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SURFACE WATER SUPPLY OF THE UNITED STATES

1910

PART VIII. WESTERN GULF OF MEXICO

PREPARED UNDER THE DIRECTION OF M. O. LEIGHTON

BY

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SURFACE WATER SUPPLY OF WESTERN GULF OF MEXICO, 1910.

By W. B. FREEMAN and J. G. MATHERS.

INTRODUCTION.

AUTHORITY FOR INVESTIGATIONS.

This volume contains results of measurements of the flow of certain streams in the United States. The work was performed by the water-resources branch of the United States Geological Survey, either independently or in cooperation with private or State organizations. The organic law of the Geological Survey (Stat. L., vol. 20, p. 394) 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 structures mineral resources, and products of the national domain.

As water is the most abundant and most valuable of the minerals, the investigation of water resources is authorized under the provision for examining mineral resources. The work has been supported since the fiscal year ending June 30, 1895, by appropriations in successive sundry civil bills passed by Congress under the following item:

> For gauging 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.

The appropriations that have been made for this purpose are as follows:

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	150,000

SCOPE OF INVESTIGATIONS.

These investigations are not complete nor do they include all the streams that might purposefully be studied. The scope of the work is limited by the appropriations available. The field covered is the

widest and the character of the work is believed to be the best possible under the controlling conditions. The work would undoubtedly have greater scientific importance and ultimately be of more practical value if the money now expended for wide areas were concentrated on a few small drainage basins; but such a course is impossible because general appropriations made by Congress are applicable to all parts of the country. Each part demands its proportionate share of the benefits.

It is essential that records of stream flow shall be kept during a period of years long enough to determine within reasonable limits the entire range of flow from the absolute maximum to the absolute minimum. The length of such a period manifestly differs for different streams. Experience has shown that the records for some streams should cover 5 to 10 years and those for other streams 20 years or even more, the limit being determined by the relative importance of the stream and the relation of the results to other long-time records on adjacent streams.

In the performance of this work an effort is made to reach the highest degree of precision possible with a rational expenditure of time and a judicious expenditure of a small amount of money. In all engineering work there is a point beyond which refinement is needless and wasteful, and this statement applies with especial force to stream-flow measurements. It is confidently believed that the stream-flow data presented in the publications of the Survey are in general sufficiently accurate for all practical purposes. Many of the records are, however, of insufficient length, owing to the unforeseen reduction of appropriations and consequent abandonment of stations. All persons are cautioned to exercise the greatest care in using such incomplete records.

Records have been obtained at nearly 2,000 different points in the United States. The surface water supply of small areas in Seward Peninsula and the Yukon-Tanana region, Alaska, and in Hawaii has also been investigated. During 1910 regular gaging stations were maintained by the Survey and cooperating organizations at about 1,100 points in the United States, and many discharge measurements were made at other points. Data were also obtained in regard to precipitation, evaporation, storage reservoirs, river profiles, and water power in many sections of the country and will be made available in the regular surface water-supply papers and in special papers from time to time.

PUBLICATIONS.

The data on stream flow collected by the United States Geological Survey have appeared in the annual reports, bulletins, and water-supply papers. Owing to natural processes of evolution and to changes in governmental requirements, the character of the work and the territory covered by these different publications have varied

greatly. 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 certain natural drainage lines. The areas so described are indicated by the following list of papers on surface water supply for 1910. The dividing line between the north Atlantic and south Atlantic drainage areas lies between York and James rivers.

Papers on surface water supply of the United States, 1910.

Part.	No.	Title.
I	281	North Atlantic coast.
II	282	South Atlantic coast and eastern Gulf of Mexico.
III	283	Ohio River basin.
IV	284	St. Lawrence River basin.
V	285	Upper Mississippi River and Hudson Bay basins.
VI	286	Missouri River basin.
VII	287	Lower Mississippi River basin.
VIII	288	Western Gulf of Mexico.
IX	289	Colorado River basin.
X	290	Great Basin.
XI	291	California.
XII	292	North Pacific coast.

The following table gives the character of data regarding stream flow at regular stations to be found in the various publications of the United States Geological Survey, exclusive of special papers:

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

[A.=Annual Report; B.=Bulletin; W S.=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.
W S. 11	Gage heights (also gage heights for earlier years)	1896.
18th A., pt. 4	Descriptions, measurements, ratings, and monthly discharge (also similar data for earlier years).	1895 and 1896.
W S. 15	Descriptions, measurements, and gage heights, eastern United States, eastern Mississippi River, and Missouri River above junction with Kansas.	1897.
W S. 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.
W S. 27	Measurements, ratings, and gage heights, eastern United States, eastern Mississippi River, and Missouri River.	1898.
W S. 28	Measurements, ratings, and gage heights, Arkansas River and western United States.	1898.
20th A., pt 4	Monthly discharge (also for many earlier years)	1898.
W S. 35 to 39	Descriptions, measurements, gage heights, and ratings	1899.
21st A., pt. 4	Monthly discharge	1899.
W S. 47 to 52	Descriptions, measurements, gage heights, and ratings	1900.
22d A., pt. 4	Monthly discharge	1900.
W S. 65, 66	Descriptions, measurements, gage heights, and ratings	1901.

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

Report.	Character of data.	Year.
W S. 75	Monthly discharge	1901.
W S. 82 to 85	Complete data	1902.
W S. 97 to 100	do	1903.
W S. 124 to 135	do	1904.
W S. 165 to 178	do	1905.
W S. 201 to 214	Complete data, except descriptions	1906.
W S. 241 to 252	Complete data	1907–8.
W S. 261 to 272	do	1909.
W S. 281 to 292	do	1910.

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

The records at most of the stations discussed in these reports extend over a series of years. An index of the reports containing records prior to 1904 has been published in Water-Supply Paper 119.

The first table which follows gives, by years and drainage basins, the numbers of the papers on surface water supply published from 1899 to 1909. Wherever the data for a drainage basin appears in two papers the number of one is placed in parentheses and the portion of the basin covered by that paper is indicated in the second table. For example, in 1904 the data for Missouri River were published in Water-Supply Papers 130 and 131, and the portion of the records contained in Water-Supply Paper 131, as indicated by the second table, is that relating to Platte and Kansas rivers.

Numbers of water-supply papers containing results of stream measurements, 1899–1910

	1899[a]	1900[b]	1901	1902	1903	1904	1905	1906	1907–8	1909	1910
Atlantic coast and eastern Gulf of Mexico:											
New England rivers	35	47	65, 75	82	97	124	165	201	241	261	281
Hudson River to Delaware River, inclusive	35	47, (48)	65, 75	82	97	125	166	202	241	261	281
Susquehanna River to York River, inclusive	35	48	65, 75	82	97	126	167	203	241	261	281
James River to Yadkin River, inclusive	(35), 36	48	65, 75	(82), 83	(97), 98	126	167	203	242	262	282
Santee River to Pearl River, inclusive	36	48	65, 75	83	98	127	168	204	242	262	282
St. Lawrence River	36	49	65, 75	(82), 83	97	129	170	206	244	264	284
Hudson Bay	.....	.....	66, 75	85	100	130	171	207	245	265	285
Mississippi River:											
Ohio River	36	48, (49)	65, 75	83	98	128	169	205	243	263	283
Upper Mississippi River	36	49	65, 75	83	98, (99)	128, (130)	171	207	245	265	285
Missouri River	(36), 37	49, (50)	66, 75	84	99	130, (131)	172	208	246	266	286
Lower Mississippi River	37	50	(65), 66, 75	(83), 84	(98), 99	(128), 131	(169), 173	(205), 209	247	267	287
Western Gulf of Mexico	37	50	66, 75	84	99	132	174	210	248	268	288
Pacific coast and Great Basin											
Colorado River	(37), 38	50	66, 75	85	100	133, (134)	175, (177)	211, (213)	249, (251)	269, (271)	289, (291)
Great Basin	38, (39)	51	66, 75	85	100	133, (134)	176, (177)	212, (213)	250, (251)	270, (271)	290, (291)
South Pacific coast to Klamath River, inclusive	(38), 39	51	66, 75	85	100	134	177	213	251	271	291
North Pacific coast	38	51	66, 75	85	100	135	(177), 178	214	252	272	292

[a] Rating tables and index to Water-Supply Papers 35–39 contained in Water-Supply Paper 39.
[b] Rating tables and index to Water-Supply Papers 47–52 and data on precipitation, wells, and irrigation in California and Utah contained in Water-Supply Paper 52.

Numbers of water-supply papers containing data covering portions of drainage basins.

No.	River basin.	Tributaries included.
35..	James	
36..	Missouri	Gallatin.
37..	Colorado	Gree 1, Gunnison, Grand above junction with Gunnison.
38..	Sacramento	Except Kings and Kern.
39..	Great Basin	Mohave.
48..	Delaware	Wissahickon and Schuylkill.
49..	Ohio	Scioto.
50..	Missouri	Loup and Platte near Columbus, Nebr. All tributaries below junction with Platte.
65..	Lower Mississippi	Yazoo.
82..	James	
	St. Lawrence	Lake Ontario, tributaries to St. Lawrence River proper.
83..	Lower Mississippi	Yazoo.
97..	James	
98..	Lower Mississippi	Do.
99..	Upper Mississippi	Tributaries from the west.
128.	Lower Mississippi	Yazoo.
130.	Upper Mississippi	Tributaries from the west.
131.	Missouri	Platte, Kansas.
134.	Colorado	Data near Yuma, Ariz., repeated.
	Great Basin	Susan, Owens, Mohave.
169.	Lower Mississippi	Yazoo.
177.	Colorado	Below junction with Gila.
	Great Basin	Susan repeated, Owens, Mohave.
	North Pacific coast	Rogue, Umpqua, Siletz.
205.	Lower Mississippi	Yazoo, Homochitto.
213.	Colorado	Data at Hardyville repeated; at Yuma, Salton Sea.
	Great Basin	Owens, Mohave.
251.	Colorado	Yuma and Salton Sea stations repeated.
271.	Great Basin	Owens River basin.

The order of treatment of stations in any basin in these papers is downstream. The main stem of any river is determined by measuring or estimating the drainage area; that is, the headwater stream having the largest drainage area is considered the continuation of the main stream and local changes in name and lake surface are disregarded. Records for all stations from the source to the mouth of the main stem of the river are presented first, and records for the tributaries in regular order from source to mouth follow, all records for each tributary basin being given before those of the next basin below.

The exceptions to this rule occur in the records for Mississippi River, which are given in four parts, as indicated above, and in the records for large lakes, where it is simpler to take up the streams in regular order around the rim of the lake than to cross back and forth over the lake surface.

DEFINITION OF TERMS.

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

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

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

1 second-foot equals 40 California miner's inches (law of Mar. 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 646,272 gallons for one day.
1 second-foot equals 6.23 British imperial gallons per second.
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 covers 1 square mile 0.03719 inch deep.
1 second-foot for one 28-day month covers 1 square mile 1.041 inches deep.
1 second-foot for one 29-day month covers 1 square mile 1.079 inches deep.
1 second-foot for one 30-day month covers 1 square mile 1.116 inches deep.
1 second-foot for one 31-day month covers 1 square mile 1.153 inches deep.
1 second-foot for one day equals 1.983 acre-feet.
1 second-foot for one 28-day month equals 55.54 acre-feet.
1 second-foot for one 29-day month equals 57.52 acre-feet.
1 second-foot for one 30-day month equals 59.50 acre-feet.
1 second-foot for one 31-day month equals 61.49 acre-feet.
100 California miner's inches equals 18.7 United States gallons per second.
100 California miner's inches equals 96 Colorado miner's inches.
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 equals 104 California miner's inches.
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 equals 7.48 gallons.
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 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: $\frac{\text{Sec.-ft.} \times \text{fall in feet}}{11}$ = net horsepower on water wheel realizing 80 per cent of theoretical power.

EXPLANATION OF DATA.

For each drainage basin there is given a brief general description covering such items as area, source, tributaries, topography, geology, forestation, rainfall, irrigation, storage, power, and other interesting or important facts.

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

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

The discharge-measurement table gives the results of the discharge measurements made during the year, including the date, name of hydrographer, width and area of cross section, gage height, and discharge in second-feet.

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. At most stations the gage is read 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 daily gage heights and daily discharges for the purpose of verifying the published results as follows:

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

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 computations for the remaining columns, which are defined on pages 11 and 12, are based.

The field methods used in the collection of the data presented in this series of reports are described in the introductory sections of

Water-Supply Papers 261 to 272, inclusive, "Surface water supply of the United States, 1909." Plate I shows typical gaging stations, indicating the method of suspending the current meter; Plate II shows the various types of current meters[1] used in the work.

ACCURACY AND RELIABILITY OF FIELD DATA AND COMPARATIVE RESULTS.

The accuracy of stream flow 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 of discharge to stage. Errors of the second group 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.

Practically all discharge measurements made under fair conditions are well within 5 per cent of the true discharge at the time of observation. Inasmuch as the errors of meter measurements are largely compensating, the mean rating curve, when well defined, is much more accurate than the individual measurements. Numerous experiments made to test the accuracy of current-meter work show that it compares very favorably with the results from standard weirs and, owing to simplicity of methods, usually gives results that are much more reliable than those from stations at dams where the coefficient may be uncertain and conditions of flow are complicated.

The work is, of course, dependent on the reliability of the gage observers. With relatively few exceptions, the observers perform their work honestly. The records are, however, closely watched and the cause of any discrepancy is investigated. It is obvious that one gage reading a day does not always give the mean height for that day. As an almost invariable rule, however, errors from this source are compensating and virtually negligible in a period of one month, although a single day's reading may, when taken by itself, be considerably in error.

An effort is made to visit every station at least once each year for the purpose of making a measurement to determine the constancy of conditions of flow since the last measurement made in the preceding year, and also to check the elevation of the gage. On account of lack of funds or for other causes some stations were not visited during the current year. If conditions of flow have been reasonably permanent up to the time of the last preceding measurement, it is considered best to publish estimates of discharge based on the latest verified rating curve rather than to omit them altogether, although

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

it should be distinctly understood that such records are at times subject to considerable error. This is also true, although to a less degree, of the period of records since the date of the last measurement of the current year. As a rule, the accuracy notes are based on the assumption that the rating curve used is strictly applicable to the current year.

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.

USE OF THE DATA.

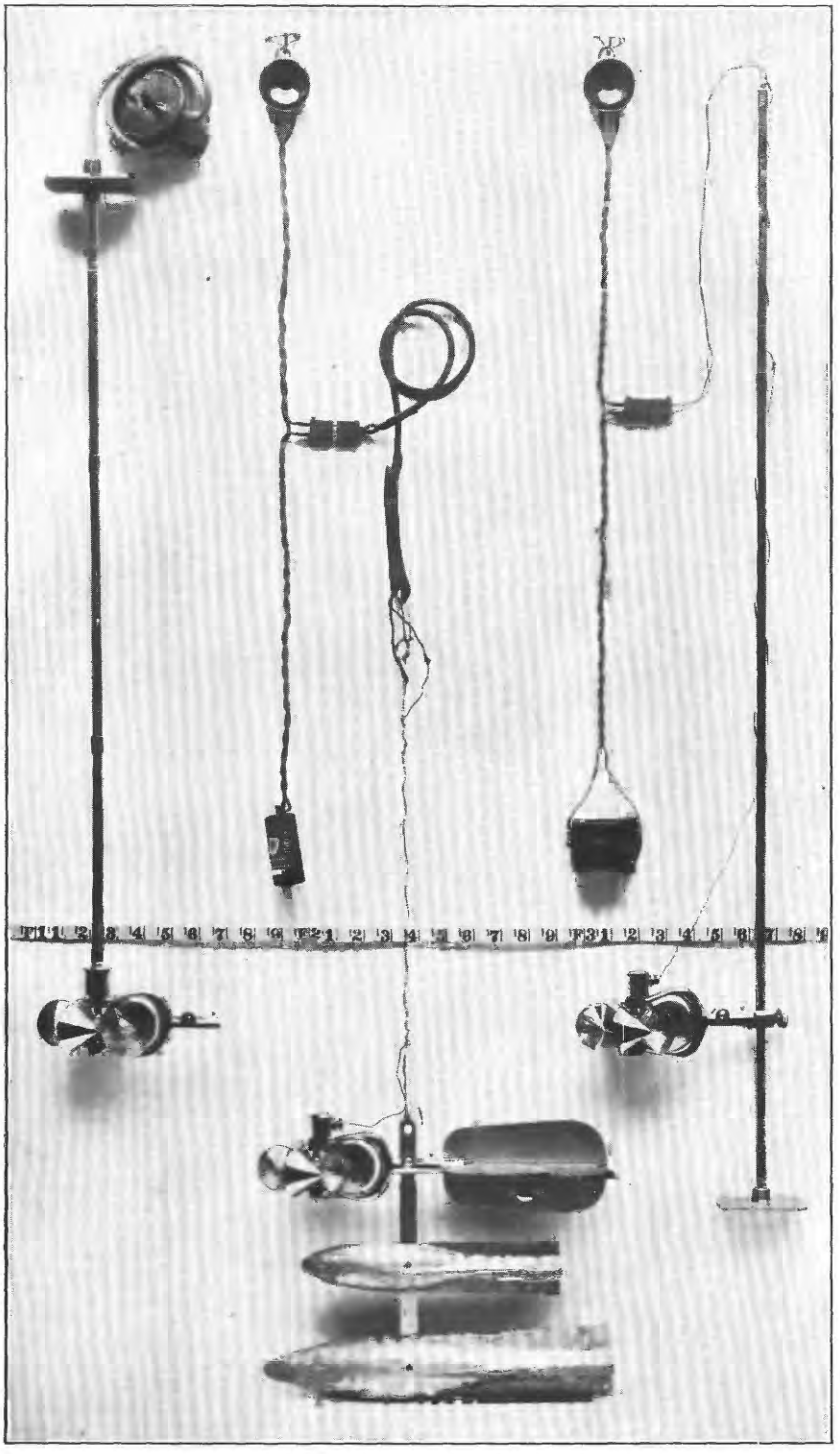
In general the base data which are collected in the field each year by the Survey engineers are published, not only to comply with the law, but also for the express purpose of giving to any engineer the opportunity of examining the computed results and of changing and adjusting them as may seem best to him. Although it is believed that the rating tables and computed monthly discharges are as good as the base data up to and including the current year will warrant, it should always be borne in mind that the additional data collected at each station from year to year nearly always throw new light on data already collected and published, and hence allow more or less improvement in the computed results of earlier years. It is therefore expected that the engineer who makes use of the figures presented in these papers will verify all ratings and make such adjustments for earlier years as may seem necessary. The work of compiling, studying, revising, and republishing data for different drainage basins for 5 or 10 year periods or more is carried on by the United States Geological Survey so far as the funds for such work are available.

The estimates in the table of monthly discharge are so arranged as to give only a general idea of the conditions of flow at the station.

A. FOR BRIDGE MEASUREMENT.

B. FOR WADING MEASUREMENT.

TYPICAL GAGING STATIONS.



SMALL PRICE CURRENT METERS.

and it is not expected that they will be used for other than preliminary estimates.

The daily discharges are published to allow a more detailed study of the variation in flow and to determine the periods of deficient flow.

COOPERATIVE DATA.

Cooperative data of various kinds and data regarding the run-off at many stations maintained by private funds are published in the surface water supply reports of the United States Geological Survey.

Many stations throughout the country are maintained for specific purposes by private parties who supply the records gratuitously to the United States Geological Survey for publication. When such records are furnished by responsible parties and appear to be reasonably accurate, they are verified, so far as possible, and estimated values of accuracy are given. Records that are clearly worthless or misleading are not published. As it is, however, impossible to verify completely all such records—for lack of funds or for other causes—they are published for what they are worth, as they are of value as a matter of record and afford at least approximate information regarding stream flow at the particular localities. The Survey does not, however, assume any responsibility for inaccuracies found in such records, although most of them are believed to be reasonably good.

COOPERATION AND ACKNOWLEDGMENTS.

Special acknowledgments are due the following:

Vernon L. Sullivan, Territorial engineer of New Mexico, who, by entering into a cooperative contract with the United States Geological Survey, spent a proportionate part of the Territorial stream-gaging fund of $2,500 on work in the Rio Grande drainage basin. Cooperation with the Atchison, Topeka & Santa Fe Railway Company and with several irrigation and power companies, as well as individuals, was also brought about through the Territorial engineer.

The International Water Commission, Gen. Anson Mills, commissioner on the part of the United States; Senor Don Jacobo Blanco, commissioner on the part of Mexico; W. W. Follett, consulting engineer on the part of the United States.

C. W. Comstock, State engineer of Colorado, who has paid the gage observers at most of the Rio Grande stations in Colorado and has materially assisted the work financially and otherwise.

The United States Reclamation Service, for the records on the Pecos at Dayton and Lakewood, New Mexico.

The United States Forest Service, for gage observations furnished by its rangers, and other cooperative assistance.

DIVISION OF WORK.

The field data in Texas except for those stations maintained by the International Water Commission were collected under the direction of T. U. Taylor, district engineer.

The field data in the Rio Grande drainage basin, except for those stations maintained by the International Water Commission, were collected under the direction of W. B. Freeman, district engineer, assisted by James B. Stewart, G. H. Russell, and various engineers of the State engineer's office of Colorado.

The New Mexico work was under the more immediate supervision of Vernon L. Sullivan, Territorial engineer, assisted by C. D. Miller, C. H. Neel, W. W. Mills, and C. B. Digby.

The data furnished by the United States section of the International Water Commission were computed under the direction of W. W. Follett.

The data, ratings, and special studies of the completed data of the stations maintained by the United States Geological Survey were prepared by W. B. Freeman, R. C. Rice, and J. G. Mathers. The computations and the preparation of the completed data for publication were made by G. C. Stevens, R. C. Rice, J. G. Mathers, H. D. Padgett, J. B. Stewart, E. O. Christiansen, G. H. Russell, and J. J. Phelan.

GAGING STATIONS MAINTAINED IN WESTERN GULF OF MEXICO DRAINAGE BASINS.

The following list comprises the gaging stations regularly maintained in western Gulf of Mexico drainage basins by the United States Geological Survey and cooperative parties. Data for these stations have appeared in the published reports as shown in tables on pages 9 and 10. The stations are arranged by river basins and appear in downstream order, tributaries of main streams being indicated by indention. (See p. 11.)

Sabine River basin:
- Sabine River near Longview, Tex., 1904–1906.
- Sabine River at Logansport, La., 1903–1906.
  - Neches River at Evadale, Tex., 1904–1906.

Trinity River basin:
- Trinity River at Dallas, Tex., 1903–1906.
- Trinity River at Riverside, Tex., 1903–1906.

Brazos River basin:
- Brazos River at Waco, Tex., 1898–1910.
- Brazos River at Richmond, Tex., 1903–1906.

Colorado River basin:
- Colorado River at Austin, Tex., 1895–1910.
- Colorado River at Columbus, Tex., 1902–1910.
  - San Saba River near San Saba, Tex., 1904–1906.

Guadalupe River basin:
- Guadalupe River near Cuero, Tex., 1903–1906.

Rio Grande basin:
- Rio Grande at Thirtymile Bridge, near Creede, Colo., 1909–10.
- Rio Grande near Creede (Wason), Colo., 1907–1910.
- Rio Grande near Del Norte, Colo., 1889–1910, except 1907.
- Rio Grande near Lobatos (Cenicero), Colo., 1899–1910.
- Rio Grande near Alamosa, Colo., 1894, 1895, 1903.
- Rio Grande near Embudo, N. Mex., 1889–1903.
- Rio Grande near Buckman, N. Mex. (Rio Grande near Ildefonzo), 1895–1905 and 1909–10.
- Rio Grande near San Marcial, N. Mex., 1895–1910.
- Rio Grande near El Paso, Tex., 1889–1893, 1897–1910.
- Rio Grande near Fort Hancock, Tex., 1900–1903.
- Rio Grande above and below Presidio, Tex., 1900–1910.
- Rio Grande near Langtry, Tex., 1900–1910.
- Rio Grande near Devils River (below mouth), Tex., 1900–1910.
- Rio Grande near Eagle Pass, Tex., 1900–1910.
- Rio Grande near Nuevo Laredo, Tamaulipas, Mexico, 1900–1903.
- Rio Grande near Laredo, Tex., 1903–1910.
- Rio Grande near Roma, Tex., 1900–1910.
- Rio Grande near Brownsville, Tex., 1900–1910.
  - Clear Creek near Creede, Colo., 1910.
  - South Fork of Rio Grande near South Fork, Colo., 1910.
  - San Luis Creek near Villa Grove, Colo., 1910.
    - Saguache River near Saguache, Colo., 1910.
  - Conejos River near Mogote, Colo., 1899, 1900, 1903–1910.
  - Culebra River at San Luis, Colo., 1910.
  - Colorado Creek above Questa, N. Mex., 1910.
  - Colorado Creek below Questa, N. Mex., 1910.
  - Rio Hondo near Arroyo Hondo, N. Mex., 1910.
  - Rio Pueblo de Taos near Taos, N. Mex., 1910.
  - Rio Pueblo de Taos at Los Cordovas, N. Mex., 1910.
    - Rio Lucero near Taos, N. Mex., 1910.
    - Rio Fernando de Taos near Taos, N. Mex., 1910.
  - Chama River near Abiquia, N. Mex., 1895–1897.
  - Santa Fe Creek at Monument Rock, near Santa Fe, N. Mex., 1910.
  - Santa Fe Water & Light Co.'s ditch near Santa Fe, N. Mex., 1910.
  - Santa Fe Creek at Santa Fe, N. Mex., 1907–1909.
  - Rio Puerco at Rio Puerco, N. Mex., 1910.
  - Rio Puerco near La Joya, N. Mex., 1910.
    - San Jose River near Suwanee, N. Mex., 1910.
  - Mimbres River near Faywood, N. Mex., 1908–1910.
    - Cameron Creek at Fort Bayard, N. Mex., 1907–1910.
      - Stevens Creek at Fort Bayard, N. Mex., 1907–1910.
  - Rio Tularosa at Mescalero, N. Mex., 1910.
  - Rio La Luz at La Luz, N. Mex., 1910.
  - Pecos River at Cowles, N. Mex., 1910.
  - Pecos River near Anton Chico, N. Mex., 1910.
  - Pecos River at Santa Rosa, N. Mex., 1903–1906, 1910.
  - Pecos River near Fort Sumner, N. Mex., 1904–1910.

Rio Grande basin—Continued.
Pecos River—Continued.
Pecos River near Roswell, N. Mex., 1903–1906.
Pecos River near Dayton, N. Mex., 1905–1910.
Pecos River near Lakewood, N. Mex., 1906–1910.
Pecos River at Avalon, N. Mex., 1906–7.
Pecos River at Carlsbad, N. Mex., 1903–1908.
Pecos River near Pecos, Tex., 1898–1907.
Margueretta flume near Pecos, Tex., 1898, 1900–1908.
Pecos River near Moorhead, Tex., 1900–1910.
Pecos River at High Bridge, near Lozier, Tex., 1898.
Gallinas River near Las Vegas, N. Mex., 1903–1910.
Taylor Moore ditch near Roswell, N. Mex., 1905.
Hondo River below Hondo reservoir, N. Mex., 1903–1906.
Hondo reservoir inlet near Hondo reservoir, N. Mex., 1906–1908.
Hondo reservoir scour gage No. 1 near Hondo reservoir, N. Mex., 1906.
Hondo River near Roswell, N. Mex., 1903–1906.
Rio Ruidoso near Glencoe, N. Mex., 1910.
Penasco River near Dayton, N. Mex., 1905–1908.
Lake McMillan at Lakewood, N. Mex., 1906–7.
Devils River near Devils River, Tex., 1900–1910.
Rio Salado at Guerrero, Tamaulipas, Mexico, 1900–1910.
Rio San Juan at La Quemada, Tamaulipas, Mexico, 1900–1902.
Rio San Juan at Santa Rosalia ranch, Tamaulipas, Mexico, 1902–1910.

BRAZOS RIVER DRAINAGE BASIN.

DESCRIPTION.

Brazos River rises in the Staked Plains in Hale and Lamb counties, western Texas, and takes a general southeasterly course into the Gulf of Mexico, which it enters south of the mouth of Trinity River. Its drainage basin is entirely within the State of Texas.

BRAZOS RIVER AT WACO, TEX.

This station was established September 14, 1898, at the suspension bridge on Bridge Street, Waco, Tex.

A single-span truss bridge crosses the river at an angle of 76° about 300 feet above the suspension bridge.

Discharge measurements are made from the suspension bridge. A boxed chain gage is fastened to the downstream upper chord of the stiffening truss of the suspension bridge.

At low stages the rating curve is not stable on account of the shifting sands. A few hundred feet below the gage sand is taken out of the river for commercial purposes. Between this point and the gage the channel is modified at low stages to direct the current away from or toward certain discharge pipes from factories.

The following measurement was made by T. U. Taylor:

August 25, 1910: Width, 9 feet; area of section, 42 square feet; gage height, 120 feet; discharge, 6 second-feet.

Daily gage height, in feet, of Brazos River at Waco, Tex., for 1907–1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1907												
1	3.7	3.6	3.2	3.3	2.5	10.6	3.2	4.0	3.1	3.0	4.4	5.4
2	3.8	3.6	3.2	3.8	2.4	9.2	4.8	3.8	3.0	3.0	4.3	5.2
3	3.8	3.5	3.2	3.4	3.5	7.2	6.0	3.8	3.0	3.0	4.2	4.8
4	4.4	3.6	3.4	3.3	4.1	7.4	5.1	3.8	3.0	3.9	4.1	5.0
5	4.0	3.6	3.4	3.2	4.0	6.8	4.5	3.7	3.0	4.1	6.6	4.9
6	4.0	3.6	3.3	3.2	3.7	6.9	4.2	3.6	3.0	9.2	6.1	4.7
7	3.9	3.6	3.2	3.2	3.4	6.5	4.1	3.6	3.0	7.7	5.1	4.5
8	3.8	3.5	3.2	3.1	8.1	6.1	4.0	3.6	3.0	6.4	5.3	4.5
9	3.8	3.6	3.3	3.0	6.9	5.6	4.0	3.5	3.0	8.6	4.9	4.4
10	3.7	3.6	3.1	3.0	6.1	5.1	3.9	4.6	3.0	7.6	5.1	4.4
11	3.7	3.6	3.0	3.0	5.2	4.8	3.7	4.8	2.9	6.6	5.0	4.2
12	3.7	3.5	3.0	2.9	5.1	7.6	4.0	4.6	2.9	7.0	4.8	4.2
13	3.7	3.4	3.0	2.8	5.0	5.0	4.8	4.5	2.9	6.4	4.8	5.0
14	3.7	3.4	3.1	2.8	4.9	4.5	7.6	4.1	2.9	5.5	4.3	5.0
15	3.7	3.4	3.1	2.8	7.8	4.1	11.4	4.1	2.9	5.1	4.2	4.6
16	3.6	3.3	3.0	2.8	6.4	4.0	11.1	4.0	2.9	5.0	4.2	4.4
17	3.6	3.3	3.0	3.0	5.8	3.9	10.8	4.0	2.9	5.0	5.0	4.3
18	3.6	3.3	3.0	2.8	8.8	4.8	10.4	3.8	3.0	5.0	6.5	4.2
19	3.6	3.3	3.0	2.7	6.3	4.8	7.8	3.8	3.0	4.9	6.1	4.2
20	3.6	3.1	2.9	2.7	5.6	4.6	6.9	3.6	3.0	5.2	9.1	4.0
21	3.6	3.1	2.9	2.7	5.5	5.1	6.5	3.5	3.0	4.3	7.1	7.4
22	3.5	3.1	4.1	2.9	5.4	9.6	5.6	3.5	2.9	4.2	7.0	14.8
23	3.5	3.1	4.0	2.9	5.0	6.5	5.4	3.4	3.0	4.1	6.3	12.4
24	3.5	3.1	3.8	2.7	4.7	5.5	5.2	3.4	3.0	4.0	5.8	8.8
25	3.8	3.1	3.8	2.6	4.6	5.8	4.8	3.2	3.0	4.0	5.4	7.1
26	3.7	3.1	3.8	2.5	8.4	7.6	4.6	3.2	3.9	4.0	4.8	6.8
27	3.6	3.1	3.7	2.5	6.1	7.0	5.4	3.2	3.0	6.1	4.8	6.1
28	3.6	3.2	3.5	2.5	5.2	6.2	4.4	3.2	3.0	5.4	4.9	6.0
29	3.6	.....	3.5	2.5	11.1	6.0	4.1	3.2	3.0	4.3	6.1	5.6
30	3.6	.....	3.5	2.5	7.0	5.4	3.9	3.2	3.0	5.2	5.3	5.2
31	3.5	.....	3.4	.....	6.8	.....	4.1	3.1	.....	4.6	.....	5.1
1908												
1	5.0	3.5	3.9	4.4	6.4	10.8	3.3	4.0	4.6	2.5	4.8	2.1
2	4.9	3.6	3.9	4.2	5.8	8.9	3.3	3.4	4.1	2.5	4.2	2.3
3	4.8	3.6	3.9	4.0	5.6	7.8	3.3	3.3	4.0	2.5	3.5	2.4
4	4.8	3.4	3.8	3.9	5.5	9.6	3.5	3.1	3.1	2.4	3.4	3.2
5	4.6	3.7	3.8	4.0	5.3	11.8	3.4	3.0	3.4	2.2	3.0	5.2
6	4.6	4.1	3.8	3.9	5.1	8.1	3.4	2.8	2.5	2.2	2.5	4.4
7	4.8	4.0	3.7	3.9	4.8	6.8	4.1	3.1	3.2	2.1	2.5	4.4
8	4.6	3.8	3.7	3.8	4.6	6.1	4.0	3.2	3.0	4.0	2.5	4.1
9	4.5	5.8	3.7	3.8	4.5	5.6	3.5	3.0	2.8	2.8	2.4	4.0
10	4.5	5.1	4.1	3.7	4.4	5.5	3.8	2.8	2.5	2.2	2.0	3.8
11	4.4	4.3	5.8	3.6	4.3	5.5	3.3	2.8	2.4	2.2	2.0	3.0
12	4.3	6.6	5.6	4.6	4.4	5.2	3.2	3.0	2.6	2.0	1.9	2.8
13	4.2	5.6	5.4	8.1	16.6	5.0	3.2	2.6	3.6	2.6	1.9	2.5
14	4.2	5.4	5.1	10.1	16.8	4.5	3.2	2.6	3.6	2.3	1.6	2.0
15	4.1	5.5	5.0	12.6	7.6	4.4	3.1	2.5	3.2	2.1	1.6	2.3
16	4.0	5.0	4.8	13.6	5.8	4.3	3.5	3.4	3.7	2.0	1.9	2.1
17	4.0	4.8	4.6	11.4	5.2	4.1	3.5	2.6	6.0	1.9	1.5	2.0
18	4.0	4.5	4.5	25.6	19.9	4.1	3.7	2.1	4.8	1.9	1.6	2.0
19	4.0	4.5	4.3	23.0	9.6	4.0	3.0	2.5	4.1	1.8	1.6	1.8
20	3.9	4.4	4.2	32.0	8.1	4.0	3.2	2.5	4.4	1.8	1.5	1.8
21	3.9	4.3	4.1	29.0	7.0	3.8	5.5	2.5	4.6	1.8	1.5	1.7
22	3.9	4.2	4.0	20.5	6.6	3.8	4.3	2.8	4.0	2.0	1.5	1.7
23	3.8	4.1	4.0	19.5	8.0	3.7	4.2	2.5	4.6	2.2	1.4	1.5
24	3.8	4.0	4.3	18.1	13.8	3.6	4.1	2.9	4.8	3.2	1.4	1.5
25	3.8	4.2	4.1	13.4	36.3	3.5	6.1	3.1	4.4	3.0	1.4	1.5
26	3.8	4.1	4.0	11.4	32.1	4.5	5.2	2.8	4.0	2.6	1.4	1.5
27	3.7	4.0	4.0	10.5	30.3	4.0	5.2	2.7	3.8	3.0	1.4	1.5
28	3.6	4.0	4.0	8.5	28.8	3.6	4.6	7.8	3.3	2.9	1.4	1.7
29	3.6	4.0	3.9	7.4	16.1	3.5	4.5	6.4	3.0	5.0	1.5	2.3
30	3.5	.....	3.9	6.5	16.1	3.4	4.3	5.7	3.0	6.1	2.0	2.0
31	3.5	.....	3.8	.....	15.0	.....	5.0	5.1	.....	5.4	.....	2.0

Daily gage height, in feet, of Brazos River at Waco, Tex., for 1907–1910—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1909												
1	1.6	1.3	1.4	1.2	1.4	2.9	4.4	1.5	2.7	1.3	3.0	3.9
2	1.5	1.3	1.2	1.2	1.3	4.0	4.8	1.4	2.5	1.3	4.1	16.8
3	1.5	1.3	1.2	1.1	1.3	3.1	4.8	1.4	2.2	1.3	3.1	10.7
4	1.6	1.3	1.1	1.0	1.3	2.8	4.0	1.4	2.2	1.2	2.6	7.8
5	1.4	1.3	1.1	1.0	1.3	2.4	3.5	3.0	3.0	1.2	2.4	8.4
6	1.4	1.2	1.1	1.0	1.4	2.4	3.1	2.5	2.6	1.2	2.3	8.0
7	1.5	1.2	1.2	1.1	1.4	2.3	3.1	2.3	2.0	1.2	2.1	6.4
8	1.5	1.2	1.2	1.2	1.4	2.2	2.8	2.0	1.5	1.2	2.0	6.0
9	1.6	1.1	1.4	1.1	1.3	2.2	2.6	3.1	1.5	3.0	1.9	4.8
10	1.6	1.1	2.6	1.1	1.3	2.0	3.0	6.4	1.5	2.4	1.8	4.0
11	1.6	1.3	1.7	1.1	1.2	1.8	3.0	4.1	2.1	3.6	1.7	3.4
12	1.6	1.4	1.6	1.2	1.2	1.7	2.8	3.6	2.2	3.0	1.7	3.4
13	1.5	1.4	1.6	1.2	1.2	1.6	2.6	3.5	1.9	2.8	1.6	3.4
14	1.5	1.4	1.6	1.2	1.2	1.6	2.5	4.2	1.8	2.6	1.8	3.2
15	1.4	1.4	1.5	1.2	1.2	13.0	2.3	4.6	3.3	2.4	4.2	3.0
16	1.4	1.5	1.5	1.3	1.2	15.0	2.3	7.4	2.2	2.2	3.6	3.0
17	1.4	1.5	1.4	1.2	1.1	12.1	2.2	6.1	1.8	2.1	3.8	2.8
18	1.5	1.4	1.4	1.3	6.6	15.1	2.2	7.4	1.7	1.9	3.4	2.6
19	1.5	1.4	1.4	1.2	5.4	14.1	2.2	6.2	1.7	3.2	3.2	2.4
20	1.5	1.4	1.4	1.2	3.0	8.5	2.0	6.6	1.6	2.6	3.0	2.4
21	1.5	1.3	1.4	1.2	2.4	7.1	1.9	6.5	1.6	2.5	3.0	2.3
22	1.5	1.3	1.3	1.4	4.6	6.0	1.9	5.1	2.2	2.4	3.9	2.2
23	1.5	1.3	1.3	1.4	3.4	5.6	2.2	4.5	1.8	2.1	3.7	2.1
24	1.4	1.3	1.5	1.3	2.6	4.8	2.0	4.0	1.5	2.0	3.4	3.2
25	1.4	1.4	1.5	1.3	2.2	8.5	1.8	3.8	1.5	1.9	3.2	6.6
26	1.4	1.4	1.4	1.3	3.0	5.8	1.7	3.5	1.8	1.9	3.1	4.4
27	1.4	1.4	1.4	2.5	2.4	4.8	1.6	3.2	1.7	3.4	3.0	4.0
28	1.4	1.4	1.3	2.2	2.0	4.4	1.6	3.0	1.5	3.6	3.0	4.0
29	1.3	.....	1.3	1.6	1.8	4.0	1.6	2.8	1.5	3.5	3.0	3.6
30	1.3	.....	1.2	1.5	2.1	4.0	1.5	2.7	1.5	3.1	3.9	3.4
31	1.3	.....	1.2	.....	2.4	.....	1.5	2.5	.....	3.1	.....	3.1
1910												
1	2.6	1.5	1.6	3.0	2.1	3.6	2.2	1.6	1.1	1.4	2.9	0.9
2	2.6	1.8	1.6	3.4	2.1	3.4	2.4	1.5	1.1	1.3	2.8	.8
3	2.4	5.2	1.6	4.2	2.1	3.2	2.1	1.5	1.1	1.3	2.5	.8
4	2.4	3.7	1.5	5.4	2.0	3.1	2.0	1.4	1.0	1.3	2.4	.8
5	2.3	3.2	1.5	4.0	2.0	4.0	2.2	1.4	1.0	1.3	2.4	.8
6	2.4	2.6	1.5	3.2	1.9	4.2	2.1	1.4	1.4	1.2	2.2	.8
7	2.2	2.1	1.5	4.6	3.2	3.9	2.1	1.4	11.4	1.1	2.1	.7
8	2.2	2.1	1.5	4.2	2.4	3.4	3.6	1.4	5.0	1.1	2.0	.7
9	2.1	1.8	1.5	10.8	2.0	4.4	3.6	1.3	3.2	1.0	2.0	.7
10	2.1	1.8	1.9	8.0	2.0	3.6	2.8	1.3	2.4	1.0	2.0	.7
11	2.0	2.2	2.4	5.4	1.9	3.2	2.7	1.2	2.4	1.0	1.9	.8
12	2.0	1.8	1.8	5.2	1.7	4.8	2.7	1.2	2.0	1.0	1.8	.8
13	2.1	1.8	1.6	5.2	1.6	4.0	2.6	1.2	1.8	1.6	1.8	.9
14	2.2	1.8	1.6	4.2	1.6	4.6	2.6	1.2	1.7	1.4	1.7	.9
15	2.2	1.7	1.5	3.8	1.6	4.2	2.5	1.2	2.4	1.4	1.6	1.0
16	2.2	1.6	1.5	3.1	1.7	3.6	2.2	1.2	3.1	1.2	1.6	1.1
17	2.1	1.6	1.5	2.8	2.7	3.2	2.2	1.2	2.6	1.2	1.6	1.1
18	2.0	1.6	1.5	5.0	14.2	3.0	2.0	1.2	2.5	1.1	1.6	1.1
19	1.9	1.8	1.5	4.6	11.7	2.9	2.0	1.2	2.5	1.0	1.5	1.0
20	2.0	1.9	1.4	4.0	10.7	2.6	1.9	1.4	2.2	1.2	1.3	1.0
21	1.9	1.9	1.4	3.6	8.0	2.4	1.8	1.3	2.0	1.2	1.2	1.0
22	1.8	1.8	1.4	3.4	15.8	2.4	1.8	1.3	1.9	1.2	1.1	1.0
23	1.8	1.7	1.4	3.2	8.7	2.4	1.7	1.2	1.6	1.0	1.1	1.4
24	1.8	1.6	1.4	3.0	5.8	2.3	1.7	1.2	1.6	1.0	1.1	1.4
25	1.8	1.6	1.4	2.7	5.4	2.1	2.2	1.2	1.5	1.4	1.0	1.4
26	1.8	1.6	1.3	2.4	5.0	2.1	2.1	1.1	1.5	4.4	1.0	1.2
27	1.8	1.6	1.3	2.2	4.6	2.6	1.9	1.1	1.4	4.0	1.0	1.2
28	1.7	1.8	1.3	2.2	4.4	3.2	1.8	1.1	1.4	5.4	1.0	1.0
29	1.6	.....	1.3	2.2	4.3	2.6	1.7	1.1	1.5	4.6	1.0	4.4
30	1.5	.....	1.3	2.2	3.8	2.5	1.6	1.1	1.4	3.8	.9	1.6
31	1.5	.....	2.0	.....	3.6	.....	1.6	1.1	.....	3.3	.....	1.6

Daily discharge, in second-feet, of Brazos River at Waco, Tex., for 1907–1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1907.												
1	820	740	460	520	208	11,600	460	1,060	410	365	1,410	2,460
2	900	740	460	900	184	8,590	1,800	900	365	365	1,320	2,220
3	900	665	460	590	665	4,960	3,220	900	365	365	1,240	1,800
4	1,410	740	590	520	1,150	5,280	2,120	900	365	980	1,150	2,000
5	1,060	740	590	460	1,060	4,340	1,500	820	365	1,150	4,060	1,900
6	1,060	740	520	460	820	4,500	1,240	740	365	8,590	3,360	1,700
7	980	740	460	460	590	3,910	1,150	740	365	5,780	2,120	1,500
8	900	665	460	410	6,480	3,360	1,060	740	365	3,770	2,340	1,500
9	900	740	520	365	4,500	2,700	1,060	665	365	7,410	1,900	1,410
10	820	740	410	365	3,360	2,120	980	1,600	365	5,600	2,120	1,410
11	820	740	365	365	2,220	1,800	820	1,800	325	4,060	2,000	1,240
12	820	665	365	325	2,120	5,600	1,060	1,600	325	4,640	1,800	1,240
13	820	590	365	290	2,000	2,000	1,800	1,500	325	3,770	1,800	2,000
14	820	590	410	290	1,900	1,500	5,600	1,150	325	2,580	1,320	2,000
15	820	590	410	290	5,940	1,150	13,500	1,150	325	2,120	1,240	1,600
16	740	520	365	290	3,770	1,060	12,700	1,060	325	2,000	1,240	1,410
17	740	520	365	365	2,960	980	12,000	1,060	325	2,000	2,000	1,320
18	740	520	365	290	7,790	1,800	11,100	900	365	2,000	3,910	1,240
19	740	520	365	260	3,630	1,800	5,940	900	365	1,900	3,360	1,240
20	740	410	325	260	2,700	1,600	4,500	740	365	2,220	8,390	1,060
21	740	410	325	260	2,580	2,120	3,910	665	365	1,320	4,800	5,280
22	665	410	1,150	325	2,460	9,410	2,700	665	325	1,240	4,640	22,600
23	665	410	1,060	325	2,000	3,910	2,460	590	365	1,150	3,630	15,900
24	665	410	900	260	1,700	2,580	2,220	590	365	1,060	2,960	7,790
25	900	410	900	234	1,600	2,960	1,800	460	365	1,060	2,460	4,800
26	820	410	900	208	7,030	5,600	1,600	460	980	1,060	1,800	4,340
27	740	410	820	208	3,360	4,640	2,460	460	365	3,360	1,800	3,360
28	740	460	665	208	2,220	3,490	1,410	460	365	2,460	1,900	3,220
29	740	.....	665	208	12,700	3,220	1,150	460	365	1,320	3,360	2,700
30	740	.....	665	208	4,640	2,460	980	460	365	2,220	2,340	2,220
31	665	.....	590	.....	4,340	.....	1,150	410	.....	1,600	.....	2,120
1908.												
1	2,000	665	980	1,410	3,770	12,500	520	1,060	1,600	208	1,800	120
2	1,900	740	980	1,240	2,960	7,990	520	590	1,150	208	1,240	162
3	1,800	740	980	1,060	2,700	5,940	520	520	1,060	208	665	184
4	1,800	590	900	980	2,580	9,410	665	410	410	184	590	460
5	1,600	820	900	1,060	2,340	14,400	590	365	590	140	365	2,220
6	1,600	1,150	900	980	2,120	6,480	590	290	208	140	208	1,410
7	1,800	1,060	820	980	1,800	4,340	1,150	410	460	120	208	1,410
8	1,600	900	820	900	1,600	3,360	1,060	460	365	1,060	208	1,150
9	1,500	2,960	820	900	1,500	2,700	665	365	290	290	184	1,060
10	1,500	2,120	1,150	820	1,410	2,580	900	290	208	140	102	900
11	1,410	1,320	2,960	1,600	1,320	2,580	520	290	184	140	102	365
12	1,320	4,060	2,700	1,600	1,410	2,220	460	365	234	102	86	290
13	1,240	2,700	2,460	6,480	28,400	2,000	460	234	740	234	86	208
14	1,240	2,460	2,120	10,500	39,200	1,500	460	234	740	162	44	102
15	1,150	2,580	2,000	16,400	5,600	1,410	410	208	460	120	44	162
16	1,060	2,000	1,800	19,100	2,960	1,320	665	590	820	102	86	120
17	1,060	1,800	1,600	13,500	2,220	1,150	665	234	3,220	86	34	102
18	1,060	1,500	1,500	68,700	41,000	1,150	820	120	1,800	86	44	102
19	1,060	1,500	1,320	55,200	9,410	1,060	365	208	1,150	70	44	70
20	980	1,410	1,240	105,400	6,480	1,060	460	208	1,410	70	34	70
21	980	1,320	1,150	87,700	4,640	900	2,580	208	1,600	70	34	56
22	980	1,240	1,060	43,600	4,060	900	1,320	290	1,060	102	34	56
23	900	1,150	1,060	39,400	6,300	820	1,240	208	1,600	140	26	34
24	900	1,060	1,320	33,900	19,600	740	1,150	325	1,800	460	26	34
25	900	1,240	1,150	18,500	132,000	665	3,360	410	1 410	365	26	34
26	900	1,150	1,060	13,500	106,000	1,500	2,220	290	1,060	234	26	34
27	820	1,060	1,060	11,400	95,300	1,060	2,220	260	900	365	26	34
28	740	1,060	1,060	7,220	86,600	740	1,600	5,940	520	325	26	56
29	740	1,060	980	5,280	26,700	665	1,500	3,770	365	2,000	34	162
30	665	.....	980	3,910	26,700	590	1,320	2,820	365	3,360	102	102
31	665	.....	900	.....	23,200	.....	2,000	2,120	.....	2,460	.....	102

Daily discharge, in second-feet, of Brazos River at Waco, Tex., for 1907–1910—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1909.												
1	44	20	26	14	26	325	1,410	34	260	20	365	980
2	34	20	14	14	20	1,060	1,800	26	208	20	1,150	29,200
3	34	20	14	10	20	410	1,800	26	140	20	410	11,800
4	44	20	10	8	20	290	1,060	26	140	14	234	5,940
5	26	20	10	8	20	184	665	365	365	14	184	7,030
6	26	14	10	8	26	184	410	208	234	14	162	6,300
7	34	14	14	10	26	162	410	162	102	14	120	3,770
8	34	14	14	14	26	140	290	102	34	14	102	3,220
9	44	10	26	10	20	140	234	410	34	365	86	1,800
10	44	10	234	10	20	102	365	3,770	34	184	70	1,060
11	44	20	56	10	14	70	365	1,150	120	740	56	590
12	44	26	44	14	14	56	290	740	140	365	56	590
13	34	26	44	14	14	44	234	665	86	290	44	590
14	34	26	44	14	14	44	208	1,240	70	234	70	460
15	26	26	34	14	14	17,400	162	1,600	520	184	1,240	365
16	26	34	34	20	14	23,200	162	5,280	140	140	740	365
17	26	34	26	14	10	15,200	140	3,360	70	120	900	290
18	34	26	26	20	4,060	23,500	140	5,280	56	86	590	234
19	34	26	26	14	2,460	20,500	140	3,490	56	460	460	184
20	34	26	26	14	365	7,220	102	4,060	44	234	365	184
21	34	20	26	14	184	4,800	86	3,910	44	208	365	162
22	34	20	20	26	1,600	3,220	86	2,120	140	184	980	140
23	34	20	20	26	590	2,700	140	1,500	70	120	820	140
24	26	20	34	20	234	1,800	102	1,060	34	102	590	410
25	26	26	34	20	140	7,220	70	900	34	86	460	4,060
26	26	26	26	20	365	2,960	56	665	70	86	410	1,410
27	26	26	26	208	184	1,800	44	460	56	590	365	1,060
28	26	26	20	140	102	1,410	44	365	34	740	365	1,060
29	20	.....	20	44	70	1,060	44	290	34	665	365	740
30	20	.....	14	34	120	1,060	34	260	34	410	980	590
31	20	.....	14	.....	184	.....	34	208	.....	410	.....	410
1910.												
1	234	34	44	365	120	740	140	44	10	26	325	6
2	234	70	44	590	120	590	184	34	10	20	290	4
3	184	2,220	44	1,240	120	460	120	34	10	20	208	4
4	184	820	34	2,460	102	410	102	26	8	20	184	4
5	162	460	34	1,060	102	1,060	140	26	8	20	184	4
6	184	234	34	460	86	1,240	120	26	26	14	140	4
7	140	120	34	1,600	460	980	120	26	13,500	10	120	3
8	140	120	34	1,240	184	590	740	26	2,000	10	102	3
9	120	70	34	12,000	102	1,410	740	20	460	8	102	3
10	120	70	86	6,300	102	740	290	20	184	8	102	3
11	102	140	184	2,460	86	460	260	14	184	8	86	4
12	102	70	70	2,220	56	1,800	260	14	102	8	70	4
13	120	70	44	2,220	44	1,060	234	14	70	44	70	6
14	140	70	44	1,240	44	1,600	234	14	56	26	56	6
15	140	56	34	900	44	1,240	208	14	184	26	44	8
16	140	44	34	410	56	740	140	14	410	14	44	10
17	120	44	34	290	260	460	140	14	234	14	44	10
18	102	44	34	2,000	20,800	365	102	14	208	10	44	10
19	86	44	34	1,600	14,200	325	102	14	208	8	34	8
20	102	86	26	1,060	11,800	234	86	26	140	20	20	8
21	86	86	26	740	6,300	184	70	20	102	20	14	8
22	70	70	26	590	25,700	184	70	20	86	20	10	8
23	70	56	26	460	7,600	184	56	14	44	8	10	26
24	70	44	26	365	2,960	162	56	14	44	8	10	26
25	70	44	26	260	2,460	120	140	14	34	26	8	26
26	70	44	20	184	2,000	120	120	10	34	1,410	8	14
27	70	44	20	140	1,600	234	86	10	26	1,060	8	14
28	56	70	20	140	1,410	460	70	10	26	2,460	8	8
29	44	.....	20	140	1,320	234	56	10	34	1,600	8	1,410
30	34	.....	20	140	900	208	44	10	26	900	6	44
31	34	.....	102	.....	740	.....	44	10	.....	520	.....	44

Monthly discharge of Brazos River near Waco, Tex., for 1907–1910.

[Drainage area, 30,800 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1907.						
January	1,410	665	827	0.027	0.03	50,800
February	740	410	580	.019	.02	32,200
March	1,150	325	557	.018	.02	34,200
April	900	208	351	.011	.01	20,900
May	12,700	184	2,810	.091	.10	173,000
June	11,600	980	3,670	.119	.13	218,000
July	13,500	460	3,400	.110	.13	209,000
August	1,800	410	858	.028	.03	52,800
September	980	325	376	.012	.01	22,400
October	8,590	365	2,560	.083	.10	157,000
November	8,390	1,150	2,590	.084	.09	154,000
December	22,600	1,060	3,440	.112	.13	212,000
The year	22,600	184	1,850	.060	.80	1,340,000
1908.						
January	2,000	665	1,220	.040	.05	75,000
February	4,060	590	1,500	.049	.05	86,300
March	2,960	820	1,310	.043	.05	80,600
April	105,400	820	19,100	.620	.69	1,140,000
May	132,000	1,320	22,000	.714	.82	1,350,000
June	14,400	590	3,120	.101	.11	186,000
July	3,360	460	1,060	.034	.04	65,200
August	5,940	120	777	.025	.03	47,800
September	3,220	184	926	.030	.03	55,100
October	3,360	70	444	.014	.02	27,300
November	1,800	26	218	.0071	.008	13,000
December	2,220	34	365	.012	.01	22,400
The year	132,000	26	4,340	.140	1.91	3,150,000
1909.						
January	44	20	32.0	.0010	.001	1,970
February	34	10	22.0	.00071	.0007	1,220
March	234	10	31.8	.0010	.001	1,960
April	208	8	26.9	.00087	.001	1,600
May	4,060	10	354	.011	.01	21,800
June	23,500	44	4,610	.150	.17	274,000
July	1,800	34	359	.0121	.01	22,100
August	5,280	26	1,410	.046	.05	86,700
September	520	34	113	.0037	.004	6,720
October	740	14	230	.0075	.009	14,100
November	1,240	44	437	.014	.02	26,000
December	29,200	140	2,750	.089	.10	169,000
The year	29,200	10	866	.028	.38	627,000
1910.						
January	234	34	114	.0037	.004	7,010
February	2,220	34	191	.0062	.006	10,600
March	184	20	41.7	.0014	.002	2,560
April	12,000	140	1,420	.046	.05	84,500
May	25,700	44	3,290	.107	.12	202,000
June	1,800	120	620	.020	.02	36,900
July	740	44	170	.0055	.006	10,500
August	44	10	18.6	.00060	.0007	1,140
September	13,500	8	616	.020	.02	36,700
October	2,460	8	270	.0088	.01	16,600
November	325	6	78.6	.0026	.003	4,680
December	1,410	3	56.1	.0018	.002	3,450
The year	25,700	3	576	.019	.24	417,000

NOTE.—The measurement made in 1910 is the only one since 1905. The estimates for 1907–1910, therefore, may be somewhat in error.

COLORADO RIVER (OF TEXAS) DRAINAGE BASIN.

DESCRIPTION.

Colorado River rises in the extreme western portion of the State, within a few miles of the eastern boundary of New Mexico, and flows in a general southeasterly direction, emptying into the Gulf of Mexico, in Matagorda County. The drainage area, comprising 40,000 square miles above Columbus, extends into the corner of New Mexico. The principal tributaries of the Colorado are the Concho, the San Saba, and the Llano. The Concho carries a greater quantity of water than the Colorado at their point of junction, furnishes water for irrigation and water power, and supports in Irion and Tom Green counties some excellent irrigation systems.[1]

The Colorado at Austin emerges from a canyon; from Austin to the Gulf it traverses a rather flat country, and its waters are utilized for many power plants. A large acreage of rice is irrigated by canals that obtain their water from the Colorado.

COLORADO RIVER AT AUSTIN, TEX.

This station, which was established December 21, 1897, was originally located at the dam near Austin, Tex. Gage heights were first obtained on the crest of the Austin dam August 13, 1895, and were continued from that date until the failure of the dam in April, 1900. On the failure of the dam the station was moved to the Congress Avenue Bridge, south of the city.

A staff gage consisting of upright posts driven into the bank of the river is located near the bathhouse about 150 feet above the bridge; for higher stage the first pier from the north has been marked up to 21.00 feet; for stages above 21.00 feet a chain gage is used.

The low-water level at this point has been gradually falling for several years. This decrease has been caused by the erosion of the channel about 200 yards below the highway bridge. Under the highway bridge the water spreads out into a large pool, the outlet of which is through two contracted sections below, the main one being that in which the erosion has taken place. The lowest level recorded from gage observations is 0.45 foot, on August 15–20, 1910.

[1] Water-Supply Paper U. S. Geol. Survey No. 71, 1902. San Saba and Llano rivers are described in the same paper.

Discharge measurements of Colorado River at Austin, Tex., in 1910.

Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Aug. 15	T. U. Taylor	0.44	41
Aug. 16	do	.44	41
16[a]	do	.44	20
16[a]	J. W. Calhoun	.44	20
Aug. 17	T. U. Taylor	.44	20
17[a]	do	.44	19
Aug. 18[b]	do	.44	24
18[c]	do	.44	19
Aug. 20	do	.44	35
Sept. 5	do	.70	93
Sept. 9	do	9.85	26,700
9	do	8.60	22,300
Sept. 10	do	5.80	10,800
10	do	5.10	8,200

[a] Made at the dam site. [b] Made at Kingsland. [c] Made at Marble Falls.

NOTE.—From Aug. 15 to Sept. 10 the flow of Barton's springs at Austin was 19 second-feet. If this amount be added to the discharges at the dam site and the falls (Aug. 16–18) it will give the discharges at the bridge for those days.

Daily gage height, in feet, of Colorado River at Austin, Tex., for 1907–1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1907.												
1	1.3	1.1	1.2	1.7	0.8	5.5	2.0	1.3	0.7	1.7	2.3	1.5
2	1.3	1.1	1.2	1.5	1.0	3.4	1.8	1.3	.7	1.6	1.9	1.4
3	1.2	1.1	1.2	1.2	1.0	2.5	1.8	1.2	.7	1.7	1.9	1.4
4	1.2	1.1	1.2	.9	1.2	2.4	1.8	1.2	.6	1.7	1.9	1.4
5	1.2	1.1	1.2	.9	1.5	2.0	3.8	1.2	.6	1.8	1.8	1.5
6	1.1	1.1	1.1	.9	2.0	1.8	2.9	1.2	.6	2.9	1.9	1.7
7	1.1	1.1	1.1	.8	2.4	1.8	2.2	2.1	.6	6.5	2.0	1.7
8	1.2	1.1	1.1	.7	3.2	1.9	2.0	2.0	.5	5.7	2.1	1.8
9	1.2	1.1	1.0	.7	3.4	1.9	1.9	2.0	.5	8.3	3.6	1.8
10	1.1	1.2	1.0	.65	4.1	1.8	1.8	1.8	.6	6.9	3.5	1.8
11	1.1	1.2	1.0	.65	3.8	1.8	1.8	1.5	.6	5.5	3.0	1.8
12	1.1	1.1	1.0	.65	3.1	1.6	1.8	1.3	.6	4.8	2.6	1.9
13	1.1	1.1	1.0	.65	3.0	1.5	1.9	1.3	.5	3.5	2.5	1.9
14	1.0	1.1	1.0	.65	2.7	1.4	10.1	1.2	.5	2.7	2.3	2.4
15	1.0	1.1	1.1	.65	2.2	1.3	7.8	1.1	.6	1.9	2.2	2.5
16	.9	1.1	1.1	.65	1.8	1.2	6.7	1.1	.6	1.9	2.1	2.5
17	.8	1.1	1.1	.9	1.6	1.2	6.5	1.0	.5	2.4	4.3	2.6
18	1.1	1.1	1.0	.7	1.5	1.1	7.3	1.0	.5	3.7	4.2	2.6
19	1.1	1.1	1.0	.7	1.5	1.0	7.2	.9	.5	2.8	9.9	2.4
20	1.1	1.1	1.0	.7	1.4	1.0	5.4	.9	.5	2.7	5.4	2.4
21	1.0	1.1	.9	.9	1.4	1.0	4.3	.9	.6	3.4	5.3	2.5
22	1.0	1.1	.9	1.0	1.6	1.1	3.8	.9	.6	2.8	5.3	2.8
23	1.0	1.1	1.0	1.1	1.6	7.6	2.2	.8	.7	2.5	5.0	2.9
24	1.0	1.1	1.0	1.0	1.8	7.7	2.1	.8	.8	2.4	4.9	2.8
25	1.0	1.1	1.0	.8	2.1	6.2	1.9	.8	.8	2.3	4.5	2.6
26	1.0	1.1	1.0	.7	2.5	5.9	1.9	.7	1.8	2.0	3.8	2.5
27	1.1	1.2	1.0	.7	5.4	4.1	1.8	.7	1.8	1.9	3.1	2.6
28	1.1	1.2	1.0	.7	5.5	3.3	1.6	.8	1.7	1.7	3.0	2.4
29	1.1	.....	1.0	.7	10.2	2.9	1.5	.7	1.7	1.8	2.9	2.2
30	1.1	.....	1.1	.7	6.6	2.2	1.5	.6	1.7	1.9	2.8	1.9
31	1.1	.....	1.1	.....	6.6	.....	1.4	.6	.....	2.0	.....	1.8
1908.												
1	1.7	1.4	1.8	1.5	2.4	4.8	2.2	1.7	2.0	2.0	2.0	1.4
2	1.7	1.3	1.7	1.3	2.4	4.5	2.2	1.6	1.5	1.9	1.9	1.5
3	1.5	1.3	1.6	1.2	2.4	4.0	2.2	1.5	1.5	1.8	1.8	1.5
4	1.5	1.4	1.6	1.4	2.3	3.8	2.2	1.4	1.5	1.7	1.8	1.5
5	2.1	1.5	1.5	1.3	2.3	3.7	3.5	2.0	1.5	1.6	1.8	3.0
6	2.4	1.3	1.5	1.3	2.2	3.6	3.0	2.5	1.5	1.6	1.7	2.7
7	2.5	1.3	1.4	1.3	2.1	3.5	4.5	3.0	1.5	2.0	1.4	2.0
8	2.5	1.3	1.5	1.2	2.1	3.4	3.5	3.7	1.7	2.4	1.5	1.9
9	2.1	2.4	1.4	1.1	2.0	3.3	3.1	5.0	1.6	2.5	1.5	1.8
10	1.9	3.1	1.5	1.0	2.0	3.2	4.4	5.2	2.2	2.6	1.4	1.8

Daily gage height, in feet, of Colorado River at Austin, Tex., for 1907–1910—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
11	1.9	3.4	2.8	1.1	2.0	3.1	5.1	3.5	2.3	2.5	1.4	1.8
12	1.8	3.5	2.8	1.1	1.9	3.0	4.4	3.0	2.4	2.2	1.4	1.7
13	1.8	2.5	2.1	1.3	1.8	2.9	3.7	3.0	2.4	2.0	1.3	1.7
14	1.6	2.4	1.6	1.4	1.7	2.8	3.3	2.5	2.5	1.7	1.3	1.7
15	1.6	2.2	2.3	3.5	5.6	2.7	3.0	2.4	2.6	1.6	1.3	1.6
16	1.4	2.4	2.1	2.8	3.8	2.6	2.7	2.1	2.6	1.6	1.2	1.6
17	1.4	2.4	1.9	3.6	2.9	2.5	2.6	2.0	2.6	1.5	1.2	1.6
18	1.4	2.1	1.8	3.0	2.5	2.4	2.5	2.0	2.5	1.4	1.2	1.6
19	1.3	2.0	1.8	5.2	3.0	2.3	2.4	2.0	4.0	1.4	1.2	1.6
20	1.2	2.0	1.6	8.8	10.0	2.2	2.4	2.0	4.5	1.4	1.2	1.6
21	1.2	1.8	1.6	12.1	11.1	2.1	2.3	1.9	4.6	1.4	1.2	1.6
22	1.2	1.8	1.7	16.0	6.0	2.0	2.2	1.8	4.2	1.5	1.2	1.5
23	1.2	1.8	1.9	21.6	4.0	1.8	2.1	1.8	3.0	1.5	1.2	1.5
24	1.3	1.8	1.6	18.5	7.4	1.8	2.0	1.7	3.0	1.5	1.2	1.5
25	1.2	1.8	1.6	8.3	17.0	1.8	2.0	1.6	2.8	4.8	1.2	1.5
26	1.3	1.9	1.6	5.0	12.2	1.8	2.0	2.1	2.7	4.0	1.2	1.4
27	1.5	1.9	1.6	3.0	13.0	1.8	2.0	2.4	2.6	3.8	1.2	1.4
28	1.5	1.8	1.5	2.5	13.7	1.8	2.0	2.6	2.5	3.0	1.2	1.4
29	1.4	1.8	1.5	2.4	9.2	2.4	2.0	2.5	2.0	2.8	1.2	1.5
30	1.4	.....	1.5	2.4	7.0	2.4	1.9	2.4	2.0	2.4	1.4	1.6
31	1.3	.....	1.4	.....	5.1	.....	1.8	2.0	.....	2.2	.....	1.6
1909.												
1	1.6	1.3	.9	.9	3.1	4.9	2.3	3.6	1.9	2.5	2.7	1.8
2	1.6	1.3	.9	1.2	2.9	5.4	2.3	3.3	1.8	2.3	2.5	1.8
3	1.6	1.3	.9	1.2	2.8	6.8	2.5	2.9	1.4	2.3	2.5	3.3
4	1.6	1.3	.9	1.3	2.7	10.6	2.4	2.6	1.4	2.2	2.5	5.7
5	1.6	1.2	.9	1.3	2.5	5.7	2.2	2.4	1.3	2.2	2.4	6.0
6	1.5	1.2	.9	1.2	2.5	4.6	2.3	2.3	1.2	1.9	2.3	5.2
7	1.4	1.1	1.0	1.2	2.6	3.8	2.1	2.3	1.4	1.8	2.4	4.6
8	1.4	1.1	.9	1.3	2.7	3.6	2.0	2.4	1.4	1.8	2.3	3.3
9	1.4	1.1	1.2	1.3	2.4	3.2	1.8	2.4	1.3	1.8	2.3	3.2
10	1.4	1.0	1.2	1.2	2.3	3.0	2.2	2.2	1.3	1.9	2.2	2.6
11	1.4	1.1	1.1	1.2	2.1	3.0	2.1	2.3	1.3	2.3	2.2	2.5
12	1.3	1.1	1.1	1.2	2.1	2.8	1.9	2.5	1.2	2.2	2.2	2.5
13	1.3	1.1	1.2	1.2	1.9	2.5	1.9	2.5	1.2	1.8	1.8	2.6
14	1.3	1.3	1.1	1.3	1.8	2.3	1.7	2.6	1.3	1.7	2.5	2.2
15	1.3	1.5	1.1	1.2	2.5	2.4	1.8	2.4	1.3	1.7	1.5	2.0
16	1.3	1.4	1.0	1.1	1.9	2.1	1.5	2.1	1.2	1.6	1.7	2.0
17	1.3	1.3	1.0	1.1	2.3	2.1	1.5	2.3	4.4	1.6	1.6	1.8
18	1.3	1.3	1.0	1.0	2.4	3.6	1.7	2.6	3.1	1.6	1.6	2.2
19	1.3	1.2	1.0	.9	2.9	3.4	1.9	2.8	2.9	2.2	1.5	2.0
20	1.4	1.2	1.0	.9	2.8	4.7	1.6	3.3	3.0	4.8	1.5	2.0
21	1.3	1.1	.9	1.0	2.6	3.5	1.3	2.9	2.8	3.4	1.6	1.8
22	1.3	1.1	.9	1.0	2.5	2.9	1.3	2.6	3.0	5.6	1.5	1.8
23	1.3	1.1	.9	1.1	2.5	2.7	1.5	2.2	3.2	5.8	1.5	2.3
24	1.2	1.1	.9	.9	2.7	2.4	10.3	2.1	2.8	5.2	1.7	2.2
25	1.2	1.1	1.1	.8	2.6	2.3	9.1	2.1	2.8	4.7	1.6	2.2
26	1.2	1.0	1.2	.8	6.8	3.1	5.2	2.1	2.8	4.1	1.6	2.3
27	1.4	.9	1.1	1.0	7.6	3.7	4.5	2.0	2.8	4.0	1.5	2.3
28	1.3	.9	1.1	1.1	5.9	4.0	4.2	1.8	2.6	3.8	1.5	2.0
29	1.3	.....	1.0	2.3	6.7	3.4	4.6	1.8	2.8	3.7	1.8	1.8
30	1.5	.....	.9	3.5	3.8	2.9	4.1	2.0	2.7	3.0	1.9	1.7
31	1.4	.....	.9	.....	3.7	.....	4.0	1.9	.....	2.7	.....	1.6
1910.												
1	1.6	1.5	1.3	7.6	1.5	1.7	.7	1.1	1.1	.55	1.40	.9
2	1.6	1.7	1.3	5.7	1.5	1.6	.7	1.1	1.0	.55	1.3	.9
3	1.6	1.6	1.3	5.0	1.4	1.5	1.2	1.0	.9	.55	1.3	.9
4	1.5	1.6	1.2	4.4	1.4	1.4	.9	1.0	.8	1.0	1.3	1.0
5	1.5	1.5	1.1	3.4	1.3	1.4	.8	1.0	.7	2.0	1.2	1.0
6	1.5	1.6	1.1	3.0	1.3	1.3	3.3	1.0	1.1	1.8	1.1	.9
7	1.3	1.6	1.0	3.2	1.3	1.4	2.2	.55	.65	1.6	1.0	.8
8	1.3	1.6	1.0	3.0	1.3	1.4	2.0	.45	.65	1.4	1.0	.8
9	1.3	1.6	1.0	3.1	1.3	1.4	1.8	.45	10.00	1.4	.9	.8
10	1.2	1.5	1.1	7.6	1.3	1.3	1.7	.45	5.8	1.4	.9	.8
11	1.2	1.5	1.1	5.5	1.3	1.2	1.6	.45	3.8	1.4	.9	.8
12	1.1	1.5	1.2	5.0	1.3	1.2	1.6	.45	3.0	1.5	.9	.8
13	1.1	1.5	1.1	4.8	2.0	1.2	1.5	.45	2.5	1.6	.9	.8
14	1.4	1.5	1.2	4.5	2.0	1.2	1.4	.45	2.0	1.5	.8	.8
15	1.3	1.5	1.2	2.9	1.8	1.2	1.4	.45	2.0	1.5	.8	1.0

Daily gage height, in feet, of Colorado River at Austin, Tex., for 1907–1910—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1907.												
16	1.2	1.5	1.1	2.6	1.7	1.2	1.4	.45	1.6	1.4	.8	1.0
17	1.2	1.5	1.2	2.4	1.8	1.2	1.3	.45	1.7	1.4	.9	1.1
18	1.3	1.5	1.3	2.2	1.7	1.2	1.2	.45	1.6	1.3	1.0	1.0
19	1.2	1.5	1.3	2.1	4.8	1.1	1.2	.45	1.5	1.3	1.0	1.0
20	1.2	1.5	1.3	2.0	5.3	1.0	1.2	.45	1.5	1.4	1.2	1.0
21	1.2	1.4	1.3	2.0	7.0	1.0	1.7	.45	1.5	1.4	1.1	1.0
22	1.1	1.4	1.3	1.9	6.0	.65	1.5	.45	1.4	1.4	1.1	1.2
23	1.2	1.5	1.3	1.9	4.1	.65	1.4	.45	1.4	1.3	1.0	1.8
24	1.0	1.5	1.3	1.9	3.3	.65	1.4	.55	1.4	1.3	1.0	1.8
25	1.0	1.3	1.3	1.8	2.6	.55	1.3	.55	1.3	1.4	1.0	1.8
26	1.1	1.3	1.3	1.7	2.4	.55	1.5	1.0	1.3	3.3	1.0	1.6
27	1.1	1.3	1.3	1.6	2.1	.55	1.4	1.6	1.0	2.6	1.0	1.5
28	1.1	1.4	1.2	1.6	2.0	.55	1.4	1.5	.65	2.0	.9	1.4
29	1.0	.....	1.2	1.6	1.9	.55	1.3	1.4	.65	1.8	.9	1.4
30	1.4	.....	1.2	1.6	1.9	.55	1.3	1.3	.55	1.6	.9	1.3
31	1.4	.....	1.1	.....	1.8	.....	1.2	1.3	.....	1.6	.....	1.1

Daily discharge, in second-feet, of Colorado River at Austin, Tex., for 1907–1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1907.												
1	306	219	260	543	123	9,820	760	306	96	543	1,030	418
2	306	219	260	418	183	2,880	613	306	96	478	685	359
3	260	219	260	260	183	1,260	613	260	96	543	685	359
4	260	219	260	152	260	1,140	613	260	72	543	685	359
5	260	219	260	152	418	760	3,870	260	72	613	613	418
6	219	219	219	152	760	613	1,840	260	72	1,840	685	543
7	219	219	219	123	1,140	613	930	840	72	13,700	760	543
8	260	219	219	96	2,430	685	760	760	50	10,600	840	613
9	260	219	183	96	2,880	685	685	760	50	20,700	3,360	613
10	219	260	183	84	4,660	613	613	613	72	15,300	3,120	613
11	219	260	183	84	3,870	613	613	418	72	9,820	2,020	613
12	219	219	183	84	2,220	478	613	306	72	7,080	1,390	685
13	219	219	183	84	2,020	418	685	306	50	3,120	1,260	685
14	183	219	183	84	1,530	359	27,800	260	50	1,530	1,030	1,140
15	183	219	219	84	930	306	18,800	219	72	685	930	1,260
16	152	219	219	84	613	260	14,500	219	72	685	840	1,260
17	123	219	219	152	478	260	13,700	183	50	1,140	5,260	1,390
18	219	219	183	96	418	219	16,800	183	50	3,620	4,960	1,390
19	219	219	183	96	418	183	16,400	152	50	1,680	27,000	1,140
20	219	219	183	96	359	183	9,420	152	50	1,530	9,420	1,140
21	183	219	152	152	359	183	5,260	152	72	2,880	9,040	1,260
22	183	219	152	183	478	219	3,870	152	72	1,680	9,040	1,680
23	183	219	183	219	478	18,000	930	123	96	1,260	7,860	1,840
24	183	219	183	183	613	18,400	840	123	123	1,140	7,480	1,680
25	183	219	183	123	840	12,500	685	123	123	1,030	5,940	1,390
26	183	219	183	96	1,260	11,400	685	96	613	760	3,870	1,260
27	219	260	183	96	9,420	4,660	613	96	613	685	2,220	1,390
28	219	260	183	96	9,820	2,650	478	123	543	543	2,020	1,140
29	219	.....	183	96	28,100	1,840	418	96	543	613	1,840	930
30	219	.....	219	96	14,100	930	418	72	543	685	1,680	685
31	219	.....	219	.....	14,100	.....	359	72	.....	760	.....	613
1908.												
1	543	359	613	418	1,140	7,090	930	543	760	760	760	359
2	543	306	543	306	1,140	5,950	930	478	418	685	685	418
3	418	306	478	260	1,140	4,400	930	418	418	613	613	418
4	418	359	478	359	1,030	3,870	930	359	418	543	613	418
5	840	418	418	306	1,030	3,620	3,120	760	418	478	613	2,020
6	1,140	306	418	306	930	3,360	2,020	1,260	418	478	543	1,530
7	1,260	306	359	306	840	3,120	5,940	2,020	418	760	359	760
8	1,260	306	418	260	840	2,880	3,120	3,620	543	1,140	418	685
9	840	1,140	359	219	760	2,650	2,220	7,860	478	1,260	418	613
10	685	2,220	418	183	760	2,430	5,600	8,640	930	1,390	359	613
11	685	2,880	1,680	219	760	2,220	8,260	3,120	1,030	1,260	359	613
12	613	3,120	1,680	219	685	2,020	5,600	2,020	1,140	930	359	543
13	613	1,260	840	306	613	1,840	3,620	2,020	1,140	760	306	543
14	478	1,140	478	359	543	1,680	2,650	1,260	1,260	543	306	543
15	478	930	1,030	3,120	10,200	1,530	2,020	1,140	1,390	478	306	478
16	359	1,140	840	1,680	3,870	1,390	1,530	840	1,390	478	260	478
17	359	1,140	685	3,360	1,840	1,260	1,390	760	1,390	418	260	478
18	359	840	613	2,020	1,260	1,140	1,260	760	1,260	359	260	478
19	306	760	613	8,640	2,020	1,030	1,140	760	4,400	359	260	478
20	260	760	478	22,700	27,400	930	1,140	760	5,940	359	260	478

Daily discharge, in second-feet, of Colorado River at Austin, Tex., for 1907–1910—Contd.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
21	260	613	478	35,600	31,700	840	1,030	685	6,320	359	260	478
22	260	613	543	50,800	11,800	760	930	613	4,960	418	260	418
23	260	613	685	72,600	4,400	613	840	613	2,020	418	260	418
24	306	613	478	60,500	17,200	613	760	543	2,020	418	260	418
25	260	613	478	20,700	54,700	613	760	478	1,680	7,080	260	418
26	306	685	478	7,860	35,900	613	760	840	1,530	4,400	260	359
27	418	685	478	2,020	39,100	613	760	1,140	1,390	3,870	260	359
28	418	613	418	1,260	41,800	613	760	1,390	1,260	2,020	260	359
29	359	613	418	1,140	24,200	1,140	760	1,260	760	1,680	260	418
30	359	.....	418	1,140	15,700	1,140	685	1,140	760	1,140	359	478
31	306	.....	359	.....	8,260	.....	613	760	.....	930	.....	478
1909.												
1	478	306	152	152	2,220	7,480	1,030	3,360	685	1,260	1,530	613
2	478	306	152	260	1,840	9,420	1,030	2,650	613	1,030	1,260	613
3	478	306	152	260	1,680	14,900	1,260	1,840	359	1,030	1,260	2,650
4	478	306	152	306	1,530	29,700	1,140	1,390	359	930	1,260	10,600
5	478	260	152	306	1,260	10,600	930	1,140	306	930	1,140	11,800
6	418	260	152	260	1,260	6,320	1,030	1,030	260	685	1,030	8,640
7	359	219	183	260	1,390	3,870	840	1,030	359	613	1,140	6,320
8	359	219	152	306	1,530	3,360	760	1,140	359	613	1,030	2,650
9	359	219	260	306	1,140	2,430	613	1,140	306	613	1,030	2,430
10	359	183	260	260	1,030	2,020	930	930	306	685	930	1,390
11	359	219	219	260	840	2,020	840	1,030	306	1,030	930	1,260
12	306	219	219	260	840	1,680	685	1,260	260	930	930	1,260
13	306	219	260	260	685	1,260	685	1,260	260	613	613	1,390
14	306	306	219	306	613	1,030	543	1,390	306	543	1,260	930
15	306	418	219	260	1,260	1,140	613	1,140	306	543	418	760
16	306	359	183	219	685	840	418	840	260	478	543	760
17	306	306	183	219	1,030	840	418	1,030	5,600	478	478	613
18	306	306	183	183	1,140	3,360	543	1,390	2,220	478	478	930
19	306	260	183	152	1,840	2,880	685	1,680	1,840	930	418	760
20	359	260	183	152	1,680	6,700	478	2,650	2,020	7,080	418	760
21	306	219	152	183	1,390	3,120	306	1,840	1,680	2,880	478	613
22	306	219	152	183	1,260	1,840	306	1,390	2,020	10,200	418	613
23	306	219	152	219	1,260	1,530	418	930	2,430	11,000	418	1,030
24	260	219	152	152	1,530	1,140	28,500	840	1,680	8,640	543	930
25	260	219	219	123	1,390	1,030	23,900	840	1,680	6,700	478	930
26	260	183	260	123	14,900	2,220	8,640	840	1,680	4,660	478	1,030
27	359	152	219	183	18,000	3,620	5,940	760	1,680	4,400	418	1,030
28	306	152	219	219	11,400	4,400	4,960	613	1,390	3,870	418	760
29	306	.....	183	1,030	14,500	2,880	6,320	613	1,680	3,620	613	613
30	418	.....	152	3,120	3,870	1,840	4,660	760	1,530	2,020	685	543
31	359	.....	152	.....	3,620	.....	4,400	685	.....	1,530	.....	478
1910.												
1	478	418	306	18,000	418	543	96	219	219	61	359	152
2	478	543	306	10,600	418	478	96	219	183	61	306	152
3	478	478	306	7,860	359	418	260	183	152	61	306	152
4	418	478	260	5,600	359	359	152	183	123	183	306	183
5	418	418	219	2,880	306	359	123	183	96	760	260	183
6	418	478	219	2,020	306	306	2,650	183	219	613	219	152
7	306	478	183	2,430	306	359	930	61	84	478	183	123
8	306	478	183	2,020	306	359	760	40	84	359	183	123
9	306	478	183	2,220	306	359	613	40	27,400	359	152	123
10	260	418	219	18,000	306	306	543	40	11,000	359	152	123
11	260	418	219	9,820	306	260	478	40	3,870	359	152	123
12	219	418	260	7,860	306	260	478	40	2,020	418	152	123
13	219	418	219	7,080	760	260	418	40	1,260	478	152	123
14	359	418	260	5,940	760	260	359	40	760	418	123	123
15	306	418	260	1,840	613	260	359	40	760	418	123	183
16	260	418	219	1,390	543	260	359	40	478	359	123	183
17	260	418	260	1,140	613	260	306	40	543	359	152	219
18	306	418	306	930	543	260	260	40	478	306	183	183
19	260	418	306	840	7,090	219	260	40	418	306	183	183
20	260	418	306	760	9,040	183	260	40	418	359	260	183
21	260	359	306	760	15,700	183	543	40	418	359	219	183
22	219	359	306	685	11,800	84	418	40	359	359	219	260
23	260	418	306	685	4,660	84	359	40	359	306	183	613
24	183	418	306	685	2,650	84	359	61	359	306	183	613
25	183	306	306	613	1,390	61	306	61	306	359	183	613
26	219	306	306	543	1,140	61	418	183	306	2,650	183	478
27	219	306	306	478	840	61	359	478	183	1,390	183	418
28	219	359	260	478	760	61	359	418	84	760	152	359
29	183	.....	260	478	685	61	306	359	84	613	152	359
30	359	.....	260	418	685	61	306	306	61	478	152	306
31	359	.....	219	.....	613	.....	260	306	.....	478	.....	219

Monthly discharge of Colorado River at Austin, Tex., for 1907–1910.

[Drainage area, 37,000 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1907.						
January	306	123	217	0.0059	0.007	13,300
February	260	219	225	.0061	.006	12,500
March	260	152	203	.0055	.006	12,500
April	543	84	145	.0039	.004	8,630
May	28,100	123	3,400	.092	.11	209,000
June	18,400	183	3,100	.084	.09	184,000
July	27,800	359	4,680	.126	.15	288,000
August	840	72	266	.0072	.008	16,400
September	613	50	156	.0042	.005	9,280
October	20,700	478	3,480	.094	.11	214,000
November	27,000	613	3,920	.106	.12	233,000
December	1,840	359	949	.026	.03	58,400
The year	28,100	50	1,740	.047	.65	1,260,000
1908.						
January	1,260	260	515	.014	.02	31,700
February	3,120	306	885	.024	.03	50,900
March	1,680	359	589	.016	.02	36,200
April	72,600	183	9,970	.269	.30	593,000
May	54,700	543	11,100	.300	.35	682,000
June	7,090	613	2,070	.056	.06	123,000
July	8,260	613	2,030	.055	.06	125,000
August	8,640	359	1,580	.043	.05	97,200
September	6,320	418	1,610	.044	.05	95,800
October	7,080	359	1,190	.032	.04	73,200
November	760	260	367	.0099	.01	21,800
December	2,020	359	566	.015	.02	34,800
The year	72,600	183	2,710	.073	1.01	1,960,000
1909.						
January	478	260	350	.0095	.01	21,500
February	418	152	251	.0068	.007	13,900
March	260	152	188	.0051	.006	11,600
April	3,120	123	349	.0094	.01	20,800
May	18,000	613	3,180	.086	.10	196,000
June	29,700	840	4,520	.122	.14	269,000
July	28,500	306	3,350	.091	.10	206,000
August	3,360	613	1,270	.034	.04	78,100
September	5,600	260	1,160	.031	.03	69,000
October	11,000	478	2,610	.071	.08	160,000
November	1,530	418	768	.021	.02	45,700
December	11,800	478	2,120	.057	.07	130,000
The year	29,700	123	1,690	.046	.61	1,050,000
1910.						
January	478	183	298	.0081	.009	18,300
February	543	306	417	.011	.01	23,200
March	306	183	263	.0071	.008	16,200
April	18,000	478	3,840	.104	.12	228,000
May	15,700	306	2,090	.056	.06	129,000
June	543	61	238	.0064	.007	14,200
July	2,650	96	444	.012	.01	27,300
August	478	40	130	.0035	.004	7,990
September	27,400	61	1,770	.048	.05	105,000
October	2,650	61	488	.013	.01	30,000
November	359	123	195	.0053	.006	11,600
December	613	123	242	.0065	.007	14,900
The year	27,400	40	865	.023	.30	626,000

NOTE.—The measurements made in 1910 are the only ones since 1906. The estimates for 1907–1910, therefore, may be somewhat in error,

COLORADO RIVER AT COLUMBUS, TEX.

This station was established in December, 1902. It is located at the highway bridge east of Columbus.

A gage is marked on the downstream side of the pier on the west side of the three-span highway bridge. Gage datum is taken at 50 feet below the top of this pier, and the observer measures down from this point with a tagged chain and lead weight.

Discharge measurements are made from bridge at which the gage is located.

The following discharge measurement was made by T. U. Taylor:

August 23, 1910: Gage height, 4.7 feet; discharge, 124 second-feet.

Daily gage height, in feet, of Colorado River at Columbus, Tex., for 1907–1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1907.												
1	6.4	6.9	7.4	6.7	6.5	34.2	9.6	8.0	5.8	5.3	11.2	10.3
2	6.4	6.9	7.3	6.7	7.0	25.0	8.1	7.8	5.6	5.3	13.0	10.0
3	7.0	6.9	7.3	6.6	6.9	20.0	7.9	7.6	5.4	5.4	13.0	10.3
4	7.0	6.9	7.2	6.6	6.6	14.0	7.8	7.6	5.4	5.5	9.8	9.8
5	7.0	6.9	7.2	6.5	6.5	13.0	7.7	7.5	5.4	5.5	8.8	9.8
6	7.0	6.9	7.2	6.5	6.5	11.8	13.5	7.5	5.2	6.0	8.8	9.7
7	7.0	6.8	7.2	6.4	6.5	10.8	12.0	7.2	5.2	6.0	9.8	9.7
8	6.9	6.8	7.1	6.4	6.5	10.2	10.5	7.2	5.2	6.1	10.8	9.5
9	6.8	6.6	7.1	6.4	8.0	9.6	10.0	7.2	5.9	17.5	11.3	9.0
10	7.0	6.6	7.1	6.3	12.0	9.1	10.0	7.2	5.9	17.5	13.2	9.0
11	7.0	6.6	6.7	6.2	10.0	8.7	9.0	7.2	5.8	19.0	11.4	8.0
12	7.0	6.6	6.7	6.0	11.8	8.3	8.0	8.0	5.8	18.5	10.8	8.7
13	6.9	6.6	6.7	6.0	9.0	8.2	7.8	7.7	5.8	14.0	9.6	18.0
14	6.9	6.5	6.7	6.0	10.2	8.2	7.6	7.6	5.8	13.2	9.2	11.5
15	6.9	6.4	6.6	6.0	9.8	8.0	9.0	7.5	5.6	11.2	9.8	9.8
16	6.8	6.4	6.5	6.0	9.0	7.9	23.2	7.4	5.6	11.1	10.0	9.0
17	6.8	6.4	6.5	6.1	8.9	7.8	20.2	6.8	5.5	10.1	21.0	8.3
18	6.7	6.4	6.7	6.1	8.7	7.5	18.1	6.8	5.5	9.8	30.0	8.0
19	6.7	6.5	6.5	6.0	8.6	7.1	15.0	6.7	5.5	9.8	25.0	7.7
20	6.7	6.5	6.4	6.0	8.0	7.1	13.1	6.6	5.6	9.6	32.5	7.3
21	6.7	6.5	6.3	6.1	7.9	7.1	12.0	6.4	5.6	9.5	34.0	7.2
22	6.8	6.5	6.3	7.4	7.8	7.7	11.6	6.3	5.5	8.7	22.0	9.8
23	6.8	6.5	6.2	7.0	10.0	7.6	11.4	6.3	5.4	8.7	16.0	8.5
24	6.9	6.5	6.2	6.4	9.0	7.1	9.8	6.2	5.4	8.6	14.5	9.7
25	6.9	10.7	6.2	6.6	8.0	17.8	9.0	6.2	5.4	9.0	12.5	8.3
26	6.8	9.0	6.3	6.6	8.0	15.0	8.4	6.2	5.5	8.5	11.0	7.9
27	6.8	7.4	6.4	6.6	10.0	12.0	8.0	6.2	5.6	8.1	10.0	7.7
28	6.8	7.4	6.4	6.5	10.0	11.0	8.0	6.1	5.4	8.1	14.5	7.5
29	6.9	.....	6.6	6.5	29.5	10.2	7.8	6.0	5.4	8.0	12.5	7.3
30	6.9	.....	6.6	6.5	33.5	9.6	7.6	6.0	5.1	20.0	11.2	7.0
31	6.8	.....	6.6	.....	35.0	.....	8.2	6.0	.....	14.0	.....	7.0
1908.												
1	7.0	5.9	6.9	6.3	13.3	23.8	8.2	7.0	8.6	7.4	8.8	7.2
2	6.8	5.8	6.9	6.3	12.3	16.0	8.9	7.0	8.1	7.2	8.3	7.4
3	6.7	5.8	6.8	6.1	11.5	15.8	8.3	7.0	7.6	7.0	7.8	6.2
4	6.7	5.8	6.8	6.0	11.1	14.2	9.2	7.0	7.3	6.9	7.5	6.6
5	6.7	5.8	6.7	6.0	10.7	13.2	7.9	7.3	7.1	6.8	7.3	6.4
6	6.9	5.8	6.6	6.0	10.2	12.5	7.8	7.1	6.8	6.7	7.0	6.3
7	9.7	5.8	6.5	5.9	9.6	11.9	7.7	7.1	6.7	6.7	6.9	6.3
8	8.4	5.8	6.5	5.9	9.5	11.3	9.9	7.6	6.6	6.6	6.8	6.6
9	7.5	19.0	6.4	5.9	9.3	10.9	10.8	7.6	6.7	6.5	7.7	7.8
10	7.1	20.8	6.3	5.7	9.0	10.5	10.7	7.3	6.7	6.8	6.6	7.7
11	6.7	13.4	6.3	6.0	8.7	10.2	9.9	11.5	6.6	6.8	6.5	7.6
12	6.7	12.0	6.3	6.7	8.6	9.8	9.2	12.3	6.6	7.1	6.4	7.7
13	6.6	11.7	6.3	6.9	8.4	9.6	13.8	10.9	7.2	6.8	6.4	7.4
14	6.5	10.9	6.3	6.7	8.2	9.4	12.6	9.9	7.7	7.4	6.5	7.1
15	6.4	10.2	8.1	6.7	21.2	9.2	11.3	9.2	7.8	7.2	6.5	6.9
16	6.3	9.2	8.3	6.3	11.8	8.9	10.4	8.6	7.7	6.9	6.4	6.7
17	6.3	8.8	7.8	6.2	10.2	8.8	9.7	8.3	7.7	6.7	6.4	6.5
18	6.2	8.5	7.6	9.8	13.2	8.1	9.1	8.0	7.8	6.6	6.3	6.6
19	6.2	8.2	7.4	10.0	11.4	8.5	8.6	7.7	7.6	6.6	6.3	6.4
20	6.2	8.5	7.1	12.9	10.2	8.4	8.3	7.7	7.3	6.6	6.3	6.5

Daily gage height, in feet, of Colorado River at Columbus, Tex., for 1907–1910—Cont'd.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
21	6.1	7.8	7.0	18.8	14.5	9.2	8.0	7.6	7.3	6.5	6.2	6.5
22	6.1	7.6	7.0	23.8	25.3	9.6	7.8	7.4	9.7	6.4	6.2	6.4
23	6.0	7.4	7.0	28.6	25.5	9.4	7.7	7.2	9.9	6.5	6.2	6.4
24	6.0	7.2	7.0	21.1	16.9	8.4	7.6	7.1	9.6	7.1	6.2	6.4
25	6.0	7.3	6.8	33.0	23.9	9.3	7.5	6.9	9.1	6.1	6.2	6.3
26	6.0	7.8	6.7	35.1	30.0	9.1	7.4	6.8	9.1	6.6	6.1	6.3
27	6.0	8.2	6.6	35.8	32.5	8.7	7.3	6.7	8.5	6.7	6.1	6.3
28	6.0	7.7	6.6	30.0	33.6	7.9	7.4	6.7	8.3	6.5	6.0	6.3
29	5.9	7.3	6.5	17.6	33.7	7.8	7.2	7.6	7.9	11.5	6.2	6.2
30	5.9	.....	6.5	14.6	33.8	7.7	7.1	8.0	7.8	10.6	6.4	6.2
31	5.9	.....	6.4	.....	32.2	.....	7.1	8.9	.....	9.6	.....	6.2
1909.												
1	9.8	5.9	5.7	5.5	7.0	11.8	10.3	11.4	6.1	7.6	16.2	7.6
2	7.7	5.9	5.7	5.5	6.4	10.7	9.2	10.2	6.0	7.5	10.8	7.4
3	7.0	5.9	5.7	5.4	6.1	10.0	8.3	8.7	5.9	7.2	9.2	7.2
4	6.7	5.9	5.7	5.4	6.7	13.4	8.0	8.2	5.9	6.9	8.6	7.1
5	6.6	5.9	5.6	5.4	6.7	20.9	7.6	7.8	5.9	6.7	8.3	7.6
6	6.3	5.9	5.6	5.4	7.1	18.0	7.3	7.5	5.9	6.6	8.0	12.0
7	6.3	5.9	5.6	5.4	6.8	13.8	7.0	7.3	5.8	6.4	7.8	15.2
8	6.3	5.9	5.6	5.6	8.7	12.2	6.9	7.3	5.7	6.3	7.6	15.6
9	6.3	5.8	5.6	10.0	8.8	10.7	6.8	7.2	6.0	6.1	7.5	11.2
10	6.2	5.8	5.6	6.9	7.3	10.0	7.2	7.2	6.2	6.1	7.5	10.8
11	6.1	5.8	5.6	6.8	6.6	9.3	7.0	7.1	6.1	6.1	7.6	10.6
12	6.0	5.8	5.5	6.7	6.2	8.7	7.2	6.9	6.0	6.0	7.7	9.8
13	6.2	5.8	5.5	5.8	6.4	8.0	7.0	6.7	5.9	5.8	8.0	9.5
14	6.1	5.8	5.5	5.8	6.2	7.8	6.8	6.5	5.8	5.8	7.8	9.1
15	6.1	5.9	5.6	5.7	6.0	7.6	6.8	6.4	5.7	5.7	7.6	9.0
16	6.0	5.9	5.6	5.6	9.0	7.3	6.7	6.2	5.7	5.7	7.5	8.6
17	6.0	5.9	5.6	5.5	8.6	8.0	6.6	6.2	5.6	5.8	7.4	8.2
18	6.0	5.9	5.6	5.5	7.3	7.1	6.5	7.5	5.6	5.6	7.4	8.1
19	6.0	5.8	5.6	5.5	7.2	6.7	6.3	7.2	5.6	5.7	7.3	8.1
20	6.1	5.8	5.6	5.4	7.8	7.1	6.2	6.9	10.0	5.8	7.0	7.9
21	6.0	5.8	5.6	5.4	7.5	7.9	6.1	7.3	9.2	7.6	7.0	7.8
22	6.0	5.8	5.6	5.4	8.2	9.0	10.7	9.9	8.2	9.6	6.9	7.7
23	6.0	5.8	5.6	5.4	7.7	11.4	9.4	8.9	7.7	12.1	6.8	7.6
24	6.0	5.8	5.6	5.4	7.2	10.4	8.7	8.2	7.2	14.6	6.8	7.6
25	6.0	5.8	5.6	5.4	7.0	9.3	8.3	7.7	6.9	13.8	7.0	7.5
26	6.1	5.7	5.6	5.4	6.8	8.8	16.9	7.3	6.9	12.5	7.7	7.7
27	6.0	5.7	5.5	5.4	6.7	8.2	14.2	6.9	6.8	11.2	7.6	7.8
28	5.9	5.7	5.5	5.4	10.8	7.8	14.3	6.7	6.6	10.1	7.5	7.6
29	5.9	.....	5.5	5.4	15.3	10.7	12.4	6.6	6.5	9.4	7.4	7.5
30	5.9	.....	5.5	5.8	13.6	9.9	12.2	6.5	7.9	8.8	7.4	7.5
31	5.9	.....	5.5	.....	14.6	.....	11.4	6.3	.....	10.1	.....	7.3
1910.												
1	6.8	5.9	5.7	5.0	6.9	7.9	5.4	5.3	5.0	5.8	7.1	5.1
2	6.7	5.9	5.6	5.2	9.9	7.7	5.3	5.2	5.0	5.8	6.9	5.0
3	6.7	6.0	5.6	14.0	6.7	7.5	5.5	5.2	5.2	5.7	6.6	5.0
4	6.6	6.0	5.5	15.1	6.6	7.3	5.9	5.1	4.7	5.6	6.4	5.0
5	6.6	5.9	5.5	14.5	6.5	8.1	6.0	5.1	4.6	5.5	6.2	5.0
6	6.5	6.0	5.5	12.9	6.5	7.9	5.5	5.1	4.4	6.2	6.1	4.9
7	6.7	6.1	5.4	11.5	6.5	7.1	5.5	5.0	4.3	6.8	6.0	4.9
8	6.6	6.1	5.4	10.4	6.4	6.9	5.4	5.0	4.3	6.4	5.9	4.9
9	6.5	6.0	5.3	10.2	6.0	6.6	5.4	5.0	4.2	6.4	5.8	4.8
10	6.5	6.0	5.3	10.7	6.2	6.5	6.7	5.0	4.2	6.5	5.8	4.8
11	6.5	6.0	5.3	12.5	6.1	6.3	7.1	4.9	18.2	6.7	5.7	4.8
12	6.4	5.9	5.3	15.6	6.0	6.2	6.7	4.9	13.2	6.4	5.6	4.8
13	6.4	5.9	5.2	16.0	5.9	6.1	6.6	4.9	13.0	9.4	5.5	5.0
14	6.5	5.9	5.2	13.7	5.8	6.0	6.5	4.8	11.2	7.8	5.5	5.0
15	6.5	5.9	5.2	13.5	5.8	5.9	6.4	4.8	10.3	7.7	5.4	5.0
16	6.4	5.8	5.2	11.7	5.7	5.8	6.2	4.9	9.2	7.0	5.4	4.9
17	6.4	5.8	5.1	10.7	6.1	5.7	6.1	4.8	8.5	6.3	5.3	5.0
18	6.3	5.8	5.1	10.0	6.8	5.7	6.1	4.8	8.0	6.1	5.3	5.0
19	6.3	5.8	5.1	9.3	7.2	5.6	5.9	4.7	7.6	6.1	5.3	5.0
20	6.3	5.8	5.1	8.6	8.0	5.6	5.7	4.7	7.3	6.0	5.5	5.0
21	6.3	5.7	5.0	8.4	14.3	5.7	5.6	4.6	7.1	6.0	5.4	4.9
22	6.2	5.7	5.0	8.0	12.1	5.6	5.5	4.6	7.0	5.9	5.3	4.9
23	6.2	5.7	5.0	7.9	20.9	5.5	5.5	4.6	6.7	5.9	5.3	10.8
24	6.1	5.7	5.0	7.7	18.7	5.5	5.9	4.5	6.5	5.8	5.3	14.5
25	6.1	5.7	5.0	7.5	13.5	5.5	6.0	4.5	6.3	5.8	5.2	11.1
26	6.1	5.7	5.0	7.4	12.0	5.7	5.8	4.5	6.1	5.7	5.2	9.5
27	6.0	5.7	5.0	7.3	10.4	5.6	5.7	4.5	6.0	5.7	5.2	9.4
28	6.0	5.8	4.9	7.1	9.8	5.6	5.6	4.5	6.0	5.6	5.2	8.2
29	6.0	.....	4.9	7.0	9.0	5.5	5.5	4.4	5.9	5.5	5.1	7.5
30	5.9	.....	4.9	7.0	8.5	5.4	5.5	4.4	5.9	7.4	5.1	7.0
31	5.9	.....	4.9	.....	8.2	.....	5.4	4.4	.....	7.5	.....	7.4

Daily discharge, in second-feet, of Colorado River at Columbus, Tex., for 1907–1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1907.												
1	950	1,220	1,520	1,120	1,000	29,900	2,990	1,880	650	400	4,210	3,490
2	950	1,220	1,460	1,120	1,280	22,200	1,940	1,760	550	400	5,710	3,270
3	1,280	1,220	1,460	1,060	1,220	14,000	1,820	1,640	450	450	5,710	3,490
4	1,280	1,220	1,400	1,060	1,060	6,610	1,760	1,640	450	500	3,130	3,130
5	1,280	1,220	1,400	1,000	1,000	5,710	1,700	1,580	450	500	2,430	3,130
6	1,280	1,220	1,400	1,000	1,000	4,690	6,160	1,580	350	750	2,430	3,060
7	1,280	1,170	1,400	950	1,000	3,890	4,850	1,400	350	750	3,130	3,060
8	1,220	1,170	1,340	950	1,000	3,410	3,650	1,400	350	800	3,890	2,920
9	1,170	1,060	1,340	950	1,880	2,990	3,270	1,400	700	10,500	4,290	2,570
10	1,280	1,060	1,340	900	4,850	2,640	3,270	1,400	700	10 500	5,890	2,570
11	1,280	1,060	1,120	850	3,270	2,360	2,570	1,400	650	12,500	4,370	1,880
12	1,280	1,060	1,120	750	4,690	2,080	1,880	1,880	650	11,800	3,890	2,360
13	1,220	1,060	1 120	750	2,570	2,010	1,760	1,700	650	6,610	2,990	11,100
14	1,220	1,000	1,120	750	3,410	2,010	1,640	1,640	650	5,890	2,710	4,450
15	1,220	950	1,060	750	3,130	1,880	2,570	1,580	550	4,210	3,130	3,130
16	1,170	950	1,000	750	2,570	1,820	19,000	1,520	550	4,130	3,270	2,570
17	1,170	950	1,000	800	2,500	1,760	14,300	1,170	500	3,340	15,500	2,080
18	1,120	950	1,120	800	2,360	1,580	11,300	1,170	500	3,130	31,800	1,880
19	1,120	1,000	1,000	750	2,290	1,340	7,590	1,120	500	3,130	22,200	1,700
20	1,120	1,000	950	750	1,880	1,340	5,800	1,060	550	2,990	36,600	1,460
21	1,120	1,000	900	800	1,820	1,340	4,850	950	550	2,920	39,600	1,400
22	1,170	1,000	900	1,520	1,760	1,700	4,530	900	500	2,360	17,000	3,130
23	1,170	1,000	850	1,280	3,270	1,640	4,370	900	450	2,360	8,660	2,220
24	1,220	1,000	850	950	2,570	1,340	3,130	850	450	2,290	7,090	3,060
25	1,220	3,810	850	1,060	1,880	10,900	2,570	850	450	2,570	5,260	2,080
26	1,170	2,570	900	1,060	1,880	7,590	2,150	850	500	2,220	4,050	1,820
27	1,170	1,520	950	1,060	3,270	4,850	1,880	850	550	1,940	3,270	1,700
28	1,170	1,520	950	1,000	3,270	4,050	1,880	800	450	1,940	7,090	1,580
29	1,220	.....	1,060	1,000	30,800	3,410	1,760	750	450	1,880	5,260	1,460
30	1,220	.....	1,060	1,000	38,600	2,990	1,640	750	305	14,000	4,210	1,280
31	1,170	.....	1,060	.....	41,500	.....	2,010	750	.....	6,610	.....	1,280
1908.												
1	1,280	700	1,220	900	5,980	20,100	2,010	1,280	2,290	1,520	2,430	1,400
2	1,170	650	1,220	900	5,090	8,660	2,500	1,280	1,940	1,400	2,080	1,520
3	1,120	650	1,170	800	4,450	8,440	2,080	1,280	1,640	1,280	1,760	850
4	1,120	650	1,170	750	4,130	6,790	2,710	1,280	1,460	1,220	1,580	1,060
5	1,120	650	1,120	750	3,810	5,890	1,820	1,460	1,340	1,170	1,460	950
6	1,220	650	1,060	750	3,410	5,260	1,760	1,340	1,170	1,120	1,280	900
7	3,060	650	1,000	700	2,990	4,770	1,700	1,340	1,120	1,120	1,220	900
8	2,150	650	1,000	700	2,920	4,290	3,200	1,640	1,060	1,060	1,170	1,060
9	1,580	12,500	950	700	2,780	3,970	3,890	1,640	1,120	1,060	1,700	1,760
10	1,340	15,200	900	600	2,570	3,650	3,810	1,460	1,120	1,170	1,060	1,700
11	1,120	6,070	900	750	2,360	3,410	3,200	4,450	1,060	1,170	1,000	1,640
12	1,120	4,850	900	1,120	2,290	3,130	2,710	5,090	1,060	1,340	950	1,700
13	1,060	4,610	900	1,220	2,150	2,990	6,430	3,970	1,400	1,170	950	1,520
14	1,000	3,970	900	1,120	2,010	2,850	5,350	3,200	1,700	1,520	1,000	1,340
15	950	3,410	1,940	1,120	15,800	2,710	4,290	2,710	1,760	1,400	1,000	1,220
16	900	2,710	2,080	900	4,690	2,500	3,570	2,290	1,700	1,220	950	1,120
17	900	2,430	1,760	850	3,410	2,430	3,060	2,080	1,700	1,120	950	1,000
18	850	2,220	1,640	3,130	5,890	1,940	2,640	1,880	1,760	1,060	900	1,060
19	850	2,010	1,520	3,270	4,370	2,220	2,290	1,700	1,640	1,060	900	950
20	850	2,220	1,340	5,620	3,410	2,150	2,080	1,700	1,460	1,060	900	1,000
21	800	1,760	1,280	12,200	7,090	2,710	1,880	1,640	1,460	1,000	850	1,000
22	800	1,640	1,280	20,100	22,800	2,990	1,760	1,520	3,060	950	850	1,000
23	750	1,520	1,280	29,100	23,100	2,850	1,700	1,400	3,200	1,000	850	950
24	750	1,400	1,280	15,600	9,740	2,150	1,640	1,340	2,990	1,340	850	950
25	750	1,460	1,170	37,600	20,200	2,780	1,580	1,220	2,640	800	850	900
26	750	1,760	1,120	41,700	31,800	2,640	1,520	1,170	2,640	1,060	800	900
27	750	2,010	1,060	43,100	36,600	2,360	1,460	1,120	2,220	1,120	800	900
28	750	1,700	1,060	31,800	38,800	1,820	1,520	1,120	2,080	1,000	750	900
29	700	1,460	1,000	10,600	39,000	1,760	1,400	1,640	1,820	4,450	850	850
30	700	.....	1,000	7,190	39,200	1,700	1,340	1,880	1,760	3,730	950	850
31	700	.....	950	.....	36,100	.....	1,340	2,500	.....	2,990	.....	850

Daily discharge, in second-feet, of Colorado River at Columbus, Tex., for 1907–1910—Con

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1909.												
1	3,130	700	600	500	1,280	4,690	3,490	4,370	800	1,640	8,900	1,640
2	1,700	700	600	500	950	3,810	2,710	3,410	750	1,580	3,890	1,520
3	1,280	700	600	450	800	3,270	2,080	2,360	700	1,400	2,710	1,400
4	1,120	700	600	450	1,120	6,070	1,880	2,010	700	1,220	2,290	1,340
5	1,060	700	550	450	1,120	15,300	1,640	1,760	700	1,120	2,080	1,640
6	900	700	550	450	1,340	11,100	1,460	1,580	700	1,060	1,880	4,850
7	900	700	550	450	1,170	6,430	1,280	1,460	650	950	1,760	7,790
8	900	700	550	550	2,360	5,010	1,220	1,460	600	900	1,640	8,220
9	900	650	550	3,270	2,430	3,810	1,170	1,400	750	800	1,580	4,210
10	850	650	550	1,220	1,460	3,270	1,400	1,400	850	800	1,580	3,890
11	800	650	550	1,170	1,060	2,780	1,280	1,340	800	800	1,640	3,730
12	750	650	500	1,120	850	2,360	1,400	1,220	750	750	1,700	3,130
13	850	650	500	650	950	1,880	1,280	1,120	700	650	1,880	2,920
14	800	650	500	650	850	1,760	1,170	1,000	650	650	1,760	2,640
15	800	700	550	600	750	1,640	1,170	950	600	600	1,640	2,570
16	750	700	550	550	2,570	1,460	1,120	850	600	600	1,580	2,290
17	750	700	550	500	2,290	1,880	1,060	850	550	650	1,520	2,010
18	750	700	550	500	1,460	1,340	1,000	1,580	550	550	1,520	1,940
19	750	650	550	500	1,400	1,120	900	1,400	550	600	1,460	1,940
20	800	650	550	450	1,760	1,340	850	1,220	3,270	650	1,280	1,820
21	750	650	550	450	1,580	1,820	800	1,460	2,710	1,640	1,280	1,760
22	750	650	550	450	2,010	2,570	3,810	3,200	2,010	2,990	1,220	1,700
23	750	650	550	450	1,700	4,370	2,850	2,500	1,700	4,930	1,170	1,640
24	750	650	550	450	1,400	3,570	2,360	2,010	1,400	7,190	1,170	1,640
25	750	650	550	450	1,280	2,780	2,080	1,700	1,220	6,430	1,280	1,580
26	800	600	550	450	1,170	2,430	9,740	1,460	1,220	5,260	1,700	1,700
27	750	600	500	450	1,120	2,010	6,790	1,220	1,170	4,210	1,640	1,760
28	700	600	500	450	3,890	1,760	6,890	1,120	1,060	3,340	1,580	1,640
29	700	.....	500	450	7,890	3,810	5,170	1,060	1,000	2,850	1,520	1,580
30	700	.....	500	650	6,250	3,200	5,010	1,000	1,820	2,430	1,520	1,580
31	700	.....	500	.....	7,190	.....	4,370	900	.....	3,340	.....	1,460
1910.												
1	1,170	700	600	260	1,220	1,820	450	400	260	650	1,340	305
2	1,120	700	550	350	3,200	1,700	400	350	260	650	1,220	260
3	1,120	750	550	6,610	1,120	1,580	500	350	350	600	1,060	260
4	1,060	750	500	7,690	1,060	1,460	700	305	135	550	950	260
5	1,060	700	500	7,090	1,000	1,940	750	305	100	500	850	260
6	1,000	750	500	5,620	1,000	1,820	500	305	45	850	800	215
7	1,120	800	450	4,450	1,000	1,340	500	260	25	1,170	750	215
8	1,060	800	450	3,570	950	1,220	450	260	25	950	700	215
9	1,000	750	400	3,410	750	1,060	450	260	10	950	650	175
10	1,000	750	400	3,810	850	1,000	1,120	260	10	1,000	650	175
11	1,000	750	400	5,260	800	900	1,340	215	11,400	1,120	600	175
12	950	700	400	8,220	750	850	1,120	215	5,890	950	550	175
13	950	700	350	8,660	700	800	1,060	215	5,710	2,850	500	260
14	1,000	700	350	6,340	650	750	1,000	175	4,210	1,760	500	260
15	1,000	700	350	6,160	650	700	950	175	3,490	1,700	450	260
16	950	650	350	4,610	600	650	850	215	2,710	1,280	450	215
17	950	650	305	3,810	800	600	800	175	2,220	900	400	260
18	900	650	305	3,270	1,170	600	800	175	1,880	800	400	260
19	900	650	305	2,780	1,400	550	700	135	1,640	800	400	260
20	900	650	305	2,290	1,880	550	600	135	1,460	750	500	260
21	900	600	260	2,150	6,890	600	550	100	1,340	750	450	215
22	850	600	260	1,880	4,930	550	500	100	1,280	700	400	215
23	850	600	260	1,820	15,300	500	500	100	1,120	700	400	3,890
24	800	600	260	1,700	12,100	500	700	70	1,000	650	400	7,090
25	800	600	260	1,580	6,160	500	750	70	900	650	350	4,130
26	800	600	260	1,520	4,850	600	650	70	800	600	350	2,920
27	750	600	260	1,460	3,570	550	600	70	750	600	350	2,850
28	750	650	215	1,340	3,130	550	550	70	750	550	350	2,010
29	750	.....	215	1,280	2,570	500	500	45	700	500	305	1,580
30	700	.....	215	1,280	2,220	450	500	45	700	1,520	305	1,280
31	700	.....	215	.....	2,010	.....	450	45	.....	1,580	.....	1,520

Monthly discharge of Colorado River at Columbus, Tex., for 1907–1910.

[Drainage area, 40,000 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1907.						
January	1,280	950	1,190	0.030	0.03	73,200
February	3,810	950	1,260	.032	.03	70,000
March	1,520	850	1,130	.028	.03	69,500
April	1,520	750	951	.024	.03	56,600
May	41,500	1,000	5,630	.141	.16	346,000
June	29,900	1,340	5,130	.128	.14	305,000
July	19,000	1,640	4,210	.105	.12	259,000
August	1,880	750	1,260	.032	.04	77,500
September	700	305	514	.013	.01	30,600
October	14,000	400	4,010	.100	.12	247,000
November	39,600	2,430	8,960	.224	.25	533,000
December	11,100	1,280	2,720	.068	.08	167,000
The year	41,500	305	3,090	.077	1.04	2,230,000
1908.						
January	3,060	700	1,060	.026	.03	65,200
February	15,200	650	2,830	.071	.08	163,000
March	2,080	900	1,200	.030	.03	73,800
April	43,100	600	9,190	.230	.26	547,000
May	39,200	2,010	12,500	.312	.36	769,000
June	20,100	1,700	4,060	.102	.11	242,000
July	6,430	1,340	2,520	.063	.07	155,000
August	5,090	1,120	1,920	.048	.06	118,000
September	3,200	1,060	1,770	.044	.05	105,000
October	4,450	800	1,410	.035	.04	86,700
November	2,430	750	1,120	.028	.03	66,600
December	1,760	850	1,120	.028	.03	68,900
The year	43,100	600	3,400	.085	1.15	2,460,000
1909.						
January	3,130	700	924	.023	.03	56,800
February	700	600	666	.017	.02	37,000
March	600	500	544	.014	.02	33,400
April	3,270	450	656	.016	.02	39,000
May	7,890	750	2,050	.051	.06	126,000
June	15,300	1,120	3,620	.090	.10	215,000
July	9,740	800	2,560	.064	.07	157,000
August	4,370	850	1,620	.040	.05	99,600
September	3,270	550	1,050	.026	.03	62,500
October	7,190	550	2,020	.050	.06	124,000
November	8,900	1,170	1,950	.049	.05	116,000
December	8,220	1,340	2,570	.064	.07	158,000
The year	15,300	450	1,690	.042	.58	1,220,000
1910.						
January	1,170	700	931	.023	.03	57,200
February	800	600	682	.017	.02	37,900
March	600	215	355	.0089	.01	21,800
April	8,660	260	3,680	.092	.10	219,000
May	15,300	600	2,750	.069	.08	169,000
June	1,940	450	906	.023	.03	53,900
July	1,340	400	687	.017	.02	42,200
August	400	45	183	.0046	.005	11,300
September	11,400	10	1,710	.043	.05	102,000
October	2,850	500	954	.024	.03	58,700
November	1,340	305	579	.014	.02	34,500
December	7,090	175	1,050	.026	.03	64,600
The year	15,300	10	1,200	.030	.42	872,000

NOTE.—The measurement made in 1910 is the only one since 1905. The estimates for 1907–1910, therefore, may be somewhat in error.

RIO GRANDE DRAINAGE BASIN.

GENERAL FEATURES.

The Rio Grande basin is a long, narrow strip of country extending from the southern part of Colorado southeastward to the Gulf of Mexico. The perennial supply of water for the upper third of this basin comes principally from a comparatively small area of about 2,000 square miles of lofty mountains in Colorado and the extreme northern part of New Mexico. The Conchos enters the river from the Mexican side some 200 miles below El Paso and brings a good perennial flow as well as enormous floods in the summer and fall. Pecos and Devils rivers and springs also substantially augment the perennial supply, and many other tributaries furnish flood discharges, so that the "lower river" is not dependent on the mountain area for its perennial flow. The flood season above the Conchos is May and June; below it is August and September. Frequently the river is dry at El Paso when the lower river country is inundated. In addition to the areas contributing a perennial supply of water and a spasmodic supply, a vast area of "lost river" basins which supply no water at any time, may, from topographic considerations, be included within this great catchment basin.

The Rio Grande rises in the mountainous area to the south and east of the Continental Divide in southwestern Colorado, flows eastward for a time as a mountain stream, enters the San Luis Valley about 80 miles below its source and then turns southward. In this valley it receives from the west Alamos, La Jara, and Conejos rivers; from the east the Trinchera, Culebra, and Rio Costilla; and possibly from the north the waters of Saguache and San Luis rivers, by seepage. About 4 miles north of the Colorado State line it enters a long canyon locally known as the Rio Grande canyon. From the east there enter this canyon two tributaries, Red River and Rio Hondo.

This canyon is 300 or 400 feet deep in places, appearing from above as a gash in an otherwise level mesa. Its south end is 3 miles above Embudo, N. Mex., where the walls open and the river enters Espanola Valley. The general slope of the valley is toward the south, the river descending, however, more rapidly than the surface of the country. In the valley above Embudo the river receives from the east Taos River, Embudo Creek, and other small streams, and in Espanola Valley it is increased by the Chama, flowing in from the west, and by a number of streams from the east.

At the lower end of Espanola Valley the river passes through White Rock Canyon, a gorge in a range of hills stretching from the Jemez to the Santa Fe Mountains. From Pena Blanca, near the lower end of this canyon, nearly to Socorro, the river flows in a valley 1 to 3

miles wide, bounded on each side by mesas that rise 300 to 600 feet above the river. About 20 miles below Pena Blanca the Jemez enters from the west, and 60 miles or more below Albuquerque the Puerco comes in from the same side. The Puerco is a torrential stream with no perennial flow. Below these streams the Rio Grande has no tributaries of note until it receives the Pecos, about 400 miles by river below El Paso.

At and below Socorro the valley contracts until it becomes too narrow for agriculture, but from San Antonio to San Marcial its width ranges from 1 to 2 miles. Below San Marcial the river swings to the west around the Cristobal and Caballos mountains, which lie along the west edge of the Jornada del Muerto, the valley from San Marcial to Rincon being narrow, low, and marshy. At Rincon the river enters a canyon which extends to Fort Selden, a distance of 15 miles. The Mesilla Valley, the most fertile valley in New Mexico, begins below Fort Selden and extends to the pass above El Paso, a distance of over 50 miles. Above El Paso the banks of the river again assume the canyon-like character for 3 miles, and the river emerging from this enters the Ysleta Valley, now commonly called the El Paso Valley.

The canyons above these valleys are not cut into hard, indurated rocks, but are bordered in many places by steep walls of comparatively soft, friable sandstones, alternating with conglomerates or beds of clay, the whole series in the northern part of New Mexico, at least, being capped by a vesicular lava. The fall through these canyons being great, the down-cutting is rapid, and thus the waters are supplied constantly with fresh detritus, part of which is deposited in turn in the valley below.

From El Paso to the Gulf the river forms the boundary between Mexico and the United States.

From source to mouth the Rio Grande is nearly 2,000 miles long, and its drainage area comprises about 248,000 square miles.

Many national forests have been established on the headwaters of the Rio Grande and its tributaries, both in Colorado and New Mexico. The drainage basin of the Rio Grande, exclusive of the Pecos, includes between 5,000 and 6,000 square miles of merchantable timber land, 6,000 square miles of woodland and sparsely timbered land, and 2,000 square miles of burned and cut-over land, the remainder being sagebrush and open land.

The largest tributaries are the Conchos, which enters from the Mexico side, 200 miles below El Paso; the Conejos, which joins the Rio Grande just above the Colorado-New Mexico line; the Chama, which enters it in Espanola Valley; the Pecos, which joins it in the southwestern part of Texas; and Devils River, about 50 miles below

the Pecos. Most of the remaining tributaries are intermittent in character.

The mountains at the headwaters reach altitudes up to 14,000 feet above sea level. At Albuquerque, N. Mex., the elevation of the river is 5,000 feet and it leaves the Territory at an elevation of about 4,000 feet.

The rainfall varies greatly from year to year and from source to mouth, its irregularity making it very difficult to give averages. The annual precipitation in the mountainous district of Colorado—that is, along the upper Rio Grande—ranges from 15 to 25 inches. In the northern part of New Mexico it ranges from 10 to 15 inches, and in the southern part from 5 to 12 inches.

In the mountains of Colorado the river is covered with a foot or more of ice from early in the winter until late in the spring. During severe winters the river is frozen over at times in northern New Mexico, and the snowfall is often very heavy. From the melting of the snows in Colorado and New Mexico comes the spring floods.

Irrigation is now practiced extensively in the following valleys along the Rio Grande and its smaller tributaries:

San Luis Valley, beginning a short distance above Del Norte and extending to the mouth of Conejos River. This district contains probably the largest cultivated area along the Rio Grande, aggregating nearly half a million acres.

Valleys of the Taos district, lying on the east side of the river below the Colorado line and including the valleys of Red River, Arroyo Hondo, and Taos. The Taos Valley surpasses the others both in water facilities and in area cultivated.

Espanola Valley, located south of the Taos district and Tres Piedras Mesa. It lies along the river, and, as in the Taos country, agriculture has been practiced for years.

Albuquerque district, including the valley from Pena Blanco to San Marcial. The system of irrigation is practically the same as the old Pueblo Indian system. In the last few years, however, new settlers have adopted progressive methods and have greatly increased the duty of water.

Mesilla Valley, next to San Luis Valley the most important agricultural area along the Rio Grande. The valley broadens just below Selden and continues generally broad and fertile for a distance of 35 miles or beyond the Texas line.

Along the Rio Grande and its tributaries in Colorado and New Mexico are available reservoir sites equal to storing of all flood waters. The largest reservoir in the country is about to be built near Engle, N. Mex. It will impound 2,500,000 acre-feet of water for the irrigation of nearly 200,000 acres of land in New Mexico, Texas, and Mexico.

The estimated power available on the Rio Grande and its tributaries, from its source to El Paso, Tex., is theoretically as follows:

Minimum horsepower	123,500
Minimum horsepower, six high months	241,000
Horsepower from storage, six months period	405,000

Developments will, however, be made chiefly on the upper tributaries in Colorado and a few of the mountain streams in New Mexico, and will not amount to more than 100,000 horsepower. At present very few water-power plants of any importance are operated in the drainage basin. The waters of the Rio Grande have been used only for irrigation and domestic purposes, but those of some of the tributaries have also been used in mining.

The years of greatest flow on the upper Rio Grande appear to be 1906 and 1907; 1902 and 1908 were low-water years.

The determination of the amount of water in the Rio Grande is of importance, both on account of its use in irrigation and from its bearing upon interstate and international distribution of water. Most of the New Mexico and all of the Texas stations down to Eagle Pass are maintained by the United States section of the International Water Commission (prior to July 1, 1910, International Boundary Commission). The data used for the following stations have been collected by W. W. Follett, consulting engineer for the commission, and have been furnished through the courtesy of Gen. Anson Mills, commissioner:

Rio Grande near San Marcial, N. Mex.
Rio Grande near El Paso, Tex.
Rio Grande above Presidio, Tex.
Rio Grande below Presidio, Tex.
Rio Grande near Langtry, Tex.
Rio Grande at Eagle Pass, Tex.
Pecos River near Moorhead, Tex.
Devils River near Devils River Station, Tex.

On account of the shifting character of the river beds at the international water stations, no rating tables have been prepared. The estimated monthly discharges are from daily discharges computed by Mr. Follett directly from the discharge measurements.

The five stations from Laredo down (Laredo, Roma, Brownsville, Salado near Guerrero, and San Juan at Santa Rosalia ranch) are maintained by the Mexican section of the commission.

RIO GRANDE PROPER.

RIO GRANDE AT THIRTYMILE BRIDGE, NEAR CREEDE, COLO.

This station, which was established June 18, 1909, is about 30 miles west of Creede, Colo., and about 200 feet above the mouth of Big Squaw Creek at an elevation of about 9,200 feet above sea level.

No water is diverted above the station and none for many miles below except a little for meadow irrigation. The station is about one-half mile downstream from the proposed reservoir of the Farmers Union Irrigation Co., which will store flood water to irrigate land in the valley 70 miles downstream. The drainage area at the station is about 160 square miles. The records at this station have been taken at the expense of the company by its engineers under the general direction of the United States Geological Survey.

The chain gage, the datum of which has remained constant, is on the right bank 200 feet upstream from Thirtymile Bridge; discharge measurements are made from a cable 30 yards below the gage.

This stream is frozen over for a number of months each year and there is also a large snowfall in that locality.

Discharge measurements of Rio Grande at Thirtymile Bridge, near Creede, Colo., in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
June 21	Pennock and Evans	.....	152	4.20	457
24	O. P. Pennock	.....	142	3.98	389
27	.....do	.....	128	3.70	318
July 18	.....do	.....	91	2.90	164
20	.....do	.....	85	2.80	146
21	.....do	.....	85	2.75	145
22	.....do	.....	83	2.70	135
26	.....do	.....	81	2.60	123
Aug. 3	.....do	.....	81	2.70	137
16	.....do	.....	68	2.47	105
24	.....do	.....	64	2.39	96
26	.....do	.....	60	2.25	85
27	.....do	.....	60	2.21	82
Sept. 8	.....do	.....	59	2.17	80
12[a]	I. G. Ferguson	37.4	51	2.17	56
12[a]	.....do	35.2	45	2.17	57
12[a]	.....do	34.8	45	2.17	57
Oct. 29	O. P. Pennock	.....	46	2.18	59
Nov. 21[a]	.....do	.....	52	2.28	64
25	.....do	.....	50	2.22	65
28	.....do	.....	53	2.33	73

[a] Made by wading.

Daily gage height, in feet, of Rio Grande at Thirtymile Bridge, near Creede, Colo., for 1910.

[O. P. Pennock, observer.]

Day.	June.	July.	Aug.	Sept.	Oct.	Nov.	Day.	June.	July.	Aug.	Sept.	Oct.	Nov.
1	.....	3.6	2.9	2.35	2.1	2.0	16	.....	2.9	2.45	2.3	2.9	2.0
2	.....	3.5	2.75	2.25	2.2	2.0	17	.....	2.9	2.45	2.2	2.6	1.85
3	.....	3.45	2.65	2.55	2.25	2.1	18	4.15	2.85	2.4	2.25	2.5	1.9
4	.....	3.4	2.9	2.45	2.2	2.2	19	4.3	2.85	2.4	2.4	2.5	2.1
5	.....	3.4	3.25	2.3	2.15	2.0	20	4.3	2.8	2.4	2.45	2.35	1.85
6	.....	3.3	2.9	2.2	2.05	1.9	21	4.2	2.75	2.4	2.4	2.1	1.95
7	.....	3.25	2.75	2.2	2.05	1.9	22	4.1	2.75	2.35	2.45	2.3	2.0
8	.....	3.2	2.7	2.15	2.05	1.8	23	4.0	2.75	2.4	2.35	2.25	1.9
9	.....	3.1	2.7	2.15	2.05	1.9	24	3.9	2.7	2.4	2.25	2.25	2.0
10	.....	3.0	2.7	2.1	2.05	1.9	25	3.8	2.65	2.3	2.2	2.3	2.0
11	.....	3.0	2.75	2.1	2.0	1.95	26	3.7	2.6	2.25	2.2	2.35	1.95
12	.....	2.95	2.75	2.15	2.05	1.95	27	3.75	2.6	2.2	2.2	2.25	1.9
13	.....	3.0	2.6	2.4	2.0	2.05	28	4.2	2.8	2.2	2.15	2.1	1.9
14	.....	2.95	2.6	2.3	2.1	2.2	29	4.0	2.6	2.25	2.15	2.1	2.0
15	.....	2.95	2.5	2.3	2.2	2.05	30	3.65	3.3	2.2	2.1	2.0	1.95
							31	.....	3.35	2.4	.....	2.0	.....

Daily discharge, in second-feet, of Rio Grande at Thirtymile Bridge, near Creede, Colo., for 1910.

Day.	June.	July.	Aug.	Sept.	Oct.	Nov.	Day.	June.	July.	Aug.	Sept.	Oct.	Nov.
1	.....	291	149	76	51	43	16	.....	149	87	70	149	43
2	.....	267	126	65	60	43	17	.....	149	87	60	105	33
3	.....	256	112	99	65	51	18	448	141	81	65	93	36
4	.....	245	149	87	60	60	19	501	141	81	81	93	51
5	.....	245	213	70	56	43	20	501	133	81	87	76	33
6	.....	223	149	60	47	36	21	465	126	81	81	51	40
7	.....	213	126	60	47	36	22	431	126	76	87	70	43
8	.....	203	119	56	47	30	23	399	126	81	76	65	36
9	.....	183	119	56	47	36	24	369	119	81	65	65	43
10	.....	165	119	51	47	36	25	341	112	70	60	70	43
11	.....	165	126	51	43	40	26	315	105	65	60	76	40
12	.....	157	126	56	47	40	27	328	105	60	60	65	36
13	.....	165	105	81	43	47	28	465	133	60	56	51	36
14	.....	157	105	70	51	60	29	399	105	65	56	51	43
15	.....	157	93	70	60	47	30	303	223	60	51	43	40
							31	.....	234	81	.....	43	.....

NOTE.—These discharges are based on a rating curve that is well defined above 50 second-feet.

Monthly discharge of Rio Grande at Thirtymile Bridge near Creede, Colo., for 1910.

Month.	Discharge in second-feet.			Run-off (total in acre-feet.)	Accuracy.
	Maximum.	Minimum.	Mean.		
June 18–30	501	303	405	10,400	A.
July	291	105	172	10,600	A.
August	213	60	101	6.210	A.
September	99	51	67.4	4,010	A.
October	149	43	62.5	3,840	A.
November	60	33	41.5	2,470	B.

RIO GRANDE NEAR CREEDE, COLO.

The station, which was established April 24, 1907, is located at the three-span highway bridge a quarter of a mile south of Wason siding, on the Creede branch of the Denver & Rio Grande Railroad, about 3 miles from Creede, and is a few miles above the site of a proposed dam and reservoir. Willow Creek (Goblin Creek) enters the river a short distance upstream from Wason, and Goose Creek enters at Wagonwheel Gap, about 5 miles below. The drainage area above the station is about 700 square miles.

The chain gage is fastened to the downstream side of left span, and discharge measurements are also made from the same side. A Bristol automatic gage was installed at the bridge by the State engineer of Colorado on September 23, 1910. Readings of this gage have been referred to the datum of the chain gage.

Except for a little meadow irrigation, no water is diverted above this station. Two or three reservoirs are about to be constructed on the upper waters of the Rio Grande and its tributaries above Wason. Among others may be mentioned the Farmers' Union Irrigation

Co.'s reservoir on the main stream, about 35 miles above. The proposed reservoir near Wason will have a capacity almost equal to the normal annual flow of the river.

The winters are long and very severe in this locality, and the stream has a heavy ice cover for several months. The bridge piers cause eddies, which materially affect the accuracy of measurements. The river channel is rough and the velocity high at flood stages, so that results obtained at this station are only fair.

The datum of the gage has not been changed since the station was established.

Discharge measurements of Rio Grande near Creede, Colo., in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Jan. 25[a]	J. B. Stewart	69	122	.....	169
Feb. 21[b]	G. H. Russell	65	93	.....	152
Apr. 14	....do	99	217	1.10	548
May 24	....do	116	366	2.37	1,560
June 26	....do	108	274	1.51	788
Aug. 2	....do	94	187	.80	396
13	Christianson and Grieve	100	191	.78	363
Sept. 1	I. G. Ferguson	109	168	.55	277
23[c]	....do	68	140	.50	233
Oct. 10	E. O. Christianson	90	143	.30	210
20	Christianson and Hezmalhalch	110	169	.60	290
Dec. 10	G. H. Russell	67	124	.31	180

[a] Made by wading. Ice. [b] Ice. [c] Made by wading.

Daily gage height, in feet, of Rio Grande near Creede, Colo., for 1910.

Day.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	0.45	1.25	2.35	4.55	1.45	0.95	0.5	0.4	0.45	0.3
2	.....	.45	1.35	2.35	4.45	1.4	.85	.5	.4	.45	.3
3	.....	.45	1.15	2.5	3.6	1.3	.8	.5	.4	.4	.3
4	.....	.5	1.2	2.55	3.6	1.2	.7	.5	.4	.5	.25
5	.....	.5	1.15	2.6	3.7	1.2	.9	.5	.35	.5	.3
6	.....	.5	1.0	2.5	3.5	1.2	1.2	.5	.35	.4	.3
7	.....	.5	1.0	2.75	3.25	1.1	.9	.5	.35	.4	.3
8	.....	.5	1.05	3.15	3.05	1.1	.....	.5	.35	.4	.3
9	.....	.55	1.1	4.0	3.15	1.0	.8	.55	.3	.35	.3
10	.....	.55	1.2	4.15	2.8	.95	.75	.55	.3	.35	.3
11	.....	.6	1.3	3.85	2.9	.95	.8	.55	.3	.4	.25
12	.....	.6	1.4	3.45	2.45	.95	.85	.55	.3	.4	.25
13	.....	.65	1.35	3.15	2.5	.9	.75	.55	.3	.4	.3
14	.....	.9	1.0	2.9	2.55	.9	.75	.5	.35	.4	.2
15	.....	1.1	1.05	2.75	2.45	.8	.7	.5	.35	.4	.15
16	.....	1.3	.9	2.85	2.3	.75	.7	.5	.7	.35	.15
17	.....	1.3	.95	2.95	2.15	.8	.6	.5	1.2	.25	.15
18	.....	1.25	1.0	2.85	2.05	.8	.6	.55	.7	.25	.1
19	.....	1.25	1.2	2.95	1.95	.85	.6	.5	.6	.4	.05
20	.....	1.25	1.5	2.85	2.0	.8	.5	.52	.55	.25	.15
21	.....	1.3	1.7	2.95	1.9	.75	.6	.5	.45	.2	.15
22	.....	1.3	1.65	3.0	1.95	.7	.55	.5	.5	.35	.15
23	.....	1.25	1.9	2.95	1.75	.7	.5	.5	.5	.35	.25
24	.....	1.35	1.95	2.6	1.7	.65	.55	.5	.5	.4	.3
25	0.45	1.35	2.1	2.75	1.55	.65	.5	.5	.5	.45	.2
26	.45	1.40	2.45	2.6	1.5	.7	.6	.45	.5	.4	.2
27	.45	1.4	2.7	2.4	1.6	.6	.5	.4	.5	.35	.2
28	.45	1.4	2.95	3.1	1.7	.65	.5	.4	.45	.3	.15
29	.....	1.5	3.15	3.4	1.7	.6	.5	.4	.45	.35	.....
30	.....	1.4	3.15	4.25	1.6	.8	.5	.35	.45	.35	.....
31	.....	1.4	.....	4.6	.....	1.15	.5	.....	.45	.....	.....

NOTE.—Ice Jan. 1–Feb. 24 and Dec. 29–31.

Daily discharge, in second-feet, of Rio Grande near Creede, Colo., for 1910.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	222	618	1,500	4,360	748	445	240	205	222	175
2	222	682	1,500	4,200	715	395	240	205	222	175
3	222	555	1,660	3,020	650	370	240	205	205	175
4	240	585	1,720	3,020	585	330	240	205	240	161
5	240	555	1,770	3,150	585	420	240	190	240	175
6	240	470	1,660	2,880	585	585	240	190	205	175
7	240	470	1,940	2,550	525	420	240	190	205	175
8	240	498	2,420	2,300	525	400	240	190	205	175
9	260	525	3,560	2,420	470	370	260	175	190	175
10	260	585	3,770	2,000	448	348	260	175	190	175
11	280	650	3,350	2,120	448	370	260	175	205	161
12	280	715	2,810	1,610	448	395	260	175	205	161
13	302	682	2,420	1,660	420	348	260	175	205	175
14	420	470	2,120	1,720	420	348	240	190	205	147
15	525	498	1,940	1,610	370	325	240	190	205	134
16	650	420	2,060	1,450	348	325	240	325	190	134
17	650	445	2,180	1,300	370	280	240	585	161	134
18	618	470	2,060	1,210	370	280	260	325	161	121
19	618	585	2,180	1,120	395	280	240	280	205	109
20	618	780	2,060	1,160	370	240	248	260	161	134
21	650	915	2,180	1,080	348	280	240	222	147	134
22	650	880	2,240	1,120	325	260	240	240	190	134
23	618	1,080	2,180	955	325	240	240	240	190	161
24	682	1,120	1,770	915	302	260	240	240	205	175
25	682	1,260	1,940	812	302	240	240	240	222	147
26	715	1,610	1,770	780	325	280	222	240	205	147
27	715	1,880	1,560	845	280	240	205	240	190	147
28	715	2,180	2,360	915	302	240	205	222	175	134
29	780	2,420	2,745	915	280	240	205	222	190	125
30	715	2,420	3,910	845	370	240	190	222	190	125
31	715	.....	4,430	.....	555	240	.....	222	.....	125

NOTE.—These discharges are based on a rating curve that is well defined below 4,300 second-feet. Aug. 8 interpolated. Dec. 29–31 estimated on account of ice.

Monthly discharge of Rio Grande near Creede, Colo., for 1910.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
January	.....	.....	180	11,100	D.
February	.....	.....	150	8,330	D.
March	780	222	483	29,700	A.
April	2,420	420	901	53,600	A.
May	4,430	1,500	2,320	143,000	A.
June	4,360	780	1,800	107,000	A.
July	748	280	436	26,800	A.
August	585	240	324	19,900	A.
September	260	190	238	14,200	A.
October	585	175	231	14,200	A.
November	240	147	198	11,800	A.
December	175	.....	152	9,350	B.
The year	4,430	.....	619	449,000	

NOTE.—Mean discharge for January and February estimated on the basis of two measurements.

RIO GRANDE NEAR DEL NORTE, COLO.

This station, which was established in the fall of 1889, was originally located about 2 miles above Del Norte, and records were taken more or less continuously until May 16, 1908, when a new station was established at the new State highway bridge about 6 miles above Del Norte, near the upper edge of the San Luis Valley. Some inflow

takes place between the two points at certain seasons of the year, so that the mean annual flow at the State bridge is somewhat less than that at the old station. The new station is about 4 miles above the mouth of Los Pinos Creek, below the mouth of Wolf Creek, and about 10 miles below the mouth of the South Fork of the Rio Grande. The drainage area is 1,440 square miles. The old station is just above the mouth of Los Pinos Creek.

The diversions from the Rio Grande and its tributaries above this point are all small and are used chiefly for meadow irrigation. They represent a very small percentage of the total flow of the stream. The largest ditch takes water out at Del Norte, about 2 miles below the original station. From this canal and many others diverted at various points nearly 300,000 acres of land in Colorado are now being irrigated from the Rio Grande.

Numerous small storage reservoirs under construction or in contemplation on the tributaries of the Rio Grande will store a large proportion of flood waters, but all the waters of the upper Rio Grande have been filed upon.

Practically no change was made in the datum of the gage at the old station during its maintenance, and this old gage is still being used by the water commissioner in that irrigation district of the State. The present chain gage is located on the highway bridge, and the readings have no determined relation to those taken at the old gage. On November 8, 1910, the State engineer established a Bristol automatic gage on the right bank a short distance upstream from the bridge. The readings of this gage have been referred to the datum of the chain gage. Discharge measurements are made from the downstream side of the bridge.

Very good results can be obtained at the present station except during the three or four winter months when the flow is affected by ice.

Discharge measurements of Rio Grande near Del Norte, Colo., in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Jan. 25[a]	J. B. Stewart	152	200	0.60	314
Feb. 22[a]	Thos. Grieve	140	180	2.65	291
22[a]	G. H. Russell	140	177	2.65	283
Mar. 17[a]	Thos. Grieve	167	341	1.28	618
Apr. 8	Thos. Grieve	168	396	1.66	896
15	G. H. Russell	176	402	1.60	918
May 23	....do	174	584	2.79	2,410
June 27	....do	168	430	1.87	1,080
July 31	....do	166	367	1.41	736
Aug. 8	Christianson and Grieve	159	325	1.18	551
10	....do	159	317	1.15	532
Sept. 7	I. G. Ferguson	154	258	.80	320
Oct. 18	Christianson and Hezmalhalch	166	313	1.14	492
Dec. 11	G. H. Russell	135	252	.78	296

[a] Ice.

Daily gage height, in feet, of Rio Grande near Del Norte, Colo., for 1910.

[James G. Duncan, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	.....	.....	1.3	3.4	4.2	1.8	1.4	0.95	0.75	0.9	0.6
2	.....	2.6	2.7	1.3	3.2	4.1	1.65	1.25	.95	.8	.9	.6
3	.....	.....	.....	1.4	3.0	4.1	1.6	1.15	.9	.8	.9	.65
4	.....	2.6	2.7	1.35	2.9	4.0	1.55	1.05	.9	.8	.9	.65
5	.....	.....	.....	1.35	3.15	3.8	1.55	1.35	.9	.75	.9	.7
6	.....	2.6	2.7	1.4	2.95	3.65	1.5	1.4	.85	.75	.9	.5
7	.....	.....	.....	1.45	3.05	3.45	1.45	1.25	.8	.75	.9	.5
8	.....	2.5	1.4	1.6	3.25	3.3	1.4	1.15	.8	.75	.85	.55
9	.....	.....	1.25	1.6	3.65	3.2	1.35	1.15	.75	.7	.85	.65
10	.....	2.5	1.2	1.6	4.0	3.1	1.3	1.15	.75	.7	.85	.65
11	.....	.....	1.15	1.75	4.3	2.95	1.3	1.15	.75	.7	.85	.7
12	.....	2.5	1.05	1.8	4.4	2.9	1.3	1.3	.75	.7	.85	.7
13	.....	.....	1.15	1.8	4.15	2.85	1.3	1.25	.75	.7	.8	.65
14	.....	2.5	1.15	1.75	4.0	2.8	1.3	1.2	.75	.7	.85	.6
15	.....	.....	1.2	1.55	3.5	2.8	1.3	1.2	.8	.7	.85	.5
16	.....	2.6	1.2	1.45	3.45	2.8	1.2	1.1	.85	.85	.75	.55
17	.....	.....	1.25	.....	3.3	2.55	1.15	1.05	.85	1.4	.7	.5
18	.....	2.6	1.3	1.6	3.25	2.4	1.15	1.0	.8	1.15	.65	.5
19	.....	.....	1.4	1.7	3.2	2.35	1.15	1.0	.8	1.1	.75	.5
20	.....	2.6	1.4	1.95	3.2	2.3	1.1	1.0	.95	1.0	.7	.55
21	.....	.....	1.5	2.2	3.1	2.25	1.1	1.05	.9	.9	.6	.55
22	.....	2.65	1.6	2.15	2.9	2.2	1.05	1.05	.9	.95	.65	.6
23	.....	.....	1.85	2.2	2.75	2.1	1.05	1.0	.9	.95	.65	.55
24	.....	2.6	1.85	2.4	2.7	2.0	1.1	1.0	.85	.95	.75	.6
25	2.6	.....	1.95	2.65	2.95	1.9	1.1	1.0	.8	1.0	.65	.6
26	.....	2.6	1.85	2.95	3.0	1.85	1.05	.95	.8	1.0	.65	.6
27	2.4	.....	1.6	3.35	3.15	1.85	1.0	.9	.75	1.0	.65	.6
28	.....	2.7	1.55	3.4	3.6	1.8	.95	.85	.75	1.0	.6	.6
29	2.4	.....	1.5	3.7	4.15	1.95	1.0	.8	.75	.95	.65	.....
30	.....	.....	1.4	3.7	4.3	1.9	1.1	.9	.75	.9	.55	.....
31	2.4	.....	1.3	.....	4.35	.....	1.4	.85	.....	.9	.....	.....

NOTE.—River frozen over from Jan. 1 to Mar. 7 and Dec. 29 to 31. Ice averaged 2.2 feet thick during January and February.

Daily discharge, in second-feet, of Rio Grande near Del Norte, Colo., for 1910.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	635	3,320	4,840	1,060	710	398	295	370	225
2	.....	635	2,970	4,630	920	598	398	320	370	225
3	.....	710	2,640	4,630	875	525	370	320	370	248
4	.....	674	2,490	4,430	832	458	370	320	370	248
5	.....	674	2,880	4,050	832	672	370	295	370	270
6	.....	710	2,560	3,770	790	710	345	295	370	180
7	.....	750	2,720	3,410	750	598	320	295	370	180
8	710	875	3,060	3,140	710	525	320	295	345	202
9	598	875	3,770	2,970	672	525	295	270	345	248
10	560	875	4,430	2,800	635	525	295	270	345	248
11	525	1,010	5,050	2,560	635	525	295	270	345	270
12	458	1,060	5,260	2,490	635	635	295	270	345	270
13	525	1,060	4,740	2,420	635	598	295	270	320	248
14	525	1,010	4,430	2,340	635	560	295	270	345	225
15	560	832	3,500	2,340	635	560	320	270	345	180
16	560	750	3,410	2,340	560	490	345	345	295	202
17	598	810	3,140	1,970	525	458	345	710	270	180
18	635	875	3,060	1,760	525	425	320	525	248	180
19	710	965	2,970	1,690	525	425	320	490	295	180
20	710	1,210	2,970	1,620	490	425	398	425	270	202
21	790	1,490	2,800	1,560	490	458	370	370	225	202
22	875	1,430	2,490	1,490	458	458	370	395	248	225
23	1,110	1,490	2,260	1,370	458	425	370	395	248	202
24	1,110	1,760	2,190	1,260	490	425	345	395	295	225
25	1,210	2,120	2,560	1,160	490	425	320	425	248	225
26	1,110	2,560	2,640	1,110	458	398	320	425	248	225
27	875	3,230	2,880	1,110	425	370	295	425	248	225
28	832	3,320	3,680	1,060	398	345	295	425	225	225
29	790	3,860	4,740	1,210	425	320	295	395	248	.....
30	710	3,860	5,050	1,160	490	370	295	370	202	.....
31	635	.....	5,160	.....	710	345	.....	370	.....	.....

NOTE.—These discharges are based on a rating curve that is fairly well defined. Discharge for Apr. 17 interpolated.

Monthly discharge of Rio Grande near Del Norte, Colo., for 1910.

[Drainage area, 1,400 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
January	.....	.....	321	0.229	0.26	19,700
February	.....	.....	293	.209	.22	16,300
March	1,210	.....	646	.461	.53	39,700
April	3,860	635	1,400	1.00	1.12	83,300
May	5,260	2,190	3,410	2.44	2.81	210,000
June	4,840	1,060	2,420	1.73	1.93	144,000
July	1,060	398	618	.441	.51	38,000
August	710	320	493	.352	.41	30,300
September	398	295	333	.238	.27	19,800
October	710	270	362	.259	.30	22,300
November	370	202	305	.218	.24	18,100
December	270	.....	218	.156	.18	13,400
The year	5,260	.....	905	.646	8.78	655,000

NOTE.—Discharge Jan. 1–Mar. 7 and Dec. 29–31 estimated on account of ice conditions.

RIO GRANDE NEAR LOBATOS, COLO.

This station was established June 28, 1899, at the State bridge about 15 miles east of Antonito, in T. 33 N., R. 11 E., a few miles above the Colorado-New Mexico line. The data are valuable in connection with the proposed Engle reservoir of the United States Reclamation Service, and will be used in the adjudication, which must eventually be made, of all water rights along the Rio Grande.

Conejos River enters about 7 miles above the station. A large part of the normal flow of the river is diverted above this station during the irrigation period. About 450,000 acres of land are irrigated, and more will be put under water in connection with some of the proposed reservoir systems above.

Ice forms on the river at this point for about three months during the winter, but open water may prevail through part of this period.

The datum of the gage has not been changed since the station was established. The present chain gage is fastened to downstream handrail of bridge. Measurements are also made from downstream side of this bridge. On March 23, 1910, the State engineer of Colorado established a Bristol automatic gage at the bridge, which was used to some extent during the season and the readings of which have been referred to chain-gage datum. Very good results have been obtained at this station. The river channel is fairly permanent, being a gash cut in the lava rock. Occasionally during low water some sediment is deposited, but it is scoured out in times of flood.

Discharge measurements of Rio Grande near Lobatos, Colo., in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Jan. 27[a]	J. B. Stewart	212	323	2.65	438
Feb. 23	G. H. Russell	214	273	2.70	366
Apr. 9	W. B. Freeman	239	596	2.68	1,210
May 26	G. H. Russell	235	585	2.68	1,220
June 24	....do	215	272	1.20	138
July 15	J. B. Stewart	43.5	21.8	.65	24
Aug. 19	Ferguson and Christianson	115	118	1.15	124
Sept. 10	Comstock and Christianson	95	69	.75	42
Oct. 13	J. B. Stewart	51	44	.88	51
Nov. 8	Mathias	125	159	1.40	212
Dec. 13[a]	G. H. Russell	230	400	1.86	331

[a] Ice.

Daily gage height, in feet, of Rio Grande near Lobatos, Colo., for 1910.

[Roman Mondragon, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.75	2.7	2.9	2.7	5.5	4.2	1.0	0.7	0.8	0.8	1.4	1.55
2	2.75	2.7	2.7	2.7	5.45	4.35	.9	.6	.8	.7	1.4	1.6
3	2.2	2.6	2.2	2.7	5.1	4.2	.9	.6	.8	.7	1.4	1.6
4	2.3	2.6	2.2	2.7	4.7	3.9	.9	.6	.7	.8	1.4	1.65
5	2.35	2.6	2.3	2.7	4.55	3.7	.8	.7	.7	.8	1.4	1.55
6	2.35	2.6	2.3	2.7	4.3	3.6	.8	.7	.7	.8	1.4	1.25
7	2.35	2.5	2.45	2.7	4.2	3.4	.7	.7	.7	.8	1.4	1.65
8	2.4	2.6	2.6	2.65	4.1	2.85	.7	.7	.7	.8	1.4	1.85
9	2.8	2.5	2.6	2.7	4.15	2.65	.7	.7	.8	.8	1.3	1.85
10	2.35	2.7	2.65	2.75	4.35	2.45	.7	.75	.75	.8	1.3	1.8
11	2.45	2.6	2.7	2.75	4.7	2.35	.7	.85	.75	.85	1.3	1.75
12	2.35	2.6	2.55	2.85	5.0	2.25	.7	.9	.75	.85	1.3	1.75
13	2.45	2.4	2.55	3.1	5.25	2.25	.7	1.0	.75	.8	1.35	1.9
14	2.5	2.3	2.7	3.1	5.4	2.15	.7	1.1	.8	.8	1.35	1.8
15	2.35	2.2	2.7	3.1	5.35	2.05	.7	1.2	.8	.9	1.35	2.3
16	2.6	2.1	2.7	3.05	5.4	1.95	.6	1.2	.8	.9	1.35	2.0
17	2.9	2.2	2.7	3.0	5.15	1.8	.6	1.15	.8	.9	1.4	1.9
18	2.8	2.5	2.65	3.0	4.7	1.7	.6	1.2	.8	.9	1.5	1.9
19	2.8	2.6	2.7	2.9	3.85	1.5	.6	1.2	.8	1.0	1.55	1.9
20	2.9	2.6	2.75	3.1	3.7	1.55	.6	1.2	.8	1.3	1.5	2.05
21	2.9	2.7	2.8	3.2	3.65	1.4	.6	1.1	.9	1.3	1.5	2.0
22	2.9	2.7	2.9	3.45	3.4	1.45	.6	1.1	.9	1.4	1.55	2.15
23	2.9	2.7	2.9	3.45	3.25	1.35	.6	1.1	.85	1.5	1.55	1.9
24	2.8	2.7	3.1	3.55	3.05	1.35	.6	1.0	.85	1.5	1.55	1.85
25	2.8	2.8	3.3	3.85	2.85	1.3	.6	1.0	.8	1.5	1.6	2.05
26	2.7	2.8	3.35	4.15	2.7	1.15	.6	1.0	.75	1.5	1.65	1.95
27	2.7	2.8	3.3	4.55	2.85	1.0	.6	1.0	.8	1.5	1.6	1.95
28	2.6	2.8	3.15	4.75	3.05	1.0	.6	.9	.8	1.5	1.6	1.0
29	2.65	.....	3.1	5.15	3.25	1.0	.6	.9	.8	1.5	1.6	.....
30	3.0	.....	2.95	5.45	3.55	1.0	.65	.85	.8	1.5	1.55	.....
31	2.7	.....	2.8	.....	4.05	.....	.95	.85	.....	1.5	.....	.....

NOTE.—Ice Jan. 1 to about Mar. 2 and about Dec. 6 to 31.

Daily discharge, in second-feet, of Rio Grande near Lobatos, Colo., for 1910.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	1,230	5,360	3,300	85	30	45	45	205	272
2	.....	1,230	5,280	3,530	65	20	45	30	205	295
3	705	1,230	4,710	3,300	65	20	45	30	205	295
4	705	1,230	4,070	2,840	65	20	30	45	205	320
5	800	1,230	3,840	2,560	45	30	30	45	205	272
6	800	1,230	3,450	2,410	45	30	30	45	205	250
7	950	1,230	3,300	2,130	30	30	30	45	205	250
8	1,110	1,170	3,140	1,410	30	30	30	45	205	300
9	1,110	1,230	3,220	1,170	30	30	45	45	165	300
10	1,170	1,290	3,530	950	30	38	38	45	165	300

Daily discharge, in second-feet, of Rio Grande near Lobatos, Colo., for 1910.—Continued.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
11	1,230	1,290	4,070	850	30	55	38	55	165	300
12	1,060	1,410	4,550	752	30	65	38	55	165	300
13	1,060	1,730	4,950	752	30	85	38	45	185	330
14	1,230	1,730	5,200	660	30	110	45	45	185	330
15	1,230	1,730	5,110	572	30	135	45	65	185	330
16	1,230	1,660	5,200	495	20	135	45	65	185	300
17	1,230	1,600	4,790	400	20	122	45	65	205	300
18	1,170	1,600	4,070	345	20	135	45	65	250	300
19	1,230	1,470	2,770	250	20	135	45	85	272	300
20	1,290	1,730	2,560	272	20	135	45	165	250	300
21	1,350	1,860	2,480	205	20	110	65	165	250	300
22	1,470	2,200	2,130	228	20	110	65	205	272	300
23	1,470	2,200	1,920	185	20	110	55	250	272	300
24	1,730	2,340	1,660	185	20	85	55	250	272	300
25	1,900	2,770	1,410	165	20	85	45	250	295	300
26	2,060	3,220	1,230	122	20	85	38	250	320	250
27	1,990	3,840	1,410	85	20	85	45	250	295	250
28	1,800	4,150	1,660	85	20	65	45	250	295	250
29	1,730	4,790	1,920	85	20	65	45	250	295	250
30	1,540	5,280	2,340	85	24	55	45	250	272	250
31	1,350	.....	3,060	.....	75	55	.....	250	.....	250

NOTE.—These discharges are based on a rating curve that is well defined below 4,600 second-feet.

Monthly discharge of Rio Grande near Lobatos, Colo., for 1910.

[Drainage area, 7,700 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
January	.....	.....	390	0.051	0.06	24,000	C.
February	.....	.....	355	.046	.05	19,700	C.
March	2,060	.....	1,240	.161	.18	76,200	A.
April	5,380	1,170	2,030	.264	.29	121,000	A.
May	5,380	1,230	3,370	.438	.50	207,000	A.
June	3,530	85	1,010	.131	.15	60,100	A.
July	85	20	32.9	.0043	.005	2,020	A.
August	135	20	74.2	.0096	.01	4,560	A.
September	65	30	43.3	.0056	.006	2,580	A.
October	250	30	121	.016	.02	7,440	A.
November	320	165	228	.030	.03	13,600	A.
December	.....	.....	289	.038	.04	17,800	C.
The year	5,380	.....	769	.100	1.34	556,000	

NOTE.—Discharges Jan. 1 to Mar. 7 and Dec. 29 to 31 estimated on account of ice.

RIO GRANDE AT RIO GRANDE NEAR BUCKMAN, N. MEX.

This station was established February 1, 1895, since which time records have been obtained at various points. It is located at the Denver & Rio Grande Railroad bridge crossing the river one-eighth mile east of Rio Grande (a water-tank station). The bridge is about 4 miles above Buckman, a lumber camp, and about 2 miles below San Ildefonso, an Indian pueblo.

The original gage was located on left bank 180 feet above the bridge. On March 30, 1904, a vertical rod gage was established at a new datum on the downstream side of the railroad pier. The datum was discontinued December 31, 1905, and was reestablished

June 22, 1909, the same gage being used as in 1904. In June, 1910, a Friez automatic gage was installed at same location and datum as staff gage. The cable above bridge had been removed and measurements were made from railroad bridge. From June 22, 1909, to June, 1910, discharge measurements were made from the railroad bridge. During 1910 a cable was installed about 3 miles below. There are no diversions or important tributaries between the gage and the measuring section.

For many miles above this station many large and small ditches divert water for irrigation.

The flow of the stream at this point is only slightly affected by ice. Since 1904 the datum has remained practically unchanged.

Discharge measurements of Rio Grande near Buckman, N. Mex., in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
June 17	C. D. Miller	195	389	3.08	1,230
July 23[a]	do	81	95.8	[b]1.05	149
Aug. 11[a]	do	120	174	1.75	336
18	J. B. Stewart	90	191	1.77	369
Oct. 26	do	126	257	2.20	603
Nov. 26	C. B. Digby	133	216	[b]2.0	524
Dec. 27	do	119	256	2.14	548

[a] Wading measurement.
[b] Gage height taken from adjusted register sheet.

Daily gage height, in feet, of Rio Grande near Buckman, N. Mex., for 1910.

[Aaron Martínez and J. B. Espinosa, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.25	2.15	3.7	4.5	9.3	5.5	1.9	1.6	1.8	.....	2.2	2.0
2	2.35	2.25	4.1	4.4	9.15	5.7	1.4	1.6	1.8	.....	2.15	1.95
3	2.45	2.25	4.1	4.35	8.75	5.75	1.2	1.55	1.75	.....	2.25	1.9
4	2.65	2.05	4.55	4.45	8.35	5.7	1.2	1.55	1.5	.....	2.5	1.95
5	2.45	1.9	4.7	4.4	7.95	5.55	1.2	1.6	1.4	.....	2.4	1.95
6	2.25	1.95	4.8	4.4	7.95	5.35	1.15	1.6	1.35	.....	2.35	1.95
7	2.35	1.85	4.55	4.45	7.7	5.15	1.05	1.6	1.3	.....	2.25	1.95
8	2.05	1.8	4.5	4.55	7.65	4.9	1.0	1.6	1.3	.....	2.3	1.95
9	2.0	1.75	4.65	4.55	7.45	4.5	1.05	1.75	1.2	.....	2.3	1.95
10	1.9	1.8	4.7	5.05	7.1	4.1	1.1	1.8	1.1	.....	2.25	2.05
11	1.85	1.9	4.55	5.2	7.85	3.9	1.1	2.0	1.1	.....	2.1	2.15
12	1.95	2.0	4.3	5.05	7.25	3.8	1.1	2.5	1.1	.....	2.0	2.2
13	2.0	2.1	4.4	5.25	7.5	3.6	1.2	2.1	1.1	.....	1.95	2.25
14	2.0	2.2	4.3	5.45	7.8	3.5	1.3	2.2	1.1	.....	1.95	2.2
15	1.9	2.05	4.5	5.65	8.1	3.4	1.15	2.0	1.1	.....	2.0	2.25
16	1.95	2.05	4.55	5.55	8.1	3.3	1.25	1.9	1.1	.....	2.0	2.15
17	2.15	1.95	4.55	5.35	7.7	3.1	1.15	1.9	1.1	.....	2.0	2.0
18	2.15	1.85	4.7	5.25	7.4	2.95	1.1	1.75	1.15	.....	2.0	2.05
19	2.25	1.85	4.7	5.15	7.0	2.9	1.0	1.75	1.5	.....	2.0	1.95
20	2.3	1.85	4.85	5.5	6.45	2.8	1.0	1.75	1.85	.....	2.0	1.95
21	2.2	1.85	5.05	5.8	5.55	2.65	1.0	1.8	1.6	.....	2.0	1.9
22	2.05	2.0	5.05	6.35	5.3	2.5	1.0	1.8	2.0	.....	2.0	1.75
23	2.05	2.1	5.3	6.35	5.3	2.5	.9	1.6	2.2	.....	1.95	1.7
24	2.25	2.05	5.4	6.6	5.3	3.1	1.0	1.6	.....	.....	2.0	1.95
25	2.3	7.2	5.6	7.1	4.95	3.15	1.05	1.6	.....	2.05	2.0	2.1
26	2.15	2.3	5.45	7.8	4.75	3.0	1.3	1.5	.....	2.1	2.0	2.15
27	2.15	2.8	5.35	8.35	4.5	2.85	1.3	1.4	.....	2.25	2.0	2.15
28	2.05	3.1	5.1	8.45	4.25	2.2	1.1	1.4	.....	2.3	2.0	2.1
29	2.25	.....	5.05	9.0	3.95	1.85	1.0	1.4	.....	2.2	2.0	2.1
30	2.1	.....	4.65	9.25	4.05	2.1	1.3	1.4	.....	2.2	2.0	2.1
31	1.95	.....	4.45	.....	4.75	.....	1.6	1.4	.....	2.2	.....	2.2

NOTE.—Gage heights after June were taken from Friez automatic register sheets and corrected for inaccuracies in gage setting. They are therefore uncertain.

Daily discharge, in second-feet, of Rio Grande near Buckman, N. Mex., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	672	601	2,040	2,960	12,500	4,320	440	295	386	.....	636	500
2	747	672	2,480	2,840	12,100	4,640	230	295	386	.....	601	470
3	825	672	2,480	2,780	11,100	4,720	180	278	362	.....	672	440
4	995	533	3,020	2,900	10,100	4,640	180	278	260	.....	865	470
5	825	440	3,210	2,840	9,120	4,400	180	295	230	.....	785	470
6	672	470	3,340	2,840	9,120	4,100	169	295	218	.....	747	470
7	747	413	3,020	2,900	8,540	3,800	148	295	205	.....	672	470
8	533	386	2,960	3,020	8,430	3,470	138	295	205	.....	709	470
9	500	362	3,140	3,020	7,990	2,960	148	362	180	.....	709	470
10	440	386	3,210	3,660	7,240	2,480	158	386	158	.....	672	533
11	413	440	3,020	3,870	8,880	2,260	158	500	158	.....	566	601
12	470	500	2,720	3,660	7,560	2,150	158	865	158	.....	500	636
13	500	566	2,840	3,940	8,100	1,930	180	566	158	.....	470	672
14	500	636	2,720	4,240	8,770	1,830	218	636	158	.....	470	636
15	440	533	2,960	4,560	9,470	1,720	169	500	158	.....	500	672
16	470	533	3,020	4,400	9,470	1,620	192	440	158	.....	500	601
17	601	470	3,020	4,100	8,540	1,420	169	440	158	.....	500	500
18	601	413	3,210	3,940	7,880	1,270	158	362	169	.....	500	533
19	672	413	3,210	3,800	7,030	1,220	138	362	260	.....	500	470
20	709	413	3,400	4,320	5,950	1,130	138	362	413	.....	500	470
21	636	413	3,660	4,800	4,400	995	138	386	295	.....	500	440
22	533	500	3,660	5,770	4,020	865	138	386	500	.....	500	361
23	533	566	4,020	5,770	4,020	865	120	295	636	.....	470	337
24	672	533	4,170	6,230	4,020	1,420	138	295	.....	.....	500	470
25	709	636	4,480	7,240	3,540	1,470	148	295	.....	533	500	566
26	601	709	4,240	8,770	3,280	1,320	205	260	.....	566	500	601
27	601	1,130	4,100	10,100	2,960	1,180	205	230	.....	672	500	601
28	533	1,420	3,730	10,300	2,660	636	158	230	.....	709	500	566
29	672	.....	3,660	11,700	2,320	413	138	230	.....	636	500	566
30	566	.....	3,140	12,300	2,420	566	205	230	.....	636	500	566
31	470	.....	2,900	.....	3,280	.....	295	230	.....	636	.....	636

NOTE.—These discharges are based on a rating curve that is fairly well defined below 5,100 second-feet.

Monthly discharge of Rio Grande near Buckman, N. Mex., for 1910.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
January	995	413	608	37,400	B.
February	1,420	362	563	31,300	B.
March	4,480	2,040	3,250	200,000	B.
April	12,300	2,780	5,120	305,000	B.
May	12,400	2,320	6,930	426,000	B.
June	4,720	413	2,190	130,000	C.
July	440	120	179	11,000	C.
August	865	230	360	22,100	C.
Sept. 1–23	636	158	259	11,800	C.
Oct. 25–31	709	533	627	8,710	C.
November	865	470	568	33,800	C.
December	672	440	525	32,300	C.
The period	.....	.....	.....	1,250,000	

RIO GRANDE NEAR SAN MARCIAL, N. MEX.

On August 8, 1889, a station was established near San Marcial and a measurement made giving a discharge of 19 second-feet. Soon after this date the gage was destroyed and the station abandoned until January 29, 1895, when it was reestablished at the Atchison, Topeka & Santa Fe Railway bridge crossing the river 1 mile south of San Marcial, N. Mex. The inclined gage installed in 1895 was carried

away in 1896 and a wire gage put in its place at the same datum. This was soon abandoned and gage heights were obtained by measuring, by means of a graduated rod, the distance from the bridge deck to the water surface.

Since January 1, 1901, the station has been maintained by the United States section of the International Water Commission (prior to July 1, 1910, International Boundary Commission).

The channel is sandy and very shifting. During high stages bridge piers interfere with the accuracy of results.

No important tributaries enter in the immediate vicinity.

Discharge measurements of Rio Grande near San Marcial, N. Mex., in 1910.

[By George W. King.]

Date.	Area of section.	Gage height.	Discharge.	Date.	Area of section.	Gage height.	Discharge.
	Sq. ft.	*Feet.*	*Sec.-ft.*		*Sq. feet.*	*Feet.*	*Sec.-ft.*
Jan. 1	323	11.4	1,627	June 12	256	10.5	940
4	308	11.5	1,527	15	238	10.0	879
7	317	11.55	276	18	149	9.7	333
10	161	10.55	472	21	108	9.5	192
13	198	10.7	988	24	42	9.1	69
16	274	11.0	1,157	27	30	8.7	34
19	284	10.9	1,370	30	31	8.9	42
22	265	10.9	1,204	July 14	58	9.3	183
25	236	10.7	883	17	8	8.5	7
28	210	10.8	832	29	20	8.9	35
31	200	10.7	777	31	3	8.5	4
Feb. 3	248	10.8	893	Aug. 3	72	9.5	151
6	216	10.8	830	6	41	9.3	95
9	236	10.7	681	9	20	9.0	43
12	177	10.6	680	11	244	10.3	710
16	152	10.7	527	14	22	9.2	30
19	199	10.9	637	17	6	8.4	7
22	303	10.8	653	20	4	8.4	4
25	244	10.9	748	24	43	9.3	70
28	408	11.1	1 267	28	61	9.4	84
Mar. 3	344	11.1	1,502	31	91	9.5	168
6	357	11.1	1,805	Sept. 1	231	10.5	786
9	518	11.5	2,176	4	20	8.9	25
12	412	11.3	2,315	7	4	8.6	3
15	430	11.4	2,471	20	12	8.9	12
18	432	11.4	2,262	24	62	9.65	117
21	381	11.3	2,260	26	8	8.7	9
24	453	11.8	2,704	28	5	8.4	4
27	539	11.8	3,298	Oct. 22	10	8.7	13
30	615	11.6	3,096	25	12	8.7	19
Apr. 3	473	11.2	2,053	28	16	8.7	34
6	534	11.3	2,353	31	13	8.7	28
9	550	11.4	2,228	Nov. 3	23	8.8	53
12	491	11.5	2,121	6	26	9.0	62
16	574	11.9	3,382	9	62	9.4	101
20	536	11.7	2,524	12	66	9.4	126
23	791	12.4	4,182	15	82	9.5	152
26	772	12.5	4,641	18	77	9.7	141
29	1,053	12.8	7,129	21	91	9.7	179
May 4	1,191	13.1	7,989	24	91	9.8	194
7	1,051	12.7	6,560	27	112	10.0	269
10	898	12.2	5,366	30	128	10.1	311
13	888	12.1	4,728	Dec. 3	140	10.3	342
16	1,179	12.6	6,571	6	141	10.4	387
19	929	12.7	5,633	9	136	10.5	366
22	682	11.7	3,675	12	125	10.4	300
25	647	11.4	3,032	15	147	10.5	376
28	492	10.7	1,867	18	180	10.6	465
31	364	10.4	1,312	21	149	10.5	339
June 3	651	11.2	2,361	24	143	10.5	337
6	628	11.4	2,980	28	138	10.5	343
9	525	11.0	1,944	31	151	10.5	350

Daily gage height, in feet, of Rio Grande near San Marcial, N. Mex., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	11.45	10.75	11.15	11.3	13.15	10.4	8.65	9.05	10.5	.....	8.75	10.1
2	11.4	10.7	11.15	11.3	13.25	10.8	8.45	9.5	9.4	.....	8.8	10.2
3	11.3	10.75	11.1	11.2	13.1	11.25	.....	9.5	9.0	.....	8.75	10.3
4	11.45	10.8	11.1	11.15	13.05	11.5	.....	9.4	9.4	.....	8.85	10.35
5	11.65	10.75	11.15	11.25	12.95	11.5	.....	9.55	9.1	.....	8.85	10.45
6	11.6	10.75	11.1	11.25	12.85	11.4	.....	9.4	8.85	.....	8.95	10.4
7	11.55	10.8	11.25	11.3	12.65	11.4	.....	9.25	8.65	.....	9.0	10.45
8	11.5	10.85	11.4	11.25	12.5	11.25	.....	9.1	.....	.....	9.25	10.5
9	10.75	10.7	11.35	11.35	12.5	11.0	.....	9.0	.....	.....	9.4	10.5
10	10.5	10.8	11.35	11.5	12.2	10.95	.....	8.8	.....	.....	9.4	10.65
11	10.55	10.7	11.3	11.6	12.1	10.75	.....	10.2	.....	.....	9.4	10.55
12	10.55	10.6	11.35	11.5	12.2	10.45	.....	10.8	.....	.....	9.4	10.4
13	10.65	10.6	11.4	11.5	12.2	10.25	.....	9.55	.....	.....	9.4	10.45
14	10.75	10.7	11.5	11.6	12.25	10.15	8.85	9.25	.....	.....	9.5	10.5
15	10.85	10.7	11.4	11.9	12.35	10.0	9.2	9.2	.....	.....	9.55	10.55
16	11.05	10.7	11.35	11.85	12.55	9.85	9.2	9.0	.....	.....	9.6	10.6
17	11.05	10.75	11.4	11.9	12.6	9.8	8.65	8.55	.....	.....	9.6	10.6
18	10.95	10.8	11.4	11.85	12.6	9.7	8.4	8.55	.....	.....	9.7	10.6
19	10.9	10.85	11.3	11.65	12.7	9.7	.....	8.45	.....	.....	9.85	10.6
20	10.85	10.95	11.3	11.7	12.55	9.65	.....	8.4	8.6	.....	9.7	10.55
21	10.9	10.9	11.3	11.7	12.4	9.45	.....	.....	8.4	.....	9.7	10.5
22	10.9	10.8	11.45	11.7	11.85	9.3	.....	.....	.....	8.7	9.75	10.5
23	10.9	10.85	11.6	12.15	11.55	9.2	.....	.....	8.45	8.8	9.8	10.5
24	10.85	10.9	11.7	12.3	11.45	9.1	.....	9.15	9.0	8.7	9.8	10.5
25	10.75	10.9	11.8	12.45	11.4	8.95	.....	8.75	9.1	8.7	9.9	10.55
26	10.7	10.8	11.8	12.5	11.1	8.75	.....	.....	8.7	8.8	9.95	10.6
27	10.75	11.1	11.8	12.5	10.85	8.7	.....	.....	8.55	8.85	10.0	10.55
28	10.8	11.15	11.7	12.7	10.7	8.85	.....	9.15	8.4	8.75	10.0	10.5
29	10.8	.....	11.6	12.75	10.55	8.9	8.9	8.65	.....	8.7	10.0	10.55
30	10.7	.....	11.6	12.95	10.45	8.9	8.6	8.65	.....	8.7	10.1	10.45
31	10.7	.....	11.45	.....	10.4	.....	8.5	9.5	.....	8.7	.....	10.45

NOTE.—There was no flow on days for which there are no gage heights.

Daily discharge, in second-feet, of Rio Grande near San Marcial, N. Mex., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	a1,730	835	1,400	2,310	8,130	1,310	20	85	a 785	0	40	310
2	1,530	775	1,470	2,310	8,420	1,840	5	150	260	0	55	325
3	1,230	a 835	a1,500	a2,050	7,990	a2,460	0	a 150	65	0	a 40	a 340
4	a1,430	870	1,600	1,900	a7,850	3,030	0	125	a 125	0	55	365
5	1,380	800	1,750	2,200	7,450	3,100	0	165	80	0	55	410
6	825	a 780	a1,800	a2,200	7,100	a2,980	0	a 125	45	0	a 60	a 385
7	a 275	815	1,940	2,230	a6,380	2,900	0	85	10	0	60	390
8	340	850	2,080	1,980	6,080	2,520	0	60	0	0	85	395
9	405	a 680	a2,040	a2,110	6,080	a1,940	0	a 45	0	0	a100	a 365
10	a 470	815	2,140	2,360	a5,370	1,840	0	25	0	0	110	470
11	595	745	2,200	2,490	4,950	1,440	0	a 680	0	0	115	405
12	715	a 680	a2,360	a2,120	5,140	a 940	0	1,220	0	0	a 125	a 300
13	a 940	620	2,470	2,120	a5,030	915	0	295	0	0	125	340
14	1,020	645	2,630	2,440	5,280	900	a 95	a 75	0	0	150	375
15	1,070	585	a2,470	3,380	5,640	a 880	160	30	0	0	a 160	a 415
16	a1,210	a 525	2,350	a3,220	a6,390	605	160	25	0	0	155	450
17	1,310	555	2,330	3,380	6,190	515	a 40	a 10	0	0	140	460
18	1,310	580	a2,260	3,160	5,810	a335	5	10	0	0	a 140	a 465
19	a1,370	a 610	2,200	2,310	a5,630	335	0	5	0	0	185	450
20	1,260	725	2,230	a2,520	5,340	300	0	a 5	a 10	0	180	395
21	1,260	715	a2,260	2,520	5,040	a 175	0	0	5	0	a 180	a 340
22	a1,200	a 655	2,390	2,520	a3,970	130	0	0	0	a 15	190	340
23	1,160	700	2,530	a3,590	3,350	100	0	0	5	25	195	335
24	1,070	750	a2,620	3,720	3,140	a 70	0	a 55	a 45	20	a 195	a 335
25	a 930	a 750	2,900	4,410	a3,030	55	0	15	55	a 20	230	370
26	840	650	3,100	a4,640	2,530	40	0	0	a 10	35	250	405
27	835	1,270	a3,300	4,870	2,120	a 35	0	0	5	45	a 270	375
28	a 830	a1,370	3,200	6,300	a1,870	40	0	a 60	a 5	a 40	270	a 345
29	830	.....	3,100	a6,830	1,590	40	a 35	15	0	30	270	380
30	775	.....	a3,100	7,560	1,400	a 40	10	15	0	30	a 310	320
31	a 775	.....	2,710	.....	1,310	.....	a 5	a 170	.....	a 30	.....	a 320

a Date of measurement.

Monthly discharge of Rio Grande near San Marcial, N. Mex., for 1910.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
January	1,730	275	997	61,329
February	1,370	525	757	42,019
March	3,300	1,400	2,336	143,663
April	7,560	1,900	3,192	189,917
May	8,420	1,310	5,019	308,628
June	3,100	35	1,060	63,094
July	160	0	17	1,061
August	1,220	0	119	7,339
September	785	0	50	2,995
October	45	0	9	575
November	310	40	150	8,915
December	465	310	377	23,157
The year	8,420	0	1,180	852,692

RIO GRANDE NEAR EL PASO, TEX.

This station was located at the pumping house of the smelter company, 3 miles north of El Paso, Tex. The bed of the stream at that point is composed of mud and is constantly shifting. On May 1, 1897, the station was placed under the charge of W. W. Follett, consulting engineer, International Water Commission (prior to July 1, 1910, International Boundary Commission), and by him removed 1 mile farther up the river to Courchesne's limekiln. Although the section is unstable and subject to overflow, it is still the best site for a station in the vicinity of El Paso, as the entire bed is constantly shifting for many miles above and below. On this account frequent discharge measurements are made in order to closely estimate the daily discharge.

River heights were measured at the masonry pump-foundation pier. As the pier was torn down in October, 1902, an inclined wooden gage was established some 60 feet upstream. This has since been moved about 300 feet downstream.

Discharge measurements of Rio Grande near El Paso, Tex., 1910.

[By W. L. Follett.]

Date.	Area of section.	Gage height	Discharge.	Date.	Area of section.	Gage height.	Discharge.
	Sq. ft.	*Feet.*	*Sec.-ft.*		*Sq. ft.*	*Feet.*	*Sec.-ft.*
Jan. 3	141	7.45	236	Apr. 9	312	10.0	1,310
9	206	8.5	669	12	325	10.2	1,383
12	171	8.05	469	15	340	10.35	1,640
15	174	8.2	496	18	451	10.9	2,114
18	230	8.7	776	22	355	10.4	1,733
21	247	8.8	919	25	426	10.8	2,204
24	262	8.95	1,038	28	670	11.6	3,366
28	200	8.5	667	30	937	12.2	4,866
31	199	8.4	567	May 3	1,160	12.9	6,967
Feb. 4	211	8.4	485	6	1,185	12.9	7,573
7	254	8.6	506	9	943	11.8	5,531
10	315	9.1	498	12	732	11.9	4,227
13	205	8.4	277	15	764	11.0	4,270
17	186	8.45	275	18	884	11.9	5,223
20	149	8.2	179	22	784	11.5	5,320
23	310	9.2	500	25	449	9.9	2,537
26	109	7.9	133	28	327	9.4	1,594
Mar. 2	182	8.5	241	31	251	8.85	1,012
6	371	9.7	747	June 4	144	8.1	460
9	432	10.5	1,728	8	349	9.8	1,597
12	416	10.5	1,640	12	225	9.1	946
15	357	10.4	1,619	16	139	8.0	338
18	350	10.3	1,519	19	33	6.8	38
21	422	10.5	1,711	22	30	6.8	41
24	362	10.4	1,619	25	11	6.2	6
27	374	10.55	1,808	28	30	6.8	36
31	464	10.9	2,320	30	43	7.1	50
Apr. 3	424	10.4	1,876	Dec. 8	16	6.6	22
6	338	10.15	1,356	27	21	6.7	24

Daily gage height, in feet, of Rio Grande near El Paso, Tex., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Sept.	Dec.
1	7.0	8.4	8.9	10.85	12.2	8.5	6.65	.....	.....
2	7.1	8.5	8.7	10.65	12.4	8.45	6.35	.....	.....
3	7.3	8.5	8.95	10.4	12.7	8.0	.....	6.9	.....
4	7.65	8.45	9.65	10.2	12.8	8.05	.....	6.1	.....
5	8.75	8.5	9.2	9.9	13.0	9.1	.....	6.0	.....
6	9.35	8.6	9.6	10.0	12.95	9.45	.....	.....	6.4
7	9.45	8.6	10.75	10.0	12.75	9.75	.....	.....	6.55
8	9.3	8.8	10.6	9.9	12.35	9.8	.....	.....	6.65
9	8.65	9.0	10.5	9.9	11.9	9.7	.....	.....	6.5
10	8.15	9.1	10.3	10.1	11.45	9.5	.....	.....	6.3
11	7.95	8.55	10.3	10.15	11.3	9.2	.....	.....	6.45
12	8.0	8.5	10.35	10.15	11.6	9.1	.....	.....	6.35
13	7.9	8.3	10.65	10.35	11.8	8.9	.....	.....	6.45
14	7.75	8.75	10.5	10.4	11.6	8.45	.....	.....	6.4
15	7.9	8.75	10.4	10.2	11.1	8.2	.....	.....	6.3
16	8.6	8.9	10.35	10.3	11.3	7.9	.....	.....	6.3
17	8.9	8.4	10.25	10.55	11.55	7.55	.....	.....	6.3
18	8.6	8.3	10.25	10.9	11.75	7.2	.....	.....	.....
19	8.55	8.3	10.5	10.9	11.75	6.95	.....	.....	.....
20	8.55	8.25	10.45	10.95	11.5	6.95	.....	.....	6.3
21	8.75	8.05	10.5	10.6	11.5	7.35	.....	.....	6.5
22	8.9	7.95	10.4	10.45	11.5	6.9	.....	.....	6.5
23	9.0	8.7	10.2	10.2	10.45	6.25	.....	.....	6.6
24	8.85	8.9	10.35	10.4	10.3	6.2	.....	.....	6.6
25	8.8	8.4	10.5	10.65	9.95	6.3	.....	.....	6.7
26	8.75	7.95	10.5	11.15	9.75	6.25	.....	.....	6.7
27	8.6	7.75	10.55	11.4	9.65	6.45	.....	.....	6.7
28	8.5	8.3	10.75	11.5	9.4	7.5	.....	.....	6.6
29	8.55	.....	10.9	11.7	9.15	8.5	.....	.....	6.3
30	8.5	.....	10.9	12.1	8.75	7.3	.....	.....	.....
31	8.4	.....	10.9	.....	8.75	.....	.....	.....	.....

NOTE.—There was no flow on days for which no gage heights are given.

Daily discharge, in second-feet, of Rio Grande near El Paso, Tex., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	115	545	400	2,270	4,870	755	25	0	0	0	0	0
2	140	555	a320	2,090	5,470	715	10	0	0	0	0	0
3	a195	535	430	a1,880	a6,370	385	0	0	50	0	0	0
4	340	a500	725	1,610	6,870	a420	0	0	10	0	0	0
5	925	495	535	1,260	7,670	1,130	0	0	5	0	0	0
6	1,350	505	a705	a1,240	a7,720	1,360	0	0	0	0	0	5
7	1,430	a505	2,030	1,310	7,290	1,570	0	0	0	0	0	15
8	1,310	515	1,850	1,280	6,550	a1,600	0	0	0	0	0	a25
9	a790	520	a1,730	a1,280	a5,710	1,500	0	0	0	0	0	15
10	530	a495	1,500	1,350	4,630	1,320	0	0	0	0	0	5
11	450	325	1,470	1,360	3,980	1,040	0	0	0	0	0	15
12	a470	310	a1,490	a1,360	a3,870	a945	0	0	0	0	0	5
13	410	a250	1,790	1,640	4,480	835	0	0	0	0	0	15
14	335	410	1,690	1,720	4,610	590	0	0	0	0	0	10
15	a375	405	a1,620	a1,380	a4,390	450	0	0	0	0	0	5
16	720	460	1,570	1,600	4,590	a315	0	0	0	0	0	5
17	890	a255	1,470	1,810	4,850	225	0	0	0	0	0	5
18	a720	220	a1,470	a2,110	a5,070	140	0	0	0	0	0	0
19	675	220	1,710	2,110	5,170	a75	0	0	0	0	0	0
20	695	a200	1,660	2,150	4,950	85	0	0	0	0	0	5
21	a880	130	a1,710	1,890	5,140	205	0	0	0	0	0	15
22	1,000	100	1,620	a1,770	a5,320	a70	0	0	0	0	0	15
23	1,080	a340	1,430	1,500	3,490	10	0	0	0	0	0	20
24	a955	415	a1,570	1,730	3,230	5	0	0	0	0	0	20
25	915	275	1,740	a2,030	a2,620	a10	0	0	0	0	0	25
26	875	a150	1,740	2,710	2,250	10	0	0	0	0	0	25
27	750	105	a1,810	3,080	2,060	20	0	0	0	0	0	a25
28	a665	205	2,100	a3,220	a1,590	a245	0	0	0	0	0	20
29	715	.....	2,320	3,620	1,330	545	0	0	0	0	0	5
30	665	.....	2,320	a4,620	905	a125	0	0	0	0	0	0
31	a565	.....	2,320	.....	a905	.....	0	0	.....	0	.....	0

a Date of measurement.

Monthly discharge of Rio Grande near El Paso, Tex., for 1910.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
January	1,430	115	707	43,498
February	555	100	355	19,726
March	2,320	320	1,511	92,916
April	4,620	1,240	1,966	116,985
May	7,720	905	4,450	273,620
June	1,600	5	557	33,124
July	25	0	1	69
August	0	0	0	0
September	50	0	2	129
October	0	0	0	0
November	0	0	0	0
December	25	0	10	595
The year	7,720	0	802	580,662

RIO GRANDE ABOVE PRESIDIO, TEX.

This station was established April 4, 1900, by the International Boundary Commission. It was originally located 9 miles above Presidio and 8 miles above the mouth of Rio Conchos, one of the principal tributaries of the Rio Grande, and about 200 miles below El Paso. The station was in a straight stretch of the river, but in the

bight of a long bend. In 1905 the river began to erode a cut-off across this bend, and the spring flood of 1905 deepened this channel to such an extent that more water passed through it than passed the station, and it became necessary to abandon the location. In September, 1905, the station was moved 8 miles farther upstream and rebuilt. Its location was far enough above the mouth of Rio Conchos to be free from the effects of backwater from that stream. Caving banks necessitated the abandonment of this upper site, and the station was moved back to the original site, at the Haciendita, July 6, 1909. A new gage was established whose readings are not comparable with the old ones. Changes of river bed have closed the crevasse which threatened in 1905, and frequent discharge measurements are necessary to determine closely the daily discharge.

The observations at this station have been made under the direction of the United States section of the International Water Commission (prior to July 1, 1910, International Boundary Commission).

Discharge measurements of Rio Grande above Presidio, Tex., in 1910.

[By W. T. Millington.]

Date.	Area of section.	Gage height.	Discharge.	Date.	Area of section.	Gage height.	Discharge.
	Sq. ft.	*Feet.*	*Sec.-ft.*		*Sq. ft.*	*Feet.*	*Sec-ft.*
Jan. 3	95	6.7	85	Apr. 14	302	7.8	683
6	71	6.4	55	17	287	7.8	604
9	61	6.25	38	20	332	8.1	888
12	319	8.1	730	23	479	9.1	1,900
15	238	7.6	345	26	339	8.5	1,180
18	192	7.3	222	29	395	8.9	1,432
21	215	7.4	328	May 3	667	10.2	3,063
24	234	7.5	373	6	916	11.9	4,835
27	284	8.0	721	9	798	10.95	3,494
30	237	7.7	467	12	821	11.4	3,519
Feb. 3	218	7.4	343	15	1,165	12.4	6,663
6	193	7.4	290	18	838	10.4	3,839
9	199	7.4	315	21	868	10.7	4,199
12	177	7.2	221	24	944	11.2	4,693
15	177	7.1	222	27	846	10.25	2,407
18	183	7.1	227	30	445	8.5	1,460
21	164	6.8	139	June 2	322	7.4	722
24	131	6.65	104	5	248	6.8	288
27	104	6.4	64	8	200	6.3	208
Mar. 3	87	6.1	44	11	134	5.7	111
6	64	6.05	23	14	248	7.0	328
9	51	5.8	19	17	339	7.55	883
12	212	7.8	628	23	132	5.8	118
15	250	8.05	792	26	96	5.35	49
18	340	8.5	1,190	30	130	6.1	134
21	302	8.2	768	July 3	137	5.7	50
24	313	8.3	790	6	34	5.15	6
27	285	8.0	587	9	21	4.85	4
30	298	8.3	758	12	251	6.7	284
Apr. 2	459	9.15	1,483	15	126	5.85	58
5	454	9.0	1,302	18	76	5.4	24
8	322	8.2	640	21	50	4.95	12
11	306	8.0	792	Sept. 8	162	6.0	232

Daily gage height, in feet, of Rio Grande above Presidio, Tex., for 1910.

Date.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Sept.
1	6.7	7.5	6.35	8.75	9.9	7.65	6.1	.....
2	6.7	7.45	6.3	9.1	10.05	7.4	5.9	.....
3	6.7	7.35	6.1	9.05	10.25	7.1	5.65	.....
4	6.6	7.55	6.0	9.1	10.4	6.85	5.4	.....
5	6.45	7.55	6.05	9.05	10.65	6.75	5.25	.....
6	6.4	7.45	6.05	8.65	11.45	6.5	5.1	.....
7	6.4	7.35	6.0	8.4	10.75	6.35	5.05	4.8
8	6.35	7.5	5.9	8.2	10.85	6.25	4.9	5.2
9	6.2	7.4	5.8	8.0	10.9	6.05	4.85	.....
10	6.2	7.3	5.8	8.45	10.9	5.85	4.7	.....
11	7.25	7.35	5.7	7.95	11.1	5.65	5.95	.....
12	7.95	7.2	7.85	7.8	11.35	7.1	6.45	.....
13	7.85	7.2	7.9	7.7	11.4	7.05	6.2	.....
14	7.65	7.15	7.95	7.8	12.05	6.95	6.0	.....
15	7.55	7.1	8.1	7.85	12.35	6.75	5.85	.....
16	7.4	7.05	8.5	7.8	11.15	6.8	5.7	.....
17	7.3	7.1	8.65	7.9	10.45	7.55	5.4	.....
18	7.25	7.1	8.45	8.05	10.55	7.3	5.35	.....
19	7.25	6.95	8.4	8.05	10.7	6.5	5.25	.....
20	7.25	6.9	8.3	8.3	10.65	6.35	5.1	.....
21	7.5	6.75	8.2	8.7	10.8	6.2	4.95	.....
22	7.5	6.65	8.25	8.85	11.05	5.95	4.7	.....
23	7.45	6.6	8.35	9.05	11.1	5.85	.....	.....
24	7.5	6.65	8.3	9.05	11.3	5.6	.....	.....
25	7.55	6.55	8.25	8.75	11.4	5.5	.....	.....
26	7.95	6.5	8.05	8.5	11.1	6.65	.....	.....
27	7.95	6.4	8.1	8.55	10.0	8.0	.....	.....
28	7.85	6.3	8.35	8.5	9.2	6.3	.....	.....
29	7.8	.....	8.35	9.1	8.7	6.55	.....	.....
30	7.7	.....	8.3	9.5	8.45	6.05	.....	.....
31	7.6	.....	8.2	.....	8.25	.....	.....	.....

NOTE.—There was no flow on days for which no gage heights are given.

Daily discharge, in second-feet, of Rio Grande above Presidio, Tex., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	85	385	55	1,160	2,620	900	135	0	0	0	0	0
2	85	365	50	a1,440	2,840	a720	90	0	0	0	0	0
3	a85	a325	a45	1,360	a3,110	505	a45	0	0	0	0	0
4	75	385	35	1,420	3,270	325	25	0	0	0	0	0
5	60	365	30	a1,340	3,530	a280	15	0	0	0	0	0
6	a55	a310	a25	1,010	a4,200	240	a5	0	0	0	0	0
7	55	280	25	805	3,210	215	5	0	30	0	0	0
8	50	345	20	a640	3,350	a200	5	0	a95	0	0	0
9	a35	a315	a20	625	a3,420	170	a5	0	0	0	0	0
10	35	270	20	935	3,220	135	5	0	0	0	0	0
11	425	290	15	a765	3,300	a100	170	0	0	0	0	0
12	a680	a220	a660	685	a3,360	345	a220	0	0	0	0	0
13	540	230	695	630	3,520	335	155	0	0	0	0	0
14	385	225	725	a685	5,560	a320	100	0	0	0	0	0
15	a325	a220	a835	680	a6,590	280	60	0	0	0	0	0
16	265	210	1,190	630	4,910	320	45	0	0	0	0	0
17	220	225	1,320	a700	3,910	a885	25	0	0	0	0	0
18	a200	a225	a1,120	840	4,020	775	a20	0	0	0	0	0
19	225	185	1,050	840	4,200	425	20	0	0	0	0	0
20	245	170	910	a1,090	4,140	355	15	0	0	0	0	0
21	a375	a130	a770	1,490	a4,300	290	a10	0	0	0	0	0
22	375	105	780	1,650	4,550	185	5	0	0	0	0	0
23	350	95	800	a1,850	4,600	a140	0	0	0	0	0	0
24	a375	105	a790	1,840	a4,810	90	0	0	0	0	0	0
25	410	90	755	1,480	4,930	75	0	0	0	0	0	0
26	690	80	620	a1,180	4,270	a570	0	0	0	0	0	0
27	a680	65	a645	1,210	a2,270	1,110	0	0	0	0	0	0
28	595	50	785	1,180	1,840	245	0	0	0	0	0	0
29	550	.....	785	a1,630	1,570	370	0	0	0	0	0	0
30	a465	.....	760	2,030	a1,440	a125	0	0	0	0	0	0
31	430	.....	710	.....	1,340	.....	0	0	.....	0	.....	0

a Date of measurement.

Monthly discharge of Rio Grande above Presidio, Tex., for 1910.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
January	690	35	304	18,694
February	385	50	224	12,426
March	1,320	15	550	33,808
April	2,030	625	1,127	67,081
May	6,590	1,340	3,619	222,545
June	1,110	75	368	21,878
July	220	0	38	2,341
August	0	0	0	0
September	95	0	4	248
October	0	0	0	0
November	0	0	0	0
December	0	0	0	0
The year	6,590	0	524	379,021

RIO GRANDE BELOW PRESIDIO, TEX.

The station was established April 8, 1900, by the International Boundary Commission. It is 6 miles below Presidio, 7 miles below the mouth of the Rio Conchos, and about 215 miles below El Paso. It is at the west end of the canyon section of the Rio Grande. The discharge at this station minus the discharge at the station above Presidio, Tex., is the discharge of Rio Conchos, except at rare intervals, when some rain water enters the Rio Grande from the north.

The river is fairly straight at the station and for one-fourth mile above and below. The right bank is a rocky bluff. The left bank is an alluvial deposit and overflows for 750 feet back from the river where gravel hills are found. The bed is of shifting sand and is affected by a drainage line called Alamos Creek, which reaches 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 backwater on to the gage, until a flood in the river scours it out. The extreme floods come from the Rio Conchos, the highest recorded gage height being 26.35 feet on September 11, 1904. Frequent discharge measurements are made to determine closely the daily flow

The observations at this station have been made under the direction of the United States section of the International Water Commission (prior to July 1, 1910, International Boundary Commission).

Discharge measurements of Rio Grande below Presidio, Tex., in 1910.

[By W. T. Millington.]

Date.	Area of section.	Gage height.	Discharge.	Date.	Area of section.	Gage height.	Discharge.
	Sq. ft.	*Feet.*	*Sec.-ft.*		*Sq. ft.*	*Feet.*	*Sec.-ft.*
Jan. 4	961	8.3	2,055	July 7	1,193	9.3	3,023
7	871	8.1	1,140	10	1,043	8.4	2,349
10	786	7.9	808	13	1,019	8.1	1,904
13	1,021	8.3	2,429	16	877	8.0	1,370
16	754	7.9	1,552	19	849	7.8	1,184
19	739	7.7	1,166	22	717	7.2	825
22	742	7.7	1,375	25	439	6.9	248
25	722	7.7	1,040	28	451	7.0	290
28	749	7.8	1,352	31	447	7.0	248
31	713	7.6	1,106	Aug. 4	359	6.7	162
Feb. 4	701	7.4	1,087	7	365	6.9	192
7	704	7.3	1,192	10	408	7.0	292
10	681	7.2	1,000	13	366	6.7	187
13	676	7.1	977	16	696	8.1	1,556
16	644	7.0	826	19	810	8.3	1,989
19	624	7.0	674	22	1,007	8.6	2,806
22	606	7.0	549	25	1,304	9.2	4,576
25	581	6.9	516	28	923	8.3	1,848
28	549	6.8	449	31	789	7.8	1,226
Mar. 4	483	6.6	315	Sept. 3	545	7.6	572
7	439	6.6	262	6	555	7.6	684
10	421	6.5	184	9	1,245	9.9	3,699
13	545	7.4	729	12	1,221	9.7	3,135
16	597	7.7	766	15	955	8.7	1,688
19	782	8.3	1,671	18	798	8.1	1,261
22	710	7.9	1,147	21	1,702	11.1	5,210
25	685	8.0	1,077	24	1,194	9.2	2,960
28	686	7.9	1,323	27	811	8.4	1,544
31	689	8.0	1,513	30	706	8.0	1,158
Apr. 3	768	8.3	1,993	Oct. 4	620	7.8	863
6	720	8.1	1,539	7	541	7.4	649
9	628	7.9	1,202	10	526	7.3	560
12	589	7.6	973	13	494	7.1	493
15	577	7.7	946	16	470	7.1	448
18	595	7.8	949	20	439	6.9	365
21	618	8.0	1,613	22	460	7.0	407
24	658	8.3	2,215	25	457	6.9	370
27	618	8.0	1,524	28	423	6.8	296
30	686	8.3	1,893	31	465	7.0	380
May 4	946	8.9	3,085	Nov. 3	464	7.0	324
7	1,082	9.1	3,530	6	317	7.0	325
10	1,157	9.1	3,485	9	207	7.0	317
13	1,240	9.4	4,312	12	194	6.9	283
16	1,380	9.5	5,069	15	188	6.9	264
19	1,164	9.1	4,051	18	192	6.9	259
22	1,185	9.2	4,249	21	189	6.8	209
25	1,239	9.35	4,946	24	168	6.7	168
28	1,097	8.8	2,329	27	158	6.6	129
31	622	8.2	1,367	30	158	6.6	130
June 3	510	7.7	1,023	Dec. 4	158	6.5	126
6	401	7.2	325	7	152	6.5	108
9	323	6.8	243	10	135	6.5	93
12	386	7.3	389	13	145	6.5	83
15	388	7.3	337	16	154	6.4	80
17	554	7.9	1,272	19	136	6.4	71
24	252	6.2	191	22	128	6.4	73
27	882	8.6	2,540	25	119	6.4	57
29	1,789	11.4	6,999	28	106	6.3	51
July 4	1,262	9.5	3,980	31	103	6.3	53

Daily gage height, in feet, of Rio Grande below Presidio, Tex., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	8.65	7.45	6.75	8.15	8.65	7.95	10.55	6.9	7.8	8.0	7.0	6.6
2	8.5	7.4	6.7	8.3	8.65	7.8	10.15	6.8	7.65	7.8	7.0	6.5
3	8.4	7.4	6.7	8.3	8.8	7.65	10.55	6.7	7.6	7.8	7.0	6.5
4	8.25	7.4	6.6	8.3	8.9	7.4	10.15	6.7	7.6	7.75	7.0	6.5
5	8.15	7.3	6.6	8.25	9.1	7.3	10.1	6.65	7.45	7.65	7.0	6.5
6	8.1	7.3	6.6	8.1	9.4	7.2	9.6	6.75	7.65	7.5	7.0	6.5
7	8.05	7.3	6.55	8.0	9.05	7.05	9.25	6.95	7.95	7.4	7.0	6.5
8	8.0	7.3	6.5	8.0	9.1	6.95	8.9	7.35	10.6	7.35	7.0	6.5
9	7.95	7.25	6.5	7.9	9.1	6.75	8.55	7.2	9.85	7.35	7.0	6.5
10	7.9	7.2	6.45	7.8	9.1	6.6	8.35	7.0	9.65	7.3	7.0	6.5
11	7.95	7.1	6.4	7.8	9.15	6.5	8.6	6.85	10.1	7.2	6.9	6.5
12	8.35	7.1	6.85	7.6	9.35	7.3	9.1	6.6	9.6	7.15	6.9	6.5
13	8.25	7.1	7.45	7.65	9.45	7.4	8.1	6.65	9.2	7.1	6.9	6.5
14	8.2	7.1	7.5	7.7	9.5	7.4	8.05	6.65	8.95	7.3	6.9	6.45
15	8.1	7.1	7.65	7.75	9.65	7.25	7.9	6.95	8.75	7.2	6.9	6.4
16	7.95	7.0	7.75	7.7	9.4	7.1	7.95	8.15	8.45	7.1	6.9	6.4
17	7.9	7.0	8.0	7.7	9.15	7.8	7.8	8.05	8.2	7.1	6.9	6.4
18	7.8	7.0	8.1	7.8	9.1	7.75	7.8	7.95	8.1	7.05	6.9	6.4
19	7.7	7.0	8.2	7.7	9.1	7.05	7.7	8.3	8.15	7.0	6.8	6.4
20	7.6	7.0	8.1	7.7	9.15	6.75	7.5	8.45	9.8	6.9	6.8	6.4
21	7.6	7.0	7.95	8.05	9.1	6.6	7.35	8.2	11.1	6.9	6.8	6.4
22	7.7	6.95	7.9	8.2	9.2	6.4	7.2	8.65	10.0	7.0	6.7	6.4
23	7.7	6.9	8.0	8.3	9.2	6.3	7.1	8.95	9.4	6.9	6.7	6.4
24	7.7	6.9	8.0	8.25	9.3	6.2	7.0	9.7	9.1	6.8	6.7	6.4
25	7.7	6.9	8.0	8.1	9.35	7.9	6.95	9.1	8.85	6.85	6.7	6.4
26	7.75	6.9	8.0	8.0	9.15	8.4	7.15	8.75	8.55	6.8	6.7	6.3
27	7.9	6.8	7.8	8.0	8.95	8.95	7.05	8.45	8.35	6.8	6.6	6.3
28	7.8	6.8	7.95	8.0	8.75	8.35	7.0	8.3	8.2	6.8	6.6	6.3
29	7.75	.....	8.0	8.2	8.5	11.35	6.9	8.15	8.1	6.8	6.6	6.3
30	7.65	.....	7.9	8.35	8.35	11.2	7.05	7.95	8.0	6.9	6.6	6.3
31	7.55	.....	8.0	.....	8.15	.....	7.0	7.8	.....	7.0	.....	6.3

Daily discharge, in second-feet, of Rio Grande below Presidio, Tex., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2,630	1,100	415	1,750	2,590	1,190	5,650	220	1,120	1,140	360	130
2	2,380	1,090	385	1,990	2,590	1,090	5,010	190	765	890	340	125
3	2,220	1,090	385	a1,990	2,890	a955	5,650	160	a570	875	a325	125
4	a1,970	a1,090	a315	1,990	a3,090	605	a5,010	a160	610	a835	325	a125
5	1,610	1,050	295	1,880	3,530	465	4,940	155	465	780	325	120
6	1,330	1,120	280	a1,540	4,200	a325	3,740	170	a750	700	a325	115
7	a1,060	a1,190	a225	1,370	a3,430	295	a2,980	a240	1,140	a650	320	a110
8	970	1,160	185	1,370	3,510	275	2,720	640	4,610	605	320	105
9	890	1,080	185	a1,200	3,500	a230	2,460	490	a3,620	605	a315	100
10	a810	a1,000	a155	1,130	a3,490	185	a2,270	a290	3,320	a560	315	a95
11	1,210	975	125	1,130	3,620	155	2,640	240	4,040	525	285	90
12	2,180	975	400	a975	4,180	a390	3,390	150	a2,990	510	a285	85
13	a2,320	a975	a735	975	a4,460	400	a1,900	a165	2,410	a490	275	a85
14	2,210	960	740	980	4,760	385	1,700	165	2,050	575	270	80
15	1,990	945	760	a985	5,370	a320	1,330	455	a1,760	510	a265	80
16	a1,660	a825	a765	920	a4,810	275	a1,320	a1,610	1,510	a450	260	a80
17	1,550	775	1,220	895	4,180	a1,150	1,180	1,510	1,330	450	260	75
18	1,360	775	1,370	a950	4,050	1,150	1,180	1,410	a1,260	430	a260	75
19	a1,170	a675	a1,520	905	a4,050	590	a1,120	a1,990	1,300	405	220	a70
20	1,080	630	1,410	1,020	4,150	350	1,000	2,360	3,480	a365	215	70
21	1,150	590	1,210	a1,710	4,050	305	915	1,930	a5,210	365	a210	75
22	a1,380	a535	a1,150	2,010	a4,250	245	a825	a2,910	3,910	a405	175	a75
23	1,260	515	1,190	2,210	4,360	215	635	3,510	3,200	370	175	70
24	1,150	a515	1,130	a2,130	4,710	a190	440	5,010	a2,780	335	a170	65
25	a1,040	515	a1,080	1,820	a4,950	1,860	a270	a4,330	2,340	a350	165	a55
26	1,170	450	1,190	1,590	3,990	2,350	355	3,290	1,810	320	160	50
27	1,460	a450	1,110	a1,520	3,040	a3,100	310	2,380	a1,500	310	a130	50
28	a1,350	.....	a1,390	1,520	a2,330	2,140	a290	a1,850	1,350	a295	130	a50
29	1,290	.....	1,480	1,770	1,850	6,910	230	1,660	1,250	295	130	50
30	1,170	.....	1,360	a1,960	1,610	6,670	245	1,410	a1,160	340	a130	55
31	a1,050	.....	a1,510	.....	a1,290	.....	a250	a1,230	.....	a380	.....	a55

a Date of measurement.

Monthly discharge of Rio Grande below Presidio, Tex., for 1910.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
January	2,630	810	1,486	91,379
February	1,190	450	840	46,641
March	1,520	125	828	50,916
April	2,210	895	1,473	87,640
May	5,370	1,290	3,641	223,894
June	6,910	155	1,159	68,955
July	5,650	230	1,999	122,886
August	5,010	150	1,364	83,861
September	5,210	465	2,120	126,169
October	1,140	295	520	31,964
November	360	130	248	14,757
December	130	50	84	5,137
The year	6,910	50	1,320	954,189

RIO GRANDE NEAR LANGTRY, TEX.

This station was established in April, 1900, by the International Boundary Commission. It is located one-half mile south of Langtry station, on the Southern Pacific Railroad, and is about 440 miles below El Paso, Tex., at the east end of the canyon section of the Rio Grande, and a short distance to the west of the mouth of Pecos River, one of the principal tributaries of the Rio Grande.

The right (Mexican) bank is a rock bluff; the left bank is alluvial deposit for 200 feet back to a rock bluff. As the river is constantly shifting, because of alluvial deposits, frequent discharge measurements are made in order to determine closely the daily flow.

Observations at this station have been made under the direction of the United States section of the International Water Commission (prior to July 1, 1910, International Boundary Commission).

Discharge measurements of Rio Grande near Langtry, Tex., in 1910.

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

Date.	Area of section.	Gage height.	Discharge.	Date.	Area of section.	Gage height.	Discharge.
	Sq. ft.	*Feet.*	*Sec.-ft.*		*Sq. ft.*	*Feet.*	*Sec.-ft*
Jan. 1	1,148	3.2	5,569	Apr. 2	603	1.2	1,472
6	686	1.9	2,097	7	644	1.6	1,757
10	659	1.7	1,844	11	619	1.3	1,527
14	632	1.5	1,686	15	544	1.0	1,228
19	634	1.5	1,702	20	536	.9	1,186
24	577	1.05	1,373	23	535	.9	1,203
28	578	1.0	1,354	27	680	1.5	1,829
Feb. 2	582	1.1	1,302	May 3	665	1.45	1,728
7	545	.9	1,178	7	1,012	2.75	4,194
11	537	.8	1,138	12	1,001	2.6	3,973
15	503	.7	1,019	16	1,065	3.1	4,943
19	466	.6	926	20	1,131	3.25	5,212
25	441	.5	833	24	995	2.65	4,040
Mar. 2	431	.4	813	30	934	2.5	3,631
7	419	.3	768	June 1	776	2.0	2,438
11	394	.2	682	6	611	1.3	1,533
15	388	.2	658	10	499	.75	1,029
19	509	.7	1,060	15	426	.4	769
24	646	1.35	1,537	20	453	.6	922
28	624	1.25	1,486	28	1,486	4.5	8,993

Discharge measurements of Rio Grande near Langtry, Tex., in 1910—Continued.

Date.	Area of section.	Gage height.	Discharge.	Date.	Area of section.	Gage height.	Discharge.
	Sq. ft.	*Feet.*	*Sec. ft.*		*Sq. ft.*	*Feet.*	*Sec. ft.*
July 2	1,174	3.2	5,566	Oct. 6	472	0.7	1,042
7	1,144	3.2	5,430	10	472	.7	1,005
12	663	1.63	1,946	14	430	.5	842
16	624	1.45	1,602	19	410	.3	775
21	518	.75	1,100	23	401	.3	786
28	420	.35	771	28	369	.2	641
Aug. 2	388	.15	656	Nov. 2	365	.15	602
6	383	.1	636	6	365	.15	591
11	337	.05	546	10	357	.15	570
16	334	.05	533	14	355	.15	575
20	349	— .05	512	18	364	.1	580
24	614	1.25	1,534	23	361	.1	573
28	822	2.0	2,638	27	363	.15	596
Sept. 2	568	1.0	1,263	Dec. 2	354	.0	557
7	826	1.95	2,705	7	362	.1	573
11	548	.9	1,194	11	362	.1	581
15	880	2.35	3,231	15	357	.0	569
19	820	2.0	2,694	19	347	.0	563
23	1,096	3.0	4,877	23	350	.0	537
27	824	2.0	2,752	28	340	— .05	519
Oct. 2	589	1.1	1,358				

Daily gage height, in feet, of Rio Grande near Langtry, Tex., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.3	1.15	0.4	1.15	1.35	1.95	2.75	0.15	1.25	1.65	0.15	0.1
2	3.0	1.1	.4	1.2	1.35	1.85	3.1	.15	1.05	1.15	.15	.0
3	2.55	1.1	.4	1.3	1.45	1.75	2.9	.1	1.05	1.05	.15	.0
4	2.15	1.0	.35	1.35	1.65	1.55	3.0	.1	.95	.95	.15	.1
5	1.95	1.0	.35	1.45	1.85	1.4	2.65	.1	.8	.9	.2	.1
6	1.9	1.0	.3	1.6	2.05	1.9	2.75	.1	4.1	.75	.15	.1
7	1.85	.9	.3	1.6	2.65	1.45	3.15	.1	1.9	.7	.2	.1
8	1.8	.9	.3	1.7	2.65	1.25	2.55	.05	1.85	.7	.2	.1
9	1.7	.9	.3	1.75	2.75	1.15	2.05	.05	1.6	.7	.15	.1
10	1.7	.85	.2	2.1	2.55	.75	2.0	.05	1.2	.7	.15	.1
11	1.55	.8	.2	1.35	2.5	.7	1.75	.05	1.15	.6	.15	.1
12	1.45	.8	.2	1.3	2.6	.7	1.65	.15	2.6	.6	.15	.1
13	1.4	.8	.2	1.1	2.7	.5	1.7	.05	2.45	.55	.15	.1
14	1.5	.75	.2	1.1	2.8	.45	1.85	.05	2.65	.45	.15	.1
15	1.55	.7	.2	1.0	2.85	.4	2.0	.05	2.35	.45	.2	.0
16	1.65	.7	.15	1.0	3.0	.3	1.5	.05	2.35	.4	.15	.05
17	1.6	.7	.1	.9	3.15	.65	1.35	.0	1.95	.3	.1	.1
18	1.5	.7	.2	.9	3.05	.7	1.15	— .05	1.8	.3	.1	.0
19	1.5	.65	.75	.9	2.95	.6	.95	— .05	1.95	.3	.15	.0
20	1.3	.6	.95	.9	3.15	1.25	.8	— .05	1.7	.3	.1	.0
21	1.2	.55	1.15	.9	2.6	1.5	.75	— .05	1.55	.3	.1	.0
22	1.2	.55	1.25	.9	2.6	.95	.65	— .05	1.35	.3	.1	.0
23	1.2	.5	1.55	.9	2.7	.8	.5	.35	2.4	.3	.1	.0
24	1.05	.5	1.35	.9	2.7	.6	.5	1.1	2.95	.3	.1	.0
25	1.1	.5	1.25	1.2	2.7	.55	.5	.95	2.45	.3	.15	.0
26	1.0	.45	1.35	1.4	2.75	1.1	.45	.85	2.2	.25	.15	.0
27	1.0	.45	1.3	1.5	2.8	2.8	.4	1.1	2.0	.2	.15	— .05
28	1.0	.45	1.25	1.55	2.75	3.85	.35	1.9	1.95	.2	.1	— .05
29	1.0	.....	1.3	1.4	2.6	2.6	.25	1.7	1.65	.15	.1	— .05
30	1.0	.....	1.1	1.35	2.5	2.6	.25	1.45	1.9	.15	.1	— .05
31	1.0	.....	1.1	.....	2.25	.....	.15	1.35	.....	.15	.....	— .05

Daily discharge, in second-feet, of Rio Grande near Langtry, Tex., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	a5,850	1,380	795	1,440	1,680	a2,370	4,570	635	1,550	2,210	610	585
2	5,030	a1,300	a815	a1,470	1,680	2,240	a5,350	a655	a1,320	a1,440	a600	a555
3	3,830	1,300	815	1,540	a1,730	2,110	4,880	645	1,310	1,320	600	555
4	2,770	1,240	790	1,580	2,110	1,850	5,070	640	1,210	1,240	600	575
5	2,230	1,240	790	1,650	2,490	1,660	4,280	635	1,060	1,200	620	575
6	a2,100	1,240	790	1,760	2,870	a2,090	4,470	a635	7,550	a1,080	a590	575
7	2,030	a1,180	a770	a1,760	a4,000	1,670	a5,320	620	a2,630	1,030	610	a575
8	1,970	1,180	760	1,880	4,050	1,490	3,970	590	2,560	1,020	610	575
9	1,840	1,180	750	1,940	4,190	1,400	2,840	575	2,200	1,010	580	575
10	a1,840	1,160	690	2,360	3,900	a1,030	2,730	560	1,630	a1,010	a570	580
11	1,710	a1,140	a680	a1,580	3,830	990	2,170	a545	a1,590	925	570	a580
12	1,640	1,140	680	1,530	a3,970	990	a1,940	565	3,910	925	570	580
13	1,610	1,140	670	1,330	4,170	845	2,030	540	3,670	880	575	580
14	a1,690	1,080	670	1,330	4,360	805	2,290	535	3,990	a825	a575	580
15	1,730	a1,020	a660	a1,230	4,460	a770	2,550	535	a3,230	825	600	a570
16	1,810	1,020	620	1,230	a4,750	695	a1,690	a530	3,230	810	590	570
17	1,780	1,020	580	1,190	5,030	960	1,530	525	2,620	775	580	580
18	1,700	1,020	660	1,190	4,850	995	1,390	510	2,390	775	a580	565
19	a1,700	a975	a1,100	1,190	4,670	920	1,240	510	a2,620	a775	590	a565
20	1,560	925	1,240	a1,190	a5,020	a1,510	1,130	a510	2,300	780	580	555
21	1,480	880	1,390	1,190	3,950	1,730	a1,100	510	2,110	780	575	550
22	1,480	880	1,470	1,200	3,950	1,210	1,020	510	1,850	785	575	545
23	1,480	835	1,690	a1,200	4,140	1,090	895	750	a3,770	a785	a575	a535
24	a1,370	835	a1,540	1,200	a4,140	930	895	a1,380	4,770	775	575	535
25	1,390	a835	1,490	1,520	4,140	890	895	1,230	3,710	760	590	535
26	1,350	795	1,540	1,620	4,240	1,440	855	1,130	3,180	705	590	525
27	1,350	795	1,510	a1,830	4,340	5,210	810	1,460	a2,750	655	a595	520
28	a1,350	795	a1,490	1,880	4,220	a7,540	a770	a2,490	2,680	a640	585	a520
29	1,350	.....	1,520	1,730	3,870	4,240	690	2,190	2,230	620	585	520
30	1,350	.....	1,400	1,680	a3,630	4,240	690	1,810	2,600	620	585	520
31	1,350	.....	1,400	.....	3,130	.....	610	1,660	.....	620	.....	520

a Date of measurement.

Monthly discharge of Rio Grande near Langtry, Tex., for 1910.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
January	5,850	1,350	1,991	122,420
February	1,380	795	1,055	58,572
March	1,690	580	1,024	62,965
April	2,360	1,190	1,514	90,089
May	5,030	1,680	3,792	233,177
June	7,540	695	1,864	110,896
July	5,350	610	2,280	140,172
August	2,490	510	859	52,790
September	7,550	1,060	2,741	163,081
October	2,210	620	923	56,727
November	610	570	588	34,969
December	585	520	557	34,264
The year	7,550	510	1,600	1,160,122

RIO GRANDE BELOW DEVILS RIVER, TEX.

The station was established in April, 1900, by the International Boundary Commission. It is alongside the Southern Pacific Railroad track, about a mile below the mouth of Devils River and the station of Devils River, and about 480 miles below El Paso.

The bed of the river is rock for a short distance from the left bank; the right bank is alluvial deposit, overflowing in extreme high water for a distance of some 500 feet back from the river. The left bank is a loose rock fill, along which runs the Southern Pacific Railroad.

Frequent discharge measurements are made to determine closely the daily flow. The observations at this station have been made under the direction of the United States section of the International Water Commission (prior to July 1, 1910, International Boundary Commission),

Discharge measurements of Rio Grande below Devils River, Tex., in 1910.

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

Date.	Area of section.	Gage height.	Discharge.	Date.	Area of section.	Gage height.	Discharge.
	Sq.-ft.	*Feet.*	*Sec.-ft.*		*Sq.-ft.*	*Feet.*	*Sec.-ft.*
Jan. 5	1,123	4.3	2,909	July 10	1,180	4.6	3,724
9	1,084	4.3	2,881	15	1,129	4.15	2,532
13	1,096	4.2	2,640	20	913	3.85	2,018
18	1,072	4.1	2,518	26	836	3.6	1,606
22	1,078	4.0	2,411	31	772	3.5	1,363
27	1,074	4.0	2,398	Aug. 5	753	3.45	1,263
31	1,053	3.9	2,219	10	749	3.4	1,266
Feb. 5	1,003	3.8	1,961	15	730	3.4	1,215
10	994	3.8	1,924	19	728	3.4	1,207
14	952	3.7	1,776	23	852	3.7	1,735
17	952	3.7	1,746	27	1,170	4.35	2,990
24	932	3.65	1,639	31	1,175	4.45	3,077
28	921	3.6	1,617	Sept. 5	992	4.0	2,165
Mar. 5	907	3.5	1,432	10	1,700	4.5	3,654
10	873	3.5	1,429	14	1,500	4.5	3,346
14	860	3.45	1,394	18	1,313	4.5	3,328
18	919	3.6	1,644	22	1,233	4.2	2,622
23	1,119	4.1	2,492	26	1,462	5.0	4,766
27	1,105	3.9	2,254	30	1,370	4.4	3,062
31	1,106	4.0	2,327	Oct. 5	1,343	4.5	3,292
Apr. 6	1,099	4.0	2,306	9	1,033	4.0	2,279
10	1,180	4.3	2,918	13	947	3.8	1,889
14	1,106	4.0	2,345	18	925	3.7	1,668
19	1,072	3.85	2,154	22	903	3.7	1,580
22	1,027	3.8	2,069	26	917	3.7	1,590
26	1,028	3.8	2,043	31	884	3.6	1,481
30	1,123	4.1	2,379	Nov. 5	886	3.6	1,424
May 6	1,258	4.35	3,149	9	887	3.6	1,442
11	1,298	4.65	4,147	13	889	3.6	1,410
15	1,276	4.8	4,302	17	888	3.6	1,421
19	1,345	5.0	4,912	22	877	3.6	1,367
23	1,646	4.9	4,695	26	869	3.6	1,355
27	1,585	4.9	4,824	30	877	3.55	1,350
June 3	1,148	4.3	3,040	Dec. 5	885	3.55	1,365
9	946	3.9	2,028	10	875	3.5	1,328
14	863	3.65	1,631	14	882	3.5	1,332
18	870	3.65	1,633	18	869	3.5	1,330
23	1,017	3.85	2,038	22	854	3.5	1,349
30	1,329	4.85	4,717	27	861	3.5	1,291
July 6	1,189	4.7	3,989	31	859	3.5	1,287

Daily gage height, in feet, of Rio Grande below Devils River, Tex., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	5.25	4.0	3.6	3.9	4.1	4.45	4.75	3.5	4.2	4.5	3.6	3.55
2	4.65	4.0	3.55	3.9	4.0	4.35	4.7	3.45	4.1	4.35	3.6	3.55
3	4.4	3.9	3.55	3.9	4.0	4.3	5.2	3.45	4.0	4.4	3.6	3.55
4	4.35	3.9	3.5	3.9	4.05	4.25	5.55	3.45	4.0	4.75	3.6	3.55
5	4.3	3.8	3.5	4.0	4.2	4.2	4.95	3.45	3.95	4.5	3.6	3.55
6	4.35	3.8	3.5	4.0	4.35	4.1	4.75	3.45	10.7	4.25	3.6	3.55
7	4.35	3.8	3.5	4.1	4.5	4.6	5.25	3.45	7.5	4.05	3.6	3.55
8	4.3	3.8	3.5	4.1	4.75	4.05	4.9	3.4	5.6	4.0	3.6	3.55
9	4.3	3.8	3.5	5.1	4.7	3.9	4.7	3.4	4.85	3.95	3.6	3.5
10	4.2	3.8	3.5	4.3	4.8	3.85	4.7	3.4	4.4	3.9	3.6	3.5
11	4.1	3.7	3.5	4.25	4.65	3.8	4.75	3.4	4.2	3.9	3.6	3.5
12	4.2	3.7	3.5	4.2	4.65	3.75	4.3	3.4	4.85	3.85	3.6	3.5
13	4.2	3.7	3.5	4.0	4.7	3.75	4.2	3.4	4.85	3.8	3.6	3.5
14	4.1	3.7	3.45	4.0	4.75	3.65	4.15	3.4	4.65	3.8	3.6	3.5
15	4.1	3.8	3.45	3.9	4.9	3.6	4.25	3.4	4.9	3.8	3.6	3.5
16	4.15	3.7	3.45	3.9	5.45	3.6	4.35	3.45	4.7	3.75	3.6	3.5
17	4.25	3.7	3.45	3.9	5.05	3.6	4.25	3.4	4.6	3.75	3.6	3.5
18	4.1	3.7	3.5	3.85	5.15	3.7	4.15	3.4	4.5	3.7	3.6	3.5
19	4.15	3.7	3.45	3.85	5.0	3.7	3.95	3.4	4.35	3.7	3.6	3.5
20	4.1	3.7	3.55	3.8	6.5	3.7	3.85	3.4	4.2	3.7	3.6	3.5
21	4.05	3.7	3.8	3.8	5.4	4.05	3.8	3.4	4.2	3.7	3.6	3.5
22	4.0	3.65	3.95	3.8	5.0	4.05	3.75	3.5	4.15	3.7	3.6	3.5
23	4.0	3.65	4.1	3.8	4.9	3.8	3.75	3.7	4.1	3.7	3.6	3.5
24	3.9	3.65	4.05	3.8	4.9	3.75	3.7	3.65	5.15	3.7	3.6	3.5
25	3.9	3.6	3.95	3.8	4.9	3.6	3.6	3.8	4.95	3.7	3.6	3.5
26	3.9	3.6	3.9	3.8	4.9	4.05	3.6	3.95	4.9	3.7	3.6	3.5
27	3.9	3.6	3.9	3.8	4.9	5.15	3.6	4.55	4.65	3.65	3.55	3.5
28	3.9	3.6	3.9	3.85	4.95	5.8	3.5	4.8	4.5	3.65	3.55	3.5
29	3.9	.....	3.9	4.1	4.9	5.35	3.5	4.75	4.5	3.6	3.55	3.5
30	3.9	.....	3.9	4.1	4.9	4.8	3.5	4.65	4.4	3.6	3.55	3.5
31	3.9	.....	4.0	.....	4.6	.....	3.5	4.45	.....	3.6	.....	3.5

Daily discharge, in second-feet, of Rio Grande below Devils River, Tex., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	5,900	2,330	1,600	2,200	2,380	3,630	4,390	1,360	2,750	3,290	1,470	1,350
2	4,010	2,310	1,530	2,200	2,180	3,240	4,200	1,280	2,370	2,950	1,460	1,360
3	3,220	2,150	1,520	2,200	2,180	a3,040	5,540	1,270	2,170	3,060	1,450	1,360
4	3,060	2,120	1,440	2,200	2,320	2,910	6,470	1,270	2,170	3,870	1,430	1,360
5	a2,910	a1,960	a1,430	2,310	2,730	2,790	4,740	a1,260	a2,070	a3,290	a1,420	a1,370
6	3,020	1,950	1,430	a2,310	3,150	2,530	a4,120	1,280	27,440	2,780	1,430	1,360
7	3,010	1,950	1,430	2,510	3,530	3,800	5,450	1,290	15,180	2,380	1,430	1,360
8	2,890	1,940	1,430	2,510	4,170	2,410	4,520	1,240	7,880	2,280	1,440	1,360
9	a2,880	1,930	1,430	5,510	4,040	a2,030	3,990	1,260	5,000	a2,180	a1,440	1,330
10	2,640	a1,920	a1,430	a2,920	4,300	1,950	a3,990	a1,270	a3,440	2,080	1,430	a1,330
11	2,400	1,780	1,430	2,820	a4,150	1,870	4,120	1,260	3,020	2,080	1,430	1,330
12	2,640	1,780	1,430	2,730	4,150	1,790	2,930	1,250	4,320	1,990	1,420	1,330
13	a2,640	1,780	1,430	2,350	4,200	1,790	2,660	1,240	4,320	a1,890	a1,410	1,330
14	2,520	a1,780	a1,390	a2,350	4,250	a1,630	2,530	1,230	a3,760	1,880	1,410	a1,330
15	2,520	1,910	1,390	2,220	a4,610	1,550	a2,700	a1,220	4,470	1,860	1,420	1,330
16	2,580	1,760	1,390	2,220	6,280	1,550	2,870	1,270	3,900	1,770	1,420	1,330
17	2,700	a1,750	1,390	2,220	5,060	1,550	2,700	1,210	3,610	1,760	a1,420	1,330
18	a2,520	1,740	a1,450	2,150	5,370	a1,730	2,530	1,210	a3,330	a1,670	1,410	a1,330
19	2,570	1,730	1,390	a2,150	a4,910	1,730	2,190	a1,210	3,000	1,650	1,400	1,330
20	2,520	1,720	1,560	2,070	11,760	1,730	a2,020	1,210	2,670	1,620	1,390	1,340
21	2,460	1,720	1,980	2,070	6,690	2,440	1,940	1,210	2,650	1,600	1,380	1,350
22	a2,410	1,650	2,240	a2,070	5,080	2,440	1,850	1,380	a2,520	a1,580	a1,370	a1,350
23	2,410	1,640	a2,490	2,060	a4,700	a1,940	1,850	a1,740	2,420	1,580	1,360	1,340
24	2,260	a1,640	2,430	2,060	4,730	1,840	1,770	1,640	5,220	1,590	1,360	1,330
25	2,260	1,620	2,310	2,050	4,760	1,540	1,610	1,930	4.640	1,590	1,360	1,320
26	2,260	1,620	2,250	a2,040	4,790	2,680	a1,610	2,220	a4,520	a1,590	a1,360	1,300
27	a2,260	1,620	a2,250	2,040	a4,820	5,480	1,610	a3,490	3,840	1,540	1,350	a1,290
28	2,250	a1,620	2,250	2,100	4,920	8,200	1,420	4,110	3,410	1,540	1,350	1,290
29	2,240	.....	2,250	2,380	4,820	6,120	1,400	3,970	3,360	1,480	1,350	1,290
30	2,230	.....	2,250	a2,380	4,820	a4,590	1,380	3,670	a3,060	1,480	a1,350	1,290
31	2,220	.....	a2,330	.....	4,220	.....	1,360	a3,080	.....	a1,480	.....	a1,290

a Date of measurement.

Monthly discharge of Rio Grande below Devils River, Tex., for 1910.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
January	5,900	2,220	2,723	167,425
February	2,330	1,620	1,836	101,990
March	2,490	1,390	1,740	107,008
April	5,510	2,040	2,380	141,620
May	11,760	2,180	4,518	277,825
June	8,200	1,540	2,751	163,676
July	6,470	1,360	2,983	183,392
August	4,110	1,210	1,727	106,175
September	27,440	2,070	4,744	282,307
October	3,870	1,480	2,045	125,712
November	1,470	1,350	1,404	83,544
December	1,370	1,290	1,332	81,898
The year	11,760	1,210	2,520	1,822,572

RIO GRANDE AT EAGLE PASS, TEX.

The station was established in April, 1900, by the International Boundary Commission. It is one-half mile above the highway bridge between Eagle Pass, Tex., and Ciudad Porfirio Diaz, Mexico, and about 540 miles below El Paso.

The right bank is alluvial deposit, with a bottom back of it about 1,500 feet wide, which begins to overflow at gage height 22 feet. The left bank is shale rock rising abruptly from the river. The bed of the stream is constantly shifting, and frequent discharge measurements are necessary to determine closely the daily discharge. The section is subject to overflow at high stages. At low water the depth is considerable and the velocity slow.

The observations at this station have been made under the direction of the United States section of the International Water Commission (prior to July 1, 1910, International Boundary Commission).

Discharge measurements of Rio Grande at Eagle Pass, Tex., in 1910.

[By J. K. Wilson.]

Date.	Area of section.	Gage height.	Discharge.	Date.	Area of section.	Gage height.	Discharge.
	Sq. ft.	*Feet.*	*Sec.-ft.*		*Sq. ft.*	*Feet.*	*Sec.-ft.*
Jan. 3	1,682	2.8	5,054	Mar. 16	816	0.8	1,076
6	1,434	2.0	3,034	19	823	0.8	1,076
9	1,407	1.9	2,943	22	1,040	1.5	1,874
20	1,333	1.8	2,684	25	1,080	1.5	1,901
27	1,195	1.5	2,304	28	1,048	1.5	1,741
31	1,141	1.5	2,198	31	1,276	2.05	2,971
Feb. 3	1,189	1.5	2,436	Apr. 3	1,474	1.7	2,922
6	1,214	1.5	2,457	6	1,112	1.7	2,481
9	1,139	1.4	2,229	10	2,070	3.75	8,502
12	1,110	1.3	2,073	13	1,376	2.0	3,120
15	1,091	1.3	1,978	16	1,385	1.5	2,501
18	1,088	1.2	1,958	19	1,390	1.5	2,533
21	1,098	1.2	1,942	22	1,316	1.4	2,361
24	1,074	1.2	1,917	25	1,343	1.3	2,240
28	1,091	1.2	1,924	28	1,254	1.2	1,997
Mar. 3	937	1.0	1,435	30	1,244	1.25	1,972
6	962	1.0	1,454	May 3	1,290	1.5	2,263
9	934	0.9	1,347	6	1,275	1.5	2,201
13	849	0.8	1,145	9	1,705	2.5	4,043

Discharge measurements of Rio Grande at Eagle Pass, Tex., in 1910—Continued.

Date.	Area of section.	Gage height.	Discharge.	Date.	Area of section.	Gage height.	Discharge.
	Sq. ft.	*Feet.*	*Sec.-ft.*		*Sq. ft.*	*Feet.*	*Sec.-ft.*
May 13	1,694	2.5	3,990	Sept. 8	3,589	4.85	14,701
16	1,714	2.7	4,867	12	2,054	1.5	4,556
19	2,149	3.1	5,798	15	2,538	3.0	6,846
22	2,130	3.1	6,140	18	1,898	2.3	4,023
26	1,811	2.7	5,389	21	1,883	1.6	4,877
28	1,748	2.5	4,817	24	1,708	1.6	4,219
31	1,716	2.6	5,092	27	2,125	2.5	5,364
June 3	1,344	2.3	3,870	30	1,906	2.0	4,519
6	1,279	2.0	3,625	Oct. 3	1,890	1.9	4,948
9	1,223	1.5	3,166	6	1,856	2.05	4,267
12	1,106	1.2	2,621	9	1,557	1.5	3,159
15	960	1.1	1,913	12	1,482	1.5	2,951
18	961	1.0	2,152	15	1,409	1.5	2,717
21	955	1.0	1,888	18	1,352	1.0	2,245
24	1,099	1.0	2,124	21	1,327	1.0	2,268
28	1,591	2.4	5,814	24	1,312	0.9	2,174
30	1,706	3.0	6,254	27	1,315	.9	2,076
July 3	1,577	2.4	5,944	31	1,299	.8	1,878
7	1,634	2.6	5,449	Nov. 3	1,273	.8	1,791
10	1,445	2.3	3,877	6	1,256	.8	1,760
13	1,139	1.65	2,324	9	1,232	.7	1,653
16	1,219	1.5	2,276	12	1,250	.7	1,625
19	1,166	1.5	2,210	15	1,247	.7	1,720
22	1,151	1.5	2,148	19	1,259	.7	1,611
25	1,116	1.2	2,098	21	1,262	.7	1,659
28	1,048	1.2	1,964	24	1,258	.7	1,661
31	990	1.0	1,669	27	1,284	.7	1,602
Aug. 3	877	.7	1,314	30	1,266	.7	1,606
6	849	.6	1,234	Dec. 3	1,251	.7	1,659
10	836	.6	1,140	6	1,272	.7	1,605
13	807	.6	1,089	9	1,242	.7	1,584
16	831	.6	1,169	12	1,274	.7	1,650
19	855	.6	1,258	15	1,270	.7	1,648
22	859	.6	1,178	18	1,262	.7	1,673
25	879	.6	1,228	21	1,258	.7	1,683
28	1,336	1.95	2,879	24	1,255	.7	1,646
31	1,461	2.3	3,441	27	1,240	.7	1,582
Sept. 3	1,083	1.7	2,264	31	1,223	.7	1,575
6	986	1.4	1,803				

Daily gage height, in feet, of Rio Grande at Eagle Pass, Tex., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.65	1.5	1.0	1.9	1.5	2.55	2.4	0.75	2.05	2.0	0.8	0.7
2	3.1	1.5	1.0	1.7	1.5	2.45	2.4	.7	1.85	2.15	.8	.7
3	2.85	1.5	1.0	1.7	1.5	2.3	2.4	.7	1.7	1.9	.8	.7
4	2.8	1.5	1.0	1.7	1.5	2.1	2.5	.65	1.6	2.05	.8	.7
5	2.3	1.5	1.0	1.7	1.5	2.0	2.95	.6	1.6	3.2	.8	.7
6	2.0	1.45	1.0	1.7	1.5	2.0	2.7	.6	1.4	2.2	.8	.7
7	2.0	1.4	1.0	1.7	1.75	1.95	2.6	.6	10.2	1.75	.8	.7
8	2.0	1.4	1.0	1.8	2.35	1.7	2.8	.6	4.4	1.55	.7	.7
9	1.9	1.3	.9	5.1	2.5	1.45	2.7	.6	2.95	1.5	.7	.7
10	1.9	1.3	.9	3.35	2.5	1.25	2.3	.6	2.7	1.5	.7	.7
11	1.8	1.3	.9	2.3	2.5	1.2	2.3	.6	2.3	1.5	.7	.7
12	1.8	1.3	.8	2.0	2.5	1.2	1.8	.6	1.6	1.5	.7	.7
13	1.75	1.3	.8	2.0	2.5	1.2	1.65	.6	2.25	1.5	.7	.7
14	1.7	1.3	.8	2.25	2.5	1.1	1.5	.6	2.5	1.5	.7	.7
15	1.7	1.3	.8	1.85	2.6	1.05	1.5	.6	2.9	1.5	.7	.7
16	1.7	1.3	.8	1.5	2.7	1.0	1.5	.6	2.7	1.1	.7	.7
17	1.85	1.25	.8	1.5	3.25	1.0	1.5	.6	2.5	1.1	.7	.7
18	2.0	1.2	.8	1.5	3.1	1.0	1.5	.6	2.3	1.0	.7	.7
19	1.95	1.2	2.55	1.5	3.1	1.0	1.5	.6	2.25	1.0	.7	.7
20	1.85	1.2	1.3	1.5	4.25	1.0	1.5	.6	1.6	1.0	.7	.7
21	1.8	1.2	1.3	1.4	4.55	1.0	1.5	.6	1.6	1.0	.7	.7
22	1.8	1.2	1.5	1.4	3.1	1.0	1.5	.6	1.6	1.0	.7	.7
23	1.75	1.2	1.5	1.3	2.7	1.0	1.5	.6	1.6	.9	.7	.7
24	1.7	1.2	1.55	1.3	2.6	1.0	1.2	.6	1.6	.9	.7	.7
25	1.7	1.2	1.5	1.3	2.65	1.0	1.2	.75	3.1	.9	.7	.7
26	1.7	1.2	1.5	1.2	2.7	1.0	1.2	1.3	2.8	.9	.7	.7
27	1.5	1.2	1.5	1.2	2.7	1.0	1.2	1.4	2.5	.9	.7	.7
28	1.5	1.2	1.5	1.2	2.5	2.4	1.2	1.75	2.3	.9	.7	.7
29	1.5	.....	1.5	1.2	2.5	4.1	1.2	1.85	2.1	.9	.7	.7
30	1.5	.....	2.95	1.35	2.5	3.0	1.2	1.75	2.0	.9	.7	.7
31	1.5	.....	2.25	.....	2.6	.....	.95	2.3	.....	.8	.....	.7

Daily discharge, in second-feet, of Rio Grande at Eagle Pass, Tex., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	4,770	2,280	1,620	2,950	2,260	4,830	5,940	1,370	2,950	4,720	1,850	1,620
2	5,360	2,360	1,530	2,920	2,260	4,430	5,940	1,310	2,560	5,170	1,820	1,640
3	a5,150	a2,440	a1,430	a2,920	a2,260	a3,870	a5,940	a1,310	a2,260	a4,950	a1,790	a1,660
4	5,050	2,440	1,440	2,780	2,240	3,710	6,140	1,270	2,110	5,210	1,780	1,640
5	3,790	2,450	1,450	2,630	2,220	3,620	7,040	1,230	2,110	7,180	1,770	1,620
6	a3,030	a2,460	a1,450	a2,480	a2,200	a3,620	5,900	a1,230	a1,800	a4,640	a1,760	a1,610
7	3,030	2,360	1,450	2,480	2,660	3,580	a5,450	1,210	53,000	3,660	1,760	1,600
8	3,030	2,270	1,450	2,600	3,760	3,350	5,850	1,190	a13,340	3,260	1,650	1,590
9	a2,940	2,230	a1,350	14,800	a4,040	a3,120	5,460	1,160	8,950	a3,160	a1,650	a1,580
10	2,930	a2,110	1,320	a7,200	4,030	2,830	a3,880	a1,140	8,190	3,090	1,640	1,610
11	2,780	2,090	1,300	3,790	4,020	2,700	3,880	1,120	6,980	3,020	1,640	1,630
12	2,770	a2,070	1,170	3,120	4,000	a2,620	2,680	1,110	a4,860	a2,950	a1,630	a1,650
13	2,690	2,040	a1,150	a3,120	a3,990	2,420	a2,320	a1,090	5,690	2,870	1,660	1,650
14	2,610	2,010	1,120	3,620	4,080	2,110	2,280	1,120	6,080	2,800	1,690	1,650
15	2,600	a1,980	1,100	3,020	4,470	a1,860	2,280	1,140	a6,690	a2,720	a1,720	a1,650
16	2,590	1,980	a1,080	a2,500	a4,870	1,930	a2,280	1,170	5,700	2,340	1,690	1,660
17	2,790	1,970	1,080	2,510	6,520	2,040	2,250	1,200	4,860	2,340	1,670	1,660
18	2,990	a1,960	1,080	2,520	5,800	a2,150	2,230	1,230	a4,020	a2,250	1,640	a1,670
19	2,900	1,950	a4,430	a2,530	a5,800	2,060	a2,210	a1,260	4,160	2,250	a1,610	1,680
20	a2,750	1,950	1,650	2,520	10,790	1,980	2,190	1,230	3,390	2,260	1,640	1,680
21	2,680	a1,940	1,650	2,380	12,120	a1,890	2,170	1,200	3,000	a2,270	a1,660	a1,680
22	2,680	1,930	a1,870	a2,360	a6,140	1,970	a2,150	a1,180	3,800	2,270	1,660	1,670
23	2,620	1,930	1,880	2,240	5,390	2,050	2,150	1,190	4,010	2,170	1,660	1,660
24	2,560	a1,920	1,940	2,240	5,190	a2,120	2,100	1,210	a4,220	a2,170	a1,660	a1,650
25	2,560	1,920	a1,900	a2,240	5,390	2,120	a2,100	a1,410	6,470	2,140	1,640	1,630
26	2,560	1,920	1,850	2,080	a5,390	2,120	2,050	2,080	5,920	2,110	1,620	1,600
27	a2,300	1,920	1,790	2,040	5,390	2,120	2,010	2,200	a5,360	a2,080	a1,600	a1,580
28	2,280	1,920	a1,740	a2,000	a4,820	a5,810	a1,960	a2,680	5,030	2,050	1,600	1,580
29	2,250	.....	1,740	2,000	4,820	10,900	1,920	2,780	4,690	2,030	1,600	1,580
30	2,220	.....	5,430	a2,090	4,820	a6,250	1,870	2,680	4,520	2,000	a1,610	1,580
31	a2,200	.....	a3,520	.....	a5,090	.....	a1,620	a3,440	.....	a1,880	.....	a1,570

a Date of measurement.

Monthly discharge of Rio Grande at Eagle Pass, Tex., for 1910.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
January	5,630	2,200	3,024	185,911
February	2,460	1,920	2,100	116,628
March	5,430	1,080	1,773	109,012
April	14,800	2,000	3,156	187,795
May	12,120	2,200	4,736	291,233
June	10,900	1,860	3,206	190,770
July	7,040	1,620	3,363	206,757
August	3,440	1,090	1,488	91,517
September	53,000	1,800	6,577	391,379
October	7,180	1,880	3,033	186,466
November	1,850	1,600	1,679	99,908
December	1,680	1,570	1,630	100,225
The year	1,080	53,000	2,980	2,157,601

RIO GRANDE NEAR LAREDO, TEX.

The station was established near Nuevo Laredo, Mexico, in April, 1900, by the International Boundary Commission. It was intended to measure the river from the highway bridge connecting Laredo, Tex., with Nuevo Laredo, Tamaulipas, and the gage was established on the right bank just above the bridge. Measurements were kept up

by the Mexican section of the commission until September 24, 1900, and gage heights were read until February 28, 1903, but the results were so conflicting that the station was abandoned. In July, 1903, a cable station was established by the commission about 2 miles above Nuevo Laredo, and on August 1, 1903, regular meter measurements and gage heights were started. The new gage heights are not comparable with the old. The station is about 670 miles below El Paso.

The river bed at the new station is constantly shifting, and frequent discharge measurements are made to determine closely the daily discharge. The banks at the new station are not subject to overflow.

The observations at these stations have been made under the direction of the Mexican section of the International Water Commission (prior to July 1, 1910, International Boundary Commission).

Discharge measurements and gage heights for the years 1900 to 1904, which had not hitherto been published by the United States Geological Survey, are given in Water-Supply Paper 248.

Discharge measurements of Rio Grande near Laredo, Tex., in 1910.

[By L. Varela.]

Date.	Area of section.	Gage height.	Discharge.	Date.	Area of section.	Gage height.	Discharge.
	Sq. ft.	*Feet.*	*Sec.-ft.*		*Sq. ft.*	*Feet.*	*Sec.-ft.*
Jan. 3	1,940	4.5	6,041	July 7	1,573	4.05	4,139
11	1,545	3.3	2,731	9	1,778	4.15	5,228
18	1,432	2.9	2,374	16	1,520	2.9	2,370
21	1,473	3.1	2,614	22	1,351	2.5	1,868
25	1,428	2.9	2,248	27	1,226	2.2	1,469
31	1,356	2.7	2,232	31	1,133	1.9	1,242
Feb. 5	1,396	2.7	2,306	Aug. 5	1,097	1.8	1,011
11	1,310	2.5	1,862	11	1,031	1.6	1,103
16	1,259	2.3	1,777	16	960	1.6	967
20	1,205	2.3	1,605	20	919	1.7	1,024
25	1,206	2.2	1,669	26	1,052	1.6	1,270
28	1,194	2.2	1,601	30	1,849	3.8	4,127
Mar. 5	1,153	2.0	1,460	31	1,793	3.95	4,391
12	1,148	2.0	1,552	Sept. 6	1,443	2.7	2,343
17	1,085	1.9	1,216	8	4,598	10.75	26,160
21	1,638	3.65	3,699	14	2,370	4.1	5,259
26	1,347	2.6	2,167	20	1,622	3.6	4,050
31	1,329	2.55	1,995	26	1,439	2.9	2,619
Apr. 7	1,318	2.7	2,194	30	1,602	3.7	3,890
10	3,058	7.4	16,802	Oct. 4	2,851	7.4	14,240
15	1,487	3.1	2,645	11	1,330	2.7	2,459
21	1,331	2.6	1,973	15	1,260	2.6	2,193
26	1,296	2.4	1,892	20	1,182	2.4	1,880
30	1,364	2.6	2,083	26	1,164	2.3	1,881
May 5	1,437	2.7	2,272	31	1,128	2.1	1,545
8	1,569	3.0	2,818	Nov. 5	1,141	2.1	1,685
13	1,786	3.8	4,299	10	1,102	2.1	1,579
18	2,831	6.6	13,130	21	1,085	2.1	1,559
26	1,742	3.8	4,336	26	1,025	2.1	1,417
31	2,236	4.1	4,760	30	1,089	2.1	1,507
June 6	1,632	3.5	3,452	Dec. 6	1,079	2.0	1,541
11	1,447	2.7	2,313	11	1,080	2.0	1,578
15	1,225	2.2	1,717	16	1,052	2.1	1,557
20	1,139	1.9	1,427	21	1,055	2.1	1,335
25	1,448	2.8	2,408	26	1,027	2.0	1,295
26	1,788	4.25	5,040	30	1,062	2.0	1,536
30	2,196	4.7	7,241				

Daily gage height, in feet, of Rio Grande near Laredo, Tex., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.4	2.7	2.1	4.05	2.8	4.0	4.35	1.9	4.05	3.4	2.1	2.1
2	2.4	2.7	2.1	3.5	2.8	3.75	3.95	1.9	3.7	3.3	2.1	2.1
3	4.45	2.7	2.05	3.0	2.8	3.55	3.65	1.9	3.3	3.45	2.0	2.0
4	4.25	2.7	2.0	2.75	2.8	3.65	3.35	1.85	3.05	7.05	2.2	2.0
5	4.05	2.7	2.0	2.7	2.65	4.15	3.65	1.8	2.9	5.35	2.1	2.0
6	3.85	2.7	2.0	2.65	2.6	3.5	4.05	1.8	2.7	4.65	2.1	2.0
7	3.65	2.65	2.0	2.65	2.65	3.05	3.95	1.8	2.8	3.95	2.1	2.0
8	3.5	2.6	2.0	2.8	3.05	2.95	3.75	1.7	10.8	3.6	2.1	2.0
9	3.4	2.55	2.0	2.8	3.45	2.7	4.15	1.6	5.25	3.35	2.1	2.0
10	3.35	2.5	2.0	6.85	3.8	2.65	4.05	1.6	4.45	3.15	2.1	2.0
11	3.25	2.45	1.95	5.35	3.7	2.6	3.65	1.6	4.2	2.7	2.1	2.0
12	3.15	2.4	2.0	4.3	3.9	2.55	3.55	1.6	3.7	2.7	2.1	2.0
13	3.1	2.4	2.0	3.8	3.75	2.3	3.25	1.6	3.4	2.7	2.1	2.0
14	3.2	2.35	1.9	3.25	3.7	2.2	3.1	1.6	4.65	2.6	2.2	2.05
15	3.15	2.3	1.9	3.1	3.7	2.15	3.05	1.6	4.8	2.6	2.2	2.1
16	3.05	2.3	1.9	3.75	3.75	2.1	2.9	1.6	5.7	2.5	2.1	2.1
17	3.0	2.3	1.9	3.15	3.9	2.1	3.1	1.55	4.2	2.45	2.1	2.1
18	2.9	2.3	1.8	2.85	6.4	2.1	3.4	1.6	3.85	2.4	2.1	2.1
19	3.15	2.3	1.9	2.7	4.6	1.95	3.0	1.65	3.65	2.4	2.1	2.0
20	3.15	2.3	2.0	2.6	4.1	1.9	2.85	1.7	3.55	2.4	2.1	2.05
21	3.1	2.3	3.45	2.55	4.95	2.05	2.55	1.7	3.3	2.35	2.1	2.1
22	3.05	2.3	2.35	2.5	5.45	2.1	2.5	1.65	3.2	2.2	2.1	2.1
23	2.95	2.3	2.25	2.5	4.4	2.1	2.45	1.6	3.1	2.1	2.2	2.1
24	2.9	2.2	2.3	2.5	3.95	2.1	2.4	1.6	3.0	2.1	2.1	2.05
25	2.85	2.2	2.5	2.45	3.8	4.0	2.3	1.6	2.9	2.2	2.2	2.0
26	2.8	2.2	2.6	2.4	3.8	3.7	2.2	1.8	3.35	2.3	2.2	2.0
27	2.75	2.2	2.75	2.5	3.85	2.4	2.2	2.1	4.1	2.3	2.2	2.0
28	2.7	2.2	2.6	2.45	4.05	2.25	2.2	2.3	3.9	2.3	2.1	2.0
29	2.65	.....	2.5	2.5	4.15	2.25	2.1	2.45	3.7	2.25	2.1	2.0
30	2.7	.....	2.5	2.65	4.2	4.75	2.05	3.7	3.6	2.15	2.1	2.0
31	2.7	.....	2.55	.....	4.1	.....	1.9	3.95	.....	2.1	.....	2.0

RIO GRANDE NEAR ROMA, TEX.

The station was established in 1900 by the International Boundary Commission. It is near Roma, Tex., 775 miles, by river, below El Paso.

The right bank is alluvial deposits and overflows in high water for a width of 250 feet. The overflow section is thickly covered with mesquite brush. The left bank is of hard material, and does not overflow.

The river bed is constantly shifting, and frequent discharge measurements are necessary to determine closely the daily discharge.

The highest recorded flood, September 16, 1904, marked 26 feet on the gage.

The observations at this section have been made under the direction of the Mexican section of the International Water Commission (prior to July 1, 1910, International Boundary Commission).

Discharge measurements and gage heights for the years 1900 to 1904, which had not hitherto been published by the United States Geological Survey, are given in Water-Supply Paper 248.

Discharge measurements of Rio Grande near Roma, Tex., in 1910.

[By H. P. Guerra.]

Date.	Area of section.	Gage height.	Discharge.	Date.	Area of section.	Gage height.	Discharge.
	Sq. ft.	*Feet.*	*Sec.-ft.*		*Sq. ft.*	*Feet.*	*Sec.-ft.*
Jan. 2	1,513	3.6	2,803	July 2	2,668	6.0	8,093
6	2,565	5.6	6,819	6	2,194	4.8	4,795
10	2,459	5.0	5,483	10	2,331	5.2	5,590
14	2,417	4.8	4,857	14	1,954	4.4	3,475
18	1,988	4.3	3,442	18	1,523	3.8	2,897
22	1,993	4.3	3,458	22	1,683	4.2	3,312
26	1,989	4.3	3,452	26	1,260	3.2	2,253
30	1,585	3.8	3,059	31	1,156	3.0	2,030
Feb. 2	1,595	3.8	3,091	Aug 2	1,152	3.0	2,025
6	1,558	3.8	3,038	6	736	2.5	1,204
10	1,546	3.8	3,026	10	698	2.4	1,134
14	1,546	3.8	3,030	14	678	2.3	1,042
17	1,522	3.6	2,828	18	678	2.3	1,049
20	1,320	3.2	2,337	22	660	2.3	1,039
24	1,323	3.2	2,355	26	656	2.3	1,034
26	1,317	3.2	2,332	31	1,372	3.8	2,409
Mar. 2	1,164	3.0	2,045	Sept. 1	4,180	9.2	18,341
6	1,166	3.0	2,047	5	2,406	5.5	6,394
10	1,166	3.0	2,051	9	5,450	11.8	28,003
14	1,075	2.8	1,855	14	4,704	11.0	24,084
18	1,080	2.8	1,867	17	9,184	20.0	77,338
23	2,573	5.6	6,853	20	5,739	12.8	30,600
27	1,507	3.6	2,799	24	3,331	7.1	14,032
31	1,501	3.6	2,758	27	2,968	6.3	9,950
Apr. 2	2,529	5.6	6,719	30	2,970	6.3	9,953
6	2,177	4.8	4,755	Oct. 2	2,836	6.2	8,762
10	2,089	4.5	3,725	4	3,970	8.7	17,888
11	3,139	6.6	11,378	9	2,623	5.9	7,753
15	2,167	4.8	4,702	14	1,988	4.5	3,792
19	1,576	4.2	3,027	18	1,954	4.4	3,487
22	1,559	4.0	2,955	22	1,613	4.0	3,057
26	1,325	3.2	2,347	26	1,540	3.8	2,711
29	1,335	3.3	2,371	31	1,510	3.8	2,645
May 1	1,291	3.2	2,311	Nov. 2	1,529	3.8	2,660
5	1,509	3.8	2,879	6	1,413	3.6	2,358
9	2,484	5.6	6,604	10	1,409	3.6	2,342
14	2,338	5.2	5,601	14	1,361	3.4	2,096
19	3,575	7.7	16,133	18	1,361	3.4	2,099
23	3,352	7.3	15,197	22	1,362	3.4	2,100
26	2,321	5.2	5,576	26	1,364	3.4	2,106
30	2,470	5.6	6,565	30	1,360	3.4	2,095
June 2	2,553	5.8	7,593	Dec. 2	1,300	3.3	2,001
7	3,869	8.2	17,443	6	1,233	3.1	1,873
10	2,325	5.2	5,575	10	1,203	3.0	1,620
14	1,968	4.4	3,511	14	1,191	3.0	1,576
18	1,313	3.2	2,265	18	1,254	3.2	1,924
22	1,173	3.0	2,065	22	1,188	3.0	1,573
25	1,165	3.0	2,041	26	1,186	3.0	1,573
27	2,360	5.3	5,735	30	1,188	3.0	1,575
30	1,573	4.0	2,976				

Daily gage height, in feet, of Rio Grande near Roma, Tex., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.4	3.8	3.15	3.6	3.25	5.6	4.85	3.0	8.25	6.2	3.8	3.3
2	3.5	3.8	3.05	5.25	3.5	5.7	5.85	2.95	9.55	6.2	3.8	3.3
3	3.6	3.8	3.0	3.55	3.75	5.4	5.5	2.8	7.75	6.2	3.8	3.2
4	4.4	3.8	3.0	3.5	4.0	5.35	5.1	2.8	5.35	8.5	3.7	3.2
5	5.1	3.8	3.0	3.6	3.7	5.3	4.85	2.7	4.9	8.3	3.6	3.1
6	5.4	3.8	3.0	4.75	3.6	5.5	4.75	2.65	4.6	7.05	3.6	3.0
7	5.35	3.75	3.0	3.8	3.35	7.6	5.1	2.6	4.35	6.4	3.6	3.0
8	5.25	3.7	3.1	3.7	3.6	6.25	5.6	2.5	4.2	6.0	3.6	3.0
9	5.1	3.8	3.0	3.7	5.2	5.2	5.2	2.4	10.85	5.65	3.6	3.0
10	5.0	3.8	2.95	5.05	4.4	5.2	5.35	2.4	7.9	5.15	3.6	3.0
11	5.0	3.7	2.9	7.2	5.1	4.5	5.55	2.3	6.6	4.95	3.5	3.0
12	4.9	3.7	2.9	7.05	5.15	4.3	5.05	2.3	5.65	4.75	3.5	3.0
13	4.9	3.7	2.8	5.9	5.2	4.35	4.75	2.3	5.35	4.65	3.5	3.0
14	4.8	3.6	2.8	5.25	5.3	4.35	4.5	2.3	6.95	4.6	3.4	3.0
15	4.8	3.5	2.8	4.9	5.2	3.8	4.4	2.3	13.0	4.5	3.4	3.0
16	4.65	3.4	2.75	4.45	5.5	3.5	4.15	2.3	19.75	4.45	3.4	3.0
17	4.45	3.35	2.7	4.95	5.8	3.35	3.95	2.3	19.25	4.4	3.4	3.05
18	4.35	3.3	2.8	4.65	6.45	3.3	3.8	2.3	16.2	4.35	3.4	3.25
19	4.3	3.3	2.7	4.25	7.5	3.2	4.05	2.3	13.95	4.25	3.5	3.1
20	4.3	3.2	2.8	4.2	6.35	3.2	4.25	2.3	11.9	4.15	3.5	3.1
21	4.3	3.2	3.05	4.2	5.8	3.1	4.25	2.3	8.9	4.05	3.4	3.1
22	4.35	3.2	4.0	4.1	7.1	3.1	4.1	2.3	7.75	3.95	3.4	3.0
23	4.4	3.2	5.25	3.7	6.9	3.0	3.75	2.2	7.1	3.85	3.4	3.0
24	4.3	3.2	4.65	3.5	5.9	3.0	3.5	2.2	7.0	3.8	3.4	3.0
25	4.3	3.1	3.95	3.3	5.45	3.4	3.4	2.3	6.75	3.8	3.4	3.0
26	4.25	3.2	3.75	3.3	5.1	4.6	3.25	2.3	6.55	3.8	3.4	3.0
27	4.05	3.2	3.6	3.35	5.0	5.15	3.2	2.5	6.35	3.8	3.4	3.0
28	3.95	3.15	3.75	3.3	5.05	4.25	3.2	3.0	6.85	3.8	3.4	3.0
29	3.9	.....	3.75	3.3	5.25	4.0	3.2	3.2	6.65	3.8	3.4	3.0
30	3.8	.....	3.65	3.2	5.4	3.8	3.15	3.35	6.25	3.8	3.4	3.0
31	3.8	.....	3.6	.....	5.6	.....	3.0	4.45	.....	3.8	.....	3.0

RIO GRANDE NEAR BROWNSVILLE, TEX.

This station was established in 1900 by the International Boundary Commission. It is about 1 mile above Brownsville, Tex., and opposite Matamoros, Tamaulipas, Mex., and 900 miles by river below El Paso.

Between Roma and Brownsville there are many lagoons (old river beds) which take river water during moderate floods, and a large area overflows quite deeply in larger 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 water at Brownsville well up toward the combined flow of the San Juan and the Rio Grande at Roma. Both banks are alluvial and are just about level with high water. The right bank is protected by piling.

As the bed of the river is constantly shifting, frequent discharge measurements are made to determine closely the daily flow.

The observations at this station have been made under the direction of the Mexican section of the International Water Commission (prior to July 1, 1910, International Boundary Commission).

Discharge measurements and gage heights for the years 1900 to 1904, which had not hitherto been published by the United States Geological Survey, are given in Water-Supply Paper 248.

Discharge measurements of Rio Grande near Brownsville, Tex., in 1910.

[By P. Guerra.]

Date.	Area of section.	Gage height.	Discharge.	Date.	Area of section.	Gage height.	Discharge.
	Sq. ft.	*Feet.*	*Sec.-ft.*		*Sq. ft.*	*Feet.*	*Sec.-ft.*
Jan. 3	1,920	2.8	3,134	July 3	1,585	2.4	2,848
7	1,994	3.1	3,541	7	1,856	3.2	3,754
11	2,268	4.6	5,172	11	2,034	3.8	4,292
15	2,032	3.8	4,461	15	1,890	3.3	3,932
19	1,960	3.5	4,185	19	1,500	1.8	2,442
23	1,968	3.0	3,418	23	1,395	1.4	2,274
27	1,998	3.1	3,557	27	1,215	.8	1,650
31	1,872	2.6	2,978	30	1,188	.4	1,444
Feb. 3	1,580	2.4	2,879	Aug. 3	1,114	— .2	1,109
7	1,568	2.3	2,837	7	1,080	— .4	1,062
11	1,552	2.1	2,758	11	988	— .8	870
15	1,469	1.7	2,485	15	955	—1.0	785
19	1,415	1.5	2,300	19	922	—1.1	705
23	1,348	1.2	2,166	23	891	—1.2	649
27	1,340	1.1	2,100	27	868	—1.3	598
Mar. 3	1,289	.9	1,955	31	997	— .8	890
7	1,222	.6	1,819	Sept. 3	3,466	8.55	19,075
11	1,166	.4	1,660	7	2,753	5.8	5,252
15	1,147	.3	1,604	11	4,374	11.0	19,882
19	1,105	.2	1,471	15	3,164	6.9	6,384
23	1,107	.2	1,447	19	5,373	13.7	22,540
27	1,934	2.8	3,206	23	5,514	14.2	24,708
31	1,409	1.5	2,329	27	4,536	11.3	20,827
Apr. 3	1,462	1.7	2,435	30	4,002	9.7	9,847
7	2,214	4.4	4,920	Oct. 3	3,774	9.0	8,997
11	1,573	2.4	2,877	7	5,416	14.0	25,497
15	2,562	6.0	5,113	11	3,436	8.0	8,123
19	1,926	3.4	4,046	15	3,032	6.5	5,888
23	1,567	2.4	2,852	19	2,615	5.7	4,707
27	1,392	1.4	2,255	23	2,495	5.0	4,538
30	1,316	1.1	2,026	27	2,337	4.5	4,118
May 3	1,282	.9	1,939	31	2,291	4.3	3,876
7	1,324	1.1	2,052	Nov. 3	2,252	4.2	3,585
11	1,573	2.4	2,872	7	2,137	3.6	3,066
15	1,666	2.7	3,122	11	2,049	3.0	2,834
19	1,642	2.6	3,003	15	1,965	2.8	2,642
23	2,472	6.2	5,403	19	1,940	2.6	2,515
27	2,525	6.4	5,676	23	1,887	2.4	2,340
31	2,044	3.8	4,316	27	1,911	2.5	2,409
June 3	2,094	4.0	4,484	Dec. 1	1,839	2.2	2,233
7	1,998	3.7	4,140	5	1,739	1.9	2,174
11	2,248	4.5	5,096	9	1,654	1.6	1,988
15	1,624	2.6	2,957	13	1,773	2.0	2,291
19	1,395	1.4	2,238	17	1,706	1.8	2,098
23	1,185	.4	1,455	21	1,737	1.9	2,197
27	1,127	.2	1,275	25	1,799	2.1	2,401
30	1,848	3.2	3,680	29	1,684	1.7	2,068

Daily gage height, in feet, of Rio Grande near Brownsville, Tex., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.8	2.5	1.05	1.7	1.05	3.8	2.85	0.2	0.8	9.65	4.3	2.2
2	2.8	2.45	1.0	1.6	1.0	3.9	1.9	.1	.9	9.3	4.25	2.05
3	2.75	2.35	.9	1.6	.95	3.95	2.2	— .1	8.0	8.95	4.2	1.8
4	2.7	2.3	.8	2.2	.9	4.25	2.7	— .3	13.1	8.8	4.05	1.85
5	2.7	2.3	.75	3.0	.95	4.15	3.2	— .3	11.7	10.25	3.85	1.9
6	2.85	2.3	.7	3.75	1.0	3.95	3.75	— .4	7.65	13.95	3.7	2.0
7	3.25	2.3	.6	4.35	1.1	3.6	3.3	— .4	6.1	14.0	3.6	2.05
8	3.7	2.2	.5	4.55	1.2	3.55	3.0	— .4	5.15	11.25	3.45	1.85
9	4.1	2.2	.4	3.75	1.95	4.8	2.95	— .45	4.55	9.3	3.25	1.55
10	4.45	2.1	.4	3.05	2.25	5.0	3.5	— .65	7.2	8.5	3.05	1.7
11	4.55	2.1	.4	2.4	2.35	4.65	3.75	— .75	10.0	7.85	3.0	1.8
12	4.4	2.1	.4	2.7	2.45	3.9	3.55	— .9	8.05	7.35	2.9	1.95
13	4.05	2.0	.4	3.55	2.55	3.5	3.4	— .9	6.95	7.0	2.9	2.0
14	3.95	1.85	.4	6.0	2.6	2.95	3.35	—1.0	5.9	6.65	2.8	2.1
15	3.8	1.75	.35	6.2	2.7	2.65	3.25	—1.0	6.35	6.5	2.75	2.0
16	3.7	1.65	.3	5.3	2.7	2.2	2.95	—1.0	7.65	6.4	2.7	1.9
17	3.6	1.55	.3	4.8	2.8	1.8	2.6	—1.05	13.45	6.3	2.7	1.8
18	3.6	1.5	.25	4.15	2.75	1.65	2.25	—1.1	13.6	6.0	2.7	1.9
19	3.5	1.45	.2	3.45	2.65	1.45	1.9	—1.1	13.7	5.75	2.6	1.9
20	3.4	1.4	.2	3.2	2.6	1.25	1.65	—1.1	13.9	5.65	2.6	1.9
21	3.3	1.35	.2	3.05	2.5	.85	1.35	—1.2	14.0	5.4	2.55	1.95
22	3.15	1.3	.2	2.7	5.2	.55	1.2	—1.2	14.1	5.15	2.45	2.0
23	3.0	1.2	.2	2.45	6.1	.45	1.4	—1.2	14.2	4.95	2.35	2.1
24	3.0	1.15	.2	2.25	6.6	.35	1.35	—1.3	14.3	4.85	2.2	2.1
25	3.0	1.1	.85	2.0	6.7	.3	1.25	—1.3	13.5	4.75	2.2	2.1
26	3.05	1.1	1.95	1.65	6.6	.25	1.05	—1.3	12.15	4.65	2.35	2.1
27	3.1	1.1	2.8	1.3	6.15	.2	.75	—1.3	10.95	4.45	2.5	2.1
28	3.0	1.1	2.6	1.2	5.4	.4	.6	—1.3	10.15	4.25	2.4	2.0
29	2.85	.....	2.6	1.1	4.6	1.75	.5	—1.3	9.7	4.1	2.3	1.75
30	2.7	.....	1.5	1.1	3.95	3.15	.35	—1.25	9.7	4.2	2.2	1.6
31	2.6	.....	1.5	.....	3.85	.....	.2	— .8	.....	4.3	.....	1.5

CLEAR CREEK BASIN.

CLEAR CREEK NEAR CREEDE, COLO.

Clear Creek rises in the southeastern part of Hinsdale County, Colo., and flows in a general southeasterly direction to its junction with the Rio Grande in Mineral County. The creek is about 20 miles long.

The gaging station, which is located near the mouth of the creek, at the highway bridge at Texas Club House, about 20 miles above Creede, was established August 12, 1910, by the State engineer, and is maintained by the State.

The gage is a vertical staff bolted to the bridge abutment.

Measurements are made from the bridge or by wading above bridge. The measuring section at the gage is poor, but the wading section above is good.

The bed of stream is composed of gravel and small bowlders, and is not liable to shift. The record at this station gives the entire flow contributed by Clear Creek to the Rio Grande.

Discharge measurements of Clear Creek near Creede, Colo., in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Aug. 12	Christiansen and Grieve	29.5	45.3	2.20	58
Sept. 12	I. G. Ferguson	34.8	38.4	2.06	38

NOTE.—Measurements made by wading at various sections.

Daily gage height, in feet, of Clear Creek near Creede, Colo., for 1910.

[Esther Workman, observer.]

Day.	Aug.	Sept.	Oct.	Day.	Aug.	Sept.	Oct.	Day.	Aug.	Sept.	Oct.
1	.....	2.1	2.05	11	.....	2.05	2.05	21	2.15	2.1	.....
2	.....	2.1	2.05	12	2.2	2.05	2.05	22	2.1	2.1	.....
3	.....	2.1	2.05	13	2.2	2.05	2.05	23	2.15	2.1	.....
4	.....	2.1	2.05	14	2.2	2.1	2.05	24	2.15	2.1	.....
5	.....	2.1	2.05	15	2.1	2.1	2.05	25	2.1	2.05	.....
6	.....	2.05	2.05	16	2.1	2.1	2.1	26	2.1	2.05	.....
7	.....	2.05	2.05	17	2.1	2.1	.....	27	2.1	2.05	.....
8	.....	2.05	2.05	18	2.1	2.1	.....	28	2.1	2.05	.....
9	.....	2.05	2.05	19	2.1	2.1	.....	29	2.1	2.05	.....
10	.....	2.05	2.05	20	2.1	2.1	.....	30	2.1	2.05	.....
								31	2.1	.....	.....

Daily discharge, in second-feet, of Clear Creek near Creede, Colo., for 1910.

Day.	Aug.	Sept.	Oct.	Day.	Aug.	Sept.	Oct.	Day.	Aug.	Sept.	Oct.
1	.....	46	40	11	.....	40	40	21	52	46	.....
2	.....	46	40	12	58	40	40	22	46	46	.....
3	.....	46	40	13	58	40	40	23	52	46	.....
4	.....	46	40	14	58	46	40	24	52	46	.....
5	.....	46	40	15	46	46	40	25	46	40	.....
6	.....	40	40	16	46	46	46	26	46	40	.....
7	.....	40	40	17	46	46	.....	27	46	40	.....
8	.....	40	40	18	46	46	.....	28	46	40	.....
9	.....	40	40	19	46	46	.....	29	46	40	.....
10	.....	40	40	20	46	46	.....	30	46	40	.....
								31	46	.....	.....

Monthly discharge of Clear Creek near Creede, Colo., for 1910.

[Drainage area, 139 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
Aug. 12–31	58	46	48.7	0.350	0.26	1,930
September	46	40	43.2	.311	.35	2,570
Oct. 1–16	46	40	40.4	.291	.17	1,280

SOUTH FORK OF RIO GRANDE.

SOUTH FORK OF RIO GRANDE AT SOUTH FORK, COLO.

The South Fork of the Rio Grande, a stream about 15 miles long, rises near Summitville, in Rio Grande County, and flows northward to its junction with the main stream at South Fork.

The gaging station, which is located at highway bridge half a mile west of South Fork, was established by the United States Geological Survey May 17, 1909, as a temporary station, a reference mark being put on lower chord of bridge. It was reestablished by the State engineer August 9, 1910, since which time a record of gage heights has been kept.

A slope gage is bolted to downstream side of right abutment of highway bridge.

Measurements are made from bridge or by wading above the bridge. The measuring section at bridge is poor, but the wading section above is good.

The bed of the stream is of gravel, cobbles, and bowlders, and is not liable to shift.

Discharge measurements of South Fork of Rio Grande at South Fork, Colo., in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Aug. 1	G. H. Russell	.....	59	1.43	87
9	Grieve and Christiansen	38	98	1.42	71
Sept. 22	I. G. Ferguson	44	65	1.33	50
Oct. 18	E. O. Christiansen	31	44	1.40	67

NOTE.—Measurement of Aug. 9 made from the bridge; the other measurements were made by wading at various sections.

Daily gage height, in feet, of South Fork of Rio Grande at South Fork, Colo., for 1910.

[Lelia Singles, observer.]

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

Daily discharge, in second-feet, of South Fork of Rio Grande at South Fork, Colo., for 1910.

Day.	Aug.	Sept.	Oct.	Nov.	Day.	Aug.	Sept.	Oct.	Nov.
1	.....	50	35	60	16	70	50	70	50
2	.....	50	42	42	17	70	35	120	42
3	.....	50	70	50	18	70	35	70	60
4	.....	50	50	50	19	70	50	60	60
5	.....	50	35	50	20	80	50	70	50
6	.....	50	35	50	21	70	35	70	50
7	.....	50	35	42	22	90	50	90	70
8	.....	42	35	50	23	80	35	60	35
9	80	35	35	35	24	80	35	70	50
10	90	35	35	35	25	90	35	90	60
11	90	35	35	35	26	60	35	170	80
12	170	35	35	35	27	60	35	70	60
13	105	42	35	42	28	50	35	50	50
14	120	35	35	35	29	50	30	50	60
15	90	35	42	35	30	50	30	50	60
					31	50	.....	60	.....

Monthly discharge of South Fork of Rio Grande near South Fork, Colo., for 1910.

[Drainage area, 216 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
Aug. 9–31	170	50	79.8	0.369	0.32	3,640
September	50	30	40.6	.188	.21	2,420
October	170	35	58.4	.270	.31	3,590
November	80	35	49.4	.229	.26	2,940

CONEJOS RIVER BASIN.

CONEJOS RIVER NEAR MOGOTE, COLO.

Conejos River, the most important tributary of the Rio Grande in Colorado, rises on the eastern slope of the San Juan Range, which forms the western boundary of Conejos County. It first flows southeastward, but at the town of Conejos bends northeastward and enters the Rio Grande below the mouth of Trinchera Creek.

The gaging station, which was established March 21, 1907, replacing the station formerly maintained about 4 miles below, is located at a private highway bridge on Jacob's ranch, about 16 miles above Antonito, Colo., in T. 33 N., R. 6 E., New Mexico principal meridian. It is above every important diversion for irrigation and below all the principal tributaries except the San Antonio.

The datum of the chain gage, which is on the bridge, has not been changed since the station was established. This gage is at the same datum as the rod gage used by Antoine Jacob during 1905 and 1906. The gage heights for these years have been furnished to the United States Geological Survey by him from his private records. Discharge measurements are made from the highway bridge.

The data obtained at this station show the amount of water available for irrigation.

Water taken from the Conejos by numerous ditches below the station is used to irrigate 70,000 to 80,000 acres of land. The basin above the station affords excellent opportunities for storage, none of which are utilized at the present time. It will be difficult to obtain additional water rights for irrigation along this stream.

The river is covered with ice for three or four months during the winter season. The stream bed is strewn with cobblestones and bowlders, and the water has a comparatively high velocity at all stages, making conditions unfavorable for accurate measurement. Eddies around the crib piers of the bridge also introduce uncertainty in the results.

Discharge measurements of Conejos River near Mogote, Colo., in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Jan. 26 [a]	J. B. Stewart	23	37	.....	46
Feb. 24 [b]	G. H. Russell	30	32	.....	53
Apr. 10	J. B. Stewart	96	169	1.20	304
May 27	G. H. Russell	104	258	2.25	1,110
June 25	do	96	176	1.30	352
Aug. 5	do	86	152	1.20	344
18	E. O. Christiansen	72	83	.63	140
Sept. 9	do	49	45	.30	71
23	do	52	40	.32	63
Oct. 22 [c]	Hezmalhalch and Christiansen	52	44	.42	72
Dec. 12 [c]	G. H. Russell	45	43	.28	65

[a] Ice. Measured by wading near Mogote. [b] Measured 2 miles above Mogote. [c] Ice. Measured by wading.

Daily gage height, in feet, of Conejos River near Mogote, Colo., for 1910.

[Francisque Jacob, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.5	0.4	0.45	0.95	2.35	2.7	1.1	0.85	0.5	0.2	0.4	0.3
2	.5	.4	.45	.95	2.1	2.7	1.1	.8	.5	.2	.4	.3
3	.5	.4	.45	.95	2.1	2.65	1.0	.75	.4	.2	.4	.3
4	.4	.4	.45	.95	2.2	2.6	1.0	.7	.4	.2	.4	.3
5	.5	.4	.5	.95	2.3	2.5	1.0	1.15	.4	.2	.4	.3
6	.5	.4	.5	1.05	2.2	2.3	1.0	1.05	.4	.2	.35	.3
7	.5	.4	.5	1.05	2.15	2.2	.95	.8	.35	.2	.4	.3
8	.5	.4	.5	1.15	2.4	2.1	.9	.8	.3	.2	.3	.3
9	.4	.4	.5	1.15	2.5	2.05	.85	.8	.3	.2	.3	.3
10	.4	.4	.5	1.15	2.65	1.95	.8	.9	.3	.2	.3	.3
11	.4	.4	.5	1.15	2.8	1.9	.8	1.15	.3	.2	.3	.3
12	.4	.4	.55	1.3	2.9	1.95	.8	1.15	.3	.2	.3	.3
13	.5	.4	.6	1.3	2.8	1.85	.8	1.05	.3	.2	.3	.3
14	.5	.4	.65	1.2	2.8	1.75	.8	1.0	.3	.2	.3	.3
15	.5	.4	.75	1.15	2.6	1.75	.8	.85	.3	.2	.3	.3
16	.5	4	.8	1.25	2.35	1.7	.75	.8	.3	.3	.3	.3
17	.5	.4	.85	1.25	2.3	1.65	.7	.7	.3	.4	.25	.3
18	.5	.4	.85	1.25	2.35	1.6	.7	.7	.3	.4	.2	.3
19	.5	.4	.85	1.3	2.15	1.5	.7	.7	.3	.5	.2	.3
20	.5	.4	.95	1.3	2.15	1.45	.6	.7	.3	.5	.2	.3
21	.5	.4	1.15	1.45	2.1	1.45	.6	.6	.3	.45	.2	.3
22	.5	.4	1.15	1.45	2.05	1.45	.8	.6	.35	.3	.2	.3
23	.5	.4	1.3	1.45	1.9	1.45	.75	.75	.3	.3	.2	.3
24	.5	.4	1.2	1.8	1.85	1.25	.7	.65	.3	.4	.2	.3
25	.5	.4	1.25	2.15	1.9	1.3	.7	.6	.3	.45	.2	.3
26	.5	.4	1.15	2.3	2.0	1.3	.65	.55	.3	.45	.2	.3
27	.5	.4	1.0	2.3	2.2	1.25	.6	.5	.3	.5	.25	.3
28	.5	.4	1.05	2.45	2.55	1.2	.65	.5	.25	.45	.3	.3
29	.5	.....	1.05	2.5	2.7	1.2	.6	.5	.2	.4	.3	.3
30	.4	.....	1.0	2.45	2.85	1.2	.65	.55	.2	.4	.3	.3
31	.4	.....	.95	.....	2.75	.....	.95	.5	.....	.4	.....	.3

NOTE.—Affected by ice Jan. 1 to Mar. 8. There was some thin ice during October, November, and December, which probably did not materially affect the gage heights.

Daily discharge, in second-feet, of Conejos River near Mogote, Colo., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	75	.....	50	222	1,180	1,630	278	190	95	47	75	60
2	75	.....	50	222	910	1,630	278	175	95	47	75	60
3	75	.....	50	222	910	1,560	240	161	75	47	75	60
4	75	.....	50	222	1,010	1,490	240	147	75	47	75	60
5	75	.....	50	222	1,120	1,360	240	298	75	47	75	60
6	75	.....	50	259	1,010	1,120	240	259	75	47	68	60
7	75	.....	50	259	960	1,010	222	175	68	47	75	60
8	75	.....	50	298	1,240	910	205	175	60	47	60	60
9	75	.....	75	298	1,360	865	190	175	60	47	60	60
10	75	.....	75	298	1,560	780	175	205	60	47	60	60
11	60	.....	75	298	1,770	740	175	298	60	47	60	60
12	60	.....	108	363	1,920	780	175	298	60	47	60	60
13	60	.....	120	363	1,770	701	175	259	60	47	60	60
14	60	.....	134	319	1,770	627	175	240	60	47	60	60
15	60	.....	161	298	1,490	627	175	190	60	47	60	60
16	50	.....	175	341	1,180	592	161	175	60	60	60	60
17	50	.....	190	341	1,120	560	147	147	60	75	54	60
18	50	.....	190	341	1,180	528	147	147	60	75	47	60
19	50	.....	190	363	960	468	147	147	60	95	47	60
20	50	.....	222	363	960	440	120	147	60	95	47	60
21	45	.....	298	440	910	440	120	120	60	85	47	60
22	45	.....	298	440	865	440	175	120	68	60	47	60
23	45	.....	363	440	740	440	161	161	60	60	47	60
24	45	.....	319	662	701	341	147	134	60	75	47	60
25	46	.....	341	960	740	363	147	120	60	85	47	60
26	45	.....	298	1,120	820	363	134	108	60	85	47	60
27	45	.....	240	1,120	1,010	341	120	95	60	95	54	60
28	45	.....	259	1,300	1,420	319	134	95	54	85	60	60
29	45	.....	259	1,360	1,630	319	120	95	47	75	60	60
30	45	.....	240	1,300	1,840	319	134	108	47	75	60	60
31	45	.....	222	.....	1,700	.....	222	95	.....	75	.....	60

NOTE.—These discharges are based on a rating curve that is fairly well defined below 2,100 second-feet.

Monthly discharge of Conejos River near Mogote, Colo., for 1910.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
January	.....	.....	58.0	3,570	D.
February	.....	.....	50.0	2,780	D.
March	.....	.....	169	10,400	C.
April	1,360	222	502	29,900	A.
May	1,920	701	1,220	75,000	A.
June	1,630	319	737	43,900	A.
July	278	120	178	10,900	A.
August	298	95	171	10,500	A.
September	95	47	63.8	3,800	B.
October	95	47	63.2	3,890	B.
November	75	47	59.0	3,510	B.
December	60	60	60.0	3,690	C.
The year	1,920	.....	275	203,000	

NOTE.—Discharge Jan. 1–Mar. 8 estimated on account of ice.

SAN LUIS CREEK BASIN.

DESCRIPTION.

San Luis Creek rises in Poncha Pass, at the north end of the San Luis Valley, Colo., and flows southward through Homan Park, but it is soon lost in the sands and gravels of the plain below, except during the rainy season. The surface configuration of the valley

is such that this creek should receive all the water entering on either side north of the Rio Grande, but as a matter of fact most of the drainage is lost by seepage before it reaches the creek, or reaches it only in flood season. The creek itself in its lower course develops a series of wet-weather ponds and finally flows into the San Luis Lakes. The old overflow drainage course to the Rio Grande still exists, but has been so blocked and concealed by incipient sand dunes as to be very difficult to trace except in its general features.[1]

SAN LUIS CREEK NEAR VILLA GROVE, COLO., 1910.

This station, which was established by the State engineer September 8, 1910, and is maintained by the State, is located at Jay White's ranch near Villa Grove. Very little water passes this station at most times during the year.

The gage is a vertical staff bolted to the abutment of highway bridge at White's ranch.

Measurements are made from the bridge or by wading at gauge. The measurement section is fair.

The bed of stream consists of mud, sand, and some small bowlders. The banks are low and liable to overflow at high water. The channel is not liable to shift.

Discharge measurements of San Luis Creek near Villa Grove, Colo., in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Sept. 8	I. C. Ferguson	7.0	2.2	0.20	0.9
Oct. 7	E. O. Christiansen	8.6	2.6	.30	2.2

NOTE.—Measurements made by wading at various sections.

Daily gage height, in feet, of San Luis Creek near Villa Grove, Colo., for 1910.

[Jay White, observer.]

Day.	Sept.	Oct.	Nov.	Day.	Sept.	Oct.	Nov.
1	.....	0.3	0.2	16	0.3	0.4	0.3
2	.....	.3	.2	17	.3	.4	.3
3	.....	.3	.2	18	.4	.35	.3
4	.....	.3	.2	19	.3	.3	.3
5	.....	.3	.2	20	.3	.3	.3
6	.....	.3	.2	21	.4	.25	.3
7	.....	.3	.2	22	.3	.3	.3
8	0.2	.3	.2	23	.3	.3	.3
9	.2	.3	.2	24	.3	.3	.3
10	.25	.3	.2	25	.3	.3	.3
11	.3	.3	.2	26	.3	.3	.3
12	.3	.3	.2	27	.3	.3	.3
13	.3	.3	.2	28	.3	.3	.3
14	.3	.3	.2	29	.3	.25	.3
15	.3	.3	.3	30	.3	.2	.25
				31	.....	.2	.....

[1] Siebenthal, C. E., Geology and water resources of the San Luis Valley, Colo.: Water-Supply Paper U. S. Geol. Survey No. 240, 1910, p. 12.

Daily discharge, in second-feet, of San Luis Creek near Villa Grove, Colo., for 1910.

Day.	Sept.	Oct.	Nov.	Day.	Sept.	Oct.	Nov.
1		2.2	0.9	16	2.2	4	2.2
2		2.2	.9	17	2.2	4	2.2
3		2.2	.9	18	4	3.1	2.2
4		2.2	.9	19	2.2	2.2	2.2
5		2.2	.9	20	2.2	2.2	2.2
6		2.2	.9	21	4	1.6	2.2
7		2.2	.9	22	2.2	2.2	2.2
8	0.9	2.2	.9	23	2.2	2.2	2.2
9	.9	2.2	.9	24	2.2	2.2	2.2
10	1.6	2.2	.9	25	2.2	2.2	2.2
11	2.2	2.2	.9	26	2.2	2.2	2.2
12	2.2	2.2	.9	27	2.2	2.2	2.2
13	2.2	2.2	.9	28	2.2	2.2	2.2
14	2.2	2.2	.9	29	2.2	1.6	2.2
15	2.2	2.2	2.2	30	2.2	.9	1.6
				31		.9	

Monthly discharge of San Luis Creek near Villa Grove, Colo., for 1910.

[Drainage area, 218 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
Sept. 8–30	4	0.9	2.22	0.010	0.01	101
October	4	.9	2.22	.010	.01	137
November	2.2	.9	1.57	.0072	.01	94

SAGUACHE RIVER NEAR SAGUACHE, COLO.

Saguache River rises among the peaks of the Continental Divide in the western part of Saguache County, Colo., flows northeasterly about 25 miles, then turns and flows southeastward into San Luis Park. In times of flood its waters may reach San Luis Creek but all the normal and high-water flow is taken by irrigation canals.

A gaging station was established in 1910 by the Stark-Hagadorn Irrigation Co. at a dam site 9 miles above Saguache. Practically no flow is contributed to Saguache River below this station. Some irrigation is carried on above the station.

Two gages are used—a Bristol automatic and a vertical staff gage set in the automatic gage well. Both gages are at the same datum, which has not changed during the year.

Measurements are made from a foot log or by wading at the gauge. The section is good. The bed of the stream consists of sand and gravel, with a few small cobbles, and is not liable to shift.

The following record was furnished by the State engineer of Colorado through the courtesy of the Stark-Hagadorn Irrigation Co.:

Discharge measurements of Saguache River near Saguache, Colo., in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Sept. 3	I. C. Ferguson	24	26.8	1.10	50
Oct. 6	E. O. Christiansen	22	23	.92	36

NOTE.—Measurements made by wading at various sections.

Daily gage height, in feet, of Saguache River near Saguache, Colo., for 1910.

Day.	Aug.	Sept.	Oct.	Nov.	Day.	Aug.	Sept.	Oct.	Nov.
1	.....	1.1	1.0	0.95	16	1.1	1.05	0.95	.....
2	.....	1.1	1.0	.95	17	1.1	1.0	1.0	.....
3	.....	1.05	1.0	.95	18	1.1	1.0	1.15	.....
4	.....	1.05	1.0	.95	19	1.1	1.0	1.1	.....
5	.....	1.05	1.0	1.0	20	1.1	1.0	1.1	.....
6	.....	1.05	1.0	.....	21	1.1	1.0	1.1	.....
7	1.15	1.0	1.0	.....	22	1.1	1.0	.9	.....
8	1.15	.95	1.0	.....	23	1.15	1.1	.95	.....
9	1.15	.95	1.0	.....	24	1.15	1.05	1.05	.....
10	1.25	.95	1.0	.....	25	1.1	1.0	1.05	.....
11	1.2	.95	.9	.....	26	1.05	1.0	1.05	.....
12	1.2	1.0	.9	.....	27	1.0	1.0	1.0	.....
13	1.2	1.1	1.0	.....	28	1.0	1.0	.95	.....
14	1.15	1.1	1.0	.....	29	1.1	1.0	.95	.....
15	1.1	1.05	.95	.....	30	1.1	1.0	.95	.....
					31	1.1	.....	.95	.....

Daily discharge, in second-feet, of Saguache River near Saguache, Colo., for 1910.

Day.	Aug.	Sept.	Oct.	Nov.	Day.	Aug.	Sept.	Oct.	Nov.
1	.....	50	42	38	16	50	46	38	.....
2	.....	50	42	38	17	50	42	42	.....
3	.....	46	42	38	18	50	42	54	.....
4	.....	46	42	38	19	50	42	50	.....
5	.....	46	42	42	20	50	42	50	.....
6	.....	46	42	.....	21	50	42	50	.....
7	54	42	42	.....	22	50	42	34	.....
8	54	38	42	.....	23	54	50	38	.....
9	54	38	42	.....	24	54	46	46	.....
10	62	38	42	.....	25	50	42	46	.....
11	58	38	34	.....	26	46	42	46	.....
12	58	42	34	.....	27	42	42	42	.....
13	58	50	42	.....	28	42	42	38	.....
14	54	50	42	.....	29	50	42	38	.....
15	50	46	38	.....	30	50	42	38	.....
					31	50	.....	38	.....

Monthly discharge of Saguache River near Saguache, Colo., for 1910.

[Drainage area, 595 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
Aug. 7–31	62	42	51.6	0.087	0.08	2,560
September	50	38	43.7	.071	.08	2,600
October	50	34	41.9	.070	.08	2,570

CULEBRA RIVER BASIN.

CULEBRA RIVER AT SAN LUIS, COLO.

Culebra River rises on the western slope of the Culebra Range in the southern part of Costilla County, Colo., flows northward along the base of the range to San Luis, then turns and flows westward to its junction with the Rio Grande.

The gaging station, which is located at the county bridge in the town of San Luis, has been maintained by the Costilla Estates Development Co.

The following discharge estimates have been furnished by the State engineer through the courtesy of the development company:

Daily discharge, in second-feet, of Culebra River at San Luis, Colo., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	57									35		
2				95			52					
3									34			
4						185						
5		36	84								33	
6								53				
7					203							
8	40									34		
9				95			24					
10									39			
11						63						
12		37	98								40	
13								58				
14					255							
15	34									35		
16				136			15					
17									37			
18						58						
19		37	89								36	
20								25				
21					212							
22	34									40		
23				185			18					
24									31			
25						59						
26		37	107								32	
27								30				
28					165							
29	37									33		
30				255			30					
31												

NOTE.—Discharges are averages for week beginning on dates opposite discharges noted. Discharge for week beginning Sept. 3, estimated.

Monthly discharge of Culebra River at San Luis, Colo., for 1910.

[Drainage area, 260 square miles.]

Month.	Discharge in second-feet.		Run-off.	
	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
January	41	0.158	0.18	2,521
February	37	.142	.15	2,055
March	87	.335	.39	5,349
April	136	.523	.58	8,093
May	222	.854	.98	13,650
June	100	.385	.43	5,950
July	28	.108	.12	1,722
August	40	.154	.18	2,460
September	35	.135	.15	2,083
October	37	.142	.16	2,275
November	35	.135	.15	2,083
The period				48,200

RIO COLORADO BASIN.

DESCRIPTION.

Rio Colorado[1] (or Red River) rises in the eastern part of Taos County, N. Mex., on the western slope of Red River Peak, and flows in a general westerly course to its junction with the Rio Grande 1 mile west of Cebollas. It is about 25 miles long.

RIO COLORADO ABOVE QUESTA, N. MEX.

This station was established October 14, 1910, about 3 miles above Questa, and about the same distance above the mouth of Cabresto Creek. It is about 300 feet below the engineers' camp of the Red River Land & Water Co.

A rod gage was installed. About March, 1910, a gage was established by one of Field, Fellows & Hinderlider's engineers at a point near the camp. The gage heights following are referred to this gage. On October 14 a new rod gage was established at a point 5 miles above Questa.

Discharge measurements of Rio Colorado above Questa, N. Mex., in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Oct. 14[a]	J. B. Stewart	21.5	10.2	0.61	20.4
Dec. 14[b]	Russell and Digby	18	10.2	.6	15.5

[a] Measurement made 3 miles above Questa. Gage height is referred to gage established this date.
[b] Measurement made 5 miles above Questa.

[1] Called "Colorado Creek" in Twelfth Ann. Rept. U. S. Geol. Survey, pp. 251–252.

Daily gage height, in feet, of Rio Colorado above Questa, N. Mex., for 1910.

Day.	Apr.	July.	Aug.	Sept.	Oct.	Day.	Apr.	July.	Aug.	Sept.	Oct.
1	.....	.....	0.66	0.66	0.49	16	1.1	.....	0.66	0.56	.....
2	.....	.....	.66	.61	.49	17	1.15	.....	.61	.51	.....
3	.....	.....	.71	.61	.49	18	1.15	.....	.61	.46	.....
4	.....	.....	.71	.61	.49	19	1.2	.....	86	.51	.....
5	0.95	.....	1.26	.56	.49	20	1.2	.....	.76	.53	.....
6	.95	.....	.96	.56	.49	21	1.25	.....	76	.51	.....
7	1.0	.....	.66	.53	.49	22	1.25	.....	.76	.61	.....
8	1.0	.....	.66	.51	.49	23	1.35	.....	1.16	.52	.....
9	1.0	.....	.66	.51	.48	24	1.45	.....	1.06	.49	.....
10	1.0	.....	.66	.53	.48	25	1.65	.....	.96	.51	.....
11	1.0	.....	.66	.51	.48	26	1.7	.....	.76	.50	.....
12	1.05	.....	.76	.51	.48	27	1.85	.....	.71	.49	.....
13	1.25	.....	.71	.51	.48	28	1.9	0.56	.66	.48	.....
14	1.2	.....	.71	.51	.48	29	.....	.56	.61	.49	.....
15	1.1	.....	.66	.51	.....	30	.....	.66	.61	.49	.....
						31	.....	.66	.66	.....	.....

NOTE.—Gage heights are referred to datum of gage established in March by one of Field, Fellows & Hinderlider's engineers.

RIO COLORADO BELOW QUESTA, N. MEX.

This station, which was established April 8, 1910, is located about 2 miles below Questa, and below the mouth of the Cabresto Creek. It is at head of Lower Canyon, 5 miles above the mouth, and is below all diversions and tributaries of any importance. Gage readings are from vertical rod gage located on right bank 50 yards upstream from Virgil's gristmill.

Discharge measurements of Rio Colorado below Questa, N. Mex., in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Apr. 8	J. B. Stewart	28.5	25	1.52	80
July 13	.....do	18.5	19.7	1.48	45.6
Sept. 12	C. D. Miller	24	14.5	1.17	26.5
Oct. 14	J. B. Stewart	17.5	13.8	1.18	25.2
Dec. 14	C. B. Digby	23	21.4	1.14	25.8

NOTE.—Measurements made by wading.

Daily gage height, in feet, of Rio Colorado below Questa, N. Mex., for 1910.

[J. G. Vigil and Narcico Vigil, observers.]

Day.	Apr.	May.	June.	July.	Oct.	Nov.	Dec.
1	.....	2.4	1.9	1.4	.....	1.1	1 1
2	.....	2.3	1.9	1.3	.....	1.1	1.1
3	.....	2.3	1.9	1.35	.....	1.1	1.1
4	.....	2.3	2.0	1.3	.....	1.1	1.1
5	.....	2.3	1.9	1.3	.....	1.1	1.1
6	.....	2.25	1.9	1.3	.....	1.1	1.1
7	.....	2.2	1.9	1.25	.....	1.1	1.05
8	1.5	2.2	1.8	1.2	.....	1.1	1.05
9	1.55	2.3	1.8	1.2	.....	1.1	1.05
10	1.5	2.3	1.7	.....	.....	1.1	1.05
11	1.6	2.3	1.7	.....	.....	1.1	1.1
12	1.6	2.3	1.7	.....	.....	1.1	1.1
13	1.7	2.45	1.6	.....	.....	1.1	1.1
14	1.6	2.45	1.6	.....	1.2	1.1	1.1
15	1.6	2.35	1.55	.....	1.2	1.1	1.0
16	1.6	2.25	1.7	.....	1.2	1.1	1.05
17	1.6	2.2	1.6	.....	1.2	1.1	1.0
18	1.65	2.15	1.55	.....	1.2	1.1	1.0
19	1.65	2.1	1.5	.....	1.2	1.1	1.0
20	1.7	2.0	1.5	.....	1.1	1.1	1.0
21	1.85	1.9	1.5	.....	1.1	1.1	1.0
22	1.8	1.95	1.45	.....	1.1	1.1	1.0
23	1.9	1.9	1.4	.....	1.2	1.1	1.0
24	2.0	1.75	1.4	.....	1.2	1.1	1.0
25	2.3	1.7	1.4	.....	1.2	1.1	1.05
26	2.4	1.65	1.45	.....	1.15	1.1	1.1
27	2.35	1.8	1.5	.....	1.1	1.1	1.05
28	2.45	1.75	1.5	.....	1.1	1.1	1.05
29	2.55	1.9	1.4	.....	1.1	1.1	1.05
30	2.5	1.9	1.4	.....	1.1	1.1	1.05
31	.....	2.0	.....	.....	1.1	.....	1.0

ARROYO HONDO BASIN.

ARROYO HONDO NEAR ARROYO HONDO, N. MEX.

Arroyo Hondo arises in the eastern part of Taos County, N. Mex., and flows southeastward to its junction with the Rio Grande. The valley through which it flows is from one-half to three-fourths of a mile wide for about 4 miles, then alternately contracts and opens at short intervals. Through the greater part of the stream's course the valley lies fully 500 feet below the level of the surrounding country.

The gaging station was established April 8, 1910, at the highway bridge at John Dunn's ranch 200 yards above the mouth of the stream and below all tributaries and diversions. It is 15 miles from Servilleta, the nearest railroad point, and 14 miles from Taos. A slope rod gage is fastened to left bridge abutment. Gage readings are taken gratis by John Dunn.

Discharge measurements of Arroyo Hondo near Arroyo Hondo, N. Mex., in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Apr. 6	W. B. Freeman	23.8	12.5	1.85	31.4
July 12	J. B. Stewart	11.0	3.5	1.55	5.2
Oct. 15	....do	10.5	4.3	1.65	10.1
Dec. 16	Russell and Digby	6.8	3.3	1.80	5.4

NOTE.—Measurements made by wading.

Daily gage height, in feet, of Arroyo Hondo near Arroyo Hondo, N. Mex., for 1910.

[John Dunn, observer.]

Day.	Apr.	May.	June.	July.	Aug.	Day.	Apr.	May.	June.	July.	Aug.
1	.....	2.8	2.65	1.5	1.5	16	2.1	2.75	2.2	1.5	1.1
2	.....	2.6	2.6	1.5	2.5	17	1.95	2.7	2.2	1.5	1.5
3	.....	2.5	2.6	1.5	2.6	18	2.0	2.65	2.15	1.5	1.5
4	.....	2.5	2.55	1.5	2.5	19	2.15	2.6	2.2	1.5	1.5
5	.....	2.5	2.5	1.5	2.5	20	2.3	2.6	2.2	1.5	1.5
6	1.85	2.5	2.5	1.45	2.5	21	2.3	2.55	2.2	1.5	1.5
7	.....	2.6	2.55	1.45	2.5	22	2.2	2.5	2.2	1.5	.....
8	1.85	2.55	2.5	1.5	2.0	23	2.25	2.55	2.15	1.5	.....
9	.....	2.55	2.4	1.5	2.0	24	2.2	2.5	2.15	1.5	.....
10	.....	2.55	2.3	1.95	2.0	25	2.4	2.5	2.1	1.5	.....
11	1.9	2.6	2.2	1.8	2.0	26	2.5	2.5	2.1	1.5	.....
12	2.0	2.7	2.2	1.55	2.0	27	2.4	2.5	2.0	1.5	.....
13	1.9	2.7	2.2	1.55	2.0	28	2.7	2.45	2.0	2.5	.....
14	1.95	2.8	2.2	1.5	1.1	29	2.7	2.5	2.0	3.0	.....
15	2.0	2.8	2.2	1.5	1.1	30	2.75	2.55	2.0	2.5	.....
						31	.....	2.5	.....	.....	.....

RIO TAOS BASIN.

DESCRIPTION.

Rio Taos is formed by three principal streams—Rio Pueblo de Taos, Rio Fernando de Taos, and Rio Grande del Rancho.

Rio Pueblo de Taos enters Taos Valley on the north, a short distance above the ancient Indian pueblo of Taos. Its principal tributaries are Rio Lucero and Arroyo Seco, but it receives only flood waters from these streams, their normal flow being used for irrigation.

Rio Fernando de Taos issues from a narrow canyon about 3½ miles above Taos. It furnishes water for three or four small ditches.

Rio Grande del Rancho, which lies farthest south, has one tributary—Rio Chiquita—which joins it 2 miles below the point where it enters the valley. During the irrigating season the stream carries little if any water.

Below Cordova the Rio Taos flows through a canyon to its junction with the Rio Grande.

The Taos Range to the east is well timbered with pine and spruce and contains valuable mineral deposits.

RIO PUEBLO DE TAOS NEAR TAOS, N. MEX.

A station was established April 7, 1910, about 2 miles upstream from the Indian pueblo of Taos and 200 yards upstream from the uppermost irrigation diversion. It is below all mountain tributaries.

A vertical rod gage was located on the left bank but was destroyed before July 12. A new gage was installed in the same position October 12, with datum 0.27 foot lower. No regular observer was employed and only occasional gage readings were obtained until December 19, when a Bristol automatic gage was installed at the datum of the second staff gage.

Discharge measurements of Rio Pueblo de Taos near Taos, N. Mex., in 1910.

Date.	Hydrographer.	Area of section.	Gage height.	Discharge.
		Sq. ft.	*Feet.*	*Sec.-ft.*
Mar. 12	S. S. Carroll			27.7
Apr. 7	J. B. Stewart	18	1.50	43
July 12	do	12		14
Sept. 15	C. D. Miller	8.9		7.2
Oct. 15	J. B. Stewart	8.8	.66	6.8
Dec. 19[a]	Digby and Russell	9.5	1.08	5.0

[a] Ice.

NOTE.—Gage heights refer to datum of gage established Apr. 7.

Daily gage height, in feet, of Rio Pueblo de Taos near Taos, N. Mex., for 1910.

[B. G. Phillips, observer.]

Day.	Dec.	Day.	Dec.	Day.	Dec.
1		11		21	1.05
2		12		22	1.0
3		13		23	1.4
4		14		24	1.6
5		15		25	1.4
6		16		26	1.05
7		17		27	1.05
8		18		28	1.1
9		19	1.1	29	1.2
10		20	1.05	30	1.6
				31	

NOTE.—These gage heights were recorded by the automatic gage.

RIO PUEBLO DE TAOS AT LOS CORDOVAS, N. MEX.

This station was established April 6, 1910, about 100 feet downstream from the mouth of Rio Grande del Rancho and Arroyo Seco and about 1 mile below the mouth of Rio Lucero. It is just below A. J. Anderson's grist mill and a short distance northeast of Los Cordovas. The readings are taken from a vertical rod gage located on the right bank.

Discharge measurements of Rio Pueblo de Taos at Los Cordovas, N. Mex., in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Apr. 6	J. B. Stewart	36.5	40	1.47	72
July 12	....do	10.5	6.4	.73	3.0
Sept. 15	C. D. Miller	13	6.0	.80	3.2
Oct. 16	J. B. Stewart	8.5	5.5	.85	6.0
Dec. 18[a]	Digby and Russell	24	25.6	1.17	24.4

[a] Ice.

NOTE.—Measurements made by wading.

Daily gage height, in feet, of Rio Pueblo de Taos at Los Cordovas, N. Mex., for 1910.

[A. J. Anderson, observer.]

Day.	Apr.	May.	June	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	2.5	1.4	0.7	0.75	0.8	0.8	1.0	1.0
2	.....	2.4	1.3	.7	.7	.8	.8	1.0	1.0
3	.....	2.3	1.3	.7	.7	.8	.9	1.0	1.0
4	.....	2.3	1.2	.7	.8	.8	.9	1.0	1.0
5	.....	2.25	1.2	.7	.8	.8	.85	1.0	1.1
6	1.45	2.2	1.1	.7	.8	.8	.8	1.0	1.1
7	1.5	2.2	1.05	.7	.8	.8	.85	1.0	1.1
8	1.55	2.15	.95	.7	.8	.8	.8	1.0	1.05
9	1.5	2.25	.9	.7	.7	.8	.85	1.0	1.1
10	1.5	2.1	.9	.8	.7	.8	.85	1.0	1.05
11	1.5	2.1	.8	.8	.75	.8	.9	1.0	1.1
12	1.5	2.1	.8	.75	.8	.75	.85	1.0	1.05
13	1.8	2.1	.8	.8	.8	.7	.85	1.0	1.05
14	1.9	2.1	.8	.8	.8	.8	.9	1.0	1.05
15	1.8	2.2	.8	.7	.7	.8	.85	1.0	1.1
16	1.75	2.05	.8	.7	.8	.8	.85	1.0	1.05
17	1.8	2.0	.8	.7	.8	.8	.9	1.0	1.1
18	1.85	1.9	.75	.7	.8	.8	.85	1.0	1.1
19	1.9	1.8	.75	.7	.8	.8	.9	1.0	1.1
20	2.0	1.7	.7	.7	.8	.8	.9	1.0	1.05
21	2.1	1.65	.7	.7	.8	.8	.9	1.0	1.1
22	2.15	1.7	.7	.7	.8	.8	.95	1.0	1.05
23	2.1	1.6	.7	.7	.8	.8	.95	1.0	1.1
24	2.1	1.5	.7	.7	.8	.8	1.0	1.0	1.1
25	2.15	1.4	.7	.7	.8	.8	.95	1.0	1.1
26	2.3	1.25	.8	.7	.8	.8	1.0	1.0	1.05
27	2.3	1.2	.8	.7	.8	.8	.95	1.0	1.05
28	2.4	1.15	.7	.7	.8	.8	1.0	1.0	1.05
29	2.5	1.2	.7	.7	.8	.8	.95	1.0	1.05
30	2.55	1.25	.7	.85	.8	.8	1.0	1.0	1.05
31	.....	1.35	.....	.8	.8	.....	1.0	.....	1.1

NOTE.—Slightly affected by ice Dec. 18–31.

RIO LUCERO NEAR TAOS, N. MEX.

This station was established April 7, 1910, in the mouth of the canyon 9 miles above Taos and about 1½ miles above Myer's ranch. It is about 200 yards upstream from the head gate of the Seco ditch, which is the uppermost diversion.

A vertical rod gage was established on the right bank. Only occasional readings were obtained, as there was no observer. On December 17 a Bristol automatic gage was installed at the same datum as the staff gage.

Discharge measurements of Rio Lucero near Taos, N. Mex., in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Mar. 12	S. S. Carroll				11.4
Apr. 7	J. B. Stewart	12	10.2	1.05	21.2
July 12	do	12.6	13.8	.95	14.7
Sept. 15	C. D. Miller	12.5	12.7	.82	10
Oct. 15	J. B. Stewart	12.5	6.6	.80	8.4
Dec. 17[a]	Russell and Digby	17	14.0	1.19	10.7

[a] Ice.

Daily gage height, in feet, of Rio Lucero near Taos, N. Mex., for 1910.

[B. G. Phillips, observer.]

Day.	May.	June.	July.	Aug.	Dec.	Day.	May.	June.	July.	Aug.	Dec.
1						16	1.55				
2		1.5				17			0.9		1.1
3			1.05			18					.9
4						19					.7
5	1.5			1.0		20					.7
6						21					.7
7						22					.7
8						23					.7
9						24					.7
10						25					.7
11						26					.7
12						27					.7
13		1.35				28					.7
14			1.0			29	1.45				.7
15						30					.7
						31					.7

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

RIO FERNANDO DE TAOS NEAR TAOS, N. MEX.

This station was established April 6, 1910, at the mouth of the canyon almost 2 miles south of Taos and 200 yards upstream from the head gate of B. G. Randall's intake ditch, the highest diversion of any importance.

A vertical rod gage is located on the left bank. Observations were taken gratis by B. G. Randall.

Discharge measurements of Rio Fernando de Taos near Taos, N. Mex., for 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Apr. 6	J. B. Stewart	14.5	7	1.05	17.8
July 12	do	9	2.3	.70	2.2
Sept. 15	C. D. Miller	3.5	1.12	.7	.8
Oct. 15	J. B. Stewart	5.8	1.3	.75	1.0
Dec. 16	Russell and Digby			.68	a.5

[a] Discharge estimated.

NOTE.—Measurements made by wading.

Daily gage height, in feet, of Rio Fernando de Taos near Taos, N. Mex., for 1910.

[B. G. Randall, observer.]

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Apr.	May.	June.	July.	Aug.	Sept.
1	.....	1.4	0.85	0.7	0.8	0.75	16	1.1	1.0	0.8	0.7	0.75	.....
2	.....	1.4	.85	.7	.8	.75	17	1.2	1.0	.8	.7	.75	.....
3	.....	1.4	.85	.7	.8	.75	18	1.2	1.0	.75	.7	.75	.....
4	.....	1.4	.8	.65	.8	.....	19	1.3	.95	.75	.65	.8	.....
5	.....	1.3	.95	.65	.8	.8	20	1.5	.95	.75	.65	.8	.....
6	1.05	1.3	.9	.65	.8	.75	21	1.5	.95	.75	.7	.8	.....
7	.....	1.3	.85	.65	.8	.75	22	1.3	.9	.75	.65	.75	.....
8	1.0	1.3	.85	.6	.8	.75	23	1.3	.9	.75	.7	.75	.....
9	1.05	1.3	.85	.6	.8	.75	24	1.4	.9	.7	.7	.75	.....
10	1.3	1.2	.8	.6	.8	.75	25	1.4	.9	.75	.75	.75	.....
11	1.3	1.15	.8	.7	.8	.75	26	1.5	.9	.75	.75	.75	.....
12	1.3	1.15	.8	.7	.8	.....	27	1.5	.9	.7	.85	.75	.....
13	1.5	1.05	.8	.85	.8	.....	28	1.5	.9	.75	.85	.75	.....
14	1.5	1.05	.8	.75	.75	.....	29	1.5	.85	.7	.8	.75	.....
15	1.3	1.05	.8	.7	.75	.....	30	1.6	.85	.7	1.5	.75	.....
							31	.....	.85	.....	.9	.75	.....

SANTA FE CREEK BASIN.

DESCRIPTION.

Santa Fe Creek rises on the range east of Santa Fe and flows westward over high plains to join the Rio Grande. In the mountains at the head of the creek are two small lakes which may be considered typical of those at the headwaters of other streams flowing toward the Rio Grande. The elevation of these lakes is about 11,000 feet. Between Santa Fe and Cieneguilla the stream runs through a valley with gradually sloping sides. At Cieneguilla it enters La Bajada Canyon, which is deep and narrow as far as the town of La Bajada; below this is a broader valley with a gentle slope to the left and the edge of the mesa to the right. This valley continues almost to the mouth of the creek.

SANTA FE CREEK AT MONUMENT ROCK, NEAR SANTA FE, N. MEX.

This station is located 7 miles above Santa Fe, at Monument Rock—a large, conspicuous bowlder near the creek. The gage was established August 27, 1910, by an engineering party temporarily in that vicinity. Several gage readings were taken daily and numerous discharge measurements made. The station is about 4 miles above that established May 12, 1910, near the Santa Fe Water & Light Co.'s ditch. No important tributaries enter between the stations.

Discharge measurements of Santa Fe Creek at Monument Rock, near Santa Fe, N. Mex., in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Sept. 29	C. H. Neel	6.4	3.0	0.72	1.6
30	do	6.4	2.8	.71	1.3
Oct. 7	do	6.4	2.8	.69	1.1
10	do	6.4	2.7	.69	1.1
21	do	8.0	3.1	.73	1.6
26	do	8.0	3.0	.72	1.3
29	do	8.0	3.0	.71	1.3
Nov. 1	do	8.0	3.1	.71	1.47
9	do	7.2	2.9	.70	1.2
11	do	8.0	3.0	.71	1.49
19	do	8.0	3.0	.73	1.74
22	do	8.0	3.1	.71	1.4
28	T. E. Neel	8.0	3.1	.75	1.56
Dec. 1	do	7.6	2.3	.65	.69
6	do	8.0	2.8	.72	1.2
9	do	8.0	2.6	.70	1.08
14	do	8.0	2.8	.71	1.16
22	do	8.0	2.8	.71	1.16
23	do	8.0	2.6	.70	1.11

Daily gage height, in feet, of Santa Fe Creek at Monument Rock, near Santa Fe, N. Mex., for 1910.

[T. E. Neel, observer.]

Day.	Aug.	Sept.	Oct.	Nov.	Dec.	Day.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	0.80	0.71	0.71	0.71	16	.....	0.74	0.69	0.73	0.69
2	.....	.80	.70	.71	.70	17	.....	.74	.75	.71	.71
3	.....	.78	.71	.71	.72	18	.....	.75	.71	.72	.71
4	.....	.76	.70	.71	.72	19	.....	.82	.75	.75	.71
5	.....	76	.70	.75	.65	20	.....	.76	.74	.72	.71
6	.....	.75	.70	.72	.71	21	.....	.75	.69	.72	.70
7	.....	.74	.70	.72	.72	22	.....	.75	.73	.72	.72
8	.....	.74	.69	.72	.71	23	.....	.74	.72	.71	.71
9	.....	.73	.69	.71	.70	24	.....	.72	.72	.71	.72
10	.....	.73	.69	.71	.70	25	.....	.72	.72	.71	.72
11	.....	.73	.70	.71	.71	26	.....	.72	.72	.71	.71
12	.....	.72	.70	.71	.70	27	.....	.71	.72	.70	.70
13	.....	.72	.70	.71	.70	28	.....	.72	.71	.72	.72
14	.....	.79	.69	.72	.71	29	0.86	.72	.71	.70	.70
15	.....	.77	.69	.71	.71	30	.82	.71	.71	.71	.70
						31	.85	.....	.71	.....	.....

Daily discharge, in second-feet, of Santa Fe Creek at Monument Rock, near Santa Fe, N. Mex., for 1910.

Day.	Aug.	Sept.	Oct.	Nov.	Dec.	Day.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	2.9	1.3	1.3	1.2	16	.....	1.8	1.1	1.6	1.0
2	.....	2.9	1.2	1.3	1.1	17	.....	1.8	2.0	1.3	1.2
3	.....	2.5	1.3	1.3	1.3	18	.....	2.0	1.3	1.4	1.2
4	.....	2.1	1.2	1.3	1.3	19	.....	3.3	2.0	2.0	1.2
5	.....	2.1	1.2	2.0	.7	20	.....	2.1	1.8	1.4	1.2
6	.....	2.0	1.2	1.4	1.2	21	.....	2.0	1.1	1.4	1.1
7	.....	1.8	1.2	1.4	1.3	22	.....	2.0	1.6	1.4	1.3
8	.....	1.8	1.1	1.4	1.2	23	.....	1.8	1.4	1.3	1.2
9	.....	1.6	1.1	1.3	1.1	24	.....	1.4	1.4	1.3	1.3
10	.....	1.6	1.1	1.3	1.1	25	.....	1.4	1.4	1.3	1.3
11	.....	1.6	1.2	1.3	1.2	26	.....	1.4	1.4	1.2	1.2
12	.....	1.4	1.2	1.3	1.1	27	.....	1.3	1.4	1.1	1.1
13	.....	1.4	1.2	1.3	1.1	28	.....	1.4	1.3	1.3	1.3
14	.....	2.7	1.1	1.4	1.2	29	4.3	1.4	1.3	1.1	1.1
15	.....	2.3	1.1	1.3	1.2	30	3.3	1.3	1.3	1.2	1.1
						31	4.1	.....	1.3	.....	1.1

NOTE.—Daily discharge from two poorly defined rating curves based on discharge measurements made during the period.

Monthly discharge of Santa Fe Creek at Monument Rock, near Santa Fe, N. Mex., for 1910.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
September	3.3	1.3	1.90	113	C.
October	2.0	1.1	1.32	81.2	C.
November	2.0	1.1	1.36	80.9	C.
December	1.3	.7	1.17	71.9	C.

SANTA FE CREEK NEAR SANTA FE, N. MEX.

This station, which was established May 31, 1907, to determine the amount of water available for irrigation and storage, is located at the Don Gaspar Avenue bridge in the city of Santa Fe.

The gage datum was changed on August 13, 1908, and again on August 22, 1908. Results obtained at this station have been very unsatisfactory owing to the torrential character of the stream, the shifting nature of the bed, and the inadequate number of discharge measurements.

Discharge measurements are made from the downstream side of the bridge.

No important tributaries except intermittent streams enter below the station. The drainage area at the station is about 40 square miles, and at the mouth of the river it is about 300 square miles.

The reservoir for the Santa Fe municipal supply is situated in the canyon above the station and a water-power plant of 100-horsepower capacity is used to develop power for lighting. Very little water is diverted for irrigation above the station. One small ditch takes water out just above. In the canyon 8 miles above Santa Fe is a reservoir site where 10,000 acre-feet can be stored.

Ice is usually to be found in the stream during the winter months, though the flow is very small during that period. The low-water flow is regulated to some extent by the waterworks reservoir above.

On May 12, 1910, the station was moved to a point 3½ miles above Santa Fe, about three-fourths of a mile above the Santa Fe Water & Light Co.'s reservoir and about 1,000 feet below the intake of the company's ditch. A vertical rod gage and a cable were installed.

Discharge measurements of Santa Fe Creek near Santa Fe, N. Mex., in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
May 12	J. B. Stewart	13.5	8.9	1.0	16.3
July 17	C. D. Miller	.....	.....	.3	*a* .15
Aug. 21	J. B. Stewart	.....	.....	.35	*a* .4
Sept. 24	C. D. Miller	3.8	1.0	.39	1.1

a Discharge estimated.

NOTE.—Measurements made at station established May 12, 3½ miles above Santa Fe and below intake of Santa Fe Light & Water Co.'s ditch.

Daily gage height, in feet, of Santa Fe Creek near Santa Fe, N. Mex., for 1910.

[John Catanache, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.
1	−0.1	−0.1	−0.1	.....	0.05	0.7	0.34
2	− .1	− .15	− .1	.....	.....	.67	.34
3	− .05	− .1	− .1	.....	.....	.65	.34
4	.1	− .1	− .1	.....	.....	.62	.34
5	.1	− .1	− .1	.....	.....	.58	.34
6	.1	− 1	− .1	.....	.....	.55	.43
7	.1	− .1	− .1	.....	.....	.49	.52
8	.1	− .1	− .1	.....	.....	.48	.52
9	.1	− .1	− .1	.....	.....	.45	.52
10	.1	− .1	− 1	.....	.....	.4	.52
11	.3	− .1	− .1	.....	.....	.4	.52
12	.3	− .1	− .1	.....	1.0	.4	.52
13	.3	− .1	− .1	.....	1.1	.4	.52
14	− .1	− .1	− .1	.....	1.05	.4	.54
15	− .05	− .1	− .1	.....	1.0	.35	.43
16	− .1	− .1	− .1	.....	.9	.34	.34
17	− .1	− .1	− .1	.....	.9	.34	.....
18	− .1	− .1	− .1	.....	.9	.34	.....
19	.0	− .1	− .1	.....	.85	.34	.....
20	.0	− .1	− .1	.....	.8	.34	.....
21	− .1	− .1	− .1	0.0	.....	.34	.....
22	− .1	− .1	− .1	.05	.75	.34	.....
23	− .1	− .1	− .1	.....	.7	.34	.....
24	− .1	− .1	− .1	.....	.69	.34	.....
25	− .1	− .1	− .1	.....	.68	.5	.....
26	− .1	− .1	− .1	.....	.67	.34	.....
27	− .1	− .1	− .1	.....	.67	.34	.....
28	− .1	− .1	− .1	.....	.67	.34	.....
29	− .1	.....	− .1	.....	.67	.34	.....
30	− 1	.....	− .1	.....	.75	.34	.....
31	− 1	.....	− .1	.....	.7	.....	.....

NOTE.—Heights previous to May 11 refer to old station in the city of Santa Fe. Heights May 12 to July 16 refer to gage established May 12 3½ miles above Santa Fe.

Daily discharge, in second-feet, of Santa Fe Creek near Santa Fe, N. Mex., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.
1	0.2	0.2	0.2	.....	0.8	6.0	0.4
2	.2	.2	.2	.....	.....	5.4	.4
3	.2	.2	.2	.....	.....	5	.4
4	.2	.2	.2	.....	.....	4.4	.4
5	.2	.2	.2	.....	.....	3.7	.4
6	.2	.2	.2	.....	.....	3.2	1.9
7	.2	.2	.2	.....	.....	2.3	3
8	.2	.2	.2	.....	.....	2.2	3
9	.2	.2	.2	.....	.....	1.8	3
10	.2	.2	.2	.....	.....	1.2	3
11	.2	.2	.2	.....	.....	1.2	3
12	.2	.2	.2	.....	16	1.2	3
13	.2	.2	.2	.....	22	1.2	3
14	.2	.2	.2	.....	19	1.2	3.7
15	.3	.2	.2	.....	16	.4	1.9
16	.2	.2	.2	.....	12	.4	.4
17	.2	.2	.2	.....	12	.4	.....
18	.2	.2	.2	.....	12	.4	.....
19	.4	.2	.2	0.8	10	.4	.....
20	.4	.2	.2	1.5	8	.4	.....
21	.2	.2	.2	1.5	8	.4	.....
22	.2	.2	.2	2	7.2	.4	.....
23	.2	.2	.2	1	6	.4	.....
24	.2	.2	.2	1	5.8	.4	.....
25	.2	.2	.2	2	5.6	2.4	.....
26	.2	.2	.2	2	5.4	.4	.....
27	.2	.2	.2	2	5.4	.4	.....
28	.2	.2	.2	2	5.4	.4	.....
29	.2	.....	.2	2	5.4	.4	.....
30	.2	.....	.2	2	7.2	.4	.....
31	.2	.....	.2	.....	6	.....	.....

NOTE.—Daily discharges for Jan. to May 1 have been estimated from records taken at the old station. Practically no flow from April 1 to 18. Discharges for May 12 to July 16 were obtained from a fairly well defined rating curve based on measurements made at the station established May 12.

Monthly discharge of Santa Fe Creek near Santa Fe, N. Mex., for 1910.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
January			0.22	13.5	C.
February			.20	11.1	C.
March			.20	12.3	C.
April			.66	39.3	C.
May (21 days)			9.30	387	B.
June	6.0	0.4	1.61	95.8	B.
July 1–16	3.7	.4	1.93	61	B.

SANTA FE WATER & LIGHT CO.'S DITCH NEAR SANTA FE, N. MEX.

The Santa Fe Water & Light Co.'s ditch diverts water from Santa Fe Creek about 3 miles above Santa Fe.

A vertical gage rod was established on the ditch June 7, 1910, at a point about one-fourth mile below the intake and about 600 feet above the cable station on the creek. A gage height record was obtained for June 7 to 30.

Discharge measurements of Santa Fe Water & Light Co.'s ditch near Santa Fe, N. Mex., in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
July 17	C. D. Miller	3.3	1.1	0.70	1.0
Sept. 24	do			.52	(a)

a No flow.

Daily gage height, in feet, of Santa Fe Water & Light Co.'s ditch near Santa Fe, N. Mex., for 1910.

[John Catanache, observer.]

Day.	June.	Day.	June.	Day.	June.
1		11	1.18	21	.90
2		12	1.10	22	.90
3		13	1.05	23	.88
4		14	1.05	24	.88
5		15	1.10	25	1.05
6		16	1.07	26	.98
7	1.20	17	1.02	27	.98
8	1.20	18	.95	28	.98
9	1.18	19	.95	29	.95
10	1.18	20	.92	30	.86

RIO PUERCO BASIN.

DESCRIPTION.

Rio Puerco rises in the mountains in the southern part of Rio Arriba County, N. Mex., and flows in a general southerly course about 100 miles across Sandoval, Bernalillo, and Valencia counties to its

junction with the Rio Grande near La Joya. It drains a large area but is dry at its mouth during the winter and early spring. It holds a constant stream as far south as Casa Salazar, a point southwest of Jemez, and from there on the water is caught during floods, by brush dams which wash away each winter and must be rebuilt in the spring.

San Jose River, the principal tributary of Rio Puerco, or, as known at the headwaters, Bluewater Creek, enters from the west. This river must discharge an enormous amount of flood water, for its drainage area is large, but normally it is a small stream which flows constantly at all seasons for some 3 miles below Laguna, where in summer it evaporates. Brush dams are used also at some points on this creek.

RIO PUERCO AT RIO PUERCO, N. MEX.

This station was established September 7, 1910, at the Atchison, Topeka & Santa Fe Railway bridge crossing Rio Puerco between the railway stations of Pavo and Rio Puerco. It is a short distance below the mouth of San Jose Creek.

A Friez automatic gage is fastened to a timber retaining wall on the left bank.

Discharge measurements of Rio Puerco at Rio Puerco, N. Mex., in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Sept. 5	J. B. Stewart				[a]0.5
7	....do				[a]1.0
11	J. A. Nicolay				[a].5
18	....do	6	0.8		.5
21	J. B. Stewart				[a].2
25	J. A. Nicolay	19	14.7		24.3
Oct. 2	....do	6	.7		.64
9	....do	8	.8		.44
16	....do	7	.8		.44
30	....do	14	10.4		8.7
Nov. 6	....do	14	4.4		3.33
12	J. B. Stewart				[a]5.0
13	J. A. Nicolay	14	4.4	0.5	4.28
20	....do	16	5.2	.4	4.84
27	....do	16	5.0	.4	5.0
Dec. 4	....do	6	1.5	.2	1.34
11	....do	6	1.7	.3	1.54

[a] Discharge estimated.

Daily gage height, in feet, of Rio Puerco at Rio Puerco, N. Mex., for 1910.

[J. A. Nicolay, observer.]

Day.	Nov.	Dec.	Day.	Nov.	Dec.	Day.	Nov.	Dec.
1	.....	0.2	11	.....	0.3	21	0.4	.....
2	.....	.2	12	.....	.....	22	.4	.....
3	.....	.2	13	0.5	.....	23	.35	.....
4	.....	.2	14	.5	.....	24	.3	.....
5	.....	.1	15	.5	.....	25	.3	.....
6	.....	.1	16	.45	.....	26	.3	.....
7	.....	.25	17	.45	.....	27	.4	.....
8	.....	.35	18	.45	.....	28	.25	.....
9	.....	.2	19	.4	.....	29	.2	.....
10	.....	.3	20	.4	.....	30	.2	.....

NOTE.—From Sept. 11 to Nov. 13, low-water stages were not recorded on automatic register. Two small rises occurred, one on Sept. 21 and the other Oct. 17.

RIO PUERCO NEAR LA JOYA, N. MEX.

This station was established September 10, 1910, at the Atchison, Topeka & Santa Fe Railway bridge crossing the stream one-half mile above its mouth and about 2 miles north of La Joya.

A Friez automatic gage is fastened to the downstream end of bridge pier.

Discharge measurements of Rio Puerco near La Joya, N. Mex., in 1910.

Date.	Hydrographer.	Discharge.
		Sec.-ft.
Sept. 10	J. B. Stewart	[a]0.5
21	....do	[a].2
Nov. 13	....do	[a]1.0

[a] Discharge estimated.

NOTE.—Low-water stages are not recorded on automatic register. With the exception of slight rises on Sept. 22 and Oct. 18, the stream has been carrying less than 1 second-foot.

SAN JOSE RIVER NEAR SUWANEE, N. MEX.

This station was established September 6, 1910, about 1¼ miles below Suwanee, a station on the coast line of the Atchison, Topeka & Santa Fe Railway, about 50 miles west of Albuquerque. The station is below all important diversions and tributaries and several miles above the mouth of the river. A large spring discharges into the stream from the right about one-eighth mile above the station.

A Friez automatic gage is located on left bank.

Discharge measurements of San Jose River near Suwanee, N. Mex., in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Aug. 30	J. B. Stewart	52.5	31.3	2.30	99.5
31	.....do	66	47.8	2.80	164
Sept. 6	.....do	9	1.6	.48	2.1
11	H. W. Ordeman	10	2.4	.50	2.4
18	.....do	12	1.9	.50	1.9
25	.....do	12	2.5	.7	3.9
Oct. 2	.....do	8	1.2	.5	.81
9	.....do	8	1.0	.5	.50
16	.....do	8	1.1	.5	.67
23	.....do	14	3.0	.8	6.09
30	.....do	12	2.8	.5	3.9
Nov. 6	.....do	14	4.0	.8	6.28
12	J. B. Stewart	10.5	3.0	.62	4.4
13	H. W. Ordeman	16	4.9	.7	5.4
20	.....do	15	4.3	.7	4.8
27	.....do	10	1.8	.5	2.15
Dec. 4	.....do	10	1.2	.4	.61
11	.....do	14	3.4	.7	4.78

NOTE.—Measurements made by wading.

Daily gage height, in feet, of San Jose River near Suwanee, N. Mex., for 1910.

[H. W. Ordeman, observer.]

Day.	Sept.	Oct.	Nov.	Dec.	Day.	Sept.	Oct.	Nov.	Dec.
1	.....	0.7	0.55	0.45	16	0.5	0.65	0.7	.....
2	.....	.6	.55	.5	17	.5	2.05	.7	.....
3	.....	.5	.55	.5	18	.5	1.1	.7	.....
4	.....	.5	.6	.45	19	.7	.65	.7	.....
5	.....	.5	.65	.45	20	1.0	.65	.7	.....
6	.....	.5	.8	.45	21	1.8	.6	.75	.....
7	0.5	.5	.75	.55	22	4.2	.95	.75	.....
8	.5	.5	.7	.55	23	4.0	.85	.75	.....
9	.5	.5	.65	.6	24	3.3	.7	.75	.....
10	.5	.5	.6	.65	25	.7	.65	.75	.....
11	.5	.5	.6	.7	26	.7	.65	.65	.....
12	.5	.5	.65	.....	27	.7	.65	.5	.....
13	.5	.5	.7	.....	28	.7	.6	.5	.....
14	.5	.5	.7	.....	29	.7	.55	.5	.....
15	.5	.5	.7	.....	30	.7	.55	.5	.....
					31	.....	.55	.....	.....

Daily discharge, in second-feet, of San Jose River near Suwanee, N. Mex., for 1910.

Day.	Sept.	Oct.	Nov.	Dec.	Day.	Sept.	Oct.	Nov.	Dec.
1	.....	5.0	2.2	0.9	16	1.9	4	5	.....
2	.....	3	2.2	1.4	17	1.9	75	5	.....
3	.....	1.4	2.2	1.4	18	1.9	17	5	.....
4	.....	1.4	3	.9	19	5	4	5	.....
5	.....	1.4	4	.9	20	13	4	5	.....
6	.....	1.2	7	.9	21	55	3	6	.....
7	2.4	1.2	6	2.2	22	422	12	6	.....
8	2.4	1.2	5	2.2	23	380	8	6	.....
9	2.4	1	4	3	24	245	5	6	.....
10	2.4	1	3	4	25	5.5	4	6	.....
11	2.4	1	3	5	26	5.5	4	4	.....
12	2.2	1	4	.....	27	5	4	1.4	.....
13	2.2	1	5	.....	28	5	3	1.4	.....
14	2.0	1	5	.....	29	5	2.2	1.4	.....
15	2.0	1	5	.....	30	5	2.2	1.4	.....
					31	.....	2.2	.....	.....

NOTE.—Discharges obtained by the indirect method for shifting channels.

Monthly discharge of San Jose River near Suwanee, N. Mex., for 1910.

Month.	Discharge in second-feet.			Run-off (total in acre feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
Sept. 7–30	422	1.9	47.0	2,240	B.
October	75	1.0	5.69	350	C.
November	7.0	1.4	4.17	248	C.
Dec. 1–11	5.0	.9	2.07	45	C.

MIMBRES RIVER BASIN.

DESCRIPTION.

Mimbres River rises on the western slope of the Mimbres Range in the extreme northeastern part of Grant County, N. Mex., and takes a general southeasterly course to the western part of Dona Ana County, where its waters are lost.

Cameron Creek, which flows through the Fort Bayard military reservation, may send its flood waters to the Mimbres.

MIMBRES RIVER NEAR FAYWOOD, N. MEX.

The station, which is located about 6 miles southeast of Faywood Hot Springs and 10 miles from Faywood station, on the Silver City branch of the Santa Fe Railway, was established April 23, 1908, to determine the amount of water available for storage.

No important tributaries enter in the vicinity of the station, though many intermittent tributaries come in both above and below. The drainage area is about 450 square miles.

Some water is used for irrigation in the Mimbres Valley below the station, but as this is primarily a flood stream and as storage has not been provided, such irrigation is uncertain. By storing the flood water and cutting off the underflow at the Rio Mimbres dam site it will be possible to reclaim several thousand acres of land along this stream.

The gage is located about 400 feet below the proposed Rio Mimbres reservoir dam site. The gage datum was lowered 4 feet on July 8, 1909, and was afterwards raised 3 feet on August 13, 1909, when a Friez automatic gage was installed 200 feet above the chain gage on the right bank.

The flow of the stream at the gaging station is not usually affected by ice during the winter months. As the channel shifts a great deal, frequent measurements are necessary at high and medium stages to obtain the best results. Measurements during high stages are made from a cable 1,000 feet below the automatic gage.

Discharge measurements of Mimbres River near Faywood, N. Mex., in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Feb. 13	J. B. Stewart	7.7	2.5	0.79	4.3
Mar. 18	do	6.5	2.9	.72	3.2
23	do	7.0	2.9	.70	3.1
May 8	C. D. Miller	8.3	2.33	.65	1.8
July 2	J. B. Stewart	.....	.....	.54	[a] .5
Sept. 20	do	.....	.....	.....	[b]

[a] Estimated. [b] Stream dry.

Daily gage height, in feet, of Mimbres River near Faywood, N. Mex., for 1910.

[R. J. Trujillo, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Nov.
1	1.0	1.0	0.7	0.7	0.7	0.65	0.55	1.0	0.9	.....
2	1.0	.95	.7	.65	.7	.65	.55	.95	.....	.....
3	1.0	.95	.7	.65	.7	.65	.5	.95	.9	.....
4	1.0	.95	.7	.65	.7	.65	.5	.95	.9	.....
5	1.0	.95	.7	.65	.65	.7	.5	.95	.9	0.8
6	.95	.9	.7	.65	.65	.7	.5	.95	.9	.....
7	1.0	.85	.7	.....	.65	.7	.65	.95	.8	.....
8	.95	.85	.7	.....	.65	.7	.55	.95	.75	.....
9	.95	.8	.7	.....	.65	.7	.55	1.1	.....	.....
10	.95	.8	.7	.....	.65	.7	.6	1.7	.....	.....
11	1.0	.8	.7	.....	.65	.7	.6	1.1	.....	.....
12	1.0	.8	.7	.....	.65	.7	.6	1.05	.....	.....
13	1.0	.8	.7	.....	.7	.7	.6	1.05	.....	.....
14	1.0	.8	.7	.7	.7	.7	.6	1.0	.....	.....
15	1.0	.8	.7	.7	.7	.7	1.1	1.2	.....	.....
16	1.0	.8	.7	.7	.65	.7	.....	1.2	.....	.....
17	1.0	.75	.7	.7	.65	.7	.....	1.1	.....	.....
18	1.0	.75	.7	.7	.65	.7	.8	1.1	1.1	.....
19	1.0	.75	.7	.7	.65	.7	.8	1.1	.....	.....
20	1.0	.75	.7	.7	.65	.7	.....	1.1	.....	.....
21	.95	.75	.7	.7	.65	.7	.....	1.1	.....	.....
22	.....	.75	.7	.7	.65	.7	.....	1.1	.....	.....
23	.....	.7	.7	.7	.65	.65	.....	1.1	.....	.....
24	.....	.7	.7	.7	.65	.8	.8	1.4	.....	.....
25	.....	.7	.7	.7	.65	.55	.75	.95	.....	.....
26	.....	.7	.7	.7	.65	.9	.7	.9	.....	.....
27	.....	.7	.7	.7	.65	.55	.7	.9	.....	.....
28	.....	.7	.7	.65	.65	.55	1.25	.....	.....	.....
29	.....	.....	.7	.7	.65	.55	1.1	.....	.....	.....
30	1.0	.....	.7	.7	.65	.55	.9	.....	.....	.....
31	1.0	.....	.7	.....	.65	.....	.9	.....	.....	.....

NOTE.—No flow after Sept. 8, except Sept. 18 and Nov. 5, when small floods occurred.

Daily discharge, in second-feet, of Mimbres River near Faywood, N. Mex., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	4.5	10	2.0	2.5	2.5	1.6	0.5	17	8
2	4.5	8	2	1.6	2.5	1.6	.5	12	8
3	4.5	8	2	1.6	2.5	1.6	0	12	8
4	4.5	8	2	1.6	2.5	1.6	0	12	8
5	4.5	8	2	1.6	1.6	2.5	0	12	8
6	3	8	2	1.6	1.6	2.5	0	12	8
7	5	4	2	2	1.6	2.5	1.0	12	3
8	3	4	2	2	1.6	2.5	0	12	2
9	3	3.5	2	2	1.6	2.5	0	27	.....
10	3	3.5	2	2	1.6	2.5	.2	196	.....
11	5	4.0	2.5	2	1.6	2.5	.2	27	.....
12	5	4.5	2.5	2	1.6	2.5	.2	21	.....
13	5.5	5	2.5	2	2.5	2.5	.2	21	.....
14	5.5	5	2.5	2.5	2.5	2.5	.2	16	.....
15	5.5	5	2.5	2.5	2.5	2.5	33	42	.....
16	5.5	5	2.5	2.5	1.6	2.5	9	42	.....
17	6	3	2.5	2.5	1.6	2.5	4.5	28	.....
18	6	3	2.5	2.5	1.6	2.5	4.5	28	.....
19	6	3	2.5	2.5	1.6	2.5	4.5	28	.....
20	6	3	2.5	2.5	1.6	2.5	4.5	28	.....
21	6	3	2.5	2.5	1.6	2.5	4.5	28	.....
22	4	3	2.5	2.5	1.6	2.5	1.0	28	.....
23	4	2	2.5	2.5	1.6	1.6	1.0	28	.....
24	4	2	2.5	2.5	1.6	6.0	4.5	86	.....
25	5	2	2.5	2.5	1.6	.5	2.5	10	.....
26	5	2	2.5	2.5	1.6	12.5	1.0	8	.....
27	6	2	2.5	2.5	1.6	.5	1.0	8	.....
28	6	2	2.5	1.6	1.6	.5	57	8	.....
29	7	.....	2.5	2.5	1.6	.5	30	8	.....
30	8	.....	2.5	2.5	1.6	.5	9	8	.....
31	8	.....	2.5	.....	1.6	.....	9	8	.....

NOTE.—Daily discharges obtained by indirect method for shifting channels and are only approximate. No discharge after Sept. 8, except Sept. 18 and Nov. 5, which have been estimated at 25 and 5 second-feet, respectively.

Monthly discharge of Mimbres River near Faywood, N. Mex., for 1910.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
January	8	3	5.11	314	D.
February	10	2	4.41	245	D.
March	2.5	2	2.34	144	C.
April	2.5	1.6	2.20	131	C.
May	2.5	1.6	1.80	111	C.
June	12.5	.5	2.47	147	D.
July	57	0	5.92	364	D.
August	196	.....	2.69	1,650	D.
September	25	0	2.60	155	D.
October	0	0	0	0	
November	5	0	.17	10.1	
December	0	0	0	0	
The year	196	0	2.47	3,270	

CAMERON CREEK BASIN.

CAMERON CREEK AT FORT BAYARD, N. MEX.

This station, which was established on January 17, 1907, at the request of the United States Forest Service, to obtain data concerning flood run-off, is located near the pumping station at Fort Bayard,

N. Mex., a United States Army post. The gage, a vertical rod, is a short distance above the crest of an old masonry dam, which was used to check the underflow of the creek.

For the greater part of the year the flow comes from springs, and amounts to less than 1 second-foot. Stevens Creek enters about 2 miles above this station.

The intake for the water supply of the post is above the station, and a little water is also diverted above for garden irrigation. The flood waters of this stream can probably be stored in natural depressions in the vicinity, which will make excellent reservoir sites. These can be supplied by feeder canals.

Ice does not appreciably affect the flow of the stream at this point. The channel has filled up with sediment above the dam, which doubtless has some effect on low-water measurements. The channel is probably permanent for measurements taken at higher stages. Unfortunately no high-water measurements have yet been made. Measurements are made by wading.

No change has been made in the datum of the gage during the maintenance of the station. Gage observations have been taken gratis by Sergt. T. J. McBurney, United States Army.

Discharge measurements of Cameron Creek at Fort Bayard, N. Mex., in 1910.

Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Feb. 10	J. B. Stewart	1.48	[a] 0.3
May 8	C. D. Miller	1.4	[a] .2
Sept. 15	J. B. Stewart	.....	(b)
Nov. 18	T. J. McBurney	.....	(b)

[a] Estimated. [b] Creek dry.

Daily gage height, in feet, and discharge, in second-feet, of Cameron Creek at Fort Bayard, N. Mex., for 1910.

Date.	Gage height.	Discharge.
Jan. 1–Feb. 9	1.35	0.2
Feb. 10–June 2	1.5	.2
June 3–4	1.55	.5
June 5–July 26	1.5	.2
July 27	2.0	13.0
July 28–Aug. 13	1.5	.2
Aug. 14	1.65	1.0
Aug. 15–Sept. 11	1.5	.2
Sept. 12–16	(a)	0
Sept. 17–24	1.5	.2
Sept. 25–Nov. 3	(a)	0
Nov. 4	1.7	2.0
Nov. 5–Dec. 31	(a)	0

[a] Creek dry.

NOTE.—The gage heights for low stages are not a true index of the discharge.

Monthly discharge of Cameron Creek at Fort Bayard, N. Mex., for 1910.

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
January	0.2	12.3
February	.2	11.1
March	.2	12.3
April	.2	11.9
May	.2	12.3
June	.22	13.1
July	.61	37.5
August	.23	14.1
September	.13	7.7
October	0	0
November	.067	4.0
December	0	0
The year	.183	136

NOTE.—Estimates of monthly discharge are only approximate. The minimum steady flow for the year was estimated to be 0.2 second-foot. There was no flow during October and December, most of November, and portions of September.

STEVENS CREEK NEAR FORT BAYARD, N. MEX.

This station, which was established January 17, 1907, at the request of the United States Forest Service, is located one-fourth mile above the Fort Bayard planting station of the Forest Service, 3 miles north of Fort Bayard.

The records furnish valuable information concerning normal and flood run-off. The station is situated about 2 miles above the junction of this stream with Cameron Creek.

The normal flow of this creek is very small, but for short periods during floods it occasionally carries a large flow, which can probably be stored. The intake for the water supply of the planting station is above the gage.

The records of this station are little, if any, affected by ice. The results obtained have not been very satisfactory, owing to the small number of discharge measurements, none of which were taken when there was any considerable flow in the stream.

No change has been made in the datum of the gage since the establishment of the station.

Discharge measurements of Stevens Creek near Fort Bayard, N. Mex., in 1910.

Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Feb. 10	J. B. Stewart	1.40	[a] 0.2
Mar. 4	....do	1.47	[a] .3
May 8	C. D. Miller	1.39	(b)
Sept. 15	J. B. Stewart	.....	[a] .1

[a] Estimated. [b] Practically no flow.

Daily gage height, in feet, of Stevens Creek near Fort Bayard, N. Mex., for 1910.

[Harry C. Turner, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.
1				1.39				
2		1.43						
3			1.43					
4	1.40		1.47	1.39				1.50
5		1.43	1.39					
6								
7	1.40			1.39				
8			1.39		1.38			1.60
9		1.43						1.10
10	1.41	1.40						
11							1.90	
12		1.43	1.39	1.39				
13	1.41							
14		1.42						
15	1.41			1.39				
16								
17	1.42	1.43						
18			1.39					
19								
20	1.42			1.40				
21		1.43						
22			1.39					
23								
24		1.43		1.40				
25	1.43		1.39					
26								
27						2.10		
28		1.43	1.39					
29	1.43							
30								
31								

NOTE.—Water diverted for irrigation on Mar. 5. There was practically no flow after this date except at times of small floods when water was flowing past the gauge for periods of less than one hour to three hours.

RIO TULAROSA BASIN.

RIO TULAROSA AT MESCALERO, N. MEX.

Rio Tularosa rises in the southwestern part of the Mescalero Apache reservation, N. Mex., flows northwestward to a point 2 miles beyond the agency, then turns and flows southwestward about 18 miles to the flats in the northeastern part of Dona Ana County.

The station was established November 27, 1910, at a wagon bridge crossing the stream just inside of the gate into an alfalfa field about one-fourth mile below the Indian agency. It is about 300 yards below the ditch which carries the tail water from the agency power house. A vertical rod gage is fastened to upstream end of left abutment.

The following discharge measurement was made by J. B. Stewart:

November 27, 1910: Width, 5.2 feet; area, 4.7 square feet; gage height, 1.82 feet; discharge, 13.6 second-feet.

Daily gage height, in feet, of Rio Tularosa at Mescalero, N. Mex., for 1910.

[Hiram Jones, observer.]

Day.	Dec.	Day.	Dec.	Day.	Dec.
1	1.9	11	2.1	21	1.95
2	1.9	12	1.9	22	1.85
3	1.85	13	1.95	23	2.5
4	1.85	14	1.95	24	1.9
5	1.9	15	1.85	25	
6	1.9	16	1.8	26	1.9
7	1.85	17	1.85	27	1.95
8	1.9	18	1.95	28	1.9
9	1.9	19	2.0	29	2.5
10	1.8	20	1.9	30	2.0
				31	2.0

RIO LA LUZ BASIN.

RIO LA LUZ NEAR LA LUZ, N. MEX.

Rio La Luz, a stream about 2 miles long, rises in the southwestern part of the Mescalero Apache reservation and flows westward through a canyon to La Luz, in Dona Ana County. Its principal tributary is Fresnal River.

This station, which was established August 13, 1910, is located about 200 feet above Ranger's cabin, which is 1 mile above La Luz. It is about 200 feet above head of the development ditch, the uppermost diversion of any importance, and half a mile below the mouth of Fresnal River.

A vertical rod gage was located on the right bank. This gage was destroyed by flood on August 17, and on November 23 a new gage was installed at a different datum.

Discharge measurements of Rio La Luz near La Luz, N. Mex., in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Aug. 13	W. B. Freeman	18.3	5.9	1.58	13.7
Nov. 23	J. B. Stewart	7.5	4.4	1.00	13.5

NOTE.—Measurements made by wading. Gage heights of measurements are referred to different datums.

Daily gage height, in feet, of Rio La Luz River near La Luz, N. Mex., for 1910.

Day.	Aug.	Day.	Aug.
13	1.6	16	1.6
14	1.6	17	2.6
15	1.6		

PECOS RIVER BASIN.

DESCRIPTION.

Pecos River, the largest tributary of the Rio Grande, rises on the east side of the Santa Fe Range in northern New Mexico, flows south through eastern New Mexico, then southeast through southwestern Texas, and unites with the Rio Grande about 400 miles (by river) below El Paso. Except for some of the upper tributaries, the branches of the Pecos are intermittent, carrying large floods at times. From source to mouth the river is about 800 miles long, and the total drainage area includes more than 32,000 square miles, of which 23,000 are in New Mexico and 9,000 in Texas.

The upper Pecos flows as a typical mountain stream through narrow valleys and deeply cut gorges, but below Fort Sumner the canyon-like walls are replaced by low hills, and when the river reaches Roswell the gradation from the flood plains to the prairie is imperceptible. Arroyos and gulches are rare, and canyons are practically unknown. The mountain tributaries of the upper Pecos rise at elevations of about 11,000 feet; at Santa Rosa, N. Mex., the elevation of the river is 4,600 feet; at Roswell, 3,500 feet; at Pecos, Tex., 2,550 feet; and at the mouth of the stream it is 1,000 feet.

The main Pecos may be said to be formed by the junction of the Gallinas with the upper Pecos at La Junta, N. Mex. The most important tributaries below this point and above Roswell are the Agua Negra and the Agua Negra Chiquita, which enter just above Puerto de Luna. Except for small springs, no important tributaries enter along this stretch, but some of the dry gulches and arroyos occasionally carry large quantities of flood water. Among the most important of the lower tributaries are the Hondo, Rio Felix, the Penasco, Seven Rivers, and Black River.

It is rather a striking fact that the Pecos receives practically no tributaries from the east, probably because of the pervious character of the soil of the Staked Plains, upon which there is no surface drainage system. The water sinks into limestone rocks and establishes an underground drainage.

The condition of the Pecos basin may be characterized roughly as follows: Merchantable-timber land, 1,300 square miles; woodland, 2,400 square miles; 300 square miles of burnt and cut over land; and the remaining area of about 27,000 square miles is open and sagebrush land.

The rainfall along the Pecos in New Mexico ranges from 20 to 25 inches in the mountainous sections, as above Las Vegas and at Cloudcroft, to about 15 inches in the plains country, or in the vicinity of Roswell and Carlsbad. Through Texas the rainfall is light, the annual average being about 12 inches.

During the winter period the flow of the Pecos is supplied mainly by springs. The river has been known to go dry in the neighborhood of Colonias, N. Mex. (See Pl. III, *A*.)

Considerable ice forms on the upper Pecos, and heavy snows are common. In the vicinity of Santa Rosa and Fort Sumner thin ice and slush ice are in evidence during a part of the winter. Lower down the valley there is an occasional light snow, which disappears very quickly, and at times there is thin ice along the edges of the river. In the lower end of the valley the climate is mild. The rainfall comes mainly in the summer months, in the form of showers, and is variable and uncertain.

Irrigation in New Mexico has reached its highest stage of development in the lower Pecos Valley, the irrigated district beginning a short distance above Roswell and continuing into Texas. Thousands of acres are under cultivation, and a wisely planned system of reservoirs and canals is in operation. The surface waters have been greatly augmented during the past few years by numerous artesian wells. Above this fertile belt comparatively little farming is done; below it irrigation is carried on only in a small way, as the return seepage water contains, unfortunately, so much alkali that it is unsuitable for irrigation.

The recently completed Carlsbad and Hondo projects of the Reclamation Service provide for the irrigation of 20,000 and 10,000 acres, respectively, while the proposed Urton Lake project, which is to be relinquished by the Reclamation Service in favor of a Carey Act project, will result in the irrigation of about 60,000 acres in the vicinity of old Fort Sumner, N. Mex.

Numerous reservoir sites are to be found along the Pecos and its tributaries. Among the reservoirs now in operation may be mentioned Lake McMillan on the Pecos, and the Hondo reservoir on Hondo River. Urton Lake, a natural depression in the vicinity of Fort Sumner, will have a storage capacity of 190,000 acre-feet. It is to be supplied by a feeder canal from Pecos River. Because of the large amount of silt carried by this stream the prevention of its deposition must be taken into account and provided for in the construction of reservoirs.

On account of its long periods of low water, this stream does not offer many favorable opportunities for the development of power. At present there are no water-power plants of any importance in operation in the basin, except a public-utility plant of about 300 horsepower at Carlsbad, N. Mex. Later there may be some power development in connection with irrigation projects.

The records along this stream are very fragmentary and most of them were taken within the last five or six years. From them it would appear that 1903 was a very low year and 1905 an unusually high one.

PROGRESSIVE DISCHARGE MEASUREMENTS BETWEEN RIBERA AND FORT SUMNER, N. MEX.[1]

In order to ascertain the amount of water sinking in the bed of the Pecos and to determine whether it reappears farther down the valley, a series of progressive discharge measurements were made March 9–16, 1910, between Ribera and Fort Sumner. (See fig. 1.)

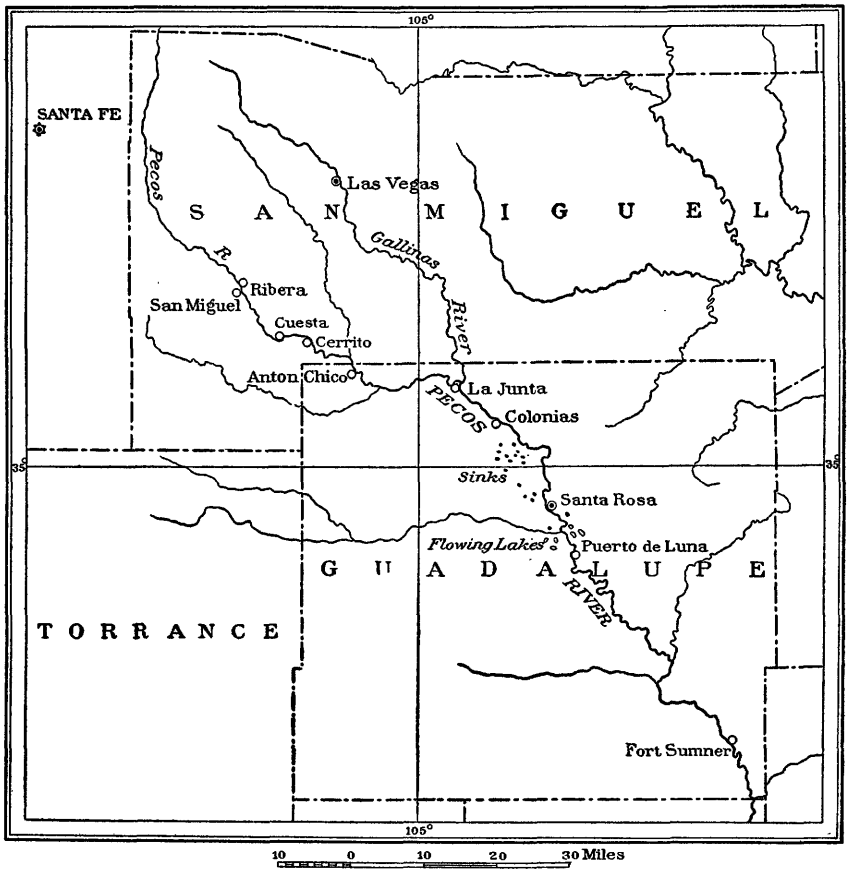


FIGURE 1.—Map of upper part of Pecos River basin.

The trip was made more or less continuously along the river from Ribera to Colonias, where it was found impracticable to follow the river, and between Colonias and Santa Rosa the journey was made across the mesa west of the river. From Santa Rosa to a point about 4 miles below Puerto de Luna the course of the river was followed, after which it was not touched again until a point about 5 miles above Fort Sumner was reached. For nearly the entire dis-

[1] Report by G. H. Russell, junior engineer, United States Geological Survey.

tance the river flows through a series of red sandstone strata, ranging in thickness from a few feet to several hundred feet and overlain in the upper portions of the section by gypsum and limestone beds. The limestone and gypsum strata dip to the east, and at Colonias and also in the section below Santa Rosa are in turn overtopped by thick layers of sandstone interstratified with thin layers of gypsum.

The river bed throughout its course consists of sand, gravel, and bowlders. Quicksand is common. The bowlders appear in the more rapid stretches of the stream and the sand in the quieter stretches. For the most part the valley lies between steep bluffs, about 500 feet high, back of which is mesa land that is in places so cut by canyons and gulches that it is difficult to cross. The canyons carry water only after the heavier rains.

The mesa is covered with a thin coating of soil supporting a scant growth of gramma grass and scattering bunches of low pines and oak. It is practically uninhabited, for it is too dry for farming and even water for domestic purposes must be brought from the river. It is used principally for sheep and goat range, and for this use it seems best adapted. The uplands, however, include tracts of open level country which would be admirably suited to irrigation were water available. The feasibility of getting water to this elevation above the river can be determined only by detailed surveys, but it is rather doubtful because of the great length of ditch necessary and the rugged and stony character of the country through which it would have to be constructed.

Between San Miguel and La Cuesta the valley is about three-fourths of a mile wide and is irrigated in a crude way by water taken from the river. The farms are divided into small tracts and the labor is done largely by hand. The principal crops are oats, corn, beans, and Mexican peas.

Between La Cuesta and Anton Chico the river flows through a narrow box canyon affording a number of good sites for reservoirs. Between Anton Chico and Colonias the valley broadens again, the bluffs becoming less precipitous. A small area is irrigated in each of these places. From Colonias to Santa Rosa the valley is narrow. At Santa Rosa it broadens out considerably, narrows again about 5 miles below, and then gradually broadens and becomes shallower until at Fort Sumner the water flows among sandbars and the banks slope gradually back to the uplands.

Gallinas River, which enters the Pecos near La Junta, is the principal tributary in this stretch and the only one that carries a perennial flow. This flow, however, is small, and is derived from a series of springs about 8 miles above the mouth of the Gallinas. There is no regular flow of this river above the springs. The mouth of the Gal-

linas was not visited during this investigation. Residents, however, stated that little or no water was flowing there.

The discharge measurements except the one 4 miles below La Cuesta were taken successively during a journey down the stream. The La Cuesta measurement was made while going from Anton Chico to San Miguel. The river in this vicinity is almost inaccessible for a stretch several miles in length. All measurements were made at selected sections and are believed to be accurate. The following is a list of discharges:

Discharge measurements of Pecos River, Mar. 10–16, 1910.

Date.	Place.	Distance below Ribera.	Discharge.
		Miles.	*Second-feet.*
Mar. 11	San Miguel	0.5	92
11	1 mile above La Cuesta	14	87
10	4 miles below La Cuesta	19	89
12	1 mile below Anton Chico	30	81
12	1 mile above La Cueva	38	77
13	1 mile below Colonias	46	20
13	Santa Rosa	65	11
14	6 miles below Santa Rosa	71	86
14	4 miles below Puerto de Luna	87	88
16	At cable section, Fort Sumner	120	83

The water of the river probably begins to sink near Anton Chico, but the diminution of flow does not become noticeable until the stream reaches La Cueva. Between La Cueva and Colonias the stream crosses strata of porous limestone, into which it gradually disappears. At normal stages the water disappears a mile or more above Colonias. Three days before the measurement was made no water was passing Colonias, but a day or so before these measurements were begun there was a small rise in the river caused by melting snows in the lower mountains. The measurements below Santa Rosa were made in advance of the rise. The above data will be used on the assumption that the river was fairly constant in stage during measurements from Ribera to Colonias and from Santa Rosa to Fort Sumner.

The difference between the discharge at the point 4 miles below La Cuesta and at Colonias is 69 cubic feet per second. As usually no water sinks below Colonias, this 69 second-feet must be the normal amount of water disappearing. The amount reaching the river 6 miles below Santa Rosa at normal stage is 85 to 90 second-feet. This would indicate an increase of about 20 second-feet over the amount sinking above Santa Rosa. An inspection of the topographic sheets of this section indicates that the waters sinking above Colonias reappear in the region of Santa Rosa. This conclusion has been strengthened by observations across the mesa between

Colonias and Santa Rosa. A chain of sinks, or so-called dry lakes, extends from a point near the place of sinking to the flowing lakes at Santa Rosa (Pl. III, *B*). Some of these sinks are smooth depressions covering several acres; others are holes 50 feet in diameter. The latest formed depressions have vertical sides and range in depth from a few feet to a hundred feet or more. Erosion gradually rounds off the edges and fills the middle until there remains only a pot-shaped depression. Some of these depressions have been formed since the settlement of the country. It is said that a man living upon the mesa found one morning in front of his house a hole 60 feet in diameter and about 150 feet deep. A story is also told of a suddenly formed depression that filled with water and was claimed by two men. The controversy was taken to court, but before a decision was rendered the water disappeared, leaving only a dry hole.

The lakes near Santa Rosa are 200 to 300 feet in diameter, and some of them are reported to have been sounded to a depth of about 250 feet. They receive no surface drainage, but each yields a constant outflow of several second-feet. The surface of these lakes is only a few feet above the river and is 300 to 400 feet below the level of the sink holes on the mesa. The water is heavily charged with gypsum and gives off a "gyppy" odor.

These sinks afford conclusive evidence of solution in the gypsiferous beds, and the course of their succession, leading from the place where the river sinks to the point where the water reappears in the lakes, forms strong presumptive evidence that underground passages are followed by the water between those points. The incident mentioned above, in which a depression formed by a cave-in filled with water, also affords evidence of underground passage. In this case it is reasonable to conclude that the cave-in choked some subterranean watercourse, thus forcing the water up into the depression until it acquired sufficient head to reopen its channel, when the pent-up water in the depression sank away.

As no surface water enters the stream between Santa Rosa and Colonias the increase of 20 second-feet of the discharge at Puerto de Luna over that at La Cuesta must also come from some subterranean source. Part of this may be derived from the sinking of the Gallinas above the springs. The remainder can probably be accounted for as ground water.

PECOS RIVER AT COWLES, N. MEX.

This station, which was established March 9, 1910, is located about three-fourths of a mile below Cowles post office, 13 miles above Pecos, about 20 miles northeast of Glorieta, a station on the Atchison, Topeka & Santa Fe Railway, and 24 miles by trail from Santa Fe.

A. PECOS RIVER 3 MILES BELOW COLONIAS, N. MEX.

There is no water at this point except when the river is above normal.

B. BLUE HOLE, ONE OF THE FLOWING LAKES NEAR SANTA ROSA, N. MEX.

It is at the second wagon bridge above Holy Ghost Creek, about halfway between that creek and Willow Creek.

A Friez automatic gage is located on the left bank.

Discharge measurements of Pecos River at Cowles, N. Mex., in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Mar. 7	Stewart and Fisher	31	33	.....	79
8	....do	31	34	.....	80
9	....do	31	32	1.30	72
10	J. B. Stewart	31	31	1.23	64
Apr. 23	.....do	37	57	1.82	173
23	.....do	48	59	1.82	181
June 9	.....do	35	43	1.50	105
Aug. 20	Stewart and Mills	34	34	1.18	52
Sept. 7	W. W. Mills	33	26	1.05	36
Oct. 31	J. B. Stewart	33	22	.98	25

NOTE.—Measurements made by wading at various sections.

Daily gage height, in feet, of Pecos River at Cowles, N. Mex., for 1910.

[Encarnacion Rivera, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	1.3	2.5	1.8	1.2	1.25	1.05	1.05	1.0	0.95
2	.....	1.25	2.45	1.75	1.2	1.25	1.0	1.05	1.0	.95
3	.....	1.3	2.4	1.75	1.2	1.25	1.05	1.05	1.0	.9
4	.....	1.3	2.4	1.7	1.2	1.45	1.05	1.05	1.0	.9
5	.....	1.3	2.45	1.6	1.2	1.4	1.05	1.05	1.0	.85
6	.....	1.3	2.4	1.6	1.2	1.3	1.05	1.0	.9	1.0
7	.....	1.25	2.4	1.55	1.2	1.2	1.05	1.0	.9	.95
8	.....	1.25	2.35	1.5	1.15	1.2	1.0	1.0	.9	.9
9	1.3	1.25	2.35	1.45	1.2	1.3	1.0	1.0	.9	.9
10	1.25	1.25	.....	1.4	1.2	1.35	1.0	1.0	.9	.9
11	1.25	1.4	.....	1.5	1.2	1.4	1.0	1.0	.95	.9
12	1.25	1.4	.....	1.6	1.25	1.55	1.0	1.0	.95	.9
13	1.25	1.45	.....	1.7	1.3	1.35	1.0	1.0	1.0	.9
14	1.3	1.45	2.5	1.6	1.3	1.3	1.05	1.0	1.0	.85
15	1.3	1.4	2.5	1.6	1.2	1.25	.....	1.0	1.0	.85
16	1.25	1.4	2.4	1.55	1.2	1.25	.....	1.05	1.05	.1
17	1.25	1.4	2.3	1.5	1.2	1.25	1.0	1.05	1.0	1.2
18	1.25	1.5	2.25	1.45	1.25	1.2	1.0	1.1	1.05	1.35
19	1.3	1.6	2.1	1.4	1.2	1.2	1.05	1.05	1.0	1.5
20	1.3	2.0	2.0	1.35	1.2	1.2	1.0	1.05	.97	1.55
21	1.3	1.75	2.0	1.35	1.2	1.15	1.05	1.05	1.0	1.55
22	1.35	1.7	1.95	1.3	1.2	1.15	1.05	1.0	1.0	1.55
23	1.45	1.85	1.9	1.3	1.2	1.1	1.0	1.0	.99	1.6
24	1.5	2.0	.....	1.3	1.2	1.05	1.0	1.0	.99	1.6
25	1.5	2.15	.....	1.35	1.35	1.05	1.0	1.0	.98	1.6
26	1.5	2.25	.....	1.35	1.3	1.0	1.0	1.0	1.0	1.6
27	1.45	2.3	.....	1.4	1.25	1.0	1.0	1.0	.9	1.6
28	1.45	2.4	1.8	1.3	1.2	1.0	1.0	.95	.9	1.6
29	1.4	2.55	.....	1.3	1.25	1.0	1.0	.95	.9	1.6
30	1.35	2.4	1.8	1.25	1.3	1.05	1.0	.95	.9	1.6
31	1.35	.....	1.8	.....	1.3	1.1	.....	.95	.....	1.6

NOTE.—Probably affected by ice Dec. 16-31.

Daily discharge, in second-feet, of Pecos River at Cowles, N. Mex., for 1910.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	70	370	172	55	62	36	36	30	25
2	.....	62	355	160	55	62	30	36	30	25
3	.....	70	340	160	55	62	36	36	30	20
4	.....	70	340	148	55	98	36	36	30	20
5	.....	70	355	127	55	88	36	36	30	17
6	.....	70	340	127	55	70	36	30	20	30
7	.....	62	340	117	55	55	36	30	20	25
8	.....	62	325	107	48	55	30	30	20	20
9	70	62	325	98	55	70	30	30	20	20
10	62	62	325	88	55	79	30	30	20	20
11	62	88	340	107	55	88	30	30	25	20
12	62	88	340	127	62	117	30	30	25	20
13	62	98	355	148	70	79	30	30	30	20
14	70	98	370	127	70	70	36	30	30	17
15	70	88	370	127	55	62	36	30	30	17
16	62	88	340	117	55	62	30	36	36	.....
17	62	88	310	107	55	62	30	36	30	.....
18	62	107	295	98	62	55	30	42	36	.....
19	70	127	251	88	55	55	36	36	30	.....
20	70	223	223	79	55	55	30	36	27	.....
21	70	160	223	79	55	48	36	36	30	.....
22	79	148	210	70	55	48	36	30	30	.....
23	98	184	197	70	55	42	30	30	29	.....
24	107	223	197	70	55	36	30	30	29	.....
25	107	266	197	79	79	36	30	30	28	.....
26	107	295	184	79	70	30	30	30	30	.....
27	98	310	184	88	62	30	30	30	20	.....
28	98	340	172	70	55	30	30	25	20	.....
29	88	384	172	70	62	30	30	25	20	.....
30	79	340	172	62	70	36	30	25	20	.....
31	79	.....	172	.....	70	42	.....	25	.....	.....

NOTE.—These discharges are based on a rating curve which is well defined between 25 and 225 second-feet.
Discharges interpolated for days when gage was not read.

Monthly discharge of Pecos River at Cowles, N. Mex., for 1910.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
Mar. 9–31	107	62	78.0	3,560	A.
April	384	62	147	8,750	B.
May	370	172	280	17,200	B.
June	172	62	106	6,310	A.
July	79	55	58.9	3,620	A.
August	117	30	58.5	3,600	A.
September	36	30	32.2	1,920	A.
October	42	25	31.7	1,950	A.
November	36	20	26.8	1,590	A.
December	30	.....	20.5	1,260	C.
The period	.....	.....	.....	49,800	

NOTE.—Discharge Dec. 16–31 estimated because of ice.

PECOS RIVER NEAR ANTON CHICO, N. MEX.

This station, which was established April 28, 1910, is located about 1 mile below the settlement of Tecolotito and 2¾ miles northwest of Anton Chico, which is 30 miles below Las Vegas and 34 miles above Santa Rosa. It is 1¼ miles below the mouth of Tecolote Creek.

A Friez automatic gage is located on the left bank.

Discharge measurements of Pecos River near Anton Chico, N. Mex., in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Apr. 28	J. B. Stewart	106	135	2.05	280
30	do	96	125	2.25	363
June 11	do	45	44	.40	59
Aug. 10	do	62	56	1.00	123
Sept. 3	W. W. Mills	58	25	.00	26
Oct. 18	G. H. Russell	26	16	.00	22
20	do	29	21	.15	30.5

NOTE.—Measurements made by wading at various sections.

Daily gage height, in feet, of Pecos River at Anton Chico, N. Mex., for 1910.

[A. A. Abercrombie, observer.]

Day.	Apr.	May.	June.	Aug.	Sept.	Oct.	Nov.	Dec.
1			1.1	0.5		.05	−0.1	0.0
2		2.2	1.1			.0	− .1	.0
3			1.0			.0	− .1	.0
4			1.0		0.0	.0	− .1	− .05
5			1.0		− .05	.0	.0	− .1
6			1.0		− .05	.0	.0	− .1
7					.0	.0	.0	− .1
8				.6	.0	.05	.1	− .1
9		1.95		.15	.0	.05	.1	− .2
10				2.25	−1	.1	.0	− .15
11			.4	1.6	− .1	.1	.0	− .15
12			.4	.65	− .1	.1	.0	− .15
13			.5	.65	.1	.1	.0	− .15
14			.3	.65	.2	.1	− .05	− .15
15				.5	.2	.05	.0	− .15
16		2.1		.4	.2	.0	.0	− .1
17		2.0		.3	.15	.15	.0	− .1
18		2.0			.0	.1	.0	− .05
19		2.0			.15	.1	.0	− .1
20		2.0	.5		.2	.2	.0	− .1
21		1.9			.2	.2	.0	− .1
22		1.8		1.1	.2	.1	.0	− .1
23		1.6		.8	.2	.1	.0	− .1
24		1.4		.4	.05	.1	.0	− .15
25	2.0	1.2		.1	.0	.1	.0	− .1
26	2.0	1.1		.0	.0	.1	.0	− .1
27	2.0	1.0	.5	− .1	− .05	.1	.0	− .1
28	2.0	.95	.35	− .1	− .05	.1	.0	− .08
29	2.0	.95	.2		− .05	.0	.0	− .1
30	2.0	.95			.0	.0	.0	− .08
31		1.1				− .1		− .05

Daily discharge, in second-feet, of Pecos River near Anton Chico, N. Mex., for 1910.

Day.	Apr.	May.	June.	Aug.	Sept.	Oct.	Nov.	Dec.
1		310	138	61	22	26	20	23
2		332	138	60	24	23	20	23
3		330	123	60	26	23	20	23
4		330	123	50	23	23	20	21.5
5		310	123	50	21.5	23	23	20
6		310	123	60	21.5	23	23	20
7		300	100	60	23	23	23	20
8		290	80	71	23	26	28	20
9		282	60	32	23	26	28	17.5
10		280	50	342	20	28	23	18.5
11		290	52	219	20	28	23	18.5
12		290	52	76	20	28	23	18.5
13		300	61	76	28	28	23	18.5
14		300	43	76	35	28	21.5	18.5
15		310	40	61	35	26	23	18.5
16		312	40	52	35	23	23	20
17		292	50	43	32	32	23	20
18		292	50	40	23	28	23	21.5
19		292	60	40	32	28	23	20
20		292	61	50	35	35	23	20
21		273	60	50	35	35	23	20
22		255	60	138	35	28	23	20
23		219	60	94	35	28	23	20
24		185	60	52	26	28	23	18.5
25	292	153	60	28	23	28	23	20
26	292	138	60	23	23	28	23	20
27	292	123	61	20	21.5	28	23	20
28	292	116	48	20	21.5	28	23	20.5
29	292	116	35	20	21.5	23	23	20
30	292	116	20	20	23	23	23	20.5
31		138		20		20		21.5

NOTE.—These discharges are based on a rating curve which is well defined below 350 second-feet. The record for July is of no value. The river was very low; probably dry during part of the month.

Monthly discharge of Pecos River near Anton Chico, N. Mex., for 1910.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
Apr. 25–30	292	292	292	3,480	B.
May	138	116	254	15,600	C.
June	138		69.7	4,150	D.
August	342		66.6	4,100	D.
September	35		26.2	1,560	C.
October	35	20	26.6	1,640	B.
November	28	20	22.9	1,360	B.
December	23	17.5	20.0	1,230	B.

PECOS RIVER AT SANTA ROSA, N. MEX.

This station, which was established February 3, 1910, is located at Santa Rosa on the highway bridge crossing the river about 400 feet below the Chicago, Rock Island & El Paso Railroad bridge. It is about 1 mile above the mouth of Rio Agua Negra Chiquita and about 6 miles above the mouth of Canyon Pintada. The chain gage located on downstream side of bridge is set to read the same as old rod gage on Chicago, Rock Island & El Paso bridge pier. There is no

determined relation between the chain gage and the gage formerly used by the United States Reclamation Service.

Discharge measurements of Pecos River at Santa Rosa, N. Mex., in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gauge height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Feb. 1	Russell and Stewart	28	12.5	1.35	12.7
3	do	29.5	13.8	1.38	12.8
Mar. 13	G. H. Russell	37	12.2	1.46	10.7
May 8	J. B. Stewart	93	70	2.37	206
June 19	do	29	25	1.47	36
Aug. 6	do	49.5	48	2.00	173
19	W. B. Freeman	133	274	2.95	1,550
19	do	116	145	2.00	570
20	do	97	102	1.48	315
23	W. W. Mills	34.1	28.8	.87	42
Oct. 16	G. H. Russell	34	9.4	.70	13.7

NOTE.—The measurements of Aug. 19 were made from the highway bridge. Other measurements made by wading.

Daily gage height, in feet, of Pecos River at Santa Rosa, N. Mex., for 1910.

[C. L. Justice, observer.]

Day.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.35	1.4	1.65	2.3	1.9	1.6	1.65	0.9	.....	0.65	0.65
2	.....	1.45	1.7	2.3	1.9	1.45	1.75	1.35	.....	.65	.6
3	1.4	1.45	1.6	2.3	1.95	1.35	1.65	.8	.....	.55	.55
4	1.5	1.45	1.55	2.25	2.2	1.4	1.7	.75	.....	.6	.6
5	1.5	1.45	1.45	2.25	2.2	1.3	1.95	.....	.....	.7	.65
6	1.4	1.45	1.45	2.25	2.1	1.35	2.45	.....	.....	.7	.65
7	1.4	1.45	1.45	2.2	2.0	1.35	2.05	.5	.....	.7	.65
8	1.4	1.45	1.45	2.35	1.9	1.4	1.8	.55	.....	.7	.7
9	1.5	1.5	1.5	2.35	1.9	1.35	3.1	.5	.....	.6	.65
10	1.5	1.45	1.45	2.45	1.85	1.3	3.15	.7	0.65	.65	.65
11	1.45	1.5	1.45	2.3	1.8	1.35	4.15	.6	.7	.6	.65
12	1.45	1.45	1.55	2.35	1.8	1.5	3.0	.65	.7	.65	.65
13	1.4	1.5	1.55	2.4	1.8	1.35	3.6	.6	.65	.6	.7
14	1.5	1.45	1.55	2.45	1.8	1.35	3.3	1.15	.65	.6	.75
15	1.4	1.45	1.65	2.4	3.1	1.7	3.35	1.35	.65	.7	.7
16	1.4	1.5	1.85	2.45	2.2	1.55	1.8	1.10	.6	.75	.6
17	1.45	1.5	1.90	2.4	1.95	1.45	1.5	.75	.55	.7	.65
18	1.5	1.6	1.85	2.5	1.75	1.5	4.85	.65	.55	.7	.65
19	1.5	1.6	1.8	2.35	1.6	1.45	2.85	.5	.7	.7	.7
20	1.5	1.6	1.85	2.35	1.45	1.5	1.6	.65	.75	.55	.65
21	1.45	1.55	1.95	2.2	1.4	1.4	1.25	.6	.55	.6	.6
22	1.45	1.55	2.05	2.25	1.4	1.4	1.0	.65	.55	.55	.65
23	1.4	1.55	2.1	2.2	1.3	1.55	1.3	.6	.6	.6	.6
24	1.45	1.6	1.95	2.25	1.35	1.4	1.75	.65	.55	.....	.65
25	1.45	1.6	2.05	2.15	1.3	1.85	1.55	.6	.6	.65	.65
26	1.5	1.6	2.15	2.15	1.3	1.6	1.1	.7	.5	.6	.65
27	1.45	1.75	2.15	2.05	1.3	1.4	.8	.5	.6	.65	.65
28	1.45	1.80	2.05	2.0	1.3	1.5	.65	.65	.6	.6	.7
29	.....	1.75	2.15	2.0	1.95	1.55	.65	1.0	.5	.7	.7
30	.....	1.75	2.25	1.95	2.2	1.6	.65	1.35	.65	.6	.7
31	.....	1.7	.....	1.9	.....	1.5	.85	.....	.6	.....	.6

Daily discharge, in second-feet, of Pecos River at Santa Rosa, N. Mex., for 1910.

Day.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	13	10	30	180	100	58	60	48	13	13	13
2	13	15	35	180	105	30	85	192	13	13	10
3	13	15	20	180	125	15	60	30	13	8	8
4	30	15	13	205	245	22	70	23	13	10	10
5	30	15	5	205	250	10	150	16	13	16	13
6	15	13	5	205	200	15	440	10	13	16	13
7	15	13	5	175	160	15	200	6	13	16	13
8	15	13	5	200	125	20	100	9	13	16	16
9	30	18	9	210	125	15	1,730	6	13	10	13
10	30	10	9	270	110	10	1,790	16	13	13	13
11	20	18	9	295	100	13	3,300	10	16	10	13
12	20	10	13	225	100	35	1,610	13	16	13	13
13	15	18	12	255	110	12	2,500	10	13	10	16
14	28	10	12	290	110	12	1,970	112	13	10	23
15	13	10	25	265	1,010	75	2,040	192	13	16	16
16	13	15	60	300	300	43	465	95	10	16	10
17	20	15	70	280	170	25	270	23	8	16	13
18	25	30	60	340	100	35	4,300	13	8	16	13
19	25	28	50	260	65	25	1,440	6	16	16	16
20	25	28	60	265	30	35	330	13	23	8	13
21	20	20	80	240	25	20	150	10	8	10	10
22	20	20	100	220	25	20	70	13	8	8	13
23	10	20	120	195	10	43	170	10	10	10	10
24	18	25	75	225	15	20	430	13	8	10	13
25	18	25	100	175	10	120	300	10	10	13	13
26	23	25	125	180	10	55	95	16	6	10	13
27	18	50	125	140	10	20	30	6	10	13	13
28	18	60	90	125	10	35	13	13	10	10	16
29	.....	48	125	130	170	43	13	70	6	16	16
30	.....	48	160	110	300	52	13	192	13	10	16
31	.....	40	.....	100	.....	35	39	.....	10	.....	10

NOTE.—These discharges were obtained as follows: Feb. 1–Aug. 8, indirect method for shifting channels; Aug. 9–Dec. 31, based on a rating curve which is fairly well defined; discharge interpolated for days when gage was not read.

Monthly discharge of Pecos River at Santa Rosa, N. Mex., for 1910.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
February	30	13	19.8	1,100	B.
March	60	10	22.6	1,390	B.
April	160	5	53.6	3,190	B.
May	340	100	214	1,320	B.
June	1,010	10	141	8,390	B.
July	120	10	31.7	1,950	C.
August	4,300	13	782	48,100	D.
September	192	6	39.8	2,370	B.
October	23	6	11.8	726	D.
November	16	8	12.4	738	B.
December	23	8	13.3	818	B.
The period	.....	.....	.....	70,100	

PECOS RIVER NEAR FORT SUMNER, N. MEX.

The station, which was established on June 12, 1904, to determine the amount of water available for the Urton Lake project of the United States Reclamation Service, is located at a place known as Arenosa, about 12 miles northwest of old Fort Sumner, N. Mex., and 4 miles upstream from Fort Sumner, a station on the Belen cut-off of the Atchison, Topeka & Santa Fe Railway, and is near the

site of the proposed diversion dam and a few miles below Arroyo Salada. The nearest post office is Fort Sumner.

All the tributaries for a long distance above and below the station are intermittent in character and only occasionally carry large amounts of water. The drainage area above the station is about 5,300 square miles.

Some irrigation is practiced along the bottom lands at various localities above the station, but not enough to materially affect the flow of the stream. The proposed Urton Lake project will divert a considerable portion of the stream flow at this point.

Slush ice sometimes forms at this station, and thin ice forms along the edges of the river, but results are not greatly affected by the ice conditions.

On July 5, 1905, the station was moved downstream and a new rod gage established at the present datum. Otherwise there had been no change in datum.

On account of the extremely shifting character of the channel, it is impossible to make reliable estimates of discharge unless very frequent measurements are made. High-water measurements are made from a cable.

The station was discontinued February 28, 1910.

Discharge measurements of Pecos River near Fort Sumner, N. Mex., in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Feb. 4	J. B. Stewart	68	51	2.75	130
Mar. 11	G. H. Russell	127	74	2.60	83

NOTE.—Measurements made by wading.

Daily gage height, in feet, and discharge, in second-feet, of Pecos River near Fort Sumner, N. Mex., for 1910.

[Observer, J. C. Pacheco.]

Day.	Jan.		Feb.		Day.	Jan.		Feb.	
	Gage height.	Discharge.	Gage height.	Discharge.		Gage height.	Discharge.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*		*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
1	2.5	20	2.6	66	16	2.4	15	2.65	220
2	2.5	20	2.6	67	17	2.6	52	2.8	380
3	2.4	11	2.6	68	18	2.6	53	2.85	480
4	2.6	39	2.7	105	19	2.6	55	2.75	380
5	2.6	40	2.7	110	20	2.6	56	2.7	345
6	2.6	41	2.6	80	21	2.6	57	2.7	370
7	2.5	24	2.6	85	22	2.7	85	2.7	395
8	2.8	105	2.7	140	23	2.6	58	2.6	300
9	3.3	600	2.6	100	24	2.7	90	2.6	320
10	3.4	750	2.65	135	25	2.6	60	2.65	400
11	2.75	90	2.7	185	26	2.6	60	2.6	380
12	2.6	46	2.65	160	27	2.6	61	2.6	410
13	2.5	27	2.65	175	28	2.6	62	2.6	435
14	2.6	45	2.65	190	29	2.6	63	.....	.....
15	2.5	30	2.7	245	30	2.6	64	.....	.....
					31	2.6	65	.....	.....

NOTE.—Daily discharges obtained by the indirect method for shifting channels.

Monthly discharge of Pecos River near Fort Sumner, N. Mex., for 1910.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
January	750	11	91.7	5,640	C.
February	480	66	240	13,300	C.

PECOS RIVER NEAR DAYTON, N. MEX.

This station, which was established March 24, 1905, has been maintained in connection with the Carlsbad irrigation project in New Mexico to determine the amount of water supplied by the river to the McMillan reservoir, and is located about 3 miles east of Dayton, N. Mex., about 6 miles above the dam of the reservoir, and approximately 100 feet downstream from the mouth of Penasco River.

The original rod gage was washed out on September 6, 1905, and was relocated September 7, 1905, at a point about one-half mile upstream. Otherwise there has been no change in gage datum. Fair results can be obtained at this station if discharge measurements are taken at frequent intervals. This station was transferred March 31, 1908, to the United States Reclamation Service, and since then they have made the discharge measurements. Discharge measurements are made from a cable located about 100 yards below the new gage.

Considerable irrigation is practiced in the vicinity of Roswell, N. Mex., and opportunities for irrigation projects exist at various points above. The winters in this vicinity are comparatively mild and ice does not appreciably affect stream flow.

Discharge measurements of Pecos River near Dayton, N. Mex., in 1910.

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Feb. 11	3.6	258	June 18	4.7	1,080
Mar. 7	2.8	116	July 13	2.45	31.7
Apr. 1	2.5	82.6	Aug. 17	6.1	2,760
May 9	3.6	272	20	8.55	3,990
16	3.2	162	Sept. 7	3.3	204
23	3.4	187	Nov. 9	2.9	115
June 8	2.6	44.9	Dec. 8	3.5	234
15	2.5	41.6			

Daily gage height, in feet, of Pecos River near Dayton, N. Mex., for 1910.

[Eugene Lattion, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	4.0	3.4	3.0	2.5	2.7	2.8	3.3	2.4	3.3	2.4	2.8	3.5
2	4.0	3.4	3.0	2.5	2.7	2.7	3.2	2.4	4.5	2.5	2.8	3.4
3	3.8	3.4	3.0	2.4	2.6	2.7	3.0	2.4	3.8	2.8	2.8	3.4
4	3.7	3.4	2.9	2.4	2.6	2.7	3.0	2.5	3.4	2.7	2.7	3.4
5	3.7	3.5	2.8	2.4	2.8	2.6	3.0	2.5	3.3	2.6	2.8	3.4
6	3.7	3.6	2.8	2.4	3.4	2.6	3.0	2.5	3.2	2.5	2.8	3.5
7	3.7	3.6	2.8	2.4	3.5	2.6	2.8	3.0	3.1	2.6	2.95	3.5
8	3.4	3.6	2.8	2.4	3.6	3.0	2.7	3.9	3.0	2.6	2.9	3.5
9	3.6	3.6	2.7	2.6	3.6	3.0	2.7	4.1	3.0	2.5	2.9	3.5
10	3.6	3.5	2.7	2.6	3.6	3.1	2.6	4.2	2.9	2.5	2.9	3.5
11	3.7	3.6	2.7	2.6	3.4	2.9	2.5	4.3	2.8	2.5	2.9	3.5
12	3.7	3.6	2.7	2.6	3.4	2.7	2.4	4.0	2.7	2.5	2.9	3.5
13	3.7	3.6	2.8	2.6	3.3	2.7	2.45	6.0	2.7	2.5	3.0	3.5
14	4.1	3.6	2.8	2.5	3.2	2.7	2.6	8.4	2.8	2.5	3.0	3.5
15	4.3	3.6	2.8	2.5	3.2	2.5	2.8	9.8	2.9	2.5	3.0	3.5
16	4.1	3.6	2.8	2.5	3.2	2.4	2.5	7.3	2.9	2.6	3.1	3.5
17	3.8	3.6	2.8	2.7	3.2	2.4	2.6	5.8	3.1	2.6	3.1	3.5
18	3.7	3.6	2.8	2.7	3.2	4.7	2.6	4.7	3.1	2.6	3.1	3.6
19	3.7	3.6	2.9	2.6	3.4	4.5	2.5	10.2	3.0	2.6	3.1	3.6
20	3.6	3.6	2.8	2.6	3.7	3.9	2.5	8.55	3.1	2.6	3.3	3.6
21	3.6	3.5	2.8	2.6	4.0	3.7	2.4	6.3	3.0	2.6	3.3	3.6
22	3.8	3.4	2.8	2.5	3.6	3.5	2.4	5.2	3.0	2.6	3.3	3.55
23	3.7	3.3	2.8	2.4	3.4	3.2	2.4	4.6	2.8	2.7	3.4	3.5
24	3.7	3.3	2.8	2.3	3.2	3.2	2.4	4.0	2.8	2.7	3.4	3.5
25	3.4	3.4	2.8	2.4	3.2	3.2	2.4	3.7	2.7	2.7	3.4	3.6
26	3.4	3.4	2.8	2.4	3.1	3.0	2.4	3.5	2.5	2.7	3.2	3.6
27	3.5	3.3	2.8	2.4	3.2	3.0	2.4	3.4	2.5	2.7	3.2	3.6
28	3.5	3.2	2.6	2.4	3.2	3.0	2.4	3.4	2.5	2.9	3.4	3.6
29	3.4	.....	2.6	2.4	3.0	3.7	2.4	3.3	2.5	2.8	3.5	3.5
30	3.5	.....	2.6	2.4	2.1	3.7	2.4	3.3	2.4	2.8	3.4	3.5
31	3.5	.....	2.6	.....	2.1	.....	2.4	3.25	.....	2.8	.....	3.5

Daily discharge, in second-feet, of Pecos River near Dayton, N. Mex., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	420	207	135	82	100	74	159	70	130	74	110	230
2	420	207	135	82	100	67	139	72	540	82	110	207
3	320	207	135	74	91	64	109	74	260	110	110	207
4	285	207	122	74	91	61	104	76	175	100	100	207
5	285	230	110	74	110	52	99	79	165	91	110	207
6	285	255	110	74	207	50	93	82	165	82	110	230
7	285	255	110	74	230	48	68	135	150	91	128	230
8	207	255	110	74	255	68	62	390	135	91	122	230
9	255	255	100	91	255	66	57	500	135	82	122	230
10	255	230	100	91	255	71	48	576	122	82	122	230
11	285	255	100	91	207	57	39	654	110	82	122	230
12	285	255	100	91	207	45	33	490	100	82	122	230
13	285	255	110	91	186	44	32	2,390	100	82	135	230
14	475	255	110	82	167	43	35	6,500	110	82	135	230
15	590	255	110	82	167	42	46	8,350	122	82	135	230
16	475	255	110	82	167	55	37	4,580	122	91	150	230
17	320	255	110	100	162	75	40	2,400	150	91	150	230
18	285	255	110	100	160	1,080	41	700	150	91	150	255
19	285	255	122	91	195	895	39	9,100	135	91	150	255
20	255	255	110	91	276	462	40	3,990	150	91	186	255
21	255	230	110	91	388	358	49	1,280	135	91	186	255
22	320	207	110	82	240	276	50	510	135	91	186	242
23	285	186	110	74	187	188	52	292	110	100	207	230
24	285	186	110	67	150	185	54	165	110	100	207	230
25	207	207	110	74	148	182	56	130	100	100	207	255
26	207	207	110	74	129	143	58	115	82	100	167	255
27	230	186	110	74	138	139	60	110	82	100	167	255
28	230	167	91	74	132	136	62	112	82	122	207	255
29	207	.....	91	74	103	276	64	110	82	110	230	230
30	230	.....	91	74	40	260	66	113	74	110	207	230
31	230	.....	91	.....	38	.....	68	114	.....	110	.....	230

NOTE.—These discharges were computed by the United States Reclamation Service.

Monthly discharge of Pecos River near Dayton, N. Mex., for 1910.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
January	590	207	298	18,300
February	255	167	230	12,800
March	135	91	109	6,700
April	100	67	81.6	4,860
May	388	38	170	10,500
June	1,080	42	185	11,000
July	159	32	63.2	3,890
August	9,100	70	1,430	87,900
September	540	74	141	8,390
October	122	74	93.3	5,740
November	230	100	151	8,980
December	255	207	234	14,400
The year	9,100	32	267	193,460

PECOS RIVER NEAR LAKEWOOD, N. MEX.

The station, which was established January 11, 1906, and transferred to the United States Reclamation Service March 31, 1908, is located 3 miles southeast of Lakewood and half a mile below the McMillan reservoir dam.

The present inclined rod gage was established May 8, 1906. It had been previously moved from its original location on February 8, 1906.

Fair results can be obtained at this station if occasional discharge measurements are made at different stages. Discharge measurements are made from a cable located about one-fourth mile above the railroad bridge of the Eastern Railway of New Mexico.

The following discharge measurement was made by the United States Reclamation Service:

August 20: Gage height, 8.4 feet; discharge, 3,810 second-feet.

Daily gage height, in feet, of Pecos River near Lakewood, N. Mex., for 1910.

Day.	Jan.	Feb.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1	.....	2.8	.....	1.0	1.2	1.0	0.55	1.0	0.9	1.1
2	.....	2.1	.....	1.0	.....	1.0	.55	1.0	.9	1.1
3	.....	1.2	.....	1.1	.....	.8	.55	1.0	.9	1.1
4	.....	1.0	.....	1.2	.....	.8	.55	1.0	.9	1.1
5	.....	.....	.....	1.2	.....	.9	.55	1.0	.9	1.2
6	.....	1.7	.....	1.2	.....	.9	.75	1.0	.9	1.2
7	.....	1.7	.....	1.2	.....	1.0	.7	1.0	.9	1.2
8	.....	1.7	.....	1.2	.....	1.0	1.2	1.0	.9	1.2
9	.....	1.7	.....	1.2	.....	.8	1.5	1.0	.9	1.2
10	.....	1.0	.....	1.2	.....	.8	1.95	1.0	.9	1.2
11	.....	.....	.....	1.2	.....	.8	2.0	1.0	.9	1.2
12	.....	.....	.....	1.2	.....	.6	2.0	1.0	.9	1.2
13	.....	.....	.....	1.2	.....	.6	1.85	1.0	.9	1.2
14	.....	.....	.....	1.2	.....	.6	1.75	1.0	.9	1.3
15	.....	.....	.....	1.2	1.2	.6	2.15	1.0	.9	1.3
16	.....	.....	1.8	1.2	1.2	.6	4.7	1.0	.9	1.3
17	.....	.....	1.8	1.2	1.2	.6	6.4	1.0	.9	1.3
18	.....	.....	1.8	1.2	1.9	.65	7.2	1.0	.9	1.3
19	.....	.....	.8	1.2	2.2	.6	8.0	1.0	.9	1.3
20	.....	.....	.7	1.2	2.2	.6	8.4	1.0	.9	1.3
21	.....	.....	.7	1.2	2.2	.6	7.4	1.0	.9	1.3
22	.....	.....	.7	1.2	1.9	.35	7.4	1.0	.9	1.3
23	.....	.....	.7	1.2	1.7	.....	7.15	1.0	1.5	1.4
24	.....	.....	.7	1.2	1.5	.....	4.95	1.0	1.25	1.4
25	.....	.....	.7	1.2	1.35	.....	1.0	1.0	.8	1.4
26	.....	.....	.7	1.2	1.2	.8	1.0	1.0	.8	1.4
27	1.2	.....	.7	1.2	1.2	.65	1.0	1.0	.8	1.4
28	1.6	.....	.7	1.2	1.2	.5	1.0	1.0	.8	1.4
29	2.1	.....	.85	1.2	1.0	.55	1.0	1.0	1.0	1.4
30	2.7	.....	1.0	1.2	1.0	.55	1.0	1.0	1.1	.....
31	2.8	.....	.....	1.2	.....	.55	1.0	.....	1.05	.....

PECOS RIVER NEAR MOORHEAD, TEX.

The station, which was established by the International Boundary Commission in April, 1900, is near Moorhead, immediately above the high bridge of the Southern Pacific Railroad.

It is in the bottom of a canyon about 300 feet deep. Both banks of the stream are of rock, but the bottom is mud. The river here consists of a series of pools connected by rapids. The best pool was chosen for the station. Frequent discharge measurements are made to determine closely the daily discharge. The highest known flood occurred April 6, 1900, about two weeks before this gage was established. The water marks showed that it reached 35.75 feet on the gage.

The observations at this station during 1910 have been made under the direction of the United States section of the International Water Commission (prior to July 1, 1910, International Boundary Commission).

Discharge measurements of Pecos River near Moorhead, Tex., in 1910.

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

Date.	Area of section.	Gage height.	Discharge.	Date.	Area of section.	Gage height.	Discharge.
	Sq. ft.	*Feet.*	*Sec.-ft.*		*Sq. ft.*	*Feet.*	*Sec.-ft.*
Jan. 3	703	0.9	328	July 8	569	0.2	189
7	705	.9	291	13	595	.15	174
11	711	.95	294	18	588	.1	170
15	709	.95	322	22	585	.1	169
20	695	.9	286	29	586	.1	167
25	692	.9	315	Aug. 3	581	.1	172
29	703	.9	299	8	552	.1	177
Feb. 3	696	.9	312	12	585	.1	172
8	687	.7	250	17	595	.1	170
12	685	.7	263	21	579	.1	165
16	703	.8	313	25	610	.35	243
21	665	.75	309	29	914	2.5	1,432
26	670	.7	305	Sept. 3	706	1.0	366
Mar. 3	677	.7	263	8	826	1.6	731
8	655	.7	248	12	663	.2	233
12	674	.7	270	16	672	.5	274
16	673	.6	263	20	589	.05	188
21	643	.5	251	24	588	.0	180
25	636	.5	247	28	640	.3	242
29	676	.5	258	Oct. 3	743	1.2	471
Apr. 4	708	.95	343	7	731	1.0	432
8	673	.6	266	11	668	.5	281
12	688	.9	291	15	684	.6	298
16	678	.75	279	20	692	.6	298
21	645	.5	231	24	689	.6	297
24	643	.5	242	29	687	.6	303
28	656	.5	248	Nov. 3	734	1.2	464
May 4	660	.5	262	7	714	1.0	450
9	641	.4	232	11	673	.5	254
13	656	.4	233	15	685	.7	265
17	636	.4	240	19	676	.6	270
21	745	1.1	487	23	666	.5	221
25	653	.45	246	28	645	.45	211
31	652	.45	248	Dec. 3	650	.5	234
June 4	656	.5	223	8	648	.45	230
7	644	.45	200	12	628	.45	213
11	643	.45	190	16	648	.5	220
16	650	.2	210	20	645	.5	224
21	634	.2	182	24	645	.5	227
24	601	.15	155	29	639	.5	262
July 3	608	.15	184				

Daily gage height, in feet, of Pecos River near Moorhead, Tex., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.0	0.95	0.7	0.6	0.5	0.45	0.15	0.1	1.55	1.3	0.65	0.45
2	.95	.95	.7	.6	.5	.45	.15	.1	1.2	1.3	.8	.5
3	.9	.9	.7	.65	.5	.45	.15	.1	1.0	1.15	1.1	.5
4	.95	.9	.65	.95	.5	.5	.15	.1	.9	3.3	1.15	.5
5	.9	.9	.65	.9	.5	.5	.15	.1	.75	1.95	1.0	.5
6	.9	.85	.7	.85	.5	.5	.15	.1	19.6	1.65	1.0	.5
7	.9	.8	.7	.65	.5	.45	.2	.1	2.45	1.0	1.0	.5
8	.9	.75	.7	.6	.5	.45	.2	.1	1.65	1.0	.95	.45
9	.95	.7	.7	.65	.55	.45	.2	.1	1.4	.95	.7	.45
10	.95	.7	.7	.95	.55	.45	.15	.1	.95	.8	.55	.45
11	.95	.7	.75	.9	.55	.45	.15	.1	.7	.5	.5	.45
12	.95	.7	.7	.9	.55	.35	.15	.1	.25	.4	.55	.45
13	.95	.95	.7	.85	.4	.35	.15	.1	.1	.5	.65	.5
14	.95	.95	.65	.8	.4	.25	.15	.1	.8	.55	.7	.5
15	.95	.9	.6	.8	.4	.2	.15	.1	.65	.6	.7	.5
16	.95	.8	.6	.75	.4	.2	.15	.1	.4	.6	.7	.5
17	.95	.8	.6	.7	.4	.2	.1	.1	.1	.6	.65	.5
18	.9	.7	.5	.6	.4	.2	.1	.05	.1	.6	.6	.5
19	.9	.7	.5	.6	.45	.2	.1	.05	.1	.6	.6	.5
20	.9	.7	.5	.5	.65	.2	.1	.1	.05	.6	.6	.5
21	.9	.75	.5	.5	1.0	.2	.1	.1	.05	.6	.6	.5
22	.9	.75	.5	.5	.95	.2	.1	.1	.05	.6	.5	.5
23	.95	.9	.5	.5	.65	.2	.1	.3	.0	.6	.5	.5
24	.95	.8	.5	.5	.5	.15	.1	.6	.0	.6	.5	.5
25	.9	.8	.5	.5	.5	.15	.1	.35	.0	.6	.5	.5
26	.9	.7	.5	.55	.45	.15	.1	1.25	.0	.6	.45	.5
27	.9	.7	.5	.5	.45	.15	.1	2.4	.1	.6	.45	.5
28	.9	.7	.5	.5	.45	.15	.1	2.7	.25	.6	.45	.5
29	.9	.....	.5	.5	.4	.15	.1	2.6	.95	.6	.45	.5
30	.9	.....	.5	.5	.45	.15	.1	2.45	1.5	.6	.45	.5
31	.9	.....	.6	.....	.45	.15	.1	1.85	.....	.6	.....	.5

Daily discharge, in second-feet, of Pecos River near Moorhead, Tex., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	395	320	290	280	255	240	160	165	845	550	320	210
2	360	325	275	280	255	230	170	170	540	550	360	235
3	a330	a310	a265	290	260	220	a185	a170	a365	a430	a440	a235
4	340	310	250	a345	a260	a225	180	175	340	1,790	460	235
5	310	310	245	330	260	225	175	175	300	995	450	235
6	300	295	255	320	260	225	170	175	26,000	815	450	235
7	a290	280	250	275	260	a200	190	175	1,410	a430	a450	235
8	285	a265	a250	a265	260	200	a190	a175	a770	430	430	a230
9	305	255	255	275	a275	195	190	175	660	415	335	225
10	300	255	260	295	275	195	175	175	495	370	275	220
11	a295	260	275	290	275	a190	175	175	405	a280	a255	220
12	300	a265	a270	a290	275	185	175	a175	a245	265	255	a215
13	310	345	270	285	a235	200	a175	170	220	280	265	220
14	315	350	265	285	235	195	175	170	315	290	265	220
15	a320	340	265	285	235	200	175	170	295	a300	a265	220
16	320	a315	a265	a280	240	a210	175	170	a255	300	270	a220
17	315	315	265	270	a240	200	170	a170	200	300	270	220
18	295	295	250	250	240	195	a170	155	200	300	265	220
19	290	295	250	250	255	190	170	155	200	300	a270	225
20	a285	300	250	230	325	185	170	165	a190	a300	265	a225
21	290	a310	a250	a230	a450	a180	165	a165	190	300	255	225
22	300	310	250	235	430	175	a165	165	190	300	230	225
23	325	340	250	240	320	170	165	225	180	295	a220	225
24	330	320	250	a240	265	a155	165	320	a180	a295	220	a225
25	a315	325	a245	245	a265	155	165	a245	180	300	220	235
26	310	a305	250	255	245	155	165	740	180	300	210	240
27	305	305	255	245	245	150	165	1,370	200	300	210	250
28	305	305	255	a250	245	150	165	1,530	a230	300	a210	255
29	a300	.....	a260	250	230	150	a165	a1,480	490	a305	210	a260
30	300	.....	260	250	245	150	165	1,410	700	305	210	260
31	300	.....	280	.....	a250	.....	165	1,110	.....	305	.....	260

a Date of measurement.

Monthly discharge of Pecos River near Moorhead, Tex., for 1910.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
January	395	285	311	19,121
February	350	255	304	16,909
March	290	245	259	15,917
April	345	230	270	16,086
May	450	230	270	16,592
June	240	150	190	11,296
July	190	160	172	10,572
August	1,530	155	392	24,129
September	26,000	180	1,232	73,329
October	1,790	265	419	25,775
November	460	210	294	17,474
December	260	210	231	14,202
The year	26,000	150	361	261,402

GALLINAS RIVER NEAR LAS VEGAS, N. MEX.

The station, which was established August 13, 1903, and maintained primarily for the purpose of determining the amount of water available for diversion and storage in the San Guyjella Basin about 6 miles northwest of Las Vegas, is located at Las Vegas Hot Springs, 6 miles above Las Vegas, N. Mex.

The altitude of the station is about 6,700 feet. It is below all perennial tributaries. The drainage area above the station is about 90 square miles; the total drainage area exceeds 600 square miles.

Very little water is diverted above the station, though practically all of the ordinary flow is used for irrigation in the valley below. The reservoir mentioned above has a capacity of about 40,000 acre-feet, and is to be used for the irrigation of 10,000 acres of land. It will be filled from the Gallinas, the Sapello, and other small streams in that vicinity. The flow of the stream at this point is not usually affected by it.

The gage was washed out on September 29, 1904, and replaced by the present rod gage on October 19, 1904, which is located about 600 feet above the foot-bridge at the power house, from which high discharge measurements are made. Lower water measurements are made by wading. The zero of the new rod gage is 0.71 foot lower than that of the old one. Results at this station have been fairly satisfactory.

Discharge measurements of Gallinas River near Las Vegas, N. Mex., in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Feb. 5	G. H. Russell	19	11	1.75	3.5
Mar. 6	do	20.5	14.4	1.85	8.4
Apr. 24	J. B. Stewart	28	26	2.20	40
Aug. 31	W. W. Mills	18.2	5.6	1.7	1.8
Oct. 22	G. H. Russell	.....	.....	1.6	*a*.25
Nov. 29	do	18.5	11.4	1.77	4.3
Dec. 1	C. B. Digby	.....	.....	1.6	*a*.25

a Discharge estimated.

NOTE.—Measurements made by wading.

Daily gage height, in feet, of Gallinas River near Las Vegas, N. Mex., for 1910.

[William Prager, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.7	1.8	1.8	1.9	2.2	1.8	1.7	1.8	1.9	.....	1.6	1.6
2	1.8	1.8	1.8	1.9	2.2	1.8	1.7	1.75	1.85	1.6	1.6	1.6
3	1.9	1.8	1.8	1.9	2.2	1.75	1.7	1.7	1.75	1.6	1.6	1.6
4	1.9	1.8	1.85	1.95	2.2	1.7	1.65	1.7	1.7	1.6	1.6	1.6
5	1.75	1.8	1.9	2.0	2.1	1.7	1.65	1.75	1.7	1.6	1.6	1.6
6	1.7	1.8	1.9	1.95	2.1	1.7	1.7	1.85	1.7	1.6	1.6	1.6
7	1.7	1.8	2.0	1.9	2.1	1.7	1.6	1.75	1.7	1.6	1.6	1.6
8	1.8	1.8	2.05	2.0	2.1	1.7	1.65	1.9	1.7	1.6	1.6	1.6
9	1.8	1.8	2.05	2.0	2.1	1.7	1.65	1.8	1.6	1.6	1.6	1.6
10	1.8	1.8	2.15	2.0	2.1	1.7	1.7	2.1	1.85	1.6	1.6	1.6
11	1.8	1.8	2.1	2.0	2.1	1.7	1.65	2.3	1.7	1.6	1.6	1.6
12	1.8	1.8	2.25	2.15	2.1	1.7	1.7	2.15	1.6	1.6	1.6	1.6
13	1.8	1.8	2.05	2.2	2.1	1.7	2.2	2.15	1.6	1.6	1.6	1.6
14	1.8	1.7	2.1	2.2	2.1	1.7	2.0	2.0	1.65	1.6	1.6	1.6
15	1.8	1.7	2.3	2.2	2.1	1.85	1.85	2.05	1.8	1.6	1.6	1.6
16	1.8	1.7	2.25	2.15	2.1	1.8	1.8	2.0	1.7	1.6	1.6	1.6
17	1.8	1.7	2.15	2.1	2.05	1.75	1.8	2.0	1.65	1.6	1.6	1.6
18	1.8	1.7	2.1	2.15	2.0	1.7	1.75	2.05	1.6	1.6	1.6	1.6
19	1.8	1.7	1.95	2.2	1.95	1.7	1.7	1.95	1.6	1.65	1.6	1.6
20	1.8	1.75	2.0	2.2	2.0	1.7	1.75	1.9	1.6	1.65	1.6	1.6
21	1.8	1.8	2.0	2.2	1.9	1.7	1.85	1.9	1.7	1.6	1.6	1.6
22	1.8	1.8	2.0	2.2	1.9	1.6	1.85	1.85	1.8	1.6	1.6	1.6
23	1.8	1.8	2.0	2.2	1.9	1.6	1.7	1.9	1.7	1.6	1.6	1.6
24	1.8	1.8	2.0	2.2	1.9	1.6	1.7	1.85	1.7	1.6	1.6	1.6
25	1.8	1.8	2.0	2.2	1.9	1.6	1.7	1.8	1.7	1.6	1.6	1.6
26	1.8	1.8	2.0	2.2	1.85	1.6	1.7	1.75	1.7	1.6	1.6	1.6
27	1.8	1.8	2.0	2.2	1.8	1.6	1.8	1.75	1.7	1.6	1.6	1.6
28	1.8	1.8	2.0	2.2	1.8	1.6	1.7	1.7	1.65	1.6	1.6	1.6
29	1.8	.....	1.95	2.2	1.8	1.7	1.8	1.7	1.6	1.6	1.6	1.6
30	1.8	.....	1.9	2.2	1.8	1.7	1.8	1.7	1.6	1.6	1.6	1.6
31	1.8	.....	1.9	.....	1.8	.....	1.9	1.7	.....	1.6	.....	1.6

Daily discharge, in second-feet, of Gallinas River near Las Vegas, N. Mex., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.8	5.0	5.0	10.5	41	5.0	1.8	5.0	10.5	0.3	0.3	0.3
2	5.0	5.0	5.0	10.5	41	5.0	1.8	3.4	7.8	.3	.3	.3
3	10.5	5.0	5.0	10.5	41	3.4	1.8	1.8	3.4	.3	.3	.3
4	10.5	5.0	7.8	14.8	41	1.8	1.0	1.8	1.8	.3	.3	.3
5	3.4	5.0	10.5	19	29	1.8	1.0	3.4	1.8	.3	.3	.3
6	1.8	5.0	10.5	14.8	29	1.8	1.8	7.8	1.8	.3	.3	.3
7	1.8	5.0	19	10.5	29	1.8	.3	3.4	1.8	.3	.3	.3
8	5.0	5.0	24	19	29	1.8	1.0	10.5	1.8	.3	.3	.3
9	5.0	5.0	24	19	29	1.8	1.0	5.0	.3	.3	.3	.3
10	5.0	5.0	35	19	29	1.8	1.8	29	7.8	.3	.3	.3
11	5.0	5.0	29	19	29	1.8	1.0	55	1.8	.3	.3	.3
12	5.0	5.0	48	35	29	1.8	1.8	35	.3	.3	.3	.3
13	5.0	5.0	24	41	29	1.8	41	35	.3	.3	.3	.3
14	5.0	1.8	29	41	29	1.8	19	19	1.0	.3	.3	.3
15	5.0	1.8	55	41	29	7.8	7.8	24	5.0	.3	.3	.3
16	5.0	1.8	48	35	29	5.0	5.0	19	1.8	.3	.3	.3
17	5.0	1.8	35	29	24	3.4	5.0	19	1.0	.3	.3	.3
18	5.0	1.8	29	35	19	1.8	3.4	24	.3	.3	.3	.3
19	5.0	1.8	14.8	41	14.8	1.8	1.8	14.8	.3	1.0	.3	.3
20	5.0	3.4	19	41	19	1.8	3.4	10.5	.3	1.0	.3	.3
21	5.0	5.0	19	41	10.5	1.8	7.8	10.5	1.8	.3	.3	.3
22	5.0	5.0	19	41	10.5	.3	7.8	7.8	5.0	.3	.3	.3
23	5.0	5.0	19	41	10.5	.3	1.8	10.5	1.8	.3	.3	.3
24	5.0	5.0	19	41	10.5	.3	1.8	7.8	1.8	.3	.3	.3
25	5.0	5.0	19	41	10.5	.3	1.8	5.0	1.8	.3	.3	.3
26	5.0	5.0	19	41	7.8	.3	1.8	3.4	1.8	.3	.3	.3
27	5.0	5.0	19	41	5.0	.3	5.0	3.4	1.8	.3	.3	.3
28	5.0	5.0	19	41	5.0	.3	1.8	1.8	1.0	.3	.3	.3
29	5.0	.....	14.8	41	5.0	1.8	5.0	1.8	.3	.3	.3	.3
30	5.0	.....	10.5	41	5.0	1.8	5.0	1.8	.3	.3	.3	.3
31	5.0	.....	10.5	.....	5.0	.....	10.5	1.8	.....	.3	.....	.3

NOTE.—These discharges are based on a rating curve which is fairly well defined below 160 second-feet.

Monthly discharge of Gallinas River near Las Vegas, N. Mex., for 1910.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
January	10.5	1.8	4.99	307	B.
February	5.0	1.8	4.26	237	B.
March	55	5.0	21.4	1,320	A.
April	41	10.5	30.5	1,810	A.
May	41	5.0	21.8	1,340	A.
June	7.8	.3	2.07	123	B.
July	41	.3	4 92	303	A.
August	55	1.8	12.3	756	A.
September	10.5	.3	2.28	136	B.
October	1.0	.3	.32	19.7	C.
November	.3	.3	.30	17.9	C.
December	.3	.3	.30	18.4	C.
The year	55	.3	8.83	6,390	

RIO HONDO BASIN.

RIO RUIDOSO NEAR GLENCOE, N. MEX.

Rio Ruidoso rises on the eastern slopes of the Sierra Blanca in the western part of Lincoln County, N. Mex., and takes a general easterly course to its junction with Rio Hondo about 6 miles below San Patricio.

The gaging station, which was established August 17, 1910, is located 2½ miles above Glencoe post office and about 2 miles above Eagle Creek. Numerous small ditches divert water for irrigation for about 16 miles above the station. Glencoe is about 50 miles east of Tularosa, and 12 miles south of Capitan, the nearest railroad point.

An inclined rod gage is fastened to the right bank about 50 yards above the forest ranger station.

Discharge measurements of Rio Ruidoso near Glencoe, N. Mex., in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Aug. 17	W. B. Freeman	8.8	8.1	1.48	7.6
Nov. 26	J. B. Stewart	10	6.7	1.50	6.6

NOTE.—Measurements made by wading.

Discharge measurements of Devils River at Devils River, Tex., in 1910.

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

Date.	Area of section.	Gage height.	Discharge.	Date.	Area of section.	Gage height.	Discharge.
	Sq. ft.	*Feet.*	*Sec.-ft.*		*Sq. ft.*	*Feet.*	*Sec.-ft.*
Jan. 4	314	2.2	426	July 14	294	2.2	415
12	321	2.2	427	19	293	2.2	424
21	306	2.2	394	25	293	2.2	395
26	310	2.2	411	30	293	2.2	393
30	306	2.2	391	Aug. 4	293	2.2	400
Feb. 4	297	2.15	409	9	292	2.2	388
14	304	2.15	415	14	292	2.2	392
17	304	2.15	392	26	320	2.3	457
23	301	2.15	388	30	292	2.2	407
27	300	2.15	384	Sept. 4	292	2.2	398
Mar. 9	296	2.15	382	9	439	2.7	803
13	297	2.15	390	17	349	2.4	598
22	295	2.15	384	25	320	2.3	495
26	294	2.15	381	29	320	2.3	510
30	290	2.1	374	Oct. 4	349	2.4	599
Apr. 5	305	2.2	398	12	349	2.4	576
13	339	2.3	497	17	320	2.3	514
18	336	2.3	504	25	320	2.3	495
25	334	2.25	461	30	292	2.2	402
29	330	2.25	453	Nov. 4	292	2.2	403
May 5	328	2.25	429	12	292	2.2	409
10	311	2.15	404	16	292	2.2	402
22	426	2.55	712	25	292	2.15	385
29	320	2.3	516	29	292	2.15	383
June 3	320	2.3	420	Dec. 4	293	2.15	373
8	317	2.3	433	13	292	2.15	375
13	298	2.25	417	18	293	2.2	396
22	301	2.2	418	26	293	2.2	388
29	311	2.25	483	30	292	2.2	382
July 9	292	2.2	400				

Daily gage height, in feet, of Devils River at Devils River, Tex., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.2	2.15	2.15	2.35	2.3	2.3	2.25	2.2	2.2	2.3	2.2	2.15
2	2.2	2.15	2.15	2.2	2.25	2.3	2.25	2.2	2.2	2.3	2.2	2.15
3	2.2	2.15	2.15	2.2	2.25	2.3	2.25	2.2	2.2	2.45	2.2	2.15
4	2.2	2.15	2.15	2.2	2.25	2.3	2.25	2.2	2.2	2.4	2.2	2.15
5	2.2	2.15	2.15	2.2	2.25	2.3	2.25	2.15	2.2	2.65	2.2	2.15
6	2.2	2.15	2.15	2.2	2.15	2.3	2.25	2.15	2.2	2.55	2.2	2.15
7	2.2	2.15	2.15	2.2	2.15	2.3	2.2	2.2	6.3	2.45	2.2	2.15
8	2.2	2.15	2.15	2.2	2.15	2.3	2.2	2.2	4.25	2.4	2.2	2.15
9	2.2	2.15	2.15	4.75	2.15	2.3	2.2	2.2	2.85	2.4	2.2	2.15
10	2.2	2.15	2.15	2.35	2.15	2.25	2.2	2.2	2.65	2.4	2.2	2.15
11	2.2	2.15	2.15	2.3	2.15	2.25	2.2	2.2	2.55	2.4	2.2	2.15
12	2.2	2.15	2.15	2.3	2.15	2.25	2.2	2.2	2.5	2.4	2.2	2.15
13	2.2	2.15	2.15	2.3	2.15	2.25	2.2	2.2	2.45	2.4	2.2	2.15
14	2.2	2.15	2.15	2.3	2.15	2.25	2.2	2.2	2.4	2.4	2.2	2.2
15	2.2	2.15	2.15	2.3	2.15	2.25	2.2	2.2	2.4	2.4	2.2	2.2
16	2.2	2.15	2.15	2.3	2.15	2.25	2.2	2.2	2.4	2.35	2.2	2.2
17	2.2	2.15	2.15	2.3	2.2	2.2	2.2	2.2	2.4	2.3	2.15	2.2
18	2.2	2.15	2.15	2.3	2.3	2.2	2.2	2.2	2.4	2.3	2.15	2.2
19	2.2	2.15	2.15	2.3	4.8	2.2	2.2	2.2	2.35	2.3	2.15	2.2
20	2.2	2.15	2.15	2.3	7.95	2.2	2.2	2.2	2.35	2.3	2.15	2.2
21	2.2	2.15	2.15	2.3	3.95	2.2	2.2	2.2	2.3	2.3	2.15	2.2
22	2.2	2.15	2.15	2.3	2.8	2.2	2.2	2.2	2.3	2.3	2.15	2.2
23	2.2	2.15	2.15	2.3	2.5	2.2	2.2	2.2	2.3	2.3	2.15	2.2
24	2.2	2.15	2.15	2.25	2.5	2.2	2.2	2.2	2.3	2.3	2.15	2.2
25	2.2	2.15	2.15	2.25	2.45	2.2	2.2	2.2	2.3	2.3	2.15	2.2
26	2.2	2.15	2.15	2.25	2.4	2.35	2.2	2.3	2.3	2.3	2.15	2.2
27	2.2	2.15	2.15	2.25	2.4	2.3	2.2	2.25	2.3	2.25	2.15	2.2
28	2.2	2.15	2.1	2.25	2.35	2.3	2.2	2.3	2.3	2.25	2.15	2.2
29	2.2	.....	2.1	2.25	2.3	2.25	2.2	2.25	2.3	2.2	2.15	2.2
30	2.2	.....	2.1	2.25	2.3	2.25	2.2	2.2	2.3	2.2	2.15	2.2
31	2.2	.....	2.3	.....	2.3	.....	2.2	2.2	.....	2.2	.....	2.2

Daily discharge, in second-feet, of Devils River at Devils River, Tex., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	405	395	385	470	470	480	475	395	405	515	400	380
2	410	400	385	400	435	450	470	395	400	525	400	380
3	420	405	385	400	435	a420	465	400	400	620	405	375
4	a425	a410	385	400	430	425	460	a400	a400	a600	a405	a375
5	425	410	385	a400	a430	425	455	380	400	745	405	375
6	425	410	385	400	405	430	445	375	400	685	405	375
7	425	410	385	400	405	430	400	395	6,550	620	405	375
8	425	410	380	400	405	a435	400	390	3,280	585	405	375
9	425	415	a380	3,820	405	435	a400	a390	a1,040	585	410	375
10	425	415	380	540	a405	420	405	390	770	580	410	375
11	425	415	385	495	405	420	405	390	715	580	410	375
12	a425	415	385	495	405	415	410	390	680	a575	a410	375
13	425	415	a390	a495	405	a415	410	390	650	575	405	a375
14	425	a415	390	500	405	420	a415	a390	620	570	405	390
15	420	405	390	500	405	420	415	395	610	570	405	390
16	415	400	390	500	405	420	420	400	605	545	a400	395
17	410	a390	385	505	435	410	420	400	a600	a515	390	395
18	410	390	385	a505	460	410	425	405	590	510	390	a395
19	405	390	385	505	3,900	415	a425	405	560	510	390	395
20	400	390	385	500	11,000	415	420	410	550	510	390	395
21	a395	390	385	500	2,690	420	410	415	520	505	385	395
22	395	390	a385	500	a1,060	a420	405	415	515	505	385	390
23	400	a390	385	500	670	425	400	420	505	500	385	390
24	405	390	385	460	670	430	a395	420	500	495	385	390
25	410	385	380	a460	630	435	395	425	a495	a495	a385	390
26	a410	385	a380	460	590	530	395	a460	500	490	385	a390
27	405	385	380	460	590	505	395	435	505	450	385	385
28	400	a385	375	455	555	510	395	445	505	445	385	385
29	395	.....	375	a455	a515	a485	395	425	510	405	a385	380
30	a390	.....	a375	455	515	485	a395	a405	510	a400	385	a380
31	390	.....	440	.....	515	.....	395	405	.....	400	.....	380

a Date of measurement.

Monthly discharge of Devils River at Devils River, Tex., for 1910.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
January	425	390	412	25,319
February	415	385	400	22,225
March	440	375	385	23,702
April	3,820	400	578	34,383
May	11,000	405	1,015	62,380
June	530	410	438	26,093
July	475	395	417	25,617
August	460	375	405	24,902
September	6,550	400	843	50,162
October	745	400	536	32,945
November	410	385	396	23,593
December	395	375	384	23,594
The year	11,000	375	518	375,000

RIO SALADO BASIN.

RIO SALADO NEAR GUERRERO, TAMAULIPAS, MEXICO.

The Salado is a torrential stream, entering the Rio Grande from the Mexican side about 60 miles below Laredo, or 730 miles by river below El Paso. The town of Guerrero is located on the Salado some 4 miles above its mouth, and the gaging station is 2 miles

above the town. The gaging station was established in 1900 by the International Boundary Commission.

The river is a series of pools and rapids. The best pool available was chosen for the station. The banks are sandy clay, not subject to erosion. The bottom is mud. In low water the river is measured by wading among the rocks below the station. Frequent discharge measurements are made to determine closely the daily flow. The highest recorded flood, on June 16, 1903, gave 17.7 on the gage.

The observations at this station have been made under the direction of the Mexican section of the International Water Commission (prior to July 1, 1910, International Boundary Commission).

Discharge measurements and gage heights for the years 1900 to 1904, which had not hitherto been published by the United States Geological Survey, are given in Water-Supply Paper 248.

Discharge measurements of Rio Salado near Guerrero, Tamaulipas, Mexico, in 1910.

[By M. G. Garcia.]

Date.	Area of section.	Gage height.	Discharge.	Date.	Area of section.	Gage height.	Discharge.
	Sq. ft.	*Feet.*	*Sec.-ft.*		*Sq. ft.*	*Feet.*	*Sec.-ft.*
Jan. 3	2,493	2.9	593	June 23	168	1.9	162
7	2,492	2.9	590	28	151	1.1	95
11	2,468	2.8	550	July 3	132	.6	65
15	2,470	2.8	551	7	129	.5	54
19	2,490	2.9	609	11	129	.4	50
23	2,467	2.8	546	15	127	.3	48
28	2,441	2.7	495	19	125	.1	35
Feb. 3	2,420	2.6	454	23	124	.1	35
7	173	2.4	144	28	105	.0	29
11	172	2.4	145	Aug. 3	87	— .2	19
15	173	2.4	149	7	87	— .3	16
19	170	2.3	136	Sept. 1	2,936	5.2	1,995
23	171	2.3	139	2	4,021	10.0	10,994
27	171	2.3	135	6	2,439	2.9	583
Mar. 3	171	2.2	121	10	2,418	2.8	541
7	169	2.2	123	13	4,155	10.2	12,199
11	168	2.1	116	16	5,402	15.6	26,407
15	171	2.1	102	18	5,136	14.7	22,595
19	178	2.5	177	22	3,428	6.7	4,058
22	2,942	4.8	1,512	27	3,184	5.5	1,993
26	2,682	3.5	849	Oct. 3	3,019	4.8	1,412
30	2,459	2.6	470	7	3,040	4.9	1,452
Apr. 3	174	2.4	146	11	2,849	4.0	1,099
7	169	2.3	123	15	2,819	3.9	1,037
11	169	2.1	103	19	2,768	3.7	979
15	2,505	2.8	556	23	2,731	3.5	878
19	176	2.5	162	28	2,701	3.4	792
23	154	1.9	117	Nov. 3	2,655	3.2	731
28	149	1.4	95	7	2,651	3.2	725
May 3	146	1.3	90	11	2,607	3.0	674
7	144	1.3	89	15	2,582	2.9	637
11	143	1.2	78	19	2,578	2.9	625
13	144	1.2	76	23	2,554	2.8	579
19	157	1.9	112	28	2,552	2.8	578
23	149	1.5	99	Dec. 3	2,526	2.7	534
24	2,482	2.7	527	7	2,521	2.7	532
28	153	1.6	103	11	2,518	2.7	523
June 3	140	1.1	72	15	2,493	2.6	457
7	3,722	8.7	8,907	19	2,546	2.8	566
11	2,478	3.0	576	23	2,519	2.7	506
15	164	1.9	158	28	2,515	2.7	500
19	159	1.5	123				

Daily gage height, in feet, of Rio Salado near Guerrero, Tamaulipas, Mexico, for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.9	2.6	2.2	2.4	1.4	1.3	0.8	−0.1	7.1	5.1	3.3	2.7
2	2.9	2.6	2.2	2.4	1.4	1.2	.7	− .2	9.35	5.0	3.3	2.7
3	2.9	2.6	2.2	2.4	1.3	1.1	.6	− .2	6.0	4.8	3.2	2.7
4	2.9	2.5	2.2	2.4	1.3	1.0	.6	− .2	4.1	4.9	3.2	2.7
5	2.9	2.5	2.2	2.3	1.3	1.0	.5	− .2	3.2	4.8	3.2	2.7
6	2.9	2.5	2.2	2.3	1.3	4.65	.5	− .3	2.8	5.25	3.2	2.7
7	2.9	2.4	2.2	2.25	1.3	7.85	.5	.3	2.4	4.75	3.2	2.7
8	2.9	2.4	2.2	2.2	1.45	4.7	.5	− .4	2.05	4.4	3.1	2.7
9	2.8	2.4	2.1	2.2	1.3	3.55	.4	− .4	1.85	4.2	3.1	2.7
10	2.8	2.4	2.1	2.1	1.3	3.3	.4	.....	2.75	4.1	3.1	2.7
11	2.8	2.4	2.1	2.1	1.2	2.95	.4	.....	2.1	4.0	3.0	2.7
12	2.8	2.4	2.1	2.3	1.2	2.7	.4	.....	2.1	4.0	3.0	2.7
13	2.8	2.4	2.1	2.2	1.2	2.3	.3	.....	3.3	4.0	3.0	2.7
14	2.8	2.4	2.1	2.9	1.2	2.05	.3	.....	6.7	3.9	3.0	2.7
15	2.9	2.4	2.1	2.8	1.6	1.9	.3	.....	10.8	3.9	2.9	2.6
16	2.9	2.4	2.1	2.7	2.05	1.8	.2	.....	15.8	3.8	2.9	2.8
17	2.9	2.4	2.1	2.6	2.0	1.7	.2	.....	15.0	3.8	2.9	2.8
18	2.9	2.4	2.1	2.6	1.9	1.6	.2	.....	14.25	3.8	2.9	2.8
19	2.8	2.3	2.9	2.5	1.85	1.5	.1	.....	12.65	3.7	2.9	2.8
20	2.8	2.3	2.9	2.35	1.65	1.4	.1	.....	7.85	3.7	2.9	2.8
21	2.8	2.3	3.0	2.15	1.45	1.3	.1	.....	7.0	3.6	2.8	2.8
22	2.8	2.3	5.4	1.95	1.85	1.7	.1	.....	6.5	3.5	2.8	2.8
23	2.8	2.3	4.95	1.9	2.05	1.85	.1	.....	6.15	3.5	2.8	2.7
24	2.8	2.3	3.85	1.8	2.85	1.65	.1	.....	5.95	3.4	2.8	2.7
25	2.7	2.3	3.65	1.7	2.4	1.45	.0	.....	5.75	3.4	2.8	2.7
26	2.7	2.3	3.35	1.6	1.95	1.3	.0	.....	5.65	3.4	2.8	2.7
27	2.7	2.3	2.95	1.5	1.7	1.2	.0	.....	5.5	3.4	2.8	2.7
28	2.7	2.2	2.75	1.4	1.6	1.1	.0	.....	5.4	3.4	2.8	2.7
29	2.7	.....	2.6	1.4	1.6	1.0	− .1	.....	5.3	3.3	2.8	2.7
30	2.6	.....	2.6	1.4	1.5	.9	− .1	.....	5.2	3.3	2.7	2.7
31	2.6	.....	2.5	.....	1.4	.....	− .1	.....	.....	3.3	.....	2.7

NOTE.—No flow Aug. 10 to 31.

RIO SAN JUAN BASIN.

RIO SAN JUAN NEAR SANTA ROSALIA RANCH, TAMAULIPAS, MEXICO.

The San Juan is a long torrential stream entering the Rio Grande 15 miles below Roma and 790 miles by river below El Paso. Six miles above its mouth is the town of Camargo.

The station was first established in 1900 near La Quemada, 12 miles above Camargo, by the International Boundary Commission, but in time of heavy flood in the Rio Grande backwater reached the station, and on July 14, 1902, it was moved 6 miles farther upstream to its present location near Santa Rosalia ranch, Tamaulipas, Mexico. It is now above backwater.

The river bed at both stations shifts constantly and frequent discharge measurements have been made to determine closely the daily flow. Both banks are of sandy clay which are above high water and do not erode. The bottom of the river is sand which erodes slightly in flood.

Low water (no flow) was approximately zero on the gage prior to the flood of 1909, which swept away the station here. The channel was either scoured out at this time or the restored gage has not the

same datum as the old. No flow is now −8.5 on the gage. The highest recorded flood, on September 16, 1904, reached 27 feet on the gage.

The observations at both stations have been made under the direction of the Mexican section of the International Water Commission (prior to July 1, 1910, International Boundary Commission).

Discharge measurements and gage heights, 1900 to 1904, which had not hitherto been published by the United States Geological Survey, are given in Water-Supply Paper 248.

Discharge measurements of Rio San Juan near Santa Rosalia ranch, Tamaulipas, Mexico, in 1910.

[By S. Jaso.]

Date.	Area of section.	Gage height.	Discharge.	Date.	Area of section.	Gage height.	Discharge.
	Sq. ft.	*Feet.*	*Sec.-ft.*		*Sq. ft.*	*Feet.*	*Sec.-ft.*
Jan. 3	1,558	−2.1	577	July 7	868	− 6 65	30
7	1,510	−2.4	529	12	787	− 7.0	27
11	1,504	−2.4	532	16	739	− 7.7	26
17	1,527	−2.35	621	20	731	− 7.8	25
23	1,461	−2.8	446	23	1,064	− 4.7	300
28	1,438	−3.4	315	28	789	− 7.0	27
Feb. 5	1.383	−3.5	275	Aug. 2	732	− 7.8	26
12	1,348	−3.9	256	7	698	− 8.2	24
16	1.317	−4.1	225	11	681	− 8.3	24
19	1,234	−4.5	154	16	665	− 8.3	24
23	1,259	−4.5	148	20	663	− 8.4	23
27	1,180	−5.0	99	24	650	− 8.4	22
Mar. 3	1,119	−5.1	70	28	622	− 8.5	0
7	1,161	−5.2	41	Sept. 1	3,192	15.5	10,342
11	1,121	−5.4	39	2	3,085	15.0	9,995
16	1,108	−5.5	39	3	1,367	7.0	2,768
21	1,158	−5.1	71	4	1,832	.9	1,545
22	1,658	− .95	750	7	1,084	− 3.6	434
24	1,543	−2.4	620	10	1,305	− 1.95	1,154
28	1,263	−4.4	173	15	3,192	15.5	10,342
Apr. 1	1,806	− .2	1,162	17	4,454	23.0	18,039
2	1,640	−1.15	908	19	1.334	6.5	3,598
6	1,443	−2.65	508	28	2,759	− 2 5	2,867
10	1,150	−4.4	332	Oct. 3	2,987	5.1	3,079
14	1,155	−5.2	40	10	2,176	2.9	1,822
18	1,102	−5.8	40	14	2,131	2.7	1,622
22	1,083	−6.3	39	18	2,019	2.0	1,476
27	941	−6.5	33	22	1,821	1.6	971
May 5	934	−7.0	33	25	1,716	1.3	833
7	883	−7.1	31	29	2,347	3.3	2,209
11	854	−7.0	31	Nov. 2	2,046	1.45	1,057
16	849	−7.0	30	7	1,776	.9	867
20	1,946	.65	1,954	11	1,645	.7	655
24	1,174	−4.55	337	15	1,550	.4	597
28	1,044	−5.9	37	19	1,492	.3	597
June 3	886	−6.7	31	23	1,486	.2	553
7	1,512	−1.45	1,208	28	1,481	.0	481
11	1,037	−5.6	37	Dec. 3	1,456	− .2	449
16	1,027	−5.7	35	7	1,448	− .3	396
21	836	−6.9	29	12	1,454	− .2	431
25	793	−7.1	28	16	1,494	.0	561
26	1,102	−4.35	331	20	1,488	.0	499
28	1,192	−4.05	427	24	1.439	− .3	404
July 3	841	−7.0	29	28	1.417	− .4	389

Daily gage height, in feet, of Rio San Juan near Santa Rosalia ranch, Tamaulipas, Mexico, for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	−2.0	−3.3	−5.1	0.3	−6.6	−6.6	−6.5	−7.55	11.45	−2.65	1.55	−0.15
2	−2.1	−3.35	−5.1	−1.45	−6.75	−6.6	−6.9	−7.85	13.1	−3.8	1.45	− .2
3	−2.15	−3.4	−5.1	−3.2	−6.8	−6.7	−7.05	−8.0	5.55	−2.9	1.35	− .2
4	−2.3	−3.5	−5.15	2.6	−7.0	−6.7	−7.2	−8.05	.1	3.5	1.15	− .2
5	−2.3	−3.55	−5.2	2.3	−7.0	−6.8	−7.3	−8.1	− 1.75	2.0	1.05	− .1
6	−2.4	−3.65	−5.2	−2.95	−7.0	−6.8	−7.4	−8.15	− 3.0	− .5	.95	− .2
7	−2.4	−3.75	−5.2	−3.75	−7.1	−3.65	−5.9	−8.2	− 3.75	−4.15	.85	− .3
8	−2.4	−3.85	−5.3	−4.25	−7.1	−1.9	−5.5	−8.3	− 4.2	−6.75	.8	− .3
9	−2.4	−3.9	−5.3	−4.4	−6.75	−2.8	−6.2	−8.3	− 4.55	−7.0	.8	− .25
10	−2.4	−3.9	−5.4	−4.4	−6.95	−4.55	−6.6	−8.3	− 1.9	−8.4	.8	− .2
11	−2.4	−3.9	−5.4	−4.45	−7.0	−5.75	−6.85	−8.3	− 1.1	3.45	.7	− .2
12	−2.4	−3.9	−5.4	−4.3	−7.0	−6.1	−7.05	−8.3	− 3.55	3.15	.6	− .2
13	−2.4	−4.0	−5.5	−4.8	−7.0	−6.3	−7.2	−8.3	1.2	2.95	.5	− .3
14	−2.4	−4.0	−5.5	−5.2	−7.1	−6.5	−7.35	−8.3	5.75	2.7	.5	− .3
15	−2.4	−4.0	−5.5	−5.3	−7.1	−4.8	−7.65	−8.3	11.35	2.55	.4	− .2
16	−2.35	−4.1	−5.5	−5.4	−7.0	−5.8	−7.7	−8.3	23.0	2.4	.3	.1
17	−2.4	−4.15	−5.5	−5.5	−7.1	−6.05	−7.7	−8.4	22.5	2.15	.3	.2
18	−2.4	−4.25	−5.5	−5.9	−7.1	−6.3	−7.8	−8.4	15.25	2.0	.3	.1
19	−2.5	−4.35	−5.2	−6.2	−3.85	−6.6	−7.8	−8.4	5.25	2.0	.3	.05
20	−2.6	−4.4	−5.1	−6.3	−0.45	−6.7	−7.8	−8.4	2.7	1.85	.3	.0
21	−2.7	−4.5	−3.0	−6.3	−2.4	−6.9	−7.8	−8.4	1.2	1.65	.3	− .1
22	−2.7	−4.5	−1.4	−6.3	−3.65	−7.05	−7.1	−8.4	.95	1.6	.3	− .1
23	−2.8	−4.5	−2.65	−6.3	−4.2	−6.7	−4.85	−8.4	1.0	1.5	.2	− .2
24	−2.85	−4.6	−2.75	−6.4	−4.6	−7.1	−5.9	−8.4	1.3	1.4	.2	− .3
25	−2.95	−4.75	−3.45	−6.4	−4.85	−3.8	−6.3	−8.4	− .75	1.3	.1	− .3
26	−3.15	−4.95	−3.9	−6.4	−5.1	−2.65	−6.7	−8.4	− 1.35	1.3	.1	− .3
27	−3.3	−5.0	−4.25	−6.5	−5.6	−3.65	−6.9	−8.4	− 1.9	1.45	.0	− .3
28	−3.4	−5.0	−4.4	−6.5	−5.95	−4.45	−7.05	.....	− 2.6	1.55	.0	− .4
29	−3.2	.....	−4.5	−6.5	−6.05	−5.6	−7.25	.....	− 3.5	3.6	− .1	− .4
30	−3.2	.....	−4.6	−6.6	−6.3	−6.1	−7.3	.....	− 4.1	2.55	− .1	− .5
31	−3.3	.....	−3.25	.....	−6.5	.....	−7.4	.....	.....	1.7	.....	− .5

NOTE.—No flow Aug. 28 to 31.

MISCELLANEOUS MEASUREMENTS IN WESTERN GULF OF MEXICO DRAINAGE BASINS.

The following miscellaneous discharge measurements were made in the western Gulf of Mexico drainage basins in 1910:

Miscellaneous measurements in western Gulf of Mexico drainage basins in 1910.

Date.	Stream.	Tributary to—	Locality.	Gage height.	Discharge.
				Feet.	*Sec.-ft.*
Dec. —	Hancock Spring	Lampasas River	Lampasas, Tex.	.....	7.4
—	Hanna Spring	do	do	.....	.9
Aug. —	Barton Springs	Colorado River (of Texas).	Austin, Tex.	.....	19
	San Marcos River	Guadalupe River	San Marcos, Tex.	.....	95
Sept. —	San Antonio River	Gulf of Mexico	San Antonio, Tex.	.....	18
13	Leona River	Nueces River	Uvalde, Tex.	.....	8.4
12	Rio Grande	Gulf of Mexico	Above mouth of Clear Creek, Colo.	.....	85
21	do	do	Below headgate of Rio Grande canal, Colo.	.....	262
21	do	do	¼ mile below Farmers' Union canal, Colo.	.....	166
21	do	do	Headgate, Prairie canal, Colo.	.....	112
20	do	do	Monte Vista, Colo.	.....	63.8
20	do	do	6 miles below Monte Vista, Colo.	.....	12.1
20	do	do	12 miles below Monte Vista, Colo.	.....	18.8

Miscellaneous measurements in western Gulf of Mexico drainage basin in 1910—Contd.

Date.	Stream.	Tributary to—	Locality.	Gage height.	Discharge.
				Feet.	*Sec.-ft.*
Sept. 20	Rio Grande	Gulf of Mexico	5 miles above Alamosa, Colo.		6.6
Aug. 16	do	do	Alamosa, Colo.		13
Sept. 25	do	do	do		9.4
14	do	do	Above mouth of Rio Alamosa, Colo.		10.8
14	do	do	Above mouth of Rio La Jara, Colo.		11.7
15	do	do	Above mouth of Conejos River, Colo.		14.8
14	do	do	Above mouth of Rio Trinchera, Colo.		15.6
15	do	do	5 miles below La Sauces, Colo.		46.2
16	do	do	2 miles above bridge, Lobatos, Colo.		41
16	do	do	Colorado-New Mexico State line.		41
July 8	Crooked Creek	Rio Grande	Sec. 31, T. 41 N., R. 2 W., Colorado.		[a] 1.2
2	Clear Creek	do	Sec. 32, T. 41 N., R. 2 W., above ditches, near Texas Club House, Colorado.		83.5
12	South Fork of Clear Creek.	Clear Creek	2 miles above mouth in sec. 13 T., 41 N., R. 3 W., Colorado.		4.0
20	Trout Creek	Rio Grande	Sec. 4, T. 39 N., R. 3 E., Colorado.		12
13	do	do	Above ditches, sec. 24, T. 40 N., R. 2 W., Colorado.		27.6
13	Bear Creek	Trout Creek	Sec. 24, T. 40 N., R. 2 W., Colorado.		.8
13	Red Mountain Creek	Rio Grande	Near county bridge, sec. 18, T. 40 N., R. 1 W., Colorado.		28.6
3	Shallow Creek	do	Above ditches, sec. 4, T. 41 N., R. 14 W., Colorado.		8.9
3	do	do	Sec. 10, T. 41 N., R. 1 W., Colorado.		3.3
6	Miners Creek	do	Sec. 2, T. 41 N., R. 1 W., Colorado.		26.5
15	Willow Creek	do	In flume above Creede, sec. 30, T. 42 N., R. 1 E., Colorado.		18.2
7	Bellows Creek	do	Sec. 13, T. 41 N., R. 1 E., Colorado.		31.5
7	do	do	500 feet above mouth, sec. 14, T. 41 N., R. 1 E., Colorado.		23.6
1	Goose Creek	do	1,000 feet above mouth, sec. 35, T. 41 N., R. 1 E., Colorado.		79.6
Sept. 23	do	do	do		22
Oct. 20	do	do	do		21
July 13	Deer Creek	Goose Creek	Sec. 35, T. 41 N., R. 1 E., Colorado.		1.0
19	Elk Creek	Rio Grande	Below all ditches, T. 40 N., R. 3 E., Colorado.		[a] .4
19	Alder Creek	do	1,000 feet above ditches, sec. 27, T. 40 N., R. 3 E., Colorado.		5.1
Aug. 1	Willow Creek	do	Below all ditches, sec. 35, T. 40 N., R. 3 E., Colorado.		3.1
3	Embargo Creek	do	Sec. 33, T. 41 N., R. 4 E., Colorado.		[a] 10.0
6	do	do	Below irrigation, sec. 23, T. 40 N., R. 4 E., Colorado.		8.4
July 27	Los Pinos Creek	do	Below irrigation, sec. 26, T. 40 N., R. 5 E., Colorado.		[a] 2.0
22	San Francisco Creek	do	Above all ditches, T. 39 N., R. 6 E., Colorado.		[a] 1.0
Aug. 17	Rock Creek	do	Sec. 32, T. 38 N., R. 7 E., Colorado.		[a] 7
Sept. 3	Spring Creek	Rock Creek	Below Sheridan's ditches, T. 37 N., R. 7 E., Colorado.		[a] 10
8	Cotton Creek	San Luis Creek	At mouth, near Mirage, Colo.		[b]
Oct. 7	do	do	do		2
7	Wild Cherry Creek	do	At mouth, near Medano Springs, Colo.		[b]
7	Rito Alto Creek	do	At mouth, near Moffat, Colo.		[b]
7	San Isabel Creek	do	At mouth, near San Isabel, Colo.		[c] 5
5	Carnero Creek	do	¼ mile above Devil's Gate, near La Garita, Colo.		5.0

[a] Float measurement. [b] Stream dry. [c] Estimated.

Miscellaneous measurements in western Gulf of Mexico drainage basins in 1910—Contd.

Date.	Stream.	Tributary to—	Locality.	Gage height.	Discharge.
				Feet.	*Sec.-ft.*
Aug. 8	Carnero Creek	San Luis Creek	At Devil's Gate, near La Garita, sec. 25, T. 42 N., R. 6 E., Colorado.		2.8
Sept. 2	do	do	At stage road, between Del Norte and Saguache, 1½ miles NW. of La Garita, Colo.		.8
Oct. 7	do	do	At mouth, near Bismark postoffice, Colo.		(a)
Aug. 25	La Garita Creek	do	Sec. 6, T. 41 N., R. 6 E., Colorado.		5.1
Sept. 2	do	do	3 miles SW. of La Garita post office on stage road between Del Norte and Saguache, Colo.		.8
Oct. 5	do	do	do		4.4
Sept. 10	Rito Arenas Creek		At King's ranch, near Liberty, Colo.		6.6
9	Deadman Creek	Rito Arenas Creek	Liberty, Colo		1.0
Oct. 17	Rio Alamosa	Rio Grande	Above Nordland ditch, sec. 7, T. 35 N., R. 8 E., Colorado.		b 2
Sept. 26	do	do	Near Capulin, Colo		8.2
Aug. 9	do	do	At mouth near Alamosa, Colo.		(a)
Sept. 24	do	do	do		(a)
28	do	do	do		(a)
Oct. 17	Rio La Jara	do	T. 34 N., R. 6 E., Colorado		b 15
Aug. 15	do	do	Hansen's ranch, above mouth, near Alamosa, Colo.		61
17	do	do	do		52
Sept. 28	do	do	do		4.4
Oct. 17	do	do	do		11.4
Sept. 14	do	do	At mouth, near Alamosa, Colo.		3.1
Sept. 17	Rio Trinchera	do	T. 31 S., R. 71 W., Colorado		9.9
18	do	do	Head of Trinchera Canal, sec. 2, T. 31 S., R. 72 W., Colorado.		6
18	do	do	Head of Pat Breen ditch, sec. 2, T. 31 S., R. 73 W., Colorado.		(a)
Oct. 4	do	do	½ mile above mouth sec. 24, T. 31 S., R. 75 W., Colorado.		b 1.0
Sept. 14	do	do	At mouth, near Alamosa, Colo.		(a)
29	do	do	do		(a)
16	Ute Creek	Rio Trinchera	Below White's ranch, T. 29 S., R. 72 W., Colorado.		6.9
15	Sangre de Cristo Creek	Ute Creek	T. 30 S., R. 71 W., Colorado		b 1.0
15	Conejos River	Rio Grande	At Austin's ranch near mouth, near La Jara, Colo.		24
28	do	do	do		25
Oct. 17	do	do	do		34
13	San Antonio River	Conejos River	At wagon bridge ¼ mile east of Lobatos, Colo.		0
Apr. 2	do	do	Highway bridge, 1 mile south of Antonito, Colo.		c 40
May 26	do	do	do	d 13.0	197
Sept. 9	Culebra River	Rio Grande	Above forks, sec. 36, T. 3N., R. 71 W., Colorado.		15.3
14	do	do	Castilla Estates Development Co. gaging station, sec. 27, T. 3 N., R. 72 W., Colorado.		31.3
12	Torcido Creek	Rio Culebra	Mouth of canyon, T. 1 N., R. 71 W., Colorado.		b .1
13	Ventero Creek	do	3 miles above Sanchez dam, sec. 1, T. 1 N., R. 72 W., Colorado.		.75
10	Joroso Creek	Ventero Creek	T. 1 N., R. 71 W., Colorado		b 2.5
10	Vallejo Creek	Rio Culebra	1 mile below sawmill, T. 2 N., R. 71 W., Colorado.		b 7.0
8	Pozo Creek	do	T. 3 N., R. 71 W., Colorado		9.9
Apr. 9	Costilla Creek	Rio Grande	At wagon bridge, about 1 mile east of Eastdale, Colo.	2.18	32

a Stream dry.
b Float measurement.
c Estimated.
d Distance from reference mark (cross painted at foot of truss post, 33 feet from right abutment, downstream side of bridge) to water surface.

Miscellaneous measurements in western Gulf of Mexico drainage basins in 1910—Contd.

Date.	Stream.	Tributary to—	Locality.	Gage height.	Discharge.
				Feet.	*Sec.-ft.*
Oct. 13	Costilla Creek	Rio Grande	At Antonito-Questa road crossing, about 4 miles from the Rio Grande, New Mexico.		0
Sept. 13	Latir Creek	do	4 miles above Cerro, N. Mex., and 8 miles above Questa, N. Mex.		4.8
Oct. 13	do	do	At Antonita-Questa road crossing near Questa, N. Mex.		*a* 3
Sept. 13	Colorado Creek	do	About 4 miles above Questa, N. Mex.	*b* 3.55	21
13	Cabresta Creek	Colorado Creek	Above all ditches, 4 miles above Questa, N. Mex.	*b* 2.25	6
13	do	do	At mouth, 4 miles above Questa, N. Mex.		*a* .5
Oct. 15	Arroyo Seco	Arroyo Hondo	Wagon bridge in Arroyo Seco, Colo., near mouth.		*a* 1.0
May 12	Rio Pueblo de Taos	Rio Grande	About 2 miles above Pueblo de Taos, N. Mex.		28
Mar. 12	Rio Lucero	Rio Pueblo de Taos.	About 9 miles above Taos, N. Mex.		11
30	Rio Santa Cruz	Rio Grande	About ½ mile above Santa Cruz, N. Mex.		32
16	Rio Quemado	Rio Santa Cruz	At mouth of canyon, 1½ miles above Cordova, N. Mex.	.43	6.3
Aug. 13	Rio Fresnal	Rio La Luz	At mouth, near La Luz, N. Mex.		*a* 6.3
Mar. 6	Pecos River	Rio Grande	500 feet below footbridge at Pecos, N. Mex.	*d* 3.00	72
Feb. 3	do	do	Below Canyon Pintada and 6 miles below Santa Rosa, N. Mex.		95
June 9	Willow Creek	Pecos River	At mouth, at Cowles, N. Mex.		*a* 2
Apr. 23	Holy Ghost Creek	do	600 feet above mouth, below Cowles, N. Mex.	*e* 2.35	15
June 9	do	do	At mouth, below Cowles, N. Mex.		*a* 8
Apr. 23	Indian Creek	do	do	*f* 3.65	2.8
June 9	do	do	do		*a* .5
Nov. 1	do	do	do		*a* .5
Apr. 23	El Macho Creek	do	do	*g* 4.45	9.7
June 9	do	do	do		0
Apr. 23	Dalton Creek	do	At mouth, above Pecos, N. Mex.	*h* 5.30	10.7
June 9	do	do	do		0
Oct. 21	Salado Creek	Gallinas River	At railroad crossing, north of Las Vegas, N. Mex.		*a* .75
Feb. 3	Agua Negra Chiquita	Pecos River	¾ mile above mouth, near Santa Rosa, N. Mex.		33
Mar. 13	do	do	50 feet below road bridge, near Santa Rosa, N. Mex.		29
Aug. 18	Canyon Pintada *i*	do	At railroad bridge, Pintada, N. Mex.		*a* 20
19	do	do	do		*a* 4
20	do	do	do		0
Feb. 3	do	do	At mouth, 5 miles below Santa Rosa, N. Mex.		29
Aug. 17	Rio Bonito	Hondo River	¼ mile below Fort Stanton, N. Mex.		*a* .25
17	Salado Creek	Rio Bonito	2 miles below Capitan, N. Mex.		*a* 8
17	do	do	do		0

a Estimated.
b Distance from reference mark to water surface.
c Stream dry.
d Distance from reference mark (on left side of bridge) to water surface.
e Distance from reference mark (on rock on left bank 5 feet above abandoned bridge) to water surface
f Distance from reference mark (a nail on downstream side of bridge) to water surface.
g Distance from reference mark (on rock on left bank, about 500 feet above mouth) to water surface.
h Distance from reference mark (on rock on left bank about 225 feet above mouth) to water surface.
i There have been several floods on this stream during the past 10 days. High-water marks of recent date indicate a flood flow of around 1,000 second-feet. The Pintada Reservoir, 1½ miles below the El Paso & Southwestern Railroad bridge, has water in it for the first time since it was built about 3 years ago. On Aug. 19 at 3 p. m., reservoir gage read 16.5 feet. It is stated that on Aug. 16 or 17 gage reading was about 20.0 feet. From the map it is estimated that when gage read 16.5 there were about 570 acre-feet in reservoir, and J. L. Campbell, engineer in charge of maintenance of way El Paso & Southwestern Railroad, states that the run-off from Pintada Canyon up to the latter part of August, 1910, had just filled the reservoir, the capacity being 1,300 acre-feet.

Miscellaneous measurements in western Gulf of Mexico drainage basins in 1910—Contd.

Date.	Stream.	Tributary to—	Locality.	Gage height.	Discharge.
				Feet.	*Sec.-ft.*
Aug. 15	Felix River	Pecos River	At Spur ranch, 2 miles west of the east boundary of Mescalero-Apache Indian Reservation.		0
15	Lincoln Canyon	Felix River	Sec. 32, T. 13 S., R. 17 W., New Mexico.		*a* .25
15	do	do	do		0
16	do	do	do		0
Mar. 26	Upper Penasco River	Pecos River	At falls, 1 mile below Box Canyon, N. Mex.		15
Apr. 14	Penasco River	do	½ mile below Peter's ranch, 5 miles below Mayhill, N. Mex		54
Mar. 23	do	do	Below springs at Cleve's ranch, 4 miles below Elk, N. Mex.		32
23	do	do	Laramore ranch, New Mexico		37
23	do	do	Head of Hope ditch, near Hope, N. Mex.		23
22	do	do	At railroad crossing, New Mexico.		31
Aug. 14	James Canyon	Penasco River	2 miles east of Cloudcroft, N. Mex.		0
14	do	do	At mouth, near Mayhill, N. Mex.		25
14	Chiquito Creek	do	At mouth, 3 miles above Elk, N. Mex.		0
Aug. 15	Elk Canyon	do	At mouth, near Elk, N. Mex.		*a* .5
Sept. —	San Felipe Creek	Rio Grande	Del Rio, Tex.		70
—	Las Moras Creek	do	Brackettville, Tex.		14

a Estimated.

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D.

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