DEPARTMENT OF THE INTERIOR
Hubert Work, Secretary

U. S. GEOLOGICAL SURVEY
George Otis Smith, Director

Water-Supply Paper 530

SURFACE WATER SUPPLY OF THE UNITED STATES

1921

PART X. THE GREAT BASIN

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Prepared in cooperation with the States of
IDAHO, UTAH, NEVADA, CALIFORNIA, and OREGON

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SURFACE WATER SUPPLY OF THE GREAT BASIN, 1921

AUTHORIZATION AND SCOPE OF WORK

This volume is one of a series of 14 reports presenting results of measurements of flow made on streams in the United States during the year ending September 30, 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 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 appropriation 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 to 1922, inclusive	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; coopera tion of the second kind is acknowledged on page 9.

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 are made at other points. In connection with this work data were also collected in regard to precipitation, evaporation, storage reservoirs, river profiles, and water power in many sections of the country and will be made available in 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, miner's inches, and discharge in second-feet per square mile, and (2) those that represent the actual quantity of water, as run-off in 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.

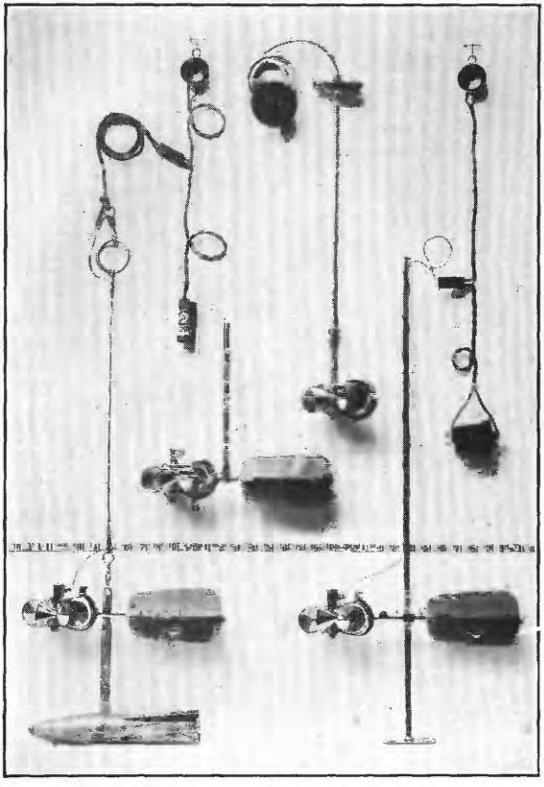
"Run-off in inches" is the depth to which an area would be covered if all the water flowing from it in a given period were uniformly distributed on the surface. It is used for comparing run-off with rainfall, which is usually expressed in depth in inches.

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.

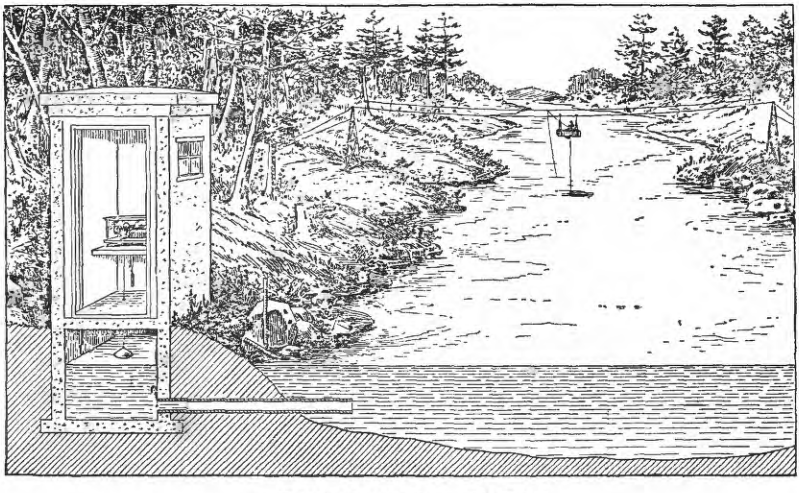
The following terms not in common use are here defined:

"Stage-discharge relation," an abbreviation for the term "relation of gage height to discharge."

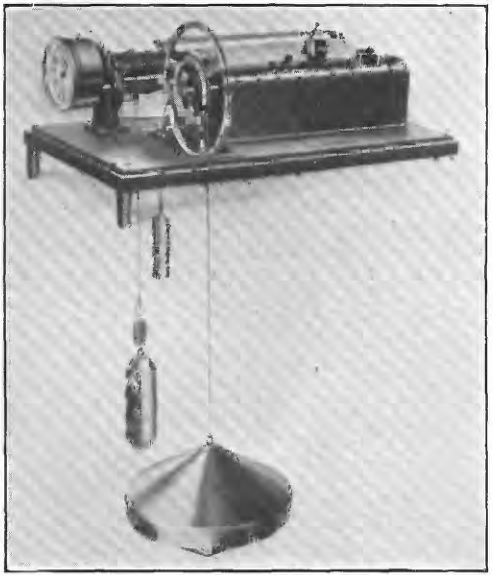
"Control," a term used to designate the section or sections of the stream below the gage which determine the stage-discharge relation at the gage. It should be noted that the control may not be the same section or sections at all stages.



A. PRICE CURRENT METERS



B. TYPICAL GAGING STATION



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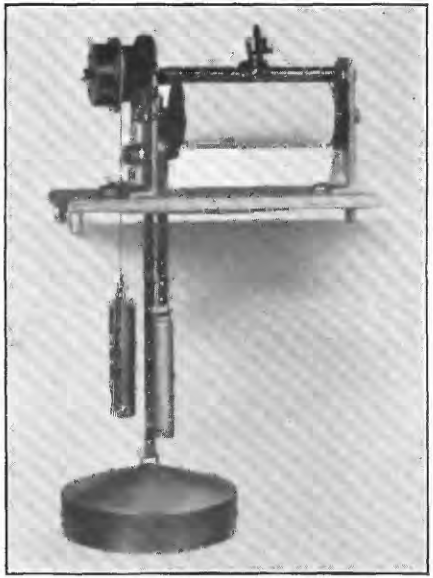

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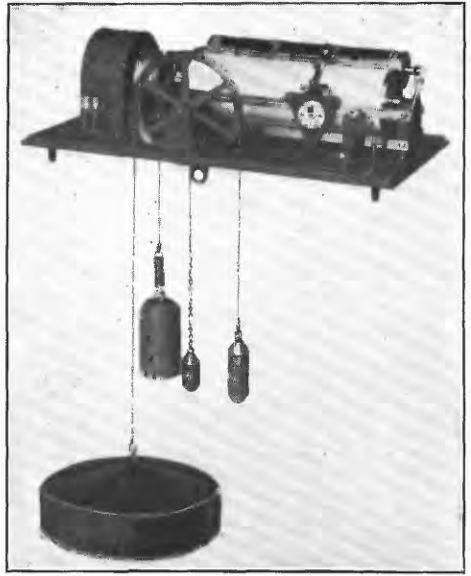

C

WATER-STAGE RECORDERS

A, Au; *B*, Gurley; *C*, Stevens

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.

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, gives the daily discharge from which the monthly and yearly mean discharge is determined.

The data presented for each gaging station in the area covered by this report comprise a description of the station, a table giving results 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 heights and results 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 constancy 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.

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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 fluctuation 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 principal 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 for each 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, measurements of flow, and interpretation of records.

A paragraph in the description of the station or footnotes added to the tables 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 heights to the rating table to obtain the daily discharge.[1]

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

[1] For a more detailed discussion of the accuracy of stream-flow data see Grover, N. C., and Hoyt, J. C. Accuracy of stream-flow data: U. S. Geol. Survey Water-Supply Paper 400, pp. 53–59, 1916.

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" previously published by the Survey should be used with caution because of possible inherent but unknown sources of error.

Many gaging stations on streams in the irrigated sections 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. Where figures are given these can not be considered exact but as being 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, underground waters, and quality of waters. Most of the results of these investigations have been published in the series of water-supply papers, but some have appeared in the bulletins, professional papers, annual reports, 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 (St. John River to York River).
II. South Atlantic and eastern Gulf of Mexico basins (James River to Mississippi River).
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.

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

2. Set of the reports may be consulted in the libraries of the principal cities in the United States.

3. 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., 316 Jackson Building.
Chattanooga, Tenn., 37 Municipal Building.
Columbus, Ohio, Engineering Experimental Station, Ohio State University.
Chicago, Ill., 950 Transportation Building.
Madison, Wis., care of Railroad Commission of Wisconsin.
Ames, Iowa, State Highway Commission Building.
Rolla, Mo., Rolla Building, School of Mines and Metallurgy.
Topeka, Kans., 23 Federal Building.
Helena, Mont., 45–46 Federal Building.
Denver, Colo., 403 Post Office Building.
Salt Lake City, Utah, 313 Federal Building.
Idaho Falls, Idaho, 228 Federal Building.
Boise, Idaho, Federal Building.
Tacoma, Wash., 404 Federal Building.
Portland, Oreg., 606 Post Office Building.
San Francisco, Calif., 303 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, 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 below:

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 to 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.

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 following table gives, by years and drainage basins, the numbers of the papers on surface-water supply published from 1899 to 1920. The data from any particular station will, in general, be found in the reports covering the years during which the station was maintained. For example, data for Machias River at Whitneyville, Me., 1903 to 1920, are published in Water-Supply Papers 97, 124, 165, 201, 241, 261, 281, 301, 321, 351, 381, 401, 431, 451, 471, 501, and 521, which contain records for the New England streams from 1903 to 1921. Results of miscellaneous measurements are published by drainage basins.

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

Year	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII		
												A	B	C
1899 [a]	35	[b] 35, 36	36	36	36	[c] 36, 37	37	37	[d] 37, 38	38, [e] 39	38, [f] 39	38	38	38
1900 [g]	47, [h] 48	48	48, [i] 49	49	49	49, [j] 50	50	50	50	51	51	51	51	51
1901	65, 75	65, 75	65, 75	65, 75	[k] 65, 66, 75	66, 75	66, 75	[k] 65, 66, 75	66, 75	66, 75	66, 75	66, 75	66, 78	66, 75
1902	82	[b] 82, 83	83	[l] 82, 83	[k] 83, 85	84	[k] 83, 84	84	85	85	85	85	85	85
1903	97	[b] 97, 98	98	97	[k] 98, 99, [m] 100	99	[k] 98, 99	99	100	100	100	100	100	100
1904	[n] 124, [o] 125, [p] 126	[p] 126, 127	128	129	[k] 128, 130	130, [q] 131	[k] 128, 131	132	133	133, [r] 134	134	135	135	135
1905	[n] 165, [o] 166, [p] 167	[p] 167, 168	169	170	171	172	[k] 169, 173	174	176, [s] 177	176, [r] 177	177	178	178	[t] 177, 178
1906	[n] 201, [o] 202, [p] 203	[p] 203, 204	205	206	207	208	[k] 205, 209	210	211	212, [r] 213	213	214	214	214
1907–8	241	242	243	244	245	246	247	248	249	250, [r] 251	251	252	252	252
1909	261	262	263	264	265	266	267	268	269	270, [r] 271	271	272	272	272
1910	281	282	283	284	285	286	287	288	289	290	291	292	292	292
1911	301	302	303	304	305	306	307	308	309	310	311	312	312	312
1912	321	322	323	324	325	326	327	328	329	330	331	332–A	332–B	332–C
1913	351	352	353	354	355	356	357	358	359	360	361	362–A	362–B	362–C
1914	381	382	383	384	385	386	387	388	389	390	391	392	393	394
1915	401	402	403	404	405	406	407	408	409	410	411	412	413	414
1916	431	432	433	434	435	436	437	438	439	440	441	442	443	444
1917	451	452	453	454	455	456	457	458	459	460	461	462	463	464
1918	471	472	473	474	475	476	477	478	479	480	481	482	483	484
1919–20	501	502	503	504	505	506	507	508	509	510	511	512	513	514
1921	521	522	523	524	525	526	527	528	529	530	531	532	533	534

[a] Rating tables and index to Water-Supply Papers 35–39 contained in Water-Supply Paper 39. Monthly discharge for 1899 in Twenty-first Annual Report, Part IV.
[b] James River only.
[c] Gallatin River.
[d] Green and Gunison rivers and Grand River above junction with Gunnison.
[e] Mohave River only.
[f] Kings and Kern rivers and south Pacific slope basins.
[g] Rating tables and index to Water-Supply Papers 47–52 and data on precipitation, wells, and irrigation in California and Utah contained in Water-Supply Paper 52. Monthly discharge for 1900 in Twenty-second Annual Report, Part IV.
[h] Wissahickon and Schuylkill rivers to James River.
[i] Scioto River.
[j] Loup and Platte rivers near Columbus, Nebr., and all tributaries below junction with Platte.
[k] Tributaries of Mississippi from east.
[l] Lake Ontario and tributaries to St. Lawrence River proper.
[m] Hudson Bay only.
[n] New England rivers only.
[o] Hudson River to Delaware River, inclusive.
[p] Susquehanna River to Yadkin River, inclusive.
[q] Platte and Kansas rivers.
[r] Great Basin in California, except Truckee and Carson River basins.
[s] Below junction with Gila.
[t] Rogue, Umpqua, and Siletz rivers only.

COOPERATION

During the year ending September 30, 1921, the work in Utah, Nevada, California, Oregon, Idaho, and Wyoming has been done under cooperative agreements between the United States Geological Survey and the respective States.

Cooperation with the States is effected under contracts which are made between the Director of the Federal Survey and the State engineers or other officials and are authorized by legislative acts appropriating moneys. The State contracts are essentially of the same order, the principal provisions being substantially as follows:

1. The United States Geological Survey retains direct supervision of the field work and the preparation of the data for publication.

2. The Federal Survey retains possession of field notes, maps, and other material collected, but this material is open at all times to inspection by the State officials, and if not satisfactory the agreements can be terminated at any time.

3. The salaries of gage observers and engineers and the traveling and field expenses of the engineers are divided between the two parties in some manner agreed upon, the accounts being rendered monthly in accordance with the regulations of the Federal Survey.

4. The streams and localities in which investigations shall be made are determined by conference between the State officials and the representatives of the United States Geological Survey.

5. The cost of publication is borne entirely by the Federal Survey.

Special acknowledgments are due to G. F. McGonagle, succeeded by R. E. Caldwell, State engineer of Utah; J. G. Scrugham, State engineer of Nevada; W. F. McClure, State engineer of California; the State Water Commission of California; Percy A. Cupper, State engineer of Oregon; W. G. Swendsen, commissioner of reclamation of Idaho; and Frank C. Emerson, State engineer of Wyoming, for the very efficient manner in which they have represented their States in the cooperative investigations.

Acknowledgments are also due to the officials and employees of the United States Bureau of Reclamation; the United States Forest Service; the United States Weather Bureau; Utah Power & Light Co.; Department of Public Service, Los Angeles, Calif.; and Southern Pacific Co., for free use of data collected by them.

Financial assistance has been rendered by the United States Office of Indian Affairs, Silver Creek Valley Irrigation District, Harney Valley Irrigation District, Chewacan Land & Cattle Co., Eastern Oregon Livestock Co., and Wm. Hanley Co.

DIVISION OF WORK

Data for stations in Utah and Nevada were collected and prepared for publication under the direction of A. B. Purton, district engineer, assisted by W. E. Dickinson, J. J. Sanford, J. W. Bones, R. R. Rowe, E. C. Howard, J. W. Mangan, M. T. Wilson, D. M. Corbett, and Miss Lysle Christensen.

For stations in California the data were collected and prepared for publication under the direction of H. D. McGlashan, district engineer, assisted by William Kessler, R. C. Briggs, K. M. Kelley, Jesse Arnold, and J. E. Jones.

For stations in Oregon, the data were collected and prepared for publication under the direction of F. F. Henshaw, district engineer, assisted by R. C. Briggs, J. J. Dirzulaitis, and J. W. Bones.

For stations in Idaho the data were collected and prepared for publication under the direction of C. G. Paulsen, district engineer, assisted by A. G. Fiedler, L. L. Bryan, Berkeley Johnson, and Miss E. H. Haugse.

For the station in Wyoming the data were collected and prepared for publication under the direction of Robert Follansbee, district engineer, assisted by J. B. Spiegel.

The records were reviewed and the manuscript assembled by B. J. Peterson.

GAGING-STATION RECORDS

GREAT SALT LAKE BASIN

GAGES ON GREAT SALT LAKE

LOCATION.—At Saltair, on southeast shore of lake, 15 miles west of Salt Lake City, and at Midlake, on Lucin cut-off of Southern Pacific Railroad, 30 miles west of Ogden, Weber County, Utah.

RECORDS AVAILABLE.—September 14, 1875, to December 15, 1899; March to July, 1904; October 1, 1912, to September 30, 1921. Records have appeared in publications of United States Geological Survey, as follows: Gage heights September 14, 1875, to January 4, 1890, in Monograph I, "Lake Bonneville," by G. K. Gilbert; gage heights September, 1875, to December, 1891, in the Thirteenth Annual Report of the Director, Part III; gage heights September 14, 1875, to December 15, 1899, in Water-Supply Paper 38; gage heights March 9 to July 21, 1904, in Water-Supply Paper 133; since October 1, 1912, gage heights have been published in water-supply papers. Chart showing variation in level of Great Salt Lake and monthly and annual precipitation in Great Salt Lake basin from 1850 to 1913 compiled from chart in office of chief engineer of Oregon Short Line Railroad, Salt Lake City, Utah, published by United States Geological Survey in Water-Supply Papers 330 and 395.

GAGES.—Midlake gage read August 15, 1902, to September 30, 1921, by Southern Pacific Co. Saltair gage read July 1, 1903, to September 30, 1921, by United States Weather Bureau. Other gages used at various times are described in earlier water-supply papers. Datum of Midlake gage is 4,198.0 feet above mean sea level as determined by comparative readings with other gages in 1916. Datum of Saltair gage is 4,196.8 feet above mean sea level as determined by levels by topographic branch in 1922.

EXTREMES OF STAGE.—Maximum stage recorded during year 4,203.3 feet above mean sea level on June 15, at Midlake gage. Minimum stage, 4,200.6 feet on October 1 and 15 at Saltair gage.

1850–1921: Maximum stage recorded, 4,211.3 feet above mean sea level July 12, 1877. Estimated maximum stage 4,212.5 feet occurred in 1868 (data furnished by Marcus E. Jones, Salt Lake City). Minimum stage 4,195.7 feet in 1902.

ACCURACY.—Saltair gage is read to tenths of feet. Midlake gage is read in inches, and reductions have been made to feet and tenths. Apparent inconsistencies in reading are probably largely due to the effect of wind as the two gages are about 40 miles apart.

COOPERATION.—Readings on Midlake gage are furnished by Southern Pacific Co.; readings on Saltair gage by United States Weather Bureau.

Gage height, in feet, of Great Salt Lake, Utah, for the year ending September 30, 1921

Day	Saltair	Midlake	Day	Saltair	Midlake	Day	Saltair	Midlake
Oct. 1	3.8	2.75	Feb. 1	4.6	3.4	June 1	6.3	5.1
15	3.8	2.65	15	4.7	3.5	15	6.4	5.35
Nov. 1	4.0	2.75	Mar. 1	4.9	3.75	July 1	6.4	5.25
15	4.1	2.9	15	5.1	4.0	15	6.1	5.1
Dec. 1	4.2	3.1	Apr. 1	5.4	4.25	Aug. 1	5.9	4.75
15	4.2	3.0	15	5.6	4.5	15	5.8	4.5
Jan. 1	4.4	3.15	May 1	5.8	4.5	Sept. 1	5.3	4.25
15	4.5	3.25	15	6.0	4.75	15	5.2	4.1

BEAR RIVER BASIN

BEAR RIVER NEAR EVANSTON, WYO.

LOCATION.—In sec. 1, T. 15 N., R. 121 W., 300 feet above highway bridge and 3½ miles northwest of Evanston, Uinta County. Nearest tributary, a small stream, enters from southwest half a mile above.

DRAINAGE AREA.—645 square miles (measured on map of Wyoming, scale 1:500,000).

RECORDS AVAILABLE.—October 26, 1913, to September 30, 1921.

GAGE.—Chain on left bank, 300 feet above bridge; read by Mrs. Alex Morrow.

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

CHANNEL AND CONTROL.—Bed composed of coarse gravel. Control at riffle a short distance below gage; shifts at long intervals. Banks subject to overflow at stage of about 5 feet.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 6.35 feet at 6.30 p. m. June 14 (discharge, 3,690 second-feet); minimum stage, 1.26 feet October 5–7 (discharge, 48 second-feet).

1914–1921: Maximum stage recorded that of June 14, 1921; minimum stage, 0.49 foot at 8.15 a. m. August 26, 1919 (discharge, 0.1 second-foot).

ICE.—Stage-discharge relation seriously affected by ice.

DIVERSIONS.—Prior to July 1, 1921, adjudicated diversions of 381 second-feet from Bear River above station and 390 second-feet below.

REGULATION.—Diurnal fluctuation during spring caused by alternate melting and freezing of mountain snow. No artificial regulation.

ACCURACY.—Stage-discharge relation not permanent. Rating curve well defined below 600 second-feet and fairly well defined between 600 and 3,000 second-feet. Gage read to hundredths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table. Records good.

Discharge measurements of Bear River near Evanston, Wyo., during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
May 3	Robert Follansbee	3.00	535	July 30	Robert Follansbee	1.98	197
June 16	J. B. Spiegel	5.72	2,700				

Daily discharge, in second-feet, of Bear River near Evanston, Wyo., for the year ending September 30, 1921.

Day	Oct.	Nov.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	54	117		258	372	1,570	820	202	137
2	51	119		320	408	1,490	720	202	146
3	51	123		495	478	1,490	535	202	153
4	51	128		620	620	1,570	495	190	177
5	48	132		620	720	1,960	495	177	190
6	48	135		425	820	2,510	390	167	163
7	50	135		372	875	3,090	372	153	148
8	54	130		355	770	3,090	355	146	142
9	54	126		338	770	3,090	338	132	135
10	57	119		338	820	3,090	304	153	132
11	65	106		338	820	3,090	320	153	126
12	67	94		338	930	3,240	338	148	119
13	68	84		355	985	3,390	355	175	106
14	74	84	355	390	1,220	3,390	372	244	98
15	83	90	372	425	1,350	3,090	408	216	92
16	86	96	425	390	1,650	2,650	425	172	88
17	92	115	575	425	1,840	2,090	535	158	88
18	90	132	820	460	1,570	1,420	535	142	90
19	94	139	930	390	1,280	1,350	495	130	94
20	98	137	442	355	1,040	1,100	425	119	96
21	106	137	338	355	1,100	930	408	112	94
22	108		304	338	1,220	985	390	108	90
23	117		355	390	1,280	1,040	355	110	86
24	119		320	408	1,420	1,160	355	115	84
25	115	135	273	390	1,350	1,100	338	117	83
26	115		258	372	1,220	1,100	304	108	77
27	120		230	355	1,280	1,040	273	96	74
28	120		216	320	1,650	1,040	258	96	70
29	125	130	216	338	1,960	985	230	88	70
30	128	130	244	338	2,230	930	202	102	70
31	117		244		2,090		202	121	

NOTE.—Stage-discharge relation affected by ice Oct. 25-29 and Nov. 22-28; discharge estimated. Braced figure shows mean daily discharge for period indicated.

Monthly discharge of Bear River near Evanston, Wyo., for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	128	48	84.7	5,210
November	139	84	123	7,320
March 14-31	930	216	384	13,700
April	620	258	387	23,000
May	2,230	372	1,170	71,900
June	3,390	930	1,940	115,000
July	820	202	398	24,500
August	244	88	147	9,040
September	190	70	111	6,600

BEAR RIVER AT HARER, IDAHO

LOCATION.—In NE. ¼ sec. 22, T. 14 S., R. 45 E., three-fourths of a mile north of Harer siding on Oregon Short Line Railroad, 7 miles by road above Dingle, and 14 miles southeast of Montpelier, Bear Lake County.

DRAINAGE AREA.—2,780 square miles (determined by Utah Power & Light Co.).

RECORDS AVAILABLE.—June 21, 1913, to September 30, 1916, and January 1, 1919, to September 30, 1921.

GAGE.—Stevens water-stage recorder on right bank; installed August 24, 1914. Gage inspected by employees of Utah Power & Light Co. Inclined staff on right bank about 1,500 feet downstream used prior to August 24, 1914; control different from that of present gage.

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

CHANNEL AND CONTROL.—Bed of clean, hard material; banks are overflowed at extremely high stages. Control practically permanent.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 10.20 feet at 4 p. m. June 19 (discharge, 3,640 second-feet); minimum discharge, about 230 second-feet, probably occurred during ice-affected period.

1913–1916; 1919–1921: Maximum stage recorded, 10.51 feet June 2, 1920 (discharge, 3,860 second-feet); minimum stage, 2.61 feet at 6.25 a. m. September 1, 1919 (discharge, 81 second-feet).

ICE.—Stage-discharge relation seriously affected by ice.

DIVERSIONS.—No large diversion above station.

REGULATION.—None.

ACCURACY.—Stage-discharge relation practically permanent, except as affected by ice. Rating curve well-defined between 80 and 3,900 second-feet. Operation of water-stage recorder satisfactory. Daily discharge ascertained by applying to rating table mean daily gage height obtained by inspection of recorder graph, except during period of ice effect for which the discharge was determined by applying to rating table mean daily gage height corrected for ice effect by means of discharge measurements, observer's notes, and weather records. Records excellent except during ice-affected period for which they are good.

COOPERATION.—Gage-height record and most of discharge measurements furnished by Utah Power & Light Co.

Discharge measurements of Bear River at Harer, Idaho, during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage	Discharge
		Feet	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 5	Karl Gilgen[a]	3.37	256	Apr. 29	Karl Gilgen	5.66	1,270
12	do	3.41	270	29	A. G. Fiedler	5.64	1,240
19	do	3.58	343	May 3	Karl Gilgen	5.82	1,360
27	do	3.74	395	9	do	8.61	2,810
Nov. 5	do	3.79	397	13	A. G. Fiedler	8.95	2,790
15	do	3.82	412	14	Karl Gilgen	9.04	3,030
23	do	3.82	419	18	do	9.33	3,230
Dec. 2	do	[b]4.01	346	25	do	9.91	3,360
8	do	[b]4.12	386	30	do	9.88	3,500
15	do	[b]3.86	257	June 6	do	9.81	3,450
21	F. M. Atkinson	[b]3.78	318	14	do	9.82	3,360
Jan. 3	Karl Gilgen	[b]3.68	320	24	A. G. Fiedler	9.80	3,300
12	do	[b]3.59	254	25	Karl Gilgen	9.91	3,220
19	do	[b]3.73	303	July 2	do	5.93	1,420
26	L. L. Bryan	[b]3.70	249	7	do	5.25	1,080
Feb. 9	Karl Gilgen	[b]3.76	250	18	do	4.96	983
23	do	[b]4.00	340	26	do	4.55	755
Mar. 5	do	[b]6.19	1,100	Aug. 2	do	4.14	569
14	do	7.34	1,960	4	Berkeley Johnson	4.09	551
19	L. L Bryan	5.98	1,410	12	Karl Gilgen	3.91	474
21	Karl Gilgen	5.91	1,400	Sept. 1	do	3.78	419
28	do	4.86	879	12	do	3.82	426
Apr. 7	do	5.47	1,180	21	do	3.66	373
12	do	4.85	915	26	do	3.71	395
19	do	5.61	1,290				

[a] Employee of Utah Power & Light Co.
[b] Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Bear River at Harer, Idaho, for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	288	417					779	1,300		1,520	570	
2	288	413				458	802	1,300		1,390	570	433
3	281	417					850	1,340	3,400	1,340	548	461
4	278	417		307		732	944	1,440		1,300	548	461
5	269	417			248	1,110	1,040	1,580		1,250	548	465
												469
6	269	421				1,630	1,130	1,780	3,370	1,160	548	
7	266	417	348			1,680	1,180	2,110	3,440	1,040	527	453
8	266	417				1,780	1,180	2,450	3,440	896	502	453
9	263	417				2,160	1,130	2,700	3,440	896	490	449
10	266	417				2,650	1,010	2,850	3,370	873	477	453
												449
11	278	374		260		2,700	944	2,900	3,370	896	481	
12	281	347				2,550	896	2,900	3,300	1,010	477	445
13	281	398				2,210	896	2,900	3,370	967	473	437
14	315	402				2,020	944	2,900	3,370	920	473	433
15	298	425				1,630	1,040	2,900	3,440	896	473	433
			271		300							421
16	294	421				1,250	1,080	2,900	3,500	896	465	
17	304	425				1,300	1,130	2,960	3,570	896	469	386
18	315	429				1,360	1,200	3,120	3,640	944	465	374
19	340	429		296		1,440	1,250	3,240	3,640	896	461	374
20	355	433				1,390	1,300	3,440	3,640	920	461	370
												370
21	359	433	304			1.340	1,390	3,500	3,570	967	457	
22	374	433				1,340	1,390	3,500	3,500	944	453	366
23	378	433				1.300	1,390	3,500	3,440	873	453	366
24	386	441				1,180	1,390	3,500	3,370	826	449	366
25	390	433			349	1,080	1,390	3,440	3,120	779	449	374
												390
26	390	421				1,010	1,340	3,370	2,400	756	437	
27	402	425		251		967	1,300	3,300	2,060	732	437	390
28	406	405	279			920	1,300	3,300	1,930	685	437	390
29	409	396				873	1,300	3,440	1,790	638	429	390
30	413					850	1,300	3,440	1,660	592	429	378
31	417					802		3,440		592	425	382

NOTE.—Stage-discharge relation affected by ice Nov. 29 to Mar. 5. Discharge estimated on account of missing record May 31 to June 5; interpolated June 28 to July 1. Braced figures show estimated mean discharge for periods indicated.

Monthly discharge of Bear River at Harer, Idaho, for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	417	263	326	20,000
November	441	347	416	24,800
December	----------	----------	310	19,100
January	----------	----------	276	17,000
February	----------	----------	295	16,400
March	2,700	----------	1,380	84,800
April	1,390	779	1,140	67,800
May	3,500	1,300	2,800	172,000
June	3,640	1,660	3,190	190,000
July	1,520	592	945	58,100
August	570	425	480	29,500
September	469	366	413	24,600
The year	3,640	----------	1,020	724,000

BEAR RIVER AT ALEXANDER, IDAHO

LOCATION.—In NE. ¼ sec. 18, T. 9 S., R 41 E., half a mile southeast of post office at Alexander, Caribou County, 3 miles above intake of Last Chance canal, and 6 miles above dam of Utah Power & Light Co. near Grace.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—May 27, 1911, to September 30, 1916, and April 17, 1919, to September 30, 1921.

GAGE.—Stevens water-stage recorder on right bank installed September 15, 1914; inspected by employees of Utah Power & Light Co. March 27 to November 14, 1911, an inclined staff on right bank 1,000 feet upstream was used; November 15, 1911, to September 14, 1914, an inclined and vertical staff at present site. Present gage at same datum as staff gage used November 15, 1911, to September 14, 1914.

DISCHARGE MEASUREMENTS.—Made from cable 400 feet above gage during open-channel period.

CHANNEL AND CONTROL.—Bed composed of gravel and sand. One channel at all stages. Control subject to slight change.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 9.46 feet from 8 to 9 p. m. June 13 (discharge, 3,870 second-feet); minimum stage, 5.64 feet October 30 (discharge, 536 second-feet).

1911–1916; 1919–1921: Maximum discharge, 3,940 second-feet; May 25–28, 1914, minimum stage, 4.96 feet at 7 a. m. November 15, 1915 (discharge, 310 second-feet).

ICE.—Stage-discharge relation seriously affected by ice during winter.

DIVERSIONS.—Water is diverted above station for irrigation and for storage for power development.

REGULATION.—Water is diverted from Bear River to North or Mud Lake during spring and released for development of power during low-water season. This water is returned to Bear River about 30 miles above station.

ACCURACY.—Stage-discharge relation not permanent; affected by ice November 29 to February 10. Rating curve used October 1 to February 22 well defined between 480 and 1,500 second-feet; curve used February 25 to September 30 well defined between 500 and 4,000 second-feet. Operation of recorder satisfactory except for breaks in record as noted in footnote to table of daily discharge. Daily discharge ascertained by applying to rating table mean daily gage height obtained by inspection of recorder graph; shifting-control method used May 15–20. Records good.

COOPERATION.—Gage-height record and numerous discharge measurements furnished by Utah Power & Light Co.

Discharge measurements of Bear River at Alexander, Idaho, during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
Oct. 2	Karl Gilgen [a]	5.94	727	Mar. 12	Karl Gilgen	5.82	601
9	do	6.02	761	16	do	5.92	665
16	do	5.85	665	19	do	6.33	900
23	do	5.85	667	20	L. L. Bryan	6.19	810
30	do	5.61	530	23	Karl Gilgen	6.06	767
Nov. 6	do	5.87	665	26	do	6.08	767
12	do	5.66	547	Apr. 2	do	6.26	871
20	do	5.91	712	6	do	6.27	876
26	do	5.78	627	9	do	6.12	788
30	do	[b] 5.77	578	14	do	6.25	893
Dec. 4	do	5.83	645	16	do	6.20	864
7	do	[b] 6.79	1,060	23	do	6.39	977
10	do	6.24	895	Apr. 30	Gilgen and Fiedler	6.22	834
14	do	[b] 6.22	819	30	A. G. Fiedler	6.21	838
20	F. M. Atkinson	[b] 6.61	948	May 7	Karl Gilgen	6.65	1,160
21	Karl Gilgen	[b] 6.40	887	13	do	6.67	1,160
28	do	[b] 6.63	1,100	13	A. G. Fiedler	6.68	1,110
31	do	6.40	1,030	21	Karl Gilgen	7.02	1,450
Jan. 5	do	6.28	944	28	do	6.84	1,290
8	do	[b] 6.19	818	June 4	do	7.80	2,120
18	do	[b] 6.28	880	11	do	9.40	3,820
21	do	[b] 6.32	900	17	do	9.40	3,890
25	L. L. Bryan	[b] 6.13	778	17	A. G. Fiedler	9.40	3,750
29	Karl Gilgen	[b] 5.99	724	28	Karl Gilgen	9.08	3,480
Feb. 2	do	[b] 6.00	742	July 6	do	6.58	1,110
4	do	5.96	727	16	do	6.60	1,110
8	do	6.05	716	23	do	6.64	1,150
11	do	6.10	795	30	do	6.50	1,060
15	do	5.93	712	Aug. 5	Berkeley Johnson	6.56	1,090
19	do	6.21	752	6	Karl Gilgen	6.43	1,030
22	do	5.98	752	Sept. 3	do	6.28	923
25	do	5.99	682	13	do	6.14	824
Mar. 1	do	5.92	661	18	do	6.13	815
4	do	6.16	798	24	do	6.19	842

[a] Employee of Utah Power & Light Co.
[b] Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Bear River at Alexander, Idaho, for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	712	564		786		665	757	820	1,450	1,530	1,080	-------
2	712	611	706	904	710	683	820	851	1,580	1,260	1,050	-------
3	706	634		968		788	916	851	1,970	1,150	1,080	916
4	676	658	700	968	700	851	949	884	2,160	1,260	1,080	884
5	658	664	611	873	658	851	916	949	2,250	1,190	1,050	820
6	682	676	570		640	689	884	1,020	2,350	1,080	1,020	820
7	737	664				653	851	1,120	2,600	851	982	820
8	768	628	999		722	629	820	1,290	2,900	820	982	851
9	761	593		776		588	757	1,330	3,320	1,020	1,050	851
10	780	587	904			593	726	1,290	3,650	1,330	1,120	851
11	817	584	873		811	599	726	1,260	3,760	1,660	1,120	851
12	749	582	792		786	611	714	1,190	3,760	1,580	1,120	820
13	712	576			761	653	671	1,150	3,760	1,490	-------	820
14	694				706	714	820	1,150	3,760	1,370	-------	820
15	664		730		700	708	820	1,290	3,760	1,220	-------	820
16	658	630		866	658	665	820	1,370	3,760	1,120	-------	820
17	664				723	714	788	1,410	3,760	1,120	-------	820
18	700				788	820	788	1,450	3,650	1,080	-------	820
19	725				854	916	788	1,490	3,650	1,080	-------	851
20	712	682			848	851	757	1,450	3,760	1,120	-------	851
21	646	646			765	757	788	1,450	3,760	1,150	-------	851
22	658	628			682	726	820	1,330	3,760	1,150	-------	851
23	652	628			729	726	949	1,290	3,760	1,150	-------	851
24	634	628	925		685	757	1,020	1,290	3,760	1,120	-------	851
25	628	622		776	641	788	982	1,290	3,650	1,080	-------	851
26	634	622			629	726	982	1,260	3,540	1,020	-------	851
27	628	646			629	689	916	1,290	3,540	1,020	-------	851
28	587	616			641	665	884	1,290	3,320	1,020	-------	851
29	570	688			-------	677	851	1,290	2,700	1,050	-------	820
30	536	718			-------	677	851	1,330	2,020	1,050	-------	788
31	559	-------	936		-------	689	-------	1,410	-------	1,050	-------	-------

NOTE.—Discharge estimated because of ice Nov. 29 to Dec. 3, Dec. 7–9, 13–18, 20–30, Jan. 5–31, Feb. 1–3, and 7–10, by graphic method for determining effective gage heights; estimated on account of no record Nov. 14–20. Recorder not in operation Aug. 13 to Sept. 2. Braced figures show mean estimated discharge for periods indicated.

Monthly discharge of Bear River at Alexander, Idaho, for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	817	536	678	41,700
November	718	564	631	37,500
December	-------	570	844	51,900
January	968	-------	819	50,400
February	854	629	716	39,800
March	916	588	713	43,800
April	1,020	671	838	49,900
May	1,490	820	1,230	75,600
June	3,760	1,450	3,130	189,000
July	1,660	820	1,170	71,900
August 1–12	1,120	982	1,060	25,200
September 3–30	916	788	840	46,700

BEAR RIVER NEAR WESTON, IDAHO

LOCATION.—In SE. ¼ sec. 17, T. 16 S., R. 39 E., at Weston-Fairview highway bridge 2 or 3 miles north of Idaho-Utah State boundary and 3 miles east of Weston, Franklin County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—October 21, 1919, to September 30, 1921. Records at this station are comparable with those obtained at the old gaging station near Preston, Idaho, where records are available from October 11, 1889, to January 15, 1917.

GAGE.—Stevens continuous water-stage recorder on left bank; inspected by Mrs. M. Rasmussen.

DISCHARGE MEASUREMENTS.—Made from highway bridge immediately below gage.

CHANNEL AND CONTROL.—Bed composed of gravel and earth. Banks fairly high and covered with brush for the most part; one channel at all stages. Control is a fairly well-defined gravel riffle about 200 feet below gage, but at high stages stage-discharge relation is probably affected by an island a short distance below.

EXTREMES OF DISCHARGE.—On account of faulty operation of recorder during high-stage period maximum stage for year is not determined; minimum stage from water-stage recorder, 1.44 feet at 9 p. m. December 1 (discharge, about 223 second-feet).

1920–1921: Maximum stage occurred in June, 1921, when operation of recorder was faulty; minimum stage, 1.28 feet at 5 p. m. November 15, 1920 (discharge, 174 second-feet).

ICE.—Stage-discharge relation seriously affected by ice during severe winters.

DIVERSIONS.—Numerous ditches divert for irrigation above station. Last Chance canal, which diverts about 4 miles below Alexander station, and West Cache canal, which heads several miles above Weston station, are principal diversions for irrigation between Alexander and Weston stations. Water diverted by Utah Power & Light Co., about 6 miles below Alexander station, is used for development of power and returned to river above gaging station near Weston.

REGULATION.—Considerable diurnal fluctuation is caused by release of water from Oneida reservoir about 25 miles above, which receives water from Mud or North Lake about 160 miles above station, and by operation of power plants above station.

ACCURACY.—Stage-discharge relation practically permanent. Rating curve well defined below 2,800 second-feet and extended above. Operation of water-stage recorder satisfactory except as noted in footnote to table of daily discharge. Daily discharge ascertained by applying to rating table mean daily gage height determined by inspecting recorder graph or by averaging mean gage height for intervals of a day. Records good except for periods when estimates are made because of missing or uncertain gage heights for which they are fair.

COOPERATION.—Gage-height record and numerous discharge measurements furnished by Utah Power & Light Co.

Discharge measurements of Bear River near Weston, Idaho, during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
Oct. 13	H. L. Stoner[a]	1.65	299	Apr. 12	R. P. Flagel	3.68	1,230
Dec. 8	R. P. Flagel[a]	1.95	418	26	A. G. Fiedler	4.27	1,480
17	F. M. Atkinson	1.66	278	May 30	R. P. Flagel	6.32	2,740
18	do	2.04	442	July 6	A. G. Fiedler	[b]3.78	739
Jan. 23	L. L. Bryan	2.82	787	20	R. P. Flagel	2.34	579
24	do	3.57	1,200	Aug. 6	Berkeley Johnson	2.76	743
Feb. 9	R. P. Flagel	1.63	301	6	do	2.62	699
Mar. 21	L. L. Bryan	4.50	1,710	6	do	2.55	690
21	do	4.70	1,770	23	R. P. Flagel	2.33	535

[a] Employees of Utah Power & Light Co.
[b] Intake obstructed; gage height about 1.0 foot too high.

Daily discharge, in second-feet, of Bear River near Weston, Idaho, for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1		880	618	1,100		1,020	696	1,550	2,920		696	903
2	970	927	999	975	1,080	1,020	623	1,820	2,710		1,050	763
3		674	975	1,150		1,350	951	1,820	2,580	960	975	856
4		652	1,050	1,250	1,050	1,550	1,820	1,930	2,710		856	740
5	1,360	631	951	1,270	1,020	1,660	1,870	1,980	2,920		809	903
6		786	1,220	1,170	786	1,760	1,820	2,090	4,060		1,050	1,250
7		951	809	1,250	1,200	1,550	1,710	2,320	3,800	1,650	1,200	1,120
8	920	832	927	1,220	1,100	2,150	1,550	2,710	3,300		856	903
9		880	1,350	696	532	1,120	1,500	2,710	3,460		1,250	786
10		975	1,170	1,170	696	1,050	1,450	2,640			740	809
	310											
11		1,200	1,120	1,220	1,170	999	1,350	2,580		600	623	740
12		1,170	1,170		1,120	999	1,350	2,640	4,300		975	903
13		1,350	1,100	990	1,170	1,050	1,500	2,710			718	999
14	950	652	1,020		1,400	1,350	1,500	2,710			532	1,120
15		316	1,450		1,400	1,400	1,550	2,640			316	1,270
16		786	2,040		1,100	1,300	1,870	2,040	4,240		674	1,220
17	640	975	631		1,150	1,350	1,660	2,850			809	1,200
18		927	342	1,280	951	1,550	1,450	3,000		1,020	999	
19		927	740		740	1,610	1,550	3,000			1,070	
20	930	1,020	1,500		503	1,400	1,550	2,920	4,100		809	
21		856	1,300	1,220	1,020	1,610	1,760	2,580		809	652	840
22	1,120	880	1,350	1,220	1,270	1,500	1,760	2,440		809	696	
23	903	856	1,120	1,020	1,050	1,400	1,760	2,640	3,880	618	951	
24	597	927	1,220	1,270	1,120	1,270	1,610	2,510		515	856	
25	763	718	1,020	1,220	1,050	1,450	1,760	2,210		856	832	
26	631	856	763	1,220	1,070	2,040	1,760	2,150	3,600	1,150		
27	840	927	1,070	975	903	1,820	1,760	2,320		999		
28	1,050	809	1,050		1,100	1,660	1,660	2,320		610	970	1,160
29	903	999	1,100	950	-------	1,450	1,760	2,320		674		
30	1,250	903	1,250		-------	1,400	1,760	2,710	2,320	1,350		
31	763	-------	1,350		-------	1,250	-------	3,000	-------	927		-------

NOTE.—Braced figures show estimated mean discharge for periods indicated. Discharge estimated on account of ice Jan. 12–20. All other estimated periods are due to missing or unreliable gage heights and are based upon comparison with Utah Power & Light Co.'s records at Oneida. Discharge interpolated Oct. 27.

Monthly discharge of Bear River near Weston, Idaho, for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	-------	-------	904	55,600
November	1,350	316	875	52,100
December	2,040	342	1,090	67,000
January	-------	-------	696	1,120	68,900
February	1,400	503	1,030	57,200
March	2,150	999	1,420	87,300
April	1,870	623	1,560	92,800
May	3,000	1,550	2,450	151,000
June	-------	2,580	3,700	220,000
July	-------	-------	915	56,300
August	1,250	316	865	53,200
September	1,270	-------	967	57,500
The year	-------	-------	1,410	1,020,000

BEAR RIVER NEAR COLLINSTON, UTAH

LOCATION.—In W. ½ sec. 34, T. 13 N., R. 2 W., a quarter of a mile below power plant of Utah Power & Light Co., at railroad siding called Wheelon, 4 miles north of Collinston, Box Elder County. Little Malad River enters 20 miles below station.

DRAINAGE AREA.—6,000 square miles (measured on topographic and United States Forest Service maps).

RECORDS AVAILABLE.—July 1, 1889, to September 30, 1921.

GAGE.—Friez eight-day water-stage recorder on left bank installed November 17, 1919; inspected by G. F. Taylor.

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

CHANNEL AND CONTROL.—Bed composed of gravel and sand. Left bank high and covered with willows; not subject to overflow. Right bank fairly high and covered with willows; may be overflowed by exceptionally high floods. Control not well defined.

EXTREMES OF DISCHARGE.—Maximum stage during year, from water-stage recorder, 5.85 feet from 9.30 a. m. to 10 p. m. June 16 (discharge, 6,760 second-feet); minimum stage, 1.04 feet at 4 a. m. August 23 (discharge, 211 second-feet).

1889–1921: Maximum stage recorded, 7.7 feet June 7–10, 1909 (discharge, 11,600 second-feet); minimum stage, 0.42 foot at midnight August 5, 1920 (discharge practically zero).

ICE.—Stage-discharge relation seldom affected by ice.

DIVERSIONS.—West Side and Hammond canals divert water on both sides of Bear River about 2 miles above station. Water can be used from either or both of these canals to supply Wheelon power plant. Water passing Wheelon penstocks is used for irrigation or can be returned to river. There are several large power plants farther upstream and considerable water is diverted for irrigation.

REGULATION.—Flow at station is affected to some extent by operation of power plants and storage and release of water at Bear Lake reservoir.

ACCURACY.—Stage-discharge relation changed slightly a number of times during year; not affected by ice. Rating curves well defined throughout. Operation of water-stage recorder satisfactory except for November 25, 27, December 1, 29, 30, and January 5, 12, and 18. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph. Discharge interpolated for days when recorder was not in operation. Records good.

COOPERATION.—Gage-height record and 7 discharge measurements furnished by Utah Power & Light Co.

Discharge measurements of Bear River near Collinston, Utah, during the year ending September 30, 1921

[Made by R. P. Flagel[a]]

Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Dec. 9	2.60	1,760	June 2	5.56	6,210
Jan. 13	2.21	1,270	July 19	1.76	772
Feb. 10	2.26	1,320	Aug. 24	1.55	558
Apr. 13	3.32	2,850			

[a] Engineer of Utah Power & Light Co.

Daily discharge, in second-feet, of Bear River near Collinston, Utah, for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1,640	1,520	1,540	1,910	1,760	2,570	2,320	3,890	6,160	3,560	624	832
2	1,590	1,580	1,500	1,680	1,760	2,680	1,820	3,830	6,230	2,660	668	693
3	1,350	1,640	1,690	1,780	1,650	3,150	1,710	4,060	6,020	2,280	900	803
4	1,090	1,370	1,740	2,080	1,680	3,560	2,270	4,310	5,730	2,210	774	1,100
5	1,230	1,360	1,720	2,120	1,730	3,860	3,410	4,600	5,510	1,680	641	1,040
6	1,960	1,380	1,620	2,160	1,720	4,060	3,730	4,830	5,160	1,340	616	1,110
7	1,940	1,630	1,870	1,920	1,300	3,970	3,730	5,210	5,570	1,420	841	1,380
8	1,540	1,680	1,500	1,820	1,500	3,710	3,540	5,700	5,800	1,880	747	1,230
9	1,420	1,590	1,560	1,650	1,820	3,710	3,240	5,970	5,880	2,410	658	993
10	1,450	1,590	1,890	1,310	1,370	2,760	3,080	5,810	5,830	1,550	832	900
11	1,350	1,810	1,780	1,500	1,430	2,380	2,880	5,560	5,930	960	408	930
12	1,060	1,710	1,780	1,370	1,820	2,280	2,850	5,350	6,160	632	386	822
13	1,420	1,840	1,780	1,240	1,920	2,340	2,900	5,350	6,380	675	616	930
14	1,540	1,800	1,690	1,430	2,100	2,860	3,190	5,480	6,540	650	535	1,040
15	1,670	1,260	1,430	1,500	2,900	3,600	3,560	5,650	6,690	590	458	1,110
16	1,960	982	1,430	1,920	2,690	3,410	3,890	5,780	6,720	675	318	1,220
17	1,870	1,480	2,160	2,090	2,100	3,020	4,000	5,650	6,580	1,160	488	1,200
18	1,600	1,730	1,760	2,800	1,960	2,980	3,810	5,950	6,250	993	624	1,150
19	1,800	1,640	1,080	3,070	1,690	3,490	3,490	6,270	5,930	860	658	850
20	1,740	1,640	1,280	2,730	1,590	3,690	3,530	6,420	5,720	910	693	860
21	1,960	1,670	1,960	2,490	1,430	3,320	3,570	6,360	5,420	765	511	1,170
22	2,020	1,600	1,690	2,060	2,100	3,120	3,700	6,000	5,350	720	358	1,260
23	1,990	1,720	1,850	1,800	2,210	3,170	4,060	5,560	5,210	675	352	1,230
24	1,680	1,590	1,670	1,780	2,050	3,030	4,350	5,360	5,060	496	566	1,180
25	1,350	1,520	1,800	2,030	2,150	2,910	4,250	5,420	4,920	474	481	982
26	1,550	1,450	1,500	1,890	2,100	3,120	4,200	5,310	4,680	774	451	765
27	1,620	1,540	1,350	1,870	2,280	3,420	4,040	5,280	4,510	1,000	541	880
28	1,510	1,640	1,540	1,800	2,180	3,140	3,910	5,360	4,380	756	738	1,320
29	1,630	1,510	1,600	1,820	-------	2,850	3,810	5,520	4,310	466	429	1,250
30	1,640	1,590	1,700	1,620	-------	2,610	3,800	5,800	4,000	582	590	1,320
31	1,820	-------	1,760	1,560	-------	2,530	-------	5,990	-------	1,070	738	-------

Monthly discharge of Bear River near Collinston, Utah, for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	2,020	1,060	1,610	99,000
November	1,840	982	1,570	93,400
December	2,160	1,080	1,650	101,000
January	3,070	1,240	1,900	117,000
February	2,900	1,300	1,860	105,000
March	4,060	2,280	3,140	193,000
April	4,350	1,710	3,420	204,000
May	6,420	3,830	5,410	333,000
June	6,720	4,000	5,620	334,000
July	3,560	466	1,190	73,200
August	900	318	588	36,200
September	1,380	693	1,050	62,500
The year	6,720	318	2,420	1,750,000

SODA CREEK NEAR SODA SPRINGS, IDAHO

LOCATION.—In sec. 24, T. 8 S., R. 41 E., at George Schmidt ranch, one-eighth mile below confluence of two branches of creek, 5 miles north of Soda Springs, Caribou County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—March 5, 1913, to September 30, 1921.

GAGE.—Vertical staff set in concrete on left bank, a quarter of a mile south of ranch house, installed June 28, 1921, at a datum 3.30 feet higher than former vertical staff at same location which was used August 1, 1913, to July 27, 1921. Gage used March 5 to July 31, 1913, was 30 feet upstream but had same control. Datum of this gage was between 0.1 and 0.2 foot above that of gage used August 1, 1913, to July 27, 1921. George Schmidt, observer.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—Bed composed of lava rock. Control is a reef about 15 feet below gage. Stage-discharge relation affected by aquatic growth.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 4.65 feet at 12.30 p. m. April 4 (discharge, 159 second-feet); minimum stage, 4.05 feet February 9–14 (discharge, 45 second-feet).

1913–1921: Maximum stage recorded, 5.3 feet April 6, 1913 (discharge 324 second-feet); minimum stage, 3.95 feet January 8 and 12–15, 1919 (discharge, 38 second-feet).

ICE.—Stage-discharge relation not affected by ice.

DIVERSIONS.—Practically no water diverted above station; a small ditch diverts water just below.

ACCURACY.—Stage-discharge relation not permanent on account of effect of aquatic growth, but flow is uniform. Well-defined standard rating curve and several curves parallel thereto used. Gage read to quarter-tenths once daily. Daily discharge ascertained by applying gage height to rating table and by shifting-control method. Records good.

Discharge measurements of Soda Creek near Soda Springs, Idaho, during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
Mar. 16	L. L. Bryan	4.15	65.5	June 17	A. G. Fiedler	4.20	67.4
May 1	A. G. Fiedler	4.16	[a]63.4	July 30	Berkeley Johnson	[b]1.00	71.0
17	do	4.24	72.9	Sept. 26	do	1.01	69.9
31	L. L. Bryan	4.24	72.7				

[a] Includes estimated flow in ditch of 4 second-feet.
[b] New gage installed June 28, 1921, at 3.30 feet higher datum.

Daily discharge, in second-feet, of Soda Creek near Soda Springs, Idaho, for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	66	60	57	51	51	55	89	75	75	70	70	76
2	66	60	57	51	51	55	138	72	75	70	70	76
3	66	60	57	51	51	53	148	72	75	70	70	76
4	66	60	57	51	51	53	159	72	75	72	70	83
5	66	60	57	51	51	53	127	72	75	72	70	79
6	66	60	57	51	51	57	111	72	75	67	70	79
7	66	60	57	51	48	57	89	76	75	67	70	79
8	66	60	57	51	48	59	89	72	75	66	70	76
9	66	60	57	51	45	59	79	72	75	66	70	76
10	66	60	57	51	45	59	79	69	75	65	70	76
11	63	60	57	48	45	59	79	69	75	70	70	76
12	63	60	57	48	45	59	78	69	75	69	70	76
13	63	60	53	48	45	62	86	69	75	69	70	76
14	63	60	53	48	45	62	86	69	70	67	70	76
15	63	60	53	48	48	66	93	69	70	67	70	76
16	60	60	53	48	48	66	84	69	70	66	70	76
17	60	60	53	48	48	66	84	70	67	69	70	76
18	60	60	53	48	48	66	84	83	67	70	70	76
19	63	60	53	48	49	70	81	83	67	70	70	76
20	63	60	53	48	49	73	81	75	67	70	70	76
21	60	60	53	48	51	81	84	75	67	70	73	76
22	60	60	51	48	51	81	84	79	67	70	73	76
23	60	57	51	48	52	81	84	79	67	70	73	76
24	60	57	51	51	52	81	84	83	67	70	73	76
25	60	57	51	48	53	81	84	83	67	70	73	73
26	60	57	51	48	53	81	84	83	67	70	73	72
27	60	57	51	48	54	81	81	86	67	70	73	73
28	60	57	51	48	54	86	81	86	67	70	73	73
29	60	57	51	48	-------	86	81	83	67	70	73	73
30	60	57	51	48	-------	89	81	79	67	70	73	73
31	60	-------	51	51	-------	89	-------	73	-------	70	76	-------

NOTE.—Shifting-control method used Feb. 19 to Mar. 2, Apr. 9–14, and July 4–17.

Monthly discharge of Soda Creek near Soda Springs, Idaho, for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	66	60	62.6	3,850
November	60	57	59.2	3,520
December	57	51	53.9	3,310
January	51	48	49.2	3,030
February	54	45	49.4	2,740
March	89	53	68.6	4,220
April	159	78	92.4	5,500
May	86	69	75.4	4,640
June	75	67	70.8	4,210
July	72	65	69.1	4,250
August	76	70	71.2	4,380
September	83	72	75.9	4,520
The year	159	45	66.5	48,200

LOGAN RIVER ABOVE STATE DAM, NEAR LOGAN, UTAH

LOCATION.—In sec. 36, T. 12 N., R. 1 E., at Logan plant of Utah Power & Light Co., 125 feet above confluence of tailrace with river and 2½ miles above Logan, Cache County.

DRAINAGE AREA.—218 square miles (measured on topographic map).

RECORDS AVAILABLE.—May 7, 1913, to September 30, 1921, at present site; June 1, 1896, to July 17, 1903, and April 14, 1904, to December 31, 1912, at old station a quarter of a mile downstream; flow at present station plus that of tailrace comparable to that at old station.

GAGE.—Stevens continuous water-stage recorder on right bank about 100 feet west of power house; inspected by operator of power plant.

DISCHARGE MEASUREMENTS.—Made by wading at gage; high-water measurements made from cable 400 feet downstream and flow in tailrace deducted.

CHANNEL AND CONTROL.—Banks high, clean, and not subject to overflow; right bank is a dry rubble retaining wall. Control is a concrete cut-off wall about 6 feet below gage.

EXTREMES OF DISCHARGE.—Maximum stage during year, from water-stage recorder, 4.68 feet at 3 a. m. June 14 (discharge, 1,380 second-feet); minimum stage from water-stage recorder, 1.15 feet at 2 a. m. December 15 (discharge, 46 second-feet).

1913–1921: Maximum stage recorded, 5.6 feet at 9.30 a. m. March 21, 1916 (discharge estimated, 2,000 second-feet); minimum discharge, 8 second-feet December 11, 1915.

ICE.—Stage-discharge relation seldom affected by ice.

BACKWATER.—Stage-discharge relation affected at times by backwater from State dam, half a mile downstream.

DIVERSIONS.—Utah Power & Light Co. diverts water above station for power, and Logan, Hyde Park & Smithfield canal diverts for irrigation. City of Logan has a municipal power plant about 2 miles above station, but water is returned to river above the two diversions noted. City of Logan is entitled to divert for municipal supply, from 4 to 10 second-feet of water, from springs in sec. 22, T. 12 N., R. 2 E., the quantity depending on flow in river.

REGULATION.—Some diurnal fluctuation is caused at times by operation of two power plants.

ACCURACY.—Stage-discharge relation changed about June 13 during high water; not affected by ice during winter. Rating curves well defined below 500 second-feet and fairly well defined above. Operation of water-stage recorder satisfactory except October 1–7, 12–14, 25, November 15–17, 26, December 4–6, February 9–19, 24–26, April 21–22, May 4, and August 7–9. Hook gage read to hundredths twice a day throughout year. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection. Records good.

COOPERATION.—Gage-height record and 10 discharge measurements furnished by Utah Power & Light Co.

Discharge measurements of Logan River above State dam, near Logan, Utah, during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
Oct. 8	H. L. Stoner[a]	1.39	80	May 30	R. P. Flagel[a]	4.51	1,360
Dec. 7	R. P. Flagel[a]	1.24	56	June 3	do	4.20	1,060
Jan. 10	do	1.25	56	July 21	do	2.42	309
Feb. 7	do	1.24	57	Aug. 23	do	1.70	145
Mar. 15	do	1.52	98	Sept. 30	A. B. Purton	1.44	94
Apr. 18	do	2.02	189				

[a] Engineer of Utah Power & Light Co.

Daily discharge, in second-feet, of Logan River above State dam, near Logan, Utah, for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	78	80	58	64	61	74	198	423	1,220	690	238	118
2	78	75	57	68	58	78	224	542	1,140	645	230	120
3	75	70	58	62	59	96	261	611	1,000	602	223	124
4	72	74	55	58	58	94	276	665	1,130	555	199	122
5	72	76	53	57	59	121	264	660	1,130	537	188	118
6	75	75	53	57	59	99	209	735	1,160	524	188	117
7	75	72	56	56	56	81	182	740	1,180	502	184	117
8	75	74	57	56	68	75	169	650	1,240	490	184	117
9	70	70	56	55	62	64	157	597	1,190	481	179	117
10	101	75	55	59	59	62	157	602	1,200	469	188	127
11	88	64	56	52	61	75	184	655	1,220	461	184	134
12	76	64	62	55	61	91	224	730	1,260	445	179	133
13	75	66	59	59	64	97	253	790	1,310	426	173	129
14	69	83	52	61	63	106	276	865	1,300	415	171	129
15	72	70	47	58	75	97	234	920	1,240	404	165	125
16	75	70	55	56	66	99	204	960	1,230	390	171	124
17	75	72	63	59	63	142	198	990	1,180	372	161	124
18	84	72	61	59	64	209	202	950	1,130	359	155	124
19	81	68	59	61	66	219	219	940	1,080	346	151	131
20	75	74	61	58	68	193	234	875	1,030	318	140	122
21	74	80	57	58	80	182	214	795	1,000	309	140	124
22	69	69	57	59	70	173	250	825	965	300	138	122
23	62	66	53	63	64	173	412	840	930	289	138	129
24	59	63	53	63	63	176	328	860	915	286	138	129
25	57	74	58	64	63	180	291	835	875	275	134	127
26	58	69	74	63	64	178	270	910	845	264	131	124
27	57	69	63	61	68	171	245	1,050	830	256	129	107
28	61	61	59	59	72	167	301	1,210	800	251	125	98
29	61	58	59	58	-------	167	338	1,270	810	240	124	98
30	61	57	61	56	-------	171	378	1,300	760	230	120	96
31	75	-------	66	59	-------	173	-------	1,320	-------	233	122	-------

Monthly discharge of Logan River above State dam, near Logan, Utah, for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	101	57	72.1	4,430
November	83	57	70.3	4,180
December	74	47	57.8	3,550
January	68	52	59.1	3,630
February	80	56	64.1	3,560
March	219	62	132	8,120
April	412	157	245	14,600
May	1,320	423	842	51,800
June	1,310	760	1,080	64,300
July	690	230	399	24,500
August	238	120	164	10,100
September	134	96	121	7,200
The year	1,320	47	276	200,000

UTAH POWER & LIGHT CO.'S TAILRACE NEAR LOGAN, UTAH

LOCATION.—In NE. ¼ sec. 36, T. 12 N., R. 1 E., 100 feet below power house at plant of Utah Power & Light Co. and 2½ miles above Logan, Cache County.

RECORDS AVAILABLE.—May 7, 1913, to September 30, 1921.

GAGE.—Friez water-stage recorder on right bank just above weir; replaced by Stevens continuous water-stage recorder February 26, 1921; inspected by plant operator.

DISCHARGE MEASUREMENTS.—Made from footbridge just above gage.

CHANNEL AND CONTROL.—A rectangular wooden weir, with a metal crest strip, just below gage acts as control. Capacity of channel above weir not sufficient to eliminate all velocity of approach. Length of crest, 17.7 feet. Stage of zero flow, zero on gage.

ICE.—Stage-discharge relation not affected by ice.

REGULATION.—Flow at station affected by operation of power plant.

ACCURACY—Stage-discharge relation permanent. Rating curve well defined. Operation of water-stage recorder satisfactory. Staff gage read to hundredths twice a day. Daily discharge ascertained by applying mean daily gage height to rating table. Plant shut down March 17 to April 2; discharge estimated. Leakage through turbines March 17-30 estimated 3 second-feet. Records good.

COOPERATION.—Gage height record and 11 discharge measurements furnished by Utah Power & Light Co.

Canal diverts water from right bank of Logan River in SE.¼ SW.¼ sec. 29, T. 12 N., R. 2 E. Water is returned to river 125 feet below gaging station on Logan River above State dam in NE.¼ sec. 36, T. 12 N., R. 1 E. Water is used for development of power.

Discharge measurements of Utah Power & Light Co.'s tailrace near Logan, Utah, during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
Oct. 8	H. L. Stoner[a]	1.13	81	June 3	R. P. Flagel[a]	1.08	79
Dec. 7	R. P. Flagel[a]	1.09	80	July 21	do	1.04	72
Jan. 10	do	.97	60	Aug. 23	do	.94	64
Feb. 1	do	.78	46.1	Sept. 20	Flagel and Stoner	.95	62
Mar. 15	do	1.07	77	21	do	.27	10.8
Apr. 14	do	1.13	87	30	Purton and Woolley	1.07	72

[a] Engineer of Utah Power & Light Co.

Daily discharge, in second-feet, of Utah Power & Light Co.'s tailrace near Logan Utah, for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	80	86	86	73	60	61	0	84	49	70	71	65
2	80	87	88	68	59	64	24	86	66	69	71	67
3	80	87	88	73	61	65	82	88	73	69	71	69
4	80	87	86	71	62	68	82	87	76	68	71	71
5	80	88	84	71	62	71	82	87	76	68	71	71
6	62	87	82	72	59	72	82	87	76	68	71	71
7	80	87	79	70	49	74	82	87	76	68	69	70
8	81	87	80	67	49	74	82	87	76	67	69	68
9	84	88	81	56	55	74	83	87	76	66	69	68
10	87	77	81	60	57	76	84	87	76	66	69	67
11	88	87	81	50	59	74	83	87	76	66	69	66
12	88	87	82	48	64	76	84	84	76	65	69	66
13	88	88	80	59	48	76	84	81	74	66	69	66
14	88	87	82	62	56	76	83	80	74	68	70	66
15	87	88	65	64	60	76	83	80	74	68	69	66
16	88	86	65	61	59	77	83	80	74	70	70	66
17	87	87	65	64	52	34	84	80	74	71	69	66
18	87	87	67	65	53		84	80	74	71	67	66
19	87	87	72	67	56		84	80	74	72	67	56
20	87	87	72	69	57		84	80	73	73	65	64
21	87	87	72	67	58		84	80	73	73	64	44
22	87	87	71	60	58		84	80	73	73	64	67
23	87	87	73	58	57		83	80	73	73	62	73
24	87	87	74	64	58	3	86	80	73	72	62	72
25	87	87	73	64	60		84	80	73	72	62	71
26	86	87	70	65	58		84	79	72	72	62	71
27	86	87	69	65	56		87	79	71	71	64	71
28	86	86	66	65	61		83	78	73	71	61	71
29	86	82	70	64	-------		82	78	71	71	61	72
30	86	82	70	60	-------	1	83	44	70	71	61	76
31	86	-------	72	59	-------	0	-------	17	-------	71	61	-------

NOTE.—Braced figure gives mean discharge for period indicated.

Monthly discharge of Utah Power & Light Co.'s tailrace near Logan, Utah, for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	88	62	84.5	5,200
November	88	77	86.4	5,140
December	88	65	75.7	4,650
January	73	48	63.9	3,930
February	64	48	57.2	3,180
March	77	0	39.5	2,430
April	87	0	78.6	4,680
May	88	17	79.2	4,870
June	76	49	72.8	4,330
July	73	65	69.6	4,280
August	71	61	66.8	4,110
September	76	44	67.4	4,010
The year	88	0	70.2	50,800

LOGAN, HYDE PARK, AND SMITHFIELD CANAL NEAR LOGAN, UTAH

LOCATION.—In NW. ¼ NE. ¼ sec. 31, T. 12 N., R. 2 E., at concrete rating flume half a mile below head of canal, 1 mile below city power plant, 1 mile above plant of Utah Power & Light Co., and 3½ miles east of Logan, Cache County.

RECORDS AVAILABLE.—Fragmentary records 1904–1911. Records during irrigation seasons April 22, 1912, to September 30, 1921.

GAGE.—Stevens continuous water-stage recorder installed June 6, 1913, on right bank near lower end of rating flume; attended by John Krebs.

DISCHARGE MEASUREMENTS.—Made from footplank at flume or by wading.

CHANNEL AND CONTROL.—Rectangular concrete rating flume. Stage of zero flow, determined January 28, 1919, 0.40 foot.

ICE.—Recording gage usually removed during winter. A small flow of water is maintained for domestic use.

DIVERSIONS.—None above gage.

REGULATION.—Flow regulated by head gates at diversion works.

ACCURACY.—Stage-discharge relation permanent during year. Rating curve well defined. Operation of water-stage recorder satisfactory. No record October 3 to May 17. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection. Records good.

Canal diverts water from Logan River in NE. ¼ NE. ¼ sec. 31, T. 12 N., R 2 E., for irrigation and domestic use in the area north of Logan.

The following discharge measurement was made by A. B. Purton:

September 30, 1921: Gage height, 1.72 feet; discharge, 63 second-feet.

87482—26†—WSP 530——3

Daily discharge, in second-feet, of Logan, Hyde Park, and Smithfield canal near Logan, Utah, for the year ending September 30, 1921

Day	Oct.	May	June	July	Aug.	Sept.	Day	Oct.	May	June	July	Aug.	Sept.
1	49	------	73	120	114	97	16	------	------	111	113	106	63
2	49	------	94	119	113	97	17	------	------	109	113	106	63
3	------	------	105	118	113	97	18	------	15	108	113	105	63
4	------	------	103	116	113	96	19	------	32	108	113	104	63
5	------	------	95	113	113	95	20	------	46	107	117	103	62
6	------	------	96	116	113	94	21	------	50	105	117	103	61
7	------	------	97	117	112	94	22	------	51	105	116	102	53
8	------	------	97	117	110	94	23	------	59	105	117	102	34
9	------	------	105	117	110	94	24	------	67	105	117	101	34
10	------	------	110	117	109	76	25	------	67	111	117	101	34
11	------	------	112	117	109	64	26	------	68	114	116	100	34
12	------	------	115	116	108	64	27	------	70	114	115	98	52
13	------	------	114	115	108	64	28	------	77	114	115	98	63
14	------	------	114	114	108	63	29	------	80	114	116	97	63
15	------	------	113	114	106	63	30	------	82	117	115	97	63
							31	------	84	------	114	97	------

Monthly discharge of Logan, Hyde Park, and Smithfield canal near Logan, Utah, for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
May 18-31	84	15	60.6	1,680
June	117	73	106	6,310
July	120	113	116	7,130
August	114	97	106	6,520
September	97	34	68.6	4,080
The period				25,700

BLACKSMITH FORK ABOVE UTAH POWER & LIGHT CO.'S DAM, NEAR HYRUM, UTAH

LOCATION.—In NE. ¼ sec. 8, T. 10 N., R. 2 E., 1 mile above diversion dam and 3½ miles above power plant of Utah Power & Light Co. and 6 miles east of Hyrum, Cache County.

DRAINAGE AREA.—260 square miles (measured on topographic maps and map of Cache National Forest.)

RECORDS AVAILABLE.—July 19, 1900, to December 31, 1902; November 28, 1913, to September 30, 1921.

GAGE.—Stevens continuous water-stage recorder on left bank 500 feet above wagon bridge and nearly a mile above dam; installed November 28, 1913; inspected by watchman at dam.

DISCHARGE MEASUREMENTS.—Made by wading about four-tenths of a mile above gage or from cable a quarter of a mile above gage. Conditions at wading section good; at cable poor, especially at high stages.

CHANNEL AND CONTROL.—Bed rough but fairly permanent; one channel at all stages.

EXTREMES OF DISCHARGE.—Maximum stage during year, from water-stage recorder, 4.85 feet at 4 a. m. May 5 (discharge, 975 second-feet); minimum stage, from water-stage recorder, 1.23 feet at 11 a. m. December 15 (discharge, 59 second-feet).

1913–1921: Maximum stage determined by levels from high-water mark in well, 6.5 feet May 15, 1917 (discharge estimated by extending rating curve, 1,620 second-feet); minimum stage, 0.85 foot at 6 a. m. February 6, 1916 (discharge estimated from an extension of rating curve, 22 second-feet).

ICE.—Stage-discharge relation not affected by ice.

DIVERSIONS.—Above all important diversions.

REGULATION.—None.

ACCURACY.—Stage-discharge relation variable after June 1. Rating curves well defined between 66 and 700 second-feet. Operation of water-stage recorder satisfactory except September 1, 2, 7–9, 15–18, and 20. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph. Shifting-control method used June 1 to September 30. Discharge interpolated September 1, 2, 7–9, 15–18, and 20. Records good.

COOPERATION.—Gage-height record and 11 discharge measurements furnished by Utah Power & Light Co.

Discharge measurements of Blacksmith Fork above Utah Power & Light Co.'s dam, near Hyrum, Utah, during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
Oct. 14	H. L. Stoner[a]	1.60	114	May 29	R. P. Flagel[a]	3.69	635
Dec. 7	R. P. Flagel[a]	1.54	96	June 3	do	3.12	469
Jan. 11	do	1.40	78	July 22	do	2.12	188
Feb. 8	do	1.48	92	Aug. 25	do	1.98	167
Mar. 15	do	1.19	185	Sept. 21	Flagel and Stoner	1.88	152
Apr. 24	do	2.27	258	30	Purton and Woolley	1.83	147

[a] Engineer of Utah Power & Light Co.

Daily discharge, in second-feet, of Blacksmith Fork above Utah Power & Light Co.'s dam, near Hyrum, Utah, for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	110	112	115	93	93	123	201	502	548	225	187	162
2	110	110	115	93	92	134	228	667	518	220	187	165
3	110	108	112	93	93	152	276	742	477	216	187	168
4	110	108	110	92	93	182	311	812	477	216	180	166
5	108	107	108	90	93	208	234	876	472	218	175	163
6	108	108	103	90	92	196	261	870	450	218	175	161
7	108	107	102	90	87	182	237	856	432	211	172	160
8	107	102	102	90	90	166	225	687	427	204	175	160
9	108	100	100	92	90	155	218	610	411	201	175	160
10	117	100	102	98	92	152	220	616	388	199	175	159
11	115	98	102	88	93	157	240	682	370	196	172	161
12	112	98	100	82	95	161	266	731	354	194	175	157
13	115	100	98	95	98	184	301	740	336	194	180	155
14	114	102	98	93	108	199	326	754	326	192	180	152
15	114	103	76	92	117	187	294	783	308	194	177	153
16	114	105	87	93	114	208	274	792	298	196	172	154
17	112	108	98	93	103	244	266	812	288	196	172	155
18	121	110	96	96	100	264	264	748	284	194	170	156
19	119	114	98	100	98	259	286	705	278	194	166	157
20	119	117	98	98	100	218	298	652	274	199	166	155
21	119	119	100	95	103	201	286	560	268	194	163	152
22	119	123	100	93	100	194	286	540	266	192	163	150
23	117	124	100	93	100	201	427	554	264	189	163	148
24	115	123	102	93	102	204	367	574	259	187	163	150
25	115	123	102	93	102	194	328	579	259	187	168	148
26	115	121	98	93	107	187	311	568	252	184	163	148
27	114	126	96	95	108	177	291	613	249	187	161	146
28	114	123	96	95	114	170	354	647	242	187	161	148
29	114	117	96	93	-------	175	403	641	237	187	159	148
30	115	117	96	93	-------	175	464	632	228	184	161	148
31	114	-------	100	93	-------	180	-------	604	-------	184	159	-------

Monthly discharge of Blacksmith Fork above Utah Power & Light Co.'s dam, near Hyrum, Utah, for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	121	107	114	7,010
November	126	98	111	6,600
December	115	76	100	6,150
January	100	82	92.9	5,710
February	117	87	99.2	5,510
March	264	123	187	11,500
April	464	201	293	17,400
May	876	502	682	41,900
June	548	228	341	20,300
July	225	184	198	12,200
August	187	159	171	10,500
September	168	146	156	9,280
The year	876	76	213	154,000

WEST SIDE CANAL NEAR COLLINSTON, UTAH

LOCATION.—In NW. ¼ sec. 34, T. 13 N., R. 2 W., at Wheelon siding on Oregon Short Line Railroad, 600 feet below penstock of Utah Power & Light Co.'s Wheelon plant, 1,000 feet northwest of gaging station on Bear River, and 4 miles north of Collinston, Box Elder County.

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

GAGE.—Friez water-stage recorder on left bank installed May 22, 1914, at same site and datum as inclined gage used prior to that time.

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

CHANNEL AND CONTROL.—Bed composed of earth and gravel. Banks steep and clean. Control not well defined; stage-discharge relation is affected probably by vegetal growth and slight silt deposit.

ICE.—Stage-discharge relation seriously affected at times by ice.

DIVERSIONS.—Water is taken out of canal about 600 feet above gage for power plant, and, if necessary, water can also be siphoned across river to Hammond canal.

REGULATION.—Flow can be regulated at head gates and also at forebay of power plant.

COOPERATION.—Records of daily discharge and discharge measurements furnished by Utah Power & Light Co.

Canal diverts water from west side of Bear River in SW. ¼ sec. 23, T. 13 N., R. 2 W., by means of a low diversion dam. Part of the water is used through the Wheelon plant of Utah Power & Light Co. about 1½ miles below; the rest which passes the gaging station is used for irrigation on west side of river. When cleaning or repairing Hammond canal in the canyon, water can be siphoned across the river at the power plant from West Side canal.

Discharge measurements of West Side canal near Colliston, Utah, during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
Oct. 15	H. L. Stoner[a]	3.10	138	June 2	R. P. Flagel	4.10	235
Dec. 9	R. P. Flagel[a]	2.05	65	July 19	do	6.92	603
Jan. 13	do	[b]1.75	36.8	Aug. 24	do	6.89	613
Feb. 10	do	1.10	19.6	31	Flagel and Stoner	6.83	586
Apr. 13	do	.24	.0				

[a] Engineer, Utah Power & Light Co. [b] Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of West Side canal near Collinston, Utah, for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.
1	148	76	69		17	17		0	226	529	599	583
2	148	74	69		17	17		16	241	523	596	580
3	150	72	66		17	16		21	257	528	589	512
4	150	72	66		19	18		37	257	538	589	457
5	152	76	69		19	18		46	292	538	589	460
6	142	72	69		18	17		66	305	538	585	462
7	144	72	69		19	17		84	317	535	585	460
8	144	71	66		19	16		80	327	567	591	460
9	146	72	66		19	18	0	76	330	572	591	460
10	144	72	63	50	18	18		70	363	572	591	457
11	142	69	66		18	17		72	391	573	591	457
12	140	69	63		19	18		76	405	578	589	457
13	150	68	66		19	17		81	405	583	593	460
14	164	66	66		18	17		78	408	586	596	460
15	152	74	66		19	15		69	405	591	594	460
16	138	76			20	17		75	416	596	589	464
17	138	76			19	17	44	110	468	602	588	464
18	142	76	66		18	17	0	178	481	602	586	466
19	144	69		12	17	18	0	178	490	602	591	466
20	142	63		14	17	0	0	178	482	602	597	460
21	142	63	66	14	18	0	0	178	514	599	597	442
22	138	66	66	13	17	69	82	178	511	599	596	402
23	124	66	66	23	17		83	178	522	599	597	398
24	105	66	66	20	17		83	180	530	599	596	395
25	94	66	66	21	17		82	187	538	596	597	394
26	89	69	66	17	17		82	190	532	596	599	395
27	92	72	66	17	17	0	32	190	546	589	599	388
28	89	72	66	16	18		0	187	543	591	602	404
29	89	69	66	18	-------		0	181	532	596	601	404
30	86	69	66	18	-------		0	180	532	599	596	408
31	86	-------	63	17	-------		-------	201	-------	599	588	-------

NOTE.—Braced figures give mean discharge for periods indicated.

Monthly discharge of West Side canal near Collinston, Utah, for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	164	86	131	8,060
November	76	63	70.4	4,190
December	69	63	66.2	4,070
January	-------	12	36.1	2,220
February	20	17	18.0	1,000
March	69	0	12.7	780
April	83	0	16.3	970
May	201	0	117	7,191
June	546	226	419	24,900
July	602	523	578	35,500
August	602	585	593	36,500
September	583	388	451	26,800
The year	602	0	213	152,000

HAMMOND (EAST SIDE) CANAL NEAR COLLINSTON, UTAH

LOCATION.—In NW. ¼ sec. 34, T. 13 N., R. 2 W., at Wheelon siding on Oregon Short Line Railroad, 400 feet below penstock of Utah Power & Light Co. and 4 miles north of Collinston, Box Elder County.

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

GAGE.—Friez water-stage recorder on right bank installed May 22, 1914, at same site and datum as inclined staff used until that date.

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

CHANNEL AND CONTROL.—Bed composed of earth and gravel. Control not well defined.

DIVERSIONS.—Water is taken from this canal about 400 feet above gage for power plant.

REGULATION.—Flow can be regulated at head gates and by means of a wasteway at power-plant forebay; also affected by operation of plant.

COOPERATION.—Complete records furnished by Utah Power & Light Co.

Canal diverts water on the east side of Bear River in SW. ¼ sec. 23, T. 13 N., R. 2 W., at the same diversion dam as West Side canal. Part of the water is used by the Wheelon plant of Utah Power & Light Co. and the rest is either wasted into the river or passes the gaging station for irrigation use.

Discharge measurements of Hammond (East Side) canal near Collinston, Utah, during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
Oct. 15	H. L. Stoner[a]	2.45	27.8	July 19	R. P. Flagel	4.98	143
Apr. 13	R. P. Flagel[a]	1.12	0	Aug. 24	do	5.06	142
June 2	do	3.50	65				

[a] Engineer, Utah Power & Light Co.

Daily discharge, in second-feet, of Hammond (East Side) canal near Collinston, Utah, for the year ending September 30, 1921

Day	Oct.	May	June	July	Aug.	Sept.	Day	Oct.	May	June	July	Aug.	Sept.
1	27	------	63	126	129	142	16	27	24	86	145	38	110
2	27	------	64	136	128	123	17	27	25	86	129	61	111
3	27	------	63	135	123	51	18	27	14	90	131	66	120
4	27	------	63	133	122	49	19	27	21	90	141	94	114
5	28	------	65	129	124	52	20	27	20	96	143	138	106
6	28	------	67	133	130	71	21	20	21	103	138	149	86
7	27	------	75	136	136	71	22	13	20	101	138	144	81
8	27	------	80	138	138	71	23	14	28	104	134	143	83
9	27	------	79	138	137	72	24	25	32	115	127	142	82
10	27	------	80	142	138	80	25	29	33	119	133	143	82
11	27	------	82	146	136	96	26	29	45	119	136	145	94
12	27	------	88	145	138	107	27	25	57	120	131	152	102
13	27	------	87	138	144	115	28	15	63	119	131	154	112
14	27	------	87	138	147	113	29	8	63	117	132	154	112
15	27	------	88	136	41	113	30	11	26	115	135	153	104
							31	11	57	------	130	151	------

NOTE.—No flow Nov. 2 to May 15.

Monthly discharge of Hammond (East Side) canal near Collinston, Utah, for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	29	8	23.9	1,470
November	5	0	.2	10
December	0	0	0	0
January	0	0	0	0
February	0	0	0	0
March	0	0	0	0
April	0	0	0	0
May	63	0	17.7	1,090
June	120	63	90.4	5,380
July	146	126	136	8,360
August	154	38	127	7,810
September	142	49	94.2	5,610
The year	154	0	41.0	29,700

BOX ELDER CREEK NEAR BRIGHAM, UTAH

LOCATION.—In SE. ¼ sec. 20, T. 9 N., R. 1 W., at highway bridge 0.3 mile below Brigham municipal power plant and 1.6 miles above Brigham, Box Elder County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—August 5, 1918, to September 30, 1921. Records were obtained May 20, 1909, to December 31, 1912, at Third West Street Bridge in Brigham.

GAGE.—Vertical enamel staff gage at site of former Gurley seven-day graphic water-stage recorder on left bank at upstream wing wall of highway bridge; read by Wesley Wight.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—Channel steep and rough; composed of boulders and gravel. Banks not subject to overflow. One channel at all stages. Cut-off wall at lower side of concrete bridge and paved channel under bridge form incomplete control.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 4.80 feet at 2.15 p. m. April 21 (discharge, 120 second-feet); minimum stage, 3.93 feet on January 5 and 10 (discharge, 27 second-feet).

1919-1921: Maximum stage, that of April 21, 1921; minimum stage, from water-stage recorder, 3.77 feet at 10 a. m. December 11, 1919 (discharge, 16 second-feet).

ICE.—Stream does not freeze over at this station.

DIVERSIONS.—Water is diverted below station for irrigation around Brigham. There are also many diversions for irrigation from the tributaries above. Water diverted for Brigham municipal power plant is returned to creek above station.

REGULATION.—A very slight regulation of flow is caused by operation of power plant immediately above.

ACCURACY.—Stage-discharge relation probably changed on October 26, 1920. Rating curves are based on one and two measurements and on slope of previous curves. Curves are fairly well defined for the small range in stage which occurred during year. Staff gage read to hundredths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table. Records fair.

Discharge measurements of Box Elder Creek near Brigham, Utah, during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*
Feb. 24	A. B. Purton	3.99	31.4
May 2	W. E. Dickinson	4.74	113

Daily discharge, in second-feet, of Box Elder Creek near Brigham, Utah, for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	30	36	29	31	32	39	49	92	49	32	29	31
2	30	37	29	28	34	40	66	94	49	31	29	29
3	28	37	29	28	32	42	75	94	49	31	30	29
4	28	37	29	28	32	40	72	89	48	31	31	29
5	29	36	31	28	32	42	61	92	48	31	30	31
6	30	37	31	29	32	40	60	99	49	31	30	30
7	28	36	31	28	34	38	61	99	47	31	31	31
8	29	37	31	28	32	36	63	99	49	29	29	29
9	28	37	31	28	32	35	61	100	49	31	28	29
10	28	37	33	28	34	34	61	99	48	31	29	29
11	29	37	32	28	33	35	63	97	47	31	29	30
12	30	37	32	28	32	35	61	93	46	32	30	29
13	31	37	33	28	33	35	61	89	45	31	31	29
14	30	35	32	28	37	37	61	88	45	31	29	30
15	30	35	32	28	37	37	60	87	45	31	29	31
16	30	34	33	34	34	38	59	87	45	31	29	29
17	31	34	32	38	32	41	102	84	44	32	29	30
18	31	33	32	44	32	42	110	84	44	32	28	30
19	33	32	32	38	31	40	112	84	44	31	29	31
20	33	33	33	36	36	40	115	82	44	31	29	31
21	33	32	34	34	35	38	117	83	42	31	28	29
22	33	31	34	32	35	38	115	82	42	32	29	29
23	33	31	34	32	36	38	110	82	42	31	29	29
24	31	32	34	32	35	38	104	80	40	32	28	29
25	31	31	34	32	35	38	102	78	38	32	29	29
26	101	32	33	32	37	39	99	77	34	31	29	29
27	68	32	32	34	37	38	99	75	33	31	28	29
28	34	31	31	32	38	39	97	75	32	32	29	30
29	34	31	31	32	------	38	99	51	33	32	29	31
30	70	29	34	32	------	40	98	51	32	30	29	31
31	37	------	35	33	------	38	------	51	------	31	31	------

Monthly discharge of Box Elder Creek near Brigham, Utah, for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	101	28	35.5	2,180
November	37	29	34.2	2,040
December	35	29	32.0	1,970
January	44	28	31.3	1,920
February	38	31	34.0	1,890
March	42	34	38.3	2,360
April	117	49	82.4	4,900
May	100	51	84.4	5,190
June	49	32	43.4	2,580
July	32	29	31.2	1,920
August	31	28	29.2	1,800
September	31	29	29.7	1,770
The year	117	28	42.2	30,500

WEBER RIVER BASIN

WEBER RIVER NEAR OAKLEY, UTAH

LOCATION.—In NE. ¼ sec. 15, T. 1 S., R. 6 E., near mouth of canyon, 3 miles above Oakley, Summit County. South Fork of Weber River enters 2 miles above station, and Beaver or Kamas Creek 6 miles below.

DRAINAGE AREA.—163 square miles (measured on topographic maps).

RECORDS AVAILABE.—October 22, 1904, to September 30, 1921.

GAGE.—Inclined staff on left bank a quarter of a mile above diversion dam of New Field & North Beach Irrigation Co.; read by John Franson.

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

CHANNEL AND CONTROL.—Bed composed of gravel and boulders. One channel at all stages; steep and rough but apparently fairly permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 9.0 feet on June 13 (discharge, 3,480 second-feet); minimum discharge occurred during estimated periods in winter.

1904–1921: Maximum discharge recorded, 4,010 second-feet July 6, 1907, and June 5–7, 1909; minimum stage, 4.0 feet for periods during February and March, 1908 (discharge, 46 second-feet).

ICE.—Stage-discharge relation seriously affected by ice every winter.

DIVERSIONS.—Above all important diversions.

REGULATION.—None.

ACCURACY.—Stage-discharge relation changed slightly during high water and was affected by ice December to February. Rating curves well defined between 75 and 2,000 second-feet; extended above. Gage read to half-tenths once a day except during periods of ice effect, when it was read once a week. Daily discharge determined by applying daily gage height to rating tables except for periods when stage-discharge relation was affected by ice. For these periods discharge was estimated from one meter measurement, temperature records, and observer's notes. Records good.

Discharge measurements of Weber River near Oakley, Utah, during the year ending September 30, 1921

[Made by A. B. Purton]

Date	Gage height	Discharge
	Feet	*Sec.-ft.*
Feb. 4	[a] 4.25	71
June 16	7.59	2,000
Aug. 12	4.59	148

[a] Stage-discharge relation affected by ice

Daily discharge, in second-feet, of Weber River near Oakley, Utah, for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	92	112				90	124	280	1,560	1,080	280	139
2	92	112				92	135	290	1,480	940	243	127
3	92	102					180	515	1,560	800	209	194
4	92	102					219	568	1,640	670	194	150
5	92	112					219	623	1,730	550	194	139
6	92	112				97	219	680	2,180	500	178	139
7	92	112					188	623	2,460	500	164	139
8	92	112					174	568	2,760	476	164	127
9	92	102				102	160	515	2,860	476	164	127
10	112	102				102	174	515	2,960	451	150	127
11	112	102				102	188	515	3,060	451	150	127
12	112	102				102	204	568	3,260	451	150	127
13	112	102				102	219	623	3,480	451	150	117
14	112	102				102	236	740	3,160	451	209	117
15	112	102			75	112	253	800	2,860	451	178	107
16	112	102	75	70		112	253	870	2,360	451	164	107
17	112	112				112	253	1,160	1,730	610	150	107
18	112	112				112	253	1,080	1,560	500	139	107
19	112	112				124	253	940	1,400	451	139	107
20	112	112				124	253	800	1,080	404	139	107
21	112	112				124	272	740	1,400	360	139	98
22	112	112				124	272	680	1,560	500	139	98
23	112	112				124	260	740	1,820	451	139	98
24	102	112				124	270	800	1,730	319	139	98
25	102	112				124	253	800	1,640	280	139	98
26	102	112				112	236	870	1,480	262	127	98
27	102	112				112	236	1,160	1,240	262	127	98
28	112	110				112	219	1,560	1,240	243	127	98
29	112	107			-------	112	219	1,910	1,240	209	127	98
30	112	104			-------	112	236	2,000	1,160	209	127	98
31	112	-------			-------	112	-------	1,730	-------	209	127	-------

NOTE.—Discharge interpolated on account of lack of gage heights Oct. 3, 21, Nov. 14, 28–30, Mar. 1–3–8, 10–12, 20, Apr. 3, 10, 17, 24, May 1, and Sept. 18. Discharge estimated on account of ice Dec. 1 to Feb. 28

Monthly discharge of Weber River near Oakley, Utah, for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	112	92	105	6,460
November	112	102	108	6,430
December	----------	----------	[a] 75	4,610
January	----------	----------	[a] 70	4,300
February	----------	----------	[a] 75	4,160
March	124	----------	109	6,700
April	290	124	222	13,200
May	2,000	260	847	52,100
June	3,480	1,080	1,960	118,000
July	1,080	209	465	28,600
August	280	127	160	9,840
September	194	98	117	6,960
The year	3,480	----------	361	261,000

[a] Estimated.

WEBER RIVER AT DEVILS SLIDE, UTAH

LOCATION.—In SW. ¼ sec. 19, T. 4 N., R. 4 E., 300 feet north of hotel and 500 feet downstream from highway bridge at Devils Slide, Morgan County. Lost Creek enters from right a quarter of a mile above station.

DRAINAGE AREA.—1,090 square miles (measured on topographic and U. S. Forest Service maps).

RECORDS AVAILABLE.—February 1, 1905, to September 30, 1921.

GAGE.—Vertical staff on left bank, installed September 21, 1915; read by A. E. Lucas.

DISCHARGE MEASUREMENTS.—Made from cable or by wading.

CHANNEL AND CONTROL.—Bed composed of gravel and sand; shifts occasionally. One channel at all stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 6.78 feet at noon May 17 (discharge, 3,810 second-feet); minimum stage, 2.11 feet January 12 (discharge, 124 second-feet).

1905–1921: Maximum stage recorded, 8.0 feet at 6 p. m. May 22, 1920 (discharge, 6,000 second-feet); minimum stage, 1.88 feet September 3, 1919 (discharge, 31 second-feet).

ICE.—Stage-discharge relation not affected by ice.

DIVERSIONS.—A number of canals divert water above this station for irrigation and domestic use.

REGULATION.—Diversions for irrigation only.

ACCURACY.—Stage-discharge relation permanent during year. Rating curve well defined. Gage read to hundredths once a day. Daily discharge ascertained by applying daily gage height to rating table. Discharge interpolated May 8 and July 4. Records good.

Discharge measurements of Weber River at Devils Slide, Utah, during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*
Dec. 1	A. B. Purton	2.55	272
May 13	Sanford and Purton	5.60	2,650
Aug. 30	A. B. Purton	2.89	437

Daily discharge, in second-feet, of Weber River at Devils Slide, Utah, for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	184	401	271	251	248	336	716	1,380	2,850	962	332	255
2	178	385	296	267	174	360	890	1,870	2,740	850	356	236
3	178	366	296	296	244	466	1,170	2,180	2,730	768	314	296
4	171	366	255	296	248	631	1,540	2,470	2,740	650	276	266
5	171	380	225	341	236	850	1,610	2,790	2,880	598	255	276
6	171	366	204	292	211	835	1,190	2,930	3,130	532	236	248
7	171	380	218	248	168	738	1,030	2,980	3,610	501	225	236
8	171	361	280	229	222	666	994	2,680	3,510	443	218	233
9	168	341	263	184	225	478	914	2,380	3,480	416	211	233
10	211	318	288	187	244	501	922	2,210	3,410	416	233	225
11	495	292	236	165	244	558	1,010	2,260	3,260	443	225	222
12	318	292	236	124	255	631	1,120	2,430	3,230	427	211	211
13	318	296	255	218	276	673	1,280	2,670	3,450	416	208	201
14	366	314	288	233	318	874	1,710	2,930	3,330	411	341	191
15	296	314	146	244	300	858	1,440	3,200	3,160	395	296	191
16	300	318	171	236	263	850	1,210	3,520	2,910	501	288	191
17	292	332	259	263	198	994	1,160	3,810	2,500	624	259	191
18	432	390	296	296	218	1,200	1,130	3,570	2,050	797	240	191
19	438	438	296	351	236	1,800	1,290	3,150	1,630	577	233	191
20	411	416	276	310	263	1,030	1,310	2,780	1,640	501	233	191
21	411	380	267	280	296	850	1,270	2,500	1,580	564	236	191
22	411	361	259	233	236	850	1,200	2,420	1,610	551	229	194
23	390	341	225	236	240	1,010	1,460	2,520	1,600	551	244	184
24	370	296	198	251	236	850	1,380	2,650	1,780	460	240	184
25	361	236	215	240	251	820	1,230	2,570	1,760	416	229	178
26	366	232	248	244	263	716	1,190	2,540	1,630	395	225	168
27	380	351	240	218	288	687	1,140	2,820	1,500	385	218	168
28	385	225	248	255	305	624	1,210	3,090	1,330	332	218	162
29	411	248	271	222	-------	666	1,250	3,330	1,250	296	218	158
30	422	255	267	198	-------	631	1,250	3,380	1,110	276	443	158
31	416	-------	288	215	-------	624	-------	3,180	-------	288	248	-------

Monthly discharge of Weber River at Devils Slide, Utah, for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	495	168	315	19,400
November	438	225	337	20,100
December	296	146	251	15,400
January	351	124	246	15,100
February	318	168	247	13,700
March	1,800	336	764	47,000
April	1,710	716	1,210	72,000
May	3,810	1,380	2,750	169,000
June	3,610	1,110	2,450	146,000
July	962	276	506	31,100
August	443	208	256	15,700
September	296	158	208	12,400
The year	3,810	124	797	577,000

WEBER RIVER AT GATEWAY, UTAH

LOCATION.—In NW. ¼ SW. ¼ sec. 27, T. 5 N., R. 1 E., 300 feet below mouth of Strawberry Creek, 1,400 feet above Union Pacific Railroad bridge across Weber River and 4,400 feet above section house at Gateway, Morgan County. East Canyon Creek enters from left 9 miles above station.

DRAINAGE AREA.—1,610 square miles (measured on Utah Water Storage Association 1919 map).

RECORDS AVAILABLE.—June 22 to September 17, 1919, and July 26, 1920, to September 30, 1921. Records were obtained from October, 1889, to July 1903, at a station 1 mile downstream known as Weber River near Uinta, Utah. Records at these stations are comparable as there were no diversions and no important tributaries between the two points.

GAGE.—Stevens continuous water-stage recorder on right bank. Datum raised 1.28 feet July 26, 1920.

DISCHARGE MEASUREMENTS.—Made from cable about 1,000 feet above gage or by wading. Flow of Strawberry Creek is added when measurement is made at the cable site.

CHANNEL AND CONTROL.—Bed composed of gravel and cobblestones. Right bank high. At high stages river overflows a bar opposite gage.

EXTREMES OF DISCHARGE.—Maximum stage during year ending September 30, 1921, from water-stage recorder, 6.60 feet 10 p. m. May 17 to 2 a. m. May 18 (discharge, 5,500 second-feet); minimum stage, 0.57 foot on September 29 and 30 (discharge, 270 second-feet).

1889–1903; 1919–1921: Maximum discharge recorded, 7,980 second-feet May 31, 1896; minimum discharge recorded, 65 second-feet August 7–13, 1898.

ICE.—Affected by ice usually only for short periods.

DIVERSIONS.—Numerous diversions from Weber River and tributaries for irrigation above Gateway. 3 miles below station Davis & Weber canal diverts water for irrigation on bench lands south of Ogden. Entire low-water flow is diverted by various canals during irrigation season so that river is practically dry at the Plain City station 25 miles below.

REGULATION.—Water stored by Davis & Weber Canal Co. on East Canyon Creek is released during July, August, and September and passes gaging station.

ACCURACY.—Stage-discharge relation permanent during period of records except as affected by ice December 15–17, 27, 1920, January 8–14, and February 7-13, 1921. Rating curve well defined. Operation of water-stage recorder satisfactory. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph. Records good.

Discharge measurements of Weber River at Gateway, Utah, during the years ending September 30, 1919–1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
1919		*Feet*	*Sec.-ft.*	1920		*Feet*	*Sec.-ft.*
June 13	A. B. Purton	2.32	464	Aug. 16	J. J. Sanford	0.92	387
17	J. W. Bones	2.00	331	25	A. B. Purton	.90	391
20	A. B. Purton	1.94	322	Sept. 4	J. J. Sanford	.72	328
23	J. W. Bones	1.82	276	Oct. 9	do	.63	278
27	do	1.84	282	Nov. 30	A. B. Purton	.84	369
29	do	1.78	268	1921			
July 5	do	1.78	273	Mar. 23	J. J. Sanford	3.06	1,590
10	do	1.67	254	28	do	2.33	1,090
12	A. B. Purton	1.70	239	May 2	do	4.32	2,890
Aug. 10	do	1.50	184	13	Purton and Sanford	5.38	4,020
Sept. 17	J. W. Bones	1.15	105	June 22	J. J. Sanford	3.24	1,760
1920				July 18	Webb and Sanford	2.03	933
July 29	do	[a] 1.10	482	Aug. 11	J. J. Sanford	1.20	513
Aug. 6	J. J. Sanford	1.21	506	Sept. 22	do	.71	316
11	do	[a] 1.06	444				

[a] Gage datum raised 1.28 feet.

Daily discharge, in second-feet, of Weber River at Gateway, Utah, for the years ending September 30, 1919-1921

Day	1919				1920		
	June	July	Aug.	Sept.	July	Aug.	Sept.
1	------	259	211	86	------	470	382
2	------	265	214	83	------	466	366
3	------	265	243	83	------	478	336
4	------	268	240	83	------	498	318
5	------	262	223	83	------	506	322
6	------	252	217	90	------	510	332
7	------	240	208	94	------	494	332
8	------	234	203	91	------	490	322
9	------	228	200	91	------	494	322
10	------	228	179	88	------	486	329
11	------	231	176	86	------	462	322
12	------	237	182	83	------	454	312
13	------	231	174	83	------	450	304
14	------	237	169	99	------	442	287
15	------	234	172	92	------	414	262
16	------	217	169	94	------	406	249
17	------	217	169	106	------	398	301
18	------	214	172	------	------	394	329
19	------	217	174	------	------	410	322
20	------	217	172	------	------	410	312
21	------	214	162	------	------	422	308
22	285	211	159	------	------	414	312
23	274	208	157	------	------	402	332
24	274	206	152	------	------	390	366
25	302	206	150	------	------	390	394
26	298	206	152	------	490	418	390
27	281	203	150	------	462	434	358
28	268	206	136	------	470	430	336
29	262	206	130	------	470	446	322
30	259	206	96	------	462	402	315
31	------	208	86	------	466	390	------

Daily discharge, in second-feet, of Weber River at Gateway, Utah, for the years ending September 30, 1919–1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1920–21												
1	301	570	378	374	378	595	1,290	2,310	4,280	1,160	560	458
2	294	526	418	386	346	710	1,530	2,810	3,940	1,070	565	462
3	287	506	410	462	386	892	1,960	3,270	3,840	955	530	478
4	287	482	382	506	398	1,170	2,460	3,670	3,800	935	502	462
5	280	486	382	462	374	1,550	2,560	4,130	3,890	862	482	454
6	280	502	350	450	370	1,550	1,190	4,300	4,050	770	470	446
7	284	538	329	418		1,300	1,820	4,240	4,480	690	474	434
8	287	530	378	360		1,140	1,710	3,900	4,660	630	458	418
9	287	494	378			960	1,590	3,560	4,610	600	486	410
10	318	462	370		390	978	1,570	3,320	4,540	640	518	370
11	470	438	362	250		1,030	1,670	3,500	4,400	655	506	358
12	494	438	358			1,060	1,870	3,760	4,260	660	498	354
13	478	446	358			1,250	2,180	3,960	4,420	640	522	350
14	494	450	374		510	1,650	2,500	4,300	4,380	635	655	350
15	462	446		322	590	1,610	2,460	4,600	4,140	625	640	346
16	454	446	270	346	460	1,600	2,150	4,960	3,810	735	585	343
17	446	462		378	430	1,770	1,990	5,400	3,400	780	555	340
18	518	502	372	426	422	2,160	1,970	5,320	2,640	935	530	336
19	610	565	378	610	438	2,540	2,120	4,960	2,300	795	510	332
20	570	635	370	506	462	1,980	2,230	4,380	2,050	755	486	329
21	550	595	366	462	494	1,570	2,160	3,820	1,850	800	490	326
22	560	498	350	402	438	1,460	2,050	3,580	1,840	770	490	315
23	546	482	346	382	422	1,530	2,330	3,730	1,930	735	482	312
24	522	458	318	402	438	1,420	2,370	3,980	1,980	665	486	298
25	494	430	329	402	442	1,350	2,070	3,900	1,890	625	470	287
26	494	430	350	394	450	1,230	1,930	3,900	1,840	585	462	287
27	494	478	290	390	486	1,110	1,820	4,130	1,680	555	454	287
28	494	426	318	414	522	1,060	2,170	4,480	1,530	518	454	287
29	510	378	343	378	-------	1,110	2,160	4,780	1,400	486	450	284
30	560	374	374	340	-------	1,120	2,130	4,860	1,270	494	478	284
31	580	-------	406	362	-------	1,150	-------	4,720	-------	518	482	-------

NOTE.—Braced figures give mean discharge for periods indicated.

Monthly discharge of Weber River at Gateway, Utah, for the years ending September 30, 1919–1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
1919				
June 22–30	302	259	278	4,960
July	268	203	227	14,000
August	243	86	174	10,700
September 1–17	106	83	88.6	2,990
1920				
July 26–31	490	462	470	5,590
August	510	390	441	27,100
September	394	249	326	19,400
1920–21				
October	610	280	442	27,200
November	635	374	482	28,700
December	418	----------	353	21,700
January	610	----------	382	23,500
February	590	346	429	23,800
March	2,540	595	1,340	82,400
April	2,560	1,290	2,030	121,000
May	5,400	2,310	4,080	251,000
June	4,660	1,270	3,170	189,000
July	1,160	486	719	44,200
August	655	450	507	31,200
September	478	284	360	21,400
The year	5,400	----------	1,190	865,000

WEBER RIVER NEAR PLAIN CITY, UTAH

LOCATION.—In SE. ¼ sec. 5, T. 6 N., R. 2 W., at county highway bridge 1 mile south of Plain City, Weber County, on road to Ogden, 1 mile below mouth of Fourmile Creek, 2 miles below Mill Creek, 6 miles below Ogden River, and 6 miles above point where Weber River empties into Great Salt Lake.

DRAINAGE AREA.—2,060 square miles (measured on topographic and U. S. Forest Service maps).

RECORDS AVAILABLE.—May 14, 1905, to September 30, 1921. Records were obtained at this point in 1904 by State of Utah under direction of State engineer.

Gage.—Chain gage on upstream side of highway bridge installed November 12, 1914, at same datum as old gage. Gage used 1904 to November 11, 1914, was painted on upstream side of middle pier of bridge. Gage read by W. E. Davies.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading. Conditions fair.

CHANNEL AND CONTROL.—Bed composed of sand and mud. Shifting. One channel at all stages. Banks are high.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 18.7 feet May 18 (discharge, 7,000 second-feet); minimum stage, 1.5 feet August 10–13 (discharge, 6 second-feet).

1904–1921: Maximum discharge recorded, (discharge, 7,580 second-feet June 6, 1909); river practically dry during latter part of summer each year since 1915.

ICE.—Stage-discharge relation affected by ice each winter.

DIVERSIONS.—In summer practically entire flow of Weber River above station is diverted for irrigation.

REGULATION.—Flow affected by diversions.

ACCURACY.—Stage-discharge relation permanent during year except as affected by ice January 11–14. Rating curve well defined. Gage read to half-tenths once a day, with occasional extra readings during high water. Daily discharge ascertained by applying daily gage height to rating table. Discharge estimated because of ice January 11-14. Records good.

Discharge measurements of Weber River near Plain City, Utah, during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*
Dec. 21	Purton and Sanford	4.61	507
May 12	A. B. Purton	17.13	5,690
Sept. 10	Purton and Sanford	3.40	242

Daily discharge, in second-feet, of Weber River near Plain City, Utah, for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	334	684	599	594	623	940	1,990	3,370	6,240	1,120	29	92
2	309	672	599	587	599	1,080	1,990	4,330	5,760	849	29	99
3	293	647	623	730	635	1,240	2,370	4,800	5,230	901	38	207
4	225	556	599	797	677	1,500	3,140	5,310	4,730	722	29	345
5	216	599	587	810	660	2,180	4,140	6,240	4,730	575	21	335
6	221	630	587	772	611	2,330	3,520	6,480	4,730	503	21	324
7	225	677	539	727	539	2,330	3,100	6,570	4,870	345	18	307
8	234	747	503	647	541	2,030	2,720	6,400	4,940	244	15	283
9	234	672	527	550	613	1,610	2,300	5,760	5,010	142	10	263
10	356	575	575	457	647	1,640	2,370	5,610	4,870	61	6	238
11	398	585	575		672	1,670	2,370	5,160	4,460	113	6	216
12	558	585	539	500	797	1,800	2,580	5,680	4,460	113	6	190
13	575	611	468		849	1,860	2,820	5,920	4,590	86	6	145
14	575	575	563		880	2,400	3,140	6,240	4,460	38	44	90
15	587	575	527	575	1,020	2,750	3,850	6,570	4,200	38	134	61
16	582	570	527	575	901	2,680	3,190	6,570	3,630	38	120	44
17	575	606	551	563	772	2,750	3,050	6,740	3,420	198	106	40
18	587	630	551	672	764	2,970	2,470	7,000	2,750	127	73	38
19	823	672	575	1,010	747	3,570	2,820	6,910	2,330	389	59	38
20	797	757	563	980	828	3,190	2,890	6,740	2,200	283	29	33
21	797	823	503	862	995	2,750	3,230	6,400	1,990	263	21	38
22	797	722	503	760	927	2,370	2,970	6,240	1,800	254	15	61
23	760	697	515	697	888	2,360	3,190	6,240	1,800	283	12	73
24	722	672	487	697	849	2,440	3,230	5,610	1,800	190	12	51
25	710	645	468	697	823	2,400	3,320	5,920	1,730	190	18	38
26	710	672	468	704	823	2,180	2,720	5,840	1,670	150	21	29
27	694	697	468	697	849	1,930	2,790	5,760	1,480	86	29	21
28	677	734	485	734	862	1,750	2,930	6,240	1,330	67	77	21
29	672	672	522	647	-------	1,730	3,190	6,400	1,080	55	99	21
30	672	599	556	611	-------	1,700	3,140	6,480	1,060	44	49	21
31	684	-------	599	672	-------	1,860	-------	6,400	-------	34	92	-------

Monthly discharge of Weber River near Plain City, Utah, for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	823	216	535	32,900
November	823	556	652	38,800
December	623	468	540	33,200
January	1,010	----------	672	41,300
February	1,020	539	764	42,400
March	3,570	940	2,130	131,000
April	4,140	1,990	2,920	174,000
May	7,000	3,370	6,000	369,000
June	6,240	1,060	3,440	205,000
July	1,120	34	274	16,800
August	134	6	40.1	2,470
September	345	21	126	7,500
The year	7,000	6	1,510	1,090,000

LOST CREEK NEAR CROYDON, UTAH

LOCATION.—In SE. ¼ sec. 8, T. 5 N., R. 5 E., 500 feet below dam site of a proposed reservoir, three-quarters of a mile below mouth of Francis Canyon, 13 miles above Devils Slide, and 10 miles northeast of Croydon, Morgan County.

DRAINAGE AREA.—133 square miles (measured on map prepared by United States Bureau of Reclamation).

RECORDS AVAILABLE.—February 1 to September 30, 1921.

GAGE.—Temporary staff gage installed at Eddington ranch on right bank February 3, 1921. Stevens continuous recorder installed on right bank March 12, 1921, 1 mile above temporary gage. Inspected by D. R. Eddington.

DISCHARGE MEASUREMENTS.—Made by wading near gage and from highway bridge above junction with Francis Canyon, three-quarters of a mile above gage, to which was added discharge of Francis Canyon, measured by wading.

CHANNEL AND CONTROL.—Banks high and wooded, subject to overflow only at extreme stages. Control well defined; shifting. Point of zero flow, gage height 0.5 foot determined March 12, 1921.

EXTREMES OF DISCHARGE.—Maximum stage recorded during period of record, 3.82 feet at midnight on May 16 (discharge, 472 second-feet); minimum stage recorded, 1.47 feet on temporary staff, 1.10 feet referred to datum of water-stage recorder, February 4 (discharge, 13 second-feet).

ICE.—No ice during period.

DIVERSIONS.—Above practically all diversions.

REGULATION.—None.

ACCURACY.—Stage-discharge relation changed about May 17. Rating curves well defined. Temporary staff gage read about once a week during February and daily March 3–10. Missing gage heights determined from observer's notes and by interpolation. Stevens continuous recorder operated successfully subsequent to installation on March 12. Records good.

Discharge measurements of Lost Creek near Croydon, Utah, during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
Feb. 3	A. B. Purton	[a] 1.48	14.5	May 13	Purton and Sanford	3.23	299
Mar. 12	do	1.60	35.8	June 19	J. J. Sanford	1.82	61
31	Sanford and Purton	1.74	47.8	Aug. 9	do	1.16	15.5
Apr. 26	J. J. Sanford	2.36	119	30	A. B. Purton	1.13	13.4

[a] Made at temporary staff gage, 1 mile below permanent station.

Daily discharge, in second-feet, of Lost Creek near Croydon, Utah, for the year ending September 30, 1921

Day	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	14	28	57	162	174	33	24	16
2	14	30	73	236	167	33	22	16
3	14	32	96	291	152	34	19	19
4	13	42	124	332	145	33	18	18
5	13	53	119	366	138	31	16	16
6	13	53	103	378	136	30	16	16
7	14	42	89	358	128	28	16	16
8	14	36	82	288	117	27	16	16
9	14	36	76	243	109	26	16	16
10	15	35	76	223	105	26	16	16
11	16	35	81	234	97	26	16	16
12	17	36	94	283	89	24	16	15
13	18	39	118	315	85	24	20	15
14	19	42	144	346	81	24	22	15
15	20	42	130	387	76	23	18	15
16	21	45	114	429	72	31	17	15
17	22	53	107	441	70	30	16	16
18	23	63	112	375	64	24	15	16
19	23	70	124	335	63	22	14	16
20	24	62	130	286	56	22	14	16
21	25	56	125	253	53	22	14	16
22	25	53	127	253	49	21	14	16
23	26	52	158	268	48	20	16	16
24	27	52	143	263	46	20	16	15
25	27	49	130	241	44	18	16	16
26	27	46	119	232	41	18	16	16
27	27	43	112	248	40	18	15	16
28	27	42	114	255	38	17	15	16
29	------	44	118	241	36	17	15	16
30	------	45	131	223	34	17	17	16
31	------	46	------	193	------	18	18	------

Monthly discharge of Lost Creek near Croydon, Utah, for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
February	27	13	19.7	1,090
March	70	28	45.2	2,780
April	158	57	111	6,600
May	441	162	290	17,800
June	174	34	85.1	5,060
July	34	17	24.4	1,500
August	24	14	16.7	1,030
September	19	15	16.0	952
The period				36,800

LOST CREEK AT DEVILS SLIDE, UTAH

LOCATION.—In SE. ¼ sec. 19, T. 4 N., R. 4 E., a quarter of a mile above confluence with Weber River, half a mile east of Devils Slide, Morgan County.

DRAINAGE AREA.—228 square miles (measured on maps of United States Bureau of Reclamation).

RECORDS AVAILABLE.—April 1 to September 30, 1921, at present site; February 2 to December 31, 1905, at a site 150 feet above mouth of creek (published as "Lost Creek near Croydon, Utah").

GAGE.—Stevens continuous recorder on right bank.

DISCHARGE MEASUREMENTS.—Made by wading near gage.

CHANNEL AND CONTROL.—Bed consists of gravel; rocky at gage. Channel is straight for about 100 feet above and below gage. Some moss on rocks at

control, but control changes very little. Most of water at this point except during high water in spring, is seepage and from springs. One channel at all stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during period, 4.05 feet at 2 a. m. May 17 (discharge, 1,040 second-feet); minimum stage, 1.03 feet on September 15 and 16 (discharge, 13 second-feet).

ICE.—None during period.

DIVERSIONS.—Below all diversions.

REGULATION.—None.

ACCURACY.—Stage-discharge relation permanent. Rating curve well defined between 10 and 500 second-feet. Water-stage recorder successfully operated April 1–5 and May 3 to September 30. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph. For periods of missing gage heights, April 6–25, 27–30, May 1, 2, and June 12–18, discharge estimated from hydrographic comparison with flow of Lost Creek near Croydon. Records good except for estimated periods for which they are fair.

Discharge measurements of Lost Creek at Devils Slide, Utah, during the year ending September 30, 1921

Date	Made by—	Gage Height	Discharge	Date	Made by—	Gage Height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
Apr. 1	Purton and Sanford	1.85	129	Aug. 9	J. J. Sanford	1.16	25.0
May 29	J. J. Sanford	2.95	449	30	A. B. Purton	1.10	18.6
June 19	do	1.61	87				

Daily discharge, in second-feet, of Lost Creek at Devils Slide, Utah, for the year ending September 30, 1921

Day	Apr.	May	June	July	Aug.	Sept.
1	130	400	315	40	29	20
2	161	500	289	35	26	20
3	205	600	259	35	23	22
4	277	705	237	36	23	24
5	292	814	218	36	23	24
6		868	218	35	21	23
7		838	203	34	21	23
8		635	188	36	22	24
9		511	172	34	26	24
10		473	166	29	24	24
11		520	161	28	23	22
12		645		30	22	21
13		705		32	21	21
14		778		30	22	15
15		850	120	32	22	14
16	270	940		37	26	14
17		940		34	26	14
18		796		27	24	14
19		694	85	23	27	14
20		568	79	24	27	15
21		482	72	22	22	15
22		469	65	23	20	16
23		511	61	22	21	17
24		529	55	23	23	18
25		490	52	23	22	18
26	237	503	56	22	22	18
27		533	58	21	22	18
28	250	520	50	19	20	17
29		494	48	17	18	16
30		445	47	21	19	16
31		366		27	21	

NOTE.—Braced figures give mean discharge for periods indicated.

Monthly discharge of Lost Creek at Devils Slide, Utah, for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
April	----	130	257	15,300
May	940	366	617	37,900
June	315	47	133	7,910
July	40	17	28.6	1,760
August	29	18	22.8	1,400
September	24	14	18.7	1,110
The period	----	----	----	65,400

SOUTH FORK OF OGDEN RIVER NEAR HUNTSVILLE, UTAH

LOCATION.—In SE. ¼ sec. 12, T. 6 N., R. 2 E., half a mile below mouth of Magpie Creek, 1 mile above heading of Huntsville Mountain canal, and 5½ miles east of Huntsville, Weber County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—March 21 to September 30, 1921.

GAGE.—Stevens continuous recorder on right bank.

DISCHARGE MEASUREMENTS.—Made by wading below gage or from cable three-quarters of a mile above gage.

CHANNEL AND CONTROL.—Bed of stream rocky and clean. One channel for all stages. Control well defined but not permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during period of records, 4.57 feet at 11 p. m. May 16 (discharge, 1,250 second-feet); minimum stage, 0.25 foot, September 28 and 30 (discharge, 52 second-feet).

ICE.—Discharge relation only occasionally affected by ice.

DIVERSIONS.—Above all except few small ranch diversions.

REGULATION.—None.

ACCURACY.—Stage-discharge relation not permanent. Rating curves used March 21 to May 17 and May 22 to September 14, well defined. Operation of water-stage recorder satisfactory. Daily discharge ascertained by applying to rating table mean daily gage height obtained from recorder graph; shifting-control method used May 18-21 and September 15-30. Records good.

Discharge measurements of South Fork of Ogden River near Huntsville, Utah, during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
Mar. 22	A. B. Purton	1.10	221	June 15	J. J. Sanford	1.36	262
Apr. 11	J. J. Sanford	1.22	245	July 11	do	.58	100
May 1	do	2.16	[a]546	28	do	.43	75
6	Sanford and Purton	4.00	1,100	Aug. 21	do	.30	56
27	J. J. Sanford	3.31	823	Sept. 27	Purton and Woolley	.27	54
June 15	do	1.36	245				

[a] Discharge measured in several channels.

Daily discharge, in second-feet, of South Fork of Ogden River near Huntsville, Utah, for the year ending September 30, 1921

Day	Mar.	Apr.	May	June	July	Aug.	Sept.
1		244	598	649	135	72	59
2		319	854	602	130	72	60
3		422	960	546	126	70	62
4		520	1,060	543	123	66	59
5		481	1,150	525	117	66	58
6		419	1,130	501	112	65	55
7		327	1,010	468	110	65	55
8		282	794	448	105	65	55
9		264	655	419	100	65	56
10		249	635	386	99	64	55
11		259	749	359	96	62	56
12		319	870	329	94	62	55
13		399	945	304	92	66	55
14		475	1,040	284	92	66	55
15		411	1,120	264	92	62	55
16		360	1,200	246	91	60	55
17		332	1,210	235	89	60	55
18		332	1,060	226	89	58	55
19		374	957	217	89	58	55
20		388	791	209	84	58	55
21	233	366	702	200	84	56	55
22	229	363	699	192	83	59	55
23	229	454	741	188	82	59	55
24	227	425	779	182	78	60	55
25	214	380	757	174	77	60	55
26	199	352	767	164	76	58	55
27	183	322	853	154	76	58	55
28	175	352	895	154	74	58	53
29	183	385	869	148	72	56	55
30	189	472	821	141	71	56	53
31	205		731		72	69	

Monthly discharge of South Fork of Ogden River near Huntsville, Utah, for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
March 21–31	233	175	203	4,490
April	520	244	368	21,900
May	1,210	598	884	54,400
June	649	141	315	18,700
July	135	71	93.9	5,770
August	72	56	62.0	3,810
September	62	53	55.7	3,310
The period				112,000

JORDAN RIVER BASIN

JORDAN RIVER NEAR LEHI, UTAH

LOCATION.—In sec. 25, T. 5 S., R. 1 W., 800 feet below pump house at outlet of Utah Lake and 4 miles southwest of Lehi, Utah County.

DRAINAGE AREA.—2,570 square miles (measured on topographic maps).

RECORDS AVAILABLE.—May 30 to December 31, 1904, and July 22, 1913, to September 30, 1921.

GAGE.—Stevens eight-day water-stage recorder on right bank 25 feet above bridge since May 16, 1920; operated by W. A. Knight. From January 6, 1914, until recorder was installed in 1920, gage was vertical staff in stilling well at same site and datum.

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

CHANNEL AND CONTROL.—Bed composed of silt and hardpan. Banks clean and low; not subject to overflow. One channel at gage. Area slightly constricted below by highway bridge.

EXTREMES OF DISCHARGE.—Maximum mean daily stage during year, 6.63 feet June 15 (discharge, 1,020 second-feet); minimum mean daily stage, 2.28 feet October 23 and 24 (discharge, 136 second-feet).

1913-1921: Maximum mean daily stage, 6.63 feet June 15, 1921 (discharge, 1,020 second-feet). Minimum stage occurred at 6 p. m. December 15, 1915, when river was dry owing to a strong north wind which blew water in lake away from outlet gates. River was dry also on August 14–15, and September 2, 1919, because of dam placed in lake outlet to permit repairing of cut-off wall under pump house, and October 16, 1919, to May 15, 1920, because of dam placed in lake outlet incident to construction of new pumping plant.

ICE.—Stage-discharge relation seldom affected by ice.

DIVERSIONS.—None from Jordan River above station. In the Narrows about 6 miles north (several farther by river) a number of large canals divert for irrigation in Salt Lake Valley and for use by the smelters, etc., near Garfield.

REGULATION.—During irrigation season when natural flow from Utah Lake is inadequate for demands below, water is pumped from lake into Jordan River. A pumping plant with a capacity of about 1,500 second-feet is at outlet of lake, 800 feet above gage, and is owned and operated by various canal companies interested in the stream. This capacity of 1,500-second-feet includes four 200-second-feet units installed during winter of 1919–20.

ACCURACY.—Stage-discharge relation permanent during year. 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.—Records of mean daily gage height furnished by W. A. Knight, water commissioner.

Discharge measurements of Jordan River near Lehi, Utah, during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
Nov. 12	W. E. Dickinson	3.13	250	May 27	A. B. Purton	6.09	907
Mar. 1	do	4.46	547	July 11	E. C. Howard	5.98	825
28	do	4.95	629	Aug. 17	do	5.20	684
Apr. 22	A. B. Purton	5.27	695				

Daily discharge, in second-feet, of Jordan River near Lehi, Utah, for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	275	156	311	363	451	521	632	740	904	937	752	648
2	273	185	303	365	466	521	635	639	908	870	745	646
3	273	214	284	369	462	523	659	706	920	882	740	648
4	272	223	311	373	458	529	551	752	918	894	736	646
5	270	212	312	379	474	533	683	759	932	894	724	643
6	261	235	313	389	411	533	659	764	949	887	718	648
7	343	248	353	383	504	531	665	775	954	882	713	630
8	359	259	334	387	476	521	668	780	956	880	718	626
9	371	247	322	389	476	573	661	782	961	877	715	626
10	305	250	326	391	476	553	668	786	978	877	715	617
11	233	252	314	391	479	551	681	789	978	870	706	628
12	162	250	322	393	485	551	641	791	988	863	706	635
13	144	248	330	395	487	573	679	793	1,000	860	706	606
14	138	261	277	395	531	571	694	798	1,000	853	706	606
15	138	268	332	395	485	577	599	805	1,020	846	694	584
16	138	268	335	391	504	580	681	829	1,010	836	683	573
17	138	268	330	399	491	582	692	834	966	834	685	584
18	138	286	332	409	493	617	697	870	992	834	679	580
19	138	294	332	424	495	560	688	858	980	834	670	580
20	138	281	337	420	498	599	688	858	971	827	670	575
21	137	288	301	420	514	613	688	858	985	822	679	573
22	137	297	343	407	506	628	699	834	980	812	670	571
23	136	286	341	445	516	606	621	853	976	805	663	566
24	136	286	349	424	514	626	617	858	983	803	672	566
25	138	286	347	439	516	624	706	877	973	786	646	564
26	138	301	353	445	518	529	706	884	976	780	652	560
27	138	210	355	445	523	626	713	899	968	775	650	560
28	138	296	353	434	518	628	720	904	961	773	637	547
29	138	301	355	447	-------	628	720	908	964	766	630	551
30	138	297	355	462	-------	624	720	911	952	764	648	553
31	138	-------	361	453	-------	637	-------	942	-------	759	648	-------

Monthly discharge of Jordan River near Lehi, Utah, for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	371	136	194	11,900
November	301	156	258	15,400
December	361	277	330	20,300
January	462	363	407	25,000
February	531	411	490	27,200
March	637	521	576	35,400
April	720	551	671	39,900
May	942	639	821	50,500
June	1,020	904	967	57,500
July	937	759	838	51,500
August	752	630	690	42,400
September	648	547	598	35,600
The year	1,020	136	570	413,000

SPANISH FORK AT THISTLE, UTAH

LOCATION.—In SW. ¼ sec. 28, T. 9 S., R. 4 E., in town of Thistle, Utah County, 800 feet below point where Soldier Fork and Thistle Creek unite to form Spanish Fork, 3 miles above confluence with Diamond Fork.

DRAINAGE AREA.—490 square miles (measured on topographic map).

RECORDS AVAILABLE.—December 3, 1907, to September 30, 1921.

GAGE.—Inclined staff on right bank 10 feet below cable, installed May 4, 1915; read by Mrs. Effie Gordon.

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

CHANNEL AND CONTROL.—Bed composed of gravel and sand. One channel at all stages. Left bank low and subject to overflow; right bank high and partly wooded. Channel straight for 100 feet above and 600 feet below gage. Control is a gravel bar about 30 feet below gage; shifting.

ICE.—Stage-discharge relation affected by ice for short periods.

DIVERSIONS.—No important diversions above station.

REGULATION.—None.

COOPERATION.—Discharge measurements and records of daily discharge furnished by United States Bureau of Reclamation.

Discharge measurements of Spanish Fork at Thistle, Utah, during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
May 14	Borg and Hutchings	6.50	615	July 27	Kenneth Borg	5.10	95
June 8	Kenneth Borg	6.17	456	Aug. 22	do	5.10	92
13	do	5.75	302	Sept. 9	Borg and Baadsgaard	5.09	86

Daily discharge, in second-feet, of Spanish Fork at Thistle, Utah, for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	71	84	60	71	103	155	242	469	571	135	78	400
2	69	84	60	84	103	194	260	425	542	125	78	135
3	69	82	60	89	100	218	315	561	528	125	78	125
4	71	82	60	91	98	235	334	514	519	125	78	117
5	71	82	80	93	95	245	307	528	473	126	76	110
6	73	94	78	93	95	326	296	514	464	125	75	105
7	74	94	71	91	98	330	267	469	464	125	75	93
8	74	92	74	86	98	245	245	473	455	122	78	89
9	74	86	78	49	103	155	252	451	421	120	80	86
10	94	84	80	49	112	155	345	429	400	117	82	86
11	84	84	88	49	117	185	263	421	349	117	80	86
12	80	88	78	49	122	326	341	429	334	115	78	82
13	78	86	60	73	122	292	281	566	289	115	78	82
14	80	84	44	73	122	368	307	613	281	112	89	78
15	80	88	44	73	110	289	300	613	256	130	89	75
16	80	100	78	78	103	311	304	660	242	125	86	73
17	82	100	98	86	110	256	300	613	238	122	86	71
18	98	100	65	95	110	218	292	636	224	120	84	75
19	98	100	65	96	110	238	285	522	207	117	82	75
20	88	102	71	98	110	249	368	464	198	112	82	75
21	88	94	76	105	115	224	315	438	194	110	89	75
22	88	92	80	105	112	256	319	451	188	110	93	75
23	88	98	76	105	115	231	380	451	185	107	91	73
24	86	96	76	98	115	242	368	542	178	105	93	73
25	84	94	74	98	115	231	361	542	172	100	93	73
26	82	94	74	93	117	224	322	519	166	95	91	71
27	84	98	71	93	125	224	304	636	160	93	93	69
28	84	94	69	93	143	224	304	613	155	89	93	65
29	86	78	69	100	-------	224	322	622	149	82	93	63
30	86	60	76	107	-------	235	315	636	143	80	112	61
31	84	-------	71	107	-------	235	-------	613	-------	82	105	-------

Monthly discharge of Spanish Fork at Thistle, Utah, for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	98	69	81.5	5,010
November	102	60	89.8	5,340
December	98	44	71.1	4,370
January	107	49	86.2	5,300
February	143	95	111	6,160
March	368	155	243	14,900
April	380	242	307	18,300
May	660	421	208	12,800
June	571	143	305	18,100
July	135	80	112	6,890
August	112	75	85.8	5,280
September	400	61	93.9	5,590
The year	660	44	149	108,000

NOTE.—Monthly discharge computed by United States Geological Survey.

SPANISH FORK AT LAKE SHORE, UTAH

LOCATION.—In NW. ¼ sec. 15, T. 8 S., R. 2 E., 1 mile east of Lake Shore, Utah County, 3 miles above mouth, and 3 miles northwest of Spanish Fork; below all tributaries and diversions.

DRAINAGE AREA.—700 square miles (measured on topographic map).

RECORDS AVAILABLE.—December 10, 1903, to July 10, 1907; March 10, 1909, to September 30, 1921.

GAGE.—Inclined staff with vertical low-water extension, on right bank about half a mile below highway bridge, installed March 10, 1909; read by Andrew Poulsen.

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

CHANNEL AND CONTROL.—Bed soft; fairly permanent. One channel at all stages banks of earth, high, and covered with willows.

ICE.—Stage-discharge relation slightly affected for short periods.

DIVERSIONS.—Entire flow is diverted above station during latter part of irrigation season; only waste and return waters pass gage at that time.

REGULATION.—Natural flow affected by irrigation diversions.

COOPERATION.—Records furnished by United States Bureau of Reclamation.

Discharge measurements of Spanish Fork at Lake Shore, Utah, during the year ending September 30, 1921

[Made by Kenneth Berg]

Date	Gage height	Discharge
	Feet	*Sec.-ft.*
Mar. 31	7.80	310
May 10	8.81	346
16	10.59	505

Daily discharge, in second-feet, of Spanish Fork at Lake Shore, Utah, for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	121	167	141	133	179	179	291	291	535	11	8	325
2	134	160	141	144	127	219	318	457	436	15	8	346
3	109	157	144	146	179	226	322	629	426	11	11	371
4	56	147	134	159	136	288	332	667	353	11	11	199
5	53	147	141	155	139	422	429	671	298	33	11	127
6	56	164	160	153	179	339	346	571	291	20	8	121
7	59	180	134	153	153	278	318	549	268	17	11	115
8	58	167	131	148	185	223	305	535	233	11	8	119
9	56	160	128	102	127	206	291	499	199	11	11	90
10	65	160	128	108	136	192	298	426	185	24	15	77
11	124	160	134	111	146	233	305	394	146	11	11	77
12	100	160	134	118	153	290	318	394	96	11	11	74
13	128	160	167	127	159	321	422	457	65	11	8	74
14	141	160	115	153	162	342	401	524	20	29	20	71
15	134	157	106	125	153	335	380	496	15	192	20	11
16	141	155	109	127	143	353	353	507	11	46	59	11
17	160	154	128	166	121	318	362	554	15	46	24	11
18	157	150	134	136	123	322	369	549	39	39	20	11
19	160	153	167	143	146	432	380	507	29	33	20	11
20	170	154	141	156	159	318	378	485	24	15	24	11
21	163	154	141	153	159	285	394	474	24	33	24	46
22	160	153	141	150	157	278	387	429	20	11	219	39
23	164	154	145	153	140	282	425	453	22	11	102	42
24	160	150	144	142	153	258	411	485	24	11	65	46
25	160	147	147	179	159	258	394	514	22	8	52	46
26	154	141	147	127	169	252	370	499	24	8	11	39
27	154	141	145	133	172	239	336	521	15	8	20	71
28	150	141	147	139	179	230	332	542	11	11	24	59
29	150	141	144	146	-------	246	346	560	11	11	77	65
30	150	141	167	140	-------	252	258	503	33	8	39	84
31	160	-------	187	136	-------	258	-------	535	-------	11	77	-------

Monthly discharge of Spanish Fork at Lake Shore, Utah, for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	170	53	126	7,750
November	180	141	154	9,160
December	187	106	141	8,670
January	179	102	141	8,670
February	185	121	153	8,500
March	432	179	280	17,200
April	429	258	352	20,900
May	671	291	506	31,100
June	535	11	130	7,740
July	192	8	23.5	1,440
August	219	8	33.2	2,040
September	371	11	93.0	5,530
The year	671	8	178	129,000

NOTE.—Monthly discharge computed by U. S. Geol. Survey.

PROVO RIVER AT FORKS, UTAH

LOCATION.—In sec. 26, T. 5 S., R. 3 E., at Vivian Park summer resort, just above Forks, Utah County, 1 mile below mouth of North Fork of Provo River, which enters on right, and 400 feet above South Fork, which enters on left, 1 mile above Utah Power & Light Co.'s diversion dam, and 12 miles up Provo Canyon on highway and railroad from Provo to Heber.

DRAINAGE AREA.—600 square miles (measured on topographic maps).

RECORDS AVAILABLE.—November 17, 1911, to September 30, 1921. Records have been obtained at various points below mouth of South Fork since 1890.

GAGE.—Vertical staff on right bank, 16 feet above steel bridge; installed July 21, 1920; read by G. Purvance.

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

CHANNEL AND CONTROL.—Bed composed of gravel and boulders; fairly permanent. Banks fairly high and not subject to overflow; one channel at all stages. Control is gravel riffle, shifting

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 6.13 feet at 7 p.m. June 11 (discharge, 3,180 second-feet); minimum stage, 1.90 feet January 12 (discharge, 160 second-feet).

1911–1921: Maximum stage recorded, that of June 11, 1921; maximum stage, 0.06 foot on August 1 and 8, 1919 (discharge, 126 second-feet).

ICE.—Occurs at this station for short periods only.

DIVERSIONS.—Station is below diversions for irrigation in Heber Valley and above those near Provo.

REGULATION.—A number of small lakes at headwaters have been utilized as storage reservoirs and flow is regulated to slight extent.

ACCURACY.—Stage-discharge relation changed March 20 to May 10 and July 20 to September 30. Rating curves well defined. Staff gage read to hundredths once a day. Daily discharge ascertained by applying daily gage height to rating table; shifting-control method used March 20 to May 10 and July 20 to September 30. Records good.

COOPERATION.—Eight discharge measurements furnished by Utah Power & Light Co.

Discharge measurements of Provo River at Forks, Utah, during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
Oct. 2	A. B. Purton	2.14	215	May 11	R. P. Flagel	3.82	914
Nov. 9	R. P. Flagel[a]	2.60	331	June 11	Howard and Purton	6.10	3,140
Jan. 7	do	2.41	285	21	R. P. Flagel	4.22	1,180
Feb. 23	E. G. Thorum[a]	2.32	265	July 11	E. C. Howard	2.23	322
Mar. 29	R. P. Flagel	2.82	511	Aug. 6	H. L. Stoner[a]	2.11	266
Apr. 12	Dickinson and McBride[b]	3.00	522	17	E. C. Howard	2.20	338
				Sept. 13	Flagel and Wentz[c]	2.31	321

[a] Engineer of Utah Power & Light Co.
[b] Water commissioner, lower Sevier River.
[c] Water commissioner, Provo River.

Daily discharge, in second-feet, of Provo River at Forks, Utah, for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	220	359	302	297	278	290	516	680	2,640	595	312	322
2	215	354	302	291	251	347	536	775	2,320	527	300	330
3	215	333	307	297	287	361	532	965	2,230	527	292	384
4	215	323	302	299	293	401	545	1,110	2,260	488	292	375
5	215	328	312	291	281	500	603	1,240	2,320	444	285	372
6	215	346	297	289	267	516	625	1,340	2,430	363	274	360
7	210	375	286	281	208	484	635	1,110	2,520	350	288	352
8	210	349	291	256	278	420	576	1,040	2,730	340	292	350
9	215	325	302	215	273	375	528	894	2,670	325	292	345
10	245	317	302	240	273	350	516	926	2,710	340	302	338
11	281	312	307	220	267	382	504	952	3,060	325	310	332
12	281	307	302	160	273	405	520	958	2,880	325	318	325
13	265	317	302	240	276	444	524	972	2,740	312	325	318
14	255	317	297	278	260	670	532	1,090	2,660	288	322	312
15	255	317	222	278	308	710	700	1,470	2,660	355	348	310
16	250	317	218	278	278	576	665	1,510	2,410	363	352	302
17	250	317	281	296	200	585	562	1,740	1,970	378	348	302
18	400	323	307	308	215	590	580	1,810	1,740	432	352	300
19	351	323	302	364	210	1,090	608	1,320	1,420	432	355	300
20	370	328	291	324	276	715	650	1,210	1,230	381	348	302
21	359	328	278	302	287	576	640	1,110	1,100	352	338	302
22	375	328	281	256	256	516	603	958	975	350	330	296
23	375	333	276	270	256	532	600	958	958	332	325	290
24	375	323	276	296	246	540	665	965	892	318	315	283
25	338	307	281	278	267	532	640	1,090	810	312	315	278
26	336	312	281	278	264	520	598	1,120	770	302	315	276
27	328	323	281	281	276	504	594	1,230	730	295	310	271
28	323	307	281	287	287	504	598	1,450	689	283	310	271
29	323	302	291	278	-------	511	625	2,070	640	292	308	271
30	359	297	286	270	-------	504	675	2,410	619	285	310	271
31	391	-------	297	276	-------	496	-------	2,450	-------	298	310	-------

Monthly discharge of Provo River at Forks, Utah, for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	400	210	291	17,900
November	375	297	325	19,300
December	312	218	288	17,700
January	364	160	277	17,000
February	308	200	265	14,700
March	1,090	290	514	31,600
April	700	504	593	35,300
May	2,450	680	1,260	77,500
June	3,060	619	1,860	111,000
July	595	283	365	22,400
August	355	274	316	19,400
September	384	271	315	18,700
The year	3,060	160	555	402,000

SOUTH FORK OF PROVO RIVER AT FORKS, UTAH

LOCATION.—In sec. 26, T. 5 S., R. 3 E., at Vivian Park summer resort, just above Forks, Utah County, a quarter of a mile above confluence with Provo River and 12 miles up Provo Canyon on highway and railroad from Provo to Heber.

DRAINAGE AREA.—30 square miles (measured on topographic maps).

RECORDS AVAILABLE.—November 17, 1911, to September 30, 1921.

GAGE.—Vertical staff nailed to cottonwood tree on right bank, installed June 15, 1913; read by J. F. Carter.

DISCHARGE MEASUREMENTS.—Made from foot log near gage or by wading.

CHANNEL AND CONTROL.—Bed composed of gravel; not permanent. One channel at all stages; banks not subject to overflow.

EXTREMES OF DISCHARGE.—Maximum discharge during year, 85 second-feet on May 31 (gage height, 1.40 feet); minimum discharge, 25 second-feet on March 6 and 7 (gage height, 0.70 foot).

1911–1921: Maximum discharge, 96 second-feet, May 24, 1920; minimum discharge, 20 second-feet, July 23, 1917, and January 2, 1920.

ICE.—Stage-discharge relation not affected by ice.

DIVERSIONS.—Below all diversions.

REGULATION.—None.

ACCURACY.—Stage-discharge relation changed frequently. Standard rating curve fairly well defined. Gage read to hundredths once a day. Daily discharge ascertained by shifting-control method. Records fair.

COOPERATION.—Seven discharge measurements furnished by Utah Power & Light Co.

Discharge measurements of South Fork of Provo River at Forks, Utah, during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
Oct. 2	A. B. Purton	0.86	41.8	May 11	R. P. Flagel	0.80	37.9
Nov. 9	R. P. Flagel[a]	.82	38.8	June 11	Howard and Purton	1.30	73.0
Jan. 7	do	.74	33.6	21	R. P. Flagel	.92	43.1
Feb. 23	E. G. Thorum[a]	.76	31.7	July 11	E. C. Howard	.89	41.0
Mar. 29	R. P. Flagel	.75	31.6	Aug. 6	H. L. Stoner[a]	1.00	43.2
Apr. 12	Dickinson and McBride[b]	.78	38.9	17	E. C. Howard	1.24	51.4
				Sept. 13	Flagel and Wentz[c]	1.10	55.1

[a] Engineer of Utah Power & Light Co.
[b] Water commissioner for Sevier River.
[c] Water commissioner for Provo River.

Daily discharge, in second-feet, of South Fork of Provo River at Forks, Utah, for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	42	41	34	34	32	29	32	34	71	45	41	47
2	42	41	34	34	32	28	32	34	62	45	42	49
3	42	41	34	34	32	28	32	34	73	44	43	75
4	40	39	34	34	32	26	32	36	71	42	43	69
5	38	39	34	34	32	26	34	37	68	41	43	64
6	38	41	34	34	32	25	34	39	71	41	43	61
7	38	41	34	34	32	25	34	38	65	41	43	59
8	38	39	34	34	32	28	34	38	62	41	43	59
9	40	39	34	34	32	30	34	38	65	41	47	56
10	45	39	34	34	32	31	34	38	71	41	47	56
11	46	37	34	34	32	31	34	38	73	41	48	61
12	46	35	34	34	32	33	34	39	73	41	48	59
13	46	35	34	34	32	33	34	39	68	41	49	55
14	46	35	34	34	32	38	34	39	65	41	49	51
15	46	35	34	34	32	32	34	39	64	41	50	51
16	44	35	34	34	32	32	34	39	60	41	50	51
17	44	35	34	34	32	32	34	39	55	42	51	51
18	44	35	34	34	32	32	34	38	50	48	51	51
19	46	35	34	34	32	39	34	38	50	44	53	51
20	44	35	34	34	32	32	34	38	46	44	53	49
21	44	35	34	33	32	32	34	38	43	42	53	51
22	41	35	34	33	32	33	34	39	40	42	53	51
23	41	35	34	33	32	32	34	39	39	41	54	54
24	41	35	34	33	32	32	34	39	39	41	53	51
25	41	34	34	33	32	32	34	40	38	41	53	54
26	41	34	34	33	32	32	34	41	39	41	49	54
27	41	34	34	33	32	32	34	45	40	41	48	54
28	41	34	34	33	32	32	34	60	44	41	45	51
29	41	34	34	33	-------	32	34	70	42	41	45	54
30	41	34	34	33	-------	30	34	80	42	41	45	54
31	44	-------	34	33	-------	30	-------	85	-------	41	45	-------

Monthly discharge of South Fork of Provo River at Forks, Utah, for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	46	38	42.3	2,600
November	41	34	36.5	2,170
December	34	34	34.0	2,090
January	34	33	33.6	2,070
February	32	32	32.0	1,780
March	39	25	30.9	1,900
April	34	32	33.7	2,010
May	85	34	42.8	2,630
June	73	38	56.3	3,350
July	48	41	41.9	2,580
August	54	41	47.7	2,930
September	75	47	55.1	3,280
The year	85	25	40.6	29,400

SEVIER LAKE BASIN

SEVIER RIVER AT HATCH, UTAH

LOCATION.—In SE. ¼ sec. 28, T. 36 S., R. 5 W., at county bridge a quarter of a mile east of J. C. Barnhurst house at Hatch, Garfield County, and 1½ miles below dam site of former Hatchtown reservoir.

DRAINAGE AREA.—260 square miles (measured on topographic maps).

RECORDS AVAILABLE.—June 3, 1911, to July 31, 1921; fragmentary.

GAGE.—Stevens continuous water-stage recorder 50 feet below bridge; used since August 23, 1914; inspected by J. C. Barnhurst.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading.

CHANNEL AND CONTROL.—One channel at all stages. Bed composed of sand and gravel.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 3.20 feet at 4 a. m. June 10 (discharge, 803 second-feet); minimum stage not recorded.

1911–1921: Maximum stage occurred about 9 p. m. May 25, 1914, when Hatchtown reservoir dam failed (discharge not determined). Maximum stage recorded, 5.8 feet, June 5, 1912, (discharge, 1,210 second-feet); minimum flow 10 second-feet on days in January, March, and April, 1912, while water was being stored at Hatchtown reservoir.

Ice.—Stage-discharge relation slightly affected by ice.

DIVERSION.—Above all diversions except Hatch Bench canal and Panguitch Lake ditch, which divert a small quantity of water from Mammoth Creek. Hillsdale ditch diverts about 4 miles downstream and several other canals about 7 miles below for irrigation in Panguitch Valley.

REGULATION.—Entire flow controlled by gates in Hatchtown reservoir dam before May 25, 1914. No regulation since that date.

ACCURACY.—Stage-discharge relation changed on February 24; affected by ice only slightly for a few one to four day periods in January and February. Rating curve fairly well defined. Operation of water-stage recorder satisfactory except for periods shown in footnote to daily-discharge table. Staff gage read to hundredths once a day December 6 to April 2, and about once a week during remainder of period. Mean daily gage height determined from recorder graph or from staff gage readings. Daily discharge determined by applying mean daily gage height to rating table. For one or two day periods of missing gage height, discharge interpolated; for longer periods, discharge estimated from hydrographic comparison with other Sevier River stations, temperature charts, and observer's notes. For period February 25 to March 31, discharge is estimated because, due to large diurnal fluctuation, one gage reading a day was not an accurate index of mean daily discharge. Records fair.

Discharge measurements of Sevier River at Hatch, Utah, during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge
		Feet	*Sec-ft.*
Apr. 2	W. E. Dickinson	0.82	109
July 5	E. C. Howard	1.12	174

Daily discharge, in second-feet, of Sevier River at Hatch, Utah, for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July
1		129		83	81		106	288	585	189
2		124		83	81		108	320	598	182
3	115	122	80	81	81			355	585	180
4		107		81	81			379	595	177
5		107		81	80			394	585	174
6	114	114	78	81	78	150		385	608	
7	114	119	78	81	78				694	
8	114	114	85	78	78			350	723	
9	112	112	85	78	78		115		739	200
10	104	110	85	78	78			317	733	
11	104	109	85	81	78			317	723	
12	104	112	85		78			337	694	
13	107	109	85	80	78			358	649	270
14	116		85		78			397	595	217
15	116		90		85	120	124	449	554	282
16	116		90	78	81		124	480	492	210
17	116	100	85	78	78		120	548	464	256
18	122		85		78			526	424	251
19	129		85	80	78			480	382	194
20			85		81			403		179
21	135		85	85	80			376		172
22		92	85		81		140	361		165
23		92	85	80	78			373	360	158
24	144	95	90					355		151
25			90	85				352		151
26	125		85	85	125	100		370		148
27		80	85	81			169	446		146
28			85	81				517	212	146
29	114		85	81			225	545	204	164
30	126		85	81				567	197	182
31	134		85	81				567		180

NOTE.—No gage heights Oct. 1–5, 11, 20–23, 25–28, Nov. 9, 10, 14–21, 25–28, 30, Dec. 1–5, Apr. 3–14, 19–26, 28–30, May 2, 7–9, June 20–27, July 3, 4, 6–12, 21–23, 29, and 31. No records computed for August and September. Braced figures give mean discharge for periods indicated.

Monthly discharge of Sevier River at Hatch, Utah, for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October		104	120	7,380
November	129		102	6,070
December	90		84.4	5,190
January	85	78	80.7	4,960
February		78	87.5	4,860
March			123	7,560
April		106	136	8,090
May	567	288	407	25,000
June	739	197	481	28,600
July	282	146	191	11,700
The period				109,000

SEVIER RIVER NEAR CIRCLEVILLE, UTAH

LOCATION.—In sec. 29, T. 31 S., R. 4 W., 2½ miles above mouth of Pine Creek and 8 miles southwest of Circleville, Piute County.

DRAINAGE AREA.—950 square miles (measured on topographic maps).

RECORDS AVAILABLE.—May 10 to September 19, 1912; April 23, 1914, to September 30, 1921.

GAGE.—Stevens continuous water-stage recorder, with outside and inside staff gages, installed April 23, 1914; inspected by J. P. Meeks.

DISCHARGE MEASUREMENTS.—Made from cable or by wading.

CHANNEL AND CONTROL.—One channel at all stages; stream bed composed of sand; shifting.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 4.80 feet at 11.30 p. m. June 8 (discharge, 622 second-feet); minimum stage not recorded.

1912–1921: Maximum stage occurred in 1914 during flood resulting from failure of Hatchtown dam; discharge not determined. Maximum stage recorded, 8.0 feet August 6, 1916 (discharge estimated, 1,600 second-feet); minimum stage, 2.12 feet July 8–11, 1919 (discharge, 52 second-feet).

ICE.—Stage-discharge relation affected by ice during winter.

DIVERSIONS.—Above all diversions for Circle Valley; below several diversions for Hatchtown project and Panguitch Valley.

REGULATION.—Flow was affected somewhat by operation of Hatchtown reservoir until dam broke May 25, 1914. No regulation except by diversion since that date.

ACCURACY.—Stage-discharge relation changed about February 7, 1921; affected by ice December 21, 1920, to February 7, 1921. Rating curves are fairly well defined below 400 second-feet and extended above. Operation of water-stage recorder satisfactory except for periods of ice effect and several periods indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph. Discharge for periods of ice effect estimated from temperature records. Discharge for periods when recorder was not in operation estimated from hydrographic comparison with station near Kingston, or interpolated from weekly staff gage readings. Records for periods estimated are fair; others good.

Discharge measurements of Sevier River near Circleville, Utah, during the year ending September 30, 1921.

Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*
Apr. 1	W. E. Dickinson	3.09	188
July 4	E. C. Howard	2.24	78.8

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Daily discharge, in second-feet, of Sevier River near Circleville, Utah, for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	119	219	165			424	190	359	557	84	185	
2	116	201	168			298	194	392	554	82	184	275
3	108	189	163			431	202	389	517	80		
4	106	182	159			479	216	382	474	79		204
5	112	199	163		150	468	236	395	498		225	
6	121	210	144			410	221	474	479			
7	122	217	144			361	198	495	492	79		185
8	116		148		179		212	465	557			
9	108		153		175		223	424	584			
10	108		153		192		225		568	79	281	
11	108	200	174		227	300	216		565			170
12	109		184		243		223	380	560		250	
13	121		170		250		243		544			
14	130	193	172		314	252	250		522	225	216	168
15	132	197	172		281		235	418				
16	130	199	170	140	259			471	380			
17	130	199	170			230				336	150	166
18	132	197	166				219	554				173
19	141	197	166		180		227	538				164
20	148	195	166				241	468	269			
21	150	186				204	250	421		275		160
22	165	180			166		262	403			192	155
23	176	168			190		288	385	200		356	150
24	166	157			210		308	364			257	148
25	174	168			311	200	306					137
26	180	166	150		364		296	350	127	186	300	131
27	180	166			426		281					131
28	180	148			450	196	271		100			126
29	178	136			-------		284			185	326	126
30	201	148			-------	193	394	500			325	127
31	233	-------			-------		-------	568	-------		300	-------

NOTE.—No gage-height record Nov. 8–13, 1920, Feb. 17–21, Mar. 6, 8–13, 15–20, 22–27, 29–31, Apr. 15–17, May 10–15, 22, 25–29, June 15–19, 21–25, 27–30, July 1, 2, 5–9, 11–17, 19–25, 27–31, Aug. 1, 3–9, 11–14, 16–21, 25–28, 30, 31, Sept. 1–3, 5–10, 12–17, 21, and 22, 1921. Braced figures give mean discharge for periods indicated.

Monthly discharge of Sevier River near Circleville, Utah, for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	233	106	142	8,730
November	----------	136	187	11,100
December	184	----------	159	9,780
January	----------	----------	140	8,610
February	450	----------	221	12,300
March	479	----------	277	17,000
April	324	190	244	14,500
May	568	----------	416	25,600
June	584	----------	372	22,100
July	----------	----------	185	11,400
August	356	----------	235	14,400
September	----------	126	174	10,400
The year	584	----------	229	166,000

SEVIER RIVER NEAR KINGSTON, UTAH

LOCATION.—In NW. ¼ sec. 16, T. 30 S., R. 3 W., 1 mile above site used until September 18, 1918, 2 miles above mouth of East Fork, and 1 mile west of Kingston, Piute County.

DRAINAGE AREA.—1,110 square miles (measured on topographic maps).

RECORDS AVAILABLE.—June 12, 1914, to September 30, 1921; also several miscellaneous measurements in 1911, published in Water-Supply Paper 310 as "South Fork near Junction, Utah."

GAGE.—Stevens continuous water-stage recorder on left bank with outside and inside staff gages, established September 20, 1918; inspected by W. S. Price.

DISCHARGE MEASUREMENTS.—Made from cable or by wading.

CHANNEL AND CONTROL.—Concrete control 10 feet below gage. One channel at all stages.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 2.95 feet at 3 p. m. September 1 (discharge about 890 second-feet); minimum stage from water-stage recorder, 0.72 foot on July 9 (discharge 13 second-feet).

1914–1921: Maximum discharge recorded, 1,260 second-feet May 23, 1920; minimum stage, 0.70 foot on July 6, 1919, and 0.72 foot on July 9, 1921 (discharge, 13 second-feet).

ICE.—Stage-discharge relation slightly affected by ice during winter.

DIVERSIONS.—Below all diversions above mouth of East Fork.

REGULATION.—Flow affected by diversions for irrigation.

ACCURACY.—Stage-discharge relation changed during rising stage between February 25 and March 1; affected by ice December 13–15, 1920. Rating curves well defined below 375 second-feet and extended above. Operation of water-stage recorder satisfactory except for periods as shown in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph. Discharge for periods of ice effect or missing gage-height record estimated from comparison with other Sevier River stations or interpolated. Records good where daily discharge is given; estimated periods fair.

Discharge measurements of Sevier River near Kingston, Utah, during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*
Apr. 1	W. E. Dickinson	1.47	172
July 4	E. C. Howard	.80	21.4

Daily discharge, in second-feet, of Sevier River near Kingston, Utah, for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	53	224	186	142	149	520	164	310	433	27	148	615
2	53	214	182	145	152	610	187	346	433	27	116	561
3	52	203	175	139	152	585	202	364	395	21	102	507
4	52	196	165	130	158	545	213	395	382	21	87	453
5	59	206	149	118	164	560	240	409	377	19	127	399
6	68	217	172	112	170	550	232	437	382	16	127	346
7	74	232	182	121	175	414	220	404	382	15	116	293
8	76	224	178	127	162	368	220	368	437	14	139	240
9	79	210	172	136	178	377	228	354	442	13	198	232
10	79	214	175	149	346	354	220	315	428	14	240	224
11	74	214	178	152	376	332	213	289	400	15	252	224
12	83	210	186	152	367	306	217	264	400	14	217	194
13	97	224	168	155	283	277	224	252	433	52	315	187
14	115	235	165	162	324	252	224	244	423	97	119	180
15	121	221	165	200	287	236	248	236	377	293	35	177
16	118	217	162	189	217	264	248	240	328	260	28	177
17	118	214	182	182	192	268	224	289	280	209	85	170
18	121	210	192	172	210	256	209	400	232	213	97	167
19	124	206	182	178	217	293	194	442	184	248	110	167
20	149	210	182	200	210	315	187	386	136	220	124	164
21	158	210	175	203	203	315	187	306	120	293	154	161
22	168	203	168	200	186	315	187	277	103	213	170	161
23	178	189	149	189	192	298	187	306	86	194	226	161
24	182	168	142	189	235	240	187	302	69	187	282	157
25	189	178	149	203	324	244	187	277	52	180	338	127
26	182	178	149	200	382	209	187	268	35	174	394	113
27	172	182	149	175	418	194	198	252	35	167	450	110
28	178	168	142	155	418	187	244	236	35	161	506	105
29	189	162	139	158	-------	184	232	324	35	154	563	102
30	232	178	136	158	-------	180	285	377	32	151	620	100
31	257	-------	136	145	-------	180	-------	442	-------	145	615	-------

NOTE.—No gage heights Feb. 4–6, Apr. 23–25, June 16–25, Aug. 23–29, and Sept. 2–7, 1921. Braced figures give mean discharge for periods indicated.

Monthly discharge of Sevier River near Kingston, Utah, for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	257	52	124	7,620
November	235	162	204	12,100
December	192	136	166	10,200
January	203	112	162	9,960
February	418	149	245	13,600
March	610	180	330	20,300
April	248	164	213	12,700
May	442	236	326	20,000
June	442	32	263	15,600
July	293	13	123	7,560
August	620	28	229	14,100
September	615	100	232	13,800
The year	620	13	218	158,000

PIUTE RESERVOIR NEAR MARYSVALE, UTAH.

LOCATION.—In NW. ¼ sec. 3, T. 29 S., R. 3 W., at Piute dam, 11 miles south of Marysvale, Piute County.

RECORDS AVAILABLE.—March 22, 1914, to September 30, 1921.

GAGE.—Iron pins driven every foot into rock face at outlet gates; readings between foot marks are measured with a graduated scale.

COOPERATION.—Complete records furnished by water commissioner of Sevier River.

Daily contents, in acre-feet, of Piute reservoir near Marysvale, Utah, for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	11,600	7,100	21,100	31,300	41,100	51,400	62,300	50,400	44,800	45,300	36,300	34,900
2	11,000	7,500	21,600	31,800	41,400	52,000	62,200	50,000	45,300	44,800	35,800	33,600
3	10,500	7,900	22,200	32,000	41,600	52,900	62,000	49,700	46,100	44,100	35,400	33,500
4	10,000	8,300	22,900	32,400	41,900	53,500	61,800	49,300	46,500	43,900	34,600	34,800
5	9,400	8,700	23,300	32,700	42,200	54,200	61,600	49,300	46,900	43,700	34,200	33,900
6	8,800	9,100	23,600	33,100	42,400	55,000	61,300	49,200	47,200	43,300	33,800	33,800
7	8,200	9,600	24,100	33,400	42,700	55,800	60,900	49,100	47,500	42,900	33,500	33,500
8	7,800	10,000	24,300	33,600	42,800	56,200	60,600	48,800	47,700	42,700	33,100	33,200
9	7,300	10,500	24,600	33,900	43,300	56,400	60,400	48,700	48,100	42,200	32,700	32,800
10	6,900	10,900	25,000	34,100	43,600	57,000	60,200	48,500	48,800	41,800	32,400	32,500
11	6,400	11,300	25,300	34,300	43,800	57,200	60,100	47,800	49,300	41,400	32,200	32,000
12	5,900	11,500	25,600	34,600	44,100	57,500	59,800	47,400	50,000	41,100	32,000	31,600
13	5,500	12,000	26,000	34,900	44,800	57,900	59,500	46,800	50,600	40,600	31,900	31,200
14	5,200	12,600	26,200	35,300	45,200	58,300	59,200	46,200	51,200	40,300	31,900	30,600
15	5,000	13,100	25,500	35,600	45,600	58,600	58,800	45,800	51,700	40,400	32,000	30,200
16	4,500	13,700	26,600	36,000	45,900	58,900	58,600	45,500	51,900	40,700	32,000	29,600
17	4,200	14,200	26,800	36,300	46,200	59,200	58,300	45,200	52,100	40,700	31,600	29,300
18	3,800	14,700	27,200	36,700	46,400	59,500	57,900	45,000	52,000	40,700	31,200	28,900
19	3,300	15,300	27,600	37,200	46,800	59,800	57,400	44,800	51,700	40,400	30,700	28,300
10	3,100	15,900	27,900	37,500	47,000	60,100	57,000	44,700	51,500	40,300	30,300	27,800
21	3,400	16,200	28,200	37,800	47,400	60,400	56,200	44,600	50,800	40,300	30,000	27,200
22	3,700	16,800	28,500	38,100	47,700	60,700	55,400	44,300	50,200	40,300	29,800	26,800
23	3,800	17,400	28,800	38,600	47,900	61,100	54,500	44,000	49,800	40,200	30,100	26,000
24	4,100	17,700	29,100	38,800	48,500	61,300	54,000	43,800	49,300	39,900	30,600	25,600
25	4,300	18,300	29,500	39,000	48,700	61,500	53,600	43,400	48,700	39,600	31,300	25,100
26	4,500	18,900	29,600	39,300	48,900	61,700	53,200	43,200	48,100	39,300	32,000	24,500
27	4,900	19,300	29,800	39,600	49,700	61,800	52,500	42,800	47,700	38,800	32,400	23,900
28	5,100	19,800	30,200	39,900	50,300	61,900	52,100	42,500	47,200	38,400	33,200	23,100
29	5,500	20,200	30,300	40,200	-------	62,100	51,500	42,900	46,600	37,700	33,800	22,300
20	5,900	20,400	30,900	40,400	-------	62,100	50,900	43,200	45,900	37,200	34,100	21,700
31	6,000	-------	31,200	41,000	-------	62,200	-------	44,100	-------	36,700	34,200	-------

SEVIER RIVER BELOW PIUTE DAM, NEAR MARYSVALE, UTAH

LOCATION.—In sec. 34, T. 28 S., R. 3 W., 700 yards below dam of Piute reservoir, 11 miles south of Marysvale, Piute County.

DRAINAGE AREA.—2,440 square miles (measured on topographic maps).

RECORDS AVAILABLE.—May 17 to August 31, 1911; May 1, 1912, to September 30, 1921.

GAGE.—Friez water-stage recorder established May 1, 1912; inspected by M. C. Jensen.

DISCHARGE MEASUREMENTS.—Made from cable or by wading.

CHANNEL AND CONTROL.—Bed composed of sand and loam. One channel at all stages. Control is a riffle of heavy gravel and rocks at gage; practically permanent, shifting only slightly during high stages.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 2.13 feet at 2 p. m. August 28 (discharge, 668 second-feet); minimum discharge about 1 second-foot November 16 to December 3, when reservoir gates were closed.

1911–1921: Maximum stage recorded, 3.00 feet from 4 a. m. to 4 p. m. May 27, 1914 (discharge, 1,380 second-feet); minimum discharge practically zero when reservoir gates were closed April 5–10, 1919.

ICE.—Stage-discharge relation affected by ice during most winters.

DIVERSIONS.—No water diverted between this station and Piute reservoir.

REGULATION.—Flow past station controlled by operation of gates in dam above.

ACCURACY.—Stage-discharge relation practically permanent. Rating curves well defined. Operation of water-stage recorder satisfactory except July 17–22. Recorder not operated November 16 to December 3 and January 16–18 because reservoir gates were closed. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph. Discharge for periods when reservoir gates were closed represents leakage through gates and was estimated. Discharge for periods of faulty gage-height record was interpolated. Records excellent.

COOPERATION.—One measurement made by water commissioner for Sevier River.

Discharge measurements of Sevier River below Piute dam, near Marysvale, Utah, during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*
Apr. 1	W. E. Dickinson	0.85	136
July 4	E. C. Howard	1.86	502
Aug. 14	Brice McBride[a]	2.12	661

[a] Water commissioner.

Daily discharge, in second-feet, of Sevier River below Piute dam, near Marysvale, Utah, for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	554	94	1	71	66	67	182	571	302	519	654	577
2	548	95	6	71	66	67	276	565	305	513	647	559
3	548	97	1	71	66	67	332	559	309	492	654	559
4	566	98	22	67	66	67	361	508	324	497	654	554
5	543	100	49	67	66	67	361	435	336	492	654	548
6	514	100	57	67	66	67	361	430	361	519	654	542
7	508	100	57	68	66	67	357	486	379	536	661	559
8	508	100	57	70	66	67	353	513	383	548	654	530
9	508	100	57	70	66	67	353	513	321	609	654	508
10	502	102	59	70	66	68	353	508	294	596	661	508
11	508	103	59	70	66	68	353	502	198	589	654	502
12	502	105	59	70	66	68	397	497	177	596	654	497
13	486	105	56	68	66	68	420	492	177	609	654	508
14	466	105	61	68	66	68	435	492	195	621	661	513
15	460	61	68	46	66	68	435	486	246	628	654	508
16	455	1	68	3	66	68	440	475	240	628	654	508
17	441	1	70	3	66	68	440	470	253	628	661	508
18	436	1	70	3	67	68	445	475	313	628	661	508
19	426	1	70	46	67	68	486	486	349	628	661	502
20	304	1	70	71	67	68	565	492	411	628	661	497
21	153	1	70	65	67	67	571	492	492	628	661	502
22	153	1	70	66	67	44	565	486	492	628	654	513
23	155	1	70	66	67	59	565	481	524	628	654	508
24	155	1	71	66	67	70	565	475	542	628	654	508
25	157	1	71	66	67	70	565	465	542	628	661	502
26	148	1	71	66	67	100	565	460	542	621	661	502
27	140	1	71	66	67	120	565	450	536	615	661	513
28	102	1	71	66	67	120	565	411	524	628	661	502
29	92	1	71	66	-------	127	554	374	519	641	654	497
30	92	1	71	66	-------	139	559	317	513	647	634	508
31	94	-------	71	66	-------	139	-------	294	-------	654	589	-------

Monthly discharge of Sevier River below Piute dam, near Marysvale, Utah, for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	566	92	362	22,300
November	105	1	49.3	2,930
December	71	1	57.9	3,560
January	71	3	60.2	3,700
February	67	66	66.4	3,690
March	139	44	77.6	4,770
April	571	182	445	26,500
May	571	294	473	29,100
June	542	177	370	22,000
July	654	492	595	36,600
August	661	589	654	40,200
September	577	497	518	30,800
The year	661	1	312	226,000

SEVIER RIVER AT SEVIER, UTAH

LOCATION.—In E. ½ sec. 32, T. 25 S., R. 4 W. at Sevier, Sevier County; 100 yards above railroad bridge on Y spur, and 50 yards west of main-line track of Denver & Rio Grande Western Railroad. Clear Creek enters Sevier River immediately above this station. Prior to November 15, 1916, Clear Creek entered Sevier River 45 yards below this station.

DRAINAGE AREA.—2,850 square miles including Clear Creek, which was diverted into Sevier River above this station on November 15, 1916; 2,700 square miles exclusive of Clear Creek. Areas measured on topographic maps.

RECORDS AVAILABLE.—May 20, 1911, to September 30, 1921.

GAGE.—Stevens continuous water-stage recorder on right bank; installed March 30, 1920; inspected by R. W. Levie.

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

CHANNEL AND CONTROL.—Channel straight. Control composed of coarse gravel 75 feet below gage; somewhat shifting.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 3.84 feet at 10.30 a. m. June 9 (discharge, 991 second-feet); minimum stage, not recorded.

1911-1921: Maximum stage recorded, 4.75 feet at 6 p. m. June 3, 1914 (discharge, 1,600 second-feet); minimum stage, 1.15 feet at 2 p. m. November 27, 1919 (discharge, 10 second-feet).

ICE.—Stage-discharge relation not affected by ice.

DIVERSIONS.—A few small ditches divert between station and Piute dam.

REGULATION.—Flow past station practically controlled by operation of gates in Piute dam, about 27 miles above.

ACCURACY.—Stage-discharge relation changed slightly about November 30, 1920. 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 to rating table mean daily gage height determined from recorder graph. Discharge for days of missing gage height interpolated or estimated from weekly staff gage readings and from hydrographic comparsion with Marysvale station. Records for periods estimated are fair; others are good.

Discharge measurements of Sevier River at Sevier, Utah, during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*
Mar. 31	W. E. Dickinson	2.21	197
July 3	E. C. Howard	3.44	738

Daily discharge, in second-feet, of Sevier River at Sevier, Utah, for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	552	144	50	101	105	109	198	711	677	746	638	643
2	542	142	51	123	101	111	263	752	666	799		604
3	536	137	58	113	107	113	328	769	671	740		604
4	552	137	67	113	105	115		763	688	723	630	593
5	557	142	74	105	107	117		717	700	694		572
6	521	142	81	105	101	121	376	666	717	677		561
7	506	142	90	103	88	106		654	817	694	626	555
8	502	139	103	97	103	92		700	913	677		561
9	506	142	99	94	111			683	946	683		534
10	506	142	99	92	105		426	671	926	711		524
11	506	139	101	90	111	92	472	660	868	706	630	524
12	497	139	81	105	111		472	677	763	723		524
13	506	153	78	105	113		498	711	740	729		514
14	497	150	103	105	113	92	519	734	781	805		519
15	492	148	88	105	111		540	758	817	799	638	524
16	482	111	113	94	99		545	763	787	758		524
17	473	71	117	66	109	102	555	787	700	740		529
18	464	64	109	66	103		545	781	660	740	630	529
19	464	61	115	74	107		561	758	660	717		529
20	441	58	115	92	109		599	734	649	717		524
21	233	55	113	103	111	115	654	706	752	723	626	524
22	207	52	90	103	111		666	683	781	717		534
23	199	50	111	107	117	121	677	700	805	717		529
24	199	46	113	101	121		677	717	842	706		524
25	199	50	123	101	125	129	683	729	835		670	524
26	199	46	113	103	125	123	688	729	811			524
27	181	54	117	105	125	157	694	746	787	675		529
28	179	42	119	105	119	177	688	793	787		717	534
29	142	45	125	103	-------	193	683	781	775		723	529
30	144	46	117	101	-------	204	677	787	746		711	524
31	146	-------	111	109	-------	198	-------	700	-------		671	-------

NOTE.—Discharge estimated because of no gage-height record, Mar. 7, 9–13, 15–20, 22–24; Apr. 4–9, 11, 12; July 25–31; Aug. 2–6, 8–14, 16–20, and 22–27. Braced figures give mean discharge for periods indicated.

Monthly discharge of Sevier River at Sevier, Utah, for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	557	142	391	24,000
November	153	42	99.6	5,930
December	125	50	98.2	6,040
January	123	66	99.6	6,120
February	125	88	110	6,110
March	204	----------	120	7,380
April	694	----------	519	30,900
May	793	654	726	44,600
June	946	649	769	45,800
July	805	----------	715	44,000
August	----------	----------	648	39,800
September	643	514	542	32,300
The year	946	----------	405	293,000

SEVIER RIVER NEAR VERMILION, UTAH

LOCATION.—In NE. ¼ sec. 19, T. 22 S., R. 1 W., at highway bridge half a mile below Rockyford dam, 2 miles below Vermilion, Sevier County, and 4 miles above mouth of Lost Creek.

DRAINAGE AREA.—3,340 square miles (measured on topographic maps).

RECORDS AVAILABLE.—July 15 to September 23, 1912; July 31, 1914, to September 30, 1921.

GAGE.—Stevens continuous water-stage recorder on right bank, installed April 20, 1917; inspected by Mrs. Will Barron.

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

CHANNEL AND CONTROL.—Fairly permanent.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 5.04 feet at noon on October 17 (discharge, 388 second-feet); minimum discharge, 4 second-feet June 27 to July 5.

1914–1921: Maximum stage recorded, 6.00 feet at 4 p. m. November 25, 1916 (discharge, 941 second-feet); minimum discharge, 2 second-feet in July and August, 1915, and July, 1919.

ICE.—Stage-discharge relation not affected by ice.

DIVERSIONS.—Entire flow diverted above station during low-water season Flow past station at such times represents seepage and return flow from canals.

REGULATION.—Flow past station regulated to a large extent by dams and reservoirs above.

ACCURACY.—Stage-discharge relation permanent. Rating curve well defined. Operation of water-stage recorder satisfactory except December 28–31, 1920, and September 24–30. During these periods discharge estimated from hydrographic comparison with upper stations. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph. Records good.

Discharge measurements of Sevier River near Vermilion, Utah, during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*
Mar. 30	W. E. Dickinson	4.20	120
July 3	E. C. Howard	3.14	3.4

Daily discharge, in second-feet, of Sevier River near Vermilion, Utah, for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	204	255	165	168	170	178	74	148	178	4	58	246
2	213	240	165	168	168	180	20	152	105	4	58	231
3	192	210	168	170	168	182	4	170	24	4	64	213
4	180	225	165	182	168	185	58	165	7	4	67	188
5	178	225	165	188	168	195	118	155	7	4	59	170
6	178	219	165	188	165	213	148	131	7	5	59	165
7	168	219	162	195	165	222	190	99	7	5	59	150
8	152	219	165	195	162	225	207	77	27	5	58	138
9	145	216	168	190	162	225	201	79	213	5	58	116
10	158	213	168	182	160	225	222	67	280	5	56	97
11	172	213	170	168	160	222	222	44	272	5	56	92
12	160	210	168	162	158	222	222	33	240	5	56	93
13	165	210	162	162	155	219	198	35	150	6	58	90
14	210	213	162	168	152	213	175	60	74	8	59	88
15	219	213	165	165	152	210	175	74	6	90	60	86
16	210	213	162	160	138	192	158	67	6	158	62	84
17	283	207	170	160	138	180	107	36	6	150	64	80
18	326	192	175	162	138	172	94	41	6	105	65	77
19	334	168	175	162	138	168	77	50	6	8	67	75
20	338	165	175	162	140	168	65	68	6	8	67	74
21	354	170	175	162	140	165	65	68	7	8	67	75
22	318	170	175	165	143	162	53	79	8	7	67	77
23	266	168	175	165	145	158	26	90	11	8	67	65
24	252	168	172	168	148	116	35	90	14	9	84	
25	243	170	170	170	150	97	122	95	8	11	185	
26	237	168	170	170	152	97	210	105	5	14	192	70
27	234	165	170	170	155	97	237	116	4	17	240	
28	228	165	170	170	162	107	190	170	4	16	204	
29	222	165	169	170	-------	118	142	219	4	14	170	
20	222	165	169	172	-------	122	140	207	4	13	216	
31	237	-------	168	172	-------	122	-------	201	-------	40	240	-------

NOTE.—Braced figure gives mean discharge for period indicated.

Monthly discharge of Sevier River near Vermilion, Utah, for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	354	145	226	13,900
November	255	165	197	11,700
December	175	162	168	10,300
January	195	160	171	10,500
February	170	138	154	8,550
March	225	97	173	10,600
April	237	4	132	7,860
May	219	33	103	6,330
June	280	4	56.5	3,360
July	158	4	24.0	1,480
August	240	56	94.9	5,840
September	246	65	109	6,490
The year	354	4	134	96,900

SEVIER RIVER BELOW SAN PITCH RIVER, NEAR GUNNISON, UTAH

LOCATION.—In NE. ¼ sec. 14, T. 19 S., R. 1 W., half a mile below former gaging station at bridge on county road from Gunnison to West View precinct, 3 miles west of Gunnison, Sanpete County. San Pitch River enters from east 1,000 feet above station.

DRAINAGE AREA.—4,880 square miles (measured on topographic maps).

RECORDS AVAILABLE.—October 1, 1917, to September 30, 1921. Records of Sevier River near Gunnison above confluence of San Pitch River were obtained June 29, 1900, to September 30, 1917. Combined flow of Sevier River near Gunnison and San Pitch River near Gunnison is comparable with flow at present station.

GAGE.—Stevens continuous water-stage recorder on left bank; installed October 4, 1917; inspected by Annetta Kenney.

DISCHARGE MEASUREMENTS.—Made from cable 250 feet above gage or by wading.

CHANNEL AND CONTROL.—One channel at all stages. Bed is composed of fine sand and gravel.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 3.61 feet at 4 a. m. June 11 (discharge, 1,420 second-feet); minimum stage from water-stage recorder, 0.36 foot on July 12 (discharge, 86 second-feet).

1918–1921: Maximum stage recorded, 3.41 feet at midnight May 22, 1920 (discharge, 1,430 second-feet); minimum stage recorded, 0.19 foot July 30, 1919 (discharge, 57 second-feet).

ICE.—Stage-discharge relation seldom affected by ice.

DIVERSIONS.—During irrigation season, greater part of flow is diverted above station.

REGULATION.—Flow at gage is affected by operation of reservoirs and numerous irrigation diversions above.

ACCURACY.—Stage-discharge relation permanent during year. Rating curve well defined. Operation of water-stage recorder satisfactory, except for dates indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph. For days when recorder was not in operation, discharge interpolated or estimated. Records good.

Discharge measurements of Sevier River below San Pitch River, near Gunnison' Utah, during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
Oct. 3	Brice McBride [a]	1.44	342	June 25	Brice McBride	1.37	283
Mar. 29	W. E. Dickinson	1.36	308	uly 3	E. C. Howard	.50	112
Apr. 4	Brice McBride	.80	182	21	Brice McBride	.58	113
5	do	1.42	337	Aug. 11	do	.97	173
May 2	do	1.77	475	19	do	1.14	225
29	do	2.58	822	Sept. 4	do	1.64	376
June 9	do	3.23	1,190				

[a] Water commissioner.

Daily discharge, in second-feet, of Sevier River below San Pitch River, near Gunnison, Utah, for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	261	452		326	342	362	252	404	754	125	196	468
2	307	452	306	313	332	376	220	441	708	112	236	464
3	332	445		322	332	433	182	517	723	106	220	460
4	329	426	313	345	336	595	174	534	600	104	218	393
5	313	430		362	342	769	267	520	513	109	196	360
6	310	426		372	339	831	386	500	637	115	187	330
7	307	430	316	380	330	831	408	441	795	130	180	294
8	300	415		372	335	800	452	352	1,110	110	176	260
9	288	411		345	340	728	468	359	1,210	92	182	240
10	300	386		352	349	641	468	386	1,310	91	189	230
11	336	383	319	339	362	564	430	370	1,380	91	198	220
12	355	386		326	362	525	393	404	1,360	92	200	210
13	372	386		313	362	517	359	508	1,280	94	205	205
14	422	383		322	369	468	345	564	1,210	100	238	200
15	433	383	316	326	342	437	332	595	1,070	194	250	200
16	437	379		329	307	393	300	632	924	218	245	194
17	433	383		345	307	393	282	679	779	300	244	178
18	484	376	313	400	310	422	270	609	627	319	237	180
19	529	352		433	322	445	264	476	538	244	230	196
20	551	329		386	339	422	241	437	546	123	222	202
21	542	326	322	359	352	404	215	430	488	120	184	200
22	546	322		352	345	393	194	418	352	136	180	200
23	534	319		362	332	393	191	480	326	130	280	205
24	505	313		359	342	372	241	637	322	117	379	200
25	475	319	332	342	349	362	273	656	304	121	430	205
26	445	319	339	339	352	352	319	656	276	123	480	205
27	437	319	326	352	352	322	359	656	236	123	538	205
28	433	307	307	362	362	319	393	728	184	121		208
29	426	300	300	366	-------	304	372	821	174	123	540	215
30	430	300	319	352	-------	273	379	912	163	130		218
31	464	-------	332	349	-------	258	-------	842	-------	169		-------

NOTE.—Water-stage recorder failed to operate satisfactorily Oct. 24, 25, Nov. 21, 22, Dec. 1–24, Jan., 7, Feb. 7–9, Mar. 8, 25, May 5, July 8, 12, Aug. 9, 12, 15, 16, 18, 22, 23, 25, 26, 28–31, Sept. 2, 5, 6, 8, 9, 11–13. Braced figures give mean discharge for periods indicated.

Monthly discharge of Sevier River below San Pitch River, near Gunnison, Utah for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	551	261	408	25,100
November	452	300	372	22,100
December	-------	-------	317	19,500
January	433	313	352	21,600
February	369	307	341	18,900
March	831	258	474	29,100
April	468	174	314	18,700
May	912	352	548	33,700
June	1,380	163	697	41,500
July	319	91	138	8,480
August	540	176	286	17,600
September	468	178	252	15,000
The year	1,380	91	375	271,000

SEVIER BRIDGE RESERVOIR NEAR JUAB, UTAH

LOCATION.—In NW. ¼ sec. 1, T. 17 S., R. 2 W., at dam of Consolidated Sevier Bridge Reservoir Co. about 13 miles southwest of Juab, Juab County.

RECORDS AVAILABLE.—January 1, 1914, to September 30, 1921.

GAGE.—Inclined staff gage about 100 feet upstream from south end of dam, since April 26, 1914.

COOPERATION.—Gage-height record furnished by Consolidated Sevier Bridge Reservoir Co.

Daily contents, in acre-feet, of Sevier Bridge reservoir near Juab, Utah, for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	16,300	44,400	67,200	86,800	107,000	128,000	158,000	170,000	147,000	134,000	93,800	77,600
2	16,700	45,500	67,800	87,100	108,000	129,000	159,000	170,000	147,000	132,000	93,400	77,600
3	17,200	46,600	68,300	87,800	109,000	129,000	159,000	170,000	147,000	130,000	92,400	77,600
4	17,800	47,900	69,100	88,400	110,000	130,000	159,000	171,000	148,000	127,000	91,400	77,300
5	20,200	48,800	69,800	89,100	110,000	131,000	160,000	171,000	148,000	124,000	90,400	77,000
6	20,800	49,500	70,500	90,100	111,000	132,000	160,000	171,000	148,000	121,000	89,400	76,700
7	21,500	50,200	71,000	90,700	112,000	133,000	160,000	171,000	147,000	119,000	88,400	76,400
8	22,100	51,200	71,800	91,400	112,000	135,000	161,000	169,000	148,000	117,000	87,800	76,100
9	22,700	52,100	72,400	92,400	113,000	137,000	162,000	168,000	149,000	115,000	87,100	75,800
10	23,600	53,000	73,000	93,400	114,000	139,000	163,000	166,000	150,000	114,000	86,200	75,500
11	24,400	54,000	73,500	94,500	115,000	140,000	164,000	164,000	151,000	112,000	85,200	75,200
12	25,200	55,000	74,100	95,200	116,000	142,000	165,000	163,000	153,000	110,000	84,300	75,000
13	26,100	55,700	74,700	95,800	117,000	144,000	166,000	161,000	154,000	109,000	83,300	74,700
14	27,000	56,400	75,200	96,200	117,000	145,000	166,000	160,000	154,000	108,000	82,400	74,700
15	27,800	56,900	75,800	96,500	118,000	146,000	167,000	158,000	155,000	106,000	81,800	74,700
16	28,700	57,700	76,400	96,900	119,000	147,000	168,000	157,000	155,000	105,000	80,900	74,700
17	29,600	58,400	77,000	97,200	119,000	147,000	169,000	155,000	155,000	103,000	80,300	74,400
18	30,500	59,200	77,600	97,600	120,000	148,000	169,000	154,000	154,000	102,000	79,700	74,100
19	31,400	59,900	78,200	97,900	121,000	149,000	169,000	152,000	154,000	101,000	79,400	73,500
20	32,600	60,700	79,100	98,300	121,000	150,000	170,000	152,000	152,000	100,000	79,100	73,000
21	33,700	61,500	79,700	98,600	122,000	151,000	170,000	149,000	151,000	99,700	78,500	72,400
22	34,900	62,000	80,300	99,000	123,000	152,000	170,000	148,000	149,000	98,600	77,900	72,100
23	36,100	62,500	80,900	99,400	124,000	152,000	170,000	147,000	148,000	97,900	77,600	71,800
24	37,300	63,000	81,500	100,000	124,000	153,000	169,000	146,000	147,000	97,200	77,300	71,800
25	38,500	63,800	82,100	101,000	125,000	154,000	169,000	147,000	144,000	96,600	77,300	70,500
26	39,600	64,600	82,700	102,000	126,000	154,000	169,000	147,000	142,000	96,200	77,000	69,700
27	40,700	65,100	83,300	102,000	126,000	155,000	169,000	147,000	140,000	95,500	77,000	69,100
28	41,700	65,600	83,900	103,000	127,000	156,000	169,000	147,000	138,000	95,200	77,000	68,600
29	42,600	66,200	84,900	104,000	-------	157,000	170,000	147,000	137,000	94,800	77,300	68,000
30	43,300	66,700	85,500	105,000	-------	157,000	170,000	147,000	135,000	94,500	77,600	67,500
31	43,900	-------	86,200	106,000	-------	158,000	-------	147,000	-------	94,100	77,600	-------

SEVIER RIVER NEAR JUAB, UTAH

LOCATION.—In NE. ¼ sec. 2, T. 17 S., R. 2 W., 1,600 feet downstream from Sevier Bridge dam and 14 miles southwest of Juab, Juab County.

DRAINAGE AREA.—5,120 square miles (measured on topographic maps).

RECORDS AVAILABLE.—September 23, 1911, to September 30, 1921.

GAGE.—Stevens continuous water-stage recorder on left bank; installed April 16, 1914; inspected by H. F. Stout.

DISCHARGE MEASUREMENTS.—Made from cable 600 feet above gage or by wading.

CHANNEL AND CONTROL.—One channel at all stages. Bed composed of sand, clay, and fine gravel. Artificial control of rocks below gage; permanent except during very high stages.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 6.0 feet on May 15 (discharge, 1,290 second-feet); minimum stage recorded, 1.25 feet October 15 to November 23 (discharge, 5 second-feet).

1911–1921: Maximum stage recorded, 7.8 feet May 28, 29, and June 4–12, 1914 (discharge, 2,030 second-feet). No flow March 7, 1918.

ICE.—Stage-discharge relation not affected by ice.

DIVERSIONS.—None between this station and that near Gunnison.

REGULATION.—Flow controlled by gates in dam just above station.

ACCURACY.—Stage-discharge relation changed slightly about April 30. Rating curves well defined. Operation of water-stage recorder April 11 to September 30 satisfactory except September 11–13. Staff gage read once a day to hundredths October 1 to April 10, during which period reservoir gates were closed except April 5–7. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph. Discharge estimated September 11–13. Records good.

COOPERATION.—Results of ten discharge measurements furnished by water commissioner for Sevier River.

Discharge measurements of Sevier River near Juab, Utah, during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
Oct. 5	Brice McBride [a]	1.26	5.4	June 11	Brice McBride	4.00	678
Nov. 21	do	1.28	6.3	26	do	5.34	1,090
Apr. 11	Dickinson and McBride	1.33	11.1	July 10	E. C. Howard	4.90	939
May 12	Brice McBride	5.02	954	29	Brice McBride	2.82	335
26	do	4.12	695	Aug. 20	do	3.36	521
30	do	3.84	575	Sept. 5	do	3.52	508

[a] Water commissioner.

Daily discharge, in second-feet, of Sevier River near Juab, Utah, for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	17	5	6	6	6	7	9	352	650	982	307	491
2	17	5	6	6	6	7	9	352	650	1,100	515	494
3	5	5	6	6	6	7	9	297	650	1,120	726	497
4	5	5	6	6	6	7	9	166	683	1,110	710	503
5	6	5	6	6	6	7	124	381	710	940	686	482
6	6	5	6	6	6	7	124	614	680	940	626	419
7	6	5	6	6	6	7	124	726	601	934	580	419
8	6	5	6	6	6	7	9	789	598	934	520	419
9	6	5	6	6	6	7	9	898	671	943	474	422
10	6	5	6	6	6	8	11	991	695	940	526	378
11	6	5	6	6	6	8	11	988	650	870	595	327
12	6	5	6	6	6	8	11	976	726	786	595	327
13	6	5	6	6	6	8	11	1,020	825	742	638	327
14	6	5	6	6	6	8	11	1,120	943	742	680	350
15	5	5	6	6	6	8	11	1,280	946	742	642	365
16	5	5	6	6	6	8	11	1,260	810	762	580	347
17	5	5	6	6	6	8	11	1,240	734	756	508	344
18	5	5	6	6	6	8	65	1,230	878	665	448	368
19	5	5	6	6	6	8	100	1,120	870	604	450	368
20	5	5	6	6	6	9	93	1,030	870	601	450	368
21	5	5	6	6	6	9	114	1,010	878	601	450	368
22	5	5	6	6	6	9	178	1,000	870	589	427	368
23	5	5	6	6	6	9	273	964	982	574	416	368
24	5	6	6	6	7	9	181	928	1,090	380	485	526
25	5	6	6	6	7	9	166	878	1,090	276	485	704
26	5	6	6	6	7	9	166	704	1,080	278	485	704
27	5	6	6	6	7	9	166	668	1,000	314	488	704
28	5	6	6	6	7	9	232	638	940	310	491	704
29	5	6	6	6	-------	9	339	607	910	307	491	750
30	5	6	6	6	-------	9	357	604	910	307	491	801
31	5	-------	6	6	-------	9	-------	650	-------	307	491	-------

Monthly discharge of Sevier River near Juab, Utah, for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	17	5	6.10	375
November	6	5	5.23	311
December	6	6	6.00	369
January	6	6	6.00	369
February	7	6	6.18	343
March	9	7	8.10	498
April	357	9	98.1	5,840
May	1,280	166	822	50,500
June	1,090	598	820	48,800
July	1,120	276	692	42,500
August	726	307	531	32,600
September	801	327	467	27,800
The year	1,280	5	291	210,000

SEVIER RIVER AT OASIS, UTAH

LOCATION.—In E. ½ sec. 33, T. 17 S., R. 7 W., three-quarters of a mile northwest of Oasis, Millard County, and 1½ miles below county bridge, locally known as Hinckley Bridge.

DRAINAGE AREA.—8,080 square miles (measured on topographic maps).

RECORDS AVAILABLE.—April 13, 1912, to September 30, 1921.

GAGE.—Stevens continuous water-stage recorder on left bank since April 24, 1914; inspected by E. F. Sanders and J. M. Jackson.

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

CHANNEL AND CONTROL.—Two channels at extremely high water, one channel at low and medium stages. Bed composed of sand with slight vegetal growth. Control is usually permanent during irrigation season.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 5.32 feet from 5 to 9 a. m. May 27 (discharge, 396 second-feet); minimum stage, 1.52 feet at 7.25 p. m. May 1 (discharge, 14 second-feet).

1912-1921: Maximum stage recorded, 9.45 feet June 12, 1914 (discharge, 1,580 second-feet); minimum stage, 2.0 feet May 13-19, 1912 (discharge, 0.5 second-foot).

ICE.—Stage-discharge relation at times affected by ice.

DIVERSIONS.—Numerous diversions above station take practically entire flow during irrigation season; water passing gage at such times is largely seepage or return water entering below Gunnison Bend reservoir.

REGULATION.—Flow controlled by storage reservoirs and diversion dams above station.

ACCURACY.—Stage-discharge relation for low stages changed about May 25; permanent for stages above 56 second-feet. Rating curves fairly well defined. Operation of water-stage recorder satisfactory except for periods indicated in footnote to daily-discharge table. Discharge estimated for periods of ice effect and periods of no gage-height record. Daily discharge ascertained by applying to rating tables mean daily gage height determined from recorder graph. Records good.

COOPERATION.—Water commissioner for Sevier River made one discharge measurement and assisted with two others.

Discharge measurements of Sevier River at Oasis, Utah, during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
Oct. 24	Brice McBride[a]	2.54	59.3	Apr. 10	McBride and Dickinson	1.63	17.7
Apr. 10	Dickinson and McBride	1.63	16.5	July 9	E. C. Howard	2.06	28.7

[a] Water commissioner.

Daily discharge, in second-feet, of Sevier River at Oasis, Utah, for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	48	30	38	40		29	22	14	37	34	30	32
2	47	30	37	40		30	17	14	35	32	28	26
3	45	29	37	40		27	17	15	25	32	27	27
4	48	28	37	40		27		14	24	30		25
5	46	28	37			28		15	24	28		25
							18				26	
6	45	28	36			28		18	24	30		25
7	44	26	36		25	32		17	23	28		25
8	42	27	37			34		17	23	30	26	24
9	41	27	38			33	18	17	23	30		26
10	41	26	37			33	19	18	25	31		29
11	42	26	38			32	17	18	23	36	30	39
12	43	26	38			34	17	19	21	36		39
13	46	21	37			33	17	20	21	38		36
14	47	20	36		27	32	18	22	20	36	33	37
15	48	22			27	32	18	23	21	36		36
16	44	22			26	32	18	24	21	36		38
17	42	21	38			32	18	24	24	36	50	36
18	40	22		25		32	18	25	25	34		36
19	39	27			26	32		26	27	36		36
20	37	29				28		27	27	39		34
21	35	34	39			29	18	30	27	44	66	34
22	33	37	38		27	30		29	24	41	67	33
23	32	36	38		27	28		29	24	39	68	34
24	30	35	37		27	28		31	28	38	69	34
25	32	35	38		27	28	19	166	38	34	69	34
26	31	38	39		28	28	17	360	32	33	57	34
27	32	40	39		27	27	15	369	35	32	45	34
28	33	39	40		28	26	15	270	38	32	41	34
29	32	36	40		-------	26	14	145	41	32	38	34
30	31	33	40		-------	26	14	71	38	30	38	34
31	30	-------	40		-------	27	-------	47	-------	30	41	-------

NOTE.—No gage-height record Dec. 11, 15–20, 27, 28, 1920; Jan. 5 to Feb. 13, 17–21, Apr. 4–8, 19–24, May 18, Aug. 4–7, 9–13, 15–20, 22, 23, and Sept. 30, 1921. Braced figures give mean discharge for periods indicated.

Monthly discharge of Sevier River at Oasis, Utah, for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	48	30	39.5	2,430
November	40	20	29.3	1,740
December	40	36	37.9	2,330
January	40	-------	26.9	1,650
February	28	-------	26.0	1,440
March	34	26	29.8	1,830
April	22	14	17.5	1,040
May	369	14	62.4	3,840
June	41	20	27.3	1,620
July	44	28	34.0	2,090
August	69	-------	41.8	2,570
September	39	24	32.3	1,920
The year	369	14	33.9	24,500

EAST FORK OF SEVIER RIVER NEAR KINGSTON, UTAH

LOCATION.—In SW. ¼ sec. 13, T. 30 S., R. 3 W., 1 mile below highway bridge and 2 miles east of Kingston, Piute County.

DRAINAGE AREA.—1,260 square miles (measured on topographic maps).

RECORDS AVAILABLE.—April 29, 1914, to September 30, 1921. Records obtained about 1½ miles above Rockyford Bridge, in SW. ¼ sec. 16, T. 30 S., R. 2½ W., March 27, 1913, to April 28, 1914; also at gage three-fourths of a mile north of Kingston, in NE. ¼ sec. 10, T. 30 S., R. 3 W., May 11 to September 20, 1912.

GAGE.—Stevens continous water-stage recorder on right bank, 1 mile below highway bridge; installed April 29, 1914; inspected by W. S. Price.

DISCHARGE MEASUREMENTS.—Made from cable 2 miles above gage, at highway bridge 1 mile above, or by wading.

CHANNEL AND CONTROL.—One channel at all stages. Right bank is overflowed during high water. Bed composed of gravel. Concrete control 20 feet below gage since December 11, 1917.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 4.15 feet on July 20 and 21 (discharge, 406 second-feet); minimum stage, not recorded.

1913-1921: Maximum stage recorded, 4.46 feet at 3 p. m. May 18, 1917 (discharge, 946 second-feet); minimum stage recorded, 1.00 foot September 19, 20, and 21, 1913 (discharge, 8 second-feet).

ICE.—Stage-discharge relation seriously affected by ice.

DIVERSIONS.—Above all diversions near Kingston.

REGULATION.—Flow affected by operation of gates at Otter Creek reservoir 8 miles above.

ACCURACY.—Stage-discharge relation changed about April 1 and July 4; affected by ice November 29, 1920, to February 21, 1921. Rating curves well defined. Operation of water-stage recorder satisfactory except October 16-19, November 16-19, 21-26, 1920, and September 2-7, 1921. Daily discharge ascertained by applying to rating tables mean daily gage height determined from recorder graph. Discharge for periods of ice effect estimated from observer's notes and temperature records. Discharge interpolated for days of no gage-height record. Records good.

Discharge measurements of East Fork of Sevier River near Kingston, Utah, during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge
		Feet.	*Sec.-ft.*
Apr. 1	W. E. Dickinson	2.80	18.8
July 4	E. C. Howard	3.99	332

Daily discharge, in second-feet, of East Fork of Sevier River near Kingston, Utah, for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	131	35				48	19	69	267	234	310	183
2	131	26				36	20	90	242	230	310	
3	131	24				44	24	84	230	305	310	
4	131	24				54	25	60	208	332	310	
5	128	24				53	28	60	167	336	314	70
6	128	37	20			61	32	52	160	350	319	
7	128	37				40	27	44	176	359	319	
8	128	31				33	28	44	173	364	327	58
9	125	29				31	30	39	157	354	336	58
10	125	28				26	32	36	140	354	332	58
11	125	30			20	22	32	33	132	364	327	58
12	125	40				16	33	40	118	373	332	56
13	128	38				26	28	49	116	373	341	55
14	128	61				26	32	73	111	350	345	54
15	89	39				27	32	64	101	373	306	54
16				18		25	34	77	79	396	293	54
17						24	33	121	71	396	293	54
18	30	35				23	33	75	68	387	285	52
19						29	33	64	62	382	285	52
20	30	36				28	29	57	59	392	285	52
21	25	34	15			21	29	50	99	396	302	52
22	25	34			23	28	28	49	234	382	341	52
23	31	33			23	26	29	54	223	373	314	52
24	24	30			24	23	43	57	234	341	302	52
25	23	28			29	21	40	54	234	319	302	52
26	23	28			49	21	35	46	238	314	297	52
27	23	30			46	23	27	77	254	314	289	51
28	23	26			69	23	27	211	254	314	281	54
29	22	25			-------	19	29	271	246	314	273	54
30	24	24			-------	18	43	292	242	314	269	54
31	29	-------			-------	18	-------	288	-------	314	261	-------

NOTE.—Braced figures give mean discharge for periods indicated.

Monthly discharge of East Fork of Sevier River near Kingston, Utah, for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	131	22	74.3	4,570
November	61	24	32.4	1,930
December	----------	----------	16.6	1,020
January	----------	----------	18.0	1,110
February	69	----------	24.4	1,360
March	61	16	29.5	1,810
April	43	19	30.5	1,810
May	292	33	86.5	5,320
June	267	59	170	10,100
July	396	230	345	21,200
August	345	261	307	18,900
September	183	51	61.4	3,650
The year	396	----------	101	72,800

ROCKYFORD CANAL NEAR VERMILION, UTAH

LOCATION.—In sec. 19, T. 22 S., R. 1 W., 300 feet below head of canal and 2 miles northeast of Vermilion, Sevier County.

RECORDS AVAILABLE.—July 8, 1914, to September 30, 1921.

GAGE.—Stevens continuous water-stage recorder on left bank; installed October 18, 1917; inspected by Mrs. Will Barron.

DISCHARGE MEASUREMENTS.—Made from highway bridge 400 feet downstream or by wading.

CHANNEL AND CONTROL.—Bed composed of gravel and clay; fairly permanent.

ICE.—Seriously affected by ice.

DIVERSIONS.—None above gage. Gage is short distance below wasteway which returns surplus water to Sevier River.

REGULATION.—Flow controlled by head gates and wasteway.

ACCURACY.—Stage-discharge relation changed during winter; probably permanent rest of year. Standard rating curve used with shifts to parallel curves. Operation of water-stage recorder satisfactory October 1 to December 12, 1920, and March 30 to September 3, 1921, except November 4–13, December 2–4, 8–11, 1920; April 2–8, June 8 and 9, when daily discharge was estimated. Staff gage readings were obtained about once a week during year. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph and staff readings; shifting-control method used October 1 to March 12. Monthly discharge estimated for winter. September 3–30 estimates were made except for days staff gage readings were taken. Records fair.

Canal diverts water from Rockyford reservoir, a small reservoir on Sevier River at Vermilion in sec. 19, T. 22 S., R. 1 W. Flow dependent on water stored in reservoir and seepage and return waters below Richfield. Water used for irrigation north of Vermilion.

Discharge measurements of Rockyford canal near Vermilion, Utah, during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*
Mar. 30	W. E. Dickinson	1.20	22.4
July 3	E. C. Howard	2.27	88.1

Daily discharge, in second-feet, of Rockyford canal near Vermilion, Utah, for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	63	62	29				30	109	84	84	97	65
2	63	61	29					101	82	87	93	65
3	62	40	29					82	81	89	77	63
4	62		29					83	81	91	76	55
5	62		30				28	84	81	91	85	49
6	62		30			10		84	84	93	85	
7	63		20					84	70	90	84	
8	64		7					81	15	88	84	
9	64	35	7				26	81	15	88	84	
10	73		7				26	81	18	87	84	
11	87		7				26	84	62	88	83	75
12	88		7			10	26	85	81	87	84	
13	89						26	78	79	87	84	
14	89	33					35	79	86	88	84	
15	89	33			10		44	80	91	89	85	
16	89	33		10		15	44	81	93	73	84	
17	101	32					44	85	94	47	84	99
18	79	30					51	86	93	78	84	
19	59	28					69	87	93	90	85	
20	59	28				26	74	89	93	97	84	75
21	59	29					78	89	93	103	84	
22	59	29	5				88	89	93	99	83	
23	58	28				19	99	85	84	100	84	56
24	58	28					102	83	83	100	84	
25	58	28					103	84	88	101	72	
26	58	28				12	105	85	93	99	51	50
27	57	28					106	87	93	93	68	
28	57	28				17	107	87	89	94	50	
29	58	28			-------		108	86	84	99	47	
30	58	28			-------	22	109	86	83	100	60	
31	60	-------			-------	22	-------	86	-------	98	63	-------

NOTE.—Braced figures give mean discharge for periods indicated.

Monthly discharge of Rockyford canal near Vermilion, Utah, for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	101	57	68.0	4,180
November	62	28	33.7	2,010
December	29	----------	10.5	646
January	----------	----------	10	615
February	----------	----------	10	555
March	----------	----------	13.6	836
April	109	----------	57.4	3,420
May	109	78	85.5	5,260
June	94	15	78.6	4,680
July	103	47	90.3	5,550
August	97	47	78.6	4,830
September	----------	----------	66.7	3,970
The year	109	----------	50.5	36,600

BEAVER RIVER BASIN

BEAVER RIVER NEAR BEAVER, UTAH

LOCATION.—In SE. ¼ sec. 18, T. 29 S., R. 6 W., a quarter of a mile above city diversion dam at mouth of canyon, 4½ miles above Beaver, Beaver County.

DRAINAGE AREA.—82 square miles (measured on topographic maps).

RECORDS AVAILABLE.—June 15 to September 22, 1906; March 15, 1914, to September 30, 1921.

GAGE.—Stevens continuous water-stage recorder on right bank used since November 14, 1914; inspected by G. W. Valantine.

DISCHARGE MEASUREMENTS.—Made from footbridge 70 feet above gage or by wading.

CHANNEL AND CONTROL.—Bed composed of boulders and coarse gravel; somewhat shifting. One channel; left bank subject to overflow at extremely high stages.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 5.84 feet at 7.30 p. m. June 10 (discharge, 665 second-feet); minimum stage, 2.78 feet at 10 a. m. February 2 (discharge, 9 second-feet).

1914–1921: Maximum stage from water-stage recorder, 6.02 feet at 9 p. m. May 30, 1920 (discharge, 760 second-feet); minimum stage recorded, 2.57 feet, January 28, 1916 (discharge, 8 second-feet).

ICE.—Stage-discharge relation seriously affected during winter.

DIVERSIONS.—Above all irrigation diversions. Above station is a small storage reservoir known as Kents Lake. Water is diverted by Beaver River Power Co. but returned to stream several miles above station.

REGULATION.—Flow probably not affected by operation of Beaver River Power Co.'s plant but is somewhat affected by the Kents Lake storage reservoir.

ACCURACY.—Stage-discharge relation changed about June 10. Rating curves fairly well defined. Water-stage recorder operated successfully except during periods indicated by braced figures in daily-discharge table. For these periods discharge interpolated or estimated from hydrographic study based on weekly staff gage readings, observer's notes, one discharge measurement, temperature records, and flow of Beaver River at Adamsville. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph or readings of staff gage. Records good, except those for estimated periods which are fair.

Discharge measurements of Beaver River near Beaver, Utah, during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*
Jan. 15	A. B. Purton	[a] 3.85	25.6
Apr. 9	W. E. Dickinson	3.25	32.8
July. 10	E. C. Howard	3.92	84

[a] Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Beaver River near Beaver, Utah, for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	29	27	23	14	27	34	40	120	355	130	58	43
2	29	24	24	13	15	34	44	148	390	125	54	42
3	30	26	24	13	16	34	44	161	397	110	46	42
4	32	25	24		17	35	48	175	397	100	46	42
5	31	27			18	36	41	171	384	91	46	
6	31	27				37	43	154	427	86	46	
7	30	25				39	44	136	490	80	46	41
8	28	26	20			34	40	127	504	80		
9	28	25		19	19	33	38	124	526	83		
10	31	24				33	39	127	560	84		
11	30	27				34	39	141	512		45	40
12	29	26	19		23	35	39	171	468			
13	30	26			24	35	39	207	424			
14	30	25			24	35	44	223	396	80	45	
15	30	27		26	24	34	40	240	368			36
16	30	26	18	24	23	34	38	274	298			
17	29	27		22	22	35	38	299	248	77	50	
18	32	27		24	22	37	40	253	211	76		33
19	28	27	19		23	38	49	216	192			
20	26	27			23	37	50	187	182			
21	25	25			21	36	50	169	182	72	46	33
22	31	27			23	35	59	167	185			
23	29	25			24	34	78	191	180			
24	25	24		22	24	34	65	198	173	68		
25	26	26			24	35	58	198	166		45	33
26	26	26	14		27	35	54	211	159			
27	27	26			33	33	53	269	153	63		
28	27	21			33	34	61	322	147		45	33
29	28	21			-------	34	77	377	139		45	
30	31	21		23	-------	35	91	371	132	58	44	
31	29	-------		21	-------	35	-------	349	-------	62	44	-------

Monthly discharge of Beaver River near Beaver, Utah, for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	32	25	28.9	1,780
November	27	21	25.4	1,510
December	24	----------	17.7	1,090
January	----------	13	20.4	1,250
February	33	15	22.3	1,240
March	39	33	34.9	2,150
April	91	38	49.4	2,940
May	377	120	209	12,900
June	560	132	312	18,600
July	130	----------	79.5	4,890
August	58	44	46.8	2,880
September	----------	----------	36.7	2,180
The year	560	----------	73.6	53,400

BEAVER RIVER AT ADAMSVILLE, UTAH

LOCATION.—In S. ½ sec. 30, T. 29 S., R. 8 W., 100 yards below highway bridge on road from Milford to Beaver, a quarter of a mile above mouth of Indian Creek, and three-quarters of a mile south of Adamsville, Beaver County.

DRAINAGE AREA.—272 square miles (measured on topographic maps).

RECORDS AVAILABLE.—December 16, 1913, to September 30, 1921.

GAGE.—Stevens continuous water-stage recorder on right bank; installed March 13, 1914; inspected by W. A. Rees.

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

CHANNEL AND CONTROL.—Bed composed of fine gravel. Banks low; covered with willows; subject to overflow at extremely high stages. Concrete control constructed July 11, 1916, and rebuilt September 26, 1919. Stage of zero flow, 1.20 feet January 15, 1921.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 3.96 feet from 4 to 8 a. m. June 11 (discharge, 505 second-feet); minimum stage recorded, 1.34 feet on July 8 (discharge, 2 second-feet).

1914–1921: Maximum stage, from water-stage recorder, 4.85 feet at 6 a. m. May 23, 1920 (discharge, 796 second-feet); minimum stage, from water-stage recorder, 1.04 feet at 3 p. m. July 9, 1919 (discharge, 0.3 second-foot).

ICE.—Stage-discharge relation affected by ice for short periods.

DIVERSIONS.—No diversions between station and storage reservoir of Beaver County Irrigation Co. There are a number of ditches above station that supply Adamsville and Beaver districts.

REGULATION.—Flow affected by irrigation diversions.

ACCURACY.—Stage-discharge relation permanent except as affected by ice December 15–17, 27, and 28, 1920, and January 12, 1921. Rating curve well defined. Staff gage read to hundredths once a week. Water-stage recorder operated satisfactorily except October 10–13, 15, 18, 19, 21, 22, 24–26, and December 13 and 14, 1920; April 7, June 9, and August 23, 1921. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph. For periods when recorder was not in operation and periods of ice effect, discharge was determined from staff gage readings. For periods when no gage heights were available, discharge estimated or interpolated. Records good.

COOPERATION.—Seven discharge measurements furnished by Beaver County Irrigation Co.

Discharge measurements of Beaver River at Adamsville, Utah, during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
Oct. 2	M. P. Lewis[a]	1.64	20.1	June 4	M. P. Lewis	3.16	291
Jan. 15	A. B. Purton	1.91	47.5	11	do	3.88	474
Apr. 8	W. E. Dickinson	1.98	57	July 2	do	1.39	4.1
29	M. P. Lewis	2.33	102	8	E. C. Howard	1.34	2.3
May 14	do	2.35	105				

[a] Engineer for Beaver County Irrigation Co.

Daily discharge, in second-feet, of Beaver River at Adamsville, Utah, for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	19	48	47	53	43	39	39	116	243	11	4	108
2	20	44	47	48	40	39	37	151	256	4	4	100
3	19	39	50	50	44	40	37	166	250	4	4	84
4	16	39	50	53	45	42	43	166	261	4	4	74
5	16	39	52	54	44	43	50	149	258	4	6	71
6	16	40	50	57	38	47	48	138	258	3	9	67
7	15	46	53	54	57	61	52	140	319	3	11	63
8	15	47	50	48	46	51	56	145	373	2	15	54
9	16	44	48	50	44	43	54	107	430	3	32	44
10	18	42	50	46	53	43	52	92	499	3	61	34
11	19	43	51	44	53	40	53	83	493	3	59	23
12	21	44	51	42	50	43	56	71	467	3	50	15
13	22	67	48	45	50	45	56	90	412	8	58	14
14	24	51	47	47	47	44	67	97	387	67	63	11
15	25	45	46	47	39	44	70	110	351	201	50	11
16	26	43	46	46	44	40	66	116	308	113	45	11
17	26	44	48	47	42	38	61	140	240	63	53	11
18	28	45	51	58	40	38	59	128	174	53	56	11
19	29	45	50	53	40	38	63	100	141	42	54	11
20	31	44	50	47	42	39	66	80	130	46	51	10
21	31	44	48	44	43	40	67	67	108	36	57	10
22	32	44	54	43	44	42	67	61	90	28	52	10
23	32	43	50	46	45	44	79	74	80	23	175	11
24	33	43	47	44	45	46	88	81	71	18	157	11
25	34	44	50	43	43	48	102	100	66	16	106	11
26	36	44	47	44	42	51	102	92	51	14	104	11
27	37	43	46	47	40	47	92	102	39	12	62	11
28	37	37	46	52	39	47	92	138	25	10	113	10
29	38	37	50	46	-------	46	97	220	19	6	104	10
30	45	42	50	43	-------	38	100	248	16	4	91	10
31	52	-------	52	44	-------	39	-------	232	-------	4	90	-------

Monthly discharge of Beaver River at Adamsville, Utah, for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	52	15	26.7	1,640
November	67	37	44.0	2,620
December	54	46	49.2	3,030
January	58	42	47.9	2,950
February	57	38	44.4	2,470
March	61	38	43.4	2,670
April	102	37	65.7	3,910
May	248	61	123	7,560
June	499	16	227	13,500
July	201	2	26.2	1,610
August	-------	4	58.1	3,570
September	108	10	31.1	1,850
The year	499	2	65.4	47,400

BEAVER RIVER AT ROCKYFORD DAM, NEAR MINERSVILLE, UTAH

LOCATION.—In NW. ¼ sec. 11, T. 30 S., R. 9 W., half a mile below Rockyford dam and 4 miles above Minersville, Beaver County, since June 1, 1916; at former site 1,000 feet below dam September 18, 1913, to May 31, 1916. Between these two sites there is some inflow from springs which has at times reached 10 second-feet. This quantity probably varies with stage of water in reservoir.

DRAINAGE AREA.—512 square miles (measured on topographic maps).

RECORDS AVAILABLE.—December 18, 1913 to September 30, 1921.

GAGE.—Friez water-stage recorder at present site since June 1, 1916; inspected by J. L. Jackson.

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

CHANNEL AND CONTROL.—Bed composed of gravel; some vegetal growth. One channel at all stages. Banks not subject to overflow. Concrete control installed November 2-12, 1916. Stage of zero flow, at gage height 0.60 foot according to measurements made October 9, 1917, and September 21, 1920.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 3.53 feet at 7 p. m. June 10 (discharge, 727 second-feet); minimum stage, 0.98 foot October 2-9 and February 7-10 (discharge, 13 second-feet).

1913–1921: Maximum stage from water-stage recorder, 3.53 feet at 7 p. m. June 10, 1921 (discharge, 727 second-feet); minimum stage recorded, 1.68 feet March 19 and 20, 1914 (discharge estimated, 0.3 second-foot).

ICE.—Stage-discharge relation not affected by ice.

DIVERSIONS.—None between dam and station.

REGULATION.—Flow controlled by operation of gates at Rockyford dam.

ACCURACY.—Stage-discharge relation permanent. Rating curve well defined, The Friez recorder operated successfully except October 11–15, 21, 22. November 2, 3, January 13, 14, 30, 31, February 1–4, March 9–11, July 24, 25, August 7, 8, 30, 31, September 1, 2, 4–9, 11–16, and 18–23. For days when recorder was not in operation, discharge interpolated or estimated. Records good.

COOPERATION.—Gage-height record and one discharge measurement furnished by Beaver County Irrigation Co.

Discharge measurements of Beaver River at Rockyford dam, near Minersville, Utah, during the year ending September 30, 1921.

Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*
Oct. 9	M. P. Lewis[a]	0.98	12.1
Jan. 15	A. B. Purton	1.17	32.0
Apr. 8	W. E. Dickinson	1.03	18.5

[a] Engineer for Beaver County Irrigation Co.

Daily discharge, in second-feet, of Beaver River at Rockyford dam, near Minersville, Utah, for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	15	38	33	35	23	48	17	62	152	101	164	67
2	13	38	30	34	23	57	18	101	152	103	162	60
3	13	38	30	34	23	57	18	105	164	90	162	53
4	13	38	30	33	23	57	18	128	176	73	162	
5	13	38	31	33	23	52	18	128	179	75	159	
6	13	44	35	33	17	50	18	128	179	76	157	
7	13	54	35	33	13	50	18	128	181	87	146	
8	13	54	35	33	13	50	18	128	279	117	136	
9	13	54	35	33	13		18	128	473	126	126	
10	23	54	34	32	13	44	18	128	585	137	126	53
11	23	54	34	32	21		18	141	568	137	128	
12	24	54	34	32	27	37	19	143	508	139	130	
13	24	55	34	32	27	37	19	134	485	141	120	
14	25	54	34	32	27	37	19	134	481	143	90	
15	26	54	34	32	27	37	19	141	401	120	90	
16	27	54	34	32	26	35	19	148	321	115	90	
17	27	48	34	32	25	32	19	148	254	139	88	53
18	27	50	34	32	25	33	19	148	199	171	87	
19	27	50	34	32	25	33	19	148	164	176	87	
20	27	50	34	32	25	33	19	148	157	166	87	
21	27	50	34	32	25	33	27	150	152	169	96	35
22	27	50	35	32	25	33	53	132	128	171	100	
23	27	45	35	32	25	33	64	124	113	171	98	
24	27	43	35	32	26	34	64	124	113	171	96	17
25	28	43	35	32	26	34	64	126	113	171	90	17
26	28	43	35	32	27	34	64	143	113	171	88	17
27	28	36	35	28	33	34	64	148	115	171	87	17
28	28	34	35	23	33	34	64	152	117	171	87	17
29	29	34	35	23	-------	35	62	150	105	171	87	17
30	33	34	35	23	-------	35	62	150	100	169	80	17
31	38	-------	35	23	-------	33	-------	152	-------	164	73	-------

NOTE.—Braced figures show mean discharges for periods indicated.

Monthly discharge of Beaver River at Rockyford dam, near Minersville, Utah, for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	38	13	23.2	1,430
November	55	34	46.2	2,750
December	35	30	33.9	2,080
January	35	23	31.1	1,910
February	33	13	23.5	1,310
March	57	32	40.0	2,460
April	64	17	31.9	1,900
May	152	62	134	8,240
June	585	100	241	14,300
July	176	73	139	8,550
August	164	73	112	6,890
September	67	17	41.7	2,480
The year	585	13	75.0	54,300

OWENS LAKE BASIN

OWENS RIVER NEAR ROUND VALLEY, CALIF.

LOCATION.—In SE. ¼ sec. 10, T. 6 S., R. 31 E., below sheep bridge, 700 feet above mouth of Rock Creek, and 2 miles north of Round Valley, Inyo County.

DRAINAGE AREA.—About 450 square miles.

RECORDS AVAILABLE.—August 4, 1903, to September 30, 1921.

GAGE.—Vertical staff on left bank 85 feet below bridge. A water-stage recorder was installed November 22, 1920. Gage operated by W. G. Allen.

DISCHARGE MEASUREMENTS.—Made from cable at gage.

CHANNEL AND CONTROL.—Rock and boulders; fairly permanent.

EXTREMES OF DISCHARGE.—Maximum stage during year, from water-stage recorder, 2.79 feet at noon June 12 (discharge, 453 second-feet); minimum stage, from water-stage recorder, 1.48 feet at 8 a. m. January 10 and 11 (discharge, 78 second-feet).

1903–1921: Maximum stage recorded, 4.0 feet June 30, 1907 (discharge, 1,190 second-feet); minimum stage, that of January 10 and 11, 1921.

ICE.—Shore ice exists at times but ordinarily does not affect stage-discharge relation.

DIVERSIONS.—No water is diverted above station.

REGULATION.—None.

ACCURACY.—Stage-discharge relation changes slightly but continuously. Standard rating curve well defined. Daily discharge ascertained by applying mean daily gage height to rating table using shifting-control method. Records good.

COOPERATION.—Gage-height record and discharge measurements furnished by city of Los Angeles.

Discharge measurements of Owens River near Round Valley, Calif., during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
Oct. 30	J. E. Jones	2.02	173	June 18	J. E. Jones	2.49	348
Dec. 16	do	1.88	153	July 2	do	2.50	363
Jan. 8	do	1.89	158	20	Smart and Mathews	2.16	212
Feb. 22	do	1.91	165	Aug. 3	do	1.96	160
Mar. 24	do	1.86	148	25	J. E. Jones	1.90	155
May 26	do	2.07	202	Sept. 23	do	1.84	142

Daily discharge, in second-feet, of Owens River near Round Valley, Calif., for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	158	159	153	172	167	294	134	164	215	360	174	162
2	151	153	151	176	162	282	134	164	220	374	176	179
3	144	146	149	181	162	261	132	167	220	356	164	176
4	138	140	160	199	164	234	127	169	237	346	164	174
5	141	133	149	186	167	218	123	184	243	328	160	174
6	144	127	158	167	164	194	136	199	246	300	158	169
7	148	158	153	147	162	179	134	199	252	291	158	164
8	151	189	149	142	164	174	136	191	289	279	176	169
9	170	174	144	147	167	172	134	191	327	270	218	169
10	189	160	140	123	169	172	132	191	365	264	184	160
11	169	182	167	104	176	164	134	191	402	255	179	172
12	149	204	127	134	169	164	134	199	437	249	174	162
13	162	181	160	136	191	176	155	212	445	237	158	160
14	174	158	155	136	194	207	158	229	453	232	162	160
15	169	161	153	149	179	202	158	232	429	220	167	160
16	164	164	151	158	169	176	155	243	409	232	162	155
17	166	167	153	160	162	169	147	234	398	243	164	151
18	169	170	155	181	164	158	136	240	349	232	169	147
19	168	172	155	167	155	160	132	237	324	212	172	144
20	166	162	147	158	138	153	127	249	307	204	155	142
21	165	151	149	164	162	158	127	267	300	207	149	142
22	164	155	167	149	155	153	127	249	324	218	153	140
23	169	160	160	142	164	153	121	288	356	229	169	142
24	164	158	160	174	176	155	115	257	352	212	160	142
25	160	158	151	164	207	149	136	226	360	202	155	142
26	158	160	164	162	236	140	144	199	374	179	160	142
27	163	162	176	164	258	142	144	199	377	181	162	153
28	168	144	186	162	294	142	147	207	380	176	158	130
39	172	144	189	160	-------	138	152	207	380	178	169	136
30	172	153	196	162	-------	136	160	215	384	179	167	138
31	166	-------	184	155	-------	140	-------	220	-------	184	162	-------

Monthly discharge of Owens River near Round Valley, Calif., for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximun	Minimum	Mean	
October	189	138	162	9,960
November	204	127	160	9,520
December	196	127	158	9,720
January	199	104	157	9,650
February	294	138	178	9,890
March	294	136	178	10,900
April	160	115	138	8,210
May	288	164	214	13,200
June	453	215	338	20,100
July	374	176	246	15,100
August	218	149	166	10,200
September	179	130	155	9,220
The year	453	104	187	136,000

OWENS RIVER NEAR BIG PINE, CALIF.

LOCATION.—In sec. 2, T. 11 S., R. 34 E., at Charlies Butte, 11 miles southeast of Big Pine, Inyo County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—September 20, 1906, to September 30, 1921.

GAGE.—Vertical staff on left bank; read by J. I. Jones.

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

CHANNEL AND CONTROL.—Sand and gravel; shift slightly. Right bank high; left bank subject to overflow during floods.

EXTREMES OF DISCHARGE.—Maximum stage during year, 3.45 feet June 13 and 14 (discharge, 524 second-feet); minimum stage, 0.47 foot September 16 (discharge, 50 second-feet).

1906–1921: Maximum stage recorded, 11.2 feet about 9 p. m. January 26, 1914 (discharge, from extension of rating curve, about 3,220 second-feet); minimum stage, −0.05 foot June 13–16, 1908 (discharge, 36 second-feet).

ICE.—Stage-discharge relation not affected by ice.

DIVERSIONS.—On account of diversions above station, record does not indicate total run-off from drainage area.

REGULATION.—Flow is partly regulated by diversions.

ACCURACY.—Stage-discharge relation changed March 31. Two fairly well defined rating curves used during year. Gage read to hundredths once a day. Daily discharge ascertained by applying gage height to rating table. Records good.

COOPERATION.—Gage-height record and discharge measurements furnished by city of Los Angeles.

Discharge measurements of Owens River near Big Pine, Calif., during the year ending September 30, 1921

[Made by J. E. Jones]

Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Nov. 9	2.72	386	Apr. 20	0.57	59
26	2.71	384	May 13	.50	52
Dec. 20	2.78	372	June 17	3.02	427
Jan. 14	2.60	360	July 6	2.12	250
Feb. 17	2.75	408	Aug. 5	.70	78
Mar. 11	2.10	240	Sept. 5	.52	55
29	1.21	126			

Daily discharge, in second-feet, of Owens River near Big Pine, Calif., for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	61	310	368	408	430	452	101	61	61	310	81	53
2	61	310	368	388	430	476	91	52	61	291	76	56
3	65	310	368	368	430	476	86	52	61	273	76	54
4	65	310	368	368	430	430	81	52	61	255	71	54
5	65	310	368	388	408	368	81	56	61	273	71	54
6	65	310	368	388	388	329	81	61	61	255	71	54
7	69	310	368	388	388	310	81	56	66	237	71	54
8	73	348	388	368	388	310	81	56	106	204	66	54
9	77	368	388	348	430	310	76	52	204	173	66	54
10	108	368	388	348	408	273	71	52	291	152	68	54
11	123	368	388	310	388	273	66	56	368	140	66	52
12	123	388	388	329	388	237	71	52	430	134	66	54
13	128	388	368	329	388	237	66	52	524	128	66	52
14	173	388	348	348	388	237	61	52	524	123	64	51
15	188	388	368	368	388	273	61	52	500	112	61	50
16	204	368	388	368	388	255	61	52	452	112	61	50
17	204	368	368	368	388	204	56	52	430	112	61	50
18	237	388	388	388	348	204	61	52	476	101	56	52
19	255	388	388	500	348	173	61	52	430	101	56	52
20	273	368	388	452	368	173	56	52	291	106	56	52
21	273	368	368	430	348	173	56	52	273	106	56	52
22	273	368	388	430	348	146	56	52	255	118	59	50
23	273	368	388	430	348	146	61	56	273	112	61	56
24	273	368	388	408	348	134	56	91	310	106	63	71
25	273	368	368	430	348	134	56	118	310	106	61	76
26	291	368	388	452	368	123	61	106	329	101	56	79
27	310	368	368	476	388	118	56	86	348	96	56	76
28	291	368	388	476	476	118	56	81	348	96	59	71
29	291	368	408	476	-------	123	56	56	348	86	56	61
30	310	368	408	430	-------	113	56	56	329	81	56	61
31	310	-------	408	452	-------	113	-------	61	-------	81	56	-------

Monthly discharge of Owens River near Big Pine, Calif., for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	310	61	187	11,500
November	388	310	358	21,300
December	408	348	380	23,400
January	500	310	400	24,600
February	476	348	389	21,600
March	476	113	240	14,800
April	101	56	67.3	4,000
May	118	52	60.9	3,740
June	524	61	286	17,000
July	310	81	151	9,280
August	81	56	63.5	3,900
September	79	50	57.0	3,390
The year	524	50	219	159,000

OWENS LAKE NEAR LONE PINE, CALIF.

LOCATION.—On west shore of Owens Lake, 1 mile north of Brier Siding on California & Nevada Railroad (Southern Pacific Co.) and 9 miles south of Lone Pine, Inyo County.

RECORDS AVAILABLE.—March, 1908, to September 30, 1921.

GAGE.—Vertical staff installed November 1, 1911, at a boulder point east of railroad culvert No. 507B; read occasionally by an employee of city of Los Angeles.

EXTREMES OF STAGE.—1911–1921: Maximum elevation recorded, 3,578.75 feet March 16 and April 7, 1912; minimum elevation, 3,560.6 feet September 27, 1921.

COOPERATION.—Records furnished by city of Los Angeles.

Elevations given in table are computed from original readings made on gage. To reduce these elevations to mean sea level (U. S. Geological Survey datum), add 3,550 feet.

Daily elevation, in feet, of Owens Lake near Lone Pine, Calif., for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1		14.25			14.05			13.25	12.95			11.38
2											11.85	
3			14.17									
4	14.65	14.25		14.15								
5								13.20				
6							13.63					
7					14.05	13.95			12.95	12.10		11.30
8	14.55		14.20	14.12							11.80	
9		14.25						13.15				
10												
11	14.45				14.03	13.93			12.90	12.05		11.25
12							13.55	13.10			11.78	
13				14.09								
14		14.25	14.20							12.10		
15	14.40				14.02	13.92	13.50					
16								13.05	12.70			11.18
17			14.20									
18		14.25					13.40					
19				14.08	14.01						11.62	11.10
20	14.35											
21												
22		14.20				13.80						
23			14.25				13.30				11.55	
24									12.39			11.05
25	14.30			14.10				13.00				
26						13.75	13.30					
27			14.18									10.60
28					14.00			13.00				
29	14.28											
30						13.70			12.29	11.90	11.45	
31			14.18									

ROCK CREEK NEAR ROUND VALLEY, CALIF.

LOCATION.—In NE. ¼ SE. ¼ sec. 9, T. 6 N., R. 31 E., below highway bridge, a short distance above mouth of Pine Creek, and 2 miles northwest of Round Valley, Inyo County.

DRAINAGE AREA.—About 46 square miles.

RECORDS AVAILABLE.—August 3, 1903, to September 30, 1921.

GAGE.—Vertical staff on left bank 600 feet below bridge; read by W. G. Allen. Prior to July, 1906, gage was located at highway bridge.

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

CHANNEL AND CONTROL.—Sand and cobblestones; somewhat shifting.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 3.15 feet at 10 a. m. June 11 (discharge, 184 second-feet); minimum stage, 0.75 foot at 5.20 p. m. August 25 (discharge, 20 second-feet).

1903–1921: Maximum stage recorded, 5.0 feet January 25, 1914 (discharge, 360 second-feet); minimum discharge, 14 second-feet, April 20–23, 1905.

ICE.—Shore ice forms but probably does not affect stage-discharge relation.
DIVERSIONS.—Water for irrigation is diverted above station.
REGULATION.—Flow partly regulated by diversions.
ACCURACY.—Stage-discharge relation not permanent. Gage read to hundredths daily during high water June 5–26 and about three times a week during remainder of year. Daily discharge ascertained by shifting-control method and interpolating discharge for days when gage was not read. Records fair.
COOPERATION.—Gage-height record and discharge measurements furnished by city of Los Angeles.

Discharge measurements of Rock Creek near Round Valley, Calif., during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
Oct. 29	J. E. Jones	0.95	26	July 2	J. E. Jones	2.13	94
Dec. 16	do	1.02	32	18	Smart and Tuthill	1.66	80
Jan. 8	do	.97	25	Aug. 3	Smart and Mathews	1.00	30
Feb. 22	do	.88	24	13	M. C. Smart	1.10	37
Mar. 24	do	.95	27	26	J. E. Jones	.83	22
May 28	do	1.22	44	Sept. 23	do	.85	22
June 18	do	1.57	64				

Daily discharge, in second-feet, of Rock Creek near Round Valley, Calif., for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	24	26	30	29	30	28	24	24	30	91	30	22
2	24	26	29	28	29	28	24	25	33	96	30	22
3	24	27	23	28	28	28	23	26	35	91	31	23
4	24	27	27	28	28	27	23	26	38	86	30	22
5	24	27	26	28	27	27	22	26	40	82	30	22
6	24	27	27	26	27	27	23	27	65	76	28	22
7	25	30	28	25	27	26	24	28	95	70	27	23
8	25	32	29	25	28	25	25	28	99	65	30	22
9	25	30	30	24	28	25	26	28	103	60	32	22
10	25	30	31	23	28	25	25	29	131	74	35	22
11	24	32	32	25	28	24	24	30	184	72	38	26
12	24	33	33	26	28	24	24	33	160	71	37	25
13	24	32	34	28	28	26	24	36	163	70	36	24
14	24	31	35	27	27	28	25	37	112	69	34	23
15	24	31	34	26	26	26	26	41	118	66	32	22
16	24	32	32	26	26	25	25	42	99	67	30	21
17	24	32	32	27	27	24	26	43	91	74	29	22
18	25	30	32	27	27	24	26	44	64	82	26	22
19	25	29	30	27	27	26	24	43	68	72	24	22
20	26	30	29	28	26	23	23	42	67	62	24	23
21	26	32	32	28	24	24	22	44	67	64	23	23
22	26	31	34	28	23	26	22	46	91	66	22	22
23	25	30	34	29	25	26	24	48	87	57	22	22
24	25	30	33	29	27	26	22	42	95	60	22	21
25	25	30	31	30	27	23	23	36	100	56	21	21
26	24	31	30	32	27	24	24	36	95	53	22	21
27	25	31	30	32	27	32	24	40	96	46	24	22
28	25	30	30	32	27	30	23	44	96	40	23	22
29	26	30	29	31	-------	28	22	39	91	40	22	22
30	26	30	30	30	-------	26	22	36	86	40	22	22
31	26	-------	30	30	-------	24	-------	33	-------	35	23	-------

Monthly discharge of Rock Creek near Round Valley, Calif., for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	26	24	24.7	1,520
November	33	26	30.0	1,790
December	35	26	30.7	1,890
January	32	23	27.8	1,710
February	30	23	27.0	1,500
March	32	23	26.0	1,600
April	26	22	23.8	1,420
May	48	24	35.5	2,180
June	184	30	89.8	5,340
July	96	35	66.2	4,070
August	38	21	27.7	1,700
September	26	21	22.3	1,330
The year	184	21	36.0	26,000

PINE CREEK NEAR ROUND VALLEY, CALIF.

LOCATION.—In SE. ¼ sec. 9, T. 6 S., R. 31 E., 300 feet above highway bridge, 600 feet above junction with Rock Creek, and 2 miles northwest of Round Valley, Inyo County.

DRAINAGE AREA.—About 32 square miles above mouth of canyon.

RECORDS AVAILABLE.—August 3, 1903 to September 30, 1921.

GAGE.—Vertical staff on left bank 300 feet above bridge; read by W. G. Allen. Prior to May 13, 1908, gage was 150 feet below highway bridge.

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

CHANNEL AND CONTROL.—Lava rock and sand; fairly permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 6.33 feet at 9 p. m. June 12 (discharge, 287 second-feet); minimum stage, 3.05 feet at 4.25 p. m. August 21 (discharge, 0.4 second-foot).

1903–1921: Maximum discharge, 370 second-feet June 22, 1911; minimum discharge, 0.1 second-foot August 13, 1920.

ICE.—Ice occasionally forms at station but does not affect stage-discharge relation.

DIVERSIONS.—Water is diverted above station for irrigation.

REGULATION.—Diversions probably affect flow.

ACCURACY.—Stage-discharge relation not permanent. Gage read to hundredths about every other day except June 5–26 when it was read once daily. Daily discharge ascertained by shifting-control method and interpolating discharge for days when gage was not read. Records fair.

COOPERATION.—Gage-height record and discharge measurements furnished by city of Los Angeles.

87482—26†—WSP 530——7

Discharge measurements of Pine Creek near Round Valley, Calif., during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
Oct. 29	J. E. Jones	3.25	3.2	June 21	W. R. McCarthy	4.48	70
Dec. 16	do	3.39	3.4	July 2	J. E. Jones	4.61	70
Jan. 8	do	3.40	3.6	15	W. R. McCarthy	3.91	26
Feb. 22	do	3.31	2.4	18	Smart and Tuthill	4.08	36
Mar. 24	do	3.25	1.6	23	W. R. McCarthy	3.69	14
May 28	do	3.49	5.2	28	do	3.39	4.7
June 6	W. R. McCarthy	4.55	56	Aug. 3	Smart and Mathews	3.33	3.6
7	do	5.08	108	13	M. C. Smart	3.37	3.1
10	do	5.05	112	26	J. E. Jones	3.15	1.0
12	do	5.94	238	Sept. 23	do	3.25	1.9
18	J. E. Jones	4.15	36				

Daily discharge, in second-feet, of Pine Creek near Round Valley, Calif., for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1.4	3.2	3.9	3.0	2.7	2.4	1.4	0.8	3.6	69	5.5	2.2
2	1.4	3.3	3.9	3.1	2.6	2.3	1.3	1.0	5	74	4.6	.8
3	1.7	3.4	3.7	2.8	2.6	2.2	1.0	1.2	6.5	64	3.7	.8
4	2.0	3.5	3.2	2.4	2.5	2.2	.8	1.4	8	55	4.0	1.2
5	2.2	3.6	2.6	2.7	2.4	2.2	.5	1.1	9.5	55	4.3	1.5
6	2.4	3.6	2.6	3.0	2.4	2.2	.5	.8	57	55	4.0	1.2
7	2.6	3.6	2.6	3.3	2.3	1.6	.5	1.7	107	55	3.6	.8
8	2.7	3.7	2.4	3.6	2.4	1.0	.6	1.3	94	55	3.8	.8
9	2.6	3.9	2.3	3.1	2.6	1.1	.6	.9	101	45	4.1	.7
10	2.6	4.1	2.8	2.6	2.6	1.2	.6	.8	144	53	3.4	.8
11	2.6	4.1	3.4	2.4	2.6	1.3	.6	.8	256	48	2.8	.6
12	2.7	4.1	3.0	2.2	2.3	1.4	.6	.8	264	43	2.6	.9
13	2.7	3.9	2.6	2.0	2.6	1.9	.6	.8	195	38	2.3	1.2
14	2.7	3.7	2.3	2.2	2.4	2.4	.7	.6	111	33	2.0	1.6
15	2.7	3.7	2.8	2.3	2.3	2.3	.8	.6	111	28	1.7	2.0
16	2.6	3.6	3.4	2.3	2.3	2.2	.8	.8	78	36	1.8	2.3
17	2.6	3.6	3.2	2.4	2.3	1.9	1.6	.9	60	36	1.8	2.0
18	2.6	3.4	2.9	2.4	2.4	1.6	2.3	1.0	36	36	1.4	2.0
19	2.6	3.1	2.6	2.5	2.4	1.3	1.8	.9	42	26	.9	2.0
20	2.5	3.2	2.3	2.5	2.4	1.6	1.2	.8	60	17	2.0	1.9
21	2.4	3.2	2.2	2.6	2.4	1.6	.9	.6	68	20	.4	1.9
22	2.4	3.4	2.2	2.6	2.4	1.6	.6	.6	88	22	.8	1.8
23	2.6	3.7	2.2	2.7	2.5	1.6	1.3	.6	79	14	1.2	1.7
24	2.6	3.7	2.2	2.7	2.6	1.5	1.0	1.2	88	17	1.0	1.7
25	2.6	3.6	2.2	2.8	2.6	1.1	1.5	1.7	85	12	.7	1.7
26	2.6	3.6	2.2	2.8	2.6	1.1	2.0	2.7	82	6	1.0	1.7
27	2.8	3.6	2.2	2.7	2.6	1.2	1.6	3.8	84	5.5	.9	1.6
28	3.0	3.8	2.8	2.6	2.6	1.2	1.3	5	87	4.9	.8	1.6
29	3.1	4.1	3.1	2.6	-------	1.3	1.0	4.6	76	5	.8	1.6
30	3.1	4.0	3.0	2.7	-------	1.4	.7	4.3	64	5	2.2	1.6
31	3.1	-------	2.8	2.7	-------	1.4	-------	4.0	-------	5	3.9	-------

Monthly discharge of Pine Creek near Round Valley, Calif., for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	3.1	1.4	2.52	155
November	4.1	3.1	3.63	216
December	3.9	2.2	2.76	170
January	3.6	2.0	2.65	163
February	2.7	2.3	2.48	138
March	2.4	1.0	1.65	101
April	2.3	.5	1.02	60.7
May	5	.6	1.55	95.3
June	264	3.6	85.0	5,060
July	74	4.9	33.5	2,060
August	5.5	.4	2.39	1,470
September	2.3	.6	1.47	87.5
The year	264	.4	11.7	9,780

MONO LAKE BASIN

MONO LAKE NEAR MONO LAKE, CALIF.

LOCATION.—In lot 6, SE. ¼ NE. ¼ sec. 31, T. 2 N., R. 26 E., about 2 miles south of Mono Lake post office, Mono County.

RECORDS AVAILABLE.—June 15, 1912, to September 30, 1921 (fragmentary).

GAGE.—Vertical staff on support of boathouse, installed July, 1916; read once daily by W. E. Green. Original gage was vertical staff fastened to willow tree about 400 feet from Hammon's store. Zero of gage installed in 1916 was 10.0 feet higher than the zero of the original gage. All gage heights published from July 13, 1916, to September 30, 1920, are 10.0 feet too low. Gage heights after September 30, 1920, have been reduced to datum of original gage.

EXTREMES OF STAGE.—1912–1921: Maximum stage recorded, 13.3 feet May 27, 1915; minimum stage, 7.93 feet December 11, 1913.

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

Daily gage height, in feet, of Mono Lake near Mono Lake, Calif., during the year ending September 30, 1921

October 20	11.25	May 16	11.6	August 17	11.4
November 19	11.1	June 23	11.8	September 15	11.25
April 15	11.6	July 16	11.9		

WALKER LAKE BASIN

EAST WALKER RIVER ABOVE MASON VALLEY, NEAR MASON, NEV.

LOCATION.—In SW. ¼ sec. 4, T. 11 N., R. 26 E., 30 feet below highway bridge and 11 miles southeast of Mason, Mineral County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—May 23 to September 30, 1921, at present site; August 27, 1916, to January 5, 1918, fragmentary records at a site half a mile upstream.

GAGE.—Stevens continuous recorder on left bank, installed May 23, 1921.

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

CHANNEL AND CONTROL.—Channel fairly straight. Bed of shifting sand and fine gravel. Banks covered with willows. Control not sharply defined.

EXTREMES OF DISCHARGE.—Maximum stage recorded during period, 3.39 feet. at 10 a. m. June 15 (discharge, 620 second-feet); minimum stage, 0.56 foot at 7 p. m. September 16 (discharge, 30 second-feet).

ICE.—None during period.

DIVERSIONS.—Above all diversions in Mason Valley. Nine diversions between gage and confluence with West Walker River with maximum capacity of 120 second-feet.

REGULATION.—Slight regulation by Twin Lakes reservoir and by irrigation.

ACCURACY.—Stage-discharge relation changed June 11. Rating curves well defined. Water-stage recorder successfully operated throughout period. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph. Shifting-control method used June 12 and 13. Records excellent.

COOPERATION.—Gage-height record and five measurements furnished by Walker River Irrigation District.

Discharge measurements of East Walker River above Mason Valley, near Mason, Nev., during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
May 31	L. S. Scott	1.91	136	Aug. 2	Lindsley and Aikens	1.69	138
June 9	do	2.70	310	Sept. 13	Aikens and Whittet	.65	35.3
14	do	3.30	581				

NOTE.—All measurements made by employees of Walker Irrigation District.

Daily discharge, in second-feet, of East Walker River above Mason Valley, near Mason, Nev., for the year ending September 30, 1921

Day	May	June	July	Aug.	Sept.	Day	May	June	July	Aug.	Sept.
1	------	130	345	123	39	16	------	560	141	71	32
2	------	100	315	123	39	17	------	442	144	64	37
3	------	93	320	120	39	18	------	408	192	62	37
4	------	104	336	133	39	19	------	330	206	62	37
5	------	113	325	133	41	20	------	280	177	61	38
6	------	126	268	114	44	21	------	238	177	58	45
7	------	155	216	107	45	22	------	255	167	56	45
8	------	224	186	101	46	23	128	351	172	57	48
9	------	291	167	102	45	24	116	428	179	54	51
10	------	296	152	101	46	25	97	446	170	51	50
11	------	313	159	103	43	26	78	418	166	52	48
12	------	387	170	92	41	27	81	397	156	48	50
13	------	520	170	81	36	28	98	378	135	45	52
14	------	576	172	77	32	29	116	372	127	44	52
15	------	600	153	76	32	30	109	363	120	42	53
						31	134	------	118	41	------

Monthly discharge of East Walker River above Mason Valley, near Mason, Nev., for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
May 23–31	134	78	106	1,890
June	600	93	323	19,200
July	345	118	194	11,900
August	133	41	79.1	4,860
September	53	32	42.7	2,540
The period				40,400

WALKER RIVER AT MASON, NEV.

LOCATION.—In NE. ¼ sec. 33, T. 13 N., R. 25 E., on left bank, 200 yards above highway bridge at Mason, Lyon County, where a station was operated prior to September 30, 1916.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—November 21, 1910, to September 15, 1912; July 3, 1913, to September 30, 1916; and May 15 to September 30, 1921.

GAGE.—Stevens continuous recorder, inside hook gage, and outside inclined staff gage.

DISCHARGE MEASUREMENTS.—Made by wading near gage and from highway bridge 200 yards below gage. Good sections at all stages.

CHANNEL AND CONTROL.—Bed is of shifting sand, with no well-defined control. Two or more channels at gage at low water. One channel for medium and high water.

EXTREMES OF DISCHARGE.—Maximum stage during period May 15 to September 30, 1921, from water-stage recorder, 4.38 feet at 2 p. m. on June 14 (discharge, 1,570 second-feet); minimum stage, 1.74 feet September 17 (discharge, 17 second-feet).

ICE.—None during period.

DIVERSIONS.—None between confluence of East and West Walker rivers and gaging station. During irrigation season practically all of stream is diverted below gage for use in Mason Valley. Maximum capacity of canals diverting water from East Walker River in Mason Valley is 120 second-feet; capacity of West Walker canals is 100 second-feet.

REGULATION.—Flow affected by storage of waters in Topaz Lake, Poor Lake, and Twin Lakes, as well as by extensive irrigation, especially in Mason, Smith, Antelope, and Bridgeport valleys.

ACCURACY.—Stage-discharge relation not permanent. Standard rating curve well defined. Recorder successfully operated throughout period. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph; shifting-control method used May 23 to June 1, June 11–30, and September 20–30. Discharge for days of missing gage heights estimated from hydrographic comparison of all Walker River stations. Records good.

COOPERATION.—Gage-height record and nine discharge measurements furnished by Walker River Irrigation District.

Discharge measurements of Walker River at Mason, Nev., during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
May 15	A. J. Aikens [a]		456	July 18	Aikens and Whittet	2.80	334
29	do	3.31	547	Aug. 2	R. R. Rowe	2.20	79
June 2	Aikens and Lindsley [a]	2.81	338	8	Lindsley and Aikens	2.12	68
11	Aikens, Scott, [a] and Whittet [a]	3.67	911	18	A. J. Aikens	1.94	36.3
13	Scott and Lindsley	4.27	1,180	22	Aikens and Whittet	1.84	25.2

[a] Ditch rider.

Daily discharge, in second-feet, of Walker River at Mason, Nev., for the year ending September 30, 1921

Day	May	June	July	Aug.	Sept.	Day	May	June	July	Aug.	Sept.
1		423	434	79	21	16		810	260	44	19
2		346	346	79	24	17		531	270	40	18
3		352	335	87	26	18		384	302	37	18
4		445	340	92	25	19		250	302	32	17
5		505	280	92	25	20	450	156	291	31	17
6		570	220	82	26	21		136	220	27	20
7		750	230	69	28	22		215	210	27	21
8		1,040	200	56	30	23	396	576	240	28	21
9		1,170	144	46	30	24	406	780	265	30	24
10		969	230	46	25	25	406	832	215	28	24
11		795	313	52	20	26	463	712	185	26	28
12		911	291	59	20	27	505	628	148	24	29
13		1,100	308	54	20	28	557	570	130	23	30
14		1,200	308	50	20	29	512	544	116	22	30
15	456	1,090	291	47	19	30	434	512	102	23	32
						31	481		87	22	

Monthly discharge of Walker River at Mason, Nev., for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
May 15–31			457	15,400
June	1,200	136	643	38,300
July	434	87	246	15,100
August	92	22	46.9	2,880
September	32	17	23.6	1,400
The period				73,100

WALKER RIVER NEAR WABUSKA, NEV.

LOCATION.—In NE. ¼ sec. 20, T. 15 N., R. 26 E., half a mile above boundary of Walker River Indian Reservation and 5 miles east of Wabuska, Lyon County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—January 15, 1920, to September 30, 1921. Comparable records were obtained July 22, 1902, to July 31, 1908, at railroad bridge 3 miles upstream.

GAGE.—Stevens eight-day water-stage recorder on left bank, installed July 28, 1920; inspected by Mrs. A. E. Parker.

DISCHARGE MEASUREMENTS.—Made by wading or from cable 30 feet upstream.

CHANNEL AND CONTROL.—Banks fairly high and clean. One channel except at very high stages when abandoned channel on right may carry small quantity of water around gage. Bed of stream composed of sand.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 5.46 feet at 2 a. m. on June 17 (discharge, 790 second-feet); minimum stage, 3.26 feet September 1 (discharge, 1 second-foot).

1920–1921: Maximum and minimum stages recorded same as given above.

ICE.—Some ice effect in winter.

DIVERSIONS.—Below all diversions except for Walker River Indian Reservation.

REGULATION.—Flow regulated by Topaz Lake, Poor Lake, and Twin Lakes reservoirs.

ACCURACY.—Stage-discharge relation changed about August 27. Rating curves well defined. Water-stage recorder was successfully operated October 12 to September 30, except December 23–26, May 16, June 10–12, July 5–11, August 9–24, and September 3–5. Daily discharge ascertained by applying to rating table, mean daily gage height determined from recorder graph. Discharge estimated because of ice January 9–17 and 22–24, on basis of one discharge measurement and observer's notes. Estimates for other periods of missing gage heights were made from hydrographic comparison with discharge at Schurz. Records fair.

Discharge measurements of Walker River near Wabuska, Nev., during the year ending September 30, 1921

[Made by R. R. Rowe]

Date	Gage height	Discharge	Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Oct. 12	3.19	2.4	Jan. 22	[a] 4.31	183	June 9	4.44	269
15	3.20	2.7	Apr. 29	3.50	28.9	July 31	3.48	26.6

[a] Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Walker River near Wabuska, Nev., for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1		35	119	167	216	220	24	53	152	265	26	1
2		32	124	161	202	253	20	48	136	242	22	2
3		30	126	164	216	269	19	52	119	196	20	2
4		27	124	167	216	284	19	45	126	176	22	3
5		28	116	170	220	300	18	39	124		19	4
6	4	28	121	152	216	288	17	25	131		20	4
7		29	119	152	220	280	16	29	134		20	4
8		30	124	136	209	246	15	36	170	140	9	5
9		32	136		227	223	15	39	272			5
10		39	136		227	216	14	48				10
11		40	134		231	213	13	53	415			7
12	3	43	134		223	213	13	55		84	4	4
13	3	46	134	150	206	182	12	57	481	84		4
14	3	72	126		206	164	11	70	603	89		4
15	3	86	126		202	147	11	91	730	82		4
16	3	93	155		209	136	10	115	711	80		4
17	3	124	161		192	124	9	139	685	72	2	4
18	3	107	161	179	192	109	8	167	447	66		4
19	3	112	164	182	202	112	8	131	253	62		3
20	6	124	164	220	189	91	7	116	216	55		3
21	9	131	161	206	179	89	7	129	167	55	2	3
22	8	139	173	183	182	82	6	124	149	48		3
23	8	147	173	190	182	72	5	144	147	40		3
24	8	144	172	200	170	58	5	144	131	36		3
25	14	144	172	220	173	57	4	152	189	33	2	3
26	26	139	171	209	173	48	19	112	265	29	2	3
27	30	134	170	206	179	42	29	102	288	26	2	3
28	30	126	173	206	189	37	29	119	321	25	3	3
29	30	129	176	196	-------	36	29	139	312	29	2	3
30	32	121	173	209	-------	33	33	161	292	30	2	10
31	33	-------	173	216	-------	32	-------	155	-------	27	1	-------

NOTE.—Braced figures give mean discharge for periods indicated.

Monthly discharge of Walker River near Wabuska, Nev., for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	33		9.7	596
November	147	27	83.7	4,980
December	176	116	148	9,100
January			176	10,800
February	231	170	202	11,200
March	300	32	150	9,220
April	33	4	14.8	881
May	167	25	93.2	5,730
June	730	119	300	17,900
July	265	25	93.9	5,770
August	26	1	7.1	437
September	10	1	3.9	232
The year	730	1	106	76,800

WALKER RIVER AT SCHURZ, NEV.

LOCATION.—In sec. 36, T. 13 N., R. 28 E., 50 feet below Southern Pacific Railroad bridge at Schurz, Mineral County, 3 miles above Walker Lake, and 6 miles below diversion dam of Walker River Indian Reservation.

DRAINAGE AREA.—2,850 square miles (measured on topographic maps).

RECORDS AVAILABLE.—July 2, 1913, to September 30, 1921.

GAGE.—Inclined staff gage on right bank 50 feet below Southern Pacific Railroad bridge, installed November 14, 1916; vertical staff gage for low stages on bridge pier. Gages read by J. G. Bradford.

DISCHARGE MEASUREMENTS.—Made by wading or from flume half a mile below gage.

CHANNEL AND CONTROL.—Bed composed of loose sand; shifts occasionally. One channel at all stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 4.00 feet at 6 p. m. June 15 (discharge, 640 second-feet). No flow October 1 to November 7, August 21 to September 3, and September 25–30.

1913–1921: Maximum stage recorded, 11.0 feet June 8 and 9, 1914 (discharge, 2,530 second-feet). No flow during periods in 1913, 1920, and 1921.

ICE.—Stage-discharge relation affected by ice during winter.

DIVERSIONS.—Below all diversions.

REGULATION.—Flow affected by irrigation diversions above.

ACCURACY.—Stage-discharge relation for low stages changed during period of low water in March and April. Rating curves fairly well defined. Gage read to tenths twice a day when there was water in river. Daily discharge ascertained by applying mean daily gage height to rating table. Discharge estimated on account of ice January 11–15, 18–20, and 22–24, and on account of uncertainties in gage heights October 1 to November 22, March 14 to May 16, May 29 to June 7, and July 14–21, from hydrographic study based on comparison with discharge near Wabuska, discharge measurements, and information furnished by E. W. Kronquist, United States Indian Service. Records fair.

Discharge measurements of Walker River at Schurz, Nev., during the year ending September 30, 1921

[Made by R. R. Rowe]

Date	Gage height	Discharge
	Feet	*Sec.-ft.*
Apr. 28	0.70	[a] 1.5
June 10	2.14	150
Aug. 3	.79	[a] 1.8

[a] Estimated.

Daily discharge, in second-feet, of Walker River at Schurz, Nev., for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1			113	167	196	130		2		124	1	0
2			113	167	196	139		3		124	1	0
3			113	167	196	148		4		124	2	0
4			113	167	190	152				84	1	1
5		0	97	167	186	158			15	51	1	1
6			97	158	186	148				51	1	1
7			105	148	186	68				51	1	1
8			122	148	196	68			21	51	1	1
9			122	148	206	68			40	51	1	1
10			113	105	210	68		4	121	40	1	1
11			130		216	62			142	40	1	1
12			130		227	55			161	30	1	1
13			148	120	227	34			223	6	1	1
14			148		223		1		402		1	1
15		2	148		210				622		1	1
16	0		148	158	206	5			586		1	1
17			148	158	206			8	551	3	1	1
18			148		206			14	528		1	1
19			139	160	202			26	402		1	1
20			148		196			35	263		1	1
21			148	171	176			63	99		0	1
22			148		148			76	91	2	0	1
23		25	148	175	97			68	70	3	0	1
24		65	148		97			63	76	3	0	1
25		82	148	196	97			51	76	2	0	0
26		82	148	206	97	2		51	94	2	0	0
27		94	158	210	97			51	124	1	0	0
28		113	176	206	105		1.5	46	161	1	0	0
29		113	167	216	-------				161	1	0	0
30		113	167	206	-------			10	161	1	0	0
31		-------	167	206	-------		-------		-------	1	0	-------

NOTE.—Braced figures give mean discharge for periods indicated.

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Monthly discharge of Walker River at Schurz, Nev., for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	0	0	0	0
November	113		23.9	1,420
December	176	97	138	8,480
January	216		164	10,100
February	227	97	178	9,890
March	158		43.7	2,690
April			1.1	64
May	76		20.6	1,270
June	622		176	10,500
July	124	1	28.0	1,720
August	2	0	.7	42
September	1	0	.7	42
The year	622	0	63.7	46,200

WEST WALKER RIVER NEAR COLEVILLE, CALIF.

LOCATION.—In NE. ¼ NW. ¼ sec. 28, T. 8 N., R. 23 E., at mouth of Ross canyon, at head of Antelope Valley, 400 feet east of State highway, 1,100 feet above Terry canal heading, and 6 miles above Coleville, Mono County.

DRAINAGE AREA.—245 square miles (measured on topographic maps).

RECORDS AVAILABLE.—June 18, 1915, to September 30, 1921; October 5, 1902, to July 31, 1908, a station was maintained half a mile above present gage.

GAGE.—Ferguson water-stage recorder installed on left bank August 15, 1919; inspected by T. F. Hardy. From June 18, 1915, to August 15, 1919, same equipment was located 1,030 feet downstream about 100 feet above Terry canal heading. Slope gage installed October 9, 1920.

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

CHANNEL AND CONTROL.—Bed composed of large boulders. Fairly permanent riffle. One channel at all stages. Point of zero flow gage height minus. 0.20 ±0.30 foot October 14, 1921.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 5.74 feet at 3 a. m. June 12 (discharge, 2,710 second-feet); minimum stage, 1.42 feet at 5 p. m. December 5 (discharge, 13 second-feet).

1915–1921: Maximum discharge recorded, 2,710 second-feet at 3 a. m. June 12, 1921; minimum discharge, 14 second-feet at 10 p. m. March 2, 1916.

ICE.—Stage-discharge relation affected by ice during winter.

DIVERSIONS.—Station is above all diversions except one small canal 1½ miles upstream which diverts a maximum of 3 second-feet.

REGULATION.—Poor Lake reservoir, 17 miles upstream, capacity not known, stores water from spring floods and releases it later in summer. Regulation is very slight.

ACCURACY.— Stage-discharge relation not permanent during year. Standard rating curve well defined. Water-stage recorder operated successfully throughout year except December 13 to February 12 and August 6–13. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph except for periods of no gage heights or ice effect when discharge was estimated from hydrographic comparison of all Walker River stations and climatological data. Records good.

COOPERATION.—Two discharge measurements furnished by Walker River Irrigation District.

Discharge measurements of West Walker River near Coleville, Calif., during the year ending September 30, 1921.

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
Oct. 9	R. R. Rowe	1.83	88	June 8	R. R. Rowe	4.88	1,750
Jan. 21	do	[a] 1.72	61	Aug. 1	do	2.36	232
Apr. 21	E. G. Pearson [b]	2.64	261	12	E. G. Pearson	1.96	141
27	R. R. Rowe	2.87	363				

[a] Stage-discharge relation affected by ice.
[b] Ditch rider, Walker River Irrigation District.

Daily discharge, in second-feet, of West Walker River near Coleville, Calif., for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	64	87	87			143	236	647	636	1,010	228	101
2	63	87	82			151	251	572	766	1,100	222	110
3	63	91	80		85	176	275	567	880	952	211	121
4	63	94	87			196	248	567	1,070	683	198	114
5	63	83	73			196	239	562	1,340	662	183	101
6	74	84	86		92	193	222	474	1,650	710		95
7	86	86	86			178	214	406	1,820	710		91
8	86	89	77	60		176	217	422	1,900	683		91
9	88	91	77			178	228	525	1,720	705		89
10	84	86	75		104	181	242	636	1,880	657	175	89
11	80	95	63			186	245	772	2,190	596		88
12	82	100				183	245	938	2,190	558		86
13	84	95			116	193	245	1,050	2,090	525		84
14	84	86			114	178	231	1,160	1,890	516	169	83
15	88	89			98	174	214	1,320	1,360	525	162	80
16	87	86		61	100	176	222	1,250	938	558	154	79
17	86	86			107	191	220	831	749	543	141	75
18	84	86			100	198	220	652	657	474	137	75
19	75	86			102	178	234	586	716	430	145	73
20	89	80			102	174	236	534	931	410	141	71
21	96	82	60		92	174	282	486	1,260	395	137	68
22	98	98			92	174	356	474	1,520	418	134	66
23	94	91			100	164	430	499	1,460	406	132	63
24	94	89		70	106	176	373	548	1,470	395	126	62
25	95	86			112	186	328	722	1,280	370	122	59
26	100	91			117	174	321	1,060	1,270	314	117	59
27	101	87			124	156	366	1,340	1,270	266	116	59
28	104	84			135	169	478	1,210	1,240	251	112	58
29	102	87				178	601	918	1,080	236	112	58
30	100	87				186	647	795	918	231	109	60
31	98					209		647		231	106	

NOTE.—Braced figures give mean discharge for periods indicated.

Monthly discharge of West Walker River near Coleville, Calif., for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	104	63	85.6	5,260
November	100	80	88.3	5,250
December	----------	----------	66.9	4,110
January	----------	----------	63.3	3,890
February	135	----------	102	5,660
March	209	143	179	11,000
April	647	214	296	17,600
May	1,340	406	747	45,900
June	2,190	636	1,340	79,700
July	1,100	231	533	32,800
August	228	106	155	9,530
September	121	58	80.3	4,780
The year	2,190	----------	311	225,000

WEST WALKER RIVER NEAR WELLINGTON, NEV.

LOCATION.—In sec. 10, T. 10 N., R. 23 E., in canyon between Antelope and Smith valleys, in Douglas County three-fourths of a mile above Lyon County line; a quarter of a mile above Plymouth canal on right and Colony or Simpson canal on left, and 1 mile above Wellington, Lyon County.

DRAINAGE AREA.—521 square miles (measured on topographic map).

RECORDS AVAILABLE.—December 20, 1917, to September 30, 1921.

GAGE.—Stevens eight-day water-stage recorder on right bank; inspected by J. W. Pierce.

DISCHARGE MEASUREMENTS.—Made by wading near gage, or from Hoye Bridge about 2 miles upstream.

CHANNEL AND CONTROL.—One channel at all stages. Banks not subject to overflow. Stream bed composed of boulders and gravel.

EXTREMES OF DISCHARGE.—Maximum stage not recorded, probably occurred on June 8 (discharge, about 1,300 second-feet); minimum stage not recorded.

1918–1921: Maximum stage from water-stage recorder, 5.24 feet at 3 a. m. May 30, 1919 (discharge, 1,940 second-feet); minimum stage, 0.68 foot August 23 and 24, 1920 (discharge, 23 second-feet).

ICE.—Stage-discharge relation affected by ice during winter.

DIVERSIONS.—Station is below all diversions and return water in Antelope Valley and above all diversions in Smith Valley except Saroni canal, records of flow for which are given on page 107.

REGULATION—None except by diversions.

ACCURACY.—Stage-discharge relation changed about July 28; affected by ice for short periods during winter. Rating curves well defined. Operation of water-stage recorder satisfactory except as indicated in footnote to daily discharge table. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph, or staff gage reading except for periods of ice effect or incomplete gage-height record. For these periods discharge was interpolated or estimated from meter measurements, temperature records, and hydrographic comparison with all Walker River stations. Records fair.

COOPERATION.—Five discharge measurements furnished by Walker River Irrigation District.

Discharge measurements of West Walker River near Wellington, Nev., during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
Oct. 10	R. R. Rowe	1.11	57	July 31	R. R. Rowe	1.51	102
Dec. 18	J. W. Bones	1.47	102	Aug. 2	do	1.54	105
Jan. 21	R. R. Rowe	1.49	108	8	E. G. Pearson	1.26	61
Apr. 27	do	1.73	154	13	do		58
June 9	do	3.60	1,020	16	do	1.08	45
July 21	E. G. Pearson[a]	2.00	255	22	do	1.08	46

[a] Ditch rider, Walker River Irrigation District.

Daily discharge, in second-feet, of West Walker River near Wellington, Nev., for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1				94	103	126	160	488	528	295	103	
2				94	113	132	164	443	520	810	103	88
3			102	94	121	139	172	412	560	325	105	
4		80		95	130	145	180	425	625	276	96	37
5	40		106	92	128	162	167	438	660	238	88	
6				85	108	172	157	456	780	298	80	
7		92		79	100	172	136	399	890	349	78	36
8				76	100	170	132	370	1,100	341	68	
9			100		106	170	136	386	1,020	382		
10	57				124	172	145	452		412		
		100							950		55	
11				75	128	178	154	515		382		33
12			100		128	178	147	620	1,220	362		
13					130		146	665	1,110	374		
14	55	108	101		124		145	671	1,110		51	37
15					113		139	704	866	325	50	
						160						
16			102	92	103		128	770	560		49	
17	56	95	102	94	106		110	565	404	337		40
18			102	134	106		124	497	322		47	
19			105	150	105	136	121	425	265	290		
20			102	112	105		119	408	272			39
	60											
21		108	92	103	105		102	395	329	231	45	
22			89	102	97	125	112	421	443	250		
23			97	103	98		154	438	520			
24	66		100	112	102			484	560	225		37
25	65	104	98	110	102		225	625	542	200	42	
26	70		92	106	106	119	162	710	484	178		
27	71		97	110	108		154	660	456	145		37
28	72	100	97	110	115		178	620	438		40	
29	76	100	97	110		125	269	575	399	130		
30	78	101	97	112			382	565	337		38	
31	76		98	105				560		102		

NOTE.—No gage-height record and discharge was interpolated or estimated for periods indicated by braced figures.

Monthly discharge of West Walker River near Wellington, Nev., for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	78	----------	56.0	3,440
November	----------	----------	96.1	5,720
December	----------	89	99.5	6,120
January	150	----------	96.?	5,950
February	130	97	111	6,160
March	----------	----------	145	8,920
April	382	102	162	9,640
May	770	370	521	32,000
June	1,220	265	643	38,300
July	412	102	274	16,800
August	105	----------	57.4	3,530
September	----------	----------	37.3	2,220
The year	1,220	----------	192	139,000

WEST WALKER RIVER AT HUDSON, NEV.

LOCATION.—About sec. 11, T. 11 N., R. 24 E., at highway bridge at Hudson, Lyon County, above canyon between Smith and Mason valleys.

DRAINAGE AREA.—953 square miles (measured on topographic maps).

RECORDS AVAILABLE.—August 3, 1914, to September 30, 1921, when station was discontinued.

GAGES.—Vertical staff, fastened to downstream pile in middle bent of highway bridge, and chain gage; read by Theodore Schneider.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of loose sand; light gravel riffle. One channel at all stages. Gage height of zero flow about 1.5 feet.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 5.20 feet at 8 a. m. June 13 (discharge, 775 second-feet); minimum discharge, 19 second-feet October 1–10 and September 12–25.

1914–1921: Maximum stage recorded, 6.9 feet at 5 p. m. June 18 and 7 a. m. June 19, 1917 (discharge, 2,200 second-feet); minimum stage, 2.2 feet August 7 to September 21, 1920 (discharge, 13 second-feet).

ICE.—Slight ice effect during January.

DIVERSIONS.—Below all diversions in Smith Valley and above those in Mason Valley.

REGULATION.—By Topaz Lake reservoir and diversions.

ACCURACY.—Stage-discharge relation changed during rise in stage about July 17. Measurements after this date show unsettled conditions in the channel. Rating curve well defined. Gage read to half-tenths twice a day, but many readings are unreliable and have been discarded. Daily discharge ascertained by applying daily gage height to rating table; shifting-control method used July 17 to September 30. Records fair.

Discharge measurements of West Walker River at Hudson, Nev., for the period October 1, 1920, to October 14, 1921

[Made by R. R. Rowe]

Date	Gage height	Discharge
1920	*Feet*	*Sec.-ft.*
Oct. 11	2.39	26.1
1921		
Jan. 22	3.00	104
Apr. 27	3.08	116
June 9	4.84	638
July 31	2.66	72
Oct. 14	2.35	30

Daily discharge, in second-feet, of West Walker River at Hudson, Nev., for the year ending September 20, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	19	47	103	103	95	103	59	381	314	125	70	
2	19	47	103	103	103	103	59	387	277	100	69	
3	19	47	103	103	103	103	59	366	366	116	64	
4	19	47	103	103	103	103	66	375	397	100	58	
5	19	47	103	103	103	103	72	366	463	87	52	21
6	19	59	103	103	112	112	72	430	530	90		
7	19	66	103		121	131	72	387	640	174		
8	19	80	103		121	121	72	306	660	149	36	
9	19	87	103		131	103	72	314	585	162		
10	19	95	103		141	103	72	350	515	250		
11	23	103	103	85	145	103	72	397	555	263	32	20
12	32	103	103		121	103	72	446	700	215	33	19
13	36	103	103		103	103	103	463	755	269	32	19
14	42	103	103		103	103	103	480	735	250		19
15	47	103	103		103	80	103	480	498	247		19
16	36	103	103	103	103	72	103	463	285	236		19
17	36	103	103	103	103	72	87	413	162	260		19
18	36	103	107	112	103	72	87	381	87	269		19
19	36	103	103	141	103	72	87	350	72	246		19
20	36	103	103	141	103	72	87	350	80	208		19
21	42	103	103	141	95	72	87	350	108	160		19
22	47	103	95	131	95	72	87	350	241	133	28	19
23	47	121	95	103	95	72	95	375	413			19
24	47	103	103	103	87	72	112	397	366			19
25	36	112	103	103	95	72	152	407	407			19
26	47	103	103	103	103	72	152	515	366	140		21
27	47	103	103	95	103	72	121	463	306			21
28	47	103	103	85	103	72	117	446	250			22
29	47	95	103	72	-------	72	258	430	210			22
30	47	95	103	72	-------	59	375	420	167			24
31	47	-------	103	72	-------	59	-------	381	-------	72		-------

NOTE.—Ice effect Dec. 22, 23, and Jan. 7–15. Gage readings unreliable for July 23–30, Aug. 1, 6–10, 14–31, Sept. 1–10. Discharge for these periods estimated from hydrographic comparison of all Walker River stations and climatological data. Braced figures give mean discharge for periods indicated.

Monthly discharge of West Walker River at Hudson, Nev., for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	47	19	33.9	2,080
November	121	47	89.8	5,340
December	107	95	103	6,330
January	141	72	98.8	6,080
February	145	87	107	5,940
March	131	59	87.2	5,360
April	375	59	104	6,190
May	515	306	400	24,600
June	755	72	384	22,800
July	269	72	171	10,500
August	70		35.3	2,170
September	24	19	20.2	1,200
The year	755	19	136	98,500

WEST WALKER RIVER NEAR HUDSON, NEV.

LOCATION.—In SE. ¼ sec. 13, T. 11 N., R. 24 E., half a mile above highway bridge in upper end of Wilson Canyon and 3 miles southeast of Hudson, Lyon County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—May 7 to September 30, 1921.

GAGE.—Stevens continuous recorder on right bank.

DISCHARGE MEASUREMENTS.—Made by wading near gage or from bridge half a mile below gage.

CHANNEL AND CONTROL.—Channel fairly straight. Bed of sand and fine gravel with few rocks. Control is rock riffle 200 feet below gage.

EXTREMES OF DISCHARGE.—Maximum stage recorded during period, 4.25 feet at 7 a. m. June 13 (discharge, 888 second-feet); minimum stage, 1.06 feet at 3 p. m. September 27 (discharge, 19 second-feet).

ICE.—None during period.

DIVERSIONS.—Below all diversions in Smith Valley. Six canals divert between gage and junction with East Walker River with total capacity of 100 second-feet.

REGULATION.—Flow regulated by Poor Lake and Topaz Lake reservoirs and by irrigation.

ACCURACY.—Stage-discharge relation changed slightly during first part of August. Rating curves fairly well defined. Water-stage recorder operated successfully May 24 to September 30. Daily discharge determined by applying to rating table mean daily gage height. Discharge estimated from hydrographic comparison of all Walker River stations May 9–23. Records fair.

COOPERATION.—Five discharge measurements and gage-height records furnished by Walker River Irrigation District.

Discharge measurements of West Walker River near Hudson, Nev., during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft*			*Feet*	*Sec.-ft.*
May 7	A. J. Aikens [a]	2.89	423	July 31	R. R. Rowe	1.54	72
28	Aikens and Scott [a]	3.00	544	Aug. 16	Aikens and Whittet [a]	1.22	30.6
June 9	R. R. Rowe	3.74	638	Sept. 27	A. J. Aikens	1.06	18.7
18	L. S. Scott	2.10	193				

[a] Ditch rider, Walker River Irrigation District.

Daily discharge, in second-feet, of West Walker River near Hudson, Nev., for the year ending September 30, 1921

Day	May	June	July	Aug.	Sept.	Day	May	June	July	Aug.	Sept.
1		252	117	70	22	16		392	228	30	19
2		228	104	69	22	17		239	288	30	19
3		297	126	66	22	18		156	277	29	19
4		340	103	56	21	19		103	257	29	19
5		332	69	51	21	20	375	88	226	29	19
6		407	91	46	21	21		120	181	29	19
7	348	550	181	36	21	22		213	142	28	19
8		725	142	33	20	23		380	191	28	19
9		715	163	32	20	24	294	366	185	27	19
10		550	292	32	20	25	322	383	161	26	19
11	375	565	252	33	19	26	392	316	156	25	19
12		730	234	33	19	27	446	266	129	25	19
13		800	264	32	19	28	428	241	120	25	19
14		785	239	32	19	29	395	220	96	24	21
15		652	228	31	19	30	324	183	79	24	21
						31	316		72	23	

NOTE.—Braced figures give mean discharge for periods indicated.

Monthly discharge of West Walker River near Hudson, Nev., for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
May 7–21			371	18,400
June	800	88	386	23,000
July	292	69	173	10,600
August	70	23	34.9	2,150
September	22	19	19.8	1,180
The period				55,300

SARONI CANAL NEAR WELLINGTON, NEV.

LOCATION.—In sec. 10, T. 10 N., R. 23 E., in canyon between Antelope and Smith valleys, Douglas County, 1 mile below head of canal and 1 mile above Wellington, Lyon County, and 150 feet east and 200 feet upstream from station on West Walker River.

RECORDS AVAILABLE.—May 26, 1920, to September 30, 1921.

GAGE.—Vertical enamel staff at upstream end of left abutment of bridge.

DISCHARGE MEASUREMENTS.—Made by wading or from bridge.

CHANNEL AND CONTROL.—One channel at all stages. Control is gravel section of canal.

ICE.—None.

DIVERSIONS.—None above station.

REGULATION.—By head gates.

ACCURACY.—Stage-discharge relation changed April 27. Rating curves well defined. Gage read to hundredths once a week with occasional additional readings. Discharge for days when gage was read determined by applying gage reading to rating table. For intermediate periods discharge estimated from notes by ditch rider or interpolated. Records fair.

COOPERATION.—Two discharge measurements furnished by Walker River Irrigation District.

Canal diverts water in NW. ¼ sec. 15, T. 10 N., R. 23 E., from right bank of West Walker River for use in Smith Valley. Combined flow of Saroni canal and West Walker River near Wellington shows quantity of water flowing from Antelope Valley.

Discharge measurements of Saroni canal near Wellington, Nev., during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
Oct. 10	R. R. Rowe	0.73	13.5	July 18	E. G. Pearson[a]		9.7
Dec. 18	J. W. Bones	.78	15.9	" 31	R. R. Rowe	0.14	[b] .8
Apr. 27	R. R. Rowe	.74	12.9	Aug. 2	do	−.20	[b] .01
June 9	do	2.20	81.	5	E. G. Pearson		6.7

[a] Ditch rider, Walker River Irrigation District.
[b] Estimated.

Daily discharge, in second-feet, of Saroni canal near Wellington, Nev., for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1		17	17	15	16	20	41	14	74	61	0	0
2		17	16	15	15	21	43	14	75	61	0	0
3		17	16	15	15	22	42	13	76	60	0	0
4		18	16	15	15	23	41	12	77	59	0	0
5	11	18	16	15	15	23	40	11	78		3	0
6		18	16	15	15		40	11	79		6	0
7		18	16	15	15	25	39	10	80	70	6	0
8		18	17	15	16		38		80		6	1
9	14	18	17	15	16		37		81		3	4
10	14	18	18	15	17		35		84	81	0	4
11	14	17	18	15	18	0	33	45	87	75	0	4
12	14	17	18	15	18		31		90	80	0	4
13	14	17	18	15	17		30			14	0	2
14	15	17	17	15	17		28			14	0	0
15	15	17	17	15	16		26	81		14	0	0
16	15	17	17	15	16	25	24		70	14	0	0
17	15	17	16	15	15		23			12	0	0
18	15	18	16	15	15		22			10	0	0
19	15	18	18	15	14	30	20	35	44	10	0	0
20	16	18	18	15	15	30	19			10	6	0
21	16	18	17	15	15	30	18			10	15	0
22	17	18	17	16	16	31	16	12	60	11	11	0
23	17	18	16	16	16	31	15			11	5	0
24	17	18	16	16	17	32	15			11	5	0
25	17	17	15	16	17	32	15	50			5	0
26	17	17	15	16	18	32	15		65		3	0
27	17	17	15	16	18	34	13		64	10	0	0
28	17	17	15	16	19	35	14		63		0	0
29	17	17	15	16	-------	37	14	71	62		0	0
30	17	17	15	16	-------	38	15	72	62		0	0
31	17	-------	15	16	-------	40	-------	73	-------	2	0	-------

NOTE.—Braced figures give mean discharge for periods indicated.

Monthly discharge of Sarsni canal near Wellington, Nev., for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	17	----------	14.5	892
November	18	17	17.5	1,040
December	18	15	16.4	1,010
January	16	15	15.3	941
February	19	15	16.1	894
March	40	0	23.1	1,420
April	43	13	26.7	1,590
May	----------	10	39.3	2,420
June	----------	----------	70.0	4,170
July	----------	2	33.2	2,040
August	----------	0	2.4	148
September	----------	0	.63	37
The year	----------	0	22.9	16,600

HUMBOLDT-CARSON SINK DRAINAGE BASIN

CARSON RIVER BASIN

EAST FORK OF CARSON RIVER NEAR MARKLEEVILLE, CALIF.

LOCATION.—In NE. ¼ sec. 27, T. 10 N., R. 20 E., at Hangman's Bridge 2 miles east of Markleeville, Alpine County. Indian Creek enters 100 feet above gage and Markleeville Creek 1¼ miles below.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—November 13, 1910, to September 30, 1921 (fragmentary).

GAGE.—Vertical staff, 75 feet below bridge, bolted to rock ledge on right bank; read by W. J. Clark.

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

CHANNEL AND CONTROL.—Gravel and small boulders; appear permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 6.5 feet June 13 (discharge, 1,640 second-feet); minimum stage recorded, 2.5 feet October 1 (discharge, 49 second-feet).

1910-1921: Maximum stage recorded, 7.7 feet June 7, 1911 (discharge not determined); minimum stage, 1.45 feet September 20, 1913 (discharge, 6 second-feet).

ICE.—Stage-discharge relation affected by ice.

DIVERSIONS.—No information.

REGULATION.—Low-water flow augmented by storage developed on Silver Creek above station.

ACCURACY.—Stage-discharge relation probably permanent during year although no current-meter measurements were made. Rating curve well defined. Gage read occasionally. Discharge for days when gage was read ascertained by applying gage reading to rating table. Records fair.

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

No discharge measurements were made during the year.

Daily discharge, in second-feet, of East Fork of Carson River near Markleeville, Calif., for the year ending September 30, 1921

Day	Oct.	Apr.	May	June	July	Aug.	Sept.
1	49						
2					794		
3						146	
4				956	435	146	
5					452	129	72
6				1,400			
7							54
8				900			
9							66
10							
11		326					
12		326					
13				1,640		99	
14				1,560	435		60
15		260		1,260			
16				1,010	312	85	
17						85	
18			840				
19			794			114	
20						114	
21							
22							60
23							
24				1,200			
25			1,010				
26					184		
27							
28							
29						72	
30							
31					215		

CARSON RIVER NEAR EMPIRE, NEV.

LOCATION.—In sec. 12, T. 15 N., R. 20 E., just below tailrace of Brunswick mill, one-quarter mile below highway bridge and 2 miles below Empire, Ormsby County.

DRAINAGE AREA.—988 square miles (measured on topographic map).

RECORDS AVAILABLE.—June 25 to December 31, 1895; October 21, 1900, to September 30, 1921.

GAGE.—Inclined staff on left bank used since February 24, 1911.

DISCHARGE MEASUREMENTS.—Made from cable one-quarter mile above gage or by wading. When made from cable power canal is measured and this quantity added.

CHANNEL AND CONTROL.—Bed composed of gravel and boulders, fairly permanent. One channel at all stages.

EXTREMES OF DISCHARGE.—Maximum mean daily stage during year, 6.2 feet May 17 (discharge, 2,000 second-feet); minimum mean daily stage, 2.3 feet October 1–6, 8, 9 (discharge, 7 second-feet).

1900–1921: Maximum stage recorded, 8.0 feet January 23, 1914 (discharge, 5,160 second-feet); minimum stage, 0.7 foot August 31 and September 4, 5, and 14, 1905 (discharge, zero).

ICE.—No information.

DIVERSIONS.—A large amount of water is diverted above station for irrigation in Carson Valley. Water diverted by Brunswick mill power canal is returned to river above gage.

COOPERATION.—Records of daily discharge furnished by United States Bureau of Reclamation.

Discharge measurements of Carson River near Empire, Nev., during the year ending September 30, 1921

[Made by R. E. Hartley[a]]

Date	Gage height	Discharge
	Feet	*Sec.-ft.*
June 26	5.13	1,060
Sept. 8	2.70	10.1

[a] Engineer for U. S. Bureau of Reclamation.

Daily discharge, in second-feet, of Carson River near Empire, Nev., for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	7	65	200	240	240	335	385	1,170	1,440	565	22	12
2	7	65	160	240	240	335	385	1,170	1,080	500	22	12
3	7	81	160	240	240	335	440	1,170	1,080	500	22	12
4	7	81	160	240	240	385	440	1,080	1,200	565	22	12
5	7	81	------	240	200	385	385	1,000	1,620	440	22	12
6	7	81	------	240	200	385	385	920	1,620	385	22	12
7	8	81	------	240	200	335	385	920	1,710	335	22	12
8	7	81	------	260	200	335	440	845	1,900	285	16	12
9	7	81	------	200	200	335	500	845	1,900	285	16	12
10	9	100	------	240	240	385	500	1,080	1,710	240	16	12
11	12	100	------	240	240	385	440	1,260	1,710	240	16	10
12	12	100	------	240	240	385	385	1,350	1,800	240	16	10
13	22	100	------	240	240	385	335	1,440	1,900	200	16	10
14	22	100	------	200	285	385	335	1,620	1,900	200	16	10
15	30	100	------	200	385	440	335	1,800	1,710	125	12	10
16	30	100	------	240	385	440	385	1,900	1,350	100	12	10
17	30	100	------	240	335	385	285	2,000	1,080	100	12	10
18	40	100	------	565	335	385	240	1,440	845	81	12	12
19	40	125	------	440	385	440	240	1,350	565	65	16	12
20	65	125	------	335	285	385	200	1,170	770	65	16	12
21	65	160	------	240	285	385	200	1,080	845	52	12	16
22	65	125	------	240	240	385	240	1,080	1,080	52	12	16
23	65	160	------	240	240	335	440	1,080	1,350	40	10	16
24	65	160	------	240	240	335	700	1,170	1,260	40	10	16
25	65	125	------	240	240	385	630	1,260	1,080	40	9	16
26	65	125	------	240	285	385	565	1,440	1,000	40	9	16
27	65	160	------	240	285	385	500	1,440	920	30	9	16
28	65	125	------	240	285	335	565	1,620	845	30	10	16
29	65	125	------	240	------	335	760	1,800	770	30	10	16
30	65	160	------	240	------	335	920	1,440	565	30	10	16
31	65	------	------	240	------	335	------	1,530	------	22	10	------

Monthly discharge of Carson River near Empire, Nev., for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	65	7	35.2	2,160
November	160	65	109	6,490
December 1–4	200	160	170	1,360
January	565	200	255	15,700
February	385	200	265	14,700
March	440	335	371	22,800
April	920	200	430	25,600
May	2,000	845	1,300	80,000
June	1,900	565	1,290	76,800
July	565	22	191	11,700
August	22	9	14.7	904
September	16	10	12.9	768

CARSON RIVER NEAR FORT CHURCHILL, NEV.

LOCATION.—In sec. 5, T. 16 N., R. 23 E., 1 mile west of Clifton station, on Mound House-Churchill branch of Southern Pacific Railroad, 9 miles west of Fort Churchill, Lyon County, and 10 miles below Dayton.

DRAINAGE AREA.—1,200 square miles (measured on topographic maps).

RECORDS AVAILABLE.—April 13, 1911, to September 30, 1921.

GAGE.—Inclined staff on right bank with vertical extension for high water.

DISCHARGE MEASUREMENTS.—Made from suspension bridge 500 feet above gage or by wading.

CHANNEL AND CONTROL.—Bed composed of sand and gravel; shifts occasionally.

EXTREMES OF DISCHARGE.—Maximum mean daily stage during year, 8.1 feet May 16 and June 9–10 (discharge, 1,850 second-feet); minimum mean daily stage, 3.4 feet during periods in October, August, and September (discharge, 9 second-feet).

1911–1921: Maximum stage, 11.5 feet January 26, 1914 (discharge, 6,150 second-feet); minimum stage, 3.0 feet September 1 to October 2, 1919 (discharge, 2 second-feet).

ICE.—No information.

DIVERSIONS.—Carson and Dayton valleys are irrigated above station.

REGULATION.—Flow affected by diversions.

COOPERATION.—Records of daily discharge furnished by United States Bureau of Reclamation.

Discharge measurements of Carson River near Fort Churchill, Nev., during the year ending September 30, 1921

[Made by R. E. Hartley [a]]

Date	Gage height	Discharge
	Feet	*Sec.-ft.*
Apr. 29	6.00	694
June 14	8.25	1,960
26	6.95	1,040
Sept. 8	3.40	9.4

[a] Engineer for U. S. Bureau of Reclamation.

Daily discharge, in second-feet, of Carson River near Fort Churchill, Nev., for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	9	68	205	360	276	480	390	920	1,410	800	37	9
2	9	83	227	332	276	480	450	1,060	1,160	800	37	9
3	9	83	205	304	276	480	515	960	1,110	760	37	9
4	9	98	205	304	304	515	585	880	1,160	655	37	9
5	9	83	205	332	304	550	515	920	1,410	655	37	9
6	9	83	227	304	276	550	480	920	1,690	480	22	9
7	9	114	205	276	276	515	450	920	1,620	450	22	9
8	9	114	------	248	276	515	450	920	1,770	450	22	9
9	9	114	------	248	276	480	450	960	1,850	390	22	9
10	9	114	------	276	304	450	480	1,060	1,850	332	22	9
11	9	114	------	550	304	450	480	1,110	1,690	332	22	9
12	9	249	------	550	360	480	515	1,340	1,690	304	22	9
13	18	131	------	304	420	450	550	1,480	1,690	304	22	9
14	18	148	------	222	450	515	450	1,620	1,770	276	22	9
15	18	166	------	248	480	480	420	1,690	1,770	248	22	9
16	29	166	------	332	420	450	420	1,850	1,480	222	9	9
17	29	166	------	276	360	450	332	1,770	1,220	222	22	9
18	29	166	------	585	332	480	276	1,620	960	173	22	9
19	29	148	------	480	332	515	276	1,340	920	150	22	9
20	29	166	------	276	332	480	248	1,220	880	107	22	9
21	41	185	------	276	360	480	248	1,110	840	107	22	9
22	54	227	------	248	360	480	248	1,060	1,110	70	22	9
23	54	227	------	304	360	450	450	1,110	1,060	70	22	9
24	54	205	------	248	332	420	655	1,0°0	1,410	70	22	9
25	54	205	------	332	360	515	690	1,220	1,340	53	9	9
26	54	185	------	304	360	550	620	1,280	1,160	37	9	9
27	54	185	------	332	390	450	515	1,340	1,110	37	9	9
28	68	185	------	332	450	420	550	1,620	920	22	9	9
29	83	185	------	304	------	390	690	1,660	880	22	9	9
30	83	205	------	304	------	390	840	1,550	840	37	9	9
31	83	------	------	420	------	420	------	1,620	------	37	9	------

Monthly discharge of Carson River near Fort Churchill, Nev., for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	83	9	31.9	1,960
November	249	68	152	9,040
December 1-7	227	205	211	2,930
January	585	222	329	20,200
February	480	276	343	19,000
March	550	390	475	29,200
April	840	248	475	28,300
May	1,850	880	1,270	78,100
June	1,850	840	1,330	79,100
July	800	22	280	17,200
August	37	9	21.1	1,300
September	9	9	9.0	536

MARKLEEVILLE CREEK[2] ABOVE MARKLEEVILLE, CALIF.

LOCATION.—At highway bridge above mouth of Pleasant Valley Creek, three-fourths mile above Markleeville, Alpine County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—November 7, 1911, to September 30, 1921 (fragmentary).

GAGE.—Vertical staff in two sections on left abutment of bridge; read by W. J. Clark; datum of gage was raised 5.71 feet August 18, 1914.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading.

[2] Known locally as Hot Springs Creek.

CHANNEL AND CONTROL.—Gravel and small boulders; fairly permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 2.75 feet May 14 and June 6 (discharge, 260 second-feet); minimum stage, 0.45 foot September 5 (discharge, 0.05 second-foot).

1911–1921: Maximum stage recorded, 3.65 feet at 4.30 p. m. June 15, 1917 (discharge, 602 second-feet); minimum stage, 0.45 foot September 5, 1921 (discharge, 0.05 second-foot).

ICE.—No record obtained during winter.

DIVERSIONS.—Town ditch, which heads above gage, furnished water for irrigation and domestic supply of Markleeville. A small ditch also diverts water for irrigation on Hot Springs ranch.

REGULATION.—No information.

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

No discharge measurements were made during the year.

Daily discharge, in second-feet, of Markleeville Creek above Markleeville, Calif., for the year ending September 30, 1921

Day	Oct.	Nov.	Apr.	May	June	July	Aug.	Sept.
1						28		
2							0.4	
3				124	92			
4				124	135			
5				108		20		0.05
6		2.5			260	14		
7				60				
8					230	14		
9				165			.2	
10				200				
11		8		200	185			
12				215				
13				245	160			.1
14		10	54	260		6		
15					112	3.6		
16	2.0				75			
17					50	2.0		
18					42	2.0	.1	
19					75	2.0	.1	
20						2.3		
21	3.6		72			.8		
22	3.6		92				.05	
23			108					
24					75	.7		.1
25			75		47		.05	
26			84					
27								
28								
29								.1
30					28			
31				75				

MARKLEEVILLE CREEK AT MARKLEEVILLE, CALIF.

LOCATION.—In SE. ¼ sec. 21, T. 10 N., 20 E., at highway bridge at Markleeville, Alpine County, three-fourths of a mile below junction with Pleasant Valley Creek.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—November 11, 1910, to September 30, 1921 (fragmentary).

GAGE—Vertical staff on left abutment of highway bridge near downstream end; read by W. J. Clark.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading.

CHANNEL AND CONTROL.—Gravel and boulders; somewhat shifting during high water. Banks are high and not subject to overflow.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 4.1 feet June 6 (discharge, 650 second-feet); minimum stage recorded, 0.8 foot October 1 (discharge, 3.5 second-feet).

1910–1921: Maximum stage recorded, 5.3 feet June 15, 1912 (discharge, 915 second-feet); minimum stage recorded, 0.65 foot September 6, 1920 (discharge, 2.0 second-feet). Flood of March, 1907, reached a stage about 9 feet.

ICE.—Stage-discharge relation affected by ice.

DIVERSIONS.—See "Markleeville Creek near Markleeville." Water is also diverted from Pleasant Valley Creek for irrigation.

REGULATION.—Diversions partly regulate flow. Some storage has been developed on Pleasant Valley Creek.

ACCURACY.—Stage-discharge relation probably permanent. Rating curve fairly well defined below 500 second-feet and extended above. Gage read to half-tenths occasionally. Daily discharge ascertained by applying daily gage height to rating table.

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

No discharge measurements were made during the year.

Daily discharge, in second-feet, of Markleeville Creek at Markleeville, Calif., for the year ending September 30, 1921

Day	Oct.	Nov.	Apr.	May	June	July	Aug.	Sept.
1	3.5					141		
2						133	8.5	
3				278			8.5	
4				292	387		7	
5				265		241	7	
6		10			650	96		
7				176				
8					507			
9				336				
10				387				
11		13	141	424	464			
12			133	507				
13				552	387			7
14		13	118	507		53		
15			103		320	43		
16					241	53	7	
17					197			
18				265	167	53	7	
19				265		35		
20								
21	7		167			30		
22			218				7	
23			320					
24					218	27		
25			176	507	197			
26			176			22		
27								
28								
29								
30					133			
31				265		8.5		

HUMBOLDT RIVER BASIN

HUMBOLDT RIVER AT PALISADE, NEV.

LOCATION.—In sec. 36, T. 32 N., R. 51 E., at highway bridge at Palisade, Eureka County, 100 feet below Southern Pacific Railroad bridge and 1 mile above mouth of Pine Creek.

DRAINAGE AREA.—5,010 square miles (measured on Land Office maps).

RECORDS AVAILABLE.—November 27, 1902, to October 19, 1906; July 26, 1911, to September 30, 1921.

GAGE.—Chain gage at highway bridge since December 1, 1911; read by Albina Siri.

DISCHARGE MEASUREMENTS.—Made from cable one-eighth mile above gage or by wading.

CHANNEL AND CONTROL.—Bed composed of sand and gravel. Control at low stages is gravel bar 50 to 75 feet below gage; at high stages a pile bent railroad bridge about 300 feet below gage and rock riffle a few hundred feet farther downstream become effective; both fairly permanent. One channel at all stages. Point of zero flow, about gage height, 0.4 foot.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 8.6 feet at 10 a. m. on March 5 (discharge, 4,300 second-feet); minimum stage, 1.10 feet October 2–6, 1920 (discharge, 20 second-feet).

1903–1906; 1911–1921: Maximum stage recorded, that of March 5, 1921; minimum stage, 0.86 foot, August 25 to September 18, 1919 (discharge, 9 second-feet).

ICE.—Stage-discharge relation occasionally affected by ice.

DIVERSIONS.—Some water diverted for irrigation in valleys above canyon.

REGULATION.—Flow affected by irrigation diversions above.

ACCURACY.—Stage-discharge relation for low stages changed about July 1. Rating curves well defined. Gage read to hundredths once a day, except December 1–4, 6–13, and May 11. Daily discharge ascertained by applying daily gage height to rating table. Records good.

Discharge measurements of Humboldt River at Palisade, Nev., during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
Dec. 14	R. R. Rowe	1.92	99	Apr. 30	R. R. Rowe	5.00	1,440
Jan. 27	do	2.23	147	June 5	do	7.90	3,670
Mar. 6	do	8.32	[a] 3,680	July 27	do	2.78	258
6	do	8.24	[a] 3,620	Aug. 6	do	2.22	118
6	do	8.21	[a] 3,580	Sept. 28	do	1.41	34.3
Apr. 12	A. B. Purton	4.67	1,150				

[a] Float measurement.

Daily discharge, in second-feet, of Humboldt River at Palisade, Nev., for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	21	46		96	122	1,620	1,090	1,410	3,490	1,410	167	36
2	20	48	84	96	104	1,690	1,090	1,410	3,720	1,270	153	35
3	20	48		96	102	2,600	1,080	1,470	3,720	1,260	145	35
4	20	48		99	102	3,580	1,120	1,480	3,760	1,240	132	35
5	20	48	83	102	107	4,210	1,130	1,510	3,650	1,130	129	35
6	20	48		102	119	4,020	1,140	1,510	3,580	1,110	122	34
7	21	48		104	128	3,580	1,140	1,510	3,490	1,020	115	34
8	21	48		104	131	3,240	1,160	1,550	3,460	984	115	34
9	21	50		104	138	2,760	1,160	1,620	3,580	960	112	34
10	22	50	85	104	187	2,440	1,160	1,660	3,760	912	107	34
11	22	52		107	662	2,280	1,170	1,660	3,940	828	101	33
12	22	52		107	880	2,120	1,180	1,660	4,030	730	96	33
13	24	54		110	1,600	1,970	1,210	1,660	4,210	670	88	33
14	24	54	99	110	2,090	1,830	1,210	1,680	4,120	601	81	34
15	25	58	91	116	1,690	1,750	1,210	1,680	3,940	527	72	34
16	26	60	93	122	1,550	1,500	1,210	1,680	3,760	483	63	34
17	29	64	91	141	1,410	1,490	1,210	1,690	3,240	424	53	35
18	30	67	88	182	2,120	1,420	1,210	1,860	3,080	400	50	35
19	32	69	86	199	2,280	1,340	1,240	1,860	2,760	385	49	35
20	33	71	83	187	1,690	1,280	1,330	2,120	2,600	377	49	35
21	35	73	83	177	1,070	1,270	1,440	3,280	2,520	377	47	36
22	36	76	86	158	800	1,240	1,470	3,760	2,360	369	46	36
23	36	78	86	141	710	1,200	1,490	3,580	2,200	369	44	36
24	38	81	88	131	590	1,170	1,510	3,440	1,970	369	43	35
25	39	83	91	138	550	1,160	1,510	3,320	1,900	369	40	35
26	39	86	86	138	510	1,130	1,510	3,260	1,760	332	39	35
27	41	88	88	147	860	1,110	1,490	3,240	1,620	304	38	34
28	43	91	88	154	1,170	1,090	1,490	3,220	1,550	258	36	35
29	45	88	91	141	------	1,090	1,480	3,320	1,510	220	36	34
30	45	86	93	135	------	1,080	1,410	3,440	1,440	177	36	33
31	46	------	96	128	------	1,090	------	3,320	------	172	36	------

Monthly discharge of Humboldt River at Palisade, Nev., for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	46	20	29.5	1,810
November	91	46	63.8	3,800
December			87.5	5,380
January	199	96	128	7,870
February	2,280	102	838	46,500
March	4,210	1,080	1,920	118,000
April	1,510	1,090	1,280	76,200
May	3,760	1,410	2,250	138,000
June	4,210	1,440	3,020	180,000
July	1,410	172	644	39,600
August	167	36	78.7	4,840
September	36	33	34.5	2,050
The year	4,210	20	862	624,000

HUMBOLDT RIVER AT BATTLE MOUNTAIN, NEV.

LOCATION.—In SE. ¼ sec. 8, T. 32 N., R. 45 E., 700 feet below Licking dam and 1 mile northeast of Battle Mountain, Lander County, Nev.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—May 1, 1896, to December 31, 1897; March 1 to September 30, 1921.

GAGE.—Low and high water enamel vertical staff gages installed on right bank; read by William Licking once a day.

DISCHARGE MEASUREMENTS.—Made by wading or from highway bridge 1,600 feet above gage.

CHANNEL AND CONTROL.—Channel crooked with several sloughs carrying water around gage at high water. Bed of gravel. Control is gravel riffle 300 feet below gage.

EXTREMES OF DISCHARGE.—Maximum stage recorded during period March 1 to September 30, 1921, 9.58 feet on June 19 and 20 (discharge, 1,560 second-feet); minimum stage, 0.37 foot at 11.40 a. m. September 30 (discharge by meter measurement, 7.0 second-feet).

ICE.—None during period.

DIVERSIONS.—Extensive diversions above and below gage.

REGULATIONS.—By irrigation, especially by Licking dam.

ACCURACY.—Stage-discharge relation permanent. Rating curve well defined. Staff gage read to hundredths once daily. Daily discharge determined by applying to rating table daily gage height. Records good.

Discharge measurements of Humboldt River at Battle Mountain, Nev., during the year ending September 30, 1921

[Made by R. R. Rowe]

Date	Gage height	Discharge	Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Mar. 2	7.37	1,160	July 28	[a]2.80	206	Sept. 30	0.42	8.8
Apr. 22	7.56	1,340	Aug. 5	2.07	142	30	.38	7.0
June 5	8.34	1,500	Sept. 30	.81	29.2			

[a] Datum of gage lowered 1.00 foot on June 6.

Daily discharge, in second-feet, of Humboldt River at Battle Mountain, Nev., for the year ending September 30, 1921

Day	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1,140	1,200	1,260	1,480	1,370	213	25
2	1,220	1,140	1,170	1,470	1,330	200	23
3	1,330	1,100	1,070	1,490	1,320	189	22
4	1,360	1,120	1,030	1,500	1,300	178	21
5	1,380	1,140	1,060	1,500	1,260	154	19
6	1,410	1,170	1,080	1,490	1,320	156	18
7	1,420	1,210	1,200	1,500	1,170	145	16
8	1,430	1,220	1,240	1,500	1,120	138	16
9	1,440	1,240	1,220	1,500	1,020	127	11
10	1,440	1,240	1,220	1,500	935	123	10
11	1,440	1,220	1,220	1,500	855	116	12
12	1,440	1,210	1,220	1,500	795	106	13
13	1,430	1,200	1,200	1,510	725	87	16
14	1,420	1,210	1,210	1,520	645	83	19
15	1,420	1,240	1,220	1,520	575	78	18
16	1,410	1,260	1,200	1,540	525	76	19
17	1,390	1,260	1,210	1,550	487	70	20
18	1,370	1,300	1,220	1,560	430	62	20
19	1,360	1,300	1,250	1,560	400	59	20
20	1,360	1,300	1,280	1,560	370	55	20
21	1,360	1,290	1,300	1,550	343	49	20
22	1,340	1,260	1,340	1,530	324	45	21
23	1,340	1,320	1,400	1,520	305	42	21
24	1,340	1,320	1,440	1,500	287	39	22
25	1,340	1,310	1,470	1,490	281	36	22
26	1,340	1,300	1,480	1,480	275	29	23
27	1,320	1,300	1,480	1,460	267	29	35
28	1,300	1,290	1,490	1,450	235	30	35
29	1,290	1,280	1,500	1,420	239	30	34
30	1,260	1,280	1,490	1,380	231	29	30
31	1,220	-------	1,480	-------	222	28	-------

NOTE.—Discharge interpolated July 25.

Monthly discharge of Humboldt River at Battle Mountain, Nev., for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
March	1,440	1,140	1,360	83,600
April	1,320	1,100	1,240	73,800
May	1,500	1,030	1,280	78,700
June	1,560	1,380	1,500	89,300
July	1,370	222	673	41,400
August	213	28	90.4	5,560
September	35	10	20.7	1,230
The period				374,000

HUMBOLDT RIVER AT COMUS, NEV.

LOCATION.—In NW. ¼ sec. 14, T. 36 N., R. 41 E., at Comus, Humboldt County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—September 25, 1917, to September 30, 1921.

GAGE.—Inclined staff on left bank 160 feet above Southern Pacific section house; established September 25, 1917; read by John Alvaro.

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

CHANNEL AND CONTROL.—Stream flows through a flat meadow and is sluggish. Bed composed of fine gravel and sand. Low-water control is gravel bar 150 feet downstream. Zero flow on October 4, 1920, 0.95 foot.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 10.9 feet June 24, 25, and 26 (discharge, 2,700 second-feet); minimum stage, 1.1 feet October 1 to November 12 (discharge, 0.1 second-foot).

1918–1921: Maximum stage recorded, that of June 24–26, 1921; no flow during periods in 1918, 1919, and 1920.

ICE.—Stage-discharge relation affected by ice in winter.

DIVERSIONS.—Water is diverted all along river both above and below this station. Practically all flow during irrigation season is seepage.

REGULATION.—None except by diversion.

ACCURACY.—Stage-discharge relation changed during period June 28 to August 5, 1921; affected by ice January 21 to February 7. Rating curves fairly well defined. Gage read to quarter-tenths once daily. Daily discharge ascertained by applying daily gage height to rating table; shifting-control method used June 29 to August 4. Records good.

Discharge measurements of Humboldt River at Comus, Nev., during the year ending September 30, 1921

[Made by R. R. Rowe]

Date	Gage height	Discharge	Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Oct. 4	1.13	0.1	Mar. 3	5.51	893	July 29	4.00	309
Dec. 12	1.85	38.4	Apr. 23	7.35	1,240	Aug. 5	3.29	203
Jan. 26	[a] 2.62	118	June 11	9.82	2,450	Sept. 30	1.73	14.9

[a] Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Humboldt River at Comus, Nev., for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	0.1	0.1	20	38	120	905	1,570	1,530	2,180	2,180	258	17
2	.1	.1	24	43	130	890	1,530	1,500	2,240	2,140	229	17
3	.1	.1	24	55	140	890	1,500	1,480	2,310	2,000	215	17
4	.1	.1	24	55	145	920	1,430	1,440	2,310	1,910	210	17
5	.1	.1	24	55	140	965	1,370	1,440	2,290	1,820	203	17
6	.1	.1	24	55	135	1,010	1,440	1,440	2,240	1,740	185	17
7	.1	.1	33	55	130	1,040	1,330	1,440	2,240	1,690	174	17
8	.1	.1	33	55	116	1,080	1,330	1,430	2,240	1,620	163	16
9	.1	.1	35	55	108	1,100	1,320	1,430	2,240	1,550	139	14
10	.1	.1	35	55	125	1,170	1,300	1,400	2,270	1,480	124	14
11	.1	.1	38	55	156	1,280	1,320	1,400	2,270	1,420	110	14
12	.1	.1	38	55	125	1,440	1,360	1,360	2,340	1,340	97	14
13	.1	3		56	158	1,560	1,360	1,360	2,340	1,260	94	14
14	.1	2		56	158	1,660	1,360	1,330	2,310	1,170	90	14
15	.1	2		55	239	1,820	1,360	1,330	2,310	1,090	72	14
16	.1	2		55	360	1,840	1,360	1,320	2,360	1,040	61	14
17	.1	4		55	458	1,900	1,360	1,320	2,430	971	56	14
18	.1	11		55	586	1,930	1,360	1,320	2,480	890	51	14
19	.1	20		55	634	1,930	1,360	1,330	2,480	796	51	17
20	.1	28		55	744	1,880	1,320	1,330	2,520	674	51	14
21	.1	20		85	788	1,780	1,370	1,320	2,550	611	49	14
22	.1	20	38	135	831	1,730	1,430	1,430	2,620	536	42	14
23	.1	20		135	860	1,690	1,480	1,430	2,660	490	38	14
24	.1	24		150	884	1,690	1,480	1,440	2,700	458	34	14
25	.1	28		145	926	1,660	1,520	1,440	2,700	426	30	15
26	.1	28		120	944	1,640	1,520	1,480	2,700	400	30	17
27	.1	28			980	1,630	1,520	1,480	2,660	365	30	17
28	.1	24			965	1,630	1,530	1,570	2,590	336	30	17
29	.1	24		120	-------	1,590	1,530	1,830	2,540	309	30	17
30	.1	20		-------	-------	1,590	1,530	1,960	2,500	292	27	16
31	.1	-------		-------	-------	1,600	-------	2,120	-------	277	24	-------

NOTE.—Discharge estimated Dec. 9–11; Dec. 13 to Jan. 1, and Jan. 21 to Feb. 7.

Monthly discharge of Humboldt River at Comus, Nev., for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	0.1	0.1	0.1	6
November	28	.1	10.3	613
December		20	34.6	2,130
January	150	38	78.7	4,480
February	980	108	432	24,000
March	1,930	890	1,470	90,400
April	1,570	1,300	1,420	84,500
May	2,120	1,320	1,470	90,400
June	2,700	2,180	2,420	144,000
July	2,180	277	1,070	65,800
August	258	24	96.7	5,950
September	17	14	15.4	916
The year	2,700	.1	709	514,000

HUMBOLDT RIVER NEAR OREANA, NEV.

LOCATION.—In sec. 35, T. 29 N., R. 32 E., 2 miles above highway bridge near J. J. McCarthy ranch and 2 miles southwest of Oreana, Pershing County.

DRAINAGE AREA.—13,800 square miles (measured on map issued by General Land Office).

RECORDS AVAILABLE.—January 27, 1896, to December 31, 1909; September 7, 1910, to September 30, 1921.

GAGE.—Friez water-stage recorder on right bank since October 4, 1914; inspected by R. H. Loban and Allen Holliday.

DISCHARGE MEASUREMENTS.—Made from cable 20 feet below gage or by wading.

CHANNEL AND CONTROL.—Bed composed of sand. Principal control not well defined but is probably about half a mile below gage, where bed is composed of firm clay; fairly permanent. Low-water control is about 50 feet below gage. Right bank high and comparatively clean. Left bank not subject to overflow, but subject to caving.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 6.89 feet on July 2, time uncertain as clock stopped (discharge, 1,980 second-feet); no flow October 1–26.

1896-1921: Maximum stage recorded, 12.0 feet May 12, 1897 (discharge, 3,050 second-feet); minimum discharge, no flow during periods in 1905, 1915, 1918, 1919, and 1920.

ICE.—Stage-discharge relation seriously affected by ice every winter.

DIVERSIONS.—Station is above all diversion for the Lovelocks district, but considerable water is diverted above station for direct irrigation and storage.

REGULATION.—Flow is affected by water stored and released by Humboldt-Lovelocks Irrigation, Light & Power Co. at its reservoirs a few miles up river, near Humboldt.

ACCURACY.—Stage-discharge relation fairly permanent throughout year. Rating curve well defined. Water-stage recorder operated successfully except during days indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder; shifting-control method used July 3–18 and July 31 to August 20. Records good.

Discharge measurements of Humboldt River near Oreana, Nev., during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
Dec. 14	J. W. Bones	[a] 1.21	20.6	June 7	R. R. Rowe	4.60	966
Jan. 24	R. R. Rowe	[a] 1.76	43.8	July 30	do	3.49	509
Mar. 5	do	3.01	489	Aug. 4	do	2.95	401
Apr. 24	do	3.80	692				

[a] Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Humboldt River near Oreana, Nev., for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	0	11	24			418		631	787	1,950	423	119
2	0	9	21			431		583	825	1,960	412	118
3	0	8	20	45	150	451	800	565	842	1,910	410	113
4	0	8	20			462		592	864	1,840	402	106
5	0	8	16	65	167	462		846	860	1,740	388	101
6	0	8	20	68		459	760	923	906	1,680	362	96
7	0	10	21			459	825	954	965	1,660	362	91
8	0	9	33		100	459	895	968	1,020	1,690	346	88
9	0	9	32			471	878	972	1,080	1,660	334	82
10	0	9	43		133	485	856	979	1,140	1,580	315	76
11	0	11	38	40	131	494	787	968	1,190	1,470	293	69
12	0	12	30		133	514	739	962	1,210	1,350	265	67
13	0	15	25		130	535	715	912	1,240	1,240	249	63
14	0	16	21		125	544	700	867	1,260	1,140	243	60
15	0	14			131	553	685	825	1,310	1,040	234	56
16	0	14			131	565	670	766	1,340	990	226	54
17	0	13			128	568		724	1,340	965	219	51
18	0	14			125	595		706	1,390	974	211	50
19	0	14			167	649		703	1,420	930	203	
20	0	16	30	55	195	664	680	715	1,470	888	197	
21	0	16			189	679		715	1,520	839		50
22	0	16			158	700		730	1,560	814		
23	0	16			171	721	682	724	1,630	781		
24	0	16		44	232	751	697	721	1,640	727	170	
25	0	16			307	769	688	730	1,640	682		
26	0	16			377	794	700	706	1,670	631		
27	9	16	40	100	402		700	655	1,700	598	144	
28	11	15			418		691	631	1,720	556	141	62
29	12	17				800	673	613	1,740	529	136	
30	12	18					655	685	1,850	506	130	
31	12							766		448	125	

NOTE.—No flow Oct. 1–26. Discharge estimated Nov. 1, 2, Dec. 12, 13, Mar. 27–31, Apr. 1–5, 17–22, and Aug. 21–26, because of no gage-height record. Discharge estimated because of ice Dec. 14 to Jan. 4, Jan. 7 to Feb. 4, and Feb. 6–9, on basis of current-meter measurements, temperature records, and observer's notes. Braced figures give mean discharge for periods indicated.

Monthly discharge of Humboldt River near Oreana, Nev., for the year ending September, 30, 1921

Month	Discharge in second feet			Run-off in acre-feet
	Maximum	Minimun	Mean	
October	12	0	1.8	111
November	18	8	13.0	774
December			30.5	1,880
January			59.9	3,680
February	418		177	9,830
March		418	602	37,000
April	895		736	43,800
May	979	565	769	47,200
June	1,850	787	1,300	77,400
July	1,910	448	1,150	70,700
August	423	125	251	15,400
September	119		70.7	4,210
The year	1,960	0	432	312,000

HUMBOLDT RIVER NEAR LOVELOCKS, NEV.

LOCATION.—In NW. ¼ sec. 11, T. 25 N., R. 31 E., 1,500 feet below dam and reservoir on Big 5 ranch, the lowest diversion for irrigation on Humboldt River, and 9 miles south of Lovelocks, Pershing County.

DRAINAGE AREA.—14,200 square miles (measured on General Land Office maps).

RECORDS AVAILABLE.—February 7, 1912, to September 30, 1921.

GAGE.—Lietz water-stage recorder on left bank since June 26, 1914; inspected by C. E. Sommer.

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

CHANNEL AND CONTROL.—Bed is composed of firm clay. Control fairly permanent. One channel at all stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 5.51 feet at 8 a. m. July 6 (discharge, 1,540 second-feet); river dry October 1 to March 15 and August 7 to September 30.

1912–1921: Maximum stage recorded, that of July 6, 1921; minimum stage, stream dry for periods in 1913, 1916, 1917, and 1918, throughout years 1919 and 1920, and for periods in 1921.

ICE.—Practically none.

DIVERSIONS.—Below all irrigation diversions.

REGULATION.—Flow affected by irrigation diversions and storage.

ACCURACY.—Stage-discharge relation shifted badly throughout year. River was dry from October 1 to March 15 and from August 7 to September 30. Lietz recorder operated successfully except March 16–26, April 18–21, May 2–7, and August 1–6 when discharge was estimated from observer's notes and comparison with records for station near Oreana. Daily discharge ascertained by shifting-control method. Records fair.

Discharge measurements of Humboldt River near Lovelocks, Nev., during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
Apr. 10	A. B. Purton	1.58	170	June 7	R. R. Rowe	2.28	456
25	R. R. Rowe	.91	82	July 30	do	1.24	187

Daily discharge, in second-feet, of Humboldt River near Lovelocks, Nev., for the year ending September 30, 1921

Day	Mar.	Apr.	May	June	July	Aug.	Day	Mar.	Apr.	May	June	July	Aug.
1		128	13	270	1,390		16		81	281	933	885	
2		126		342	1,400		17		32	256	1,050	760	
3		143		430	1,430		18	1		226	965	523	
4		133		485	1,500	40	19			192	930	520	
5		128	90	462	1,520		20		10	153	1,010	541	
6		153		445	1,520		21			136	1,320	532	
7		161		430	1,440		22		259	232	1,320	517	
8		181	328	456	1,420		23		128	442	1,320	410	
9		459	340	479	1,410		24	5	42	474	1,330	354	
10		314	356	532	1,390		25		68	479	1,330	312	
11		365	379	571	1,360		26		96	474	1,330	264	
12		494	393	680	1,270		27	1	108	450	1,350	176	
13		421	398	872	1,210		28	14	120	413	1,340	153	
14		334	384	917	1,120		29	25	108	298	1,350	192	
15		267	320	892	1,030		30	40	74	229	1,370	200	
							31	140		229		150	

NOTE.—No flow during periods for which no discharge is given.

Monthly discharge of Humboldt River near Lovelocks, Nev., for the year ending September 30, 1921.

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	0	0	0	0
November	0	0	0	0
December	0	0	0	0
January	0	0	0	0
February	0	0	0	0
March	140	0	8.2	504
April	494	----------	165	9,820
May	479	13	271	16,700
June	1,370	270	884	52,600
July	1,520	150	868	53,400
August	----------	0	7.7	473
September	0	0	0	0
The year	1,520	0	182	133,000

STARR CREEK NEAR DEETH, NEV.

LOCATION.—In NE. ¼ sec. 12, T. 36 N., R. 59 E., at highway bridge, 2 miles above mouth and 3 miles southeast of Deeth, Elko County; below all large tributaries except Boulder Creek.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—June 4, 1913, to September 30, 1921.

GAGE.—Vertical enamel staff nailed to upstream pile of bridge bent near right bank; read by G. E. Weathers.

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

CHANNEL AND CONTROL.—Bed composed of small gravel. Control is gravel bar; shifts occasionally. One channel except at extremely high stages, when part of flow passes under an auxiliary bridge.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 4.65 feet on June 9 (discharge, 391 second-feet); minimum stage, 1.4 feet October 2–5 8, 10–12 (discharge, 5.0 second-feet).

1913–1921: Maximum discharge recorded, June 9, 1921, 391 second-feet; minimum stage, 0.80 foot July 8 to August 7, 1919 (discharge, 0.5 second-foot).

ICE.—Stage-discharge relation generally affected by ice in winter.

DIVERSIONS.—Station is below practically all diversions from Starr Creek.

REGULATION.—Some variation in daily flow at times caused by diversions for irrigation.

ACCURACY.—Stage-discharge relation changed during latter part of July and first part of August due to backwater from growth of moss on control. Rating curves fairly well defined. Gage usually read four times a week except during period of high water from middle of May to first part of July when it was read five times a week. Daily discharge ascertained by applying daily gage height to rating table; shifting-control method used July 15 to September 30. Discharge was interpolated for days of no gage height except during periods of ice effect when discharge was estimated from observer's notes and one meter measurement. Records fair.

Discharge measurements of Starr Creek near Deeth, Nev., during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
Dec. 17	R. R. Rowe	1.48	8.1	June 23	E. C. Howard	3.44	191
Jan. 29	do	[a]1.56	10.1	Aug. 8	R. R. Rowe	1.80	7.1
May 15	W. E. Dickinson	2.89	113				

[a] Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Starr Creek near Deeth, Nev., for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	5	12		10	10	40	24	61	290	155	13	6
2	5	12		12	10	60	23	66	264	148	11	6
3	5	12		14	10	75	22	68	240	134	10	6
4	5	11		17	10	72	27	70	260	120	8	6
5	5	10		20	10	70	32	80	280	108	8	6
6	5	10			10	52	37	91	300	108	8	6
7	5	9			10	44	34	96	322	102	7	6
8	5	9				35	32	93	348	96	7	6
9	5	9	9	15	11	25	31	90	391	91	6	6
10	5	9				28	34	86	386	83	6	6
11	5	12			12	30	37	91	382	75	6	6
12	5	16			18	32	40	91	360	75	6	6
13	6	16		14	25	34	44	91	340	72	6	6
14	6	16		12	31	28	53	86	331	70	6	6
15	7	15		9	36	36	61	113	315	68	6	6
16	8	13		9	40	44	70	141	300	67	6	6
17	8	12	8	15	52	42	80	148	280	66	7	6
18	8	12		37	40	40	78	152	200	64	7	6
19	8	12		12	28	38	75	155	200	63	6	6
20	9	12			16	36	70	185	200	62	6	6
21	10	12		10	14	34	65	208	197	52	6	6
22	10	11	8		13	31	61	200	195	43	6	6
23	10	11		9	12	38	91	200	192	38	6	6
24	10	10		9	12	44	114	200	178	34	6	6
25	10	10		10	12	48	80	200	185	27	6	6
26	10	10		10	12	40	66	192	185	24	6	6
27	10	10		9	12	31	61	208	170	22	6	6
28	10	10	8	10	12	25	57	244	170	20	6	6
29	11	10	7	10	-------	25	52	280	165	17	6	6
30	11	10	6	10	-------	25	57	288	160	14	6	6
31	12	-------	8	10	-------	25	-------	314	-------	14	6	-------

NOTE.—Braced figures give mean discharge for periods indicated.

Monthly discharge of Starr Creek near Deeth, Nev., for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	12	5	7.5	461
November	16	9	11.4	678
December		6	8.4	516
January	37		13.0	799
February	52		17.9	994
March	75	25	39.6	2,430
April	114	22	53.6	3,190
May	314	61	148	9,100
June	391	160	260	15,500
July	155	14	68.8	4,230
August	13	6	6.8	418
September	6	6	6.0	357
The year	391	5	53.4	38,700

MARYS RIVER NEAR DEETH, NEV.

LOCATION.—In NW. ¼ sec. 31, T. 40 N., R. 60 E., at bridge 300 feet east of Mala Vista ranch house of Nevada Land & Livestock Co. and 19 miles north of Deeth, Elko County.

DRAINAGE AREA.—355 square miles (measured on map of Nevada issued by General Land Office, edition of 1908).

RECORDS AVAILABLE.—November 24, 1902, to July 14, 1903; January 17, 1912, to September 30, 1921.

GAGE.—Chain gage on upstream side of bridge. A temporary vertical staff was installed May 14, 1921, on right upstream face of bridge. Both gages set to same datum. Gage read by W. H. Gilham and Herb Clayton.

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

CHANNEL AND CONTROL.—Bed composed of gravel and loose sand; banks below gage subject to caving. One channel at all stages. Control slightly shifting.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 7.1 feet May 29 and 30 (discharge, 530 second-feet); minimum discharge, 1 second-foot October 1–6 and 8–10, 1920.

1912–1921: Maximum stage recorded, that of May 29 and 30, 1921; minimum discharge, 1 second-foot during periods in 1918, 1919, and 1920.

ICE.—Stage-discharge relation affected by ice during winter.

DIVERSIONS.—Station is below all diversions except one small ditch on Mala Vista ranch and Cross ranch diversions about 12 miles below.

REGULATION.—During low-water periods flow is affected by diversions above.

ACCURACY.—Stage-discharge relation fairly permanent throughout year; affected by ice during December, January, and February. Rating curve well defined. Gage read to hundredths once a day. Daily discharge ascertained by applying daily gage height to rating table except for periods when stage-discharge relation was affected by ice. For these periods discharge estimated from weather records and observer's notes. Records good.

Discharge measurements of Marys River near Deeth, Nev., during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
Dec. 17	R. R. Rowe	[a] 2.53	10.0	June 25	E. C. Howard	3.90	138
Jan. 29	do	[a] 2.63	18.8	Aug. 8	R. R. Rowe	2.34	8.4
May 14	W. E. Dickinson	6.1	402				

[a] Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Marys River near Deeth, Nev., for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1	17	10	12		173	150	282	481	64	20	4
2	1	18	11	12	19	203	190	296	429	58	18	4
3	1	16	12	15		242	228	332	402	53	16	4
4	1	16	15	19		248	289	367	346	50	14	4
5	1	15	13	18	19	222	310	388	388	46	10	3
6	1	13	12	18	17	203	242	402	402	43	9	3
7	2	11	10		16	173	203	388	416	31	8	3
8	1	11	10		15	168	185	374	429	28	8	3
9	1	12	12		15	135	168	360	455	22	7	3
10	1	12	10		15	125	162	343	442	19	6	3
11	2	14	10		19	122	216	346	429	19	6	3
12	2	16	10		22	120	235	366	416	17	6	4
13	2	17	10	15	25	125	254	374	388	15	6	4
14	2	19	12		34	135	303	395	374	14	6	5
15	2	19	11		52	125	275	429	346	24	6	6
16	2	20	10			120	228	442	318	29	5	6
17	2	20	10			151	185	481	289	29	5	6
18	2	20	10	16		146	197	494	197	29	5	6
19	2	21	10	17		179	191	506	162	30	4	6
20	3	22	11	15	30	156	209	468	130	30	4	7
21	3	21	12			151	197	416	120	30	4	7
22	5	20	12			146	203	402	110	29	4	8
23	5	20				140	235	374	110	30	4	9
24	5	19			24	140	245	374	120	31	4	9
25	6	19	16	17	25	146	254	402	120	29	4	9
26	9	21			28	140	228	442	110	29	4	9
27	10	20			36	130	191	494	100	28	4	9
28	12	13			100	125	179	518	90	26	4	10
29	14	9	12	19	-------	130	185	530	81	25	4	10
30	14	8	12	19	-------	125	228	530	81	25	4	10
31	16	-------	12	19	-------	120	-------	506	-------	23	4	-------

NOTE.—Braced figures give mean discharge for periods indicated.

Monthly discharge of Marys River near Deeth, Nev., for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	16	1	4.2	258
November	22	8	16.6	988
December	15	----------	10.9	670
January	----------	----------	16.1	990
February	100	15	27.8	1,540
March	248	120	154	9,470
April	310	150	219	13,000
May	530	282	414	25,500
June	481	81	276	16,400
July	64	14	30.8	1,890
August	20	4	6.9	424
September	10	3	5.9	351
The year	530	1	98.7	71,500

LAMOILLE CREEK NEAR LAMOILLE, NEV.

LOCATION.—In sec. 6, T. 32 N., R. 58 E., 50 feet below tailrace of Elko-Lamoille Power Co.'s plant, 50 feet above first irrigation diversion, 2 miles above Lamoille, and 22 miles southeast of Elko, Elko County.

DRAINAGE AREA.—14 square miles (measured on maps issued by United States Forest Service).

RECORDS AVAILABLE.—May 8, 1915, September 30, 1921.

GAGE.—Vertical staff on right bank; installed July 4, 1917. Gage read by employees of Elko-Lamoille Power Co. Datum of gage raised 0.36 foot on August 7, 1921.

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

CHANNEL AND CONTROL.—Bed composed of gravel and large boulders. Control shifts during high water. One channel at all stages.

EXTREMES OF DISCHARGE.—Maximum stage during year not recorded but probably was between 400 and 450 second-feet; minimum stage recorded, 0.86 foot at 7 a. m. on February 8 (discharge 5 second-feet).

1915–1921: Maximum stage probably occurred in June, 1917, when gage was washed out (discharge probably exceeded 500 second-feet); minimum discharge, 1 second-foot at 7 p. m. January 24, 1918.

ICE.—Stage-discharge relation occasionally affected by ice.

DIVERSIONS.—Above all irrigation diversions. Water is diverted for Elko-Lamoille Power Co.'s plant but returned to stream about 50 feet above gage.

REGULATION.—A daily fluctuation occurs on days when power plant is not in continuous operation.

ACCURACY.—Stage-discharge relation remained permanent throughout year. Rating curve fairly well defined. Gage read to hundredths twice a day. Daily discharge determined by applying mean daily gage height to rating table except for October 16, 26, November 1, 2, January 17, March 25, and August 15, when discharge was interpolated. Discharge estimated May 29 to June 27, from comparison with records for Secret Creek. Records fair.

Discharge measurements of Lamoille Creek near Lamoille, Nev., during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
Dec. 2	R. R. Rowe	0.97	8.0	June 23	E. C. Howard	2.80	274
May 15	W. E. Dickinson	2.56	233	Aug. 7	R. R. Rowe	[a].98	34.1

[a] Raised datum 0.36 foot.

Daily discharge, in second-feet, of Lamoille Creek near Lamoille, Nev., for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	7	10	9	8	7	9	21	58		249	44	12
2	6	10	8	8	6	12	21	63		259	44	14
3	6	10	8	8	7	8	26	76		200	40	14
4	6	10	8	8	7	15	30	84		194	36	12
5	6	10	8	8	6	20	26	93		200	34	11
6	6	10	7	8	6	20	28	91		209	34	10
7	8	10	8	6	6	20	26	88		209	34	10
8	8	10	8	7	5	20	26	82		213	34	10
9	8	8	8	8	7	18	28	86		208	34	10
10	7	7	8	8	7	20	30	97		206	33	10
11	9	8	7	8	8	20	34	122	300	196	32	10
12	9	8	8	8	8	20	34	131		190	32	10
13	9	8	8	9	8	18	39	208		181	32	10
14	8	10	8	8	8	20	37	247		181	30	10
15	10	9	8	8	7	20	39	231		179	32	10
16	9	8	8	8	8	20	39	217		164	33	10
17	8	10	8	8	8	20	39	208		162	32	9
18	8	10	8	7	8	20	37	208		149	20	9
19	9	10	8	8	8	20	44	171		149	20	9
20	11	8	8	7	8	20	40	160		138	16	9
21	9	8	8	8	9	20	39	146		117	17	8
22	9	10	8	7	9	21	42	151		105	16	8
23	8	8	8	7	9	21	51	170	277	114	16	8
24	9	8	8	8	10	20	49	164		97	17	8
25	9	8	8	8	8	20	46	198	300	94	17	8
26	10	8	8	8	8	20	44	217		78	15	8
27	11	8	7	9	8	21	44	267		66	14	8
28	10	7	8	8	8	20	44	360	310	59	14	8
29	10	8	8	7	-------	20	49		289	56	16	8
30	9	8	8	8	-------	20	51	400	279	47	15	8
31	10	-------	8	7	-------	20	-------		-------	47	12	-------

Monthly discharge of Lamoille Creek near Lamoille, Nev., for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	11	6	8.5	523
November	10	7	8.8	524
December	9	7	7.9	486
January	9	6	7.8	480
February	10	5	7.6	422
March	21	8	18.8	1,160
April	51	21	36.8	2,190
May	----------	58	180	11,100
June	----------	----------	298	17,700
July	259	47	153	9,410
August	44	12	26.3	1,620
September	14	8	9.6	571
The year	----------	5	63.8	46,200

SECRET CREEK NEAR HALLECK, NEV.

LOCATION.—In NE. ¼ NW. ¼ sec. 1, T 34 N., R. 59 E., at Ryan ranch, 500 feet from Secret Pass highway, half a mile below mouth of Doisey Creek, 12 miles above confluence with Lamoille Creek, and 15 miles southeast of Halleck, Elko County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—May 28, 1917, to September 30, 1921.

GAGE.—Vertical staff on right bank, 75 feet below lower fence on Ryan ranch; washed out May 28, 1921. A new enamel section was installed by observer, J. M. Ryan, on June 16.

DISCHARGE MEASUREMENTS.—Made by wading at gage.

CHANNEL AND CONTROL.—Bed composed of sand and gravel; one channel except at extremely high stages when water runs through shallow overflow channel on right bank. Control is coarse gravel bar which is fairly permanent. Stage of zero flow at gage height 0.45 foot, determined September 16, 1920.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 3.65 feet at 5 a. m. April 23 (discharge, 375 second-feet). Minimum discharge, 2 second-feet October 1 and 3–6.

1917–1921: Maximum stage recorded, that of April 23, 1921. Minimum discharge probably zero during August and September, 1919.

ICE.—Stage-discharge relation affected by ice in winter.

DIVERSIONS.—Station is below Secret Valley and Ryan ranch diversions; the "71" ranch diverts water 4 to 6 miles below.

REGULATION.—Flow affected by irrigation diversions above.

ACCURACY.—Stage-discharge relation fairly permanent throughout the year except as affected by ice. Rating curve well defined below 150 second-feet. Daily discharge determined by applying daily gage height to rating table. Records good.

Discharge measurements of Secret Creek near Halleck, Nev., during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft*			*Feet*	*Sec.-ft.*
Dec. 18	R. R. Rowe	[a] 0.89	3.4	June 23	E. C. Howard	[b] 0.97	35.2
May 15	W. E. Dickinson	2.00	123	Aug. 8	R. R. Rowe	.47	3.6

[a] Stage discharge relation slightly affected by ice.
[b] Datum raised 0.33 foot on June 16.

Daily discharge, in second-feet, of Secret Creek near Halleck, Nev., for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	2	5	8	11	6	22	73	117	175	17	6	3
2	3	6	8	10	6	28	84	130	170	16	6	3
3	2	4	8	11	6	40	96	134		16	6	3
4	2	4	8	14	7	53	105	126		15	5	3
5	2	4	8	12	7	93	83	126		14	4	3
									150			
6	2	5	8	11	7	104	83	134		14	4	3
7	4	5	11	10	7	79	73	140		12	4	3
8	3	5	10	10	7	50	91	102		12	4	3
9	3	5	9	10	13	40	68	93	135	12	3	3
10	5	5	8	11	10	60	69	93		12	3	3
11	6	5	8	10	14	64	88	100		11	3	3
12	5	6		8	20	64	99	99	100	10	3	3
13	6	6		7	18	65	104	109		10	3	3
14	4	6		7	22	58	60	112		10	3	3
15	7	6	4	7	17	58	95	123		10	3	3
16	3	7		7	18	109	108	120	69	10	3	3
17	4	7		7	16	137	80	117	59	9	3	3
18	5	7	3	7	14	117	70	159	54	9	3	3
19	5	7	7	7	13	104	87	216	53	8	3	3
20	5	6	7	6	13	58	84	158	37	8	3	3
21	5	6	6	6	12	73	93	162	36	8	3	3
22	6	6	6	6	12	60	93	154	37	7	3	3
23	6	6	6	7	13	102	288	162	35	8	3	3
24	6	6	6	7	13	99	113	159	33	8	3	3
25	5	6	6	7	13	65	124	210	31	7	3	3
26	6	7	6	7	14	46	96	198	28	7	3	3
27	6	5	6	7	15	46	91	213	27	7	3	3
28	6	5	7	6	17	44	93	248	24	7	3	3
29	6	5	8	6	-------	44	101	210	21	6	3	3
30	6	8	10	6	-------	48	117	230	19	6	3	3
31	5	-------	11	6	-------	53	-------	180	-------	6	3	-------

NOTE.—Discharge estimated because of ice effect Nov. 28, 29, Dec. 12–18, 23, 24, Jan. 7–9, 12–14, 20–22, 29–31, Feb. 1–3, 7, 8, 17, and 22. Discharge estimated or interpolated June 1, 3–8, 10–15, and several days in September when gage was not read. Braced figures give mean discharge for periods indicated.

Monthly discharge of Secret Creek near Halleck, Nev., for the year ending September 30, 1921

Month	Discharge in second-feet			Run off in acre-feet
	Maximum	Minimum	Mean	
October	7	2	4.5	277
November	8	4	5.7	339
December	11	3	6.9	424
January	14	6	8.2	504
February	22	6	12.5	694
March	137	22	67.2	4,130
April	288	60	97.0	5,770
May	248	93	149	9,160
June	-------	19	84.8	5,050
July	17	6	10.1	621
August	6	3	3.5	215
September	3	3	3.0	179
The year	288	2	37.8	27,400

87482—26†—WSP 530——10

NORTH FORK OF HUMBOLDT RIVER AT DEVILS GATE, NEAR HALLECK, NEV.

LOCATION.—In sec. 13, T. 38 N., R. 57 E., at narrows 3½ miles above buildings of Charles Clayton ranch (also known as Devils Gate ranch), 17 miles north of Halleck, Elko County, and 32 miles from Elko.

DRAINAGE AREA.—830 square miles (measured on General Land Office maps).

RECORDS AVAILABLE.—November 11, 1913, to September 30, 1921; also at mouth of stream from October 10, 1902, to December 31, 1909, and October 1, 1910, to December 31, 1913.

GAGE.—Stevens continuous water-stage recorder on right bank; inspected by Mrs. J. C. McInnis and C. A. Clayton.

DISCHARGE MEASUREMENTS.—Made from cable about 30 feet below gage or by wading.

CHANNEL AND CONTROL.—Bed composed of sand with gravel riffle at control. About half of control section is affected by growth of moss. Channel crooked. Banks comparatively high and covered with willows. At extremely high stages water may overflow right bank and pass in an overflow channel around gage.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 10.35 feet about March 2 or 3 (discharge, 1,600 second-feet); minimum discharge not determined.

1913–1921: Maximum stage recorded, 10.35 feet about March 2 or 3, 1921 (discharge, 1,600 second-feet); minimum discharge, 1 second-foot, August 20–28 and September 30, 1913.

ICE.—Stage-discharge relation seriously affected by ice in winter.

DIVERSIONS.—Numerous diversions in valley above and below Devils Gate. During summer almost all low-water flow is diverted.

REGULATION.—Flow during summer depends on amount of irrigation above. A small flow is maintained from seepage and springs.

ACCURACY.—Stage-discharge relation changed during flood in March and changed again about May 5; affected by ice during winter. Rating curves fairly well defined. Operation of water-stage recorder satisfactory except for periods as shown in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table, mean daily gage height determined from recorder graph or from staff-gage reading except for period when stage-discharge relation was affected by ice and when gage-height record was missing. For these periods discharge was estimated from meter measurements, weather records, observer's notes, and comparison with Humboldt River at Palisade. Records fair.

Discharge measurements of North Fork of Humboldt River at Devils Gate, near Halleck, Nev., during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
Dec. 16	R. R. Rowe	[a] 2.16	24.2	May 16	W. E. Dickinson	4.80	319
Jan. 29	do	[a] 2.33	38.5	June 25	E. C. Howard	3.56	159
Apr. 8	A. B. Purton	4.47	296	Aug. 9	R. R. Rowe	1.66	18.1

[a] Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of North Fork of Humboldt River at Devils Gate, near Halleck, Nev., for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	12	13	36	25					483			10
2	12	13	34	23	33				435	120		10
3	11	13	33	25				400	403			10
4	11	13	32	27	31		300		371	109		10
5	11	13	30	30	30				371	106	25	10
6	11	13		34				449	385	100		10
7	11	13					311	453	376	91		
8	11	13					296	366	337	80		
9	11	13					299	319	329	71	18	
10	11	14					317	297	335	63	18	
			27									
11	11	15					336	282	340	57	16	
12	12	15					341	281	344	56	16	
13	12	16					368	281	333	54	17	10
14	12	16					397	282	324	52	24	
15	12	17					374	292	309	50	15	
16	12	17	24				355	313	308	47	14	
17	12	18					348	347	314	46	14	
18	12	19			35		345	411	311	46	14	
19	12	19					325	503	267	46	14	
20	12	20					322	655	230	44	13	
21	12	20					328	770	206	43	13	12
22	12	20					338	628	180	43	12	12
23	12	20	24				342	520	152	42	12	12
24	12	21						451	143	41	12	12
25	12	22						483	161	40	11	12
26	12	22					330	501		37	10	12
27	12	23						537		37	9	12
28	12	23						434	130	34	10	12
29	13	23		38				459			19	13
30	13	33	24	37				522		30	14	14
31	13		24	36				537			11	

NOTE.—Discharge estimated or interpolated for following periods when gage did not operate: Oct. 15–20, 22–31, Nov. 1–3, Dec. 2–4, 6–15, Jan. 9–28, Apr. 1–6, 24–30, May 1–5, June 26–30, July 1–3, 29–31, Aug. 1–8, and Sept. 7–20. Discharge estimated because of ice effect Dec. 16–29, Jan. 7, 8, 29–31, and Feb. 1–3. No records Feb. 6 to Mar. 31. Braced figures give mean discharge for periods indicated.

Monthly discharge of North Fork of Humboldt River at Devils Gate, near Halleck, Nev., for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	13	11	11.8	726
November	33	13	17.7	1,050
December	36		26.4	1,620
January		23	33.7	2,070
February				
March				
April			328	19,500
May	770	281	431	26,500
June	483		280	16,700
July			60.8	3,740
August		9	17.0	1,050
September	14		10.8	643

SOUTH FORK OF HUMBOLDT RIVER NEAR ELKO, NEV.

LOCATION.—In sec. 19, T. 33 N., R. 55 E., at head of canyon below Cowling ranch, 4 miles above mouth and 10 miles southwest of Elko, Elko County.

DRAINAGE AREA.—Not measured (1,150 square miles at old station 1½ miles above).

RECORDS AVAILABLE.—August 29, 1896, to December 31, 1909; September 9, 1910, to January 31, 1921, and April 1 to September 30, 1921.

GAGE.—Stevens continuous water-stage recorder on right bank 1½ miles below highway bridge since November 14, 1913; inspected by Grace Clayton.

DISCHARGE MEASUREMENTS.—Made from cable 110 feet above gage or by wading.

CHANNEL AND CONTROL.—Bed composed of gravel and sand. Basalt dike a short distance below gage affords well-defined control. One channel at all stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 6.32 feet at 1 a. m. May 24 (discharge, 2,070 second-feet); river dry October 1–17, 1920. 1896–1921: Maximum discharge recorded, 2,400 second-feet January 26, 1914; minimum stage, river dry at times in 1915, 1916, 1918, 1919, and 1920.

ICE.—Stage-discharge relation seriously affected by ice during winter.

DIVERSIONS.—Below all tributaries and all diversions except those of Hunter & Banks ranch 3 miles downstream.

REGULATION.—Flow affected by diversions above.

ACCURACY.—Stage-discharge relation changed about September 30, 1920, and remained permanent throughout 1921, except as affected by ice November 19–30 and December 13 to January 31. Rating curve well defined below 900 second-feet and extended above. Operation of water-stage recorder satisfactory except for periods as shown in footnote to daily discharge-table. Six staff gage readings were made during July, August, and September when recorder was not in operation. Daily discharge determined by applying to rating table mean daily gage height determined from recorder graph or staff readings. Records for estimated periods fair; others good.

Discharge measurements of South Fork of Humboldt River near Elko, Nev., during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
Nov. 30	R. R. Rowe	[a] 1.10	28.0	Apr. 21	R. R. Rowe	2.60	339
Jan. 28	do	[a] 1.26	24.0	May 17	W. E. Dickinson	3.77	781
Apr. 8	A. B. Purton	2.26	246	Aug. 9	R. R. Rowe	.59	7.6

[a] Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of South Fork of Humboldt River near Elko, Nev., for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Apr.	May	June	July	Aug.	Sept.
1	0	20	27			294	1,090	608		6
2	0	19	25			334	1,000			6
3	0	19	26			368	948			5
4	0	17	23			384	995			6
5	0	16	14	26	235	408	1,080		22	6
6	0	16	12			436	1,180			6
7	0	17	27			439	1,500			6
8	0	16	26		251	436	1,500			6
9	0	15	21		246	422	1,650		8	6
10	0	13	28		216	408	1,650			6
11	0	16	28	23	235	391	1,610			6
12	0	18	24	25	261	418	1,600			6
13	0	19		27	294	486	1,570			6
14	0	19		29	337	554	1,420	340		6
15	0	19			374	632	1,260			6
16	0	23			408	720	1,100			5
17	0	22			418	768	906			5
18	1	22			381	792	712		6	5
19	1	23			352	1,160	656			5
20	2	23			349	1,470	624			5
21	4	24	26	27	343	1,850	608			5
22	8	24			349	2,000	593			5
23	10	25			425	2,040	648			5
24	10	25			446	2,030	680		4	5
25	14	26			404	1,940	688		4	5
26	18	26			374	1,960	660	108	4	5
27	18	27			328	1,930	660		4	5
28	18	27		24	297	1,660	660		4	5
29	19	28		24	272	1,380	664	77	4	5
30	19	28		24	280	1,340	640		3	5
31	19	-------		24	-------	1,220	-------		5	-------

NOTE.—Discharge estimated because of ice effect Nov. 19–30, Dec. 13 to Jan. 10, and Jan. 28–31, on basis of two current-meter measurements, observer's notes and weather records. Discharge for following periods for which gage-height records were not obtained, interpolated or estimated by comparison with records for other stations in the basin: Apr. 1–7, June 7, 14, 15, July 2–25, 27–31, Aug. 1–8, 10–23, Sept. 10, 11, 13–28, and 30. No records for February and March. Braced figures show mean discharge for periods indicated.

Monthly discharge of South Fork of Humboldt River near Elko, Nev., for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	19	0	5.2	320
November	28	13	21.1	1,260
December	----------	12	25.0	1,540
January	----------	----------	26.2	1,610
April	446	----------	310	18,400
May	2,040	294	991	60,900
June	1,650	593	1,020	60,700
July	----------	----------	288	17,700
August	----------	3	9.7	596
September	----------	----------	5.5	327

MAGGIE CREEK AT CARLIN, NEV.

LOCATION.—In sec. 26, T. 33 N., R. 52 E., 700 feet above highway bridge, half a mile above confluence with Humboldt River, and half a mile east of Carlin, Elko County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—June 6, 1913, to September 30, 1921.

GAGE.—Vertical staff on right bank about 800 feet above Pacific Fruit Express Co.'s dam; installed September 22, 1917. Gage read by C. G. Wright and H. R. Wyberg.

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

CHANNEL AND CONTROL.—Bed composed of sand and gravel; shifts occasionally. One channel at all stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 4.12 feet at 2.30 p. m. March 5 (discharge, 416 second-feet); creek dry October 1–19.

1913–1921: Maximum stage recorded, that of March 5, 1921; no flow July 22 to October 24, 1919, and July 16 to October 19, 1920.

ICE.—Stage-discharge relation slightly affected by ice.

DIVERSIONS.—No information.

REGULATION.—None.

ACCURACY.—Stage-discharge relation for low water changed February 14; affected by ice December 17–22 and January 10–17. Rating curves well defined. Gage read to hundredths once a day. Daily discharge ascertained by applying daily gage height to rating tables, except for periods of ice effect for which it was estimated. Records good.

Discharge measurements of Maggie Creek at Carlin, Nev., during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
Dec. 3	R. R. Rowe	0.98	4.6	June 24	E. C. Howard	1.44	7.3
Jan. 27	do	1.10	8.4	July 27	R. R. Rowe	1.11	1.1
Feb. 15	do	1.65	26.0	Aug. 7	do	1.13	1.5
Apr. 12	A. B. Purton	2.28	108	Sept. 28	do	1.11	1.3
21	R. R. Rowe	2.30	107				

Daily discharge, in second-feet, of Maggie Creek at Carlin, Nev., for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1			3	5	9	235	77	91	94	2		
2			3	6	8	322	79	97	91	2		
3			5	6	9	286	75	102	83	3		
4			3	7	8	394	105	111	100	4		
5			3	7	10	416	135	108	64	4		
		1										
6			3	6	9	405	144	123	54	4		
7			3	6	9	383	126	120	40	3		
8			3	6	8	286	129	114	19	5		
9			3	6	11	232	120	110	10	4		
10			3	5	68	185	114	105	6	4		
	0											
11			3	4	24	172	110	90	7	4		
12			3	4	16	153	105	80	5	3		
13			4	4	169	156	108	77	5	3		
14			4	3	286	166	114	81	7	4		
15		2	4	3	27	159	156	79	6	3		
											1	1
16			4	4	6	195	138	88	12	3		
17			4	5	4	182	132	97	10	3		
18			4	98	10	159	123	114	9	2		
19		3	4	14	16	153	118	120	10	3		
20		6	4	11	10	150	114	135	14	2		
21		5	4	9	208	144	110	153	12	2		
22		5	4	8	49	138	117	159	16	2		
23		5	4	7	80	147	141	153	17	2		
24		4	4	8	153	135	144	147	8	1		
25	1	4	4	9	130	138	135	135	5	1		
26		4	4	9	185	135	134	114	4	1		
27		4	4	8	166	108	115	108	4	1		
28		4	5	9	185	91	102	86	3	1		
29		4	5	9	------	80	97	108	3	1		
30		3	6	9	------	83	94	105	3	1		
31		------	5	10	------	80	------	102	------	1		------

NOTE.—Braced figures give estimated mean discharge for periods indicated.

Monthly discharge of Maggie Creek at Carlin, Nev., for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	1	0	0.4	25
November	6	1	2.6	155
December	6	3	3.8	234
January	98	3	9.8	603
February	286	4	66.9	3,720
March	416	80	196	12,100
April	156	75	117	6,960
May	159	77	110	6,760
June	100	3	24.0	1,430
July	5	1	2.5	154
August	1	1	1.0	61
September	1	1	1.0	60
The year	416	0	44.5	32,300

ROCK CREEK NEAR BATTLE MOUNTAIN, NEV.

LOCATION.—In NE. ¼ sec. 17, T. 34 N., R. 48. E., at mouth of canyon below all tributaries; half a mile above highway bridge on Overland Trail, in Eureka County, 25 miles northeast of Battle Mountain, Lander County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—March 26, 1918, to September 30, 1921.

GAGE.—Stevens continuous water-stage recorder on left bank installed March 26, 1918; inspected by Frank Eads.

DISCHARGE MEASUREMENTS.—Made by wading near gage or from highway bridge half a mile downstream.

CHANNEL AND CONTROL.—One channel at all stages. Banks high and not subject to overflow. Stream bed composed of gravel and boulders. Principal control is rock riffle 50 feet below gage.

EXTREMES OF DISCHARGE.—Maximum stage during year, from water-stage recorder, 5.54 feet at 1 a. m. February 11 (discharge, 2,240 second-feet); no flow October 1–10 and August 15 to September 3.

1918–1921: Maximum stage, from water-stage recorder, that of February 11, 1921; no flow during parts of each year.

ICE.—Stage-discharge relation unaffected by ice.

DIVERSIONS.—There are diversions in valley above canyon. Station is above all diversions in Boulder Flat and is below all tributaries.

REGULATION.—A small reservoir in Squaw Valley about 30 miles upstream may affect the run-off to a small extent.

ACCURACY.—Stage-discharge relation changed during high water in February. Rating curves well defined below 700 second-feet. Operation of water-stage recorder satisfactory except November 10–25 and March 8–15. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph. Discharge estimated October 11–18, 1920, and interpolated for other periods of missing gage height. Records good.

Discharge measurements of Rock Creek near Battle Mountain, Nev., during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
Oct. 19	R. R. Rowe	0.92	1.4	Apr. 11	A. B. Purton	2.12	124
Dec. 13	do	.98	1.7	22	R. R. Rowe	2.05	115
Jan. 25	do	1.09	3.6	July 27	do	.76	.2
Mar. 1	do	3.20	524	Sept. 29	do	.91	1.5

Daily discharge, in second-feet, of Rock Creek near Battle Mountain, Nev., for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1		2	3	3	8	368	125	113	127	4		
2		2	3	4	5	368	138	119	119	3		0
3		2	3	4	5	458	162	119	109	3		
4		2	2	4	6	588	174	101	94	3		
5	0	2	1	5	4	684	157	75	103	4		
6		2	1	5	5	804	159	48	107	4		
7		2	1	4	3	616	147	70	80	3	0.1	
8		2	2	4	2		138	94	62	5		
9		2	1	3	2		134	85	54	5		
10			2	3	550		134	65	52	2		
11		4	2	2	846	400	130	56	45	3		
12			2	1	529		138	53	34	12		
13			2	1	429		141	60	31	12		
14			1	1	364		147	53	28	15		.5
15	.5	5	1	1	251		143	54	28	13		
16			1	2	89	185	136	66	33	12		
17			1	2	56	213	127	70	88	10		
18			1	20	49	254	119	71	62	7		
19	1		1	243	53	268	117	90	44	6		
20	2		1	23	50	231	115	188	43	5		
21	2	4	2	12	40	208	113	150	36	3		
22	3		2	6	39	196	113	123	32	1		
23	2		2	8	40	191	125	113	29		0	
24	2		3	5	26	180	134	113	34			
25	2		2	4	121	172	121	113	24	.5		
26	2	3	2	5	244	159	115	111	17			1
27	3	4	2	7	289	143	109	117	13	.2		2
28	3	2	2	9	275	132	105	130	14			1
29	3	2	3	6	-------	130	103	157	14			1
30	2	2	4	8	-------	130	109	150	9	.2		2
31	2	-------	3	5	-------	123	-------	141	-------			-------

NOTE.—Braced figures give mean discharge for periods indicated.

Monthly discharge of Rock Creek near Battle Mountain, Nev., for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	3	0	1.06	65
November	-------	2	3.2	190
December	4	1	1.9	117
January	243	1	13.2	812
February	846	2	156	8,660
March	804	123	323	19,900
April	174	103	131	7,800
May	188	48	99.1	6,090
June	127	9	52	3,090
July	15	-------	4.45	274
August	-------	0	.05	3
September	2	0	.60	36
The year	846	0	64.9	47,000

HUMBOLDT-LOVELOCKS IRRIGATION, LIGHT & POWER CO.'S FEEDER CANAL NEAR MILL CITY, NEV.

LOCATION.—In SW. ¼ sec. 29, T. 33 N., R. 35 E., a quarter of a mile below head of canal and 2 miles north of Mill City, Pershing County.

RECORDS AVAILABLE.—February 19, 1914, to September 30, 1921.

GAGE.—Stevens continuous water-stage recorder on left bank; inspected by Peter Organ.

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

CHANNEL AND CONTROL.—Earth section. Control indefinite. Stage-discharge relation is affected by growth of aquatic plants and by the wash from several small gullies below station.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 5.40 feet at 3 a. m. May 3 (discharge, 250 second-feet). Dry about half of year.

DIVERSIONS.—None.

REGULATION.—Flow regulated by head gates one-fourth mile above station.

ACCURACY.—Stage-discharge relation permanent. Rating curve fairly well defined. Water-stage recorder operated successfully when canal was in operation except for periods indicated in footnote to daily-discharge table. Weekly gage readings obtained until canal went dry. Daily discharge obtained by applying to rating table mean daily gage height determined from recorder graph or staff gage readings. Records fair.

Canal diverts from Humboldt River in sec. 29, T. 33 N., R. 35 E., for storage in the Taylor-Pitt reservoirs near Humboldt. The water is returned to the river during the irrigation season, about 3 miles west of Humboldt through the Humboldt-Lovelocks Irrigation, Light & Power Co.'s outlet canal and carried in the natural channel to the head gates of the canals serving the Lovelocks district.

Discharge measurements of Humboldt-Lovelocks Irrigation, Light & Power Co.'s feeder canal near Mill City, Nev., during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
Mar. 5	R. R. Rowe	0.54	0.2	June 6	R. R. Rowe	4.52	170
Apr. 10	A. B. Purton	4.54	173	July 29	do	.61	[a].05
24	R. R. Rowe	4.77	192				

[a] Estimated.

Daily discharge, in second-feet, of Humboldt-Lovelocks Irrigation, Light & Power Co.'s feeder canal near Mill City, Nev., for the year ending September 30, 1921

Day	Mar.	Apr.	May	June	July	Day	Mar.	Apr.	May	June	July
1	-------	171	232			16	37	177	184	195	139
2	-------	207	233			17	42	180	201		
3	-------	213	151	185		18	50	179	208		2
4	-------	207	7			19	61	180	209		
5	-------	209	2		210	20	82	180	208	200	
6	-------		2	171		21	97	179	203		
7	-------		1	166		22	111	179	198		
8	-------	195	1	169		23	123	176	199	204	1
9	-------		1	169	195	24	139	173			
10	-------	177	1	170		25	143	172			
									205		
11	-------	192	37			26	143	177		210	-------
12	-------	197	92		195	27	143	200			-------
13	-------	199	128	175		28	145	208	208		-------
14	4	204	137			29	151	222			-------
15	18	202	157			30	157	224	200	222	-------
						31	160	-------		-------	-------

NOTE.—No flow on days for which no discharge is given. Braced figures show estimated mean discharge for periods when water-stage recorder failed to operate satisfactorily.

Monthly discharge of Humboldt-Lovelocks Irrigation, Light & Power Co.'s feeder canal near Mill City, Nev., for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	0	0	0	0
November	0	0	0	0
December	0	0	0	0
January	0	0	0	0
February	0	0	0	0
March	160	0	58.3	3,580
April	224	171	192	11,400
May	233	1	143	8,790
June		166	191	11,400
July		0	103	6,330
August	0	0	0	0
September	0	0	0	0
The year	233	0	57.3	41,500

PYRAMID AND WINNEMUCCA LAKES BASIN

LAKE TAHOE AT TAHOE, CALIF.

LOCATION.—In SE. ¼ sec. 6, T. 15 N., R. 17 E., near outlet of lake at Tahoe, Placer County.

DRAINAGE AREA.—519 square miles (including water surface of lake, 193 square miles).

RECORDS AVAILABLE.—1900 to September 30, 1921.

GAGE.—Vertical staff fastened to piling of boat landing near outlet; read once a day by an employee of the United States Bureau of Reclamation. Datum is 6,220 feet above sea level. Mean low-water elevation of lake is 6,226.0 feet.

EXTREMES OF STAGE.—Maximum stage recorded during year, 6.69 feet July 3; minimum stage, 4.37 feet November 7.

1900–1921: Maximum stage recorded, 11.26 feet July 14, 15, 17, and 18, 1907; minimum stage, 4.37 feet November 7, 1920.

ACCURACY.—Gage read to hundredths once daily.

COOPERATION.—Record furnished by United States Bureau of Reclamation.

Daily gage height, in feet, of Lake Tahoe at Tahoe, Calif., for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	4.70	4.44	4.52	4.75	4.84	4.98	5.19	5.36	6.11	6.68	6.51	5.92
2	4.69	4.44	4.52	4.74	4.84	4.99	5.19	5.38	6.13	6.68	6.50	5.91
3	4.67	4.43	4.51	4.74	4.84	5.00	5.17	5.38	6.17	6.69	6.48	5.90
4	4.65	4.41	4.56	4.74	4.84	5.00	5.17	5.39	6.19	6.68	6.46	5.90
5	4.62	4.40	4.56	4.74	4.90	5.00	5.17	5.40	6.21	6.68	6.44	5.88
6	4.60	4.38	4.56	4.70	4.90	5.00	5.17	5.42	6.24	6.68	6.42	5.87
7	4.65	4.37	4.56	4.68	4.91	5.01	5.17	5.51	6.26	6.68	6.41	5.86
8	4.63	4.38	4.59	4.66	4.91	5.02	5.17	5.53	6.29	6.67	6.41	5.84
9	4.61	4.38	4.58	4.63	4.91	5.03	5.17	5.54	6.32	6.68	6.40	5.82
10	4.59	4.38	4.61	4.60	4.90	5.04	5.18	5.55	6.35	6.68	6.38	5.79
11	4.57	4.40	4.70	4.58	4.90	5.05	5.18	5.57	6.39	6.67	6.37	5.77
12	4.54	4.42	4.70	4.58	4.90	5.06	5.19	5.59	6.42	6.67	6.35	5.75
13	4.53	4.42	4.70	4.58	4.90	5.08	5.20	5.61	6.44	6.66	6.34	5.72
14	4.52	4.42	4.68	4.59	4.90	5.09	5.21	5.63	6.47	6.67	6.31	5.69
15	4.52	4.42	4.65	4.60	4.92	5.10	5.22	5.65	6.49	6.66	6.30	5.66
16	4.51	4.44	4.65	4.60	4.92	5.11	5.22	5.67	6.49	6.66	6.28	5.63
17	4.50	4.45	4.65	4.65	4.92	5.11	5.22	5.71	6.50	6.66	6.25	5.61
18	4.63	4.46	4.65	4.78	4.92	5.12	5.24	5.76	6.51	6.66	6.22	5.58
19	4.59	4.55	4.72	4.85	4.92	5.14	5.25	5.79	6.53	6.65	6.19	5.56
20	4.59	4.55	4.72	4.87	4.91	5.16	5.26	5.82	6.55	6.65	6.17	5.54
21	4.58	4.55	4.71	4.87	4.94	5.16	5.27	5.85	6.57	6.65	6.15	5.51
22	4.56	4.55	4.71	4.85	4.94	5.17	5.28	5.87	6.59	6.65	6.13	5.49
23	4.54	4.55	4.70	4.83	4.94	5.17	5.29	5.88	6.59	6.64	6.11	5.47
24	4.53	4.54	4.72	4.81	4.95	5.17	5.29	5.89	6.61	6.63	6.09	5.46
25	4.51	4.54	4.72	4.80	4.97	5.17	5.30	5.90	6.62	6.61	6.06	5.45
26	4.51	4.54	4.71	4.80	4.97	5.17	5.31	5.91	6.64	6.59	6.04	5.42
27	4.49	4.56	4.71	4.80	4.98	5.18	5.32	5.93	6.65	6.57	6.01	5.40
28	4.50	4.56	4.71	4.81	4.98	5.18	5.33	5.95	6.66	6.55	5.98	5.38
29	4.49	4.55	4.70	4.81	-------	5.18	5.34	5.98	6.67	6.54	5.96	5.37
30	4.48	4.53	4.75	4.85	-------	5.18	5.35	6.02	6.67	6.53	5.95	5.35
31	4.45	-------	4.75	4.85	-------	5.18	-------	6.09	-------	6.52	5.93	-------

TRUCKEE RIVER AT TAHOE, CALIF.

LOCATION.—In NW. ¼ sec. 7, T. 15 N., R. 17 E., at Tahoe, Placer County, a short distance below dam at outlet of Lake Tahoe.

DRAINAGE AREA.—519 square miles.

RECORDS AVAILABLE.—July 3, 1895, to February 29, 1896; June 17, 1900, to September 30, 1921.

GAGE.—Vertical staff fastened to a large cottonwood tree on left bank, 300 feet below dam at outlet of Lake Tahoe. Original gage, 100 feet above, was destroyed by dredging operations July 15, 1912.

DISCHARGE MEASUREMENTS.—Made from cable 140 feet below gage or by wading.

CHANNEL AND CONTROL.—Gravel; practically permanent.

EXTREMES OF DISCHARGE.—1895–1896; 1900–1921: Maximum mean daily discharge, 1,340 second-feet, July 13–20, 1907 (stage 4.3 feet); river dry during parts of 1900, 1901, 1914, and 1918–1921.

ICE.—Stage-discharge relation not seriously affected by ice.

DIVERSIONS.—No information.

REGULATION.—Flow regulated by operation of gates in dam at Lake Tahoe.

ACCURACY.—Stage-discharge relation not permanent. Rating curve well defined. Gage read to hundredths at least once each day. Stage controlled by outlet gates at Lake Tahoe. Daily discharge ascertained by United States Bureau of Reclamation by applying mean daily gage height to rating table.

COOPERATION.—Daily-discharge record and discharge measurements furnished by United States Bureau of Reclamation which maintains the station in cooperation with Stone & Webster Engineering Corporation.

The following discharge measurement was made by R. E. Hartley:
October 27, 1920: Gage height, 2.02 feet; discharge, 136 second-feet.

Daily discharge, in second-feet, of Truckee River at Tahoe, Calif., for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	July	Aug.	Sept.
1	159	116	136	176	77	39	------	399	459
2	154	116	136	140	77	------	------	399	455
3	159	114	134	140	77	------	------	399	455
4	156	109	144	140	77	------	------	417	452
5	154	107	142	140	161	------	------	455	452
6	154	104	142	90	161	------	140	455	459
7	156	102	142	167	161	------	85	455	455
8	152	104	148	161	161	------	30	455	452
9	148	104	146	174	161	------	65	455	462
10	146	104	148	183	161	------	65	448	459
11	144	107	163	146	161	------	75	445	455
12	142	112	163	146	62	------	133	455	448
13	138	112	163	146	0	------	188	452	459
14	134	112	161	150	0	------	212	452	455
15	133	114	152	154	0	------	233	448	455
16	131	120	152	152	62	------	275	448	452
17	129	120	152	0	62	------	275	465	448
18	152	120	152	163	0	------	275	462	445
19	146	140	167	163	0	------	289	462	441
20	146	0	167	165	0	------	301	462	437
21	144	0	165	167	67	------	301	459	455
22	142	142	165	167	67	------	331	455	452
23	150	142	163	165	67	------	331	452	448
24	136	140	167	75	44	------	331	459	448
25	131	140	167	75	44	------	331	455	445
26	131	138	165	75	0	------	358	452	452
27	127	142	165	75	0	------	399	448	448
28	129	140	165	75	0	------	399	445	445
29	129	140	163	75	------	------	399	455	445
30	135	138	176	152	------	------	399	455	441
31	116	------	176	152	------	------	399	448	------

NOTE.—Outlet gates closed Mar. 2 to July 5; no flow.

Monthly discharge of Truckee River at Tahoe, Calif., for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	159	116	142	8,730
November	142	0	113	6,720
December	176	134	156	9,590
January	183	0	134	8,240
February	161	0	68.2	3,790
March	39	0	1.3	77.5
April	0	0	0	0
May	0	0	0	0
June	0	0	0	0
July	399	0	214	13,200
August	465	399	447	27,500
September	462	437	451	26,800
The year	465	0	145	105,000

TRUCKEE RIVER AT ICELAND, CALIF.

LOCATION.—In sec. 36, T. 18 N., R. 17 E., above dam of National Ice Co., 400 feet northeast of Southern Pacific Railroad station at Iceland, Nevada County, and 23 miles west of Reno, Nev.

DRAINAGE AREA.—937 square miles.

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

GAGE.—Water-stage recorder on right bank above dam; auxiliary vertical staff fastened to gage well.

DISCHARGE MEASUREMENTS.—Made from cable 130 feet above gage.

CHANNEL AND CONTROL.—Bed consists of small boulders; fairly smooth and permanent. Left bank high; right bank subject to overflow at high stages. Dam of National Ice Co. is the control.

EXTREMES OF DISCHARGE.—1907-1921: Maximum mean daily discharge, 15,300 second-feet March 18, 1907; minimum mean daily discharge, 175 second-feet November 6-7, 1920.

ICE.—Stage-discharge relation somewhat affected by ice.

DIVERSIONS.—No information.

REGULATION.—See Truckee River at Tahoe.

ACCURACY.—Mean daily gage heights determined from water-stage recorder sheets. Daily discharge ascertained by United States Bureau of Reclamation by applying mean daily gage height to rating table.

COOPERATION.—Daily discharge record furnished by United States Bureau of Reclamation which maintains the station in cooperation with Stone & Webster Engineering Corporation.

Discharge measurements of Truckee River at Iceland, Calif., during the year ending September 30, 1921

[Made by R. E. Hartley]

Date	Gage height	Discharge
	Feet	*Sec.-ft.*
Oct. 26	0.33	212
June 25	2.12	1,100
July 30	1.18	506

Daily discharge, in second-feet, of Truckee River at Iceland, Calif., for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	222	187	362	490	432	478	1,250	1,710	1,280	767	514	510
2	215	209	346	470	432	498	1,360	1,570	1,460	740	510	510
3	209	209	336	451	414	665	1,400	1,440	1,360	650	506	510
4	197	209	336	451	386	568	1,160	1,340	1,500	595	498	506
5	197	197	279	470	369	946	1,010	1,320	1,680	572	522	502
6	191	175	285	379	379	960	967	1,300	1,900	490	518	506
7	215	175	346	396	396	939	967	1,270	1,250	572	510	506
8	222	191	336	432	400	904	1,080	1,230	1,800	572	510	595
9	203	191	330	396	490	925	1,160	1,320	1,780	518	510	506
10	215	181	324	396	425	995	1,160	1,500	1,780	518	510	514
11	203	266	282	432	414	995	1,150	1,660	1,780	474	502	494
12	197	414	285	432	451	925	1,120	1,770	1,780	490	494	506
13	197	330	379	425	490	1,160	1,160	1,800	1,720	530	506	514
14	203	317	389	414	530	1,160	1,050	2,100	1,500	518	510	514
15	209	298	389	396	432	1,080	911	1,900	1,330	518	510	510
16	212	349	362	396	414	1,160	855	2,030	1,080	530	510	510
17	209	432	349	510	502	1,440	855	1,780	960	530	510	506
18	215	502	349	617	432	1,930	837	1,540	897	514	510	502
19	266	690	343	604	414	1,550	862	1,300	925	518	510	490
20	222	595	343	550	396	1,300	925	995	967	510	514	490
21	212	379	340	530	379	1,180	1,110	1,100	1,080	510	514	498
22	234	379	346	510	396	1,040	1,340	1,080	1,120	518	518	510
23	253	379	356	510	396	925	1,600	1,250	1,080	530	510	514
24	250	346	362	510	414	925	1,340	1,410	960	506	514	506
25	260	330	362	414	403	925	1,160	1,550	918	506	510	506
26	247	432	362	396	425	837	1,120	1,710	1,120	510	665	498
27	250	640	356	425	470	801	1,250	1,880	890	506	522	518
28	234	432	340	403	482	843	1,500	1,860	890	506	510	510
29	240	396	356	403	-------	904	1,660	1,600	837	510	498	502
30	240	379	389	379	-------	953	1,720	1,420	751	510	506	498
31	228	-------	542	470	-------	1,100	-------	1,340	-------	510	498	-------

Monthly discharge of Truckee River at Iceland, Calif., for the year ending September 30, 1921

Month	Disharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	266	191	222	13,700
November	690	175	340	20,200
December	542	279	350	21,500
January	617	379	453	27,900
February	530	369	427	23,700
March	1,930	478	1,000	61,500
April	1,720	837	1,170	69,600
May	2,100	995	1,520	93,500
June	1,900	751	1,280	76,200
July	767	474	540	33,200
August	665	494	514	31,600
September	595	490	509	30,300
The year	2,100	175	695	503,000

HONEY LAKE BASIN

SUSAN RIVER AT SUSANVILLE, CALIF.

LOCATION.—Three-fourths of a mile southwest of Susanville, Lassen County, 2 miles above Piute Creek, and 3½ miles below Cheney Creek.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—June 3, 1900, to December 31, 1905; March 10 to May 31, 1913; February 8, 1917, to June 30, 1921, when station was discontinued.

GAGE.—Staff gage in three sections 150 feet above old electric light plant. First section on right bank, other sections on left bank. Previous to September 21, 1919, gage was located below electric light plant at a different datum. Gage read by Mrs. Bert Gerking and D. E. Alvord.

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

CHANNEL AND CONTROL.—Gravel and cobblestones; willows growing on island in stream cause shift at medium stages. Right bank high and covered with vegetation. Left bank low and covered with sparse growth of willows; subject to overflow.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 4.4 feet at 5 p.m. January 17 (discharge, 1,070 second-feet); minimum stage, 1.1 feet October 17 (discharge, 2.6 second-feet).

1900-1905, 1913, and 1916-1921: Maximum stage recorded, 9.9 feet February 22, 1904 (discharge, 1,750 second-feet); minimum stage, 4.35 feet at 7.30 p.m. August 10, 1918 (discharge, 0.8 second-foot).

DIVERSIONS.—Ramsey ditch diverts water from the old electric light plant flume which heads at dam about 800 feet above station, on right bank. Electric light plant flume diverts water past gage and spills back into river just above plant through a break in flume. Considerable water leaks from flume and Ramsey ditch into the river between point of diversion and gage. There is also leakage from Ramsey ditch between old and new gages and some overflow from the Susanville waterworks.

REGULATION.—Probably none from ditch.

ACCURACY.—Stage-discharge relation changed from that of previous year due to willows growing on control. Rating curve well defined below 250 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 below 250 second-feet and fair above.

Discharge measurements of Susan River at Susanville, Calif., during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
Feb. 21	K. M. Kelley	2.02	88	May 28	K. M. Kelley	2.53	186
22	do	1.77	49	28	do	2.53	185
23	do	2.01	80	29	do	2.50	180
24	do	1.88	67	Sept. 15	R. C. Briggs	1.87	66

Daily discharge, in second-feet, of Susan River at Susanville, Calif., for the period October 1, 1920, to June 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	8.5	4.8	30	108	40	168	190	168	179
2	8.5	4.8	30	90	40	212	225	168	158
3	8.5	4.8	26	118	40	300	270	190	179
4	8.5	4.8	30	168	40	450	200	200	168
5	8.5	4.8	35	300	40	430	190	190	148
6	8.5	4.8	30	179	35	332	179	225	138
7	8.5	8.5	22	158	60	270	168	200	128
8	8.5	8.5	14	128	46	212	168	225	118
9	8.5	6.5	18	99	40	200	179	255	99
10	8.5	4.8	22	82	60	200	200	285	82
11	8.5	6.5	22	67	82	200	200	270	82
12	8.5	11	46	52	138	179	200	315	82
13	8.5	14	30	40	200	370	212	300	99
14	8.5	14	30	60	410	390	179	315	118
15	4.8	8.5	40	46	315	255	158	270	138
16	4.8	14	35	35	168	200	158	225	158
17	2.6	22	22	332	148	315	158	212	168
18	4.8	40	22	200	128	410	148	179	179
19	6.5	108	22	148	90	315	148	190	158
20	6.5	67	14	179	82	240	138	212	148
21	4.8	30	18	179	82	200	158	200	138
22	4.8	30	30	179	74	240	82	200	128
23	4.8	26	26	138	90	225	200	200	118
24	8.5	2	30	99	82	190	190	179	99
25	8.5	18	22	74	82	179	179	190	82
26	4.8	74	22	52	99	168	148	200	82
27	4.8	128	22	46	138	138	168	225	52
28	4.8	46	22	46	168	138	158	200	35
29	4.8	40	22	40	-------	158	200	179	26
30	4.8	30	212	40	-------	148	190	179	22
31	4.8	-------	200	40	-------	179	-------	179	-------

Monthly discharge of Susan River at Susanville, Calif., for the period October 1, 1920, to June 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	8.5	2.6	6.75	415
November	128	4.8	26.9	1,600
December	212	14	37.6	2,310
January	332	35	114	7,010
February	410	35	108	6,000
March	450	138	246	15,100
April	270	82	178	10,600
May	315	168	217	13,300
June	179	22	117	6,960
The period				63,300

WARNER LAKES BASIN

TWENTYMILE CREEK NEAR WARNER LAKE, OREG.

LOCATION.—In sec. 24, T. 40 S., R. 23 E., a quarter of a mile above highway bridge on Warner Lake-Coleman Valley road at mouth of canyon, below all tributaries, and 2 miles south of Warner Lake, Lake County.

DRAINAGE AREA.—155 square miles (measured on map issued by United States Bureau of Reclamation), not including 43 square miles tributary to Cowhead Lake which contributes water only during years of heavy run-off.

RECORDS AVAILABLE.—March 1, 1910, to July 2, 1916; December 16, 1917, to September 30, 1919, and March 14 to September 30, 1921.

GAGE.—Gurley seven-day water-stage recorder on right bank beginning April 12, 1921; inspected by A. C. F. Perry. Staff gage read once a day March 17 to April 11 by Hillard Houston. Earlier gages at different locations and datum.

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

CHANNEL AND CONTROL.—Bed is solid rock reef broken by crevices and obstructed by boulders and gravel; shifts slightly. Water seeps under the boulders and gravel.

EXTREMES OF DISCHARGE.—Maximum stage during winter, 9.2 feet, determined on March 14 from high-water mark (discharge, 2,000 second-feet); minimum stage from water-stage recorder, 0.90 foot August 30 to September 1 (discharge, 2.0 second-feet).

1910–1916; 1918–1919; and 1921: Maximum discharge recorded, 2,610 second-feet March 1, 1910; minimum discharge recorded, 1.4 second-feet, August 1, 1919.

ICE.—Stage-discharge relation not affected by ice during year.

DIVERSIONS.—Some diversions for irrigation along Twelvemile and Fifteenmile creeks and along Eightmile Creek, a tributary of Cowhead Lake. Two small ditches divert just above gage. A ditch also diverts water from head of Twelvemile Creek for storage in Lake Anne.

REGULATION.—None.

ACCURACY.—Stage-discharge relation considered permanent. Rating curve well defined between 30 and 400 second-feet. Operation of water-stage recorder fairly satisfactory. Daily discharge ascertained by applying to rating table mean daily gage height obtained by inspecting recorder graph. Records good.

Discharge measurements of Twentymile Creek near Warner Lake, Oreg., during the year ending September 30, 1921.

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
Mar. 14	J. W. Bones	3.48	141	May 27	A. C. F. Perry	3.68	162
21	do	3.01	79	June 25	do	2.41	40.9
Apr. 4	A. C. F. Perry [a]	2.83	68	July 9	do	1.33	14.8
12	do	3.00	80	27	do	1.04	3.8
May 24	do	3.25	109				

[a] Assistant to State engineer of Oregon.

Daily discharge, in second-feet, of Twentymile Creek near Warner Lake, Oreg.. for the year ending September 30, 1921

Day	Mar.	Apr.	May	June	July	Aug.	Sept.
1		79	87	123	24	3.1	2.2
2		83	83	103	21	3.0	2.5
3		97	76	116	21	2.9	2.8
4		56	72		18	2.8	3.1
5		53	76	a 120	12	2.8	3.0
6		62	76		9.9	2.8	3.0
7		53	83		9.7	2.8	3.0
8		65	87	123	9.0	2.8	2.9
9		65	92	123	8.8	2.6	3.0
10		68	103	116	8.5	2.7	a 3.1
11		72	116	109	7.1	2.7	a 3.2
12		76	123	97	6.1	2.5	3.3
13		72	138	87	6.1	2.2	3.4
14	138	65	146	76	4.8	2.2	3.4
15	a 210	56	146	68	3.7	2.6	3.4
16	a 280	53	153	65	4.1	2.8	3.4
17	347	56	153	56	4.5	2.8	3.6
18	287	56	a 134	50	5.0	2.7	3.6
19	138	56	a 116	50	5.1	3.0	4.0
20	103	59	97	47	5.0	3.0	a 3.6
21	87	59	103	47			a 3.2
22	79	59	116	47			2.9
23	72	68	109	44			2.9
24	65	65	123	44	a 4.8		2.8
25	62	59	123	38		a 2.6	2.8
26	50	56	153	35			3.0
27	47	56	176	34	4.7		3.3
28	50	68	130	29	4.5		3.3
29	62	83	109	29	4.2	2.3	3.3
30	68	87	97	28	3.6	2.2	3.4
31	76		103		3.1	2.2	

a Discharge interpolated.

Monthly discharge of Twentymile Creek near Warner Lake, Oreg., for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
March 14–31	347	47	123	4,390
April	97	53	65.4	3,890
May	176	72	113	6,950
June	123	28	75.5	4,490
July	24	3.1	7.82	481
August	3.1	2.2	2.65	163
September	4.0	2.2	3.15	187
The period				20,600

DEEP CREEK AT ADEL, OREG.

LOCATION.—In SE. ¼ sec. 21, T. 39 S., R. 24 E., just back of Wible's Hotel at Adel, Lake County, one-eighth mile upstream from wagon bridge, below all tributaries.

DRAINAGE AREA.—250 square miles (measured on U. S. Bureau of Reclamation map).

RECORDS AVAILABLE.—May 11, 1909, to May 31, 1916; December 18, 1917, to September 30, 1919; January 30 to September 30, 1921.

GAGE.—Stevens eight-day water-stage recorder on left bank one-eighth mile above bridge; inspected by W. S. Wible.

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

CHANNEL AND CONTROL.—Bed composed of gravel and boulders; probably permanent except for slight shifts affecting only low water. Banks subject to overflow at gage and bridge in extreme floods. Zero flow, gage height 2.0 feet.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 5.9 feet at 9 p. m. March 4 (discharge, 1,290 second-feet); minimum stage from water-stage recorder, 2.42 feet at noon August 19 (discharge, 2.6 second-feet).

1909–1919, 1921: Maximum stage recorded, 9.0 feet at 6 p. m. March 2, 1910 (discharge, 4,950 second-feet); minimum stage, 2.4 feet July 18-21, 1919 (discharge, 1.4 second-feet).

ICE.—Stage-discharge relation not affected by ice during year.

DIVERSIONS.—Considerable area irrigated from tributaries, and 2,000 or 3,000 acres watered by natural flooding in Big Valley and Crane Lake. Five ditches having a total capacity of about 30 second-feet, divert water within 2 miles above gage. Gaging stations maintained on these canals by State engineer of Oregon gave the following determinations for run-off which should be added to the results obtained at the gaging station to give the total flow of Deep Creek.

Monthly discharge of canals diverting water from Deep Creek above Adel, Oreg., for the period April to September, 1921

Month	Discharge in second-feet					Total	
	Crump	Morris & O'Keefe	Messner & Wible	Wible	Givan	Second-feet	Acre-feet
April	0	7.51	1.95	0.01	5.27	14.7	875
May	1.08	11.1	7.49	1.20	8.79	29.7	1,830
June	2.56	5.35	5.20	.55	3.55	17.2	1,020
July	1.79	5.01	6.53	.30	6.29	19.9	1,020
August	2.23	7.66	6.02	.30	2.15	18.4	1,130
September	1.94	6.61	6.40	.20	3.90	19.0	1,130
The period						19.8	7,200

REGULATION.—None.

ACCURACY.—Stage-discharge relation permanent. Rating curve well defined below 1,000 second-feet. Staff gage read January 30 to March 12 and August 25 to September 30; water-stage recorder successfully operated March 13 to August 24. Daily discharge ascertained by applying to rating table mean daily gage height obtained by inspecting recorder graph or during periods when recorder was not operating by applying daily gage reading to rating table. Records good.

Discharge measurements of Deep Creek at Adel, Oreg., during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
Mar. 13	J. W. Bones	4.55	485	June 24	A. C. F. Perry	3.58	158
21	do	4.28	373	July 5	do	3.16	62
Apr. 2	A. C. F. Perry[a]	4.48	460	26	do	2.64	10.4
4	do	4.96	704				

[a] Assistant to State engineer of Oregon.

Daily discharge, in second-feet, of Deep Creek at Adel, Oreg., for the year ending September 30, 1921

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1		90	695	285	655	510	107	10	4.4
2		90	842	342	595	469	100	11	4.4
3		111	966	501	585	487	90	10	4.4
4		159	1,160	464	482	520	85	10	4.4
5		159	1,090	442	487	501	73	9.0	5.0
6		159	1,090	409	501	487	62	7.0	5.4
7		159	873	350	530	487	54		5.0
8		159	783	372	564	478	51	6.0	4.7
9		159	611	430	585	447	46		4.7
10		215	559	501	606	417	39		5.0
11		275	487	534	633	388	33		5.0
12		275	421	549	655	361	32	3.0	5.0
13		611	492	554	666	328	32		5.0
14		307	421	482	695	307	24		5.0
15		510	372	409	724	278	22		5.4
16		307	388	372	754	251	19	2.9	5.4
17		291	666	365	724	236	16	2.9	5.4
18		245	405	350	601	204	15	3.8	5.4
19		230	611	392	559	183	15	3.2	5.4
20		215	464	392	520	175	14	3.2	5.4
21		245	350	413	510	172	14	3.2	5.4
22		200	314	478	569	167	14	3.5	7.4
23		200	281	559	501	164	13	3.5	7.4
24		186	263	473	492	162	13	3.5	7.4
25		215	236	421	525	154		4.4	7.4
26		245	221	388	559	149		4.4	7.4
27		324	215	421	611	144	12	4.4	7.4
28		380	167	501	549	129		4.4	7.4
29			192	601	492	122		4.4	7.4
30	71		209	628	469	113		4.4	7.4
31	90		230		554		11	5.0	

NOTE.—Discharge estimated for periods indicated by braces.

Monthly discharge of Deep Creek at Adel, Oreg., for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
February	611	90	240	13,300
March	1,160	167	519	31,900
April	628	285	446	26,500
May	754	469	579	35,600
June	520	113	300	17,900
July	107	11	34.4	2,120
August	11	2.9	4.97	306
September	7.4	4.4	5.73	341
The period				128,000

HONEY CREEK NEAR PLUSH, OREG.

LOCATION.—In SW. ¼ sec. 20, T. 36 S., R. 24 E., half a mile above mouth of canyon, 1½ miles northwest of Plush, Lake County, and 1 mile above wagon bridge near Plush; below all tributaries.

DRAINAGE AREA.—156 square miles (measured on maps prepared by U. S. Bureau of Reclamation).

RECORDS AVAILABLE.—May 13, 1909, to September 30, 1914; March 1 to May 16, 1915, and March 15 to August 31, 1921.

GAGE.—Water-stage recorder on left bank, installed April 7, 1921. Staff gage used March 15 to April 6, 1921.

DISCHARGE MEASUREMENTS.—Made by wading near gage.

CHANNEL AND CONTROL.—Gravel and boulders; shift in extreme floods.

EXTREMES OF DISCHARGE.—Maximum stage recorded during period, 4.65 feet May 22 (discharge, 288 second-feet); minimum stage, 0.25 foot August 28 (discharge, 0.5 second-foot).

ICE.—None during period of records.

DIVERSIONS.—A few hundred acres are irrigated in the basin above gage; large area irrigated in valley below.

REGULATION.—None.

ACCURACY.—Stage-discharge relation affected by leaves collecting on control in September. Rating curve well defined below 200 second-feet. Staff gage read to hundredths twice a day March 15 to April 6; water-stage recorder operated thereafter giving fair record. Daily discharge ascertained by applying to rating table mean daily gage height obtained from staff readings, by inspecting recorder graph, or by method of shifting control. Records good.

Discharge measurements of Honey Creek near Plush, Oreg., during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
Mar. 22	J. W. Bones	2.75	73	June 27	A. C. F. Perry [a]	1.90	17.6
Apr. 5	A. C. F. Perry [a]	2.96	91	July 11	do	1.29	4.9
30	do	3.40	138	Aug. 1	Lee McAllister [a]	.40	.8

[a] Assistant to State engineer of Oregon.

Daily discharge, in second-feet, of Honey Creek near Plush, Oreg., for the year ending September 30, 1921

Day	Mar.	Apr.	May	June	July	Aug.
1		76	139	101	12	0.8
2		96	134	91	9.8	
3		106	128	86	9.8	
4		81	117	122	9.6	
5		86	122	101	8.6	
6		91	134	81	7.9	
7		81		76	7.1	.8
8		86	142	76	6.2	
9		101		72	5.5	
10		112	150	67	5.2	
11		117	122	63	5.2	
12		128	128	56	5.2	.7
13		112	144	52	5.1	.7
14		101		48	5.1	.6
15	56	91		48	5.0	.7
16	59	86	142	52	5.0	.7
17	67	86		48	4.1	.8
18	63	86		42	3.3	1.4
19	128	86	139	45	2.4	1.4
20	56	81	122	42	2.4	1.6
21	76	81	205	39	2.8	1.7
22	67	106	288	27	2.3	1.2
23	52	117	139	25	1.7	.9
24	52	106	150	19	1.5	.7
25	52	101	122	20	1.2	.6
26	48	96	117	19	1.1	.6
27	45	96	117	17		.5
28	42	112	117	16		.5
29	48	134	112	13	1.0	
30	59	139	96	14		.5
31	67		128			

NOTE.—Discharge interpolated for periods when no gage-heights were observed, as indicated by braces.

Monthly discharge of Honey Creek near Plush, Oreg., for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
March 15-31	128	42	61.0	2,060
April	139	76	96.3	5,910
May	288	96	139	8,550
June	122	13	52.6	3,130
July	12		4.52	278
August	1.7		.826	51
September			a.5	30
The period				20,000

a Estimated.

ABERT LAKE BASIN

CHEWAUCAN RIVER NEAR PAISLEY, OREG.

LOCATION.—In NW. ¼ sec. 34, T. 33 S., R. 18 E., 500 feet above diversion dam of Withers power plant, one-fourth mile above mouth of Mill Creek, and 2½ miles upstream from Paisley, Lake County.

DRAINAGE AREA.—263 square miles (measured on map of Fremont National Forest).

RECORDS AVAILABLE.—November 6, 1912, to September 30, 1921, at gages above Mill Creek. Records at stations giving practically same yearly run-off are available January 4, 1905, to December 31, 1907, and January 18, 1909, to July 13, 1912. Station discontinued September 30, 1921.

GAGE.—Lietz water-stage recorder on left bank, belonging to Chewacan Land & Cattle Co., established March 26, 1919. Gage one-fourth mile below used until July 18, 1918; from July 19, 1918, to March 25, 1919, gage 100 yards below was used. Gages inspected by W. A. Banister.

DISCHARGE MEASUREMENTS.—Made from cable 20 feet below site of recorder used 1914 to 1918—discharge of power canal added—or by wading; fairly good section.

CHANNEL AND CONTROL.—Control of present gage is composed of rock and boulders; for gage used prior to March 26, 1919, it was diversion dam of power canal, practically permanent during period of record. Channel of gravel and boulders. Control for former gage was just above Mill Creek; is composed of boulders, and shifts slightly during floods.

EXTREMES OF DISCHARGE.—Maximum stage during year probably occurred during May when no record was obtained (maximum discharge estimated by comparison with record for station at Narrows, about 1,200 second-feet); minimum stage from recorder, 0.16 foot at noon September 9 (discharge, 19 second-feet).

1905–1907; 1909–1921: Maximum stage recorded 9.40 feet on old gage half a mile above Paisley at 5 p. m. November 23, 1909 (discharge estimated from extension of rating curve, 4,000 second-feet); minimum stage from water-stage recorder, 0.44 foot November 11, 1916 (discharge, 9.6 second-feet).

ICE.—Stage-discharge relation seriously affected by ice.

DIVERSIONS.—About 160 acres are shown as irrigated above station on surveys made by State engineer.

REGULATION.—None.

ACCURACY.—Stage-discharge relation changed during high water and ice jam January 1; also affected by ice. Rating curve used October 1 to January 1, fairly well defined; curve used January 2 to September 30, well defined between 40 and 800 second-feet. Operation of water-stage recorder satisfactory except October 3–6, 9–12, October 15 to November 13, November 18–20, 25–27, December 2–4, January 5–15, February 17–25, March 14–15, 21–22, May 8–31, July 24–31, August 16–25, and September 25–30. Daily discharge ascertained by applying to rating table mean daily gage height determined by inspecting gage-height graph. Records fair.

COOPERATION.—Most of field data furnished by Chewacan Land & Cattle Co.

Discharge measurements of Chewaucan River near Paisley, Oreg., during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
Nov. 29	Bert Harber [a]	0.50	49.1	Apr. 28	Bert Harber	2.00	481
Jan. 28	do	.56	69	June 6	do	2.25	658
Feb. 27	do	.90	121	18	J. W. Bones	1.38	256
Mar. 8	J. W. Bones	1.58	325	July 15	Bert Harber	.48	58
26	do	1.08	176	Aug. 24	Wendell Dawson	.29	30.9
29	Bert Harber	1.20	204	31	Bert Harber	.25	25.0

[a] Employee of Chewacan Land & Cattle Co.

Daily discharge, in second-feet, of Chewaucan River near Paisley, Oreg., for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	24		30		60	233	280	667	639	142	43	20
2	26				64	333	315	639	639	137	41	21
3			25	300	63	414	393	584	723	121	40	24
4					64	436	372	532	723	103	40	30
5	35		24		64	483	352	532	667	95	34	33
6			36		74	459	333	532	584	92	38	36
7	50	40	53		71	414	315	558	507	94	41	36
8	41		61		92	372	315	-------	483	88	41	37
9			55		118	372	315	-------	483	90	40	41
10			53		264	333	352	-------	483	92	36	41
	40			85								
11					315	280	393	-------	507	94	36	35
12					333	280	372	-------	436	92	32	32
13	30				352	315	393	-------	315	76	32	35
14	28	40			414	315	352	-------	280	55	32	36
15		32			233	315	315	-------	264	53	32	34
16		53		88	162	315	352	-------	297	53		34
17		218		95		333	352	-------	280	55		34
18				142		333	352	-------	264	58		32
19		350		118		280	333	-------	248	58		34
20			60	79		264	333	-------	248	60		43
21		97		67	115	250	352	-------	264	62	30	43
22		79		86		234	414	-------	190	59		50
23		39		92		218	483	-------	162	55		64
24	45	43		107		218	436	-------	142			64
25				99		204	414	-------	142			
		67										
26				94	176	190	372	-------	139			
27				78	176	176	414	-------	144	50	30	50
28		45		71	204	176	483	-------	149		30	
29		65	176	60	-------	204	611	-------	149		29	
30		43	410	58	-------	218	611	-------	139		25	
31		-------		59	-------	233	-------	-------	-------	-------	27	-------

NOTE.—Stage-discharge relation affected by ice Dec. 11 to Jan. 15; discharge estimated from observer's notes and studies of precipitation and temperature. For braced periods at other times, no gage-height record available, discharge estimated largely from hydrographic comparisons with Chewaucan River at N arrows.

Monthly discharge of Chewaucan River near Paisley, Oreg., for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October			40.8	2,510
November			84.2	5,010
December			78.8	4,850
January			121	7,440
February	414	60	155	8,610
March	459	176	297	18,300
April	611	315	383	22,800
May			[a] 700	[a] 43,000
June	723	139	356	21,200
July	142		73.7	4,530
August	43	25	33.2	2,040
September	64	20	39.5	2,350
The year			197	143,000

[a] Estimated from record for Chewaucan River at Narrows.

CHEWAUCAN RIVER AT NARROWS, NEAR PAISLEY, OREG.

LOCATION.—In NE. ¼ sec. 24, T. 34 S., R. 19 E., at constriction in Chewaucan Marsh known as "The Narrows," one-eighth mile below lower end of outside canal, and 15 miles, by road around north and east sides of marsh, southeast of Paisley, Lake County. Moss Creek enters upper marsh but seldom contributes any water to river.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—January 18, 1914, to September 30, 1921, station discontinued.

GAGE.—Vertical staff on left bank just below wagon bridge, installed October 22, 1916; read by John Hamilton.

DISCHARGE MEASUREMENTS.—Made from wooden wagon bridge or by wading.

CHANNEL AND CONTROL.—Dredged canal fairly permanent, but stage-discharge relation affected by backwater from dam during part of year.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 4.65 feet May 21 (discharge, estimated from extension of rating curve, 832 second-feet); minimum stage, 0.40 foot August 26–29 (discharge, 7 second-feet).

1914–1921: Maximum discharge recorded, that of May 21, 1921; channel dry September 8–10, 1915.

ICE.—Stage-discharge relation seriously affected by ice.

DIVERSIONS.—About 6,200 acres of uplands and 14,300 acres of marsh hay land are irrigated between gage above Pailsey and this station.

REGULATION.—Discharge varies considerably owing to manipulation of dams and ditches used for irrigating marsh and border lands.

ACCURACY.—Stage-discharge relation changed February 28; affected by ice during part of winter and by moss August 4 to September 28. Rating curve, poorly defined by four discharge measurements, used October 1 to February 28; curve fairly well defined by eight discharge measurements, used March 21 to September 30. Staff gage read to half-tenths once daily. Daily discharge determined by applying daily gage height to rating table; shifting-control method used August 4 to September 25. Records fair.

COOPERATION.—Part of measurements and gage readings furnished by Chewacan Land & Cattle Co.

Discharge measurements of Chewaucan River at Narrows, near Paisley, Oreg., during the period October 1, 1920, to October 21, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
1920		*Feet*	*Sec.-ft.*	1921		*Feet*	*Sec.-ft.*
Oct. 30	Bert Harber [a]	[b] 0.95	29.9	Mar. 30	Bert Harber	2.98	194
Nov. 30	do	1.75	117	Apr. 30	do	2.45	102
1921				June 19	J. W. Bones	2.97	218
				July 15	Bert Harber	1.30	44.5
Feb. 28	do	[c] 2.05	136	Aug. 24	W. Dawson	.60	7.7
Mar. 8	J. W. Bones	3.20	267	Oct. 3	Bert Harber	.65	18.8
26	do	2.79	145	21	K. N. Phillips	.76	24.8

[a] Employee of Chewacan Land & Cattle Co.
[b] Stage-discharge relation affected by moss.
[c] Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Chewaucan River at Narrows, near Paisley, Oreg., for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June	July	Aug.	Sept.
1	13	26	91			160	70	112	492	70	25	11
2	13	22	74			220	70	122	512	62	25	11
3	13		63	270		250	70	164	452	62	24	
4	13		58			412	72	190	492	67	23	
5	13	26	53		70	412	77	190	452	72	23	12
6	13		53			392	218	233	412	72	22	
7	16		48			392	282	334	353	67	22	14
8	13	30				316	265	334	334	64	20	14
9	19	34				265	265	334	298	62	20	14
10	23	43			97	233	249	298	334	57	18	14
11	23	38	45		131	233	265	298	298	53	15	14
12	26	43			167	218	412	316	265	49	14	15
13	23	53			222	218	472	316	249	47	18	15
14	23	53			213	218	492	316	249	45	17	20
15	26	43			247	233	412	452	233	45	17	19
16	19	43	58			282	353	572	218	41	18	19
17	23	53	74			334	316	672	203	37	18	19
18	23	160	74		150	372	298	732	190	35	16	19
19	26	281	74	90		472	249	792	190	37	14	21
20	26	290				372	190	812	177	35	14	25
21	30	182			74	233	134	832	177	35	14	27
22	30	131			68	233	117	812	177	33	13	24
23	43	110			53	265	117	772	164	33	10	24
24	48	85	55			249	103	732	134	33	8	23
25	48	97			100	265	89	672	112	33	8	21
26	48	85				233	92	652	100	31	7	22
27	43	97				164	103	612	89	29	7	20
28	43	104	63		136	152	103	572	83	29	7	20
29	34	63	74		-------	143	103	552	72	27	7	20
30	30	97	80		-------	152	103	532	72	25	9	19
31	30	-------	150		-------	70	-------	512	-------	25	11	-------

Discharge estimated because of ice effect Dec. 8–15, 20–27, Jan. 6–31, Feb. 1–9, 16–20, and 24–28, on basis of weather records, one current-meter measurement, and comparison with records for other stations. Discharge, Nov. 3–7, Dec. 31 to Jan. 5, July 4, 8, and Sept. 3–6, when gage was not read, estimated by comparison with records for other stations.

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Monthly discharge, of Chewaucan River at Narrows, near Paisley, Oreg., for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	48	13	26.3	1,620
November	290	22	79.8	4,750
December	91	----------	60.9	3,740
January	----------	----------	119	7,300
February	247	----------	114	6,330
March	472	70	263	16,200
April	492	70	205	12,200
May	832	112	479	29,500
June	512	72	253	15,100
July	72	25	45.5	2,800
August	25	7	15.6	960
September	27	11	17.7	1,050
The year	832	7	140	102,000

CHEWAUCAN RIVER AT HOTCHKISS FORD, NEAR PAISLEY, OREG.

LOCATION.—At former river crossing known as Hotchkiss Ford, near line between secs. 11 and 12, T. 35 S., R. 20 E., below Chewaucan Marsh, above Crooked Creek, and 20 miles southeast of Paisley, Lake County. Willow Creek enters the lower marsh but contributes water to it only when flood in the early spring causes it to overflow its banks.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—January 18, 1914, to September 30, 1921, when station was discontinued.

GAGE.—Vertical staff on left bank; new gage set 150 feet upstream from old and at different datum on December 27, 1918. Gage reader, John Hamilton.

DISCHARGE MEASUREMENTS.—Made by wading at medium and low stages; at high water from plank projecting from wagon drawn across river by horse on shore or from boat.

CHANNEL AND CONTROL.—Dredged canal apparently fairly permanent, but stage-discharge relation formerly affected by backwater from dredge operating below gage and growth of aquatic plants.

EXTREMES OF DISCHARGE.—Maximum stage during year occurred between May 20 and 29 when water went over top of gage which is at 6 feet (discharge exceeded 515 second-feet); minimum stage recorded, 0.65 foot August 29 (discharge, 6 second-feet).

1914-1921: Maximum discharge recorded that of 1921; stream bed practically dry September 7–17, 1915, and August 2–6, 1918.

ICE.—Stage-discharge relation affected by ice.

DIVERSIONS.—About 7,800 acres of marsh hay land are irrigated between stations at Narrows and Hotchkiss Ford. A total of 28,300 acres is watered from river above station.

REGULATION.—Discharge may vary during irrigating season owing to manipulation of dams and ditches for irrigating the marsh.

COOPERATION.—Part of field data furnished by Chewacan Land & Cattle Co.

Comp utations of discharge withheld on account of insufficient data.

Discharge measurements of Chewaucan River at Hotchkiss Ford, near Paisley, Oreg., during the period October 1, 1920, to October 21, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
1920		*Feet*	*Sec.-ft.*	1921		*Feet*	*Sec.-ft.*
Oct. 31	Bert Harber [a]	1.40	26.2	July 15	Bert Harber	1.55	41
Nov. 30	do	1.95	70	Aug. 24	Wendell Dawson	.78	8.8
1921				Aug. 31	Bert Harber	.80	10.4
Apr. 30	do	2.15	56	Oct. 3	do	1.05	18.8
June 7	do	5.70	480	21	K. N. Phillips	1.16	21.7

[a] Employee of Chewacan Land & Cattle Co.

Daily gage height, in feet, of Chewaucan River at Hotchkiss Ford, near Paisley, Oreg., for the year ending September 30, 1921

Day	Oct.	Nov	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1.0	1.35	2.25	4.35	2.35	1.75	4.1	2.1	5.9	2.85	1.0	0.8
2	1.0	1.3	2.2	4.5	2.2	1.8	4.15	1.95	5.95	2.65	1.0	.8
3	1.0	------	1.85	4.6	2.1	1.55	4.05	2.65	5.9	2.5	.95	------
4	1.0	------	1.8	4.45	2.15	3.05	4.0	2.8	5.95	------	.95	------
5	1.0	------	1.90	------	2.1	3.7	3.55	2.9	5.9	2.3	.95	------
6	1.0	------	1.75	4.0	2.0	4.05	3.2	3.05	5.85	2.75	.95	------
7	1.05	------	1.3	4.1	1.95	4.2	3.05	3.25	5.8	2.55	.9	.9
8	1.0	1.25	1.9	3.75	1.9	3.9	3.0	3.2	5.65	------	.9	.9
9	1.05	1.15	1.85	2.8	2.0	3.6	3.25	3.15	5.45	2.25	.9	.9
10	1.25	1.25	1.9	1.65	2.0	3.15	3.3	3.15	4.95	2.1	.85	.9
11	1.2	1.25	------	1.5	2.6	2.9	3.35	3.2	4.7	1.85	.8	.95
12	1.25	1.4	1.8	1.55	3.4	2.4	4.6	3.25	4.5	1.8	.8	.95
13	1.25	1.65	1.7	1.65	4.15	2.65	4.8	3.35	4.2	1.7	.9	.95
14	1.25	1.7	2.0	1.8	4.05	2.8	4.85	3.5	3.85	1.6	.9	.95
15	1.3	1.6	1.8	1.9	3.5	2.95	4.45	3.7	3.55	1.5	.9	1.0
16	1.25	1.55	1.5	2.0	3.15	3.15	4.2	4.2	3.4	1.4	.9	1.1
17	1.25	1.6	1.7	2.05	3.05	3.3	4.1	4.95	3.3	1.3	.9	1.2
18	1.25	2.2	2.1	2.15	2.9	3.4	4.05	5.3	3.2	1.25	.85	1.2
19	1.35	3.3	2.0	2.4	------	4.3	3.85	6.0	3.25	1.25	.85	1.3
20	1.4	5.0	2.0	2.35	2.6	3.85	3.75	------	3.25	1.2	.85	1.35
21	1.45	4.0	1.95	2.2	2.2	2.9	3.6	------	3.25	1.2	.9	1.6
22	1.4	3.3	1.95	2.1	2.15	3.05	3.3	------	3.25	1.15	.9	1.5
23	1.4	3.05	1.8	------	2.3	3.3	3.05	------	5.45	1.15	.85	1.4
24	1.75	2.4	1.75	2.15	2.55	2.75	2.8	------	5.4	1.15	.8	1.25
25	1.65	2.2	------	2.2	1.4	3.45	2.65	------	4.95	1.15	.8	1.15
26	1.6	2.3	1.8	2.35	1.4	3.2	2.35	------	4.7	1.1	.75	1.1
27	1.6	2.6	1.8	2.35	1.65	2.1	2.3	------	4.5	1.1	.7	1.0
28	1.6	2.65	1.9	2.3	2.2	2.1	2.35	------	4.05	1.1	.7	1.0
29	1.5	2.0	1.95	2.25	------	2.2	2.25	------	3.5	1.0	.65	1.0
30	------	1.95	2.0	2.3	------	2.4	2.15	6.0	3.0	1.0	.7	1.9
31	1.45	------	------	2.2	------	4.0	------	5.95	------	1.0	.8	------

NOTE.—Stage was over 6 feet May 20–29. Stage-discharge relation probably affected by ice at times from Nov. 10 to Feb. 10

SMALLS CREEK AT PAISLEY, OREG.

LOCATION.—In SW. ¼ sec. 24, T. 33 S., R. 18 E., in western part of Paisley, Lake County, just above road bridge, 200 yards below the point of diversion from Chewaucan River, and same distance above head gate of Bagley ditch.

RECORDS AVAILABLE.—January 18, 1914, to September 30, 1921, when station was discontinued.

GAGE.—Vertical staff on left bank; read by W. A. Banister.

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

CHANNEL AND CONTROL.—Channel straight and narrow, with well-defined banks. Bed composed of gravel; somewhat shifting.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 1.9 feet May 16 (discharge, 73 second-feet); no flow October 22–30.

1914–1921: Maximum stage recorded, 2.2 feet May 15, 1914 (discharge 107 second-feet); no flow November 27, 1918, and October 22–30, 1920.

ICE.—Stage-discharge relation affected by ice during severe winters.

ACCURACY.—Stage-discharge relation somewhat unstable. Two fairly well defined rating curves used applicable October 1 to January 21 and January 22 to September 30, except June 23 to August 31, when indirect shifting-control method has been used on account of growth of aquatic plants. Gage read to half-tenths once a day. Daily discharge obtained by applying daily gage reading to rating table. Records fair.

COOPERATION.—Part of field data furnished by Chewacan Land & Cattle Co.

Smalls Creek is a natural slough or defluent of Chewaucan River and has been converted into an irrigation canal. It diverts water from the river in SW. ¼ sec. 24, T. 33 S., R. 18 E., and irrigates 2,417 acres of the alluvial fan of Chewaucan River above the upper marsh, including 1,209 acres watered from Bagley ditch, which diverts water from Smalls Creek a short distance from the river. The irrigation season extends from about April 1 to September 15. Water is diverted at other times for watering stock. Surplus and return waters find their way to the marsh.

Discharge measurements of Smalls Creek at Paisley, Oreg., during the period October 1, 1920, to October 31, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
1920		*Feet*	*Sec.-ft.*	1921		*Feet*	*Sec.-ft.*
Nov. 29	Bert Harber[a]	0.60	2.0	June 6	Bert Harber	1.60	40.7
1921				19	J. W. Bones	1.64	53
Feb. 27	do	.80	8.6	July 15	Bert Harber	1.15	21.2
Mar. 7	J. W. Bones	.88	11.8	Aug. 24	Wendell Dawson	.80	6.5
29	Bert Harber	.60	3.2	31	Bert Harber	.60	2.8
Apr. 28	do	1.30	35	Oct. 2	do	.90	15.6
				21	K. N. Phillips	.79	6.3

[a] Employee of Chewacan Land & Cattle Co.

Daily discharge, in second-feet, of Smalls Creek at Paisley, Oreg., for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	3.8	3.0	2.1	0.8	0.4	3.2	3.2	49	49	34	5.5	7.0
2	3.8	2.1	2.1	.8	.5	3.2	3.2	52	52	26	4.4	7.0
3	2.1	3.0	1.5	.8	.8	3.2	3.2	56	56	26	5.5	5.5
4	3.8	2.1	.9	.8	.8	7.0	3.2	56	56	26	2.5	5.5
5	5.2	.3	.8	.8	.5	7.0	3.2	59	52	26	1.8	5.5
6	5.2	.1	.8	.8	.4	13	2.5	62	52	23	1.8	5.5
7	6.6	2.1	.8	.9	.4	13	1.8	62	52	23	1.8	5.5
8	8.8	1.5	.8	.9	.4	13	1.8	59	52	23	3.2	4.4
9	8.8	3.0	.8	.9	.4	5.5	2.5	59	49	20	5.5	4.4
10	8.8	3.0	.8	.9	1.0	1.8	4.4	62	46	20	7.0	4.4
11	8.8	2.1	.6	.9	1.4	1.8	7.0	59	59	20	7.0	4.4
12	8.8	3.8	.6	.9	.8	2.5	8.5	59	62	20	4.4	5.5
13	8.8	5.2	.6	.6	1.0	3.2	10	62	59	23	2.5	5.5
14	6.6	6.6	.4	.6	1.0	3.2	7.0	70	59	23	2.5	5.5
15	3.8	6.6	.4	.4	.8	2.5	18	70	52	23	1.4	5.5
16	3.0	6.6	.6	.4	.5	1.8	18	73	49	20	1.4	
17	3.8	6.6	.6	.4	.5	4.4	20	70	52	23	1.4	
18	3.8	11	.6	.4	.5	7.0	18	46	56	23	1.8	
19	15	15	.8	.4	7.0	7.0	18	10	56	20	1.4	
20	5.2	2.1	.8	.4	3.2	4.4	18	10	52	20	1.4	
21	5.2	2.1	.8	.4	1.8	3.2	28	10	52	20	7.0	
22	0	1.5	.8	.3	4.4	2.5	28	8.5	52	20	7.0	
23	0	3.0	.6	.5	3.2	1.8	31	28	49	16	7.0	7
24	0	3.8	.8	.5	3.2	1.8	31	26	46	13	5.5	
25	0	3.0	.8	.5	4.4	1.4	28	28	43	8.5	7.0	
26	0	5.2	.8	.5	4.4	3.2	34	31	43	13	2.5	
27	0	6.6	.8	.4	4.4	3.2	34	31	43	13	2.5	
28	0	5.2	.8	.4	4.4	3.2	34	31	40	13	2.5	
29	0	2.1	.8	.4	-------	4.4	40	59	40	11	2.5	
30	0	2.1	.8	.4	-------	4.4	46	66	37	8.5	2.5	
31	3.6	-------	.8	.4	-------	4.4	-------	52	-------	5.5	7.0	-------

NOTE.—Discharge estimated Sept. 16–30.

Monthly discharge of Smalls Creek near Paisley, Oreg., for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	15	0	4.28	263
November	15	.1	4.01	239
December	2.1	.4	.84	52
January	.9	.4	.60	37
February	7.0	.4	1.88	104
March	13	1.4	4.55	280
April	46	1.8	16.8	1,000
May	73	8.5	47.6	2,930
June	62	37	50.6	3,010
July	34	5.5	19.5	1,200
August	7.0	1.4	3.78	232
September	-------	4.4	6.2	369
The year	73	0	13.4	9,720

JONES-INNIS-ZX DITCH NEAR PAISLEY, OREG.

LOCATION.—In NW. ¼ sec. 19, T. 33 S., R. 19 E., 100 yards below intake and 1 mile east of Paisley, Lake County.

RECORDS AVAILABLE.—July 20, 1914, to July 8, 1921; station discontinued.

GAGE.—Vertical staff. Gage reader, W. A. Banister.

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

CHANNEL AND CONTROL.—Channel excavated in gravel and firm soil; control fairly permanent. Stage-discharge relation affected at times by growth of aquatic plants or changes in gages.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 111 second-feet May 16.

1914-1921: Maximum stage recorded, 3.25 feet June 10, 1917 (discharge, 193 second-feet); canal dry at times.

ICE.—Stage-discharge relation probably affected by ice during winter, discharge not computed.

ACCURACY.—Stage-discharge relation unstable. Two fairly well defined rating curves used April 1 to May 12 and June 5 to July 31; shifting-control method used May 13 to June 4. Gage read to half-tenths once a day. Daily discharge obtained by applying daily gage reading to rating table. Records good from April 1 to July 8. Data insufficient for determination of discharge for remainder of year, but flow was small.

COOPERATION.—Most of field data furnished by Chewacan Land & Cattle Co.

Jones-Innis-ZX ditch (so-called from the largest water users under it, ZX being the common name of the Chewacan Land & Cattle Co.'s ranch) diverts water from Chewaucan River in NW. ¼ sec. 19, T. 33 S., R. 19 E., in natural sloughs, from which is irrigated an area of 2,218 acres of the lowest part of the alluvial fan of Chewaucan River immediately above the upper marsh.

One of these (Paisley Slough) at its lower end discharges into the "Stock ditch," which is used for irrigation and watering cattle. The irrigating season extends from early in April to about July 1. Water is diverted practically the entire year for either irrigation or stock.

Discharge measurements of Jones-Innis-ZX ditch near Paisley, Oreg., during 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft*
Mar. 9	J. W. Bones	0.76	2.7	June 19	J. W. Bones	2.30	50
Apr. 28	Bert Harber [a]	2.40	73	Oct. 21	K. N. Phillips	.33	0
June 6	do	2.90	81				

[a] Employee of Chewacan Land & Cattle Co.

Daily discharge, in second-feet, of Jones-Innis-ZX ditch near Paisley, Oreg., for the year ending September 30, 1921

Day	Apr.	May	June	July	Day	Apr.	May	June	July
1	2.8	76	93	48	16	6.5	111	75	
2	2.8	79	93	40	17	7.5	107	87	
3	2.8	79	96	40	18	7.5	70	7.5	
4	4.8	82	93	38	19	73	79	45	
5	4.8	90	81	36	20	73	82	78	
6	4.1	90	81	36	21	79	82	72	
7	4.1	86	81	36	22	82	82	70	
8	3.4	90	78	36	23	86	82	70	
9	4.1	93	75		24	86	86	65	
10	4.1	96	70		25	32	104	60	
11	4.8	96	78		26	86	107	58	
12	6.5	96	78		27	73	93	58	
13	6.5	100	78		28	73	96	55	
14	4.8	100	81		39	73	86	55	
15	6.5	107	78		30	73	90	52	
					31		93		

Monthly discharge of Jones-Innis-ZX ditch near Paisley, Oreg., for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
April	86	2.8	34.2	2,040
May	111	70	90.6	5,570
June	96	7.5	71.4	4,250
July 1–8	48	36	38.8	616
The period				12,500

SILVER LAKE BASIN

SILVER CREEK NEAR SILVER LAKE, OREG.

LOCATION.—In SW. ¼ sec. 28, T. 28 S., R. 14 E., near diversion point of proposed project of Silver Lake Irrigation District, 1½ miles southwest of Silver Lake post office, Lake County, and 3 miles above mouth of Bridge Creek.

DRAINAGE AREA.—221 square miles.

RECORDS AVAILABLE.—December 29, 1904, to March 31, 1907; January 11, 1909, to September 30, 1921.

GAGE.—Stevens continuous water-stage recorder referred to inclined staff on right bank since March 5, 1921. Gage reader, J. H. Gowdy.

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

CHANNEL AND CONTROL.—Composed of rocks and gravel; fairly permanent.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder 4.20 feet at 10 p. m. April 11 (discharge, 423 second-feet); minimum discharge, 1.1 second-feet October 26-27 and November 1-2.

1905–1907; 1909–1921: Maximum stage recorded, 6.40 feet at 4 p. m. November 23, 1909 (discharge, 910 second-feet); minimum discharge, 0.3 second-foot August 30, September 2 and 6, 1918.

ICE.—Stage-discharge relation somewhat affected by ice, practically no gage-height record during period of ice effect.

DIVERSIONS.—A few small tracts irrigated above station, chiefly in Thompson Valley.

REGULATION.—Some water stored in a small reservoir in Thompson Valley.

ACCURACY.—Stage-discharge relation affected by beaver dam built during October and removed between November 4 and February 8, changed also about May 1. Fairly well defined rating curves applicable October 1-3, February 8 to April 23, and May 7 to September 30; shifting-control method used October 26 to November 4 and April 24 to May 1. Operation of water-stage recorder satisfactory after March 5, 1921, except for a few short gaps. Gage read once a week in February. Daily discharge ascertained by applying to rating table mean daily gage height obtained by inspecting recorder graph or daily gage reading. Records good except for estimated period for which they are fair.

Discharge measurements of Silver Creek near Silver Lake, Oreg., during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
Nov. 1	Dawson ond Briggs	0.56	1.1	May 2	Wendell Dawson	2.86	162
Mar. 5	J. W. Bones	3.08	212	15	do	2.70	152
28	do	1.66	78	June 13	J. W. Bones	1.10	24
Apr. 8	Wendell Dawson	2.00	100	25	do	.97	21.6
19	do	2.27	118	Aug. 22	Wendell Dawsen	.46	2.9
23	do	3.25	231				

Daily discharge, in second-feet, of Silver Creek near Silver Lake, Oreg., for the year ending September 30, 1921

Day	Oct.	Nov.	De.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	2.6	1.1				50		196	70	13		3.5
2	2.4	1.1				100	130	163	67	13		3.5
3	2.9	1.3				150		143	64	13		3.8
4		2.5				200	147	133	67	12		3.8
5					6	235	128	124	56	12		3.8
6						259	114	143	53	12		4.0
7						235	78	143	50	11	5	3.8
8						199	93	143	47	10		3.8
9						167	170	143	41	8.1		3.8
10						167		143	38	8.4		3.8
11						137	247	143	35	8.1		3.8
12						128	295	143	34	7.8		4.0
13					147	167	259	143	32	7.2		4.2
14	2.6					167	228	143	30	6.9	5.0	4.5
15						128	187	143	30	6.0	5.8	4.8
16			10	8		167	137	143	30	5.8	5.6	4.8
17		10				199	147	169	28	5.8	5.0	4.2
18						247	137	207	28	5.6	5.0	4.2
19						187	128	185	28	5.0	4.8	4.8
20						137	137	163	26		4.5	4.2
21					38	119	137	163	25		4.2	
22						114	177	143	24		4.2	
23					38		223	124	28		4.0	3.5
24							163	139	25		4.0	3.2
25					38		143	97	23	5	4.0	3.0
26	1.1					91	124	93	20		4.0	2.8
27	1.1				38		124	85	20		4.0	2.2
28	1.3				50	68	153	76	18		4.0	2.0
29	1.6					89	196	89	16		3.8	2.0
30	2.2					101	196	81	14		3.8	1.8
31	2.2					114		64			3.5	

NOTE.—Discharge for following periods when no gage-height record is available, estimated from observer's notes, records of temperature and precipitation, and comparisons with records for other stations in the vicinity: Oct. 4–25, Nov. 5 to Feb. 7, Feb. 9–12, 14–20, 22–26, 28, Mar. 1–4, 23–27, Apr. 1–3, 9, 10, July 20 to Aug. 13, and Sept. 20–22.

Monthly discharge of Silver Creek near Silver Lake, Oreg., for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	----------	1.1	1.98	122
November	----------	1.1	8.87	528
December	----------	----------	10	615
January	----------	----------	8	492
February	147	----------	45.6	2,530
March	259	----------	145	8,920
April	295	78	161	9,580
May	207	64	135	8,300
June	70	14	35.6	2,120
July	13	----------	7.29	448
August	----------	3.5	4.68	288
September	*4.8	1.8	3.67	218
The year	295	1.1	47.0	34,200

WEST FORK OF SILVER CREEK NEAR SILVER LAKE, OREG.

LOCATION.—In sec. 8, T. 29 S., R. 14 E., half a mile above mouth of West Fork and 7 miles southwest of Silver Lake post office, Lake County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—March 21 to August 31, 1919; March 21 to July 31, 1920; and February 21 to September 30, 1921.

GAGE.—Stevens 8-day water-stage recorder on left bank; inspected by J. H. Gowdy.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—Stream bed gravel and small boulders, fairly permanent; banks covered with brush.

EXTREMES OF DISCHARGE.—Maximum stage during period from water-stage recorder, 2.24 feet at 6 p. m. April 11 (discharge, 138 second-feet); minimum discharge about 3 second-feet the last part of August.

1919–1921: Maximum discharge that of April 11, 1921; minimum stage from recorder, 0.37 foot July 27, 1920 (discharge, 1.1 second-feet).

ICE.—Stage-discharge relation affected by ice during severe winters.

DIVERSIONS.—None.

REGULATION.—None.

ACCURACY.—Stage-discharge relation unstable on account of accumulation of brush on control. Poorly defined rating curve used February 21 to April 10 and June 25 to August 7; shifting-control method used April 11 to June 16. Operation of recorder satisfactory, except for a few periods, when it was not attended regularly. Daily discharge ascertained by applying to rating table mean daily gage height obtained by inspecting recorder graph. Records fair.

Discharge measurements of West Fork of Silver Creek near Silver Lake, Oreg., during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
Mar. 27	J. W. Bones	0.72	10.7	May 8	Wendell Dawson	1.35	22.8
Apr. 8	Wendell Dawson	.84	16.8	June 14	J. W. Bones	.98	19.2
20	do	1.13	20.5	27	do	.72	12.0
23	do	1.30	24.8	Aug. 22	Wendell Dawson	.52	3.0

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Daily discharge, in second-feet, of West Fork of Silver Creek near Silver Lake, Oreg., for the year ending September 30, 1921

Day	Feb.	Mar.	Apr.	May	June	July	Aug.
1		16	18	36	35	11	4.7
2		33	24	35	32	9.3	
3		50	32	27	34		
4		44	23	21	33	9.0	
5		51	24	18	28		4.7
6		59	21	22		8.6	
7		52	18	21		8.4	4.7
8		42	19	21	34	7.5	
9		36	20	26		7.2	
10		34	29	31	37	7.2	
11		27	102	36	33	6.8	
12		25	60	42	30	6.5	
13		40	52	50	27		
14		35	42	60	24	6.8	
15		24	33		21		3.8
16		56	26		16	7.2	
17		54	23	58		7.2	
18		72	21			7.2	
19		36	19			6.5	
20		28	21			6.5	
21	7.9	24	19	56	15	6.5	
22	18	22	24	54		6.2	3.0
23	5.9	18	29	54		5.6	
24	9.3	21	21	58			
25	12	19	20	60	13		
26	12	14	16	60	13	5.3	3.0
27	12	12	16	59	13		
28	16	14	20	54	13		
29		14	29	47	13		
30		14	32	40	12		
31		16		36		5.0	

NOTE.—Mean discharge estimated for periods for which no gage-height record is available is indicated by braces.

Monthly discharge of West Fork of Silver Creek near Silver Lake, Oreg., for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
February 21-28	18	5.9	11.6	184
March	72	12	32.3	1,990
April	102	16	28.4	1,690
May		18	44.2	2,720
June		12	22.8	1,360
July	11		6.93	426
August	4.7		3.75	231
September			[a]2.8	167
The period				8,770

[a] Estimated.

BUCK CREEK NEAR SILVER LAKE, OREG.

LOCATION.—In sec. 22, T. 28 S., R. 13 E., at Deadmond ranch, 100 yards north of bridge on Klamath, Falls road and 7 miles west of town of Silver Lake, Lake County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—January 21, 1905, to July 19, 1906; January 20, 1909, to September 24, 1910; some fragmentary records in 1911; March 13, 1919, to August 20, 1920; March 1 to September 30, 1921.

GAGE.—Vertical staff on left bank, directly back of Deadmond house. Gage reader, B. J. Deadmond. Inclined staff in sec. 17, T. 28 S., R. 14 E., about 4 miles downstream, used 1905 to 1910.

DISCHARGE MEASUREMENTS.—Made by wading near gage and from head gate about 1 mile above gage.

CHANNEL AND CONTROL.—Stream bed narrow and crooked. Banks overgrown with willows, and subject to overflow at a stage of 4 feet. Control not well defined.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 4.6 feet at 10 a. m. June 7 (discharge, 164 second-feet); minimum stage, 0.83 foot September 26 (discharge, 5.2 second-feet).

1905–6; 1909–10; 1919–1921: Maximum stage recorded, 10.0 feet on old gage, February 24, 1910, at 8 p. m. (discharge estimated from extension of rating curve, 409 second-feet); minimum discharge, 2.5 second-feet, December 11 and 12, 1906. The flood of February, 1907, reached a stage of 6.6 feet on present gage, according to observer (discharge from extension of rating curve, 450 second-feet).

ICE.—No record during frozen period.

DIVERSIONS.—Three small ranches are irrigated from the creek above the station. Deadmond ditch also diverts around gage. It has been measured and an estimate made of quantity of water diverted.

REGULATION.—None.

ACCURACY.—Stage-discharge relation somewhat unstable. Fairly well defined rating curve used April 4 to August 31; shifting-control method used March 1 to April 3 and September 1–30. Gage read to half-tenths twice a day. Daily discharge obtained by applying mean daily gage height to rating table. Records fair.

Discharge measurements of Buck Creek near Silver Lake, Oreg., during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
Nov. 1	Wendell Dawson	0.74	3.0	May 15	Wendell Dawson	3.04	68
Mar. 6	J. W. Bones	1.58	24.8	June 14	J. W. Bones	4.08	113
27	do	.90	9.7	25	do	3.33	65
Apr. 8	Wendell Dawson	1.12	11.2	Aug. 22	Wendell Dawson	.90	7.4
20	do	1.27	12.5				

Daily discharge, in second-feet, of Buck Creek near Silver Lake, Oreg., for the year ending September 30, 1921

Day	Mar.	Apr.	May	June	July	Aug.	Sept.
1	17	15	18	101	54	11	6.0
2	18	15	18	107	51	11	6.0
3	17	18	18	114	48	13	6.0
4	18	16	17	122	45	13	6.0
5	19	18	19	132	39	12	6.0
6	24	15	19	142	36	11	6.0
7	22	13	18	152	36	11	6.0
8	21	12	19	142	36	11	6.0
9	21	13	21	132	33	11	6.0
10	19	15	25	122	33	11	6.0
11	19	23	27	114	30	12	6.0
12	21	20	34	114	27	11	6.0
13	20	21	42	122	25	11	6.0
14	20	21	57	114	23	11	6.0
15	18	19	60	95	23	11	6.0
16	18	19	66	84	20	10	6.0
17	23	17	74	66	21	9.0	6.0
18	26	17	66	66	19	9.0	6.0
19	24	16	54	66	19	8.7	6.0
20	22	15	54	66	18	8.2	6.7
21	20	15	60	66	18	8.2	6.7
22	18	15	60	66	18	7.7	6.7
23	18	18	66	74	17	7.4	6.7
24	17	17	74	79	17	7.4	6.0
25	17	15	84	74	17	7.4	5.4
26	16	15	114	66	15	7.4	5.4
27	12	13	122	66	15	7.4	5.4
28	15	15	114	66	13	7.4	5.4
29	13	15	101	63	13	7.4	5.4
30	15	18	89	60	12	6.7	5.8
31	16	------	84	------	11	6.7	------

Monthly discharge of Buck Creek near Silver Lake, Oreg., for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet		
	Maximum	Minimum	Mean	Creek	Ditch[a]	Total
March	26	12	18.8	1,160	0	1,160
April	23	12	16.4	976	80	1,060
May	122	17	54.6	3,360	100	3,460
June	152	60	95.1	5,660	100	5,760
July	54	11	25.9	1,590	150	1,740
August	13	6.7	9.58	589	50	639
September	6.7	5.4	5.99	356	0	356
The period				13,700	480	14,200

[a] Total.

MALHEUR AND HARNEY LAKES BASIN

MUD LAKE OUTLET NEAR NARROWS, OREG.

LOCATION.—In the NW. ¼ sec. 17, T. 27 S., R. 30 E., half a mile from gap in sand reef through which outlet enters Harney Lake, 3 or 4 miles southwest of Mud Lake, and 6 miles southwest of The Narrows, Harney County.

RECORDS AVAILABLE.—May 10 to July 19, 1916; April 28 to September 30, 1917; April 22 to June 10, 1918, and May 17 to August 31, 1921.

GAGE.—Vertical staff on bent of bridge; read by Frank Brown.

DISCHARGE MEASUREMENTS.—Made from footbridge.

CHANNEL AND CONTROL.—Bed composed of mud and sand on top of hardpan somewhat shifting.

EXTREMES OF DISCHARGE.—Maximum stage recorded during season 4.6 feet June; 6 (discharge, 245 second-feet); stream bed dry up to about May 15.

1916–1918; 1921: Maximum stage recorded that of 1921.

DIVERSIONS.—A little hay land is irrigated by natural overflow below gage on Malheur Lake outlet at Narrows.

ACCURACY.—Stage-discharge relation probably permanent during period of records in 1921. Rating curve poorly defined. Gage read three times a week to half-tenths. Daily discharge ascertained by applying gage heights to rating table. Records fair.

The following discharge measurement was made by J. W. Bones:
July 23, 1921: Gage height, 2.10 feet; discharge, 36 second-feet.

Daily discharge, in second-feet, of Mud Lake outlet near Narrows, Oreg., for the year ending September 30, 1921

Day	May	June	July	Aug.	Day	May	June	July	Aug.
1					16			42	22
2			95	24	17				
3		200			18		175		22
4				22	19			36	
5			84		20				22
6		245		22	21		170	34	
7			74		22				
8		235			23		155	36	22
9			60	22	24	100			
10					25		146		24
11		215		22	26			28	
12			54		27				24
13				22	28		132	26	
14		195	48		29				
15					30		124	24	
					31				

NOTE.—Discharge estimated May 17 to June 5.

Monthly discharge of Mud Lake outlet near Narrows, Oreg., for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
May 17–31			[a] 100	2,980
June		124	183	10,900
July	95	24	49.3	3,030
August	24	22	22.5	1,380
The period				18,300

[a] Estimated.

SILVIES RIVER NEAR SILVIES, OREG.

LOCATION.—In NE. ¼ sec. 14, T. 20 S., R. 31 E., at site of proposed storage dam, three-quarters of a mile below Trout Creek, 1 mile southwest of Craddock ranch, and 3 miles southwest of former post office of Silvies, Harney County.

DRAINAGE AREA.—510 square miles (measured on map prepared by United States Bureau of Reclamation).

RECORDS AVAILABLE.—May 9, 1903, to December 31, 1904; January 1, 1909, to June 30, 1911; April 11 to June 9, 1912; April 1 to June 13, 1916; March 1 to June 11, 1921.

GAGE.—Inclined staff; read daily by G. W. Hankins.

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

CHANNEL AND CONTROL.—Stream tortuous and gradient flat; control not well defined. Water overflows to the right at high stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded, 11.0 feet April 12 (discharge, 1,920 second-feet). No record of minimum, but stream is practically dry at times.

1903–4; 1909–1912; 1916, 1921: Maximum stage recorded, known to have been maximum for period, although records are fragmentary, 12.15 feet April 16, 1904 (discharge, 2,320 second-feet); stream bed dry in August and September, 1910, and probably at other times.

ICE.—No record during winter.

DIVERSIONS.—Several hundred acres irrigated from flood waters above station.

REGULATIONS.—None.

ACCURACY.—Stage-discharge relation probably permanent during periods in 1921, although there has been a change since 1916. Fairly well defined rating curve used. Gage read to tenths once a day. Records good.

Discharge measurements of Silvies River near Silvies, Oreg., during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*
Mar. 27	C. B. Smith[a]	6.59	426
Apr. 7	Bones and Smith	7.91	690
July 29	J. W. Bones	2.61	9.3

[a] Engineer, Harney Valley Irrigation District.

Daily discharge, in second-feet, of Silvies River near Silvies, Oreg., for the year ending September 30, 1921

Day	Mar.	Apr.	May	June	Day	Mar.	Apr.	May	June
1	320	750	1,120	263	16	416	1,020	536	
2	320	1,020	1,020	258	17	432	980	700	
3	308	1,400	950	252	18	464	1,050	750	
4	308	1,550	860	246	19	491	1,050	800	
5	344	1,200	775	246	20	473	1,120	800	
6	320	890	775	166	21	518	1,200	750	
7	320	775	750	158	22	536	1,350	700	
8	332	670	750	151	23	536	1,400	630	
9	332	750	750	141	24	590	1,550	630	
10	344	1,080	700	131	25	464	1,550	432	
11	344	1,400	590	121	26	464	1,400	416	
12	358	1,920	590		27	440	1,300	400	
13	358	1,650	572		28	440	890	386	
14	372	1,550	545		29	440	950	386	
15	424	1,200	545		30	500	1,020	416	
					31	610		416	

Monthly discharge of Silvies River near Silvies, Oreg., for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
March	610	308	417	25,600
April	1,920	570	1,180	70,200
May	1,120	386	659	40,500
June 1-11	263	121	194	4,280
The period				141,000

SILVIES RIVER NEAR BURNS, OREG.

LOCATION.—In sec. 7, T. 22 S., R. 30 E., at wagon bridge on Parker ranch, 12 miles northwest of Burns, Harney County.

DRAINAGE AREA.—940 square miles (measured on map prepared by U. S. Bureau of Reclamation).

RECORDS AVAILABLE.—May 10, 1903, to July 24, 1906; December 14, 1908, to September 30, 1921.

GAGE.—Inclined and vertical staff on left bank; datum raised 2.04 feet August 11, 1918.

DISCHARGE MEASUREMENTS.—Made from wagon bridge at gage or by wading; high-water measurements from cable about 1 mile upstream.

CHANNEL AND CONTROL.—Low-water control is a gravel riffle about 25 feet below gage. Probably shifts in high water. Above gage height 13 feet river overflows its banks near gage and begins cutting across bends, with no defined control.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 13.55 feet April 13 (discharge, 3,040 second-feet). No record of minimum.

1904–1906; 1909–1921: Maximum stage recorded, 17.12 feet on original datum April 15, 1904 (discharge, 4,730 second-feet). Minimum discharge estimated at 1 second-foot July 4 and 5, 1920.

ICE.—Stage-discharge relation not seriously affected by ice.

DIVERSIONS.—A large area of land at headwaters of Silvies River is irrigated with flood water.

REGULATION.—Flow at lower station occasionally affected by operation of Sylvester dam half a mile above.

ACCURACY.—Stage-discharge relation changed during winter. Rating curve used March 6 to June 30 well defined between 400 and 2,000 second-feet; fairly well defined below 400 second-feet. Gage read to tenths twice a day until July 15, once a day thereafter. Daily discharge determined by applying to rating table mean daily gage height. Records good.

Discharge measurements of Silvies River near Burns, Oreg., during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
Mar. 15	C. B. Smith[a]	8.60	731	Apr. 19	J. W. Bones	12.22	1,520
18	do	12.08	1,560	May 21	Wendell Dawson	11.2	1,060
29	do	9.52	838	June 5	J. W. Bones	6.6	527
Apr. 10	Bones and Smith	11.62	1,260	Aug. 3	do	[b]1.38	[c]21.2

[a] Engineer, Harney Valley Irrigation District.
[b] Gage height from new gage 4 miles upstream from gage at wagon bridge on Parker ranch.
[c] Discharge at gage at wagon bridge on Parker ranch, about 2 second-feet.

Daily discharge, in second-feet, of Silvies River near Burns, Oreg., for the year ending September 30, 1921

Day	Oct.	Mar.	Apr.	May	June	Day	Oct.	Mar.	Apr.	May	June
1	8		1,130	1,650	709	16		775	1,900	849	161
2			1,280	1,580	646	17	16	980	1,650	926	128
3	8	500	1,730	1,510	606	18		1,450	1,510	1,100	144
4			2,090	1,400	530	19		1,450	1,580	1,220	116
5			1,900	1,320	530	20		1,280	1,650	1,220	128
6		548	1,580	1,280	476	21		1,220	1,730	1,160	95
7		548	1,450	1,280	431	22	16	1,250	1,810	1,130	74
8	10	566	1,360	1,280	431	23		1,250	2,090	1,040	83
9		646	1,280	1,160	440	24		1,160	2,090	944	83
10	10	636	1,280	1,100	395	25		1,100	1,900	835	74
11		636	1,510	1,080	449	26		1,020	1,730	720	59
12		616	1,900	1,060	386	27		893	1,730	646	54
13		709	2,780	980	278	28		822	1,510	596	34
14		798	2,530	926	233	29		835	1,450	566	30
15	16	731	2,300	863	170	30		878	1,580	646	21
						31		962		666	

NOTE.—Discharge Mar. 1–5 estimated by comparison with records for other stations. Gage-height record and rating table both uncertain for July and August; no discharge computed.

Monthly discharge of Silvies River near Burns, Oreg., for the year ending September 30, 1921

Month	Discharge in second-feet			Run off in acre-feet
	Maximum	Minimum	Mean	
March	1,450		847	52,100
April	2,780	1,130	1,730	103,000
May	1,650	566	1,060	65,200
June	709	21	266	15,800
The period				236,000

EMIGRANT CREEK NEAR BURNS, OREG.

LOCATION.—In SW. ¼ sec. 26, T. 20 S., R 29 E., at Garrett ranch, 2 miles above mouth and 15 miles northwest of Burns, Harney County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—March 11 to April 25, 1921.

GAGE.—Vertical staff on left bank, 150 feet below farm bridge; read by John W. Mickey.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading.

CHANNEL AND CONTROL.—Stream narrow, crooked, and grown up with willows. Bed fairly permanent.

DIVERSIONS.—Several hundred acres irrigated above station.

REGULATION.—None.

ACCURACY.—Stage-discharge relation permanent. Rating curve fairly well defined below 500 second-feet. Gage read to tenths once a day. Daily discharge obtained by applying daily gage readings to rating table. Records good.

Discharge measurements of Emigrant Creek at Garret ranch, near Burns, Oreg., during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
Mar. 11	Chas. B. Smith [a]	4.85	232	May 27	W. Dawson	3.38	122
21	do	6.69	336	Aug. 2	J. W. Bones	1.40	11.4
Apr. 1	do	7.65	393				

[a] Engineer, Harney Valley Irrigation District.

Daily discharge, in second-feet, of Emigrant Creek near Burns, Oreg., for the year ending September 30, 1921

Day	Mar.	Apr.	Day	Mar.	Apr.	Day	Mar.	Apr.
1		410	11	215	520	21	346	470
2		520	12	203	560	22	353	490
3		510	13	248	570	23	346	520
4		570	14	311	520	24	290	434
5		434	15	241	461	25	283	418
6		388	16	241	418	26	234	
7		360	17	480	395	27	227	
8		339	18	540	395	28	234	
9		353	19	470	402	29	297	
10		402	20	374	425	30	311	
						31	346	

POISON CREEK NEAR BURNS, OREG.

LOCATION.—In sec. 34, T. 22 S., R. 31 E., at Jackson ranch, 6 miles from Burns, Harney County, on Canyon City road.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—March 7 to May 27, 1921.

GAGE.—Vertical enamel staff 100 feet above highway bridge.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading.

CHANNEL AND CONTROL.—Gravel and cobbles, fairly permanent.

EXTREMES OF DISCHARGE.—Maximum stage, 2.90 feet at 6 p.m. March 18 (discharge, 235 second-feet); stream dry except after rains or during spring break-up.

ICE.—No record during frozen period.

DIVERSIONS.—Small irrigation canal diverts about one-half mile above gage and may carry a little water around station during spring run-off.

REGULATION.—None.

ACCURACY.—Stage-discharge relation permanent. Rating curve fairly well defined below 120 second-feet. Staff gage read to half-tenths once a day. Daily discharge determined by applying daily gage height to rating table.

Discharge measurements of Poison Creek near Burns, Oreg., during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
Mar. 16	C. B. Smith [a]	1.98	107	May 23	Wendell Dawson	0.74	2.0
30	do	1.70	65	June 5	J. W. Bones	.58	.7
Apr. 10	Bones and Smith	1.27	37.4				

[a] Engineer, Harney Valley Irrigation District.

Daily discharge, in second-feet, of Poison Creek near Burns, Oreg., for the year ending September 30, 1921

Day	Mar.	Apr.	May	Day	Mar.	Apr.	May	Day	Mar.	Apr.	May
1	------	145	6.5	11	61	40	0.2	21	81	15	4.0
2	------	92	6.5	12	52	40	.2	22	86	15	4.0
3	------	81	4.0	13	117	36	.2	23	76	12	2.7
4	------	48	2.7	14	117	32	.2	24	71	15	1.4
5	------	48	2.7	15	92	29	.2	25	66	12	1.0
6	------	44	1.4	16	117	22	1.0	26	56	12	.2
7	66	40	1.4	17	175	22	6.5	27	52	12	.2
8	66	36	1.0	18	235	22	6.5	28	48	9	------
9	71	36	.6	19	160	22	4.0	29	81	9	------
10	81	36	.4	20	98	15	4.0	30	71	9	------
								31	131	------	------

Monthly discharge of Poison Creek near Burns, Oreg., for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
March 7–31	235	48	93.1	4,610
April	145	9	33.5	1,990
May 1–27	6.5	.2	236	126
The period	------	------	------	6,730

PRATHER CREEK NEAR BURNS, OREG.

LOCATION.—In sec. 25, T. 22 S., R. 31 E., just above bridge on road from Burns to Canyon City and 9 miles northeast of Burns, Harney County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—March 8 to June 18, 1921.

GAGE.—Vertical staff on left bank; read by Dave Fowler.

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

CHANNEL AND CONTROL.—Bed composed of gravel; slightly shifting.

EXTREMES OF DISCHARGE.—Maximum stage recorded, 3.3 feet from 6 p. m. March 17 to 6 p. m. March 19 (discharge, 67 second-feet); stream dry at times.

DIVERSIONS.—None above gage.

REGULATION.—None.

ACCURACY.—Stage-discharge relation permanent during period of record. Rating curve fairly well defined between 2 and 30 second-feet but poorly defined beyond these limits. Staff gage read to tenths once daily. Daily discharge determined by applying mean daily gage height to rating table. Records fair except those for discharge below 2 second-feet and above 25 second-feet which are poor.

Discharge measurements of Prather Creek near Burns, Oreg., during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
Mar. 8	C. B. Smith [a]	3.05	24.8	Apr. 10	Bones and Smith	2.95	14.0
30	do	2.85	9.6	May 23	Wendell Dawson	[b] 2.52	1.6

[a] Engineer, Harney Valley Irrigation District.
[b] Observer's reading.

Daily discharge, in second-feet, of Prather Creek near Burns, Oreg., for the year ending September 30, 1921

Day	Mar.	Apr.	May	June	Day	Mar.	Apr.	May	June
1		18	6.1	2.0	16	24	11	1.3	0.4
2		30	4.3	1.1	17	38	12	4.3	.6
3		30	3.7	1.6	18	67	12	2.7	.4
4		18	3.7	1.3	19	67	12	2.7	
5		17	3.7	.8	20	30	12	2.7	
6		12	3.1	1.1	21	30	12	2.7	
7		12	3.1	1.1	22	18	11	2.4	
8	24	12	2.7	.8	23	14	11	1.6	
9		11	2.7	.8	24	14	11	1.1	
10		17	1.6	.6	25	11	7.4	1.1	
11	24	30	2.0	.6	26	9.4	7.4	1.3	
12		30	2.0	.4	27	7.4	7.4	1.3	
13		24	2.0	.3	28	7.4	7.4	2.0	
14		14	1.3	.4	29	9.6	7.4	.8	
15		14	.8	.2	30	10	7.4	.8	
					31	11		3.1	

NOTE.—Discharge interpolated Mar. 9–15.

Monthly discharge of Prather Creek near Burns, Oreg., for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
March 8–31	67	7.4	23.3	1,110
April	30	7.4	14.6	869
May	6.1	.8	2.41	148
June 1–18	2.0	.4	.805	28.7
The period				2,160

DONNER UND BLITZEN RIVER NEAR DIAMOND, OREG.

LOCATION.—In SW. ¼ sec. 8, T. 32 S., R. 32½ E., at mouth of canyon, 1½ miles above "P" ranch buildings, 25 miles southwest of Diamond, and 40 miles above The Narrows, Harney County.

DRAINAGE AREA.—200 square miles (measured on maps prepared by Garfield Stubblefield).

RECORDS AVAILABLE.—May 22, 1910, to September 30, 1916; April 15, 1917, to September 30, 1921, when station was discontinued. Also January 26, 1909, to July 31, 1910, and November 1 to 12, 1910, at former stations below several diversion ditches.

GAGE.—Vertical staff on left bank; gage datum not always properly maintained. Gage readers, Prim Ortego and Pat Donegan. Original gage was vertical staff on right bank just below wagon bridge near ranch buildings.

DISCHARGE MEASUREMENTS.—Made from a cable 75 yards above gage or by wading.

CHANNEL AND CONTROL.—Bed composed of gravel and sand; one channel at all stages. Banks of stream covered with dense growth of willows and underbrush; subject to overflow at flood stages. Control composed of gravel; somewhat shifting.

EXTREMES OF DISCHARGE.—Maximum stage during year observed from high-water marks next morning, 6.6 feet during night of March 3 (discharge, 2,200 second-feet); minimum stage, 1.16 feet January 11 (discharge, 37 second-feet).

1909–1921: Maximum stage recorded, that of March 3, 1921; minimum discharge, 23 second-feet December 19 and 26, 1915, and January 2, 9, and 16, 1916.

ICE.—Stage-discharge relation practically unaffected by ice, owing to inflow from springs.

DIVERSIONS.—Present gage is above all irrigation ditches. Five ditches divert water from stream above old gage at ranch buildings.

REGULATION.—None.

ACCURACY.—Stage-discharge relation changed during high water of February 14. Rating curve used October 1 to February 13 well defined above 130 second-feet; curve used February 14 to September 17 same as previous curve above 400 second-feet and fairly well defined. Gage read to hundredths once a day and high-water mark noted for days when there was considerable fluctuation. Daily discharge ascertained by applying to rating table daily gage reading; during high stages mean gage height obtained by adding high-water gage height to twice the daily reading and dividing by 3. Records good except for discharge below 100 second-feet for which they are fair.

Discharge measurements of Donner und Blitzen River near Diamond, Oreg., during the year ending September 30, 1921

[Made by J. W. Bones]

Date	Gage height	Discharge
	Feet	*Sec.-ft.*
Mar. 19	1.98	188
Apr. 23	2.28	241
July 31	.87	72

Daily discharge, in second-feet, of Donner und Blitzen River near Diamond, Oreg., for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1		56	74	131	63	620	178	246	425		72	65
2		56	76	210	63	1,140	225	225	990	157	72	65
3		58	69	500	61	1,110	225	246	665		72	65
4		53	69	175	61	990	246	246	620		72	65
5		51	72	145	63	1,380	205	225	580	149	70	65
6	50	48	74	72	68	580	188	258	620	138	70	65
7		52	69	61	74	755	181	373	688	126	69	65
8		56	72	51	76	205	174	416	800	119	68	65
9		66	91	46	175	188	168	460	665	113	68	65
10		69	88	41	1,240	188	188	540	665	110	70	65
11		74	76	37	868	181	196	500	580	106	68	65
12	56	74	68	43	940	161	188	620	500	103	68	65
13		82	58	48	1,240	178	188	620	442	101	68	65
14		82	43	63	1,040	171	196	540	181	99	68	65
15	56	82	39	72	408	178	205	460	205	94	68	65
16		100	46	69	270	188	205	620	236	93	67	65
17		107	48	66	174	178	188	620	181	92	66	65
18	56	131	46	121	108	225	188	755	165	90	66	
19	56	157	44	100	119	185	196	710	161	87	66	
20	58	153	43	79	114	172	205	580	188	84	66	
21	61	133	41	69	108	158	225	500	185	83	66	
22	63	113	39	61	106	152	205	500	246	79	65	
23	63	107	39	61	110	147	225	460	296	78	65	
24	66	120	41	61	121	136	205	620	246	78	65	65
25	69	134	41	63	136	133	188	620	196	77	65	
26	74	185	48	63	138	133	188	710	190	76	65	
27	69	124	56	66	258	125	174	800	185	76	65	
28	66	108	104	69	480	117	181	620	174	75	65	
29	66	91	165	74	-------	119	178	540	171	74	65	
30	61	74	1,190	72	-------	124	225	500	165	73	65	
31	58	-------	235	69	-------	136	-------	442	-------	72	65	

NOTE.—Discharge interpolated for periods when no gage heights were observed, as indicated by braces and also for most of Sundays.

Monthly discharge of Donner und Blitzen River near Diamond, Oreg., for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	74		57.2	3,520
November	185	48	93.2	5,550
December	1,190	39	105	6,460
January	500	37	92.2	5,670
February	1,240	61	310	17,200
March	1,390	117	340	20,900
April	246	168	198	11,800
May	800	225	502	30,900
June	990	161	387	23,000
July		72	102	6,270
August	72	65	67.4	4,140
September			65.0	3,870
The year	1,390	37	192	139,000

DONNER UND BLITZEN RIVER NEAR VOLTAGE, OREG.

LOCATION.—In sec. 35, T. 26 S., R. 31 E., at bridge on road known as Sod-house Lane, along original meander line of Malheur Lake, 2 miles west of Voltage post office, and 6 miles east of Narrows, Harney County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—April 6, 1916, to September 30, 1917; April 17 to May 25, 1918; March 20 to June 6, 1919; and March 1 to August 5, 1921.

GAGE.—Vertical staff on abutment of bridge, also a gage on one of main overflow channels about a mile west of main channel. Gage reader, C. A. Beckley.

DISCHARGE MEASUREMENTS.—Made from bridges across main channel and 16 culverts which carry water at high stages; measuring conditions poor.

CHANNEL AND CONTROL.—Channel crooked and turns abruptly to right just below bridge; no well-defined control.

EXTREMES OF DISCHARGE.—Maximum discharge, 680 second-feet by current-meter measurement on May 26; no record of minimum.

1916–1919; 1921: Maximum stage recorded, 3.3 feet May 21, 1917 (discharge, 800 second-feet); discharge practically zero during summer of 1918.

DIVERSIONS.—Several thousand acres irrigated from river and its tributaries; discharge at station is largely return water.

REGULATION.—Discharge considerably influenced by diversion dams.

ACCURACY.—Stage-discharge relation for main channel changed June 27 due to raising of an irrigating dam below. Fairly well-defined rating curve used March 17 to June 24, poorly defined curve thereafter. Rating uncertain for gage on overflow, and no gage readings were obtained prior to May 26. Gage read to hundredths about three times a week. Daily discharge ascertained by applying daily gage reading to rating table and adding the discharge through overflow channel as estimated May 4–23, and determined from gage readings after May 25. Records fair.

Discharge measurements of Donner und Blitzen River near Voltage, Oreg., during the year ending September 30, 1921

Date	Made by—	Main channel		Overflow channel		Total discharge
		Gage height	Discharge	Gage height	Discharge	
		Feet	*Sec.-ft.*	*Feet*	*Sec.-ft.*	*Sec.-ft.*
Mar. 20	J. W. Bones	2.94	341		0	341
Apr. 22	do	2.65	230		0	230
May 26	Wendell Dawson	2.27	162	2.08	518	680
July 31	J. W. Bones	1.50	13.8		0	13.8

Daily discharge, in second-feet, of Donner und Blitzen River near Voltage, Oreg., for the year ending September 30, 1921

Day	Mar.	Apr.	May	June	July	Aug.	Day	Mar.	Apr.	May	June	July	Aug.
1				310	220	14	16			90			
2			80				17	370			420		
3				360		14	18			160		50	
4			70		95		19						
5						27	20	330		320	400	42	
6			70	380	85		21						
7							22		230		330	14	
8				400	85		23			490			
9			70				24				290		
10				420			25		260			14	
11			70		75		26			680			
12							27		230	530	240	14	
13			70	420	66		28						
14							29		230		200	14	
15				480	66		30			280		14	
							31						

Monthly discharge of Donner und Blitzen River near Voltage, Oreg., for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
March			a 400	25,000
April			a 200	12,000
May	680	70	229	14,100
June	480	200	358	21,300
July	220	14	61.0	3,750
August 1-5	27	14	18.3	182
The period				76,300

a Estimated by comparison with records at station near Diamond.

KEIGER CREEK NEAR DIAMOND, OREG.

LOCATION.—In NW. ¼ sec. 10, T. 30 S., R. 33 E., 100 yards above point where creek forks, 2½ miles southeast of Diamond, Harney County.

DRAINAGE AREA.—75 square miles.

RECORDS AVAILABLE.—1909–1913; 1915–1921; fragmentary. Station discontinued.

GAGE.—Stevens eight-day recorder installed on left bank May 27, 1917, 25 feet below old vertical staff used up to that time; gage used 1909 and 1910 at different location and datum.

DISCHARGE MEASUREMENTS.—Made from footbridge or by wading.

CHANNEL AND CONTROL.—Bed composed of gravel; somewhat shifting. Banks covered with brush; not subject to overflow.

EXTREMES OF DISCHARGE.—Maximum stage during period of record from water-stage recorder 2.80 feet at 10 a. m. May 27 (discharge, 163 second-feet); no record of minimum stage.

1909–1921: Maximum stage recorded, 4.7 feet May 9, 1912 (discharge, 330 second-feet). A higher flood may have occurred while records were suspended. Minimum stage recorded, 0.56 foot, February 16, 1918 (discharge 3.2 second-feet).

ICE.—Stage-discharge relation generally affected by ice; no record during winter.

DIVERSIONS.—None above station.

REGULATION.—None.

ACCURACY.—Stage-discharge relation practically permanent. Rating curve well defined. Operation of recorder somewhat unsatisfactory. Daily discharge ascertained by applying to rating table mean daily gage height obtained by inspecting recorder graph. Records fair.

Discharge measurements of Keiger Creek near Diamond, Oreg., during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
Mar. 18	J. W. Bones	1.73	75	May 25	Wendell Dawson	2.23	122
Apr. 17	do	1.59	65	July 30	J. W. Bones	1.02	20.9

Daily discharge, in second-feet, of Keiger Creek near Diamond, Oreg., for the year ending September 30, 1921

Day	Oct.	Mar.	Apr.	May
1				44
2				44
3				44
4				49
5	17			47
6				52
7				63
8				63
9			70	64
10	19			70
11	21			79
12	18			85
13	18			96
14	17			109
15	19			113
16	19			129
17	16		64	121
18		78	64	97
19		66	65	113
20		59	67	109
21		58	67	121
22		56	71	105
23		54	78	107
24		52	56	107
25		51	35	109
26			32	133
27			32	145
28		52	33	121
29			40	133
30			44	135
31				135

NOTE.—Discharge Apr. 1-16 estimated from maximum and minimum indicated by recorder graph.

Monthly discharge of Keiger Creek near Diamond, Oreg., for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October 1–17	21	16	17.7	598
March 18–31			60.5	1,560
April		32	62.3	3,710
May	145	44	94.9	5,840

McCOY CREEK NEAR DIAMOND, OREG.

LOCATION.—In sec. 12, T. 30 S., R. 32 E., 1,000 feet above Wells ranch house and 5 miles southwest of Diamond, Harney County.

DRAINAGE AREA.—45 square miles.

RECORDS AVAILABLE.—May 23, 1910, to September 30, 1921 (fragmentary); also January 27 to June 30, 1909, on original gage which was below some diversion. Station discontinued.

GAGE.—Vertical staff on right bank, installed August 7, 1913, 250 feet below that installed May 23, 1910. Gage reader, C. A. Wells. Original gage was 2½ miles farther downstream and 3 miles from Diamond post office.

DISCHARGE MEASUREMENTS.—Made by wading or from footbridge at Frazier ranch 2 miles below gage.

CHANNEL AND CONTROL.—Bed composed of clean gravel and sand; likely to shift slightly in floods.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 5.0 feet May 27 (discharge, 264 second-feet); minimum stage, 1.76 October 6 (discharge, 5.8 second-feet).

1910-1921: Maximum stage recorded, 6.6 feet during night of June 7, 1912 (discharge from extension of rating curve, 300 second-feet); minimum discharge, 0.7 second-foot March 14, 1918.

ICE.—Stage-discharge relation affected by ice.

DIVERSIONS.—Station above all diversions except one unimportant ditch.

REGULATION.—None.

ACCURACY.—Stage-discharge relation practically permanent. Rating curve fairly well defined. Gage read to hundredths once a day. Daily discharge ascertained by applying to rating table daily gage height except for periods of ice effect and days of missing gage height when it was estimated. Records good.

Discharge measurements of McCoy Creek near Diamond, Oreg., during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
Mar. 18	J. W. Bones	2.24	25.2	May 25	Wendell Dawson	[a] 4.0	152
Apr. 17	do	2.37	35.9	July 30	J. W. Bones	1.91	12.3

[a] Gage reading from observer's daily record.

Daily discharge, in second-feet, of McCoy Creek near Diamond, Oreg., for the year ending September 30, 1921

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	11	11	21	28		22	19	56	136	51	17	13
2	7.6	11	16	29		23	22	52	136	43	17	14
3	7.0	10	21	26		28	27	56	136	40	14	14
4	7.0	8.8	16	21		33	27	59	216	40	14	14
5	6.4	8.8	8.8		12	52	30	59	228	40	11	12
6	5.8	8.8	8.8			46	27	59	195	40	11	12
7	7.0	9.4	8.8			40	26	70	205	40	10	12
8	7.6	10	11			34	25	80	195	40	11	12
9	8.2	10	21	14	21	32	26	76	165	39	12	12
10	7.6	11	22		145	28	32	87	195	36	12	6.4
11	7.6	10	14		66	28	33	95	185	34	12	6.4
12	8.8	12	25		46	26	34	119	185	30	12	6.4
13	10	11	21		46	26	35	136	136	30	13	6.4
14	11	8.8	14		46	25	34	145	136	30		7.0
15	12	8.8		11	43	23	34	145	95	26	12	7.0
16	10	10			49	23	33	155	80	23		6.4
17	11	15			28	21	29	127	66	19		7.0
18	11	34	12	14	34	26	29	119	59	20		7.0
19	7.6	34			38	23	30	127	73	21	10	7.6
20	8.2	28			23	22	33	127	76	20	10	8.2
21	11	25			23	22	33	119	73	19	10	7.6
22	13	23	17		11	21	38	119	80	18	10	7.0
23	11	15	21		21	18	38	119	84	18	9.1	7.0
24	11	16	23	13	18	21	34	136	70	19	9.1	7.0
25	12	16	22		18	19	30	155	73	11	9.1	7.0
26	12	22	10		18	18	34	185	70	11	8.8	6.4
27	11	16	12		18	17	34	264	70	17	7.6	6.4
28	12	12	14		28	14	38	165	70	14	10	6.4
29	12	20	23		-------	17	43	175	66	11	9.2	7.0
30	10	22	26	10	-------	17	46	165	59	11	10	7.0
31	9.4	-------	28	11	-------	17	-------	145	-------	14	12	-------

NOTE.—Stage-discharge relation affected by ice Dec. 15–21, 23, 29, 30, Jan. 5–17, 19–29, and Jan. 31 to Feb. 8; discharge estimated.

Monthly discharge of McCoy Creek near Diamond, Oreg., for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	13	5.8	9.58	589
November	34	8.8	15.2	904
December	28	8.8	16.4	1,010
January	29	-------	14.6	898
February	145	11	29.9	1,660
March	52	14	25.2	1,550
April	46	19	31.8	1,890
May	264	52	119	7,320
June	228	59	120	7,140
July	51	11	26.6	1,640
August	17	7.6	11.3	695
September	14	6.4	8.65	515
The year	264	6.4	15.6	25,800

RIDDLE CREEK NEAR DIAMOND, OREG.

LOCATION.—In sec. 23, T. 28 S., R. 33 E., at bridge on road from Diamond to Waverly, at dam site of proposed Happy Valley reservoir, below all tributaries, and 8 miles northeast of Diamond, Harney County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—March 27 to October 17, 1917; March 17 to September 16, 1918; March 1 to July 5, 1919; March 14 to July 3, 1920; February 10 to June 4, 1921. Station discontinued.

GAGE.—Vertical staff on abutment of highway bridge; read by Sylvester Smith.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of mud and sand. Channel crooked with overhanging willows. Control not well defined.

EXTREMES OF DISCHARGE.—Maximum stage recorded during period, 3.6 feet February 10 and 11 (discharge, 219 second-feet); minimum stage, 0.85 foot May 4 (discharge, 6.2 second-feet).

1917–1921: Maximum stage recorded, 4.5 feet in March, 1917, probably March 27 (discharge, 330 second-feet); minimum stage, 0.20 foot June 19–22, 1919 (discharge, estimated 0.2 second-foot).

ICE.—No record during frozen period.

DIVERSION.—A considerable area of hay land is irrigated above station.

REGULATION.—None.

ACCURACY.—Stage-discharge relation apparently permanent during period. Rating curve well defined between 10 and 150 second-feet. Gage read to hundredths twice a day. Daily discharge ascertained by applying mean daily gage height to rating table. Records good.

Discharge measurements of Riddle Creek near Diamond, Oreg., during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*
Mar. 18	J. W. Bones	1.58	39.1
Apr. 22	do	1.06	11.2
May 25	Wendell Dawson	1.20	17.4

Daily discharge, in second-feet, of Riddle Creek near Diamond, Oreg., for the year ending September 30, 1921

Day	Feb.	Mar.	Apr.	May	June
1		62	26	9.7	18
2		62	28	8.8	16
3		89	28	6.8	13
4		93	25	6.2	13
5		187	24	6.6	
6		138	24	8.8	
7		98	25	10	
8		77	20	9.1	
9		69	14	7.3	
10	219	62	14	6.4	
11	219	55	20	6.8	
12	147	48	23	6.8	
13	111	52	25		
14	138	48	23		
15	120	41	22	10	
16	120	41	16		
17	98	41	15	14	
18	66	48	17	17	
19	66	41	14	22	
20	66	40	22	31	
21	59	40	14	44	
22	48	37	13	48	
23	34	37	12	33	
24	32	34	14	22	
25	40	34	13	18	
26	48	29	12	16	
27	44	28	11	12	
28	55	28	12	11	
29		25	11	12	
30		26	10	20	
31		25		18	

Monthly discharge of Riddle Creek near Diamond, Oreg., for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
February 10–28	219	32	91.1	3,430
March	187	25	56.0	3,440
April	28	10	18.2	1,080
May	48	6.2	15.2	935
June 1–4	18	13	15.0	118
The period				9,000

SILVER CREEK ABOVE SUNTEX, OREG.

LOCATION.—In NW. ¼ sec. 30, T. 22 S., R. 26 E., at Cecil ranch, 3 miles below mouth of Nicoll Creek, and 5 miles above Suntex, Harney County.

DRAINAGE AREA.—260 square miles (measured on maps of U. S. Bureau of Reclamation).

RECORDS AVAILABLE.—April 19, 1904, to July 14, 1906; February 16 to December 12, 1909; April 6 to October 19, 1910; flood periods of 1911, 1912, and 1914–1921.

GAGE.—Stevens eight-day recorder referred to vertical and inclined staff on right bank, one-fourth mile above Cecil ranch house and 100 yards above point where creek divides into three channels; installed March 6, 1921. Gage reader, J. C. Cecil. Staff gage used prior to 1921.

DISCHARGE MEASUREMENTS.—Made from cable about 100 yards below gage or by wading.

CHANNEL AND CONTROL.—Bed composed of clean gravel; slightly shifting. Banks heavily covered with willows, which may affect stage-discharge relation somewhat.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 6.58 feet at 6 p. m. April 3 (discharge, 590 second-feet). No record of minimum discharge.

1904–1906; 1909–1921: Maximum stage recorded, 13.95 feet on original gage, observed from high-water mark April 14, 1904 (discharge, 1,760 second-feet); stream bed dry in August and September, 1910.

DIVERSIONS.—About 300 acres irrigated above station, large areas irrigated below.

ACCURACY.—Stage-discharge relation practically permanent. Rating curve well defined. Operation of water-stage recorder satisfactory March 6 to April 21; gage read once a day February 11–14. Daily discharge ascertained by applying mean daily gage height to rating table. Records good for March and April; fair for February, May, and June.

Discharge measurements of Silver Creek above Suntex, Oreg., during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
Mar. 6	M. V. Dodge	5.00	350	Apr. 15	Dodge and Bones	5.06	354
20	do	5.39	376	May 18	Wendell Dawson	2.40	95
27	do	3.34	188	June 3	J. W. Bones	2.24	85
30	do	3.81	216	Aug. 4	do	.50	a 2
Apr. 4	do	6.17	524				

a Estimated.

Daily discharge, in second-feet, of Silver Creek above Suntex, Oreg., for the year ending September 30, 1921

Day	Feb.	Mar.	Apr.	May	June	Aug.
1			347			
2			444			
3			570		86	
4		280	510			2
5			414			
6		358	358			
7		325	303			
8		283	283			
9		268	293			
10		283	336			
11	72	263	402			
12	213	243	444			
13	203	267	476			
14	30	293	414			
15		243	347			
16		243	325			
17		347	283			
18		510	293	97		
19		510	283			
20	10	402	283			
21		347	303			
22		303				
23		273				
24		243				
25		223				
26		193	250			
27	90	174				
28		165				
29		193				
30		223				
31		273				

NOTE.—Discharge for braced periods estimated by hydrographic comparison with Silver Creek below Suntex.

Monthly discharge of Silver Creek above Suntex, Oreg., for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
February 11–28	213		49.9	1,780
March	510		285	17,500
April	570		332	19,800
May			[a]90	5,530
June			[a]40	2,380
The period				47,000

[a] Estimated from comparisons with records for Silver Creek below Suntex.

SILVER CREEK BELOW SUNTEX, OREG. [3]

LOCATION.—In NE. ¼ sec. 14, T. 24 S., R. 27 E., three-fourths mile southwest of Cryder ranch, 6 miles southeast of former Riley post office, and 15 miles southeast of Suntex, Harney County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—March 12 to June 21, 1912; May 6 to June 7, 1913; February 23 to June 30, 1914; fragmentary records in 1915 and 1917; March 21 to May 17, 1919; and February 28 to June 30, 1921.

GAGE.—Water-stage recorder installed March 4, 1921, and referred to vertical staff on left bank; inspected by A. D. Cryder.

[3] Published in previous reports as Silver Creek below Riley, Oreg.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—Gravel and small boulders, fairly permanent.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 3.70 feet at 9 p. m. April 4 (discharge, 510 second-feet); stream bed dry July to September.

1912–1914; 1919; and 1921: Maximum discharge that of April 4, 1921; creek dry practically every summer.

ICE.—No flow during winter.

DIVERSIONS.—About 3,800 acres irrigated from Silver Creek above station.

REGULATION.—None except by irrigation dams.

ACCURACY.—Stage-discharge relation fairly permanent. Rating curve used March 9 to June 30, well defined; shifting-control method used March 4–8. Operation of recorder satisfactory. Daily discharge obtained by applying to rating table mean daily gage height obtained by inspecting recorder graph. Records good.

Dicharge measurements of Silver Creek below Suntex, Oreg., during the year ending September 30, 1921

Date	Made by—	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
Mar. 5	M. V. Dodge	2.77	246	Apr. 14	J. W. Bones	3.21	410
7	do	2.75	281	May 18	Wendell Dawson	1.56	104
20	do	3.18	403	June 3	J. W. Bones	1.31	67
28	do	1.97	171				

Daily discharge, in second-feet, of Silver Creek below Suntex, Oreg., for the year ending September 30, 1921

Day	Mar.	Apr.	May	June	Day	Mar.	Apr.	May	June
1		248	166	83	16	220		42	13
2	160	307	141	76	17	229	330	70	8.0
3		384	127	67	18	318		94	3.5
4	290	473	106	65	19	384	267	108	9.4
5	290	473	98	60	20	420	267	109	12
6	290	408	97	62	21	372	258	141	7.6
7	290	350	87	59	22	318	268	150	6.8
8	180	287	73	56	23	287	277	109	6.4
9	230	258	73	52	24	267	287	97	5.6
10	229	267	69	48	25	238	267	87	4.8
11	238	307	59	43	26	210	229	76	3.3
12	229	372	49	37	27	184	201	66	2.4
13	229	408	43	31	28	175	175	62	1.6
14	248	420	37	25	29	166	166	63	1.2
15	258	395	35	15	30	184	175	67	1.0
					31	210		94	

NOTE.—Discharge estimated Mar. 1–3.

Monthly discharge of Silver Creek below Suntex, Oreg., for the year ending September 30, 1921

Month	Discharge in second-feet			Run off in acre-feet
	Maximum	Minimum	Mean	
March	420		247	15,200
April	473	166	306	18,200
May	166	35	86.9	5,340
June	83	1.0	28.9	1,720
The period				40,500

SILVER CREEK NEAR NARROWS, OREG.

LOCATION.—In NW. ¼ sec. 21, T. 25 S., R. 28 E., a quarter of a mile north of house at Dunn Field, 20 miles southwest of Suntex, and 25 miles northwest of Narrows, Harney County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—Flood periods of 1917 and 1919 to 1921.

GAGE.—Vertical staff on right bank 200 feet below diversion dam; read by employees of Wm. Hanley Co.

DISCHARGE MEASUREMENTS.—Made from cable 100 yards below gage or by wading.

CHANNEL AND CONTROL.—Bed slightly shifting. Grass grows in channel before water ceases to flow. Control not well defined.

EXTREMES OF DISCHARGE.—Maximum stage recorded during the year, 4.75 feet April 6 (discharge, 391 second-feet). Stream bed dry up to February 27 and after June 11.

1917–1921: Maximum discharge recorded, 400 second-feet April 29 and 30, 1917; creek dry during periods in each year.

DIVERSIONS.—About 4,000 acres of land, mostly in wild hay, is irrigated above station. Dunn Field ditch diverted from 25 to 47 second-feet of water past gage March 20-28, 1921, and from 22 to 39 second-feet April 27 to May 2. These diversions included in determinations of discharge of Silver Creek at gaging station.

REGULATION.—Small amount of water is stored in dams used to subirrigate lands within a few miles above station.

ACCURACY.—Stage-discharge relation changed slightly due to removal of obstruction above gage March 8. Rating curve used before change fairly well defined; curve used after the change, well defined. Gage read to half-tenths twice a day. Daily discharge ascertained by applying mean daily gage height to rating table. Records good.

Records of combined discharge of Silver Creek and Dunn Field ditch good except for June.

Discharge measurements of Silver Creek at Dunn Field, near Narrows, Oreg., during the year ending September 30, 1921

Date	Made by	Gage height	Discharge	Date	Made by—	Gage height	Discharge
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
Mar. 5	M. V. Dodge	4.35	285	Mar. 21	M. V. Dodge	4.35	298
7	do	4.20	253	Apr. 5	do	4.66	369
8	do	3.86	200	June 3	J. W. Bones	2.75	61

NOTE.—On Mar. 21, Dunn Field ditch carried 26.4 second-feet (gage height, 1.70 feet) as measured by current meter. On June 3 ditch was dry.

Daily discharge, in second-feet, of Silver Creek near Narrows, Oreg., for the year ending September 30, 1921

Day	Feb.	Mar.	Apr.	May	June	Day	Feb.	Mar.	Apr.	May	June
1		62	187	154	78	16		173	322	31	
2		90	217	150	68	17		157	276	39	
3		154	266	115	64	18		190	256	60	
4		224	287	103	56	19		236	236	84	
5		264	368	92	55	20		304	236	92	
6		286	379	87	49	21		336	226	109	
7		253	333	78	52	22		312	246	150	
8		236	287	73	83	23		231	266	109	
9		208	246	68	73	24		212	266	98	
10		190	208	60	55	25		189	246	78	
11		173	226	55	24	26		181	217	68	
12		150	276	48	27	27		176	212	60	
13		173	333	39	27	28	44	170	172	56	
14		190	356	31		29		126	147	56	
15		199	356	31		30		128	183	56	
						31		150		68	

NOTE.—Discharge June 8–13 somewhat uncertain as most of water was carried in Dunn Field ditch. See "Diversions."

Monthly discharge of Silver Creek near Narrows, Oreg., for the year ending September 30, 1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
March	336	62	198	12,200
April	379	147	261	15,500
May	154	31	77.4	4,760
June 1–13	83	27	54.7	1,410
The period				33,900

MISCELLANEOUS DISCHARGE MEASUREMENTS

Discharge measurements of streams in the Great Basin at points other than regular gaging stations, made during the year ending September 30, 1921, are listed in the following table:

Miscellaneous discharge measurements in the Great Basin during the year ending September 30, 1921

Bear River basin

Date	Stream	Tributary to or diverting from—	Locality	Gage height	Discharge
				Feet	*Sec.-ft.*
Feb. 24	Box Elder Creek	Bear River Bay	SW. ¼ sec. 20, T. 9 N., R. 1 W., just above Brigham municipal tailrace, 1½ miles east of Brigham, Utah.		9.6

Miscellaneous discharge measurements in the Great Basin during the year ending September 30, 1921—Continued

Weber River basin

Date	Stream	Tributary to or diverting from—	Locality	Gage height	Discharge
				Feet	*Sec.-ft.*
May 13	Francis Fork	Lost Creek	SW. ¼ sec. 4, T. 5 N., R. 5 E., near confluence with Lost Creek, 10 miles northeast of Croydon, Utah.		32.2
July 7	East Canyon Creek	Weber River	NW. ¼ sec. 10, T. 2 N., R. 3 E., at old measuring weirs, three-eighths mile below Davis & Weber Canal Co's reservoir, 12 miles southeast of Morgan, Utah.	0.75	62
8	do	do	do	1.10	114
21	do	do	do	1.44	175
Aug. 29	do	do	do	1.42	169
Sept. 21	do	do	do	.64	44.4
July 7	do	do	SW. ¼ sec. 31, T. 3 N., R. 3 E., at bridge known as White's crossing, 8 miles southeast of Morgan, Utah.		76
Aug. 29	do	do	SW. ¼ sec. 35, T. 4 N., R. 2 E., at highway bridge, immediately above Littleton canal heading, 1½ miles southwest of Morgan, Utah.		167
July 7	do	do	SW. ¼ sec. 35, T. 4N., R. 2 E. immediately below Littleton canal heading.		46.9
8	do	do	NW. ¼ sec. 27, T. 4 N., R. 2 E., quarter of a mile above confluence with Weber River, and 3 miles northwest of Morgan, Utah.	.84	76
7	Sheep Creek	East Canyon Creek	NE. ¼ sec. 6, T. 2 N., R. 3 E., at confluence with East Canyon Creek and 9 miles southeast of Morgan, Utah.		5.9
7	Porterville canal	do	NW. ¼ sec. 31, T. 3 N., R. 3 E., 300 feet below head of canal and 3 miles southeast of Porterville, Utah.	1.13	15.2
7	Hardscrabble Creek	do	SW. ¼ sec. 24, T. 3 N., R. 2 E., at confluence with East Canyon Creek, 0.3 mile south of Porterville store.		13.9
7	C. G. Porter canal	do	NW. ¼ sec. 24, T. 3 N., R. 2 E., at culvert under main road at Porterville, Utah.		0.5
7	East Richville canal	do	NW. ¼ sec. 24, T. 3 N., R. 2 E., at head of canal at Porterville, Utah.	1.45	7.3
7	West Richville canal	do	NE. ¼ sec. 14, T. 3 N., R. 2 E., at head of canal, 1½ miles northwest of Porterville, Utah.	1.76	9.2
7	Welch canal	do	NE. ¼ sec. 11, T. 3 N., R. 2 E., near head of canal, 2 miles southwest of Morgan, Utah.	2.10	8.4
Aug. 29	do	do	do	1.41	3.5
July 7	Littleton canal	do	SW. ¼ sec. 35, T. 4 N., R. 2 E., at head of canal 1½ miles west of Morgan, Utah.	1.52	29.9
Aug. 29	do	do	do	1.53	11.6
May 1	Downs canal	South Fork of Ogden River.	NE. ¼ sec. 15, T. 6 N., R. 2 E., near head of canal, and 3 miles east of Huntsville, Utah.		18.4

Miscellaneous discharge measurements in the Great Basin during the year ending September 30, 1921—Continued

Jordan River basin

Date	Stream	Tributary to or diverting from—	Locality	Gage height	Discharge
				Feet	*Sec.-ft.*
Sept. 12	Bonneville High-lift canal.	Jordan River	SE. ¼ sec. 11, T. 1 N., R. 1 W. three-eighths of a mile north of Salt Lake-Davis County line, Utah.	2.32	28.4

Sevier Lake basin

Nov. 22	Sevier River	Sevier Lake	SE. ¼ sec. 27, T. 15 S., R. 5 W., at former gaging station 3½ miles southwest of Lynndyl, Utah.	1.58	25.2
Oct. 8	do	do	NW. ¼ sec. 27, T. 16 S., R. 6 W., at former gaging station below Delta spillway, 6½ miles northeast of Delta, Utah.	.36	31.
Nov. 23	do	do	do	.30	23.4
Mar. 31	Clear Creek	Sevier River	SE. ¼ sec. 32, T. 25 S., R. 4 W., 100 yards above confluence with Sevier River at Sevier, Utah.		35.5
29	San Pitch River	do	NW. ¼ SW. ¼ sec. 13, T. 19 S., R. 1 W., 1,000 feet below a small diversion dam, half a mile above confluence with Sevier River, and 3 miles west of Gunnison, Utah.		44.9

Beaver River basin

Jan. 13	Coal Creek		E. ½ sec. 13, T. 36 S., R. 11 W., about 500 feet above power plant of Cedar Electric Co. and about 1¾ miles southeast of Cedar City, Utah.	1.90	18.8
Apr. 4	do		do	.87	43.9
July 6	do		do	.69	35.8

Walker Lake basin

May 13	East Walker River	Walker River	Sec. 27, T. 6 N., R. 25 E., half a mile above the highway bridge and 6 miles below Bridgeport, Calif.	2.81	271
June 25	do	do	do	4.21	530
July 7	do	do	do	3.25	411
Aug. 13	do	do	do	2.12	113
14	do	do	do	2.00	66
25	do	do	do	1.91	54
Sept. 19	do	do	do	2.00	61
Apr. 28	Walker River	Walker Lake	Sec. 32, T. 14 N., R. 28 E., immediately above Indian Reservation dam and 7 miles north of Schurz, Nev.		25.1
Aug. 3	do	do	do		14.2
Apr. 28	Walker River Indian canal No. 2.	Walker River	Sec. 32, T. 14 N., R. 28 E., at head of canal, 7 miles north of Schurz, Nev.		21.0
June 10	do	do	30 feet below head of lateral A at Schurz, Nev.		6.3
10	do	do	300 feet below lateral D, 1¼ miles east of Schurz, Nev.	.55	6.7
10	Walker River Indian canal No. 1.	do	Half a mile below head and 4 miles west of Schurz, Nev.	1.28	40.8
Aug. 3	do	do	100 feet below head gate near Schurz, Nev.		10.0

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Miscellaneous discharge measurements in the Great Basin during the year ending September 30, 1921—Continued

Humboldt-Carson Sink basin

Date	Stream	Tributary to or diverting from—	Locality	Gage height	Discharge
				Feet	*Sec.-ft.*
Oct. 7	West Carson River	Carson River	SE. ¼ sec. 34, T. 11 N., R. 19 E., at highway bridge at Woodfords, Calif.	0.83	8.80
Dec. 17	do	do	do	1.30	26.1
Jan. 19	do	do	do	1.28	18.8
Apr. 26	do	do	do	2.64	274
June 8	do	do	do	3.18	443
Aug. 1	do	do	do	1.58	59
Apr. 26	Ellis & Dudley canal	West Carson River	Sec. 34, T. 11 N., R. 19 E., at Woodfords, Calif.		13.6
June 8	do	do	do		8.6
Apr. 26	Springmeyer canal	do	do		9.9
June 8	do	do	do		10.7
Apr. 26	Snowshoe-Thompson canal.	do	do		8.0
June 8	do	do	do		10.2
8	Woodfords canal	do	do		.8
Aug. 4	Humboldt River	Humboldt Sink	Sec. 21, T. 36 N., R. 38 E., at Winnemucca, Nev.	4.22	283

Pyramid and Winnemucca Lakes basin

Jan. 18	Truckee River	Pyramid Lake	Sec. 11, T. 19 N., R. 19 E. at former gaging station "Truckee River at Reno, Nev."	1.98	656
18	Riverside Milling Co.'s canal.	Truckee River	Sec. 11, T. 19 N., R. 19 E., 1,000 feet below Riverside bridge at Reno, Nev. Canal diverts on left bank 900 feet above bridge.		64
18	Sullivan & Kelly canal	do	Sec. 11, T. 19 N., R. 19 E., 1,000 feet below Riverside bridge at Reno, Nev. Canal diverts on left bank 800 feet above bridge.		43

Honey Lake basin

May 30	Long Valley Creek	Honey Lake	Old gaging station near Scotts, Calif.	3.80	6.5
Feb. 21	Susan River	do	Below old electric light plant near Susanville, Calif.		91
22	do	do	do		51
23	do	do	do		89
24	do	do	do		68
21	Electric Light Co.'s flume.	Susan River	Gage No. 1 near head gate at Susanville, Calif.	1.30	6.1
May 28	do	do	do	1.45	8.6
28	do	do	do	1.30	7.1
28	do	do	do	.30	1.3
29	do	do	do	.30	1.3
29	do	do	do	.80	4.2
29	do	do	do	1.30	7.1
29	do	do	do	1.70	11.4
Sept. 15	do	do	do	.37	2.1
Feb. 21	do	do	Gage No. 2 opposite gage on Susan River.	3.60	3.2
Sept. 15	Ramsey ditch	Electric Light Co.'s flume.	Opposite gage on Susan River		1.7

Miscellaneous discharge measurements in the Great Basin during the year ending September 30, 1921—Continued

Warner Lakes basin

Date	Stream	Tributary to or diverting from—	Locality	Gage height	Discharge
				Feet	*Sec.-ft.*
May 7	Crump ditch	Deep Creek	Adel, Oreg.	0.82	1.1
23	do	do	do	1.00	2.5
Apr. 9	Morris-O'Keefe (Fitzgerald) canal.	do	do	.98	7.3
29	do	do	do	1.07	7.4
May 1	do	do	do	1.50	11.4
June 24	do	do	do	.70	4.0
Apr. 9	Messner Wible ditch	do	do	.65	3.6
19	do	do	do	.16	.4
23	do	do	do	.88	5.5
29	do	do	do	1.17	8.8
Apr. 23	Wible ditch	do	do	.45	.13
May 1	do	do	do	1.48	3.6
7	do	do	do	1.08	2.1
June 24	do	do	do	.62	.43
Sept. 8	do	do	do	.88	.19
Apr. 9	Givan ditch	do	do	1.02	5.1
19	do	do	do	1.30	7.0
May 5	do	do	do	1.44	9.2
June 8	do	do	do	.80	2.1
May 4	Flagstaff Lake inlet	Flagstaff Lake	Old gaging station near Plush, Oreg.	2.40	221
June 9	do	do	do	3.09	346

Abert Lake basin

June 6	Conn ditch	Chewaucan River	Old gaging station near Paisley, Oreg.	1.52	7.0
July 15	do	do	do	1.65	7.4
Aug. 24	do	do	do	1.43	2.6
31	do	do	do	1.4	4.5
Mar. 7	Bagley ditch	do	do	1.00	4.9
Apr. 28	do	do	do	1.50	12.8
June 6	do	do	do	1.50	33.4
19	do	do	do	1.56	33.1
Aug. 24	do	do	do	.40	1.5

Summer Lake basin

Aug. 23	Ana River	Summer Lake	Below dam of Summer Lake Irrigation District.	.76	122

Malheur Lake basin

Apr. 1	Silvies River	Malheur Lake	McDowell ranch 2 miles above mouth of Emigrant Creek.	-------	715
11	West Fork of Silvies River.	do	Old gaging station near Lawen, Oreg.	8.95	80.8
May 26	do	do	do	9.00	542

Miscellaneous discharge measurements in the Great Basin during the year ending September 30, 1921—Continued

Harney Lake basin

Date	Stream	Tributary to or diverting from—	Locality	Gage height	Discharge
				Feet	*Sec.-ft.*
Mar. 8	Silver Creek	Harney Lake	Near mouth, Oreg.	0.60	2.5
22	do	do	do	1.10	24.4
May 19	do	do	do	1.85	11.7
June 4	do	do	do	.66	8.6
Mar. 3	Chickahominy Creek	Silver Creek	Francis ranch, near mouth, in sec. 29, T. 23 S., R. 26 E., Oreg.	1.25	87
10	do	do	do	.57	13
4	Thornberg Creek	do	Near mouth, at former Riley Post Office, Oreg.	1.40	18
4	Rock Quarry Creek	do	Bridge on old Bend-Burns road near Suntex, Oreg.	.90	16.4
7	do	do	do	.60	5.7
Apr. 24	"00" spring	Harney Lake	Sec. 24, T. 26 S., R. 28 E., Oreg.	-------	15.2
Mar. 8	"00" drainage canal	do	Near Harney Lake, in sec. 36, T. 26 S., R. 29 E., Oreg.	.60	9.9
Apr. 14	do	do	do	1.50	161
June 4	do	do	do	1.40	10.5

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