

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

WATER-SUPPLY PAPER 328

SURFACE WATER SUPPLY OF THE
UNITED STATES

1912

PART VIII. WESTERN GULF OF MEXICO BASINS

BY

W. W. FOLLETT, ROBERT FOLLANSBEE
AND G. A. GRAY



WASHINGTON
GOVERNMENT PRINTING OFFICE
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SURFACE WATER SUPPLY OF WESTERN GULF OF MEXICO BASINS, 1912.

By W. W. FOLLETT, ROBERT FOLLANSBEE, and G. A. GRAY.

AUTHORIZATION AND SCOPE OF WORK.

This volume is one of a series of 12 reports presenting results of measurements of flow made on streams in the United States during the calendar year 1912.

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 1914, inclusive.....	150,000

In the execution of the work many private and States organizations have cooperated, either (a) by furnishing data or (b) by assisting in collecting the data. Acknowledgments for cooperation under class "a" are made in connection with the description of each station affected, and for class "b" on page 14.

Measurements of stream flow have been made at about 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 1912 gaging stations were maintained by the Survey and the cooperating organizations at about 1,500 points, 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 water-supply papers from time to time.

PUBLICATIONS.

For each calendar year there has been prepared a report embodying the stream-flow data collected during that year. An index to the reports containing stream-flow measurements prior to 1904 has been published as Water-Supply Paper 119. Circulars are also available giving complete lists of the gaging stations maintained by the Survey to date, and a list of the reports relating to the water supply of the country.

Prior to 1902 gage heights and discharge measurements were published in water-supply papers or bulletins and estimates of monthly discharge in annual reports; since 1902 both classes of data have been published in water-supply papers and they are now being published in 12 parts, as shown in the following table:

Papers on surface water supply of the United States, 1912.

Part. ^a	No.	Title.
I	321	North Atlantic coast basins.
II	322	South Atlantic coast and eastern Gulf of Mexico basins.
III	323	Ohio River basin.
IV	324	St. Lawrence River basin.
V	325	Upper Mississippi River and Hudson Bay basins.
VI	326	Missouri River basin.
VII	327	Lower Mississippi River basin.
VIII	328	Western Gulf of Mexico basins.
IX	329	Colorado River basin.
X	330	Great Basin.
XI	331	Pacific coast basins in California.
XII	332	North Pacific coast basins.

^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.

A list of reports containing stream-flow data is presented in 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 65, 66.....	Descriptions, measurements, gage heights, and ratings.....	1901.
WS 75.....	Monthly discharge.....	1901.
WS 82 to 85.....	Complete data.....	1902.
WS 97 to 100.....	do.....	1903.
WS 124 to 135.....	do.....	1904.
WS 165 to 178.....	do.....	1905.
WS 201 to 214.....	Complete data, except descriptions.....	1906.
WS 241 to 252.....	Complete data.....	1907-8.
WS 261 to 272.....	do.....	1909.
WS 281 to 292.....	do.....	1910.
WS 301 to 312.....	do.....	1911.
WS 321 to 332.....	do.....	1912.

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 any station in the area covered by Part I are published in Water-Supply Papers 97, 124, 165, 201, 241, 261, 281, 301, and 321, which contain records for the New England streams from 1903 to 1912. The year covered by the report is indicated at the head of the column in which the paper is listed.

Numbers of water-supply papers containing results of stream measurements, 1899-1912.

	1899 ^c	1900 ^b	1901	1902	1903	1904	1905	1906	1907-8	1909	1910	1911	1912
North Atlantic coast basins (St. John River to York River).....	35	47, ^c 48	65, 75	82	97	<i>d</i> 124, ^e 125, ^f 126	<i>d</i> 165, ^e 166, ^f 167	<i>e</i> 201, ^e 202, ^f 203	241	261	281	301	321
South Atlantic coast and eastern Gulf of Mexico basins (James River to the Mississippi).....	^g 35, ^h 36	48	65, 75	^g 82, ^h 83	^g 97, ^h 98	^f 126, 127	^f 167, 168	^f 203, 204	242	262	282	302	322
Ohio River basin.....	36	48, ^a 49	65, 75	84	98	128	169	205	243	263	283	303	323
St. Lawrence River and Great Lakes basins.....	36	49	65, 75	ⁱ 82, ^j 83	97	129	170	206	244	264	284	304	324
Hudson Bay and upper Mississippi River basins.....	36	49	65, 66, 75	ⁱ 83, ^j 85	^j 98, ^j 99, ^k 100	^f 128, 130	171	207	245	265	285	305	325
Missouri River basin.....	ⁱ 36, ^j 37	49, ^m 50	65, 66, 75	ⁱ 84	99	130, ⁿ 131	172	208	246	266	286	306	326
Lower Mississippi River basin.....	37	50	65, 66, 75	ⁱ 83, ^h 84	^f 98, ^j 99	^f 128, 131	^f 169, 173	^f 203, 209	247	267	287	307	327
Western Gulf of Mexico basins.....	37	50	66, 75	85	99	132	174	211	248	268	288	308	328
Colorado River basin.....	^o 37, ^h 38	50	66, 75	85	100	133	175, ^p 177	210	249	269	289	309	329
Great Basin.....	38, ^q 39	51	66, 75	85	100	133, ^r 134	176, ^r 177	212, ^r 213	250, ^r 251	270, ^r 271	290	310	330
Pacific coast basins in California.....	38, ^s 39	51	66, 75	85	100	134	177	213	251	271	291	311	331
North Pacific coast basins.....	38, 38	51	66, 75	85	100	135	^t 177, 178	214	252	272	292	312	332

^a Rating tables and index to Water-Supply Papers 35-39 contained in Water-Supply Paper 39. Estimates for 1899 in Twenty-first Ann. Rept., pt. 4.
^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. Estimates for 1900 in Twenty-second Ann. Rept., pt. 4.

^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.

Water-supply papers and other publications of the United States Geological Survey containing data in regard to the water resources of the United States may be obtained or consulted as indicated below:

1. Copies may be obtained free of charge by applying to the Director of the Geological Survey, Washington, D. C. The edition printed for free distribution is, however, small and is soon exhausted.

2. Copies may be purchased at nominal cost from the Superintendent of Documents, Government Printing Office, Washington, D. C., who will on application furnish lists giving prices.

3. Sets of the reports may be consulted in the libraries of the principal cities in the United States.

4. Complete sets are available for consultation in the local offices of the water-resources branch of the Geological Survey, as follows:

Albany, N. Y., room 18, Federal Building.

Atlanta, Ga., Post Office Building.

St. Paul, Minn., Old Capitol Building.

Helena, Mont., Montana National Bank Building.

Denver, Colo., 302 Chamber of Commerce Building.

Salt Lake City, Utah, Federal Building.

Boise, Idaho, 615 Idaho Building.

Portland, Oreg., 416 Couch Building.

Tacoma, Wash., Federal Building.

San Francisco, Cal., 505 Custom House.

Los Angeles, Cal., Federal Building.

Santa Fe, N. Mex., Capitol Building.

Honolulu, Hawaii, Kapiolani Building.

A list of the Geological Survey's publications will be sent on application to the Director of the United States Geological Survey, Washington, D. C.

DEFINITION OF TERMS.

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

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

“Second-feet per square mile” is the average number of cubic feet of water flowing per second from each square mile of area drained, on

the assumption that the run-off is distributed uniformly both as regards time and area.

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

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

CONVENIENT EQUIVALENTS.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

EXPLANATION OF DATA.

For each regular current-meter gaging station the following data, so far as available, are given: Description of the station, list of discharge measurements, table of daily gage heights, table of daily discharge, table of monthly and yearly discharges and run-off. For stations located at weirs or dams the gage-height table is usually 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 negative readings shall not occur.

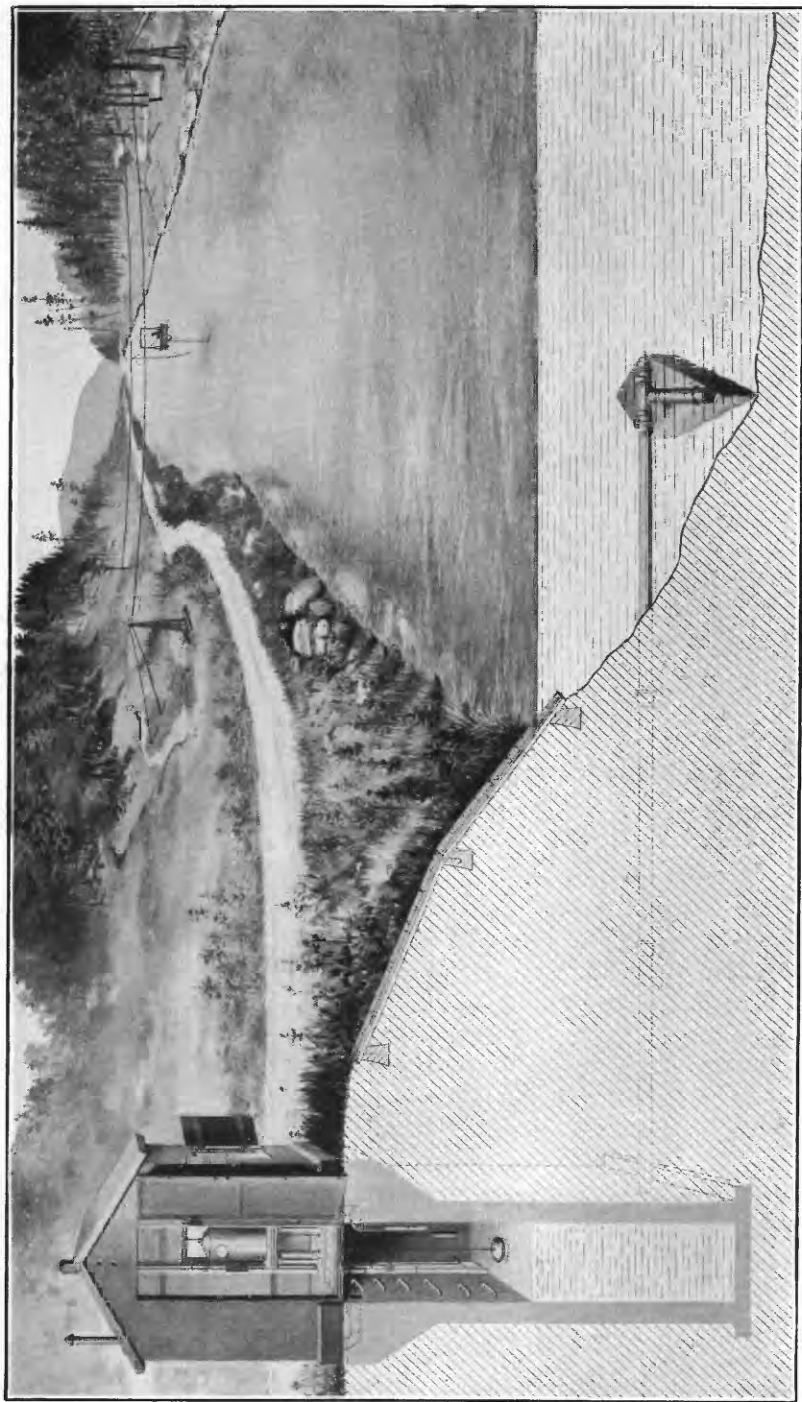
The discharge measurements and gage heights are the base data from which rating tables, daily discharge tables, and monthly discharge tables are computed.

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

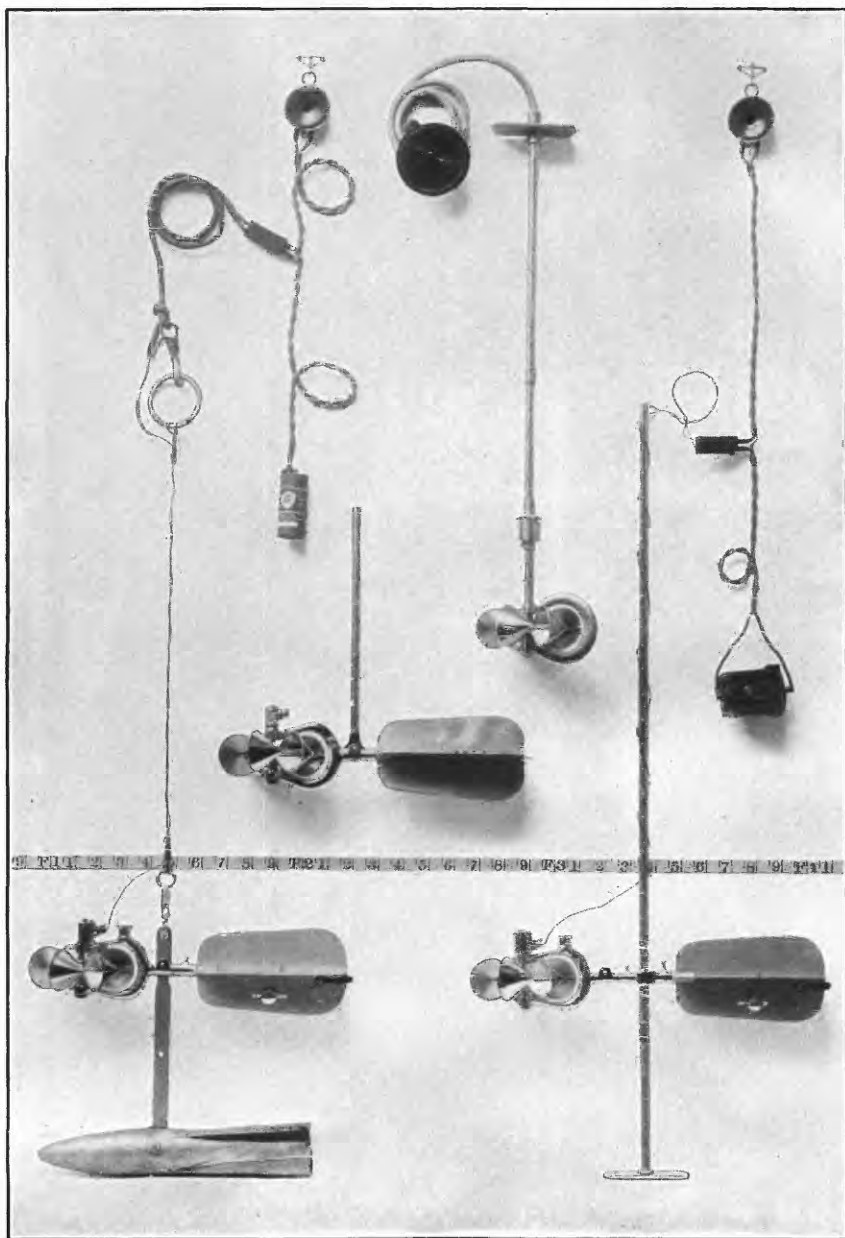
The table of daily discharges gives the discharges in second-feet corresponding to the observed gage heights as determined from the rating tables.

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 computation for the remaining columns, which are defined on pages 9 and 10, are based.

The base data presented in this report, unless otherwise stated in the description of the stations, have been collected by the methods commonly used at current-meter gaging stations and described in standard textbooks. Plate I shows typical gaging stations. Plate II shows current meters used in the work.



TYPICAL GAGING STATIONS.



PRICE CURRENT METERS.

ACCURACY AND RELIABILITY OF FIELD DATA AND COMPARATIVE RESULTS.

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

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

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

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

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

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

Special acknowledgments are due for financial assistance rendered by the State engineers of Colorado and New Mexico.

Through the efforts of Mr. J. A. French, State engineer of New Mexico, a suboffice was established at Santa Fe, and work was actively resumed in that State.

The stations on the lower Rio Grande and tributaries have been maintained by the International Boundary Commission, Wilbur Keblinger, commissioner on the part of the United States; Señor Fernando Beltrán y Puga, commissioner on the part of Mexico; and W. W. Follett, consulting engineer on the part of the United States.

DIVISION OF WORK.

The field data for the Rio Grande drainage basin in Colorado were collected under the direction of Robert Follansbee, district engineer, by H. B. Waha.

The work in New Mexico was under the general supervision of Robert Follansbee. Beginning with August, the work was in the direct charge of G. A. Gray, assistant engineer, who was assisted by F. O'Brien, A. S. Kirkpatrick, E. L. Redding, J. E. Powers, R. L. Cooper, and C. J. Emerson.

The ratings and estimates for Colorado stations were made, and the completed data prepared for publication, under the direction of Robert Follansbee, by Raymond Richards, assisted by R. H. Fletcher.

The New Mexico ratings and computations were made by G. A. Gray, assisted by H. J. Dean.

STATION RECORDS.

RIO GRANDE AT THIRTYMILE BRIDGE, NEAR CREEDE, COLO.

Location.—In the Rio Grande National Forest, about 30 miles southwest of Creede, in sec. 13, T. 40 N., R. 4 W.; a short distance above mouth of Squaw Creek.

Records available.—June 18, 1909, to November 30, 1912.

Drainage area.—163 square miles (measured from topographic sheets).

Gage.—Chain gage, 200 feet upstream from Thirtymile Bridge; washed out October 5, 1911. The flood of this date changed the mouth of Squaw Creek, making it enter above the gaging station. For that reason, when the records were resumed April 8, 1912, a vertical staff gage was established a quarter of a mile above the old location and above the new mouth of Squaw Creek. The relation between the gages was not determined.

Channel.—Apparently permanent.

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

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

Diversions.—So far as known, no water is diverted above the station.

Artificial control.—A short distance above the station the San Luis Valley irrigation district is constructing a large reservoir which will materially modify the flow of the river when completed. During the low water of 1912, the operation of the reservoir gates controlled the flow somewhat.

Accuracy.—Owing to the high altitude at this point it is possible that at certain seasons of the year the alternate melting and freezing may cause considerable diurnal fluctuations. For this reason the mean daily gage height taken from morning and evening readings may not represent accurately the true mean for the day. With this exception, conditions are favorable for accurate results, and altogether the records are considered good.

Cooperation.—Station maintained in cooperation with Mr. J. C. Ulrich, of the San Luis Valley irrigation district, by whom the field data were furnished.

Discharge measurements of Rio Grande at Thirtymile Bridge, near Creede, Colo., for 1912.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
June 2	Follansbee and Sievers.	6.75	1,630	July 23	C. H. Sievers.	5.23	628
6	C. H. Sievers.	7.30	2,470	29		5.45	827
12	do.....	5.65	916	Aug. 6	do.....	4.40	282
18	do.....	5.10	604	24	do.....	3.10	24
21	do.....	5.85	990	Sept. 14	do.....	3.72	103
29	do.....	5.90	1,010	20	do.....	3.60	80
July 18	do.....	4.78	448	23	do.....	3.50	67
19	do.....	5.00	596				

Daily gage height, in feet, of Rio Grande at Thirtymile Bridge, near Creede, Colo., for 1912.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1		3.99	6.50	5.60	4.90	3.95	3.52	3.28
2		4.25	6.80	4.85	4.75	3.83	3.58	
3		4.10	7.05	5.80	4.65	3.80	3.60	
4		3.74	7.60	5.05	4.55	3.80	3.60	2.60
5		3.81	7.60	4.85	4.50	3.78	3.68	2.60
6		4.05	7.20	4.95	4.40	3.75	3.70	2.60
7		4.30	7.10	5.20	4.35	3.75	3.74	2.60
8	3.52	4.45	6.80	5.15	4.25	3.73	3.68	2.60
9	3.71	4.30	6.80	5.10	4.20	3.78	3.60	2.60
10	3.78	4.10	6.50	5.15	4.15	3.80	3.60	2.55
11	3.50	4.20	6.40	5.10	4.10	3.88	3.40	2.55
12	3.42	4.50	5.70	5.05	4.10	3.85	3.28	2.60
13	3.55	4.90	5.70	4.95	4.05	3.80	3.60	2.65
14	3.67	4.70	5.60	4.95	4.65	3.75	3.75	2.65
15	3.65	3.85	6.00	4.95	4.45	3.70	3.75	2.60
16	3.55	4.60	6.00	4.95	4.25	3.68	3.60	2.60
17	3.64	4.85	5.70	4.85	4.45	3.65	3.50	2.60
18	3.65	5.40	5.20	4.80	4.40	3.65	3.50	2.60
19	3.58	5.75	5.50	4.95	4.30	3.64	3.20	2.60
20	3.46	5.80	5.65	4.85	4.15	3.60	3.70	2.60
21	3.60	6.10	5.85	4.75	3.60	3.58	3.60	2.60
22	3.55	6.20	5.80	4.75	3.10	3.55	3.50	2.60
23	3.60	6.20	5.85	5.10	3.10	3.53	3.60	2.60
24	3.48	6.30	5.90	4.85	3.10	3.58	3.20	2.60
25	3.63	6.40	6.00	4.95	3.10	3.60	3.80	2.60
26	3.33	6.60	5.90	4.85	3.50	3.58	3.55	2.70
27	3.49	6.60	5.80	4.85	3.85	3.60	3.63	2.85
28	3.44	6.50	5.80	4.75	4.85	3.55	3.70	2.85
29	3.72	6.80	6.00	5.30	4.70	3.55	3.58	2.85
30	3.86	7.20	5.90	5.30	4.40	3.53	3.70	2.80
31		6.70		5.05	4.20		3.30	

Daily discharge, in second-feet, of Rio Grande at Thirtymile Bridge, near Creede, Colo., for 1912.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....		162	1,460	865	500	152	68	38
2.....		240	1,750	478	432	122	77	27
3.....		195	2,040	980	388	115	80	15
4.....		103	2,860	575	345	115	80	4
5.....		118	2,860	478	325	111	92	4
6.....		180	2,250	525	290	105	95	4
7.....		255	2,110	650	262	105	103	4
8.....	68	308	1,750	625	240	101	92	4
9.....	97	255	1,750	600	225	111	80	4
10.....	111	195	1,460	625	210	115	80	2
11.....	65	225	1,380	600	195	135	50	2
12.....	53	325	920	575	195	128	38	4
13.....	72	500	920	525	180	115	80	6
14.....	90	410	865	525	388	105	105	6
15.....	88	128	1,100	525	308	95	105	4
16.....	72	365	1,100	525	240	92	80	4
17.....	86	478	920	478	308	88	65	4
18.....	88	755	650	455	290	88	65	4
19.....	77	950	810	525	255	86	32	4
20.....	59	980	892	478	210	80	95	4
21.....	80	1,170	1,010	432	80	77	80	4
22.....	72	1,240	980	432	25	72	65	4
23.....	80	1,240	1,010	600	25	70	80	4
24.....	62	1,310	1,040	478	25	77	32	4
25.....	84	1,380	1,100	525	25	80	115	4
26.....	43	1,550	1,040	478	65	77	72	8
27.....	64	1,550	980	478	128	80	84	14
28.....	56	1,460	980	432	478	72	95	14
29.....	99	1,750	1,100	700	410	72	77	14
30.....	130	2,250	1,040	700	290	70	95	12
31.....		1,650		575	225		40	

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

Monthly discharge of Rio Grande at Thirtymile Bridge, near Creede, Colo., for 1912.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
April 8-30.....	130	43	78.1	3,560	B.
May.....	2,250	103	764	47,000	B.
June.....	2,860	650	1,340	79,700	B.
July.....	980	432	563	34,600	B.
August.....	478	25	244	15,000	B.
September.....	152	70	97.0	5,770	B.
October.....	115	32	77.3	4,750	B.
November.....	38	2	7.7	458	B.
The period.....	2,860	2.0	396	191,000	

RIO GRANDE NEAR CREEDE, COLO.

Location.—In the Rio Grande National Forest, at a highway bridge in about sec. 8, T. 41 N., R. 1 E., a quarter of a mile from Wason siding and 3 miles south-east of Creede. Nearest tributary, Willow or Goblin Creek, enters a short distance upstream.

Records available.—April 24, 1907, to November 30, 1912.

Drainage area.—689^a square miles (topographic sheets and Forest Atlas).

^a Revised since 1911 report.

Gage.—An automatic recording gage, the property of the State engineer. It is referred to the same datum as the chain gage used previously.

Channel.—Practically permanent.

Discharge measurements.—Made from bridge.

Winter flow.—River frozen over during winter months; ice causes backwater at gage.

Diversions.—There are no court decrees for diversions from the Rio Grande above this station, but for diversions of 39 second-feet from tributaries. There are no reservoirs on the river between this station and the one at Thirtymile Bridge, but a large one is being built on Clear Creek, which enters between.

Accuracy.—Good.

Cooperation.—During 1912, this station was maintained by the State engineer in cooperation with the United States Forest Service.

Discharge measurements of Rio Grande near Creede, Colo., in 1912.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Jan. 19 ^a	B. S. Clayton.....	1.46	191	July 10	C. C. Heizmalhach.....	2.08	1,230
Feb. 24 ^a	do.....	.64	138	Aug. 21	do.....	1.35	654
Apr. 2	do.....	.05	120	Sept. 12	C. E. Turner.....	.85	363
May 11	do.....	1.58	858	Nov. 14	do.....	.11	126
June 4	C. C. Heizmalhach.....	4.69	4,930				

^a Ice.

Daily gage height, in feet, of Rio Grande near Creede, Colo., for 1912.

[Bristol automatic gage.]

Day.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....		0.25	0.05	1.75	4.3	3.15	2.0	1.0	0.5	0.6
2.....		.2	.1	1.85	4.45		1.9	.9	.5	.4
3.....		.2	.3	1.75	4.65		1.75	.85	.5	.45
4.....		.15	.4	1.3	4.9		1.65	.85	.5	.4
5.....		.1	.45	1.35	4.85		1.55	.8	.6	.4
6.....		.35	.5	1.3	4.55		1.5	.8	.55	.35
7.....		.4	.6	1.6	4.45		1.45	.75	.8	.3
8.....		.35	.8	2.05	4.3		1.4	.7	.9	.25
9.....		.35	.95	2.05	4.2		1.35	.7	.8	.2
10.....		.55	1.1	1.75	4.0	2.05	1.3	.75	.7	.2
11.....		.4	1.05	1.8	3.9	1.95	1.25	.75	.6	.15
12.....		.15	.9	2.15	3.55	1.95	1.3	.8	.6	.15
13.....			.7	2.2	3.25	1.95	1.35	.8	.6	.15
14.....			.6	2.0	3.2	1.95	1.55	.8	.6	.1
15.....			.65	1.7	3.35	1.95	1.75	.7	.6	.1
16.....			.7	1.95	3.45	1.9	1.65	.7	.6	.1
17.....			.75	2.5	3.25	1.85	1.6	.65	.55	.1
18.....			.6	3.15	2.85	1.75	1.7	.6	.6	.1
19.....			.55	3.65	2.75	1.8	1.5	.6	.6	.1
20.....			.45	3.85	2.85	1.9	1.5	.6	.6	.1
21.....			.35	4.1	3.1	1.75	1.4	.6	.55	.1
22.....		.25	.3	4.15	3.15	1.85	1.15	.55	.55	.1
23.....		.25	.5	4.05	3.3	2.05	1.05	.5	.55	.1
24.....		.25	.85	4.2	3.3	2.1	1.0	.5	.55	.1
25.....		.25	1.1	4.45	3.25	2.0	.95	.5	.55	.1
26.....		.25	.9	4.45	3.15	2.0	.95	.5	.6	.1
27.....		.25	.9	4.35	3.05	2.1	.95	.5	.55	.1
28.....		.15	.95	4.5	3.05	2.0	1.0	.5	.95	.1
29.....	0.2	.2	1.35	4.7	3.2	2.15	1.0	.45	.7	.1
30.....		.2	1.65	4.8	3.25	2.35	.95	.45	.8	.1
31.....		.15		4.55		2.2	.95		.6	

Daily discharge, in second-feet, of Rio Grande near Creede, Colo., for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....	170	180	165	120	950	4,290	2,530	1,180	460	240	240
2.....	170	180	150	130	1,035	4,532	2,370	1,080	410	240	225
3.....	170	180	150	180	950	4,865	2,210	950	385	240	225
4.....	170	180	140	210	620	5,290	2,050	870	385	240	210
5.....	170	175	130	225	655	5,205	1,880	795	360	280	210
6.....	175	175	195	240	620	4,698	1,720	760	360	260	195
7.....	175	175	210	280	830	4,532	1,560	725	340	360	180
8.....	175	175	195	360	1,230	4,290	1,400	690	320	410	165
9.....	175	175	195	435	1,230	4,130	1,300	655	320	360	150
10.....	175	170	260	510	950	3,810	1,230	620	340	320	150
11.....	180	170	210	485	990	3,650	1,130	590	340	280	140
12.....	180	170	140	410	1,330	3,125	1,130	620	360	280	140
13.....	180	170	140	320	1,380	2,675	1,130	655	360	280	140
14.....	180	165	140	280	1,180	2,600	1,130	795	360	280	130
15.....	180	165	150	300	910	2,825	1,130	950	320	280	130
16.....	185	165	150	320	1,130	2,975	1,080	870	320	280	130
17.....	185	160	150	340	1,690	2,675	1,035	830	300	260	130
18.....	185	160	160	280	2,530	2,115	950	910	280	280	130
19.....	190	160	160	260	3,275	1,990	990	760	280	280	130
20.....	190	150	165	225	3,575	2,115	1,080	760	280	280	130
21.....	190	150	165	195	3,970	2,460	950	690	280	260	130
22.....	190	145	165	180	4,050	2,530	1,035	535	260	260	130
23.....	190	145	165	240	3,890	2,750	1,230	485	240	260	130
24.....	190	140	165	385	4,130	2,750	1,280	460	240	260	130
25.....	190	140	165	510	4,532	2,675	1,180	435	240	260	130
26.....	185	145	165	410	4,532	2,530	1,180	435	240	280	130
27.....	185	150	165	410	4,370	2,390	1,280	435	240	260	130
28.....	185	150	140	435	4,615	2,390	1,180	460	240	435	130
29.....	185	150	150	655	4,950	2,600	1,330	460	225	320	130
30.....	185		150	870	5,120	2,675	1,530	435	225	360	130
31.....	185		140		4,698		1,380	435		280	

NOTE.—Discharge estimated or interpolated for days for which gage heights are missing.

Monthly discharge of Rio Grande near Creede, Colo., for 1912.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
January.....	190	170	181	11,100
February.....	180	140	163	9,380
March.....	260	130	164	10,100
April.....	870	120	340	20,200
May.....	5,120	620	2,450	151,000
June.....	5,290	1,990	3,270	195,000
July.....	2,530	950	1,370	84,200
August.....	1,180	435	685	42,100
September.....	460	225	310	18,400
October.....	435	240	290	17,800
November.....	240	130	153	9,100
The period.....				568,000

NOTE.—The above records have been changed slightly from the State engineer's records to conform with the computing rules of the U. S. Geological Survey.

RIO GRANDE NEAR DEL NORTE, COLO.

Location.—At highway bridge in about sec. 30, T. 40 N., R. 5 E., 6 miles west of Del Norte, a short distance below the mouth of West Creek. From October 11, 1889, to November 30, 1906, a station was maintained about 4 miles below the present station and just above Los Pinos Creek. The flow at the two points is not directly comparable, as a number of small tributaries enter between.

Records available.—May 16, 1908, to November 30, 1912.

Drainage area.—1,400 square miles (furnished by State engineer).

Gage.—Automatic recording gage, the property of the State engineer. The gage is referred to the same datum as was the chain gage installed May 16, 1908.

Channel.—Slightly shifting.

Discharge measurements.—Made from bridge.

Winter flow.—River is frozen over during the winter months.

Diversions.—There are court decrees for diversions of 101 second-feet from the Rio Grande between the Creede station and Del Norte, and for diversions of 162 second-feet from intervening tributaries.

Cooperation.—Complete records furnished by the State engineer.

Discharge measurements of Rio Grande near Del Norte, Colo., in 1912.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Jan. 12 ^a	B. S. Clayton.....	1.58	400	June 6	C. C. Hezmalhalch.....	4.81	6,200
Feb. 25 ^a	do.....	1.30	265	Aug. 22	do.....	1.38	687
Apr. 3	do.....	1.12	526	Sept. 14	C. E. Turner.....	1.10	459
9	do.....	1.46	731	Nov. 15	do.....	.59	206
May 12	do.....	2.90	2,420				

^a Ice.

Daily gage height, in feet, of Rio Grande near Del Norte, Colo., for 1912.

[James G. Duncan, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.	0.95	1.4		0.85	2.3	4.8	3.4	2.2	1.4	0.85	1.0
2.	.95	1.4	1.2	.95	2.55	4.7	8.2	2.05	1.25	.85	1.0
3.	1.15	1.4		1.1	2.35	5.0	2.85	1.9	1.15	.85	1.0
4.	.95	1.45	1.2	1.1	2.0	5.05	2.9	1.75	1.15	.85	.95
5.	.9	1.4	1.2	1.1	1.95	5.15	2.65	1.8	1.15	.95	.95
6.	.9	1.4	1.0	1.15	1.95	4.75	2.55	1.7	1.1	.95	.9
7.	1.15	1.45	.95	1.3	2.2	4.65	2.55	1.6	1.1	1.0	.85
8.	1.3	1.45	.95	1.45	2.7	4.7	2.55	1.55	1.05	1.05	.85
9.	1.3	1.45	.95	1.5	2.95	4.65	2.5	1.5	1.1	1.0	.85
10.	1.25	1.4	.85	1.8	2.5	4.5	2.4	1.45	1.1	1.0	.75
11.	1.25	1.35	.8	1.55	2.4	4.45	2.4	1.35	1.1	1.0	.75
12.	1.25	1.35	.75	1.55	2.7	3.8	2.4	1.3	1.1	1.0	.7
13.	1.25	1.3	.7	1.5	2.95	3.65	2.45	1.45	1.1	1.0	.65
14.	1.3	1.3	.65	1.1	2.7	3.65	2.35	1.5	1.1	.95	.65
15.	1.3	1.3	.7	1.2	2.45	3.7	2.35	1.95	1.05	.95	.55
16.	1.35	1.3	.75	1.1	2.3	3.7	2.3	1.9	1.05	.95	.55
17.	1.35	1.3	.7	1.0	3.1	3.55	2.3	1.7	1.05	.95	.55
18.	1.4	1.25	.6	.95	3.7	3.2	2.15	1.85	1.0	.95	.55
19.	1.4	1.2	.75	.95	4.2	3.0	2.2	1.7	1.0	.95	.55
20.	1.4	1.2	.85	.95	4.4	3.0	2.2	1.65	.95	.95	.5
21.	1.4	1.2	.85	.85	4.65	3.1	2.0	1.55	.95	.95	.5
22.	1.4	1.25	.8	4.8	4.8	3.2	2.0	1.45	.95	.9	.5
23.	1.35		.8	.85	4.7	3.5	2.2	1.25	.95	.9	.45
24.	1.45		.7	1.15	4.75	3.65	2.25	1.2	.95	.9	.45
25.	1.5		.65	1.5	4.9	3.55	2.2	1.1	.9	.9	.45
26.	1.5	1.25	.65	1.45	5.0	3.4	2.15	1.1	.9	.9	.45
27.	1.5		.75	1.25	4.9	3.4	2.2	1.05	.9	.9	.45
28.	1.45	1.3	.75	1.4	5.0	3.35	2.2	1.1	.9	.9	.45
29.	1.45		.8	1.5	5.05	3.45	2.4	1.5	.9	.9	.45
30.	1.45		.8	1.95	5.15	3.3	2.6	1.45	.9	.9	.45
31.	1.4		.8		5.1		2.35	1.5		.95	

NOTE.—Gage heights Jan. 1 to Mar. 14 affected by ice.

Daily discharge, in second-feet, of Rio Grande near Del Norte, Colo., for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....	350	300	265	340	1,560	6,170	3,320	1,430	680	340	420
2.....	350	300	265	392	1,900	5,950	2,960	1,255	578	340	420
3.....	375	300	265	480	1,625	6,610	2,350	1,100	512	340	420
4.....	350	325	265	480	1,200	6,720	2,430	955	512	340	392
5.....	325	300	265	480	1,150	6,940	2,045	1,000	512	392	392
6.....	325	300	250	512	1,150	6,060	1,900	910	480	392	365
7.....	375	325	250	610	1,430	5,840	1,900	830	480	420	340
8.....	375	325	250	715	2,120	5,950	1,900	790	450	450	340
9.....	400	325	250	750	2,515	5,840	1,830	750	480	420	340
10.....	400	300	270	1,000	1,830	5,520	1,690	715	480	420	292
11.....	400	275	270	790	1,690	5,415	1,690	645	480	420	292
12.....	400	275	292	790	2,120	4,080	1,690	610	480	420	270
13.....	400	265	270	750	2,515	3,785	1,760	715	480	420	250
14.....	350	265	250	480	2,120	3,785	1,625	750	480	392	250
15.....	350	265	270	545	1,760	3,880	1,625	1,150	450	392	212
16.....	325	265	292	480	1,560	3,880	1,560	1,100	450	392	212
17.....	275	265	270	420	2,780	3,595	1,560	910	450	392	212
18.....	300	240	230	392	3,880	2,960	1,370	1,050	420	392	212
19.....	300	215	292	392	4,890	2,600	1,430	910	420	392	212
20.....	300	215	340	392	5,310	2,600	1,430	870	392	392	195
21.....	300	215	340	340	5,840	2,780	1,200	790	392	392	195
22.....	300	240	315	315	6,170	2,960	1,200	715	392	365	195
23.....	275	265	315	340	5,950	3,500	1,430	578	392	365	180
24.....	325	265	270	512	6,060	3,785	1,495	545	392	365	180
25.....	350	265	250	750	6,390	3,595	1,430	480	365	365	180
26.....	350	240	250	715	6,610	3,320	1,370	480	365	365	180
27.....	350	240	292	578	6,390	3,320	1,430	450	365	365	180
28.....	325	265	292	680	6,610	3,230	1,430	480	365	365	180
29.....	325	265	315	750	6,720	3,410	1,690	750	365	365	180
30.....	325		315	1,150	6,940	3,140	1,970	715	365	365	180
31.....	300		315		6,830		1,625	750		392	

NOTE.—Discharge estimated Jan. 1 to Mar. 14.

Monthly discharge of Rio Grande near Del Norte, Colo., for 1912.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
January.....	400	275	340	20,900
February.....	325	215	273	15,700
March.....	340	230	279	17,200
April.....	1,150	315	577	34,300
May.....	6,940	1,150	3,730	229,000
June.....	6,940	2,600	4,370	260,000
July.....	3,320	1,200	1,750	108,000
August.....	1,430	450	812	49,900
September.....	680	365	447	26,600
October.....	450	340	384	23,600
November.....	420	180	262	15,600
The period.....				801,000

NOTE.—The above records have been changed slightly from the State engineer's records to conform with the computing rules of the U. S. Geological Survey.

RIO GRANDE AT ALAMOSA, COLO.

Location.—At the railroad bridge half a mile east of Alamosa. Rio Alamosa, the nearest tributary, enters about 6 miles below.

Records available.—Discharge measurements and gage heights September 24, 1894, to December 31, 1895. Miscellaneous measurements, 1903 and 1910. Complete records May 15 to December 6, 1912.

Drainage area.—Not measured.

Gage.—Vertical staff.

Channel.—Data too meager to determine.

Discharge measurements.—Made from highway bridge one-fourth mile above the railroad bridge.

Diversions.—Below most of the large diversions from the Rio Grande.

Cooperation.—During 1912 station was maintained and complete records furnished by United States Reclamation Service.

Discharge measurements of Rio Grande at Alamosa, Colo., in 1912.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
May 15	French and Robinson..	6.84	805	July 3	C. B. Sampson.....	8.74	2,200
20	do.....	9.00	2,620	30	Stannard and Robinson	6.26	246
23	do.....	10.31	4,350	31	do.....	6.88	636
25	do.....	10.12	4,050	Aug. 3	do.....	6.30	276
29	do.....	13.53	4,310	9	do.....	5.44	42.2
June 3	do.....	10.09	3,700	12	do.....	5.34	21.2
13	do.....	9.40	2,680	Sept. 30	Stannard and Sivesind..	5.03	132
19	do.....	8.87	2,130	Nov. 7	do.....	6.02	316

Daily gage height, in feet, of Rio Grande at Alamosa, Colo., for 1912.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....		10.69	9.12	6.90	5.41	5.62	6.02	6.00
2.....		10.32	9.02	6.55	5.45	5.58	5.96	6.00
3.....		10.09	8.75	6.42	5.42	5.74	5.95	6.00
4.....		10.24	8.25	6.18	5.29	5.76	6.01	5.91
5.....		10.46	8.04	5.85	5.30	5.78	6.11	5.85
6.....		10.49	7.68	5.76	5.20	5.80	6.07	5.72
7.....		10.36	7.32	5.58	5.18	5.93	6.03	
8.....		10.13	7.08	5.52	5.17	5.98	6.02	
9.....		10.04	6.90	5.46	5.17	6.02	6.00	
10.....		10.02	6.70	5.38	5.17	6.04	6.03	
11.....		9.89	6.48	5.34	5.17	6.00	6.02	
12.....		9.74	6.26	5.30	5.28	5.98	6.02	
13.....		9.54	6.20	5.30	5.44	5.93	6.02	
14.....		9.11	6.10	5.36	5.72	5.90	5.96	
15.....	6.84	8.89	6.08	5.34	5.78	5.86	5.93	
16.....	6.42	8.93	6.06	5.60	5.94	5.80	5.96	
17.....	7.04	9.19	6.00	6.02	5.84	5.74	6.02	
18.....	7.66	9.19	5.84	5.88	5.82	5.72	6.07	
19.....	8.29	9.18	5.78	5.85	5.78	5.68	5.90	
20.....	9.08	8.34	5.72	5.92	5.62	5.65	5.84	
21.....	9.42	8.55	5.66	5.84	5.58	5.65	5.84	
22.....	9.86	8.64	5.62	5.75	5.56	5.64	5.84	
23.....	10.18	8.81	5.70	5.62	5.56	5.63	5.82	
24.....	10.23	9.25	5.70	5.48	5.52	5.61	5.91	
25.....	10.08	9.52	5.70	5.42	5.48	5.57	5.92	
26.....	10.30	9.40	5.80	5.36	5.49	5.56	5.95	
27.....	10.42	9.30	5.89	5.29	5.46	5.54	5.96	
28.....	10.12	9.22	5.85	5.28	5.66	5.52	5.98	
29.....	10.59	9.16	6.32	5.28	5.66	5.58	5.99	
30.....	10.19	9.04	6.26	5.30	5.64	6.02	6.00	
31.....	10.19		6.81	5.36		5.98		

Daily discharge, in second-feet, of Rio Grande at Alamosa, Colo., for 1912.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....		4,740	2,550	720	40	106	280	271
2.....		4,170	2,430	537	50	91	253	271
3.....		3,830	2,120	472	43	157	249	271
4.....		4,050	1,620	352	16	165	275	231
5.....		4,380	1,460	205	17	174	320	205
6.....		4,430	1,190	165	10	183	302	148
7.....		4,230	962	91	8	240	284	
8.....		3,880	820	70	6	262	280	
9.....		3,760	720	53	6	280	271	
10.....		3,730	614	34	6	289	284	
11.....		3,550	502	25	6	271	280	
12.....		3,340	392	17	15	262	280	
13.....		3,070	362	17	48	240	280	
14.....		2,540	315	29	148	227	253	
15.....	638	2,230	306	25	174	209	240	
16.....	472	2,330	297	98	245	183	253	
17.....	797	2,680	271	280	201	157	280	
18.....	1,170	2,640	201	218	192	148	302	
19.....	1,660	2,630	174	205	174	131	227	
20.....	2,500	2,010	148	236	106	118	201	
21.....	2,920	1,910	122	201	91	118	201	
22.....	3,500	2,010	106	161	84	114	201	
23.....	3,960	2,190	139	106	84	110	192	
24.....	4,040	2,710	139	58	70	102	231	
25.....	3,810	3,050	139	43	58	87	236	
26.....	4,140	2,900	183	29	61	84	249	
27.....	4,320	2,770	223	16	84	77	253	
28.....	4,480	2,670	205	15	122	70	262	
29.....	4,280	2,600	422	15	122	91	267	
30.....	4,280	2,460	392	17	114	280	271	
31.....	4,580		671	29		262		

Monthly discharge of Rio Grande at Alamosa, Colo., for 1912.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
May 15-31.....	4,580	472	3,040	103,000
June.....	4,740	1,910	3,120	186,000
July.....	2,550	106	651	40,000
August.....	720	15	146	8,980
September.....	245	6	80.0	4,760
October.....	289	70	171	10,500
November.....	320	192	259	15,400
December 1-6.....	271	148	233	2,770
The period.....				371,000

RIO GRANDE NEAR LOBATOS, COLO.¹

Location.—At highway bridge in sec. 22, T. 33 N., R. 11 E., 10 miles east of Lobatos and a few miles above the Colorado-New Mexico line; 7 miles below mouth of Conejos River.

Records available.—June 28, 1899, to November 30, 1912.

Drainage area.—7,700 square miles.

Gage.—Automatic recording gage, the property of the State engineer. This gage is referred to the datum of the original gage.

Channel.—A gash cut in lava rock; shifting.

¹ Originally known as Rio Grande at Cenicero, Colo.

Discharge measurements.—Made from bridge.

Winter flow.—Ice causes backwater varying in amount during the three winter months.

Diversions.—There are court decrees for diversions from the Rio Grande of 5,134 second-feet between the Del Norte station and this one. There are also decrees for diversions from the following tributaries: Minor tributaries above Alamosa, 464 second-feet; Alamosa and tributaries, 2,116 second-feet, Conejos and tributaries, 3,464 second-feet; Culebra and tributaries, 177 second-feet.

Cooperation.—Complete records furnished by the State engineer.

Discharge measurements of Rio Grande near Lobatos, Colo., in 1912.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
Jan. 18 ^a	B. S. Clayton.....	3.00	510	July 12	C. C. Hezmalhalch.....	1.75	410
Feb. 28 ^a	do.....	2.45	460	Aug. 23	do.....	1.60	276
May 13	do.....	3.38	2,020	Nov. 16	C. E. Turner.....	1.75	370
June 9	C. C. Hezmalhalch.....	6.50	6,791				

^a Ice present.

Daily gage height, in feet, of Rio Grande River near Lobatos, Colo., for 1912.

[C. E. Mondragon, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....		3.00	2.60	2.00	2.55	7.30	4.50	2.15	1.30	1.45	1.70
2.....		3.00	2.60	2.05	3.05	7.15	4.45	2.10	1.40	1.45	1.75
3.....		3.00	2.40	2.05	3.55	6.90	4.25	1.70	1.40	1.45	1.75
4.....		3.15	2.50	2.25	3.75	6.75	3.85	1.90	1.40	1.45	1.80
5.....		3.15	2.40	2.60	3.30	6.65	3.50	1.75	1.30	1.50	1.80
6.....		3.00	2.40	2.75	3.00	6.60	3.30	1.60	1.30	1.50	1.80
7.....	2.60	3.00	2.45	2.65	2.90	6.80	2.90	1.50	1.20	1.50	1.80
8.....	2.60	3.00	2.45	2.65	3.15	6.80	2.45	1.40	1.20	1.70	1.80
9.....	2.90	2.90	2.20	2.80	3.55	6.55	2.20	1.30	1.20	1.70	1.80
10.....	2.90	2.80	2.25	2.85	3.85	6.40	2.10	1.20	1.20	1.70	1.80
11.....	2.90	2.90	2.20	3.00	3.70	6.10	1.95	1.10	1.20	1.70	1.80
12.....	2.90	2.90	2.20	2.90	3.50	6.00	1.70	1.10	1.20	1.70	1.80
13.....	2.90	2.80	2.25	2.65	3.45	5.65	1.50	1.10	1.20	1.70	1.80
14.....	2.95	2.80	2.15	2.60	3.50	5.35	1.35	1.15	1.20	1.70	1.75
15.....	3.00	2.80	2.10	2.35	3.75	5.00	1.45	1.10	1.25	1.70	1.80
16.....	3.00	2.80	2.10	2.20	3.60	4.80	1.35	1.20	1.30	1.65	1.80
17.....	3.00	2.75	2.15	2.40	3.65	4.75	1.45	1.35	1.60	1.60	1.80
18.....	3.00	2.80	2.15	2.40	3.95	4.75	1.40	1.50	1.60	1.65	1.80
19.....	3.00	2.70	2.20	2.35	4.65	4.65	1.40	1.65	1.50	1.60	1.80
20.....	3.00	2.70	2.30	2.25	5.45	4.40	1.35	1.60	1.50	1.55	1.80
21.....	3.00	2.60	2.35	2.10	6.35	4.20	1.25	1.60	1.50	1.50	1.75
22.....	2.95	2.40	2.35	2.00	6.60	4.05	1.25	1.70	1.40	1.50	1.70
23.....	3.00	2.30	2.20	1.90	6.95	4.15	1.30	1.70	1.50	1.50	1.70
24.....	2.95	2.20	2.15	1.90	7.10	4.50	1.30	1.60	1.50	1.50	1.70
25.....	2.95	2.20	2.15	1.90	7.10	4.80	1.30	1.45	1.45	1.50	1.60
26.....	3.05	2.80	2.15	2.00	7.10	4.95	1.15	1.60	1.45	1.50	1.60
27.....	3.05		2.00	2.00	7.35	4.90	1.30	1.80	1.40	1.50	1.40
28.....	3.00		2.05	2.05	7.50	4.80	1.30	1.70	1.45	1.50	1.40
29.....	3.00	2.60	2.10	2.00	7.60	4.70	1.30	1.60	1.45	1.50	1.70
30.....	3.00		2.15	2.25	7.35	4.55	1.40	1.50	1.45	1.50	1.60
31.....	3.15		2.15		7.40		1.70	1.40		1.70	

NOTE.—Gage heights Jan. 7 to Mar. 12 affected by ice.

Daily discharge, in second-feet, of Rio Grande River near Lobatos, Colo., for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1	450	510	475	530	1,050	8,140	3,550	660	165	228	345
2	450	510	475	572	1,575	7,870	3,475	615	205	228	372
3	450	510	460	572	2,195	7,420	3,175	345	205	228	372
4	475	530	470	753	2,460	7,150	2,600	460	205	228	400
5	475	530	480	1,100	1,870	6,975	2,130	372	165	250	400
6	475	510	480	1,250	1,520	6,890	1,870	295	165	250	400
7	475	510	450	1,150	1,410	7,240	1,410	250	135	250	400
8	475	510	500	1,150	1,690	7,240	950	205	135	345	400
9	500	500	500	1,300	2,195	6,805	705	165	135	345	400
10	500	490	500	1,355	2,600	6,550	615	135	135	345	400
11	500	500	550	1,520	2,390	6,070	495	110	135	345	400
12	500	500	550	1,410	2,130	5,910	345	110	135	345	400
13	500	490	550	1,150	2,065	5,350	250	110	135	345	400
14	500	490	575	1,000	2,130	4,870	185	122	135	345	372
15	510	490	615	850	2,460	4,310	227	110	150	345	400
16	510	490	615	705	2,260	4,000	185	135	165	320	400
17	510	480	660	900	2,325	3,925	227	185	295	295	400
18	510	490	660	900	2,740	3,925	205	250	295	320	400
19	510	475	705	850	3,775	3,775	205	320	250	295	400
20	510	475	800	735	5,030	3,400	185	295	250	272	400
21	510	470	850	615	6,470	3,100	150	295	250	250	372
22	500	450	850	530	6,890	2,880	150	345	205	250	345
23	510	440	705	460	7,510	3,025	165	345	205	250	345
24	500	430	660	460	7,780	3,550	165	295	250	250	345
25	500	430	660	460	7,780	4,000	165	228	228	250	295
26	525	490	660	530	7,780	4,230	122	295	228	250	295
27	525	470	530	530	8,230	4,150	165	400	205	250	205
28	510	460	572	572	8,500	4,000	165	345	228	250	205
29	510	475	615	530	8,680	3,850	165	295	228	250	345
30	510	-----	660	753	8,230	3,625	205	250	228	250	295
31	530	-----	660	-----	8,320	-----	345	205	-----	345	-----

NOTE.—Discharge Jan. 1 to Mar. 12 estimated.

Monthly discharge of Rio Grande near Lobatos, Colo., for 1912.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
January	530	450	497	30,600
February	530	430	486	28,000
March	850	460	597	35,700
April	1,520	460	840	50,000
May	8,680	1,050	4,260	262,000
June	8,140	2,880	5,140	306,000
July	3,550	122	805	49,500
August	660	110	282	17,300
September	295	135	196	11,700
October	345	228	283	17,400
November	400	205	364	21,700
The period	-----	-----	-----	831,000

NOTE.—The above records have been changed slightly from the State engineer's records to conform with the computing rules of the U. S. Geological Survey.

RIO GRANDE AT EMBUDO, N. MEX.

Location.—At Santa Barbara Tie & Pole Co.'s bridge, a few hundred feet below the Denver & Rio Grande Railroad eating house, at Embudo, just above the mouth of the Box Canyon near sec. 27, T. 23 N., R. 9 E. Santa Barbara Creek, the nearest tributary, joins the Rio Grande about 3 miles above the station.

Records available.—January 1, 1889, to December 31, 1903; September 8 to December 31, 1912.

Drainage area.—Approximately 10,100 square miles.

Gage.—Automatic recording. From January 1, 1889, to December 31, 1903, an inclined staff gage was used about 1,500 feet above the present gage. On September 8, 1912, an automatic gage was installed which was referred to a new datum. Old records do not show a change in datum from 1889 to 1903.

Channel.—Subject to a change during flood stages, but fairly permanent at low stages.

Discharge measurements.—By wading at low stages and from a cable during flood and medium stages.

Winter flow.—Very slight ice affect during the winter months.

Diversions.—A large part of the natural run-off is diverted for irrigation above this point.

Accuracy.—The daily estimates of discharge in 1912 can only be considered fair.

Discharge measurements of Rio Grande at Embudo, N. Mex., in 1912.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Sept. 8	Gray and O'Brien	2.40	321	Oct. 29	J. E. Powers	2.65	432
25	Robert Cooper	2.60	399	Dec. 10	do.....	2.70	445
Oct. 8	Gray and Powers	2.80	461				

Daily gage height, in feet, and discharge, in second-feet, of Rio Grande at Embudo, N. Mex., for 1912.

[H. W. Wallace, observer.]

Day.	September.		October.		November.		December.	
	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.
1.....			2.70	432	2.90	528	2.98	562
2.....			2.70	430	3.00	570	2.95	549
3.....			2.70	428	3.02	578	2.95	549
4.....			2.68	420	3.02	578	2.80	488
5.....			2.70	427	3.00	570	2.82	496
6.....			2.75	447	3.02	578	2.75	468
7.....			2.75	447	3.08	604	2.55	390
8.....	2.42	329	2.80	461	3.10	612	2.58	401
9.....	2.38	313	2.84	477	3.10	612	2.75	468
10.....	2.39	317	2.90	500	3.08	604	2.75	468
11.....	2.37	309	2.95	522	3.10	612	2.72	456
12.....	2.42	329	3.00	542	3.10	612	2.68	440
13.....	2.42	329	3.04	562	3.12	620	2.65	428
14.....	2.45	340	3.02	553	3.10	612	2.68	440
15.....	2.47	348	3.02	558	3.12	620	2.68	440
16.....	2.49	356	3.01	555	3.08	604	2.70	448
17.....	2.53	372	2.98	545	2.98	562	2.68	440
18.....	2.55	380	2.98	545	3.00	570	2.60	409
19.....	2.60	399	2.95	535	3.02	578	2.62	417
20.....	2.60	399	2.89	512	3.00	570	2.68	440
21.....	2.60	399	2.86	498	3.00	570	2.70	440
22.....	2.60	399	2.82	489	2.88	520	2.70	410
23.....	2.58	391	2.80	481	2.85	508	2.70	410
24.....	2.55	380	2.79	477	2.95	549	2.70	410
25.....	2.58	391	2.79	480	2.98	562	2.60	400
26.....								
27.....	2.60	399	2.70	445	2.95	549	2.60	400
28.....	2.60	396	2.70	445	2.85	508	2.55	400
29.....	2.68	427	2.70	448	2.75	468	2.50	390
30.....	2.70	434	2.68	442	2.65	428	2.50	390
31.....	2.70	432	2.68	440	2.75	468	2.50	390
			2.70	448			2.55	400

NOTE.—Gage heights affected by ice Dec. 21–31, 1912. Daily discharge determined as follows: Sept. 8–25 from a fairly well-defined curve; Sept. 26 to Oct. 29 by the indirect method for shifting channels; Oct. 30 to Dec. 20, from a fairly well-defined curve; Dec. 21–31 estimated on account of ice.

Monthly discharge of Rio Grande at Embudo, N. Mex., for 1912.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
September 8-30.....	434	309	373	17,000	C.
October.....	562	420	484	29,800	C.
November.....	620	428	564	33,600	C.
December.....	562	390	440	27,100	C.
The period.....				108,000	

RIO GRANDE NEAR BUCKMAN, N. MEX.¹

Location.—At the Denver & Rio Grande Railroad bridge 4 miles above Buckman 2 miles below the Indian village of San Ildefonso, in about sec. 18, T. 19 N., R. 8 E. The nearest stream is Tesuque Creek, which enters near San Ildefonso. There is an arroyo just above the station.

Records available.—February 1, 1895, to December 31, 1905; June 23, 1909, to December 31, 1912.

Drainage area.—Not measured.

Gage.—Automatic recording; installed in June, 1910. The original gage was located on the left bank 180 feet above the bridge. On March 30, 1904, a vertical staff gage was established at a new datum at the bridge. The same gage was used when the station was reestablished in 1909. The datum of the present gage is the same as that of the gage established in 1904.

Channel.—Somewhat shifting.

Discharge measurements.—Made from car and cable 3 miles below the gage. No diversions or important tributaries between the two points.

Winter flow.—Only slightly affected by ice.

Diversions.—For many miles above the station many large and small ditches divert water for irrigation.

Accuracy.—Prior to the flood in October, 1911, conditions were favorable for accurate results, but the flood caused considerable change which was not fully covered by field work. Thus the estimates previous to May 1, 1912, can not be considered better than fair. The records for the last part of 1912 can be considered good.

Discharge measurements of Rio Grande near Buckman, N. Mex., in 1912.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
May 10	R. H. Fletcher.....	7.50	7,740	Oct. 6	A. S. Kirkpatrick.....	3.60	670
June 7	Carroll and Kirkpatrick	9.20	13,600	Nov. 5	do.....	3.50	605
Aug. 2	Gray and Redding.....	2.58	670	Dec. 9 ^a	do.....	3.20	530
Sept. 2	Gray and O'Brien.....	2.15	609				

^a Slight ice effect.

¹ In earlier reports this station was designated as near Rio Grande, and at Watertank.

Daily gage height, in feet, of Rio Grande near Buckman, N. Mex., for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	2.90	2.50	2.50	3.85	5.65	9.44		2.65	2.40	3.27	3.42	3.42
2.....	2.90	2.50	2.52	3.65	6.60	9.36		2.60	2.10	3.34	3.59	3.45
3.....	2.90	2.50	2.53	3.62	7.23	9.40		2.85	2.02	3.32	3.60	3.45
4.....	2.90	2.50	2.53	3.90	7.33	9.27	5.30	2.92	1.98	3.33	3.60	3.40
5.....	2.90	2.50	2.60	4.20	6.86	9.12	5.00	2.88	1.95	3.69	3.60	3.35
6.....	2.70	2.45	2.68	4.66	6.42	9.17	4.63	2.71	1.89	3.54	3.55	3.30
7.....	2.70	2.45	2.90	5.17	6.64	9.20	4.45	2.55	1.82	3.52	3.60	3.25
8.....	2.70	2.45	2.95	5.23	6.97		4.05	2.46	1.80	3.53	3.65	3.20
9.....	2.70	2.45	3.15	4.98	7.36		3.70	2.43	1.75	3.53	3.68	3.30
10.....	2.70	2.48	3.22	4.87	7.48		3.40	2.40	1.68	3.52	3.68	3.30
11.....	2.70	2.50	3.60	5.01	7.28		3.15	2.40	1.63	3.55	3.62	3.40
12.....	2.70	2.50	3.70	4.87	7.22		2.97	2.40	2.10	3.59	3.60	3.50
13.....	2.70	2.50	3.35	4.81	7.07		2.80	2.40	2.83	3.60	3.65	3.50
14.....	2.65	2.50	8.22	4.35	7.21		2.65	2.48	2.59	3.60	3.68	3.60
15.....	2.50	2.50	3.00	4.04	7.04		2.80	3.42	2.58	3.61	3.65	3.65
16.....	2.50	2.50	2.80	4.05	7.07		3.04	2.87	2.60	3.57	3.62	3.50
17.....	2.50	2.50	2.80	4.11	7.35		3.50	2.82	2.65	3.58	3.60	3.50
18.....	2.50	2.50	2.80	4.19	8.02		2.60	2.82	2.78	3.55	3.55	3.50
19.....	2.50	2.50	2.95	4.05	8.94		2.60	2.83	2.94	3.54	3.55	3.50
20.....	2.50	2.52	4.88	3.89	9.80		2.60	2.81	2.97	3.53	3.55	3.50
21.....	2.50	2.50	6.09	3.69	10.92		2.60	2.80	3.01	3.51	3.55	3.50
22.....	2.50	2.43	4.66	3.47	11.31		2.60	2.79	3.04	3.45	3.52	3.50
23.....	2.50	2.43	4.32	3.35	11.38		3.05	2.78	3.06	3.45	3.40	3.50
24.....	2.50	2.48	4.09	3.41	11.24		2.70	2.78	3.07	3.40	3.50	3.50
25.....	2.50	2.50	3.73	3.96	10.71		2.75	2.77	3.03	3.38	3.45	3.50
26.....	2.50	2.45	3.70	4.29	9.68		3.05	2.78	3.07	3.38	3.50	3.50
27.....	2.50	2.30	3.80	4.13	9.50		2.80	2.75	3.12	3.38	3.45	3.50
28.....	2.50	2.35	3.70	4.32	9.50		2.55	2.75	3.14	3.38	3.45	3.50
29.....	2.50	2.50	3.60	4.40	9.47		2.55	2.74	3.15	3.32	3.28	3.50
30.....	2.50		3.72	5.02	9.46		2.55	2.73	3.14	3.38	3.22	3.50
31.....	2.50		3.78		9.45		2.55	2.95		3.42		3.50

NOTE.—Gage heights affected by ice Jan. 1-14 and Dec. 11-31, 1912.

Daily discharge, in second-feet, of Rio Grande near Buckman, N. Mex., for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	900	760	760	1,840	4,200	14,800		745	720	640	578	578
2.....	900	760	772	1,640	5,890	14,500		710	570	670	664	590
3.....	900	760	778	1,620	7,120	14,700		885	520	640	670	590
4.....	900	760	778	1,890	7,330	14,000	3,620	936	505	600	670	570
5.....	850	760	820	2,220	6,380	13,100	3,170	916	500	760	670	550
6.....	850	730	876	2,800	5,560	13,400	2,650	787	460	650	640	530
7.....	800	730	1,030	3,490	5,970	13,600	2,420	700	430	622	670	510
8.....	800	730	1,060	3,570	6,600		1,960	650	420	628	700	490
9.....	800	730	1,220	3,220	7,400		1,590	620	400	628	718	530
10.....	800	748	1,280	3,080	7,660		1,320	620	370	622	718	530
11.....	800	760	1,600	3,260	7,230		1,120	620	350	640	682	520
12.....	750	760	1,690	3,080	7,100		976	620	560	664	670	520
13.....	750	760	1,380	2,990	6,800		850	630	1,000	670	700	520
14.....	760	760	1,280	2,400	7,080		745	680	814	670	718	540
15.....	760	760	1,100	2,040	6,740		850	1,360	750	676	700	540
16.....	760	760	960	2,060	6,800		1,030	960	710	652	682	540
17.....	760	760	960	2,120	7,380		1,400	920	720	658	670	520
18.....	760	760	960	2,210	8,970		710	920	770	640	640	510
19.....	760	760	1,060	2,060	12,200		710	960	840	634	640	520
20.....	760	772	3,080	1,880	16,400		710	955	820	628	640	520
21.....	760	760	4,960	1,680	21,200		710	960	800	616	640	520
22.....	760	718	2,800	1,480	23,500		710	950	800	590	622	520
23.....	760	718	2,360	1,380	23,800		1,040	950	770	590	570	500
24.....	760	748	2,100	1,430	23,200		780	950	750	670	610	500
25.....	760	760	1,720	1,960	20,700		815	940	700	562	590	510
26.....	760	730	1,690	2,330	15,700		1,040	950	690	562	610	510
27.....	760	640	1,790	2,140	15,000		850	925	680	562	590	510
28.....	760	670	1,690	2,360	15,000		685	925	650	562	590	510
29.....	760	760	1,600	2,460	14,800		685	940	650	538	522	510
30.....	760		1,710	3,280	14,800		685	940	600	562	498	520
31.....	760		1,770		14,800		685	1,100		578		530

NOTE.—Daily discharge determined as follows: Jan. 1-14, estimated on account of ice; Jan. 15 to June 7, from a curve well defined below 14,800 second-feet; Aug. 2 to Sept. 2, by the indirect method for shifting channels; Sept. 3-12, from a fairly well-defined curve; Sept. 13 to Oct. 6, by the indirect method for shifting channels; Oct. 7 to Dec. 10 from a well-defined curve; and Dec. 11-31, estimated on account of ice.

Monthly discharge of Rio Grande near Buckman, N. Mex., for 1912.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	900	750	790	48,600	C.
February.....	772	640	744	42,500	B.
March.....	4,960	760	1,540	94,700	B.
April.....	3,570	1,380	2,330	139,000	B.
May.....	23,800	4,200	11,400	701,000	B.
June 1-7.....	14,800	15,100	14,000	194,000	B.
July 4-31.....	3,620	685	1,230	68,500	B.
August.....	1,360	620	802	53,000	C.
September.....	1,000	350	644	38,500	C.
October.....	760	538	622	38,200	B.
November.....	718	498	643	38,500	B.
December.....	590	490	528	32,500	C.

RIO GRANDE NEAR SAN MARCIAL, N. MEX.

Location.—At the Atchison, Topeka & Santa Fe Railway bridge 1 mile south of San Marcial, in sec. 19, T. 7 S., R. 1 W. No important tributaries enter in the immediate vicinity of the station.

Records available.—August 8, 1889, to December 31, 1912.

Gage.—Inclined staff gage established January 29, 1895, and carried away by flood in 1896. A wire gage was established in its place at the same datum. This was soon abandoned and gage heights have since been measured with a graduated rod from the bridge-deck to the water surface. The gage datum of the inclined staff and wire gages is still used.

Channel.—Sandy and very shifting. A number of bridge piers interfere with the accuracy of discharge measurements but not with gage height fluctuations.

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

Cooperation.—Station maintained since 1901 by the American section of the International Boundary Commission.

Discharge measurements of Rio Grande near San Marcial, N. Mex., in 1912.

[By G. W. King.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Jan. 3..	10.7	374	Mar. 22..	12.3	3,292	June 9..	14.0	12,872
6..	10.9	689	25..	11.7	2,651	12..	13.3	10,323
9..	11.0	756	28..	11.0	1,458	15..	12.9	7,337
12..	10.9	969	31..	10.9	1,227	18..	11.9	5,983
15..	11.1	1,232	Apr. 3..	11.1	1,477	21..	11.5	4,787
18..	11.2	1,159	6..	11.2	1,483	24..	11.7	5,142
21..	11.1	1,057	9..	12.1	3,284	27..	11.7	4,708
24..	10.9	843	12..	12.0	3,318	30..	11.8	4,918
28..	11.1	906	15..	11.9	2,445	July 3..	11.5	4,229
31..	10.9	957	18..	11.4	1,955	6..	11.2	3,192
Feb. 3..	11.0	949	21..	11.4	1,614	9..	10.6	2,041
6..	11.0	765	24..	11.4	1,742	12..	9.7	860
9..	10.8	793	27..	10.8	987	15..	9.5	810
12..	11.0	754	30..	11.6	1,885	18..	9.9	1,019
15..	10.9	746	May 3..	12.0	2,882	21..	9.5	971
18..	11.0	713	6..	12.8	6,429	24..	10.9	2,218
21..	11.0	742	9..	12.5	4,251	27..	10.4	1,777
24..	11.1	877	12..	12.7	5,646	29..	9.9	1,092
27..	10.9	776	16..	13.15	6,150	31..	9.4	558
29..	10.9	755	19..	12.8	7,562	Aug. 3..	9.0	230
Mar. 3..	10.9	626	22..	13.6	9,474	6..	8.9	195
6..	11.0	629	25..	14.1	13,153	9..	8.9	182
9..	11.1	749	28..	14.3	14,827	12..	8.7	111
12..	11.4	1,495	31..	14.6	15,267	15..	8.5	81
15..	11.2	848	June 3..	14.2	13,404	16..	12.2	4,060
19..	10.8	785	6..	14.1	12,197	19..	9.2	463

Discharge measurements of Rio Grande near San Marcial, N. Mex., in 1912—Continued.

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Aug. 22..	9.0	266	Oct. 19..	9.2	208	Nov. 27..	10.2	568
25..	8.8	193	22..	9.3	262	30..	10.2	549
28..	8.5	173	25..	9.5	268	Dec. 3..	10.3	537
31..	10.2	1,253	28..	9.5	267	6..	10.2	502
Sept. 3..	9.5	512	31..	9.4	237	9..	10.1	487
6..	8.9	117	Nov. 3..	9.6	322	12..	10.3	526
9..	8.5	52	6..	9.7	384	15..	10.4	501
12..	8.4	23	9..	9.9	436	18..	10.2	567
15..	8.6	36	12..	10.1	434	21..	10.1	473
18..	8.2	14	15..	10.1	402	24..	9.9	166
Oct. 7..	7.9	5	18..	10.1	599	27..	9.9	180
10..	8.7	117	21..	10.1	561	29..	9.9	174
13..	8.9	86	24..	10.0	566	31..	9.9	167
16..	9.0	153						

Daily gage height, in feet, of Rio Grande near San Marcial, N. Mex., for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	10.55	10.95	10.9	10.95	11.7	14.5	11.65	9.2	9.9		9.45	10.2
2.....	10.55	10.85	11.0	11.0	11.75	14.45	11.55	9.15	9.65		9.5	10.25
3.....	10.6	10.95	10.95	11.1	12.1	14.2	11.45	9.0	9.5		9.6	10.3
4.....	10.7	11.0	10.95	12.95	14.2	11.4	9.05	9.55			9.6	10.2
5.....	10.65	10.95	11.0	11.05	13.0	14.2	11.3	8.95	9.4		9.6	10.3
6.....	10.8	10.95	11.0	11.2	12.8	14.05	11.2	8.9	8.95		9.65	10.2
7.....	10.95	10.95	10.95	11.45	12.75	13.6	10.95	8.95	8.75	7.9	9.75	10.15
8.....	10.9	10.85	11.05	11.75	12.55	13.9	10.75	9.05	8.55	8.25	9.8	10.1
9.....	10.95	10.8	11.1	12.0	12.5	14.0	10.45	8.95	8.5	8.55	9.85	10.1
10.....	10.95	10.95	11.15	12.0	12.7	13.55	10.05	8.8	8.4	8.7	9.95	10.2
11.....	10.9	11.0	11.4	11.95	12.7	13.4	9.85	8.7	8.45	8.75	10.0	10.25
12.....	10.85	11.0	11.4	12.0	12.7	13.3	9.65	8.7	8.4	8.8	10.05	10.3
13.....	10.85	10.9	11.4	11.95	13.0	13.3	9.6	8.7	8.4	8.85	10.1	10.3
14.....	10.95	10.95	11.3	12.0	12.65	13.2	9.5	8.6	8.8	8.9	10.05	10.4
15.....	11.1	10.9	11.2	11.95	12.75	12.95	9.5	8.75	8.65	9.0	10.1	10.4
16.....	11.15	10.85	11.05	11.6	13.15	12.55	9.6	11.0	8.45	9.0	9.95	10.35
17.....	11.1	11.0	11.0	11.7	12.8	12.25	9.75	10.1	8.35	9.1	10.1	10.25
18.....	11.2	11.0	10.95	11.45	12.75	12.0	9.95	9.4	8.25	9.15	10.05	10.15
19.....	11.2	10.9	10.85	11.4	12.75	11.75	9.75	9.25	8.05	9.2	10.0	10.15
20.....	11.1	10.85	10.8	11.45	13.15	11.5	9.55	9.1		9.2	10.1	10.1
21.....	11.1	11.0	10.8	11.4	13.2	11.5	9.5	9.0		9.2	10.05	10.05
22.....	10.95	10.95	11.75	11.5	13.5	11.5	9.65	9.0		9.3	10.05	9.95
23.....	10.85	11.0	12.4	11.5	13.7	11.5	10.55	9.0		9.3	10.0	9.9
24.....	10.8	11.05	11.9	11.4	13.85	11.7	11.3	8.9		9.35	10.05	9.85
25.....	10.75	11.05	11.7	11.4	14.15	11.6	10.4	8.8		9.45	10.05	9.9
26.....	10.8	11.0	11.5	10.9	14.3	11.6	11.0	8.7		9.5	10.1	9.8
27.....	10.8	10.9	11.25	10.8	14.3	11.7	10.4	8.6		9.5	10.15	9.85
28.....	11.0	10.9	11.0	10.9	14.3	11.7	9.6	8.55		9.5	10.2	9.9
29.....	11.05	10.9	11.0	11.45	14.3	11.7	9.85	8.7		9.5	10.15	9.85
30.....	11.0		10.95	11.6	14.45	11.75	9.55	9.0		9.4	10.2	9.85
31.....	10.9		10.9		14.6		9.4	9.6		9.4		9.9

NOTE.—No flow Sept. 20 to Oct. 6.

Daily discharge, in second-feet, of Rio Grande near San Marcial, N. Mex., for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	195	970	710	1,290	2,150	14,820	4,570	395	955	0	260	535
2.....	225	835	770	1,350	2,320	14,600	4,340	355	695	0	285	535
3.....	a 295	a 900	a 675	a 1,480	a 3,230	a 13,490	a 130	a 230	a 510	0	a 320	a 535
4.....	410	890	630	1,290	6,460	13,190	3,880	245	545	0	335	500
5.....	400	775	630	1,370	6,880	12,900	3,540	210	445	0	345	535
6.....	a 590	a 715	a 630	a 1,480	a 6,430	a 12,050	a 13,900	a 195	a 150	0	a 370	a 500
7.....	720	790	570	1,980	5,880	11,020	2,710	210	95	a 5	395	495
8.....	690	765	690	2,580	4,800	12,250	2,330	240	60	55	410	485
9.....	a 720	a 795	a 750	a 3,080	a 4,250	a 12,870	a 1,850	a 200	a 50	95	a 425	a 485
10.....	810	865	825	3,160	5,180	11,230	1,320	145	25	a 115	430	505

a Date of measurement.

Daily discharge, in second-feet, of Rio Grande near San Marcial, N. Mex., for 1912—Con.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
11.....	865	835	1,410	3,140	5,410	10,690	1,060	110	35	105	425	515
12.....	<i>a</i> 920	<i>a</i> 755	<i>a</i> 1,500	<i>a</i> 3,320	<i>a</i> 5,650	<i>a</i> 10,320	<i>a</i> 850	<i>a</i> 110	<i>a</i> 25	90	<i>a</i> 435	<i>a</i> 525
13.....	940	745	1,410	2,990	5,990	9,730	835	110	25	<i>a</i> 75	425	510
14.....	1,060	750	1,130	2,870	5,590	8,830	810	95	105	100	395	515
15.....	<i>a</i> 1,230	<i>a</i> 745	<i>a</i> 850	<i>a</i> 2,550	5,700	<i>a</i> 7,490	<i>a</i> 810	<i>a</i> 180	<i>a</i> 55	140	<i>a</i> 400	<i>a</i> 500
16.....	1,220	650	825	2,150	<i>a</i> 6,160	6,860	860	<i>a</i> 2,380	30	<i>a</i> 155	425	525
17.....	1,120	760	815	2,250	6,280	6,460	940	1,430	25	180	545	540
18.....	<i>a</i> 1,160	<i>a</i> 715	810	<i>a</i> 2,000	6,840	<i>a</i> 6,120	<i>a</i> 1,040	680	<i>a</i> 20	195	<i>a</i> 585	<i>a</i> 555
19.....	1,160	625	<i>a</i> 790	1,840	<i>a</i> 7,490	5,530	1,000	<i>a</i> 515	5	<i>a</i> 210	555	530
20.....	1,060	585	785	1,780	8,400	4,790	975	365	0	215	575	490
21.....	<i>a</i> 1,060	<i>a</i> 740	785	<i>a</i> 1,610	8,520	<i>a</i> 4,790	<i>a</i> 970	265	0	225	<i>a</i> 545	<i>a</i> 455
22.....	895	675	<i>a</i> 2,370	1,760	<i>a</i> 9,240	4,790	1,000	<i>a</i> 265	0	<i>a</i> 260	560	320
23.....	790	740	3,460	1,800	10,430	4,790	1,870	265	0	260	555	230
24.....	<i>a</i> 735	<i>a</i> 810	2,880	<i>a</i> 1,740	11,590	<i>a</i> 5,140	<i>a</i> 3,020	230	0	265	<i>a</i> 580	<i>a</i> 150
25.....	730	850	<i>a</i> 2,650	1,740	<i>a</i> 13,350	4,800	1,780	<i>a</i> 195	0	<i>a</i> 265	560	165
26.....	765	825	2,310	1,110	14,240	4,650	2,600	185	0	265	560	145
27.....	765	<i>a</i> 775	1,890	<i>a</i> 990	14,540	<i>a</i> 4,710	<i>a</i> 1,780	180	0	265	<i>a</i> 555	<i>a</i> 165
28.....	<i>a</i> 920	765	<i>a</i> 1,460	1,100	<i>a</i> 14,830	4,710	980	<i>a</i> 175	0	<i>a</i> 265	560	175
29.....	985	<i>a</i> 755	1,440	1,710	14,830	4,710	<i>a</i> 1,040	235	0	265	540	<i>a</i> 160
30.....	975		1,330	<i>a</i> 1,880	15,050	<i>a</i> 4,810	720	325	0	235	<i>a</i> 550	155
31.....	<i>a</i> 955		<i>a</i> 1,230		<i>a</i> 15,270		<i>a</i> 560	<i>a</i> 790		<i>a</i> 235		<i>a</i> 165

a Date of measurement.

Monthly discharge of Rio Grande near San Marcial, N. Mex., for 1912.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
January.....	1,230	195	818	50,311
February.....	970	585	772	44,430
March.....	3,460	570	1,258	77,375
April.....	3,320	990	1,980	117,798
May.....	15,270	2,150	8,161	501,779
June.....	14,820	4,650	8,438	502,096
July.....	4,570	560	1,850	113,772
August.....	2,380	95	371	22,830
September.....	955	0	128	7,646
October.....	265	0	146	9,005
November.....	585	260	463	27,580
December.....	555	145	406	24,992
The year.....	15,270	0	2,066	1,499,614

RIO GRANDE NEAR EL PASO, TEX.

Location.—Courchesne's limekiln, about 4 miles north of El Paso.

Records available.—May 10, 1889, to June 30, 1893, and January 25, 1895, to December 31, 1912.

Gage.—Originally located at Old Fort Bliss about 1,500 feet above the Mexican dam; maintained 1889 to 1893. Reestablished 1895, $1\frac{1}{2}$ miles farther upstream and 3 miles north of El Paso; maintained until April 30, 1897. Moved 1 mile farther upstream to its present location May 1, 1897. Gage heights at the kiln measured at the masonry pump foundation pier with a graduated rod until October, 1902, when the pier was torn down. From October, 1902, to August 19, 1906, an inclined wooden gage 60 feet above the pier was used. Subsequent to August 19, 1906, a gage 300 feet below the inclined gage has been used. Datum of gages at the kiln has remained unchanged.

Channel.—Bed is unstable and channel shifts. Left bank is the loose rock embankment of the Atchison, Topeka & Santa Fe Railway; right bank is of made ground and subject to inundation by floods.

Discharge measurements.—Made from cable.

Cooperation.—Station operated by the United States section of the International Boundary Commission since May 1, 1897.

Discharge measurements of Rio Grande near El Paso, Tex., in 1912.

[By W. L. Follett and C. R. Folk.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Jan. 4	8.35	240	May 15	12.5	5,433	Sept. 6	8.8	674
7	8.3	281	18	12.55	5,866	9	8.0	289
10	8.6	505	21	12.5	5,557	12	8.05	254
13	8.95	771	25	14.2	9,577	15	7.7	127
18	9.2	801	27	14.7	10,132	18	7.25	60
20	9.45	1,126	29	15.05	12,050	21	6.8	13
24	9.6	1,081	31	15.6	15,312	24	6.75	11
27	9.3	983	June 2	15.1	15,756	30	6.75	10
31	9.2	862	4	14.7	13,947	Oct. 3	6.75	9
Feb. 3	9.2	785	6	14.2	12,773	6	6.65	7
6	8.8	614	9	13.5	10,208	9	6.6	5
9	8.9	622	12	13.8	11,180	12	6.6	5
12	8.95	555	15	12.9	9,297	15	6.6	5
16	8.8	395	18	11.9	6,544	18	6.75	9
20	8.8	502	21	11.3	5,293	21	6.5	7
24	8.6	306	24	11.05	4,276	24	6.8	10
27	9.0	487	27	11.0	4,321	27	7.0	25
Mar. 1	8.95	541	30	11.1	5,265	30	7.6	100
5	8.9	440	July 3	11.05	5,171	Nov. 3	7.8	95
8	8.4	253	6	10.4	3,799	6	7.8	108
12	10.75	2,273	9	9.7	2,704	9	7.8	126
16	9.3	1,042	12	8.9	1,535	12	8.1	196
19	9.0	802	15	8.3	628	15	8.3	302
22	8.6	473	18	8.0	331	18	8.7	512
25	11.8	4,257	21	8.6	1,024	21	8.6	500
28	9.9	1,832	24	8.0	374	24	8.6	500
31	9.15	976	27	9.9	2,369	27	8.4	461
Apr. 3	9.0	722	31	8.2	764	30	8.7	463
6	9.6	1,185	Aug. 3	8.1	307	Dec. 3	8.5	554
10	10.1	2,039	6	7.7	227	6	8.6	579
12	10.9	3,062	9	7.1	57	9	8.6	589
15	10.5	2,529	17	7.95	397	12	8.9	642
18	10.3	2,390	19	9.15	1,301	15	8.75	372
21	9.6	1,494	22	8.65	866	18	8.75	377
24	9.8	1,642	25	9.1	1,042	21	8.9	396
28	8.95	683	28	8.7	830	24	8.6	320
May 4	9.4	1,000	31	8.1	282	27	8.4	269
8	12.5	5,529	Sept. 3	10.05	2,099	31	7.8	130
11	11.45	4,087						

Daily gage height, in feet, of Rio Grande near El Paso, Tex., for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	8.6	9.15	8.95	9.3	9.65	15.3	10.9	8.4	9.05	6.85	7.5	8.55
2.....	8.45	9.15	9.0	9.3	9.65	15.0	11.05	8.25	9.1	6.8	7.7	8.5
3.....	8.35	9.25	8.95	9.0	9.45	15.15	10.85	8.05	10.0	6.8	7.8	8.5
4.....	8.3	9.3	8.95	9.25	9.4	14.7	10.5	8.0	9.2	6.8	7.8	8.7
5.....	8.4	9.35	8.8	9.5	10.2	14.55	10.55	7.85	8.85	6.7	7.8	8.8
6.....	8.35	8.8	8.4	9.6	11.7	14.15	10.35	7.7	8.8	6.75	7.8	8.7
7.....	8.3	8.7	8.25	9.6	12.5	13.9	10.15	7.55	8.5	6.75	7.65	8.8
8.....	8.4	8.9	8.35	9.7	12.5	13.75	9.95	7.35	8.2	6.65	7.7	8.7
9.....	8.5	8.9	8.25	9.9	11.95	13.45	9.55	7.0	8.05	6.6	7.8	8.6
10.....	8.65	8.95	8.35	10.25	11.6	13.55	9.35		8.2	6.6	7.8	8.7
11.....	9.0	8.95	8.4	10.55	11.45	13.6	9.1		8.1	6.6	7.85	8.5
12.....	9.2	8.95	10.0	10.9	11.8	13.75	8.85		8.2	6.6	8.1	9.35
13.....	8.95	8.90	10.05	10.7	12.35	13.6	8.65		8.0	6.6	8.2	9.35
14.....	9.1	8.85	9.6	10.5	12.6	13.3	8.45		7.85	6.6	8.3	9.05
15.....	9.45	8.85	9.5	10.55	12.5	12.75	8.3		7.7	6.6	8.3	8.5
16.....	9.5	8.8	9.3	10.45	12.5	12.5	8.25	9.45	7.55	6.6	8.3	8.6
17.....	9.1	8.9	9.5	10.45	12.55	12.25	8.05	7.9	7.4	6.6	8.45	8.7
18.....	9.25	8.9	9.45	10.3	12.6	11.7	8.0	7.8	7.25	6.7	8.7	8.8
19.....	9.3	8.95	9.1	9.75	12.7	11.65	8.0	9.3	7.1	6.6	8.6	8.95
20.....	9.45	8.9	8.7	9.75	12.45	11.35	8.45	9.15	6.95	6.5	8.6	8.7

Daily gage height, in feet, of Rio Grande near El Paso, Tex., for 1912—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
21.....	9.45	8.85	8.55	9.6	12.55	11.15	8.55	8.6	6.8	6.6	8.6	8.8
22.....	9.5	8.75	8.55	9.5	12.9	11.0	9.0	8.65	6.8	6.8	8.6	8.55
23.....	9.5	8.75	8.3	9.7	13.15	10.9	8.7	8.55	6.75	6.9	8.6	8.5
24.....	9.6	8.65	8.4	9.75	13.8	10.9	8.6	8.8	6.75	6.9	8.6	8.55
25.....	9.6	8.8	11.55	9.6	14.3	10.7	9.25	9.1		6.9	8.6	8.6
26.....	10.25	9.0	10.8	9.3	14.45	10.85	9.45	8.65		6.9	8.6	8.55
27.....	9.6	9.0	10.1	9.1	14.7	11.05	9.9	8.3		7.0	8.45	8.45
28.....	9.1	9.0	9.95	8.95	14.85	11.2	9.85	8.55		7.5	8.5	8.2
29.....	8.75	8.9	9.6	8.85	15.05	10.95	9.5	8.2		7.65	8.6	8.0
30.....	9.15		9.2	8.8	15.0	11.1	9.15	8.2	6.75	7.55	8.7	7.85
31.....	9.15		9.2		15.5		8.2	8.15		7.4		7.8

Note.—No flow Aug. 10 to 15 and Sept. 25 to 29.

Daily discharge, in second-feet, of Rio Grande near El Paso, Tex., for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	470	800	α 540	1,130	1,190	15,380	4,890	845	1,170	15	80	475
2.....	335	775	560	1,110	1,190	α15,300	5,170	575	1,210	10	90	510
3.....	240	α 820	510	α 720	1,040	15,980	α4,750	α 295	α2,040	α 10	α 95	α 555
4.....	α 205	855	490	915	α 1,000	α13,950	4,010	285	1,130	10	100	605
5.....	305	890	α 370	1,110	2,170	13,590	4,120	255	845	10	105	630
6.....	290	α 615	255	α 1,190	4,360	α12,590	α3,720	α 225	α 675	α 10	α 110	α 605
7.....	α 280	605	200	1,240	5,530	11,670	3,410	185	530	10	85	630
8.....	355	620	α 235	1,420	α 5,530	11,130	3,100	130	385	5	100	610
9.....	430	α 620	200	1,730	4,780	α10,050	α2,480	α 35	α 315	α 5	α 125	α 590
10.....	α 545	620	235	α2,230	4,300	10,370	2,190	0	370	5	125	605
11.....	810	590	275	2,620	α 4,090	10,530	1,830	0	300	5	160	570
12.....	960	α 555	α1,640	α3,060	4,530	α11,080	α1,460	0	α 330	α 5	α 195	α 625
13.....	α 770	510	1,680	2,800	5,240	10,760	1,160	0	235	5	250	850
14.....	885	460	1,300	2,530	5,560	10,140	860	0	180	5	300	610
15.....	1,140	445	1,210	α2,600	α 5,430	α 8,880	α 630	0	α 125	α 5	α 300	α 400
16.....	1,180	α 395	α1,040	2,490	5,550	8,200	580	1,480	105	5	300	335
17.....	735	480	1,200	2,490	5,750	7,510	380	α 360	80	5	380	365
18.....	α 865	510	1,160	α2,390	α 5,940	α 6,130	α 330	285	α 60	α 10	α 510	α 390
19.....	930	565	α 880	1,690	6,010	6,020	330	α1,410	45	10	500	420
20.....	α1,130	α 565	555	1,690	5,560	5,400	850	1,300	30	5	500	365
21.....	1,070	515	430	α1,490	α 5,680	α 4,990	α 970	825	α 15	α 10	α 500	α 385
22.....	1,070	435	α 430	1,420	6,300	4,520	1,460	α 865	15	10	500	310
23.....	1,010	415	235	1,570	7,100	4,150	1,130	825	10	α 15	500	295
24.....	α1,080	α 335	350	α1,590	8,640	α 3,980	α1,010	925	α 10	α 15	α 500	α 310
25.....	1,080	395	α3,970	1,420	α 9,820	3,630	1,690	α1,040	0	15	500	320
26.....	1,930	485	2,980	1,080	9,860	3,980	1,900	805	0	15	500	305
27.....	α1,280	α 485	2,080	850	α10,130	α 4,420	α2,370	620	0	α 25	α 470	α 280
28.....	845	485	α1,890	α 685	11,000	4,970	2,320	α 750	0	90	460	225
29.....	610	440	1,490	585	α12,050	4,720	1,990	495	0	105	460	175
30.....	835		1,030	535	12,380	α 5,260	1,660	415	10	α 95	α 465	140
31.....	α 835		α1,030		α14,910		α 765	α 305		75		α 130

α Date of measurement.

Monthly discharge of Rio Grande near El Paso, Tex., for 1912.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
January.....	1,930	205	790	48,605
February.....	890	335	562	32,301
March.....	3,970	200	982	60,397
April.....	3,060	535	1,613	95,960
May.....	14,910	1,000	6,220	382,453
June.....	15,980	3,630	8,643	514,274
July.....	5,170	330	2,049	125,980
August.....	1,480	0	501	30,813
September.....	2,040	0	341	20,271
October.....	105	5	20	1,230
November.....	510	80	309	18,377
December.....	850	130	439	27,015
The year.....	15,980	0	1,870	1,357,676

RIO GRANDE ABOVE PRESIDIO, TEX.

Location.—At the Haciendita, 9 miles above Presidio. From April, 1900, to September, 1905, the station was located at a point 9 miles above Presidio, 8 miles above the mouth of Rio Conchos, and about 200 miles below El Paso. Owing to the formation of a cut-off around the station it was necessary to abandon this site and, in September, 1905, the station was moved to a point 8 miles farther upstream. The cut-off formed in 1905 having since been closed and caving banks necessitating the abandonment of the new station, it was moved back to its original site on July 6, 1909, with a different gage datum from that of the first station.

Records available.—April 4, 1900, to December 31, 1912.

Gage.—An inclined rod fastened to posts sunk in the ground. Datum changed in September, 1905, and on July 6, 1909.

Channel.—The bed is sandy and shifting. Both banks are fairly permanent and are inundated by extreme floods.

Discharge measurements.—Made from a cable.

Cooperation.—Station established and operated by the United States section of the International Boundary Commission.

Discharge measurements of Rio Grande above Presidio, Tex., in 1912.

[By W. T. Millington and C. L. Vasquez.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Jan. 3	7.7	1,190	May 3	6.9	439	Sept. 2	6.45	973
6	7.3	636	6	6.8	365	5	6.2	784
9	7.3	614	9	7.5	845	8	6.75	1,112
12	7.0	451	12	10.5	3,841	11	7.3	1,622
15	7.0	395	15	9.9	3,418	14	7.55	1,906
18	7.3	565	18	10.55	3,806	17	5.7	473
21	7.8	816	21	10.8	4,032	20	5.4	379
24	8.1	1,137	24	10.75	4,259	23	5.25	238
27	8.05	1,399	27	10.75	4,138	26	5.2	219
30	8.0	1,139	30	10.65	3,947	29	5.0	181
Feb. 1	7.9	836	June 2	11.5	4,923	3	5.8	370
4	7.6	622	5	12.0	6,556	6	5.2	209
7	7.6	607	9	13.65	10,008	9	5.1	162
10	7.6	540	12	14.85	14,498	12	4.8	118
13	7.4	423	15	14.15	13,405	15	4.6	98
16	7.4	446	18	13.1	10,249	18	4.5	84
19	7.35	385	20	12.0	9,501	21	4.4	60
22	7.4	304	23	9.65	6,533	24	4.3	54
25	7.3	325	26	9.3	5,576	27	4.3	42
28	7.3	278	29	9.6	5,895	30	4.2	38
Mar. 3	7.1	243	July 3	9.4	5,609	Nov. 2	4.2	35
6	7.2	271	6	9.3	5,153	5	4.1	27
9	7.1	304	9	9.0	4,842	8	4.1	23
12	7.2	357	12	8.6	4,210	11	4.1	b 20
15	7.0	291	15	7.6	3,481	14	4.0	b 16
18	7.8	447	18	7.2	2,575	17	4.4	b 57
21	7.7	388	21	6.8	1,039	20	4.6	b 89
24	7.6	355	24	7.0	1,193	23	4.6	b 88
27	7.5	428	27	6.6	1,021	26	5.0	b 164
30	9.3	1,531	30	6.6	978	29	5.0	b 164
Apr. 2	8.05	848	Aug. 3	7.6	1,546	Dec. 3	5.4	b 299
5	7.7	783	6	7.0	980	6	5.5	b 336
8	7.5	625	9	6.7	571	9	5.3	b 280
11	8.05	992	12	6.4	403	12	5.85	b 586
14	8.55	1,453	15	6.4	322	15	6.0	b 513
17	9.2	1,988	18	9.0	2,185	18	5.5	b 337
20	9.3	2,205	21	7.05	1,715	21	5.7	b 483
23	8.25	1,559	24	6.6	1,254	24	5.6	b 326
26	7.7	923	27	6.1	816	27	5.6	b 313
29	7.6	669	30	6.3	955	30	5.5	b 286

^a Discharge obtained by subtracting the flow of the Conchos from the flow below Presidio.

^b Measurement made 1 mile above mouth of the Conchos.

Daily gage height, in feet, of Rio Grande above Presidio, Tex., for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	7.7	7.85	7.05	8.35	7.15	11.3	9.65	8.15	6.9	5.8	4.2	5.1
2.....	7.75	7.85	7.0	8.0	7.0	11.5	9.4	7.85	6.4	6.15	4.2	5.35
3.....	7.65	7.6	7.05	7.75	6.85	11.7	9.55	7.55	6.15	5.6	4.1	5.4
4.....	7.5	7.65	7.0	7.55	6.75	11.75	9.65	7.25	5.95	5.3	4.1	5.5
5.....	7.4	7.7	7.1	7.7	6.8	12.0	9.45	7.2	6.4	5.15	4.1	5.5
6.....	7.25	7.6	7.15	7.65	6.95	12.3	9.3	7.0	6.2	5.1	4.1	5.5
7.....	7.1	7.6	7.05	7.55	7.1	12.7	9.1	6.9	7.25	4.85	4.1	5.55
8.....	7.0	7.6	7.15	7.45	7.1	13.35	9.05	6.85	6.6	5.75	4.1	5.5
9.....	7.15	7.6	7.1	7.45	7.3	13.65	9.0	6.65	6.3	5.05	4.1	5.35
10.....	7.15	7.6	7.2	7.65	10.05	13.95	8.8	6.55	6.1	4.8	4.1	5.55
11.....	7.0	7.55	7.2	8.05	10.75	14.5	8.65	6.45	7.1	4.8	4.1	5.75
12.....	6.9	7.5	7.2	8.2	10.6	14.85	8.5	6.4	6.85	4.85	4.1	5.85
13.....	7.0	7.4	7.15	8.3	10.5	14.85	8.1	6.4	7.1	4.9	4.1	5.6
14.....	7.05	7.4	7.1	8.65	10.0	14.5	8.15	6.4	7.4	4.75	4.0	5.7
15.....	6.9	7.4	6.95	9.15	9.95	14.15	7.6	6.45	6.3	4.65	4.0	6.0
16.....	7.0	7.4	6.9	9.35	10.3	13.95	7.5	6.5	6.15	4.6	4.0	5.75
17.....	7.35	7.4	7.0	9.2	10.45	13.5	7.3	6.45	5.65	4.55	4.4	5.55
18.....	7.35	7.4	7.7	8.9	10.6	13.1	7.2	8.5	5.5	4.5	4.45	5.5
19.....	7.6	7.35	7.8	9.1	10.5	12.7	7.3	8.5	5.4	4.5	4.45	5.65
20.....	7.9	7.4	7.75	9.2	10.7	11.9	7.05	9.05	5.35	4.45	4.55	5.5
21.....	7.8	7.4	7.7	8.6	10.75	10.95	6.9	6.7	5.3	4.35	4.5	5.7
22.....	7.8	7.4	7.7	8.35	10.75	10.2	7.9	6.85	5.3	4.3	4.5	5.6
23.....	8.1	7.4	7.65	8.25	10.8	9.7	7.2	6.0	5.3	4.3	4.55	5.6
24.....	8.1	7.3	7.55	8.05	10.75	9.55	6.9	6.5	5.25	4.3	4.7	5.6
25.....	8.15	7.3	7.5	7.85	10.75	9.4	6.75	6.4	5.2	4.3	4.85	5.55
26.....	7.95	7.3	7.55	7.65	10.75	9.3	6.7	6.1	5.15	4.3	5.0	5.55
27.....	8.05	7.25	7.4	7.5	10.8	9.1	6.75	6.15	5.1	4.3	5.0	5.55
28.....	8.1	7.25	7.35	7.75	10.8	9.15	7.1	5.85	5.0	4.2	5.0	5.55
29.....	8.1	7.2	8.0	7.55	10.9	9.6	6.95	6.15	5.2	4.2	5.0	5.55
30.....	8.1		9.15	7.3	10.75	9.35	7.1	6.25	5.9	4.2	5.0	5.45
31.....	8.0		8.7		10.9		9.0	5.85		4.2		5.4

Daily discharge, in second-feet, of Rio Grande above Presidio, Tex., for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	1,070	800	195	995	420	4,680	5,920	2,270	1,260	450	35	200
2.....	1,160	800	195	840	410	4,920	5,640	1,870	940	585	35	285
3.....	1,150	620	230	790	400	5,530	5,960	1,500	825	315	30	300
4.....	960	655	215	755	330	5,840	5,860	1,220	725	235	30	335
5.....	800	685	245	785	365	6,560	5,450	1,170	935	195	25	335
6.....	600	610	255	745	470	7,180	5,150	980	785	185	25	335
7.....	490	605	245	665	570	8,020	4,960	845	1,570	115	25	360
8.....	410	585	300	590	570	9,380	4,800	760	1,040	330	25	335
9.....	535	565	305	590	710	10,010	4,840	545	885	155	25	285
10.....	535	540	340	725	3,400	11,260	4,570	485	785	120	20	420
11.....	450	510	350	990	4,090	13,130	4,340	430	1,470	120	20	530
12.....	390	480	355	1,130	3,940	14,500	4,140	405	1,280	125	20	585
13.....	430	425	340	1,220	3,840	14,500	3,840	375	1,500	135	20	470
14.....	445	430	325	1,540	3,490	13,950	3,880	350	1,790	115	15	465
15.....	340	440	280	1,940	3,450	13,410	3,480	345	930	105	15	515
16.....	395	445	270	2,110	3,660	12,730	3,210	370	815	100	15	425
17.....	595	435	290	1,990	3,750	11,430	2,840	345	460	90	55	350
18.....	690	425	430	1,750	3,840	10,250	2,570	1,840	410	85	65	335
19.....	715	385	445	1,980	3,760	9,980	2,300	1,840	380	80	65	420
20.....	865	380	420	2,140	3,940	9,370	1,670	2,390	360	70	80	380
21.....	815	340	390	1,780	3,980	8,180	1,120	1,350	310	55	75	485
22.....	815	305	390	1,630	4,070	7,230	1,890	1,510	285	55	75	405
23.....	1,140	330	370	1,560	4,220	6,590	1,350	775	260	55	80	365
24.....	1,140	300	340	1,330	4,260	6,230	1,150	1,170	240	55	105	325
25.....	1,290	325	360	1,100	4,220	5,870	1,090	1,080	220	50	135	305
26.....	1,190	310	410	875	4,180	5,580	1,060	815	210	45	165	305
27.....	1,400	265	400	670	4,190	5,360	1,100	850	200	40	165	300
28.....	1,380	250	385	870	4,160	5,420	1,260	645	180	40	165	300
29.....	1,310	220	765	630	4,230	5,890	1,170	850	260	40	165	300
30.....	1,240		1,440	430	4,050	5,650	1,480	930	540	40	165	270
31.....	1,140		1,170		4,200		3,380	730		40		255

α Date of measurement.

Monthly discharge of Rio Grande above Presidio, Tex., for 1912.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
January.....	1,400	340	835	51,342
February.....	800	220	464	26,707
March.....	1,440	195	402	24,694
April.....	2,140	430	1,171	69,709
May.....	4,260	330	2,941	180,823
June.....	14,500	4,680	8,621	512,985
July.....	5,960	1,060	3,276	201,421
August.....	2,390	345	1,001	61,567
September.....	1,790	180	728	43,339
October.....	585	40	136	8,380
November.....	165	15	65	3,848
December.....	585	200	364	23,374
The year.....	14,500	15	1,667	1,208,189

RIO GRANDE BELOW PRESIDIO, TEX.

Location.—6 miles below Presidio and 7 miles below the mouth of Rio Conchos, at the west end of the canyon section of the Rio Grande.

Records available.—April 8, 1900, to December 31, 1912.

Gage.—Inclined rod bolted to posts sunk into the ground. An additional flood gage is nailed to a tree at the gravel hills.

Channel.—The bed is of shifting sand and is affected by a drainage channel called Alamos Creek, which enters the river one-fourth mile below the station. This creek is subject to torrential floods, which bring large quantities of bowlders and gravel into the Rio Grande, forming a temporary dam which remains, throwing back-water onto the gage until a flood in the river scours it out. The right bank is a rock bluff. The left bank is an alluvial deposit and overflows above a stage of about 13 feet for a distance of 750 feet back from the stream to gravel hills.

Discharge measurements.—From cable for stream proper and from boat for flooded left bank.

Cooperation.—Station established and operated by the United States section of the International Boundary Commission.

Discharge measurements of Rio Grande below Presidio, Tex., in 1912.

[By W. T. Millington and C. L. Vasquez.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Jan. 4	10.0	4,171	Mar. 4	7.9	640	May 4	8.1	437
7	9.5	3,011	7	7.9	625	7	8.0	557
10	9.1	2,572	10	7.9	612	10	9.5	1,991
13	8.9	2,528	13	7.9	631	13	10.5	3,813
16	8.8	2,305	16	7.8	455	16	10.35	3,476
19	9.0	2,854	19	8.4	985	19	10.6	3,714
22	9.0	2,777	22	8.6	1,002	22	10.8	4,284
25	9.2	3,453	25	8.2	573	25	10.9	4,223
28	9.1	2,896	28	7.9	462	28	11.0	4,356
31	9.0	2,678	31	9.1	1,350	31	11.1	4,605
Feb. 2	8.9	2,497	Apr. 3	8.6	829	June 3	11.35	5,284
5	8.7	2,414	6	8.6	920	6	11.7	6,903
8	8.6	2,351	9	8.4	611	9	13.35	10,286
11	8.6	1,490	12	8.8	1,662	12	14.2	14,765
14	8.5	1,118	15	9.0	1,566	15	14.0	13,664
17	8.3	901	18	9.35	1,959	18	13.45	10,510
20	8.2	862	21	9.4	2,083	21	12.75	8,804
23	8.1	793	24	9.0	1,668	24	11.65	6,289
26	8.0	754	27	8.6	1,157	27	10.9	5,231
29	8.0	741	30	8.5	797	30	10.9	5,879

Discharge measurements of Rio Grande, below Presidio, Tex., in 1912—Continued.

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
July 4	10.7	5,313	Sept. 6	12.15	9,055	Nov. 3	8.2	1,214
7	10.5	5,155	7	14.7	15,910	6	8.1	940
10	10.0	4,433	9	12.4	9,551	9	8.0	816
13	9.4	4,339	12	16.4	20,357	12	7.9	715
16	8.7	3,386	15	16.8	21,796	15	7.8	503
19	9.65	5,345	18	14.9	13,007	18	8.0	693
22	8.7	3,021	21	10.7	6,600	21	8.0	629
25	9.3	3,599	24	9.8	4,620	24	8.0	596
28	8.9	2,915	27	9.4	3,716	27	8.2	751
31	10.0	5,029	30	9.1	3,239	30	8.2	753
Aug. 4	9.55	2,822	Oct. 4	11.2	5,248	Dec. 4	8.2	732
7	9.1	2,067	7	10.5	4,546	7	8.2	641
10	8.6	1,268	10	10.0	3,593	10	8.4	923
13	8.2	748	13	9.5	2,891	13	8.3	740
16	8.4	809	16	9.1	2,564	16	8.2	646
19	13.5	7,995	19	9.0	2,047	19	8.8	1,298
22	15.3	12,455	22	8.7	1,795	22	8.7	1,123
28	12.55	7,891	25	8.55	1,684	25	8.6	1,028
31	14.65	11,128	28	8.3	1,298	28	8.5	869
Sept. 3	13.6	11,611	31	8.3	1,228	31	8.3	762

Daily gage height, in feet, of Rio Grande below Presidio, Tex., for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	8.9	8.9	7.9	9.0	8.3	11.1	10.8	10.85	15.7	11.65	8.2	8.2
2.....	9.0	8.9	7.9	8.75	8.3	11.25	10.7	10.2	14.85	10.85	8.2	8.2
3.....	9.0	8.8	7.9	8.55	8.2	11.35	10.6	9.9	13.6	10.85	8.2	8.2
4.....	10.0	8.7	7.9	8.4	8.05	11.5	10.75	9.6	13.6	11.15	8.1	8.2
5.....	9.8	8.7	7.9	8.5	7.95	11.6	10.7	9.45	13.1	11.0	8.1	8.3
6.....	9.7	8.7	7.9	8.6	7.8	11.75	10.65	9.25	12.1	10.65	8.1	8.2
7.....	9.45	8.6	7.9	8.5	8.0	12.05	10.45	9.1	14.2	10.45	8.0	8.2
8.....	9.3	8.6	7.9	8.45	8.0	12.7	10.25	8.95	12.7	10.85	8.0	8.2
9.....	9.2	8.6	7.9	8.4	8.35	13.4	10.1	8.65	12.35	11.0	8.0	8.25
10.....	9.1	8.6	7.9	8.5	9.6	13.85	10.35	8.55	11.6	10.0	8.0	8.4
11.....	9.0	8.6	7.9	8.8	10.15	14.05	10.4	8.4	14.4	9.85	7.9	8.5
12.....	9.0	8.4	7.9	8.8	10.35	14.2	9.6	8.3	14.8	9.65	7.9	8.45
13.....	8.9	8.45	7.9	8.7	10.5	14.3	9.4	8.15	16.05	9.5	7.9	8.25
14.....	8.9	8.5	7.8	8.95	10.4	14.2	9.2	8.15	16.55	9.4	7.8	8.2
15.....	8.8	8.45	7.8	9.1	10.3	14.0	9.0	8.4	17.0	9.25	7.8	8.15
16.....	8.85	8.4	7.8	9.4	10.35	13.75	8.75	8.35	16.9	9.1	7.8	8.3
17.....	9.1	8.3	7.7	9.5	10.6	13.6	8.75	9.35	16.65	9.1	7.9	9.0
18.....	9.1	8.3	8.15	9.35	10.65	13.45	9.3	12.35	14.35	9.1	8.0	8.9
19.....	9.0	8.3	8.4	9.4	10.65	13.3	9.35	13.6	11.85	9.0	8.1	8.8
20.....	9.1	8.3	8.5	9.5	10.75	13.1	8.75	14.95	11.1	8.9	8.0	8.8
21.....	9.1	8.2	8.45	9.4	10.8	12.65	8.75	15.9	10.65	8.85	8.0	8.7
22.....	9.0	8.2	8.6	9.25	10.8	12.2	8.9	15.1	10.4	8.7	8.0	8.7
23.....	9.05	8.2	8.6	9.1	10.9	11.85	9.15	16.5	10.2	8.7	8.0	8.6
24.....	9.2	8.1	8.25	8.95	10.95	11.6	8.75	15.4	9.8	8.6	8.0	8.6
25.....	9.2	8.05	8.15	8.8	10.9	11.3	9.4	16.3	9.65	8.55	8.1	8.6
26.....	9.2	8.0	8.0	8.7	10.9	11.1	9.5	13.6	9.5	8.45	8.2	8.5
27.....	9.1	8.0	8.0	8.6	10.9	10.9	9.0	13.7	9.35	8.4	8.2	8.5
28.....	9.1	8.0	7.9	8.7	11.0	10.9	8.9	12.45	9.2	8.3	8.2	8.5
29.....	9.1	8.0	7.8	8.6	11.0	10.9	9.5	12.65	9.1	8.3	8.2	8.4
30.....	9.0		9.5	8.45	11.0	10.9	9.5	13.75	9.1	8.35	8.2	8.3
31.....	9.0		9.1		11.1		10.35	14.85		8.3		8.3

Daily discharge, in second-feet, of Rio Grande below Presidio, Tex., for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	2,680	2,540	685	1,250	615	4,670	5,660	6,300	14,280	6,040	1,210	750
2.....	2,830	a2,500	670	985	615	5,020	5,450	4,560	13,200	4,900	1,210	745
3.....	2,830	2,460	655	a780	525	a5,280	5,230	3,760	a11,610	4,800	a1,210	740
4.....	a4,170	2,410	a640	660	a395	5,890	a5,350	a2,950	11,610	a5,200	1,060	a730
5.....	3,740	a2,410	635	790	385	6,400	5,310	2,650	10,730	5,050	1,000	780
6.....	3,440	2,410	630	a920	330	a7,000	5,270	2,320	a8,970	4,700	a940	670
7.....	a2,960	2,350	a625	785	a555	7,620	a5,080	a2,070	a14,530	a4,500	830	a640
8.....	2,790	a2,350	620	700	555	8,950	4,800	1,830	10,380	4,900	825	670
9.....	2,680	2,060	615	a610	890	a10,440	4,580	1,350	a9,450	5,050	a815	745
10.....	a2,570	1,780	a610	910	a2,140	12,430	a4,960	a1,200	7,260	a3,960	815	a925
11.....	2,550	a1,490	620	1,510	3,070	13,670	5,030	1,010	15,190	3,380	715	995
12.....	2,550	1,270	625	a1,650	3,480	a14,760	4,480	880	a16,040	3,110	a715	915
13.....	a2,530	1,190	a630	1,410	a3,810	15,070	a4,340	a735	19,410	a2,890	680	a695
14.....	2,490	a1,120	540	1,620	3,630	14,520	4,070	735	21,000	2,810	540	645
15.....	2,350	1,060	495	a1,680	3,440	a13,660	3,800	810	a22,400	2,960	a505	600
16.....	a2,360	995	a455	2,010	a3,480	12,410	a3,460	a795	21,950	a2,560	505	a755
17.....	2,720	a900	365	2,130	3,710	11,470	3,650	1,790	20,880	2,420	600	1,520
18.....	2,840	900	765	a1,960	3,760	a10,510	4,650	6,260	12,170	2,280	a695	1,410
19.....	a2,850	900	a985	2,040	a3,790	10,140	a4,890	a8,240	8,350	a2,050	750	a1,300
20.....	2,930	a900	995	2,170	4,030	9,660	3,700	11,590	7,260	1,960	650	1,270
21.....	2,900	850	990	a2,080	4,190	a8,580	3,390	13,950	a6,520	1,920	a630	1,150
22.....	a2,780	840	a1,000	1,920	a4,280	7,550	a3,210	a11,960	5,940	a1,800	620	a1,120
23.....	2,990	a830	965	1,770	4,360	6,740	3,450	17,850	5,430	1,800	605	1,030
24.....	3,290	795	650	a1,600	4,370	a6,220	3,070	12,900	a4,620	1,720	a595	1,030
25.....	a3,450	775	a555	1,410	a4,220	5,800	a3,770	16,950	4,280	a1,680	675	a1,030
26.....	3,300	a755	500	1,280	4,220	5,510	3,940	10,430	3,970	1,540	750	910
27.....	3,050	750	500	a1,100	4,220	a5,230	3,090	10,670	a3,640	1,440	a750	890
28.....	a2,900	745	a460	1,200	a4,360	5,450	a2,910	a7,740	3,400	a1,300	750	a870
29.....	2,800	a740	420	1,000	4,390	5,660	3,970	8,050	3,240	1,270	755	815
30.....	2,720		1,630	a745	4,420	a5,880	4,120	9,740	a3,240	1,280	a755	765
31.....	a2,680		a1,350		a4,610		a5,560	a11,530		a1,230		a760

a Date of measurement.

Monthly discharge of Rio Grande below Presidio, Tex., for 1912.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
January.....	4,170	2,350	2,896	178,096
February.....	2,540	740	1,416	81,471
March.....	1,630	365	706	43,398
April.....	2,170	610	1,358	80,797
May.....	4,610	330	2,930	180,188
June.....	15,070	4,670	8,739	520,026
July.....	5,660	2,910	4,330	266,261
August.....	17,850	735	6,245	384,010
September.....	22,400	3,240	10,718	637,765
October.....	6,040	1,230	2,967	182,420
November.....	1,210	505	772	45,926
December.....	1,520	600	899	55,279
The year.....	22,400	330	3,658	2,655,637

RIO GRANDE NEAR LANGTRY, TEX.

Location.—One-half mile south of Langtry station on the Southern Pacific Railroad and at the east end of the canyon section of the Rio Grande, a short distance above the confluence of the Pecos and the Rio Grande.

Records available.—April, 1900, to December 31, 1912.

Gage.—Vertical rod bolted to the bluff on the right bank.

Channel.—Bed sandy and shifting. The right (Mexican) bank is a rock bluff; the left bank is an alluvial deposit for 200 feet back to a rock bluff, and overflows at about 29.5 feet on the gage.

Discharge measurements.—Made from cable.

Cooperation.—Station was established and operated by the United States section of the International Boundary Commission.

Discharge measurements of Rio Grande near Langtry, Tex., in 1912.

[By E. E. Winter and W. H. Dodd.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Jan. 2	1.25	1,547	May 6	0.6	964	Sept. 5	6.3	13,054
6	1.3	1,576	11	.0	662	9	6.95	15,449
11	1.7	2,125	18	2.5	3,497	13	7.55	18,174
15	1.5	1,898	21	2.7	3,775	16	9.2	21,179
20	1.5	1,622	24	2.75	3,941	19	10.25	24,467
25	1.45	1,527	28	3.0	4,715	23	4.35	7,185
28	1.5	1,565	June 2	3.0	4,601	27	3.0	4,276
Feb. 2	1.45	1,607	6	3.0	4,668	Oct. 2	2.3	2,947
7	1.1	1,349	12	4.85	8,960	7	4.5	8,135
12	1.05	1,290	17	5.7	10,995	11	4.35	7,432
16	1.05	1,270	20	5.3	10,409	15	2.4	3,137
21	.8	1,081	24	4.3	7,049	19	2.0	2,533
26	.6	954	27	3.25	4,881	24	1.7	2,008
Mar. 2	.5	886	July 2	3.0	3,988	28	1.4	1,671
7	.5	863	8	2.8	3,342	2	1.2	1,365
12	.4	801	12	2.3	2,701	7	1.1	1,315
16	.4	748	17	1.9	2,048	11	.95	1,285
21	.4	667	22	1.8	2,030	15	.9	1,204
24	.6	773	25	1.4	1,536	20	1.4	1,753
28	.7	998	29	1.9	1,945	24	.9	1,235
Apr. 2	1.2	1,379	Aug. 4	2.3	2,943	29	.85	1,178
7	3.4	5,237	8	1.85	2,288	Dec. 2	1.0	1,351
9	.8	1,094	12	1.4	1,635	6	.95	1,266
13	.6	933	16	1.9	2,286	11	1.2	1,398
16	1.6	1,861	20	2.05	2,436	16	1.1	1,345
22	1.6	1,889	23	7.15	15,359	20	1.4	1,681
27	1.4	1,620	27	7.95	19,506	26	1.4	1,719
May 2	1.0	1,219	Sept. 2	7.2	17,074	28	1.3	1,547

Daily gage height, in feet, of Rio Grande near Langtry, Tex., for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	1.45	1.5	0.5	0.5	1.0	2.9	2.95	0.8	5.75	2.4	1.25	0.95
2.....	1.25	1.45	.5	.85	1.0	3.0	2.95	.8	7.3	2.3	1.2	1.0
3.....	1.3	1.4	.5	1.3	.9	3.2	2.9	1.55	7.9	4.75	1.2	.9
4.....	1.3	1.4	.5	1.3	.85	3.1	2.9	2.0	7.45	3.55	1.2	.85
5.....	1.3	1.4	.5	1.2	.75	3.1	2.9	2.15	6.5	4.1	1.15	.85
6.....	1.3	1.3	.5	1.05	.6	3.05	2.85	2.1	7.15	4.1	1.15	.95
7.....	1.6	1.1	.5	4.4	.55	3.3	2.85	1.95	8.45	4.5	1.1	.95
8.....	1.65	1.05	.5	.95	.45	3.3	2.75	2.05	5.65	4.0	1.05	1.0
9.....	1.85	1.05	.45	.8	.4	3.5	2.55	1.85	6.35	4.05	1.0	1.05
10.....	1.75	1.05	.45	.8	.25	3.9	2.45	1.4	4.65	3.95	1.0	1.1
11.....	1.7	1.05	.45	.8	.0	4.55	2.3	1.45	4.05	4.2	.95	1.2
12.....	1.6	1.05	.4	.75	1.0	4.9	2.3	1.4	4.25	3.45	.95	1.2
13.....	1.55	1.05	.4	.6	1.25	5.35	2.75	1.25	7.9	2.95	.9	1.25
14.....	1.5	1.05	.4	.6	2.15	5.75	2.2	.95	9.7	2.75	.9	1.25
15.....	1.5	1.05	.4	.7	2.2	5.85	2.05	2.0	7.5	2.45	.9	1.2
16.....	1.4	1.05	.4	.85	2.05	5.9	1.85	1.8	9.3	2.5	.9	1.1
17.....	1.5	1.0	.45	1.15	2.25	5.85	1.8	1.65	9.05	2.3	.8	1.0
18.....	1.5	1.0	.4	1.55	2.5	5.7	1.65	1.85	8.35	2.15	.8	1.0
19.....	1.5	.95	.4	1.55	2.4	5.5	1.7	1.95	10.3	2.0	1.05	1.0
20.....	1.5	.9	.4	1.6	2.55	5.25	1.85	3.45	9.2	1.9	1.4	1.2
21.....	1.5	.8	.4	1.65	2.7	5.1	1.6	4.75	6.15	1.9	1.1	1.65
22.....	1.55	.8	.5	1.65	2.6	5.0	1.8	6.2	4.95	1.85	.9	1.7
23.....	1.5	.85	.5	1.7	2.6	4.65	1.95	7.0	4.3	1.75	.9	1.7
24.....	1.5	.8	.6	1.7	2.75	4.25	1.95	6.2	3.85	1.65	.9	1.7
25.....	1.45	.7	.6	1.65	2.85	3.75	1.4	7.9	3.6	1.6	.85	1.55
26.....	1.5	.6	.65	1.45	2.95	3.5	1.55	6.7	3.25	1.55	.9	1.4
27.....	1.5	.6	.8	1.4	3.0	3.25	1.55	7.8	2.95	1.45	.9	1.45
28.....	1.5	.55	.7	1.15	3.0	3.2	1.7	5.7	2.8	1.8	.85	1.35
29.....	1.5	.5	.65	1.05	2.9	3.05	1.9	5.55	2.65	1.3	.85	1.3
30.....	1.5	.5	.65	1.0	2.9	2.95	1.75	5.4	2.5	1.3	.9	1.2
31.....	1.5	.5	.6	.5	2.9	.5	1.65	5.2	.5	1.3	.5	1.2

Daily discharge, in second-feet, of Rio Grande near Langtry, Tex., for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	1,730	1,610	880	865	1,220	4,510	3,970	1,070	12,070	3,110	1,460	1,290
2.....	a1,550	a1,610	a885	a1,120	a1,220	a4,600	a3,890	1,070	a17,520	a2,950	a1,370	a1,350
3.....	1,580	1,670	880	1,450	1,150	5,020	3,750	2,010	20,200	8,730	1,370	1,260
4.....	1,580	1,570	875	1,450	1,120	4,830	3,710	a2,570	18,190	5,900	1,370	1,210
5.....	1,580	1,570	875	1,380	1,060	4,850	3,670	2,730	a13,650	7,200	1,340	1,200
6.....	a1,580	1,500	870	1,270	a965	a4,780	3,520	2,650	15,600	7,200	1,340	a1,270
7.....	1,910	a1,350	a865	a7,600	940	5,360	3,480	2,440	19,500	a8,140	a1,320	1,270
8.....	1,990	1,310	860	1,210	890	5,360	a3,280	a2,580	11,940	6,890	1,300	1,290
9.....	2,220	1,300	835	a1,090	865	5,830	3,020	2,290	a13,650	7,010	1,290	1,320
10.....	2,150	1,300	830	1,090	790	6,760	2,890	1,640	8,550	6,760	1,290	1,350
11.....	a2,130	1,300	825	1,090	a660	8,260	2,700	1,710	6,750	a7,100	a1,280	a1,400
12.....	2,010	a1,290	a800	1,050	1,460	a9,080	a2,700	a1,640	7,400	5,450	1,270	1,400
13.....	1,960	1,290	790	a930	1,790	10,160	3,430	1,480	a19,220	4,350	1,230	1,420
14.....	1,900	1,280	775	930	2,970	11,110	2,540	1,190	23,970	3,910	1,220	1,420
15.....	a1,900	1,280	760	1,030	3,040	11,350	2,290	2,290	16,720	a3,250	a1,290	1,400
16.....	1,740	a1,270	a750	1,160	2,820	11,470	1,970	a2,190	a21,490	3,290	1,200	a1,350
17.....	1,790	1,230	750	1,440	3,120	a11,350	a1,930	2,040	20,710	2,990	1,140	1,300
18.....	1,730	1,230	715	a1,820	a3,500	10,990	1,770	2,240	18,520	2,760	1,140	1,300
19.....	1,680	1,190	700	1,820	3,360	10,700	1,850	2,340	a24,620	a2,530	1,390	1,300
20.....	a1,620	1,160	685	1,880	3,570	a10,290	2,050	a5,520	21,400	2,380	a1,750	a1,490
21.....	1,610	a1,080	a965	1,930	a3,770	9,690	1,770	8,380	12,460	2,350	1,440	1,960
22.....	1,650	1,080	720	a1,960	3,650	9,210	a2,030	12,600	8,940	2,250	1,240	2,020
23.....	1,590	1,110	720	2,020	3,690	8,130	2,210	a14,920	a7,080	2,100	1,230	2,030
24.....	1,580	1,080	a775	2,020	a3,940	a6,950	2,210	12,980	6,110	a1,950	a1,230	2,030
25.....	a1,530	1,020	775	1,960	4,210	5,910	a1,540	19,320	5,570	1,900	1,200	1,880
26.....	1,560	a955	845	1,690	4,480	5,390	1,660	14,850	4,820	1,840	1,220	1,720
27.....	1,560	955	1,050	a1,620	4,650	a4,880	1,660	a19,000	a4,180	1,730	1,220	1,740
28.....	a1,560	925	a1,000	1,370	a4,710	4,700	1,780	11,860	3,880	a1,560	1,180	a1,600
29.....	1,570	895	970	1,270	4,510	4,320	a1,950	11,350	3,580	1,560	a1,180	1,550
30.....	1,570		970	1,220	4,510	4,040	1,820	10,840	3,280	1,560	1,240	1,470
31.....	1,570		940		4,510		1,750	10,160		1,560		a1,470

a Date of measurement.

Monthly discharge of Rio Grande near Langtry, Tex., for 1912.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
January.....	2,220	1,530	1,732	106,473
February.....	1,610	895	1,252	72,020
March.....	1,050	665	827	50,866
April.....	7,600	865	1,624	96,664
May.....	4,710	660	2,682	164,906
June.....	11,470	4,040	7,329	436,125
July.....	3,970	1,540	2,542	156,278
August.....	19,320	1,070	6,131	376,978
September.....	24,620	3,290	13,052	776,668
October.....	8,730	1,560	3,944	242,499
November.....	1,750	1,140	1,288	76,661
December.....	2,030	1,200	1,486	91,359
The year.....	24,620	660	3,647	2,647,497

RIO GRANDE BELOW DEVILS RIVER, TEX.

Location.—About 1 mile below the mouth of Devils River and the station of Devils River and about 480 miles below El Paso, Tex.

Records available.—April, 1900, to December 31, 1912.

Gage.—Inclined rod spiked to posts set in the ground.

Channel.—Bed is composed of gravel and sand and is shifting; right bank is an alluvial deposit which is inundated by extreme floods for a distance of about 500 feet back from the river proper; left bank is a loose-rock embankment of the Southern Pacific Railroad.

Discharge measurements.—Made from cable.

Cooperation.—Station established and operated by the United States section of the International Boundary Commission.

Discharge measurements of Rio Grande below Devils River, Tex., in 1912.

[By E. E. Winter and W. H. Dodd.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Jan. 5	4.0	2,287	May 15	4.45	3,126	Sept. 12	6.0	9,349
10	4.45	2,975	20	4.6	3,709	14	8.4	20,871
13	4.3	2,653	23	4.8	4,309	18	8.2	20,092
18	4.1	2,297	27	5.0	5,186	21	7.1	14,997
24	4.15	2,463	31	4.9	4,747	26	5.4	6,440
27	4.1	2,425	June 5	5.1	5,535	30	5.35	6,240
31	4.1	2,357	11	5.7	7,546	Oct. 5	5.5	6,662
Feb. 6	4.0	2,172	15	6.7	11,652	10	6.15	9,384
10	3.95	2,080	19	6.55	11,501	14	5.3	6,132
15	3.9	1,973	22	6.3	10,092	18	4.5	3,647
20	3.85	1,877	26	5.5	6,573	23	4.3	2,827
24	3.8	1,778	30	5.0	4,712	27	4.0	2,355
29	3.7	1,661	July 6	4.85	4,071	31	4.0	2,301
Mar. 6	3.7	1,600	11	4.7	3,521	Nov. 6	3.9	1,976
11	3.6	1,493	16	4.55	3,313	10	3.8	1,884
15	3.6	1,481	20	4.1	2,009	14	3.8	1,863
20	3.6	1,457	24	4.4	2,543	19	3.8	1,855
23	3.55	1,447	28	4.1	2,233	23	3.9	2,040
26	3.7	1,579	31	4.15	2,236	26	3.85	1,896
31	3.7	1,573	Aug. 7	4.4	3,166	30	3.8	1,865
Apr. 5	4.0	2,183	11	4.3	2,790	Dec. 5	3.9	2,014
8	4.5	3,345	15	3.9	1,938	10	3.9	2,020
12	4.0	2,483	19	4.3	2,872	14	4.0	2,206
17	3.9	2,203	22	6.25	9,263	19	3.9	1,994
20	4.25	2,809	26	7.8	16,270	24	4.25	2,840
25	4.4	3,215	28	7.9	17,188	27	4.1	2,341
30	4.0	2,191	31	6.4	11,139	31	3.9	2,062
May 5	3.85	1,987	Sept. 4	8.0	18,290			
10	3.6	1,451	8	7.35	15,708			

Daily gage height, in feet, of Rio Grande below Devils River, Tex., for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	4.15	4.1	3.75	3.65	3.9	5.3	5.05	4.1	6.6	4.65	3.9	3.8
2.....	4.1	4.1	3.75	3.6	3.9	5.0	5.0	4.2	7.4	4.35	3.9	3.85
3.....	4.1	4.1	3.75	3.8	3.85	5.0	5.0	4.2	7.6	4.3	3.9	3.85
4.....	4.1	4.1	3.7	3.95	3.85	5.0	5.0	4.2	8.0	6.55	3.9	3.9
5.....	4.0	4.0	3.7	4.0	3.85	5.1	4.9	4.7	7.25	5.45	3.9	3.9
6.....	4.1	4.0	3.7	4.0	3.8	5.15	4.85	4.45	7.1	5.5	3.9	3.85
7.....	4.1	4.0	3.6	6.4	3.7	5.2	4.95	4.35	7.7	5.55	3.85	3.85
8.....	4.45	4.0	3.6	4.6	3.65	5.0	4.9	4.25	7.3	5.6	3.85	3.8
9.....	4.5	4.0	3.6	4.25	3.6	5.3	4.9	4.5	7.35	5.85	3.8	3.85
10.....	4.45	3.95	3.6	4.05	3.6	5.5	4.85	4.4	6.55	6.0	3.8	3.9
11.....	4.4	3.95	3.6	4.0	3.55	5.7	4.7	4.25	6.1	5.5	3.8	3.95
12.....	4.3	3.9	3.6	4.0	3.55	6.05	4.65	3.95	6.0	5.5	3.8	4.0
13.....	4.3	3.9	3.6	3.85	3.55	6.3	4.6	3.95	7.15	5.2	3.8	4.0
14.....	4.2	3.9	3.6	3.8	3.55	6.35	4.7	3.9	8.4	5.2	3.8	4.0
15.....	4.15	3.9	3.6	3.8	4.5	6.75	4.4	3.85	7.35	4.7	3.75	4.0
16.....	4.1	3.85	3.6	3.8	4.7	6.8	4.45	4.1	8.1*	4.6	3.75	4.0
17.....	4.1	3.85	3.6	3.9	4.7	6.7	4.3	4.2	8.25	4.75	3.75	4.0
18.....	4.1	3.85	3.6	4.0	4.6	6.85	4.3	4.45	8.25	4.5	3.8	4.0
19.....	4.1	3.85	3.6	4.1	4.6	6.55	4.35	4.25	8.6	4.5	3.8	3.9
20.....	4.1	3.85	3.6	4.15	4.6	6.5	4.1	4.25	8.9	4.5	3.95	3.9
21.....	4.15	3.8	3.6	4.3	4.75	6.45	4.2	5.85	7.05	4.45	4.15	3.9
22.....	4.2	3.75	3.6	4.3	4.8	6.3	4.15	6.3	6.25	4.35	4.0	3.95
23.....	4.15	3.75	3.55	4.3	4.8	6.2	4.2	7.2	5.85	4.25	3.9	4.3
24.....	4.15	3.8	3.55	4.4	4.85	6.1	4.35	7.4	5.55	4.1	3.9	4.25
25.....	4.1	3.75	3.7	4.4	4.9	5.95	4.2	7.3	5.55	4.1	3.8	4.2
26.....	4.1	3.75	3.7	4.35	5.0	5.45	4.2	7.85	5.35	4.1	3.85	4.15
27.....	4.1	3.7	3.7	4.3	5.0	5.3	4.2	7.5	5.2	4.0	3.85	4.05
28.....	4.1	3.7	3.7	4.2	5.25	5.15	4.1	7.85	4.9	4.0	3.8	4.0
29.....	4.1	3.7	3.7	4.05	4.9	5.1	4.1	6.95	7.1	4.0	3.8	4.0
30.....	4.1	-----	3.7	4.0	4.9	5.0	4.1	6.65	5.25	4.0	3.8	3.95
31.....	4.1	-----	3.7	-----	4.9	-----	4.15	6.35	-----	4.0	-----	3.9

Daily discharge, in second-feet, of Rio Grande below Devils River, Tex., for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	2,430	2,350	1,710	1,530	2,050	5,630	4,760	2,240	12,030	4,140	2,130	1,860
2.....	2,390	2,350	1,700	1,490	2,050	5,100	4,600	2,470	15,610	3,240	2,100	1,940
3.....	2,390	2,340	1,690	1,820	1,990	5,180	4,540	2,550	16,500	3,090	2,070	1,940
4.....	2,390	2,330	1,620	2,080	1,990	5,260	4,480	2,630	18,290	10,860	2,040	2,010
5.....	a2,290	2,180	1,610	a2,180	a1,990	a5,540	4,230	3,460	15,310	a6,450	2,010	a2,010
6.....	2,440	a2,170	a1,600	2,180	1,880	5,770	a4,070	3,160	14,720	6,660	a1,980	1,950
7.....	2,440	2,170	1,490	9,720	1,700	6,010	4,220	a3,090	17,100	6,870	1,930	1,950
8.....	2,980	2,160	1,490	a3,680	1,590	5,740	4,070	2,880	15,510	7,080	1,930	1,880
9.....	3,050	2,160	1,490	2,910	1,480	6,480	4,020	3,200	15,470	8,130	1,880	1,950
10.....	a2,980	a2,080	1,490	2,570	a1,450	7,010	3,870	3,000	12,030	a8,810	a1,880	a2,020
11.....	2,870	2,070	a1,490	2,480	1,350	a7,540	a3,520	a2,710	9,990	6,900	1,880	2,100
12.....	2,690	1,990	1,490	a2,480	1,350	8,870	3,450	2,200	a9,350	6,900	1,870	2,180
13.....	a2,650	1,990	1,490	2,230	1,350	9,900	3,380	2,140	14,870	5,760	1,870	2,200
14.....	2,490	1,980	1,480	2,130	1,350	10,320	3,520	2,000	a20,870	a5,820	a1,860	a2,210
15.....	2,410	a1,970	a1,480	2,100	a3,230	a11,900	3,100	a1,840	16,780	4,270	1,810	2,190
16.....	2,320	1,890	1,480	2,080	3,680	12,150	a3,160	2,370	19,700	3,960	1,810	2,130
17.....	2,310	1,890	1,470	a2,200	3,740	11,890	2,780	2,600	20,290	4,420	1,810	2,160
18.....	a2,300	1,890	1,470	2,380	3,590	12,280	2,620	3,130	a20,320	a3,650	1,860	2,150
19.....	2,310	1,880	1,460	2,550	3,650	a11,500	2,540	a2,770	21,940	3,540	a1,860	a2,000
20.....	2,330	a1,880	a1,460	a2,630	a3,710	11,130	a2,010	2,770	23,330	3,440	2,050	2,060
21.....	2,420	1,800	1,460	2,920	4,080	10,760	2,190	7,960	a14,800	3,260	2,310	2,140
22.....	2,510	1,720	1,460	2,950	4,240	a10,090	2,100	a9,490	11,250	3,010	2,140	2,280
23.....	2,450	1,710	a1,450	2,980	a4,310	9,510	2,190	13,560	9,290	a2,780	a2,040	2,840
24.....	a2,460	a1,780	1,450	3,180	4,530	8,930	a2,490	14,460	7,740	2,580	2,010	a2,840
25.....	2,430	1,720	1,580	a3,210	4,750	8,200	2,340	14,010	7,390	2,540	1,860	2,670
26.....	2,430	1,720	a1,580	3,060	5,070	a6,470	2,340	a16,500	a6,270	2,500	a1,900	2,510
27.....	a2,430	1,660	1,580	2,910	a5,190	5,960	2,340	15,150	5,760	a2,360	1,900	a2,270
28.....	2,410	1,660	1,580	2,670	5,630	5,440	a2,230	a16,990	4,640	2,340	1,860	2,200
29.....	2,390	a1,660	1,570	2,340	4,870	5,130	2,220	13,360	13,240	2,330	1,860	2,200
30.....	2,370		1,570	a2,190	4,810	a4,710	2,200	12,150	a5,840	2,320	a1,860	2,130
31.....	a2,360		a1,570		a4,750		a2,240	a10,940		a2,300		a2,060

a Date of measurement.

Monthly discharge of Rio Grande below Devils River, Tex., for 1912.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
January.....	3,050	2,290	2,488	152,965
February.....	2,350	1,660	1,971	113,355
March.....	1,710	1,450	1,533	94,235
April.....	9,720	1,490	2,728	162,907
May.....	5,630	1,350	3,142	193,190
June.....	12,280	4,710	8,013	476,826
July.....	4,760	2,010	3,155	194,023
August.....	16,990	1,840	6,380	392,291
September.....	23,330	4,640	13,874	825,580
October.....	10,860	2,300	4,591	282,268
November.....	2,310	1,810	1,946	115,775
December.....	2,840	1,860	2,164	133,051
The year.....	23,330	1,350	4,320	3,135,866

RIO GRANDE AT EAGLE PASS, TEX.

Location.—Half a mile above the highway bridge at Eagle Pass and about 540 miles below El Paso, Tex.

Records available.—April, 1900, to December 31, 1912.

Gage.—A vertical rod bolted to a shale cliff read to stage 10.5 feet; an inclined rod spiked to posts set in the shale is used for stages above 10.5 feet.

Channel.—The bed is sandy and shifting. At low water the depth is considerable and the current is slow. Right bank is an alluvial deposit and is inundated by floods for a distance of about 1,500 feet back from the stream; left bank is of shale and rises abruptly from the river to a height above flood stages.

Discharge measurements.—Made from cable.

Cooperation.—Station established and operated by the United States section of the International Boundary Commission.

Discharge measurements of Rio Grande at Eagle Pass, Tex., in 1912.

[By R. L. Guy, R. Boubel, and J. S. Denika.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Jan. 3	1.3	2,426	May 3	1.0	1,669	Sept. 6	5.3	14,266
6	1.3	2,391	6	1.0	1,795	9	4.9	13,149
9	2.1	3,063	9	.9	1,474	12	4.5	12,010
12	1.9	2,705	12	.9	1,143	15	6.6	28,534
15	1.7	2,483	15	.9	1,235	18	6.0	21,706
18	1.6	2,504	18	2.4	3,583	21	6.0	20,641
21	1.7	2,790	21	2.4	4,026	24	3.8	8,173
24	1.8	2,712	24	2.6	3,529	27	3.1	5,844
27	1.7	2,683	27	2.8	4,940	30	4.8	12,785
31	1.8	2,581	31	2.6	4,819	Oct. 4	3.85	8,555
Feb. 3	1.8	2,696	June 3	3.0	5,216	6	3.6	7,692
6	1.6	2,233	6	2.9	5,209	9	3.6	8,178
9	1.6	2,574	9	3.0	5,123	12	3.95	9,517
12	1.5	2,003	12	3.8	8,700	15	2.7	5,036
15	1.4	2,024	15	4.5	11,573	18	2.4	3,952
18	1.4	2,068	21	5.0	12,794	21	2.2	3,597
21	1.4	1,913	24	4.4	10,592	24	2.05	3,075
24	1.4	1,833	27	3.6	6,723	27	1.8	2,677
27	1.2	1,714	30	3.0	5,277	31	1.7	2,466
29	1.2	1,793	July 3	2.9	5,136	Nov. 3	1.5	2,196
Mar. 3	1.1	1,703	6	2.7	4,552	6	1.45	1,998
6	1.1	1,480	9	2.7	4,661	9	1.4	1,924
9	1.0	1,345	12	2.4	3,815	12	1.35	2,018
12	1.0	1,581	15	2.45	4,102	15	1.3	1,892
15	1.0	1,379	18	1.9	3,010	18	1.7	2,621
18	.9	1,400	21	1.8	2,615	21	1.65	2,579
21	.9	1,406	24	1.8	2,643	24	1.5	2,210
24	.9	1,324	27	1.7	2,399	27	1.5	2,206
27	1.1	1,634	31	1.9	2,825	30	1.45	2,044
31	1.0	1,598	Aug. 3	1.8	2,745	Dec. 3	1.55	2,115
Apr. 3	.9	1,348	6	2.4	3,989	6	1.5	2,084
6	1.4	1,847	9	1.9	2,773	9	1.6	2,280
9	1.7	2,666	12	1.7	2,490	12	1.65	2,521
12	1.0	2,003	15	1.4	1,977	15	1.65	2,444
15	1.0	1,632	18	1.6	2,445	18	1.65	2,378
18	1.3	1,768	21	2.5	3,981	21	1.65	2,339
21	1.6	2,103	24	5.35	15,888	24	1.7	2,214
24	1.7	2,354	27	5.8	16,323	27	1.75	2,302
27	1.8	2,310	31	4.5	11,336	31	1.8	2,426
30	1.4	1,796	Sept. 3	5.7	15,097			

a Measurement rejected.

Daily gage height, in feet, of Rio Grande at Eagle Pass, Tex., for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	1.3	1.8	1.2	1.0	1.4	2.95	3.0	1.9	4.6	3.4	1.65	1.4
2.....	1.3	1.8	1.15	.95	1.15	3.0	2.95	1.85	4.85	2.85	1.6	1.5
3.....	1.3	1.8	1.1	.9	1.0	3.0	2.9	1.8	5.8	3.1	1.55	1.5
4.....	1.3	1.7	1.1	.9	1.0	2.9	2.85	1.8	6.1	3.6	1.5	1.5
5.....	1.3	1.6	1.1	.95	1.1	2.95	2.8	1.9	5.9	3.8	1.5	1.5
6.....	1.3	1.6	1.1	1.35	1.05	2.9	2.7	2.4	5.3	3.6	1.4	1.5
7.....	1.3	1.6	1.1	1.45	1.0	3.0	2.7	2.0	5.45	3.5	1.4	1.5
8.....	1.4	1.6	1.05	3.85	.95	3.05	2.7	1.9	5.3	3.9	1.4	1.6
9.....	2.1	1.6	1.0	1.75	.9	3.0	2.7	1.9	4.9	3.55	1.4	1.6
10.....	1.95	1.55	1.0	1.6	.9	3.0	2.65	2.15	4.75	3.45	1.4	1.6
11.....	1.9	1.5	1.0	1.5	.9	3.15	2.55	1.95	4.65	3.5	1.4	1.6
12.....	1.9	1.5	1.0	1.0	.9	3.8	2.45	1.7	4.5	4.05	1.3	1.65
13.....	1.9	1.6	1.0	1.0	.9	3.85	2.4	1.65	4.2	3.7	1.3	1.7
14.....	1.8	1.5	1.0	1.0	.9	4.25	2.4	1.55	5.65	3.15	1.3	1.7
15.....	1.7	1.4	1.0	1.0	.9	4.55	2.45	1.4	6.4	2.75	1.3	1.7
16.....	1.7	1.5	1.0	1.0	.9	4.6	2.35	1.4	6.7	3.1	1.3	1.6
17.....	1.7	1.45	1.0	.95	1.15	5.05	2.1	1.5	6.4	2.8	1.55	1.6
18.....	1.6	1.4	.9	1.3	2.2	11.6	1.9	1.6	6.05	2.5	1.75	1.6
19.....	1.6	1.4	.9	1.45	2.4	6.45	1.9	1.6	5.9	2.3	2.0	1.6
20.....	1.6	1.4	.9	1.6	2.4	5.55	1.75	1.75	5.85	2.25	1.75	1.6
21.....	1.7	1.4	.9	1.65	2.4	4.9	1.75	2.6	6.25	2.2	1.6	1.6
22.....	1.8	1.4	.95	1.8	2.4	4.8	1.8	2.95	5.65	2.15	1.5	1.6
23.....	1.8	1.4	.9	2.0	2.45	4.5	1.8	3.65	4.75	2.1	1.5	1.65
24.....	1.8	1.4	.9	1.7	2.6	4.4	1.8	5.35	3.9	2.0	1.5	1.7
25.....	1.8	1.4	.9	1.8	2.65	4.35	1.8	5.55	3.6	1.95	1.5	1.95
26.....	1.8	1.3	.95	1.85	2.75	4.1	2.1	5.9	3.25	1.85	1.5	1.95
27.....	1.7	1.2	1.05	1.8	2.8	3.7	1.7	5.8	3.1	1.8	1.5	1.8
28.....	1.8	1.2	1.1	1.75	2.8	3.55	1.7	5.55	3.0	1.8	1.5	1.8
29.....	1.8	1.2	1.05	1.6	2.75	2.9	1.7	5.4	3.15	1.75	1.4	1.8
30.....	1.8		1.0	1.4	2.6	3.0	1.75	5.3	4.45	1.7	1.4	1.8
31.....	1.8		1.0		2.55		1.9	4.65		1.7		1.8

Daily discharge, in second-feet, of Rio Grande at Eagle Pass, Tex., for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	2,580	2,620	1,790	1,550	1,800	5,160	5,280	2,830	11,650	7,180	2,400	2,010
2.....	2,500	2,660	1,750	1,450	1,720	5,220	5,210	2,780	12,430	4,990	2,330	2,080
3.....	a2,430	a2,700	a1,700	a1,350	a1,670	a5,220	a5,140	a2,750	a15,500	5,880	a2,260	a2,080
3.....	2,410	2,510	1,630	1,350	1,710	5,310	4,980	2,750	16,700	a7,660	2,150	2,080
5.....	2,400	2,320	1,560	1,400	1,800	5,310	4,810	2,950	16,090	8,380	2,110	2,080
6.....	a2,390	a2,230	a1,480	a1,800	a1,820	a5,300	a4,550	a3,990	a14,270	a7,690	a1,920	a2,080
7.....	2,390	2,350	1,480	1,900	1,710	5,310	4,590	3,128	14,680	7,500	1,920	2,100
8.....	2,470	2,460	1,410	8,800	1,590	5,320	4,620	2,850	14,270	8,720	1,920	2,260
9.....	a3,060	a2,570	a1,340	a2,810	a1,470	a5,120	a4,660	a2,770	a13,150	a7,990	a1,920	a2,280
10.....	2,820	2,370	1,420	2,570	1,360	5,120	4,480	3,130	12,720	7,600	1,980	2,340
11.....	2,730	2,160	1,500	2,480	1,250	5,500	4,200	2,840	12,440	7,790	2,030	2,390
12.....	a2,710	a2,000	a1,580	a2,000	a1,140	a8,700	a3,920	a2,490	a12,010	a9,880	a1,950	a2,520
13.....	2,710	2,140	1,510	1,880	1,170	9,206	3,880	2,410	11,110	8,620	1,930	2,570
14.....	2,590	2,080	1,450	1,760	1,210	10,570	3,940	2,230	21,640	6,650	1,910	2,540
15.....	a2,480	a2,020	a1,380	a1,630	a1,240	a11,720	a4,100	a1,980	a27,080	a5,220	a1,890	a2,510
16.....	2,520	2,140	1,430	1,630	1,310	11,870	3,900	2,020	28,660	6,480	1,890	2,350
17.....	2,560	2,100	1,470	1,620	1,310	13,220	3,410	2,230	25,580	5,400	2,350	2,330
18.....	a2,500	a2,070	a1,400	a1,770	a3,260	66,200	a3,010	a2,450	a22,100	a4,310	a2,720	a2,310
19.....	2,570	2,020	1,400	1,940	3,730	17,700	2,940	2,450	20,850	3,770	3,220	2,300
20.....	2,630	1,960	1,400	2,100	3,880	14,660	2,680	2,700	20,250	3,690	2,760	2,280
21.....	a2,790	a1,910	a1,410	a2,180	a4,030	a12,540	a2,510	a4,230	a21,890	a3,600	a2,510	a2,270
22.....	2,830	1,890	1,430	2,400	4,030	12,060	2,620	5,110	18,400	3,420	2,320	2,300
23.....	2,770	1,860	1,350	2,700	4,140	11,080	2,630	8,250	13,410	3,250	2,260	2,210
24.....	a2,710	a1,830	a1,320	a2,350	4,480	a10,590	a2,640	a15,890	a8,670	a2,990	a2,210	a2,210
25.....	2,710	1,830	1,360	2,410	4,600	9,840	2,630	16,230	7,510	2,920	2,210	2,650
26.....	2,710	1,770	1,450	2,410	4,830	8,600	3,210	17,180	6,340	2,760	2,210	2,650
27.....	a2,680	a1,710	a1,580	a2,310	a4,940	a6,970	a2,400	a16,320	a5,840	a2,680	a2,210	a2,390
28.....	2,730	1,750	1,630	2,250	4,940	6,540	2,400	15,370	5,540	2,660	2,180	2,400
29.....	2,680	a1,790	1,620	2,050	4,910	5,160	2,400	14,790	6,150	2,570	2,000	2,410
30.....	2,630		1,600	a1,800	4,820	a5,280	2,510	14,400	a11,370	2,480	a1,970	2,420
31.....	a2,580		a1,600		a4,790		a2,820	a11,910		a2,470		a2,430

aDate of measurement.

Monthly discharge of Rio Grande at Eagle Pass, Tex., for 1912.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
January.....	3,060	2,390	2,622	161,197
February.....	2,700	1,710	2,132	122,618
March.....	1,790	1,320	1,498	92,093
April.....	8,800	1,350	2,221	132,179
May.....	4,940	1,140	2,805	172,502
June.....	66,200	5,120	10,346	615,649
July.....	5,280	2,400	3,644	224,073
August.....	17,180	1,980	6,239	383,603
September.....	28,660	5,540	14,943	889,190
October.....	9,880	2,470	5,394	331,636
November.....	3,220	1,890	2,188	130,195
December.....	2,650	2,010	2,314	142,274
The year.....	66,200	1,140	4,680	3,397,209

RIO GRANDE NEAR LAREDO, TEX.

Location.—Two miles above Laredo and about 670 miles below El Paso.

Records available.—May, 1900, to December 31, 1912, except March 1 to July 31, 1903. Earlier records fragmentary.

Gage.—An inclined rod fastened to posts and trees. Gage was originally located at highway bridge at Laredo, Tex.; maintained April, 1900, to February 28, 1903. Measurements were made at this point only from April to September 24, 1900. Records at this location were poor, hence station was moved 2 miles upstream, where it has been maintained since August 1, 1903.

Channel.—Bed is sandy and shifting; right bank is of alluvial deposit; left bank is a shale bluff; both banks are above flood level.

Discharge measurements.—Made from cable.

Cooperation.—Station established and operated by the Mexican section of the International Boundary Commission.

Discharge measurements of Rio Grande near Laredo, Tex., in 1912.

[By L. Varela.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Jan. 5	3.4	2,845	May 6	4.2	6,327	Aug. 31	6.9	14,145
9	3.3	2,741	12	1.7	1,711	Sept. 5	7.9	18,459
15	3.8	3,374	17	1.4	1,394	11	7.2	16,385
20	3.4	3,132	21	3.2	3,760	15	7.4	18,888
26	3.5	3,086	25	3.5	4,355	21	8.6	22,694
30	3.4	2,926	31	3.9	4,881	25	6.2	9,608
Feb. 3	3.6	3,192	June 3	5.4	9,948	29	4.0	6,471
9	3.3	2,866	8	4.1	5,683	Oct. 5	3.5	4,893
15	3.1	2,504	14	5.5	9,608	9	5.6	9,537
21	2.1	2,294	20	16.0	40,923	15	4.2	6,801
24	1.9	2,184	21	9.0	16,509	19	3.7	5,561
28	1.8	2,134	26	5.8	8,134	25	3.1	3,897
Mar. 6	1.7	1,900	30	3.9	3,078	30	2.7	2,813
11	1.6	1,713	July 5	3.9	5,278	Nov. 4	2.5	2,578
16	1.5	1,550	10	3.7	5,304	9	2.4	2,403
21	1.6	1,604	14	3.2	4,587	15	2.3	2,051
26	1.6	1,776	20	2.7	3,042	20	2.5	2,571
30	1.8	1,918	26	2.5	2,891	26	2.5	2,682
Apr. 4	1.6	1,708	31	2.4	3,115	30	2.3	2,184
9	6.7	14,523	Aug. 4	3.3	2,584	Dec. 5	2.4	2,585
15	2.3	2,386	9	2.9	3,817	13	2.8	2,943
21	2.0	2,187	14	2.4	2,789	18	2.5	3,016
26	2.6	2,844	20	2.4	2,806	23	2.7	2,903
30	2.6	2,615	24	6.2	10,654	27	2.9	3,301
May 5	2.1	2,258	26	7.2	15,079	31	2.7	3,035

Daily gage height, in feet, of Rio Grande near Laredo, Tex., for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	3.45	3.45	1.8	1.8	2.4	4.1	3.85	2.4	6.45	3.95	2.65	2.3
2.....	3.4	3.5	1.75	1.75	3.35	5.45	4.0	2.65	6.3	3.8	2.6	2.3
3.....	3.5	3.6	1.9	1.65	2.45	5.3	3.9	3.15	6.1	3.65	2.5	2.35
4.....	3.4	3.55	1.8	1.6	2.15	3.95	3.9	3.3	7.15	3.5	2.5	2.4
5.....	3.4	3.45	1.75	1.55	2.1	3.85	3.9	3.15	7.7	3.5	2.4	2.4
6.....	3.35	3.45	1.7	1.6	4.75	3.85	3.85	2.6	7.15	3.6	2.4	2.4
7.....	3.4	3.5	1.75	1.5	3.8	4.55	3.8	2.65	6.95	3.55	2.4	2.4
8.....	3.3	3.35	1.7	1.75	2.6	4.1	3.7	2.8	6.8	4.5	2.4	2.4
9.....	3.3	3.3	1.65	6.95	2.35	4.0	3.7	2.9	6.5	5.75	2.4	2.4
10.....	3.25	3.35	1.6	3.75	2.0	4.15	3.7	2.8	6.45	6.0	2.4	2.4
11.....	3.3	3.25	1.6	2.75	1.9	4.1	3.7	2.7	7.1	5.7	2.35	2.55
12.....	3.4	3.2	1.55	2.5	1.7	4.0	3.5	2.6	6.55	5.1	2.3	2.75
13.....	3.45	3.3	1.5	2.4	1.55	4.5	3.35	2.45	6.05	4.7	2.3	2.8
14.....	3.7	3.25	1.5	2.4	1.5	5.5	3.2	2.4	5.75	4.35	2.3	2.8
15.....	3.8	3.1	1.5	2.3	1.55	5.65	3.1	2.25	7.55	4.2	2.3	2.7
16.....	3.75	3.0	1.5	2.25	1.4	6.2	3.1	2.05	7.55	4.1	2.3	2.65
17.....	3.7	3.0	1.5	2.2	1.4	6.5	3.0	1.9	7.3	4.05	2.35	2.55
18.....	3.6	2.95	1.55	2.1	2.95	8.75	2.9	1.95	8.1	3.9	2.4	2.5
19.....	3.5	2.85	1.55	2.05	3.95	19.85	2.75	2.15	7.7	3.7	2.45	2.5
20.....	3.4	2.45	1.6	1.9	3.2	15.95	2.7	2.4	7.9	3.6	2.5	2.4
21.....	3.45	2.1	1.6	2.0	3.2	9.0	2.65	2.4	8.6	3.5	2.5	2.55
22.....	3.5	2.05	1.6	2.15	3.25	6.75	2.6	3.6	8.25	3.45	2.5	2.55
23.....	3.6	1.95	1.6	2.55	3.5	6.2	2.55	5.35	7.2	3.3	2.5	2.7
24.....	3.55	1.9	1.6	2.7	3.5	6.2	2.5	6.4	6.65	3.2	2.5	2.75
25.....	3.6	1.95	1.6	2.7	3.5	5.95	2.5	7.0	6.1	3.15	2.5	2.8
26.....	3.5	1.9	1.6	2.6	3.45	5.8	2.5	6.95	5.55	3.1	2.5	2.9
27.....	3.45	1.85	1.6	2.7	3.55	5.55	2.8	6.9	4.8	2.95	2.4	2.9
28.....	3.45	1.8	1.65	2.75	3.7	5.05	2.45	6.65	4.2	2.8	2.4	2.8
29.....	3.45	1.8	1.7	2.65	3.95	4.55	2.4	6.7	4.0	2.7	2.35	2.75
30.....	3.4		1.8	2.6	4.2	3.9	2.4	6.9	3.9	2.7	2.3	2.7
31.....	3.45		1.8		3.85		2.4	6.9		2.7		2.7

RIO GRANDE NEAR ROMA, TEX.

Location.—Near Roma and about 775 miles below El Paso, Tex.

Records available.—August 14, 1900, to December 31, 1912, except March and April, 1903.

Gage.—An inclined rod spiked to posts and trees.

Channel.—Bottom sandy and shifting. Right bank, an alluvial deposit covered with mesquite brush and subject to overflow for the width of 250 feet back from the stream; left bank is of hard material and is above flood level.

Discharge measurements.—Made from cable.

Cooperation.—Station established and operated by the Mexican section of the International Boundary Commission.

Discharge measurements of Rio Grande near Roma, Tex., in 1912.

[By H. P. Guerra.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Jan. 2	3.6	1,910	May 13	2.8	2,134	Sept. 7	8.2	13,754
6	3.4	1,711	18	2.3	1,755	11	7.9	12,829
10	3.2	1,554	23	4.3	3,498	17	8.5	14,302
15	4.2	2,937	28	4.8	4,068	21	8.9	16,080
19	3.6	2,186	June 2	7.1	10,183	26	6.2	8,975
23	3.4	1,848	6	5.3	4,383	Oct. 1	10.2	22,789
27	3.5	2,026	10	5.7	4,771	5	5.1	4,340
Feb. 1	3.3	1,714	15	7.4	10,814	10	6.3	8,307
5	3.4	1,854	20	21.0	86,623	15	6.0	7,506
10	3.2	1,583	24	12.0	30,467	19	6.6	8,788
15	3.0	1,567	28	7.3	10,719	24	4.9	5,126
19	2.8	1,530	July 1	6.7	9,208	30	4.2	2,721
26	2.5	1,304	5	5.6	4,627	Nov. 2	3.9	2,618
Mar. 2	2.4	1,203	10	5.3	4,354	7	3.6	2,095
8	2.2	1,073	15	4.7	3,737	12	3.4	1,890
15	2.0	963	19	4.3	3,374	19	4.1	2,695
22	1.8	854	24	3.8	2,932	23	3.7	2,169
29	1.7	809	29	4.0	3,110	28	3.6	2,074
Apr. 2	2.1	1,068	Aug. 1	3.7	2,879	Dec. 2	3.4	1,960
6	1.8	874	5	3.5	2,587	9	3.5	2,073
10	6.5	9,419	9	4.5	3,563	13	3.7	2,410
16	2.9	2,188	14	3.3	2,432	16	3.9	2,743
22	2.7	2,011	19	2.7	1,953	20	3.8	2,409
29	3.5	2,804	24	6.9	10,344	24	3.7	2,374
May 2	3.8	3,089	30	8.5	14,724	30	4.2	2,902
8	6.0	8,224	Sept. 2	7.5	11,379			

* Approximate; velocity by floats, area computed; no soundings.

Daily gage height, in feet, of Rio Grande near Roma, Tex., for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	3.7	3.3	2.45	1.95	3.6	5.3	6.7	3.7	7.85	9.9	4.0	3.5
2.....	3.6	3.3	2.4	2.15	3.8	7.05	6.3	3.6	7.4	7.9	3.9	3.4
3.....	3.6	3.4	2.4	2.05	4.5	6.95	5.95	3.55	7.3	6.0	3.8	3.4
4.....	3.5	3.4	2.4	1.9	3.85	6.1	5.75	3.5	8.2	5.3	3.75	3.5
5.....	3.5	3.35	2.4	1.8	3.3	5.5	5.6	3.5	8.55	4.95	3.7	3.5
6.....	3.4	3.3	2.3	1.75	3.05	5.3	5.6	3.5	8.45	5.5	3.7	3.5
7.....	3.35	3.3	2.3	1.7	2.9	5.55	5.5	3.65	8.15	6.3	3.6	3.5
8.....	3.3	3.25	2.25	1.85	6.3	5.95	5.4	4.25	8.3	5.8	3.6	3.4
9.....	3.2	3.2	2.2	3.65	4.1	5.8	5.3	4.4	8.4	6.05	3.55	3.4
10.....	3.2	3.2	2.15	6.7	3.5	5.7	5.3	3.95	7.9	6.3	3.5	3.4
11.....	3.2	3.2	2.1	4.7	3.25	5.75	5.2	3.75	7.5	6.2	3.45	3.5
12.....	3.35	3.1	2.1	4.2	2.95	5.7	5.2	3.65	7.65	6.1	3.4	3.5
13.....	3.95	3.1	2.0	3.95	2.7	6.15	4.95	3.5	7.4	6.3	3.4	3.65
14.....	4.15	3.0	2.0	3.5	2.35	6.8	4.85	3.35	6.85	6.35	3.35	3.75
15.....	4.1	3.0	1.95	3.15	2.4	7.4	4.65	3.2	6.7	6.05	3.3	3.9
16.....	3.85	2.9	1.9	2.95	2.4	7.45	4.55	3.1	8.5	6.05	3.3	3.9
17.....	3.7	2.9	1.9	2.85	2.3	7.4	4.5	2.95	8.55	6.4	3.3	3.8
18.....	3.6	2.8	1.9	2.8	2.3	8.1	4.5	2.9	8.15	7.3	3.4	3.8
19.....	3.55	2.8	1.9	2.7	2.3	16.35	4.35	2.75	8.6	6.3	4.05	3.7
20.....	3.45	2.7	1.8	2.6	3.85	20.45	4.2	2.7	8.8	5.2	3.65	3.8

Daily gage height, in feet, of Rio Grande near Roma, Tex., for 1912—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
21.....	3.35	2.7	1.8	2.7	4.2	17.45	4.05	2.9	8.85	4.95	3.45	3.8
22.....	3.3	2.6	1.8	2.75	4.3	13.95	3.85	3.0	9.1	5.35	3.65	3.8
23.....	3.4	2.6	1.9	2.9	4.3	12.4	3.8	4.0	7.9	6.25	3.7	3.7
24.....	3.25	2.6	1.9	3.2	4.4	11.5	3.8	6.6	6.75	5.15	3.6	3.7
25.....	3.35	2.6	1.8	3.4	4.5	10.8	3.8	7.7	6.3	4.75	3.7	3.7
26.....	3.5	2.5	1.8	3.5	4.5	10.0	3.7	8.05	6.1	4.55	3.9	3.8
27.....	3.5	2.5	1.8	3.5	4.6	8.0	3.65	8.05	6.15	4.45	3.85	4.2
28.....	3.5	2.5	1.7	3.5	4.7	7.25	3.65	8.45	5.9	4.35	3.65	4.2
29.....	3.5	2.5	1.7	3.5	4.85	7.05	3.95	8.3	5.45	4.25	3.6	4.2
30.....	3.5		1.7	3.6	5.05	6.95	3.8	8.5	6.75	4.2	3.5	4.2
31.....	3.4		1.7		5.25		3.8	8.4		4.1		4.0

RIO GRANDE AT BROWNSVILLE, TEX.

Location.—About a mile above Brownsville, Tex., opposite Matamoros, Tamaulipas, Mexico; about 900 miles below El Paso.

Records available.—April 29, 1900, to December 31, 1912, except March and April, 1903.

Gage.—Vertical rod, fastened to fender pile on right bank.

Channel.—Bed is sandy and shifting; both banks are alluvial deposits and are inundated by extreme floods only; right bank is protected by piling.

Discharge measurements.—Made from cable.

Cooperation.—Station established and operated by the Mexican section of the International Boundary Commission.

Between Roma and Brownsville there are many lagoons (old river beds) into which the river water flows during moderate floods, and a large area is overflowed deeply by the higher floods. Much of this water returns slowly to the river as the flood subsides, so that the flow passes Brownsville more uniformly than it passes Roma. Large quantities of water also leave the river entirely, reaching the Gulf of Mexico through channels remote from the Rio Grande. Local run-off, however, keeps the total discharge at Brownsville well up toward the combined flow of the San Juan and the Rio Grande at Roma.

Discharge measurements of Rio Grande near Brownsville, Tex., in 1912.

[By P. Guerra.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Jan. 2	2.7	2,702	May 3	0.7	1,741	Sept. 4	7.8	10,763
6	2.3	2,575	7	1.5	2,173	8	11.0	16,968
11	2.0	2,394	11	4.4	4,070	12	9.5	13,236
15	1.7	2,217	15	1.2	1,880	16	8.0	11,146
19	2.4	2,646	21	—	9	20	11.5	19,037
26	2.1	2,378	25	1.0	1,771	24	13.0	21,386
30	2.2	2,474	29	1.9	2,480	29	8.1	11,171
Feb. 3	2.1	2,366	June 2	4.0	3,952	Oct. 3	13.6	23,431
7	2.0	2,248	6	6.5	8,798	7	6.7	7,369
11	1.7	2,309	10	5.7	6,398	11	7.6	8,321
15	1.6	2,138	14	5.3	5,735	15	8.3	11,585
19	1.6	2,123	18	8.2	11,035	19	8.5	12,167
23	1.2	1,939	22	13.9	19,426	23	6.3	5,639
29	1.0	1,792	26	14.1	21,182	27	7.0	7,683
Mar. 3	1.0	1,813	30	13.7	18,773	31	5.0	4,224
7	.5	1,578	July 3	8.6	9,348	Nov. 3	4.1	5,361
11	.3	1,465	7	7.5	7,554	7	3.4	3,142
15	.2	1,397	11	6.5	5,594	12	2.5	2,437
19	.1	1,304	15	5.5	4,945	15	2.1	2,163
23	—	1,140	19	4.3	3,493	19	2.3	2,317
27	.5	1,068	23	4.2	3,216	23	2.9	3,049
31	.6	975	27	2.8	2,553	27	2.8	2,902
Apr. 3	.7	923	31	3.0	2,689	30	3.0	3,153
7	.5	1,052	Aug. 3	3.6	3,137	Dec. 3	2.7	3,063
11	3.7	3,832	7	2.8	2,472	7	2.8	3,201
15	3.5	3,601	11	3.1	3,092	11	2.6	2,917
19	1.8	2,396	15	2.1	2,229	15	2.5	2,875
23	.9	1,911	19	2.0	2,139	19	2.5	2,886
27	.1	1,466	23	1.2	1,581	23	2.3	2,616
30	1.1	1,854	27	7.25	12,200	27	2.4	2,784
			31	10.0	16,134	31	2.7	3,081

Daily gage height, in feet, of Rio Grande near Brownsville, Tex., for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	2.7	2.1	1.0	—0.7	0.95	2.0	11.05	3.95	10.0	8.75	4.45	3.05
2.....	2.7	2.1	1.0	— .7	.8	3.05	9.9	3.85	9.25	11.65	4.25	2.85
3.....	2.6	2.05	1.0	— .7	.7	6.65	9.0	3.65	8.45	13.6	4.15	2.7
4.....	2.5	2.0	1.0	— .7	.6	7.1	8.5	3.45	7.85	12.35	3.95	2.8
5.....	2.4	2.0	.6	— .7	.5	6.9	8.25	3.25	8.25	9.15	3.55	2.8
6.....	2.3	2.0	.5	— .6	.75	6.55	7.9	3.05	9.25	7.35	3.5	2.9
7.....	2.3	2.0	.5	— .5	1.5	5.8	7.45	2.85	10.6	6.65	3.3	2.8
8.....	2.3	1.85	.5	— .6	1.5	5.25	7.25	2.65	11.1	6.75	3.05	2.75
9.....	2.25	1.75	.4	— .8	1.05	5.1	6.9	2.45	10.3	7.65	2.75	2.7
10.....	2.15	1.7	.3	— .6	2.75	5.5	6.65	2.25	10.1	7.65	2.6	2.6
11.....	2.05	1.7	.3	3.85	4.4	6.1	6.45	3.05	10.4	7.65	2.7	2.6
12.....	1.95	1.7	.7	4.7	3.4	6.2	6.15	2.55	9.75	8.05	2.5	2.5
13.....	1.85	1.75	.35	5.1	2.2	6.1	5.95	3.25	9.5	8.15	2.5	2.5
14.....	1.75	1.7	.2	4.5	1.75	5.35	5.75	2.75	9.2	7.95	2.25	2.5
15.....	1.7	1.6	.2	3.75	1.1	5.35	5.55	2.2	8.55	8.3	2.1	2.5
16.....	1.75	1.5	.2	3.05	.35	5.9	5.3	2.45	8.05	8.65	2.1	2.5
17.....	2.5	1.5	.2	2.9	.05	7.3	5.05	2.25	8.9	8.35	2.15	2.5
18.....	2.55	1.5	.2	2.5	— .3	8.0	4.85	2.1	11.25	7.95	2.2	2.5
19.....	2.4	1.6	.05	1.9	— .45	8.8	4.4	2.05	11.15	8.35	2.3	2.5
20.....	2.4	1.6	— .05	1.5	— .65	12.3	4.15	1.9	11.4	9.85	2.3	2.4
21.....	2.3	1.4	— .2	1.25	— .85	13.75	4.3	1.45	11.9	8.25	2.5	2.4
22.....	2.2	1.0	— .3	1.05	— .9	13.95	4.2	1.2	12.3	7.4	2.8	2.3
23.....	2.2	1.15	— .35	.85	— .9	14.0	3.95	1.2	12.75	6.5	2.95	2.3
24.....	2.25	1.2	— .4	.5	— .05	14.0	3.4	1.6	13.0	7.75	3.05	2.2
25.....	2.2	1.3	— .4	.15	.95	14.1	3.0	1.75	11.5	8.3	3.15	2.2
26.....	2.1	1.2	— .4	.0	1.4	14.15	2.9	2.2	9.6	7.95	2.95	2.3
27.....	2.1	1.2	— .45	.4	1.5	14.2	2.85	7.3	8.65	7.3	2.85	2.4
28.....	2.2	1.1	— .5	.85	1.5	14.2	2.7	8.95	8.4	6.6	2.7	2.3
29.....	2.2	1.0	— .5	1.0	1.85	14.2	2.6	9.55	8.0	5.9	2.85	2.45
30.....	2.2		— .6	1.15	1.9	13.55	2.55	9.9	7.8	5.15	3.0	2.6
31.....	2.2		— .6		2.0		2.85	10.0		4.85		2.7

SOUTH FORK OF RIO GRANDE AT SOUTH FORK, COLO.

Location.—At highway bridge half a mile west of South Fork station, in sec. 34, T. 40 N., R. 3 E. No tributaries between the station and the mouth and none for several miles above.

Records available.—August 9, 1910, to November 30, 1912. Also a number of discharge measurements made in 1909 by the United States Geological Survey.

Drainage area.—216 square miles (furnished by State engineer).

Gage.—Chain gage established May 12, 1912, at the site of the original staff gage, but referred to a different datum. The original gage was washed out by flood October 5, 1911, and was replaced by an inclined staff gage at the railroad bridge at different datum, October 16, 1911. This gage was read until May 12, 1912.

Channel.—Apparently permanent at the present location.

Discharge measurements.—Made from bridge.

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

Diversions.—There are court decrees for diversions of 11 second-feet from South Fork above the station; none below.

Cooperation.—Records furnished by the State engineer, by whom the station is maintained.

Discharge measurements of South Fork of Rio Grande at South Fork, Colo., in 1912.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Jan. 20 ^a	B. S. Clayton.....		54	July 11	C. C. Hexmalhalch.....	1.73	362
Feb. 26 ^a	do.....	2.30	50	Aug. 23	do.....	.82	78
Apr. 4	do.....	1.93	134	Sept. 13	C. E. Turner.....	.65	59
May 12	do.....	2.12	540	Oct. 17	do.....	.74	67
June 5	C. C. Hexmalhalch.....	3.22	1,510	Nov. 15	do.....	.79	73

^a Ice present.

^b Gage at railroad bridge.

Daily gage height, in feet, of South Fork of Rio Grande at South Fork, Colo., for 1912.

[Maggie Breen, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....	2.6	2.2	2.4	2.2	2.9	3.1	2.25	1.15	0.7	0.7	1.2
2.....	2.6	2.2	2.4	2.2	2.95	3.1	2.2	1.1	.7	.9	1.2
3.....	2.5	2.2	2.3	2.2	2.55	3.3	2.1	.9	.7	.6	.95
4.....	2.5	2.2	2.3	1.95	2.45	3.2	2.1	.9	.7	.8	1.0
5.....	2.4	2.2	2.2	1.95	2.6	3.3	1.9	1.0	.7	.9	1.0
6.....	2.5	2.2	2.3	1.95	2.4	3.2	1.85	.95	.75	.7	1.0
7.....	2.6	2.2	2.2	1.95	2.75	3.3	1.9	.85	.65	.7	.9
8.....	2.5	2.2	2.1	1.95	3.05	3.25	1.8	.8	.65	.7	.8
9.....	2.45	2.2	1.9	1.7	2.9	3.2	1.75	.9	.7	.8	.8
10.....	2.4	2.2	1.9	1.7	2.75	2.9	1.70	.8	.75	.7	.7
11.....	2.4	2.1	1.9	2.4	2.95	2.8	1.65	.9	.7	.6	.6
12.....	2.35	2.1	1.9	2.15	2.1	2.7	1.7	.9	.7	.65	.7
13.....	2.3	2.1	1.9	2.0	2.05	2.6	1.55	.8	.5	.6	.9
14.....	2.3	2.1	1.9	2.0	2.05	2.5	1.7	1.2	.6	.6	.8
15.....	2.3	2.1	1.9	2.0	1.95	2.7	1.65	1.1	.6	.6	.9
16.....	2.3	2.1	1.9	1.8	2.2	2.7	1.6	.95	.6	.7	.85
17.....	2.3	2.1	1.9	1.75	2.45	2.6	1.4	.9	.6	.5	.8
18.....	2.3	2.1	1.9	1.75	2.8	2.3	1.5	.85	.5	.6	.8
19.....	2.25	2.1	1.9	1.75	3.3	2.3	1.45	.85	.5	.75	.8
20.....	2.2	2.1	1.9	1.7	3.15	2.2	1.45	.85	.5	.8	.8
21.....	2.2	2.1	1.9	2.0	3.4	2.3	1.4	.85	.5	.75	.8
22.....	2.2	2.3	1.9	1.8	3.2	2.5	1.3	.8	.5	.6	.75
23.....	2.2	2.3	1.9	1.8	3.15	2.65	1.4	.7	.55	.5	.7
24.....	2.1	2.3	1.9	2.0	3.0	2.85	1.45	.7	.5	.65	.7
25.....	2.1	2.3	1.9	2.3	3.1	2.6	1.4	.7	.5	.75	.65
26.....	2.1	2.3	1.9	1.95	3.15	2.7	1.3	.7	.6	.75	.8
27.....	2.2	2.3	1.9	1.95	3.15	2.7	1.4	.7	.5	.7	.8
28.....	2.2	2.3	2.0	2.2	3.2	2.65	1.3	.7	.5	1.3	.9
29.....	2.2	2.3	2.0	2.55	3.25	2.55	1.2	.7	.7	1.0	.9
30.....	2.2	-----	2.0	2.7	3.3	2.6	1.2	.7	.65	1.15	.9
31.....	2.2	-----	2.0	-----	3.2	-----	1.2	.9	-----	1.2	-----

NOTE.—Gage heights affected by ice Jan. 1 to Apr. 3.

Daily discharge, in second-feet, of South Fork of Rio Grande at South Fork, Colo., for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....	70	50	55	100	510	1,390	635	152	62	62	165
2.....	70	50	55	110	540	1,390	600	140	62	95	165
3.....	70	50	55	120	332	1,610	540	95	62	52	105
4.....	70	50	55	132	290	1,500	540	95	62	75	115
5.....	70	50	55	132	355	1,610	430	115	62	95	115
6.....	60	50	60	132	270	1,500	405	105	68	62	115
7.....	60	50	60	132	428	1,610	430	85	57	62	95
8.....	60	50	60	132	600	1,555	380	75	57	62	75
9.....	60	50	60	83	510	1,500	360	95	62	75	75
10.....	60	50	60	83	428	1,180	340	75	68	62	62
11.....	60	50	60	270	540	1,080	320	95	62	52	52
12.....	60	50	60	185	540	990	340	95	62	57	62
13.....	55	50	60	145	510	900	280	75	45	52	95
14.....	55	50	60	145	510	820	340	165	52	52	75
15.....	55	50	60	145	455	990	320	140	52	52	95
16.....	55	50	70	100	600	990	300	105	52	62	85
17.....	55	50	70	92	780	900	225	95	52	45	75
18.....	55	50	70	92	1,080	670	260	85	45	52	75
19.....	55	50	70	92	1,610	670	242	85	45	68	75
20.....	55	50	70	83	1,445	600	242	85	45	75	75
21.....	55	50	70	145	1,720	670	225	85	45	68	75
22.....	55	50	70	100	1,500	820	190	75	45	52	68
23.....	55	50	70	100	1,445	945	225	62	48	45	62
24.....	55	50	80	145	1,280	1,130	242	62	45	57	62
25.....	55	50	80	230	1,390	900	225	62	45	68	57
26.....	55	50	80	132	1,445	990	190	62	52	68	75
27.....	55	50	80	132	1,445	990	225	62	45	62	75
28.....	55	50	90	200	1,500	945	190	62	45	190	95
29.....	55	50	90	332	1,555	860	165	62	62	115	95
30.....	55	-----	90	400	1,610	900	165	62	57	152	95
31.....	55	-----	90	-----	1,500	-----	165	95	-----	165	-----

NOTE.—Discharge estimated Jan. 1 to Apr. 3.

Monthly discharge of South Fork of Rio Grande at South Fork, Colo., for 1912.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
January.....	70	55	58.5	3,600
February.....	50	50	50.0	2,880
March.....	90	55	68.2	4,190
April.....	400	83	147	8,750
May.....	1,720	270	927	57,000
June.....	1,610	600	1,090	64,900
July.....	635	165	314	19,300
August.....	165	62	90.6	5,570
September.....	68	45	54.1	3,220
October.....	190	45	74.5	4,580
November.....	165	52	87.0	5,180
The period.....				179,000

NOTE.—These records have been changed slightly from the State engineer's records to conform with the computing rules of the U. S. Geological Survey.

SAGUACHE RIVER NEAR SAGUACHE, COLO.

Location.—At the dam site of the Stark-Hagadorn Irrigation Co., 9 miles above Saguache. Ford Creek, the nearest important tributary, enters some distance below.

Records available.—August 7, 1910, to September 30, 1912.

Drainage area.—595 square miles (furnished by State engineer).

Gage.—An automatic recording gage.

Channel.—Shifting.

Discharge measurements.—Made from footbridge 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 46 second-feet from Saguache River above the station, and 365 second-feet below.

Cooperation.—Records are furnished by the State engineer through the courtesy of the Stark-Hagadorn Irrigation Co.

Discharge measurements of Saguache River near Saguache, Colo., in 1912.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Jan. 14 ^a	B. S. Clayton.....	1.67	29	June 8	C. C. Hezmalhalch.....	2.91	355
Apr. 7 ^a	do.....	1.04	82	July 13	do.....	1.38	113
May 9	do.....	2.51	268	Sept. 16	C. E. Turner.....	1.06	66

^a Ice measurement.

Daily gage height, in feet, of Saguache River near Saguache, Colo., for 1912.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Apr.	May.	June.	July.	Aug.	Sept.
1.....		2.25	3.15	1.9	1.6	1.1	16.....	0.7	1.65	1.9	1.65	2.0	0.9
2.....		2.5	2.9	1.65			17.....	.7	1.8	2.65	1.65	1.85	.85
3.....		2.2	2.75	1.45			18.....	.7	2.4	2.15	1.5	1.7	.75
4.....		1.45	2.75	1.35			19.....	.7	2.75	2.0	1.5	1.45	.75
5.....		1.25	2.75	1.45			20.....	.6	2.9	1.75	1.6	1.35	.75
6.....		1.15	2.8	1.4			21.....	.5	3.0	1.65	1.35	1.25	.75
7.....		1.5	2.65	1.4			22.....	.4	3.1	1.7	1.6	1.15	.7
8.....		2.1	2.85	1.45			23.....	.5	3.1	1.85	2.2	1.05	.7
9.....		2.5	2.85	1.35		1.0	24.....	.5	3.0	2.0	2.0	1.05	
10.....		2.25	2.75	1.35		1.0	25.....	.85	3.0	1.8	2.0	1.0	
11.....	1.15	2.0	2.55	1.35		1.0	26.....	.85	3.2	1.8	1.6	1.0	
12.....	1.1	2.0	2.35	1.35		1.0	27.....	.8	3.2	1.85	1.65	1.0	
13.....	.7	2.25	2.2	1.35		1.0	28.....	.75	3.15	1.8	2.1	1.0	
14.....	.6	2.0	2.1	1.35	1.6	1.0	29.....	1.3	3.1	1.8	1.95	1.0	
15.....	.7	1.65	2.0	1.45	2.0	1.0	30.....	1.85	3.1	2.1	1.75	1.05	
							31.....		3.15		1.65	1.1	

Daily discharge, in second-feet, of Saguache River near Saguache, Colo., for 1912.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	80	224	413	168	131	87	16.....	64	136	168	136	183	74
2.....	80	268	353	136	131	85	17.....	64	155	298	136	162	71
3.....	80	215	320	116	131	85	18.....	64	249	206	121	142	66
4.....	80	116	320	106	131	85	19.....	64	320	183	121	116	66
5.....	80	98	320	116	131	85	20.....	60	353	148	131	106	66
6.....	80	90	331	111	131	80	21.....	56	377	136	106	98	66
7.....	82	121	298	111	131	80	22.....	53	401	142	131	90	64
8.....	82	198	342	116	131	80	23.....	56	401	162	215	84	64
9.....	87	268	342	106	131	80	24.....	56	377	183	183	84	60
10.....	87	224	320	106	131	80	25.....	71	377	155	183	80	60
11.....	90	183	278	106	131	80	26.....	71	425	155	131	80	60
12.....	87	183	240	106	131	80	27.....	68	425	162	136	80	60
13.....	64	224	215	106	131	80	28.....	66	413	155	198	80	60
14.....	60	183	198	106	131	80	29.....	102	401	155	176	80	60
15.....	64	136	183	116	183	80	30.....	162	401	198	148	84	60
							31.....		413		136	87	

NOTE.—Discharge estimated or interpolated for days for which gage heights are missing.

Monthly discharge of Saguache River near Saguache, Colo., for 1912.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
April.....	162	53	75.3	4,480
May.....	425	90	270	16,600
June.....	413	136	236	14,000
July.....	215	111	133	8,180
August.....	183	80	118	7,260
September.....	87	60	72.8	4,330
The period.....				54,800

NOTE.—Records have been changed slightly from the State engineer's records to conform with the computing rules of the U. S. Geological Survey.

SAN LUIS CREEK AT VILLA GROVE, COLO.

Location.—Opposite Villa Grove post office; a short distance below the mouth of Kerber Creek. From September 8 to November 30, 1910, a station was maintained 5 miles south of Villa Grove, about sec. 5, T. 45 N., R. 10 E. The records at the two points are not comparable as there are court decrees for diversions of 33 second-feet between the two points.

Records available.—July 30, 1911, to September 30, 1912.

Drainage area.—218 square miles (furnished by the State engineer).

Gage.—Vertical staff.

Channel.—Apparently permanent.

Discharge measurements.—Made from footbridge.

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

Diversions.—There are court decrees for diversions from San Luis Creek of 34 second-feet above the station, and 111 second-feet below.

Cooperation.—Records are furnished by the State engineer, by whom the station is maintained.

Discharge measurements of San Luis Creek at Villa Grove, Colo., in 1912.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Jan. 13 ^a	B. S. Clayton.....	0.65	5.0	June 8	C. C. Hezmalhalch.....	2.05	102
Feb. 25	C. C. Hezmalhalch.....	.82	6.8	July 13	do.....	1.20	20
Apr. 6	B. S. Clayton.....	1.22	43	Sept. 16	C. E. Turner.....	1.12	14
May 10	do.....	1.52	46				

^a Ice conditions.

Daily gage height, in feet, of San Luis Creek at Villa Grove, Colo., for 1912.

[A. V. Shippey, observer.]

Day.	Jan.	Feb.	Apr.	May.	June.	July.	Aug.	Sept.
1					2.2	1.5	1.3	1.1
2					2.1	1.4	1.3	1.0
3					2.0	1.3	1.3	1.0
4					1.9	1.3	1.3	1.0
5					2.0	1.3	1.3	1.1
6			1.2		2.0	1.2	1.3	1.1
7					1.9	1.2	1.3	1.1
8					2.0	1.1	1.2	1.1
9					2.2	1.1	1.2	1.1
10					2.0	1.0	1.2	1.1
11					1.8	1.1	1.0	1.1
12				1.6	1.8	1.1	1.0	1.1
13	0.65			1.6	1.7	1.2	1.1	1.1
14				1.5	1.7	1.2	1.2	1.1
15				1.5	1.6	1.2	1.2	1.1
16				1.4	1.5	1.2	1.3	1.1
17				1.5	1.7	1.3	1.3	1.1
18				1.7	1.5	1.3	1.3	1.1
19				1.7	1.9	1.3	1.2	1.1
20				1.7	1.8	1.4	1.2	1.1
21				1.7	1.6	1.4	1.2	1.1
22				2.1	1.7	1.3	1.2	1.1
23				2.1	1.7	1.4	1.1	1.1
24				2.1	1.7	1.4	1.1	1.1
25		0.8		2.2	1.8	1.4	1.1	1.1
26				2.2	1.8	1.3	1.1	1.1
27				2.2	1.7	1.3	1.1	1.1
28				2.3	1.6	1.4	1.3	1.1
29				2.2	1.6	1.4	1.2	1.1
30				2.2	1.5	1.4	1.2	1.1
31				2.4		1.3	1.2	

Daily discharge, in second-feet, of San Luis Creek at Villa Grove, Colo., for 1912.

Day.	Jan.	Feb.	Apr.	May.	June.	July.	Aug.	Sept.
1				44	120	44	27	15
2				44	108	35	27	11
3				44	97	27	27	11
4				44	85	27	27	11
5				48	97	27	27	15
6			43	48	97	20	27	15
7				48	85	20	27	15
8				48	97	15	20	15
9				54	120	15	20	15
10				54	97	11	20	15
11				54	74	15	11	15
12				54	74	15	11	15
13	5			54	64	20	15	15
14				44	64	20	20	15
15				44	54	20	20	15
16				35	44	20	27	15
17				44	64	27	27	15
18				44	44	27	27	15
19				64	85	27	20	15
20				64	74	35	20	15
21				64	54	35	20	15
22				108	64	27	20	15
23				108	64	35	15	15
24				108	64	35	15	15
25		7		120	74	35	15	15
26				120	74	27	15	15
27				120	64	27	15	15
28				132	54	35	27	15
29				120	54	35	20	15
30				120	44	35	20	15
31				145		27	20	

NOTE.—Discharge estimated May 1 to 11.

Monthly discharge of San Luis Creek at Villa Grove, Colo., for 1912.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
May.....	145	35	91.8	5,640
June.....	120	44	75.1	4,470
July.....	44	11	26.5	1,630
August.....	27	11	20.9	1,290
September.....	15	11	14.6	869
The period.....				13,900

NOTE.—Records have been changed slightly from the State engineer's records to conform with the computing rules of the U. S. Geological Survey.

KERBER CREEK NEAR VILLA GROVE, COLO.

Location.—6 miles above Villa Grove, in about sec. 19, T. 46 N., R. 9 E.

Records available.—October 17, 1911, to June 30, 1912.

Drainage area.—80 square miles. (Furnished by the State engineer.)

Gage.—Vertical staff.

Channel.—Records not sufficient to show.

Discharge measurements.—Made by wading.

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

Diversions.—There are court decrees for diversions of 10 second-feet from Kerber Creek above the station and 46 second-feet below.

Cooperation.—Station maintained by the State engineer, by whom the records are furnished.

Discharge measurements of Kerber Creek near Villa Grove, Colo., in 1911–12.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
1911.		<i>Feet.</i>	<i>Sec.-ft.</i>	1912.		<i>Feet.</i>	<i>Sec.-ft.</i>
Oct. 17	B. S. Clayton.....	1.01	10.0	Feb. 25 ^a	C. C. Hezmalhalch.....		5.1
Nov. 20 ^a	do.....	1.10	11.6	Apr. 6	B. S. Clayton.....	1.20	20.0
				May 10	do.....	1.37	33.0
1912.				July 13	C. C. Hezmalhalch.....	1.10	15.0
Jan. 15 ^a	do.....		4.0	Sept. 16	C. E. Turner.....	.95	6.8

^a Ice.

Daily discharge, in second-feet, of Kerber Creek near Villa Grove, Colo., for 1911.

Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.
1.....		14	10	11.....		9	8.0	21.....	14	20	6.0
2.....		14	10	12.....		12	8.0	22.....	20	17	6.0
3.....		14	10	13.....		20	8.0	23.....	27	14	6.0
4.....		14	10	14.....		27	8.0	24.....	20	12	4.0
5.....		14	10	15.....		20	6.0	25.....	14	12	4.0
6.....		14	10	16.....		20	6.0	26.....	14	12	4.0
7.....		14	10	17.....		17	6.0	27.....	14	12	4.0
8.....		14	8.0	18.....		20	6.0	28.....	14	12	4.0
9.....		14	8.0	19.....		20	6.0	29.....	14	12	4.0
10.....		14	8.0	20.....	12	20	6.0	30.....	14	12	4.0
								31.....	14		4.0

NOTE.—Daily discharge estimated because of ice Nov. 24 to Dec. 31.

Daily gage height, in feet, and discharge, in second-feet, of Kerber Creek near Villa Grove, Colo., for 1912.

[Mrs. Geo. Ellis, observer.]

Day.	January.		February.		March.		April.		May.		June.	
	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.
1.....	1.9	4		4		5		18	1.3	27	2.2	153
2.....	1.95	4		4		5		18	1.35	32	2.15	144
3.....	2.0	4		4		5		20	1.4	36	1.95	108
4.....	2.0	4		4		7		20	1.35	32	1.95	108
5.....	2.15	4		5		7		20	1.3	27	1.8	84
6.....	2.3	4		5		7		20	1.3	27	1.8	84
7.....	2.35	4		5		7	1.2	20	1.3	27	1.8	84
8.....	2.4	4		5		7	1.35	32	1.35	32	1.75	77
9.....	2.4	4		5		10	1.35	32	1.35	32	1.7	70
10.....	2.4	4		5		10	1.3	27	1.45	41	1.7	70
11.....	2.4	4		5		10	1.2	20	1.45	41	1.65	64
12.....	2.4	4		5		10	1.2	20	1.45	41	1.6	57
13.....	2.35	4		5		10	1.2	20	1.5	46	1.6	57
14.....	2.3	4		5		10	1.1	14	1.35	32	1.6	57
15.....	1.0	4		5		10	1.1	14	1.35	32	1.6	57
16.....	1.1	4		5		12	1.1	14	1.4	36	1.55	52
17.....	1.2	4		5		12	1.1	14	1.45	41	1.5	46
18.....	1.2	4		5		12	1.1	14	1.6	57	1.5	46
19.....	1.2	4		5		12	1.1	14	1.65	64	1.45	41
20.....	1.2	4		5		12	1.1	14	1.75	77	1.45	41
21.....	1.1	4		5		14	1.1	14	2.1	134	1.5	46
22.....	1.0	4		5		14	1.1	14	2.15	144	1.5	46
23.....	1.0	4		5		14	1.15	17	2.2	153	1.5	46
24.....	1.0	4		5		14	1.2	20	2.35	182	1.5	46
25.....	1.0	4		5		14	1.25	24	2.45	202	1.55	52
26.....	1.0	4		5		14	1.3	27	2.4	192	1.6	57
27.....	1.0	4		5		14	1.25	24	2.35	182	1.6	57
28.....	1.0	4		5		16	1.25	24	2.25	182	1.6	57
29.....	1.25	4		5		16	1.25	24	2.25	182	1.6	57
30.....	1.2	4				16	1.35	32	2.35	182	1.6	57
31.....	1.2	4				16			2.3	172		

NOTE.—Gage heights Jan. 1 to 31 affected by ice. Daily discharge Jan. 1 to Apr. 6 estimated.

Monthly discharge of Kerber Creek near Villa Grove, Colo., for 1911-12.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1911.				
October 18-30	27	9.0	15.0	387
November	27	9.0	15.2	904
December	10	4.0	6.77	416
1912.				
January	4.0	4.0	4.0	246
February	5.0	4.0	4.9	282
March	16	5.0	11.0	676
April	32	14	20.2	1,200
May	202	27	85.4	5,250
June	153	41	67.4	4,010
The period				11,700

NOTE.—Records have been changed slightly from the State engineer's records to conform with the computing rules of the U. S. Geological Survey.

RIO ALAMOSA NEAR MONTE VISTA, COLO.

Location.—In the Rio Grande National Forest, in sec. 2, T. 36 N., R. 5 E., 28 miles southwest of Monte Vista; a short distance below the mouth of French Creek.

Records available.—September 29, 1911, to June 6, 1912.

Drainage area.—91¹ square miles. (Determined from Forest Atlas.)

Gage.—Vertical staff.

Channel.—Data too few to be conclusive.

Discharge measurements.—Made from bridge 1 mile above gage during high water and by wading at ordinary stages.

Winter flow.—No information available.

Diversions.—The station is above all diversions except a ditch and flume used for hydraulic power at Terrace reservoir, which takes water half a mile above. There are court decrees for diversions of 1,700 second-feet from Alamosa River below the station.

Accuracy.—Conditions are favorable for fairly accurate results, and the estimates are considered fair.

Cooperation.—Gage heights furnished by the United States Forest Service.

Discharge measurements of Rio Alamosa near Monte Vista, Colo., in 1912.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Jan. 20 ^a	H. B. Waha.....	2.20	14.5	May 21	H. B. Waha.....	5.55	1,000
Mar. 14 ^a	do.....	1.90	19.9	22	do.....	5.40	916
Apr. 30	do.....	3.50	175				

^a Ice present.

Daily discharge, in second-feet, of Rio Alamosa near Monte Vista, Colo., for 1911.

Day.	Sept.	Oct.	Nov.	Dec.	Day.	Sept.	Oct.	Nov.	Dec.
1.....		220	69	42	16.....		109	58	38
2.....		185	67	41	17.....		110	71	38
3.....		135	67	41	18.....		93	71	38
4.....		142	67	41	19.....		91	71	38
5.....		4,250	66	39	20.....		88	53	38
6.....		710	66	39	21.....		86	51	38
7.....		555	64	39	22.....		85	49	38
8.....		400	59	39	23.....		81	50	38
9.....		245	59	39	24.....		80	52	25
10.....		210	58	39	25.....		79	50	25
11.....		170	55	38	26.....		76	52	28
12.....		156	55	38	27.....		75	42	31
13.....		139	55	38	28.....		73	44	25
14.....		125	53	38	29.....	62	71	44	25
15.....		115	55	38	30.....	96	69	44	25
					31.....		69		25

¹ Revised since 1911 report.

Daily gage height, in feet, and discharge, in second-feet, of Rio Alamosa near Monte Vista, Colo., for 1912.

Day.	January.		February.		March.		April.		May.		June.	
	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
1.....	2.00		2.20		2.20	20	2.25	42	3.50	185		
2.....			2.20		2.15	20	2.25	42	3.25	149		
3.....	2.00		2.32		2.15	20	2.25	42	3.20	142		
4.....	2.00		2.32		2.15	20	2.25	42	3.15	135	6.0	1,250
5.....	2.05		2.32		2.20	20	2.25	42	3.15	135		
6.....	2.05		2.35		2.22	20	2.30	45	3.30	156		
7.....	2.05		2.35		2.22	20	2.50	62	3.60	200		
8.....	2.00		2.30		2.30	20	2.50	62	3.95	285		
9.....	2.00		2.30		2.30	20	2.65	76	3.85	258		
10.....	2.05		2.32		2.20	20	2.75	86	3.50	185		
11.....	2.05		2.32		2.20	20	2.55	66	3.50	185		
12.....	2.05		2.30		2.20	20	2.51	63	3.60	200		
13.....	2.10		2.30		2.15	20	2.46	58	3.50	185		
14.....	2.10		2.30			20	2.48	60	3.60	200		
15.....			2.30			22	2.42	55	3.40	170		
16.....			2.30			24		54	3.60	200		
17.....	2.20		2.28			26		52	4.15	348		
18.....	2.15		2.28			28		50	4.70	570		
19.....	2.10		2.20			30	2.34	48	4.90	660		
20.....	2.15	14.5	2.22		2.10	31	2.38	51	5.20	810		
21.....	2.15		2.22		2.12	32	2.30	45	5.60	1,020		
22.....	2.15		2.22		2.00	25	2.24	41	5.50	970		
23.....	2.20		2.20		2.00	25	2.40	53		995		
24.....	2.20		2.20		2.05	28	2.60	71	5.60	1,020		
25.....	2.15		2.20		2.05	28	2.64	75		1,040		
26.....	2.20		2.20		2.05	28	2.58	69		1,060		
27.....	2.22		2.20		2.05	28	2.62	73		1,080		
28.....	2.20		2.20		2.05	28	2.70	81		1,100		
29.....	2.22		2.20		2.10	31	2.98	113		1,120		
30.....	2.20				2.00	25	3.40	170		1,140		
31.....	2.20					33				1,160		

NOTE.—Gage heights Jan. 1 to Mar. 13 affected by ice. Daily discharge determined from a rating curve fairly well defined below 185 second-feet and between 810 and 1,080 second-feet. Discharge estimated or interpolated for days for which gage heights are missing. Discharge estimated on account of ice Mar. 1-13, 1912.

Monthly discharge of Rio Alamosa near Monte Vista, Colo., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
1911.					
October.....	a 4,250	69	293	18,000	C.
November.....	69	42	57.2	3,400	B.
December.....	42	25	35.5	2,180	B.
1912.					
January.....			b15.0	922	D.
February.....			b17.5	1,010	D.
March.....	33	20	24.3	1,490	C.
April.....	170	41	63.0	3,750	B.
May.....	1,160	135	550	33,800	C.
The period.....				41,000	

a Only approximate.

b Estimated from actual discharge measurements.

RIO ALAMOSA NEAR LA JARA, COLO.

Location.—Just below the Terrace reservoir dam in sec. 14, T. 36 N., R. 6 E., and 24 miles northwest of La Jara. There is no tributary within several miles.

Records available.—April 18, 1909, to October 22, 1912.

Drainage area.—120 square miles (furnished by the State engineer).

Gage.—Vertical staff located 1,000 feet below the dam.

Channel.—Fairly permanent.

Artificial control.—The Terrace reservoir has a total capacity of 17,000 acre-feet, of which 7,000 acre-feet were actually used during 1912. The reservoir eliminates daily fluctuations in stage and effects the high-water flow by reducing the crest somewhat and prolonging the high-water period. Since the records have been maintained the reservoir has had no effect on the low-water flow.

Diversions.—There are no court decrees for diversions above the station.

Cooperation.—This station maintained by the San Luis Land & Irrigation Co. and the records furnished by Mr. John E. Field.

Daily discharge, in second-feet, of Rio Alamo a near La Jara, Colo., for 1909-1912.

Day.	Apr.	May.	June.	July.	Oct.	Nov.	Dec.
1909.							
1.....		194	411	354	75	35	90
2.....		194	469	318	97	35	60
3.....		290	645	301	105	25	75
4.....		391	722	284	105	35	60
5.....		555	874	252	90	35	222
6.....		645	874	237	90	35	222
7.....		670	978	237	90	35	144
8.....		695	874	222	75	35	105
9.....		555	941	222	75	35	75
10.....		410	740	194	90	35	75
11.....		510	722	194	75	45	90
12.....		510	645	181	75	35	167
13.....		510	722	167	75	35	167
14.....		510	695	167	60	35	105
15.....		490	645	194	60	35	60
16.....		510	645	144	60	75	75
17.....		555	645	144	60	90	75
18.....		391	622	599	133	60	105
19.....		555	645	599	122	60	90
20.....		354	599	645	122	60	75
21.....		284	490	599	144	45	60
22.....		429	555	155	45	35	105
23.....		194	391	510	167	45	45
24.....		180	336	510	167	45	45
25.....		105	318	510	155	45	60
26.....		133	372	510	144	35	60
27.....		159	490	490	122	35	45
28.....		284	555	449	122	35	45
29.....		194	391	391	105	35	60
30.....		188	469	354	90	35	60
31.....		411		82	25		75

Day.	Jan.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1910.									
1.....	60		70	469	645	144	122	45	25
2.....	75		105	429	645	122	105	45	25
3.....	60		105	391	645	122	105	35	25
4.....	75		85	391	645	122	90	35	25
5.....	60		85	391	555	105	222	35	25
6.....	60		85	469	469	105	167	25	25
7.....	60		105	429	429	105	144	35	25
8.....	75	75	122	469	252	105	105	25	25
9.....	75	75	167	510	252	90	105	25	25
10.....	75	90	118	599	284	90	144	35	25

Daily discharge, in second-feet, of Rio Alamosa near La Jara, Colo., for 1909-1912—Con.

Day.	Jan.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
11.....	90	75	144	645	284	90	144	25	25
12.....	75	90	142	645	284	90	167	35	25
13.....	75	90	167	645	397	90	167	25	25
14.....	75	90	144	599	354	90	167	25	25
15.....	75	75	144	510	318	90	167	25	25
16.....	75	75	105	469	318	90	167	25	25
17.....	90	90	122	429	194	90	144	25	25
18.....	75	144	429	222	75	122	25	25	25
19.....	90	167	429	222	75	105	25	25	25
20.....	75	167	391	252	75	105	25	25	25
21.....	75	167	391	252	75	90	35		
22.....	105	167	318	252	75	75	35		
23.....	167	167	284	252	60	45	25		
24.....	144	252	252	194	60	45	25		
25.....	167	318	252	167	60	45	35		
26.....	144	354	429	167	60	45	25		
27.....	122	354	469	167	60	45	25		
28.....	105	429	555	144	60	45	25		
29.....	90	510	645	144	144	45	25		
30.....	105	510	645	144	144	45	25		
31.....	90		645		144	45			

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1911.							
1.....	60	222	555	530	235	100	215
2.....	75	252	599	670	235	100	255
3.....	75	252	599	720	215	100	335
4.....	60	284	555	720	215	100	530
5.....	60	354	555	670	215	100	1,085
6.....	60	469	599	530	215	100	1,310
7.....	60	510	599	410	68	100	1,165
8.....	60	555	872	335	68	100	810
9.....	60	599	1,090	335	68	100	510
10.....	60	599	1,090	335	47	100	252
11.....	60	555	1,090	335	68	100	144
12.....	45	469	645	335	68	100	0
13.....	45	429	645	335	100	100	0
14.....	45	354	645	335	135	100	0
15.....	60	391	645	335	135	100	0
16.....	75	429	645	335	135	100	695
17.....	105	469	645	235	100	100	695
18.....	105	510	645	235	100	100	122
19.....	122	555	645	235	100	100	90
20.....	122	510	749	235	100	100	90
21.....	144	391	808	235	100	215	90
22.....	194	391	808	235	100	215	90
23.....	194	510	812	235	100	215	90
24.....	194	555	808	235	100	175	90
25.....	194	599	808	235	100	175	90
26.....	222	599	555	235	100	175	90
27.....	284	555	429	235	100	100	90
28.....	252	510	429	235	100	100	90
29.....	284	469	429	235	100	100	90
30.....	252	510	510	235	100	135	90
31.....		555		235	100		90

Day.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1912.									
1.....	53	53	53	166	1,030	480	290	65	43
2.....	53	53	53	210	1,030	480	290	65	43
3.....	53	53	53	176	1,100	460	290	65	43
4.....	53	53	72	156	795	420	290	65	43
5.....	53	53	86	146	678	380	290	65	43
6.....	53	53	86	176	708	360	290	65	43
7.....	53	53	94	240	631	360	290	65	43
8.....	53	53	94	360	609	360	290	53	43
9.....	53	53	86	305	661	360	290	53	43
10.....	53	53	102	225	692	325	290	53	43

Daily discharge, in second-feet, of Rio Alamosa near La Jara, Colo., for 1909-1912—Con.

Day.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
11.....	53	53	86	198	695	325	288	53	43
12.....	53	53	78	240	670	308	286	53	43
13.....	53	53	65	240	595	342	180	53	43
14.....	53	53	53	240	460	360	122	53	43
15.....	53	53	53	240	380	360	104	53	43
16.....	53	53	53	240	400	360	126	53	43
17.....	53	53	53	360	400	360	142	53	43
18.....	53	65	53	528	400	360	130	53	43
19.....	53	78	53	650	400	360	96	53	43
20.....	53	78	53	825	360	325	94	53	43
21.....	53	53	53	890	360	325	94	53	43
22.....	53	53	53	925	360	325	94	53	35
23.....	53	53	59	1,030	360	325	94	53	
24.....	53	53	59	1,030	360	325	102	43	
25.....	53	53	59	995	380	325	86	43	
26.....	53	53	59	1,030	400	325	78	43	
27.....	53	53	72	1,030	460	325	78	43	
28.....	53	53	65	1,030	480	325	86	43	
29.....	53	53	86	1,030	480	325	65	43	
30.....		53	136	1,030	480	325	65	43	
31.....		53		1,030		290	65		

Monthly discharge of Rio Alamosa near La Jara, Colo., for 1909-1912.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1909.				
April (12 days).....	555	105	252	6,000
May.....	695	194	475	29,200
June.....	978	354	632	37,600
July.....	354	82	182	11,200
October.....	105	25	63	3,870
November.....	105	25	49	2,920
December.....	222	60	98	6,030
1910.				
January 1-16.....	90	60	71	2,250
March 8-31.....	167	75	99	4,710
April.....	510	70	191	11,400
May.....	645	252	472	29,000
June.....	645	144	318	18,900
July.....	144	60	94	5,780
August.....	222	45	108	6,640
September.....	45	25	29	1,730
October 1-20.....	25	25	25	992
1911.				
April.....	284	45	121	7,200
May.....	599	222	465	28,600
June.....	1,090	429	684	40,700
July.....	720	235	348	21,400
August.....	235	47	120	7,380
September.....	215	100	120	7,140
October.....	1,310	0	300	18,400
The period.....				131,000
1912.				
February.....	53	53	53	3,050
March.....	78	53	55	3,380
April.....	136	53	69	4,110
May.....	1,030	146	547	33,600
June.....	1,100	360	560	33,300
July.....	480	290	354	21,800
August.....	290	65	173	10,600
September.....	65	43	53	3,150
October 1-22.....	43	35	43	1,880
The period.....				115,000

CONEJOS RIVER NEAR MOGOTE, COLO.

Location.—At highway bridge near Mogote. From September 1, 1899, to March 31, 1900, and from April 17, 1903, to October 31, 1905, a station was maintained about 4 miles above Mogote. From March 21, 1907, to October 5, 1911, a station was maintained at Jacob's ranch, 8 miles above Mogote.

Records available.—January 1, 1912, to December 6, 1912.

Drainage area.—Not measured.

Gage.—Chain.

Channel.—Apparently permanent at present location.

Discharge measurement.—Made from bridge.

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

Diversions.—There are court decrees for diversion of 3,476 second-feet from Conejos River, all but 66 second-feet being diverted below the present station.

Cooperation.—Station maintained by the State engineer, who furnished the complete records.

Discharge measurements of Conejos River near Mogote, Colo., in 1912.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec. ft.</i>			<i>Feet.</i>	<i>Sec. ft.</i>
Jan. 17 ^a	B. S. Clayton.....		74	July 12	C. C. Hezmalhalch.....	3.00	634
Feb. 27 ^a	do.....		46	Aug. 23	do.....	2.00	115
Apr. 5	do.....	1.24	199	Sept. 17	C. E. Turner.....	1.85	65
May 14	do.....	2.68	875	Oct. 18	do.....	1.93	77
June 10	C. C. Hezmalhalch.....	4.40	2,110	Nov. 16	do.....	1.92	78

^a Ice.

Daily gage height, in feet, of Conejos River near Mogote, Colo., for 1912.

[Dryden Broyles, observer.]

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....		2.4	4.6	3.6	2.55	1.95	1.75	1.9	2.0
2.....		2.6	4.45	3.4	2.5	1.85	1.75	1.95	1.9
3.....		2.55	4.8	3.3	2.55	1.9	1.8	1.9	1.9
4.....		2.2	4.9	3.2	2.2	1.85	1.8	1.8	2.0
5.....	1.25	2.1	4.6	2.85	2.2	1.85	1.9	1.9	2.0
6.....	1.2	2.2	4.7	2.8	2.2	1.85	1.95	1.85	2.0
7.....	1.35	2.7	4.8	3.0	2.15	1.8	1.9	1.85	
8.....	1.4	2.9	4.7	3.4	2.1	1.75	1.85	1.85	
9.....	1.3	2.85	4.75	2.9	2.05	1.85	1.85	1.9	
10.....	1.6	2.55	4.35	2.85	2.0	1.8	1.85	1.95	
11.....	1.3	2.55	4.25	2.9	2.0	1.9	1.9	1.95	
12.....	1.3	2.7	3.9	3.05	2.0	1.9	1.85	1.9	
13.....	1.1	2.7	3.9	3.0	1.95	1.85	1.9	1.9	
14.....	1.15	2.55	3.8	3.05	2.0	1.8	1.85	1.95	
15.....	1.1	2.4	4.25	3.6	2.85	1.85	1.9	1.9	
16.....	1.1	2.65	3.95	3.2	2.15	1.9	1.85	1.85	
17.....	1.1	3.2	3.95	3.05	2.0	1.8	1.85	1.85	
18.....	1.1	3.4	3.7	2.9	2.05	1.85	1.9	1.9	
19.....	1.1	3.8	3.4	2.9	2.0	1.8	1.9	1.85	
20.....	1.1	4.1	3.35	2.85	2.05	1.8	1.95	1.85	
21.....	1.0	4.45	3.55	2.9	2.1	1.75	1.9	1.95	
22.....	1.0	4.65	3.8	2.95	2.2	1.8	1.9	1.9	
23.....	1.2	5.15	3.7	2.85	2.0	1.8	1.8	1.85	
24.....	1.5	4.6	3.85	2.8	1.95	1.8	1.85	1.85	
25.....	1.6	4.95	3.7	2.75	1.9	1.8	1.85	1.85	
26.....	1.4	5.0	3.55	2.75	1.95	1.8	1.9	1.85	
27.....	1.5	5.15	3.65	2.75	1.9	1.8	1.85	2.05	
28.....	1.5	5.15	3.65	2.7	1.9	1.8	2.4	2.15	
29.....	1.8	4.6	3.5	2.7	1.95	1.85	2.1	2.2	
30.....	2.2	4.7	3.65	2.6	1.85	1.8	1.95	2.0	
31.....		4.6		2.55	1.95		1.95		

Daily discharge, in second-feet, of Conejos River near Mogote, Colo., for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....	90	65	45	190	665	2,600	1,170	342	95	48	80
2.....	90	65	45	190	805	2,175	975	315	68	48	95
3.....	90	65	45	200	768	2,650	880	342	80	55	80
4.....	90	65	45	200	545	2,790	790	180	68	55	55
5.....	90	60	45	200	490	2,370	525	180	68	80	80
6.....	80	60	50	190	545	2,510	490	180	68	95	68
7.....	80	60	50	222	885	2,650	635	162	55	80	68
8.....	80	60	50	235	1,060	2,510	975	145	48	68	68
9.....	80	60	50	210	1,015	2,580	560	128	68	68	80
10.....	80	60	60	295	768	2,045	525	110	55	68	95
11.....	80	60	60	210	768	1,929	560	110	80	80	95
12.....	80	60	60	210	885	1,500	672	110	80	68	80
13.....	74	55	60	170	885	1,500	635	95	68	80	80
14.....	74	55	70	180	768	1,390	672	110	55	68	95
15.....	74	55	70	170	665	1,920	1,170	525	68	80	80
16.....	74	55	70	170	845	1,560	790	162	80	68	68
17.....	74	55	80	170	1,375	1,560	672	110	55	68	68
18.....	74	50	90	170	1,605	1,280	560	128	68	80	80
19.....	74	50	100	170	2,110	975	560	110	55	80	68
20.....	74	50	110	170	2,530	928	525	128	55	95	68
21.....	74	50	120	155	3,060	1,120	560	145	48	80	95
22.....	74	50	130	155	3,390	1,390	598	180	55	80	80
23.....	70	50	140	190	4,290	1,280	525	110	55	55	68
24.....	70	45	150	265	3,300	1,445	490	95	55	68	68
25.....	70	45	150	295	3,650	1,280	460	80	55	68	68
26.....	70	45	150	235	3,460	1,120	460	95	55	80	68
27.....	70	45	160	265	3,450	1,225	460	80	55	68	128
28.....	65	45	160	265	3,200	1,225	430	80	55	265	162
29.....	65	45	160	365	3,420	1,070	430	95	68	145	180
30.....	65		180	545	3,300	1,225	370	68	55	95	110
31.....	65		180		2,870		342	95		95	

NOTE.—Daily discharge Jan. 1 to Apr. 4 estimated.

Monthly discharge of Conejos River near Mogote, Colo., for 1912.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
January.....	90	65	76.1	4,680
February.....	65	45	54.7	3,150
March.....	180	45	91.1	5,600
April.....	545	155	222	13,200
May.....	4,290	490	1,850	114,000
June.....	2,790	928	1,730	103,000
July.....	1,170	342	628	38,600
August.....	525	68	155	9,530
September.....	95	48	63.1	3,750
October.....	265	48	81.6	5,020
November.....	180	55	85.9	5,110
The period.....				306,000

NOTE.—Records have been changed slightly from the State engineer's records to conform with the computing rules of the U. S. Geological Survey.

COSTILLA CREEK NEAR MOUTH, N. MEX.

Location.—In sec. 5, T. 1 S., R. 74 W., a mile or more above the mouth, on the Questa road, 7 miles from the State bridge.

Records available.—April 23, 1912, to July 7, 1912.

Drainage area.—Not measured.

Cooperation.—Station is maintained and complete records are furnished by United States Reclamation Service.

Discharge measurements of Costilla Creek near mouth, N. Mex., in 1912.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Apr. 23	French and Schenfeldt.		a 8.0	May 14	French and Schenfeldt.	5.05	127
27	do.	4.25	16.8	17	French and Narega.	5.30	137
30	do.	5.15	117	22	do.	5.92	326
May 2	French and Narega.	5.85	238	27	do.	5.55	217
5	French and Ortega.	5.00	104	June 2	French and Ortega.	5.45	199
8	French and Narega.	5.30	153	6	do.	5.85	293
10	do.	5.20	154	14	French and Davidson.	5.25	169

a Estimated.

Daily gage height, in feet, and discharge, in second-feet, of Costilla Creek near mouth, N. Mex., for 1912.

Day.	April.		May.		June.		July.	
	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.
1.			5.5	198	5.1	126	4.7	69
2.			5.7	245	5.45	188	4.6	56
3.			5.5	198	5.45	188	4.4	34
4.			5.1	126	5.5	198	4.4	34
5.			5.0	110	5.6	220	4.35	29
6.			5.1	126	5.75	258	4.1	6.9
7.			5.3	160	6.0	344	4.0	.3
8.			5.2	143	5.9	306		
9.			5.4	178	5.9	306		
10.			5.2	143	5.85	288		
11.			5.15	134	5.6	220		
12.			5.15	134	5.65	232		
13.			5.1	126	5.5	198		
14.			5.1	126	5.2	143		
15.			4.9	96	5.2	143		
16.			5.05	118	5.05	118		
17.			5.3	160	5.3	160		
18.			5.4	178	5.2	143		
19.			5.5	198	5.15	134		
20.			5.6	220	5.0	110		
21.			5.8	273	4.9	96		
22.			5.95	324	4.9	95		
23.			6.0	344	5.05	118		
24.			6.0	344	5.3	160		
25.			5.1	126	5.2	143		
26.			5.55	209	5.1	126		
27.	4.25	20	5.55	209	5.0	110		
28.	4.7	69	5.7	245	4.95	103		
29.	4.9	96	5.6	220	4.9	96		
30.	5.3	160	5.65	232	4.85	89		
31.			5.1	126				

Monthly discharge of Costilla Creek near mouth, N. Mex., for 1912.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
April 27-30.	160	20	86.2	683
May.	344	96	186	11,400
June.	344	89	172	10,200
July 1-7.	69	.3	32.7	454

RIO COLORADO¹ ABOVE QUESTA, N. MEX.

Location.—2 miles above Questa, 1½ miles above the mouth of Cabresto Creek, half a mile above the Eagle Rock ranger station of the United States Forest Service, near sec. 33, T. 29 N., R. 13 E.

Records available.—October 6 to December 31, 1912.

Drainage area.—Not measured.

Gage.—Chain gage.

Channel.—Subject to shift during high water and permanent at times of medium and low stages.

Discharge measurements.—Wading.

Winter flow.—Backwater from ice during the winter months.

Diversions.—No diversions of consequence above this station.

Cooperation.—Gage heights furnished by the United States Forest Service.

Discharge measurements of Rio Colorado above Questa, N. Mex., in 1912.

Date.	Hydrographer.	Gage height.	Discharge.
Oct. 6	Gray and Powers.....	<i>Feet.</i> 0.85	<i>Sec.-ft.</i> 35.7
Nov. 2	J. E. Powers.....	.70	17.9
Dec. 14	do.....	.65	16.5

Daily gage height, in feet, and discharge, in second-feet, of Rio Colorado above Questa, N. Mex., for 1912.

[L. E. Anderson, observer.]

Day.	October.		November.		December.		Day.	October.		November.		December.	
	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.		Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
1.....			0.74	21	0.70	18	16.....		47	0.80	28	0.70	18
2.....			.70	18	.75	22	17.....		46	.80	28	.70	18
3.....				18	.80	28	18.....		45	.80	28		18
4.....			.70	18	.75	22	19.....	0.90	45		26		18
5.....				20		19	20.....	.90	45	.77	24		18
6.....	0.85	36	.75	22	.60	16	21.....	.90	45	.77	24		18
7.....	.95	56	.80	28		16	22.....		44	.75	22		18
8.....		56	.80	28	.65	16	23.....		43	.80	28		18
9.....		56	.83	32	.62	16	24.....		42	.80	28		18
10.....	.95	56	.83	32	.60	16	25.....		41	.80	28		18
11.....	.95	56	.83	32	.67	17	26.....		40	.80	28		20
12.....	.94	54	.80	28	.80	28	27.....	.87	39	.80	28		20
13.....	.92	49	.80	28		22	28.....	.87	39	.77	24		20
14.....		49	.77	24	.65	16	29.....		39	.75	22		20
15.....		48	.70	18	.80	28	30.....	.87	39	.70	18		20
							31.....		30				20

NOTE.—Gage heights Dec. 18–31 are of no value because of extreme effect of backwater from ice jams. Daily discharge determined as follows: Oct. 6 to Dec. 17 from a fairly well defined curve; Dec. 18–31 estimated on account of ice. Discharge interpolated on days for which gage height is missing.

¹ Also known as Red River.

Monthly discharge of Rio Colorado above Questa, N. Mex., for 1912.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
October 6-31.....	56	30	45.6	2,350	A.
November.....	32	18	25.0	1,490	A.
December.....	28	16	19.4	1,190	B.
The period.....				5,030	

RIO COLORADO¹ BELOW QUESTA, N. MEX.

Location.—Two miles below Questa, at the head of Lower Canyon, near sec. 1, T. 28 N., R. 12 E., below all important tributaries, the nearest tributary above being Cabresto Creek.

Records available.—April 8, 1910, to December 31, 1912.

Drainage area.—Not measured.

Gage.—Vertical staff.

Channel.—Shifting during high water.

Discharge measurements.—Made by wading.

Winter flow.—Slightly affected by ice during December and January of each year.

Diversions.—There are no diversions below, but for several miles above diversions are made for irrigation.

Accuracy.—The estimates made during the first part of 1912 can not be considered better than fair, but those for the last part of the year can be rated as good.

Cooperation.—Gage heights furnished by the United States Reclamation Service.

Discharge measurements of Rio Colorado below Questa, N. Mex., in 1912.

Date.	Hydrographer.	Gage height.	Dis- charge.	Date.	Hydrographer.	Gage height.	Dis- charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Apr. 23	W. B. Freeman.....	3.48	46.4	Oct. 6	Gray and Powers.....	3.55	49.9
27	do.....	3.67	66.2	Nov. 2	J. E. Powers.....	3.30	25.2
Sept. 21	Robert Cooper.....	3.40	41.2	Dec. 14	do.....	3.30	31.7

Daily gage height, in feet, of Rio Colorado below Questa, N. Mex., for 1912.

[Narciso Vigil, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	3.45	3.40	3.35	3.40	4.20	4.30	3.05	3.40	3.60	3.50	3.35	3.28
2.....	3.40	3.40	3.40	3.35	4.35	4.35	3.05	3.35	3.60	3.50	3.32	3.25
3.....	3.40	3.45	3.40	3.40	4.40	4.25	3.10	3.35	3.60	3.50	3.35	3.25
4.....	3.40	3.45	3.40	3.40	4.30	4.50	3.25	3.30	3.60	3.50	3.35	3.20
5.....	3.45	3.40	3.40	3.40	4.20	5.15	3.35	3.25	3.55	3.70	3.35	3.28
6.....	3.50	3.45	3.40	3.60	4.20	5.15	3.55	3.25	3.55	3.58	3.35	3.20
7.....	3.55	3.45	3.40	3.60	4.35	5.15	3.55	3.25	3.55	3.52	3.35	3.10
8.....	3.55	3.45	3.40	3.60	4.45	5.10	3.55	3.20	3.55	3.52	3.35	3.10
9.....	3.55	3.40	3.40	3.60	4.50	5.10	3.45	3.20	3.50	3.50	3.35	3.20
10.....	3.55	3.40	3.40	3.60	4.40	4.80	3.45	3.20	3.45	3.50	3.35	3.22
11.....	3.55	3.40	3.40	3.60	4.40	4.75	3.45	3.20	3.45	3.48	3.30	3.20
12.....	3.50	3.40	3.40	3.70	4.35	4.20	3.50	3.20	3.45	3.48	3.30	3.20
13.....	3.45	3.40	3.40	3.60	4.30	3.80	3.45	3.20	3.45	3.50	3.30	3.20
14.....	3.50	3.35	3.40	3.60	4.30	3.50	3.45	3.25	3.45	3.48	3.30	3.22
15.....	3.50	3.40	3.30	3.60	4.25	3.40	3.55	3.30	3.45	3.48	3.30	3.22
16.....	3.50	3.25	3.35	3.60	4.30	3.25	3.55	3.35	3.45	3.45	3.20	3.28
17.....	3.50	3.25	3.40	3.60	4.45	3.35	3.55	3.40	3.45	3.45	3.20	3.25
18.....	3.50	3.40	3.40	3.60	4.50	3.25	3.50	3.35	3.45	3.48	3.20	3.20
19.....	3.50	3.40	3.40	3.60	4.50	3.15	3.45	3.35	3.40	3.40	3.25	3.22
20.....	3.50	3.35	3.55	3.60	4.55	2.95	3.45	3.30	3.40	3.40	3.25	3.22

¹ Also known as Red River.

Daily gage height, in feet, of Rio Colorado below Questa, N. Mex., for 1912—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
21.....	3.35	3.25	3.50	3.60	4.75	3.00	3.45	3.65	3.40	3.40	3.28	3.20
22.....	3.40	3.30	3.50	3.60	5.20	3.00	2.95	3.70	3.40	3.40	3.25	3.25
23.....	3.45	3.35	3.50	3.60	5.00	3.20	2.90	3.60	3.40	3.40	3.25	3.20
24.....	3.45	3.35	3.45	3.60	5.05	3.05	3.00	3.60	3.40	3.40	3.25	3.20
25.....	3.50	3.35	3.40	3.65	5.60	3.00	3.25	3.55	3.40	3.40	3.25	3.22
26.....	3.45	3.30	3.40	3.70	5.40	2.95	3.60	3.55	3.40	3.40	3.25	3.25
27.....	3.50	3.35	3.40	3.70	5.25	3.00	3.55	3.50	3.45	3.40	3.20	3.22
28.....	3.50	3.35	3.40	3.70	4.50	3.10	3.50	3.55	3.40	3.42	3.22	3.20
29.....	3.45	3.30	3.40	3.80	4.45	3.05	3.50	3.60	3.45	3.42	3.25	3.28
30.....	3.35		3.40	3.90	4.45	3.10	3.45	3.60	3.45	3.40	3.25	3.28
31.....	3.40		3.40		4.35		3.45	3.65		3.38		3.25

Daily discharge, in second-feet, of Rio Colorado below Questa, N. Mex., for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	43	38	33	38		13	41	62	51	30	30
2.....	38	38	38	33		13	36	62	51	27	28
3.....	38	43	38	38		16	36	62	51	30	28
4.....	38	43	38	38		28	32	62	51	30	23
5.....	43	38	38	48		36	28	56	70	30	30
6.....	48	43	38	59		56	28	56	53	30	23
7.....	54	43	38	59		56	28	56	46	30	16
8.....	54	43	38	59		56	23	56	46	30	16
9.....	54	38	33	59		46	23	51	44	30	23
10.....	54	38	38	59		46	23	46	44	30	25
11.....	54	38	38	59		46	23	46	42	25	23
12.....	48	38	38	70		51	23	46	42	25	23
13.....	43	38	38	59	86	46	23	46	44	25	23
14.....	48	33	38	59	51	46	28	46	42	25	25
15.....	48	38	28	59	41	56	32	46	42	27	25
16.....	48	33	33	59	36	56	36	46	39	27	30
17.....	48	33	38	59	36	56	41	46	39	28	28
18.....	48	38	38	59	28	51	36	46	36	28	23
19.....	48	38	38	59	20	46	36	41	34	23	25
20.....	48	33	54	59	8	46	41	41	34	23	25
21.....	33	23	48	59	10	46	68	41	34	26	23
22.....	38	28	48	59	10	8	74	41	34	23	28
23.....	43	33	48	59	23	5	62	41	34	23	23
24.....	43	33	43	59	13	10	62	41	34	23	23
25.....	48	33	38	64	10	28	56	41	34	23	25
26.....	43	28	38	70	8	62	56	41	34	23	28
27.....	48	33	38	70	10	56	51	46	34	21	25
28.....	48	33	38	70	16	51	56	41	36	24	23
29.....	43	28	38	83	13	51	62	46	36	28	30
30.....	33		38	96	16	46	62	46	34	28	30
31.....	38		38			46	68		32		28

NOTE.—No estimates made May 1 to June 12, because of lack of high-water measurements. Daily discharge for remainder of the year determined from rating curves covering short periods and by the indirect method for shifting channels.

Monthly discharge of Rio Colorado below Questa, N. Mex., for 1912.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	54	33	45.3	2,790	C.
February.....	43	23	35.8	2,060	C.
March.....	54	28	39.0	2,400	C.
April.....	96	33	59.3	3,530	C.
June 13-30.....	86	8	24.1	860	C.
July.....	62	5	41.1	2,530	C.
August.....	74	23	41.7	2,560	B.
September.....	62	41	48.1	2,860	B.
October.....	70	32	41.2	2,530	B.
November.....	30	21	26.5	1,580	B.
December.....	30	16	25.1	1,540	B.

RIO HONDO NEAR ARROYO HONDO, N. MEX.

Location.—At highway bridge at Dunn's Hotel, 200 yards above the mouth of the stream, 1 mile west of Arroyo Hondo post office, near sec. 31, T. 27 N., R. 12 E.
No tributary between station and mouth.

Records available.—April 8, 1910, to December 31, 1912.

Drainage area.—Not measured.

Gage.—Vertical staff.

Channel.—Shifting.

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

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

Diversions.—None below but several diversions for irrigation are made above.

Accuracy.—Owing to the shifting character of the stream no estimates of discharge were made the first part of 1912. The estimates during the last part of 1912 can be considered good.

Cooperation.—Gage heights furnished by the United States Reclamation Service.

Discharge measurements of Rio Hondo near Arroyo Hondo, N. Mex., for 1912.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Apr. 23	W. B. Freeman.....		a 4.5	Nov. 1	J. E. Powers.....	1.80	11.6
Sept. 22	Robt. Cooper.....	1.70	10.8	Dec. 15	do.....	2.00	21.4
Oct. 5	Gray and Powers.....	1.75	11.8				

a Estimated.

Daily gage height, in feet, of Rio Hondo near Arroyo Hondo, N. Mex., for 1912.

[J. H. Dunn, observer.]

Day.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....		1.92	2.05	2.15	3.08	2.12	2.08	2.00	1.75	1.72	1.81
2.....		1.95	2.10	2.58	3.02	2.10	2.05	2.00	1.70	1.76	1.81
3.....		1.95	2.08	2.32	3.18	2.12	2.02	2.00	1.70	1.82	1.85
4.....		2.02	2.08	2.18	3.12	2.10	2.00	2.00	1.75	1.78	1.90
5.....	1.98	2.18	2.10	2.18	3.15	2.15	2.00	2.00	1.78	1.80	1.92
6.....	2.25	2.25	2.08	2.10	3.30	2.10	2.02	2.00	1.76	1.82	1.91
7.....	2.10	2.22	2.08	2.08	3.28	2.10	2.02	2.00	1.72	1.82	2.38
8.....	2.10	1.95	2.10	2.10	3.25	2.10	2.02	2.00	1.70	1.82	1.98
9.....	1.92	1.95	2.10	2.20	3.25	2.12	2.00	2.00	1.70	1.81	2.28
10.....	1.92	2.00	2.08	2.15	3.22	2.18	2.02	2.00	1.70	1.85	2.05
11.....	1.92	2.05	2.10	2.18	3.25	2.12	2.05	2.00	1.72	1.89	2.25
12.....		2.12	2.10	2.12	3.08	2.12	2.05	2.00	1.72	1.88	2.12
13.....		2.10	2.08	2.12	3.08	2.12	2.00	2.00	1.74	1.86	2.15
14.....		2.10	2.02	2.10	3.02	2.12	2.00	2.00	1.68	1.88	2.38
15.....		2.10	2.05	2.10	3.02	2.10	2.00	2.00	1.62	1.86	2.10
16.....		2.10	2.05	2.12	2.68	2.12	2.00	2.00	1.60	1.86	2.05
17.....		2.12	2.05	2.18	2.28	2.10	2.05	2.00	1.61	1.88	2.25
18.....		2.08	2.05	2.58	2.28	2.10	2.00	2.00	1.58	1.89	2.00
19.....		2.18	2.05	3.05	2.22	2.10	2.00	2.00	1.55	1.88	2.12
20.....		2.28	2.05	3.18	2.28	2.10	2.00	2.00	1.59	1.89	2.15
21.....		2.48	2.02	3.28	2.28	2.10	2.00	1.70	1.62	1.88	1.95
22.....	1.95	2.48	2.02	3.30	2.25	2.10	2.00	1.85	1.70	1.92	1.92
23.....	2.05	2.80	2.05	3.25	2.18	2.10	2.00	2.00	1.70	1.90	1.95
24.....	2.12	3.05	2.05	3.22	2.12	2.10	2.00	1.70	1.70	1.80	1.95
25.....	2.12	2.98	2.02	3.20	2.12	2.10	2.00	1.85	1.74	1.89	2.25
26.....	2.02	2.88	2.02	3.18	2.10	2.10	2.00	1.85	1.80	1.90	2.00
27.....	2.00	2.78	2.05	3.22	2.12	2.10	2.00	2.00	1.80	1.90	2.25
28.....	2.00	2.62	2.05	3.25	2.10	2.10	2.00	2.00	1.79	1.91	1.95
29.....	2.00	2.40	2.12	3.25	2.12	2.10	2.00	1.85	1.79	1.84	1.92
30.....		2.18	2.15	3.22	2.08	2.10	2.00	1.85	1.78	1.85	1.95
31.....		2.10		3.20		2.10	2.00		1.76		2.22

Daily discharge, in second-feet, of Rio Hondo near Arroyo Hondo, N. Mex., for 1912.

Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	39	35	29	12	9	12	16.....	39	29	29	4	14	24
2.....	37	33	29	10	10	12	17.....	37	33	29	4	15	39
3.....	39	31	29	10	13	14	18.....	37	29	29	4	16	21
4.....	37	29	29	12	11	16	19.....	37	29	29	3	15	29
5.....	42	29	29	13	12	17	20.....	37	29	29	4	16	32
6.....	37	31	29	12	13	16	21.....	37	29	11	4	15	18
7.....	37	31	29	10	13	49	22.....	37	29	19	7	17	17
8.....	37	31	29	9	13	20	23.....	37	29	29	8	13	18
9.....	39	29	29	9	12	41	24.....	37	29	11	8	12	18
10.....	44	31	29	9	14	24	25.....	37	29	19	9	16	39
11.....	39	33	29	9	15	39	26.....	37	29	18	12	16	21
12.....	39	33	29	9	15	29	27.....	37	29	28	12	16	39
13.....	39	29	29	10	14	32	28.....	37	29	28	12	16	18
14.....	39	29	29	8	15	49	29.....	37	29	18	12	14	17
15.....	37	29	29	5	14	28	30.....	37	29	18	11	14	18
							31.....	37	29		10		37

NOTE.—Channel dry Jan. 1 to Feb. 4 and Feb. 12-21. Daily discharge July 1 to Dec. 31 determined as follows: July 1 to Sept. 22 from a well-defined curve, Sept. 23 to Nov. 1 by the indirect method for shifting channels, and Nov. 2 to Dec. 31 from a fairly well-defined curve.

Monthly discharge of Rio Hondo near Arroyo Hondo, N. Mex., for 1912.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
July.....	44	37	37.9	2,330	C.
August.....	35	29	30.0	1,840	C.
September.....	29	11	26.0	1,550	B.
October.....	13	3	8.7	535	B.
November.....	17	9	14.0	833	B.
December.....	49	12	25.9	1,590	C.
The period.....				8,680	

RIO PUEBLO DE TAOS NEAR TAOS, N. MEX.

Location.—Two miles above Taos Pueblo, $4\frac{1}{2}$ miles northeast of Taos, at Glorieta Grove, near sec. 2, T. 25 N., R. 13 E. A number of intermittent tributaries enter above and below the station.

Records available.—December 19, 1910, to December 31, 1912. Records prior to December, 1910, are fragmentary.

Drainage area.—Not measured.

Gage.—An automatic recording gage installed by the United States Indian Service December 19, 1910. A vertical staff gage was installed first, but was destroyed before July 12, 1910. On October 12, 1910, a new gage was installed which was referred to a datum 0.27 foot lower than the original. The automatic gage was referred to the datum of the second gage.

Channel.—Somewhat shifting, especially during high stages.

Discharge measurements.—Made by wading.

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

Diversions.—None above station; several just below.

Accuracy.—The estimates made in 1912 are fragmentary and can be considered only fair.

Cooperation.—Gage heights furnished by the United States Forest Service.

Discharge measurements of Rio Pueblo de Taos near Taos, N. Mex., in 1912.

Date.	Hydrographer.	Gage height.	Discharge.
Oct. 4	Gray and Powers.....	<i>Feet.</i> 1.10	<i>Sec.-ft.</i> 9.9
31	J. E. Powers.....	1.05	10.2
Dec. 12 ^a	do.....	1.20	13.7

^a Slight ice affect.*Daily gage height, in feet, of Rio Pueblo de Taos near Taos, N. Mex., for 1912.*

[C. E. Hulbert, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Dec.
1.....		1.45	2.80		1.35	1.10	1.10		
2.....		1.55	3.20		1.35	1.15	1.10		
3.....		1.65	3.50		1.30	1.05	1.10		
4.....		1.75	3.35		1.20	1.05	1.10	1.10	
5.....		1.95	3.20		1.15	1.05	1.15		
6.....		2.05	3.15		1.20	1.05	1.15		
7.....		1.95	3.20		1.15	1.05	1.10		
8.....	1.40	2.00	3.25		1.15	1.05	1.10		
9.....	1.38	2.05	3.30		1.15	1.10	1.10		
10.....	1.42	2.15	3.25		1.15	1.05	1.10		
11.....	1.40	2.00	3.20		1.15	1.05	1.10		
12.....	1.40	2.30	3.20		1.20	1.05	1.10		1.20
13.....	1.42	2.15	3.20		1.20	1.05	1.15		1.10
14.....	1.38	2.00	3.00		1.20	1.05	1.05	1.12	1.00
15.....	1.30	1.90	3.00		1.20	1.05	1.05		1.05
16.....	1.43	1.85	3.05		1.25	1.10	1.05		1.05
17.....	1.28	1.90	3.20	1.65	1.25	1.05	1.05		1.00
18.....	1.28	1.90	3.35	1.50	1.20	1.05	1.05		1.15
19.....	1.43	1.90	3.55	1.50	1.25	1.05	1.10	1.10	1.45
20.....	1.70	1.90	3.80	1.50	1.20	1.05	1.10		1.55
21.....	1.70	1.75	4.50	1.60	1.15	1.05	1.10		1.65
22.....	1.63	1.70	4.55	1.65	1.10	1.10	1.05		1.70
23.....	1.65	1.70	4.30	1.70	1.15	1.10	1.05		1.70
24.....	1.50	1.90	3.40	1.55	1.15	1.10	1.05		1.80
25.....	1.50	2.20		1.55	1.15	1.05	1.05		2.00
26.....	1.55	2.20		1.55	1.20	1.00	1.10		2.30
27.....	1.60	2.30		1.55	1.15	1.00	1.10		2.35
28.....	1.60	2.25		1.55	1.10	1.00			2.35
29.....	1.60	2.40		1.55	1.10	1.05			2.30
30.....	1.60	2.60		1.45	1.10	1.00			2.30
31.....	1.50				1.10	1.10		1.05	2.30

NOTE.—Gage heights affected by ice Dec. 18-31, 1912.

Daily discharge, in second-feet, of Rio Pueblo de Taos near Taos, N. Mex., for 1912.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Dec.
1.....		20	127		18	10	10		8.0
2.....		24	192		18	12	10		8.0
3.....		28	248		16	9.5	10		8.0
4.....		32	219		13	9.5	10	10	8.0
5.....		43	192		12	9.5	12		8.0
6.....		49	183		13	9.5	12		7.0
7.....		43	192		12	9.5	10		7.0
8.....	19	46	201		12	9.5	10		9.0
9.....	18	49	210		12	10	10		9.0
10.....	20	56	201		12	9.5	10		11
11.....	19	46	192		12	9.5	10		12
12.....	19	67	192		13	9.5	10		13
13.....	20	56	192		13	9.5	12		10
14.....	18	46	158		13	9.5	9.5	11	8.5
15.....	16	40	158		13	9.5	9.5		9.5

Daily discharge, in second-feet, of Rio Pueblo de Taos near Taos, N. Mex., for 1912—Con.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Dec.
16.....	20	38	166		14	10	9.5		9.5
17.....	15	40	192	28	14	9.5	9.5		8.5
18.....	15	40	219	22	13	9.5	9.5		8.0
19.....	20	40	258	22	14	9.5	10	10	8.0
20.....	30	40	308	22	13	9.5	10		8.0
21.....	30	32	430	26	12	9.5	10		8.0
22.....	27	30	440	28	10	10	9.5		8.0
23.....	28	30	388	30	12	10	9.5		8.0
24.....	22	40	228	24	12	10	9.5		8.0
25.....	22	59		24	12	9.5	9.5		8.0
26.....	24	59		24	13	8.5	10		8.0
27.....	26	67		24	12	8.5	10		8.0
28.....	26	63		24	10	8.5	10		8.0
29.....	26	77		24	10	9.5	10		8.0
30.....	26	99		20	10	8.5	10		8.0
31.....	22				10	10		9.5	8.0

NOTE.—Daily discharge determined from a fairly well defined curve. Discharge estimated Dec. 1-11 and Dec. 18-31. Ice in stream Jan. 1 to Mar. 7 and Dec. 18 to 31, 1912.

Monthly discharge of Rio Pueblo de Taos near Taos, N. Mex., for 1912.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
March 8-31.....	30	15	22.0	1,050	B.
April.....	99	20	46.6	2,770	B.
May 1-24.....	440	127	229	10,900	B.
June 17-30.....	30	20	24.4	677	B.
July.....	18	10	12.7	781	B.
August.....	12	8.5	9.56	588	B.
September.....	12	9.5	10.0	595	B.
October.....			^a 10.0	615	C.
November.....			^a 9.00	536	C.
December.....	13	7	8.58	528	C.

^a Estimated.

RIO TAOS¹ AT LOS CORDOVAS, N. MEX.

Location.—At Los Cordovas, 100 feet below the mouth of Little Rio Grande and Arroyo Seco, near sec. 22, T. 25 N., R. 12 E.

Records available.—April 6, 1910, to December 31, 1912.

Drainage area.—Not measured.

Gage.—Vertical staff.

Channel.—Fairly permanent; probably shifts during extreme high water.

Discharge measurements.—Made by wading.

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

Diversions.—Several are made above this station.

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

Cooperation.—Gage heights furnished by the United States Reclamation Service.

Discharge measurements of Rio Taos at Los Cordovas, N. Mex., in 1912.

Date.	Hydrographer.	Gage height.	Dis- charge.
Sept. 23	R. L. Cooper.....	<i>Feet.</i> 0.89	<i>Sec.-ft.</i> 10.6
Oct. 4	Gray and Powers.....	.92	15.6
Nov. 1	J. E. Powers.....	1.05	25.8
Dec. 13	do.....	1.15	45.8

¹ Called Rio Pueblo de Taos in previous reports.

Daily gage height, in feet, of Rio Taos at Los Cordovas, N. Mex., for 1912.

[Alex. J. Anderson, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	1.4	1.35	1.4	1.55	2.55	3.1	1.45	0.85	0.85	1.0	1.1	1.1
2.....	1.4	1.4	1.35	1.4	2.75	2.95	1.45	.8	.85	1.0	1.1	1.05
3.....	1.35	1.4		1.5	2.9	2.85	1.35	.85	.85	1.0	1.1	1.1
4.....	1.3	1.4	1.3	1.65	2.8	2.8	1.35	.8	.85	.95	1.1	1.0
5.....	1.3	1.45	1.4	1.8	2.55	2.85	1.25	.8	.85	1.1	1.1	1.0
6.....	1.3	1.4	1.4	1.9	2.6	2.75	1.25	.85	.95	1.0	1.1	1.05
7.....	1.3	1.4	1.4	1.8	2.6	2.7	1.15	.85	.95	1.05	1.1	1.3
8.....	1.35	1.4	1.35	1.9	2.7	2.7	1.1	.85	.95	1.0	1.1	1.1
9.....	1.4	1.4	1.8	1.85	2.75	2.55	1.0	.8	.9	1.0	1.1	1.05
10.....	1.4	1.3	1.55	1.95	2.65	2.55	.95	.8	.85	1.0	1.1	1.05
11.....	1.35	1.35	1.5	1.9	2.7	2.5	.95	.85	.85	1.0	1.1	1.1
12.....	1.35	1.35	1.4	2.0	2.7	2.45	.9	.85	.85	1.0	1.1	1.1
13.....	1.4	1.35	1.4	1.9	2.7	2.35	.85	.85	.85	1.0	1.1	1.2
14.....	1.4	1.35	1.35	1.8	2.7	2.3	.7	.85	.85	1.0	1.1	
15.....	1.3	1.35	1.3	1.8	2.6	2.2	.95	.9	.85	1.0	1.1	
16.....	1.8	1.35	1.3	1.85	2.55	2.1	1.3	.85	.85	1.0	1.1	1.05
17.....	1.3	1.3	1.3	1.85	2.65	2.05	1.0	.85	.85	1.0	1.1	1.1
18.....	1.3	1.3	1.3	1.8	2.8	1.95	.9	.85	.95	1.0	1.05	1.3
19.....	1.3	1.35	1.35	1.8	3.1	1.75	.85	.85	.95	1.0	1.1	1.15
20.....	1.3	1.3	1.95	1.7	3.2	1.65	.85	.85	.95	1.1	1.05	1.15
21.....	1.2	1.3	1.7	1.7	3.4	1.6	.85	.95	.95	1.0	1.05	1.3
22.....	1.35	1.3	1.7	1.75	3.6	1.6	.8	.9	.95	1.0	1.05	1.1
23.....	1.4	1.3	1.7	1.75	3.45	1.8	.85	.9	.95	1.05	1.0	1.05
24.....	1.4	1.3	1.5	1.9	3.4	1.85	.85	.95	.95	1.05	1.1	1.1
25.....	1.35	1.3	1.4	2.0	3.4	1.8	.85	.85	.95	1.05	1.05	
26.....	1.3	1.4	1.55	2.05	3.3	1.7	1.0	.85	.95	1.1	1.05	1.15
27.....	1.4	1.4	1.65	2.0	3.4	1.65	.85	.85	.95	1.0	1.05	1.1
28.....	1.3	1.4	1.6	2.0	3.25	1.6		.85	.95	1.1		1.05
29.....	1.3	1.4	1.55	2.1	3.15	1.55	.85	.85	.95	1.1	1.0	
30.....	1.3		1.5	2.2	3.15	1.5	.85	.9	1.05	1.1	.9	1.1
31.....	1.3		1.5		3.15		.85	.85		1.1		1.1

NOTE.—Gage heights affected by ice Jan. 1 to Feb. 19, Nov. 28-30, Dec. 7, 8, 13, and 18-21, 1912.

Daily discharge, in second-feet, of Rio Taos at Los Cordovas, N. Mex., for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	30	30	59	83	315	492	71	8	8	21	31	38
2.....	30	30	52	59	376	441	71	6	8	22	31	29
3.....	30	30	49	75	424	408	57	8	8	22	31	38
4.....	23	30	46	100	392	392	57	6	8	18	31	28
5.....	23	30	59	128	315	408	44	6	8	31	31	28
6.....	23	30	59	148	330	376	44	8	14	22	32	33
7.....	23	30	59	128	330	360	32	8	14	26	32	33
8.....	30	30	52	148	360	360	27	8	14	22	32	33
9.....	30	30	46	138	376	315	18	6	11	22	32	33
10.....	30	23	83	159	345	315	14	6	8	22	33	34
11.....	30	30	75	148	360	300	14	8	8	22	33	40
12.....	30	30	59	170	360	285	11	8	8	22	34	40
13.....	30	30	59	148	360	256	8	8	8	22	34	46
14.....	30	30	52	128	360	242	3	8	8	22	34	42
15.....	23	30	46	128	330	218	14	11	8	22	34	38
16.....	23	30	46	138	315	195	50	8	8	22	34	34
17.....	23	30	46	138	345	184	18	8	8	22	35	40
18.....	23	35	46	128	392	162	11	8	14	22	30	40
19.....	23	40	52	128	492	120	8	8	14	22	35	40
20.....	23	46	159	108	526	102	8	8	14	31	30	40
21.....	16	46	108	108	596	94	8	14	14	22	30	40
22.....	30	46	108	118	670	94	6	11	14	22	31	40
23.....	30	46	108	118	614	129	8	11	14	26	26	34
24.....	30	46	75	148	596	140	8	14	14	26	36	40
25.....	30	46	59	170	596	129	8	8	15	26	31	43
26.....	23	59	83	181	560	110	18	8	15	31	32	46
27.....	30	59	100	170	596	102	8	8	16	22	32	40
28.....	23	59	91	170	543	94	8	8	16	31	30	34
29.....	23	59	83	192	509	86	8	8	16	31	27	37
30.....	23		75	216	509	78	8	11	25	31	19	40
31.....	23		75		509		8	8		31		40

NOTE.—Daily discharge determined from rating curves covering short periods and by the indirect method for shifting channels. Discharge estimated Jan. 1 to Feb. 19, Nov. 28-30, Dec. 7, 8, 13, and 18-21 on account of ice.

Monthly discharge of Rio Taos at Los Cordovas, N. Mex., for 1912.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	30	16	26.2	1,610	D.
February.....	59	23	37.6	2,160	D.
March.....	159	46	70.0	4,300	C.
April.....	216	59	137	8,150	C.
May.....	670	315	442	27,200	C.
June.....	492	78	233	13,900	C.
July.....	71	3	21.8	1,340	C.
August.....	14	6	8.5	523	B.
September.....	25	8	11.9	708	B.
October.....	31	18	24.4	1,500	B.
November.....	35	19	31.4	1,870	B.
December.....	46	28	37.5	2,310	C.
The year.....	670	3	90.3	65,600	

RIO LUCERO NEAR TAOS, N. MEX.

Location.—Just above the head gate of the Seco ditch, at the mouth of the canyon, 9 miles above Taos, in sec. 11, T. 26 N., R. 13 E. No important tributaries near the station.

Records available.—December 17, 1910, to December 31, 1912, and fragmentary records from May to August, 1910.

Drainage area.—17 square miles.

Gage.—Automatic recording; installed by the United States Indian Service December 17, 1910, referred to the datum of vertical staff gage originally installed.

Channel.—Somewhat shifting.

Discharge measurements.—Made by wading.

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

Diversions.—No diversions above the station. Records represent the natural run-off. Below the station water is diverted for irrigation.

Accuracy.—Although the channel is somewhat shifting, it is probable that the estimates may be considered fair.

Cooperation.—Gage-height record furnished by United States Forest Service and United States Indian Service.

Discharge measurements of Rio Lucero near Taos, N. Mex., in 1912.

Date.	Hydrographer.	Gage height.	Dis- charge.
		<i>Feet.</i>	<i>Sec.ft.</i>
Oct. 5	Gray and Powers.....	0.91	13.8
Oct. 31	J. E. Powers.....	.80	8.2
Dec. 12 ^a	do.....	.83	7.7

^a Ice present.

Daily gage height, in feet, of Rio Lucero near Taos, N. Mex., for 1912.

[C. E. Hulbert, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.		0.80	1.35	2.10	1.60	1.10	0.95	0.90	0.75	-----
2.		.85	1.50	2.10	1.55	1.10	.95	.90	.70	-----
3.		.95	1.50	2.10	1.55	1.05	.95	.90	.70	-----
4.		1.05	1.30	2.20	1.50	1.07	.95	.90	.70	0.85
5.		1.10	1.20	2.20	1.50	1.05	.95	.90	.70	.85
6.		1.05	1.20	2.20	1.50	1.05	.95	.85	.70	.90
7.		1.00	1.30	2.20	-----	1.03	.93	.85	.70	.85
8.	.74	1.05	1.40	2.10	-----	1.00	.95	.85	.75	.90
9.	.73	1.05	1.45	2.10	-----	1.05	.95	.85	.75	.90
10.	.72	1.10	1.40	1.90	-----	1.03	.90	.80	.75	.85
11.	.69	1.15	1.35	-----	-----	1.00	.90	.80	.72	.85
12.	.69	1.15	1.30	-----	-----	1.00	.95	.80	.72	.85
13.	.69	1.10	1.30	-----	-----	1.00	.95	.75	.70	.90
14.	.72	.95	1.25	-----	1.25	1.00	.95	.75	.70	.95
15.	.84	.90	1.20	-----	1.20	1.00	.90	.75	.70	.95
16.	.75	.90	1.30	-----	1.25	1.00	.90	.75	.75	.90
17.	.71	.90	1.40	-----	1.20	1.00	.90	.75	.70	.90
18.	.71	.90	1.65	1.60	1.20	.95	.90	.75	.70	1.00
19.	.80	.95	1.75	1.50	1.20	.93	.90	.75	.75	.95
20.	.91	.95	1.90	1.50	1.20	.90	.90	.75	-----	1.00
21.	.87	.85	1.95	1.50	1.20	.97	.90	.75	-----	.95
22.	.87	.85	1.95	1.55	1.20	1.00	.85	.75	-----	.95
23.	.90	.80	1.95	1.60	1.20	.97	.85	.75	-----	.95
24.	.90	.95	1.95	1.55	1.20	.95	.85	.80	-----	.95
25.	.85	.85	2.00	1.55	1.20	.95	.90	.80	-----	1.00
26.	.90	1.05	2.10	1.60	1.20	.90	.85	.80	-----	.95
27.	.85	1.05	2.10	1.60	1.15	.90	.85	.75	-----	1.00
28.	.90	1.05	2.10	1.65	1.10	.95	.85	.75	-----	1.00
29.	.85	1.15	2.15	1.70	1.10	.97	.90	.70	-----	1.00
30.	.85	1.25	2.20	1.65	1.10	1.03	.90	.70	-----	.95
31.	.85	-----	2.15	-----	1.10	1.02	-----	.70	-----	1.00

NOTE.—Gage heights affected by ice Dec. 4-31, 1912.

Daily discharge, in second-feet, of Rio Lucero near Taos, N. Mex., for 1912.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.		9.0	44	132	72	24	14	12	8.0	7.0
2.		10	60	132	66	24	14	12	7.0	7.0
3.		14	60	132	66	20	14	12	7.0	6.5
4.		20	40	144	60	22	14	12	7.0	6.0
5.		24	31	144	60	20	14	12	7.0	6.0
6.		20	31	144	60	20	14	10	7.0	5.5
7.		17	40	144	57	19	14	10	7.0	5.0
8.	7.8	20	49	132	54	17	14	10	8.0	5.0
9.	7.6	20	54	132	51	20	14	10	8.0	6.0
10.	7.4	24	49	108	48	19	12	9.0	8.0	7.0
11.	6.8	28	44	104	45	17	12	9.0	7.4	8.0
12.	6.8	28	40	100	42	17	14	9.0	7.4	8.0
13.	6.8	24	40	96	39	17	14	8.0	7.0	8.0
14.	7.4	14	36	92	36	17	14	8.0	7.0	8.0
15.	10	12	31	86	31	17	12	8.0	7.0	8.0
16.	8.0	12	40	82	36	17	12	8.0	8.0	8.0
17.	7.2	12	49	77	31	17	12	8.0	7.0	8.0
18.	7.2	12	78	72	31	14	12	8.0	7.0	8.0
19.	9.0	14	90	60	31	14	12	8.0	8.0	8.0
20.	12	14	96	60	31	12	12	8.0	8.0	8.0
21.	11	10	114	60	31	16	12	8.0	8.0	8.0
22.	11	10	114	66	31	17	10	8.0	8.0	8.0
23.	12	9.0	114	72	31	16	10	8.0	8.0	7.0
24.	12	14	114	66	31	14	10	9.0	8.0	6.0
25.	10	10	120	66	31	14	12	9.0	8.0	7.0
26.	12	20	132	72	31	12	10	9.0	8.0	8.0
27.	10	20	132	72	28	12	10	8.0	8.0	8.0
28.	12	20	132	78	24	14	10	8.0	8.0	8.0
29.	10	28	138	84	24	16	12	7.0	8.0	8.0
30.	10	36	144	78	24	19	12	7.0	8.0	8.0
31.	10	-----	138	-----	24	18	-----	7.0	-----	8.0

NOTE.—Daily discharge Mar. 8 to Nov. 19, 1912, determined from a well defined curve. Discharge estimated Nov. 20 to Dec. 31 on account of ice. Discharge interpolated June 11-17 and July 7-13.

Monthly discharge of Rio Lucero near Taos, N. Mex., for 1912.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
March 8-31.....	12	6.8	9.33	444	B.
April.....	36	9.0	17.5	1,040	B.
May.....	144	31	77.2	4,750	B.
June.....	144	60	96.2	5,720	B.
July.....	72	24	40.5	2,490	B.
August.....	24	12	17.2	1,060	B.
September.....	14	10	12.4	738	A.
October.....	12	7.0	9.00	553	A.
November.....	8.0	7.0	7.59	452	B.
December.....	8.0	5.0	7.26	446	C.
The period.....				17,700	

RIO FERNANDO DE TAOS NEAR TAOS, N. MEX.

Location.—2 miles southeast of Taos, 200 yards upstream from the headgate of B. G. Randall's intake ditch, at the mouth of the canyon, in sec. 21, T. 25 N., R. 13 E.

Records available.—April 6, 1910, to December 31, 1912; fragmentary.

Drainage area.—Not measured.

Gage.—Vertical staff; datum unchanged.

Channel.—Permanent at low stages, but subject to a shift during high water.

Discharge measurements.—Wading.

Winter flow.—Springs just above the section keep it open during the winter months.

Diversions.—No water of consequence diverted above the station. The flow at this point represents the natural run-off.

Accuracy.—Estimates of discharge made in 1912 considered good.

Discharge measurements of Rio Fernando de Taos near Taos, N. Mex., in 1912.

Date.	Hydrographer.	Gage height.	Dis- charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
Oct. 4	Gray & Powers.....	1.11	3.5
31	J. E. Powers.....	1.10	2.7
Dec. 13	do.....	1.02	1.6

Daily gage height, in feet, and discharge, in second-feet, of Rio Fernando de Taos near Taos, N. Mex., for 1912.

[Elsie Witt, observer.]

Day.	October.		November.		December.		Day.	October.		November.		December.	
	Gage height.	Dis- charge.	Gage height.	Dis- charge.	Gage height.	Dis- charge.		Gage height.	Dis- charge.	Gage height.	Dis- charge.	Gage height.	Dis- charge.
1....		3.5	1.10	2.7	1.08	2.4	16....	1.10	2.7	1.04	1.8	1.01	1.5
2....		3.5	1.10	2.7	1.08	2.4	17....	1.10	2.7	1.10	2.7	1.00	1.4
3....		3.5	1.09	2.5	1.08	2.4	18....	1.10	2.7	1.10	2.7	1.00	1.4
4....	1.10	3.4	1.08	2.4	1.08	2.4	19....	1.10	2.7	1.09	2.5	1.00	1.4
5....	1.60	15	1.07	2.2	1.07	2.2	20....	1.10	2.7	1.08	2.4	1.00	1.4
6....	1.20	4.7	1.06	2.1	1.07	2.2	21....	1.10	2.7	1.07	2.2	1.00	1.4
7....	1.20	4.5	1.05	1.9	1.06	2.1	22....	1.10	2.7	1.06	2.1	1.00	1.4
8....	1.15	3.6	1.05	1.9	1.05	1.9	23....	1.10	2.7	1.06	2.1	1.00	1.4
9....	1.15	3.6	1.05	1.9	1.05	1.9	24....	1.10	2.7	1.05	1.9	1.00	1.4
10....	1.10	2.7	1.05	1.9	1.05	1.9	25....	1.10	2.7	1.04	1.8	1.00	1.4
11....	1.10	2.7	1.05	1.9	1.05	1.9	26....	1.10	2.7	1.03	1.7	1.00	1.4
12....	1.10	2.7	1.05	1.9	1.03	1.7	27....	1.10	2.7	1.02	1.6	1.00	1.4
13....	1.10	2.7	1.04	1.8	1.02	1.6	28....	1.10	2.7	1.01	1.5	1.00	1.4
14....	1.10	2.7	1.04	1.8	1.02	1.6	29....	1.10	2.7	1.00	1.4	1.00	1.4
15....	1.10	2.7	1.04	1.8	1.01	1.5	30....	1.10	2.7	1.00	1.4	1.00	1.4
							31....	1.10	2.7			1.00	1.4

NOTE.—Daily discharge determined as follows: Oct. 1-3 estimated; Oct. 4-7 by the indirect method for shifting channels; Oct. 8 to Dec. 31 from a fairly well defined curve.

Monthly discharge of Rio Fernando de Taos near Taos, N. Mex., for 1912.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
October.....	15	2.7	3.38	508	B.
November.....	2.7	1.4	2.04	121	B.
December.....	2.4	1.4	1.70	105	B.
The period.....				434	

CHAMA RIVER AT CHAMA, N. MEX.

Location.—At Denver & Rio Grande Railroad bridge about half a mile northeast of Chama, 2 miles above the mouth of Little Chama River, in sec. 13, T. 31 N., R. 3 E.

Records available.—September 23, 1912, to December 31, 1912.

Drainage area.—Not measured.

Gage.—Vertical staff.

Channel.—Permanent at low stages, but subject to a shift during flood stages.

Discharge measurements.—Wading at low stages and from a bridge during flood stages.

Winter flow.—Affected by ice.

Diversions.—Little water is taken out for irrigation above this point.

Accuracy.—The estimates made in 1912 can be considered good.

Cooperation.—Gage heights furnished by the Arlington Land Co., Chama, N. Mex.

Discharge measurements of Chama River at Chama, N. Mex., in 1912.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Sept. 23	Gray and O'Brien	1.17	18.6	Oct. 29	F. O'Brien.....	1.44	39.8
Oct. 9	F. O'Brien.....	1.32	29.7	Nov. 14	do.....	1.26	25.7
9	do.....	1.32	30.5	Dec. 18	do.....	a 1.38	15.8
19	do.....	1.29	25.2				

a Gage height affected by ice.

Daily gage height, in feet, and discharge, in second-feet, of Chama River at Chama, N. Mex., for 1912.

[G. C. Carr, observer.]

Day.	September.		October.		November.		December.	
	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.
1.....			1.20	21	1.28	27	1.10	13
2.....			1.25	24	1.34	31	1.08	12
3.....			1.27	26	1.30	28	1.16	14
4.....			1.20	21	1.38	34	1.08	12
5.....			1.41	37	1.30	28	1.10	12
6.....			1.39	35	1.32	30	1.13	13
7.....			1.39	35	1.33	30	1.26	13
8.....			1.41	37	1.39	35	1.20	13
9.....			1.36	33	1.40	36	1.28	15
10.....			1.35	32	1.35	32	1.29	15

Daily gage height, in feet, and discharge, in second-feet, of Chama River at Chama, N. Mex., for 1912—Continued.

Day.	September.		October.		November.		December.	
	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.
11.....			1.31	29	1.31	29	1.26	14
12.....			1.31	29	1.35	32	1.26	14
13.....			1.30	28	1.30	28	1.26	14
14.....			1.30	28	1.22	22	1.28	15
15.....			1.29	27	1.28	27	1.28	15
16.....			1.28	27	1.25	24	1.29	15
17.....			1.28	27	1.30	28	1.30	15
18.....			1.28	27	1.20	21	1.36	16
19.....			1.28	27	1.30	28	1.38	16
20.....			1.29	27	1.28	27	1.36	16
21.....			1.28	27	1.28	27	1.35	16
22.....			1.28	27	1.23	23	1.35	16
23.....	1.18	20	1.28	27	1.24	24	1.55	16
24.....	1.18	20	1.28	27	1.23	23	1.50	16
25.....	1.17	19	1.27	26	1.19	20	1.40	15
26.....	1.18	20	1.25	24	1.16	18	1.37	15
27.....	1.18	20	1.24	24	1.12	15	1.35	15
28.....	1.18	20	1.70	64	1.08	13	1.33	15
29.....	1.18	20	1.38	34	1.09	13	1.35	15
30.....	1.18	20	1.36	33	1.06	12	1.40	15
31.....			1.22	22			1.55	15

NOTE.—Gage heights affected by ice along the edges of the stream Dec. 1-31. Daily discharge determined as follows: Sept. 23 to Nov. 30 from a curve well defined between 10 and 55 second-feet; Dec. 1-31 estimated on account of ice, taking into consideration discharge measurements and U. S. Weather Bureau reports.

Monthly discharge of Chama River at Chama, N. Mex., for 1912.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
September 23-30.....	20	19	19.9	316	A.
October.....	64	21	29.4	1,810	A.
November.....	36	12	25.5	1,520	A.
December.....	16	12	14.6	898	C.
The period.....				4,540	

CHAMA RIVER AT PARK VIEW, N. MEX.

Location.—At the wagon-road bridge half a mile northwest of Park View, about 800 feet below the confluence of Brazos and Chama rivers, in sec. 7, T. 29 N., R. 4 E.

Records available.—November 25 to December 31, 1912.

Drainage area.—Not measured.

Gage.—Automatic recording.

Channel.—No data.

Discharge measurements.—Wading at low stages and from wagon bridge at high stages.

Winter flow.—Backwater from ice during the winter months.

Diversions.—Some water diverted for irrigation above this point.

Accuracy.—Because of meager data daily estimates of the discharge were not made in 1912. These data will appear in a later report and should be rated as good.

Cooperation.—Gage heights furnished by the Arlington Land Co., Chama, N. Mex.

Discharge measurements of Chama River at Park View, N. Mex., in 1912.

Date.	Hydrographer.	Gage height.	Dis-charge.
Nov. 25 ^a	F. O'Brien.....	<i>Feet.</i> 0.50	<i>Sec.-ft.</i> 25.6
Dec. 19 ^b	do.....	.70	36.2

^a Floating slush ice.^b Stream frozen across.*Daily gage height, in feet, and discharge, in second-feet, of Chama River at Park View, N. Mex., for 1912.*

[G. C. Carr, observer.]

Day.	Nov.	Dec.	Day.	Nov.	Dec.	Day.	Nov.	Dec.
1.....		0.56	11.....		0.59	21.....		0.60
2.....		.42	12.....		.59	22.....		.65
3.....		.54	13.....		.62	23.....		.65
4.....		.52	14.....		.62	24.....		.70
5.....			15.....		.59	25.....	0.50	.70
6.....			16.....		.58	26.....	.50	.70
7.....			17.....		.58	27.....	.52	.70
8.....		.52	18.....		.57	28.....	.52	.70
9.....		.58	19.....		.57	29.....	.53	
10.....		.60	20.....		.57	30.....	.55	
						31.....		

NOTE.—Gage heights affected by ice Dec. 5-28, 1912.

CHAMA RIVER NEAR CHAMITA, N. MEX.

Location.—At the Denver & Rio Grande Railroad bridge 1 mile south of Chamita, 4 miles above Espanola, half a mile above the mouth, in sec. 15, T. 21 N., R. 8 E. Records available.—October 10, 1912, to December 31, 1912.

Drainage area.—Not measured.

Gage.—Automatic recording.

Channel.—Shifting.

Discharge measurements.—By wading at low stages and from bridge at high stages.

Winter flow.—Severe ice effect during a portion of the winter months.

Diversions.—Considerable water diverted for irrigation above this station.

Accuracy.—Daily estimates of the discharge were not computed for 1912 because of meager data. These data, when compiled, should give results with a fair degree of accuracy.

Cooperation.—Gage heights furnished by the Arlington Land Co., Chama, N. Mex.

Discharge measurements of Chama River near Chamita, N. Mex., in 1912.

Date.	Hydrographer.	Gage height.	Dis-charge.
Oct. 10	J. E. Powers.....	<i>Feet.</i>	<i>Sec.-ft.</i>
Nov. 6	do.....	0.85	102
Dec. 9	do.....	1.00	98.6

Daily gage height, in feet, of Chama River near Chamita, N. Mex., for 1912.

[H. H. Kramer, observer.]

Day.	Nov.	Dec.	Day.	Nov.	Dec.	Day.	Nov.	Dec.
1.....		0.91	11.....	0.90	0.93	21.....	0.86	0.95
2.....		.92	12.....	.88	.94	22.....	.83	.96
3.....		.91	13.....	.90	.96	23.....	.82	.96
4.....		.94	14.....	.91	.95	24.....	.84	.95
5.....	0.82	.92	15.....	.92	.92	25.....	.87	.97
6.....	.85	.91	16.....	.90	.93	26.....	.88	1.03
7.....	.88	.91	17.....	.90	.92	27.....	.89	.98
8.....	.90	.91	18.....	.90	.96	28.....	.89	.98
9.....	.91	.96	19.....	.90	.96	29.....	.96	.98
10.....	.91	.97	20.....	.88	.96	30.....	.95	.98
						31.....		.96

NOTE.—Gage heights affected by ice Dec. 18-31, 1912.

BRAZOS RIVER AT BRAZOS, N. MEX.

Location.—Three-fourths mile southeast of Brazos, 1 mile above the confluence of Brazos and Chama rivers, in sec. 5, T. 29 N., R. 4 E. No tributaries below the station. Small tributary from the north about 4 miles above the station.

Records available.—November 24, 1912, to December 31, 1912.

Drainage area.—Not measured.

Gage.—Automatic recording.

Channel.—Practically permanent.

Discharge measurements.—By wading at low stages and from bridge at high stages.

Winter flow.—Backwater effect from ice during the winter months.

Diversions.—Water taken from stream above and below this station for irrigation.

Accuracy.—Discharge measurements taken in 1912 would not permit daily estimates of discharge to be made.

Cooperation.—Gage heights furnished by the Arlington Land Co., Chama, N. Mex.

Discharge measurements of Brazos River at Brazos, N. Mex., in 1912.

Date.	Hydrographer.	Gage height.	Discharge.
Nov. 25	F. O'Brien.....	<i>Feet.</i> 1.00	<i>Sec.-ft.</i> 18.7
Dec. 19	do.....	a.85	10.6

a Gage height affected by ice.

NOTE.—Water is diverted for irrigation just above the station. The amount diverted at the time of the above measurements is as follows: Nov. 25, 5.8 second-feet; Dec. 19, 3.1 second-feet.

Daily gage height, in feet, of Brazos River at Brazos, N. Mex., for 1912.

[G. C. Carr, observer.]

Day.	Nov.	Dec.	Day.	Nov.	Dec.	Day.	Nov.	Dec.
1.....		0.87	11.....		0.83	21.....		0.95
2.....		.87	12.....		.84	22.....		.97
3.....		.86	13.....		.92	23.....		.98
4.....		.84	14.....		.86	24.....	0.85	1.10
5.....		.83	15.....		.96	25.....	.85	1.20
6.....		.82	16.....		.95	26.....	.86	1.20
7.....		.80	17.....		.95	27.....	.87	1.20
8.....		.85	18.....		.95	28.....	.90	1.20
9.....		.84	19.....		.95	29.....	.93	
10.....		.83	20.....		.95	30.....	.95	
						31.....		

NOTE.—Gage heights affected by ice Dec. 6-23, 1912.

HORN RIVER¹ NEAR CANJILON, N. MEX.

Location.—In the Carson National Forest, at Canjilon ranger station, in sec. 2, T.

26 N., R. 5 E., 5 miles northeast of Canjilon. No important tributaries near by.

Records available.—June 19, 1911, to September 28, 1912.

Drainage area.—Not measured.

Gage.—Vertical staff.

Channel.—Shifting.

Discharge measurements.—Made by wading.

Diversions.—No water diverted above the station. The records represent the natural run-off.

Accuracy.—Owing to a lack of discharge measurements, no estimates of discharge can be made.

Cooperation.—Gage heights furnished by the United States Forest Service.

Discharge measurements of Horn River near Canjilon, N. Mex., in 1912.

Date.	Hydrographer.	Gage height.	Discharge.
Nov. 24	F. O'Brien.....	Feet. 2.26	Sec.-ft. 2.4
Dec. 19	do.....		α 1.5

α Estimated, stream almost entirely frozen.

Daily gage height, in feet, of Horn River near Canjilon, N. Mex., for 1912.

[L. A. Shartzer, observer.]

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Apr.	May.	June.	July.	Aug.	Sept.
1.....		2.30		1.60		1.31	16.....	2.28	3.30	1.92	1.55	1.35	
2.....		2.30	2.30	1.60		1.30	17.....	2.28	3.35	1.88	1.43	1.25	
3.....		3.40		1.59		1.30	18.....	2.29	3.35	1.85	1.92	1.25	1.28
4.....		3.38				1.29	19.....	1.79	3.40	1.85		1.24	1.27
5.....		3.30	2.28	1.58	1.40		20.....	1.78		1.80	1.53	1.24	
6.....		2.21	2.25	1.55	1.38	1.29	21.....	1.78	3.40	1.79	1.65	1.24	
7.....		2.25	2.22	1.52	1.38	1.29	22.....			2.10	1.55	1.25	1.27
8.....	2.28		2.20	1.50		1.29	23.....			1.80	1.60	1.24	1.27
9.....			2.10			1.29	24.....			2.10	1.75	1.92	1.27
10.....			2.10	1.47		1.29	25.....			2.20	1.74	1.57	1.25
11.....	2.22	2.25	1.98	1.45			26.....	2.26			1.60		1.28
12.....	2.21	3.40	1.92	1.43		1.42	27.....	2.30		1.65	1.55	1.26	1.28
13.....	2.21		1.85	1.90		1.33	28.....	2.28		1.60			1.28
14.....	2.20	2.25	1.80	1.60		1.27	29.....			1.59			
15.....	2.21	3.35		1.65			30.....		2.51	1.58		1.35	
							31.....		2.52				

RIO VALLECITOS AT VALLECITOS, N. MEX.

Location.—At Vallecitos, in sec. 17, T. 26 N., R. 8 E., in the Carson National Forest.

Records available.—June 17, 1911, to December 16, 1912.

Drainage area.—Not measured.

Gage.—Vertical staff.

Channel.—Fairly permanent.

Discharge measurements.—Made by wading.

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

¹ Known also as Rio Canjilon.

Diversions.—Water is diverted in small amounts for a distance of 6 miles above the station.

Accuracy.—Estimates of discharge during 1911 and 1912 may be considered good.

Owing to fragmentary records during 1912 estimates were made only for days having gage heights.

Cooperation.—Gage-height record furnished by the United States Forest Service.

Discharge measurements of Rio Vallecitos at Vallecitos, N. Mex., in 1912.

Date.	Hydrographer.	Gage height.	Discharge.
Dec. 16 ^a	J. E. Powers.....	<i>Fect.</i> 1.10	<i>Sec.-ft.</i> 6.4

^a Stream covered with ice.

Daily gage height, in feet, of Rio Vallecitos at Vallecitos, N. Mex., for 1912.

[D. G. Darrah, observer.]

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....		3.10	2.63	1.41	1.21			0.99
2.....					1.12	0.92		.98
3.....	1.88			1.23	.97	.91		.99
4.....		3.30	2.24					1.00
5.....	2.02		2.32		1.10			.98
6.....		3.40	2.16		1.12	.91		.97
7.....		3.47			.97	.90		
8.....			2.00	.87	.91			
9.....		3.30	.87			.91		
10.....		3.31	2.20	.87		.90		
11.....				.87				
12.....			1.88	.87	.87	.89		
13.....			1.69		.97	.89		.88
14.....					.98	.90		.88
15.....	2.00		1.65	1.97				.87
16.....				1.76	.97	.91		.87
17.....	1.16	3.80		1.52	.92	.90		
18.....	2.05							.88
19.....			2.43	1.33	.92		1.11	.92
20.....	2.00	4.40	2.36	1.64		.90		
21.....		4.65	1.99				1.06	.86
22.....	2.00		1.87	1.25	.89		1.03	
23.....	2.30						1.01	
24.....	2.31	3.63	1.84	1.12		.90	1.00	
25.....	2.29		1.90	1.11		.90		.89
26.....	2.50				.88	.88		.94
27.....		3.33	1.67	.91	.89			.96
28.....	2.37				.88	.88	.97	
29.....		3.26	1.49	.91	.89		.90	.90
30.....	3.70			.91		.89	.98	
31.....		2.66					.98	

NOTE.—Stream probably frozen solid January to March. Ice on stream through December.

Daily discharge, in second-feet, of Rio Vallecitos at Vallecitos, N. Mex., for 1911-12.

Day.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1911.							
1.		8.4	13	9.0	14	22	20
2.		23	11	5.8	16	20	24
3.		18	10	6.2	9.9	18	24
4.		14	14	6.2	9.0	18	24
5.		11	7.8	6.2	73	17	23
6.		442	7.6	11	137	16	
7.		20	6.6	7.8	118	16	
8.		16	6.2	7.0	83	21	
9.		13	4.2	6.7	60	21	
10.		11	4.3	6.4	45	22	
11.		9.0	4.5	6.4	37	22	
12.		11	7.4	6.6	32	22	
13.		11	5.6	11	27	23	
14.		29	4.2	8.2	25	23	
15.		18	4.0	11	22	23	
16.		45	4.4	10	20	24	
17.	28	20	4.8	7.6	24	24	
18.	27	23	4.2	6.6	28	24	
19.	24	25	6.2	6.6	24	25	
20.	19	36	6.4	17	21	25	
21.	18	24	4.6	9.0	17	24	
22.	18	24	15	7.8	18	24	
23.	16	19	18	7.4	18	22	
24.	15	46	12	8.2	16	21	
25.	10	28	11	8.4	15	20	
26.	8.4	102	8.6	7.8	17	23	
27.	8.2	24	7.6	10	19	26	
28.	8.2	30	9.3	8.6	18	26	
29.	8.2	26	8.6	9.6	24	26	
30.	9.6	22	6.8	11	29	25	
31.		18	7.0		25		

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1912.								
1.		374	222	16	9.3			4.9
2.					7.4	4.2		4.8
3.	51			9.9	4.7	4.1		4.9
4.		442	113					5.0
5.	68		135		7.0			4.8
6.		476	94		7.4	4.1		4.7
7.		500			4.7	4.0		
8.			65	8.7	4.1			
9.		442		3.7		4.1		
10.		445	102	3.7		4.0		
11.				3.7				
12.			51	3.7	3.7	3.9		
13.			32		4.7	3.9		3.8
14.					4.8	4.0		3.8
15.	65		30	61				3.7
16.				39	4.7	4.1		3.7
17.	8.2	630		21	4.2	4.0		
18.	73							3.8
19.			165	13	4.2		7.2	4.2
20.	65	870	146	29		4.0		
21.		970	64				6.2	3.6
22.	65		50	10	3.9		5.6	
23.	129						5.2	
24.	132	562	47	7.4		4.0	5.0	
25.	126		53	7.2		4.0		3.9
26.	185				3.8	3.8		4.4
27.		452	31	4.1	3.9			4.6
28.	149				3.8	3.8	4.7	
29.		428	20	4.1	3.9		4.9	4.0
30.	590			4.1		3.9	4.8	
31.		232					4.8	

NOTE.—Daily discharge determined from a curve well defined between 5 and 300 second-feet. Discharge interpolated during 1911 on days for which gage heights are missing.

Monthly discharge of Rio Vallecitos at Vallecitos, N. Mex., for 1911.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
June 17-30.....	28	8.2	15.5	430	B.
July.....	442	8.4	37.6	2,310	B.
August.....	18	4.0	79.0	4,830	B.
September.....	17	5.8	83.7	4,930	B.
October.....	137	9.0	83.6	2,070	B.
November.....	26	16	22.1	1,320	B.
December 1-5.....	24	20	23.0	228	B.
The period.....				16,200	

RIO PUERCO AT RIO PUERCO, N. MEX.

Location.—At the Atchison, Topeka & Santa Fe Railway bridge between Dalies and Rio Puerco, in sec. 31, T. 7 N., R. 1 W. Nearest tributary a small stream entering from the west just below; San Jose River enters about 8 miles above.

Records available.—Fragmentary records September 7, 1910, to October 2, 1911, and August 19, 1912, to December 31, 1912.

Drainage area.—Not measured.

Gage.—Automatic recording.

Channel.—Shifting.

Discharge measurements.—Made by wading and from cable and car.

Diversions.—No data.

Accuracy.—Owing to meager data, no estimates of discharge can be made.

Discharge measurements of Rio Puerco at Rio Puerco, N. Mex., in 1912.

Date.	Hydrographer.	Gage height.	Dis- charge.	Date.	Hydrographer.	Gage height.	Dis- charge.
Aug 19	R. L. Cooper.....	<i>Feet.</i> 0.18	<i>Sec.-ft.</i> 68.6	Nov. 28	C. J. Emerson.....	<i>Feet.</i> 0.15	<i>Sec.-ft.</i> a 3.0
Oct. 4	do.....	— .16	a 15.0	Dec. 22	J. E. Powers.....		.0
31	Emerson and Broome..	— .08	6.2				

a Estimated.

Daily gage height, in feet, of Rio Puerco at Rio Puerco, N. Mex., for 1912.

[L. A. Maxey, observer.]

Day.	Aug.	Oct.	Nov.	Dec.	Day.	Aug.	Oct.	Nov.	Dec.
1.....			—0.08	0.15	16.....		—1.00	0.00	0.30
2.....			— .08	.15	17.....		—1.00	.00	.30
3.....			.00	.75	18.....		—1.00	.00	.25
4.....			.00	.40	19.....		—1.00	.00	.30
5.....		—0.16	.00	.40	20.....	0.10	—1.00	.00	.20
6.....			.00	.25	21.....	.10	— .90	.00	.20
7.....			.00	.10	22.....	.10	— .80	.00	
8.....			.00	.40	23.....	.10	— .70	.00	
9.....			.00	.35	24.....	.10	— .60	.00	
10.....			.00	.50	25.....	.10	— .50	.00	
11.....			.00	.40	26.....	.10	— .40	.05	
12.....			.00	.20	27.....	.10	— .30	.10	
13.....		—1.00	.00	.10	28.....	.10	— .30	.15	
14.....		—1.00	.00	.10	29.....	.10	— .30	.15	
15.....		—1.00	.00	.30	30.....		— .30	.15	
					31.....		— .08		

NOTE.—Sept. 19 there was a discharge of 2 second-feet. Gage heights affected by ice Nov. 27 to Dec. 21. No discharge Dec. 22-31, 1912.

RIO PUERCO NEAR LA JOYA, N. MEX.

Location.—At the Atchison, Topeka & Santa Fe Railway bridge, 2 miles north of the La Joya railway station, in sec. 20, T. 2 N., R. 1 E., $\frac{1}{4}$ mile above the mouth of the river, above all tributaries; no important tributaries for several miles above.

Records available.—Fragmentary records September 10, 1910, to December 31, 1912.

Drainage area.—Not measured.

Gage.—Automatic recording.

Channel.—Very shifting.

Discharge measurements.—Made by wading.

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

Accuracy.—Owing to the extreme changes in conditions and the few discharge measurements, estimates of discharge were not made.

Discharge measurements of Rio Puerco near La Joya, N. Mex., in 1912.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
Aug. 20	R. L. Cooper.....	<i>Feet.</i> 3.15	<i>Sec.-ft.</i> 48.0	Nov. 22	C. J. Emerson.....	<i>Feet.</i> 1.50	<i>Sec.-ft.</i> a 0.2
Oct. 5	do.....	1.96	a 12.5	Dec. 23	J. E. Powers.....		.0
31	Emerson and Broome.....		.0				

a Estimated.

Daily gage height, in feet, of Rio Puerco near La Joya, N. Mex., for 1912.

[S. C. Elliott, observer.]

Day.	May.	June.	July.	Aug.	Oct.	Day.	May.	June.	July.	Aug.	Oct.
1		5.53		5.60		16			b 6.21	5.55	
2				5.60		17			6.05	5.55	
3				5.60		18			5.90		
4						19			5.80		
5					2.00	20				3.15	
6					2.60	21					
7					2.40	22	5.55		5.55		
8					2.35	23	5.60	a 5.62	c 6.00		
9					2.25	24	5.63	5.78	5.90		
10		5.55			2.20	25	5.70	5.68	5.75		
11		5.65			2.15	26	5.70	5.65	5.80		
12		5.85				27	5.74	5.65	5.60		
13		5.60				28	5.72	5.65	5.60		
14						29	5.68	5.65	5.60		
15				5.60		30	5.60		5.60		
						31	5.55		5.60		

a Maximum gage height, 7.3 feet. b Maximum gage height, 9.0 feet. c Maximum gage height, 8.2 feet.

NOTE.—There was no flow on days for which gage heights are not given during 1912 except Mar. 2-9, June 2 and 3, Aug. 4-6 and 18-31, Sept. 1-21, and Nov. 18-31, during which periods there was a small discharge.

BLUEWATER CREEK NEAR BLUEWATER, N. MEX.

Location.—About $2\frac{1}{4}$ miles northwest of Bluewater post office, one-fourth mile from the mouth of Bluewater Creek box canyon, 8 miles below dam site of Bluewater Development Co., near sec. 8, T. 12 N., R. 11 W.

Records available.—May 29 to December 31, 1912.

Drainage area.—Not measured.

Gage.—Automatic recording.

Channel.—Not liable to shift.

Discharge measurements.—By wading.

Winter flow.—Ice affects the gage heights during the winter months.

Accuracy.—On account of a lack of high-water measurements, estimates of the discharge were not made.

Cooperation.—Gage heights furnished by W. S. Post, of Los Angeles, Cal.

Discharge measurements of Bluewater Creek near Bluewater, N. Mex., in 1912.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
May 29	S. S. Carroll.....	1.09	3.8	Oct. 30	Emerson and Broome..	1.10	a2.0
Aug. 17	R. L. Cooper.....	1.20	2.2	Nov. 26	C. J. Emerson.....	1.15	a1.5
Oct. 2	do.....	1.08	a.5	Dec. 21	J. E. Powers.....		b.0

a Estimated.

b Stream frozen solid.

Daily gage height, in feet, of Bluewater Creek near Bluewater, N. Mex., for 1912.

[E. H. Dewey, observer.]

Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....		1.32	1.53	1.08	1.13	1.03	16.....	1.02	1.30	1.00	1.10	1.05	
2.....		1.20	1.32	1.08	1.08	1.05	17.....	1.12	1.20	1.00	1.10	1.08	
3.....		1.10	1.28	1.08	1.05	1.07	18.....	1.03	1.12	1.00	1.10	1.05	
4.....		1.10	1.17	1.09	1.07	1.05	19.....	1.02	1.12	1.00	1.10	1.04	
5.....		1.20	1.13	1.41	1.05	1.06	20.....	4.00	1.12	1.00	1.08	1.04	
6.....		1.25	1.10	1.35	1.02	1.05	21.....	4.65	1.12	1.00	1.08	1.03	
7.....		1.15	1.10	1.25	1.02	1.08	22.....	a5.30	1.35	1.00	1.05	1.02	
8.....		1.15	1.08	1.19	1.02	1.10	23.....	3.80	1.18	1.00	1.05	1.02	
9.....		1.15	1.03	1.10	1.08	1.10	24.....	1.65	1.14	1.00	1.08	.97	
10.....		1.05	1.00	1.06	1.06	1.10	25.....	1.52	1.13	1.00	1.08	1.01	
11.....		1.10	1.00	1.09	1.05	1.10	26.....	1.45	1.24	1.00	1.08	1.02	
12.....		1.10	1.00	1.10	1.04	1.10	27.....	1.55	1.71	1.00	1.12	1.03	
13.....	0.93	1.15	1.00	1.10	1.01	1.10	28.....	1.35	1.15	1.00	1.15	1.03	
14.....	.98	1.50	1.00	1.10	1.01	1.10	29.....	1.65	1.25	1.00	1.10	1.03	
15.....	1.02	1.50	1.00	1.10	.99		30.....	1.48	b2.24	1.03	1.12	1.00	
							31.....	1.40	2.08		1.13		

a Maximum gage height, 5.4 feet.

b Maximum gage height, 4.8 feet.

NOTE.—Stream frozen solid Dec. 15-31, 1912.

BLUEWATER CREEK AT GRANTS, N. MEX.

Location.—At wagon bridge opposite Atchison, Topeka & Santa Fe Railway depot at Grants, in sec. 25, T. 11 N., R. 10 W.

Records available.—October 30 to December 31, 1912.

Drainage area.—Not measured.

Gage.—Vertical staff.

Channel.—Shifting.

Discharge measurements.—Wading at low stages and from bridge at high stages.

Winter flow.—Slight effect from ice during winter months.

Cooperation.—Gage heights furnished by W. S. Post, of Los Angeles, Cal.

The following discharge was estimated by C. J. Emerson:

October 30, 1912: Gage height, 0.92 foot; discharge, 0.5 second-foot.

Additional gage heights were obtained by E. R. Vaughn: December 30, 0.95 foot; December 31, 1.05 feet.

Channel was dry November 26 to December 29, 1912.

SAN JOSE RIVER NEAR SUWANEE, N. MEX.

Location.—Two miles below the railroad station at Suwanee, near sec. 29, T. 8 N., R. 2 W., about 6 miles above the mouth of the river and 3 miles below Rio Lucero.

Records available.—August 30, 1910, to December 31, 1912; fragmentary.

Drainage area.—Not measured.

Gage.—Automatic recording.

Channel.—Shifting.

Discharge measurements.—Made by wading.

Accuracy.—The fragmentary estimates of daily discharge made in 1912 can be considered only fair.

Discharge measurements of San Jose River near Suwanee, N. Mex., in 1912.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Aug. 18	R. L. Cooper.....	1.40	27.1	Nov. 27	C. J. Emerson.....	0.65	4.6
Oct. 3	do.....	1.80	33.7	Dec. 22	J. E. Powers.....		a.0
31	C. J. Emerson.....	.80	6.9				

a Frozen to bottom.

Daily gage height, in feet, of San Jose River near Suwanee, N. Mex., for 1912.

[James A. Conway, observer.]

Day.	Jan.	Feb.	Mar.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.	0.38				0.80			0.80	0.80	0.74
2.	.32				.65			a 2.73	.80	.72
3.	.48	0.35			.60			1.95	.80	
4.	.55	.45			.60			b 1.79	.80	
5.	.55	.43			.60			2.89	.80	
6.	.65	.45			.60			1.72	.80	
7.	.62	.48			.60			1.15	.80	
8.	.65	.48			.60			1.05	.80	
9.	.68	.48			.60			.95	.80	
10.	.80	.48	0.94		.60			.95	.80	
11.	.90	.43	1.09		.60			.95	.80	.70
12.	.95	.40	.95		.60			.95		.70
13.	1.10	.35	.95		.60			.95		
14.	1.10	.35	.92		.60			.95		
15.	1.18	.40	.92		.70			.93		
16.	1.15	.55	.95	0.30	.60			.93		
17.	1.20	.48	.98	.30	.60			.91		
18.	1.32	.40	.98	.30	.60	1.40		.91		
19.	1.02	.40	.92	.30	.60	1.30		.90		
20.	1.30	.42	1.32	.30	.60	1.25	0.80			
21.	1.25	.40	1.19	.30		1.37	.80		.72	
22.	.85	.35	1.06	.30		1.12	.80		.72	
23.	.70	.50	2.01	.30		1.05	.80		.72	
24.		.50	1.65	.70		1.05	.80		.70	
25.	.43	.42	1.50	.60		1.05	.80		.70	
26.	.48	.40	1.28	1.50		1.00	.80		.70	
27.	.35	.35	1.40	.75		1.00	.80		.60	
28.	.36	.35	1.69	.68		1.00	.80		.73	
29.	.38		1.42	.70			.80		.72	
30.			1.29	.70			.80		.75	
31.			1.16					.80		

a Maximum gage height, 4.40 feet.

b Maximum gage height, 4.10 feet.

NOTE.—Stream frozen to bottom, Dec. 17-31.

Daily discharge, in second-feet, of San Jose River near Suwanee, N. Mex., for 1912.

Day.	Jan.	Feb.	Mar.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.5	2.4			6.8			6.8	6.8	5.7
2	2.2	2.4			4.5			103	6.8	5.4
3	3.1	2.4			4.0			42	6.8	5.4
4	2.9	2.9			4.0			31	6.8	5.3
5	3.6	2.8			4.0			112	6.8	5.3
6	4.5	2.9			4.0			43	6.8	5.2
7	4.2	3.1			4.0			17	6.8	5.2
8	4.5	3.1			4.0			13	6.8	5.1
9	4.8	3.1			4.0			9.9	6.8	5.1
10	6.8	3.1	9.7		4.0			9.9	6.8	5.0
11	8.8	2.8	15		4.0			9.9	6.8	5.0
12	9.9	2.6	9.9		4.0			9.9	6.7	5.0
13	15	2.4	9.9		4.0			9.9	6.6	4.0
14	15	2.4	9.2		4.0			9.9	6.5	3.0
15	18	2.6	9.2		5.0			9.5	6.4	2.0
16	17	3.6	9.9	2.1	4.0			9.5	6.3	1.0
17	19	3.1	11	2.1	4.0			9.0	6.2	
18	24	2.6	11	2.1	4.0	27		9.0	6.0	
19	12	2.6	9.2	2.1	4.0	23		8.8	5.8	
20	23	2.7	24	2.1	4.0	21	6.8	8.6	5.6	
21	21	2.6	19	2.1		26	6.8	8.4	5.4	
22	7.8	2.4	13	2.1		16	6.8	8.2	5.4	
23	5.0	3.2	60	2.1		13	6.8	8.0	5.4	
24	3.2	2.9	40	5.0		13	6.8	7.8	5.0	
25	2.8	2.7	32	4.0		13	6.8	7.6	5.0	
26	3.1	2.6	22	32		11	6.8	7.4	5.0	
27	2.4	2.4	27	5.9		11	6.8	7.2	4.0	
28	2.4	2.4	42	4.8		11	6.8	7.1	5.5	
29	2.5	2.4	28	5.0			6.8	7.0	5.4	
30	2.5		23	5.0			6.8	6.9	5.9	
31	2.5		17					6.8		

NOTE.—Daily discharge determined from a well-defined curve except Oct. 3 and 4, when the indirect method for shifting channels was used. No flow Mar. 1-9 and Dec. 17-31. Discharge interpolated on other days for which gage heights are missing.

Monthly discharge of San Jose River near Suwanee, N. Mex., for 1912.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January	24	2.2	8.28	509	B.
February	3.6	2.4	2.73	157	B.
March	60	0	14.5	892	B.
June 16-30	32	2.1	5.23	156	B.
July 1-20	6.8	4.0	4.22	167	B.
August 18-28	27	11	16.8	367	B.
September 20-30	6.8	6.8	6.80	148	B.
October	112	6.8	18.2	1,120	B.
November	6.8	4.0	6.10	363	B.
December	5.7	0	2.35	144	B.

PECOS RIVER BASIN.

PECOS RIVER NEAR COWLES, N. MEX.

Location.—At highway bridge in about sec. 28, T. 18 N., R. 12 E., three-fourths mile below the old Cowles post office, 5 miles below the present Cowles post office, midway between Esperito Santo and Mora Creeks, about half a mile below the mouth of Willow Creek.

Records available.—March 9, 1910, to December 31, 1912.

Drainage area.—Not measured.

Gage.—Automatic recording. A gage of the Bristol type was installed June 5, 1912, in place of a Friez automatic gage. These gages were referred to the same datum.

Channel.—Fairly permanent except during high water, when it may shift slightly.

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

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

Accuracy.—Conditions are favorable for accurate results, and the record should be reliable. The estimates previous to July 31, 1912, can be considered good, but on account of doubtful gage heights estimates were not made after that date.

Discharge measurements of Pecos River near Cowles, N. Mex., in 1912.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec. ft.</i>			<i>Feet.</i>	<i>Sec. ft.</i>
Mar. 30	R. H. Fletcher.....	1.28	52.5	Oct. 7	R. L. Cooper.....	1.40	40.9
June 5	S. S. Carroll.....	3.60	832	Nov. 3	A. S. Kirkpatrick.....	1.15	26.5
Aug. 14	R. L. Cooper.....	1.68	85.1	Dec. 14 ^a	C. J. Emerson.....	2.45	28.7

^a Ice present.

Daily gage height, in feet, of Pecos River near Cowles, N. Mex., for 1912.

[J. H. Cortez, observer.]

Day.	Feb.	Mar.	Apr.	May.	June.	July.	Day.	Feb.	Mar.	Apr.	May.	June.	July.
1.....		1.07	1.10		4.60	1.85	16.....		1.10	1.45		2.50	1.30
2.....		1.05	1.10		3.60	1.70	17.....		1.10	1.40		2.30	1.30
3.....		1.03	1.15		3.60	1.85	18.....	1.1	1.15	1.35	3.00	1.80	1.30
4.....		1.03	1.25	2.60	3.60	1.75	19.....	1.1	1.25	1.35		1.80	1.55
5.....		1.06	1.40		3.60	1.65	20.....	1.1	1.35	1.60	3.70	2.05	1.65
6.....		1.09	1.45		3.50	1.65	21.....	1.08	1.25		3.90	2.35	1.75
7.....		1.08	1.45		3.65	1.80	22.....	1.08	1.25		4.00	2.30	1.95
8.....		1.08	1.45		4.00	2.05	23.....	1.04	1.20		4.10	2.10	1.90
9.....		1.07	1.40		3.75	2.00	24.....	1.04	1.15		4.20	2.00	1.85
10.....		1.04	1.55		3.75	1.80	25.....	1.04	1.25		5.05	1.75	1.80
11.....		1.02	1.60	2.50	3.50	1.90	26.....	1.05	1.20		4.30	2.00	1.65
12.....		1.06	1.70		3.50	1.85	27.....	1.05	1.20	2.00	5.30	2.20	1.60
13.....		1.05	1.65		3.80	2.00	28.....	1.05	1.15		5.10	2.20	1.60
14.....		1.04	1.55		4.20	1.85	29.....	1.07	1.15		5.20	2.30	1.70
15.....		1.05	1.45		3.40	1.40	30.....		1.15		5.00	2.30	1.65
							31.....		1.15		4.80		1.70

NOTE.—Gage heights affected by ice Jan. 1 to Feb. 17. Gage heights Apr. 20 to June 4 were read from a staff gage.

Daily discharge, in second-feet, of Pecos River near Cowles, N. Mex., for 1912.

Day.	Feb.	Mar.	Apr.	May.	June.	July.	Day.	Feb.	Mar.	Apr.	May.	June.	July.
1.....		26	29	299	1,380	119	16.....		29	76	488	300	30
2.....		24	29	326	827	88	17.....		29	67	514	238	30
3.....		23	34	353	827	119	18.....	29	34	60	542	108	30
4.....		23	46	380	827	98	19.....	29	46	60	710	108	62
5.....		25	67	375	827	62	20.....	29	60	105	879	168	79
6.....		28	76	370	775	79	21.....	27	46	117	986	252	98
7.....		27	76	364	853	108	22.....	27	46	129	1,040	238	142
8.....		27	76	358	1,040	168	23.....	24	40	141	1,100	182	130
9.....		26	67	352	906	155	24.....	24	34	154	1,150	155	119
10.....		24	95	347	906	108	25.....	24	46	166	1,650	98	108
11.....		22	105	342	775	130	26.....	24	40	178	1,200	155	79
12.....		25	125	370	775	119	27.....	24	40	190	1,800	209	70
13.....		24	115	398	932	155	28.....	24	34	217	1,690	209	70
14.....		24	95	427	1,150	119	29.....	26	34	244	1,740	238	88
15.....		24	76	457	720	42	30.....		34	271	1,620	238	79
							31.....		34		1,500		98

NOTE.—Daily discharge determined as follows: Feb. 18 to June 14 and June 15 to July 31 from two curves well defined between 10 and 1,200 second-feet. Discharge interpolated on days for which gage heights are missing.

Monthly discharge of Pecos River near Cowles, N. Mex., for 1912.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....			^a 20.0	1,230	D.
February.....			^a 25.0	1,440	D.
March.....	60	22	32.2	1,980	B.
April.....	271	29	110	6,550	C.
May.....	1,800	299	778	47,800	C.
June.....	1,380	98	547	32,500	B.
July.....	168	30	96.2	5,920	B.
The period.....				97,400	

^a Estimated.

PECOS RIVER NEAR ANTON CHICO, N. MEX.

Location.—About 1 mile below the settlement of Tecolotito, near sec. 31, T. 12 N. R. 17 E., about 3 miles northwest of Anton Chico, 1½ miles below the mouth of Tecolote Creek.

Records available.—April 28, 1910, to December 31, 1912.

Drainage area.—Not measured.

Gage.—Automatic recording gage, which was moved three-fourths mile downstream on May 15, 1911, and referred to a new datum.

Channel.—Apparently permanent.

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

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

Accuracy.—Owing to the character of the stream, the 1912 estimates can be considered only fair.

Cooperation.—Gage heights furnished by V. K. Jones, Las Vegas, N. Mex.

Discharge measurements of Pecos River near Anton Chico, N. Mex., in 1912.

Date.	Hydrographer.	Gage height.	Dis- charge.	Date.	Hydrographer.	Gage height.	Dis- charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
May 18	V. K. Jones.....	2.40	601	May 21	V. K. Jones.....	2.97	1,190
19	do.....	2.56	770	21	do.....	3.10	1,210
19	do.....	2.67	836	Aug. 11	do.....	1.20	24.4
19	do.....	2.71	851	Oct. 15	J. E. Powers.....	1.20	31.4
20	do.....	2.81	946	20	C. J. Emerson.....	1.30	25.4
21	do.....	2.97	1,110	Nov. 29	J. E. Powers.....	1.30	12.0

Daily gage height, in feet, of Pecos River near Anton Chico, N. Mex., for 1912.

[A. A. Abercrombie, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	1.90	1.30	1.15	1.85	2.16	2.90	1.95	1.48	1.15	1.18	1.23	1.20
2.....	1.90	1.30	1.18	1.82	2.30	2.85	1.92	1.48	1.16	1.19	1.30	1.25
3.....	1.90	1.30	1.18	1.78	2.48	2.82	1.90	1.48	1.12	1.20	1.25	1.25
4.....	1.90	1.30	1.18	1.80	2.60	2.80	1.87		1.08	1.21	1.22	
5.....	1.90	1.30	1.18	1.90	2.50	2.78	1.82		1.07	1.28	1.25	
6.....	1.90	1.30	1.20	2.05	2.34	2.78	1.83		1.05	1.35	1.25	
7.....	1.90	1.30	1.20	2.10	2.21	2.90	1.83		1.06	1.30	1.25	1.50
8.....	1.90	1.30	1.20	2.05	2.20		1.80		1.05	1.30	1.25	1.50
9.....	1.90	1.25	1.30	2.05	2.22		1.78		1.10	1.29	1.20	1.50
10.....	1.90	1.20	1.33	1.98	2.28	2.80	1.77		1.06	1.27	1.20	1.50

Daily gage height, in feet, of Pecos River near Anton Chico, N. Mex., for 1912—Contd.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
11.....	1.90	1.12	1.42	2.08	2.28	2.80	1.78		1.10	1.25	1.17	1.50
12.....	1.90	1.15	1.42	2.12	2.20	2.80	1.79	0.90	1.16	1.20	1.17	1.50
13.....	1.90	1.15	1.36	2.18	2.15	2.65	1.70	.95	1.35	1.20	1.22	1.50
14.....	1.90	1.10	1.35	2.13	2.25	2.58	1.58	1.10	1.20	1.20	1.17	1.50
15.....	1.90	1.10	1.34		2.33	2.52	1.58	1.85	1.16	1.20	1.16	1.40
16.....	1.90	1.12	1.32		2.33	2.50	1.77	1.56	1.16	1.20	1.20	1.30
17.....	1.90	1.10	1.37		2.32	2.50	1.69	1.38	1.15	1.20	1.20	1.30
18.....	1.90	1.10	1.38		2.32	2.52	1.74	1.27	1.13	1.20	1.20	1.30
19.....	1.90	1.10	1.45		2.45	2.50	1.62	1.22	1.10	1.20	1.20	1.30
20.....	1.90	1.10	1.65	1.70	2.62	2.41	1.60	1.69	1.14	1.30	1.20	1.30
21.....	1.90	1.16	2.05	1.70	2.72	2.33	1.67	1.66	1.15	1.30	1.18	1.20
22.....	1.90	1.12	2.05	1.68	2.88	2.18	1.60	1.58	1.16	1.30	1.25	1.20
23.....	1.90	1.15	1.95	1.68	3.00	2.31	1.59	1.57	1.18	1.32	1.40	1.20
24.....	1.90	1.10	1.92	1.70	3.00	2.44	1.60	1.46	1.19	1.32	1.35	1.20
25.....	1.90	1.15	1.84	1.88	2.98	2.31	1.52	1.43	1.19	1.33	1.35	1.20
26.....	1.70	1.15	1.83	2.03	2.95	2.30	1.49	1.37	1.18	1.30	1.35	1.20
27.....	1.55	1.15	1.86	2.03	2.98	2.13	1.54	1.27	1.19	1.25	1.30	1.20
28.....	1.30	1.15	1.85	2.05	3.02	2.09	1.48	1.22	1.18	1.22	1.30	1.30
29.....	1.30	1.15	1.82	2.08	3.02	2.03	1.48	1.18	1.16	1.22	1.30	1.35
30.....	1.30		1.80	2.12	3.02	2.00	1.48	1.26	1.17	1.28	1.30	1.40
31.....	1.30		1.80		3.00		1.48	1.17		1.28		1.40

NOTE.—Gage heights affected by ice Jan. 1 to Feb. 11 and Nov. 22 to Dec. 31.

Daily discharge, in second-feet, of Pecos River near Anton Chico, N. Mex., for 1912.

Day.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....	15	16	238	452	1,040	305	68	16	19	31
2.....	15	19	218	550	995	284	68	17	20	33
3.....	15	19	194	684	968	270	68	14	21	27
4.....	15	19	205	780	950	250	61	11	22	23
5.....	15	19	270	700	932	218	54	10	31	27
6.....	15	21	375	578	932	224	47	9	42	27
7.....	15	21	410	487	1,040	224	39	10	33	27
8.....	15	21	375	480	1,010	205	31	9	33	27
9.....	15	33	375	494	980	194	23	12	32	21
10.....	15	38	326	536	950	188	16	10	29	21
11.....	15	54	396	536	950	194	9	12	27	18
12.....	16	54	424	480	950	200	2	17	21	18
13.....	16	43	466	445	820	150	4	42	21	23
14.....	12	42	431	515	764	98	12	21	21	18
15.....	12	40	384	571	716	98	238	17	21	17
16.....	14	36	337	571	700	188	91	17	21	21
17.....	12	45	290	564	700	145	47	16	21	21
18.....	12	47	244	564	716	172	29	15	21	21
19.....	12	61	197	660	700	113	23	12	21	21
20.....	12	127	150	796	628	104	145	16	33	21
21.....	17	375	150	878	571	136	132	16	33	19
22.....	14	375	141	1,020	466	104	98	17	33	19
23.....	16	305	141	1,130	557	101	94	19	36	19
24.....	12	284	150	1,130	652	104	63	20	36	19
25.....	16	231	257	1,110	557	78	57	20	38	19
26.....	16	224	361	1,080	550	70	45	19	33	19
27.....	16	244	361	1,110	431	85	20	20	27	19
28.....	16	238	375	1,150	403	68	23	19	23	19
29.....	16	218	396	1,150	361	68	19	17	23	19
30.....		205	424	1,150	340	68	20	18	31	19
31.....		205		1,130		68	18		31	

NOTE.—Daily discharge determined as follows: Feb. 1-11, estimated on account of ice; Feb. 12 to Nov. 21, from a curve well defined between 5 and 1,600 second-feet; Nov. 22-30, estimated on account of ice. Discharge interpolated on days of no gage heights.

Monthly discharge of Pecos River near Anton Chico, N. Mex., for 1912.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....			^a 25.0	1,540	D.
February.....	17	12	14.6	840	C.
March.....	375	16	119	7,320	B.
April.....	466	141	302	18,000	B.
May.....	1,150	445	757	46,500	B.
June.....	1,040	340	744	44,300	B.
July.....	305	68	154	9,470	B.
August.....	238	2	54.3	3,340	B.
September.....	42	9	16.3	970	B.
October.....	42	19	27.5	1,690	B.
November.....	33	17	21.8	1,300	C.
December.....			^a 19.0	1,170	D.
The year.....	1,150		188	136,000	

^a Estimated.

PECOS RIVER AT SANTA ROSA, N. MEX.

Location.—At highway bridge at Santa Rosa, 1 mile above the mouth of Rio Agua Negra Chiquita, 6 miles above Canyon Pintada, in sec. 11, T. 8 N., R. 21 E. From May 5, 1903, to December 31, 1906, a station was maintained near the present one by the United States Reclamation Service, but the gage heights were referred to a different datum.

Records available.—February 1, 1910, to July 31, 1911, and September 21 to December 31, 1912.

Drainage area.—2,780 square miles (measured on land-office map).

Gage.—Chain gage.

Channel.—Very shifting.

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

Winter flow.—Practically no ice at this station.

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

Discharge measurements of Pecos River at Santa Rosa, N. Mex., in 1912.

Date.	Hydrographer.	Gage height.	Dis- charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
Sept. 21	C. J. Emerson.....	1.78	14.9
Oct. 16	Gray and Emerson.....	1.92	14.8
Nov. 17	C. J. Emerson.....	2.02 ₆	14.6

Daily gage height, in feet, and discharge, in second-feet, of Pecos River at Santa Rosa, N. Mex., for 1912.

[Geo. H. Smith, jr., observer.]

Day.	September.		October.		November.		December.	
	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.
1.....			1.85	16	1.98	15	1.95	14
2.....			1.75	15	1.85	15	1.99	14
3.....			1.90	16	1.88	15	1.95	14
4.....			1.85	15	2.00	15	1.95	14
5.....			1.90	16	1.95	15	1.96	14
6.....			1.85	15	1.92	14	2.00	14
7.....			1.80	14	1.92	14	1.98	14
8.....			1.80	14	1.98	15	2.00	14
9.....			1.80	14	2.00	15	2.05	14
10.....			1.80	14	2.00	15	2.05	14
11.....			1.80	14	1.95	15	1.99	14
12.....			1.90	15	1.98	15	2.00	14
13.....			1.90	15	2.00	15	1.99	14
14.....			1.95	15	1.95	14	1.90	13
15.....			1.95	15	1.98	14	1.90	13
16.....			1.96	15	1.95	14	2.00	14
17.....			1.89	15	1.95	14	1.98	14
18.....			1.94	15	1.92	14	2.00	14
19.....			1.82	14	2.00	15	1.98	14
20.....			1.82	14	1.94	14	1.98	14
21.....	1.80	15	1.84	14	1.98	15	1.95	13
22.....	1.70	14	1.95	15	1.98	15	1.90	12
23.....	1.70	14	1.95	15	2.00	15	2.10	14
24.....	1.75	14	1.85	15	2.00	15	2.10	14
25.....	1.75	14	1.85	15	2.00	15	1.95	13
26.....	1.70	14	1.95	15	1.98	15	2.05	14
27.....	1.75	14	1.92	15	2.02	15	2.00	14
28.....	1.75	14	1.92	15	2.00	15	2.00	14
29.....	1.80	15	1.95	15	2.05	15	2.00	14
30.....	1.90	16	1.90	15	1.94	14	2.00	14
31.....			1.92	15			2.00	14

NOTE.—Daily discharge determined by the indirect method for shifting channels.

Monthly discharge of Pecos River at Santa Rosa, N. Mex., for 1912.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
September 21-30.....	16	14	14.4	286	C.
October.....	16	14	14.8	910	C.
November.....	15	14	14.7	875	C.
December.....	14	13	13.8	848	C.
The period.....				2,920	

PECOS RIVER NEAR GUADALUPE, N. MEX.

Location.—17 miles northwest of Fort Sumner, 8 miles above Guadalupe post office, 4 miles west of Fort Sumner and Santa Rosa road, 500 feet below the mouth of Alamo Gordo Creek, half a mile above the Alamo dam site in sec. 34, T. 5 N., R. 24 E.

Records available.—October 11 to December 31, 1912.

Drainage area.—Not measured.

Gage.—Automatic recording.

Channel.—Somewhat shifting.

Discharge measurements.—By wading during low water and from a cable during high stages.

Winter flow.—Slightly affected by ice.

Diversions.—Large portion of the water is diverted for irrigation above the station.

Accuracy.—The daily estimates of discharge made in 1912 can be considered only fair.

Discharge measurements of Pecos River near Guadalupe, N. Mex., in 1912.

Date.	Hydrographer.	Gage height.	Discharge.
Oct. 11	C. J. Emerson	Feet.	Sec.-ft.
Nov. 23	do.	0.70	75.8
		.78	81.8

Daily gage height, in feet, and discharge, in second-feet, of Pecos River near Guadalupe, N. Mex., for 1912.

[W. A. Conger, observer.]

Day.	October.		November.		Day.	October.		November.	
	Gage height.	Discharge.	Gage height.	Discharge.		Gage height.	Discharge.	Gage height.	Discharge.
1			0.76	80	16	0.72	77	0.80	84
2			.77	81	17	.68	74	.80	84
3			.77	81	18	.67	74	.80	84
4			.77	81	19	.69	75	.80	84
5			.77	81	20	.70	76	.80	84
6			.78	82	21	.70	76	.80	84
7			.78	82	22	.71	77	.80	84
8			.78	82	23	.72	77	.78	82
9			.78	82	24	.73	78		80
10			.78	82	25	.73	78		80
11	0.69	75	.80	84	26	.75	80		80
12	.70	76	.80	84	27	.76	80		80
13	.70	76	.80	84	28	.76	80		80
14	.70	76	.80	84	29	.76	80		80
15	.72	77	.80	84	30	.76	80		80
					31	.77	81		

NOTE.—Daily discharge estimated, taking into consideration the discharge measurements.

Monthly discharge of Pecos River near Guadalupe, N. Mex., for 1912.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October 11-31	81	74	77.3	3,220	B.
November	84	80	82.1	4,890	C.
December			80.0	4,920	D.
The period				13,000	

^a Estimated.

PECOS RIVER NEAR FORT SUMNER, N. MEX.

Location.—4 miles northwest of Fort Sumner, $3\frac{1}{2}$ miles above the Atchison, Topeka & Santa Fe Railway bridge in sec. 12, T. 3 N., R. 25 E., short distance above the mouth of an arroyo, coming from the west, and about 10 miles below the mouth of Arroyo Salada.

Records available.—June 12, 1904, to February 28, 1910, and September 16, 1912, to December 31, 1912.

Drainage area.—Approximately 5,300 square miles.

Gage.—Inclined staff. The reading from June 12, 1904, to July 5, 1905, are from a gage to a different datum, located upstream from the present gage. Since this change was made the datum has remained unchanged.

Channel.—Shifting.

Discharge measurements.—Wading at low stages and from a cable at high stages.

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

Diversions.—Considerable water is diverted for irrigation above this station.

Accuracy.—The daily estimates of discharge made for 1912 can be considered only fair.

Discharge measurements of Pecos River near Fort Sumner, N. Mex., in 1912.

Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Fect.</i>	<i>Sec.-ft.</i>
Sept. 16	C. J. Emerson.....	2.71	114
24	do.....	2.75	72.8
Oct. 12	Gray and Emerson.....	2.84	89.8
Nov. 25	C. J. Emerson.....	3.00	82.0

Daily gage height, in feet, and discharge, in second-feet, of Pecos River near Fort Sumner, N. Mex., for 1912.

[J. C. Pacheco, Observer.]

Day.	September.		October.		November.		December.	
	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.
1.....			2.80	80	2.92	94	2.95	72
2.....			2.82	84	2.90	90	2.98	78
3.....			2.80	80	2.90	90	3.00	80
4.....			2.80	80	2.90	90	3.00	80
5.....			2.80	80	2.90	90	3.00	80
6.....			2.85	89	2.90	90	3.10	70
7.....			2.85	89	2.88	85	3.08	70
8.....			2.85	89	2.85	78	3.02	70
9.....			2.80	80	2.85	78	3.00	80
10.....			2.80	80	2.85	78	3.00	80
11.....			2.80	80	2.85	78	3.02	84
12.....			2.80	80	2.85	78	3.00	80
13.....			2.85	89	2.88	82	3.00	80
14.....			2.85	89	2.95	90	3.00	80
15.....			2.85	89	2.90	82	3.00	80
16.....	2.71	114	2.85	89	2.95	85	3.00	80
17.....		110	2.80	80	2.95	85	3.02	84
18.....		105	2.80	80	2.95	85	3.10	100
19.....	2.70	100	2.80	80	2.88	70	3.05	90
20.....	2.75	105	2.82	80	2.90	78	3.02	84
21.....	2.78	110	2.85	84	2.88	68	3.20	85
22.....	2.80	100	2.85	84	2.90	74	3.20	88
23.....	2.80	100	2.85	84	2.92	74	3.05	90
24.....	2.72	72	2.85	84	2.95	74	3.22	87
25.....	2.75	75	2.85	84	2.95	72	3.02	84
26.....	2.75	75	2.90	100	2.95	72	3.32	80
27.....	2.78	78	2.90	96	2.95	72	3.55	80
28.....	2.80	80	2.85	80	2.98	78	3.75	80
29.....	2.80	80	2.90	94	3.00	80	3.75	80
30.....	2.80	80	2.90	94	3.00	80	4.20	80
31.....			2.95	100			3.70	80

NOTE.—Gage heights somewhat affected by ice Dec. 6-8, 21, 22, 24, and 26-31.

Daily discharge determined by the indirect method for shifting channels except Dec. 6-8, 21, 22, 24, and 26-31, when it was estimated on account of ice.

Monthly discharge of Pecos River near Fort Sumner, N. Mex., for 1912.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
September 16-30.....	114	72	92.3	2,750	C.
October.....	100	80	85.5	5,260	C.
November.....	94	68	80.7	4,800	C.
December.....	100	70	81.2	4,990	C.
The period.....				17,800	

PECOS RIVER NEAR DAYTON, N. MEX.

Location.—Three miles east of Dayton, in sec. 13, T. 18 S., R. 26 E., half a mile above the mouth of Penasco River.

Records available.—March 24, 1905, to December 31, 1912.

Drainage area.—Not measured.

Gage.—Vertical staff. The original gage, which was located 100 feet below the mouth of Penasco River, was washed out September 6, 1905, and was relocated September 7, 1905, half a mile upstream. Datum unchanged since then.

Channel.—Shifting during high water.

Discharge measurements.—Made from car and cable.

Winter flow.—Ice has little effect on the relation of gage height to discharge.

Diversions.—The station is about 10 miles above the dam at the outlet of Lake McMillan, one of the reservoirs in the United States Reclamation Service Carlsbad project which will irrigate about 20,000 acres in the vicinity of Carlsbad.

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

Cooperation.—Gage heights and discharge measurements furnished by the United States Reclamation Service.

Discharge measurements of Pecos River near Dayton, N. Mex., in 1912.

[By U. S. Reclamation Service engineers.]

Date.	Gage height.	Dis- charge.	Date.	Gage height.	Dis- charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Mar. 15.....	2.5	147	Sept. 28.....	3.15	88
May 20.....	3.7	450	Oct. 17.....	3.3	143
31.....	4.85	998	Nov. 2.....	3.1	121
June 13.....	7.2	3,100	30.....	3.5	179
25.....	3.9	367	Dec. 17.....	4.0	238
July 11.....	2.7	66	31.....	3.8	257

Daily gage height, in feet, of Pecos River near Dayton, N. Mex., for 1912.

[P. R. Ramuz, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	2.9	3.0	3.0	2.9	2.2	4.8	4.0	2.9	3.3	3.6	3.1	3.5
2.....	2.8	3.0	3.1	2.8	2.1	5.0	3.7	2.9	3.3	3.7	3.1	3.6
3.....	3.0	3.2	3.2	2.7	2.1	4.8	3.6	2.9	3.1	4.0	3.1	3.6
4.....	3.0	3.1	3.1	2.7	2.4	4.8	3.5	2.8	3.1	3.8	3.1	3.6
5.....	3.0	3.0	3.1	2.7	2.6	4.8	3.4	2.9	3.2	3.7	3.1	3.7
6.....	2.9	3.1	3.0	2.7	2.8	4.5	3.4	3.0	3.2	3.6	3.1	3.7
7.....	2.9	3.0	2.9	2.7	3.45	4.4	3.3	3.6	2.9	3.6	3.1	3.7
8.....	2.9	3.0	2.8	2.6	4.05	4.6	3.1	3.3	2.9	3.5	3.1	3.8
9.....	3.0	3.2	2.7	2.6	3.9	4.6	2.9	3.1	2.9	3.6	3.1	3.9
10.....	3.1	3.2	2.7	2.5	3.8	4.8	2.8	2.9	2.8	3.5	3.1	3.9

Daily gage height, in feet, of Pecos River near Dayton, N. Mex., for 1912—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
11.....	3.1	3.1	2.7	2.5	3.6	5.1	2.6	2.9	2.8	3.4	3.0	3.9
12.....	3.2	3.1	2.7	2.5	3.3	5.3	2.6	2.8	3.3	3.3	3.0	4.1
13.....	3.5	3.2	2.6	2.5	3.3	7.1	2.6	2.7	3.0	3.4	3.1	4.1
14.....	3.3	3.1	2.6	2.5	3.4	6.1	2.5	2.8	4.2	3.4	3.2	4.1
15.....	3.3	3.1	2.5	2.5	3.9	5.4	2.4	2.7	4.6	3.4	3.1	4.0
16.....	3.2	3.1	2.4	2.6	4.0	5.1	2.5	2.8	4.2	3.3	3.1	4.0
17.....	3.2	3.0	2.3	2.6	3.9	4.7	2.5	3.5	4.9	3.3	3.3	4.0
18.....	3.2	2.9	2.4	2.8	4.0	4.4	2.5	3.8	4.5	3.3	3.3	3.9
19.....	3.3	2.9	2.3	2.9	3.9	4.2	2.7	3.7	4.0	3.3	3.3	3.9
20.....	3.4	2.8	2.3	3.0	3.7	4.1	2.8	4.6	3.9	3.3	3.4	3.8
21.....	3.2	2.9	2.2	3.1	3.5	4.1	3.3	4.1	3.7	3.3	3.3	3.8
22.....	3.2	2.8	2.2	3.0	3.7	4.2	3.4	4.45	3.6	3.3	3.4	3.9
23.....	3.3	2.8	2.2	2.8	3.6	4.0	4.1	3.8	3.6	3.3	3.4	3.9
24.....	3.2	2.8	2.3	2.6	4.3	4.2	4.4	3.6	3.5	3.3	3.4	4.0
25.....	3.2	2.8	2.3	2.5	4.4	3.9	4.1	3.4	3.4	3.2	3.4	3.9
26.....	3.1	2.7	2.3	2.4	4.7	3.9	3.9	3.3	3.4	3.1	3.4	3.9
27.....	3.0	2.7	2.3	2.3	4.8	3.8	3.6	3.4	3.3	3.2	3.5	3.9
28.....	3.0	2.9	2.3	2.3	4.7	5.0	3.4	3.4	3.2	3.2	3.4	3.9
29.....	3.1	3.1	2.3	2.2	4.8	4.7	3.2	3.2	3.4	3.2	3.5	4.1
30.....	3.0	-----	3.0	2.2	4.7	4.4	3.1	3.2	3.8	3.2	3.5	3.9
31.....	3.0	-----	3.0	-----	4.85	-----	3.0	3.3	-----	3.1	-----	3.8

Daily discharge, in second-feet, of Pecos River near Dayton, N. Mex., for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	220	240	240	220	100	960	380	82	135	200	103	175
2.....	200	240	265	200	90	1,080	279	82	135	225	103	200
3.....	240	290	290	180	90	960	248	82	103	320	108	200
4.....	240	265	265	180	126	960	217	78	103	255	108	200
5.....	240	240	265	180	160	960	191	82	118	225	103	225
6.....	220	265	240	180	200	780	185	91	118	200	103	225
7.....	220	240	220	180	360	730	159	200	82	200	103	225
8.....	220	240	200	160	570	840	121	135	82	175	103	255
9.....	240	290	180	160	510	840	94	103	82	200	103	275
10.....	265	290	180	143	475	960	79	82	73	175	103	265
11.....	265	265	180	143	405	1,150	57	82	73	155	91	255
12.....	290	265	180	143	315	1,290	57	73	135	135	91	315
13.....	375	290	160	143	315	3,000	57	65	91	155	103	305
14.....	315	265	160	143	345	1,960	50	73	390	155	118	295
15.....	315	265	143	143	510	1,320	44	65	540	155	103	250
16.....	290	265	126	160	550	1,100	50	73	390	135	103	240
17.....	290	240	112	160	510	840	50	175	660	135	135	240
18.....	290	220	126	200	550	660	50	255	500	135	135	215
19.....	315	220	112	220	510	555	65	225	320	135	135	215
20.....	345	200	112	240	440	500	73	540	285	135	155	195
21.....	290	220	100	265	375	490	135	355	225	135	135	195
22.....	290	200	100	240	440	525	155	480	200	135	155	235
23.....	315	200	100	200	405	430	355	255	200	135	155	235
24.....	290	200	112	160	680	505	460	200	175	135	155	280
25.....	290	200	112	143	730	370	355	155	155	118	155	255
26.....	265	180	112	126	900	370	285	135	155	103	155	265
27.....	240	180	112	112	960	345	200	155	135	118	175	275
28.....	240	220	112	112	900	780	155	155	118	118	155	285
29.....	265	265	112	100	960	660	118	118	155	118	175	355
30.....	240	-----	240	100	900	530	103	118	255	118	175	285
31.....	240	-----	240	-----	990	-----	91	135	-----	103	-----	255

NOTE.—Daily discharge determined as follows: Jan. 1 to June 13, from a curve well defined between 80 and 3,200 second-feet; June 14 to July 11, by the indirect method for shifting channels; July 12 to Dec. 7, from a curve well defined between 40 and 500 second-feet; Dec. 8-31, by the indirect method for shifting channels.

Monthly discharge of Pecos River near Dayton, N. Mex., for 1912.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	375	200	270	16,600	B.
February.....	290	180	240	13,800	A.
March.....	290	100	168	10,300	A.
April.....	265	100	168	10,000	A.
May.....	990	90	496	30,500	A.
June.....	3,000	345	882	52,500	B.
July.....	460	44	159	9,780	B.
August.....	540	65	158	9,720	A.
September.....	660	73	206	12,300	A.
October.....	320	103	159	9,780	A.
November.....	175	91	126	7,500	A.
December.....	355	175	248	15,200	B.
The year.....	3,000	44	273	198,000	

PECOS RIVER NEAR MOORHEAD, TEX.

Location.—At the high bridge of the Southern Pacific Railroad near Moorhead, Tex.

Records available.—April, 1900, to December 31, 1912.

Gage.—Rod bolted to one of the bridge piers; read with field glasses from the top of the cliff.

Channel.—A series of pools and rapids in a canyon about 300 feet deep; straight above and below the station; both banks are of rock and above flood level; the bottom of the pool at the station is of mud.

Discharge measurements.—Made from cable.

Cooperation.—Station established and operated by the United States section of the International Boundary Commission.

Discharge measurements of Pecos River near Moorhead, Tex., in 1912.

[By E. E. Winter and W. H. Dodd.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	<i>Feet.</i>	<i>Sec.-feet.</i>		<i>Feet.</i>	<i>Sec.-feet.</i>		<i>Feet.</i>	<i>Sec.-feet.</i>
Jan. 3	0.8	319	May 8	0.35	203	Sept. 16	0.1	130
8	.9	339	13	.35	184	14	.2	155
12	.9	331	18	.35	185	17	.1	137
16	.8	308	22	.25	171	20	.1	a 128
22	.7	279	25	.25	171	24	.1	a 141
25	.8	307	29	.2	169	28	.1	a 137
29	.7	279	3	.2	158	Oct. 3	.15	a 140
Feb. 3	.7	296	7	.2	184	8	.15	a 137
8	.7	273	13	.2	157	12	.3	a 207
13	.7	273	18	.2	159	16	.25	a 193
17	.7	289	21	.2	161	21	.2	a 173
22	.7	282	24	.7	314	25	.2	a 160
27	.7	279	28	.6	294	29	.2	a 164
Mar. 4	.7	285	3	.3	219	Nov. 3	.15	a 160
8	.6	266	9	.2	165	8	.2	a 166
13	.6	275	13	.15	161	12	.2	a 175
18	.6	254	18	.1	152	16	.25	a 190
22	.6	257	22	.2	153	21	.4	a 246
25	.6	258	26	.1	135	25	.4	a 243
29	.65	285	30	.1	143	29	.45	a 250
Apr. 3	.55	277	5	.1	146	Dec. 3	.5	a 267
8	.8	355	9	.1	143	7	.55	247
10	.7	277	13	.1	144	12	.6	260
15	.6	266	17	.1	153	17	.8	301
19	.5	259	21	.1	149	21	.8	319
23	.5	246	24	.1	148	26	.8	327
28	.5	245	29	.1	130	29	.7	291
May 3	.4	201	Sept. 3	.1	130			
			6	.1	123			

a Measurement made by wading below bridge.

Daily gage height, in feet, of Pecos River near Moorhead, Tex., for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.8	0.7	0.7	0.6	0.4	0.65	0.35	0.1	0.1	0.1	0.15	0.45
2.....	.8	.7	.7	.6	.4	.4	.3	.1	.1	.15	.15	.5
3.....	.8	.7	.7	.55	.4	.2	.3	.1	.1	.15	.15	.5
4.....	.75	.7	.7	.55	.4	.25	.3	.1	.1	.1	.15	.55
5.....	.7	.7	.7	.55	.4	.2	.3	.1	.1	.1	.2	.55
6.....	.7	.7	.65	.55	.4	.2	.2	.1	.1	.15	.2	.55
7.....	.7	.7	.65	2.05	.4	.25	.2	.1	.1	.15	.2	.55
8.....	.85	.7	.6	.8	.35	.25	.2	.1	.1	.15	.2	.55
9.....	.9	.7	.6	.7	.35	.2	.2	.1	.1	.15	.2	.6
10.....	.9	.7	.6	.7	.35	.2	.2	.1	.1	.15	.15	.6
11.....	.9	.7	.6	.7	.35	.2	.2	.1	.1	.25	.15	.6
12.....	.9	.7	.6	.65	.35	.2	.2	.1	.1	.3	.2	.6
13.....	.9	.7	.6	.6	.35	.2	.15	.1	.1	.3	.2	.6
14.....	.9	.7	.6	.6	.35	.2	.15	.1	.2	.3	.25	.6
15.....	.85	.7	.6	.6	.35	.2	.15	.1	.1	.3	.25	.6
16.....	.75	.7	.6	.55	.35	.2	.15	.1	.1	.25	.25	.65
17.....	.7	.7	.6	.55	.35	.2	.1	.1	.1	.25	.55	.8
18.....	.7	.7	.6	.5	.35	.2	.1	.1	.1	.25	.4	.8
19.....	.7	.7	.6	.5	.3	.2	.15	.1	.1	.25	.4	.8
20.....	.7	.7	.6	.5	.3	.2	.15	.1	.1	.2	.4	.8
21.....	.75	.7	.6	.5	.3	.2	.2	.1	.55	.2	.4	.8
22.....	.7	.7	.6	.5	.25	.2	.2	.1	.15	.2	.4	.8
23.....	.75	.7	.6	.5	.25	.2	.1	.1	.1	.2	.4	.8
24.....	.75	.75	.6	.5	.25	.95	.1	.1	.1	.2	.4	.8
25.....	.7	.7	.6	.5	.25	.65	.1	.1	.1	.2	.4	.8
26.....	.7	.7	.6	.5	.25	.5	.1	.1	.2	.2	.4	.8
27.....	.7	.7	.6	.5	.2	.55	.1	.1	.1	.2	.45	.75
28.....	.7	.7	.65	.5	.2	.6	.1	.1	.1	.2	.45	.7
29.....	.7	.7	.65	.45	.2	.6	.1	.1	.1	.2	.45	.7
30.....	.7		.65	.4	.2	.5	.1	.1	.1	.2	.45	.7
31.....	.7		.6		.2		.1	.1		.2		.7

Daily discharge, in second-feet, of Pecos River near Moorhead, Tex., for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	325	285	280	275	225	285	230	135	145	135	160	250
2.....	320	290	280	275	215	215	220	135	135	140	160	265
3.....	α 320	α 295	285	α 250	α 200	α 160	α 220	140	α 130	α 140	α 160	α 265
4.....	310	290	α 285	250	200	175	215	140	130	135	160	270
5.....	300	285	285	250	205	170	205	α 145	125	135	165	265
6.....	300	285	275	250	205	175	180	145	α 125	140	165	255
7.....	300	280	275	1, 110	205	α 195	175	145	125	140	α 165	α 245
8.....	α 330	α 275	α 265	α 335	α 205	190	170	145	125	α 135	α 165	245
9.....	335	275	270	275	200	175	α 165	α 145	130	135	165	255
10.....	335	275	270	α 275	195	170	165	145	α 130	135	160	255
11.....	335	275	270	275	190	165	165	145	130	185	165	260
12.....	α 330	275	275	270	190	160	165	145	130	α 205	α 175	α 260
13.....	330	α 275	α 275	265	α 185	α 155	α 160	α 145	130	205	175	260
14.....	330	275	270	265	185	160	160	145	α 155	205	190	260
15.....	320	280	265	α 265	185	160	160	145	135	205	190	260
16.....	α 300	285	265	265	185	160	160	145	135	α 195	α 190	270
17.....	285	α 290	260	265	185	160	150	α 145	α 135	195	305	α 300
18.....	285	290	α 255	260	α 185	α 160	α 150	145	135	195	245	305
19.....	285	285	255	α 260	180	160	150	150	130	195	245	310
20.....	285	285	255	255	180	160	150	150	α 130	175	245	315
21.....	290	285	255	255	180	α 160	155	α 155	265	α 175	α 245	α 320
22.....	α 280	α 280	α 255	250	α 170	160	α 155	150	155	170	245	320
23.....	290	280	260	α 245	170	160	135	150	140	165	245	325
24.....	295	290	260	245	170	α 395	135	α 150	α 140	165	245	325
25.....	α 285	280	α 260	245	α 170	305	135	150	140	α 160	α 245	325
26.....	285	280	260	245	170	275	α 135	150	160	160	240	α 325
27.....	285	α 280	265	245	170	285	135	150	140	180	245	310
28.....	280	280	280	α 245	170	α 295	135	150	α 135	165	245	290
29.....	α 280	280	α 285	240	α 170	295	135	α 150	135	α 165	α 245	α 290
30.....	280		285	235	170	270	135	150	135	165	245	290
31.....	280		275		170		135	150		165		290

α Date of measurement.

Monthly discharge of Pecos River near Moorhead, Tex., for 1912.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
January.....	335	280	303	18,624
February.....	295	275	282	16,235
March.....	285	255	270	16,572
April.....	1,110	235	288	17,137
May.....	225	170	187	11,474
June.....	395	155	204	12,119
July.....	230	135	163	9,997
August.....	155	135	146	8,995
September.....	265	125	140	8,311
October.....	205	135	166	10,205
November.....	305	160	207	12,288
December.....	325	245	283	17,415
The year.....	1,110	125	220	159,372

GALLINAS RIVER NEAR LAS VEGAS, N. MEX.

Location.—At Las Vegas Hot Springs, 6 miles northwest of Las Vegas, about sec. 1, T. 16 N., R. 15 E. No tributaries between the station and Las Vegas, nor for several miles above.

Records available.—August 13, 1903, to May 31, 1912; December 1 to 31, 1912.

Drainage area.—89 square miles (measured on topographic sheets).

Gage.—Vertical staff 600 feet above the power-house foot bridge, installed to replace the original gage, which was washed out September 29, 1904; datum of new gage, 0.71 foot lower than that of the original gage.

Channel.—Somewhat shifting during high water.

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

Winter flow.—Gage heights unaffected by ice as channel is kept open by the hot springs.

Diversions.—A short distance above the station is a timber dam which forms a pond from which ice is cut, but this dam does not control the flow in any way. A small amount of water is diverted at this point by the Agua Pura Co., which furnishes Las Vegas and the Santa Fe Railway with water. A mile below the station is a dam which diverts the flood flow of the Gallinas to the San Guyjilla basin. The fall of the river is so heavy that the gaging station is above the influence of this dam.

Accuracy.—Although the river is somewhat shifting at this station, it is believed that the estimates of discharge may be considered fair.

Discharge measurements of Gallinas River near Las Vegas, N. Mex., in 1912.

Date.	Hydrographer.	Gage height.	Discharge.
Dec. 3	J. E. Powers.....	<i>Feet.</i> 1.60	<i>Sec.-feet.</i> 1.5
31	do.....	1.60	1.3

NOTE.—The discharge measurement of July 28, 1911, as published in Water Supply Paper 308, page 89, is in error. The correct discharge is 110 second-feet.

Daily gage height, in feet, of Gallinas River near Las Vegas, N. Mex., for 1912.

[William Prager, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	Dec.	Day.	Jan.	Feb.	Mar.	Apr.	May.	Dec.
1.....	1.70	1.70	1.75	2.20	2.60	-----	16.....	1.70	2.05	2.00	2.30	2.60	1.70
2.....	1.70	1.70	1.70	2.20	2.65	1.60	17.....	1.70	1.80	1.90	2.30	2.70	1.70
3.....	1.70	1.70	1.70	2.20	2.70	1.60	18.....	1.70	1.80	1.95	2.20	2.80	1.68
4.....	1.70	1.70	1.70	2.20	2.60	1.60	19.....	1.70	1.80	2.10	2.20	2.80	1.62
5.....	1.70	1.70	1.75	2.30	2.50	1.60	20.....	1.70	1.75	2.35	2.20	2.80	1.60
6.....	1.70	1.70	1.80	2.40	2.45	1.60	21.....	1.70	2.45	2.20	2.80	2.80	1.60
7.....	1.70	1.70	1.85	2.30	2.45	1.60	22.....	1.70	1.70	2.40	2.20	2.80	1.60
8.....	1.70	1.70	1.90	2.30	2.50	1.60	23.....	1.70	1.70	2.35	2.20	2.80	1.60
9.....	1.70	1.70	1.90	2.30	2.50	1.60	24.....	1.70	1.70	2.20	2.25	2.70	1.60
10.....	1.70	1.70	1.95	2.40	2.50	1.60	25.....	1.70	1.70	2.25	2.30	2.70	1.60
11.....	1.70	1.70	2.05	2.40	2.50	1.60	26.....	1.70	1.70	2.25	2.35	2.70	1.60
12.....	1.70	2.30	2.20	2.50	2.50	1.62	27.....	1.70	1.90	2.25	2.40	2.65	1.60
13.....	1.70	2.00	2.05	2.40	2.60	1.65	28.....	1.70	1.85	2.20	2.40	2.60	1.60
14.....	1.70	1.90	2.00	2.40	2.55	1.68	29.....	1.70	1.80	2.20	2.45	2.60	1.60
15.....	1.70	1.90	1.95	2.30	2.60	1.70	30.....	1.70	-----	2.20	2.50	2.50	1.60
							31.....	1.70	-----	2.20	-----	2.50	1.60

Daily discharge, in second-feet, of Gallinas River near Las Vegas, N. Mex., for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	Dec.	Day.	Jan.	Feb.	Mar.	Apr.	May.	Dec.
1.....	2.0	2.0	3.6	40	114	1.4	16.....	2.0	23	18	54	114	3.2
2.....	2.0	2.0	2.0	40	126	1.4	17.....	2.0	5.2	10.7	54	139	3.2
3.....	2.0	2.0	2.0	40	139	1.4	18.....	2.0	5.2	14.4	40	167	2.8
4.....	2.0	2.0	2.0	40	114	1.4	19.....	2.0	5.2	28	40	167	1.8
5.....	2.0	2.0	3.6	54	91	1.4	20.....	2.0	3.6	62	40	167	1.4
6.....	2.0	2.0	5.2	71	81	1.4	21.....	2.0	2.0	81	40	167	1.4
7.....	2.0	2.0	8.0	54	81	1.4	22.....	2.0	2.0	71	40	167	1.4
8.....	2.0	2.0	10.7	54	91	1.4	23.....	2.0	2.0	62	40	167	1.4
9.....	2.0	2.0	10.7	54	91	1.4	24.....	2.0	2.0	40	47	139	1.4
10.....	2.0	2.0	14.4	71	91	1.4	25.....	2.0	2.0	47	54	139	1.4
11.....	2.0	2.0	23	71	91	1.4	26.....	2.0	2.0	47	62	139	1.4
12.....	2.0	54	40	91	91	1.8	27.....	2.0	10.7	47	71	126	1.4
13.....	2.0	18	23	71	114	2.3	28.....	2.0	8.0	40	71	114	1.4
14.....	2.0	10.7	18	71	102	2.8	29.....	2.0	5.2	40	81	114	1.4
15.....	2.0	10.7	14.4	54	114	3.2	30.....	2.0	-----	40	91	91	1.4
							31.....	2.0	-----	40	-----	91	1.4

NOTE.—Daily discharge determined as follows: Jan. 1 to May 31, from a curve well defined between 1 and 150 second-feet; Dec. 1, estimated; Dec. 2-31, from a fairly well-defined curve.

Monthly discharge of Gallinas River near Las Vegas, N. Mex., for 1912.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	2.0	2.0	2.0	123	C.
February.....	54	2.0	6.67	384	B.
March.....	81	2.0	28.0	1,720	B.
April.....	91	40	56.7	3,370	B.
May.....	167	81	121	7,440	B.
December.....	3.2	1.4	1.72	106	B.
The period.....				13,100	

SOUTH FORK OF GALLINAS RIVER NEAR EL PORVENIR, N. MEX.

Location.—At the Gallinas planting station of the United States Forest Service in the Pecos National Forest, near sec. 14, T. 17 N., R. 14 E., 1 mile south of El Porvenir post office, 2½ miles above the junction of the north and south forks. Nearest tributary is a small stream entering from the north a short distance above.

Records available.—May 9, 1911, to December 31, 1912.

Drainage area.—Not measured.

Gage.—Vertical staff.

Channel.—Permanent except during high stages.

Discharge measurements.—Made by wading.

Winter flow.—Ice present at this station during the winter months.

Diversions.—No diversions above, except an intermittent one of less than one-half second-foot. Just below the station the Forest Service has a ditch of 3 second-feet capacity.

Accuracy.—Owing to a lack of discharge measurements, no estimates of flow are available at the present time.

Cooperation.—Gage heights furnished by the United States Forest Service.

Discharge measurements of South Fork of Gallinas River near El Porvenir, N. Mex., in 1912.

Date.	Hydrographer.	Gage height.	Discharge.
Dec. 2	J. E. Powers.....	<i>Feet.</i> 1.30	<i>Sec.-ft.</i> 2.7
11 ^a	do.....	1.45	2.4

^a Ice present.

Daily gage height, in feet, of South Fork of Gallinas River near El Porvenir, N. Mex., for 1912.

[H. D. Burrall, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	1.38	1.32	1.36	1.76	2.33	2.28	1.62	1.35	1.38	1.30	1.31	1.24
2.....	1.42	1.30	1.36	1.76	2.47		1.61	1.32	1.35	1.30	1.30	1.25
3.....	1.56	1.31	1.35	1.81	2.49	2.18	1.59	1.32	1.32	1.28	1.32	1.22
4.....	1.51	1.34	1.38	1.92	2.32	2.12	1.55	1.36	1.32	1.29	1.35	
5.....	1.55	1.33	1.40	2.00	2.28	2.12	1.52	1.42	1.30	1.53	1.34	
6.....	1.46	1.30	1.43	2.05	2.20	2.18	1.52	1.37	1.29	1.42	1.33	
7.....	1.39	1.28		1.99	2.24	2.22	1.52	1.32	1.29	1.36	1.34	
8.....	1.40	1.30		2.05	2.27	2.26	1.50	1.30	1.28	1.32	1.34	
9.....	1.42	1.30		2.08		2.26	1.46	1.30	1.27	1.32	1.29	1.41
10.....	1.42	1.30	1.53	2.05		2.24	1.44	1.28	1.26	1.30	1.26	1.40
11.....	1.42	1.28	1.60	2.14		2.20	1.42	1.28	1.36	1.30	1.23	1.40
12.....	1.37	1.24	1.64	2.17	2.28	2.20	1.43	1.28	1.38	1.32	1.18	1.38
13.....	1.40	1.29	1.55	2.08	2.29	2.20	1.44	1.30	1.34	1.31	1.24	1.39
14.....	1.38	1.30	1.56	1.91	2.18	2.17	1.42	1.55	1.30	1.30	1.30	1.41
15.....	1.38	1.32	1.62	1.95	2.21	2.12	1.44	1.56	1.29	1.31	1.28	1.36
16.....	1.36	1.30	1.46	1.93	2.32	1.95	1.45	1.42	1.29	1.32	1.36	1.32
17.....	1.35	1.25	1.52	1.88	2.48	1.94	1.46	1.46	1.28	1.30	1.32	1.30
18.....	1.42	1.31	1.70	1.84	2.58	1.92	1.44	1.47	1.27	1.30	1.28	1.30
19.....	1.44	1.33	1.85	1.81	2.65	1.91	1.44	1.51	1.27	1.30	1.22	1.31
20.....	1.48	1.31	2.30	1.82	2.62	1.88	1.42	1.52	1.24	1.28	1.28	1.28
21.....	1.46	1.33	2.04	1.78	2.65	1.83	1.42	1.76	1.25	1.30	1.29	1.28
22.....	1.35	1.30	1.94	1.82	2.65	1.79	1.42	1.69	1.26	1.30	1.21	1.26
23.....	1.35	1.28	1.88	1.85	2.58	1.71	1.45	1.59	1.25	1.30	1.23	1.28
24.....	1.36	1.24	1.90	2.02	2.58	1.72	1.41	1.56	1.24	1.28	1.21	1.30
25.....	1.34	1.32	1.91	2.12	2.56	1.74	1.38	1.52	1.26	1.30	1.21	1.27
26.....	1.32	1.44	1.98	2.08	2.56	1.74	1.36	1.46	1.26	1.30	1.22	1.24
27.....	1.30	1.37	1.94	2.10	2.52	1.72	1.36	1.42	1.27	1.30	1.23	1.22
28.....	1.33	1.37	1.90	2.12	2.50	1.75	1.36	1.40	1.26	1.30	1.26	1.23
29.....	1.32	1.36	1.85	2.16	2.43	1.73	1.48	1.40	1.27	1.31	1.26	1.36
30.....	1.35		1.86	2.27	2.39	1.67	1.38	1.42	1.32	1.31	1.30	1.38
31.....	1.37		1.83		2.36		1.38	1.40		1.32		1.44

NOTE.—Gage heights affected by ice Jan. 1 to Mar. 6 and Dec. 9-31, 1912.

Daily discharge, in second feet, of South Fork of Gallinas River near El Porvenir, N. Mex., for 1911-12.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1911.								
1.....		8.9	5.7	16	2.6	2.4	13	2.6
2.....		7.1	17	16	2.4	1.9	13	2.6
3.....		6.6	23	13	2.6	1.8	10	2.6
4.....		5.2	16	10	3.2	10	9.8	2.6
5.....		5.0	14	8.3	2.4	226	11	2.6
6.....		4.1	13	7.5	1.9	223	11	2.6
7.....		3.9	12	6.4	1.8	106	10	2.6
8.....		3.6	10	6.4	1.8	39	10	2.6
9.....	20	3.6	15	5.2	1.9	20	11	2.6
10.....	21	3.1	19	4.6	2.2	17	10	2.6
11.....	16	2.7	32	4.1	2.1	16	11	2.4
12.....	15	2.7	23	3.9	1.9	13	12	2.4
13.....	16	2.6	20	3.8	1.9	12	13	2.4
14.....	23	2.6	21	3.6	1.6	11	10	2.4
15.....	24	2.6	27	4.2	1.5	12	10	2.4
16.....	21	2.6	34	4.8	1.5	10	10	2.4
17.....	19	2.6	40	5.5	1.5	7.3	10	2.4
18.....	16	2.0	37	4.6	1.4	6.6	10	2.2
19.....	14	2.0	28	5.0	1.5	6.2	8.6	2.2
20.....	16	2.4	25	3.6	1.9	5.7	8.0	2.2
21.....	13	2.4	52	3.6	1.6	5.7	8.6	2.2
22.....	10	2.6	28	3.9	1.6	6.6	8.6	2.2
23.....	9.2	1.8	21	7.1	1.4	5.9	8.0	2.2
24.....	6.6	1.5	30	3.9	1.4	5.3	4.8	2.2
25.....	7.5	1.2	30	3.6	1.2	5.5	10	2.0
26.....	7.1	1.2	32	3.2	1.5	5.2	9.2	2.0
27.....	6.4	1.3	32	3.2	1.5	7.8	8.3	2.0
28.....	6.2	1.4	30	3.9	1.5	9.5	2.6	2.0
29.....	6.2	1.2	26	3.9	2.2	12	2.6	2.0
30.....	5.7	1.5	20	3.6	3.8	20	2.6	2.0
31.....	7.5	-----	19	3.2	-----	20	-----	2.0

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1912.										
1.....	2.0	13	37	34	8.6	3.2	3.6	2.6	2.7	1.9
2.....	2.0	13	36	32	8.3	2.9	3.2	2.6	2.6	2.0
3.....	2.0	14	47	29	7.8	2.9	2.9	2.4	2.9	1.7
4.....	2.0	18	36	26	6.8	3.4	2.9	2.5	3.2	1.8
5.....	2.0	21	34	26	6.2	4.3	2.6	6.4	3.1	1.9
6.....	2.0	23	30	29	6.2	3.5	2.5	4.3	3.0	2.0
7.....	3.1	21	32	31	6.2	2.9	2.5	3.4	3.1	2.0
8.....	4.2	23	34	33	5.7	2.6	2.4	2.9	3.1	2.0
9.....	5.3	24	34	33	5.0	2.6	2.3	2.9	2.5	2.0
10.....	6.4	23	34	32	4.6	2.4	2.2	2.6	2.2	2.0
11.....	8.0	27	34	30	4.3	2.4	3.4	2.6	1.8	2.0
12.....	9.2	28	34	30	4.4	2.4	3.6	2.9	1.4	2.0
13.....	6.8	24	34	30	4.6	2.6	3.1	2.7	1.9	2.0
14.....	7.1	17	29	28	4.3	6.8	2.6	2.6	2.6	2.0
15.....	8.6	19	30	26	4.6	7.1	2.5	2.7	2.4	2.0
16.....	5.0	18	36	19	4.8	4.3	2.5	2.9	3.4	2.5
17.....	6.2	16	47	19	5.0	5.0	2.4	2.6	2.9	2.5
18.....	11	15	54	18	4.6	5.2	2.3	2.6	2.4	2.5
19.....	16	14	59	17	4.6	5.9	2.3	2.6	1.7	2.5
20.....	35	15	57	16	4.3	6.2	1.9	2.4	2.4	2.5
21.....	23	13	59	15	4.3	13	2.0	2.6	2.5	2.5
22.....	19	15	59	14	4.3	11	2.2	2.6	1.6	2.5
23.....	16	16	54	11	4.8	7.8	2.0	2.6	1.8	2.5
24.....	17	22	54	12	4.1	7.1	1.9	2.4	1.6	2.5
25.....	17	26	52	12	3.6	6.2	2.2	2.6	1.6	2.5
26.....	20	24	52	12	3.4	5.0	2.2	2.6	1.7	2.0
27.....	19	25	49	12	3.4	4.3	2.3	2.6	1.8	2.0
28.....	17	26	48	12	3.4	3.9	2.2	2.6	2.2	2.0
29.....	16	28	43	12	5.3	3.9	2.3	2.7	2.2	2.0
30.....	16	34	40	10	3.6	4.3	2.9	2.7	2.6	2.0
31.....	15	-----	39	-----	3.6	3.9	-----	2.9	-----	2.4

NOTE.—Daily discharge determined from a well-defined curve. Discharge estimated for days of no gage height and Nov. 18, 1911; Nov. 24, 1911, to Mar. 6, 1912; and Dec. 9-31, 1912.

Monthly discharge of South Fork of Gallinas River near El Porvenir, N. Mex., for 1911-12.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
1911.					
May 9-31.....	24	5.7	13.3	607	B.
June.....	8.9	1.2	3.07	183	B.
July.....	52	5.7	24.2	1,490	B.
August.....	16	3.2	5.79	356	B.
September.....	3.8	1.2	1.91	114	B.
October.....	226	1.8	27.4	1,680	B.
November.....	13	2.6	9.22	549	C.
December.....	2.6	2.0	2.33	143	D.
The period.....				5,120	
1912.					
January.....			a 2.0	123	D.
February.....			a 2.0	115	D.
March.....	35	2.0	10.9	670	C.
April.....	34	13	20.5	1,220	B.
May.....	59	29	42.8	2,630	B.
June.....	34	10	22.0	1,310	B.
July.....	8.6	3.4	4.99	307	B.
August.....	13	2.4	4.81	296	B.
September.....	3.6	1.9	2.53	151	B.
October.....	6.4	2.4	2.84	175	B.
November.....	3.4	1.4	2.36	140	B.
December.....	2.5	1.7	2.15	132	C.
The year.....	59		10.0	7 270	

a Estimated.

DELAWARE RIVER NEAR MALAGA, N. MEX.

Location.—About a quarter of a mile south of New Mexico-Texas State line, 20 miles southwest of Malaga, N. Mex., 5 miles above the mouth, in sec. 33, T. 26 S., R. 28 E.

Records available.—April 20, 1912, to December 31, 1912.

Drainage area.—Not measured.

Gage.—Automatic recording.

Channel.—Subject to shift during high water.

Discharge measurements.—Made by wading.

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

Diversions.—No data.

Accuracy.—1912 daily estimates of discharge can be considered good.

Cooperation.—Gage heights furnished by A. L. Coad, Malaga, N. Mex.

Discharge measurements of Delaware River near Malaga, N. Mex., in 1912.

Date.	Hydrographer.	Gage height.	Dis- charge.	Date.	Hydrographer.	Gage height.	Dis- charge.
Apr. 23	R. H. Fletcher.....	<i>Feet.</i> 1.00	<i>Sec.-ft.</i> 2.7	Oct. 1	E. L. Redding.....	<i>Feet.</i> 1.01	<i>Sec.-ft.</i> 3.5
June 12	S. S. Carroll.....	2.40	125	Oct. 30	do.....	.92	2.6
Aug. 27	E. L. Redding.....	1.00	3.9	Dec. 10	do.....	1.00	3.4

Daily gage height, in feet, of Delaware River near Malaga, N. Mex., for 1912.

[A. L. Coad, observer.]

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....		1.05	1.00		1.00	1.05	1.05	0.97	0.97
2.....		1.05	1.00		1.00	1.05	.98	.97	.98
3.....		1.05	1.00		1.10	1.10	.99	.97	.95
4.....		1.05	1.00		1.05	1.10	1.00	.99	.92
5.....		1.08	1.00		1.00	1.15	.97	.99	.98
6.....		1.08	1.00		1.00	1.13	.98	.97	1.00
7.....		1.10	1.00		1.00	1.12	1.05	.94	1.00
8.....		1.10	1.10		1.00	1.10	2.02	.96	1.00
9.....		1.11	1.22		1.00	1.10	1.52	.96	1.00
10.....		1.12	1.35		1.00	1.10	1.28	.97	1.00
11.....		1.12	a 3.00	1.00	1.00	1.10	1.18	.96	
12.....		1.14	2.50	1.00	1.00		1.20	.98	
13.....		1.14		1.50	1.00		1.03	.97	
14.....		1.16		1.90	1.00	1.40	.99	.97	
15.....		1.19	1.00	1.30	1.10	1.20	1.02	.97	1.00
16.....		1.19	1.00	1.15	2.85	1.20	1.01	1.04	1.00
17.....		1.19	1.00	1.00		1.15	1.01	1.10	1.00
18.....		1.19	1.00			1.15	1.01	1.07	1.00
19.....		1.20	1.00			1.05	1.00	1.00	1.00
20.....	1.00	1.20	1.00			1.00	.98	.99	1.00
21.....	1.00	1.20			1.00	.98	.97	1.00	
22.....	1.00	1.20			1.20	1.05	.99	.97	
23.....	1.00	1.20		1.00	1.20	1.05	.98	.97	
24.....		1.00		1.00	1.10	1.05	.97	.96	1.00
25.....		1.00		1.00	1.10	1.00	.97	.96	1.00
26.....	1.00	1.00		1.00	1.10	1.00	.98	.96	1.00
27.....	1.05	1.00		1.00	1.00	1.00	.96	.98	1.00
28.....	1.05	1.00		1.00	1.00	1.05	.94	.98	1.00
29.....	1.05	1.00		1.00	1.02	1.05	.96	.97	1.00
30.....	1.05	1.00		1.00	1.03	1.05	.95	.97	1.00
31.....		1.00		1.00	1.04		.95		1.00

a Maximum gage height 11.6 feet.

NOTE.—Gage heights affected by ice Dec. 15-31.

Daily discharge, in second-feet, of Delaware River near Malaga, N. Mex., for 1912.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....		3.6	2.8	3.9	3.9	4.5	4.5	3.4	3.4
2.....		3.6	2.8	3.9	3.9	4.5	3.6	3.4	3.6
3.....		3.6	2.8	3.9	5.2	5.2	3.7	3.4	3.1
4.....		3.6	2.8	3.9	4.5	5.2	3.9	3.7	2.8
5.....		4.4	2.8	3.9	3.9	6.6	3.5	3.7	3.6
6.....		4.4	2.8	3.9	3.9	6.0	3.6	3.4	3.7
7.....		4.5	2.8	3.9	3.9	5.7	4.5	3.0	3.7
8.....		4.5	4.6	3.9	3.9	5.2	78	3.3	3.6
9.....		4.6	8.4	3.9	3.9	5.2	29	3.3	3.5
10.....		4.8	17	3.9	3.9	5.2	13	3.4	3.4
11.....		4.8	200	3.9	3.9	5.2	7.6	3.3	3.4
12.....		5.6	137	3.9	3.9	10	8.0	3.6	3.4
13.....		5.6	93	28	3.9	15	4.2	3.4	3.4
14.....		6.0	48	65	3.9	21	3.7	3.4	3.4
15.....		7.3	3.9	14	5.2	8.0	4.1	3.4	3.4
16.....		7.3	3.9	6.6	179	8.0	4.0	4.2	3.4
17.....		7.3	3.9	3.9	149	6.6	4.0	5.2	3.4
18.....		7.3	3.9	3.9	119	6.6	4.0	4.7	3.4
19.....		7.5	3.9	3.9	89	4.5	3.9	3.9	3.4
20.....	2.7	7.5	3.9	3.9	62	3.9	3.6	3.7	3.4
21.....	2.7	7.5	3.9	3.9	35	3.9	3.6	3.4	3.4
22.....	2.7	7.5	3.9	3.9	8.0	4.5	3.7	3.4	3.4
23.....	2.7	7.5	3.9	3.9	8.0	4.5	3.6	3.4	3.4
24.....	2.7	2.8	3.9	3.9	5.2	4.5	3.5	3.3	3.4
25.....	2.7	2.8	3.9	3.9	5.2	3.9	3.5	3.3	3.4
26.....	2.7	2.8	3.9	3.9	5.2	3.9	3.6	3.3	3.4
27.....	3.6	2.8	3.9	3.9	3.9	3.9	3.3	3.6	3.4
28.....	3.6	2.8	3.9	3.9	3.9	4.5	3.0	3.6	3.4
29.....	3.6	2.8	3.9	3.9	4.1	4.5	3.3	3.4	3.4
30.....	3.6	2.8	3.9	3.9	4.2	4.5	3.1	3.4	3.4
31.....		2.8		3.9	4.3		3.1		3.4

NOTE.—Daily discharge Apr. 20 to June 12 determined by the indirect method for shifting channels; June 13 to Dec. 14 determined from a fairly well-defined curve; discharge Dec. 15-31 estimated on account of ice. Discharge interpolated for days for which gage heights are missing.

Monthly discharge of Delaware River near Malaga, N. Mex., for 1912.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
April 20-30.....	3.6	2.7	3.03	66	B.
May.....	7.5	2.8	4.84	298	B.
June.....	200	2.8	19.7	1,170	B.
July.....	65	3.9	7.06	434	B.
August.....	179	3.9	24.1	1,480	B.
September.....	21	3.9	6.16	367	B.
October.....	78	3.0	7.47	459	B.
November.....	5.2	3.0	3.56	212	B.
December.....	3.7	2.8	3.41	210	B.
The period.....				4,700	

DEVILS RIVER BASIN.**DEVILS RIVER AT DEVILS RIVER, TEX.**

Location.—Opposite the Southern Pacific Railroad station at Devils River, Tex.

Records available.—April, 1900, to December 31, 1912.

Gage.—A vertical rod spiked to a tree.

Channel.—The channel is rocky and rough, with fissures and faults. Right bank is the talus of a cliff and the left bank is a bottom heavily wooded.

Discharge measurements.—Made from cable.

Cooperation.—Station established and operated by the United States section of the International Boundary Commission.

Discharge measurements of Devils River at Devils River, Tex., in 1912.

[By E. E. Winter and W. H. Dodd.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	<i>Feet.</i>	<i>Sec.-feet.</i>		<i>Feet.</i>	<i>Sec.-feet.</i>		<i>Feet.</i>	<i>Sec.-feet.</i>
Jan. 9	2.2	392	May 5	2.2	382	Sept. 6	2.05	284
17	2.2	390	14	2.15	367	11	2.05	292
23	2.2	387	19	2.1	337	18	2.2	376
26	2.2	384	26	2.1	292	25	2.3	487
31	2.2	396	30	2.1	305	29	3.7	1,636
Feb. 5	2.2	384	June 10	2.1	297	Oct. 9	2.15	343
9	2.2	380	14	2.1	312	17	2.15	328
14	2.2	386	22	2.1	333	22	2.1	318
19	2.2	383	25	2.2	353	26	2.15	333
24	2.2	387	29	2.1	312	30	2.15	329
28	2.2	385	July 5	2.1	293	Nov. 9	2.1	319
Mar. 5	2.2	385	10	2.05	257	18	2.15	325
14	2.2	376	19	2.1	259	22	2.15	330
20	2.15	361	27	2.05	308	26	2.1	310
26	2.15	362	30	2.05	280	30	2.1	307
30	2.15	359	Aug. 10	2.05	309	Dec. 5	2.1	306
Apr. 4	2.1	301	14	2.0	277	10	2.2	364
8	2.35	462	22	2.05	299	18	2.15	338
16	2.3	405	26	2.1	326	23	2.15	336
24	2.2	384	30	2.05	308	30	2.15	342
29	2.2	381						

Daily gage height, in feet, of Devils River near Devils River, Tex., for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	2.25	2.2	2.25	2.15	2.2	2.4	2.1	2.05	2.05	2.35	2.1	2.1
2.....	2.25	2.2	2.2	2.15	2.2	2.2	2.1	2.05	2.05	2.3	2.1	2.1
3.....	2.25	2.2	2.2	2.1	2.2	2.2	2.1	2.05	2.05	2.25	2.1	2.1
4.....	2.2	2.2	2.2	2.1	2.2	2.15	2.1	2.05	2.05	2.2	2.1	2.1
5.....	2.2	2.2	2.2	2.1	2.2	2.1	2.1	2.05	2.05	2.2	2.1	2.1
6.....	2.2	2.2	2.2	2.1	2.2	2.1	2.1	2.05	2.05	2.25	2.1	2.1
7.....	2.2	2.2	2.2	2.65	2.2	2.2	2.1	2.05	2.05	2.2	2.1	2.1
8.....	2.2	2.2	2.2	2.35	2.2	2.0	2.1	2.05	2.05	2.2	2.1	2.1
9.....	2.2	2.2	2.2	2.35	2.2	2.1	2.1	2.05	2.05	2.15	2.1	2.1
10.....	2.2	2.2	2.2	2.35	2.2	2.1	2.05	2.05	2.05	2.15	2.1	2.2
11.....	2.2	2.2	2.2	2.4	2.1	2.1	2.1	2.05	2.05	2.15	2.1	2.2
12.....	2.2	2.2	2.2	2.3	2.1	2.1	2.1	2.05	2.05	2.15	2.1	2.2
13.....	2.2	2.2	2.2	2.3	2.1	2.1	2.1	2.05	2.05	2.2	2.1	2.2
14.....	2.2	2.2	2.2	2.3	2.15	2.1	2.1	2.0	2.2	2.15	2.1	2.2
15.....	2.2	2.2	2.2	2.3	2.15	2.1	2.1	2.0	2.15	2.15	2.1	2.15
16.....	2.2	2.2	2.2	2.3	2.15	2.1	2.1	2.0	2.15	2.25	2.1	2.15
17.....	2.2	2.2	2.2	2.3	2.15	2.1	2.1	2.0	2.2	2.15	2.15	2.15
18.....	2.2	2.2	2.2	2.35	2.1	2.7	2.1	2.05	2.2	2.15	2.15	2.15
19.....	2.2	2.2	2.15	2.2	2.1	2.25	2.1	2.05	2.2	2.15	2.1	2.15
20.....	2.2	2.2	2.15	2.2	2.1	2.2	2.1	2.05	2.1	2.15	2.15	2.15
21.....	2.2	2.2	2.15	2.2	2.1	2.15	2.1	2.05	2.1	2.15	2.2	2.15
22.....	2.2	2.2	2.15	2.2	2.1	2.1	2.1	2.05	2.1	2.1	2.15	2.15
23.....	2.2	2.2	2.2	2.2	2.1	2.15	2.1	2.05	2.1	2.1	2.1	2.15
24.....	2.15	2.2	2.2	2.2	2.1	2.3	2.1	2.1	2.15	2.1	2.1	2.15
25.....	2.2	2.2	2.2	2.2	2.1	2.2	2.05	2.1	2.25	2.1	2.15	2.15
26.....	2.2	2.2	2.15	2.2	2.1	2.2	2.05	2.1	2.25	2.1	2.1	2.15
27.....	2.2	2.2	2.15	2.25	2.1	2.15	2.05	2.1	2.1	2.15	2.1	2.15
28.....	2.2	2.2	2.15	2.2	2.1	2.15	2.05	2.1	2.1	2.15	2.1	2.15
29.....	2.2	2.2	2.15	2.2	2.1	2.1	2.05	2.1	3.1	2.15	2.15	2.15
30.....	2.2		2.15	2.2	2.1	2.1	2.05	2.05	2.8	2.15	2.1	2.15
31.....	2.2		2.15		2.1		2.05	2.05		2.15		2.15

Daily discharge, in second feet, of Devils River near Devils River, Tex., for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	435	395	400	350	380	455	305	285	305	520	320	305
2.....	435	390	385	345	380	350	305	285	300	475	320	305
3.....	430	390	385	310	380	350	300	290	300	430	320	305
4.....	405	390	385	300	380	320	300	290	295	335	320	305
5.....	400	α 385	α 385	α 380	α 380	295	α 295	295	290	385	320	α 305
6.....	400	385	385	300	380	295	290	300	α 285	430	320	310
7.....	395	380	385	750	380	350	285	300	285	385	320	320
8.....	395	380	380	α 460	380	245	280	305	285	385	320	325
9.....	α 390	α 380	380	460	380	295	275	305	285	α 345	α 320	330
10.....	390	380	380	455	380	α 295	α 255	α 310	290	340	320	α 365
11.....	390	380	380	475	350	300	270	365	α 290	340	320	365
12.....	390	385	380	420	350	305	270	300	290	335	320	360
13.....	390	385	375	415	350	310	265	295	290	375	315	360
14.....	390	α 385	α 375	415	α 365	α 310	265	α 275	375	355	315	360
15.....	390	385	375	410	365	315	265	275	350	330	315	345
16.....	390	385	375	α 405	360	315	265	275	350	410	315	340
17.....	α 390	385	375	405	360	315	260	275	375	α 330	325	340
18.....	390	385	375	395	340	620	260	300	α 375	330	α 325	α 340
19.....	390	α 385	360	385	α 335	400	α 260	300	375	350	315	340
20.....	390	385	α 360	385	330	375	265	300	325	330	325	340
21.....	385	385	360	385	325	355	275	300	325	330	340	335
22.....	385	385	360	385	315	α 335	285	α 300	325	α 320	α 330	335
23.....	α 385	385	375	385	310	345	280	300	325	320	310	α 335
24.....	360	α 385	375	α 385	305	375	300	325	365	320	310	335
25.....	385	385	375	385	300	α 355	200	325	α 445	320	320	335
26.....	α 385	385	α 360	380	α 290	355	300	α 325	445	220	α 310	335
27.....	385	385	360	390	295	330	α 310	325	325	330	310	340
28.....	390	α 385	360	380	300	330	300	325	325	330	310	340
29.....	390	385	360	α 380	300	α 310	290	325	α 1,140	330	315	340
30.....	395		α 360	380	α 305	310	α 280	α 310	915	α 330	α 305	α 340
31.....	α 395		360		305		280	310		330		340

α Date of measurement.

Monthly discharge of Devils River near Devils River, Tex., for 1912.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
January.....	435	360	394	24,228
February.....	395	380	385	22,145
March.....	400	360	374	22,979
April.....	750	300	399	23,752
May.....	380	290	344	21,134
June.....	620	245	341	20,261
July.....	310	255	282	17,326
August.....	325	275	301	18,516
September.....	1,140	285	375	22,314
October.....	520	320	358	22,026
November.....	340	305	318	18,942
December.....	365	305	335	20,579
The year.....	1,140	245	350	254,202

RIO SALADO BASIN.**RIO SALADO NEAR GUERRERO, TAMAULIPAS, MEXICO.**

Location.—2 miles above Guerrero and 6 miles above the confluence of the Rio Salado and the Rio Grande.

Records available.—December 27, 1900, to December 31, 1912, except March and April, 1903.

Gage.—An inclined rod fastened to posts sunk in the bank.

Channel.—A series of pools and rapids between permanent banks of sandy clay. The station is at a pool with a mud bed. Channel curves to the left both above and below the station.

Discharge measurements.—Made from cable at high stages and by wading at low stages.

Cooperation.—Station established and operated by the Mexican section of the International Boundary Commission.

Discharge measurements of Rio Salado near Guerrero, Tamaulipas, Mexico, in 1912.

[By M. G. Garcia.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Jan. 3	0.7	a 81	May 3	0.1	a 27	Aug. 19	0.0	a 27
7	.6	a 72	7	.1	a 27	23	— .1	a 0
11	.6	a 68	8	3.3	731	28	— .3	a 0
15	.4	a 59	11	2.8	525	Oct. 1	8.9	8,868
19	1.0	a 111	15	2.3	a 265	3	3.9	1,006
23	1.0	a 115	19	2.1	a 230	7	2.1	a 229
28	.9	a 92	23	1.9	a 190	11	1.5	a 138
Feb. 3	.9	a 93	28	1.5	a 148	15	1.3	a 119
7	.8	a 72	June 3	1.2	a 105	17	3.6	855
11	.8	a 72	5	3.2	700	19	4.4	1,147
15	.6	a 64	7	1.5	a 147	23	6.1	3,590
19	.6	a 67	11	1.3	a 118	28	2.4	a 276
23	.5	a 58	15	1.6	a 175	Nov. 3	2.2	a 247
28	.5	a 60	19	10.5	11,924	7	2.0	a 214
Mar. 3	.4	a 55	23	6.0	3,721	11	1.7	a 157
7	.4	a 53	24	8.7	8,318	15	1.5	a 131
11	.3	a 49	28	2.9	561	19	1.9	a 191
15	.3	a 49	July 3	2.3	a 265	23	1.5	a 129
19	.2	a 39	7	2.2	a 244	28	2.1	a 223
23	.2	a 37	11	1.8	a 171	Dec. 3	1.8	a 178
28	.1	a 29	15	1.4	a 123	7	1.6	a 149
Apr. 3	.1	a 27	19	1.2	a 95	11	1.5	a 125
7	.1	a 27	23	1.0	a 76	15	1.4	a 109
11	.4	a 58	28	.5	a 61	19	1.5	a 131
15	.3	a 48	Aug. 3	.3	a 55	23	1.6	a 159
19	.3	a 47	7	.2	a 46	28	1.7	a 171
23	.2	a 38	11	.1	a 44			
28	.2	a 38	15	.1	a 42			

a Taken at rocks below the station.

NOTE.—No measurements were made at this station during September because there was no flow.

Daily gage height in feet, of Rio Salado near Guerrero, Tamaulipas, Mexico, for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Oct.	Nov.	Dec.
1.....	0.1	0.9	0.4	0.1	0.1	0.8	2.3	0.4	8.15	2.2	1.9
2.....	.1	.9	.4	.1	.1	1.4	2.3	.4	5.55	2.2	1.85
3.....	.7	.9	.4	.1	.1	1.1	2.3	.3	3.7	2.2	1.8
4.....	.7	.9	.4	.1	.1	2.15	2.6	.3	3.1	2.1	1.8
5.....	.6	.8	.4	.1	.1	2.95	2.5	.3	2.8	2.1	1.7
6.....	.6	.8	.4	.1	.1	1.85	2.35	.2	2.4	2.1	1.6
7.....	.6	.8	.4	.1	.1	1.3	2.2	.2	2.05	2.0	1.6
8.....	.6	.8	.3	.4	3.25	1.5	2.1	.2	1.85	1.9	1.5
9.....	.6	.8	.3	.4	2.75	1.45	2.0	.2	1.7	1.8	1.5
10.....	.6	.8	.3	.4	3.0	1.3	1.9	.1	1.6	1.7	1.5
11.....	.6	.75	.3	.4	2.75	1.3	1.8	.1	1.5	1.7	1.5
12.....	.5	.7	.3	.7	2.55	1.2	1.7	.1	1.5	1.6	1.4
13.....	.5	.7	.3	.6	2.4	1.7	1.6	.1	1.4	1.6	1.4
14.....	.4	.6	.3	.45	2.4	1.7	1.5	.1	1.3	1.5	1.4
15.....	.4	.6	.3	.3	2.3	1.6	1.4	.1	1.3	1.5	1.4
16.....	1.0	.6	.3	.3	2.3	1.5	1.3	.1	1.2	1.4	1.5
17.....	1.0	.6	.2	.3	2.2	1.5	1.3	.0	3.35	1.3	1.5
18.....	1.0	.6	.2	.3	2.2	3.85	1.2	.0	2.85	1.9	1.5
19.....	1.0	.6	.2	.3	2.1	10.75	1.2	.0	4.35	1.9	1.5
20.....	1.0	.5	.2	.3	2.1	11.0	1.1	-----	3.7	1.8	1.5
21.....	1.0	.5	.2	.2	2.0	11.25	1.1	-----	3.1	1.7	1.5
22.....	1.0	.5	.2	.2	2.0	8.75	1.0	-----	3.1	1.6	1.6
23.....	1.0	.5	.2	.2	1.9	6.2	1.0	-----	5.75	1.5	1.6
24.....	.9	.5	.1	.2	1.8	8.7	.9	-----	3.6	2.75	1.8
25.....	.9	.5	.1	.2	1.7	8.2	.8	-----	2.95	2.1	1.8
26.....	.9	.5	.1	.2	1.6	7.35	.7	-----	2.75	2.3	1.8
27.....	.9	.5	.1	.2	1.5	4.15	.6	-----	2.55	2.2	1.7
28.....	.9	.5	.1	.2	1.45	2.8	.5	-----	2.4	2.1	1.7
29.....	.9	.4	.1	.1	1.3	2.55	.5	-----	2.3	2.0	1.6
30.....	.9	-----	.1	.1	1.05	2.35	.4	-----	2.2	1.9	1.6
31.....	.9	-----	.1	-----	1.0	-----	.4	-----	2.2	-----	1.6

NOTE.—No flow Aug. 20-Sept. 30.

RIO SAN JUAN BASIN.

RIO SAN JUAN NEAR SANTA ROSALIA RANCH, TAMAULIPAS, MEXICO.

Location.—Near the Santa Rosalia ranch, 12 miles above the original station established in 1900 near La Quemada, 18 miles above Camargo, and 24 miles above the confluence of the Rio San Juan and the Rio Grande, which is about 15 miles below Roma, Tex.; removed to present site July 14, 1902, to obviate effect of backwater from the Rio Grande during floods.

Records available.—October, 1900, to December 31, 1912, except March and April, 1903.

Gage.—An inclined rod spiked to posts and a tree.

Channel.—The bed is sandy and shifts slightly in floods. Both banks are above flood level, are composed of sandy clay, and do not erode.

Discharge measurements.—Made from cable.

Zero flow.—Low water (no flow) was approximately zero on the gage prior to the flood of 1909, which swept away the station. The datum of the restored gage was 8.5 feet above that of the original gage, but the datum was lowered about 10.5 feet on May 25, 1912.

Cooperation.—Station installed and operated by the Mexican section of the International Boundary Commission.

Discharge measurements of Rio San Juan near Santa Rosalia ranch, Tamaulipas, Mexico.

[By S. Jaso.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-feet.</i>		<i>Feet.</i>	<i>Sec.-feet.</i>		<i>Feet.</i>	<i>Sec.-feet.</i>
Jan. 2	-2.8	69	May 6	-3.2	27	Sept. 6	7.1	24
6	-2.8	71	10	-3.4	26	11	7.0	23
11	-2.9	27	14	-3.4	26	16	7.0	22
15	-3.0	27	18	-3.9	19	19	8.0	77
19	-3.1	22	22	-4.1	18	23	12.65	2,006
23	-3.2	26	27	6.9	18	25	9.15	335
28	-3.1	27	June 2	6.9	18	28	9.5	375
Feb. 2	-3.2	26	4	10.2	642	Oct. 2	14.75	3,810
6	-3.1	27	6	8.4	211	4	11.35	1,441
10	-3.1	27	8	11.8	1,525	6	9.75	546
14	-2.55	127	10	11.25	966	10	8.65	287
19	-3.4	26	14	8.9	337	15	8.1	146
23	-3.5	26	19	20.6	10,481	19	8.65	259
27	-3.7	26	23	12.5	1,859	23	9.65	436
Mar. 2	-3.7	26	25	24.75	20,565	24	17.5	5,546
6	-3.7	26	28	17.1	4,515	26	12.05	1,857
11	-3.7	26	July 3	11.45	1,282	Nov. 2	11.0	1,076
15	-3.8	24	7	10.7	707	2	9.8	497
19	-3.9	24	11	9.9	415	6	9.4	423
23	-3.9	23	15	9.2	228	10	9.0	325
28	-3.7	25	19	8.75	196	14	8.75	253
Apr. 2	-3.9	22	24	8.4	178	19	9.5	363
6	-3.9	21	28	9.15	291	23	10.1	590
10	1.5	1,747	Aug. 2	8.0	84	28	10.6	856
12	-3	616	6	7.8	59	Dec. 2	10.1	647
15	-2.6	177	10	7.7	41	6	9.6	507
19	-3.3	26	14	7.6	25	10	9.4	403
23	-3.6	26	19	7.5	25	14	9.4	428
27	-3.8	19	24	7.4	25	18	9.2	360
May 2	-3.4	26	28	7.3	25	22	9.1	334
4	-2.7	168	Sept. 2	7.2	24	27	9.0	314

NOTE.—Gage datum lowered about 10.5 feet May 25. Exact amount not known.

Daily gage height, in feet, of Rio San Juan near Santa Rosalia ranch, Tamaulipas, Mexico, for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	-2.8	-3.1	-3.7	-3.9	-3.9	6.85	12.35	8.0	7.2	15.1	9.95	10.4
2.....	-2.8	-3.2	-3.7	-3.9	-3.4	7.0	11.65	7.95	7.2	14.45	9.8	10.05
3.....	-2.8	-3.2	-3.7	-3.9	-2.55	9.45	11.45	7.9	7.15	13.0	9.65	9.85
4.....	-2.8	-3.2	-3.7	-3.9	-2.75	10.0	11.15	7.85	7.1	11.2	9.5	9.7
5.....	-2.8	-3.2	-3.7	-3.9	-3.05	8.7	11.0	7.8	7.1	10.35	9.5	9.7
6.....	-2.8	-3.15	-3.7	-3.9	-3.25	8.3	10.8	7.8	7.1	9.7	9.4	9.6
7.....	-2.8	-3.1	-3.7	-3.9	-3.4	9.5	10.65	7.8	7.1	9.35	9.4	9.6
8.....	-2.9	-3.1	-3.7	-3.9	-3.55	12.25	10.45	7.7	7.1	9.2	9.25	9.5
9.....	-2.9	-3.1	-3.7	-3.9	-3.4	12.35	10.25	7.7	7.05	9.05	9.1	9.5
10.....	-2.9	-3.1	-3.7	1.4	-3.45	10.85	10.05	7.7	7.0	8.65	9.0	9.4
11.....	-2.9	-3.1	-3.7	.2	-3.5	9.4	9.85	7.65	7.0	8.5	8.95	9.4
12.....	-2.9	-3.1	-3.7	.8	-3.5	9.0	9.65	7.6	7.0	8.4	8.9	9.5
13.....	-3.0	-3.1	-3.8	-1.05	-3.35	10.0	9.5	7.6	7.0	8.25	8.8	9.4
14.....	-3.0	-2.55	-3.8	-2.4	-3.35	8.85	9.35	7.6	7.0	8.2	8.75	9.35
15.....	-3.0	-3.05	-3.8	-2.7	-3.5	8.3	9.15	7.6	7.0	8.1	8.7	9.3
16.....	-3.1	-3.15	-3.8	-2.85	-3.65	8.05	9.0	7.6	7.0	8.1	8.65	9.3
17.....	-3.1	-3.2	-3.8	-3.0	-3.75	7.85	8.9	7.6	7.8	8.05	9.75	9.3
18.....	-3.1	-3.3	-3.8	-3.15	-3.85	8.0	8.8	7.65	7.5	7.95	10.3	9.2
19.....	-3.15	-3.35	-3.85	-3.3	-3.95	18.0	8.75	7.5	8.05	8.6	9.6	9.2
20.....	-3.2	-3.4	-3.9	-3.35	-4.0	19.5	8.65	7.5	8.0	8.25	11.1	9.15
21.....	-3.2	-3.4	-3.9	-3.4	-4.0	17.65	8.6	7.5	7.7	8.2	11.05	9.1
22.....	-3.2	-3.5	-3.9	-3.5	-4.1	13.05	8.7	7.5	7.6	10.35	10.45	9.1
23.....	-3.2	-3.5	-3.9	-3.6	-4.2	15.95	8.55	7.4	12.3	9.45	10.05	9.1
24.....	-3.2	-3.5	-3.9	-3.6	-4.2	24.15	8.4	7.4	10.2	16.95	9.8	9.1
25.....	-3.2	-3.55	-3.9	-3.7	-4.25	24.7	8.3	7.35	9.05	13.6	9.65	9.1
26.....	-3.1	-3.6	-3.8	-3.7	7.0	22.05	8.25	7.3	8.6	12.0	9.6	9.05
27.....	-3.1	-3.7	-3.7	-3.8	6.9	18.25	9.45	7.3	8.45	11.4	10.05	9.0
28.....	-3.05	-3.7	-3.7	-3.8	6.9	16.6	9.0	7.3	9.3	10.95	10.45	9.0
29.....	-3.0	-3.7	-3.8	-3.9	6.9	13.95	8.55	7.3	8.5	10.65	10.35	9.0
30.....	-3.0		-3.8	-3.9	6.9	12.8	8.3	7.25	13.35	10.4	10.9	9.0
31.....	-3.0		-3.9		6.8		8.2	7.2		10.15		9.0

NOTE.—Gage datum lowered about 10.5 feet on May 25. Exact amount not known.

INTERIOR BASINS IN NEW MEXICO.

MIMBRES RIVER BASIN.

MIMBRES RIVER NEAR FAYWOOD, N. MEX.

Location.—About 6 miles northeast of Faywood Hot Springs, in sec. 7, T. 20 S., R. 10 W., 10 miles from Faywood, a station on the Silver City branch of the Atchison, Topeka & Santa Fe Railway.

Records available.—April 8, 1908, to December 31, 1912.

Drainage area.—Approximately 450 square miles.

Gage.—An automatic recording gage installed August 13, 1909, at a point 200 feet upstream from the site of the chain gage originally installed. The chain-gage datum was lowered 4 feet on July 8, 1909, and the datum of the recording gage is about 3 feet higher than the new datum of the chain gage.

Channel.—Very shifting.

Discharge measurements.—Made from car and cable during high water and by wading at other times.

Winter flow.—Practically no backwater from ice at this point.

Diversions.—Some water is diverted for irrigation above and below the station; 400 feet above is the dam site of the Rio Mimbres reservoir, which is designed to control the flood water for irrigation.

Accuracy.—The estimates made in 1912 can be considered fair.

Discharge measurements of Mimbres River near Faywood, N. Mex., in 1912.

Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
May 7	R. H. Fletcher.....	0.80	9.9
Aug. 19	Gray and Redding.....	.90	27.9
Sept. 5	E. L. Redding.....	.95	46.8
Oct. 7	do.....	.88	10.9
Nov. 5	do.....	.50	10.9
Dec. 24	do.....	.20	10.0

Daily gage height, in feet, of Mimbres River near Faywood, N. Mex., for 1912.

[Ralph Trujillo, observer.]

Day.	Mar.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....			0.74		0.89	1.12	0.88	0.53	0.28
2.....			.74		.88	^a 1.48	.88	.50	.28
3.....			.74		.97	1.47	.87	.50	.30
4.....			.74		.85	1.05	.86	.50	.30
5.....		0.80	.72		.95	.98	.87	.50	.30
6.....		.80	.72		.96	.97	.87	.50	.34
7.....		.80	.70		.89	.95	.86	.50	.30
8.....		.80	.70		.89	.90	.84	.50	.31
9.....		.80	.70		.89	.88	.81	.50	.31
10.....	^b 1.50	.80	.70		.88	.85	.82		.30
11.....	1.90	.80	.70		.76	.84	.80		.29
12.....	1.80	.80	.71		.77	.86	.80		.27
13.....	1.30	.79	.72		.79	.90	.80		.30
14.....	1.20	.79	.72		.93	.90	.79		.29
15.....	1.20	.78	.73	0.80	1.20	.88	.78		.28
16.....	1.15	.78	.73	1.07	1.16	.86	.77		.28
17.....	1.15	.77	.73	1.12	.91	.84	.77		.27
18.....	1.15	.76	.74	1.00	.93	.82	.76		.27
19.....	1.13	.74	.75	1.03	1.06	.81	.75		.27
20.....	1.10	.74	.76	1.13	1.09	.81	.75		.26

^a Maximum gage height, 3.30 feet.

^b Maximum gage height, 4.80 feet.

Daily gage height, in feet, of Mimbres River near Faywood, N. Mex., for 1912—Contd.

Day.	Mar.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
21.....	1.10	0.74	0.76	1.22	1.10	0.83	0.75		0.25
22.....	1.10	.74	.76	1.29	1.02	.82	.74		.25
23.....	1.10	.74	.70	^a 1.46	.95	.81	.73		.24
24.....	1.05	.74	.70	.82	1.09	.81	.72		.20
25.....	1.00	.74	.70	1.03	1.11	.80	.71		.21
26.....	1.00	.74	.72	1.15	1.11	.80	.70		.21
27.....	.98	.74	.70	.93	1.10	.81	.62	0.35	.21
28.....	.97	.74	.70	.95	1.21	.83	.59	.34	.20
29.....	.95	.74	1.06	1.22	.88	.87	.58	.32	
30.....		.74		.95	1.22	.85	.57	.30	
31.....		.74		.91	1.21		.55		

^a Maximum gage height, 4.70 feet.

NOTE.—Gage heights Jan. 1 to Mar. 9 were below 0.5 foot.

Daily discharge, in second-feet, of Mimbres River near Faywood, N. Mex., for 1912.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	10	8	10	27	82	16	11	10
2.....	10	8	10	26	160	15	11	10
3.....	10	8	10	35	155	13	11	10
4.....	10	8	9	24	70	12	11	10
5.....	10	7	9	33	52	12	11	10
6.....	10	7	9	34	49	12	11	10
7.....	10	6	9	27	45	11	11	10
8.....	10	6	8	27	35	11	11	10
9.....	10	6	8	27	31	11	11	10
10.....	10	6	8	26	27	11	11	10
11.....	10	6	8	19	24	11	11	10
12.....	10	6	7	19	26	11	11	10
13.....	10	7	8	21	31	11	11	10
14.....	10	7	9	32	30	11	11	10
15.....	9	7	10	90	27	11	11	10
16.....	9	7	47	72	24	11	11	10
17.....	9	7	61	29	21	11	11	10
18.....	8	8	39	32	18	11	11	10
19.....	8	8	45	46	17	11	11	10
20.....	8	8	70	51	16	11	11	10
21.....	8	8	95	52	18	11	11	10
22.....	8	8	110	41	16	11	11	10
23.....	8	6	150	33	15	11	11	10
24.....	8	6	22	51	14	11	11	10
25.....	8	6	42	54	13	11	11	10
26.....	8	7	70	54	12	11	11	10
27.....	8	6	32	52	12	11	11	10
28.....	8	6	33	75	14	11	11	10
29.....	8	38	95	26	17	11	11	10
30.....	8	10	33	95	14	11	11	10
31.....	8		29	100		11		10

NOTE.—During the week ending Apr. 20 there was a very slight flow. Mean discharge during April estimated at 8 second-feet. Discharge May 1-4 estimated. May 5 to Dec. 31, discharge determined by the indirect method for shifting channels. Discharge interpolated for days for which gage heights are missing. The channel shifted from the gage Mar. 30 to May 4 and June 30 to July 14.

Monthly discharge of Mimbres River near Faywood, N. Mex., for 1912.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
May.....	10	8	9.0	553	C.
June.....	38	6	8.1	482	C.
July.....	150	7	35.6	2,190	B.
August.....	100	19	42.9	2,640	B.
September.....	160	12	36.2	2,150	B.
October.....	16	11	11.5	707	B.
November.....	11	11	11.0	655	B.
December.....	10	10	10.0	615	B.
The period.....				9,990	

LAMPBRIGHT DRAW NEAR SANTA RITA, N. MEX.

Location.—5½ miles southeast of Santa Rita, at mouth of box canyon, in sec. 19, T. 18 S., R. 11 W. Rustler Canyon enters Lampbright Draw about 2 miles above the station and Martin Canyon joins about 3½ miles below.

Records available.—August 20, 1912, to December 31, 1912.

Drainage area.—Not measured.

Gage.—Automatic recording.

Channel.—Subject to shift during high water.

Discharge measurements.—By wading at low stages and from cable at flood stages.

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

Accuracy.—Because of a lack of high-water discharge measurements daily estimates of discharge were not made.

Cooperation.—Gage heights furnished by the Chino Copper Co., Hurley, N. Mex.

Discharge measurements of Lampbright Draw near Santa Rita, N. Mex., in 1912.

Date.	Hydrographer.	Gage height.	Discharge.
Aug. 20	Gray and Redding	<i>Feet.</i>	<i>Sec.-ft.</i>
Sept. 5	E. L. Redding	0.30	1.2
Oct. 7	do.	.38	1.1
		.35	1.0

Daily gage height, in feet, of Lampbright Draw near Santa Rita, N. Mex., for 1912.

[Chino Copper Co. engineers, observers.]

Day.	Aug.	Sept.	Oct.	Nov.	Dec.	Day.	Aug.	Sept.	Oct.	Nov.	Dec.
1.		0.37	0.42	0.40	0.35	16.		0.40	0.38	0.35	0.35
2.		.93	.40	.40	.35	17.		.40	.37	.35	.35
3.		.48	.40	.40	.35	18.		.40	.36	.35	.35
4.		.38	.40	.40	.35	19.		.40	.35	.35	.35
5.		.38	.40	.40	.36	20.	0.31	.40	.35	.35	.35
6.		.39	.40	.40	.38	21.	.24	.40	.35	.35	.35
7.		.40	.41	.40	.35	22.	.21	.40	.35	.35	.35
8.		.41	.40	.40	.36	23.	.22	.40	.36	.35	.35
9.		.41	.38	.40	.36	24.	.58	.40	.36	.35	.35
10.		.41	.38	.40	.35	25.	.53	.40	.33	.35	.36
11.		.40	.38	.40	.35	26.	.30	.40	.37	.35	.35
12.		.40	.37	.40	.35	27.	.30	.40	.40	.35	.35
13.		.40	.37	.40	.35	28.	.30	.40	.39	.36	.35
14.		.40	.39	.40	.35	29.	.30	.40	.39	.36	.35
15.		.40	.38	.37	.35	30.	.31	.41	.39	.35	.35
						31.	.35		.40		.35

NOTE.—Gage heights affected by ice Dec. 19-31, 1912.

CAMERON CREEK AT FORT BAYARD, N. MEX.

Location.—Near the pumping plant at Fort Bayard, in sec. 25, T. 17 S., R. 13 W.; 1 mile below the mouth of the nearest tributary, Beartooth Creek, an intermittent stream.

Records available.—January 17, 1907, to September 11, 1911, and August 6, 1912, to December 31, 1912.

Drainage area.—Not measured.

Gage.—Vertical staff for high stages and inclined staff for medium and low stages.

Channel.—Shifting.

Discharge measurements.—Made by wading. For the greater part of the year the flow comes from springs and amounts to less than 1 second-foot.

Winter flow.—Ice does not appreciably affect the flow at this station.

Diversions.—The intake for the Army post water supply is above the station and a small amount of water is also diverted for garden irrigation.

Accuracy.—Owing to the shifting character of the stream and a lack of high-water discharge measurements, no estimates of flow can be made.

Cooperation.—Gage heights furnished by Sergt. T. J. McBurney.

Discharge measurements of Cameron Creek at Fort Bayard, N. Mex., in 1912.

Date.	Hydrographer.	Gage height.	Dis-charge.
Aug. 6	Gray and Redding.....	<i>Feet.</i> 1.55	<i>Sec.-ft.</i> a1.0
14	do.....	1.30	a.2
Sept. 16	E. L. Redding.....	1.30	a.25
21	do.....	1.30	a.25

^a Estimated.

Daily gage height, in feet, of Cameron Creek at Fort Bayard, N. Mex., for 1912.

Day.	Aug.	Sept.	Oct.	Nov.	Dec.	Day.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....			1.30	1.30	1.30	16.....	2.28	1.30	1.30	1.30	1.30
2.....		a2.10	1.30	1.30	1.30	17.....	1.20	1.30	1.30	1.30	1.30
3.....		1.35	1.30	1.30	1.30	18.....	1.20	1.30	1.30	1.30	1.30
4.....		1.30	1.30	1.30	1.30	19.....	2.25	1.30	1.30	1.30	1.30
5.....		1.30	1.30	1.30	1.30	20.....	1.65	1.30	1.30	1.30	1.30
6.....		1.30	1.30	1.30	1.30	21.....	1.20	1.30	1.30	1.30	1.30
7.....		1.30	1.30	1.30	1.30	22.....	1.20	1.30	1.30	1.30	1.30
8.....		1.30	1.30	1.30	1.30	23.....	1.20	1.30	1.30	1.30	1.30
9.....		1.30	1.30	1.30	1.30	24.....	1.20	1.30	1.30	1.30	1.30
10.....		1.30	1.30	1.30	1.30	25.....	1.20	1.30	b1.65	1.30	1.30
11.....		1.30	1.30	1.30	1.30	26.....	1.20	1.30	1.30	1.30	1.30
12.....		1.30	1.30	1.30	1.30	27.....	1.20	1.30	1.30	1.30	1.30
13.....		1.30	1.30	1.30	1.30	28.....	1.20	1.30	1.30	1.30	1.30
14.....		1.30	1.30	1.30	1.30	29.....	1.20	1.30	1.30	1.30	1.30
15.....	c3.28	1.30	1.30	1.30	1.30	30.....	c3.10	1.30	1.30	1.30	1.30
						31.....	2.50		1.30		1.30

^a Maximum gage height 3.0 feet. ^b Maximum gage height 2.2 feet. ^c Maximum gage height 5.0 feet.

STEVENS CREEK NEAR FORT BAYARD, N. MEX.

Location.—About 3½ miles north of Fort Bayard, 2 miles above the mouth, in sec. 12, T. 17 S., R. 13 W. No tributary below the station.

Records available.—January 17, 1907, to December 31, 1912; fragmentary.

Drainage area.—Not measured.

Gage.—From January 17, 1907, to August 3, 1912, an inclined gage one-half mile above the Forest Nursery. The position and datum remained unchanged through this period. August 4, 1912, a vertical staff gage was installed at the Forest Nursery and was referred to a new datum.

Channel.—Permanent.

Discharge measurements.—Made by wading.

Winter flow.—Ice has practically no effect on the discharge.

Diversions.—The intake for the planting station ditch of the Forest Service is located above the station.

Accuracy.—Owing to a lack of discharge measurements, no estimates of flow can be made.

Cooperation.—Gage heights furnished by the United States Forest Service.

Discharge measurements of Stevens Creek near Fort Bayard, N. Mex., in 1912.

Date.	Hydrographer.	Gage height.	Discharge.
Aug. 6	Gray and Redding.....	Feet.	Dry.
7	do.....		Do.
14	do.....		Do.
Sept. 16	E. L. Redding.....		Do.

Floods on Stevens Creek near Fort Bayard, N. Mex., 1912.

[H. C. Turner, observer.]

Date.	Hour.	Duration (hours).	Maximum gage height (feet).
Aug. 15.....	11.15 a. m.	1.5	0.5
16.....	1.15 p. m.	1.5	.2
19.....	12.45 p. m.	1.5	.1
30.....	5.45 p. m.	4.0	1.1
31.....	2.30 p. m.	2.0	.5
Sept. 2.....	7.30 p. m.	2.5	.4

NOTE.—Creek was dry Aug. 6-14, 17, 18, 20-29, Sept. 1, and Sept. 3 to Dec. 31, 1912.

RIO TULAROSA BASIN.

RIO TULAROSA NEAR TULAROSA, N. MEX.

Location.—3 miles above Tularosa, about one-half mile above the head gate of the Tularosa irrigation ditch, in sec. 21, T. 14 S., R. 10 E.

Records available.—December 2 to 31, 1912.

Drainage area.—Not measured.

Gage.—Vertical staff.

Channel.—Shifting.

Discharge measurements.—By wading.

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

Diversions.—Some water diverted for irrigation above this station.

Accuracy.—Estimates of the daily discharge could not be made in 1912 because of meager data.

The following discharge measurement was made by E. L. Redding, December 2, 1912: Gage height, 1.50 feet; discharge, 13.1 second-feet.

Daily gage height, in feet, of Rio Tularosa near Tularosa, N. Mex., for 1912.

[Carlos Márquez, observer.]

Day.	Dec.	Day.	Dec.	Day.	Day.
1.....		11.....	1.50	21.....	1.45
2.....	1.42	12.....	1.50	22.....	1.48
3.....	1.42	13.....	1.52	23.....	1.48
4.....	1.44	14.....	1.46	24.....	1.48
5.....	1.44	15.....		25.....	1.45
6.....	1.44	16.....	1.50	26.....	1.35
7.....	1.46	17.....	1.48	27.....	1.50
8.....		18.....	1.48	28.....	1.40
9.....	1.44	19.....	1.48	29.....	
10.....	1.45	20.....	1.45	30.....	1.45
				31.....	1.42

NOTE.—Gage heights slightly affected by ice Dec. 7, 8, 11-13, and 26-28, 1912.

RIO LA LUZ BASIN.

RIO LA LUZ NEAR LA LUZ, N. MEX.

Location.—2 miles southeast of La Luz, one-fourth mile above the confluence of the Rio La Luz and Rio Fresnal, in sec. 30, T. 15 S., R. 11 E.

Records available.—July 19, 1911, to August 24, 1912, when the station was discontinued.

Drainage area.—30 square miles.

Gage.—Automatic recording. On July 10, 1912, the automatic gage was taken out by a flood. From July 11, 1912, to August 24, 1912, a staff gage was used. Both gages were referred to the same datum. August 25, 1912, the staff gage was carried away by a flood.

Channel.—Shifting.

Discharge measurements.—Wading.

Winter flow.—No backwater from ice during the winter months.

Diversions.—Several diversions for irrigation above this station.

Cooperation.—These data have been furnished by the State engineer of New Mexico, having been taken in connection with the Fresnal hydrographic survey.

Discharge measurements of Rio La Luz near La Luz, N. Mex., in 1911-12.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
1911.		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Sept. 14	J. E. Powers.....	1.35	2.1	Apr. 8	J. E. Powers.....	1.50	3.5
Oct. 30	Powers and Carroll.....	1.70	5.5	May 8	do.....	1.60	2.5
				30	do.....	1.55	1.1
1912.				June 22	do.....	1.50	2.7
Jan. 13	J. E. Powers.....	1.65	5.7	July 20	do.....	1.50	3.6
Feb. 10	do.....	1.60	3.9	Aug. 24	do.....	1.60	4.6
Mar. 20	do.....	1.60	4.0				

Daily gage height, in feet, of Rio La Luz near La Luz, N. Mex., for 1911-12.

[J. E. Powers, observer.]

Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1911.							1911.						
1.....		0.97	1.20	1.61	1.79	1.80	16.....		1.02	1.40	1.71	1.80	1.80
2.....		.96	1.25	1.63	1.79	1.81	17.....		1.04	1.40	1.70	1.80	1.79
3.....		.88	1.30	1.66	1.80	1.82	18.....		1.03	1.45	1.72	1.80	1.79
4.....		.79	1.26	1.69	1.80	1.82	19.....		1.09	1.02	1.48	1.72	1.80
5.....		.80	1.21	1.73	1.81	1.83	20.....		1.04	.96	1.57	1.70	1.80
6.....		.81	1.15	1.77	1.81	1.83	21.....		1.02	.95	1.58	1.70	1.81
7.....		.81	1.17	1.80	1.82	1.84	22.....		1.04	.92	1.58	1.71	1.81
8.....		.85	1.24	1.75	1.82	1.84	23.....		.95	1.03	1.59	1.72	1.81
9.....		.86	1.32	1.71	1.80	1.81	24.....		.95	1.02	1.48	1.72	1.81
10.....		.88	1.37	1.71	1.80	1.79	25.....		.94	1.03	1.42	1.72	1.79
11.....		.87	1.38	1.71	1.80	1.80	26.....		.92	1.03	1.45	1.72	1.79
12.....		.86	1.40	1.71	1.79	1.80	27.....		.91	1.00	1.43	1.72	1.80
13.....		.85	1.40	1.71	1.79	1.81	28.....		.97	1.28	1.71	1.74	1.80
14.....		.90	1.43	1.70	1.78	1.81	29.....		1.05	1.30	1.58	1.86	1.80
15.....		.97	1.41	1.70	1.79	1.81	30.....		.98	1.18	1.60	1.80	1.80
							31.....		.98	1.21		1.80	

^a Maximum gage height, 3.90 feet.

^b Maximum gage height, 5.65 feet.

Daily gage height, in feet, of Rio La Luz near La Luz, N. Mex., for 1911-12—Contd.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.
1912.								
1.....	1.79	1.81	1.62	1.48	1.61	1.53	1.48	1.45
2.....	1.79	1.80	1.59	1.46	1.62	1.57	1.47	
3.....	1.79	1.80	1.58	1.44	1.63	1.56	1.47	1.45
4.....	1.79	1.80	1.59	1.45	1.61	1.56	1.69	
5.....	1.80	1.80	1.59	1.46	1.63	1.66	1.60	
6.....	1.79	1.80	1.59	1.50	1.70	1.61	1.50	
7.....	1.80	1.79	1.60	1.52	1.61	1.61	1.50	
8.....	1.80	1.79	1.60	1.53	1.65	1.60	1.50	1.45
9.....	1.80	1.78	1.60	1.56	1.64	1.60	1.50	
10.....	1.80	1.79	1.61	1.59	1.67	1.60	1.50	1.50
11.....	1.80	1.80	1.62	1.60	1.57	1.60		
12.....	1.80	1.79	1.62	1.60	1.58	1.60		
13.....	1.80	1.80	1.62	1.60	1.56	1.59		
14.....	1.80	1.80	1.63	1.60	1.50	1.57		
15.....	1.80	1.80	1.63	1.60	1.50	1.55		1.50
16.....	1.80	1.80	1.61	1.60	1.47	1.59		
17.....	1.79	1.80	1.60	1.60	1.51	1.58	1.50	1.50
18.....	1.79	1.79	1.59	1.61	1.60	1.58		
19.....	1.79	1.77	1.57	1.60	1.50	1.59		
20.....	1.80	1.78	1.57	1.60	1.52	1.52	1.50	
21.....	1.80	1.79	1.56	1.62	1.55	1.50		
22.....	1.81	1.80	1.55	1.65	1.64	1.50		
23.....	1.80	1.80	1.53	1.64	1.53	1.51		1.50
24.....	1.81	1.80	1.53	1.64	1.55	1.61	1.45	1.50
25.....	1.81	1.77	1.53	1.63	1.60	^a 1.62		
26.....	1.81	1.74	1.51	1.63	1.61	1.58		
27.....	1.81	1.71	1.51	1.60	1.61	1.57	1.45	
28.....	1.81	1.68	1.50	1.63	1.58	1.56		
29.....	1.82	1.65	1.49	1.62	1.58	1.55		
30.....	1.82		1.49	1.61	1.58	1.53		
31.....	1.82		1.49		1.58			

^a Maximum gage height, 2.05 feet.

RIO LA LUZ AT LA LUZ, N. MEX.

Location.—In the Alamo National Forest, three-fourths of a mile above La Luz, in sec. 30, T. 15 S., R. 11 E., half a mile below the mouth of Rio Fresno, the nearest tributary.

Records available.—Fragmentary records August 13, 1910, to December 31, 1912.

Drainage area.—74 square miles.

Gage.—Automatic recording. From August 13, 1910, to November 23, 1910, readings were taken from an inclined gage referred to a different datum than is being used at present. The present datum has remained unchanged since November 23, 1910, but an automatic gage was installed July 8, 1911, in place of the inclined staff.

Channel.—Shifting.

Discharge measurements.—Made by wading.

Winter flow.—No effect from ice.

Diversions.—There are several diversions above and below this station.

Cooperation.—Data furnished by the State engineer, having been taken in connection with the Fresno hydrographic survey.

Discharge measurements of Rio La Luz at La Luz, N. Mex., in 1911-12.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
1911.		<i>Feet.</i>	<i>Sec.-ft.</i>	1912.		<i>Feet.</i>	<i>Sec.-ft.</i>
Jan. 28	C. D. Miller.....	0.98	10.0	Mar. 30	J. E. Powers.....	1.30	7.0
May 22	H. B. Waha.....	.90	3.4	May 30	do.....	1.30	1.9
Aug. 7	J. E. Powers.....	.78	1.1	July 20	do.....	.85	8.3
Sept. 14	do.....	1.00	4.1	Aug. 17	do.....	4.10	420
15	do.....	1.00	6.9	24	do.....	1.20	8.6
Oct. 14	do.....	1.10	10.0	24	do.....	4.50	765
Nov. 1	do.....	1.12	10.5	Sept. 28	E. L. Redding.....	1.05	4.7
Dec. 15	do.....	1.15	9.6	Oct. 27	do.....	1.30	6.1
				Nov. 30	do.....	1.20	5.4.
1912.							
Jan. 20	J. E. Powers.....	1.15	9.5				
Feb. 10	do.....	1.20	7.6				

Daily gage height, in feet, of Rio La Luz at La Luz, N. Mex., for 1911-12.

[J. E. Powers and G. P. Davis, observers.]

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1911.								
1.....		0.90		0.90	0.97	0.98	1.25	1.25
2.....		.80		.88	.85	1.00	1.24	1.21
3.....		.80		.80	.76	.99	1.26	1.19
4.....		.90		.79	.85	1.10	1.27	1.20
5.....		.85		.80	.90	1.40	1.30	1.20
6.....		.85		.80	.85	1.05	1.30	1.20
7.....		.85		.80	.80	1.00	1.30	1.20
8.....		.90	0.87	.80	.87	1.05	1.50	1.20
9.....		.85	a 1.03	.80	1.30	1.12	1.30	1.17
10.....		1.00	.91	.80	1.30	1.12	1.30	1.13
11.....		1.00	.89	.80	1.25	1.12	1.30	1.13
12.....		1.00	.92	.80	1.12	1.11	1.30	1.10
13.....		1.00	1.01	.82	1.05	1.11	1.32	1.10
14.....		.90	.91	.84	1.05	1.10	1.31	1.10
15.....		1.00	.96	.81	1.00	1.12	1.32	1.15
16.....		.95	.95	.83	1.00	1.14	1.33	1.20
17.....		.95	.92	.84	1.00	1.16	1.31	1.18
18.....		.95	.92	.82	1.00	1.17	1.30	1.18
19.....		1.00	.92	.87	1.00	1.18	1.30	1.20
20.....		1.00	.91	.88	1.02	1.19	1.29	1.20
21.....		1.50	.91	.87	1.00	1.20	1.28	1.20
22.....	0.90		.88	.86	1.00	1.20	1.27	1.20
23.....			.91	.99	1.00	1.20	1.28	1.20
24.....			1.02	1.00	.99	1.21	1.28	1.20
25.....			.99	1.01	.98	1.22	1.30	1.20
26.....	.95		1.07	1.00	.98	1.22	1.30	1.20
27.....	.90		1.09	1.00	.98	1.22	1.30	1.25
28.....	.90		1.16	1.24	c 1.34	1.28	1.30	1.24
29.....	.85		1.02	b 1.72	.90	1.48	1.34	1.20
30.....	.85		.93	1.70	.90	1.45	1.34	1.20
31.....	1.03		.92	1.45		1.26		1.21

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1912.												
1.....	1.21	1.20	1.20	1.30	1.30	1.29	1.45	0.90	1.07	1.12	1.31	1.21
2.....	1.24	1.20	1.20	1.30	1.31	1.31	1.32	.83	1.40	1.12	1.30	1.22
3.....	1.26	1.20	1.20	1.28	1.29	1.32	1.32	.81	.95	1.10	1.30	1.25
4.....	1.25	1.20	1.21	1.28	1.30	1.30	1.40	.72	.95	1.10	1.30	1.28
5.....	1.21	1.20	1.21	1.29	1.32	1.39	1.43	.58	.95	1.10	1.30	1.30
6.....	1.20	1.20	1.21	1.40	1.35	1.39	1.40	.58	.95	1.12	1.30	1.30
7.....	1.20	1.20	1.21	1.40	1.33	1.39	1.40	.61	.95	1.32	1.31	1.29
8.....	1.20	1.20	1.21	1.40	1.31	1.40	1.41	.62	.80	1.26	1.31	1.29
9.....	1.20	1.20	1.20	1.40	1.31	1.39	1.41	.62	.88	1.20	1.30	1.29
10.....	1.20	1.20	1.33	1.41	1.31	1.39	1.43	.60	.88	1.20	1.31	1.30

a Maximum gage height, 315 feet. b Maximum gage height, 3.95 feet. c Maximum gage height, 4.20 feet.

Daily gage height, in feet, of Rio La Luz at La Luz, N. Mex., for 1911-12—Contd.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
11.....	1.20	1.20	1.40	1.42	1.29	1.40	1.30	0.52	0.89	1.20	1.31	1.30
12.....	1.20	1.20	1.41	1.41	1.30	1.41	1.30	.55	1.07	1.33	1.31	1.30
13.....	1.20	1.20	1.41	1.40	1.30	1.39	1.16	.58	1.08	1.31	1.31	1.29
14.....	1.20	1.20	1.42	1.40	1.28	1.36	1.07	.55	1.06	1.29	1.31	1.29
15.....	1.20	1.20	1.41	1.40	1.28	1.40	.93	.88	1.05	1.29	1.31	1.30
16.....	1.20	1.20	1.41	1.40	1.26	1.40	.86	.94	1.07	1.29	1.30	1.30
17.....	1.20	1.20	1.39	1.40	1.20	1.40	.84	^a 1.14	1.08	1.29	1.30	1.30
18.....	1.20	1.20	1.38	1.43	1.30	1.40	^b 1.22	1.02	1.08	1.29	1.30	1.30
19.....	1.20	1.20	1.35	1.39	1.30	1.40	.94	1.10	1.05	1.29	1.30	1.30
20.....	1.20	1.20	1.34	1.35	1.30	1.41	.83	1.12	1.07	1.31	1.31	1.30
21.....	1.20	1.20	1.34	1.35	1.28	1.41	.79	1.24	1.00	1.31	1.31	1.30
22.....	1.20	1.20	1.34	1.36	1.30	1.38	.75	1.20	1.02	1.31	1.30	1.30
23.....	1.20	1.20	1.34	1.35	1.30	1.37	.75	1.20	1.02	1.32	1.30	1.31
24.....	1.20	1.20	1.31	1.31	1.30	1.39	.73	^c 1.45	1.05	1.31	1.27	1.32
25.....	1.20	1.20	1.31	1.30	1.30	1.41	.78	.85	1.04	1.30	1.27	1.32
26.....	1.20	1.20	1.31	1.30	1.31	1.41	.80	.65	.98	1.30	1.26	1.31
27.....	1.20	1.20	1.31	1.30	1.30	1.41	.79	.55	.99	1.30	1.25	1.31
28.....	1.20	1.20	1.30	1.31	1.27	1.41	.79	.64	1.03	1.30	1.25	1.33
29.....	1.20	1.20	1.30	1.31	1.30	1.40	.91	.76	1.00	1.31	1.25	1.32
30.....	1.20		1.30	1.30	1.31	1.40	.88	.88	1.03	1.31	1.25	1.32
31.....	1.20	1.30			1.32		.90	1.10		1.30		1.34

^a Maximum gage height, 4.10 feet. ^b Maximum gage height, 6.95 feet. ^c Maximum gage height, 4.50 feet.

RIO FRESNAL NEAR MOUNTAIN PARK, N. MEX.

Location.—About 5 miles east of Mountain Park, 4 miles east of Highrolls, 1 mile below the Fresno box canyon, one-fourth mile below the confluence of Rio Fresno and Salado Creek, the nearest tributary, in sec. 1, T. 16 S., R. 10 E.

Records available.—August 7, 1911, to August 23, 1912, when station was discontinued.

Drainage area.—44 square miles.

Gage.—Automatic recording. From August 7, 1911, to October 28, 1911, the gage readings are from the original datum used. On November 4, 1911, a second gage was installed which was referred to a new datum. This datum remained unchanged until August 23, 1912, when the gage was washed away by a flood.

Channel.—Shifting.

Discharge measurements.—By wading.

Winter flow.—No backwater from ice during winter months.

Diversions.—There are several diversions above this station for irrigation.

Cooperation.—These data were furnished by the State engineer of New Mexico, having been taken in connection with the Fresno hydrographic survey.

Discharge measurements of Rio Fresno near Mountain Park, N. Mex., in 1911-12.

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
1911.		<i>Feet.</i>	<i>Sec. ft.</i>	1912.		<i>Feet.</i>	<i>Sec. ft.</i>
Aug. 7	R. L. Cooper.....	^a 0.50	0.6	Jan. 13	J. E. Powers.....	0.70	6.2
Sept. 14	J. E. Powers.....	^a .60	2.8	Feb. 10	do.....	.70	4.3
Oct. 30	Carroll and Powers.....		5.5	Mar. 30	do.....	.60	5.0
Nov. 6	J. E. Powers.....	.70	5.6	May 30	do.....	.30	.6
				July 20	do.....	.40	5.6
				Aug. 24	do.....	.40	5.6

^a Gage height taken from original gage.

Daily gage height, in feet, of Rio Fresnal near Mountain Park, N. Mex., for 1911-12.

[J. E. Powers, observer.]

Day.	Aug.	Sept.	Oct.	Nov.	Dec.	Day.	Aug.	Sept.	Oct.	Nov.	Dec.
1911.						1911.					
1.....		0.97	0.45		0.71	16.....	0.39	0.60	0.30	0.68	0.70
2.....		.70	.38		.70	17.....	.38	.59	.32	.69	.70
3.....		.68	.33		.70	18.....	.35	.60	.34	.70	.71
4.....		.68	.34	0.70	.70	19.....	.31	.60	.36	.70	.71
5.....		.68	a .58	.70	.70	20.....	.29	.74	.38	.70	.72
6.....		.68	.40	.71	.71	21.....	.29	.78	.40	.70	.72
7.....	0.50	.68	.40	.71	.71	22.....	.31	.76	.40	.70	.72
8.....		.72	.41	.71	.71	23.....	.29	.60	.37	.70	.70
9.....		1.08	.40	.69	.69	24.....	.31	.60	.33	.70	.70
10.....	.46	1.02	.40	.69	.67	25.....	.46	.56	.32	.70	.70
11.....	.45	.97	.39	.70	.65	26.....	.62	.55	.32	.70	.69
12.....	.45	.90	.38	.70	.68	27.....	.60	.57	.31	.70	.69
13.....	.43	.82	.37	.70	.68	28.....	.84	b .95	.34	.70	.70
14.....	.41	.75	.31	.70	.67	29.....	1.06	1.12		.70	.70
15.....	.40	.67	.30	.69	.68	30.....		.99		.70	.70
						31.....	.98				.71

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.
1912.								
1.....	0.72	0.73	0.77	0.59	0.49	0.30	0.66	0.40
2.....	.72	.72	.78	.60	.49	.27	.73	.42
3.....	.72	.71	.78	.56	.47	.24	.73	.40
4.....	.71	.72	.78	.55	.42	.21	.71	.40
5.....	.70	.71	.78	.56	.41	.23	.62	.40
6.....	.70	.70	.77	.51	.40	.20	.45	.38
7.....	.70	.71	.76	.50	.41	.32	.42	.41
8.....	.70	.71	.75	.51	.41	.41	.44	.42
9.....	.70	.70	.75	.51	.41	.40	.40	.41
10.....	.70	.70	.78	.51	.43	.42	c .55	.36
11.....	.70	.69	.63	.51	.45	.43	.40	.35
12.....	.70	.69	.62	.51	.45	.40	.35	.36
13.....	.70	.68	.61	.51	.43	.45	.30	.35
14.....	.70	.68	.60	.56	.42	.43		.35
15.....	.69	.68	.60	.52	.42	.45		.47
16.....	.69	.68	.60	.53	.42	.43	.35	.52
17.....	.70	.70	.61	.53	.41	.42	.35	.53
18.....	.69	.70	.61	.53	.41	.41	d .60	.54
19.....	.70	.69	.60	.54	.42	.40	.42	.62
20.....	.71	.69	.57	.51	.40	.41	.40	.64
21.....	.72	.69	.52	.51	.39	.43	.40	e .61
22.....	.73	.69	.57	.51	.32	.44	.40	.42
23.....	.73	.72	.62	.51	.30	.42	.40	.40
24.....	.73	.74	.67	.50	.29	.47	.40	
25.....	.73	.78	.68	.49	.34	.45	.40	
26.....	.73	.78	.65	.48	.35	.48	.40	
27.....	.71	.79	.63	.50	.36	.47	.40	
28.....	.72	.78	.60	.50	.36	.49	.40	
29.....	.73	.76	.60	.49	.35	.51	.42	
30.....	.74		.60	.49	.35	.52	.42	
31.....	.74		.59		.33		.42	

a Maximum gage height, 2.95 feet.

b Maximum gage height, 3.65 feet.

c Maximum gage height, 1.50 feet.

d Maximum gage height, 2.00 feet.

e Maximum gage height, 1.50 feet.

NOTE.—Gage heights Aug. 10 to Oct. 28, 1911, refer to the original gage datum. Gage washed out Oct. 29 and replaced Nov. 4, 1911, 1,500 feet downstream at a different datum. Aug. 24, 1912, the new gage was washed out by a flood whose maximum gage height was 2.55 feet.

MISCELLANEOUS MEASUREMENTS.

The following miscellaneous discharge measurements were made on streams in the Rio Grande basin during 1912:

Miscellaneous measurements in Rio Grande drainage basin in 1912.

Date.	Stream.	Tributary to—	Locality.	Gage height.	Dis-charge.
				<i>Feet.</i>	<i>Sec.-ft.</i>
Sept. 22	Rio Grande.....		Dunn's bridge, N. Mex.....		387
24	do.....		Woody's bridge, N. Mex.....		372
Jan. 20	South Fork of Rio Grande.....	Rio Grande.....	South Fork, Colo.....	3.20	54
17	Conejos River.....	do.....	12 miles above Mogote, Colo.....		74
Feb. 27	do.....	do.....	6 miles above Mogote, Colo.....		46
Sept. 20	Costilla Creek.....	do.....	Mouth, N. Mex.....		0
20	Latir Creek.....	do.....	do.....		0
Apr. 26	Rio Colorado.....	do.....	3 miles above Red River, N. Mex.....		15.8
27	do.....	do.....	5 miles above Questa, N. Mex.....		49.5
26	Road canyon.....	Rio Colorado.....	1½ miles above Red River, N. Mex.....		α 1.0
26	Bobcat Creek.....	do.....	Just above Red River, N. Mex.....		α 3.0
25	Columbine Creek.....	do.....	½ mile above mouth.....		α 8.0
27	do.....	do.....	Mouth, N. Mex.....		α 7.0
24	Cabresto Creek.....	do.....	3 miles above Questa, N. Mex.....		15.3
27	do.....	do.....	2½ miles above Questa, N. Mex.....		15.5
24	Lake Fork of Cabresto Creek.....	Cabresto Creek.....	Mouth, N. Mex.....		α 5.0
Sept. 23	Rio Fernando de Taos.....	Rio Taos.....	3 miles above mouth, N. Mex.....		9.8
Apr. 22	Rio Grande Chiquita.....	Taos Creek.....	Taos road crossing, N. Mex.....		α 40.0
Sept. 24	Rio Hondo.....	Rio Grande.....	Mouth, N. Mex.....		0
Apr. 22	Cieneguilla Creek.....	do.....	3 miles above Woodys, N. Mex.....		α 2.5
Sept. 24	do.....	do.....	Mouth, N. Mex.....		0
24	Embudo Creek.....	do.....	do.....		29.4
28	Nambe Creek.....	do.....	Nambe Falls, N. Mex.....		6.8
Apr. 16	Santa Fe Creek.....	do.....	Santa Fe, N. Mex.....		α 12.0
17	do.....	do.....	do.....		α 12.0
18	do.....	do.....	do.....		α 12.0
19	do.....	do.....	do.....		α 7.0
21	do.....	do.....	do.....		α 2.5
22	do.....	do.....	do.....		α 2.5
Aug. 4	Rio Tularosa.....	do.....	4 miles below Bent, N. Mex.....		11.3
Mar. 31	Pecos River.....	do.....	Valley Ranch, N. Mex.....		112
Oct. 20	do.....	do.....	1 mile below San Miguel, N. Mex.....		37.8
20	do.....	do.....	1 mile below Puerticito, N. Mex.....		39.7
19	do.....	do.....	2 miles above La Cueva, N. Mex.....		26.3
19	do.....	do.....	2 miles below La Jauta, N. Mex.....		α 2.0
19	do.....	do.....	2 miles above Los Colonias, N. Mex.....		.0
19	do.....	do.....	Los Colonias, N. Mex.....		.0
Feb. 17	do.....	do.....	Santa Rosa, N. Mex.....		α 3.0
Sept. 22	do.....	do.....	4 miles below Santa Rosa, N. Mex.....		76.7
18	do.....	do.....	Confluence with Alamo Gordo Creek, N. Mex.....		82.4
Apr. 29	do.....	do.....	Carlsbad, N. Mex.....		136
June 11	do.....	do.....	do.....		476
Mar. 30	Davis Creek.....	Pecos River.....	Mouth, N. Mex.....		α 1.0
30	Holy Ghost Creek.....	do.....	do.....		α 20.0
30	Indian Creek.....	do.....	do.....		α 8.0
30	Macho Creek.....	do.....	do.....		α 10.0
30	Dalton Creek.....	do.....	do.....		α 8.0
Apr. 20	Gallinas River.....	do.....	Las Vegas, N. Mex.....		α 7.0
21	do.....	do.....	do.....		α 7.0
Sept. 22	Rito Creek.....	do.....	Santa Rosa, N. Mex.....		27.7
Feb. 17	Pintada Creek.....	do.....	El Paso Southwestern Railroad crossing, N. Mex.....		0
Sept. 22	Canal on east side of Pecos River.....		Santa Rosa, N. Mex.....		1.0
22	Canal from Pintada Canyon.....		Puerto de Luna, N. Mex.....		4.0
Oct. 13	Fort Sumner canal.....		1 mile above Fort Sumner, N. Mex.....		6.6
13	do.....		Fort Sumner, N. Mex.....		5.3

α Discharge estimated.

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