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GEORGE OTIS SMITH, Director

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SURFACE WATER SUPPLY OF THE
UNITED STATES

1921

PART XI. PACIFIC SLOPE BASINS IN CALIFORNIA

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Prepared in cooperation with
THE STATES OF CALIFORNIA AND OREGON



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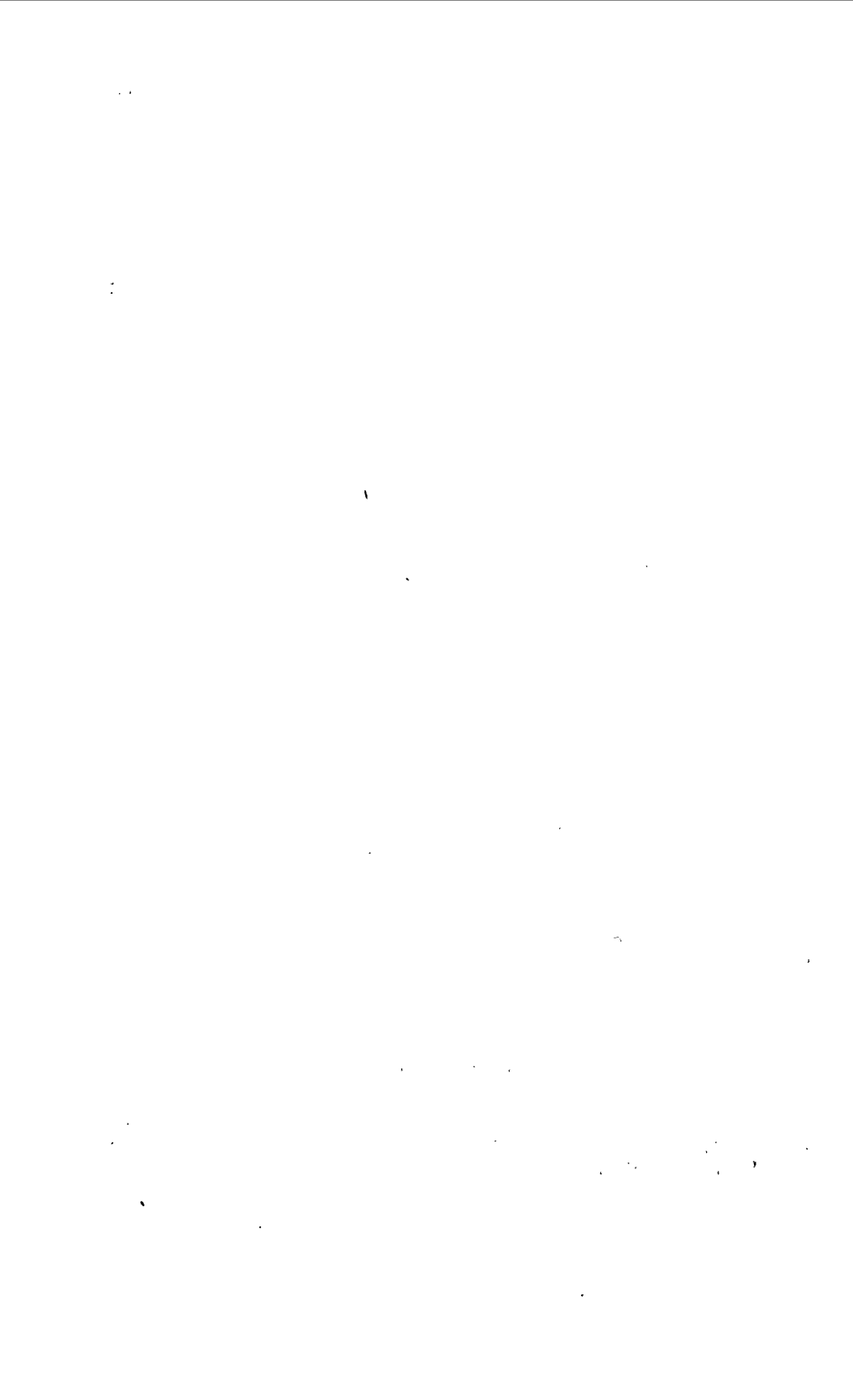
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SURFACE WATER SUPPLY OF PACIFIC SLOPE BASINS IN CALIFORNIA, 1921

AUTHORIZATION AND SCOPE OF WORK

This volume is one of a series of 14 reports presenting records of measurements of flow made on streams in the United States during the years ending September 30, 1921.

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

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 relating to irrigation in the arid West. 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, 1895-1922

1895.....	\$12, 500. 00
1896.....	20, 000. 00
1897 to 1900, inclusive.....	50, 000. 00
1901 to 1902, inclusive.....	100, 000. 00
1903 to 1906, inclusive.....	200, 000. 00
1907.....	150, 000. 00
1908 to 1910, inclusive.....	100, 000. 00
1911 to 1917, inclusive.....	150, 000. 00
1918.....	175, 000. 00
1919.....	148, 244. 10
1920.....	175, 000. 00
1921.....	180, 000. 00
1922.....	180, 000. 00

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 pages 9 and 10.

Measurements of stream flow have been made at about 5,200 points in the United States and also at many points in Alaska and the

Hawaiian Islands. In July, 1921, 1,350 gaging stations were being maintained by the Survey and the cooperating organizations. Many miscellaneous discharge measurements were made at other points. In connection with this work data were also collected in regard to precipitation, evaporation, storage reservoirs, river profiles, and water power in many sections of the country and will be made available in water-supply papers from time to time.

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, miners’ inches, and discharge in second-feet per square mile, and (2) those that represent the actual quantity of water, as run-off in inches, acre-feet, and millions of cubic feet. The principal terms used in this series of reports are second-feet, second-feet per square mile, run-off in inches, and acre-feet. They may be defined as follows:

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

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

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

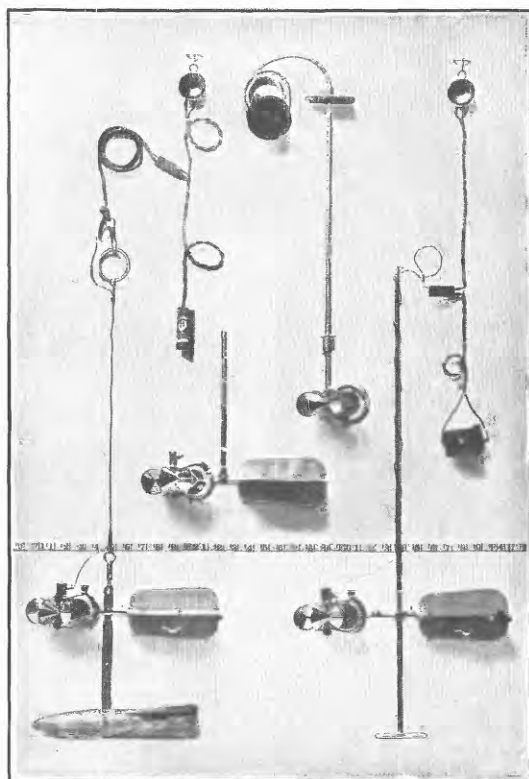
An “acre-foot,” equivalent to 43,560 cubic feet, is the quantity required to cover an acre to the depth of 1 foot. The term is commonly used in connection with storage for irrigation.

The following terms not in common use are here defined:

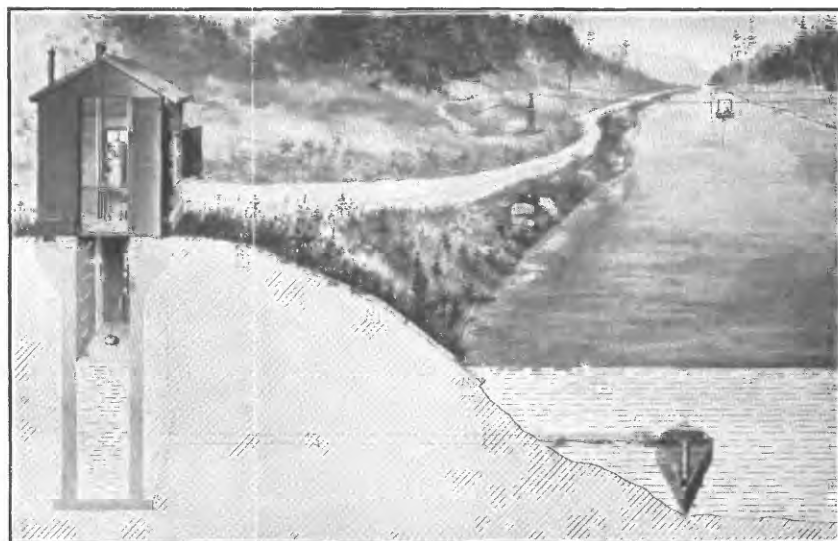
“Stage-discharge relation;” an abbreviation for the term “relation of gage height to discharge.”

“Control;” a term used to designate the section or sections of the stream channel below the gage which determine the stage-discharge relation at the gage. It should be noted that the control may not be the same section or sections at all stages.

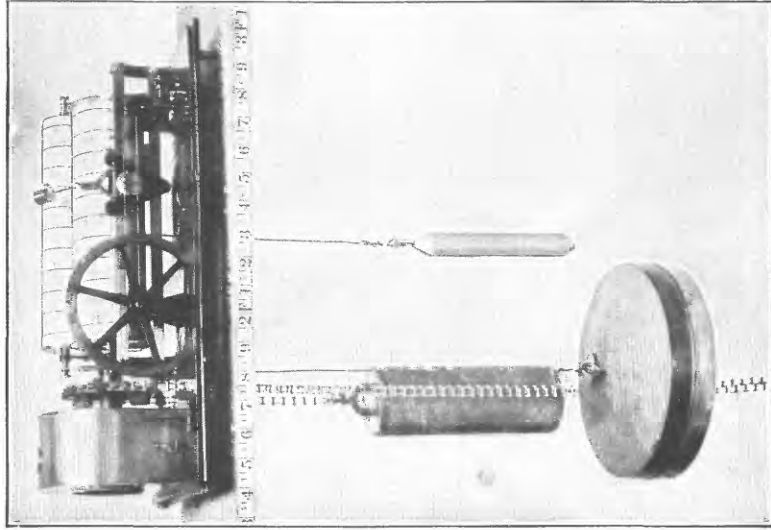
The “point of zero flow” for a given gaging station is that point on the gage—the gage height—at which water ceases to flow over the control.



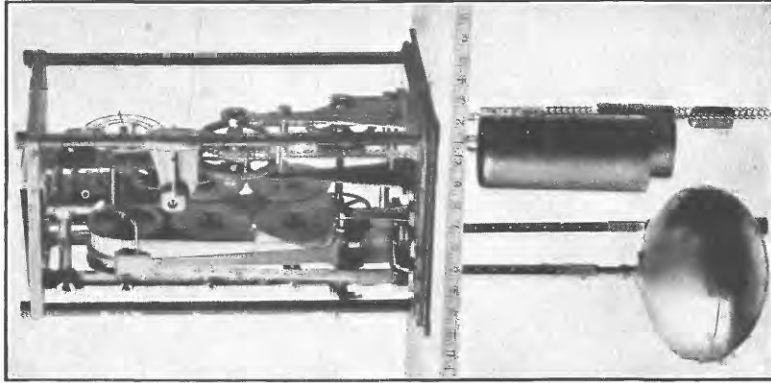
A. PRICE CURRENT METERS.



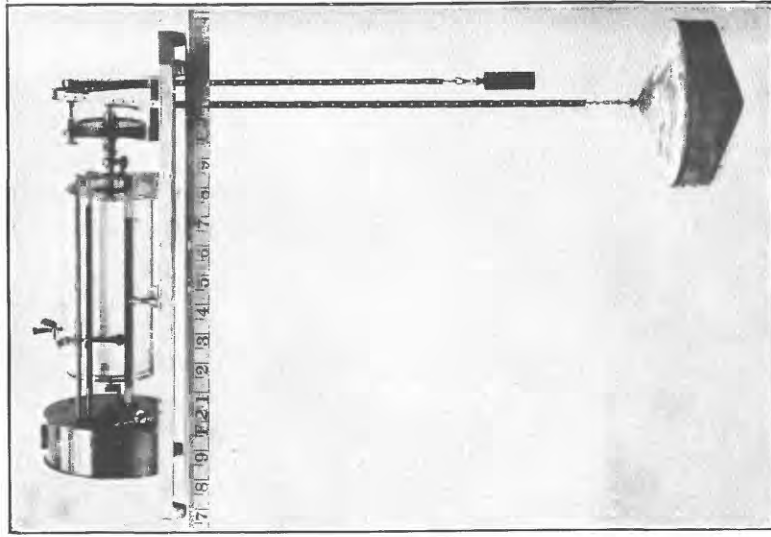
B. TYPICAL GAGING STATION.



A. STEVENS CONTINUOUS.



B. GURLEY PRINTING.
WATER-STAGE RECORDERS.



C. FRIEZ.

EXPLANATION OF DATA

The data presented in this report cover the year beginning October 1, 1920, and ending September 30, 1921. At the beginning of January in most parts of the United States, much of the precipitation in the preceding three months is stored as ground water, in the form of snow or ice, or in ponds, lakes, and swamps, and this stored water passes off in the streams during the spring break-up. At the end of September, on the other hand, the only stored water available for run-off is possibly a small quantity in the ground; therefore the run-off for the year beginning October 1 is practically all derived from precipitation within that year.

The base data collected at gaging stations consist of records of stage, measurements of discharge, and general information used to supplement the gage heights and discharge measurements in determining the daily flow. The records of stage are obtained either from direct readings on a staff gage or from a water-stage recorder that gives a continuous record of the fluctuations. Measurements of discharge are made with a current meter. (See Pls. I, II.) The general methods are outlined in standard textbooks on the measurement of river discharge.

From the discharge measurements rating tables are prepared that give the discharge for any stage. The application of the daily gage heights to these rating tables give the daily discharge from which the monthly and yearly mean discharge is computed.

The data presented for each gaging station in the area covered by this report comprise a description of the station, a table giving records of discharge measurements, a table showing the daily discharge of the stream, and a table of monthly and yearly discharge and run-off.

If the base data are insufficient to determine the daily discharge, tables giving daily gage height and records of discharge measurements are published.

The description of the station gives, in addition to statements regarding location and equipment, information in regard to any conditions that may affect the permanence of the stage-discharge relation, covering such subjects as the occurrence of ice, the use of the stream for log driving, shifting of control, and the cause and effect of backwater; it gives also information as to diversions that decrease the flow at the gage, artificial regulation, maximum and minimum recorded stages, and the accuracy of the records.

The table of daily discharge gives, in general, the discharge in second-feet corresponding to the mean of the gage heights read each day. At stations on streams subject to sudden or rapid diurnal fluctuations the discharge obtained from the rating table and the mean daily gage height may not be the true mean discharge for the day.

If such stations are equipped with water-stage recorders, the mean daily discharge may be obtained by averaging discharge at regular intervals during the day or by using the discharge integrator, an instrument operating on the principle of the planimeter and containing as an essential element the rating curve of the station.

In the table of monthly discharge the column headed "Maximum" gives the mean flow for the day when the mean gage height was highest. As the gage height is the mean for the day it does not indicate correctly the stage when the water surface was at crest height and the corresponding discharge was consequently larger than given in the maximum column. Likewise in the column headed "Minimum" the quantity given is the mean flow for the day when the mean gage height was lowest. The column headed "Mean" is the average flow in cubic feet per second during the month. On this average flow computations recorded in the remaining columns, which are defined on page 2, are based.

ACCURACY OF FIELD DATA AND COMPUTED RESULTS

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

A paragraph in the description of the station gives information regarding the (1) permanence of the stage-discharge relation, (2) precision with which the discharge rating curve is defined, (3) refinement of gage readings, (4) frequency of gage readings, and (5) methods of applying daily gage height to the rating table to obtain the daily discharge.

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," within 15 to 25 per cent. These notes are very general and are based on the plotting of the individual measurements with reference to the mean rating curve.

The monthly means for any station may represent with high accuracy the quantity of water flowing past the gage, but the figures showing discharge per square mile and run-off in inches may be subject to gross errors caused by the inclusion of large noncontributing districts in the measured drainage area, by lack of information concerning water diverted for irrigation or other use, or by inability to interpret the effect of artificial regulation of the flow of the river above the station. "Second-feet per square mile" and "run-off in inches" are therefore not computed if such errors appear probable. The computations are also omitted for stations on streams draining areas in which the annual rainfall is less than 20 inches. All figures representing "second-feet per square mile" and "run-off in inches"

published in the earlier reports by the Survey should be used with caution because of possible inherent sources of error not known to the Survey.

Many gaging stations on streams in the irrigated areas of the United States are located above most of the diversions from those streams, and the discharge recorded does not show the water supply available for further development, as prior appropriations below the stations must first be satisfied. To give an idea of the amount of prior appropriations, a paragraph on diversions is presented in each station description. The figures given can not be considered exact, but represent the best information available.

The table of monthly discharge gives only a general idea of the flow at the station and should not be used for other than preliminary estimates; the tables of daily discharge allow more detailed studies of the variation in flow. It should be borne in mind, however, that the observations in each succeeding year may be expected to throw new light on data previously published.

PUBLICATIONS

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, ground water, 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 annual reports, bulletins, professional papers, and monographs.

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 slope basins.

II. South Atlantic slope 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 slope basins in California.

XII. North Pacific slope basins, in three volumes:

A, Pacific slope basins in Washington and upper Columbia River basin.

B, Snake River basin.

C, Lower Columbia River basin and Pacific slope basins in Oregon.

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:

Boston, Mass., 2500 Customhouse.

Albany, N. Y., 704 Journal Building.

Trenton, N. J., State House.

Asheville, N. C., 6 Government Street.

Chattanooga, Tenn., 37 Municipal Building.

Columbus, Ohio, Brown Hall, Ohio State University.

Chicago, Ill., 1404 Kimball Building.

Madison, Wis., care of Railroad Commission of Wisconsin.

Ames, Iowa, 103 Engineering Hall, Iowa State College.

Rolla, Mo., Rolla Building, School of Mines and Metallurgy.

Topeka, Kans., 23 Federal Building.

Helena, Mont., 52 National Bank Building.

Denver, Colo., 403 Post Office Building.

Salt Lake City, Utah, 313 Federal Building.

Idaho Falls, Idaho, 228 Federal Building.

Boise, Idaho, 615 Idaho Building.

Tacoma, Wash., 406 Federal Building.

Portland, Oreg., 606 Post Office Building.

San Francisco, Calif., 328 Customhouse.

Los Angeles, Calif., 600 Federal Building.

Tucson, Ariz., 210 Agricultural Building, University of Arizona.

Austin, Tex., State Capitol.

Honolulu, Hawaii, 25 Capitol 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 records have been obtained at about 5,200 points in the United States, and the data obtained have been published in the reports tabulated on pages 7-8.

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

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

Report	Character of data	Year
10th A, pt. 2....	Descriptive information only.....	
11th A, pt. 2....	Monthly discharge and descriptive information.....	1884 to Sept., 1890.
12th A, pt. 2....	.....do.....	1884 to June 30, 1891.
13th A, pt. 3....	Mean discharge in second-feet.....	1884 to Dec. 31, 1892.
14th A, pt. 2....	Monthly discharge (long-time records, 1871 to 1893).....	1888 to Dec. 31, 1893.
B 131.....	Descriptions, measurements, gage heights, and ratings.....	1893 and 1894.
16th A, pt. 2....	Descriptive information only.....	
B 140.....	Descriptions, measurements, gage heights, ratings, and monthly discharge (also many data covering earlier years).....	1895.
W 11.....	Gage heights (also gage heights for earlier years).....	1896.
18th A, pt. 4....	Descriptions, measurements, ratings, and monthly discharge (also similar data for some earlier years).....	1895 and 1896.
W 15.....	Descriptions, measurements, and gage heights, eastern United States, eastern Mississippi River, and Missouri River above junction with Kansas.....	1897.
W 16.....	Descriptions, measurements, and gage heights, western Mississippi River below junction of Missouri and Platte, and western United States.....	1897.
19th A, pt. 4....	Descriptions, measurements, ratings, and monthly discharge (also some long-time records).....	1897.
W 27.....	Measurements, ratings, and gage heights, eastern United States, eastern Mississippi River, and Missouri River.....	1898.
W 28.....	Measurements, ratings, and gage heights, Arkansas River, and western United States.....	1898.
20th A, pt. 4....	Monthly discharge (also for many earlier years).....	1898.
W 35 to 39.....	Descriptions, measurements, gage heights, and ratings.....	1899.
21st A, pt. 4....	Monthly discharge.....	1899.
W 47 to 52.....	Descriptions, measurements, gage heights, and ratings.....	1900.
22d A, pt. 4....	Monthly discharge.....	1900.
W 65, 66.....	Descriptions, measurements, gage heights, and ratings.....	1901.
W 75.....	Monthly discharge.....	1901.
W 82 to 85.....	Complete data.....	1902.
W 97 to 100.....	.....do.....	1903.
W 124 to 135.....	.....do.....	1904.
W 165 to 178.....	.....do.....	1905.
W 201 to 214.....	.....do.....	1906.
W 241 to 252.....	.....do.....	1907-8.
W 261 to 272.....	.....do.....	1909.
W 281 to 292.....	.....do.....	1910.
W 301 to 312.....	.....do.....	1911.
W 321 to 332.....	.....do.....	1912.
W 351 to 362.....	.....do.....	1913.
W 381 to 394.....	.....do.....	1914.
W 401 to 414.....	.....do.....	1915.
W 431 to 444.....	.....do.....	1916.
W 451 to 464.....	.....do.....	1917.
W 471 to 484.....	.....do.....	1918.
W 501 to 514.....	.....do.....	1919 and 1920.
W 521 to 534.....	.....do.....	1921.

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 which follows gives, by years and drainage basins, the numbers of the papers on surface-water supply published from 1899 to 1921. 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, Maine, 1903 to 1920, are published in Water-Supply Papers 97, 124, 165, 201, 241, 261, 281, 301, 321, 351, 381, 401, 431, 451, 471, and 501, which contain records for the New England streams from 1903 to 1920. Results of miscellaneous measurements are published by drainage basins.

Numbers of water-supply papers containing results of stream measurements, 1899-1921

Year	North Pacific slope basins									
	I North Atlantic slope basins (St. John River to York River)	II South Atlantic and eastern Gulf of Mexico (James River to the Mississippi)	III Ohio River basin	IV St. Lawrence River and Great Lakes basins	V Hudson Bay and upper Mississippi River basins	VI Missouri River basin	VII Lower Mississippi River basin	VIII Western Gulf of Mexico basins	IX Colorado River basin	X Great Basin
Year	Pacific slope basins in California									
	Snake River basin									
Year	Lower Columbia River and Pacific slope basins in Oregon									
1899	35	35, 36	36	36	36	36, 37	37	37	37, 38	38
1900	47, 48	47, 48	48, 49	49	49	49, 50	50	50	51	51
1901	65, 75	65, 75	65, 75	65, 75	65, 75	66, 75	66, 75	66, 75	66, 75	66, 75
1902	82	82, 83	82, 83	82, 83	82, 83	83, 84	84	84	85	85
1903	97	97, 98	97, 98	97, 98	97, 98	98, 99	98, 99	99	100	100
1904	124, 125	124, 125, 127	128	129	128, 130	130, 131	128, 131	132	133	135
1905	165, 166	167, 168	169	170	171	172	169, 173	174	175, 177	178
1906	201, 202	203, 204	205	206	207	208	205, 209	210	211, 212, 213	214
1907-8	241	242	243	244	245	246	247	248	249, 250, 251	252
1909	261	262	263	264	265	266	267	268	270, 271	272
1910	281	282	283	284	285	286	287	288	289	292
1911	301	302	303	304	305	306	307	308	309	312
1912	321	322	323	324	325	326	327	328	329	332
1913	351	352	353	354	355	356	357	358	359	362-A
1914	381	382	383	384	385	386	387	388	389	392
1915	401	402	403	404	405	406	407	408	409	412
1916	431	432	433	434	435	436	437	438	439	442
1917	451	452	453	454	455	456	457	458	459	462
1918	471	472	473	474	475	476	477	478	479	482
1919-20	501	502	503	504	505	506	507	508	509	511
1921	521	522	523	524	525	526	527	528	529	531

* Rating tables and index to Water-Supply Papers 35-39 contained in Water-Supply Paper 33. Tables of monthly discharge for 1899 in Twenty-first Annual Report, Part IV.

† James River only.

‡ Galatin River.

§ Green and Gunnison rivers and Grand River above junction with Gunnison.

|| Kings and Kern rivers and south Pacific slope basins.

¶ Rating tables and index to Water-Supply Papers 47-52 and data on precipitation, wells, and irrigation in California and Utah contained in Water-Supply Paper 52.

‡ Tables of monthly discharge for 1900 in Twenty-second Annual Report, Part IV.

§ Wisslamuckon and Schuykill rivers to James River.

† Sagadahoc River.

† Lepp and Platte rivers near Columbus, Nebr., and all tributaries below junction with Platte.

‡ Tributaries of Mississippi from east.

§ Lake Ontario and tributaries to St. Lawrence River proper.

¶ Hudson Bay only.

|| New England rivers only.

¶ Hudson River to Delaware River, inclusive.

‡ Susquehanna River to York River, inclusive.

§ Platte and Kansas rivers.

† Great Basin in California except Truckee and Carson river basins.

‡ Below junction with Columbia.

§ Rogue, Umpqua, and Siletz rivers only.

COOPERATION

Investigation of the water resources of California is being carried on by the United States Geological Survey in cooperation with the State in accordance with acts of the State legislature, approved March 16, 1903, March 20, 1905, March 11, 1907, and April 22, 1909, empowering the State authorities to enter into contracts with the Director of the United States Geological Survey for the purpose of making topographic maps, gaging streams, and surveying reservoir sites and canal locations for the conservation and utilization of the flood and storm waters of the State. The work for the year 1921 was maintained in accordance with the contract signed by W. F. McClure, State engineer.

Additional funds for the maintenance of river-measurement stations were furnished by the State Water Commission of California. The members of the commission during the year were C. H. Lee, executive member, W. A. Johnstone (resigned during year) A. W. Mason, and J. L. Matthews; W. D. Stephens, governor; and W. F. McClure, State engineer. Josephine A. Patten is secretary.

The entire expense of the stream-flow investigations in the Tuolumne River drainage basin for the Hetch Hetchy project is paid by the city and county of San Francisco, through M. M. O'Shaughnessy, city engineer.

All stations in Los Angeles County were maintained in cooperation with the Board of Supervisors; the United States Department of Agriculture, represented by the Forest Service through F. H. Fowler, district engineer; the United States Weather Bureau, through H. B. Hersey, meteorologist; and the United States Geological Survey. Los Angeles County paid all expenses of the field work except services furnished by the Forest Service, Weather Bureau, and Geological Survey. The Geological Survey supervised the work and compiled all field data for publication.

The stations in the Santa Ana River basin were maintained in cooperation with San Bernardino, Riverside, and Orange counties through their boards of supervisors. Substantial cooperation was also furnished by the Weather Bureau. The cost of installation of a number of the stations was paid from a special appropriation disbursed by the State water commission.

Assistance in the maintenance of gaging stations was furnished by the United States Forest Service, United States Weather Bureaus, United States Indian Service, United States Bureau of Fisheries, National Park Service, Los Angeles County, Volcan Land & Water Co., Cuyamaca Water Co., Southern California Edison Co., San Diego Consolidated Gas & Electric Co., and Turlock, Modesto, Oakdale, South San Joaquin, and Madera irrigation districts.

Many complete records of run-off, gage-height records, and discharge measurements were furnished by various Federal bureaus, private companies, and individuals who are interested in the water resources of California. This cooperation is acknowledged and explained in the descriptions that precede the records.

The work in Oregon was carried on under a cooperative agreement with the State through Percy A. Cupper, State engineer. Financial cooperation was also furnished by the United States Indian Office, the Goose Lake Valley Irrigation Co., and the Talent Irrigation District.

DIVISION OF WORK

The data for stations in California were collected and prepared for publication under the direction of H. D. McGlashan, district engineer, assisted by William Kessler, F. C. Ebert, R. C. Briggs, C. J. Emerson, K. M. Kelley, Jarrett Oliver, H. C. Troxell, Jesse Arnold, and H. J. Tompkins.

The field work in Oregon was carried on under the direction of F. F. Henshaw, district engineer, by J. W. Bones, R. C. Briggs, Wendell Dawson, and K. N. Phillips, and by Ted Cole, hydrographer of the United States Bureau of Reclamation. The ratings, special estimates, and computations were made and data prepared for publication by F. F. Henshaw, district engineer, assisted by G. H. Canfield, K. N. Phillips, and Wendell Dawson.

The manuscript was reviewed and assembled by J. J. Dirzulaitis.

GAGING-STATION RECORDS

SWEETWATER RIVER BASIN

SWEETWATER RIVER NEAR DESCANSO, CALIF.

LOCATION.—In SE. $\frac{1}{4}$ sec. 25, T. 15 S., R. 3 E., at Ellis ranch, 2 miles below mouth of Guatay Creek and $1\frac{1}{2}$ miles below Descanso, San Diego County.

DRAINAGE AREA.—43.7 square miles (measured on topographic maps).

RECORDS AVAILABLE.—November 21, 1905, to September 30, 1921.

GAGE.—Staff in three sections on left bank a short distance below intake of Ellis ditch. On November 6, 1918, a new staff was installed at a new datum at new concrete control below old gage. Previous gages were at approximately the same location but at different datums. Read by Henry D. Ellis.

DISCHARGE MEASUREMENTS.—Made from cable just below gage or by wading.

CHANNEL AND CONTROL.—Channel is cut in sand and fine gravel; bed shifting. Banks are generally high and not likely to be overflowed. A group of large boulders about 125 feet below gage acts as a partial control. On November 6, 1918, a concrete control was built at this location.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 2.24 feet November 5 (discharge, 12 second-feet); minimum stage, 1.30 feet August 7 (discharge, 0.1 second-foot).

1905–1921: Maximum stage not known, occurred January 27, 1916 (discharge, about 9,870 second-feet); stream dry during a part of the years 1910, 1911, 1913, and 1916.

DIVERSIONS.—About 0.3 second-foot is diverted above gage for irrigation on Ellis ranch.

REGULATION.—None.

ACCURACY.—Stage-discharge relation not permanent. Rating curve fairly well defined. Gage read to hundredths twice a day. Daily discharge ascertained by applying mean daily gage height to rating curve except January 18 to February 12 and March 12-22, when shifting-control method was used. Records good.

Discharge measurements of Sweetwater River near Descanso, Calif., during the year ending Sept. 30, 1921

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	W. E. Ellis	1.52	0.6	Mar. 23	W. E. Ellis	1.84	3.4
15	do.	1.50	.5	30	do.	1.80	2.9
23	do.	1.60	1.1	Apr. 2	do.	1.70	1.6
Nov. 9	do.	1.58	1.2	14	do.	1.74	2.4
29	do.	1.56	1.0	22	do.	1.62	1.3
Dec. 4	do.	1.62	1.1	30	do.	1.48	.3
11	do.	1.62	1.3	May 8	do.	1.84	3.4
31	do.	1.66	1.2	16	do.	1.56	.7
Jan. 20	do.	1.96	3.7	19	Ebert and Green ^a	1.64	1.7
31	do.	1.96	3.0	23	W. E. Ellis	2.20	11
Feb. 6	do.	1.92	3.2	31	do.	1.68	1.7
13	F. C. Ebert	1.76	2.8	June 6	do.	1.54	1.0
23	W. E. Ellis	1.74	2.4	16	do.	1.50	.4
Mar. 2	do.	1.72	2.0	21	do.	1.44	.2
13	do.	2.38	9.0				

^a Employee of Cuyamaca Water Co.

Daily discharge, in second-feet, of Sweetwater River near Descanso, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	0.5	1.2	1.1	2.0	2.8	2.1	1.6	0.4	1.6	0.2	0.2	0.2
2	.4	1.1	1.0	1.9	2.6	2.1	1.8	.4	1.5	.2	.2	.2
3	.6	1.2	1.1	1.6	1.7	1.9	2.1	.4	1.2	.2	.2	.2
4	.7	1.2	1.2	1.5	1.7	2.0	5.5	11	1.2	.2	.2	.2
5	.5	12	1.1	1.7	2.6	1.5	3.0	6.5	1.2	.2	.2	.2
6	.5	3.4	1.1	1.7	2.9	1.4	2.6	3.0	1.1	.2	.1	.2
7	.6	2.1	1.0	1.7	2.1	2.5	2.4	1.6	1.0	.2	.1	.2
8	.5	1.8	1.9	1.7	2.0	1.8	2.2	1.6	.9	.2	.1	.2
9	.5	1.4	1.2	1.6	4.2	1.8	1.9	1.5	.7	.2	.2	.2
10	.5	1.4	1.1	2.4	2.4	2.6	1.7	1.4	.7	.2	.2	.2
11	.5	1.2	1.2	2.9	2.2	2.1	2.2	1.4	.5	.2	.2	.2
12	.5	1.5	1.3	1.7	2.2	7.5	1.9	1.2	.4	.2	.2	.2
13	.6	1.1	1.3	1.5	2.4	10	2.0	1.2	.4	.2	.2	.2
14	.4	1.1	1.1	1.4	6	8	2.0	.9	.4	.2	.2	.2
15	.6	1.2	1.3	1.2	7	5.5	2.0	.8	.4	.2	.2	.2
16	.4	1.0	1.5	1.2	3.6	4.6	2.4	.9	.4	.2	.2	.2
17	.7	1.1	1.7	1.5	6	4.1	2.1	1.0	.4	.3	.2	.2
18	.9	1.0	1.9	6	4.0	4.0	1.9	.9	.4	.4	.2	.2
19	8	1.1	5	7	3.6	4.8	1.7	.9	.4	.3	.2	.2
20	2.1	1.2	4.9	8.5	4.9	4.0	1.6	7.5	.4	.4	.2	.2
21	1.5	.9	2.5	3.6	6	3.5	1.4	8.5	.3	.4	.2	.2
22	1.2	1.0	1.9	3.2	3.0	3.8	1.4	7.5	.4	.4	.2	.2
23	1.2	1.1	1.7	8	2.7	3.8	1.2	7.5	.3	.3	.2	.2
24	1.3	1.0	1.8	6.5	2.2	2.1	1.2	6	.4	.3	.2	.2
25	1.1	1.2	1.9	6.5	2.5	2.2	1.4	4.1	.3	.3	.2	.2
26	1.1	1.1	1.7	7.5	2.1	2.0	1.0	3.5	.4	.2	.2	.2
27	.9	1.0	1.7	7.5	2.6	1.9	1.0	3.6	.3	.2	.2	.2
28	1.3	1.1	1.9	7.5	2.1	1.7	.9	3.5	.3	.2	.2	.2
29	1.8	1.1	2.0	7	-----	1.8	.6	3.5	.3	.2	.2	.2
30	1.7	1.1	1.8	8.5	-----	2.0	.5	2.8	.2	.2	.2	1.8
31	1.2	-----	1.8	3.6	-----	1.4	-----	1.8	-----	.2	.2	-----

Monthly discharge of Sweetwater River near Descanso, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	8	0.4	1.11	68.3
November.....	12	.9	1.63	97.0
December.....	5	1.0	1.73	106
January.....	8.5	1.2	3.87	238
February.....	7	1.7	3.22	179
March.....	10	1.4	3.24	199
April.....	5.5	.5	1.84	109
May.....	11	.4	3.12	192
June.....	1.6	.2	.61	36.3
July.....	.4	.2	.24	14.8
August.....	.2	.1	.19	11.7
September.....	1.8	.2	1.25	14.9
The year.....	12	.1	1.75	1,270

SAN DIEGO RIVER BASIN

SAN DIEGO RIVER NEAR SANTEE, CALIF.

LOCATION.—At Loop dam site, 6 miles west of Santee, San Diego County.

DRAINAGE AREA.—375 square miles (measured on topographic maps) at station at old Mission dam.

RECORDS AVAILABLE.—May 25, 1912, to September 30, 1921 (record not complete).

GAGE.—Water-stage recorder on right bank at Loop dam site, 1½ miles below old Mission dam. Station moved downstream November 20, 1920.

DISCHARGE MEASUREMENTS.—Made from cable just above gage or by wading.

CHANNEL AND CONTROL.—Solid rock formation forces ground water above dam to surface. The old Loop dam serves as part control.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 0.53 foot at 10 a. m. March 14 (discharge, 15 second-feet); ground water rising to surface estimated as 0.1 second-foot during summer months.

1912-1921: Maximum stage recorded, 25.1 feet January 27, 1916 (discharge, 70,200 second-feet); stream practically dry for several months each year except for a small amount of ground water being forced to surface.

DIVERSIONS.—See Cuyamaca Water Co.'s flume near Lakeside. Water for irrigation is pumped from wells along the river above and below Lakeside.

REGULATION.—Water is stored at Cuyamaca reservoir on Boulder Creek.

ACCURACY.—Stage-discharge relation permanent. Rating curve fairly well defined by two discharge measurements and six estimates of discharge. Water-stage recorder installed November 10 and removed June 6. Recorder record excellent. Daily discharge ascertained by applying mean daily gage height to rating table. The discharge was probably very small on all days when gage was not in operation and has been estimated as 0.1 second-foot steady flow. Records fair.

COOPERATION.—Gage-height record obtained in cooperation with Cuyamaca Water Co., Ed Fletcher, manager.

Discharge measurements of San Diego River near Santee, Calif., during the year ending Sept. 30, 1921

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. 10	Green ^a and Ebert.....	0.12	^b 0.2	Mar. 17	F. E. Green.....	0.19	^b 0.5
Feb. 14	F. C. Ebert.....	.15	^b .2	May 7	.....do.....	.19	^b .6
Mar. 14	F. E. Green.....	.53	^b 15	June 6	.....do.....	.11	^b .05

^a Employee of Cuyamaca Water Co.

^b Estimated.

Daily discharge, in second-feet, of San Diego River near Santee, Calif., for the year ending Sept. 30, 1921

Day	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1.....	0.1	0.1	0.3	0.5	0.3	0.1	0.1	0.1
2.....	.1	.6	.2	.5	.3	.1	.1	.1
3.....	.1	.6	.2	.3	.4	.1	.1	.1
4.....	.1	.4	.3	.2	.4	.1	.1	.1
5.....	.1	.4	.3	.2	.4	.1	.5	.1
6.....	.1	.2	.3	.2	.5	.1	1.9	.1
7.....	.1	.1	.3	.2	.6	.1	.4	-----
8.....	.1	.1	.2	.2	.7	.1	.1	-----
9.....	.1	.1	.3	.3	.7	.1	.1	-----
10.....	.1	.1	.2	.3	.6	.1	.1	-----
11.....	.2	.2	.2	.3	1.2	.1	.1	-----
12.....	.2	.5	.4	.2	2.5	.1	.1	-----
13.....	.3	.2	.4	.3	3.8	.1	.1	-----
14.....	.2	.1	.3	.5	7.5	.1	.1	-----
15.....	.3	.1	.4	.7	1.8	.1	.1	-----
16.....	.3	.1	.4	.5	.7	.1	.1	-----
17.....	.1	.1	.3	.6	.5	.1	.1	-----
18.....	.2	.1	1.2	.6	.5	.1	.1	-----
19.....	.2	.7	.1	.5	.2	.1	.1	-----
20.....	.2	.5	.1	.4	.1	.1	.7	-----
21.....	.2	.3	.1	1.4	.1	.1	2.2	-----
22.....	.2	.3	.1	1.0	.1	.1	2.2	-----
23.....	.2	.3	.2	.3	.1	.1	1.4	-----
24.....	.2	.3	.2	.2	.1	.1	.5	-----
25.....	.2	.3	.2	.2	.1	.1	.2	-----
26.....	.2	.3	.3	.2	.1	.1	.2	-----
27.....	.2	.3	.2	.3	.1	.1	.3	-----
28.....	.2	.2	.2	.4	.1	.1	.4	-----
29.....	.1	.3	.4	-----	.1	.1	.2	-----
30.....	.1	.5	.4	-----	.1	.1	.1	-----
31.....	-----	.5	.5	-----	.1	-----	.1	-----

NOTE.—Water-stage recorder not in operation Oct. 1 to Nov. 9 and June 7 to Sept. 30; discharge estimated as 0.1 second-foot.

Monthly discharge of San Diego River near Santee, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off
	Maximum	Minimum	Mean	
October.....	-----	-----	* 0.1	6.1
November.....	0.3	0.1	.17	10.1
December.....	.7	.1	.29	17.8
January.....	1.2	.1	.30	18.4
February.....	1.4	.2	.41	22.8
March.....	7.5	.1	.80	49.2
April.....	.1	.1	.10	6.0
May.....	2.2	.1	.42	25.8
June.....	-----	-----	* 1	6.0
July.....	-----	-----	* 1	6.1
August.....	-----	-----	* 1	6.1
September.....	-----	-----	* 1	6.0
The year.....	7.5	-----	.25	180

* Estimated

BOULDER CREEK NEAR JULIAN, CALIF.

LOCATION.—In Cuyamaca grant, at outlet of Cuyamaca reservoir, 7 miles south of Julian, San Diego County, and 12 miles above mouth of Boulder creek.

DRAINAGE AREA.—12.0 square miles (measured on topographic map).

RECORDS AVAILABLE.—June 19, 1912, to September 30, 1921.

GAGE.—Vertical staff on right side of weir box, $3\frac{1}{2}$ feet above weir. Zero at elevation of crest of the 6-foot Cippoletti weir, which is 100 feet below outlet gates of reservoir. Gage read by watchman at dam.

DISCHARGE MEASUREMENTS.—Made by wading near weir. On account of velocity of approach it has been necessary to rate weir.

CONTROL.—Cippoletti weir acts as permanent control.

EXTREMES OF DISCHARGE.—Maximum mean daily discharge during year, 13.5 second-feet May 13; stream dry several months during year.

1912-1921: Maximum mean daily discharge, 1,877 second-feet January 28, 1916. No water is released from reservoir except when needed for Cuyamaca Water Co.'s flume.

DIVERSIONS.—None.

REGULATION.—Flow completely regulated by operation of outlet gate of reservoir. Cuyamaca dam, completed in 1886, was one of the first earth dams built in California to store water for irrigation. The dam was originally 35 feet high but in 1894 was enlarged, increasing the capacity of the reservoir to 11,400 acre-feet. The present dam is 635 feet long and 41½ feet high, with an inner slope of 2:1 and an outer slope of 1½:1. From the reservoir the water flows 12½ miles down the natural channel of Boulder Creek and San Diego River to the intake of Cuyamaca Water Co.'s flume.

ACCURACY.—Stage-discharge relation permanent. Rating curve well defined. Gage read daily to hundredths; additional observations are made when reservoir gates are changed. Records excellent.

COOPERATION.—Gage-height record and measurements furnished by Cuyamaca Water Co.

Discharge measurements of Boulder Creek near Julian, Calif., during the year ending Sept. 30, 1921

[Made by F. E. Green ^a]

Date	Gage height	Dis-charge	Date	Gage height	Dis-charge
	<i>Feet</i>	<i>Sec.-ft.</i>		<i>Feet</i>	<i>Sec.-ft.</i>
June 23.....	0.40	5.6	Sept. 3.....	0.38	5.6
Aug. 17.....	.23	2.3	18.....	.59	9.9

^a Employee of Cuyamaca Water Co.

Daily discharge, in second-feet, of Boulder Creek near Julian, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Apr.	May	June	July	Aug.	Sept.
1.....	10.5	2.8	2.0	2.0	-----	8.0	-----	9.5	6.3	7.5
2.....	10.5	2.8	2.0	2.0	-----	8.5	-----	9.5	6.3	7.5
3.....	10.5	2.8	2.0	2.0	-----	10.5	-----	9.5	6.3	6.6
4.....	10.5	2.8	2.0	2.0	-----	10.5	-----	9.5	6.3	8.5
5.....	10.5	6.8	2.0	2.0	-----	5.2	-----	9.5	6.3	8.8
6.....	10.5	6.8	2.0	2.0	-----	-----	-----	9.5	8.8	8.0
7.....	10.5	6.8	2.0	2.0	-----	-----	-----	9.5	6.3	10.2
8.....	10.5	6.8	2.0	2.0	-----	-----	-----	9.5	5.2	10.5
9.....	10.5	6.8	2.0	2.0	-----	-----	-----	9.5	5.2	10.5
10.....	10.5	6.8	2.0	2.0	-----	-----	-----	9.5	5.2	10.0
11.....	10.5	6.8	2.0	2.0	-----	-----	-----	12	5.2	10.0
12.....	10.5	6.8	2.0	2.0	-----	-----	-----	12	5.2	10.5
13.....	8.0	2.0	2.0	2.0	-----	13.5	1.0	12	5.2	10.5
14.....	8.0	2.0	2.0	2.0	-----	3.6	2.0	12	5.2	10.5
15.....	8.0	2.0	2.0	2.0	-----	-----	2.0	10.4	5.2	10.0
16.....	8.0	2.0	2.0	2.0	-----	-----	1.7	12	2.5	10.2
17.....	10.5	2.0	2.0	2.0	-----	-----	3.6	9.2	2.5	10.2
18.....	10.5	2.0	2.0	2.0	-----	-----	3.6	12	5.2	11.1
19.....	2.0	2.0	1.5	-----	-----	-----	3.6	12	7.5	12.3
20.....	10.5	2.0	-----	-----	-----	-----	5.6	6.9	7.5	12.3
21.....	8.0	2.0	-----	-----	6.5	-----	5.6	3.2	7.5	12.3
22.....	8.0	2.0	-----	-----	2.0	-----	5.6	6.3	7.5	9.5
23.....	8.0	2.0	-----	-----	2.0	-----	5.6	6.3	7.5	9.2
24.....	8.0	2.0	-----	-----	2.0	-----	5.6	6.3	7.5	9.2
25.....	8.0	2.0	-----	-----	2.0	-----	7.5	6.3	7.5	10.2
26.....	8.0	2.0	-----	-----	2.0	-----	7.5	6.3	7.5	10.8
27.....	8.0	2.0	-----	-----	2.0	-----	7.5	6.3	7.5	10.8
28.....	8.0	2.0	-----	-----	5.6	-----	9.1	6.3	7.5	10.8
29.....	6.8	2.0	2.0	-----	8.0	-----	9.5	6.3	7.5	5.4
30.....	2.8	2.0	-----	-----	6.8	-----	9.5	6.3	7.5	-----
31.....	2.8	-----	2.0	-----	-----	-----	-----	6.3	7.5	-----

NOTE.—No water released from Cuyamaca reservoir when no discharge is given.

Monthly discharge of Boulder Creek near Julian, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	10.5	2.0	8.64	531
November.....	6.8	2.0	3.39	202
December.....	2.0	0	1.40	86.1
January.....	2.0	0	1.16	71.3
April.....	8.0	0	1.30	77.4
May.....	13.5	0	1.93	119
June.....	9.5	0	3.20	190
July.....	12.0	3.2	8.76	539
August.....	8.8	2.5	6.32	389
September.....	12.3	0	9.46	563
The year.....	13.5	0	3.82	2,770

NOTE.—No flow in months for which no record is given.

BOULDER CREEK NEAR LAKESIDE, CALIF.

LOCATION.—In NW. $\frac{1}{4}$ sec. 12, T. 14 S., R. 2 E., just above junction with San Diego River and about 14 miles northeast of Lakeside, San Diego County.

DRAINAGE AREA.—33.5 square miles (measured on topographic maps).

RECORDS AVAILABLE.—August 12, 1912, to January 26, 1916, and October 1, 1919, to September 30, 1921.

GAGE.—Vertical staff on right wing wall of a short lined section of channel. Original gage and weir were destroyed by the flood on January 27, 1916.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year ending September 30, 1920, 3.20 feet afternoon of February 22 (discharge, about 226 second-feet); minimum stage, no flow October 10–14.

Maximum stage recorded during year ending September 30, 1921, 0.92 foot March 14 (discharge, 31 second-feet); minimum stage, 0.19 foot June 12 (discharge, 0.8 second-foot).

1912–1916 and 1920–1921: Maximum stage recorded, 7.00 feet January 18, 1916 (discharge, about 345 second-feet); minimum stage, dry July 2–8, 1914, and October 10–14, 1919.

DIVERSIONS.—None.

REGULATION.—Water is stored at Cuyamaca reservoir and released during low-water period. See Boulder Creek near Julian.

ACCURACY.—Stage-discharge relation not permanent. Rating curves fairly well defined. Gage read to hundredths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table. Records fair.

Discharge measurements of Boulder Creek near Lakeside, Calif., during the period May 23, 1919, to Sept. 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
1919		<i>Feet</i>	<i>Sec.-ft.</i>	1920		<i>Feet</i>	<i>Sec.-ft.</i>
May 23	F. C. Ebert.....	7.3	7.3	July 10	F. E. Green.....	0.55	11
July 22	G. E. Holyoke ^a	0.62	9.0	Sept. 1	do.....	.39	6.7
				20	Ebert and Green.....	.52	10
1920				Nov. 12	F. E. Green.....	.54	8.5
Jan. 15	Holyoke and Green ^a...	.38	1.8	Dec. 10	do.....	.49	5.0
15	do.....	.38	1.6				
Feb. 13	F. E. Green.....	.57	5.2	1921			
13	do.....	.57	5.3	Mar. 6	do.....	.29	2.2
Mar. 3	do.....	.82	24	21	do.....	.40	6.0
13	Ebert and Green.....	.60	10	May 5	do.....	.52	10
Apr. 5	F. E. Green.....	.86	28	7	do.....	.51	9.1
27	Ebert and Green.....	.71	20	22	do.....	.55	11
May 18	F. E. Green.....	.51	9.3	June 27	do.....	.46	6.6
June 10	do.....	.36	3.5	July 21	do.....	.50	9.3

^a Employee of Cuyamaca Water Co.

Daily discharge, in second-feet, of Boulder Creek near Lakeside,, Calif. for the years ending Sept. 30, 1920 and 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1919-20												
1.....	4.6	2.8	2.4	1.2	1.8	9.5	48	16	6	3.9	14	6
2.....	4.0	3.2	2.0	1.3	1.8	33	40	16	6	3.3	9.5	.6
3.....	2.8	4.0	1.9	1.3	2.2	22	37	15	5.5	3.1	7.5	4.7
4.....	1.2	3.8	2.8	2.8	2.8	16	30	15	5.5	3.9	5	7
5.....	.6	4.0	31	5.5	2.4	13	27	14	5.5	4.2	5.5	6.5
6.....	.4	2.8	10	3.6	2.0	11	25	13	5.5	7	9	8
7.....	.2	3.2	6	2.8	1.8	9.5	23	13	4.7	10	9	9
8.....	.1	2.2	4.0	2.4	1.9	9.5	22	12	4.7	8	9	8.5
9.....	.1	3.2	4.0	2.0	6.5	8.5	20	12	4.2	8	9	8.5
10.....	0	4.3	3.2	2.0	14	17	32	12	4.5	9	9.5	8.5
11.....	0	4.3	2.4	1.9	11	17	22	13	4.5	11	10	8.5
12.....	0	4.3	2.8	1.9	7.5	13	19	12	4.5	11	9	8.5
13.....	0	4.6	3.6	1.9	6	10	18	11	6	14	9	8.5
14.....	0	4.6	2.4	1.9	4.9	9.5	17	12	7	13	9	8.5
15.....	1.6	2.6	2.0	1.9	4.0	9	19	11	7	13	9	8.5
16.....	2.0	.9	2.0	1.8	3.6	8.5	68	10	7.5	13	9.5	8.5
17.....	1.4	.8	1.8	1.8	3.2	24	76	9.5	5.5	13	11	8.5
18.....	.8	.7	1.8	1.6	3.0	27	48	9	4.2	13	11	8
19.....	2.0	.7	1.0	1.6	2.8	15	35	8.5	3.6	13	12	8
20.....	2.8	.7	1.6	1.6	7	14	31	8.5	3.1	13	11	8.5
21.....	2.8	1.4	1.3	1.6	60	17	30	8.5	3.6	13	11	10
22.....	2.8	1.7	1.8	1.6	146	36	26	10	4.7	13	11	10
23.....	6	3.6	1.8	3.2	100	186	24	8.5	4.7	9	11	11
24.....	6.5	3.8	1.3	5.5	40	82	23	8.5	4.7	8.5	11	9.5
25.....	5	2.8	1.3	3.2	25	65	20	7.5	4.5	8.5	12	9
26.....	2.0	2.4	1.2	2.8	18	166	19	7	5.5	8.5	11	9.5
27.....	1.3	45	1.1	2.4	15	108	18	7	7.5	8.5	11	9
28.....	.8	8	1.1	2.0	10	72	18	6	7.5	8.5	12	9
29.....	2.8	3.6	1.1	2.0	9.5	58	18	6	5.5	8	11	8.5
30.....	9	2.6	1.1	1.8	-----	54	16	6	4.2	14	11	8.5
31.....	5.5	-----	1.1	1.8	-----	51	-----	6	-----	14	5.5	-----
1920-21												
1.....	8.5	3.1	4.1	4.1	6.5	2.8	2.2	7	2.8	9	3.6	5
2.....	8.5	2.5	4.4	3.8	4.5	2.8	2.2	7	2.3	9	3.9	5
3.....	8.5	2.6	5.5	3.8	3.6	2.8	1.9	9.5	2.3	9	2.8	5
4.....	11	3.8	5.5	3.8	3.3	2.3	2.8	11	2.3	9	2.2	5
5.....	8.5	2.6	5	3.8	3.1	2.3	3.9	10	2.2	9	2.5	5.5
6.....	8.5	6.5	5	3.8	7	2.3	3.1	14	2.0	9	4.5	5.5
7.....	8.5	7	5.5	3.8	5	3.6	2.8	8.5	1.9	8.5	8	5.5
8.....	8.5	7.5	5.5	3.8	3.9	3.1	2.2	4.7	1.5	8	6.5	5.5
9.....	8.5	7.5	5	3.8	3.3	3.1	2.2	3.3	1.1	7	4.5	8
10.....	3.1	7.5	5	4.7	2.8	3.6	2.0	2.8	.9	7	6.5	8
11.....	8.5	8	5	5	2.5	3.6	2.0	2.3	.9	8.5	3.6	8
12.....	8.5	8	6	4.7	2.5	6.5	2.0	1.7	.8	9	4.7	7.5
13.....	9.5	3.1	8	2.0	2.8	23	2.0	1.2	1.2	9	4.7	8
14.....	5.5	2.6	5	2.0	3.3	31	2.5	3.6	1.5	10	4.2	8
15.....	5.5	2.6	4.1	1.8	10	29	2.5	2.2	2.5	11	3.6	8.5
16.....	5.5	2.6	4.1	1.6	5.5	13	2.2	1.5	2.8	12	3.1	8.5
17.....	10	2.6	4.1	1.4	5.5	10	2.2	3.3	2.8	7.5	2.8	8.5
18.....	10	2.6	4.1	5	6.5	7	1.9	3.3	3.6	7	2.0	8.5
19.....	15	2.6	5	12	6	6.5	1.5	2.3	4.7	10	2.0	8.5
20.....	3.8	2.6	12	11	5.5	6.5	1.5	2.3	4.7	11	3.9	8.5
21.....	4.1	2.8	3.4	8.5	4.7	6	1.5	14	5.5	7.5	4.7	9
22.....	7.5	3.4	2.3	5.5	8.5	5	1.5	14	5.5	4.5	5.5	9
23.....	7	3.8	2.0	4.7	7.5	4.7	3.6	18	5.5	3.3	5.5	7.5
24.....	5.5	3.8	2.0	4.5	4.7	4.5	2.8	13	5.5	4.5	5.5	6.5
25.....	5.5	3.8	1.6	4.2	3.6	3.6	2.3	7	6	3.3	5.5	7
26.....	5	3.8	1.6	3.3	3.3	3.1	2.0	5.5	7	4.7	5.5	6
27.....	5	3.8	1.6	2.5	3.1	2.8	5.5	5	8	6	5	7
28.....	5	3.8	1.3	12	3.1	2.5	7	4.5	8.5	6	5	8.5
29.....	5.5	4.1	1.1	11	-----	2.2	7	4.2	8	6	5	3.1
30.....	8	4.1	1.0	7	-----	2.2	7	3.6	10	5.5	4.7	3.1
31.....	5	-----	3.8	8	-----	2.2	-----	3.1	-----	4.7	4.7	-----

Monthly discharge of Boulder Creek near Lakeside, Calif., for the years ending Sept. 30, 1920 and 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
1919-20				
October.....	9	0.0	2.23	137
November.....	45	.7	4.42	263
December.....	31	1.1	3.32	204
January.....	5.5	1.2	2.28	140
February.....	146	1.8	17.7	1,020
March.....	186	8.5	38.4	2,360
April.....	76	16	29.0	1,730
May.....	16	6	10.4	639
June.....	7.5	3.1	5.25	312
July.....	14	3.1	9.71	597
August.....	14	5	9.84	605
September.....	11	4.7	8.36	497
The year.....	186	0	11.7	8,500
1920-21				
October.....	15	3.1	7.32	450
November.....	8	2.5	4.17	248
December.....	12	1.0	4.18	257
January.....	12	1.4	5.06	311
February.....	10	2.5	4.70	261
March.....	31	2.2	6.57	404
April.....	7	1.5	2.86	170
May.....	18	1.2	6.24	384
June.....	10	.8	3.81	227
July.....	12	3.3	7.60	467
August.....	8	2.0	4.39	270
September.....	9	3.1	6.91	411
The year.....	31	.8	5.33	3,860

CUYAMACA WATER CO.'S FLUME AT DIVERTING DAM, NEAR LAKESIDE, CALIF.

LOCATION.—In SE. $\frac{1}{4}$ sec. 11, T. 14 S., R. 2 E., just below intake, at diverting dam, 13 miles northeast of Lakeside, San Diego County.

RECORDS AVAILABLE.—June 1, 1912, to September 30, 1921.

GAGE.—Vertical staff in a stilling box on outside of flume, about 1,000 feet below intake, installed April 8, 1916. Part of the flume was rebuilt October 7-14, 1919, and a new gage installed October 15 at approximately same location and datum. Original gage was similar but was 500 feet below intake and just above sand box. Datum has always been elevation of floor of flume. Gage read by employees of Cuyamaca Water Co.

DISCHARGE MEASUREMENTS.—Made from foot plank across flume at gage.

CHANNEL AND CONTROL.—The flume is lined with tar paper to reduce leakage.

EXTREMES OF DISCHARGE.—1912-1921: Maximum daily discharge, 51 second-feet, March 24, 1913. No flow for periods nearly every year.

ACCURACY.—Stage-discharge relation permanent. Rating curve fairly well defined. Gage read to hundredths three times daily except for a few days when it was read only twice. Daily discharge ascertained by applying mean daily gage height to rating table. Records fair.

COOPERATION.—Gage-height record and discharge measurements furnished by Cuyamaca Water Co.

Cuyamaca Water Co.'s flume, which diverts water from San Diego River and receives water from the South Fork of San Diego River, is 6 feet wide, and 24 inches deep, and more than 30 miles long. It discharges into La Mesa reservoir, about 8 miles northeast of San Diego. This system supplied the city of San Diego with water until 1906, when the Southern California Mountain Water Co. extended its system to the city. The flume was again used to supply the city of San Diego after the floods of 1916, and it now supplies water for irrigation and domestic service. The Capitan Grande Indian Reservation has a water right of 0.8 second-foot from this flume.

Discharge measurements of Cuyamaca Water Co.'s flume at diverting dam, near Lakeside, Calif., during the year ending Sept. 30, 1921

[Made by F. E. Green a]

Date	Gage height	Dis-charge	Date	Gage height	Dis-charge
	<i>Feet</i>	<i>Sec.-ft.</i>		<i>Feet</i>	<i>Sec.-ft.</i>
Nov. 12.....	0.69	6.9	May 7.....	1.05	14.7
Mar. 6.....	.59	5.3	June 22.....	1.09	14.3
21.....	.97	12.9	July 27.....	.65	6.5
May 5.....	.75	8.5	July 21.....	.73	8.0

a Employee of Cuyamaca Water Co.

Daily discharge, in second-feet, of Cuyamaca Water Co.'s flume at diverting dam, near Lakeside, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	9.6	5.2	3.6	4.3	10.5	5.4	4.4	7.0	7.6	10	4.6	5.2
2.....	9.8	4.3	3.8	4.3	9.1	5.0	4.2	6.3	6.6	10.5	3.4	5.4
3.....	10	4.3	5.4	4.2	6.3	4.4	6.6	10.5	6.6	10.5	2.4	5.2
4.....	10.5	3.8	4.4	4.3	6.3	4.3	8.1	14	6.3	10.5	2.0	3.8
5.....	10	4.0	4.6	4.3	5.4	4.0	9.6	11.5	5.4	10.5	1.0	6.1
6.....	10	7.8	4.2	4.2	13.5	4.4	8.0	15	4.3	10	2.7	6.3
7.....	10.5	9.6	4.0	4.0	10	7.8	7.4	16	3.1	7.6	8.7	9.1
8.....	10	8.7	4.2	3.8	8.7	6.6	6.1	14	2.6	7.4	6.8	6.8
9.....	10	8.7	4.4	3.8	7.0	6.5	5.6	10.5	1.8	7.0	4.2	8.7
10.....	9.8	7.8	4.4	4.6	5.9	8.0	4.9	7.8	1.6	8.5	5.0	8.9
11.....	9.6	8.0	4.2	4.9	5.2	7.2	4.4	6.5	2.7	8.0	4.8	9.1
12.....	10.5	7.2	4.4	4.3	5.2	11.5	4.4	4.8	3.4	8.9	4.6	9.1
13.....	11	6.6	4.6	3.1	4.8	15	5.6	2.0	5.9	9.6	4.8	9.6
14.....	11	4.2	3.7	2.7	8.3	14.5	6.8	.0	3.8	11	4.4	9.3
15.....	5.9	3.6	3.8	2.7	15.5	15	7.0	3.3	3.7	11.5	3.0	9.6
16.....	5.0	3.7	3.7	2.6	15	15.5	6.3	2.2	2.9	17	2.7	12.5
17.....	11	3.4	3.8	2.4	14	17	5.6	3.7	4.3	7.6	2.4	9.6
18.....	11	3.6	3.4	12	15	20	4.9	5.7	4.0	7.2	2.1	9.6
19.....	17.5	3.3	4.2	13.5	11	17.5	4.9	4.3	4.0	11	3.1	10
20.....	6.5	3.1	9.1	14	8.5	18.5	4.3	7.4	4.4	12.5	4.4	10
21.....	8.7	3.3	5.7	14	8.3	14.5	4.0	12	4.9	9.6	4.4	10.5
22.....	11.5	3.6	3.4	13	16.5	11.5	4.6	12.5	5.0	3.3	6.6	12
23.....	9.6	3.7	2.7	10.5	13.5	11	4.8	21	5.0	2.0	6.6	9.3
24.....	7.4	3.8	2.4	8.3	9.1	10	4.8	26	4.9	4.2	6.6	7.4
25.....	7.8	3.8	2.4	6.5	8.5	9.6	4.4	26	5.2	3.3	5.9	7.0
26.....	7.2	3.8	2.9	5.0	7.0	9.6	3.1	23	6.5	3.8	5.4	6.8
27.....	6.8	3.8	2.6	5.2	4.9	8.7	7.0	16	6.5	5.0	5.4	10
28.....	7.0	3.8	2.4	11.5	5.0	6.1	9.1	6.0	6.5	5.4	5.4	9.8
29.....	10	3.7	2.1	14	-----	6.1	8.0	10.5	6.6	4.3	5.4	3.4
30.....	9.8	3.7	1.8	11	-----	5.7	7.6	10.5	8.5	3.8	5.4	2.7
31.....	7.0	-----	4.2	12.5	-----	4.3	-----	9.3	-----	4.0	5.4	-----

Monthly discharge of Cuyamaca Water Co.'s flume at diverting dam, near Lakeside, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	17.5	5.0	9.42	579
November.....	9.6	3.1	4.83	293
December.....	9.1	1.8	3.89	239
January.....	14	2.4	6.95	427
February.....	16.5	4.8	9.21	512
March.....	20	4.0	9.85	606
April.....	9.6	3.1	5.88	350
May.....	26	0	10.5	646
June.....	8.5	1.6	4.82	287
July.....	12.5	2.0	7.92	487
August.....	8.7	1.0	4.50	277
September.....	12.5	2.7	8.09	481
The year.....	26	0	7.16	5,180

CUYAMACA WATER CO.'S FLUME NEAR LAKESIDE, CALIF.

LOCATION.—At patrolman's cabin half a mile above trestle crossing at Los Coches Creek, 3 miles southeast of Lakeside, San Diego County, and 20 miles below intake on San Diego River.

RECORDS AVAILABLE.—January 1, 1907, to September 30, 1921.

GAGE.—Vertical staff in a stilling box fastened to outside of flume just below patrolman's cabin at same site as water-stage recorder used from November 12, 1912, to June 30, 1915. Position of gage has been changed slightly several times since station was first established, but datum has always been same as elevation of floor of flume. Gage read by an employee of Cuyamaca Water Co.

DISCHARGE MEASUREMENTS.—Made from foot plank across flume near gage.

CHANNEL AND CONTROL.—In fall of 1914 the flume was deepened 8 inches and more tar-paper lining was put in. Capacity of flume was slightly increased as a result of repairs made December 1-19, 1917, and also after changes made December 7-19, 1918.

EXTREMES OF DISCHARGE.—1907-1921: Maximum mean daily discharge, 25 second-feet February 16, 1918. No flow at times nearly every year.

ACCURACY.—Stage-discharge relation changed January 18 and April 15. Two fairly well defined rating curves were used during year. Gage read to hundredths three times daily except for several days when it was read twice. Daily discharge ascertained by applying mean daily gage height to rating table. Records fair.

COOPERATION.—Gage-height record and some measurements furnished by Cuyamaca Water Co.

There is a small diversion from this flume at Capitan Grande Indian Reservation above the station. Water is also diverted into the flume from South Fork of San Diego River. For location of intake, description of flume, and explanation of the use of the water, see description of Cuyamaca Water Co.'s flume at diverting dam, near Lakeside, page 17.

Discharge measurements of Cuyamaca Water Co.'s flume near Lakeside, Calif., during the year ending Sept. 30, 1921

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. 12	F. E. Green ^a -----	0.65	6.6	Mar. 21	F. E. Green-----	1.20	17.
Jan. 31	do-----	1.04	12	29	do-----	.70	5.8
Feb. 5	do-----	.79	7.0	May 5	do-----	.88	11.7
13	F. C. Ebert-----	.69	5.5	19	Ebert and Green-----	.56	4.7
Mar. 17	F. E. Green-----	1.17	14	July 21	F. E. Green-----	.94	11.1

^a Employee of Cuyamaca Water Co.

Daily discharge, in second-feet, of Cuyamaca Water Co.'s flume near Lakeside, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	6.6	3.6	3.1	4.5	11.5	6.0	4.0	5.5	7.4	10.5	6.4	8.6
2	6.4	2.8	3.1	7.0	10	5.7	4.8	6.6	7.4	10	6.6	9.7
3	6.6	2.9	3.1	4.6	8.1	4.3	3.5	7.0	7.8	8.0	6.1	9.0
4	7.8	3.0	3.0	3.2	6.4	4.3	5.5	10	7.4	7.8	4.6	7.8
5	7.0	3.0	3.1	3.6	6.8	5.5	7.5	7.6	7.8	7.0	4.4	8.6
6	6.2	3.0	3.2	4.5	8.1	4.6	6.2	12	5.9	7.0	3.6	8.8
7	6.2	5.0	3.3	3.4	10.5	7.3	6.2	13	4.6	6.4	3.3	9.5
8	6.2	5.7	3.1	3.6	9.2	8.6	4.8	13.5	4.6	9.0	12	9.7
9	6.4	5.5	3.2	3.8	7.9	8.2	4.4	12	5.0	7.8	8.0	9.3
10	7.0	5.3	3.4	4.0	7.3	6.4	4.0	8.2	3.6	11	9.3	10.5
11	7.4	5.5	3.8	3.6	6.8	7.9	3.7	7.2	3.4	10	8.6	11
12	7.6	5.5	3.6	3.6	5.9	9.0	3.0	3.9	2.1	7.4	9.3	11.5
13	7.8	2.9	3.6	3.6	5.5	15	4.2	2.8	3.8	8.2	9.3	9.7
14	5.9	2.9	3.6	3.2	5.5	15.5	4.0	.9	4.6	9.7	9.5	9.9
15	3.6	2.9	3.3	3.6	10.5	16	6.6	1.8	3.4	13.5	7.6	10
16	3.2	3.0	3.1	3.9	12	14.5	6.6	2.6	2.9	12.5	6.6	11.5
17	3.9	2.6	3.6	3.9	11.5	15	5.9	3.1	2.5	9.0	7.0	11.5
18	6.8	2.6	3.0	4.5	10.5	17	4.8	4.2	3.3	5.9	7.6	11.5
19	9.3	2.6	3.1	9.6	12	16.5	4.2	4.4	7.6	8.8	5.5	7.4
20	6.1	2.6	5.3	11	9.8	16	3.4	4	6.2	9.0	8.8	11.5
21	4.4	2.9	6.8	6.0	8.8	16	3.2	14.5	8.2	8.2	5.2	11
22	8.0	2.9	4.2	10.5	10.5	14	3.9	12	6.1	4.8	9.7	14
23	8.0	2.6	3.4	6.0	8.4	11.5	4.6	19	4.6	6.6	9.9	12
24	6.1	2.9	3.0	7.7	10.5	11.5	4.0	19	6.8	11	10.5	11
25	5.2	2.9	5.0	7.9	12	10.5	3.3	19.5	3.6	8.5	10.5	9.9
26	5.0	3.1	4.2	6.9	8.4	8.2	2.8	19.5	4.1	8.0	8.4	9.9
27	4.5	2.9	3.3	6.0	6.6	7.1	5.0	17	4.6	8.6	8.8	8.6
28	4.2	2.9	2.4	8.1	6.0	6.0	6.2	14	5.5	9.0	9.0	11.5
29	4.4	2.4	2.5	12.5	-----	6.6	5.7	13	9.5	8.0	9.0	10.5
30	4.0	2.6	2.2	12	-----	5.4	5.7	8.8	6.4	7.4	9.0	8.0
31	4.0	-----	2.2	12	-----	4.3	-----	7.8	-----	6.8	8.6	-----

NOTE.—Discharge interpolated for Feb. 8, Mar. 22, Apr. 9, May 15, and June 26; discharge estimated July 24 and 25.

Monthly discharge of Cuyamaca Water Co.'s flume near Lakeside, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	9.3	3.2	5.99	368
November	5.7	2.4	3.37	201
December	6.8	2.2	3.45	212
January	12.5	3.2	6.07	373
February	12	5.5	8.82	490
March	17	4.3	9.82	604
April	7.5	2.8	4.72	281
May	19.5	.9	9.50	584
June	9.5	2.1	5.36	319
July	13.5	4.8	8.56	526
August	12	3.3	7.83	481
September	14	7.4	10.1	601
The year	19.5	.9	6.96	5,040

SAN DIEGUITO RIVER BASIN

SANTA YSABEL CREEK NEAR MESA GRANDE, CALIF.

LOCATION.—In NW. $\frac{1}{4}$ sec. 21, T. 12 S., R. 2 E., at Sutherland dam site, 1 mile below Sutherland, $1\frac{1}{2}$ miles above mouth of Black Canyon Creek, and $4\frac{1}{2}$ miles southwest of Mesa Grande, San Diego County.

DRAINAGE AREA.—53.4 square miles (measured on topographic map).

RECORDS AVAILABLE.—December 29, 1912, to September 30, 1921.

GAGE.—Water-stage recorder on right bank just above Sutherland dam site.

Gage datum was lowered 0.21 foot on October 12, 1916, on account of change in control. Previous gages have been at same location but original datum has not been maintained.

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

CHANNEL AND CONTROL.—Bed is shifting sand. A concrete control has been constructed at an outcropping of bedrock 20 feet below gage. This control was repaired November 6-9, 1916. Banks are high, covered with brush, and not subject to overflow.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 2.12 feet at 1 p. m. March 14 (discharge, 68 second-feet); no flow July 6-14 and July 23 to September 30.

1912-1921: Maximum stage recorded, 11.0 feet January 27, 1916 (discharge, 21,100 second-feet); stream dry October 1-2, 1913; August 12-29, September 6-13, 1914; July 6-14 and July 23 to September 30, 1921.

DIVERSIONS.—No large diversions above the station.

REGULATION.—None.

ACCURACY.—Stage-discharge relation at low stages changes frequently owing to sand collecting on control. Standard rating curve is well defined by 61 discharge measurements. The operation of the water-stage recorder was satisfactory throughout the year. Daily discharge ascertained by applying mean daily gage height to rating table or by shifting-control method. Records good.

Discharge measurements of Santa Ysabel Creek near Mesa Grande, Calif., during the year ending Sept. 30, 1921

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	N. DuBois.....	1.11	0.6	Mar. 12	T. B. DuBois.....	2.02	39
13	do.....	1.14	1.1	13	do.....	2.05	55
19	T. B. DuBois.....	1.49	6.6	14	do.....	2.10	62
27	N. DuBois.....	1.16	2.0	16	do.....	1.80	17
30	T. B. DuBois.....	1.23	4.4	23	do.....	1.52	8.0
30	do.....	1.59	11	31	do.....	1.42	5.1
Nov. 3	do.....	1.18	2.7	Apr. 7	do.....	1.38	5.8
9	do.....	1.20	2.7	12	DuBois and Hunting..	1.38	5.4
17	do.....	1.19	2.4	20	T. B. DuBois.....	1.33	4.8
24	do.....	1.20	2.5	May 4	DuBois and Hunting..	1.24	3.4
Dec. 1	do.....	1.18	2.7	6	O. R. Hunting.....	1.72	16
8	do.....	1.22	3.4	11	do.....	1.37	4.8
12	do.....	1.48	7.2	14	do.....	1.22	3.3
14	F. E. Green.....	1.20	2.3	18	do.....	1.33	6.3
19	T. B. DuBois.....	1.50	8.7	21	do.....	1.85	21
20	do.....	1.55	9.6	23	do.....	2.05	45
22	do.....	1.32	4.1	25	do.....	1.62	13
30	F. E. Green.....	1.27	2.9	28	do.....	1.52	11
Jan. 5	T. B. DuBois.....	1.23	3.7	June 1	do.....	1.42	9.4
12	do.....	1.29	4.5	4	do.....	1.40	6.9
18	do.....	2.06	49	8	do.....	1.27	4.6
26	do.....	1.38	5.8	11	do.....	1.30	4.4
28	do.....	1.82	20	15	do.....	1.32	5.1
Feb. 2	do.....	1.40	6.6	18	do.....	1.22	2.6
9	do.....	1.42	5.3	22	do.....	1.10	1.2
15	do.....	1.73	15	25	do.....	1.14	1.8
23	Ebert and Green.....	1.58	9.5	29	do.....	1.12	1.4
15	T. B. DuBois.....	1.43	7.4	July 1	do.....	1.06	.6
Mar. 3	do.....	1.41	6.0	18	do.....	1.11	.8
9	do.....	1.42	5.4	20	do.....	1.08	.6
12	do.....	1.82	19				

NOTE.—All measurements except those by F. C. Ebert were made by employees of Volcan Land & Water Co.

Daily discharge, in second-feet, of Santa Ysabel Creek near Mesa Grande, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July
1.....	0.1	4.4	2.7	3.0	8.5	6.5	5	3.0	10	0.5
2.....	.4	2.7	4.2	3.4	7.5	6	4.8	2.7	9	.3
3.....	.3	2.5	5.4	3.6	7	5.5	5	3.0	8	.4
4.....	.4	2.5	3.0	3.6	6.5	6	7.5	3.4	7.5	.5
5.....	.4	2.7	2.8	3.6	7.5	6	6.5	6	7.5	.1
6.....	.4	3.2	2.7	3.8	9.5	7	6	17	6.5	-----
7.....	.4	4.8	3.0	3.8	6.5	8	6	16	6	-----
8.....	.6	3.6	3.2	3.0	5	5.5	5.5	8.5	6	-----
9.....	.6	2.8	2.8	3.4	4.8	5.5	5	7	4.8	-----
10.....	.8	2.7	2.3	6	5	7	5.5	5.5	4.2	-----
11.....	.9	3.2	2.3	5.5	4.8	7	5.5	4.2	3.8	-----
12.....	.9	3.4	5	3.6	4.8	20	5.5	4.2	3.8	-----
13.....	1.3	3.0	2.3	3.8	5	35	6	4.2	4.4	-----
14.....	1.0	2.5	2.5	3.6	9.5	36	7.5	4.2	4.8	-----
15.....	.5	2.5	2.3	3.0	12	24	6.5	4.4	4.6	2.9
16.....	.4	3.0	2.3	3.0	8	17	6	4.8	4.4	2.2
17.....	.4	2.8	2.5	3.8	8.5	14	6	5	4.0	1.3
18.....	.6	2.7	2.5	20	8.5	12	5.5	7	2.8	.5
19.....	8	2.7	7.5	17	8	12	5.5	6.5	2.7	.1
20.....	3.8	2.7	12	12	8	12	5	11	2.3	.5
21.....	2.0	2.5	6	10	10	9	5	23	2.0	.1
22.....	1.5	2.5	4.6	10	11	8.5	4.6	23	1.8	.1
23.....	1.6	2.5	4.2	9	7.5	8	5	33	1.8	-----
24.....	1.6	2.5	4.0	8	7.5	7.5	5.5	17	1.6	-----
25.....	1.6	2.7	6.5	6.5	7.5	7.5	5	13	1.6	-----
26.....	1.8	2.5	3.8	6	7	7	4.6	11	1.6	-----
27.....	1.8	2.5	2.8	9	7	6.5	4.2	11	1.3	-----
28.....	2.0	2.3	2.5	16	7	5	3.8	11	1.3	-----
29.....	2.0	2.0	2.7	10	-----	5	3.4	11	1.2	-----
30.....	7	2.5	2.7	10	-----	5	3.4	10	.9	-----
31.....	6.5	-----	3.0	12	-----	5	-----	10	-----	-----

NOTE.—Stream dry July 6-14 and July 23 to Sept. 30.

Monthly discharge of Santa Ysabel Creek near Mesa Grande, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	8	0.1	1.66	102
November.....	4.8	2.0	2.83	168
December.....	12	2.3	3.75	231
January.....	20	3.0	7.06	434
February.....	12	4.8	7.48	415
March.....	36	5	10.5	646
April.....	7.5	3.4	5.34	318
May.....	33	2.7	9.70	596
June.....	10	.9	4.07	242
July.....	2.9	0	.81	19.1
August.....	0	0	0	0
September.....	0	0	0	0
The year.....	36	0	4.38	3,170

SANTA YSABEL CREEK NEAR RAMONA, CALIF.

LOCATION.—In NE. $\frac{1}{4}$ NE. $\frac{1}{4}$ sec. 27, T. 12 S., R. 1 E., at Pamo dam site at lower end of Pamo Valley, $1\frac{1}{2}$ miles below mouth of Temescal Creek, and $4\frac{1}{2}$ miles north of Ramona, San Diego County.

DRAINAGE AREA.—110 square miles (measured on topographic maps).

RECORDS AVAILABLE.—February 5, 1912, to September 30, 1921.

GAGE.—Water-stage recorder on left bank at dam site used during fluctuating stages. A vertical staff fastened to outside of gage well used during remainder of year. Gage read by C. M. DeVenelle. Original gage was a staff in four sections on left bank, one-half mile up stream, with a short vertical section at concrete control.

DISCHARGE MEASUREMENTS.—Made from cable about 1,000 feet above gage or by wading.

CHANNEL AND CONTROL.—Shifting sand. Banks are high and clean; channel straight for 200 feet above and 600 feet below gage. Concrete control built across channel just below gage was completed December 8, 1916, and was destroyed by the high water on March 12, 1918.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 2.60 feet at 2 p. m. March 14 (discharge, 122 second-feet); stream practically dry during July, August, and September.

1912-1921: Maximum stage recorded, 14.0 feet January 27, 1916 (discharge, 28,400 second-feet); stream practically dry July, August, and September, 1921.

DIVERSIONS.—Large diversions above the station. Water is diverted from Santa Ysabel Creek near the mouth of the canyon, 5 miles below the station, by East San Pasqual ditch, which takes out on the left bank, and West San Pasqual ditch, which takes out on the right bank and below the intake of the East San Pasqual ditch.

REGULATION.—None.

ACCURACY.—Stage-discharge relation changed frequently. Staff gage read to hundredths twice daily. Water-stage recorder in operation January 2 to September 30. Two well-defined rating curves used January 18 to March 11 and March 13-27. Daily discharge for these periods ascertained by applying mean daily gage height to rating table, and for other periods by reading direct from curves or by shifting-control method. During low water discharge was ascertained mainly by interpolation between discharge measurements. Records fair.

Discharge measurements of Santa Ysabel Creek near Ramona, Calif., during the year ending Sept. 30, 1921

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. 1	A. M. King	2.16	0.3	Mar. 13	C. T. Dixon	2.33	66
2	C. T. Dixon	2.15	.07	14	do	2.30	68
9	do	2.22	.3	14	do	2.57	115
16	do	2.18	.6	16	do	1.98	27
21	F. E. Green	2.38	2.8	19	do	1.85	16
23	C. T. Dixon	2.28	1.0	23	do	1.82	13
30	do	2.30	1.8	27	do	1.76	9.9
Nov. 1	do	2.32	2.7	Apr. 1	do	1.79	8.1
6	do	2.30	2.4	3	do	1.80	8.0
13	do	2.31	3.2	7	do	1.81	7.9
17	Dixon and Green	2.34	2.6	10	do	1.84	5.6
20	C. T. Dixon	2.28	1.7	14	do	1.87	9.7
24	do	2.28	2.7	17	do	1.86	5.9
27	do	2.26	2.9	21	do	1.78	4.0
Dec. 1	do	2.24	1.6	24	do	1.80	5.1
5	do	2.30	3.3	28	do	1.81	3.1
9	do	2.29	2.8	May 1	do	1.74	2.2
11	do	2.30	2.7	5	do	1.75	3.2
12	do	2.38	6.3	6	do	2.01	23
14	Dixon and Green	2.38	3.1	7	do	2.26	35
18	C. T. Dixon	2.32	2.8	12	do	1.76	4.6
20	do	2.60	17	15	do	1.74	2.8
25	do	2.28	8.7	19	do	1.78	7.9
30	do	2.20	4.2	21	do	2.13	32
Jan. 2	do	2.18	2.8	22	do	2.21	39
5	do	2.18	3.5	23	do	2.30	76
8	do	2.18	2.6	25	do	1.84	24
14	do	2.18	3.2	28	do	1.72	10
28	do	2.30	33	June 2	do	1.68	7.9
Feb. 1	do	2.02	11	4	do	1.67	6.2
5	do	2.00	8.8	8	do	1.64	4.4
9	do	1.94	8.1	11	do	1.64	3.2
12	do	1.98	5.3	15	do	1.67	4.3
16	Green and Ebert	2.04	12	18	do	1.64	3.8
19	C. T. Dixon	1.94	9.1	22	do	1.64	1.5
22	do	2.17	21	25	do	1.64	1.2
27	do	1.94	7.1	29	do	1.60	.8
Mar. 1	do	1.97	7.9	July 2	do	1.60	.06
5	do	1.86	6.8	6	do	1.56	.02
10	do	1.98	8.6	16	do	1.68	2.8
12	do	2.10	25	20	do	1.56	.04
12	do	2.48	59	Sept. 30	do	1.60	.06

NOTE.—All measurements except those by F. C. Ebert were made by employees of Volcan Land & Water Co.

Daily discharge, in second-feet, of Santa Ysabel Creek near Ramona, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July
1	0.2	2.9	1.6	3.7	10	7	8	2.2	8	0.2
2	.2	2.2	2.2	3.2	10	6	8	2.8	8	.1
3	.6	2.0	4.2	4	11	6.5	8	3.1	7	.1
4	.8	1.9	3.3	3.7	10	6	9	3.5	6.5	.1
5	.6	2.3	3.3	3.5	9	5.5	9	3.8	6	-----
6	.4	2.5	3.4	3.5	13	6	9	27	5.5	-----
7	.2	3.1	2.9	3.3	9	7	7.5	28	5	-----
8	.1	2.8	3.9	2.4	8	7	6.5	10	4.6	-----
9	.2	2.3	2.9	2.1	8	7	5.5	5.5	4.6	-----
10	.1	2.3	3.1	3.0	8	7	5.5	5.5	4.0	-----
11	.6	2.9	3.6	2.6	7	7.5	5.5	5.5	3.2	-----
12	.3	2.8	7	2.1	7	32	6.5	5	3.2	-----
13	.7	3.2	5	2.4	8	74	7.5	4.1	3.5	-----
14	.8	2.9	3.1	2.8	9	75	9	3.4	4.0	-----
15	.5	2.3	2.3	3.0	25	39	9	2.9	4.5	1.0
16	.7	2.6	2.0	3.5	11	24	8	4.1	4.5	2.2
17	.6	2.5	2.0	2.6	10	19	5	5.5	4.5	1.3
18	1.0	1.4	2.6	65	9	16	4.6	6.5	4.4	-----
19	3.6	2.0	3.1	37	7.5	19	4.8	8	4.0	-----
20	3.9	1.6	14	25	8	17	4.6	10	3.0	-----
21	2.5	2.2	9.5	20	9	14	4.1	32	2.0	-----
22	1.3	2.0	9.5	15	14	13	4.8	38	1.3	-----
23	1.2	2.9	6.5	12	9	14	5	69	1.2	-----
24	1.0	2.8	7	11	8	13	5.5	30	1.2	-----
25	1.0	3.2	8.5	10	6.5	12	4.3	20	1.0	-----
26	1.1	2.8	6.5	8.5	7	12	3.6	14	.9	-----
27	1.2	3.4	4.7	10	7	11	3.1	11	.8	-----
28	1.1	3.2	3.7	23	8	9.5	2.7	11	.7	-----
29	1.5	2.6	4.4	18	-----	9	2.3	10	.7	-----
30	2.8	2.0	4.4	11	-----	8.5	2.8	9	.4	-----
31	5.1	-----	4.7	13	-----	7.5	-----	9	-----	-----

NOTE.—Stream practically dry July 5-14 and July 18 to Sept. 30.

Monthly discharge of Santa Ysabel Creek near Ramona, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	5.1	0.1	1.16	71.3
November	3.4	1.4	2.52	150
December	14	1.6	4.67	287
January	65	2.1	10.6	652
February	25	6.5	9.50	528
March	75	5.5	16.5	1,010
April	9	2.3	5.96	355
May	69	2.2	12.9	793
June	8	.4	3.61	215
July	2.2	0	1.66	9.8
August	0	0	0	0
September	0	0	0	0
The year	75	0	5.63	4,070

SAN DIEGUITO RIVER NEAR ESCONDIDO, CALIF.¹

LOCATION.—In SE. $\frac{1}{4}$ NW. $\frac{1}{4}$ sec. 18, T. 13 S. R. 2 W., at Lake Hodges dam, $5\frac{1}{2}$ miles below Bernardo bridge, $10\frac{1}{2}$ miles above mouth of river, and 4 miles southwest of Bernardo, San Diego County.

DRAINAGE AREA.—299 square miles at the dam (measured on topographic maps).

RECORDS AVAILABLE.—January 17, 1916, to September 30, 1921.

DIVERSIONS.—East and West San Pasqual ditches divert water for irrigation from Santa Ysabel Creek at the upper end of San Pasqual Valley (see Santa Ysabel Creek near Ramona). Water for irrigation is also pumped from wells along the river.

¹ Formerly known as "near Bernardo."

COOPERATION.—Monthly-discharge record furnished for publication by San Dieguito Mutual Water Co., through Ed Fletcher, manager.

The following table gives the inflow of San Dieguito River to Lake Hodges as computed from storage data on the lake:

Inflow of San Dieguito River to Lake Hodges, near Escondido, Calif., for the year ending Sept. 30, 1921

Month	Gage height	Area flooded	Storage	Water released	Gross evaporation	Rain-fall	Net evaporation	Evaporation loss or gain	Run-off
	<i>Feet</i>	<i>Acres</i>	<i>Acre-ft.</i>	<i>Acre-ft.</i>	<i>Inches</i>	<i>Inches</i>	<i>Inches</i>	<i>Acre-ft.</i>	<i>Acre-ft.</i>
October.....	89.67	636.2	13,370	0	5.40	0.80	4.60	-243.1	39.1
November.....	89.28	627.8	13,123	145.6	3.44	.54	2.90	-152.0	57.6
December.....	89.20	626.0	13,073	0	3.03	1.23	1.80	-94.0	61.0
January.....	89.35	629.3	13,168	0	3.52	2.92	.60	-31.4	133.4
February.....	89.11	624.1	13,011	159.7	2.83	1.33	1.50	-81.5	91.2
March.....	89.95	642.2	13,549	0	4.00	1.10	2.90	-152.0	697.0
April.....	89.35	629.3	13,167	142.2	6.35	.03	6.30	-357.0	104.2
May.....	89.43	631.0	13,218	93.1	4.04	2.04	1.40	-75.6	226.7
June.....	88.67	614.6	12,705	182.0	5.90	0	5.90	-305.2	0
July.....	87.50	589.4	12,040	352.9	7.23	.03	7.20	-361.2	56.1
August.....	86.72	572.6	11,587	131.9	6.79	.11	6.68	-325.4	10.3
September.....	85.98	556.7	11,169	233.4	5.85	1.67	4.18	-197.6	19.0
The year.....									1,485.6

BLACK CANYON CREEK NEAR MESA GRANDE, CALIF.

LOCATION.—In NE. $\frac{1}{4}$ sec. 17, T. 12 S., R. 2 E., 1 mile above junction with Santa Ysabel Creek and 4 miles southwest of Mesa Grande, San Diego County.

DRAINAGE AREA.—15.2 square miles (measured on topographic maps).

RECORDS AVAILABLE.—February 14, 1913, to September 30, 1921 (record not complete).

GAGE.—Inclined staff on left bank; read by employees of Volcan Land & Water Co.

DISCHARGE MEASUREMENTS.—Made by wading near gage.

CHANNEL AND CONTROL.—Solid rock and boulders.

DIVERSIONS.—None.

REGULATION.—None.

ACCURACY.—Stage-discharge relation changed May 6. Rating curves fairly well defined. Gage read occasionally. Daily discharge ascertained by applying gage height to rating table. Records fair.

COOPERATION.—Gage-height record furnished by Volcan Land & Water Co.

Discharge measurements of Black Canyon Creek near Mesa Grande, Calif., during the year ending Sept. 30, 1921

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>
Dec. 3	T. B. DuBois.....	0.70	0.3	Mar. 30	T. B. DuBois.....	0.90	1.2
8	do.....	.60	.2	Apr. 7	do.....	.90	1.0
14	F. E. Green.....	.70	.4	12	DuBois and Hunting...	.85	.8
20	T. B. DuBois.....	.90	1.1	30	do.....	.70	.3
Jan. 19	do.....	.90	1.8	May 6	O. R. Hunting.....	1.25	7.5
Feb. 2	do.....	.85	1.4	14	do.....	.78	.8
9	do.....	.80	.9	21	do.....	1.30	10
15	do.....	1.10	3.5	28	do.....	1.00	3.5
15	Ebert and Green.....	1.02	2.8	June 4	do.....	.90	1.8
Mar. 3	T. B. DuBois.....	.80	.7	11	do.....	.74	.8
9	do.....	.85	1.0	18	do.....	.70	.55
12	do.....	1.45	13	25	do.....	.62	.28
16	do.....	1.20	6.1	July 1	do.....	.60	.20
23	do.....	.95	1.5	6	do.....	.54	.06

NOTE.—All measurements except those by F. C. Ebert were made by employees of Volcan Land & Water Co.

Daily discharge, in second-feet, of Black Canyon Creek near Mesa Grande, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Sept.
1									2.3	0.2	
2					1.0						
3		0.1	0.3			0.6					
4									1.8		
5				0.3	1.0						
6		.1						0.9		.1	
7		4.2					1.4				
8		.6	.1								
9		.3			.6	1.0			1.0	.1	
10		.2									0.1
11			.3					1.5	.7		
12				.4	.4	7.5	1.0				
13		.1					1.0			.1	
14			.3					.9			
15			.3		4.2				1.0		
16						6.5	.6			.1	
17		.2									.1
18	6.5							1.8	.5		
19	.6			1.3		5.5					
20	.1		1.3								
21	.1	.2						10			
22	.1		.4						.3		
23	.1			1.3	1.1	1.8	.3				
24		.2									.1
25			.6					.5	.3		
26				.6	1.0	1.3					
27	.1	.2									
28				4.4				3.1			
29			.4						.2		
30	.1			1.3		1.3	.3				
31											

SAN LUIS REY RIVER BASIN

SAN LUIS REY RIVER NEAR MESA GRANDE, CALIF.

LOCATION.—In NW. $\frac{1}{4}$ NE. $\frac{1}{4}$ sec. 9, T. 11 S., R. 2 E., 1 mile below Warner dam site, 1 mile below mouth of Carrizo Creek, and 5 miles north of Mesa Grande, San Diego County.

DRAINAGE AREA.—209 square miles (measured on topographic maps).

RECORDS AVAILABLE.—October 3, 1911, to September 30, 1921.

GAGE.—Water-stage recorder on left bank at same location as previous gage. Before June 13, 1912, gage was just above cut-off wall at dam site. Original datum has not been maintained.

DISCHARGE MEASUREMENTS.—Made from cable about 1 mile above gage or by wading.

CHANNEL AND CONTROL.—Sand and gravel; shifting.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 3.90 feet at 11 a. m. March 14 (discharge, 315 second-feet); minimum stage, 2.50 feet at 2 p. m. August 25 (discharge, 0.1 second-foot).

1911–1921: Maximum stage recorded, 18.0 feet January 27, 1916 (discharge, 58,600 second-feet); minimum stage recorded, 2.50 feet at 2 p. m. August 25, 1921 (discharge, 0.1 second-foot).

DIVERSIONS.—None.

REGULATION.—None.

ACCURACY.—Stage-discharge relation changed at intervals of a few days. Water-stage recorder operated satisfactorily. Mean daily gage height determined by inspecting gage-height graph. Daily discharge ascertained by shifting-control method or by interpolation between frequent discharge measurements. Records good.

Discharge measurements of San Luis Rey River near Mesa Grande, Calif., during the year ending Sept. 30, 1921

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. 2	W. R. Bushey	2.57	1.6	Mar. 9	W. R. Bushey	2.80	7.2
6	do.	2.52	1.6	12	do.	3.32	83
9	do.	2.53	2.0	13	do.	3.30	78
13	do.	2.55	2.0	14	do.	3.77	261
16	do.	2.50	1.9	15	do.	3.29	54
18	do.	2.58	2.2	16	do.	3.10	30
19	do.	2.74	6.4	19	do.	2.99	19
20	do.	2.64	2.8	23	do.	2.90	9.8
23	do.	2.56	2.1	26	do.	2.90	8.8
27	do.	2.56	2.4	30	do.	2.86	7.0
30	do.	2.60	2.8	Apr. 2	do.	2.80	6.0
30	do.	2.69	4.7	4	do.	2.91	17
31	do.	2.64	4.2	6	do.	2.80	11
Nov. 3	do.	2.54	2.3	9	do.	2.75	6.2
6	do.	2.58	2.5	13	do.	2.75	6.3
7	do.	2.70	5.7	14	do.	2.80	11
8	do.	2.58	2.7	16	do.	2.75	6.8
10	do.	2.57	2.8	20	do.	2.73	5.0
12	do.	2.59	2.9	24	do.	2.71	3.6
15	do.	2.56	2.2	27	do.	2.66	2.7
20	do.	2.56	2.3	30	do.	2.71	2.5
24	do.	2.55	2.7	May 5	do.	2.87	11
27	do.	2.58	2.6	6	do.	2.99	29
Dec. 1	do.	2.55	2.5	6	do.	3.09	52
3	do.	2.75	6.1	7	do.	3.09	43
8	do.	2.67	4.2	8	do.	2.97	16
11	do.	2.67	3.8	12	do.	2.80	2.9
12	do.	2.76	6.6	14	do.	2.76	3.7
15	Bushey and Green	2.60	3.4	18	do.	2.75	6.1
18	W. R. Bushey	2.59	3.0	19	do.	2.80	6.4
19	do.	2.93	21	20	do.	2.83	9.7
20	do.	2.89	18	21	do.	3.06	41
22	do.	2.81	7.8	21	do.	3.15	56
25	do.	2.78	7.0	22	do.	3.20	68
29	do.	2.71	4.6	23	do.	3.24	70
Jan 1	do.	2.72	4.5	24	do.	3.05	28
5	do.	2.69	4.9	26	do.	2.86	12
8	do.	2.70	4.3	28	do.	2.84	7.9
10	do.	2.87	13	June 2	do.	2.77	4.8
11	do.	2.82	8.1	5	do.	2.68	3.7
15	do.	2.75	5.1	9	do.	2.70	3.3
18	do.	3.52	175	11	do.	2.60	1.5
18	do.	3.59	191	16	do.	2.64	1.7
21	do.	3.14	21	19	do.	2.60	1.5
22	do.	3.04	19	22	do.	2.62	1.6
26	do.	2.98	8.8	27	do.	2.59	1.2
27	do.	3.07	14	July 2	do.	2.61	1.3
28	do.	3.25	87	6	do.	2.66	1.5
30	do.	2.97	14	10	do.	2.64	1.2
31	do.	2.97	18	13	do.	2.78	2.2
Feb 3	do.	2.87	11	14	do.	2.61	1.9
5	do.	2.89	9.7	16	do.	2.64	1.8
8	do.	2.92	14	23	do.	2.68	1.2
12	do.	2.82	10	29	do.	2.62	1.4
14	do.	2.82	7.5	Aug. 6	do.	2.67	1.5
15	do.	3.10	47	13	do.	2.65	1.0
17	do.	3.04	30	20	do.	2.73	2.3
19	do.	2.95	15	21	do.	2.68	1.9
21	do.	2.88	12	23	do.	2.72	1.8
22	do.	2.93	23	27	do.	2.66	1.8
26	do.	2.91	18	Sept. 4	do.	2.64	1.3
Mar. 2	do.	2.83	7.9	10	do.	2.70	1.3
5	do.	2.82	8.2	17	do.	2.66	1.3
6	do.	2.80	5.6	24	do.	2.60	1.1
6	do.	2.82	6.0	30	do.	2.92	8.2
7	do.	2.86	9.1				

NOTE.—All measurements made by employees of Volcan Land & Water Co.

Daily discharge, in second-feet, of San Luis Rey River near Mesa Grande, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1.6	2.5	2.3	4.2	9	10	5.5	3.2	4.6	1.8	1.9	2.1
2	1.6	2.3	3.8	5	8	8	6	2.9	5	1.4	1.6	1.8
3	1.6	2.2	5	4.6	11	8	7	2.6	6	1.8	1.8	1.4
4	1.6	2.3	2.2	4.2	8	7	15	2.3	5.5	2.1	1.9	1.4
5	1.6	2.4	2.2	4.2	12	5.5	11	2.1	3.8	1.8	1.9	1.4
6	1.6	2.6	1.4	4.2	14	6	9	40	2.6	1.5	1.8	1.4
7	1.7	4.3	2.7	3.5	9	8	6	47	2.1	1.6	1.8	1.4
8	1.8	3.2	3.4	1.9	10	10	5.5	11	2.4	1.4	1.1	1.6
9	1.9	2.9	2.7	2.1	9	7.5	5.5	7.5	1.9	1.0	.9	1.4
10	1.9	2.8	2.7	7	9	7.5	5	8	1.4	1.6	.9	1.3
11	1.9	2.8	3.8	9	7	7.5	5	9	1.6	1.6	.8	1.3
12	1.8	2.8	6.5	5.5	7.5	55	5.5	2.6	1.9	1.1	1.0	1.3
13	1.8	2.4	3.8	4.6	8	122	6	2.4	1.6	1.4	.9	1.4
14	1.9	2.2	3.5	4.6	25	195	10	2.9	1.4	3.8	.7	1.1
15	2.0	2.3	3.3	4.6	31	47	7	2.6	1.4	3.2	1.1	1.1
16	2.0	2.4	3.4	3.5	18	28	6	2.9	1.8	1.6	1.4	1.3
17	2.0	2.3	3.5	6	16	18	4.6	5	1.4	1.6	1.3	1.3
18	2.4	2.4	3.5	114	15	17	3.5	7	1.6	1.4	1.1	1.3
19	6	2.3	7	56	11	12	2.4	4.2	1.4	1.1	1.1	1.1
20	2.5	2.3	17	15	12	10	1.9	15	1.0	1.1	1.4	.9
21	2.3	2.4	12	13	19	10	1.4	47	.8	.9	1.9	1.1
22	2.2	2.5	8	21	17	10	1.3	75	1.4	.7	1.4	1.1
23	2.0	2.7	7	20	11	10	2.1	55	1.6	1.1	1.1	1.4
24	2.0	2.9	7	19	10	10	1.8	22	1.9	1.4	.6	1.3
25	2.1	2.8	7	13	10	8	2.1	15	1.3	1.4	.5	1.0
26	2.2	2.7	5.5	8	7.5	9	2.6	13	1.0	1.6	.7	.8
27	2.3	2.6	4.6	11	7.5	7	2.1	8	1.2	1.3	1.9	.6
28	2.3	2.4	4.6	66	9	7.5	1.1	7.5	1.8	1.1	1.9	.4
29	2.4	2.3	4.6	22	-----	7.5	1.3	5.5	3.2	1.3	2.1	.4
30	2.8	2.2	4.6	14	-----	5	3.5	5.5	2.6	1.1	2.4	2.9
31	3.0	-----	4.5	16	-----	4.2	-----	5.5	-----	1.3	2.1	-----

Monthly discharge of San Luis Rey River near Mesa Grande, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	6	1.6	2.15	132
November	4.3	2.2	2.57	153
December	17	1.4	4.94	304
January	114	1.9	15.7	966
February	31	7	12.2	678
March	195	4.2	21.8	1,340
April	15	1.1	4.89	291
May	75	2.1	14.2	873
June	6	.8	2.24	133
July	3.8	.7	1.52	93.5
August	2.4	.5	1.39	85.5
September	2.9	.4	1.28	76.2
The year	195	.4	7.08	5,130

WEST FORK OF SAN LUIS REY RIVER NEAR NELLIE, CALIF.

LOCATION.—On line between secs. 7 and 8, T. 10 S., R. 2 E., at lower end of Barker Valley, 4 miles east of Nellie, San Diego County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—October 30, 1920, to September 30, 1921, when station was discontinued.

GAGE.—Water-stage recorder.

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

CHANNEL AND CONTROL.—Control is concrete with a 2½ foot weir 0.67 foot deep, completely end contracted.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 2.90 feet March 14 (discharge, 269 second-feet); no flow September 5–18.

DIVERSIONS.—No information.

REGULATION.—No information.

ACCURACY.—Stage-discharge relation changed December 15 when a weir was built in the concrete control, and March 13 when flood filled in pool above control. Three rating curves are well defined. Daily discharge ascertained by applying mean daily gage height to rating table except for period December 15-21 when discharge was estimated by comparison with records for Pauma Creek at Pauma Indian Reservation. Records good.

COOPERATION.—San Diego Consolidated Gas & Electric Co. installed station and furnished gage-height record and discharge measurements.

Discharge measurements of West Fork of San Luis Rey River near Nellie, Calif., during the year ending Sept. 30, 1921

[Made by San Diego Consolidated Gas & Electric Co.]

Date	Gage height	Discharge	Date	Gage height	Discharge
	<i>Feet</i>	<i>Sec.-ft.</i>		<i>Feet</i>	<i>Sec.-ft.</i>
Oct. 31	1.44	1.8	Jan. 28	1.77	8.0
Nov. 8	1.27	.7	28	1.76	8.0
11	1.52	.9	Feb. 15	1.72	6.1
14	1.28	.8	18	1.72	5.0
16	1.29	.8	18	1.74	5.2
18	1.29	.8	Mar. 12	2.05	29
27	1.29	.8	12	2.16	30
Dec. 6	1.42	1.2	12	2.24	36
10	1.54	.9	13	2.20	32
Jan. 18	2.50	54	14	2.90	269
18	2.15	30	14	2.70	174
19	1.80	9.0	14	2.59	141
19	1.83	11	15	1.95	23
19	1.84	13	15	1.98	21
22	1.70	4.9	20	1.80	9.9
28	1.81	10	21	1.75	7.5
28	1.80	9.5			

Daily discharge, in second-feet, of West Fork of San Luis Rey River near Nellie, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1		0.9	0.7	1.3	3.3	2.4	3.2	1.4	3.4	0.5	0.5	0.1
2		.8	1.1	1.3	3.3	2.1	3.1	1.3	3.3	.6	.5	.1
3		.7	.9	1.2	2.6	2.2	3.1	1.3	3.1	.8	.4	.1
4		.7	.8	1.1	2.6	1.9	3.5	1.4	3.0	.8	.4	.1
5		.7	.8	1.1	3.0	2.1	3.7	2.8	3.0	.7	.3	.0
6		1.1	.8	1.1	2.8	2.4	3.5	11	2.8	.7	.4	.0
7		1.3	.9	1.1	2.2	2.6	3.5	8.5	2.6	.6	.5	.0
8		.9	1.0	1.1	2.2	2.1	3.2	6	2.4	.6	.5	.0
9		.8	1.0	1.2	2.2	1.9	3.1	5	2.4	.6	.4	.0
10		.8	.9	1.4	2.1	1.9	3.1	3.9	2.0	.6	.4	.0
11		.8	1.0	1.3	2.1	1.8	3.2	3.0	2.0	1.6	.4	.0
12		.8	1.4	1.6	1.9	20	3.2	2.7	1.9	.8	.3	.0
13		1.0	.8	2.0	1.9	24	3.2	2.4	1.9	2.4	.3	.0
14		.9	.7	1.4	3.7	100	3.7	2.3	1.8	1.4	.8	.0
15		.8	.7	1.3	4.3	31	3.3	2.2	1.6	1.2	.3	.0
16		.7	.7	1.2	3.4	19	3.1	2.2	1.6	1.0	.3	.0
17		.8	.8	1.2	4.1	12	3.1	2.4	1.6	.5	.2	.0
18		.8	.8	1.6	3.7	10	2.8	2.9	1.3	.5	.2	.0
19		.9	.7	8.5	3.2	9.5	2.7	2.6	1.3	.5	.1	.1
20		.9	5	4.1	3.1	9	2.8	8.5	1.2	.7	.1	.1
21		.8	3.5	13	4.6	8.5	2.7	33	1.0	.6	.1	.1
22		.9	3.5	2.8	4.3	7.5	2.7	27	.9	.5	.1	.1
23		.8	6	2.5	3.1	5.5	2.8	18	.9	.4	.7	.1
24		.7	2	2.2	3.2	4.8	2.8	11	.9	.4	.3	.1
25		.8	1.5	2.2	3.4	4.8	2.8	7	1.0	.3	.2	.1
26		.8	1.3	2.2	3.2	4.4	2.6	7	.7	.3	.1	.1
27		.8	1.1	4.1	3.2	4.2	2.4	6.5	.7	.3	.1	.1
28		.8	1.1	14	2.8	3.7	2.0	5.5	.6	.3	.1	.1
29		.8	1.1	4.8		3.9	1.6	4.8	.5	.3	.1	.2
30	1.8	.7	1.2	3.9		3.7	1.4	3.9	.5	.3	.2	3.2
31	1.3		1.3	4.3		3.4		3.7		.4	.1	

Monthly discharge of West Fork of San Luis Rey River near Nellie, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
November.....	1.3	0.7	0.83	49.4
December.....	7	.7	1.66	102
January.....	16	1.1	3.44	212
February.....	4.6	1.9	3.05	169
March.....	100	1.8	10.1	621
April.....	3.7	1.4	2.93	174
May.....	33	1.3	6.49	399
June.....	3.4	.5	1.73	103
July.....	2.4	.3	.68	41.8
August.....	.7	.1	.29	17.8
September.....	3.2	.0	.16	9.5
The period.....				1,900

ESCONDIDO MUTUAL WATER CO.'S CANAL NEAR NELLIE, CALIF.

LOCATION.—In SW. $\frac{1}{4}$ NW. $\frac{1}{4}$ sec. 33, T. 10 S., R. 1 E., 500 feet below intake on San Luis Rey River, $3\frac{1}{2}$ miles above Rincon Indian Reservation, 5 miles southwest of Nellie, San Diego County, and 15 miles northeast of Escondido.

RECORDS AVAILABLE.—October 1, 1896, to September 30, 1921, except that there are no records for the years 1901-2 and 1903-4.

GAGE.—Enameled vertical staff indicating depth of water on crest of weir.

DISCHARGE MEASUREMENTS.—Made from plank across canal or by wading at various sections near gage.

CONTROL.—Rectangular weir with steel plate crest 6 feet long in concrete slab, 500 feet below intake. October 29, 1915, wooden weir board was replaced by concrete slab with steel plate for crest. Length of crest not changed. March, 1916, Mr. E. R. Bowen installed a weir at south portal of tunnel No. 2 and developed rating curves for the various crude weirs which had been used in previous years.

COOPERATION.—Daily-discharge record furnished by Escondido Mutual Water Co.; computed from weir table. Monthly discharge computed by United States Geological Survey.

The canal is 5.6 miles long; consists of flume, ditch, and tunnel sections constructed through a very rough, mountainous country. It discharges into a reservoir about 6 miles northeast of Escondido. The dam is 76 feet high and 380 feet long, is of the usual rock-fill type, and is faced with redwood planks. The reservoir (capacity, 3,120 acre-feet) supplies water for irrigation and domestic uses at Escondido and vicinity.

No discharge measurements during the year.

Daily discharge, in second-feet, of Escondido Mutual Water Co.'s canal near Nellie, Calif., for the year ending Sept. 30, 1921

Day	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July
1		4.0	6.4	16.4	8.8	9.8	4.0	10.8	3.2
2		6.0	6.2	14.8	10.2	9.0	3.8	10.2	3.2
3		9.0	6.2	13.4	9.0	9.0	4.0	10.2	3.2
4		6.0	6.4	13.6	9.0	16.8	4.0	10.2	3.2
5		4.5	6.4	13.6	9.0	17.8	4.2	8.8	3.2
6		4.2	6.2	24	10.2	16.8	36	7.5	3.2
7		4.5	6.2	17.8	16.8	13.4	42	6.2	1.6
8		6.0	6	13.4	13.4	10.2	30	5.8	
9		5.8	5.8	11.6	10.2	8.8	17.8	5.0	
10	4.0	5.8	8.6	11.6	10.2	8.8	13.6	5.0	
11	4.0	6.0	10.8	10.8	10.2	7.5	10.8	5.0	
12	5.0	10.2	7.5	10.2	26.0	8.6	8.6	5.0	
13	4.2	6.4	7.5	10.2	33	8.8	6.2	5.0	
14	4.0	5.0	7.5	11.6	33	14.8	5.8	5.0	
15	4.0	4.5	6.2	33	41	11.6	5	5.0	
16	5.0	5.0	6.2	28	39	9.0	4.2	5.0	
17	4.2	5.0	7.5	20	30	8.8	6.2	5.0	
18	4.0	5.0	32	28	26	7.5	7.5	5.0	
19	4.2	5.8	32	20	23	6.8	9.0	5.0	
20	4.2	24	32	13.6	28	6.2	8.6	4.0	
21	4.2	10.2	20	13.4	23	6.2	44	4.0	
22	4.2	9.8	20	30	18.6	6.0	42	4.0	
23	4.2	8.6	18.6	13.4	16.4	5.0	42	4.0	
24	4.2	7.5	17.8	10.2	14.8	6.2	41	4.0	
25	4.2	8.8	15.6	9.8	13.6	6.0	32	4.0	
26	4.5	7.5	9.8	8.8	9.8	5.0	23	3.2	
27	4.5	7.5	13.4	8.8	13.4	4.5	19	3.2	
28	4.2	6.2	32	8.8	11.6	4.2	16.4	3.2	
29	3.8	6.4	24		10.8	4.2	16.4	3.2	
30	3.8	6.4	16.8		10.2	3.1	13.6	3.2	
31		6.4	21		10.2		9.8		

NOTE.—Discharge, Apr. 19, estimated. No flow Oct. 1 to Nov. 9 and July 8 to Sept. 30.

Monthly discharge of Escondido Mutual Water Co.'s canal near Nellie, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
November	5.0	0	2.95	176
December	24	4.0	7.03	432
January	32	5.8	13.6	836
February	33	8.8	15.7	872
March	41	8.8	17.7	1,060
April	17.8	3.1	8.68	516
May	44	3.8	17.1	1,050
June	10.8	3.2	5.49	327
July	3.2	0	.67	41.3
The year	44	0	7.38	5,340

NOTE.—No flow in months for which record is not given.

PAUMA CREEK NEAR NELLIE, CALIF.

LOCATION.—In SE. $\frac{1}{4}$ sec. 31, T. 9 S., R. 1 E., at lower end of Doane Valley, 4 miles northwest of Nellie, San Diego County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—October 1, 1920, to September 30, 1921, when station was discontinued.

GAGE.—Water-stage recorder in concrete well and shelter on left bank.

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

CHANNEL AND CONTROL.—Channel is solid rock and boulders. A concrete control with a 2 $\frac{1}{2}$ -foot rectangular weir was constructed December 17, 1920.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 2.72 feet at 7 a. m. March 14 (discharge, 74 second-feet); minimum stage, 1.05 feet at 1 a. m. September 12 (discharge, 0.1 second-feet).

DIVERSIONS.—None.

REGULATION.—None.

ACCURACY.—Stage-discharge relation permanent. Rating curve well defined.

Operation of water-stage recorder satisfactory. Daily discharge ascertained by applying mean daily gage height to rating table. Records good.

COOPERATION.—San Diego Consolidated Gas & Electric Co. installed station and furnished gage-height record and discharge measurements.

Discharge measurements of Pauma Creek near Nellie, Calif., during the year ending Sept. 30, 1921

[Made by San Diego Consolidated Gas & Electric Co.]

Date	Gage height	Dis-charge	Date	Gage height	Dis-charge
	<i>Feet</i>	<i>Sec.-ft.</i>		<i>Feet</i>	<i>Sec.-ft.</i>
Jan. 18.....	1.98	12	Mar. 14.....	2.55	53
18.....	2.00	12	14.....	2.48	44
18.....	1.81	5.8	14.....	2.44	40
18.....	1.72	4.5	14.....	2.36	31
Mar. 12.....	2.03	12	14.....	2.31	32
12.....	2.06	13	14.....	2.26	27
12.....	2.11	15	14.....	2.21	24
13.....	1.92	8.0	14.....	2.15	22
13.....	1.96	11	15.....	1.94	11

Daily discharge, in second-feet, of Pauma Creek near Nellie, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....		0.4	0.4	0.5	1.6	1.3	1.7	1.1	2.9	0.7	0.3	0.3
2.....		.4	.7	.5	1.4	1.2	1.6	1.1	2.8	.6	.3	.2
3.....		.4	.4	.5	1.3	1.2	1.6	1.1	2.6	.6	.3	.3
4.....		.4	.4	.5	1.3	1.2	2.3	1.1	2.5	.6	.3	.2
5.....		.4	.4	.5	1.4	1.2	2.8	1.6	2.3	.5	.3	.2
6.....	0.3	.6	.4	.5	1.4	1.5	2.4	1.6	2.2	.5	.3	.2
7.....		.6	.5	.5	1.2	1.6	2.0	3.1	2.1	.5	.4	.2
8.....		.5	.5	.5	1.2	1.3	1.7	4.6	1.9	.5	.4	.2
9.....		.5	.5	.5	1.1	1.2	1.6	3.7	1.9	.5	.4	.2
10.....		.4	.5	.6	1.1	1.2	1.5	2.2	1.7	.5	.4	.2
11.....		.5	.5	.6	1.1	1.2	1.7	2.0	1.6	.8	.4	.2
12.....	.3	.5	.6	1.0	1.1	1.7	1.7	1.7	1.6	.8	.3	.2
13.....	.3	.4	.6	1.0	1.8	1.7	1.7	1.7	1.5	.8	.3	.2
14.....	.3	.4	.5	1.6	33	2.3	1.6	1.4	.6	.3	.2	.2
15.....	.3	.4	.7	1.6	9.5	2.0	1.5	1.3	.5	.3	.3	.3
16.....	.3	.5	.6	1.5	7	1.9	1.5	1.3	.6	.3	.3	.3
17.....	.3	.5	.5	1.5	6	1.8	1.6	1.2	.4	.3	.3	.3
18.....	.5	.5	.5	6.4	1.7	5	1.6	2.0	1.1	.4	.3	.3
19.....	5.0	.5	1.6	3.0	1.9	5.5	1.6	1.9	1.1	.4	.3	.3
20.....	.7	.4	1.2	1.8	2.0	4.5	1.6	4.4	1.1	.5	.2	.3
21.....	.4	.4	.7	1.5	3.3	3.5	1.5	17	1.0	.5	.2	.3
22.....	.4	.4	.7	1.1	2.6	3.1	1.4	16	.9	.4	.3	.3
23.....	.3	.4	.7	1.1	1.9	2.8	1.4	12	.8	.4	.5	.3
24.....	.3	.4	.8	1.0	1.8	2.6	1.4	8	.8	.4	.4	.3
25.....	.3	.4	.8	1.0	1.7	2.4	1.4	6	.7	.4	.3	.3
26.....	.3	.4	.6	1.0	1.6	2.4	1.4	5	.7	.4	.3	.3
27.....	.3	.4	.5	2.4	1.5	2.3	1.2	4.4	.7	.4	.3	.3
28.....	.3	.4	.6	8.1	1.4	2.2	1.2	3.8	.7	.4	.3	.3
29.....	.3	.4	.6	2.2	-----	2.1	1.1	3.5	.7	.3	.3	.3
30.....	.7	.4	.5	2.2	-----	1.9	1.1	3.3	.7	.3	.3	1.0
31.....	.6	-----	.5	2.2	-----	1.8	-----	3.1	-----	.3	.3	-----

NOTE.—Discharge estimated Oct. 1-11 and Dec. 12-16. Braced figures show mean discharge for periods indicated.

Monthly discharge of Pauma Creek near Nellie, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	5.0	0.3	0.50	30.7
November.....	.6	.4	.44	26.2
December.....	1.6	.4	.60	33.9
January.....	8.1	.5	1.44	88.5
February.....	3.3	1.0	1.56	86.6
March.....	33	1.2	4.54	279
April.....	2.8	1.1	1.67	99.4
May.....	17	1.1	3.97	244
June.....	2.9	.7	1.46	86.9
July.....	.8	.3	.50	30.7
August.....	.5	.2	.32	19.7
September.....	1.0	.2	.28	16.7
The year.....	33	.2	1.44	1,050

PAUMA CREEK AT PAUMA INDIAN RESERVATION, NEAR NELLIE, CALIF.

LOCATION.—At mouth of canyon, three-quarters of a mile northeast of Pauma Indian Reservation and 6 miles northwest of Nellie, San Diego County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—December 15, 1920, to September 30, 1921, when station was discontinued.

GAGE.—Water-stage recorder on left bank.

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

CHANNEL AND CONTROL.—A concrete control was built at the gage. A 2½-foot weir was installed in the control.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 3.22 feet at 7.20 a. m. March 14 (discharge, 105 second-feet); minimum stage occurred during period September 1–16 when recorder was not in operation (discharge, less than 0.9 second-foot).

DIVERSIONS.—No information.

REGULATION.—No information.

ACCURACY.—Stage-discharge relation permanent throughout year. Rating curve fairly well defined. Gage-height record complete except for period September 1–16. Daily discharge ascertained by applying mean daily gage height to rating table. Records good.

COOPERATION.—San Diego Consolidated Gas & Electric Co. installed station and furnished gage-height record and discharge measurements.

Discharge measurements of Pauma Creek at Pauma Indian Reservation, near Nellie, Calif., during the year ending Sept. 30, 1921

[Made by San Diego Consolidated Gas & Electric Co.]

Date	Gage height	Discharge	Date	Gage height	Discharge
	<i>Feet</i>	<i>Sec.-ft.</i>		<i>Feet</i>	<i>Sec.-ft.</i>
Jan. 19.....	1.83	6.2	Mar. 15.....	2.34	19
19.....	1.87	7.5	May 23.....	2.32	18

Daily discharge, in second-feet, of Pauma Creek at Pauma Indian Reservation, near Nellie, Calif., for the year ending Sept. 30, 1921

Day	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1		1.9	4.0	3.3	4.1	2.6	6	1.8	1.1	
2		1.9	3.6	3.2	4.0	2.6	5.5	1.8	1.1	
3		1.9	3.4	3.2	4.2	2.6	5.5	1.8	1.0	
4		1.9	3.3	3.0	5.5	2.7	5.5	1.8	1.0	
5		1.9	3.4	3.0	5	3.7	5	1.6	.9	
6		1.9	3.6	3.4	5	7	4.5	1.5	1.0	
7		1.9	3.1	4.8	4.2	6	4.2	1.5	1.2	
8		1.9	2.8	3.7	3.8	6	4.0	1.4	1.1	
9		1.9	2.8	3.3	3.6	6	3.8	1.4	1.1	0.9
10		2.2	2.7	3.7	3.6	4.5	3.6	1.4	1.1	
11		1.9	2.6	3.4	3.8	3.7	3.4	1.7	1.0	
12		1.9	2.6	14	3.9	3.5	3.3	2.0	.9	
13		1.9	2.7	24	3.8	3.3	3.3	1.6	.9	
14		2.0	5.5	44	4.5	3.2	3.4	1.6	.9	
15	1.8	2.0	4.5	18	4.2	3.0	3.3	1.5	.9	
16	1.8	2.0	4.8	12	3.7	3.1	3.3	1.5	.8	
17	1.9	2.1	4.1	10	3.5	3.2	3.2	1.3	.8	.9
18	1.9	11	4.0	9	3.4	4.2	2.9	1.2	.8	1.1
19	4.2	8	3.7	8.5	3.3	3.8	2.6	1.2	.8	1.1
20	3.7	5	4.0	8.5	3.3	8	2.6	1.6	.8	1.1
21	2.5	4.5	6	7.5	3.2	24	2.4	1.5	.8	1.0
22	2.4	3.7	6	6.5	3.1	25	2.3	1.2	.8	1.0
23	2.3	3.3	4.4	6	3.2	22	2.3	1.2	1.3	1.0
24	2.2	2.9	4.0	6	3.3	14	2.2	1.2	1.3	.9
25	2.6	2.8	4.0	5.5	3.1	11	2.2	1.2	1.1	.9
26	2.1	2.8	3.8	5	2.9	9.5	2.2	1.1	1.0	.9
27	2.0	4.2	3.7	4.7	2.7	8.5	2.1	1.1	.9	.9
28	2.0	12	3.5	4.4	2.6	8	2.0	1.1	1.0	.9
29	2.0	6		4.4	2.6	7.5	2.0	1.1	.9	.9
30	2.0	5		4.2	2.6	7	1.9	1.1	.9	1.0
31	2.0	5.5		4.2		6.5		1.1	.9	

NOTE.—Mean discharge estimated Sept. 1-16; recorder stopped.

Monthly discharge of Pauma Creek at Pauma Indian Reservation, near Nellie, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
December 15-31			2.32	78.2
January	12	1.9	3.54	218
February	6	2.6	3.81	212
March	44	3.0	7.88	485
April	5.5	2.6	3.66	218
May	25	2.6	7.28	448
June	6	1.9	3.35	199
July	2.0	1.1	1.42	87.3
August	1.3	.8	.97	59.6
September	1.1	.9	.93	55.3
The period				2,060

SANTA ANA RIVER BASIN

SANTA ANA RIVER NEAR MENTONE, CALIF.

LOCATION.—In SW. $\frac{1}{4}$ sec. 4, T. 1 S., R. 2 W., near mouth of canyon, one-fourth mile above Southern California Edison Co.'s power plant, half a mile above mouth of Deep Creek, and $3\frac{1}{2}$ miles northeast of Mentone, San Bernardino County.

DRAINAGE AREA.—189 square miles (measured on topographic map).

RECORDS AVAILABLE.—July 1, 1896, to September 30, 1921.

GAGE.—Water-stage recorder, in concrete well and shelter, installed September 7, 1917, on left bank at rock ledge one-fourth mile above power house, at same location and datum as vertical staff installed February 11, 1916. Previous staff, destroyed by the flood of January, 1916, was 10 feet upstream at an independent datum. Original gage was just above Warm Springs Canyon, $1\frac{1}{2}$ miles upstream.

DISCHARGE MEASUREMENTS.—Made from cable just above gage or by wading.

CHANNEL AND CONTROL.—Gravel and boulders; shifting during high water.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 4.20 feet at 6 a. m. March 14 (discharge, 1,100 second-feet); minimum stage, 0.72 foot January 26 (discharge, 1.1 second-feet).

1896–1921: Maximum discharge (stage not known, gage washed out), 29,100 second-feet January 27, 1916, computed from cross-section and slope; minimum stage 0.44 foot at 1 a. m. October 12, 1919 (discharge estimated, 0.1 second-foot).

DIVERSION.—Water is diverted at Southern California Edison Co.'s plant No. 2, $2\frac{1}{2}$ miles above gage for use at Mentone power house. The Greenspot pipe line diverts water for irrigation from the forebay at Mentone power house. From the tailrace the water is carried across Santa Ana River and used for irrigation.

REGULATION.—Water is stored on Bear Creek at Bear Valley reservoir. Southern California Edison Co.'s power plants Nos. 1 and 2 are $5\frac{1}{4}$ and $2\frac{3}{4}$ miles, respectively, above the Mentone plant, at the mouth of the canyon. Capacity of Big Bear reservoir is 65,065 acre-feet.

ACCURACY.—Stage-discharge relation not permanent. Rating curves fairly well defined. Recorder operated satisfactorily. Daily discharge ascertained by applying mean daily gage height to rating table. Records good.

Discharge measurements of Santa Ana River near Mentone, Calif., during the year ending Sept. 30, 1921

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. 27	Jarrett Oliver	0.88	2.0	Apr. 22	Jarrett Oliver	0.93	2.3
Nov. 19	do	.84	2.1	May 9	do	1.00	4.5
Dec. 9	do	.89	2.1	24	Ebert and Oliver	1.39	37
Jan. 4	do	.91	1.8	27	Jarrett Oliver	1.25	19
21	do	.99	6.7	31	do	1.03	5.5
27	do	1.56	54	June 3	do	.99	3.6
Feb. 4	do	.87	3.5	7	Ebert and Oliver	.98	2.5
15	do	.89	3.6	14	Jarrett Oliver	.97	3.1
Mar. 4	do	.85	2.7	23	Arnold and Ebert	.96	3.0
17	do	1.61	76	July 19	Jarrett Oliver	.95	1.6
25	do	1.03	3.6	Aug. 22	do	.97	1.9
30	do	.98	3.6	Sept. 21	do	.90	1.4
Apr. 12	do	.93	3.5				

Daily discharge, in second-feet, of Santa Ana River near Mentone, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	3.2	4.6	2.2	2.6	4.3	2.4	2.8	1.8	7	2.6	3.0	2.2
2.....	3.2	2.9	2.4	2.6	3.6	2.6	2.6	1.8	3.9	2.6	3.0	2.0
3.....	3.2	2.4	2.6	2.6	3.2	2.6	2.6	1.8	3.4	2.6	3.0	2.0
4.....	3.2	2.2	2.6	2.9	3.0	2.6	3.0	1.8	4.8	2.2	3.0	2.0
5.....	3.2	1.9	2.6	2.9	3.2	2.6	2.8	2.2	4.4	2.4	3.0	2.0
6.....	3.2	1.9	2.6	3.2	3.2	5.5	3.2	8.2	3.2	1.6	3.4	2.0
7.....	3.2	1.7	2.6	3.2	3.0	5	2.4	3.4	3.0	1.8	6	2.0
8.....	3.2	1.7	2.6	3.2	3.0	3.2	1.8	1.4	3.0	1.8	3.9	2.0
9.....	3.2	1.5	2.4	3.2	3.0	3.0	2.0	2.0	3.0	2.6	3.9	2.0
10.....	2.9	1.5	2.6	2.9	2.8	2.8	2.0	1.6	2.8	2.4	3.2	2.0
11.....	2.6	1.5	3.2	2.6	2.8	3.0	2.2	1.4	2.8	2.0	3.0	2.0
12.....	2.6	1.5	3.5	2.6	2.8	16	2.0	1.3	2.8	1.8	3.0	2.4
13.....	2.6	1.5	3.2	2.6	2.8	139	2.4	1.2	2.8	1.3	3.0	2.4
14.....	2.6	1.5	2.9	2.6	4.3	527	2.6	1.3	2.8	1.6	3.0	2.6
15.....	2.6	1.5	2.6	3.2	3.4	174	2.4	1.4	2.6	2.0	3.0	2.6
16.....	2.6	1.5	2.9	3.8	3.2	108	2.2	2.0	2.4	2.4	3.0	2.8
17.....	2.6	1.5	2.9	4.0	3.4	67	2.2	2.0	2.2	3.0	3.0	2.8
18.....	2.6	1.5	2.9	183	3.4	52	2.0	2.0	2.4	2.8	3.0	2.4
19.....	50	1.5	6.6	125	3.2	47	2.0	2.0	2.0	2.6	3.2	2.2
20.....	7.5	1.5	4.9	30	12	25	3.4	2.4	1.8	2.8	3.2	2.0
21.....	3.5	1.5	4.3	7	6	18	2.0	29	1.8	3.0	3.0	1.8
22.....	2.9	1.5	3.8	5	2.2	10	2.0	52	2.0	3.0	2.8	1.8
23.....	2.6	1.3	2.6	3.2	1.8	18	2.2	47	2.6	3.0	2.8	1.6
24.....	2.6	1.3	2.2	2.0	1.6	11	5.5	41	2.8	3.0	2.8	1.6
25.....	2.6	1.3	2.2	1.4	1.5	5.5	2.4	33	3.0	3.0	2.6	1.4
26.....	2.6	1.3	2.4	1.1	1.8	6.5	2.0	24	3.0	3.0	2.6	1.4
27.....	2.4	1.5	2.6	11	2.2	3.9	2.0	17	3.0	3.0	2.6	1.8
28.....	2.4	1.5	2.6	76	2.4	3.4	1.8	17	2.8	3.0	2.6	1.8
29.....	2.4	1.7	2.6	15	-----	3.2	1.8	9	2.8	3.0	2.4	2.2
30.....	4.0	2.2	2.6	6	-----	3.0	1.8	6	2.6	3.0	2.4	4.4
31.....	12	-----	2.6	5	-----	3.0	-----	5.5	-----	3.0	-----	-----

NOTE.—Discharge interpolated May 17-20, July 14-16, and Sept. 18-20; water-stage recorder not in operation.

Monthly discharge of Santa Ana River near Mentone, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	50	2.4	4.84	298
November.....	4.6	1.3	1.75	104
December.....	6.6	2.2	2.95	181
January.....	183	1.1	16.8	1,080
February.....	12	1.5	3.32	184
March.....	527	2.4	41.2	2,530
April.....	5.5	1.8	2.40	143
May.....	52	1.2	10.4	640
June.....	7	1.8	2.98	177
July.....	3.0	1.3	2.51	154
August.....	6	2.2	3.05	188
September.....	4.4	1.4	2.14	127
The year.....	527	1.1	7.96	5,760

Combined daily discharge, in second-feet, of Santa Ana River and canals near Mentone, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	86	71	49	46	67	60	73	66	89	79	76	74
2	86	59	54	46	64	59	70	69	86	82	81	72
3	84	56	50	46	63	61	73	69	82	82	76	72
4	81	53	47	43	60	61	81	77	84	75	78	72
5	81	50	42	44	66	61	73	74	80	77	81	72
6		51	52	45	42	63	73	88	82	69	78	75
7	76	60	48	42	55	74	69	80	79	72	87	75
8	78	59	48	42	52	64	69	78	79	77	82	73
9	84	53	59	52	55	61	69	82	77	79	82	73
10	83	48	53	52	58	59	66	77	74	76	73	73
11	83	51	54	52	55	59	66	68	77	78	73	73
12	80	53	57	52	58	90	70	73	71	75	73	71
13	83	51	54	55	60	227	85	68	77	75	73	71
14	80	51	49	55	64	612	70	76	74	76	73	74
15	80	51	46	55	60	256	69	76	77	77	78	68
16	77	51	46	56	60	187	66	76	73	74	78	76
17	80	48	51	56	58	146	66	78	76	75	73	74
18	77	48	51	223	60	139	66	81	70	73	80	74
19	139	45	58	146	60	134	71	82	64	70	83	74
20	77	53	69	103	69	107	86	74	70	75	83	65
21	62	54	51	80	58	97	66	114	68	81	83	67
22	56	59	52	68	50	97	71	137	74	81	79	70
23	59	61	51	60	58	108	58	132	77	70	76	70
24	61	58	48	59	58	96	86	126	77	73	71	67
25	69	58	48	58	60	91	70	115	84	73	76	67
26	67	58	48	58	60	93	69	111	74	73	76	67
27	67	59	49	56	60	82	66	104	71	73	71	68
28	67	59	49	163	60	75	66	104	74	76	74	71
29	75	56	49	104		75	66	96	77	76	74	74
30	90	59	49	82		73	66	96	79	76	71	76
31	95		46	70		73		93		78	71	

NOTE.—See p. 42 for daily discharge of Southern California Edison Co.'s canal and p. 43 for daily discharge of Greenspot pipe lines.

Combined monthly discharge of Santa Ana River and canals near Mentone, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	139	56	78.8	4,850
November	71	45	54.8	3,260
December	69	42	50.6	3,110
January	223	42	69.9	4,300
February	69	50	59.7	3,320
March	612	59	114	7,010
April	86	58	70.5	4,200
May	137	66	88.4	5,440
June	89	64	76.5	4,550
July	82	69	75.7	4,650
August	87	71	76.9	4,730
September	76	65	71.6	4,260
The year	612	42	74.1	53,700

SANTA ANA RIVER NEAR PRADO, CALIF.

LOCATION.—At Riverside-Orange County line in lower Santa Ana Canyon (unsurveyed), 3 miles by river below Rincon bridge and 3 miles southwest of Prado, Riverside County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—January 31, 1919, to September 30, 1921.

GAGE.—Water-stage recorder, installed in concrete well and house, on left bank at county line.

DISCHARGE MEASUREMENTS.—Made from cable 500 feet above gage. At low stages measurements are made from temporary footbridge at cable or by wading.

CHANNEL AND CONTROL.—Bed consists of sand; shifting. Banks are low and subject to overflow at high stages; extreme flood channel about 800 feet wide. Right bank covered with trees and brush; left bank has trees and brush along bank of low-water channel.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 5.60 feet at 5 p. m. March 14 (discharge, about 2,900 second-feet); minimum stage, 1.12 feet at 10 p. m. July 17 (discharge, 60 second-feet).

1919-1921: Maximum stage from water-stage recorder, 5.45 feet at 3 a. m. February 23, 1920 (discharge, about 7,560 second-feet); minimum stage from water-stage recorder, 1.21 feet at 8 p. m. July 15, 1919 (discharge, 41 second-feet).

DIVERSIONS.—Numerous water companies divert water from main river and its tributaries above and below station. Large quantities of water are taken out of underground storage by flowing wells and pumping plants.

REGULATION.—Storage has been developed at Big Bear reservoir in upper Santa Ana River basin and at Hemet reservoir in San Jacinto River basin. Lake Elsinore receives the run-off from San Jacinto River basin and discharges into Temescal Creek only during seasons of very high run-off. (See Lake Elsinore at Elsinore p. 67).

ACCURACY.—Stage-discharge relation continually changing. Five fairly well defined curves used during year. Operation of water-stage recorder satisfactory. Mean daily gage height determined by inspecting recorder graph. Daily discharge ascertained by applying mean daily gage height to rating tables, by shifting-control method, and by interpolation between measurements. Records are good.

Discharge measurements of Santa Ana River near Prado, Calif., during the year ending Sept. 30, 1921

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	Jarrett Oliver	1.29	98	Apr. 28	Jarrett Oliver	1.20	105
Nov. 10	do.	1.63	142	May 7	do.	1.62	202
24	do.	1.67	156	11	do.	1.54	143
Dec. 8	do.	1.71	152	17	Oliver and Thompson	1.40	132
13	Marliave and Oliver	1.73	184	25	F. C. Ebert	1.78	253
Jan. 5	Jarrett Oliver	1.85	176	2	Jarrett Oliver	1.54	129
12	do.	1.88	163	8	F. C. Ebert	1.53	147
20	F. C. Ebert	1.92	312	15	Jarrett Oliver	1.44	106
26	Ebert and Oliver	2.10	279	22	Ebert and Arnold	1.33	100
Feb. 3	Jarrett Oliver	2.08	248	28	do.	1.29	78
9	Oliver and Ebert	2.08	223	July 6	F. C. Ebert	1.25	92
18	Jarrett Oliver	2.09	232	15	Jarrett Oliver	1.23	63
25	do.	2.00	191	22	do.	1.27	84
Mar. 3	do.	1.91	176	29	do.	1.25	72
11	do.	1.95	179	Aug. 7	F. C. Ebert	1.27	78
14	do.	4.15	1,610	16	Jarrett Oliver	1.28	78
16	F. C. Ebert	1.63	456	24	do.	1.25	67
18	Jarrett Oliver	1.54	393	31	do.	1.26	63
26	do.	1.79	303	Sept. 8	do.	1.25	74
Apr. 2	do.	1.47	169	15	do.	1.33	81
7	do.	1.38	147	21	do.	1.33	77
9	do.	1.30	116				

Daily discharge, in second-feet, of Santa Ana River near Prado, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	89	135	149	192	280	194	255	99	152	84	72	65
2.....	89	121	153	200	244	185	178	99	146	86	73	67
3.....	89	119	158	202	248	182	157	98	149	88	74	69
4.....	89	122	147	195	248	179	161	94	138	90	75	70
5.....	94	122	139	198	252	173	164	102	133	92	76	71
6.....	94	130	137	194	252	182	154	152	146	92	77	72
7.....	92	147	145	190	224	208	144	202	146	89	78	73
8.....	93	143	153	186	220	197	142	184	146	86	78	74
9.....	91	141	158	182	244	182	137	166	142	83	78	75
10.....	93	143	160	177	264	188	144	142	121	80	78	76
11.....	94	141	165	172	272	188	144	146	112	76	78	77
12.....	93	151	185	167	276	240	131	138	107	73	78	78
13.....	93	155	172	170	272	350	134	121	114	70	78	79
14.....	93	155	165	167	295	1,540	126	110	119	66	78	80
15.....	92	158	160	155	272	850	126	117	124	63	78	81
16.....	93	153	165	167	240	490	124	121	117	66	78	81
17.....	95	151	170	185	240	440	116	119	109	70	77	80
18.....	100	147	170	520	244	445	118	114	102	73	76	79
19.....	122	145	192	390	236	564	124	109	95	77	74	78
20.....	116	147	192	325	228	493	121	107	95	80	73	77
21.....	112	149	178	290	232	466	118	124	98	84	71	77
22.....	111	153	180	320	224	438	118	238	99	84	70	75
23.....	112	149	178	345	212	400	118	438	101	82	68	75
24.....	105	151	182	300	220	360	111	332	99	80	67	75
25.....	106	160	198	250	208	324	110	265	93	76	66	75
26.....	112	153	198	300	194	300	110	295	88	74	65	75
27.....	110	153	198	315	191	286	111	275	83	72	65	75
28.....	110	149	200	385	194	291	105	242	78	72	64	75
29.....	112	147	195	315	-----	282	104	210	80	72	64	75
30.....	155	147	188	300	-----	278	98	188	82	72	63	102
31.....	141	-----	192	295	-----	278	-----	174	-----	72	63	-----

Monthly discharge of Santa Ana River near Prado, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	155	89	103	6,330
November.....	160	119	145	8,630
December.....	200	137	172	10,600
January.....	520	155	251	15,400
February.....	295	191	240	13,300
March.....	1,540	173	360	22,100
April.....	255	98	133	7,910
May.....	438	94	172	10,600
June.....	152	78	114	6,780
July.....	92	63	78.2	4,810
August.....	78	63	72.7	4,470
September.....	102	65	76.0	4,520
The year.....	1,540	63	160	115,400

LOWER SANTA ANA RIVER

For comparative purposes, discharge measurements were made on the same day during the irrigating season at various points in the lower Santa Ana River drainage basin. Measurements were also made at some of these points during the irrigating season of 1919 and 1920. The results of these measurements are given in the following table.

Discharge measurements, in second-feet, in lower Santa Ana River drainage basin for the year ending Sept. 30, 1921

Date	Santa Ana River											
	E Street, San Bernardino		Colton Bridge, near Colton, dis-	Rubidoux Bridge, near Riverside		Los Angeles & Salt Lake Railroad bridge, near Arlington (Riverside Narrows)		Hamner Avenue Bridge, near Corona		Auburndale Bridge, near Corona		
	Measurement began	Dis-charge	Measurement began	Dis-charge	Measurement began	Dis-charge	Measurement began	Dis-charge	Measurement began	Dis-charge	Measurement began	Dis-charge
Oct. 9												
May 17	7.15 p. m.	0.5			10.20 a. m.	28	10.55 a. m.	54	1.25 p. m.	82		
June 15					8.00 a. m.	25	9.00 a. m.	85	10.45 a. m.	90		
22					8.55 a. m.	20	9.50 a. m.	56	11.15 a. m.	56		
28		0			4.25 p. m.	12	3.30 p. m.	49	1.40 p. m.	49		
July 6		0			6.00 p. m.	10	5.00 p. m.	47	3.40 p. m.	48	2.40 p. m.	67
15		0			4.45 p. m.	8.4	3.15 p. m.	50	1.50 p. m.	43	12.45 p. m.	60
22					4.35 p. m.	7.6	3.30 p. m.	35	2.10 p. m.	36	1.10 p. m.	46
29					3.40 p. m.	16	2.45 p. m.	52	1.15 p. m.	38	11.35 a. m.	54
Aug. 7					2.20 p. m.	8.8	1.30 p. m.	39	12 noon	39	11.00 a. m.	62
16					11.55 a. m.	10	11.00 a. m.	48	12 noon	41		
24					3.55 p. m.	8.6	3.10 p. m.	41	1.50 p. m.	36		
31					3.00 p. m.	11	2.10 p. m.	44	1.00 p. m.	44		
Sept. 8							12.45 p. m.	40				
15					3.15 p. m.	11	11.25 a. m.	45	1.15 p. m.	42		
22					3.30 p. m.	17	2.40 p. m.	51	1.20 p. m.	44		

Date	Santa Ana River—Continued						Spring Brook		Durkee ditch	
	Atchison, Topeka & Santa Fe Railway bridge near Prado		Riverside-Orange County line (Prado gaging station)		Intake of Anaheim Union and Santa Ana canals		Rubidoux Bridge, near Riverside		Above Hamner Avenue Bridge, near Corona	
	Measurement began	Dis-charge	Measurement began	Dis-charge	Measurement began	Dis-charge	Measurement began	Dis-charge	Measurement began	Dis-charge
Oct. 9	1.00 p. m.	95	2.05 p. m.	98	4.25 p. m.	130				
May 17	3.05 p. m.	124	3.50 p. m.	132	3.00 p. m.	129				
June 8	1.00 p. m.	150	2.10 p. m.	147	3.00 p. m.	104				0
15	1.25 p. m.	118	3.05 p. m.	106	2.25 p. m.	104			12.15 p. m.	1.2
22	12.10 p. m.	117	11.10 a. m.	100	10.20 a. m.	80				0
28	1.05 p. m.	111	12.05 p. m.	78	10.55 a. m.	88				0
July 6	11.20 a. m.	89	10.15 a. m.	93	9.30 a. m.	83				1.0
15	9.10 a. m.	74	10.25 a. m.	63	11.15 a. m.	63			1.40 p. m.	2.2
22	8.05 a. m.	81	9.10 a. m.	84	10.10 a. m.	75			11.25 a. m.	
29	9.40 a. m.	73	10.40 a. m.	72	9.00 a. m.	73				
Aug. 7	9.55 a. m.	79	8.10 a. m.	78	11.20 a. m.	68			1.20 p. m.	3.5
16	9.25 a. m.	80	10.20 a. m.	75	10.45 a. m.	64			12.20 p. m.	2.5
24	8.50 a. m.	76	9.45 a. m.	67	10.40 a. m.	64				
31	8.50 a. m.	69	9.55 a. m.	63	10.40 a. m.	59				
Sept. 8	1.20 p. m.	70	3.10 p. m.	74	2.25 p. m.	74				
15	9.40 a. m.	80	10.45 a. m.	81	11.45 a. m.	74			3.45 p. m.	7.4
21				77	10.40 a. m.	72			4.00 p. m.	6.8
22	9.40 a. m.	84	11.30 a. m.							

SOUTHERN CALIFORNIA EDISON CO.'S CANAL AND GREENSPOT PIPE LINE NEAR MENTONE, CALIF.

LOCATION.—At Southern California Edison Co.'s power plant at mouth of canyon, $2\frac{3}{4}$ miles below intake on Santa Ana River and 3 miles northeast of Mentone, San Bernardino County.

RECORDS AVAILABLE.—1896 to September 30, 1921.

DISCHARGE.—Canal discharge computed from records showing kilowatt output of power plant. Pipe line discharge computed from weir record at forebay. Records furnished by power company.

EXTREMES OF DISCHARGE.—1896-1921: Maximum mean daily canal discharge recorded, 97 second-feet March 16, 1905; no flow during short periods nearly every year.

DIVERSIONS.—Water diverted from the forebay by the Greenspot pipe line must be added to give total flow of canal above forebay. From 1903 to 1911 pipe line diverted from canal above forebay, but no discharge was reported. The present pipe line was put in operation September 7, 1911.

ACCURACY.—The record for power canal is computed on the assumption that 1 second-foot develops 18.9 kilowatts. The weir record for the pipe line is considered good.

COOPERATION.—Record furnished by Southern California Edison Co. through H. W. Dennis, chief engineer.

The intake of this canal is at Southern California Edison Co.'s power plant No. 2, $2\frac{3}{4}$ miles above the Mentone plant at the mouth of the canyon. All the water, except that taken by the Greenspot line, is first used for development of power. After it leaves the Mentone power house it is conducted across Santa Ana River in a flume and discharged into a lined canal from which it is distributed for irrigation. Before it enters the irrigation canal it passes through three power plants.

Daily discharge, in second-feet, of Southern California Edison Co.'s canal near Mentone, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1-----	77	61	43	40	59	53	67	56	75	69	67	67
2-----	77	51	48	40	56	51	64	59	75	72	72	64
3-----	75	48	43	40	56	53	67	59	72	72	67	64
4-----	72	45	40	37	53	53	75	67	72	67	69	64
5-----	72	43	35	37	59	53	67	64	69	69	72	64
6-----	72	45	40	35	56	51	67	72	72	61	69	67
7-----	67	53	43	35	48	64	64	69	69	64	75	69
8-----	69	51	43	35	45	56	64	69	69	69	72	67
9-----	75	45	51	45	48	53	64	72	67	72	72	67
10-----	75	40	45	45	51	51	61	67	64	69	64	67
11-----	75	43	45	45	48	51	61	59	67	72	64	67
12-----	72	45	48	45	51	69	59	64	61	69	64	64
13-----	75	43	48	48	53	83	75	59	67	69	64	64
14-----	72	43	43	48	56	80	59	67	64	69	64	67
15-----	72	43	40	48	53	77	59	67	67	72	69	61
16-----	69	43	40	48	53	77	56	67	64	69	69	69
17-----	72	40	45	48	51	77	56	69	67	69	64	67
18-----	69	40	45	38	53	85	56	72	61	67	72	67
19-----	83	37	48	20	53	85	61	75	64	64	75	67
20-----	64	45	61	69	53	80	75	67	61	69	75	59
21-----	53	48	44	69	48	77	56	80	59	75	75	61
22-----	48	53	45	59	44	85	61	80	64	72	72	64
23-----	51	56	45	53	51	88	48	80	67	61	69	64
24-----	53	53	43	53	51	83	72	80	67	64	64	61
25-----	61	53	43	53	53	83	59	77	77	64	69	61
26-----	59	53	43	53	53	85	59	80	67	64	69	61
27-----	59	53	43	42	53	75	56	80	64	64	64	61
28-----	59	51	43	83	53	69	56	80	64	67	67	64
29-----	67	48	43	85	-----	69	56	80	67	67	67	67
30-----	80	51	43	72	-----	67	56	83	69	67	64	67
31-----	77	-----	40	61	-----	67	-----	80	-----	69	64	-----

*Monthly discharge of Southern California Edison Co.'s canal near Mentone, Calif.,
for the year ending Sept. 30, 1921*

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	83	48	68.4	4,210
November.....	61	37	47.4	2,820
December.....	61	35	44.2	2,720
January.....	85	20	49.3	3,030
February.....	59	44	52.2	2,900
March.....	88	51	69.4	4,270
April.....	75	48	61.9	3,680
May.....	83	56	71.0	4,370
June.....	77	59	67.1	3,990
July.....	75	61	68.0	4,180
August.....	75	64	68.5	4,210
September.....	69	59	64.8	3,860
The year.....	88	20	61.1	44,200

*Daily discharge, in second-feet, of Greenspot pipe line near Mentone, Calif.,
for the year ending Sept. 30, 1921*

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	5.5	5.5	4	3	4	5	3	8	7	7	6	4.5
2.....	5.5	5.5	4	3	4	5	3	8	7	7	6	5.5
3.....	5.5	5.5	4	3	4	5	3	8	7	7	6	5.5
4.....	5.5	5.5	4	3	4	5	3	8	7	5.5	6	5.5
5.....	5.5	5.5	4	4	4	5	3	8	7	5.5	6	5.5
6.....	5.5	5.5	2	4	4	5	3	8	7	6.5	6	5.5
7.....	5.5	5.5	2	4	4	5	3	8	7	6.5	6	4.5
8.....	5.5	6	2	4	4	5	3	8	7	6.5	6	4.5
9.....	5.5	6	5.5	4	4	5	3	8	7	4.5	6	4.5
10.....	5.5	6	5.5	4	4	5	3	8	7	4.5	6	4.5
11.....	5.5	6	5.5	4	4	5	3	8	7	4.5	6	4.5
12.....	5.5	6	5.5	4	4	5	9	8	7	4.5	6	4.5
13.....	5.5	6	3	4	4	5	8	8	7	4.5	6	4.5
14.....	5.5	6	3	4	4	5	8	8	7	5.5	6	4.5
15.....	5.5	6	3	4	4	5	8	8	7	3	6	4.5
16.....	5.5	6	3	4	4	2	8	7	7	3	6	4.5
17.....	5.5	6	3	4	4	2	8	7	7	3	6	4.5
18.....	5.5	6	3	2.2	4	2	8	7	7	3	4.5	5
19.....	5.5	6	3	1.2	4	2	8	5	7.5	3	4.5	5
20.....	5.5	6	3	4	4	2	8	5	7.5	3	4.5	4.5
21.....	5.5	4	3	4	4	2	8	5	7.5	3	4.5	4.5
22.....	5.5	4	3	4	4	2	8	5	7.5	6	4.5	4.5
23.....	5.5	4	3	4	5	2	8	5	7.5	6	4.5	4.5
24.....	5.5	4	3	4	5	2	8	5	7.5	6	4.5	4.5
25.....	5.5	4	3	4	5	2	8	5	4	6	4.5	4.5
26.....	5.5	4	3	4	5	2	8	7	4	6	4.5	5
27.....	5.5	4	3	2.5	5	3	8	7	6	6	4.5	5
28.....	5.5	6	3	4	5	3	8	7	7	6	4.5	5
29.....	5.5	6	3	4	-----	3	8	7	7	6	4.5	5
30.....	5.5	6	3	4	-----	3	8	7	7	6	4.5	5
31.....	5.5	-----	3	4	-----	3	-----	7	-----	6	4.5	-----

Monthly discharge of Greenspot pipe line near Mentone, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	5.5	5.5	5.50	338
November.....	6	4.0	5.42	323
December.....	5.5	2.0	3.39	208
January.....	4	1.2	3.67	225
February.....	5	4.0	4.21	234
March.....	5	2.0	3.61	222
April.....	9	3.0	6.20	369
May.....	8	5	7.03	432
June.....	7.5	4	6.80	406
July.....	7	3.0	5.18	319
August.....	6	4.5	5.32	327
September.....	5.5	4.5	4.78	284
The year.....	9	1.2	5.09	3,690

MILL CREEK NEAR CRAFTONVILLE, CALIF.

LOCATION.—In NE. $\frac{1}{4}$ sec. 13, T. 1 S., R. 2 W., at mouth of canyon, on Redlands-Bear Valley highway, $5\frac{1}{4}$ miles northeast of Craftonville, San Bernardino County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—January 21, 1919, to September 30, 1921.

GAGE.—Water-stage recorder on left bank just above Southern California Edison Co.'s concrete diversion dam.

DISCHARGE MEASUREMENTS.—Made from highway bridge 75 feet below gage or by wading.

CHANNEL AND CONTROL.—Bed consists of gravel and boulders; shifts during high stages. Control is concrete diversion dam, but is not very satisfactory on account of the gravel which collects at the dam.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 0.90 foot at 6 a. m. March 14 (discharge, from extension of rating curve, about 280 second-feet); all water diverted into Mill Creek power canal No. 1 at various times during year.

1919-1921: Maximum stage recorded, 2.00 feet February 22, 1920 (discharge, about 650 second-feet); all water diverted into Mill Creek power canal No. 1 at various times.

DIVERSIONS.—Mill Creek power canal No. 1 heads at the diversion dam at the station. Power canal No. 2 heads about 3 miles farther up the canyon and canal No. 3 about 3 miles above the headworks of canal No. 2. Canals No. 2 and 3 lead to power plants No. 2 and 3, which are located in a combined power house near the intake of canal No. 1. The tailrace of the combined power house discharges into canal No. 1, and the water is used in power plant No. 1. Water is diverted from Mill Creek by canal No. 1 only when the water discharged from the combined power house is insufficient to operate power plant No. 1 to capacity. When canal No. 1 can not take all the flow in the creek it is not operated as the diversions by canals Nos. 2 and 3 furnish sufficient water for plant No. 1.

ACCURACY.—Stage-discharge relation not permanent. Rating curves fairly well defined. Water-stage recorder operated part of time. Daily discharge ascertained by applying mean daily gage height to rating tables, interpolating between measurements, estimated by employees of Southern California

Edison Co., or by measurements over weir in Mill Creek power canal No. 1. Combined daily discharge of creek and canals is the sum of the flow in creek, in power canal No. 1, and power canal No. 2 and 3 (see p. 47 for record of flow in canals). Records fair.

COOPERATION.—Water-stage recorder attended by electrician of Southern California Edison Co.

Discharge measurements of Mill Creek near Craftonville, Calif., during the year ending Sept. 30, 1921

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>
Mar. 17	F. C. Ebert	0.31	13	June 3	Jarrett Oliver	0.31	22
May 24	Ebert and Oliver	.40	25	6	Oliver and Ebert	.28	18
27	Jarrett Oliver	.39	25	9	F. C. Ebert	.30	22
27	do	.38	27	14	Jarrett Oliver	.25	16
27	do	.38	25	23	Arnold and Ebert		13
31	do	.31	23				

Daily discharge, in second-feet, of Mill Creek near Craftonville, Calif., for the year ending Sept. 30, 1921

Day	Jan.	Mar.	Apr.	May	June	Day	Jan.	Mar.	Apr.	May	June
1				8	26	16		40		14	16
2					26	17		13		14	15
3					24	18	50			16	15
4				2	24	19	50	13		16	15
5				2	23	20	11	7		16	15
6				9	23	21				23	13
7				13	23	22				19	12
8				13	23	23			1.0	29	13
9				14	23	24			3.0	25	11
10			1.0	14	23	25				25	7
11				14	21	26				25	
12			43	14	20	27				26	
13		114		14	19	28	7		1.0	26	
14		114		13	18	29			4.0	27	
15		60		14	17	30			8.0	28	
						31				28	

NOTE.—All water in creek diverted into Mill Creek power canal No. 1 when discharge is not given.

Monthly discharge of Mill Creek near Craftonville, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
January	50	0	3.81	234
March	114	0	13.5	830
April	8	0	.60	35.7
May	29	0	16.2	996
June	26	0	15.5	922
The year	114	0	4.16	3,020

NOTE.—Flow diverted into power canal No. 1 during months for which no records are given.

Combined daily discharge, in second-feet, of Mill Creek and power canals Nos. 1, 2, and 3, near Craftonville, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	24	28	26	27	24	25	35	47	58	37	29	24
2.....	24	26	26	26	24	27	36	40	58	37	28	23
3.....	23	27	26	26	24	27	37	40	56	37	28	23
4.....	23	26	26	25	24	26	39	43	56	37	26	24
5.....	23	25	26	25	27	27	38	42	55	36	27	23
6.....	23	26	26	24	23	26	37	40	55	36	30	22
7.....	23	27	26	24	23	26	37	44	55	34	32	22
8.....	23	27	26	24	25	25	36	45	55	34	31	22
9.....	23	27	26	24	25	25	36	46	55	34	28	22
10.....	25	26	25	24	26	26	35	46	55	34	28	22
11.....	25	26	25	24	27	27	37	46	53	34	28	22
12.....	24	27	26	25	26	72	36	46	52	35	27	22
13.....	24	26	26	24	27	142	36	45	51	34	26	22
14.....	24	26	26	24	28	142	37	44	50	35	26	22
15.....	24	27	26	24	26	88	36	46	48	38	26	21
16.....	28	26	25	20	26	68	36	46	48	37	25	21
17.....	30	24	25	27	28	45	36	46	47	35	25	21
18.....	30	24	25	78	26	45	35	47	47	34	26	21
19.....	29	24	26	73	26	44	36	48	47	33	24	21
20.....	30	24	31	36	25	42	35	48	47	34	24	20
21.....	29	26	30	25	25	40	37	54	44	34	29	20
22.....	31	26	29	24	25	40	41	51	44	33	28	20
23.....	29	26	29	24	25	38	43	57	44	32	30	20
24.....	25	26	29	23	26	37	42	57	42	31	29	20
25.....	24	26	28	23	27	37	38	57	41	32	25	19
26.....	24	26	28	24	27	37	39	57	42	31	27	19
27.....	24	26	28	26	27	38	39	58	40	30	28	19
28.....	24	26	28	34	29	36	40	58	39	30	26	19
29.....	24	26	28	28	-----	36	41	59	39	29	27	19
30.....	27	26	28	26	-----	36	47	60	38	29	27	28
31.....	29	-----	27	24	-----	35	-----	60	-----	29	24	-----

Combined monthly discharge of Mill Creek and power canals Nos. 1, 2, and 3, near Craftonville, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	31	23	25.5	1,570
November.....	28	24	26.0	1,550
December.....	31	25	26.8	1,650
January.....	78	20	28.5	1,750
February.....	29	23	25.8	1,430
March.....	142	25	44.7	2,750
April.....	47	35	37.8	2,250
May.....	60	40	40.1	3,020
June.....	58	38	48.7	2,900
July.....	37	29	33.7	2,070
August.....	32	24	27.2	1,670
September.....	28	19	21.4	1,270
The year.....	142	19	33.0	23,900

MILL CREEK POWER CANALS NOS. 2 AND 3, NEAR CRAFTONVILLE, CALIF.

LOCATION.—In NE. $\frac{1}{4}$ sec. 13, T. 1 S., R. 2 W., at Southern California Edison Co.'s power plant near Redlands-Bear Valley highway, 5 miles northeast of Craftonville, San Bernardino County.

RECORDS AVAILABLE.—January 1, 1919, to September 30, 1921.

DISCHARGE.—Computed from weir records taken in tailrace of combined power plants.

EXTREMES OF DISCHARGE.—Maximum mean daily discharge recorded during year, 33 second-feet March 22 and 27, minimum mean daily discharge recorded, 16.9 second-feet September 26 to 29.

1919-1921. Maximum mean daily discharge recorded, 34 second-feet April 18 and 22, 1920; minimum mean daily discharge recorded, 9.5 second-feet October 13, 1919.

ACCURACY.—Records good.

COOPERATION.—Records furnished by Southern California Edison Co. Mill Creek power canal No. 2 diverts from Mill Creek in sec. 8, T. 1 S., R. 1 W. The headworks of canal No. 3 are in sec. 13, T. 1 S., R. 1 W., about 3 miles above the intake of canal No. 2. The canals serve power plants Nos. 2 and 3 which discharge into a common tailrace. The water then passes into Mill Creek power canal No. 1 and is used again at power plant No. 1.

Daily discharge, in second-feet, of Mill Creek power canals Nos. 2 and 3, near Craftonville, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	22	25	24	25	21	22	32	32	32	30	26	22
2.....	22	24	24	24	21	24	32	32	32	31	25	21
3.....	21	24	24	24	21	24	32	32	32	30	25	21
4.....	21	23	24	23	21	23	32	32	32	31	24	22
5.....	21	22	24	23	23	24	32	32	32	31	24	21
6.....	21	23	24	22	18	22	32	31	32	31	25	19.8
7.....	21	23	24	22	20	22	32	31	32	30	26	20
8.....	21	24	24	22	22	21	32	32	32	30	22	20
9.....	21	24	24	22	22	22	32	32	32	30	24	20
10.....	22	23	23	22	23	23	32	32	32	30	25	19.9
11.....	22	23	23	22	24	24	32	32	32	30	25	19.9
12.....	21	24	24	23	23	27	32	32	32	30	24	19.9
13.....	21	23	24	22	24	28	32	31	32	30	23	19.4
14.....	21	23	24	22	24	28	32	31	32	30	23	19.4
15.....	21	24	24	22	22	28	32	32	31	31	23	19.1
16.....	21	23	23	18	22	28	32	32	32	32	23	19.2
17.....	22	22	23	24	23	32	32	32	32	31	23	19.2
18.....	22	22	23	27	22	32	32	31	32	31	23	19.2
19.....	23	22	22	23	22	31	31	32	32	30	22	18.6
20.....	25	22	26	22	22	31	30	32	32	30	22	18.2
21.....	25	24	26	20	22	32	32	31	31	30	26	18.2
22.....	27	24	25	20	22	33	32	32	32	30	25	18.2
23.....	26	24	26	20	22	32	32	28	31	29	26	18.2
24.....	22	24	26	20	23	32	32	32	31	28	24	18.0
25.....	22	24	25	20	24	32	32	32	32	29	22	17.6
26.....	22	24	25	21	24	32	32	32	32	28	24	16.9
27.....	22	24	25	22	24	33	32	32	31	27	25	16.9
28.....	22	24	25	23	26	32	32	32	30	27	24	16.9
29.....	22	24	25	22	-----	32	31	32	31	26	24	16.9
30.....	23	24	25	21	-----	32	32	32	30	26	25	25
31.....	25	-----	25	20	-----	32	-----	32	-----	26	22	-----

Monthly discharge of Mill Creek power canals Nos. 2 and 3, near Craftonville, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	27	21	22.3	1,370
November.....	25	22	23.4	1,390
December.....	26	22	24.3	1,490
January.....	27	18	22.0	1,350
February.....	26	18	22.4	1,240
March.....	33	21	28.1	1,730
April.....	32	30	31.9	1,900
May.....	32	28	31.7	1,950
June.....	32	30	31.7	1,890
July.....	32	26	29.5	1,810
August.....	26	22	24.0	1,480
September.....	25	16.9	19.4	1,150
The year.....	33	16.9	25.9	18,800

MILL CREEK POWER CANAL NO. 1 NEAR CRAFTONVILLE, CALIF.

LOCATION.—In NE. $\frac{1}{4}$ sec. 13, T. 1 S., R. 2 W., one-fourth mile below diversion dam on Mill Creek, on Redlands-Bear Valley highway, 5 miles northeast of Craftonville, San Bernardino County.

RECORDS AVAILABLE.—January 21, 1919, to September 30, 1921.

GAGE.—Water-stage recorder just above weir, one-fourth mile below intake.

DISCHARGE.—Computed from gage-height record showing head over 6-foot, sharp-crested, rectangular weir without end contractions.

ACCURACY.—Discharge obtained by applying mean daily gage height to weir tables. Records good.

COOPERATION.—Water-stage recorder attended by electrician of Southern California Edison Co.

Canal diverts water from Mill Creek in NE. $\frac{1}{4}$ sec. 13, T. 1 S., R. 2 W., at gaging station on Mill Creek near Craftonville and after going through Mill Creek power house No. 1 is distributed for irrigation.

Daily discharge, in second-feet, of Mill Creek power canal No. 1 near Craftonville, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	2.3	2.5	2.1	2.3	3.3	2.8	3.4	6.6	-----	6.9	2.8	2.2
2	2.3	2.5	2.1	2.3	3.0	3.0	3.8	7.5	-----	6.2	2.6	2.1
3	2.3	2.6	2.1	2.3	3.0	3.1	4.9	8.1	-----	6.9	2.5	2.2
4	2.3	2.6	2.1	2.3	2.8	3.1	7.3	8.6	-----	5.8	2.5	2.1
5	2.3	3.0	2.2	2.3	4.3	3.1	6.0	8.4	-----	5.1	2.8	2.2
6	2.3	3.4	2.2	2.3	4.9	4.0	5.1	-----	-----	4.5	4.7	2.1
7	2.3	4.0	2.5	2.3	3.0	4.3	4.7	-----	-----	3.8	5.8	2.1
8	2.3	3.4	2.2	2.3	2.8	4.0	3.8	-----	-----	4.0	9.1	2.1
9	2.3	3.1	2.2	2.3	2.6	3.3	3.6	-----	-----	4.1	3.8	2.1
10	2.8	3.0	2.2	2.5	2.6	3.1	2.4	-----	-----	3.6	3.0	2.1
11	2.8	2.8	2.3	2.3	2.8	3.0	5.1	-----	-----	4.0	2.6	2.3
12	3.0	2.8	2.5	2.3	2.6	2.3	4.5	-----	-----	4.7	2.6	2.3
13	3.0	2.6	2.3	2.3	2.6	-----	4.3	-----	-----	4.1	2.5	2.3
14	3.3	3.0	2.3	2.3	4.0	-----	5.4	-----	-----	5.1	2.6	2.2
15	3.0	2.8	2.3	2.2	4.0	-----	4.3	-----	-----	6.9	2.5	2.2
16	7.1	2.5	2.2	2.1	3.8	-----	4.0	-----	-----	4.7	2.3	2.2
17	7.6	2.5	2.3	2.6	4.5	-----	3.6	-----	-----	3.8	2.3	2.2
18	8.1	2.3	2.3	1.2	4.0	-----	3.4	-----	-----	3.4	2.5	2.2
19	6.3	2.2	4.1	0	3.6	-----	4.5	-----	-----	3.3	2.5	2.2
20	4.5	2.2	5.1	2.6	3.3	4.5	4.7	-----	-----	3.8	2.5	2.1
21	4.0	2.2	4.0	4.7	3.3	8.1	5.4	-----	-----	3.6	3.0	1.9
22	3.6	2.2	3.6	4.0	3.1	7.1	8.6	-----	-----	3.1	3.3	1.8
23	3.3	2.2	3.3	3.6	3.0	6.2	10	-----	-----	3.0	4.1	1.8
24	3.0	2.3	3.1	3.3	2.8	5.4	6.6	-----	-----	2.8	3.3	1.8
25	2.5	2.3	3.0	3.0	2.6	5.2	6.4	-----	2.4	2.6	2.8	1.8
26	2.3	2.5	2.6	2.8	2.6	5.1	7.1	-----	9.8	2.6	2.6	1.9
27	2.2	2.2	2.6	3.6	2.6	4.5	7.3	-----	9.1	3.0	2.8	2.2
28	2.2	2.2	2.6	3.6	2.6	4.0	6.9	-----	8.6	3.0	2.5	2.3
29	2.2	2.1	2.5	6.2	-----	3.8	6.2	-----	7.9	2.8	2.6	2.3
30	3.6	2.1	2.5	4.7	-----	3.6	7.1	-----	7.5	2.8	2.3	3.4
31	3.6	-----	2.3	4.0	-----	3.3	-----	-----	-----	2.8	2.2	-----

NOTE.—No water diverted when discharge is not given. Recorder not working Oct. 17, 19, 21-23, and 31; discharge interpolated.

Monthly discharge of Mill Creek power canal No. 1 near Craftonville, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	8.1	2.2	3.38	208
November.....	4.0	2.1	2.60	155
December.....	5.1	2.1	2.64	162
January.....	6.2	0	2.79	172
February.....	4.9	2.6	3.22	179
March.....	8.1	0	3.22	198
April.....	10	2.4	5.35	318
May.....	8.6	0	1.26	77.5
June.....	9.8	0	1.51	89.8
July.....	6.9	2.6	4.09	251
August.....	9.1	2.2	3.10	191
September.....	3.4	1.8	2.16	129
The year.....	10	0	2.94	2,130

PLUNGE CREEK NEAR EAST HIGHLANDS, CALIF.

LOCATION.—In NE. $\frac{1}{4}$ sec. 1, T. 1 S., R. 3 W., at mouth of canyon at crossing of North Fork ditch siphon, 2 miles northeast of East Highlands, San Bernardino County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—January 26, 1919, to September 30, 1921.

GAGE.—Water-stage recorder installed in concrete well and shelter on left bank about 10 feet above siphon.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—Bed composed of gravel and boulders; shifting. Control is section of abandoned steel pipe line filled with sand and gravel and imbedded in channel. Right bank high; left bank is overflowed during extreme floods.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 3.15 feet at 4 a. m. March 14 (discharge, 1,100 second-feet); no flow for several months during year.

1919-1921: Maximum stage, from water-stage recorder, 3.15 feet at 4 a. m. March 14, 1921 (discharge, 1,100 second-feet); no flow for several months during each year.

DIVERSIONS.—The East Highlands Orange Co. controls Plunge Creek water and diverts at several points, from 2 to 5 miles above station. A small quantity of water is diverted about 200 feet above gage, which is wasted back into creek just below control when not needed for irrigation.

REGULATION.—None.

ACCURACY.—Stage-discharge relation not permanent. Three fairly well defined rating curves used during year. The water-stage recorder operated satisfactorily. Daily discharge ascertained by applying to rating table mean daily gage height determined by inspecting water-stage recorder graph. Records fair.

Discharge measurements of Plunge Creek near East Highlands, Calif., during the year ending Sept. 30, 1921

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. 27	Jarrett Oliver	0.00	0.02	Mar. 30	Jarrett Oliver	0.55	7.4
Dec. 9	do	.13	a .15	Apr. 12	do	.46	4.2
20	do	.48	3.3	22	do	.29	.8
Jan. 19	do	.82	26	May 9	do	.35	1.6
28	do	.92	36	24	Ebert and Oliver	.82	30
Feb. 4	do	.47	5.5	27	Jarrett Oliver	.63	12
15	do	.50	6.2	31	do	.53	6.8
21	do	.46	4.9	June 3	do	.53	5.9
Mar. 4	do	.39	1.7	7	Ebert and Oliver	.35	1.5
17	do	.95	33	14	Jarrett Oliver	.28	.5
25	do	.57	9.1	23	Arnold and Ebert	.14	.02

^a Estimated.

Daily discharge, in second-feet, of Plunge Creek, near East Highlands, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1.				8	1.7	4.8	0.2	7.5
2.				6	1.9	4.4	.2	7
3.				5	1.9	4.1	.3	7
4.				5	2.0	6.5	.3	6.5
5.				7	1.9	4.1	.8	5.5
6.		0.1		5.5	3.2	4.1	3.8	4.
7.		.2		4.7	4.8	3.8	3.8	3.
8.		.2		4.4	2.8	3.5	1.4	1.8
9.		.2		4.1	2.8	3.2	1.8	1.9
10.		.3		3.8	2.8	3.5	1.6	.8
11.		.3		3.8	2.5	4.1	.9	.6
12.		.2		3.8	10	3.8	.7	.5
13.				3.8	125	3.8	.7	.6
14.				5.5	427	3.2	.7	.4
15.		.2		6.5	101	2.2	.5	.4
16.		.3		5	55	3.2	.8	.3
17.		.5	0.1	6	40	2.1	1.6	.2
18.		.7	41	5	31	1.4	4.8	
19.	0.9	3.3	26	5	24	1.4	3.2	
20.		6	15	4.7	20	1.3	3.5	
21.		1.0	10	4.7	17	1.1	42	
22.			7	4.1	15	1.0	61	
23.			6	3.6	13	1.1	44	
24.			5.5	2.6	10	1.3	25	
25.			5.5	2.6	9	1.0	19	
26.			5	2.5	8.5	.7	14	
27.			8.5	2.5	7.5	.4	11	
28.			40	2.3	7.5	.4	10	
29.			18		8	.3	9	
30.			19		8	.2	8.5	
31.			11		6.5		8	

NOTE.—Discharge interpolated Jan. 24–26. No flow when discharge is not given.

Monthly discharge of Plunge Creek near East Highlands, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	0.9	0	0.03	1.8
December	6	0	.44	27.1
January	41	0	6.83	420
February	8	2.3	4.55	253
March	427	1.7	31.3	1,920
April	6.5	.2	2.53	151
May	61	.2	9.13	561
June	7.5	0	1.60	95.2
The year	427	0	4.74	3,430

NOTE.—No flow during months for which no record is given.

WARM CREEK NEAR COLTON, CALIF.

LOCATION.—In SW. $\frac{1}{4}$ sec. 21, T. 1 S., R. 4 W., at Colton Avenue highway bridge, $1\frac{1}{4}$ miles east of Colton, San Bernardino County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—August 7, 1920, to September 30, 1921.

GAGE.—Water-stage recorder in concrete well and shelter on right bank just above highway bridge.

DISCHARGE MEASUREMENTS.—Made from highway bridge or by wading, 50 feet below bridge.

CHANNEL AND CONTROL.—Constantly shifting sand.

EXTREMES OF DISCHARGE.—Maximum stage during the period of record from water-stage recorder, 5.88 feet at 6.30 a. m. March 14 (discharge, 2,100 second-feet); minimum stage, from water-stage recorder, 0.88 foot at 6 p. m. August 27, 1921 (discharge, 43 second-feet).

DIVERSIONS.—Meeks and Daley canal diverts water half a mile above the gage.
REGULATION.—Slightly regulated by diversion into Meeks and Daley canal.

ACCURACY.—State-discharge relation constantly changing. Standard rating curves fairly well defined. Water-stage recorder operated satisfactorily during the period. Daily discharge ascertained by shifting-control method. Records good.

Discharge measurements of Warm Creek near Colton, Calif., during the period Aug. 7, 1920, to Sept. 30, 1921

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>
1920				1921			
Aug. 7	Jarrett Oliver	1.20	66	Mar. 25	Jarrett Oliver	2.30	90
Sept. 18	do	1.12	55	Apr. 4	do	2.24	93
25	do	1.24	67	9	do	2.11	85
Oct. 28	do	1.20	54	18	do	2.01	84
Nov. 20	do	1.46	65	20	do	1.98	74
27	do	1.49	69	23	do	1.93	71
Dec. 4	do	1.57	73	30	do	1.80	60
11	do	1.61	62	May 6	do	2.04	93
18	do	1.65	67	11	McGlashan and Ebert.	1.68	62
1921				28	Jarrett Oliver	1.74	67
Jan. 8	do	1.84	71	June 7	F. C. Ebert	1.58	64
15	do	1.87	76	11	Jarrett Oliver	1.52	57
21	do	2.20	94	17	do	1.65	66
26	Oliver and Ebert	2.21	93	24	Arnold and Ebert	1.51	61
Feb. 5	Jarrett Oliver	2.26	86	30	do	1.50	67
8	F. C. Ebert	2.22	101	July 7	F. C. Ebert	1.37	66
11	Jarrett Oliver	2.23	85	16	Jarrett Oliver	1.21	51
19	do	2.20	77	23	do	1.13	47
26	do	2.17	80	30	do	1.08	48
Mar. 4	do	2.19	84	Aug. 7	do	1.02	49
9	do	2.17	81	20	do	.96	54
12	do	2.42	110	27	do	.88	43
13	do	2.88	173	Sept. 3	do	.88	49
14	do	5.37	1,640	10	do	.87	46
19	do	2.27	101	17	do	.88	49
				24	do	.88	50

Daily discharge, in second-feet, of Warm Creek near Colton, Calif., for the years ending Sept. 30, 1920 and 1921

Day	Aug.	Sept.	Day	Aug.	Sept.	Day	Aug.	Sept.
1920			1920			1920		
1.....		60	11.....	65	56	21.....	62	59
2.....		60	12.....	64	56	22.....	62	61
3.....		59	13.....	64	55	23.....	61	63
4.....		59	14.....	63	54	24.....	62	64
5.....		59	15.....	62	54	25.....	61	66
6.....		59	16.....	62	54	26.....	61	66
7.....	65	58	17.....	62	54	27.....	61	65
8.....	65	58	18.....	62	55	28.....	61	64
9.....	65	57	19.....	62	56	29.....	62	64
10.....	65	57	20.....	62	57	30.....	61	64
						31.....	61	

Daily discharge, in second-feet, of Warm Creek near Colton, Calif., for the years ending Sept. 30, 1920 and 1921—Continued

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1920-21												
1.....	64	56	71	72	91	82	88	62	66	67	50	45
2.....	63	56	74	72	88	81	88	64	65	67	50	46
3.....	63	56	73	73	87	82	88	64	65	67	49	46
4.....	62	56	73	72	86	83	85	65	65	66	48	46
5.....	62	57	72	72	91	82	93	70	65	66	48	46
6.....	62	58	70	71	94	82	91	79	64	66	48	46
7.....	61	59	68	72	94	85	87	77	63	66	50	46
8.....	59	59	66	71	101	88	86	70	62	62	50	46
9.....	58	60	64	71	95	81	85	66	59	60	51	46
10.....	58	60	63	72	89	84	84	64	58	58	51	46
11.....	58	60	63	72	84	86	85	62	57	57	51	46
12.....	58	60	65	74	82	104	89	62	58	56	51	46
13.....	58	61	63	76	82	189	90	61	59	54	51	47
14.....	58	61	64	76	86	674	88	61	60	53	52	47
15.....	57	63	64	77	84	114	84	60	61	52	52	48
16.....	56	64	65	77	81	95	86	60	63	51	52	49
17.....	56	64	66	79	81	93	86	60	65	50	52	50
18.....	56	65	67	200	79	97	86	60	64	50	52	50
19.....	57	65	75	112	78	101	78	62	64	49	52	50
20.....	56	65	74	98	77	101	73	64	63	49	53	50
21.....	56	65	72	101	79	99	72	68	63	49	51	50
22.....	56	66	72	101	78	99	72	75	64	47	49	50
23.....	55	66	72	100	78	97	71	72	62	47	48	50
24.....	55	67	72	93	79	94	69	67	61	47	47	50
25.....	55	68	73	91	79	90	67	66	62	47	45	51
26.....	54	69	72	91	80	89	65	66	63	47	44	51
27.....	54	69	71	97	79	90	64	66	64	48	43	51
28.....	54	70	71	118	82	90	62	67	65	48	44	51
29.....	54	70	71	98	-----	88	61	66	66	49	44	51
30.....	57	70	71	95	-----	88	59	66	67	49	44	63
31.....	56	-----	72	94	-----	89	-----	66	-----	50	44	-----

NOTE.—Intake to gage well obstructed June 23 to July 6; discharge estimated.

Monthly discharge of Warm Creek near Colton, Calif., for the years ending Sept. 30, 1920 and 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
1920				
August 7-31.....			62.5	3,100
September.....	66	54	59.1	3,520
The period.....				6,620
1920-21				
October.....	64	54	57.7	3,550
November.....	70	56	62.8	3,740
December.....	75	63	69.3	4,260
January.....	200	71	88.3	5,430
February.....	101	77	84.4	4,690
March.....	674	81	113	6,950
April.....	95	59	79.7	4,740
May.....	79	60	65.7	4,040
June.....	67	57	62.8	3,740
July.....	67	47	54.6	3,360
August.....	53	43	48.9	3,010
September.....	63	45	48.7	2,900
The year.....	674	43	69.6	50,400

Combined daily discharge, in second-feet, of Warm Creek and Meeks and Daley canal near Colton, Calif., for the period Sept. 18, 1920, to Sept. 30, 1921

Day	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1		78	66	79	75	91	82	96	76	70	83	64	60
2		76	66	82	74	88	81	95	76	70	85	65	59
3		75	65	80	76	87	82	95	73	74	84	64	58
4		74	64	80	76	86	83	104	76	76	83	63	58
5		74	63	78	77	91	82	103	85	74	80	63	59
6		73	60	76	76	94	82	100	90	72	81	63	60
7		72	61	74	77	94	85	96	85	73	83	64	59
8		69	61	72	76	101	82	95	79	71	79	66	58
9		67	61	70	76	95	81	94	74	67	77	66	58
10		68	64	69	73	89	84	92	72	67	75	65	59
11		67	68	67	78	84	86	93	71	65	74	66	60
12		67	68	66	79	82	104	97	70	67	73	65	60
13		67	68	66	80	84	189	96	68	71	68	65	60
14		67	69	69	80	88	675	94	68	73	67	66	59
15		66	65	70	81	85	114	91	72	74	66	66	60
16		65	66	72	81	82	95	94	73	77	66	68	62
17		66	66	73	81	82	93	94	72	77	65	68	63
18	69	67	67	74	202	80	97	91	72	74	65	68	63
19	71	69	67	78	114	79	101	87	76	74	62	67	63
20	71	62	73	74	100	78	101	85	78	74	63	67	64
21	73	62	72	72	101	80	99	85	73	70	59	65	64
22	75	62	73	72	101	79	99	84	82	67	62	64	64
23	77	60	73	72	100	79	97	85	79	72	62	63	64
24	79	62	74	72	93	80	94	84	73	78	61	62	62
25	79	62	75	74	91	79	90	81	71	77	62	59	62
26	78	61	76	74	91	80	89	78	71	77	62	58	63
27	77	61	76	74	97	79	90	78	71	77	62	58	64
28	78	62	77	74	118	82	90	76	72	79	60	58	63
29	78	62	77	74	98	88	88	75	71	82	60	58	66
30	78	67	77	74	95	88	88	73	71	83	64	58	75
31		66	75	94	94	92	92	71	71	65	58	58	

NOTE.—For records of Meeks and Daley canal, see pp. 64-65.

Combined monthly discharge of Warm Creek and Meeks and Daley canal near Colton, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	78	60	67.0	4, 120
November	77	60	68.6	4, 080
December	82	66	73.4	4, 510
January	202	74	90.8	5, 580
February	101	78	84.9	4, 720
March	675	81	113	6, 950
April	104	73	89.7	5, 340
May	90	68	74.5	4, 580
June	83	65	73.4	4, 370
July	85	59	69.6	4, 280
August	68	58	63.5	3, 900
September	75	58	61.6	3, 670
The year	675	58	77.5	56, 100

STRAWBERRY CREEK NEAR ARROWHEAD SPRINGS, CALIF.

LOCATION.—At Del Rosa Water Co.'s diversion dam in SE. $\frac{1}{4}$ sec. 11, T. 1 N., R. 4 W., half a mile south of Arrowhead Springs, San Bernardino County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—December 27, 1919, to September 30, 1921.

GAGE.—Water-stage recorder in concrete well and house on right bank 100 feet above diversion dam.

DISCHARGE MEASUREMENTS.—Made from footbridge 200 feet above gage or by wading.

CHANNEL AND CONTROL.—Bed consists of large boulders. Control consists of boulders concreted together.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 3.70 feet at 4 a. m. March 14 (discharge, 360 second-feet); minimum stage, 0.62 foot at 5 p. m. September 26 (discharge, 0.7 second-foot).

1920-1921: Maximum and minimum stages the same as for the year ending September 30, 1921.

DIVERSIONS.—Arrowhead Hotel Co. diverts water from East Twin Creek 1 mile above the gage through a 3-inch pipe line for domestic use.

REGULATION.—Slight regulation at low water from diversion of Arrowhead Hotel Co.

ACCURACY.—Stage-discharge relation changed slightly due to debris on control. Rating curves fairly well defined. Water-stage recorder operated satisfactorily except for periods indicated in footnote to daily-discharge table. Daily discharge ascertained by applying mean daily gage height to rating table and interpolating for periods of no gage-height record. Records good.

Discharge measurements of Strawberry Creek near Arrowhead Springs, Calif., during the year ending Sept. 30, 1921

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. 17	Jarrett Oliver.....	0.87	2.3	Apr. 6	Jarrett Oliver.....	1.11	5.4
Dec. 8	do.....	.88	2.9	21	do.....	1.00	3.5
14	Oliver and Mariave....	.88	3.0	May 9	do.....	1.05	4.4
Jan. 4	Jarrett Oliver.....	.88	2.7	22	Thompson and Oliver..	1.94	27
14	do.....	.87	2.6	25	Jarrett Oliver.....	1.58	14.3
19	do.....	1.73	20	31	do.....	1.34	7.7
23	do.....	1.38	8.8	June 4	do.....	1.29	6.3
Feb. 4	do.....	1.05	4.8	17	do.....	1.13	4.8
18	do.....	1.02	4.1	23	Arnold and Ebert.....	1.05	3.9
Mar. 3	do.....	.91	3.3	28	do.....	.94	2.8
16	do.....	1.66	17	July 20	Jarrett Oliver.....	.86	1.7
23	do.....	1.24	6.8	Aug. 15	do.....	.72	.7

Daily discharge, in second-feet, of Strawberry Creek near Arrowhead Springs, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	0.9	3.7	3.4	3.0	5.5	3.2	4.5	3.2	6.5	2.7	1.8	1.0
2	.9	3.4	3.6	3.0	4.9	3.0	4.4	3.2	6.5	2.7	1.7	1.2
3	1.0	3.4	3.5	3.0	4.7	3.1	4.9	3.3	6.5	2.9	1.4	1.4
4	1.0	3.3	3.4	3.0	4.6	3.0	7.5	3.3	6.5	2.6	1.2	1.2
5	1.0	3.4	3.3	3.1	6	3.0	5.5	4.1	6	2.5	1.2	1.0
6	1.0	3.7	3.2	3.0	5.5	3.6	5	6	5.5	2.2	1.4	1.0
7	1.1	3.4	3.4	3.1	4.7	3.6	4.8	5.5	5.5	2.2	1.6	.9
8	1.2	3.8	3.2	2.8	4.5	3.5	4.6	4.7	4.7	2.3	1.6	.9
9	1.4	3.7	3.1	3.0	4.3	3.3	4.4	4.4	4.7	2.5	1.6	1.1
10	1.2	3.3	3.1	3.0	4.0	3.3	4.3	4.2	4.7	2.3	1.3	1.2
11	1.2	3.2	3.3	3.0	3.8	3.3	4.5	3.9	4.4	2.2	1.3	1.2
12	1.3	3.2	3.4	3.0	3.8	8	4.6	3.8	4.4	1.8	1.2	1.2
13	1.5	3.1	3.1	3.0	3.8	34	4.7	3.7	4.5	1.8	1.2	1.2
14	1.1	3.1	3.0	3.0	4.3	103	4.9	3.6	4.5	1.8	1.2	1.2
15	1.1	3.0	3.0	2.9	4.4	31	4.5	3.7	4.7	2.0	1.4	1.1
16	1.0	3.0	3.0	2.9	4.1	18	4.4	4.1	4.5	1.8	1.2	1.1
17	1.4	3.0	3.0	3.2	4.4	14	4.3	4.5	4.4	1.7	1.0	1.1
18	2.6	3.1	3.0	3.4	4.2	12	4.2	6	4.3	1.6	1.0	1.0
19	11	3.2	5.5	19	4.0	10	4.0	4.8	4.0	1.5	1.0	1.0
20	4.8	3.2	5	12	3.8	9	4.0	9	3.8	1.9	1.0	1.0
21	3.7	3.2	4.2	11	3.8	8	3.8	34	3.7	1.8	.9	1.0
22	3.3	3.2	3.6	9	3.7	7	3.8	30	3.6	1.7	.9	.9
23	3.0	3.2	3.5	8	3.4	6.5	3.8	24	3.4	1.7	1.0	.9
24	2.7	3.3	3.5	7.5	3.3	6	4.1	17	3.3	1.7	1.2	.9
25	2.7	3.3	3.4	7	3.4	5.5	3.8	13	3.1	1.8	1.2	.8
26	2.6	3.3	3.4	6	3.3	5.5	3.8	13	2.9	1.6	1.0	.8
27	2.6	3.3	3.3	7.5	3.4	5	3.4	12	2.9	1.6	1.0	.8
28	2.7	3.4	3.2	11	3.4	5	3.3	11	2.6	1.6	1.2	.8
29	2.6	3.4	3.2	8	-----	4.8	3.2	9.5	2.6	1.6	1.0	.9
30	6	3.4	3.1	7	-----	4.5	3.1	8.5	2.7	1.7	1.0	2.7
31	4.2	-----	3.1	6.5	-----	4.7	-----	7.5	-----	1.8	1.0	-----

NOTE.—Recorder did not operate properly Oct. 3-6, Nov. 11-16, and Sept. 13-20; discharge interpolated.

Monthly discharge of Strawberry Creek near Arrowhead Springs, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	11	0.9	2.38	146
November.....	3.8	3.0	3.31	197
December.....	5.5	3.0	3.42	210
January.....	32	2.8	6.53	402
February.....	6	3.3	4.18	232
March.....	103	3.0	10.9	670
April.....	7.5	3.1	4.34	258
May.....	34	3.2	8.66	532
June.....	6.5	2.6	4.38	261
July.....	2.9	1.5	1.99	122
August.....	1.8	.9	1.22	75.0
September.....	2.7	.8	1.08	64.3
The year.....	103	.8	4.38	3,170

WATERMAN CANYON CREEK NEAR ARROWHEAD SPRINGS, CALIF.

LOCATION.—In SW. $\frac{1}{4}$ sec. 2, T. 1 N., R. 4 W., 600 feet above old toll house and 1 mile northwest of Arrowhead Springs, San Bernardino County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—December 31, 1919, to September 30, 1921. A station known as "Waterman Canyon Creek near San Bernardino" was operated at the same site from November 2, 1911, to October 31, 1914.

GAGE.—Water-stage recorder in concrete well and shelter on right bank 600 feet above old toll house.

DISCHARGE MEASUREMENTS.—Made from highway bridge 500 feet below gage or by wading 300 feet below gage.

CHANNEL AND CONTROL.—Bed consists of boulders. Control is a natural boulder dam with a drop of 6 feet at low stage, located 10 feet below gage. Two notches in control clog easily with debris.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 2.95 feet at 2 a. m. March 14 (discharge, 152 second-feet); minimum stage, 0.67 foot September 26–27 (discharge, 0.3 second-foot).

1911–1914 and 1920–1921: Maximum stage occurred during January or February, 1914, stage and discharge unknown; no flow September 15–17, 1913.

DIVERSIONS.—Huley Poppet diverts water through a 2-inch pipe line at the control for domestic use.

REGULATION.—None.

ACCURACY.—Stage-discharge relation changed frequently owing to changes in channel above control. Rating curves well defined below 30 second-feet and extended above. Water-stage recorder operated satisfactorily throughout year except for periods July 22 to August 3 and August 12–15. Daily discharge ascertained by applying mean daily gage height to rating table and interpolating when gage was not in operation. Records good.

Discharge measurements of Waterman Canyon Creek near Arrowhead Springs, Calif., during the year ending Sept. 30, 1921

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. 27	Jarrett Oliver.....	0.70	0.9	Apr. 13	Jarrett Oliver.....	1.02	2.9
Nov. 22	do.....	.78	1.5	May 4	do.....	.94	2.0
Dec. 10	do.....	.76	1.6	22	Thompson and Oliver	1.56	14.0
Jan. 4	do.....	.75	1.4	25	Jarrett Oliver.....	1.28	7.8
Jan. 14	do.....	.74	1.2	31	do.....	1.14	4.8
19	do.....	1.31	9.0	June 4	do.....	1.09	4.7
Feb. 2	do.....	.90	2.8	17	do.....	1.00	3.6
15	do.....	.87	2.2	23	Arnold and Ebert.....	.93	1.9
Mar. 3	do.....	.75	1.6	29	do.....	.90	1.7
16	do.....	1.49	9.6	July 13	Jarrett Oliver.....	.71	1.0
24	do.....	1.13	4.6	20	do.....	.79	1.2
29	do.....	1.05	3.7	Aug. 15	do.....	.68	.4
Apr. 6	do.....	1.05	3.5	Sept. 14	do.....	.82	.6

Daily discharge, in second-feet, of Waterman Canyon Creek near Arrowhead Springs, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	0.5	1.6	1.6	1.5	2.9	1.5	3.2	2.1	4.1	2.4	1.3	0.4
2.....	.6	1.5	2.0	1.4	2.6	1.4	3.1	2.1	4.1	2.2	1.3	.4
3.....	.5	1.5	1.9	1.4	2.5	1.4	3.9	2.2	4.1	2	1.3	.4
4.....	.6	1.5	1.6	1.4	2.4	1.3	4.7	2.2	3.9	2.1	1.4	.3
5.....	.6	2.0	1.6	1.4	3.2	1.3	3.8	2.8	3.6	1.8	1.5	.3
6.....	.6	2.1	1.7	1.4	2.8	1.7	3.5	3.6	3.1	1.7	1.6	.3
7.....	.5	2.2	1.9	1.3	2.6	1.7	3.1	3.1	2.8	1.7	1.7	.3
8.....	.6	2.0	1.9	1.3	2.4	1.6	2.8	2.8	2.7	1.8	1.9	.3
9.....	.6	1.8	1.6	1.4	2.4	1.7	2.7	2.7	2.5	1.7	2.3	.4
10.....	.6	1.6	1.5	1.6	2.3	1.6	2.8	2.5	2.4	1.2	2.3	.4
11.....	.6	1.6	1.5	1.6	2.2	1.7	2.9	2.3	2.4	1.2	2.1	.4
12.....	.7	1.6	1.7	1.5	2.2	3.8	2.8	2.1	2.5	1.2	1.8	.4
13.....	.7	1.6	1.6	1.4	2.1	22	3.1	2.7	2.5	1.2	1.5	.4
14.....	.6	1.6	1.5	1.3	2.4	63	3.2	2.0	2.5	1.2	1.2	.4
15.....	.6	1.6	1.5	1.4	2.4	18	2.9	1.9	2.6	1.3	.9	.4
16.....	.6	1.6	1.5	1.4	2.3	13	2.8	2.3	2.6	1.2	.5	.4
17.....	.8	1.6	1.5	1.5	2.4	12	2.5	2.7	2.6	1.1	.5	.5
18.....	2.1	1.6	1.5	11	2.3	11	2.3	3.4	2.4	1.1	.4	.5
19.....	6.5	1.7	2.4	8.5	2.1	10	2.3	2.7	2.2	1.0	.4	.6
20.....	3.2	1.6	2.0	6	2	9.5	2.2	5.5	2.1	1.2	.4	.6
21.....	2.4	1.6	1.7	.5.5	1.9	8	2.2	13	2.1	1.2	.4	.7
22.....	2.1	1.6	1.6	4.5	1.9	7	2.2	14	2.1	1.2	.4	.3
23.....	1.6	1.6	1.6	4.1	1.9	5.5	2.4	12	2.3	1.2	.4	.3
24.....	1.8	1.6	1.6	3.8	1.8	4.7	2.4	8.5	2.6	1.2	.4	.3
25.....	1.6	1.7	1.6	3.6	1.7	4.7	2.3	6.5	2.9	1.2	.4	.3
26.....	1.5	1.6	1.5	3.4	1.7	4.6	2.2	6.5	2.6	1.2	.4	.3
27.....	1.3	1.5	1.5	4.1	1.7	4.2	2.1	6	2.3	1.2	.4	.3
28.....	1.3	1.6	1.5	5	1.7	4.1	2.1	6	2.3	1.3	.4	.4
29.....	1.3	1.6	1.5	4.3	-----	3.8	2.1	5.5	2.4	1.3	.3	.6
30.....	2.8	1.6	1.5	3.6	-----	3.6	2.1	4.9	2.4	1.3	.3	1.5
31.....	2.2	-----	1.5	3.3	-----	3.5	-----	4.2	-----	1.3	.4	-----

NOTE.—Discharge interpolated July 22 to Aug. 3 and Aug. 12-15; no gage-height record.

Monthly discharge of Waterman Canyon Creek near Arrowhead Springs, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	6.5	0.5	1.35	83.0
November.....	2.2	1.5	1.68	98.8
December.....	2.4	1.5	1.65	101
January.....	11	1.3	3.06	188
February.....	3.2	1.7	2.24	124
March.....	63	1.3	7.51	462
April.....	4.7	2.1	2.76	164
May.....	14	1.9	4.54	279
June.....	4.1	2.1	2.72	162
July.....	2.4	1.0	1.42	87.3
August.....	2.3	.3	.98	60.3
September.....	1.5	.3	.44	26.2
The year.....	63	.3	2.54	1,840

CITY CREEK NEAR HIGHLANDS, CALIF.

LOCATION.—In SW. $\frac{1}{4}$ sec. 27, T. 1 N., R. 3 W., $1\frac{1}{4}$ miles northeast of Highlands, San Bernardino County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—October 1, 1919, to September 30, 1921.

GAGE.—Water-stage recorder in concrete well and shelter on left bank 300 feet above North Fork Ditch Co.'s trestle.

DISCHARGE MEASUREMENTS.—Made from cable 400 feet below gage or by wading.

CHANNEL AND CONTROL.—Bed consists of shifting boulders above and below a concrete control.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 6.20 feet at 3 a. m. March 14 (discharge, 1,320 second-feet); no flow October 1–18 and July 5 to September 29.

1919–1921: Maximum stage from water-stage recorder, 6.20 feet at 3 a. m. March 14, 1921 (discharge, 1,320 second-feet); no flow for several months during each year.

DIVERSIONS.—City Creek Water Co. diverts water three-fourths mile above gage **REGULATION.**—NONE.

ACCURACY.—Stage-discharge relation changed frequently owing to deposits of gravel above control. Rating curves fairly well defined. Water-stage recorder operated satisfactorily throughout year. Daily discharge ascertained by applying mean daily gage height to rating table. Records fair.

Discharge measurements of City Creek near Highlands, Calif., during the year ending Sept. 30, 1921

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. 27	Jarrett Oliver.....	0.95	1.0	Mar. 30	Jarrett Oliver.....	1.48	8.9
Nov. 19	do.....	.77	1	Apr. 12	do.....	1.39	4.1
Dec. 14	Oliver and Marliave.....	1.20	3.9	22	do.....	1.26	1.2
Jan. 11	Jarrett Oliver.....	.78	5	27	do.....	1.24	.9
19	do.....	1.89	42	May 9	do.....	1.33	2.4
28	do.....	1.86	38	24	Ebert and Oliver.....	1.84	44
Feb. 15	do.....	1.23	5.7	27	Jarrett Oliver.....	1.65	24
21	do.....	1.19	4.8	31	do.....	1.56	17
Mar. 3	do.....	1.00	2.5	June 7	Ebert and Oliver.....	1.38	6.4
15	do.....	2.34	109	14	Jarrett Oliver.....	1.31	3.5
17	do.....	1.78	35	23	Arnold and Ebert.....	0.99	a. 2
21	do.....	1.57	17	29	do.....	.95	a. 05
23	do.....	1.59	18	July 7	F. C. Ebert.....	.90	.0

* Estimated.

Daily discharge, in second-feet, of City Creek near Highlands, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Sept.
1		5.5	0.4	4.2	10	3.0	7.5	0.3	13	0.1	
2		4.8	1.7	3.8	8.5	2.5	6	.8	11	.1	
3		3.8	1.7	3.8	7.5	2.4	6	.3	11	.1	
4		3.1	.5	3.6	7	2.1	8.5	.3	11	.1	
5		3.8	.4	2.2	10	1.7	6.5	3.1	10		
6		6.1	.3	.9	8.5	3.2	6	8.5	9		
7		6.1	1.5	.9	7.5	5.0	5.5	4.9	7.5		
8		5.9	4.2	.9	7	3.3	4.6	2.8	6.5		
9		5.1	4.0	.7	6.5	2.8	4.3	2.5	6		
10		4.8	2.9	.5	6	2.8	4.3	1.4	4.5		
11		4.5	2.7	.3	6	2.5	4.6	.8	2.6		
12		3.9	4.5	.3	5.5	13	4.3	.6	2.8		
13		3.1	4.0	.3	5	138	4.3	.4	3.1		
14		3.0	3.9	.3	6	393	6	.3	2.9		
15		3.2	3.2	.3	6	109	4.6	.3	3.3		
16		2.3	2.4	.3	5.5	55	4.3	.4	3.3		
17		.3	2.7	.9	6	39	4.0	2.2	2.9		
18		.3	2.7	76	6	30	3.7	7.6	2.8		
19	15	.2	5.5	41	5.5	24	3.7	6	2.2		
20	7.5	.2	12	23	5.5	20	3.7	12	1.9		
21	4.6	.2	6	17	5	16	3.4	79	1.0		
22	3.2	.2	5.5	13	5.5	16	1.6	84	.3		
23	2.9	.2	5	12	4.8	16	.8	58	.2		
24	2.4	.2	4.8	9	4.2	15	1.4	42	.2		
25	1.8	.2	4.6	7.5	4.0	14	1.3	32	.2		
26	1.4	.1	4.6	7	3.5	12	1.2	27	.2		
27	1.2	.1	4.5	11	3.3	11	1.0	24	.1		
28	1.1	.1	4.4	51	3.3	9.5	.8	23	.1		
29	1.2	.3	4.4	22		9	.7	20	.1		
30	5	.3	4.4	15		9	.3	19	.1		
31	6		4.4	12		9		17			

NOTE.—No flow Oct. 1–18 and July 5 to Sept. 29.

Monthly discharge of City Creek near Highlands, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	15	0	1.72	106
November.....	6.1	.1	2.40	143
December.....	12	.3	3.67	226
January.....	76	.8	11.0	676
February.....	10	3.3	6.04	335
March.....	393	1.7	31.9	1,960
April.....	8.5	.3	3.83	228
May.....	84	.3	15.5	953
June.....	13	1	3.99	237
July.....	.1	0	.01	0
August.....	0	0	0	0
September.....	.8	0	.03	1.8
The year.....	393	0	6.72	4,870

DEVIL CANYON CREEK NEAR SAN BERNARDINO, CALIF.

LOCATION.—In NE. $\frac{1}{4}$ sec. 6, T. 1 N., R. 4 W., 7.3 miles northwest of San Bernardino, San Bernardino County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—December 27, 1919, to September 30, 1921. A station was operated at practically the same site November 1, 1911, to October 31, 1914.

GAGE.—Water-stage recorder in concrete well and house, on right bank, 300 feet above ford at mouth of canyon.

DISCHARGE MEASUREMENTS.—Made from timber footbridge at the gage or by wading.

CHANNEL AND CONTROL.—Bed consists of gravel and boulders. Artificial control formed by cementing large boulders together, 10 feet below gage.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 2.52 feet at 4 a. m. March 14 (discharge, 86 second-feet); minimum stage, 0.70 foot September 27 and 28, stream practically dry.

1919-1921: Maximum stage from water-stage recorder, 2.52 feet at 4 a. m. March 14, 1921 (discharge, 86 second-feet); minimum stage, 0.70 foot September 27-28, 1921, stream practically dry.

DIVERSIONS.—Water diverted above gage during June and spread over canyon floor to increase absorption.

REGULATION.—See preceding paragraph.

ACCURACY.—Stage-discharge relation changed July 5. Rating curves well defined. Water-stage recorder operated satisfactorily throughout year. Daily discharge ascertained by applying mean daily gage height to rating table. Records good.

Discharge measurements of Devil Canyon Creek near San Bernardino, Calif., during the year ending Sept. 30, 1921

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. 27	Jarrett Oliver.....	0.77	1.0	Apr. 13	Jarrett Oliver.....	1.03	3.2
Nov. 17	do.....	.85	1.2	May 26	do.....	.88	1.6
Dec. 10	do.....	.86	1.8	May 24	Ebert and Oliver.....	1.36	11
Jan. 19	do.....	1.43	12.0	27	Jarrett Oliver.....	1.21	6.4
Feb. 2	do.....	1.04	3.5	31	do.....	1.16	5.3
19	do.....	.94	2.4	June 4	do.....	1.09	4.2
Mar. 1	do.....	.90	1.9	16	do.....	1.02	3.1
16	do.....	1.46	13.0	23	Arnold and Ebert.....	.64	.2
23	do.....	1.11	5.3	29	do.....	.63	.2
29	do.....	1.03	3.1	July 19	Jarrett Oliver.....	.77	.1
29	do.....	1.03	3.2	Aug. 15	do.....	.76	.09
Apr. 6	do.....	1.03	3.3	Sept. 14	do.....	.74	.07

Daily discharge, in second-feet, of Devil Canyon Creek near San Bernardino, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	0.6	2.0	1.6	1.8	3.9	2.0	3.3	2.0	5	0.2	0.1	0.1
2	.7	1.7	1.8	1.8	3.6	2.0	3.2	2.1	4.9	.2	.1	.1
3	.7	1.5	1.7	1.8	3.4	2.0	3.8	2.1	5	.2	.1	.1
4	.7	1.4	1.7	1.8	3.3	2.0	5	2.1	4.9	.2	.1	.1
5	.8	1.8	1.6	1.7	3.9	2.0	3.9	2.8	4.2	.1	.1	.1
6	.8	2.2	1.6	1.7	3.6	2.2	3.6	4.4	3	.1	.1	.1
7	.8	2.5	1.7	1.7	3.3	2.4	3.3	3.9	2.6	.1	.1	.1
8	.8	2.3	1.8	1.7	3.3	2.3	3.2	3.2	2.6	.1	.1	.1
9	.9	2.0	1.7	1.7	3	2.2	3.0	2.8	2.6	.1	.1	.1
10	1.0	1.8	1.7	1.8	2.8	2.1	3.0	2.6	2.8	.1	.1	.1
11	1.0	1.8	1.8	1.8	2.7	2.2	3.0	2.4	2.8	.1	.1	.1
12	1.1	1.8	1.8	1.8	2.7	4.9	3.2	2.2	2.9	.1	.1	.1
13	1.0	1.9	1.7	1.8	2.7	25	3.4	2.2	2.9	.1	.1	.1
14	.8	1.7	1.5	1.6	3	51	3.9	2.0	3.8	.1	.1	.1
15	.8	1.7	1.4	1.6	3	23	3.3	2.0	4	.1	.1	.1
16	.8	1.7	1.4	1.6	2.8	15	3.0	2.6	3.4	.1	.1	.1
17	1.0	1.6	1.4	1.6	2.7	12	2.7	2.9	2.8	.1	.1	.1
18	2.0	1.7	1.5	10	2.7	9.5	2.5	4.9	1.5	.1	.1	.1
19	6.0	1.8	2.4	14	2.5	8.5	2.4	3.6	1.1	.1	.1	.1
20	2.7	1.8	2.4	9	2.4	7	2.2	4.0	.8	.1	.1	.1
21	2.3	1.8	2.2	7	2.5	6	2.0	18	.6	.1	.1	.1
22	1.8	1.8	2.1	5.5	2.4	6	1.8	18	.4	.1	.1	.1
23	1.4	1.8	2.0	4.9	2.3	5.5	1.8	14	.3	.1	.1	.1
24	1.3	1.9	1.9	4.2	2.2	4.7	1.9	11	.2	.1	.1	.1
25	1.1	1.8	1.8	3.9	2.1	4.4	1.9	9	.2	.1	.1	.1
26	1.1	1.8	1.8	3.6	2.1	4	2.0	7.5	.2	.1	.1	.1
27	1.1	1.7	1.8	4.5	2.1	3.8	2.1	7	.2	.1	.1	.1
28	1.2	1.6	1.9	8.5	2.1	3.6	1.9	7	.2	.1	.1	.1
29	1.2	1.5	1.8	5.5		3.4	1.8	6	.2	.1	.1	.1
30	2.6	1.6	1.8	4.7		3.3	1.9	6	.2	.1	.1	.1
31	2.5		1.8	4.4		3.4		5.5		.1	.1	

NOTE.—Stream practically dry Sept. 23-29.

Monthly discharge of Devil Canyon Creek near San Bernardino, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	6	0.6	1.37	84.2
November	2.5	1.4	1.80	107
December	2.4	1.4	1.78	109
January	14	1.6	3.84	226
February	3.9	2.1	2.82	157
March	51	2.0	7.34	451
April	5	1.8	2.80	167
May	18	2.0	5.35	329
June	5	.2	2.21	132
July	.2	.1	.11	6.8
August	.1	.1	.10	6.1
September	.1	0	.08	4.8
The year	51	0	2.47	1,790

LYTLE CREEK AND FONTANA PIPE LINE NEAR FONTANA, CALIF.

LOCATION.—In NW. $\frac{1}{4}$ sec. 6, T. 1 N., R. 5 W., unsurveyed; one-fourth mile below Lytle Creek power plant of Southern California Edison Co., $4\frac{1}{2}$ miles above Fontana power plant, and $7\frac{1}{2}$ miles north of Fontana, San Bernardino County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—October 1, 1918, to September 30, 1921.

GAGE.—Water-stage recorder in concrete well and shelter on left bank.

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

CHANNEL AND CONTROL.—Gravel and boulders; shifts at high stage.

EXTREMES OF DISCHARGE.—Maximum discharge during year estimated at 160 second-feet March 13; all the flow of Lytle Creek was diverted past the station by Fontana pipe line except on January 18 and March 12 and 13.

DIVERSIONS.—Water is diverted about 3 miles above gage in sec. 26, T. 2 N., R. 6 W., by Southern California Edison Co. for the Lytle Creek power plant. This water is then carried directly across the creek by a siphon to the headworks of the Fontana pipe line which serves the plant of the Fontana Power Co. located in sec. 22, T. 1 N., R. 5 W., about $4\frac{1}{2}$ miles downstream. The Fontana Union Water Co. develops ground water by means of a tunnel above the headworks of the Fontana pipe line which is supplied to the pipe line, and also diverts water by means of a temporary diversion dam on Lytle Creek above Lytle Creek power plant into the Fontana pipe line in order to operate the Fontana plant at capacity when water is available. During low-water period water is pumped from gravels into the Lytle power plant canal by Fontana Union Water Co.

ACCURACY.—Daily discharge of Lytle Creek for January 18 was estimated by Henry Lamb of Fontana Land & Water Co., and for March 12 and 13 by J. G. Woodward, superintendent, Fontana power plant. Total flow of creek during two storms of January 18 and March 12 and 13 estimated to be about 100 acre-feet.

COOPERATION.—Records of daily discharge of Fontana pipe line furnished by Southern California Edison Co.

Daily discharge, in second-feet, of Fontana pipe line near Fontana, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	40	28	27	24	29	25	33	32	38	29	25	23
2.....	41	29	27	24	28	23	33	32	38	27	26	22
3.....	40	28	27	23	29	24	33	31	38	29	25	23
4.....	40	26	27	23	29	23	33	31	37	27	26	23
5.....	39	23	27	23	31	24	32	33	36	28	25	23
6.....	36	25	28	24	29	24	32	34	35	28	26	22
7.....	38	25	28	23	30	23	31	31	34	27	26	22
8.....	39	24	27	23	29	24	31	29	35	28	25	24
9.....	38	23	28	23	29	23	30	29	34	26	25	22
10.....	39	24	28	24	29	24	31	28	34	28	25	24
11.....	39	24	27	23	29	26	33	28	36	29	23	24
12.....	39	24	28	24	28	30	33	28	37	31	24	23
13.....	37	24	27	24	28	44	34	28	37	30	24	22
14.....	35	23	27	25	29	44	33	26	38	28	24	21
15.....	35	23	27	28	28	50	31	26	37	28	23	22
16.....	37	23	27	29	28	55	31	28	36	28	24	23
17.....	37	23	26	29	29	48	31	34	35	29	24	24
18.....	38	24	26	37	28	42	33	29	36	29	23	23
19.....	36	23	28	34	28	36	34	28	36	28	22	22
20.....	34	23	26	30	28	34	33	30	35	28	22	22
21.....	33	23	25	30	27	34	35	55	34	28	22	20
22.....	31	23	26	29	26	35	36	56	34	28	23	21
23.....	31	23	25	28	25	35	36	48	32	27	24	23
24.....	33	23	25	27	26	35	34	36	33	28	22	23
25.....	32	24	25	28	26	36	34	37	32	27	25	22
26.....	32	23	25	27	26	35	31	36	31	26	22	22
27.....	31	24	24	29	26	34	29	34	30	26	23	22
28.....	32	24	24	30	26	33	28	34	31	25	23	22
29.....	31	24	24	29	-----	33	28	34	30	26	19.3	21
30.....	34	26	23	30	-----	34	31	35	29	25	23	22
31.....	30	-----	23	29	-----	34	-----	35	-----	26	23	-----

Monthly discharge of Fontana pipe line near Fontana, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	41	30	35.7	2,200
November.....	29	23	24.2	1,440
December.....	28	23	26.2	1,610
January.....	37	23	26.9	1,650
February.....	31	25	28.0	1,560
March.....	55	23	33.0	2,030
April.....	36	28	32.2	1,820
May.....	56	26	33.4	2,050
June.....	38	29	34.6	2,060
July.....	31	25	27.6	1,700
August.....	26	19.3	23.8	1,460
September.....	24	20	22.4	1,330
The year.....	56	19.3	29.0	21,000

CAJON CREEK NEAR KEENBROOK, CALIF.

LOCATION.—In SE. $\frac{1}{4}$ sec. 12, T. 2 N., R. 6 W., 300 feet above mouth of Lone Pine Creek, 1 mile north of Keenbrook, San Bernardino County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—December 26, 1919, to September 30, 1921.

GAGE.—Water-stage recorder in concrete well and shelter on left bank.

DISCHARGE MEASUREMENTS.—Made from cable 150 feet below gage or by wading.

CHANNEL AND CONTROL.—Gravel; shifts slightly. Artificial control, 5 feet below gage built of boulders cemented together.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 4.60 feet at 3 a. m. March 14 (discharge, 740 second-feet); minimum stage from water-stage recorder, 1.24 feet August 31 and September 1 (discharge, 0.8 second-foot).

DIVERSIONS.—None above gage. Muscupiabe Land & Water Co. diverts all the water during irrigating season, below the gage.

REGULATION.—None.

ACCURACY.—Stage-discharge relation changed January 18. Rating curves well defined below 15 second-feet and fairly well defined above. Water-stage recorder operated satisfactorily throughout year. Daily discharge ascertained by applying mean daily gage height to rating table except October 1 to November 15, January 19, and July 7 to September 30 when shifting-control method was used. Records good.

Discharge measurements of Cajon Creek near Keenbrook, Calif., during the year ending Sept. 30, 1921

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	Jarrett Oliver	1.33	2.6	Apr. 18	Jarrett Oliver	1.31	3.5
Dec. 9	do	1.35	2.6	26	do	1.30	3.1
20	do	1.35	3.2	May 6	do	1.37	4.8
Jan. 7	do	1.34	3.0	23	do	1.67	20
19	do	1.73	25	26	F. C. Ebert	1.64	21
25	do	1.36	5.3	23	Jarrett Oliver	1.47	10.1
Feb. 2	do	1.35	4.2	3	do	1.39	7.1
2	do	1.35	4.8	16	do	1.32	3.7
8	do	1.32	3.8	23	Arnold and Ebert	1.28	3.0
8	do	1.32	3.7	29	do	1.29	3.1
17	do	1.34	4.7	July 7	F. C. Ebert	1.28	3.0
Mar. 1	do	1.31	2.8	19	do	1.28	1.8
16	do	1.55	16	Aug. 15	Jarrett Oliver	1.26	1.2
23	do	1.37	6.8	Sept. 7	do	1.26	.9
29	do	1.35	4.9	21	do	1.26	1.8
Apr. 6	do	1.33	4.3				

Daily discharge, in second-feet, of Cajon Creek near Keenbrook, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	2.5	2.5	2.5	2.5	4.9	3.5	4.1	3.2	6	2.9	2.0	0.9
2	2.5	2.2	2.8	2.5	4.9	3.5	4.1	3.2	6.5	2.9	2.0	1.0
3	2.5	2.2	2.8	2.5	4.9	3.5	4.1	3.5	6	3.2	1.8	1.0
4	2.5	2.5	3.2	2.5	4.9	3.5	5.5	3.5	5.5	2.9	1.8	1.0
5	2.5	2.8	3.2	2.8	4.5	3.5	4.9	4.5	5.5	2.9	1.6	1.0
6	2.5	3.2	2.8	2.8	4.5	3.8	4.1	5.5	4.9	2.6	1.4	1.0
7	2.5	3.8	3.2	2.8	4.1	3.8	4.1	4.5	4.5	2.6	1.4	1.0
8	2.5	3.5	3.2	2.5	3.8	3.5	4.1	4.1	4.1	2.6	1.6	1.0
9	2.5	3.2	3.2	2.2	3.8	3.5	4.1	3.8	4.1	2.6	1.6	1.0
10	2.8	2.8	3.2	2.2	3.8	3.5	4.1	3.5	4.1	2.6	1.6	1.0
11	2.8	2.8	3.2	2.2	3.8	3.5	4.1	3.2	4.1	2.3	1.4	1.0
12	3.2	2.8	3.2	1.9	3.8	4.1	4.1	3.2	4.1	2.3	1.4	.9
13	3.2	2.8	3.2	1.9	3.8	23	4.5	2.9	4.1	2.3	1.6	1.2
14	2.8	2.8	2.8	1.6	5.5	113	4.5	2.6	4.1	2.0	1.4	1.2
15	3.2	2.8	2.8	1.6	4.5	21	4.1	2.9	4.1	1.8	1.2	1.2
16	2.5	2.5	2.8	1.6	4.1	15	4.1	3.2	4.1	1.8	1.2	1.4
17	2.8	2.5	2.8	1.9	4.1	12	3.8	3.8	4.1	1.8	1.2	1.4
18	2.8	2.2	3.2	75	4.1	10	3.8	4.1	3.8	1.6	1.2	1.6
19	3.2	2.2	3.8	22	3.8	9	3.5	3.8	3.8	1.6	1.4	1.8
20	3.2	2.5	3.5	11	3.8	8.5	3.5	4.1	3.5	1.8	1.4	1.8
21	3.2	2.5	3.2	13	3.8	7.5	3.2	56	3.2	1.8	1.4	1.8
22	3.2	2.5	3.2	9	3.5	6.5	3.2	43	3.2	1.8	1.4	1.6
23	2.5	2.5	3.2	7.5	3.5	6	3.5	24	3.2	1.6	1.4	1.6
24	2.2	2.5	3.2	6	3.2	5.5	3.5	17	3.2	1.8	1.2	1.6
25	2.2	2.5	3.2	5.5	3.2	5.5	3.2	13	3.2	1.8	1.0	1.8
26	2.5	2.8	2.8	5.5	3.2	5.5	3.2	11	3.2	1.8	1.0	2.0
27	2.5	2.8	2.8	6	3.2	5.5	3.2	9	3.2	1.8	1.0	2.0
28	2.5	2.5	2.5	6.5	3.2	4.9	3.2	8.5	3.2	1.6	1.0	2.0
29	2.5	2.5	2.5	6	-----	4.9	3.2	8	3.2	1.6	1.0	1.8
30	3.2	2.5	2.5	5.5	-----	4.5	3.2	7	3.2	1.8	1.0	4.5
31	2.8	-----	2.5	5.5	-----	4.5	-----	6.5	-----	2.0	.9	-----

Monthly discharge of Cajon Creek near Keenbrook, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	3.2	2.2	2.72	167
November	3.8	2.2	2.67	159
December	3.8	2.5	3.00	184
January	75	1.6	7.16	440
February	5.5	3.2	4.01	223
March	113	3.5	10.2	627
April	5.5	3.2	3.86	230
May	56	2.6	8.91	548
June	6.5	3.2	4.10	244
July	3.2	1.6	2.15	132
August	2.0	.9	1.37	84.2
September	4.5	.9	1.47	87.5
The year	113	.9	4.32	3,130

LONE PINE CREEK NEAR KEENBROOK, CALIF.

LOCATION.—In SW. $\frac{1}{4}$ sec. 12, T. 2 N., R. 6 W., 50 feet above Atchison, Topeka & Santa Fe Railway bridge, 100 feet above junction of Lone Pine and Cajon creeks, and 1 mile north of Keenbrook, San Bernardino County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—December 26, 1919, to September 30, 1921.

GAGE.—Water-stage recorder in concrete well and house on left bank 50 feet above railway bridge.

DISCHARGE MEASUREMENTS.—Made from timber footbridge at the gage or by wading.

CHANNEL AND CONTROL.—Bed consists of gravel and small boulders; shift at all stages. Artificial control for medium and high stages is built of boulders cemented together, at site of natural waterfall 10 feet below gage; gravel and small boulders act as control for low stages.

EXTREMES OF DISCHARGE.—Maximum stage during year, from flood marks, 2.72 feet at 10 a. m. March 22 (discharge, about 280 second-feet); minimum stage from water-stage recorder, 0.57 foot August 31 (discharge, 0.2 second-foot).

DIVERSIONS.—None above gage. All water diverted by Muscupiabe Land & Water Co. through a pipe line, 100 feet below gage, during irrigating season.

REGULATION.—None.

ACCURACY.—Stage-discharge relation changes continuously. Rating curves poorly defined. Water-stage recorder operated satisfactorily except for period July 31 to August 14 when gage was tampered with by unknown persons. Daily discharge ascertained by applying mean daily gage height to rating curves covering short periods of time and by interpolating between discharge measurements. Records fair.

Discharge measurements of Lone Pine Creek near Keenbrook, Calif., during the year ending Sept. 30, 1921

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	Jarrett Oliver	0.68	0.46	Apr. 18	Jarrett Oliver	0.74	0.23
Dec. 9	do	.60	.36	26	do	.73	.21
20	do	.61	.40	May 6	do	.76	.32
Jan. 7	do	.59	.42	23	do	.79	.39
19	do	.86	1.0	26	do	.77	.22
25	do	.75	.46	June 3	do	.77	.22
Feb. 2	do	.74	.45	16	do	.78	.22
2	do	.74	.36	23	Arnold and Ebert	.77	.55
8	do	.75	.43	29	do	.77	.50
8	do	.75	.47	July 7	F. C. Ebert	.78	.41
17	do	.75	.36	19	Jarrett Oliver	.78	.25
Mar. 1	do	.74	.36	Aug. 15	do	.78	.34
16	do	.75	.42	Sept. 7	do	.76	.24
23	do	.74	.39	21	do	.77	.26
29	do	.75	.37	21	do	.77	.26
Apr. 6	do	.75	.35	21	do	.77	.23

Daily discharge, in second-feet, of Lone Pine Creek near Keenbrook, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.2	0.2	0.4	0.4	0.2
2	.4	.4	.4	.4	.4	.4	.3	.3	.2	.4	.4	.2
3	.4	.4	.4	.4	.4	.4	.3	.3	.2	.4	.4	.2
4	.4	.4	.4	.4	.4	.4	.3	.3	.2	.4	.3	.2
5	.4	.5	.4	.4	.4	.4	.3	.3	.2	.4	.3	.2
6	.4	.5	.4	.4	.4	.4	.3	.3	.2	.4	.3	.2
7	.4	.5	.4	.4	.4	.4	.3	.3	.2	.4	.3	.2
8	.4	.5	.4	.4	.4	.4	.3	.3	.2	.4	.3	.2
9	.4	.5	.4	.4	.4	.4	.3	.3	.2	.4	.3	.2
10	.4	.5	.4	.4	.4	.4	.3	.3	.2	.4	.3	.2
11	.4	.5	.4	.4	.4	.4	.3	.3	.2	.4	.3	.3
12	.4	.5	.4	.4	.4	.5	.3	.3	.3	.4	.3	.3
13	.4	.5	.4	.4	.4	3.0	.3	.3	.3	.3	.3	.3
14	.4	.5	.4	.4	.4	48	.3	.3	.3	.3	.3	.3
15	.4	.5	.4	.4	.4	1.0	.3	.3	.3	.3	.3	.3
16	.4	.5	.4	.4	.4	.4	.3	.3	.2	.3	.3	.3
17	.4	.5	.4	.4	.4	.4	.3	.4	.3	.3	.3	.3
18	.4	.5	.4	.4	.4	.4	.3	.4	.3	.2	.3	.3
19	.4	.5	.4	1.2	.4	.4	.3	.4	.4	.2	.3	.3
20	.4	.5	.4	.5	.4	.4	.2	.4	.4	.3	.3	.3
21	.4	.5	.4	.5	.4	.4	.2	1.6	.5	.3	.3	.3
22	.4	.5	.4	.5	.4	.4	.2	.5	.5	.3	.3	.3
23	.4	.5	.4	.5	.4	.4	.2	.4	.6	.3	.2	.3
24	.4	.5	.4	.5	.4	.4	.2	.3	.6	.3	.2	.3
25	.4	.5	.4	.5	.4	.4	.2	.2	.6	.4	.2	.3
26	.4	.5	.4	.5	.4	.4	.2	.2	.5	.4	.2	.3
27	.4	.5	.4	.5	.4	.4	.2	.2	.5	.4	.2	.3
28	.4	.4	.4	.5	.4	.4	.2	.2	.5	.4	.2	.3
29	.4	.4	.4	.5		.4	.2	.2	.5	.4	.2	.3
30	.4	.4	.4	.5		.4	.2	.2	.5	.4	.2	.5
31	.4		.4	.4		.4		.2		.4	.2	

Monthly discharge of Lone Pine Creek near Keenbrook, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	0.4	0.4	0.40	24.6
November.....	.5	.4	.48	28.6
December.....	.4	.4	.40	24.6
January.....	8.5	.4	.72	44.3
February.....	.4	.4	.40	22.2
March.....	.48	.4	2.04	125
April.....	.3	.2	.26	15.5
May.....	1.6	.2	.34	20.9
June.....	.6	.2	.34	20.2
July.....	.4	.2	.36	22.1
August.....	.....	.2	.28	17.2
September.....	.5	.2	.27	16.1
The year.....	48	.2	.53	381

MECKS AND DALEY CANAL NEAR COLTON, CALIF.

LOCATION.—In SW. $\frac{1}{4}$ sec. 21, T. 1 S., R. 4 W., on Colton Avenue, 1 mile east of Colton, San Bernardino County.

RECORDS AVAILABLE.—September 18, 1920, to September 30, 1921.

GAGE.—Water-stage recorder in concrete well and shelter on south side of Colton Avenue.

DISCHARGE MEASUREMENTS.—Made from footbridge at the gage.

CHANNEL AND CONTROL.—Concrete-lined canal. Sand and moss collect causing slight changes in flow. Flashboards are placed in canal below gage to divert water into irrigation ditches, at times.

EXTREMES OF DISCHARGE.—Maximum mean daily discharge, 17.7 second-feet July 2; no flow at various times.

ACCURACY.—Stage-discharge relation not permanent. Flashboards at weir below gage cause backwater at times. Rating curves fairly well defined. Water-stage recorder operated satisfactorily. Daily discharge ascertained by applying mean daily gage height to rating table except on days of large fluctuation when hourly discharge was averaged. Records good.

Discharge measurements of Meeks and Daley canal near Colton, Calif., during the period Sept. 18, 1920, to Sept. 30, 1921

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
1920		<i>Feet</i>	<i>Sec.-ft.</i>	1921		<i>Feet</i>	<i>Sec.-ft.</i>
Sept. 18	Jarrett Oliver.....	1.94	13.2	Apr. 12	Jarrett Oliver.....	2.33	6.1
18	do.....	1.98	13.6	16	do.....	1.36	8.8
25	do.....	1.92	11.6	18	do.....	.87	4.0
Oct. 2	do.....	2.06	14	20	do.....	1.62	12
9	do.....	1.72	9.7	23	do.....	1.74	13
Nov. 15	do.....	.86	1.8	30	do.....	1.90	15
24	do.....	1.64	7.5	May 6	do.....	.44	.8
27	do.....	1.68	7.7	11	McGlashan and Ebert.	1.60	9.2
Dec. 4	do.....	1.63	7.2	28	Jarrett Oliver.....	1.36	5.2
11	do.....	1.58	6.1	June 4	do.....	1.76	11
13	Marliave and Oliver.....	.61	.9	7	F. C. Ebert.....	1.71	10
18	Jarrett Oliver.....	1.66	6.4	11	Jarrett Oliver.....	1.78	10
1921				18	do.....	1.82	11
Jan. 8	do.....	1.43	5.2	24	Arnold and Ebert.....	2.28	17
15	do.....	1.34	4.1	30	do.....	2.02	18
Feb. 17	do.....	.65	1.0	July 7	F. C. Ebert.....	2.00	18
19	do.....	.64	.7	11	Jarrett Oliver.....	2.06	16
Apr. 4	do.....	1.39	9.2	16	do.....	2.11	17
4	do.....	1.39	9.1	30	do.....	2.05	15
9	do.....	2.32	8.6	Aug. 7	do.....	2.12	15
9	do.....	2.24	7.4	20	do.....	2.06	16
9	do.....	2.24	6.7	27	do.....	1.97	13
11	do.....	1.32	8.2	Sept. 3	do.....	1.91	13
12	do.....	2.38	6.6	10	do.....	1.95	13
12	do.....	2.37	6.6	17	do.....	1.96	13
12	do.....	2.35	6.3	24	do.....	1.91	11

Daily discharge, in second-feet, of Meeks and Daley canal near Colton, Calif., for the period Sept. 18, 1920, to Sept. 30, 1921

Day	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1		14.1	9.6	7.6	2.6			7.8	14.4	3.5	15.7	14.0	15.1
2		13.4	9.5	7.9	2.5			6.6	12.0	5.5	17.7	14.9	13.0
3		12.0	9.1	6.7	2.8			7.3	8.8	9.4	17.1	15.1	11.6
4		12.3	8.0	6.8	4.0			9.1	11.1	10.9	16.6	15.4	12.3
5		12.0	5.6	6.4	4.9			9.8	15.1	8.8	14.0	15.1	13.0
6		11.3	2.5	6.5	4.9		0.2	9.3	10.6	8.5	15.0	14.8	13.5
7		11.2	2.0	6.0	4.8		.2	9.2	7.9	10.1	17.2	14.4	12.9
8		10.4	1.6	5.9	5.0		.2	9.4	8.8	9.2	17.1	16.0	11.9
9		9.4	1.0	6.0	5.3			8.6	8.3	8.4	17.4	15.1	12.4
10		9.6	4.0	6.1	5.5			7.7	8.2	9.4	17.0	14.4	12.8
11			7.6	4.2	5.6		.2	8.1	8.9	8.4	16.7	14.6	14.3
12			7.5	1.0	4.7		.2	8.3	8.1	9.1	17.0	13.8	14.4
13			7.5	3.2	4.3	1.5	.4	6.3	7.3	11.7	13.8	13.8	12.8
14			8.0	5.2	4.2	1.8	.8	6.1	6.6	12.6	13.8	14.0	11.7
15			1.8	6.2	4.3	1.2		7.1	11.6	12.9	13.8	14.1	12.2
16				7.1	4.3	1.1		8.4	12.8	14.1	15.4	16.2	12.7
17		10.0		7.1		1.0		5.4	12.2	11.9	15.1	16.2	13.2
18	13.8	11.2		7.2		1.0		5.2	11.5	10.1	14.6	16.5	13.4
19	14.6	11.6		2.8	2.0	.8		8.9	13.8	9.5	13.4	15.1	13.4
20	14.4	5.9	8.0			.7		12.3	14.4	11.5	13.8	14.3	13.5
21	14.0	5.6	6.7			.8		12.8	5.0	6.5	10.0	14.3	13.6
22	13.6	5.6	6.9	.5		.8		12.3	7.0	3.1	14.9	13.5	13.5
23	14.0	5.5	7.0			.7		13.7	7.3	10.2	15.4	14.6	14.1
24	15.1	7.0	7.0			.5		14.9	5.9	16.7	14.3	14.6	12.3
25	13.0		7.1			.1		13.8	5.1	14.8	14.6	14.4	11.3
26	12.4	7.4		1.9				13.2	5.0	14.4	15.4	14.4	12.0
27	12.4		7.3	3.3				13.6	5.1	13.1	14.0	14.8	12.8
28	13.6		7.4	3.3				14.1	5.5	13.7	11.7	14.1	12.3
29	13.8	8.0	7.4	3.0				13.7	5.2	15.7	11.2	14.1	14.9
30	14.0	10.4	7.4	2.7				14.0	5.1	16.3	15.1	14.4	11.7
31		10.1		2.6			3.0		4.8		14.6	13.5	

NOTE.—Recorder not working properly Oct. 1, 11-16, 25-27, Nov. 16-19, May 12, 13, 21, 22, July 5, 6, and Sept. 15, 16. Intake to gage well obstructed Dec. 20-25, Jan. 17-20, and Feb. 25. Backwater effect from weir Apr. 9, 12, 21, 27, May 19, June 20, July 3, 9, Aug. 5, 6, 13, 14, 24, Sept. 19, and 28. Discharge for the above dates estimated from discharge measurement and study of flow of Warm Creek. No flow in canal on days for which no record is given. Braced figures show mean discharge for periods indicated.

Monthly discharge of Meeks and Daley canal near Colton, Calif., for the period Sept. 18, 1920, to Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
1920				
September 18-30			13.7	353
1920-21				
October		5.5	9.37	576
November	9.6	1.0	5.76	343
December	7.9		4.18	257
January	5.6	0	2.51	154
February	1.8	0	.43	23.9
March	3.0	0	.17	10.5
April	14.9	5.2	9.97	593
May	15.1	4.8	8.82	542
June	16.7	3.1	10.7	637
July	17.7	10.0	14.9	916
August	16.5	13.5	14.7	904
September	15.1	11.3	13.0	774
The year	17.7	0	7.91	5,730

SAN JACINTO RIVER NEAR SAN JACINTO, CALIF.

LOCATION.—In SE. $\frac{1}{4}$ sec. 13, T. 5 S., R. 1 E., at highway bridge $8\frac{1}{4}$ miles southeast of San Jacinto, Riverside County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—October 25, 1920, to September 30, 1921.

GAGE.—Water-stage recorder in concrete well and shelter on left bank, 100 feet below highway bridge.

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

93681-25†-wsp 531—6

CHANNEL AND CONTROL.—Sand, gravel, and boulders; shift during floods. Channel straight 100 feet above and below gage. Banks, high, gravel; not subject to overflow except during extreme stages.

EXTREMES OF DISCHARGE.—Maximum stage during period, from water-stage recorder, 4.12 feet at 10 p. m. March 13 and 8 a. m. March 14 (discharge, 324 second-feet); stream dry July 12 to August 26, September 4, and 25-29.

DIVERSIONS.—Water is diverted from Lake Hemet on South Fork of San Jacinto River, $3\frac{3}{4}$ miles above the station, from Strawberry Creek $3\frac{3}{4}$ miles above, and from North Fork of San Jacinto River 1 mile above the station.

REGULATION.—Lake Hemet Water Co. stores water on South Fork of San Jacinto River at Lake Hemet.

ACCURACY.—Stage-discharge relation changes frequently. Rating curves poorly defined. Water-stage recorder not in operation November 19-25 and January 11-23. Mean daily gage height determined by inspection of recorder graph. Daily discharge ascertained by applying mean daily gage height to rating table. Records fair.

Discharge measurements of San Jacinto River near San Jacinto, Calif., during the year ending Sept. 30, 1921

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. 26	Jarrett Oliver	1.81	0.2	Apr. 1	Jarrett Oliver	2.31	8.8
Jan. 3	do.	1.83	3	14	do.	1.87	1.1
24	do.	2.44	7.7	22	do.	1.81	.3
29	do.	2.70	21	29	do.	1.80	.4
Feb. 10	Ebert and Oliver	2.53	15	May 11	McGlashan and Ebert	2.06	4.7
17	Ebert and Post	2.59	18	25	Jarrett Oliver	2.56	20
Mar. 5	Jarrett Oliver	2.49	13	June 1	do.	1.93	1.2
15	do.	3.39	129	July 25	do.	1.63	a. 02
17	F. C. Ebert	3.10	79	Aug. 26	do.	1.73	a. 05
24	Jarrett Oliver	2.70	29				

^a Estimated.

Daily discharge, in second-feet, of San Jacinto River near San Jacinto, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1		1.1	0.3	0.3	15	17	9	0.4	1.5	0.4		0.4
2		.7	.3	.3	14	16	8	.4	1	.4		.4
3		.7	.3	.4	13	15	8	.4	.9	.4		.4
4		.6	.3	.4	12	13	12	.5	.9	.4		
5		.7	.3	.8	14	12	11	.6	.8	.4		.3
6		.5	.4	1.0	14	13	13	1.6	.8	.3		.4
7		.3	1.3	1.1	13	16	8.5	10	7	.3		.4
8		.2	1.5	1.1	13	14	3.2	9	.7	.3		.4
9		.2	1.5	1.3	13	12	2.0	11	.6	.3		.5
10		.2	.8	1.6	14	12	7	6	.6	.2		.5
11		.2	.4	1.5	16	13	4.2	3.8	.6	.1		.5
12		.2	.3	1.5	18	70	2.4	.9	.6			.5
13		.2	.3	1.6	18	235	2.7	.4	.6			.5
14		.2	.3	1.6	20	263	1.8	.4	.7			.4
15		.2	.4	1.6	18	141	9	.4	.6			.4
16		.7	.4	1.7	18	101	4.7	.4	.7			.5
17		1.0	.3	2.8	18	75	.8	.4	.6			.5
18		1.0	.3	24	16	65	1.8	.4	.6			.4
19		.5	.4	20	17	58	.7	.4	.6			.4
20		.4	.5	18	16	51	.7	1.1	.5			.3
21		.3	.4	15	18	45	.6	31	.5			.3
22		.3	.4	12	20	38	.5	35	.5			.2
23		.3	.4	9	17	34	.6	37	.5			.1
24		.3	.4	8	18	30	.5	35	.5			.1
25		.3	.4	9	20	28	.6	22	.5			
26	.2	.3	.4	8	18	28	.5	20	.5			
27	.2	.3	.4	7.5	18	27	.4	14	.5		0.2	
28	.2	.3	.4	32	18	24	.4	10	.5		.3	
29	.2	.3	.4	23		21	.4	6.5	.4		.5	
30	.2	.3	.3	19		19	.4	4.2	.4		.5	.5
31	1.2		.3	16		13		2.5			.4	

NOTE.—Stream dry July 19 to Aug. 26, Sept. 4, and 25-29. Recorder not working properly Nov. 19-25 and Jan. 11-23; discharge estimated.

Monthly discharge of San Jacinto River near San Jacinto, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October 25-31.....			0.34	4.7
November.....	1.1	0.2	.43	25.6
December.....	1.5	.3	.48	29.5
January.....	32	.3	7.78	478
February.....	20	12	16.3	905
March.....	263	12	49.0	3,010
April.....	13	.4	3.85	229
May.....	37	.4	8.51	523
June.....	1.5	.4	.65	38.7
July.....	.4	0	.11	6.8
August.....	.5	0	.06	3.7
September.....	.5	0	.31	18.4
The period.....				5,270

ELSINORE LAKE AT ELSINORE, CALIF.

LOCATION.—A short distance southeast of outlet at Elsinore, Riverside County.

RECORDS AVAILABLE.—December 1, 1915, to September 30, 1921.

GAGE.—Vertical staff on northeast shore near outlet; read by W. L. Wilhite.

Several gages at slightly different datums have been used but all have been referred to mean sea level. The location has been changed frequently in order to accommodate the rising or receding of the lake.

Elsinore Lake overflows only during and after years of heavy rainfall. Temescal Creek is the high-water outlet for the lake. The heavy rains during the winter and spring of 1916 filled the lake, and there was flow in Temescal Creek during 1916 and until July, 1917. The surface of the lake has been below the outlet since the latter date. A history of the lake is published in United States Geological Survey Water-Supply Papers 426, 429, and 441.

Daily elevation, in feet, of Lake Elsinore at Elsinore, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....							49.2					
2.....		49.5						48.8				
3.....	49.9											46.7
4.....	49.8		49.3	49.2	49.3		49.3		48.6	48.1		
5.....						49.3						46.6
6.....		49.4	49.3			49.3					47.5	
7.....		49.4		49.2	49.3			48.9	48.6			
8.....	49.8						49.2			48.0	47.5	
9.....									48.6			46.6
10.....			49.3	49.2			49.0	48.8		48.0		
11.....	49.7				49.3	49.3		48.9				
12.....									48.5			46.5
13.....		49.4	49.3								47.1	
14.....				49.2				48.8				
15.....	49.6	49.4				49.4	49.0			47.9		
16.....				49.2	49.3			48.8			47.0	46.4
17.....			49.2				48.9			47.9		
18.....									48.5			
19.....				49.3	49.3	49.4					47.0	46.4
20.....		49.4						48.7	48.3			
21.....			49.3		49.3	49.3						
22.....	49.6			49.3						47.8		
23.....		49.4						48.7			46.8	46.4
24.....			49.3	49.3			48.9					
25.....						49.3			48.3	47.7		
26.....	49.5				49.3				48.2			46.3
27.....		49.4	49.2					48.6			46.8	
28.....				49.3	49.3	49.2				47.7		
29.....		49.3					48.8					
30.....	49.5			49.3					48.2		46.8	46.2
31.....			49.2					48.7		47.6		

NOTE.—Add 1,200 feet to above elevations to obtain mean sea level elevation.

SAN ANTONIO CREEK NEAR CLAREMONT, CALIF.

LOCATION.—In NW. $\frac{1}{4}$ SE. $\frac{1}{4}$ sec. 36, T. 2 N., R. 8 W., at highway bridge half a mile above Southern California Edison Co.'s power house (Sierra plant), 4 miles above mouth of canyon, and 8 miles northeast of Claremont, Los Angeles County.

DRAINAGE AREA.—16.9 square miles (measured on topographic map).

RECORDS AVAILABLE.—January 25, 1917, to September 30, 1921. (Discharge measurements only, May 31 to September 4, 1916.)

GAGE.—Water-stage recorder, in concrete well and house, on left bank at north end of highway bridge.

DISCHARGE MEASUREMENTS.—Made from highway bridge or by wading near gage.

CHANNEL AND CONTROL.—Coarse gravel and small boulders; shift during high stages. One channel except at extreme floods when left bank is overflowed. A concrete control, 30 feet below gage, was completed July 23, 1919.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 2.68 feet at 1 a. m. March 14 (discharge, 68 second-feet); minimum stage from water-stage recorder, 1.44 feet December 6 and 7 (discharge, 0.5 second-foot).

1917–1921: Maximum stage from water-stage recorder, 4.00 feet at 3 p. m. March 7, 1918 (discharge, 362 second-feet); minimum stage not known (estimated discharge, 0.1 second-foot) for periods during August and September, 1919.

DIVERSIONS.—The Southern California Edison Co. diverts water about 1 mile above the station, for power development. (See p. 70.)

REGULATION.—None except as indicated above.

ACCURACY.—Stage-discharge relation changed March 14. Rating curves well defined. Daily discharge ascertained by applying to the rating table mean daily gage height determined by inspecting recorder graph. Water-stage recorder not in operation during several periods; discharge for these periods was interpolated or estimated from records of flow on adjacent streams. Records good.

COOPERATION.—Southern California Edison Co. furnished attendant for water-stage recorder.

Discharge measurements of San Antonio Creek near Claremont, Calif., during the year ending Sept. 30, 1921

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. 4	H. J. Tompkins.....	1.48	0.6	Apr. 12	Troxell and Tompkins.....	1.62	1.2
Dec. 21	do.....	1.52	.8	May 10	H. J. Tompkins.....	1.62	1.3
Jan. 31	do.....	1.60	1.7	24	do.....	2.05	13
Feb. 11	do.....	1.56	1.0	June 29	H. C. Troxell.....	1.64	2.0
24	do.....	1.56	.8	July 30	do.....	1.54	1.1
Mar. 9	do.....	1.52	.9	Aug. 5	do.....	1.54	1.1
23	do.....	1.66	2.2				

Daily discharge, in second-feet, of San Antonio Creek near Claremont, Calif., for the year ending Sept. 30, 1921

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	0.5	1.2	0.9	0.7	1.4	1.3	2.1	1.3	25	1.5	1.0	0.8
2	.5	1.1	.9	.7	1.2	1.3	2.1	1.3	25	1.5	1.0	.9
3	.5	1.0	.9	.7	1.2	1.2	2.1	1.3	23	1.4	1.0	1.0
4	.5	.9	.9	.7	1.2	1.2	2.0	1.3	21	1.4	1.0	.9
5	.5	.8	.9	.8	1.1	1.1	2.0	1.5	18	1.3	1.0	.9
6	.5	.7	.9	.8	1.0	1.1	2.0	1.8	16	1.2	1.0	.8
7	.5	.7	.9	.8	1.3	1.1	1.8	1.8	15	1.2	1.0	.8
8	.5	.7	.9	.7	1.3	1.0	1.8	1.8	14	1.2	1.4	.8
9	.5	.7	.9	.7	1.2	.9	1.7	1.7	13	1.2	1.0	.8
10	.5	.7	.7	.7	1.3	1.0	1.7	1.7	12	1.1	1.0	.8
11	.5	.7	.7	.7	1.2	1.0	1.6	1.7	12	1.1	.9	.8
12	.6	.7	.7	.7	1.2	1.7	1.6	1.6	11	1.1	.9	.9
13	.6	.7	.7	.7	1.3	7.5	1.7	1.6	10	1.1	.8	1.0
14	.7	.7	.6	.6	1.3	28	1.6	1.6	10	1.1	.8	.9
15	.7	.7	.7	.6	1.4	8.5	1.5	1.5	10	1.1	.8	.9
16	.9	.7	.7	.6	1.4	6	1.5	1.5	9.5	1.1	.8	.9
17	1.1	.7	.7	.8	1.6	4.3	1.4	2.0	8.5	1.2	.8	.9
18	1.2	.7	.7	6.5	1.7	3.6	1.4	2.1	7.5	1.2	.8	.9
19	1.1	.7	.7	5.5	1.6	3.4	1.3	2.2	6.5	1.2	.8	.9
20	.9	.7	.7	3.8	1.7	3.0	1.3	2.4	5.5	1.2	.8	.9
21	.8	.6	.8	2.8	1.5	2.7	1.3	20	4.6	1.2	.8	.9
22	.7	.6	.8	2.4	1.4	2.5	1.3	24	3.8	1.0	.9	.8
23	.7	.6	.8	2.0	1.4	2.5	1.3	17	3.4	1.0	.9	.8
24	.7	.6	.9	1.7	1.2	2.4	1.3	14	2.9	1.0	.9	.8
25	.7	.7	.9	1.5	1.3	2.2	1.3	14	2.7	1.0	.9	.7
26	.7	.7	.9	1.4	1.4	2.3	1.3	14	2.5	1.0	.9	.7
27	.7	.7	.8	1.4	1.4	2.2	1.2	15	2.1	1.0	.9	.7
28	.7	.8	.8	2.0	1.4	2.2	1.2	20	1.8	1.0	.9	.7
29	.8	.9	.8	2.0	-----	2.2	1.2	25	1.8	1.0	.9	.8
30	1.2	.9	.8	1.9	-----	2.1	1.2	28	1.7	1.0	.8	1.0
31	1.2	-----	.8	1.5	-----	2.1	-----	27	-----	1.0	.8	-----

NOTE.—Recorder not working properly Oct. 13-18, Nov. 1-7, Dec. 19 to Jan. 10, Feb. 13-23, Mar. 26 to Apr. 11 and Apr. 14-18; discharge for above periods interpolated or estimated by comparison with records for Dalton Creek.

Monthly discharge of San Antonio Creek near Claremont, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	1.2	0.5	0.72	44.3
November	1.2	.6	.75	44.6
December	.9	.6	.80	49.2
January	6.5	-----	1.56	95.9
February	1.7	1.0	1.34	74.4
March	28	.9	3.24	205
April	2.1	1.2	1.56	92.8
May	28	1.3	8.12	499
June	25	1.7	9.99	594
July	1.5	1.0	1.15	70.7
August	1.4	.8	.91	56.0
September	1.0	.7	.85	50.6
The year	28	.5	2.59	1,880

Combined daily discharge, in second-feet, of San Antonio Creek and Southern California Edison Co.'s canal near Claremont, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	12	12	10	10	12	12	28	20	55	30	19	15
2	12	11	11	9.5	11	12	28	20	55	30	18	15
3	12	11	11	9.5	11	12	28	20	53	28	18	15
4	12	11	11	9.5	11	12	28	20	51	26	18	15
5	11	12	11	10	11	12	27	21	48	26	18	15
6	11	12	11	10	11	12	27	22	46	26	17	15
7	11	12	11	9.5	12	12	25	21	45	25	18	15
8	12	12	11	9.5	12	12	25	21	44	24	18	14
9	11	11	11	9.5	11	12	24	21	43	23	17	14
10	11	11	10	10	11	12	24	20	42	23	17	14
11	11	11	10	9.5	11	12	24	20	42	23	17	14
12	11	11	10	9.5	11	16	24	20	41	22	17	14
13	11	11	10	9.5	11	30	23	20	40	22	16	14
14	11	11	10	9.5	12	58	23	20	40	21	16	14
15	11	11	10	9.5	12	30	22	19	40	21	16	14
16	11	11	10	9.5	12	28	22	20	40	21	16	13
17	12	11	10	10	12	28	21	21	38	21	16	13
18	12	11	10	19	12	30	21	21	38	21	16	13
19	13	11	10	18	12	29	21	21	36	20	16	13
20	12	11	10	15	12	31	20	22	36	21	16	14
21	12	11	10	13	12	30	20	50	35	20	16	14
22	11	10	10	12	12	30	20	54	34	20	16	13
23	12	11	10	12	11	32	20	47	33	20	16	12
24	11	11	10	11	11	30	20	44	33	20	16	12
25	12	11	10	11	12	32	20	44	33	20	16	12
26	11	10	10	11	12	32	20	44	32	19	15	12
27	11	10	10	12	12	32	19	45	32	19	15	12
28	11	11	10	13	12	32	20	50	31	19	15	12
29	11	11	10	13	-----	32	20	55	31	19	15	12
30	12	10	10	13	-----	32	20	58	31	19	15	13
31	12	-----	10	12	-----	30	-----	57	-----	19	15	-----

Monthly discharge of San Antonio Creek and Southern California Edison Co.'s canal near Claremont, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	13	11	11.5	707
November	12	10	11.0	655
December	11	10	10.3	633
January	19	9.5	11.3	695
February	12	11	11.6	644
March	58	12	24.4	1,500
April	28	19	22.8	1,360
May	58	19	30.9	1,900
June	55	31	39.9	2,370
July	30	19	22.2	1,370
August	19	15	16.5	1,010
September	15	12	13.6	809
The year	58	9.5	18.8	13,700

SOUTHERN CALIFORNIA EDISON CO.'S CANAL NEAR CLAREMONT, CALIF.

LOCATION.—In NW. $\frac{1}{4}$ sec. 1, T. 1 N., R. 8 W., at weir in tailrace of Sierra power house, on San Antonio Creek, $1\frac{1}{2}$ miles below intake and 8 miles north-east of Claremont, Los Angeles County.

RECORDS AVAILABLE.—January 1, 1917, to September 30, 1921.

GAGE.—Hook gage which indicates head on wier; read by B. F. Campbell, operator at power house.

DISCHARGE.—Computed from head on 10-foot rectangular weir.

ACCURACY.—Gage is read at 8 a. m. and 4 p. m. Discharge computed from weir table by observer. Records good.

COOPERATION.—Discharge record furnished by Southern California Edison Co.

This canal diverts water from San Antonio Creek in SE. $\frac{1}{4}$ sec. 25, T. 2 N., R. 8 W., 1 mile above gaging station on San Antonio Creek near Claremont. The water is used for the development of power at the Sierra power house, in NW. $\frac{1}{4}$ sec. 1, T. 1 N., R. 8 W., and then returned directly to creek.

Daily discharge, in second-feet, of Southern California Edison Co.'s canal near Claremont, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	11.3	10.7	9.6	9.1	10.3	10.4	26	18.3	30	28	17.9	14.0
2.....	11.0	10.2	9.7	8.9	10.0	10.4	26	18.4	30	29	17.5	13.8
3.....	11.6	10.3	9.9	9.0	10.2	10.7	26	18.5	30	27	17.4	14.2
4.....	11.1	10.3	9.8	8.8	10.1	10.8	26	18.3	30	25	16.9	14.1
5.....	10.7	11.3	9.8	9.0	10.2	10.8	25	19.5	30	25	16.6	14.2
6.....	10.9	11.0	9.8	9.0	10.4	10.8	25	19.7	30	25	16.3	14.0
7.....	10.9	11.1	9.8	8.9	10.3	11.3	23	19.2	30	24	16.8	13.8
8.....	11.0	10.8	9.9	8.8	10.3	10.9	23	18.9	30	23	16.4	13.4
9.....	10.7	10.7	9.9	9.0	10.1	11.2	22	19	30	22	16.2	13.2
10.....	10.8	10.5	9.7	9.1	10.0	11.2	22	18.3	30	22	16.0	13.4
11.....	10.7	10.1	9.8	8.9	10.1	11.3	22	18.3	30	22	16.0	13.2
12.....	10.8	10.4	9.7	8.9	9.8	14.2	22	18.3	30	21	15.9	13.3
13.....	10.4	10.7	9.7	9.0	10.0	22	21	17.9	30	21	15.6	12.9
14.....	10.4	10.4	9.7	8.9	10.4	30	21	17.9	30	20	15.4	13.2
15.....	10.5	10.5	9.6	8.8	10.4	22	21	17.7	30	20	15.6	13.0
16.....	10.5	10.5	9.3	8.8	10.3	22	20	18.2	30	20	15.6	12.2
17.....	10.5	10.2	9.6	9.0	10.4	24	19.9	19.1	30	20	15.4	12.2
18.....	10.8	10.4	9.4	12.8	10.1	26	19.4	19.1	30	19.6	15.2	12.2
19.....	12.3	10.1	9.4	12.0	10.1	26	19.3	19	30	19.3	15.0	11.7
20.....	11.1	10.0	9.6	11.0	10.0	28	19.2	19.5	30	19.4	15.0	12.7
21.....	11.1	10.2	9.4	10.5	10.4	27	18.8	30	30	19.3	15.3	12.6
22.....	10.4	9.9	9.2	10.1	10.2	28	19.2	30	30	19.2	14.8	11.8
23.....	10.9	10.3	9.2	10.0	10.0	29	18.6	30	30	18.8	15.2	11.7
24.....	10.5	10.0	9.3	9.7	10.1	28	18.9	30	30	19.2	14.6	11.5
25.....	10.8	9.9	9.2	9.8	10.3	30	18.8	30	30	18.8	14.6	11.3
26.....	10.4	9.8	9.2	9.9	10.2	30	18.5	30	30	18.4	14.4	11.5
27.....	10.2	9.8	9.2	10.6	10.3	30	18.2	30	30	18.3	14.4	11.8
28.....	10.4	10.0	9.2	10.8	10.3	30	18.3	30	29	18.2	14.3	11.4
29.....	10.2	10.2	9.2	10.9	-----	30	18.3	30	29	18.2	14.2	11.5
30.....	10.8	9.6	9.1	10.8	-----	30	18.4	30	29	18.2	14.0	12.2
31.....	10.8	-----	9.0	10.6	-----	28	-----	30	-----	18	14.2	-----

Monthly discharge of Southern California Edison Co.'s canal near Claremont, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	12.3	10.2	10.8	664
November.....	11.3	9.6	10.3	613
December.....	9.9	9.0	9.51	585
January.....	12.8	8.8	9.72	598
February.....	10.4	9.8	10.2	568
March.....	30	10.4	21.1	1,300
April.....	26	18.2	21.2	1,260
May.....	30	17.7	22.7	1,400
June.....	30	29	29.9	1,780
July.....	29	18.0	21.2	1,300
August.....	17.9	14.0	15.6	959
September.....	14.2	11.3	12.7	756
The year.....	30	8.8	16.3	11,800

SANTIAGO CREEK NEAR VILLA PARK, CALIF.

LOCATION.—In SW. $\frac{1}{4}$ sec. 13, T. 4 S., R. 9 W., at mouth of canyon, $1\frac{1}{4}$ miles northeast of Villa Park, Orange County, and five-eighths mile below Serrano & Carpenter Water Co.'s diversion dam.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—June 30, 1920, to September 30, 1921.

GAGE.—Water-stage recorder in concrete well and shelter on right bank, five-eighths mile below the diversion dam.

DISCHARGE MEASUREMENTS.—Made from cable half a mile above gage or by wading.

CHANNEL AND CONTROL.—Sand, gravel, and boulders; shift at high stages.

EXTREMES OF DISCHARGE.—Maximum stage during period, from water-stage recorder, 4.20 feet at 7 a. m. March 14 (discharge, 685 second-feet); stream dry June 30 to September 30, 1920, and at various times during the year ending September 30, 1921.

DIVERSIONS.—Serrano Carpenter canal diverts water at the diversion dam above the gage. See record of canal, pages 74-75.

REGULATION.—All water diverted at times by the Serrano & Carpenter canal.

ACCURACY.—Stage-discharge relation changed March 13. Rating curves fairly well defined. Water-stage recorder operated satisfactorily. Daily discharge ascertained by applying mean daily gage height to rating table. Records fair.

Discharge measurements of Santiago Creek near Villa Park, Calif., during the year ending Sept. 30, 1921

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. 10	Jarrett Oliver.....	1.52	a 0.1	Mar. 14	Jarrett Oliver.....	3.09	196
Dec. 13	Marliave and Oliver.....	1.54	a .05	14	do.....	3.05	178
Jan. 18	Jarrett Oliver.....	1.96	9.9	16	F. C. Ebert.....	1.81	12
18	do.....	2.05	15	18	Jarrett Oliver.....	1.25	.3
20	F. C. Ebert.....	1.58	a .2	May 10	McGlashan and Ebert.....	1.07	a .1
Feb. 3	Jarrett Oliver.....	1.55	a .05	11	Jarrett Oliver.....	1.02	0
25	do.....	1.49	0	25	F. C. Ebert.....	1.14	a .2
Mar. 14	do.....	3.17	224				

* Estimated.

Daily discharge, in second-feet, of Santiago Creek near Villa Park, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Aug.
1		0.2	0.1		0.1				
2			.1		.1				
3			.1		.1				
4			.1		.1				
5			.1		.1				
6			.1		.1				
7			.1		.1	0.1			
8			.1		.1	.1			
9			.1		.1	.1		0.1	
10		.1	.1		.1	.1		.1	
11		.1	.1		.1	.1	0.3		
12		.1	.1		.1	.2	.6		
13		.1	.1		.1	17			
14		.1	.1		.1	360			0.2
15		.1	.1		.1	45			.2
16		.1	.1		.1	12			.1
17		.1			.1	4.3			
18		.1		6.5	.1	.9			
19		.1	.1	1.9	.1	.2			
20		.1	.1	.7	.1	.2			
21		.1		.2	.1	.2		3.1	
22		.1		.3	.1	.2		11	
23		.1		.8	.1	.2		7	
24		.1		.1	.1	.2		.8	
25		.1		.1		.2		.2	
26		.1			.1	.1		.1	
27		.1		.2	.1	.1			
28		.1		.5					
29		.1		.1					
30	3.8	.1		.1					
31	1.2			.1					

NOTE.—Stream dry at gage when discharge is not given and also from June 30 to Sept. 30, 1920.

Monthly discharge of Santiago Creek near Villa Park, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	3.8	0	0.16	9.8
November.....	.2	0	.077	4.6
December.....	.1	0	.058	3.6
January.....	6.5	0	.37	22.8
February.....	.1	0	.093	5.2
March.....	360	0	14.2	873
April.....	.6	0	.030	1.8
May.....	11	0	.72	44.3
August.....	.2	0	.016	1.0
The year.....	360	0	1.34	966

NOTE.—No flow in months for which record is not given; also from June 30 to Sept. 30, 1920.

Combined daily discharge, in second-feet, of Santiago Creek and Serrano and Carpenter canal near Villa Park, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	5.7	3.4	4.0	2.8	3.2	2.5	4.9	6.5	6.7	8.3	9.0	6
2.....	5.7	4.9	3.8	2.6	3.2	2.5	4.9	6.7	6.7	8.5	8.9	5.5
3.....	5.7	4.7	3.8	2.5	3.3	2.5	4.9	7.0	6.5	8.9	8.7	6.0
4.....	5.8	4.7	3.7	2.5	3.3	2.3	4.9	6.8	6.5	8.9	8.5	5.8
5.....	5.7	4.7	3.7	2.5	3.3	2.3	4.9	7.6	6.5	8.3	8.3	5.8
6.....	5.7	4.7	3.5	2.5	3.3	2.3	5.0	8.3	6.3	8.5	8.3	6.0
7.....	5.7	4.7	3.5	2.5	3.3	2.4	5.0	7.7	6.3	8.1	8.5	6.1
8.....	5.7	4.4	3.4	2.5	3.2	2.4	5.2	6.3	6.3	7.4	8.3	6.1
9.....	5.7	4.3	3.4	2.5	3.2	2.4	5.3	6	6.3	7.4	7.9	6.1
10.....	5.7	4.2	3.3	2.5	3.2	2.4	5.3	6	6.3	7.6	7.7	
11.....	5.5	4.2	3.3	2.3	3.2	2.4	6.5	6.0	6.1	8.5	7.9	
12.....	5.0	4.1	3.2	2.3	3.2	2.7	7	5.8	6.1	9.2	7.0	
13.....	4.7	4.1	3.2	2.2	3.2	18	7.7	5.8	6.1	9.4	6.5	
14.....	4.3	4.1	3.2	2.2	3.2	360	7.6	6.0	6.1	8.9	7	
15.....	4.3	4.1	3.0	2.2	3.0	45	7.6	6.1	6.1	9.4	7	
16.....	4.3	4.1	3.0	2.2	3.0	13	7	6.3	6.3	9.0	7	
17.....	4.3	4.1	2.9	2.2	2.9	8.5	7	6.3	6.7	9.0	6.7	
18.....	4.4	4.1	2.9	6.5	2.9	7.5	6.8	6.1	6.7	8.9	6.3	
19.....	4.4	4.1	3.3	2.9	2.9	7	6.8	6.3	6.7	8.5	6.3	
20.....	4.3	4.1	3.3	3.3	2.8	6.5	6.7	6.5	7	8.5	6.3	6.0
21.....	4.1	4.1	3.1	2.8	2.8	6	6.1	9	7.7	9.6	6.1	
22.....	4.1	4.1	2.9	3.0	2.7	6	6.1	11	7.7	9.0	6.1	
23.....	4.1	4.1	2.8	2.1	2.7	6	6.3	7	7.7	9.0	6.1	
24.....	4.0	4.1	2.8	2.6	3.0	5.5	6.3	5.5	7.9	9.0	6.5	
25.....	4.1	4.1	2.8	2.7	2.9	5.5	6.7	8	8.1	9.2	6	
26.....	4.1	4.1	2.8	2.7	2.6	5.5	6.7	7.5	7.9	8.9	6	
27.....	4.1	4.1	2.8	2.0	2.6	5.5	7	7.4	7.7	8.9	6.1	
28.....	4.1	4.1	2.8	2.5	2.5	5.5	7	7.2	7.7	9.0	6	
29.....	4.1	4.0	2.8	2.9	---	5.3	6.8	7	7.0	8.9	6	
30.....	6.5	4.0	2.8	2.9	---	5.3	6.7	6.8	7.2	8.9	6.1	
31.....	1.2	---	2.8	3.1	---	5.2	---	6.8	---	9.2	6.3	---

NOTE.—Discharge estimated Nov. 28 to Dec. 12, Sept. 1, and 10-30; recorder on canal not working properly.

Combined monthly discharge of Santiago Creek and Serrano and Carpenter canal near Villa Park, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	6.5	1.2	4.75	292
November.....	4.9	3.4	4.22	251
December.....	4.0	2.8	3.18	196
January.....	6.5	2.0	2.68	165
February.....	3.3	2.5	3.02	168
March.....	360	2.3	17.9	1,100
April.....	7.7	4.9	6.24	371
May.....	11	5.8	6.88	423
June.....	8.1	6.1	6.83	406
July.....	9.4	7.4	8.72	536
August.....	9.0	6.0	7.08	435
September.....	-----	-----	5.98	356
The year.....	360	1.2	6.49	4,700

NOTE.—Serrano and Carpenter canal diverted entire flow of creek from Aug. 11 to Sept. 30, 1920; see p. 75.

SERRANO AND CARPENTER CANAL NEAR VILLA PARK, CALIF.

LOCATION.—In SW. $\frac{1}{4}$ sec, 13, T. 4 S., R. 9 W., at division box half a mile above mouth of Santiago Creek canyon and $2\frac{1}{4}$ miles northeast of Villa Park, Orange County.

RECORDS AVAILABLE.—August 11, 1920, to September 30, 1921.

GAGE.—Water-stage recorder in concrete well and wooden shelter in division box above the weirs.

DISCHARGE MEASUREMENTS.—Made from footbridge in tunnel 1,000 feet above gage.

CHANNEL AND CONTROL.—Control formed by two weirs with 6-inch flashboards always in place. Weirs are 1.6 feet long. All water may be diverted into one pipe line by addition of flashboards on one weir.

EXTREMES OF DISCHARGE.—Maximum mean daily discharge recorded during the period, 9.4 second-feet July 13. No water is diverted at times.

ACCURACY.—Stage-discharge relation permanent. Rating curve well defined. Water-stage recorder stopped November 28 to December 12 and September 10–30, 1921. Daily discharge ascertained by applying mean daily gage height to rating table and interpolating when recorder was not in operation. Records good.

Discharge measurements of Serrano and Carpenter canal near Villa Park, Calif., during the period Aug. 11, 1920, to Sept. 30, 1921

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
1920		<i>Feet</i>	<i>Sec.-ft</i>	1921		<i>Feet</i>	<i>Sec.-ft</i>
Sept. 16	Jarrett Oliver.....	0.53	5.2	Feb. 25	Jarrett Oliver.....	0.33	2.4
Nov. 10	do.....	.46	4.0	Apr. 7	do.....	.52	5.4
Dec. 13	do.....	.38	3.3	Apr. 19	do.....	.64	6.9
1921				May 28	do.....	.63	7.0
Jan. 5	do.....	.33	2.4	May 11	do.....	.57	5.8
Feb. 20	F. C. Ebert.....	.34	2.6	June 2	do.....	.60	6.2
Feb. 3	Jarrett Oliver.....	.39	3.1	Aug. 25	do.....	.58	6.0

Daily discharge, in second-feet, of Serrano and Carpenter canal near Villa Park, Calif., for the period Aug. 11, 1920, to Sept. 30, 1921

Day	Aug.	Sept.	Day	Aug.	Sept.	Day	Aug.	Sept.
1920			1920			1920		
1		6.0	11	6.3	6.5	21	6.5	5.3
2		6.1	12	7.0	6.8	22	6.5	5.2
3		6.1	13	6.8	6.8	23	6.7	5.2
4		6.3	14	6.8	7.0	24	6.7	5.0
5		6.1	15	6.8	6.8	25	6.5	5.2
6		6.3	16	7.2	5.8	26	6.5	5.2
7		6.3	17	7.4	5.3	27	6.7	5.3
8		6.1	18	7.2	5.3	28	6.3	5.7
9		6.1	19	6.3	5.3	29	6.1	5.7
10		6.1	20	6.7	5.3	30	6.1	5.8
						31	6.1	

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1920-21												
1	5.7	3.2	3.9	2.8	3.1	2.5	4.9	6.5	6.7	8.3	9.0	6.0
2	5.7	4.9	3.7	2.6	3.1	2.5	4.9	6.7	6.7	8.5	8.9	5.5
3	5.7	4.7	3.7	2.5	3.2	2.5	4.9	7.0	6.5	8.9	8.7	6.0
4	5.8	4.7	3.6	2.5	3.2	2.3	4.9	6.8	6.5	8.9	8.5	5.8
5	5.7	4.7	3.6	2.5	3.2	2.3	4.9	7.6	6.5	8.3	8.3	5.8
6	5.7	4.7	3.4	2.5	3.2	2.3	5.0	8.3	6.3	8.5	8.3	6.0
7	5.7	4.7	3.4	2.5	3.2	2.3	5.0	7.7	6.3	8.1	8.5	6.1
8	5.7	4.4	3.3	2.5	3.1	2.3	5.2	6.3	6.3	7.4	8.3	6.1
9	5.7	4.3	3.3	2.5	3.1	2.3	5.3	6.1	6.3	7.4	7.9	6.1
10	5.7	4.1	3.2	2.5	3.1	2.3	5.8	6.0	6.3	7.6	7.7	6.0
11	5.5	4.1	3.2	2.3	3.1	2.3	6.3	6.0	6.1	8.5	7.9	6.0
12	5.0	4.0	3.1	2.3	3.1	2.5	6.3	5.8	6.1	9.2	7.0	6.0
13	4.7	4.0	3.1	2.2	3.1	1.4	7.7	5.8	6.1	9.4	6.5	6.0
14	4.3	4.0	3.1	2.2	3.1	0	7.6	6.0	6.1	8.9	6.7	6.0
15	4.3	4.0	2.9	2.2	2.9	0	7.6	6.1	6.1	9.4	6.7	6.0
16	4.3	4.0	2.9	2.2	2.9	1.1	7.0	6.3	6.3	9.0	6.7	6.0
17	4.3	4.0	2.9	2.2	2.8	4.3	7.0	6.3	6.7	9.0	6.7	6.0
18	4.4	4.0	2.9	0	2.8	6.8	6.8	6.1	6.7	8.9	6.3	6.0
19	4.4	4.0	3.2	1.0	2.8	6.7	6.8	6.3	6.7	8.5	6.3	6.0
20	4.3	4.0	3.2	2.6	2.7	6.3	6.7	6.5	7.0	8.5	6.3	6.0
21	4.1	4.0	3.1	2.6	2.7	6.0	6.1	5.8	7.7	9.0	6.1	6.0
22	4.1	4.0	2.9	2.7	2.6	6.0	6.0	0	7.7	9.0	6.1	6.0
23	4.1	4.0	2.8	1.3	2.6	5.7	6.3	0	7.7	9.0	6.1	6.0
24	4.0	4.0	2.8	2.5	2.9	5.5	6.3	4.8	7.9	9.0	6.5	6.0
25	4.1	4.0	2.8	2.6	2.9	5.5	6.7	7.6	8.1	9.2	6.0	6.0
26	4.1	4.0	2.8	2.7	2.5	5.5	6.7	7.4	7.9	8.9	6.0	6.0
27	4.1	4.0	2.8	1.8	2.5	5.5	7.0	7.4	7.7	8.9	6.1	6.0
28	4.1	4.0	2.8	2.0	2.5	5.5	7.0	7.2	7.7	9.0	6.0	6.0
29	4.1	3.9	2.8	2.8		5.3	6.8	7.0	7.0	8.9	6.0	6.0
30	2.7	3.9	2.8	2.8		5.3	6.7	6.8	7.2	8.9	6.1	6.0
31			2.8	3.0		5.2		6.8		9.2	6.3	

NOTE.—Recorder not working properly Nov. 28 to Dec. 12, Sept. 1, and Sept. 10-30; discharge estimated.

Monthly discharge of Serrano and Carpenter canal near Villa Park, Calif., for the period Aug. 11, 1920, to Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
1920				
August 11-31	7.4	6.1	6.63	276
September	7.0	5.0	5.87	349
The period				625
1920-21				
October	5.8	0	4.58	282
November	4.9	3.2	4.14	246
December	3.9	2.8	3.12	192
January	3.0	0	2.30	141
February	3.2	2.5	2.93	163
March	6.8	0	3.74	230
April	7.7	4.9	6.21	370
May	8.3	0	6.16	379
June	8.1	6.1	6.83	406
July	9.4	7.4	8.72	536
August	9.0	6.0	7.05	433
September			5.98	356
The year	9.4	0	5.16	3,730

SAN GABRIEL RIVER BASIN

SAN GABRIEL RIVER NEAR AZUSA, CALIF.

LOCATION.—In NW. $\frac{1}{4}$ sec. 23, T. 1 N., R. 10 W., near road crossing at mouth of canyon, half a mile above Southern California Edison Co.'s power house, and 2 miles north of Azusa, Los Angeles County.

DRAINAGE AREA.—222 square miles.

RECORDS AVAILABLE.—1894 to September 30, 1921.

GAGE.—Water-stage recorder on left bank at rock point above ford. Original location of gage was just above ford at mouth of canyon. On account of frequent changes in channel it has been necessary to install numerous gages at points from 1,000 feet above ford to 600 feet below. Most of the gages used have been installed at independent datums.

DISCHARGE MEASUREMENTS.—Made from cable 1,000 feet above ford or by wading near gage.

CHANNEL AND CONTROL.—Gravel and boulders; shift during high water.

EXTREMES OF DISCHARGE.—Maximum stage during year, from flood marks, 7.45 feet March 14 (discharge, 4,000 second-feet); stream dry at gage several times during year.

1894-1921: Maximum stage recorded, 12.0 feet January 18, 1916 (discharge, 40,000 second-feet); stream dry for several months each year.

DIVERSIONS.—The power canal of the Southern California Edison Co. heads about 5 miles above station. Water was diverted through the tunnel about 500 feet above ford at various times. (For daily discharge of these canals see pp. 78-81.)

REGULATION.—None.

ACCURACY.—Stage-discharge relation not permanent throughout year. Rating curves well defined. Operation of water-stage recorder satisfactory. Daily discharge ascertained by applying to rating table mean daily gage height determined by inspecting recorder graph. Records good.

Discharge measurements of San Gabriel River near Azusa, Calif., during the year ending Sept. 30, 1921

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>
Jan. 18	F. C. Ebert.....	5.47	692	Apr. 6	Troxell and Tompkins..	3.65	50
19	do.....	4.90	310	14	do.....	3.48	33
20	do.....	4.02	98	19	H. C. Troxell.....	(a)	11
22	do.....	3.28	31	21	Troxell and Tompkins..	2.44	1.6
25	do.....	2.86	8.6	25	do.....	2.36	.5
28	do.....	4.10	108	May 6	do.....	3.08	10
Feb. 7	do.....	3.19	23	12	do.....	2.68	2.4
11	H. J. Tompkins.....	2.12	1.6	17	H. J. Tompkins.....	2.88	4.0
16	do.....	3.15	20	23	F. C. Ebert.....	5.72	622
19	do.....	2.82	8.1	25	Troxell and Tompkins..	5.48	507
Mar. 14	F. C. Ebert.....	6.28	2,020	28	F. C. Ebert.....	5.16	294
15	do.....	5.08	568	June 7	Troxell and Tompkins..	3.86	64
18	do.....	4.76	272	10	F. C. Ebert.....	3.71	50
24	do.....	4.16	111	15	do.....	3.58	43
26	do.....	4.06	109	17	H. J. Tompkins.....	3.16	16
31	do.....	3.76	72	24	Arnold and Ebert.....	2.89	5.4
Apr. 4	Troxell and Ebert.....	3.85	74	28	H. J. Tompkins.....	2.72	2.1

* Sand bar between gage and river; gage not read.

Daily discharge, in second-feet, of San Gabriel River near Azusa, Calif., for the year ending Sept. 30, 1921

Day	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1.				29		56		170
2.				23		54		157
3.				21		53		143
4.				22		67		104
5.				24		55	0.4	90
6.	48			50	0.9	50	11	78
7.	6			22	2.0	43	17	65
8.	3.1			17		40	8	63
9.	1.8			32		35	6.5	60
10.	1.1			8		36	4.7	51
11.	1.8			3.2		45	2.6	45
12.	1.1			7	13	37	1.6	39
13.				8.5	312	32	1.1	36
14.				5.5	2,050	32	1.1	36
15.				32	578	27	.4	40
16.				18	448	24	.6	38
17.				14	343	23	6	25
18.			272	15	294	21	17	11
19.		4.5	244	9	237	15	8.5	10
20.		10	86	5.5	204	8.5	34	8
21.		3.4	53	4.9	168	2.4	955	7
22.			29	3.2	147	1.4	1,050	6
23.			22	3.1	130	1.3	660	6
24.			11		115	3.4	478	6
25.			9		105	.9	409	6
26.			6.5		95		367	5
27.			16		85		321	4.2
28.			105		76		325	2.8
29.			67		70		350	1.1
30.			48		63		281	
31.			37		59		196	

NOTE.—Stream dry at gage when discharge is not given.

Monthly discharge of San Gabriel River near Azusa, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
November	48	0	2.10	125
December	10	0	.58	35.7
January	272	0	32.4	1,990
February	50	0	13.5	750
March	2,050	0	180	11,100
April	67	0	25.4	1,510
May	1,050	0	178	10,900
June	170	0	43.8	2,610
The year	2,050	0	40.1	29,000

NOTE.—No flow in months for which no record is given.

Combined daily discharge, in second-feet, of San Gabriel River and canals near Azusa, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.	30	36	31	37	97	72	127	80	249	88	47	33
2.	29	36	32	35	91	70	125	80	235	86	46	36
3.	31	35	32	35	89	70	123	78	221	83	44	34
4.	29	32	32	35	89	71	138	80	222	81	42	30
5.	29	38	34	35	86	70	126	84	209	77	42	29
6.	28	90	35	35	85	70	121	111	197	75	41	30
7.	29	57	35	35	85	73	114	107	184	74	43	31
8.	30	50	37	35	72	68	111	94	183	68	51	31
9.	31	45	37	35	86	66	106	90	174	66	50	32
10.	31	42	35	38	77	65	107	88	166	66	47	32
11.	32	41	34	37	74	64	116	84	158	65	46	32
12.	31	40	33	36	78	84	108	82	148	65	43	32
13.	32	39	35	35	80	85	103	81	145	63	41	32
14.	31	38	35	35	78	2, 120	103	80	143	62	41	33
15.	31	37	32	35	104	650	98	78	147	60	41	32
16.	31	37	32	34	89	520	94	78	142	60	38	31
17.	31	38	30	38	86	415	93	89	149	60	40	31
18.	33	37	31	340	87	366	91	102	138	58	38	31
19.	55	37	50	315	81	310	90	90	129	56	38	32
20.	34	37	56	160	78	277	97	119	127	56	37	32
21.	39	37	45	127	77	241	89	1, 060	118	59	36	30
22.	35	37	38	101	74	219	91	1, 160	113	58	35	31
23.	32	37	37	94	71	202	95	741	111	53	35	30
24.	27	37	35	82	68	187	91	557	108	52	37	27
25.	32	37	36	79	69	176	89	487	107	50	36	28
26.	33	36	37	78	71	167	86	442	104	48	35	28
27.	32	36	36	88	71	157	83	396	101	48	35	29
28.	32	35	35	176	72	147	77	352	99	49	35	28
29.	32	34	36	137	-----	141	80	353	98	48	33	29
30.	39	33	37	117	-----	134	79	332	95	49	33	33
31.	37	-----	37	105	-----	130	-----	274	-----	48	32	-----

Combined monthly discharge of San Gabriel River and canals near Azusa, Calif., for the year ending Sept. 30, 1921

[Drainage area, 222 square miles]

Month	Discharge in second-feet				Run-off	
	Maximum	Minimum	Mean	Per square mile	In inches	In acre-feet
October	55	27	32.5	0.146	0.17	2,000
November	90	33	40.0	.180	.20	2,380
December	56	30	36.0	.162	.19	2,210
January	340	34	84.0	.378	.44	5,160
February	104	68	90.9	.364	.38	4,490
March	2, 120	64	251	1.13	1.30	15,400
April	138	77	102	.459	.51	6,070
May	1, 160	78	256	1.15	1.33	15,700
June	249	95	151	.680	.76	8,980
July	88	48	62.3	.281	.32	3,830
August	51	32	39.9	.180	.21	2,450
September	36	27	31.0	.140	.16	1,840
The year	2, 120	27	97.5	.439	5.97	70,500

SOUTHERN CALIFORNIA EDISON CO.'S CANAL NEAR AZUSA, CALIF.

LOCATION.—At Southern California Edison Co.'s power house, 5 miles southwest of intake on San Gabriel River and $1\frac{1}{2}$ miles north of Azusa, Los Angeles County.

RECORDS AVAILABLE.—1896 to September 30, 1921.

DISCHARGE.—Computed by applying mean daily gage height to weir tables.

GAGE.—Hook gage in division box in tailrace of power plant. Read twice daily by employee of power company.

CHANNEL AND CONTROL.—Control formed by two weirs with end contractions.

A movable steel plate forms the left end of one weir and right end of the other weir. Total length of weir crest is 44 feet $9\frac{1}{4}$ inches. A supplementary plate $1\frac{1}{2}$ feet long is placed on crest of Duarte weir to shorten it up when necessary to divide the water.

EXTREMES OF DISCHARGE.—Maximum mean daily discharge during year, 79 second-feet June 8 and 10. Canal dry May 29 and part of May 28, 30, and February 6.

1896-1921: Maximum mean daily discharge recorded, 97 second-feet November 27, 1906; canal usually dry for a few days each year.

ACCURACY.—Records good.

Diversion dam for canal is on San Gabriel River in SE. $\frac{1}{4}$ SE. $\frac{1}{4}$ sec. 31, T. 2 N., R. 9 W., 5 miles above gaging station on San Gabriel River at the mouth of the canyon near Azusa. The water is used for power development at a point about $1\frac{1}{2}$ miles north of Azusa and, after leaving the power plant, is divided and used for irrigation—part is discharged into Azusa-Covina canal and the remainder into Duarte canal. During the rainy season part of the water from the power plant is wasted back into San Gabriel River below the gaging station.

Daily discharge, in second-feet, of Southern California Edison Co.'s canal near Azusa, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	30	36	31	37	68	72	71	72	78	76	47	33
2.....	29	36	32	35	68	70	71	72	78	76	46	36
3.....	31	35	32	35	68	70	70	72	78	76	44	34
4.....	29	32	32	35	67	71	71	72	78	76	42	30
5.....	29	38	34	35	62	70	71	72	78	74	42	29
6.....	28	42	35	35	35	69	71	72	78	73	41	30
7.....	29	51	35	35	63	71	71	72	78	73	43	31
8.....	30	47	37	35	55	68	71	72	79	68	51	31
9.....	31	43	37	35	54	66	71	72	78	66	50	32
10.....	31	41	35	38	69	65	71	72	79	66	47	32
11.....	32	39	34	37	71	64	71	72	78	65	46	32
12.....	31	39	33	36	71	71	71	72	78	65	43	32
13.....	32	39	35	35	71	73	71	72	78	63	41	32
14.....	31	38	35	35	72	72	71	72	78	62	41	33
15.....	31	37	32	35	72	72	71	72	78	60	41	32
16.....	31	37	32	34	71	72	70	72	78	60	38	31
17.....	31	38	30	38	72	72	70	72	78	60	40	31
18.....	33	37	31	68	72	72	70	73	78	58	38	31
19.....	55	37	46	71	72	73	70	72	78	56	38	32
20.....	34	37	46	74	72	73	70	72	78	56	37	32
21.....	39	37	42	74	72	73	70	73	77	59	36	30
22.....	35	37	38	72	71	72	70	73	76	58	35	31
23.....	32	37	37	72	68	72	73	73	76	53	35	30
24.....	27	37	35	71	68	72	72	73	76	52	37	27
25.....	32	37	36	70	69	71	73	73	76	50	36	28
26.....	33	36	37	71	71	72	72	72	76	48	35	28
27.....	32	36	36	72	71	72	73	72	76	48	35	29
28.....	32	35	35	71	72	71	71	24	76	49	35	28
29.....	32	34	36	70	-----	71	72	0	76	48	33	29
30.....	39	33	37	69	-----	71	71	48	76	49	33	33
31.....	37	-----	37	68	-----	71	-----	76	-----	48	32	-----

Monthly discharge of Southern California Edison Co.'s canal near Azusa, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	55	27	32.5	2,000
November.....	51	32	37.9	2,260
December.....	46	30	35.5	2,180
January.....	74	34	51.5	3,170
February.....	72	35	67.4	3,740
March.....	73	64	70.8	4,350
April.....	73	70	71.0	4,220
May.....	76	0	67.7	4,160
June.....	79	76	77.4	4,610
July.....	76	48	61.0	3,750
August.....	51	32	39.9	2,450
September.....	36	27	31.0	1,840
The year.....	79	0	53.5	38,700

TUNNEL DIVERSION NEAR AZUSA, CALIF.

LOCATION.—Near line between secs. 22 and 23, T. 1 N., R. 10 W., at weir box where water is divided between Azusa and Duarte canals, 1,000 feet north-east of Southern California Edison Co.'s power plant and 1½ miles north of Azusa, Los Angeles County.

RECORDS AVAILABLE.—October 1, 1917, to September 30, 1921.

GAGE.—Vertical staff fastened to north wall of weir box; read by B. Bunje.

DISCHARGE MEASUREMENTS.—Made by wading near gage.

CHANNEL AND CONTROL.—Concrete weir box. Water is divided between Azusa canal and Duarte canal by passing over weirs. Either weir can be closed.

ACCURACY.—Stage-discharge relation changed April 24 and June 27 due to manipulation of weirs. Rating curves fairly well defined for conditions when either or both weirs are open. Gage read to hundredths once daily. Daily discharge ascertained by applying mean daily gage height to rating table. Records fair.

The intake of this canal is on San Gabriel River about 600 feet above United States Geological Survey gaging station on San Gabriel River near Azusa. Water is used to augment the irrigation supply obtained from the tailrace of the Southern California Edison Co.'s power plant and to provide a supply when the water is shut out of power canal.

Discharge measurements of tunnel diversion near Azusa, Calif., during the year ending Sept. 30, 1921

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>
Apr. 19	H. J. Tompkins.....	1.63	6	May 12	Troxell and Tompkins.....	1.68	7.6
21	do.....	2.24	17	17	H. J. Tompkins.....	1.74	10
25	Troxell and Tompkins.....	1.92	18	June 10	F. C. Ebert.....	2.21	33
29	H. C. Troxell.....	1.59	4.8	28	H. J. Tompkins.....	2.16	21
May 3	Troxell and Tompkins.....	1.66	7.8	30	Arnold and Ebert.....	2.07	17.4

Daily discharge, in second-feet, of tunnel diversion near Azusa, Calif., for the year ending Sept. 30, 1921

Day	Apr.	May	June	July	Day	Apr.	May	June	July
1.....		7.6	1	12.2	16.....		5.2	26	-----
2.....		7.6	0	9.7	17.....		10.8	46	-----
3.....		6.4	0	7.1	18.....		12.3	49	-----
4.....		7.6	40	5	19.....	4.7	9.5	41	-----
5.....		11.5	41	2.8	20.....	18.3	13.1	41	-----
6.....		28	41	1.7	21.....	16.5	29	34	-----
7.....		18.4	41	1.1	22.....	19.3	24	31	-----
8.....		13.9	41	-----	23.....	21	7.6	29	-----
9.....		11.5	36	-----	24.....	15.5	5.8	26	-----
10.....		10.8	36	-----	25.....	15.5	5.2	25	-----
11.....		8.9	35	-----	26.....	13.5	3.4	23	-----
12.....		8.2	31	-----	27.....	9.8	3.4	21	-----
13.....		7.6	31	-----	28.....	6.4	3.4	20	-----
14.....		7	29	-----	29.....	7.6	3.4	21	-----
15.....		5.2	29	-----	30.....	7.6	2.6	18.7	-----
					31.....		1.8	-----	-----

NOTE.—No water diverted Oct. 1 to Apr. 18 and July 8 to Sept. 30.

*Monthly discharge of tunnel diversion near Azusa, Calif., for the year ending
Sept. 30, 1921*

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
April.....	21	0	5.19	309
May.....	29	1.8	9.70	596
June.....	49	0	29.5	1,760
July.....	12.2	0	1.28	78.7
The year.....	49	0	3.78	2,740

NOTE.—No flow during months for which no records are given.

ROGERS CREEK NEAR AZUSA, CALIF.

LOCATION.—In southwest corner of sec. 14, T. 1 N., R. 10 W., half a mile above mouth of creek and $2\frac{1}{4}$ miles north of Azusa, Los Angeles County.

DRAINAGE AREA.—6.4 square miles (measured on topographic map).

RECORDS AVAILABLE.—October 1, 1917, to September 30, 1921. (Discharge measurements only, May 8, 1916, to June 11, 1917.)

GAGE.—Water-stage recorder on left bank at mouth of canyon, one-half mile above junction with San Gabriel River.

DISCHARGE MEASUREMENTS.—Made by wading or from cable about 150 feet below gage.

CHANNEL AND CONTROL.—Boulders, gravel, and solid rock; fairly permanent. A new control was built about 30 feet above the natural control, during the summer of 1920.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 4.40 feet at 2 a. m. March 14 (discharge, 244 second-feet); stream dry October 1 to November 6 and July 9 to September 30.

1917–1921: Maximum stage recorded, 5.25 feet at 11.30 p. m.

March 10, 1918 (discharge, 332 second-feet); stream dry several months each year.

DIVERSIONS.—Beginning April 27, 1920, a pipe line has diverted an unknown quantity of water from a point about 40 feet above the gage. After April 30, 1920, this diversion is not included in tables. The capacity of this pipe line is 0.5 second-feet.

REGULATION.—None.

ACCURACY.—Stage-discharge relation permanent. Rating curve well defined.

Daily discharge ascertained by applying to the rating table mean daily gage height determined by inspecting recorder graph. Records good.

*Discharge measurements of Rogers Creek near Azusa, Calif., during the year ending
Sept. 30, 1921*

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>
Jan. 18	F. C. Ebert.....	2.06	20	Mar. 18	F. C. Ebert.....	1.62	5.3
19	do.....	1.95	15	Apr. 4	Troxell and Ebert.....	1.12	1.3
Feb. 11	H. J. Tompkins.....	.92	.6	May 6	Troxell and Tompkins.....	1.10	1.6
Mar. 2	do.....	.78	.2	23	F. C. Ebert.....	1.92	13
6	F. C. Ebert.....	.78	.1	June 8	Troxell and Tompkins.....	1.14	1.6
14	do.....	2.96	71	10	F. C. Ebert.....	1.10	1.2

Daily discharge, in second-feet, of Rogers Creek near Azusa, Calif., for the year ending Sept. 30, 1921

Day	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July
1.		0.2	0.3	1.2	0.3	1.3	0.4	2.8	0.3
2.		.2	.3	1.0	.3	1.2	.4	2.6	.2
3.		.3	.3	.9	.3	1.3	.4	2.6	.2
4.		.2	.3	.9	.3	1.6	.4	2.5	.2
5.		.2	.3	1.0	.3	1.2	.7	2.3	.1
6.		.2	.2	.9	.5	1.2	1.6	1.9	.1
7.	0.4	.3	.2	.8	.6	1.1	1.4	1.8	.1
8.	.2	.3	.2	.8	.4	1.0	.9	1.6	.1
9.	.1	.3	.2	.7	.4	.9	.8	1.6	
10.	.1	.3	.3	.7	.4	.8	.8	1.4	
11.	.1	.3	.3	.7	.4	1.4	.6	1.4	
12.	.1	.3	.2	.6	2.6	1.4	.4	1.2	
13.	.1	.3	.2	.6	88	1.3	.3	1.2	
14.	.1	.2	.2	1.2	86	1.2	.3	1.2	
15.	.1	.2	.2	1.2	22	1.0	.3	1.2	
16.	.1	.2	.2	.9	11	1.0	.4	1.2	
17.	.2	.2	.3	1.0	7	1.0	.7	1.1	
18.	.2	.2	10	1.0	5.5	.9	.7	.9	
19.	.2	1.0	11	.9	4.6	.8	.5	.8	
20.	.2	1.0	3.2	.8	3.9	.8	1.6	.7	
21.	.2	.7	2.4	.8	3.4	.7	41	.6	
22.	.2	.6	2.0	.8	3.0	.5	28	.6	
23.	.2	.5	1.8	.8	2.6	.6	12	.6	
24.	.2	.5	1.6	.7	2.4	.8	8	.6	
25.	.2	.4	1.4	.7	2.0	.7	6	.5	
26.	.2	.4	1.2	.5	1.8	.6	5	.5	
27.	.1	.4	1.8	.4	1.7	.5	4.3	.4	
28.	.1	.3	2.0	.3	1.6	.4	4.1	.4	
29.	.1	.3	1.8		1.4	.3	3.6	.4	
30.	.1	.3	1.5		1.4	.3	3.4	.3	
31.		.3	1.4		1.4		3.0		

NOTE.—Stream dry Oct. 1 to Nov. 6 and July 9 to Sept. 30.

Monthly discharge of Rogers Creek near Azusa, Calif., for the year ending Sept. 30, 1921

[Drainage area, 6.4 square miles]

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
November	0.4	0.0	0.13	7.7
December	1.0	.2	.36	22.1
January	11	.2	1.53	94.1
February	1.2	.3	.81	45.0
March	88	.3	8.31	511
April	1.6	.3	.93	55.3
May	41	.3	4.26	262
June	2.8	.3	1.23	73.2
July	.3	.0	.04	2.5
The year	88	.0	1.48	1,070

NOTE.—No flow during months for which no record is given.

FISH CREEK NEAR DUARTE, CALIF.

LOCATION.—In SW. $\frac{1}{4}$ SW. $\frac{1}{4}$ sec. 15, T. 1 N., R. 10 W., three-fourths mile above mouth of canyon and 4 miles northeast of Duarte, Los Angeles County.

DRAINAGE AREA.—6.5 square miles (measured on topographic maps).

RECORDS AVAILABLE.—July 23 to September 30, 1916; and July 28, 1917, to September 30, 1921.

GAGE.—Water-stage recorder, in concrete well and house, on left bank at same location and datum as vertical staff.

DISCHARGE MEASUREMENTS.—Made by wading near gage.

CHANNEL AND CONTROL.—Gravel and boulders; not permanent. Banks are high and not subject to overflow. In 1918 a concrete control was built at an out-crop of bedrock a short distance below gage.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 4.20 feet at 7 p. m. March 13 (discharge, 286 second-feet); practically no flow October 1–12, August 27 to September 1, September 4–8, and 21–29.

1916–1921: Maximum stage from water-stage recorder, 4.50 feet at 4 p. m. March 10, 1918 (discharge, 330 second-feet); no flow during periods in 1919, 1920, and 1921.

DIVERSIONS.—None above.

REGULATION.—None.

ACCURACY.—Stage-discharge relation not permanent. Three fairly well defined rating curves were used. Water-stage recorder operated satisfactorily.

Daily discharge ascertained by applying to rating table mean daily gage height determined by inspecting recorder graph. Records good.

Discharge measurements of Fish Creek near Duarte, Calif., during the year ending Sept. 30, 1921

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. 4	H. J. Tompkins.....	1.72	0.2	Mar. 17	H. J. Tompkins.....	2.30	11
Jan. 19	F. C. Ebert.....	2.36	11	Apr. 6	Troxell and Tompkins.....	2.00	2.1
25	do.....	1.99	1.4	21	H. C. Troxell.....	1.93	1.5
Feb. 9	H. J. Tompkins.....	1.88	.8	May 26	H. J. Tompkins.....	2.30	9.8
Mar. 4	do.....	1.88	.6	June 28	do.....	1.90	.8
14	C. W. Sopp.....	3.12	89	July 15	do.....	1.74	.3
15	F. C. Ebert.....	2.58	26				

Daily discharge, in second-feet, of Fish Creek near Duarte, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July.	Aug.	Sept.
1.....		0.5	0.4	0.6	1.4	0.6	2.3	0.7	5.5	0.7	0.2	-----
2.....		.4	.4	.6	1.3	.6	2.2	.7	5	.7	.2	0.1
3.....		.4	.5	.6	1.2	.6	2.3	.8	4.7	.6	.2	.1
4.....		.3	.5	.6	1.1	.6	2.9	.9	4.5	.7	.1	-----
5.....		.3	.5	.6	1.3	.6	2.3	1.5	4.0	.6	.1	-----
6.....		.5	.5	.6	1.1	1.1	2.1	3.3	3.5	.4	.1	-----
7.....		.7	.5	.5	.9	.9	2.1	2.7	3.3	.4	.1	-----
8.....		.7	.5	.5	.7	.7	1.9	1.8	3.2	.4	.1	-----
9.....		.6	.5	.5	.7	.6	1.8	1.6	2.8	.4	.1	.1
10.....		.5	.5	.6	.6	.6	1.7	1.5	2.6	.4	.1	.1
11.....		.5	.5	.6	.6	.6	2.2	1.1	2.4	.3	.1	.1
12.....		.4	.5	.5	.6	4.4	2.2	1.0	2.3	.3	.1	.1
13.....	0.1	.5	.5	.5	.6	120	2.1	1.0	2.3	.3	.1	.1
14.....	.1	.5	.5	.5	1.3	88	1.9	.9	2.4	.3	.1	.1
15.....	.1	.4	.5	.5	1.3	26	1.8	.9	2.6	.3	.1	.1
16.....	.1	.4	.5	.5	1.1	17	1.7	1.0	2.6	.3	.1	.1
17.....	.1	.4	.5	.6	1.2	13	1.6	1.6	2.4	.3	.1	.1
18.....	.2	.4	.5	1.8	1.3	9	1.5	1.5	1.9	.2	.1	.1
19.....	1.0	.4	1.9	13	1.2	7	1.3	1.2	1.7	.2	.1	.1
20.....	.4	.4	1.3	5	1.0	6	1.3	3.3	1.6	.2	.1	.1
21.....	.3	.4	1.0	3.7	.9	5.5	1.3	69	1.5	.2	.1	-----
22.....	.2	.4	.9	2.8	.8	4.8	1.3	41	1.4	.2	.1	-----
23.....	.2	.4	.9	2.6	.7	4.2	1.3	21	1.4	.2	.1	-----
24.....	.2	.4	.8	2.1	.7	4.2	1.3	15	1.5	.2	.1	-----
25.....	.2	.4	.7	1.5	.6	3.8	1.0	12	1.2	.2	.1	-----
26.....	.1	.4	.7	1.3	.6	3.6	1.0	10	1.1	.2	.1	-----
27.....	.1	.4	.7	1.8	.6	3.1	.9	9	.9	.2	-----	-----
28.....	.1	.4	.7	3.0	.6	2.7	.8	8.5	.8	.2	-----	-----
29.....	.1	.4	.6	2.4	-----	2.5	.8	7.5	.8	.2	-----	-----
30.....	.7	.4	.6	2.2	-----	2.3	.7	6.6	.8	.2	-----	.1
31.....	.6	-----	.6	1.8	-----	2.3	-----	6	-----	.2	-----	-----

NOTE.—Stream practically dry Oct. 1–12, Aug. 27 to Sept. 1, 4–8, and 21–29.

Monthly discharge of Fish Creek near Duarte, Calif., for the year ending Sept. 30, 1921

[Drainage area, 6.5 square miles]

Month	Discharge in second-feet				Run-off	
	Maximum	Minimum	Mean	Per square mile	Inches	Acre-feet
October.....	1.0	0	0.16	0.025	0.03	9.8
November.....	.7	.3	.44	.068	.08	26.2
December.....	1.9	.4	.65	.100	.12	40.0
January.....	18	.5	2.28	.351	.40	140
February.....	1.4	.6	.94	.145	.16	52.2
March.....	120	.6	10.9	1.68	1.94	670
April.....	2.9	.7	1.65	.254	.28	98.2
May.....	69	.7	7.57	1.16	1.34	465
June.....	5.5	.8	2.42	.372	.42	144
July.....	.7	.2	.33	.051	.06	20.3
August.....	.2	0	.09	.014	.02	5.5
September.....	.1	0	.05	.0077	.009	3.0
The year.....	120	0	2.31	.355	4.86	1,670

SAWPIT CREEK NEAR MONROVIA, CALIF.

LOCATION.—In SE. $\frac{1}{4}$ NW. $\frac{1}{4}$ sec. 13, T. 1 N., R. 11 W., at highway bridge just below junction of two main branches, 2 miles north of Monrovia, Los Angeles County.

DRAINAGE AREA.—5.3 square miles (measured on topographic map).

RECORDS AVAILABLE.—November 8, 1916, to September 30, 1921.

GAGE.—Water-stage recorder in concrete well and shelter, on left bank at east end of highway bridge.

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

CHANNEL AND CONTROL.—Bed consists of coarse gravel and boulders; apparently permanent. Channel is straight for 25 feet above gage and curved below; banks are high. Control is a concrete-boulder dam just below the gage. In 1919 a dam was built a short distance above the gage, forming a pool for intercepting sand and gravel, which would otherwise collect in the channel at gage and change the velocity of approach.

EXTREMES OF DISCHARGE.—Maximum stage during year, from water-stage recorder, 2.45 feet at 1 a. m. March 14 (discharge, 130 second-feet); stream dry at gage for several months.

1916–1921: Maximum stage recorded, 2.65 feet March 10, 1918 (discharge, 256 second-feet); stream dry several months each year.

DIVERSIONS.—Part of the water supply for Monrovia is obtained from the two branches of Sawpit Creek above gage. See record for Monrovia pipe line (p. 87.)

REGULATION.—None.

ACCURACY.—Stage-discharge relation permanent. Rating curve well defined.

Water-stage recorder operated satisfactorily. Daily discharge ascertained by applying to rating table mean daily gage height determined by inspecting recorder graph. Records excellent.

COOPERATION.—City of Monrovia furnished observer for water-stage recorder.

Discharge measurements of Sawpit Creek near Monrovia, Calif., during the year ending Sept. 30, 1921

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>
Mar. 13	C. W. Sopp.....	2.03	72	Mar. 15	F. C. Ebert.....	1.23	11
13	do.....	2.12	75	20	do.....	.64	.05
14	do.....	1.47	22	May 22	do.....	1.31	13

Daily discharge, in second-feet, of Sawpit Creek near Monrovia, Calif., for the year ending Sept. 30, 1921

Day	Jan.	Mar.	May	June	Day	Jan.	Mar.	May	June	Day	Jan.	Mar.	May	June
1.....				2	11.....					21.....	0.8	0.4	16	-----
2.....					12.....					22.....	.2	.1	13	-----
3.....					13.....		25			23.....		.2	7	-----
4.....					14.....		36			24.....		.1	4.5	-----
5.....					15.....		9			25.....			3.8	-----
6.....					16.....		3			26.....			3.3	-----
7.....					17.....		1.5			27.....			2.6	-----
8.....					18.....	2.0	.4			28.....			3.3	-----
9.....					19.....	1.7	.1			29.....			2.8	-----
10.....					20.....	.8	.5			30.....			2.3	-----
										31.....			2.5	-----

NOTE.—No flow when discharge is not given.

Monthly discharge of Sawpit Creek near Monrovia, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
January.....	2.0	0	0.18	11.1
March.....	36	0	2.46	151
May.....	16	0	1.96	121
June.....	.2	0	.01	.6
The year.....	36	0	.39	284

NOTE.—No flow during months for which no record is given.

Combined daily discharge, in second-feet, of Sawpit Creek and Monrovia pipe line near Monrovia, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	0.8	0.9	0.9	0.9	1.3	1.1	1.9	1.1	2.0	1.3	1.0	0.8
2.....	.8	.9	1.0	.9	1.3	1.1	1.8	1.1	2.6	1.3	1.0	.8
3.....	.8	.9	.9	.9	1.3	1.1	1.8	1.1	2.7	1.3	1.0	.8
4.....	.8	.9	.9	.9	1.3	1.1	1.9	1.1	2.6	1.3	1.0	.8
5.....	.8	.9	.9	.9	1.3	1.1	1.8	1.3	2.6	1.2	.9	.8
6.....	.8	.9	.9	.9	1.3	1.1	1.7	1.4	2.4	1.2	.8	.8
7.....	.8	.9	1.0	.9	1.3	1.2	1.7	1.5	2.4	1.2	.9	.8
8.....	.8	.9	.9	.9	1.3	1.1	1.5	1.5	2.6	1.0	1.0	.8
9.....	.8	.9	.9	.9	1.3	1.1	1.3	1.4	2.4	1.0	.9	.8
10.....	.8	.9	.9	.9	1.3	1.1	1.3	1.3	2.2	1.0	1.0	.8
11.....	.8	.9	.9	.9	1.3	1.1	1.6	1.3	2.1	1.0	1.0	.8
12.....	.8	.9	.9	.9	1.3	1.6	1.6	1.3	2.1	1.0	.9	.8
13.....	.8	.9	.9	.9	1.3	27	1.6	1.2	2.1	1.0	.8	.8
14.....	.8	.9	.9	.9	1.5	37	1.7	1.2	2.1	1.0	.9	.8
15.....	.8	.9	.9	.9	1.3	11	1.7	1.1	2.0	1.0	.8	.8
16.....	.8	.9	.9	.9	1.3	6.5	1.6	1.2	1.9	1.0	.8	.8
17.....	.8	.9	.9	.9	1.5	5	1.7	1.3	1.9	1.0	.8	.8
18.....	.8	.9	.9	4.0	1.3	3.8	1.7	1.2	1.7	1.0	.8	.8
19.....	1.1	.9	1.1	3.6	1.3	3.8	1.7	1.2	1.7	.9	.8	.8
20.....	.9	.9	1.0	2.3	1.3	2.7	1.7	1.3	1.7	1.1	.8	.8
21.....	.9	.9	.9	2.3	1.3	2.5	1.7	18	1.7	1.0	.8	.6
22.....	.9	.9	.9	1.7	1.3	2.7	1.5	15	1.7	.9	.8	.6
23.....	.9	.9	.9	1.5	1.2	2.6	1.5	8.5	1.6	.9	1.0	.6
24.....	.9	.9	.9	1.5	1.2	2.5	1.5	6.5	1.5	.9	.8	.6
25.....	.9	.9	.9	1.3	1.2	2.4	1.5	5.5	1.5	1.0	.8	.6
26.....	.8	.9	.9	1.3	1.2	2.2	1.3	4.6	1.5	1.0	.8	.6
27.....	.8	.9	.9	1.5	1.2	2.1	1.3	3.8	1.5	1.0	.8	.6
28.....	.8	.9	.9	1.7	1.2	1.9	1.2	4.5	1.5	1.0	.8	.6
29.....	.8	.9	.9	1.5	-----	1.9	1.1	3.9	1.3	1.0	.8	.6
30.....	1.4	.9	.9	1.5	-----	1.9	1.1	3.4	1.3	1.0	.8	.8
31.....	.9	-----	.9	1.5	-----	1.9	-----	3.4	-----	1.0	.8	-----

Combined monthly discharge of Sawpit Creek and Monrovia pipe line near Monrovia, Calif., for the year ending Sept. 30, 1921

[Drainage area, 5.3 square miles]

Month	Discharge in second-feet				Run-off	
	Maximum	Minimum	Mean	Per square mile	Inches	Acre-feet
October.....	1.4	0.8	0.85	0.160	0.18	52.3
November.....	.9	.9	.90	.170	.19	53.6
December.....	1.1	.9	.92	.174	.20	56.6
January.....	4.0	.9	1.37	.258	.30	84.2
February.....	1.5	1.2	1.29	.243	.25	71.6
March.....	37	1.1	4.36	.823	.95	268
April.....	1.9	1.1	1.57	.296	.33	93.4
May.....	18	1.1	3.30	.623	.72	203
June.....	2.7	1.3	1.96	.370	.41	117
July.....	1.3	.9	1.05	.198	.23	64.6
August.....	1.0	.8	.87	.164	.19	53.5
September.....	.8	.6	.74	.140	.16	44.0
The year.....	37	.6	1.60	.302	4.11	1,160

MONROVIA PIPE LINE NEAR MONROVIA, CALIF.

LOCATION.—Near southeast corner sec. 14, T. 1 N., R. 11 W., 300 feet above settling reservoir at mouth of Sawpit Canyon and $1\frac{1}{2}$ miles north of Monrovia, Los Angeles County.

RECORDS AVAILABLE.—May 18, 1916, to September 30, 1921.

GAGE.—Vertical staff in weir box; read by Armstrong and Pratt, canyon guards.

DISCHARGE.—Determined by two rectangular weirs, with end contractions; left weir, 2.25 feet long; right weir, 2.26 feet long. Crest of left weir is at zero gage height; crest of right weir is 0.02 foot lower at one end. Rating table has been checked by current-meter measurements made at mouth of intake pipe in weir box.

EXTREMES OF DISCHARGE.—Maximum mean daily discharge, 3.7 second-feet March 16 and 17; minimum mean daily discharge, 0.6 second-foot September 21–29.

1916–1921: Maximum mean daily discharge recorded, 5.0 second-feet May 18 and 19, 1916; minimum mean daily discharge recorded, 0.6 second-foot September 21–29, 1921.

ACCURACY.—Stage-discharge relation permanent. Gage read to hundredths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table. Records excellent.

COOPERATION.—Gage-height record furnished by city of Monrovia.

The Monrovia pipe line furnishes part of the water supply of Monrovia. It obtains its water from two branches of Sawpit Creek. Most of this water is collected by tunnels driven into the sides of the canyon.

Daily discharge, in second-feet, of Monrovia pipe line near Monrovia, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	0.8	0.9	0.9	0.9	1.3	1.1	1.9	1.1	1.8	1.3	1.0	0.8
2	.8	.9	1.0	.9	1.3	1.1	1.8	1.1	2.6	1.3	1.0	.8
3	.8	.9	.9	.9	1.3	1.1	1.8	1.1	2.7	1.3	1.0	.8
4	.8	.9	.9	.9	1.3	1.1	1.9	1.1	2.6	1.3	1.0	.8
5	.8	.9	.9	.9	1.3	1.1	1.8	1.3	2.6	1.2	.9	.8
6	.8	.9	.9	.9	1.3	1.1	1.7	1.4	2.4	1.2	.8	.8
7	.8	.9	1.0	.9	1.3	1.2	1.7	1.5	2.4	1.2	.9	.8
8	.8	.9	.9	.9	1.3	1.1	1.5	1.5	2.6	1.0	1.0	.8
9	.8	.9	.9	.9	1.3	1.1	1.3	1.4	2.4	1.0	.9	.8
10	.8	.9	.9	.9	1.3	1.1	1.3	1.3	2.2	1.0	1.0	.8
11	.8	.9	.9	.9	1.3	1.1	1.6	1.3	2.1	1.0	1.0	.8
12	.8	.9	.9	.9	1.3	1.6	1.6	1.3	2.1	1.0	.9	.8
13	.8	.9	.9	.9	1.3	1.9	1.6	1.2	2.1	1.0	.8	.8
14	.8	.9	.9	.9	1.5	1.4	1.7	1.2	2.1	1.0	.9	.8
15	.8	.9	.9	.9	1.3	2.2	1.7	1.1	2.0	1.0	.8	.8
16	.8	.9	.9	.9	1.3	3.7	1.6	1.2	1.9	1.0	.8	.8
17	.8	.9	.9	.9	1.5	3.7	1.7	1.3	1.9	1.0	.8	.8
18	.8	.9	.9	2.0	1.3	3.4	1.7	1.2	1.7	1.0	.8	.8
19	1.1	.8	1.1	1.9	1.3	3.7	1.7	1.2	1.7	.9	.8	.8
20	.9	.9	1.0	1.5	1.3	2.2	1.7	1.3	1.7	1.1	.8	.8
21	.9	.9	.9	1.5	1.3	2.1	1.7	2.1	1.7	1.0	.8	.6
22	.9	.9	.9	1.5	1.3	2.6	1.5	2.2	1.7	.9	.8	.6
23	.9	.9	.9	1.5	1.2	2.4	1.5	1.7	1.6	.9	1.0	.6
24	.9	.9	.9	1.5	1.2	2.4	1.5	1.7	1.5	.9	.8	.6
25	.9	.9	.9	1.3	1.2	2.4	1.5	1.5	1.5	1.0	.8	.6
26	.8	.9	.9	1.3	1.2	2.2	1.3	1.3	1.5	1.0	.8	.6
27	.8	.9	.9	1.5	1.2	2.1	1.3	1.2	1.5	1.0	.8	.6
28	.8	.9	.9	1.7	1.2	1.9	1.2	1.2	1.5	1.0	.8	.6
29	.8	.9	.9	1.5	-----	1.9	1.1	1.1	1.3	1.0	.8	.6
30	1.4	.9	.9	1.5	-----	1.9	1.1	1.1	1.3	1.0	.8	.8
31	.9	-----	.9	1.5	-----	1.9	-----	1.1	-----	1.0	.8	-----

Monthly discharge of Monrovia pipe line near Monrovia, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	1.4	0.8	0.85	52.3
November	.9	.9	.90	53.6
December	1.1	.9	.92	56.6
January	2.0	.9	1.19	73.2
February	1.5	1.2	1.29	71.6
March	3.7	1.1	1.93	119
April	1.9	1.1	1.57	93.4
May	2.2	1.1	1.33	81.8
June	2.7	1.3	1.96	117
July	1.3	.9	1.05	64.6
August	1.0	.8	.87	53.5
September	.8	.6	.74	44.0
The year	3.7	.6	1.21	881

SAN DIMAS CREEK NEAR SAN DIMAS, CALIF.

LOCATION.—In SW. $\frac{1}{4}$ NE. $\frac{1}{4}$ sec. 25, T. 1 N., R. 9 W., at mouth of San Dimas Canyon, 3 miles northeast of San Dimas, Los Angeles County.

DRAINAGE AREA.—18.3 square miles (measured on topographic map).

RECORDS AVAILABLE.—December 3, 1916, to September 30, 1921. (Discharge measurements only, April 14 to September 4, 1916.)

GAGE.—Water-stage recorder, in concrete well and house, on left bank, at mouth of canyon just above concrete control.

DISCHARGE MEASUREMENTS.—Made from cable about 50 feet above gage or by wading.

CHANNEL AND CONTROL.—Bed consists of sand, gravel, and boulders; shifting. Control is low concrete dam built across channel just below gage. This dam was raised about 2 feet January 18–23, 1918. During 1921 a wooden dam about 2½ feet high was built on the control. It has a notch in it, in which are placed flashboards to raise water so it can be diverted through a 12-inch pipe. Gravel fills in above and below dam affecting stage-discharge relation. Left bank is steep and not subject to overflow; right bank is brushy and is overflowed during high stages.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 7.70 feet at 12.30 a. m. March 14 (discharge, about 800 second-feet); no flow October 1–6 and August 20 to September 30.

1916–1921: Maximum stage, from water-stage recorder, 6.15 feet at 1.30 a. m. March 2, 1920 (discharge from extension of rating curve, 1,010 second-feet); stream dry during a part of October and November, 1916, September, 1919, and August and September, 1921.

DIVERSIONS.—The San Dimas Water Co. diverts water for irrigation through a pipe line at the dam.

ACCURACY.—Stage-discharge relation changed when flashboards in notch in dam were placed or removed. Rating curves for various conditions are fairly well defined. Water-stage recorder operated satisfactorily throughout year. Daily discharge ascertained by applying mean daily gage height to rating table, except March 13 and 14 when hourly discharge was averaged. Records good.

Discharge measurements of San Dimas Creek near San Dimas, Calif., during the year ending Sept. 30, 1921

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. 20	H. J. Tompkins.....	2.24	0.8	Mar. 23	H. J. Tompkins.....	3.63	8.6
Nov. 8	do.....	2.62	1.3	25	F. C. Ebert.....	3.18	7.1
17	do.....	2.40	.9	29	H. J. Tompkins.....	2.76	5.3
Dec. 11	do.....	5.37	1.4	Apr. 6	Troxell and Tompkins.....	5.07	4.8
20	do.....	2.58	2.5	12	do.....	5.78	4.3
Jan. 2	do.....	5.45	1.4	25	do.....	2.86	3.4
8	F. C. Ebert.....	5.45	1.3	May 3	do.....	5.58	2.3
13	H. J. Tompkins.....	5.43	1.2	6	Thompson, Troxell, and Tompkins.....	3.95	4.0
18	F. C. Ebert.....	3.50	27	12	Troxell and Tompkins.....	5.36	1.9
19	do.....	4.30	23	17	H. J. Tompkins.....	5.76	3.4
20	do.....	2.89	9.4	22	F. C. Ebert.....	4.22	29
21	do.....	3.15	8.5	24	H. J. Tompkins.....	3.60	17
22	do.....	3.76	6.8	25	F. C. Ebert.....	3.50	13
25	do.....	3.58	5.1	June 7	Troxell and Tompkins.....	5.79	5.2
28	do.....	3.73	5.6	10	F. C. Ebert.....	5.55	3.6
Feb. 8	H. J. Tompkins.....	3.97	2.2	15	do.....	6.00	4.4
17	do.....	4.28	3.3	24	Arnold and Ebert.....	5.58	2.2
Mar. 4	do.....	4.04	1.8	28	H. J. Tompkins.....	5.46	1.6
5	F. C. Ebert.....	4.06	2.1	30	Arnold and Ebert.....	5.52	1.5
9	H. J. Tompkins.....	3.44	2.4	July 8	F. C. Ebert.....	5.22	.6
14	F. C. Ebert.....	6.30	115	13	H. J. Tompkins.....	5.10	.5
15	do.....	5.35	45	18	do.....	4.90	.2
17	H. J. Tompkins.....	4.10	16	30	H. C. Troxell.....	4.60	a. 2
18	F. C. Ebert.....	4.03	14				

a Estimated.

Daily discharge, in second-feet, of San Dimas Creek near San Dimas, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.
1		0.7	1.0	1.7	5.5	2.2	6	2.5	7.5	1.2	0.2
2		.8	1.1	1.7	5.5	2.2	5.5	2.5	7	1.2	.2
3		.7	1.1	1.7	6	2.1	5.5	2.6	6.5	1.2	.1
4		.7	1.1	1.6	5.5	2.1	5	2.7	6.5	1.1	.1
5		2.5	1.1	1.6	5.5	2.2	5	2.7	6	.8	.1
6		1.5	1.1	1.6	3.9	8.5	4.8	4.0	5.5	.7	.2
7	0.1	1.3	1.2	1.7	3.0	8.5	4.8	3.5	3.8	.6	.2
8	.2	1.1	1.3	1.6	2.8	6	4.7	3.0	3.4	.6	.2
9	.3	1.1	1.2	1.6	2.4	3.2	4.7	2.8	3.4	.5	.2
10	.4	1.0	1.2	1.4	2.3	2.9	4.6	2.4	3.3	.5	.1
11	.5	1.0	1.3	1.3	2.4	3.1	4.6	1.8	3.2	.5	.1
12	.6	1.0	1.2	1.3	2.4	18	4.6	1.5	3.2	.4	.1
13	.6	1.0	1.2	1.5	2.4	140	4.6	1.4	3.2	.4	.1
14	.7	1.0	1.2	1.5	3.9	175	4.6	1.3	3.6	.4	.1
15	.7	.9	1.2	1.5	3.0	45	4.4	1.3	4.1	.4	.1
16	.8	.9	1.2	1.4	3.0	24	4.4	2.0	3.8	.4	.1
17	.8	.9	1.2	2.0	3.2	16	4.1	3.6	3.5	.4	.1
18	.9	.9	1.2	70	2.7	14	3.6	3.2	2.6	.3	.1
19	.9	.9	12	27	2.6	14	3.6	2.8	2.2	.3	.1
20	.7	.9	2.6	11	2.5	10	3.6	3.2	2.0	.4	-----
21	.7	.9	1.8	8	2.6	9	3.5	102	1.9	.4	-----
22	.7	.9	1.6	7	2.6	8.5	3.5	38	1.9	.3	-----
23	.7	.9	1.6	6.5	2.5	8	3.4	26	1.8	.3	-----
24	.7	.8	1.5	5	2.5	7.5	3.4	19	1.9	.3	-----
25	.7	.9	1.5	4.0	2.5	7.5	3.2	15	1.9	.3	-----
26	.7	.9	1.4	3.2	2.4	7.5	3.2	13	1.8	.2	-----
27	.7	.8	1.4	5.5	2.4	7	3.1	11	1.5	.2	-----
28	.7	.8	1.5	6.5	2.4	7	2.7	10	1.4	.2	-----
29	.7	.8	1.6	6	-----	6.5	2.6	9	1.4	.2	-----
30	.9	1.0	1.8	5.5	-----	6.5	2.5	8.5	1.4	.2	-----
31	.8	-----	1.8	5.5	-----	6	-----	8	-----	.2	-----

NOTE.—No flow Oct. 1-6 and Aug. 20 to Sept. 30. Discharge interpolated or estimated for Oct. 7-15, 26-28, Nov. 5-7, Dec. 4-6, Jan. 10, 11, Feb. 22 to Mar. 3, Mar. 26 to Apr. 11, Apr. 21-26, May 5-8, June 10-12, July 8-11, and Aug. 12-19.

Monthly discharge of San Dimas Creek near San Dimas, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	0.9	0	0.52	32.0
November	2.5	.7	.98	58.3
December	12	1.0	1.72	106
January	70	1.3	6.37	392
February	6	2.3	3.23	179
March	175	2.1	18.7	1,150
April	6	2.5	4.13	246
May	102	1.3	10.0	615
June	7.5	1.4	3.37	201
July	1.2	.2	.49	30.1
August	.2	0	.08	4.9
September	0	0	0	0
The year	175	0	4.16	3,010

DALTON CREEK NEAR GLENDORA, CALIF.

LOCATION.—At center of sec. 21, T. 1 N., R. 9 W., at Glendora Irrigation Co.'s dam, one-fourth mile above mouth and $2\frac{1}{2}$ miles northeast of Glendora, Los Angeles County.

DRAINAGE AREA.—7.5 square miles.

RECORDS AVAILABLE.—December 1, 1919, to September 30, 1921.

GAGE.—Water-stage recorder in concrete well and shelter on right bank.

DISCHARGE MEASUREMENTS.—Made from cable 50 feet above gage or by wading.

CHANNEL AND CONTROL.—Control is the rubble masonry dam. Crest of dam slopes from wings to center, being 5 feet lower at the center. Pool above dam has been filled with silt and control is not effective.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 3.00 feet at 1.10 a. m. March 14 (discharge, 294 second-feet); no flow October 1–29, November 4, 10, 11, 14, February 11–13, June 21–27, and July 7 to September 30.

1919–1921: Maximum stage from water-stage recorder, 4.03 feet at 12.45 a. m. March 2, 1920 (discharge, 525 second-feet); no flow for several months during each year.

DIVERSIONS.—The Glendora Irrigation Co. diverts water half a mile and $1\frac{1}{2}$ miles above the gage through a 10-inch pipe line. A 12-inch pipe line diverts water at the control. No record of amount diverted was kept for this year, except for some miscellaneous measurements; page 294.

REGULATION.—None.

ACCURACY.—Stage-discharge relation changes due to silt collecting on the control. Rating curves well defined. Drainage area was burned over during 1919 and excessive erosion during rainy season brought down an unusual amount of silt. Water-stage recorder operated satisfactorily throughout year. Daily discharge ascertained by applying mean daily gage height to rating table. Records good.

Discharge measurements of Dalton Creek near Glendora, Calif., during the year ending Sept. 30, 1921

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>
Dec. 20	H. J. Tompkins.....	1.02	0.3	Mar. 18	F. C. Ebert.....	1.28	7.0
Jan. 8	F. C. Ebert.....	1.04	.2	25	do.....	1.27	3.0
18	do.....	1.11	6.1	29	H. J. Tompkins.....	1.06	1.3
19	do.....	1.10	6.8	Apr. 6	Troxell, Tompkins, and Ebert.....	1.10	1.5
21	do.....	1.05	2.5				
25	do.....	1.01	1.0	May 22	F. C. Ebert.....	1.18	6.5
Feb. 8	H. J. Tompkins.....	1.00	.5	23	do.....	1.15	5.2
Mar. 5	F. C. Ebert.....	.94	a .05	25	Troxell and Tompkins.....	1.08	2.6
14	do.....	1.60	44	25	F. C. Ebert.....	1.09	2.2
15	do.....	1.44	22	June 7	Troxell and Tompkins.....	.93	.2
17	H. J. Tompkins.....	1.30	8.4	10	F. C. Ebert.....	.96	.2

a Estimated.

Daily discharge, in second-feet, of Dalton Creek near Glendora, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July
1.....		0.2	0.1	0.2	0.7	0.2	1.3	0.1	0.5	0.1
2.....		.1	.1	.3	.5	.1	1.3	.1	.5	.1
3.....		.1	.1	.3	.5	.1	1.4	.1	.3	.1
4.....		.0	.1	.4	.5	.1	1.8	.1	.3	.1
5.....		.3	.1	.4	1.2	.1	1.6	.2	.2	.1
6.....		.1	.1	.4	.7	.5	1.8	.3	.2	.1
7.....		.1	.2	.4	.7	.7	1.2	.2	.2	
8.....		.1	.2	.4	.7	.7	.5	.2	.1	
9.....		.1	.2	.4	.7	.7	.4	.2	.2	
10.....		.0	.2	.5	.2	.5	.6	.2	.2	
11.....		.0	.2	.4	.0	.5	1.6	.2	.2	
12.....		.1	.2	.4	.0	4.3	2.0	.1	.2	
13.....		.1	.2	.4	.0	41	1.6	.1	.2	
14.....		.0	.2	.4	.1	95	1.4	.1	.2	
15.....		.1	.2	.4	.7	17	.8	.1	.2	
16.....		.1	.2	.4	.5	16	.3	.2	.2	
17.....		.1	.2	.6	.7	8	.4	.2	.1	
18.....		.1	.2	21	.7	7.5	.4	.2	.1	
19.....		.1	.8	9	.5	7.5	.4	.2	.1	
20.....		.1	.3	4.3	.3	7	.4	.5	.1	
21.....		.1	.3	3.6	.3	7	.4	31	.0	
22.....		.1	.2	1.9	.3	6	.3	9.5	.0	
23.....		.1	.2	1.5	.8	4.6	.3	5.8	.0	
24.....		.1	.2	1.2	.3	3.8	.4	4.9	.0	
25.....		.1	.2	.9	.3	6	.2	2.7	.0	
26.....		.2	.2	.7	.3	4.6	.2	2.5	.0	
27.....		.2	.2	1.2	.2	2.9	.2	1.6	.0	
28.....		.1	.2	1.2	.2	1.5	.1	1.1	.1	
29.....		.1	.2	.9		1.2	.1	.9	.1	
30.....	0.1	.1	.2	.9		1.2	.1	.7	.1	
31.....	.2		.2	.7		1.3		.7		

NOTE.—No flow Oct. 1-29 and July 7 to Sept. 30.

Monthly discharge of Dalton Creek near Glendora, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	0.2	0	0.01	0.6
November.....	.3	0	.10	6.0
December.....	.8	.1	.21	12.9
January.....	21	.2	1.80	111
February.....	1.2	.0	.43	23.9
March.....	95	.1	7.99	491
April.....	2.0	.1	.78	46.4
May.....	31	.1	2.10	129
June.....	.5	.0	.16	9.5
July.....	.1	.0	.02	1.2
The year.....	95	.0	1.15	832

NOTE.—No flow during months for which no record is given.

LOS ANGELES RIVER BASIN

PACOIMA CREEK NEAR SAN FERNANDO, CALIF.

LOCATION.—In SE. $\frac{1}{4}$ NE. $\frac{1}{4}$ sec. 24, T. 3 N., R. 15 W., 600 feet above mouth of canyon and 4 miles northeast of San Fernando, Los Angeles County.

DRAINAGE AREA.—27.9 square miles (measured on topographic maps).

RECORDS AVAILABLE.—March 31, 1916, to September 30, 1921 (not complete).

GAGE.—Water-stage recorder, in concrete well and house, on left bank, installed December 2, 1916. Previous gage was a staff fastened to a boulder on left bank, 216 feet above water-stage recorder.

DISCHARGE MEASUREMENTS.—Made from cable 20 feet above gage or by wading.

CHANNEL AND CONTROL.—Bed consists of sand, gravel, and boulders; not permanent. Left bank is steep rock cliff; right bank is gently sloping and covered with brush and trees. Control is a low boulder and concrete dam built across channel about 7 feet below gage.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, from water-stage recorder, 3.73 feet at 10 p. m. May 21 (discharge, 440 second-feet); no flow September 27 and 28.

1916-1921: Maximum stage recorded, 4.68 feet December 24, 1916 (discharge, 1,440 second-feet); usually no flow during part of each year.

DIVERSIONS.—None above station. Water is diverted just below control.

REGULATION.—None.

ACCURACY.—Stage-discharge relation not permanent on account of shifting deposits of sand at control. The entire drainage area was burned over during September, 1919, and more than the usual amount of debris was brought down. Several well defined rating curves were used. Water-stage recorder operated satisfactorily except May 22 and 23 when discharge was estimated from flow of Tujunga Creek. Daily discharge ascertained by applying to rating table mean daily gage height determined by inspecting recorder graph. Records good.

Discharge measurements of Pacoima Creek near San Fernando, Calif., during the year ending Sept. 30, 1921

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. 3	C. W. Sopp.....	1.42	0.5	May 23	H. J. Tompkins.....	2.90	167
Jan. 8	H. J. Tompkins.....	1.56	1.1	June 1	do.....	2.37	39
20	do.....	1.92	22	9	Troxell and Tompkins.....	2.26	22
Feb. 7	do.....	1.80	9.3	17	H. J. Tompkins.....	2.22	15
18	do.....	1.80	9.2	27	do.....	2.10	11
Mar. 3	do.....	1.74	5.2	July 5	do.....	2.03	5.6
11	do.....	1.73	5.4	13	do.....	1.98	3.7
13	do.....	2.04	40	21	do.....	1.92	2.5
15	do.....	2.18	56	28	H. C. Troxell.....	1.89	1.6
24	do.....	1.92	19	Aug. 11	do.....	1.82	.6
Apr. 7	Troxell and Tompkins.....	1.88	11	24	do.....	1.85	.6
May 2	H. C. Troxell.....	1.76	4.9	Sept. 12	do.....	1.82	.4
20	H. J. Tompkins.....	1.78	6.3				

Daily discharge, in second-feet, of Pacoima Creek near San Fernando, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1-----	0.1	0.7	1.1	1.3	16	8	13	5.5	36	8	2.0	0.2
2-----	.1	.5	1.3	1.3	15	8	13	5.5	32	8	1.8	.3
3-----	.2	.4	1.3	1.2	14	8	13	6	29	8.5	1.7	.3
4-----	.2	.4	1.3	1.2	14	8	13	5.5	27	8	1.8	.3
5-----	.2	.4	1.3	1.2	14	8	13	7	25	7	2.0	.1
6-----	.2	.6	1.3	1.1	12	8	13	15	23	5.5	2.0	.1
7-----	.2	2.2	1.4	1.1	10	8	13	9	20	5.5	2.5	.1
8-----	.2	1.3	1.4	1.0	9	7.5	13	6	19	5	1.7	.1
9-----	.2	1.1	1.4	.9	8.5	7	13	5	18	5	1.6	.2
10-----	.2	.9	1.4	1.0	8.5	7	13	4.3	19	5	1.2	.2
11-----	.2	.8	1.4	1.2	8	6.5	13	3.5	20	5	.8	.3
12-----	.2	.8	1.4	1.2	8	8	13	3.5	20	4.2	.4	.4
13-----	.1	.8	1.4	1.1	8.5	81	13	3.1	20	3.8	.4	.4
14-----	.1	.8	1.4	1.0	14	115	13	3.1	20	3.5	.4	.3
15-----	.1	.8	1.3	1.0	10	57	13	3.1	20	3.5	.3	.3
16-----	.1	.8	1.3	1.0	9	45	13	3.5	22	3.5	.3	.3
17-----	.2	1.0	1.3	1.1	9	40	13	4.7	17	3.2	.3	.3
18-----	.3	1.1	1.3	11	9	39	13	5.5	15	2.2	.2	.4
19-----	.5	1.1	5.5	44	8.5	38	13	4.7	15	2.0	.2	.4
20-----	.3	1.2	5	19	8	34	13	19	12	1.8	.2	.3
21-----	.2	1.2	2.8	15	8	32	13	174	12	2.5	.2	.2
22-----	.2	1.2	1.7	14	8	27	13	233	11	2.0	.3	.1
23-----	.2	1.2	1.4	14	8	23	13	165	11	2.0	.3	.1
24-----	.2	1.2	1.3	14	8	23	13	116	11	2.0	.4	.1
25-----	.3	1.2	1.3	14	8	15	13	82	11	2.0	.3	.1
26-----	.3	1.2	1.3	12	8	15	12	71	12	1.8	.3	.1
27-----	.3	1.2	1.3	17	8	15	10	66	10	1.8	.2	.0
28-----	.3	1.2	1.3	26	8	15	8	64	9	1.8	.2	.0
29-----	.3	1.1	1.3	19	-----	15	7	54	9	1.8	.2	.1
30-----	.4	1.1	1.3	18	-----	14	6	48	8.5	2.0	.1	.2
31-----	.6	-----	1.3	17	-----	14	-----	42	-----	2.0	.1	-----

Monthly discharge of Pacoima Creek near San Fernando, Calif., for the year ending Sept. 30, 1921

(Drainage area, 27.9 square miles)

Month	Discharge in second-feet				Run-off	
	Maximum	Minimum	Mean	Per square mile	Inches	Acre-feet
October-----	0.6	0.1	0.23	0.0082	0.009	14.1
November-----	2.2	.4	.98	.035	.04	58.3
December-----	5.5	1.1	1.64	.059	.07	101
January-----	44	.9	8.80	.315	.36	541
February-----	16	8	9.89	.354	.37	549
March-----	115	6.5	24.2	.867	1.00	1,490
April-----	13	6	12.3	.441	.49	732
May-----	233	3.1	39.9	1.43	1.65	2,450
June-----	36	8.5	17.8	.638	.71	1,060
July-----	8.5	1.8	3.87	.139	.16	238
August-----	2.5	.1	.79	.028	.03	48.6
September-----	.4	0	.21	.0075	.008	12.5
The year-----	233	0	10.1	.362	4.90	7,290

TUJUNGA CREEK NEAR SUNLAND, CALIF.

LOCATION.—Near center of sec. 32, T. 3 N., R. 13 W. (unsurveyed), at a partly constructed and abandoned dam 2 miles above mouth of canyon and 4 miles northeast of Sunland, Los Angeles County.

DRAINAGE AREA.—106 square miles (measured on topographic map).

RECORDS AVAILABLE.—October 28, 1916, to September 30, 1921. (Discharge measurements only, April 1 to August 27, 1916.)

GAGE.—Water-stage recorder on right bank above dam.

DISCHARGE MEASUREMENTS.—Made from cable about 1,000 feet below gage or by wading at various sections near dam.

CHANNEL AND CONTROL.—Bed consists of gravel and boulders; appears permanent. Control is concrete dam, which has a notch in center about 20 feet long and 1 foot deep, with a steel angle set in the recess near downstream face.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 2.27 feet at 8 p. m. March 13 (discharge, 411 second-feet); minimum stage, 0.50 foot August 23 and September 26–29 (discharge, 0.5 second-foot).

1916–1921: Maximum stage recorded, 3.35 feet December 24, 1916 (discharge, from revised rating curve defined by measurements in 1918, 1,960 second-feet); minimum stage not known (discharge estimated as 0.1 second-foot, September 20–23, 1919).

DIVERSIONS.—Two or three ranches divert a part of the low-water flow for irrigation above the station. There are two small diversions between gage and mouth of canyon.

REGULATION.—None.

ACCURACY.—Stage-discharge relation not permanent due to sand collecting at control; changed from that of last year. Rating curve well defined below 400 second-feet. Operation of the water-stage recorder satisfactory except for period October 27 to November 4 and April 8–22. Daily discharge ascertained by applying to rating table mean daily gage height determined by inspecting recorder graph. Records good.

Discharge measurements of Tujunga Creek near Sunland, Calif., during the year ending Sept. 30, 1921

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. 21	H. J. Tompkins.....	0.64	3.9	Apr. 27	Troxell and Tompkins..	0.72	8.9
Nov. 1	do.....	.63	3.2	May 9	H. J. Tompkins.....	.78	13
Jan. 7	do.....	.66	5.5	May 11	Troxell and Tompkins..	.72	8
Jan. 20	do.....	1.10	42	May 13	H. J. Tompkins.....	.72	8.9
Feb. 7	do.....	.80	13	May 18	do.....	.75	10
Feb. 18	do.....	.83	18	May 22	Tompkins and Troxell..	1.94	204
Mar. 3	do.....	.72	10	June 6	do.....	.88	29
Mar. 11	do.....	.72	11	June 27	H. J. Tompkins.....	.70	8.5
Mar. 14	do.....	2.04	228	July 13	do.....	.60	3.7
Mar. 21	do.....	1.00	32	July 21	do.....	.58	3.3
Mar. 28	do.....	.86	21	July 28	H. C. Troxell.....	.57	2.2
Apr. 7	Troxell and Tompkins..	.80	16	Aug. 11	do.....	.56	1.7
Apr. 23	H. C. Troxell.....	.74	11				

Daily discharge, in second-feet, of Tujunga Creek near Sunland, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	4.0	2.5	4.0	10	23	10	18	8	29	5	2.2	1.0
2.....	3.5	2.5	4.5	9.5	21	9.5	17	9.5	28	4.5	2.0	1.0
3.....	3.0	2.5	5	8.5	21	9.5	19	12	27	5	1.8	1.0
4.....	2.8	2.5	5.5	8	21	9.5	22	12	26	4.5	1.5	1.0
5.....	2.5	2.5	5	8	20	9.5	18	16	23	3.5	1.5	.8
6.....	2.5	2.5	4.5	7.5	20	9.5	17	26	21	3	1.5	.8
7.....	2.5	9.5	5.5	7	18	10	17	24	21	2.8	1.8	.8
8.....	2.2	7	6	7	17	10	16	16	20	3	2.0	.8
9.....	2.0	4.0	6	7	17	10	16	13	20	2.8	2.0	.8
10.....	1.8	3.0	6	8	16	11	15	13	18	2.8	1.8	.8
11.....	1.8	2.8	6.5	8	15	11	15	11	17	2.8	1.8	1.0
12.....	1.8	2.5	6.5	8	16	16	15	10	17	2.8	1.5	1.0
13.....	2.0	2.5	6.5	7.5	15	112	14	9.5	17	2.5	1.2	1.0
14.....	2.5	2.5	6.5	7	24	225	14	8.5	17	2.5	1.2	1.0
15.....	3.5	2.5	5.5	6.5	20	129	14	8	17	2.2	1.2	1.0
16.....	4.5	2.5	7	6.5	16	77	14	9.5	17	2.2	1.2	1.0
17.....	5.5	2.5	7.5	7	18	55	14	11	17	2.0	1.2	1.0
18.....	5.5	2.5	8	176	17	45	13	11	14	2.0	1.2	1.2
19.....	2.8	2.5	20	157	16	38	13	10	12	2.0	1.0	1.2
20.....	5.0	2.5	17	51	15	34	12	23	11	2.2	.8	1.0
21.....	5	2.5	13	40	14	32	12	183	10	2.5	.8	1.0
22.....	5	2.5	12	30	13	31	12	232	10	2.2	.8	1.0
23.....	4.5	2.5	12	26	12	29	12	204	10	2.0	.5	.8
24.....	3.5	2.5	11	22	12	27	12	150	9.5	2.0	.8	.8
25.....	3.0	2.5	11	20	12	25	10	96	9.5	2.0	.8	.8
26.....	2.8	2.5	11	20	12	23	10	64	8.5	2.0	.8	.5
27.....	2.8	2.5	11	26	12	22	8.5	51	7.5	2.0	.8	.5
28.....	2.8	2.2	10	35	11	21	8	45	6.5	2.0	.8	.5
29.....	2.8	2.8	10	29	21	7.5	40	6.5	2.0	.8	.5	.5
30.....	2.8	3.5	10	28	20	7.5	36	5.5	2.2	.8	1.0	
31.....	2.5	11	26	19	32	32	32	2.2	1.0			

NOTE.—Recorder not working properly Oct. 1-4, Oct. 27 to Nov. 4, and April 8-22; discharge estimated by comparison with records of flow of Pacoima Creek.

Monthly discharge of Tujunga Creek near Sunland, Calif., for the year ending Sept. 30, 1921

[Drainage area, 106 square miles]

Month	Discharge in second-feet				Run-off	
	Maximum	Minimum	Mean	Per square mile	Inches	Acre-feet
October.....	5.5	1.8	3.20	0.030	0.03	197
November.....	9.5	2.2	2.99	.028	.03	178
December.....	20	4.0	8.55	.081	.09	526
January.....	176	6.5	26.4	.249	.29	1,629
February.....	24	11	16.3	.157	.16	922
March.....	225	9.5	35.8	.338	.39	2,200
April.....	22	7.5	13.8	.130	.14	821
May.....	232	8	45.0	.425	.49	2,770
June.....	29	5.5	15.8	.149	.17	940
July.....	5	2.0	2.68	.025	.03	165
August.....	2.2	.5	1.26	.012	.01	77.5
September.....	1.2	.5	.89	.0084	.01	53.0
The year.....	232	.5	14.4	.136	1.84	10,500

HAINES CREEK NEAR TUJUNGA, CALIF.

LOCATION.—In NE. $\frac{1}{4}$ NE. $\frac{1}{4}$ sec. 18, T. 2 N., R. 13 W., 800 feet above mouth of canyon and $1\frac{1}{2}$ miles northeast of Tujunga, Los Angeles County.

DRAINAGE AREA.—1.2 square miles (measured on topographic map).

RECORDS AVAILABLE.—February 7, 1917, to September 30, 1921.

GAGE.—Water-stage recorder in concrete well and house, on right bank.

DISCHARGE MEASUREMENTS.—Made by volumetric method when discharge is very small, or by wading on crest of dam. A gaging bridge, for use during high water, is 4 feet above dam.

CHANNEL AND CONTROL.—Bed consists of boulders and gravel overlying solid rock, permanent; banks are high and fairly clean. A concrete dam, having a maximum height of about 5 feet above bedrock, was built across the channel at downstream face of gage well. A 12-foot concrete wing wall was constructed at left end of dam. Crest of dam has a trapezoidal notch 6 inches wide on bottom and 1 foot deep, which makes control more sensitive for low stages. Zero flow, gage height about 0.25 foot.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 1.15 feet at 8 p. m. May 21 (discharge, 3.8 second-feet); stream dry July 18 to August 1.

1917-1921: Maximum stage recorded, 1.37 feet March 10, 1918 (discharge, 6.8 second-feet); stream dry July 18 to August 1, 1921.

DIVERSIONS.—About a mile above the station a tunnel has been driven into the stream bed and a 4-inch pipe carries the water past the gage. A fragmentary record of upper diversion is given on page 97. This water is used for domestic supply at Tujunga. A similar tunnel, a short distance below the station, obtains a small supply during the greater part of the year.

REGULATION.—A large number of small check dams, constructed of brush and boulders, have been built across the stream channel in the upper part of the drainage basin.

ACCURACY.—Stage-discharge relation permanent. Rating curve well defined. Operation of water-stage recorder satisfactory throughout year. Daily discharge ascertained by applying to rating table mean daily gage height determined by inspecting gage-height graph. Records good.

The following discharge measurement was made by H. J. Tompkins:

May 21, 1921: Gage height, 1.02 feet; discharge, 2.5 second-feet.

Daily discharge, in second-feet, of Haines Creek near Tujunga, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	0.01	0.02	0.02	0.02	0.02	0.03	0.04	0.03	0.12	0.10		0.01
2	.01	.02	.02	.02	.02	.03	.03	.03	.12	.09	0.01	.01
3	.01	.02	.02	.02	.02	.03	.04	.03	.14	.09	.01	.01
4	.01	.02	.02	.02	.02	.03	.03	.03	.14	.07	.01	.01
5	.01	.01	.02	.02	.02	.03	.03	.04	.14	.07	.01	.01
6	.01	.01	.02	.02	.02	.03	.03	.04	.14	.07	.01	.01
7	.01	.02	.02	.02	.02	.03	.03	.03	.14	.10	.01	.01
8	.01	.01	.02	.03	.02	.03	.03	.03	.12	.11	.02	.02
9	.01	.02	.02	.04	.02	.02	.03	.03	.12	.11	.02	.02
10	.01	.02	.02	.04	.02	.02	.03	.03	.11	.09	.02	.03
11	.01	.02	.02	.04	.02	.03	.04	.02	.10	.07	.02	.03
12	.01	.02	.02	.04	.02	.02	.03	.02	.10	.06	.02	.03
13	.01	.02	.02	.04	.02	.15	.03	.02	.10	.04	.02	.03
14	.01	.02	.02	.04	.03	.10	.03	.02	.10	.04	.02	.03
15	.01	.02	.02	.04	.02	.09	.03	.02	.10	.02	.02	.02
16	.01	.02	.02	.03	.02	.09	.03	.03	.10	.01	.01	.02
17	.01	.02	.02	.02	.02	.09	.03	.03	.10	.01	.01	.02
18	.01	.02	.02	.07	.03	.09	.03	.03	.09		.01	.02
19	.01	.02	.02	.05	.03	.09	.04	.04	.10		.01	.02
20	.01	.02	.02	.02	.03	.09	.04	.07	.10		.01	.02
21	.01	.02	.02	.02	.03	.09	.04	.45	.10		.01	.02
22	.01	.02	.02	.02	.03	.09	.04	.43	.09		.01	.02
23	.01	.02	.02	.02	.03	.07	.04	.29	.09		.01	.02
24	.01	.02	.02	.02	.03	.06	.04	.23	.09		.01	.02
25	.01	.02	.02	.02	.03	.06	.04	.20	.09		.01	.02
26	.01	.02	.02	.02	.03	.06	.03	.17	.09		.01	.02
27	.01	.02	.02	.02	.03	.06	.03	.17	.10		.01	.02
28	.01	.02	.02	.02	.03	.06	.03	.17	.10		.01	.02
29	.01	.02	.02	.02		.05	.03	.17	.10		.01	.02
30	.02	.02	.02	.02		.04	.03	.15	.10		.01	.02
31	.02		.02	.02		.04		.14			.01	

NOTE.—Stream dry July 18 to Aug. 1.

Monthly discharge of Haines Creek near Tujunga, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	0.02	0.01	0.011	0.68
November.....	.02	.01	.019	1.13
December.....	.02	.02	.020	1.23
January.....	.03	.02	.028	1.72
February.....	.03	.02	.024	1.33
March.....	.15	.02	.058	3.57
April.....	.04	.03	.033	1.96
May.....	.45	.02	.108	6.33
June.....	.14	.09	.108	6.43
July.....	.11	0	.037	2.28
August.....	.02	0	.012	.74
September.....	.03	.01	.019	1.13
The year.....	.45	0	.039	28.5

Daily discharge, in second-feet, of upper Haines diversion near Tujunga, Calif., for the year ending Sept. 30, 1921

Date	Dis-charge	Date	Dis-charge	Date	Dis-charge
Oct. 11.....	0.06	Jan. 8.....	0.08	Apr. 16.....	0.11
18.....	.06	15.....	.07	30.....	.08
25.....	.06	21.....	.10	May 7.....	.08
Nov. 1.....	.07	Feb. 5.....	.10	14.....	.08
9.....	.07	19.....	.09	June 11.....	.15
13.....	.08	26.....	.07	18.....	.14
26.....	.08	Mar. 5.....	.08	Aug. 11.....	.05
Dec. 4.....	.08	Apr. 9.....	.11	Sept. 12.....	.05
Dec. 18.....	.08				

ARROYO SECO NEAR PASADENA, CALIF.

LOCATION.—Near south line of sec. 30, T. 2 N., R. 12 W. (unsurveyed), just below trail crossing at forest ranger's station in Angeles National Forest, 1½ miles above mouth of Millard Canyon, 3 miles above Devil's Gate, and 5½ miles northwest of Pasadena, Los Angeles County.

DRAINAGE AREA.—16.4 square miles (measured on topographic map).

RECORDS AVAILABLE.—December 1, 1910, to September 30, 1921.

GAGE.—Water-stage recorder in concrete well and house, on right bank just upstream from original staff gage. Original datum was not maintained.

DISCHARGE MEASUREMENTS.—Made from cable 150 feet above gage or by wading. Cable moved upstream December, 1920.

CHANNEL AND CONTROL.—Bed consists of solid rock, gravel, and boulders. A concrete dam, extending to bedrock, was built across channel 15 feet below gage. There is a notch in the crest 2 feet wide and 1 foot deep. In July, 1919, a concrete intake box was built from gage house down to control.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 4.30 feet at 8.30 p. m. March 13 (discharge, 1,230 second-feet); minimum stage, 0.75 foot September 26–29 (discharge, 0.2 second-foot).

1910–1921: Maximum stage recorded, 12.5 feet February 20, 1914 (discharge, from extension of rating curve, about 5,630 second-feet); minimum stage, 0.72 foot August 20–23, 1920 (discharge, 0.04 second-foot).

DIVERSIONS.—None.

REGULATION.—None.

ACCURACY.—Stage-discharge relation changed December 5 when channel was cleaned out. Rating curves are well defined. Water-stage recorder was not in operation for certain periods as indicated in footnote to table of daily discharge. Daily discharge was ascertained by applying to rating table mean daily gage height determined by inspection of recorder graph. Records good.

Discharge measurements of Arroyo Seco near Pasadena, Calif., during the year ending Sept. 30, 1921

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>
Jan. 21	H. J. Tompkins.....	1.81	8.4	Apr. 23	H. C. Troxell.....	1.25	2.6
Feb. 9	do.....	1.26	2.5	May 26	do.....	2.08	25
18	do.....	1.50	3.7	July 13	H. J. Tompkins.....	1.00	.7
Mar. 3	do.....	1.20	2.0	21	do.....	.94	.5
11	do.....	1.24	2.4	28	H. C. Troxell.....	.86	.4
15	do.....	2.17	35				
Apr. 5	Troxell, Tompkins, and Ebert.....	1.44	4.1				

Daily discharge, in second-feet, of Arroyo Seco near Pasadena, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	0.2	0.4	0.8	1.1	3.8	2.4	3.6	1.6	17	3.4	0.4	0.2
2.....	.2	.3	1.0	1.1	3.6	2.2	3.5	1.7	16	3.3	.4	.2
3.....	.2	.3	1.0	1.1	3.5	2.1	3.9	1.7	15	3.3	.4	.2
4.....	.2	.2	1.0	1.1	3.4	2.1	5	1.8	16	3.4	.3	.2
5.....	.2	.4	.8	1.1	3.4	2.1	3.7	2.4	13	3.1	.3	.2
6.....	.2	.6	.8	1.1	2.9	2.1	3.6	5	10	2.9	.3	.2
7.....	.2	.9	.9	1.0	2.7	2.2	3.6	4.6	9.5	2.8	.3	.2
8.....	.2	.8	.9	1.0	2.6	2.2	3.4	3.1	8.5	2.8	.3	.2
9.....	.2	.6	.8	1.0	2.4	2.2	3.1	2.8	7.5	2.7	.3	.2
10.....	.2	.6	.8	1.1	2.4	2.3	3.0	2.7	6.5	2.6	.3	.2
11.....	.2	.8	.9	1.1	2.1	2.5	4.2	2.2	6	2.6	.2	.2
12.....	.2	.9	1.0	1.1	2.1	4.5	4.3	2.0	6	2.4	.2	.2
13.....	.2	1.0	.9	1.1	2.3	108	3.6	1.9	5.5	2.2	.2	.2
14.....	.2	1.0	.8	1.1	4.7	80	3.4	1.9	5.5	2.1	.2	.2
15.....	.2	1.0	.8	1.0	4.8	35	3.0	1.8	5.5	1.9	.2	.2
16.....	.2	1.0	.8	1.0	3.4	20	2.9	1.9	5	1.6	.2	.2
17.....	.2	1.0	.8	1.4	3.9	15	2.8	2.2	5	1.5	.2	.2
18.....	.3	1.0	.8	32	4.1	12	2.7	2.2	4.7	1.2	.2	.2
19.....	.6	1.0	2.2	27	3.6	10	2.6	2.1	4.2	.9	.2	.2
20.....	.5	1.0	2.2	11	3.5	9	2.5	4.1	4	.7	.2	.2
21.....	.4	1.0	1.9	8.5	3.4	8.5	2.4	141	3.8	.7	.2	.2
22.....	.4	1.0	1.6	6	3.2	8	2.2	198	3.8	.6	.2	.2
23.....	.3	1.0	1.4	5	3.0	7.5	2.2	57	3.8	.5	.2	.2
24.....	.2	1.0	1.4	4.2	2.7	6	2.3	40	3.8	.4	.2	.2
25.....	.2	.9	1.4	3.8	2.5	5	2.0	31	3.8	.5	.2	.2
26.....	.3	.9	1.3	3.7	2.4	4.8	1.9	26	3.6	.5	.2	.2
27.....	.3	.9	1.3	4.8	2.4	4.5	1.8	21	3.5	.4	.2	.2
28.....	.3	.9	1.2	10	2.4	4.1	1.7	23	3.4	.4	.2	.2
29.....	.4	.8	1.1	6.5	-----	4.0	1.6	24	3.4	.4	.2	.2
30.....	.4	.8	1.1	5	-----	3.8	1.6	20	3.4	.4	.2	.2
31.....	.4	-----	1.0	4.4	-----	3.7	-----	19	-----	.4	.2	-----

NOTE.—Water-stage recorder not in operation Oct. 25-30, Jan. 1-4, and Aug. 18-24 (discharge interpolated); Feb. 11, 12, and July 12-19, discharge estimated from records of flow of Tujunga Creek.

Monthly discharge of Arroyo Seco near Pasadena, Calif., for the year ending Sept. 30, 1921

[Drainage area, 16.4 square miles]

Month	Discharge in second-feet				Run-off	
	Maximum	Minimum	Mean	Per square mile	Inches	Acre-feet
October.....	0.6	0.2	0.27	0.016	0.02	16.6
November.....	1.0	.2	.80	.049	.05	47.6
December.....	2.2	.8	1.12	.068	.08	68.9
January.....	32	1.0	4.85	.296	.34	298
February.....	4.8	2.1	3.11	.190	.20	173
March.....	108	2.1	12.2	.744	.86	750
April.....	5	1.6	2.94	.179	.20	175
May.....	141	1.6	17.7	1.08	1.24	1,090
June.....	17	3.4	6.89	.420	.47	410
July.....	3.4	.4	1.70	.104	.12	105
August.....	.4	.2	.24	.015	.02	14.8
September.....	.2	.2	.20	.012	.01	11.9
The year.....	141	.2	4.36	.266	3.61	3,160

SANTA ANITA CREEK NEAR SIERRA MADRE, CALIF.

LOCATION.—In SW. $\frac{1}{4}$ NE. $\frac{1}{4}$ sec. 10, T. 1 N., R. 11 W., at head of Hermit's Falls, 4 miles northeast of Sierra Madre, Los Angeles County.

DRAINAGE AREA.—10.5 square miles (measured on topographic map).

RECORDS AVAILABLE.—July 31, 1916, to September 30, 1921.

GAGE.—Water-stage recorder on right bank of pool at head of Hermit's Falls.

DISCHARGE MEASUREMENTS.—Made from cable 300 feet below gage or by wading at lower end of gage pool.

CHANNEL AND CONTROL.—Channel at gage is pool in bedrock; bed is rough and steep above and below pool. Banks are high, clean, and not subject to overflow. Control is bedrock, the same for all stages, and is permanent. Zero flow, stage about 0.45 foot.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 5.65 feet at 6 p. m. March 13 (discharge, 496 second-feet); minimum stage, 0.65 foot at 3 p. m. September 28 (discharge, 0.2 second-foot).

1916–1921: Maximum stage recorded, 5.65 feet at 6 p. m. March 13, 1921 (discharge, 496 second-feet); minimum stage, 0.57 foot September 12 and 13, 1919 (discharge, 0.1 second-foot).

DIVERSIONS.—None above.

REGULATION.—None.

ACCURACY.—Stage-discharge relation permanent. Rating curve well defined. Mean daily gage height determined by inspecting recorder graph. Daily discharge ascertained by applying mean daily gage height to rating table. Records good.

Discharge measurements of Santa Anita Creek near Sierra Madre, Calif., during the year ending Sept. 30, 1921

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>
Dec. 29	H. J. Tompkins.....	0.86	1.1	Apr. 15	Troxell and Tompkins..	1.02	2.9
Feb. 3	do.....	.99	2.6	May 4	do.....	.93	1.9
22	do.....	.96	2.0	24	H. C. Troxell.....	1.78	40
Mar. 8	do.....	1.94	2.0	June 2	do.....	1.28	9.2
15	C. W. Sopp.....	1.82	25	28	do.....	1.04	3.6
15	do.....	1.80	26	July 8	Tompkins and Troxell..	.96	2.1
15	do.....	1.78	25	Aug. 3	H. C. Troxell.....	.88	1.1
18	H. J. Tompkins.....	1.36	10	26	do.....	.79	.7

Daily discharge, in second-feet, of Santa Anita Creek near Sierra Madre, Calif., for year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	0.2	0.6	0.6	1.0	2.5	1.7	3.0	2.0	8.5	2.7	1.3	0.3
2.....	.2	.6	.7	.9	2.4	1.6	3.0	1.8	8	2.5	1.2	.4
3.....	.2	.5	.8	.9	2.3	1.6	3.2	1.8	8	2.5	1.0	.4
4.....	.2	.5	.7	.9	2.3	1.6	3.8	1.6	8	2.5	1.0	.4
5.....	.2	.6	.7	.9	2.2	1.6	3.1	2.2	7	2.3	1.0	.3
6.....	.2	1.0	.7	.9	2.1	2.3	3.1	3.5	6	2.2	1.0	.2
7.....	.2	1.2	.8	.9	2.1	2.2	3.0	3.4	5.5	2.1	1.0	.3
8.....	.2	1.2	.9	.9	2.0	1.7	2.7	2.4	5.5	1.8	1.1	.3
9.....	.2	1.0	.9	.9	2.0	1.7	2.5	2.2	5.5	1.8	1.0	.4
10.....	.3	.7	.9	1.1	1.8	1.6	2.4	2.1	4.8	1.8	1.0	.4
11.....	.3	.6	1.0	1.2	1.8	1.7	3.2	1.8	4.6	2.0	1.0	.4
12.....	.3	.6	1.0	1.0	1.7	4.8	3.0	1.7	4.6	1.8	.9	.5
13.....	.3	.7	1.0	1.0	1.7	109	2.8	1.7	4.4	1.7	.8	.5
14.....	.3	.6	1.0	1.0	3.0	103	2.8	1.7	4.4	1.7	.8	.5
15.....	.2	.6	.9	1.0	2.7	29	2.7	1.7	4.6	1.6	.8	.4
16.....	.2	.6	.9	1.0	2.2	17	2.5	1.7	4.4	1.6	.8	.4
17.....	.2	.6	.8	1.1	2.4	12	2.4	2.0	4.2	1.5	.8	.4
18.....	.7	.6	.8	1.6	2.4	10	2.4	1.8	3.7	1.4	.7	.5
19.....	2.3	.6	2.2	1.2	2.3	8	2.4	1.8	3.5	1.3	.6	.5
20.....	1.1	.6	1.8	5.5	2.2	7	2.4	6.5	3.4	1.4	.6	.4
21.....	.8	.6	1.3	4.6	2.2	6	2.4	128	3.2	1.5	.6	.4
22.....	.6	.6	1.2	3.7	2.1	5.5	2.3	81	3.1	1.4	.5	.3
23.....	.5	.6	1.2	3.2	2.0	5	2.4	39	3.1	1.3	.5	.2
24.....	.5	.6	1.2	3.0	2.0	4.6	2.4	26	3.1	1.3	.7	.2
25.....	.4	.7	1.2	2.7	1.8	4.2	2.3	20	3.0	1.3	.6	.2
26.....	.4	.7	1.1	2.4	1.7	4.0	2.3	16	3.0	1.3	.4	.2
27.....	.4	.6	1.0	3.1	1.7	3.8	2.2	14	2.8	1.2	.4	.2
28.....	.4	.6	1.0	4.2	1.7	3.5	2.1	13	3.0	1.2	.4	.2
29.....	.4	.6	1.0	3.4	-----	3.2	2.1	11	3.0	1.2	.3	.2
30.....	1.0	.6	1.0	3.0	-----	3.1	2.0	10	2.8	1.2	.3	.5
31.....	.7	-----	1.0	2.8	-----	3.1	-----	9.5	-----	1.3	.3	-----

NOTE.—No gage heights Oct. 1-8; discharge interpolated.

Monthly discharge of Santa Anita Creek near Sierra Madre, Calif., for the year ending Sept. 30, 1921

[Drainage area, 10.5 square miles]

Month	Discharge in second-feet				Run-off	
	Maximum	Minimum	Mean	Per square mile	Inches	Acre-feet
October.....	2.3	0.2	0.45	0.043	0.05	27.7
November.....	1.2	.5	.67	.064	.07	39.9
December.....	2.2	.6	1.01	.096	.11	62.1
January.....	16	.9	2.78	.265	.31	171
February.....	3.0	1.7	2.12	.202	.21	118
March.....	109	1.6	11.8	1.12	1.29	726
April.....	3.8	2.0	2.63	.250	.28	156
May.....	128	1.6	13.3	1.27	1.46	818
June.....	8.5	2.8	4.62	.440	.49	275
July.....	2.7	1.2	1.69	.161	.19	104
August.....	1.3	.3	.75	.071	.08	46.1
September.....	.5	.2	.35	.033	.04	20.8
The year.....	128	.2	3.54	.337	4.58	2,560

LITTLE SANTA ANITA CREEK NEAR SIERRA MADRE, CALIF.

LOCATION.—Near center of W. $\frac{1}{2}$ sec. 9, T. 1 N., R. 11 W., 2 miles northeast of Sierra Madre, Los Angeles County.

DRAINAGE AREA.—1.9 square miles (measured on topographic maps).

RECORDS AVAILABLE.—April 15, 1916, to September 30, 1921.

GAGE.—Water-stage recorder, on left bank about 150 feet below Scherer's cabin.

DISCHARGE MEASUREMENTS.—Made from wooden bridge near gage or by wading.

CHANNEL AND CONTROL.—Bed consists of gravel and boulders; permanent; one channel at all stages; straight for 75 feet above control. Right bank is rock cliff; left bank is stone wall 5 feet high, which is probably above maximum

stage. Control is small concrete dam, with triangular notch at left end, just below gage. Zero flow, gage height, 0.70 foot and top of dam, gage height, 1.50 feet.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 2.55 feet at 8 p. m. March 13 (discharge, 98 second-feet); minimum stage, 0.85 foot at 2 p. m. October 26 (discharge, 0.04 second-foot).

1916-1921: Maximum stage recorded, 2.55 feet at 8 p. m. March 13, 1921 (discharge, 98 second-feet); stream dry during part of each day September 16 and 17, 1919.

DIVERSIONS.—None above.

REGULATION.—None.

ACCURACY.—Stage-discharge relation permanent during year. Rating curve fairly well defined. Daily discharge ascertained by applying to rating table mean daily gage height determined by inspection of water-stage recorder graph. For periods not covered by gage-height record, discharge was interpolated or estimated from record of flow of Santa Anita Creek. Records good.

Discharge measurements of Little Santa Anita Creek near Sierra Madre, Calif., during the year ending Sept. 30, 1921

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>
Dec. 17	H. J. Tompkins.....	1.04	0.08	Apr. 11	Troxell and Tompkins.....	1.23	0.6
Jan. 26	.....do.....	1.16	.3	26	H. C. Troxell.....	1.16	.4
Feb. 10	.....do.....	1.10	.3	May 27	.....do.....	1.76	7.4
Mar. 2	.....do.....	1.06	.2	June 13	.....do.....	1.38	1.0
16	.....do.....	1.60	2.8				

Daily discharge, in second-feet, of Little Santa Anita Creek near Sierra Madre, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	0.04	0.1	0.2	0.2	0.3	0.2	0.5	0.3	2.3	0.5	0.2	0.1
2.....	.04	.1	.2	.2	.3	.2	.5	.3	2.1	.5	.2	.2
3.....	.04	.1	.2	.2	.3	.2	.6	.3	2.0	.5	.2	.1
4.....	.04	.1	.2	.2	.3	.2	.7	.3	1.9	.5	.2	.1
5.....	.04	.1	.2	.2	.3	.2	.6	.4	1.6	.4	.2	.1
6.....	.04	.2	.2	.2	.2	.2	.5	.7	1.4	.4	.2	.1
7.....	.04	.3	.2	.2	.2	.2	.5	.6	1.3	.4	.2	.1
8.....	.04	.2	.2	.2	.2	.2	.4	.5	1.2	.4	.2	.1
9.....	.04	.2	.2	.2	.2	.2	.4	.4	1.2	.3	.2	.1
10.....	.05	.2	.2	.2	.2	.2	.4	.4	1.0	.3	.2	.2
11.....	.05	.2	.2	.2	.2	.2	.5	.3	1.0	.3	.2	.2
12.....	.05	.2	.2	.2	.2	.7	.5	.3	1.0	.3	.2	.2
13.....	.04	.2	.2	.1	.2	13	.5	.3	1.0	.3	.2	.2
14.....	.04	.2	.2	.1	.4	16	.4	.3	1.0	.3	.2	.2
15.....	.04	.2	.2	.1	.3	4.6	.4	.3	1.0	.3	.2	.2
16.....	.04	.2	.1	.1	.3	2.8	.4	.4	.9	.3	.2	.2
17.....	.04	.2	.1	.2	.3	2.1	.3	.4	.9	.3	.2	.2
18.....	.05	.2	.1	1.6	.3	1.7	.3	.4	.8	.3	.1	.2
19.....	.2	.2	.3	1.2	.3	1.4	.3	.3	.8	.3	.1	.2
20.....	.3	.2	.2	.8	.3	1.2	.3	.8	.8	.3	.1	.1
21.....	.2	.2	.2	.6	.3	1.1	.3	28	.7	.3	.1	.1
22.....	.2	.1	.2	.5	.3	1.0	.3	15	.7	.3	.1	.1
23.....	.2	.2	.2	.5	.3	.9	.3	7.5	.7	.3	.1	.1
24.....	.1	.2	.2	.4	.2	.8	.4	5.1	.7	.3	.1	.1
25.....	.1	.2	.2	.4	.2	.8	.3	5.0	.7	.3	.1	.1
26.....	.1	.2	.2	.3	.2	.8	.3	4.1	.6	.3	.1	.1
27.....	.1	.2	.2	.3	.2	.7	.3	3.8	.6	.3	.1	.1
28.....	.1	.2	.2	.4	.2	.6	.3	3.6	.6	.2	.1	.1
29.....	.1	.2	.2	.3	-----	.6	.3	3.3	.6	.2	.1	.1
30.....	.2	.2	.2	.3	-----	.6	.3	2.8	.6	.2	.1	.1
31.....	.1	-----	.2	.3	-----	.6	-----	2.7	-----	.2	.1	-----

NOTE.—No gage-height record Oct. 16-25 and Nov. 21; discharge estimated. Discharge interpolated July 13-22 and Sept. 21-30.

Monthly discharge of Little Santa Anita Creek near Sierra Madre, Calif., for the year ending Sept. 30, 1921

[Drainage area, 1.9 square miles]

Month	Discharge in second-feet				Run-off	
	Maximum	Minimum	Mean	Per square mile	Inches	Acre-feet
October.....	0.3	0.04	0.089	0.047	0.05	5.5
November.....	.3	.1	.18	.095	.11	10.7
December.....	.3	.1	.19	.100	.12	11.7
January.....	1.6	.1	.35	.184	.21	21.5
February.....	.4	.2	.26	.137	.14	14.4
March.....	16	.2	1.75	.921	1.06	108
April.....	.7	.3	.40	.211	.24	23.8
May.....	28	.3	2.87	1.51	1.74	176
June.....	2.3	.6	1.06	.558	.62	63.1
July.....	.5	.2	.33	.174	.20	20.3
August.....	.2	.1	.15	.079	.09	9.2
September.....	.2	.1	.14	.074	.08	8.3
The year.....	28	.04	.653	.344	4.66	472

EATON CREEK NEAR PASADENA, CALIF.

LOCATION.—Near line between secs. 2 and 11, T. 1 N., R. 12 W., at mouth of canyon just above Mount Wilson toll bridge and 4 miles northeast of Pasadena, Los Angeles County.

DRAINAGE AREA.—6.5 square miles (measured on topographic map).

RECORDS AVAILABLE.—March 1, 1918, to September 30, 1921.

GAGE.—Water-stage recorder on left bank just above toll bridge.

DISCHARGE MEASUREMENTS.—Made by wading near gage.

CHANNEL AND CONTROL.—Gravel and boulders, fairly permanent; concrete control.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder 3.18 feet at 8 p. m. March 13 (discharge, 421 second-feet); no flow for several months.

1918–1921: Maximum stage recorded, 3.18 feet at 8 p. m. March 13, 1921 (discharge, 421 second-feet); no flow for long periods each year.

DIVERSIONS.—The Precipice Canyon Water Co. diverts an unmeasured amount of water above station.

REGULATION.—None.

ACCURACY.—Stage-discharge relation changed from that of previous years.

Rating curve well defined below 40 second-feet, fairly well defined between 40 and 300 second-feet, and extended above. Water-stage recorder operated satisfactorily. Daily discharge ascertained by applying to rating table mean daily gage height determined by inspecting recorder graph. Records good.

Discharge measurement of Eaton Creek near Pasadena, Calif., during the year ending Sept. 30, 1921

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>
Jan. 18	H. J. Tompkins.....	1.76	18	Mar. 14	H. J. Tompkins.....	2.07	39
Feb. 9	do.....	.83	5	Mar. 18	do.....	1.34	5.5
Mar. 13	C. W. Sopp.....	2.90	296	May 23	H. C. Troxell.....	1.96	30
14	do.....	2.04	40	June 8	do.....	.98	1.7

Daily discharge, in second-feet, of Eaton Creek near Pasadena, Calif., for the year ending Sept. 30, 1921

Day	Jan.	Feb.	Mar.	Apr.	May	June	Day	Jan.	Feb.	Mar.	Apr.	May	June
1		1.0		0.1		4.0	16		0.2	13			0.2
2		.8		.1		3.5	17		.2	9			.2
3		.6				3.1	18	1.2	.1	5.5			.1
4		.5				2.9	19	10		4.5			
5		.5				2.7	20	3.8		3.2			
6		.5				2.3	21	2.8		2.4		112	
7		.5				1.1	22	1.8		2.1		76	
8		.5				.8	23	1.4		1.8		33	
9		.3				.8	24	1.0		1.3		22	
10						.6	25	.8		1.3		17	
11						.4	26	.5		.5		12	
12						.5	27	.9		.3		9	
13			44			.3	28	1.5		.2		7.5	
14		.1	59			.3	29	1.0		.1		6	
15		.4	22			.3	30	.9		.1		5	
							31	.9		.1		4.5	

NOTE.—Stream dry on days for which discharge is not given.

Monthly discharge of Eaton Creek near Pasadena, Calif., for the year ending Sept. 30, 1921

[Drainage area, 6.5 square miles]

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
January	12	0	1.27	78.1
February	1.0	0	.22	12.2
March	59	0	5.50	338
April	.1	0	.007	.4
May	112	0	9.81	603
June	4.0	0	.80	47.6
The year	112	0	1.49	1,080

NOTE.—No flow during months for which no record is given.

SANTA CLARA RIVER BASIN

PIRU CREEK AT LOS ALAMOS DAM SITE, NEAR GORMAN, CALIF.

LOCATION.—In SE. $\frac{1}{4}$ sec. 34, T. 7 N., R. 18 W. 500 feet above Los Alamos dam site, below mouth of Los Alamos Creek, and 9 miles southeast of Gorman, Los Angeles County.

DISCHARGE MEASUREMENTS.—Made by wading just above dam site. High-water measurements by floats.

COOPERATION.—Discharge measurements furnished by Sespe Light & Power Co.

Discharge measurements of Piru Creek at Los Alamos dam site, near Gorman, Calif., during the year ending Sept. 30, 1921

[Made by Sespe Light & Power Co.]

Date	Dis-charge	Date	Dis-charge	Date	Dis-charge
	<i>Sec.-ft.</i>		<i>Sec.-ft.</i>		<i>Sec.-ft.</i>
Nov. 2.....	9.3	Jan. 21.....	a 141	Mar. 15.....	a 135
8.....	22	22.....	a 145	16.....	a 135
13.....	10	24.....	47	18.....	25
16.....	11	26.....	50	24.....	25
20.....	12	27.....	a 156	30.....	25
24.....	15	28.....	a 160	Apr. 4.....	37
28.....	14	29.....	a 82	9.....	38
Dec. 2.....	17	31.....	a 94	13.....	36
6.....	13	Feb. 3.....	51	18.....	36
10.....	17	7.....	48	22.....	34
14.....	17	11.....	52	27.....	33
19.....	24	13.....	112	30.....	32
27.....	18	14.....	112	May 4.....	28
Jan. 2.....	17	15.....	55	6.....	32
6.....	18	20.....	51	13.....	31
10.....	32	24.....	54	20.....	33
13.....	21	28.....	37	21.....	a 88
16.....	22	Mar. 4.....	24	22.....	a 236
17.....	a 182	8.....	25	23.....	a 295
18.....	a 218	12.....	a 83	26.....	40
19.....	a 132	13.....	a 124	30.....	35
20.....	a 100	14.....	a 244		

a Float measurements.

SESPE CREEK NEAR SESPE, CALIF.

LOCATION.—At Bradfield's camp, in Santa Barbara National Forest, three-fourths mile below mouth of West Fork of Sespe Creek, $4\frac{1}{2}$ miles above intake of Fillmore canal, and $6\frac{1}{2}$ miles northwest of Sespe, Ventura County.

DRAINAGE AREA.—216 square miles (measured by Ralph Bennett, consulting engineer).

RECORDS AVAILABLE.—October 1, 1915, to September 30, 1921 (not complete).

GAGE.—Staff gage 200 feet below old gage which was painted on large boulder and on rock cliff on left bank. Gage installed October 11, 1921; read by G. H. Killgore.

DISCHARGE MEASUREMENTS.—Made from cable 450 feet above gage or by wading.

CHANNEL AND CONTROL.—Gravel and large boulders; shift slightly.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 5.50 feet at noon March 13 (discharge, 1,190 second-feet); minimum stage, 4.39 feet October 1–5 (discharge, 3.8 second-feet).

1915–1921: Maximum stage recorded, 18.7 feet January 17, 1916 (discharge, 18,600 second-feet); minimum stage, 4.36 feet July 31 to August 14, 1920 (discharge, 3.4 second-feet).

ACCURACY.—Stage-discharge relation changed January 18. Rating curves are fairly well defined. Gage read to hundredths twice a day. Daily discharge ascertained by applying mean daily gage height to rating table. Records good.

COOPERATION.—Gage-height record and discharge measurements furnished by Sespe Light & Power Co.

Discharge measurements of Sespe Creek near Sespe, Calif., during the year ending Sept. 30, 1921

[Furnished by Sespe Light & Power Co.]

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. 1-----	4.39	3.8	Dec. 29-----	1.30	12	Mar. 19-----	2.20	79
8-----	4.40	4.0	Jan. 11-----	1.32	14	29-----	1.86	57
15-----	1.03	3.9	18-----	3.50	375	Apr. 3-----	1.85	53
19-----	1.08	5.0	18-----	3.16	229	10-----	1.65	39
Nov. 2-----	1.05	4.4	18-----	3.62	448	17-----	1.64	34
9-----	1.19	8.4	19-----	2.77	200	24-----	1.51	24
12-----	1.20	8.7	20-----	2.16	99	May 1-----	1.46	21
16-----	1.21	9.1	28-----	3.26	316	6-----	1.75	45
22-----	1.20	8.8	29-----	2.38	129	14-----	1.46	21
30-----	1.20	8.5	Feb. 2-----	2.04	74	21-----	3.52	347
Dec. 7-----	1.23	9.1	14-----	2.58	142	23-----	3.05	263
9-----	1.26	11	25-----	1.83	48	June 2-----	1.82	48
15-----	1.25	11	Mar. 11-----	1.74	38	8-----	1.60	35
19-----	1.36	14	13-----	3.00	246	21-----	1.46	24
19-----	1.42	15	13-----	3.62	408	29-----	1.35	12
21-----	1.39	14	14-----	4.20	648	July 17-----	1.16	6

Daily discharge, in second-feet, of Sespe Creek near Sespe, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1-----	4.0	4.8	8.5	12	85	50	65	22	55	12	5.5	5
2-----	4.0	4.3	9	12	77	50	61	20	52	11	5	5
3-----	4.0	4.3	9	12	70	50	55	20	44	10	5	4.8
4-----	4.0	4.3	9	11	67	50	51	20	41	9	5	5
5-----	4.0	4.6	9	11	65	49	47	19	38	8.5	5	5
6-----	4.0	5	9	11	61	48	44	44	37	9	5	5
7-----	4.0	11	9	11	57	46	42	38	35	8.5	5	5
8-----	4.0	13	9.5	11	53	44	41	34	33	8.5	5	5
9-----	4.0	8	10	11	48	44	37	34	31	8.5	5	4.8
10-----	4.5	7.5	10	13	56	43	35	33	31	8	5	5
11-----	4.8	9	10	13	65	43	38	29	29	7.5	5	4.8
12-----	4.3	8.5	11	12	65	48	39	28	29	7.5	5	5
13-----	4.3	8	11	11	62	306	39	26	28	7	5	5
14-----	4.3	7.5	11	11	146	644	37	22	26	6.5	5	4.8
15-----	4.3	8	11	11	102	312	37	20	26	6	5	4.8
16-----	4.3	8.5	11	11	64	179	36	20	25	5.5	5.5	4.8
17-----	4.3	8.5	10	12	65	133	34	20	25	6.5	5	4.8
18-----	4.8	8.5	11	242	67	107	29	20	23	6.5	5	4.8
19-----	5	8.5	15	205	56	97	27	20	22	6	5	4.8
20-----	4.8	8.5	16	107	52	88	25	44	20	6	5	4.8
21-----	4.8	8.5	16	85	52	72	23	332	20	5.5	5	4.8
22-----	4.8	8.5	13	72	52	64	23	438	19	5.5	5	4.7
23-----	4.8	8.5	12	64	52	60	23	228	17	5.5	5	4.7
24-----	4.8	8.5	12	54	52	59	24	209	16	5	4.8	4.8
25-----	4.3	8.5	12	49	52	58	23	122	15	5	4.8	4.7
26-----	4.3	8.5	12	46	51	56	23	99	15	5	5	4.8
27-----	4.3	8.5	12	109	50	56	22	92	14	5	5	4.8
28-----	4.3	8.5	12	292	51	54	22	77	14	5.5	5	4.7
29-----	4.3	8.5	12	200	-----	54	22	70	13	5.5	5	4.7
30-----	4.8	8.5	12	96	-----	52	22	66	13	5.5	5	5
31-----	4.8	-----	12	92	-----	51	-----	60	-----	5.5	5	-----

NOTE.—Gage not read July 1-4, 14, and 15; discharge interpolated.

Monthly discharge of Sespe Creek near Sespe, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	5.0	4.0	4.39	270
November.....	13	4.3	7.84	467
December.....	16	8.5	11.2	689
January.....	292	11	61.6	3,790
February.....	146	48	64.1	3,560
March.....	644	43	98.9	6,080
April.....	65	22	34.9	2,080
May.....	438	19	75.0	4,610
June.....	55	13	26.9	1,600
July.....	12	5	6.98	429
August.....	5.5	4.8	5.02	309
September.....	5	4.7	4.86	289
The year.....	644	4.0	33.4	24,200

CARPINTERIA CREEK BASIN

GOBERNADOR CREEK NEAR CARPINTERIA, CALIF.

LOCATION.—In SW. $\frac{1}{4}$ SW. $\frac{1}{4}$ sec. 14, T. 4 N., R. 25 W., 1,000 feet below junction of Eldorado and Steer creeks and $3\frac{1}{4}$ miles northeast of Carpinteria, Santa Barbara County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—June 24, 1916, to September 30, 1921 (not complete).

GAGE.—Vertical staff in two sections on left bank; read by K. C. Lillingston. A temporary gage was used June 24 to September 11, 1916; datum 1.11 feet lower.

DISCHARGE MEASUREMENTS.—Made from cable 150 feet below gage or by wading.

CHANNEL AND CONTROL.—Small boulders and gravel; shift. Banks are high, clean, and not subject to overflow.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 1.48 feet May 21 (discharge, 14 second-feet); minimum stage 0.82 foot September 29 (discharge, 0.1 second-foot).

1916-1921: Maximum stage recorded, 3.5 feet February 21, 1917 (discharge, 200 second-feet); stream practically dry August and September, 1920.

DIVERSIONS.—None above. The Gobernador Water Co. diverts water at its submerged dam 1 mile below station.

REGULATION.—None.

ACCURACY.—Stage-discharge relation shifted slightly May 21. Gage read to hundredths occasionally. Daily discharge ascertained by applying gage height to rating table. Records fair.

COOPERATION.—Gage-height record furnished by K. C. Lillingston.

Discharge measurements of Gobernador Creek near Carpinteria, Calif., during the year ending Sept 30, 1921

[Made by K. C. Lillingston]

Date	Gage height	Discharge
May 4.....	<i>Feet</i> 1.01	<i>Sec.-ft.</i> 0.3
Aug. 16.....	.90	.99

Daily discharge, in second-feet, of Gobernador Creek near Carpinteria, Calif., for the year ending Sept. 30, 1921

Date	Dis-charge	Date	Dis-charge	Date	Dis-charge
Oct. 2.....	0.2	Jan. 15.....	0.2	May 6.....	0.9
15.....	.1	20.....	.7	12.....	.2
22.....	.2	22.....	.9	21.....	14
26.....	.1	29.....	.9	27.....	.5
30.....	.2	Feb. 1.....	.9	31.....	.4
Nov. 3.....	.1	12.....	.6	June 18.....	.3
6.....	.2	19.....	.7	25.....	.2
10.....	.2	26.....	.6	July 1.....	.1
13.....	.2	Mar. 4.....	.5	8.....	.2
20.....	.2	19.....	.7	29.....	.1
27.....	.2	26.....	.6	Aug. 16.....	.1
Dec. 4.....	.2	Apr. 2.....	.5	24.....	.1
9.....	.5	8.....	.4	Sept. 1.....	.1
15.....	.5	16.....	.4	10.....	.1
22.....	.5	21.....	.3	15.....	.1
31.....	.4	30.....	.2	22.....	.1
Jan. 6.....	.3	May 4.....	.2	29.....	.1

NOTE.—Monthly discharge not computed.

SANTA YNEZ RIVER BASIN

SANTA YNEZ RIVER NEAR SANTA BARBARA, CALIF.

LOCATION.—Near line between secs. 10 and 11, T. 5 N., R. 27 W., at Gibraltar dam, 7 miles north of Santa Barbara, Santa Barbara County.

DRAINAGE AREA.—218 square miles.

RECORDS AVAILABLE.—November 1, 1903, to April 30, 1907; October 1, 1907, to January 31, 1908; February 6, 1910, to November 24, 1918; and October 1, 1920, to September 30, 1921. Station was maintained $4\frac{3}{4}$ miles above dam site January 1 to June 20, 1903.

DIVERSIONS.—City of Santa Barbara diverts water at the dam for municipal use.

COOPERATION.—Monthly-discharge record furnished for publication by the city of Santa Barbara through V. E. Trace, superintendent of water works.

The following table gives the data showing storage in the reservoir, increases to storage, and decreases from storage:

Data on storage in reservoir on Santa Ynez River near Santa Barbara, Calif.

Date	Reservoir			Increase during month				Decrease during month			
	Gage height (feet)	Surface area (acres)	Storage (acre-feet)	Precipitation		Inflow		City weir (acre-feet)	River weir (acre-feet)	Evaporation	
				In-ches	Acre-feet	Second-feet	Acre-feet			Feet	Acre-feet
1920											
Sept. 30-----	1,338.00	261	10,542								
Oct. 31-----	1,336.53	254	10,167	0.70	15.0	8.2	16.2	185.1	123.8	0.370	97.2
Nov. 30-----	1,336.05	252	10,046	1.92	40.6	11.4	22.6	108.9	26.9	.188	49.0
Dec. 31-----	1,335.33	249	9,863	1.59	31.8	9.9	19.5	117.4	84.6	.129	32.2
1921											
Jan. 31-----	1,339.75	270	11,017	8.87	186.5	562.3	1,113.4	46.1	78.3	.088	21.9
Feb. 28-----	1,344.46	294	12,352	2.65	62.1	757.2	1,499.4	121.6	37.1	.242	67.6
Mar. 31-----	1,350.80	334	14,324	2.66	66.8	1,066.3	2,105.4	77.8	33.2	.280	89.0
Apr. 30-----	1,351.62	340	14,598	.35	9.8	302.1	598.2	213.0	32.1	.265	89.1
May 31-----	1,352.86	348	15,029	3.57	101.2	302.7	599.3	136.2	37.4	.281	96.2
June 30-----	1,351.47	338	14,556	.00	.0	89.1	176.4	161.6	267.4	.650	219.6
July 31-----	1,349.66	327	13,954	.00	.0	37.2	73.8	264.0	96.7	.940	315.3
Aug. 31-----	1,347.94	315	13,403	.00	.0	23.6	46.8	270.0	63.2	.832	265.4
Sept. 30-----	1,346.63	306	12,995	.29	7.5	18.5	36.6	213.1	49.2	.612	189.7
				22.60	521.3		6,307.6	1,914.8	929.9	4.877	1,532.2

NOTE.—Storage is obtained from gage height of reservoir; precipitation and evaporation are measured; city and river weir are from weir records. Inflow equals storage plus precipitation minus evaporation, city weir, and river weir.

SALINAS RIVER BASIN**ARROYO SECO NEAR SOLEDAD, CALIF.**

LOCATION.—In sec. 21, T. 19 S., R. 6 E., at Pettitt's ranch, 15 miles south of Soledad, Monterey County.

DRAINAGE AREA.—215 square miles.

RECORDS AVAILABLE.—January 1, 1901, to September 30, 1921.

GAGE.—Staff in three sections on right bank; lower two sections fastened to an alder tree 400 feet above cable, upper section fastened to a sycamore tree about 100 feet downstream. Gage read by Mrs. Charles Pettitt.

DISCHARGE MEASUREMENTS.—Made from cable 400 feet below gage or by wading.

CHANNEL AND CONTROL.—Gravel and solid rock; fairly permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 12.0 feet at 10 a. m. January 30 (discharge, 11,500 second-feet); no flow August 26 to September 16.

1901-1921: Maximum discharge, from extension of rating curve, about 22,000 second-feet at 4.30 p. m., February 21, 1917; stream dry during periods in 1902, 1903, 1904, 1906, 1908, 1913, 1919, and 1921.

DIVERSIONS.—None.

REGULATION.—None.

ACCURACY.—Stage-discharge relation for low water changed on November 18.

Rating curves fairly well defined. Gage read to hundredths once a day, more frequently during floods. Daily discharge ascertained by applying gage height to rating table. Records good except during high water when they are fair.

Discharge measurements of Arroyo Seco near Soledad, Calif., during the year ending Sept. 30, 1921

[Made by K. M. Kelley.]

Date	Gage height	Dis-charge
	<i>Feet</i>	<i>Sec.-ft.</i>
Jan. 14.....	2.48	32
23.....	3.90	375
Mar. 21.....	3.17	188

Daily discharge, in second-feet, of Arroyo Seco near Soledad, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1-----	0.1	8.5	38	55	895	128	109	33	23	9	0.6	-----
2-----	.1	8.5	38	55	895	128	99	33	23	9	.6	-----
3-----	.1	8.5	35	38	515	114	90	33	23	8	.4	-----
4-----	.1	8.5	33	38	441	109	85	31	22	8	.4	-----
5-----	.1	10	33	35	375	114	85	45	22	7	.4	-----
6-----	.1	10	31	35	316	123	81	56	22	7	.4	-----
7-----	.2	10	33	35	287	123	76	45	20	6.5	.4	-----
8-----	.3	13	45	35	260	114	76	43	19	5.5	.4	-----
9-----	.3	14	133	33	238	114	72	40	18	5.5	.4	-----
10-----	.4	16	133	33	223	109	67	38	17	4.9	.4	-----
11-----	.6	16	128	33	202	104	67	33	16	4.2	.4	-----
12-----	.8	16	119	33	187	133	63	31	16	4.2	.4	-----
13-----	10	16	109	33	172	1,060	67	29	16	3.5	.4	-----
14-----	7.5	17	104	31	177	555	63	28	14	3.5	.3	-----
15-----	7.5	107	95	31	207	375	63	29	14	3.5	.3	-----
16-----	7.5	133	85	31	182	302	59	29	14	3.0	.3	-----
17-----	7.5	260	76	840	330	260	59	29	14	2.5	.3	0.2
18-----	7.5	104	72	3,600	233	249	56	29	14	2.5	.3	.3
19-----	8.5	80	230	1,720	207	212	56	29	14	2.5	.3	.3
20-----	10	60	260	1,120	192	197	52	31	14	2.0	.2	.4
21-----	11	40	233	790	197	177	52	33	13	1.5	.2	.7
22-----	11	40	207	535	202	177	49	35	13	1.5	.2	.7
23-----	13	40	133	345	187	177	49	31	12	1.0	.1	.7
24-----	11	40	128	330	172	167	33	29	12	.9	.1	.9
25-----	11	40	123	287	167	157	43	28	12	.9	.1	.9
26-----	10	40	119	535	157	147	43	26	11	.7	-----	.9
27-----	8.5	38	109	1,900	147	138	40	24	11	.7	-----	.9
28-----	8.5	38	104	1,060	133	133	38	23	10	.7	-----	.9
29-----	8.5	40	95	665	-----	123	35	23	10	.7	-----	.9
30-----	8.5	40	76	4,590	-----	119	35	23	10	.7	-----	.9
31-----	8.5	-----	72	1,360	-----	114	-----	23	-----	.6	-----	-----

NOTE.—Stream dry Aug. 26 to Sept. 16. Discharge interpolated Nov. 19, 20, and Jan. 1.

Monthly discharge of Arroyo Seco near Soledad, Calif., for the year ending Sept. 30, 1921

[Drainage area, 215 square miles]

Month	Discharge in second-feet				Run-off	
	Maximum	Minimum	Mean	Per square mile	Inches	Acre-feet
October-----	13	0.1	5.76	0.027	0.03	354
November-----	260	8.5	43.7	.203	.23	2,600
December-----	260	31	104	.484	.56	6,390
January-----	4,590	31	653	3.04	3.50	40,200
February-----	895	133	272	1.26	1.31	15,100
March-----	1,060	104	202	.940	1.08	12,400
April-----	109	33	62.1	.289	.32	3,700
May-----	56	23	32.0	.149	.17	1,970
June-----	23	10	15.6	.073	.08	928
July-----	9	.6	3.60	.017	.02	221
August-----	.6	0	.27	.0013	.001	16.6
September-----	.9	0	.32	.0015	.002	19.0
The year-----	4,590	0	116	.540	7.30	83,900

COYOTE RIVER BASIN

COYOTE RIVER NEAR MADRONE, CALIF.

LOCATION.—In northwest corner of San José grant, above highway bridge at mouth of canyon, one-fourth mile below mouth of Las Animas Creek, and $2\frac{3}{4}$ miles northeast of Madrone, Santa Clara County.

DRAINAGE AREA.—193 square miles (reported by Duryea, Haebl, and Gilman).

RECORDS AVAILABLE.—October, 1902, to September 30, 1912; December 8, 1916, to September 30, 1921.

GAGE.—Inclined staff in three sections on left bank about 1,000 feet above highway bridge. Gage for 1902-1912 was on right bank at highway bridge. Read by R. C. Howe, jr.

DISCHARGE MEASUREMENTS.—Made from cable 800 feet below gage or by wading.

CHANNEL AND CONTROL.—Bed consists of gravel, boulders, and solid rock. Banks high, one channel at all stages. Control boulders and solid rock; practically permanent. Zero flow, gage height 1.6 feet.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 11.2 feet at 8 a. m. January 30 (discharge, 5,130 second-feet); no flow October 1 to about November 15, and November 26-29.

1902-1912 and 1917-1921: Maximum discharge, 25,000 second-feet, probably occurred March 7, 1911; no flow August 7 to November 15, and November 26-29, 1920 (record incomplete 1902-1907).

DIVERSIONS.—None.

REGULATION.—None.

ACCURACY.—Stage-discharge relation permanent during year. Rating curve well defined. Gage read to half-tenths once daily but record is not reliable July 1 to September 30 and for a few other short periods. Daily discharge ascertained by applying daily gage height to rating table except as noted in footnote to table of daily discharge. Records fair.

Discharge measurements of Coyote River near Madrone, Calif., during the year ending Sept. 30, 1921

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>
Dec. 9	K. M. Kelley	3.45	36	Jan. 24	K. M. Kelley	4.63	145
Jan. 15	do.	2.80	11	Mar. 22	do.	3.80	59
15	do.	2.80	11	July 8	H. D. McGlashan	2.28	2.3
23	do.	5.15	216	30	William Kessler	2.14	1.3

Daily discharge, in second-feet, of Coyote River near Madrone, Calif., for the year ending Sept. 30, 1921

Day	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1		1.8	26	580	62	47	7.5	7.5
2		1.8	18	273	54	44	7.5	7.5
3		1.8	15	168	54	36	9.5	7.5
4		12	9.5	152	50	31	11	7.5
5		1.8	9.5	138	47	28	12	5.5
6		1.8	7.5	119	47	26	14	5.5
7		2.7	12	114	50	24	15	5.5
8		7.5	15	108	45	22	12	5.5
9		38	12	88	40	18	11	5.5
10		60	9.5	79	35	18	9.5	5.5
11		79	12	74	30	18	8.5	5.5
12		215	12	62	25	22	7.5	5.5
13		79	12	54	196	22	7.5	5.5
14		79	12	79	720	18	7.5	5.5
15		62	12	84	490	18	7.5	5.5
16		50	12	93	314	15	7.5	5.5
17		40	500	103	160	15	7.5	5.5
18		30	3,130	108	114	15	8.5	5.5
19		145	2,700	98	70	14	7.5	4.8
20		177	1,580	84	58	12	8.5	3.4
21		0.8	62	1,070	88	62	12	2.7
22		.8	177	580	88	108	12	14
23		.5	177	260	84	145	12	2.7
24		.5	1,250	160	79	131	11	12
25		.1	535	62	70	98	9.5	12
26			108	79	70	98	8.5	12
27			79	535	66	98	7.5	12
28			54	343	62	98	7.5	11
29			41	196		88	7.5	12
30			36	4,600		79	7.5	12
31			47	820		62		9.5

NOTE.—No gage-height record Oct. 1 to Nov. 20. No flow Oct. 1 to Nov. 15, and Nov. 26-29. Gage-height record not reliable Dec. 10, 16-18, 23, Jan. 17, and Mar. 8-12, discharge estimated by comparison with records for Coyote and Alameda creeks. July 1 to Sept. 30 gage heights unreliable, daily discharge not determined.

Monthly discharge of Coyote River near Madrone, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....		0	0	0
November.....			0.5	29.8
December.....	1,250	1.8	118	7,260
January.....	4,600	7.5	543	33,400
February.....	580	54	117	6,500
March.....	720	25	120	7,380
April.....	47	7.5	18.6	1,110
May.....	15	7.5	10.3	633
June.....	7.5	2.7	5.00	298
July.....			2.0	123
August.....			1.0	61.5
September.....			0.5	29.8
The year.....	4,600	0	78.4	56,800

* Estimated by comparison with records of flow of Coyote and Alameda creeks.

COYOTE RIVER AT COYOTE, CALIF.

LOCATION.—Near north end La Laguna Seca grant, one-fourth mile above ford, and just east of Coyote, Santa Clara County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—October 1, 1916, to September 30, 1921.

GAGE.—Vertical staff in two sections fastened to sycamore trees on left bank 1,000 feet east of post office at Coyote; read by Mrs. Mary Rodoni.

DISCHARGE MEASUREMENTS.—Made from cable 40 feet below gage or by wading.

CHANNEL AND CONTROL.—Gravel; shifting during high water. Channel clean and straight for several hundred feet above and below gage. One channel at all stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 12.5 feet at 9.30 a. m. January 30 (discharge, 3,200 second-feet); stream dry October 1 to December 6, December 8–10, 16–18, 22, January 1–16, March 12, and April 22 to September 30.

1917–1921: Maximum stage recorded, 15.2 feet at 5.30 p. m. February 2, 1917 (discharge, 9,900 second-feet); no flow most of each year.

DIVERSIONS.—None. Some water is pumped from wells along the river above Coyote.

REGULATION.—None.

ACCURACY.—Stage-discharge relation changed from that of previous years. Rating curve fairly well defined. Gage read to half-tenths once daily, more frequently during high water. Daily discharge ascertained by applying mean daily gage height to rating table. Records good.

Discharge measurements of Coyote River at Coyote, Calif., during the year ending Sept. 30, 1921

[Made by K. M. Kelley]

Date	Gage height	Dis-charge	Date	Gage height	Dis-charge	Date	Gage height	Dis-charge
	<i>Feet</i>	<i>Sec.-ft.</i>		<i>Feet</i>	<i>Sec.-ft.</i>		<i>Feet</i>	<i>Sec.-ft.</i>
Jan. 18.....	11.28	1,900	Jan. 21.....	8.69	639	Jan. 24.....	7.02	107
18.....	10.82	1,610	22.....	7.90	31	31.....	8.80	701
20.....	10.38	1,390	22.....	7.68	274	Mar. 22.....	6.30	23
21.....	8.92	774						

Daily discharge, in second-feet, of Coyote River at Coyote, Calif., for the year ending Sept. 30, 1921

Day	Dec.	Jan.	Feb.	Mar.	Apr.	Day	Dec.	Jan.	Feb.	Mar.	Apr.
1			390	27	2.5	16	0		68	48	1.2
2			255	24	2.5	17	0	260	58	48	1.2
3			182	18	2.5	18	0	2,380	58	48	.8
4			115	16	2.5	19	53	1,830	53	36	.5
5			97	14	2.5	20	170	1,060	48	38	.5
6			105	12	2.5	21	30	660	38	34	.2
7	2.5		101	10	2.5	22	0	355	48	29	
8	0		48	10	2.5	23	34	95	48	30	
9	0		46	6	2.5	24	720	105	43	26	
10	0		43	2.5	2.5	25	390	26	40	23	
11	105		34	1.2	2.5	26	135	58	38	22	
12	85		30	0	2.0	27	53	78	30	20	
13	38		30	225	1.5	28	26	182	30	18	
14	22		26	85	1.4	29	20	285		16	
15	6		53	53	1.2	30	10	1,710		6	
						31	2.5	780		2.5	

NOTE.—No flow when discharge is not given.

Monthly discharge of Coyote River at Coyote, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
December	720	0	61.4	3,780
January	2,380	0	318	19,600
February	390	26	77.0	4,280
March	225	0	30.4	1,870
April	2.5	0	1.27	76
The year	2,380	0	40.8	29,600

NOTE.—No flow during months for which no record is given.

COYOTE RIVER NEAR EDENVALE, CALIF.

LOCATION.—At east boundary Santa Teresa grant, at The Narrows, $1\frac{1}{2}$ miles northeast of Edenvale, Santa Clara County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—October 1, 1916, to September 30, 1921.

GAGE.—Inclined staff in two sections fastened to solid rock on left bank at The Narrows; read by Mrs. J. H. Swickard.

DISCHARGE MEASUREMENTS.—Made from cable 1,000 feet above gage or by wading.

CHANNEL AND CONTROL.—Fine gravel overlying solid rock; not permanent. Channel is clean and straight for several hundred feet above and below gage. Left bank, high; right bank not likely to be overflowed.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 7.9 feet at 5 p. m. January 30 (discharge, 3,190 second-feet); stream dry October 1 to December 23, December 29 to January 17, March 3–13, and March 30 to September 30.

1917–1921: Maximum stage recorded, 12.2 feet at 6.10 p. m. February 21, 1917 (discharge, 8,590 second-feet); no flow during most of each year.

DIVERSIONS.—None. Water is pumped from wells along the river above station for irrigation purposes.

REGULATION.—None.

ACCURACY.—Stage-discharge relation at low water changed slightly from previous year. Rating curve fairly well defined. Gage read to half-tenths twice daily, more frequently during high water. Daily discharge ascertained by applying mean daily gage height to rating table. Records good.

Discharge measurements of Coyote River near Edenvale, Calif., during the year ending Sept. 30, 1921.

[Made by K. M. Kelley]

Date	Gage height	Dis-charge	Date	Gage height	Dis-charge	Date	Gage height	Dis-charge
1908	<i>Feet</i>	<i>Sec.-ft.</i>	1909	<i>Feet</i>	<i>Sec.-ft.</i>	1911	<i>Feet</i>	<i>Sec.-ft.</i>
Jan. 19.....	7.10	2,420	Jan. 21.....	5.08	622	Jan. 24.....	3.72	78
19.....	6.70	2,020	22.....	4.55	359	Mar. 22.....	2.96	7.6
20.....	5.84	1,170						

Daily discharge, in second-feet, of Coyote River near Edenvale, Calif., for the year ending Sept. 30, 1921

Day	Dec.	Jan.	Feb.	Mar.	Day	Dec.	Jan.	Feb.	Mar.
1.....			360	5	16.....			24	26
2.....			224	3.8	17.....			29	19
3.....			134		18.....		1,800	35	14
4.....			100		19.....		2,410	26	10
5.....			82		20.....		1,120	22	8.5
6.....			76		21.....		700	18	7
7.....			46		22.....		315	39	8
8.....			28		23.....		162	22	16
9.....			21		24.....	415	90	18	14
10.....			15		25.....	240	51	14	10
11.....			12		26.....	56	31	11	8.5
12.....			9.5		27.....	8.5	76	8	6.5
13.....			8.5		28.....	8	134	6.5	4.0
14.....			8.5	60	29.....		76		1.5
15.....			35	51	30.....		2,300		
					31.....		795		

NOTE.—No flow when discharge is not given.

Monthly discharge of Coyote River near Edenvale, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
December.....	415	0	23.2	1,430
January.....	2,410	0	325	20,000
February.....	360	6.5	51.1	2,840
March.....	60	0	8.80	541
The year.....	2,410	0	34.2	24,800

NOTE.—No flow during months for which no record is given.

ALAMEDA CREEK BASIN

ALAMEDA CREEK AT SUNOLGLEN, CALIF.

LOCATION.—In SE. $\frac{1}{4}$ sec. 7, T. 4 S., R. 1 E., at Sunol dam, 1 mile below junction with Arroyo de la Laguna and 1 mile west of Sunolglen, Alameda County.

DRAINAGE AREA.—620 square miles (measured by Spring Valley Water Co.).

RECORDS AVAILABLE.—October 4, 1900, to September 30, 1921.

GAGE.—Water-stage recorder on upstream face of dam on left bank. Previous to 1914 a staff gage on upstream side of dam on right bank was used.

DISCHARGE MEASUREMENTS.—Made from suspension footbridge about 400 feet above dam.

CHANNEL AND CONTROL.—The concrete dam acts as a control for the station. Bed above and below dam consists of gravel and boulders; shifts during high water.

EXTREMES OF DISCHARGE.—1901–1921: Maximum mean daily discharge, 14,700 second-feet March 7, 1911; no flow for part of nearly every year.

DIVERSIONS.—See Spring Valley Water Co.'s aqueduct near Sunolglén, pages 116–117.

REGULATION.—Spring Valley Water Co. has under construction a large reservoir on Calaveras Creek. Water was released from the reservoir after periods of natural flow.

ACCURACY.—The dam has been rated in accordance with the cooperative agreement between the Spring Valley Water Co. and the city of San Francisco. Current-meter measurements have been obtained by both parties and a rating curve developed which has been accepted by both.

COOPERATION.—Records showing millions of gallons per day furnished by Spring Valley Water Co. through G. A. Elliott, chief engineer. Daily discharge converted into second-feet and monthly discharge computed by engineers of United States Geological Survey.

Daily discharge, in second-feet, of Alameda Creek at Sunolglén, Calif., for the year ending Sept. 30, 1921

Day	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Sept.
1	0	81	692	37	10	17	1.5	-----
2	11	67	600	29	10	18	1.4	-----
3	9	56	367	24	10	16	1.4	-----
4	6	42	329	24	10	16	1.2	0.8
5	0	42	499	24	10	16	1.2	.8
6	0	42	375	22	10	16	1.2	.8
7	0	35	338	19	10	15	1.1	.8
8	30	27	300	18	10	14	1.1	.8
9	27	22	232	17	10	13	1.1	.8
10	118	22	100	15	10	12	.9	.8
11	227	20	82	15	10	12	.9	.8
12	194	11	70	14	10	11	.9	.8
13	132	6	60	18	10	8	.8	.8
14	117	6	103	19	10	2.0	.8	.8
15	134	6.5	108	17	10	.9	.8	.8
16	170	6.5	108	15	10	.9	.8	.5
17	168	50	108	14	10	.9	.6	.5
18	148	1,850	117	12	10	.9	.6	.5
19	302	2,520	108	11	10	.8	.6	.5
20	294	2,260	95	10	13	1.5	.5	.3
21	215	1,520	314	11	13	6	.5	.3
22	326	1,100	199	11	13	2.9	.3	.3
23	282	879	122	11	13	2.0	.3	.3
24	1,350	753	118	11	13	2.0	.2	.3
25	876	471	83	11	15	2.0	.2	.8
26	311	267	75	11	19	2.0	-----	1.4
27	194	423	70	11	22	1.9	-----	1.4
28	123	500	45	11	40	1.9	-----	1.4
29	98	215	-----	11	29	1.7	-----	.8
30	80	1,670	-----	11	16	1.7	-----	.8
31	111	939	-----	11	-----	1.5	-----	-----

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

Monthly discharge of Alameda Creek at Sunolglen, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
December.....	1,350	0	195	12,000
January.....	2,520	6	513	31,500
February.....	692	45	208	11,600
March.....	37	10	16.0	984
April.....	40	10	13.2	785
May.....	18	.8	7.02	432
June.....	1.5	0	.70	41.7
September.....	1.4	0	.66	39.3
The year.....	2,520	0	79.2	57,400

NOTE.—No flow during months for which no record is given.

ALAMEDA CREEK NEAR NILES, CALIF.

LOCATION.—In Niles Canyon, one-eighth mile below Southern Pacific Co.'s first bridge above Niles, one-fourth mile above highway bridge, and $1\frac{1}{4}$ miles northeast of Niles, Alameda County.

DRAINAGE AREA.—633 square miles (measured on topographic map by State Water Commission).

RECORDS AVAILABLE.—October 1, 1916, to September 30, 1921.

GAGE.—Water-stage recorder on right bank at highway water tank 1,800 feet above highway bridge.

DISCHARGE MEASUREMENTS.—Made from suspension footbridge 800 feet below gage or by wading.

CHANNEL AND CONTROL.—Gravel; not permanent. Banks are high; channel straight from gage to some distance below suspension bridge. Control at gage solid rock and boulders.

DIVERSIONS.—Spring Valley Water Co. obtains water from the gravels at lower end of Livermore Valley, above station. See Spring Valley Water Co.'s aqueduct near Sunolglen. Water, for irrigation is diverted on right bank at Niles dam about 1 mile above station.

REGULATION.—Spring Valley Water Co. has, under construction, a large storage reservoir on Calaveras Creek. Water was released from Calaveras reservoir during periods of natural flow.

ACCURACY.—Stage-discharge relation permanent during year. Rating curve well defined. Water stage recorder operated satisfactorily during period of record: Daily discharge ascertained by applying mean daily gage height to rating table except December 11, 19, 24, January 17, 30, and April 28 when hourly discharge was averaged. Records excellent.

Discharge measurements of Alameda Creek near Niles, Calif., during the year ending Sept. 30, 1921

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>
Jan. 7	R. C. Briggs.....	1.29	42	Mar. 14	Briggs and Kelley.....	1.18	34
25	K. M. Kelley.....	2.77	515	14	do.....	1.18	32
25	do.....	2.44	362	22	K. M. Kelley.....	1.05	19
Feb. 1	do.....	3.12	775	June 15	H. D. McGlashan.....	.60	2.2
1	do.....	3.06	663				

Daily discharge, in second-feet, of Alameda Creek near Niles, Calif., for the year ending Sept. 30, 1921

Day	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1		94	804	58	13	33	4.2	1.4	0.3	1.7
2		76	652	51	14	34	4.2	1.1	.3	2.0
3		62	415	42	13	33	4.2	.5	.3	2.2
4		55	355	35	12	34	4.2	.5	.3	1.8
5		47	550	35	12	34	3.8	.4	.3	1.3
6		46	470	42	12	34	3.2	.4	.3	1.2
7		41	382	35	10	34	2.8	.3	.3	1.1
8		35	328	28	10	33	2.2	.3	.3	1.5
9		35	38	266	24	10	31	2.2	.3	1.5
10	195	32	116	21	11	30	1.8	.6	.3	1.2
11	303	28	103	19	11	29	1.7	.6	.3	1.0
12	278	29	90	18	12	28	1.6	.6	.3	1.0
13	192	17	74	25	12	29	1.6	.4	.2	.9
14	161	18	109	31	12	14	2.0	.4	.2	.9
15	164	12	144	28	10	8	2.4	.4	.2	.8
16	216	6	131	23	9.5	6	2.8	.4	.2	.9
17	223	100	144	20	9	5	2.6	.4	.2	.8
18	209	2,520	156	17	8.5	5	2.0	.4	.2	.7
19	397	3,200	134	15	9	4.5	2.3	.4	.2	.7
20	373	2,900	114	14	17	6	2.3	.4	.2	.5
21	278	1,850	278	14	28	10	2.0	.4	.2	.5
22	405	1,380	294	18	31	9	1.5	.3	.2	.9
23	382	1,100	209	21	33	6	1.4	.3	.2	.9
24	1,680	881	173	19	35	5	1.3	.3	.2	1.1
25	1,140	525	116	17	34	4.8	1.5	.3	.2	1.5
26	400	302	90	16	36	4.2	1.4	.3	.3	2.6
27	230	500	83	15	44	4.0	1.4	.3	.3	2.6
28	156	510	69	15	54	3.5	1.5	.3	.2	3.0
29	114	223		15	43	3.8	1.6	.3	.3	3.2
30	90	2,110		14	36	4.0	1.6	.3	.3	2.9
31	118	1,100		14		4.2		.3	1.3	

NOTE.—Water-stage recorder not in operation Oct. 1 to Dec. 10. Discharge Oct. 1 to Nov. 30 estimated to be about 0.5 second-foot. Discharge Dec. 1-9 not known but estimated as 35 second-feet for one day and assumed to have occurred on Dec. 9. Discharge Mar. 23-25 estimated from incomplete hydrograph.

Monthly discharge of Alameda Creek near Niles, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October			^a 0.5	30.7
November			^a .5	30
December	1,680		250	15,400
January	3,200	6	640	39,400
February	804	69	245	13,600
March	58	14	24.5	1,510
April	54	8.5	20.0	1,190
May	34	3.5	16.9	1,040
June	4.2	1.3	2.31	137
July	1.4	.3	.44	27.1
August	1.3	.2	.29	17.8
September	3.2	.5	1.43	85.1
The year	3,200	.2	99.9	72,500

^a Estimated.

SPRING VALLEY WATER CO.'S AQUEDUCT NEAR SUNOLGLEN, CALIF.

LOCATION.—In sec. 12, T. 4 S., R. 1 W., at Brightside weirs, 2½ miles west of Sunolglén, Alameda County.

RECORDS AVAILABLE.—April 6, 1903, to September 30, 1921.

GAGE.—Water-stage recorder in pool above the weirs.

DISCHARGE.—Computed from gage-height record showing head over four rectangular bronze weirs; each having a 30-inch crest.

EXTREMES OF DISCHARGE.—1903-1921: Maximum mean daily discharge reported, 47 second-feet March 21, 1914.

ACCURACY.—The weirs were very carefully installed and much care is exercised in their maintenance. There is no velocity of approach.

COOPERATION.—Records showing million gallons per day furnished by Spring Valley Water Co. through G. A. Elliott, chief engineer. Daily discharge converted into second-feet and monthly discharge computed by engineers of United States Geological Survey.

Daily discharge, in second-feet, of Spring Valley Water Co.'s aqueduct near Sunol-glen, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	32	32	31	31	33	33	32	33	33	33	33	34
2.....	33	32	31	31	32	33	32	34	33	33	33	34
3.....	32	33	31	21	32	33	33	34	33	34	33	33
4.....	31	32	31	31	33	33	33	34	33	34	33	34
5.....	32	33	31	31	28	33	33	33	33	34	33	33
6.....	32	32	32	32	25	33	33	33	33	34	33	34
7.....	32	32	32	31	33	33	33	33	33	34	33	34
8.....	32	32	32	31	33	33	33	33	33	34	34	34
9.....	31	32	31	31	32	33	33	33	33	34	34	34
10.....	31	32	32	31	32	33	33	34	33	33	33	33
11.....	30	32	32	31	32	33	33	34	33	33	34	32
12.....	32	32	31	31	32	33	33	33	33	33	33	31
13.....	32	32	31	32	33	33	33	33	33	33	33	32
14.....	32	32	32	32	32	33	34	34	33	33	33	33
15.....	32	32	31	34	33	33	32	34	33	33	33	34
16.....	32	32	32	33	33	33	32	34	33	33	33	34
17.....	32	32	31	34	33	33	32	33	33	33	33	34
18.....	32	31	22	33	33	33	32	34	33	33	33	33
19.....	32	31	30	32	33	33	33	34	33	33	33	33
20.....	32	32	31	3	33	33	33	34	33	34	33	33
21.....	32	31	32	11	33	32	33	33	34	33	33	33
22.....	30	31	32	33	33	33	33	33	34	33	33	34
23.....	26	31	32	33	33	33	33	33	34	33	33	33
24.....	24	30	32	33	33	33	33	32	34	33	34	33
25.....	20	32	28	33	34	32	34	31	33	33	33	33
26.....	12	32	22	33	33	31	33	33	33	33	34	33
27.....	30	31	31	33	33	31	33	33	34	33	33	34
28.....	32	31	31	33	33	33	34	33	33	33	33	34
29.....	32	31	31	33	-----	33	34	33	34	34	34	33
30.....	31	31	32	32	-----	33	34	33	34	33	33	34
31.....	32	-----	31	33	-----	33	-----	33	-----	33	34	-----

Monthly discharge of Spring Valley Water Co.'s aqueduct near Sunol-glen, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	33	12	30.2	1,860
November.....	33	30	31.7	1,890
December.....	32	22	30.7	1,890
January.....	34	.3	30.4	1,870
February.....	34	25	32.3	1,790
March.....	33	31	32.8	2,020
April.....	34	32	33.0	1,960
May.....	34	31	33.3	2,050
June.....	34	33	33.2	1,980
July.....	34	33	33.3	2,050
August.....	34	33	33.3	2,050
September.....	34	31	33.3	1,980
The year.....	34	.3	32.3	23,400

KERN RIVER BASIN**KERN RIVER NEAR KERNVILLE, CALIF.**

LOCATION.—In SE. $\frac{1}{4}$ sec. 14, T. 23 S., R. 32 E., at base of Fairview Mountain, 1 mile below intake of Kern River No. 3 canal, in Tulare County, in Kern National Forest, 3 miles above Salmon Creek, and 15 miles north of Kernville, Kern County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—January 1, 1912, to September 30, 1921.

GAGE.—Water-stage recorder on left bank 1 mile above mouth of Tobias Creek. Original gage was vertical staff in three sections fastened to overhanging willow tree on left bank 160 feet above recorder. From April 1 to September 14, 1913, readings were taken from a temporary staff in two sections located one-fourth mile upstream. The readings were reduced to the original datum by a relation curve. The first gage was replaced March 17, 1914, by a vertical staff in two sections, 7 feet downstream from the original one, on the same bank and at the same datum. The recorder was installed September 15, 1913, in the same pool and at the same datum.

DISCHARGE MEASUREMENTS.—Made from cable 90 feet below recorder or by wading.

CHANNEL AND CONTROL.—Coarse gravel and boulders; practically permanent.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 3.98 feet at 8 a. m. June 8 (discharge, 3,000 second-feet); minimum stage, —0.70 foot at the dam at 6 a. m. July 27 (discharge, 0.4 second-foot).

1912–1921: Maximum stage recorded, 8.8 feet, from water-stage recorder, at 4 p. m. January 17, 1916 (discharge, 9,690 second-feet); minimum stage, —0.70 foot at the dam at 6 a. m. July 27, 1921 (discharge, 0.4 second-foot).

DIVERSIONS.—Kern River No. 3 canal diverts water for power about 1 mile above station. The water is returned to the river at the power house about 8 miles below station.

REGULATION.—Complete regulation by the canal at stages below capacity of canal.

ACCURACY.—Stage-discharge relation permanent. Rating curve well defined. Water-stage recorder operated satisfactorily to July 12 when water fell below intake pipe. Staff gage on dam read frequently during day, July 13 to August 6; staff gage at recorder read once daily August 7 to September 30. Daily discharge ascertained by applying mean daily gage height to rating table except July 14–21 and July 26 to August 6, when discharge was ascertained by applying mean daily gage height at the dam to rating table developed for the dam. Records good.

COOPERATION.—Station maintained in cooperation with Southern California Edison Co. through H. W. Dennis, construction engineer.

Discharge measurements of Kern River near Kernville, Calif., during the year ending Sept. 30, 1921

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. 23	William Kessler.....	—0.05	298	Aug. 7	H. J. Tompkins.....	—2.40	3.0
Feb. 12	O. W. Bauer.....	.40	413	7	O. W. Bauer.....	—2.39	2.7
15	do.....	.26	377	7	H. J. Tompkins.....	a— .13	3.0
June 14	H. J. Tompkins.....	2.91	1,760	9	R. C. Briggs.....	—2.24	6.9
July 25	do.....	a—.03	4.6	11	O. W. Bauer.....	—2.38	2.3
Aug. 5	O. W. Bauer.....	—2.49	1.6	14	do.....	—2.21	7.0
7	do.....	—2.42	2.4	15	do.....	—2.11	9.9

^a Gage height at the dam, measurement made in the fishway.

Daily discharge, in second-feet, of Kern River near Kernville, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	198	248	240	275	310	608	424	1,040	700	630	2.3	6
2.....	198	245	255	278	310	630	488	980	860	652	2.0	6
3.....	196	245	232	278	285	700	525	950	775	585	1.8	6
4.....	194	242	236	278	308	675	435	890	830	428	2.0	6
5.....	190	240	236	260	325	652	391	725	1,080	300	2.2	6
6.....	198	224	236	262	290	608	349	630	1,600	260	4.4	6
7.....	245	230	240	252	285	545	328	525	2,170	250	3.0	8
8.....	230	255	236	240	312	545	322	470	2,600	240	5.5	7.5
9.....	232	255	234	245	315	505	340	435	2,400	204	7	8.5
10.....	255	252	258	238	328	470	310	585	2,500	172	5	8
11.....	240	265	260	214	370	545	315	652	2,600	165	3.2	9
12.....	234	270	240	222	407	545	290	890	2,600	129	3.4	9
13.....	245	260	222	252	435	725	315	1,140	2,120	70	7.5	9
14.....	216	252	258	250	435	675	272	1,280	1,810	5	7.5	8
15.....	232	275	258	245	382	585	240	1,440	1,480	4.2	7.5	8
16.....	234	320	252	245	358	585	268	1,440	1,010	4.3	8	7.5
17.....	226	310	245	275	379	608	258	1,080	802	4.2	7.5	7.5
18.....	248	305	242	361	335	630	265	802	630	2.2	7	8.5
19.....	270	290	268	312	335	608	292	608	525	1.9	6.5	8.5
20.....	238	285	242	278	335	545	310	585	652	1.7	8	7.5
21.....	262	268	248	300	364	488	382	700	920	3.0	7	7.5
22.....	272	262	290	305	340	435	505	630	1,080	666	6.5	8
23.....	270	250	280	295	346	414	630	630	1,140	725	7	8
24.....	278	248	295	272	382	545	545	630	1,080	545	7.5	8.5
25.....	285	240	298	290	432	565	452	630	980	120	8.5	8
26.....	278	240	272	290	452	585	470	802	920	2.0	7	8
27.....	275	255	270	292	505	585	505	1,140	800	1.4	5.5	8
28.....	270	242	278	292	545	545	630	1,240	800	1.8	5.5	8
29.....	265	238	285	270	-----	585	775	1,280	860	1.8	5.5	8.5
30.....	262	240	285	310	-----	630	980	890	652	2.4	5.5	8.5
31.....	258	-----	288	272	-----	505	-----	700	-----	1.8	5.5	-----

NOTE.—Kern River No. 3 canal started to divert water Mar. 7. See combined flow for total flow of river, page 120.

Monthly discharge of Kern River near Kernville, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	285	190	242	14,900
November.....	320	224	258	15,400
December.....	298	222	257	15,800
January.....	361	214	272	16,700
February.....	545	285	365	20,300
March.....	725	414	576	35,400
April.....	980	240	420	25,000
May.....	1,440	435	850	52,300
June.....	2,600	525	1,310	78,000
July.....	725	1.4	199	12,200
August.....	8.5	1.8	5.56	342
September.....	9	6	7.70	458
The year.....	2,600	1.4	396	287,000

NOTE.—Kern River No. 3 canal started to divert water March 7. See combined flow for total flow of river, page 120.

Combined daily discharge, in second-feet, of Kern River and Kern River No. 3 canal near Kernville, Calif., for the year ending Sept. 30, 1921

Day	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	608	682	1,510	1,310	1,250	363	264
2.....	630	705	1,450	1,470	1,270	351	308
3.....	700	762	1,420	1,380	1,200	339	367
4.....	675	672	1,400	1,440	1,050	327	308
5.....	652	671	1,320	1,690	920	315	275
6.....	608	662	1,210	2,210	880	306	264
7.....	565	641	1,060	2,780	870	305	255
8.....	545	635	1,080	3,210	860	308	244
9.....	537	653	1,040	3,010	824	332	226
10.....	541	623	1,110	3,090	792	354	225
11.....	545	628	1,260	3,180	785	340	226
12.....	545	603	1,500	3,180	749	340	226
13.....	725	628	1,770	2,700	690	332	226
14.....	675	585	1,910	2,400	639	320	225
15.....	585	565	2,050	2,100	638	310	225
16.....	585	581	2,050	1,630	652	288	224
17.....	608	571	1,690	1,420	638	276	214
18.....	669	578	1,410	1,260	608	276	215
19.....	634	605	1,210	1,160	580	264	216
20.....	571	623	1,190	1,290	552	277	214
21.....	528	695	1,310	1,540	623	266	214
22.....	491	818	1,240	1,700	885	266	205
23.....	498	943	1,240	1,760	725	298	195
24.....	555	858	1,240	1,700	615	288	196
25.....	565	747	1,240	1,600	670	278	195
26.....	585	786	1,410	1,540	512	265	186
27.....	585	862	1,750	1,510	422	264	177
28.....	595	1,030	1,820	1,510	387	264	177
29.....	595	1,220	1,600	1,480	363	264	186
30.....	644	1,410	1,470	1,270	363	264	186
31.....	595	-----	1,290	-----	363	264	-----

NOTE.—Kern River No. 3 canal started to divert water Mar. 7. Daily discharge Oct. 1 to Mar. 6 is same as for the river alone; see page 119.

Combined monthly discharge of Kern River and Kern River No. 3 canal near Kernville, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	285	190	242	14,900
November.....	320	224	258	15,400
December.....	298	222	257	15,800
January.....	361	214	272	16,700
February.....	545	285	365	20,300
March.....	725	491	595	36,600
April.....	1,410	565	735	43,700
May.....	2,050	1,040	1,430	87,900
June.....	3,210	1,160	1,920	114,000
July.....	1,270	363	722	44,400
August.....	363	264	300	18,400
September.....	367	177	229	13,600
The year.....	3,210	177	610	442,000

KERN RIVER NEAR BAKERSFIELD, CALIF.

LOCATION.—In sec. 2, T. 29 S., R. 28 E., at mouth of lower canyon, 5 miles northeast of Bakersfield, Kern County.

DRAINAGE AREA.—2,345 square miles.

RECORDS AVAILABLE.—January 1, 1894, to June 30, 1907, and March 1, 1908, to September 30, 1921.

GAGE.—Water-stage recorder at footbridge.

DISCHARGE MEASUREMENTS.—Made from footbridge at gage.

CHANNEL AND CONTROL.—Shifting sand.

EXTREMES OF DISCHARGE.—1896-1921: Maximum discharge, 18,287 second-feet, January 26, 1914; minimum discharge, 80 second-feet, September 15, 1898.

DIVERSIONS.—Several small diversions on main river and South Fork for irrigation. Water diverted near Kernville for power development is returned to the river above the station.

REGULATION.—No information.

COOPERATION.—Complete record, except run-off in acre-feet, furnished by Kern County Land Co., through A. K. Warren, engineer.

Daily discharge, in second-feet, of Kern River near Bakersfield, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	216	303	306	413	458	762	813	1,456	1,630	1,393	414	233
2	217	308	320	410	426	843	837	1,562	1,573	1,356	405	232
3	219	293	338	397	434	895	882	1,525	1,721	1,344	392	234
4	210	287	325	392	435	965	957	1,495	1,636	1,287	379	258
5	201	278	302	395	433	976	933	1,363	1,652	1,149	356	280
6	198	270	326	390	465	932	877	1,481	1,970	1,020	347	257
7	203	265	305	381	463	919	825	1,281	2,454	951	340	236
8	219	261	312	363	441	882	804	1,207	2,959	917	329	227
9	243	291	312	323	435	856	797	1,194	3,175	862	332	224
10	232	298	304	354	470	858	799	1,160	3,128	831	337	224
11	244	303	320	352	495	885	777	1,181	3,235	825	347	228
12	251	306	325	308	536	909	780	1,301	3,247	834	346	225
13	245	320	334	300	604	970	747	1,547	3,122	813	329	214
14	258	329	300	320	671	1,162	758	1,781	2,653	780	307	211
15	262	330	312	329	696	1,081	735	1,940	2,346	739	288	211
16	246	329	325	317	662	966	720	2,063	2,041	712	280	197
17	264	369	326	323	612	897	711	1,988	1,715	686	268	193
18	268	419	328	341	604	915	703	1,724	1,531	690	258	187
19	278	413	326	427	580	962	704	1,524	1,353	667	253	189
20	325	404	349	469	558	989	724	1,570	1,253	619	244	193
21	305	384	343	448	566	937	765	1,578	1,359	568	235	201
22	306	388	324	427	597	898	833	1,656	1,609	566	228	202
23	325	361	340	432	617	876	966	1,664	1,786	611	227	194
24	326	366	365	439	606	833	1,094	1,726	1,778	699	237	189
25	333	347	373	420	621	811	1,089	1,804	1,741	668	249	183
26	344	341	386	397	651	854	986	1,872	1,657	703	240	188
27	339	327	386	391	681	869	969	1,918	1,613	622	230	188
28	337	322	369	393	707	862	1,003	2,115	1,602	533	229	185
29	325	311	367	403	-----	817	1,168	2,059	1,594	471	224	184
30	318	303	388	407	-----	781	1,321	1,958	1,564	432	225	183
31	310	-----	402	399	-----	772	-----	1,769	-----	414	234	-----

Monthly discharge of Kern River near Bakersfield, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	349	196	270	16,600
November	427	252	328	19,500
December	404	274	337	20,700
January	480	268	383	23,600
February	730	422	554	30,800
March	1,202	730	901	55,400
April	1,437	695	869	51,700
May	2,222	1,130	1,628	106,000
June	3,548	1,201	2,023	120,000
July	1,440	399	799	49,100
August	425	221	294	18,100
September	297	180	212	12,600
The year	3,548	180	716	518,000

NOTE.—Maximum and minimum are absolute values determined from the water-stage recorder graph. Run-off in acre-feet computed by engineers of United States Geological Survey.

KERN RIVER NO. 3 CANAL NEAR KERNVILLE, CALIF.

LOCATION.—In S. $\frac{1}{2}$ sec. 12, T. 23 S., R. 32 E., at intake 16 miles above Kernville, Kern County.

RECORDS AVAILABLE.—March 7 to September 30, 1921.

GAGE.—Gage heights obtained by measuring down from a reference point on right bank a short distance below the sand box at the intake.

DISCHARGE MEASUREMENTS.—Made from a plank across canal a short distance below the gage.

CHANNEL AND CONTROL.—A straight stretch of concrete-lined open canal and a tunnel act as control.

EXTREMES OF DISCHARGE.—Maximum mean daily discharge recorded during the period 648 second-feet, July 16; canal was dry March 8, 11–17, 25–27, and July 23.

ACCURACY.—Stage-discharge relation probably permanent during the period. Rating curve fairly well defined. Gage read to half-tenths frequently during day and mean gage height determined. Daily discharge ascertained by applying mean daily gage height to rating table. Records good.

Discharge measurements of Kern River No. 3 canal near Kernville, Calif., during the year ending Sept. 30, 1921

Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>
June 15	H. J. Tompkins.....	7.16	620
Aug. 9	R. C. Briggs.....	4.83	329

Daily discharge, in second-feet, of Kern River No. 3 canal near Kernville, Calif., for the year ending Sept. 30, 1921

Day	Mar.	Apr.	May	June	July	Aug.	Sept.
1		258	471	606	620	361	258
2		217	471	606	620	349	302
3		237	471	606	620	337	361
4		237	510	606	620	325	302
5		280	592	606	620	313	269
6		313	578	606	620	302	258
7	20	313	536	606	620	302	247
8	0	313	606	606	620	302	237
9	32	313	606	606	620	325	217
10	71	313	606	592	620	349	217
11	0	313	606	578	620	337	217
12	0	313	606	578	620	337	217
13	0	313	634	578	620	325	217
14	0	313	634	592	634	313	217
15	0	325	606	620	634	302	217
16	0	313	606	620	648	280	217
17	0	313	606	620	634	269	207
18	39	313	606	634	606	269	207
19	26	313	606	634	578	258	217
20	26	313	606	634	550	269	207
21	40	313	606	620	620	269	207
22	56	313	606	620	219	269	197
23	84	313	606	620	0	291	187
24	10	313	606	620	70	280	187
25	0	295	606	620	550	269	187
26	0	316	606	620	510	258	178
27	0	357	606	620	421	258	169
28	50	397	578	620	385	258	169
29	10	445	325	620	361	258	178
30	14	433	578	620	361	258	178
31	90		592		361	258	

NOTE.—Canal started to divert water Mar. 7.

Monthly discharge of Kern River No. 3 canal near Kernville, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
March.....	90	0	18.3	1,130
April.....	445	217	314	18,700
May.....	634	325	577	35,500
June.....	634	578	611	36,400
July.....	648	0	523	32,200
August.....	361	258	295	18,100
September.....	361	169	222	13,200
The period.....				155,000

SOUTH FORK OF KERN RIVER NEAR ONYX, CALIF.

LOCATION.—In NE. $\frac{1}{4}$ SW. $\frac{1}{4}$ sec. 24, T. 25 S., R. 35 E., three-fourths mile north of Kernville-Walker Pass road, on Rankin ranch, 5 miles northeast of Onyx, Kern County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—September 12, 1911, to August 31, 1914; January 23, 1919, to September 30, 1921.

GAGE.—Water-stage recorder at same site as United States Geological Survey gage used in 1914.

DISCHARGE MEASUREMENTS.—Made from cable 60 feet below gage or by wading.

CHANNEL AND CONTROL.—Sand and fine gravel; fairly permanent.

EXTREMES OF DISCHARGE.—Maximum mean daily discharge reported during the year, 349 second-feet May 25; minimum mean daily discharge, 3 second-feet August 21–26.

1911–1914; 1919–1921: Maximum stage recorded, 7.1 feet January 25, 1914 (discharge, 2,360 second-feet); minimum mean daily discharge, 3 second-feet August 21–26, 1921.

DIVERSIONS.—Three small irrigation ditches head above station.

ACCURACY.—Stage-discharge relation fairly permanent. Rating curves well defined.

COOPERATION.—Mean daily discharge record and some measurements furnished by city of Los Angeles.

Discharge measurements of South Fork of Kern River near Onyx, Calif., during the year ending Sept. 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	Sec.-ft.			Feet	Sec.-ft.
Oct. 13	J. E. Jones.....	1.28	30	Mar. 16	J. E. Jones.....	2.32	167
Nov. 12	do.....	1.50	40	June 15	H. J. Tompkins.....	1.98	118
Dec. 22	do.....	1.46	38	Aug. 8	R. C. Briggs.....	1.05	14

Daily discharge, in second-feet, of South Fork of Kern River near Onyx, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Dec.	Jan.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	17	40	41	51	57	111	220	146	195	58	15	5
2	17	39	42	53	57	117	225	144	186	60	15	6
3	18	38	46	49	55	132	259	138	184	41	15	10
4	18	39	44	46	60	150	232	137	184	41	13	15
5	17	40	44	49	62	155	184	138	182	40	14	13
6	17	40	35	47	55	153	156	143	178	40	15	14
7	17	38	37	43	53	147	149	146	174	40	7	15
8	19	38	39	44	58	141	153	141	174	44	8	15
9	21	33	39	45	61	138	162	141	158	40	8	15
10	18	33	47	39	68	137	155	133	150	37	9	15
11	23	34	47	40	71	137	156	127	147	36	12	7
12	26	39	41	38	86	152	141	124	138	33	13	6
13	28	49	45	46	86	182	143	124	132	32	14	6
14	28	51	35	59	88	174	144	127	132	31	12	6
15	29	47	40	54	83	158	131	125	131	32	11	6
16	30	58	45	55	74	150	125	124	132	32	10	6
17	28	53	44	55	84	156	117	121	133	23	10	7
18	27	54	39	67	78	189	118	121	135	22	10	16
19	27	56	43	56	79	212	124	121	104	21	10	13
20	26	57	34	47	84	191	138	121	104	21	10	12
21	24	56	32	61	80	178	149	135	105	21	3	12
22	31	54	43	56	79	164	162	193	104	22	3	12
23	35	49	51	52	79	147	180	266	103	26	3	12
24	39	44	49	58	80	146	174	293	103	26	3	13
25	40	41	46	43	84	173	152	349	103	24	3	16
26	41	40	52	50	91	187	144	315	83	23	3	15
27	40	42	51	51	95	182	141	275	68	23	4	15
28	42	45	53	49	101	176	143	249	66	24	6	15
29	43	43	56	43	-----	180	144	225	64	24	5	15
30	43	39	55	56	-----	193	146	212	62	28	5	16
31	41	-----	56	55	-----	203	-----	203	-----	15	5	-----

Monthly discharge of South Fork of Kern River near Onyx, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	43	17	28.1	1,730
November	58	33	44.3	2,640
December	56	32	44.2	2,720
January	67	38	50.2	3,090
February	101	53	74.6	4,140
March	212	111	162	9,960
April	259	117	159	9,460
May	349	121	173	10,600
June	195	62	130	7,740
July	60	15	31.6	1,940
August	15	3	8.84	544
September	16	5	11.6	690
The year	349	3	76.3	55,300

TULARE LAKE BASIN

DEER CREEK AT HOT SPRINGS, CALIF.

LOCATION.—Below footbridge at forest supervisor's headquarters in Sequoia National Forest, half a mile below Hot Springs, Tulare County. Tyler Creek enters $2\frac{1}{2}$ miles below station.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—October 7, 1910, to September 30, 1921.

GAGE.—Vertical staff fastened to an alder tree on left bank, 30 feet below foot-bridge; read by employees of United States Forest Service.

DISCHARGE MEASUREMENTS.—Made from highway bridge, 100 feet below gage or by wading.

CHANNEL AND CONTROL.—Sand, gravel, and boulders; fairly permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 1.40 feet March 13 (discharge, 55 second-feet); minimum stage not known but probably less than 2.0 second-feet during October.

1910-1921: Maximum stage recorded, 4.5 feet at 4 p. m. January 27, 1916 (discharge, from extension of rating curve, 540 second-feet); minimum stage recorded, 0.30 foot August 5-12, 1920 (discharge, 0.6 second-foot).

DIVERSIONS.—Water is diverted for irrigation above station.

REGULATION.—No information.

ACCURACY.—Stage-discharge relation changed March 12. Rating curves fairly well defined between 2 and 40 second-feet and extended above. Gage read to hundredths once daily. Daily discharge ascertained by applying mean daily gage height to rating table. Discharge during period of no record, October 1 to November 30, estimated in monthly table.

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

Discharge measurements of Deer Creek at Hot Springs, Calif., during the year ending Sept. 30, 1921

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
Nov. 17	William Kessler.....	<i>Feet.</i> 0.55	<i>Sec.-ft.</i> 4.0	Feb. 28	R. C. Briggs.....	<i>Feet</i> 0.80	<i>Sec.-ft.</i> 14
Feb. 28	R. C. Briggs.....	.78	11	Aug. 12	do.....	.40	3.0

Daily discharge, in second-feet, of Deer Creek at Hot Springs, Calif., for the year ending Sept. 30, 1921

Day	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	3.5	6	6.5	13	22	25	25	12	5.5	3.0
2.....	8	5	6	14	22	25	25	12	5.5	2.6
3.....	4.5	4.5	6	15	22	24	25	12	5.5	2.2
4.....	4.5	4.5	6	15	21	24	25	12	5.5	2.2
5.....	4.5	4.0	11	14	20	22	24	11	3.8	2.6
6.....	4.0	4.0	6.5	14	20	26	24	11	3.8	2.6
7.....	4.0	3.5	7.5	15	20	25	22	9.5	5.5	3.0
8.....	4.5	3.5	6	13	20	23	22	9.5	4.3	2.6
9.....	4.5	3.0	6	13	21	22	21	9	3.8	3.0
10.....	6.5	3.5	6.5	12	21	22	21	8.5	3.8	2.6
11.....	7.5	3.5	8	11	20	22	21	8.5	3.0	3.0
12.....	8	3.0	10	16	21	23	21	8	3.4	3.0
13.....	4.5	3.0	10	55	20	23	21	7	3.8	3.0
14.....	4.5	3.5	11	40	18	23	21	6.5	2.2	3.4
15.....	4.5	3.5	6	33	18	23	21	7	2.6	3.0
16.....	5	3.5	7.5	26	18	23	21	8	2.2	3.4
17.....	5	10	9.5	26	20	23	20	8	3.0	3.0
18.....	5.5	6.5	8.5	26	21	23	18	7	1.9	2.6
19.....	5.5	4.5	8.5	26	21	23	16	5.5	2.2	3.0
20.....	5.5	5	11	24	21	25	16	6	3.0	3.0
21.....	5.5	4.5	13	24	21	47	15	8.5	2.6	3.0
22.....	5.5	4.5	12	23	21	33	16	14	2.2	3.4
23.....	5.5	4.0	10	21	22	33	15	7	2.6	3.4
24.....	13	4.0	10	21	24	33	15	6.5	2.2	3.0
25.....	10	5	13	22	23	30	15	6.5	2.2	2.6
26.....	6.5	5.5	14	21	21	30	15	4.8	1.9	3.0
27.....	6	8.5	14	20	21	29	15	6	2.2	3.0
28.....	6.5	6.5	13	20	21	29	15	4.8	1.9	3.0
29.....	6.5	8	-----	20	23	27	15	4.8	2.2	3.0
30.....	6	10	-----	20	24	26	14	5.5	2.2	1.9
31.....	6	9.5	-----	21	-----	26	-----	5.5	2.2	-----

NOTE.—No gage-height record October and November; estimated mean discharge given in monthly discharge table.

Monthly discharge of Deer Creek at Hot Springs, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....			a 2.0	123
November.....			a 4.0	238
December.....	13	3.5	5.84	356
January.....	10	3.0	5.08	312
February.....	14	6	9.18	510
March.....	55	11	21.1	1,300
April.....	24	18	20.9	1,240
May.....	47	22	26.2	1,610
June.....	25	14	19.3	1,150
July.....	14	4.8	8.13	500
August.....	5.5	1.9	3.18	196
September.....	3.4	1.9	2.87	171
The year.....	55		10.7	7,710

a Estimated.

TULE RIVER NEAR PORTERVILLE, CALIF.

LOCATION.—In NW. $\frac{1}{4}$ NW. $\frac{1}{4}$ sec. 25, T. 21 S., R. 28 E., below highway bridge near McFarland ranch, 1 mile above mouth of South Fork, and 6 miles east of Porterville, Tulare County. North and Middle forks of Tule River unite 9 miles above station.

DRAINAGE AREA.—266 square miles.

RECORDS AVAILABLE.—May 1, 1901, to September 30, 1921.

GAGE.—Vertical staff in four sections on right bank 75 feet below bridge. Original gage was on same bank 200 feet below bridge and at same datum. There have been several changes in the number and kinds of staff sections but the same datum has been maintained. Gage read by G. B. Kieffer.

DISCHARGE MEASUREMENTS.—Made from bridge above gage or by wading.

CHANNEL AND CONTROL.—Gravel and small boulders; shift slightly during high water. Left bank low and wooded; subject to overflow above a stage of about 6 feet.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 3.65 feet at 6.30 a. m. March 14 (discharge, 657 second-feet); minimum stage 0.15 foot September 7–12 (discharge, 0.6 second-foot).

1901–1921: Maximum stage recorded, 11.0 feet at 11.30 a. m. January 17, 1916 (discharge, determined from extension of rating curve, about 6,780 second-feet); minimum stage September 2–13, 1919 (discharge, 0.05 second-foot).

DIVERSIONS.—Several small irrigation ditches divert water above station.

REGULATION.—Power is developed on the Middle Fork and on the North and South forks of the Middle Fork.

ACCURACY.—Stage-discharge relation not changed during year. Rating curve fairly well defined below 3,000 second-feet; extended above. Gage read to hundredths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table. Records good.

Discharge measurements of Tule River near Porterville, Calif., during the year ending Sept. 30, 1921

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	William Kessler.....	1.38	62	May 10	R. C. Briggs.....	2.15	181
Feb. 27	R. C. Briggs.....	2.35	220	June 18	do.....	1.93	126
Apr. 5	do.....	2.13	183	Aug. 11	do.....	.25	1.4

Daily discharge, in second-feet, of Tule River near Porterville, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	3.2	19	27	64	110	248	193	248	214	46	42	0.8
2.....	4.2	20	48	61	98	248	193	236	214	42	38	.8
3.....	4.8	18	38	58	97	248	214	214	214	39	29	.8
4.....	4.2	18	33	55	93	248	193	204	214	39	25	.8
5.....	3.4	18	34	54	126	214	173	193	193	33	23	.7
6.....	4.0	18	33	52	143	214	164	225	225	30	1.9	.7
7.....	5	19	31	53	119	214	154	193	260	28	1.7	.6
8.....	6	21	33	54	107	193	150	183	248	25	1.6	.6
9.....	6.5	23	38	52	106	193	154	193	236	21	1.3	.6
10.....	7.5	24	40	50	106	173	140	183	214	20	1.3	.6
11.....	9.5	26	49	46	126	164	147	193	214	19	1.2	.6
12.....	10	28	65	45	173	193	140	204	193	18	1.0	.6
13.....	13	28	50	46	193	376	136	236	183	16	1.2	.7
14.....	13	26	39	46	260	565	149	273	164	16	1.2	.7
15.....	10	28	38	45	236	344	134	260	154	14	1.2	.8
16.....	10	65	36	42	183	286	136	248	143	14	1.3	.7
17.....	10	49	36	46	173	273	133	225	150	14	1.3	.8
18.....	13	39	39	122	150	286	128	204	133	10	1.7	.8
19.....	28	35	40	183	143	273	136	183	112	10	1.4	.9
20.....	24	35	84	154	140	236	126	173	98	10	1.4	1.3
21.....	21	36	61	126	112	214	140	483	89	11	1.4	1.7
22.....	21	35	63	107	101	193	164	329	91	10	1.7	1.4
23.....	22	31	54	98	150	214	204	300	97	10	1.4	1.3
24.....	26	30	58	89	173	193	164	314	80	10	1.7	1.3
25.....	26	28	65	87	193	193	150	314	76	10	1.2	1.3
26.....	24	28	84	89	225	183	147	314	70	8	1.0	1.3
27.....	24	27	75	89	225	173	154	314	66	6.5	1.2	1.3
28.....	24	27	65	133	225	173	193	314	63	6.5	1.0	1.3
29.....	23	27	64	112	-----	173	225	273	56	5.5	1.0	1.3
30.....	22	27	66	112	-----	183	236	260	51	4.8	.9	1.6
31.....	20	-----	64	133	-----	183	-----	225	-----	4.6	.8	-----

Monthly discharge of Tule River near Porterville, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	28	3.2	14.3	879
November.....	65	18	28.4	1,690
December.....	84	27	50.0	3,070
January.....	183	42	80.7	4,960
February.....	260	93	153	8,500
March.....	565	164	234	14,400
April.....	236	126	162	9,640
May.....	483	173	249	15,300
June.....	260	51	150	8,930
July.....	46	4.6	17.8	1,090
August.....	4.2	.8	1.60	98.4
September.....	1.7	.6	.96	57.1
The year.....	565	.6	94.9	68,600

SOUTH FORK OF TULE RIVER NEAR PORTERVIL CALIF.

LOCATION.—Opposite Indian School in Tule Indian Reservation, 2 miles below mouth of Rocky Creek, 7 miles southeast of Success, 8 miles above junction with Tule River, and 14 miles southeast of Porterville, Tulare County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—October 10, 1910, to September 30, 1921.

GAGE.—Vertical staff on right bank 30 feet above pump house July 18, 1916, to June 30, 1920, and June 19, 1921, to September 30, 1921, read by employees of Indian Service. Original gage was a vertical staff fastened to an alder tree 100 feet above pump house at a different datum. A temporary gage 150 feet below pump house was used July 1, 1920, to June 18, 1921.

DISCHARGE MEASUREMENTS.—Made from cable $1\frac{1}{2}$ miles below gage or by wading.

CHANNEL AND CONTROL.—Rough; boulders and gravel; shift slightly during high water. Banks high and not subject to overflow.

EXTREMES OF DISCHARGE.—Maximum stage uncertain owing to poor gage readings; minimum stage recorded 0.8 foot August 18–26 (discharge, 2.6 second-foot).

1910–1921: Maximum stage recorded, 8 feet at 8 a. m. January 26, 1914 (discharge, determined from extension of rating curve, about 2,750 second-foot); minimum stage, 0.48 foot August 8–24 and September 14, 1918 (discharge, 0.7 second-foot).

DIVERSIONS.—Several small irrigation ditches, having a total capacity of about 12 second-feet, divert water above the station.

REGULATION.—None.

ACCURACY.—Stage-discharge relation changed March 14. Rating curve for temporary gage below pump house fairly well defined; curve for gage above pump house well defined. Gage apparently read occasionally from October 1 to May 9; read to half-tenths once daily May 10 to September 30. Daily discharge not ascertained for period October 1 to April 30. Daily discharge ascertained by applying gage height to rating table. Mean monthly discharge for months October to April estimated from flow of Tule River and from flow on certain days when record appeared reliable. Records poor October to May and fair June to September.

COOPERATION.—Gage-height record furnished by United States Indian Service.

Discharge measurements of South Fork of Tule River near Porterville, Calif., during the year ending Sept. 30, 1921

Gage	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	William Kessler.....	^a 2.50	31	May 10	R. C. Briggs.....	^a 2.60	49
Feb. 27	R. C. Briggs.....	^a 2.75	57	June 18	do.....	^a 2.50	36
Apr. 5	do.....	^a 2.60	49	Aug. 11	do.....	.91	4.3

^a Temporary gage 150 feet below pump house.

Daily discharge, in second-feet, of South Fork of Tule River near Porterville, Calif., for the year ending Sept. 30, 1921

Day	May	June	July	Aug.	Sept.	Day	May	June	July	Aug.	Sept.
1.....	56	56	18	6	3.3	16.....	46	36	9	4.0	4.0
2.....	56	46	18	6	4.0	17.....	46	36	9	4.0	4.0
3.....	56	46	18	6	3.3	18.....	46	36	9	2.6	4.0
4.....	56	46	18	6	4.0	19.....	36	32	9	2.6	4.0
5.....	56	46	13	6	3.3	20.....	36	32	9	2.6	3.3
6.....	56	46	13	6	3.3	21.....	118	32	9	2.6	4.0
7.....	46	46	13	4.0	3.3	22.....	76	28	9	2.6	3.3
8.....	46	46	13	4.0	3.3	23.....	66	24	9	2.6	4.0
9.....	46	46	13	4.0	3.3	24.....	66	24	6	2.6	4.0
10.....	46	46	9	4.0	3.3	25.....	66	24	6	2.6	4.0
11.....	46	46	9	4.0	3.3	26.....	56	24	6	2.6	3.3
12.....	46	46	9	4.0	3.3	27.....	56	24	6	4.0	3.3
13.....	46	36	9	4.0	3.3	28.....	56	24	6	4.0	3.3
14.....	46	36	9	4.0	3.3	29.....	56	18	6	4.0	3.3
15.....	46	36	9	4.0	3.3	30.....	56	18	6	2.6	3.3
						31.....	56	-----	6	4.0	3.3

NOTE.—Gage-height record unreliable Oct. 1 to Mar. 23, and gage read occasionally Mar. 27 to May 9. Daily discharge not ascertained; estimated mean discharge given in monthly-discharge table.

Monthly discharge of South Fork of Tule River near Porterville, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....			a 7	430
November.....			a 15	893
December.....			a 25	1,540
January.....			a 30	1,840
February.....			a 50	2,780
March.....			a 75	4,610
April.....			a 55	3,270
May.....	118	36	54.1	3,330
June.....	66	18	36.1	2,150
July.....	18	6	10.0	615
August.....	6	2.6	3.94	242
September.....	4.0	3.3	3.53	210
The year.....			30.3	21,900

a Estimated from floor of Tule River.

KAWAHA RIVER NEAR THREE RIVERS, CALIF.

LOCATION.—In SE. $\frac{1}{4}$ sec. 27, T. 17 S., R. 28 E., at J. O. Carter's ranch $1\frac{1}{4}$ miles southwest of Three Rivers, Tulare County. South Fork enters three-fourths of a mile above station and North Fork 3 miles above.

DRAINAGE AREA.—520 square miles.

RECORDS AVAILABLE.—April 29, 1903, to September 30, 1921.

GAGE.—Vertical and inclined staff in four sections on left bank a few feet above cable and one-fourth of a mile back of observer's house; read by Vickroy and Nice. Water-stage recorders were used from March 29 to August 7 at same site as staff gage. The original gage was installed by the United States Geological Survey at same location and datum. On December 5, 1912, the Weather Bureau gage was installed and for about two years the two gages were read interchangeably. October 19, 1914, the Geological Survey repaired the upper section of the Weather Bureau gage and used this gage to October 27, 1917, when the entire gage was rebuilt.

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

CHANNEL AND CONTROL.—Gravel and boulders; fairly permanent.

EXTREMES OF DISCHARGE.—Maximum stage during year, from water-stage recorder, 8.46 feet from 10 to 11 p. m., June 7 (discharge, 3,190 second-feet); minimum stage recorded, 4.70 feet September 22–30 (discharge, 36 second-feet).

1903–1921: Maximum stage recorded, 13.5 feet at 11 a. m.

January 17, 1916 (discharge, from extension of rating curve, about 14,700 second-feet); minimum stage recorded, 4.50 feet October 25, 26, 1918; September 3–5, 10–16, 20, and October 17–19, 1919 (discharge, 26 second-feet).

DIVERSIONS.—Several canals divert water above McKay Point and below Three Rivers. Capacity of these canals is about 135 second-feet with an annual diversion of about 35,000 second-feet.

REGULATION.—Power is developed on the Middle and East forks but effect is thought to be small.

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ACCURACY.—Stage-discharge relation changed June 10. Rating curves well defined between 40 and 4,000 second-feet; extended above. Gage read to half-tenths twice daily. Water-stage recorder record used March 29 to August 7. Daily discharge ascertained by applying mean daily gage height to rating table. Records poor, October 1 to March 28 owing to unreliability of gage-height record; excellent March 29 to September 30.

Discharge measurements of Kaweah River near Three Rivers, Calif., during the year ending Sept. 30, 1921

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. 19	William Kessler.....	5.20	157	May 12	R. C. Briggs.....	7.33	1,640
Mar. 1	R. C. Briggs.....	6.15	644	June 19	.....do.....	6.51	878
Apr. 1	.....do.....	6.33	716	Aug. 7	.....do.....	4.97	89
May 11	.....do.....	6.87	1,200				

Daily discharge, in second-feet, of Kaweah River near Three Rivers, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	66	128	102	172	300	644	780	1,820	1,250	745	118	39
2.....	59	134	102	157	300		860	1,600	1,400	745	112	52
3.....	66	134	115	172	300		900	1,500	1,250	675	106	62
4.....	62	142	128	151	280		745	1,500	1,400	570	96	52
5.....	71	128	128	142			675	1,300	1,710	480	94	52
6.....	71	142	134	157		640	605	1,160	1,820	480	86	49
7.....	84	142	151	163		710	570	980	2,190	450	77	49
8.....	76	151	163	163		710	605	940	2,450	422	72	49
9.....	123	157	151	157		780	675	980	2,320	395	72	49
10.....	115	157	142	172	390	780	605	1,200	2,450	395	72	44
11.....	102	142	128	182		745	640	1,500	2,320	395	72	44
12.....	115	128	160	182		710	605	1,710	2,190	345	72	44
13.....	163	134	130	157		1,400	640	1,940	1,820	300	72	44
14.....	163	142	128	151		1,710	570	2,060	1,600	280	62	44
15.....	128	151	142	142	640	1,710	540	2,060	1,400	280	62	44
16.....	115	151	128	128	640	1,710	540	1,820	1,060	280	62	44
17.....	102	157	151	150	605	1,300	540	1,500	980	259	52	44
18.....	98	182	163	860	540	1,110	540	1,200	900	240	52	44
19.....	80	157	163	860	450	1,060	640	1,020	940	226	52	44
20.....	215	188	205	370	450	1,020	605	1,020	1,060	212	52	49
21.....	205	188	182	395	450	940	780	1,500	1,200	229	52	44
22.....	188	205	182	370	422	940	1,060	1,300	1,300	240	52	39
23.....	195	195	195	300	395	780	1,300	1,250	1,200	215	52	36
24.....	188	157	182	300	395	710	980	1,400	1,160	197	52	36
25.....	172	128	182	259	395	640	820	1,400	1,020	179	49	36
26.....	157	102	182	280	510	640	860	1,710	980	176	49	36
27.....	157	123	172	300	510	640	1,160	1,820	980	160	44	36
28.....	172	123	182	345	480	605	1,500	1,710	940	147	44	36
29.....	157	128	188	345		605	1,710	1,600	860	138	49	36
30.....	142	123	195	345		675	1,820	1,300	745	129	44	36
31.....	134		172	322		675		1,110		120	44	

NOTE.—Discharge estimated Dec. 12, 13, Jan. 17, Feb. 5-14, and Mar. 1-5, by comparison with records for North Fork, South Fork, and McKay Point.

Monthly discharge of Kaweah River near Three Rivers, Calif., for the year ending Sept. 30, 1921

[Drainage area, 520 square miles]

Month	Discharge in second-feet				Run-off	
	Maximum	Minimum	Mean	Per square mile	Inches	Acre-feet
October.....	215	59	127	0.244	0.28	7,810
November.....	205	102	147	.283	.32	8,750
December.....	205	102	156	.300	.35	9,590
January.....	860	128	269	.517	.60	16,500
February.....			427	.821	.85	23,700
March.....	1,710		890	1.71	1.97	54,700
April.....	1,820	540	829	1.59	1.77	49,300
May.....	2,060	940	1,450	2.79	3.22	89,200
June.....	2,450	745	1,430	2.75	3.07	85,100
July.....	745	120	326	.627	.72	20,000
August.....	118	44	66.0	.127	.15	4,060
September.....	62	36	43.8	.084	.09	2,610
The year.....	2,450	36	513	.987	13.39	371,000

KAWEAH RIVER AT MCKAY POINT, NEAR LEMON COVE, CALIF.

LOCATION.—On line between secs. 3 and 4, T. 17 S., R. 27 E., at diversion dam at McKay Point, 1 mile west of Lemon Cove, Tulare County, and 9 miles below United States Geological Survey gaging station near Three Rivers.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—October 1, 1918, to July 7, 1921.

GAGE.—Water-stage recorder on left bank a short distance above dam.

DISCHARGE MEASUREMENTS.—Made by wading on crest of dam, or from cable 1 mile upstream at high water.

CHANNEL AND CONTROL.—Control formed by two broad crested weirs set at an angle of 90 degrees with the point upstream. The left weir is 117 feet long and the right weir is 113 feet long. The left weir discharges into Kaweah River and the right weir into St. Johns River. Both weirs are level for a distance of 12 feet back from overfall. Height of overfall is 15 inches, the water falling on a sloping concrete apron.

DIVERSIONS.—Several irrigating ditches divert water between the gaging station near Three Rivers and McKay Point. Proceeding downstream they are as follows:

Meyers ditch, diverts 2 second-feet half time for 10 months.

Marks ditch, diverts 2 second-feet half time for 10 months.

Lemon Cove ditch, diverts 7 second-feet continuously for 9 months.

Merryman ditch, diverts 9 second-feet continuously for 9 months.

Wutchumna ditch, diverts 10 per cent of the flow up to 1,000 second-feet with no stated rights above that stage, continuously except during November. During May and June it may divert as much as 115 second-feet.

The total annual diversion of these ditches is between 30,000 and 35,000 acre-feet. The maximum capacity of all ditches is about 135 second-feet.

ACCURACY.—Stage-discharge relation changes when flashboards are placed on weirs to divide water. Rating curves for each condition well defined up to 1,700 second-feet and fairly well defined above. Water-stage recorder set to record natural scale. Daily discharge ascertained by applying mean daily gage height to rating table.

COOPERATION.—Daily-discharge record furnished by H. H. Holley, consulting engineer, Visalia, Calif.

Daily discharge, in second-feet, of Kaweah River at McKay Point, near Lemon Cove, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July
1	3.8	91	90	198	290	640	715	1,610	1,170	697
2	3.4	85	110	184	270	668	774	1,450	1,360	662
3	3.2	86	118	179	256	732	824	1,390	1,210	618
4	3.4	83	112	174	243	750	709	1,310	1,320	496
5	3.5	82	113	171	322	650	620	1,210	1,560	441
6	4.0	79	106	161	342	640	568	1,040	1,810	427
7	4.2	78	108	150	295	588	520	877	2,110	408
8	24	92	112	143	278	529	537	849	2,230	-----
9	5.2	95	110	147	282	503	599	849	2,180	-----
10	5.5	92	125	139	299	466	555	1,000	2,200	-----
11	5.9	92	133	130	362	462	581	1,270	2,130	-----
12	5.8	116	166	119	434	508	545	1,530	2,020	-----
13	18	110	132	130	452	1,130	570	1,740	1,740	-----
14	16	98	136	129	546	1,360	525	1,840	1,570	-----
15	5.1	100	140	127	532	931	478	1,900	1,370	-----
16	5.0	154	136	125	465	780	478	1,780	991	-----
17	5.0	164	133	143	456	811	472	1,390	902	-----
18	5.3	162	126	539	387	836	482	1,110	813	-----
19	98	154	159	591	370	787	568	940	801	-----
20	110	156	218	420	347	680	539	931	973	-----
21	100	150	169	396	-----	640	676	1,460	1,120	-----
22	102	138	159	329	-----	623	940	1,320	1,180	-----
23	111	122	165	290	-----	648	1,140	1,240	1,140	-----
24	122	110	166	258	-----	640	898	1,260	1,040	-----
25	130	106	233	254	-----	618	723	1,310	929	-----
26	128	98	189	254	-----	570	736	1,560	886	-----
27	123	98	167	347	-----	554	979	1,700	871	-----
28	116	99	169	436	-----	563	1,290	1,660	854	-----
29	109	93	192	303	-----	598	1,510	1,500	799	-----
30	102	90	200	307	-----	620	1,600	1,230	672	-----
31	91	-----	202	334	-----	627	-----	1,060	-----	-----

NOTE.—No record Feb. 21–28; clock stopped.

Monthly discharge of Kaweah River at McKay Point, near Lemon Cove, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	130	3.2	50.6	3,110
November	164	78	109	6,490
December	233	90	148	9,100
January	591	119	245	15,100
February 1–20	546	243	361	14,300
March	1,360	462	682	41,900
April	1,600	472	738	43,900
May	1,900	849	1,330	81,800
June	2,230	672	1,330	79,100
July 1–7	697	408	536	7,440

NORTH FORK OF KAWEAH RIVER AT KAWEAH, CALIF.

LOCATION.—In SW. $\frac{1}{4}$ sec. 2, T. 17 S., R. 28 E., at highway bridge in Sequoia National Forest, half a mile north of Kaweah, Tulare County, and 2 miles above junction with Kaweah River, Manikin Creek enters one-fourth mile below and Sheep Creek $2\frac{1}{2}$ miles above gage.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—October 12, 1910, to September 30, 1921.

GAGE.—Staff gage in two sections on right bank; low-water section is inclined and fastened to abutment of bridge; upper section is vertical and fastened to sycamore tree 20 feet below bridge. Previous to flood of January, 1914, gage was vertical staff fastened to right abutment. Original datum has been maintained. Gage read by T. T. Gross.

DISCHARGE MEASUREMENTS.—Made from bridge at gage or by wading.

CHANNEL AND CONTROL.—Solid rock and sand; fairly permanent. One channel at all stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 3.55 feet at 12.30 p. m. March 13 (discharge, 1,040 second-feet); minimum stage, 0.22 foot August 27 and 30 (discharge, 3.7 second-feet).

1910–1921: Maximum stage recorded, 10.2 feet at 7 p. m. January 25, 1914 (discharge, from extension of rating curve, above 7,400 second-feet); minimum discharge, 0.8 second-feet, August 27, 1913.

DIVERSIONS.—About 20 second-feet is diverted by several small ditches for irrigation above station.

REGULATION.—None.

ACCURACY.—Stage-discharge relation permanent during the year. Rating curves well defined between 2 and 400 second-feet and extended above. Gage read to hundredths once daily, occasionally twice daily and crest of floods noted. Daily discharge ascertained by applying gage height to rating table. Records good.

Discharge measurements of North Fork of Kaweah River at Kaweah, Calif., during the year ending Sept. 30, 1921

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	William Kessler.....	1.03	26	May 11	R. C. Briggs.....	2.10	215
Mar. 1	R. C. Briggs.....	2.05	198	June 19	do.....	1.58	98
Apr. 4	do.....	2.14	216	Aug. 7	do.....	.47	7

Daily discharge, in second-feet, of North Fork of Kaweah River near Kaweah, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	4.5	12	17	47	88	212	237	310	200	43	8.5	4.0
2	4.7	11	31	40	71	237	270	290	200	40	8	4.0
3	4.8	11	19	36	71	254	310	270	224	38	8	6
4	5	10	17	40	73	290	237	254	187	35	7	6
5	5	10	17	55	116	224	200	237	187	35	6	5
6	5.5	11	15	36	97	224	185	224	187	31	6	4.8
7	8.6	12	17	35	89	187	200	187	187	27	7	4.5
8	12	14	19	35	74	169	212	212	200	25	7	4.6
9	8.5	14	19	31	81	166	237	212	182	19	7	4.8
10	14	15	23	28	88	160	200	212	187	20	6.5	4.8
11	13	18	24	25	118	178	237	212	171	20	6.5	5
12	11	19	33	25	153	212	187	212	176	19	6.5	5
13	14	21	20	22	169	788	200	254	160	17	7	5.5
14	14	20	21	23	185	515	182	254	144	19	7	5.5
15	11	21	21	23	138	332	173	254	132	18	7	4.6
16	9	55	23	23	136	270	164	224	124	16	6	4.8
17	9	39	21	31	126	290	164	200	140	16	6	5
18	12	33	20	187	108	310	160	212	122	15	5.5	5
19	32	28	23	200	120	270	200	200	102	14	5.5	5.5
20	17	28	41	108	108	224	164	200	98	14	5.5	5.5
21	16	26	24	102	118	212	187	380	88	14	5.5	6
22	17	23	35	81	124	212	254	290	76	15	5.5	6
23	17	21	36	71	120	200	270	290	71	14	5.5	6
24	16	20	36	70	128	212	237	270	67	13	5.5	6.5
25	16	19	62	71	166	224	224	270	58	13	5.5	6.5
26	15	18	41	71	187	200	237	270	59	12	5.5	6.5
27	14	18	37	173	212	200	224	270	55	10	3.7	6.5
28	14	17	43	114	200	200	290	254	53	9.5	4.0	6.5
29	13	17	45	65	-----	187	310	290	49	9	3.9	6.5
30	13	17	44	93	-----	200	332	224	48	9	3.7	4.8
31	12	-----	51	106	-----	237	-----	237	-----	8.5	4.0	-----

Monthly discharge of North Fork of Kaweah River at Kaweah, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	32	4.5	12.2	750
November.....	55	10	19.9	1,180
December.....	62	15	28.9	1,780
January.....	200	22	67.0	4,120
February.....	212	71	124	6,890
March.....	788	160	251	15,400
April.....	332	160	223	13,300
May.....	380	187	248	15,200
June.....	224	48	131	7,800
July.....	43	8.5	19.6	1,210
August.....	8.5	3.7	5.99	368
September.....	6.5	4.0	5.39	321
The year.....	788	3.7	94.5	68,300

SOUTH FORK OF KAWEAH RIVER NEAR THREE RIVERS, CALIF.

LOCATION.—In SE. $\frac{1}{4}$ sec. 8, T. 18 S., R. 29 E., on Mehrten ranch, 500 feet above mouth of Cinnamon Creek, $4\frac{1}{2}$ miles southeast of Three Rivers, Tulare County, and 5 miles above junction with Kaweah River.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—September 18, 1911, to September 30, 1921.

GAGE.—Vertical staff fastened to large boulders on right bank; read by D. H. Mehrten.

DISCHARGE MEASUREMENTS.—Made from cable 300 feet above gage or by wading.

CHANNEL AND CONTROL.—Gravel and boulders; rough and fairly permanent. Banks subject to overflow at extreme high water.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year 4.0 feet at 6.45 a. m. June 8 (discharge, 372 second-feet); minimum stage 1.76 feet August 30 to September 1 and September 6–30 (discharge, 3.4 second-feet).

1911–1921: Maximum stage recorded, 6.3 feet at 7.45 a. m. January 17, 1916 (discharge, from extension of rating curve, about 1,880 second-feet); minimum stage, 1.6 feet September 3–5, 1918 (discharge, 1.5 second-feet).

DIVERSIONS.—Two small ditches divert water for irrigation above the station.

REGULATION.—None.

ACCURACY.—Stage-discharge relation permanent. Rating curve well defined below 350 second-feet. Gage read to hundredths once daily. Daily discharge ascertained by applying gage height to rating table. Records good except January 11 to April 3 which are only fair as gage heights are considered unreliable.

Discharge measurements of South Fork of Kaweah River near Three Rivers, Calif., during the year ending Sept. 30, 1921

[Made by R. C. Briggs]

Date	Gage height	Discharge	Date	Gage height	Discharge
	<i>Feet</i>	<i>Sec.-ft.</i>		<i>Feet</i>	<i>Sec.-ft.</i>
Apr. 3.....	3.14	95	June 20.....	3.30	133
May 12.....	3.72	221	Aug. 7.....	1.95	8.2

Daily discharge, in second-feet, of South Fork of Kaweah River near Three Rivers, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	6	8	21	26	153	58	78	268	232	58	14	3.4
2.....	6	8	24	27	153	58	72	287	249	56	13	4.8
3.....	6	8	21	28	153	58	98	232	232	52	13	7
4.....	6	8	21	28	140	61	78	215	232	49	12	3.7
5.....	6	8	21	28	140	62	67	215	268	44	11	3.7
6.....	12	8	21	27	127	62	64	153	308	42	11	3.4
7.....	10	8	22	27	106	61	62	127	350	39	11	3.4
8.....	8	10	21	27	78	58	66	127	372	36	11	3.4
9.....	12	9	21	27	72	58	75	153	350	35	11	3.4
10.....	12	8.5	21	28	62	61	75	200	308	33	11	3.4
11.....	11	8	21		54	62	72	215	308	32	11	3.4
12.....	10	8	21		46	62	72	268	287	31	10	3.4
13.....	10	8	21		36	168	70	328	249	29	9.5	3.4
14.....	10	8.5	21		38	168	62	350	232	28	8.5	3.4
15.....	9	9	26	28	41	140	58	328	200	27	7	3.4
16.....	9	22	24		45	127	56	308	168	26	7	3.4
17.....	9	21	21		48	116	58	249	153	24	6.5	3.4
18.....	9	21	21	232	52	98	62	200	140	24	6	3.4
19.....	9	21	26	215	62	84	75	153	140	22	6	3.4
20.....	9	20	28	215	64	72	68	140	127	23	5.5	3.4
21.....	10	20	26	215	64	70	90	287	127	24	5	3.4
22.....	9	20	26	200	58	67	153	184	127	24	4.8	3.4
23.....	9	20	26	200	62	64	184	184	127	24	4.4	3.4
24.....	9	20	26	184	64	62	153	215	116	22	4.0	3.4
25.....	8.5	21	26	184	61	64	127	232	106	20	3.8	3.4
26.....	8	21		168	58	66	106	268	90	19	3.7	3.4
27.....	8	21		168	58	67	153	287	84	18	3.7	3.4
28.....	8	21	26	168	67	70	215	308	78	17	3.7	3.4
29.....	8	21		168		72	249	249	72	16	3.6	3.4
30.....	8	21		168		76	268	215	64	15	3.4	3.4
31.....	8			153		78		184		14	3.4	

NOTE.—Gage not read Dec. 26-31 and Jan. 11-17; discharge estimated for these periods from flow of North Fork. Oct. 1 and 2, interpolated.

Monthly discharge of South Fork of Kaweah River near Three Rivers, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	12	6	8.79	540
November.....	22	8	14.5	863
December.....	28	21	23.5	1,440
January.....	232	26	100	6,150
February.....	153	36	77.2	4,290
March.....	168	58	79.0	4,860
April.....	268	56	103	6,130
May.....	350	127	230	14,100
June.....	372	64	197	11,700
July.....	58	14	29.8	1,830
August.....	14	3.4	7.69	473
September.....	7	3.4	3.59	214
The year.....	372	3.4	72.7	52,600

KINGS RIVER NEAR SANGER, CALIF.

LOCATION.—In NW. $\frac{1}{4}$ sec. 8, T. 13 S., R. 24 E., half a mile below new highway bridge at Piedra, near mouth of canyon, southwest of Red Mountain, and 12 miles northeast of Sanger, Fresno County.

DRAINAGE AREA.—1,740 square miles.

RECORDS AVAILABLE.—September 3, 1895, to September 30, 1921.

GAGE.—Water-stage recorder in wooden well at the Weather Bureau gage.

Weather Bureau gage is an inclined staff, installed January 30, 1914, on left bank opposite original gage and was used to January 14, 1920. Original gage was inclined staff on right bank. Friez water-stage recorder on right bank was used from April 18, 1903, to January 26, 1914, when it was destroyed by flood. All gages have been referred to same datum.

DISCHARGE MEASUREMENTS.—Made from cable 500 feet below gage.

CHANNEL AND CONTROL.—Gravel and small boulders; shift slightly during high water. Banks not subject to overflow.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 12.8 feet at 3 a. m. June 12 (discharge, 16,000 second-feet); minimum stage from water-stage recorder, 3.73 feet at midnight of September 30 (discharge, 190 second-feet).

1895-1921: Maximum stage determined by leveling from flood marks, 21.8 feet during night of January 25, 1914, (discharge, from extension of rating curve, about 59,700 second-feet); minimum stage recorded, 3.7 feet January 21, 1904 (discharge, 130 second-feet).

DIVERSIONS.—There is a small diversion several miles above the station for a flume used to float lumber to Sanger.

REGULATION.—None.

ACCURACY.—Stage-discharge relation changed January 18 and July 16. Rating curves well defined. Mean gage height obtained from record of water-stage recorder except for December 23-28, January 4-9, 15-18, February 6-12, 23-28, March 1-5, May 8-14, and June 19-25 when Weather Bureau gage was read. Daily discharge ascertained by applying mean daily gage height to rating table. Shifting-control method used July 16 to August 5. Records excellent except when water-stage recorder was not in operation when they are fair.

Discharge measurements of Kings River near Sanger, Calif., during the year ending Sept. 30, 1921

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. 20	William Kessler.....	4.88	828	July 16	C. L. Kaupke.....	6.42	1,880
Mar. 3	R. C. Briggs.....	7.10	2,610	Aug. 6	R. C. Briggs.....	4.65	658
Apr. 6	do.....	6.68	2,150	30	C. L. Kaupke.....	4.02	298
May 14	do.....	10.52	7,980	Sept. 5	William Kessler.....	4.27	423
June 16	do.....	9.08	5,280				

Daily discharge, in second-feet, of Kings River near Sanger, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	192	514	442	750	917	2,130	2,690	7,680	4,560	4,100	820	294
2.....	192	466	490	701	868	2,240	2,990	6,960	5,880	4,250	785	294
3.....	192	454	520	687	833	2,690	3,240	6,500	5,480	3,960	722	476
4.....	192	436	496	615	819	2,930	2,810	6,080	5,480	3,300	687	512
5.....	192	419	496	615	1,000	2,240	2,520	5,680	7,440	2,750	654	429
6.....	223	402	448	550	980	2,080	2,240	4,910	8,960	2,690	650	380
7.....	380	386	400	560	910	1,920	2,130	4,250	11,200	2,690	656	350
8.....	419	448	400	490	840	1,720	2,130	4,100	12,800	2,570	644	326
9.....	315	460	466	490	840	1,680	2,300	4,560	11,800	2,460	590	308
10.....	419	460	508	550	840	1,630	2,300	6,080	12,400	2,350	572	286
11.....	375	460	544	508	840	1,680	2,350	7,680	12,400	2,300	566	278
12.....	365	667	628	472	1,290	1,680	2,180	8,960	12,400	2,180	554	270
13.....	442	615	520	472	1,370	3,170	2,300	10,100	10,300	2,020	536	262
14.....	375	544	570	490	1,500	3,300	2,180	9,780	9,220	1,870	494	254
15.....	350	520	582	430	1,450	2,630	1,920	9,500	8,180	1,870	458	243
16.....	350	715	563	430	1,290	2,350	1,870	9,780	5,290	1,840	434	236
17.....	350	708	544	490	1,250	2,350	1,870	7,200	4,250	1,840	412	218
18.....	345	694	520	2,500	1,170	2,460	1,970	5,680	3,620	1,740	390	198
19.....	570	641	596	1,770	1,050	2,350	2,180	4,560	3,600	1,660	375	201
20.....	460	771	757	1,210	994	2,020	2,350	4,100	5,100	1,520	355	215
21.....	490	674	660	1,040	1,050	1,870	2,990	4,560	7,440	1,560	345	218
22.....	521	628	646	924	1,130	1,770	4,100	4,560	8,180	1,970	335	212
23.....	552	570	648	833	1,130	1,920	4,910	4,730	7,680	1,880	326	208
24.....	582	532	615	812	1,820	1,820	3,960	4,560	7,440	1,740	345	208
25.....	615	520	820	819	1,210	1,920	3,240	4,910	6,720	1,560	330	208
26.....	634	472	715	812	1,370	1,920	3,430	6,080	5,290	1,430	317	204
27.....	634	490	615	952	1,540	1,920	4,250	7,920	5,880	1,270	304	204
28.....	602	490	615	1,330	1,820	1,970	5,680	7,920	5,680	1,120	290	201
29.....	550	454	764	866	-----	2,130	6,500	7,200	5,100	1,000	290	198
30.....	532	448	764	1,050	-----	2,240	7,440	5,680	4,100	890	304	194
31.....	538	-----	799	1,130	-----	2,300	-----	4,560	-----	848	294	-----

NOTE.—Discharge estimated Apr. 23-26, interpolated Oct. 21-23.

Monthly discharge of Kings River near Sanger, Calif., for the year ending Sept. 30, 1921

[Drainage area, 1,740 square miles]

Month	Discharge in second-feet				Run-off	
	Maximum	Minimum	Mean	Per square mile	Inches	Acre-feet
October.....	634	192	418	0.240	0.28	25,700
November.....	771	386	535	.307	.34	31,800
December.....	820	442	589	.339	.39	36,200
January.....	2,500	430	821	.472	.54	50,500
February.....	1,820	819	1,120	.644	.67	62,200
March.....	3,300	1,630	2,160	1.24	1.43	133,000
April.....	7,440	1,870	3,100	1.78	1.99	184,000
May.....	10,100	4,100	6,350	3.65	4.21	390,000
June.....	12,800	3,620	7,470	4.29	4.79	444,000
July.....	4,250	848	2,100	1.21	1.39	129,000
August.....	820	204	479	.275	.32	29,500
September.....	512	194	270	.155	.17	16,100
The year.....	12,800	192	2,120	1.22	16.52	1,530,000

SAN JOAQUIN RIVER BASIN

MAIN STREAM

SAN JOAQUIN RIVER NEAR FRIANT, CALIF.

LOCATION.—In NW. $\frac{1}{4}$ sec. 5, T. 11 S., R. 21 E., $1\frac{1}{2}$ miles northeast of Friant, Fresno County.

DRAINAGE AREA.—1,640 square miles at old location 2 miles upstream.

RECORDS AVAILABLE.—October 18, 1907, to September 30, 1921.

GAGE.—Water-stage recorder on left bank, installed December 9, 1913. Previous to that date a staff gage located on left bank in SE. $\frac{1}{4}$ sec. 34, T. 10 S., R. 21 E., 4 miles northeast of Friant, was used.

DISCHARGE MEASUREMENTS.—Made from cable 300 feet below gage or by wading.

CHANNEL AND CONTROL.—Bed consists of sand and gravel. Control is a solid rock dyke about 500 feet below gage.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 13.08 feet at 8 a. m. June 12 (discharge, 15,300 second-feet); minimum stage from water-stage recorder, 3.01 feet at 3 a. m. September 12 (discharge, 162 second-feet).

1907–1921: Maximum stage recorded, 21.72 feet at 11.30 p. m. January 25, 1914 (discharge, from extension of rating curve, about 46,200 second-feet); minimum stage from water-stage recorder 2.67 feet from 6 a. m. to 10 p. m. September 27, 1920 (discharge, 98 second-feet); stage was probably lower as instrument could not record below 2.67 feet as float rested on bottom of well.

DIVERSIONS.—None.

REGULATION.—Storage is developed for power at Huntington Lake on Big Creek, at Crane Valley reservoir on North Fork Creek, and a small amount on Stevenson Creek at Shaver.

ACCURACY.—Stage-discharge relation permanent. Rating curve well defined between 240 and 16,000 second-feet and extended above. Water-stage recorder stopped November 25 to February 20. Mean daily gage height determined by averaging readings printed every 15 minutes by the water-stage recorder. Daily discharge ascertained by applying mean daily gage height to rating table. Discharge for periods of no record determined by comparison with records of flow of Kings River near Sanger and the Weather Bureau gage heights at Friant. Records excellent except for estimated periods which are fair.

Discharge measurements of San Joaquin River near Friant, Calif., during the year ending Sept. 30, 1921

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. 20	Kessler and Kelley.....	5.13	1,000	Apr. 7	R. C. Briggs.....	7.50	2,880
Nov. 21	William Kessler.....	4.34	629	May 13	do.....	10.60	8,550
Feb. 20	do.....	6.50	1,820	June 21	do.....	9.46	5,450
Mar. 2	R. C. Briggs.....	7.50	2,940	Sept. 15	William Kessler.....	3.57	317

Daily discharge, in second-feet, of San Joaquin River near Friant, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	463	636		2,510	3,080	6,120	3,830	4,720	1,200	665
2	463	631		2,800	3,560	5,700	4,900	4,540	1,050	608
3	506	550		3,260	3,260	5,910	4,900	4,290	1,170	740
4	418	631		3,380	3,630	5,490	5,290	3,560	1,170	960
5	564	665		3,320	2,380	5,090	6,560	2,960	1,110	740
6	494	715		2,910	2,560	4,210	7,940	3,080	1,140	715
7	270	568		2,700	2,280	3,700	10,200	3,140	1,020	690
8	379	1,270		2,330	2,160	3,320	10,900	3,080	1,020	622
9	394	546		2,380	2,460	3,630	9,900	3,020	960	586
10	241	546		2,240	2,600	4,370	10,700	2,800	878	595
11	518	470		2,240	2,750	5,490	11,500	2,800	905	622
12	577	449		2,420	2,650	6,560	11,500	2,650	905	498
13	690	715		3,500	2,650	7,010	10,400	2,560	960	590
14	740	1,020		4,050	2,650	7,240	9,400	2,460	822	608
15	740	850		2,910	2,380	7,940	7,940	2,380	932	470
16	490	740		2,750	2,120	8,420	5,700	2,380	850	554
17	349	932		2,650	2,080	6,120	3,690	2,650	795	542
18	410	932		2,960	2,280	4,630	3,500	2,510	768	568
19	768	990		3,140	2,460	3,900	3,500	2,380	690	538
20	905	932		2,460	2,560	3,560	4,210	2,080	550	518
21	795	768	1,540	2,240	2,910	3,830	5,910	1,800	715	522
22	715	990	1,400	2,240	3,980	3,830	6,780	1,920	715	514
23	715	740	1,650	2,380	5,090	3,760	7,240	2,040	740	510
24	590	768	1,050	2,160	4,370	4,370	6,120	2,120	715	514
25	554		1,580	2,000	3,760	4,130	5,910	1,880	740	502
26	546		2,000	2,460	3,380	5,700	5,700	1,800	690	510
27	878		1,960	1,920	3,500	7,240	5,290	1,650	494	506
28	932		2,280	2,240	4,540	7,240	5,910	1,300	542	522
29	1,020			2,240	5,290	5,910	5,290	1,170	526	486
30	990			2,600	6,120	4,720	4,720	1,200	600	486
31	530			2,600		3,900		1,200	622	

NOTE.—Water-stage recorder stopped Nov. 25 to Feb. 20. Mean monthly discharge for this period given in monthly table.

Monthly discharge of San Joaquin River near Friant, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	1,020	241	601	37,000
November			750	44,600
December			700	43,000
January			1,100	67,600
February			1,400	77,800
March	4,050	1,920	2,640	162,000
April	6,120	2,080	3,180	189,000
May	8,420	3,320	5,260	323,000
June	11,500	3,500	6,840	407,000
July	4,720	1,170	2,520	155,000
August	1,200	494	839	51,600
September	960	470	583	34,700
The year	11,500	241	2,200	1,590,000

* Estimated from records of flow of Kings River near Sanger and the Weather Bureau gage-height records of San Joaquin River at Friant.

SAN JOAQUIN RIVER NEAR NEWMAN, CALIF.

LOCATION.—In SW. $\frac{1}{4}$ sec. 3, T. 7 S., R. 9 E., at drawbridge on Hill's Ferry road, 300 feet below mouth of Merced River and $3\frac{1}{2}$ miles northeast of Newman, Stanislaus County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—April 29, 1912, to September 30, 1921.

GAGE.—Vertical staff fastened to upstream side of downstream support of draw span, 60 feet below bridge, in middle of stream. Gage read by Rasmus Lorensen.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading.

CHANNEL AND CONTROL.—Sand and small gravel; shift during high water. Banks subject to overflow.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 12.5 feet at 7 a. m. January 20 (discharge, 9,200 second-feet); minimum stage 1.45 feet October 1 and 2 (discharge, 58 second-feet).

1912-1921: Maximum stage recorded, 18.0 feet at 9 a. m. January 27, 1914 (discharge, 20,700 second-feet); minimum stage 1 foot October 5 and 8 to 18, 1913 (discharge, 50 second-feet).

DIVERSIONS.—Practically the entire low-water flow of main river and tributaries is diverted for irrigation, hence the low-water records show mainly the amount of return water.

REGULATION.—Storage is developed for power at Huntington Lake on Big Creek, at Crane Valley reservoir on North Fork Creek.

ACCURACY.—Stage-discharge relation changed December 13, March 5, and June 6. Rating curves well defined except for period December 14 to March 5 which is fairly well defined. Gage read to half-tenths once daily. Daily discharge ascertained by applying gage height to rating table except March 6 to April 3 when shifting-control method was used. Records good.

Discharge measurements of San Joaquin River near Newman, Calif., during the year ending Sept. 30, 1921

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>
Dec. 29	K. M. Kelley	5.08	1,650	June 11	R. C. Briggs	11.60	7,690
Mar. 5	R. C. Briggs	8.57	4,570	11	W. J. Manetta	11.60	7,670
Apr. 4	W. J. Manetta	5.80	1,830	14	do.	11.92	8,050
9	R. C. Briggs	6.22	2,270	21	do.	12.00	7,840
25	W. J. Manetta	6.60	2,410	28	do.	8.65	4,010
May 6	do.	9.10	4,950	July 12	do.	5.60	1,480
7	R. C. Briggs	8.82	4,660	19	do.	4.32	787
12	W. J. Manetta	8.35	4,030	Aug. 2	do.	2.99	303
25	do.	8.90	4,390	9	do.	2.81	269
June 1	do.	9.50	5,370	14	R. C. Briggs	2.50	210
9	do.	11.10	6,680	Sept. 2	W. J. Manetta	2.00	110

NOTE.—W. J. Manetta is employee of State Water Commission.

Daily discharge, in second-feet, of San Joaquin River near Newman, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.	58	330	720	1,790	5,960	3,250	3,050	4,220	5,370	3,460	320	97
2.	58	305	720	1,720	5,620	3,520	3,050	4,550	5,250	3,460	320	104
3.	65	305	770	1,720	5,160	3,800	2,960	4,550	5,490	3,370	308	97
4.	65	305	770	1,660	4,720	3,990	2,870	4,660	5,250	3,660	320	97
5.	77	280	720	1,600	4,500	4,500	2,780	4,890	5,250	3,370	320	104
6.	80	280	675	1,540	4,290	4,550	2,600	4,770	5,490	2,660	320	97
7.	92	280	720	1,480	4,190	4,550	2,440	4,550	5,760	2,580	320	97
8.	95	280	770	1,540	3,900	4,770	2,280	4,110	6,480	2,420	295	104
9.	95	305	770	1,540	3,610	4,770	2,120	3,900	6,860	2,030	270	97
10.	102	292	820	1,480	3,430	4,550	2,120	3,600	6,860	1,820	245	104
11.	95	305	820	1,480	3,340	4,330	2,040	3,500	7,510	1,610	220	104
12.	98	305	925	1,480	3,160	4,110	1,960	3,700	7,900	1,480	220	110
13.	102	305	1,540	1,540	3,080	4,110	1,890	4,660	8,160	1,420	200	97
14.	113	355	1,540	1,600	3,080	4,330	1,820	5,370	8,030	1,240	200	97
15.	125	510	1,360	1,480	3,520	4,890	1,820	6,000	7,900	1,070	200	91
16.	140	510	1,240	1,360	4,190	4,330	1,680	6,390	7,770	920	190	85
17.	155	492	1,240	1,480	4,190	4,110	1,610	6,780	7,640	920	180	97
18.	155	550	1,240	1,660	4,290	4,550	1,610	6,260	7,510	825	160	104
19.	165	550	1,240	7,400	4,190	4,770	1,540	5,610	7,510	780	160	104
20.	175	550	1,180	9,200	3,990	4,770	1,280	6,000	7,770	780	150	97
21.	255	550	1,240	8,120	3,800	4,330	1,340	5,490	8,030	735	140	97
22.	235	675	1,240	6,920	4,190	4,000	1,220	5,490	8,290	655	140	97
23.	235	630	1,420	6,680	4,610	4,000	1,960	5,010	7,640	615	132	97
24.	245	630	1,600	6,320	4,090	3,900	2,780	4,660	6,000	470	125	97
25.	255	630	1,720	5,390	3,520	3,800	2,520	4,550	5,050	440	125	91
26.	255	630	1,920	4,390	3,340	3,500	2,120	4,440	4,830	440	125	85
27.	280	630	1,860	3,900	3,080	3,500	2,280	5,250	4,720	410	118	85
28.	318	675	1,660	3,800	3,160	3,320	3,050	5,870	4,170	380	110	85
29.	342	720	1,600	5,500	-----	3,230	3,500	6,260	3,760	350	110	85
30.	255	720	1,540	5,280	-----	3,140	4,000	5,740	3,560	350	118	85
31.	330	-----	1,600	5,960	-----	3,140	-----	5,370	-----	320	110	-----

Monthly discharge of San Joaquin River, near Newman Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	355	58	168	10,300
November.....	720	280	463	27,600
December.....	1,920	675	1,200	73,800
January.....	9,200	1,360	3,450	212,000
February.....	5,960	3,080	4,010	223,000
March.....	4,890	3,140	4,080	251,000
April.....	4,000	1,220	2,280	136,000
May.....	6,780	3,500	5,040	310,000
June.....	8,290	3,560	6,390	380,000
July.....	3,660	320	1,450	89,200
August.....	320	110	202	12,400
September.....	110	85	96.3	5,730
The year.....	9,200	58	2,390	1,730,000

SAN JOAQUIN RIVER AT LATHROP, CALIF.

LOCATION.—At highway bridge 3 miles southwest of Lathrop, San Joaquin County.

RECORDS AVAILABLE.—October 1, 1920, to September 30, 1921.

GAGE.—Water-stage recorder on highway bridge. United States Weather Bureau gage on the Southern Pacific Railroad bridge about 1,000 feet down-stream.

DISCHARGE MEASUREMENTS.—Made from boat 300 feet above highway bridge. Tidal cycle measurements were made at low water.

CHANNEL AND CONTROL.—Shifting sand and silt. Control is cross section and slope of channel. Tide effect is felt at this point at low water.

DIVERSIONS.—Considerable water is diverted from main stream and tributaries for irrigation.

REGULATION.—See preceding paragraph.

COOPERATION.—Daily-discharge record furnished by State engineer.

Daily discharge, in second-feet, of San Joaquin River at Lathrop, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	730	1,720	3,300	5,020	12,700	6,630	7,140	10,300	13,700	8,240	1,870	1,120
2.....	660	1,570	3,240	5,450	12,100	6,860	7,690	11,100	12,100	7,460	1,720	1,020
3.....	570	1,410	3,040	5,180	11,100	7,320	8,300	11,500	10,900	7,040	1,600	960
4.....	476	1,510	3,270	4,800	10,100	8,030	8,710	11,100	10,900	7,050	1,540	840
5.....	395	1,550	3,170	4,680	9,370	9,060	8,830	10,400	11,400	6,950	1,750	810
6.....	425	1,450	3,040	4,580	9,320	9,230	8,140	10,500	12,100	6,320	2,030	790
7.....	425	1,230	3,130	4,450	9,580	10,400	6,940	9,910	13,100	5,480	2,130	760
8.....	453	1,330	2,990	4,430	8,840	10,100	6,260	9,120	14,100	4,980	1,970	600
9.....	314	1,360	3,070	4,300	8,100	9,700	5,920	8,400	15,000	4,460	1,830	880
10.....	540	1,380	3,290	4,440	7,620	9,440	5,820	8,420	15,700	4,020	1,650	1,240
11.....	770	1,450	3,620	4,000	7,180	9,230	6,020	9,050	16,100	3,630	1,480	980
12.....	990	1,590	3,960	3,770	7,070	9,180	6,350	9,910	16,300	3,580	1,310	790
13.....	1,130	1,660	5,540	3,510	7,280	9,190	6,100	11,000	16,500	3,280	1,130	720
14.....	1,080	1,730	4,860	3,470	7,630	9,320	5,780	12,100	16,700	3,060	1,230	690
15.....	1,030	1,950	4,080	3,510	8,240	10,200	5,560	13,000	16,800	2,980	1,140	710
16.....	1,200	2,340	3,780	3,500	9,370	10,400	5,170	13,700	16,800	2,850	1,170	800
17.....	1,140	2,290	3,570	3,560	9,200	9,820	4,730	14,300	16,100	2,710	1,270	710
18.....	1,300	2,340	3,400	4,100	8,640	9,440	4,260	14,800	14,600	2,590	1,170	550
19.....	1,230	2,250	3,500	9,140	8,300	9,440	4,000	14,400	12,500	2,420	1,000	680
20.....	1,110	2,350	3,400	13,400	7,970	9,650	3,810	12,800	10,800	2,270	1,060	650
21.....	1,310	2,450	3,490	15,300	7,620	9,650	3,800	11,100	10,200	2,150	1,060	580
22.....	1,390	3,570	3,770	16,100	7,590	9,170	4,680	10,400	10,800	2,070	980	590
23.....	1,400	3,060	3,640	15,500	8,440	8,520	5,620	10,500	12,000	2,020	950	620
24.....	1,330	2,960	3,570	13,800	8,070	8,420	7,420	10,500	12,900	1,900	850	610
25.....	1,390	3,180	4,180	11,900	7,400	8,180	8,420	10,500	13,100	1,640	750	720
26.....	1,450	3,080	5,390	10,500	6,850	7,920	7,780	11,100	12,700	1,450	810	610
27.....	1,660	3,000	5,470	9,300	6,640	7,540	6,570	12,000	11,500	1,330	880	580
28.....	1,780	3,010	4,960	9,050	6,520	7,300	6,330	13,200	10,300	1,420	920	580
29.....	1,960	3,060	4,330	10,800	-----	6,990	7,440	14,200	9,500	1,600	970	560
30.....	2,060	3,360	4,490	11,800	-----	6,850	8,940	14,900	8,900	1,660	1,110	750
31.....	1,960	-----	4,460	12,000	-----	6,910	-----	14,900	-----	1,860	1,200	-----

*Monthly discharge of San Joaquin River at Lathrop, Calif., for the year ending
Sept. 30, 1921*

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	2,060	314	1,090	67,000
November.....	3,570	1,230	2,170	129,000
December.....	5,540	2,990	3,850	237,000
January.....	16,100	3,470	7,590	467,000
February.....	12,700	6,520	8,530	474,000
March.....	10,400	6,630	8,710	536,000
April.....	8,940	3,800	6,420	382,000
May.....	14,900	8,400	11,600	713,000
June.....	16,800	8,900	13,100	780,000
July.....	8,240	1,330	3,560	219,000
August.....	2,130	1,750	1,310	80,500
September.....	1,240	550	750	44,600
The year.....	16,800	314	5,700	4,130,000

FRESNO RIVER BASIN

FRESNO RIVER NEAR KNOWLES, CALIF.

LOCATION.—In N. $\frac{1}{2}$ sec. 15, T. 8 S., R. 20 E., at Fresno Crossing, 6 miles northeast of Knowles, Madera County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—September 16, 1911, to January 1, 1914, and November 13, 1915, to September 30, 1921.

GAGE.—Vertical staff in two sections; low-water section on left bank about 60 feet above bridge; high-water section on right bank about 100 feet above bridge. There have been several changes in gage sections but the original datum probably has been maintained. Gage read by J. E. Gayman.

DISCHARGE MEASUREMENTS.—Made from cable about 300 feet below bridge or by wading.

CHANNEL AND CONTROL.—Bed consists of small boulders, gravel, sand, and outcroppings of bedrock; fairly permanent. A concrete control was installed November 4, 1916.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 3.60 feet at 4.30 p. m. January 18 (discharge, determined from extension of rating curve, about 1,740 second-feet); minimum stage, 0.50 foot August 31 and September 1 (discharge, 1.0 second-foot).

1911–1914 and 1916–1921: Maximum stage recorded, 6.0 feet at 5 p. m. February 21, 1917 (discharge, determined from extension of rating curve, about 4,500 second-feet); no flow part of August and September, 1919.

DIVERSIONS.—Water is diverted above the station for irrigation and lumbering.

REGULATION.—Diurnal fluctuation at low stages due to diversions above.

ACCURACY.—Stage-discharge relation permanent. Rating curve well defined below 400 second-feet and extended above. Gage read to hundredths once daily. Daily discharge ascertained by applying gage height to rating table. Records good except those for high water which are fair.

Discharge measurements of Fresno River near Knowles, Calif., during the year ending Sept. 30, 1921

[Made by R. C. Briggs]

Date	Gage height	Dis- charge
Feb. 26.....	<i>Feet</i> 1.46	<i>Sec.-ft.</i> 146
Apr. 7.....	1.40	125
Aug. 5.....	.59	2.1

Daily discharge, in second-feet, of Fresno River near Knowles, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	3.0	15	46	29	207	149	126	134	119	26	4.5	1.0
2.....	3.0	17	55	29	126	149	126	134	112	26	4.5	2.5
3.....	3.0	17	42	26	126	149	134	126	112	26	4.0	8
4.....	3.0	15	36	26	149	156	134	112	91	24	3.5	3.5
5.....	3.5	15	36	29	207	164	156	91	91	24	3.5	3.0
6.....	3.5	17	39	29	164	302	149	126	91	26	3.5	2.5
7.....	34	19	40	26	149	207	134	126	85	24	3.5	2.5
8.....	26	19	39	26	141	156	141	119	85	22	2.5	3.0
9.....	22	17	40	26	126	156	134	119	80	19	2.5	2.5
10.....	14	17	42	26	126	149	134	112	80	19	2.2	2.5
11.....	12	15	63	29	126	156	141	119	69	19	2.2	2.2
12.....	9.5	17	63	29	134	149	141	119	63	22	1.9	2.2
13.....	8	55	42	26	149	156	149	105	74	22	1.9	1.9
14.....	7	36	26	29	156	410	156	105	74	19	1.6	1.9
15.....	5	32	29	29	207	253	156	105	80	17	1.9	1.9
16.....	5.5	32	29	29	164	164	149	112	74	15	1.9	1.9
17.....	5	29	26	36	156	164	149	119	74	15	2.2	2.2
18.....	5.5	32	26	1,440	156	156	149	98	74	14	2.2	2.5
19.....	91	29	63	502	126	156	141	105	69	11	1.9	4.0
20.....	29	29	26	302	126	156	149	112	69	11	2.2	4.0
21.....	26	29	26	207	355	149	156	282	63	9.5	2.2	3.5
22.....	24	29	26	164	253	156	156	164	63	7.5	1.9	3.5
23.....	19	31	26	156	207	207	149	156	59	7.5	1.9	3.0
24.....	15	42	29	156	164	156	149	156	50	7	1.6	3.0
25.....	17	39	29	112	156	156	149	149	55	7	1.6	2.5
26.....	17	39	26	119	149	149	141	149	46	6	1.6	2.5
27.....	19	42	26	253	149	141	141	134	46	6	1.6	3.0
28.....	17	42	29	670	141	134	134	134	42	5.5	1.3	3.0
29.....	17	42	26	535	-----	134	126	126	42	5.5	1.3	2.5
30.....	17	46	29	705	-----	134	126	126	39	5	1.3	2.5
31.....	17	-----	29	334	-----	134	-----	126	-----	5	1.0	-----

Monthly discharge of Fresno River near Knowles, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	91	3.0	16.0	984
November.....	55	15	28.5	1,700
December.....	63	26	35.8	2,200
January.....	1,440	26	198	12,200
February.....	355	126	164	9,110
March.....	410	134	171	10,500
April.....	156	126	142	8,450
May.....	282	91	129	7,930
June.....	119	39	72.4	4,310
July.....	26	5	15.2	935
August.....	4.5	1.0	2.30	141
September.....	8	1.0	2.82	168
The year.....	1,440	1.0	81.0	58,600

MERCED RIVER BASIN

MERCED RIVER AT HAPPY ISLES BRIDGE, NEAR YOSEMITE, CALIF.

LOCATION.—At Happy Isles Bridge, 1½ miles southeast of Yosemite, Mariposa County.

DRAINAGE AREA.—181 square miles (measured on topographic maps).

RECORDS AVAILABLE.—August 23, 1915, to September 30, 1921.

GAGE.—Water-stage recorder on right bank about 20 feet below bridge. Previous to November 2, 1916, the gage was a staff fastened to downstream side of large boulder which is used for the right abutment of the bridge.

DISCHARGE MEASUREMENTS.—Made from Clark Bridge about half a mile below gage or by wading.

CHANNEL AND CONTROL.—Boulders; practically permanent. Banks high; not subject to overflow.

EXTREMES OF DISCHARGE.—Maximum stage during year, from water-stage recorder, 6.10 feet at 11 p. m. June 12 (discharge, 2,720 second-feet); minimum stage, from water-stage recorder, 0.57 foot at midnight September 30 (discharge, 12 second-feet).

1915-1921: Maximum stage, from water-stage recorder, 7.10 feet at 10 p. m. May 28, 1919 (discharge, 3,800 second-feet); minimum stage, from water-stage recorder, 0.13 foot at 11 a. m. January 9, 1918 (discharge, 2.1 second-feet).

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

DIVERSIONS.—None.

REGULATION.—None.

ACCURACY.—Stage-discharge relation permanent. Rating curve well defined.

Mean daily gage height determined by inspecting recorder graph. Daily discharge ascertained by applying mean daily gage height to rating table except February 13 to July 31 when the discharge integrator was used. Records excellent.

COOPERATION.—Gage-height record furnished by officials of Yosemite National Park.

Discharge measurements of Merced River at Happy Isles Bridge, near Yosemite Calif., during the year ending Sept. 30, 1921

Date	Made by—	Gage height	Discharge
		Feet	Sec.-ft.
Oct. 28	William Kessler	1.73	123
June 13	R. C. Briggs	5.76	2,250
Aug. 1	do	1.93	170

Daily discharge, in second-feet, of Merced River at Happy Isles Bridge, near Yosemite, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.	22		74	122	97	300	525	1,380	850	1,160	166	33
2.	20		76	122	94	346	553	1,220	1,220	1,250	154	35
3.	19		70	122	94	418	555	1,250	1,190	1,050	142	55
4.	18		76	119	91	418	402	1,120	1,300	732	129	62
5.	25		60	112	88	370	370	975	1,630	630	117	54
6.	23		72	112	90	328	334	755	2,030	685	106	45
7.	23		71	78	100	291	320	640	2,290	675	106	37
8.	23	100	68	100	88	273	345	682	2,300	643	109	34
9.	37		68	83	94	280	403	890	2,200	610	106	29
10.	72		74	78	114	270	407	1,150	2,500	580	102	27
11.	76		78	88	140	270	390	1,420	2,580	510	92	25
12.	91		60	103	162	270	373	1,650	2,610	474	91	24
13.	92		76	77	185	285	407	1,700	2,380	430	91	23
14.	76		78	71	173	260	356	1,640	2,150	416	78	22
15.	81	98	77	64	154	250	324	1,880	1,670	425	66	20
16.	81	108	72	70	155	300	300	1,790	1,030	467	60	19
17.	72	114	68	91	135	400	293	1,170	735	663	55	18
18.	74	106	66	106	124	400	335	850	670	470	53	18
19.	78	109	68	94	118	275	375	737	855	377	51	18
20.	86	103	68	98	118	247	395	658	1,220	325	49	18
21.	94	96	72	106	120	230	600	650	1,540	295	47	18
22.	96	87	78	114	120	230	925	612	1,890	310	43	17
23.	98	82	77	114	133	216	960	715	2,340	323	41	16
24.	122	81	83	114	160	226	735	920	1,750	320	40	16
25.	145	72	84	109	210	247	620	1,170	1,330	300	39	16
26.	145	74	87	103	218	250	750	1,680	1,230	247	37	16
27.	136	78	98	103	235	250	1,020	2,100	1,360	200	37	14
28.	127	81	109	103	271	281	1,500	1,800	1,380	176	35	14
29.	120	81	114	94		322	1,470	1,250	1,240	157	33	13
30.	110	78	117	98		370	1,500	970	1,080	150	33	12
31.	100		122	98		437		747		153	33	

NOTE.—Recorder not working properly Oct. 2, 3, 8, 9, 14, 19-22, 27, 29-31, Nov. 1-14, 27, and Jan. 8; discharge estimated by comparison with records of flow of Merced River at Pohono Bridge.

*Monthly discharge of Merced River at Happy Isles Bridge, near Yosemite, Calif.,
for the year ending Sept. 30, 1921*

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	145	18	76.8	4,720
November.....	114	72	94.9	5,650
December.....	122	60	79.4	4,880
January.....	122	64	98.9	6,080
February.....	271	88	139	7,720
March.....	437	216	300	18,400
April.....	1,500	203	588	35,000
May.....	2,100	612	1,170	71,900
June.....	2,610	670	1,620	96,400
July.....	1,250	150	490	30,100
August.....	166	33	75.5	4,640
September.....	62	12	25.6	1,520
The year.....	2,610	12	396	287,000

MERCED RIVER AT POHONO BRIDGE, NEAR YOSEMITE, CALIF.

LOCATION.—At Pohono Bridge, 5 miles below Yosemite, Mariposa County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—November 2, 1916, to September 30, 1921.

GAGE.—Water-stage recorder on left bank 150 feet above bridge. Datum lowered 0.8 foot September 4, 1918.

DISCHARGE MEASUREMENTS.—Made from cable three-eighths mile below gage or by wading.

CHANNEL AND CONTROL.—Bed consists of sand and gravel above gage and of boulders below gage. Control formed by boulders; practically permanent.

EXTREMES OF DISCHARGE.—Maximum stage during year, from water-stage recorder, 8.40 feet at 5 a. m. June 11 (discharge, 4,610 second-feet); minimum stage, from water-stage recorder, 1.05 feet September 30 (discharge, 26 second-feet).

1916-1921: Maximum stage, from water-stage recorder, 9.80 feet at 2 a. m. May 29, 1919 (discharge, 6,150 second-feet); minimum stage, from water-stage recorder, 0.72 foot at 9.30 p. m. November 27, 1919 (discharge, 4.8 second-feet).

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

DIVERSIONS.—None.

REGULATION.—None.

ACCURACY.—Stage-discharge relation permanent. Rating curve well defined below 6,000 second-feet and extended above. Daily discharge ascertained by applying mean daily gage height to rating table except February 26 to July 20 when the discharge integrator was used. Periods of no gage-height record estimated from records of flow at Happy Isles Bridge. Records good.

COOPERATION.—Gage-height record furnished by officials of Yosemite National Park.

No discharge measurements made during the year.

Daily discharge, in second-feet, of Merced River at Pohono Bridge, near Yosemite, for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	34	142	146	207	212	660	1,230	2,760	1,700	1,380	188	54
2	31	132	146	219	205	720	1,260	2,370	2,080	1,430	184	69
3	29	126	139	212	205	880	1,300	2,420	2,140	1,240	176	69
4	27	120	153	209	203	985	940	2,290	2,220	940	166	73
5	27	115	115	201	207	825	820	2,010	2,720	850	157	70
6	39	111	140	196	186	760	770	1,630	3,210	900	148	64
7	65	118	140	159	192	710	793	1,440	3,770	885	150	58
8	58	121	150	176	205	640	880	1,530	3,760	858	150	52
9	60	130	130	170	217	630	967	1,830	3,640	810	150	49
10	80	130	140	152	248	630	964	2,250	3,950	800	130	47
11	100	157	152	160	328	630	912	2,760	4,010	725	110	46
12	121	231	115	180	328	633	885	3,170	3,670	674	100	44
13	161	229	139	155	396	670	972	3,280	3,250	634	92	41
14	133	217	153	145	385	620	790	3,220	2,940	602	86	40
15	144	205	152	140	300	560	710	3,450	2,940	598	80	39
16	142	212	145	153	303	600	733	3,350	1,750	620	74	39
17	128	226	142	207	309	755	740	2,150	1,430	740	69	39
18	136	243	146	294	266	755	780	1,800	1,030	618	69	39
19	139	238	152	229	268	644	895	1,550	1,260	493	67	38
20	166	207	145	212	270	570	900	1,450	1,600	417	67	37
21	186	192	144	214	270	540	1,340	1,390	1,960	400	67	35
22	190	180	162	219	270	530	1,860	1,390	2,440	398	65	34
23	188	164	162	212	270	503	1,990	1,550	2,790	398	62	32
24	243	161	188	209	380	530	1,570	1,880	2,170	396	61	30
25	279	148	176	212	490	588	1,270	2,250	1,660	358	61	30
26	274	152	180	214	493	602	1,450	3,030	1,570	309	60	29
27	255	176	185	233	522	600	1,860	3,400	1,610	255	60	28
28	233	159	190	231	603	660	2,350	2,960	1,610	221	59	27
29	212	159	195	212	-----	782	2,730	2,250	1,490	201	56	26
30	190	152	200	221	-----	858	2,890	1,810	1,300	190	54	26
31	162	-----	207	205	-----	1,050	-----	1,500	-----	188	53	-----

NOTE.—Water-stage recorder not in operation Oct. 1-4, Dec. 5-11, 26-31, Jan. 11-14, Feb. 20-25, Mar. 6-11, May 15-20, July 22, 23, and Aug. 7-12; discharge estimated from flow of Merced River at Happy Isles Bridge.

Monthly discharge of Merced River at Pohono Bridge, near Yosemite, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	279	27	137	8,420
November	243	111	168	10,000
December	207	115	155	9,530
January	294	140	199	12,200
February	603	186	305	16,900
March	1,050	503	681	41,900
April	2,890	710	1,250	74,400
May	3,450	1,390	2,260	139,000
June	4,010	1,030	2,370	141,000
July	1,430	188	630	38,700
August	188	53	99.1	6,090
September	73	26	43.5	2,590
The year	4,010	26	692	501,700

MERCED RIVER AT EXCHEQUER, CALIF.

LOCATION.—In SW. $\frac{1}{4}$ NE. $\frac{1}{4}$ sec. 13, T. 4 S., R. 15 E., just above remains of old dam at Exchequer, Mariposa County, above mouth of Cotton Creek, and 8 miles upstream from Merced Falls.

DRAINAGE AREA.—1,020 square miles (measured on topographic maps).

RECORDS AVAILABLE.—November 28, 1915, to September 30, 1921.

GAGE.—Vertical staff in four sections bolted to solid rock ledge on right bank 250 feet above old dam; read by Stewart and Dyer.

DISCHARGE MEASUREMENTS.—Made from cable one-half mile above gage or by wading just below cable.

CHANNEL AND CONTROL.—Bed consists of boulders, gravel, and solid rock. Control is old concrete dam. Banks high, clean, and not likely to be over-flowed. Part of dam was blasted February 1, 1918.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 18.7 feet at 9 a. m. January 18 (discharge, 19,400 second-feet); minimum stage, 4.0 feet at 4.30 a. m. August 30 (discharge, 14 second-feet).

1915-1921: Maximum stage recorded, 20.0 feet at 4 p. m. January 17, 1916 (discharge, from extension of rating curve, about 22,000 second-feet); minimum stage, 4.0 feet, September 21, 22, and 26, 1919, September 24 and 27, 1920, and August 30, 1921 (discharge, 14 second-feet).

DIVERSIONS.—None.

REGULATION.—The several small power plants above have little or no storage.

The effect of their operation is believed to be slight except during low water.

ACCURACY.—Stage-discharge relation permanent during the year. Rating curve well defined below 6,000 second-feet and extended above. Gage read to half-tenths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table. Records good except those for low water when operation of power plants causes diurnal fluctuation.

Discharge measurements of Merced River at Exchequer, Calif., during the year ending Sept. 30, 1921

[Made by R. C. Briggs]

Date	Gage height	Dis-charge	Date	Gage height	Dis-charge
	<i>Feet</i>	<i>Sec.-ft.</i>		<i>Feet</i>	<i>Sec.-ft.</i>
Mar. 4.....	10.35	2,310	June 15.....	11.55	3,820
Apr. 8.....	9.45	1,630	Aug. 4.....	6.05	247
June 14.....	12.00	4,440			

Daily discharge, in second-feet, of Merced River at Exchequer, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	59	256	291	630	1,720	1,660	2,360	5,360	2,460	1,720	256	85
2.....	58	234	399	550	1,300	1,790	2,460	4,170	3,220	1,660	245	42
3.....	53	212	399	550	1,150	2,100	2,560	4,030	3,350	1,660	223	90
4.....	69	202	316	550	1,050	2,360	2,100	4,170	4,170	1,360	212	101
5.....	67	183	330	485	1,790	2,020	1,660	3,610	4,450	1,100	223	149
6.....	35	192	279	485	1,540	1,940	1,660	2,880	6,020	1,000	174	107
7.....	42	183	291	485	1,300	1,660	1,600	2,460	6,380	1,050	183	90
8.....	157	223	343	399	1,200	1,540	1,660	2,460	6,020	1,000	192	85
9.....	120	223	343	357	1,100	1,540	1,860	2,660	5,680	950	142	72
10.....	223	223	515	399	1,100	1,420	1,790	3,610	6,380	1,000	174	72
11.....	157	223	1,000	371	1,150	1,360	1,790	5,050	6,380	900	149	76
12.....	165	357	900	371	1,250	1,420	1,790	5,520	6,020	715	183	76
13.....	223	670	485	371	1,300	2,560	1,720	6,380	5,200	630	174	72
14.....	267	455	427	357	1,660	2,270	1,790	6,020	4,600	630	174	76
15.....	183	399	413	385	1,660	1,860	1,720	6,020	3,750	630	149	63
16.....	114	485	357	357	1,480	1,720	1,420	6,200	2,660	630	149	67
17.....	174	470	385	399	1,360	1,790	1,420	4,170	2,020	630	101	67
18.....	202	441	357	13,000	1,300	1,790	1,420	2,990	1,790	805	134	63
19.....	470	427	413	6,950	1,300	1,860	1,540	2,560	1,660	715	101	63
20.....	330	515	715	3,610	1,100	1,660	1,660	2,270	1,940	550	85	59
21.....	267	455	550	1,940	1,860	1,420	1,860	2,460	2,270	427	101	63
22.....	291	413	680	1,660	1,940	1,540	3,750	2,360	2,880	399	90	59
23.....	291	371	550	1,200	1,540	1,540	4,170	2,660	3,550	427	95	59
24.....	291	343	715	1,050	1,420	1,480	3,100	2,880	3,610	427	72	59
25.....	343	343	900	950	1,420	1,420	2,270	3,480	2,880	413	101	56
26.....	399	291	680	900	1,540	1,540	2,460	5,360	2,270	385	90	52
27.....	427	291	550	1,790	1,540	1,540	3,480	5,680	1,940	304	85	48
28.....	413	371	550	2,990	1,660	1,600	4,170	5,680	2,100	304	80	52
29.....	371	316	680	2,100	-----	1,660	5,050	4,750	1,940	304	80	52
30.....	371	304	670	2,270	-----	1,790	5,360	3,100	1,720	256	27	48
31.....	316	-----	715	2,100	-----	1,940	-----	2,460	-----	245	80	-----

Monthly discharge of Merced River at Exchequer, Calif., for the year ending Sept. 30, 1921

[Drainage area, 1,020 square miles]

Month	Discharge in second-feet				Run-off	
	Maximum	Minimum	Mean	Per square mile	Inches	Acre-feet
October.....	470	35	224	0.219	0.25	13,800
November.....	670	183	336	.329	.37	20,000
December.....	1,000	279	518	.508	.58	31,900
January.....	13,000	357	1,610	1.58	1.82	99,000
February.....	1,940	1,050	1,420	1.39	1.45	78,900
March.....	2,560	1,360	1,740	1.70	1.96	107,000
April.....	5,360	1,420	2,390	2.34	2.61	142,000
May.....	6,380	2,270	3,980	3.90	4.50	245,000
June.....	6,380	1,660	3,610	3.54	3.95	215,000
July.....	1,720	245	749	.734	.85	46,100
August.....	256	27	139	.136	.16	8,550
September.....	149	42	70.8	.069	.08	4,210
The year.....	13,000	27	1,400	1.37	18.58	1,011,000

MERCED RIVER AT MILIKEN BRIDGE, NEAR NEWMAN, CALIF.

LOCATION.—At concrete highway bridge 7 miles above Newman, Stanislaus County.

RECORDS AVAILABLE.—March 18 to August 31, 1921.

GAGE.—Staff gage on left bank just below bridge.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading.

CHANNEL AND CONTROL.—Shifting sand; control is a stretch of the river. Back-water from high stages on San Joaquin River affects stage-discharge relation.

DIVERSIONS.—Practically all the water of Merced River is diverted above the station. The records show the amount of water going to waste during high stages and the amount of return water from irrigation during low stages.

REGULATION.—See preceding paragraph.

ACCURACY.—Stage-discharge relation not permanent. Rating curves fairly well defined. Gage read to half-tenths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table except June 9-28 when shifting-control method was used. Records good.

Discharge measurements of Merced River at Miliken Bridge, near Newman, Calif., during the year ending Sept. 30, 1921

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>
Mar. 18	Harrison Smitherum ^a	5.00	1,870	June 15	W. J. Manetta.....	7.40	3,100
19	do.....	5.10	1,910	22	do.....	4.60	1,090
Apr. 14	W. J. Manetta ^a	3.80	1,260	29	do.....	3.85	1,050
25	do.....	4.60	1,700	July 6	do.....	2.30	637
May 12 ^a	do.....	6.35	2,690	12	do.....	1.60	237
26	do.....	6.25	2,610	19	Harrison Smitherum...	1.28	132
June 2	do.....	5.11	1,840	26	do.....	.70	101
8	do.....	8.39	4,020	Aug. 2	do.....	.58	60

^a Employees of State Water Commission.

Daily discharge, in second-feet, of Merced River at Miliken Bridge, near Newman, Calif., for the period Mar. 18 to Aug. 31, 1921

Day	Mar.	Apr.	May	June	July	Aug.	Day	Mar.	Apr.	May	June	July	Aug.
1-----	-----	1,970	3,260	1,850	940	80	16-----	-----	890	4,030	2,390	138	72
2-----	-----	2,210	3,190	1,850	860	72	17-----	-----	890	3,890	1,550	130	72
3-----	-----	2,210	2,570	2,450	1,070	72	18-----	1,850	850	2,570	1,150	130	65
4-----	-----	2,210	2,510	2,330	1,220	72	19-----	1,910	690	2,450	890	130	65
5-----	-----	1,550	2,450	2,630	740	72	20-----	1,750	810	1,650	810	138	65
6-----	-----	1,350	2,450	3,050	458	72	21-----	1,600	730	1,700	810	115	65
7-----	-----	1,150	1,650	3,750	325	72	22-----	1,550	655	1,650	1,050	95	65
8-----	-----	1,150	1,450	4,310	295	72	23-----	1,800	1,970	1,750	1,700	95	65
9-----	-----	1,050	1,450	4,240	268	72	24-----	1,650	2,330	1,970	2,090	90	65
10-----	-----	1,350	1,700	4,240	242	72	25-----	1,550	1,700	2,210	1,650	90	65
11-----	-----	1,250	2,330	4,310	242	72	26-----	1,600	1,300	2,570	1,350	80	65
12-----	-----	1,200	2,810	4,310	242	72	27-----	1,550	1,350	3,610	1,100	80	65
13-----	-----	1,150	3,470	3,890	195	72	28-----	1,550	1,970	4,030	1,050	80	65
14-----	-----	1,200	4,100	3,330	165	72	29-----	1,450	2,690	3,750	1,070	80	65
15-----	-----	970	3,750	2,930	155	72	30-----	1,550	3,050	2,810	1,020	80	65
							31-----	1,750	-----	2,510	-----	72	65

NOTE.—Discharge, Aug. 31, estimated.

Monthly discharge of Merced River at Miliken Bridge, near Newman, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
March 18-31-----	1,910	1,450	1,650	45,800
April-----	3,050	655	1,490	86,900
May-----	4,100	1,450	2,650	163,000
June-----	4,310	810	2,300	137,000
July-----	1,220	72	292	18,000
August-----	80	65	69.1	4,250
The period-----	-----	-----	-----	455,000

TENAYA CREEK NEAR YOSEMITE, CALIF.

LOCATION.—At Tenaya Bridge, in Yosemite National Park, five-eighths mile below outlet of Mirror Lake, five-eighths mile above junction with Merced River, and $1\frac{7}{8}$ miles east of Yosemite, Mariposa County.

DRAINAGE AREA.—47 square miles.

RECORDS AVAILABLE.—July, 1904, to June, 1909; January 5, 1912, to September 30, 1921.

GAGE.—Water-stage recorder installed September 15, 1918, on left bank, at same datum as staff gage used since February 5, 1913.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading.

CHANNEL AND CONTROL.—Small boulders and gravel; fairly permanent.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 5.25 feet at 9 p. m. May 15 (discharge, 960 second-feet); minimum stage from water-stage recorder, 1.05 feet August 22-27 (discharge, 1.3 second-feet).

1904-1909, 1912-1921: Maximum stage from water-stage recorder, 7.05 feet at 9 p. m. May 28, 1919 (discharge, 1,730 second-feet); minimum discharge, 0.5 second-foot, occurred September 12 and most of October, 1906.

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

DIVERSIONS.—None.

REGULATION.—None.

ACCURACY.—Stage-discharge relation not changed during year. Rating curve fairly well defined to 700 second-feet and extended above. Daily discharge ascertained by applying mean daily gage height to rating table. Records good for high stages and fair for low stages.

COOPERATION.—Gage-height record furnished by officials of Yosemite National Park.

Discharge measurements of Tenaya Creek near Yosemite, Calif., during the year ending Sept. 30, 1921

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
Oct. 27	William Kessler	<i>Feet</i> 2.14	<i>Sec.-ft.</i> 36	June 14	R. C. Briggs	<i>Feet</i> 3.77	<i>Sec.-ft.</i> 404
June 13	R. C. Briggs	3.85	442	Aug. 1	do.	1.25	6.2

Daily discharge, in second-feet, of Tenaya Creek near Yosemite, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	4.1	31	38	46	46	107	235	520	295	82	5.5	1.6
2	4.1	29	39	46	44	125	256	464	355	76	5.5	1.6
3	4.1	27	42	46	44	165	238	468	370	72	4.7	1.9
4	4.1	26	42	44	42	165	163	443	422	62	4.4	1.9
5	4.1	24	40	42	38	129	131	379	520	54	4.1	1.9
6	4.7	24	39	40	35	110	120	295	572	52	3.9	1.9
7	4.4	26	38	37	37	95	119	256	660	46	3.7	1.9
8	4.4	27	37	38	40	90	145	286	625	43	3.4	1.9
9	4.4	29	37	37	42	91	173	337	608	40	3.2	1.9
10	4.7	28	36	31	49	85	161	426	625	37	3.0	1.9
11	18	38	39	28	56	87	145	555	608	34	2.8	1.9
12	30	50	34	28	63	89	141	660	538	31	2.6	1.9
13	36	46	40	30	70	93	157	660	485	26	1.9	1.9
14	32	44	44	31	68	87	120	680	409	26	1.8	1.9
15	40	42	44	31	58	83	107	740	331	24	1.8	1.9
16	34	40	42	31	63	85	96	608	235	24	1.7	1.9
17	26	44	40	40	58	100	96	418	181	22	1.5	1.9
18	30	40	42	41	54	102	107	319	147	20	1.5	1.9
19	41	38	43	40	48	91	124	256	145	18	1.4	1.9
20	48	46	41	38	46	83	135	230	165	17	1.4	1.9
21	50	46	40	41	46	78	250	235	208	16	1.4	1.9
22	50	43	44	43	47	78	370	210	302	15	1.3	1.9
23	60	39	46	42	50	74	385	280	301	14	1.3	1.9
24	71	37	52	42	56	78	280	355	218	14	1.3	1.9
25	73	34	42	42	70	83	235	471	177	12	1.3	1.9
26	68	34	44	46	83	83	310	590	153	11	1.3	1.9
27	60	44	48	48	85	85	412	660	133	10	1.3	1.9
28	56	44	53	50	98	96	520	590	119	9.5	1.3	1.9
29	53	41	54	51	-----	116	555	450	102	8.5	1.3	1.9
30	46	40	56	50	-----	141	590	349	90	7	1.3	1.9
31	38	-----	53	46	-----	190	-----	271	-----	6	1.3	-----

NOTE.—No record Oct. 3 and Feb. 25 (discharge interpolated); Aug. 28 to Sept. 2 (discharge estimated)

Monthly discharge of Tenaya Creek near Yosemite, Calif., for the year ending Sept. 30, 1921

[Drainage area, 47 square miles]

Month	Discharge in second-feet				Run-off	
	Maximum	Minimum	Mean	Per square mile	Inches	Acre-feet
October	73	4.1	32.4	0.689	0.79	1,990
November	50	24	36.7	.781	.87	2,180
December	56	34	42.9	.918	1.05	2,640
January	51	28	40.2	.855	.99	2,470
February	98	35	54.9	1.17	1.22	3,050
March	190	74	102	2.17	2.50	6,270
April	590	96	229	4.87	5.43	13,600
May	740	210	434	9.23	10.64	26,700
June	660	90	337	7.17	8.00	20,100
July	82	6	30.1	.640	.74	1,850
August	5.5	1.3	2.39	.051	.06	147
September	1.9	1.6	1.88	.040	.04	112
The year	740	1.3	112	2.38	32.33	81,100

YOSEMITE CREEK AT YOSEMITE, CALIF.

LOCATION.—At highway bridge in Yosemite National Park, half a mile above junction with Merced River and one-fourth mile northwest of Yosemite, Mariposa County.

DRAINAGE AREA.—43.2 square miles (measured on topographic map).

RECORDS AVAILABLE.—July, 1904, to June, 1909, and January 4, 1912, to September 30, 1921 (incomplete).

GAGE.—Staff in two sections; upper, vertical, fastened to left abutment near downstream end; lower, inclined, fastened to boulder in front of upper section; read by an employee of Yosemite National Park. Present gage was installed February 5, 1913, at datum 3.04 feet higher than that of original staff gage which was on tree on right bank 50 feet above bridge.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading.

CHANNEL AND CONTROL.—Fine gravel and sand; fairly permanent.

EXTREMES OF DISCHARGE.—1904–1909, 1912–1921: Maximum stage recorded, 10.0 feet at 7.50 p. m. June 8, 1917 (discharge not determined because of backwater); no flow September 9, 1915, November 8, 1919, and September 4–30, 1921.

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

DIVERSIONS.—None.

REGULATION.—None.

ACCURACY.—Stage-discharge relation changed July 18. Rating curves fairly well defined. Gage read to tenths occasionally. Daily discharge ascertained by applying daily gage height to rating table. Records fair.

COOPERATION.—Gage-height record furnished by officials of Yosemite National Park.

Discharge measurements of Yosemite Creek at Yosemite, Calif., during the year ending Sept. 30, 1921

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	William Kessler	3.21	16	June 13	R. C. Briggs	4.70	257
29	do	3.21	18	Aug. 1	do	3.05	3.2

Daily discharge, in second-feet, of Yosemite Creek at Yosemite, Calif., for the year ending September 30, 1921

Date	Dis-charge	Date	Dis-charge	Date	Dis-charge
Oct. 16	9	Apr. 2	194	July 16	25
23	17	12	322	18	10
29	18	16	276	23	12
30	17	26	299	26	9
Nov. 6	17	30	368	30	6
13	35	May 3	194	Aug. 1	3.2
Jan. 15	21	7	157	2	3.2
22	30	10	368	6	3.2
Feb. 5	35	14	460	9	2.0
12	73	17	437	13	2.0
15	80	21	414	16	1.5
19	88	24	194	20	1.0
Mar. 1	104	28	157	23	1.0
5	139	June 13	254	27	1.0
8	112	21	194	30	.5
12	104	25	157	Sept. 3	.2
15	121	28	121		
19	157	July 2	88		
22	96	5	73		
26	104	9	41		
29	157	12	47		

NOTE.—No flow Sept. 4–30.

SOUTH FORK OF MERCED RIVER NEAR WAWONA, CALIF.

LOCATION.—In SE. $\frac{1}{4}$ sec. 33, T. 4 S., R. 21 E., 1 mile below Wawona, Mariposa County. Big Creek enters half a mile above and Rush Creek three-fourths mile below station.

DRAINAGE AREA.—131 square miles.

RECORDS AVAILABLE.—December 15, 1910, to June 30, 1916; April 13, 1917, to September 30, 1921.

GAGE.—Vertical staff fastened to alder tree on left bank; installed August 22, 1911, 250 feet below site of original gage, which was vertical staff fastened to center pier of footbridge destroyed by high water January 30, 1911. Original datum has not been maintained. Gage read by A. H. Bruce.

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

CHANNEL AND CONTROL.—Gravel and boulders; appear permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 4.6 feet May 13 (discharge, 1,190 second-feet); minimum stage, 1.80 feet August 16 (discharge, 4.2 second-feet).

1910-1921: Maximum stage recorded, 7.2 feet January 26 and February 19 and 20, 1914 (discharge, 3,770 second-feet); minimum stage, 1.4 feet October 17 to November 8, 1915 (discharge, 0.2 second-foot).

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

DIVERSIONS.—The ranch of the Wawona Co. is irrigated from a tributary above the station.

REGULATION.—None.

ACCURACY.—Stage-discharge relation permanent during the year. Rating curve fairly well defined between 10 and 400 second-feet, well defined between 400 and 2,000 second-feet, and is extended above. Gage read to half-tenths about three times a week. Daily discharge ascertained by applying gage height to rating table and interpolating on days when gage was not read, except July 1-31 when mean monthly discharge was estimated from flow at other stations on Merced River. Records good.

The following discharge measurement was made by R. C. Briggs:

August 2, 1921: Gage height, 2.21 feet; discharge, 22 second-feet.

Daily discharge, in second-feet, of South Fork of Merced River near Wawona, Calif., for the year ending Sept. 30, 1921

Day	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	72	116	185	430	530	964	545	-----	24	13
2.....	72	116	185	502	575	912	485	-----	23	13
3.....	71	116	185	575	530	894	662	-----	22	13
4.....	70	113	180	530	485	875	840	330	21	12
5.....	70	110	174	485	432	740	935	-----	20	12
6.....	75	114	170	446	380	605	1,030	308	19	12
7.....	80	118	176	408	420	616	1,010	-----	19	11
8.....	85	122	183	369	458	627	990	104	20	11
9.....	90	127	189	330	451	638	1,030	-----	20	11
10.....	90	134	196	346	444	814	1,070	-----	18	10
11.....	90	140	230	363	437	990	970	110	17	10
12.....	94	136	264	380	430	1,090	870	-----	17	10
13.....	90	133	285	405	405	1,190	770	94	17	10
14.....	92	133	258	430	380	1,190	704	-----	12	11
15.....	85	133	231	430	368	1,190	638	-----	8	11
16.....	84	136	204	430	355	1,190	670	-----	4.2	11
17.....	82	144	204	430	380	930	702	-----	6	11
18.....	81	152	204	405	405	670	670	-----	8	11
19.....	80	158	204	380	430	600	637	-----	9	11
20.....	80	166	204	355	635	528	605	-----	10	11
21.....	80	174	224	330	840	458	532	-----	10	11
22.....	80	181	244	335	876	548	458	-----	11	10
23.....	82	170	264	340	912	638	428	-----	12	10
24.....	85	159	286	350	758	686	398	-----	12	10
25.....	94	201	308	360	605	735	368	-----	12	10
26.....	104	243	332	370	722	714	338	-----	12	10
27.....	106	285	355	380	840	692	308	-----	12	10
28.....	107	268	392	420	955	670	286	-----	13	9.5
29.....	112	252	-----	458	1,070	648	264	-----	13	9.5
30.....	116	204	-----	472	1,020	626	270	-----	14	10
31.....	116	194	-----	485	-----	605	-----	-----	14	-----

NOTE.—No record Oct. 1 to Nov. 30. Mean discharge for July estimated in monthly table.

Monthly discharge of South Fork of Merced River near Wawona, Calif., for the year ending Sept. 30, 1921

[Drainage area, 131 square miles]

Month	Discharge in second-feet				Run-off	
	Maximum	Minimum	Mean	Per square mile	Inches	Acre-feet
December.....	116	70	87.9	0.671	0.77	5,400
January.....	285	110	160	1.22	1.41	9,840
February.....	392	170	233	1.78	1.85	12,900
March.....	575	330	411	3.14	3.62	25,300
April.....	1,070	355	584	4.46	4.98	34,800
May.....	1,190	458	783	5.98	6.89	48,100
June.....	1,070	264	649	4.95	5.52	38,600
July.....			*100	.763	.88	6,150
August.....	24	4.2	14.5	.111	.13	892
September.....	13	9.5	10.8	.082	.09	643
The period.....						183,000

* Estimated from records of flow at other stations on Merced River.

TUOLUMNE RIVER BASIN

TUOLUMNE RIVER NEAR HETCH HETCHY, CALIF.*

LOCATION.—In SW. $\frac{1}{4}$ SE. $\frac{1}{4}$ sec. 17, T. 1 N., R. 20 E., in Yosemite National Park, 11 miles northeast of Sequoia and three-fourths mile below Hetch Hetchy dam site at Hetch Hetchy, Tuolumne County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—December 20, 1914, to September 30, 1921.

GAGE.—Water-stage recorder on left bank.

DISCHARGE MEASUREMENTS.—Made from cable 30 feet below gage or by wading.

CHANNEL AND CONTROL.—Boulders and solid rock; permanent. Bed at measuring section has been smoothed by removing some boulders. Banks high and not subject to overflow.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 12.20 feet at 9 a. m. June 12 (discharge, 8,090 second-feet); minimum stage from water-stage recorder, 1.07 feet at 7 p. m. September 30 (discharge, 13 second-feet).

1915–1921: Maximum stage from water-stage recorder, 13.4 feet at 3 a. m. May 29, 1919 (discharge, 11,400 second-feet); minimum stage from water-stage recorder, 0.47 foot at 2 p. m. November 27, 1919 (discharge, 2.4 second-feet).

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

DIVERSIONS.—None.

REGULATION.—None.

ACCURACY.—Stage-discharge relation permanent. Rating curve well defined.

Daily discharge ascertained by applying to rating table mean daily gage height determined by averaging readings printed every 15 minutes by the water-stage recorder. May 17–19 estimated from readings on a gage just below dam site. Records excellent.

Discharge measurements of Tuolumne River near Hetch Hetchy, Calif., during the year ending Sept. 30, 1921

[Made by C. J. Emerson.]

Date.	Gage height	Discharge	Date	Gage height	Discharge
	<i>Feet</i>	<i>Sec.-ft.</i>		<i>Feet</i>	<i>Sec.-ft.</i>
Oct. 2.....	1.58	36	June 9.....		
Feb. 26.....	6.01	763	July 12.....	11.88	7,280
May 5.....	9.16	2,600		6.79	1,020

* Formerly known as below Hetch Hetchy dam site, near Sequoia.

Daily discharge, in second-feet, of Tuolumne River near Hetch Hetchy, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	34	236	257	430	364	1,030	1,420	3,570	2,090	2,630	250	54
2.....	31	215	280	400	355	1,090	1,540	2,930	2,830	2,730	236	59
3.....	29	201	280	391	346	1,330	1,640	2,930	3,050	2,350	222	73
4.....	27	194	304	410	355	1,480	1,130	2,830	3,870	1,570	208	72
5.....	26	182	257	373	391	1,180	930	2,530	5,290	1,390	188	55
6.....	35	164	250	364	355	1,010	808	2,050	6,350	1,480	176	46
7.....	90	158	243	304	337	878	775	1,740	7,310	1,480	170	41
8.....	114	164	243	312	337	808	825	1,780	7,310	1,390	170	37
9.....	109	170	243	288	264	842	1,010	2,300	7,070	1,330	158	34
10.....	170	170	250	243	500	775	1,030	3,050	7,310	1,280	153	31
11.....	153	229	296	236	628	808	950	3,870	7,570	1,110	147	30
12.....	222	470	257	243	730	790	930	4,710	7,830	1,030	138	29
13.....	272	391	280	243	760	990	1,070	5,290	7,570	930	126	28
14.....	236	346	296	236	760	860	895	5,090	6,830	860	111	28
15.....	312	304	288	236	602	775	760	5,690	4,890	842	98	26
16.....	280	364	272	243	530	775	730	5,690	2,730	842	86	24
17.....	229	364	257	450	500	930	715	3,400	1,930	912	80	23
18.....	250	391	257	930	450	930	760	2,400	1,740	790	76	22
19.....	264	373	296	552	430	808	912	2,100	2,170	670	74	21
20.....	296	430	296	480	410	685	895	1,780	3,050	590	70	20
21.....	328	355	280	440	450	640	1,390	1,850	4,190	520	64	20
22.....	337	328	296	420	420	655	2,170	1,780	4,830	578	60	19
23.....	304	296	288	391	460	640	2,530	1,930	4,890	602	58	17
24.....	364	272	410	364	530	628	1,850	2,300	4,350	552	59	16
25.....	460	250	373	346	685	685	1,450	3,050	3,570	510	58	16
26.....	490	250	328	355	775	655	1,480	4,710	3,290	430	54	16
27.....	500	391	420	440	825	615	2,010	5,910	3,290	355	52	16
28.....	470	320	490	420	950	685	2,630	5,690	3,290	304	49	15
29.....	430	288	480	373	-----	790	3,290	3,710	3,050	280	49	14
30.....	346	272	520	400	-----	912	3,570	2,730	2,530	257	49	14
31.....	280	-----	520	373	-----	1,160	-----	2,220	-----	250	53	-----

Monthly discharge of Tuolumne River near Hetch Hetchy, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	500	26	242	14,900
November.....	470	158	285	17,000
December.....	520	243	316	19,400
January.....	930	236	377	23,200
February.....	950	337	521	28,900
March.....	1,480	615	866	53,200
April.....	3,570	715	1,400	83,300
May.....	5,910	1,740	3,280	202,000
June.....	7,830	1,740	4,540	270,000
July.....	2,730	250	995	61,200
August.....	250	49	114	7,010
September.....	73	14	30.5	1,810
The year.....	7,830	14	1,080	782,000

TUOLUMNE RIVER NEAR BUCK MEADOWS, CALIF.

LOCATION.—In SW. $\frac{1}{4}$ NW. $\frac{1}{4}$ sec. 28, T. 1 S., R. 18 E., 1 mile below junction with South Fork of Tuolumne River and 2 miles north of Buck Meadows, Mariposa County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—September 2, 1907, to September 30, 1921 (not complete).

GAGE.—Water-stage recorder on left bank installed January 2, 1913. Prior to January 2, 1913, station was maintained by the Yosemite Power Co. The gage used was a vertical staff on left bank at the site of the present cable.

DISCHARGE MEASUREMENTS.—Made from cable one-third mile above gage.

CHANNEL AND CONTROL.—Boulders and solid rock; probably premanent. Banks are high and not subject to overflow.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 10.23 feet at 1.15 a. m. June 11 and 1.30 a. m. June 12 (discharge, 12,600 second-feet); minimum stage from water-stage recorder, 1.30 feet at 4 a. m. October 6 (discharge, 110 second-feet).

1907-1921: Maximum stage recorded, 14.00 feet January 14, 1909 (discharge, 27,200 second-feet); minimum stage recorded, 0.47 foot from 2 to 10 a. m. November 3, 1917 (discharge, 29 second-feet).

DIVERSIONS.—A small amount of water is diverted from South Fork of Tuolumne River at Harden ranch, 7 miles above mouth and is used in vicinity of Groveland.

REGULATION.—None.

ACCURACY.—Stage-discharge relation permanent. Rating curve well defined.

Mean daily gage height determined by averaging gage heights recorded every 15 minutes by the water-stage recorder. Daily discharge ascertained by applying mean daily gage height to rating table except January 17 when hourly discharge was averaged. Records excellent.

Discharge measurements of Tuolumne River near Buck Meadows, Calif., during the year ending Sept. 30, 1921

[Made by C. J. Emerson]

Date	Gage height	Discharge
Mar. 10.	Feet 5.39	Sec.-ft. 2,090
July 20.	3.63	838

Daily discharge, in second-feet, of Tuolumne River near Buck Meadows, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.	122	435	690	1,040	1,300	2,480	2,770	7,250	3,680	3,750	420	216
2.	119	468	760	950	1,270	2,590	3,170	5,950	4,950	3,990	405	236
3.	118	420	760	950	1,240	3,030	3,310	5,550	5,550	3,600	390	238
4.	116	340	785	950	1,240	3,750	2,420	5,550	6,350	2,530	376	251
5.	114	376	690	890	1,460	3,100	1,960	4,770	8,250	2,160	362	238
6.	130	340	668	920	1,240	2,710	1,830	3,990	10,400	2,160	348	216
7.	345	291	668	810	1,070	2,310	1,740	3,450	11,400	2,160	340	204
8.	334	308	668	785	1,040	2,110	1,920	3,380	11,800	2,060	334	200
9.	303	331	668	760	980	2,160	2,420	4,230	11,000	1,920	326	192
10.	468	334	690	690	1,170	2,060	2,650	5,550	11,400	1,740	318	186
11.	420	376	862	645	1,420	2,110	2,480	7,010	11,900	1,540	313	184
12.	450	980	760	668	1,660	2,110	2,360	8,350	11,800	1,380	316	180
13.	668	890	735	668	1,830	3,310	2,590	9,410	11,400	1,270	306	180
14.	540	712	760	645	2,060	2,590	2,310	9,410	10,400	1,170	294	178
15.	600	580	735	668	1,700	2,210	1,960	10,000	7,990	1,100	277	176
16.	600	785	712	690	1,580	2,110	1,830	10,000	4,590	1,070	265	174
17.	502	712	645	1,400	1,500	2,360	1,780	6,350	3,170	1,140	253	172
18.	600	712	580	4,590	1,340	2,360	1,740	4,410	2,710	1,040	245	171
19.	668	835	712	2,160	1,200	2,210	2,060	3,750	3,310	890	242	169
20.	600	950	690	1,500	1,100	1,920	2,110	3,450	4,680	785	238	167
21.	645	735	645	1,270	1,270	1,830	3,030	3,910	6,150	735	231	167
22.	645	712	712	1,300	1,240	1,880	4,680	3,750	7,490	712	223	165
23.	580	690	690	1,380	1,240	1,880	5,750	3,990	7,010	785	218	162
24.	668	622	920	1,300	1,340	1,780	4,320	4,950	6,790	760	214	160
25.	810	600	1,070	1,240	1,620	1,830	3,310	6,150	5,750	690	214	156
26.	862	600	862	1,240	1,880	1,780	3,310	8,530	5,150	645	212	156
27.	862	1,040	890	1,780	2,110	1,620	4,230	10,000	5,150	560	206	154
28.	810	920	1,070	1,740	2,310	1,660	5,550	9,710	5,050	502	204	151
29.	735	785	1,070	1,460	-----	1,830	6,570	7,010	4,590	468	200	144
30.	645	735	1,140	1,580	-----	1,960	7,250	5,150	3,830	450	198	142
7.	502	-----	1,340	1,420	-----	2,360	-----	3,990	-----	435	198	-----

Monthly discharge of Tuolumne River near Buck Meadows, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	862	114	503	30,900
November.....	1,040	291	620	36,900
December.....	1,340	580	795	48,900
January.....	4,590	645	1,230	75,600
February.....	2,310	980	1,440	80,000
March.....	3,750	1,620	2,260	139,000
April.....	7,250	1,740	3,110	185,000
May.....	10,000	3,380	6,100	375,100
June.....	11,800	2,710	7,120	424,000
July.....	3,990	435	1,430	87,900
August.....	420	198	280	17,200
September.....	251	142	183	10,900
The year.....	11,800	114	2,090	1,510,000

TUOLUMNE RIVER ABOVE LA GRANGE DAM, NEAR LA GRANGE, CALIF.

LOCATION.—In NE. $\frac{1}{4}$ sec. 3, T. 3 S., R. 14 E., $3\frac{1}{2}$ miles above La Grange dam and 5 miles above La Grange, Stanislaus County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—March 19, 1915, to September 30, 1921.

GAGE.—Water-stage recorder on left bank 1 mile below Don Pedro dam (in course of construction).

DISCHARGE MEASUREMENTS.—Made from cable 80 feet below gage or by wading.

CHANNEL AND CONTROL.—Bed consists of solid rock and boulders. Banks are high, one channel at all stages. Control is solid rock dyke which extends entirely across stream and over which at low water there is a drop of about 5 feet. Point of zero flow, gage height 0.06 foot.

EXTREMES OF DISCHARGE.—Maximum stage during year not recorded but flow over the La Grange dam was about 25,000 second-feet, at 7 a. m. January 18; minimum stage, from water-stage recorder, 2.27 feet from 12.30 to 5.15 p. m. October 5 (discharge, 76 second-feet).

1916-1921: Maximum stage recorded, 27.58 feet at 5.15 p. m. February 21, 1917 (discharge, 36,500 second-feet); minimum stage, 1.06 feet October 30, 31, November 4, and 5, 1917 (discharge, 5 second-feet).

DIVERSIONS.—Sierra & San Francisco Power Co.'s canal heads $9\frac{1}{2}$ miles above the station and returns its water half a mile above the bridge at La Grange, except during irrigation season, when the water is not used for power but is returned to river above La Grange dam for use by Waterford irrigation district. There is also a diversion from South Fork of Tuolumne River at Harden ranch for irrigation in vicinity of Groveland.

REGULATION.—None.

ACCURACY.—Stage-discharge relation permanent. Rating curve well defined. Water-stage recorder stopped frequently during year due to various causes. Mean daily gage height determined by averaging gage heights printed every hour by the water-stage recorder. Daily discharge ascertained by applying mean daily gage height to rating table. Discharge for periods when water-stage recorder was stopped estimated from flow of river at Buck Meadows and flow over La Grange dam. Records excellent except estimated periods which are fair.

Discharge measurements of Tuolumne River above La Grange dam, near La Grange, Calif., during the year ending Sept. 30, 1921

Date	Made by—	Gage height	Dis-charge
Feb. 25	Kessler and Briggs	Feet 8.66	Sec.-ft. 2,670
Aug. 16	C. J. Emerson	3.40	244

Daily discharge, in second-feet, of Tuolumne River above La Grange dam, near La Grange, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	94	558			2,440	3,700	4,000	8,610	5,000		404	190
2	86	520			2,130	3,800	4,550		5,300		393	204
3	80	480				4,330	4,790		6,260		382	217
4	79	430				5,300	3,800		6,960		371	231
5	77	380				4,790	3,150		8,610	2,860	360	229
6	87	340				4,440	2,790	5,800	10,400		349	210
7	206	300				3,800	2,700		11,800		338	190
8	360	320				3,420	2,790		12,400		327	177
9	338	340				3,330	3,330		11,600		316	169
10	349	360		1,300		3,240	3,800	6,260		1,660	305	163
11	478	360				3,240	3,600	7,710	12,000	1,660	294	156
12	440	530				3,240	3,330	9,210		1,430	283	152
13	662	1,330			2,800	5,040	3,510	10,100		1,330	272	150
14	558	1,040	1,000			4,790	3,420	10,400	11,000	1,190	261	148
15	558	912				3,900	3,000	10,900	9,360	1,120	250	147
16	646	932				3,600	2,610	11,000	5,980	1,080	240	147
17	601	972				3,800	2,520		3,800	1,060	229	144
18	544	873				3,800	2,440		3,240	1,100	217	144
19		873				3,700	2,700		3,420	952	210	144
20		1,280				3,240	2,880	5,500	4,670	835	204	145
21	1,000			7,500		2,970	3,700		6,260	744	201	145
22		1,120				3,240	5,560		7,710	694	192	139
23		952				3,240			7,560	762	185	134
24	631	835				3,060		5,700	7,410	762	184	131
25	646				2,060	2,520	5,000	6,820	6,400	694	182	128
26	780					2,880						
27	892			1,980	2,880	2,880		9,060	5,700	646	178	125
28	932	900		3,700	3,240	2,700	5,170	10,600	5,430	572	174	122
29	816		1,500	5,980	3,420	2,700	6,540		5,430	504	171	121
30	780			3,420		2,880	8,010	7,500	4,440	478	167	120
31	744			4,670		3,060	8,610		4,000	440	164	114
	646			3,510		3,510				416	177	

NOTE.—No gage-height record for long periods due to stopping of water-stage recorder. Discharge, Nov. 2-10, Apr. 15, June 1, 30, Aug. 14, 15, 26-29, 31, Sept. 1-3, and braced figures showing mean discharge for periods indicated, are based on records of flow at Buck Meadows and over La Grange dam.

Monthly discharge of Tuolumne River above La Grange dam, near La Grange, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October		77	552	33,900
November	1,330	300	745	44,300
December			1,100	67,600
January			3,220	198,000
February			2,790	155,000
March	5,300	2,700	3,600	221,000
April	8,610	2,440	4,110	245,000
May	11,000		7,140	439,000
June		3,240	7,600	452,000
July		416	1,480	91,000
August	404	164	257	15,800
September	231	114	158	9,400
The year		77	2,720	1,970,000

Combined daily discharge, in second-feet, of Tuolumne River and Sierra & San Francisco Power Co.'s canal near La Grange, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	152	623			2,510	3,770	4,070	8,680	4,360	3,600	470	258
2.....	145	585			2,200	3,870	4,620		4,540	3,600	460	273
3.....	139	545				4,400	4,860		5,940	3,680	449	285
4.....	143	495				5,370	3,870		6,600	3,260	438	299
5.....	141	445				4,860	3,220		8,540	2,410	428	297
6.....	151	405				4,510	2,860	5,870	11,000	2,110	417	277
7.....	271	365				3,870	2,770		12,500	2,350	405	257
8.....	425	385				3,480	2,860		13,100	2,390	394	244
9.....	405	407				3,400	3,400		12,500	2,230	383	236
10.....	414	427		1,370		3,310	3,870	6,330	12,600	1,730	372	230
11.....	543	427				3,310	3,670	7,780	12,900	1,730	361	223
12.....	505	597				3,310	3,400	9,280	13,000	1,500	350	219
13.....	727	1,400	1,070			5,110	3,580	10,200	12,800	1,400	339	217
14.....	623	1,110			2,870	4,860	3,490	10,500	11,600	1,260	328	215
15.....	623	979				3,970	3,070	11,000	12,000	1,190	317	214
16.....	711	999				3,670	2,680	11,100	6,620	1,150	307	214
17.....	666	1,040				3,870	2,590		4,080	1,130	296	211
18.....	609	939				3,870	2,510		3,190	1,170	284	211
19.....		940				3,770	2,770		2,910	1,020	277	211
20.....		1,350				3,310	2,950	5,570	3,580	902	271	212
21.....	1,060			7,570		3,040	3,770		5,480	811	268	212
22.....		1,190				3,310	5,630		7,130	760	259	206
23.....	696	902				3,310			7,700	828	252	201
24.....	711					3,130		5,700	6,560	828	253	198
25.....	845			2,130	2,590	2,950	5,070	6,890	6,700	760	249	195
26.....	957			2,050	2,950	2,950		9,130	4,850	712	244	192
27.....	997	967		3,770	3,310	2,770	5,240	10,700	4,910	639	240	189
28.....	881		1,570	6,050	3,490	2,770	6,610		4,530	571	238	189
29.....	845			3,480		2,950	8,080	7,570	4,530	545	234	187
30.....	809			4,730		3,130	8,680		4,200	506	230	181
31.....	711			3,580		3,580				483	243	

NOTE.—Figures in brackets also Nov. 2-10, Apr. 15, Aug. 4-15, 26-29, 31, and Sept. 1-3, are estimates for periods when water-stage recorder was not in operation at the station on the river. Discharge June 1 to July 9 obtained by adding flow of Turlock and Modesto canals to the flow over the dam.

Combined monthly discharge of Tuolumne River and Sierra & San Francisco Power Co.'s canal near La Grange, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....		139	616	37,900
November.....		365	812	48,300
December.....			1,170	71,900
January.....			3,290	202,000
February.....			2,860	159,000
March.....	5,370	2,770	3,670	226,000
April.....	8,680	2,510	4,180	249,000
May.....	11,100		7,210	443,000
June.....	13,100	2,910	7,700	458,000
July.....	3,680	483	1,520	93,500
August.....	470	230	324	19,900
September.....	299	181	225	13,400
The year.....		139	2,790	2,020,000

NOTE.—See page 168 for record of flow of Sierra & San Francisco Power Co.'s canal.

FALLS CREEK NEAR HETCH HETCHY, CALIF.³

LOCATION.—In NE. $\frac{1}{4}$ sec. 3, T. 1 N., R. 20 E., in Yosemite National Park 300 feet above branch to Tueeulala Falls, one-fourth mile above Wapama Falls, 2 miles northeast of Hetch Hetchy, and 13 miles northeast of Sequoia, Tuolumne County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—November 22, 1915, to September 30, 1921.

³ Formerly known as near Sequoia.

GAGE.—Water-stage recorder on right bank.

DISCHARGE MEASUREMENTS.—Made from cable 400 feet above gage or by wading.

CHANNEL AND CONTROL.—Bed consists of broken boulders; rough; straight above and below station. Banks not subject to overflow. Control is ledge of rock 75 feet below gage. Point of zero flow, gage height 0.5 foot.

EXTREMES OF DISCHARGE.—Maximum stage during year, from water-stage recorder, 5.47 feet at 8 a. m. June 11 (discharge, 1,160 second-feet); minimum stage, from water-stage recorder, 0.71 foot September 29 and 30 (discharge, 0.1 second-foot).

1916-1921: Maximum stage, from water-stage recorder, 5.6 feet at 8 a. m. June 10, 1917 (revised discharge, 1,240 second-feet); practically no flow November 24, 1919.

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

DIVERSIONS.—None.

REGULATION.—None.

ACCURACY.—Stage-discharge relation permanent. Rating curve well defined.

Daily discharge ascertained by applying to rating table mean daily gage height determined by inspecting recorder graph, except October 6, when hourly discharge was averaged. Records excellent.

Discharge measurements of Falls Creek near Hetch Hetchy, Calif., during the year ending Sept. 30, 1921

[Made by C. J. Emerson]

Date	Gage height	Dis-charge
	<i>Feet</i>	<i>Sec.-ft.</i>
May 4.....	3.61	377
June 8.....	5.23	1,110
Aug. 9.....	1.55	10

Daily discharge, in second-feet, of Falls Creek near Hetch Hetchy, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	1.6	45	46	59	45	171	236	549	247	321	15	1.1
2.....	1.6	37	54	57	45	193	272	416	372	346	15	1.9
3.....	1.4	35	58	56	38	219	292	359	477	309	14	2.3
4.....	1.2	33	58	55	43	224	200	362	568	216	13	2.9
5.....	1.1	32	47	55	55	188	153	318	775	173	12	3
6.....	11	29	44	52	52	146	119	261	915	176	11	2.6
7.....	8	28	42	47	49	123	112	222	1,050	180	9	2.2
8.....	8	29	42	43	42	121	127	211	1,020	168	8.5	1.9
9.....	13	30	43	40	50	125	157	306	891	159	8	1.7
10.....	22	29	45	47	70	123	164	429	965	153	8	1.5
11.....	18	61	47	47	86	121	159	587	1,050	134	8	1.4
12.....	52	140	47	39	104	123	153	754	992	115	7	1.1
13.....	47	90	58	33	114	162	178	798	915	99	6.5	1
14.....	42	67	64	31	104	123	140	798	867	84	6	.9
15.....	56	64	52	33	82	114	110	820	647	78	5.5	.8
16.....	52	84	47	35	71	121	97	798	362	78	4.6	.7
17.....	41	72	40	83	59	138	100	440	244	77	4	.6
18.....	52	71	42	91	58	144	106	289	208	71	3.4	.6
19.....	58	88	46	61	51	115	131	236	275	61	3	.6
20.....	68	86	48	58	47	91	136	230	426	51	2.8	.5
21.....	71	66	55	62	49	82	222	264	606	44	2.5	.4
22.....	71	63	45	67	48	78	343	233	689	40	2.4	.4
23.....	68	54	42	64	55	83	410	266	626	39	2	.3
24.....	74	47	67	50	71	82	315	381	647	38	1.9	.2
25.....	93	41	56	45	95	99	241	487	530	37	1.8	.2
26.....	112	47	51	42	119	95	219	754	453	33	1.6	.2
27.....	119	100	68	44	134	86	286	891	440	27	1.4	.2
28.....	108	66	71	42	157	102	381	820	433	23	1.4	.1
29.....	104	54	74	47	-----	121	494	530	410	19	1.3	.1
30.....	78	48	97	45	-----	144	549	365	336	17	1.2	.1
31.....	56	-----	78	47	-----	190	-----	272	-----	16	1.1	-----

Monthly discharge of Falls Creek near Hetch Hetchy, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	119	1.1	48.7	2,990
November.....	140	28	57.9	3,450
December.....	97	40	54	3,320
January.....	91	31	50.9	3,130
February.....	157	38	71.2	3,950
March.....	224	78	131	8,060
April.....	549	97	220	13,100
May.....	891	211	466	28,700
June.....	1,050	208	615	36,600
July.....	346	16	109	6,700
August.....	15	1.2	5.90	363
September.....	3	.1	1.05	62.5
The year.....	1,050	.1	152	110,000

CHERRY CREEK NEAR HETCH HETCHY, CALIF.⁴

LOCATION.—In SW. $\frac{1}{4}$ sec. 28, T. 2 N., R. 19 E., in Stanislaus National Forest, at abandoned sawmill camp 3 miles by trail from Lake Eleanor, 13 miles north of Sequoia, and $7\frac{1}{2}$ miles northwest of Hetch Hetchy, Tuolumne County.

DRAINAGE AREA.—114 square miles⁵ (above dam site in sec. 5, T. 1 N., R. 19 E.).

RECORDS AVAILABLE.—April 1, 1910, to September 30, 1921, and May 26 to October 15, 1901, at Eleanor trail crossing.

GAGE.—Water-stage recorder on right bank 800 feet above site of old suspension bridge. Original gage was a water-stage recorder at the bridge. It was moved upstream to present site (new datum) October 22, 1913, and replaced by the present gage (same datum) November 30, 1914.

DISCHARGE MEASUREMENTS.—Made from cable 800 feet below gage or by wading.

CHANNEL AND CONTROL.—Bed consists of fine gravel and sand which shift slightly. Control is a solid rock dike except at right bank, where it is gravel and small boulders. Channel is straight above and curved to right below. Left bank is high; right bank fairly high and probably not subject to overflow. Zero flow, gage height 0.4 foot.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 8.37 feet at 11 p. m. June 10 (discharge, from extension of rating curve, about 3,840 second-feet); minimum stage from water-stage recorder, 0.78 foot September 30 (discharge, 0.8 second-foot).

1910-1921: Maximum mean daily discharge, 7,000 second-feet January 31, 1911 (maximum stage unknown); no flow September 6-12, 1910.

ICE.—Stream freezes over at gage but not at control. Stage-discharge relation probably not affected by ice.

DIVERSIONS.—None.

REGULATION.—None.

ACCURACY.—Stage-discharge relation permanent. Rating curve well defined between 10 and 3,000 second-feet. Operation of water-stage recorder satisfactory except for a few short periods from January to March. Daily discharge ascertained by applying to rating table mean daily gage height determined by averaging the readings printed every 15 minutes by the water-stage recorder, except October 6 and September 2, when hourly discharge was averaged. Records excellent except those for extreme low water which are considered good.

⁴ Formerly known as near Sequoia.

⁵ Freeman, J. R., The Hetch Hetchy water supply for San Francisco, p. 24, 1912.

Discharge measurements of Cherry Creek near Hetch Hetchy, Calif., during the year ending Sept. 30, 1921

[Made by C. J. Emerson]

Date	Gage height	Dis-charge	Date	Gage height	Dis-charge
	<i>Feet</i>	<i>Sec.-ft.</i>		<i>Feet</i>	<i>Sec.-ft.</i>
Nov. 4.....	2.01	78	July 26.....	1.87	58
May 9.....	4.26	868	Aug. 23.....	1.04	4.8

Daily discharge, in second-feet, of Cherry Creek near Hetch Hetchy, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	1.7	98	144	188	135	512	755	1,360	692	734	30	1.8
2.....	1.6	87	170	188	131	548	845	1,080	1,020	755	27	13
3.....	1.5	82	176	185	131	692	755	958	1,220	692	26	14
4.....	1.4	77	167	182	135	778	497	935	1,500	493	24	6
5.....	1.2	72	131	167	150	592	366	712	2,000	409	22	3.9
6.....	132	65	129	173	135	474	340	652	2,490	409	20	2.9
7.....	119	69	126	161	130	395	366	552	2,660	406	18	2.4
8.....	87	94	134	134	130	365	451	692	2,330	373	18	2.2
9.....	84	106	136	124	136	380	552	1,000	2,250	351	17	1.9
10.....	191	92	134	104	226	350	520	1,250	2,660	326	16	1.8
11.....	90	268	136	106	272	365	501	1,620	2,740	278	16	1.7
12.....	299	466	142	98	316	355	512	1,880	2,490	239	14	1.6
13.....	229	299	164	100	409	445	572	1,960	2,250	210	14	1.6
14.....	182	213	161	104	319	385	394	2,020	1,960	182	12	1.5
15.....	216	229	147	112	232	350	295	2,180	1,360	161	12	1.4
16.....	158	309	134	122	197	326	278	1,680	755	150	10	1.4
17.....	100	265	124	225	176	444	306	980	512	144	9.5	1.3
18.....	200	248	142	565	158	428	299	692	548	131	8.5	1.3
19.....	275	432	170	265	153	330	444	632	755	112	7.5	1.2
20.....	268	268	142	240	144	282	536	632	1,120	98	6	1.2
21.....	272	213	147	200	150	261	890	778	1,500	85	5.5	1.1
22.....	248	252	136	195	150	268	1,180	692	1,820	77	4.7	1.1
23.....	239	194	131	170	175	265	1,150	958	1,330	71	3.9	1.0
24.....	312	170	197	160	210	252	800	1,300	1,380	67	3.5	1.0
25.....	333	136	158	145	290	323	632	1,750	1,150	62	3.1	1.0
26.....	326	200	147	150	340	295	778	2,250	1,020	59	2.8	1.0
27.....	306	351	226	175	380	278	1,020	2,410	1,000	51	2.6	.9
28.....	265	197	248	170	455	348	1,300	1,960	980	46	2.3	.9
29.....	223	170	248	136	-----	421	1,500	1,120	890	40	2.2	.8
30.....	156	153	306	129	-----	485	1,560	822	755	36	2.0	.8
31.....	119	-----	232	140	-----	612	-----	612	-----	33	1.9	-----

NOTE.—Water-stage recorder not in operation Jan. 17-28, Jan. 31, Feb. 1, Feb. 3-8, 22-28, Mar. 7-15; discharge estimated from flow of Tuolumne River near Hetch Hetchy.

Monthly discharge of Cherry Creek near Hetch Hetchy, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	333	1.2	175	10,800
November.....	466	65	196	11,700
December.....	306	124	164	10,100
January.....	465	98	168	10,300
February.....	455	130	213	11,800
March.....	778	252	407	25,000
April.....	1,560	278	680	40,500
May.....	2,410	552	1,230	75,600
June.....	2,740	512	1,510	89,800
July.....	755	33	235	14,400
August.....	30	1.9	11.7	719
September.....	14	.8	2.46	146
The year.....	2,740	.8	415	301,000

LAKE ELEANOR NEAR HETCH HETCHY, CALIF.⁶

LOCATION.—In NW. $\frac{1}{4}$ sec. 3, T. 1 N., R. 19 E., at dam at Lake Eleanor, 11 miles north of Sequoia and $5\frac{1}{2}$ miles northwest of Hetch Hetchy, Tuolumne County.

RECORDS AVAILABLE.—October 1, 1919, to September 30, 1921.

GAGE.—Inclined staff gage on upstream face of tenth arch of dam, from left end. Crest of dam is at elevation 61.00 feet on gage.

REGULATION.—When reservoir is full, waste gates on left end of dam are left open. Water is drawn from storage through gates near the gage, and flows down natural channel of Eleanor Creek.

EXTREMES OF STAGE.—Maximum stage recorded during year, 60.8 feet July 21–22; minimum stage recorded, 43.7 feet September 30.

1919–1921: Maximum stage recorded, 60.8 feet July 21–22, 1921; minimum stage recorded, 30.0 feet December 1, 1919.

ACCURACY.—Gage read to tenths once daily.

COOPERATION.—Gage-height record furnished by city of San Francisco.

Daily gage height, in feet, of Lake Eleanor near Hetch Hetchy, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	48.2	52.1	57.2	55.3	48.6	46.2	54.2	59.1	58.3	60.2	59.4	51.7
2	48.1	52.0	57.0	55.2	48.0	46.7	55.5	58.9	58.3	60.2	59.2	51.4
3	48.0	52.0	56.8	55.2	47.5	47.1	56.8	58.7	58.4	60.2	59.0	51.2
4	47.8	52.0	56.7	55.1	46.8	48.2	57.7	58.7	58.5	60.2	58.8	50.9
5	47.6	52.0	56.5	55.0	46.3	48.8	58.2	58.6	58.7	60.2	58.5	50.6
6	47.6	52.0	56.3	54.9	45.9	49.1	58.5	58.4	58.8	60.1	58.3	50.3
7	47.5	52.1	56.1	54.8	45.7	49.2	58.8	58.3	59.0	60.0	58.0	50.0
8	47.4	52.2	56.0	54.8	45.4	49.3	59.1	58.2	58.9	59.9	57.8	49.8
9	47.3	52.3	55.8	54.8	45.3	49.3	59.4	58.2	58.7	59.7	57.6	49.5
10	47.2	52.4	55.7	54.3	45.3	49.3	58.9	58.5	58.7	59.9	57.4	49.2
11	47.1	52.6	55.6	54.1	45.4	49.4	58.8	58.7	58.8	60.0	57.2	49.0
12	47.4	53.5	55.5	53.9	45.6	49.5	58.8	59.0	59.0	60.2	56.9	48.7
13	47.7	53.9	55.3	53.8	45.9	50.1	58.8	59.2	59.1	60.3	56.6	48.4
14	47.8	54.2	55.2	53.6	46.1	50.4	58.7	59.3	59.0	60.4	56.3	48.1
15	47.8	54.6	55.0	53.3	46.2	50.5	58.5	59.3	58.8	60.5	56.0	47.9
16	47.9	55.2	54.9	53.1	46.0	50.5	58.4	59.2	58.8	60.6	55.8	47.6
17	48.0	55.5	54.8	53.1	45.7	50.6	58.3	58.9	59.1	60.7	55.6	47.3
18	48.1	55.9	54.8	53.7	45.4	50.8	58.3	58.6	59.2	60.7	55.4	47.0
19	48.3	56.3	55.0	54.0	45.2	50.9	58.3	58.5	59.3	60.7	55.1	46.8
20	48.7	57.0	55.0	54.1	45.2	51.0	58.4	58.3	59.3	60.7	54.8	46.5
21	49.0	57.3	55.1	54.1	45.3	50.8	58.8	58.4	59.6	60.8	54.5	46.2
22	49.3	57.5	55.2	53.8	45.3	50.7	59.2	58.4	60.0	60.8	54.2	46.0
23	49.6	57.8	55.2	53.0	45.3	50.6	59.3	58.4	60.2	60.7	54.0	45.7
24	50.0	57.9	55.2	52.6	45.4	50.5	59.1	58.5	60.3	60.7	53.8	45.5
25	50.3	57.9	55.3	52.1	45.5	50.7	58.8	58.7	60.2	60.5	53.5	45.2
26	50.7	57.9	55.2	51.6	45.9	51.0	58.7	58.9	60.1	60.3	53.2	45.0
27	51.1	57.8	55.1	51.2	46.0	51.1	58.8	59.1	60.0	60.2	53.0	44.5
28	51.4	57.7	55.0	50.7	46.1	51.3	59.0	59.1	59.9	60.1	52.7	44.2
29	51.7	57.6	55.0	50.3	-----	51.7	59.3	58.8	60.0	60.0	52.5	44.0
30	51.9	57.5	55.1	49.7	-----	52.5	59.5	58.5	60.1	59.8	52.2	43.7
31	52.0	-----	55.3	49.1	-----	53.2	-----	58.4	-----	59.6	52.0	-----

ELEANOR CREEK NEAR HETCH HETCHY, CALIF.⁶

LOCATION.—In SW. $\frac{1}{4}$ sec. 3, T. 1 N., R. 19 E., in Yosemite National Park, one-third mile below Lake Eleanor dam site, $1\frac{1}{2}$ miles below Lake Eleanor, 11 miles north of Sequoia, and $5\frac{1}{2}$ miles northwest of Hetch Hetchy, Tuolumne County.

DRAINAGE AREA.—79 square miles ⁷ (above dam site in sec. 3, T. 1 N., R. 19 E.).

RECORDS AVAILABLE.—November 20, 1909, to September 30, 1921.

GAGE.—Water-stage recorder in wooden house on reinforced concrete well on right bank, installed December 19, 1918, taking place of a Lietz recorder in use since November 13, 1915. Previous to November, 1915, recorder was 1 mile upstream on right bank, a short distance below a vertical staff in two sections, which was probably the original gage.

⁶ Formerly known as near Sequoia.

⁷ Freeman, J. R., The Hetch Hetchy water supply for San Francisco, p. 24, 1912.

DISCHARGE MEASUREMENTS.—Made from cable 75 feet above gage or by wading.
CHANNEL AND CONTROL.—Bed consists of small boulders. Control of large boulders, ledge, and concrete wall for low water. Channel straight above and below. Banks not subject to overflow. Zero flow, gage height 0.9 foot.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 6.30 feet at noon April 30 (discharge, 1,610 second-feet); minimum stage from water-stage recorder, 1.15 feet at noon October 13 (discharge, 1.2 second-feet).

1909-1921: Maximum stage recorded, 13.1 feet January 30, 1911 (discharge, 5,000 second-feet); minimum stage, dry September 8-14, 1910.

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

DIVERSIONS.—None.

REGULATION.—Flow completely regulated by operation of gates in Eleanor dam.

ACCURACY.—Stage-discharge relation permanent. Rating curve well defined.

Operation of water-stage recorder satisfactory throughout year. Daily discharge ascertained by applying to rating table mean daily gage height determined by inspecting recorder graph, except days of large diurnal fluctuation, when hourly discharge was averaged. Records excellent.

Discharge measurements of Eleanor Creek near Hetch Hetchy, Calif., during the year ending Sept. 30, 1921

[Made by C. J. Emerson]

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 10.....	4.48	578	Aug. 31.....	3.28	188
Aug. 24.....	2.96	127	31.....	3.16	167

Daily discharge, in second-feet, of Eleanor Creek near Hetch Hetchy, Calif., for the year ending Sept. 30, 1921

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	67	69	239	209	420	327	38	980	448	205	104	138
2.....	68	102	234	207	416	324	29	845	451	196	105	136
3.....	69	45	231	207	412	330	24	720	497	198	109	136
4.....	69	42	231	207	412	330	54	675	553	196	110	136
5.....	69	74	228	207	406	333	79	585	652	192	112	136
6.....	69	2.9	223	207	345	333	113	521	745	185	113	134
7.....	81	2.7	218	207	257	333	136	473	898	176	117	134
8.....	80	2.7	218	207	211	333	214	430	898	172	119	134
9.....	78	2.7	216	207	154	330	448	458	795	79	120	133
10.....	78	2.5	214	207	152	330	585	585	795	13	120	133
11.....	78	2.7	214	205	154	330	493	720	745	13	128	133
12.....	32	3.3	211	205	170	330	458	870	720	13	133	133
13.....	29	3.1	211	203	216	336	469	980	720	13	133	131
14.....	66	3.1	211	203	257	336	451	1,010	675	13	133	131
15.....	71	3.3	211	203	285	339	395	1,010	517	13	133	131
16.....	90	3.5	196	200	333	339	342	980	273	13	133	131
17.....	89	3.1	134	203	333	342	315	745	174	13	131	130
18.....	79	6	96	207	300	342	303	529	196	13	131	130
19.....	32	12	86	203	214	342	321	505	207	14	131	130
20.....	9.5	28	86	205	154	342	354	473	236	27	131	130
21.....	9.5	39	86	231	154	342	454	537	300	44	131	128
22.....	9	49	91	360	154	342	720	549	260	54	130	128
23.....	9	74	106	451	154	342	898	525	315	59	130	128
24.....	9	94	168	448	154	254	720	585	448	64	130	123
25.....	9	101	209	440	154	183	561	652	440	69	130	120
26.....	9	203	209	437	196	183	513	770	402	76	130	120
27.....	9.5	309	207	437	330	183	577	870	367	89	128	120
28.....	9.5	288	207	434	327	120	720	898	270	105	128	116
29.....	9.5	262	207	430	-----	95	820	720	198	105	128	112
30.....	10	244	207	430	-----	96	1,010	585	214	105	126	110
31.....	10	-----	209	423	-----	74	-----	505	-----	104	133	-----

Monthly discharges of Eleanor Creek near Hetch Hetchy, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	90	9	45.4	2,790
November.....	309	2.5	69.2	4,120
December.....	239	86	188	11,600
January.....	461	200	278	17,100
February.....	420	152	258	14,300
March.....	342	74	287	17,600
April.....	1,010	24	420	25,000
May.....	1,010	430	687	42,200
June.....	898	174	480	28,600
July.....	205	13	84.9	5,220
August.....	133	104	125	7,680
September.....	138	110	129	7,680
The year.....	1,010	2.5	254	184,000

SOUTH FORK OF TUOLUMNE RIVER NEAR BUCK MEADOWS, CALIF.

LOCATION.—At South Fork trail bridge, in Stanislaus National Forest, one-fourth mile above junction with Tuolumne River and 2 miles northeast of Buck Meadows, Mariposa County. Middle Fork enters $2\frac{1}{2}$ miles above station.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—September 13, 1910, to September 30, 1921 (records fragmentary before September 30, 1916).

GAGE.—Water-stage recorder installed November 4, 1916, on right bank 600 feet above trail bridge, at same location and datum as inclined staff gage installed May 19, 1914. Previous to this date gage was a vertical staff on middle pier of bridge at downstream end and at same datum as present gage.

DISCHARGE MEASUREMENTS.—Made from cable half a mile above gage or by wading.

CHANNEL AND CONTROL.—Boulders and gravel; very rough. A quantity of muck from the tunnels 3 miles above gage was washed down June, 1921, filling up the pool at the gage and lodging on the control, changing stage-discharge relation. Point of zero flow 3.4 feet, September 9, 1921.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 7.75 feet at 7 a. m. January 18 (discharge, 3,160 second-feet); minimum stage from water-stage recorder, 4 feet August 27, September 26–27, 29–30 (discharge, 5 second-feet).

1910–1921: Maximum stage recorded, between 8 and 10 feet January 25, 1914. A camper at the bridge said that on that date the water touched the under stringers of the footbridge (discharge not determined); minimum discharge, 3 second-feet September 15, 1913, and August 10, 1919.

DIVERSIONS.—Water is diverted at Harden ranch, 7 miles above mouth, for use in vicinity of Groveland.

REGULATION.—A small amount of storage is developed at Harden ranch.

ACCURACY.—Stage-discharge relation changed June 11–30 when muck from the tunnels above gage was washed down by high water and deposited on control. Rating curve before change well defined; curve after change poorly defined. Mean daily gage height determined by inspecting recorder graph. Daily discharge ascertained by applying daily gage height to rating table except January 17 and 18 when hourly discharge was averaged. Records good October 1 to June 11 and poor June 12 to September 30.

Discharge measurements of South Fork of Tuolumne River near Buck Meadows, Calif., during the year ending Sept. 30, 1921

[Made by C. J. Emerson]

Date	Gage height	Discharge
July 20.....	Feet 4.31	Sec.-ft. 29
Aug. 4.....	4.15	13

Daily discharge, in second-feet, of South Fork of Tuolumne River near Buck Meadows, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	9	24	32	85	171	282	316	744	478	70	16	6
2.....	9	24	50	74	153	302	316	665	540	68	15	10
3.....	8.5	22	42	71	142	338	341	580	515	66	14	11
4.....	8.5	22	37	70	140	404	296	605	510	57	14	9
5.....	8.5	22	34	68	200	369	264	560	585	57	13	8
6.....	12	22	35	71	144	355	252	483	695	58	12	7.5
7.....	36	24	38	50	136	302	246	445	725	60	12	7.5
8.....	21	28	39	56	136	264	252	437	677	58	11	7
9.....	19	28	38	57	131	261	273	449	575	53	10	7
10.....	23	26	42	50	137	249	264	478	610	55	10	6.5
11.....	20	28	91	42	158	246	255	695		50	10	7
12.....	27	77	60	48	190	249	246	764		46	9.5	6
13.....	34	90	42	61	210	488	267	764		46	9	7
14.....	25	56	45	55	255	327	255	725		43	8.5	6.5
15.....	22	45	42	56	200	267	228	643		40	8	7
16.....	22	66	42	64	183	282	222	648		40	7.5	6
17.....	22	52	40	378	179	292	215	555		37	7.5	6.5
18.....	41	46	40	1,650	160	288	212	483		36	7.5	6.5
19.....	29	48	66	535	154	273	228	449		35	8	7
20.....	25	87	54	255	149	255	231	433		30	7.5	7
21.....	25	61	46	192	212	240	273	470	275	29	7.5	7.5
22.....	25	54	69	164	196	261	369	457		29	7.5	6.5
23.....	25	48	60	144	181	255	425	488		27	7.5	6.5
24.....	25	42	90	134	190	249	348	525		26	7.5	6
25.....	27	40	96	124	215	252	299	525		23	6.5	5.5
26.....	29	37	71	136	240	246	313	695		22	5.5	5
27.....	32	40	64	372	255	237	397	764		20	5	5
28.....	32	42	64	313	270	240	496	695		19	6	5.5
29.....	31	36	67	208		255	648	585		19	6	5
30.....	32	33	78	270		264	725	510		17	6	5
31.....	28		102	200		285		470		16	5.5	

NOTE.—No gage-height record Oct. 7-27, and channel obstructed by muck from tunnels above, June 11-30; discharge estimated by comparison with flow of Middle Fork of Tuolumne River.

Monthly discharge of South Fork of Tuolumne River near Buck Meadows, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	41	8.5	23.6	1,450
November.....	90	22	42.3	2,520
December.....	102	32	55.4	3,410
January.....	1,650	42	195	12,000
February.....	270	131	182	10,100
March.....	488	237	286	17,600
April.....	725	212	316	18,800
May.....	764	433	574	35,300
June.....	725		380	22,600
July.....	70	16	40.4	2,480
August.....	16	5	9.05	556
September.....	11	5	6.78	403
The year.....	1,650	5	176	127,000

MIDDLE FORK OF TUOLUMNE RIVER NEAR BUCK MEADOWS, CALIF.

LOCATION.—In NW. $\frac{1}{4}$ NW. $\frac{1}{4}$ sec. 28, T. 1 S., R. 18 E., 800 feet below Hog ranch road highway bridge, half a mile above junction with South Fork of Tuolumne River, and 4 miles east of Buck Meadows, Mariposa County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—November 23, 1916, to September 30, 1921.

GAGE.—Water-stage recorder on left bank.

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

CHANNEL AND CONTROL.—Bed consists of gravel; permanent. Control is granite ledge across channel 100 feet below gage. One channel at all stages, straight for 100 feet above and 200 feet below gage; banks clear.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 6.65 feet at 6.15 a. m. January 18 (discharge, 884 second-feet); minimum stage from water-stage recorder, 0.58 foot September 30 (discharge, 1.1 second-feet).

1917–1921: Maximum stage, from water-stage recorder, 8.15 feet at 10.30 p. m. May 28, 1919 (discharge, 1,330 second feet); minimum discharge, 0.3 second-foot September 2 to 27, 1919.

DIVERSIONS.—None.

REGULATION.—None.

ACCURACY.—Stage-discharge relation permanent. Rating curve well defined below 600 second-feet and extended above. Mean daily gage height determined by inspecting recorder graph. Daily discharge ascertained by applying mean daily gage height to rating table except January 17 and 18, when hourly discharge was averaged. Records excellent.

Discharge measurements of Middle Fork of Tuolumne River near Buck Meadows, Calif., during the year ending Sept. 30, 1921

[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. 16.....	2.94	113	June 14.....	3.42	191	July 22.....	1.37	15
May 13.....	4.65	422	15.....	3.28	172	Aug. 11.....	.89	3.3
18.....	3.73	241	17.....	3.10	139	Sept. 29.....	.60	.9
27.....	4.77	445	July 6.....	1.80	34			

Daily discharge, in second-feet, of Middle Fork of Tuolumne River near Buck Meadows, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1.5	13	18	39	60	95	144	315	228	47	7	1.6
2	1.5	13	24	35	56	102	151	288	280	42	6.5	1.7
3	1.6	12	17	33	54	115	162	262	262	39	6.5	1.9
4	1.5	12	19	32	56	137	134	280	271	35	6	2.5
5	1.5	12	14	32	74	128	121	262	306	33	5.5	2.2
6	3.4	12	18	32	54	122	116	220	343	30	5	1.9
7	11	13	19	22	50	105	114	194	352	29	4.9	1.7
8	10	15	18	30	52	98	122	198	334	28	4.6	1.7
9	9	14	18	29	51	98	131	228	324	27	4.3	1.6
10	11	13	20	27	53	93	129	280	334	26	4.2	1.6
11	10	16	43	24	60	95	128	324	306	24	3.7	1.6
12	14	31	24	26	67	95	125	362	271	22	3.6	1.6
13	19	32	20	29	72	176	139	412	237	21	3.5	1.5
14	14	22	23	25	85	131	135	433	212	20	3.0	1.5
15	12	20	22	25	68	110	123	433	178	19	2.9	1.4
16	12	25	22	28	64	105	122	392	155	18	2.5	1.4
17	12	23	21	153	66	113	120	297	145	18	2.5	1.4
18	23	21	21	443	62	116	120	254	134	16	2.4	1.4
19	16	24	30	152	60	108	132	228	131	19	2.4	1.4
20	14	35	25	78	58	100	133	220	128	15	2.3	1.4
21	14	25	23	62	79	95	162	237	126	14	2.1	1.4
22	14	23	34	55	70	106	220	228	162	13	1.8	1.4
23	14	20	29	52	68	103	246	254	103	13	1.8	1.3
24	14	17	46	48	70	102	193	297	88	12	1.7	1.3
25	15	17	43	46	76	106	167	315	79	12	1.7	1.3
26	16	16	34	48	83	103	180	382	72	11	1.7	1.3
27	18	21	30	118	87	99	228	392	66	10	1.6	1.3
28	18	21	30	95	91	101	271	372	60	9	1.6	1.2
29	18	18	31	69	-----	109	306	297	54	8.5	1.6	1.2
30	18	18	37	100	-----	115	315	246	51	7.5	1.6	1.1
31	15	-----	43	68	-----	129	-----	220	-----	7.5	1.6	-----

NOTE.—No gage-height record Apr. 9-15; discharge estimated from flow of South Fork of Tuolumne River.

Monthly discharge of Middle Fork of Tuolumne River near Buck Meadows, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	23	1.5	12.0	738
November	35	12	19.1	1,140
December	46	14	26.3	1,620
January	443	22	66.3	4,080
February	91	50	65.9	3,660
March	176	93	110	6,760
April	315	114	163	9,700
May	433	194	294	18,100
June	352	51	193	11,500
July	47	7.5	20.8	1,280
August	7	1.6	3.29	202
September	2.5	1.1	1.53	91.0
The year	443	1.1	81.3	58,900

SIERRA & SAN FRANCISCO POWER CO.'S CANAL NEAR LA GRANGE, CALIF.

LOCATION.—In SW. $\frac{1}{4}$ sec. 16, T. 3 S., R. 14 E., at short flume opposite La Grange dam, just above waste gate, three-fourths mile above power house, $1\frac{1}{4}$ miles northeast of La Grange, Stanislaus County, and $13\frac{3}{4}$ miles below intake on Tuolumne River.

RECORDS AVAILABLE.—1908 to September 30, 1921 (not complete).

GAGE.—Enameled vertical staff on right side of flume near upper end; read by H. T. Sackett.

DISCHARGE MEASUREMENTS.—Made in flume just below gage.

CHANNEL AND CONTROL.—Rectangular ditch excavated mostly in shale rock.

EXTREMES OF DISCHARGE.—1908-1921: Maximum discharge recorded, 70 second-feet during part of season 1919-20.

ACCURACY.—Stage-discharge relation not changed during year. Rating curve well defined. Gage read to hundredths once daily. Daily discharge ascertained by applying gage height to rating table. Records good.

COOPERATION.—Gage-height record furnished by Turlock Irrigation District, through R. V. Meikle, chief engineer.

The Sierra & San Francisco Power Co.'s canal takes water from the south side of Tuolumne River at Indian Bar, in SW. $\frac{1}{4}$ sec. 6, T. 2 S., R. 15 E., 15 miles above the town of La Grange. This canal was built in the early days to supply water for hydraulic mining in the vicinity of La Grange, and is now locally known as the La Grange mining ditch. Having been thoroughly repaired, it is used principally as a supply canal for the hydroelectric plant which was installed in 1907. The power house is on the left bank of the river about half a mile above La Grange and is below La Grange dam. Water diverted by canal is returned to river at power house except during some irrigation seasons when it is returned to the river above La Grange dam and sold to the Waterford Irrigation District. During 1921 the water was returned to the river above La Grange dam from June 1 to July 7.

Discharge measurements of Sierra & San Francisco Power Co.'s canal near La Grange, Calif., during the year ending Sept. 30, 1921

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
Jan. 25	C. J. Emerson.....	Feet 2.88	Sec.-ft. 66	Apr. 11	R. C. Briggs.....	Feet 2.88	Sec.-ft. 66
Feb. 25	Kessler and Briggs.....	2.90	66	Aug. 15	C. J. Emerson.....	2.82	66

Daily discharge, in second-feet, of Sierra & San Francisco Power Co.'s canal near La Grange, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	July	Aug.	Sept.
1.....	58	65	67	67	67	67	67	69	-----	66	68
2.....	59	65	67	67	67	67	67	69	-----	67	69
3.....	59	65	67	67	67	67	66	68	-----	67	68
4.....	0	65	67	44	67	67	67	68	-----	67	68
5.....	64	65	67	67	63	67	67	44	-----	68	68
6.....	64	65	67	65	63	67	67	67	-----	68	67
7.....	44	65	67	66	67	67	67	67	-----	67	67
8.....	65	66	67	67	67	67	67	67	69	67	67
9.....	67	67	67	67	44	67	66	67	69	67	67
10.....	65	67	67	67	67	67	66	67	69	67	67
11.....	65	67	69	67	67	67	66	68	69	67	67
12.....	65	67	69	0	0	67	67	68	69	67	67
13.....	65	67	69	67	67	67	67	68	68	67	67
14.....	65	67	68	67	69	68	67	68	68	67	67
15.....	65	67	68	65	68	68	67	69	69	67	67
16.....	65	67	68	66	67	67	66	69	68	67	67
17.....	65	66	68	66	67	67	66	69	68	67	67
18.....	65	66	68	48	67	67	66	69	67	67	67
19.....	65	67	68	42	67	67	66	69	68	67	67
20.....	65	67	68	65	67	67	67	68	67	67	68
21.....	65	67	68	43	67	67	66	68	67	67	67
22.....	65	67	68	66	68	67	66	68	66	67	67
23.....	65	67	67	67	67	67	67	68	66	67	67
24.....	65	67	67	66	67	67	68	68	0	69	67
25.....	65	66	67	66	67	67	68	68	0	67	67
26.....	65	67	69	67	67	67	68	69	66	66	67
27.....	65	67	67	67	67	66	67	69	67	66	67
28.....	65	67	67	67	67	67	67	69	67	67	66
29.....	65	67	67	60	-----	67	68	68	67	67	67
30.....	65	67	69	58	-----	67	68	68	66	66	67
31.....	65	-----	67	65	-----	66	-----	68	67	66	-----

NOTE.—No flow June 1 to July 7. Gage not read Oct. 1, Dec. 16-20, Jan. 12, 28, Feb. 12, 19, 20, and Apr. 9; discharge estimated.

Monthly discharge of Sierra & San Francisco Power Co.'s canal near La Grange, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	67	0	61.6	3,790
November.....	67	65	66.4	3,950
December.....	69	67	67.6	4,160
January.....	67	0	60.9	3,740
February.....	69	0	63.6	3,530
March.....	68	66	67.0	4,120
April.....	68	66	66.8	3,970
May.....	69	44	67.4	4,140
June.....	0	0	0	0
July.....	69	0	48.0	2,950
August.....	69	66	67.0	4,120
September.....	69	66	67.2	4,000
The year.....	69	0	58.7	42,500

MODESTO CANAL NEAR LA GRANGE, CALIF.

LOCATION.—In SE. $\frac{1}{4}$ sec. 17, T. 3 S., R. 14 E., below waste gates, 500 feet below intake at La Grange dam on Tuolumne River, and $1\frac{1}{2}$ miles northeast of La Grange, Stanislaus County. Canal is on right bank of river.

RECORDS AVAILABLE.—April 26, 1903, to September 30, 1921.

GAGE.—Vertical staff in concrete well on left bank, 500 feet below head gates. March 27, 1920, gage was moved 50 feet downstream when canal was improved. Gage read by J. H. Morton.

DISCHARGE MEASUREMENTS.—Made from footbridge 500 feet below gage.

CHANNEL AND CONTROL.—Canal is concrete lined; control is cross section of canal below gage. For the last few years timber flumes that formed the canal a mile or more below the station have been gradually replaced by fills with concrete lining. The cross-section has been increased thereby increasing capacity of canal.

EXTREMES OF DISCHARGE.—1903-1921: Maximum discharge, 1,340 second-feet part of 1920.

ACCURACY.—Stage-discharge relation changed when canal was empty October 10 to February 19. Rating curves well defined. Gage read to hundredths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table or by averaging results obtained by applying gage height for parts of day to rating table. Records good.

COOPERATION.—Gage-height record furnished by Modesto Irrigation District.

The water is used for irrigation in the Modesto Irrigation District.

Discharge measurements of Modesto canal near La Grange, Calif., during the year ending Sept. 30, 1921

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		Feet	Sec.-ft.			Feet	Sec.-ft.
Feb. 25	Kessler and Briggs.....	7.02	906	Apr. 11	R. C. Briggs.....	7.33	995
Apr. 10	R. C. Briggs.....	4.68	468	May 8	do.....	8.42	1,270
10	do.....	5.61	642	Aug. 16	C. J. Emerson.....	2.10	110

Daily discharge, in second-feet, of Modesto canal near La Grange, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	116		1,160	716	1,250	816	1,160	165	74
2	116		1,160	716	1,250	816	1,160	165	81
3	102		1,160	716	1,250	816	1,160	165	101
4	102		1,080	776	1,250	816	1,160	154	85
5	120		924	816	1,250	816	1,110	148	101
6	98		924	816	1,250	816	836	148	97
7	107		924	816	1,250	880	756	143	89
8	116		924	880	1,250	880	756	132	85
9	89		924	924	1,250	902	756	126	77
10			495	924	1,250	924	696	126	77
11			214	990	1,250	968	656	121	74
12			214	1,010	1,250	1,040	562	116	70
13			214	1,080	1,250	1,110	508	121	70
14			309	1,110	1,250	1,160	455	116	70
15			356	1,130	1,250	1,200	421	110	70
16			356	1,060	1,250	1,280	404	110	70
17			356	924	1,250	1,280	388	101	70
18			356	880	1,250	1,280	438	97	70
19			356	968	1,250	1,320	372	93	70
20		101	356	1,160	1,250	1,320	325	93	70
21		356	716	1,160	1,200	1,320	281	89	70
22		438	716	1,160	1,160	1,320	267	89	85
23		616	716	1,200	1,040	1,320	281	85	85
24		816	716	1,200	924	1,320	281	85	85
25		968	716	1,200	880	1,320	295	81	85
26		1,110	716	1,200	816	1,320	267	81	85
27		1,160	716	1,230	816	1,250	240	81	85
28		1,160	716	1,230	816	1,160	214	77	85
29			716	1,230	816	1,160	201	77	85
30			716	1,230	816	1,160	189	77	85
31			716		816		177	77	

NOTE.—Canal dry Oct. 10 to Feb. 19.

Monthly discharge of Modesto canal near La Grange, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	120	0	31.2	1,920
February	1,160	0	240	13,300
March	1,160	214	666	41,000
April	1,220	716	1,020	60,700
May	1,250	816	1,130	69,500
June	1,320	816	1,100	65,500
July	1,160	177	541	35,300
August	165	77	111	6,820
September	101	70	80.2	4,770
The year	1,320	0	410	297,000

NOTE.—Canal dry for months for which no discharge is given.

TURLOCK CANAL NEAR LA GRANGE, CALIF.

LOCATION.—Near north line of NW. $\frac{1}{4}$ NW. $\frac{1}{4}$ sec. 21, T. 3 S., R. 14 E., just below H. T. Sackett's house, 2,400 feet below intake at La Grange dam, and $1\frac{1}{4}$ miles northeast of La Grange, Stanislaus County. Canal is on left bank of Tuolumne River.

RECORDS AVAILABLE.—July, 1899, to September 30, 1921.

GAGE.—Float gage in 8-inch pipe on left bank, 150 feet below observer's house. Previous gage, used until September 14, 1915, was float gage in well just below spillway and about 150 feet below intake tunnel. Gage read by H. T. Sackett.

DISCHARGE MEASUREMENTS.—Made from foot plank across lined section of canal at the gage.

CHANNEL AND CONTROL.—Cut partly lined, and fill completely lined.

Control is slope and cross section of canal below gage.

EXTREMES OF DISCHARGE.—1907–1921: Maximum stage recorded, 8.50 feet May 8–16, 19, and 20, 1921 (discharge, 1,820 second-feet); no flow during periods each year. Capacity of canal is about 1,800 second-feet.

ACCURACY.—Stage-discharge relation permanent during year. Rating curve well defined. Gage read to hundredths once daily and regulation of head gate recorded. Daily discharge ascertained by applying gage height to rating table except when range of stage was large when hourly discharge was averaged. Records excellent.

COOPERATION.—Gage-height record furnished by Turlock Irrigation District through R. V. Meikle, chief engineer.

The water is used to irrigate about 100, 000 acres of land in Turlock Irrigation District.

Discharge measurements of Turlock canal near La Grange, Calif., during the year ending Sept. 30, 1921

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>
Feb. 24	Kessler and Briggs.....	1.48	213	May 8	R. C. Briggs.....	8.50	1,790
Apr. 9	R. C. Briggs.....	6.55	1,280	June 22	.....do.....	8.44	1,800
11	.....do.....	3.48	579	Aug. 15	C. J. Emerson.....	.97	142

Daily discharge, in second-feet, of Turlock canal near La Grange, Calif., for year ending Sept. 30, 1921

Day	Oct.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....			218	1,040	1,790	1,540	1,540	250	73
2.....			218	1,090	1,790	1,540	1,540	250	86
3.....			218	1,090	1,790	1,540	1,480	250	127
4.....			218	1,140	1,790	1,540	1,330	218	120
5.....			218	1,140	1,790	1,540	1,270	211	120
6.....			218	1,200	1,790	1,540	1,270	204	113
7.....			218	1,200	1,790	1,540	1,590	183	99
8.....			218	1,250	1,820	1,540	1,560	176	86
9.....			218	1,270	1,820	1,540	1,400	162	79
10.....			218	1,350	1,820	1,540	1,300	169	74
11.....	91		218	1,270	1,820	1,540	1,200	155	70
12.....	95		337	1,460	1,820	1,540	1,200	155	67
13.....	149		571	1,510	1,820	1,540	924	155	65
14.....			634	1,510	1,820	1,540	806	155	65
15.....			634	1,560	1,820	1,540	762	141	65
16.....			634	1,560	1,590	1,540	718	134	62
17.....			634	1,540	936	1,620	696	127	62
18.....			634	1,510	1,660	1,680	784	120	62
19.....			634	1,540	1,820	1,590	654	106	62
20.....	634	204	634	939	1,790	1,730	554	106	62
21.....	634	204	674	900	1,480	1,790	476	99	62
22.....	634	204	740	1,510	1,400	1,790	440	92	47
23.....	211	218	806	1,620	1,460	1,680	440	92	47
24.....		218	876	1,680	1,650	774	476	86	47
25.....		218	948	1,730	1,680	1,140	476	86	47
26.....		218	972	1,760	1,650	1,350	458	86	47
27.....		218	972	1,760	1,540	1,480	386	86	47
28.....		218	972	1,760	1,540	1,540	332	80	47
29.....			972	1,760	1,540	1,540	314	79	47
30.....			996	1,760	1,540	1,540	282	77	47
31.....			996		1,540		266	77	

NOTE.—Canal dry during periods for which no records are given.

Monthly discharge of Turlock canal near La Grange, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	634	0	99.4	6,110
February.....	218	0	68.6	3,810
March.....	996	218	570	35,000
April.....	1,760	900	1,410	83,900
May.....	1,820	936	1,670	103,000
June.....	1,790	774	1,530	91,000
July.....	1,590	266	863	53,100
August.....	250	77	141	8,670
September.....	127	47	70.1	4,170
The year.....	1,820	0	537	389,000

NOTE.—Canal dry during months for which no record is given.

STANISLAUS RIVER BASIN

MIDDLE FORK OF STANISLAUS RIVER AT SAND BAR FLAT, NEAR AVERY, CALIF.

LOCATION.—At diversion dam of Sierra & San Francisco Power Co. at Sand Bar Flat, in Tuolumne County, 3 miles below Bakers Crossing, 11 miles above junction with North Fork of Stanislaus River, and 11 miles southeast of Avery, Calaveras County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—September 1, 1905, to September 30, 1921.

GAGE.—Staff showing depth of water over crest of dam. There is also a staff in flume below dam.

DISCHARGE.—Flow over dam is computed from formula developed by Sierra & San Francisco Power Co. Current-meter measurements are made in flume. Daily discharge, as published, is combined flow of river over dam and discharge of flume.

EXTREMES OF DISCHARGE.—1905-1921: Maximum mean daily discharge, 9,760 second-feet, March 19, 1907; minimum mean daily discharge, 34 second-feet, January 7, 1920.

DIVERSIONS.—Philadelphia ditch diverts water from South Fork of Stanislaus River below Strawberry and empties into Middle Fork above station.

REGULATION.—Relief reservoir (capacity, 16,000 acre-feet), on Relief Creek about a mile above mouth of creek, is used to store water.

COOPERATION.—Daily-discharge record furnished by Pacific Gas & Electric Co. through A. H. Markwart, vice president, in charge of engineering.

Daily discharge, in second-feet, of Middle Fork of Stanislaus River at Sand Bar Flat, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	184	143	248	298	326	766	1,290	2,220	1,370	1,240	280	277
2	121	133	243	461	320	767	1,440	1,900	1,460	1,270	277	290
3	111	128	246	298	314	1,020	1,400	1,700	1,440	1,240	270	295
4	109	124	242	299	320	2,450	1,160	1,750	1,760	984	299	291
5	104	125	236	298	336	1,150	1,000	1,570	2,250	856	262	260
6	112	123	240	298	315	1,060	929	1,390	2,760	857	263	268
7	171	125	255	279	300	965	857	1,200	2,930	874	279	292
8	218	121	240	285	294	876	928	1,250	2,850	839	275	266
9	170	121	237	280	305	875	1,090	1,480	2,680	820	271	285
10	152	130	239	271	352	875	1,090	1,630	2,830	765	273	279
11	115	131	240	277	403	929	1,040	1,920	2,960	562	273	286
12	119	206	241	259	451	910	1,020	2,170	2,880	502	273	277
13	129	234	234	270	499	1,130	1,070	2,340	2,710	513	298	273
14	111	203	237	278	566	1,050	1,020	2,370	2,590	522	293	276
15	111	190	250	281	499	946	855	2,560	2,120	521	290	276
16	110	213	246	286	457	929	707	2,440	1,610	522	281	276
17	122	230	241	585	437	1,020	706	1,830	1,180	529	279	276
18	145	236	236	552	420	1,060	706	1,480	1,000	492	277	276
19	135	235	244	365	413	1,020	876	1,400	948	454	274	276
20	131	262	227	353	402	911	910	1,260	1,330	423	268	274
21	115	270	225	359	420	838	1,160	1,240	1,770	390	272	276
22	133	266	248	328	397	623	1,570	1,270	2,100	369	271	276
23	140	276	250	304	400	706	1,800	1,430	2,120	384	268	268
24	140	241	267	315	419	672	1,420	1,550	2,050	396	268	268
25	155	242	271	305	499	708	1,270	1,780	1,630	378	283	268
26	135	234	261	316	554	697	1,260	2,140	1,500	341	287	267
27	185	278	260	350	599	683	1,440	2,420	1,480	303	283	262
28	200	276	275	336	670	670	1,730	2,370	1,510	293	287	274
29	199	279	270	320	-----	767	1,940	1,870	1,400	275	287	278
30	160	260	276	341	-----	875	2,120	1,630	1,250	289	283	281
31	157	-----	284	321	-----	1,070	-----	1,440	-----	283	279	-----

Monthly discharge of Middle Fork of Stanislaus River at Sand Bar Flat, Calif., for the year ending Sept. 30, 1921

Month	Observed discharge in second-feet			Run-off in acre-feet		Natural mean discharge in second-feet
	Maximum	Minimum	Mean	Observed	Natural	
October	218	104	142	8,730	7,440	121
November	279	121	201	12,000	10,300	173
December	284	225	249	15,300	12,900	210
January	585	259	327	20,100	18,000	292
February	670	294	417	23,200	21,500	388
March	2,450	623	936	57,600	54,400	885
April	2,120	706	1,200	71,400	70,200	1,180
May	2,560	1,200	1,770	109,000	118,000	1,920
June	2,950	948	1,950	116,000	114,000	1,920
July	1,270	275	596	36,600	35,900	584
August	298	262	277	17,000	16,300	168
September	295	260	276	16,400	6,430	108
The year	2,950	104	695	503,000	479,000	664

NOTE.—Natural mean discharge and run-off in acre-feet determined by deducting water diverted from South Fork of Stanislaus River into the Middle Fork and correcting for storage in relief reservoir.

STANISLAUS RIVER NEAR KNIGHTS FERRY, CALIF.

LOCATION.—In SW. $\frac{1}{4}$ sec. 1, T. 1 S., R. 12 E., 300 feet above old Tulloch dam, 2 miles above Goodwin dam, and 6 miles above Knights Ferry, Stanislaus County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—December 18, 1915, to September 30, 1921. Also at Knights Ferry, May 19, 1903, to April 30, 1916.

GAGE.—Water-stage recorder on right bank in reinforced concrete well and house.

DISCHARGE MEASUREMENTS.—Made from cable 20 feet above gage or by wading.

CHANNEL AND CONTROL.—Bed consists of solid rock and shifting sand. Channel straight for 250 feet above and 300 feet below; one channel at all stages. Control is Tulloch dam.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 9.45 feet at 8 a. m. January 18 (discharge, 16,200 second-feet); minimum stage from water-stage recorder, 1.10 feet at noon October 4 (discharge, 94 second-feet).

1915-1921: Maximum discharge, 20,000 second-feet, at 3.45 a. m. February 21, 1917; minimum stage recorded, 0.94 foot from 1 to 7 p. m. November 25, 1919 (discharge, 39 second-feet).

DIVERSIONS.—Numerous ditches divert water for mining above the station. Water is also diverted from the South Fork into Tuolumne basin and from North Fork for use in the vicinity of Murphy and Angels (see Utica Gold Mining Co.'s canal near Avery, page 177). The water diverted for the development of power on Middle Fork at Sand Bar Flat near Avery is returned to river above this station.

REGULATION.—Flow is partly regulated by storage in the drainage basins of the Middle, North, and South forks.

ACCURACY.—Stage-discharge relation changed from that of previous year. Rating curve well defined. Water-stage recorder stopped several times during year. Mean daily gage height determined by inspecting recorder graph. Daily discharge ascertained by applying mean daily gage height to rating table, except January 17 and 18 when hourly discharge was averaged. Estimated periods obtained by comparison with flow of Mokelumne River at Clements, the gage heights at the Goodwin dam, and the maximum and minimum gage heights recorded by the pencil. Records good.

Discharge measurements of Stanislaus River near Knights Ferry, Calif., during the year ending Sept. 30, 1921

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. 23	William Kessler.....	1.76	567	June 9	R. C. Briggs.....	5.33	6,580
Mar. 6	R. C. Briggs.....	3.36	2,850	July 30	do.....	1.54	302
Apr. 12	do.....	3.14	2,440				

Daily discharge, in second-feet, of Stanislaus River near Knights Ferry, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.	202	196	475	1,250	2,000	2,320	3,110	5,550	2,750	1,740	310	277
2.	196	202	726	1,000		2,320	3,660	4,350	2,930	1,680	317	297
3.	214	191	630	988		2,660	3,860	3,950	3,200	1,660	297	344
4.	120	174	534	964		3,570	3,020	4,050	3,570	1,400	297	344
5.	191	185	518	964		3,290	2,580	3,380	4,750	1,320	290	297
6.	179	174	460	1,060	1,520	3,020	2,320	3,110	5,950	1,200	277	271
7.	202	191	500	880	1,290	2,580	2,320	2,750	7,100	1,200	277	264
8.	208	227	715	792	1,210	2,400	2,320	2,840	6,750	1,120	290	284
9.	245	208	630	792	1,150	2,400	2,660	3,290	6,150	1,120	304	277
10.	258	202	803	759	1,150	2,400	2,660	4,050	6,350	1,520	297	277
11.	245	360	2,060	610	1,260	2,400	2,660	4,750	6,950	1,120	277	277
12.	208		1,350	620	1,510	2,320	2,580	5,950	6,550	928	277	264
13.	196		715	660	1,680	3,200	2,660	6,350	5,950	792	297	277
14.	202		560	610	2,660	3,200	2,490	6,750	5,350	671	310	277
15.			415	580	610	2,150	2,750	6,950	4,350	650	277	277
16.		452	535	610	1,680	2,580	1,950	6,950	3,200	660	290	264
17.		484	505	1,370	1,600	2,840	1,850	4,350	2,400	620	277	284
18.		445	475	10,900	1,490	2,930	1,820	3,290	1,930	580	284	297
19.		560	847	6,750	1,340	2,840	2,050	2,930	1,820	550	264	264
20.	250	1,480	1,000	4,750	1,250	2,580	2,150	2,660	2,010	520	277	297
21.		748	860	2,580	2,050	2,320	2,840	3,020	2,840	490	277	297
22.		693		1,920	1,740	2,320	3,950	3,020	3,570	460	277	297
23.		590		1,550	1,510	2,400	5,150	3,290	3,760	430	271	297
24.		570		1,370	1,490	2,240	3,760	3,950	3,570	400	277	297
25.	214	484		1,380	1,640	2,150	3,020	4,550	3,020	415	277	297
26.	202	460	1,000	1,880	2,150	3,020	5,950	2,580	415	277	297	297
27.	233	552	814	1,750	2,000	1,980	6,750	2,400	379	297	297	297
28.	245	781	1,080	1,740	2,080	2,030	6,950	2,400	351	317	297	297
29.	252	640		3,290	2,150	2,150	4,650	2,240	330	284	297	297
30.	252	543		2,600	2,400	2,400	3,570	1,800	304	284	297	297
31.	245				2,750	2,750	3,020		330	290		

NOTE.—Water-stage recorder did not operate Oct. 15-24, Nov. 11-13, Dec. 16, 17, 21-25, 28-31, Jan. 1, 26-28, 31, Feb. 1-5, Apr. 27-30, July 17-23, and Sept. 23-30; discharge estimated. Braced figures show mean discharge for periods indicated.

Monthly discharge of Stanislaus River near Knights Ferry, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October		120	226	13,900
November	1,480	174	450	26,800
December	2,060	460	810	49,800
January	10,900	610	1,890	116,000
February	2,660	1,150	1,690	93,900
March	3,570	1,980	2,560	157,000
April		1,820	3,020	180,000
May	6,950	2,660	4,420	272,000
June	7,160	1,800	3,940	234,000
July	1,740	304	821	50,500
August	317	264	288	17,700
September	344	264	289	17,200
The year	10,900	120	1,700	1,230,000

NORTH FORK OF STANISLAUS RIVER NEAR AVERY, CALIF.

LOCATION.—In sec. 35, T. 5 N., R. 15 E., 700 feet above intake of Utica Gold Mining Co.'s canal and 5 miles northeast of Avery, Calaveras County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—July 14, 1914, to September 30, 1921.

GAGE.—Vertical staff in two sections on right bank; read by James Hunter.

DISCHARGE MEASUREMENTS.—Made from cable 35 feet below gage or by wading.

CHANNEL AND CONTROL.—Large boulders and gravel; apparently permanent.

One channel at all stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 5.9 feet at 11.30 a. m. May 13 (discharge, 2,060 second-feet); minimum stage, 0.85 foot at 5 p. m. October 18 (discharge, 20 second-feet).

1914-1921: Maximum stage recorded, 8.7 feet May 11, 1915 (discharge, 5,250 second-feet); minimum stage, 0.85 foot November 27 and 29, 1919, and October 18, 1920 (discharge, 20 second-feet).

DIVERSION.—Water is diverted from Beaver Creek into the North Fork of Stanislaus River about half a mile above station.

REGULATION.—Flow regulated to some extent by reservoirs on the headwaters of this stream.

ACCURACY.—Stage-discharge relation permanent. Rating curve well defined between 30 and 4,000 second-feet. Gage read to half-tenths once daily or on alternate days. Daily discharge ascertained by applying gage height to rating table and interpolated for days on which gage was not read. Records good; low-water records subject to some uncertainty owing to effect of regulation and lack of refinement in gage readings.

COOPERATION.—Gage-height record furnished by Utica Gold Mining Co.

No discharge measurements were made during year.

Daily discharge, in second-feet, of North Fork of Stanislaus River near Avery, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept
1.....	43	65	133	328	200	720	630	1,620	1,250	630	77	77
2.....	43	57	168	312	200	745	652	1,580	1,400	588	77	75
3.....	43	54	178	295	200	770	675	1,540	1,420	545	77	73
4.....	40	54	212	280	194	745	698	1,580	1,440	420	77	71
5.....	36	57	280	265	189	720	720	1,620	1,470	295	77	69
6.....	61	57	280	258	189	745	770	1,580	1,500	236	77	67
7.....	50	57	328	251	200	770	820	1,540	1,540	178	77	65
8.....	43	57	361	232	189	770	848	1,540	1,580	138	79	63
9.....	43	57	344	212	189	770	875	1,540	1,620	98	81	61
10.....	46	61	396	190	189	770	932	1,710	1,660	96	81	61
11.....	46	61	328	168	227	770	990	1,880	1,700	94	81	61
12.....	50	361	265	158	265	822	1,020	1,970	1,740	92	81	59
13.....	54	361	251	149	280	875	1,050	2,060	1,790	89	81	57
14.....	50	361	237	158	295	932	1,120	2,010	1,840	79	81	56
15.....	46	378	212	168	469	990	1,180	1,960	1,880	69	81	54
16.....	43	396	212	190	414	1,020	1,180	1,920	1,790	63	79	54
17.....	36	431	212	212	361	1,050	1,180	1,880	1,700	57	77	54
18.....	20	431	246	378	344	1,050	1,220	1,840	1,580	63	77	54
19.....	94	1,050	280	545	328	875	1,250	1,790	1,470	69	77	54
20.....	65	1,050	288	436	328	798	1,250	1,790	1,360	69	79	52
21.....	69	930	295	328	328	720	1,250	1,790	1,250	69	81	50
22.....	69	720	295	265	320	698	1,280	1,840	1,220	71	81	48
23.....	65	585	295	212	312	675	1,320	1,880	1,180	73	81	46
24.....	69	396	295	232	320	630	1,320	1,840	1,180	77	81	46
25.....	94	237	295	251	328	585	1,320	1,790	1,180	81	81	46
26.....	94	120	280	266	479	585	1,400	1,740	1,050	79	79	46
27.....	98	361	265	280	630	585	1,470	1,700	930	77	77	46
28.....	85	212	258	240	720	608	1,540	1,620	770	79	77	46
29.....	85	168	251	200	-----	630	1,620	1,540	720	81	77	46
30.....	77	120	290	200	-----	630	1,620	1,430	630	81	77	46
31.....	73	-----	328	200	-----	630	-----	1,320	-----	81	77	-----

Monthly discharge of North Fork of Stanislaus River near Avery, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	98	20	59.0	3,630
November.....	1,050	54	310	18,400
December.....	396	133	270	16,600
January.....	545	149	254	15,600
February.....	720	189	310	17,200
March.....	1,050	585	764	47,000
April.....	1,620	630	1,110	66,000
May.....	2,060	1,320	1,720	106,000
June.....	1,880	630	1,390	82,700
July.....	630	57	155	9,530
August.....	81	77	78.8	4,850
September.....	77	46	56.8	3,380
The year.....	2,060	20	540	391,000

UTICA GOLD MINING CO.'S CANAL NEAR AVERY, CALIF.

LOCATION.—In sec. 35, T. 5 N., R. 15 E., 450 feet below headworks on North Fork of Stanislaus River and 5 miles northeast of Avery, Calaveras County.

RECORDS AVAILABLE.—July 14, 1914, to September 30, 1921.

GAGE.—Enameled vertical staff installed May 19, 1915, on right side of flume; gage used previous to May 19, 1915, was vertical staff 300 feet upstream.

Gage read by James Hunter.

DISCHARGE MEASUREMENTS.—Made from foot plank across flume at gage.

CHANNEL AND CONTROL.—Rectangular wooden flume.

EXTREMES OF DISCHARGE.—1914-1921: Maximum stage recorded, 1.65 feet May 19, 1915 (discharge, 116 second-feet).

ACCURACY.—Stage-discharge relation not changed during year. Rating curve well defined between 30 and 50 second-feet. Gage read to half-tenths on alternate days. Daily discharge ascertained by applying daily gage height to rating table and interpolating for days on which gage was not read. Records good.

COOPERATION.—Gage-height record furnished by Utica Gold Mining Co.

No discharge measurements were made during the year.

Daily discharge, in second-feet, of Utica Gold Mining Co.'s canal near Avery, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	36	58	70	70	70	70	75	70	66	70	62	66
2	36	43	70	70	70	70	75	70	68	70	62	66
3	36	40	70	70	70	70	75	70	70	70	62	66
4	32	40	70	70	70	70	75	70	70	70	62	64
5	32	43	70	70	70	70	75	70	70	70	62	62
6	58	43	70	70	70	70	75	70	70	70	62	60
7	50	43	70	70	70	70	75	70	70	70	62	58
8	36	43	70	70	70	70	75	70	70	68	64	58
9	36	43	70	70	70	70	75	70	70	66	66	58
10	43	46	70	70	70	70	78	70	70	66	66	56
11	43	46	70	70	70	70	80	70	70	66	66	54
12	46	70	70	70	70	70	80	70	70	66	66	52
13	50	70	70	70	70	70	80	70	70	66	66	50
14	50	70	70	70	70	70	80	68	70	66	66	50
15	43	70	70	70	70	70	80	66	70	66	66	50
16	36	70	70	70	70	72	80	66	70	66	64	46
17	36	70	70	70	70	75	80	66	70	66	62	43
18	32	70	70	70	70	75	78	66	70	66	62	40
19	66	70	70	70	70	75	75	66	70	66	62	36
20	58	70	70	70	70	75	72	66	70	66	64	36
21	58	70	70	70	70	75	70	66	70	66	66	36
22	58	70	70	70	70	75	70	66	70	66	66	34
23	58	70	70	70	70	75	70	66	70	66	66	32
24	62	70	70	70	70	75	72	66	70	66	68	32
25	70	70	70	70	70	75	75	66	70	66	70	32
26	70	70	70	70	70	75	75	66	70	66	70	32
27	70	70	70	70	70	75	75	66	70	66	70	32
28	70	70	70	70	70	75	72	66	70	66	70	32
29	66	70	70	70	70	75	70	66	70	66	70	32
30	66	70	70	70	70	75	70	66	70	66	70	32
31	66	70	70	70	70	75	75	66	70	66	70	32

Monthly discharge of Utica Gold Mining Co.'s canal near Avery, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	70	32	50.6	3, 110
November.....	70	40	60.6	3, 610
December.....	70	70	70.0	4, 300
January.....	70	70	70.0	4, 300
February.....	70	70	70.0	3, 890
March.....	75	70	72.5	4, 460
April.....	80	70	75.2	4, 470
May.....	70	66	67.7	4, 160
June.....	70	66	69.8	4, 150
July.....	70	66	67.0	4, 120
August.....	70	62	65.5	4, 030
September.....	66	32	46.6	2, 770
The year.....	80	32	65.4	47, 400

SOUTH SAN JOAQUIN CANAL NEAR KNIGHTS FERRY, CALIF.

LOCATION.—At footbridge three-fourths mile below head gate at Goodwin dam on Stanislaus River and 4 miles above Knights Ferry, Stanislaus County.

RECORDS AVAILABLE.—May 1, 1914, to September 30, 1921. Also miscellaneous measurements and rough estimates for 1913.

GAGE.—Vertical staff in concrete well on left bank installed March 12, 1915. A water-stage recorder was installed in same well July 1, 1921. Original gage was inclined staff on right bank 100 feet below and probably at the same datum. Staff gage read by G. H. Hill.

DISCHARGE MEASUREMENTS.—Made from footbridge at gage.

CHANNEL AND CONTROL.—Canal has trapezoidal section and is concrete lined. Tunnels below gage lined with concrete between September 19, 1919, and February 7, 1920.

EXTREMES OF DISCHARGE.—1914-1921: Maximum stage from water-stage recorder, 8.05 feet at 2 a. m. July 2, 1921 (discharge, 1,070 second-feet); no flow several periods each year.

ACCURACY.—Stage-discharge relation not changed during year. Rating curve well defined. Gage read to hundredths twice daily to June 30. Water-stage recorder gage heights used July 1 to September 30. Daily discharge ascertained by applying mean daily gage height to rating table except July 20, 22, and September 14, when hourly discharge was averaged. Records good October to June and excellent July 1 to September 30.

COOPERATION.—Daily gage-height record furnished by South San Joaquin Irrigation District.

South San Joaquin canal is on the right bank of Stanislaus River. The water is used for irrigation in the Oakdale and South San Joaquin irrigation districts.

Discharge measurements of South San Joaquin canal near Knights Ferry, Calif., during the year ending Sept. 30, 1921

[Made by R. C. Briggs]

Date	Gage height	Dis-charge	Date	Gage height	Dis-charge
	<i>Feet</i>	<i>Sec.-ft.</i>		<i>Feet</i>	<i>Sec.-t.</i>
Apr. 12.....	6.75	862	June 9.....	7.55	955
13.....	7.35	972	July 30.....	3.18	266
May 9.....	.97	40			

Daily discharge, in second-feet, of South San Joaquin canal near Knights Ferry, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.	145	48		635	754	998	754	1,070	227	227
2.	114	22		454	771	998	771	1,070	234	227
3.	110			300	771	998	771	1,070	221	278
4.	62			114	686	998	788	1,020	215	285
5.	52		52	8	652	998	908	890	215	234
6.	62		390	0	788	998	998	926	215	215
7.	62		324	0	856	998	998	998	209	203
8.	62		0	0	890	518	998	998	209	215
9.	82		0	165	873	42	998	980	221	221
10.	52		0	470	822	406	980	1,030	215	221
11.	52		0	470	822	926	998	962	203	221
12.	52		0	470	856	968	998	788	203	215
13.	48		0	502	890	968	998	686	215	234
14.	48		311	534	926	1,020	998	518	221	180
15.	66		635	438	926	1,020	998	486	215	227
16.	87		669	486	944	1,020	1,020	518	215	215
17.	124		669	550	944	1,020	1,020	518	209	215
18.	134		686	567	944	998	1,030	486	215	221
19.	63		686	567	944	1,020	1,030	454	209	209
20.	0		686	550	944	1,020	1,030	376	203	215
21.	0		669	652	944	998	1,030	360	197	215
22.	22		686	805	980	998	1,030	298	221	215
23.	36		703	805	998	1,020	1,020	315	221	221
24.	74		703	822	998	1,020	1,030	330	215	215
25.	62		703	856	998	998	1,020	322	215	215
26.	48		703	754	980	962	1,020	330	203	197
27.	42		703	686	998	890	1,030	292	215	203
28.	21		703	652	998	873	1,030	270	221	209
29.	0			652	998	822	1,050	255	227	209
30.	28			652	998	754	1,050	240	227	221
31.	42			703		754		234	227	

NOTE.—Canal dry Nov. 3 to Feb. 4.

Monthly discharge of South San Joaquin canal near Knights Ferry, Calif., for the year ending Sept. 30, 1921

Month.	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.	145	0	59.7	3,670
November.	48	0	2.33	139
February.	703	0	381	21,200
March.	856	0	494	30,400
April.	998	652	896	53,300
May.	1,020	42	906	55,700
June.	1,050	754	980	58,300
July.	1,070	234	616	37,900
August.	234	197	215	13,200
September.	285	180	220	13,100
The year.	1,070	0	396	287,000

NOTE.—No flow during months for which no record is given.

OAKDALE CANAL NEAR KNIGHTS FERRY, CALIF.

LOCATION.—On lot no. 2, near northwest corner of SE. $\frac{1}{4}$ SE. $\frac{1}{4}$ sec. 10, T. 1 S., R. 12 E., 1,700 feet below head gate at Goodwin dam on Stanislaus River, and 4 miles above Knights Ferry, Stanislaus County.

RECORDS AVAILABLE.—May 3, 1914, to September 30, 1921. Also miscellaneous measurements and rough estimates for 1913.

GAGE.—Vertical staff in well on left bank installed April 29, 1916; previous gage was a vertical staff in well on left bank about 800 feet below head gate and at a different datum. Gage read by Collins and Quinley.

DISCHARGE MEASUREMENTS.—Made from footbridge at gage.

CHANNEL AND CONTROL.—Canal has trapezoidal section and side walls are concrete.

EXTREMES OF DISCHARGE.—1914-1921: Maximum stage recorded, 5.47 feet June 20, 23-25, 1920 (discharge, 247 second-feet); no flow during periods of each year.

ACCURACY.—Stage-discharge relation changed slightly April 19. Rating curves well defined. Gage read to hundredths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table. Records excellent.

COOPERATION.—Gage-height record furnished by Oakdale Irrigation District.

Oakdale canal diverts water from left bank of Stanislaus River at Goodwin dam. The water is used for irrigation in the Oakdale Irrigation District.

Discharge measurements of Oakdale canal near Knights Ferry, Calif., during the year ending Sept. 30, 1921

[Made by R. C. Briggs]

Date	Gage height	Discharge	Date	Gage height	Discharge
	<i>Feet</i>	<i>Sec.-ft.</i>		<i>Feet</i>	<i>Sec.-ft.</i>
Apr. 12.....	4.65	199	May 9.....	2.66	91
May 9.....	5.37	229	June 8.....	5.36	232
9.....	4.01	158	July 30.....	2.71	91

Daily discharge, in second-feet, of Oakdale canal near Knights Ferry, for the year ending Sept. 30, 1921

Day	Oct.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	65	-----	156	234	234	234	88	79
2.....	49	-----	172	234	234	234	84	79
3.....	86	-----	140	234	234	234	84	88
4.....	90	-----	162	234	234	234	84	92
5.....	95	-----	162	234	234	234	79	79
6.....	110	-----	172	234	234	234	74	74
7.....	120	-----	194	234	234	234	74	79
8.....	130	-----	194	234	234	234	70	74
9.....	156	-----	194	217	234	234	74	74
10.....	110	-----	194	234	234	234	74	74
11.....	100	-----	194	234	234	234	70	79
12.....	90	-----	194	234	234	234	70	74
13.....	86	-----	194	334	234	190	74	79
14.....	86	-----	194	234	234	173	79	84
15.....	82	-----	200	234	234	173	74	79
16.....	73	-----	200	234	234	190	74	74
17.....	69	-----	211	234	234	184	70	74
18.....	95	-----	211	234	234	168	79	79
19.....	84	-----	217	234	234	157	74	70
20.....	-----	-----	222	234	234	142	70	74
21.....	-----	55	222	217	234	112	62	74
22.....	-----	82	228	234	234	142	79	74
23.....	-----	86	234	234	234	127	74	74
24.....	-----	82	234	217	234	127	74	74
25.....	-----	114	234	200	234	122	74	70
26.....	-----	114	234	206	234	117	70	66
27.....	-----	124	234	212	234	107	74	70
28.....	-----	124	234	228	234	102	79	70
29.....	-----	150	234	228	234	92	79	70
30.....	-----	156	234	234	234	88	79	74
31.....	-----	156	-----	234	-----	88	84	-----

NOTE.—Canal dry Oct. 20 to Mar. 20.

Monthly discharge of Oakdale canal near Knights Ferry, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	130	0	57.3	3,520
March.....	156	0	40.1	2,470
April.....	234	140	203	12,100
May.....	234	200	229	14,100
June.....	234	234	234	13,900
July.....	234	88	174	10,700
August.....	88	62	75.6	4,650
September.....	92	66	75.8	4,510
The year.....	234	0	91.2	66,000

NOTE.—No flow during months for which no record is given.

CALAVERAS RIVER BASIN

CALAVERAS RIVER AT JENNY LIND, CALIF.

LOCATION.—In SE. $\frac{1}{4}$ sec. 22, T. 3 N., R. 10 E., at highway bridge on Milton road, one-fourth mile southeast of Jenny Lind, Calaveras County, and 27 miles above junction with San Joaquin River. North and South forks unite 15 miles above station.

DRAINAGE AREA.—395 square miles.

RECORDS AVAILABLE.—January 1 to June 30, 1907; December 1, 1907, to June 30, 1908; and November 1, 1908, to September 30, 1921.

GAGE.—Vertical staff in two sections on downstream end of middle pier of bridge. Datum lowered 5 feet October 13, 1917.

DISCHARGE MEASUREMENTS.—Made from bridge at gage or by wading.

CHANNEL AND CONTROL.—Gravel and small boulders; shift during high water. Banks not subject to overflow.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 15.0 feet January 18 (discharge, from extension of rating curve, about 54,500 second-feet); no flow in river October 1–7 and July 10 to September 30.

1907–1921: Maximum discharge, from extension of rating curve, about 69,600 second-feet at 7 a. m. January 31, 1911, stage was higher about midnight; no flow during fall of 1913 to 1915 and 1917 to 1921.

DIVERSIONS.—A small quantity of water is stored at Salt Springs Valley for use in connection with dredging operations below Jenny Lind.

ACCURACY.—Stage-discharge relation not changed during year. Rating curve well defined below 1,000 second-feet and extended above. Gage read to tenths once daily. Daily discharge ascertained by applying mean daily gage height to rating table. Records poor.

COOPERATION.—Gage-height record furnished by the United States Weather Bureau through N. R. Taylor, meteorologist.

Discharge measurements of Calaveras River at Jenny Lind, Calif., during the year ending Sept. 30, 1921

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>
Dec. 28	K. M. Kelley.....	4.14	288	Apr. 13	R. C. Briggs.....	3.80	161
Feb. 8	do.....	4.55	514	May 6	do.....	3.62	84
Mar. 7	R. C. Briggs.....	4.30	367	June 7	do.....	3.42	37

Daily discharge, in second-feet, of Calaveras River at Jenny Lind, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July
1		37	84	320	990	420	273	84	84	1.0
2		37	84	320	740	420	273	84	58	1.0
3		37	150	273	600	370	229	58	58	1.0
4		37	150	273	600	370	188	58	58	1.0
5		37	114	229	1,600	320	188	58	37	.5
6		21	114	370	820	320	150	58	37	.5
7		21	188	370	670	320	150	58	37	.5
8	1	21	320	273	600	320	114	58	37	.5
9	1	21	320	273	480	320	114	58	37	.5
10	1	37	990	229	480	320	114	58	21	
11	1	37	370	229	420	320	114	58	21	
12	1	37	990	229	370	320	114	37	21	
13	1	37	820	229	320	670	114	37	21	
14	1	114	320	188	670	670	114	37	21	
15	1	114	188	188	540	600	114	37	10	
16	2	114	114	188	480	540	114	21	10	
17	2	188	114	188	480	420	114	21	10	
18	2	114	84	54,500	480	420	84	21	10	
19	5	114	150	5,430	480	420	84	21	10	
20	5	540	150	5,430	480	320	84	21	10	
21	21	540	114	1,860	480	320	84	21	5	
22	21	229	114	370	480	600	84	150	5	
23	21	188	2,300	229	480	540	84	150	5	
24	21	114	1,080	150	480	420	84	150	5	
25	21	84	1,600	150	480	420	84	114	5	
26	21	58	820	150	480	370	84	114	2	
27	21	84	670	188	480	370	84	114	2	
28	21	84	670	370	480	370	84	114	2	
29	21	84	540	370		370	84	114	2	
30	21	84	420	15,000		320	84	84	2	
31	21		420	1,480		320		84		

NOTE.—No flow Oct. 1-7 and July 10 to Sept. 30.

Monthly discharge of Calaveras River at Jenny Lind, Calif., for the year ending Sept. 30, 1921

[Drainage area, 395 square miles]

Month	Discharge in second-feet				Run-off	
	Maximum	Minimum	Mean	Per square mile	Inches	Acre-feet
October	21	0	8.23	0.021	0.02	506
November	540	21	109	.276	.31	6,490
December	2,300	84	470	1.19	1.37	28,900
January	54,500	150	2,900	7.34	8.46	178,000
February	1,600	320	576	1.46	1.52	32,000
March	670	320	407	1.03	1.19	25,000
April	273	84	123	.311	.35	7,320
May	150	21	69.4	.176	.20	4,270
June	84	2.0	21.4	.054	.06	1,270
July	1.0	0	.21	.00053	.0006	12.9
August	0	0	0	0	0	0
September	0	0	0	0	0	0
The year	54,500	0	393	.995	13.48	284,000

MOKELUMNE RIVER BASIN

MOKELUMNE RIVER NEAR CLEMENTS, CALIF.

LOCATION.—In NW. $\frac{1}{4}$ sec. 15, T. 4 N., R. 8 E., at highway bridge 1 mile north of Clements, San Joaquin County. Cosumnes River enters $19\frac{1}{2}$ miles below station. North and Middle forks of Mokelumne River unite 35 miles above Clements.

DRAINAGE AREA.—631 square miles.

RECORDS AVAILABLE.—October 28, 1904, to September 30, 1921.

GAGE.—Staff in four sections at bridge; No. 1, vertical, fastened to pile in middle of left low-water channel; No. 2, vertical post in left bank; No. 3, vertical, bolted to middle pier near downstream end; No. 4, vertical, bolted to left abutment near downstream end. Read by Frank Hodges.

DISCHARGE MEASUREMENTS.—Made from bridge at gage or by wading.

CHANNEL AND CONTROL.—Sand and gravel; somewhat shifting. Right bank is high and not subject to overflow; left bank is overflowed above stage 15 feet for a distance of 200 feet.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 14.4 feet at 11 a. m. January 18 (discharge, 11,100 second-feet); minimum discharge, 52 second-feet October 1.

1904–1921: Maximum stage recorded, 17.45 feet January 30, 1911 (discharge, 16,700 second-feet); minimum stage, 0.6 foot at 7.30 p. m. July 26, 1920 (discharge, 8 second-feet).

DIVERSIONS.—Several small ditches divert water for mining and irrigation above station. Power is developed on the North Fork and part of the water is diverted outside of the drainage.

REGULATION.—Flow partly regulated by storage developed on the head-waters of the North Fork.

ACCURACY.—Stage-discharge relation changed June 8. Rating curve before change fairly well defined between 50 and 2,000 second-feet and extended parallel to previous curves; curve used after change poorly defined. Gage read to tenths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table. Records good for high and fair for low stages.

Discharge measurements of Mokelumne River near Clements, Calif., during the year ending Sept. 31, 1921

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>
Dec. 27	K. M. Kelley	3.02	600	May 6	R. C. Briggs	5.44	2,180
Feb. 7	do	3.45	782	June 8	do	10.1	6,430
Mar. 7	R. C. Briggs	4.93	1,700	Sept. 20	K. M. Kelley	1.50	111
Apr. 14	do	4.85	1,670				

Daily discharge, in second-feet, of Mokelumne River near Clements, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	52	159	386	1,110	1,110	1,630	2,250	4,160	2,250	1,230	95	120
2	86	147	420	885	1,170	1,780	2,840	3,000	2,500	995	120	120
3	64	114	460	885	995	1,830	2,170	2,840	2,920	885	128	111
4	52	114	400	830	885	2,920	2,090	3,090	3,260	675	128	128
5	95	104	380	750	940	2,330	1,630	2,410	4,160	580	103	95
6	71	104	322	995	885	2,090	1,490	2,170	5,020	470	147	73
7	159	78	400	725	885	1,860	1,460	1,930	5,900	450	147	111
8	224	124	380	650	802	1,630	1,490	1,930	5,300	430	88	103
9	210	184	322	550	830	1,700	1,780	2,580	4,730	370	138	103
10	197	159	480	502	802	1,560	1,630	3,090	5,110	335	138	66
11	159	159	675	420	995	1,490	1,630	4,260	4,920	410	158	73
12	171	171	885	400	1,110	1,490	1,630	5,300	4,920	352	158	54
13	197	575	460	420	1,230	2,250	1,780	5,600	4,640	300	147	66
14	171	440	400	400	1,700	2,500	1,700	5,800	4,160	270	147	88
15	184	304	360	380	1,360	1,930	1,420	6,100	2,750	228	128	95
16	171	287	322	420	1,170	1,780	1,360	5,700	2,090	202	95	111
17	114	304	304	460	1,110	1,860	1,110	3,260	1,490	179	158	103
18	136	380	322	7,350	1,110	2,090	1,170	2,410	1,290	138	138	111
19	400	341	460	3,530	995	1,930	1,110	2,170	1,490	158	128	73
20	304	1,360	750	2,660	885	1,780	1,170	2,090	1,420	179	120	103
21	210	525	525	1,560	1,230	1,630	1,930	1,930	2,010	147	168	120
22	159	502	625	1,230	1,230	1,490	2,580	2,090	3,090	179	80	95
23	147	525	440	995	1,050	1,560	3,440	2,840	2,580	158	147	80
24	124	400	965	995	1,110	1,490	2,840	3,440	2,250	111	128	103
25	95	360	940	940	1,230	1,560	2,250	4,350	2,250	111	111	103
26	124	287	700	830	1,360	1,630	1,930	5,500	1,560	128	120	60
27	136	304	650	1,050	1,230	1,360	2,410	6,400	1,490	138	111	88
28	147	700	650	1,630	1,490	1,360	3,260	5,900	1,360	120	103	103
29	159	420	675	1,230	-----	1,360	3,800	3,440	1,490	103	73	111
30	184	420	675	3,260	-----	1,360	4,440	2,330	1,230	120	138	111
31	136	-----	1,630	1,630	-----	1,290	-----	2,010	-----	128	103	-----

Monthly discharge of Mokelumne River near Clements, Calif., for the year ending Sept. 30, 1921

[Drainage area, 631 square miles]

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	400	52	156	9,590
November	1,360	78	335	19,900
December	1,630	304	561	34,500
January	7,350	380	1,280	78,700
February	1,700	802	1,100	61,100
March	2,920	1,290	1,760	108,000
April	4,440	1,110	2,060	123,000
May	6,400	1,930	3,550	218,000
June	5,900	1,230	2,990	178,000
July	1,230	103	332	20,400
August	168	73	126	7,750
September	128	54	96.0	5,710
The year	7,350	52	1,190	865,000

MIDDLE FORK OF MOKELUMNE RIVER AT WEST POINT, CALIF.

LOCATION.—In sec. 10, T. 6 N., R. 13 E., 1,000 feet above highway bridge, 1 mile south of West Point, Calaveras County, $1\frac{1}{4}$ miles below mouth of Bear Creek, and $3\frac{1}{2}$ miles above junction with South Fork.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—October 9, 1911, to September 30, 1921.

GAGE.—Vertical staff in two sections, fastened to trees on right bank; read by M. A. Spink.

DISCHARGE MEASUREMENTS.—Made from cable half a mile above gage or by wading.

CHANNEL AND CONTROL.—Boulders and gravel; fairly permanent. Point of zero flow at gage height 2.19 feet, September 19, 1921.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 6.30 feet at 4 p. m. January 18 (discharge, 640 second-feet); minimum stage, 2.50 feet September 25-30 (discharge, 1.8 second-feet).

1911-1921: Maximum stage recorded, 10.0 feet at 4 p. m. January 23, 1914 (discharge, 2,550 second-feet); minimum stage 2.40 feet August 16-30, 1919, and August 6-23, 1920 (discharge, 1.0 second-foot).

DIVERSIONS.—Mokelumne Hill and Valley Springs ditch (capacity about 6 second-feet) diverts water about 2 miles above station.

REGULATION.—None.

ACCURACY.—Stage-discharge relation not changed. Rating curve well defined below 900 second-feet and is extended above. Gage read to half-tenths and hundredths once daily. Daily discharge ascertained by applying daily gage height to rating table. Records good except during high stages for which they are fair.

Discharge measurements of Middle Fork of Mokelumne River at West Point, Calif., during the year ending Sept. 30, 1921

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
May 5	R. C. Briggs	Feet 4.14	Sec.-ft. 105	Sept. 19	K. M. Kelley	Feet 2.59	Sec.-ft. 3.3
5	do	4.10	103	19	do	2.59	3.4

Daily discharge, in second-feet, of Middle Fork of Mokelumne River at West Point Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	2.2	8	18	80	127	152	178	127	75	16	4.7	3.0
2	2.2	8	46	75	127	169	178	120	75	15	4.3	4.0
3	2.2	7.5	31	70	112	188	198	112	70	14	4.0	4.3
4	2.2	7.5	25	65	112	220	178	105	60	13	3.6	3.0
5	2.6	7.5	25	70	160	231	169	105	55	12	3.3	2.7
6	2.6	7	22	75	127	242	160	105	50	12	3.3	2.7
7	12	7	25	60	112	220	152	105	46	11	3.0	2.7
8	11	11	31	55	105	198	143	98	42	11	3.0	2.4
9	7	9	34	46	98	188	135	92	42	10	2.7	2.4
10	8	8	28	46	98	178	135	86	38	10	2.7	2.4
11	6	8	264	46	98	169	143	86	38	10	2.4	2.4
12	18	31	46	46	92	160	135	92	34	10	2.4	2.7
13	11	34	31	46	92	338	143	92	34	9	2.1	2.7
14	8	25	31	50	198	312	135	98	34	9	2.1	2.7
15	7	65	31	50	152	264	127	98	34	8.5	2.1	2.7
16	7	28	31	50	143	231	120	92	38	8.5	2.1	3.0
17	6.5	20	28	105	135	220	112	92	34	8	2.1	3.0
18	65	16	28	640	127	264	112	86	31	8	2.1	3.0
19	25	86	86	394	127	242	112	86	31	7.5	2.1	3.2
20	18	28	55	242	120	220	105	92	28	7	2.1	3.0
21	14	20	46	178	253	220	112	92	28	6.5	2.4	2.8
22	9	65	65	143	152	264	120	86	25	6	2.4	2.7
23	9	34	31	127	135	220	127	86	25	5.5	2.4	2.4
24	9	25	160	112	135	198	120	86	22	5.5	2.4	2.1
25	9	20	86	98	135	220	120	86	22	5	2.7	1.8
26	9	20	65	98	127	198	112	86	20	5	2.7	1.8
27	9	31	55	198	135	178	112	80	20	5	2.7	1.8
28	8.5	25	46	198	143	178	120	80	18	5	2.7	1.8
29	8.5	20	38	160	-----	178	120	80	18	5	2.7	1.8
30	8.5	20	46	242	-----	169	120	75	16	5	2.7	1.8
31	8	-----	160	160	-----	169	-----	75	-----	5	3.0	-----

Monthly discharge of Middle Fork of Mokelumne River at West Point, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	65	2.2	10.5	646
November.....	86	7	23.4	1,390
December.....	264	18	55.3	3,400
January.....	640	46	130	7,996
February.....	253	92	131	7,280
March.....	358	152	213	13,100
April.....	198	105	135	8,030
May.....	127	75	92.9	5,710
June.....	75	16	36.8	2,190
July.....	16	5	8.65	532
August.....	4.7	2.1	2.74	108
September.....	4.3	1.8	2.63	156
The year.....	640	1.8	69.9	50,600

SOUTH FORK OF MOKELUMNE RIVER NEAR RAILROAD FLAT, CALIF.

LOCATION.—In sec. 34, T. 6 N., R. 14 E., at Laidet ranch, 5 miles above mouth of Licking Fork and 5 miles east of Railroad Flat, Calaveras County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—October 23, 1911, to September 30, 1921.

GAGE.—Vertical staff fastened to alder tree on right bank 100 feet above suspension footbridge; read by Rose Laidet.

DISCHARGE MEASUREMENTS.—Made from cable 150 feet below gage or by wading.

CHANNEL AND CONTROL.—Gravel; shifts slightly. Point of zero flow 0.75 foot September 19, 1921.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 3.98 feet at 4 p. m. January 18 (discharge, 945 second-feet); minimum stage, 1.30 feet at 5 p. m. October 5 (discharge, 3.0 second-feet).

1911–1921: Maximum stage recorded, 6.9 feet at 4.20 p. m. January 25, 1914 (discharge, 3,330 second-feet); minimum discharge 2.4 second-feet, August 22, 1918, September 16 and 17, 1920.

DIVERSIONS.—An irrigation and power ditch of about 2 second-feet capacity diverts water at base of Blue Mountain, above station. Some water is also used for irrigation at Laidet ranch.

REGULATION.—No information.

ACCURACY.—Stage-discharge relation changed January 18. Rating curves fairly well defined. Gage read to hundredths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table. Records fair.

Discharge measurements of South Fork of Mokelumne River near Railroad Flat, Calif., during the year ending Sept. 30, 1921

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
		Feet	Sec.-ft.			Feet	Sec.-ft.
May 5	R. C. Briggs.....	2.17	98	Sept. 19	K. M. Kelley.....	1.35	6.5
5	do.....	2.16	98	19	do.....	1.35	8.4

Daily discharge, in second-feet, of South Fork of Mokelumne River near Railroad Flat, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	3.4	6	33	69	215	107	171	101	66	22	9	8
2	3.4	6	38	66	148	99	168	103	63	20	9	7
3	3.4	6	30	63	150	101	168	111	62	21	9.5	10
4	3.4	6	22	64	151	105	162	97	59	21	9	7.5
5	3.4	5.5	16	72	153	118	159	96	57	19	9	8
6	7	6	18	67	150	118	159	105	57	17	9	7.5
7	7.5	9.5	19	63	150	120	150	101	57	17	9	8
8	9	12	22	59	146	113	148	101	62	15	9	8.5
9	11	14	24	57	142	116	136	103	57	16	9.5	8
0	13	16	26	58	138	122		99	55	17	8.5	8
1	14	18	28	60	134	120		90	52	16	8	7.5
2	17	19	28	60	130	120		88	51	16	8	7
3	16	23	24	60	124		130	101	51	15	8.5	7.5
4	17		26	57	128			96	46	14	9	7
5	18	60	28	60	133			88	44	15	8.5	7
6	19		29	66	153	200		84	44	15	8.5	7
7	22	84	32	148	156		116	84	43	14	8.5	7
8	48	81	36	912	143		140	84	43	14	9	7
9	47	88	46	376	136		131	84	43	14	8.5	7.5
0	43	84	56	229	124		126	81	42	14	8	7
1	32	62	80	218	131	201	120	83	42	13	8	6.5
2	12	48		171		212	116	83	42	12	7.5	6
3	7	26	75	150	130	215	107	90	39	12	8	7
4	7	23		170		198	110	86	38	12	8	6.5
5	7	26		190	111	184	113	83	33	11	7.5	7
6	6	46	70	208	101	171	117	84	29	11	8	7
7	6	36	72	232	103	165	120	80	26	11	7.5	7
8	6	32	74	246	105	159	111	78	26	10	8	7
9	6.5	35	76	246		163	105	75	24	10	8	6.5
0	6	33	78	226		167	107	64	24	9	7.5	7
1	6		78	212		171		66		10	8	

NOTE.—Gage not read; discharge estimated from flow of Middle Fork of Mokelumne River Oct. 1-4, 25, 26, Nov. 9, 10, 14-16, Dec. 1-4, 22-25, 28, 29, Jan. 10, 24, Feb. 3, 4, 8-12, 22-24, 27, 28, Mar. 13-20, 29, 30, Apr. 10-16, 24-26, June 19, 20, July 18, 26-28, Aug. 4, 29, Sept. 9-11 and 25. Gage readings Feb. 13-21, 26, 28, and Mar. 1-12, obviously 1 foot in error; discharge determined after correcting gage readings 1 foot.

Monthly discharge of South Fork of Mokelumne River near Railroad Flat, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	48	3.4	13.8	849
November	88	5.5	34.3	2,040
December	90	16	45.4	2,790
January	912	57	159	9,780
February	215	101	137	7,610
March	215	99	160	9,840
April	171	105	132	7,860
May	111	64	89.3	5,490
June	66	24	45.9	2,730
July	22	9	14.6	898
August	8.5	7.5	8.42	518
September	10	6	7.32	436
The year	912	3.4	70.3	50,800

NORTH FORK OF COSUMNES RIVER NEAR EL DORADO, CALIF.

LOCATION.—In sec. 23, T. 9 N., R. 10 E., at suspension footbridge at Celio's ranch,⁸ 4 miles above junction with Middle Fork and 5 miles south of El Dorado, Eldorado County. Martinez Creek enters 1½ miles above station.

DRAINAGE AREA.—Not measured.

⁸ "Kings Store" on map of Placerville quadrangle, United States Geological Survey.

RECORDS AVAILABLE.—August 13, 1911, to September 30, 1921.

GAGE.—Staff in three sections on right bank at the bridge; read by James Yates.

A temporary gage at same site was used August 13 to September 23, 1911; datum 10 feet higher, but all gage heights have been reduced to datum of present gage.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading.

CHANNEL AND CONTROL.—Gravel and solid rock; apparently permanent. Point of zero flow 2.15 feet gage height July 15, 1921.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 11.0 feet at 9 a. m. January 18 (discharge, 4,150 second-feet); minimum stage, 2.80 feet August 29 to September 2 (discharge, 2.3 second-feet).

1911-1921: Maximum stage recorded, 14.2 feet January 25, 1914 (discharge, from extension of rating curve, about 6,930 second-feet); minimum stage, 2.60 feet August 28 to September 2, 1919 (discharge, 1.2 second-feet).

DIVERSIONS.—The J. J. Crawford ditch (about 2 feet wide) diverts from Camp Creek, above the station. The water is used for irrigation below Placer-ville.

REGULATION.—None.

ACCURACY.—Stage-discharge relation permanent. Rating curve well defined below 3,000 second-feet and extended above. Gage read to half-tenths once daily. Daily discharge ascertained by applying gage height to rating table. Records good except during high stages, when they are fair.

The following discharge measurement was made by Arnold and Kelly:
July 15, 1921: Gage height, 3.25 feet; discharge, 16 second-feet.

Daily discharge, in second-feet, of North Fork of Cosumnes River near El Dorado, Calif., for the year ending Sept. 30, 1921

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	3.4	21	149	454	568	610	695	490	240	60	5	2.3
2	3.4	21	384	463	610	652	740	490	240	54	4.8	2.3
3	3.4	21	191	472	490	695	675	454	240	49	4.3	2.8
4	3.4	21	169	481	638	925	610	418	240	49	3.8	3.4
5	3.4	21	130	490	785	975	528	384	240	44	3.4	3.4
6	29	21	149	528	528	925	490	368	240	39	3.4	3.4
7	34	21	149	384	472	925	490	352	240	39	3.4	3.4
8	29	39	240	352	418	785	490	352	240	34	3.4	3.4
9	14	29	191	322	384	740	490	352	240	29	3.4	3.4
10	14	29	191	293	384	696	490	352	240	29	3.4	3.4
11	14	29	975	240	384	652	490	384	240	25	3.4	3.4
12	14	72	401	240	352	652	490	418	240	21	3.4	3.4
13	14	60	215	240	352	1,190	490	454	215	21	2.8	3.4
14	14	49	169	240	785	1,240	490	454	191	20	2.8	4.3
15	21	49	154	215	652	1,080	454	490	180	18	2.8	4.3
16	22	74	140	215	610	925	418	454	169	14	2.8	4.3
17	23	99	130	191	528	1,020	384	454	149	8	2.8	4.3
18	24	99	130	4,150	500	1,020	384	352	140	8	2.5	4.3
19	26	215	528	1,960	472	975	368	293	130	8	2.8	5
20	27	418	384	1,360	418	830	368	293	114	8	2.8	5
21	28	215	215	925	1,240	830	384	454	114	6.5	2.8	5
22	30	293	454	875	695	1,020	436	322	99	6.5	2.8	5
23	31	203	468	610	610	875	490	322	99	5	2.8	4.3
24	32	169	490	550	610	695	454	293	99	5	2.8	4.3
25	34	130	436	490	610	1,080	418	322	99	5	2.8	5
26	34	99	380	454	610	830	418	293	86	5	2.8	5
27	29	240	322	652	610	830	454	293	72	5	2.8	5
28	29	130	266	785	610	652	454	293	60	5	2.8	4.3
29	25	130	240	785	-----	652	490	293	54	5	2.3	4.3
30	25	130	740	1,300	-----	652	490	280	60	8	2.3	3.4
31	23	-----	740	695	-----	652	-----	266	-----	6	2.3	-----

NOTE.—Gage not read Oct. 16-24, Nov. 16, Dec. 15, 26, Jan. 2-4, 24, Feb. 4, 18, 24, Mar. 10, 15, Apr. 3, 10, 15, May 30, June 5, 13, 26, July 14, 31, Aug. 4, 7, 8, 26, and Sept. 9-11; discharge interpolated.

Monthly discharge of North Fork of Cosumnes River near El Dorado, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	34	3.4	21.2	1,300
November.....	418	21	105	6,250
December.....	975	130	323	19,900
January.....	4,150	191	691	42,500
February.....	1,240	352	569	31,600
March.....	1,240	610	848	52,100
April.....	740	368	484	28,800
May.....	490	266	371	22,800
June.....	240	54	167	9,940
July.....	60	5	20.6	1,270
August.....	5	2.3	3.11	191
September.....	5	2.3	3.95	235
The year.....	4,150	2.3	299	217,000

COSUMNES RIVER AT MICHIGAN BAR, CALIF.

LOCATION.—In NW. $\frac{1}{4}$ SE. $\frac{1}{4}$ sec. 36, T. 8 N., R. 8 E., at highway bridge at Michigan Bar, Sacramento County, $5\frac{1}{2}$ miles southwest of Latrobe. North and Middle forks unite 12 miles above station.

DRAINAGE AREA.—525 square miles.

RECORDS AVAILABLE.—October 20, 1907, to September 30, 1921.

GAGE.—Vertical staff on downstream end of bridge pier, near left bank; read by C. B. Ruman.

DISCHARGE MEASUREMENTS.—Made from bridge at gage or by wading.

CHANNEL AND CONTROL.—Sand, gravel, and small boulders; fairly permanent. Point of zero flow 1.60 feet gage height, July 14, 1921.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 10.5 feet at 8 a. m. January 18 (discharge, 20,600 second-feet); minimum stage 1.80 feet August 26 to September 1 (discharge, 1.7 second-feet).

1907–1921: Maximum stage recorded, 11.0 feet February 21, 1917 (discharge, 22,400 second-feet); minimum stage, river dry July 25 to September 16, 1908, September 4–11, 1918, and August 29 to September 10, 1919.

DIVERSIONS.—Douglas and Enterprise ditches divert from the Middle and South forks and have a combined capacity of about 50 second-feet. The water is used for power, domestic supply, and irrigation at Plymouth and vicinity. Slug Gulch ditch, having a capacity of 7 or 8 second-feet, also diverts water from the Middle Fork when prior appropriations permit. Michigan Bar canal, which has a capacity of about 50 second-feet, heads on the Main Cosumnes at Musicdale Creek. No record is available showing the quantity of water that is diverted.

REGULATION.—Flow is partly regulated by diversions.

ACCURACY.—Stage-discharge relation permanent. Rating curve very well defined. Gage read to quarter-tenths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table. Records excellent.

Discharge measurements of Cosumnes River at Michigan Bar, Calif., during the year ending Sept. 30, 1921

Date	Made by—	Gage height	Discharge
		<i>Feet</i>	<i>Sec.-ft.</i>
July 14	Jesse Arnold.....	2.48	36
14	K. M. Kelley.....	2.48	36

Daily discharge, in second-feet, of Cosumnes River at Michigan Bar, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	4.6	39	210	1,000	1,340	1,160	1,050	850	430	98	12	1.7
2.....	4.6	29	525	850	1,160	1,280	1,050	850	400	98	10	2.5
3.....	4.6	29	372	760	1,050	1,480	1,100	760	400	84	9	2.5
4.....	4.6	29	320	675	950	1,550	1,100	760	400	80	9	2.5
5.....	4.6	29	295	718	1,620	1,620	1,000	675	400	78	6.5	2.7
6.....	7.5	29	250	1,160	1,100	1,620	950	675	400	74	6	3.3
7.....	14	29	492	760	1,000	1,550	850	675	400	64	6	3.3
8.....	41	39	635	675	900	1,280	805	635	400	51	6	3.3
9.....	29	41	473	595	850	1,280	805	635	400	51	14	3.3
10.....	29	41	718	581	760	1,160	760	595	400	58	7.5	3.3
11.....	20	39	1,780	525	760	1,050	805	595	400	54	6	3.3
12.....	27	45	1,000	492	805	1,050	805	635	384	39	3.3	3.3
13.....	51	218	560	460	850	2,100	850	675	345	39	3.3	3.3
14.....	67	230	400	442	1,550	2,370	850	675	295	39	3.3	3.3
15.....	41	175	320	430	1,280	2,020	760	675	295	31	3.3	3.3
16.....	29	145	295	400	1,160	1,780	760	675	295	29	3.3	3.3
17.....	29	182	268	900	1,050	1,550	675	595	286	29	3.3	3.3
18.....	49	145	295	11,500	1,000	1,480	675	525	286	29	3.3	3.3
19.....	335	203	900	4,470	900	1,280	675	525	250	29	3.3	3.3
20.....	175	850	1,100	4,210	850	1,280	635	525	230	29	2.5	4.6
21.....	94	335	588	2,280	1,160	1,280	718	850	210	24	2.5	4.6
22.....	72	412	805	1,620	1,410	1,780	718	595	210	24	2.5	5.5
23.....	64	460	560	1,340	1,160	1,550	675	525	175	20	2.5	6
24.....	51	305	1,050	1,050	1,050	1,280	760	525	175	20	2.5	6
25.....	45	250	1,000	1,000	1,050	1,860	805	525	160	19	2.5	5.5
26.....	45	210	760	950	1,050	1,480	760	525	145	14	1.7	4.6
27.....	45	295	595	1,410	1,050	1,280	635	525	132	14	1.7	3.3
28.....	41	325	525	1,700	1,100	1,160	675	525	132	13	1.7	3.3
29.....	41	250	492	1,410	-----	1,050	718	525	120	12	1.7	3.3
30.....	39	218	635	3,700	-----	1,050	805	512	120	12	1.7	3.3
31.....	39	-----	1,340	1,860	-----	1,050	-----	460	-----	12	1.7	-----

Monthly discharge of Cosumnes River at Michigan Bar, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	335	4.6	49.8	3,060
November.....	850	29	188	11,200
December.....	1,780	210	631	38,800
January.....	11,500	400	1,610	99,000
February.....	1,620	760	1,070	59,400
March.....	2,370	1,050	1,440	88,500
April.....	1,100	635	808	48,100
May.....	850	460	623	38,300
June.....	430	120	289	17,200
July.....	98	12	40.9	2,510
August.....	14	1.7	4.63	283
September.....	6	1.7	3.60	214
The year.....	11,500	1.7	562	407,000

GOOSE LAKE BASIN

DREW CREEK RESERVOIR NEAR LAKEVIEW, OREG.

LOCATION.—Dam is in sec. 5, T. 40 S., R. 18 E.; reservoir extends upstream 10 miles.

RECORDS AVAILABLE.—February 26, 1913, to September 30, 1921, when station was discontinued; occasional readings until February 6, 1916; after that date readings practically every day.

GAGE.—Gage attached to plank on upstream face of dam since 1915. Previous readings obtained by measuring down from floor of gate house. Gage

heights refer to a datum level with lowest contour of reservoir. Gage reader, James McShane.

OUTLETS.—A tunnel with sill at elevation 16.3 feet and a blowout pipe in center of dam at bottom.

EXTREMES OF STAGE.—Maximum stage recorded during year, 48.9 feet May 24-28 (quantity stored, 39,080 acre-feet); no record of minimum stage.

1913-1921: Maximum stage recorded, 53.4 feet April 18-20, 1914 (contents, 55,500 acre-feet).

ACCURACY.—Prior to 1914 the estimated monthly increase or decrease in storage is subject to some error, as the readings of water stage were very rough, but the error for the entire year is probably not great. Beginning in 1914 the results are good.

The following readings, at the end of each month, have been used in correcting the observed flow of Drew Creek below the dam:

Readings used in correcting observed flow of Drew Creek below dam for the year ending Sept. 30, 1921

Date	Gage height (feet)	Contents (acre-feet)	Loss or gain during month (acre-feet)	Date	Gage height (feet)	Contents (acre-feet)	Loss or gain during month (acre-feet)
Oct. 31.....			a +500	Apr. 30.....	48.0	36,200	+1,860
Nov. 30.....			a +2,000	May 31.....	48.8	38,760	+2,560
Dec. 31.....	34.6	7,540	a +4,060	June 30.....	46.7	32,230	-6,530
Jan. 31.....	40.0	15,800	+8,260	July 31.....	41.5	18,900	-13,330
Feb. 28.....	43.6	23,800	+8,000	Aug. 31.....	38.6	13,320	-5,580
Mar. 31.....	47.4	34,340	+10,540	Sept. 30.....	37.6	11,680	-1,640

a Distribution by months estimated.

DREW CREEK NEAR LAKEVIEW, OREG.

LOCATION.—In SE. $\frac{1}{4}$ sec. 4, T. 40 S., R. 18 E., at highway bridge half a mile below mouth of Willow Creek, 1 mile below Drew Creek dam, and 18 miles southwest of Lakeview, Lake County.

DRAINAGE AREA.—211 square miles.

RECORDS AVAILABLE.—January 16, 1909, to September 30, 1919, and February 23 to September 30, 1921, when station was discontinued.

GAGE.—Friez water-stage recorder on right bank, 100 yards upstream from highway bridge used since May 18, 1918; inspected by James McShane. Several other gages prior to that date; relation of datums uncertain.

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

CHANNEL AND CONTROL.—Control about 150 feet below gage, of rock and apparently permanent; bed composed of gravel and sand; shifts slightly; drift and growth of aquatic plants collect on control occasionally, affecting stage-discharge relation. One channel at all stages. Willows on right bank.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 2.32 feet March 14 to 22 (discharge from extension of rating curve, 550 second-feet); minimum discharge recorded 6 second-feet August 6-19 and August 29 to September 20, practically no flow reported October 1 to February 22.

1909-1919, 1921: Maximum stage recorded, 8.3 feet January 16, 1909 (discharge, 2,730 second-feet). Discharge estimated (gage washed out) on evenings of March 1 and 2, 1910, about 3,000 second-feet. Creek dry at times.

ICE.—Stage-discharge relation affected by ice during coldest weather, generally for one or two months.

DIVERSIONS.—The North Drew canal of the Goose Lake Valley Irrigation Co., diverts water past station; record is kept of its discharge and this is added to obtain the total run-off from the creek.

REGULATION.—Beginning with the last part of 1912, water has been stored in the reservoir of the Goose Lake Valley Irrigation Co. just above station. A negligible quantity of water was stored prior to that time. The run-off records when corrected for storage are often negative during summer as the discharge into the reservoir becomes too small to offset the evaporation losses.

ACCURACY.—Stage-discharge relation apparently permanent except when affected by growth of aquatic plants. Poorly defined rating curve used February 23 to June 25; shifting-control method thereafter. Operation of water-stage recorder unsatisfactory; daily reading on staff gage used except for a few days of considerable fluctuation. Daily discharge ascertained by applying to rating table mean daily gage height obtained by inspecting recorder graph, or the daily gage reading. Records fair.

Discharge measurements of Drew Creek near Lakeview, Oreg., during the year 1921

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
Mar. 24	J. W. Bones	<i>Feet</i> 1.58	<i>Sec.-ft.</i> 247	Aug. 25	Wendell Dawson	<i>Feet</i> 0.42	<i>Sec.-ft.</i> a 10
June 20	do	.38	24.4	Oct. 21	G. H. Canfield	.14	4.4

a Estimated.

Daily discharge, in second-feet, of Drew Creek near Lakeview, Oreg., for the year ending Sept. 30, 1921

Day	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1		128	140	34	27	17	14	6
2		128	178	34	27	17	14	6
3		152	205	34	27	17	8	6
4		330	220	34	27	17	8	6
5		390	272	34	18	17	8	6
6		490	272	34	18	17	6	6
7		490	272	32	18	17	6	6
8		490	310	32	18	17	6	6
9		490	310	32	18	17	6	6
10		540	310	32	30	17	6	6
11		540	272	30	30	17	6	6
12		540	272	30	24	17	6	6
13		540	272	30	24	17	6	6
14		540	220	30	24	17	6	6
15		540	220	29	24	17	6	6
16		540	220	29	24	17	6	6
17		540	220	29	24	17	6	6
18		540	220	29	24	17	6	6
19		540	220	29	24	22	6	6
20		540	220	29	24	22	8	6
21		540	165	29	24	22	8	8
22		540	115	29	24	22	8	8
23	55	310	115	29	18	22	10	8
24	55	178	115	29	18	22	10	8
25	60	238	115	29	18	22	10	8
26	60	238	115	29	25	22	10	8
27	75	238	75	29	25	14	10	8
28	75	238	44	18	25	14	10	8
29		205	36	27	25	14	6	8
30		178	34	27	17	14	6	8
31		178		27		14	6	

NOTE.—Stream practically dry Oct. 1 to Feb. 22.

Monthly discharge of Drew Creek near Lakeview, Oreg., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
February 23-28.....	75	55	63.3	753
March.....	540	128	391	24,000
April.....	310	34	192	11,400
May.....	34	18	29.9	1,840
June.....	30	17	23.1	1,370
July.....	22	14	17.8	1,090
August.....	14	6	7.68	472
September.....	8	6	6.67	397
The period.....	540	6	94.5	41,300

NOTE.—Creek practically dry Oct. 1 to Feb. 22.

NORTH DREW CANAL NEAR LAKEVIEW, OREG.

LOCATION.—In SE. $\frac{1}{4}$ sec. 4, T. 40 S., R. 18 E., nearly opposite station on Drew Creek, $1\frac{1}{2}$ miles below intake of canal at Drew Creek dam, and 18 miles southwest of Lakeview, Lake County.

RECORDS AVAILABLE.—March 18, 1914, to September 22, 1921, when station was discontinued.

GAGE.—Vertical staff on right side of canal opposite bridge, on Drew Creek, installed May 20, 1918. A gage in flume at station 107, half a mile below, was used from 1914 to May 19, 1918. Gage reader, James McShane.

DISCHARGE MEASUREMENTS.—Made from wagon bridge one-fourth mile above gage or by wading.

CHANNEL AND CONTROL.—Canal excavated in earth and rock, control is a rock cut a few hundred feet below gage.

EXTREMES OF DISCHARGE.—Maximum stage recorded, 4.24 feet, June 27 to July 4 (discharge, 164 second-feet).

1914-1921.—Maximum discharge that of 1921; canal dry during nonirrigating season of each year.

ACCURACY.—Stage-discharge relation practically permanent. Rating curve well defined. Gage read to hundredths once daily. Daily discharge ascertained by applying daily gage reading to rating table. Records good.

North Drew canal diverts water from Drew Creek at reservoir dam in the SE. $\frac{1}{4}$ sec. 5 for irrigating land north of the creek on the west side of Goose Lake Valley.

Discharge measurements of North Drew canal near Lakeview, Oreg., during 1921

Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>
June 30	J. W. Bones.....	3.90	139
Aug. 25	Wendell Dawson.....	1.88	31
Oct. 21	G. H. Canfield.....	.85	2.7

Daily discharge, in second-feet, of North Drew canal near Lakeview, Oreg., for the year ending Sept. 30, 1921

Day	Apr.	May	June	July	Aug.	Sept.	Day	Apr.	May	June	July	Aug.	Sept.
1.....		30	35	164	124	28	16.....	35	32	104	155	55	9.4
2.....		30	45	164	110	20	17.....	35	32	124	155	26	9.4
3.....		30	45	164	86	20	18.....	35	32	124	155	26	9.4
4.....		30	45	164	70	20	19.....	35	32	124	155	28	9.4
5.....		30	34	147	80	20	20.....	35	32	139	155	28	9.4
6.....		30	39	147	80	20	21.....	53	32	139	155	28	9.4
7.....		32	43	147	70	12	22.....	53	32	139	155	35	9.4
8.....		32	43	147	65	12	23.....	53	32	147	155	35	-----
9.....		32	43	147	55	12	24.....	53	32	147	155	32	-----
10.....		32	53	147	55	12	25.....	53	32	155	155	32	-----
11.....		32	53	155	55	12	26.....	53	32	155	155	32	-----
12.....		32	65	155	55	9.4	27.....	53	32	164	155	32	-----
13.....		32	86	155	55	9.4	28.....	60	35	164	155	32	-----
14.....	35	32	92	155	55	9.4	29.....	60	35	164	155	28	-----
15.....	35	32	92	155	55	9.4	30.....	28	35	164	155	28	-----
							31.....		35		155	28	-----

NOTE.—Canal dry October 1 to April 13 and September 23 to 30.

Monthly discharge of North Drew canal near Lakeview, Oreg., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
April 14-30.....	60	28	44.9	1,510
May.....	35	30	32.0	1,970
June.....	164	34	98.9	5,880
July.....	164	147	155	9,530
August.....	124	26	50.8	3,120
September 1-22.....	28	9.4	13.2	576
The period.....	164	9.4	70.3	22,600

NOTE.—Canal dry October 1 to April 13 and September 23-30.

SACRAMENTO RIVER BASIN

MAIN STREAM

SACRAMENTO RIVER AT CASTELLA, CALIF.

LOCATION.—In sec. 22, T. 38 N., R. 4 W., at private highway bridge at Castella, Shasta County, half a mile below the mouth of Castle Creek.

DRAINAGE AREA.—257 square miles.

RECORDS AVAILABLE.—October 15, 1910, to September 30, 1921; records not complete.

GAGE.—Vertical staff on downstream end of bridge pier near right bank; read by H. O. Wickes.

DISCHARGE MEASUREMENTS.—Made from bridge at Sweetbrier camp, half a mile below gage, the section being more satisfactory than the one at the highway bridge where early measurements were made.

CHANNEL AND CONTROL.—Small boulders; rough, fairly permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 8.1 feet at 7.20 a. m. November 19 (discharge, 6,810 second-feet); minimum stage 2.05 feet October 1-5 (discharge, 122 second-feet).

1910-1921: Maximum stage recorded, 13.7 feet at 5.50 a. m. January 2, 1914 (discharge, from extension of rating curve, about 16,000 second-feet); minimum stage, 2.00 feet August 5 to September 21, 1920 (discharge, 110 second-feet).

DIVERSIONS.—None.

REGULATION.—None.

ACCURACY.—Stage-discharge relation permanent. Rating curve well defined below 3,500 second-feet and extended above. Gage read to half-tenths once daily. Daily discharge ascertained by applying gage height to rating table. Records good during low and fair during high stages.

COOPERATION.—Gage-height record furnished by H. O. Wickes.

Discharge measurements of Sacramento River at Castella, Calif., during the year ending Sept. 30, 1921

Date	Made by—	Gage height	Discharge
May 12	K. M. Kelley-----	<i>Feet</i>	<i>Sec.-ft.</i>
13	do-----	4.30	1,510
Aug. 14	Jesse Arnold-----	4.50	1,760
		2.30	175

Daily discharge, in second-feet, of Sacramento River at Castella, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	122	165	880	880	760	1,680	1,790	1,790	1,260	440	212	195
2	122	150	1,060	800	685	1,910	1,910	2,150	1,260	440	212	195
3	122	150	760	880	650	2,400	2,150	1,460	1,360	395	212	195
4	122	150	760	1,360	650	2,660	1,790	1,110	1,360	350	212	195
5	122	150	620	5,160	760	2,790	1,460	1,060	1,460	350	212	195
6	350	135	590	2,400	685	2,530	1,260	1,110	1,460	350	195	195
7	230	150	562	1,570	620	2,150	1,260	1,160	1,460	350	195	195
8	180	150	535	1,260	620	1,790	1,260	1,260	1,160	350	195	195
9	165	150	650	1,060	620	1,790	1,460	1,460	1,060	310	195	195
10	180	150	620	880	800	1,790	1,460	1,570	970	310	195	195
11	230	159	1,260	800	1,060	1,680	1,570	1,790	925	310	195	195
12	250	270	800	720	1,260	1,680	1,680	1,910	880	290	195	195
13	195	395	620	650	1,680	2,150	1,680	1,910	800	295	195	195
14	195	290	590	620	4,300	2,150	1,570	2,030	720	290	195	195
15	165	230	535	620	2,150	1,910	1,260	2,150	685	290	195	195
16	165	1,260	485	590	1,570	1,910	1,160	1,790	650	290	195	195
17	165	3,880	510	2,150	1,360	1,910	1,110	1,360	620	270	195	195
18	230	5,460	590	1,790	1,160	2,150	1,060	1,360	590	270	195	195
19	202	5,760	800	1,160	1,060	1,910	1,060	1,160	590	270	195	220
20	195	2,150	650	1,060	1,020	1,680	1,110	1,570	590	270	195	212
21	195	1,260	535	880	1,680	1,680	1,260	1,680	485	270	195	195
22	195	1,460	535	760	1,260	1,460	1,570	1,260	535	250	195	195
23	195	970	535	720	1,060	1,680	1,570	1,360	535	250	195	195
24	195	800	510	720	1,060	1,910	1,460	1,570	535	250	195	195
25	195	650	510	720	1,160	1,790	1,260	1,680	535	250	195	195
26	195	1,160	485	1,060	1,260	1,680	1,260	1,680	485	230	195	195
27	165	1,160	485	2,150	1,360	1,460	1,360	1,680	485	230	195	195
28	165	800	510	1,110	1,460	1,460	1,790	1,260	485	230	195	195
29	165	685	590	1,060	-----	1,460	2,270	1,160	485	230	195	195
30	165	620	1,160	1,160	-----	1,360	1,790	1,110	440	230	195	195
31	165	-----	970	880	-----	1,790	-----	1,160	-----	230	195	-----

Monthly discharge of Sacramento River at Castella, Calif., for the year ending Sept. 30, 1921

[Drainage area, 257 square miles]

Month	Discharge in second-feet				Run-off	
	Maximum	Minimum	Mean	Per square mile	Inches	Acre-feet
October.....	350	122	184	0.716	0.83	11,300
November.....	5,760	135	1,030	4.01	4.47	61,300
December.....	1,260	485	668	2.60	3.00	41,100
January.....	5,160	590	1,210	4.71	5.43	74,400
February.....	4,300	620	1,210	4.71	4.90	67,200
March.....	2,790	1,360	1,480	7.32	8.44	116,000
April.....	2,270	1,060	1,490	5.80	6.47	88,700
May.....	2,150	1,060	1,490	5.80	6.69	91,600
June.....	1,460	440	830	3.23	3.60	49,400
July.....	440	230	295	1.15	1.33	18,100
August.....	212	195	198	.770	.89	12,200
September.....	230	195	197	.767	.86	11,700
The year.....	5,760	122	888	3.46	46.91	643,000

SACRAMENTO RIVER AT ANTLER, CALIF.

LOCATION.—In SE. $\frac{1}{4}$ sec. 13, T. 35 N., R. 5 W., at highway bridge at Antler, Shasta County. Gregory Creek enters 200 feet below gage and Pit River 14 miles below.

DRAINAGE AREA.—461 square miles.

RECORDS AVAILABLE.—November 19, 1910, to December 31, 1911; April 18, 1919, to September 30, 1921.

GAGE.—Vertical staff on downstream end of wooden pier at right end of highway bridge.

DISCHARGE MEASUREMENTS.—Made from highway bridge.

CHANNEL AND CONTROL.—Gravel and small boulders; shift during high stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 14.0 feet at 8 a. m. November 19 (discharge, 18,100 second-feet); minimum stage 2.05 feet October 2 and 4 (discharge, 145 second-feet).

1910-1911; 1919-1921: Maximum stage recorded, 14.0 feet November 19, 1920 (discharge, 18,100 second-feet); minimum stage recorded, 2.0 feet August 17-19, 21, 23, 25, 1920 (discharge, 135 second-feet).

DIVERSIONS.—None.

REGULATION.—None.

ACCURACY.—Stage-discharge relation changed January 5. Rating curves well defined below 5,000 second-feet and extended above. Gage read to half-tenths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table. Records good except for stages above 5,000 second-feet which may be in error, owing to extension of rating curve.

Discharge measurements of Sacramento River at Antler Calif., during the year ending Sept. 30, 1921

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
May 10	K. M. Kelley.....	<i>Feet</i> 4.95	<i>Sec.-ft.</i> 2,290	June 29	K. M. Kelley.....	<i>Feet</i> 3.15	<i>Sec.-ft.</i> 627
14	do.....	5.65	3,080	Aug. 15	Jesse Arnold.....	2.35	247
19	do.....	4.73	1,990	Sept. 3	K. M. Kelley.....	2.34	237
19	do.....	4.79	2,030				

Daily discharge, in second-feet, of Sacramento River at Antler, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	155	205	2,790	2,540	3,450	3,050	3,320	2,790	2,180	530	260	225
2	155	205	3,600	2,180	3,050	3,600	3,320	2,300	1,960	530	260	225
3	155	192	2,540	1,960	2,660	4,170	3,740	1,960	2,070	500	260	225
4	155	205	2,300	2,540	2,790	4,470	3,180	1,850	1,960	470	260	225
5	155	205	2,300	10,500	3,050	5,720	2,540	1,640	1,850	445	260	225
6		365	205	2,070	5,720	2,540	4,920	2,300	1,640	1,850	420	260
7		440	205	1,850	3,880	2,300	4,170	2,300	1,640	1,850	420	260
8		300	205	3,740	3,050	2,070	3,600	2,300	1,440	1,640	375	260
9		235	205	4,620	2,540	1,850	3,320	2,300	1,440	1,540	375	260
10		205	205	4,620	2,300	2,300	3,050	2,420	2,180	1,640	375	242
11		282	235	5,720	2,070	2,920	2,920	2,540	2,790	1,440	375	242
12		282	390	3,600	1,850	3,320	3,050	2,660	2,790	1,350	335	242
13		265	1,000	2,420	1,640	3,740	4,170	2,660	3,050	1,260	295	242
14		265	390	2,070	1,640	8,100	4,170	2,300	3,050	1,170	295	242
15		235	415	1,640	1,640	5,720	3,880	2,180	3,050	1,000	295	242
16		205	2,920	1,540	1,640	3,880	3,600	1,850	2,790	920	295	242
17		205	9,200	1,440	8,800	3,320	3,600	1,850	2,300	885	295	242
18		300	12,600	2,180	7,400	2,790	3,740	1,850	1,850	850	295	242
19		282	15,200	4,170	4,770	2,300	3,320	1,740	2,070	815	295	242
20		235	5,720	3,050	3,600	2,920	3,050	1,640	2,800	815	295	242
21		235	3,600	2,300	2,790	5,880	2,790	2,070	2,070	815	295	242
22		220	3,880	1,960	2,420	4,020	3,600	2,540	2,070	815	295	242
23		235	2,790	1,850	2,180	3,050	4,470	2,420	2,180	780	295	242
24		205	2,300	1,850	2,790	2,790	5,400	2,300	2,540	710	295	242
25		220	2,300	1,740	3,880	2,790	4,620	2,070	2,540	680	295	242
26		205	4,170	1,640	4,170	2,790	3,740	1,960	2,790	680	295	242
27		205	4,170	1,540	9,950	3,050	3,320	2,070	2,660	680	260	242
28		205	3,050	1,440	5,560	3,180	3,050	2,540	2,300	590	260	242
29		205	2,420	1,850	5,720		2,920	3,050	2,300	620	260	242
30		205	2,300	3,320	8,300		3,050	2,790	2,300	530	260	242
31		205		2,920	4,470		3,050		2,300		260	225

Monthly discharge of Sacramento River at Antler, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	440	155	233	14,300
November	15,200	192	2,700	161,000
December	5,720	1,440	2,600	180,000
January	10,500	1,640	4,020	247,000
February	8,100	1,850	3,310	184,000
March	5,720	2,790	3,730	229,000
April	3,740	1,640	2,430	145,000
May	3,050	1,440	2,290	141,000
June	2,180	530	1,200	71,400
July	530	260	341	21,000
August	260	225	247	15,200
September	260	210	232	13,800
The year	15,200	155	1,940	1,400,000

SACRAMENTO RIVER NEAR RED BLUFF, CALIF.

LOCATION.—In lot 4, sec. 34, T. 28 N., R. 3 W., at lower end of Iron Canyon, 4 miles northeast of Red Bluff, Tehama County. Paines Creek enters 3 miles above and Antelope Creek 7 miles below station.

DRAINAGE AREA.—9,300 square miles, not including drainage area of Goose Lake—1,090 square miles—which belongs naturally in Pit River basin but has contributed no water except for a short time in 1869 and for more than two hours during a severe storm from the north in 1881, when the lake overflowed to North Fork of Pit River. Previously published figures of discharge in second-feet per square mile and run-off in depth in inches, based on drainage area including Goose Lake, should be used with caution because of the large noncontributing area.

RECORDS AVAILABLE.—January 28, 1902, to September 30, 1921. In 1879 the State engineer and in 1893 and 1894 the commissioner of public works made measurements at this point. From April 30, 1895, to June 30, 1902, a gaging station was maintained at Jellys Ferry, 12 miles above Red Bluff.

GAGE.—Water-stage recorder in concrete well and shelter on left bank, installed January 1, 1920. Outside staff gage in six sections at the well. Previous to January 1, 1920, record is from a staff gage in seven sections about 50 feet below the well. Datum not changed.

DISCHARGE MEASUREMENTS.—Made from cable at the gage.

CHANNEL AND CONTROL.—Coarse gravel and small boulders; practically permanent.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 22.36 feet at noon January 30 (discharge, 127,000 second-feet); minimum stage from water-stage recorder, 0.45 foot at 5 a. m. October 2 (discharge, 3,400 second-feet).

1902–1921: Maximum stage recorded, 35.2 feet February 3, 1909 (discharge, 278,000 second-feet); minimum stage from water-stage recorder, 0.30 foot at 2.45 p. m. August 18, 1920 (discharge, 3,150 second-feet).

DIVERSIONS.—The Anderson-Cottonwood canal has diverted water from Sacramento River at Redding, since 1918. A small amount of water is diverted from some of the minor tributaries for irrigation.

REGULATION.—No storage of any importance has been developed in the drainage area above station.

ACCURACY.—Stage-discharge relation not changed during year. Rating curve well defined. Water-stage recorder operated satisfactorily except January 11–18 when paper tore. Daily discharge ascertained by applying mean daily gage height to rating tables except January 11–18 when it was estimated from flow of streams above. Records excellent.

Discharge measurements of Sacramento River near Red Bluff, Calif., during the year ending Sept. 30, 1921

Gage	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
Feb. 3	R. C. Briggs.....	<i>Feet</i> 7.53	<i>Sec.-ft.</i> 26,500	Aug. 18	Jesse Arnold.....	<i>Feet</i> 0.79	<i>Sec.-ft.</i> 4,250
May 8	K. M. Kelley.....	3.38	10,700	28	K. M. Kelley.....	.82	4,000

Daily discharge, in second-feet, of Sacramento River near Red Bluff, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	3,580	4,010	16,200	22,700	37,500	21,900	19,800	13,300	9,540	5,880	4,300	3,920
2.....	3,490	4,010	33,200	20,200	30,800	22,300	19,800	13,700	9,540	5,650	4,300	4,010
3.....	3,490	4,010	24,500	19,400	27,600	23,200	20,200	12,600	9,540	5,430	4,300	4,010
4.....	3,580	4,100	22,300	20,200	24,500	25,400	19,800	11,900	9,540	5,430	4,300	4,010
5.....	3,580	4,100	18,200	35,100	29,000	28,000	18,200	11,200	9,540	5,430	4,200	4,010
6.....	3,580	4,100	15,500	45,300	26,200	32,700	17,400	11,200	9,220	5,320	4,200	4,010
7.....	4,300	4,100	17,400	33,200	23,200	28,500	16,600	11,200	9,540	5,210	4,200	4,010
8.....	4,060	4,100	21,000	27,200	20,600	25,800	15,900	10,900	9,220	5,210	4,200	3,920
9.....	3,830	4,200	27,200	22,700	19,000	24,000	15,900	11,200	8,910	5,110	4,200	3,920
10.....	4,200	4,100	43,700	19,800	19,000	22,700	15,500	11,200	8,600	5,000	4,100	4,010
11.....	4,100	4,200	57,400	17,000	20,600	21,400	15,900	11,500	8,300	5,000	4,100	4,010
12.....	4,790	4,690	43,700	15,100	22,300	20,600	15,500	11,900	8,000	4,900	4,100	4,010
13.....	4,490	7,160	27,200	14,000	23,600	23,200	15,900	12,200	7,710	4,790	4,100	4,010
14.....	4,200	6,370	20,600	13,300	39,000	26,700	15,500	12,600	7,430	4,790	4,100	4,010
15.....	4,010	5,430	17,400	12,900	42,100	25,800	14,800	12,900	7,430	4,790	4,100	4,010
16.....	4,010	12,900	15,100	12,900	33,200	24,500	14,000	12,900	7,160	4,690	4,100	4,010
17.....	4,010	35,100	14,000	39,000	29,000	23,200	14,000	12,200	6,890	4,590	4,010	4,010
18.....	4,300	74,400	17,400	68,900	25,400	25,400	14,000	11,500	6,630	4,590	4,010	4,100
19.....	4,690	104,000	50,900	52,600	22,700	25,800	13,700	10,900	6,630	4,590	4,010	4,300
20.....	4,390	58,600	39,500	36,600	21,900	23,600	13,300	11,200	6,630	4,590	4,010	4,300
21.....	4,390	28,500	26,200	30,300	50,900	24,500	12,900	14,400	6,370	4,390	4,010	4,200
22.....	4,200	31,300	23,600	25,400	42,600	34,100	13,700	11,900	6,120	4,390	4,010	4,200
23.....	4,100	23,600	21,400	22,300	32,200	32,700	14,000	11,200	6,120	4,390	4,010	4,200
24.....	4,010	17,800	31,800	31,800	27,600	33,200	13,700	11,500	6,120	4,390	4,010	4,200
25.....	4,100	14,400	22,700	45,300	24,500	33,200	12,900	11,500	6,120	4,300	4,010	4,200
26.....	4,100	33,600	19,000	42,100	23,200	29,400	12,600	11,900	6,120	4,300	4,010	4,200
27.....	4,100	52,100	16,600	61,100	22,300	25,800	12,200	11,900	5,880	4,300	4,010	4,100
28.....	4,100	27,600	15,500	63,000	22,300	23,600	12,200	11,500	5,880	4,300	4,010	4,100
29.....	4,010	20,200	15,500	43,700	21,400	33,200	13,300	11,200	5,880	4,300	4,010	4,100
30.....	4,010	16,200	20,200	96,000	20,600	20,600	13,700	10,200	5,880	4,300	4,010	4,100
31.....	4,010	-----	25,800	55,600	20,200	20,200	-----	9,860	-----	4,300	3,920	-----

NOTE.—Discharge estimated Oct. 7-8 and Jan. 11-18.

Monthly discharge of Sacramento River near Red Bluff, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	4,790	3,490	4,060	250,000
November.....	104,000	4,010	20,600	1,230,000
December.....	57,400	14,000	25,200	1,550,000
January.....	96,000	12,900	34,300	2,110,000
February.....	50,900	19,000	28,000	1,560,000
March.....	34,100	20,200	25,600	1,570,000
April.....	20,200	12,200	15,200	904,000
May.....	14,400	9,860	11,800	726,000
June.....	9,540	5,880	7,550	449,000
July.....	5,880	4,300	7,800	295,000
August.....	4,300	3,920	4,100	252,000
September.....	4,300	3,920	4,070	242,000
The year.....	104,000	3,490	15,400	11,138,000

SACRAMENTO RIVER AT BUTTE CITY, CALIF.

LOCATION.—At highway bridge at Butte City, Glenn County.

RECORDS AVAILABLE.—April 21 to November 3, 1921.

GAGE.—Water-stage recorder on fender pier of highway bridge about 100 feet above bridge.

CHANNEL AND CONTROL.—Rifle of small gravel about half a mile below gage.

DIVERSIONS.—Considerable diversion from main stream and tributaries above station for irrigation.

REGULATION.—See preceding paragraph.

COOPERATION.—Daily-discharge record furnished by State engineer who maintained station.

Daily discharge, in second-feet, of Sacramento River at Butte City, Calif., for the period Apr. 21 to Nov. 3, 1921

Day	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.
1	-----	12,800	9,000	4,730	3,100	2,970	3,510	4,540
2	-----	12,800	8,900	4,700	3,100	2,940	3,560	4,520
3	-----	12,700	8,700	4,520	3,090	2,960	3,630	4,500
4	-----	12,000	8,640	4,480	3,090	2,970	3,660	-----
5	-----	11,300	8,640	4,380	3,090	2,990	3,690	-----
6	-----	10,900	8,500	4,340	3,060	3,000	3,720	-----
7	-----	11,300	8,410	4,200	3,050	2,990	3,720	-----
8	-----	10,900	8,390	4,130	3,050	2,990	-----	-----
9	-----	10,800	8,210	4,080	3,040	2,990	-----	-----
10	-----	10,700	7,970	4,010	3,040	2,990	-----	-----
11	-----	10,800	7,650	3,970	2,970	2,950	-----	-----
12	-----	11,000	7,420	3,900	2,960	2,960	-----	-----
13	-----	11,100	7,100	3,840	2,980	2,970	4,180	-----
14	-----	11,400	6,910	3,840	3,000	2,970	4,180	-----
15	-----	11,700	6,550	3,740	3,040	3,030	-----	-----
16	-----	11,700	6,500	3,740	3,050	3,060	-----	-----
17	-----	-----	6,260	3,650	3,040	3,080	-----	-----
18	-----	-----	6,000	3,630	3,020	3,080	-----	-----
19	-----	-----	5,830	3,570	2,910	3,110	-----	-----
20	-----	-----	5,740	3,520	2,900	3,140	4,320	-----
21	13,300	-----	5,540	3,440	2,880	3,290	4,380	-----
22	13,200	-----	5,450	3,380	2,860	3,400	4,340	-----
23	13,300	-----	5,270	3,370	2,850	3,480	4,350	-----
24	13,300	-----	5,250	3,340	2,890	3,440	4,380	-----
25	13,100	10,300	5,150	3,290	2,890	3,430	4,410	-----
26	12,800	10,300	5,130	3,260	2,890	3,430	4,470	-----
27	12,300	10,400	5,150	3,230	2,910	3,420	4,480	-----
28	11,800	-----	4,940	3,240	2,970	3,400	4,590	-----
29	12,100	-----	4,810	3,230	2,970	3,500	4,690	-----
30	12,700	-----	4,770	3,180	2,970	3,500	4,610	-----
31	-----	9,400	-----	3,140	2,980	-----	4,570	-----

NOTE.—No record on days for which discharge is not given.

SACRAMENTO RIVER AT COLUSA, CALIF.

LOCATION.—At highway bridge at Colusa, Colusa County.

RECORDS AVAILABLE.—April 11 to October 31, 1921.

GAGE.—Water-stage recorder on highway bridge fender pier in middle of river about 50 feet above bridge.

CHANNEL AND CONTROL.—Shifting sand; control is cross section and slope of channel.

DIVERSIONS.—Considerable water is diverted above station from main stream and tributaries for irrigation.

REGULATION.—See preceding paragraph.

COOPERATION.—Daily-discharge record furnished by State engineer who maintained station.

Daily discharge, in second-feet, of Sacramento River at Colusa, Calif., for the period Apr. 11 to Oct. 31, 1921

Day	Apr.	May	June	July	Aug.	Sept.	Oct.
1	-----	12,700	9,270	4,850	2,920	2,700	3,310
2	-----	12,600	9,090	4,830	2,900	2,650	3,380
3	-----	12,700	8,910	4,860	2,860	2,640	3,420
4	-----	12,300	8,790	4,620	2,830	2,670	3,480
5	-----	11,700	8,740	4,540	2,810	2,690	3,520
6	-----	11,300	8,610	4,420	2,820	2,700	3,540
7	-----	11,200	8,430	4,340	2,810	2,690	3,760
8	-----	11,100	8,400	4,230	2,800	2,680	3,730
9	-----	11,000	8,300	4,130	2,800	2,680	3,670
10	-----	10,900	8,080	4,040	2,780	2,650	3,730
11	14,900	10,900	7,800	3,870	2,710	2,620	3,830
12	14,800	11,000	7,555	3,810	2,660	2,590	4,020
13	14,800	11,100	7,330	3,760	2,670	2,640	4,040
14	14,900	11,000	7,130	3,710	2,700	2,640	4,100
15	14,800	11,500	6,920	3,590	2,730	2,660	4,120
16	14,400	11,500	6,740	3,570	2,740	2,760	4,230
17	14,000	11,400	6,540	3,480	2,730	2,800	4,360
18	13,700	11,100	6,280	3,430	2,720	2,800	4,340
19	13,600	10,500	6,060	3,400	2,690	2,840	4,300
20	13,300	10,000	6,000	3,360	2,640	2,860	4,200
21	13,100	10,100	5,870	3,320	2,620	3,010	4,180
22	13,000	11,800	5,680	3,260	2,590	3,080	4,230
23	13,100	11,400	5,520	3,200	2,580	3,200	4,190
24	13,000	10,200	5,430	3,170	2,590	3,250	4,210
25	13,000	10,300	5,260	3,140	2,610	3,210	4,250
26	12,700	10,400	5,220	3,120	2,600	3,210	4,290
27	12,400	10,500	5,150	3,060	2,630	3,200	4,340
28	12,000	10,500	5,110	3,060	2,710	3,150	4,420
29	12,000	10,800	4,880	3,040	2,720	3,210	4,620
30	12,400	10,500	4,880	3,030	2,730	3,320	4,520
31	-----	9,740	-----	2,940	2,700	-----	4,520

SACRAMENTO RIVER AT KNIGHTS LANDING, CALIF.

LOCATION.—At Southern Pacific Railroad bridge at Knights Landing, Yolo County.

RECORDS AVAILABLE.—April 1 to October 31, 1921.

GAGE.—Water-stage recorder on middle pier of bridge.

CHANNEL AND CONTROL.—Shifting sand; control is cross section and slope of channel.

DIVERSIONS.—Considerable water is diverted for irrigation from main stream and tributaries above station.

REGULATION.—See preceding paragraph.

COOPERATION.—Daily-discharge record furnished by State engineer who maintained station.

Daily discharge, in second-feet, of Sacramento River at Knights Landing, Calif., for the period Apr. 1 to Oct. 31, 1921

Day	Apr.	May	June	July	Aug.	Sept.	Oct.
1.....	16,600	11,600	9,430	4,280	-----	2,760	3,680
2.....	16,400	11,900	8,960	4,190	-----	2,780	3,620
3.....	16,400	11,900	8,880	4,250	-----	2,730	3,630
4.....	16,400	11,700	8,860	4,000	2,720	2,630	3,750
5.....	16,400	11,300	8,770	3,890	2,700	2,610	3,920
6.....	16,000	10,500	8,750	3,840	2,750	2,680	3,840
7.....	15,200	10,200	8,790	3,810	2,620	2,850	3,840
8.....	14,400	10,200	8,870	3,720	2,660	2,840	3,980
9.....	13,800	10,100	8,670	3,560	2,790	2,820	4,020
10.....	13,400	10,100	8,330	3,490	2,680	2,700	3,880
11.....	13,200	10,100	8,020	3,410	2,580	2,610	3,800
12.....	13,000	10,300	7,800	3,310	2,510	2,600	3,850
13.....	13,100	10,700	7,510	3,250	2,540	2,780	3,920
14.....	13,100	11,100	7,270	3,210	2,650	2,880	4,000
15.....	13,200	11,500	7,000	3,180	2,630	2,900	4,100
16.....	12,900	11,700	6,760	3,100	2,730	2,910	4,010
17.....	12,400	11,800	6,630	3,160	2,600	2,830	3,990
18.....	12,000	11,600	-----	3,140	2,550	2,840	4,080
19.....	11,700	11,100	-----	3,060	2,580	2,950	4,140
20.....	11,500	10,400	-----	2,990	2,650	3,130	4,140
21.....	11,200	9,820	5,440	2,970	2,600	3,250	4,050
22.....	11,100	9,960	5,290	2,970	2,510	3,340	4,030
23.....	11,300	10,200	5,200	2,870	2,370	3,280	3,950
24.....	11,700	9,910	5,030	2,870	2,400	3,370	3,900
25.....	11,800	9,880	4,890	2,970	2,500	3,530	3,880
26.....	11,600	10,100	4,750	2,870	2,610	3,530	3,920
27.....	11,300	10,500	4,630	2,870	2,610	3,400	3,920
28.....	11,000	10,800	4,540	2,790	2,660	-----	3,920
29.....	10,900	11,000	4,420	-----	2,580	3,370	4,030
30.....	11,200	10,700	4,480	-----	2,570	3,590	4,030
31.....	-----	10,100	-----	-----	2,670	-----	3,980

NOTE.—No record on days for which discharge is not given.

SACRAMENTO RIVER AT SACRAMENTO, CALIF.

LOCATION.—At Southern Pacific Railroad bridge at Sacramento, Sacramento County.

RECORDS AVAILABLE.—June 19 to November 24, 1921.

GAGE.—United States Weather Bureau gage at railroad bridge.

DISCHARGE MEASUREMENTS.—Tidal cycle discharge measurements were made on Sacramento River at Second Bannon slough, 2 miles upstream. This discharge was added to that for the same day of American River at H Street Bridge. The total was used as the discharge of Sacramento River at Sacramento, using the United States Weather Bureau gage as datum.

CHANNEL AND CONTROL.—Channel is silt. No control. Tide effect is felt above Sacramento.

DIVERSIONS.—See descriptions of stations upstream for details of diversions and regulation.

COOPERATION.—Daily-discharge record furnished by State engineer, who maintained station.

Daily discharge, in second-feet, of Sacramento River at Sacramento, Calif., for the period June 19 to Nov. 14, 1921

Day	June	July	Aug.	Sept.	Oct.	Nov.
1.		11,200	5,900	4,690	6,910	6,770
2.		10,100	5,680	4,750	6,880	6,520
3.		10,200	5,300	4,200	6,430	6,450
4.		10,400	4,850	3,360	6,280	6,150
5.		10,100	4,980	3,200	6,950	5,800
6.		9,540	5,820	3,180	7,030	5,800
7.		9,350	5,820	3,240	6,050	5,570
8.		9,070	5,050	3,050	6,350	5,250
9.		8,190	3,970	3,480	6,750	5,170
10.		7,400	4,440	5,250	6,430	5,300
11.		7,080	4,380	4,180	5,860	5,400
12.		6,800	4,130	3,360	5,860	5,570
13.		6,300	3,520	3,050	5,950	7,650
14.		6,250	3,970	3,340	6,060	6,300
15.		5,170	3,650	3,590	6,130	6,630
16.		6,030	3,300	4,000	6,380	6,220
17.		6,850	4,450	3,850	6,180	6,180
18.		7,300	3,930	3,240	6,630	6,280
19.	18,400	6,520	3,610	3,630	7,180	5,500
20.	17,800	6,100	4,280	3,720	7,600	5,400
21.	18,400	5,950	4,320	3,930	7,930	5,270
22.	19,100	6,030	3,610	4,160	7,900	5,300
23.	19,600	6,380	3,250	4,550	6,800	5,620
24.	19,200	6,380	2,630	4,450	6,400	6,830
25.	17,400	6,180	2,630	4,850	5,860	-----
26.	16,000	5,080	3,200	4,690	6,250	-----
27.	14,300	4,050	3,100	4,630	6,220	-----
28.	13,200	4,160	3,400	4,930	5,940	-----
29.	12,900	4,550	3,470	5,400	6,460	-----
30.	12,200	5,130	4,050	6,150	6,850	-----
31.	-----	5,680	4,380	-----	6,950	-----

PIT RIVER BASIN

PIT RIVER AT HENDERSON, CALIF.

LOCATION.—In sec. 36, T. 37 N., R. 1 W., at Big Bend ferry, one-fourth mile above Henderson, Shasta County. Nelson Creek enters half a mile above and Kosk Creek 1 mile below station.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—September 28, 1910, to September 30, 1921.

GAGE.—Water-stage recorder 50 feet below vertical staff fastened to an alder tree on left bank about 100 feet above ferry; the gages do not read exactly the same on account of the slope of water surface. Staff gage is the original gage. From December 28, 1912, to September 21, 1917, record is from a Gurley printing water-stage recorder. Original datum has been maintained.

DISCHARGE MEASUREMENTS.—Made from cable 25 feet downstream from water-stage recorder.

CHANNEL AND CONTROL.—Rough; boulders and coarse gravel; fairly permanent. One channel at all stages; banks not subject to overflow.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 3.54 feet at 2 a. m. January 6 (discharge, 8,570 second-feet); minimum stage from water-stage recorder, 0.17 foot, regulated flow, at 2 a. m. September 16 (discharge, 1,820 second-feet).

1910-1921: Maximum stage from water-stage recorder, 5.39 feet at 8 p. m. April 25, 1917 (discharge, 13,600 second-feet); minimum stage from water-stage recorder, 0.17 foot, regulated flow, September 16, 1921 (discharge, 1,820 second-feet).

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

DIVERSIONS.—No information.

REGULATION.—Pacific Gas & Electric Co.'s Hat Creek plants affect flow slightly at low water.

ACCURACY.—Stage-discharge relation permanent. Rating curve fairly well defined. Mean daily gage height determined by inspecting recorder graph. Daily discharge ascertained by applying mean daily gage height to rating table. Records good.

The following discharge measurement was made by R. C. Briggs:

September 7, 1921: Gage height, 0.46 foot; discharge, 2,210 second-feet.

Daily discharge, in second-feet, of Pit River at Henderson, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	2,150	2,290	3,250	4,780	4,370	5,890	4,370	3,420	3,420	2,590	2,220	2,290
2.....	2,220	2,290	3,420	5,000	4,170	6,120	4,570	3,420	3,420	2,590	2,210	2,290
3.....	2,220	2,290	3,420	5,000	4,170	6,360	4,570	3,420	3,420	2,590	2,200	2,290
4.....	2,220	2,290	3,250	5,890	4,170	6,840	4,570	3,420	3,420	2,590	2,190	2,220
5.....	2,150	2,290	3,250	7,570	4,570	7,080	4,570	3,420	3,250	2,590	2,180	2,220
6.....	2,290	2,290	3,080	8,320	4,170	7,320	4,370	3,420	3,420	2,590	2,180	2,220
7.....	2,220	2,290	3,080	7,570	4,170	7,080	4,370	3,420	3,250	2,590	2,170	2,220
8.....	2,220	2,290	3,080	6,360	3,790	6,840	4,370	3,600	3,420	2,590	2,160	2,220
9.....	2,290	2,290	3,080	5,660	3,790	6,360	4,370	3,600	3,250	2,590	2,150	2,220
10.....	2,290	2,290	3,250	4,570	4,170	6,360	4,370	3,600	3,250	2,590	2,150	2,220
11.....	2,290	2,290	4,570	4,370	5,000	6,120	4,370	3,600	3,080	2,440	2,150	2,220
12.....	2,290	2,440	4,370	3,980	5,440	5,890	4,170	3,600	3,080	2,440	2,220	2,220
13.....	2,290	2,440	3,790	3,600	5,890	6,120	4,370	3,600	3,080	2,440	2,290	2,220
14.....	2,290	2,440	3,600	3,420	7,570	5,890	4,370	3,600	3,080	2,440	2,290	2,220
15.....	2,290	2,440	3,250	3,420	8,320	5,890	4,170	3,790	3,030	2,440	2,290	2,220
16.....	2,290	2,750	3,080	3,420	8,320	5,660	4,170	3,790	2,990	2,440	2,290	2,080
17.....	2,290	3,080	3,080	3,980	7,320	5,890	4,170	3,790	2,940	2,440	2,290	2,220
18.....	2,290	3,600	3,080	5,890	6,840	6,600	4,170	3,790	2,890	2,290	2,290	2,290
19.....	2,290	4,170	3,420	6,120	6,360	6,600	4,170	3,790	2,840	2,290	2,290	2,290
20.....	2,290	3,790	3,420	5,890	6,120	6,840	3,980	3,790	2,800	2,290	2,290	2,290
21.....	2,290	3,420	3,250	5,440	7,320	6,360	3,980	3,790	2,750	2,290	2,290	2,290
22.....	2,290	3,250	3,080	5,220	7,080	6,120	3,980	3,600	2,750	2,440	2,290	2,290
23.....	2,290	3,080	3,080	4,780	6,360	5,890	3,980	3,600	2,590	2,440	2,290	2,290
24.....	2,290	2,910	3,080	4,370	5,890	5,660	3,790	3,600	2,750	2,420	2,290	2,290
25.....	2,290	2,910	3,250	4,170	5,440	5,440	3,790	3,600	2,910	2,400	2,290	2,290
26.....	2,290	3,600	3,080	3,980	5,220	5,220	3,790	3,600	2,750	2,380	2,290	2,290
27.....	2,290	3,790	3,080	4,370	5,220	5,000	3,600	3,600	2,750	2,350	2,290	2,290
28.....	2,290	4,170	3,080	4,570	5,440	4,780	3,600	3,600	2,750	2,330	2,290	2,290
29.....	2,290	3,600	3,080	4,570	-----	4,570	3,600	3,420	2,750	2,310	2,290	2,290
30.....	2,290	3,420	3,790	4,780	-----	4,570	3,600	3,420	2,750	2,290	2,290	2,290
31.....	2,290	-----	4,570	4,570	-----	4,570	-----	3,420	-----	2,290	2,290	-----

NOTE.—Recorder not working properly June 15-20, July 24-29, Aug. 2-8, and 17-19; discharge interpolated.

Monthly discharge of Pit River at Henderson, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	2,290	2,150	2,270	140,000
November.....	4,170	2,290	2,880	171,000
December.....	4,570	3,080	3,360	207,000
January.....	8,320	3,420	5,020	309,000
February.....	8,320	3,790	5,600	311,000
March.....	7,320	4,570	6,000	369,000
April.....	4,570	3,600	4,140	246,000
May.....	3,790	3,420	3,580	220,000
June.....	3,420	2,590	3,030	180,000
July.....	2,590	2,290	2,440	150,000
August.....	2,290	2,150	2,250	138,000
September.....	2,290	2,080	2,250	134,000
The year.....	8,320	2,080	3,560	2,580,000

PIT RIVER NEAR YDALPOM, CALIF.

LOCATION.—In NW. $\frac{1}{4}$ sec. 32, T. 34 N., R. 3 W., at Silverthorne Ferry, $1\frac{1}{2}$ miles southwest of Ydaltom, Shasta County, and $7\frac{1}{2}$ miles above junction with Sacramento River. Squaw Creek enters half a mile above and McCloud River 4 miles below station.

DRAINAGE AREA.—5,260 square miles not including drainage area of Goose Lake.

RECORDS AVAILABLE.—November 16, 1910, to September 30, 1921.

GAGE.—Vertical staff in two sections fastened to an ash tree on left bank 350 feet below ferry; read by M. D. Rodrigue.

DISCHARGE MEASUREMENTS.—Made from cable 50 feet above ferry cable.

CHANNEL AND CONTROL.—Gravel and sand; practically permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 12.3 feet at 4 p. m. November 18 (discharge, 25,900 second-feet); minimum stage, 2.40 feet October 1–6 (discharge, 2,390 second-feet).

1910–1921: Maximum stage recorded, 18.2 feet December 31, 1913 (discharge, from extension of rating curve, about 47,000 second-feet); minimum stage, 2.3 feet August 19 to September 23, 1920 (revised discharge, 2,300 second-feet).

DIVERSIONS.—A small quantity of water, used for irrigation, is diverted from the main stream and tributaries above station.

REGULATION.—See Pit River at Henderson.

ACCURACY.—Stage-discharge relation permanent. Rating curve revised and is well defined below 35,000 second-feet and extended above. Gage read to half-tenths once daily, during floods twice daily. Daily discharge ascertained by applying gage height to rating table. Records excellent.

Discharge measurements of Pit River near Ydaltom, Calif., during the year ending Sept. 30, 1921

Date	Made by—	Gage height	Discharge
		<i>Feet</i>	<i>Sec.-ft.</i>
May 9	K. M. Kelley.....	3.95	4,610
Aug. 15	Jesse Arnold.....	2.50	2,500

* See drainage area of Sacramento River near Red Bluff.

Daily discharge, in second-feet, of Pit River near Ydalpom, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	2,390	2,580	10,100	7,520	15,000	8,540	7,120	4,930	4,080	3,030	2,580	2,480
2.....	2,390	2,580	6,740	7,320	13,700	8,540	7,120	4,760	3,910	3,030	2,580	2,480
3.....	2,390	2,580	6,180	7,120	12,700	8,750	6,930	4,760	3,910	3,030	2,580	2,480
4.....	2,390	2,580	6,180	8,960	11,500	8,750	6,930	4,760	3,910	3,030	2,580	2,480
5.....	2,390	2,580	6,180	13,900	10,800	8,960	6,550	4,590	3,750	2,910	2,530	2,480
6.....	2,390	2,580	6,180	11,200	9,830	8,960	6,360	4,590	3,750	2,910	2,530	2,480
7.....	2,440	2,690	6,180	10,100	8,330	8,960	6,360	4,590	3,750	2,910	2,530	2,480
8.....	2,440	2,690	6,180	8,540	7,520	9,170	6,180	4,590	3,590	2,910	2,530	2,480
9.....	2,440	2,690	7,920	7,320	6,360	9,170	6,180	4,420	3,590	2,910	2,480	2,480
10.....	2,440	2,690	10,500	6,550	6,930	9,170	6,180	4,420	3,590	2,910	2,480	2,480
11.....	2,480	2,690	23,900	6,180	7,520	9,170	6,000	4,420	3,590	2,800	2,480	2,480
12.....	2,480	2,910	10,100	6,000	7,720	9,170	6,000	4,590	3,440	2,800	2,480	2,480
13.....	2,480	4,250	9,610	5,280	9,610	9,390	6,000	4,590	3,440	2,800	2,480	2,480
14.....	2,480	4,250	8,960	5,100	10,800	9,390	5,820	4,590	3,300	2,800	2,480	2,480
15.....	2,480	4,250	8,330	4,930	13,400	9,390	5,820	4,590	3,300	2,800	2,480	2,480
16.....	2,480	6,360	7,920	5,100	12,700	9,610	5,640	4,590	3,300	2,690	2,480	2,480
17.....	2,480	10,500	7,320	8,120	11,000	9,610	5,640	4,420	3,300	2,690	2,480	2,480
18.....	2,530	18,700	6,930	13,400	9,830	10,300	5,460	4,420	3,300	2,690	2,480	2,480
19.....	2,530	14,700	11,000	12,200	8,750	10,300	5,460	4,420	3,300	2,690	2,480	2,480
20.....	2,530	8,330	10,100	11,700	8,750	10,100	5,460	4,420	3,300	2,690	2,480	2,480
21.....	2,530	6,180	9,610	11,000	24,200	10,100	5,460	4,250	3,160	2,690	2,480	2,480
22.....	2,530	5,640	8,330	10,300	13,900	9,830	5,280	4,250	3,160	2,580	2,480	2,480
23.....	2,580	5,100	7,920	9,830	12,700	8,960	5,280	4,250	3,160	2,580	2,480	2,480
24.....	2,580	4,760	6,000	10,100	10,800	8,330	5,280	4,250	3,160	2,690	2,480	2,480
25.....	2,580	4,420	5,460	10,800	10,100	8,120	5,100	4,250	3,160	2,690	2,480	2,480
26.....	2,580	10,100	4,760	11,500	8,750	7,920	5,100	4,250	3,030	2,690	2,480	2,480
27.....	2,580	9,390	5,280	11,900	8,330	7,520	5,100	4,250	3,030	2,690	2,480	2,480
28.....	2,580	6,000	5,460	12,700	8,330	7,520	5,100	4,250	3,030	2,690	2,480	2,480
29.....	2,580	4,930	5,820	13,400	-----	7,320	4,930	4,250	3,030	2,580	2,480	2,480
30.....	2,580	4,250	6,000	17,500	-----	7,320	4,930	4,080	3,030	2,580	2,480	2,480
31.....	2,580	-----	6,180	15,800	-----	7,320	-----	4,080	-----	2,580	2,480	-----

NOTE.—No gage-height record Sept. 27-30, discharge interpolated.

Monthly discharge of Pit River near Ydalpom, Calif., for the year ending Sept. 30, 1921

[Drainage area, 5,260 square miles]

Month	Discharge in second-feet				Run-off	
	Maximum	Minimum	Mean	Per square mile	Inches	Acre-feet
October.....	2,580	2,390	2,490	0.473	0.55	153,000
November.....	18,700	2,580	5,460	1.04	1.16	325,000
December.....	23,900	4,760	7,980	1.52	1.75	491,000
January.....	17,500	4,930	9,720	1.85	2.13	598,000
February.....	24,200	6,360	10,700	2.03	2.11	594,000
March.....	10,300	7,320	8,890	1.69	1.95	547,000
April.....	7,120	4,930	5,830	1.11	1.24	347,000
May.....	4,930	4,080	4,450	.846	.98	274,000
June.....	4,080	3,030	3,410	.648	.72	203,000
July.....	3,030	2,580	2,780	.529	.61	171,000
August.....	2,580	2,480	2,500	.475	.55	154,000
September.....	2,480	2,480	2,480	.471	.53	148,000
The year.....	24,200	2,390	5,530	1.05	14.28	4,000,000

PINE CREEK NEAR ALTURAS, CALIF.

LOCATION.—In SE. $\frac{1}{4}$ SW. $\frac{1}{4}$ sec. 35, T. 42 N., R. 13 E., at Alturas Electric Light & Power Co.'s power house, 6 miles above mouth of creek and 9 miles southeast of Alturas, Modoc County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—May 27, 1918, to September 30, 1921.

GAGE.—Vertical staff fastened to wall of machine shop on left bank, 30 feet below discharge pipe of power plant; read by I. W. Gibbins.

DISCHARGE MEASUREMENTS.—Made by wading or from a footbridge above gage.
CHANNEL AND CONTROL.—Large irregular boulders and gravel; rough; permanent. Left bank is a sloping stone wall; right bank slopes gradually. Channel straight above and below gage.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 3.20 feet at 5 p. m. December 30 (discharge, 147 second-feet); minimum stage 0.98 foot at 7.15 p. m. November 9 (discharge, 6.5 second-feet).

1918–1921: Maximum stage recorded, 3.20 feet at 5 p. m. March 29, 1919, and December 30, 1920 (discharge, 147 second-feet); minimum stage 0.8 foot at 10.30 a. m. January 5 and 7.30 a. m. January 26, 1919 (discharge, 2.3 second-feet).

DIVERSIONS.—The Alturas Electric Light & Power Co.'s canal diverts water above gage and returns it to creek 30 feet above gage.

REGULATION.—Diurnal fluctuation caused by operation of power plant just above gage.

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

Discharge measurements of Pine Creek near Alturas, Calif., during the year ending Sept. 30, 1921

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. 13	T. R. Simpson a-----	1.18	9.8	May 27	K. M. Kelley-----	2.32	68
Feb. 19	K. M. Kelley-----	1.34	15	Sept. 14	R. C. Briggs-----	1.32	14
Mar. 29	T. R. Simpson-----	1.42	21				

a Engineer of State water commission.

Daily discharge, in second-feet, of Pine Creek near Alturas, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1-----	9.5	10	12	16	9	13	17	28	82	46	18	14
2-----	10	9	13	60	10	15	19	27	67	45	17	14
3-----	9.5	9.5	12	46	10	17	25	25	67	45	19	15
4-----	8	8.5	12	18	10	27	25	25	60	41	18	14
5-----	8	9.5	11	20	9	34	24	24	64	41	19	15
6-----	8.5	8.5	17	15	8.5	56	28	32	67	45	16	14
7-----	8.5	7.5	16	14	8.5	29	24	38	82	43	16	14
8-----	8.5	9	17	12	10	20	20	35	96	41	18	15
9-----	8	8.5	18	12	60	18	19	37	90	38	18	14
10-----	8.5	9	12	11	104	17	21	40	90	33	18	14
11-----	8.5	9	12	11	43	17	22	40	82	32	17	13
12-----	11	9.5	11	15	29	17	21	43	90	30	16	14
13-----	8.5	9.5	9	15	22	18	27	46	82	30	16	14
14-----	8.5	8.5	10	13	22	19	24	50	82	29	15	14
15-----	9	9	8.5	11	15	16	23	60	82	30	16	14
16-----	10	10	12	11	11	17	22	60	74	31	15	13
17-----	8.5	10	13	70	11	19	21	74	67	30	15	14
18-----	11	11	11	22	11	27	21	67	60	30	15	13
19-----	9	24	10	17	12	17	19	60	60	28	16	14
20-----	8.5	17	10	15	12	17	18	53	53	27	15	14
21-----	10	11	13	8.5	11	17	19	50	46	24	15	14
22-----	11	13	14	8.5	12	17	23	50	46	24	14	13
23-----	11	12	12	11	16	17	24	53	50	24	14	14
24-----	9.5	11	15	16	32	18	22	46	53	18	15	12
25-----	11	11	15	19	18	16	25	50	53	20	15	12
26-----	10	41	13	12	13	16	22	53	53	21	16	13
27-----	10	24	12	10	12	15	22	67	56	21	15	13
28-----	10	12	12	9	15	14	24	74	53	20	14	13
29-----	9.5	10	53	9	-----	15	29	74	53	19	14	13
30-----	9	14	147	9.5	-----	16	30	74	53	17	15	13
31-----	8.5	-----	29	10	-----	17	-----	90	-----	19	14	-----

NOTE.—Discharge, Oct. 5–7, estimated.

Monthly discharge of Pine Creek near Alturas, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	11	8	9.32	573
November.....	41	7.5	12.2	726
December.....	147	8.5	18.8	1,160
January.....	70	8.5	17.6	1,080
February.....	104	8.5	19.9	1,110
March.....	56	13	19.6	1,210
April.....	30	17	22.7	1,350
May.....	90	24	49.8	3,060
June.....	90	46	66.9	3,980
July.....	46	17	30.4	1,870
August.....	19	14	15.9	978
September.....	15	12	13.7	815
The year.....	147	7.5	24.7	17,900

MCCLOUD RIVER AT BAIRD, CALIF.

LOCATION.—In NW. $\frac{1}{4}$ sec. 23, T. 34 N., R. 4 W., at United States fishery at Baird, Shasta County, 2 miles above junction with Pit River. Bailey Creek enters 2,000 feet above and John Creek 2,000 feet below station.

DRAINAGE AREA.—665 square miles.

RECORDS AVAILABLE.—December 22, 1910, to September 30, 1921.

GAGE.—Vertical staff fastened to an alder tree on right bank, 600 feet above hatchery; read by employees of United States fishery.

DISCHARGE MEASUREMENTS.—Made from cable 20 feet above gage.

CHANNEL AND CONTROL.—Gravel and cobblestones; fairly permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 11.5 feet November 19 (discharge, 19,200 second-feet); minimum stage, 1.08 feet October 4 and 5 (discharge, 880 second-feet).

1910-1921: Maximum stage recorded, 14.3 feet at noon February 2, 1917 (discharge, 27,600 second-feet); minimum stage, 1.05 feet September 3-17, 1920 (discharge, 860 second-feet).

DIVERSIONS.—None.

REGULATION.—None.

ACCURACY.—Stage-discharge relation not changed during year. Rating curve revised and well defined. Gage read to hundredths once daily. Daily discharge ascertained by applying gage height to rating table. Records good.

COOPERATION.—Gage-height record furnished by W. K. Hancock, superintendent of the United States fishery.

Discharge measurements of McCloud River at Baird, Calif., during the year ending Sept. 30, 1921

[Made by K. M. Kelley]

Date	Gage height	Discharge	Date	Gage height	Discharge
	<i>Feet</i>	<i>Sec.-ft.</i>		<i>Feet</i>	<i>Sec.-ft.</i>
May 9.....	2.93	2,270	May 15.....	3.13	2,480
10.....	2.95	2,310	June 29.....	1.98	1,480
15.....	3.35	2,570	Sept. 4.....	1.50	1,090

Daily discharge, in second-feet, of McCloud River at Baird, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	880	905	3,270	2,720	3,990	3,160	3,620	2,720	1,940	1,430	1,150	1,060
2	880	905	6,110	2,410	3,620	3,270	3,620	2,610	1,940	1,430	1,150	1,090
3	880	905	3,990	2,310	3,270	3,380	3,740	2,410	1,940	1,350	1,150	1,090
4	880	905	3,380	2,720	3,050	3,740	3,620	2,410	1,940	1,350	1,150	1,090
5	880	905	2,830	9,440	3,860	3,990	3,160	2,310	1,850	1,430	1,150	1,090
6	980	930	2,510	6,790	3,380	4,250	3,160	2,210	1,850	1,430	1,150	1,060
7	980	905	2,310	4,650	3,050	3,860	2,940	2,210	1,940	1,280	1,150	1,060
8	880	905	2,510	3,740	2,720	3,500	2,940	2,210	1,850	1,280	1,150	1,060
9	880	905	3,500	3,270	2,610	3,270	2,940	2,310	1,850	1,350	1,150	1,060
10	905	905	4,380	2,830	2,830	3,160	2,940	2,310	1,760	1,280	1,150	1,060
11	905	930	9,880	2,610	2,940	3,160	2,940	2,410	1,760	1,280	1,150	1,060
12	1,000	1,000	5,070	2,410	3,160	3,050	2,940	2,410	1,760	1,280	1,150	1,060
13	930	1,210	3,070	2,210	3,270	3,990	3,160	2,410	1,670	1,280	1,150	1,060
14	905	1,030	2,940	2,120	6,790	4,650	3,050	2,410	1,670	1,280	1,090	1,060
15	905	1,030	2,510	2,030	5,650	4,380	2,830	2,510	1,670	1,280	1,090	1,060
16	905	2,030	2,210	1,940	4,380	4,120	2,720	2,510	1,590	1,280	1,090	1,060
17	905	7,550	2,030	6,970	3,740	4,120	2,720	2,310	1,590	1,280	1,090	1,060
18	1,030	17,200	2,610	7,950	3,380	4,650	2,720	2,210	1,510	1,210	1,090	1,060
19	955	19,200	4,930	6,350	2,940	4,250	2,610	2,120	1,510	1,280	1,090	1,090
20	930	7,350	3,990	4,380	2,940	3,860	2,610	2,310	1,510	1,210	1,090	1,090
21	905	4,380	3,050	3,620	7,950	3,860	2,720	2,310	1,510	1,210	1,090	1,060
22	905	3,620	2,610	3,160	5,350	4,650	2,610	2,210	1,510	1,210	1,090	1,060
23	905	3,740	2,310	2,830	4,120	4,790	2,610	2,210	1,510	1,210	1,090	1,060
24	905	2,940	2,410	3,500	3,620	5,950	2,610	2,210	1,430	1,210	1,090	1,060
25	905	2,510	2,310	4,380	3,380	5,650	2,510	2,210	1,430	1,210	1,090	1,060
26	905	3,270	2,120	3,990	3,160	4,790	2,610	2,310	1,430	1,150	1,090	1,060
27	905	4,510	2,030	11,000	3,160	4,250	2,510	2,310	1,430	1,150	1,090	1,030
28	905	3,380	1,940	6,610	3,160	3,860	2,610	2,120	1,430	1,150	1,090	1,030
29	905	2,720	1,940	5,350	-----	3,620	2,720	2,120	1,430	1,150	1,090	1,030
30	905	2,410	2,720	9,000	-----	3,500	2,720	2,030	1,430	1,150	1,090	1,030
31	905	-----	3,050	5,210	-----	3,500	-----	1,940	-----	1,150	1,090	-----

Monthly discharge of McCloud River at Baird, Calif., for the year ending Sept. 30, 1921

[Drainage area, 665 square miles]

Month	Discharge in second-feet				Run-off	
	Maximum	Minimum	Mean	Per square mile	Inches	Acre-feet
October	1,030	880	913	1.37	1.58	56,100
November	19,200	905	3,370	5.07	5.66	201,000
December	9,880	1,940	3,260	4.90	5.65	200,000
January	11,000	1,940	4,440	6.68	7.70	273,000
February	7,950	2,610	3,770	5.67	5.90	209,000
March	5,950	3,050	4,010	6.03	6.95	247,000
April	3,740	2,510	2,910	4.38	4.89	173,000
May	2,720	1,940	2,300	3.46	3.99	141,000
June	1,940	1,430	1,650	2.48	2.77	98,200
July	1,430	1,150	1,270	1.91	2.20	78,100
August	1,150	1,090	1,120	1.68	1.94	68,900
September	1,090	1,030	1,060	1.59	1.77	63,100
The year	19,200	880	2,500	3.76	51.00	1,810,000

THOMAS CREEK BASIN

THOMAS CREEK AT PASKENTA, CALIF.

LOCATION.—In NE. $\frac{1}{4}$ sec. 4, T. 23 N., R. 6 W., at highway bridge at Paskenta, Tehama County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—January 2, 1921, to September 30, 1921. Also gage heights from October 10, 1920, to January 1, 1921.

GAGE.—Vertical staff attached to upstream end of center pier of highway bridge; read by Lester Flood.

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

CHANNEL AND CONTROL.—Gravel and sand; shifts at high water. Point of zero flow gage height 1.6 feet, August 18, 1921.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 8.9 feet at noon November 18 (discharge not determined); no flow October 1–10 and probably part of August and September.

DIVERSIONS.—None.

REGULATION.—None.

ACCURACY.—Stage-discharge relation permanent during period. Rating curve fairly well defined by seven discharge measurements. Staff gage read to half-tenths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table. Daily discharge not ascertained for period October 10 to January 1, rating curve not defined, for this period owing to high water and shifting channel. Records good below 1,000 second-feet and fair above.

COOPERATION.—Gage-height record and some discharge measurements furnished by W. H. Philips.

Discharge measurements of Thomas Creek at Paskenta, Calif., during the year ending Sept. 30, 1921

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>
Feb. 4	R. C. Briggs	3.35	500	Aug. 18	Jesse Arnold	1.82	1.7
Mar. 23	W. H. Philips *	3.30	489	18	do.	1.92	1.8
May 20	K. M. Kelley	3.02	250	21	Philips and Landis * ..	1.81	1.4
June 19	Philips and Flood *	2.55	68				

* Cooperating parties.

Daily gage height, in feet, of Thomas Creek at Paskenta, Calif., for the period Oct. 10, 1920, to Jan. 1, 1921

Day	Oct.	Nov.	Dec.	Jan.	Day	Oct.	Nov.	Dec.	Jan.
1.....		1.9	3.7	6.95	16.....	1.8	3.45	3.1	-----
2.....		1.8	4.45	-----	18.....	1.8	6.0	3.2	-----
3.....		1.85	3.45	-----	18.....	1.85	8.77	3.35	-----
4.....		1.9	3.3	-----	19.....	1.95	6.8	4.0	-----
5.....		1.8	3.0	-----	20.....	2.0	5.2	3.9	-----
6.....		1.8	3.3	-----	21.....	1.9	4.0	3.7	-----
7.....		1.9	3.45	-----	22.....	1.85	3.85	3.5	-----
8.....		1.8	3.4	-----	23.....	1.9	3.4	3.9	-----
9.....		1.8	4.03	-----	24.....	2.0	3.0	3.95	-----
10.....	0.8	1.8	3.9	-----	25.....	2.05	3.9	3.9	-----
11.....	1.9	1.9	3.95	-----	26.....	2.05	6.73	3.7	-----
12.....	1.8	2.55	3.95	-----	27.....	2.0	4.95	3.75	-----
13.....	1.8	3.75	3.55	-----	28.....	2.0	3.5	3.85	-----
14.....	1.85	3.0	3.2	-----	29.....	1.95	3.75	4.3	-----
15.....	1.8	2.85	3.2	-----	30.....	1.9	3.8	6.27	-----
					31.....	1.8	-----	6.5	-----

NOTE.—Daily discharge, Oct. 10 to Jan. 1, not determined, owing to high water and shifting channel. No flow Oct. 1–9.

Daily discharge, in second-feet, of Thomas Creek at Paskenta, Calif., for the year ending Sept. 30, 1921

Day	Jan.	Feb.	Mar.	Apr.	May	June	Sept.
1.		650	1,040	750	510	185	
2.	1,250	602	1,560	980	380	185	
3.	1,250	510	1,320	860	537	185	
4.	1,320	602	1,400	602	305	185	
5.	2,120	860	1,560	650	365	185	
6.	1,320	574	1,250	574	272	162	
7.	1,400	510	1,040	483	212	149	
8.	1,180	483	860	483	272	162	
9.	860	750	805	510	240	176	0
10.	650	1,320	805	483	342	149	0
11.	750	1,400	750	465	380	149	.2
12.	555	1,320	805	448	465	133	.4
13.	750	1,400	1,110	448	465	112	.2
14.	650	1,560	860	397	465	112	.4
15.	465	1,320	631	397	510	79	.7
16.	750	1,040	650	342	448	92	.7
17.	1,920	860	750	253	320	84	1.0
18.	1,180	700	700	253	305	63	.7
19.	1,110	602	700	253	342	75	.7
20.	1,040	510	750	342	253	75	1.3
21.	860	750	700	397	320	69	.7
22.	650	980	631	448	305	79	.5
23.	750	860	465	510	320	84	.4
24.	4,020	860	700	448	397	63	.4
25.	1,180	980	750	510	365	47	.5
26.	1,920	1,250	700	555	380	47	.4
27.	805	1,180	700	602	465	44	.2
28.	920	980	602	555	380	47	.1
29.	1,040		574	555	305	47	.1
30.	700		602	483	253	47	.2
31.	555		750		176		

NOTE.—No record July 1 to September 8. Record book lost in fire at Paskenta.

Monthly discharge of Thomas Creek at Paskenta, Calif., for the period Jan. 2 to Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
January 2-31	4,020	465	1,150	68,400
February	1,560	483	908	50,400
March	1,560	465	855	52,600
April	980	253	501	29,800
May	537	176	357	22,000
June	185	44	109	6,490
September 9-30	1.3	0	.45	19.6

DEER CREEK BASIN

DEER CREEK NEAR VINA, CALIF.

LOCATION.—In NW. $\frac{1}{4}$ sec. 23, T. 25 N., R. 1 W., $2\frac{1}{2}$ miles northeast of Roberts ranch house, and $9\frac{1}{2}$ miles northeast of Vina, Tehama County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—October 17, 1911, to December 31, 1915, and March 9, 1920, to September 30, 1921.

GAGE.—Vertical staff fastened to a sycamore tree on left bank, one-fourth of a mile above location of old sheep bridge.

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

CHANNEL AND CONTROL.—Gravel and small boulders; shift during extreme high water.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 8.0 feet at 2 p. m. January 17 (discharge, 3,820 second-feet); minimum stage 1.70 feet October 1-3 (discharge, 80 second-feet).

1911-1915 and 1920-1921: Maximum stage recorded, 11.0 feet at 3.30 p. m. December 31, 1913 (discharge, 6,920 second-feet); minimum stage, 1.65 feet August 16-22, 1920 (discharge, 76 second-feet).

DIVERSIONS.—No information.

REGULATION.—No information.

ACCURACY.—Stage-discharge relation changed from that of previous years.

Rating curve well defined. Gage read to hundredths once daily October 1 to December 31 and about three times a week from January 1 to September 30. Daily discharge ascertained by applying gage height to rating table and interpolating discharge for days when gage was not read. Records good.

COOPERATION.—Gage-height record furnished by Stanford-Vina Ranch Irrigation Co. through C. W. Wright, irrigation superintendent.

Discharge measurements of Deer Creek near Vina, Calif., during the year ending Sept. 30, 1921

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>
Feb. 2	R. C. Briggs	3.70	626	June 28	K. M. Kelley	2.28	162
May 22	K. M. Kelley	3.21	460	28	do	2.28	180
22	do	3.20	457	Aug. 19	Jesse Arnold	1.90	102
June 20	C. W. Wright	2.45	212	Sept. 8	K. M. Kelley	1.90	97

^a Irrigation superintendent.

Daily discharge, in second-feet, of Deer Creek near Vina, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	80	87	870	590	1,240	555	590	520	410	172	114	101
2	80	87	820	520	630	590	630	510	400	172	114	101
3	80	87	720	450	590	630	670	500	390	172	114	101
4	86	87	630	930	570	670	600	485	384	166	114	101
5	92	87	555	1,410	550	670	520	500	336	161	114	101
6		99	87	485	1,090	490	670	500	520	336	156	110
7		97	87	417	770	434	670	485	555	336	150	106
8		96	90	502	650	420	630	485	520	336	150	101
9		93	101	630	538	400	590	485	485	336	150	101
10		91	114	720	480	470	570	500	485	336	140	101
11		94	130	670	417	538	555	510	485	336	130	101
12		99	150	670	380	830	760	520	485	310	130	101
13		94	352	720	352	1,120	970	555	500	288	130	101
14		91	185	384	330	1,410	920	555	520	270	122	101
15		87	400	352	304	870	820	555	520	257	122	101
16		90	590	320	2,060	770	720	550	520	226	122	101
17		92	1,900	272	3,820	670	730	540	510	226	122	101
18		96	3,720	417	2,810	600	750	538	500	226	122	101
19		111	2,220	2,990	2,380	538	770	530	485	226	122	101
20		105	1,550	1,980	1,340	900	700	520	502	212	114	101
21		99	970	1,080	870	1,270	630	520	468	212	114	101
22		92	555	520	730	950	870	530	450	212	114	101
23		92	450	590	590	630	770	538	450	212	114	101
24		91	336	630	1,340	610	670	550	450	212	114	101
25		91	520	590	1,240	590	630	555	450	205	114	101
26		90	720	434	1,140	570	590	555	469	198	114	101
27		90	1,270	417	2,060	555	560	555	470	185	114	101
28		89	870	384	2,190	555	538	550	480	172	114	101
29		88	590	434	2,320	538	538	485	172	114	101	100
30		87	368	485	2,460	538	530	450	172	114	101	100
31		87	540	1,850	560	560	417	417	114	101	101	100

NOTE.—See "Accuracy" paragraph for days on which discharge was interpolated.

Monthly discharge of Deer Creek near Vina, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	111	80	91.9	5,650
November.....	3,720	87	625	37,200
December.....	2,990	272	683	42,000
January.....	3,820	304	1,240	76,200
February.....	1,410	400	706	39,200
March.....	970	538	672	41,300
April.....	670	485	542	32,300
May.....	555	417	489	30,100
June.....	410	172	271	16,100
July.....	172	114	132	8,120
August.....	114	101	104	6,400
September.....	101	100	101	6,010
The year.....	3,820	80	470	340,000

STONY CREEK BASIN

STONY CREEK NEAR STONYFORD, CALIF.

LOCATION.—In NW. $\frac{1}{4}$ SE. $\frac{1}{4}$ sec. 35, T. 18 N., R. 7 W., at East Park feed canal diversion dam, $3\frac{1}{2}$ miles west of Stonyford, Colusa County.

DRAINAGE AREA.—97 square miles (measured by United States Bureau of Reclamation).

RECORDS AVAILABLE.—April 1, 1913, to December 31, 1914. November 26, 1918, to December 19, 1920, when station was discontinued.

GAGE.—Water-stage recorder at diversion dam.

DISCHARGE.—Discharge is sum of flow over diversion dam, flow through fishway, flow diverted by the feed canal, flow over feed canal spillway. Flow over dam computed from head on dam and weir formula. Flow in feed canal computed from weir formula.

CHANNEL AND CONTROL.—Diversion dam acts as control for river; a 16-foot weir is control in feed canal. There is a fish ladder in dam and a spillway in feed canal below head gates.

DIVERSION.—East Park feed canal diverts at the dam and empties into East Park reservoir.

REGULATION.—None.

COOPERATION.—Daily-discharge record furnished by United States Bureau of Reclamation through R. C. E. Weber, project manager.

*Daily discharge, in second-feet, of Stony Creek near Stonyford, Calif., for the period
Nov. 26, 1918, to Dec. 19, 1920*

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1918-19												
1			48	38	120	366	350	314	133	63	53	46
2			54	38	117	649	370	304	123	63	53	46
3			48	39	103	491	352	294	113	63	53	46
4			48	39	103	523	407	270	102	63	53	46
5			48	39	114	386	352	269	101	63	53	46
6			53	39	109	396	330	254	100	57	53	46
7			80	33	287	411	306	244	99	57	53	49
8			66	36	677	376	255	234	97	57	53	49
9			148	35	3,210	350	255	224	95	57	53	49
10			82	44	2,950	326	270	214	93	57	53	49
11			75	142	1,950	295	270	204	91	57	53	49
12			68	136	928	295	255	191	89	57	53	49
13			72	75	647	371	240	186	88	50	53	49
14			66	72	551	285	240	186	87	50	53	53
15			68	87	351	250	230	186	85	50	53	53
16			63	142	312	250	213	186	83	50	53	53
17			62	790	354	245	213	182	84	50	49	53
18			53	733	298	371	350	182	82	50	49	53
19			55	1,260	263	456	318	182	81	50	49	53
20			55	240	249	300	292	176	80	50	49	53
21			60	232	249	300	286	176	79	50	49	40
22			60	227	279	340	286	172	78	50	49	40
23			55	229	230	350	280	172	78	50	49	40
24			54	223	220	350	280	166	78	50	40	40
25			54	220	212	376	270	166	73	50	40	40
26		84	50	216	799	386	270	162	71	50	40	40
27		84	51	210	448	396	270	156	69	53	40	40
28		78	46	196	411	371	240	153	67	53	40	43
29		68	47	164		396	330	148	65	53	40	43
30		63	45	146		371	330	144	63	53	40	43
31			44	129		356		139		53	46	
1919-20												
1	43	49	43	43	28	32	75	115	63	45	23	23
2	43	49	43	48	59	43	69	108	63	45	23	23
3	43	49	43	23	34	33	69	96	63	45	23	23
4	43	49	43	30	34	31	68	89	63	45	23	23
5	46	49	43	32	31	31	71	74	63	45	23	23
6	46	49	43	43	16	31	75	98	63	45	23	23
7	46	49	43	44	26	31	75	85	63	45	23	23
8	46	49	43	33	24	31	73	88	63	45	23	23
9	46	49	43	33	24	37	300	88	63	45	23	23
10	46	49	52	32	23	63	171	88	63	45	23	23
11	46	49	820	30	23	48	155	85	63	39	23	23
12	40	49	146	30	23	45	145	83	61	32	23	23
13	40	49	26	30	21	48	140	83	57	28	23	23
14	40	49	39	30	23	77	134	83	53	28	23	23
15	40	49	26	30	24	56	814	83	50	28	23	23
16	40	49	31	22	23	60	596	85	47	28	23	23
17	40	49	32	30	23	50	339	88	45	28	23	23
18	40	49	32	26	21	45	235	95	45	28	23	23
19	43	49	123	34	23	49	206	95	45	26	23	23
20	43	49	213	24	23	55	203	88	45	26	23	23
21	43	49	102	22	23	223	181	85	45	24	23	23
22	43	49	153	30	23	167	151	83	45	24	23	23
23	43	49	142	28	23	137	126	80	45	24	23	23
24	43	49	90	28	23	139	118	77	45	24	23	23
25	43	49	56	28	23	114	108	66	45	24	23	23
26	49	49	50	26	23	94	104	69	45	24	23	23
27	49	49	48	26	24	85	128	63	45	24	23	23
28	49	49	40	26	35	78	113	63	45	24	23	23
29	49	49	52	26	27	78	116	63	45	24	23	23
30	49	49	49	26		78	119	63	45	24	23	23
31	49		39	26		78		63		24	23	

Daily discharge, in second-feet, of Stony Creek near Stonyford, Calif., for the period Nov. 26, 1918, to Dec. 19, 1920—Continued

Day	Oct.	Nov.	Dec.	Day	Oct.	Nov.	Dec.	Day	Oct.	Nov.	Dec.
1.....	23	39	238	11.....	39	45	1,770	21.....	39	905	-----
2.....	23	39	792	12.....	39	78	667	22.....	39	600	-----
3.....	23	39	406	13.....	39	322	433	23.....	39	623	-----
4.....	23	39	331	14.....	39	121	332	24.....	39	510	-----
5.....	23	39	270	15.....	39	121	283	25.....	39	673	-----
6.....	23	39	232	16.....	39	279	251	26.....	39	349	-----
7.....	23	39	232	17.....	39	522	242	27.....	39	673	-----
8.....	23	39	310	18.....	39	1,840	253	28.....	39	382	-----
9.....	23	39	221	19.....	39	1,540	867	29.....	39	314	-----
10.....	39	39	420	20.....	39	837	-----	30.....	39	257	-----
								31.....	39	-----	-----

Monthly discharge of Stony Creek near Stonyford, Calif., for the period Nov. 26, 1918, to Dec. 19, 1920

[Drainage area, 97 square miles]

Month	Discharge in second-feet				Run-off	
	Maximum	Minimum	Mean	Per square mile	Inches	Acre-feet
1918-19						
November 26-30.....	-----	-----	75.4	0.777	0.14	748
December.....	148	44	60.6	.625	.72	3,730
January.....	1,260	33	202	2.08	2.40	12,400
February.....	3,210	103	591	6.09	6.84	32,800
March.....	649	245	367	3.78	4.36	22,600
April.....	407	213	260	2.99	3.34	17,300
May.....	314	139	201	2.07	2.39	12,400
June.....	133	63	87.6	.903	1.01	5,210
July.....	63	50	54.2	.559	.64	3,330
August.....	53	40	48.9	.504	.58	3,010
September.....	53	40	46.6	.480	.54	2,770
The period.....	-----	-----	-----	-----	-----	116,000
1919-20						
October.....	49	40	44.2	.456	.53	2,720
November.....	49	49	49.0	.505	.56	2,920
December.....	820	26	88.6	.913	1.05	5,450
January.....	48	22	30.3	.312	.36	1,860
February.....	59	16	25.9	.267	.29	1,490
March.....	223	31	69.9	.721	.83	4,300
April.....	814	68	176	1.81	2.02	10,500
May.....	115	63	83.0	.856	.99	5,100
June.....	63	45	53.0	.546	.61	3,150
July.....	45	24	32.4	.334	.39	1,990
August.....	23	23	23.0	.237	.27	1,410
September.....	23	23	23.0	.237	.26	1,370
The year.....	820	16	58.2	.600	8.16	42,300
1920						
October.....	39	23	34.4	.355	.41	2,120
November.....	1,840	39	379	3.91	4.36	22,600
December (19 days).....	1,770	221	450	4.64	3.28	17,000
The period.....	-----	-----	-----	-----	-----	41,700

STONY CREEK NEAR ELK CREEK, CALIF.

LOCATION.—In NW. $\frac{1}{4}$ NW. $\frac{1}{4}$ sec. 27, T. 20 N., R. 6 W., at county road bridge $2\frac{1}{2}$ miles south of Elk Creek, Glenn County.

DRAINAGE AREA.—298 square miles (measured by United States Bureau of Reclamation).

RECORDS AVAILABLE.—May 1, 1919, to September 30, 1921.

GAGE.—Vertical staff in two sections; read by Cecil Gollnick.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading.

CHANNEL AND CONTROL.—Channel, solid rock; permanent. Banks subject to overflow.

EXTREMES OF DISCHARGE.—1919–1921: Maximum stage, from flood marks, 7.80 feet January 31, 1921 (discharge, about 10,200 second-feet); minimum stage recorded, 0.15 foot September 28, 1920 (discharge, 15 second-feet).

DIVERSIONS.—No information.

REGULATION.—Water is stored in East Park reservoir on Little Stony Creek and released during irrigating season.

ACCURACY.—Rating curve well defined to 600 second-feet and extended above. Gage read daily to hundredths. Daily discharge ascertained by applying daily gage height to rating table.

COOPERATION.—Daily-discharge record furnished by the United States Bureau of Reclamation through R. C. E. Weber, project manager.

Daily discharge, in second-feet, of Stony Creek near Elk Creek, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	19	20	2,150	410	1,800	585	317	207	177	205	236	205
2.....	19	20	1,550	465	1,550	585	317	207	177	190	245	205
3.....	18	20	1,550	465	1,800	585	317	192	148	190	245	205
4.....	19	20	1,550	476	1,000	585	317	177	148	190	245	205
5.....	19	19	83	702	1,000	585	317	150	134	205	245	205
6.....		20	19	83	875	1,300	650	317	150	123	190	245
7.....		20	33	150	525	1,100	650	295	150	123	205	230
8.....		20	33	126	410	1,100	650	295	150	134	205	223
9.....		22	33	1,100	317	1,100	650	275	150	134	205	230
10.....	19	36	1,000	317	1,100	650	275	150	134	245	223	190
11.....		19	40	1,700	240	1,300	650	275	177	134	223	223
12.....		19	45	1,700	177	1,300	650	257	177	123	245	223
13.....		19	126	1,450	177	1,300	525	240	177	123	245	227
14.....		19	104	650	177	1,100	495	240	177	205	245	230
15.....		19	83	104	150	900	465	240	177	177	245	223
16.....		19	240	83	150	900	465	240	207	177	245	223
17.....		18	360	65	2,280	800	465	240	207	162	245	223
18.....		18	2,650	48	2,030	800	410	223	177	177	245	223
19.....		19	2,050	3,650	1,360	750	385	223	207	177	270	230
20.....		19	900	360	1,820	800	317	223	207	185	245	230
21.....		19	1,000	1,450	1,000	750	360	223	207	185	245	223
22.....		19	525	650	780	750	410	223	207	177	245	205
23.....		33	525	650	1,000	650	317	223	207	177	245	205
24.....		20	360	1,450	2,580	650	317	207	177	177	245	223
25.....		20	620	650	1,400	650	317	207	207	185	270	223
26.....		22	240	585	2,980	650	317	207	207	185	254	223
27.....		23	650	465	5,800	650	317	207	207	177	254	223
28.....		22	240	650	2,030	650	317	207	207	177	270	205
29.....		20	177	1,000	1,440	-----	317	207	257	185	245	205
30.....		20	126	650	4,750	-----	340	207	223	205	245	205
31.....		20	-----	465	5,900	-----	317	-----	207	-----	236	205

Monthly discharge of Stony Creek near Elk Creek, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	33	18	20.0	1,230
November.....	2,650	19	377	22,400
December.....	3,650	48	897	55,200
January.....	5,900	150	1,390	85,500
February.....	1,800	650	1,010	56,100
March.....	650	317	473	29,100
April.....	317	207	252	15,000
May.....	257	150	190	11,700
June.....	205	123	163	9,700
July.....	270	190	233	14,800
August.....	245	205	225	13,800
September.....	205	110	178	10,600
The year.....	5,900	18	449	325,000

STONY CREEK NEAR ORLAND, CALIF.

LOCATION.—In NW. $\frac{1}{4}$ sec. 7, T. 22 N., R. 4 W., at county road bridge near Simpson ranch, 10 miles northwest of Orland, Glenn County.

DRAINAGE AREA.—636 square miles (measured by United States Bureau of Reclamation).

RECORDS AVAILABLE.—January 1, 1920, to September 30, 1921.

GAGE.—Vertical staff in two sections at the bridge; read by Leonora Simpson.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading.

CHANNEL AND CONTROL.—Channel consists of gravel; shifting. Banks subject to overflow at high water.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 10.3 feet January 30 (discharge, 19,500 second-feet); no flow November 12.

DIVERSIONS.—No information.

REGULATION.—Water is stored in East Park reservoir on Little Stony Creek and released during irrigating season.

ACCURACY.—Rating curve well defined by frequent discharge measurements. Gage read to hundredths once daily during low water and twice or more daily during high water. Daily discharge ascertained by applying mean daily gage height to rating table. Records good.

COOPERATION.—Daily-discharge record furnished by the United States Bureau of Reclamation through R. C. E. Weber, project manager.

Daily discharge, in second-feet, of Stony Creek near Orland, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	7	5	220	2,020	3,520	1,060	530	405	280	210	215	165
2.....	7	4	1,750	1,750	3,370	1,340	510	430	250	205	215	156
3.....	7	4	960	1,560	2,700	1,260	510	400	250	190	220	155
4.....	7	4	650	1,470	2,450	1,260	470	385	250	185	215	165
5.....	7	4	360	1,380	2,300	1,220	485	360	295	185	215	165
6.....	7	3	155	1,380	1,950	1,190	510	310	250	180	215	165
7.....	7	3	710	1,360	1,560	1,120	470	280	235	190	215	165
8.....	7	2	410	1,350	1,120	1,060	470	250	235	215	215	165
9.....	7	2	1,180	1,300	1,120	930	450	280	225	215	215	165
10.....	7	2	2,440	920	1,380	830	430	280	200	215	215	165
11.....	7	1	3,980	800	2,840	800	430	280	200	225	210	165
12.....	7	0	1,380	520	2,450	780	430	300	185	220	207	165
13.....	7	570	710	520	1,860	760	510	250	175	220	207	156
14.....	7	205	650	460	1,950	680	450	250	200	215	207	156
15.....	6	157	310	410	1,750	630	430	235	200	215	205	165
16.....	6	660	220	530	1,380	730	400	310	200	230	205	165
17.....	6	606	185	4,560	1,300	750	360	325	200	240	200	165
18.....	6	4,670	155	4,020	960	650	360	340	200	240	200	165
19.....	5	4,280	4,140	2,920	840	630	340	340	200	230	197	165
20.....	5	2,680	2,440	2,300	840	630	360	430	200	235	195	162
21.....	5	1,350	1,120	2,300	2,060	630	320	800	200	235	190	162
22.....	5	1,000	840	1,380	1,300	610	370	650	175	230	190	162
23.....	5	520	1,850	1,370	1,220	590	320	430	175	230	190	162
24.....	6	310	1,750	3,710	1,190	830	320	400	225	230	190	165
25.....	6	185	1,080	4,340	1,000	800	320	400	225	230	190	165
26.....	5	157	1,000	5,950	1,080	730	312	340	238	230	190	165
27.....	6	2,860	1,080	9,460	1,000	730	304	310	238	230	185	185
28.....	5	770	1,150	6,230	1,000	680	304	450	244	225	185	210
29.....	5	310	1,950	5,560	-----	630	344	430	244	215	182	200
30.....	5	260	4,140	13,100	-----	590	392	320	250	215	180	195
31.....	5	-----	2,440	4,970	-----	550	-----	340	-----	215	177	-----

Monthly discharge of Stony Creek near Orland, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	7	5	6.13	377
November.....	4,670	0	719	42,800
December.....	4,140	155	1,340	82,400
January.....	13,100	410	2,900	178,000
February.....	3,520	840	1,700	94,400
March.....	1,340	550	828	50,900
April.....	530	304	407	24,200
May.....	800	235	365	22,400
June.....	295	175	221	13,200
July.....	240	180	218	13,400
August.....	220	177	201	12,400
September.....	210	155	168	10,000
The year.....	13,100	0	752	544,000

LITTLE STONY CREEK NEAR LODOGA, CALIF.

LOCATION.—At East Park reservoir, 4 miles above junction with Stony Creek and $3\frac{1}{2}$ miles northwest of Lodoga, Colusa County.

DRAINAGE AREA.—102 square miles.

RECORDS AVAILABLE.—January 1, 1908, to September 30, 1921.

GAGE.—Record beginning December 1, 1910, is from gage at the dam; prior to that date gage was a short distance below present site. Gage read by J. J. Lea.

DISCHARGE.—Computed from gage readings at the dam. Correction made for evaporation, which is measured by evaporation pan at reservoir. When discharge is 10 second-feet or less it is computed from weir and current-meter measurements taken at the head of the reservoir about 3 miles above dam.

EXTREMES OF DISCHARGE.—1907-1921: Maximum stage reported, 11.8 feet February 2, 1909 (discharge, 7,060 second-feet); minimum stage, no flow during parts of every year.

DIVERSIONS.—No information.

REGULATION.—East Park reservoir is used for storage for the Orland project of the United States Bureau of Reclamation.

COOPERATION.—Daily discharge record furnished by United States Bureau of Reclamation, through R. C. E. Weber, project manager.

Daily discharge, in second-feet, of Little Stony Creek near Lodoga, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July
1		0.2	90	162	352	132	70	38	23	8
2		.2	263	152	303	131	64	31	20	7
3		.2	195	155	288	131	57	36	20	7
4		.2	212	128	237	128	55	41	12	6
5		.2	202	126	292	125	50	29	15	6
6	0.1	.2	170	128	193	131	53	22	15	6
7	.5	.2	80	128	205	131	57	28	18	6
8	.5	5.5	78	105	227	124	75	33	23	6
9	.1	1.0	78	108	168	123	90	24	21	6
10	.5	1.0	679	105	200	120	91	22	21	5
11	.5	1.0	559	102	186	113	96	20	21	5
12	.5	5	477	75	189	110	86	18	21	5
13	.5	12	196	80	189	109	83	20	18	4
14	.5	6	224	78	191	129	83	20	4	4
15	.5	3.6	157	78	170	131	83	23	5	4
16	.5	70	90	88	168	108	79	20	9	3
17	.2	119	125	885	177	86	82	23	5	3
18	.2	210	109	260	153	83	112	23	5	3
19	.2	977	1,250	1,830	127	88	102	20	8	2
20	.2	444	738	589	144	88	86	20	9	2
21	.2	70	220	426	149	70	96	19	14	2
22	.2	123	362	244	203	70	96	23	18	1
23	.2	118	200	140	135	82	96	26	8	1
24	.2	56	534	772	143	85	93	23	11	1
25	.2	35	365	1,040	134	80	92	23	15	1
26	.2	36	255	812	141	80	79	26	9	1
27	.2	140	212	1,930	141	78	64	23	9	
28	.2	216	192	386	144	75	58	23	9	
29	.2	110	112	436		75	56	21	8	
30	.2	110	152	2,960		70	53	18	8	
31	.2		125	283		70		20		

NOTE.—No flow Oct. 1-5 and July 27 to Sept. 30.

Monthly discharge of Little Stony Creek near Lodoga, Calif., for the year ending Sept. 30, 1921

[Drainage area, 102 square miles]

Month	Discharge in second-feet				Run-off	
	Maximum	Minimum	Mean	Per square mile	Inches	Acre-feet
October	0.5	0	0.25	0.0025	0.003	15.4
November	977	0.2	95.7	.938	1.05	5,690
December	1,250	78	281	2.75	3.17	17,300
January	2,960	75	477	4.68	5.40	29,300
February	352	127	191	1.87	1.95	10,600
March	132	70	102	1.00	1.15	6,270
April	112	50	77.9	.764	.85	4,640
May	41	18	24.4	.239	.28	1,500
June	23	4	13.4	.131	.15	797
July	8	0	3.39	.033	.04	208
The year	2,960	0	105	1.03	14.04	76,300

NOTE.—No flow for months for which no record is given.

FEATHER RIVER BASIN

NORTH FORK OF FEATHER RIVER NEAR PRATTVILLE, CALIF.

LOCATION.—In sec. 28, T. 27 N., R. 8 E., below Great Western Power Co.'s dam at Lake Almanor, 4 miles above mouth of Butt Creek, and 5 miles southeast of Prattville, Plumas County.

DRAINAGE AREA.—506 square miles above dam.

RECORDS AVAILABLE.—June 13, 1905, to September 30, 1921.

GAGE.—Original gage was a Friez water-stage recorder nearly on south line of sec. 21 (above the dam); it was moved downstream about 1,300 feet April 29, 1912, and again about 2,200 feet downstream July 31, 1912. The Friez recorder was discontinued March 21, 1914. Original datum has not been maintained. Since March 21, 1914, discharge was obtained from gate openings and head on dam.

DISCHARGE MEASUREMENTS.—Made in flume at gage.

CHANNEL AND CONTROL.—No information.

EXTREMES OF DISCHARGE.—1905-1921: Maximum stage recorded, 16.2 feet, crest of flood, March 19, 1907 (discharge, 10,000 second-feet); minimum stage, dry April 15 and 16, 1914, and parts of January to April, 1919 (water being stored).

DIVERSIONS.—No information.

REGULATION.—From March 7, 1914, to May 7, 1921, the record shows the quantity of water released from Lake Almanor. After May 7, 1921, the record shows the amount released down the river and the amount diverted through the tunnel into Butte Creek reservoir. There was 85,500 acre-feet of water in reservoir September 30, 1920, and 173,250 acre-feet on September 30, 1921.

COOPERATION.—Record of discharge and storage furnished by Great Western Power Co., through P. W. Ham, chief engineer.

Daily discharge, in second-feet, of North Fork of Feather River near Prattville, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	883	1,330	65	85	1,500	800	1,000	2,000	2,420	1,230	1,680	1,210
2	500	1,180	50	275	1,500	800	1,000	2,450	2,020	1,210	1,870	1,160
3	900	1,250	50	184	1,230	800	1,000	2,500	2,000	1,040	1,430	1,340
4	967	1,250	78	184	1,200	800	842	2,090	2,000	1,250	1,350	904
5	967	1,050	61	85	1,020	1,170	100	1,530	2,000	1,330	1,180	1,350
6	850	642	442	85	1,000	1,420	100	1,780	2,000	1,660	1,430	1,240
7	850	950	413	85	819	873	100	2,270	2,000	1,430	1,140	1,190
8	750	1,150	367	85	800	100	100	1,920	1,600	1,500	1,090	9'3
9	500	1,220	275	223	800	100	1,100	1,800	1,500	1,150	1,850	1,560
10	850	942	85	344	800	100	2,000	1,980	1,500	1,430	1,420	1,0'0
11	765	1,030	85	305	800	100	2,000	2,280	1,500	1,600	1,300	1,420
12	750	183	229	275	800	100	2,000	2,480	1,500	1,600	700	1,2'9
13	850	100	229	275	800	100	2,000	2,500	1,060	1,630	735	1,030
14	800	650	275	275	800	100	1,720	2,960	1,000	1,730	1,310	1,0'9
15	750	450	321	85	800	100	1,520	3,350	1,470	1,670	1,320	1,030
16	500	80	504	275	800	100	1,500	3,400	1,230	1,450	1,060	1,0'9
17	750	76	436	85	800	100	1,370	3,400	1,020	1,640	1,300	1,5'0
18	675	80	85	85	800	58	1,300	3,120	1,000	1,750	1,080	1,079
19	800	80	85	85	800	50	1,300	2,730	1,000	1,750	973	1,330
20	800	80	184	85	800	50	1,300	2,700	1,000	1,780	678	1,130
21	825	80	85	85	800	50	1,300	2,700	1,000	1,800	1,020	1,130
22	800	80	275	85	800	50	1,300	2,700	1,000	1,780	1,040	1,140
23	817	80	275	184	800	50	1,300	2,440	1,000	1,600	1,130	978
24	1,470	80	85	85	800	50	1,480	2,400	1,000	1,670	1,250	743
25	1,580	227	85	85	800	50	1,050	2,400	1,000	1,700	1,170	1,140
26	1,720	80	275	85	800	50	1,000	2,400	1,250	1,680	1,170	1,440
27	1,730	80	321	968	800	50	819	2,400	1,000	1,660	991	1,010
28	1,820	80	321	1,480	800	50	942	2,680	1,210	1,220	1,240	1,090
29	1,720	80	321	1,500	-----	50	1,270	2,700	1,190	833	1,100	1,020
30	1,130	80	184	1,500	-----	50	1,950	2,700	1,140	1,410	1,190	1,020
31	1,550	-----	85	1,500	-----	50	-----	2,700	-----	1,720	1,060	-----

Monthly discharge of North Fork of Feather River near Prattville, Calif., for the year ending Sept. 30, 1921

Month	Discharge (second-feet)					Run-off (acre-feet)		
	Maximum	Minimum	Observed mean	Gain or loss in storage	Corrected for storage	Observed	Gain or loss in storage	Corrected for storage
October.....	1,820	500	988	-393	595	60,800	-24,200	36,600
November.....	1,330	76	491	+506	997	29,200	+30,100	59,300
December.....	504	50	214	+584	798	13,200	+35,900	49,100
January.....	1,500	85	356	+770	1,130	21,900	+47,300	69,500
February.....	1,500	800	895	-2.32	893	49,700	129	49,600
March.....	1,420	50	270	+1,340	1,610	16,600	+82,400	99,000
April.....	2,000	100	1,190	+563	1,760	70,800	+33,500	105,000
May.....	3,400	1,530	2,500	+49.9	2,550	154,000	+3,070	157,000
June.....	2,420	1,000	1,390	+124	1,510	82,700	+7,380	89,800
July.....	1,800	833	1,510	-823	687	92,800	-50,600	42,200
August.....	1,870	678	1,200	-690	513	74,000	-42,400	31,500
September.....	1,560	743	1,150	-592	560	68,400	-35,200	33,300
The year.....	3,400	50	1,010	+120	1,130	734,000	+87,100	822,000

NORTH FORK OF FEATHER RIVER AT BIG BAR, CALIF.

LOCATION.—In NW. $\frac{1}{4}$ sec. 32, T. 23 N., R. 5 E., one-fourth mile above Big Bar station on Western Pacific Railroad, Butte County, 7 miles above intake of Great Western Power Co.'s power plant at Big Bend.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—February 24, 1911, to September 30, 1921.

GAGE.—Bristol water-stage recorder. Original gage was a staff, installed July, 1910, opposite the middle of Jesse Moore Bar. Station was moved 300 feet upstream January 17, 1911, and the Bristol water-stage recorder was installed; gage datum, 1,347.96 feet above sea level (United States Geological Survey datum). In November, 1912, the Bristol gage was moved 130 feet upstream; gage datum now 1,348.96 feet above sea level.

DISCHARGE MEASUREMENTS.—Made from cable 20 feet above gage.

CHANNEL AND CONTROL.—Solid rock, boulders, and gravel; practically permanent.

EXTREMES OF DISCHARGE.—1911-1921: Maximum mean daily discharge, 35,000 second-feet January 1, 1914; minimum mean daily discharge, 500 second-feet February 22, 1920.

DIVERSIONS.—No information.

REGULATION.—Flow partly regulated by Lake Almanor.

COOPERATION.—Daily-discharge record furnished by Great Western Power Co., through P. W. Ham, chief engineer.

Daily discharge, in second-feet, of North Fork of Feather River at Big Bar, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	1, 140	2, 040	2, 960	4, 180	4, 770	5, 180	4, 750	-----	5, 190	2, 340	2, 360	1, 56 ^a
2.....	996	1, 710	3, 740	3, 470	4, 750	5, 380	5, 680	-----	5, 300	2, 420	2, 320	1, 60 ^a
3.....	660	1, 660	3, 110	3, 370	4, 480	6, 550	5, 920	-----	4, 860	1, 360	2, 190	1, 56 ^a
4.....	1, 050	1, 670	2, 800	3, 830	4, 100	7, 320	6, 550	-----	4, 750	1, 130	2, 180	1, 840
5.....	1, 200	1, 650	2, 550	6, 190	4, 150	8, 100	4, 970	-----	4, 750	1, 950	2, 120	1, 200
6.....	1, 380	1, 270	2, 290	7, 000	3, 770	7, 020	4, 530	-----	5, 080	2, 860	2, 100	1, 62 ^a
7.....	1, 230	882	2, 540	5, 420	3, 450	7, 940	4, 200	-----	4, 970	2, 880	2, 380	1, 56 ^a
8.....	1, 100	1, 350	2, 560	4, 050	3, 750	6, 180	4, 110	-----	4, 750	2, 710	2, 390	1, 52 ^a
9.....	977	1, 300	2, 520	3, 480	3, 750	5, 420	4, 110	-----	4, 310	2, 700	2, 140	1, 44 ^a
10.....	830	1, 350	2, 740	3, 250	3, 460	5, 420	-----	-----	4, 310	2, 220	2, 290	1, 360
11.....	1, 190	1, 400	4, 040	3, 050	3, 680	4, 530	-----	-----	4, 640	2, 720	1, 860	1, 25 ^a
12.....	1, 180	3, 200	3, 620	2, 860	4, 020	4, 860	-----	-----	3, 840	2, 720	1, 740	1, 41 ^a
13.....	1, 100	2, 540	2, 850	2, 700	4, 370	7, 480	-----	-----	3, 750	2, 390	1, 490	1, 56 ^a
14.....	1, 200	1, 350	2, 620	2, 620	7, 200	7, 640	-----	-----	1, 870	2, 430	1, 380	1, 51 ^a
15.....	1, 100	2, 130	2, 510	2, 500	7, 660	8, 420	-----	-----	2, 380	2, 480	1, 560	1, 46 ^a
16.....	1, 050	3, 880	2, 180	2, 270	6, 810	6, 180	-----	-----	2, 290	2, 410	1, 620	1, 460
17.....	780	4, 200	2, 460	6, 890	5, 400	6, 050	-----	-----	2, 260	1, 960	1, 560	1, 370
18.....	1, 250	12, 700	2, 600	14, 300	4, 900	7, 790	-----	6, 050	2, 130	2, 810	1, 500	1, 660
19.....	1, 210	15, 000	4, 060	10, 400	4, 340	7, 320	-----	5, 680	1, 300	2, 770	1, 470	1, 440
20.....	1, 220	5, 950	3, 700	6, 950	4, 050	5, 920	-----	5, 680	2, 070	2, 780	1, 360	1, 55 ^a
21.....	1, 200	3, 820	3, 240	5, 450	5, 210	5, 190	-----	5, 420	2, 190	2, 780	1, 160	1, 48 ^a
22.....	1, 220	3, 870	2, 780	4, 230	4, 530	5, 080	-----	5, 420	2, 170	2, 740	1, 440	1, 48 ^a
23.....	1, 070	3, 030	2, 770	3, 670	4, 310	4, 970	-----	-----	2, 280	2, 660	1, 380	1, 360
24.....	1, 290	2, 620	2, 890	3, 680	3, 900	4, 420	-----	-----	2, 270	2, 220	1, 340	1, 08 ^a
25.....	1, 810	2, 310	2, 680	3, 480	3, 950	4, 310	-----	-----	2, 300	2, 780	1, 640	1, 31 ^a
26.....	2, 060	6, 060	2, 470	3, 590	4, 010	4, 110	-----	-----	1, 680	2, 620	1, 550	1, 500
27.....	2, 110	6, 810	2, 570	4, 330	4, 330	3, 750	-----	-----	2, 060	2, 680	1, 600	1, 320
28.....	2, 480	4, 160	2, 620	5, 300	4, 830	3, 750	-----	-----	2, 450	2, 620	1, 930	1, 28 ^a
29.....	2, 360	3, 230	2, 600	5, 190	-----	3, 750	-----	-----	2, 410	2, 160	1, 480	1, 21 ^a
30.....	1, 920	2, 720	3, 580	5, 640	-----	3, 750	-----	-----	2, 450	2, 130	1, 620	1, 290
31.....	1, 910	-----	4, 750	5, 140	-----	3, 750	-----	-----	-----	2, 320	1, 630	-----

NOTE.—No record Apr. 10 to May 17 and May 23-31.

Monthly discharge of North Fork of Feather River at Big Bar, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	2, 480	660	1, 330	81, 800
November.....	15, 000	882	3, 530	210, 000
December.....	4, 750	2, 180	2, 950	181, 000
January.....	14, 300	2, 270	4, 790	295, 000
February.....	7, 660	3, 450	4, 570	254, 000
March.....	8, 100	3, 750	5, 660	348, 000
June.....	5, 300	1, 300	3, 240	193, 000
July.....	2, 880	1, 130	2, 440	150, 000
August.....	2, 390	1, 160	1, 750	108, 000
September.....	1, 840	1, 080	1, 440	85, 700

FEATHER RIVER AT OROVILLE, CALIF.

LOCATION.—In sec. 8, T. 19 N., R. 4 E., at highway bridge at Oroville, Butte County, 6 miles below junction of North and Middle forks and 30 miles above mouth of Yuba River.

DRAINAGE AREA.—3,640 square miles.

RECORDS AVAILABLE.—January 1, 1902, to September 30, 1921.

GAGE.—Water-stage recorder in concrete well and wooden shelter, on right bank 200 feet below bridge, at same datum as United States Weather Bureau vertical staff which is in two sections on pier of highway bridge near right bank. Weather Bureau gage was used 1902 to 1905 by adding 2 feet to the readings to reduce them to the datum of United States Geological Survey staff gage installed on left bank about 1,000 feet above bridge in December, 1905. The latter gage was washed out several times and until repaired the Weather Bureau gage was used.

DISCHARGE MEASUREMENTS.—Made from cable 1,000 feet above bridge. At extreme low water measurements have been made from a boat 1,000 feet below bridge.

CHANNEL AND CONTROL.—Boulders and gravel; shift somewhat during high water.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 14.25 feet at 4 a. m. November 19 (discharge, 82,200 second-feet); minimum stage from water-stage recorder, -0.37 foot at 10.30 a. m. October 5 (discharge, 638 second-feet).

1902-1921: Maximum stage recorded, 30.2 feet on Weather Bureau gage; 39.3 feet on gage 1,000 feet above, March 19, 1907 (discharge, 187,000 second-feet); minimum stage from water-stage recorder, -0.39 foot at 11 a. m. September 29, 1920 (discharge, 626 second-feet).

DIVERSIONS.—Minor diversions from tributaries above station.

STORAGE.—See North Fork of Feather River near Prattville, Calif.

REGULATION.—The operation of the Big Bend plant of the Great Western Power Co. causes diurnal fluctuations in stage, especially during extreme low water, when it amounts to about a foot.

ACCURACY.—Stage-discharge relation changed November 19. Rating curves well defined below 15,000 second-feet. Operation of water-stage recorder satisfactory except for a few short periods when observer neglected gage. Daily discharge ascertained with a discharge integrator. Records excellent.

Discharge measurements of Feather River at Oroville, Calif., during the year ending Sept. 30, 1921

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>
Dec. 26	K. M. Kelley	4.50	6,130	May 7	K. M. Kelley	6.02	11,100
Feb. 12	do.	5.30	8,400	July 1	do.	2.63	3,340
Feb. 13	do.	5.46	8,830	Sept. 24	Arnold and Kelley	1.73	2,350
Mar. 2	do.	6.47	12,500	Sept. 9	K. M. Kelley	.85	1,480

Daily discharge, in second-feet, of Feather River at Oroville, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1,230	2,120	6,200	10,300	11,500	11,000	11,100	17,000	9,800	3,580	2,300	1,710
2	1,170	1,820	13,400	8,760	10,400	11,800	13,300	15,400	10,200	3,350	2,300	1,700
3	950	1,710	8,390	8,430	9,670	13,200	15,100	14,000	9,620	2,930	2,280	1,690
4	1,160	1,780	7,150	9,900	8,960	15,000	14,300	12,900	9,200	2,810	2,260	1,520
5	1,220	1,730	5,980	16,900	9,730	18,300	12,400	11,500	9,480	3,270	2,240	1,690
6	1,500	1,650	5,470	20,000	8,590	20,000	10,300	10,800	10,000	2,920	2,220	1,680
7	1,630	1,270	5,720	14,100	7,800	18,000	9,650	10,900	10,100	3,380	2,220	1,670
8	1,500	1,580	6,680	11,400	7,100	15,100	9,360	12,100	9,550	3,120	2,000	1,660
9	1,340	1,890	6,980	9,480	6,610	12,900	9,600	12,200	8,770	3,070	2,000	1,650
10	1,150	1,890	8,700	8,350	6,870	12,300	11,100	12,500	8,430	2,620	1,940	1,640
11	1,370	1,830	15,300	7,450	7,170	11,800	12,500	13,500	8,330	2,730	1,980	1,480
12	1,730	3,720	10,900	6,800	8,200	11,500	12,900	14,900	7,840	2,970	1,900	1,640
13	1,630	8,140	7,700	6,800	8,900	23,600	13,400	16,200	7,400	2,970	1,800	1,700
14	1,500	4,530	6,280	5,350	15,300	22,800	12,600	17,000	6,500	2,950	1,610	1,650
15	1,420	3,380	5,500	5,400	16,200	18,900	11,200	16,400	5,900	2,930	1,750	1,680
16	1,370	8,340	5,000	5,100	13,700	16,100	10,300	17,400	6,300	2,870	1,750	1,620
17	1,100	10,300	4,670	10,700	12,300	15,900	9,970	14,900	5,560	2,620	1,760	1,600
18	1,700	30,700	5,730	64,200	10,700	19,700	9,550	13,300	5,060	2,700	1,650	1,900
19	1,860	62,500	23,000	37,500	9,500	18,900	9,110	11,800	4,800	2,810	1,720	1,820
20	1,610	23,600	14,200	8,350	8,500	16,400	9,020	11,500	4,900	2,800	1,630	1,780
21	1,540	10,900	9,300	7,450	14,900	14,300	9,970	12,300	4,830	2,800	1,430	1,750
22	1,530	10,400	7,650	12,700	11,600	15,500	11,700	11,200	4,770	2,780	1,600	1,770
23	1,370	7,770	6,440	10,600	10,100	14,200	13,000	12,400	4,710	2,770	1,670	1,670
24	1,550	6,000	8,370	11,800	9,280	12,500	13,100	12,700	4,400	2,380	1,620	1,540
25	2,040	4,670	7,600	10,800	9,000	12,200	12,300	13,100	4,110	2,510	1,800	1,330
26	2,180	11,400	6,470	10,300	9,100	11,500	11,000	13,500	3,720	2,770	1,770	1,590
27	2,270	23,400	5,920	12,000	9,500	10,500	11,200	14,200	4,000	2,570	1,730	1,630
28	2,330	11,600	5,820	13,300	10,400	12,000	12,600	13,700	3,630	2,480	1,560	1,610
29	2,220	8,400	5,670	12,500	-----	9,740	14,500	11,200	3,860	2,390	1,720	1,600
30	2,240	6,620	8,330	18,800	-----	9,740	15,700	10,300	3,800	2,300	1,720	1,660
31	1,590	-----	12,900	14,000	-----	10,000	-----	10,200	-----	2,100	1,710	-----

NOTE.—No gage-height record Jan. 16-22, July 28, 29, 31, Aug. 1-5, and Aug. 28 to Sept. 9; discharge estimated.

Monthly discharge of Feather River at Oroville, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	2,330	950	1,580	97,200
November.....	62,500	1,270	9,190	547,000
December.....	23,600	4,670	8,300	510,000
January.....	64,200	5,100	13,200	812,000
February.....	16,200	6,610	10,100	561,000
March.....	23,600	9,740	14,700	904,000
April.....	15,700	9,020	11,700	696,000
May.....	17,400	10,200	13,300	818,000
June.....	10,200	3,630	6,650	396,000
July.....	3,580	2,100	2,810	173,000
August.....	2,300	1,430	1,860	114,000
September.....	1,900	1,330	1,650	98,200
The year.....	64,200	950	7,900	5,730,000

FEATHER RIVER AT NICOLAUS, CALIF.

LOCATION.—At highway bridge at Nicolaus, Sutter County.

RECORDS AVAILABLE.—June 13 to October 28, 1921.

GAGE.—Water-stage recorder on middle fender pier 50 feet above bridge.

CHANNEL AND CONTROL.—Shifting sand; control is cross section and slope of river.

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

REGULATION.—Partly regulated by diversions above and by operation of power plants of Great Western Power Co.

COOPERATION.—Daily-discharge record furnished by State engineer who maintained station.

Daily discharge, in second-feet, of Feather River at Nicolaus, Calif., for the period June 13 to Oct. 28, 1921

Day	June	July	Aug.	Sept.	Oct.	Day	June	July	Aug.	Sept.	Oct.
1.....		3,850	1,190	470	1,390	16.....	7,520	1,940	610	690	1,700
2.....		3,650	1,320	500	1,450	17.....	8,080	1,880	615	715	1,890
3.....		3,380	1,260	500	1,350	18.....	6,600	1,790	605	780	2,400
4.....		3,010	1,100	505	1,330	19.....	5,960	1,720	580	880	2,720
5.....		2,870	1,030	595	1,600	20.....	5,900	1,750	560	1,130	2,650
6.....		2,940	1,000	705	1,620	21.....	6,100	1,680	565	1,120	2,600
7.....		2,890	920	475	1,700	22.....	6,280	1,620	520	1,160	2,060
8.....		2,700	1,010	545	1,650	23.....	6,340	1,640	470	1,160	1,620
9.....		2,440	1,020	560	1,510	24.....	5,950	1,640	460	1,160	1,410
10.....		2,280	1,010	525	1,380	25.....	5,520	1,420	460	1,160	1,520
11.....		1,960	850	520	1,340	26.....	4,960	1,260	455	1,120	1,690
12.....		1,860	850	534	1,590	27.....	5,160	1,500	490	1,140	1,790
13.....	10,700	1,960	930	515	1,690	28.....	4,500	1,420	495	1,280	2,020
14.....	9,980	1,960	765	620	1,700	29.....	4,040	1,420	475	1,310	-----
15.....	8,680	1,970	680	665	1,770	30.....	4,110	1,260	425	1,300	-----
						31.....	-----	1,190	475	-----	-----

BUTT CREEK AT BUTTE VALLEY, CALIF.

LOCATION.—At lower end of Butte Valley, 100 feet below footbridge, 1,000 feet above intake to Great Western Power Co.'s diversion flume, one-fourth mile south of Butte Valley post office, Plumas County, and 2 miles above junction with North Fork of Feather River.

DRAINAGE AREA.—73 square miles at original station.

RECORDS AVAILABLE.—June 14, 1905, to April 30, 1921, when station was discontinued.

GAGE.—Vertical staff on left bank, installed July 19, 1912, seven-eighths of a mile upstream from original vertical staff, which was on right bank. This gage

is out of the influence of the low-water diversion dam near the flume intake for the Great Western Power Co.'s Butt Creek plant.

DISCHARGE MEASUREMENTS.—Made from footbridge at gage.

CHANNEL AND CONTROL.—Sand, gravel, and clay; practically permanent.

EXTREMES OF DISCHARGE.—1905-1921: Maximum mean daily discharge, 1,640 second-feet January 16, 1909; minimum mean daily discharge, 7 second-feet August, 8, 9, 23, and 24, 1920.

DIVERSIONS.—The Oro Light & Power Co. diverts water through Wallack ditch from Butt Creek above station into the drainage basin of Yellow Creek; capacity of ditch, 15 to 20 second-feet.

REGULATION.—No information.

COOPERATION.—Daily-discharge record furnished by Great Western Power Co., through P. W. Ham, chief engineer.

Daily discharge, in second-feet, of Butt Creek at Butte Valley, Calif., for the period Oct. 1, 1920, to Apr. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
1	10	17	107	130	99	146	280
2	109	17	132	108	87	172	310
3	11	18	96	111	85	206	335
4	12	19	100	119	86	238	292
5	12	19	58	263	87	254	243
6	17	18	78	209	114	257	233
7	22	18	72	162	128	237	224
8	14	19	76	155	72	229	222
9	15	18	36	144	74	230	247
10	15	18	79	112	82	226	264
11	14	23	114	99	88	226	268
12	18	62	75	86	92	213	294
13	17	53	91	78	100	378	292
14	16	53	72	74	224	319	246
15	14	50	71	73	224	287	220
16	14	78	61	74	203	270	215
17	14	106	54	222	171	290	220
18	29	255	68	357	124	384	207
19	24	343	50	284	114	311	214
20	21	233	82	227	105	270	212
21	18	121	77	173	133	240	253
22	18	131	68	144	108	290	291
23	17	94	74	112	105	212	303
24	17	73	73	104	106	196	270
25	17	65	62	119	104	193	249
26	17	143	57	108	104	184	233
27	17	287	56	109	125	173	251
28	17	141	54	104	139	179	278
29	17	107	54	94	-----	195	314
30	17	88	91	93	-----	202	315
31	17	-----	179	98	-----	229	-----

Monthly discharge of Butt Creek at Butte Valley, Calif., for the period Oct. 1, 1920, to Apr. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	109	10	19.6	1,210
November	343	17	89.6	5,330
December	179	36	78.0	4,800
January	357	73	140	8,610
February	224	72	117	6,500
March	384	146	240	14,800
April	335	207	260	15,500
The period	-----	-----	-----	56,800

SPANISH CREEK AT KEDDIE, CALIF.

LOCATION.—In SW. $\frac{1}{4}$ sec. 22, T. 25 N., R. 9 E., at highway bridge at Keddle, Plumas County, 2 miles above junction with Indian Creek.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—October 22, 1911, to September 30, 1921.

GAGE.—Staff gage in two sections on left bank 250 feet below bridge, used since October 1, 1917. First section inclined; second section vertical; fastened to alder trees. Gage read by G. M. Norton.

Prior to August 12, 1914, low-water section was a vertical staff fastened to a stump on left bank 20 feet below bridge and a high-water section was painted on the left abutment of bridge. From August 12, 1914, to September 30, 1917, gage was a vertical staff in three sections; first section on right bank 50 feet above bridge; second section on left bank 20 feet below bridge; third section fastened to downstream side of left bridge pier. Present gage not at same datum as previous gages.

DISCHARGE MEASUREMENTS.—Made from downstream side of bridge or by wading.

CHANNEL AND CONTROL.—Boulders; practically permanent. A loose rock dam was partly built on control August 19, 1919, and completed during summer of 1921.

EXTREMES OF DISCHARGE.—Maximum mean discharge recorded during the period February 14 to September 30 was 1,840 second-feet on March 13; minimum discharge probably occurred sometime during the period August 11–20.

1911–1921: Maximum stage recorded, 10.0 feet at 11 a. m. December 31, 1913, and at 1 p. m. January 2, 1914 (discharge, from extension of rating curve, about 9,450 second-feet); minimum stage recorded, 2.95 feet August 15 and 28, 1918 (discharge, 17 second-feet).

DIVERSIONS.—Water is diverted from Spanish Creek for irrigation in American Valley.

REGULATION.—None.

ACCURACY.—Stage-discharge relation changed sometime during the period October 1 to February 13 when record is considered unreliable, also July 20 due to construction of loose rock dam on control. Rating curve fairly well defined. Gage read to half-tenths twice daily, but record is unreliable from October 1 to February 13 and discharge for this period not computed. Daily discharge, ascertained by applying mean daily gage height to rating table. Discharge for period July 21 to September 30, when dam was built on control, estimated from flow of Middle Fork of Feather River at Sloat and from the gage heights at Hadley's ranch 1 mile upstream. Records fair February 14 to September 30.

Discharge measurements of Spanish Creek at Keddle, Calif., during the year ending Sept. 30, 1921

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>
Feb. 14	K. M. Kelley	6.86	1,560	May 24	K. M. Kelley	5.22	452
14	do	7.10	1,600	24	do	5.15	440.
15	do	6.14	993	31	do	5.10	410
15	do	5.95	958	July 19	Jesse Arnold	3.90	44
Mar. 1	do	5.65	685	19	K. M. Kelley	3.90	44

Daily discharge, in second-feet, of Spanish Creek at Keddie, Calif., for the period Feb. 14 to Sept. 30, 1921

Day	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1		650	875	625	410	104		
2		875	980	650	390	104		
3		910	1,050	600	370	104		
4		1,050	840	600	370	86		
5		1,190	680	600	370	72		
6		1,120	600	600	310	72	30	25
7		980	625	600	310	72		
8		910	550	600	290	72		
9		840	550	650	290	72		
10		840	550	710	290	72		
11		840	550	710	290	72		
12		740	550	710	290	72		
13		1,840	550	710	290	72		
14	1,540	1,470	550	710	290	72		
15	1,050	1,190	550	710	330	53	20	30
16	840	1,120	550	710	290	53		
17	575	1,190	550	650	290	53		
18	478	1,610	550	600	290	53		
19	455	1,400	550	550	290	44		
20	650	980	550	500	215	44		
21	770	875	550	500	185			
22	525	1,050	550	500	155			
23	500	910	600	432	155		40	
24	500	840	600	410	104			
25	500	805	600	390	104			
26	455	710	600	500	104		25	35
27	600	600	600	455	104			
28	650	550	600	410	104			
29		550	600	410	104	35		
30		575	600	410	104			
31		770		410				

NOTE.—Record unreliable Oct. 1 to Feb. 13. Braced figures show mean discharge for periods indicated, estimated from records of flow of Middle Fork of Feather River.

Monthly discharge of Spanish Creek at Keddie, Calif., for the period Feb. 14 to Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
February 14-28	1,540	455	672	20,000
March	1,840	550	967	59,500
April	1,050	550	623	37,100
May	710	390	568	34,900
June	410	104	250	14,900
July	104		59.0	3,630
August			25.0	1,540
September			30.0	1,790
The period				173,000

MIDDLE FORK OF FEATHER RIVER AT SLOAT, CALIF.

LOCATION.—Half a mile above Sloat, Plumas County, three-fourths of a mile above mouth of Poplar Creek, and $1\frac{1}{2}$ miles below Cromberg.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—November 3, 1910, to September 30, 1921.

GAGE.—Water-stage recorder on right bank. Original gage was at California White Pine Co.'s log chute at Cromberg. Several changes in gage at that site were made. All were on downstream side of log-chute piers and original datum was maintained. During construction of recorder well (November 9 to December 4, 1913) a staff gage at new site and new datum was read.

DISCHARGE MEASUREMENTS.—Made from cable 1 mile above gage or by wading.

CHANNEL AND CONTROL.—Boulders and gravel, practically permanent. Left bank, flat and timbered, overflowed at flood stages.

EXTREMES OF DISCHARGE.—Maximum stage during year, from water-stage recorder, 6.30 feet at 7 a. m. March 5 (discharge, 3,130 second-feet); minimum stage from water-stage recorder, 2.53 feet, October 1-2 (discharge, 36 second-feet).

1910-1921: Maximum stage recorded, 13.0 feet April 7, 1911 (discharge, 9,640 second-feet); minimum stage recorded, 2.47 feet August 15-17, September 8-10, 13-16, and 21, 1920 (discharge, 28 second-feet).

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

DIVERSIONS.—None.

REGULATION.—None.

ACCURACY.—Stage-discharge relation has not changed since station was relocated in 1913. Rating curve well defined below 6,000 second-feet and extended above. Mean daily gage height determined by inspecting recorder graph. Daily discharge ascertained by applying mean daily gage height to rating table. Discharge for periods of no gage-height record estimated from flow of Middle Fork of Feather River near Oroville. Records good.

Discharge measurements of Middle Fork of Feather River at Sloat, Calif., during the year ending Sept. 30, 1921

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>
Feb. 16	K. M. Kelly	5.46	1,840	Feb. 27	K. M. Kelley	4.74	1,060
17	do	5.30	1,650	May 25	do	4.49	960
17	do	5.30	1,660	25	do	4.45	865
27	do	4.62	1,020	July 20	Jesse Arnold	2.95	103

Daily discharge, in second-feet, of Middle Fork of Feather River at Sloat, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	36	60	508	686	375	1,340	1,120	912	749	306	84	48
2	36	59	528	808	337	1,440	1,190	852	763	289	84	48
3	37	59	408	875	346	1,550	1,320	785	778	252	84	46
4	39	59	361	936	361	2,470	1,020	700	770	216	80	46
5	40	59	298	1,340	332	3,040	905	672	822	213	78	46
6	42	57	285	1,390	310	2,710	905	700	905	213	78	46
7	43	59	282	1,120	302	2,250	898	714	905	207	74	46
8	45	57	270	920	310	1,910	920	707	860	191	72	46
9	46	60	259	830	310	1,660	960	756	815	188	70	46
10	48	59	252	740	356	1,550	984	822	830	176	70	46
11	49	66	259	650	424	1,440	960	868	822	159	70	46
12	50	239	270	560	514	1,340	920	920	792	153	70	51
13	52	396	245	470	808	2,180	944	1,020	735	156	70	52
14	53	236	229	380	1,390	2,180	860	1,000	644	151	68	54
15	54	200	204	289	1,500	1,980	808	968	616	139	66	57
16	59	402	197	289	1,660	1,720	742	1,000	574	137	66	59
17	59	471	188	1,500	1,660	1,780	637	905	489	131	62	60
18	87	1,440	188	3,000	1,250	2,320	644	845	435	131	60	62
19	68	1,720	332	2,000	1,120	1,910	665	778	413	126	60	62
20	62	936	282	1,500	1,000	1,600	672	721	424	121	60	62
21	59	630	252	1,100	1,000	1,440	721	770	453	115	58	62
22	57	686	248	920	815	1,390	815	822	514	110	56	62
23	51	540	244	815	830	1,200	944	912	489	105	54	62
24	52	435	240	749	785	1,100	845	928	447	105	52	62
25	54	380	236	651	808	1,060	721	952	402	103	52	62
26	55	770	222	616	868	952	637	1,020	370	100	52	62
27	56	1,390	259	644	1,050	936	742	1,020	358	98	51	62
28	58	756	375	602	1,250	905	815	960	356	96	49	62
29	59	623	375	560	-----	905	860	830	346	94	48	62
30	60	560	616	453	-----	905	890	756	319	91	48	62
31	62	-----	830	375	-----	976	-----	756	-----	89	48	-----

NOTE.—No gage-height record, Oct. 3-14, 24-30, Dec. 22-24, Jan. 9-21, and Aug. 21-23; discharge estimated from records of flow of Middle Fork of Feather River near Oroville.

Monthly discharge of Middle Fork of Feather River at Sloat, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	87	36	52.5	3,230
November.....	1,720	57	449	26,700
December.....	830	188	314	19,340
January.....	a 3,000	289	896	55,100
February.....	1,660	302	788	43,800
March.....	3,040	905	1,620	99,600
April.....	1,320	637	869	51,700
May.....	1,020	672	851	52,300
June.....	905	319	606	36,100
July.....	306	89	154	9,470
August.....	84	48	64.3	3,950
September.....	62	46	55.0	3,270
The year.....	3,040	36	555	405,000

a Estimated.

MIDDLE FORK OF FEATHER RIVER NEAR OROVILLE, CALIF.

LOCATION.—In NW. $\frac{1}{4}$ sec. 32, T. 20 N., R. 5 E., at highway bridge at Bidwell Bar, 2 miles above junction with North Fork and 7 miles northeast of Oroville, Butte County. Canyon Creek enters three-fourths mile below and South Fork $1\frac{1}{4}$ miles above station.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—October 7, 1911, to September 30, 1921.

GAGE.—Vertical staff in three sections; high-water section fastened to lower end of bridge pier near left bank; other sections fastened to a sycamore tree on left bank 100 feet above bridge; read by T. W. Curry.

DISCHARGE MEASUREMENTS.—Made from cable 250 feet below bridge.

CHANNEL AND CONTROL.—Boulders and gravel; fairly permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 11.09 feet at 8 a. m. November 19 (discharge, 12,200 second-feet); minimum stage, 1.90 feet at 8 a. m. October 1 (discharge, 139 second-feet).

1911–1921: Maximum stage recorded, 18 feet at 4 p. m. December 31, 1913 (discharge, from extension of rating curve, about 34,200 second-feet); minimum stage, 1.84 feet August 26, September 5–9 and 15–18, 1920 (discharge, 123 second-feet).

DIVERSIONS.—The Palermo Land & Water Co.'s canal and South Feather Land & Water Co.'s canal divert from South Fork of Feather River and tributaries.

REGULATION.—None.

ACCURACY.—Stage-discharge relation changed during high water of November 19. Rating curves well defined below 12,000 second-feet. Gage read to hundredths once daily. Daily discharge ascertained by applying gage height to rating table. Records good.

Discharge measurements of Middle Fork of Feather River near Oroville, Calif., during the year ending Sept. 30, 1921

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>
Dec. 24	K. M. Kelley.....	6.04	2,910	July 24	Jesse Arnold.....	2.80	430
Feb. 11	do.....	5.66	2,370	Aug. 9	do.....	2.47	322
May 4	do.....	6.85	3,900	Sept. 9	K. M. Kelley.....	2.18	244
July 1	do.....	4.00	900				

Daily discharge, in second-feet, of Middle Fork of Feather River near Oroville, Calif., for the year ending Sept. 30, 1921

Day	Oct	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	139	256	2,680	3,880	3,310	4,180	4,810	5,470	2,920	1,020	360	250
2.....	145	241	4,180	3,450	3,050	4,810	5,130	4,970	3,050	960	360	250
3.....	145	226	3,050	3,310	2,920	5,130	5,640	4,490	3,050	900	360	250
4.....	145	228	2,920	4,330	2,800	5,640	5,130	4,030	2,920	840	360	250
5.....	145	228	2,340	6,920	3,180	7,110	4,490	3,880	2,920	785	360	250
6.....	204	222	2,040	7,110	2,680	7,490	4,180	4,180	3,050	785	345	250
7.....	430	222	2,140	6,730	2,450	6,540	4,030	3,880	3,310	730	330	250
8.....	360	266	2,240	6,360	2,340	5,820	3,880	4,030	3,180	730	330	250
9.....	247	260	1,940	3,880	2,240	5,470	4,030	4,180	2,920	680	330	250
10.....	286	247	2,680	3,450	2,340	5,130	4,180	4,490	2,800	680	315	238
11.....	254	260	6,360	2,920	2,450	4,970	4,330	4,650	2,680	630	315	238
12.....	430	1,080	3,310	2,560	2,800	4,650	4,490	5,130	2,560	608	300	238
13.....	430	4,490	2,340	2,450	3,180	9,760	4,810	5,640	2,450	585	300	238
14.....	292	1,680	2,040	2,240	5,470	8,480	4,180	5,820	2,140	562	300	238
15.....	260	1,020	1,860	2,140	4,970	7,490	3,730	5,300	2,040	540	300	250
16.....	241	3,200	1,760	2,040	4,650	6,540	3,590	4,970	1,940	540	300	250
17.....	228	4,020	1,600	4,330	4,650	6,540	3,590	4,650	1,760	520	300	250
18.....	745	7,610	1,680	12,000	4,030	7,680	3,310	4,180	1,600	500	288	250
19.....	535	12,200	7,110	9,760	3,590	7,490	3,310	3,730	1,520	500	275	250
20.....	430	7,490	4,030	7,300	3,310	6,540	3,310	3,310	1,440	480	275	238
21.....	360	4,180	2,920	5,820	5,470	5,820	3,590	3,880	1,440	480	275	275
22.....	318	4,180	2,560	4,970	4,180	6,540	4,180	3,590	1,440	460	275	262
23.....	305	3,050	2,240	4,180	3,590	5,820	5,130	4,030	1,440	442	275	250
24.....	292	2,450	2,920	4,650	3,450	5,130	4,810	4,330	1,360	425	262	250
25.....	318	2,140	2,560	3,880	3,450	4,970	4,490	4,490	1,290	425	262	250
26.....	312	2,560	2,340	3,880	3,450	4,650	4,030	4,650	1,220	425	262	250
27.....	299	7,680	2,140	4,490	3,730	4,330	4,180	4,970	1,150	408	262	238
28.....	292	4,970	2,040	4,180	4,030	4,030	4,810	4,650	1,080	390	262	238
29.....	286	3,590	2,140	3,730	-----	4,030	5,640	4,030	1,080	390	262	238
30.....	273	3,180	2,920	5,300	-----	4,030	5,820	3,310	1,020	375	250	225
31.....	260	-----	4,970	3,880	-----	4,180	-----	3,180	-----	375	250	-----

Monthly discharge of Middle Fork of Feather River near Oroville, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	745	139	303	18,600
November.....	12,200	222	2,780	165,000
December.....	7,110	1,600	2,840	175,000
January.....	12,000	2,040	4,710	290,000
February.....	5,470	2,240	3,490	194,000
March.....	9,760	2,030	5,840	359,000
April.....	5,820	3,310	4,360	259,000
May.....	5,820	3,180	4,390	270,000
June.....	3,310	1,020	2,090	124,000
July.....	1,020	375	586	36,000
August.....	360	250	300	18,400
September.....	288	225	248	14,800
The year.....	12,200	139	2,660	1,920,000

SOUTH FORK OF FEATHER RIVER AT ENTERPRISE, CALIF.

LOCATION.—In NE. $\frac{1}{4}$ sec. 1, T. 19 N., R. 6 E., 800 feet above mouth of Powell Creek and half a mile above highway bridge at Enterprise, Butte County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—October 8, 1911, to September 30, 1921.

GAGE.—Inclined staff bolted to ledge on right bank; read by Agnes Parks Alm. Original gage consisted of two vertical sections on left bank 150 feet below and was read until November 8, 1913. Original datum maintained.

DISCHARGE MEASUREMENTS.—Made from cable 90 feet below gage or by wading.

CHANNEL AND CONTROL.—Gravel and small boulders; shift during high water.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 8.6 feet at 11.45 a. m. and 3.30 p. m. November 19 (discharge, 4,680 second-feet); minimum stage 3.2 feet August 5-16 (discharge, 0.5 second-foot).

1911-1921: Maximum stage recorded, 12.05 feet February 25, 1917 (discharge, from extension of rating curve, 10,600 second-feet); minimum discharge, 0.2 second-foot August 11, 1917.

DIVERSIONS.—The Palermo Land & Water Co.'s canal diverts 1 mile above station, The South Feather Land & Water Co.'s canal diverts from Lost and Pinkard creeks above the station. This water is used for irrigation near Wyandotte and Bangor.

REGULATION.—None.

ACCURACY.—Stage-discharge relation changed during high water of November 19 and January 18. Rating curves fairly well defined below 1,000 second-feet and extended above. Gage read to half-tenths once daily and frequently during high water. Daily discharge ascertained by applying gage height to rating table. Records fair.

Discharge measurements of South Fork of Feather River at Enterprise, Calif., during the year ending Sept. 30, 1921

[Made by K. M. Kelley]

Date	Gage height	Dis-charge	Date	Gage height	Dis-charge
	<i>Feet</i>	<i>Sec.-ft.</i>		<i>Feet</i>	<i>Sec.-ft.</i>
Dec. 25.....	5.50	698	May 5.....	5.75	674
Feb.* 11.....	5.48	503	July 1.....	4.60	67

Daily discharge, in second-feet, of South Fork of Feather River at Enterprise, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	76	16	1,440	840	750	675	790	950	440	53	3	5
2.....	76	16	2,280	700	710	675	870	870	440	53	3	5
3.....	76	16	700	630	710	710	1,030	790	380	53	3	5
4.....	76	16	700	920	570	790	870	710	380	53	1	5
5.....	76	11	560	1,170	710	870	790	675	380	53	.5	5
6.....	96	11	500	1,440	570	870	750	790	380	44	.5	5
7.....	96	11	530	1,080	500	870	710	710	380	44	.5	5
8.....	96	11	560	920	440	870	710	710	380	37	.5	5
9.....	96	28	500	840	440	870	710	710	380	30	.5	5
10.....	58	42	770	700	440	790	710	710	380	28	.5	5
11.....	35	42	2,160	700	440	790	790	750	380	25	.5	5
12.....	118	460	920	630	440	790	870	870	320	21	.5	5
13.....	96	1,270	630	595	440	3,050	790	870	295	21	.5	5
14.....	58	460	560	560	870	1,800	750	870	248	21	.5	5
15.....	42	274	500	560	675	1,390	710	870	225	21	.5	5
16.....	28	405	440	560	640	1,300	710	790	225	17	.5	5
17.....	28	1,370	380	2,280	570	1,300	710	790	225	17	1	5
18.....	237	2,740	380	3,790	500	1,690	640	710	180	17	3	5
19.....	118	4,680	2,050	2,510	440	1,300	640	640	180	16	3	5
20.....	76	1,940	1,260	1,690	440	1,210	570	570	180	14	5	5
21.....	58	1,170	700	1,300	950	950	640	710	160	12	5	5
22.....	42	1,260	630	1,030	710	1,300	790	570	160	11	5	5
23.....	42	1,730	630	870	440	1,160	870	570	140	11	5	5
24.....	42	1,350	770	1,120	500	1,030	870	570	120	11	5	5
25.....	42	1,350	700	870	535	950	790	675	120	8	5	5
26.....	28	1,530	630	870	570	870	790	750	67	5	5	5
27.....	28	2,050	630	1,120	570	790	790	710	84	5	5	5
28.....	28	2,160	560	950	675	790	870	710	67	5	5	5
29.....	28	1,830	560	1,690	-----	750	1,030	500	67	5	5	5
30.....	28	1,530	700	1,210	-----	790	1,030	500	60	5	5	5
31.....	28	-----	920	950	-----	790	-----	500	-----	3	5	-----

NOTE.—Discharge, Mar. 26, interpolated; gage not read.

Monthly discharge of South Fork of Feather River at Enterprise, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	237	28	66.2	4,070
November.....	4,680	11	993	59,100
December.....	2,280	380	815	50,100
January.....	3,790	560	1,130	69,500
February.....	950	440	580	32,200
March.....	3,050	675	1,060	65,200
April.....	1,030	570	786	46,800
May.....	950	500	714	43,900
June.....	440	60	247	14,700
July.....	53	3.0	23.2	1,430
August.....	5	.5	2.68	165
September.....	5	5	5.00	298
The year.....	4,680	.5	535	387,000

PALERMO LAND & WATER CO.'S CANAL AT ENTERPRISE, CALIF.

LOCATION.—In NE $\frac{1}{4}$ sec. 1, T. 19 N., R. 6 E., 1,000 feet above Alm's residence at Enterprise, Butte County, and three-fourths mile below intake at diversion dam on South Fork of Feather River.

RECORDS AVAILABLE.—October 8, 1911, to September 30, 1921.

GAGE.—Vertical staff used since April 14, 1915, on right wall of concrete approach to sheet-iron flume; read by Agnes Parks Alm. Original gage, which was read up to March 31, 1914, and also from March 15 to April 13, 1915, during rebuilding of flume just above it, was vertical staff fastened to post on right bank about one-fourth of a mile below. Datum of this gage was lowered 1.00 foot November 9, 1913. From April 1, 1914, to March 14, 1915, readings were taken from a gage installed March 22, 1914, in the flume, about 800 feet above old gage. Relations between the three gages used have not been determined.

DISCHARGE MEASUREMENTS.—Made from foot plank at gage.

CHANNEL AND CONTROL.—Control is throat of concrete approach to metal flume.

EXTREMES OF DISCHARGE.—1911–1921: Maximum discharge recorded, 41 second-feet June 17, 1918; no flow during periods of every year.

ACCURACY.—Stage-discharge relation permanent. Rating curve well defined. Gage read to hundredths once daily and operation of headgates noted. Daily discharge ascertained by applying gage height to rating table. Records excellent.

This canal furnishes water for irrigation below Oroville.

Discharge measurements of Palermo Land & Water Co.'s canal at Enterprise, Calif., during the year ending Sept. 30, 1921

[Made by K. M. Kelley]

Date	Gage height	Dis-charge	Date	Gage height	Dis-charge
	<i>Feet</i>	<i>Sec.-ft.</i>		<i>Feet</i>	<i>Sec.-ft.</i>
Dec. 25.....	1.00	7.4	May 5.....	2.05	29
Feb. 11.....	.88	5.5	July 1.....	2.29	36

Daily discharge, in second-feet, of Palermo Land & Water Co.'s canal at Enterprise, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	16.7	22	8.1	7.5	1.6	0	14.2	28	32	37	34	23
2.....	16.3	23	8.1	7.5	1.6	0	14.2	25	32	37	34	24
3.....	16.7	23	8.1	7.5	3.9	0	14.4	30	32	37	34	25
4.....	16.7	23	8.1	7.5	5.0	0	14.2	30	32	37	34	25
5.....	16.7	23	8.1	7.5	1.6	0	14.2	30	32	37	32	25
6.....	23.0	23	8.1	7.8	1.5	0	14.2	30	33	38	31	25
7.....	19.4	23	7.8	7.8	4.2	0	14.2	30	34	38	31	24
8.....	19.4	20	7.8	7.8	6.2	0	14.2	30	34	38	31	24
9.....	19.4	15.9	7.8	7.5	6.2	3.3	13.8	30	34	39	31	23
10.....	19.4	15.9	7.8	7.5	6.2	10.2	14.0	30	34	38	31	23
11.....	18.1	15.9	8.4	7.5	6.0	12.7	16.7	30	35	39	31	23
12.....	15.5	15.9	7.8	7.5	6.0	10.7	18.5	30	34	40	31	23
13.....	15.5	15.2	7.8	7.5	6.0	3.2	18.5	31	34	36	31	23
14.....	15.5	11.3	7.8	7.5	6.2	3.0	18.5	33	35	40	30	23
15.....	15.5	11.6	7.8	7.5	6.2	9.2	21	33	35	40	30	23
16.....	15.5	12.3	7.8	7.5	6.2	12.3	23	32	36	40	29	24
17.....	15.5	12.3	7.8	8.4	6.2	12.3	23	32	35	40	27	24
18.....	17.6	12.0	7.8	8.4	6.2	7.9	23	32	35	40	27	25
19.....	18.5	9.0	8.7	4.6	6.2	12.7	23	32	35	40	26	27
20.....	18.5	8.8	8.4	2.2	6.2	12.3	23	27	36	40	25	29
21.....	18.5	8.4	7.8	1.6	6.2	12.3	23	16.3	35	40	25	28
22.....	18.5	8.4	7.8	1.6	6.2	12.3	23	24	35	40	24	25
23.....	18.5	8.4	7.8	1.6	16.8	12.3	23	31	35	40	24	24
24.....	18.1	8.4	7.8	1.6	21.0	12.3	24	33	36	40	24	23
25.....	20	8.4	7.8	1.6	21.0	12.3	24	33	37	39	24	23
26.....	21	8.4	7.8	1.6	6.2	12.7	24	33	37	38	24	23
27.....	21	8.4	7.8	1.6	0	14.2	24	33	37	38	24	23
28.....	21	8.4	7.8	1.6	0	14.2	24	33	37	37	24	23
29.....	21	8.4	7.5	1.6	-----	13.8	27	33	37	37	24	22
30.....	21	8.2	7.5	1.6	-----	14.2	30	32	37	36	23	22
31.....	21	-----	7.5	1.6	-----	14.2	-----	32	-----	35	23	-----

Monthly discharge of Palermo Land & Water Co.'s canal at Enterprise, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	23	15.5	18.4	1,130
November.....	23	8.2	14.0	833
December.....	8.7	7.5	7.90	486
January.....	8.4	1.6	5.23	322
February.....	21	0	6.31	350
March.....	14.2	0	8.21	505
April.....	30	13.8	19.9	1,180
May.....	33	16.3	30.3	1,860
June.....	37	32	34.7	2,060
July.....	40	35	38.4	2,360
August.....	34	23	28.2	1,730
September.....	29	22	24.0	1,430
The year.....	40	0	19.7	14,200

MIDDLE FORK OF YUBA RIVER NEAR NORTH SAN JUAN, CALIF.

LOCATION.—In N. $\frac{1}{2}$ NW. $\frac{1}{4}$ sec. 23, T. 18 N., R. 8 E., below highway bridge at Freemans Crossing, in Tahoe National Forest, $1\frac{1}{2}$ miles northeast of North San Juan, Nevada County. Moonshine Creek enters one-fourth mile below station, Oregon Creek three-fourths mile above, and North Fork of Yuba River 4 miles below.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—July 1 to October 20, 1900; October 27, 1910, to September 30, 1921.

GAGE.—Vertical staff wedged between two large boulders on right bank one-fourth of a mile below bridge; read by Henry Zurhorst.

DISCHARGE MEASUREMENTS.—Made from cable 200 feet above gage or by wading.

CHANNEL AND CONTROL.—Gravel and small boulders; fairly permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 8.2 feet at 6 p. m. November 19 (discharge, 4,410 second-feet); minimum stage, 4.30 feet October 1-5 (discharge, 33 second-feet).

1910-1921: Maximum stage recorded, 11.7 feet at 10 a. m. May 12, 1915 (discharge, 14,300 second-feet); minimum stage 4.28 feet part of July, August, and September, 1920 (discharge, 30 second-feet).

DIVERSIONS.—No information.

REGULATION.—No information.

ACCURACY.—Stage-discharge relation permanent during the year. Rating curve well defined. Gage read to quarter-tenths once daily. Daily discharge ascertained by applying gage height to table. Records excellent during low water and fair to good during periods of considerable diurnal fluctuation.

Discharge measurements of Middle Fork of Yuba River near North San Juan, Calif., during the year ending Sept. 30, 1921

Date	Made by—	Gage height	Dis-charge
July 21	Jesse Arnold	<i>Feet</i>	<i>Sec.-ft.</i>
Sept. 13	K. M. Kelley	4.60	92
		4.35	41

Daily discharge, in second-feet, of Middle Fork of Yuba River near North San Juan, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	33	72	520	980	685	840	1,130	1,610	685	208	68	48
2	33	72	980	840	650	930	1,240	1,240	760	200	68	48
3	33	68	615	760	615	1,080	1,430	1,030	840	208	68	48
4	33	72	582	1,180	615	1,300	1,080	980	840	194	62	42
5	33	68	435	1,240	840	1,480	930	840	930	176	56	42
6	56	68	408	1,610	685	1,480	840	930	1,760	170	56	48
7	123	68	380	1,130	550	1,240	760	840	1,240	176	56	48
8	83	94	435	885	520	1,130	760	840	1,130	185	56	48
9	72	72	462	760	490	1,030	840	1,030	980	185	56	48
10	99	72	615	615	550	1,030	1,540	1,130	1,030	176	56	48
11	72	72	2,360	550	685	930	840	1,360	1,030	170	56	42
12	170	615	800	490	760	930	885	1,540	930	165	56	42
13	131	930	490	462	840	3,080	1,130	1,760	840	157	52	42
14	99	380	435	435	1,420	2,090	840	1,920	760	157	52	48
15	72	238	380	408	980	1,610	760	1,610	582	144	52	48
16	72	650	330	435	760	1,360	685	1,610	550	123	52	48
17	72	885	306	840	685	1,360	685	1,130	435	139	52	42
18	330	685	435	3,520	615	2,090	615	930	408	113	52	48
19	144	3,520	2,660	2,660	582	1,680	615	760	408	99	52	52
20	113	2,090	1,030	1,610	550	1,360	685	685	424	94	52	52
21	94	840	615	1,130	1,610	1,180	800	840	435	94	48	48
22	99	1,030	582	930	885	1,610	1,130	685	615	94	48	48
23	94	615	435	760	760	1,240	1,610	930	490	90	48	48
24	90	462	980	800	685	1,130	1,130	1,130	462	83	48	48
25	94	380	760	650	760	1,080	930	1,240	391	83	48	48
26	90	800	615	650	760	930	840	1,480	340	76	42	42
27	76	2,460	520	1,240	840	930	1,030	1,610	330	76	42	42
28	74	980	550	1,080	930	800	1,300	1,480	320	76	42	37
29	73	650	520	800	-----	840	1,610	1,030	292	72	48	37
30	72	490	685	1,180	-----	840	1,610	800	219	72	48	37
31	72	-----	1,540	800	-----	930	-----	722	-----	72	48	-----

NOTE.—Gage not read Oct. 28 and 29; discharge interpolated.

Monthly discharge of Middle Fork of Yuba River near North San Juan, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	330	33	90.4	5,560
November.....	3,520	68	650	38,700
December.....	2,660	306	725	44,600
January.....	3,520	408	1,010	62,100
February.....	1,610	490	761	42,300
March.....	3,080	800	1,280	78,700
April.....	1,610	615	1,010	60,00
May.....	1,920	685	1,150	70,700
June.....	1,760	219	682	40,000
July.....	208	72	133	8,180
August.....	68	42	52.9	3,250
September.....	52	37	45.6	2,710
The year.....	3,520	33	632	458,000

YUBA RIVER AT SMARTSVILLE, CALIF.

LOCATION.—In sec. 22, T. 16 N., R. 6 E., at Narrows, 1 mile north of Smartsville, Yuba County, 1 mile below mouth of Deer Creek, $6\frac{1}{2}$ miles below mouth of South Fork, 7 miles above mouth of Dry Creek, and 18 miles above junction with Feather River.

DRAINAGE AREA.—1,220 square miles.

RECORDS AVAILABLE.—June 2, 1903, to September 30, 1921.

GAGE.—Staff in three sections, bolted to solid rock on left bank; read by Joseph French. On account of the gradual erosion of the channel, gage datum was lowered 10 feet August 1, 1906. Before the change, first section was vertical and driven into gravel near left bank 50 feet below cable; second section was painted on rock ledge on left bank.

DISCHARGE MEASUREMENTS.—Made from cable at gage.

CHANNEL AND CONTROL.—Gravel and small boulders; shift during high water. As the result of extensive hydraulic mining in the early days the channel has been filled with an enormous quantity of tailings. At the station the depth of mining debris is estimated to be more than 80 feet.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 13.4 feet at 8 a. m. January 18 (discharge, 24,800 second-feet); minimum stage, 2.48 feet October 2-3 (discharge, 158 second-feet).

1903-1921: Maximum stage recorded, 28.3 feet January 15, 1909 (discharge, 111,000 second-feet); minimum stage, 2.32 feet August 25, September 8 and 11, 1920 (discharge, 106 second-feet).

DIVERSIONS.—Water is diverted for power and irrigation above station.

REGULATION.—Several small glacial lakes near the headwaters of the South Fork of Yuba River are utilized as storage reservoirs. A part of this water is diverted into the Bear River drainage basins.

ACCURACY.—Stage-discharge relation changed during high water of November 19 and March 13. Rating curves fairly well defined. Gage read to quarter-tenths once daily. Daily discharge ascertained by applying gage height to rating table. Records fair.

Discharge measurements of Yuba River at Smartsville, Calif., during the year ending Sept. 30, 1921

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>
Dec. 22	K. M. Kelley.....	6.09	4,000	July 23	K. M. Kelley.....	2.39	546
23	do.....	5.86	3,480	23	Jesse Arnold.....	2.39	540
Jan 31	R. C. Briggs.....	6.96	5,530	Aug. 20	do.....	1.95	331
May 3	K. M. Kelley.....	6.45	5,800	Sept. 14	K. M. Kelley.....	1.80	278

Daily discharge, in second-feet, of Yuba River at Smartsville, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1-----	165	434	6,640	6,010	5,000	4,810	6,510	6,920	4,950	1,650	490	273
2-----	158	418	7,300	5,200	4,810	5,200	6,920	6,110	5,330	1,650	465	263
3-----	158	401	5,600	4,620	4,430	5,400	7,340	5,910	5,710	1,450	440	263
4-----	165	390	4,430	4,430	5,800	5,600	6,720	5,520	5,910	1,260	440	263
5-----	172	401	3,700	7,300	5,600	6,860	6,110	5,330	6,720	1,260	395	263
6-----	335	418	3,050	7,750	4,620	6,430	5,710	5,330	7,340	1,090	395	273
7-----	785	445	3,360	6,430	4,060	6,010	5,330	5,330	7,780	1,090	395	263
8-----	680	530	3,700	5,200	3,880	5,600	5,140	5,330	7,560	1,090	395	252
9-----	1,010	456	4,430	4,620	3,700	5,400	5,330	5,520	7,340	1,010	395	252
10-----	620	418	5,000	4,240	3,700	5,000	5,520	5,910	7,130	1,010	375	245
11-----	590	560	14,700	3,530	3,700	4,810	5,710	8,230	6,920	940	375	252
12-----	680	3,790	5,800	3,200	4,430	6,220	5,520	8,690	6,310	870	355	245
13-----	750	6,570	4,240	3,050	4,430	14,700	5,710	9,650	5,710	800	355	245
14-----	650	2,530	3,530	3,050	7,300	9,900	5,520	10,200	4,950	765	355	252
15-----	560	1,580	3,050	2,900	5,800	8,920	5,330	9,400	4,560	730	347	245
16-----	530	4,910	2,760	3,360	4,810	8,230	4,950	9,650	4,410	730	347	245
17-----	680	4,530	2,760	11,800	4,240	7,780	5,330	9,160	3,540	665	335	252
18-----	1,680	6,990	4,060	24,800	3,880	8,230	5,140	7,780	3,220	605	335	263
19-----	890	19,900	12,300	13,500	3,700	8,690	4,950	7,130	3,540	575	323	280
20-----	680	10,200	6,640	8,690	6,010	8,460	5,140	6,310	3,380	545	323	273
21-----	590	8,210	5,000	7,520	7,750	8,230	5,330	5,710	3,710	545	323	273
22-----	560	6,430	4,060	6,010	5,000	11,400	6,510	5,710	4,230	545	315	263
23-----	530	5,000	5,800	5,200	4,620	8,460	7,340	5,910	3,710	545	308	263
24-----	560	3,530	5,200	6,220	4,430	7,130	6,510	6,920	3,220	545	308	252
25-----	590	3,050	4,620	6,010	4,240	6,720	5,710	7,780	2,920	518	298	252
26-----	530	7,980	4,060	6,640	4,430	6,110	6,110	8,690	2,640	518	298	252
27-----	500	11,500	3,530	7,300	4,430	5,710	6,510	9,900	2,500	490	287	245
28-----	472	6,220	3,360	6,220	4,810	5,520	6,720	9,400	2,110	490	280	245
29-----	500	4,810	3,050	5,000	-----	5,710	7,340	7,780	2,240	490	280	238
30-----	512	4,240	8,450	8,210	-----	5,710	7,780	5,520	1,870	490	273	245
31-----	472	-----	6,860	5,600	-----	5,910	-----	4,950	-----	490	273	-----

Monthly discharge of Yuba River at Smartsville, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October-----	1,580	158	569	35,000
November-----	19,900	390	4,230	252,000
December-----	14,700	2,760	5,190	319,000
January-----	24,800	2,900	6,570	404,000
February-----	7,750	3,700	4,770	265,000
March-----	14,700	4,810	7,060	434,000
April-----	7,780	4,950	5,990	356,000
May-----	10,200	4,950	7,150	440,000
June-----	7,780	1,870	4,720	281,000
July-----	1,650	490	821	50,500
August-----	490	273	351	21,600
September-----	280	238	256	15,200
The year-----	24,800	168	3,970	2,870,000

OREGON CREEK NEAR NORTH SAN JUAN, CALIF.

LOCATION.—In N. $\frac{1}{2}$ SE. $\frac{1}{4}$ sec. 28, T. 18 N., R. 8 E., below highway bridge in Tahoe National Forest, 500 feet above junction with Middle Fork of Yuba River, half a mile above Freemans Crossing, Yuba County, and 2 miles northeast of North San Juan, Nevada County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—October 28, 1910, to September 30, 1921.

GAGE.—Vertical staff fastened to an alder tree on right bank 150 feet below bridge; read by Henry Zurhorst.

DISCHARGE MEASUREMENTS.—Made from cable 30 feet below gage or by wading.

CHANNEL AND CONTROL.—Small boulders and gravel; shifts during high water.

Point of zero flow 3.60 feet, September 13, 1921.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 6.2 feet at 10 a. m. November 27 (discharge, 1,160 second-feet); minimum stage, 3.7 feet August 7–10 (discharge, 1.0 second-foot).

1910–1921: Maximum stage recorded, 8.5 feet at 5 p. m. December 31, 1913 (discharge, from extension of rating curve, about 4,080 second-feet); minimum stage, 3.7 feet August 7–10, 1921 (discharge, 1.0 second-foot).

DIVERSIONS.—None.

REGULATION.—None.

ACCURACY.—Stage-discharge relation changed November 27. Rating curves fairly well defined. Gage read to quarter-tenths once daily. Daily discharge ascertained by applying gage height to rating table. Records fair.

Discharge measurements of Oregon Creek near North San Juan, Calif., during the year ending Sept. 30, 1921

Date	Made by—	Gage height	Dis-charge
July 21	Jesse Arnold.....	<i>Feet</i>	<i>Sec.-ft.</i>
Sept. 13	K. M. Kelley.....	3.80	4.8
		3.75	2.4

Daily discharge, in second-feet, of Oregon Creek near North San Juan, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	3	10	184	365	288	332	265	166	64	20	4.2	3
2.....	3	10	355	332	265	346	265	160	60	20	4.2	3
3.....	3	10	245	301	265	355	274	154	60	18	3	3
4.....	3	10	208	405	257	365	265	138	60	18	3	3
5.....	3	10	175	477	355	405	245	132	57	16	3	3
6.....	5.5	10	146	560	310	453	225	146	52	16	3	3
7.....	17	10	132	453	265	380	190	138	44	16	1	3
8.....	11	20	184	365	257	355	166	132	44	18	1	1.8
9.....	6	16	175	310	218	332	160	127	44	18	1	1.8
10.....	16	11	265	274	225	310	190	127	44	16	1	1.8
11.....	11	11	900	245	265	301	197	118	44	11	1.8	4.2
12.....	50	190	265	225	274	288	197	118	41	11	1.8	4.2
13.....	18	310	233	190	301	850	257	110	38	11	3	4.2
14.....	12	82	190	184	453	595	197	105	38	10	3	3
15.....	11	50	166	166	355	465	190	105	38	10	1.8	3
16.....	11	225	154	190	319	405	175	100	44	10	3	3
17.....	11	208	132	274	288	395	190	105	41	10	3	3
18.....	82	166	208	805	265	477	166	105	38	10	3	3
19.....	29	850	675	675	245	417	160	100	38	8	3	5
20.....	20	405	405	465	225	365	160	93	38	6	3	5
21.....	17	225	301	395	675	332	175	154	34	8	3	4.2
22.....	16	265	257	346	365	417	184	132	31	8	3	4.2
23.....	14	197	225	301	319	365	190	118	29	8	3	4.2
24.....	12	154	435	310	301	355	190	105	26	6	3	4.2
25.....	12	118	346	257	310	346	184	105	26	6	3	3
26.....	10	274	274	245	310	310	166	100	26	5	3	3
27.....	10	1,160	257	405	332	274	160	86	22	5	3	3
28.....	10	355	233	380	346	265	175	81	20	5	3	3
29.....	10	225	225	319	-----	257	184	81	20	5	3	3
30.....	10	175	365	380	-----	257	184	77	18	5	3	3
31.....	10	-----	495	310	-----	257	-----	70	-----	4.2	3	-----

NOTE.—Gage not read Oct. 28 and 29; discharge interpolated.

Monthly discharge of Oregon Creek near North San Juan, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	82	3.0	14.7	904
November.....	1,160	10	192	11,400
December.....	900	132	284	17,500
January.....	805	166	352	21,600
February.....	675	218	309	17,200
March.....	850	257	375	23,100
April.....	274	160	198	11,800
May.....	166	70	116	7,130
June.....	64	18	39.4	2,340
July.....	20	4.2	10.9	670
August.....	4.2	1.0	2.70	166
September.....	5	1.8	3.29	196
The year.....	1,160	1.0	157	114,000

NORTH FORK OF YUBA RIVER AT GOODYEAR BAR, CALIF.

LOCATION.—In E. $\frac{1}{2}$ SW. $\frac{1}{4}$ sec. 5, T. 19 N., R. 10 S., in Tahoe National Forest, at highway bridge at Goodyear Bar, Sierra County. Rock Creek enters one-eighth mile and Goodyear Creek one-fourth mile below station; North Fork of North Fork of Yuba River enters at Downieville, 4 miles above.

DRAINAGE AREA.—214 square miles.

RECORDS AVAILABLE.—October 31, 1910, to September 30, 1921.

GAGE.—Vertical staff in two sections on left bank; low-water section fastened to old piling under bridge; upper section bolted to left abutment of bridge; read by G. E. King.

DISCHARGE MEASUREMENTS.—Made from downstream side of bridge or by wading.

CHANNEL AND CONTROL.—Solid rock, small boulders, and gravel; fairly permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 7.7 feet, November 19 (discharge, 4,600 second-feet); minimum stage, 3.15 feet, October 3–5 (discharge, 121 second-feet).

1910–1921: Maximum stage recorded, 11.5 feet at 5.40 p. m. May 11, 1915 (discharge, 12,600 second-feet); minimum stage,¹⁰ 3.05 feet, November 27 and 28, 1919 (discharge, 100 second-feet).

DIVERSIONS.—No information.

REGULATION.—No information.

ACCURACY.—Stage-discharge relation not changed during year. Rating curve well defined below 4,000 second-feet and extended above. Gage read to half-tenths once daily. Daily discharge ascertained by applying gage height to rating table. Records good.

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

Discharge measurements of North Fork of Yuba River at Goodyear Bar, Calif., during the year ending Sept. 30, 1921

[Made by K. M. Kelley]

Date	Gage height	Discharge
	Feet	Sec.-ft.
July 21.....	3.75	332
Sept. 12.....	3.30	162
Do.....	3.30	160

¹⁰ Minimum stages as given in Water-Supply Paper 511 are not correct.

Daily discharge, in second-feet, of North Fork of Yuba River at Goodyear Bar, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1-----	133	146	735	965	663	1,000	1,390	1,870	1,480	735	312	227
2-----	133	133	810	810	663	1,120	1,670	1,670	1,570	735	312	210
3-----	121	133	663	885	663	1,210	1,570	1,480	1,670	735	312	210
4-----	121	133	663	1,120	699	1,570	1,390	1,480	1,870	735	290	210
5-----	121	133	593	1,210	699	1,570	1,210	1,480	2,080	735	290	210
6-----	268	133	527	1,120	628	1,480	1,120	1,390	2,790	735	290	192
7-----	192	133	527	965	593	1,210	1,040	1,390	2,190	735	290	192
8-----	160	146	527	885	593	1,120	1,040	1,300	2,190	663	290	192
9-----	176	146	560	810	593	1,120	1,120	1,390	1,970	593	290	176
10-----	160	146	593	735	663	1,120	1,210	1,570	2,190	467	290	176
11-----	160	227	885	663	810	1,120	1,210	1,870	2,190	467	290	176
12-----	227	1,040	593	663	848	1,210	1,210	2,080	1,970	411	290	170
13-----	176	735	527	628	885	1,870	1,300	3,050	1,870	411	290	170
14-----	160	439	467	593	1,210	1,570	1,210	2,530	1,570	411	290	160
15-----	160	467	467	593	965	1,390	1,040	2,790	1,570	411	268	160
16-----	160	1,120	467	628	885	1,390	1,040	2,190	1,300	360	248	160
17-----	160	1,040	467	2,530	885	1,480	1,040	1,770	1,300	360	227	160
18-----	248	2,410	1,120	1,670	810	1,870	965	1,570	1,300	360	227	160
19-----	192	3,940	965	1,390	735	1,570	965	1,480	1,300	360	227	176
20-----	176	1,570	663	1,120	885	1,390	965	1,480	1,210	360	227	176
21-----	176	965	593	965	848	1,300	1,870	1,300	1,210	336	227	160
22-----	176	965	527	885	772	1,300	1,770	1,480	1,210	336	227	160
23-----	176	735	467	810	735	1,210	1,670	1,870	1,120	336	227	146
24-----	176	663	663	810	735	1,120	1,480	2,190	1,040	336	227	146
25-----	176	527	593	735	810	1,120	1,300	2,530	965	336	227	146
26-----	176	1,970	593	735	810	1,040	1,300	2,790	965	312	227	133
27-----	176	1,570	527	965	885	1,040	1,670	2,920	885	312	227	133
28-----	160	1,040	527	810	965	965	1,870	2,080	810	312	227	133
29-----	160	885	527	735	-----	965	1,970	1,670	810	312	227	133
30-----	146	735	1,480	810	-----	1,040	2,080	1,570	735	312	227	133
31-----	146	-----	1,210	735	-----	1,210	-----	1,480	-----	312	227	-----

Monthly discharge of North Fork of Yuba River at Goodyear Bar, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October-----	268	121	169	10,400
November-----	3,940	133	814	48,400
December-----	1,480	467	662	40,700
January-----	2,530	593	935	57,500
February-----	1,210	593	783	43,500
March-----	1,870	965	1,280	78,700
April-----	2,080	965	1,360	80,900
May-----	3,050	1,300	1,860	114,000
June-----	2,790	735	1,510	89,800
July-----	735	312	462	28,400
August-----	312	227	260	16,000
September-----	227	133	170	10,100
The year-----	3,940	121	855	618,000

NORTH FORK OF NORTH FORK OF YUBA RIVER AT DOWNIEVILLE, CALIF.

LOCATION.—In N.E. $\frac{1}{4}$ NW. $\frac{1}{4}$ sec. 35, T. 20 N., R. 10 E., at upper highway bridge in Downieville, Sierra County, 500 feet above dam and one-fourth mile above junction with North Fork of Yuba River. East Fork of North Fork enters one-eighth mile above and Middle Fork of North Fork $1\frac{1}{4}$ miles above station.

DRAINAGE AREA.—71.2 square miles.

RECORDS AVAILABLE.—November 1, 1910, to September 30, 1921.

GAGE.—Vertical staff fastened to right abutment of bridge; read by J. T. Mason.

DISCHARGE MEASUREMENTS.—Made from bridge at gage or by wading.

CHANNEL AND CONTROL.—Bed consists of gravel and small boulders. Natural control at low stages is a riffle below the gage and at high stages is the dam. An artificial control is formed by adding flashboards of variable height to the dam.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 5.50 feet (flashboards on dam) at 4.30 p. m. November 19 (discharge, 3,340 second-foot); minimum stage 2.50 feet (flashboards on dam) October 1–6 (discharge, 31 second-foot).

1911–1921: Maximum stage recorded, 8.0 feet at 5 p. m. May 11, 1915 (discharge, from extension of rating curve, about 6,760 second-foot); minimum stage, 2.70 feet (flashboards on dam) November 28, 1919 (discharge, 10 second-foot).

ICE.—Stage-discharge relation slightly affected by ice for short periods in severe winters.

DIVERSIONS.—The intake of the municipal water system of Downieville is above station.

REGULATION.—None.

ACCURACY.—Stage-discharge relation dependent on the presence and height of flashboards upon the dam and on the operation of the power plant which diverts water between the gage and dam. Observer reads the gage when plant is not running. It is usually shut down between 7.30 a. m. and 4.30 p. m. Flashboards of variable height were used during year. Rating curves fairly well defined. Gage read to hundredths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table. Records fair.

COOPERATION.—Gage-height record furnished by John T. Mason.

Discharge measurements of North Fork of North Fork of Yuba River at Downieville, Calif., during the year ending Sept. 30, 1921

Date	Made by—	Gage height	Discharge
July 21	Jesse Arnold.....	Feet 2.55	Sec.-ft. 132
Sept. 11	K. M. Kelley.....	2.17	59
11	do.....	2.17	56

Daily discharge, in second-feet, of North Fork of North Fork of Yuba River at Downieville, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	31	90	540	450	285	450	600	1,020	600	285	97	57
2.....	31	90	570	420	260	540	740	810	600	285	97	57
3.....	31	90	510	450	260	635	740	670	600	270	93	57
4.....	31	90	480	705	260	810	670	600	670	260	93	57
5.....	31	90	420	970	260	890	600	600	850	225	93	55
6.....	78	90	390	740	260	740	600	600	1,020	201	97	57
7.....	83	78	390	540	260	740	540	600	890	197	97	57
8.....	68	78	390	480	260	670	540	570	740	178	97	58
9.....	74	78	450	420	260	670	540	635	775	178	97	58
10.....	83	78	420	360	260	600	600	810	740	178	78	58
11.....	78	108	510	360	260	570	600	890	670	178	78	54
12.....	116	670	420	310	260	635	635	1,060	670	178	78	57
13.....	83	810	360	260	260	1,020	600	1,110	600	162	78	57
14.....	78	335	310	238	300	775	600	1,020	570	146	78	57
15.....	78	310	285	216	285	740	570	970	540	146	78	57
16.....	78	970	300	251	260	740	480	1,060	480	146	78	57
17.....	78	970	310	1,110	310	740	450	810	420	138	78	57
18.....	116	2,060	360	890	310	1,060	420	635	310	132	78	58
19.....	98	3,010	540	635	295	810	420	570	360	132	78	58
20.....	90	1,180	450	540	310	740	420	705	450	132	78	58
21.....	90	670	360	480	360	670	540	510	420	132	78	58
22.....	86	635	310	480	310	705	705	600	510	132	78	58
23.....	83	510	310	480	310	600	850	775	510	132	78	58
24.....	90	450	360	420	360	600	670	775	360	132	78	58
25.....	90	420	360	390	335	600	635	1,020	360	119	78	58
26.....	90	1,180	360	310	310	540	600	1,060	310	108	78	58
27.....	90	1,160	360	420	310	480	740	1,110	310	108	61	58
28.....	90	810	360	335	360	540	930	890	285	108	61	57
29.....	90	670	360	335	-----	540	970	740	285	108	61	57
30.....	90	600	740	420	-----	540	930	635	285	101	61	57
31.....	90	-----	600	310	-----	540	-----	570	-----	108	58	-----

NOTE.—Gage not read Aug. 13; discharge estimated.

Monthly discharge of North Fork of North Fork of Yuba River at Downieville, Calif., for the year ending Sept. 30, 1921

[Drainage area, 71.2 square miles]

Month	Discharge in second-feet				Run-off	
	Maximum	Minimum	Mean	Per square mile	Inches	Acre-feet
October.....	116	31	77.8	1.09	1.26	4,780
November.....	3,010	78	611	8.53	9.57	36,400
December.....	740	285	416	5.84	6.73	25,600
January.....	1,110	216	475	6.67	7.69	29,200
February.....	360	260	290	4.07	4.24	16,100
March.....	1,060	450	675	9.48	10.93	41,500
April.....	970	420	631	8.86	9.88	37,500
May.....	1,110	510	788	11.1	12.80	48,500
June.....	1,020	285	540	7.58	8.46	32,100
July.....	285	101	162	2.28	2.63	9,960
August.....	97	58	80.3	1.13	1.30	4,940
September.....	58	54	57.3	.805	.90	3,410
The year.....	3,010	31	401	5.63	76.39	290,000

ROCK CREEK AT GOODYEAR BAR, CALIF.

LOCATION.—In W. $\frac{1}{2}$ SW. $\frac{1}{4}$ sec. 5, T. 19 N., R. 10 E., at footbridge at Goodyear Bar, Sierra County, in Tahoe National Forest. Woodruff Creek enters 350 feet above, and Rock Creek joins North Fork of Yuba River 600 feet below station.

DRAINAGE AREA.—10.8 square miles.

RECORDS AVAILABLE.—October 30, 1910, to September 30, 1921.

GAGE.—Vertical staff fastened to an alder tree on right bank 40 feet below bridge; read by G. E. King.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading.

CHANNEL AND CONTROL.—Boulders and gravel; rough; fairly permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 4.0 feet January 17 (discharge, 251 second-feet); minimum stage, 1.25 feet part of August and September (discharge, 0.5 second-foot).

1910-1921: Maximum stage recorded, 7.0 feet at 3.30 p. m. December 31, 1913 (discharge, from extension of rating curve, about 820 second-feet); minimum discharge, 0.3 second-foot, July 18, 19, 23, and 24, 1917; August 4-9, 24, and 25, 1918; and July 28-31, 1920.

DIVERSIONS.—Three small ditches, having a total capacity of about 10 second-feet, head above station.

REGULATION.—None.

ACCURACY.—Stage-discharge relation not changed during year. Rating curve well defined. Gage read to half-tenths once daily. Daily discharge ascertained by applying gage height to rating table. Records good.

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

Discharge measurements of Rock Creek at Goodyear Bar, Calif., during the year ending Sept. 30, 1921

[Made by K. M. Kelley]

Date	Gage height	Discharge
July 21.....	Feet 1.35	Sec.-ft. 1.1
Sept. 12.....	1.30	.6

Daily discharge, in second-feet, of Rock Creek at Goodyear Bar, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1-----	1.7	3.7	59	78	50	78	78	68	24	3.7	0.7	0.5
2-----	1.7	3.7	78	68	50	83	88	68	20	3.7	.7	.5
3-----	1.7	3.7	59	78	50	88	78	59	20	1.7	.7	.5
4-----	1.7	3.7	59	98	59	88	68	54	14	1.7	.7	.5
5-----	1.7	3.7	42	170	59	121	68	50	14	1.7	.7	.5
6-----	10	3.7	34	121	54	98	59	50	14	1.7	.5	.5
7-----	3.7	3.7	34	98	42	88	59	50	14	1.7	.5	.5
8-----	1.7	3.7	34	88	38	88	59	50	14	1.2	.5	.5
9-----	3.7	3.7	42	78	38	78	59	50	10	.7	.5	.5
10-----	3.7	3.7	50	68	42	78	59	54	10	.7	.5	.7
11-----	3.7	14	98	59	54	73	59	68	10	.7	.5	.7
12-----	6.5	59	50	59	68	78	59	68	10	.7	.5	.7
13-----	3.7	42	42	50	78	157	68	68	10	.7	.5	.7
14-----	3.7	24	34	42	88	133	59	64	10	.7	.5	.7
15-----	3.7	27	34	42	78	109	54	59	10	.7	.5	.7
16-----	3.7	98	34	42	68	109	50	68	10	.7	.5	.7
17-----	3.7	50	34	251	59	109	50	50	10	.7	.7	.7
18-----	14	133	133	145	50	133	50	42	10	.7	.7	1.2
19-----	6.5	209	121	121	42	121	50	42	10	.7	.7	1.7
20-----	3.7	98	78	98	68	98	50	59	8	.7	.7	1.2
21-----	3.7	88	50	78	78	88	59	42	8	.7	.7	1.2
22-----	3.7	88	42	73	68	88	68	42	8	.7	.7	1.2
23-----	3.7	59	42	68	59	88	68	42	3.7	.7	.7	1.2
24-----	3.7	50	68	68	59	78	64	42	3.7	.7	.5	.7
25-----	3.7	34	42	59	68	78	59	42	3.7	.7	.5	.7
26-----	3.7	133	50	59	68	73	59	42	3.7	.7	.5	.7
27-----	3.7	109	50	88	68	68	38	3.7	.7	.5	.7	.7
28-----	3.7	88	50	78	68	68	73	34	3.7	.7	.5	.7
29-----	3.7	68	50	68	-----	68	73	34	3.7	.7	.5	.7
30-----	3.7	54	121	88	-----	68	73	27	3.7	.7	.5	.7
31-----	3.7	-----	88	59	-----	73	-----	27	-----	.7	.5	-----

Monthly discharge of Rock Creek at Goodyear Bar, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October-----	14	1.7	4.03	248
November-----	209	3.7	52.1	3,100
December-----	133	34	58.1	3,570
January-----	251	42	85.2	5,240
February-----	88	38	59.7	3,320
March-----	157	68	91.8	5,640
April-----	88	50	62.9	3,740
May-----	68	27	50.1	3,080
June-----	24	3.7	9.92	590
July-----	3.7	.7	1.07	65.8
August-----	.7	.5	.58	35.7
September-----	1.7	.5	.76	45.2
The year-----	251	.5	39.6	28,700

GOODYEAR CREEK AT GOODYEAR BAR, CALIF.

LOCATION.—In W. $\frac{1}{2}$ SW. $\frac{1}{4}$ sec. 5, T. 19 N., R. 10 E., at trail bridge in Tahoe National Forest, 300 feet above junction with North Fork of Yuba River and half a mile north of Goodyear Bar, Sierra County.

DRAINAGE AREA.—12.2 square miles.

RECORDS AVAILABLE.—October 30, 1910, to September 30, 1921.

GAGE.—Vertical staff fastened to an alder tree on left bank 200 feet above bridge; read by G. E. King.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading.

CHANNEL AND CONTROL.—Solid rock and gravel; fairly permanent. A temporary road was built on control in June, 1921. Zero flow 1.95 feet July 21, 1921, and 2.15 feet September 12, 1921.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 4.1 feet January 17 (discharge, 364 second-feet); minimum stage 2.25 feet September 25-26 (discharge, 3 second-feet).

1910-1921: Maximum stage recorded, 7.0 feet at 3 p. m. December 31, 1913 (discharge, from extension of rating curve, about 1,460 second-feet); minimum stage, 1.30 feet August 24-31, 1918 (discharge, 1.2 second-feet).

DIVERSIONS.—Three small irrigation ditches, having a total capacity of about $7\frac{1}{2}$ second-feet, head above station.

REGULATION.—None.

ACCURACY.—Stage-discharge relation changed June 14 when a temporary road was built on control. Rating curves fairly well defined. Gage read to half-tenths once daily. Daily discharge ascertained by applying gage height to rating table, except period June 14 to July 20 when mean discharge was estimated from Rock Creek. Records fair.

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

Discharge measurements of Goodyear Creek at Goodyear Bar, Calif., during the year ending Sept. 30, 1921

Date	Made by—	Gage height	Dis-charge
July 21	Jesse Arnold.....	Feet 2.35	Sec.-ft. 5.7
Sept. 12	K. M. Kelley.....	2.35	5.7

Daily discharge, in second-feet, of Goodyear Creek at Goodyear Bar, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	6	8	88	131	72	118	144	118	48		4	6
2.....	6	8	112	106	72	131	158	112	43		4	6
3.....	6	8	83	118	72	144	144	106	43		4	4
4.....	6	8	83	172	83	158	118	100	38		4	6
5.....	6	8	62	257	83	187	112	94	34		4	6
6.....	22	8	52	187	78	144	100	88	34		4	6
7.....	8	8	52	144	62	144	100	83	34		4	6
8.....	6	8	52	118	57	131	100	83	34		4	6
9.....	8	8	62	106	57	124	94	83	34		4	6
10.....	6	8	72	94	62	118	100	94	34		4	6
11.....	6	38	131	83	78	112	100	106	26	8	4	6
12.....	12	94	72	83	106	118	100	106	26		4	6
13.....	8	62	62	72	118	257	106	112	26		4	6
14.....	6	43	52	67	131	172	100	100			4	6
15.....	6	48	52	67	118	144	94	94			4	6
16.....	6	172	52	72	106	144	94	94			6	6
17.....	6	106	52	364	94	144	83	83			6	6
18.....	19	158	158	203	83	187	83	72			6	6
19.....	8	340	131	172	72	158	83	72			6	6
20.....	8	158	106	158	94	144	83	83			6	6
21.....	8	118	72	118	106	131	94	72	20	6	8	6
22.....	8	118	62	106	94	131	106	72		6	6	4
23.....	8	94	62	94	83	131	118	72		6	6	4
24.....	8	72	94	94	83	118	106	72		6	4	4
25.....	8	57	83	83	83	112	100	72		4	4	3
26.....	8	340	83	83	83	106	100	72		4	4	3
27.....	8	158	83	118	94	106	106	72		4	4	4
28.....	8	124	83	100	94	106	112	67		4	6	4
29.....	8	94	83	94	-----	106	112	62		4	6	4
30.....	8	83	203	118	-----	118	112	52		4	6	6
31.....	8	-----	144	83	-----	131	-----	52	-----	4	6	-----

NOTE.—Road being built on control during the period June 14 to July 20; mean discharge estimated from records of flow of Rock Creek at Goodyear Bar.

*Monthly discharge of Goodyear Creek at Goodyear Bar, Calif., for the year ending
Sept. 30, 1921*

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	22	6	8. 16	502
November.....	340	8	85. 2	5, 070
December.....	203	52	85. 1	5, 230
January.....	364	67	125	7, 690
February.....	131	57	86. 4	4, 800
March.....	257	106	138	8, 490
April.....	158	83	105	6, 250
May.....	118	52	84. 5	5, 200
June.....	48		26. 5	1, 580
July.....			6. 84	421
August.....	8	4	4. 84	298
September.....	6	3	5. 33	317
The year.....	364	3	63. 3	45, 800

BEAR CREEK AT VAN TRENT, CALIF.

LOCATION.—In SE. $\frac{1}{4}$ sec. 21, T. 14 N., R. 6 E., below highway bridge at McCourtney Crossing, 1 mile below Van Trent, Placer County, and 8 miles above Wheatland.

DRAINAGE AREA.—263 square miles.

RECORDS AVAILABLE.—October 9, 1904, to September 30, 1921.

GAGE.—Staff in five sections on left bank 500 feet below bridge; read by G. W. Dunlap.

DISCHARGE MEASUREMENTS.—Made from cable half a mile below gage or by wading.

CHANNEL AND CONTROL.—Solid rock, boulders, and gravel; shift during high water.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, from flood marks, 14.0 feet morning of January 18 (discharge, 18,400 second-feet); minimum stage, 0.0 foot at 8 a. m. July 15, 17, 18, and 20 (discharge, 3 second-feet).

1904-1921: Maximum stage recorded, 18.9 feet at 8 a. m. January 14, 1909 (discharge, from extension of rating curve, about 29,600 second-feet); minimum discharge 2 second-feet, July 4, 1918.

DIVERSIONS.—Water is diverted above station for power and irrigation. Stored water from South Fork of Yuba River is diverted into the drainage basin above Colfax.

REGULATION.—A small amount of storage is developed on the headwaters of the stream.

ACCURACY.—Stage-discharge relation changed December 11. Rating curves well defined below 4,000 second-feet and extended above. Gage read to tenths once daily to September 16 with extra readings during fluctuating stages and to hundredths twice daily from September 17. Daily discharge ascertained by applying mean daily gage height to rating table. Records fair.

*Discharge measurements of Bear River at Van Trent, Calif., during the year ending
Sept. 30, 1921*

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>
Dec. 21	K. M. Kelley.....	3. 55	1, 210	July 25	Jesse Arnold.....	0. 14	7. 5
Jan. 30	R. C. Briggs.....	6. 75	3, 740	Aug. 22	do.....	. 16	6. 5
May 2	K. M. Kelley.....	1. 88	306	Sept. 15	K. M. Kelley.....	. 22	7. 5
June 1	do.....	1. 21	126				

Daily discharge, in second-feet, of Bear River at Van Trent, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	8	12	300	1,390	1,820	920	735	245	144	86	12	12
2	12	12	3,440	1,320	1,600	985	570	328	144	86	12	5
3	8	18	790	985	1,530	985	570	275	166	86	12	12
4	8	18	970	985	1,390	1,120	570	245	144	86	8	12
5	4	26	620	1,320	2,140	1,120	425	215	144	43	5	12
6	8	26	420	1,530	1,600	1,320	385	215	70	62	8	8
7	48	18	515	1,180	1,320	1,390	385	275	104	86	12	17
8	36	26	1,240	985	1,180	985	448	275	144	104	17	5
9	48	26	790	855	1,050	795	625	215	144	86	8	8
10	122	36	1,590	795	1,050	735	425	215	86	70	17	12
11	36	48	13,200	735	1,120	735	245	188	124	55	12	8
12	18	1,170	1,900	690	1,120	570	310	188	104	23	8	20
13	36	1,740	1,320	690	1,120	2,780	385	144	43	12	8	17
14	18	420	1,120	570	1,680	1,680	345	166	104	6.5	12	12
15	18	420	795	625	1,460	1,250	425	166	104	3	17	12
16	12	620	1,320	570	1,180	985	345	104	124	5	12	8
17	12	515	680	1,530	1,250	855	345	166	144	3	17	15
18	18	300	680	15,700	1,120	1,050	345	188	124	3	18	25
19	80	3,130	5,090	4,960	1,250	985	385	215	104	6.5	8	22
20	36	1,450	2,140	3,020	1,180	1,050	345	245	104	3	8	29
21	18	420	1,320	2,140	4,020	735	310	570	70	8	12	28
22	18	1,310	1,320	1,750	2,060	3,020	310	245	23	5	12	26
23	18	515	1,120	1,750	1,680	1,820	275	215	70	5	12	15
24	18	340	2,380	1,600	1,250	1,180	405	188	78	5	12	16
25	18	300	1,600	1,680	1,120	1,180	275	215	70	8	12	16
26	12	200	1,320	1,460	1,120	920	310	188	86	12	12	16
27	18	1,660	985	2,780	1,320	795	245	188	86	12	12	16
28	18	565	795	2,220	985	680	245	188	144	8	12	22
29	18	465	735	1,820	-----	680	215	188	104	5	12	22
30	18	420	1,680	6,290	-----	625	215	86	95	12	12	16
31	18	-----	1,680	2,220	-----	735	-----	124	-----	17	12	-----

NOTE.—Gage not read Nov. 15 and June 30; discharge estimated.

Monthly discharge of Bear River at Van Trent, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	122	4	25.1	1,540
November	3,130	12	541	32,200
December	13,200	300	1,740	107,000
January	15,700	570	2,130	131,000
February	4,020	985	1,450	80,500
March	3,020	570	1,120	68,900
April	735	215	381	22,700
May	570	86	215	13,200
June	166	23	106	6,310
July	104	3	32.6	2,000
August	17	5	11.4	701
September	29	5	15.5	922
The year	15,700	3	645	467,000

BEAR RIVER CANAL NEAR COLFAX, CALIF.

LOCATION.—Just below lower spillway gates 1 mile below diversion dam on Bear River and 2 miles northwest of Colfax, Placer County.

RECORDS AVAILABLE.—January 1, 1912, to September 30, 1921.

GAGE.—Float gage in stilling box on left bank about 800 feet below the spillway gates.

DISCHARGE MEASUREMENTS.—Made from foot plank across flume at gage.

CHANNEL AND CONTROL.—Rectangular wooden flume. Control is cross-section of channel.

EXTREMES OF DISCHARGE.—1912-1921: Maximum mean daily discharge, 287 second-feet June 7, 1919.

COOPERATION.—Discharge record furnished by Pacific Gas & Electric Co. The water is used for development of power near Auburn.

Discharge measurements of Bear River canal near Colfax, Calif., during the year ending Sept. 30, 1921

Date	Made by—	Gage height	Dis-charge
May 1	K. M. Kelley	<i>Feet</i> 5.80	<i>Sec.-ft.</i> 258
1	do	6.00	268
Aug. 21	Jesse Arnold	4.46	163

Daily discharge, in second-feet, of Bear River canal near Colfax, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	169	243	269	168	252	253	253	275	265	223	210	241
2	158	270	251	250	257	250	259	277	273	221	248	222
3	74	270	268	258	257	251	262	276	253	205	238	226
4	86	270	261	266	257	251	263	277	274	218	236	208
5	164	270	264	256	241	252	265	276	263	225	241	220
6	216	269	266	262	253	251	262	274	265	230	236	228
7	156	170	263	265	258	246	262	276	274	235	230	236
8	74	208	256	266	257	257	263	277	274	248	217	245
9	52	270	250	265	259	263	263	277	273	244	264	233
10	81	270	241	266	259	264	262	277	271	236	245	251
11	58	270	209	264	264	260	257	277	251	246	239	204
12	211	253	257	264	264	264	265	277	273	231	233	202
13	105	259	158	265	266	241	265	277	261	219	241	233
14	69	253	254	265	248	251	267	278	251	216	230	234
15	59	238	260	265	255	250	269	277	247	219	225	205
16	56	260	264	264	260	252	271	248	251	209	250	235
17	66	265	262	243	259	255	270	278	258	215	250	244
18	250	264	246	228	65	253	270	278	242	258	253	214
19	161	230	210	202	0	255	270	277	265	247	234	205
20	115	258	261	225	0	190	271	270	244	239	248	232
21	169	260	259	247	0	257	272	276	266	249	222	227
22	185	260	259	257	0	235	273	277	259	228	229	212
23	261	266	261	254	83	248	272	277	262	249	222	222
24	178	269	243	244	241	248	271	278	250	210	239	234
25	188	264	263	255	161	257	268	278	251	247	240	211
26	267	255	259	256	189	262	274	270	243	233	236	210
27	268	260	265	225	70	261	272	277	225	227	256	210
28	268	269	264	247	237	265	274	276	233	232	208	227
29	268	269	264	255	-----	267	276	272	227	230	221	185
30	141	268	239	221	-----	246	276	272	221	229	250	228
31	176	-----	257	248	-----	234	-----	275	-----	227	251	-----

Monthly discharge of Bear River canal near Colfax, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	268	52	153	9, 410
November.....	270	170	257	15, 300
December.....	269	158	252	15, 500
January.....	266	168	249	15, 300
February.....	266	0	193	10, 700
March.....	267	190	251	15, 400
April.....	276	253	267	15, 900
May.....	278	248	275	16, 900
June.....	274	221	256	15, 200
July.....	258	205	230	14, 100
August.....	264	208	237	14, 600
September.....	251	185	223	13, 300
The year.....	278	0	237	172, 000

AMERICAN RIVER BASIN

NORTH FORK OF AMERICAN RIVER NEAR COLFAX, CALIF.

LOCATION.—In SW. $\frac{1}{4}$ sec. 30, T. 14 N., R. 10 E., at bridge on Colfax-Forest Hill road, 150 feet below mouth of Shirttail Canyon Creek, 5 miles southeast of Colfax, Placer County, and 11 miles above junction with Middle Fork.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—August 16, 1911, to September 30, 1921.

GAGE.—Vertical staff in two sections: Section 1 bolted to ledge on left bank 30 feet below bridge; section 2 on right bank 35 feet below bridge. From December 18, 1912, to August 16, 1914, a water-stage recorder was in operation on right bank 50 feet below bridge at same datum. Gage read by W. D. Finch.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading.

CHANNEL AND CONTROL.—Gravel and small boulders—tailings from placer mining; shift during high water. Banks high, rocky, wooded, and not subject to overflow. Zero flow 1.80 feet July 16, 1921, and 1.70 feet August 21, 1921.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 7.9 feet at 8 a. m. January 18 (discharge, 5,370 second-feet); minimum discharge, 50 second-feet August 30 to September 4 and September 19–20.

1911–1921: Maximum stage recorded, 16.0 feet during morning of January 1, 1914, determined by high-water mark on gage in recorder well (discharge, from extension of rating curve, about 23,000 second-feet); minimum discharge, 40 second-feet September 26–28 and November 28, 1919.

DIVERSIONS.—A small ditch diverts water from Lake Valley reservoir, which is on a small tributary of North Fork of American River. This water, after passing through Alta power plant, is wasted into Bear River drainage basin.

STORAGE.—The capacity of Lake Valley reservoir is 8,000 acre-feet.

REGULATION.—None.

ACCURACY.—Stage-discharge relation changed March 14. Rating curves fairly well defined below 3,000 second-feet and extended above. Gage read to tenths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table. Records good.

Discharge measurements of North Fork of American River near Colfax, Calif., during the year ending Sept. 30, 1921

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>
Dec. 19	K. M. Kelley	5.87	2,180	Apr. 29	K. M. Kelley	5.50	1,990
Jan. 29	R. C. Briggs	5.00	1,310	July 16	Jesse Arnold	2.73	179
Apr. 29	K. M. Kelley	5.55	2,020	Aug. 21	do.	2.26	71

Daily discharge, in second-feet, of North Fork of American River near Colfax, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	52	65	610	1,310	1,310	1,310	1,830	2,040	710	390	80	50
2	52	65	1,170	1,170	1,170	1,390	2,040	1,730	1,220	390	80	50
3	52	65	700	970	1,030	1,880	2,150	1,460	1,300	312	80	50
4	52	65	700	1,310	1,030	2,100	1,640	1,460	1,300	295	80	50
5	52	65	610	1,480	1,310	2,210	1,460	1,380	1,460	242	80	61
6	72	65	570	1,310	1,100	1,880	1,300	1,300	1,730	295	80	65
7	165	77	570	1,170	1,030	1,680	1,300	1,220	1,830	312	80	65
8	72	80	650	1,030	970	1,480	1,300	1,300	1,460	242	80	65
9	65	77	700	910	910	1,310	1,460	1,460	1,380	260	80	65
10	77	65	910	800	1,030	1,100	1,460	1,640	1,460	210	80	65
11	68	88	2,590	750	1,170	1,310	1,480	1,830	1,460	195	80	65
12	225	1,240	1,030	700	1,240	1,310	1,490	2,040	1,380	210	80	65
13	72	1,310	700	700	1,310	3,780	1,640	2,270	1,300	195	80	65
14	77	530	610	650	1,880	3,080	1,300	2,390	1,070	170	80	65
15	77	325	610	610	1,880	2,270	1,140	2,040	930	170	80	65
16	77	910	570	610	1,170	2,040	1,140	2,270	770	170	80	65
17	80	910	490	1,030	1,030	2,270	1,140	1,550	650	170	65	65
18	355	700	700	5,180	970	2,930	1,070	1,300	535	170	65	65
19	188	2,100	2,100	3,950	910	2,270	1,140	1,140	650	145	65	58
20	110	1,390	1,240	2,460	910	1,830	1,140	830	680	145	65	50
21	114	800	910	1,680	2,330	1,640	1,460	1,300	800	145	65	65
22	88	1,170	850	1,480	1,310	2,270	1,830	1,140	830	145	65	65
23	96	800	750	1,240	1,170	2,040	2,270	1,460	770	120	65	65
24	96	610	1,240	1,170	1,170	1,830	1,550	1,640	740	120	65	65
25	114	490	1,170	1,100	1,240	1,640	1,380	1,730	650	100	65	65
26	96	530	910	1,170	1,310	1,460	1,300	2,150	535	100	65	65
27	96	1,880	850	2,100	1,240	1,380	1,640	2,270	535	100	65	65
28	96	910	910	1,680	1,310	1,300	1,830	2,040	535	100	65	65
29	88	700	850	1,310	-----	1,300	2,150	1,380	485	100	65	65
30	80	610	1,310	2,210	-----	1,460	2,150	1,000	390	100	58	65
31	65	-----	2,100	1,780	-----	1,640	-----	770	-----	100	50	-----

Monthly discharge of North Fork of American River near Colfax, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet ¹
	Maximum	Minimum	Mean	
October	355	52	99.0	6,090
November	2,100	65	623	37,100
December	2,590	490	957	58,800
January	5,180	610	1,450	89,200
February	2,330	910	1,230	68,300
March	3,780	1,300	1,860	114,000
April	2,270	1,070	1,540	91,600
May	2,390	770	1,600	98,400
June	1,820	390	985	58,600
July	390	100	191	11,700
August	80	50	72.0	4,430
September	65	50	62.3	3,710
The year	5,180	50	887	642,000

AMERICAN RIVER AT FAIROAKS, CALIF.

LOCATION.—At highway bridge 1,500 feet northwest of Southern Pacific Co.'s railroad station at Fair Oaks Bridge, half a mile southeast of Fair Oaks, Sacramento County, and 10 miles below mouth of South Fork.

DRAINAGE AREA.—1,910 square miles.

RECORDS AVAILABLE.—November 3, 1904, to September 30, 1921.

GAGE.—Vertical staff in two sections on right bank at highway bridge. First section is on a post 60 feet above bridge, and is the temporary gage used October 1, 1918, to February 9, 1919, and June 1, 1919, to August 30, 1920. The datum of the temporary gage raised 0.09 foot on August 30, 1920, to make it agree with second section which is painted on bridge pier. Water-stage recorder 800 feet below bridge has not been used since May 31, 1919, as the channel has changed at the gage.

DISCHARGE MEASUREMENTS.—Made from downstream side of bridge or by wading.

CHANNEL AND CONTROL.—Gravel and small boulders; shift during high water.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 14.1 feet at 8 a. m. January 18 (discharge, 39,200 second-feet); minimum stage, 0.45 foot at 5 p. m. October 3 (discharge, 114 second-feet).

1907–1921: Maximum stage recorded, 30.4 feet March 19, 1907 (discharge, from extension of rating curve, about 119,000 second-feet); minimum discharge, from extension of low-water curve, about 25 second-feet, from 8 to 10.30 a. m. September 24, 1915.

DIVERSIONS.—Water is diverted for irrigation above station.

REGULATION.—See descriptions of Middle, North, and South forks. Low-water flow partly regulated by power plant at Folsom.

ACCURACY.—Stage-discharge relation changed frequently during year. Gages read to half-tenths twice daily. Rating curves well defined except the one used December 13 to January 18 which is poorly defined. Daily discharge ascertained by applying mean daily gage height to rating table. Records good except December 13 to January 18 which are poor. .

Discharge measurements of American River at Fair Oaks, Calif., during the year ending Sept. 30, 1921

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>
Dec. 18	K. M. Kelley-----	2.54	2,580	July 14	Kelley and Arnold-----	2.01	1,150
Jan. 28	R. C. Briggs-----	5.60	7,990	14	Jesse Arnold-----	2.02	1,180
Feb. 9	K. M. Kelley-----	4.09	4,130	25	do-----	1.49	580
Mar. 3	do-----	5.83	8,330	Aug. 23	do-----	1.02	301
Apr 27	do-----	5.79	8,530	Sept. 17	K. M. Kelley-----	.99	308

Daily discharge, in second-feet, of American River at Fair Oaks, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	148	504	2,260	6,400	6,990	6,720	8,740	10,900	6,200	2,600	478	300
2.....	130	504	3,370	5,080	5,700	6,990	9,360	8,430	6,200	2,460	486	270
3.....	123	504	3,370	4,360	5,230	7,840	9,360	7,840	7,270	2,460	446	240
4.....	127	456	2,790	5,920	5,010	9,050	9,360	7,270	7,550	2,180	554	240
5.....	137	433	2,390	6,400	6,990	9,670	7,270	6,990	9,670	2,180	537	230
6.....	137	456	2,000	8,880	5,700	9,670	6,720	6,460	10,900	1,660	462	200
7.....	201	405	2,000	6,140	5,010	8,430	5,700	6,200	10,900	1,790	423	200
8.....	245	405	2,830	5,080	4,400	7,840	6,200	7,270	9,670	1,600	454	240
9.....	255	426	3,370	4,700	4,210	6,720	5,700	7,270	9,050	1,620	430	215
10.....	592	456	4,400	4,010	4,210	6,720	6,200	8,430	9,670	1,600	395	181
11.....	565	456	10,300	3,850	4,600	6,720	7,270	9,050	9,670	1,530	367	181
12.....	384	1,760	11,600	4,010	5,230	6,720	7,270	9,670	9,670	1,400	306	181
13.....	700	4,080	4,010	4,010	5,700	12,200	7,550	10,900	8,740	1,340	225	240
14.....	750	3,070	3,390	3,390	7,550	13,800	7,270	13,800	7,840	1,210	225	270
15.....	610	2,260	2,820	3,390	8,430	10,300	5,700	13,200	6,200	1,210	252	230
16.....	610	2,130	2,650	3,390	5,700	9,360	5,010	9,670	5,010	910	348	215
17.....	700	3,370	2,500	3,690	5,230	9,670	4,800	9,050	4,400	855	288	240
18.....	800	2,520	2,540	32,800	4,800	11,600	4,800	7,550	3,690	910	264	190
19.....	1,100	3,220	2,800	20,000	4,600	12,200	4,800	6,460	3,370	800	294	270
20.....	1,000	10,600	7,080	14,400	4,800	9,670	5,010	6,200	3,690	800	264	312
21.....	750	4,030	4,700	10,300	7,270	8,430	4,800	7,270	3,690	800	270	312
22.....	538	3,860	4,340	8,130	7,840	9,360	8,430	6,990	5,010	800	215	270
23.....	592	4,210	4,010	7,270	5,700	9,670	9,670	7,270	4,800	745	215	270
24.....	504	3,690	4,900	5,700	5,460	9,050	9,050	9,050	4,210	635	168	240
25.....	720	3,370	6,600	5,700	5,230	9,050	7,270	9,050	4,030	635	145	270
26.....	720	3,690	5,080	5,460	5,700	8,130	5,950	9,980	3,690	636	215	230
27.....	900	6,200	4,360	7,270	5,700	6,990	7,270	12,800	3,690	591	240	300
28.....	1,000	4,800	4,360	8,130	6,200	6,720	9,050	10,900	3,050	591	270	240
29.....	1,000	2,790	4,200	6,720	-----	6,720	10,900	7,270	3,050	555	330	252
30.....	800	2,260	4,340	15,700	-----	6,720	11,200	6,720	2,750	555	330	348
31.....	655	-----	11,700	8,430	-----	6,720	-----	5,700	-----	519	312	-----

Monthly discharge of American River at Fair Oaks, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	1,100	123	564	34,700
November.....	10,600	405	2,560	152,000
December.....	11,700	2,000	4,420	272,000
January.....	32,800	3,390	7,700	473,000
February.....	8,430	4,210	5,680	315,000
March.....	13,800	6,720	8,690	534,000
April.....	11,200	4,800	7,260	432,000
May.....	13,800	5,700	8,570	527,000
June.....	10,900	2,750	6,240	371,000
July.....	2,600	519	1,240	76,200
August.....	537	145	326	20,000
September.....	348	181	246	14,600
The year.....	32,800	123	4,450	3,220,000

AMERICAN RIVER AT SACRAMENTO, CALIF.

LOCATION.—At H Street Bridge, Sacramento, Sacramento County.

RECORDS AVAILABLE.—July 13 to October 27, 1920.

GAGE.—Water-stage recorder on left bank about 100 feet above bridge.

CHANNEL AND CONTROL.—Shifting sand. Control is cross section and slope of channel.

DIVERSIONS.—See American River at Fair Oaks.

COOPERATION.—Daily-discharge record furnished by State engineer who maintained the station.

Daily discharge, in second-feet, of American River at Sacramento, Calif., for the period July 15 to Oct. 27, 1921

Day	July	Aug.	Sept.	Oct.	Day	July	Aug.	Sept.	Oct.
1.....		400	305	315	16.....	1,230	330	310	375
2.....		405	305	300	17.....	1,180	310	310	345
3.....		425	310	260	18.....	1,080	320	320	370
4.....		425	315	285	19.....	1,060	310	300	350
5.....		400	310	265	20.....	1,000	310	320	360
6.....		380	305	305	21.....	945	318	325	380
7.....		365	335	300	22.....	900	280	335	365
8.....		325	330	320	23.....	855	280	340	375
9.....		330	320	330	24.....	835	305	340	350
10.....		330	315	300	25.....	785	300	340	380
11.....		340	300	320	26.....	775	305	305	420
12.....		325	285	335	27.....	660	320	320	490
13.....	1,420	370	300	340	28.....	600	330	320	-----
14.....	1,370	370	305	340	29.....	545	300	310	-----
15.....	1,300	305	305	350	30.....	525	315	320	-----
					31.....	510	310	-----	-----

MIDDLE FORK OF AMERICAN RIVER NEAR EAST AUBURN, CALIF.

LOCATION.—In SE. $\frac{1}{2}$ sec. 6, T. 12 N., R. 9 E., at Mountain Quarry Co.'s plant, $1\frac{1}{4}$ miles above junction with North Fork of American River and $3\frac{1}{2}$ miles northeast of East Auburn, Placer County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—October 22, 1911, to September 30, 1921.

GAGE.—Staff in four sections on left bank at pump house; read by J. A. Collins.

DISCHARGE MEASUREMENTS.—Made from cable 700 feet below gage or by wading.

CHANNEL AND CONTROL.—Gravel and small boulders; shift during high water. Banks high and not subject to overflow.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 11.5 feet at 7.30 a. m. January 18 (discharge, 11,700 second-feet); minimum stage, 2.60 feet October 1-5 (discharge, 54 second-feet).

1911-1921: Maximum stage recorded, 18 feet at 7 a. m. January 1, 1914 (discharge, from extension of rating curve, about 26,400 second-feet); minimum stage, 1 foot at 7 a. m. October 23, 24, and 31, 1915 (discharge, 32 second-feet).

DIVERSIONS.—Pilot Creek ditch diverts from Pilot Creek for irrigation on Georgetown divide. Little South Fork ditch diverts from Gerle Creek and discharges into Pilot Creek drainage basin where it is used when necessary to supplement the flow in Pilot Creek ditch; maximum discharge is probably less than 20 second-feet.

REGULATION.—Storage is developed in Loon Lake at the head of Gerle Creek to serve the ditches mentioned in the preceding paragraph.

ACCURACY.—Stage-discharge relation changed January 18. Rating curve before change fairly well defined below 5,000 second-feet; curve used after change well defined. Gage read to half-tenths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table. Records good.

Discharge measurements of Middle Fork of American River near East Auburn, Calif., during the year ending Sept. 30, 1921

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>
Dec. 20	K. M. Kelley.....	5.50	1,800	Apr. 28	K. M. Kelley.....	7.65	4,150
20	do.....	5.55	1,870	July 16	Jesse Arnold.....	3.88	419
Jan. 29	R. C. Briggs.....	6.10	2,130	Aug. 22	do.....	2.64	93

Daily discharge, in second-feet, of Middle Fork of American River near East Auburn, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept
1	54	225	960	3,060	2,040	2,840	3,770	4,450	2,480	1,140	168	80
2	54	195	1,400	2,100	1,940	3,100	4,350	3,630	2,480	1,100	158	80
3	54	141	1,310	2,100	1,840	3,490	4,650	3,100	3,230	996	158	87
4	54	135	1,040	2,560	1,740	4,050	3,230	2,840	2,970	892	148	87
5	54	135	960	2,680	2,150	3,770	3,100	2,720	3,490	789	148	87
6	135	135	880	2,320	1,860	3,770	2,720	2,970	3,630	685	138	87
7	180	135	845	2,560	1,560	3,230	2,720	2,480	4,950	685	133	87
8	141	165	960	1,880	1,470	3,230	2,720	2,720	3,770	625	128	84
9	130	141	960	1,490	1,300	2,970	2,970	3,360	3,490	598	128	80
10	132	135	1,490	1,400	1,380	2,970	3,100	4,050	3,770	570	119	80
11	135	165	3,320	1,220	1,650	2,840	2,970	4,350	3,770	570	119	80
12	180	435	2,270	1,310	2,040	2,600	2,970	4,500	3,630	495	119	80
13	225	1,780	1,220	1,220	2,260	6,250	3,230	5,590	3,490	470	110	80
14	195	1,220	960	1,130	2,970	4,950	2,720	5,430	3,230	470	110	80
15	195	635	845	1,130	2,600	4,050	2,260	5,110	2,480	425	110	80
16	195	810	775	1,130	2,260	3,630	2,260	5,270	1,840	425	102	80
17	165	1,680	740	1,490	2,040	4,050	2,260	3,490	1,740	425	102	73
18	300	1,400	810	10,000	2,040	5,110	2,260	3,100	1,560	425	102	73
19	340	2,100	2,320	5,750	1,840	4,950	2,040	2,600	1,650	360	102	80
20	225	4,500	1,990	3,770	1,560	3,770	2,370	2,480	1,300	305	94	80
21	225	3,240	1,130	2,840	2,720	3,230	2,970	2,970	2,040	275	94	87
22	219	1,990	1,310	2,260	2,260	3,630	4,500	2,720	2,150	275	90	84
23	219	1,680	1,130	2,050	2,040	3,230	4,650	3,490	2,260	262	87	80
24	242	1,220	1,310	1,840	2,040	2,970	3,630	4,050	2,040	262	87	73
25	242	1,040	1,310	1,650	2,260	3,360	2,720	4,350	1,840	250	86	73
26	320	810	1,310	1,740	2,480	2,970	2,720	4,650	1,650	225	86	73
27	340	4,500	1,310	2,370	2,480	2,720	3,490	5,430	1,560	225	85	73
28	340	2,100	1,490	2,600	2,600	2,480	4,050	3,770	1,470	225	84	73
29	300	1,490	1,490	2,260	-----	2,720	4,950	3,360	1,470	212	83	73
30	242	1,220	1,880	2,970	-----	2,970	5,270	2,600	1,220	200	82	73
31	225	-----	4,980	2,370	-----	3,230	-----	2,480	-----	178	81	-----

NOTE.—Gage not read Oct. 10, Nov. 21, Dec. 12, 25, 26, Jan. 23, Feb. 6, Mar. 27, July 3-5, Aug. 7, and 25-31; discharge interpolated.

Monthly discharge of Middle Fork of American River near East Auburn, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	340	54	195	12,000
November	4,500	135	1,190	70,800
December	4,980	740	1,440	88,500
January	10,000	1,130	2,430	149,000
February	2,970	1,300	2,050	114,000
March	6,250	2,480	3,520	216,000
April	5,270	2,040	3,250	193,000
May	5,590	2,480	3,680	226,000
June	4,950	1,220	2,560	152,000
July	1,140	178	485	29,800
August	168	81	111	6,830
September	87	73	79.6	4,740
The year	10,000	54	1,750	1,260,000

CACHE CREEK BASIN

CLEAR LAKE AT LAKEPORT, CALIF.

LOCATION.—At municipal wharf on north side of Third Street at Lakeport, Lake County.

RECORDS AVAILABLE.—February 25, 1913, to September 30, 1921.

GAGE.—Vertical staff fastened to piling at municipal wharf; read once a day by W. E. Smith.

EXTREMES OF STAGE.—Maximum stage recorded during year, 7.20 feet March 28, 31, April, 1, 2, and 8; minimum stage, -3.25 feet November 11.

1913-1921: Maximum stage recorded, 11.12 feet January 28, 1914; minimum stage, -3.50 feet September 24-27, 1920.

COOPERATION.—Gage-height record furnished by Yolo Water & Power Co.

Daily gage height, in feet, of Clear Lake at Lakeport, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	-3.10	-3.05	-1.95	1.55	6.10	6.62	7.20	6.95	6.28	5.28	4.18	3.03
2.....	-3.10	-3.10	-1.65	1.70	6.25	6.65	7.20	6.95	6.28	5.28	4.15	3.00
3.....	-3.15	-3.10	-1.60	1.75	6.50	6.70	7.15	6.93	6.25	5.25	4.10	2.95
4.....	-3.15	-3.15	-1.60	1.90	6.51	6.70	7.10	6.90	6.23	5.20	4.05	2.92
5.....	-3.20	-3.15	-1.60	1.90	6.90	6.75	7.15	6.90	6.20	5.15	4.03	2.88
6.....	-3.20	-3.15	-1.60	1.90	7.10	6.78	7.15	6.88	6.15	5.12	4.00	2.85
7.....	-3.20	-3.15	-1.50	1.95	7.10	6.80	7.15	6.87	6.12	5.10	3.95	2.82
8.....	-3.20	-3.15	-1.30	2.00	7.10	6.80	7.20	6.85	6.10	5.08	3.90	2.80
9.....	-3.20	-3.20	-1.10	2.00	7.10	6.80	7.15	6.83	6.05	5.05	3.88	2.78
10.....	-3.10	-3.20	-.95	2.00	7.10	6.83	7.15	6.80	6.03	5.02	3.85	2.75
11.....	-3.10	-3.25	-.95	2.05	7.05	6.83	7.15	6.80	6.00	5.00	3.80	2.75
12.....	-3.10	-3.20	-.60	2.10	6.95	6.85	7.15	6.79	6.00	4.95	3.75	2.72
13.....	-3.10	-3.10	-.50	2.10	6.80	6.90	7.15	6.77	5.95	4.90	3.70	2.70
14.....	-3.10	-3.00	-.35	2.15	6.80	6.90	7.15	6.75	5.85	4.85	3.65	2.68
15.....	-3.10	-3.00	-.30	2.15	6.85	6.95	7.18	6.70	5.75	4.82	3.60	2.65
16.....	-3.10	-2.95	-.20	2.20	6.75	6.95	7.12	6.60	5.70	4.78	3.55	2.62
17.....	-3.10	-2.95	-.20	2.50	6.75	6.93	7.18	6.57	5.75	4.75	3.52	2.62
18.....	-3.10	-2.65	-.10	2.90	6.60	6.95	7.18	6.57	5.72	4.72	3.50	2.61
19.....	-3.15	-2.45	+.00	3.15	6.65	6.97	7.18	6.59	5.70	4.65	3.45	2.60
20.....	-3.15	-2.35	+.40	3.30	6.55	6.97	7.12	6.57	5.68	4.62	3.40	2.58
21.....	-3.15	-2.20	.50	3.50	6.50	6.97	7.11	6.55	5.65	4.60	3.40	2.55
22.....	-3.00	-2.20	.55	3.60	6.52	7.00	7.11	6.53	5.60	4.58	3.38	2.50
23.....	-3.00	-2.20	.75	3.80	6.50	7.00	7.10	6.50	5.60	4.52	3.35	2.48
24.....	-3.00	-2.20	1.00	3.95	6.51	7.02	7.08	6.50	5.55	4.48	3.32	2.45
25.....	-3.00	-2.18	1.20	4.40	6.51	7.05	7.05	6.48	5.50	4.45	3.28	2.40
26.....	-3.00	-2.10	1.30	4.50	6.54	7.10	7.02	6.45	5.45	4.38	3.25	2.38
27.....	-3.00	-2.05	1.40	5.10	6.60	7.15	7.02	6.40	5.42	4.32	3.20	2.37
28.....	-3.00	-2.00	1.45	5.50	6.60	7.20	7.01	6.35	5.40	4.30	3.15	2.35
29.....	-3.05	-2.00	1.50	5.90	-----	7.15	7.00	6.30	5.35	4.28	3.12	2.32
30.....	-3.00	-1.95	1.55	5.95	-----	7.15	6.99	6.30	5.30	4.25	3.10	2.30
31.....	-3.05	-----	1.60	6.00	-----	7.20	-----	6.30	-----	4.22	3.05	-----

CACHE CREEK AT YOLO, CALIF.

LOCATION.—At highway bridge half a mile south of Yolo, Yolo County, in Rio Jesus Maria grant, 1,000 feet above Southern Pacific Co.'s railroad bridge.

DRAINAGE AREA.—1,230 square miles.

RECORDS AVAILABLE.—January 1, 1903, to September 30, 1921.

GAGE.—Staff in four sections; lower section, vertical, fastened to pile under bridge near left bank; second section, inclined, right bank, 30 feet above bridge; third section, vertical, fastened to cottonwood tree on right bank 70 feet above bridge; upper section, vertical, fastened to upper end of right abutment. This gage was installed October 2, 1904, at the same datum as original gage on upstream side of right pier of bridge. Gage read by Dorothy E. Bigelow. Two temporary gages were used during the year after section 2 washed out at high water of January 20-25.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading.

CHANNEL AND CONTROL.—Sand and gravel; somewhat shifting. Zero flow gage height 0.50 foot= ± 0.10 .

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 24.3 feet at 6.30 p. m. January 30 (discharge, 18,000 second-feet); no flow October 1 to November 18, 27, May 12-24, and June 7 to September 30.

1903-1921: Maximum stage recorded, 27.8 feet at 5 p. m. February 2, 1915 (discharge, 21,100 second-feet); no flow for periods in nearly every year.

DIVERSIONS.—Numerous ditches divert water for irrigation above station.

REGULATION.—At low water, channel is sometimes deepened at Lower Lake in order to increase the flow from lake.

ACCURACY.—Stage-discharge relation changed January 30. Rating curves fairly well defined. Gage read to half-tenths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table. Records fair.

Discharge measurements of Cache Creek at Yolo, Calif., during the year ending Sept. 30, 1921

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>
Dec. 14	K. M. Kelley	2.65	796	Mar. 4	K. M. Kelley	2.12	357
17	do	1.85	325	Apr. 26	do	1.29	84
17	do	1.84	326	June 2	do	.98	21
Jan. 26	R. C. Briggs	5.48	2,550	July 26	do		0
Feb. 5	do	6.64	3,130	Aug. 24	do		0
Mar. 4	K. M. Kelley	2.13	361				

Daily discharge, in second-feet, of Cache Creek at Yolo, Calif., for the year ending Sept. 30, 1921

Day	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1		33	457	5,020	472	100	36	31
2		24	394	3,740	430	82	31	21
3		762	354	3,500	390	87	31	16
4		354	316	3,260	350	92	26	14
5		280	316	3,260	350	100	18	0
6		187	436	1,990	350	87	11	1
7		146	394	1,520	312	74	6	
8		545	354	2,060	305	62	16	
9		478	316	1,990	283	50	14	
10		1,760	316	1,920	276	50	13	
11		1,140	247	2,620	258	50	3	
12		2,680	247	2,620	258	50	0	
13		1,080	216	2,550	258	39	0	
14		712	216	2,410	276	39	0	
15		478	187	2,620	276	6	0	
16		354	187	2,340	247	2	0	
17		316	3,000	2,270	233	31	0	
18		298	5,080	2,270	233	50	0	
19	3,480	2,150	8,500	2,200	206	57	0	
20	1,020	3,720		2,130	174	39	0	
21	354	1,380		2,200	168	62	0	
22	187	1,380	5,000	2,620	830	62	0	
23	160	1,080		2,340	1,160	36	0	
24	80	1,950		1,580	370	67	0	
25	33	1,500		930	312	74	18	
26	9	1,140	2,360	730	247	82	13	
27	0	812	5,480	598	200	87	7	
28	280	638	4,360	514	158	87	14	
29	155	522	2,520		120	31	14	
30	74	478	12,300		114	14	21	
31		566	7,350		109		31	

NOTE.—Gage washed out, no gage-height record Jan. 20-25, discharge estimated from flood marks and comparison with flow of Putah Creek. No flow Oct. 1 to Nov. 18 and June 7 to Sept. 30.

Monthly discharge of Cache Creek at Yolo, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
November.....	3,480	0	194	11,500
December.....	3,720	24	934	57,400
January.....	12,300	187	2,770	170,000
February.....	5,020	514	2,280	127,000
March.....	1,160	109	314	19,300
April.....	100	2.0	58.3	3,470
May.....	36	0	10.4	640
June.....	31	0	2.77	165
The year.....	12,300	0	538	389,000

NOTE.—No flow during months for which no record is given.

PUTAH CREEK BASIN

PUTAH CREEK AT WINTERS, CALIF.

LOCATION.—Just below Southern Pacific Co.'s railroad bridge at Winters, Yolo County, in Rio de los Puntos grant.

DRAINAGE AREA.—654 square miles (measured by State engineer).

RECORDS AVAILABLE.—September 26, 1905, to September 30, 1921.

GAGE.—Staff in five sections; lower two on right bank and upper three on left bank, 600 feet below bridge; read by Miss Stella McFall. Previous to February 22, 1919, the gages were all on left bank with an auxiliary gage on right bank for low water. Original datum has been maintained.

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

CHANNEL AND CONTROL.—Sand and gravel; somewhat shifting. Two channels at low water.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 29.2 feet at 11 a. m. January 30 (discharge, about 33,500 second-feet); no flow October 1 to November 15 and July 27 to September 30.

1905-1921: Maximum stage recorded, 39.0 feet, from flood marks at gage, December 31, 1913 (discharge, from extension of rating curve, about 60,000 second-feet); no flow during part of the years ending September 30, 1913, 1914, 1918 to 1921.

DIVERSIONS.—There are several small diversions for irrigation above station.

REGULATION.—None.

ACCURACY.—Stage-discharge relation changed December 19. Rating curve before change poorly defined; that used after change well defined below 10,000 second-feet and extended above. Gage read to half-tenths once daily and twice daily during floods. Daily discharge ascertained by applying mean daily gage height to rating table. Records fair.

Discharge measurements of Putah Creek at Winters, Calif., during the year ending Sept. 30, 1921

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>
Dec. 16	K. M. Kelley.....	6.49	623	Apr. 25	K. M. Kelley.....	5.27	128
16	do.....	6.46	622	26	do.....	5.24	120
Jan. 27	R. C. Briggs.....	14.65	8,130	June 2	do.....	4.70	40
Feb. 5	do.....	8.15	1,390	July 13	Jesse Arnold.....	4.00	2.2
Mar. 5	K. M. Kelley.....	6.05	364	13	K. M. Kelley.....	4.00	2.0

Daily discharge, in second-feet, of Putah Creek at Winters, Calif., for the year ending Sept. 30, 1921

Day	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July
1.		245	460	3,000	420	292	96	40	4.5
2.		4,000	420	2,170	400	275	96	40	4.5
3.		1,060	380	1,760	380	260	105	40	4.5
4.		740	362	1,600	380	245	96	38	4.5
5.		500	362	1,600	362	230	96	35	3.2
6.		620	880	1,240	480	215	96	30	3.2
7.		740	580	1,120	400	215	96	30	3.2
8.		1,300	460	940	362	215	88	26	2.0
9.		1,000	420	830	328	200	88	22	2.0
10.		3,900	380	740	310	200	88	22	2.0
11.		7,640	345	700	310	186	80	16	2.0
12.		3,300	328	660	310	186	72	16	2.0
13.		1,300	310	660	740	186	65	14	2.0
14.		1,020	310	660	660	172	65	11	1.5
15.		740	310	740	660	172	58	11	1.5
16.	88	580	292	660	540	179	58	11	1.0
17.	620	520	21,100	660	460	186	65	11	2.0
18.	1,840	480	7,880	660	420	200	65	11	.8
19.	16,000	13,200	9,560	620	380	172	58	11	.5
20.	3,200	1,760	6,000	620	362	172	65	11	.5
21.	2,260	1,520	2,440	1,060	345	158	65	9	.5
22.	1,840	2,000	1,680	940	1,000	146	58	9	.5
23.	830	1,920	1,240	660	700	134	52	9	.5
24.	620	3,600	4,440	620	580	129	52	7.5	.4
25.	520	1,920	9,680	580	500	124	52	7.5	.2
26.	420	1,380	4,000	580	420	124	52	7.5	.1
27.	1,300	830	8,000	510	380	114	52	7.5	
28.	1,180	700	3,500	440	345	114	46	6	
29.	500	660	2,620		310	96	46	6	
30.	380	580	23,300		328	96	46	6	
31.		500	4,550		310		40		

NOTE.—No flow Oct. 1 to Nov. 15 and July 27 to Sept. 30. Gage not read Nov. 25, Dec. 6, 14, 26, Jan. 1, 2, 20, Feb. 27, Mar. 20, Apr. 16, 24, June 4, and July 3: discharge interpolated.

Monthly discharge of Putah Creek at Winters, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
November	16,000	0	1,050	62,500
December	13,200	245	1,940	119,000
January	23,300	292	3,760	231,000
February	3,000	440	965	53,600
March	1,000	310	448	27,500
April	292	96	180	10,700
May	105	40	69.6	4,280
June	40	6	17.4	1,040
July	4.5	0	1.60	98.4
The year	23,300	0	705	510,000

NOTE.—No flow during months for which no record is given.

EEL RIVER BASIN**EEL RIVER AT SCOTIA, CALIF.**

LOCATION.—In sec. 18, T. 1 N., R. 1 E., at Wildwood Bridge, half a mile north-east of Scotia, Humboldt County. Larabee Creek enters 14 miles above and Van Duzen River 7 miles below the station.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—December 15, 1910, to February 6, 1915; October 1, 1916, to September 30, 1921.

GAGE.—Staff gage in eight sections, read by Millard Barisdale. Section No. 1 is spiked to old cofferdam on northeast corner of footing of middle pier; No. 2 is painted on upstream and south corner of middle pier; No. 3 is painted on downstream and north face of footing of south pier; No. 4 is painted on vertical form brace at downstream end of south pier; No. 5 is painted on downstream face of south pier; No. 6 is painted on vertical post of first wooden bent of trestle; No. 7 is painted on vertical post of second bent of trestle; No. 8 painted on vertical post of third bent of trestle. Former gages at this station were destroyed when suspension bridge was built in 1914 and when it was destroyed in 1915. The original datum has not been maintained but the new datum probably does not differ more than a few tenths of a foot from the original.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading.

CHANNEL AND CONTROL.—Solid rock and gravel; fairly permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 38.2 feet at 7.20 a. m. November 19 (discharge, 148,000 second-feet); minimum discharge, 63 second-feet October 5.

1911-1921: Maximum stage recorded, 55.5 feet February 2, 1915 (discharge, from extension of rating curve, about 290,000 second-feet); minimum discharge, 40 second-feet, September 9-11, 1920.

DIVERSIONS.—None.

REGULATION.—None.

ACCURACY.—Stage-discharge relation at low water changed January 30. Rating curves fairly well defined. Gage read to hundredths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table. Records fair.

Discharge measurements of Eel River at Scotia, Calif., during the year ending Sept. 30, 1921

[Made by K. M. Kelley]

Date	Gage height	Discharge
	<i>Feet</i>	<i>Sec.-ft.</i>
Mar. 27.....	16.20	18,000
Aug. 7.....	8.88	124

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Daily discharge, in second-feet, of Eel River at Scotia, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	67	291	13, 100	26, 000	37, 500	11, 000	9, 150	3, 670	1, 300	350	137	102
2	67	250	52, 500	17, 700	28, 800	9, 510	8, 790	3, 670	1, 110	332	137	101
3	66	228	35, 500	16, 100	25, 600	9, 510	8, 430	3, 670	1, 110	315	135	101
4	66	214	30, 600	20, 100	23, 000	9, 510	7, 720	3, 160	1, 060	298	133	100
5	63	198	24, 300	30, 100	42, 000	9, 510	6, 350	3, 040	1, 110	280	128	99
6	110	186	19, 700	37, 500	35, 000	9, 870	6, 030	2, 920	1, 230	265	126	98
7	190	178	27, 000	28, 300	24, 700	9, 510	5, 400	2, 680	1, 230	250	124	97
8	278	170	27, 000	23, 000	20, 900	8, 790	5, 090	2, 570	1, 170	238	122	95
9	360	163	31, 500	16, 500	16, 100	8, 070	4, 790	2, 460	1, 110	212	121	95
10	390	163	62, 600	13, 100	15, 300	7, 370	4, 500	2, 360	1, 060	200	120	94
11	420	186	87, 000	11, 700	14, 600	6, 030	4, 220	2, 460	1, 000	188	119	94
12	560	450	67, 400	10, 200	13, 500	6, 030	4, 220	2, 680	1, 000	188	117	94
13	630	17, 700	39, 500	9, 510	13, 100	6, 350	4, 790	2, 680	950	175	116	93
14	560	10, 600	29, 200	9, 510	16, 900	8, 070	4, 500	2, 920	770	164	115	92
15	475	4, 790	21, 800	8, 790	20, 100	8, 070	3, 940	3, 160	660	154	113	92
16	400	11, 700	15, 300	8, 430	14, 200	6, 680	3, 410	3, 160	660	146	112	92
17	385	69, 800	12, 400	12, 400	12, 800	6, 030	3, 410	3, 160	630	146	112	91
18	500	130, 000	13, 500	32, 500	11, 700	6, 680	3, 410	2, 920	630	146	110	91
19	1, 580	138, 000	30, 100	26, 000	10, 200	9, 150	3, 160	2, 570	600	146	110	92
20	1, 750	69, 200	34, 500	23, 900	12, 400	8, 430	3, 160	2, 360	570	146	108	92
21	1, 230	33, 500	27, 000	22, 200	76, 000	9, 870	3, 160	3, 040	540	146	108	93
22	1, 000	42, 600	45, 400	16, 900	44, 800	23, 400	3, 160	3, 670	540	146	108	94
23	850	31, 500	34, 500	13, 800	29, 600	23, 400	3, 670	3, 040	512	146	107	94
24	670	18, 100	57, 200	16, 900	20, 500	36, 500	3, 160	2, 680	512	146	106	94
25	595	13, 800	42, 000	31, 500	16, 900	34, 500	3, 160	2, 570	485	137	106	97
26	560	33, 000	29, 200	29, 200	15, 000	23, 400	3, 160	2, 570	460	137	105	99
27	500	88, 300	23, 900	38, 000	12, 400	18, 100	3, 040	2, 460	435	137	105	101
28	450	38, 500	17, 700	38, 500	12, 000	12, 400	3, 040	2, 460	435	137	104	102
29	400	23, 400	15, 500	32, 500	-----	11, 700	3, 670	2, 360	390	137	104	103
30	380	15, 700	20, 900	102, 000	-----	9, 510	3, 410	2, 140	370	137	103	103
31	340	-----	39, 000	52, 000	-----	9, 510	-----	1, 840	-----	137	102	-----

Monthly discharge of Eel River at Scotia, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	1, 750	63	513	31, 500
November	138, 000	163	26, 400	1, 570, 000
December	87, 000	12, 400	33, 100	2, 040, 000
January	102, 000	8, 430	25, 000	1, 540, 000
February	76, 000	10, 200	22, 700	1, 260, 000
March	36, 500	6, 030	12, 100	744, 000
April	9, 150	3, 040	4, 570	272, 000
May	3, 670	1, 840	2, 810	173, 000
June	1, 300	370	788	46, 900
July	350	137	190	11, 700
August	137	102	115	7, 070
September	103	91	96. 2	5, 720
The year	138, 000	63	10, 600	7, 700, 000

MIDDLE FORK OF EEL RIVER NEAR COVELO, CALIF.

LOCATION.—In E. $\frac{1}{2}$ sec. 36, T. 23 N., R. 12 W., near Covelo ranger station, 6 miles east of Covelo, Mendocino County. Williams Creek enters half a mile above station.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—August 22, 1911, to September 30, 1921 (incomplete).

GAGE.—Staff in two sections on left bank, about one-fourth mile west of ranger station and 1 mile below bridge; read by forest rangers. Several changes in sections have been made but original location and datum have been maintained.

DISCHARGE MEASUREMENTS.—Made from cable 300 feet above gage or by wading.

CHANNEL AND CONTROL.—Small boulders and gravel; fairly permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 21.3 feet at 8 a. m. November 18 (discharge, 18,600 second-feet); minimum stage, 7.4 feet October 1-2 and September 24-27 (discharge, 7.5 second-feet).

1911-1921: Maximum stage recorded between 30 and 31 feet at 4.30 p. m. December 31, 1913 (discharge, between 41,500 and 47,100 second-feet). Water overtopped gage and washed out high-water section. Minimum stage, 6.9 feet at 8 a. m. September 12, 1915 (discharge, 2.5 second-feet).

DIVERSIONS.—None.

REGULATION.—None.

ACCURACY.—Stage-discharge relation not changed during year. Rating curve fairly well defined below 8,000 second-feet and extended above. Gage read to half-tenths once daily but irregularly. Daily discharge ascertained by applying gage height to rating table and estimating on days of no gage-height record by comparison with flow of Eel River at Scotia. Record fair.

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

Discharge measurements of Middle Fork of Eel River near Covelo, Calif., during the year ending Sept. 30, 1921

[Made by K. M. Kelley]

Date	Gage height	Dis-charge
Mar. 25.....	Feet 12.61	Sec.-ft. 2,720
Aug. 5.....	7.72	17

Daily discharge in second-feet, of Middle Fork of Eel River near Covelo, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	7.5	28	4,800	5,790	2,970	1,870	2,280	1,370	1,020		29	13
2.....	7.5	28	3,090	4,990	2,730	1,680	2,610	1,260	1,020		26	13
3.....	10	28	1,970	4,190	2,350	2,070	2,170	1,340	920		23	12
4.....	13	20	1,870	3,760	1,970	1,970	1,590	1,180	834		20	12
5.....	16	24	1,920	7,370	2,280	2,410	1,340	1,220	747		17	12
6.....	24	20	1,970	4,040	1,850	2,850	1,420	1,260	660		20	12
7.....	22	20	2,070	4,040	1,420	2,500	1,180	1,180	573		24	11
8.....	22	20	1,340	4,040	1,500	2,500	1,260	1,100	510		28	10
9.....	25	20	2,500	1,770	1,870	2,170	1,180	1,100	446	100	26	10
10.....	28	20	10,000	1,590	2,610	1,870	1,020	1,160	392		25	10
11.....	40	20	2,280	1,340	2,850	1,680	1,020	1,220	337		24	9.5
12.....	70	2,500	2,180	1,340	2,610	1,590	1,020	1,280	337		23	9
13.....	70	2,970	2,070	1,260	2,500	1,870	937	1,340	318		22	8.5
14.....	48	1,890	1,770	1,180	2,850	2,070	855	1,420	310		21	8.5
15.....	40	818	1,500	1,100	2,280	1,590	772	1,500	301		20	8.5
16.....	33	2,280	1,420	2,130	1,870	1,420	690	1,590	292		20	8.5
17.....	24	10,200	1,590	3,160	1,590	2,730	754	1,590	283		20	8.5
18.....	90	18,600	2,070	4,190	1,420	2,280	818	1,680	266	58	20	12
19.....	155	12,800	2,170	2,070	2,610	1,770	818	1,590	266	58	19	16
20.....	182	5,620	2,170	2,070	5,620	1,590	1,260	1,500	254	58	19	12
21.....	208	5,060	1,680	3,220	5,960	1,970	1,310		242	53	18	10
22.....	235	4,490	2,500	2,390	2,500	1,680	1,360		229	48	18	10
23.....	155	2,850	2,850	2,070	2,560	1,420	1,400		216	48	18	8.5
24.....	266		8,470	1,590	2,610	3,090	1,450		204	48	18	7.5
25.....	179		6,400	1,590	2,280	2,500	1,500		192	48	18	7.5
26.....	83		4,300	1,770	1,870	1,870	1,590	1,260	179	44	16	7.5
27.....	76		2,280	1,870	2,070	1,590	1,640		167	44	16	7.5
28.....	70		2,500	1,970	1,970	1,590	1,680		155	42	15	7.5
29.....	48		3,480	2,530		1,680	1,590		134	40	15	7.5
30.....	40		14,400	3,090		1,770	1,480		155	36	14	7.5
31.....	33		9,420	1,970		2,170				32	14	

NOTE.—Gage not read Oct. 3, 4, 9, 18, 20, 21, 27, 30, Nov. 2, 7, 8, 11, 14, 21, 24-30, Dec. 5, 10, 12, 25, 26, Jan. 2, 7, 16, 17, 27, 29, Feb. 3, 8, 23, 28, Mar. 5, Apr. 13-15, 17, 21-24, 28, 30, May 1, 5, 7, 10-12, 15, 19, 21-31, June 4-6, 8, 10, 14-16, 20-25, 27, July 1-16, 18, 21, 24, 28, 30, 31, Aug. 1-4, 6, 7, 9-12, 14, 19, 20, 23, 24, 27-31, Sept. 1, 3, 7, 11, 12, 18, 23, and 28-30. Discharge estimated by comparison with records of flow of Eel River at Scotia.

Monthly discharge of Middle Fork of Eel River near Covelo, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	266	7.5	74.8	4,600
November.....	18,600	20	3,280	195,000
December.....	14,400	1,340	3,520	216,000
January.....	7,370	1,100	2,760	170,000
February.....	5,960	1,420	2,480	138,000
March.....	3,090	1,420	1,990	122,000
April.....	2,610	690	1,330	79,100
May.....			1,310	80,600
June.....	1,020	134	399	23,700
July.....		32	74.7	4,590
August.....	29	14	20.2	1,240
September.....	16	7.5	9.90	589
The year.....	18,600	7.5	1,430	1,040,000

KLAMATH RIVER BASIN

WILLIAMSON RIVER NEAR SILVER LAKE, OREG.

LOCATION.—In sec. 14, T. 30 S., R. 10 E., at Beckley ranch, 1 mile east of road from Klamath Falls to Silver Lake and 42 miles from Silver Lake. Station is in Klamath County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—1917 to 1921, portion of each irrigation season.

GAGE.—Vertical staff on south abutment of wagon bridge. Gage reader T. C. Hamilton.

DISCHARGE MEASUREMENTS.—Made from foot log about 200 feet above gage; current sluggish; conditions fairly good.

CHANNEL AND CONTROL.—Stream bed of firm sand and clay, covered during summer with growths of aquatic plants; no defined control.

EXTREMES OF DISCHARGE. Maximum stage recorded, 2.92 feet May 18 (discharge 200 second-feet) minimum discharge 51 second-feet at time of measurement, August 31 (gage height, 1.30 feet).

DIVERSIONS.—A few hundred acres are irrigated from Williamson River and tributaries above station.

REGULATION.—None.

ACCURACY.—Stage-discharge relation unstable owing to growth of aquatic plants. Fairly well defined rating curve used, April 10–30; shifting-control method May to June 30. Gage read to hundredths once daily. Daily discharge obtained by applying daily gage reading to rating table. Records fair.

Discharge measurements of Williamson River near Silver Lake, Oreg., during the year ending Sept. 30, 1921

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. 1	Wendell Dawson.....	0.95	52	June 13	Wendell Dawson.....	2.34	114
Apr. 9	do.....	1.40	91	25	J. W. Bones.....	2.20	99
26	do.....	1.96	131	Aug. 31	Wendell Dawson.....	1.30	51

Daily discharge, in second-feet, of Williamson River near Silver Lake, Oreg., for the period Apr. 10 to June 30, 1921

Day	Apr.	May	June	Day	Apr.	May	June	Day	Apr.	May	June
1		141	137	11	96	140	128	21	144	181	100
2		146	129	12	104	146	110	22	153	159	100
3		145	167	13	107	145	110	23	144	149	98
4		140	154	14	110	143	104	24	135	140	98
5		140	151	15	110	146	103	25	135	138	100
6		133	138	16	110	149	103	26	132	143	98
7		133	136	17	111	159	103	27	124	142	93
8			130	18	116	200	103	28	124	140	92
9		140	129	19	124	198	102	29	130	141	91
10	96		129	20	125	184	102	30	132	139	91
								31		138	

NOTE.—Gage not read May 8-11; discharge estimated.

Monthly discharge of Williamson River near Silver Lake, Oreg., for the period Apr. 10 to June 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
April 10-30	153	96	122	5,080
May	200	133	149	9,160
June	167	91	114	6,780

WILLIAMSON RIVER ABOVE SPRING CREEK, NEAR KLAMATH AGENCY, OREG.

LOCATION.—In sec. 2, T. 34 S., R. 7 E., 8 miles north of Chiloquin, 2 miles above Spring Creek, and 6 miles northeast of Klamath Agency, Klamath County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—November 9, 1917, to September 30, 1919, and May 23, 1920, to September 30, 1921. Stations maintained at Rocky Ford in sec. 1, T. 33 S., R. 7 E., March 26, 1908, to June 30, 1910, and 5 miles above Spring Creek, May 1, 1912, to September 30, 1913, give practically the same record, except for an inflow of a few second-feet from springs below Rocky Ford.

GAGE.—Stevens continuous recorder on left bank. Inspected by Mrs. Anna McKeever. Temporary gage at Kirk sawmill about 6 miles upstream, read October 29, 1918, to March 31, 1919.

DISCHARGE MEASUREMENTS.—Made from cable 25 feet below gage, or by wading at same section.

CHANNEL AND CONTROL.—Bed composed of sand and gravel, practically permanent; one channel at all stages. Control is riffle 200 feet below gage. Stage-discharge relation is probably affected by growth of aquatic plants. No definite control at temporary gage.

EXTREMES OF DISCHARGE.—Minimum stage from water-stage recorder —0.12 foot, September 15 to 18 (discharge, 16 second-feet). No record of maximum.

1917-1921: Maximum stage from water-stage recorder 3.84 feet, April 13, 1919 (discharge, 1,220 second-feet). The flood of 1917, about April 27 or 28, reached a stage of 5.65 feet, as determined by leveling to high-water marks (discharge, estimated by extension of rating curve 2,500 second-feet).

Minimum stage recorded, —0.19 foot July 26, 1920 (discharge, 15 second-feet).

ICE.—Ice practically never forms at the station.

DIVERSIONS.—A large area of Klamath Marsh and adjoining lands are irrigated by natural flooding, and smaller areas by ditches.

RELATION.—None.

ACCURACY.—Stage-discharge relation changed slightly during high-water period.

The date of change has been taken arbitrarily as December 1. Two well defined rating curves used. Water-stage recorder operated in satisfactory manner October 29 to January 6, March 27 to July 14, and August 27 to September 30. Daily discharge obtained by applying to rating table mean daily gage height obtained by inspecting recorder graph. Records good except estimates for periods when recorder was not operating which are fair.

Discharge measurements of Williamson River above Spring Creek, near Klamath Agency, Oreg., during the year ending Sept. 30, 1921

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	Wendell Dawson	0.02	25.7	June 10	Wendell Dawson	0.78	151
Apr. 9	do	1.80	495	25	J. W. Bones	.50	94
14	do	1.66	396	Aug. 31	Wendell Dawson	.60	23.3
26	do	1.25	265	Sept. 29	K. N. Phillips	.01	21.6
29	do	1.14	229				

Daily discharge, in second-feet, of Williamson River above Spring Creek, near Klamath Agency, Oreg., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1		27	154	110			575	235	195	73		23
2		27	131	118			555	235	187	68		23
3		29	142	140			555	235	184	64		23
4		29	142	164			515	232	184	61		23
5		29	138	169			507	230	179	58		23
6		30	131	235			487	230	176	51		21
7		29	127				459	220	166	50		21
8		29	102				467	220	164	47		21
9		31	114				475	192	156	47		21
10		32	102	250			463	190	154	45		20
11	28	35	77				456	179	142	44		18
12		36	70				436	184	138	37		18
13		38	64	264			428	179	131	36		16
14		40	64			900	413	174	120	36	26	16
15		49	64		120		398	164	120			16
16		63	62				391	154	116			16
17		89	61				394	162	114			16
18		116	60				376	179	110			16
19		127	60				376	179	110			17
20		145	60				327	182	108			17
21		145	58				334	192	106			17
22	31	142	52	150			330	206	106			17
23		145	52				305	206	104	32		17
24		145	50				308	206	99			17
25		145	45				301	206	95			17
26		136	44				280	198	91			18
27		147	50			675	267	195	91		24	19
28		154	33			675	259	201	86		24	22
29	25	154	33			635	247	195	77		24	23
30		25	154	50		635	250	201	75		24	24
31	27		84			615		201			24	

NOTE.—Braced figures showing mean discharge for periods indicated estimated by comparison with records for Williamson River below Sprague River and Sprague River near Chiloquin.

Monthly discharge of Williamson River above Spring Creek, near Klamath Agency, Oreg., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....			27.6	1,700
November.....	154	27	83.2	4,950
December.....	154	33	79.9	4,910
January.....			122	7,500
February.....			^a 100	5,560
March.....			859	52,800
April.....	575	247	398	23,700
May.....	235	154	199	12,200
June.....	195	75	129	7,680
July.....	73		40.7	2,500
August.....		24	25.7	1,580
September.....	24	16	19.2	1,140
The year.....		16	174	126,000

^a Estimated.

WILLIAMSON RIVER BELOW SPRAGUE RIVER, NEAR CHILOQUIN, OREG.

LOCATION.—In sec. 3, T. 35 S., R. 7 E., one-fourth mile below mouth of Sprague River and three-fourths mile southwest of Chiloquin, Klamath County.

DRAINAGE AREA.—2,810 square miles.

RECORDS AVAILABLE.—June 25, 1917, to September 30, 1921. The sum of discharge records at stations on Williamson and Sprague rivers above their junction is directly comparable with these records.

GAGE.—Friez water-stage recorder on left bank with inside hook and outside staff gage.

DISCHARGE MEASUREMENTS.—Made from cable at gage.

CHANNEL AND CONTROL.—Rocky ledge and boulders; probably permanent. Current somewhat uneven.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 3.42 feet at noon March 13 (discharge, 3,260 second-feet); minimum stage from water-stage recorder, 0.35 foot at 6 a. m. October 14, very uncertain as drum of recorder slipped (discharge estimated as sum of Williamson River above Spring Creek, 320 second-feet).

1911–1921: Maximum discharge obtained by adding results obtained at stations above junction, about 7,000 second-feet April 27, 1917; Williamson River estimated from high-water mark as 2,500 second-feet. Minimum stage recorded that of 1921.

ICE.—Stage-discharge relation affected by ice, during extremely cold winters.

DIVERSIONS.—Modoc Point canal diverts past the station. Large areas of land are irrigated from the river and its tributaries.

ACCURACY.—Stage-discharge relation practically permanent. Affected by ice in January and February and by logs on control September 17–30. Well-defined rating curves used October 1 to September 16 and September 17–30. Gage-height record good except for January and February and short periods at other times. Daily discharge ascertained by applying to rating table mean daily gage height obtained by inspecting recorder graphs. Records good except for periods when recorder was stopped or stage-discharge relation affected by ice, for which they are fair.

Discharge measurements of Williamson River below Sprague River, near Chiloquin, Oreg., during the year ending Sept. 30, 1921

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. 30	R. C. Briggs	0.87	580	June 11	J. W. Bones	1.99	1,590
Apr. 7	Ted Cole ^a	2.52	2,240	24	do	1.34	930
10	Wendell Dawson	2.46	2,080	Aug. 27	Wendell Dawson	.65	432
13	do	2.38	2,100	Sept. 8	Ted Cole	.93	639
19	Ted Cole	2.70	2,310	29	K. N. Phillips	.78	470
29	Wendell Dawson	2.32	1,860				

^a Engineer U. S. Bureau of Reclamation.

Daily discharge, in second-feet, of Williamson River below Sprague River, near Chiloquin, Oreg., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.		
1.	542	500	900	830	800	1,620	2,160	1,920	2,040	893	634	500		
2.	562			902		1,740	2,160	1,860	2,040	893	536	500		
3.	607			1,040		1,920		1,920	1,980	814	634	500		
4.	549			893		2,100		1,920	1,980	740	600			
5.	549			885		1,220	846	2,280	2,160	1,980	1,860	705	524	
6.	555	506	875	1,220	800	2,400		2,040	1,860	705	600	525		
7.	555	476	800	800		2,530	2,160	2,160	1,800	740	524			
8.	555	506				2,720	2,130	2,040	1,680	740	512		562	
9.	530	2,920				2,100	1,920	1,680	697	568	562			
10.	395	3,070				2,100	1,920	1,740	697	524	562			
11.	405	600	726	850	1,030	3,070	2,100	1,920	1,570	683	579	562		
12.	385					3,230	2,040	1,800	1,520	719	518	568		
13.	334					733	3,230	2,040	1,860	1,470	719	600	562	
14.	356					777	3,230	2,130	1,920	1,420	683	600	607	
15.	375					740	700	3,230	2,220	1,920	1,370	669	607	599
16.	448	800	740	850	1,050	3,070	2,530	1,920	1,270	669	634	621		
17.	518					3,070	2,530	1,980	1,150	634	607	680		
18.	494					3,070	2,400	2,040	1,020	676	634	580		
19.	506					3,070	2,340	2,100	1,020	634	634	597		
20.	518	919	747			3,070	2,280	2,220	996		690	597		
21.	590	885	733	850	1,050	3,070	2,220	2,340	978	650	614	610		
22.	680	987	726			3,230	2,070	2,400	961					
23.	770	987	762			3,070	1,920	2,400	927				669	638
24.	740	1,010	784			3,070	1,790	2,340	910				579	680
25.	726	987	814			2,900	1,860	2,280	910		579	525		
26.	792	966	814	850	1,370	2,720	1,860	2,220	927	579	512	576		
27.	740	944	830			1,420	2,530	1,860	2,220				893	
28.	726	935	822			1,520	2,400	1,860	2,220				902	
29.	740	935	814				2,340	1,920	2,160				902	
30.	600	935	814				2,220	1,980	2,100		902	579	500	473
31.	600		814			2,160		2,100		549		473		

NOTE.—Stage-discharge relation affected by ice Jan. 7 to Feb. 25. Recorder not working properly Oct. 21, 22, Nov. 1-5, 9-12, 16-19, 26, 30, Dec. 1-3, 7-10, 12-17, Mar. 25, Apr. 3-6, 8, 14, 22, 24, July 20-22, 26-29, Aug. 22-26, 28-31, Sept. 1, 2, 4-7, 9, 25-28, and Sept. 30. Discharge estimated by comparison with records for Sprague River and Williamson River above Spring Creek and study of weather records and observer's notes.

Monthly discharge of Williamson River below Sprague River, near Chiloquin, Oreg., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	792	334	563	34,600
November	1,010	476	744	44,300
December			788	48,500
January	1,220		890	54,700
February	1,520		1,010	56,100
March	3,230	1,620	2,720	167,000
April	2,530	1,790	2,110	126,000
May	2,400	1,800	2,070	127,000
June	2,040	893	1,360	80,900
July	893	549	675	41,500
August	690		565	34,700
September	680	473	568	33,800
The year	3,230	334	1,170	849,000

UPPER KLAMATH LAKE NEAR KLAMATH FALLS, OREG.

LOCATION.—In sec. 30, T. 38 S., R. 9 E., at outlet of Upper Klamath Lake, 2 miles northwest of Klamath Falls, Klamath County.

RECORDS AVAILABLE.—May 28, 1904, to September 30, 1921.

GAGE.—Friez water-stage recorder February 16, 1906, to June 16, 1918; vertical staff read about once a week to September 30, 1920, and daily since that date. Zero on gage is 4,136.13 feet above sea level. Gage readings 1918 to 1921, reduced to a datum of 4,100 feet. During 1904 and 1905, vertical staff on Pelican Bay; zero 4,137.78 feet above sea level (United States Bureau of Reclamation datum) as determined by E. C. LaRue on June, 1920.

EXTREMES OF STAGE.—Maximum stage recorded during year, 42.85 feet April 4; minimum stage recorded, 39.33 feet October 5.

1904-1921: Maximum stage, 4.144.98 feet (United States Bureau of Reclamation datum) about April 20, 1904, determined from high-water marks May 28, 1904; minimum stage recorded that of 1921.

FLUCTUATION.—Gage heights very much affected by wind. Water is lowered near outlet when wind blows from south and is raised as much above its normal level when wind is in opposite direction. There is a periodic oscillation when wind blows for any length of time.

REGULATION.—Water stored by a temporary dam at outlet of lake, beginning April 15, 1919.

COOPERATION.—Record for 1921 furnished by California-Oregon Power Co. and United States Bureau of Reclamation.

Daily gage height, in feet, of Upper Klamath Lake near Klamath Falls, Oreg., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	40.22	40.77	41.11	41.63	41.62	41.83	42.32	41.03	41.67	41.10	40.60	40.18
2.....	40.26	40.67	41.37	41.67	41.58	41.81	42.27	41.68	41.66	41.16	40.46	40.14
3.....	40.25	40.89	41.22	41.69	41.62	41.81	42.47	41.85	41.73	41.13	40.44	40.23
4.....	40.34	40.79	41.44	41.71	41.37	41.81	42.85	41.03	41.63	40.97	40.39	40.32
5.....	39.33	40.83	41.32	41.83	41.85	41.73	42.30	41.92	41.65	40.92	40.48	40.24
6.....	40.53	40.79	41.32	41.86	41.61	41.80	42.19	42.13	41.64	40.93	40.45	40.23
7.....	40.23	40.80	41.36	41.91	41.60	41.81	42.17	41.85	40.85	40.85	40.35	40.26
8.....	40.31	40.78	41.28	41.91	41.60	42.01	42.18	41.81	41.64	40.88	40.34	40.33
9.....	40.46	40.79	40.13	41.91	41.53	41.87	42.04	41.75	41.56	41.11	40.42	40.28
10.....	40.40	40.79	41.23	41.91	41.56	41.91	42.26	41.73	41.53	40.88	40.34	40.33
11.....	40.42	40.75	41.52	41.91	41.57	41.82	42.13	-----	41.55	40.93	40.31	40.29
12.....	40.45	40.73	41.37	41.91	41.53	41.91	41.94	-----	41.51	40.82	40.32	40.41
13.....	40.52	40.74	41.51	41.91	41.53	42.01	42.16	41.81	41.34	40.81	40.22	40.34
14.....	40.28	40.79	41.45	41.91	41.93	42.09	42.06	41.84	41.60	40.83	40.22	40.31
15.....	40.63	40.47	41.43	41.82	41.73	41.96	41.95	41.75	41.56	40.81	40.23	40.32
16.....	40.40	40.73	41.43	41.80	41.63	41.91	41.95	41.08	41.51	40.79	40.23	40.24
17.....	40.33	40.95	41.43	41.79	41.73	42.11	41.97	41.85	41.35	40.93	40.22	40.19
18.....	40.43	40.79	41.43	41.83	41.65	42.13	41.90	41.63	41.30	40.64	40.36	40.08
19.....	40.63	41.03	41.58	41.85	41.63	42.35	41.91	41.71	41.35	40.62	40.32	40.53
20.....	40.63	41.04	41.53	41.81	41.55	42.15	42.15	41.67	41.31	40.70	40.13	40.21
21.....	40.62	40.79	41.53	41.81	41.91	41.93	41.97	41.93	41.24	40.69	40.16	40.12
22.....	40.61	40.79	41.53	41.81	41.83	42.10	42.05	41.91	41.44	40.55	40.22	40.13
23.....	40.70	41.15	41.55	41.73	41.82	41.95	42.18	41.83	41.22	40.62	40.11	40.32
24.....	40.63	41.15	41.59	41.71	41.83	42.24	42.35	41.73	41.15	40.52	40.32	40.31
25.....	40.70	40.97	41.60	41.68	41.82	42.33	41.97	41.73	41.19	40.55	40.24	40.32
26.....	40.71	41.07	41.61	41.61	41.83	42.42	41.97	41.71	41.13	40.73	40.23	40.32
27.....	40.73	41.39	41.61	41.67	41.83	42.43	41.93	41.99	41.43	40.54	40.24	40.33
28.....	40.75	41.33	41.62	41.67	41.73	42.33	41.91	41.81	41.09	40.53	40.28	40.31
29.....	41.16	41.22	41.61	41.47	-----	42.35	42.23	41.71	40.88	40.52	40.28	40.49
30.....	41.01	41.32	41.68	41.63	-----	42.51	41.80	41.89	41.03	40.56	40.23	40.30
31.....	40.90	-----	41.68	41.61	-----	42.31	-----	41.56	-----	40.52	40.11	-----

° Average of two readings a day. Gage not read May 11, 12, and June 7.

LINK RIVER AT KLAMATH FALLS, OREG.

LOCATION.—In NW. $\frac{1}{4}$ sec. 32, T. 38 S., R. 9 E., one-quarter mile above county bridge over Link River, $1\frac{1}{4}$ miles below outlet of Upper Klamath Lake, and immediately above head of Lake Ewauna at Klamath Falls, Klamath County.

DRAINAGE AREA.—3,110 square miles.

RECORDS AVAILABLE.—May 15, 1904, to September 30, 1921.

GAGE.—Friez water-stage recorder on left bank; elevation of zero is 4,080.0 feet above sea level. Friez recorder on opposite bank and a little farther upstream was used June 6, 1908, to August 30, 1912: Chain gage on bridge used 1904 to 1908. Gage reader, Marie Talbot.

DISCHARGE MEASUREMENTS.—Made from bridge; section deep, current sluggish at low water.

CHANNEL AND CONTROL.—Bed composed of mud and sand with rock and boulder rapids. Rock and boulder riffle a short distance below gage affords fairly permanent control. Stage-discharge relation at chain gage is affected by backwater from Lake Ewauna and wind.

Water from the tailrace of the California-Oregon Power Co.'s plant, which enters the river opposite gage appears to affect stage the same as if it came down river channel.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 8.30 feet at 3 p. m. April 4 (discharge, 5,000 second-feet); minimum stage during year from recorder, 4.67 feet August 13 (discharge, 366 second-feet).

1904-1921: Maximum stage, 7.30 feet at gage at bridge May 12, 1904, determined May 15, 1904, from high-water marks (discharge, 9,400 second-feet); minimum stage, 4.07 feet, August 30, 1918, determined by leveling (discharge estimated at 22 second-feet).

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

DIVERSIONS.—The main or A canal of the Klamath project of the United States Bureau of Reclamation diverts water from Link River immediately below Upper Klamath Lake. Record is kept of this diversion. (See pp. 284-285.) Some water is also diverted for irrigation from the tributaries to Upper Klamath Lake, but the total run-off is as yet only slightly affected.

REGULATION.—Water stored in Upper Klamath Lake by a temporary dam beginning April 15, 1919. Marked natural fluctuations are caused by effect of wind on Upper Klamath Lake.

ACCURACY.—Stage-discharge relation changing during year. Rating curves and periods of application poorly defined. Operation of recorder not satisfactory because observer did not read staff gage but recorded position of pencil on graph; recorder graphs corrected by daily staff gage reading made by an employee of the California-Oregon Power Co. Discharge determined by applying corrected mean gage heights from graph, or daily staff gage reading, when recorder was not operating, to rating tables, and method of shifting channel January 13 to April 27. Records fair.

COOPERATION.—Most of field data furnished by United States Bureau of Reclamation, H. D. Newell, project manager.

Discharge measurements of Link River at Klamath Falls, Oreg., during the year ending Sept. 30, 1921

[Made by Ted Cole, U. S. Bureau of Reclamation]

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>
Mar. 18.....	7.42	3,800	Apr. 6.....	7.60	3,820	Apr. 16.....	7.30	3,240
28.....	7.70	4,260	9.....	7.48	3,380	(*).....	7.15	3,610
Apr. 2.....	7.62	3,860	13.....	7.45	3,760	May 5.....	7.00	3,310

* Date uncertain, probably about Apr. 30.

Daily discharge, in second-feet, of Link River at Klamath Falls, Oreg., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	765	1,060	1,480	2,280	2,880	3,190	3,820	3,320	2,840	1,790	525	525
2.....	855	1,000	1,610	2,280	2,880	3,190	4,140	3,320	2,680	1,790	525	570
3.....	810	1,000	1,610	2,580	3,030	3,190	4,470	3,320	2,840	1,650	525	543
4.....	855	1,000	1,740	2,580	3,030	3,190	4,470	3,320	2,840	1,580	525	570
5.....	675	1,000	1,610	2,730	2,880	3,350	4,140	3,480	2,840	1,510	525	543
6.....	765	1,060	1,540	2,880	2,880	3,190	3,820	3,640	2,680	1,510	480	570
7.....	765	1,000	1,610	3,190	2,880	3,500	3,660	3,480	2,840	1,440	435	586
8.....	720	1,000	1,610	3,190	2,880	3,500	3,500	3,320	2,680	1,440	480	626
9.....	855	1,000	1,480	3,190	2,880	3,350	3,350	3,320	2,680	1,510	480	570
10.....	810	1,000	1,540	3,190	2,880	3,500	3,500	3,160	2,520	1,260	480	594
11.....	765	1,000	1,680	3,350	2,730	3,500	3,500	3,000	2,370	1,320	435	570
12.....	950	1,000	1,610	3,500	2,730	3,820	3,500	3,000	2,370	1,140	435	570
13.....	950	1,000	1,610	3,500	3,190	3,820	3,820	3,000	2,370	1,080	660	578
14.....	855	1,000	1,610	3,500	3,190	3,820	3,660	3,320	2,220	1,080	390	610
15.....	950	950	1,610	3,350	3,030	3,820	3,500	3,160	2,220	1,030	390	594
16.....	855	950	1,610	3,500	3,190	3,980	3,190	3,160	2,070	980	480	570
17.....	810	1,170	1,610	3,350	3,190	4,140	3,190	3,320	2,070	980	480	561
18.....	810	1,230	1,680	3,350	3,190	3,660	3,190	3,160	1,930	980	507	453
19.....	950	1,350	1,680	3,500	3,190	3,980	3,190	3,000	1,930	740	578	1,030
20.....	950	1,350	1,680	3,500	3,500	3,660	3,500	3,000	2,070	785	453	880
21.....	950	1,230	1,680	3,500	3,500	3,500	3,500	3,000	1,930	740	480	1,030
22.....	950	1,350	1,680	3,500	3,500	3,500	3,500	3,000	2,070	740	489	930
23.....	950	1,420	1,680	3,350	3,500	3,820	3,660	3,000	1,930	740	480	1,030
24.....	950	1,420	1,740	3,190	3,500	3,980	3,820	3,000	1,790	695	516	1,030
25.....	950	1,480	1,740	3,190	3,500	4,640	3,820	3,000	1,790	650	570	1,030
26.....	950	1,540	1,740	3,190	3,500	4,300	3,500	3,160	1,650	610	534	980
27.....	1,000	1,540	1,740	3,190	3,500	4,300	3,500	3,320	1,790	610	516	1,030
28.....	1,000	1,540	1,740	3,190	3,500	4,300	3,640	3,160	1,720	570	525	1,140
29.....	1,060	1,540	1,740	2,880	-----	4,140	3,640	3,000	1,720	570	525	1,080
30.....	1,060	1,480	1,740	3,030	-----	4,140	3,320	3,160	1,720	570	525	1,030
31.....	1,110	-----	1,870	2,880	-----	3,980	-----	2,840	-----	570	525	-----

Monthly discharge of Link River at Klamath Falls, Oreg., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	1,110	675	892	54,800
November.....	1,540	950	1,190	70,800
December.....	1,870	1,480	1,650	101,000
January.....	3,500	2,280	3,150	194,000
February.....	3,500	2,730	3,150	175,000
March.....	4,640	3,190	3,740	230,000
April.....	4,470	3,190	3,630	216,000
May.....	3,640	2,840	3,180	196,000
June.....	2,840	1,650	2,240	133,000
July.....	1,790	570	1,050	64,600
August.....	570	366	490	30,100
September.....	1,140	453	747	44,400
The year.....	4,640	366	2,090	1,510,000

Combined daily discharge, in second-feet, of Link River and A canal at Klamath Falls, Oreg., for the year ending Sept. 30, 1921

Day	May	June	July	Aug.	Sept.	Day	May	June	July	Aug.	Sept.
1	3,350	3,180	2,260	1,160	679	16	3,460	2,660	1,270	848	644
2	3,350	3,060	2,210	1,160	716	17	3,580	2,650	1,230	848	603
3	3,340	3,220	2,020	1,180	685	18	3,400	2,490	1,090	801	479
4	3,340	3,220	1,860	1,180	706	19	3,240	2,470	1,030	804	1,060
5	3,500	3,220	1,810	1,180	673	20	3,210	2,570	1,140	679	904
6	3,670	2,860	1,760	1,160	698	21	3,200	2,390	1,150	706	1,060
7	3,550	3,290	1,620	1,100	724	22	3,190	2,560	1,210	715	968
8	3,390	3,180	1,660	1,160	772	23	3,190	2,470	1,160	685	1,070
9	3,400	3,210	1,690	1,120	701	24	3,180	2,280	1,110	707	1,070
10	3,270	3,070	1,660	1,080	720	25	3,180	2,280	1,110	757	1,070
11	3,140	2,930	1,760	999	683	26	3,360	2,140	1,130	714	1,010
12	3,180	2,870	1,560	987	679	27	3,520	2,170	1,140	697	1,060
13	3,230	2,920	1,480	870	687	28	3,450	2,180	1,120	706	1,170
14	3,570	2,900	1,460	894	719	29	3,330	2,190	1,150	698	1,110
15	3,440	2,830	1,410	826	703	30	3,430	2,200	1,180	692	1,040
						31	3,110		1,180	687	

NOTE.—No water turned into canal from Oct. 1 to May 1. Combined flow for this period is flow of Link River, p. 267.

Combined monthly discharge of Link River and A canal near Klamath Falls, Oreg., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	1,110	675	892	54,800
November	1,540	950	1,180	70,800
December	1,870	1,480	1,650	101,000
January	3,500	2,280	3,150	194,000
February	3,500	2,730	3,150	175,000
March	4,640	3,190	3,740	230,000
April	4,470	3,190	3,630	216,000
May	3,670	3,110	3,350	206,000
June	3,290	2,140	2,720	162,000
July	2,260	1,030	1,440	88,500
August	1,180	679	897	55,200
September	1,170	479	829	49,300
The year	4,640	479	2,210	1,600,000

KLAMATH RIVER AT SPENCER BRIDGE, NEAR KENO, OREG.

LOCATION.—In sec. 32, T. 39 S., R. 7 E., at highway bridge 1 mile below Spencer Creek, 6 miles below former station at Keno, and 18 miles west, on road to Ashland, from Klamath Falls, Klamath County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—October 7, 1913, to September, 30, 1921. Records at Keno, May 31, 1904, to December 31, 1913, give results smaller by the relatively small flow contributed by Spencer Creek.

GAGE.—Vertical staff near upstream end of first concrete pier at east end of bridge. Gage reader Mrs. Roy F. Beck. Datum lowered 1.0 foot June 21, 1918, and 0.56 foot July 16, 1921.

DISCHARGE MEASUREMENTS.—Made from upstream side of wagon bridge, or by wading at low water just above bridge.

CHANNEL AND CONTROL.—Heavy gravel and boulders; practically permanent; bed even.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 3.32 feet March 24 (discharge, 4,270 second-feet); minimum stage recorded, 1.28 foot August 11, new datum (discharge, 640 second-feet). The true maximum was probably about 4,700 second-feet, estimated April 4 and 5 from records at Copco.

1913–1921: Maximum stage recorded 2.42 feet, original datum April 21, 1914 (discharge, 5,130 second-feet); minimum stage recorded, 0.38 foot August 3, 1918 (discharge, 386 second-feet). A stage of 15.3 feet (discharge, 9,250 second-feet), occurred at Keno station about May 10, 1904.

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

DIVERSIONS.—Only a small quantity of water diverted below Klamath Falls station. Practically all the flow of Lost River during nonirrigating season is diverted into Klamath River between Klamath Falls and Keno stations.

REGULATION.—Water stored in Upper Klamath Lake by California-Oregon Power Co., beginning April 15, 1919. Some natural regulation due to effect of wind on the wide flat stretches of river above Keno.

ACCURACY.—Stage-discharge relation probably permanent throughout year except as affected by change of gage datum July 16. Two fairly well defined rating curves used. Staff gage read to hundredths three times a week October 1 to March 26 and July 16 to September 30, occasional readings at other times. Daily discharge ascertained by applying daily gage heights to rating tables; mean discharge estimated for periods when gage was not read. Records good except for periods when discharge was estimated for which they are fair.

COOPERATION.—Field data furnished by United States Bureau of Reclamation, H. D. Newell, project manager, Klamath project.

Discharge measurements of Klamath River at Spencer Bridge, near Keno, Oreg., during the year ending Sept. 30, 1921

[Made by Ted Cole, U. S. Bureau of Reclamation]

Date	Gage height	Discharge
	<i>Feet</i>	<i>Sec.-ft.</i>
Apr. 21.....	3.12	3,970
Apr. 26.....	3.25	4,130
June 23.....	1.92	2,240

Daily discharge, in second-feet, of Klamath River at Spencer Bridge, near Keno, Oreg., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....				2,420	3,640	3,800				1,700		720
2.....	805	1,080	1,430						3,030		680	
3.....					3,640	3,800				1,700		720
4.....		1,150	1,430	2,570					2,870		680	
5.....	760				3,640	3,800				1,580		
6.....		1,150		3,030				3,640			680	720
7.....	715		1,500							1,430		
8.....				3,180	3,490	3,800						720
9.....	850	1,150	1,500							1,300	640	
10.....		1,150			3,640	3,800						765
11.....			1,580	3,490						1,200	640	
12.....	960				3,800	3,800						
13.....		1,220		3,640						1,100	640	765
14.....	905		1,650									
15.....				3,640	3,640	3,950						
16.....	960	1,220	1,650							965	680	
17.....					3,800	4,110						810
18.....		1,220	1,720	3,800							680	
19.....	960			3,800	3,800	4,110				860		
20.....		1,290									680	1,080
21.....	960		1,880							810		
22.....				3,640	3,800	4,270	3,950					1,150
23.....	1,020	1,290	1,960						2,120	765	720	
24.....					3,800	4,270		3,180				1,220
25.....		1,360	1,960	3,490							680	
26.....	1,020				3,800	4,270	4,110	3,180		765		
27.....		1,360		3,640							680	1,150
28.....	1,080		2,040			4,400		3,180		720		
29.....				3,640								1,150
30.....	1,150	1,360	2,040			4,400				720	720	
31.....												

NOTE.—See "Accuracy" paragraph.

Monthly discharge of Klamath River at Spencer Bridge, near Keno, Oreg., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	1, 150	715	934	57, 400
November.....	1, 360	1, 080	1, 230	73, 200
December.....	2, 040	1, 430	1, 720	106, 000
January.....	3, 800	2, 420	3, 380	208, 000
February.....	3, 800	3, 480	3, 710	206, 000
March.....	^a 4, 400	3, 800	4, 040	248, 000
April.....	^a 4, 700	-----	^a 4, 100	244, 000
May.....	-----	-----	^a 3, 300	203, 000
June.....	-----	-----	^a 2, 500	149, 000
July.....	^a 1, 700	720	1, 120	68, 900
August.....	720	640	677	41, 600
September.....	1, 220	720	906	53, 900
The year.....	^a 4, 700	640	2, 300	1, 660, 000

^a Estimated from records of California-Oregon Power Co. at Copco, Calif.

KLAMATH RIVER NEAR SEIAD VALLEY, CALIF.

LOCATION.—In NE. $\frac{1}{4}$ sec. 13, T. 46 N., R. 12 W., above highway bridge, 300 feet above mouth of Walker Creek, $1\frac{1}{4}$ miles southeast of Seiad Valley, Siskiyou County, and $11\frac{1}{2}$ miles below mouth of Scott River.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—November 23, 1912, to September 30, 1921.

GAGE.—Staff in five sections fastened to trees on left bank one-fourth of a mile above highway bridge; read by M. J. Brickley.

DISCHARGE MEASUREMENTS.—Made from cable 35 feet below gage.

CHANNEL AND CONTROL.—Gravel and boulders; fairly permanent. Banks are high and not subject to overflow.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 12.1 feet. February 21 (discharge, 21,800 second-feet); minimum stage, 2.9 feet August 31 (discharge, 860 second-feet).

1913–1921: Maximum stage recorded, 13.3 feet at 9.30 p. m. December 31, 1913 (discharge, from extension of rating curve, about 26,500 second-feet); minimum stage, 2.05 feet November 25, 1917 (discharge, 320 second-feet).

DIVERSIONS.—Water is diverted from main river and tributaries above the station for use in irrigation, placer mining, and power developments.

REGULATION.—Low-water flow affected by operation of power plant above.

ACCURACY.—Stage-discharge relation permanent. Rating curve fairly well defined between 1,000 and 10,000 second-feet and extended above and below. Gage read to tenths once daily. Daily discharge ascertained by applying daily gage height to rating table. Records fair.

The following discharge measurement was made by Jesse Arnold:

August 12, 1921: Gage height, 3.08 feet; discharge, 1,130 second-feet.

Daily discharge, in second-feet, of Klamath River near Seiad Valley, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1,490	1,730	4,200	8,600	6,170	10,000	7,910	7,250	6,590	2,990	1,270	1,380
2	1,490	1,730	3,850	7,090	5,550	9,290	8,140	7,030	6,590	3,310	1,610	1,490
3	1,270	1,730	2,990	9,060	5,350	10,700	8,370	6,810	6,590	3,310	1,610	1,490
4	1,270	1,730	4,010	8,830	5,750	10,700	9,290	6,810	6,810	2,690	1,490	1,490
5	1,270	1,730	3,150	9,290	6,810	12,000	8,830	6,380	6,810	2,690	1,490	1,050
6	1,380	1,730	2,990	8,600	6,170	13,300	8,600	6,380	6,810	2,990	1,490	1,270
7	1,050	1,730	2,990	8,830	5,960	11,500	7,910	6,380	6,810	3,310	1,490	1,490
8	1,490	1,730	2,540	8,060	5,960	10,700	7,690	6,380	6,590	2,840	1,490	1,490
9	1,490	1,730	2,690	7,250	5,750	10,000	7,470	6,380	6,590	2,840	1,490	1,490
10	1,380	1,730	3,480	6,590	7,690	9,520	7,250	6,170	6,380	2,840	1,490	1,490
11	1,490	1,730	4,960	6,590	8,140	9,290	7,030	6,380	6,170	2,690	1,380	1,490
12	1,610	1,730	5,350	5,960	8,830	9,060	7,690	6,380	6,170	2,400	1,380	1,490
13	1,490	1,730	4,960	5,960	8,830	8,830	7,690	6,590	5,750	2,540	1,610	1,380
14	1,610	1,730	4,200	5,750	13,300	9,290	7,690	7,030	5,750	2,540	1,380	1,490
15	1,730	1,730	3,830	5,750	12,800	8,830	7,250	7,470	5,350	2,400	1,270	1,490
16	1,730	1,990	3,480	5,750	10,700	7,250	7,030	7,690	4,960	2,400	1,270	1,490
17	1,860	7,690	3,650	5,550	9,290	8,370	6,810	7,250	4,770	2,120	1,190	1,490
18	1,860	7,030	3,650	7,470	8,370	8,370	6,590	7,250	4,200	2,120	1,270	1,610
19	1,860	7,690	3,650	6,380	7,690	8,600	6,590	6,590	4,200	1,860	1,380	1,610
20	1,860	8,140	4,390	6,380	7,690	9,060	6,590	6,810	4,200	1,860	1,490	1,610
21	1,860	5,350	3,650	5,750	21,800	8,830	6,590	6,810	4,010	1,610	1,380	1,610
22	1,860	4,200	3,310	5,550	16,200	8,370	6,170	7,030	3,830	1,610	1,050	1,610
23	1,860	4,390	3,310	5,550	11,500	7,910	7,030	7,690	3,830	1,860	1,490	1,610
24	1,860	4,580	3,310	5,350	10,200	8,140	7,030	7,470	4,200	1,730	1,490	1,610
25	1,730	4,390	3,830	5,150	10,000	8,140	8,140	7,470	3,650	1,610	1,490	1,610
26	1,730	4,390	3,310	5,960	9,520	7,910	7,030	7,470	3,650	1,490	1,490	1,610
27	1,730	8,830	3,310	4,390	9,290	7,910	6,590	7,690	3,650	1,610	1,490	1,610
28	1,730	6,590	4,390	6,380	10,000	7,910	6,590	7,250	2,690	1,490	1,490	1,610
29	1,730	5,550	4,010	6,590	-----	7,690	7,030	7,250	2,690	1,490	1,380	1,730
30	1,610	5,550	11,000	5,350	-----	7,690	7,030	6,810	3,310	1,490	850	1,730
31	1,610	-----	13,000	5,960	-----	7,910	-----	6,590	-----	1,380	860	-----

Monthly discharge of Klamath River near Seiad Valley, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	1,860	1,050	1,610	99,000
November	8,830	1,730	3,740	223,000
December	13,000	2,540	4,240	261,000
January	9,290	4,390	6,670	410,000
February	21,800	5,350	9,120	506,000
March	13,300	7,250	9,130	561,000
April	9,290	6,170	7,390	440,000
May	7,690	6,170	6,930	426,000
June	7,810	2,690	5,130	305,000
July	3,310	1,380	2,260	139,000
August	1,610	860	1,390	85,500
September	1,730	1,050	1,520	90,400
The year	21,800	860	4,900	3,550,000

KLAMATH RIVER NEAR REQUA, CALIF.

LOCATION.—In sec. 29, T. 13 N., R. 2 E., at Scofield Ferry, 9 miles above Requa, Del Norte County, and mouth of river, and 30 miles below mouth of Trinity River.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—December 25, 1910, to September 30, 1921.

GAGE.—Staff in four sections on right bank at ferry cable; read by S. A. McBeth.

DISCHARGE MEASUREMENTS.—Made from ferry cable.

CHANNEL AND CONTROL.—Gravel; fairly permanent. Banks high and not subject to overflow.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 27 feet, from flood marks, December 31 (discharge, 130,000 second-feet); minimum stage recorded, 5.8 feet September 3, 4, and 9 (discharge, 2,290 second-feet).

1911-1921: Maximum stage recorded, 33.3 feet at 1 p.m., February 2, 1915 (discharge, from extension of rating curve, about 182,000 second-feet); minimum stage, 4.85 feet August 11 and 12, 1918 (discharge, 1,490 second-feet).

DIVERSIONS.—Water is diverted for irrigation and power from main river and tributaries in Oregon and California.

REGULATION.—Effect of regulation believed to be small.

ACCURACY.—Stage-discharge relation changed from previous year. Rating curve revised and is well defined between 2,100 and 6,000 second-feet and extended above. Gage read to half-tenths once daily. Daily discharge ascertained by applying gage height to rating table. Records fair.

Discharge measurements of Klamath River near Requa, Calif., during the year ending Sept. 30, 1921

[Made by K. M. Kelley]

Date	Gage height	Discharge
	<i>Feet</i>	<i>Sec.-ft.</i>
Aug. 11.....	6.15	2,790
12.....	6.24	3,000
13.....	6.06	2,580

Daily discharge, in second-feet, of Klamath River at Requa, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	3,220	4,800	30,700	89,700	36,100	39,700	31,300	26,800	23,000	12,000	3,600	2,560
2.....	3,400	4,540	26,400	56,900	34,900	39,700	32,500	25,800	23,900	11,600	3,600	2,420
3.....	3,600	4,280	31,300	60,400	35,500	40,900	33,700	24,400	24,400	11,300	3,600	2,290
4.....	3,400	4,280	37,300	70,900	36,100	41,500	31,900	23,400	26,800	11,600	3,400	2,290
5.....	3,600	4,280	33,700	73,000	38,500	42,100	30,100	23,400	25,800	8,680	3,400	2,560
6.....	3,600	4,280	28,400	75,300	42,100	42,100	29,000	22,600	24,800	9,000	3,220	2,560
7.....	3,600	4,040	28,400	66,700	42,700	42,700	27,900	22,100	24,800	9,320	3,220	2,560
8.....	3,600	4,040	28,400	58,300	43,300	39,700	26,400	22,100	25,400	8,680	3,220	2,560
9.....	3,820	4,040	31,900	43,300	42,100	38,500	24,800	22,100	23,900	8,360	3,040	2,290
10.....	4,280	3,820	34,900	39,700	41,500	36,100	24,800	22,600	23,000	8,040	3,040	2,560
11.....	4,540	4,280	39,100	34,900	40,900	33,700	24,800	23,400	21,600	7,720	3,040	2,560
12.....	5,060	5,060	38,500	33,100	40,300	32,500	25,800	25,800	20,800	7,400	2,880	2,560
13.....	5,340	6,800	37,900	31,300	41,500	32,500	26,800	27,900	19,400	7,100	2,720	2,560
14.....	5,620	9,000	34,900	29,600	60,400	33,700	25,800	28,400	18,500	6,800	2,720	2,560
15.....	5,900	8,680	31,900	29,600	66,700	33,100	24,400	29,000	18,000	6,500	2,560	2,560
16.....	3,600	8,680	27,900	27,400	54,100	33,700	18,500	27,900	16,800	6,200	2,880	2,560
17.....	3,600	92,900	29,000	27,900	47,100	32,500	22,100	26,800	15,600	5,900	3,220	2,880
18.....	5,620	90,500	30,100	27,900	40,900	35,500	22,100	25,800	14,400	5,620	3,220	2,880
19.....	12,000	96,100	35,100	27,900	33,700	36,100	22,100	23,000	14,400	5,620	3,040	3,040
20.....	10,600	94,500	30,700	27,400	54,100	33,700	22,600	23,900	14,400	5,620	2,880	3,040
21.....	9,320	59,700	27,400	27,400	102,000	33,100	23,000	24,800	14,800	5,060	2,880	2,880
22.....	8,680	51,300	27,900	27,400	76,100	32,800	23,000	23,900	15,200	5,060	2,880	2,880
23.....	8,360	33,700	27,900	25,800	59,700	32,500	23,000	23,400	15,200	4,800	2,720	2,880
24.....	8,040	30,100	47,800	24,800	60,400	31,900	23,000	25,400	15,200	4,540	2,880	2,880
25.....	7,720	39,700	44,500	25,400	63,900	31,300	23,000	30,100	14,400	4,540	2,880	2,880
26.....	7,400	49,200	31,300	25,800	63,900	29,000	23,000	29,600	14,000	4,280	2,880	3,040
27.....	7,100	52,000	30,700	27,400	40,900	29,000	23,000	29,000	13,200	4,040	2,720	3,040
28.....	6,800	56,200	30,100	30,100	40,300	29,600	23,000	28,400	12,400	4,040	2,720	2,880
29.....	6,200	45,700	36,700	31,300	-----	30,100	23,400	26,400	12,400	4,040	2,560	2,880
30.....	5,340	37,300	97,700	33,100	-----	30,100	24,400	23,400	12,000	3,820	2,560	2,880
31.....	5,060	-----	114,000	36,100	-----	30,100	-----	23,000	-----	3,600	2,560	-----

NOTE.—Gage not read Mar. 22 and 24; discharge interpolated.

Monthly discharge of Klamath River near Requa, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	12, 000	3, 220	5, 740	353, 000
November.....	96, 100	3, 820	30, 500	1, 810, 000
December.....	114, 000	26, 400	37, 500	2, 310, 000
January.....	89, 700	24, 800	40, 100	2, 470, 000
February.....	102, 000	33, 700	49, 300	2, 740, 000
March.....	42, 700	29, 000	34, 900	2, 150, 000
April.....	33, 700	18, 500	25, 300	1, 510, 000
May.....	30, 100	22, 100	25, 300	1, 560, 000
June.....	26, 800	12, 000	18, 600	1, 110, 000
July.....	12, 000	3, 600	6, 800	418, 000
August.....	3, 600	2, 560	2, 990	184, 000
September.....	3, 040	2, 290	2, 700	161, 000
The year.....	114, 000	2, 290	23, 100	16, 800, 000

SAND CREEK NEAR FORT KLAMATH, OREG.

LOCATION.—In sec. 29, T. 31 S., R. 7 E., $3\frac{1}{2}$ miles above bridge on Bend-Fort Klamath road and 25 miles by road from Fort Klamath, Klamath County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—1917–1921: Portion of each irrigation season.

GAGE.—Stevens continuous recorder on north bank of creek; vertical staff used in 1917.

DISCHARGE MEASUREMENTS.—Made by wading near gage.

CHANNEL AND CONTROL.—Stream bed of shifting pumice; no definite control; banks low but well defined at gage; beginning about 100 yards below gage the stream spreads and some water disappears in the pumice soil.

EXTREMES OF DISCHARGE.—Maximum stage during period June 9 to September 30 from water-stage recorder, 1.33 feet, June 29 (discharge, 71 second-feet); minimum stage not known owing to fragmentary record.

ICE.—Stream freezes in winter; no record.

DIVERSIONS.—None.

REGULATION.—None.

ACCURACY.—Stage-discharge relation changed during summer. Rating curves fairly well defined. Operation of recorder unsatisfactory. Daily discharge ascertained by applying to rating tables mean daily gage height determined by inspecting gage-height graph. Record, for periods recorder was operating, fair.

Discharge measurements of Sand Creek near Fort Klamath, Oreg., during the year ending Sept. 30, 1921

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	Briggs and Dawson.....	0. 32	12. 4	Sept. 1	Wendell Dawson.....	0. 35	24
Apr. 29	Wendell Dawson.....	. 44	19. 8	30	K. N. Phillips.....	. 32	23
June 9	Bones and Dawson.....	1. 12	57				

Daily discharge, in second-feet, of Sand Creek near Fort Klamath, Oreg., for the year ending Sept. 30, 1921

Day	Oct.	Apr.	June	July	Aug.	Sept.	Day	Oct.	Apr.	June	July	Aug.	Sept.
1				67		24	16						24
2				66		26	17						24
3				66		26	18						24
4				64		26	19						28
5						26	20						25
6						26	21						24
7						26	22						24
8						24	23			61			23
9			57			25	24			63			22
10						26	25			63			22
11						25	26			62			21
12						25	27			61		27	22
13						24	28			64		26	22
14						24	29	13	19	70		26	22
15						24	30			69		26	23
							31					26	

SPRAGUE RIVER NEAR BEATTY, OREG.

LOCATION.—In NW. $\frac{1}{4}$ sec. 20, T. 36 S., R. 13 E., 2 miles above highway bridge on road from Yainax to Silver Lake, 4 miles above mouth of Sycan River, and 3 miles east of Beatty post office, Klamath County.

DRAINAGE AREA.—513 square miles.

RECORDS AVAILABLE.—April 19, 1912, to September 30, 1921, fragmentary.

GAGE.—Vertical staff gage with duplicate inclined section on left bank; read by L. F. Belknap. Stevens water-stage recorder at same location used February 20, 1914, to September 11, 1917.

CHANNEL AND CONTROL.—Bed composed of sand and gravel; no definite control as stream is very sluggish for miles above and below gage; banks subject to overflow at a stage of about 5 feet and considerable water may flow in a cut-off across a bend to the right of the station.

DISCHARGE MEASUREMENTS.—Made from cable about 100 feet below gage; at high stages, from wagon bridge 2 miles downstream, and inflow estimated.

EXTREMES OF DISCHARGE.—Maximum stage recorded during period 5.6 feet March 6 (discharge, 1,270 second-feet); minimum stage 0.92 foot September 13-19 (discharge, 102 second-feet).

1912-1920: Maximum stage from water-stage recorder, 5.75 feet April 24, 1917 (discharge, 1,320 second-feet); minimum stage recorded, 0.66 foot September 18, 1920 (estimated discharge, 66 second-feet). Discharge of 2,080 second-feet occurred at a station 2 miles downstream, on May 21, 1904.

ICE.—Stage-discharge relation not seriously affected by ice, as stream is spring-fed.

DIVERSION.—Considerable water is diverted near Bly for irrigation.

REGULATION.—None.

ACCURACY.—Stage-discharge relation unstable owing to growth of aquatic plants. Fairly well defined rating curve used October 1 to June 15, indirect shifting control method thereafter. Gage read to hundredths about three times a week. Daily discharge ascertained by applying daily gage reading to rating table. Records good.

Discharge measurements of Sprague River near Beatty, Oreg., during the year ending Sept. 30, 1921

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
Oct. 30	Wendell Dawson	<i>Feet</i> 0.84	<i>Sec.-ft.</i> 118	June 11	J. W. Bones	<i>Feet</i> 3.65	<i>Sec.-ft.</i> 546
Apr. 12	do.	4.40	745	June 21	do.	2.50	274
Apr. 28	do.	4.00	595	Aug. 26	Wendell Dawson	1.08	106

Daily discharge, in second-feet, of Sprague River near Beatty, Oreg., for the year ending Sept. 30, 1921

Day	Oct.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1			595		780	780		118	
2			* 622	520			164		
3			650	570	900	820		118	106
4			* 775						
5			900	650		745	154	118	102
6					780				
7			* 1,110	570	710	710			
8			945				136	118	
9			* 812	495	780	595			
10			680				136	118	106
11			620		860	520			
12			620	745					
13			595	780		495	136	118	102
14			680		945				
15			990			405	127		102
16	118		570	650	1,040				
17			595						
18		310	710	570	1,120	310	122		
19			860						102
20		325	780	545	1,040	295	122		
21			570			272			110
22			520	595			122		
23	118		470		990	258			
24			520	710				106	
25			425		900		122		
26		280	425					106	
27			365	620		210	122	106	
28		520	345	620	945				
29			345	620		189			
30	114		228		900		122	102	
31			425						

* Interpolated.

NOTE.—Gage not read on days for which no record is given.

Monthly discharge of Sprague River near Beatty, Oreg., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run ⁴ off in acre-feet
	Maximum	Minimum	Mean	
March	1,270	228	646	39,700
April	780	495	617	36,700
May	1,120	710	908	55,800
June	820	189	472	28,100
July	164	122	232	14,300
August	118	102	113	6,950
September	106	102	104	6,190
The period	1,270	102	442	188,000

NOTE.—Monthly discharge determined from flow on days when gage was read.

SPRAGUE RIVER AT MCCREADY RANCH, NEAR CHILOQUIN, OREG.

LOCATION.—In sec. 30, T. 34 S., R. 9 E., 200 yards north of F. F. McCready's house, 2 miles below Big Spring, and 13 miles above Chiloquin, Klamath County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—July 10, 1920, to September 30, 1921.

GAGE.—Enameled section on right bank. Gage reader, F. F. McCready.

DISCHARGE MEASUREMENT.—Made at extreme low stages by wading near gage; medium and high stages from highway bridge about 2 miles below gage. Section at bridge very poor.

CHANNEL AND CONTROL.—Bed composed of hard pan and pumice sand. One channel at all stages. No definite control.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 5.70 feet. March 9 (discharge, 1,780 second-feet); minimum stage recorded, -0.08 foot August 26 (discharge, 157 second-feet).

DIVERSIONS.—Considerable water diverted near Bly for irrigation.

REGULATION.—Irrigation dam near Yainax regulates flow at times.

ACCURACY.—Stage-discharge relation apparently fairly permanent during year. Rating curve fairly well defined between 150 and 1,300 second-feet. Gage read to hundredths once a day in October and twice a day March to September. Daily discharge ascertained by applying mean daily gage height to rating table. Records good.

Discharge measurements of Sprague River at McCready ranch, near Chiloquin Oreg., during the year ending Sept. 30, 1921

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. 30	Dawson and Briggs.....	0.62	285	June 12	J. W. Bones.....	3.15	1,000
Apr. 13	Wendell Dawson.....	3.90	1,230	Aug. 26	Wendell Dawson.....	— .02	180
28do.....	4.30	1,270				

Daily discharge, in second-feet, of Sprague River at McCready ranch, near Chiloquin, Oreg., for the year ending Sept. 30, 1921

Day	Oct.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	265	809	1,110	1,230	1,380	406	278	236
2	265	925	1,110	1,230	1,380	382	278	236
3	265	1,080	1,110	1,230	1,350	382	278	236
4	265	1,140	1,170	1,260	1,320	358	278	236
5	265	1,230	1,170	1,350	1,320	382	289	236
6	278	1,350	1,230	1,420	1,260	430	289	236
7	276	1,510	1,230	1,480	1,200	382	289	236
8	276	1,680	1,230	1,450	1,140	382	289	236
9	274	1,780	1,230	1,380	1,140	358	278	236
10	317	1,740	1,200	1,350	1,110	334	278	236
11	298	1,740	1,200	1,350	1,040	311	278	236
12	289	1,740	1,170	1,320	985	358	278	236
13	296	1,710	1,230	1,350	925	334	278	236
14	311	1,640	1,320	1,350	896	311	278	236
15	298	1,610	1,510	1,350	867	289	278	480
16	289	1,610	1,610	1,380	838	289	246	311
17	298	1,610	1,580	1,420	752	289	180	256
18	318	1,610	1,540	1,450	668	289	171	256
19	302	1,610	1,480	1,510	668	289	246	256
20	296	1,640	1,420	1,580	640	289	334	256
21	296	1,680	1,320	1,640	640	289	289	256
22	296	1,680	1,260	1,640	586	289	267	256
23	296	1,610	1,230	1,640	586	289	256	256
24	298	1,510	1,200	1,640	559	289	188	256
25	300	1,420	1,170	1,610	532	289	162	256
26	356	1,320	1,170	1,580	532	289	180	256
27	296	1,260	1,290	1,540	506	289	180	256
28	291	1,200	1,320	1,480	480	289	206	334
29	292	1,170	1,290	1,450	455	289	216	278
30	293	1,140	1,260	1,420	382	289	226	188
31	293	1,140	-----	1,380	-----	289	226	-----

NOTE.—Discharge estimated Oct. 31. Gage not read Nov. 1 to Mar. 1.

*Monthly discharge of Sprague River at McCready ranch, near Chiloquin, Oreg.,
for the year ending Sept. 30, 1921*

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	356	265	292	18,000
March.....	1,780	809	1,450	89,200
April.....	1,610	1,110	1,280	76,200
May.....	1,640	1,230	1,430	87,900
June.....	1,380	382	871	51,800
July.....	430	289	323	19,900
August.....	334	162	251	15,400
September.....	480	188	257	15,300

FIVEMILE CREEK NEAR BLY, OREG.

LOCATION.—In sec. 34, T. 35 S., R. 13 E., 4 miles above mouth and 10 miles northeast of Beatty, Klamath County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—September 8, 1917, to September 30, 1921; fragmentary.

GAGE.—Vertical staff on right bank installed May 11, 1919. Stevens eight-day recorder on left bank and vertical staff about 1 mile above mouth, in sec. 1, T. 36 S., used prior to May 11, 1919.

DISCHARGE MEASUREMENTS.—Made by wading near gage.

CHANNEL AND CONTROL.—Bed of small boulders. Control is a rocky riffle about 25 feet below gage. At old station channel crooked and lined with thick growth of willows.

EXTREMES OF DISCHARGE.—Gage reading of March 4 probably made close to peak of spring high water, gage height 2.20 feet (discharge, 195 second-feet); minimum discharge recorded, 17 second-feet August 26.

1917–1921: Maximum and minimum discharge those of 1921.

ICE.—No ice forms; stream spring fed.

DIVERSIONS.—None above gages; two ditches divert between former gage section and mouth of stream.

REGULATION.—None.

ACCURACY.—Stage-discharge relation fairly permanent to July 20 and fairly well defined rating curve used. Gage read to hundredths occasionally. Daily discharge ascertained by applying daily gage height to rating table. Daily records good.

*Discharge measurements of Fivemile Creek near Bly, Oreg., during the year ending
Sept. 30, 1921*

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	Dawson and Briggs.....	0.83	18.9	June 22	J. W. Bones.....	0.87	23.0
Apr. 11	Wendell Dawson.....	1.65	106	Aug. 26	Wendell Dawson.....	.84	17.3
June 12	do.....	.89	20.8				

*Daily discharge, in second-feet, of Fivemile Creek, near Bly, Oreg., for the year ending
Sept. 30, 1921*

Date	Discharge	Date	Discharge	Date	Discharge
Oct. 16.....	19	May 11.....	30	June 22.....	21
31.....	19	18.....	30	29.....	23
Mar. 4.....	195	24.....	26	July 9.....	23
Apr. 9.....	98	31.....	23	13.....	23
11.....	106	June 7.....	23	20.....	22
22.....	52	12.....	22	Aug. 26.....	17
27.....	38	15.....	23		
May 5.....	30	20.....	23		

SYCAN RIVER NEAR SILVER LAKE, OREG.

LOCATION.—In sec. 21, T. 32 S., R. 14 E., one-fourth mile above upper diversion dam for Sycan Marsh, 1 mile above ZX ranch house, and 30 miles south of Silver Lake, Lake County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—May 10, 1918, to August 28, 1921, fragmentary. Also May 2 to October 28, 1905, at former station at bridge.

GAGE.—Stevens continuous recorder on right bank.

DISCHARGE MEASUREMENTS.—Made by wading near gage at low and medium stages; from wagon bridge three fourths mile below gage at high stages.

CHANNEL AND CONTROL.—Gravel bed somewhat shifting, banks of silt and soil, with scattered growth of willows; banks overflowed in extreme floods.

EXTREMES OF DISCHARGE.—Maximum stage probably occurred May 13 when recorder was stopped and was about 5.3 feet, as indicated by recording pencil (discharge, 1,100 second feet); minimum stage, 0.14 foot November 2 (discharge, 1.5 second-feet).

1918-1921: Maximum and minimum, those of 1921 as far as recorded.

ICE.—Stream probably freezes nearly solid in winter.

DIVERSIONS.—None above station; most of water is applied to Sycan Marsh by flooding, from several dams and ditches.

REGULATION.—None.

ACCURACY.—Stage-discharge relation practically permanent. Rating curve fairly well defined during year. Water-stage recorder operated satisfactorily only for short periods. Discharge ascertained by applying to rating tables mean daily gage height determined by inspecting gage-height graph, or, for days of considerable fluctuation, by averaging discharge for equal intervals of day. Records for days recorder was operating, good.

Discharge measurements of Sycan River near Silver Lake, Oreg., during the year ending Sept. 30, 1921

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. 3	R. C. Briggs	0.29	3.9	June 15	J. W. Bones	1.72	101
Apr. 21	Wendell Dawson	2.14	175	26	do.	1.27	46.4
May 9	do.	3.04	380	Aug. 21	Wendell Dawson	.54	5.3

Daily discharge, in second-feet, of Sycan River near Silver Lake, Oreg., for the year ending Sept. 30, 1921

Day	Nov.	Apr.	May	June	July	Aug.	Day	Nov.	Apr.	May	June	July	Aug.
1			445		36		16				100		
2	1.5		322		33		17				89		
3	3.6		272		31		18				83		
4			255		29		19				89		
5			255		26		20				78		
6			290				21		216		69		6.5
7			350				22		297		62		8.0
8							23		310		63		7.8
9			459				24		207		57		7.5
10			501				25		176		52		7.2
11			554				26		172		48		7.0
12			621				27		236		44		6.8
13							28		428		41		5.5
14							29		515		39		
15				96			30		474		39		

SYCAN RIVER NEAR BEATTY, OREG.

LOCATION.—In SE. $\frac{1}{4}$ sec. 8, T. 35 S., R. 12 E., 8 miles by stream above mouth, 11 miles by road north of Beatty, and 18 miles northeast of Yainax, Klamath County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—October 29, 1917, to September 30, 1921, November 25, 1911, to October 29, 1917, at station referred to as Sycan River near Yainax.

GAGE.—Stevens water-stage recorder on left bank; inspected by L. F. Belknap. Vertical staff in sec. 3, T. 36 S., R. 12 E., 6 miles below present gage, was used 1911 to 1913, and recorder in NE. $\frac{1}{4}$ sec. 28 about 3 miles below present gage, up to October 29, 1917.

DISCHARGE MEASUREMENTS.—Made from cable 200 feet upstream from gage or by wading.

CHANNEL AND CONTROL.—Stream bed, gravel and small boulders, fairly even; control of boulders about 100 feet below gage, fairly permanent. One straight channel at all stages; banks not subject to overflow.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 3.94 feet at 6 a. m. March 10 (discharge, 1,510 second-feet); minimum stage from water-stage recorder, 0.14 foot October 16–17, 31, and November 1 (discharge, 6.4 second-feet).

1911–1921: Maximum stage at station in sec. 28, 11.25 feet, April 25, 1917 (discharge, 2,250 second-feet; minimum stage from recorder, 0.03 August 2, 1920 (discharge, 3.2 second-feet, uncertain).

ICE.—Stage-discharge relation not affected by ice, as most of winter flow comes from springs.

DIVERSIONS.—Some water is used for irrigation by flooding.

REGULATION.—None.

ACCURACY.—Stage-discharge relation permanent. Rating curve well defined by nine discharge measurements in 1920 and 1921 and two in 1922. Operation of water-stage recorder satisfactory except for short periods. Daily discharge ascertained by applying to rating table mean daily gage height obtained by inspecting recorder graph. Records excellent except during part of winter when recorder was not operated, and for periods when recorder was not operating satisfactorily, for which they are fair.

Discharge measurements of Sycan River near Beatty, Oreg., during the year ending Sept. 30, 1921

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	Wendell Dawson.....	0.14	5.9	June 12	Wendell Dawson.....	1.44	192
Apr. 11	do.....	2.98	879	21	J. W. Bones.....	1.02	119
27	do.....	2.28	468	Aug. 26	Wendell Dawson.....	.23	9.6

Daily discharge, in second-feet, of Sycan River near Beatty, Oreg., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1		6.4		14	540	630	441	49	16	9.6
2		6.8		14	565	660	425	42	15	
3		6.8		300	600	660	394	39	14	
4		6.8		508	445	580	417	35	14	
5		7.1		642	465	540	421	33	13	9.6
6		7.4		798	550		402	31	13	9.6
7		7.4		900	465		352	25	12	
8	7.0	7.1		1,100	421	550	300	23	12	
9		7.1		1,160	405		276	23	12	
10		7.4	30	1,270	405		246	25	12	9.6
11		6.8		960	834	605	218	23	11	9.6
12		8.2		732	1,100	580	208	23	12	
13		8.2		900	1,020	605	177	23	12	
14		8.5		990	930	630	166	22	11	
15		8.2		960	774	672	149	21	10	9.6
16	6.4	7.1		960	672	690	145	20	8.5	9.6
17	6.4	8.5		1,100	590	810	141	19	7.8	
18	7.1	25		1,020	555	846	135	19	7.8	
19	7.4	74		990	498	774	131	19	7.8	
20	7.8	160		873	498	810	125	19	7.8	9.6
21	8.2	116		708	477	798	116	19	7.8	9.6
22	9.0	77		595	461	750	107	18	8.5	
23	8.5	49	34	555	521	744	98	18	9.6	
24	8.2	42	46	413	605	660	90	17	8.5	
25	8.2	34	50	433	620	620	87	18	10	9.6
26	8.5	34	46	437	580	565	74	18	10	
27	9.0		39	425	494	530	70	19		
28	8.5	35	28	425	485	530	65	20		
29	7.8			457	508	540	59	20		9.6
30	7.4			469	530	530	52	18		
31	6.4			516		508		16	11	

NOTE.—Discharge, Mar. 3 and Aug. 25, and for periods for which mean discharge is shown by braced figures, estimated from study of records of flow for near-by streams; operation of water-stage recorder not satisfactory.

Monthly discharge of Sycan River near Beatty, Oreg., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October			7.41	456
November	160	6.4	29.2	1,740
December			20.0	1,230
January			30.0	1,840
February			41.2	2,290
March	1,270	14	698	42,900
April	1,100	405	590	35,100
May	846	508	633	38,900
June	441	52	203	12,100
July	49	16	23.7	1,460
August	16	7.8	10.8	664
September			9.6	571
The year	1,270	6.4	192	139,000

NOTE.—Discharge for December and January estimated from study of records for near-by streams. See footnote to daily-discharge table.

LONG CREEK NEAR SILVER LAKE, OREG.

LOCATION.—In sec. 4, T. 32 S., R. 13 E., 27 miles south of Silver Lake, Lake County; above point where creek begins to divide and spread over Sycan Marsh.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—May 13 to November 6, 1918; April 20 to August 31, 1919; March 20 to August 25, 1920; and May 10 to August 31, 1921.

GAGE.—Stevens continuous recorder installed on right bank of creek, about half mile above location of gage used from 1918 to 1920.

DISCHARGE MEASUREMENTS.—Made from foot-log at gage or by wading.

CHANNEL AND CONTROL.—Stream bed crooked and deep, vertical sod banks with scattered growth of willows; control apparently the remains of an old beaver dam, 150 yards downstream.

EXTREMES OF DISCHARGE.—Maximum stage from water-stage recorder during period May 10 to August 31, 3.02 feet at 6 p. m. May 17 (discharge, 166 second-feet); minimum stage from water-stage recorder, 0.60 foot, August 30 and 31 (discharge, 8 second-feet).

1918-1921: Maximum recorded discharge that of 1921; minimum discharge 5.7 feet as result of discharge measurement August 30, 1919 (gage height, 0.38 foot).

ICE.—No record during winter.

DIVERSIONS.—None above station; water is spread over meadows below station by numerous dams.

REGULATION.—None.

ACCURACY.—Stage-discharge relation practically permanent during the period in 1921. Rating curve fairly well defined by four discharge measurements. Operation of recorder satisfactory only for short periods. Discharge ascertained by applying to rating table mean daily gage height determined by an inspection of recorder graph. Records good, except for periods when recorder was not operating, for which they are fair.

Discharge measurements of Long Creek near Silver Lake, Oreg., during the year ending Sept. 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
Nov. 4	Wendell Dawson.....	Feet 0.80	Sec.-ft. 12.4	June 26	J. W. Bones.....	Feet 1.38	55
May 10	.....do.....	2.63	139	Aug. 21	Wendell Dawson.....	.72	13.4

Daily discharge, in second-feet, of Long Creek near Silver Lake, Oreg., for the year ending Sept. 30, 1921

Day	May	June	July	Aug.	Day	May	June	July	Aug.
1.....			48		16.....	156	71		
2.....			42		17.....	159	62		
3.....			39		18.....	144	62		20
4.....			36		19.....	129	64		
5.....			36		20.....	144	62		
6.....					21.....	127	65		15
7.....					22.....	118	74		15
8.....		120		20	23.....	117	85		14
9.....					24.....	123	75	30	14
10.....	143				25.....	129	64		14
11.....	143		30		26.....	138	57		13
12.....	148				27.....	139	55		12
13.....	152				28.....	132	54		10
14.....	158				29.....		53		9
15.....	159	79			30.....	130	53		8
					31.....				8

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

Monthly discharge of Long Creek near Silver Lake, Oreg., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
May 10-31.....			98.3	6,040
June.....		53	90.5	5,390
July.....	48		31.7	1,950
August.....		8	17.2	1,060
The period.....		8	63.8	14,400

MODOC POINT CANAL NEAR CHILOQUIN, OREG.

LOCATION.—In SE. $\frac{1}{4}$ sec. 3, T. 35 S., R. 7 E., at intake 1 mile south of Chiloquin, Klamath County.

RECORDS AVAILABLE.—June 14, 1915, to September 30, 1919, May 4 to September 30, 1920, and May 14 to September 14, 1921.

GAGE.—Inclined staff on left of concrete-lined section, about 100 feet below head gates; installed June 29, 1915; previous to that date readings were made on gage at bridge, half a mile below.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—Earth section of channel begins immediately below gage; bottom width, 10 feet; grade, 2.64 feet per mile. Control is cobble-stone apron several hundred feet below gage, placed in March, 1918.

EXTREMES OF DISCHARGE.—Maximum stage recorded, 2.0 feet May 18 to July 31 (discharge, 32 second-feet); canal dry at times.

1915-1921: Maximum quantity diverted, 95 second-feet July 10, 1915.

Most of it is turned back into river at first waste way. Canal dry at times.

ACCURACY.—Stage-discharge relation permanent. Staff gage read to tenths once a day. Daily discharge determined by applying daily gage readings to rating table. Records subject to considerable uncertainty, but are of value in estimating the total run-off of Williamson River below Sprague River.

No discharge measurements made during the year.

Monthly discharge of Modoc Point canal near Chiloquin, Oreg., for the year ending Sept. 30, 1921

Date	Mean discharge in second-feet	Run-off in acre-feet
May 14-31.....	27.5	982
June.....	32.0	1,900
July.....	32.0	1,970
August.....	19.0	1,170
September 1-14.....	19.0	523
The period.....		6,550

NOTE.—Water turned into canal May 14 and shut off Sept. 14.

WOOD RIVER AT FORT KLAMATH, OREG.

LOCATION.—In sec. 22, T. 33 S., R. 7 $\frac{1}{2}$ E., at highway bridge one-fourth mile east of Fort Klamath, Klamath County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—August 5, 1911, to January 1, 1921, and July 1 to September 30, 1921.

GAGE.—Vertical staff attached to bridge; gage read by Chester Jackson.

DISCHARGE MEASUREMENTS.—Made from highway bridge.

CHANNEL AND CONTROL.—Clean gravel overlain with pumice sand, dunes of which may at times be observed moving downstream; likely to shift.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 2.60 feet at 8 a. m. November 17 (discharge, 520 second-feet); minimum stage, 1.25 feet November 1 (discharge, 208 second-feet), discharge probably within these limits January to June 30.

1911 and 1913–1921: Maximum stage recorded, that of 1921; minimum stage recorded 0.90 foot July 5, 6, and August 22, 1920 (discharge, 152 second-feet).

ICE.—Stage-discharge relation not affected by ice, as most of the water comes from copious springs a few miles above.

DIVERSIONS.—Considerable water is diverted above station for watering hay lands, mostly in May and June.

REGULATION.—None.

ACCURACY.—Stage-discharge relation not permanent. Fairly well defined rating curve used October 1 to July 12; shifting-control method thereafter. Gage read to half-tenths once a day, record for period January 2 to June 30 lost. Daily discharge ascertained by applying daily gage reading to rating table. Records good.

Discharge measurements of Wood River near Fort Klamath, Oreg., during the year ending Sept. 30, 1921

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>
Apr. 10	Wendell Dawson.....	1.50	250	July 24	Ted Cole *.....	1.82	330
June 10	J. W. Bones.....	1.83	319	Aug. 30	Wendell Dawson.....	1.60	255
24	do.....	1.95	352	Sept. 28	K. N. Phillips.....	1.87	306
July 4	Ted Cole *.....	1.90	335				

* Employee of U. S. Bureau of Reclamation.

Daily discharge, in second-feet, of Wood River at Fort Klamath, Oreg., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	July	Aug.	Sept.	Day	Oct.	Nov.	Dec.	July	Aug.	Sept.
1	215	208	235	335	315	265	16	215	245	225	285	305	255
2	215	215	235	335	315	275	17	225	520	225	295	305	255
3	215	215	245	325	315	275	18	225	315	225	295	305	265
4	215	215	245	335	315	275	19	225	335	225	305	305	275
5	215	215	215	315	315	275	20	225	275	225	305	305	275
6	225	215	225	315	315	275	21	225	235	225	305	285	275
7	215	215	225	305	315	275	22	225	235	225	305	275	285
8	215	215	225	305	315	275	23	225	215	225	315	275	285
9	215	215	225	305	315	275	24	225	215	225	325	265	285
10	215	215	225	295	315	275	25	225	275	235	325	255	285
11	215	225	225	295	305	275	26	225	315	235	325	255	295
12	215	225	225	285	305	275	27	225	275	235	325	255	295
13	215	225	225	285	305	265	28	225	235	245	325	265	295
14	215	225	235	285	305	265	29	215	235	245	325	265	285
15	215	235	225	285	305	265	30	215	235	245	315	255	285
							31	215	-----	275	315	265	-----

NOTE.—Record lost from Jan. 1 to June 30.

Monthly discharge of Wood River at Fort Klamath, Oreg., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	225	215	219	13,500
November.....	520	208	248	14,800
December.....	275	215	231	14,200
July.....	335	285	310	19,100
August.....	315	255	294	18,100
September.....	295	255	276	16,400

A CANAL AT KLAMATH FALLS, OREG.

LOCATION.—In NW. $\frac{1}{4}$ sec. 29, T. 38 S., R. 9 E., at head of tunnel one-fourth mile below head gates of canal and 1 mile northwest of Klamath Falls, Klamath County.

RECORDS AVAILABLE.—Irrigation seasons, 1911–1921. Some water was diverted for three or four years prior to 1911, but no record was kept.

GAGE.—Stevens eight-day water-stage recorder on right bank of canal just above weir. Barrett & Lawrence water-stage recorder used prior to 1917.

DISCHARGE MEASUREMENTS.—Made from a foot plank just inside lower end of tunnel, about half a mile below gage; rectangular section, 13.5 feet wide.

CHANNEL AND CONTROL.—Trapezoidal weir, 18.15 feet long, with its crest 7.27 feet above bottom of canal, which is a concrete-lined section 13.5 feet wide on the bottom, 12 feet deep, and with side slopes $\frac{1}{2}$ to 1; canal has become partly filled with débris, which has fallen in from the sides.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 4.30 feet August 8 (discharge, 685 second-feet).

1911–1921: Maximum discharge that of 1921. Minimum discharge, zero.

ACCURACY.—Stage-discharge relation practically permanent during season. Rating curve well defined. Operation of recorder satisfactory, daily gage height obtained by inspecting recorder graph. Discharge ascertained by applying daily gage height to rating table. Records excellent.

COOPERATION.—Data furnished by United States Bureau of Reclamation.

This canal diverts water from Link River immediately below outlet of Upper Klamath Lake, in NE. $\frac{1}{4}$ sec. 30, T. 38 S., R. 9 E., for irrigating lands east of Klamath River on both sides of Lost River. Most of the return waters reach Lost River.

Discharge measurements of A canal at Klamath Falls, Oreg., during the year ending Sept. 30, 1921

[Made by Ted Cole.ª]

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>
May 5.....	0.80	37	June 13.....	3.78	572	Sept. 14.....	1.51	112
9.....	1.40	93	22.....	3.70	540	26.....	.62	28.8
18.....	2.30	225	Aug. 15.....	2.82	295			
19.....	2.30	224	25.....	2.00	189			

ª Employee of U. S. Bureau of Reclamation.

Daily discharge, in second-feet, of A canal at Klamath Falls, Oreg., for the year ending Sept. 30, 1921.

Day	May	June	July	Aug.	Sept.	Day	May	June	July	Aug.	Sept.
1	34	336	470	636	154	16	304	588	204	368	74
2	27	378	424	636	146	17	264	576	254	368	42
3	21	378	368	660	142	18	235	564	264	264	26
4	21	378	284	660	136	19	235	540	264	236	25
5	21	378	804	660	130	20	214	504	357	226	24
6	28	181	254	685	128	21	195	458	412	226	26
7	67	447	181	660	138	22	188	493	470	226	38
8	72	504	216	685	146	23	186	540	424	205	40
9	82	528	181	636	131	24	181	493	412	191	38
10	109	552	401	600	126	25	181	493	458	187	38
11	135	564	436	564	113	26	195	493	516	181	33
12	181	504	424	552	109	27	195	482	528	181	25
13	226	552	401	504	109	28	294	458	552	181	29
14	254	576	378	504	109	29	326	470	576	173	28
15	264	612	378	436	109	30	274	482	612	167	12
						31	274		612	162	

Monthly discharge of A canal at Klamath Falls, Oreg., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
May	326	21	171	10,500
June	612	181	483	28,700
July	612	181	391	24,000
August	685	162	408	25,100
September	154	12	80.9	4,810
The period				93,100

KEENE CREEK AT HYATT PRAIRIE, NEAR ASHLAND, OREG.

LOCATION.—In SW. $\frac{1}{4}$ sec. 16, T. 39 S., R. 3 E., near proposed dam site at Hyatt Prairie, 3 miles north of Green Spring Mountain road from Ashland to Klamath Falls, and 20 miles from Ashland, Jackson County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—April 1, 1917, to September 30, 1921, with some breaks in record when stream was practically dry.

GAGE.—Stevens continuous water-stage recorder on right bank 100 feet above proposed dam site. Inspected by engineers of Talent Irrigation District.

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

CHANNEL AND CONTROL.—Stream bed, sand and clay; may shift in extreme floods; control of rock and boulders, practically permanent.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 3.60 feet at noon April 25 (discharge, 176 second-feet); stream practically dry September 5–12.

1917–1921: Maximum open-channel stage from water-stage recorder, 4.08 feet April 25, 1917 (discharge, 194 second-feet). Creek goes practically dry each summer.

ICE.—Stage-discharge relation seriously affected by ice most of time from December 16 to some time in March, records suspended after December 28.

DIVERSIONS.—Practically none above station.

REGULATION.—None.

ACCURACY.—Stage-discharge relation permanent, affected by ice December 17–28. Water-stage recorder not operating during winter; operating satisfactorily for remainder of year except for short periods. Daily discharge ascertained by applying to rating table mean daily gage heights determined by inspecting recorder graph; mean discharge for periods when recorder not operating and during winter estimated from climatic record. Records, when recorder was operating, good; for periods when discharge was estimated, fair.

No measurements made during year.

Daily discharge, in second-feet, of Keene Creek at Hyatt Prairie, near Ashland, Oreg., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1		1.4	9.4				68	78	34	4.2		0.1
2		1.4	7.2				79	72	34	8.8		.1
3		1.4	12				65	58	41	3.5		.1
4		1.3	6.5				64	50	40	3.4		.1
5		1.3	5.3				57	52	27	3.3		.0
6		1.3	8.4				52	50	23	3.2		.0
7		1.3	12				57	44	22	3.1		.0
8		1.2	8.8				66	47	20	3.0		.0
9		1.2	6.4				68	50	18	3.0		.0
10		1.2	6.2				76	54	17	2.9		.0
11		1.3	5.9				82	57	15	2.9		.0
12		1.7	6.0				69	63	14	2.8		.0
13		2.2	5.7				71	68	13	2.7		.2
14		2.1	5.6				67	75	13	2.6		.2
15	1.0	2.3	5.5			28	51	76	13	2.4		.2
16		10		10	7		50	81	13	2.4	1.0	.2
17		47					53	83	12	2.4		.2
18		21					50	74	11	2.3		.2
19		22					49	72	12	2.2		.1
20		11					56	88	10	2.1		.1
21		9.4					82	78	7.8	2.1		.1
22		10					88	70	6.5	2.0		.1
23		7.4	5				82	68	5.7	1.8		.3
24		6.9					83	66	5.3	1.8		1.5
25		7.6					92	64	4.9	1.8		2.9
26		35					60	60	4.6	1.8		2.6
27							59	56	4.4	1.8		2.1
28	1.8	12					70	52	4.5	1.8		1.8
29	1.8	11				38	80	84	4.4	1.8		1.6
30	1.6	10				41	78	43	4.4	1.8		1.5
31	1.5					52		38		1.0		

NOTE.—No gage-height record Oct. 1-27, Nov. 26, 27, Dec. 29 to Mar. 28, Apr. 28, June 29, July 29, and July 31 to Aug. 31; stage-discharge relation affected by ice Dec. 16-28. Discharge for these periods estimated from study of temperature and precipitation.

Monthly discharge of Keene Creek at Hyatt Prairie, near Ashland, Oreg., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	1.8		1.09	67
November	47	1.2	9.26	551
December	12		6.16	379
January			10.0	615
February			7.00	389
March			29.5	1,810
April	92	49	67.5	4,020
May	88	38	62.6	3,850
June	51	4.4	15.5	922
July	4.2	1.0	2.51	154
August			1.08	61
September	2.9		.64	32
The year	92		17.7	12,800

SHASTA RIVER NEAR MONTAGUE, CALIF.

LOCATION.—In N. $\frac{1}{2}$ NE. $\frac{1}{4}$ sec. 33, T. 45 N., R. 6 W., at highway bridge $1\frac{1}{4}$ miles southwest of Montague, Siskiyou County. Little Shasta River enters 1 mile above and Yreka Creek $5\frac{1}{2}$ miles below station.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—August 24, 1911, to September 30, 1913; September 20, 1916, to September 30, 1921.

GAGE.—Vertical staff in two sections; lower section fastened to bridge pier on right bank; upper section to left abutment. Several changes in gage section have been made but original datum has been maintained. Gage read by J. Q. Spooner.

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

CHANNEL AND CONTROL.—Small boulders and gravel; fairly permanent. Banks are subject to overflow during very high water. Zero flow 2.00 feet August 12, 1921.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 8.0 feet February 21 (discharge, about 3,630 second-feet); minimum stage, 2.3 feet July 21–23, 25, and July 31 to August 2 (discharge, 3 second-feet).

1911–1921: Maximum stage recorded, 8.0 feet February 21, 1921 (discharge, 3,630 second-feet); minimum stage, 2.1 feet April 7, 1918 (discharge, 1.5 second-feet).

DIVERSIONS.—The Dwinnell ditch diverts about 30 second-feet 2 miles above gage. The Grenada ditch diverts about 40 second-feet 12 miles above gage. Some water is probably returned to river above gage. Other small ditches divert above station.

REGULATION.—Considerable diurnal fluctuation at the gage due to irrigation above.

ACCURACY.—Stage-discharge relation changed February 21. Rating curves well defined below 600 second-feet and extended above. Gage read to half-tenths once daily. Daily discharge ascertained by applying daily gage height to rating table. Records good below 600 second-feet, except those for irrigating season, which are fair, and poor above 600 second-feet.

Discharge measurements of Shasta River near Montague, Calif., during the year ending Sept. 30, 1921

Date	Made by—	Gage height	Dis-charge
		<i>Feet</i>	<i>Sec.-ft.</i>
May 11	K. M. Kelley.....	3. 28	140
May 12	do.....	3. 35	164
Aug. 11	Jesse Arnold.....	2. 70	85

Daily discharge, in second-feet, of Shasta River near Montague, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	57	148	355	660	660	660	277	177	149	48	3	35
2.....	57	148	315	490	490	690	277	207	149	48	3	35
3.....	57	148	277	395	395	720	296	224	163	48	5	35
4.....	66	148	277	395	395	785	315	240	177	48	5	35
5.....	97	148	240	660	375	1, 140	277	240	177	42	7	35
6.....	148	162	207	990	355	990	277	258	177	42	7	35
7.....	148	148	207	490	355	850	258	240	177	35	14	35
8.....	148	148	240	315	355	818	258	207	163	35	14	23
9.....	148	148	258	315	355	785	240	177	149	35	18	23
10.....	148	148	258	315	440	752	240	149	177	23	23	23
11.....	148	148	395	315	465	752	240	149	163	14	35	35
12.....	162	177	660	315	545	720	224	149	149	7	35	56
13.....	177	207	545	296	545	660	207	177	149	7	35	56
14.....	177	207	395	296	660	660	207	240	149	7	35	65
15.....	192	207	315	296	1, 960	660	207	240	138	7	35	65
16.....	192	240	315	277	1, 290	630	207	315	138	7	23	94
17.....	192	395	395	277	990	572	207	149	126	7	29	94
18.....	192	395	395	1, 370	440	545	192	395	126	7	35	104
19.....	177	990	355	990	395	490	177	490	126	5	35	104
20.....	148	1, 220	315	660	630	465	163	545	115	5	35	104
21.....	148	1, 220	395	355	3, 630	440	149	490	104	3	23	104
22.....	148	990	355	315	2, 780	418	126	440	104	3	29	104
23.....	148	395	315	315	1, 960	418	126	355	83	3	35	104
24.....	148	395	315	315	990	395	126	315	83	5	35	104
25.....	148	490	315	315	720	375	138	240	83	3	35	115
26.....	148	490	315	355	660	355	126	240	83	7	35	115
27.....	148	1, 370	315	1, 870	660	355	126	277	83	7	35	115
28.....	148	545	315	990	660	355	138	296	65	7	35	115
29.....	148	395	315	490	-----	355	126	240	65	7	35	115
30.....	148	395	315	920	-----	335	126	224	48	7	29	115
31.....	148	-----	395	1, 060	-----	315	-----	177	-----	3	29	-----

*Monthly discharge of Shasta River near Montague, Calif., for the year ending
Sept. 30, 1921*

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	192	57	144	8,850
November.....	1,370	148	412	24,500
December.....	660	207	335	20,600
January.....	1,870	277	562	34,600
February.....	3,630	355	863	47,900
March.....	1,140	315	595	36,600
April.....	315	126	202	12,000
May.....	545	149	267	16,400
June.....	177	48	128	7,620
July.....	48	3	17.2	1,060
August.....	35	3	25.4	1,560
September.....	115	23	73.2	4,360
The year.....	3,630	3	298	216,000

EAST FORK OF SCOTT RIVER AT CALLAHAN, CALIF.

LOCATION.—In SW. $\frac{1}{4}$ SW. $\frac{1}{4}$ sec. 16, T. 40 N., R. 8 W., in Shasta National Forest, at highway bridge at Callahan, Siskiyou County, 800 feet above junction with South Fork.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—September 9, 1913, to September 20, 1921, when station was discontinued.

GAGE.—Staff in two sections on left bank; lower section, inclined, is fastened to cottonwood tree 10 feet above bridge; upper section, vertical, is fastened to large cottonwood tree 5 feet above lower section; read by F. H. Williams.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading.

CHANNEL AND CONTROL.—Boulders and small gravel; fairly permanent. One channel at all stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 8.6 feet November 19 (discharge, 1,800 second-feet); minimum stage recorded, 5.2 feet part of October, August, and September (discharge, 6.5 second-feet).

1913-1921: Maximum stage recorded, that of November 19, 1920; minimum stage recorded, 5.03 feet September 7, 1920 (discharge, 1.5 second-feet).

DIVERSIONS.—No information.

REGULATION.—No information.

ACCURACY.—Stage-discharge relation not changed during year. Rating curve fairly well defined below 250 second-feet and extended above. Gage read to half-tenths occasionally. Daily discharge ascertained by applying gage height to rating table. Records fair.

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

The following discharge measurement was made by Jesse Arnold:

August 13, 1921: Gage height, 5.28 feet; discharge, 7.9 second-feet.

Daily discharge, in second-feet, of East Fork of Scott River at Callahan, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.		12							6.5
2.					480			15	
3.	12	12					110		
4.				274					6.5
5.		12			595		100		
6.	12			220		595			
7.							100		6.5
8.				220	508		83		
9.						428			
10.		12							6.5
11.				274	428				
12.	12	18				380	69		
13.				274	508			12	6.5
14.							55	12	
15.	6.5	18		220	725	274			
16.									
17.				160			41	6.5	
18.	6.5	1,200			660	220			6.5
19.		1,860		160					
20.	6.5						32	6.5	9.5
21.									
22.	6.5	274	255	189		220			
23.			220	220	404		23	6.5	
24.					565	160			
25.	6.5		189	220					
26.		1,200		255				6.5	
27.			160		535	160	15		
28.	12								
29.		122	160	480				6.5	
30.		100			404	147	15		
31.			220						

SCOTT RIVER AT CALLAHAN, CALIF.

LOCATION.—In NE. $\frac{1}{4}$ sec. 17, T. 40 N., R. 8 W., in Shasta National Forest, at highway bridge three-fourths mile below junction of East and South forks and 1 mile northwest of Callahan, Siskiyou County. Wildcat Creek enters 500 feet above and Sugar Creek $1\frac{1}{2}$ miles below station.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—June 12, 1911, to August 13, 1921, when station was discontinued.

GAGE.—Vertical staff in three sections on right bank; installed November 14, 1912; original gage was just above power house about 2,000 feet above present site; present gage installed at independent datum, which on June 26, 1914, was raised 0.97 foot. Gage read by F. H. Williams.

DISCHARGE MEASUREMENTS.—Made from highway bridge at gage or by wading.

CHANNEL AND CONTROL.—Gravel and boulders; fairly permanent. One channel at all stages.

EXTREMES OF DISCHARGE.—1911–1921: Maximum stage recorded, 3.65 feet November 19, 1921 (discharge, about 1,140 second-feet); minimum stage recorded, 0.67 foot September 7, 1920 (discharge, 5.5 second-feet).

DIVERSIONS.—No information.

REGULATION.—No information.

ACCURACY.—Stage-discharge relation not changed during period. Rating curve fairly well defined. Gage read to half-tenths four days in November. Discharge ascertained by applying gage height to rating table. Records fair but are incomplete.

COOPERATION.—Gage-height record furnished by United States Forest Service,

The following discharge measurement was made by Jesse Arnold:

August 13, 1921: Gage height, 0.96 foot; discharge, 20 second-feet.

Daily discharge, in second-feet, of Scott River at Callahan, Calif., for the year ending Sept. 30, 1921

Date	Discharge	Date	Discharge	Date	Discharge
Nov. 19.....	1,140	Nov. 26.....	1,080	Aug. 13.....	19
22.....	452	28.....	476		

INDIAN CREEK AT HAPPY CAMP, CALIF.

LOCATION.—In NW. $\frac{1}{4}$ sec. 22, T. 17 N., R. 7 E., in Klamath National Forest, at highway bridge at Robert's ranch, $4\frac{3}{4}$ miles north of Happy Camp, Siskiyou County, and junction with Klamath River.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—September 8, 1911, to February 28, 1921, when station was discontinued (fragmentary).

GAGE.—Staff in two sections at bridge. No. 1, vertical, fastened to tree on right bank 5 feet below bridge; No. 2, inclined, fastened to alder tree on left bank 12 feet below bridge. Several changes have been made in the sections since the gage was installed November 20, 1912. Original gage was vertical staff fastened to alder tree on left bank about 700 feet above bridge at an independent datum. Gage read by M. M. Morgan.

DISCHARGE MEASUREMENTS.—Made from bridge at gage or by wading.

CHANNEL AND CONTROL.—Small boulders and gravel; permanent.

EXTREMES OF DISCHARGE.—1911–1921; Maximum stage recorded, 10.6 feet (original gage) February 17, 1912 (discharge, from extension of rating curve, about 8,430 second-feet); minimum stage recorded, 2.5 feet August 19 to September 6, 1914 (discharge, 20 second-feet).

DIVERSIONS.—The Reeve Davis Consolidated Mining Co.'s ditch diverts water above and returns it to the stream below the station; but none was diverted this year. Other small ditches use water for mining.

REGULATION.—None.

ACCURACY.—No measurements were made during year. Rating curve used in 1920 used this year. Gage read to tenths occasionally, December to February. Daily discharge ascertained by applying gage height to rating table. Records fair.

COOPERATION.—Gage-height record furnished by United States Forset Service.

No discharge measurements were made during year.

Daily discharge, in second-feet, of Indian Creek near Happy Camp, Calif., for the period Oct. 1, 1920, to Feb. 28, 1921

Date	Discharge	Date	Discharge	Date	Discharge
Dec. 2.....	660	Dec. 31.....	1,770	Jan. 31.....	510
4.....	720	Jan. 7.....	1,100	Feb. 26.....	470
8.....	470	26.....	470	27.....	555
24.....	605	27.....	555	28.....	510
29.....	945	28.....	510		

TRINITY RIVER AT LEWISTON, CALIF.

LOCATION.—In NE. $\frac{1}{4}$ sec. 19, T. 33 N., R. 8 W., at highway bridge at Lewiston, Trinity County, and 9 miles below Stewarts Fork. Indian Creek enters 6 miles below station.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—August 28, 1911, to September 30, 1921.

GAGE.—Vertical staff in two sections on left bank at bridge; lower section fastened to pile 10 feet above bridge; upper section fastened to downstream end of bridge abutment. Gage read by R. N. Phillips.

DISCHARGE MEASUREMENTS.—Made from bridge at gage or by wading.

CHANNEL AND CONTROL.—Small boulders and gravel; practically permanent. Banks are subject to overflow at extreme high water.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 13.4 feet at 5 p. m. November 18 (discharge, 18,500 second-feet); minimum stage, 2.00 feet October 1-5 (discharge, 82 second-feet).

1911-1921: Maximum stage recorded, 16.7 feet at 12.30 p. m. January 2, 1914 (discharge, from extension of rating curve, about 26,900 second-feet); minimum stage, 1.80 feet August 15-17 and 21-25, 1920 (discharge, 43 second-feet).

DIVERSIONS.—Water is diverted above station for irrigation, placer mining, and development of power.

REGULATION.—None.

ACCURACY.—Stage-discharge relation changed November 18. Rating curves well defined between 50 and 8,000 second-feet and extended above. Gage read to half-tenths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table. Records excellent except those for very high water, which are probably fair.

Discharge measurements of Trinity River at Lewiston, Calif., during the year ending Sept. 30, 1921

Date	Made by—	Gage height	Dis-charge	Date	Made by—	Gage height	Dis-charge
May 16	K. M. Kelley.....	Feet 7.70	Sec.-ft. 6,100	May 18	K. M. Kelley.....	Feet 6.49	Sec.-ft. 4,060
17	do.....	6.98	4,750	Aug. 16	Jesse Arnold.....	2.45	243
17	do.....	6.91	4,820				

Daily discharge, in second-feet, of Trinity River at Lewiston, Calif., for the year ending Sept. 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	82	202	2,130	3,950	2,600	3,950	4,530	5,670	4,680	1,820	350	150
2.....	82	171	2,730	3,670	2,360	4,830	5,490	4,380	5,150	1,530	372	150
3.....	82	165	2,130	3,670	2,130	6,030	5,850	3,670	5,320	1,350	372	150
4.....	82	165	2,130	3,950	2,130	6,940	4,680	3,390	5,150	1,260	359	150
5.....	82	165	1,720	8,500	2,600	8,100	3,950	3,120	5,320	1,260	350	150
6.....	223	165	1,720	5,670	2,130	7,320	3,390	3,120	5,490	1,350	328	150
7.....	352	165	1,530	4,230	1,920	6,210	3,390	3,390	5,670	1,260	305	150
8.....	195	165	1,530	3,390	1,820	5,490	3,390	3,950	4,990	1,260	305	150
9.....	159	150	1,720	2,860	1,920	4,830	3,530	4,530	4,380	1,180	269	144
10.....	165	150	1,720	2,360	2,730	4,830	3,950	4,990	4,530	1,100	260	135
11.....	171	171	2,860	2,130	3,250	4,680	4,230	5,490	4,530	1,020	260	135
12.....	272	293	2,130	2,130	3,250	4,380	4,380	5,850	4,230	940	260	135
13.....	237	575	1,720	1,720	3,670	4,830	3,950	5,850	3,950	870	260	135
14.....	195	390	1,530	1,620	7,700	4,830	5,530	7,320	3,390	870	252	135
15.....	258	352	1,350	1,620	5,150	4,380	3,120	7,510	2,730	838	240	135
16.....	223	2,470	1,260	1,620	3,950	4,230	2,600	6,570	2,360	772	228	135
17.....	202	15,300	1,180	3,250	3,390	4,630	2,730	4,830	2,360	740	220	135
18.....	237	17,300	1,620	3,950	2,730	4,830	2,600	3,950	2,360	675	220	150
19.....	258	15,600	2,360	3,120	2,600	4,230	2,600	4,230	2,480	675	220	178
20.....	230	6,570	2,020	2,600	2,600	3,810	2,600	4,530	2,480	615	220	192
21.....	230	3,950	1,620	2,130	3,670	3,950	3,250	4,230	2,860	615	220	202
22.....	230	3,670	1,530	1,920	3,120	3,670	4,380	4,230	2,730	555	220	178
23.....	237	2,600	1,350	1,920	2,860	3,670	4,530	5,490	2,600	600	202	150
24.....	272	2,130	1,260	1,920	2,600	4,090	3,810	5,850	2,360	500	202	168
25.....	293	1,920	1,180	1,920	2,990	3,810	3,390	6,390	2,130	500	202	157
26.....	258	4,530	1,180	2,130	3,120	3,670	3,670	7,320	2,130	489	192	150
27.....	237	4,530	1,180	4,230	3,670	3,390	3,950	8,100	2,130	489	185	150
28.....	230	2,980	1,180	3,530	3,950	3,250	5,150	5,850	2,020	420	168	135
29.....	202	2,360	1,530	2,860	-----	3,530	6,210	4,530	2,020	395	150	135
30.....	195	2,130	6,940	3,950	-----	3,670	5,850	4,090	2,020	372	150	126
31.....	195	-----	6,210	2,990	-----	4,230	-----	4,530	-----	350	150	-----

Monthly discharge of Trinity River at Lewiston, Calif., for the year ending Sept. 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October.....	352	82	205	12,600
November.....	17,300	150	3,060	182,000
December.....	6,940	1,180	2,010	124,000
January.....	8,500	1,620	3,060	188,000
February.....	7,700	1,820	3,090	172,000
March.....	8,100	3,250	4,650	286,000
April.....	6,210	2,600	3,960	236,000
May.....	8,100	3,120	5,060	311,000
June.....	5,670	2,020	3,480	207,000
July.....	1,820	350	857	52,700
August.....	372	150	248	15,300
September.....	202	126	150	8,930
The year.....	17,300	82	2,480	1,800,000

MISCELLANEOUS MEASUREMENTS

Measurements of stream flow in the Pacific slope basins of California at points other than gaging stations are listed in the following tables:

Miscellaneous discharge measurements in Pacific slope basins in California during the year ending Sept. 30, 1921

Streams south of San Francisco Bay

Date	Stream	Tributary to or diverting from—	Locality	Gage height	Discharge
				Feet	Sec.-ft. α 0
Dec. 10	Tia Juana River	Pacific Ocean	Near Ysidro		
	San Diego River	do	Above Boulder Creek near Lakeside, Calif.		.5
Mar. 6	do	do	do		3.1
21	do	do	do		9.5
May 5	do	do	do		.9
7	do	do	do		23
22	do	do	do		19
Mar. 21	do	do	Diverting dam, near Lakeside, Calif.	9.52	2.8
May 7	do	do	do	9.68	17.3
22	do	do	do	9.68	15.6
Dec. 10	do	do	El Capitan dam site, near Lakeside, Calif.	1.00	.2
Feb. 5	do	do	do	1.10	1.9
Mar. 6	do	do	do	1.00	1.5
21	do	do	do	.95	3.3
May 5	do	do	do	.90	1.2
7	do	do	do	1.20	21
Nov. 12	Cuyamaca Water Co.'s flume	Diverts from San Diego River	Near San Diego, Calif. South Fork of San Diego River, near Alpine.	.94	α 0 8
Feb. 5	do	do	do	.99	8.4
Mar. 6	do	do	do	1.00	6.6
21	do	do	do	1.37	14.2
May 5	do	do	do	1.23	10.9
22	do	do	do	1.52	19.2
July 21	do	do	do	.89	6.2
Nov. 12	do	do	Crossing of Chocolate Creek	.82	8.6
Feb. 5	do	do	do	.86	7.8
Mar. 21	do	do	do	1.18	14.4
May 5	do	do	do	.96	10.4
July 21	do	do	do	.68	5.6
Nov. 12	do	do	do	.56	4.6
Jan. 31	do	do	Grossmont, Calif.	.80	9.2
Mar. 17	do	do	do	1.00	11.8
21	do	do	do	1.09	14
Apr. 11	do	do	do	.35	2.4
May 5	do	do	do	.57	4.8
22	do	do	do	.85	10.7
July 21	do	do	do	.67	6.8

α Stream dry all year.

Miscellaneous discharge measurements in Pacific slope basins in California during the year ending Sept. 30, 1921—Continued

Streams south of San Francisco Bay—Continued

Date	Stream	Tributary to or diverting from—	Locality	Gage height	Discharge
				<i>Feet</i>	<i>Sec.-ft.</i>
Feb. 5	South Fork of San Diego River	Diverts from San Diego River.	Below intake of South Fork flume, near Alpine, Calif.		0.1
5	Cuyamaca Water Co.'s South Fork flume.	Diverts from South Fork of San Diego River.	Intake, near Alpine, Calif.		1.3
Mar. 21	do	do	do		1.7
Jan. 31	La Mesa ditch	Diverts from San Diego River.	Intake, near La Mesa, Calif.	1.05	5.6
Mar. 17	do	do	do	1.17	6.6
Feb. 11	San Vicente ditch	San Diego River.	Foster, Calif.		a 0
10	East San Pasqual ditch	Diverts from San Dieguito River.	Intake, near San Pasqual, Calif.		7.2
Apr. 21	West San Pasqual ditch.	do	do		2
Feb. 10	Webb ditch	do	do		2.2
10	Myars ditch	do	do		2.9
Feb. 11	Guelito Creek	do	Mouth, Calif.		a 0
Apr. 23	Lake Hodges conduit.	Diverts from Lake Hodges.	Lake Hodges, Calif.	.71	3.1
May 10	do	do	do	.68	3.2
July 9	do	do	do	1.05	5.8
16	do	do	do	.99	5.7
30	do	do	do	.99	5.7
Apr. 23	do	do	Outlet at Del Mar, Calif.		3.1
May 10	do	do	do		3.2
Nov. 19	San Luis Rey River	Pacific Ocean	Abandoned United States Geological Survey gaging station near Bonsall.	.98	1.3
Dec. 21	do	do	do	1.10	21
Feb. 2	do	do	do	1.02	24
Apr. 21	do	do	do	.83	1.5
Dec. 23	Santa Ana River	do	Colton Bridge at Colton, Calif.		1.7
Jan. 15	do	do	do		0
Feb. 6	do	do	do		48
Mar. 5	do	do	do		21
30	do	do	do		57
Apr. 16	do	do	do		0
21	do	do	do		0
May 18	do	do	do		0
June 1	do	do	do		0
July 26	do	do	do		0
Sept. 16	do	do	do		0
Dec. 23	do	do	Rubidoux Bridge, West Riverside, Calif.		40
Jan. 15	do	do	do		38
Feb. 6	do	do	do		99
Mar. 5	do	do	do		65
30	do	do	do		102
Apr. 16	do	do	do		24
21	do	do	do		28
May 18	do	do	do		17
June 1	do	do	do		38
July 26	do	do	do		10
Sept. 16	do	do	do		10
Dec. 23	do	do	Salt Lake Railway Bridge at Riverside Narrows, Calif.		97
Jan. 15	do	do	do		86
Feb. 6	do	do	do		144
Mar. 5	do	do	do		106
30	do	do	do		157
Apr. 16	do	do	do		63
21	do	do	do		64
May 18	do	do	do		68
June 1	do	do	do		87
July 26	do	do	do		50
Sept. 16	do	do	do		48
Dec. 23	do	do	Rincon Narrows, near Corona, Calif.		178
May 30	do	do	do		205
July 26	do	do	do		79
Feb. 11	Warm Creek	Santa Ana River	Base Line Bridge, near San Bernardino, Calif.		8.4
Mar. 9	do	do	do		6.4
Apr. 20	do	do	do		2.5

* Stream dry all year.

Miscellaneous discharge measurements in Pacific slope basins in California during the year ending Sept. 30, 1921—Continued

Streams south of San Francisco Bay—Continued

Date	Stream	Tributary to or diverting from—	Locality	Gage height	Dis-charge
				<i>Feet</i>	<i>Sec.-ft.</i>
Feb. 11	Warm Creek.....	Santa Ana River.....	10 feet above Olty Creek, near San Bernardino, Calif.	-----	29
Mar. 9	.....do.....	.....do.....	.....do.....	-----	26
Apr. 20	.....do.....	.....do.....	20 feet below City Creek, near San Bernardino, Calif.	-----	47
Feb. 11	.....do.....	.....do.....	150 feet above Town Creek, near San Bernardino, Calif.	-----	40
Mar. 9	.....do.....	.....do.....	.....do.....	-----	39
Apr. 20	.....do.....	.....do.....	.....do.....	-----	52
Apr. 20	.....do.....	.....do.....	100 feet above Lytle Creek, near San Bernardino, Calif.	-----	85
Feb. 11	.....do.....	.....do.....	50 feet below Lytle Creek, near San Bernardino, Calif.	-----	77
Mar. 9	.....do.....	.....do.....	.....do.....	-----	66
Apr. 21	Strawberry Creek.....	Warm Creek.....	Willow Nook Ave., San Bernardino, Calif.	-----	.4
Feb. 11	City Creek.....	.....do.....	Mouth, near San Bernardino, Calif.	-----	4.1
Mar. 9	.....do.....	.....do.....	.....do.....	-----	3.8
Apr. 20	.....do.....	.....do.....	.....do.....	-----	3.3
Feb. 11	Town Creek.....	.....do.....	.....do.....	-----	2.4
Mar. 9	.....do.....	.....do.....	.....do.....	-----	2.4
Apr. 20	.....do.....	.....do.....	.....do.....	-----	2.2
Apr. 13	Devil Canyon Creek.....	Town Creek.....	Wiggins Hill, near Devore, Calif.	-----	.4
Apr. 13	Waterman Canyon Creek.....	.....do.....	Willow Nook Ave., Arrowhead Springs.	-----	1.2
Feb. 11	Lytle Creek.....	Warm Creek.....	Mouth, near San Bernardino, Calif.	-----	3.2
Mar. 9	.....do.....	.....do.....	.....do.....	-----	2.9
Apr. 20	.....do.....	.....do.....	.....do.....	-----	2.0
May 5	North Fork of San Jacinto River.	San Jacinto River.....	Just above Lake Hemet Water Co.'s diversion, near San Jacinto, Calif.	-----	8.9
June 6	.....do.....	.....do.....	.....do.....	-----	15
May 5	Lake Hemet Water Co.'s main canal.	Diverts from San Jacinto River.	Opposite United States Geological Survey gaging station on San Jacinto River, near San Jacinto, Calif.	-----	16.3
June 1	.....do.....	.....do.....	.....do.....	-----	28
6	.....do.....	.....do.....	.....do.....	-----	25
Sept. 16	.....do.....	.....do.....	.....do.....	-----	16.6
Jan. 20	Santiago Creek.....	Santa Ana River.....	100 feet above Serrano & Carpenter Water Co.'s dam, near Villa Park, Calif.	-----	2.8
Apr. 14	San Gabriel River.....	Pacific Ocean.....	800 feet below Foothill Boulevard Bridge, near Azusa, Calif.	-----	48
21	.....do.....	.....do.....	.....do.....	-----	.4
Apr. 12	San Dimas Water Co.'s diversion.	Diverts from San Dimas Creek.	100 feet below gaging station on San Dimas Creek, near San Dimas, Calif.	-----	2.8
Mar. 29	Glendora Consolidated Mutual Water Co.'s diversion.	Diverts from Dalton Creek.	Opposite gaging station on Dalton Creek, near Glendora, Calif.	-----	.9
Apr. 16	.....do.....	.....do.....	.....do.....	-----	.9
25	.....do.....	.....do.....	.....do.....	-----	.6
May 3	.....do.....	.....do.....	.....do.....	-----	.6
6	.....do.....	.....do.....	.....do.....	-----	1.3
12	.....do.....	.....do.....	.....do.....	-----	.8
June 7	.....do.....	.....do.....	.....do.....	-----	1.0
28	.....do.....	.....do.....	.....do.....	-----	.7
Mar. 3	San Fernando Water Co.'s diversion.	Diverts from Pacoima Creek.	100 feet below gaging station on Pacoima Creek, near San Fernando, Calif.	-----	2.7
11	.....do.....	.....do.....	.....do.....	-----	2.9
Apr. 7	.....do.....	.....do.....	.....do.....	-----	3.6
22	.....do.....	.....do.....	.....do.....	-----	3.5
May 2	.....do.....	.....do.....	.....do.....	-----	3.4
July 13	.....do.....	.....do.....	.....do.....	-----	3.1

Miscellaneous discharge measurements in Pacific slope basins in California during the year ending Sept. 30, 1921—Continued

Streams south of San Francisco Bay—Continued

Date	Stream	Tributary to or diverting from—	Locality	Gage height	Discharge
				<i>Feet</i>	<i>Sec.-ft.</i>
Apr. 27	Tujunga Creek.....	Los Angeles River....	Los Angeles Aqueduct dam site at mouth of canyon, near Sunland, Calif.	-----	3.7
28	do.....	do.....	do.....	-----	4.4
May 9	do.....	do.....	do.....	-----	9.8
11	do.....	do.....	do.....	-----	8.2
13	do.....	do.....	do.....	-----	5.9
18	do.....	do.....	do.....	-----	7.7
28	do.....	do.....	do.....	-----	56
June 1	do.....	do.....	do.....	-----	43
Apr. 28	do.....	do.....	State highway crossing, near Sunland, Calif.	-----	3.3
May 11	do.....	do.....	do.....	-----	6.2
13	do.....	do.....	do.....	-----	4.4
18	do.....	do.....	do.....	-----	6.3
27	do.....	do.....	do.....	-----	50
28	do.....	do.....	do.....	-----	42
June 1	do.....	do.....	do.....	-----	34
May 11	do.....	do.....	Orcas Ave. ford above mouth of Little Tujunga Creek, 3 miles east of Pacoima, Calif.	-----	6.2
13	do.....	do.....	do.....	-----	1.3
18	do.....	do.....	do.....	-----	3.4
27	do.....	do.....	do.....	-----	49
June 1	do.....	do.....	do.....	-----	27
May 11	do.....	do.....	Hansons Hill, about 1 mile below mouth of Little Tujunga Creek, 2 miles east of Pacoima, Calif.	-----	1.7
June 1	do.....	do.....	do.....	-----	22
Mar. 3	Sunland Water Co.'s diversion.	Diverts from Tujunga Creek.	Bryant ranch, near Sunland, Calif.	-----	1.4
11	do.....	do.....	do.....	-----	1.7
Apr. 7	do.....	do.....	do.....	-----	.3
23	do.....	do.....	do.....	-----	1.6
27	do.....	do.....	do.....	-----	1.7
May 9	do.....	do.....	do.....	-----	1.2
11	do.....	do.....	do.....	-----	1.7
July 13	do.....	do.....	do.....	-----	2.5
Apr. 27	Ditch.....	do.....	Ford above Johnstone ranch, near Sunland, Calif.	-----	1.4
27	do.....	do.....	Opposite Johnstone ranch, near Sunland, Calif.	-----	1.4
May 9	do.....	do.....	do.....	-----	2.5
11	do.....	do.....	do.....	-----	1.8
18	do.....	do.....	do.....	-----	1.4
Oct. 7	Eaton Creek.....	Rio Hondo.....	Just above upper tunnel, near Pasadena, Calif.	-----	.2
Apr. 5	do.....	do.....	1/2 mile above gaging station on Eaton Creek near Pasadena, Calif.	-----	1.2
June 8	do.....	do.....	do.....	-----	2.4
Oct. 6	Piru Creek.....	Santa Clara River.....	At Piru, Calif.	-----	5.4
Jan. 28	West Fork of Sespe Creek.	Sespe Creek.....	200 feet above mouth, near Sespe, Calif.	-----	10
Oct. 3	Fillmore Land & Water Co.'s canal.	Diverts from Sespe Creek.	Intake, near Sespe, Calif.	-----	4.7
July 9	do.....	do.....	do.....	-----	11
Apr. 29	Big Rock Creek.....	Antelope Valley.....	15 feet below Pallet Creek, near Valyermo, Calif.	-----	7.7
29	Pallet Creek.....	Big Rock Creek.....	50 feet above mouth, near Valyermo, Calif.	-----	.2
29	Little Rock Creek.....	Antelope Valley.....	300 feet above Palmdale Irrigation Co.'s diversion, near Valyermo.	-----	9.4
May 1	Sheep Creek.....	do.....	Just below Swartout Canyon Creek, near Valyermo, Calif.	-----	.3
Apr. 28	Big Oak Creek.....	do.....	N.E. 1/4 sec. 15, T. 11 N., R. 14 W., near Valyermo, Calif.	-----	.6
28	Cottonwood Creek.....	do.....	Knechts ranch, near Valyermo, Calif.	-----	3.1

Miscellaneous discharge measurements in Pacific slope basins in California during the year ending Sept. 30, 1921—Continued

Streams south of San Francisco Bay—Continued

Date	Stream	Tributary to or diverting from—	Locality	Gage height	Discharge
				<i>Feet</i>	<i>Sec.-ft.</i>
Mar. 21	Clark Colony canal.....	Diverts from Arroyo Seco.	Intake, near Greenfields, Calif.	4.33	70
21	do.....	do.	do.	3.21	5.5
Jan. 14	Cypress Street Lateral.....	Diverts from Clark Colony canal.	Head of lateral near Greenfields, Calif.		7.6
14	do.....	do.	End of lateral near Greenfields, Calif.		4.7
Jan. 8	Laguna Seca.....	Coyote River.....	Old United States Geological Survey gaging station, near Coyote, Calif.		0
22	do.....	do.	do.	1.13	2.4
31	do.....	do.	do.		0
Dec. 10	do.....	do.	Mouth, near Coyote, Calif.		0
Jan. 8	do.....	do.	do.		0
Mar. 22	do.....	do.	do.		14.5
Aug. 1	Kern River.....	Kern Basin.....	Above Big Arroyo in sec. 16, T. 17 S., R. 33 E., Calif.		194
July 31	do.....	do.	Above Kern Lake in sec. 33, T. 18 S., R. 33 E., Calif.		308
Aug. 3	do.....	do.	Kern flat T. 20 S., R. 33 E., Calif.		282
5	do.....	do.	Below Little Kern River in sec. 5, T. 21 S., R. 33 E., Calif.		317
July 25	do.....	do.	Below Salmon Creek near Kernville, Calif.		53
Aug. 7	do.....	do.	do.		8.9
June 13	do.....	do.	Bridge at Kernville, Calif.	5.06	2,330
Aug. 1	Big Arroyo.....	Kern River.....	Mouth in T. 17 S., R. 33 E., Calif.		41
July 30	Golden Trout Creek.....	do.....	Tunnel in T. 18 S., R. 34 E., Calif.	1.00	11
Aug. 7	Tobias Creek.....	do.....	In sec. 23, T. 23 S., R. 32 E., 50 feet above diversion, near Kernville, Calif.		1.7
July 30	South Fork of Kern River.....	do.....	Tunnel in T. 17 S., R. 33 E., Calif.		2.7
29	do.....	do.	Monache Meadow in T. 20 S., R. 35 E., Calif.	.63	9.3
June 13	do.....	do.	Isabella, Calif.	1.08	99
July 25	do.....	do.	do.	.53	10
June 14	Borel canal.....	do.....	Near Kernville, Calif.	7.55	620
Nov. 16	Deer Creek.....	Tulare Lake.....	Highway bridge on old Porterville-Hot Springs Road, near Porterville, Calif.		24
Apr. 5	do.....	do.	do.		29
2	Kaweah River.....	do.	McKay Point near Lemon Cove, Calif.	1.08	784
4	do.....	do.	Electric railway bridge 1 mile above McKay Point, Calif.	6.40	742
2	Merryman ditch.....	Diverts from Kaweah River.	Above McKay Point at the weir, near Lemon Cove, Calif.	.67	11.0
2	Wachumna ditch.....	do.	Above McKay Point, near Lemon Cove, Calif.	1.55	96
Sept. 14	South Fork of Kings River.....	Kings River.....	Above Bubbs Creek in sec. 13, T. 13 S., R. 37 E., Calif.		34
16	do.....	do.	do.		33
17	do.....	do.	do.		34
13	do.....	do.	Zumalt Meadow in sec. 15, T. 13 S., R. 31 E., Calif.		71
14	do.....	do.	do.		69
16	do.....	do.	do.		64
14	do.....	do.	Below Roaring River in sec. 17, T. 13 S., R. 31 E., Calif.		80
17	do.....	do.	do.		83
Aug. 29	do.....	do.	Mouth, near Hume, Calif.		134
31	do.....	do.	do.		124
Sept. 5	do.....	do.	do.		155
5	do.....	do.	do.		159
7	do.....	do.	do.		138
9	do.....	do.	do.		130

Miscellaneous discharge measurements in Pacific slope basins in California during the year ending Sept. 30, 1921—Continued

Streams south of San Francisco Bay—Continued

Date	Stream	Tributary to or diverting from—	Locality	Gage height	Dis-charge
				<i>Feet</i>	<i>Sec-ft.</i>
Aug. 29	Kings River.....	Tulare Lake.....	Gaging station, near Hume, Calif.	1.91	277
30	do.....	do.....	do.....	1.88	250
Sept. 2	do.....	do.....	do.....	2.18	402
3	do.....	do.....	do.....	2.27	466
7	do.....	do.....	do.....	1.90	290
9	do.....	do.....	do.....	1.85	258
30	do.....	do.....	do.....	1.54	154
7	Middle Fork of Kings River.	Kings River.....	Mouth, near Hume, Calif.		137
9	do.....	do.....	do.....		115
30	do.....	do.....	do.....		64
Aug. 15	Tenmile Creek.....	do.....	200 yards above lake, at Hume, Calif.		2.2
Sept. 9	do.....	do.....	Mouth, near Hume, Calif.		1.8

San Joaquin River basin

Feb. 26	Miller and Lux flume.....	Fresno River.....	Near Knowles, Calif.		3.7
Oct. 29	Merced River.....	San Joaquin River.....	Below power house, near Yosemite, Calif.		19.3
29	Yosemite power plant tailrace.	Merced River.....	Power house, near Yosemite, Calif.		22
June 3	Sierra & San Francisco Power Co.'s main ditch.	South Fork of Stanislaus River.	Intake at Lyons Dam.....	1.31	47.6
3	do.....	do.....	do.....	1.00	30.0
3	do.....	do.....	do.....	.66	15.4
3	do.....	do.....	do.....	.44	7.4

Sacramento River basin

Sept. 14	North Fork of Pit River	Pit River.....	Alturas, Calif.		* 4
13	Pit River.....	Sacramento River.....	3 miles below Canby, Calif.		* 5
13	do.....	do.....	Lookout, Calif.		* 2
13	do.....	do.....	Bieber, Calif.		* 5
10	do.....	do.....	Below Fall River, near Fall River Mills, Calif.	1.81	1,360
7	do.....	do.....	Intake of proposed Pit River No. 5 power plant, near Big Bend, Calif.	1.75	2,560
13	Ash Creek.....	Pit River.....	Adin, Calif.		* 10
5	Fall River.....	do.....	Shaffer ranch, near Fall River Mills, Calif.	1.32	1,190
5	Bear Creek.....	Fall River.....	Erickson ranch, near Dana, Calif.	1.02	* 8
4	Hat Creek.....	Pit River.....	Wilcox ranch, near Cassel, Calif.	2.12	101
11	do.....	do.....	Giesner ranch, near Cassel, Calif.	.41	* 1
3	do.....	do.....	do.....		0
9	Rising River.....	Hat Creek.....	Near Cassel, Calif.	1.89	290
3	Burney Creek.....	Pit River.....	Near Burney, Calif.	.70	17
3	do.....	do.....	Below Burney Falls, near Burney, Calif.	.89	152
Aug. 20	Thomas Creek.....	Sacramento River.....	8 miles above Faskenta, Calif.		3.1
May 31	Nelson Creek.....	Middle Fork of Feather River.	Road crossing, near Nelson Point, Calif.	4.00	303
Sept. 12	North Fork of Yuba River.	Yuba River.....	Above North Fork of North Fork of Yuba River, 1 mile above Downsville, Calif.		101
13	South Fork of Yuba River.	do.....	200 feet below highway bridge near Nevada City, Calif.		57
May 1	Bear River.....	Feather River.....	Above Pacific Gas & Electric Co.'s dam, near Colfax, Calif.		532
July 16	do.....	do.....	do.....		313
May 1	do.....	do.....	500 feet below Pacific Gas & Electric Co.'s dam near Colfax, Calif.		267
Apr. 30	do.....	do.....	Abandoned United States Geological Survey gaging station, near Colfax, Calif.		162
Aug. 21	do.....	do.....	do.....		* 3

* Estimated.

Miscellaneous discharge measurements in Pacific slope basins in California during the year ending Sept. 30, 1921—Continued

Streams north of San Francisco Bay

Date	Stream	Tributary to or diverting from—	Locality	Gage height	Discharge
Aug. 6	Middle Fork of Eel River.	Eel River.....	Dos Rios, Calif.....	<i>Feet</i>	<i>Sec.-ft.</i> 13.6
6	South Eel River.....	do.....	do.....		6.0

Klamath River basin

Oct. 29	Big Spring Creek.....	Williamson River in Klamath Marsh.	Below tributary, on Lenz ranch in sec. 22, T. 30 S., R. 8 E., Ore.		21.1
Apr. 29	do.....	do.....	do.....		30.3
June 23	do.....	do.....	do.....		31.0
Sept. 1	do.....	do.....	do.....		25.9
Oct. 29	Scott Creek.....	do.....	Discontinued gaging station near Fort Klamath, Ore.		4.8
Sept. 30	do.....	do.....	do.....		9.0
Apr. 12	Brown Creek.....	Sprague River.....	Highway bridge, near Beatty, Ore.		20.3
Aug. 26	do.....	do.....	do.....		4.2
Aug. 30	Fort Creek.....	Wood River.....	Near Fort Klamath in sec. 26, T. 33 S., R. 7½ E., Ore.		72
Sept. 28	do.....	do.....	do.....		88
Aug. 30	Crooked Creek.....	do.....	Road crossing near Klamath Agency, Ore.		37.1
Sept. 29	do.....	do.....	Klamath Agency in sec. 13, T. 34 S., R. 7½ E., Ore.		75
July 12	Fourmile Creek.....	Upper Klamath Lake.	Outlet of Fourmile Lake, former gaging station, Ore.	2.02	69
30	do.....	do.....	do.....	1.80	37
Aug. 9	do.....	do.....	do.....	1.60	18.4
30	do.....	do.....	do.....	1.25	4.0
Sept. 28	do.....	do.....	do.....	1.00	1.7
Oct. 18	Salmon River.....	Klamath River.....	Mouth at Somes Bar, Calif.		146

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