78
13	3.4	3.38	3.35	3.05	3.8	4.0	4.1	3.6	3.45	4.3	3.7	3.86
14	3.4	3.38	3.3	3.02	4.2	4.0	5.7	3.55	3.53	4.25	3.72	4.23
15	3.35	3.42	3.3	3.0	4.0	4.1	6.35	3.55	3.57	4.2	3.75	3.88
16	3.38	3.45	3.3	3.0	4.0	4.0	6.8	4.0	3.55	4.08	3.75	3.78
17	3.4	3.4	3.3	3.0	3.9	3.92	4.05	3.7	3.55	4.0	3.75	3.8
18	3.4	3.4	3.45	3.0	3.9	4.38	7.3	4.25	3.55	4.0	3.8	3.78
19	3.4	3.35	3.42	3.0	3.85	4.8	4.8	3.55	3.53	4.0	3.75	4.33
20	3.4	3.35	3.4	3.0	3.85	3.92	4.6	3.55	3.5	4.12	3.75	4.73
21	3.4	3.35	3.4	3.0	3.85	3.92	4.9	3.55	3.47	4.1	3.7	4.48
22	3.4	3.35	3.4	3.0	3.85	4.9	4.1	3.83	3.45	4.0	3.7	4.03
23	3.4	3.35	3.42	3.0	3.82	4.1	4.5	3.95	3.45	3.93	3.75	3.88
24	3.35	3.38	3.45	3.0	3.8	3.92	4.65	4.3	3.45	3.9	3.72	3.88
25	3.32	3.38	3.45	3.7	3.8	3.85	4.12	4.75	3.45	3.9	3.7	3.98
26	3.35	3.4	3.45	3.35	3.55	3.75	4.1	3.8	3.4	3.9	3.72	4.23
27	3.35	3.4	3.45	3.12	3.55	4.22	4.05	3.7	3.4	3.9	3.75	4.18
28	3.38	3.4	3.45	3.15	3.7	3.7	4.1	3.75	3.35	3.9	3.72	4.18
29	3.4	.....	3.32	3.15	3.9	3.75	4.4	3.7	3.35	3.9	3.7	4.05
30	3.4	.....	3.3	3.1	3.88	3.75	4.28	3.65	3.35	3.9	3.72	4.03
31	3.35	.....	3.3	.....	3.96	.....	4.05	3.6	.....	3.9	.....	4.03

NOTE.—Gage heights affected by ice Jan. 1 to 31 and Dec. 1 to 31.

Daily discharge, in second-feet, of Purgatory River at Trinidad, Colo., for 1911.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	9	8	15	10	30	200	100	115	50	21	74	5
2	9	8	38	10	27	94	106	100	50	42	74	5
3	8	8	58	10	27	88	130	93	50	42	88	7
4	9	8	28	16	22	87	350	75	42	42	88	7
5	9	8	34	6	30	95	714	66	42	1,120	88	7
6	9	8	38	5	51	102	1,850	66	36	390	74	7
7	9	6	24	4	65	101	170	57	36	260	70	9
8	10	6	18	3	90	108	375	50	36	230	65	7
9	10	6	15	2	112	108	190	50	36	230	50	7
10	10	6	15	2	116	120	170	88	36	220	40	7
11	10	6	15	3	112	109	130	88	36	180	40	12
12	10	6	15	3	96	120	375	82	36	160	30	7
13	10	6	15	3	61	120	210	57	36	160	30	7
14	10	6	10	2	138	120	1,200	50	46	150	20	7
15	8	7	10	2	96	140	1,850	50	52	140	15	7
16	9	7	10	2	96	125	2,400	170	50	100	15	7
17	10	5	10	2	75	100	190	75	50	88	10	7
18	10	5	20	2	75	220	3,100	278	50	88	10	7
19	10	5	18	2	68	400	570	50	46	88	10	7
20	10	5	16	2	68	110	450	50	42	115	10	7
21	10	5	16	2	68	110	630	50	38	110	10	7
22	10	5	16	2	68	475	210	109	36	88	10	7
23	10	5	18	2	64	150	400	150	36	78	10	7
24	8	5	20	2	62	120	480	300	36	74	10	7
25	8	5	20	48	62	92	219	540	36	74	10	7
26	8	6	20	16	31	76	210	100	30	74	7	7
27	8	6	20	6	34	190	190	75	30	74	7	7
28	9	6	20	7	50	70	210	88	25	74	7	7
29	10	.....	12	7	82	77	350	75	25	74	7	7
30	10	.....	10	5	80	77	291	66	25	74	7	7
31	8	.....	10	.....	93	.....	190	57	.....	74	.....	7

NOTE.—Daily discharge determined as follows: Jan. 1–31, estimated; Feb. 1 to Mar. 9, by indirect method for shifting channels; May 10–19, from a fairly well defined curve; May 20 to July 1, by indirect method for shifting channels; July 2 to Nov. 6, from a fairly well defined curve; Nov. 7 to Dec. 31, estimated.

Monthly discharge of Purgatory River at Trinidad, Colo., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
January	10	8	9.3	571	C.
February	8	5	6.2	343	C.
March	58	10	19.5	1,200	B.
April	48	2	6.3	374	B.
May	138	22	69.3	4,260	B.
June	475	70	137	8,140	B.
July	3,100	100	581	35,700	B.
August	540	50	107	6,590	B.
September	52	25	39.2	2,330	B.
October	1,120	21	153	9,390	C.
November	88	7	32.9	1,960	C.
December	12	5	7.1	436	C.
The year	3,100	2	98.5	71,300	

BIG SANDY CREEK AT HUGO, COLO.

Location.—At highway bridge in sec. 32, T. 10 S., R. 54 W., half a mile south of Hugo. No important tributaries within several miles of the station.

Records available.—April 10, 1910, to October 31, 1911.

Drainage area.—Approximately 555 square miles.

Gage.—Vertical staff; datum unchanged.

Channel.—Very shifting.

Discharge measurements.—Made from the bridge during high water and by wading at ordinary stages.

Winter flow.—The bed of the stream is usually dry during the winter months.

Diversions.—There are no court decrees for diversions from Big Sandy Creek.

Accuracy.—Owing to a lack of measurements no estimates of discharge for 1911 have been made.

Cooperation.—Station is maintained in cooperation with the Central Land & Irrigation Co.

Discharge measurements of Big Sandy Creek at Hugo, Colo., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Apr. 21	E. O. Christiansen	2.30	[a]0.2
July 7	G. H. Russell	[a]2.20	(b)
14	E. O. Christiansen	.....	[a].2
18	G. H. Russell	.....	0

[a] Estimated. [b] Very slight flow.

Daily gage height, in feet, of Big Sandy Creek at Hugo, Colo., for 1911.

[George Leonard, observer.]

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1	.....	2.45	2.3	2.3	2.3	.....	2.3
2	.....	2.3	2.3	2.3	2.3	.....	2.3
3	.....	2.3	2.3	2.45	2.3	[b]2.8	2.3
4	.....	2.3	2.3	2.3	2.3	2.3	2.3
5	.....	2.35	2.3	2.45	2.3	2.3	2.3
6	.....	2.3	2.3	2.3	2.3	2.3	2.3
7	.....	2.3	2.3	2.3	2.3	2.3	2.3
8	.....	2.3	2.3	2.3	2.3	2.3	2.3
9	.....	2.3	2.3	2.3	2.3	2.3	2.3
10	.....	2.3	2.3	2.3	2.3	2.3	2.3
11	.....	2.3	2.3	2.3	2.3	2.3	2.3
12	.....	2.3	2.3	2.45	2.3	2.3	2.3
13	.....	2.3	2.3	2.3	2.3	2.3	2.3
14	.....	2.3	2.3	2.7	2.3	2.3	2.3
15	.....	2.3	2.4	2.3	2.3	2.3	2.3
16	.....	2.3	2.3	2.3	2.3	2.3	2.3
17	.....	2.3	2.4	2.3	2.3	2.3	2.3
18	.....	2.3	2.3	2.3	2.3	2.3	2.3
19	.....	2.3	2.3	2.3	2.3	2.3	2.3
20	.....	2.3	2.3	2.3	.....	2.3	2.3
21	2.3	2.3	2.3	2.3	.....	2.3	2.5
22	2.3	2.3	2.3	2.3	.....	2.3	2.35
23	2.45	2.3	2.3	2.3	.....	2.3	2.3
24	2.45	2.3	2.3	2.3	.....	2.3	2.3
25	2.4	2.3	2.3	2.3	.....	2.3	2.3
26	2.35	2.3	2.3	2.3	.....	2.3	2.3
27	2.3	2.3	2.3	2.3	.....	2.3	2.3
28	2.3	2.35	2.3	2.3	.....	2.3	2.3
29	2.25	[a]2.6	2.3	2.3	.....	2.3	2.3
30	2.7	2.3	2.3	2.3	.....	2.5	2.3
31	.....	2.3	.....	2.3	.....	.....	2.3

[a] Maximum gage height, 3.2 feet. [b] Maximum gage height, 3.5 feet.

NOTE.—No discharge Aug. 20 to Sept. 2, 1911.

BIG SANDY CREEK AT KIT CARSON, COLO.

Location.—At highway bridge in sec. 8, T. 15 S., R. 48 W., 1 mile west of Kit Carson, 1 mile above mouth of Wildhorse Creek, the nearest tributary.

Records available.—April 15, 1910, to October 31, 1911.

Drainage area.—Approximately 1,100 square miles.

Gage.—Vertical staff; datum unchanged.

Channel.—Shifting; dry during the greater portion of the time.

Discharge measurements.—Made from the bridge during high water and by wading at ordinary stages.

Winter flow.—Bed of this stream usually dry during the winter months.

Diversions.—There are no court decrees for diversions from Big Sandy Creek.

Accuracy.—There was flow during only five days in 1911; no discharge measurements were made.

Cooperation.—Station maintained in cooperation with the Central Land & Irrigation Co.

Discharge measurements of Big Sandy Creek at Kit Carson, Colo., in 1911.

Date.	Hydrographer.	Discharge.	Date.	Hydrographer.	Discharge.
		Sec.-ft.			*Sec.-ft.*
Apr. 19	E. O. Christiansen	0	July 14	E. O. Christiansen	0
20	do	0	18	G. H. Russell	0
July 8	G. H. Russell	0			

Daily gage height of Big Sandy Creek at Kit Carson, Colo., 1911.

[Cyrus Platner, observer.]

	Feet.		*Feet.*
May 28	1.3	July 16	1.2
May 29	1.25	July 17	1.0
May 30	.9		

NOTE.—Creek dry during remainder of year.

BIG SPRING CREEK NEAR ARENA, COLO.

Location.—In sec. 6, T. 15 S., R. 47 W., 1½ miles southwest of Arena. There is no tributary between the station and the mouth, 2 miles below.

Records available.—April 11, 1910, to October 23, 1911.

Drainage area.—Approximately 295 square miles.

Gage.—Vertical staff; datum unchanged.

Channel.—Data too meager to determine.

Discharge measurements.—Made by wading.

Winter flow.—Ice causes backwater during the winter months, and the records are discontinued.

Diversions.—There are no court decrees for diversions from Big Spring Creek.

Accuracy.—Owing to the meager data, no estimates of discharge have been made.

Cooperation.—Station maintained in cooperation with the Central Land & Irrigation Co.

Discharge measurements of Big Spring Creek near Arena, Colo., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Apr. 20	E. O. Christiansen	1.50	0.0
July 8	G. H. Russell	2.00	8.3

Daily gage height, in feet, of Big Spring Creek near Arena, Colo., for 1911.

[James Cook, observer.]

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1	.....	1.6	1.5	.....	1.6	1.5	.....
2	.....	1.6	1.5	.....	1.6	1.5	.....
3	.....	1.6	1.5	.....	1.5	1.7	.....
4	.....	1.6	1.5	.....	1.5	1.6	.....
5	.....	1.55	.....	.....	1.5	1.6	1.5
6	.....	1.5	.....	.....	1.5	1.5	1.6
7	.....	1.5	.....	7.25	1.5	1.5	1.6
8	.....	1.5	.....	2.35	1.5	1.5	1.5
9	.....	1.5	.....	1.75	1.5	1.5	1.5
10	.....	1.5	.....	1.7	1.5	1.5	1.5
11	.....	1.5	.....	1.7	1.5	1.5	1.5
12	.....	1.5	.....	1.7	1.5	1.5	1.5
13	.....	1.5	.....	1.6	1.5	1.5	1.5
14	.....	1.5	.....	1.6	1.5	1.5	1.5
15	.....	1.5	.....	1.6	1.5	.....	1.5
16	.....	1.5	.....	1.5	1.5	.....	1.5
17	.....	1.5	.....	1.5	.....	.....	1.5
18	.....	1.5	.....	1.5	.....	.....	1.5
19	.....	1.5	.....	1.5	.....	.....	1.5
20	1.5	1.5	.....	1.5	.....	.....	1.5
21	1.5	1.5	.....	1.5	.....	.....	1.5
22	1.5	1.5	.....	1.5	.....	.....	1.5
23	1.5	1.5	.....	.....	.....	.....	1.5
24	1.5	1.5	.....	.....	.....	.....	.....
25	1.6	1.5	.....	.....	1.45	.....	.....
26	1.8	1.5	.....	.....	1.6	.....	.....
27	1.6	1.5	.....	.....	1.6	.....	.....
28	1.5	1.5	.....	.....	1.6	.....	.....
29	1.6	1.5	.....	.....	1.6	.....	.....
30	1.7	1.5	.....	.....	1.6	.....	.....
31	.....	1.5	.....	.....	1.5	.....	.....

NOTE.—No water flowing in the creek on days for which gage heights are missing from Apr. 19 to Oct. 31.

CANADIAN RIVER AT LOGAN, N. MEX.

Location.—Three-fourths of a mile above railroad bridge in sec. 15, T. 13 N., R. 33 E., 1 mile south of Logan, 5 miles below mouth of Ute Creek, and about 5 miles above mouth of Arroyo Largo or Tucumcari Creek.

Records available.—June 29, 1904, to February 26, 1905; December 22, 1908, to December 31, 1911.

Drainage area.—Approximately 12,000 square miles.

Gage.—Automatic recording gage was installed August 5, 1910, at a point three quarters of a mile above bridge and referred to a datum different from that of gage previously used. The original gage was a staff. On the reestablishment of the station in 1908, a gage was painted on one of the bridge piers, but referred to a new datum. This gage was used until August 5, 1910, when the present gage was placed in position.

Channel.—Very shifting.

Discharge measurements.—Flood measurements are made by floats, owing to the great amount of drift carried in the stream. Measurements at ordinary stage are made from a car and cable, and at low water by wading.

Winter flow.—Ice causes slight backwater during a portion of the winter months.

Diversions.—Some water is diverted from the headwater streams, as irrigation is carried on quite actively, but there are no diversions from the Canadian itself.

Accuracy.—As the station as referred to the datum established in 1910 has not been completely rated, no estimates of discharge have been made.

Cooperation.—The station was maintained in cooperation with the Territorial engineer of New Mexico.

Discharge measurements of Canadian River at Logan, N. Mex., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Feb. 17	C. B. Digby	[a] 4.0	[a] 1.0	Aug. 1	Christiansen and Shepherd.	5.75	326
Apr. 5	G. H. Russell	3.5	.0				
May 20	do	5.25	100	25	G. H. Russell	[b] 7.80	6,040
22	do	4.81	83.4	Nov. 7	W. B. Freeman	5.45	82.0

[a] Estimated.
[b] Gage height on automatic gage could only be determined approximately.

Daily gage height, in feet, of Canadian River at Logan, N. Mex., for 1911.

[Thomas Goodrich, observer.]

Day.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1		4.3			6.2			7.4	6.2	5.7	5.1
2		4.2			5.6			7.2	5.6	5.7	5.1
3		4.15			5.6			6.9	5.3	5.7	5.1
4		4.2			5.2			6.0	5.3	5.7	5.2
5		4.2			4.6			5.55	5.3	5.6	5.2
6		4.15			3.9		5.4	4.9	5.5	5.6	5.2
7		4.1					5.4	4.5	5.9	5.45	5.25
8		4.0					5.3	4.7	5.8	5.45	5.25
9		3.9					5.2	[d] 7.7	5.8	5.45	5.25
10		3.85					5.05	9.4	5.8	5.45	5.1
11		3.85					5.0	6.5	5.8	5.45	4.9
12		3.8		[a] 6.7			4.95		5.7	5.45	4.8
13		3.8		6.2			4.9	6.0	5.7	5.45	4.8
14		3.8		6.0			4.8		5.7	5.45	4.8
15		3.8		7.0			4.7	5.4	5.6	5.45	4.8
16	4.0	3.9		6.9			4.7	5.0	5.5	5.4	4.8
17	4.0	3.9		6.2			4.65	4.9	5.5	5.4	4.8
18	4.0	3.9		5.8			4.6	4.8	5.4	5.4	4.8
19	4.0	3.85		5.45			4.55	4.8	5.4	5.4	4.8
20	4.0	3.8		5.1			4.5	4.75	5.4	5.4	4.8
21	4.0	3.8		5.0			4.5	4.7	5.4	5.4	4.85
22	4.0	3.8		4.8			4.5	4.8	5.4	5.4	4.9
23	4.0	3.8	5.5	4.75			6.0	4.8	5.4	5.35	4.9
24	4.0	3.8	4.5	4.6			6.0	4.75	5.4	5.25	4.9
25	4.0	3.8	4.25	4.5			[c] 7.8	4.7	5.4	5.15	4.9
26	4.0	3.8	4.1	4.35			6.65	4.6	5.4	5.1	4.9
27	4.0	3.8	4.0	4.2				4.4	5.4	5.15	5.0
28	4.3		3.9	4.2			7.8	4.4	5.4	5.25	5.1
29			3.8	9.9			7.7	5.4	5.5	5.2	5.1
30				[b] 10.1			7.65	5.8	5.6	5.18	5.2
31				8.6			7.5		5.7		5.2

[a] Maximum gage height, 8.25 feet.
[b] Maximum gage height, 14.0 feet.
[c] Maximum gage height, 8.8 feet.
[d] Maximum gage height, 10.5 feet.

NOTE.—The stream was dry on days for which gage heights are missing except Aug. 27, Sept. 12 and 14, when there was water flowing in the river. Gage heights affected by ice Nov. 28–30 and Dec. 4–31, 1911.

CHICO RICO CREEK NEAR RATON, N. MEX.

Location.—At St. Louis, Rocky Mountain & Pacific Railway bridge in sec. 21, T. 30 N., R. 24 E., and 10 miles southeast of Raton; above Raton and Una del Gato creeks.

Records available.—May 3, 1910, to December 31, 1911.

Drainage area.—Not measured.

Gage.—Automatic recording gage; datum unchanged.

Channel.—Shifting.

Discharge measurements.—Made from bridge during high water and by wading at ordinary stages.

Winter flow.—Ice causes backwater during the winter months.

Diversions.—The greater part of the normal flow is diverted above the station for irrigation.

Accuracy.—Owing to lack of measurements no estimates of discharge have been made.

Cooperation.—Station maintained in cooperation with the Territorial engineer of New Mexico.

Discharge measurements of Chico Rico Creek near Raton, N. Mex., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Feb. 18	C. B. Digby	1.60	[a]1.0	July 19	G. H. Russell	3.50	[b]350
June 8	G. H. Russell	.....	.0	22	.....do	1.28	[a]12
29	.....do	.20	.0				

[a] Estimated. [b] From Kutter's formula.

Daily gage height, in feet, of Chico Rico Creek near Raton, N. Mex., for 1911.

[Jay Walroth and E. T. Knox, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.60	1.60	1.60	1.55	.....	.....	.....	.....	.....	.....	1.15	1.20
2	1.60	1.60	1.60	1.55	.....	.....	1.45	.....	.....	.....	1.15	1.20
3	1.60	1.60	1.60	1.50	.....	.....	1.30	.....	.....	.....	1.20	1.30
4	1.60	1.60	1.60	.....	.....	.....	.....	.....	.....	.....	1.20	1.40
5	1.60	1.60	1.60	.....	.....	.....	1.50	.....	.....	1.90	1.20	1.40
6	1.60	1.60	1.60	.....	.....	.....	1.75	.....	.....	1.30	1.15	1.40
7	1.65	1.60	1.60	.....	.....	.....	1.45	.....	.....	1.20	1.15	1.40
8	1.80	1.60	1.60	.....	.....	.....	1.30	.....	.....	1.20	1.15	1.40
9	1.90	1.60	1.60	.....	.....	.....	1.25	.....	.....	.....	1.15	1.40
10	1.95	1.60	1.75	.....	.....	.....	.....	.....	.....	.....	1.15	1.40
11	2.20	1.60	2.05	.....	.....	.....	.....	.....	.....	.....	1.10	1.40
12	2.15	1.60	1.90	.....	1.45	.....	.....	.....	.....	.....	.....	1.40
13	2.15	1.60	1.75	.....	1.50	.....	.....	.....	.....	.....	.....	1.40
14	2.15	1.60	1.65	.....	1.75	[b]1.85	.....	.....	.....	.....	.....	1.40
15	2.05	1.60	1.60	.....	1.55	1.55	.....	.....	.....	.....	.....	1.40
16	2.00	1.60	1.60	.....	1.45	1.40	1.45	.....	.....	.....	.....	1.40
17	2.00	1.60	1.60	.....	1.50	1.70	1.25	.....	.....	.....	1.10	1.40
18	1.90	1.60	1.60	.....	1.50	1.50	.....	.....	.....	.....	1.10	1.40
19	1.75	1.60	1.60	.....	1.45	.....	[c]1.70	.....	.....	.....	1.10	1.35
20	1.75	1.60	1.60	.....	.....	.....	1.60	.....	.....	.....	1.15	1.35
21	1.60	1.60	1.55	.....	.....	.....	1.35	.....	.....	.....	1.15	1.30
22	1.60	1.60	1.55	.....	.....	.....	1.23	.....	.....	.....	1.15	1.30
23	1.60	1.60	1.55	.....	.....	.....	1.50	1.40	.....	.....	1.15	1.30
24	1.60	1.60	1.55	.....	.....	.....	1.45	.....	.....	.....	1.15	1.30
25	1.65	1.60	1.55	.....	.....	.....	1.25	1.65	.....	1.20	1.18	1.30
26	1.70	1.60	1.55	.....	.....	.....	.....	1.50	.....	1.20	1.20	1.30
27	1.70	1.60	1.55	.....	.....	.....	.....	.....	.....	1.25	1.20	1.30
28	1.60	1.60	1.55	.....	1.20	.....	.....	.....	.....	1.20	1.20	1.30
[illegible]	1.60	.....	1.55	.....	[a]3.30	.....	.....	.....	.....	1.20	1.20	1.30
[illegible]	1.60	.....	1.55	.....	1.80	.....	.....	.....	1.25	1.20	1.20	1.30
31	1.60	.....	1.55	.....	.....	.....	.....	.....	.....	1.20	1.20	1.30

[a] Maximum gage height, 6.5 feet.
[b] Maximum gage height, 3.85 feet.
[c] Maximum gage height, 3.50 feet.

NOTE.—No flow on days for which gage heights are missing. Gage heights affected by ice Jan. 1–30, Feb. 22 to Mar. 4, and Nov. 16 to Dec. 31.

UNA DEL GATO CREEK NEAR RATON, N. MEX.

Location.—In sec. 13, T. 30 N., R. 25 E., about 2 miles northeast of Meloche's ranch and 18 miles southeast of Raton, N. Mex. No important tributary enters within several miles.

Records available.—May 3, 1910, to December 16, 1911.

Drainage area.—Not measured.

Gage.—An automatic recording gage.

Channel.—Probably shifting.

Discharge measurements.—Made by wading.

Winter flow.—Ice causes slight backwater during a portion of the winter months.

Artificial control.—A short distance above the station is a reservoir designed to hold the flood water for use in irrigation farther down the valley.

Accuracy.—Owing to lack of high-water measurements no estimates of discharge have been made.

Cooperation.—Station was maintained in cooperation with the Territorial engineer of New Mexico and Mr. A. J. Meloche, of Raton, N. Mex., who furnished the gage heights.

Discharge measurements of Una del Gato Creek near Raton, N. Mex., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Feb. 18	C. B. Digby	0.81	[a] 0.5	July 20	G. H. Russell	1.60	74.8
Apr. 9	G. H. Russell	.78	[a] .5	20	do	6.50	[b] 2,000
July 20	do	1.25	47.0	22	do	.20	[a] .1

[a] Estimate. [b] Estimated by use of Kutter's formula.

Daily gage height, in feet, of Una del Gato Creek, near Raton, N. Mex., for 1911.

[A. J. Meloche, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.80	0.80	0.85	0.80	0.80	1.20	0.80	0.55	0.20	0.10	0.17	0.30
2	.80	.80	.85	.80	.75	1.10	.80	.30	.20	.05	.18	.30
3	.80	.85	.90	.80	.75	1.00	.75	.35	.20	.00	.19	.40
4	.80	.80	.90	.80	.75	1.00	.70	.40	.20	.00	.20	.40
5	.80	.80	.90	.80	.75	1.00	.75	.20	.10	.05	.24	.40
6	.80	.80	.85	.80	.75	1.00	[a] 3.35	.35	.10	.05	.22	.40
7	.80	.85	.80	.80	.75	1.00	1.50	.25	.10	.00	.20	.40
8	.80	.80	.80	.80	.75	1.10	.80	.25	.15	.00	.17	.40
9	.80	.80	.80	.80	.75	1.05	.75	.20	.15	.00	.17	.40
10	.80	.75	.80	.80	.75	.80	.75	.15	.25	.00	.18	.25
11	.80	.80	.75	.80	.75	.80	.70	.25	.22	.00	.20	.35
12	.80	.85	.80	.80	.75	.80	.75	.20	.20	.00	.28	.70
13	.80	.80	.80	.80	.75	.80	.75	.20	.20	.00	.28	.80
14	.80	.85	.80	.80	1.00	.90	.90	.20	.20	.00	.22	.80
15	.70	.85	.80	.80	1.00	.85	[a] 2.20	.20	.20	.00	.25	.80
16	.75	.80	.80	.80	.90	.80	2.20	.25	.20	.10	.22	.80
17	.70	.85	.80	.80	.80	.80	.20	.20	.15	.12	.24	.....
18	.75	.75	.80	.80	.80	.80	.20	.20	.18	.12	.22	.....
19	.75	.80	.80	.80	.80	.95	.20	.15	.15	.12	.20	.....
20	.75	.80	.70	.80	.80	1.00	[b] 2.00	.15	.20	.12	.22	.....
21	.75	.80	.75	.80	.80	.85	1.50	.30	.15	.15	.23	.....
22	.80	.80	.80	.80	.80	.85	.20	.30	.18	.15	.21	.....
23	.80	.80	.75	.80	.80	.85	.50	.30	.18	.14	.20	.....
24	.80	.80	.70	.80	.80	.80	.20	.20	.20	.14	.20	.....
25	.80	.80	.70	.80	.80	.80	.10	.20	.20	.14	.20	.....
26	.80	.80	.75	.80	.80	.80	.35	.20	.20	.13	.20	.....
27	.80	.80	.85	.80	.80	.80	.20	.25	.20	.15	.20	.....
28	.85	.85	.85	.80	.80	.80	.00	.20	.20	.18	.20	.....
29	.80	.....	.85	.80	1.15	.80	.30	.25	.20	.18	.20	.....
30	.80	.....	.80	.80	1.15	.80	.30	.20	.18	.18	.30	.....
31	.80	.....	.80	.....	1.20	.....	.40	.25	.....	.18	.....	.....

[a] Maximum gage height 6.4 feet. [b] Maximum gage height 6.5 feet.

NOTE.—Gage heights affected by ice Jan. 1–14, Feb. 19–28, and Nov. 24 to Dec. 31, 1911.

CIMARRON RIVER AT UTE PARK, N. MEX.

Location.—At highway bridge in Ute Park in sec. 19, T. 27 N., R. 18 E., half a mile below mouth of Ute Creek.

Records available.—July 14, 1907, to December 31, 1911.

Drainage area.—235 square miles.

Gage.—Automatic recording gage installed in September, 1909; referred to the same datum as the staff gage previously used.

Channel.—Fairly permanent, but rough.

Discharge measurements.—Made from bridge during high water and by wading at ordinary stages.

Winter flow.—Very little backwater from ice during the winter months.

Diversions.—Little water is diverted above the station, but most of the normal flow is diverted below.

Accuracy.—Conditions are favorable for accurate results and the estimates of flow should be reliable.

Cooperation.—Station maintained in cooperation with the Territorial engineer of New Mexico.

Discharge measurements of Cimarron River at Ute Park, N. Mex., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Apr. 7	Russell and Waha	0.65	50.1	June 8	G. H. Russell	0.50	26.0
7	do	.65	52.0	July 24	do	.60	45.7
May 6	G. H. Russell	.80	93.0				

Corrected daily gage height, in feet, of Cimarron River at Ute Park, N. Mex., for 1910.

Day.	Nov.	Dec.	Day.	Nov.	Dec.	Day.	Nov.	Dec.
1		0.3	11		0.35	21	0.4	0.3
2		.4	12		.35	22	.4	.3
3		.45	13	0.45	.3	23	.4	.35
4		.5	14	.5	.3	24	.4	.35
5		.35	15	.5	.3	25	.4	.35
6		.35	16	.5	.3	26	.4	.35
7		.4	17	.5	.3	27	.35	.35
8		.4	18	.5	.3	28	.3	.35
9		.4	19	.4	.3	29	.3	.35
10		.4	20	.4	.3	30	.3	.35
						31		.35

NOTE.—Gage heights Nov. 13–Dec. 31, 1910, published in Water-Supply Paper 287 were found to be in error. The above values are correct. The change made in the daily discharges was so small, they are not republished. Gage height affected by ice Dec. 17–31, 1910.

Daily gage height, in feet, of Cimarron River at Ute Park, N. Mex., for 1911.

[Mrs. R. P. Woodard, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.35	0.60	0.24	0.63	0.77	0.80	0.42	0.48	0.45	0.48	0.53	0.44
2	.35	.55	.24	.63	.76	.75	.48	.45	.45	.42	.50	.42
3	.35	.55	.24	.66	.77	.70	.50	.48	.46	.38	.57	.40
4	.35	.42	.35	.66	.77	.68	.48	.48	.48	.40	.55	.38
5	.36	.55	.56	.62	.80	.62	.45	.45	.46	.75	.55	.38
6	.37	.53	[a].84	.60	.80	.58	.43	.45	.45	.62	.55	.40
7	.37	.55	.69	.62	.83	.57	.44	.45	.43	.65	.55	.40
8	.40	.58	.55	.62	.87	.52	.43	.45	.43	.62	.57	.42
9	.40	.64	.60	.62	.84	.50	.38	.43	.40	.58	.57	.45
10	.40	.63	.68	.62	.82	.42	.45	.43	.40	.57	.55	.45
11	.48	.58	.70	.58	.77	.42	.38	.43	.38	.57	.55	.44
12	.45	.55	.52	.60	.77	.42	.43	.45	.38	.58	.48	.42
13	.47	.57	.58	.58	.72	.40	.45	.43	.40	.55	.55	.42
14	.38	.53	.55	.59	.73	.38	.48	.43	.39	.55	.60	.41
15	.36	.53	.55	.58	.77	.35	.48	.43	.43	.52	.58	.48
16	.38	.58	.53	.62	.67	.35	.47	.43	.42	.50	.57	.53
17	.37	.58	.55	.65	.62	.35	.46	[c].62	.39	.51	.53	.54
18	.38	.40	.52	.65	.62	.42	.44	.45	.39	.49	.53	.50
19	.37	.27	.54	.64	.62	.38	.43	.45	.39	.49	.56	.50
20	.35	.27	.54	.63	.62	.37	.47	.47	.39	.49	.56	.52
21	.40	.27	.54	.65	.60	.46	.46	.55	.39	.53	.55	.50
22	.40	.27	.58	.70	.60	.43	.45	.60	.39	.57	.55	.50
23	.44	.27	.53	.80	.60	.38	.50	.50	.38	.58	.53	.45
24	.44	.27	.52	.80	.60	.40	[b].90	.40	.35	.59	.52	.47
25	.45	.24	.53	.84	.60	.37	.53	.42	.35	.58	.48	.47
26	.47	.24	.52	.82	.60	.37	.48	.50	.35	.58	.46	.50
27	.42	.24	.51	.85	.60	.40	.45	.50	.34	.60	.48	.48
28	.45	.24	.53	.84	.58	.42	.60	.50	.33	.58	.46	.50
29	.57	.....	.55	.80	.66	.37	.55	.50	.38	.56	.48	.50
30	.60	.....	.58	.77	.66	.38	.55	.50	.52	.56	.45	.45
31	.62	.....	.62	.....	.68	.....	.48	.45	.....	.55	.....	.50

[a] Maximum gage height, 1.13 feet.
[b] Maximum gage height, 1.50 feet.
[c] Maximum gage height, 1.25 feet.

Daily discharge, in second-feet, of Cimarron River at Ute Park, N. Mex., for. 1911.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	8.4	44	2.0	50	78	87	15	21	18	21	30	17
2	8.4	34	2.0	50	76	74	21	18	18	15	24	15
3	8.4	34	2.0	56	78	64	24	21	19	11	38	13
4	8.4	15	8.4	56	78	60	21	21	21	13	34	11
5	9.2	34	36	48	87	48	18	18	19	74	34	11
6	10	30	99	44	87	40	16	18	18	48	34	13
7	10	34	62	48	96	38	17	18	16	54	34	13
8	13	40	34	48	108	28	16	18	16	48	38	15
9	13	52	44	48	99	24	11	16	13	40	38	18
10	13	50	60	48	93	15	18	16	13	38	34	18
11	21	40	64	40	78	15	11	16	11	38	34	17
12	18	34	28	44	78	15	16	18	11	40	21	15
13	20	38	40	40	68	13	18	16	13	34	34	15
14	11	30	34	42	70	11	21	16	12	34	44	14
15	9.2	30	34	40	78	8.4	21	16	16	28	40	21
16	11	40	30	48	58	8.4	20	16	15	24	38	30
17	10	40	34	54	48	8.4	19	48	12	26	30	32
18	11	13	28	54	48	15	17	18	12	22	30	24
19	10	3.5	32	52	48	11	16	18	12	22	36	24
20	8.4	3.5	32	50	48	10	20	20	12	22	36	28
21	13	3.5	32	54	44	19	19	34	12	30	34	24
22	13	3.5	40	64	44	16	18	44	12	38	34	24
23	17	3.5	30	87	44	11	24	24	11	40	30	18
24	17	3.5	28	87	44	13	117	13	8.4	42	28	20
25	18	2.0	30	99	44	10	30	15	8.4	40	21	20
26	20	2.0	28	93	44	10	21	24	8.4	40	19	24
27	15	2.0	26	102	44	13	18	24	7.6	44	21	21
28	18	2.0	30	99	40	15	44	24	6.9	40	19	24
29	38	.....	34	87	56	10	34	24	11	36	21	24
30	44	.....	40	78	56	11	34	24	28	36	18	18
31	48	.....	48	.....	60	.....	21	18	.....	34	.....	24

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

Monthly discharge of Cimarron River at Ute Park, N. Mex., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
January	48	8.4	15.9	978	A.
February	52	2.0	23.6	1,310	A.
March	99	2.0	34.6	2,130	A.
April	102	40	60.3	3,590	A.
May	108	40	65.2	4,010	A.
June	87	8.4	24.0	1,430	A.
July	117	11	23.7	1,460	A.
August	48	13	21.1	1,300	A.
September	28	6.9	13.7	815	A.
October	74	11	34.6	2,130	A.
November	44	18	30.9	1,840	A.
December	32	11	19.5	1,200	A.
The year	117	2.0	30.6	22,200	

RAYADO RIVER NEAR CIMARRON, N. MEX.

Location.—Just above the box canyon in sec. 23, T. 25 N., R. 17 E., 20 miles southwest of Cimarron. Nearest tributary, Agua Fria Creek, enters one-quarter mile above.

Records available.—May 8, 1911, to October 7, 1911, when the station was discontinued.

Drainage area.—Not measured.

Gage.—Vertical gage.

Channel.—Data too meager to determine.

Discharge measurements.—Made by wading.

Winter flow.—No data.

Diversions.—No data.

Accuracy.—As the station has not been completely rated, no estimates of flow have been made.

Cooperation.—Station maintained in cooperation with the Territorial engineer of New Mexico. Gage heights are furnished through the courtesy of Mr. G. W. Webster, jr., Cimarron, N. Mex.

Discharge measurements of Rayado River near Cimarron, N. Mex., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
May 8	G. H. Russell	0.75	25.3
9	do	.73	24.6
June 10	do	.50	9.0

Daily gage height, in feet, of Rayado River near Cimarron, N. Mex., for 1911.

[Leon B. Ryan, observer.]

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Day.	May.	June.	July.	Aug.	Sept.	Oct.
1	.....	0.70	0.42	0.50	0.38	.....	16	.....	0.45	0.48	0.38	0.38	.....
2	.....	.60	.42	.50	.36	.....	17	.....	.45	.48	.38	.35	.....
3	.....	.60	.40	.48	.35	.....	18	.....	.50	.45	.54	.35	.....
4	.....	.60	.40	.45	.45	0.45	19	.....	.45	.45	.42	.32	.....
5	.....	.55	.40	.42	.39	1.45	20	.....	.48	.50	.38	.35	.....
6	.....	.55	.58	.40	.36	1.30	21	.....	.50	.60	.38	.32	.....
7	.....	.55	.60	.40	.35	1.30	22	0.60	.50	.50	.43	.31	.....
8	0.75	.55	.52	.40	.35	.....	23	.60	.45	.45	.51	.30	.....
9	.75	.55	.45	.40	.35	.....	24	.55	.42	.60	.46	.30	.....
10	.....	.52	.45	.40	.35	.....	25	.55	.40	.55	.42	.....	.....
11	.....	.50	.45	.40	.32	.....	26	.55	.40	.52	.40	.....	.....
12	.....	.50	.45	.40	.32	.....	27	.50	.40	.50	.38	.....	.....
13	.65	.50	.45	.38	.32	.....	28	.50	.40	.50	.40	.....	.....
14	.65	.50	.45	.38	.36	.....	29	.52	.40	.78	.40	.....	.....
15	.60	.45	.45	.38	.41	.....	30	.55	.40	.55	.40	.....	.....
							31	.68	.....	.52	.38	.....	.....

RAYADO RIVER NEAR ABREU'S RANCH, NEAR CIMARRON, N. MEX.

Location.—Six miles above Abreu's ranch house, at the mouth of the box canyon 15 miles southeast of Cimarron near sec. 29, T. 25 N., R. 18 E.

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

Drainage area.—Not measured.

Gage.—Automatic recording gage, installed May 5, 1911. A staff gage, located three-quarters of a mile above Abreu's ranch house, was read until May 5, 1911, when the station was moved to its present site. No determined relation between the two gages. No streams enter between the two points, but it is possible that some of the flow is lost by sinking into the sand.

Channel.—Slightly shifting.

Discharge measurements.—Made by wading.

Winter flow.—Ice causes some backwater during the winter months.

Diversions.—No water is diverted above the station, and the records represent the natural run-off.

Cooperation.—Prior to October, 1909, stations in the Rayado River basin were maintained by the New Mexico Hydrographic Survey, but since that time they have been maintained by the United States Geological Survey in cooperation with the Territorial engineer of New Mexico.

Discharge measurements of Rayado River near Abreu's ranch, near Cimarron, N. Mex., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Apr. 6	G. H. Russell	*1.50	11.0	June 9	G. H. Russell	1.01	9.2
May 4	do	1.10	17.1	July 25	do	1.01	9.5
4	do	1.10	16.1	Nov. 15	W. B. Freeman	1.01	10.3
9	do	1.32	25.0				

* Gage height to the old gage datum.

Daily gage height, in feet, of Rayado River near Abreu's ranch, near Cimarron, N. Mex., for 1911.

[C. H. Coulter, observer.]

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	1.25	0.90	0.95	0.75	0.86	1.05	1.05
2	.....	1.15	.90	.95	.80	.80	1.10	1.00
3	.....	1.15	.85	.90	.80	.75	1.05	.90
4	1.10	1.15	.85	.90	.90	.85	.85	.70
5	1.20	1.07	.80	.90	.80	2.17	.80	.65
6	1.25	1.07	.95	.85	.75	1.66	.90	.65
7	1.30	1.07	1.05	.85	.75	1.47	.93	.60
8	1.35	1.07	.90	.90	.75	1.38	.94	.60
9	1.35	1.00	.90	.90	.75	1.32	.93	.80
10	1.30	.98	.85	.85	.75	1.28	.94	.80
11	1.30	.95	.85	.85	.75	1.23	.95	.80
12	1.25	.95	.90	.80	.75	1.18	1.00	.80
13	1.25	.95	.90	.80	.75	1.14	1.13	.80
14	1.35	.90	.90	.80	.75	1.10	1.17	.80
15	1.40	.90	.95	.80	.88	1.06	.98	.80
16	1.30	.90	.95	.80	.78	1.03	.98	.78
17	1.30	.90	.95	.80	.72	1.02	1.00	.78
18	1.25	.95	.90	.85	.72	1.00	1.00	.78
19	1.20	.90	.95	.90	.72	1.00	.95	.78
20	1.10	.95	1.00	.90	.74	.99	.98	.78
21	1.10	1.05	1.05	.95	.73	1.05	.97	.78
22	1.10	1.05	.95	.95	.71	1.08	.95	.78
23	1.10	1.00	.95	.85	.70	1.08	.97	.78
24	1.07	.85	1.15	.85	.70	1.05	.98	.78
25	1.07	.80	1.05	.85	.70	1.03	1.05	.78
26	1.07	.80	1.00	.80	.70	1.05	1.03	.78
27	1.02	.80	.95	.80	.70	1.05	1.02	.78
28	1.02	.80	1.00	.90	.70	1.08	1.02	.78
29	1.02	.80	1.15	.85	.98	1.13	1.04	.78
30	1.07	.80	1.10	.80	1.06	1.12	1.12	.78
31	1.25	.....	1.00	.80	.....	1.09	.....	.78

NOTE.—Gage heights May 17 to June 9 estimated from a hydrograph. Gage heights Nov. 25 to Dec. 31 affected by ice.

Daily discharge, in second-feet, of Rayado River near Abreu's ranch, near Cimarron, N. Mex., for 1911.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1	.....	21	6.5	7.9	3.3	5.6	11
2	.....	16	6.5	7.9	4.2	4.2	13
3	.....	16	5.4	6.5	4.2	3.3	11
4	16	16	5.4	6.5	6.5	5.4	5.4
5	20	12	4.2	6.5	4.2	111	4.2
6	23	12	7.9	5.4	3.3	53	6.5
7	25	12	11	5.4	3.3	36	7.3
8	28	12	6.5	6.5	3.3	29	7.6
9	27	9.3	6.5	6.5	3.3	25	7.3
10	24	8.7	5.4	5.4	3.3	23	7.6
11	24	7.9	5.4	5.4	3.3	20	7.9
12	21	7.9	6.5	4.2	3.3	17	9.3
13	21	7.9	6.5	4.2	3.3	15	14
14	27	6.5	6.5	4.2	3.3	13	16
15	30	6.5	7.9	4.2	6.0	12	8.7
16	24	6.5	7.9	4.2	3.8	10	8.7
17	24	6.5	7.9	4.2	2.8	10	9.3
18	21	7.9	6.5	5.4	2.8	9.3	9.3
19	18	6.5	7.9	6.5	2.8	9.3	7.9
20	13	7.9	9.3	6.5	3.1	9.0	8.7
21	13	11	11	7.9	2.9	11	8.5
22	13	11	7.9	7.9	2.6	12	7.9
23	13	9.3	7.9	5.4	2.4	12	8.5
24	12	5.4	16	5.4	2.4	11	8.7
25	12	4.2	11	5.4	2.4	10	.....
26	12	4.2	9.3	4.2	2.4	11	.....
27	10	4.2	7.9	4.2	2.4	11	.....
28	10	4.2	9.3	6.5	2.4	12	.....
29	10	4.2	16	5.4	8.7	14	.....
30	12	4.2	13	4.2	12	14	.....
31	21	.....	9.3	4.2	.....	13	.....

NOTE.—Daily discharge determined as follows: May 4–9 by the indirect method for shifting channels, May 10 to Nov. 24 from a well-defined curve, Nov. 25 to Dec. 31 estimated on account of ice.

Monthly discharge of Rayado River near Abreu's ranch near Cimarron, N. Mex., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
May 4–31	30	10	18.7	1,040	A.
June	21	4.2	8.96	533	A.
July	16	4.2	8.26	508	A.
August	7.9	4.2	5.62	346	A.
September	12	2.4	3.80	226	A.
October	111	3.3	17.8	1,090	B.
November	16	.....	7.94	472	B.
December	.....	.....	2.0	123	C.
The period	.....	.....	.....	4,340	

NOTE.—Discharge estimated at 4 second-feet Nov. 25–30 and at 2 second-feet Dec. 1–31, 1911, on account of ice.

MORA RIVER AND LA CUEVA CANAL AT LA CUEVA, N. MEX.

Location.—At highway bridge at La Cueva, a few miles above the mouth of the Cebolla and a short distance downstream from the intake of the La Cueva canal, and just below wasteway, about sec. 24, T. 20 N., R. 16 E.

Records available.—August 25, 1903, to July 31, 1911, when the station was discontinued.

Drainage area.—Not measured.

Gage.—The original gage was washed out by a flood on September 29, 1904. A new staff gage, referred to a datum 1.32 feet above that of the original gage, was installed April 29, 1905, and has remained unchanged since that date. The canal gage is at a footbridge below the wasteway; its datum has remained constant.

Channel.—Somewhat shifting, both in the river and the canal.

Discharge measurements.—Made from the bridge during high water and by wading during low water.

Winter flow.—Ice causes slight backwater for a few days during the winter months.

Diversions.—Above the station only a little water is diverted so that the combined flow of the river and canal represent closely the natural run-off from the drainage area.

Accuracy.—Owing to the somewhat shifting channel and insufficient measurements, the estimates of flow can not be considered better than fair.

Cooperation.—Station maintained in cooperation with the Territorial engineer of New Mexico.

Discharge measurements of Mora River at La Cueva, N. Mex., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
May 9	R. L. Cooper	1.30	36.1
June 13	G. H. Russell	.86	9.3

Daily gage height, in feet, of Mora River at La Cueva, N. Mex., for 1911.

[Hugh Louden, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.
1	.....	0.85	0.80	0.65	0.75	1.80	1.00
2	.....	.85	.80	.65	.75	2.10	1.10
3	.....	.80	.50	.75	.70	1.85	1.70
4	.....	.80	.85	.75	.70	1.80	1.50
5	.....	.80	.70	.80	.75	1.60	1.50
6	.....	.85	.85	.65	.....	1.40	1.70
7	.....	.75	.90	.60	1.30	1.40	2.00
8	.....	.80	.95	.80	1.70	1.35	.....
9	.....	.80	.90	.70	1.30	1.15	1.55
10	.....	.80	1.00	.80	1.20	1.05	1.60
11	0.80	.60	1.00	.80	.95	1.25	1.90
12	.55	.50	1.00	.70	.90	1.00	1.55
13	.50	.70	.95	.70	1.55	.90	[a] 2.75
14	.50	.60	.95	.70	2.35	.70	2.00
15	.50	.70	.95	.70	2.25	.75	2.20
16	.50	.80	1.00	.70	2.15	.60	2.20
17	.45	.60	.90	.70	1.90	.60	2.32
18	.45	.60	.95	.70	1.65	2.28	2.00
19	.80	.70	.95	.70	1.65	1.40	1.95
20	.45	.80	.95	.75	1.65	1.35	2.00
21	.45	1.10	.95	.60	1.70	1.60	[b] 3.30
22	.45	.....	.85	.60	1.45	1.45	2.00
23	.45	.....	.80	.65	1.35	1.25	3.88
24	.45	.....	.70	.80	1.20	1.15	4.15
25	.50	.....	.80	1.00	.....	1.15	3.15
26	.50	.....	1.00	.80	1.30	.90	2.90
27	.45	.....	.65	.60	1.40	.55	2.60
28	.45	.....	.65	.60	1.50	.60	2.50
29	.85	.....	.85	.75	1.60	.75	2.70
30	.85	.....	.55	.80	1.70	.60	2.40
31	.50	.....	.65	.....	1.60	.....	2.10

[a] Maximum gage height 3.6 feet. [b] Maximum gage height 3.8 feet.

NOTE.—Gage heights affected by ice Jan. 1 to 10 and Feb. 22 to 28.

Daily discharge, in second-feet, of Mora River at La Cueva, N. Mex., for 1911.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.
1	.....	9.0	7.0	3.2	5.5	90	16
2	.....	9.0	7.0	3.2	5.5	126	22
3	.....	7.0	1.5	5.5	4.0	96	78
4	.....	7.0	9.0	5.5	4.0	90	55
5	.....	7.0	4.0	7.0	5.5	66	55
6	.....	9.0	9.0	3.2	21	45	78
7	.....	5.5	11	2.5	36	45	114
8	.....	7.0	14	7.0	78	40	87
9	.....	7.0	11	4.0	36	26	60
10	.....	7.0	16	7.0	29	19	66
11	7.0	2.5	16	7.0	14	32	102
12	2.0	1.5	16	4.0	11	16	60
13	1.5	4.0	14	4.0	60	11	210
14	1.5	2.5	14	4.0	158	4.0	114
15	1.5	4.0	14	4.0	146	5.5	139
16	1.5	7.0	16	4.0	132	2.5	139
17	1.0	2.5	11	4.0	102	2.5	155
18	1.0	2.5	14	4.0	72	149	114
19	7.0	4.0	14	4.0	72	45	108
20	1.0	7.0	14	5.5	72	40	114
21	1.0	22	14	2.5	78	66	282
22	1.0	.....	9.0	2.5	50	50	114
23	1.0	.....	7.0	3.2	40	32	358
24	1.0	.....	4.0	7.0	29	26	406
25	1.5	.....	7.0	16	32	26	262
26	1.5	.....	16	7.0	36	11	230
27	1.0	.....	3.2	2.5	45	2.0	191
28	1.0	.....	3.2	2.5	55	2.5	178
29	9.0	.....	9.0	5.5	66	5.5	204
30	9.0	.....	2.0	7.0	78	2.5	165
31	1.5	.....	3.2	.....	66	.....	126

NOTE.—Daily discharge determined from a curve not well defined. Discharge interpolated May 6, 25, and July 8.

Monthly discharge of Mora River at La Cueva, N. Mex., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
January	9.0	.....	2.05	126	C.
February	22	1.5	6.04	335	C.
March	16	1.5	10.0	615	B.
April	16	2.5	4.94	294	B.
May	158	4.0	52.9	3,250	C.
June	149	2.0	39.1	2,330	B.
July	406	16	142	8,730	C.
The period	.....	.....	.....	15,700	

NOTE.—Discharge estimated at 1 second-foot Jan. 1–10 and at 5 second-feet Feb. 22–28 on account of ice.

Discharge measurements of La Cueva canal at La Cueva, N. Mex., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
May 9	R. L. Cooper	a 0.10	4.8
June 13	G. H. Russell	a .80	13.0

a The gage height taken during measurement was distorted. This gage height was taken by the observer in the evening.

Daily gage height, in feet, of La Cueva canal at La Cueva, N. Mex., for 1911.

[Hugh Louden, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May	June	July.
1	.....	0.05	.....	0.7	0.75	0.8	0.3
2	.....	.05	0.1	.9	.8	.9	1.2
3	.....	.05	.6	1.0	.7	.8	1.1
4	.....	.1	.2	.9	.6	.8	1.2
5	.....	.05	.6	.8	.8	.8	1.0
6	.....	.....	.2	.85	.....	.7	1.0
7	.....	.1	.2	.6	1.05	.7	.5
8	.....	.....	.05	.7	.....	.7	.....
9	.....	.....	.1	.9	.75	.7	1.05
10	.....	.....	.05	.6	.85	.65	1.1
11	.....	.3	.05	.5	.8	1.0	1.0
12	0.5	.5	.05	.6	.75	.55	1.15
13	.55	.3	.2	.65	.1	.8	.95
14	.5	.4	.05	.6	.....	.85	.85
15	.5	.3	.05	.6	.....	.9	1.0
16	.55	.....	.05	.7	.....	.85	1.0
17	.6	.5	.05	.5	.7	.9	1.1
18	.55	.6	.05	.5	.6	.8	1.05
19	.....	.5	.05	.5	.4	.9	.5
20	.4	.2	.05	.2	.3	1.1	.2
21	.55	.....	.05	.45	.65	1.1	.....
22	.55	.....	.4	.6	.4	1.1	.....
23	.5	.....	.55	.8	.3	1.15	.6
24	.55	.....	.55	.8	.55	1.1	.....
25	.6	.....	.5	.6	.....	1.15	.....
26	.6	.....	.1	.75	.6	.9	.....
27	.55	.....	.8	.6	.9	1.0	.....
28	.5	.....	.9	.8	.9	.6	.....
29	.05	.....	.7	.8	.8	.5	1.1
30	.05	.....	.9	.95	.8	.7	1.05
31	.55	.....	.85	.....	.8	.....	1.1

NOTE.—No water flowing in the canal on days for which gage heights are missing from Jan. 1 to July 31, except May 6, 25, and July 8, when gage was not read.

Daily discharge, in second-feet, of La Cueva canal at La Cueva, N. Mex., for 1911.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.
1	0.0	4.6	0.0	11.3	12.2	13.0	6.3
2	.0	4.6	4.8	14.9	13.0	14.9	21.5
3	.0	4.6	9.8	17.0	11.3	13.0	19.2
4	.0	4.8	5.5	14.9	9.8	13.0	21.5
5	.0	4.6	9.8	13.0	13.0	13.0	17.0
6	.0	.0	5.5	14.0	15.6	11.3	17.0
7	.0	4.8	5.5	9.8	18.1	11.3	8.5
8	.0	.0	4.6	11.3	.0	11.3	13.3
9	.0	.0	4.8	14.9	12.2	11.3	18.1
10	.0	.0	4.6	9.8	14.0	10.6	19.2
11	.0	6.3	4.6	8.5	13.0	17.0	17.0
12	8.5	8.5	4.6	9.8	12.2	9.2	20.4
13	9.2	6.3	5.5	10.6	4.8	13.0	16.0
14	8.5	7.3	4.6	9.8	.0	14.0	14.0
15	8.5	6.3	4.6	9.8	.0	14.9	17.0
16	9.2	.0	4.6	11.3	.0	14.0	17.0
17	9.8	8.5	4.6	8.5	11.3	14.9	19.2
18	9.2	9.8	4.6	8.5	9.8	13.0	18.1
19	.0	8.5	4.6	8.5	7.3	14.9	8.5
20	7.3	5.5	4.6	5.5	6.3	19.2	5.5
21	9.2	.0	4.6	7.9	10.6	19.2	.0
22	9.2	.0	7.3	9.8	7.3	19.2	.0
23	8.5	.0	9.2	13.0	6.3	20.4	9.8
24	9.2	.0	9.2	13.0	9.2	19.2	.0
25	9.8	.0	8.5	9.8	9.5	20.4	.0
26	9.8	.0	4.8	12.2	9.8	14.9	.0
27	9.2	.0	13.0	9.8	14.9	17.0	.0
28	8.5	.0	14.9	13.0	14.9	9.8	.0
29	4.6	.....	11.3	13.0	13.0	8.5	19.2
30	4.6	.....	14.9	16.0	13.0	11.3	18.1
31	9.2	.....	14.0	.....	13.0	.....	19.2

NOTE.—Daily discharge determined from a rating curve not well defined. Discharge interpolated May 6, 25, and July 8.

Monthly discharge of La Cueva canal at La Cueva, N. Mex., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
January	9.8	0.0	5.23	322	B.
February	9.8	.0	3.39	188	C.
March	14.9	.0	6.89	424	B.
April	17.0	5.5	11.3	672	B.
May	18.1	.0	9.85	606	B.
June	20.4	8.5	14.2	845	B.
July	21.5	.0	12.3	756	B.
The period	.....	.....	.....	3,810	

SAPELLO RIVER AT LOS ALAMOS, N. MEX.

Location.—At Los Alamos post office near sec. 28, T. 18 N., R. 16 E. No important tributary enters between this station and the mouth, a few miles east.

Records available.—August 22, 1903, to May 31, 1911, when the station was discontinued.

Drainage area.—144 square miles.

Gage.—A chain gage installed in April, 1905, to replace the original gage which was destroyed by flood September 29, 1904.

Channel.—Somewhat shifting.

Discharge measurements.—Made from car and cable during high water and by wading at ordinary stages.

Winter flow.—There is very little backwater from ice during the winter period.

Diversions.—A considerable part of the normal flow is diverted for irrigation above the station.

Accuracy.—Owing to the shifting channel and insufficient measurements, the estimates of flow can not be considered better than fair.

Cooperation.—Station maintained in cooperation with the Territorial engineer of New Mexico.

The following discharge measurement was made by R. L. Cooper: May 10, 1911, gage height, −0.04 foot; discharge, 1.3 second-feet.

Daily gage height, in feet, and discharge, in second-feet, of Sapello River at Los Alamos, N. Mex., for 1911.

[William Prank, observer.]

Day.	Jan.		Feb.		Mar.		Apr.		May.	
	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
1	.....	.....	−0.10	1.5	−0.10	1.5	0.05	4.9	0.00	3.5
2	.....	.....	− .10	1.5	− .05	2.5	.05	4.9	.00	3.5
3	.....	.....	− .10	1.5	.00	3.5	.05	4.9	.00	3.5
4	.....	.....	− .10	1.5	.10	6.3	.05	4.9	−.10	1.5
5	.....	.....	− .05	2.5	.10	6.3	.05	4.9	−.10	1.5
6	.....	.....	.00	3.5	.15	8.2	.05	4.9	−.10	1.5
7	.....	.....	.00	3.5	.10	6.3	.05	4.9	.00	3.5
8	.....	.....	− .05	2.5	.10	6.3	.05	4.9	−.10	1.5
9	−0.10	1.5	− .05	2.5	.10	6.3	.20	10	−.10	1.5
10	− .10	1.5	− .10	1.5	.05	4.9	.20	10	−.05	2.5
11	− .10	1.5	− .10	1.5	.05	4.9	.20	10	−.05	2.5
12	− .10	1.5	− .10	1.5	.05	4.9	.20	10	.00	3.5
13	− .10	1.5	− .05	2.5	.05	4.9	.20	10	.00	3.5
14	− .10	1.5	.00	3.5	.05	4.9	.20	10	.75	46
15	− .10	1.5	− .10	1.5	.05	4.9	.20	10	.85	54
16	− .10	1.5	− .10	1.5	.05	4.9	.20	10	.65	37
17	− .10	1.5	− .10	1.5	.05	4.9	.20	10	.55	30
18	− .10	1.5	− .10	1.5	.05	4.9	.20	10	.50	26
19	− .10	1.5	.....	1.5	.05	4.9	.20	10	.50	26
20	− .10	1.5	.....	2.0	.05	4.9	.10	6.3	.40	20
21	− .10	1.5	.00	3.5	.05	4.9	.00	3.5	.40	20
22	− .10	1.5	.00	3.5	.05	4.9	.10	6.3	.35	18
23	− .10	1.5	.00	3.5	.05	4.9	− .10	1.5	.25	12
24	− .10	1.5	− .05	2.5	.08	5.7	− .10	1.5	.10	6.3
25	− .10	1.5	− .05	2.5	.08	5.7	.00	3.5	.00	3.5
26	− .10	1.5	− .05	2.5	.05	4.9	.05	4.9	.00	3.5
27	− .10	1.5	− .05	2.5	.05	4.9	.20	10	.00	3.5
28	− .10	1.5	.00	3.5	.05	4.9	.20	10	.30	15
29	− .10	1.5	.....	.....	.05	4.9	.10	6.3	.50	26
30	− .10	1.5	.....	.....	.05	4.9	− .10	1.5	.50	26
31	− .10	1.5	.....	.....	.05	4.9	.....	.....	.60	33

NOTE.—Gage heights affected by ice Jan. 1 to 8, Feb. 19 and 20, 1911. Daily discharge determined from a rating curve not well defined. Discharge Feb. 19 and 20 estimated on account of ice.

Monthly discharge of Sapello River at Los Alamos, N. Mex., for 1911.

Month.	Discharge, in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
January	1.5	.....	1.37	84	C.
February	3.5	1.5	2.30	128	C.
March	8.2	1.5	5.05	311	C.
April	10	1.5	6.82	406	C.
May	54	1.5	14.2	873	B.

NOTE.—Discharge estimated at 1 second-foot Jan. 1–8, 1911.

PAJARITO CREEK NEAR HANLEY, N. MEX.

Location.—In sec. 26, T. 11 N., R. 28 E., 2 miles north of Hanley, a quarter of a mile above mouth of Vigil Creek, the nearest tributary.

Records available.—August 30, 1911, to December 31, 1911.

Drainage area.—310 square miles.

Gage.—Automatic recording gage.

Channel.—Data too meager to determine.

Discharge measurements.—Made by floats during high water and by wading at ordinary stages.

Winter flow.—No data.

Diversions.—No water is diverted above the station, and therefore the records represent the natural run-off.

Accuracy.—Owing to the possibility of shift and the fact that the upper portion of the rating curve is determined by floats and slope measurements, no estimates of discharge have been made.

Cooperation.—Station maintained in cooperation with the Territorial engineer of New Mexico. The gage heights are furnished through the courtesy of Mr. V. W. Moore, Tucumcari, N. Mex.

Discharge measurements of Pajarito Creek near Hanley, N. Mex., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Aug. 27	G. H. Russell	11.50	[a]4,520	Aug. 28	G. H. Russell	1.60	136
27	do	8.00	[a]2,280	30	do	.87	[b]3.0
27	do	5.00	[a]882	30	do	.50	0
28	do	2.70	374	Nov. 10	W. B. Freeman	.65	0

[a] Estimated from Kutter's formula. [b] Estimated.

Daily gage height, in feet, of Pajarito Creek near Hanley, N. Mex., for 1911.

[V. W. Moore, observer.]

Aug. 27	8.15	Sept. 12	2.10
28	2.15	13	1.60
30	.87	14	1.20
31	.87	15	.90
Sept. 9	[1]2.50	16	.80
10	1.10	17	.70
11	1.50	Oct. 31	1.20

NOTE.—No flow in creek on dates from Aug. 26 to Dec. 31, for which time gage heights are not published. The total discharge of floods in June is estimated as 300 acre-feet and in July 1,600 acre-feet. The discharge of flood on Aug. 23 is estimated as 2,000 acre-feet and on Aug. 28 as 2,400 acre-feet.

UTE CREEK NEAR LOGAN, N. MEX.

Location.—Four miles above the mouth of Ute Creek in the northeastern corner of T. 13 N., R. 32 E. No important tributaries enter within several miles of the station.

Records available.—August 12, 1904, to June 30, 1906; April 13, 1909, to December 31, 1911.

Drainage area.—Not measured.

Gage.—Automatic recording gage installed August 1, 1911, to replace original staff gage used since 1904. Datum of recording gage different from that of staff gage.

Channel.—Very shifting.

[1] Maximum gage height 4.55 feet.

Discharge measurements.—Made by wading at ordinary stages. Estimates of flood discharge are made by slope measurements and the use of Kutter's formula.

Winter flow.—Little backwater from ice during the winter months.

Diversions.—A small amount of water is diverted above the station for irrigation.

Accuracy.—Owing to the shifting nature of the stream bed, the records can be considered only fair. The finding of an error in obtaining the cross section of the stream necessitated the revision of the back data which are published in this report.

Cooperation.—During 1911 the station was maintained in cooperation with the Territorial engineer of New Mexico.

Discharge measurements of Ute Creek near Logan, N. Mex., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Feb. 17	C. B. Digby	.....	(a)	Aug. 1	E. O. Christiansen	0.70	b 1.0
Apr. 5	G. H. Russell	.....	0	26	G. H. Russell	c 1.85	201
May 21	R. L. Cooper	0.70	b .5	Nov. 8	W. B. Freeman	c .57	b .2
July 30	E. O. Christiansen	1.30	15.8				

a Very slight flow. b Estimated. c Gage height from automatic gage at new datum.

Daily gage height, in feet, of Ute Creek near Logan, N. Mex., for 1911.

[Samuel Rufi, observer.]

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	1.35	0.45	0.85	0.90	0.90	0.60	0.78
2	.....	1.20	1.10	.80	.70	.70	.60	.83
3	.....	1.20	1.00	.85	.....	.60	.60	.82
4	.....	.....	.50	.75	.80	.80	.60	.80
5	.....	.90	.40	.70	.80	.90	.60	.78
6	.....	.80	.60	.....	.80	.65	.60	.72
7	.....	.70	1.70	.70	.80	.60	.55	.65
8	.....	.65	.60	.65	.80	.60	.55	.65
9	.....	.60	1.20	.65	a 3.00	.55	.55	.65
10	.....	.60	.50	.35	2.40	.55	.55	.65
11	.....	.....	3.00	.35	1.70	.55	.50	.65
12	.....	.60	2.50	.30	1.00	.55	.45	.65
13	.....	.60	2.80	.....	.60	.55	.45	.67
14	.....	.60	1.40	.20	.60	.55	.45	.67
15	.....	.55	1.10	.25	.60	.50	.45	.68
16	6.00	.55	1.00	.30	.60	.50	.40	.68
17	.....	.55	.80	.20	.90	.50	.40	.69
18	.....	1.30	1.10	.20	.85	.50	.40	.70
19	.....	.55	1.50	.10	.70	.50	.40	.70
20	.....	.60	3.50	.....	.65	.50	.40	.70
21	.70	.60	2.80	.10	.55	.50	.40	.70
22	.75	.65	5.80	.30	.50	.50	.40	.70
23	.65	.50	1.50	3.00	.50	.50	.40	.70
24	.65	.40	1.60	2.00	.50	.50	.40	.70
25	.65	.....	1.20	4.00	.50	.50	.50	.70
26	.65	.40	1.10	1.85	.50	.50	.60	.70
27	.65	.70	1.10	.....	.50	.50	.65	.70
28	4.00	.55	1.50	2.00	.50	.50	.....	.70
29	3.60	.50	1.30	1.20	.50	.95	.70	.70
30	3.25	.50	1.30	1.10	1.10	.75	.70	.70
31	1.60	.....	.95	1.00	.....	.60	.....	.70

a Maximum gage height, 4.3 feet.

NOTE.—No flow in the creek on days for which gage heights are omitted except the middle of February, when there was slight flow. Gage heights after Aug. 1, 1911, refer to automatic gage at new datum.

Daily discharge, in second-feet, of Ute Creek near Logan, N. Mex., for 1904–1906, 1909–1911.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1904.												
1									0	700	0.0	0.0
2									19,000	500	.0	.0
3									6,400	310	.0	.0
4									1,950	166	.0	.0
5									310	92	.0	.0
6									54	39	.0	.0
7									18	18	.0	.2
8									4	4	.0	.2
9									1.5	39	.0	.2
10									.0	26	.0	.2
11									.2	26	.0	.2
12									1.5	18	.0	.0
13									1.5	11	.0	.0
14								0.2	1.5	4	.0	.0
15								.2	1.5	.2	.0	.0
16								.2	1.5	.2	.0	.0
17								6,400	1.5	.2	.0	.0
18								500	1.5	.2	.0	.0
19								400	.2	.2	.0	.0
20								92	.2	.0	.0	.0
21								72	.2	.0	.0	.0
22								54	.2	.0	.0	.0
23								39	.2	.0	.0	.0
24								26	.2	.0	.0	.0
25								18	.0	.0	.0	.0
26								11	.0	.0	.0	.0
27								7	.0	.0	.0	.0
28								0	1,950	.0	.0	.0
29								0	5,100	.0	.0	.0
30								0	1,250	.0	.0	.0
31								0		.0	.0	.0
1905.												
1	0.2	0.2	17.7	7.0	17.7	72	352	4,300	2	2	0	31
2	.2	.2	17.7	2,400	7.0	26	70	4,100	2	2	0	19
3	.0	.2	17.7	1,090	3.9	7.0	70	3,400	2	2	0	19
4	.0	.2	17.7	420	1.5	7.0	38	900	2	2	0	11
5	.0	.2	7.0	234	.2	7.0	27	19	550	0	0	5
6	.0	.2	17.7	166	.2	17.7	190	46	186	0	0	5
7	.0	.2	17.7	114	.2	17.7	14	186	900	0	0	2
8	.0	.2	7.0	72	.2	17.7	14	1,350	450	0	31	0
9	.0	.2	7.0	54	.2	17.7	14	550	84	0	300	0
10	.0	.2	7.0	26	.2	26	14	186	155	0	186	0
11	.2	.2	1.5	26	.2	26	10	65	155	0	84	0
12	.2	.2	26	26	.0	17.7	10	11	105	0	155	0
13	1.5	.2	26	26	.0	7.0	10	11	19	0	155	65
14	1.5	.2	26	17.7	.0	3.9	7	5	5	0	186	31
15	1.5	1.5	26	17.7	.0	.2	7	19	2	0	186	31
16	1.5	1.5	17.7	1.5	.0	.0	7	5	46	0	105	31
17	1.5	1.5	17.7	1.5	.0	.0	7	2	19	0	19	31
18	1.5	.2	17.7	1.5	.0	.0	7	0	19	0	5	31
19	3.9	.2	1.5	1.5	.0	.0	7	0	5	0	5	31
20	3.9	17.7	1.5	.2	166	.0	7	0	0	0	5	31
21	3.9	54	33.9	1.5	26	1.5	38	0	0	0	5	31
22	3.9	26	7.9	1.5	17.7	.2	162	0	0	0	11	19
23	3.9	26	7.0	1,900	18,000	.0	70	0	0	0	750	11
24	3.9	166	7.0	2,400	5,700	.0	38	0	0	0	105	11
25	3.9	114	7.0	1,600	2,600	.0	38	0	0	0	46	11
26	1.5	54	7.0	680	18,000	.0	27	0	5	0	46	11
27	1.5	26	3.9	375	2,600	.0	27	0	5	0	46	11
28	1.5	26	1.5	139	420	.0	14	2	2	0	46	11
29	1.5		.2	39	272	3.9	10	5	2	0	46	5
30	.2		.2	26	198	150	5,000	5	2	0	31	5
31	.2		.2		139		4,800	2		0		5

Daily discharge, in second-feet, of Ute Creek near Logan, N. Mex., for 1904–1906, 1909–1911—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1906.												
1	5	5	2	0	2	2						
2	5	5	0	0	0	0						
3	5	5	0	0	0	3,200						
4	11	5	0	0	0	300						
5	11	5	0	2	0	186						
6	11	5	0	2	0	11						
7	11	5	0	2	0	11						
8	11	5	0	2	0	5						
9	11	5	0	2	0	2						
10	11	5	0	2	0	2						
11	19	5	0	0	0	2						
12	31	19	0	0	19	2						
13	31	19	0	0	19	2						
14	31	11	0	0	11	0						
15	31	11	0	0	5	0						
16	31	5	0	0	5	0						
17	31	5	0	0	2	0						
18	19	5	0	0	0	0						
19	19	5	0	65	0	0						
20	11	5	0	31	0	0						
21	11	2	0	31	0	0						
22	11	2	0	31	74	0						
23	5	2	0	11	300	0						
24	5	2	0	11	186	0						
25	5	2	0	2	11	0						
26	5	2	0	2	5	0						
27	5	2	0	2	5	0						
28	5	2	0	2	5	0						
29	5		0	2	5	0						
30	5		0	2	2	0						
31	5		0		2							
1909.												
1					.0	0	0	0	0	0	0	4
2					.0	0	0	0	0	0	0	6
3					.0	0	0	0	0	196	0	8
4					.0	0	0	0	0	232	0	13
5					.0	0	0	0	0	310	0	8
6					.0	0	0	0	12,500	310	0	8
7					.0	0	0	0	2,070	310	0	8
8					.0	0	0	0	490	232	0	8
9					.0	0	0	1,000	196	196	0	8
10					.0	0	0	164	67	21	0	8
11					.0	0	0	110	27	10	0	8
12					.0	0	0	110	33	1.1	0	8
13					.0	0	0	164	17	.0	0	8
14					.0	0	0	6.2	4.5	.0	0	8
15					.0	420	0	.0	33	.0	0	8
16					.0	360	0	33	88	.0	0	8
17					.0	164	0	78	58	210	0	8
18					.0	1.1	0	1,260	21	132	0	8
19					.0	.0	0	310	17	19	0	5
20					.0	.0	0	164	1.1	11	0	5
21					6.2	.0	0	150	.0	10	0	2
22					1.1	.0	0	41	.0	1	0	2
23					.0	.0	0	33	.0	0	0	2
24					67	8.0	0	78	.0	0	0	2
25					6.2	290	0	8	.0	0	0	2
26					.0	1,330	0	1.1	.0	0	0	2
27					.0	67	0	.0	.0	0	0	2
28					.0	196	0	.0	.0	0	0	1
29					.0	232	0	.0	.0	0	0	1
30					.0	560	0	.0	.0	0	2	1
31					.0		0	.0		0		1
1910.												
1	2	.2	.1	0	0	0	21	850	0	0	0	0
2	3	.2	.1	0	0	0	13	1,600	0	0	0	0
3	3	.2	.1	0	0	0	136	590	6	0	0	0
4	2	.2	.1	0	0	0	58	2,500	0	0	0	0
5	2,100	.2	.1	0	0	0	88	99	0	0	0	0

Daily discharge, in second-feet, of Ute Creek near Logan, N. Mex., for 1904–1906, 1909–1911—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1910.												
6	1,400	0.1	0.1	0	0	0	310	24	0	0	0	0
7	360	.1	.1	0	0	0	136	24	0	0	0	0
8	8	.1	.1	0	0	0	136	13	0	0	0	0
9	4	.1	.1	0	0	0	640	6	0	0	0	0
10	4	.1	.1	0	0	0	8,020	2,800	0	0	0	0
11	4	.1	.1	0	0	0	6,000	120	0	0	0	0
12	4	.1	.1	0	0	0	4,760	1,650	0	0	0	0
13	4	.2	.1	0	0	0	3,600	22	0	0	0	0
14	4	.2	.1	0	0	0	2,600	42	0	0	0	0
15	4	.2	.1	0	0	0	2,700	42	0	0	0	0
16	.2	.2	.1	0	0	0	1,680	4	0	0	0	0
17	.2	.2	.1	0	0	0	88	200	0	0	0	0
18	.2	.2	.1	0	0	0	67	3,600	0	0	0	0
19	.2	.2	.1	0	0	0	58	720	0	0	0	0
20	.2	.1	.1	0	0	0	49	84	0	0	0	0
21	.2	.1	.1	0	0	0	49	6	0	0	0	0
22	.2	.1	.1	0	0	0	13	9	0	0	0	0
23	.2	.1	.1	0	0	0	8	2	0	0	0	0
24	.2	.1	.1	0	0	0	.2	8	0	0	0	0
25	.2	.1	.1	0	0	0	.0	4	0	0	0	0
26	.2	.1	.1	0	0	88	.0	2	0	0	0	0
27	.2	.1	.1	0	0	33	.0	0	0	0	0	0
28	.2	.1	.1	0	0	27	.0	0	0	0	0	0
29	.2	.....	.1	0	0	21	.0	0	0	0	0	0
30	.2	.....	.1	0	0	21	21	0	0	0	0	0
31	.2	.....	.1	.....	0	.....	2,500	0	.....	0	.....	0

Daily discharge, in second-feet, of Ute Creek near Logan, N. Mex., for 1911.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1911.								
1	0	55	0.0	9	11	11	1	6
2	0	31	19	7	3	3	1	8
3	0	31	11	9	5	1	1	8
4	0	18	0	5	7	7	1	7
5	0	5	0	3	7	11	1	6
6	0	2	0	3	7	2	1	4
7	0	.5	130	3	7	1	.2	2
8	0	.0	0	2	7	1	.2	2
9	0	.0	31	2	1,080	.2	.2	2
10	0	.0	0	0	500	.2	.2	2
11	0	.0	950	0	152	.2	.0	2
12	0	.0	500	0	18	.2	.0	2
13	0	.0	750	0	1	.2	.0	2
14	0	.0	65	0	1	.2	.0	2
15	0	.0	19	0	1	.0	.0	3
16	7,100	.0	11	0	1	.0	.0	3
17	200	.0	2	0	11	.0	.0	3
18	10	46	2	0	9	.0	.0	3
19	1.0	.0	84	0	3	.0	.0	3
20	.5	.0	1,600	0	2	.0	.0	3
21	.5	.0	750	0	0	.0	.0	3
22	1.0	.0	5,900	0	0	.0	.0	3
23	.0	.0	40	1,080	0	.0	.0	3
24	.0	.0	58	255	0	.0	.0	3
25	.0	.0	8	2,600	0	.0	.0	3
26	.0	.0	4	200	0	.0	1	3
27	.0	.5	4	230	0	.0	2	3
28	2,600	.0	40	255	0	.0	2	3
29	1,700	.0	16	43	0	14	3	3
30	1,300	.0	16	29	29	5	3	3
31	106	.....	.5	18	.....	1	.....	3

NOTE.—The finding of an error in obtaining the cross section of the stream necessitated the revision of all high-water discharges for previous years. The corrected daily discharges are published above. These were determined from rating curves covering short periods of time and by the indirect method for shifting channels.

Monthly discharge of Ute Creek near Logan, N. Mex., for 1904–1906, 1909–1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
1904.					
August 14–31	6,400	0	423	15,100	B.
September	19,000	0	1,200	71,400	B.
October	700	0	63	3,870	B.
November	0	0	0	0	
December	2	0	.032	2	C.
The period				90,400	
1905.					
January	3.9	0	1.40	86	C.
February	166	.2	18.5	1,030	C.
March	26	.2	10.9	670	C.
April	2,400	.2	395	23,500	B.
May	18,000	0	1,550	95,300	B.
June	150	0	14.2	845	C.
July	5,000	7	353	21,700	B.
August	4,300	0	489	30,100	B.
September	900	0	90.8	5,400	B.
October	2	0	.26	16	C.
November	750	0	85.1	5,060	B.
December	65	0	16.3	1,000	C.
The year	18,000	0	255	185,000	
1906.					
January	31	5	13.3	818	C.
February	19	2	5.57	309	C.
March	2	0	.065	4	C.
April	65	0	6.8	405	C.
May	300	0	21.2	1,300	C.
June	3,200	0	124	7,380	B.
The period				10,200	
1909.					
May	67	0	2.60	160	C.
June	1,330	0	121	7,200	B.
July	0	0	0	0	
August	1,260	0	120	7,380	B.
September	12,500	0	521	31,000	B.
October	310	0	71	4,370	B.
November	2	0	.067	3.98	C.
December	13	1	5.52	339	C.
The period				50,500	
1910.					
January	2,100	.2	126	7,750	B.
Febraury	.2	.1	.14	7.8	C.
March	.1	.1	.10	6.2	C.
April	.0	.0	.0	0	
May	.0	.0	.0	0	
June	88	.0	6.33	377	C.
July	8,020	.0	1,090	67,000	B.
August	3,600	.0	465	28,600	B.
September	6	.0	.2	12.3	C.
October	.0	.0	.0	0	
November	.0	.0	.0	0	
December	.0	.0	.0	0	
The year	8,020	0	143	104,000	
1911.					
January	0	0	.00	0	
February		0	.25	14	C.
March	0	0	.00	0	
April	0	0	.00	0	
May	7,100	0	420	25,800	B.
June	55	0	6.3	375	C.
July	5,900	0	355	21,800	B.
August	2,600	0	153	9,410	B.
September	1,080	0	62.1	3,700	B.
October	14	0	1.88	116	C.
November	3	0	.59	35	C.
December	8	2	3.4	209	C.
The year	7,100	0	85.0	61,500	

YAZOO RIVER BASIN.

TALLAHATCHIE RIVER AT BATESVILLE, MISS.

Location.—At the county highway bridge 1 mile west of Batesville and about 2 miles below the crossing of the Illinois Central Railroad.

Records available.—June 15, 1906, to December 31, 1911, except from August 1 to September 19, 1906.

Drainage area.—Not measured.

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

Channel.—Bed is soft and liable to change.

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

Floods.—The flood of April 20, 1911, reached a height of 18.9 feet above the gage zero.

Winter flow.—Ice does not affect the flow.

Accuracy.—Good. Discharge rating curve has remained fairly constant.

Cooperation.—Station is maintained in cooperation with the Tallahatchie Drainage Commission.

Discharge measurements of Tallahatchie River at Batesville, Miss., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Aug. 23	R. E. Robertson	10.54	3,890	Nov. 14	R. E. Robertson	3.02	624
23	do	10.54	4,000	14	do	3.02	614

Daily gage height, in feet, of Tallahatchie River at Batesville, Miss., for 1911.

[J. G. Goff, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	7.1	4.2	5.8	6.7	11.2	4.15	3.6	7.2	5.1	2.1	2.1	2.8
2	8.2	4.4	5.8	7.2	9.8	3.95	4.0	7.0	4.9	2.2	2.1	2.8
3	7.4	4.1	5.7	10.0	9.0	3.75	4.1	5.9	4.3	2.2	2.1	2.7
4	7.1	4.0	4.9	11.1	8.3	3.55	3.9	5.7	3.6	2.2	2.1	2.7
5	7.0	5.8	6.1	11.3	7.9	3.45	3.4	6.0	3.5	2.2	2.1	2.7
6	7.2	4.6	6.4	11.1	9.0	3.35	3.1	6.0	2.9	2.2	2.4	2.7
7	7.2	5.3	6.7	11.0	6.0	3.25	3.0	6.4	3.3	2.2	2.7	2.7
8	7.7	5.3	6.6	11.1	5.5	3.15	2.8	6.2	3.2	2.2	2.9	2.7
9	7.8	7.8	6.7	13.0	5.0	3.15	2.8	5.7	3.2	2.2	3.0	2.6
10	8.0	7.7	5.8	14.3	4.85	3.15	2.6	5.5	3.1	2.2	2.6	2.8
11	8.1	7.7	5.1	16.2	4.65	3.15	2.6	5.3	3.7	1.8	3.2	7.5
12	8.2	8.8	4.7	16.3	4.45	3.05	2.6	5.0	4.1	2.4	3.1	10.4
13	8.1	9.1	4.5	16.3	4.25	2.9	3.0	4.5	4.8	2.5	2.9	9.6
14	7.8	9.7	4.3	14.8	4.15	2.85	3.0	3.8	4.5	2.8	2.9	9.2
15	5.1	10.4	4.1	16.0	4.05	2.75	3.5	3.7	4.1	3.0	2.9	12.2
16	4.4	10.7	4.0	16.5	3.95	2.75	3.5	3.7	3.6	3.0	2.8	14.0
17	4.1	11.1	3.9	16.8	3.85	2.65	3.5	5.3	3.1	2.7	2.9	17.6
18	3.9	11.3	3.8	16.7	3.75	2.65	3.4	5.9	3.1	2.6	3.3	17.7
19	3.2	11.6	3.8	18.1	3.65	2.6	3.4	7.0	3.0	2.6	3.1	17.6
20	3.6	11.8	3.9	18.9	3.55	2.7	3.4	7.4	2.8	2.6	3.2	17.4
21	3.6	11.1	4.0	18.0	4.25	2.75	3.6	9.0	2.7	2.6	3.2	17.2
22	3.6	10.0	4.1	17.4	6.4	2.65	4.6	10.0	2.6	2.6	3.2	16.6
23	3.5	9.0	4.3	17.0	8.2	2.65	5.1	10.4	2.6	2.5	3.2	16.2
24	3.4	8.2	4.4	17.4	11.7	3.1	5.4	10.2	2.5	2.4	3.1	15.6
25	3.4	7.7	4.4	17.1	12.8	3.35	6.1	9.9	2.5	2.4	3.1	13.6
26	3.4	7.2	5.5	16.4	12.5	3.0	6.8	9.1	2.45	2.4	3.0	14.8
27	3.6	6.7	6.8	15.7	10.7	3.0	9.5	8.0	2.4	2.2	2.9	18.2
28	3.9	6.3	5.9	14.8	8.8	3.05	9.5	6.8	2.3	2.2	2.9	18.4
29	4.1	.....	6.0	14.0	7.4	4.6	9.7	5.9	2.25	2.1	2.8	16.9
30	4.4	.....	6.4	12.5	6.0	3.4	9.5	5.7	2.12	2.4	2.8	16.8
31	4.6	.....	6.7	.....	4.85	.....	7.0	5.6	.....	2.6	.....	16.6

Daily discharge, in second-feet, of Tallahatchie River at Batesville, Miss., in 1911.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2,240	1,030	1,650	2,040	4,700	1,010	815	2,290	1,360	335	335	549
2	2,800	1,100	1,650	2,290	3,760	937	955	2,190	1,290	365	335	549
3	2,390	991	1,600	3,900	3,260	866	991	1,690	1,060	365	335	517
4	2,240	955	1,290	4,680	2,860	798	919	1,600	815	365	335	517
5	2,190	1,650	1,770	4,820	2,650	764	747	1,730	781	365	335	517
6	2,290	1,170	1,910	4,680	3,260	730	645	1,730	581	365	425	517
7	2,290	1,440	2,040	4,600	1,730	696	613	1,910	713	365	517	517
8	2,540	1,440	2,000	4,680	1,520	662	549	1,820	679	365	581	517
9	2,600	2,600	2,040	6,270	1,320	662	549	1,600	679	365	613	485
10	2,700	2,540	1,650	7,610	1,270	662	485	1,520	645	365	485	549
11	2,750	2,540	1,360	10,100	1,190	662	485	1,440	849	260	679	2,440
12	2,800	3,140	1,210	10,200	1,120	629	485	1,320	991	425	645	4,180
13	2,750	3,320	1,140	10,200	1,040	581	613	1,140	1,250	455	581	3,640
14	2,600	3,700	1,060	8,190	1,010	565	613	883	1,140	549	581	3,380
15	1,360	4,180	991	9,760	973	533	781	849	991	613	581	5,560
16	1,100	4,390	955	10,500	937	533	781	849	815	613	549	7,280
17	991	4,680	919	11,000	901	501	781	1,440	645	517	581	12,200
18	919	4,820	883	10,800	866	501	747	1,690	645	485	713	12,300
19	679	5,060	883	13,000	832	485	747	2,190	613	485	645	12,200
20	815	5,220	919	14,200	798	517	747	2,390	549	485	679	11,900
21	815	4,680	955	12,800	1,040	533	815	3,260	517	485	679	11,600
22	815	3,900	991	11,900	1,910	501	1,170	3,900	485	485	679	10,700
23	781	3,260	1,060	11,300	2,800	501	1,360	4,180	485	455	679	10,100
24	747	2,800	1,100	11,900	5,140	645	1,480	4,040	455	425	645	9,200
25	747	2,540	1,100	11,400	6,090	730	1,770	3,830	455	425	645	6,840
26	747	2,290	1,520	10,400	5,820	613	2,090	3,320	440	425	613	8,190
27	815	2,040	2,090	9,340	4,390	613	3,570	2,700	425	365	581	13,100
28	919	1,860	1,690	8,190	3,140	629	3,570	2,090	395	365	581	13,400
29	991	.....	1,730	7,280	2,390	1,170	3,700	1,690	380	335	549	11,100
30	1,100	.....	1,910	5,820	1,730	747	3,570	1,600	341	425	549	11,000
31	1,170	.....	2,040	.....	1,270	.....	2,190	1,560	.....	485	.....	10,700

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

Monthly discharge of Tallahatchie River at Batesville, Miss., for 1911.

Month.	Discharge in second-feet.			Accuracy.
	Maximum.	Minimum.	Mean.	
January	2,800	679	1,640	A.
February	5,220	955	2,830	A.
March	2,090	883	1,420	A.
April	14,200	2,040	8,460	A.
May	6,090	798	2,310	A.
June	1,170	485	666	A.
July	3,700	485	1,270	A.
August	4,180	849	2,080	A.
September	1,360	341	716	A.
October	613	260	425	B.
November	713	335	558	A.
December	13,400	485	6,330	A.
The year	14,200	260	2,390	

TALLAHATCHIE RIVER AT PHILIPP, MISS.

Location.—At the Yazoo & Mississippi Valley Railroad bridge at Philipp, Miss.

Records available.—September 6, 1908, to December 31, 1911.

Drainage area.—Not measured.

Gage.—Vertical timber attached to a bridge pier; datum unchanged.

Channel.—Fairly permanent and good for discharge measurements at all but high flood stages when some water, difficult to measure, passes through distant bayous.

Discharge measurements.—Made from the railroad bridge.

Floods.—The flood of April 28, 1911, reached a height of 138.6 feet above the gage datum, which is mean sea level.

Winter flow.—Ice does not affect the flow.

Accuracy.—Records fair.

Cooperation.—Station maintained in cooperation with the Tallahatchie Drainage Commission.

Discharge measurements of Tallahatchie River at Philipp, Miss., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-feet.*
Aug. 21	R. E. Robertson	119.80	4,660
Nov. 18	do	112.88	1,070

Corrected daily gage height, in feet, of Tallahatchie River at Philipp, Miss., for 1910.

Day.	Feb.	Mar.	Day.	Feb.	Mar.	Day.	Feb.	Mar.
1		128.1	11			21	123.2	
2		128.6	12			22	124.0	
3		129.0	13			23	125.0	
4		129.3	14			24	125.8	
5			15			25	126.4	
6			16			26	126.9	
7			17			27	127.4	
8			18			28	127.8	
9			19	120.1		29		
10			20	121.4		30		
						31		

NOTE.—The gage height for Feb. 19 to Mar. 4, 1910, published in Water-Supply Paper No. 287 were found to be in error. The above values are correct. Mar. 5 and 6 are also evidently in error, but the correct values for those two days are not known. These corrections change the mean discharge for February to 6,260 second-feet, March 8,230 second-feet., and for the year to 5,350 second-feet

Daily gage height, in feet, of Tallahatchie River at Philipp, Miss., for 1911.

[J. P Mahoney, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	117.1	115.2	127.9	122.0	138.5	124.2	116.1	119.3	121.2	112.5	112.0	112.8
2	118.4	115.7	127.8	122.0	138.4	123.4	115.6	119.5	120.6	112.4	112.0	112.8
3	120.0	115.9	127.5	121.9	138.3	121.6	115.4	119.8	120.0	112.3	112.0	112.8
4	121.5	115.8	127.1	122.2	138.2	120.1	115.4	119.8	119.4	112.3	111.9	112.7
5	121.9	116.0	126.6	124.0	138.0	118.6	115.3	119.4	118.8	112.2	111.9	112.7
6	122.1	115.9	126.0	125.7	137.9	117.5	115.2	118.9	118.3	112.2	111.9	112.7
7	122.3	115.8	125.4	127.0	137.8	116.6	115.0	118.6	117.8	112.2	112.0	112.7
8	122.5	117.0	124.9	128.2	137.6	116.1	115.2	118.3	117.0	112.1	112.2	112.6
9	122.6	118.9	123.7	129.2	137.4	115.8	114.9	118.0	116.2	112.1	112.6	112.6
10	122.8	121.0	123.4	130.0	137.2	115.7	114.3	117.8	115.9	112.2	112.9	112.6
11	122.8	122.4	122.9	130.8	137.0	115.4	113.8	117.6	115.5	112.4	113.2	113.5
12	122.8	123.4	122.0	131.6	136.8	115.1	113.7	117.1	115.2	112.5	113.3	116.3
13	122.6	124.2	120.9	132.2	136.6	114.8	113.5	117.1	115.0	112.6	113.1	120.1
14	122.1	124.8	119.9	132.7	136.2	114.6	113.6	117.3	114.9	112.6	113.1	122.5
15	122.1	125.3	118.9	133.3	135.8	114.3	113.6	117.0	115.3	112.8	113.0	123.8
16	120.6	125.7	118.0	133.7	135.4	114.1	113.8	116.5	115.6	112.9	112.9	124.7
17	119.4	126.0	117.2	134.2	134.9	113.9	114.2	116.1	115.7	113.0	112.9	126.8
18	118.0	126.4	116.6	134.5	134.3	113.8	114.5	116.4	115.5	112.9	112.9	127.8
19	116.8	126.7	116.2	135.3	133.3	113.7	114.6	117.1	115.0	112.9	112.9	129.0
20	116.0	127.0	116.3	135.8	132.3	113.7	114.6	118.3	114.5	112.8	113.0	129.9
21	115.3	127.2	116.3	136.3	131.1	113.6	114.5	119.5	114.1	112.7	113.2	130.5
22	114.7	127.4	116.4	136.8	129.7	113.8	114.3	120.4	113.6	112.6	113.2	131.2
23	114.4	127.7	116.4	137.3	128.4	113.8	114.1	121.0	113.3	112.7	113.2	131.7
24	114.2	127.8	116.5	137.7	127.2	114.3	114.3	121.4	113.0	112.7	113.2	132.2
25	114.1	127.9	116.5	138.1	126.5	114.2	114.8	121.8	112.9	112.6	113.1	132.5
26	114.1	127.9	116.7	138.3	126.1	114.5	115.7	122.2	112.8	112.5	113.0	133.1
27	114.1	128.1	118.5	138.5	126.0	115.0	117.3	122.5	112.8	112.4	113.0	134.5
28	114.0	128.1	120.4	138.6	126.0	115.6	118.0	122.6	112.7	112.2	113.0	134.8
29	114.1		121.5	138.6	126.0	116.6	118.7	122.5	112.6	112.2	113.0	135.3
30	114.2		121.6	138.6	125.9	116.6	119.2	122.2	112.5	112.1	112.9	136.0
31	114.5		121.8		125.5		119.4	121.8		112.1		136.7

Daily discharge, in second-feet, of Tallahatchie River at Philipp, Miss., for 1911.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2,520	1,770	8,740	5,200	25,400	6,520	2,100	3,620	4,720	1,030	940	1,090
2	3,150	1,940	8,680	5,200	25,100	6,040	1,910	3,730	4,360	1,010	940	1,090
3	4,000	2,020	8,500	5,140	24,800	4,960	1,840	3,890	4,000	990	940	1,090
4	4,900	1,980	8,260	5,320	24,600	4,060	1,840	3,890	3,680	990	925	1,070
5	5,140	2,060	7,960	6,400	24,100	3,250	1,800	3,680	3,360	972	925	1,070
6	5,260	2,020	7,600	7,420	23,800	2,700	1,770	3,410	3,100	972	925	1,070
7	5,380	1,980	7,240	8,200	23,500	2,300	1,700	3,250	2,840	972	940	1,070
8	5,500	2,480	6,940	8,920	23,000	2,100	1,770	3,100	2,480	956	972	1,050
9	5,560	3,410	6,220	9,520	22,500	1,980	1,660	2,940	2,140	956	1,050	1,050
10	5,680	4,600	6,040	10,000	22,000	1,940	1,470	2,840	2,020	972	1,110	1,050
11	5,680	5,440	5,740	10,500	21,500	1,840	1,320	2,750	1,880	1,010	1,170	1,250
12	5,680	6,040	5,200	11,000	21,000	1,740	1,300	2,520	1,770	1,030	1,200	2,180
13	5,560	6,520	4,540	11,600	20,500	1,630	1,250	2,520	1,700	1,050	1,150	4,060
14	5,260	6,880	3,950	12,100	19,500	1,560	1,270	2,620	1,660	1,050	1,150	5,500
15	5,260	7,180	3,410	12,900	18,500	1,470	1,270	2,480	1,800	1,090	1,130	6,280
16	4,360	7,420	2,940	13,500	17,500	1,410	1,320	2,260	1,910	1,110	1,110	6,820
17	3,680	7,600	2,570	14,500	16,300	1,350	1,440	2,100	1,940	1,130	1,110	8,080
18	2,940	7,840	2,300	15,300	14,800	1,320	1,530	2,220	1,880	1,110	1,110	8,680
19	2,390	8,020	2,140	17,200	12,900	1,300	1,560	2,520	1,700	1,110	1,110	9,400
20	2,060	8,200	2,180	18,500	11,700	1,300	1,560	3,100	1,530	1,090	1,130	9,940
21	1,800	8,320	2,180	19,700	10,700	1,270	1,530	3,730	1,410	1,070	1,170	10,300
22	1,600	8,440	2,220	21,000	9,820	1,320	1,470	4,240	1,270	1,050	1,170	10,700
23	1,500	8,620	2,220	22,400	9,040	1,320	1,410	4,600	1,200	1,070	1,170	11,100
24	1,440	8,680	2,260	23,300	8,320	1,470	1,470	4,840	1,130	1,070	1,170	11,600
25	1,410	8,740	2,260	24,300	7,900	1,440	1,630	5,080	1,110	1,050	1,150	11,900
26	1,410	8,740	2,340	24,800	7,660	1,530	1,940	5,320	1,090	1,030	1,130	12,600
27	1,410	8,860	3,200	25,400	7,600	1,700	2,620	5,500	1,090	1,010	1,130	15,300
28	1,380	8,860	4,240	25,600	7,600	1,910	2,940	5,560	1,070	972	1,130	16,000
29	1,410	.....	4,900	25,600	7,600	2,300	3,300	5,500	1,050	972	1,130	17,200
30	1,440	.....	4,960	25,600	7,540	2,300	3,570	5,320	1,030	956	1,110	19,000
31	1,530	.....	5,080	.....	7,300	.....	3,680	5,080	.....	956	.....	20,700

NOTE.—Daily discharge determined from a rating curve which is fairly well defined but which is affected by the variation in the slope of the river below. This stream is affected by backwater from Mississippi River.

Monthly discharge of Tallahatchie River at Philipp, Miss., for 1911.

Month.	Discharge in second-feet.			Accuracy.
	Maximum.	Minimum.	Mean.	
January	5,680	1,380	3,430	B.
February	8,860	1,770	5,880	B.
March	8,740	2,140	4,740	B.
April	25,600	5,140	14,900	B.
May	25,400	7,300	16,300	B.
June	6,520	1,270	2,240	A.
July	3,680	1,250	1,850	A.
August	5,560	2,100	3,680	B.
September	4,720	1,030	2,060	A.
October	1,130	956	1,030	B.
November	1,200	925	1,080	B.
December	20,700	1,050	7,400	B.
The year	25,600	925	5,380	

YAZOO RIVER AT GREENWOOD, MISS.

Location.—At the highway bridge in the city of Greenwood, about 1 mile below the mouth of Yalobusha River.

Records available.—January 1, 1908, to December 31, 1911. The 1908 gage heights prior to July 15, when the station was established, are from the United States Weather Bureau, whose records began November 1, 1904.

Drainage area.—Not measured.

Gage.—Standard chain gage attached to the highway bridge. The datum, which is sea level, has not been changed. The datum of the United States Weather Bureau gage is 92.5 feet above sea level.

Channel.—Excellent for measurements, and appears to be practically permanent.

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

Floods.—The flood of May 2, 1911, reached a height of 128.9 feet by the gage datum. (On Apr. 7, 1912, the height was 130.7 feet.)

Point of zero flow.—Has not been determined.

Winter flow.—Ice does not affect the flow.

Artificial control.—None.

Accuracy.—Good. Records for back years have been worked up and are published herewith. Discharge rating affected by backwater from Mississippi River.

Discharge measurements of Yazoo River at Greenwood, Miss., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Aug. 21	R. E. Robertson	100.12	4,620
Nov. 18	do	94.30	1,540

Daily gage height, in feet, of Yazoo River at Greenwood, Miss., for 1911.

[W. T. Davis, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	99.43	96.26	112.37	104.76	128.87	110.17	98.10	99.21	102.40	93.88	93.46	94.10
2	104.49	96.65	112.37	104.75	128.88	109.17	97.76	99.36	101.75	93.81	93.41	94.08
3	108.12	97.04	112.37	104.60	128.80	107.92	97.32	99.59	101.08	93.77	93.38	94.04
4	108.69	97.49	112.34	105.53	128.63	106.51	96.88	99.71	100.47	93.73	93.36	94.00
5	108.65	97.83	112.28	109.24	128.39	104.98	96.62	99.79	99.89	93.69	93.36	93.99
6	108.63	97.98	112.18	110.67	128.08	103.41	96.58	99.64	99.34	93.65	93.46	93.98
7	108.80	97.86	111.99	111.07	127.75	102.02	96.45	99.35	98.81	93.61	93.46	93.99
8	109.05	97.90	111.76	112.14	127.34	100.73	96.49	98.93	98.26	93.57	93.55	93.99
9	109.29	99.62	111.47	113.16	126.93	99.52	96.48	98.56	97.71	93.53	93.85	93.98
10	109.53	102.64	111.10	114.30	126.49	98.53	96.14	98.29	97.10	93.69	94.06	94.01
11	109.77	104.61	110.66	115.23	126.03	97.75	95.83	98.01	96.71	93.79	94.24	96.72
12	109.94	106.10	110.00	116.36	125.55	97.10	95.61	97.74	96.54	94.00	94.38	100.66
13	109.99	107.28	109.09	117.22	125.09	96.66	95.35	99.34	96.36	94.02	94.51	105.55
14	109.94	108.06	107.81	117.79	124.57	96.27	95.78	100.43	96.02	94.05	94.46	108.55
15	109.70	108.77	106.44	118.28	124.05	95.98	96.53	100.99	95.84	93.97	94.41	110.20
16	109.07	109.37	104.94	118.73	123.47	95.70	96.78	100.87	95.93	94.02	94.34	111.85
17	108.01	109.79	103.49	119.10	122.86	95.51	96.67	100.47	96.08	94.20	94.28	112.86
18	106.53	110.12	102.18	119.50	122.23	95.40	96.41	100.09	96.15	94.20	94.26	113.40
19	104.86	110.40	101.21	120.57	121.50	95.22	96.31	99.95	96.06	94.31	94.20	113.98
20	103.21	110.70	100.41	121.70	120.68	95.29	96.25	99.74	95.78	94.33	94.22	114.61
21	101.69	110.89	99.81	122.24	119.82	95.20	96.10	100.26	95.42	94.25	94.26	115.21
22	100.32	110.95	99.32	122.69	118.84	95.67	95.85	101.58	95.06	94.09	94.31	116.19
23	99.17	110.84	99.88	123.23	117.79	95.78	95.70	102.45	94.79	93.96	94.36	117.34
24	98.25	110.62	98.60	123.95	116.76	96.01	95.62	102.90	94.55	93.92	94.42	117.93
25	97.63	110.30	98.41	124.88	115.78	96.45	95.57	103.39	94.39	93.90	94.41	118.14
26	97.17	110.01	99.12	125.97	114.95	96.63	95.88	103.61	94.26	93.86	94.40	118.70
27	96.77	110.50	100.73	126.99	114.11	96.85	96.68	103.66	94.14	93.78	94.40	119.71
28	96.47	112.24	102.40	127.80	113.27	97.61	97.73	103.74	94.07	93.68	94.36	116.40
29	96.26	.....	103.52	128.36	112.45	98.29	98.41	103.61	94.03	93.61	94.26	120.82
30	96.16	.....	104.16	128.70	111.73	98.35	98.83	103.42	93.96	93.56	94.16	121.66
31	96.11	.....	104.58	.....	111.00	.....	99.06	102.99	.....	93.51	.....	123.04

Daily discharge, in second-feet, of Yazoo River at Greenwood, Miss., for 1908–1911.

Day	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	6,300	6,230	29,400	24,400	10,800	6,090	4,760	2,540	1,880	1,550	980	1,600
2	7,000	6,790	29,400	24,400	10,600	5,760	4,160	2,400	1,800	1,500	980	1,600
3	7,580	7,140	29,300	24,400	10,600	5,430	3,920	2,460	1,700	1,450	980	1,620
4	8,020	7,350	29,000	24,200	10,400	5,060	3,740	2,460	1,620	1,400	980	1,720
5	8,900	7,720	28,700	24,100	10,400	4,760	3,560	2,680	1,550	1,350	980	1,850
6	9,460	8,020	28,600	23,900	12,800	5,180	3,390	3,000	1,550	1,300	980	2,180
7	9,860	8,500	28,200	23,600	13,600	6,160	3,220	3,310	1,480	1,280	980	3,620
8	10,200	8,980	27,700	22,800	13,300	6,790	3,340	3,000	1,400	1,250	1,000	5,530
9	10,400	9,380	27,500	22,200	13,000	7,420	3,740	2,540	1,350	1,200	980	6,120
10	10,700	10,100	27,000	21,600	12,700	8,100	4,040	2,650	1,320	1,150	1,000	5,980
11	11,000	11,200	26,600	20,900	12,300	8,660	4,340	2,760	1,300	1,100	1,000	5,620
12	11,400	12,700	26,200	20,000	12,200	9,140	4,400	2,900	1,280	1,080	1,000	5,240
13	11,600	14,100	25,800	19,300	11,800	9,620	4,400	3,060	1,250	1,080	1,050	4,940
14	11,600	18,700	25,400	18,500	11,800	10,000	4,340	3,120	1,220	1,080	1,050	4,550
15	11,400	21,500	24,900	17,700	11,600	10,100	4,220	3,000	1,220	1,080	1,120	4,550
16	11,400	22,300	24,400	17,000	11,100	10,300	4,040	2,780	1,200	1,050	1,200	3,860
17	11,500	23,000	24,000	16,300	10,900	10,400	3,740	2,650	1,180	900	1,200	3,530
18	11,600	23,900	23,600	15,700	11,000	10,400	3,440	2,560	1,150	1,050	1,200	3,140
19	11,500	25,400	23,100	14,800	11,300	10,300	3,120	2,480	1,150	1,020	1,200	2,760
20	11,400	27,000	22,600	14,100	11,000	10,200	2,840	2,590	1,150	1,020	1,150	2,460
21	11,300	28,000	22,200	13,400	10,700	10,100	2,700	2,780	1,120	1,000	1,150	2,350
22	11,100	28,700	22,000	12,800	10,200	9,940	2,950	2,780	1,200	1,000	1,150	2,840
23	10,900	29,300	22,300	12,100	9,780	9,700	3,200	2,780	1,450	1,000	1,150	3,920
24	10,700	29,400	23,600	11,400	9,300	9,460	3,220	2,650	1,620	1,000	1,150	3,800
25	10,900	29,600	24,100	11,600	8,900	9,140	3,170	2,620	1,720	980	1,080	3,740
26	10,000	29,800	24,000	11,800	8,580	8,420	3,170	2,560	1,700	980	1,250	3,740
27	9,460	29,800	23,900	11,700	8,180	7,880	3,220	2,380	1,700	950	1,350	3,740
28	8,900	29,600	23,900	11,400	7,800	6,930	3,170	2,250	1,650	950	1,450	3,680
29	8,100	29,600	23,900	11,000	7,420	6,020	3,060	2,150	1,600	950	1,500	3,620
30	7,350	.....	24,000	10,800	6,930	5,300	2,900	2,050	1,580	950	1,580	3,530
31	6,440	.....	24,200	.....	6,440	.....	2,730	1,950	.....	950	.....	3,420
1909.												
1	3,260	2,080	18,400	26,500	18,900	24,000	18,100	2,150	1,260	2,500	1,060	1,660
2	3,060	2,030	18,200	26,100	18,900	24,900	17,600	2,280	1,240	2,340	1,040	1,650
3	2,850	1,990	18,900	25,700	18,300	25,400	16,900	2,310	1,240	2,180	1,040	1,600
4	2,660	1,950	19,300	25,100	18,100	25,800	16,100	2,260	1,220	1,960	1,030	1,540
5	2,520	2,000	19,600	24,500	17,900	26,000	15,600	2,220	1,200	1,740	1,030	1,510
6	2,410	2,220	20,200	23,900	17,700	26,200	14,300	2,140	1,180	1,580	1,030	1,440
7	2,340	2,780	20,200	23,200	17,600	26,400	13,200	2,070	1,160	1,440	1,030	1,600
8	2,410	3,110	20,500	22,600	17,300	26,400	12,100	2,100	1,160	1,340	1,030	1,740
9	2,540	3,260	21,000	21,700	17,000	26,300	11,000	2,170	1,420	1,260	1,020	1,970
10	2,580	4,460	21,300	20,600	16,800	26,600	9,860	2,400	1,620	1,200	1,010	2,290
11	2,560	6,160	21,500	19,500	15,900	26,100	9,030	2,720	1,620	1,160	1,010	2,500
12	2,560	6,900	21,700	18,200	15,000	25,900	7,640	2,770	1,710	1,130	1,000	2,690
13	2,580	6,980	22,400	18,000	14,100	25,700	6,640	2,710	1,840	1,100	995	3,010
14	2,580	7,210	23,400	18,100	13,100	25,400	5,870	2,690	1,950	1,080	990	3,790
15	2,560	9,480	24,000	17,700	12,100	25,100	5,250	2,770	1,960	1,060	995	4,640
16	2,550	11,200	23,800	17,400	11,100	24,800	4,750	2,830	1,940	1,050	1,030	5,130
17	2,660	11,300	23,900	17,100	10,200	24,300	4,370	2,750	1,860	1,040	1,110	5,390
18	2,760	11,600	24,000	17,000	10,100	24,000	4,210	2,540	1,740	1,020	1,140	5,570
19	2,810	12,300	24,200	16,800	9,780	24,000	3,760	2,310	1,580	1,010	1,150	5,750
20	2,900	13,200	25,500	16,700	9,520	23,200	3,420	2,160	1,460	1,020	1,190	5,870
21	3,000	13,800	26,300	16,700	9,510	22,700	3,130	2,050	1,580	1,140	1,370	5,920
22	3,130	14,100	26,700	16,300	9,560	22,300	2,980	1,940	2,070	1,090	1,660	5,940
23	3,220	15,000	26,900	16,400	9,680	22,200	2,820	1,810	2,180	1,070	1,920	5,940
24	3,250	16,400	27,000	17,000	10,100	21,900	2,770	1,680	2,870	1,050	2,080	5,970
25	3,240	17,600	27,100	16,800	12,600	21,300	2,710	1,600	2,900	1,050	2,160	6,310
26	3,100	18,000	27,200	18,500	16,200	20,800	2,590	1,520	2,830	1,050	2,120	6,860
27	2,940	18,200	27,200	19,500	19,000	20,300	2,610	1,450	2,710	1,050	2,050	7,160
28	2,720	18,200	27,200	20,200	20,100	19,800	2,350	1,380	2,600	1,050	1,900	7,220
29	2,550	.....	27,100	19,700	20,600	19,200	2,260	1,340	2,560	1,050	1,760	7,240
30	2,340	.....	27,000	19,300	21,000	18,700	2,190	1,300	2,540	1,060	1,680	7,270
31	2,180	.....	26,700	.....	22,500	.....	2,150	1,260	.....	1,080	.....	7,260

Daily discharge, in second-feet, of Yazoo River at Greenwood, Miss., for 1908–1911— Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1910.												
1	7,160	13,300	16,300	3,910	11,100	11,400	9,240	20,800	2,970	1,360	1,360	1,180
2	7,020	12,900	16,500	3,580	11,200	11,200	9,120	20,600	2,840	1,320	1,320	1,180
3	6,850	12,400	16,700	3,360	11,200	10,800	9,000	19,900	2,660	1,300	1,280	1,180
4	6,600	12,000	16,900	3,200	11,300	10,500	9,340	19,200	2,470	1,280	1,260	1,200
5	6,330	11,600	17,000	3,110	11,300	10,300	9,810	18,500	2,340	1,280	1,260	1,250
6	6,720	11,100	17,100	3,050	11,300	10,100	10,700	17,800	2,350	1,440	1,250	1,360
7	8,460	10,500	17,100	3,100	11,200	9,590	11,700	17,100	2,430	2,470	1,250	1,510
8	9,480	9,810	17,000	3,250	11,000	8,890	12,500	16,400	2,400	3,430	1,250	1,840
9	9,780	8,990	16,800	3,470	10,600	8,030	13,300	15,600	2,360	3,440	1,250	1,950
10	10,100	8,070	16,500	3,670	10,100	7,300	14,000	14,700	2,340	3,080	1,250	1,880
11	10,400	7,210	16,000	3,840	9,440	7,240	14,900	13,700	2,340	2,860	1,240	1,860
12	10,700	6,410	15,500	3,930	8,510	7,900	16,000	12,600	2,310	2,710	1,230	1,800
13	10,900	5,660	15,000	3,880	7,460	8,280	17,300	11,500	2,220	2,710	1,230	1,740
14	10,900	5,070	14,600	3,730	6,440	8,480	18,500	10,200	2,100	3,140	1,220	1,680
15	10,800	4,570	15,200	3,660	5,460	8,610	19,600	8,960	1,960	3,820	1,210	1,660
16	10,800	4,140	13,900	4,740	4,680	8,720	20,500	7,830	1,820	3,880	1,200	1,630
17	10,700	5,270	13,600	6,620	4,080	8,700	21,100	6,870	1,730	3,500	1,200	1,580
18	10,600	8,940	13,300	8,230	3,570	8,620	21,600	5,980	1,660	3,110	1,190	1,540
19	10,500	10,300	12,900	9,380	3,360	8,590	22,200	5,160	1,600	2,720	1,180	1,470
20	10,800	10,600	12,500	10,200	3,470	9,460	22,600	4,470	1,550	2,440	1,170	1,430
21	13,000	11,200	12,000	10,800	3,940	10,100	22,700	4,800	1,500	2,370	1,170	1,380
22	14,200	12,700	11,400	11,200	5,520	10,200	22,700	5,870	1,470	2,370	1,160	1,350
23	14,300	13,600	10,700	11,300	7,530	10,300	22,700	5,580	1,440	2,320	1,150	1,550
24	14,200	14,200	9,810	11,300	8,520	10,300	22,500	5,350	1,420	2,200	1,150	2,180
25	14,200	14,700	8,840	11,300	9,170	10,100	22,300	5,220	1,400	2,020	1,150	2,880
26	14,400	15,100	7,870	11,200	9,880	9,900	22,400	5,140	1,400	1,860	1,150	3,080
27	14,500	15,500	6,950	11,100	10,500	9,800	22,400	4,870	1,400	1,720	1,180	2,980
28	14,500	15,900	6,090	11,000	11,000	9,680	22,000	4,460	1,420	1,630	1,170	2,960
29	14,500	.....	5,380	11,100	11,500	9,480	21,500	4,040	1,400	1,520	1,170	2,870
30	14,200	.....	4,820	11,100	11,600	9,230	21,100	3,530	1,380	1,440	1,170	2,850
31	13,800	.....	4,330	.....	11,600	.....	20,800	3,180	.....	1,400	.....	2,940
1911.												
1	4,360	2,540	14,700	7,920	36,300	12,500	3,560	4,230	6,230	1,340	1,130	1,450
2	7,720	2,760	14,700	7,910	36,300	11,600	3,370	4,320	5,790	1,300	1,100	1,440
3	10,600	2,970	14,700	7,800	36,200	10,400	3,130	4,450	5,350	1,280	1,090	1,420
4	11,100	3,220	14,600	8,520	35,900	9,310	2,880	4,530	4,980	1,260	1,080	1,400
5	11,100	3,410	14,600	11,600	35,600	8,080	2,740	4,570	4,630	1,240	1,080	1,400
6	11,100	3,490	14,500	13,000	35,100	6,940	2,720	4,480	4,300	1,220	1,130	1,390
7	11,200	3,420	14,300	13,400	34,600	5,960	2,650	4,310	3,990	1,200	1,130	1,400
8	11,400	3,440	14,100	14,400	34,000	5,140	2,670	4,060	3,660	1,180	1,180	1,400
9	11,700	4,470	13,800	15,500	33,400	4,410	2,660	3,840	3,340	1,160	1,320	1,390
10	11,900	6,400	13,400	16,700	32,700	3,820	2,480	3,670	3,000	1,240	1,430	1,400
11	12,100	7,810	13,000	17,800	32,000	3,360	2,320	3,510	2,790	1,300	1,520	2,800
12	12,200	8,980	12,300	19,000	31,300	3,000	2,200	3,360	2,700	1,400	1,590	5,100
13	12,300	9,920	11,500	20,100	30,600	2,760	2,080	4,300	2,600	1,410	1,660	8,540
14	12,200	10,600	10,300	20,700	29,900	2,550	2,290	4,960	2,410	1,420	1,630	11,000
15	12,000	11,200	9,250	21,400	29,100	2,390	2,690	5,290	2,320	1,380	1,600	12,500
16	11,500	11,700	8,060	21,900	28,300	2,250	2,830	5,220	2,360	1,410	1,570	14,200
17	10,500	12,100	6,990	22,400	27,400	2,160	2,770	4,980	2,440	1,500	1,540	15,200
18	9,320	12,400	6,080	23,000	26,500	2,100	2,630	4,750	2,480	1,500	1,530	15,700
19	8,000	12,700	5,440	24,300	25,600	2,010	2,570	4,670	2,430	1,560	1,500	16,400
20	6,800	13,000	4,950	25,800	24,500	2,040	2,540	4,540	2,290	1,560	1,510	17,100
21	5,750	13,200	4,590	26,500	23,400	2,000	2,460	4,860	2,110	1,520	1,530	17,700
22	4,890	13,200	4,290	27,200	22,100	2,240	2,320	5,680	1,930	1,440	1,560	18,800
23	4,200	13,100	4,630	27,900	20,700	2,290	2,250	6,260	1,800	1,380	1,580	20,200
24	3,650	12,900	3,860	28,900	19,500	2,410	2,210	6,580	1,680	1,360	1,610	20,900
25	3,300	12,600	3,750	30,300	18,400	2,650	2,180	6,920	1,600	1,350	1,600	21,200
26	3,040	12,300	4,170	32,000	17,400	2,750	2,340	7,080	1,530	1,330	1,600	21,900
27	2,820	12,800	5,140	33,500	16,500	2,870	2,770	7,110	1,470	1,290	1,600	23,200
28	2,660	14,500	6,230	34,700	15,600	3,290	3,350	7,170	1,440	1,240	1,580	19,100
29	2,540	.....	7,010	35,500	14,800	3,670	3,750	7,080	1,420	1,200	1,530	24,700
30	2,490	.....	7,470	36,000	14,000	3,710	4,000	6,940	1,380	1,180	1,480	25,800
31	2,460	.....	7,780	.....	13,300	.....	4,140	6,640	.....	1,160	.....	27,700

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

Monthly discharge of Yazoo River at Greenwood, Miss., for 1908–1911.

Month.	Discharge in second-feet.			Accuracy.
	Maximum.	Minimum.	Mean.	
1908.				
January	11,600	6,300	9,930	A.
February	29,800	6,230	18,800	A.
March	29,400	22,000	25,500	B.
April	24,400	10,800	17,600	A.
May	13,600	6,440	10,600	A.
June	10,400	4,760	8,090	A.
July	4,760	2,700	3,560	A.
August	3,310	1,950	2,640	A.
September	1,880	1,120	1,440	A.
October	1,550	900	1,120	A.
November	1,580	980	1,130	A.
December	6,120	1,600	3,580	A.
The year	29,800	900	8,620	
1909.				
January	3,260	2,180	2,740	A.
February	18,200	1,950	9,050	A.
March	27,200	18,200	23,500	A.
April	26,500	16,300	19,900	B.
May	22,500	9,510	15,200	A.
June	26,600	18,700	23,900	A.
July	18,100	2,150	7,360	B.
August	2,830	1,260	2,120	A.
September	2,900	1,160	1,840	A.
October	2,500	1,010	1,290	A.
November	2,160	990	1,320	A.
December	7,270	1,440	4,340	A.
The year	27,200	990	9,350	
1910.				
January	14,500	6,330	11,000	A.
February	15,900	4,140	10,400	B.
March	17,100	4,330	12,900	A.
April	11,300	3,050	6,780	A.
May	11,600	3,360	8,630	A.
June	11,400	7,240	9,390	A.
July	22,700	9,000	17,600	A.
August	20,800	3,180	10,300	B.
September	2,970	1,380	1,960	A.
October	3,880	1,280	2,330	A.
November	1,360	1,150	1,210	A.
December	3,080	1,180	1,870	A.
The year	22,700	1,150	7,880	
1911.				
January	12,300	2,460	7,960	B.
February	14,500	2,540	8,970	A.
March	14,700	3,750	9,360	B.
April	36,000	7,800	21,500	A.
May	36,300	13,300	26,800	A.
June	12,500	2,000	4,360	B.
July	4,140	2,080	2,760	A.
August	7,170	3,360	5,170	A.
September	6,230	1,380	2,880	A.
October	1,560	1,160	1,330	A.
November	1,660	1,080	1,430	A.
December	27,700	1,390	12,100	A.
The year	36,300	1,080	8,730	

COLDWATER RIVER AT SAVAGE, MISS.

Location.—At the Yazoo & Mississippi Valley Railroad bridge at Savage, Miss., about 3 miles above the mouth of Arkabutla Creek.

Records available.—October 1, 1908, to December 31, 1911.

Drainage area.—Not measured.

Gage.—Vertical timber in two sections on the left bank just below the bridge; datum unchanged.

Channel.—Good, and practically permanent. There is some overflow water difficult to measure at high floods.

Discharge measurements.—Made from the railroad bridge.

Floods.—The flood of April 18, 1910, reached a height of 187 feet above the gage datum, which is mean sea level.

Winter flow.—Ice does not affect the flow.

Accuracy.—Fair.

Cooperation.—Station maintained in cooperation with the Tallahatchie Drainage Commission.

Discharge measurements of Coldwater River at Savage, Miss., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Nov. 15	R. E. Robertson	166.58	132
15	do	166.58	142

Daily gage height, in feet, of Coldwater River at Savage, Miss., for 1911.

[David J. Hill, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	174.7	168.0	169.8	171.5	178.9	167.7	169.3	168.4	176.5	166.5	166.4	167.0
2	175.7	167.6	170.0	169.8	178.0	167.4	168.4	170.0	176.9	166.5	166.4	167.0
3	176.0	167.4	169.5	168.5	176.7	167.0	167.9	169.4	175.0	166.5	166.4	167.0
4	176.5	167.3	169.2	175.8	174.5	167.0	167.0	171.1	173.4	166.5	166.4	167.0
5	176.6	167.2	169.3	184.0	172.9	171.0	166.9	171.4	170.7	166.5	166.4	167.1
6	176.4	169.3	169.3	186.8	171.4	171.0	167.0	170.1	168.5	166.5	166.4	167.0
7	174.9	175.0	168.9	186.9	169.8	168.3	167.0	169.3	167.5	166.5	166.4	167.0
8	172.6	176.4	168.4	.....	169.0	168.3	167.0	169.0	167.0	166.5	166.4	166.8
9	170.4	178.2	168.2	186.0	168.5	168.4	167.0	170.0	166.9	166.5	166.4	166.8
10	169.1	179.3	168.0	186.8	168.0	168.3	167.0	169.8	166.9	166.5	166.4	166.7
11	168.5	180.0	167.8	185.0	167.9	167.0	167.2	168.6	170.0	166.5	166.4	170.1
12	168.0	180.0	167.6	186.5	167.7	166.9	167.5	167.8	171.1	166.5	166.4	171.0
13	167.8	182.0	167.5	184.0	167.4	166.9	167.4	167.4	171.5	166.5	166.5	176.0
14	167.7	183.3	167.4	183.7	167.1	166.9	167.3	166.9	171.0	166.5	166.5	170.5
15	167.5	183.1	167.3	183.9	167.0	166.7	168.2	166.9	169.8	166.5	166.5	178.8
16	167.3	183.0	167.1	185.6	167.0	166.6	168.4	167.3	168.4	166.5	166.5	180.5
17	167.3	182.9	167.0	186.9	167.0	166.4	168.9	172.0	167.3	166.5	166.5	181.2
18	167.0	182.4	167.0	186.8	166.9	166.4	167.8	172.3	167.0	166.5	166.5	183.0
19	167.0	182.3	167.3	186.7	166.9	166.4	167.0	170.2	166.8	166.5	166.5	184.5
20	167.0	182.0	167.8	186.6	166.9	167.5	166.8	170.8	166.7	166.5	166.5	184.8
21	167.0	178.5	168.1	186.8	177.0	167.8	166.4	171.0	166.8	166.5	166.5	184.4
22	166.9	177.1	169.5	186.7	180.3	167.9	169.0	172.7	166.7	166.5	166.5	184.0
23	166.9	176.8	169.5	186.0	181.0	169.8	171.2	173.6	166.7	166.5	166.5	183.6
24	166.9	175.0	168.7	185.5	180.0	169.4	172.9	174.2	166.7	166.5	166.5	180.3
25	167.1	173.4	168.0	184.9	178.8	169.8	173.6	174.7	166.7	166.5	166.5	181.9
26	167.1	170.3	169.7	184.3	176.7	168.3	173.9	174.5	166.6	166.5	166.5	181.7
27	167.2	170.0	174.8	183.5	173.5	168.2	174.0	174.0	166.6	166.5	166.5	181.5
28	169.2	169.1	174.9	182.6	170.4	168.0	173.9	173.5	166.5	166.5	166.5	182.5
29	169.3	.....	174.0	181.0	168.9	168.0	172.5	174.4	166.5	166.5	166.5	183.0
30	169.4	.....	174.2	180.0	168.0	168.0	170.0	175.0	166.5	166.5	166.6	184.1
31	168.6	.....	173.2	.....	167.8	.....	169.0	176.0	.....	166.4	.....	185.9

Daily discharge, in second-feet, of Coldwater River at Savage, Miss., for 1911.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,140	248	421	619	2,420	223	370	284	1,560	132	125	167
2	1,360	215	443	421	2,050	199	284	443	1,680	132	125	167
3	1,430	199	390	293	1,620	167	239	380	1,200	132	125	167
4	1,560	191	360	1,380	1,100	167	167	570	894	132	125	167
5	1,590	183	370	6,160	815	558	160	606	522	132	125	175
6	1,540	370	370	14,000	606	558	167	454	293	132	125	167
7	1,180	1,200	330	14,500	421	275	167	370	207	132	125	167
8	770	1,540	284	12,400	340	275	167	340	167	132	125	153
9	487	2,130	266	10,400	293	284	167	443	160	132	125	153
10	350	2,600	248	14,000	248	275	167	421	160	132	125	146
11	293	2,950	231	7,700	239	167	183	302	443	132	125	454
12	248	2,950	215	12,600	223	160	207	231	570	132	125	558
13	231	4,250	207	6,160	199	160	199	199	619	132	132	1,430
14	223	5,390	199	5,810	175	160	191	160	558	132	132	1,900
15	207	5,190	191	6,040	167	146	266	160	421	132	132	2,370
16	191	5,100	175	9,140	167	139	284	191	284	132	132	3,240
17	191	5,010	167	14,500	167	125	330	685	191	132	132	3,680
18	167	4,570	167	14,000	160	126	231	727	167	132	132	5,100
19	167	4,490	191	13,500	160	125	167	465	153	132	132	6,830
20	167	4,250	231	13,000	160	207	153	534	146	132	132	7,330
21	167	2,250	257	14,000	1,710	231	125	558	153	132	132	6,680
22	160	1,740	390	13,500	3,120	239	340	785	146	132	132	6,160
23	160	1,650	390	10,400	3,540	421	582	928	146	132	132	5,700
24	160	1,200	311	8,870	2,950	380	815	1,040	146	132	132	3,120
25	175	894	248	7,510	2,370	421	928	1,140	146	132	132	4,170
26	175	476	410	6,540	1,620	275	982	1,100	139	132	132	4,030
27	183	443	1,160	5,590	910	266	1,000	1,000	139	132	132	3,890
28	360	350	1,180	4,740	487	248	982	910	132	132	132	4,650
29	370	.....	1,000	3,540	330	248	755	1,080	132	132	132	5,100
30	380	.....	1,040	2,950	248	248	443	1,200	132	132	139	6,280
31	302	.....	862	.....	231	.....	340	1,430	.....	125	.....	10,000

NOTE.—Daily discharge determined from a fairly well-defined rating curve below 6,000 second-feet. Discharge interpolated Apr. 3 and Dec. 14. Gage height on Dec. 14 considered to be in error.

Monthly discharge of Coldwater River at Savage, Miss., for 1911.

Month.	Discharge in second-feet.			Accuracy.
	Maximum.	Minimum.	Mean.	
January	1,590	160	519	B.
February	5,390	183	2,220	B.
March	1,180	167	410	B.
April	14,500	293	8,480	B.
May	3,540	160	943	B.
June	558	125	249	B.
July	1,000	125	373	B.
August	1,430	160	617	B.
September	1,680	132	394	B.
October	132	125	132	B.
November	139	125	129	B.
December	10,000	146	3,040	B.
The year	14,500	125	1,440	

YALOBUSHA RIVER AT GRENADA, MISS.

Location.—At the highway bridge in the western part of Grenada, about half a mile below the Illinois Central Railroad bridge and three-fourths of a mile below the mouth of Batawpan Bogue.

Records available.—June 14, 1906, to November 2, 1906, and July 7, 1908, to December 31, 1911.

Drainage area.—Not measured.

Gage.—Standard chain gage attached to the wagon bridge. After having been twice stolen the chain has for some time been carried to and from the station by the observer. The datum has not been changed.

Channel.—Mostly in soft rock or firm clay.

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

Floods.—The flood of July 10, 1910, reached a height of 25.7 feet above the gage datum.

Winter flow.—Ice does not affect the flow.

Accuracy.—Fair; there has been considerable change in the discharge rating curve.

Cooperation.—Station was maintained in cooperation with the Tallahatchie Drainage Commission.

Discharge measurements of Yalobusha River at Grenada, Miss., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Aug. 24	R. E. Robertson	8.96	2,260
24	.....do	8.90	2,250
Nov. 13	.....do	1.75	181
13	.....do	1.75	181

Daily gage height, in feet, of Yalobusha River at Grenada, Miss., for 1911.

[J. E. Caldwell, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	15.0	2.6	19.9	6.3	14.8	3.0	3.0	2.2	2.4	1.5	1.2	1.9
2	18.2	2.6	19.4	5.6	13.0	2.85	3.2	2.1	2.4	1.4	1.4	1.7
3	21.7	2.6	17.1	5.4	10.8	2.85	3.3	2.2	2.3	1.2	1.5	1.6
4	21.7	3.0	16.9	21.8	8.5	2.75	3.4	2.4	2.5	1.2	1.7	1.5
5	21.7	3.1	16.4	22.3	4.9	2.7	3.7	2.7	2.8	1.1	1.9	1.4
6	21.3	3.1	15.7	23.4	4.1	2.55	3.7	2.7	3.0	1 0	2.0	1 4
7	20.5	3.1	14.9	21.1	3.8	2.45	3.8	2.9	3.2	.9	2.0	1.2
8	19.3	3.1	13.9	23.2	3.6	2.45	3.8	2.7	3.5	.8	2.2	1.1
9	18.6	13.3	12.9	24.1	3.5	2.35	3.7	2.6	3.7	.65	2.3	.95
10	17.9	15.1	11.4	23.7	3.3	2.3	3.6	2.4	3.8	.6	2.0	.95
11	16.9	14.9	9.9	23.3	3.1	2.2	3.5	2.3	4.0	.9	1.9	2.0
12	15.0	15.6	6.9	22.6	3.0	2.15	3.3	2.2	3.6	1.1	1.8	3.5
13	11.0	15.1	4.5	22.0	2.85	2.1	3.0	2.3	3.4	1.2	1.8	5.2
14	7.7	14.6	3.9	21.0	2.85	1.95	2.8	2.5	3.2	1.2	2.0	10.0
15	5.8	14.4	3.7	21.2	2.75	1.8	3.1	2.6	3.1	1.3	2.2	20.6
16	4.3	12.9	3.5	21.4	2.65	1.6	3.2	3.4	2.9	1.4	2.3	21.3
17	3.5	12.4	2.9	21.7	2.55	1.5	3.3	4.0	2.8	1.6	2.4	21.5
18	3.0	12.3	2.8	21.5	2.5	1.35	3.4	4.7	2.8	2.0	2.6	22.0
19	2.8	11.4	4.4	24.0	2.85	1.25	3.3	5.7	2.7	2.1	2.7	23.1
20	2.75	10.3	4.3	25.1	2.95	1.25	3.2	6.5	2.6	2.2	2.9	21.8
21	2.7	8.9	4.1	25.2	4.0	1.45	3.0	10.1	2.5	2.4	3.0	20.1
22	2.65	7.4	3.9	25.4	5.3	1.6	3.1	11.3	2.3	2.5	3.2	19.0
23	2.6	6.9	3.7	24.7	7.9	1.75	2.9	9.8	2.2	2.4	3.4	18.7
24	2.6	6.6	3.4	23.5	9.5	2.1	2.8	9.0	2.2	2.3	3.4	18.2
25	2.6	6.5	3.2	22.6	7.5	2.85	2.8	8.0	2.1	2.2	3.3	18.0
26	2.55	6.4	5.9	21.3	5.2	3.0	2.7	6.8	2.0	2.0	3.0	17.9
27	2.55	18.9	10.8	20.6	3.6	3.4	2.7	5.4	1.9	1.8	2.8	23.0
28	2.5	18.9	9.4	19.0	3.6	3.9	2.5	4.3	1.8	1.6	2.6	22.1
29	2.5	.....	8.6	17.8	3.5	3.6	2.4	3.8	1.7	1.5	2.5	21.3
30	2.55	.....	6.9	17.4	3.3	3.3	2.3	2.9	1.6	1.4	2.2	24.0
31	2.6	.....	6.4	.....	3.1	.....	2.2	2.6	.....	1.3	.....	25.0

Daily discharge, in second-feet, of Yalobusha River at Grenada, Miss., for 1911.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	5,900	316	9,710	1,260	5,760	388	388	250	282	145	110	203
2	8,260	316	9,260	1,030	4,550	361	428	234	282	133	133	173
3	11,700	316	7,420	970	3,240	361	448	250	266	110	145	158
4	11,700	388	7,280	11,900	2,100	343	468	282	298	110	173	145
5	11,700	408	6,900	12,500	825	334	531	334	352	99	203	133
6	11,300	408	6,390	14,100	625	307	531	334	388	88	218	133
7	10,400	408	5,830	11,000	554	290	554	370	428	78	218	110
8	9,170	408	5,140	13,800	508	290	554	334	488	68	250	99
9	8,580	4,740	4,490	15,000	488	274	531	316	531	54	266	83
10	8,020	5,970	3,590	14,500	448	266	508	282	554	50	218	83
11	7,280	5,830	2,750	13,900	408	250	488	266	600	78	203	218
12	5,900	6,320	1,460	12,900	388	242	448	250	508	99	188	488
13	3,350	5,970	725	12,100	361	234	388	266	468	110	188	910
14	1,780	5,620	577	10,900	361	210	352	298	428	110	218	2,800
15	1,090	5,480	531	11,100	343	188	408	316	408	121	250	10,500
16	675	4,490	488	11,400	325	158	428	468	370	133	266	11,300
17	488	4,190	370	11,700	307	145	448	600	352	158	282	11,500
18	388	4,130	352	11,500	298	127	468	775	352	218	316	12,100
19	352	3,590	700	14,900	361	116	448	1,060	334	234	334	13,600
20	343	2,960	675	16,600	379	116	428	1,320	316	250	370	11,900
21	334	2,260	625	16,700	600	139	388	2,860	298	282	388	9,910
22	325	1,660	577	17,000	940	158	408	3,530	266	298	428	8,900
23	316	1,460	531	16,000	1,860	180	370	2,700	250	282	468	8,660
24	316	1,360	468	14,200	2,550	234	352	2,300	250	266	468	8,260
25	316	1,320	428	12,900	1,700	361	352	1,900	234	250	448	8,100
26	307	1,290	1,120	11,300	910	388	334	1,430	218	218	388	8,020
27	307	8,820	3,240	10,500	508	468	334	970	203	188	352	13,500
28	298	8,820	2,500	8,900	508	577	298	675	188	158	316	12,200
29	298	.....	2,140	7,950	488	508	282	554	173	145	298	11,300
30	307	.....	1,460	7,650	448	448	266	370	158	133	250	14,900
31	316	.....	1,290	.....	408	.....	250	316	.....	121	.....	16,400

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

Monthly discharge of Yalobusha River at Grenada, Miss., for 1911.

Month.	Discharge in second-feet.			Accuracy.
	Maximum.	Minimum.	Mean.	
January	11,700	298	3,930	B.
February	8,820	316	3,190	B.
March	9,710	352	2,870	B.
April	17,000	970	11,500	B.
May	5,760	298	1,080	B.
June	577	116	282	B.
July	554	250	415	B.
August	3,530	234	845	B.
September	600	158	341	B.
October	298	50	154	C.
November	468	110	278	B.
December	16,400	83	6,350	B.
The year	17,000	50	2,600	

SUNFLOWER RIVER NEAR RULEVILLE, MISS.

Location.—At the new iron wagon bridge 3 miles southwest of Ruleville; just below the point at which Dougherty Bayou connects with the river.
Records available.—January 1, 1909, to December 31, 1911.
Drainage area.—Not measured.
Gage.—Vertical timber in two sections, set on sea level datum; datum unchanged.
Channel.—Very sluggish current at low stage, and surface height is greatly affected by the stage of Mississippi River.
Discharge measurements.—Made from the wagon bridge.
Floods.—The flood of April 21, 1911, reached a height of 117.5 feet above the gage zero.
Winter flow.—Ice does not affect the flow.
Accuracy.—No discharge estimates have been made.
Cooperation.—Station maintained in cooperation with the Tallahatchie Drainage Commission.

Discharge measurements of Sunflower River near Ruleville, Miss., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Nov. 16	R. E. Robertson	97.58	170
16	do	97.58	182

Daily gage height, in feet, of Sunflower River near Ruleville, Miss., for 1911.

[W. E. McMathe, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	97.0	97.0	99.8	99.1	105.45	98.0	99.28	99.0	99.45	97.0	97.0	97.0
2	97.45	97.0	99.35	98.6	104.6	98.0	99.18	100.3	99.4	97.0	97.0	97.0
3	97.95	97.0	98.9	98.1	104.15	98.0	99.05	101.6	99.3	97.0	97.0	97.0
4	98.38	97.0	98.52	102.5	103.15	98.0	98.92	102.75	99.2	97.0	97.0	97.0
5	98.5	97.45	98.38	112.25	102.65	98.0	98.82	103.5	99.05	97.0	97.0	97.0
6	98.42	98.15	98.28	115.38	102.15	98.0	98.72	103.6	98.5	97.0	97.0	97.0
7	98.35	98.6	98.18	116.0	101.55	98.0	98.62	103.0	98.3	97.0	97.0	97.0
8	98.32	99.65	98.05	115.55	100.65	98.0	98.52	102.3	98.2	97.0	97.0	97.0
9	98.22	100.5	98.0	114.5	100.1	98.0	98.42	101.65	98.2	97.0	97.0	97.0
10	98.12	102.0	98.0	113.05	99.85	98.0	98.32	101.0	98.1	97.0	97.0	97.3
11	97.98	103.25	98.0	112.1	99.72	98.0	98.22	100.2	98.1	97.0	97.0	100.05
12	97.88	104.3	98.0	110.75	99.62	98.0	98.12	99.65	97.9	97.0	97.0	101.8
13	97.78	104.6	98.0	109.45	99.52	98.0	98.0	99.5	97.9	97.0	97.0	104.0
14	97.55	103.9	98.0	108.6	99.42	98.0	98.0	99.68	97.9	97.0	97.0	105.85
15	97.42	102.75	98.0	108.82	99.32	98.0	98.0	99.85	97.85	97.0	97.0	108.15
16	97.32	101.75	98.0	109.58	99.22	98.0	98.0	100.15	97.8	97.0	97.0	112.0
17	97.22	100.9	98.0	110.10	99.12	98.0	98.0	100.85	97.7	97.0	97.0	113.55
18	97.12	100.8	98.0	110.90	98.98	98.0	98.0	101.4	97.7	97.0	97.0	113.5
19	97.0	100.82	98.0	113.8	98.88	98.0	98.0	101.5	97.7	97.0	97.0	112.75
20	97.0	100.92	98.0	116.68	98.78	98.0	98.0	101.15	97.65	97.0	97.0	111.75
21	97.0	100.95	98.0	117.5	98.68	98.0	98.0	101.7	97.6	97.0	97.0	110.75
22	97.0	100.88	98.0	116.7	98.58	98.12	98.0	100.3	97.52	97.0	97.0	109.35
23	97.0	100.7	98.0	115.5	98.48	98.22	98.0	100.2	97.48	97.0	97.0	108.05
24	97.0	100.28	98.0	113.75	98.38	98.32	98.0	100.45	97.38	97.0	97.0	107.45
25	97.0	99.4	98.15	112.1	98.28	98.45	98.0	100.5	97.28	97.0	97.0	107.4
26	97.0	99.0	99.15	110.0	98.18	98.7	98.0	100.5	97.18	97.0	97.0	109.3
27	97.0	99.4	100.25	108.2	98.05	99.12	98.0	100.3	97.05	97.0	97.0	114.3
28	97.0	99.65	101.15	107.8	98.0	99.45	98.0	100.2	97.0	97.0	97.0	115.0
29	97.0	.....	101.3	107.8	98.0	99.5	98.0	100.2	97.0	97.0	97.0	114.7
30	97.0	.....	100.85	106.6	98.0	99.4	98.0	100.05	97.0	97.0	97.0	115.0
31	97.0	.....	100.25	.....	98.0	.....	98.15	99.7	.....	97.0	.....	116.9

SUNFLOWER RIVER AT BAIRD, MISS.

Location.—At the Southern Railway bridge at Baird, Miss., about 4 miles below the Mouth of Quiver River.

Records available.—September 3, 1908, to December 31, 1911. Also from records of United States Engineers, March 15 to July 25, 1908.

Drainage area.—Not measured.

Gage.—Vertical timber set on sea-level datum; datum unchanged.

Discharge measurements.—Made from the Southern Railway bridge.

Floods.—The flood of June 3, 1909, reached a height of 104.4 feet above the gage datum.

Winter flow.—Ice does not affect the flow.

Accuracy.—Water surface height is greatly affected by the stage of Mississippi River. There is no fixed relation between the gage height and discharge. No discharge estimates have been made.

Cooperation.—Station maintained in cooperation with the Tallahatchie Drainage Commission.

Discharge measurements of Sunflower River at Baird, Miss., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Aug. 22	R. E. Robertson	87.16	1,359
Nov. 17	do	82.60	335

Daily gage height, in feet, of Sunflower River at Baird, Miss., for 1911.

[H. V. Finch, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	83.8	83.0	93.0	88.0	98.5	88.0	84.7	83.0	85.8	82.7	82.5	82.5
2	85.5	83.0	93.5	87.8	98.0	87.0	84.5	83.0	85.5	82.7	82.5	82.5
3	86.5	83.0	93.6	87.8	97.3	86.4	84.2	83.2	85.3	82.7	82.5	82.5
4	87.1	83.0	93.5	87.8	96.9	85.4	84.0	84.2	84.8	82.7	82.5	82.5
5	87.1	83.1	93.1	91.3	96.5	84.5	83.7	85.8	84.5	82.7	82.5	82.5
6	87.0	83.1	92.4	95.8	96.0	84.0	83.5	86.3	84.3	82.6	82.5	82.5
7	86.5	83.1	91.6	98.0	95.7	83.8	83.3	86.4	84.0	82.6	82.5	82.5
8	86.1	83.2	91.0	99.0	95.5	83.5	83.3	86.2	83.8	82.6	82.6	82.5
9	85.6	84.2	89.9	100.0	95.3	83.4	83.2	85.7	83.6	82.6	82.6	82.5
10	85.3	86.0	89.5	100.5	95.1	83.3	83.1	85.5	83.5	82.6	82.6	82.5
11	84.8	88.0	88.6	100.5	95.0	83.2	83.1	84.8	83.5	82.6	82.5	86.0
12	84.6	89.5	88.0	100.5	94.8	83.1	83.0	84.3	83.5	82.7	82.5	89.0
13	84.4	90.4	87.4	100.5	94.7	83.0	83.7	84.2	83.4	82.8	82.5	92.0
14	84.2	90.8	86.8	100.5	94.6	83.0	83.7	84.0	83.3	82.8	82.5	95.0
15	84.0	91.1	86.3	99.5	94.5	83.0	84.0	83.8	83.2	82.8	82.6	98.0
16	83.8	91.1	85.6	99.0	94.1	83.0	83.7	83.6	83.1	82.8	82.6	101.0
17	83.6	90.9	85.3	98.9	94.0	83.0	83.6	84.7	83.1	82.8	82.5	102.5
18	83.5	90.4	85.0	99.0	93.7	83.0	83.5	85.0	83.1	82.7	82.5	103.0
19	83.4	89.3	84.7	100.0	93.6	83.0	83.4	85.9	83.1	82.7	82.5	103.0
20	83.3	89.3	84.6	101.5	93.4	83.0	83.3	87.7	83.0	82.7	82.5	102.9
21	83.2	89.2	84.5	102.5	93.2	83.0	83.3	87.7	83.0	82.6	82.5	102.5
22	83.1	88.5	84.5	103.0	93.1	83.4	83.3	87.2	83.0	82.6	82.5	102.0
23	83.1	88.0	84.3	103.0	93.0	83.8	83.2	87.0	83.0	82.6	82.5	101.8
24	83.0	87.5	84.1	102.5	92.7	83.7	83.2	87.0	83.0	82.6	82.5	101.5
25	83.0	87.3	84.0	102.0	92.4	84.6	83.5	86.7	83.0	82.6	82.5	101.5
26	83.0	87.1	85.0	101.0	92.1	84.9	83.4	86.5	82.9	82.6	82.6	102.0
27	83.0	89.5	86.6	100.5	91.8	84.9	83.3	86.5	82.9	82.6	82.6	104.0
28	83.0	92.0	87.8	100.0	91.3	86.0	83.2	86.4	82.8	82.6	82.6	105.0
29	83.0	.....	87.9	99.5	90.5	85.5	83.2	86.3	82.7	82.6	82.5	105.5
30	83.0	.....	88.8	99.0	90.0	85.0	83.1	86.2	82.7	82.6	82.5	106.0
31	83.0	.....	88.6	.....	89.0	.....	83.1	86.1	.....	82.6	.....	107.0

RED RIVER BASIN.

RED RIVER AT ARTHUR CITY, TEX.

Location.—At a bridge at Arthur City, Tex.

Records available.—January 1, 1905, to December 31, 1911. The United States Weather Bureau has maintained a gaging station at this point since 1891.

Drainage area.—Not measured.

Gage.—Vertical staff, fastened to one of the piers of the bridge.

Channel.—Composed of sand; shifting.

Discharge measurements.—Made from the bridge.

Winter flow.—Ice does not affect the flow.

Accuracy.—The accuracy is uncertain. Discharge measurements made in 1905–6 indicate a shifting channel. One measurement made in 1911 checks the mean curve drawn through the previous measurement. No measurement made during 1907–1910. The rating table, used to work up the records, is the one published in Water Supply Paper 209, page 51, extended down to a gage height of 4.7 feet. Daily discharges are not published because of their unreliability, but the monthly values are considered fair.

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

The following discharge measurement was made at this station by T. U. Taylor: December 28,1911, gage height, 11.0 feet; discharge, 9,500 second-feet.

Daily gage height, in feet, of Red River at Arthur City, Tex., for 1907–1911.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1907.												
1	7.5	9.5	11.0	7.9	10.0	20.0	13.0	7.7	7.8	5.9	7.8	10.4
2	7.7	9.4	10.8	7.9	10.5	21.0	12.7	7.6	7.5	5.7	7.9	8.9
3	8.5	9.0	9.8	7.8	10.5	19.5	11.5	7.6	7.1	5.9	.....	.....
4	9.1	8.8	9.4	7.7	9.3	17.0	11.1	8.5	6.9	.....	.....	8.0
5	9.3	8.7	9.0	7.6	8.9	14.7	10.5	10.6	6.8	.....	.....	7.9
6	9.2	8.7	8.6	8.8	7.9	13.7	9.8	9.8	6.6	17.0	9.8	7.9
7	9.0	8.5	8.5	10.5	10.5	13.0	10.0	9.5	6.4	17.6	9.5	7.5
8	8.8	8.4	8.2	10.6	12.5	12.6	10.8	9.5	6.2	.....	9.0	.....
9	8.6	8.3	8.2	8.5	14.5	13.5	10.0	9.8	6.0	14.0	8.5	7.6
10	8.7	8.2	12.8	8.4	14.0	12.4	10.3	10.0	6.1	.....	.....	.....
11	11.0	8.2	14.9	8.3	14.0	12.8	10.9	9.4	6.0	10.8	8.0	7.4
12	12.0	8.2	15.0	8.0	14.0	11.9	20.8	8.8	6.0	10.6	8.7	7.5
13	12.0	8.1	16.0	7.8	12.4	16.5	16.8	8.5	6.2	10.0	.....	8.0
14	12.0	8.0	14.7	7.5	11.3	15.3	14.8	8.0	5.8	.....	.....	11.9
15	12.4	7.8	14.5	7.4	10.5	13.0	15.2	7.8	6.2	.....	7.6	.....
16	11.0	7.7	12.0	7.2	10.8	12.3	14.3	7.6	6.1	.....	.....	10.0
17	10.2	7.7	11.3	7.1	10.7	12.3	12.7	7.5	5.9	9.6	.....	9.7
18	9.8	7.6	11.6	7.0	9.8	11.6	12.0	7.3	6.0	9.0	7.5	8.8
19	9.6	7.6	10.0	7.0	9.1	11.1	11.3	7.1	6.0	8.9	.....	8.0
20	9.7	7.6	9.7	7.0	9.0	10.8	10.4	7.0	6.0	.....	.....	7.8
21	9.7	7.5	9.4	6.9	8.6	10.5	10.0	6.8	5.9	8.4	.....	7.6
22	9.6	7.5	9.1	6.9	8.3	10.5	9.6	6.9	5.8	8.1	.....	.....
23	9.8	7.5	8.8	6.9	8.1	13.9	9.2	6.8	5.7	8.0	9.0	16.0
24	11.3	7.5	8.6	6.9	8.3	13.6	8.9	7.3	5.8	7.9	.....	14.0
25	11.5	7.5	8.5	6.8	11.0	14.3	8.6	7.2	7.0	7.7	.....	.....
26	10.5	7.7	8.3	6.7	15.6	15.6	8.4	7.4	6.8	7.6	7.8	13.6
27	9.9	7.5	8.2	6.7	21.4	13.5	8.3	6.8	6.6	7.5	7.7	12.0
28	9.6	9.3	8.0	7.7	23.0	12.6	8.2	6.5	6.5	.....	.....	11.0
29	9.5	.....	7.9	7.8	19.0	12.0	8.0	6.4	6.2	.....	7.8	.....
30	9.5	.....	7.9	9.4	16.5	13.0	7.9	6.2	6.0	8.0	10.7	10.0
31	9.5	.....	7.9	.....	19.0	.....	7.8	7.0	.....	7.7	.....	9.6

Daily gage height, in feet, of Red River at Arthur City, Tex., for 1907–1911—Contd.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	9.7	7.9	10.0	15.6	12.0	25.5	15.3	9.7	7.8	8.3	10.4	14.5
2	9.0	7.8	9.6	14.0	11.5	27.0	15.7	10.8	7.9	7.9	10.1	19.5
3	9.0	7.8	9.6	14.4	10.6	26.6	18.8	10.1	7.6	7.6	.....	18.5
4	9.6	8.0	9.4	15.0	10.2	29.4	17.8	10.4	7.7	8.2	8.8	17.0
5	11.0	7.6	9.0	16.6	10.0	30.0	19.5	9.4	7.8	8.3	9.0	15.0
6	13.0	7.5	9.0	14.6	9.9	32.0	19.3	8.9	7.3	7.8	8.6	14.0
7	12.4	7.4	9.0	14.6	11.0	32.1	15.6	8.5	7.2	7.4	8.1	13.5
8	12.0	7.4	9.0	13.6	10.5	30.8	13.6	8.5	7.0	7.2	7.8	12.0
9	11.8	7.6	9.4	15.0	9.6	29.1	11.6	8.3	6.7	7.1	7.5	11.3
10	11.6	7.8	14.0	18.0	9.1	27.1	11.5	8.0	6.5	7.0	7.4	11.0
11	12.4	8.7	13.6	18.0	8.7	28.0	11.0	7.7	6.6	6.7	7.1	10.9
12	10.4	10.7	13.0	22.0	9.5	27.8	10.8	7.5	7.5	6.5	7.0	10.7
13	10.0	14.7	12.6	20.5	18.0	25.8	10.6	7.4	6.9	6.7	6.9	10.4
14	9.6	14.4	12.0	19.5	21.0	24.3	11.6	7.3	6.7	6.4	6.8	9.7
15	9.4	14.2	11.0	20.2	19.0	23.3	11.0	7.2	6.6	7.0	6.7	9.2
16	9.0	13.7	10.0	18.8	18.6	27.5	10.7	7.0	6.4	7.5	6.7	8.9
17	8.8	12.7	9.6	17.8	18.5	27.5	10.5	6.9	6.3	7.3	6.6	8.8
18	8.7	11.7	9.0	17.1	17.7	26.0	10.7	6.8	6.4	7.4	6.8	8.7
19	8.2	10.7	8.8	18.0	17.6	27.0	10.9	6.7	6.7	7.1	6.7	8.5
20	8.0	10.0	8.7	18.5	17.5	28.6	13.0	6.8	6.9	6.9	6.8	8.4
21	7.8	9.6	8.4	17.7	18.5	27.2	13.6	6.6	6.6	6.7	6.9	8.3
22	7.6	9.2	8.4	19.0	17.0	24.5	11.0	6.7	6.4	8.4	6.7	8.2
23	7.5	9.2	8.4	17.5	16.0	22.6	10.5	6.6	6.5	17.5	6.8	8.1
24	7.4	9.0	8.1	16.8	15.9	20.2	11.4	6.6	7.3	18.4	6.7	8.0
25	7.6	9.4	7.8	18.2	24.4	18.2	13.5	6.8	7.1	18.7	6.8	7.9
26	7.6	10.0	7.8	16.2	29.0	16.2	12.0	7.8	6.9	18.5	9.2	7.8
27	7.6	11.0	7.6	14.5	36.5	15.2	13.0	7.7	7.0	16.5	9.7	7.7
28	7.6	10.7	7.8	13.8	42.7	16.0	12.8	7.2	7.8	15.0	8.7	7.6
29	7.4	10.1	11.8	13.2	41.3	16.4	11.8	6.9	9.3	14.5	8.2	7.5
30	7.4	.....	16.8	12.6	34.5	15.2	10.6	6.8	9.1	13.2	11.0	7.6
31	7.6	.....	18.0	.....	28.5	.....	9.9	7.3	.....	12.0	.....	7.7
1909.												
1	7.6	6.9	6.3	6.5	8.5	8.3	11.7	5.9	6.2	4.8	4.8	6.5
2	7.5	6.8	6.3	6.4	7.4	8.3	10.7	5.9	6.0	4.8	4.8	6.4
3	7.4	6.7	6.2	6.9	7.2	9.2	10.2	6.0	6.0	4.7	4.8	15.8
4	7.3	6.6	6.2	7.1	6.8	8.7	9.4	5.8	6.0	4.6	4.8	14.3
5	7.2	6.7	6.2	6.8	6.7	7.5	9.0	5.6	5.9	4.6	4.8	13.9
6	7.1	6.7	6.1	6.6	6.8	7.3	8.5	5.6	5.7	4.6	4.8	13.2
7	7.0	6.8	6.1	6.7	6.7	6.8	8.1	5.5	5.6	4.6	4.8	12.4
8	7.0	6.6	6.1	6.8	6.6	6.7	7.7	5.5	5.6	4.6	4.8	11.8
9	6.9	6.5	6.3	6.5	6.0	6.7	7.6	5.5	5.6	4.8	4.9	10.8
10	6.8	6.5	6.5	7.0	5.8	6.4	7.4	5.6	5.4	4.6	4.9	10.2
11	6.7	6.5	6.8	7.1	5.9	6.2	7.3	5.4	5.2	4.6	8.0	9.8
12	6.7	6.4	6.8	7.2	5.8	7.0	7.2	5.4	5.0	4.6	8.0	9.4
13	6.7	6.4	6.7	7.0	6.5	8.1	7.0	5.2	5.0	4.6	7.6	9.0
14	6.8	6.5	6.5	6.7	6.4	13.2	6.9	5.2	4.9	4.6	6.3	8.9
15	6.9	6.4	6.3	6.5	6.0	13.8	6.7	5.2	4.9	4.5	6.0	8.3
16	7.0	6.4	6.3	6.3	5.8	12.5	6.6	5.2	4.9	4.5	5.9	7.9
17	7.0	6.5	6.2	6.3	5.8	11.7	6.7	5.2	4.9	4.5	7.0	7.7
18	6.9	6.5	6.2	6.0	6.2	15.0	6.7	5.2	4.8	4.5	8.2	7.5
19	6.8	6.5	6.1	5.9	7.0	13.8	6.4	5.2	4.8	4.5	8.3	7.2
20	6.8	6.5	6.8	5.8	9.8	12.7	6.4	5.2	4.8	4.6	8.3	7.0
21	6.9	6.7	6.8	6.2	9.4	11.7	6.3	7.5	4.8	4.5	8.3	6.9
22	7.0	6.5	6.8	6.2	8.7	10.7	6.3	7.2	4.6	4.5	8.9	6.8
23	7.0	6.7	6.9	8.1	8.7	10.0	6.3	7.0	4.6	4.5	8.5	6.8
24	7.1	6.8	6.9	7.5	7.7	9.3	6.3	7.5	4.6	4.5	8.0	6.8
25	7.0	7.0	6.6	6.6	6.9	9.0	6.3	7.5	5.2	5.4	7.8	6.4
26	7.1	6.5	7.7	6.3	8.4	9.0	6.1	6.3	5.4	5.4	7.6	6.0
27	7.2	6.4	7.6	6.2	9.8	8.7	6.0	6.2	5.6	5.3	7.6	7.0
28	7.1	6.4	7.5	7.3	10.2	15.3	6.0	6.2	5.0	5.2	7.3	7.1
29	7.1	.....	7.2	8.5	10.3	13.1	6.0	6.2	5.0	5.1	6.9	7.0
30	7.1	.....	6.9	8.7	10.2	12.2	6.0	6.0	4.8	5.0	6.5	7.0
31	7.0	.....	6.7	.....	9.2	.....	6.0	6.0	.....	4.8	.....	7.0

Daily gage height, in feet, of Red River at Arthur City, Tex., for 1907–1911—Contd.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1910.												
1	7.0	6.9	6.2	6.0	7.4	10.0	6.6	6.4	6.5	5.4	5.0	5.0
2	7.0	6.9	6.2	6.0	7.0	10.0	6.6	6.3	6.5	5.4	5.0	5.0
3	7.0	6.9	6.2	7.0	7.0	10.0	6.6	6.3	6.5	5.4	5.8	5.0
4	7.0	6.9	6.2	9.0	7.0	10.0	6.6	6.3	6.0	5.4	5.8	5.0
5	7.0	6.9	6.2	9.0	6.9	9.6	6.6	6.0	6.0	5.4	5.2	5.0
6	7.0	6.9	6.2	9.0	6.9	9.0	6.6	6.0	6.0	5.4	5.2	5.0
7	7.0	6.9	6.2	8.5	6.6	8.0	6.6	6.0	5.8	5.4	5.0	5.0
8	7.0	6.9	6.2	8.0	6.6	8.6	6.6	6.0	5.8	5.4	5.0	5.0
9	7.0	6.9	6.2	7.9	6.6	8.0	6.6	6.0	5.8	5.4	5.0	5.0
10	7.0	6.9	6.2	7.0	6.4	8.0	6.6	6.4	5.8	5.4	5.4	5.0
11	7.0	6.9	6.2	6.9	6.4	8.0	6.6	8.0	5.8	5.4	5.2	5.0
12	7.0	6.9	6.2	7.5	6.3	7.9	6.6	8.9	5.8	5.4	5.0	5.0
13	7.0	6.9	6.2	10.0	6.3	7.9	6.6	8.8	5.8	5.4	5.0	5.1
14	7.0	6.7	6.2	11.6	6.3	7.9	8.6	8.2	5.8	5.4	5.0	5.0
15	7.0	6.6	6.2	10.0	6.3	7.9	10.6	8.1	5.6	5.4	5.0	5.0
16	6.9	6.5	6.2	10.0	6.1	7.6	13.6	7.6	5.6	5.4	5.0	5.0
17	6.9	6.5	6.2	12.2	6.4	7.6	11.6	7.3	5.6	5.4	5.0	5.0
18	6.9	6.5	6.2	11.0	8.0	7.6	10.6	6.9	5.6	5.4	5.0	5.0
19	6.9	6.5	6.2	11.0	9.0	7.6	10.0	6.4	5.6	5.4	5.0	5.0
20	6.9	6.5	6.2	10.9	9.3	7.6	10.0	6.7	5.6	5.2	5.0	5.0
21	6.9	6.3	6.2	9.6	8.6	7.0	9.0	6.4	5.6	5.2	5.0	5.0
22	6.9	6.3	6.2	9.0	8.0	7.0	8.9	7.0	5.6	5.0	5.0	5.0
23	6.9	6.3	6.0	8.6	7.6	7.0	8.6	7.0	5.6	5.0	5.0	5.0
24	6.9	6.3	6.0	8.6	7.0	7.0	8.0	7.0	5.6	5.0	5.0	5.0
25	6.9	6.3	6.0	8.6	12.0	7.0	7.8	7.0	5.6	5.0	5.0	5.0
26	6.9	6.3	6.0	8.5	12.0	7.0	7.4	7.0	5.4	5.0	5.0	5.0
27	6.9	6.3	6.0	8.5	11.6	7.0	7.0	6.5	5.4	5.0	5.0	5.0
28	6.9	6.3	6.0	8.4	11.6	7.0	6.8	6.5	5.4	5.0	5.0	5.0
29	6.9	.....	6.0	7.9	11.0	7.0	6.7	6.5	5.4	5.0	5.0	5.0
30	6.9	.....	6.0	7.6	9.6	6.6	6.6	6.5	5.4	5.0	5.0	5.0
31	6.9	.....	6.0	.....	9.6	.....	6.5	6.5	.....	5.0	.....	5.0
1911.												
1	5.0	5.0	8.3	5.5	5.5	6.0	5.4	10.5	13.4	7.0	6.0	6.0
2	5.0	5.0	8.0	5.5	5.5	6.0	5.4	9.8	13.0	7.0	6.0	6.0
3	5.0	5.0	7.8	5.5	5.5	5.8	5.4	9.4	11.0	6.8	6.0	6.0
4	4.8	5.0	7.6	5.3	5.5	11.5	5.2	9.0	10.0	6.6	6.0	6.0
5	4.8	5.0	7.4	5.3	5.5	10.0	5.0	8.2	10.0	6.5	6.0	6.0
6	4.7	5.0	7.0	5.3	6.0	9.3	5.0	7.5	9.5	6.4	6.0	6.0
7	4.7	5.0	6.8	5.3	6.4	9.0	5.0	7.0	9.0	6.3	6.0	6.0
8	4.7	5.1	6.6	5.2	6.6	8.7	5.0	6.6	8.6	6.3	6.0	6.0
9	4.7	5.0	6.6	5.2	6.0	8.5	5.0	6.2	9.5	6.3	6.0	6.0
10	4.9	5.0	6.4	5.2	6.0	8.3	5.5	6.0	9.8	6.0	6.0	6.0
11	5.0	5.0	6.2	5.2	6.0	8.0	5.2	6.0	11.3	5.8	6.0	6.0
12	5.0	5.0	6.0	5.2	6.0	8.0	5.0	6.0	11.3	5.8	6.0	5.9
13	5.0	5.0	6.0	5.0	5.6	8.0	5.0	6.0	10.5	5.8	6.0	5.8
14	5.0	5.0	6.0	5.0	5.5	7.8	5.0	6.4	10.0	5.8	6.0	12.0
15	5.0	5.0	5.9	6.9	5.5	7.6	5.0	6.3	11.5	6.0	6.0	11.0
16	5.0	5.0	5.8	10.0	5.3	7.4	5.5	8.0	10.5	6.0	6.0	9.0
17	5.0	5.0	5.8	10.7	5.2	7.2	5.5	8.0	9.5	6.0	6.0	9.0
18	5.0	8.0	5.8	9.8	5.2	7.0	5.5	8.0	9.3	6.4	6.0	9.0
19	5.0	7.6	5.8	8.9	5.2	7.0	6.5	8.5	8.8	6.6	6.0	8.9
20	5.0	7.0	5.8	8.5	6.0	7.0	9.0	8.3	8.5	6.6	6.0	9.9
21	5.0	8.8	5.8	8.0	8.0	7.0	9.0	8.3	8.3	6.6	6.0	9.5
22	5.0	7.8	5.8	7.7	9.0	6.8	9.0	7.0	8.0	6.6	6.0	9.0
23	5.0	11.6	5.8	7.5	9.5	6.3	11.8	6.5	7.6	6.4	6.2	8.6
24	5.0	10.6	5.8	7.0	8.5	5.7	16.0	6.0	7.3	6.2	6.0	15.0
25	5.0	9.6	5.8	7.5	8.3	5.5	16.0	7.0	7.0	6.0	6.0	14.0
26	5.0	8.9	5.8	7.7	7.5	5.5	14.4	6.8	7.0	6.0	6.0	14.9
27	5.0	8.9	5.7	6.6	6.5	5.5	13.5	6.5	6.8	6.0	6.0	11.0
28	5.0	8.5	5.6	6.0	6.5	5.4	11.4	7.0	7.0	6.0	6.0	10.5
29	5.0	.....	5.5	5.8	6.3	5.4	10.8	7.8	7.0	6.0	6.0	9.9
30	5.0	.....	5.5	5.6	6.0	5.4	10.2	11.4	7.0	6.0	6.0	9.0
31	5.0	.....	5.5	.....	6.0	.....	11.0	13.0	.....	6.0	.....	10.6

Monthly discharge of Red River at Arthur City, Tex., for 1907–1911.

[Drainage area, 40,200 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1907.						
January	13,000	3,480	7,360	0.183	0.21	453,000
February	6,630	3,480	4,300	.107	.11	239,000
March	24,800	4,010	8,140	.202	.23	501,000
April	8,750	2,580	3,870	.096	.11	230,000
May	55,200	4,300	12,700	.316	.36	781,000
June	45,900	8,540	17,000	.423	.47	1,010,000
July	45,000	3,870	9,820	.244	.28	604,000
August	8,750	2,100	4,010	.100	.12	247,000
September	3,870	1,710	2,200	.055	.06	131,000
October	31,100	1,710	6,270	.156	.18	386,000
November	8,960	3,480	4,920	.122	.14	293,000
December	24,800	3,360	6,810	.169	.19	419,000
The year	55,200	1,710	7,280	.181	2.46	5,290,000
1908.						
January	14,600	3,360	6,090	.151	.17	374,000
February	20,000	3,360	7,360	.183	.20	423,000
March	32,800	3,610	7,940	.198	.23	488,000
April	50,500	13,500	27,500	.684	.76	1,640,000
May	155,000	5,240	34,900	.868	1.00	2,150,000
June	101,000	21,800	64,400	1.60	1.78	3,830,000
July	39,200	7,360	14,300	.356	.41	879,000
August	9,170	2,480	3,870	.096	.11	238,000
September	6,270	2,200	3,120	.078	.09	186,000
October	35,700	2,290	7,360	.183	.21	453,000
November	9,660	2,480	3,870	.096	.11	230,000
December	39,200	3,480	8,540	.212	.24	525,000
The year	155,000	2,200	15,800	.393	5.31	11,400,000
1909.						
January	3,610	2,580	2,900	.072	.08	178,000
February	2,900	2,290	2,480	.062	.06	138,000
March	3,740	2,020	2,480	.062	.07	152,000
April	5,240	2,100	2,680	.067	.07	159,000
May	8,140	1,790	3,480	.087	.10	214,000
June	22,200	2,100	7,550	.188	.21	449,000
July	11,200	1,950	3,240	.081	.09	199,000
August	3,480	1,360	1,870	.046	.05	115,000
September	2,100	1,070	1,360	.034	.04	80,900
October	1,500	1,030	1,110	.028	.03	68,200
November	5,580	1,150	2,480	.062	.07	148,000
December	24,000	1,950	5,410	.135	.16	333,000
The year	24,000	1,030	3,090	.077	1.03	2,230,000
1910.						
January	2,900	2,790	2,840	.071	.08	175,000
February	2,790	2,200	2,480	.062	.06	138,000
March	2,100	1,950	2,020	.050	.06	124,000
April	12,400	1,950	5,410	.135	.15	322,000
May	11,900	2,020	4,300	.107	.12	264,000
June	7,550	2,480	4,010	.100	.11	239,000
July	16,400	2,380	4,010	.100	.12	247,000
August	5,580	1,950	2,790	.069	.08	172,000
September	2,380	1,500	1,790	.044	.05	107,000
October	1,500	1,220	1,436	.036	.04	87,900
November	1,790	1,220	1,290	.032	.04	76,800
December	1,290	1,220	1,220	.030	.03	75,000
The year	16,400	1,220	2,800	.070	.94	2,030,000
1911.						
January	1,220	1,040	1,190	.030	.03	73,200
February	11,000	1,220	2,980	.074	.08	166,000
March	4,600	1,570	2,260	.056	.06	139,000
April	8,960	1,220	2,870	.071	.08	171,000
May	6,630	1,360	2,420	.060	.07	149,000
June	10,700	1,500	3,480	.087	.10	207,000
July	24,800	1,220	5,720	.142	.16	352,000
August	14,600	1,950	4,170	.104	.12	256,000
September	15,800	2,680	6,610	.164	.18	393,000
October	2,900	1,790	2,180	.054	.06	134,000
November	2,110	1,950	1,960	.049	.05	117,000
December	21,000	1,790	6,240	.155	.18	384,000
The year	24,800	1,040	3,510	.087	1.17	2,540,000

NOTE.—These records are considered only fair on account of the lack of discharge measurements and the shifting character of the stream bed.

WICHITA RIVER AT WICHITA FALLS, TEX.

Location.—At the Fort Worth & Denver City Railway bridge at Wichita Falls, Tex.
Records available.—October 1, 1910, to December 31, 1911.
Drainage area.—Not measured.
Gage.—Standard chain gage fastened to the bridge.
Channel.—Bottom of stream is sandy and shifting.
Discharge measurements.—Made from the bridge or by wading.
Accuracy.—No discharge estimates have been made.
Cooperation.—Station maintained in cooperation with the chief engineer of the Wichita Falls & Northwestern Railway.

Discharge measurements of Wichita River at Wichita Falls, Tex., in 1911.

Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Aug. 14	E. F. Mittmann	3.5	525
30	do	8.3	3,510

Daily gage height, in feet, of Wichita River at Wichita Falls, Tex., for 1911.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.2	0.9	1.0	0.8	1.3	1.1	0.4	2.0	3.9	0.9	0.5	0.4
2	1.2	.9	.9	.8	1.2	1.1	.3	1.9	3.2	.8	.5	.4
3	1.2	.9	.9	.8	1.1	1.0	.5	1.8	2.9	.8	.5	.4
4	1.1	.8	.9	.8	1.0	1.0	.5	1.8	2.5	.8	.5	.4
5	1.1	.8	.9	.8	1.0	1.0	.5	1.8	2.2	.8	.5	.4
6	1.1	.8	.8	.8	.9	.9	.5	1.7	2.0	.8	.5	.4
7	1.1	.8	.8	.8	.9	.9	.5	1.7	1.8	.8	.5	.4
8	1.0	.8	.8	.8	.8	.9	.6	1.7	2.9	.7	.5	.4
9	1.0	.8	.8	.8	.8	.9	.6	1.6	2.7	.7	.4	.4
10	1.0	.8	.8	.8	.7	.9	1.6	1.6	2.4	.7	.4	14.2
11	1.2	3.0	.7	.8	.7	.8	2.9	1.6	2.1	.7	.4	7.8
12	1.2	2.8	.7	.8	.7	.8	3.3	1.5	2.7	.7	.4	6.5
13	1.2	2.6	.7	.8	.7	.8	3.4	1.2	2.9	.7	.4	5.6
14	1.2	2.0	.7	.8	11.1	.8	6.0	1.0	2.2	.7	.4	4.7
15	1.1	1.6	1.5	.8	6.5	.8	1.7	.8	2.0	.7	.3	4.0
16	1.1	1.2	1.5	.8	4.9	.7	1.4	.6	2.0	.7	.3	3.2
17	1.1	1.2	1.4	.7	4.5	.7	1.8	.4	2.0	.6	.3	2.6
18	1.1	4.0	1.4	.7	3.9	.7	4.0	.4	1.9	.6	.3	2.0
19	1.0	3.8	1.3	.7	3.3	.7	3.9	.4	1.9	.6	.3	1.7
20	1.0	3.6	1.2	.7	2.8	.7	4.7	.3	1.8	.6	.3	11.3
21	1.0	3.2	1.2	.7	2.2	.7	4.7	.3	1.7	.5	.3	10.8
22	1.0	2.7	1.1	.7	1.9	.7	4.8	.3	1.3	.5	.3	4.8
23	1.0	2.2	1.1	.7	1.7	.7	4.7	.7	1.3	.5	.3	3.3
24	.9	1.7	1.1	.7	1.6	.7	4.2	.9	1.2	.5	.3	2.8
25	.9	1.2	1.0	.7	1.5	.7	3.4	.9	1.2	.5	.3	2.4
26	.9	1.0	1.0	3.2	1.4	.7	2.9	.8	1.1	.5	.3	2.2
27	.9	1.0	.9	2.8	1.3	.6	2.7	4.2	1.0	.5	.3	1.9
28	.9	1.0	.9	2.4	1.3	.6	2.6	13.1	1.0	.5	.3	1.7
29	.9	.....	.9	1.8	1.2	.5	2.4	11.0	.9	.5	.3	1.6
30	.9	.....	.8	1.7	1.2	.4	2.2	8.3	.9	.5	.3	1.4
31	.9	.....	.8	.....	1.1	.....	2.1	5.4	.....	.5	.....	1.3

MISCELLANEOUS MEASUREMENTS.

The following miscellaneous measurements were made on streams in the Arkansas River basin in 1911:

Miscellaneous measurements in Arkansas River drainage basin in 1911.

Date.	Stream.	Tributary to—	Locality.	Gage height.	Discharge.
				Feet.	*Sec. ft.*
Dec. 25	Arkansas River	Mississippi River.	Near Leadville, Colo., below confluence of Tennessee Fork and East Arkansas River.	.....	a 21.8
Feb. 7	Chalk Creek	Arkansas River	Near Buena Vista, Colo	0.20	17.5
Mar. 10	do	do	do	.23	20.8
Jan. 17	Grape Creek	do	Near Canon City, Colo	.....	4.5
Feb. 20	do	do	do	.....	b 2.5
July 8	Fountain Creek	do	Crystola, Colo	.....	0
8	do	do	Green Mountain Falls, Colo	.....	b .5
8	do	do	Cascade, Colo	.....	b 5.0
8	do	do	2 miles above Manitou, Colo	.....	b 8.0
Mar. 9	do	do	Fountain, Colo	.....	b 3.0
Dec. 1	do	do	do	.....	b 4.0
28	do	do	Butte, Colo	.....	b 5.0
Mar. 9	St. Charles River	do	San Carlos, Colo	.....	b .2
May 19	do	do	do	.....	b .25
Sept. 24	do	do	do	.....	b .05
Mar. 9	Huerfano River	do	Huerfano, Colo	.....	b 6.0
9	Cucharas River	Huerfano River	Walsenburg, Colo	.....	b 3.0
May 19	do	do	do	.....	b .5
Sept. 24	do	do	do	.....	0
May 19	Santa Clara Creek	Cucharas River	Monson, Colo	.....	b 2.0
Sept. 24	Apishapa Creek	Arkansas River	Lynn, Colo	.....	0
24	Salado Creek	Apishapa Creek	Rugby, Colo	.....	b .25
Mar. 9	do	do	Monson, Colo	.....	b .7
Nov. 16	Canadian River	Arkansas River	Dillon, N. Mex	.....	b .3
July 20	do	do	4 miles south of Raton, N. Mex	.....	b 1.50
26	do	do	do	.....	b 2.0
Apr. 28	do	do	Near Maxwell, N. Mex	.....	0
Oct. 26	do	do	do	.....	b 1.0
Feb. 17	do	do	French, N. Mex	.....	b .25
Aug. 20	do	do	do	.....	b 1.0
Nov. 4	do	do	do	.....	b 7.0
Dec. 13	do	do	do	.....	b 3.0
25	do	do	do	.....	b 6.0
25	do	do	Near Tucumcari, N. Mex	.....	b 30.0
Feb. 18	Raton Creek	Canadian River	Raton, N. Mex	.....	0
July 21	do	do	do	1.32	19.7
24	do	do	do	.70	b .1
24	Vermejo Creek	do	Colfax, N. Mex	.....	b 150
26	do	do	do	.....	b 60
26	do	do	do	.....	b 50
Nov. 16	do	do	do	.....	b .5
Apr. 28	do	do	Near French, N. Mex	.....	0
Sept. 2	do	do	do	.....	b .3
Apr. 28	Cimarron River	do	Springer, N. Mex	.....	b 2.0
Aug. 20	do	do	do	.....	b 2.0
Oct. 26	do	do	do	.....	b 1.5
Nov. 15	do	do	do	.....	b 10.0
Nov. 16	Ponil Creek	Cimarron River	Near Cimarron, N. Mex	.....	b 5.0
May 9	Urraca Creek	Rayado River	Webster's ranch, near Springer, N. Mex.	.29	1.5
June 11	do	do	do	.....	b .5
Nov. 14	Ocate Creek	Canadian River	Near Colmor, N. Mex	.....	b .5
Apr. 28	Mora River	do	Watrus, N. Mex	.....	b 3.0
Sept. 4	do	do	do	.....	b 1.0
Nov. 14	do	do	do	.....	b 18.0
Aug. 20	do	do	Near Wagon Mound, N. Mex	.....	b .5
3	Pajarito Creek	do	15 miles above Tucumcari, N. Mex	.....	0
Dec. 23	Vigil Creek	Pajarito Creek	Near Tucumcari, N. Mex	.....	b .25
Nov. 5	Tequesquite Creek	Ute Creek	Near Albert, N. Mex., below confluence with Carriso Creek.	.....	0
5	do	do	5 miles below Albert, N. Mex	.....	b .12

a Ice conditions. b Estimated.

INDEX.