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SURFACE WATER SUPPLY OF THE
UNITED STATES

1914

PART VIII. WESTERN GULF OF MEXICO BASINS

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Prepared in cooperation with the State
of New Mexico



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SURFACE WATER SUPPLY OF WESTERN GULF OF MEXICO BASINS, 1914.

AUTHORIZATION AND SCOPE OF WORK.

This volume is one of a series of 14 reports presenting results of measurements of flow made on streams in the United States during the year ending September 30, 1914.

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

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

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

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

Annual appropriations for the fiscal years ending June 30, 1895-1915:

1895.....	\$12, 500
1896.....	20, 000
1897 to 1900, inclusive.....	50, 000
1901 to 1902, inclusive.....	100, 000
1903 to 1906, inclusive.....	200, 000
1907.....	150, 000
1908 to 1910, inclusive.....	100, 000
1911 to 1915, inclusive.....	150, 000

In the execution of the work many private and State organizations have cooperated either by furnishing data or by assisting in collecting data. Acknowledgments for cooperation of the first kind are made in connection with the description of each station affected; cooperation of the second kind is acknowledged on page 13.

Measurements of stream flow have been made at about 3,400 points in the United States and also at many points in small areas in Seward Peninsula and the Yukon-Tanana region, Alaska, and the Hawaiian

Islands. In July, 1914, 1,480 gaging stations were being maintained by the Survey and the cooperating organizations. Many miscellaneous discharge measurements are made at other points. In connection with this work data were also collected in regard to precipitation, evaporation, storage reservoirs, river profiles, and water power in many sections of the country and will be made available in the regular water-supply papers from time to time.

PUBLICATIONS.

A report has been prepared for each year embodying the stream-flow data collected during that year. Previous to 1911 the basis of publication was a calendar year. One volume of the report for 1911 (Part XII), three volumes for 1912 (Parts X, XI, and XII), six volumes for 1913 (Parts III, V, VIII, X, XI, and XII), and all the parts of the report for 1914 contain records for the year ending September 30.

An index to the reports containing stream-flow measurements prior to 1904 has been published as Water-Supply Paper 119. Circulars are also available giving complete lists of the gaging stations maintained by the Survey to date and a list of the reports relating to the water resources of the country.

Gage heights and discharge measurements prior to 1901 were published in water-supply papers or bulletins and estimates of monthly discharge in annual reports; since 1901 complete records have been published in water-supply papers. They are now being published in 14 parts, as shown in the following table:

Papers on surface water supply of the United States, 1914.

No.	Title.
381	North Atlantic basins.
382	South Atlantic and eastern Gulf of Mexico basins.
383	Ohio River basin.
384	St. Lawrence River basin.
385	Upper Mississippi River and Hudson Bay basins.
386	Missouri River basin.
387	Lower Mississippi River basin.
388	Western Gulf of Mexico basins.
389	Colorado River basin.
390	Great Basin.
391	Pacific drainage basins in California.
	North Pacific drainage basins:
392	Pacific basins in Washington and upper Columbia River basin.
393	Snake River basin.
394	Lower Columbia River and Pacific basins in Oregon.

A list of reports containing stream-flow data is presented in the following table:

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

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

Report.	Character of data.	Year.
10th A, pt. 2.....	Descriptive information only.....	
11th A, pt. 2.....	Monthly discharge and descriptive information.....	1884 to Sept., 1890.
12th A, pt. 2.....	.....do.....	1884 to June 30, 1891.
13th A, pt. 3.....	Mean discharge in second-feet.....	1884 to Dec. 31, 1892.
14th A, pt. 2.....	Monthly discharge (long-time records, 1871 to 1893).....	1888 to Dec. 31, 1893.
B 131.....	Descriptions, measurements, gage heights, and ratings.....	1893 and 1894.
16th A, pt. 2.....	Descriptive information only.....	
B 140.....	Descriptions, measurements, gage heights, ratings, and monthly discharge (also many data covering earlier years).....	1895.
WS 11.....	Gage heights (also gage heights for earlier years).....	1896.
18th A, pt. 4.....	Descriptions, measurements, ratings, and monthly discharge (also similar data for some earlier years).....	1895 and 1896.
WS 15.....	Descriptions, measurements, and gage heights, eastern United States, eastern Mississippi River, and Missouri River above junction with Kansas.....	1897.
WS 16.....	Descriptions, measurements, and gage heights, western Mississippi River below junction of Missouri and Platte, and western United States.....	1897.
19th A, pt. 4.....	Descriptions, measurements, ratings, and monthly discharge (also some long-time records).....	1897.
WS 27.....	Measurements, ratings, and gage heights, eastern United States, eastern Mississippi River, and Missouri River.....	1898.
WS 28.....	Measurements, ratings, and gage heights, Arkansas River and western United States.....	1898.
20th A, pt. 4.....	Monthly discharge (also for many earlier years).....	1898.
WS 35 to 39.....	Descriptions, measurements, gage heights, and ratings.....	1899.
21st A, pt. 4.....	Monthly discharge.....	1899.
WS 47 to 52.....	Descriptions, measurements, gage heights, and ratings.....	1900.
22d A, pt. 4.....	Monthly discharge.....	1900.
WS 65, 66.....	Descriptions, measurements, gage heights, and ratings.....	1901.
WS 75.....	Monthly discharge.....	1901.
WS 82 to 85.....	Complete data.....	1902.
WS 97 to 100.....	.....do.....	1903.
WS 124 to 135.....	.....do.....	1904.
WS 165 to 178.....	.....do.....	1905.
WS 201 to 214.....	.....do.....	1906.
WS 241 to 252.....	.....do.....	1907-8.
WS 261 to 272.....	.....do.....	1909.
WS 281 to 292.....	.....do.....	1910.
WS 301 to 312.....	.....do.....	1911.
WS 321 to 332.....	.....do.....	1912.
WS 351 to 362 ^a.....	.....do.....	1913.
WS 381 to 394 ^a.....	.....do.....	1914.

^a In preparation.

NOTE.—No data regarding stream flow are given in the fifteenth and seventeenth annual reports.

The following table gives, by years and drainage basins, the numbers of the papers on surface-water supply published from 1899 to 1914. As a rule, the data for any particular station will be found in the reports covering the years during which the station was maintained. For example, data for any station in the area covered by Part I are published in Water-Supply Papers 97, 124, 165, 201, 241, 261, 281, 301, 321, and 351, which contain records for the New England streams from 1903 to 1913.

Numbers of water-supply papers containing results of stream measurements, 1899-1914.

Year.	North Atlantic coast (St. John River to York River).	South Atlantic coast and eastern Gulf of Mexico (James River to the Mississippi).	Ohio River.	St. Lawrence River and Great Lakes.	Hudson Bay and upper Mississippi River.	Missouri River.	Lower Mississippi River.	Western Gulf of Mexico.	Colorado River.	Great Basin.	Pacific coast in California.	North Pacific drainage basins.		
												Pacific basins in Washington and upper Columbia River.	S Snake River basin.	Lower Columbia River and Pacific basins in Oregon.
1899 ^a	35	b 35, 36	36	36	36	c 36	37	37	d 37	38	38	38	38	38
1900 ^e	47	48	48	49	49	f 50	50	50	50	51	51	51	51	51
1901.....	65	65	65	65	65	65	65	66	66	66	66	66	66	66
1902.....	75	75	75	75	75	75	75	75	75	75	75	75	75	75
1903.....	82	b 82	83	82	83	84	84	84	85	85	85	85	85	85
1904.....	97	b 97	98	97	98	99	99	99	100	100	100	100	100	100
1905.....	124	126	128	129	130	130	130	132	133	133	134	135	135	135
1906.....	126	127	127	127	130	131	131	131	134	134	134	135	135	135
1907.....	165	167	169	170	171	172	173	174	175	176	177	178	178	178
1908.....	166	168	168	170	171	172	173	174	175	176	177	178	178	178
1909.....	201	203	205	206	207	208	208	210	211	212	213	214	214	214
1910.....	202	204	205	206	207	208	209	210	211	212	213	214	214	214
1911.....	241	242	243	244	245	246	247	248	249	250	251	252	252	252
1912.....	261	262	263	264	265	266	267	268	269	270	271	272	272	272
1913.....	281	282	283	284	285	286	287	288	289	290	291	292	292	292
1914.....	301	302	303	304	305	306	307	308	309	310	311	312	312	312
1915.....	321	322	323	324	325	326	327	328	329	330	331	332A	332B	332C
1916.....	351	352	353	354	355	356	357	358	359	360	361	362A	362B	362C
1917.....	381	382	383	384	385	386	387	388	389	390	391	392	393	394

^a Rating tables and index to Water-Supply Papers 35-39 contained in Water-Supply Paper 39. Estimates for 1899 in Twenty-first Annual Report, Part IV.^b James River only.^c Sebeto River.

- ^dGreen and Gunnison rivers and Grand River above junction with Gunnison.
^eMohave River only.
^fKings and Kern rivers and south Pacific coast drainage basins.
^gRating tables and index to Water-Supply Papers 47-52 and data on precipitation, wells, and irrigation in California and Utah contained in Water-Supply Paper 52. Estimates for 1900 in twenty-second Annual Report, Part IV.
^hWissahickon and Schuylkill rivers to James River.
ⁱGallatin River.
^jLoup and Platte rivers near Columbus, Nebr., and all tributaries below junction with Platte.
^kTributaries of Mississippi from east.
^lLake Ontario and tributaries to St. Lawrence River proper.
^mHudson Bay only.
ⁿNew England rivers only.
^oSusquehanna River to York River, inclusive.
^pHudson River to Delaware River, inclusive.
^qPlatte and Kansas rivers.
^rGreat Basin in California except Truckee and Carson river basins.
^sRogue, Umpqua, and Siletz rivers only.
^tBelow junction with Gila.

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

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

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

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

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

Albany, N. Y., Room 18, Federal Building.
Atlanta, Ga., Post Office Building.
Madison, Wis., Capitol Building.
St. Paul, Minn., Old Capitol Building.
Helena, Mont., Montana National Bank Building.
Denver, Colo., 302 Chamber of Commerce Building.
Phoenix, Ariz., Fleming Building.
Salt Lake City, Utah, 421 Federal Building.
Boise, Idaho, 615 Idaho Building.
Tacoma, Wash., Federal Building.
Portland, Oreg., 416 Couch Building.
San Francisco, Cal., 505 Custom House.
Los Angeles, Cal., Federal Building.
Honolulu, Hawaii, Kapiolani Building.

DEFINITION OF TERMS.

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

“Second-feet” is an abbreviation for “cubic feet per second.” A second-foot is the rate of discharge of water flowing in a channel of rectangular cross-section 1 foot wide and 1 foot deep at an average velocity of 1 foot per second. It is generally used as a fundamental unit from which others are computed by the use of the factors given in the tables of convenient equivalents (p. 7).

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

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

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

"Millions of cubic feet" is used to express quantities of water stored in reservoirs, most frequently in connection with studies of flood control.

The following terms used in these reports are not in common use:

"Discharge relation" an abbreviation for the term "relation of gage height to discharge."

"Control," "controlling section," and "point of control," terms used to designate the section or sections of the stream below the gage which determine the discharge relation at the gage. It should be noted that the control may not be the same section or sections at all stages.

The "point of zero flow" for a given gaging station is that point on the gage—the gage height—to which the surface of the river would fall if there were no flow.

CONVENIENT EQUIVALENTS.

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

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

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

NOTE.—For part of month multiply the value for 1 day by the number of days.

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

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

NOTE.—For part of month multiply value for 1 day by the number of days.

Table for converting discharge in second-feet into run-off in millions of cubic feet.

Discharge (second- feet.)	Run-off (millions of cubic feet.)				
	1 day.	28 days.	29 days.	30 days.	31 days.
1.....	0.0864	2.419	2.506	2.592	2.678
2.....	.1728	4.838	5.012	5.184	5.356
3.....	.2592	7.257	7.518	7.776	8.034
4.....	.3456	9.676	10.02	10.37	10.71
5.....	.4320	12.10	12.53	12.96	13.39
6.....	.5184	14.51	15.04	15.55	16.07
7.....	.6048	16.93	17.54	18.14	18.75
8.....	.6912	19.35	20.05	20.74	21.42
9.....	.7776	21.77	22.55	23.33	24.10

NOTE.—For part of month multiply the value for one day by the number of days.

Table for converting discharge in second-feet into run-off in millions of gallons.

Discharge (second- feet).	Run-off (millions of gallons).				
	1 day.	28 days.	29 days.	30 days.	31 days.
1.....	0.6463	18.10	18.74	19.39	20.04
2.....	1.293	36.20	37.48	38.78	40.08
3.....	1.939	54.30	56.22	58.17	60.12
4.....	2.585	72.40	74.96	77.56	80.16
5.....	3.232	90.50	93.70	96.95	100.2
6.....	3.878	108.6	112.4	116.3	120.2
7.....	4.524	126.7	131.2	135.7	140.3
8.....	5.170	144.8	149.9	155.1	160.3
9.....	5.817	162.9	168.7	174.5	180.4

NOTE.—For part of month multiply the value for 1 day by the number of days.

Table for converting velocity in feet per second into velocity in miles per hour.

[1 foot per second=0.681818 mile per hour, or two-thirds mile per hour, very nearly; 1 mile per hour=1.4666 foot per second. In computing the table the values 0.68182 and 1.4667 were used.]

Feet per second (units).	Miles per hour for tenths of foot per second.									
	0	1	2	3	4	5	6	7	8	9
0.....	0.000	0.068	0.136	0.205	0.273	0.341	0.409	0.477	0.545	0.614
1.....	.682	1.750	.818	.886	.955	1.02	1.09	1.16	1.23	1.30
2.....	1.36	1.43	1.50	1.57	1.64	1.70	1.77	1.84	1.91	1.98
3.....	2.05	2.11	2.18	2.25	2.32	2.39	2.45	2.52	2.59	2.66
4.....	2.73	2.80	2.86	2.93	3.00	3.07	3.14	3.20	3.27	3.34
5.....	3.41	3.48	3.55	3.61	3.68	3.75	3.82	3.89	3.95	4.02
6.....	4.09	4.16	4.23	4.30	4.36	4.43	4.50	4.57	4.64	4.70
7.....	4.77	4.84	4.91	4.98	5.05	5.11	5.18	5.25	5.32	5.39
8.....	5.45	5.52	5.59	5.66	5.73	5.80	5.86	5.93	6.00	6.07
9.....	6.14	6.20	6.27	6.34	6.41	6.48	6.55	6.61	6.68	6.75

- 1 second-foot equals 40 California miner's inches (law of March 23, 1901).
- 1 second-foot equals 38.4 Colorado miner's inches.
- 1 second-foot equals 40 Arizona miner's inches.
- 1 second-foot equals 7.48 United States gallons per second; equals 448.8 gallons per minute; equals 646,317 gallons for one day.
- 1 second-foot for one year (365 days) covers 1 square mile 1.131 feet, or 13.572 inches deep.
- 1 second-foot for one year (365 days) equals 31,536,000 cubic feet.
- 1 second-foot equals about 1 acre-inch per hour.
- 1 second-foot for one year (365 days) equals 724 acre-feet.
- 1 second-foot for one day equals 86,400 cubic feet.
- 1,000,000,000 (1 United States billion) cubic feet equals 11,570 second-feet for one day.
- 1,000,000,000 cubic feet equals 414 second-feet for one 28-day month.
- 1,000,000,000 cubic feet equals 399 second-feet for one 29-day month.
- 1,000,000,000 cubic feet equals 386 second-feet for one 30-day month.
- 1,000,000,000 cubic feet equals 373 second-feet for one 31-day month.
- 100 California miner's inches equals 18.7 United States gallons per second.
- 100 California miner's inches for one day equals 4.96 acre-feet.
- 100 Colorado miner's inches equals 2.60 second-feet.
- 100 Colorado miner's inches equals 19.5 United States gallons per second.
- 100 Colorado miner's inches for one day equals 5.17 acre-feet.
- 100 United States gallons per minute equals 0.223 second-foot.
- 100 United States gallons per minute for one day equals 0.442 acre-foot.
- 1,000,000 United States gallons per day equals 1.55 second-feet.
- 1,000,000 United States gallons equals 3.07 acre-feet.
- 1,000,000 cubic feet equals 22.95 acre-feet.
- 1 acre-foot equals 325,850 gallons.
- 1 inch deep on 1 square mile equals 2,323,200 cubic feet.
- 1 inch deep on 1 square mile equals 0.0737 second-foot per year.
- 1 foot equals 0.3048 meter.
- 1 mile equals 1.60935 kilometers.
- 1 mile equals 5,280 feet.
- 1 acre equals 0.4047 hectare.
- 1 acre equals 43,560 square feet.
- 1 acre equals 209 feet square, nearly.
- 1 square mile equals 2.59 square kilometers.
- 1 cubic foot equals 0.0283 cubic meter.
- 1 cubic foot of water weighs 62.5 pounds.
- 1 cubic meter per minute equals 0.5886 second-foot.
- 1 horsepower equals 550 foot-pounds per second.
- 1 horsepower equals 76.0 kilogram-meters per second.
- 1 horsepower equals 746 watts.
- 1 horsepower equals 1 second-foot falling 8.80 feet.
- 1½ horsepower equals about 1 kilowatt.

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

EXPLANATION OF DATA.

The data presented in this report cover the year beginning October 1, 1913, and ending September 30, 1914. At the first of January in most parts of the country a large amount of the precipitation for

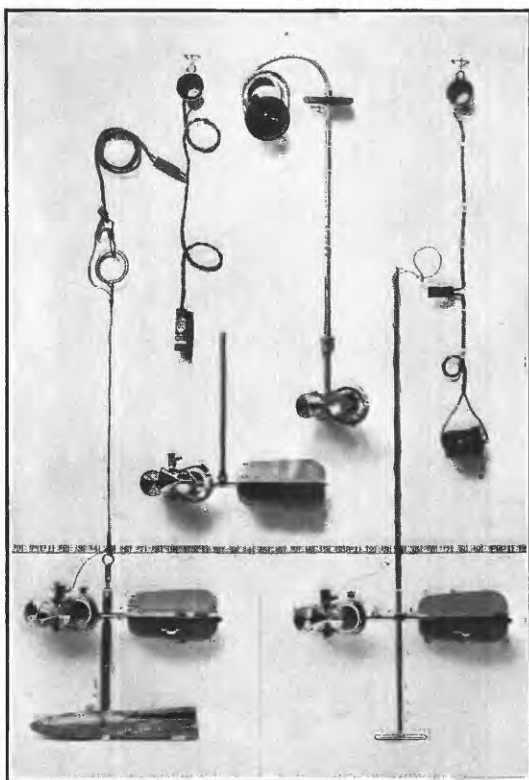
the preceding three months is stored, either as ground water, in the form of snow, or in lakes. This stored water passes off in the streams during the spring break-up. At the end of September the only stored water available for run-off in the streams is possibly a small amount held in ground storage. Therefore the run-off for a year, beginning with October 1 is practically all derived from precipitation occurring within that year.

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

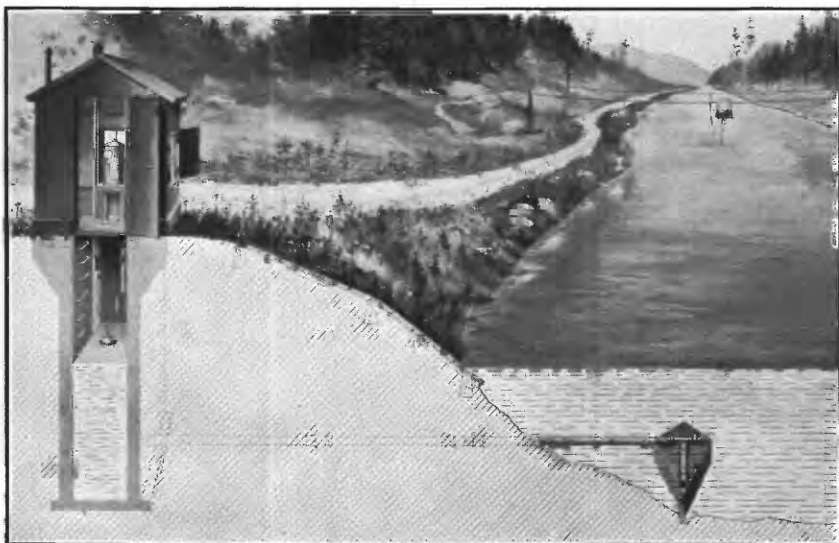
In addition to statements regarding the location and equipment of gaging stations the descriptions give information in regard to any conditions that may affect the constancy of the discharge relation, covering such points as ice, logging, shifting channels, and backwater; also information regarding diversions which decrease the total flow at the gage. Statements are also made regarding the accuracy of the data and computed results.

The table of daily gage height shows the daily fluctuations of the surface of the river as found from the mean of the gage readings taken each day, usually in the morning and in the evening, though at many stations only one reading is made each day. At many stations automatic gages are used, some of which give a continuous record of river stage in the form of a hydrograph and others a record printed at intervals, from which the mean daily gage height can be computed. The gage height given in the table represents the elevation of the surface of the water above the zero of the gage. When the discharge relation is affected by the presence of ice in the streams or by backwater from obstructions, all gage heights 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, in general somewhat below the lowest known flow, to avoid negative readings.

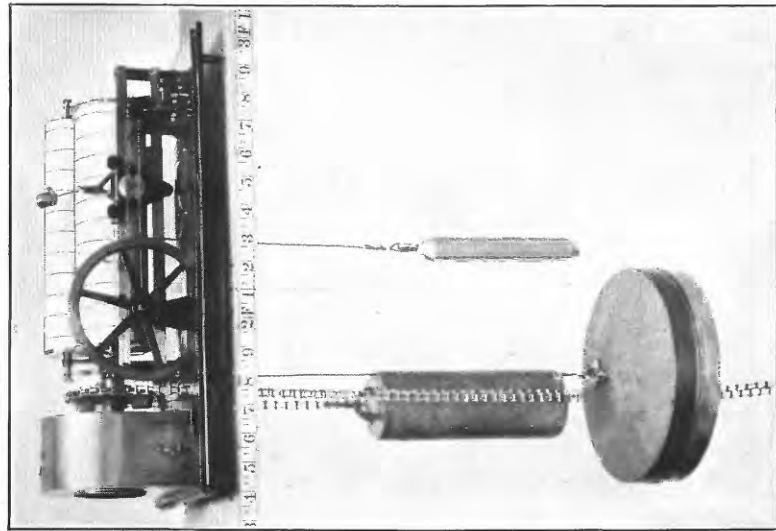
In the tables of daily gage height the use of zeros in the hundredths place indicates the degree of refinement to which the gage was read and to which the mean daily gage height was computed. If a gage is read to tenths or half-tenths once a day or to tenths twice a day, no zeros appear in the hundredths place for any stage. If the gage is read to half-tenths twice a day or to quarter-tenths or hundredths, regardless of the number of readings a day, the gage heights are published to hundredths, and zeros appear in the hundredths place, below a certain limiting stage. This limiting stage is so selected that the average error in the mean daily discharge, resulting from



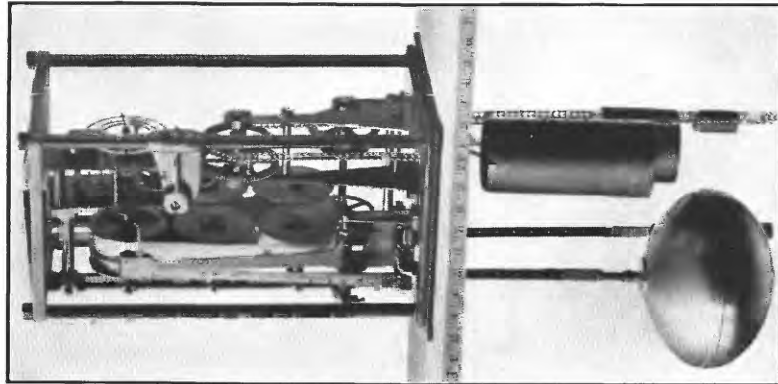
A. PRICE CURRENT METERS.



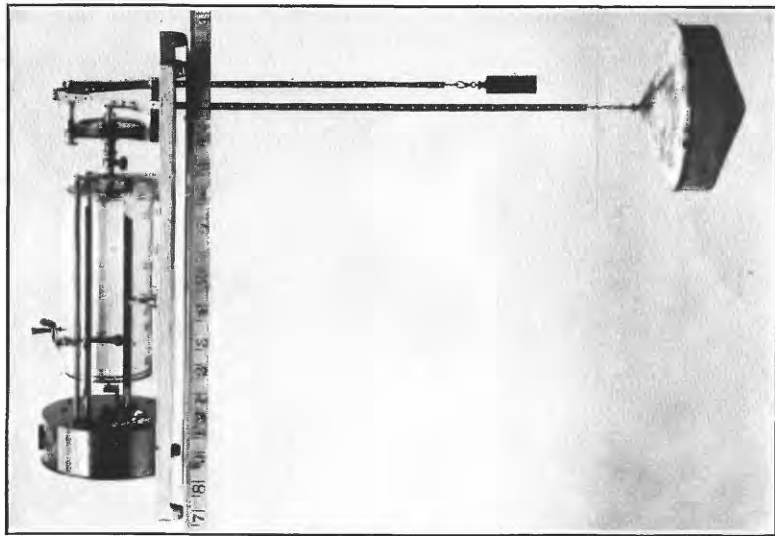
B. TYPICAL GAGING STATIONS.



A. STEVENS.



J. GURLEY.
AUTOMATIC GAGES.



C. FRIEZ.

not using the mean daily gage height to hundredths above that stage, shall not be greater than 2 per cent. For automatic gages the allowable average error of the daily discharge has been taken as 1 per cent. The selection of the percentage is arbitrary, but it should be noted that the maximum error will in all cases be twice the average error. In like manner half-tenths are used from the hundredths limit to another higher limit, above which only tenths are used. It is the aim to have the gage height observations at each gaging station recorded to the degree of refinement required by the above method of use, but in practice it is found necessary, in order to avoid confusion in the gage-observer's record, to have the observations for all stages recorded to the degree of refinement required for low stages, which usually necessitates readings to hundredths of a foot.

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

The base data presented in this report, unless otherwise stated in the descriptions of stations, have been collected by the methods commonly used at current-meter gaging stations and described in standard textbooks. (See Pls. I and II.)

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

The table of daily discharge determined from the gage height and rating tables gives the discharge in second-feet corresponding to the means of the gage readings observed each day. At some stations subject to rapid or diurnal fluctuation the discharge obtained from the rating table and the mean daily gage height may not be the true mean discharge for the day. When such stations are equipped with automatic gages, the true mean daily discharge may be obtained by weighting discharges for parts of the day.

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 6 and 7, are based.

ACCURACY OF FIELD DATA AND COMPUTED RESULTS.

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

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 estimate of maximum or minimum discharge nor to that for any one day, but to the monthly mean. It is based on the accuracy of the rating curve, the probable reliability of the observer, the number of gage readings per day, the range of the fluctuation in stage, and knowledge of local conditions. In this column A indicates that the mean monthly flow is probably accurate within 5 per cent; B, within 10 per cent; C, within 15 per cent; D, within 25 per cent. Special conditions are covered by footnotes.

Even though the monthly means for any station may represent with a high degree of accuracy the quantity of water flowing past the gage, the figures showing discharge per square mile and depth of run-off in inches may be subject to gross errors which result from including in the measured drainage area large noncontributing districts or omitting estimates of water diverted for irrigation or other use. On this account computations of "second-feet per square mile" and "run-off (depth in inches)" have not been made for streams draining areas in which the annual rainfall is less than 20 inches nor for streams draining areas in which the precipitation exceeds 20 inches if such computations might be uncertain or misleading because of the presence of large noncontributing districts in the measured drainage area, because of the omission of estimates of water diverted for irrigation or other use, or because of artificial control or unusual natural control of the flow of the river above the gaging station. All values of "second-feet per square mile" and "run-off (depth in inches)" previously published by the Survey should be used with care because of possible inherent sources of error not known to the Survey.

In general the base data collected each year by the survey engineers are published not only to comply with the law but also to afford any engineer the means of analyzing in detail the results of the computations. The table of monthly discharge is so arranged as to give only a general idea of the flow at the station and should not be used for other than preliminary estimates; the tables of daily discharge allow more detailed studies of the variation in flow. It should be borne in mind, however, that the observations in each succeeding year may be expected to throw new light on data already collected and published.

COOPERATION.

All stations in New Mexico were maintained in cooperation with the State through Mr. James A. French, State engineer.

The United States Reclamation Service furnished a large part of the money expended in the lower Pecos River valley and also rendered assistance in the Rio Colorado, Rio Hondo, and Rio Taos drainage basins.

The United States Forest Service aided in the collection of data on Rio Colorado, Rio Pueblo, Rio Lucero, Horn River, Rio Vallecitos, South Fork of Gallinas River, and Stevens Creek.

The United States Indian Office bore part of the expense on Rio Pueblo and Rio Lucero.

The Arlington Land Co., through its chief engineer, Mr. H. I. Reid, gave valuable assistance in maintaining the stations in Chama River basin.

The Chino Copper Co. bore a large part of the expense of the stations on Lampbright Draw, Whitewater Creek, Cameron Creek, and Rio de Arena.

W. S. Post, of Los Angeles, Cal., paid the salaries of the observers on Bluewater Creek.

DIVISION OF WORK.

The field data for the Rio Grande drainage basin in New Mexico were collected, under the direction of Glenn A. Gray, district engineer, by C. J. Emerson, W. R. King, F. O'Brien, J. E. Powers, E. L. Redding, R. S. Watrous, R. J. Hank, and J. E. Quinlan.

Ratings and computations were made by Glenn A. Gray, assisted by W. R. King and C. J. Emerson.

The manuscript was prepared by H. J. Dean and edited by Mrs. B. D. Wood.

STATION RECORDS.

RIO GRANDE BASIN.

RIO GRANDE AT EMBUDO, N. MEX.

Location.—Near sec. 27, T. 23 N., R. 9 E., 100 feet below the Santa Barbara Tie & Pole Co.'s bridge, a few hundred feet below the Denver & Rio Grande Railroad eating house at Embudo, a short distance above the mouth of the box canyon. Nearest tributary, Embudo Creek, joins the Rio Grande about 3 miles above the station.

Records available.—January 1, 1889, to December 31, 1903; September 8, 1912, to September 30, 1914.

Drainage area.—Approximately 10,100 square miles.

Gage.—Friez, automatic recording. From January 1, 1889, to December 31, 1903, an inclined staff gage was used about 1,500 feet above the present gage. On September 8, 1912, an automatic gage was installed which was referred to a new datum. Old records do not show a change in datum from 1889 to 1903. On June 20, 1914, the automatic gage was moved from the wagon bridge to a point on the right bank, about 100 feet downstream and referred to the same datum.

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

Discharge measurements.—Made by wading at low stages and from car at high and medium stages.

Winter flow.—Very slightly affected by ice.

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

Accuracy.—Estimates of daily discharge good.

Discharge measurements of Rio Grande at Embudo, N. Mex., during the year ending Sept. 30, 1914.

Date.	Made by—	Gage height.	Dis-charge.	Date.	Made by—	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Oct. 6	J. E. Powers	3.00	612	Mar. 26	R. S. Watrous	3.60	875
22	Frank O'Brien	3.26	806	Apr. 15	J. E. Powers	4.08	1,340
27	J. E. Powers	3.15	706	May 14	Gray and Watrous	6.20	3,790
Nov. 4	.....do.....	3.30	826	May 25	J. E. Powers	7.00	5,410
Dec. 17	.....do.....	^a 2.73	490	July 15	.....do.....	2.93	639
Jan. 27	.....do.....	2.83	524	Sept. 1	.....do.....	4.03	1,220
Mar. 2	.....do.....	3.00	658	Sept. 14	R. S. Watrous	3.28	812
17	Gray and King	3.39	738				

^a Discharge relation affected by ice.

Daily gage height, in feet, of Rio Grande at Embudo, N. Mex., for the year ending Sept. 30, 1914.

[H. W. Wallace, observer.]

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	2.50	3.12	2.98	2.72	2.83	2.91	3.69	4.41	6.80	3.54	4.99	4.02
2.....	3.87	3.20	2.89	2.70	2.82	3.08	3.65	4.41	7.30	3.47	4.90	4.02
3.....	2.82	3.26	2.89	2.69	2.75	3.16	3.63	4.38	7.71	3.45	4.88	3.95
4.....	2.83	3.31	2.88	2.63	2.74	3.04	3.64	4.38	7.80	3.42	4.79	3.82
5.....	2.85	3.32	2.95	2.60	2.73	2.96	3.70	4.39	^a 7.84	3.38	4.65	3.70
6.....	2.96	3.42	2.66	2.64	2.75	3.03	3.88	4.45	7.70	3.29	4.60	3.57
7.....	2.99	3.50	2.52	2.64	2.70	3.09	3.95	4.58	7.45	3.39	4.51	3.47
8.....	3.17	3.51	2.55	2.64	2.77	3.10	4.02	4.72	7.08	3.38	4.55	3.36
9.....	3.20	3.39	2.54	2.68	2.75	3.12	4.12	5.02	6.65	3.55	4.30	3.31
10.....	3.24	3.21	2.32	2.66	2.80	3.18	4.11	5.36	6.19	3.40	4.09	3.27
11.....	3.25	3.14	2.43	2.65	2.80	3.17	4.08	5.84	5.74	3.26	4.19	3.21
12.....	3.23	3.09	2.35	2.75	2.81	3.15	4.01	6.20	5.26	3.20	4.05	3.31
13.....	3.30	3.04	2.58	2.66	2.75	3.15	3.90	6.24	4.99	3.29	3.92	3.43
14.....	3.35	3.03	2.58	2.67	2.81	3.27	3.94	6.23	5.07	3.14	3.76	3.32
15.....	3.36	3.00	2.68	2.66	2.76	3.30	4.08	6.18	5.13	2.98	3.54	3.41
16.....	3.36	3.00	2.78	2.70	2.77	3.33	4.18	6.03	4.92	2.88	3.35	3.84
17.....	3.37	3.01	2.78	2.70	2.80	3.38	4.13	5.82	5.24	3.10	3.20	4.00
18.....	3.35	3.00	2.78	2.72	2.83	3.50	4.09	5.64	5.84	3.45	3.08	4.11
19.....	3.31	2.97	2.70	2.69	2.90	3.57	4.11	5.61	5.90	3.62	3.04	4.10
20.....	3.28	2.96	2.70	2.69	2.86	3.61	4.12	5.64	5.94	4.04	2.99	3.98
21.....	3.25	3.00	2.70	2.72	2.96	3.69	4.11	5.66	.....	4.12	2.90	4.03
22.....	3.25	3.06	2.65	2.73	3.06	3.56	4.16	5.74	6.58	5.18	2.94	4.11
23.....	3.24	3.07	2.55	2.85	3.03	3.70	4.38	5.98	6.63	5.47	3.09	4.14
24.....	3.22	3.09	2.60	2.84	2.95	3.60	4.42	6.48	6.45	5.59	3.03	4.21
25.....	3.21	3.16	2.70	2.84	2.86	3.48	4.40	6.91	6.04	5.64	3.09	4.22
26.....	3.18	3.03	2.70	2.84	2.97	3.53	4.36	7.12	5.57	5.54	3.29	4.20
27.....	3.11	2.99	2.70	2.86	2.96	3.63	4.27	6.93	5.10	5.44	3.52	4.15
28.....	3.15	2.97	2.60	2.98	2.86	3.60	4.28	6.78	4.56	5.35	3.50	4.01
29.....	3.16	3.04	2.56	2.81	.....	3.63	4.15	6.72	4.12	5.26	3.67	3.92
30.....	3.10	3.02	2.60	2.79	.....	3.67	4.10	6.62	3.72	5.17	3.92	3.86
31.....	3.08	.....	2.88	2.74	.....	3.70	.....	6.48	.....	5.08	3.99	.....

^a Maximum gage height 7.9 feet.

NOTE.—Discharge relation slightly affected by ice Dec. 12 to Jan. 3. Gage heights June 15–20 and July 25 to Aug. 2 obtained from one reading a day made by the observer.

Daily discharge, in second-feet, of Rio Grande at Embudo, N. Mex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	360	693	594	434	535	604	933	1,670	4,320	1,020	2,260	1,220
2.....	524	752	535	429	530	705	906	1,670	5,420	975	2,170	1,220
3.....	496	794	535	429	496	756	893	1,640	6,610	961	2,150	1,180
4.....	498	835	529	405	492	668	960	1,640	6,880	940	2,060	1,080
5.....	515	839	568	401	487	610	940	1,650	7,000	913	1,920	1,000
6.....	578	912	424	421	501	639	1,070	1,700	6,580	860	1,850	920
7.....	601	974	366	425	477	662	1,120	1,830	6,160	927	1,760	866
8.....	725	981	379	429	510	656	1,180	1,970	5,370	920	1,800	866
9.....	747	890	378	451	501	656	1,260	2,270	4,420	1,040	1,370	787
10.....	778	755	309	446	525	680	1,250	2,650	3,760	933	1,390	774
11.....	788	704	341	446	530	662	1,250	3,240	3,100	846	1,450	749
12.....	772	667	320	492	535	639	1,220	3,780	2,540	866	1,340	813
13.....	823	637	385	451	506	627	1,150	3,850	2,240	866	1,230	893
14.....	859	625	385	455	535	686	1,210	3,830	2,330	768	1,100	819
15.....	868	605	400	451	510	693	1,340	3,750	2,390	668	947	880
16.....	869	606	490	468	520	699	1,420	3,520	2,200	599	800	1,190
17.....	875	613	490	468	535	730	1,380	3,210	2,550	730	705	1,320
18.....	862	604	490	477	551	806	1,350	2,970	3,280	961	633	1,410
19.....	837	585	400	464	588	853	1,370	2,930	3,360	1,080	610	1,400
20.....	811	579	400	464	566	880	1,380	2,970	3,420	1,420	582	1,300
21.....	786	609	400	477	627	933	1,370	3,000	3,990	1,460	520	1,340
22.....	786	647	390	482	686	846	1,410	3,100	4,560	2,510	540	1,410
23.....	778	657	360	540	668	940	1,600	3,440	4,670	2,840	621	1,430
24.....	767	666	380	535	621	873	1,630	4,280	4,300	2,980	588	1,490
25.....	758	677	400	535	572	793	1,620	5,200	3,590	3,050	621	1,500
26.....	742	623	400	535	639	826	1,580	5,230	2,960	2,900	724	1,480
27.....	684	598	400	546	633	893	1,500	4,800	2,430	2,780	873	1,440
28.....	713	587	380	610	577	873	1,510	4,480	1,870	2,680	860	1,330
29.....	718	632	350	520	.....	893	1,400	4,360	1,460	2,580	975	1,260
30.....	678	620	370	510	.....	920	1,360	4,170	1,140	2,480	1,160	1,210
31.....	659	.....	400	487	.....	940	.....	3,920	.....	2,380	1,220	.....

NOTE.—Daily discharge determined as follows: Dec. 12 to Jan. 3, estimated, on account of ice; Oct. 1 to Dec. 11, Jan. 11–31, May 1–25, and Sept. 12–30, from two well-defined rating curves; other periods by indirect method for shifting channels; June 21, interpolated.

Monthly discharge of Rio Grande at Embudo, N. Mex., for the year ending Sept. 30, 1914.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
October.....	875	360	718	44,100	A.
November.....	981	579	699	41,600	A.
December.....	594	309	418	25,700	C.
January.....	610	401	474	29,100	B.
February.....	686	477	552	30,700	B.
March.....	940	604	763	46,900	C.
April.....	1,650	913	1,280	76,200	C.
May.....	5,230	1,640	3,180	196,000	B.
June.....	7,000	1,140	3,830	228,000	C.
July.....	3,050	599	1,510	92,800	B.
August.....	2,260	520	1,190	73,200	B.
September.....	1,500	749	1,150	68,400	B.
The year.....	7,000	309	1,320	953,000	

RIO GRANDE NEAR BUCKMAN, N. MEX.¹

Location.—About sec. 18, T. 19 N., R. 8 E., at the Denver & Rio Grande Railroad bridge 2 miles below the Indian village of San Ildefonso and 4 miles above Buckman. Nearest tributary is Tesuque Creek, which enters near San Ildefonso; there is an arroyo just above the station.

Records available.—February 1, 1895, to December 31, 1905; June 23, 1909, to September 30, 1914.

Drainage area.—Not measured.

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

Channel.—Shifting during low water but fairly permanent at medium and high stages.

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

Winter flow.—Only slightly affected by ice.

Diversions.—Many large and small ditches divert water for irrigation above the station.

Accuracy.—Estimates of daily discharge good.

Discharge measurements of Rio Grande near Buckman, N. Mex., during the year ending Sept. 30, 1914.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Oct. 23	Gray and King.....	2.97	888	Apr. 21	King and Powers.....	5.17	3,510
27	.....do.....	2.88	802	May 12	.....do.....	7.51	8,050
Nov. 6	Gray and Emerson.....	3.08	907	June 1	.....do.....	6.42	5,590
Dec. 1	King and Powers.....	2.90	792	30	Powers and Watrous....	3.23	1,300
31	Emerson and Powers....	2.53	563	July 28	Powers and Hank.....	5.25	4,310
Jan. 15	Emerson and Watrous....	2.52	476	Aug. 1	.....do.....	4.60	3,060
15	.....do.....	2.52	493	25	.....do.....	3.45	806
Feb. 7	.....do.....	2.42	495	Sept. 12	Watrous and Hank.....	3.52	796
Mar. 4	J. E. Powers.....	3.36	1,230	24	W. R. King.....	4.48	1,760
30	C. J. Emerson.....	3.69	1,530				

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

Daily gage height, in feet, of Rio Grande near Buckman, N. Mex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	3.81	2.81	2.90	2.71	2.81	3.14	3.55	5.39	6.69	3.27	4.55	4.26
2.....	3.05	2.82	2.79	2.75	2.82	3.94	3.50	5.50	7.14	3.03	4.41	4.24
3.....	3.00	3.06	2.79	2.75	2.81	4.34	3.56	5.22	7.35	2.96	4.56	4.17
4.....	2.99	3.56	2.81	2.75	2.75	3.53	3.71	5.06	7.35	3.45	4.96	4.11
5.....	2.99	3.18	2.82	2.73	2.72	3.29	4.02	5.05	7.23	3.40	4.93	4.01
6.....	2.99	3.08	2.71	2.73	2.68	3.50	4.35	5.31	7.04	3.32	4.69	3.92
7.....	2.99	3.05	2.53	2.80	2.62	3.47	4.62	5.58	6.86	3.29	4.54	3.84
8.....	2.99	3.11	2.62	2.75	.....	3.48	4.66	5.99	6.50	3.08	4.48	3.72
9.....	2.99	3.12	2.65	2.75	.....	3.62	4.55	6.65	6.05	3.34	4.65	3.68
10.....	2.97	3.00	2.60	2.77	.....	3.70	4.47	7.22	5.64	2.99	4.57	3.65
11.....	2.97	2.90	2.54	2.80	.....	3.62	4.46	7.35	5.22	2.86	4.68	3.60
12.....	2.97	2.89	2.49	2.80	.....	3.42	4.54	7.49	4.84	2.81	4.50	3.98
13.....	2.97	2.88	2.41	2.86	2.70	3.46	4.46	7.39	4.73	2.78	4.36	3.95
14.....	2.97	2.86	2.39	2.80	2.72	3.23	4.54	7.28	4.69	^b 4.01	4.16	3.85
15.....	2.97	2.82	2.37	2.65	2.68	3.41	4.65	7.26	4.72	.....	.....	4.15
16.....	2.97	2.82	2.40	2.65	2.68	3.56	4.85	7.22	4.81	.....	.....	4.30
17.....	2.97	2.82	2.40	2.80	2.73	3.70	5.03	6.97	5.06	.....	.....	4.40
18.....	2.97	2.83	2.40	2.86	2.77	3.96	4.79	6.80	5.36	.....	.....	4.41
19.....	2.97	2.84	2.40	2.85	2.80	4.03	4.66	6.66	5.43	.....	.....	4.42
20.....	2.97	2.86	2.40	2.80	2.86	3.98	4.80	6.57	5.45	.....	.....	4.41
21.....	2.97	2.90	2.40	2.81	2.89	3.80	5.14	6.55	5.53	.....	.....	4.42
22.....	2.97	2.92	2.45	2.84	3.38	3.70	5.32	6.60	5.55	.....	.....	4.48
23.....	2.96	2.95	2.45	2.94	3.90	3.50	5.49	6.69	5.50	.....	.....	4.47
24.....	2.92	2.95	2.50	2.90	3.39	3.57	5.45	7.17	5.21	.....	.....	4.48
25.....	2.91	2.98	2.50	2.84	3.09	3.57	5.21	^a 7.65	4.77	.....	3.48	4.47
26.....	2.90	2.95	2.50	2.88	3.05	3.49	5.32	7.45	4.31	.....	3.47	4.41
27.....	2.88	2.95	2.50	2.93	3.08	3.55	5.38	7.17	.....	.....	3.70	4.38
28.....	2.85	2.93	2.50	3.05	3.01	3.62	5.22	6.99	.....	5.26	3.77	4.33
29.....	2.88	2.90	2.50	2.89	.....	3.66	5.07	6.75	.....	5.13	3.81	4.21
30.....	2.89	2.90	2.50	2.89	.....	3.67	4.89	6.59	3.22	5.26	3.98	4.14
31.....	2.85	.....	2.53	2.84	.....	3.62	.....	6.43	.....	4.78	4.23	.....

^a Maximum gage height, 7.9 feet.

^b Maximum gage height, 6.6 feet.

NOTE.—Discharge relation slightly affected by ice Dec. 18 to Feb. 7.

STATION RECORDS.

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Daily discharge, in second-feet, of Rio Grande near Buckman, N. Mex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	1,230	754	790	590	662	1,010	1,390	3,860	6,140	1,340	2,990	1,510
2.....	733	754	724	618	669	1,810	1,340	4,030	7,110	1,120	2,760	1,490
3.....	721	906	724	618	662	2,290	1,400	3,610	7,620	1,060	2,910	1,410
4.....	715	1,250	736	618	618	1,370	1,550	3,370	8,000	1,520	3,460	1,340
5.....	733	983	742	604	597	1,150	1,900	3,360	7,690	1,470	3,350	1,250
6.....	733	907	676	604	570	1,340	2,400	3,740	7,230	1,390	2,950	1,170
7.....	751	885	568	654	530	1,310	2,760	4,150	6,820	1,360	2,690	1,080
8.....	751	927	622	618	550	1,320	2,810	4,810	6,060	1,170	2,560	978
9.....	769	934	640	618	570	1,460	2,660	6,060	5,180	1,410	2,740	934
10.....	757	850	610	633	590	1,540	2,560	7,300	4,480	1,090	2,590	909
11.....	775	790	574	654	610	1,460	2,550	7,620	3,840	978	2,690	868
12.....	775	784	545	654	630	1,270	2,650	7,970	3,280	938	2,410	1,190
13.....	793	778	505	700	654	1,300	2,550	7,720	3,120	914	2,190	1,170
14.....	793	766	495	654	669	1,090	2,650	7,440	3,070	2,160	1,900	1,070
15.....	811	742	485	550	640	1,260	2,800	7,390	3,110	1,690	1,800	1,360
16.....	811	742	500	550	640	1,400	3,080	7,300	3,230	1,300	1,700	1,510
17.....	829	742	500	654	677	1,540	3,330	6,730	3,600	1,560	1,600	1,630
18.....	829	748	480	700	707	1,830	3,000	6,370	4,040	1,580	1,500	1,640
19.....	847	754	480	692	730	1,920	2,810	6,080	4,150	2,240	1,400	1,660
20.....	847	766	480	654	779	1,860	3,010	5,890	4,180	2,630	1,300	1,650
21.....	865	790	490	662	803	1,650	3,490	5,850	4,310	2,530	1,200	1,670
22.....	888	802	500	684	1,230	1,540	3,760	5,950	4,340	3,680	1,100	1,740
23.....	878	820	500	762	1,760	1,340	4,020	6,140	4,260	3,980	1,010	1,740
24.....	850	820	530	730	1,240	1,410	3,960	7,180	3,820	3,520	920	1,760
25.....	840	838	530	684	969	1,410	3,600	8,410	3,180	3,630	827	1,740
26.....	825	820	530	715	935	1,330	3,760	7,870	2,550	4,360	819	1,660
27.....	802	820	540	754	961	1,390	3,850	7,160	2,030	3,970	1,010	1,630
28.....	790	808	550	852	901	1,460	3,610	6,780	1,730	4,330	1,060	1,560
29.....	802	790	555	722	.....	1,500	3,390	6,260	1,470	4,060	1,100	1,430
30.....	808	790	560	722	.....	1,510	3,140	5,930	1,290	4,200	1,250	1,360
31.....	778	.....	563	684	.....	1,460	.....	5,610	.....	3,400	1,490	.....

NOTE.—Daily discharge determined as follows: Dec. 18 to Feb. 7 estimated on account of ice; Nov. 7 to Dec. 17 and Feb. 13 to June 3, from three well-defined rating curves; remainder of year by indirect method for shifting channels; interpolated or estimated on days for which gage heights are missing.

Monthly discharge of Rio Grande near Buckman, N. Mex., for the year ending Sept. 30, 1914.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
October.....	1,230	715	811	49,900	B.
November.....	1,250	742	829	49,300	B.
December.....	790	480	572	35,200	B.
January.....	852	550	665	40,900	C.
February.....	1,760	530	770	42,800	B.
March.....	2,290	1,010	1,470	90,400	B.
April.....	4,020	1,340	2,860	170,000	B.
May.....	8,410	3,360	6,060	373,000	B.
June.....	8,000	1,290	4,360	259,000	C.
July.....	4,360	914	2,280	140,000	C.
August.....	3,460	819	1,910	117,000	C.
September.....	1,760	868	1,400	83,300	B.
The year.....	8,410	480	2,010	1,450,000	

RIO GRANDE NEAR SAN MARCIAL, N. MEX.

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

Records available.—January 29, 1895, to September 30, 1914.

Drainage area.—Not measured.

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

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

Discharge measurements.—Made from downstream side of bridge.

Diversions.—Water is diverted above this point for irrigation.

Cooperation.—Records from October to March furnished by the American section of the International Boundary Commission and from April to September by the United States Reclamation Service.

Discharge measurements of Rio Grande near San Marcial, N. Mex., during the year ending Sept. 30, 1914.

[By King, Teeter, and Mitchell.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Oct. 3.....	9.5	129	Feb. 6.....	11.3	573	June 13.....	11.6	3,157
5.....	14.5	6,338	9.....	11.3	571	16.....	11.4	2,367
8.....	10.3	392	12.....	11.3	469	19.....	11.85	2,790
11.....	10.2	295	15.....	11.3	528	22.....	12.04	2,783
14.....	9.9	264	18.....	11.6	875	24.....	12.0	2,775
17.....	9.9	345	21.....	11.9	1,650	27.....	11.93	2,722
20.....	10.0	355	23.....	11.7	1,051	27.....	11.92	2,769
23.....	9.9	332	26.....	11.6	1,334	30.....	11.3	1,374
26.....	9.8	307	28.....	11.3	771	July 3.....	11.1	844
29.....	9.9	362	Mar. 4.....	11.5	713	6.....	11.6	2,417
31.....	9.9	332	7.....	11.5	1,012	9.....	10.8	1,117
Nov. 3.....	10.1	481	10.....	11.4	1,038	13.....	10.8	624
6.....	11.2	1,226	13.....	11.7	1,320	14.....	10.7	560
9.....	10.2	538	16.....	11.4	1,015	17.....	10.8	651
12.....	10.5	605	19.....	11.2	717	18.....	11.3	1,172
15.....	10.2	519	22.....	11.7	1,520	19.....	12.8	5,027
18.....	10.3	529	25.....	11.2	877	23.....	12.05	2,658
21.....	10.3	566	28.....	11.4	1,072	24.....	13.7	8,375
24.....	10.5	696	31.....	11.6	1,344	27.....	12.4	3,503
27.....	10.8	726	Apr. 3.....	11.4	1,036	29.....	13.2	5,782
30.....	10.7	691	6.....	11.4	1,099	31.....	12.6	4,608
Dec. 3.....	10.7	689	9.....	12.3	2,497	Aug. 3.....	11.7	2,188
6.....	10.9	787	12.....	12.0	2,410	6.....	12.45	3,642
9.....	10.8	601	15.....	11.7	1,938	10.....	11.45	1,582
12.....	10.8	400	18.....	12.0	2,195	13.....	11.66	1,810
15.....	10.8	359	21.....	11.7	1,767	17.....	10.5	536
18.....	10.8	267	24.....	12.1	2,120	20.....	10.7	563
22.....	11.0	168	27.....	12.2	2,860	24.....	11.25	1,158
25.....	10.6	71	30.....	12.0	2,396	27.....	10.48	410
28.....	11.2	445	May 3.....	12.1	2,613	30.....	11.30	228
31.....	11.2	495	6.....	11.9	2,190	Sept. 2.....	10.35	280
Jan. 3.....	11.6	1,145	9.....	12.0	2,275	5.....	10.55	355
6.....	11.4	1,024	12.....	13.2	5,611	8.....	10.6	420
9.....	11.1	602	15.....	13.2	6,006	11.....	10.57	390
12.....	11.2	559	18.....	12.8	5,518	12.....	11.1	886
15.....	11.4	448	21.....	12.3	4,612	16.....	10.65	381
18.....	11.4	495	25.....	12.5	4,902	19.....	10.85	516
21.....	11.4	506	28.....	12.8	5,790	22.....	11.4	1,000
24.....	11.4	567	31.....	12.4	4,871	25.....	11.55	1,119
28.....	11.4	589	June 4.....	12.8	5,613	28.....	11.45	870
31.....	11.7	766	7.....	12.6	5,209			
Feb. 3.....	11.2	518	10.....	12.1	4,601			

Daily gage height, in feet, of Rio Grande near San Marcial, N. Mex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	9.75	10.05	10.65	11.15	11.45	11.45	11.5	11.95	12.5	11.05	12.45	10.45
2.....	9.65	10.0	10.75	11.2	11.3	11.4	11.4	11.95	12.55	11.1	11.9	10.4
3.....	9.5	10.05	10.7	11.5	11.25	11.4	11.4	12.05	12.4	11.1	11.75	10.4
4.....	9.75	10.15	10.75	11.65	11.25	11.5	11.5	12.25	12.7	11.25	11.95	10.5
5.....	13.85	10.15	10.8	11.55	11.35	12.1	11.4	12.05	12.85	11.65	12.95	10.55
6.....	11.8	10.9	10.85	11.4	11.3	11.75	11.5	11.9	12.7	11.65	12.2	10.55
7.....	11.35	10.35	10.85	11.25	11.25	11.55	11.45	11.85	12.65	11.25	11.6	10.55
8.....	10.55	10.25	10.9	11.1	11.3	11.4	11.4	11.85	12.45	11.15	11.65	10.6
9.....	10.1	10.2	10.8	11.1	11.25	11.35	11.9	12.0	12.3	10.7	11.3	10.45
10.....	10.0	10.15	10.75	11.15	11.4	11.4	12.05	12.4	12.2	10.85	11.4	10.45
11.....	10.15	10.15	10.8	11.2	11.35	11.5	11.95	12.6	12.05	10.8	11.2	10.65
12.....	9.95	10.35	10.8	11.2	11.25	11.45	12.0	13.2	11.8	11.1	11.4	11.0
13.....	9.95	10.35	10.85	11.2	11.3	11.65	12.0	12.95	11.6	10.7	11.7	10.7
14.....	9.9	10.3	10.8	11.25	11.3	11.6	11.9	13.0	11.5	10.6	10.95	10.6
15.....	9.8	10.2	10.85	11.35	11.35	11.45	11.75	13.2	11.35	10.55	10.8	10.3
16.....	9.8	10.3	10.8	11.35	11.35	11.4	11.7	13.2	11.4	10.5	10.65	10.65
17.....	9.95	10.3	10.85	11.45	11.4	11.4	11.75	13.0	11.5	10.9	10.5	10.8
18.....	9.9	10.25	10.75	11.4	11.55	11.35	11.95	12.8	11.5	11.3	10.3	10.8
19.....	9.8	10.35	10.75	11.3	11.45	11.25	11.9	12.5	11.8	12.8	10.3	10.85
20.....	9.95	10.4	10.8	11.35	11.4	11.2	11.85	12.55	11.65	12.25	10.55	10.85
21.....	10.0	10.3	10.85	11.4	12.1	11.65	11.7	12.3	12.0	12.4	10.4	11.0
22.....	9.95	10.35	10.95	11.35	11.35	11.75	11.65	12.3	12.0	12.0	10.55	11.35
23.....	9.9	10.4	10.85	11.25	11.6	11.55	11.75	12.4	12.15	12.25	11.05	11.3
24.....	9.85	10.5	10.7	11.4	11.4	11.35	12.1	12.3	12.0	12.9	11.15	11.4
25.....	9.9	10.45	10.55	11.4	11.45	11.2	12.1	12.5	12.1	13.45	10.85	11.55
26.....	9.8	10.55	10.5	11.35	11.55	11.2	12.1	12.7	11.95	12.45	10.6	11.4
27.....	9.8	10.7	10.55	11.4	11.45	11.25	12.1	12.8	11.85	12.4	10.45	11.45
28.....	9.9	10.7	11.0	11.35	11.35	11.3	12.05	12.8	11.45	12.45	10.5	11.45
29.....	9.95	10.65	11.1	11.35	.....	11.35	12.05	12.7	11.15	13.35	10.35	11.4
30.....	9.9	10.7	11.2	11.4	.....	11.5	12.0	12.6	11.2	12.4	10.45	11.35
31.....	9.9	.....	11.15	11.6	.....	11.55	.....	12.3	.....	12.5	10.45	.....

Daily discharge, in second-feet, of Rio Grande near San Marcial, N. Mex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	175	445	665	475	645	855	1,210	2,175	5,235	1,210	4,300	310
2.....	155	405	715	495	570	745	1,040	2,175	5,325	1,045	2,740	α 265
3.....	α 130	α 445	α 690	α 1,080	α 545	680	α 1,035	α 2,615	5,050	α 885	α 2,190	305
4.....	255	515	715	1,170	545	α 715	1,100	2,900	α 5,600	1,350	2,875	325
5.....	α 5,040	515	740	1,110	600	1,910	1,030	2,695	5,875	2,600	5,475	α 355
6.....	1,720	α 1,020	α 765	α 1,020	α 575	1,390	α 1,100	α 2,190	5,600	α 2,415	α 3,640	370
7.....	1,320	640	715	850	555	α 1,090	1,050	2,145	α 5,210	2,000	2,050	360
8.....	α 610	570	695	680	575	970	1,000	2,140	4,940	1,675	2,050	α 420
9.....	310	α 540	α 600	α 600	α 555	965	α 2,500	α 2,275	4,735	α 1,115	1,350	320
10.....	260	525	515	595	575	α 1,040	2,635	3,385	α 4,600	1,100	α 1,440	295
11.....	α 280	525	465	590	525	1,130	2,545	4,500	4,240	1,100	1,275	α 395
12.....	270	α 570	α 400	α 560	α 450	1,090	α 2,410	α 5,610	3,640	1,200	1,600	α 745
13.....	270	560	400	495	490	α 1,270	2,400	4,770	α 3,160	α 625	α 2,005	505
14.....	α 265	545	370	450	510	1,220	2,100	5,040	2,775	α 560	925	420
15.....	270	α 520	α 375	α 430	α 555	1,070	α 1,940	α 6,005	2,200	520	750	230
16.....	300	530	230	445	585	α 1,020	1,875	6,000	α 2,365	500	710	α 380
17.....	α 350	530	305	500	645	1,020	1,940	5,760	2,750	α 650	α 535	445
18.....	345	α 520	α 255	α 495	α 820	940	α 2,195	α 5,520	2,750	α 1,170	440	450
19.....	335	550	220	470	705	α 790	2,120	4,975	α 2,790	α 5,025	440	α 515
20.....	α 350	575	195	490	650	715	2,045	5,065	2,750	3,550	α 505	525
21.....	355	α 565	170	α 505	α 2,050	1,440	α 1,765	α 4,610	2,780	4,100	500	660
22.....	345	605	α 160	510	660	α 1,600	1,720	4,610	α 2,780	2,950	540	α 1,000
23.....	α 330	640	130	500	α 940	1,330	1,810	4,755	2,775	α 3,330	950	925
24.....	320	α 695	95	α 565	745	1,070	α 2,120	4,610	α 2,755	α 5,965	α 1,060	1,005
25.....	330	690	α 60	570	965	α 875	2,490	α 4,900	2,770	7,925	795	α 1,120
26.....	α 305	700	50	560	α 1,280	875	2,730	5,490	2,750	3,900	530	745
27.....	320	α 715	75	580	1,050	925	α 2,860	5,790	α 2,770	α 3,600	α 365	850
28.....	350	700	α 330	α 575	α 865	α 975	2,630	α 5,790	2,650	3,900	410	α 870
29.....	α 370	685	420	560	.....	1,000	2,600	5,605	2,000	α 6,130	295	800
30.....	345	α 690	480	590	.....	1,210	α 2,395	5,420	α 1,375	4,200	α 380	770
31.....	α 330	.....	α 475	α 705	.....	α 1,280	.....	α 4,870	.....	α 4,300	360	.....

α See also discharge-measurement table.

Monthly discharge of Rio Grande near San Marcial, N. Mex., for the year ending Sept. 30, 1914.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October.....	5,040	130	539	33,144
November.....	1,620	405	591	35,167
December.....	765	50	406	24,942
January.....	1,170	430	620	38,122
February.....	2,050	450	722	40,086
March.....	1,910	680	1,071	65,862
April.....	2,860	1,000	1,946	115,720
May.....	6,005	2,140	4,335	266,562
June.....	5,875	1,375	3,566	212,225
July.....	7,925	500	2,600	159,850
August.....	5,475	295	1,403	86,243
September.....	1,120	230	556	33,085
The year.....	7,925	50	1,535	1,111,008

NOTE.—Entire record furnished by the International Boundary Commission and the United States Reclamation Service.

RIO GRANDE NEAR EL PASO, TEX.

Location.—At Courchesne's limekiln, 1 mile upstream from pumping house of the Smelter Co., 3 miles north of El Paso.

Records available.—May 10, 1889, to June 30, 1893, for station at old Fort Bliss, about 1,500 feet above the Mexican dam; January 25, 1895, to May 1, 1897, for station at pumping house of the Smelter Co.; May 1, 1897, to September 30, 1914, for present site.

Drainage area.—Not measured.

Gage.—A number of inclined gages have been used, located at slightly different points but referred to same datum. Gage at original site a vertical staff.

Channel.—Extremely shifting and subject to overflow.

Discharge measurements.—Made from car and cable.

Winter flow.—Discharge relation not affected by ice.

Diversions.—Many small diversions above station. The United States Reclamation Service is constructing a reservoir at Elephant Butte, which will have a capacity of 2,627,000 acre-feet, to be used in irrigating land in the Rio Grande valley.

Accuracy.—Owing to the shifting channel estimates of discharge are based almost entirely on discharge measurements made very frequently.

Cooperation.—From May 1, 1897, to March 31, 1914, the station was maintained and records were furnished by the United States section of the International Water Commission. Since August 1, 1914, the station has been maintained by the Commission for the Equitable Distribution of the Waters of the Rio Grande, by whom the records are furnished.

STATION RECORDS.

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Discharge measurements of Rio Grande near El Paso, Tex., during the year ending Sept. 30, 1914.

Date.	Made by—	Gage height.	Dis-charge.	Date.	Made by—	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Oct. 9	W. K. Homan	9.55	1,110	Jan. 28	W. C. Stewart	8.7	247
12	do	8.2	124	31	W. K. Homan	8.85	332
15	do	6.8	56	Feb. 3	W. C. Stewart	8.8	423
18	do	6.0	7	6	W. K. Homan	8.8	280
21	do	6.3	26	9	do	8.8	289
24	do	6.7	63	12	do	8.6	232
27	do	7.1	104	15	do	8.2	146
31	do	6.1	15	18	do	8.4	184
Nov. 3	W. C. Stewart	7.1	128	21	W. C. Stewart	8.9	432
6	W. K. Homan	6.9	84	24	W. K. Homan	9.5	890
9	do	7.95	361	28	W. C. Stewart	9.6	1,080
10	do	8.45	455	Mar. 3	do	9.1	543
13	do	8.1	212	6	do	8.85	326
16	do	8.2	260	9	do	9.75	1,232
19	do	8.3	298	12	do	8.85	436
22	do	8.3	240	15	do	8.9	608
25	do	8.35	368	18	do	8.8	624
28	do	8.7	508	21	do	8.95	403
30	do	8.8	519	24	do	9.6	1,050
Dec. 3	do	8.85	366	27	do	9.4	914
6	do	8.8	306	31	do	8.55	285
9	do	8.7	294	Aug. 3	do	10.9	3,184
12	do	8.6	298	7	do	10.7	2,480
15	do	8.6	276	10	do	9.9	1,800
18	do	8.75	393	13	do	9.05	745
21	do	8.85	440	17	do	8.75	378
24	do	9.1	570	20	do	8.15	124
27	do	8.8	256	24	do	8.6	386
31	do	7.95	102	28	do	8.4	288
Jan. 3	do	8.45	227	31	do	8.0	124
6	do	8.8	392	Sept. 3	do	7.35	23
8	do	9.6	1,014	7	do	7.3	19
10	do	9.05	637	11	do	7.1	7
13	do	8.8	307	15	do	7.35	8
16	do	8.6	339	19	do	7.95	98
19	W. C. Stewart	8.7	388	23	do	7.95	95
22	do	8.8	330	26	do	8.8	470
25	do	8.7	424	30	do	8.8	553

Daily gage height, in feet, of Rio Grande near El Paso, Tex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1		6.5	8.9	7.85	8.7	9.65					11.5	7.7
2		6.8	8.8	7.8	8.7	9.1					11.05	7.5
3		7.1	8.85	8.6	8.8	9.05					10.9	7.35
4		7.2	8.7	8.55	9.2	8.95					10.15	7.25
5		7.0	8.8	8.7	8.95	8.8					9.75	7.3
6		6.85	8.8	8.8	8.75	8.65					9.0	7.3
7		6.9	8.6	8.9	8.65	8.65					11.2	7.25
8	8.6	7.3	8.7	9.7	8.7	9.95					10.8	7.1
9	9.25	7.9	8.75	9.15	8.8	9.55					9.9	7.1
10	8.75	8.4	8.8	8.95	8.75	8.95					9.75	7.3
11	8.6	8.35	8.85	8.95	8.7	8.8					9.65	7.1
12	8.1	8.25	8.55	8.85	8.6	8.85					9.3	7.3
13	7.6	8.05	8.85	8.8	8.65	8.85					9.05	7.2
14	7.25	8.1	8.7	8.7	8.25	8.75					9.1	7.25
15	6.7	8.2	8.6	8.65	8.25	8.95					9.5	7.35
16	6.35	8.2	8.7	8.5	8.25	9.2					9.1	7.2
17	6.2	8.2	8.95	8.55	8.2	9.1					8.75	7.85
18	6.0	8.3	8.7	8.4	8.45	8.7					8.5	7.85
19	6.0	8.4	8.7	8.5	8.7	8.7					8.35	7.95
20	6.35	8.2	8.7	8.65	8.55	8.95					8.15	7.95
21	6.35	8.3	8.8	8.65	8.75	8.9					8.0	7.95
22	6.55	8.3	8.9	8.65	8.75	8.9					7.85	7.8
23	6.65	8.3	8.95	8.65	8.95	9.05					8.25	7.9
24	6.8	8.4	9.05	8.7	9.5	9.75					8.5	7.9
25	7.0	8.45	8.9	8.7	9.3	9.75					8.5	8.65
26	7.0	8.75	8.95	8.75	9.35	9.7					9.0	8.8
27	7.1	8.85	8.8	8.7	9.5	9.3					8.7	9.0
28	6.95	8.75	8.65	8.75	10.05	8.9					8.4	9.05
29	6.55	8.8	8.4	8.85		8.95					8.2	8.8
30	6.35	8.8	8.15	8.7		8.85					8.15	8.8
31	6.35		7.85	8.8		8.55					8.0	

NOTE.—No flow Oct. 1-7, 1913.

Daily discharge, in second-feet, of Rio Grande near El Paso, Tex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	0	60	500	75	285	1,130					4,040	80
2	0	95	405	65	325	545					3,400	50
3	0	a 130	a 365	a 295	a 425	a 490					a 3,180	a 30
4	0	150	280	275	725	435					2,210	15
5	0	105	315	345	445	330					1,690	20
6	0	a 75	a 305	a 390	a 255	a 245					715	20
7	0	85	220	440	210	245					a 3,980	a 15
8	415	190	280	a 1,080	235	1,340					2,560	5
9	a 890	a 345	a 320	705	a 290	a 1,060					1,800	5
10	525	a 420	360	a 570	275	530					a 1,670	20
11	415	385	405	515	260	395					1,490	a 5
12	a 120	315	a 275	395	a 230	a 435					1,060	10
13	95	a 190	415	a 305	240	480					a 745	5
14	75	210	335	300	155	460					805	10
15	a 50	260	a 275	320	a 155	a 650					1,290	a 10
16	30	a 260	355	a 290	155	880					805	5
17	20	260	550	315	145	835					a 380	70
18	a 5	300	a 370	240	a 210	a 565					275	80
19	5	a 340	370	a 290	330	460					210	a 100
20	30	240	370	325	255	510					a 125	100
21	a 30	260	a 415	290	a 360	a 375					100	100
22	50	a 240	465	a 255	360	405					70	80
23	60	275	490	305	460	565					240	a 90
24	a 75	350	a 545	375	a 890	a 1,150					a 350	90
25	95	a 410	360	a 425	770	1,150					335	405
26	95	530	410	390	835	1,120					580	a 470
27	a 105	570	a 255	305	975	a 840					435	560
28	90	a 530	230	a 275	a 1,420	545					a 290	600
29	55	540	185	330	580	580					205	535
30	35	a 520	140	245	505	505					185	a 555
31	a 35		a 85	a 305		a 285					a 125	

a See also discharge-measurement table.

Monthly discharge of Rio Grande near El Paso, Tex., for the year ending Sept. 30, 1914.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	890	0	110	6,744
November	570	60	288	17,138
December	550	85	344	21,124
January	1,080	65	356	21,888
February	1,420	145	417	23,157
March	1,340	245	630	38,757
August	4,040	70	1,140	70,105
September	600	5	138	8,212

RIO GRANDE ABOVE PRESIDIO, TEX.

Location.—At the Haciendita, 9 miles above Presidio, and 8 miles above the mouth of Rio Conchos, one of the principal tributaries of the Rio Grande. On September 26, 1905, the station was moved 8 miles farther upstream and maintained at that point until July 6, 1909, when it was removed to the original site. As no tributaries enter between the two points the flow is the same at both sites.

Records available.—May 22, 1900, to March 31, 1914.

Drainage area.—Not measured.

Gage.—Inclined staff. Relation between the gage readings at the two sites or between the two gages used at the present site not determined.

Channel.—Shifting greatly.

Discharge measurements.—Made from car and cable.

Diversions.—No data.

Accuracy.—Owing to the shifting channel estimates of daily discharge are based almost directly on discharge measurements made very frequently.

Cooperation.—Station maintained and the records furnished by the United States section of the International Water Commission.

Discharge measurements of Rio Grande above Presidio, Tex., during the year ending Sept. 30, 1914.

[Made by W. T. Millington.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Oct. 3.....	6.45	56	Jan. 6.....	6.8	83	Feb. 20.....	6.5	32
6.....	6.2	14	9.....	6.7	68	23.....	6.5	25
Nov. 26.....	6.6	44	12.....	6.3	46	27.....	6.5	29
29.....	6.6	40	15.....	7.4	142	Mar. 3.....	6.5	30
Dec. 3.....	6.9	76	18.....	7.4	149	6.....	7.55	224
6.....	7.1	110	21.....	7.0	93	9.....	7.4	175
9.....	7.4	192	24.....	6.9	74	12.....	7.0	127
12.....	7.2	152	27.....	6.9	65	15.....	7.6	261
15.....	7.1	124	30.....	6.8	48	18.....	7.6	283
18.....	7.3	163	Feb. 2.....	6.9	50	21.....	7.4	200
21.....	7.2	136	5.....	6.8	40	24.....	7.4	181
24.....	7.3	167	8.....	6.8	32	27.....	7.0	116
27.....	7.0	111	11.....	6.8	27	30.....	8.25	387
30.....	7.0	133	14.....	6.7	46			
Jan. 3.....	7.1	126	17.....	7.0	59			

Daily gage height, in feet, of Rio Grande above Presidio, Tex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.
1.....	5.85	.....	6.5	7.1	6.9	6.5	16.....	6.35	.....	7.15	7.35	6.85	7.5
2.....	7.0	.....	6.6	7.1	6.9	6.5	17.....	5.9	.....	7.2	7.0	6.9	7.6
3.....	6.9	.....	6.95	7.1	6.95	6.65	18.....	.....	.....	7.3	7.4	6.6	7.6
4.....	7.05	.....	7.2	6.8	6.95	7.2	19.....	.....	.....	7.35	7.3	6.55	7.35
5.....	6.0	.....	7.1	6.8	6.85	7.45	20.....	.....	.....	7.25	7.15	6.5	7.2
6.....	6.2	.....	7.1	6.8	6.8	7.55	21.....	.....	.....	7.2	7.0	6.5	7.4
7.....	5.95	.....	7.25	6.7	6.8	7.8	22.....	.....	.....	7.15	6.95	6.5	7.3
8.....	5.8	.....	7.35	6.7	6.8	7.65	23.....	.....	.....	7.15	6.9	6.5	7.45
9.....	.....	.....	7.4	6.7	6.8	7.4	24.....	.....	6.25	7.3	6.9	6.5	7.4
10.....	.....	.....	7.3	6.7	6.8	7.3	25.....	.....	6.55	7.25	6.9	6.5	7.1
11.....	.....	.....	7.25	6.4	6.8	7.1	26.....	.....	6.6	7.2	6.9	6.5	6.85
12.....	.....	.....	7.2	6.3	7.0	7.0	27.....	.....	6.6	7.0	6.9	6.5	7.0
13.....	.....	.....	7.1	6.65	6.85	7.25	28.....	.....	6.6	7.0	6.85	6.5	6.95
14.....	.....	.....	7.1	7.1	6.7	7.85	29.....	.....	6.6	7.0	6.8	.....	7.35
15.....	.....	.....	7.1	7.5	6.7	7.6	30.....	.....	6.5	7.0	6.8	.....	8.3
							31.....	.....	.....	7.0	6.7	.....	8.45

NOTE.—No flow on days for which no gage height is given.

Daily discharge, in second-feet, of Rio Grande above Presidio, Tex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.
1.....	10	0	35	140	50	30	16.....	25	0	135	140	50	250
2.....	235	0	45	135	a 50	30	17.....	10	0	145	105	a 55	275
3.....	a 200	0	a 80	a 125	55	a 55	18.....	0	0	a 165	a 150	40	a 285
4.....	250	0	125	85	55	160	19.....	0	0	175	135	35	210
5.....	10	0	110	85	a 45	205	20.....	0	0	150	115	a 30	165
6.....	a 15	0	a 110	a 85	35	a 225	21.....	0	0	a 135	a 95	30	a 200
7.....	10	0	150	70	35	305	22.....	0	0	120	85	25	180
8.....	5	0	175	70	a 30	200	23.....	0	0	120	75	a 25	195
9.....	0	0	a 190	a 70	30	a 175	24.....	0	25	a 165	a 75	25	a 180
10.....	0	0	170	70	30	165	25.....	0	40	155	70	25	135
11.....	0	0	160	50	a 25	140	26.....	0	a 45	145	70	30	90
12.....	0	0	a 150	a 45	65	a 125	27.....	0	45	a 110	a 65	a 30	a 115
13.....	0	0	125	75	55	180	28.....	0	40	115	55	30	105
14.....	0	0	125	115	a 45	315	29.....	0	a 40	125	50	.....	190
15.....	0	0	a 125	a 150	45	a 260	30.....	0	35	a 135	a 50	.....	a 395
							31.....	0	.....	140	40	.....	425

a See also discharge-measurement table.

Monthly discharge of Rio Grande above Presidio, Tex., for the year ending Sept. 30, 1914.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October.....	250	0	25	1,527
November.....	45	0	9	535
December.....	190	35	133	8,152
January.....	150	40	89	5,445
February.....	65	25	39	2,142
March.....	425	30	194	11,950
The period.....	.....	.....	.....	29,800

RIO GRANDE BELOW PRESIDIO, TEX.

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

Records available.—May 1, 1900, to September 30, 1914.

Drainage area.—Not measured.

Gage.—Inclined staff in main channel and vertical staff at the gravel hills to measure the overflow.

Channel.—Shifting sand, and is affected by an intermittent stream called Alamos Creek, which reaches the river one-fourth mile below station. This creek is subject to torrential floods which bring large quantities of bowlders and gravel into the Rio Grande, forming a temporary dam that remains, throwing backwater onto the gage, until a flood in the river scours it out. The channel overflows at gage height 13 feet to an extreme width of 750 feet, where gravel hills are found.

Discharge measurements.—Made in main channel from car and cable and in overflow section from boat.

Floods.—Below the mouth of the Rio Conchos the Rio Grande is subject to severe floods from this tributary. Since the records have been maintained the highest flood occurred September 11, 1904, reaching a stage of 26.35 feet and a discharge of 149,200 second-feet. On the same day the discharge above the Rio Conchos was only 2,600 second-feet.

Diversions.—No data.

Accuracy.—Owing to the shifting channel estimated daily discharge is based almost directly on frequent discharge measurements.

Cooperation.—Station maintained and records were furnished by the United States section of the International Water Commission until March 31, 1914. After August 10, 1914, station maintained and records furnished by the Commission for the Equitable Distribution of the Water of the Rio Grande.

The discharge at this station minus the discharge at the station above Presidio is the discharge of the Rio Conchos, except at rare intervals, when some rain water enters the Rio Grande from the north.

Discharge measurements of Rio Grande below Presidio, Tex., during the year ending Sept, 30, 1914.

[Made by W. T. Millington.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Oct. 4.....	8.6	792	Dec. 22.....	8.1	189	Mar. 13.....	7.6	283
7.....	8.4	420	25.....	8.1	254	16.....	7.9	344
10.....	8.2	289	28.....	8.1	237	19.....	7.8	280
13.....	8.0	234	31.....	8.1	247	22.....	7.9	331
16.....	8.6	748	Jan. 4.....	7.8	195	25.....	7.7	245
19.....	8.1	152	7.....	7.8	188	28.....	7.5	220
22.....	7.7	102	10.....	7.8	193	31.....	8.3	481
25.....	7.7	93	13.....	7.5	159	Aug. 10.....	11.0	5,182
28.....	7.7	82	16.....	8.2	426	13.....	11.05	5,361
31.....	7.6	75	19.....	8.0	271	16.....	11.5	6,621
Nov. 3.....	7.6	67	22.....	7.7	216	19.....	11.6	6,590
6.....	7.5	61	25.....	7.6	189	22.....	10.0	3,107
9.....	7.5	58	28.....	7.6	155	25.....	11.7	7,612
12.....	7.5	68	31.....	7.7	179	28.....	12.4	9,485
15.....	7.55	64	Feb. 3.....	7.6	151	31.....	13.75	11,331
18.....	7.65	63	6.....	7.6	146	Sept. 3.....	11.1	5,610
21.....	7.6	71	9.....	7.5	135	6.....	13.5	8,732
24.....	7.6	75	12.....	7.6	193	9.....	14.0	12,020
27.....	7.8	119	15.....	7.6	207	12.....	12.75	7,522
30.....	7.9	121	18.....	7.6	195	15.....	11.95	5,918
Dec. 4.....	8.2	159	21.....	7.4	160	18.....	12.3	6,065
7.....	8.2	177	24.....	7.4	158	21.....	11.35	4,835
10.....	8.25	215	28.....	7.4	181	24.....	10.4	4,270
13.....	8.1	194	Mar. 4.....	7.35	187	27.....	11.2	4,753
16.....	8.1	176	7.....	7.6	276	30.....	11.85	5,584
19.....	8.4	271	10.....	7.95	393			

α Rejected as too small.

Daily gage height, in feet, of Rio Grande below Presidio, Tex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	8.4	7.5	8.1	8.1	7.6	7.3						13.5
2.....	8.75	7.5	8.1	8.1	7.6	7.3						12.6
3.....	8.55	7.5	8.15	8.1	7.6	7.3						11.1
4.....	9.3	7.5	8.2	7.8	7.6	7.45						13.8
5.....	9.55	7.5	8.2	7.8	7.6	7.55						13.6
6.....	9.15	7.5	8.2	7.8	7.6	7.6						13.5
7.....	8.4	7.5	8.2	7.8	7.5	7.65						14.0
8.....	8.3	7.5	8.2	7.8	7.4	8.25						14.1
9.....	8.2	7.5	8.25	7.8	7.5	8.0						14.0
10.....	8.2	7.5	8.3	7.8	7.5	7.95					11.0	13.55
11.....	8.1	7.5	8.2	7.55	7.5	7.8					11.0	13.05
12.....	8.0	7.5	8.2	7.5	7.6	7.7					10.95	12.75
13.....	7.95	7.5	8.1	7.5	7.6	7.6					11.05	12.45
14.....	8.05	7.5	8.1	7.95	7.6	7.75					12.45	12.2
15.....	7.9	7.5	8.1	8.2	7.6	8.35					12.4	11.95
16.....	8.45	7.5	8.1	8.2	7.6	7.9					11.5	12.6
17.....	7.9	7.5	8.25	8.1	7.6	7.8					11.6	12.15
18.....	7.9	7.7	8.5	8.0	7.6	7.7					11.0	12.2
19.....	8.1	7.7	8.4	8.0	7.5	7.8					11.35	12.2
20.....	7.85	7.65	8.3	7.9	7.45	7.8					10.5	11.75
21.....	7.7	7.6	8.2	7.8	7.4	7.8					10.3	11.35
22.....	7.7	7.55	8.1	7.7	7.4	7.9					10.0	10.85
23.....	7.6	7.6	8.1	7.7	7.4	7.9					11.2	10.35
24.....	7.7	7.6	8.1	7.6	7.4	7.85					11.35	10.4
25.....	7.7	7.7	8.1	7.6	7.4	7.7					12.25	11.0
26.....	7.7	7.8	8.1	7.6	7.4	7.6					12.75	11.2
27.....	7.7	7.9	8.1	7.6	7.4	7.5					13.05	11.2
28.....	7.7	8.25	8.1	7.6	7.4	7.5					12.55	11.4
29.....	7.6	8.05	8.1	7.55		7.5					13.25	11.5
30.....	7.6	7.9	8.1	7.5		8.05					13.3	11.95
31.....	7.6		8.1	7.65		8.3					13.75	

Daily discharge, in second-feet, of Rio Grande below Presidio, Tex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	610	70	145	245	150	165						10,790
2.....	980	65	145	245	150	170						8,850
3.....	750	^a 60	155	245	^a 150	175						^a 5,610
4.....	^a 1,560	60	^a 160	^a 195	150	^a 225						11,580
5.....	1,790	60	165	195	145	260						11,140
6.....	1,300	^a 60	170	190	^a 145	275						^a 10,910
7.....	^a 420	60	^a 175	^a 190	135	^a 290						12,020
8.....	355	60	185	190	125	495						12,240
9.....	290	^a 60	205	195	^a 135	410						^a 12,020
10.....	^a 290	60	^a 225	^a 195	145	^a 395					^a 5,180	10,400
11.....	260	65	210	165	155	345					5,230	8,600
12.....	235	^a 70	210	160	^a 195	315					5,220	^a 7,520
13.....	^a 220	65	^a 195	^a 160	200	^a 285					^a 5,360	6,920
14.....	275	60	190	330	205	315					9,280	6,420
15.....	205	^a 60	180	425	^a 205	435					9,140	^a 5,920
16.....	^a 600	60	^a 175	^a 425	205	^a 345					^a 6,620	6,570
17.....	155	60	225	350	200	305					6,740	5,810
18.....	125	^a 65	305	270	^a 195	270					5,470	^a 5,900
19.....	^a 150	70	^a 270	^a 270	180	^a 280					^a 6,090	5,930
20.....	120	70	245	255	170	290					4,190	5,350
21.....	105	^a 70	215	235	^a 160	300					3,760	^a 4,830
22.....	^a 100	70	^a 190	^a 215	160	^a 330					^a 3,110	4,540
23.....	90	75	210	215	160	330					6,290	4,250
24.....	95	^a 75	235	190	^a 160	310					6,680	^a 4,270
25.....	^a 95	95	^a 255	^a 190	165	^a 245					^a 9,070	4,630
26.....	90	110	250	180	170	235					9,870	4,750
27.....	85	^a 130	240	165	175	220					10,630	^a 4,750
28.....	^a 80	160	^a 235	^a 155	^a 180	^a 220					^a 9,790	5,010
29.....	75	140	240	145		220					10,760	5,140
30.....	75	^a 120	245	130		400					10,840	^a 5,710
31.....	^a 75	.....	^a 245	^a 165		480					^a 11,330	.....

^a See also discharge-measurement table.

Monthly discharge of Rio Grande below Presidio, Tex., for the year ending Sept. 30, 1914.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October.....	1,790	75	376	23,117
November.....	160	60	77	4,572
December.....	305	145	210	12,883
January.....	425	130	222	13,646
February.....	205	125	167	9,263
March.....	495	165	301	18,516
August 10-31.....	11,330	3,110	7,302	318,644
September.....	12,240	4,250	7,279	433,150

RIO GRANDE NEAR LANGTRY, TEX.

Location.—At east end of canyon section, half a mile south of Langtry, and a few miles above the mouth of Pecos River.

Records available.—May 1, 1900, to September 30, 1914.

Drainage area.—Not measured.

Gage.—Vertical staff.

Channel.—Very shifting and subject to overflow at stage of 29.5 feet. The overflow extends 110 feet back of the main bank.

Discharge measurements.—Made from car and cable.

Floods.—Below the Rio Conchos the Rio Grande is subject to severe floods from that source. Since the records have been maintained the highest flood occurred September 13, 1904, reaching a stage of 34.25 feet and a discharge of 132,000 second-feet. This is somewhat less than the maximum stage of 149,200 at the station below Presidio, showing the slight retarding effect of the channel upon flood flow.

Diversions.—No data.

Accuracy.—Owing to shifting of channel the estimates of daily discharge are based almost directly on frequent discharge measurements.

Cooperation.—Station maintained by the United States section of the International Water Commission, by whom the records were furnished, until March 31, 1914. After August 10, 1914, station maintained and records furnished by the Commission for the Equitable Distribution of the Waters of the Rio Grande.

Discharge measurements of Rio Grande near Langtry, Tex., during the year ending Sept. 30, 1914.

[Made by E. E. Winter and W. H. Dodd.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Oct. 2.....	2.65	3,735	Dec. 15.....	0.5	876	Mar. 3.....	—0.05	474
7.....	1.0	1,302	20.....	.8	1,108	8.....	.05	470
10.....	1.0	1,293	26.....	.5	897	13.....	.3	722
15.....	.7	952	29.....	.5	901	Aug. 10.....	3.5	5,883
20.....	.7	1,016	Jan. 2.....	.4	795	14.....	5.8	11,156
24.....	.45	824	6.....	.4	764	17.....	4.35	8,357
28.....	.35	700	10.....	.4	734	22.....	3.2	4,252
Nov. 2.....	.3	703	15.....	.3	710	27.....	4.9	8,596
6.....	.3	699	19.....	.2	676	31.....	5.5	11,074
11.....	.2	668	23.....	.4	777	Sept. 2.....	6.9	13,157
15.....	.2	671	28.....	.3	756	7.....	6.7	13,127
20.....	.2	692	Feb. 2.....	.2	675	11.....	6.6	12,966
23.....	.2	674	6.....	.15	619	15.....	5.25	9,831
28.....	.2	665	11.....	.2	707	18.....	5.15	9,948
Dec. 2.....	.3	763	16.....	.1	565	21.....	5.4	10,280
7.....	.45	841	20.....	.05	553	24.....	4.6	8,130
11.....	.45	870	25.....	.0	517	29.....	4.95	9,149

Daily discharge, in second-feet, of Rio Grande near Langtry, Tex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	1.8	0.3	0.25	0.4	0.25	0.0						6.15
2.....	2.4	.3	.3	.4	.2	-.05						6.7
3.....	2.45	.3	.3	.4	.2	-.05						5.8
4.....	1.75	.3	.3	.4	.2	-.05						6.2
5.....	1.75	.3	.3	.4	.15	-.05						5.5
6.....	1.15	.3	.35	.4	.15	-.05						6.55
7.....	1.1	.25	.45	.4	.15	-.05						6.5
8.....	1.7	.2	.45	.4	.15	-.05						6.2
9.....	1.35	.2	.45	.4	.1	-.05						6.5
10.....	1.0	.2	.5	.4	.1	-.05					4.15	6.8
11.....	.9	.2	.45	.35	.2	-.05					3.7	6.6
12.....	.8	.2	.5	.3	.15	.0					3.8	6.15
13.....	.7	.2	.5	.3	.1	.3					5.15	5.75
14.....	.6	.2	.5	.3	.1	.25					5.45	5.6
15.....	.7	.2	.5	.3	.2	.15					4.25	5.25
16.....	.65	.2	.5	.25	.1	.25					4.25	5.65
17.....	.75	.2	.6	.25	.1	.15					4.35	5.0
18.....	1.85	.2	.6	.2	.05	.15					3.9	5.0
19.....	1.1	.2	.6	.2	.05	.4					3.8	4.9
20.....	.7	.2	.75	.2	.05	.45					3.45	4.7
21.....	.6	.2	.65	.25	.05	.5					3.4	5.4
22.....	.5	.2	.7	.4	.05	.5					3.2	5.15
23.....	.45	.2	.7	.4	.05	.45					3.2	5.2
24.....	.45	.2	.7	.35	.05	.4					3.0	4.6
25.....	.45	.2	.55	.3	.0	.3					5.25	4.7
26.....	.4	.2	.5	.3	.0	.25					5.75	4.6
27.....	.35	.2	.5	.3	.0	.2					4.9	5.0
28.....	.35	.2	.5	.3	.0	.3					6.25	5.0
29.....	.3	.2	.5	.3		.2					5.45	4.95
30.....	.3	.2	.5	.3		.2					4.35	5.0
31.....	.3		.5	.3		.25					5.45	

Daily discharge, in second-feet, of Rio Grande near Langtry, Tex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	2,210	690	715	820	715	505						12,040
2.....	a3,360	a 705	a 765	a 795	a 675	485						a12,860
3.....	3,440	705	765	785	665	a 475						11,510
4.....	2,400	705	765	780	660	475						12,110
5.....	2,400	700	765	770	625	475						11,060
6.....	1,520	a 700	790	a 765	a 620	470						12,870
7.....	a1,440	685	a 840	755	630	470						a12,780
8.....	2,280	670	850	750	640	a 470						12,320
9.....	1,790	670	855	740	610	470						12,800
10.....	a1,290	670	885	a 735	620	470					a 7,180	13,290
11.....	1,180	a 670	a 870	720	a 705	470					6,340	a12,970
12.....	1,060	670	875	710	655	505					6,570	11,920
13.....	950	670	875	710	605	a 720					9,660	10,990
14.....	850	670	875	710	590	675					a10,350	10,650
15.....	a 950	a 670	a 875	a 710	655	590					8,160	a 9,830
16.....	940	675	875	695	a 565	675					8,170	10,480
17.....	1,040	680	950	695	565	590					a 8,360	9,650
18.....	2,470	685	950	675	555	590					6,750	a 9,740
19.....	1,520	690	950	a 675	555	810					6,390	9,620
20.....	a1,020	a 690	a1,070	a 675	a 555	855					5,150	9,350
21.....	940	685	1,000	700	555	900					4,970	a10,280
22.....	860	680	1,040	775	555	900					a 4,250	9,610
23.....	825	a 675	1,040	a 775	555	865					4,250	9,740
24.....	a 825	675	1,040	765	555	825					3,740	a 8,130
25.....	810	670	930	755	a 515	750					9,500	8,420
26.....	760	670	a 895	755	515	715					10,780	8,130
27.....	715	665	895	755	515	675					a 8,600	9,290
28.....	a 700	a 665	900	a 755	515	750					12,520	9,290
29.....	670	665	a 900	755		675					10,520	a 9,150
30.....	670	665	900	755		675					7,700	9,290
31.....	670		900	755		715					a10,940	

a See also discharge-measurement table.

Monthly discharge of Rio Grande near Langtry, Tex., for the year ending Sept. 30, 1914.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October.....	3,440	670	1,372	84,347
November.....	705	665	679	40,433
December.....	1,070	715	890	54,744
January.....	820	675	741	45,560
February.....	715	515	598	33,213
March.....	900	470	635	39,054
August 10-31.....	12,520	3,740	7,766	338,876
September.....	13,290	8,130	10,672	635,048

RIO GRANDE NEAR DEVILS RIVER, TEX.

Location.—One mile below the mouth of Devils River and the station of the same name, on the Galveston, Harrisburg & San Antonio Railway.

Records available.—May 1, 1900, to September 30, 1914.

Drainage area.—Not measured.

Gage.—Inclined staff.

Channel.—Shifting greatly and subject to overflow for a distance of 500 feet.

Discharge measurements.—Made from car and cable.

Floods.—The lower Rio Grande is subject to severe floods. The highest on record occurred April 6, 1900, and reached a stage of 36.5 feet at this station.

Diversions.—No data.

Accuracy.—Owing to the shifting channel, estimates of daily discharge are based almost directly on very frequent discharge measurements.

Cooperation.—Station maintained by the United States section of the International Water Commission, by whom the records were furnished until March 31, 1914. After August 10, 1914, station maintained and records furnished by the Commission for the Equitable Distribution of the Waters of the Rio Grande.

Discharge measurements of Rio Grande near Devils River, Tex., during the year ending Sept. 30, 1914.

[Made by E. E. Winter and W. H. Dodd.]

Date.	Gage height.	Dis- charge.	Date.	Gage height.	Dis- charge.	Date.	Gage height.	Dis- charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Oct. 4.....	5.0	4,934	Dec. 18.....	3.9	1,913	Mar. 6.....	3.5	1,403
9.....	4.5	3,470	24.....	4.0	2,159	11.....	3.5	1,391
14.....	3.9	2,210	28.....	3.85	1,965	17.....	3.65	1,600
18.....	3.9	2,149	31.....	3.85	1,967	23.....	3.7	1,751
23.....	3.7	1,707	Jan. 5.....	3.8	1,927	Aug. 12.....	5.9	8,209
27.....	3.6	1,708	9.....	3.8	1,864	15.....	6.55	13,977
31.....	3.6	1,670	14.....	3.75	1,848	19.....	5.75	7,274
Nov. 5.....	3.6	1,571	17.....	3.75	1,756	25.....	6.15	9,969
10.....	3.6	1,617	22.....	3.7	1,812	30.....	6.8	12,483
14.....	3.6	1,575	27.....	3.7	1,728	Sept. 4.....	7.35	14,325
19.....	3.85	1,939	31.....	3.75	1,887	8.....	7.15	13,689
22.....	3.75	1,681	Feb. 5.....	3.65	1,704	12.....	7.35	14,082
26.....	4.85	5,137	9.....	3.65	1,691	16.....	6.85	12,372
30.....	6.0	8,094	14.....	3.65	1,631	22.....	6.7	10,862
Dec. 6.....	4.0	2,212	19.....	3.6	1,618	26.....	6.6	10,703
10.....	3.95	2,127	24.....	3.6	1,531	30.....	6.65	11,015
13.....	3.95	2,108	28.....	3.55	1,466			

Daily gage height, in feet, of Rio Grande near Devils River, Tex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	5.8	3.55	5.25	3.85	3.7	3.55	.....	.....	.....	.....	.....	6.9
2.....	4.45	3.85	4.5	3.8	3.7	3.55	.....	.....	.....	.....	.....	7.45
3.....	4.75	3.55	4.15	3.8	3.7	3.5	.....	.....	.....	.....	.....	7.1
4.....	4.9	3.6	4.0	3.8	3.7	3.5	.....	.....	.....	.....	.....	7.35
5.....	4.5	3.6	4.0	3.8	3.65	3.5	.....	.....	.....	.....	.....	7.0
6.....	4.45	3.6	4.0	3.8	3.65	3.5	.....	.....	.....	.....	.....	6.9
7.....	5.15	3.6	4.8	3.8	3.65	3.5	.....	.....	.....	.....	.....	7.6
8.....	4.4	3.6	4.25	3.8	3.65	3.5	.....	.....	.....	.....	.....	7.15
9.....	4.55	3.6	4.0	3.8	3.65	3.5	.....	.....	.....	.....	.....	7.45
10.....	4.6	3.6	3.95	3.8	3.65	3.5	.....	.....	.....	.....	5.7	7.55
11.....	4.5	3.6	3.95	3.8	3.65	3.5	.....	.....	.....	.....	7.75	7.55
12.....	4.25	3.6	4.0	3.8	3.65	3.5	.....	.....	.....	.....	5.9	7.35
13.....	4.05	3.6	3.9	3.75	3.65	3.55	.....	.....	.....	.....	6.0	7.2
14.....	3.9	3.6	3.9	3.75	3.65	3.7	.....	.....	.....	.....	7.6	7.0
15.....	3.8	3.6	3.9	3.75	3.65	3.9	.....	.....	.....	.....	6.8	6.75
16.....	3.8	3.6	3.9	3.75	3.6	3.9	.....	.....	.....	.....	6.55	6.95
17.....	3.8	3.6	3.9	3.75	3.6	3.65	.....	.....	.....	.....	6.05	6.6
18.....	4.15	3.8	3.9	3.75	3.6	3.65	.....	.....	.....	.....	6.15	6.6
19.....	4.25	3.8	3.9	3.75	3.6	3.65	.....	.....	.....	.....	5.75	6.55
20.....	3.95	3.8	3.95	3.75	3.6	3.65	.....	.....	.....	.....	5.55	6.7
21.....	3.75	3.75	4.0	3.7	3.6	3.7	.....	.....	.....	.....	5.55	6.7
22.....	3.7	3.75	3.95	3.7	3.6	3.7	.....	.....	.....	.....	5.6	6.75
23.....	3.7	3.85	3.9	3.8	3.6	3.7	.....	.....	.....	.....	5.65	6.45
24.....	3.65	4.2	4.0	3.8	3.6	3.75	.....	.....	.....	.....	5.45	6.45
25.....	3.65	4.55	3.9	3.7	3.6	3.75	.....	.....	.....	.....	6.15	6.5
26.....	3.6	4.85	3.9	3.7	3.6	3.7	.....	.....	.....	.....	6.9	6.6
27.....	3.6	4.25	3.9	3.7	3.55	4.0	.....	.....	.....	.....	7.65	6.65
28.....	3.6	4.15	3.85	3.7	3.55	3.65	.....	.....	.....	.....	7.0	6.7
29.....	3.6	4.0	3.85	3.75	.....	4.0	.....	.....	.....	.....	7.25	6.6
30.....	3.6	6.3	3.85	3.75	.....	3.6	.....	.....	.....	.....	6.9	6.65
31.....	3.6	.....	3.85	3.75	.....	3.5	.....	.....	.....	.....	6.9	.....

Daily discharge, in second-feet, of Rio Grande near Devils River, Tex., for the year ending Sept. 30, 1914.

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

• See also discharge-measurement table.

Monthly discharge of Rio Grande near Devils River, Tex., for the year ending Sept. 30, 1914.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October.....	7,570	1,670	2,781	170,975
November.....	8,990	1,540	2,276	135,451
December.....	5,890	1,910	2,355	144,813
January.....	1,970	1,730	1,841	113,217
February.....	1,830	1,470	1,637	90,942
March.....	2,270	1,390	1,622	99,709
August 10-31.....	16,530	6,370	10,740	468,654
September.....	15,120	10,460	12,412	738,545

RIO GRANDE AT EAGLE PASS, TEX.

Location.—Half a mile above the highway bridge between Eagle Pass, Tex., and Ciudad Porfirio Diaz, Mexico.

Records available.—May 1, 1900, to September 30, 1914.

Drainage area.—Not measured.

Gage.—Vertical and inclined staff.

Channel.—Very shifting and subject to overflow for a width of 1,500 feet, beginning at a stage of 22 feet.

Discharge measurements.—Made from car and cable.

Floods.—The maximum recorded flood occurred at midnight June 29, 1905, and reached a stage of 34.6 feet. The flood of September, 1904, reached a maximum 24-hour stage of 23.1 feet with a corresponding discharge of 172,300 second-feet.

Diversions.—No data.

Accuracy.—Owing to the shifting channel, estimates of daily discharge are based almost directly on very frequent discharge measurements.

Cooperation.—Station maintained by the United States section of the International Water Commission, by whom the records were furnished, until March 31, 1914. After August 10, 1914, station maintained and records furnished by the Commission for the Equitable Distribution of the Waters of the Rio Grande.

Discharge measurements of Rio Grande at Eagle Pass, Tex., during the year ending Sept. 30, 1914.

[Made by R. L. Guy and C. F. Carson.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Oct. 3.....	3.8	8,190	Dec. 21.....	1.8	2,694	Mar. 12.....	1.1	1,758
6.....	2.8	4,032	24.....	1.8	2,634	15.....	1.1	1,774
9.....	2.9	4,577	27.....	1.8	2,594	18.....	1.2	1,883
12.....	2.9	4,467	31.....	1.7	2,469	21.....	1.2	1,969
15.....	2.7	4,006	Jan. 3.....	1.7	2,366	24.....	1.3	2,008
18.....	1.8	2,935	6.....	1.6	2,412	27.....	1.4	2,039
21.....	1.7	2,736	9.....	1.6	2,371	31.....	1.3	1,945
24.....	1.6	2,368	12.....	1.6	2,333	Aug. 12.....	3.9	8,816
27.....	1.5	2,337	15.....	1.6	2,207	15.....	4.95	14,464
31.....	1.4	2,288	18.....	1.5	2,179	18.....	5.4	13,473
Nov. 3.....	1.4	2,049	21.....	1.5	2,079	21.....	3.85	7,917
6.....	1.3	2,089	24.....	1.5	2,270	24.....	3.7	7,708
9.....	1.3	1,994	27.....	1.5	2,202	27.....	5.0	14,140
12.....	1.3	1,940	31.....	1.5	2,288	29.....	5.7	18,067
15.....	1.3	2,059	Feb. 3.....	1.5	2,139	31.....	4.8	12,222
18.....	1.4	2,092	6.....	1.4	2,145	Sept. 3.....	5.8	17,411
21.....	1.5	2,211	9.....	1.3	2,032	6.....	5.0	13,249
24.....	4.2	8,744	12.....	1.5	2,289	8.....	5.7	17,297
27.....	2.8	3,825	15.....	1.3	2,024	12.....	5.8	17,209
30.....	2.9	4,103	18.....	1.3	2,084	15.....	5.1	14,105
Dec. 3.....	2.95	5,636	21.....	1.3	1,956	18.....	4.9	13,606
6.....	2.2	4,394	24.....	1.2	1,940	21.....	5.0	13,684
9.....	2.2	3,441	28.....	1.2	1,913	24.....	4.5	10,918
12.....	2.0	2,982	Mar. 3.....	1.1	1,803	27.....	4.7	12,260
15.....	1.9	2,906	6.....	1.1	1,790	30.....	4.7	12,548
18.....	1.9	2,804	9.....	1.1	1,775			

Daily gage height, in feet, of Rio Grande at Eagle Pass, Tex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1.95	1.4	4.15	1.7	1.5	1.2						5.2
2	2.8	1.4	3.3	1.7	1.5	1.2						5.65
3	3.75	1.4	3.1	1.7	1.5	1.1						5.8
4	4.2	1.3	3.35	1.7	1.5	1.1						5.5
5	3.6	1.3	3.6	1.7	1.4	1.1						5.55
6	2.7	1.3	2.35	1.6	1.4	1.1						5.15
7	3.2	1.3	2.05	1.6	1.4	1.1						5.7
8	3.0	1.3	2.5	1.6	1.3	1.1						5.8
9	2.9	1.3	2.2	1.6	1.3	1.1						5.45
10	2.9	1.3	2.0	1.6	1.3	1.1					3.9	5.85
11	2.9	1.3	2.0	1.6	1.3	1.1					3.4	5.95
12	2.9	1.3	2.0	1.6	1.5	1.1					3.25	5.8
13	2.75	1.3	2.0	1.6	1.4	1.1					3.8	5.6
14	2.7	1.3	1.9	1.6	1.3	1.1					6.15	5.35
15	2.65	1.3	1.9	1.6	1.3	1.1					5.3	5.15
16	2.15	1.3	1.9	1.6	1.3	1.2					5.45	5.0
17	1.85	1.3	1.9	1.6	1.3	1.2					4.9	5.0
18	1.8	1.45	1.9	1.5	1.3	1.2					5.5	4.95
19	1.8	2.0	1.9	1.5	1.3	1.2					4.3	4.95
20	1.75	2.95	1.8	1.5	1.3	1.2					4.0	4.85
21	1.7	1.5	1.8	1.5	1.3	1.2					3.85	5.0
22	1.7	1.45	1.8	1.5	1.3	1.3					3.7	4.9
23	1.6	3.7	1.8	1.5	1.3	1.3					3.55	5.0
24	1.6	4.35	1.8	1.5	1.2	1.3					3.7	4.6
25	1.6	2.95	1.8	1.5	1.2	1.3					3.6	4.55
26	1.55	2.9	1.8	1.5	1.2	1.3					5.05	4.65
27	1.5	2.8	1.8	1.5	1.2	1.4					5.2	4.7
28	1.5	2.75	1.8	1.5	1.2	1.4					6.0	4.7
29	1.45	2.7	1.7	1.5		1.3					5.8	4.7
30	1.4	3.0	1.7	1.5		1.3					5.55	4.7
31	1.4		1.7	1.5		1.3					4.8	

Daily discharge, in second-feet, of Rio Grande at Eagle Pass, Tex., for the year ending Sept. 30, 1914.

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

a See also discharge-measurement table.

Monthly discharge of Rio Grande at Eagle Pass, Tex., for the year ending Sept. 30, 1914.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October.....	9,850	2,290	3,837	235,984
November.....	9,110	1,940	2,966	176,509
December.....	8,570	2,470	3,596	221,118
January.....	2,440	2,080	2,279	140,112
February.....	2,290	1,910	2,052	113,990
March.....	2,040	1,760	1,883	115,755
August 10-31.....	20,460	6,060	12,309	537,103
September.....	18,020	11,310	14,558	866,261

RIO GRANDE NEAR LAREDO, TEX.

Location.—At Fort McIntosh, 2 miles above Laredo. No tributary within many miles.

Records available.—May 1, 1900, to March 31, 1914.

Drainage area.—Not measured.

Gage.—Inclined staff. The original gage was located near the bridge connecting Laredo with Nuevo Laredo, but was moved to its present location August 1, 1903.

Channel.—Very shifting.

Discharge measurements.—Made from car and cable.

Floods.—The highest flood recorded is 32.2 feet and occurred on the night of June 30, 1905.

Diversions.—No data.

Accuracy.—Although frequent discharge measurements have been obtained, no estimates of daily discharge have been made by the commission.

Cooperation.—This station was maintained by the Mexican section of the International Water Commission, by whom the base data were furnished.

Discharge measurements of Rio Grande near Laredo, Tex., during the year ending Sept. 30, 1914.

[Made by L. Varela.]

Date.	Gage height.	Dis- charge.	Date.	Gage height.	Dis- charge.	Date.	Gage height.	Dis- charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Oct. 2.....	12.5	26,861	Nov. 25.....	6.0	11,761	Feb. 19.....	2.2	1,863
3.....	8.1	14,403	28.....	5.6	8,893	25.....	2.0	2,060
8.....	4.8	7,353	Dec. 7.....	3.8	5,308	27.....	2.0	1,825
14.....	3.3	3,228	12.....	3.0	3,315	Mar. 5.....	1.9	1,565
20.....	2.8	2,893	16.....	2.9	3,253	9.....	1.8	1,659
25.....	2.7	2,415	22.....	2.8	3,193	12.....	3.0	3,352
30.....	2.4	1,870	26.....	2.8	3,343	18.....	2.1	1,898
Nov. 5.....	2.4	2,126	30.....	2.7	2,903	22.....	2.0	1,857
11.....	2.4	1,964	Jan. 9.....	2.6	2,640	26.....	2.1	1,905
15.....	2.3	1,930	14.....	2.5	2,469	30.....	2.0	1,964
20.....	3.7	4,128	Feb. 15.....	2.4	2,512			

Daily gage height, in feet, of Rio Grande near Laredo, Tex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.
1.....	3.25	2.3	3.3	2.7	2.35	2.0	16.....	2.8	2.3	2.95	2.5	2.4	2.0
2.....	15.35	2.35	5.3	2.7	2.4	2.0	17.....	2.8	2.3	2.9	2.5	2.3	2.05
3.....	7.7	2.5	5.25	2.7	2.4	2.1	18.....	2.8	2.3	2.9	2.5	2.2	2.1
4.....	5.5	2.4	4.8	2.7	2.4	1.95	19.....	2.8	2.3	2.9	2.45	2.2	2.1
5.....	4.55	2.4	4.35	2.7	2.35	1.9	20.....	2.8	3.65	2.9	2.4	2.2	2.1
6.....	4.85	2.4	4.85	2.7	2.3	1.9	21.....	3.3	2.9	2.85	2.4	2.2	2.05
7.....	5.6	2.4	3.9	2.65	2.3	1.9	22.....	3.1	2.5	2.8	2.35	2.2	2.0
8.....	5.5	2.4	3.35	2.6	2.3	1.9	23.....	2.9	2.5	2.8	2.3	2.2	2.0
9.....	4.45	2.4	3.8	2.6	2.3	1.85	24.....	2.8	4.8	2.8	2.3	2.15	2.05
10.....	3.5	2.4	3.7	2.6	2.35	1.8	25.....	2.7	6.25	2.8	2.3	2.0	2.1
11.....	3.6	2.4	3.3	2.6	2.4	2.75	26.....	2.7	4.6	2.8	2.5	2.0	2.1
12.....	3.5	2.35	3.05	2.6	2.35	3.0	27.....	2.7	7.85	2.9	2.5	2.0	2.1
13.....	3.45	2.3	3.0	2.5	2.35	2.3	28.....	2.6	5.15	2.9	2.5	2.0	2.4
14.....	3.35	2.3	3.0	2.5	2.35	2.0	29.....	2.5	3.65	2.85	2.5	.....	2.2
15.....	3.1	2.3	3.0	2.5	2.4	2.0	30.....	2.4	3.2	2.7	2.4	.....	2.0
							31.....	2.4	.....	2.7	2.3	.....	2.0

RIO GRANDE NEAR ROMA, TEX.

Location.—Near Roma.

Records available.—August 14, 1900, to March 31, 1914.

Drainage area.—Not measured.

Gage.—Inclined staff.

Channel.—Shifting; subject to overflow to a width of 250 feet.

Discharge measurements.—Made from car and cable.

Diversions.—No data.

Accuracy.—Although frequent discharge measurements have been obtained, no estimates of daily discharge have been made by the commission.

Cooperation.—This station was maintained by the Mexican section of the International Water Commission, by whom the base data were furnished.

Discharge measurements of Rio Grande near Roma, Tex., during the year ending Sept. 30, 1914.

[Made by H. P. Guerra.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Nov. 10.....	2.9	2,325	Jan. 3.....	2.9	2,534	Feb. 7.....	2.3	2,139
15.....	2.8	2,307	7.....	2.8	2,315	24.....	2.0	2,008
19.....	2.7	2,118	10.....	2.8	2,565	28.....	2.0	1,888
26.....	7.2	10,313	15.....	2.7	2,590	Mar. 5.....	1.8	1,665
Dec. 5.....	6.1	8,790	17.....	2.7	2,413	12.....	2.7	3,209
12.....	4.0	3,866	21.....	2.5	2,325	14.....	3.0	3,026
17.....	3.4	3,283	24.....	2.4	2,131	17.....	1.8	1,762
22.....	3.2	3,186	28.....	2.4	2,258	21.....	1.9	1,959
26.....	3.1	2,987	Feb. 3.....	2.4	2,358	25.....	1.9	2,041
30.....	3.0	2,835						

Daily gage height, in feet, of Rio Grande near Roma, Tex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.
1.....	5.8	3.6	4.25	2.95	2.4	2.0	16.....	5.7	2.8	3.5	2.7	2.3	1.9
2.....	12.5	3.55	3.85	2.9	2.4	2.0	17.....	5.6	2.8	3.4	2.7	2.35	1.8
3.....	22.05	3.45	6.3	2.9	2.5	2.0	18.....	5.5	2.8	3.4	2.7	2.25	1.8
4.....	17.7	3.3	7.0	2.9	2.5	1.8	19.....	5.3	2.7	3.35	2.6	2.2	1.9
5.....	11.75	3.25	5.9	2.9	2.4	1.8	20.....	5.2	2.7	3.3	2.5	2.1	1.95
6.....	9.0	3.2	5.3	2.9	2.4	1.8	21.....	4.95	2.7	3.2	2.5	2.05	1.8
7.....	7.9	3.1	5.85	2.85	2.3	1.8	22.....	4.7	2.7	3.2	2.5	2.0	1.8
8.....	8.15	3.0	5.0	2.8	2.4	1.7	23.....	4.45	2.7	3.1	2.5	2.0	1.8
9.....	7.85	3.0	4.1	2.8	2.3	1.7	24.....	4.2	2.7	3.1	2.4	2.0	1.9
10.....	7.2	2.95	4.2	2.8	2.35	1.7	25.....	4.0	7.5	3.1	2.4	2.0	1.9
11.....	6.5	2.9	4.45	2.8	2.4	1.7	26.....	3.9	7.1	3.1	2.5	2.0	1.8
12.....	6.35	2.9	3.95	2.8	2.4	2.35	27.....	3.8	5.95	3.0	2.5	2.0	1.8
13.....	6.3	2.9	3.65	2.8	2.3	4.15	28.....	3.8	9.65	3.0	2.5	2.0	2.0
14.....	6.15	2.8	3.45	2.8	2.3	3.1	29.....	3.75	6.1	3.1	2.5	.....	2.0
15.....	5.9	2.8	3.4	2.75	2.3	2.25	30.....	3.65	4.9	3.0	2.5	.....	2.0
							31.....	3.6	.....	3.0	2.5	.....	2.0

RIO GRANDE NEAR BROWNSVILLE, TEX.

Location.—One mile above Brownsville, opposite Matamoros, Mexico.

Records available.—April 29, 1900, to March 31, 1914.

Gage.—Vertical staff.

Channel.—Shifting.

Discharge measurements.—Made from car and cable.

Natural storage.—Between Roma and Brownsville there are many lagoons (old river channels) which take river water during moderate floods, and a large area is overflowed deeply in large floods. Much of this water returns slowly to the river as the floods subside, thus making the flow more uniform at Brownsville than at Roma. Large quantities also leave the river entirely, reaching the Gulf of Mexico by other channels.

Accuracy.—Although frequent discharge measurements have been obtained, no estimates of daily discharge have been made by the commission.

Cooperation.—This station was maintained by the Mexican section of the International Water Commission, by whom the base data were furnished.

Daily gage height, in feet, of Rio Grande near Brownsville, Tex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.
1.....			8.4	3.3	2.0	1.4	16.....	14.0	.....	4.8	2.6	2.0	0.75
2.....			6.7	3.3	2.0	1.3	17.....		.....	4.45	2.6	2.0	1.75
3.....	10.0		5.85	3.2	1.95	1.2	18.....		.....	4.3	2.3	2.0	2.0
4.....	13.9		6.05	3.2	1.9	1.05	19.....		.....	4.3	2.45	1.95	1.45
5.....	14.35		6.45	3.05	1.75	.85	20.....		3.8	4.25	2.55	1.8	1.0
6.....	14.6		8.05	2.9	1.55	.65	21.....		3.55	4.1	2.5	1.7	.8
7.....	14.5		7.75	2.75	1.45	.45	22.....		3.3	4.0	2.4	1.6	.8
8.....	14.45		7.3	2.6	1.4	.4	23.....		3.4	3.85	2.25	1.6	.9
9.....	14.4		7.4	2.7	1.4	.4	24.....		3.55	3.7	2.1	1.6	1.05
10.....	14.35		7.1	2.7	1.8	.6	25.....		3.85	3.7	2.1	1.5	1.2
11.....	14.45		6.65	2.7	1.9	.5	26.....		4.05	3.6	2.2	1.5	1.15
12.....	14.6		6.25	2.7	2.0	.4	27.....		9.45	3.5	2.2	1.4	1.1
13.....	14.15		5.8	2.7	2.0	.3	28.....		9.1	3.35	2.1	1.4	1.05
14.....	13.7		5.45	2.7	2.0	.2	29.....		7.75	3.45	2.0	.....	.95
15.....	14.1		5.2	2.7	1.9	.0	30.....		11.2	3.55	1.6	.....	.9
							31.....		.....	3.3	1.9	.....	1.1

RIO COLORADO¹ NEAR QUESTA, N. MEX.

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

Records available.—October 6, 1912, to September 30, 1914.

Drainage area.—Not measured.

Gage.—Chain gage.

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

Discharge measurements.—Made by wading.

Winter flow.—Affected by ice.

Diversions.—None of consequence above station.

Accuracy.—Estimates of daily discharge good.

Discharge measurements of Rio Colorado near Questa, N. Mex., during the year ending Sept. 30, 1914.

[Made by J. E. Powers.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
Oct. 3.	<i>Feet.</i> 1.00	<i>Sec.-ft.</i> 35.2	Jan. 26.	<i>Feet.</i> (a)	13.2	May 22.	<i>Feet.</i> 2.41	<i>Sec.-ft.</i> 270
21. ....	.90	24.5	Feb. 28.	a0.80	21.4	July 21.	1.10	74.7
Dec. 13.	(a)	10.5	Apr. 11.	1.00	31.0	Sept. 6. ....	.80	42.0

a Discharge relation affected by ice.

Daily gage height, in feet, of Rio Colorado near Questa, N. Mex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.	0.9							1.50	2.35			0.87
2.			0.80				0.87				1.10	
3.	1.0							1.50	2.40			.82
4.		0.85								1.02	1.15	
5.								1.65				.80
6.								1.70		1.12		.80
7.	1.0	.9						1.90	1.90			
8. ....		.85						2.00		1.17	1.05	
9.			1.60				1.07	2.35				
10. ....	.95	.85						2.47	1.77	1.10	1.00	
11.							1.00	2.40		1.10		
12. ....		.85					1.00	2.25				
13. ....	.9						1.05		1.87		.95	.90
14. ....	.9	.85						2.30	1.87	1.10		
15. ....	.9					0.75			1.80		.90	.80
16. ....		.85					1.35	2.20	1.77			
17. ....						.85	1.35		1.75			
18. ....	.9	.85								1.10	.95	
19. ....		.85						2.25	1.60			.75
20.							1.35		1.65	1.23	.90	
21. ....	.9							2.35		1.10	.90	.80
22. ....						.85		2.41	1.50	1.25	1.02	
23.							1.50	2.45				.78
24. ....		.8						2.45			1.00	
25. ....	.9					.82	1.50		1.35	1.17	.97	
26. ....		.8						2.27		1.15	.92	.75
27. ....						.82	1.50	2.30	1.20		.90	
28. ....	.85				0.80		1.50	2.20			.90	.70
29. ....		.8					1.50		1.20	1.10		
30. ....						.88	1.57				.90	
31. ....	.85											

NOTE.—Discharge relation affected by ice Dec. 4 to Mar. 14.

¹ Also known as Red River.

Daily discharge, in second-feet, of Rio Colorado near Questa, N. Mex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	30							67	266			47
2.....			22				26				72	
3.....	35							67	277			44
4.....		22								67	76	
5.....								84				42
6.....								90		76		42
7.....	35	24						118	185			
8.....		24						136		82	66	
9.....							36	193				
10.....	30	24						219	163	74	61	
11.....							32	211		74		
12.....		24					32	190				
13.....	27		10				35		180		56	48
14.....	27	24						206	180	74		
15.....	27					20			168		52	42
16.....		24					54	195	163			
17.....						24	54		160			
18.....	24	24								74	56	
19.....		24						215	137			39
20.....							54		144	88	51	
21.....	24							245		74	51	42
22.....						24		270	122	39	61	
23.....							67	277				40
24.....		22						279			58	
25.....	24					23	67		102	80	56	
26.....		22		18				247		77	52	38
27.....						23	67	252	85		50	
28.....	22				21		67	234			49	35
29.....		22					67		85	72		
30.....						26	73				49	
31.....	22											

NOTE.—Discharge determined as follows: Oct. 1 to Dec. 3 and May 5 to Sept. 30 by indirect method for shifting channels; Mar. 15 to May 4 from well-defined rating curve; estimates of discharge made only for days on which gage was read.

RIO COLORADO¹ BELOW QUESTA, N. MEX.

Location.—Near sec. 1, T. 28 N., R. 12 E., 2 miles below Questa, at the head of Lower Canyon; below all important tributaries, the nearest one above being Cabresto Creek.

Records available.—April 8, 1910, to September 30, 1914.

Drainage area.—Not measured.

Gage.—Vertical staff. On July 20, 1914, a new gage was installed 150 feet downstream with a datum 2.77 feet lower than that of the old gage. All gage heights in this report refer to the datum of the original gage.

Channel.—Shifting during high water.

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

Winter flow.—Sometimes affected by ice during December and January.

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

Accuracy.—Estimates of discharge good.

¹ Also known as Red River.

Discharge measurements of Rio Colorado below Questa, N. Mex., during the year ending Sept. 30, 1914.

[Made by J. E. Powers.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Oct. 4.....	3.57	37.6	Jan. 26.....	3.40	25.0	May 22.....	4.50	347
21.....	3.47	28.1	Mar. 1.....	3.35	19.7	July 20.....	3.94	109
Dec. 14.....	3.10	10.3	Apr. 12.....	3.54	41.3	Sept. 6.....	3.53	50.2

Daily gage height, in feet, of Rio Colorado below Questa, N. Mex., for the year ending Sept. 30, 1914.

[Narciso Vigil, observer.]

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	3.52	3.40	3.40	3.42	3.30	3.35	3.35	4.20	4.45	3.78	3.80	3.60
2.....	3.52	3.40	3.22	3.40	3.30	3.38	3.35	4.20	4.60	3.80	3.80	3.60
3.....	3.50	3.48	3.30	3.40	3.25	3.35	3.40	4.20	4.50	3.80	3.80	3.60
4.....	3.52	3.45	3.35	3.35	3.32	3.28	3.42	4.20	4.45	3.80	3.80	3.52
5.....	3.50	3.42	3.32	3.35	3.28	3.30	3.45	4.22	4.38	3.80	3.75	3.50
6.....	3.50	3.42	3.28	3.35	3.30	3.28	3.52	4.25	4.35	3.80	3.72	3.50
7.....	3.50	3.42	3.18	3.35	3.25	3.28	3.60	4.30	4.28	3.88	3.68	3.50
8.....	3.50	3.42	3.12	3.35	3.28	3.28	3.58	4.40	4.25	3.82	3.55	3.48
9.....	3.50	3.42	3.15	3.45	3.25	3.28	3.60	4.35	4.22	3.78	3.60	3.50
10.....	3.48	3.42	3.15	3.32	3.30	3.30	3.60	4.38	4.20	3.75	3.68	3.50
11.....	3.45	3.42	3.08	3.25	3.35	3.30	3.55	4.40	4.18	3.72	3.65	3.50
12.....	3.45	3.42	3.10	3.40	3.35	3.22	3.55	4.45	4.15	3.72	3.62	3.52
13.....	3.48	3.40	3.08	3.38	3.28	3.25	3.58	4.45	4.12	3.88	3.60	3.68
14.....	3.50	3.40	3.10	3.38	3.35	3.28	3.62	4.45	4.10	3.78	3.62	3.70
15.....	3.50	3.40	3.12	3.42	3.32	3.30	3.65	4.50	4.15	3.75	3.60	3.55
16.....	3.48	3.40	3.18	3.42	3.35	3.30	3.85	4.45	4.18	3.72	3.58	3.55
17.....	3.50	3.42	3.22	3.45	3.32	3.30	4.00	4.48	4.12	3.82	3.58	3.50
18.....	3.50	3.42	3.25	3.42	3.45	3.32	3.95	4.48	4.10	3.78	3.55	3.50
19.....	3.48	3.40	3.22	3.40	3.40	3.32	3.85	4.58	4.10	3.92	3.55	3.50
20.....	3.48	3.45	3.15	3.40	3.45	3.30	3.98	4.50	4.10	3.95	3.62	3.50
21.....	3.45	3.42	3.15	3.25	3.45	3.30	4.00	4.60	3.55	3.85	3.55	3.52
22.....	3.45	3.42	3.15	3.28	3.40	3.25	4.15	4.55	3.55	3.90	3.68	3.50
23.....	3.42	3.40	3.25	3.40	3.35	3.30	4.10	4.60	3.45	3.90	3.72	3.50
24.....	3.42	3.40	3.28	3.35	3.30	3.35	4.08	4.60	3.90	3.85	3.72	3.48
25.....	3.42	3.40	3.25	3.40	3.30	3.30	4.08	4.52	3.90	3.85	3.70	3.50
26.....	3.42	3.40	3.32	3.40	3.40	3.30	4.15	4.52	3.88	3.82	3.70	3.50
27.....	3.40	3.32	3.35	3.40	3.30	3.30	4.15	4.50	3.82	3.90	3.68	3.50
28.....	3.40	3.32	3.32	3.40	3.30	3.35	4.15	4.48	3.78	3.85	3.62	3.48
29.....	3.40	3.35	3.32	3.20	.....	3.35	4.18	4.45	3.75	3.82	3.62	3.42
30.....	3.40	3.32	3.32	3.25	.....	3.38	4.20	4.42	3.75	3.82	3.62	3.42
31.....	3.40	.....	3.35	3.28	.....	3.38	.....	4.42	.....	3.75	3.60	.....

Daily discharge, in second-feet, of Rio Colorado below Questa, N. Mex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	33	22	23	25	17	20	20	207	320	71	91	61
2.....	33	22	10	23	17	22	20	207	405	75	93	61
3.....	31	29	16	23	15	20	23	207	347	75	96	61
4.....	33	26	21	20	18	16	25	207	320	75	98	49
5.....	31	24	20	20	16	17	28	216	282	75	89	46
6.....	31	24	17	20	17	16	35	229	267	75	84	46
7.....	31	24	10	20	15	16	44	247	233	93	75	46
8.....	31	24	7	20	16	16	43	298	220	80	53	43
9.....	31	24	10	28	15	16	47	272	207	71	61	46
10.....	29	24	10	18	17	17	49	287	198	66	75	46
11.....	26	24	6	15	20	17	43	298	190	61	70	46
12.....	26	24	8	23	20	14	43	325	178	61	64	49
13.....	29	22	8	22	16	15	47	325	167	93	61	77
14.....	31	22	10	22	20	16	53	325	159	71	64	82
15.....	31	22	11	25	18	17	57	347	178	66	61	54
16.....	29	22	12	25	20	17	98	320	190	61	57	54
17.....	31	24	14	28	18	17	142	336	167	80	57	47
18.....	31	24	15	25	28	18	122	336	159	71	53	47
19.....	29	22	14	23	23	18	96	393	159	103	53	47
20.....	29	26	12	23	28	17	132	347	159	112	64	47
21.....	26	24	12	15	28	17	139	405	38	86	53	50
22.....	26	24	12	16	23	15	194	376	38	98	75	47
23.....	24	22	15	23	20	17	175	405	28	98	84	47
24.....	24	22	16	20	17	20	163	405	98	86	84	44
25.....	24	22	15	23	17	17	163	359	98	86	80	47
26.....	24	22	18	23	23	17	190	359	93	80	80	47
27.....	22	16	20	23	17	17	190	347	80	101	75	47
28.....	22	16	18	23	17	20	190	336	71	91	64	44
29.....	22	18	18	13	.....	20	198	320	66	86	64	38
30.....	22	16	18	15	.....	22	207	303	66	89	64	38
31.....	22	.....	20	16	.....	22	.....	303	.....	75	61	.....

NOTE.—Oct. 1 to Nov. 30, Dec. 15 to Apr. 5, and May 15 to July 26, discharge determined from two fairly well defined curves; remainder of year by indirect method for shifting channels.

Monthly discharge of Rio Colorado below Questa, N. Mex., for the year ending Sept. 30, 1914.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
October.....	33	22	27.9	1,720	B.
November.....	29	16	22.6	1,340	B.
December.....	23	6	14.1	867	B.
January.....	28	13	21.2	1,300	B.
February.....	28	15	19.1	1,060	B.
March.....	22	14	17.6	1,080	B.
April.....	207	20	99.2	5,900	B.
May.....	405	207	311	19,100	B.
June.....	405	28	173	10,300	B.
July.....	112	61	81.0	4,980	B.
August.....	98	53	71.1	4,370	B.
September.....	82	38	50.1	2,980	B.
The year.....	405	6	76.0	55,000	

RIO HONDO NEAR ARROYO HONDO, N. MEX.

Location.—Near sec. 31, T. 27 N., R. 12 E., at highway bridge at Rael Hotel, 200 yards above mouth of stream, 1 mile west of Arroyo Hondo post office. No tributary between station and mouth.

Records available.—April 8, 1910, to September 30, 1914.

Drainage area.—Not measured.

Gage.—Inclined staff.

Channel.—Slightly shifting.

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

Winter flow.—Affected by ice during some of the winter months.

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

Accuracy.—Estimates good.

Discharge measurements of Rio Hondo near Arroyo Hondo, N. Mex., during the year ending Sept. 30, 1914.

[Made by J. E. Powers.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Oct. 3.....	1.75	10.1	Jan. 25.....	a 1.90	15.0	May 23.....	3.00	149
23.....	1.70	7.9	Feb. 28.....	a 1.90	13.4	July 21.....	1.70	10.5
Dec. 13.....	a 2.75	8.4	Apr. 12.....	2.00	20.1	Sept. 6.....	1.60	5.8

a Discharge relation affected by ice.

Daily gage height, in feet, of Rio Hondo near Arroyo Hondo, N. Mex., for the year ending Sept. 30, 1914.

[J. H. Dunn, observer.]

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	1.72	1.74	1.92	2.00	1.90	1.90	1.92	1.92	2.78	2.10	1.85	1.80
2.....	1.72	1.77	1.94	1.98	1.90	1.90	1.92	1.90	2.70	2.10	1.70	1.70
3.....	1.75	1.80	1.90	2.00	1.90	1.90	1.92	1.88	2.62	2.00	1.80	1.68
4.....	1.72	1.80	1.98	2.00	2.00	1.93	1.92	1.85	2.62	2.00	1.75	1.65
5.....	1.75	1.81	1.92	2.00	2.08	1.90	1.92	1.90	2.60	2.20	1.70	1.60
6.....	1.78	1.81	1.92	2.00	2.02	1.90	1.92	1.98	2.52	2.20	1.70	1.70
7.....	1.80	1.84	1.92	1.95	1.92	1.90	1.98	1.98	2.42	2.10	1.70	1.70
8.....	1.79	1.84	1.92	1.95	1.90	1.90	2.02	2.02	2.40	2.10	1.70	1.70
9.....	1.78	1.84	1.92	1.95	1.90	1.90	2.00	2.02	2.28	2.10	1.80	1.70
10.....	1.79	1.84	1.92	1.90	1.90	1.92	1.98	2.08	2.18	2.10	2.35	1.70
11.....	1.78	1.85	1.92	1.92	2.00	1.96	2.02	2.05	.....	2.10	1.90	1.70
12.....	1.76	1.85	1.92	1.94	2.05	1.98	2.00	2.02	.....	2.10	1.80	1.70
13.....	1.79	1.85	2.75	1.94	2.02	1.92	2.02	2.02	.....	2.10	1.70	1.95
14.....	1.79	1.84	2.08	1.95	1.98	1.91	1.92	2.02	.....	2.10	1.80	1.80
15.....	1.82	1.82	2.15	1.95	1.90	1.90	1.92	2.05	.....	2.10	1.80	1.80
16.....	1.82	1.82	2.18	2.00	1.90	1.91	1.90	2.08	.....	2.00	1.80	1.80
17.....	1.82	1.82	2.20	2.00	1.90	1.92	1.92	2.08	.....	2.00	1.80	1.85
18.....	1.81	1.84	2.25	1.95	1.90	1.91	1.92	2.12	.....	1.90	1.80	1.75
19.....	1.80	1.82	2.50	1.90	1.90	1.90	1.95	2.20	.....	1.90	1.80	1.70
20.....	1.79	1.84	2.78	1.90	1.90	1.90	2.00	2.23	.....	1.90	1.80	1.70
21.....	1.80	1.88	3.10	1.90	1.90	1.90	1.95	2.35	.....	1.80	1.80	1.70
22.....	1.74	1.92	3.32	1.90	1.90	1.90	1.92	2.45	.....	1.85	1.95	1.70
23.....	1.70	1.92	2.05	1.91	1.90	1.90	1.92	3.02	.....	1.80	1.90	1.70
24.....	1.71	1.90	2.00	1.92	1.90	2.00	1.92	3.02	.....	1.78	1.90	1.72
25.....	1.72	1.90	2.00	1.91	1.90	2.05	1.98	3.01	.....	1.80	1.90	1.72
26.....	1.72	1.90	2.00	1.93	1.90	2.08	2.02	3.00	.....	2.22	1.90	1.80
27.....	1.71	1.88	2.00	1.90	1.90	2.02	2.05	2.98	.....	2.05	1.85	1.76
28.....	1.71	1.92	1.95	1.90	1.98	1.96	2.08	2.95	.....	1.90	1.88	1.70
29.....	1.74	1.92	2.02	1.90	.....	1.94	2.02	2.90	.....	1.80	1.80	1.70
30.....	1.74	1.92	2.02	1.90	.....	1.91	1.95	2.82	.....	1.75	1.80	1.70
31.....	1.74	.....	2.00	1.90	.....	1.92	.....	2.80	.....	1.80	1.80	.....

NOTE.—Discharge relation affected by ice Dec. 2 to Mar. 14. Gage readings June 11-30 of doubtful value and not published.

Daily discharge, in second-feet, of Rio Hondo near Arroyo Hondo, N. Mex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	8.6	9.2	17	10	.....	13	17	17	191	34	15	11
2.....	8.6	10	18	10	.....	13	17	16	108	34	8.9	8.0
3.....	9.5	11	16	10	.....	13	17	15	96	27	12	7.6
4.....	8.6	11	16	10	.....	13	17	14	96	27	10	7.0
5.....	9.5	12	17	10	.....	13	17	16	93	42	8.6	6.0
6.....	10	12	17	10	.....	13	17	20	81	42	8.6	8.0
7.....	11	13	17	10	.....	13	20	20	68	34	8.6	8.0
8.....	11	13	17	10	.....	13	22	22	65	34	8.3	8.0
9.....	10	13	17	10	.....	13	21	22	51	34	12	8.0
10.....	11	13	17	10	.....	14	20	27	40	34	51	8.0
11.....	10	14	16	12	.....	14	22	24	40	34	16	8.0
12.....	9.8	14	12	12	.....	15	21	22	40	34	11	8.0
13.....	11	14	8.4	12	.....	15	22	22	40	34	8.0	18
14.....	11	13	8.4	12	.....	15	17	22	40	34	11	11
15.....	12	12	8.4	12	.....	16	17	24	40	34	11	11
16.....	12	12	8.4	12	.....	16	16	27	40	27	11	11
17.....	12	12	8.4	12	.....	17	17	27	38	27	11	14
18.....	12	13	8.4	12	.....	16	17	29	38	20	11	9.5
19.....	11	12	8.4	12	.....	16	18	35	38	20	11	8.0
20.....	11	13	8.4	12	.....	16	21	42	38	20	11	8.0
21.....	11	15	8.4	15	.....	16	18	50	38	15	11	8.0
22.....	9.2	17	8.4	15	.....	16	17	62	36	18	18	8.0
23.....	8.0	17	8.4	15	.....	16	17	153	36	15	16	8.0
24.....	8.3	16	8.4	15	.....	21	17	171	36	14	16	8.6
25.....	8.6	16	8.4	15	.....	24	20	169	36	14	16	8.6
26.....	8.6	16	8.4	15	.....	25	22	166	36	42	16	11
27.....	8.3	15	8.4	15	.....	22	24	162	36	28	14	9.8
28.....	8.3	17	10	15	.....	19	27	155	34	18	15	8.0
29.....	9.2	17	10	15	.....	18	22	144	34	13	11	8.0
30.....	9.2	17	10	15	.....	16	18	128	34	11	11	8.0
31.....	9.2	.....	10	15	.....	17	.....	125	.....	12	11	.....

NOTE.—Daily discharge determined as follows: Dec. 2 to Mar. 14, estimated on account of ice; June 11–30, estimated by comparison with stations in adjoining drainages and information furnished by the hydrographer; May 24 to Aug. 10, by indirect method for shifting channels; for remainder of year from two well-defined rating curves.

Monthly discharge of Rio Hondo near Arroyo Hondo, N. Mex., for the year ending Sept. 30, 1914.

Month.	Discharge in second feet.			Run off (total in acre feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
October.....	12	8.0	9.92	610	B.
November.....	17	9.2	13.6	809	B.
December.....	18	8.4	11.7	719	C.
January.....	15	10	12.4	762	C.
February.....	.....	.....	^a 14.0	778	D.
March.....	25	13	16.0	984	C.
April.....	27	16	19.2	1,140	C.
May.....	171	14	62.8	3,860	C.
June.....	121	34	52.2	3,110	D.
July.....	42	11	26.7	1,640	B.
August.....	51	8.0	13.2	812	B.
September.....	18	6.0	9.07	540	B.
The year.....	171	6.0	21.8	15,800	

^a Estimated.

RIO PUEBLO DE TAOS NEAR TAOS, N. MEX.

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

Records available.—December 19, 1910, to September 30, 1914. Fragmentary records March to December, 1910.

Drainage area.—Not measured.

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

Channel.—Somewhat shifting, especially during high stages.

Discharge measurements.—Made by wading.

Winter flow.—Affected by ice.

Diversions.—None above this station, but several just below.

Accuracy.—Estimates good.

Discharge measurements of Rio Pueblo de Taos near Taos, N. Mex., during the year ending Sept. 30, 1914.

[Made by J. E. Powers.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Oct. 24.....	1.06	8.9	Feb. 26.....	0.90	7.4	July 17.....	1.40	20.0
Dec. 12.....	^a 1.20	7.8	Apr. 9.....	1.73	36.3	Sept. 3.....	1.27	12.6
Jan. 23.....	^a 1.02	7.0	May 20.....	2.98	153			

^a Discharge relation affected by ice.

Daily gage height, in feet, of Rio Pueblo de Taos near Taos, N. Mex., for the year ending Sept. 30, 1914.

[Manuel Mondragón, observer.]

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	1.15	1.0	1.0	1.0	1.35	0.95	.....	.....	2.7	1.55	1.5	1.3
2.....	1.2	1.0	.9	1.0	1.05	1.0	.....	.....	2.75	1.65	1.55	1.2
3.....	1.2	1.0	.95	.9	1.05	1.0	.....	.....	2.75	1.65	1.4	1.25
4.....	1.3	1.0	1.05	.85	1.05	1.0	1.55	.....	2.6	1.5	1.55	1.25
5.....	1.2	1.0	.95	.85	1.05	1.0	.....	.....	2.7	1.55	1.5	1.15
6.....	1.2	1.0	1.05	.85	.95	1.0	.....	.....	2.65	1.55	1.4	1.25
7.....	1.15	.95	1.0	.9	1.05	1.0	.....	.....	2.45	1.45	1.5	1.25
8.....	1.15	.95	1.0	.95	1.1	.95	.....	.....	2.5	1.55	1.5	1.15
9.....	1.15	.95	1.0	.95	1.15	.95	1.73	.....	2.4	1.55	1.45	1.25
10.....	1.15	.9	1.0	.9	1.0	1.05	.....	.....	2.3	1.4	1.55	1.25
11.....	1.15	.9	1.1	1.05	.9	1.05	.....	.....	2.35	1.5	1.65	1.15
12.....	1.1	.95	1.25	1.1	.9	.95	.....	.....	2.3	1.5	1.55	1.25
13.....	1.1	1.0	1.05	.95	.9	1.05	.....	.....	2.1	1.4	1.6	1.3
14.....	1.1	1.05	.95	.85	.85	1.25	.....	.....	2.15	1.55	1.55	1.25
15.....	1.05	1.05	.95	.9	.9	1.45	.....	.....	2.1	1.5	1.45	1.25
16.....	1.1	1.05	.95	.9	.85	1.45	.....	.....	1.95	1.4	1.5	1.25
17.....	1.1	1.05	.9	.9	.85	1.5	.....	.....	2.05	1.45	1.5	1.15
18.....	1.1	1.05	.95	.85	.9	1.55	.....	.....	2.0	1.6	1.4	1.2
19.....	1.0	1.05	1.05	.8	.9	1.6	.....	.....	1.9	1.4	1.55	1.2
20.....	1.0	1.05	1.05	.8	.95	1.55	.....	3.0	2.0	1.6	1.55	1.1
21.....	1.0	1.05	1.45	.75	.95	1.5	.....	3.0	1.95	1.5	1.4	1.2
22.....	.95	1.05	1.6	.95	.95	1.55	.....	3.0	1.75	1.45	1.5	1.2
23.....	1.0	.95	1.15	1.0	.95	1.4	.....	3.1	1.85	1.6	1.45	1.1
24.....	1.0	1.0	.95	1.0	.95	1.3	.....	3.1	1.85	1.55	1.35	1.2
25.....	1.0	.95	1.1	1.05	.95	1.25	.....	3.0	1.75	1.45	1.4	1.2
26.....	1.0	.95	1.05	1.05	.95	1.3	.....	2.9	1.75	1.55	1.4	1.2
27.....	.95	1.0	.9	1.1	.95	1.35	.....	2.9	1.65	1.55	1.3	1.2
28.....	1.0	.95	.9	1.1	.95	.....	.....	2.85	1.55	1.45	1.4	1.2
29.....	1.0	1.05	1.3	1.15	.....	.....	.....	2.75	1.65	1.6	1.35	1.2
30.....	1.0	1.0	1.35	1.25	.....	.....	.....	2.75	1.6	1.55	1.25	1.2
31.....	1.0	.....	1.0	1.25	.....	.....	.....	2.75	.....	1.45	1.3	.....

NOTE.—Discharge relation affected by ice Dec. 6 to Mar. 1. No gage reader available Mar. 28 to May 19.

Daily discharge, in second-feet, of Rio Pueblo de Taos near Taos, N. Mex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	10	7.7	7.7	8.0	8.5	7.4			110	25	23	14
2	12	7.7	5.9	8.0	8.5	8.4			117	29	25	11
3	12	7.7	6.7	6.4	8.5	8.4			117	29	19	12
4	14	7.7	8.7	5.6	8.5	8.4	28		98	23	25	12
5	12	7.7	6.7	5.6	8.5	8.4			110	25	23	10
6	12	7.7	8.0	5.6	7.0	8.4			104	25	19	12
7	11	6.7	8.0	5.6	8.5	8.4			82	21	23	12
8	11	6.7	8.0	5.6	8.0	7.4			87	25	23	9.8
9	11	6.7	8.0	5.6	8.5	7.4	36		77	25	21	12
10	11	5.9	8.0	5.6	7.0	9.6			68	19	25	12
11	11	5.9	8.0	5.6	6.4	9.6			72	23	29	9.6
12	9.7	6.7	8.0	8.4	6.4	7.4			68	23	25	12
13	9.7	7.7	8.0	5.6	6.4	9.6			53	19	27	13
14	9.7	8.7	7.0	5.0	5.5	14			56	25	25	12
15	8.7	8.7	7.0	5.6	6.4	21			53	23	21	12
16	9.7	8.7	7.0	5.6	5.5	21			43	19	23	12
17	9.7	8.7	7.0	5.6	5.5	23			49	21	23	9.3
18	9.7	8.7	7.0	5.0	6.4	25			46	27	19	10
19	7.7	8.7	8.0	5.0	6.4	27			40	19	25	10
20	7.7	8.7	8.0	5.0	7.4	26		154	46	27	25	8.2
21	7.7	8.7	8.0	5.0	7.4	24		154	43	23	19	10
22	6.7	8.7	8.0	5.5	7.4	26		154	33	21	23	10
23	7.7	6.7	8.0	6.4	7.4	21		170	38	27	21	8.0
24	7.7	7.7	7.0	6.4	7.4	18		170	38	25	18	10
25	7.7	6.7	8.0	7.4	7.4	16		154	33	21	19	10
26	7.7	6.7	8.0	7.4	7.4	18		138	33	25	18	10
27	6.7	7.7	7.0	8.4	7.4	20		138	29	25	15	10
28	7.7	6.7	7.0	8.4	7.4	21		131	25	21	18	10
29	7.7	8.7	8.0	8.5		22		117	29	27	16	10
30	7.7	7.7	8.0	8.5		23		117	27	25	13	10
31	7.7		8.0	8.5		24		117		21	14	

NOTE.—Discharge determined as follows: Dec. 6 to Mar. 1 estimated on account of ice; Oct. 25 to Dec. 5, Mar. 2-27, and May 20 to Aug. 23, from two well-defined rating curves; Mar. 28-31 estimated; remainder of year by indirect method for shifting channels.

Monthly discharge of Rio Pueblo de Taos near Taos, N. Mex., for the year ending Sept. 30, 1914.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
October	14	6.7	9.42	579	A.
November	8.7	5.9	7.65	455	A.
December	8.7	5.9	7.60	467	B.
January	8.5	5.0	6.40	394	C.
February	8.5	5.5	7.25	403	C.
March	27	7.4	16.1	990	C.
April					
May 20-31	170	117	143	3,400	B.
June	117	25	60.8	3,620	B.
July	29	19	23.6	1,450	B.
August	29	13	21.4	1,320	B.
September	14	8.0	10.8	643	B.

RIO TAOS¹ AT LOS CORDOVAS, N. MEX.

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

Records available.—April 6, 1910, to September 30, 1914.

Drainage area.—Not measured.

Gage.—Vertical staff.

Channel.—Fairly permanent; subject to shift during extreme high water.

Discharge measurements.—Made by wading.

Winter flow.—Affected by ice during some of the winter months.

Diversions.—Several above station.

Accuracy.—Conditions favorable for accurate results and estimates are good.

Discharge measurements of Rio Taos at Los Cordovas, N. Mex., during the year ending Sept. 30, 1914.

[Made by J. E. Powers.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Oct. 2.....	0.96	18.4	Jan. 24.....	1.13	32.8	May 21.....	2.55	403
25.....	1.08	24.8	Feb. 27.....	a 1.20	30.0	July 18.....	1.06	28.9
Dec. 15.....	a 1.34	22.8	Apr. 10.....	1.40	66.3	Sept. 4.....	.96	15.4

a Discharge relation affected by ice.

Daily gage height, in feet, of Rio Taos at Los Cordovas, N. Mex., for the year ending Sept. 30, 1914.

[Alex. Anderson, observer.]

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	0.90	1.10	1.10	1.00	1.10	1.10	1.30	2.30	2.56	1.14	1.22	0.99
2.....	1.00	1.10	1.10	1.10	1.20	1.10	1.30	2.25	2.58	1.01	1.24	.98
3.....	1.00	1.10	1.00	1.10	1.10	1.10	1.30	2.20	2.57	1.04	1.26	1.00
4.....	1.00	1.10	1.00	1.10	1.00	1.10	1.35	2.25	2.48	1.09	1.18	.99
5.....	1.00	1.10	1.00	1.10	.90	1.10	1.35	2.30	2.15	1.05	1.12	.98
6.....	1.00	1.10	1.05	1.10	1.10	1.10	1.45	2.40	2.15	1.12	1.09	.94
7.....	1.00	1.10	1.05	1.10	1.10	1.10	1.45	2.50	2.00	1.16	1.03	.94
8.....	1.00	1.10	1.00	1.10	1.10	1.20	1.45	2.65	1.80	1.18	1.12	.97
9.....	1.00	1.10	1.10	1.10	1.10	1.15	1.40	2.85	1.76	1.14	1.09	.99
10.....	1.05	1.10	1.20	1.10	1.00	1.15	1.45	2.85	1.62	1.12	1.24	.98
11.....	1.10	1.10	1.25	1.10	1.00	1.15	1.50	2.85	1.49	1.10	1.19	.97
12.....	1.10	1.10	1.20	1.10	1.10	1.15	1.50	2.65	1.43	1.02	1.15	.98
13.....	1.10	1.10	1.40	1.10	1.00	1.15	1.50	2.60	1.39	1.04	1.10	1.07
14.....	1.10	1.10	1.30	1.10	1.00	1.20	1.60	2.60	1.32	1.06	1.10	1.06
15.....	1.10	1.10	1.20	1.10	1.20	1.20	1.70	2.65	1.31	1.00	1.10	1.04
16.....	1.10	1.10	1.10	1.10	1.05	1.20	1.80	2.55	1.30	1.00	1.08	1.04
17.....	1.10	1.10	1.00	1.20	1.05	1.25	1.80	2.45	1.26	1.00	1.07	1.04
18.....	1.10	1.10	1.00	1.10	1.15	1.30	1.75	2.45	1.24	1.18	1.06	1.04
19.....	1.10	1.10	1.00	1.10	1.15	1.30	1.70	2.40	1.20	1.10	1.18	1.04
20.....	1.10	1.10	1.20	1.10	1.15	1.30	1.80	2.50	1.18	1.21	1.07	1.08
21.....	1.10	1.10	1.15	1.10	1.10	1.30	1.90	2.58	1.12	1.24	1.06	1.07
22.....	1.10	1.10	1.10	1.10	1.10	1.25	1.90	2.60	1.05	1.30	1.12	1.06
23.....	1.10	1.10	1.15	1.10	1.10	1.10	1.90	2.66	1.05	1.33	1.10	1.04
24.....	1.10	1.10	1.15	1.10	1.05	1.15	2.00	2.81	.98	1.39	1.09	1.04
25.....	1.10	1.10	1.10	1.10	1.10	1.20	2.00	2.77	.92	1.40	1.06	1.00
26.....	1.10	1.10	1.10	1.20	1.10	1.15	2.00	2.68	.88	1.40	.99	1.00
27.....	1.10	1.10	1.10	1.20	1.20	1.20	1.95	2.56	.88	1.39	1.00	.99
28.....	1.10	1.10	1.20	1.20	1.10	1.20	1.85	2.54	.84	1.38	1.00	.98
29.....	1.10	1.10	1.25	1.20	.....	1.20	1.80	2.45	.82	1.36	1.00	.99
30.....	1.10	1.10	1.20	1.10	.....	1.25	2.00	2.43	.80	1.32	1.00	.98
31.....	1.10	.....	1.20	.90	.....	1.25	.....	2.45	.....	1.28	.99	.....

NOTE.—Discharge relation affected by ice Dec. 9-16 and Dec. 20 to Mar. 7.

¹ In earlier reports called Rio Pueblo de Taos.

Daily discharge, in second-feet, of Rio Taos at Los Cordovas, N. Mex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	15	26	26	20	30	30	52	293	410	34	41	17
2.....	23	26	26	25	30	30	52	274	420	23	44	17
3.....	22	26	18	30	25	30	52	255	415	25	46	18
4.....	22	26	18	30	22	30	59	274	371	29	37	17
5.....	22	26	18	30	18	30	59	293	238	26	31	17
6.....	21	26	22	30	18	30	73	335	238	32	28	14
7.....	21	26	22	30	18	30	73	380	190	36	23	14
8.....	21	26	18	30	20	40	73	455	137	38	30	16
9.....	21	26	18	30	20	35	66	558	128	34	28	17
10.....	24	26	18	30	20	35	73	558	100	32	42	17
11.....	29	26	20	30	20	35	80	588	79	30	36	16
12.....	29	26	20	30	30	35	80	455	70	24	32	17
13.....	29	26	20	30	25	35	80	430	65	25	28	22
14.....	28	26	20	30	22	40	96	430	55	27	28	21
15.....	28	26	20	30	40	40	115	455	53	22	28	20
16.....	28	26	19	30	30	40	137	405	52	22	25	20
17.....	27	26	18	40	30	46	137	358	47	22	24	20
18.....	27	26	18	30	35	52	126	358	45	38	24	20
19.....	27	26	18	30	35	52	115	335	40	30	34	20
20.....	26	26	18	30	35	52	137	380	38	41	24	23
21.....	26	26	18	30	30	52	162	420	32	45	23	22
22.....	26	26	18	30	30	46	162	430	26	52	28	21
23.....	26	26	18	30	30	30	162	460	26	56	26	20
24.....	26	26	18	30	30	35	190	536	21	65	25	20
25.....	26	26	18	30	30	40	190	515	17	66	23	18
26.....	26	26	18	40	30	35	190	470	15	66	18	18
27.....	26	26	18	40	30	40	176	410	15	65	18	17
28.....	26	26	20	40	30	40	150	400	13	63	18	17
29.....	26	26	20	40	-----	40	137	358	12	60	18	17
30.....	26	26	20	30	-----	46	190	348	11	55	18	17
31.....	26	-----	20	25	-----	46	-----	358	-----	50	17	-----

NOTE.—Daily discharge determined as follows: Dec. 9-16 and Dec. 20 to Mar. 7 estimated on account office; Aug. 1 to Sept. 30 by indirect method for shifting channels; remainder of year from two well-defined rating curves.

Monthly discharge of Rio Taos at Los Cordovas, N. Mex., for the year ending Sept. 30, 1914.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
October.....	29	15	25.0	1,540	A.
November.....	26	26	26.0	1,550	A.
December.....	26	18	19.4	1,190	B.
January.....	40	20	31.0	1,910	C.
February.....	40	18	27.2	1,510	C.
March.....	52	30	38.6	2,370	B.
April.....	190	52	115	6,840	A.
May.....	588	255	406	25,000	A.
June.....	420	11	113	6,720	A.
July.....	66	22	39.8	2,450	A.
August.....	46	17	27.9	1,720	B.
September.....	23	14	18.3	1,090	B.
The year.....	588	11	74.3	53,900	

RIO LUCERO NEAR TAOS, N. MEX.

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

Records available.—December 17, 1910, to September 30, 1914. Fragmentary records from May to August, 1910.

Drainage area.—17 square miles.

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

Channel.—Shifting.

Discharge measurements.—Made by wading.

Winter flow.—Affected by ice.

Diversions.—None above station; below station water is diverted for irrigation.

Accuracy.—Estimates fair.

Discharge measurements of Rio Lucero near Taos, N. Mex., during the year ending Sept. 30, 1914.

[Made by J. E. Powers.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Oct. 2.....	1.06	18.7	Jan. 23.....	a 0.80	7.6	May 20.....	1.70	93.3
Oct. 24.....	.92	15.2	Feb. 26.....	a .80	5.6	July 17.....	1.33	25.2
Dec. 12.....	a 1.20	13.0	Apr. 9.....	1.01	16.9	Sept. 3.....	1.25	15.0

a Discharge relation affected by ice.

Daily gage height, in feet, of Rio Lucero near Taos, N. Mex., for the year ending Sept. 30, 1914.

[Manuel Mondragón, observer.]

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	1.0	0.85	0.8	0.8	0.75	0.75	.....	2.05	1.45	1.5	1.25	1.25
2.....	1.05	.9	.9	.8	.75	.8	.....	2.1	1.45	1.45	1.45	1.25
3.....	1.1	.75	1.0	.75	.75	.8	.....	2.1	1.45	1.45	1.45	1.25
4.....	1.15	.95	.85	.7	.7	.85	0.95	2.1	1.45	1.45	1.45	1.2
5.....	1.1	.95	1.05	.7	.75	.9	.....	1.95	1.45	1.45	1.45	1.2
6.....	1.05	.85	1.05	.75	.8	.85	.....	1.9	1.4	1.45	1.45	1.2
7.....	1.1	.9	1.0	.8	.8	.85	.....	1.85	1.45	1.45	1.45	1.2
8.....	1.1	.85	.9	.75	.9	.85	.....	1.8	1.45	1.45	1.45	1.2
9.....	1.1	.85	.85	.8	1.0	.8	1.01	1.75	1.4	1.45	1.45	1.2
10.....	1.0	.75	.95	.8	.9	.8	.....	1.75	1.4	1.45	1.45	1.2
11.....	.95	.95	1.0	.8	.85	.85	.....	1.45	1.75	1.4	1.45	1.2
12.....	1.0	.95	1.15	.8	.8	.85	.....	1.45	1.75	1.35	1.45	1.2
13.....	.9	.85	1.0	.8	.85	.9	.....	1.45	1.8	1.35	1.45	1.2
14.....	1.05	.9	1.0	.8	.85	.9	.....	1.45	1.7	1.35	1.4	1.2
15.....	1.05	.9	1.05	.8	.8	.85	.....	1.4	1.75	1.35	1.4	1.2
16.....	1.0	.9	1.0	.8	.8	.85	.....	1.4	1.7	1.35	1.4	1.2
17.....	1.0	.85	.95	.8	.8	1.0	.....	1.35	1.7	1.3	1.35	1.2
18.....	.95	.95	.85	.8	.8	1.1	.....	1.35	1.65	1.3	1.35	1.15
19.....	.8	.95	.8	.8	.8	1.05	.....	1.45	1.65	1.25	1.4	1.2
20.....	.9	.9	.8	.85	.75	1.0	.....	1.6	1.65	1.35	1.35	1.25
21.....	.95	.9	.85	.85	.75	1.0	.....	1.6	1.6	1.35	1.35	1.25
22.....	.95	.9	.8	.9	.8	1.0	.....	1.65	1.55	1.4	1.35	1.25
23.....	.95	.8	.85	.85	.75	.95	.....	1.85	1.55	1.35	1.35	1.25
24.....	.95	.65	.85	.85	.75	.9	.....	2.0	1.55	1.35	1.3	1.2
25.....	.9	.75	.8	.8	.8	.9	.....	1.9	1.55	1.45	1.3	1.2
26.....	.85	.75	.8	.8	.8	.95	.....	1.85	1.5	1.45	1.3	1.2
27.....	.8	.7	.8	.9	.75	.95	.....	1.9	1.5	1.45	1.3	1.2
28.....	.8	.7	.8	.85	.8	.95	.....	1.9	1.45	1.5	1.3	1.2
29.....	.85	.85	.8	.8	.....	.....	.....	1.9	1.45	1.5	1.3	1.2
30.....	.85	.9	.85	.85	.....	.....	.....	1.9	1.45	1.5	1.25	1.15
31.....	.9	.....	.85	.8	.....	.....	.....	1.9	.....	1.5	1.25	.....

NOTE.—Discharge relation affected by ice Dec. 2 to Feb. 28. No gage reader available Mar. 29 to May 10.

Daily discharge, in second-feet, of Rio Lucero near Taos, N. Mex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	16	13	11	10	7.0	8.0	-----	50	158	41	38	15
2	19	15	11	9.0	7.0	9.0	-----	50	168	41	33	15
3	25	10	11	8.0	7.0	9.0	-----	50	168	41	33	15
4	31	18	11	7.0	6.0	10	14	50	168	40	33	13
5	27	18	11	7.0	6.0	12	-----	50	138	40	33	13
6	24	13	11	7.4	6.0	10	-----	53	128	34	33	13
7	27	15	11	8.0	6.0	10	-----	53	117	39	32	13
8	27	13	11	7.4	7.0	10	-----	53	108	39	32	14
9	27	13	11	7.4	8.6	9.0	17	56	99	34	32	14
10	20	10	11	7.4	7.0	9.0	-----	56	97	34	32	14
11	18	18	11	7.4	6.3	10	-----	56	97	33	31	14
12	20	18	11	7.4	5.6	10	-----	56	96	28	31	14
13	15	13	11	7.4	6.3	12	-----	56	104	28	31	14
14	24	15	11	7.4	6.3	12	-----	56	87	28	27	15
15	24	15	12	7.4	5.6	10	-----	49	94	28	26	15
16	20	15	11	7.4	5.6	10	-----	49	86	27	26	15
17	20	13	13	7.4	5.6	16	-----	44	84	23	23	15
18	18	18	13	7.4	5.6	22	-----	44	75	23	23	13
19	11	18	11	7.4	5.6	19	-----	56	74	20	25	15
20	15	15	11	8.2	5.0	16	-----	77	74	27	22	18
21	18	15	13	8.2	5.0	16	-----	77	65	27	22	18
22	18	15	11	9.6	5.6	16	-----	86	58	31	22	18
23	18	11	13	8.2	5.0	14	-----	120	58	27	21	18
24	18	7	13	8.2	5.0	12	-----	149	57	27	18	16
25	15	10	11	7.4	5.6	12	-----	130	57	34	18	16
26	13	10	11	7.4	5.6	14	-----	120	50	34	18	16
27	11	8	11	9.6	5.0	14	-----	130	49	34	18	16
28	11	8	11	8.2	7.0	14	-----	130	44	39	18	16
29	13	13	11	7.4	-----	14	-----	130	42	38	18	17
30	13	15	13	8.2	-----	14	-----	130	42	38	15	15
31	15	-----	13	7.4	-----	14	-----	130	-----	38	15	-----

NOTE.—Daily discharge determined as follows: Dec. 2 to Feb. 28, estimated on account of ice; Mar. 1-28, May 11 to June 4, Oct. 1-2, and Oct. 5 to Dec. 1, from two well-defined rating curves; Mar. 29 to May 10, estimated by comparison with other stations in this basin; remainder of year by indirect method for shifting channels.

Monthly discharge of Rio Lucero near Taos, N. Mex., for the year ending Sept. 30, 1914.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
October.....	31	11	19.1	1,170	A.
November.....	18	7.0	13.6	809	A.
December.....	13	11	11.5	707	B.
January.....	10	7.0	7.85	483	C.
February.....	8.6	5.0	6.03	335	C.
March.....	22	8.0	12.5	769	B.
April.....	-----	-----	^a 28.0	1,670	D.
May.....	149	44	77.3	4,750	C.
June.....	168	42	91.4	5,440	B.
July.....	41	20	32.7	2,010	B.
August.....	38	15	25.8	1,590	B.
September.....	18	13	15.1	898	B.
The year.....	168	5.0	28.5	20,600	

^a Estimated.

RIO FERNANDO DE TAOS NEAR TAOS, N. MEX.

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

Records available.—Fragmentary records from April 6, 1910, to October 4, 1912, complete records October 5, 1912, to September 30, 1914.

Drainage area.—Not measured.

Gage.—Vertical staff.

Channel.—Somewhat shifting.

Discharge measurements.—Made by wading.

Winter flow.—Only slightly affected by ice; springs just above the section keep it open.

Diversions.—None of consequence above station.

Accuracy.—Estimates good.

Discharge measurements of Rio Fernando de Taos near Taos, N. Mex., during the year ending Sept. 30, 1914.

[Made by J. E. Powers.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Oct. 24.....	1.00	2.2	Feb. 27.....	1.12	4.1	July 18.....	1.26	11.6
Dec. 15.....	a .80	b .6	Apr. 9.....	1.50	26.5	Sept. 4.....	1.00	2.9
Jan. 24.....	1.02	2.2	May 21.....	1.75	44.5			

a Discharge relation slightly affected by ice.

b Estimated.

Daily gage height, in feet, of Rio Fernando de Taos near Taos, N. Mex., for the year ending Sept. 30, 1914.

[Sadie Witt, observer.]

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	1.00	1.20	0.90	1.00	1.00	1.02	1.30	2.25	1.40	1.20	1.30	1.05
2.....	1.00	1.20	1.00	1.00	1.00	1.02	1.40	2.35	1.40	1.20	1.20	1.04
3.....	1.00	1.20	1.00	1.00	1.00	1.05	1.40	2.35	1.40	1.20	1.35	1.03
4.....	1.10	1.05	1.00	1.00	1.00	1.10	1.40	2.35	1.30	1.20	1.30	1.00
5.....	1.20	1.05	.90	1.00	1.00	1.10	1.45	2.30	1.30	1.20	1.27	1.00
6.....	1.18	1.03	.90	1.00	1.00	1.10	1.55	2.35	1.32	1.20	1.25	1.00
7.....	1.18	1.00	.90	1.00	1.00	1.10	1.50	2.25	1.30	1.20	1.22	1.00
8.....	1.15	1.00	.90	1.00	1.00	1.10	1.50	2.25	1.30	1.20	1.20	1.00
9.....	1.13	1.00	.90	1.00	1.00	1.20	1.50	2.15	1.30	1.15	1.20	1.00
10.....	1.10	1.00	1.00	1.00	1.00	1.20	1.50	2.15	1.30	1.12	1.50	1.00
11.....	1.10	.99	1.00	1.00	1.01	1.20	1.50	2.15	1.30	1.10	1.28	1.00
12.....	1.05	.99	1.00	1.00	1.02	1.20	1.55	2.15	1.30	1.10	1.25	1.20
13.....	1.00	.99	1.00	1.00	1.01	1.10	1.50	2.05	1.30	1.10	1.20	1.10
14.....	1.00	.99	.90	1.00	1.00	1.05	1.50	2.00	1.27	1.10	1.15	1.10
15.....	1.00	.99	.90	1.00	1.00	1.00	1.50	2.00	1.24	1.10	1.10	1.10
16.....	1.00	1.02	.90	1.00	1.01	1.15	1.55	2.00	1.21	1.10	1.10	1.10
17.....	1.00	1.00	.90	1.00	1.00	1.30	1.58	1.90	1.20	1.20	1.10	1.10
18.....	1.00	1.02	.90	1.00	1.00	1.50	1.65	1.80	1.20	1.30	1.10	1.10
19.....	1.00	1.02	.90	1.00	1.00	1.35	1.55	1.80	1.20	1.23	1.10	1.10
20.....	1.00	1.02	.80	1.00	1.00	1.35	1.55	1.75	1.20	1.22	1.10	1.10
21.....	1.00	1.02	.80	1.00	1.05	1.15	1.55	1.72	1.20	1.20	1.10	1.10
22.....	1.00	1.08	.80	1.00	1.00	1.15	1.65	1.72	1.18	1.35	1.15	1.10
23.....	1.00	1.08	.80	1.00	1.00	1.30	1.75	1.72	1.16	1.40	1.15	1.10
24.....	1.00	1.08	.80	1.00	1.00	1.30	1.75	1.72	1.14	1.40	1.10	1.10
25.....	1.00	1.08	.80	1.05	1.00	1.22	1.85	1.72	1.12	1.40	1.10	1.10
26.....	1.15	1.10	.90	1.05	1.00	1.25	1.80	1.72	1.10	1.35	1.10	1.10
27.....	1.15	1.10	.90	1.05	1.01	1.40	1.85	1.68	1.10	1.30	1.10	1.08
28.....	1.20	.90	.90	1.05	1.02	1.55	2.05	1.68	1.10	1.25	1.10	1.00
29.....	1.20	.90	.90	1.00	-----	1.45	2.45	1.68	1.05	1.35	1.10	1.04
30.....	1.20	.90	.90	1.00	-----	1.30	2.15	1.40	1.05	1.20	1.08	1.02
31.....	1.20	-----	.90	1.00	-----	1.30	-----	1.40	-----	1.20	1.06	-----

NOTE.—Discharge relation slightly affected by ice Dec. 10-19.

Daily discharge, in second-feet, of Rio Fernando de Taos near Taos, N. Mex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	2.2	7.0	1.3	2.2	2.2	2.5	14	84	20	8.5	14	3.8
2.....	2.2	7.0	2.2	2.2	2.2	2.5	20	92	20	8.5	8.5	3.6
3.....	2.2	7.0	2.2	2.2	2.2	3.0	20	92	20	8.5	17	3.4
4.....	3.8	3.0	2.2	2.2	2.2	3.8	20	92	14	8.5	14	2.9
5.....	7.0	3.0	1.3	2.2	2.2	3.8	23	88	14	8.5	12	2.9
6.....	6.4	2.7	1.3	2.2	2.2	3.8	30	92	15	8.5	11	2.9
7.....	6.4	2.2	1.3	2.2	2.2	3.8	26	84	14	8.5	9.6	2.9
8.....	5.4	2.2	1.3	2.2	2.2	3.8	26	84	14	8.5	8.5	2.9
9.....	4.8	2.2	1.3	2.2	2.2	7.0	26	76	14	6.6	8.5	2.9
10.....	3.8	2.2	1.0	2.2	2.2	7.0	26	76	14	5.5	26	2.9
11.....	3.8	2.1	.9	2.2	2.4	7.0	26	76	14	4.7	13	2.9
12.....	3.0	2.1	.9	2.2	2.5	7.0	30	76	14	4.7	11	8.5
13.....	2.2	2.1	.8	2.2	2.4	3.8	26	68	14	4.7	8.5	4.7
14.....	2.2	2.1	.6	2.2	2.2	3.0	26	64	12	4.7	6.6	4.7
15.....	2.2	2.1	.6	2.2	2.2	2.2	26	64	11	4.7	4.7	4.7
16.....	2.2	2.5	.6	2.2	2.4	5.4	30	64	9.0	4.7	4.7	4.7
17.....	2.2	2.2	.6	2.2	2.2	12	32	56	8.5	8.5	4.7	4.7
18.....	2.2	2.5	.6	2.2	2.2	26	36	48	8.5	14	4.7	4.7
19.....	2.2	2.5	.6	2.2	2.2	17	30	48	8.5	10	4.7	4.7
20.....	2.2	2.5	.7	2.2	2.2	17	30	44	8.5	9.6	4.7	4.7
21.....	2.2	2.5	.7	2.2	3.0	6.6	30	42	8.5	8.5	4.7	4.7
22.....	2.2	3.5	.7	2.2	2.2	6.6	36	42	7.7	17	6.6	4.7
23.....	2.2	3.5	.7	2.2	2.2	14	44	42	7.0	20	6.6	4.7
24.....	2.2	3.5	.7	2.2	2.2	14	44	42	6.2	20	4.7	4.7
25.....	2.2	3.5	.7	3.0	2.2	9.6	52	42	5.5	20	4.7	4.7
26.....	5.4	3.8	1.3	3.0	2.2	11	48	42	4.7	17	4.7	4.7
27.....	5.4	3.8	1.3	3.0	2.4	20	52	39	4.7	14	4.7	4.3
28.....	7.0	1.3	1.3	3.0	2.5	30	68	39	4.7	11	4.7	4.0
29.....	7.0	1.3	1.3	2.2	2.2	23	100	39	3.8	17	4.7	3.6
30.....	7.0	1.3	1.3	2.2	2.2	14	76	20	3.8	8.5	4.3	3.3
31.....	7.0	.....	1.3	2.2	2.2	14	.....	20	.....	8.5	4.0	.....

NOTE.—Discharge Dec. 10-19 estimated on account of ice; for remainder of year determined from two well-defined rating curves.

Monthly discharge of Rio Fernando de Taos near Taos, N. Mex., for the year ending Sept. 30, 1914.

Month.	Discharge in second-feet.			Run-off (in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October.....	7.0	2.2	3.82	235	A.
November.....	7.0	1.3	2.97	177	A.
December.....	2.2	.6	1.08	66	A.
January.....	3.0	2.2	2.30	141	B.
February.....	3.0	2.2	2.28	127	B.
March.....	30	2.2	9.81	603	B.
April.....	100	14	35.8	2,130	A.
May.....	92	20	60.5	3,720	A.
June.....	20	3.8	10.8	643	A.
July.....	20	4.7	10.1	621	A.
August.....	26	4.0	8.09	497	A.
September.....	8.5	2.9	4.12	245	B.
The year.....	100	.6	12.7	9,200	

CHAMA RIVER AT CHAMA, N. MEX.

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

Records available.—September 23, 1912, to May 26, 1914, when the station was discontinued.

Drainage area.—Not measured.

Gage.—Vertical staff.

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

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

Winter flow.—Affected by ice.

Diversions.—Very little water diverted for irrigation above station.

Accuracy.—Estimates fair.

Discharge measurements of Chama River at Chama, N. Mex., during the year ending Sept. 30, 1914.

Date.	Made by—	Gage height.	Dis-charge.	Date.	Made by—	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.ft.</i>			<i>Feet.</i>	<i>Sec.ft.</i>
Oct. 28	Frank O'Brien.....	1.80	21.2	Mar. 1	R. S. Watrous.....	^a 1.98	20.8
28	.....do.....	1.88	26.0	Apr. 7	.....do.....	2.71	225
Nov. 18	.....do.....	1.94	28.2	May 2	.....do.....	2.81	266
Dec. 19	C. J. Emerson.....	^a 2.05	17.1	26	.....do.....	3.00	664
Jan. 21	Emerson and Watrous	^a 1.88	10.4				

^a Discharge relation affected by ice.

Daily gage height, in feet, of Chama River at Chama, N. Mex., for the year ending Sept. 30, 1914.

[H. L. Gillum, observer.]

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.
1.....	1.92	1.82	1.96	.....	1.92	1.98	2.24	2.97
2.....	1.95	1.82	1.93	.....	2.05	.....	2.34	2.87
3.....	2.34	1.88	1.95	.....	.....	.....	2.45	2.74
4.....	2.28	1.90	2.52	1.88	.....	.....	2.59	2.92
5.....	2.21	1.86	1.96	.....	2.00	1.85	2.71	2.80
6.....	2.17	1.82	2.95	.....	.....	.....	2.83	2.94
7.....	2.11	1.78	2.05	1.92	.....	.....	2.73	3.08
8.....	1.98	1.76	2.50	.....	2.04	1.84	2.73	3.59
9.....	1.97	1.78	2.37	.....	.....	.....	2.67	4.00
10.....	1.98	1.90	2.27	1.90	.....	.....	2.61	3.38
11.....	1.94	1.94	2.34	.....	2.09	1.96	2.54	3.40
12.....	1.93	1.92	2.32	1.90	.....	.....	2.54	3.32
13.....	1.94	1.94	2.24	.....	.....	2.02	2.55	3.35
14.....	1.97	2.00	2.15	1.91	2.04	.....	2.65	3.12
15.....	1.96	1.96	2.35	.....	.....	2.27	2.67	3.09
16.....	1.94	1.92	2.34	1.91	2.01	.....	2.79	2.98
17.....	1.96	1.90	2.32	.....	2.35	.....	2.67	2.98
18.....	1.90	1.92	2.11	.....	2.04	.....	2.69	3.00
19.....	1.87	1.94	2.02	1.91	.....	2.41	2.86	3.01
20.....	1.86	1.95	2.00	.....	.....	.....	3.03	3.10
21.....	1.86	1.92	2.00	1.90	2.02	.....	3.17	3.12
22.....	1.88	1.96	1.98	.....	.....	2.09	3.07	3.16
23.....	1.87	1.94	1.94	.....	2.00	.....	2.99	3.35
24.....	1.88	1.96	1.90	1.89	.....	.....	3.39	3.28
25.....	1.86	1.94	1.86	.....	.....	2.31	3.92	3.62
26.....	1.86	1.93	1.81	1.91	1.99	.....	3.43	3.04
27.....	1.88	1.84	1.73	.....	.....	.....	2.89	.....
28.....	1.82	1.86	1.76	1.90	.....	.....	2.79	.....
29.....	1.81	1.88	1.84	.....	.....	2.26	2.87	.....
30.....	1.82	1.87	1.86	1.89	.....	.....	2.95	.....
31.....	1.82	.....	1.81	.....	.....	2.18	.....	.....

NOTE.—Discharge relation affected by ice Dec. 1-24 and Jan. 1 to Mar. 1.

Daily discharge, in second-feet, of Chama River at Chama, N. Mex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.
1.....	27	22	25	.....	.....	21	80	353
2.....	30	22	25	.....	.....	22	102	297
3.....	78	26	25	.....	.....	24	130	236
4.....	69	27	20	.....	.....	25	176	324
5.....	59	24	20	.....	.....	26	222	262
6.....	54	22	20	.....	.....	25	277	335
7.....	47	19	20	.....	.....	24	231	426
8.....	34	17	20	.....	.....	24	231	1,090
9.....	34	19	20	.....	.....	28	206	1,640
10.....	34	27	20	.....	.....	33	183	1,160
11.....	31	30	19	.....	.....	37	159	1,210
12.....	30	28	19	.....	.....	40	159	1,090
13.....	31	30	18	.....	.....	44	162	1,120
14.....	34	34	17	.....	.....	65	198	824
15.....	33	30	18	.....	.....	86	206	776
16.....	31	27	18	.....	.....	95	258	644
17.....	33	26	17	.....	.....	104	206	644
18.....	28	27	17	.....	.....	112	214	668
19.....	26	29	17	.....	.....	119	292	680
20.....	25	30	17	.....	.....	98	391	788
21.....	25	27	17	.....	.....	76	496	812
22.....	27	30	20	.....	.....	54	419	896
23.....	26	33	20	.....	.....	67	364	1,160
24.....	27	31	25	.....	.....	80	728	1,050
25.....	25	30	25	.....	.....	94	1,360	1,510
26.....	25	29	22	.....	.....	91	776	716
27.....	27	23	17	.....	.....	89	307	.....
28.....	22	24	19	.....	.....	86	258	.....
29.....	22	26	24	.....	.....	84	297	.....
30.....	22	26	25	.....	.....	76	341	.....
31.....	22	.....	22	.....	.....	69	.....	.....

NOTE.—Daily discharge determined as follows: Dec. 1-24 and Mar. 1 estimated on account of ice; Nov. 2-30 and May 10-26 by indirect method for shifting channels; during remainder of year from two fairly well defined rating curves, interpolated for days for which gage heights are missing.

Monthly discharge of Chama River at Chama, N. Mex., for the year ending Sept. 30, 1914.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
October.....	78	22	33.5	2,060	A.
November.....	34	17	26.5	1,580	A.
December.....	25	17	20.3	1,250	B.
January.....	.....	.....	^a 12.0	738	D.
February.....	.....	.....	^a 16.0	889	D.
March.....	119	21	61.9	3,810	C.
April.....	1,360	80	314	18,700	B.
May 1-26.....	1,640	236	797	41,100	C.
The period.....	.....	.....	.....	70,100	.....

^a Estimated on account of ice.

CHAMA RIVER NEAR CHAMA, N. MEX.

Location.—In sec. 25, T. 31 N., R. 3 E., at highway bridge on main road from Chama to Tierra Amarilla, 2½ miles southeast of Chama, and 14½ miles northwest of Tierra Amarilla, 200 feet above mouth of Little Chama River. This station supersedes that known as Chama River at Chama, N. Mex., which was located 2 miles above. No intervening tributaries of consequence.

Records available.—May 27 to September 30, 1914.

Drainage area.—Not measured.

Gage.—Automatic recording.

Channel.—Somewhat shifting.

Discharge measurements.—Made by wading and from bridge.

Winter flow.—Greatly affected by ice.

Diversions.—None of appreciable amount above station.

Accuracy.—Estimates good.

Discharge measurements of Chama River near Chama, N. Mex., during the year ending Sept. 30, 1914.

[Made by R. S. Watrous.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
May 27.....	3.33	636	July 22.....	2.16	115	Sept. 25.....	1.91	50.7
June 12.....	3.03	391	Sept. 22.....	2.04	74.1			

Daily gage height, in feet, and discharge, in second-feet, of Chama River near Chama, N. Mex., for the year ending Sept. 30, 1914.

[I. L. Gillum, observer.]

Day.	May.		June.		July.		August.		September.	
	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.
1.....			3.56	866	2.28	128	1.90	56	1.91	58
2.....			3.48	780	2.31	134	1.94	62	1.87	52
3.....			3.50	800	2.30	132	2.08	86	1.85	49
4.....			3.37	672	2.45	171	2.07	85	1.83	46
5.....			3.27	580		200	2.02	76	1.80	42
6.....			3.18	506	2.40	157	1.98	69	1.78	40
7.....			3.03	407	2.33	140	1.98	69	1.77	38
8.....			2.93	351	2.28	128	1.92	59	1.77	38
9.....			2.88	326	2.17	104	1.90	56	1.93	61
10.....			2.97	372	2.13	96	2.02	76	1.87	52
11.....			3.09	444	2.10	90	1.96	66	1.79	41
12.....			3.12	464	2.09	88	1.89	55	2.10	92
13.....			3.13	471	2.13	96	1.85	49	2.18	106
14.....				450	2.08	86	1.86	50	2.31	134
15.....				425	2.00	72	1.82	45	2.20	110
16.....				407	1.95	64	1.81	43	2.23	117
17.....				388	1.99	70	1.83	46	2.10	92
18.....			2.98	377	2.25	121	1.78	40	2.02	74
19.....			2.92	346	2.30	132	1.76	37	1.98	69
20.....			2.86	317	2.20	110	1.76	37	1.94	62
21.....			2.78	282	2.42	163	1.83	46	2.15	100
22.....			2.70	251	2.23	117	2.16	102	2.02	74
23.....			2.61	220	2.08	86	1.99	70	2.00	72
24.....			2.56	204	2.19	108	1.91	58	1.96	66
25.....			2.50	185	2.19	108	1.86	50	1.93	61
26.....			2.45	171	2.07	85	1.97	67	1.91	58
27.....	3.35	652	2.38	152	2.09	88	2.19	108	1.89	55
28.....	3.35	652	2.33	140	2.10	90	2.03	77	1.88	53
29.....	3.36	662	2.29	130	2.05	81	2.14	98	1.85	49
30.....	3.36	662	2.29	130	1.98	69	2.04	79	1.85	49
31.....	3.39	690			1.94	62	1.97	67		

NOTE.—Discharge determined from a fairly well defined rating curve, except for days for which gage heights are missing, when it was estimated.

Monthly discharge of Chama River near Chama, N. Mex., for the year ending Sept. 30, 1914.

Month.	Discharge in second feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
May 27-31.....	690	652	664	6,590	A.
June.....	866	130	387	23,000	B.
July.....	200	62	109	6,700	A.
August.....	108	37	64.0	3,940	B.
September.....	134	38	67.0	3,990	B.
The period.....				44,200	

CHAMA RIVER AT PARK VIEW, N. MEX.

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

Records available.—November 25, 1912, to September 30, 1914.

Drainage area.—Not measured.

Gage.—Automatic recording.

Channel.—Shifting.

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

Winter flow.—Affected by ice.

Diversions.—Some water diverted for irrigation above station.

Accuracy.—Estimates fair.

Discharge measurements of Chama River at Park View, N. Mex., during the year ending Sept. 30, 1914.

Date.	Made by—	Gage height.	Dis- charge.	Date.	Made by—	Gage height.	Dis- charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Oct. 29	Frank O'Brien.....	0.78	34.6	Apr. 30	R. S. Watrous.....	3.13	1,190
Nov. 16	.....do.....	.93	52.5	May 23	.....do.....	4.52	2,750
Dec. 21	C. J. Emerson.....	a 1.02	62.1	June 14	.....do.....	2.86	702
Jan. 17	Emerson and Watrous.	a 1.16	55.0	Aug. 1	.....do.....	2.88	116
Mar. 3	R. S. Watrous.....	a 1.09	70.6	Sept. 23	.....do.....	2.91	123
Apr. 9	.....do.....	2.20	555				

a Discharged relation affected by ice.

Daily gage height, in feet, of Chama River at Park View, N. Mex., for the year ending Sept. 30, 1914.

[I. L. Gillum, observer.]

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	1.05	0.78	0.91	1.05	1.95	.....	1.50	3.14	3.99	2.08	2.88	2.84
2.....	1.10	.79	.83	1.07	.....	1.09	1.59	2.91	3.88	2.16	2.89	2.82
3.....	1.46	.86	.92	.95	.....	1.11	1.91	2.79	3.92	2.24	2.95	2.78
4.....	1.86	.91	.86	.90	1.08	1.10	2.17	2.80	3.68	2.31	2.97	2.78
5.....	1.46	.87	.82	.95	.....	1.09	2.44	3.05	3.54	2.40	2.95	2.76
6.....	1.17	.86	.91	.....	.....	1.07	2.65	3.28	3.33	2.36	2.92	2.75
7.....	1.02	.88	.90	.....	.....	1.07	2.65	3.63	.....	2.30	2.94	2.73
8.....	1.08	.86	.85	.....	1.09	1.22	2.50	4.01	.....	2.28	2.87	2.72
9.....	1.06	.85	.89	.....	.....	1.34	2.27	4.33	2.89	2.22	2.87	2.78
10.....	1.02	.85	.87	.....	.....	1.37	2.33	4.57	2.91	2.16	2.92	2.81
11.....	.99	.84	.96	.98	.....	1.37	2.35	^a 4.49	2.98	2.08	3.00	2.76
12.....	1.01	.87	.99	.....	.....	1.30	2.42	4.56	3.01	2.11	2.89	2.82
13.....	1.04	.91	.94	.....	.....	1.39	2.30	4.57	2.99	2.27	2.84	3.02
14.....	1.04	.96	.93	.....	.....	1.45	2.49	4.47	2.92	2.21	2.85	3.27
15.....	1.00	.96	.92	.....	1.02	1.55	2.70	4.52	2.97	2.08	2.79	3.19
16.....	.98	.92	.93	.....	1.03	1.46	2.80	4.37	2.92	1.99	2.78	3.13
17.....	.94	.93	.93	1.15	1.03	1.33	2.60	4.40	2.88	2.17	2.78	2.99
18.....	.92	.97	.93	.....	1.05	1.38	2.41	4.43	2.79	2.35	2.76	2.93
19.....	.91	.96	.93	.....	1.08	1.28	2.58	4.40	2.69	2.43	2.73	2.89
20.....	.92	1.01	.93	.....	1.27	1.17	2.87	4.40	2.60	2.39	2.74	2.88
21.....	.92	.98	1.04	1.90	1.32	1.03	3.21	4.52	2.53	2.50	2.77	3.05
22.....	.91	.97	.97	.....	1.04	.98	3.31	4.57	2.48	2.48	2.97	2.96
23.....	.89	.86	.97	.....	.95	1.40	3.18	^b 4.70	2.41	2.32	2.94	2.91
24.....	.88	.96	1.03	.....	.....	1.53	2.97	4.50	2.32	2.31	2.89	2.88
25.....	.87	1.03	1.07	1.93	.....	1.45	3.20	4.16	2.21	2.44	2.84	2.86
26.....	.85	.89	1.10	.....	.....	1.52	3.37	4.03	2.10	2.35	2.85	2.85
27.....	.79	.94	1.13	.....	.....	1.60	3.20	3.97	1.92	2.31	3.01	2.84
28.....	.77	.82	1.05	.....	.....	1.62	3.02	3.83	.....	2.39	2.93	2.83
29.....	.78	.84	.95	.....	.....	1.62	3.02	3.77	.....	2.39	2.93	2.82
30.....	.77	.83	.97	.....	.....	1.53	3.20	3.71	2.14	2.35	2.93	2.82
31.....	.78	.....	1.04	.....	.....	1.48	.....	3.73	.....	2.28	2.87	.....

^a Maximum gage height 4.8 feet.

^b Maximum gage height 5.1 feet.

NOTE.—Discharge relation Dec. 14 to Feb. 21, affected by ice.

Daily discharge, in second-feet, of Chama River at Park View, N. Mex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	74	34	50	.....	.....	65	201	1,200	2,070	194	117	105
2.....	84	35	40	.....	.....	70	236	1,020	1,940	220	120	100
3.....	190	43	51	.....	.....	70	386	932	1,830	249	135	91
4.....	357	50	43	.....	.....	70	528	940	1,570	276	141	91
5.....	190	44	38	.....	.....	70	691	1,130	1,430	312	135	87
6.....	101	43	50	.....	.....	75	830	1,320	1,240	290	128	85
7.....	68	46	48	.....	.....	78	830	1,060	1,110	258	133	81
8.....	80	43	42	.....	.....	117	730	2,090	1,000	244	115	79
9.....	76	42	47	.....	.....	150	587	2,500	902	217	115	91
10.....	68	42	44	.....	.....	158	623	2,330	888	191	128	98
11.....	62	41	58	.....	.....	158	635	2,720	851	161	150	87
12.....	66	44	62	.....	.....	138	678	2,310	802	167	120	100
13.....	72	50	54	.....	.....	164	605	2,330	788	220	107	152
14.....	72	58	53	.....	.....	184	724	2,090	743	194	110	240
15.....	64	58	51	.....	.....	220	865	2,760	776	150	96	209
16.....	61	51	53	.....	.....	187	940	2,550	743	122	94	187
17.....	54	53	53	.....	.....	147	795	2,590	717	170	94	144
18.....	51	59	53	.....	.....	161	672	2,430	659	232	89	128
19.....	50	58	53	.....	.....	133	782	2,590	599	262	83	117
20.....	51	66	55	.....	.....	105	992	2,590	545	240	85	115
21.....	51	61	62	.....	.....	75	1,260	2,760	506	285	91	161
22.....	50	59	59	.....	.....	66	1,350	2,330	479	267	141	135
23.....	47	43	59	.....	.....	167	1,230	3,010	440	194	133	122
24.....	46	58	60	.....	.....	213	1,070	2,730	391	134	120	115
25.....	44	70	60	.....	.....	184	1,250	2,280	335	224	107	110
26.....	42	47	60	.....	.....	209	1,400	2,120	285	184	110	107
27.....	35	54	60	.....	.....	240	1,250	2,040	209	164	152	105
28.....	33	38	58	.....	.....	249	1,110	1,880	212	184	130	103
29.....	34	41	56	.....	.....	249	1,110	1,320	215	177	130	100
30.....	33	40	59	.....	.....	213	1,250	1,750	217	158	130	100
31.....	34	.....	62	.....	.....	194	.....	1,770	.....	135	115	.....

NOTE.—Daily discharge determined as follows: Oct. 1 to Dec. 13 and Mar. 8 to June 2 from two well-defined rating curves; Dec. 14-31 estimated on account of ice; during remainder of year by indirect method for shifting channels, except on days for which gage heights are missing when discharge was interpolated.

Monthly discharge of Chama River at Park View, N. Mex., for the year ending Sept. 30, 1914.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
October.....	357	33	75.5	4,640	B.
November.....	70	34	49.0	2,920	A.
December.....	62	38	53.3	3,280	C.
January.....	.....	.....	^a 50.0	3,070	D.
February.....	.....	.....	^a 55.0	3,050	D.
March.....	249	65	148	9,100	C.
April.....	1,400	201	854	50,800	B.
May.....	3,010	932	2,170	133,000	B.
June.....	2,070	209	816	48,600	C.
July.....	312	122	210	12,900	C.
August.....	152	83	118	7,260	B.
September.....	240	79	118	7,020	B.
The year.....	3,010	.....	395	286,000	.....

^a Estimated because of ice.

CHAMA RIVER NEAR TIERRA AMARILLA, N. MEX.

Location.—At the mouth of the box canyon below El Vado Valley, 1 mile southeast of El Vado and 15 miles southwest of Tierra Amarilla. Nutrias Creek, which is the south line of the Tierra Amarilla land grant, joins the Chama from the north 4 miles below the station.

Records available.—September 28, 1913, to September 30, 1914.

Drainage area.—Not measured.

Gage.—Automatic recording.

Channel.—Somewhat shifting.

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

Winter flow.—Greatly affected.

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

Accuracy.—Estimates fair.

Discharge measurements of Chama River near Tierra Amarilla, N. Mex., during the year ending Sept. 30, 1914.

Date.	Made by—	Gage height.	Dis-charge.	Date.	Made by—	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Oct. 31	Frank O'Brien.....	0.03	41.3	May 1	R. S. Watrous.....	4.05	1,240
Nov. 17	do.....	.20	59.2	22	do.....	6.00	2,410
Dec. 21	C. J. Emerson.....	a 1.70	55.5	June 15	do.....	3.00	848
Jan. 18	Emerson and Watrous.	a 1.70	112	July 27	do.....	1.03	202
Mar. 4	R. S. Watrous.....	a 1.54	105	Sept. 24	do.....	.52	108
Apr. 11	do.....	2.70	651				

a Discharge relation affected by ice.

Daily gage height, in feet, of Chama River near Tierra Amarilla, N. Mex., for the year ending Sept. 30, 1914.

[I. L. Gillum, observer.]

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	0.36	0.05	-----	1.70	-----	-----	-----	4.12	5.24	0.81	0.67	0.46
2.....	.41	.08	-----	-----	-----	-----	-----	3.69	5.16	.88	.63	.38
3.....	a 1.40	-----	-----	-----	-----	-----	-----	3.33	5.12	1.21	.75	.29
4.....	1.72	-----	-----	-----	-----	1.54	-----	3.31	4.61	1.38	.87	.19
5.....	1.06	-----	-----	-----	-----	-----	-----	3.86	4.29	1.62	.77	.11
6.....	.78	-----	-----	-----	-----	-----	-----	4.28	4.01	1.67	.63	.09
7.....	.62	-----	-----	-----	-----	-----	-----	5.04	3.90	1.38	.54	.00
8.....	.50	-----	-----	-----	-----	-----	-----	6.06	3.80	1.25	.50	— .12
9.....	.40	-----	-----	-----	-----	-----	-----	6.87	3.70	1.08	.52	— .02
10.....	.39	-----	-----	-----	-----	-----	-----	b 6.97	3.60	.92	.50	.21
11.....	.32	-----	-----	-----	-----	-----	3.04	6.49	3.50	-----	.89	.31
12.....	.31	-----	-----	-----	-----	-----	2.91	6.59	3.40	-----	.62	.23
13.....	.33	-----	-----	-----	-----	-----	3.06	6.51	3.30	-----	.42	.36
14.....	.34	-----	-----	-----	-----	-----	3.08	6.32	3.20	-----	.35	1.46
15.....	.30	-----	-----	-----	-----	-----	3.33	6.32	3.12	-----	.32	1.76
16.....	.29	-----	-----	-----	-----	-----	3.66	5.80	3.08	-----	.28	2.15
17.....	.25	.20	-----	1.70	-----	-----	3.25	5.81	2.96	-----	.29	1.12
18.....	.20	.32	-----	1.70	-----	-----	2.91	5.91	2.76	-----	.27	.90
19.....	.19	.30	-----	-----	-----	-----	3.02	5.83	2.60	-----	.23	.73
20.....	.19	-----	-----	-----	-----	-----	3.76	5.89	2.48	-----	.19	.66
21.....	.18	-----	1.70	-----	-----	-----	4.39	6.09	2.23	-----	.24	.62
22.....	.18	-----	-----	-----	-----	-----	4.49	6.03	2.01	-----	.34	1.09
23.....	.17	-----	-----	-----	-----	-----	4.44	6.30	1.80	-----	.96	.83
24.....	.13	-----	-----	-----	-----	-----	3.88	c 6.86	1.63	-----	.74	.56
25.....	.11	-----	-----	-----	-----	-----	4.12	5.82	1.47	-----	.59	.47
26.....	.10	-----	-----	-----	-----	-----	4.52	5.46	1.30	-----	.43	.43
27.....	.04	-----	-----	-----	-----	-----	4.17	5.32	1.13	1.10	.69	.38
28.....	.01	-----	-----	-----	-----	-----	3.80	5.01	1.02	1.83	.89	.35
29.....	.01	-----	-----	-----	-----	-----	3.59	4.86	.96	1.46	.67	.33
30.....	.01	-----	-----	-----	-----	-----	4.07	4.67	.98	1.14	.83	.32
31.....	.02	-----	-----	-----	-----	-----	4.68	-----	-----	.85	.64	-----

a Maximum gage height, 2.5 feet. b Maximum gage height, 8.0 feet. c Maximum gage height, 7.8 feet.

NOTE.—Discharge relation affected by ice Nov. 20 to Mar. 4; automatic gage not working properly Nov. 3–10, Mar. 5 to Apr. 10, and July 11–26.

Daily discharge, in second-feet, of Chama River near Tierra Amarilla, N. Mex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.	76	46					207	1,280	2,030	164	139	102
2.	81	48					241	1,070	1,980	176	132	92
3.	243						401	906	1,960	241	152	81
4.	327						560	897	1,650	283	171	70
5.	176						746	1,150	1,470	351	155	62
6.	131						910	1,360	1,320	366	132	60
7.	108						910	1,790	1,260	283	119	52
8.	92						790	2,460	1,220	250	113	41
9.	80						628	3,030	1,160	213	116	50
10.	79						667	3,100	1,120	183	113	72
11.	71						785	2,700	1,070	168	173	82
12.	70						735	2,830	1,020	172	130	73
13.	72						793	2,780	977	226	101	38
14.	73						801	2,640	933	199	92	285
15.	69						906	2,570	897	153	88	372
16.	68						1,050	2,280	880	126	82	497
17.	64	59					872	2,280	830	174	84	207
18.	59	71					735	2,360	750	238	81	168
19.	58	69					777	2,360	689	270	77	140
20.	58						1,100	2,340	644	246	72	130
21.	57						1,420	2,480	552	292	78	122
22.	57						1,470	2,440	477	273	90	199
23.	56						1,450	2,630	410	200	183	155
24.	53						1,160	3,020	357	189	147	113
25.	51						1,280	2,430	310	230	124	101
26.	50						1,490	2,190	265	189	100	96
27.	45						1,300	2,080	225	215	137	90
28.	42						1,120	1,890	203	413	169	86
29.	42						1,200	1,800	192	301	134	84
30.	42						1,260	1,690	174	223	160	82
31.	43							1,690		169	130	

NOTE.—Daily discharge determined as follows: Apr. 1–10, and July 11–26, estimated by comparison with records of other stations in this drainage; Oct. 1 to Nov. 2, and Apr. 11 to May 25, from a fairly well defined rating curve; remainder of year by indirect method for shifting channels.

Monthly discharge of Chama River near Tierra Amarilla, N. Mex., for the year ending Sept. 30, 1914.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
October.....	327	42	83.6	5,140	A.
November.....			^a 55.0	3,270	D.
December.....			^a 58.0	3,570	D.
January.....			^a 55.0	3,380	D.
February.....			^a 65.0	3,610	D.
March.....			^a 152	9,350	D.
April.....	1,490	207	919	54,700	C.
May.....	3,100	897	2,150	132,000	B.
June.....	2,030	174	901	53,600	B.
July.....	413	126	231	14,200	D.
August.....	183	72	122	7,500	B.
September.....	497	41	128	7,620	B.
The year.....	3,100		412	298,000	

^a Estimated by comparison with adjacent stations.

CHAMA RIVER NEAR CHAMITA, N. MEX.

Location.—In sec. 15, T. 21 N., R. 8 E., at Denver & Rio Grande Railroad bridge, 1 mile south of Chamita, 4 miles above Espanola, and one-half mile above mouth.

Records available.—October 10, 1912, to September 30, 1914.

Drainage area.—Not measured.

Gage.—Automatic recording.

Channel.—Shifting.

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

Winter flow.—Slightly affected by ice during some of the winter months.

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

Accuracy.—Estimates fair.

Discharge measurements of Chama River near Chamita, N. Mex., during the year ending Sept. 30, 1914.

Date.	Made by—	Gage height.	Dis-charge.	Date.	Made by—	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec. ft.</i>			<i>Feet.</i>	<i>Sec. ft.</i>
Oct. 7	J. E. Powers	1.40	218	Mar. 3	J. E. Powers	2.20	1,550
24	Frank O'Brien	.85	81.4	Apr. 16	do	2.48	1,980
Nov. 3	J. E. Powers	.99	142	May 18	do	3.13	3,830
6	Powers and King	1.10	145	27	do	3.85	2,650
Dec. 18	J. E. Powers	.96	119	July 13	do	2.60	224
Jan. 21	do	.80	101	14	do	2.75	529
Feb. 24	do	1.68	683	Aug. 31	do	1.50	136

Daily gage height, in feet, of Chama River near Chamita, N. Mex., for the year ending Sept. 30, 1914.

[H. H. Kramer, observer.]

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.	1.53	0.76	0.94	.....	0.82	1.00	1.58	2.84	3.75	2.64	2.53	1.38
2.	1.80	.75	.94	.....	.84	1.38	1.56	2.71	3.82	2.54	2.48	1.25
3.	1.62	1.03	.93	.....	.80	2.20	1.63	2.50	3.33	2.49	2.10	1.18
4.	1.60	1.51	1.00	1.10	.83	2.00	1.83	2.41	3.75	2.67	2.01	.92
5.	1.60	1.17	.94	.....	.83	2.00	1.98	2.49	3.63	2.64	2.06	.75
6.	1.57	1.07	.91	.....	.82	1.98	2.19	2.76	3.52	2.63	1.91	.94
7.	1.46	1.05	.88	.....	.75	1.90	2.32	2.96	3.57	2.64	1.85	.88
8.	1.25	1.01	.83	.....	.80	1.80	2.32	3.23	3.51	2.62	1.86	.76
9.	1.13	1.00	.79	.....	.82	1.72	2.22	3.48	3.30	2.68	1.96	.69
10.	1.02	1.01	.79	.....	.85	1.80	2.12	3.36	3.15	2.57	1.89	.72
11.	1.01	1.00	.79	1.00	.83	1.67	2.13	2.92	3.06	2.54	1.82	.70
12.	1.00	.99	.83	.....	.83	1.48	2.22	2.80	3.04	2.56	1.75	1.10
13.	.99	1.00	.90	.....	.82	1.38	2.26	2.77	3.05	2.70	1.74	1.54
14.	.96	1.00	.90	.....	.83	1.47	2.28	2.79	3.02	3.01	1.64	1.84
15.	.94	1.03	.....	.....	.85	1.55	2.38	2.90	3.01	2.51	1.48	2.21
16.	.92	1.05	.....	.....	.83	1.63	2.48	2.80	2.98	2.21	1.42	1.92
17.	.90	1.08	.....	.....	.82	1.78	2.57	2.59	3.03	2.30	1.58	1.80
18.	.90	.99	1.00	.84	.85	1.90	2.43	2.94	2.94	2.15	1.49	1.60
19.	.90	.97	.98	.....	.89	1.90	2.37	3.16	2.89	2.50	1.40	1.50
20.	.88	1.08	.....	.....	.92	1.71	2.54	.....	2.86	2.53	1.45	1.47
21.	.86	1.07	.85	.92	1.05	1.63	2.77	3.80	2.77	2.45	1.24	1.83
22.	.83	1.08	.....	.89	1.65	1.56	2.93	.....	2.75	2.51	1.74	1.70
23.	.83	1.06	.....	.94	1.78	1.50	3.00	4.10	2.72	2.49	1.78	1.68
24.	.83	1.03	.....	.86	1.63	1.54	2.84	4.15	2.67	2.08	1.65	1.58
25.	.82	1.00	.....	.92	1.46	1.58	2.74	4.17	2.66	2.12	1.56	1.54
26.	.81	1.03	.....	1.01	1.33	1.55	2.89	3.96	2.66	2.67	1.53	1.50
27.	.82	1.05	.....	.97	1.22	1.63	2.87	3.90	2.63	2.52	1.43	1.52
28.	.81	1.03	1.08	1.07	1.11	1.67	2.70	3.79	2.62	2.51	1.41	1.45
29.	.81	.99	.....	.87	.....	1.68	2.59	3.74	2.56	2.60	1.61	1.42
30.	.78	.94	.....	.82	.....	1.70	2.63	3.71	2.51	2.75	1.59	1.38
31.	.77	.....	.....	.89	.....	1.64	.....	3.69	.....	2.55	1.50	.....

^a Maximum gage height, 3.1 feet. ^b Maximum gage height, 3.75 feet. ^c Maximum gage height, 4.2 feet.

NOTE.—Dec. 15 to Jan. 20, discharge relation somewhat affected by ice during the night. May 18-25, channel completely changed by scour.

Daily discharge, in second-feet, of Chama River near Chamita, N. Mex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	464	62	92	90	98	145	447	2,250	1,770	248	1,210	183
2.....	705	60	92	90	102	372	357	1,970	1,910	193	1,120	145
3.....	491	172	88	90	88	1,560	413	1,560	1,930	169	559	136
4.....	446	491	126	90	98	1,190	619	1,390	1,770	267	466	155
5.....	419	196	96	90	95	1,190	830	1,540	1,540	248	517	124
6.....	365	126	84	90	92	1,160	1,170	2,080	1,330	242	330	215
7.....	270	120	72	90	67	1,020	1,410	2,520	1,430	248	334	184
8.....	126	96	53	90	81	860	1,410	3,180	1,320	237	342	174
9.....	76	92	45	90	88	740	1,230	3,850	956	274	422	141
10.....	45	96	45	90	98	860	1,140	4,090	725	210	364	155
11.....	48	96	45	90	88	606	1,160	3,970	606	193	312	145
12.....	51	92	56	90	88	413	1,320	3,630	580	204	267	102
13.....	53	96	84	90	84	334	1,480	3,550	593	286	261	342
14.....	51	96	88	90	84	405	1,520	3,630	559	896	204	632
15.....	51	120	98	90	92	475	1,710	3,910	475	1,200	128	637
16.....	51	140	108	100	84	506	1,980	3,630	517	697	102	387
17.....	51	150	120	100	78	684	1,990	3,330	570	830	174	299
18.....	56	96	130	100	88	860	1,710	3,410	475	619	132	183
19.....	64	92	125	120	102	860	1,410	3,180	431	1,160	95	136
20.....	64	156	100	140	111	563	1,930	2,870	405	1,210	115	124
21.....	64	150	90	155	169	457	2,310	2,610	334	1,070	42	320
22.....	60	156	90	141	645	396	2,680	2,940	320	1,170	261	237
23.....	68	150	90	164	830	350	2,850	3,280	299	1,140	290	226
24.....	76	132	90	124	619	380	2,470	3,390	267	538	210	174
25.....	72	114	90	150	440	413	2,030	3,540	261	580	164	155
26.....	68	132	90	193	334	350	2,360	2,900	261	1,460	150	136
27.....	68	150	90	169	261	413	2,310	2,750	242	1,190	106	145
28.....	64	138	90	220	198	449	1,950	2,270	237	1,170	98	115
29.....	64	114	90	124	.....	457	1,730	1,750	204	1,330	188	102
30.....	68	88	90	98	.....	475	1,810	1,690	179	1,610	179	88
31.....	65	.....	90	128	.....	423	.....	1,660	.....	1,240	136	.....

NOTE.—Daily discharge determined as follows: Dec. 15 to Jan. 20 estimated on account of ice; Feb. 20 to Mar. 10 from a fairly well-defined rating curve; on days for which gage heights are missing, interpolated; for remainder of year, by indirect method for shifting channels and by comparison with other stations in this drainage.

Monthly discharge of Chama River near Chamita, N. Mex., for the year ending Sept. 30, 1914.

Month.	Discharge in second feet.			Run off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
October.....	705	45	151	9,280	C.
November.....	491	60	132	7,860	C.
December.....	130	45	88.3	5,430	C.
January.....	220	90	115	7,070	C.
February.....	830	67	189	10,500	C.
March.....	1,560	145	626	38,500	D.
April.....	2,850	357	1,590	94,600	D.
May.....	4,080	1,390	2,850	175,000	D.
June.....	1,930	179	752	44,700	D.
July.....	1,610	169	708	43,500	C.
August.....	1,210	42	301	18,500	C.
September.....	697	88	212	12,600	C.
The year.....	4,080	42	646	468,000	

BRAZOS RIVER NEAR BRAZOS, N. MEX.

Location.—At the mouth of the box canyon 3 miles east of Brazos, and 15 miles southeast of Chama. The Little Brazos joins the Brazos from the north about 1½ miles below station.

94280°—WSP 388—15—5

Records available.—September 18, 1913, to September 30, 1914.

Drainage area.—Not measured.

Gage.—Automatic recording, installed in a well connected with the river by an intake pipe.

Channel.—Slightly shifting.

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

Winter flow.—Greatly affected by ice.

Diversions.—None above station.

Accuracy.—Estimates good.

Discharge measurements of Brazos River near Brazos, N. Mex., during the year ending Sept. 30, 1914.

Date.	Made by—	Gage height.	Dis-charge.	Date.	Made by—	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec. ft.</i>			<i>Feet.</i>	<i>Sec. ft.</i>
Nov. 16	Frank O'Brien.....	0.49	19.0	Apr. 27	R. S. Watrous.....	2.32	563
Dec. 20	C. J. Emerson.....	0.92	23.9	May 24	do.....	3.35	1,620
Jan. 20	Emerson and Watrous	0.48	25.8	June 13	do.....	1.60	283
Mar. 2	R. S. Watrous.....	0.52	32.0	July 23	do.....	.90	97.7
Apr. 8	do.....	1.13	115	Sept. 23	do.....	.68	51.0

^a Discharge relation affected by ice.

Daily gage height, in feet, of Brazos River near Brazos, N. Mex., for the year ending Sept. 30, 1914.

[I. L. Gillum, observer.]

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	0.82	0.51	0.76	0.63	0.62	0.53	0.78	2.15	2.51	0.88	0.81	0.57
2.....	.81	.51	.96	.59	.....	.53	.82	1.88	2.29	.93	.78	.55
3.....	.92	.61	1.04	.57	.....	.52	.90	1.79	2.38	.97	.78	.54
4.....	1.02	.59	.93	.54	.....	.56	.97	1.84	2.17	1.07	.80	.54
5.....	.92	.54	.96	.54	.....	.61	1.08	2.14	2.07	1.04	.78	.52
6.....	.96	.55	.99	.53	.....	.57	1.17	2.56	1.94	.99	.72	.51
7.....	.85	.56	.90	.52	.....	.58	1.22	3.05	1.81	.93	.70	.50
8.....	.86	.55	.92	.51	.58	.57	1.14	3.45	1.74	.90	.69	.49
9.....	.62	.52	.90	.51	.58	.58	1.13	^a 3.71	1.65	.87	.78	.51
10.....	.59	.51	1.03	.52	.58	.56	1.10	3.49	1.62	.81	.79	.53
11.....	.60	.51	1.04	.51	.59	.58	1.05	3.35	1.62	.77	.91	.52
12.....	.65	.58	1.05	.51	.58	.58	1.04	3.34	1.62	.82	.71	.52
13.....	.68	.57	1.24	.49	.57	.....	1.11	3.33	1.60	.99	.65	1.01
14.....	.69	.59	1.00	.49	.56	.....	1.20	3.30	1.56	.84	.64	1.35
15.....	.64	.59	.90	.49	.53	.....	1.34	3.18	1.61	.78	.63	1.20
16.....	.61	.52	.91	.48	.52	.68	1.47	3.02	1.62	.80	.63	.99
17.....	.59	.62	.92	.48	.52	.82	1.36	3.08	1.62	1.11	.63	.78
18.....	.58	.60	.93	.51	.47	.93	1.32	3.21	1.52	.92	.62	.71
19.....	.55	.60	.83	.49	.49	.95	1.41	3.13	1.43	1.08	.59	.68
20.....	.54	.65	.85	.49	.51	.89	1.70	3.17	1.38	1.13	.62	.69
21.....	.54	.59	.....	.45	.48	.83	2.03	3.15	1.31	1.16	.65	1.00
22.....	.54	.56	.....	.52	.50	.81	2.18	3.13	1.24	1.13	.75	.78
23.....	.53	.57	.....	.60	.51	.78	2.08	3.34	1.17	.92	.73	.69
24.....	.51	.62	.....	.60	.55	.76	2.01	3.34	1.12	.91	.71	.65
25.....	.52	.62	.....	.53	.56	.76	2.29	2.87	1.08	1.17	.62	.64
26.....	.49	.54	.....	.53	.54	.78	2.48	2.72	1.03	.92	.58	.61
27.....	.52	.61	.....	.....	.53	.81	2.37	2.62	.95	.89	.69	.61
28.....	.52	.66	.69	.....	.56	.82	2.11	2.47	.90	1.03	.63	.60
29.....	.53	.66	.67	.....	.....	.83	2.08	2.38	.87	1.06	.63	.58
30.....	.52	.71	.65	.....	.....	.79	2.25	2.31	.84	.93	.64	.58
31.....	.53	.....	.64	.....	.....	.79	.....	2.26	.....	.82	.61	.....

^a Maximum gage height 4.25 feet.

NOTE.—Discharge relation affected by ice Nov. 30 to Mar. 5.

Daily discharge, in second-feet, of Brazos River near Brazos, N. Mex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	64	20	20	35	33	31	58	496	824	94	82	42
2.....	62	20	20	36	33	31	64	336	648	103	77	40
3.....	77	29	18	34	34	30	74	298	714	110	77	39
4.....	92	27	20	32	34	30	84	319	568	130	80	39
5.....	77	23	20	32	35	38	103	452	507	124	77	37
6.....	83	24	20	31	35	34	120	738	435	114	68	35
7.....	65	24	20	30	36	35	130	1,280	372	103	65	34
8.....	41	24	20	29	36	34	114	1,790	340	98	64	33
9.....	36	21	20	29	36	35	112	2,190	302	92	76	35
10.....	32	20	18	30	36	33	106	1,820	294	83	77	37
11.....	32	20	18	29	37	35	98	1,620	294	77	94	35
12.....	36	26	18	29	36	35	96	1,610	294	84	66	35
13.....	38	25	18	27	34	38	108	1,590	283	114	57	101
14.....	38	27	18	27	34	41	126	1,550	268	88	56	176
15.....	32	27	20	27	31	44	158	1,390	287	78	54	139
16.....	29	21	22	26	30	46	192	1,190	294	82	53	98
17.....	27	30	22	26	30	64	163	1,270	294	139	53	65
18.....	26	28	24	29	25	78	153	1,480	254	101	52	56
19.....	24	28	24	27	27	82	176	1,330	224	133	48	52
20.....	23	32	24	27	29	73	264	1,380	209	144	52	53
21.....	23	27	24	24	26	65	405	1,380	189	156	54	96
22.....	23	24	26	30	28	62	484	1,380	170	144	68	64
23.....	22	25	26	30	29	58	430	1,610	153	101	65	52
24.....	20	30	26	30	32	56	395	1,610	146	99	62	47
25.....	21	30	28	31	33	56	549	1,090	133	153	51	46
26.....	18	23	28	31	32	58	676	1,080	122	101	45	43
27.....	21	22	28	31	31	62	600	990	106	96	58	43
28.....	21	22	28	31	33	64	446	738	98	122	51	41
29.....	22	22	30	32	.....	65	430	714	92	128	51	39
30.....	21	20	30	32	.....	60	525	632	88	103	52	39
31.....	22	.....	35	32	.....	60	.....	627	.....	84	48	.....

NOTE.—Discharge determined as follows: Oct. 1-26 and Mar. 6 to May 24 from a well-determined curve; Nov. 30 to Mar. 5, estimated on account of ice; remainder of year by indirect method for shifting channels.

Monthly discharge of Brazos River near Brazos, N. Mex., for the year ending Sept. 30, 1914.

Month.	Discharge in second feet.			Run off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
October.....	92	18	37.7	2,320	B.
November.....	32	20	24.7	1,470	C.
December.....	35	18	23.0	1,410	C.
January.....	36	24	29.9	1,840	C.
February.....	37	25	32.3	1,790	C.
March.....	82	30	49.5	3,040	B.
April.....	676	58	248	14,800	A.
May.....	2,160	598	1,150	70,700	A.
June.....	824	88	300	17,900	B.
July.....	156	77	109	6,700	B.
August.....	94	45	62.4	3,840	B.
September.....	176	33	56.4	3,360	B.
The year.....	2,160	18	178	129,000	

LITTLE BRAZOS RIVER NEAR BRAZOS, N. MEX.

Location.—In the Tierra Amarilla land grant, $1\frac{1}{2}$ miles east of Brazos, 1 mile north-east of Ensenada, and one-half mile above confluence with Brazos River. The wagon road from Brazos up Brazos canyon crosses the Little Brazos about 200 feet below the gage.

Records available.—April 8 to September 30, 1914.

Drainage area.—Not measured.

Gage.—Vertical staff.

Discharge measurements.—Made by wading.

Channel.—Rocky; fairly permanent.

Winter flow.—Affected by ice.

Diversions.—No diversions above station.

Accuracy.—Estimates good.

Discharge measurements of Little Brazos River near Brazos, N. Mex., during the year ending Sept. 30, 1914.

[Made by R. S. Watrous.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	<i>Fect.</i>	<i>Sec.-ft.</i>		<i>Fect.</i>	<i>Sec.-ft.</i>		<i>Fect.</i>	<i>Sec.-ft.</i>
Apr. 8.....	0.91	33.8	May 23.....	1.87	218	July 26.....	0.52	10.1
29.....	1.06	54.7	June 13.....	.80	33.0	Sept. 23.....	.37	4.7

Daily gage height, in feet, and discharge, in second-feet, of Little Brazos River near Brazos, N. Mex., for the year ending Sept. 30, 1914.

[I. L. Gillum, observer.]

Day.	April.		May.		June.		July.		August.		September.	
	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
1.....			1.09	59	1.25	87	0.47	9.2			0.30	3.0
2.....												
3.....					1.19	78	.60	16	0.48	8.8		
4.....			1.25	84							.28	2.6
5.....			1.18	72					.47	8.4		
6.....							.48	9.2				
7.....					1.08	63						
8.....	0.91	34	1.75	190							.29	2.8
9.....					.86	37	.51	11	.42	6.4		
10.....												
11.....			1.82	207							.32	3.5
12.....					.80	32			.38	5.1		
13.....	.86	31					.58	14				
14.....	1.04	49	1.68	172								
15.....											.45	7.6
16.....	.98	44			.83	35	.51	10				
17.....	.88	33	1.70	177					.37	4.8		
18.....											.35	4.3
19.....	1.08	55			.72	26						
20.....							.54	12				
21.....									.40	5.6		
22.....			1.90	227							.37	4.8
23.....	1.09	58			.60	17						
24.....												
25.....							.52	11	.31	3.3	.33	3.8
26.....					.52	12						
27.....			1.40	112					.32	3.5		
28.....	1.05	54									.31	3.3
29.....			1.27	90								
30.....												
31.....												

NOTE.—Discharge determined by the indirect method for shifting channels Apr. 8-28 and May 29 to July 13, and from well-defined rating curve Apr. 29 to May 28 and July 14 to Sept. 30. No estimates for days on which gage was not read.

NUTRITUS CREEK NEAR TIERRA AMARILLA, N. MEX.

Location.—In T. 29 N., R. 3 E., at highway bridge on road from Tierra Amarilla to Canjilon, and about $1\frac{1}{2}$ miles south of Tierra Amarilla; about 7 miles above confluence with Chama River.

Records available.—May 24 to September 30, 1914.

Drainage area.—Not measured.

Gage.—Vertical staff.

Channel.—Sandy and shifting.

Discharge measurements.—Made by wading.

Winter flow.—Affected by ice.

Diversions.—None of consequence above station.

No estimates of discharge made on account of lack of data.

Discharge measurements of Nutritus Creek near Tierra Amarilla, N. Mex., during the year ending Sept. 30, 1914.

[Made by R. S. Watrous.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
May 24	5.23	90.6	July 30	4.10	0.7
June 14	4.25	2.0	Sept. 24	3.95	a.2

a Estimated.

Daily gage height, in feet, of Nutritus Creek near Tierra Amarilla, N. Mex., for the year ending Sept. 30, 1914.

[I. L. Gillum, observer.]

Day.	May.	June.	July.	Aug.	Sept.	Day.	May.	June.	July.	Aug.	Sept.
1.....		4.95			3.95	16.....		4.28			
2.....			4.05			17.....		4.27	4.53		
3.....						18.....				4.02	4.00
4.....		4.80		4.07	3.91	19.....		4.22			
5.....						20.....					
6.....		4.78				21.....			4.25	3.95	
7.....			4.08	4.07		22.....					4.00
8.....		4.50				23.....		4.06			
9.....		4.45			3.95	24.....	5.25				3.95
10.....		4.38	4.10	4.06		25.....	5.10			3.95	
11.....						26.....	5.03	4.05			
12.....		4.80				27.....					
13.....		4.38		4.05		28.....	4.97			4.00	
14.....		4.25	4.06			29.....					3.93
15.....					4.05	30.....	4.82	4.03	4.10		
						31.....	4.95				

NUTRIAS CREEK NEAR CEBOLLA, N. MEX.

Location.—At highway bridge over Nutrias Creek on the road from Tierra Amarilla to Cebolla, 3 miles northwest of Cebolla, 13½ miles southeast of Tierra Amarilla, and about 18 miles above confluence with Chama River.

Records available.—April 9 to September 30, 1914.

Drainage area.—Not measured.

Gage.—Vertical staff.

Channel.—Somewhat shifting.

Discharge measurements.—Made by wading and from highway bridge.

Winter flow.—Affected by ice.

Diversions.—Some water diverted for irrigation above station.

Accuracy.—Discharge estimates fair.

Discharge measurements of Nutrias Creek near Cebolla, N. Mex., during the year ending Sept. 30, 1914.

[Made by R. S. Watrous.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Apr. 9.....	1.23	26.2	May 25.....	1.65	72.3	July 30.....	0.89	5.1
28.....	1.41	37.1	June 14.....	.98	11.2	Sept. 24.....	.73	1.8

Daily gage height, in feet, and discharge, in second-feet, of Nutrias Creek near Cebolla, N. Mex., for the year ending Sept. 30, 1914.

[I. L. Gillum, observer.]

Day.	Apr.		May.		June.		July.		Aug.		Sept.	
	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
1.....					1.55	56					0.68	1.6
2.....							0.80	4.7				
3.....												
4.....					1.45	42			0.81	3.3	.70	1.7
5.....			1.50	48								
6.....												
7.....												
8.....			1.82	114	1.28	27	.86	5.8	.76	2.6		
9.....	1.23	26									.75	2.1
10.....	1.20	24					.85	5.4	.72	2.1		
11.....					1.02	13						
12.....												
13.....			1.95	156					.68	1.7		
14.....					.98	11	.75	3.2				
15.....	1.32	32									.80	2.6
16.....			1.80	108								
17.....	1.37	36			.97	11	.78	3.5				
18.....									.54	1.2	.75	2.0
19.....			1.86	126	.97	11						
20.....												
21.....							.82	4.0	.58	1.3		
22.....	1.68	81									.80	2.6
23.....					.78	4.9						
24.....	1.40	37									.73	1.9
25.....			1.65	73					.65	1.4		
26.....			1.65	73	.75	4.0						
27.....												
28.....	1.42	39	1.35	32					.70	1.8		
29.....	1.42	39									.70	1.6
30.....					.70	3.0	.89	5.1				
31.....												

NOTE.—Discharge Apr. 29 to June 4 determined from a fairly well defined rating curve, for remainder of year by indirect method for shifting channels. No estimates for days on which gage was not read.

HORN RIVER ¹ NEAR CANJILON, N. MEX.

Location.—In sec. 2, T. 26 N., R. 5 E., in the Carson National Forest, at Canjilon ranger station, 5 miles northeast of Canjilon. No important tributaries near.

Records available.—June 19, 1911, to August 18, 1914, when station was discontinued.

Drainage area.—Not measured.

Gage.—Vertical staff, installed April 22, 1913, to replace staff gage washed out by flood April 14, 1913; new gage referred to original datum.

Channel.—Shifting.

Discharge measurements.—Made by wading.

Diversions.—None above station.

Accuracy.—Estimates of discharge fair.

Discharge measurements of Horn River near Canjilon, N. Mex., during the year ending Sept. 30, 1914.

[Made by R. S. Watrous.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Apr. 10.....	2.80	44.2	May 25.....	3.08	60.7
28.....	2.80	49.9	25.....	3.30	75.5

Daily gage height, in feet, of Horn River near Canjilon, N. Mex., for the year ending Sept. 30, 1914.

[L. A. Shartzer, observer.]

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	1.90				1.85			3.90	2.30			
2.....	1.91							2.90				
3.....	2.20							2.90				
4.....												
5.....								3.40	2.50			
6.....	1.90								2.40	1.94		
7.....	1.88				1.88			3.30				
8.....									2.35	1.94		
9.....							3.00	3.30		1.92		
10.....	1.85	1.90					2.80		2.30	1.94		
11.....	1.84	1.89					2.70		2.27	1.92		
12.....	1.84	1.89										
13.....	1.83	1.89		2.00			3.30		2.30	1.92		
14.....	1.82	1.90					3.40			1.92		
15.....	1.82	1.90							2.60			
16.....	1.80		1.88					3.10		1.92		
17.....		1.91		2.10			3.00		2.26		2.20	
18.....		1.91					2.80	2.90			1.95	
19.....								3.20				
20.....	1.82		1.88				3.70		2.20			
21.....	1.80						4.00	3.30				
22.....	1.80				1.85			3.40	2.20			
23.....	1.79						2.90	3.40				
24.....	1.77	1.91		1.85			3.90					
25.....		1.92					2.85	3.20	2.05			
26.....		1.92							1.99			
27.....		1.93							1.99			
28.....	1.75				1.90		2.80	3.10				
29.....	1.75							3.10	1.95			
30.....	1.75						4.70	2.70	1.92			
31.....												

NOTE.—Discharge relation affected by ice throughout December, January, and February.

¹Also called Rio Canjilon.

Daily discharge, in second-feet, of Horn River near Canjilon, N. Mex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.	1.1							222	2.8			
2.	1.2							62				
3.	4.6							62				
4.												
5.								126	8.8			
6.	1.1								6.2	1.5		
7.	1.0							110				
8.									5.2	1.5		
9.							75	110		1.3		
10.	1.0	1.1					44		4.3	1.5		
11.	.9	1.1					30		5.0	1.3		
12.	.9	1.1										
13.	.9	1.1					123		5.6	1.3		
14.	.9	1.1					139			1.3		
15.	.9	1.1							16			
16.	.8							62		1.3		
17.		1.2					75		5.8		4.6	
18.		1.2					44	32			1.6	
19.								78				
20.	.9						187		4.6			
21.	.8						241	94				
22.	.8							110	4.6			
23.	.8						65	110				
24.	.7	1.2					225					
25.		1.3					58	68	2.5			
26.		1.3							1.9			
27.		1.4							1.9			
28.	.6						50	44				
29.	.6							44	1.6			
30.	.6						350	12	1.3			
31.												

NOTE.—Discharge determined Apr. 9-29 and May 5 to June 16 by indirect method for shifting channels, and for remainder of year from a fairly well defined curve.

RIO VALLECITOS AT VALLECITOS, N. MEX.

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

Records available.—June 17, 1911, to September 30, 1914.

Drainage area.—Not measured.

Gage.—Vertical staff.

Channel.—Practically permanent.

Discharge measurements.—Made by wading.

Winter flow.—Affected by ice.

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

Accuracy.—Estimates of discharge fair.

Discharge measurements of Rio Vallecitos at Vallecitos, N. Mex., during the year ending Sept. 30, 1914.

Date.	Made by—	Gage height.	Discharge.
Apr. 13	J. E. Powers	<i>Feet.</i> 2.37	<i>Sec.-ft.</i> 149
July 22	.....do.....	1.48	24.8

Daily gage height, in feet, of Rio Vallecitos at Vallecitos, N. Mex., for the year ending Sept. 30, 1914.

[D. G. Darrah, observer.]

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.	1.22	-----	-----	-----	-----	-----	1.62	-----	2.24	0.89	1.39	-----
2.	1.33	-----	1.90	-----	-----	-----	1.64	-----	2.20	-----	-----	0.87
3.	1.29	1.12	1.89	-----	-----	1.34	1.59	-----	2.07	.91	1.56	.98
4.	1.41	1.21	1.76	-----	1.46	-----	1.62	3.07	2.01	-----	-----	.94
5.	-----	1.21	1.82	1.71	1.42	1.82	-----	3.47	2.09	-----	2.11	.91
6.	1.32	1.24	1.74	-----	-----	-----	-----	3.62	-----	1.00	1.64	.93
7.	1.29	1.25	-----	-----	-----	-----	1.67	3.56	-----	1.47	1.52	-----
8.	1.31	1.27	1.32	-----	-----	-----	1.72	-----	1.94	-----	1.99	-----
9.	1.28	-----	-----	1.68	1.46	1.49	1.74	-----	1.87	-----	-----	-----
10.	-----	-----	-----	-----	-----	1.57	1.78	-----	1.87	.96	-----	.92
11.	1.21	1.32	1.49	-----	-----	-----	1.80	3.63	1.81	2.9	2.13	.89
12.	-----	-----	-----	1.69	-----	1.29	-----	2.83	-----	-----	-----	-----
13.	1.20	-----	-----	-----	1.45	-----	1.96	-----	-----	.97	-----	-----
14.	-----	1.31	-----	-----	-----	1.32	2.01	2.94	-----	.89	-----	-----
15.	1.19	1.28	1.62	-----	-----	1.36	2.23	2.65	1.58	1.68	-----	.91
16.	1.18	-----	-----	1.68	1.38	1.24	2.64	2.47	1.56	1.14	-----	-----
17.	1.19	1.31	1.59	-----	-----	-----	2.59	-----	1.49	.95	1.59	.83
18.	1.18	1.32	-----	-----	-----	1.32	2.46	-----	1.42	.89	-----	-----
19.	-----	1.30	-----	1.73	1.36	-----	-----	2.86	-----	-----	1.47	-----
20.	-----	1.33	-----	-----	-----	-----	3.21	2.78	-----	1.59	1.48	.87
21.	1.22	1.47	-----	-----	-----	-----	3.14	2.67	-----	1.18	-----	.86
22.	1.23	1.50	1.71	1.69	-----	-----	-----	2.63	1.17	1.48	-----	-----
23.	1.21	-----	-----	-----	-----	1.43	-----	2.76	1.16	-----	1.15	.86
24.	1.20	-----	1.59	-----	-----	1.49	-----	2.51	-----	1.40	-----	.89
25.	1.19	2.05	-----	-----	1.12	1.44	3.40	2.56	.95	1.70	-----	.88
26.	-----	-----	-----	-----	-----	1.44	-----	2.61	.89	1.43	1.21	-----
27.	-----	-----	-----	-----	-----	1.56	3.05	2.22	.89	-----	-----	.85
28.	1.23	-----	-----	-----	1.10	1.64	2.79	-----	-----	1.80	1.01	.87
29.	1.24	-----	1.68	-----	-----	-----	2.69	2.41	-----	1.47	-----	.89
30.	1.24	-----	-----	-----	-----	1.67	-----	-----	-----	1.46	.91	-----
31.	1.23	-----	-----	-----	-----	1.67	-----	-----	-----	1.52	.93	-----

NOTE.—Discharge relation affected by ice Nov. 20 to Mar. 5.

Daily discharge, in second-feet, of Rio Vallecitos at Vallecitos, N. Mex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.	9.0	8.1	-----	-----	-----	10	34	290	116	2.9	18	3.2
2.	-----	7.7	-----	-----	-----	12	36	315	107	3.0	24	2.7
3.	-----	7.3	-----	-----	-----	16	31	340	86	3.2	29	4.6
4.	-----	8.8	-----	-----	-----	18	34	364	76	3.8	60	3.8
5.	-----	8.8	-----	-----	-----	20	35	504	88	4.4	92	3.2
6.	-----	8.8	-----	-----	-----	21	36	557	81	5.0	36	3.6
7.	-----	9.0	-----	-----	-----	22	38	536	74	23	26	3.6
8.	-----	9.5	-----	-----	-----	23	43	542	67	16	74	3.5
9.	-----	9.7	-----	-----	-----	24	45	548	59	10	81	3.4
10.	9.4	9.9	-----	-----	-----	30	49	554	59	4.2	88	3.4
11.	-----	8.8	10	-----	-----	22	51	560	52	3.4	95	2.9
12.	-----	8.6	10	-----	-----	14	60	284	47	3.9	84	2.9
13.	-----	8.5	10	-----	-----	14	70	302	42	4.4	73	3.0
14.	-----	8.5	10	-----	-----	15	76	319	37	2.9	62	3.1
15.	-----	8.4	9.8	-----	-----	17	114	230	31	39	51	3.2
16.	-----	8.2	9.9	-----	-----	12	227	177	29	8.2	41	2.8
17.	-----	8.4	10	-----	-----	13	212	215	24	4.0	31	2.3
18.	-----	8.2	11	-----	-----	15	174	254	20	2.9	27	2.4
19.	-----	8.2	10	-----	-----	16	294	293	17	17	23	2.6
20.	-----	8.3	9.0	-----	-----	17	414	269	14	31	24	2.7
21.	-----	8.4	9.0	-----	-----	18	389	236	11	9.4	19	2.6
22.	-----	8.5	9.0	-----	-----	19	415	224	9.1	25	14	2.6
23.	-----	8.8	9.0	-----	-----	21	440	263	8.8	22	8.5	2.6
24.	-----	8.5	8.0	-----	-----	24	465	188	6.4	19	9.0	2.9
25.	-----	8.4	8.0	-----	-----	21	480	203	4.0	41	9.5	2.8
26.	-----	8.4	8.0	-----	-----	21	419	218	2.9	21	10	2.6
27.	-----	8.5	8.0	-----	-----	29	358	111	2.9	36	7.6	2.5
28.	-----	8.5	8.0	-----	-----	36	272	135	2.9	51	5.2	2.7
29.	-----	8.8	8.0	-----	-----	37	242	160	2.9	23	4.2	2.9
30.	-----	8.8	8.0	-----	-----	38	266	145	2.9	23	3.2	2.8
31.	-----	8.5	-----	-----	-----	38	-----	130	-----	26	3.6	-----

NOTE.—Daily discharge determined as follows: Oct. 1 to Nov. 19 and Mar. 6 to Sept. 30 from a well-defined rating curve; Nov. 20-30 and Mar. 1-5 estimated on account of ice; interpolated for days for which gage heights are missing.

Monthly discharge of Rio Vallecitos at Vallecitos, N. Mex., for the year ending Sept. 30, 1914.

Month.	Discharge in second feet.			Run off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
October.....	16	8.2	9.47	582	B.
November.....	11	7.3	9.01	536	B.
December.....			a 6.0	369	C.
January.....			a 6.0	369	D.
February.....			a 7.0	389	D.
March.....	38	10	21.1	1,300	C.
April.....	480	31	194	11,500	B.
May.....	564	111	305	18,800	D.
June.....	116	2.9	39.3	2,340	C.
July.....	51	2.9	15.8	972	C.
August.....	95	3.2	36.5	2,240	C.
September.....	4.6	2.3	3.00	179	C.
The year.....	564		54.7	-39,600	

a Estimated on account of ice.

SANTA FE CREEK ABOVE RESERVOIR NEAR SANTA FE, N. MEX.

Location.—In sec. 22, T. 17 N., R. 10 E., one-fourth mile above Santa Fe Water & Light Co.'s diversion for water supply, $1\frac{1}{2}$ miles above reservoir and 5 miles east of Santa Fe.

Records available.—April 24, 1913, to September 30, 1914, at present site. May 12, 1910, to April 23, 1913, 1 mile below; fragmentary.

Drainage area.—22.5 square miles (from topographic map).

Gage.—Automatic recording. One mile below present site staff gage used May 12, 1910, to February 23, 1913, and automatic gage February 24 to April 23, 1913.

Channel.—Permanent since October 24, 1913, when a concrete artificial control was installed just below the gage with zero flow at gage height 1.0 foot.

Winter flow.—Affected by ice.

Floods.—On June 16, 1914, a flood of 30 minutes' duration reached gage height 2.82 feet. The maximum discharge was found, by Kutter's formula, to be 226 second-feet.

Diversions.—None above station.

Accuracy.—Discharge estimates excellent during open-water season and good during winter months.

Discharge measurements of Santa Fe Creek above reservoir near Santa Fe, N. Mex., during the year ending Sept. 30, 1914.

Date.	Made by—	Gage height.	Dis-charge.	Date.	Made by—	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Oct. 9	G. A. Gray.....	0.86	6.9	Apr. 7	C. J. Emerson.....	1.63	18.1
14	Gray and Redding.....	.80	5.8	18	J. E. Powers.....	1.65	20.1
22	E. L. Redding.....	.69	3.4	May 7	Gray and Watrous.....	1.64	20.2
25	Gray and King.....	1.28	3.8	16	Gray and Quinlan.....	1.76	31.2
Nov. 1	Gray and Emerson.....	1.26	3.1	23	W. R. King.....	1.83	38.0
8	Gray and Powers.....	1.26	3.2	June 6	Gray and King.....	1.67	21.9
25	J. E. Powers.....	1.34	5.9	10	G. A. Gray.....	1.56	14.2
Dec. 6	.....do.....	a 1.34	5.3	13	.....do.....	1.50	12.1
27	C. J. Emerson.....	a 1.25	3.4	16	.....do.....	2.82	b 226
Jan. 3	.....do.....	a 1.25	3.2	17	.....do.....	1.68	23.2
12	.....do.....	a 1.64	2.7	July 3	Gray and Watrous.....	1.57	14.9
14	.....do.....	a 1.30	3.6	20	Gray and King.....	1.70	24.3
17	J. E. Powers.....	a 1.26	3.5	Ang. 4	G. A. Gray.....	1.66	19.9
29	.....do.....	1.25	2.7	27	Gray and Hank.....	1.50	11.4
Feb. 6	Gray and Watrous.....	a 1.33	4.3	Sept. 28	Gray and King.....	1.28	3.4
18	R. S. Watrous.....	a 1.24	2.6	28	.....do.....	1.28	2.8
Mar. 14	Gray and Watrous.....	1.38	6.4				

a Discharge relation affected by ice. b Determined by slope measurements and Kutter's formula.

STATION RECORDS.

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Daily gage height, in feet, of Santa Fe Creek above reservoir near Santa Fe, N. Mex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	0.83	1.26	1.30	1.28	1.27	1.34	1.41	1.67	1.81	1.52	1.71	1.47
2.....	.84	1.26	1.30	1.21	1.26	1.34	1.40	1.63	1.83	1.48	1.69	1.45
3.....	.84	1.30	1.33	1.26	1.25	1.35	1.40	1.61	1.78	1.53	1.71	1.44
4.....	.85	1.29	1.34	1.33	1.22	1.34	1.40	1.61	1.74	1.55	1.68	1.43
5.....	.84	1.28	1.34	1.34	1.20	1.35	1.42	1.60	1.71	1.56	1.66	1.43
6.....	.82	1.28	1.34	1.27	1.22	1.37	1.44	1.61	1.67	1.68	1.67	1.41
7.....	.82	1.27	1.34	1.27	1.25	1.36	1.64	1.64	1.65	1.81	1.67	1.39
8.....	.85	1.26	1.34	1.32	1.25	1.36	1.65	1.72	1.62	1.79	1.65	1.39
9.....	.88	1.26	1.34	1.38	1.25	1.36	1.62	1.78	1.60	1.75	1.63	1.38
10.....	.87	1.26	1.34	1.36	1.22	1.37	1.61	1.81	1.57	1.71	1.63	1.37
11.....	.85	1.26	1.33	1.33	1.22	1.38	1.60	1.80	1.57	1.70	1.64	1.38
12.....	.83	1.27	1.33	1.30	1.22	1.50	1.58	1.80	1.54	1.68	1.62	1.39
13.....	.87	1.27	1.33	1.28	1.23	1.40	1.57	1.80	1.52	1.67	1.60	1.40
14.....	.82	1.28	1.32	1.26	1.24	1.38	1.58	1.80	1.53	1.62	1.60	1.40
15.....	.82	1.29	1.32	1.24	1.29	1.41	1.63	1.80	1.51	1.61	1.57	1.37
16.....	.81	1.29	1.32	1.24	1.33	1.46	1.70	1.76	1.57	1.59	1.57	1.36
17.....	.79	1.30	1.32	1.25	1.29	1.48	1.73	1.73	1.66	1.62	1.57	1.35
18.....	.77	1.29	1.32	1.23	1.24	1.52	1.66	1.71	1.59	1.67	1.55	1.33
19.....	.74	1.28	1.32	1.20	1.26	1.53	1.61	1.73	1.56	1.70	1.53	1.33
20.....	.72	1.38	1.30	1.24	1.30	1.58	1.61	1.77	1.55	1.70	1.53	1.34
21.....	.68	1.30	1.30	1.24	1.31	1.48	1.65	1.80	1.52	1.69	1.53	1.35
22.....	.67	1.30	1.28	1.27	1.30	1.50	1.72	1.81	1.49	1.70	1.56	1.35
23.....	.66	1.30	1.27	1.25	1.29	1.49	1.74	1.85	1.48	1.73	1.55	1.32
24.....	1.29	1.33	1.25	1.23	1.42	1.42	1.70	1.87	1.47	1.83	1.53	1.30
25.....	1.28	1.34	1.25	1.21	1.41	1.41	1.70	1.81	1.46	1.86	1.54	1.30
26.....	1.27	1.31	1.25	1.19	1.35	1.41	1.70	1.80	1.45	1.82	1.53	1.29
27.....	1.25	1.30	1.25	1.18	1.31	1.42	1.70	1.80	1.44	1.81	1.51	1.29
28.....	1.25	1.29	1.25	1.19	1.33	1.43	1.67	1.78	1.45	1.88	1.50	1.28
29.....	1.24	1.30	1.36	1.22	.....	1.45	1.65	1.75	1.44	1.88	1.50	1.28
30.....	1.24	1.30	1.34	1.27	.....	1.43	1.63	1.74	1.43	1.80	1.50	1.28
31.....	1.25	.....	1.32	1.26	.....	1.43	.....	1.71	.....	1.75	1.48	.....

^a Maximum gage height, 2.82 feet.

NOTE.—Discharge relation affected by ice Dec. 3 to Jan. 25 and Feb. 4-19. An artificial control was installed Oct. 24, 1913.

Daily discharge, in second-feet, of Santa Fe Creek above reservoir, near Santa Fe, N. Mex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	6.5	3.3	4.3	4.0	3.4	5.3	7.6	22	36	13	26	10
2.....	6.7	3.3	4.3	3.0	3.2	5.3	7.2	19	38	10	24	9.4
3.....	6.7	4.3	5.5	3.2	3.0	5.6	7.2	18	32	13	26	8.9
4.....	7.0	4.1	5.9	3.2	2.4	5.3	7.2	18	29	14	23	8.5
5.....	6.7	3.8	5.9	3.4	2.0	5.6	8.1	17	26	15	22	8.5
6.....	6.3	3.8	5.9	3.0	2.4	6.2	8.9	18	22	23	22	7.6
7.....	6.3	3.6	5.9	3.0	3.0	5.9	20	20	21	36	22	6.9
8.....	7.0	3.3	5.9	3.2	3.0	5.9	21	26	18	34	21	6.9
9.....	7.6	3.3	5.9	3.2	3.0	5.9	18	32	17	30	19	6.6
10.....	7.4	3.3	5.9	3.2	2.4	6.2	18	36	15	26	19	6.2
11.....	7.0	3.3	5.5	3.2	2.4	6.6	17	35	15	24	20	6.6
12.....	6.5	3.6	5.5	3.0	2.4	12	16	35	14	23	18	6.9
13.....	7.4	3.6	5.5	3.6	2.6	7.2	15	35	13	22	17	7.2
14.....	6.3	3.8	5.1	3.2	2.8	6.6	16	35	13	18	17	7.2
15.....	6.3	4.1	5.1	2.8	3.8	7.6	19	35	12	18	15	6.2
16.....	6.0	4.1	5.1	2.8	5.0	9.8	24	31	15	16	15	5.9
17.....	5.6	4.3	5.1	3.5	3.8	11	28	28	22	18	15	5.6
18.....	5.3	4.1	5.1	2.6	2.8	13	22	26	16	22	14	5.0
19.....	4.7	3.8	5.1	2.0	3.2	13	18	28	15	24	13	5.0
20.....	4.4	7.4	4.3	2.8	4.0	16	18	32	14	24	13	5.3
21.....	3.7	4.3	4.3	2.8	4.3	11	21	35	13	24	13	5.6
22.....	3.6	4.3	3.8	3.4	4.0	12	26	36	11	24	15	5.6
23.....	3.4	4.3	3.6	3.0	3.8	11	29	40	11	28	14	4.6
24.....	4.1	5.5	3.1	2.6	8.1	8.1	24	43	10	38	13	4.0
25.....	3.8	5.9	3.1	2.2	7.6	7.6	24	36	9.8	41	14	4.0
26.....	3.6	4.7	3.1	1.9	5.6	7.6	24	35	9.4	37	13	3.8
27.....	3.1	4.3	3.1	1.7	4.3	8.1	24	35	8.9	36	12	3.8
28.....	3.1	4.1	3.1	1.9	5.0	8.5	22	32	9.4	44	12	3.6
29.....	2.9	4.3	6.6	2.4	.....	9.4	21	30	8.9	44	12	3.6
30.....	2.9	4.3	5.9	3.4	.....	8.5	19	29	8.5	35	12	3.6
31.....	3.1	.....	5.1	3.2	.....	8.5	.....	26	.....	30	11	.....

NOTE.—Discharge determined from two well-defined curves during the open season, and estimated on account of ice, Dec. 3 to Jan. 25 and Feb. 4-19.

Monthly discharge of Santa Fe Creek above reservoir, near Santa Fe, N. Mex., for the year ending Sept. 30, 1914.

Month.	Discharge in second feet.			Run off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
October.....	7.6	2.9	5.32	327	A.
November.....	7.4	3.3	4.14	246	A.
December.....	6.6	3.1	4.89	301	B.
January.....	4.0	1.7	2.92	180	B.
February.....	8.1	2.0	3.69	205	B.
March.....	16	5.3	8.40	516	B.
April.....	29	7.2	18.3	1,090	A.
May.....	43	17	29.8	1,830	A.
June.....	38	8.5	16.8	1,000	A.
July.....	44	10	25.9	1,590	A.
August.....	26	11	16.8	1,030	A.
September.....	10	3.6	6.09	362	A.
The year.....	44	1.7	12.0	8,680	

EVAPORATION AT SANTA FE, N. MEX.

An evaporation station was established on Jones reservoir, about a mile west of Santa Fe, April 26, 1913. Data were collected at this station until May 1, 1914, when the pan was moved to the reservoir of the Santa Fe Water & Light Co., about 2 miles east of Santa Fe.

The Jones reservoir is located in an open field, without shade from trees or other sources, at an elevation of approximately 6,900 feet. The reservoir of the Santa Fe Water & Light Co. is located at the mouth of the Santa Fe Creek canyon, at an elevation of 7,300 feet.

The equipment consists of a standard rain gage and heavy galvanized-iron pan, 3 feet square and 18 inches deep, floated on the reservoir. The elevation of the water surface in the pan is kept approximately the same as that outside the pan and the amount of evaporation measured therefrom, allowance being made for the amount of rainfall.

The following table shows the evaporation, rainfall, and approximate mean temperature of the water in and out of the pan by months for the year ending September 30, 1914:

Evaporation at Santa Fe, N. Mex., for the year ending Sept. 30, 1914.

Month.	Temperature.		Rainfall.	Evapora- tion.
	In pan.	Outside of pan.		
	° F.	° F.	Inches.	Inches.
October.....	55	55	0.40	5.15
November.....	47	48	1.48	3.29
December.....			.77	2.66
January.....			.19	1.96
February.....			.63	2.20
March.....	47	45	.82	3.85
April.....	46	46	.59	5.66
May.....	56	54	2.27	5.95
June.....	67	66	3.59	10.19
July.....	69	68	4.99	6.24
August.....	69	68	2.26	5.97
September.....	64	64	.45	6.28
The year.....			18.44	59.40

NOTE.—During part of December, January, and February, ice formed in the pan; the evaporation during these months was from water and ice surface.

ARROYO HONDO NEAR SANTA FE, N. MEX.

Location.—In the NE. $\frac{1}{4}$ sec. 17, T. 16 N., R. 10 E., 6 miles southeast of Santa Fe, 2,000 feet upstream from the point where the Santa Fe trail crosses Arroyo Hondo, and 1 mile above confluence of the two branches of Arroyo Hondo.

Records available.—February 21, 1913, to September 30, 1914.

Drainage area.—13.5 square miles (from topographic map).

Gage.—Automatic recording.

Channel.—Shifting.

Winter flow.—Affected by ice.

Floods.—On June 16, 1914, a gage height of 5.40 feet, or discharge of 2,830 second-feet (Kutter's formula) was reached. This stage was maintained for 15 minutes.

Diversions.—None above station.

Accuracy.—Estimates of discharge poor.

Discharge measurements of Arroyo Hondo near Santa Fe, N. Mex., during the year ending Sept. 30, 1914.

Date.	Made by—	Gage height.	Dis-charge.	Date.	Made by—	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Oct. 11	J. E. Powers.....	0.70	0.0	May 18	Gray and Quinlan....	0.80	^a 0.1
Nov. 8	C. J. Emerson.....	.70	.0	June 6	Gray and King.....	.82	^a 0.1
Dec. 16	J. E. Powers.....	.70	.0	16	G. A. Gray.....	5.40	^b 2,830
Jan. 20	do.....	.80	^a 5	18	do.....	1.52	3.1
Feb. 18	R. S. Watrous.....	.85	^a 2	July 3	Powers and Hank.....	1.58	3.7
Mar. 7	J. E. Powers.....	.83	^a 3	9	do.....	1.00	^a 5
Apr. 2	do.....	.90	^a 5	21	Gray and King.....	1.59	^a 5
18	do.....	.75	^a 3	31	Powers and Hank.....	1.80	^a 3
May 15	do.....	.90	^a 1.0	Aug. 12	J. E. Powers.....	1.86	^a 2

^a Estimated.

^b Determined from slope measurements and Kutter's formula.

Daily gage height, in feet, of Arroyo Hondo near Santa Fe, N. Mex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.
1.....	0.75			0.78	0.88		0.94	0.84	0.93	1.45	1.80
2.....	.76			.76	.85		.90	.84	.89	1.51	1.80
3.....	.76			.78	.88		.90	.83	.84	1.60	1.76
4.....	.76	0.77		.78	.92		.90	.85	.82	1.50	1.70
5.....	.75	.73		.79	.87		.87	.86	.82	1.35	1.70
6.....	.74				.87		.88	.85	.80	1.26	1.69
7.....	.73				.90	0.83	.88	.84	.80	1.17	1.69
8.....	.73				.90	.81	.88	.86	.79	1.09	1.70
9.....	.73				.93	.81	.85	.85	.79	1.00	1.69
10.....					.92	.82	.82	.84	.80	1.00	^b 1.75
11.....					.92	.88	.81	.85	.80	1.00	1.85
12.....					.93	.92	.81	.85	.80	.96	1.85
13.....					.92	.90	.77	.87	.80	.94	1.90
14.....					.93	.88	.77	.89	.80	.92	1.92
15.....					.95	.90	.76	.90	.81	.92	1.91
16.....					.87	.92	.75	.88	^a 1.03	.91	1.90
17.....					.92	.97	.75	.85	1.59	1.02	1.89
18.....					.88	1.03	.75	.82	1.50	1.22	1.90
19.....					.83	1.02	.77	.81	1.52	1.29	1.90
20.....				.80	.84	.98	.76	.81	1.57	1.18	1.90
21.....				.82	.85	.99	.74	.80	1.56	1.60	2.00
22.....				.83	.85	.97	.76	.80	1.59	1.55	2.01
23.....				.82	.82	.95	.77	.89	1.59	1.58	1.95
24.....				.82		.92	.75	.84	1.49	1.82	1.88
25.....				.82		.91	.74	.80	1.42	1.80	1.84
26.....				.82		.89	.74	.79	1.37		1.80
27.....				.81		.89	.79	.80	1.35		1.80
28.....				.82		.88	.80	.80	1.32		
29.....				.82		.89	.81	.80	1.32		
30.....				.84		.91	.82	.81	1.34		
31.....				.86		.96		.89		1.80	

^a Maximum gage height, 5.4 feet.

^b Maximum gage height, 3.1 feet.

Daily discharge, in second-feet, of Arroyo Hondo near Santa Fe, N. Mex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.
1	0.7			0.2	0.7	0.2	0.7	0.7	1.5	10.	0.3
2	.7			.1	.6	.2	.5	.7	.9	5.0	.3
3	.7			.2	.7	.2	.5	.6	.4	3.9	.2
4	.7	0.8		.2	.8	.2	.5	.7	.2	2.0	.1
5	.7	.6		.3	.6	.2	.3	.8	.2	1.0	.1
6	.7			.3	.6	.3	.4	.7	.1	.8	.1
7	.6			.3	.8	.3	.4	.7	.1	.7	.1
8	.6			.3	.8	.2	.4	.8	.1	.6	.1
9	.6			.3	.8	.2	.3	.7	.1	.5	.1
10				.3	.7	.2	.3	.7	.1	.5	10.
11				.4	.7	.5	.3	.7	.1	.5	1.0
12				.4	.7	.8	.3	.7	.1	.4	.2
13				.4	.6	.7	.3	.8	.1	.3	.2
14				.4	.7	.5	.3	.9	.1	.2	.2
15				.4	.8	.7	.3	1.0	.1	.2	.2
16				.5	.4	.8	.3	.9	35.	.1	.2
17				.5	.6	1.2	.3	.7	5.0	10.	.2
18				.5	.3	2.0	.3	.5	3.1	15.	.2
19				.5	.2	2.0	.4	.4	3.1	5.0	.2
20				.5	.2	1.4	.3	.4	2.5	1.0	.2
21				.6	.2	1.5	.3	.3	2.2	.5	5.0
22				.6	.2	1.4	.3	.3	2.0	.4	4.0
23				.6	.1	1.2	.4	.9	2.0	10.	2.0
24				.6	.1	1.0	.3	.6	1.0	8.0	.5
25				.6	.1	.8	.4	.3	.8	1.0	.4
26				.6	.2	.7	.4	.2	.6	.5	.3
27				.5	.2	.7	.6	.2	.5	.5	.2
28				.6	.2	.6	.6	.2	.5	.4	.2
29				.6		.6	.6	.1	.5	.4	.5
30				.6		.6	.7		.5	.3	.5
31				.7		.8		.9		.3	.4

NOTE.—Estimates of discharge are based upon individual discharge measurements and gage record for the year. There was no flow in the stream Oct. 10 to Nov. 3 and Nov. 6 to Dec. 31. Discharge interpolated for days for which gage heights are missing.

Monthly discharge of Arroyo Hondo near Santa Fe, N. Mex., for the year ending Sept. 30, 1914.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
October	0.7	0.0	0.19	12	C.
November	.8	.0	.05	3	C.
December	.0	.0	.00	0	
January	.7	.1	.44	27	D.
February	.8	.1	.49	27	D.
March	2.0	.2	.73	45	D.
April	.7	.3	.40	24	D.
May	1.0	.1	.59	36	D.
June	35	.1	2.12	126	D.
July	15	.1	2.58	159	D.
August	10	.1	.91	56	D.
September			a. 50	30	D.
The year	35	.0	.75	545	

a Estimated from U. S. Weather Bureau reports and information furnished by hydrographers.

RIO PUERCO AT RIO PUERCO, N. MEX.

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

Records available.—August 9, 1912, to September 30, 1914; fragmentary records September 7, 1910, to October 2, 1911.

Drainage area.—Not measured.

Gage.—Vertical staff installed to replace unsatisfactory automatic gage used prior to 1913; same datum. Staff gage washed out November 5, 1913, and replaced at same datum. On August 21, 1914, datum was lowered 3.14 feet.

Channel.—Shifting.

Discharge measurements.—Made by wading during low stages and from car and cable during floods.

Diversions.—No data.

Accuracy.—Discharge estimates fair.

Discharge measurements of Rio Puerco at Rio Puerco, N. Mex., during the year ending Sept. 30, 1914.

Date.	Made by—	Gage height.	Dis-charge.	Date.	Made by—	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Oct. 7	C. J. Emerson.....	—0.16	60.2	July 21	R. J. Hank.....	0.30	454
Nov. 15	do.....	— .80	2.9	Aug. 5	do.....	2.28	1,560
Jan. 6	do.....	— .55	7.7	8	do.....	—1.25	29.3
Feb. 19	do.....	—1.52	507	8	do.....	— .75	155
Mar. 16	do.....	— .02	83.8	10	G. A. Gray.....	— .60	a 5.0
Apr. 2	do.....	— .00	74.6	22	R. J. Hank.....	3.50	149
May 9	do.....	— .08	38.7				

a Estimated.

Daily gage height, in feet, of Rio Puerco at Rio Puerco, N. Mex., for the year ending Sept. 30, 1914.

[Goldie Barber, observer.]

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	—0.55	—1.00	—0.75	—0.3	—0.4	1.15	—0.1	—0.25	—0.65	—	0.5	—
2	— .45	—1.00	—	— .25	— .4	.6	.0	.2	— .3	—0.75	.55	—
3	2.35	—1.00	—	— .05	— .3	.9	— .15	.2	.55	.05	2.25	—
4	6.00	—1.00	— .45	— .1	— .6	.45	— .1	.15	— .1	3.9	4.3	—
5	a 2.80	b 3.75	— .60	— .3	— .6	— .4	— .2	— .1	— .35	1.7	2.05	—
6	1.55	— .50	— .70	— .55	— .6	— .5	— .25	— .1	— .45	1.0	— .1	—
7	— .25	— .20	— .70	— .65	— .7	— .5	— .3	— .1	— .6	— .05	— .65	2.4
8	— .35	— .17	— .80	— .7	— .7	— .4	— .25	— .45	— .75	— .5	.9	2.4
9	— .55	— .33	— .80	— .9	— .6	— .4	— .25	.2	— .8	— .55	— .35	2.55
10	— .65	— .50	— .80	— .9	— .6	— .05	— .05	.25	.85	.95	— .75	3.9
11	— .52	— .67	— .70	— .6	— .7	— .35	.05	.2	— .35	— .25	1.2	3.45
12	— .25	— .67	— .60	— .6	— .7	— .1	.2	.35	— .6	— .35	— .8	3.3
13	— .25	—1.00	— .60	.5	— .8	— .2	.0	.1	— .65	— .55	— .85	2.8
14	— .25	—1.00	— .60	.5	1.35	— .35	.2	.65	— .75	— .65	—	3.15
15	— .25	— .80	— .60	.6	1.0	— .45	— .25	1.55	— .9	1.35	—	2.9
16	— .25	— .90	— .50	.6	1.6	.1	— .45	1.1	— .65	.6	—	2.5
17	— .50	— .70	— .60	.6	1.85	— .2	— .55	.35	.15	3.7	—	2.6
18	— .50	— .95	— .80	.5	1.9	— .2	— .35	.25	.25	1.25	—	2.45
19	—1.00	— .80	— .80	.6	1.75	— .45	— .05	.35	— .35	a 4.5	—	2.0
20	—1.00	— .80	— .70	.6	1.65	.6	.0	.25	— .65	3.3	—	2.0
21	—1.00	— .90	— .70	.6	1.05	— .6	.05	.25	— .7	1.0	3.5	2.8
22	—1.00	— .70	— .70	.7	c 4.5	.0	— .05	— .35	— .85	.05	3.8	4.8
23	—1.00	— .80	— .70	.6	1.35	.25	.1	— .4	.9	1.5	3.8	3.5
24	—1.00	— .80	— .80	.7	.9	— .4	.15	.0	—	a 2.05	3.6	3.1
25	—1.00	— .80	— .80	.5	1.0	— .55	.25	.1	—	.6	3.0	2.85
26	—1.00	— .75	— .90	.5	.3	— .15	.25	— .25	—	.0	2.4	2.15
27	—1.00	— .80	— .90	.15	.05	— .55	.3	.3	—	1.1	2.0	2.0
28	—1.00	— .50	— .60	.6	.55	— .25	.2	.45	—	2.75	2.3	—
29	—1.00	— .50	— .50	.95	—	.05	.05	.55	—	3.15	2.8	—
30	—1.00	— .50	— .50	.25	—	—	.15	.65	—	3.05	2.15	—
31	—1.00	— .50	— .50	.4	—	—	.15	— .75	—	1.35	2.0	—

a Maximum gage height, approximately 9.5 feet.

b Maximum gage height, approximately 5 feet.

c Maximum gage height, approximately 8.5 feet.

d Maximum gage height, approximately 6 feet.

Daily discharge, in second-feet, of Río Puerco at Río Puerco, N. Mex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	8.0	1.7	3.0	27	18	397	58	22	2.0	0.0	522	0.0
2.....	14	1.7	.0	32	18	213	74	27	18	.8	545	.0
3.....	497	1.7	.0	58	27	306	51	27	152	58	1,540	.0
4.....	1,160	1.7	14	51	6.0	176	58	32	38	1,960	3,010	.0
5.....	591	740	6.0	27	6.0	27	44	38	14	872	1,400	.0
6.....	366	10	3.5	8.5	6.0	18	38	38	8.5	522	289	.0
7.....	49	39	3.5	4.5	3.0	18	32	38	3.0	163	140	4.5
8.....	35	43	2.5	3.0	3.0	27	38	8.5	.8	74	735	4.5
9.....	15	24	2.5	.5	6.0	27	38	27	.5	66	22	11
10.....	9.0	10	2.5	.5	6.0	74	66	92	.4	500	2	256
11.....	17	4.2	3.5	6.0	3.0	32	74	83	14	119	377	140
12.....	49	4.2	6.0	6.0	3.0	66	100	110	3.0	100	1.0	110
13.....	49	1.0	6.0	11	1.0	51	66	66	2.0	66	.8	32
14.....	49	1.0	6.0	11	437	32	100	176	.8	51	.0	83
15.....	49	2.5	6.0	6.0	306	22	32	478	.2	685	.0	44
16.....	49	1.5	10	6.0	545	100	14	306	2.0	358	.0	8.5
17.....	19	3.5	6.0	6.0	660	51	8.5	110	74	2,200	.0	14
18.....	19	1.2	2.5	11	685	51	22	22	92	635	.0	6.0
19.....	1.7	2.5	2.5	6.0	612	22	58	14	14	2,770	.0	.1
20.....	1.7	2.5	3.5	6.0	568	11	66	22	2.0	2,310	.0	.1
21.....	1.7	1.5	3.5	6.0	323	11	66	22	1.0	790	152	32
22.....	1.7	.0	3.5	3.0	2,380	83	51	14	.4	358	227	612
23.....	1.7	.0	2.5	3.0	478	130	74	11	.2	1,080	227	152
24.....	1.7	.0	2.5	6.0	306	27	83	51	.0	1,440	176	74
25.....	1.7	2.5	2.5	11	340	14	100	38	.0	590	58	38
26.....	1.7	3.0	1.5	11	140	58	100	22	.0	340	4.5	.5
27.....	1.7	2.5	1.5	92	14	110	18	.0	.0	845	.1	.1
28.....	1.7	10	6.0	188	200	44	92	8.5	.0	1,920	2.0	.0
29.....	1.7	10	10	289	.....	92	66	4.5	.0	2,200	32	.0
30.....	1.7	10	10	32	.....	74	38	2.0	.0	2,140	.5	.0
31.....	1.7	.....	10	18	.....	58	.....	.8	.....	985	.1	.....

NOTE.—Discharge determined from two poorly defined curves Oct. 1 and 2, Nov. 6 to Feb. 22, and Apr. 11–20, and by indirect method for shifting channels for remainder of year.

Monthly discharge of Río Puerco at Río Puerco, N. Mex., for the year ending Sept. 30, 1914.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
October.....	1,160	1.7	98.9	6,080	C.
November.....	740	.0	31.2	1,860	C.
December.....	14	.0	4.61	283	D.
January.....	289	.5	30.5	1,880	C.
February.....	2,380	1.0	292	16,200	C.
March.....	397	11	75.0	4,610	C.
April.....	110	8.5	60.6	3,610	C.
May.....	478	.8	62.2	3,820	C.
June.....	152	.0	14.8	881	C.
July.....	2,770	.0	845	52,000	D.
August.....	3,010	.0	305	18,800	D.
September.....	612	.0	54.1	3,220	D.
Year.....	3,010	.0	156	113,000	

RIO PUERCO NEAR LA JOYA, N. MEX.

Location.—In sec. 20, T. 2 N., R. 1 E., at the Atchison, Topeka & Santa Fe Railway bridge 2 miles north of La Joya railroad station, one-fourth mile above mouth of the river, and below all tributaries.

Records available.—Fragmentary records September 10, 1910, to August 28, 1914, when station was discontinued.

Drainage area.—Not measured.

Gage.—Automatic recording.

Channel.—Very shifting.

Discharge measurements.—Made by wading.

Winter flow.—Affected by ice.

Diversions.—No data.

Estimate of discharge withheld on account of lack of data.

Discharge measurements of Rio Puerco near La Joya, N. Mex., during the year ending Sept. 30, 1914.

Date.	Made by—	Gage height.	Dis-charge.	Date.	Made by—	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Oct. 11	C. J. Emerson.....	.....	0.0	Mar. 20	C. J. Emerson.....	2.90	105
27	do.....	.....	.0	May 8	do.....	2.44	7.5
Nov. 15	do.....	0.55	.0	July 2	R. J. Hank.....	.....	.0
Feb. 17	do.....	1.80	61.5	22	do.....	3.87	323

Daily gage height, in feet, of Rio Puerco near La Joya, N. Mex., for the year ending Sept. 30, 1914.

[S. C. Elliott, observer.]

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	2.85										2.60	
2	2.85										2.70	
3	2.84					1.0					3.02	
4	5.11						1.30			3.79	3.80	
5	3.94	2.33								4.18	4.00	
6	2.92	2.42							2.00	3.90	2.80	
7	2.49	2.31				1.0				3.83	2.20	
8	2.22	2.31						2.40		3.64		
9								2.40		3.15		
10						.8		2.40		2.70		
11							.20	3.10		3.01		
12						1.8		3.48		2.75		
13						1.8		3.52	2.00	2.48		
14								3.69		2.46		
15						1.8		4.18		2.33		
16								4.92		2.80		
17					1.80	1.8		4.16		2.87		
18						1.6	.40	3.50		4.00		
19								3.13		4.47		
20						2.90		2.90	2.00	5.28		
21								2.70		4.63		
22								2.35		3.88		
23								2.00		3.87	3.00	
24										4.79	5.95	
25							.40			4.70	5.82	
26										4.00	5.20	
27						1.40				4.00	4.00	
28										4.20	3.00	
29										4.66		
30								2.00		4.76		
31										5.11		

^a Maximum gage height about 8.0 feet.

NOTE.—The stream was dry on days for which gage heights are missing, except Feb. 15 to Mar. 25, May 24 to June 23, and Aug. 8-22, when there was a slight flow.

BLUEWATER CREEK NEAR BLUEWATER, N. MEX.

Location.—Near sec. 8, T. 12 N., R. 11 W., one-fourth mile from mouth of Bluewater Creek box canyon, about 2½ miles northwest of Bluewater post office, and 8 miles below dam site of Bluewater Development Co.

Records available.—May 29, 1912, to September 30, 1914.

Drainage area.—Not measured.

Gage.—Automatic recording.

Channel.—Practically permanent.

Discharge measurements.—Made by wading.

Winter flow.—Affected by ice.

Diversions.—No data.

Accuracy.—Discharge estimates good.

Discharge measurements of Bluewater Creek near Bluewater, N. Mex., during the year ending Sept. 30, 1914.

Date.	Made by	Gage height.	Discharge.	Date.	Made by.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Oct. 5	C. J. Emerson.....	1.48	9.8	Mar. 14	C. J. Emerson.....	2.86	92.5
6	do.....	1.32	4.2	Apr. 3	do.....	2.84	90.7
13	do.....	1.12	a 1.5	May 10	do.....	1.20	1.9
Nov. 14	do.....	1.10	a 1.0	July 1	R. J. Hank.....	1.10	.8
Jan. 7	do.....	2.12	35.9	Aug. 6	do.....	1.40	8.0
Feb. 18	do.....	3.31	139	Aug. 23	do.....	1.55	12.9
Mar. 14	do.....						

a Estimated.

Daily gage height, in feet, of Bluewater Creek near Bluewater, N. Mex., for the year ending Sept. 30, 1914.

[E. H. Dewey, observer.]

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	1.02	1.10	1.04	.....	.....	1.77	2.62	1.38	1.13	1.15	1.49	.....
2.....	1.99	1.10	1.00	.....	.....	2.04	2.51	1.35	1.12	1.10	1.42	.....
3.....	2.38	1.11	1.00	.....	.....	2.04	2.53	.....	1.17	1.09	1.42	.....
4.....	1.89	1.55	1.00	.....	.....	1.93	2.41	.....	1.12	1.18	1.41	.....
5.....	1.46	1.10	.98	.....	.....	2.05	2.46	.....	1.09	1.52	1.42	1.17
6.....	1.25	1.10	.98	.....	.....	2.28	2.44	.....	1.06	1.21	1.45	1.15
7.....	.....	1.10	.....	.....	1.30	.....	2.35	.....	1.06	1.15	1.45	1.13
8.....	.....	1.10	.....	.....	.....	.....	2.32	.....	1.05	1.10	1.49	1.14
9.....	.....	1.10	.....	.....	.....	.....	2.23	.....	1.05	1.08	1.41	1.29
10.....	.....	1.10	.....	.....	.....	.....	2.09	1.20	1.05	1.08	1.35	1.63
11.....	.....	1.10	.....	.....	.....	.....	2.56	1.16	1.05	1.09	1.30	1.58
12.....	.....	1.10	.....	.....	.....	.....	3.02	1.15	1.05	1.02	1.24	1.62
13.....	1.11	1.10	.....	.....	.....	.....	2.28	1.17	1.05	1.05	1.18	1.51
14.....	1.19	1.10	.....	.....	1.60	3.40	2.02	1.19	1.00	1.43	1.14	1.31
15.....	1.16	1.10	.....	.....	.....	3.47	1.89	1.21	.95	1.64	1.10	1.22
16.....	1.15	1.10	.....	.....	.....	3.70	1.78	1.22	.90	1.21	1.21	1.15
17.....	1.11	1.11	.....	.....	.....	3.81	1.68	1.24	.85	1.15	1.11	1.14
18.....	1.08	1.12	.....	.....	1.90	3.86	1.65	1.22	.80	1.68	1.39	1.13
19.....	1.07	1.13	.....	.....	1.87	3.47	1.61	1.20	.80	1.92	1.55	1.10
20.....	1.07	1.14	.....	.....	1.62	2.72	1.57	1.17	.80	1.56	1.28	1.10
21.....	1.06	1.15	.....	.....	1.78	2.55	1.55	1.15	.75	1.45	1.18	1.09
22.....	1.05	1.15	.....	.....	2.18	2.47	1.54	1.13	.....	1.73	2.15	1.09
23.....	1.05	1.15	.....	.....	1.85	2.49	1.53	1.16	.....	1.56	1.52	1.09
24.....	1.05	1.15	.....	.....	2.02	2.70	1.62	1.37	.....	1.75	1.33	1.08
25.....	1.05	1.15	.....	.....	2.02	2.63	1.57	1.24	.....	2.45	1.25	1.08
26.....	1.05	1.15	.....	.....	1.77	2.78	1.53	1.18	.....	2.23	1.23	1.09
27.....	1.06	1.15	.....	.....	1.77	2.65	1.50	1.12	.....	2.25	1.24	1.09
28.....	1.06	1.16	.....	.....	1.65	2.59	1.49	1.10	.....	2.34	1.24	1.09
29.....	1.07	1.12	.....	.....	.....	2.67	1.48	1.08	.....	2.43	1.20	1.09
30.....	1.08	1.04	.....	.....	.....	2.96	1.41	1.09	.....	1.87	.....	1.10
31.....	1.09	.....	.....	.....	.....	2.99	.....	1.11	.....	1.60	.....	.....

Daily discharge, in second-feet, of Bluewater Creek near Bluewater, N. Mex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	0.5	1.1	0.7			20	71	6.6	1.5	1.8	9.7	2.3
2.....	30	1.1	.4			22	62	5.8	1.4	1.1	7.8	2.2
3.....	53	1.2	.4			24	63	5.3	2.0	1.0	7.8	2.2
4.....	25	12	.4			26	55	4.8	1.4	2.1	7.5	2.1
5.....	8.9	1.1	.4			32	58	4.4	1.0	11	7.8	2.0
6.....	3.4	1.1	.4			46	57	4.0	.8	2.6	8.6	1.8
7.....	2.8	1.1			2	61	50	3.6	.8	1.8	8.6	1.5
8.....	2.8	1.1			4	106	48	3.2	.8	1.1	9.7	1.6
9.....	2.4	1.1			6	138	43	2.8	.8	1.0	7.5	4.2
10.....	2.1	1.1			8	186	34	2.4	.8	1.0	5.8	15
11.....	1.8	1.1			10	162	66	1.9	.8	1.0	4.4	13
12.....	1.5	1.1			12	138	108	1.8	.8	.5	3.2	14
13.....	1.2	1.1			14	106	46	2.0	.8	.8	2.1	10
14.....	2.3	1.1			16	150	31	2.3	.4	8.0	1.6	4.7
15.....	1.9	1.1			18	158	25	2.6	.3	15	1.1	2.8
16.....	1.8	1.1			20	186	20	2.8	.2	2.6	2.6	1.8
17.....	1.2	1.2			22	200	16	3.2	.2	1.8	1.2	1.6
18.....	1.0	1.4			25	207	15	2.8	.1	16	6.9	1.5
19.....	.9	1.5			24	158	14	2.4	.1	26	12	1.1
20.....	.9	1.6			14	79	12	2.0	.1	12	4.0	1.1
21.....	.8	1.8			20	65	12	1.8		8.6	2.1	1.0
22.....	.8	1.8			20	59	11	1.5		18	35	1.0
23.....	.8	1.8			20	60	11	1.9		12	11	1.0
24.....	.8	1.8			20	77	14	6.4		19	5.2	1.0
25.....	.8	1.8			20	71	12	3.2		58	3.4	1.0
26.....	.8	1.8			20	84	11	2.1		43	3.0	1.0
27.....	.8	1.8			20	73	10	1.4		44	3.2	1.0
28.....	.8	1.9			15	68	9.7	1.1		50	3.2	1.0
29.....	.9	1.4				75	9.4	1.0		56	2.4	1.0
30.....	1.0	.7				102	7.5	1.0		24	2.4	1.1
31.....	1.0					105		1.2		14	2.3	

NOTE.—Daily discharge determined as follows: Feb. 7, 14, 22-25, Mar. 2, 3, and 7-13 estimated from data furnished by gage reader and hydrographer; Oct. 7-12, Feb. 8-13, 15-17, May 3-9, and Aug. 30 to Sept. 4 interpolated; for remainder of year from a well-defined rating curve. Stream was dry Dec. 7 to Feb. 6 and June 21-30.

Monthly discharge of Bluewater Creek near Bluewater, N. Mex., for the year ending Sept. 30, 1914.

Month.	Discharge in second feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
October.....	53	0.5	5.00	307	B.
November.....	12	.7	1.70	101	C.
December.....	.7	.0	.09	6	C.
January.....	.0	.0	.00	0	
February.....	25	.0	12.5	694	D.
March.....	207	20	98.2	6,040	B.
April.....	108	7.5	33.4	1,990	A.
May.....	6.6	1.0	2.88	177	B.
June.....	2.0	.0	.50	30	B.
July.....	58	.5	14.7	904	B.
August.....	38	1.1	6.33	389	B.
September.....	15	1.0	3.22	192	B.
The year.....	207	.0	15.0	10,800	

BLUEWATER CREEK AT GRANTS, N. MEX.

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

Records available.—October 30, 1912, to September 30, 1914.

Drainage area.—Not measured.

Gage.—Vertical staff.

Channel.—Shifting.

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

Winter flow.—Slightly affected by ice.

Diversions.—No data.

Discharge measurements of Bluewater Creek at Grants, N. Mex., during the year ending Sept. 30, 1914.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Oct. 4	C. J. Emerson.....	1.94	51.7	Aug. 6	R. J. Hank.....	0.98	6.2
May 10	.....do.....	1.46	28.5	23	.....do.....	1.00	6.1
		.65	.0				

Daily gage height, in feet, of Bluewater Creek at Grants, N. Mex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1							3.0				0.8	0.2
2	0.6						2.4				.6	.2
3	3.05						2.0			4.0	.4	.1
4	1.7						1.2			2.5	.3	.1
5	.8						1.2			1.8		
6							1.0			.8	.9	
7						0.7	1.6				.6	
8						1.0	2.4				.4	
9						1.2	2.0				.3	
10						2.4	2.0				.4	.6
11						2.8	1.8					.9
12						2.4	1.8			4.8		.6
13						2.4	1.8			.8		.5
14						3.6	1.2					.3
15						3.8	.8	1.0				.2
16						3.8		.4				.2
17						3.8				4.4		.1
18						3.6				.8		
19						2.4				.6		
20						2.0						
21						1.8					.1	.2
22						1.2				.4	.8	.3
23						1.2				.6	1.0	.3
24						1.2				.3	.8	.1
25						1.8				.2	.6	
26						2.2				2.1	.8	
27						2.6				3.8	1.9	
28						2.0				1.4	1.0	
29						2.3				2.55	.6	
30						2.6				4.4	.3	
31						3.2				2.25	.3	

NOTE.—Stream was dry on days for which gage heights are missing except Nov. 20-30. Discharge for October and November, 1913, estimated as follows: Oct. 2, 2.2 second-feet; Oct. 3, 108 second-feet; Oct. 4, 40 second-feet; Oct. 5, 6 second-feet; and Nov. 20-30, 0.2 second-foot. No estimates were made during 1914 on account of the lack of data.

SAN JOSE RIVER NEAR SUWANEE, N. MEX.

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

Records available.—Fragmentary records August 30, 1910, to September 30, 1914.

Drainage area.—Not measured.

Gage.—Stevens's automatic recording, installed April 1, 1914, referred to the original datum.

Channel.—Somewhat shifting.

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

Diversions.—No data.

Accuracy.—Estimates of discharge fair.

Discharge measurements of San Jose River near Suwanee, N. Mex., during the year ending Sept. 30, 1914.

Date.	Made by—	Gage height.	Dis-charge.	Date.	Made by—	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Oct. 6	C. J. Emerson.....	1.44	21.7	May 9	C. J. Emerson.....	0.40	2.9
Nov. 4	.....do.....	.75	5.3	June 30	R. J. Hank.....	.55	1.8
Jan. 6	.....do.....	.92	8.8	July 21	.....do.....	2.30	92.2
Feb. 19	.....do.....	.38	1.6	Aug. 4	.....do.....	2.76	168
Mar. 15	.....do.....	1.62	33.1	7	.....do.....	.99	9.5
Apr. 1	.....do.....	1.72	41.7	24	.....do.....	1.00	12.1
2	.....do.....	2.00	55.0				

Daily gage height, in feet, of San Jose River near Suwanee, N. Mex., for the year ending Sept. 30, 1914.

[A. J. Johncock, observer.]

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	4.19	0.93	0.60	0.85	.....	.....	1.72	0.41	.....	.....	.....	0.57
2	2.86	.93	.60	.90	.....	.....	1.88	.42	.....	.....	.....	.57
3	2.01	.93	.61	.90	.....	.....	1.62	.40	.....	.....	.....	.55
4	1.33	.95	.66	1.00	0.90	.....	1.56	.41	.....	3.77	3.30	.55
5	1.13	1.35	.70	.90	.85	.....	1.47	.41	.....	2.26	4.26	.64
6	1.01	.97	.75	.85	.85	0.30	1.38	.40	.....	.....	2.05	1.50
7	.91	.95	.69	.85	.80	.....	1.35	.40	.....	.....	1.10	.87
8	.85	.85	.65	.85	.75	.....	1.42	.40	.....	.....	1.96	.71
9	.....	.75	.65	.85	.60	.....	1.46	.40	.....	.....	1.04	.71
10	.....	.75	.69	.80	.50	.....	1.37	.40	.....	.....	.68	.....
11	.90	.75	.64	.80	.50	.....	1.31	.39	.....	.....	.83	.....
12	.90	.75	.62	.80	.50	.....	1.24	.39	.....	.....	.74	1.10
13	.90	.75	.61	.80	.45	2.00	1.23	.40	.....	.....	.73	1.00
14	1.09	.75	.78	.90	.45	2.00	2.02	.43	.....	.....	.73	1.17
15	1.12	.74	1.03	.95	.45	1.70	1.36	α 3.25	.....	.....	.73	1.08
16	1.02	.73	.79	.95	.40	2.10	.96	1.40	.....	.....	.72	1.10
17	.95	.72	.71	1.00	.40	2.45	.90	.84	.....	.....	.72	1.10
18	.94	.72	.64	.85	.40	2.55	.79	.....	.....	.....	.71	1.10
19	.91	.72	.61	.80	.40	2.65	.69	.....	.....	3.42	.72	1.10
20	.91	.73	.61	.80	.....	2.70	.67	.....	.....	.....	1.10	1.10
21	.91	.71	.61	.80	.....	.....	.66	.....	.....	2.28	1.34	2.40
22	.91	.71	.62	.80	.....	.....	.66	.....	.....	1.85	3.08	3.49
23	.92	.71	.62	.....	.....	.....	.65	.....	.....	3.91	1.84	1.84
24	.92	.71	.63	.....	.....	.....	.58	2.57	.....	4.12	.99	1.39
25	.92	.71	.63	.....	.....	1.30	.50	.....	.....	.....	.74	1.29
26	.92	.68	.63	.....	.....	1.25	.42	.....	.....	.....	.68	1.31
27	.93	.65	.63	.....	.....	1.40	.42	.....	.....	.....	1.14	1.24
28	.93	.60	.63	.....	.....	1.60	.41	.....	.....	.....	1.25	1.24
29	.93	.60	.63	.....	.....	.....	.41	.....	.....	.....	.76	1.24
30	.93	.60	.63	.....	.....	.....	.41	.....	0.55	.....	.69	1.24
31	.93	.....	.63	.....	.....	1.60	.....	.....	.....	.....	.65	.....

α Maximum gage height, 8.7 feet.

Daily discharge, in second-feet, of San Jose River near Suwanee, N. Mex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	181	9.3	4.0	7.5	7.5	0.8	42	3.0	-----	-----	118	2.7
2.....	102	9.3	4.0	8.5	8.5	.8	47	3.2	-----	-----	62	2.7
3.....	51	9.3	4.1	8.5	8.5	.5	32	2.9	-----	-----	118	2.5
4.....	17	9.9	4.6	11	8.5	.5	29	3.0	-----	377	274	2.5
5.....	11	24	5.0	8.5	7.5	.5	26	3.0	-----	88	485	3.6
6.....	7.9	10	5.7	7.5	7.5	.5	22	2.9	-----	-----	66	30
7.....	6.2	9.9	4.9	7.5	6.5	.5	21	2.9	-----	-----	14	7.9
8.....	5.5	7.5	4.5	7.5	5.5	.5	24	2.9	-----	-----	59	4.7
9.....	5.5	5.7	4.5	7.5	3.0	.5	25	2.9	-----	-----	12	4.7
10.....	6.0	5.7	4.9	6.5	2.0	.5	22	2.9	-----	-----	4.2	7.0
11.....	6.0	5.7	4.4	6.5	2.0	.5	19	2.8	-----	-----	7.1	10
12.....	6.0	5.7	4.2	6.5	2.0	.5	16	2.8	-----	-----	5.3	14
13.....	6.0	5.7	4.1	6.5	1.5	60	16	2.9	-----	-----	5.1	11
14.....	14	5.7	6.2	8.5	1.5	57	57	3.3	-----	-----	5.1	17
15.....	15	5.5	12	9.7	1.5	37	23	263	-----	-----	5.1	13
16.....	12	5.4	6.3	9.7	1.0	66	9.5	26	-----	-----	4.9	14
17.....	9.9	5.3	5.2	11	1.0	103	8.5	7.3	-----	-----	4.9	14
18.....	9.6	5.3	4.4	7.5	1.0	117	6.3	3.0	-----	-----	4.7	14
19.....	8.8	5.3	4.1	6.5	1.0	132	4.7	2.5	-----	300	4.9	14
20.....	8.8	5.4	4.1	6.5	1.0	140	4.7	2.5	-----	-----	14	14
21.....	8.8	5.2	4.1	6.5	1.0	116	4.9	2.5	-----	90	24	104
22.....	8.8	5.2	4.2	6.5	1.0	92	5.3	2.5	-----	50	226	316
23.....	9.0	5.2	4.2	6.5	1.0	68	5.5	16	-----	408	50	50
24.....	9.0	5.2	4.3	6.5	1.0	44	4.5	129	-----	454	11	26
25.....	9.0	5.2	4.3	6.5	1.0	20	3.6	52	-----	-----	5.3	22
26.....	9.0	4.8	4.3	6.5	.8	18	2.8	19	-----	-----	4.2	22
27.....	9.3	4.5	4.3	7.5	.8	25	3.0	11	-----	-----	16	20
28.....	9.3	4.0	4.3	7.5	.8	34	3.0	7.5	-----	-----	20	20
29.....	9.3	4.0	4.3	7.5	-----	34	3.0	6.4	-----	-----	5.7	20
30.....	9.3	4.0	4.3	7.5	-----	34	3.0	4.9	1.8	-----	4.3	20
31.....	9.3	-----	4.3	7.5	-----	34	-----	4.2	-----	-----	3.8	-----

NOTE.—Daily discharge determined as follows: Oct. 1 to Mar. 12, May 15 to 31, June 30, July 4, 5, 19, and 21 to 24, and Aug. 1 to Sept. 30 from well-defined rating curves; remainder of year by indirect method for shifting channels; days for which gage heights are missing estimated.

Monthly discharge of San Jose River near Suwanee, N. Mex., for the year ending Sept. 30, 1914.

Month.	Discharge in second feet.			Run off (in acre feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October.....	181	5.5	19.0	1,170	B.
November.....	24	4.0	6.76	402	A.
December.....	12	4.0	4.78	294	A.
January.....	11	6.5	7.61	468	B.
February.....	8.5	.8	3.07	170	C.
March.....	140	.5	39.9	2,450	D.
April.....	57	2.8	16.4	976	B.
May.....	263	2.5	19.4	1,190	D.
June.....	-----	-----	a 6.00	357	D.
July.....	454	-----	a 95.0	5,840	D.
August.....	485	3.8	53.0	3,260	C.
September.....	316	2.5	27.4	1,630	C.
The year.....	485	-----	25.2	18,200	

a Estimated.

PECOS RIVER NEAR COWLES, N. MEX.

Location.—About sec. 28, T. 18 N., R. 12 E., at highway bridge three-fourths of a mile below old Cowles post office, 5 miles below present Cowles post office, which is at Windsor, and midway between Espiritu Santo and Mora creeks; about half a mile below mouth of Willow Creek.

Records available.—March 9, 1910, to September 30, 1914.

Drainage area.—Not measured.

Gage.—Friez automatic recording gage installed April 18, 1913, to replace the Bristol gage installed June 5, 1912, in place of a Friez. All referred to same datum.

Channel.—Fairly permanent; may shift slightly during high water.

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

Winter flow.—Affected by ice during some of the winter months.

Diversions.—No data.

Accuracy.—Estimates of discharge fair.

Discharge measurements of Pecos River near Cowles, N. Mex., during the year ending Sept. 30, 1914.

Date.	Made by—	Gage height.	Dis-charge.	Date.	Made by—	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Oct. 10	J. E. Powers.....	1.72	101	Apr. 1	J. E. Powers.....	1.50	56.7
Nov. 7	C. J. Emerson.....	1.41	47.4	May 14	Powers and Quinlan...	2.62	468
Dec. 3	J. E. Powers.....	1.45	53.5	July 8	Powers and Hank.....	2.20	339
Jan. 19	.....do.....	a 1.23	26.7	30	.....do.....	2.40	324
Mar. 6	.....do.....	a 1.29	32.9				

a Discharge relation affected by ice.

Daily gage height, in feet, of Pecos River near Cowles, N. Mex., for the year ending Sept. 30, 1914.

[Ed. Irvin, observer.]

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	2.04	1.53	1.40	.....	.....	.....	1.45	2.12	2.92	.....	2.52	.....
2.....	1.99	1.50	1.40	.....	.....	.....	1.52	2.10	2.81	.....	2.48	.....
3.....	2.00	1.52	1.45	.....	.....	.....	1.56	2.12	2.77	.....	2.50	.....
4.....	2.00	1.48	1.32	2.50	.....	.....	1.56	2.13	2.66	.....	2.42	.....
5.....	1.98	1.44	1.30	.....	.....	.....	1.65	2.19	2.59	2.11	2.38	1.71
6.....	1.92	1.46	1.30	.....	.....	1.30	1.78	2.28	2.49	2.11	2.33	1.68
7.....	1.90	1.41	1.29	.....	2.90	1.25	1.79	2.45	2.42	2.12	2.24	1.67
8.....	1.89	1.40	1.57	.....	.....	1.20	1.72	2.70	2.36	2.15	2.16	1.67
9.....	1.86	1.40	1.87	.....	.....	1.22	1.68	2.97	2.30	2.13	2.11	1.70
10.....	1.80	1.40	2.26	2.20	.....	1.26	1.69	3.05	2.27	2.08	2.17	1.73
11.....	1.74	1.40	2.53	.....	.....	1.26	1.66	2.90	2.26	2.08	2.29	1.74
12.....	1.79	1.40	2.80	.....	.....	1.27	1.62	2.83	2.23	2.05	2.28	1.71
13.....	1.79	1.40	2.80	.....	.....	1.30	1.65	2.77	2.19	2.04	2.30	1.70
14.....	1.77	1.40	2.80	.....	2.00	1.32	1.67	2.70	2.15	2.00	2.31	1.67
15.....	1.75	1.40	2.80	.....	.....	1.34	1.75	2.63	.....	1.98	2.23	1.61
16.....	1.73	1.40	2.75	.....	.....	1.47	1.84	2.58	.....	1.96	2.21	1.59
17.....	1.72	1.40	2.70	1.30	.....	1.52	1.87	2.50	.....	2.49	2.18	1.57
18.....	1.66	1.40	2.70	1.25	.....	1.58	1.82	2.48	.....	2.61	2.16	1.56
19.....	1.63	1.40	2.60	1.23	.....	1.60	1.76	2.54	.....	2.70	2.19	1.55
20.....	1.64	1.40	2.60	1.25	.....	1.55	.....	2.57	.....	2.81	2.13	1.55
21.....	1.62	1.40	2.60	1.31	1.20	.....	.....	2.66	1.90	2.62	2.11	1.61
22.....	1.63	1.40	2.60	1.35	.....	.....	.....	2.73	.....	2.60	2.14	1.63
23.....	1.62	1.40	2.60	1.41	.....	1.18	.....	2.91	.....	2.64	2.20	1.58
24.....	1.61	1.40	2.60	1.35	.....	1.10	.....	2.96	.....	2.68	2.21	1.55
25.....	1.61	1.40	2.60	1.27	.....	1.07	.....	2.85	.....	2.62	2.21	1.52
26.....	1.60	1.40	2.60	1.17	.....	1.07	2.10	2.81	.....	2.50	2.27	1.51
27.....	1.60	1.40	2.60	1.15	.....	1.08	.....	2.78	.....	2.53	2.20	1.50
28.....	1.58	1.40	2.60	1.14	1.40	1.12	.....	2.71	1.62	2.50	2.14	1.49
29.....	1.59	1.40	2.60	1.18	.....	1.20	.....	2.65	.....	2.54	2.15	1.49
30.....	1.58	1.40	2.60	1.57	.....	1.22	.....	2.58	.....	2.50	2.10	1.48
31.....	1.57	.....	2.60	1.70	.....	1.25	.....	2.61	.....	2.44	.....	.....

NOTE.—Discharge relation affected by ice Dec. 8 to Feb. 23.

Daily discharge, in second-feet, of Pecos River near Cowles, N. Mex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	170	65	47	25	25	45	50	232	637	218	369	156
2.....	158	60	47	25	25	40	59	229	581	239	350	141
3.....	160	63	54	25	28	40	65	238	561	260	358	126
4.....	160	57	39	25	28	40	65	244	506	281	324	111
5.....	155	52	37	25	31	35	80	266	472	303	310	96
6.....	138	55	37	25	31	35	106	300	432	307	290	90
7.....	136	48	36	25	33	31	108	366	402	310	260	89
8.....	134	47	35	25	33	27	94	477	377	321	232	89
9.....	127	47	35	25	35	28	87	617	354	314	217	94
10.....	114	47	30	25	35	31	90	663	342	296	232	100
11.....	102	47	30	25	35	31	85	591	342	293	270	102
12.....	112	47	30	25	32	32	78	561	332	279	263	96
13.....	112	47	30	25	32	35	83	535	317	273	270	94
14.....	108	47	30	25	32	36	89	506	303	257	270	89
15.....	104	47	30	25	30	38	104	472	292	247	244	78
16.....	100	47	30	25	30	52	123	454	281	238	235	74
17.....	98	47	25	25	30	59	129	419	270	427	226	71
18.....	87	47	25	28	30	68	121	410	260	477	217	70
19.....	81	47	25	27	30	71	110	436	250	515	228	68
20.....	83	47	25	28	29	63	124	450	240	566	206	68
21.....	80	47	25	33	29	50	139	496	229	468	200	78
22.....	81	47	25	36	29	38	153	530	218	454	206	81
23.....	80	47	25	40	30	26	168	622	207	468	223	73
24.....	78	47	25	36	33	22	182	648	196	482	223	68
25.....	78	47	25	30	35	21	196	591	185	450	223	63
26.....	76	47	25	24	40	21	211	576	175	393	238	62
27.....	76	47	25	23	40	21	215	561	165	402	217	60
28.....	73	47	25	22	45	23	220	525	155	385	197	59
29.....	74	47	25	24	.....	27	224	496	176	393	200	59
30.....	73	47	25	25	.....	28	228	463	197	369	186	57
31.....	71	.....	25	25	.....	31	.....	477	.....	339	171	.....

NOTE.—Daily discharge determined as follows: Dec. 8 to Feb. 28 estimated, on account of ice; Oct. 1 to Dec. 7 and Aug. 28 to Sept. 30 from a well-defined curve; remainder of year by indirect method for shifting channels. Discharges for days for which gage heights are missing interpolated.

Monthly discharge of Pecos River near Cowles, N. Mex., for the year ending Sept. 30, 1914.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
October.....	170	71	106	6,520	A.
November.....	65	47	49.4	2,940	A.
December.....	54	25	30.7	1,890	B.
January.....	40	24	26.6	1,640	D.
February.....	45	25	32.0	1,780	D.
March.....	71	21	36.9	2,270	C.
April.....	228	50	126	7,500	C.
May.....	663	229	466	28,700	B.
June.....	637	155	315	18,700	D.
July.....	566	218	356	21,900	C.
August.....	369	171	247	15,200	B.
September.....	156	57	85.4	5,080	B.
The year.....	663	21	158	114,000	

PECOS RIVER NEAR ANTON CHICO, N. MEX.

Location.—Near sec. 31, T. 12 N., R. 17 E., about 1 mile below the settlement of Tecolotito, and about 3 miles northwest of Anton Chico; $1\frac{1}{2}$ miles below the mouth of Tecolote Creek.

Records available.—April 28, 1910, to September 30, 1914.

Drainage area.—Not measured.

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

Channel.—Somewhat shifting.

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

Winter flow.—Affected by ice.

Diversions.—No data.

Accuracy.—Estimates of discharge good.

Discharge measurements of Pecos River near Anton Chico, N. Mex., during the year ending Sept. 30, 1914.

[Made by J. E. Powers.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Nov. 20.....	1.42	46.4	Feb. 17.....	^a 1.20	20.7	May 5.....	1.93	250
Jan. 6.....	1.40	60.0	Mar. 27.....	1.41	66.1	June 25.....	1.71	140

^a Discharge relation affected by ice.

Daily gage height, in feet, of Pecos River near Anton Chico, N. Mex., for the year ending Sept. 30, 1914.

[A. A. Abercrombie, observer.]

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	1.52	1.24	1.30	1.70	1.32	1.20	1.45	2.25	2.27	1.80	1.68	1.80
2.....	1.62	1.25	1.30	1.68	1.32	1.20	1.42	2.10	2.33	1.93	.....	1.78
3.....	1.81	1.26	1.31	1.57	1.34	1.20	1.39	2.00	2.28	2.07	.....	1.76
4.....	1.80	1.33	1.24	1.52	1.35	1.20	1.43	1.99	2.22	2.85	.....	1.74
5.....	1.71	1.29	1.39	1.56	1.36	1.20	1.47	1.94	2.16	^a 2.90	.....	1.73
6.....	1.68	1.26	1.32	1.48	1.38	1.22	1.56	1.95	2.09	2.34	.....	1.74
7.....	1.62	1.23	1.32	1.39	.....	1.24	1.67	2.00	2.05	2.70	.....	1.74
8.....	1.57	1.23	1.36	1.37	.....	.....	1.82	2.11	1.97	2.32	2.17	1.72
9.....	1.53	1.22	1.37	1.33	.....	.....	1.79	2.22	1.90	2.10	2.09	1.70
10.....	1.50	1.23	1.39	1.33	.....	.....	1.73	2.41	1.85	1.98	2.04	1.68
11.....	1.42	1.23	1.39	1.32	.....	.....	1.76	2.43	1.83	2.08	2.16	1.79
12.....	1.39	1.23	1.58	1.51	.....	.....	1.84	2.38	1.87	2.17	2.14	1.76
13.....	1.39	1.24	1.70	1.45	.....	.....	1.88	2.38	1.83	1.98	2.01	1.73
14.....	1.41	1.29	1.70	1.37	.....	1.30	1.74	2.37	.....	1.90	1.99	1.72
15.....	1.41	1.32	1.70	1.35	.....	1.42	1.76	2.35	.....	1.86	2.12	1.69
16.....	1.40	1.34	1.70	1.34	.....	1.48	1.81	2.34	.....	1.80	1.94	1.64
17.....	1.40	1.36	1.70	1.35	1.20	1.53	1.87	2.29	.....	2.01	1.91	1.62
18.....	1.40	1.36	1.72	1.35	1.20	1.56	1.88	2.35	.....	^b 2.48	1.86	1.60
19.....	1.39	1.39	1.71	1.35	1.20	1.58	1.86	2.37	.....	2.35	1.80	1.58
20.....	1.39	1.42	1.71	1.35	1.20	1.65	1.86	2.28	1.70	2.33	1.82	1.58
21.....	1.39	1.42	1.70	1.40	1.20	1.70	1.86	2.29	1.69	2.27	1.84	1.62
22.....	1.39	1.40	1.70	1.44	1.20	1.65	1.98	2.31	1.62	2.06	1.94	1.64
23.....	1.38	1.35	1.70	1.49	1.20	1.52	2.00	2.35	1.59	2.04	1.89	1.64
24.....	1.37	1.37	1.70	1.46	1.23	1.56	1.99	2.56	1.59	1.97	2.00	1.65
25.....	1.31	1.37	1.70	1.38	1.21	1.57	1.94	2.47	1.87	1.96	1.98	1.65
26.....	1.28	1.40	1.70	1.36	1.21	1.50	1.94	2.36	1.55	1.83	1.98	1.65
27.....	1.28	1.38	1.70	1.34	1.20	1.40	1.99	2.30	1.47	1.79	2.02	1.62
28.....	1.28	1.32	1.69	1.34	1.20	1.40	1.93	2.29	1.42	1.76	1.96	1.59
29.....	1.28	1.31	1.68	1.36	.....	1.43	1.94	2.20	1.42	1.76	1.91	1.56
30.....	1.25	1.30	1.68	.....	.....	1.48	1.92	2.11	1.80	1.73	1.89	1.53
31.....	1.23	.....	1.68	1.35	.....	1.48	.....	2.10	.....	1.69	1.84	.....

^a Maximum gage height, 4.3 feet.

^b Maximum gage height, 4.5 feet.

NOTE.—Discharge relation affected by ice Dec. 12 to Jan. 7.

Daily discharge, in second-feet, of Pecos River near Anton Chico, N. Mex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	59	25	34	60	40	21	69	470	486	180	133	180
2.....	83	24	34	60	40	21	62	360	534	248	171	172
3.....	149	26	35	60	44	21	53	290	494	339	210	164
4.....	145	33	28	60	46	21	62	284	446	1,000	250	156
5.....	111	29	46	60	47	21	71	254	402	1,060	290	152
6.....	104	27	37	60	51	21	95	260	353	542	330	156
7.....	86	25	37	55	48	21	130	290	325	850	370	156
8.....	72	25	43	49	45	29	190	290	272	526	409	148
9.....	63	24	44	42	42	31	176	446	230	360	353	140
10.....	57	25	47	42	39	32	152	598	205	278	318	133
11.....	43	25	49	40	36	33	164	614	195	346	402	176
12.....	39	25	50	81	33	34	200	574	215	409	388	164
13.....	39	25	50	66	30	35	220	574	195	278	297	152
14.....	42	30	50	49	27	36	156	566	188	230	286	148
15.....	42	33	50	46	24	60	164	550	180	210	374	137
16.....	40	35	50	44	21	73	185	542	172	180	254	120
17.....	40	37	50	46	21	86	215	502	164	297	236	113
18.....	40	37	55	46	21	95	220	550	156	654	210	106
19.....	39	42	55	46	21	100	210	566	148	550	180	100
20.....	39	46	55	46	21	126	210	494	140	534	190	100
21.....	40	47	60	55	21	144	210	502	137	486	200	113
22.....	40	44	60	64	21	130	278	518	113	332	254	120
23.....	39	37	60	76	21	89	290	550	103	318	225	120
24.....	37	40	60	69	26	103	284	724	103	272	290	123
25.....	31	40	60	51	22	106	254	646	215	266	288	123
26.....	28	46	60	47	22	89	254	558	92	195	288	123
27.....	28	43	60	44	21	64	284	510	71	176	304	113
28.....	28	35	60	44	21	62	248	502	60	164	266	103
29.....	28	34	60	47	.....	69	254	430	60	164	236	95
30.....	25	33	60	46	.....	78	242	367	180	152	225	86
31.....	24	.....	60	46	.....	78	.....	360	.....	137	200	.....

NOTE.—Daily discharge determined as follows: Dec. 12 to Jan. 7 estimated because of ice; Oct. 1 to Dec. 11 and Mar. 20 to Apr. 2 by indirect method for shifting channels; remainder of year from a well-defined curve; for days for which gage heights are missing, interpolated.

Monthly discharge of Pecos River near Anton Chico, N. Mex., for the year ending Sept. 30, 1914.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
October.....	149	24	54.2	3,330	B.
November.....	47	24	33.2	1,980	B.
December.....	60	28	50.3	3,090	C.
January.....	81	40	53.1	3,260	B.
February.....	51	21	31.1	1,730	C.
March.....	144	21	62.5	3,840	C.
April.....	290	53	187	11,100	B.
May.....	724	254	476	29,300	B.
June.....	534	60	221	13,200	B.
July.....	1,060	137	378	23,200	B.
August.....	409	133	272	16,700	B.
September.....	180	86	133	8,180	B.
The year.....	1,060	21	164	119,000	

PECOS RIVER AT SANTA ROSA, N. MEX.

Location.—In sec. 11, T. 8. N., R. 21 E., at highway bridge at Santa Rosa, 1 mile above the mouth of Rio Agua Negra Chiquita, and 6 miles above Canyon Pintada; near site of station maintained by United States Reclamation Service May 5, 1903, to December 31, 1906.

Records available.—February 1, 1910, to July 31, 1911; September 21, 1912, to September 30, 1914.

Drainage area.—2,780 square miles (from Land Office map).

Gage.—Chain gage; different datum from that of United States Reclamation Service gage.

Channel.—Very shifting.

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

Winter flow.—Practically not affected by ice.

Diversions.—No data.

Accuracy.—Estimates poor.

Discharge measurements of Pecos River at Santa Rosa, N. Mex., during the year ending Sept. 30, 1914.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Nov. 19	C. J. Emerson.....	1.70	13.3	June 20	R. J. Hank.....	2.50	162
Jan. 9	.....do.....	1.77	11.2	July 16	.....do.....	2.55	157
Feb. 15	.....do.....	1.69	9.6	Aug. 12	.....do.....	3.22	1,140
Mar. 23	.....do.....	1.93	37.0	Sept. 3	.....do.....	2.20	62.2
May 6	.....do.....	2.14	207				

Daily gage height, in feet, of Pecos River at Santa Rosa, N. Mex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	1.82	1.66	1.69	1.79	1.71	1.74	1.90	3.60	2.90	3.40	2.85	2.42
2.....	1.78	1.66	1.70	1.79	1.71	1.69	1.92	2.84	2.80	2.90	2.70	2.36
3.....	1.98	1.68	1.71	1.75	1.71	1.70	1.86	2.36	2.65	5.80	2.85	2.32
4.....	2.00	1.80	1.76	1.79	1.71	1.69	1.84	2.24	2.60	4.75	2.95	2.20
5.....	2.00	1.78	1.78	1.76	1.71	1.74	1.81	2.12	2.70	5.05	3.20	2.10
6.....	2.08	1.66	1.72	1.75	1.70	1.74	1.80	2.14	2.60	3.20	2.95	2.18
7.....	2.02	1.64	1.70	1.76	1.70	1.75	1.90	2.21	2.55	3.25	2.80	2.08
8.....	2.02	1.66	1.69	1.78	1.69	1.74	2.03	2.42	2.60	3.10	4.00	2.10
9.....	1.92	1.66	1.74	1.75	1.77	1.70	2.20	2.45	2.45	2.95	2.90	2.08
10.....	1.93	1.68	1.72	1.78	1.73	1.71	2.20	2.55	2.52	2.78	2.90	2.08
11.....	1.95	1.68	1.74	1.75	1.69	1.75	2.16	2.80	2.50	2.78	4.50	2.12
12.....	1.80	1.68	1.68	1.76	1.72	1.74	2.08	2.70	2.45	3.40	3.08	2.30
13.....	1.80	1.65	1.70	1.75	1.69	1.75	2.13	2.60	2.75	2.78	2.85	2.22
14.....	1.76	1.66	1.70	1.76	1.70	1.72	2.09	2.68	2.70	2.50	3.15	2.15
15.....	1.80	1.68	1.70	1.75	1.70	1.76	2.03	2.70	2.90	2.50	3.25	2.10
16.....	1.80	1.68	1.78	1.75	1.72	1.71	1.95	2.95	2.95	2.50	2.88	2.10
17.....	1.80	1.73	1.82	1.75	1.75	1.72	1.95	2.65	2.55	2.50	2.68	2.05
18.....	1.81	1.72	1.71	1.74	1.72	1.69	2.11	2.60	2.45	3.25	2.70	2.08
19.....	1.80	1.70	1.74	1.75	1.71	1.70	2.17	2.58	2.70	3.85	2.63	2.10
20.....	1.88	1.69	1.70	1.76	1.74	1.70	2.13	3.80	2.50	3.88	2.56	2.05
21.....	1.88	1.70	1.71	1.74	1.74	1.72	2.14	2.75	2.42	3.28	2.60	2.05
22.....	1.68	1.70	1.73	1.70	1.74	1.88	2.07	2.70	2.50	3.35	2.77	2.30
23.....	1.68	1.71	1.80	1.74	1.72	1.96	2.18	2.70	2.45	4.00	2.75	2.12
24.....	1.58	1.73	1.78	1.74	1.72	2.10	2.27	2.70	2.32	4.15	2.72	2.00
25.....	1.62	1.74	1.88	1.73	1.75	2.08	2.24	2.85	2.32	3.50	2.71	2.48
26.....	1.62	1.71	1.75	1.74	1.72	2.05	2.21	2.60	2.52	3.22	2.71	2.00
27.....	1.60	1.69	1.74	1.75	1.76	2.04	2.09	2.60	2.35	3.10	2.61	2.05
28.....	1.70	1.68	1.73	1.73	1.74	2.00	2.23	2.65	2.05	3.20	2.70	2.00
29.....	1.68	1.69	1.78	1.75	.....	.....	2.13	2.60	2.00	3.20	2.60	2.05
30.....	1.74	1.70	1.74	1.75	.....	1.75	2.20	2.70	2.98	2.92	2.47	2.02
31.....	1.62	.....	1.74	1.69	.....	1.80	.....	2.50	.....	2.90	2.42	.....

^a Maximum gage height, 6.7 feet.

^b Maximum gage height, 8.0 feet.

Daily discharge, in second-feet, of Pecos River at Santa Rosa, N. Mex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	39	16	12	12	11	13	35	675	308	505	300	118
2.....	35	16	12	12	11	10	38	500	270	280	245	100
3.....	60	16	12	10	11	11	30	284	217	2,540	300	89
4.....	62	24	14	12	11	10	28	242	201	1,500	340	65
5.....	62	22	16	11	11	13	25	201	234	1,790	455	48
6.....	76	14	12	10	10	14	25	207	198	400	340	59
7.....	63	13	11	11	10	14	36	198	183	425	280	43
8.....	63	14	10	12	9.4	14	56	201	168	356	945	46
9.....	48	14	11	10	14	11	89	210	153	296	320	42
10.....	49	14	12	12	12	12	89	228	174	234	320	42
11.....	51	14	12	10	9.4	15	82	280	165	231	1,360	48
12.....	34	14	10	11	11	14	67	245	150	495	1,030	78
13.....	33	12	10	10	9.4	15	76	210	245	231	645	63
14.....	29	12	10	11	10	13	68	238	228	145	615	51
15.....	33	13	10	10	10	16	57	245	300	145	560	42
16.....	32	13	14	10	11	14	46	340	316	142	352	42
17.....	32	15	16	10	13	14	46	228	177	142	273	35
18.....	32	14	10	9.4	11	12	74	210	148	480	245	38
19.....	31	14	12	10	11	13	87	204	224	835	214	40
20.....	38	13	10	11	12	13	78	800	162	856	189	34
21.....	38	13	10	9.4	12	16	82	259	138	495	198	33
22.....	20	13	11	7.0	12	30	68	242	159	532	252	72
23.....	20	14	14	9.4	11	40	91	242	145	945	242	40
24.....	14	14	13	9.4	11	63	112	242	112	1,060	228	26
25.....	16	14	19	8.8	13	59	105	296	112	615	220	108
26.....	15	13	12	9.4	11	56	100	204	162	465	217	25
27.....	14	12	11	10	14	54	74	204	118	405	183	29
28.....	19	12	10	8.8	12	48	105	220	54	455	207	24
29.....	18	12	12	10	-----	34	82	204	46	455	174	28
30.....	21	12	10	10	-----	19	98	238	320	328	135	25
31.....	14	-----	10	9.4	-----	23	-----	174	-----	320	120	-----

NOTE.—May 11-20 and July 18 to Aug. 11 discharge determined from a poorly defined rating curve, and for remainder of year by indirect method for shifting channels.

Monthly discharge of Pecos River at Santa Rosa, N. Mex., for the year ending Sept. 30, 1914.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
October.....	76	14	35.8	2,200	C.
November.....	24	12	14.2	845	C.
December.....	19	10	11.9	732	C.
January.....	12	7.0	10.2	627	C.
February.....	14	9.4	11.2	622	C.
March.....	63	10	22.7	1,400	C.
April.....	112	25	68.3	4,060	D.
May.....	800	174	273	16,800	D.
June.....	320	46	186	11,100	D.
July.....	2,540	142	584	35,900	D.
August.....	1,360	120	371	22,800	D.
September.....	118	24	51.1	3,040	D.
The year.....	2,540	7.0	138	100,000	

PECOS RIVER NEAR GUADALUPE, N. MEX.

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

Records available.—October 11, 1912, to September 30, 1914.

Drainage area.—Not measured.

Gage.—Automatic recording.

Channel.—Shifting.

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

Winter flow.—Slightly affected by ice.

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

Accuracy.—Estimates of discharge fair.

Discharge measurements of Pecos River near Guadalupe, N. Mex., during the year ending Sept. 30, 1914.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Nov. 16	C. J. Emerson.....	0.71	84.1	May 12	C. J. Emerson.....	2.10	518
Jan. 8	.....do.....	.68	101	June 22	R. J. Hank.....	1.50	241
Feb. 15	.....do.....	.66	80.2	Aug. 10	.....do.....	2.86	1,590
Mar. 23	.....do.....	.70	79.7	Sept. 2	.....do.....	1.18	154

Daily gage height, in feet, of Pecos River near Guadalupe, N. Mex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	0.82	0.68	0.71	0.71	0.70	0.70	0.69	11.63	2.13	2.58	1.98	1.22
2.....	.80	.72	.71	.70	.67	.69	.76	5.13	2.24	3.15	1.85	1.16
3.....	.85	.71	.73	.71	.65	.68	.81	2.30	2.32	4.10	1.89	1.12
4.....	.91	.79	1.13	.69	.68	.68	.79	1.92	2.18	3.13	2.03	1.04
5.....	1.01	.78	.92	.70	.69	.67	.75	1.80	2.13	4.18	2.17	1.01
6.....	.95	.75	.73	.70	.69	.68	.70	1.76	2.05	3.12	2.17	.99
7.....	.96	.71	.74	.70	.82	.69	.72	1.70	1.97	2.80	1.91	.97
8.....	.93	.71	.76	.65	.71	.65	.82	1.68	1.93	2.70	2.32	.91
9.....	.91	.70	.76	.64	.64	.66	.87	1.67	1.82	2.39	2.17	.90
10.....	.84	.72	.76	.67	.66	.65	1.12	1.75	1.69	2.23	2.34	.92
11.....	.85	.72	.74	.66	.65	.66	1.02	2.03	1.58	2.02	2.83	.99
12.....	.83	.71	.73	.68	.67	.71	1.00	2.10	1.50	2.17	2.80	.99
13.....	.82	.70	.74	.70	.63	.69	.98	1.90	2.79	2.14	2.19	1.08
14.....	.80	.70	.74	.66	.62	.68	.97	1.96	2.00	1.90	2.10	.94
15.....	.80	.70	.74	.65	.63	.69	.95	2.01	1.95	1.62	1.95	.93
16.....	1.51	.71	.88	.64	.66	.71	.87	2.38	2.17	1.50	2.04	.89
17.....	1.86	.79	.90	.65	.67	.70	.83	2.00	2.11	1.67	1.81	.88
18.....	1.03	.81	.81	.66	.70	.68	.81	1.85	1.97	1.64	1.70	.87
19.....	.80	.77	.80	.66	.70	.67	.90	3.63	1.96	2.97	1.62	.85
20.....	.74	.76	.79	.64	.69	.65	.98	3.32	1.88	3.07	1.54	.85
21.....	.70	.76	.79	.64	.69	.67	.96	3.25	1.63	2.66	1.52	.86
22.....	.66	.71	.93	.66	.69	.72	.96	2.50	1.55	2.45	1.46	.82
23.....	.67	.71	.93	.69	.64	.72	.90	2.34	1.44	3.11	1.65	1.00
24.....	.66	.73	.91	.66	.68	.79	.93	2.35	1.33	2.91	1.50	.95
25.....	.64	.77	.89	.65	.67	.78	1.16	2.48	1.32	2.98	1.61	.87
26.....	.66	.77	.88	.64	.70	.73	1.12	2.36	2.10	2.59	1.60	.86
27.....	.69	.75	.75	.66	.78	.72	1.06	2.23	1.58	2.26	1.51	.83
28.....	.67	.70	.75	.69	.73	.72	1.05	2.17	1.34	2.27	1.43	.84
29.....	.70	.72	.74	.69	.....	.72	1.10	2.29	1.21	2.18	1.41	.84
30.....	.70	.71	.70	.69	.....	.69	2.91	2.28	1.33	2.20	1.28	.85
31.....	.69	.....	.68	.69	.....	.68	.....	2.17	.....	2.16	1.26	.....

^aMaximum gage height, 15.5 feet; discharge, about 42,000 second-feet.

Daily discharge, in second-feet, of Pecos River near Guadalupe, N. Mex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	114	81	83	101	92	86	75	26,200	578	1,170	702	172
2.....	110	88	83	101	86	85	86	5,570	656	1,810	606	149
3.....	121	85	86	103	83	83	95	656	717	3,540	634	138
4.....	138	99	199	101	88	81	92	402	620	1,830	742	117
5.....	169	97	129	103	88	80	85	333	585	3,860	863	110
6.....	149	92	88	103	88	81	77	311	529	1,850	863	106
7.....	152	85	92	106	114	83	80	279	482	1,480	656	101
8.....	144	85	95	95	92	76	95	269	456	1,370	1,020	90
9.....	135	83	97	94	80	76	106	264	391	1,060	890	88
10.....	116	85	97	99	83	75	176	305	316	917	1,050	94
11.....	119	85	94	95	81	76	143	469	264	734	1,550	108
12.....	114	83	94	99	85	85	138	515	228	863	1,500	108
13.....	112	81	95	103	78	80	132	391	1,170	836	890	129
14.....	108	81	97	95	76	78	129	425	515	641	800	97
15.....	108	81	97	92	78	80	121	463	482	450	679	95
16.....	408	83	129	90	83	81	103	725	634	379	742	90
17.....	634	97	138	92	85	80	95	456	599	482	564	88
18.....	169	101	114	92	90	77	92	373	501	463	482	86
19.....	106	94	112	92	90	75	110	2,050	495	1,670	425	83
20.....	94	92	112	88	88	73	129	1,660	443	1,780	373	83
21.....	86	92	112	88	86	75	124	1,590	305	1,330	356	86
22.....	80	83	149	90	86	83	124	845	264	1,120	316	80
23.....	81	83	152	95	78	83	108	709	223	1,830	420	114
24.....	80	86	146	90	85	94	114	725	187	1,630	327	103
25.....	75	94	141	86	83	92	183	836	191	1,680	385	88
26.....	78	94	141	85	86	83	169	734	656	1,260	379	88
27.....	83	90	108	88	101	81	149	634	333	944	321	83
28.....	80	81	110	94	92	81	146	599	223	953	274	85
29.....	85	85	108	92	-----	81	163	687	180	872	264	85
30.....	85	83	99	92	-----	77	1,540	679	237	890	203	86
31.....	83	-----	95	92	-----	75	-----	599	-----	854	191	-----

NOTE.—Discharge determined from a well-defined curve Nov. 17 to Dec. 2, and by the indirect method for shifting channels for remainder of year.

Monthly discharge of Pecos River near Guadalupe, N. Mex., for the year ending Sept. 30, 1914.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
October.....	634	75	136	8,360	B.
November.....	101	81	87.6	5,210	B.
December.....	199	83	113	6,950	B.
January.....	106	85	94.7	5,820	B.
February.....	114	76	86.6	4,810	C.
March.....	94	73	80.5	4,950	C.
April.....	1,540	75	166	9,880	C.
May.....	26,200	264	1,640	101,000	C.
June.....	1,170	180	449	26,700	C.
July.....	4,940	917	1,310	80,600	C.
August.....	1,550	191	628	38,600	C.
September.....	172	80	101	6,010	C.
The year.....	26,200	73	412	299,000	

PECOS RIVER NEAR FORT SUMNER, N. MEX.

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

Records available.—June 12, 1904, to February 28, 1910; September 16, 1912, to December 31, 1913, when station was discontinued.

Drainage area.—Approximately 5,300 square miles.

Gage.—Inclined staff gage located downstream and referred to different datum from gage read June 12, 1904, to July 5, 1905, since which time datum has remained unchanged.

Channel.—Very shifting.

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

Winter flow.—Slightly affected by ice.

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

Accuracy.—Discharge estimates fair.

The following discharge measurement was made by C. J. Emerson:

November 17, 1914: Gage height, 2.88 feet; discharge, 103 second-feet.

Daily gage height, in feet, and discharge, in second-feet, of Pecos River near Fort Sumner, N. Mex., for the year ending Sept. 30, 1914.

[J. C. Pacheco, observer.]

Day.	Oct.		Nov.		Dec.	
	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
1.....	2.98	104	2.80	80	2.80	82
2.....	2.92	101	2.80	85	2.90	82
3.....	2.90	110	2.80	82	2.88	88
4.....	2.95	125	2.92	96	3.25	194
5.....	3.12	148	2.90	96	3.00	130
6.....	3.12	137	2.82	93	3.00	88
7.....	3.12	140	2.80	82	2.62	88
8.....	3.00	130	2.80	82	2.82	93
9.....	2.98	125	2.80	82	2.72	93
10.....	3.10	110	2.85	85	2.70	93
11.....	3.05	110	2.85	85	2.70	88
12.....	3.02	107	2.82	82	2.72	88
13.....	3.00	104	2.82	82	2.80	88
14.....	3.00	102	2.80	82	2.82	88
15.....	3.00	102	2.80	82	2.80	88
16.....	3.00	383	2.85	85	2.92	118
17.....	3.50	618	2.89	99	2.95	121
18.....	2.79	159	2.90	102	3.02	104
19.....	2.80	118	2.90	96	2.82	99
20.....	2.80	88	2.92	93	2.90	99
21.....	2.80	82	2.85	93	2.95	99
22.....	2.80	78	2.82	82	2.98	133
23.....	2.80	78	2.80	82	2.90	138
24.....	2.85	76	2.90	88	3.35	125
25.....	2.85	74	2.90	96	3.38	118
26.....	2.80	78	2.85	93	3.02	118
27.....	2.80	80	2.80	90	3.18	93
28.....	2.80	78	2.82	82	3.10	90
29.....	2.80	82	2.85	85	3.00	90
30.....	2.80	82	2.80	110	3.00	82
31.....	2.80	80	.....	.....	2.98	78

NOTE.—Discharge determined from relation of gage height at this station to that at the station on Pecos River near Guadalupe.

Monthly discharge of Pecos River near Fort Sumner, N. Mex., for the year ending Sept. 30, 1914.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
October	618	74	129	7,930	B.
November	110	80	88.4	5,260	B.
December	194	78	102	6,270	C.
The period				19,500	

PECOS RIVER NEAR DAYTON, N. MEX.

Location.—In sec. 13. T. 18 S., R. 26 E., 3 miles east of Dayton, half a mile above mouth of Penasco River.

Records available.—March 24, 1905, to September 30, 1914.

Drainage area.—Not measured.

Gage.—Stevens automatic gage installed August 27, 1914, at same site and datum as staff gage. The original staff gage was washed out September 6 and relocated September 7, 1905, at a point one-half mile upstream. Datum unchanged since September 7, 1905.

Channel.—Shifting.

Discharge measurements.—Made from car and cable.

Winter flow.—Affected very little by ice.

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

Accuracy.—Estimates of discharge good.

Discharge measurements of Pecos River near Dayton, N. Mex., during the year ending Sept. 30, 1914.

Date.	Made by—	Gage height.	Dis- charge.	Date.	Made by—	Gage height.	Dis- charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Nov. 22	U. S. R. S. Engineers..	2.45	268	June 12	U. S. R. S. Engineers..	3.50	519
Dec. 26	do.	2.70	327	July 3	C. J. Emerson.....	7.85	5,020
Jan. 15	do.	2.55	262	8	do.	5.68	1,620
30	do.	2.40	237	15	do.	4.69	893
Feb. 11	do.	2.30	226	28	do.	5.34	1,130
Mar. 6	do.	2.25	207	Aug. 6	do.	3.68	366
Apr. 7	do.	2.40	245	15	do.	5.22	971
May. 2	do.	2.35	245	22	do.	3.48	231
3	do.	11.40	a 18,200	Sept. 8	do.	2.87	113
7	do.	3.55	758	17	do.	2.64	102
21	do.	5.90	2,580	25	do.	2.84	142
June 3	do.	4.93	1,460				

^a Determined from capacity curves and rate of rise in McMillan reservoir.

STATION RECORDS.

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Daily gage height, in feet, of Pecos River near Dayton, N. Mex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	1.7	1.9	2.3	2.8	2.5	2.3	1.8	1.6	4.4	2.8	4.3	3.56
2.....	1.7	1.9	2.3	2.7	2.5	2.3	1.8	2.3	4.9	2.7	4.4	3.40
3.....	2.7	1.9	2.2	2.7	2.5	2.3	1.9	11.8	5.1	8.45	4.1	3.30
4.....	2.7	1.9	2.3	2.6	2.5	2.3	1.8	6.1	5.1	6.6	4.4	3.25
5.....	2.1	1.9	2.3	2.6	2.5	2.3	1.8	4.9	4.8	6.45	4.8	3.11
6.....	2.1	1.9	2.3	2.6	2.5	2.3	2.5	4.2	4.2	5.8	3.7	3.02
7.....	2.1	1.9	2.2	2.6	2.5	2.2	2.4	3.5	3.9	6.5	3.7	2.96
8.....	1.9	2.0	2.9	2.6	2.5	2.1	2.3	3.3	3.6	5.9	4.1	2.89
9.....	1.9	2.1	2.6	2.6	2.5	2.0	2.2	3.1	3.5	5.4	4.2	2.88
10.....	1.8	2.0	2.5	2.6	2.4	2.0	2.1	2.9	4.4	5.6	3.8	2.83
11.....	1.9	2.0	2.4	2.6	2.4	1.9	2.2	2.8	4.1	5.7	4.9	2.79
12.....	1.9	2.0	2.4	2.6	2.4	1.9	2.2	2.7	3.5	4.7	4.3	2.76
13.....	1.9	2.0	2.3	2.5	2.3	1.9	2.0	2.7	3.4	4.5	4.9	2.70
14.....	1.9	2.0	2.5	2.5	2.3	1.9	2.0	2.7	3.5	4.0	5.8	2.67
15.....	1.8	2.0	2.5	2.5	2.5	1.9	2.3	3.5	3.6	4.3	4.2	.....
16.....	2.0	2.0	2.6	2.5	2.4	1.9	2.4	3.4	4.6	4.1	4.7	.....
17.....	1.9	2.0	2.7	2.5	2.4	1.9	2.2	3.4	5.6	3.8	4.4	2.65
18.....	2.0	2.1	2.8	2.5	2.4	1.9	2.1	4.7	4.3	3.5	4.4	2.65
19.....	3.8	2.3	3.0	2.5	2.4	1.9	2.0	3.6	3.8	3.5	4.6	2.67
20.....	3.2	2.5	2.9	2.5	2.4	1.9	1.9	4.3	3.8	4.8	3.9	2.61
21.....	2.8	2.3	3.3	2.5	2.4	1.9	1.8	6.6	3.5	5.0	3.7	2.57
22.....	2.6	2.5	2.9	2.5	2.3	1.9	1.8	4.7	3.2	5.9	3.5	2.57
23.....	2.5	2.5	2.9	2.5	2.3	1.9	1.7	5.5	3.1	5.6	3.4	2.54
24.....	2.3	2.4	2.8	2.5	2.3	1.9	1.6	4.5	3.0	5.3	3.4	2.55
25.....	2.2	2.3	2.7	2.5	2.3	1.8	1.6	4.3	3.0	5.0	3.4	2.83
26.....	2.1	2.3	2.7	2.5	2.4	1.8	1.6	4.0	2.8	5.5	3.5	2.80
27.....	2.0	2.3	2.7	2.5	2.3	1.7	1.6	3.8	2.7	5.7	3.70	2.76
28.....	1.9	2.3	2.7	2.4	2.3	1.7	1.7	4.7	2.7	5.4	3.52	2.71
29.....	2.0	2.3	2.7	2.4	.....	1.7	1.6	3.8	2.6	5.1	3.36	2.66
30.....	2.0	2.4	2.7	2.4	.....	1.7	1.6	4.2	2.4	4.6	3.34	2.58
31.....	2.0	.....	2.7	2.5	.....	1.7	.....	4.8	.....	5.0	3.31	.....

Daily discharge, in second-feet, of Pecos River near Dayton, N. Mex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	120	150	230	354	280	225	132	108	1,140	265	575	242
2.....	120	150	230	328	280	225	132	225	1,510	238	625	200
3.....	328	150	208	328	280	225	146	20,300	1,630	6,300	505	180
4.....	328	150	230	295	280	225	132	2,880	1,630	2,940	678	169
5.....	188	150	230	295	280	225	132	1,670	1,390	2,640	900	146
6.....	188	150	230	295	280	225	280	1,140	960	1,890	380	132
7.....	188	150	208	295	280	200	250	732	788	2,480	380	125
8.....	150	168	382	295	280	180	225	625	625	1,800	528	115
9.....	150	188	302	295	280	162	200	528	550	1,360	550	114
10.....	134	168	278	295	250	162	180	440	1,080	1,510	362	109
11.....	150	168	254	280	250	146	200	380	870	1,590	870	106
12.....	150	168	254	280	250	146	200	345	514	900	528	104
13.....	150	168	230	250	225	146	162	345	469	788	815	100
14.....	150	168	278	250	225	146	162	345	514	528	1,360	99
15.....	134	168	278	250	280	146	225	705	575	678	440	98
16.....	168	168	302	250	250	146	250	650	1,140	550	678	106
17.....	150	168	328	250	250	146	200	650	1,840	420	528	103
18.....	168	188	354	250	250	146	180	1,470	960	310	550	103
19.....	714	230	412	250	250	146	162	760	678	295	650	107
20.....	474	278	382	250	250	146	146	1,180	678	900	345	103
21.....	354	230	510	265	250	146	132	3,460	528	1,020	295	101
22.....	302	278	382	265	225	146	132	1,430	400	1,630	238	103
23.....	278	278	382	265	225	146	120	2,120	362	1,390	212	102
24.....	230	254	354	265	225	146	108	1,280	328	1,140	212	105
25.....	208	230	328	265	225	132	108	1,140	328	960	212	140
26.....	188	230	328	265	250	132	108	930	265	1,250	238	132
27.....	168	230	328	265	225	120	108	815	238	1,390	289	124
28.....	150	230	328	238	225	120	120	1,390	238	1,180	238	114
29.....	168	230	328	238	.....	120	108	815	212	990	196	105
30.....	168	254	328	238	.....	120	108	1,020	171	705	192	94
31.....	168	.....	328	265	.....	120	.....	1,430	.....	930	184	.....

NOTE.—Daily discharge determined as follows: Oct. 1 to Jan. 4, Feb. 1 to May 3, and May 11-21 from two well-defined rating curves; Sept. 15 and 16 estimated; remainder of year by indirect method for shifting channels.

Monthly discharge of Pecos River near Dayton, N. Mex., for the year ending Sept. 30, 1914.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
October.....	714	120	216	13,300	B.
November.....	278	150	196	11,700	B.
December.....	510	208	307	18,900	B.
January.....	354	238	273	16,800	B.
February.....	280	225	254	14,100	A.
March.....	225	120	160	9,840	A.
April.....	280	108	162	9,640	A.
May.....	20,300	108	1,660	102,000	B.
June.....	1,840	171	753	44,800	C.
July.....	6,300	238	1,320	81,200	C.
August.....	1,360	184	476	29,300	B.
September.....	242	94	123	7,320	A.
The year.....	20,300	94	495	359,000	

PECOS RIVER AT CARLSBAD, N. MEX.

Location.—In the SE. $\frac{1}{4}$ sec. 6, T. 22 S., R. 27 E., at Green Street steel highway bridge in Carlsbad, 300 feet downstream from Atchison, Topeka & Santa Fe Railway depot, 1,500 feet above mouth of Dark Canyon, and 2,000 feet below the Hagerman dam.

Records available.—May 20, 1903, to March 31, 1908; May 18 to September 30, 1914.

Drainage area.—Not measured.

Gage.—Vertical staff, installed May 18, 1914, at same site and datum as gages used from 1903 to 1908. The original gage was washed out in 1904, but was replaced by new staff gage which was used until March 31, 1908.

Channel.—Practically permanent.

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

Winter flow.—Discharge relation not affected by ice.

Diversions.—Water is diverted in large amounts above the station.

Regulation.—Lake McMillan and Lake Avalon of the Carlsbad project of the United States Reclamation Service are located on Pecos River a few miles above the station. These storage reservoirs control the flow of the river at Carlsbad. Considerable water is known to seep into the river between the storage reservoirs and the gaging station. The quantity depends upon the amount of water being used for irrigation between the two points.

Accuracy.—Estimates of discharge good.

Discharge measurements of Pecos River at Carlsbad, N. Mex., during the year ending Sept. 30, 1914.

[Made by J. C. Emerson.]

Date.	Gage height.	Dis- charge.	Date.	Gage height.	Dis- charge.	Date.	Gage height.	Dis- charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
May 18.....	1.01	134	July 24.....	2.10	908	Aug. 17.....	2.18	910
June 10.....	4.60	3,890	27.....	3.50	2,390	Sept. 10.....	1.02	122
11.....	3.12	2,160	Aug. 5.....	1.98	734	18.....	.94	102
11.....	5.78	6,290	10.....	1.04	154			

Daily gage height, in feet, and discharge, in second-feet, of Pecos River at Carlsbad, N. Mex., for the year ending Sept. 30, 1914.

[Genaro Lopez, observer.]

Day.	May.		June.		July.		August.		September.	
	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.
1.....			1.37	332	0.90	85	1.00	125	0.92	93
2.....			1.63	501	1.00	125	1.00	125	.93	97
3.....			3.13	1,890	4.40	3,640	1.00	125	1.08	165
4.....			1.60	480	4.80	4,330	1.00	125	1.13	192
5.....			2.57	1,310	3.65	2,540	2.10	865	1.13	192
6.....			2.37	1,110	4.50	3,800	2.17	928		184
7.....			2.40	1,140	4.40	3,640	1.53	434	1.10	175
8.....			2.37	1,110	3.60	2,470	1.00	125	1.15	202
9.....			1.23	248	3.38	2,190	.99	121	1.23	248
10.....			3.70	2,600	1.03	140	1.13	192	1.00	125
11.....			2.45	1,190	2.92	1,660	1.20	230	1.00	125
12.....			.87	74	3.00	1,750	1.25	260	.93	97
13.....			.87	74	2.00	780	1.27	272	.90	85
14.....			1.00	125	1.00	125	1.32	302	.90	85
15.....			1.00	125	1.00	125	1.62	494	.92	93
16.....			2.01	788	1.00	125	1.75	588	.93	97
17.....			1.77	602	1.00	125	2.08	848	.93	97
18.....	1.44	376	2.30	1,040	1.00	125	1.82	640	.93	97
19.....	2.93	1,670	2.47	1,210	2.30	1,040	1.32	302	.95	105
20.....	1.00	125	1.39	332	2.17	928	1.35	320	.97	113
21.....	.90	85	1.00	125	1.30	290	1.42	363	1.00	125
22.....	4.03	3,080	.97	113	2.32	1,060	1.30	290	1.03	140
23.....	4.37	3,590	.93	97	2.22	973	1.25	260	1.13	192
24.....	2.35	1,090	.90	85	2.17	928	1.35	320	1.10	175
25.....	3.13	1,890	.90	85	1.35	320	1.22	242	1.03	140
26.....	1.13	192	.90	85	2.00	780	1.20	230	.98	117
27.....	1.73	572	.90	85	3.43	2,250	1.00	125	.98	117
28.....	1.90	700	.90	85	3.50	2,340	.95	105	.95	105
29.....	3.01	1,760	.90	85	2.73	1,470	.93	97	.95	105
30.....	2.20	955	.90	85	1.00	125		101	.95	105
31.....	2.45	1,190			1.00	125	.95	105		

^a Maximum gage height, 5.1 feet.

NOTE.—Discharge determined from a well-defined curve.

Monthly discharge of Pecos River at Carlsbad, N. Mex., for the year ending Sept. 30, 1914.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
May 18-31.....	3,590	85	1,230	34,200	B.
June.....	2,600	74	574	34,200	B.
July.....	4,330	85	1,300	79,900	B.
August.....	928	97	312	19,200	B.
September.....	248	85	133	7,910	B.
The period.....				175,000	

EVAPORATION NEAR CARLSBAD, N. MEX.

An evaporation station was installed July 31, 1914, at the headgates on Lake Avalon of the United States Reclamation Service, Carlsbad project, about 6 miles north of Carlsbad, N. Mex., at an approximate elevation of 3,200 feet. The method and equipment are the same as those used at the station at Santa Fe, N. Mex.

The following table shows the evaporation, rainfall, and approximate mean temperature of the water in and out of the pan for the period August and September, 1914:

Evaporation near Carlsbad, N. Mex., for the period August and September, 1914.

Month.	Temperature.		Rainfall.	Evapo- ration.
	In pan.	Outside of pan.		
	° F.	° F.	Inches.	Inches.
August.....	79	79	1.66	8.06
September.....	75	74	.80	8.04
The period.....			2.46	16.10

PECOS RIVER NEAR ANGELES, TEX.

Location.—In T. 26 S., R. 29 E., just below the mouth of Delaware River, 2½ miles southeast of Red Bluff, N. Mex., 8½ miles northwest of Angeles, Tex.; about 2 miles north of the New Mexico-Texas State line.

Records available.—May 27 to September 30, 1914.

Drainage area.—Not measured.

Gage.—Automatic recording.

Channel.—Slightly shifting.

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

Winter flow.—Not affected by ice.

Diversions.—Considerable water diverted above station.

Accuracy.—Estimates of discharge, good.

Discharge measurements of Pecos River near Angeles, Tex., during the year ending Sept. 30, 1914.

[Made by C. J. Emerson.]

Date.	Gage height.	Dis- charge.	Date.	Gage height.	Dis- charge.	Date.	Gage height.	Dis- charge.
	<i>Fect.</i>	<i>Sec.-ft.</i>		<i>Fect.</i>	<i>Sec.-ft.</i>		<i>Fect.</i>	<i>Sec.-ft.</i>
May 28.....	0.91	477	July 7.....	2.40	2,080	Aug. 19.....	1.15	627
July 4.....	3.17	3,350	18.....	.70	235	29.....	.59	222
6.....	1.82	1,300	25.....	1.36	864	Sept. 12.....	.65	197
7.....	2.65	2,370	30.....	1.18	728	21.....	.70	243

Daily gage height, in feet, and discharge, in second-feet, of Pecos River near Angeles, Tex., for the year ending Sept. 30, 1914.

Day.	May.		June.		July.		August.		September.	
	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.
1.....	2.57	2,290	0.58	300	0.69	355	0.66	244
2.....	1.02	576	2.00	1,520	.69	355	^b 1.40	712
3.....	^a 2.63	2,390	1.02	576	.70	360	2.70	2,150
4.....	2.00	1,520	2.77	2,610	.71	366	.....	856
5.....	1.23	744	3.26	3,550	.71	366	.....	728
6.....	2.10	1,640	2.93	2,890	1.20	720	.....	680
7.....	1.75	1,230	3.15	3,320	1.27	776	.....	592
8.....	1.63	1,110	3.21	3,440	1.14	672	.....	438
9.....	1.46	940	3.01	3,040	.88	468	.....	372
10.....	3.58	4,290	1.97	1,480	.70	360	.....	290
11.....	3.06	3,140	.88	468	.60	310	.75	240
12.....	1.42	900	2.16	1,710	.86	450	.66	200
13.....67	345	2.25	1,830	.74	372	.63	184
14.....72	372	1.14	632	.70	345	.61	172
15.....70	360	.76	340	.71	345	.67	200
16.....82	432	.74	305	.87	432	.64	192
17.....	1.80	1,280	.71	265	1.05	560	.71	224
18.....	1.18	704	.71	240	1.31	760	1.48	720
19.....	1.57	1,050	.71	240	1.13	608	.98	372
20.....	1.54	1,020	.77	270	.93	450	.83	300
21.....	1.07	616	1.35	680	.67	300	.71	248
22.....72	372	.88	378	.74	330	.69	240
23.....54	280	1.41	808	.73	320	.66	228
24.....49	256	1.35	800	.68	290	.67	232
25.....48	252	1.36	864	.87	384	.66	224
26.....50	260	1.00	576	.91	402	.64	216
27.....	0.56	290	.55	285	1.52	1,020	.....	285	.64	216
28.....	.99	552	.58	300	2.60	2,390	.....	236	.58	192
29.....	1.70	1,180	.56	290	2.60	2,390	.....	232	.54	172
30.....	2.53	2,230	.48	252	1.42	930	.66	252	.52	164
31.....	2.57	2,290	.....	.....	.74	384	.81	320	.....	.....

^a Maximum gage height, 6.5 feet.

^b Maximum gage height, 6.7 feet.

NOTE.—Daily discharge determined as follows: May 27 to July 13 and Aug. 1-11, from a well-defined rating curve; July 14-31 and Aug. 12 to Sept. 30 by indirect method for shifting channels; for days for which gage heights are missing, estimated by comparison with other stations in this drainage and from information furnished by the hydrographer.

Monthly discharge of Pecos River near Angeles, Tex., for the year ending Sept. 30, 1914.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
May 27-31.....	2,290	290	1,310	13,000	B.
June.....	4,290	252	983	58,500	B.
July.....	3,550	240	1,300	79,900	A.
August.....	776	232	412	25,300	B.
September.....	2,150	164	400	23,800	B.
The period.....	.....	.....	.....	200,000	.....

PECOS RIVER NEAR BARSTOW, TEX.

Location.—Near the northeast corner of water tract No. 10, sec. 34, Ward County, Tex., 4 miles southeast of Barstow, and 7 miles downstream from Texas & Pacific Railway bridge crossing the Pecos; 2½ miles above mouth of Toyah Creek.

Records available.—April 27 to September 30, 1914.

Drainage area.—Not measured.

Gage.—Automatic recording.

Channel.—Subject to shift during high water.

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

Winter flow.—Not affected by ice.

Diversions.—A large part of flow is diverted above station during irrigation season.

Accuracy.—Estimates of discharge fair.

Discharge measurements of Pecos River near Barstow, Tex., during the year ending Sept. 30, 1914.

[Made by C. J. Emerson.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Apr. 27.....	0.12	27.6	July 11.....	5.27	1,100	July 23.....	3.06	452
June 26.....	1.70	194	12.....	3.87	635	Aug. 3.....	1.66	136
27.....	1.49	160	12.....	3.62	563	14.....	.83	47.6
30.....	1.16	117	14.....	5.66	1,520	Sept. 3.....	2.01	242
July 11.....	6.79	1,730	14.....	5.66	1,520	15.....	.71	61.4
11.....	5.91	1,350	21.....	1.55	120	22.....	1.76	180
11.....	5.55	1,260	22.....	2.38	272	30.....	.84	65.4

Daily gage height, in feet, and discharge, in second-feet, of Pecos River near Barstow, Tex., for the year ending Sept. 30, 1914.

Day.	Apr.		May.		June.		July.		Aug.		Sept.	
	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.
1.....			0.60	64	6.14	1,460	1.09	113	3.07	384	.....	264
2.....			1.86	210	7.25	1,940	.98	102	2.20	216	.....	235
3.....			.56	61	6.43	1,570	1.32	140	1.66	136	.....	232
4.....			.38	46	5.66	1,260	2.50	312	1.44	110	6.43	1,590
5.....			.34	43	7.68	2,160	1.69	187	1.27	92	6.00	1,410
6.....			.33	42	6.74	1,700	5.05	1,030	1.32	97	5.66	1,260
7.....			2.55	321	5.96	1,380	7.62	2,130	1.10	74	5.22	1,080
8.....			6.42	1,570	5.74	1,300	7.94	2,290	1.83	154	4.81	996
9.....			5.10	1,040	5.54	1,220	8.42	2,530	2.64	267	.....	788
10.....			2.45	303	5.41	1,160	8.12	2,380	2.25	208	.....	623
11.....			1.27	134	7.43	2,040	6.32	1,530	1.30	92	.....	463
12.....			.83	87	8.36	2,500	3.70	590	1.10	72	.....	334
13.....			.79	83	7.58	2,110	4.20	842	.94	57	.....	212
14.....			.66	70	.....	1,970	5.55	1,480	1.21	82	.....	125
15.....			.60	64	.....	1,820	5.20	1,280	1.63	128	.76	66
16.....			.58	62	.....	1,670	5.02	1,150	1.25	90	.76	66
17.....			.62	66	.....	1,520	4.86	1,030	1.18	86	.71	62
18.....			1.19	125	.....	1,370	.....	761	1.22	92	.....	60
19.....			1.05	109	.....	1,220	.....	246	1.74	154	.....	58
20.....			4.88	968	.....	1,070	.....	144	2.70	296	2.58	305
21.....			.....	1,970	.....	927	.....	126	2.00	194	2.28	256
22.....			.....	1,660	.....	779	2.00	213	1.47	130	1.80	185
23.....			.....	1,420	.....	631	2.81	397	.90	73	1.35	128
24.....			.....	1,160	.....	483	2.04	252	.85	70	1.24	114
25.....			.....	1,020	.....	335	2.89	405	1.02	90	1.11	100
26.....			.....	888	1.69	187	2.92	408	.....	90	.98	86
27.....	0.12	27	.....	770	1.49	161	2.78	374	.....	93	.99	85
28.....	.12	27	.....	686	1.37	146	3.30	487	.....	430	.95	79
29.....	.14	28	3.56	551	1.26	133	5.97	1,390	.....	468	.91	73
30.....	.15	29	3.18	453	1.17	122	6.22	1,490	.....	342	.85	66
31.....	.....	.....	6.29	1,520	.....	.....	4.85	922	.....	292	.....	.....

NOTE.—Daily discharge determined as follows: Apr. 22 to July 12 from a well-defined rating curve; June 14 to 25 interpolated; on days for which gage heights are missing, estimated by comparison with other stations in this drainage and from information furnished by the hydrographer; for remainder of year by indirect method for shifting channels.

Monthly discharge of Pecos River near Barstow, Tex., for the year ending Sept. 30, 1914.

Month	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
April 27-30.....	29	27	27.8	221	C.
May.....	1,970	42	567	84,900	C.
June.....	2,500	123	1,210	72,000	B.
July.....	2,530	102	862	53,000	B.
August.....	468	57	166	10,200	C.
September.....	1,590	58	378	22,500	C.
The period.....				193,000	

PECOS RIVER NEAR MOORHEAD, TEX.

Location.—At highway bridge of Southern Pacific Railroad near Moorhead siding, Tex., about 2 miles above confluence with Rio Grande, and below all tributaries.

Records available.—April, 1900, to September 30, 1914.

Drainage area.—Not measured. —

Gage.—Vertical staff.

Channel.—A series of rapids and pools in a canyon about 300 feet deep. Subject to shift at all stages.

Discharge measurements.—Made from car and cable.

Winter flow.—Not affected by ice.

Diversions.—Considerable water is diverted above station; no diversions below.

Cooperation.—Station maintained and records furnished by American section of the International Water Commission until April 1, 1914, after which the records were collected in cooperation with the United States Reclamation Service and the Commission for the Equitable Distribution of the Water of the Rio Grande.

Discharge measurements of Pecos River near Moorhead, Tex., for the year ending Sept. 30, 1914.

[Made by E. E. Winter and W. H. Dodd.]

Date.	Gage height.	Dis- charge.	Date.	Gage height.	Dis- charge.	Date.	Gage height.	Dis- charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Oct. 3.....	2.25	1,140	Dec. 16.....	1.1	413	Mar. 4.....	0.55	284
8.....	1.8	1,038	22.....	1.1	417	9.....	.5	263
12.....	1.1	516	26.....	1.1	422	14.....	.5	254
16.....	.8	351	30.....	1.1	406	22.....	.5	244
21.....	.7	376	Jan. 3.....	1.0	407	June 1.....	2.15	1,060
25.....	.7	374	7.....	1.0	396	July 15.....	2.8	1,530
29.....	.65	370	12.....	1.1	455	26.....	1.1	549
Nov. 3.....	.6	289	16.....	1.0	435	Aug. 2.....	1.2	511
7.....	.7	298	20.....	1.1	447	14.....	1.0	400
12.....	.7	301	24.....	.95	390	31.....	1.45	687
17.....	.75	331	29.....	1.2	503	Sept. 3.....	1.5	689
21.....	.8	360	Feb. 7.....	.9	357	9.....	2.2	1,190
24.....	5.65	4,206	3.....	.9	316	14.....	1.45	613
29.....	1.85	992	7.....	.6	304	18.....	1.6	771
Dec. 3.....	1.5	612	12.....	.7	315	23.....	1.4	648
8.....	1.1	421	17.....	.65	301	28.....	1.3	580
12.....	1.1	417	26.....	.6	277			

a Measurement made by C. J. Emerson.

Daily gage height, in feet, of Pecos River near Moorhead, Tex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.	0.7	0.6	1.5	1.1	1.05	0.6	0.5	8.0	2.2	1.75	1.0	1.55
2.	1.0	.6	1.4	1.05	.9	.6	.5	3.5	1.95	5.25	1.0	1.6
3.	2.3	.6	1.5	1.0	.9	.55	.5	.95	1.65	1.75	1.2	1.5
4.	1.2	.6	1.45	1.0	.85	.55	.5	.9	1.45	1.6	1.85	1.5
5.	1.3	.6	1.3	1.0	.8	.5	.5	.8	3.2	1.55	1.9	1.5
6.	1.0	.7	1.2	1.0	.8	.5	.45	.8	3.35	1.5	1.65	1.5
7.	.85	.7	1.2	1.0	.75	.5	.4	.7	5.35	1.45	1.45	1.6
8.	1.8	.7	1.1	1.0	.7	.5	.4	.65	5.65	1.4	1.3	1.85
9.	1.6	.7	1.1	1.0	.7	.5	.4	.5	6.25	1.4	1.2	2.15
10.	1.5	.7	1.15	1.0	.7	.5	.4	.5	4.55	1.4	1.1	1.85
11.	1.5	.7	1.3	1.0	.7	.5	.4	.5	3.9	2.65	1.95	1.7
12.	1.2	.7	1.2	1.1	.65	.5	.45	.55	3.5	3.25	1.2	1.6
13.	1.0	.7	1.1	1.1	.6	.5	.5	3.0	3.4	3.2	2.25	1.5
14.	.95	.7	1.1	1.1	.6	.5	.5	.8	3.2	3.0	1.9	1.5
15.	.8	.7	1.1	1.0	.6	.5	.5	1.1	3.15	2.8	1.45	1.4
16.	.8	.7	1.1	1.0	.6	.5	.5	.9	4.65	2.35	1.3	1.3
17.	.8	.75	1.1	1.0	.7	.5	.5	.8	5.9	1.9	1.3	1.3
18.	.8	.7	1.1	1.1	.7	.5	.5	2.6	3.8	1.9	1.15	1.45
19.	.7	.75	1.1	1.1	.7	.5	.5	1.55	3.8	2.1	1.1	1.5
20.	.7	.8	1.1	1.1	.7	.5	.5	2.95	2.75	1.7	1.1	1.4
21.	.7	.8	1.1	1.05	.65	.5	.5	2.95	2.5	1.6	1.1	1.35
22.	.7	.8	1.1	1.0	.6	.5	.5	7.9	2.2	1.55	1.05	1.3
23.	.7	2.95	1.1	1.0	.6	.5	.5	8.5	2.25	1.4	1.0	1.35
24.	.7	5.8	1.1	.95	.6	.5	.5	2.75	2.4	1.3	1.0	1.4
25.	.7	2.8	1.1	.95	.6	.5	.5	2.6	2.4	1.25	1.7	1.4
26.	.7	1.75	1.1	.95	.6	.45	.5	2.2	2.6	1.1	1.25	1.4
27.	.65	1.6	1.1	1.0	.6	.45	.5	2.0	2.4	1.0	7.7	1.4
28.	.65	1.65	1.1	1.1	.6	.4	.5	1.75	2.05	1.0	4.0	1.3
29.	.65	1.95	1.1	1.2	.....	.4	.6	1.95	1.9	1.0	2.0	1.3
30.	.6	1.3	1.1	1.2	.....	.5	.6	2.25	1.8	1.0	1.55	1.3
31.	.6	.....	1.1	1.1	.....	.5	.....	1.1	.....	1.0	1.4	.....

Daily discharge, in second-feet, of Pecos River near Moorhead, Tex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.	325	270	660	410	435	280	253	8,310	α1,100	800	490	740
2.	485	280	595	410	355	285	253	2,140	928	3,980	486	758
3.	α1,170	α290	α610	α405	α355	280	253	392	740	800	584	α688
4.	570	290	590	405	345	α285	253	373	628	710	967	α694
5.	625	290	515	400	335	265	253	340	1,870	682	995	699
6.	460	300	470	400	335	265	240	340	2,000	655	824	704
7.	380	α300	470	α395	α325	265	228	309	4,120	628	699	770
8.	α1,040	300	α420	395	315	265	228	294	4,510	600	611	934
9.	890	300	420	395	315	α265	228	253	5,380	600	550	α1,150
10.	815	300	440	395	315	260	228	253	3,160	600	495	921
11.	815	300	500	395	315	260	228	253	2,510	1,430	995	806
12.	α590	α300	α455	α455	α310	255	240	266	2,140	1,920	540	728
13.	460	300	415	455	305	255	253	1,710	2,050	1,870	1,190	655
14.	435	300	415	455	305	α255	253	340	1,870	1,710	940	α638
15.	350	300	415	435	305	255	253	450	1,830	α1,550	660	600
16.	α350	α300	α415	α435	305	250	253	373	3,280	1,240	572	562
17.	345	α330	415	435	α315	250	253	340	4,480	928	567	578
18.	335	300	415	445	310	250	253	1,390	2,410	928	α486	α682
19.	290	330	415	445	310	250	253	682	2,410	1,100	459	710
20.	265	360	415	α445	305	250	253	1,670	1,510	830	454	655
21.	α275	α360	415	430	α300	245	253	1,670	1,310	770	450	628
22.	275	360	415	410	290	α245	253	8,120	1,100	770	426	594
23.	275	1,910	420	410	285	245	253	9,280	1,140	682	403	α622
24.	275	α4,330	420	α390	280	245	253	1,510	1,240	655	α399	644
25.	α275	1,780	420	390	280	245	253	1,390	1,240	628	758	644
26.	275	900	α420	α390	α275	240	253	1,100	1,390	α550	520	638
27.	270	775	420	415	275	240	253	960	1,240	500	7,760	638
28.	270	820	415	460	275	230	253	830	995	500	2,610	α578
29.	α270	α1,070	410	α505	.....	230	280	928	895	495	1,000	578
30.	260	605	α405	505	.....	245	280	1,140	830	495	728	578
31.	260	.....	405	460	.....	245	.....	450	.....	495	α655	.....

α See also discharge-measurement table.

NOTE.—Discharge Oct. 1 to Mar. 31 furnished by the International Water Commission. Discharge determined from a well-defined rating curve, Apr. 1 to July 15, and by indirect method for shifting channels, July 16 to Sept. 30.

Monthly discharge of Pecos River near Moorhead, Tex., for the year ending Sept. 30, 1914.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
October.....	1,170	260	451	27,800	
November.....	4,330	270	632	37,600	
December.....	660	405	453	27,800	
January.....	505	390	425	26,100	
February.....	435	275	313	17,400	
March.....	285	230	255	15,700	
April.....	280	228	250	14,900	C.
May.....	9,280	253	1,540	94,700	C.
June.....	5,380	628	2,020	120,000	C.
July.....	3,980	495	971	59,700	C.
August.....	7,760	396	945	58,100	C.
September.....	1,150	562	694	41,300	C.
The year.....	9,280	228	748	541,000	

GALLINAS RIVER NEAR LAS VEGAS, N. MEX.

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

Records available.—August 13, 1903, to May 31, 1912; December 1, 1912, to September 30, 1914.

Drainage area.—89 square miles (from topographic sheets).

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

Channel.—Somewhat shifting during high water.

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

Winter flow.—Not affected by ice; channel kept open by hot springs.

Diversions.—A short distance above the station is a timber dam forming a pond from which ice is cut; this dam has slight effect on the flow. The Agua Pura Co. has been diverting water for storage in a new reservoir since February, 1913. This diversion is located about 1½ miles above the station. A second small diversion is made by this company which furnishes Las Vegas and the Santa Fe Railway with water. A mile below the station is a dam that diverts the flood flow of the Gallinas to the San Geyjillo basin. The fall of the river is so heavy that the gaging station is above the influence of this dam.

Accuracy.—River somewhat shifting, but discharge estimates probably good.

Discharge measurements of Gallinas River near Las Vegas, N. Mex., during the year ending Sept. 30, 1914.

Date.	Made by—	Gage height.	Dis- charge.	Date.	Made by—	Gage height.	Dis- charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Oct. 18	J. E. Powers.....	1.68	2.1	May 4	J. E. Powers.....	2.31	58.1
Nov. 22	.....do.....	1.70	4.3	June 24	.....do.....	1.75	4.2
Jan. 5	.....do.....	1.60	2.2	Aug. 10	.....do.....	2.66	174
Feb. 16	.....do.....	1.55	a1.0	Sept. 11	Grover and Powers.....	1.89	10.5
Mar. 28	.....do.....	1.80	5.7	11	Grover and Gray.....	1.89	9.2

a Estimated.

Daily gage height, in feet, of Gallinas River near Las Vegas, N. Mex., for the year ending Sept. 30, 1914.

[W. E. Burnside, observer.]

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	1.80	1.78	1.60	1.60	1.65	1.60	1.80	2.42	2.12	1.90	2.48	.....
2.....	1.80	1.82	1.62	1.62	1.78	1.90	1.80	2.42	2.06	2.00	2.44	.....
3.....	1.92	1.82	1.65	1.65	1.68	1.88	1.82	2.36	2.05	2.55	2.98	.....
4.....	1.90	1.80	1.70	1.65	1.60	2.05	1.84	2.32	1.99	2.70	2.72	.....
5.....	1.90	1.72	1.70	1.65	1.60	1.88	1.86	2.29	1.95	2.72	2.70	.....
6.....	1.82	1.65	1.70	1.60	1.60	1.78	1.83	2.28	1.92	2.54	2.85	.....
7.....	1.98	1.60	1.70	1.60	1.60	1.72	2.00	2.25	1.90	2.58	2.78	.....
8.....	1.90	1.60	1.70	1.60	1.60	1.70	1.98	2.26	1.87	2.78	2.63	.....
9.....	1.90	1.60	1.65	1.60	1.60	1.70	1.89	2.29	1.83	2.54	2.65	.....
10.....	1.90	1.60	1.65	1.60	1.60	1.65	1.95	2.30	1.80	2.38	2.90	.....
11.....	1.82	1.60	1.65	1.60	1.60	1.85	2.00	2.25	1.80	3.62	2.80	2.10
12.....	1.80	1.60	1.65	1.65	1.60	2.10	1.97	2.22	1.79	2.36	2.71	1.85
13.....	1.80	1.62	1.65	1.65	1.58	2.00	1.96	2.20	1.80	2.34	2.68	1.88
14.....	1.80	1.65	1.65	1.62	1.55	1.82	1.98	2.19	1.82	2.23	2.62	1.82
15.....	1.75	1.65	1.65	1.60	1.55	1.75	2.00	2.21	1.90	2.23	2.62	1.80
16.....	1.65	1.65	1.68	1.60	1.55	1.75	2.05	2.19	1.92	2.19	2.53	1.80
17.....	1.70	1.65	1.70	1.65	1.55	1.80	2.10	2.22	2.04	2.72	2.40	1.80
18.....	1.65	1.70	1.70	1.65	1.55	1.70	2.06	2.30	2.19	2.85	2.35	1.77
19.....	1.65	1.70	1.70	1.65	1.55	1.75	2.02	2.70	2.12	2.90	2.32	1.75
20.....	1.62	1.70	1.70	1.65	1.55	1.75	2.04	2.50	2.08	2.95	2.22	1.78
21.....	1.60	1.70	1.70	1.65	1.55	1.70	2.10	2.65	1.94	2.75	2.28	1.88
22.....	1.60	1.70	1.68	1.60	1.58	1.70	2.14	2.30	1.82	2.70	2.20	1.82
23.....	1.60	1.70	1.65	1.60	1.60	1.75	2.14	2.26	1.76	2.80	2.20	1.75
24.....	1.55	1.78	1.62	1.60	1.60	1.80	2.12	2.28	1.75	2.80	2.28	1.72
25.....	1.60	1.80	1.60	1.60	1.60	1.75	2.08	2.18	1.80	2.72	2.20	1.70
26.....	1.65	1.80	1.60	1.60	1.60	1.75	2.09	2.14	1.71	2.82	2.19	1.70
27.....	1.58	1.80	1.60	1.60	1.60	1.78	2.04	2.11	1.66	2.81	2.18	1.70
28.....	1.60	1.80	1.60	1.60	1.60	1.80	2.06	2.08	1.64	2.68	2.18	1.70
29.....	1.70	1.75	1.60	1.60	.....	1.80	2.03	2.06	1.63	2.92	2.16	1.70
30.....	1.70	1.68	1.60	1.60	.....	1.82	2.20	2.03	1.68	2.76	2.12	1.68
31.....	1.75	.....	1.60	1.60	.....	1.80	.....	2.04	.....	2.60	1.98	.....

^a Maximum gage height, 4.9 feet.

Daily discharge, in second-feet, of Gallinas River near Las Vegas, N. Mex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	4.9	6.2	2.3	1.8	2.5	1.8	6.0	90	28	10	109	16
2.....	4.9	7.6	2.7	2.1	5.4	10	6.0	90	22	17	96	16
3.....	9.7	9.0	3.4	2.5	2.9	9.2	6.8	73	22	132	287	15
4.....	8.6	8.0	4.5	2.5	1.8	22	7.6	62	16	183	190	15
5.....	8.6	5.2	4.5	2.5	1.8	9.2	8.4	54	14	190	183	15
6.....	5.6	3.4	4.5	1.8	1.8	5.4	12	52	11	128	238	14
7.....	13	2.3	4.5	1.8	1.8	3.8	17	47	10	141	213	14
8.....	8.6	2.3	4.5	1.8	1.8	3.2	16	49	8.8	213	158	12
9.....	8.6	2.3	3.4	1.8	1.8	3.2	9.6	54	7.2	128	166	12
10.....	8.6	2.3	3.4	1.8	1.8	2.5	14	56	6.0	78	257	12
11.....	5.6	2.3	3.4	1.8	1.8	8.0	17	47	6.0	523	220	26
12.....	4.9	2.3	3.4	2.5	1.8	26	15	42	5.7	73	187	8.0
13.....	4.9	2.7	3.4	2.5	1.6	17	14	38	6.0	67	176	9.2
14.....	4.9	3.4	3.4	2.1	1.3	6.8	16	37	6.8	43	155	6.8
15.....	3.8	3.4	3.4	1.8	1.3	4.6	17	40	10	43	155	6.0
16.....	1.9	3.4	4.1	1.8	1.3	4.6	22	37	11	37	125	6.0
17.....	2.5	3.4	4.5	2.5	1.3	6.0	26	42	21	190	84	6.0
18.....	1.8	4.5	4.5	2.5	1.3	3.2	22	56	37	238	70	5.2
19.....	1.8	4.5	4.5	2.5	1.3	4.6	19	183	28	257	62	4.6
20.....	1.3	4.5	4.5	2.5	1.3	4.6	21	115	24	276	42	5.4
21.....	1.2	4.5	4.5	2.5	1.3	3.2	26	166	13	202	52	9.2
22.....	1.2	4.5	3.8	1.8	1.6	3.2	31	56	6.8	183	38	6.8
23.....	1.2	4.5	3.2	1.8	1.8	4.6	31	49	4.9	220	38	4.6
24.....	.9	7.3	2.5	1.8	1.8	6.0	28	52	4.6	220	52	3.8
25.....	1.2	8.0	2.2	1.8	1.8	4.6	24	36	6.0	190	38	3.2
26.....	1.8	8.0	2.2	1.8	1.8	4.6	25	31	3.5	227	37	3.2
27.....	1.1	8.0	2.2	1.8	1.8	5.4	21	27	2.6	224	36	3.2
28.....	1.4	8.0	2.2	1.8	1.8	6.0	22	24	2.4	176	36	3.2
29.....	2.5	6.2	2.1	1.8	.....	6.0	20	22	2.2	264	33	3.2
30.....	3.2	4.1	2.1	1.8	.....	6.8	38	20	2.9	205	28	2.9
31.....	4.3	.....	2.1	1.8	.....	6.0	.....	21	.....	148	16	.....

NOTE.—Discharge determined as follows: Oct. 15-18, Oct. 28 to Nov. 3, and Dec. 22-31, by indirect method for shifting channels; Sept. 1-10 interpolated; for remainder of year from two well-defined rating curves.

Monthly discharge of Gallinas River near Las Vegas, N. Mex., for the year ending Sept. 30, 1914.

Month.	Discharge in second feet.			Run off (total in acre feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
October.....	13	0.9	4.34	267	B.
November.....	9.0	2.3	4.87	290	B.
December.....	4.5	2.1	3.42	210	B.
January.....	2.5	1.8	2.05	126	B.
February.....	5.4	1.3	1.84	102	B.
March.....	26	1.8	6.84	421	B.
April.....	38	6.0	18.6	1,110	A.
May.....	183	20	57.0	3,500	A.
June.....	37	2.2	11.6	690	A.
July.....	523	10	169	10,400	A.
August.....	287	16	115	7,070	A.
September.....	26	2.9	8.92	531	C.
The year.....	523	.9	34.1	24,700	

SOUTH FORK OF GALLINAS RIVER NEAR EL PORVENIR, N. MEX.

Location.—Near sec. 14, T. 17 N., R. 14 E., at the Gallinas planting station of the United States Forest Service in the Pecos National Forest, 1 mile south of El Porvenir post office, 2½ miles above junction of North and South forks. Nearest tributary, a small stream entering from the north a short distance above.

Records available.—May 9, 1911, to September 30, 1914.

Drainage area.—Not measured.

Gage.—Vertical staff.

Channel.—Somewhat shifting.

Discharge measurements.—Made by wading.

Winter flow.—Affected by ice.

Diversions.—Above station an intermittent diversion of less than one-half second-foot; just below station the Forest Service maintains a ditch of 3 second-foot capacity.

Accuracy.—Estimates good.

Discharge measurements of South Fork of Gallinas River near El Porvenir, N. Mex., during the year ending Sept. 30, 1914.

[Made by J. E. Powers.]

Date.	Gage height.	Dis- charge.	Date.	Gage height.	Dis- height.	Date.	Gage height.	Dis- charge
Nov. 22.....	<i>Feet.</i> 1.75	<i>Sec.-ft.</i> 3.2	Feb. 16.....	<i>Feet.</i> 1.65	<i>Sec.-ft.</i> 2.5	May 4.....	<i>Feet.</i> 2.42	<i>Sec.-ft.</i> 19
Jan. 5.....	1.62	4.1	Mar. 28.....	1.94	5.9	June 24.....	1.90	5.7

α Discharge relation slightly affected by ice.

Daily gage height, in feet, of South Fork of Gallinas River near El Porvenir, N. Mex., for the year ending Sept. 30, 1914.

[Hermann Krauch, observer.]

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	2.02	1.82	1.82	1.65	1.75	1.79	1.85	2.55	2.30	2.12	2.60	2.22
2.....	2.02	1.82	1.55	1.68	1.70	1.75	1.90	2.48	2.20	2.11	2.59	2.21
3.....	1.98	1.80	1.78	1.68	1.62	1.78	1.95	2.42	2.20	2.68	2.65	2.21
4.....	1.94	1.80	1.78	1.62	1.69	1.75	1.95	2.42	2.18	2.75	.....	2.18
5.....	1.96	1.76	1.72	1.62	1.62	1.78	1.98	2.42	2.13	2.78	2.78	2.15
6.....	1.92	1.74	1.68	1.62	1.62	1.78	2.02	2.42	2.12	2.59	2.84	2.15
7.....	1.95	1.74	1.65	1.62	1.55	1.75	2.05	2.40	2.10	2.75	.....	2.10
8.....	1.92	1.75	1.68	1.62	1.65	1.75	2.20	2.42	2.10	2.75	2.84	2.09
9.....	1.93	1.75	1.65	1.60	1.68	1.72	2.05	2.57	2.05	2.62	2.88	2.06
10.....	1.92	1.76	1.68	1.65	1.55	1.75	2.18	2.48	2.00	2.52	2.88	2.04
11.....	1.88	1.74	1.68	1.65	1.60	1.75	2.10	2.43	2.06	2.48	2.72	2.10
12.....	1.86	1.72	1.72	1.62	1.65	1.75	2.09	2.42	2.00	2.41	2.74	2.10
13.....	1.84	1.74	1.75	1.70	1.62	1.75	2.10	2.40	1.96	2.46	2.78	.....
14.....	1.84	1.73	1.70	1.65	1.68	1.70	2.08	2.40	1.92	2.43	2.75	2.07
15.....	1.86	1.72	1.70	1.68	1.65	1.72	2.10	2.40	1.93	2.40	2.72	2.02
16.....	1.84	1.74	1.65	1.68	1.65	1.75	2.10	2.40	1.95	2.34	2.63	2.02
17.....	1.83	1.75	1.82	1.72	1.78	1.80	2.28	2.40	2.28	2.92	2.65	2.00
18.....	1.82	1.75	1.72	1.72	1.75	1.82	2.12	2.42	2.25	3.15	2.61	2.01
19.....	1.86	1.75	1.65	1.72	1.68	1.78	2.02	2.40	2.14	3.26	2.52	1.99
20.....	1.82	1.78	1.68	1.78	1.62	1.65	2.10	2.40	2.05	3.05	2.42	1.99
21.....	1.82	1.80	1.68	1.60	1.68	1.68	2.25	2.42	2.00	2.86	2.41	2.02
22.....	1.80	1.74	1.65	1.72	1.72	1.75	2.25	2.42	1.90	2.76	2.32	2.02
23.....	1.81	1.72	1.65	1.71	1.75	1.82	2.30	2.42	1.86	2.68	2.32	2.00
24.....	1.78	1.76	1.68	1.70	1.68	1.92	2.32	2.39	1.85	2.70	2.35	1.98
25.....	1.74	1.80	1.65	1.70	1.65	1.98	2.25	2.31	1.81	2.88	2.24	1.96
26.....	1.76	1.76	1.65	1.70	1.68	1.80	2.38	2.28	1.77	2.99	.....	1.96
27.....	1.78	1.74	1.68	1.78	1.70	1.80	2.32	2.26	1.72	2.96	.....	.....
28.....	1.76	1.69	1.65	1.72	1.69	1.80	2.22	2.20	1.70	3.20	.....	1.91
29.....	1.76	1.68	1.70	1.75	.....	1.82	2.25	2.15	1.60	3.02	2.23	1.91
30.....	1.79	1.65	1.68	1.75	.....	1.85	2.40	2.15	1.78	2.90	2.20	1.92
31.....	1.80	.....	1.68	1.76	.....	1.95	.....	2.18	.....	2.66	2.22	.....

NOTE.—Discharge relation affected by ice Nov. 28 to Feb. 4.

Daily discharge, in second-feet, of South Fork of Gallinas River near El Porvenir, N. Mex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	8.6	4.3	2.0	.....	3.0	4.1	5.0	25	16	10	27	13
2.....	8.6	4.3	2.8	.....	3.0	3.6	5.8	22	12	10	27	13
3.....	7.5	3.9	3.6	.....	2.2	4.0	6.7	20	12	31	30	13
4.....	6.6	3.9	3.6	.....	2.5	3.6	6.7	20	12	34	33	12
5.....	7.1	3.3	2.8	.....	2.2	4.0	7.2	20	11	36	36	11
6.....	6.2	3.1	2.3	.....	2.2	4.0	8.1	20	10	27	39	11
7.....	6.8	3.1	2.0	.....	1.6	3.6	8.8	19	10	34	39	10
8.....	6.2	3.2	2.3	.....	2.5	3.6	12	20	10	34	39	9.8
9.....	6.4	3.2	2.0	.....	2.8	3.2	8.8	26	8.8	28	42	9.0
10.....	6.2	3.3	2.3	.....	1.6	3.6	12	22	7.6	24	42	8.6
11.....	5.3	3.1	2.3	.....	2.0	3.6	10	20	9.0	22	33	10
12.....	5.0	2.8	2.8	.....	2.5	3.6	9.8	20	7.6	19	34	10
13.....	4.6	3.1	3.2	.....	2.2	3.6	10	19	6.9	21	36	9.6
14.....	4.6	3.0	2.5	.....	2.8	3.0	9.5	19	6.2	20	34	9.3
15.....	5.0	2.8	2.5	.....	2.5	3.2	10	19	6.3	19	33	8.1
16.....	4.6	3.1	2.0	.....	2.5	3.6	10	19	6.7	17	28	8.1
17.....	4.4	3.2	2.0	.....	4.0	4.2	15	19	15	44	30	7.6
18.....	4.3	3.2	2.0	.....	3.6	4.5	10	20	14	62	28	7.8
19.....	5.0	3.2	2.0	.....	2.8	4.0	8.1	19	11	71	24	7.4
20.....	4.3	3.6	2.3	.....	2.2	2.5	10	19	8.8	54	20	7.4
21.....	4.3	3.9	2.3	.....	2.8	2.8	14	20	7.6	41	19	8.1
22.....	3.9	3.1	2.0	.....	3.2	3.6	14	20	5.8	35	16	8.1
23.....	4.1	2.8	2.0	.....	3.6	4.5	16	20	5.2	81	16	7.6
24.....	3.6	3.3	2.3	.....	2.8	6.2	16	19	5.0	32	17	7.2
25.....	3.1	3.9	2.0	.....	2.5	7.2	14	16	4.4	42	14	6.9
26.....	3.3	3.3	2.0	.....	2.8	4.2	18	15	3.8	49	14	6.9
27.....	3.6	3.1	2.3	.....	3.0	4.2	16	14	3.2	47	14	6.4
28.....	3.3	2.4	2.0	.....	2.9	4.2	13	12	3.0	66	13	6.0
29.....	3.3	2.3	2.5	.....	.....	4.5	14	11	2.0	52	13	6.0
30.....	3.8	2.0	2.3	.....	.....	5.0	19	11	4.0	43	12	6.2
31.....	3.9	.....	2.3	.....	.....	6.7	.....	12	.....	30	13	.....

NOTE.—Daily discharge determined as follows: Nov. 28 to Dec. 31 and Feb. 1-4, estimated on account of ice; Oct. 1 to Nov. 27 and Feb. 5 to Sept. 30, from a fairly well defined rating curve; on days for which gage heights are missing, interpolated.

Monthly discharge of South Fork of Gallinas River near El Porvenir, N. Mex., for the year ending Sept. 30, 1914.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
October.....	8.6	3.1	5.08	312	B.
November.....	4.3	2.0	3.23	192	B.
December.....	3.6	2.0	2.36	145	B.
January.....			a 3.00	185	D.
February.....	4.0	1.6	2.65	147	C.
March.....	7.2	2.5	4.07	250	B.
April.....	19	5.0	11.2	666	B.
May.....	26	11	18.6	1,140	A.
June.....	16	2.0	8.16	486	A.
July.....	71	10	35.0	2,150	A.
August.....	42	12	26.3	1,620	B.
September.....	13	6.0	8.84	526	B.
The year.....	71	1.6	10.8	7,820	

a Estimated.

BLACK RIVER NEAR MALAGA, N. MEX.

Location.—In the NW. $\frac{1}{4}$ NE. $\frac{1}{4}$ sec. 10, T. 24 S., R. 28 E., at highway bridge on the Malaga-Loving road, 1 mile north of Malaga, 400 feet downstream from Atchison, Topeka & Santa Fe Railway bridge, about $1\frac{1}{2}$ miles above confluence with Pecos River.

Records available.—May 1 to September 30, 1914.

Drainage area.—Not measured.

Gage.—Staff, inclined and vertical.

Channel.—Practically permanent.

Discharge measurements.—Made by wading and from highway bridge.

Winter flow.—Not affected by ice.

Diversions.—Considerable water is diverted above station; no diversions below.

Accuracy.—Estimates fair.

Discharge measurements of Black River near Malaga, N. Mex., during the year ending Sept. 30, 1914.

[Made by C. J. Emerson.]

Date.	Gage height.	Dis- charge.	Date.	Gage height.	Dis- charge.	Date.	Gage height.	Dis- charge.
June 24.....	<i>Feet.</i> 1.80	<i>Sec.-ft.</i> 31.5	Aug. 7.....	<i>Feet.</i> 1.05	<i>Sec.-ft.</i> 6.2	Sept. 9.....	<i>Feet.</i> 1.30	<i>Sec.-ft.</i> 11.9
July 16.....	1.05	6.8	20.....	1.24	12.6	24.....	1.10	7.3

Daily gage height, in feet, and discharge, in second-feet, of Black River near Malaga, N. Mex., for the year ending Sept. 30, 1914.

[Frank Beeman, observer.]

* Day.	May.		June.		July.		Aug.		Sept.	
	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
1.....	1.00	5.0	2.30	60	1.75	30	1.70	27	2.20	54
2.....	.85	5.7	1.15	8.6	2.40	67	1.85	34	3.20	128
3.....	1.28	4.0	2.00	42	1.65	24	2.00	42	1.80	32
4.....	1.26	12	1.60	22	1.30	12	1.25	11	1.80	32
5.....	1.26	11	.95	5.0	1.65	24	1.15	8.6	2.50	74
6.....	1.05	6.6	1.00	5.7	2.08	47	1.05	6.6	2.45	70
7.....	.88	4.2	1.02	6.1	2.02	43	1.00	5.7	2.45	70
8.....	.86	4.1	.95	5.0	2.20	54	1.35	14	1.85	34
9.....	1.02	6.1	1.05	6.6	2.10	48	1.35	14	1.80	32
10.....	.95	5.0	2.95	108	2.55	78	1.05	6.6	1.75	30
11.....	1.65	24	1.15	8.6	2.95	108	1.10	7.5	1.25	11
12.....	1.60	22	1.05	6.6	1.85	34	1.30	12	1.35	14
13.....	1.51	18	1.00	5.7	1.82	33	1.05	6.6	1.10	7.5
14.....	1.36	14	.98	5.4	1.95	40	1.05	6.6	1.20	9.6
15.....	1.38	14	.95	5.0	1.35	14	1.05	6.6	1.10	7.5
16.....	1.22	10	2.20	54	1.02	6.1	1.05	6.6	1.05	6.6
17.....	1.02	6.1	1.30	12	1.08	7.1	1.35	14	1.45	16
18.....	.95	5.0	1.20	9.6	1.10	7.5	1.62	23	1.90	37
19.....	^a 4.35	230	2.05	45	1.15	8.6	1.05	6.6	1.85	34
20.....	1.85	34	2.05	45	.90	4.4	1.15	8.6	2.28	59
21.....	1.02	6.1	1.70	27	1.02	6.1	1.10	7.5	1.25	11
22.....	1.02	6.1	1.60	22	1.35	14	1.80	32	1.25	11
23.....	1.30	12	1.30	12	1.05	6.6	1.70	27	1.40	15
24.....	1.25	11	1.59	22	1.00	5.7	1.70	27	1.50	18
25.....	1.05	6.6	2.05	45	1.15	8.6	1.42	16	1.50	18
26.....	1.00	5.7	2.25	57	1.00	5.7	1.55	20	1.90	37
27.....	.85	4.0	2.55	78	2.22	55	1.00	5.7	1.15	8.6
28.....	.95	5.0	2.25	57	1.62	23	.90	4.4	1.20	9.6
29.....	1.42	16	1.75	30	1.50	18	1.10	7.5	1.35	14
30.....	1.15	8.6	1.10	7.5	1.55	20	1.95	40	1.25	11
31.....	3.00	112	.....	.....	1.50	18	2.20	54	.....	.....

^a Maximum gage height, 5.0 feet.

NOTE.—Discharge May 1 estimated; May 2 to Sept. 30, determined from a fairly well defined rating curve.

Monthly discharge of Black River near Malaga, N. Mex., for the year ending Sept. 30, 1914.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
May.....	230	4.0	20.4	1,250	C.
June.....	108	5.0	27.4	1,630	C.
July.....	108	4.4	28.1	1,730	C.
August.....	54	4.4	16.4	1,010	C.
September.....	128	6.6	30.4	1,810	C.
The period.....	.....	.....	.....	7,430	

DELAWARE RIVER NEAR ANGELES, TEX.

Location.—In T. 26 N., R. 29 E., 1 mile above confluence with Pecos River, 2½ miles south of Red Bluff, N. Mex., about 3 miles north of the New Mexico-Texas State line, and 10 miles northwest of Angeles, Tex.

Records available.—May 26 to September 30, 1914.

Drainage area.—Not measured.

Gage.—Automatic recording.

Channel.—Permanent.

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

Winter flow.—Not affected by ice.

Diversions.—A large part of the flow is diverted above the station. No diversions below.

Accuracy.—Estimates of discharge good.

Discharge measurements of Delaware River near Angeles, Tex., during the year ending Sept. 30, 1914.

[Made by C. J. Emerson.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
May 26.....	0.45	2.5	July 30.....	1.00	3.9	Aug. 19.....	1.00	^a 4.0
June 19.....	1.00	7.3	Aug. 11.....	.98	4.1	31.....	.88	^a 1.5
July 6.....	1.20	12.5	12.....	2.12	145	Sept. 12.....	.86	^a 1.0
19.....	1.08	7.1	12.....	1.91	100	21.....	1.12	7.9
25.....	.88	1.6						

^a Estimated.

Daily gage height, in feet, and discharge, in second-feet, of Delaware River near Angeles, Tex., for the year ending Sept. 30, 1914.

Day.	June.		July.		August.		September.	
	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.
1.....					0.94	2.7	0.89	1.6
2.....					1.02	4.9	.96	3.1
3.....					1.02	4.9	.98	3.6
4.....			1.90	97	1.03	5.3	.92	2.2
5.....				55	.94	2.7	.91	1.9
6.....			1.20	13	.90	1.7	.91	1.9
7.....			1.15	10	.92	2.2	.90	1.7
8.....			1.24	15	.89	1.6	.89	1.6
9.....			1.12	9.0	.87	1.2	.89	1.6
10.....			1.11	8.5	.88	1.4	.88	1.4
11.....			1.25	16	1.04	5.7	.88	1.4
12.....			1.12	9.0	1.98	114	.88	1.4
13.....	1.20		1.06	6.4	1.63	51	.97	3.4
14.....			1.03	5.3	1.36	23	.91	1.9
15.....			1.02	4.9		6.0	.88	1.4
16.....	1.02		1.02	4.9		4.1	.88	1.4
17.....			.99	3.9		4.1	.97	3.4
18.....			1.25	16		4.1	1.63	51
19.....			1.28	13	1.00	4.1	.98	3.6
20.....			1.06	6.4	.99	3.9	.95	2.9
21.....			.98	3.6	.90	1.7	1.04	5.7
22.....			.95	2.9	.85	1.0	.95	2.9
23.....			.91	1.9	1.02	4.9	.90	1.7
24.....			.90	1.7	.97	3.4	.90	1.7
25.....			.89	1.6	^a 1.30	19	.89	1.6
26.....			.90	1.7	1.78	75	.89	1.6
27.....			1.05	6.0	1.32	20	1.05	6.0
28.....			1.11	8.5	.95	2.9	1.01	4.5
29.....			1.04	5.7	.90	1.7	1.00	4.1
30.....			.97	3.4	.90	1.7	1.00	4.1
31.....			.97	3.4	.89	1.6		

^a Maximum gage height, 3.7 feet.

NOTE.—Discharge determined from a fairly well defined rating curve; discharge for days for which gage heights are missing, interpolated.

Monthly discharge of Delaware River near Angeles, Tex., for the year ending Sept. 30, 1914.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
July 4-31.....	97	1.6	12.1	672	B.
August.....	114	1.0	12.3	756	B.
September.....	51	1.4	4.21	251	B.
The period.....				1,680	

DEVILS RIVER AT DEVILS RIVER, TEX.

Location.—Near the mouth of Devils River and opposite the station of the same name on the Southern Pacific Railroad.

Records available.—May 1, 1900, to March 31, 1914.

Drainage area.—Not measured.

Gage.—Vertical staff.

Channel.—Rocky and rough, with fissures and faults.

Discharge measurements.—Made from car and cable.

Floods.—The highest recorded flood occurred April 6, 1900, reaching a stage corresponding to 25.4 feet on the gage subsequently established. The next highest stage had a discharge of 52,400 second-feet.

Diversions.—No data.

Accuracy.—Owing to the uncertain conditions of channel, very frequent discharge measurements are made, on which the estimates of daily discharge are based almost directly.

Cooperation.—Station was maintained and records were furnished by the United States section of the International Water Commission.

Discharge measurements of Devils River at Devils River, Tex., during the year ending Sept. 30, 1914.

[Made by E. E. Winter and W. H. Dodd.]

Date.	Gage height.	Dis- charge.	Date.	Gage. height.	Dis- charge.	Date.	Gage height.	Dis- charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Oct. 4.....	3.0	1,036	Nov. 30.....	7.4	8,336	Feb. 4.....	2.45	557
9.....	2.4	520	Dec. 5.....	2.9	890	9.....	2.45	550
17.....	2.3	434	9.....	2.9	903	13.....	2.45	547
22.....	2.3	428	17.....	2.5	573	18.....	2.45	549
26.....	2.3	422	23.....	2.5	581	23.....	2.4	523
30.....	2.3	424	31.....	2.5	590	27.....	2.4	502
Nov. 4.....	2.3	410	Jan. 8.....	2.5	568	Mar. 5.....	2.4	503
13.....	2.3	409	13.....	2.5	563	17.....	2.4	511
18.....	2.5	596	21.....	2.45	541	23.....	2.4	498
21.....	2.35	462	26.....	2.45	535			
26.....	4.1	2,207	30.....	2.45	553			

Daily gage height, in feet, of Devils River at Devils River, Tex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.
1.....	2.3	2.3	3.8	2.5	2.45	2.4	16.....	2.3	2.3	2.5	2.45	2.45	2.5
2.....	3.5	2.3	3.55	2.5	2.45	2.4	17.....	2.3	2.3	2.5	2.45	2.45	2.4
3.....	3.05	2.3	3.35	2.5	2.45	2.4	18.....	2.3	2.5	2.5	2.45	2.45	2.4
4.....	3.05	2.3	3.0	2.5	2.45	2.4	19.....	2.3	2.5	2.5	2.45	2.45	2.4
5.....	3.2	2.3	2.9	2.5	2.45	2.4	20.....	2.3	2.4	2.5	2.45	2.45	2.4
6.....	2.45	2.3	2.8	2.5	2.45	2.4	21.....	2.3	2.35	2.5	2.45	2.45	2.4
7.....	2.5	2.3	4.3	2.5	2.45	2.4	22.....	2.3	2.35	2.5	2.45	2.4	2.4
8.....	2.4	2.3	3.7	2.5	2.45	2.4	23.....	2.3	2.55	2.5	2.45	2.4	2.4
9.....	2.4	2.3	2.95	2.5	2.45	2.4	24.....	2.3	2.4	2.5	2.45	2.45	2.4
10.....	2.4	2.3	2.8	2.5	2.45	2.4	25.....	2.3	2.5	2.5	2.45	2.4	2.4
11.....	2.35	2.3	2.7	2.5	2.45	2.4	26.....	2.3	4.2	2.5	2.45	2.4	2.4
12.....	2.3	2.3	2.7	2.5	2.45	2.4	27.....	2.3	3.45	2.5	2.45	2.4	2.4
13.....	2.3	2.3	2.6	2.5	2.45	2.4	28.....	2.3	2.8	2.5	2.45	2.4	2.4
14.....	2.3	2.3	2.6	2.45	2.45	2.4	29.....	2.3	2.55	2.5	2.45	.....	2.4
15.....	2.3	2.3	2.6	2.45	2.45	2.6	30.....	2.3	7.1	2.5	2.45	.....	2.4
							31.....	2.3	.....	2.5	2.45	.....	2.4

Daily discharge, in second-feet, of Devils River at Devils River, Tex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.
1.....	410	420	1,800	585	555	500	16.....	435	425	575	540	550	560
2.....	1,480	415	1,550	585	555	500	17.....	^a 435	450	^a 575	540	550	^a 510
3.....	1,080	415	1,350	580	555	505	18.....	435	^a 595	575	540	^a 550	510
4.....	^a 1,080	^a 410	990	580	^a 555	505	19.....	430	590	575	540	545	505
5.....	1,210	410	^a 890	575	555	^a 505	20.....	430	500	575	540	545	505
6.....	565	410	795	570	555	505	21.....	430	^a 460	575	^a 540	540	500
7.....	605	410	2,300	570	550	505	22.....	^a 430	460	580	540	525	500
8.....	520	410	1,700	^a 570	550	505	23.....	425	620	^a 580	540	^a 525	^a 500
9.....	^a 520	410	^a 950	570	^a 550	505	24.....	425	500	580	535	530	500
10.....	520	410	820	565	550	505	25.....	425	580	580	535	515	500
11.....	475	410	740	565	550	505	26.....	^a 420	^a 2,310	585	^a 535	510	500
12.....	435	410	740	565	545	505	27.....	420	1,520	585	540	^a 500	500
13.....	435	^a 410	655	^a 565	^a 545	505	28.....	425	870	585	545	500	500
14.....	435	415	655	540	545	505	29.....	425	670	590	545	.....	500
15.....	435	420	655	540	545	610	30.....	^a 425	^a 7,740	590	550	.....	500
							31.....	425	.....	^a 590	^a 555	.....	500

^a See also discharge-measurement table.

Monthly discharge of Devils River at Devils River, Tex., for the year ending Sept. 30, 1914.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October.....	1,480	420	550	33,808
November.....	7,740	410	816	48,545
December.....	2,300	575	835	51,342
January.....	585	535	554	34,086
February.....	555	500	541	30,040
March.....	610	500	508	31,260
The period.....	.....	.....	.....	229,000

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

Location.—At Santa Rosalia ranch, 18 miles above Camargo, and 24 miles above mouth of river.

Records available.—April 28, 1900, to July 14, 1902, at original site, 6 miles farther downstream; July 14, 1902, to February 28, 1914, at present site.

Drainage area.—Not measured.

Gage.—Inclined staff. Datum of Santa Rosalia gage changed by an unknown amount October 1, 1909. On May 27, 1912, datum of gage was raised about 11 feet.

Channel.—Shifting. Station was originally within the influence of the Rio Grande during severe floods but is now above backwater.

Discharge measurements.—Made from car and cable.

Floods.—Rio San Juan is subject to very severe floods. The highest recorded stage, 60 feet, occurred August 30, 1909.

Zero flow.—At approximately 3.0 on present gage. At approximately -8.5 feet on gage used October 1, 1909, to May 25, 1912.

Accuracy.—Although frequent discharge measurements have been obtained, no estimates of daily discharge have been prepared by the commission.

Cooperation.—Station was maintained by the Mexican section of the International Water Commission, by whom the records were furnished.

Daily gage height, in feet, of San Juan River near Santa Rosalia Ranch, Tamaulipas, Mexico, for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Feb.	Day.	Oct.	Nov.	Dec.	Feb.
1.....	12.6	11.75	10.55	.....	16.....	17.15	10.55	10.0	8.5
2.....	21.4	11.8	10.5	.....	17.....	15.8	10.5	10.05	8.5
3.....	19.2	11.8	10.5	.....	18.....	15.8	10.45	10.15	8.5
4.....	22.15	11.75	10.35	.....	19.....	18.75	10.45	10.2	8.5
5.....	19.0	12.45	10.3	.....	20.....	15.85	10.4	10.05	8.55
6.....	15.75	11.75	10.35	.....	21.....	14.85	10.35	10.05	8.5
7.....	14.2	11.45	10.15	.....	22.....	14.2	10.3	10.0	8.45
8.....	21.5	11.4	10.1	8.65	23.....	13.85	10.3	10.0	8.4
9.....	17.8	11.25	10.1	8.6	24.....	13.45	11.7	10.05	8.4
10.....	14.0	11.1	10.15	8.7	25.....	13.15	17.05	9.9	8.4
11.....	13.4	11.05	10.15	8.7	26.....	12.95	12.75	9.9	8.3
12.....	17.65	11.0	10.2	8.7	27.....	12.75	12.0	9.8	8.3
13.....	27.85	10.85	10.1	8.7	28.....	12.55	10.95	9.75	8.3
14.....	24.55	10.7	10.1	8.7	29.....	12.35	11.05	9.8	.....
15.....	19.25	10.7	10.05	8.7	30.....	12.1	11.7	9.7	.....
					31.....	11.85	.....	9.7	.....

INTERIOR BASINS IN NEW MEXICO.**MIMBRES RIVER BASIN.****MIMBRES RIVER NEAR FAYWOOD, N. MEX.**

Location.—In sec. 7, T. 20 S., R. 10 W., about 6 miles northeast of Faywood Hot Springs, 10 miles from Faywood, a station on the Silver City branch of the Atchison, Topeka & Santa Fe Railway.

Records available.—April 8, 1908, to September 30, 1914.

Drainage area.—Approximately 450 square miles.

Gage.—Automatic recording, installed August 13, 1909, at a point 200 feet upstream from the site of the chain gage originally installed. Datum of chain gage was lowered 4 feet July 8, 1909, and datum of the recording gage is 3 feet higher than the new datum of the chain gage.

Channel.—Shifting.

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

Winter flow.—Practically no backwater from ice.

Diversions.—Some water is diverted for irrigation above and below the station; 400 feet above is the dam site of the Rio Mimbres reservoir, which is designed to control the flood water for irrigation.

Accuracy.—Estimates fair.

Discharge measurements of Mimbres River near Faywood, N. Mex., during the year ending Sept. 30, 1914.

Date.	Made by—	Gage height.	Dis-charge.	Date.	Made by—	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Nov. 6	E. L. Redding.....	0.32	1.9	June 9	Redding and Quinlan..	0.26	3.2
Dec. 2	do.....	.70	15.2	July 7	J. E. Quinlan.....	.97	8.5
Jan. 8	do.....	.83	18.2	Aug. 8	do.....	1.40	78.1
Feb. 12	do.....	.80	11.4	Aug. 11	do.....	.21	62.4
Mar. 14	do.....	.38	3.2				

Daily gage height, in feet, of Mimbres River near Faywood, N. Mex., for the year ending Sept. 30, 1914.

[J. C. Myers, observer.]

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	0.39	0.29	0.70	0.84	0.82	0.56	0.42	0.27	0.34	0.81	0.47	0.26
2.....	.37	.29	.70	.85	.80	.56	.45	.26	.29	1.12	.55	.21
3.....	.38	.29	.70	.85	.78	.58	.48	.26	.32	1.08	.66	.16
4.....	.45	.29	.71	.83	.77	.55	.50	.25	.32	.96	.42	.24
5.....	.46	.29	.71	.83	.75	.55	.44	.24	.29	1.03	.38	.14
6.....	.44	.30	.71	.83	.77	.54	.32	.23	.28	1.02	.30	.18
7.....	.42	.30	.71	.83	.78	.53	.36	.24	.25	1.12	.39	.32
8.....	.41	.32	.72	.82	.76	.50	.40	.24	.23	1.52	.38	.20
9.....	.40	.33	.75	.82	.73	.45	.46	.24	.22	1.50	.34	.29
10.....	.40	.37	.77	.81	.71	.44	.52	a .38	.22	c 1.69	.37	.32
11.....	.39	.37	.79	.82	.72	.43	.53	.....	b .87	.80	.36	.37
12.....	.40	.32	.79	.83	.76	.42	.44	.....	.41	.75	.19	.31
13.....	.40	.32	.80	.85	.72	.42	.36	.....	.35	.73	.....	.....
14.....	.39	.32	.78	.89	.66	.40	.32	.....	.30	.75	.....	.....
15.....	.39	.33	.80	.90	.63	.38	.31	.....	.29	.82	.17	.....
16.....	.38	.37	.85	.90	.60	.37	.39	.32	.31	.83	.16	.....
17.....	.39	.72	.82	.88	.62	.36	.37	.33	.96	1.56	.15	.....
18.....	.34	.79	.81	.90	.56	.35	.39	.34	.86	2.25	.16	.....
19.....	.31	.60	.81	.91	.55	.35	.39	.35	.89	1.83	.18	.....
20.....	.30	.61	.81	.91	.61	.35	.29	.33	1.05	d 1.94	.18	.....
21.....	.30	.62	.81	.89	.61	.36	.28	.34	.77	.....	.51	.....
22.....	.30	.55	.80	.88	.60	.38	.30	.35	.68	.....	.54	.....
23.....	.30	.57	.79	.84	.59	.38	.32	.44	.58	.....	.40	.....
24.....	.29	.57	.80	.83	.58	.37	.31	.....	.51	.....	.57	.....
25.....	.29	.60	.80	.83	.57	.38	.30	.....	.50	.75	.47	.....
26.....	.29	.87	.81	.82	.59	.40	.30	.....	.50	.82	.45	.....
27.....	.29	.67	.82	.80	.61	.41	.28	.....	.46	e 1.35	.50	.....
28.....	.29	.65	.80	.84	.57	.41	.28	.....	.45	.84	.42	.....
29.....	.29	.76	.81	.84	.....	.39	.28	.....	.43	1.07	.22	.....
30.....	.29	.73	.80	.83	.....	.39	.27	.....	.42	.71	.36	.....
31.....	.29	.....	.80	.85	.....	.40	.....	.30	.....	.59	.35	.....

a Maximum gage height, 5.2 feet.

b Maximum gage height, 4.4 feet.

c Maximum gage height, 6.0 feet.

d Maximum gage height, 5.4 feet.

e Maximum gage height, 4.0 feet.

NOTE.—The automatic gage was out of order May 11–15, 24–30, and July 21–24.

Daily discharge, in second-feet, of Mimbres River near Faywood, N. Mex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	1.8	1.4	15	22	14	4.7	4.7	1.9	6.0	4.2	140	27
2.....	1.4	1.4	15	23	12	5.1	6.0	1.6	3.8	29	173	22
3.....	1.6	1.4	15	22	11	6.4	7.3	1.6	5.1	24	223	17
4.....	6.0	1.4	15	20	9.8	5.6	8.2	1.4	5.1	13	122	25
5.....	6.8	1.4	15	19	8.2	6.0	5.6	1.3	3.8	19	108	12
6.....	5.2	1.6	15	19	9.0	6.0	1.9	1.3	3.8	14	84	19
7.....	3.6	1.6	15	18	9.8	6.0	2.8	1.4	3.1	23	111	36
8.....	2.8	2.0	15	17	8.2	5.1	3.8	1.4	2.6	102	108	32
9.....	2.0	2.8	20	17	6.9	3.6	6.4	1.4	2.4	96	96	32
10.....	2.0	6.0	23	16	6.0	3.6	9.8	5.6	2.4	164	105	36
11.....	1.8	6.0	24	17	6.4	3.6	11	3.6	53	16	102	44
12.....	2.0	2.0	24	18	8.2	3.6	6.0	3.6	4.2	12	58	34
13.....	2.0	2.0	26	20	6.4	3.8	3.1	3.6	2.6	11	57	34
14.....	1.8	2.0	23	24	3.8	3.8	2.1	7.8	1.4	12	55	34
15.....	1.8	2.8	24	25	3.1	3.3	1.9	3.8	1.3	18	54	32
16.....	1.6	6.0	34	24	2.6	3.1	4.2	3.8	1.6	19	34	30
17.....	1.8	18	28	22	3.1	2.8	3.6	4.2	51	318	33	28
18.....	1.6	40	24	24	1.6	2.6	4.2	4.7	34	790	34	28
19.....	1.8	4.4	24	25	1.6	2.6	4.2	5.1	39	598	37	26
20.....	1.6	5.2	24	25	3.3	2.6	1.6	4.2	70	724	37	26
21.....	1.6	6.0	24	22	3.6	2.8	1.6	5.1	14	1,700	115	26
22.....	1.6	1.6	21	21	3.6	3.3	2.1	5.6	7.3	1,050	125	24
23.....	1.6	2.0	20	17	3.6	3.3	2.6	11	3.3	2,200	81	24
24.....	1.4	2.0	21	16	3.6	3.1	2.4	3.8	1.6	670	136	24
25.....	1.4	4.4	20	16	3.6	3.3	2.1	3.6	1.4	266	102	24
26.....	1.4	46	21	14	4.7	3.8	2.4	3.8	1.4	302	70	25
27.....	1.4	10	23	13	6.0	4.2	1.9	3.8	1.2	616	81	25
28.....	1.4	8.4	18	16	4.7	4.2	1.9	3.8	1.1	313	63	25
29.....	1.4	24	20	16	.....	3.6	1.9	3.6	1.0	448	29	26
30.....	1.4	20	18	15	.....	3.6	1.6	3.6	.9	247	51	26
31.....	1.4	.....	18	17	.....	3.8	.....	3.8	.....	190	49	.....

NOTE.—Discharge determined by the indirect method for shifting channels except May 11–15, 24–30, July 21–24, Aug. 13–14, and Sept. 13–30, when it was estimated.

Monthly discharge of Mimbres River near Faywood, N. Mex., for the year ending Sept. 30, 1914.

Month	Discharge in second-feet			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum	Mean.		
October.....	6.8	1.4	2.16	133	B.
November.....	46	1.4	7.79	464	B.
December.....	34	15	20.7	1,270	B.
January.....	25	13	19.4	1,190	C.
February.....	14	1.6	6.01	334	C.
March.....	6.4	2.6	3.96	243	C.
April.....	11	1.6	3.97	236	C.
May.....	11	1.3	3.70	228	C.
June.....	70	.9	11.0	655	C.
July.....	2,200	4.2	355	21,800	D.
August.....	223	29	86.2	5,300	D.
September.....	44	12	26.7	1,590	D.
The year.....	2,200	.9	46.2	33,000	

LAMPBRIGHT DRAW NEAR SANTA RITA, N. MEX.

Location.—In sec. 19, T. 18 S., R. 11 W., at mouth of box canyon, $5\frac{1}{2}$ miles southeast of Santa Rita. Rustler Canyon enters Lampbright Draw about 2 miles above the station and Martin Canyon about $3\frac{1}{2}$ miles below.

Records available.—August 20, 1912, to September 30, 1914.

Drainage area.—Not measured.

Gage.—Automatic recording.

Channel.—Subject to shift during high water.

Discharge measurements.—Made by wading at low stages and from cable during floods.

Winter flow.—Slightly affected by ice.

Accuracy.—Discharge estimates poor.

Monthly discharge of Lampbright Draw near Santa Rita, N. Mex., during the year ending Sept. 30, 1914.

Date.	Made by—	Gage height.	Dis-charge.	Date.	Made by—	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Nov. 6	E. L. Redding.....	0.32	^a 0.1	Feb. 11	E. L. Redding.....	0.30	0.6
25	do.....	.35	1.2	Mar. 14	do.....	.31	^a .3
Dec. 2	do.....	.32	^a .5	June 9	J. E. Quinlan.....	.28	^a .2
22	do.....	.36	^a 1.5	July 8	do.....	.28	^a .2
Jan. 7	do.....	.35	.9				

^a Estimated.

Daily gage height, in feet, of Lampbright Draw near Santa Rita, N. Mex., for the year ending Sept. 30, 1914.

Day.*	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	0.45	0.32	0.30	0.32	0.33	0.31	0.30	0.30	0.29	0.32	0.33	0.47
2.....	.42	.32	.30	.32	.33	.31	.30	.30	.29	^a .73	.35	.46
3.....	.31	.32	.31	.32	.32	.31	.30	.30	.29	.33	.51	.46
4.....	.30	.32	.31	.32	.32	.31	.30	.29	.29	.36	.33	.46
5.....	.30	.31	.44	.32	.32	.31	.30	.29	.29	.22	.44	.44
6.....	.30	.31	.31	.32	.31	.31	.30	.28	.28	.21	.44	.42
7.....	.30	.30	.31	.32	.32	.....	.30	.28	.28	.29	.33	.43
8.....	.30	.30	.31	.33	.31	.....	.30	.27	.28	.22	.33	.42
9.....	.30	.30	.31	.33	.31	.....	.30	.27	.28	.20	.33	.42
10.....	.30	.30	.31	.32	.33	.....	.30	.27	.31	.22	.32	.43
11.....	.30	.31	.31	.32	.31	.....	.30	.27	.28	.40	.33	.42
12.....	.30	.31	.31	.32	.31	.....	.30	.28	.27	.32	.30	.41
13.....	.30	.31	.....	.32	.30	.....	.30	.28	.28	.33	.30	.41
14.....	.30	.32	.....	.31	.30	.....	.30	.29	.27	.33	.30	.41
15.....	.31	.38	.....	.31	.30	.31	.30	.29	.28	.51	.33	.42
16.....	.32	.38	.....	.31	.30	.31	.30	.28	.28	^b .73	.37	.42
17.....	.33	.42	.....	.31	.31	.31	.30	.29	.34	.86	.39	.40
18.....	.34	.40	.....	.31	.31	.32	.30	.29	.29	^c 1.27	.41	.42
19.....	.35	.40	.....	.31	.31	.33	.30	.29	.29	.63	.44	.40
20.....	.35	.53	.30	.31	.31	.31	.30	.29	.28	^d 1.50	.48	.40
21.....	.35	.41	.31	.31	.31	.31	.30	.29	.28	.83	.37	.40
22.....	.36	.40	.36	.31	.32	.31	.30	.30	.28	.65	.35	.40
23.....	.34	.39	.30	.31	.32	.31	.30	.30	.27	.48	.40	.39
24.....	.35	.....	.32	.31	.32	.31	.30	.30	.27	.40	.58	.39
25.....	.33	.35	.32	.31	.31	.30	.30	.30	.26	.40	.38	.38
26.....	.33	.....	.32	.31	.31	.30	.30	.31	.26	.41	.46	.38
27.....	.33	.34	.32	.32	.32	.30	.30	.31	.25	.42	.32	.38
28.....	.33	.32	.33	.33	.31	.30	.30	.32	.26	.42	.32	.38
29.....	.32	.31	.31	.42	.....	.31	.30	.34	.27	1.50	.30	.38
30.....	.32	.31	.31	.33	.....	.30	.30	.30	.28	.65	.57	.38
31.....	.32	.....	.32	.33	.....	.30	.....	.29	.....	.36	.36	.....

^a Maximum gage height, 2.0 feet.

^b Maximum gage height, 5.0 feet.

^c Maximum gage height, 4.4 feet.

^d Maximum gage height, 6.1 feet.

Daily discharge, in second-feet, of Lampbright Draw near Santa Rita, N. Mex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	4.2	0.5	0.5	1.0	0.8	0.4	0.3	0.3	0.3	2.5	0.4	0.7
2.....	3.3	.4	.4	1.0	.8	.4	.3	.3	.3	100	.6	.6
3.....	1.2	.4	.5	1.0	.7	.4	.3	.3	.3	5.0	27	.6
4.....	1.0	.3	.5	.9	.7	.4	.3	.3	.3	6.0	.8	.6
5.....	1.0	.2	3.1	.9	.7	.4	.3	.3	.3	.1	14	.5
6.....	1.0	.1	.9	.9	.6	.4	.3	.2	.2	.1	7.0	.5
7.....	1.0	.1	.9	.8	.7	.3	.3	.2	.2	.3	.5	.5
8.....	1.0	.1	.9	.8	.6	.3	.3	.2	.2	.1	.4	.5
9.....	1.0	.1	.9	.8	.6	.3	.3	.2	.2	.1	.4	.5
10.....	1.0	.1	.9	.8	.8	.3	.3	.2	.3	.1	.3	.5
11.....	1.0	.1	.9	.8	.6	.3	.3	.2	.2	10	.3	.5
12.....	1.0	.1	.9	.8	.6	.3	.3	.2	.2	.8	.2	.4
13.....	1.0	.1	.9	.8	.6	.3	.3	.2	.2	1.0	.2	.4
14.....	1.0	.1	.9	.7	.6	.3	.3	.3	.2	2.0	.2	.4
15.....	1.2	.3	.9	.7	.6	.3	.3	.3	.2	27	.3	.4
16.....	1.3	.3	.9	.7	.6	.3	.3	.2	.2	100	2.0	.4
17.....	1.5	.7	.8	.7	.6	.3	.3	.3	.2	157	4.0	.4
18.....	1.7	.7	.8	.7	.6	.4	.3	.3	.3	365	10	.4
19.....	1.8	.8	.8	.7	.6	.4	.3	.3	.3	65	14	.4
20.....	1.8	3.1	.8	.7	.6	.3	.3	.3	.2	500	20	.4
21.....	1.8	2.3	.9	.7	.5	.3	.3	.3	.2	145	3.0	.4
22.....	2.0	2.1	1.5	.7	.6	.3	.3	.3	.2	70	2.0	.4
23.....	1.7	1.9	.8	.7	.6	.3	.3	.3	.2	6.0	5.0	.4
24.....	1.7	1.6	1.0	.7	.6	.3	.3	.3	.2	2.0	45	.4
25.....	1.2	1.2	1.0	.7	.5	.3	.3	.3	.2	1.5	4.0	.3
26.....	1.0	1.1	1.0	.7	.5	.3	.3	.3	.2	1.0	10	.3
27.....	.9	1.0	1.0	.7	.6	.3	.3	.3	.1	1.0	.5	.3
28.....	.9	.8	1.1	.8	.5	.3	.3	.4	.2	1.0	.4	.3
29.....	.7	.7	.9	2.0	.....	.3	.3	.6	.2	500	.3	.3
30.....	.6	.7	.9	.8	.....	.3	.3	.3	.2	70	40	.3
31.....	.6	.....	1.0	.8	.....	.3	.....	.3	.....	2.0	2.0	.....

NOTE.—Discharge determined as follows: During low water estimated from discharge measurements; during high water from a poorly defined rating curve based on slope measurements and Kutter's formula; Mar 7-14 and Dec. 13-19, interpolated.

Monthly discharge of Lampbright Draw near Santa Rita, N. Mex., for the year ending Sept. 30, 1914.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
October.....	4.2	0.6	1.36	84	C.
November.....	3.1	.1	.73	43	C.
December.....	3.1	.4	.94	58	C.
January.....	2.0	.7	.82	50	C.
February.....	.8	.5	.62	34	D.
March.....	.4	.3	.33	20	D.
April.....	.3	.3	.30	18	D.
May.....	.6	.2	.28	17	D.
June.....	.6	.1	.24	14	D.
July.....	500	.1	69.1	4,250	D.
August.....	45	.2	6.93	426	D.
September.....	.7	.3	.43	26	D.
The year.....	500	.1	6.96	5,040	

WHITEWATER CREEK AT HURLEY, N. MEX.

Location.—About the center of sec. 30, T. 18 S., R. 12 W., at B ranch pumping station of the Chino Copper Co., half a mile northeast of Hurley, and about 1 mile above the hydraulic fill dam being built by the Chino Copper Co. A small draw enters from the east below the station.

Records available.—June 2, 1913, to September 30, 1914.

Drainage area.—35 square miles (from topographic sheet).

Gage.—Vertical staff.

Channel.—Shifting.

Discharge measurements.—By wading and from cable.

Winter flow.—Affected very little by ice.

Flood discharge.—Being on a flood-water stream, station is affected by sudden floods. No water in stream most of the year.

On account of lack of discharge measurements and reliable gage heights, estimates of flow can not be made.

Discharge measurements of Whitewater Creek at Hurley, N. Mex., during the year ending Sept. 30, 1914.

Date.	Made by—	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
Jan. 9	E. L. Redding.....		0
July 1	Moore and Bonsman.....	2.99	693
2	Bonsman and Robinson.....	2.57	243

Floods on Whitewater Creek at Hurley, N. Mex., during year ending Sept. 30, 1914.

Date.	Hour.	Duration.	Maximum gage height.	Date.	Hour.	Duration.	Maximum gage height.
		<i>Hours.</i>	<i>Feet.</i>			<i>Hours.</i>	<i>Feet.</i>
Oct. 2	6.30 a. m.	8.0	2.30	July 20	1.00 a. m.	8.0	1.50
Nov. 16	9.30 a. m.	24.0		20	3.00 p. m.	9.0	5.00
17	5.00 a. m.	4.0	2.20	21	1.00 a. m.	18.0	3.50
20	5.30 a. m.	9.5	1.90	22	1.00 a. m.	7.0	1.00
24	8.00 a. m.	14.0	2.00	26	5.05 p. m.	4.5	2.50
July 1	12.35 p. m.	4.0	4.00	27	2.00 p. m.	8.5	5.00
2	10.45 a. m.	10.5	4.00	29	2.05 a. m.	22.0	4.70
12	4.45 p. m.	3.0	1.20	Aug. 5	3.05 p. m.	8.0	4.70
14	5.30 a. m.	4.0	1.80	7	5.10 p. m.	7.0	2.90
15	1.15 p. m.	8.5	2.80	20	8.00 p. m.	4.0	3.00
16	5.10 p. m.	5.5	1.70	21	1.00 a. m.	5.0	2.50
17	8.20 a. m.	17.0	4.60	24	2.25 p. m.	9.5	5.70
18	3.30 p. m.	23.0	5.20	30	5.00 a. m.	24.0	4.70
19	1.00 a. m.	18.0	1.50	Sept. 10	3.35 p. m.	3.5	2.70
19	6.30 p. m.	6.0	2.70				

NOTE.—During the remainder of the year the stream was dry.

CAMERON CREEK NEAR HURLEY, N. MEX.

Location.—In sec. 27, T. 18 S., R. 13 W., 2 miles northwest of Hurley, one-fourth mile below the concrete dam of Chino Copper Co. Two small draws enter from the northwest just above station.

Records available.—June 2, 1913, to September 30, 1914.

Drainage area.—46 square miles (measured from topographic map).

Gage.—Vertical staff.

Channel.—Slightly shifting.

Discharge measurements.—By wading and from car and cable.

Winter flow.—Affected very little by ice.

Flood discharge.—Stream subject to sudden floods. No flow most of the year.

Accuracy.—Estimates of flood discharges were made from discharge measurements and the slope and cross section of the stream, and are fair.

Discharge measurements of Cameron Creek near Hurley, N. Mex., during the year ending Sept. 30, 1914.

Date.	Made by—	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
Jan. 9	E. L. Redding.....		0.0
July 2	J. E. Quinlan.....	0.25	2.9

Floods on Cameron Creek near Hurley, N. Mex., for the year ending Sept. 30, 1914.

Date.	Maximum gage height of flood.	Estimated discharge at maximum gage height.	Dura-tion.	Mean gage height of flood.	Mean dis-charge.	Run-off.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Hours.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Acre-ft.</i>
Nov. 17.....	0.50	70	4.0	0.35	35	12
June 6.....	.40	21	1.0	.30	8	1
July 1.....	1.80	825	8.0	.70	108	71
2.....	.40	21	8.0	.20	3	2
3.....	.80	150	8.5	.45	32	22
8.....	.20	3	2.5	.10	1	.....
10.....	.30	8	2.5	.45	32	7
11.....	.20	3	2.0	.10	1	.....
12.....	1.80	825	5.0	1.20	375	155
13.....	.40	21	5.5	.25	6	3
15.....	.90	200	6.5	.95	228	122
16.....	2.50	1,480	7.0	1.35	475	275
17.....	1.90	910	14.0	.95	228	264
18.....	3.00	2,000	22.0	1.40	510	927
19.....	.30	8	1.5	.15	2	.....
20.....	1.20	375	7.0	.70	108	62
26.....	.80	150	3.0	.55	57	14
27.....	.70	108	15.5	.45	32	41
28.....	.70	108	10.5	.45	32	28
Aug. 4.....	.70	108	13.0	.50	42	45
5.....	1.50	585	13.0	.85	175	188
7.....	.90	200	11.5	.55	57	54
11.....	1.40	510	13.0	.85	175	188
21.....	1.20	375	9.0	.85	175	130
23.....	.30	8	3.5	.15	2	1
24.....	2.80	1,790	8.0	1.25	408	270
26.....	.80	150	20.0	.45	32	53
Sept. 6.....	.40	21	4.0	.30	8	3
7.....	1.70	745	2.5	1.10	315	65
The year.....						3,003

NOTE.—Stream was dry on days for which data are missing.

CAMERON CREEK AT FORT BAYARD, N. MEX.

Location.—In sec. 25, T. 17 S., R. 13 W., near the pumping plant at Fort Bayard, and 1 mile below mouth of nearest tributary, Beartooth Creek, an intermittent stream.

Records available.—January 17, 1907, to September 11, 1911; August 6, 1912, to September 30, 1914.

Gage.—Vertical staff gage for high stages and an inclined staff gage for medium and low stages.

Channel.—Shifting.

Discharge measurements.—Made by wading.

Winter flow.—Not appreciably affected by ice.

Diversions.—The intake for the Army post water supply is above the station and a small amount of water is also diverted for garden irrigation.

Flood discharge.—Stream subject to sudden floods. For the greater part of the year the flow comes from springs and amounts to less than 1 second-foot.

Accuracy.—Owing to shifting character of stream estimates of discharge only fair.

Discharge measurements of Cameron Creek at Fort Bayard, N. Mex., during the year ending Sept. 30, 1914.

Date.	Made by—	Gage height.	Dis-charge.	Date.	Made by—	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
June 6	Redding and Quinlan		0.0	July 20	J. E. Quinlan	1.55	99.9
July 1	J. E. Quinlan	1.33	a. 25	Aug. 24	.....do.....	1.80	160
1	.....do.....	1.64	2.8	24	.....do.....	1.62	78.1
20	.....do.....	1.80	143	24	.....do.....	1.45	44.8

a Estimated.

Floods on Cameron Creek at Fort Bayard, N. Mex., for year ending Sept. 30, 1914.

Date.	Maximum gage height of flood.	Estimated discharge at maximum gage height.	Duration.	Mean gage height of flood.	Mean discharge.	Run-off.
	<i>Feet.</i>	<i>Sec.-feet.</i>	<i>Hours.</i>	<i>Feet.</i>	<i>Sec.-feet.</i>	<i>Acre-feet.</i>
July 17.....	3.00	1,270	7	2.50	770	445
20.....	3.00	430	2	2.15	40	7
Aug. 3.....	2.10	100	4	1.70	30	10
5.....	2.60	500	1	2.20	160	13
11.....	3.00	500	9	2.50	107	80
24.....	3.00	1,300	4	2.05	355	117
Total.....						672

NOTE.—For the remainder of the year the flow came from springs and amounted to less than 1 second-foot.

STEVENS CREEK NEAR FORT BAYARD, N. MEX.

Location.—In sec. 12, T. 17 S., R. 13 W., about $3\frac{1}{2}$ miles north of Fort Bayard, and 2 miles above the mouth. No tributary below station.

Records available.—Fragmentary records January 17, 1907, to September 30, 1914.

Drainage area.—Not measured.

Gage.—Vertical staff gage installed August 4, 1912, at the Forest Nursery, to replace inclined staff gage located half a mile above which was used January 17, 1907, to August 3, 1912. Vertical staff referred to new datum.

Channel.—Practically permanent.

Discharge measurements.—Made by wading.

Winter flow.—Practically not affected by ice.

Flood discharge.—Stream subject to sudden floods. No flow during most of the year.

Diversions.—The intake for the planting station ditch of the Forest Service is located above station.

Owing to lack of discharge measurements no estimates of flow can be made.

Discharge measurements of Stevens Creek near Fort Bayard, N. Mex., during the year ending Sept. 30, 1914.

Date.	Made by—	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
June 6	J. E. Quinlan		0.0
July 1	.....do.....	0.05	.0

Floods on Stevens Creek near Fort Bayard, N. Mex., during year ending Sept. 30, 1914.

Date.	Hour.	Duration.	Maximum gage height.	Date.	Hour.	Duration.	Maximum gage height.
		<i>Hours.</i>	<i>Feet.</i>			<i>Hours.</i>	<i>Feet.</i>
July 1.....	.....	1.0	0.0	Aug. 22.....	2.30 p. m.	1.0	0.9
17.....	7.30 a. m.	3.5	1.1	23.....	12.45 p. m.	2.0	1.4
20.....	1.00 p. m.	2.5	1.1	30.....	5.30 a. m.	1.5	1.1
Aug. 1.....	1.00 p. m.	1.5	1.1				

NOTE.—Creek dry on all other days during year.

RIO DE ARENA NEAR HURLEY, N. MEX.

Location.—In sec. 21, T. 18 S., R. 13 W., 150 feet southwest of pumping station of Chino Copper Co., just above a small concrete dam, about half a mile above mouth of a small stream coming in from the north, and 4 miles northwest of Hurley.

Records available.—June 2, 1913, to September 30, 1914.

Drainage area.—16 square miles (from topographic sheet).

Gage.—Vertical staff installed August 12, 1914, a short distance upstream from the old staff gage washed out by flood July 16, 1914; referred to new datum.

Channel.—Shifting.

Discharge measurements.—Made by wading and from cable.

Winter flow.—Affected very little by ice.

Flood discharge.—Stream subject to sudden floods. No flow most of the year.

Accuracy.—Estimates of flood discharge for part of year determined by means of slope and cross section, and are fair.

Discharge measurements of Rio de Arena near Hurley, N. Mex., during the year ending Sept. 30, 1914.

Date.	Made by—	Gage height.	Dis- charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
Jan. 9	E. L. Redding.....		0.0
July 18	Moore and Bonsman.....	2.5	332

a Estimated.

Floods on Rio de Arena near Hurley, N. Mex., during year ending Sept. 30, 1914.

Date.	Maximum gage height of flood.	Estimated discharge at maxi- mum gage height.	Dura- tion.	Mean gage height of flood.	Mean dis- charge.	Run-off.
	<i>Feet.</i>	<i>Second-feet.</i>	<i>Hours.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Acres-feet.</i>
Oct. 3.....	1.80	55	1.0	1.60	35	3
July 1.....	3.60	440	4.0	2.30	124	41
2.....	1.20	8	2.0	.65	.....	.....
3.....	2.50	164	4.0	1.90	64	21
8.....	5.20	950	4.0	2.65	196	65
10.....	1.60	35	1.5	1.25	11	1
11.....	.50	.....	.5	.30	.....	.....
13.....	1.50	28	2.5	.85	2	.....
13.....	2.00	79	2.0	1.55	32	5
14.....	2.20	105	1.5	1.90	64	8
16.....	10.10	2,660	3.5	4.60	750	217
17.....	1.10	.....	4.0	.60	.....	.....
18.....	11.00	.....	24.0	5.70	.....	.....
21.....	3.00	.....	3.0	1.45	.....	.....
26.....	2.5	.....	3.5	1.20	.....	.....
27.....	2.5	.....	2.0	1.15	.....	.....
29.....	3.5	.....	3.5	1.85	.....	.....
Aug. 7.....	2.6	.....	2.0	1.85	.....	.....
20.....	1.1	.....	1.5	.90	.....	.....
30.....	1.9	.....	4.0	1.15	.....	.....

NOTE.—Gage heights July 17 to Aug. 7 were estimated by gage reader. Aug. 20 to 30 gage heights were taken from a gage referred to a new datum.

On days for which gage heights are missing the stream was dry.

RIO TULAROSA BASIN.

RIO TULAROSA NEAR TULAROSA, N. MEX.

Location.—In sec. 21, T. 14 S., R. 10 E., about half a mile above the headgate of the Tularosa irrigation ditch, and 3 miles above Tularosa.

Records available.—December 2, 1912, to September 30, 1914.

Drainage area.—Not measured.

Gage.—Vertical staff; datum lowered 2 feet July 17, 1914, to avoid negative readings.

Channel.—Shifting.

Discharge measurements.—Made by wading.

Winter flow.—Affected very little by ice.

Diversions.—Some water diverted for irrigation above station.

Accuracy.—Estimates of discharge during first part of the year good; last part fair.

Discharge measurements of Rio Tularosa near Tularosa, N. Mex., during the year ending Sept. 30, 1914.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec. ft.</i>			<i>Feet.</i>	<i>Sec. ft.</i>
Oct. 9	E. L. Redding.....	1.47	9.5	July 17	R. J. Hank.....	1.65	15.6
Jan. 1	.....do.....	1.62	12.3	Sept. 1	.....do.....	1.25	13.9
May 18	.....do.....	1.57	9.6				

Daily gage height, in feet, of Rio Tularosa near Tularosa, N. Mex., for the year ending Sept. 30, 1914.

[Fred Montoya, observer.]

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	1.40	1.50	1.60	1.65	1.65	1.60	1.68	1.65	1.68	1.50	1.70	1.18
2.....	1.50	1.52	1.60	1.65	1.52	1.62	1.68	1.65	1.70	.....	1.62	1.35
3.....	1.50	1.45	1.65	1.65	1.65	1.68	1.70	1.65	1.65	.....	1.72	1.40
4.....	1.35	1.48	1.65	1.62	1.65	1.60	1.68	1.58	1.68	.....	1.88	1.30
5.....	1.40	1.52	1.65	1.62	1.62	1.65	1.70	1.58	1.65	.....	1.80	1.25
6.....	1.45	1.55	1.65	1.65	1.65	1.68	1.65	1.48	1.60	.....	1.62	1.10
7.....	1.50	1.58	1.62	1.65	1.65	1.70	1.62	1.52	1.48	.....	1.60	1.18
8.....	1.50	1.55	1.62	1.60	1.65	1.68	1.70	1.50	1.60	.....	1.60	1.18
9.....	1.45	1.55	1.62	1.68	1.65	1.65	1.65	1.50	1.65	.....	1.50	1.18
10.....	1.40	1.55	1.60	1.72	1.65	1.68	1.65	1.35	1.70	.....	1.48	1.10
11.....	1.40	1.50	1.65	1.68	1.65	1.68	1.65	1.40	1.62	.....	1.60	1.10
12.....	1.50	1.52	1.65	1.68	1.65	1.68	1.55	1.65	3.30	.....	1.55	1.10
13.....	1.40	1.52	1.65	1.68	1.62	1.58	1.45	1.65	1.48	.....	1.48	1.15
14.....	1.30	1.55	1.65	1.65	1.62	1.62	1.68	1.68	1.52	.....	1.48	1.02
15.....	1.30	1.50	1.65	1.70	1.65	1.68	1.70	1.65	1.55	.....	1.45	1.20
16.....	1.40	1.50	1.65	1.62	1.65	1.55	1.62	1.65	1.48	.....	1.40	1.20
17.....	1.40	1.52	1.65	1.65	1.60	1.55	1.65	1.55	1.58	1.65	1.42	1.20
18.....	1.35	1.58	1.65	1.70	1.62	1.62	1.68	1.58	2.15	2.30	1.42	1.18
19.....	1.20	1.60	1.65	1.70	1.58	1.65	1.50	1.50	1.35	2.50	1.42	1.35
20.....	1.30	1.68	1.62	1.65	1.70	1.65	1.58	1.55	1.30	1.95	3.00	1.25
21.....	1.30	1.60	1.63	1.65	1.62	1.68	1.60	1.68	1.18	2.10	1.12	1.25
22.....	1.42	1.60	1.64	1.65	1.68	1.59	1.55	1.60	1.22	2.08	1.25	1.15
23.....	1.38	1.60	1.64	1.65	1.68	1.55	1.58	1.58	1.48	2.30	1.25	1.20
24.....	1.38	1.65	1.64	1.65	1.62	1.52	1.55	1.42	1.48	2.02	1.20	1.18
25.....	1.50	1.65	1.64	1.65	1.58	1.60	1.58	1.45	1.48	1.92	1.28	1.18
26.....	1.50	1.65	1.65	1.65	1.62	1.45	1.42	1.62	1.48	1.88	1.40	1.35
27.....	1.50	1.60	1.65	1.65	1.65	1.35	1.45	1.65	1.48	1.82	1.32	1.25
28.....	1.50	1.60	1.65	1.65	1.62	1.45	1.45	1.62	1.42	1.80	1.18	1.25
29.....	1.50	1.60	1.64	1.65	.....	1.42	1.68	1.62	1.40	1.85	1.30	1.28
30.....	1.50	1.60	1.64	1.78	.....	1.45	1.65	1.65	1.40	1.75	1.18	1.20
31.....	1.50	.....	1.65	1.62	.....	1.45	.....	1.72	.....	1.70	1.25	.....

NOTE.—The crest of a flood on July 2, 1914, reached a gage height of about 8 feet, scouring out the channel and leaving the gage out of the water. Datum of gage lowered 2 feet on July 17.

Daily discharge, in second-feet, of Rio Tularosa near Tularosa, N. Mex., for the year ending Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	7.0	8.0	12	14	14	12	15	14	15	8.0	18	11
2.....	10	8.8	12	14	8.8	13	15	14	16	.....	14	19
3.....	10	6.6	14	14	14	15	16	14	14	.....	20	22
4.....	5.8	7.4	14	13	14	12	15	11	15	.....	30	16
5.....	7.0	8.8	14	13	13	14	16	11	14	.....	24	14
6.....	8.5	10	14	14	14	15	14	7.4	12	.....	14	8.0
7.....	10	11	13	14	14	16	13	8.8	7.4	.....	14	11
8.....	10	10	13	12	14	15	16	8.0	12	.....	14	11
9.....	8.5	10	13	15	14	14	14	8.0	14	.....	9.6	11
10.....	7.0	10	12	17	14	15	14	4.2	16	.....	8.8	8.0
11.....	7.0	8.0	14	15	14	15	14	5.2	13	.....	14	8.0
12.....	10	8.8	14	15	14	15	10	14	325	.....	12	8.0
13.....	7.0	8.8	14	15	13	11	6.6	14	15	.....	8.8	10
14.....	4.5	10	14	14	13	13	15	15	17	.....	8.8	5.8
15.....	4.5	8.0	14	16	14	15	16	14	19	.....	7.7	12
16.....	7.0	8.0	14	13	14	10	13	14	15	.....	6.3	12
17.....	7.0	8.8	14	14	12	10	14	10	21	.....	6.9	12
18.....	5.8	11	14	16	13	13	15	11	90	.....	6.9	11
19.....	4.5	12	14	16	11	14	8.0	8.0	10	.....	6.9	19
20.....	4.5	15	13	14	16	14	11	10	8.0	.....	260	14
21.....	4.5	12	13	14	13	15	12	15	4.8	53	23	14
22.....	7.6	12	14	14	15	11	10	12	5.8	50	25	10
23.....	6.5	12	14	14	15	10	11	11	7.4	89	25	12
24.....	6.5	14	14	14	13	8.8	10	5.8	7.4	43	22	11
25.....	8.0	14	14	14	11	12	11	6.6	7.4	33	21	11
26.....	8.0	14	14	14	13	6.6	5.8	13	7.4	30	22	19
27.....	8.0	12	14	14	14	4.2	6.6	14	7.4	26	17	14
28.....	8.0	12	14	14	13	6.6	6.6	13	5.8	24	11	14
29.....	8.0	12	14	14	.....	5.8	15	13	5.2	27	16	15
30.....	8.0	12	14	21	.....	6.6	14	14	5.2	21	11	12
31.....	8.0	.....	14	13	.....	6.6	.....	17	.....	18	14	.....

NOTE.—Oct. 1 to June 12 and June 23 to July 1 discharge determined from two poorly defined rating curves; for remainder of year by indirect method for shifting channels, except July 2-16 for which period data are not available.

Monthly discharge of Rio Tularosa near Tularosa, N. Mex., for the year ending Sept. 30, 1914.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
October.....	10	4.5	7.31	449	A.
November.....	15	6.6	10.5	625	A.
December.....	14	12	13.6	836	A.
January.....	21	13	14.5	892	B.
February.....	16	8.8	13.4	744	B.
March.....	16	4.2	11.7	719	B.
April.....	16	5.8	12.4	738	B.
May.....	17	4.2	11.3	695	B.
June.....	325	4.8	24.4	1,450	D.
July.....	.....	.....	.....	.....	.....
August.....	260	6.3	23.0	1,410	D.
September.....	22	5.8	12.5	744	C.

MISCELLANEOUS MEASUREMENTS.

The following miscellaneous measurements were made on streams in the Rio Grande basin during the year ending September 30, 1914:

Miscellaneous discharge measurements in Rio Grande basin during the year ending Sept. 30, 1914.

Date.	Stream.	Tributary to—	Locality.	Gage height.	Dis-charge.
				<i>Feet.</i>	<i>Sec.-ft.</i>
Mar. 18	Embudo Creek....	Rio Grande.....	1 mile above mouth.....	.....	95.6
Apr. 13	Canada Barracha..	Rio Vallecitos	One-quarter mile above mouth..	.....	35.3
June 6	Santa Fe Creek....	Rio Grande.....	200 feet below State weir, one-half mile above reservoir.	16.5



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STREAM-GAGING STATIONS
AND
PUBLICATIONS RELATING TO WATER RESOURCES
1885-1914
PART VIII. WESTERN GULF OF MEXICO
DRAINAGE BASINS



STREAM-GAGING STATIONS AND PUBLICATIONS RELATING TO WATER RESOURCES, 1885-1914.

INTRODUCTION.

Investigation of water resources by the United States Geological Survey has consisted in large part of measurements of the volume of flow of streams and studies of the conditions affecting that flow, but it has comprised also investigation of such closely allied subjects as irrigation, water storage, water powers, underground waters, and quality of waters. Most of the results of these investigations have been published in the series of water-supply papers, but some have appeared in the bulletins, professional papers, and annual reports.

The results of stream-flow measurements are now published annually in 12 parts, each part covering an area whose boundaries coincide with natural drainage features as indicated below:

Part I. North Atlantic basins.

II. South Atlantic and eastern Gulf of Mexico basins.

III. Ohio River basin.

IV. St. Lawrence River basin.

V. Upper Mississippi River and Hudson Bay basins.

VI. Missouri River basin.

VII. Lower Mississippi River basin.

VIII. Western Gulf of Mexico basins.

IX. Colorado River basin.

X. Great Basin.

XI. Pacific basins in California.

XII. North Pacific basins.

HOW GOVERNMENT REPORTS MAY BE OBTAINED OR CONSULTED.

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

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

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

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

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

Albany, N. Y., Room 18, Federal Building.
 Atlanta, Ga., Post Office Building.
 St. Paul, Minn., Old Capitol Building.
 Madison, Wis., Capitol Building.
 Helena, Mont., Montana National Bank Building.
 Denver, Colo., 302 Chamber of Commerce Building.
 Salt Lake City, Utah, Federal Building.
 Boise, Idaho, 615 Idaho Building.
 Phoenix, Ariz., 417 Fleming Building.
 Austin, Tex., Old Post Office Building.
 Portland, Oreg., 416 Couch Building.
 Tacoma, Wash., Federal Building.
 San Francisco, Cal., 505 Customhouse.
 Los Angeles, Cal., Federal Building.
 Honolulu, Hawaii, Kapiolani Building.

A list of the Geological Survey's publications may be obtained by applying to the Director of the United States Geological Survey, Washington, D. C.

STREAM-FLOW REPORTS.

Stream-flow records have been obtained at more than 1,550 points in the United States, and the data obtained have been published in the reports tabulated below:

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

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

Report.	Character of data.	Year.
10th A, pt. 2.	Descriptive information only.	
11th A, pt. 2.	Monthly discharge and descriptive information.	1884 to Sept., 1890.
12th A, pt. 2.	do.	1884 to June 30, 1891.
13th A, pt. 3.	Mean discharge in second-feet.	1884 to Dec. 31, 1892.
14th A, pt. 2.	Monthly discharge (long-time records, 1871 to 1893).	1888 to Dec. 31, 1893.
B 131.	Descriptions, measurements, gage heights, and ratings.	1893 and 1894.
16th A, pt. 2.	Descriptive information only.	
B 140.	Descriptions, measurements, gage heights, ratings, and monthly discharge (also many data covering earlier years).	1895.
WS 11.	Gage heights (also gage heights for earlier years).	1896.
18th A, pt. 4.	Descriptions, measurements, ratings, and monthly discharge (also similar data for some earlier years).	1895 and 1896.
WS 15.	Descriptions, measurements, and gage heights, eastern United States, eastern Mississippi River, and Missouri River above junction with Kansas.	1897.
WS 16.	Descriptions, measurements, and gage heights, western Mississippi River below junction of Missouri and Platte, and western United States.	1897.
19th A, pt. 4.	Descriptions, measurements, ratings, and monthly discharge (also some long-time records).	1897.
WS 27.	Measurements, ratings, and gage heights, eastern United States, eastern Mississippi River, and Missouri River.	1898.
WS 28.	Measurements, ratings, and gage heights, Arkansas River and western United States.	1898.
20th A, pt. 4.	Monthly discharge (also for many earlier years).	1898.
WS 35 to 39.	Descriptions, measurements, gage heights, and ratings.	1899.
21st A, pt. 4.	Monthly discharge.	1899.
WS 47 to 52.	Descriptions, measurements, gage heights, and ratings.	1900.
22d A, pt. 4.	Monthly discharge.	1900.

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

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

Report.	Character of data.	Year.
WS 65, 66.....	Descriptions, measurements, gage heights, and ratings.....	1901.
WS 75.....	Monthly discharge.....	1901.
WS 82 to 85.....	Complete data.....	1902.
WS 97 to 100.....	do.....	1903.
WS 124 to 135.....	do.....	1904.
WS 165 to 178.....	do.....	1905.
WS 201 to 214.....	do.....	1906.
WS 241 to 252.....	do.....	1907-8.
WS 261 to 272.....	do.....	1909.
WS 281 to 292.....	do.....	1910.
WS 301 to 312.....	do.....	1911.
WS 321 to 332 ^a	do.....	1912.
WS 351 to 362 ^a	do.....	1913.
WS 381 to 394.....	do.....	1914.

^a In preparation.

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, and miscellaneous measurements at many points other than regular gaging stations have been made each year. An index of the reports containing records obtained prior to 1904 has been published in Water-Supply Paper 119.

The table below gives, by years and drainage basins, the numbers of the papers on surface-water supply published from 1899 to 1913. The data for any particular station will in general be found in the reports covering the years during which the station was maintained. For example, data for Machias River at Whitneyville, Me., 1903 to 1913, are published in Water-Supply Papers 97, 124, 165, 201, 241, 261, 281, 301, 321, and 351, which contain records for the New England streams from 1903 to 1913. Results of miscellaneous measurements are published by drainage basins.

In these papers and in the following lists the stations are arranged in downstream order. The main stem of any river is determined by measuring or estimating its drainage area—that is, the headwater stream having the largest drainage area is considered the continuation of the main stream, and local changes in name and lake surface are disregarded. All stations from the source to the mouth of the main stem of the river are presented first, and the tributaries in regular order from source to mouth follow, the streams in each tributary basin being listed before those of the next basin below.

The exceptions to this rule occur in the records for Mississippi River, which are given in four parts, as indicated on page III, 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.

Numbers of water-supply papers containing results of stream measurements, 1899-1914.

Year.	North Atlantic coast (St. John River to York River).	South Atlantic coast and eastern Gulf of Mexico (James River to the Mississippi).	Ohio River.	St. Lawrence River and Great Lakes.	Hudson Bay and upper Mississippi River.	Missouri River.	Lower Mississippi River.	Western Gulf of Mexico.	Colorado River.	Great Basin.	Pacific coast in California.	North Pacific drainage basins.		
												Pacific basins in Washington and upper Columbia River.	Snake River basin.	Lower Columbia River and Pacific basins in Oregon.
1899 <i>a</i>	35	<i>b</i> 35, 36	36	36	36	<i>i</i> 36, 37	37	37	<i>d</i> 37, 38	38, <i>e</i> 39	38, <i>f</i> 39	38	38	38
1900 <i>a</i>	47, <i>h</i> 48	48	48, <i>c</i> 49	49	49	49, <i>j</i> 50	50	50	50	51	51	51	51	51
1901.....	65, 75	65, 75	65, 75	65, 75	<i>k</i> 65, 66, 75	66, 75	66, 75	66, 75	66, 75	66, 75	66, 75	66, 75	66, 75	66, 75
1902.....	82	<i>b</i> 82, 83	84	84	<i>k</i> 83, 85	84	84	84	85	85	85	85	85	85
1903.....	97	<i>b</i> 97, 98	98	98	<i>k</i> 98, 99, <i>m</i> 100	99	99	99	100	100	100	100	100	100
1904.....	<i>n</i> 124, <i>o</i> 125, <i>p</i> 126	<i>p</i> 126, 127	128	129	<i>k</i> 128, 130	130, <i>q</i> 131	132, 131	132	133	133, <i>r</i> 134	134	135	135	135
1905.....	<i>n</i> 165, <i>o</i> 166, <i>p</i> 167	<i>p</i> 167, 168	169	170	171	172	<i>k</i> 169, 173	174	175, <i>s</i> 177	176, <i>r</i> 177	177	178	178	178
1906.....	<i>n</i> 201, <i>o</i> 202, <i>p</i> 203	<i>p</i> 203, 204	205	206	207	208	<i>k</i> 205, 209	210	211	212, <i>r</i> 213	213	214	214	214
1907-8.....	241	242	243	244	245	246	247	248	249	250, <i>r</i> 251	251	252	252	252
1909.....	261	262	263	264	265	266	267	268	269	270, <i>r</i> 271	271	272	272	272
1910.....	281	282	283	284	285	286	287	288	289	290	291	292	292	292
1911.....	301	302	303	304	305	306	307	308	309	310	311	312	312	312
1912.....	321	322	323	324	325	326	327	328	329	330	331	332A	332B	332C
1913.....	351	352	353	354	355	356	357	358	359	360	361	362A	362B	362C
1914.....	381	382	383	384	385	386	387	388	389	390	391	392	393	394

a Rating tables and index to Water-Supply Papers 35-39 contained in Water-Supply Paper 39. Estimates for 1899 in Twenty-first Annual Report, Part IV.

b James River only.

c Soto River.

d Green and Gunnison rivers and Grand River above junction with Gunnison.

e Mohave River only.

f Kings and Kern rivers and south Pacific coast basins.

g Rating tables and index to Water-Supply Papers 47-52 and data on precipitation, wells, and irrigation in California and Utah contained in Water-Supply Paper 52. Estimates for 1900 in Twenty-second Annual Report, Part IV.

h Wissahickon and Schuylkill rivers to James River.

i Gallatin River.

j Loup and Platte rivers near Columbus, Nebr., and all tributaries below junction with Platte.

k Tributaries of Mississippi from east.

l Lake Ontario and tributaries to St. Lawrence River proper.

m Hudson Bay only.

n New England rivers only.

o Hudson River to Delaware River, inclusive.

p Susquehanna River to Yackin River, inclusive.

q Platte and Kansas rivers.

r Great Basin in California except Truckee and Carson river basins.

s Below junction with Gila.

t Rogue, Umpqua, and Siletz rivers only.

PART VIII. WESTERN GULF OF MEXICO DRAINAGE BASINS.

PRINCIPAL STREAMS.

The western Gulf of Mexico drainage basins include all streams draining into the Gulf of Mexico west of the mouth of the Mississippi and into the Rio Grande. The largest streams flowing into the Gulf of Mexico north of the mouth of the Rio Grande are Sabine, Trinity, and Brazos rivers, Colorado River of Texas, and Guadalupe River. The principal tributaries of the Rio Grande are Chama River, Rio Puerco, and Pecos River in the United States and Rio Salado and Rio San Juan in Mexico. The streams drain wholly or in part the States of Colorado, Louisiana, New Mexico, Texas, and northern States of Mexico.

In addition to the list of gaging stations and annotated list of publications relating specifically to the section, these pages contain a similar list of reports that are of general interest in many sections and cover a wide range of hydrologic subjects, and also brief references to reports published by State and other organizations. (See p. xvii.)

GAGING STATIONS.

NOTE.—Dash after a date indicates that station was being maintained September 30, 1914; period after a date indicates discontinuance.

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., 1898–99; 1903–1906.

Trinity River at Riverside, Tex., 1903–1906.

BRAZOS RIVER BASIN.

Brazos River at Waco, Tex., 1898–1911.

Brazos River near Lewis (Hearne), Tex., 1898–99.

Brazos River at Richmond, Tex., 1903–1906.

COLORADO RIVER (OF TEXAS) BASIN.

Colorado River at Austin, Tex., 1895–1911.

Colorado River at Columbus, Tex., 1903–1911.

San Saba River near San Saba, Tex., 1905–6.

GUADALUPE RIVER BASIN.

Guadalupe River near New Braunfels, Tex., 1898-99.

Guadalupe River near Cuero, Tex., 1903-1906.

RIO GRANDE BASIN.

Rio Grande at Thirtymile Bridge near Creede, Colo., 1909-1913.

Rio Grande near Creede (Wason), Colo., 1907-1913.

Rio Grande near Del Norte, Colo. (except 1907), 1889-1913.

Rio Grande near Alamosa, Colo., 1894-5; 1903; 1912-13.

Rio Grande near Lobatos (Cenicero), Colo., 1899-1913.

Rio Grande at Embudo, N. Mex., 1889-1903; 1912-

Rio Grande near Buckman, N. Mex. (Rio Grande near Ildefonso), 1895-1905; 1909-

Rio Grande near San Marcial, N. Mex., 1895-

Rio Grande near El Paso, Tex., 1889-1893; 1895-

Rio Grande near Fort Hancock, Tex., 1900-1903.

Rio Grande above Presidio, Tex., 1900-1914.

Rio Grande below Presidio, Tex., 1900-

Rio Grande near Langtry, Tex., 1900-

Rio Grande near Devils River, Tex., 1900-

Rio Grande at Eagle Pass, Tex., 1900-

Rio Grande near Laredo, Tex., 1900-1914.

Rio Grande near Roma, Tex., 1900-1914.

Rio Grande near Brownsville, Tex., 1900-1914.

Clear Creek near Creede, Colo., 1910.

South Fork of Rio Grande at South Fork, Colo., 1910-1913.

San Luis Creek at Villa Grove, Colo., 1911-12.

San Luis Creek near Villa Grove, Colo., 1910-1913.

Kerber Creek near Villa Grove, Colo., 1911-12.

Saguache River near Saguache, Colo., 1910-1913.

Rio Alamosa near Monte Vista, Colo., 1911-12.

Rio Alamosa near La Jara, Colo., 1909-1912.

Conejos River near Mogote, Colo., 1899-1900; 1905-1913.

Culebra River at San Luis, Colo., 1910-11.

Rio San Antonio near Ortiz, N. Mex., 1911.

Costilla Creek near mouth, N. Mex., 1912.

Rio Colorado above Questa, N. Mex., 1910-11.

Rio Colorado near Questa, N. Mex., 1912-

Rio Colorado below Questa, N. Mex., 1910-

Rio Hondo near Arroyo Hondo, N. Mex., 1910-

Rio Pueblo de Taos near Taos, N. Mex., 1910-

Rio 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 at Chama, N. Mex., 1912-1914.

Chama River near Chama, N. Mex., 1914-

Chama River at Park View, N. Mex., 1912-

Chama River near Tierra Amarilla, N. Mex., 1913-

Chama River near Abiquiu, N. Mex., 1895-1897.

Chama River near Chamita, N. Mex., 1912-

Brazos River near Brazos, N. Mex., 1913-

Brazos River at Brazos, N. Mex., 1912-13.

Little Brazos River near Brazos, N. Mex., 1914-

Rio Grande tributaries—Continued.

Chama River tributaries—Continued.

Nutritus Creek near Tierra Amarilla, N. Mex., 1914—

Nutrias Creek near Cebolla, N. Mex., 1914—

Horn River near Canjilon, N. Mex., 1911—1914.

Rio Vallecitos at Vallecitos, N. Mex., 1911—

Santa Fe Creek at Monument Rock, near Santa Fe, N. Mex., 1910—11.

Santa Fe Creek above reservoir, near Santa Fe, N. Mex., 1910; 1913—

Santa Fe Creek at Santa Fe, N. Mex., 1907—1911.

Santa Fe Water & Light Co.'s ditch near Santa Fe, N. Mex., 1910.

Arroyo Hondo near Santa Fe, N. Mex., 1913—

Rio Puerco at Rio Puerco, N. Mex., 1910—

Rio Puerco near La Joya, N. Mex., 1910—1914.

Bluewater Creek (head of San Jose River) near Bluewater, N. Mex., 1912—

Bluewater Creek at Grants, N. Mex., 1912—

San Jose River near Suwanee, N. Mex., 1910—

Pecos River near Cowles, N. Mex., 1910—

Pecos River near Anton Chico, N. Mex., 1910—

Pecos River at Santa Rosa, N. Mex., 1903—1906; 1910—11; 1912—

Pecos River near Guadalupe, N. Mex., 1912—

Pecos River near Fort Sumner, N. Mex., 1904—1910; 1912—13.

Pecos River near Roswell, N. Mex., 1903—1906.

Pecos River near Dayton, N. Mex., 1905—

Pecos River near Lakewood, N. Mex., 1906—1911.

Pecos River at Avalon, N. Mex., 1906—7.

Pecos River at Carlsbad, N. Mex., 1903—1908; 1914—

Pecos River near Angeles, Tex., 1914—

Pecos River near Pecos, Tex., 1898—1907.

Margueretta flume near Pecos, Tex., 1898; 1900—1908.

West Valley ditch near Pecos, Tex., 1904.

Pecos River near Barstow, Tex., 1914—

Pecos River near Moorhead, Tex., 1898; 1900—

Gallinas River near Las Vegas, N. Mex., 1903—

South Fork of Gallinas River near El Porvenir, N. Mex., 1911—

Taylor-Moore ditch near Roswell, N. Mex., 1905.

Hondo River at Hondo Reservoir, N. Mex., 1903—1906.

Hondo reservoir inlet near Roswell, N. Mex., 1906—1908.

Hondo reservoir scour gate near Hondo Reservoir, N. Mex., 1906.

Hondo River at Roswell, N. Mex., 1903—1906.

Rio Ruidoso near Ruidoso, N. Mex., 1911.

Rio Ruidoso near Glencoe, N. Mex., 1910—11.

Penasco River at Elk, N. Mex., 1910—11.

Penasco River at Cleve's ranch, near Elk, N. Mex., 1911.

Penasco River near Dayton, N. Mex., 1905—1908.

Lake McMillan at Lakewood, N. Mex., 1906—7.

Black River near Malaga, N. Mex., 1914—

Delaware River near Malaga, N. Mex., 1912—13.

Delaware River near Angeles, Tex., 1914—

Devils River at Devils River, Tex., 1900—1914.

Rio Salado near Guerrero, Tamaulipas, Mex., 1900—1913.

Rio San Juan at La Quemada, Tamaulipas, Mex., 1900—1902.

Rio San Juan near Santa Rosalia ranch, Tamaulipas, Mex., 1902—1914.

INTERIOR BASINS IN NEW MEXICO.

Mimbres River basin:

Mimbres River near Faywood, N. Mex., 1908-

Lampbright Draw near Santa Rita, N. Mex., 1912-

Whitewater Creek near Hurley, N. Mex., 1913-

Cameron Creek at Fort Bayard, N. Mex., 1907-1911; 1912-

Cameron Creek near Hurley, N. Mex., 1913-

Stevens Creek near Fort Bayard, N. Mex., 1907-1911; 1912-

Rio de Arena near Hurley, N. Mex., 1913-

Rio Tularosa basin:

Rio Tularosa at Mescalero, N. Mex., 1910-11.

Rio Tularosa near Bent, N. Mex., 1911-12.

Rio Tularosa near Tularosa, N. Mex., 1912-

Rio La Luz basin:

Rio La Luz near La Luz, N. Mex., 1911-12.

Rio La Luz at La Luz, N. Mex., 1910-1913.

Rio Fresnal near Mountain Park, N. Mex., 1911-12.

REPORTS ON WATER RESOURCES OF THE WESTERN GULF STATES.

PUBLICATIONS OF UNITED STATES GEOLOGICAL SURVEY.

WATER-SUPPLY PAPERS.

Water-supply papers are distributed free by the Geological Survey as long as its stock lasts. An asterisk (*) indicates that this stock has been exhausted. Many of the papers marked in this way may, however, be purchased (at price noted) from the SUPERINTENDENT OF DOCUMENTS, WASHINGTON, D. C. Omission of the price indicates that the report is not obtainable from Government sources. Water-supply papers are of octavo size.

- *10. Irrigation in Mesilla Valley, N. Mex., by F. C. Barker. 1898. 51 pp., 11 pls.
Describes primitive methods of irrigation and agriculture employed in an area lying along both sides of the Rio Grande, extending from Fort Seldon, N. Mex., on the north, to within 3 miles of El Paso on the south. Chiefly of historic interest.
- *13. Irrigation systems in Texas, by W. F. Huston. 1898. 68 pp., 10 pls.
Discusses climate, rainfall, irrigation works and projects in Texas; considers use of both surface and underground waters.
40. The Austin dam, by T. U. Taylor. 1900. 51 pp., 16 pls. 15c.
Describes preliminary projects, construction, economic aspects, and failure of the dam across Colorado River.
57. Preliminary list of deep borings in the United States, Part I (Alabama-Montana), by N. H. Darton. 1902. 60 pp. (See No. 149.) 5c.
61. Preliminary list of deep borings in the United States, Part II (Nebraska-Wyoming), by N. H. Darton. 1902. 67 pp. 5c.
Nos. 57 and 61 contain information as to depth, diameter, yield, and head of water in borings more than 400 feet deep; under head "Remarks" gives information concerning temperature, quality of water, purposes of boring, etc. The lists are arranged by States, and the States are arranged alphabetically. A second revised edition was published in 1905 as Water-Supply Paper 149 (p. v.). 5c.
71. Irrigation systems of Texas, by T. U. Taylor. 1902. 137 pp., 9 pls. 10c.
Discusses principal irrigation systems in geographic order and gives statistics as to the location, cost, and benefits of the devices for obtaining water; describes rice irrigation systems, and appends a brief statement of laws governing irrigation in the State.
74. Water resources of the State of Colorado, by A. L. Fellows. 1902. 151 pp., 14 pls. 25c.
Discusses, under South Platte, Arkansas, Rio Grande, San Juan, Grand, and Green River irrigation divisions, drainage and irrigation and gives records of stream flow.
93. Proceedings of first conference of engineers of Reclamation Service, with accompanying papers, compiled by F. H. Newell, chief engineer. 1904. 361 pp. 25c. [Inquiries concerning this report should be addressed to the Reclamation Service.]
Contains "Investigations in Pecos Valley," by W. M. Reed.
101. Underground waters of southern Louisiana, by G. D. Harris, with discussions of their uses for water supplies and for rice irrigation, by M. L. Fuller. 1904. 98 pp., 11 pls. 20c.
Discusses the topography and stratigraphic geology of the area and the origin of the well waters, gives statistics of artesian wells, describes methods of well drilling and pumping and treats briefly of rice cultivation.

105. The water powers of Texas, by T. U. Taylor. 1904. 116 pp., 17 pls. 15c.
Gives a résumé of the available data regarding water powers and briefly describes the principal streams.
114. Underground waters of eastern United States; M. L. Fuller, geologist in charge. 1905. 285 pp., 18 pls. 25c.
Contains brief report on Louisiana and southern Arkansas; discusses the geologic formation as related to water supply; gives a list of the principal publications.
140. Field measurements of the rate of movement of underground waters, by C. S. Slichter. 1905. 122 pp., 15 pls. 15c.
Contains a chapter giving results of tests of typical pumping plants in the Rio Grande valley in Texas and New Mexico.
141. Observations on the ground waters of the Rio Grande valley, by C. S. Slichter. 1905. 83 pp., 5 pls. 5c.
Describes investigation of the underflow in the valley of the Rio Grande in Texas and New Mexico, gives details of tests of pumping plants near El Paso, Tex., in Mesilla Valley, N. Mex., and near Berino, N. Mex., and analyses of well waters and data concerning wells at and near El Paso.
147. Destructive floods in the United States in 1904, by E. C. Murphy and others. 206 pp., 18 pls. 15c. Contains:
Pecos River basin flood, New Mexico, from report of Frank S. Dobson.
Failures of Lake Avalon dam near Carlsbad, N. Mex., by E. C. Murphy.
Rio Grande floods, New Mexico, by E. C. Murphy.
149. Preliminary list of deep borings in the United States, second edition with additions, by N. H. Darton. 1905. 175 pp. 10c.
Gives by States (and within the States by counties), location, depth, diameter, yield, height of water, and other available information, concerning wells 400 feet or more in depth; includes all wells listed in Water-Supply Papers 57 to 61; mentions also principal publications relating to deep borings.
158. Preliminary report on the geology and underground waters of the Roswell artesian area, New Mexico, by C. A. Fisher. 1906. 22 pp., 9 pls. 15c.
Discusses topography and geology of a belt lying along Pecos River from Roswell to Lake McMillan; discusses area and extent of artesian basins, source, amount, pressure, quality (with analyses), and waste of artesian waters, and irrigation; lists typical wells and gives well records.
- *162. Destructive floods in the United States in 1905, with a discussion of flood discharge and frequency and an index of flood literature, by E. C. Murphy and others. 1906. 105 pp., 4 pls. 15c.
Gives accounts of floods on Pecos and Hondo Rivers and the Rio Grande and estimates of flood frequency and discharge for Rio Grande at San Marcial, N. Mex., and Colorado River (Texas) at Austin; contains also index to literature on floods on American streams.
- *188. Water resources in the Rio Grande valley, New Mexico, and their development, by W. T. Lee. 1907. 59 pp., 10 pls. 20c.
Describes the physical features of the valley, rock formation and structure, the Engle, San Acaci, San Felipe, and Espanola reservoir sites, surface and underground waters by districts, the origin, course, and quantity of the underflow, the chemical character of the water in the Mesilla and other districts, and the utilization of the underflow by wells and seepage ditches.
- *190. Underground waters of the Coastal Plain of Texas, by Thomas U. Taylor. 15c.
Describes topography, drainage, and geology, and discusses the underground waters by counties; gives many well records and analyses.
236. The quality of surface waters in the United States: Part I, Analyses of waters east of the one hundredth meridian, by R. B. Dole. 1909. 123 pp. 10c.
Describes collection of samples, method of examination, preparation of solutions, accuracy of estimates, and expression of analytical results; gives results of analyses of waters of Brazos and Colorado (of Texas) rivers and the Rio Grande.

240. Geology and water resources of the San Luis Valley, Colorado, by C. E. Siebenthal. 1910. 128 pp., 13 pls. 25c.

Describes the topography, drainage, climate, geologic features, flowing and nonflowing, wells, springs, the grouping of wells, and variations in flow and temperature, and the quality (with analyses) and uses of the water; discusses briefly well-drilling methods and costs, and approximate measurements of flows.

260. Preliminary report on the ground waters of Estancia Valley, New Mexico, by O. E. Meinzer. 1910. 33 pp. 5c. (See Water-Supply Paper 275.)

Discusses briefly the geographic relation and industrial development, geology, and soils; discusses the source, disposal, recovery, and quality, and utilization of the ground waters, cost of pumping, windmills, value of crops, and the alkali problem.

274. Some stream waters of the Western United States, with chapters on sediment carried by the Rio Grande and the industrial application of water analyses, by Herman Stabler. 1911. 188 pp. 15c.

Describes collection of samples, plan of analytical work, and methods of analyses; discusses soap-consuming power of waters, water softening, boiler waters, and water for irrigation; gives results of analyses of waters of the Rio Grande and of Pecos, Gallinas, and Hondo rivers.

275. Geology and water resources of Estancia Valley, New Mexico, with notes on ground-water conditions in adjacent parts of central New Mexico, by O. E. Meinzer. 1911. 89 pp., 14 pls. 20c.

Describes physiographic features and geologic formations, soils and climate; discusses the source and disposal of the water supply, the head of the water supply, artesian conditions, yield of wells and quantity of water available, the quality of the water (dissolved solids, chlorine, sulphates, carbonates, and bicarbonates), the storage of storm water, the present and future use of ground water for irrigation, proper types of wells, windmills, cost of pumping, value of crops, and the alkali problem; tables give depth to water and field assays. Contains also brief reports on physiography, geology, soil, ground water, and irrigation in Encino and Pinos Wells basins.

- *317. Geology and underground waters of the Wichita region, north-central Texas, by C. H. Gordon. 1913. 88 pp., 2 pls. 10c.

Describes the physiography, climate, surface, and deep waters of an area in Montague Clay, Wichita, Wilbarger, Hardeman, Foard, Knox, Baylor, Archer, Jack, Young, Throckmorton, and Haskell counties; gives details by counties.

335. Geology and underground waters of the southeastern part of the Texas Coastal Plain, by Alexander Deussen. 1914. 365 pp., 9 pls. 55c.

Describes an area lying east of Brazos River and south of a line extending east and west through Jefferson, in Marion County; discusses the underground-water horizons of the region and the artesian conditions and prospects in the several counties; gives well sections and tabulated details of the wells.

343. Geology and water resources of Tularosa Basin, New Mexico, by O. E. Meinzer and R. F. Hare. 1915. 317 pp., 19 pls. 40c.

Describes a closed basin lying between the Pecos and the Rio Grande; gives an account of the climate, history of previous investigations and literature, and industrial development; discusses the physiography and drainage, rocks, sources of the underground water, yield of wells, and quality of the waters in the various formations; suggests methods of drilling, boring, digging, casing, and finishing wells; discusses also soil and native vegetation in relation to water supply, irrigation from streams, springs, flood waters, and wells, and railroad and public water supplies; gives detailed information in regard to watering places on routes of travel.

345. Contributions to the hydrology of the United States. 1914. N. C. Grover, chief hydraulic engineer. Contains:

(c) Underground water of Luna County, N. Mex., by N. H. Darton, with results of pumping tests, by A. T. Schwennesen, pp. 25-40.

Describes briefly the extent and thickness of the water-bearing beds underlying the wide bolsons of Luna County, the source and quality of the underground waters, the wells in the region about Deming, Tola, Waterloo, Columbus, and Myndus, in the Carne region, lower Mimbres Valley, the region west of Red Mountain, and other parts of the county; discusses the depletion of supply by the pumping plants. The pumping tests were made at plants representing average types.

358. Water resources of the Rio Grande basin, 1888-1913, by Robert Follansbee and H. J. Dean, including surface water supply of the western Gulf of Mexico basins, 1913, by Robert Follansbee, W. W. Follett, and G. A. Gray. 1914. 725 pp., 3 pls. 50c.

Describes the general features of the Rio Grande basin and the closed basins lying between the Rio Grande and the Pecos, west of the Rio Grande, and in Mexico; discusses the distribution of precipitation, forestation, and population. Contains "not only all data concerning stream flow in the Rio Grande basin collected by the Survey and cooperating parties but also records furnished by individuals connected with private interests." Most of the records have been taken from publications of the Geological Survey, but original estimates have been revised where later data have indicated errors.

ANNUAL REPORTS.

Each of the papers contained in the annual reports was also issued in separate form.

Annual reports are distributed free by the Geological Survey as long as its stock lasts. An asterisk (*) indicates that this stock has been exhausted. Many of the papers so marked, however, may be purchased from the SUPERINTENDENT OF DOCUMENTS, WASHINGTON, D. C.

- *Tenth Annual Report of the United States Geological Survey, 1888-89, J. W. Powell, Director. 1890. 2 parts. *Pt. II, Irrigation, viii, 123 pp. 35c.

Makes a preliminary report on the organization and prosecution of the survey of the arid lands for purposes of irrigation; includes an account of the methods of topographic and hydraulic work, the segregation work on reservoir sites and irrigable lands, field and office methods, and brief descriptions of the topography of some of the river basins.

- Eleventh Annual Report of the United States Geological Survey, 1889-90, J. W. Powell, Director. 1891. 2 parts. Pt. II, Irrigation, pp. xiv, 395, 30 pls. and maps. \$1.25. Contains:

*Hydrography, pp. 1-110. Discusses scope of work, methods of stream measurement, rainfall and evaporation, and describes the more important streams; sediment in the Rio Grande, pp. 55-57.

*Engineering, pp. 111-200. Defines the scope of the work and gives an account of the surveys in the Sun River basin and in the Arkansas, Rio Grande, California, Lahontan, Utah, and Snake River divisions.

*The arid lands, pp. 201-289. Includes statement of the Director to the House Committee on Irrigation, extracts from the constitutions of States relating to irrigation, and a report on artesian irrigation on the Great Plains, including a discussion of the general considerations affecting artesian water supply, the economic limit to the utilization of artesian water for irrigation, irrigation by artesian wells in various countries, and the geologic conditions and statistics of artesian wells on the Great Plains.

*Topography, pp. 291-343. Comprises reports of the topographic surveys in California, Nevada, Colorado, Idaho, Montana, and New Mexico, and a report on reservoir sites.

*Irrigation literature, pp. 345-388. Gives a list of books and pamphlets on irrigation and allied subjects, mainly contained in the library of the United States Geological Survey.

- Twelfth Annual Report of the United States Geological Survey, 1890-91, J. W. Powell, Director. 1891. 2 parts. Pt. II, Irrigation, xviii, 576 pp., 93 pls. \$2. Contains:

*Report upon the location and survey of reservoir sites during the fiscal year ending June 30, 1891, by A. H. Thompson, pp. 1-212, Pls. LIV-LVII. Describes reservoir sites in Rio Arriba, Taos, Santa Fe, Bernalillo, Mora, San Miguel, Valencia, Socorro, and Sierra counties, New Mexico, and on tributaries of the Rio Grande; for each reservoir site gives the location, height of dam, areas inclosed by contour, approximate contents of reservoir, position of irrigable lands, and areas of segregated lands.

*Hydrography of the arid regions, by F. H. Newell, pp. 213-361, Pls. LVIII-CVI. Discusses the available water supply of the arid regions, the duty of water, flood waters, relation of rainfall to river flow; classifies the drainage basins; and describes the rivers of the Missouri, Arkansas, Rio Grande, Colorado, Sacramento, and San Joaquin basins, and the principal streams of the Great Basin in Nevada and Utah and the Snake River drainage.

- Thirteenth Annual Report of the United States Geological Survey, 1891-92, J. W. Powell, Director. 1892. (Pts. II and III, 1893.) 3 parts. Pt. III, Irrigation, pp. xi, 486, 77 pls. \$1.85. Contains:

*Engineering results of irrigation survey, by H. N. Wilson, pp. 351-437, Pls. CXLVII-CLXXXII. Discusses surveys, flood-water storage, dam site, estimated cost of El Paso reservoir, Texas.

*Sixteenth Annual Report of the United States Geological Survey, 1894-95, Charles D. Walcott, Director. 1896. (Pts. II, III, and IV, 1895.) 4 parts. *Pt. II, Papers of an economic character, pp. xix, 598, 43 pls. \$1.25. Contains:

The public lands and their water supply, by F. H. Newell, pp. 457-533, Pls. XXXV-XXXIX. Describes general character of the public lands, the lands disposed of (railroad, grant, and swamp lands, and private miscellaneous entries), lands reserved (Indian, forest, and military reservations), the vacant lands, and the rate of disposal of vacant lands; discusses the streams, wells, and reservoirs as sources of water supply; gives details for each State.

Eighteenth Annual Report of the United States Geological Survey, 1896-97, Charles D. Walcott, Director. 1897. (Pts. II and III, 1898.) 5 parts in 6 vols.

*Pt. II, papers chiefly of a theoretic nature, p. v, 653, 105 pls. \$1.65. Contains:

*Geology of portions of the Edwards Plateau and Rio Grande Plain adjacent to Austin and San Antonio, Tex., with especial reference to the occurrence of artesian and other underground waters, by R. T. Hill and T. W. Vaughan, pp. 193, 322, Pls. XXI-LXIV. Discusses the general principles of artesian waters, the capacity of the various rock sheets for water, the nonflowing wells, the gravity springs, and artesian wells of the Edwards Plateau and Rio Grande Plain; the probable identity of source of artesian and fissure spring waters, and the availability and limitations of underground waters; treats of the chemical quality of the artesian well waters, and gives analyses of waters from the various beds and of spring waters from Austin and vicinity.

Twenty-first Annual Report of the United States Geological Survey, 1899-1900, Charles D. Walcott, Director. 1900. (Parts III, IV, VI, VI continued, and VII, 1901.) 7 parts in 8 vols., and separate case for maps with Pt. V.

*Pt. IV, Hydrography, pp. 768, 156 pls. \$2.35. Contains:

*The High Plains and their utilization, by W. D. Johnson, pp. 601-741, Pls. CXIII-CLVI. Describes the area lying in an irregular belt about midway across the long eastward slope of the Great Plains and including parts of Wyoming, Colorado, and Nebraska (North and South Platte, Platte, Republican, and Smoky Hill River basins), Colorado, Kansas, New Mexico, Oklahoma, and Texas (Arkansas River basin), and Colorado, New Mexico, and Texas, (Rio Grande basin); discusses the origin and structure of the High Plains, the precipitation, temperature, and other factors of climate, experiments with irrigation, and the use of mountain streams, local storm-water storage, and artesian waters. Concluded in the Twenty-second Annual Report.

Twenty-second Annual Report of the United States Geological Survey, 1900-1901, Charles D. Walcott, Director. 1901. (Pts. III and IV, 1902.) 4 parts. Pt. IV, Hydrography, pp. 631-669, Pls. LI-LXV. \$2.20. Contains:

Conclusion of The High Plains and their utilization.

BULLETINS.

An asterisk (*) indicates that the Geological Survey's stock of the paper is exhausted. Many of the papers so marked may be purchased from the SUPERINTENDENT OF DOCUMENTS, WASHINGTON, D. C. Bulletins are of octavo size.

264. Records of deep-well drilling for 1904, by M. L. Fuller, E. F. Lines, and A. C. Veatch. 1905. 106 pp. 10c.

Discusses the importance of accurate well records to the driller, to owners of oil, gas, and water wells, and to geologists; describes the general methods of work; gives tabulated records of wells in Colorado, Louisiana, New Mexico, and Texas, and detailed record of well near Houston, Harris County, Tex. This well was selected because it affords definite stratigraphic information.

*298. Record of deep-well drilling for 1905, by M. L. Fuller and Samuel Sanford. 1906. 299 pp. 25c.

Gives an account of progress in the collection of well records and samples; contains tabulated records of wells in Colorado, Louisiana, New Mexico, and Texas; and detailed records of wells in Eddy and Torrance counties, New Mexico; and Bexar, Cameron, Coleman, Dallas, Dimmit, Duval, Fayette, Fort Bend, Guadalupe, Hardin, Harris, Hays, Jasper, Johnson, Kendall, Lampasas, Liberty, Medina, Navarro, Nueces, Parker, Williamson, and Zavalla counties, Tex. The wells of which detailed sections are given were selected because they afford valuable stratigraphic information.

GEOLOGIC FOLIOS.

Under the plan adopted for the preparation of a geologic map of the United States the entire area is divided into small quadrangles, bounded by certain meridians and parallels, and these quadrangles, which number several thousand, are separately surveyed and mapped.¹ The unit of survey is also the unit of publication, and the maps and description of each quadrangle are issued in the form of a folio. When all the folios are completed they will constitute a Geologic Atlas of the United States.

A folio is designated by the name of the principal town or of a prominent natural feature within the quadrangle. Each folio includes maps showing the topography, geology, underground structure, and mineral deposits of the area mapped and several pages of descriptive text. The text explains the maps and describes the topographic and geologic features of the country and its mineral products. The topographic map shows roads, railroads, waterways, and, by contour lines, the shapes of the hills and valleys and the height above sea levels of all points in the quadrangle. The areal-geology map shows the distribution of the various rocks at the surface. The structural-geology map shows the relations of the rocks to one another underground. The economic-geology map indicates the location of mineral deposits that are commercially valuable. The artesian-water map shows the depth to underground-water horizons. Economic-geology and artesian-water maps are included in folios if the conditions in the areas mapped warrant their publication. The folios are of special interest to students of geography and geology and are valuable as guides in the development and utilization of mineral resources.

The folios numbered from 1 to 163, inclusive, are published in only one form (18 by 22 inches), called the library edition. Some of the folios that bear numbers higher than 163 are published also in an octavo edition (6 by 9 inches). Owing to a fire in the Geological Survey building May 18, 1913, the stock of geological folios was more or less damaged by fire and water, but 80 or 90 per cent of the folios are usable. They will be sold at the uniform price of 5 cents each, with no reduction for wholesale orders. This rate applies to folios in stock from 1 to 184, inclusive, also to the library edition of folio 186. The library edition of folios 185, 187, and higher numbers sells for 25 cents a copy, except that some folios which contain an unusually large amount of matter sell for 50 cents a copy. The octavo edition of folio 185 and higher numbers sells for 50 cents a copy. If 34 folios selling at 25 cents each (or their equivalent in higher-priced folios) are ordered at one time a discount of 40 per cent is allowed; \$5.10 is the minimum amount accepted at this rate.

All the folios contain descriptions of the drainage of the quadrangles. The folios in the following list contain also brief discussions of the underground waters in connection with the economic resources of the areas and more or less information concerning the utilization of the water resources.

An asterisk (*) indicates that the stock of the folio is exhausted.

42. Nueces, Texas.

Describes geography and geology, and relations of geologic formations to underground waters.

64. Uvalde, Texas.

Describes the topography and geology of the area, the streams, springs and wells, and discusses the possibility of obtaining artesian flows.

76. Austin, Texas.

Describes the topography and geology of the area, the drainage, and discusses the possibility of obtaining artesian water.

¹ Index maps showing areas in the western Gulf of Mexico basins covered by topographic maps and by geologic folios will be mailed on receipt of request addressed to the Director, U. S. Geological Survey, Washington, D. C.

120. Silverton, Colorado.

Describes an area in the San Juan Mountains including a portion of the Continental Divide, and sending streams through Animas River to the San Juan, through Uncompahgre to the Gunnison and the Colorado, and through small creeks to the Rio Grande; includes in the discussion of the economic geology a brief study of the ground waters.

166. El Paso,¹ Texas.

Discusses surface waters and valley and mesa wells; gives analyses of underground waters.

183. Llano-Burnet,¹ Texas.

Describes the relief of the Llano and Burnet quadrangles, the drainage through Colorado River (of Texas and tributaries), and tributaries of Brazos River, and the geology; under "Mineral Resources" discusses rainfall, streams, springs, wells, tanks, and cisterns.

194. Van Horn, Texas.

Describes a quadrangle in El Paso and Culberson counties, about 100 miles southeast of El Paso and about midway between Pecos River and the Rio Grande. Discusses underground waters and gives analyses of water from railroad wells at Van Horn and well at Figure 2 ranch headquarters.

MISCELLANEOUS REPORTS.

Other Federal bureaus, State and other organizations, have from time to time published reports relating to the water resources of various sections of the country. Notable among those pertaining to the western Gulf of Mexico drainage basins are the reports of the State geological surveys of Louisiana and Texas, the reports of the State engineers of Colorado and New Mexico, and the annual reports of the United States Reclamation Service. The following deserve special mention:

Report of commission appointed to revise the laws of the State of Colorado regulating the appropriation, distribution, and use of water. 1890.

Preliminary examination of reservoir sites in Wyoming and Colorado; letter from the Secretary of War transmitting a letter from the Chief of Engineers, together with a report of Captain Chittenden: 55th Cong., 2d sess., House Doc. 141.

Report on the underground waters of Louisiana, by G. D. Harris, A. C. Veatch, and others, made under the direction of the State experiment station: Louisiana Geol. Survey Bull. 1, 1905.

Preliminary report on the soils and waters of the upper Rio Grande and Pecos valleys in Texas, by H. H. Harrington: Texas Geol. Survey Bull. 2, 1890.

Water supply of southwestern Texas, compiled by H. M. Madison. 1912.

Artesian water on the Llano Estacado, by G. G. Shumard: Texas Geol. Survey Bull. 1, 1892.

Preliminary reports on the artesian wells of the Gulf coastal slope, by J. A. Singley, and on the organic remains from the deep well at Galveston, by Gilbert D. Harris: Texas Geol. Survey Fourth Ann. Rept., 1892.

A study of the use of water for irrigation on the Rio Grande del Norte, by W. W. Follett: International (Water) Boundary Comm. Proc., pp. 284-323, 1903.

Silt in the Rio Grande, by W. W. Follett: International Boundary Comm. Proc., 1913.

Silt survey on Pecos River: U. S. Recl. Service Third Ann. Rept., 1905.

¹ Issued in two editions (see p. xvi). Specify edition desired.

GEOLOGICAL SURVEY HYDROLOGIC REPORTS OF GENERAL INTEREST.

The following list comprises reports not readily classifiable by drainage basins and covering a wide range of hydrologic investigations:

WATER-SUPPLY PAPERS.

- *1. Pumping water for irrigation, by H. M. Wilson. 1896. 57 pp., 9 pls.
Describes pumps and motive powers, windmills, water wheels, and various kinds of engines; also storage reservoirs to retain pumped water until needed for irrigation.
- *3. Sewage irrigation, by G. W. Rafter. 1897. 100 pp., 4 pls. (See Water-Supply Paper 22.) 10c.
Discusses methods of sewage disposal by intermittent filtration and by irrigation; describes utilization of sewage in Germany, England, and France, and sewage purification in the United States.
- *8. Windmills for irrigation, by E. C. Murphy. 1897. 49 pp., 8 pls. 10c.
Gives results of experimental tests of windmills during the summer of 1896 in the vicinity of Garden, Kansas; describes instruments and methods and draws conclusions.
- *14. New tests of certain pumps and water lifts used in irrigation, by O. P. Hood, 1898. 91 pp., 1 pl. 10c.
Discusses efficiency of pumps and water lifts of various types.
- *20. Experiments with windmills, by T. O. Perry. 1899. 97 pp., 12 pls. 15c.
Includes tables and descriptions of wind wheels, makes comparisons of wheels of several types, and discusses results.
- *22. Sewage irrigation, Part II, by G. W. Rafter. 1899. 100 pp., 7 pls. 15c.
Gives résumé of Water-Supply Paper No. 3; discusses pollution of certain streams, experiments on purification of factory wastes in Massachusetts, value of commercial fertilizers and describes American sewage-disposal plants by States; contains bibliography of publications relating to sewage, utilization, and disposal.
32. Water resources of Puerto Rico, by H. M. Wilson. 1899. 48 pp., 17 pls. 15c.
Describes briefly topography, climate, rivers, irrigation methods, soils, forestation, water power, and transportation facilities. 15c.
- *41. The windmill; its efficiency and economic use, Part I, by E. C. Murphy. 1901. 72 pp., 14 pls. 15c.
- *42. The windmill; its efficiency and economic use, Part II, by E. C. Murphy. 1901. 75 pp., 2 pls. 10c.
Nos. 41 and 42 give details of results of experimental tests with windmills of various types.
- *43. Conveyance of water in irrigation canals, flumes, and pipes, by Samuel Fortier. 1901. 86 pp., 15 pls. 15c.
- *44. Profiles of rivers in the United States, by Henry Gannett. 1901. 100 pp. 11 pls. 15c.
Gives elevations and distance along rivers of the United States, also brief description of many of the streams. Arrangement geographic. Many river profiles are scattered through other reports on surface waters in various parts of the United States
- *56. Methods of stream measurement. 1901. 51 pp., 12 pls. 15c.
Describes the methods used by the Survey in 1901-2. (See also Nos. 64, 94, and 95.)

64. Accuracy of stream measurements, by E. C. Murphy. 1902. 99 pp., 4 pls. (See No. 95.) 10c.
- Describes methods of measuring velocity of water and of measuring and computing stream flow, and compares results obtained with the different instruments and methods; describes also experiments and results at the Cornell University hydraulic laboratory. A second, enlarged edition published as Water-Supply Paper 95.
- *67. The motions of underground waters, by C. S. Slichter. 1902. 106 pp., 8 pls. 15c.
- Discusses origin, depth, and amount of underground waters; permeability of rocks and porosity of soils; causes, rates, and laws of motions of underground water; surface and deep zones of flow, and recovery of waters by open wells and artesian and deep wells; treats of the shape and position of the water table; gives simple methods of measuring yield of flowing well; describes artesian wells at Savannah, Ga.
72. Sewage pollution in the metropolitan area near New York City and its effect on inland water resources, by M. O. Leighton. 1902. 75 pp., 8 pls. 10c.
- Defines "normal" and "polluted" waters and discusses the damage resulting from pollution.
77. The water resources of Molokai, Hawaiian Islands, by Waldemar Lindgren. 1903. 62 pp., 4 pls. 10c.
- Describes briefly the topography, geology, coral reefs, climate, soils, vegetation, forests, fauna of the island, the springs, running streams and wells, and discusses the utilization of the surface and underground waters.
- *80. The relation of rainfall to run-off, by G. W. Rafter. 1903. 104 pp. 10c.
- Treats of measurements of rainfall and laws and measurements of stream flow; gives rainfall run-off, and evaporation formulas; discusses effect of forests on rainfall and run-off.
87. Irrigation in India (second edition), by H. M. Wilson. 1903. 238 pp., 27 pls. 25c.
- First edition was published in Part II of the Twelfth Annual Report.
93. Proceedings of first conference of engineers of Reclamation Service, with accompanying papers, compiled by F. H. Newell, chief engineer. 1904. 361 pp. 25c.
- Contains, in addition to an account of the organization of the hydrographic [water-resources] branch of the United States Geological Survey and the reports of the conferences, the following papers of more or less general interest:
- Limits of an irrigation project, by D. W. Ross.
 - Relation of Federal and State laws to irrigation, by Morris Bien.
 - Electrical transmission of power for pumping, by H. A. Storrs.
 - Correct design and stability of high masonry dams, by Geo. Y. Wisner.
 - Irrigation surveys and the use of the planetable, by J. B. Lippincott.
 - The use of alkaline waters for irrigation, by Thomas A. Means.
- *94. Hydrographic manual of the United States Geological Survey, prepared by E. C. Murphy, J. C. Hoyt, and G. B. Hollister. 1904. 76 pp., 3 pls. 10c.
- Gives instruction for field and office work relating to measurements of stream flow by current meters. (See also No. 95.)
95. Accuracy of stream measurements (second, enlarged edition), by E. C. Murphy. 1904. 169 pp., 6 pls.
- Describes methods of measuring and computing stream flow and compares results derived from different instruments and methods. (See also No. 94.)
103. A review of the laws forbidding pollution of inland waters in the United States, by E. B. Goodell. 1904. 120 pp. (See No. 152.)
- Explains the legal principles under which antipollution statutes become operative, quotes court decisions to show authority for various deductions, and classifies according to scope the statutes enacted in the different States.

110. Contributions to the hydrology of eastern United States, 1904; M. L. Fuller, geologist in charge. 1905. 211 pp., 5 pls. 10c.
Contains the following reports of general interest. The scope of each paper is indicated by its title.
Description of underflow meter used in measuring the velocity and direction of underground water, by Charles S. Slichter.
The California or "stovepipe" method of well construction, by Charles S. Slichter.
Approximate methods of measuring the yield of flowing wells, by Charles S. Slichter.
Corrections necessary in accurate determinations of flow from vertical well casings, from notes furnished by A. N. Talbot.
Experiment relating to problems of well contamination at Quitman, Ga., by S. W. McCallie.
Notes on the hydrology of Cuba, by M. L. Fuller.
113. The disposal of strawboard and oil-well wastes, by R. L. Sackett and Isaiah Bowman. 1905. 52 pp., 4 pls. 5c.
The first paper discusses the pollution of streams by sewage and by trade wastes, describes the manufacture of strawboard, and gives results of various experiments in disposing of the waste. The second paper describes briefly the topography, drainage, and geology of the region about Marion, Ind., the contamination of rock wells and of streams by waste oil and brine.
114. Underground waters of eastern United States; M. L. Fuller, geologist in charge. 1905. 285 pp., 18 pls. 25c.
Contains report on "Occurrence of underground waters," by M. L. Fuller, discussing sources, amount, and temperature of waters, permeability and storage capacity of rocks, water-bearing formations, recovery of water by springs, wells, and pumps, essential conditions of artesian flows, and general conditions affecting underground waters in eastern United States.
115. River surveys and profiles made during 1903, by W. C. Hall and J. C. Hoyt. 1905. 115 pp., 4 pls. 10c.
Contains results of surveys made to determine location of undeveloped power sites.
119. Index to the hydrographic progress reports of the United States Geological Survey, 1888 to 1903, by J. C. Hoyt and B. D. Wood. 1905. 253 pp. 15c.
Scope indicated by title.
120. Bibliographic review and index of papers relating to underground waters published by the United States Geological Survey, 1879-1904, by M. L. Fuller. 1905. 128 pp. 10c.
Scope indicated by title.
- *122. Relation of the law to underground waters, by D. W. Johnson. 1905. 55 pp. 5c.
Defines and classifies underground waters, gives common-law rules relating to their use, and cites State legislative acts affecting them.
140. Field measurements of the rate of movement of underground waters, by C. S. Slichter. 1905. 122 pp., 15 pls. 15c.
Discusses the capacity of sand to transmit water, describes measurements of underflow in Rio Hondo, San Gabriel, and Mohave River valleys, Cal., and on Long Island, N. Y.; gives results of tests of wells and pumping plants, and describes stovepipe method of well construction.
143. Experiments on steel-concrete pipes on a working scale, by J. H. Quinton. 1905. 61 pp., 4 pls.
Scope indicated by title.
144. The normal distribution of chlorine in the natural waters of New York and New England, by D. D. Jackson. 1905. 31 pp., 5 pls. 10c.
Discusses common salt in coast and inland waters, salt as an index to pollution of streams and wells, the solutions and methods used in chlorine determinations, and the use of the normal chlorine map; gives charts and tables for chlorine in the New England States and New York.
145. Contributions to the hydrology of eastern United States, 1905; M. L. Fuller, geologist in charge. 1905. 220 pp., 6 pls.
Contains brief reports of general interest as follows:
Drainage of ponds into drilled wells, by Robert E. Horton. Discusses efficiency, cost, and capacity of drainage wells, and gives statistics of such wells in southern Michigan.
Construction of so-called fountain and geyser springs, by Myron L. Fuller.
A convenient gage for determining low artesian heads, by Myron L. Fuller.

146. Proceedings of second conference of engineers of the Reclamation Service, with accompanying papers, compiled by F. H. Newell, chief engineer. 1905. 267 pp. 15c.

Contains brief account of the organization of the hydrographic [water-resources] branch and the Reclamation Service, reports of conferences and committees, circulars of instruction, and many brief reports on subjects closely related to reclamation, and a bibliography of technical papers by members of the service. Of the papers read at the conference those listed below (scope indicated by title) are of more or less general interest:

Proposed State code of water laws, by Morris Bien.
 Power engineering applied in irrigation problems, by O. H. Ensign.
 Estimates on tunneling in irrigation projects, by A. L. Fellows.
 Collection of stream-gaging data, by N. C. Grover.
 Diamond-drill methods, by G. A. Hammond.
 Mean-velocity and area curves, by F. W. Hanna.
 Importance of general hydrographic data concerning basins of streams gaged, by R. E. Horton.
 Effect of aquatic vegetation on stream flow, by R. E. Horton.
 Sanitary regulations governing construction camps, by M. O. Leighton.
 Necessity of draining irrigated land, by Thos. H. Means.
 Alkali soils, by Thos. H. Means.
 Cost of stream-gaging work, by E. C. Murphy.
 Equipment of a cable gaging station, by E. C. Murphy.
 Silting of reservoirs, by W. M. Reed.
 Farm-unit classification, by D. W. Ross.
 Cost of power for pumping irrigating water, by H. A. Storrs.
 Records of flow at current-meter gaging stations during the frozen season, by F. H. Tillinghast.

147. Destructive floods in United States in 1904, by E. C. Murphy. 15c.

Contains a brief account of "A method of computing cross-section area of waterways," including formulas for maximum discharge and areas of cross section.

150. Weir experiments, coefficients, and formulas, by R. E. Horton. 1906. 189 pp., 38 pls. (See Water-Supply Paper 200.) 15c.

Scope indicated by title.

151. Field assay of water, by M. O. Leighton. 1905. 77 pp., 4 pls. 10c.

Discusses methods, instruments, and reagents used in determining turbidity, color, iron, chlorides, and hardness in connection with the studies of the quality of water in various parts of the United States.

152. A review of the laws forbidding pollution of inland waters in the United States (second edition), by E. B. Goodell. 1905. 149 pp.

Scope indicated by title.

155. Fluctuations of the water level in wells, with special reference to Long Island, N. Y., by A. C. Veatch. 1906. 83 pp., 9 pls. 25c.

Includes general discussion of fluctuation due to rainfall and evaporation, barometric changes, temperature changes in rivers, changes in lake level, tidal changes, effects of settlement, irrigation, dams, underground water developments, and to indeterminate causes.

- *160. Underground water papers, 1906; M. L. Fuller, geologist in charge. 1906. 104 pp., 1 pl.

Gives account of work in 1905; lists of publications relating to underground waters, and contains the following brief reports of general interest:

Significance of the term "artesian," by Myron L. Fuller.
 Representation of wells and springs on maps, by Myron L. Fuller.
 Total amount of free water in the earth's crust, by Myron L. Fuller.
 Use of fluorescein in the study of underground waters, by R. B. Dole.
 Problems of water contamination, by Isalah Bowman.
 Instances of improvement of water in wells, by Myron L. Fuller.

- *162. Destructive floods in the United States in 1905, with a discussion of flood discharge and frequency and an index to flood literature, by E. C. Murphy and others. 1906. 105 pp., 4 pls. 15c.

163. Bibliographic review and index of underground-water literature published in the United States in 1905, by M. L. Fuller, F. G. Clapp, and B. L. Johnson. 1906. 130 pp. 15c.
Scope indicated by title.
- *179. Prevention of stream pollution by distillery refuse, based on investigations at Lynchburg, Ohio, by Herman Stabler. 1906. 34 pp., 1 pl. 10c.
Describes grain distillation, treatment of slop, sources, character, and effects of effluents on streams; discusses filtration, precipitation, fermentation, and evaporation methods of disposal of wastes without pollution.
180. Turbine water-wheel tests and power tables, by R. E. Horton. 1906. 134 pp., 2 pls. 20c.
Scope indicated by title.
- *185. Investigations on the purification of Boston sewage, by C-E. A. Winslow and E. B. Phelps. 1906. 163 pp. 25c.
Discusses composition, disposal, purification, and treatment of sewages and recent tendencies in sewage-disposal practice in England, Germany, and the United States; describes character of crude sewage at Boston, removal of suspended matter, treatment in septic tanks, and purification in intermittent sand filtration and coarse material; gives bibliography.
- *186. Stream pollution by acid-iron wastes, a report based on investigations made at Shelby, Ohio, by Herman Stabler. 1906. 36 pp., 1 pl. 10c.
Gives history of pollution by acid-iron wastes at Shelby, Ohio, and resulting litigation; discusses effect of acid-iron liquors on sewage purification processes, recovery of copperas from acid-iron wastes, and other processes for removal of pickling liquor.
- *187. Determination of stream flow during the frozen season, by H. K. Barrows and R. E. Horton. 1907. 93 pp., 1 pl. 15c.
Scope indicated by title.
- *189. The prevention of stream pollution by strawboard waste, by E. B. Phelps. 1906. 29 pp., 2 pls. 5c.
Describes manufacture of strawboard, present and proposed methods of disposal of waste liquors, laboratory investigations of precipitation and sedimentation, and field studies of amounts and character of water used, raw material and finished product, and mechanical filtration.
- *194. Pollution of Illinois and Mississippi rivers by Chicago sewage (a digest of the testimony taken in the case of *The State of Missouri v. The State of Illinois and the Sanitary District of Chicago*), by M. O. Leighton. 1907. 369 pp., 2 pls. 40c.
Scope indicated by amplification of title.
- *196. Water supply of Nome region, Seward Peninsula, Alaska, 1906, by J. C. Hoyt and F. F. Henshaw. 1907. 52 pp., 6 pls. 15c.
Gives results of measurements of flow of Alaskan streams, discusses available water supply for ditch and pipe lines and power development; presents notes for investors.
- *200. Weir experiments, coefficients, and formulas, revision of paper No. 150, by R. E. Horton. 1907. 195 pp., 38 pls. 35c.
Scope indicated by title.
- *218. Water-supply investigations in Alaska, 1906-7 (Nome and Kougarak regions, Seward Peninsula; Fairbanks district, Yukon-Tanana region), by F. F. Henshaw and C. C. Covert. 1908. 156 pp., 12 pls. 25c.
Describes the drainage basins, gives results of observations at the gaging stations, and discusses the water supply of the ditches and pipe lines and possibilities of development; gives also meteorological records.
- *226. The pollution of streams by sulphite-pulp waste, a study of possible remedies, by E. B. Phelps. 1908. 37 pp., 1 pl. 10c.
Describes manufacture of sulphite pulp, the waste liquors, and the experimental work leading to suggestions as to methods of preventing stream pollution.

228. Water-supply investigations of the Yukon-Tanana region, Alaska, 1907 and 1908 (Fairbanks, Circle, and Rampart districts), by C. C. Covert and C. E. Ellsworth. 1909. 108 pp., 7 pls. 20c.
- Describes the drainage basins; gives results of observations at gaging stations; discusses the water supplies of the ditches and pipe lines and possibilities of hydraulic development.
- *229. The disinfection of sewage and sewage filter effluents, with a chapter on the putrescibility and stability of sewage effluents, by E. B. Phelps. 1909. 91 pp., 1 pl. 15c.
- Scope indicated by title.
234. Papers on the conservation of water resources. 1909. 96 pp., 2 pls. 15c.
- Contains the following papers, whose scope is indicated by their titles: Distribution of rainfall, by Henry Gannett; Floods, by M. O. Leighton; Developed water powers, compiled under the direction of W. M. Steuart, with discussion by M. O. Leighton; Undeveloped water powers, by M. O. Leighton; Irrigation, by F. H. Newell; Underground waters, by W. C. Mendenhall; Denudation, by R. B. Dole and Herman Stabler; Control of catchment areas, by H. N. Parker.
- *235. The purification of some textile and other factory wastes, by Herman Stabler and G. H. Pratt. 1909. 76 pp. 10c.
- Discusses waste waters from wool-scouring, bleaching, and dyeing cotton yarn, bleaching cotton piece goods, and manufacture of oleomargarine, fertilizer, and glue.
236. The quality of surface waters in the United States: Part I, Analyses of waters east of the one-hundredth meridian, by R. B. Dole. 1909. 123 pp. 10c.
- Describes collections of samples, method of examination, preparation of solutions, accuracy of estimates, and expression of analytical results.
238. The public utility of water powers and their governmental regulation, by René Tavernier and M. O. Leighton. 1910. 161 pp. 15c.
- Discusses hydraulic power and irrigation, French, Italian, and Swiss legislation relative to the development of water powers, and laws proposed in the French Parliament; reviews work of bureau of hydraulics and agricultural improvement of the French department of agriculture, and gives résumé of Federal and State water-power legislation in the United States.
255. Underground waters for farm use, by M. L. Fuller. 1910. 58 pp., 17 pls. 15c.
- Discusses rocks as sources of water supply and the relative safety of supplies from different materials; springs, and their protection; open or dug and deep wells, their location, yield, relative cost, protection, and safety; advantages and disadvantages of cisterns and combination wells and cisterns.
- *257. Well-drilling methods, by Isaiah Bowman. 1911. 139 pp., 4 pls. 15c.
- Discusses amount, distribution, and disposal of rainfall, water-bearing rocks, amount of underground water, artesian conditions, and oil and gas-bearing formations; gives history of well drilling in Asia, Europe, and the United States; describes in detail the various methods and the machinery used; discusses loss of tools and geologic difficulties; contamination of well waters and methods of prevention; tests of capacity and measurement of depth; and costs of sinking wells.
258. Underground water papers, 1910, by M. L. Fuller, F. G. Clapp, G. C. Matson, Samuel Sanford, and H. C. Wolff. 1911. 125 pp., 2 pls. 15c.
- Contains the following papers (scope indicated by titles) of general interest:
 Drainage by wells, by M. L. Fuller.
 Freezing of wells and related phenomena, by M. L. Fuller.
 Pollution of underground waters in limestone, by G. C. Matson.
 Protection of shallow wells in sandy deposits, by M. L. Fuller.
 Magnetic wells, by M. L. Fuller.
- *259. The underground waters of southwestern Ohio, by M. L. Fuller and F. G. Clapp, with a discussion of the chemical character of the waters, by R. B. Dole. 1912. 228 pp., 9 pls. 35c.
- Describes the topography, climate, and geology of the region, the water-bearing formations, the source, mode of occurrence, and head of the waters, and municipal supplies; gives details by counties; discusses in supplement, under chemical character, method of analysis and expression of results, mineral constituents, effect of the constituents on waters for domestic, industrial, or medicinal uses, methods of purification, chemical composition; many analyses and field assays. The matter in the supplement was also published in Water-Supply Paper 254 (The underground waters of north-central Indiana).

274. Some stream waters of the western United States, with chapters on sediment carried by the Rio Grande and the industrial application of water analyses, by Herman Stabler. 1911. 188 pp. 15c.
- Describes collection of samples, plan of analytical work, and methods of analyses; discusses soap-consuming power of waters, water softening, boiler waters, and water for irrigation; gives results of analyses of waters of the Rio Grande and of Pecos, Gallinas, and Hondo rivers.
- *280. Gaging stations maintained by the United States Geological Survey, 1888-1910, and Survey publications relating to water resources, compiled by B. D. Wood. 1912. 102 pp. 10c.
314. Surface water supply of Seward Peninsula, Alaska, by F. F. Henshaw and G. L. Parker, with a sketch of the geography and geology by P. S. Smith, and a description of methods of placer mining by A. H. Brooks. 1913. 317 pp., 17 pls. 45c.
- Contains results of work at gaging stations.
- *315. The purification of public water supplies, by G. A. Johnson. 1913. 84 pp., 8 pls. 10c.
- Discusses ground, lake, and river waters as public supplies, development of waterworks systems in the United States, water consumption, and typhoid fever; describes methods of filtration and sterilization of water, and municipal water softening.
- *318. Water resources of Hawaii, 1909-1911, by W. F. Martin and C. H. Pierce. 1913. 552 pp., 15 pls. 50c.
- Describes the general features of the islands and gives results of measurements of streams and of observations of rainfall and evaporation; contains a gazetteer.
334. The Ohio Valley flood of March-April, 1913 (including comparisons with some earlier floods), by A. H. Horton and H. J. Jackson. 1913. 96 pp., 32 pls. 20c.
- Although relating specifically to floods in the Ohio Valley, this report discusses also the causes of floods and the prevention of damage by floods.
336. Water resources of Hawaii, 1912, by C. H. Pierce and G. K. Larrison. 392 pp. 50c.
- Contains results of stream measurements on the islands in 1912.
337. The effects of ice on stream flow, by William Glenn Hoyt. 1913. 76 pp., 7 pls. 15c.
- Discusses methods of measuring the winter flow of streams.
342. Surface water supply of the Yukon-Tanana region, Alaska, by C. E. Ellsworth and R. W. Davenport. 1915. 343 pp., 13 pls.
- Presents results of six years observations of the water supply of the Yukon-Tanana region, discusses climate and precipitation, and gives station records.
345. Contributions to the hydrology of the United States. 1914. N. C. Grover, chief hydraulic engineer.
- (e) A method of determining the daily discharge of rivers of variable slope, by M. R. Hall, W. E. Hall, and C. H. Pierce, pp. 53-65. Scope indicated by title.
- (f) The discharge of Yukon River at Eagle, Alaska, by E. A. Porter and R. W. Davenport, pp. 67-77. Pls. IV-V. 5c. Describes briefly the location and size of the Yukon basin, the climatic conditions, and the methods of collecting hydrometric data; compares run-off with precipitation, and gives table showing the discharge of some of the large rivers in the United States as compared with the discharge of the Yukon and the Nile.
364. Water analyses from the laboratory of the United States Geological Survey, tabulated by F. W. Clarke, chief chemist. 1914. 40 pp. 5c.
- Contains analyses of waters from rivers, lakes, wells, and springs in various parts of the United States, including analyses of waters of the geysers in Yellowstone National Park, hot springs in Montana, brines from Death Valley, water from the Gulf of Mexico, and mine waters from Tennessee, Michigan, Missouri and Oklahoma, Montana, Colorado and Utah, Nevada and Arizona, and California.

371. Equipment for current-meter gaging stations, by G. J. Lyon. 1915. 64 pp., 37 pls.

Describes methods of installing automatic and other gages and of constructing gage wells, shelters, and structures for making discharge measurements and artificial controls.

375. Contributions to the hydrology of the United States, 1914. N. C. Grover, chief hydraulic engineer.

(c) Relation of stream gaging to the science of hydraulics, by C. H. Pierce and R. W. Davenport, pp. 77-84.

(e) A method for correcting river discharge for changing stage, by B. E. Jones, pp. 117-130.

(f) Conditions requiring the use of automatic gages in obtaining stream-flow records, by C. H. Pierce, pp. 131-139.

Three papers presented at the conference of engineers of the water-resources branch in December, 1914.

ANNUAL REPORTS.

- *Fifth Annual Report of the United States Geological Survey, 1883-84, J. W. Powell, Director. 1885. xxxvi, 469 pp., 58 pls. \$2.25. Contains:

*The requisite and qualifying conditions of artesian wells, by T. C. Chamberlain, pp. 125 to 173, Pl. XXI. Scope indicated by title.

- Twelfth Annual Report of the United States Geological Survey, 1890-91, J. W. Powell, Director. 1891. 2 parts. Pt. II, Irrigation, xviii, 576 pp., 93 pls. \$2. Contains:

*Irrigation in India, by H. M. Wilson, pp. 368-561, Pls. CVII to CXLVI. (See Water-Supply Paper 87.)

- Thirteenth Annual Report of the United States Geological Survey, 1891-92, J. W. Powell, Director. 1892. (Pts. II and III, 1893.) 3 parts. Pt. III, Irrigation, pp. xi, 486, 77 plates. \$1.85. Contains:

*American irrigation engineering, by H. M. Wilson, pp. 101-349, Pls. CXI to CXLV. Discusses the economical aspects of irrigation, alkaline drainage, silt and sedimentation; gives brief history of legislation; describes perennial canals in Idaho-California, Wyoming, and Arizona; discusses water storage at reservoirs of the California and other projects, subsurface sources of supply, pumping, and subirrigation.

- Fourteenth Annual Report of the United States Geological Survey, 1892-93, J. W. Powell, Director. 1893. (Pt. II, 1894.) 2 parts. *Pt. II, Accompanying papers, pp. xx, 597, 73 pls. \$2.10. Contains:

*Potable waters of the eastern United States, by W J McGee, pp. 1 to 47. Discusses cistern water, stream waters, and ground waters, including mineral springs and artesian wells.

*Natural mineral waters of the United States, by A. C. Peale, pp. 49-88, Pls. III and IV. Discusses the origin and flow of mineral springs, the source of mineralization, thermal springs, the chemical composition and analysis of spring waters, geographic distribution, and the utilization of mineral waters; gives a list of American mineral spring resorts; contains also some analyses.

- Nineteenth Annual Report of the United States Geological Survey, 1897-98, Charles D. Walcott, Director. 1898. (Parts II, III, and V, 1899.) 6 parts in 7 vols. and separate case for maps with Pt. V. *Pt. II, papers chiefly of a theoretical nature, pp. v, 958, 172 plates. \$2.65. Contains:

*Principles and conditions of the movements of ground water, by F. H. King, pp. 59-294, Pls. VI to XVI. Discusses the amount of water stored in sandstone, in soil, and in other rocks, the depth to which ground water penetrates; gravitational, thermal, and capillary movements of ground waters, and the configuration of the ground-water surface; gives the results of experimental investigations on the flow of air and water through a rigid, porous medium, and through sands, sandstones, and silts; discusses results obtained by other investigators, and summarizes results of observations; discusses also rate of flow of water through sand and rock, the growth of rivers, rate of filtration through soil, interference of wells, etc.

*Theoretical investigation of the motion of ground waters, by C. S. Slichter, pp. 295-384, Pls. XVII. Scope indicated by title.

Twentieth Annual Report of the United States Geological Survey, 1898-99, Charles D. Walcott, Director. 1899. (Parts II, III, IV, V, and VII, 1900.) 7 parts in 8 vols. and separate case for maps with Pt. V. *Pt. IV, Hydrography, vii, 660 pp., 75 plates. \$1.40. Contains:

*Hydrography of Nicaragua, by A. P. Davis, pp. 563-637, Pls. LXIV to LXXV. Describes the topographic features of the boundary, the lake basin, and Rio San Juan; gives a brief résumé of the boundary dispute; discusses rainfall, temperature, and relative humidity, evaporation, resources, and productions, the ship railway and canal projects; gives the history of the investigations by the Canal Commission, and results of measurements on the Rio Grande, on streams tributary to Lake Nicaragua, and on Rio San Juan and its tributaries.

Twenty-second Annual Report of the United States Geological Survey, 1900-1901, Charles D. Walcott, Director. 1901. (Parts III and IV, 1902.) 4 parts. Pt. IV, Hydrography, 690 pp., 65 pls. \$2.20. Contains:

*Hydrography of the American Isthmus, by A. P. Davis, pp. 507-630, Pls. XXXVII to L. Describes the physiography, temperature, rainfall, and winds of Central America; discusses the hydrography of the Nicaragua Canal route and the Panama Canal route; gives estimated monthly discharges of many of the streams, rainfall, and evaporation tables at various points.

PROFESSIONAL PAPERS.

*72. Denudation and erosion in the southern Appalachian region and the Monongahela basin, by L. C. Glenn. 1911. 137 pp., 21 pls. 35c.

Describes the topography, geology, drainage, forests, climate and population, and transportation facilities of the region, the relation of agriculture, lumbering, mining, and power development to erosion and denudation, and the nature, effects, and remedies of erosion; gives details of conditions in Holston, Nolichucky, French Broad, Little Tennessee, and Hiwassee river basins, along Tennessee River proper, and in the basins of the Coosa-Alabama system, Chattahoochee, Savannah, Saluda, Broad, Catawba, Yadkin, New, and Monongahela rivers.

BULLETINS.

*32. Lists and analyses of the mineral springs of the United States (a preliminary study), by A. C. Peale. 1886. 235 pp.

Defines mineral waters, lists the springs by States, and gives tables of analyses so far as available.

264. Record of deep-well drilling for 1904, by M. L. Fuller, E. F. Lines, and A. C. Veatch. 1905. 106 pp. 10c.

*298. Record of deep-well drilling for 1905, by M. L. Fuller and Samuel Sanford. 1906. 299 pp. 25c.

Bulletins 264 and 298 discuss the importance of accurate well records to the driller, to owners of oil, gas, and water wells, and to the geologist; describes the general methods of work; gives tabulated records of wells by States, and detailed records selected as affording valuable stratigraphic information.

*319. Summary of the controlling conditions of artesian flows, by Myron L. Fuller. 1908. 10c.

Describes underground reservoirs, the sources of underground waters, the confining agents, the primary and modifying factors of artesian circulation, the essential and modifying factors of artesian flow, and typical artesian systems.

479. The geochemical interpretation of water analyses, by Chase Palmer. 1911. 31 pp. 5c.

Discusses the expression of chemical analyses, the chemical character of water and the properties of natural waters; gives a classification of waters based on property values and reacting values, and discusses the character of the waters of certain rivers as interpreted directly from the results of analyses; discusses also the relation of water properties to geologic formations, silica in river water, and the character of the water of the Mississippi and the Great Lakes and St. Lawrence River as indicated by chemical analyses.

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