69TH CONGRESS, 1st Session } HOUSE OF REPRESENTATIVES { DOCUMENT No. 81

DEPARTMENT OF THE INTERIOR
Hubert Work, Secretary

U. S. GEOLOGICAL SURVEY
George Otis Smith, Director

Water-Supply Paper 587

SURFACE WATER SUPPLY OF THE UNITED STATES

1924

PART VII. LOWER MISSISSIPPI RIVER BASIN

NATHAN C. GROVER, Chief Hydraulic Engineer
H. C. BECKMAN, ROBERT FOLLANSBEE, H. B. KINNISON
and C. E. ELLSWORTH, District Engineers

Prepared in cooperation with the States of
MISSOURI, COLORADO, KANSAS, and TEXAS

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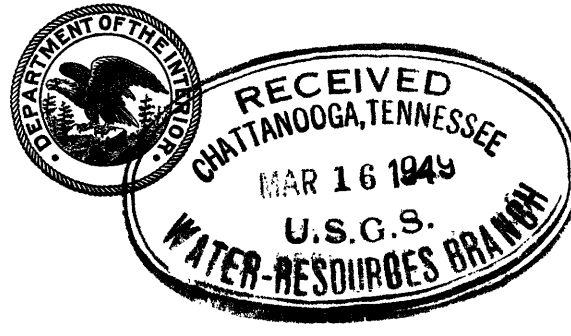

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ILLUSTRATION

SURFACE WATER SUPPLY OF LOWER MISSISSIPPI RIVER BASIN, 1924

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, 1924.

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 appropriation bills passed by Congress have carried the following items:

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

Annual appropriations for the fiscal years ending June 30, 1895–1925

1895	$12,500.00
1896	[1] 24,500.00
1897 to 1899, inclusive	50,000.00
1900	[2] 70,000.00
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 1923, inclusive	180,000.00
1924 to 1925, inclusive	170,000.00

In the execution of the work many private and State organizations have cooperated either by furnishing data or by assisting in collecting data. Acknowledgments for cooperation of the first kind are made in connection with the description of each station affected; cooperation of the second kind is acknowledged on page 10.

Measurements of stream flow have been made at about 4,990 points in the United States and also at many points in Alaska and the

[1] Includes $4,500 appropriated in act of Apr. 25, 1896.
[2] Includes $20,000 appropriated in deficiency act of Mar. 30, 1900.

Hawaiian Islands. In July, 1924, 1,670 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, and 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 a 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.

The "point of zero flow" for a 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, 1923, and ending September 30, 1924. At the beginning of January in most parts of the United States much of the precipitation in the preceding three months is stored in the form of snow or ice, or in ponds, lakes, and swamps, or as ground water, 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

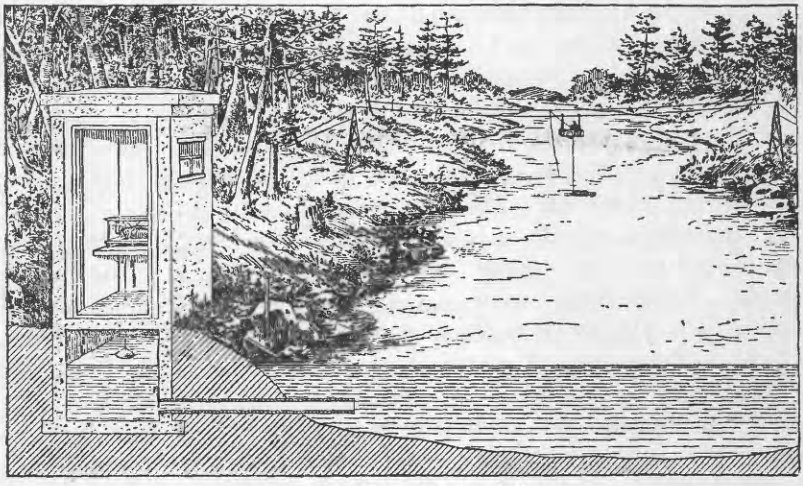

FIGURE 1.—Typical gaging station

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 chain gage or from a water-stage recorder that gives a continuous record of the fluctuations. Measurements of discharge are made with a current meter. The general methods are outlined in standard textbooks on the measurement of river discharge. A typical gaging station, equipped with water-stage recorder and measuring cable and car is shown in Figure 1.

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 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 permanence of the stage-discharge relation, covering such subjects as the occurrence of ice, the use of the stream for log driving, shifting of control, and the cause and effect of backwater; it gives also information as to diversions that decrease the flow at the gage, artificial regulation, maximum and minimum recorded stages, and the accuracy of the records.

The table of daily discharge gives, in general, the discharge in second-feet corresponding to the mean of the gage heights read each day. At stations on streams subject to sudden or rapid diurnal 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 principle of the planimeter and containing as an essential element the rating curve of the station.

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

ACCURACY OF FIELD DATA AND COMPUTED RESULTS

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

A paragraph in the description of the station gives information regarding the (1) permanence of the stage-discharge relation, (2) percision 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.

For the rating tables "well defined" indicates, in general, that the rating is probably accurate within 5 per cent; "fairly well defined," within 10 per cent; "poorly defined," within 15 to 25 per cent. These notes are very general and are based on the plotting of the individual measurements with reference to the mean rating curve.

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

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

PUBLICATIONS

Investigation of water resources by the United States Geological Survey has consisted in large part of measurements of the volume of flow of streams and studies of the conditions affecting that flow, but it has comprised also investigation of such closely allied subjects as irrigation, water storage, water powers, 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 monographs, bulletins, professional papers, and annual reports.

The results of stream-flow measurements are now published annually in 12 parts, each part covering an area whose boundaries coincide with natural drainage features as indicated below:

Part I. North Atlantic slope basins (St. John River to York River).
II. South Atlantic slope and eastern Gulf of Mexico basins (James River to the Mississippi.
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 Basin.
IX. Colorado River Basin.
X. Great Basin.
XI. Pacific slope basins in California.
XII. North Pacific slope basins, in three parts:
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. Sets 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., 904 Home Savings Bank Building.
Trenton, N. J., Statehouse.
Charlottesville, Va., care of University of Virginia.
Asheville, N. C., 316 Jackson Building.
Chattanooga, Tenn., 830 Power Building.
Columbus, Ohio, Engineering Experiment Station, Ohio State University.
Chicago, Ill., 1510 Consumers Building.
Madison, Wis., care of Railroad Commission of Wisconsin.
Rolla, Mo., Rolla Building, School of Mines and Metallurgy.
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., 106 College of Law Building, University of Arizona.
Austin, Tex., State Capitol.
Honolulu, Hawaii, Territorial Office Building.

A list of the Geological Survey's publications may be obtained by applying to the Director of the United States Geological Survey, Washington, D. C.

Stream-flow records have been obtained at about 4,990 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 September, 1890.
12th A, pt. 2	do	1884 to June 30, 1891.
13th A, pt. 3	Mean discharge in second-feet	1884 to Dec. 31, 1892.
14th A, pt. 2	Monthly discharge (long-time records, 1871 to 1893)	1888 to Dec. 31, 1893.
B 131	Descriptions, measurements, gage heights, and ratings	1893 and 1894.
16th A, pt. 2	Descriptive information only	1895.
B 140	Descriptions, measurements, gage heights, ratings, and monthly discharge (also many data covering earlier years).	
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 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	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	1919–20.
W 521 to 534	do	1921.
W 541 to 554	do	1922.
W 561 to 574	do	1923.
W 581 to 594	do	1924.

NOTE.—No data regarding stream flow are given in the Fifteenth and Seventeenth Annual Reports.

The records at most of the stations discussed in these reports extend over a series of years, and miscellaneous measurements at many points other than regular gaging stations have been made each year. An index of the reports containing records obtained prior to 1904 has been published in Water-Supply Paper 119.

The following table gives, by years and drainage basins, the numbers of the papers on surface-water supply published from 1899 to 1924. The data for any particular station will, as a rule, 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 1921, 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, 1899–1924

[For basins included see p. 6]

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	[k] 65, 66, 75	66, 75	66, 75	66, 75	66, 75	66, 75	66, 75	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	175, [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
1922	541	542	543	544	545	546	547	548	549	550	551	552	553	554
1923	561	562	563	564	565	566	567	568	569	570	571	572	573	574
1924	581	582	583	584	585	586	587	588	589	590	591	592	593	594

[a] Rating tables and index to Water-Supply Papers 35–39 contained in Water-Supply Paper 39. Tables of monthly discharge for 1899 in Twenty-first Annual Report, Part IV.
[b] James River only.
[c] Gallatin River.
[d] Green and Gunnison Rivers and Grand River above junction with Gunnison.
[e] Mohave River only.
[f] Kings and Kerns Rivers and south Pacific slope drainage 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. Tables of 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

In Missouri the work was done in cooperation with the Missouri Bureau of Geology and Mines, through H. A. Buehler, State geologist. Financial assistance has also been rendered by the United States Weather Bureau, Little River Drainage District, Western Tie & Timber Co., Ozark Power & Water Co., and Hugh L. Cooper & Co.

In Arkansas the station on White River at Beaver, Ark., was maintained in cooperation with the Ozark Power & Water Co., and the stations on Ouachita River near Hot Springs and Malvern, Ark., were maintained in cooperation with the Arkansas Light & Power Co.

In Kansas the work was done in cooperation with the Kansas Water Commission, Gov. Jonathan M. Davis, chairman; H. A. Rice, secretary; and H. B. Walker. Financial assistance was also rendered by G. S. Knapp, State irrigation commissioner; city of Wichita, P. L. Brockway, city engineer; and Kansas Gas & Electric Co.

The Oklahoma Gas & Electric Co. cooperated in the maintenance of all stations in Oklahoma.

In Texas the work was carried on in cooperation with the Texas Board of Water Engineers, consisting of John A. Norris, chairman, C. S. Clark, and A. H. Dunlop.

The station on Bayou Cocodrie near Meeker, La., was maintained in cooperation with the Louisiana Gravity Canal Co.

DIVISION OF WORK

Data for stations in Missouri and Arkansas were collected and prepared for publication under the direction of H. C. Beckman, district engineer, assisted by V. L. Austin, W. S. Frame, and H. H. Brittingham.

Data for stations in Colorado were collected and prepared for publication under the direction of Robert Follansbee, district engineer, assisted by P. V. Hodges, J. W. Mangan, and Miss Florence M. Hall.

Data for stations in Kansas and Oklahoma were collected and prepared for publication under the direction of H. B. Kinnison, district engineer, assisted by G. H. Barger, J. H. Hofmann, and C. P. Heartburg.

Data for stations in Texas were collected and prepared for publication under the direction of C. E. Ellsworth, district engineer, assisted by C. E. McCashin, A. G. Fiedler, W. E. Armstrong, D. S. Wallace, Trigg Twichell, H. C. Pritchett, T. A. Slack, C. C. Crosnoe, E. A. Schlaudt, O. S. L. Talbot, Tate Dalrymple, N. C. Magnuson, H. W. McCue, Morris Reedy, J. A. Muncey, W. T. Guyton, Kate Casparis, and Katherine E. Hickey.

The manuscript was assembled and reviewed by D. S. Wallace.

GAGING-STATION RECORDS

MERAMEC RIVER BASIN

MERAMEC RIVER NEAR STEELVILLE, MO.

LOCATION.—In NE. ¼ sec. 21, T. 38 N., R. 4 W., at highway bridge on Steelville-Cuba road, 400 feet below St. Louis-San Francisco Railway bridge, half a mile above Whittenberg Creek, 2 miles below Perigee Spring, and 2½ miles north of Steelville, Crawford County.

DRAINAGE AREA.—Approximately 830 square miles (measured on topographic and soil survey maps).

RECORDS AVAILABLE.—December 21, 1922, to September 30, 1924. The United States Weather Bureau has records of stage 1 mile upstream since October 1, 1916.

GAGE.—Chain gage on downstream side of bridge; read by William Weis.

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

CHANNEL AND CONTROL.—Bed composed of clean, coarse gravel. Left bank high and rocky. Right bank thinly wooded; subject to overflow at extreme high stages. Control is a gravel bar extending 200 feet downstream from bridge; fairly permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 12.43 feet at 6 p. m. May 29 (discharge, 11,900 second-feet); minimum stage, 0.58 foot October 16 (discharge, 140 second-feet).

1923–24: Maximum and minimum stages same as for year ending September 30, 1924, as given above.

Maximum stage of 26.5 feet (determined from records of United States Weather Bureau) occurred August 20, 1915.

REGULATION.—Natural regulation by large springs.

ACCURACY.—Stage-discharge relation not permanent; not affected by ice. Rating curves fairly well defined. Gage read to hundredths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table except as described in footnote to table of daily discharge. Records good except those for estimated periods.

Discharge measurements of Meramec River near Steelville, Mo., during the year ending September 30, 1924

Date	Gage height	Discharge	Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Oct. 25	0.72	160	Apr. 12	2.19	964	May 5	1.04	280
Jan. 26	.91	212	Do	2.10	965	Aug. 21	1.23	338

Daily discharge, in second-feet, of Meramec River near Steelville, Mo., for the year ending September 30, 1924

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	160	228	185	290	237	282	898	365	1,960		540	
2	160	210	185	273	256	290	710	330	1,640		480	
3	157	185	185	265	277	248	605	290	1,010		450	
4	154	198	185	256	282	290	540	282	890		450	
5	150	228	245	237	480	290	480	269	760		390	
6	150	228	355	237	510	290	450	265	640		315	
7	150	210	405	237	450	282	420	256	570		277	
8	150	198	430	226	420	273	390	248	390		265	240
9	150	198	455	212	390	265	2,370	310	450		260	
10	150	185	508	212	355	265	4,850	269	420	480	277	
11	150	185	535	223	320	265	1,480	248	510		2,640	
12	150	172	618	226	305	256	972	252	1,960		10,700	
13	150	172	6,940	219	335	248	785	246	1,400		2,200	
14	160	185	5,180	219	365	248	640	239	1,080		1,080	
15	160	185	1,580	216	325	260	540	232	860		822	206
16	140	185	960	209	325	265	510	226	605		748	206
17	172	185	765	198	420	290	480	212	675		570	206
18	185	185	618	195	1,320	290	450	212	2,120		480	206
19	185	185	562	203	1,160	300	390	212	4,850	3,640	450	209
20	210	172	480	176	898	330	340	212	1,720	4,520	420	2,640
21	228	172	480	186	710	340	340	212	2,120	2,640	365	3,230
22	198	172	480	195	570	510	315	209	1,530	1,640	325	860
23	185	172	480	186	540	605	320	212	935	1,160	295	570
24	185	172	480	192	480	822	365	2,460	935	935	335	450
25	172	185	480	189	450	710	273	1,240	935	748	450	420
26	172	185	508	203	450	540	265	785	1,640	605	335	340
27	160	172	480	206	420	510	265	2,280	2,550	510	290	305
28	172	172	430	209	365	510	265	4,520	935	450	277	273
29	172	172	405	212	340	1,960	256	11,200	748	420	252	265
30	185	172	355	223	-------	2,280	277	7,930	710	390	241	248
31	228	-------	330	234	-------	1,400	-------	4,940	-------	365	240	-------

NOTE.—Discharge interpolated for Oct. 3–4, Feb. 10 and 13, Apr. 7, May 13–15 and 31, June 4–5 and 22; estimated from discharge of Meramec Spring near St. James and Meramec River near Sullivan for July 1–18 and Aug. 31 to Sept. 14; gage not read. Braced figures show mean discharge for periods indicated.

Monthly discharge of Meramec River near Steelville, Mo., for the year ending September 30, 1924

[Drainage area, 830 square miles]

Month	Discharge in second-feet				Run-off in inches
	Maximum	Minimum	Mean	Per square mile	
October	228	140	169	0.204	0.24
November	228	172	188	.227	.25
December	6,940	185	848	1.02	1.18
January	290	176	218	.263	.30
February	1,320	237	474	.571	.62
March	2,280	248	507	.611	.70
April	4,850	256	708	.853	.95
May	11,200	209	1,330	1.60	1.84
June	4,850	390	1,250	1.51	1.68
July	4,520	365	860	1.04	1.20
August	10,700	240	878	1.06	1.22
September	3,230	206	466	.561	.63
The year	11,200	140	659	.794	10.81

MERAMEC RIVER NEAR SULLIVAN, MO.

LOCATION.—In N. ½ SW. ¼ sec. 35, T. 40 N., R. 2 W., at Sappington highway bridge, 3½ miles below Brazil Creek, 4½ miles below Thickety Creek, and 6 miles southeast of Sullivan, Franklin County. Gage is in Crawford County.

DRAINAGE AREA.—1,550 square miles (measured on topographic and soil survey maps).

RECORDS AVAILABLE.—September 9, 1921, to September 30, 1924.

GAGE.—Chain gage bolted to upstream side of bridge; read by John V. Sappington.

DISCHARGE MEASUREMENTS.—Made from downstream side of bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of silt, gravel, and rock; clean and fairly permanent. Right bank high, rocky, and not subject to overflow. Left bank is wooded and is overflowed at stage of about 20 feet. Control is a bar of gravel and boulders 400 feet below gage; practically permanent. Small trees and brush grow on high parts of bar.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 17.25 feet at 7.30 p. m. April 9 (discharge from extension of rating curve, 15,400 second-feet); minimum stage, 1.68 feet October 12 (discharge, 304 second-feet).

1921–1924: Maximum stage recorded, that of April 9, 1924, as given above; minimum stage, 1.58 feet August 14, 1922 (discharge, 273 second-feet).

The flood of August, 1915, reached a stage of about 30.7 feet (determined by levels to somewhat indefinite floodmarks).

REGULATION.—Natural regulation by large springs.

ACCURACY.—Stage-discharge relation permanent during year; not affected by ice. Rating curve well defined below 11,000 second-feet. Gage read to hundredths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table. Records good.

The following discharge measurements were made:
October 23, 1923: Gage height, 2.01 feet; discharge, 403 second-feet.
April 5, 1924: Gage height, 3.44 feet; discharge, 1,090 second-feet.
August 19, 1924: Gage height, 2.83 feet; discharge, 749 second-feet.

Daily discharge, in second-feet, of Meramec River near Sullivan, Mo., for the year ending September 30, 1924

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	330	462	392	630	500	630	1,980	675	3,240	870	820	462
2	330	462	392	630	500	585	1,620	675	2,570	720	820	500
3	317	462	426	585	540	585	1,380	630	2,100	675	770	585
4	317	462	462	540	630	540	1,260	585	1,740	675	675	630
5	317	500	540	540	720	540	1,020	585	1,500	630	585	540
6	317	500	820	585	820	540	970	540	2,360	585	540	462
7	317	500	870	500	820	500	970	630	1,500	585	540	426
8	317	462	870	462	720	500	920	585	1,320	540	540	426
9	317	426	920	462	675	462	11,400	585	1,200	540	500	392
10	304	392	920	462	630	500	8,670	585	1,140	540	462	392
11	304	392	1,080	462	630	462	3,880	540	1,440	500	2,290	376
12	304	392	1,440	462	585	462	2,500	500	3,080	500	4,440	376
13	304	376	6,870	462	585	462	1,920	500	2,850	500	6,180	360
14	317	376	7,710	426	585	500	1,620	462	2,220	1,320	1,920	345
15	317	376	3,400	426	585	500	1,440	462	1,800	2,570	1,320	345

Daily discharge, in second-feet, of Meramec River near Sullivan, Mo., for the year ending September 30, 1924—Continued

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
16	330	376	2,360	426	585	540	1,260	462	1,500	1,620	1,080	360
17	360	376	1,800	426	720	540	1,140	426	1,320	1,380	970	360
18	462	376	1,500	426	1,260	585	1,020	426	2,500	1,380	820	360
19	540	360	1,380	426	1,860	630	970	462	5,100	1,500	720	376
20	540	360	1,260	392	1,560	675	870	720	4,360	7,350	675	1,920
21	500	360	1,200	392	1,320	720	820	585	3,400	5,100	585	4,360
22	462	360	1,260	392	1,140	770	770	500	2,290	3,080	540	1,980
23	419	376	1,320	392	970	970	720	500	1,860	2,100	540	1,260
24	376	376	1,320	426	920	1,500	675	4,440	1,620	1,620	585	870
25	360	360	1,140	426	870	1,380	630	3,400	1,320	1,440	540	770
26	360	360	1,080	462	820	1,200	630	2,360	2,220	1,140	585	630
27	360	360	1,020	426	720	1,080	585	3,560	1,620	920	500	585
28	345	360	920	426	720	1,260	585	9,750	1,440	870	462	540
29	376	360	820	426	675	2,710	585	13,100	1,260	770	462	500
30	426	376	770	426	------	5,100	630	12,800	1,080	720	426	462
31	462	-------	720	462	-------	2,920	-------	5,630	-------	675	426	-------

NOTE.—Gage not read Oct. 23 and Apr. 6–8; discharge estimated.

Monthly discharge of Meramec River near Sullivan, Mo., for the year ending September 30, 1924

[Drainage area, 1,550 square miles]

Month	Discharge in second-feet				Run-off in inches
	Maximum	Minimum	Mean	Per square mile	
October	540	304	368	0.237	0.27
November	500	360	401	.259	.29
December	7,710	392	1,520	.981	1.13
January	630	392	464	.299	.34
February	1,860	500	816	.526	.57
March	5,100	462	979	.632	.73
April	11,400	585	1,780	1.15	1.28
May	13,100	426	2,180	1.41	1.63
June	5,100	1,080	2,100	1.35	1.51
July	7,350	500	1,400	.903	1.04
August	6,180	426	1,040	.671	.77
September	4,360	345	732	.472	.53
The year	13,100	304	1,150	.742	10.09

MERAMEC RIVER NEAR EUREKA, MO.

LOCATION.—In SE. ¼ sec. 32, T. 44 N., R. 4 E., at Votaw Ford highway bridge on Eureka-Valley Park road, one-fourth mile below Antire Creek, 1½ miles above St. Louis-San Francisco Railway bridge, 2 miles east of Eureka, St. Louis County, 3 miles below Big River, and 35 miles above mouth.

DRAINAGE AREA.—3,800 square miles (measured on topographic and soil survey maps).

RECORDS AVAILABLE.—August 26, 1903, to July 21, 1906, and October 6, 1921, to September 30, 1924.

GAGE.—Chain gage bolted to handrail on downstream side of bridge; read by J. W. Paul. Datum of present gage not same as that used 1903 to 1906.

DISCHARGE MEASUREMENTS.—Made from downstream side of highway bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of coarse gravel and boulders. Right bank high, rocky, and wooded. Left bank wooded at edge and cultivated beyond; is overflowed at stage of about 27 feet. Control is a short section of river channel of rock and gravel just below gage; clean and fairly permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 20.50 feet at 6 p. m. May 30 (discharge, 31,000 second-feet); minimum stage, 0.76 foot October 12–13 (discharge, 495 second-feet).

1922–1924: Maximum stage recorded, 24.45 feet April 19, 1922 (discharge, 38,600 second-feet); minimum stage, 0.60 foot September 28, 1922 (discharge, 320 second-feet).

The flood of August 22, 1915, reached a stage of 38.8 feet, and the flood of February 1, 1916, a stage of 35.6 feet, determined by levels to high-water marks.

REGULATION.—None.

ACCURACY.—Stage-discharge relation permanent during year; not affected by ice. Rating curve fairly well defined. Gage read to hundredths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table, except as described in footnote to table of daily discharge. Records good.

Discharge measurements of Meramec River near Eureka, Mo., during the year ending September 30, 1924

Date	Gage height	Discharge	Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Oct. 24	1.38	816	Mar. 21	2.80	2,220	Aug. 14	7.36	7,760
Dec. 5	2.55	1,850	May 10	1.89	1,200	Aug. 20	2.18	1,560
Feb. 18	3.66	3,360	May 31	20.03	29,700			

Daily discharge, in second-feet, of Meramec River near Eureka, Mo., for the year ending September 30, 1924

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	550	960	820	3,060	1,210	1,310	7,810	1,310	12,000	3,640	1,410	1,210
2	550	960	855	1,740	1,310	1,630	5,600	1,310	10,700	2,200	2,930	1,120
3	550	1,000	855	1,520	1,520	1,520	4,950	1,210	7,810	1,960	2,680	1,040
4	550	1,410	960	1,520	2,440	1,410	3,430	1,120	5,730	1,740	1,410	1,040
5	530	1,520	1,960	1,960	2,800	1,410	2,680	1,040	4,820	1,630	1,310	1,000
6	510	1,630	2,560	2,320	3,560	1,410	2,680	1,210	5,730	1,520	1,210	960
7	510	1,520	3,430	2,440	3,180	1,310	2,440	2,680	5,600	1,410	1,040	855
8	510	1,310	3,800	2,320	2,680	1,310	1,960	1,310	5,210	1,310	1,000	820
9	510	1,210	3,430	1,850	2,320	1,210	11,800	1,120	4,560	1,210	1,000	760
10	510	1,040	3,430	1,210	1,960	1,210	18,100	1,120	4,060	1,040	1,630	700
11	510	925	5,210	1,210	1,850	1,210	16,500	1,310	10,100	1,120	2,200	700
12	495	890	5,080	1,120	1,630	1,210	16,300	1,040	22,400	1,040	5,860	700
13	495	890	17,200	1,040	1,520	1,210	9,990	960	16,800	1,120	7,940	670
14	530	855	21,500	1,040	1,520	1,210	3,680	1,000	10,900	1,210	6,900	670
15	530	820	18,500	1,040	1,520	1,120	3,560	925	7,290	2,800	3,800	670
16	530	790	19,200	1,220	1,630	1,410	3,300	820	6,120	5,210	2,680	670
17	550	760	6,510	1,410	2,560	1,410	3,060	925	4,300	4,690	2,320	670
18	700	760	4,950	2,680	3,930	1,520	2,440	925	5,210	4,690	1,960	670
19	1,000	760	4,060	1,740	6,380	1,740	2,080	962	10,100	4,690	1,740	820
20	1,000	730	3,930	1,740	6,250	2,080	1,960	1,000	12,800	9,650	1,520	925
21	1,210	730	3,680	1,410	4,960	2,080	1,900	2,930	11,700	9,800	1,120	5,730
22	1,040	700	3,800	1,410	3,680	2,440	1,850	2,800	10,200	10,100	925	6,120
23	925	730	4,430	1,630	2,930	3,300	1,740	2,680	9,200	6,120	1,120	3,930
24	855	730	4,300	1,740	2,680	4,300	1,630	12,200	5,730	4,180	1,850	2,560
25	760	760	4,060	2,080	2,440	4,560	1,520	14,600	4,560	3,800	1,740	1,960
26	730	760	3,680	1,740	2,320	4,060	1,410	13,200	3,680	3,560	1,630	1,630
27	670	730	3,430	1,740	1,960	3,300	1,310	11,700	5,080	2,440	1,210	1,310
28	670	730	2,930	2,320	1,630	2,930	1,260	23,700	5,340	1,850	960	1,120
29	730	760	2,560	2,200	1,210	10,900	1,210	25,300	5,470	1,740	925	1,040
30	820	790	2,320	1,410	-------	15,800	1,210	30,400	5,080	1,630	925	960
31	890	-------	3,300	1,310	-------	15,200	-------	30,600	-------	1,520	890	-------

NOTE.—Gage not read Oct. 8, Nov. 14, Jan. 16, Feb. 21, Apr. 13, 21, 28, May 19, 26, and July 1; discharge interpolated.

Monthly discharge of Meramec River near Eureka, Mo., for the year ending September 30, 1924

[Drainage area, 3,800 square miles]

Month	Discharge in second-feet				Run-off in inches
	Maximum	Minimum	Mean	Per square mile	
October	1,210	495	675	0.178	0.21
November	1,630	700	939	.247	.28
December	21,500	820	5,380	1.42	1.64
January	3,060	1,040	1,720	.453	.52
February	6,380	1,210	2,610	.687	.74
March	15,800	1,120	3,120	.821	.95
April	18,100	1,210	4,650	1.22	1.36
May	30,600	820	6,240	1.64	1.89
June	22,400	3,680	7,940	2.09	2.33
July	10,100	1,040	3,250	.855	.99
August	7,940	890	2,120	.558	.64
September	6,120	670	1,430	.376	.42
The year	30,600	495	3,340	.879	11.97

MERAMEC SPRING NEAR ST. JAMES, MO.

LOCATION.—In SE. ¼ sec. 1, T. 37 N., R. 6 W., 600 feet below outlet of spring, 1 mile above mouth of Spring Branch, and 6 miles southeast of St. James, Phelps County.

RECORDS AVAILABLE.—March 1, 1903, to July 21, 1906, and November 11, 1921, to September 30, 1924.

GAGE.—Vertical staff gage in two sections fastened to overhanging oak tree on right bank; read by F. E. Beezley. From 1903 to 1906 a vertical staff gage 100 feet above present gage; not set to same datum.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—Bed composed of coarse gravel; small growth of aquatic plants in channel. Control is a coarse gravel bar 200 feet below gage; clean and practically permanent; affected by backwater from Meramec River during high stages.

EXTREMES OF DISCHARGE.—Maximum discharge during year, 388 second-feet July 21; minimum stage, 1.01 feet January 23 and 28; minimum discharge, 73 second-feet November 27–28.

1922–1924: Maximum stage recorded, 3.00 feet June 16, 1923 (affected by backwater from Meramec River); maximum discharge, 420 second-feet March 17, 1923; minimum stage, 1.01 feet January 23 and 28, 1924; minimum discharge, 73 second-feet November 27–28, 1923.

ACCURACY.—Stage-discharge relation not permanent; not affected by ice, but affected by backwater from Meramec River whenever river is more than about 6 feet above low-water stage. Rating curves well defined between 90 and 300 second-feet. Gage read to hundredths once daily except Sundays. Daily discharge ascertained by applying daily gage height to rating table; indirect method for shifting control used June 23 to September 30. Records good.

Discharge measurements of Meramec Spring near St. James, Mo., during the year ending September 30, 1924

Date	Gage height	Discharge	Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Oct. 25	1.13	82	Apr. 4	1.26	156	May 24	1.60	250
Jan. 26	1.03	93	May 5	1.12	108	Aug. 16	1.33	198

Daily discharge, in second-feet, of Meramec Spring near St. James, Mo., for the year ending September 30, 1924

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	83	87	81	a 112	96	116	188	118	a 309	191	157	a 136
2	81	85	a 80	108	98	a 113	171	113	266	185	155	138
3	81	83	79	108	a 103	110	157	113	234	180	a 152	136
4	81	a 83	83	103	108	110	152	a 112	215	a 174	a 149	136
5	79	83	114	98	141	106	144	110	200	168	a 147	133
6	79	83	117	a 98	130	106	a 137	110	185	a 164	a 144	130
7	a 78	83	117	98	118	100	130	108	180	160	a 142	a 128
8	77	81	114	98	110	98	130	113	a 168	155	a 139	126
9	77	81	a 109	96	106	a 98	266	113	157	152	136	123
10	77	79	104	96	b 103	98	250	110	152	146	a 160	120
11	77	a 78	95	96	b 120	98	218	a 109	152	a 145	185	120
12	81	77	120	93	b 133	96	185	108	203	144	b 300	123
13	77	75	b 334	a 93	118	100	a 176	106	234	a 205	283	120
14	a 78	75	334	93	116	100	166	103	212	266	250	a 119
15	79	79	266	93	110	100	157	103	a 194	283	215	118
16	79	77	a 230	96	108	a 105	149	103	177	a 266	197	118
17	81	77	194	90	a 171	110	a 141	103	166	a 250	a 190	118
18	81	a 77	171	90	234	a 113	133	a 103	283	234	182	118
19	83	77	157	93	218	116	128	103	370	334	174	120
20	81	77	149	a 90	188	120	a 127	100	334	a 361	168	215
21	a 81	75	144	88	166	118	126	100	352	388	163	a 185
22	81	75	138	88	a 155	146	126	98	a 318	a 359	157	155
23	81	75	141	86	144	a 150	116	98	283	a 331	152	144
24	81	75	144	88	a 137	155	116	250	250	a 302	a 152	136
25	81	a 75	a 137	96	130	146	116	a 214	234	a 274	152	130
26	79	75	130	93	128	136	113	177	266	a 245	146	126
27	77	73	126	a 90	126	133	a 112	317	250	a 217	141	126
28	a 77	73	123	86	120	128	110	334	234	188	138	a 122
29	77	a 76	120	88	118	283	110	a 340	a 216	182	136	118
30	85	79	a 118	93	-------	a 250	118	a 346	197	168	133	116
31	87	-------	116	96	-------	218	-------	352	-------	160	a 134	-------

a Gage not read; discharge interpolated.
b Stage-discharge relation affected by backwater from Meramec River; discharge estimated.

Monthly discharge of Meramec Spring near St. James, Mo., for the year ending September 30, 1924

Month	Discharge in second-feet			Month	Discharge in second-feet		
	Maximum	Minimum	Mean		Maximum	Minimum	Mean
October	87	77	79.9	May	352	98	154
November	87	73	78.3	June	370	152	233
December	334	79	145	July	388	144	225
January	112	86	94.6	August	300	133	169
February	234	96	133	September	215	116	132
March	283	96	128				
April	266	110	145	The year	388	73	143

BOURBEUSE RIVER AT UNION, MO.

LOCATION.—In SW. ¼ sec. 26, T. 43 N., R. 1 W., at highway bridge on St. Clair-Union road, 800 feet above Flat Creek, 1 mile east of Union, Franklin County, 4 miles below Hamilton Creek, 7 miles above Birch Creek, and 13 miles above mouth.

DRAINAGE AREA.—767 square miles (measured on topographic maps and base map of Missouri).

RECORDS AVAILABLE.—June 7, 1921, to September 30, 1924. The United States Weather Bureau has records of stage since October 19, 1916.

GAGE.—Chain gage on downstream side of bridge; read by W. J. Keller. Prior to September 24, 1921, a vertical staff gage on left bank 150 feet above bridge; set to same datum.

DISCHARGE MEASUREMENTS.—Made from downstream side of bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of clay and coarse gravel. Control is bar of clean, coarse gravel 800 feet below gage; fairly permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 14.16 feet at 6 p. m. May 31 (discharge, 13,700 second-feet); minimum stage, 1.04 feet at 5.45 p. m. October 8 (discharge, 38 second-feet).

1921–1924: Maximum stage recorded, 14.70 feet April 2, 1922 (discharge, 14,600 second-feet); minimum stage, 0.80 foot October 5 and 6, 1922; minimum discharge, 38 second-feet October 8, 1923.

Maximum stage recorded by United States Weather Bureau, 25.5 feet August 22, 1915. Flood of 1897 reached a stage of 26.0 feet (exact date unknown).

REGULATION.—None.

ACCURACY.—Stage-discharge relation not permanent; not affected by ice during the year. Rating curves fairly well defined. Gage read to hundredths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table; indirect method for shifting control used August 30 to September 30. Records good for medium and high stages and fair for low stages.

Discharge measurements of Bourbeuse River at Union, Mo., during the year ending September 30, 1924

Date	Gage height	Discharge	Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Oct. 25	1.19	52	Feb. 21	3.62	1,210	Aug. 21	1.70	134
Dec. 4	2.30	230	May 8	1.62	134			

Daily discharge, in second-feet, of Bourbeuse River at Union, Mo., for the year ending September 30, 1924

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	47	81	102	371	475	452	1,300	113	2,410	390	130	73
2	45	78	106	335	570	390	810	113	1,380	330	490	98
3	45	201	110	318	595	371	580	121	1,420	275	150	104
4	43	275	275	286	770	371	475	165	1,040	222	124	96
5	39	216	465	271	860	335	400	178	705	186	142	75
6	41	170	810	228	1,000	335	360	143	775	165	160	68
7	41	145	1,550	228	860	318	300	162	1,640	152	138	61
8	39	122	1,340	215	650	286	300	127	1,120	130	116	59
9	41	112	1,040	215	498	302	400	115	1,210	126	465	58
10	40	100	810	228	430	286	320	107	1,420	126	415	56
11	40	98	670	215	410	271	280	100	6,770	118	640	55
12	39	90	1,550	215	371	271	340	96	6,650	120	740	55
13	40	86	5,740	215	371	271	300	92	3,840	112	1,300	54
14	48	90	8,800	202	410	286	265	88	4,340	122	610	51
15	47	90	11,900	202	475	286	235	86	1,980	112	370	45
16	48	81	2,770	202	452	302	220	84	1,120	2,230	292	54
17	48	80	1,380	178	740	335	205	78	810	610	131	53
18	100	78	1,000	190	1,840	390	190	78	1,550	440	195	52
19	90	82	860	190	3,040	498	172	86	5,630	1,080	162	55
20	69	81	770	167	1,680	710	168	107	6,650	1,080	140	310
21	59	86	800	167	1,220	710	143	113	2,590	1,800	128	845
22	55	94	1,000	167	860	650	143	119	5,520	1,890	114	920
23	51	104	860	178	680	1,000	134	280	1,800	880	108	580
24	52	96	860	271	570	1,300	117	1,890	1,000	580	240	350
25	51	94	860	302	545	1,000	115	4,440	740	465	140	258
26	49	86	770	390	545	740	109	2,680	580	310	110	204
27	48	82	650	650	570	545	98	2,860	1,800	275	106	168
28	47	76	570	620	545	710	98	6,880	1,340	216	100	148
29	60	94	520	498	475	2,860	97	10,100	880	180	92	120
30	114	108	475	452	------	6,080	127	11,300	550	160	81	114
31	84	------	430	430	------	3,440	------	13,500	------	140	71	------

Monthly discharge of Bourbeuse River at Union, Mo., for the year ending September 30, 1924

[Drainage area, 767 square miles]

Month	Discharge in second-feet				Run-off in inches
	Maximum	Minimum	Mean	Per square mile	
October	114	39	53.5	0.070	0.08
November	275	76	109	.142	.16
December	11,900	102	1,610	2.10	2.42
January	650	167	284	.370	.43
February	3,040	371	776	1.01	1.09
March	6,080	271	842	1.10	1.27
April	1,300	97	293	.382	.43
May	13,500	78	1,820	2.37	2.73
June	6,770	550	2,310	3.01	3.36
July	2,230	112	485	.632	.73
August	1,300	71	265	.346	.40
September	920	45	175	.228	.25
The year	13,500	39	752	.980	13.35

BIG RIVER AT BYRNESVILLE, MO.

LOCATION.—In SE. ¼ sec. 12, T. 42 N., R. 3 E., at highway bridge in Byrnesville, Jefferson County, 200 feet below dam and mill, and 4 miles above Head's Creek and Rockford Dam.

DRAINAGE AREA.—892 square miles (measured on topographic and United States soil survey maps).

RECORDS AVAILABLE.—May 10, 1922, to September 30, 1924.

GAGE.—Chain gage on downstream side of bridge; read by Charles Steidle.

DISCHARGE MEASUREMENTS.—Made from upstream side of bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of silt, gravel, and rock. Control is a bar of clean, coarse gravel 500 feet below gage; practically permanent. Brush grows on the bar above low-water line.

EXTREMES OF DISCHARGE.—Maximum stage recorded during period of records, 17.40 feet at 6 a. m. May 17, 1923 (discharge, 11,100 second-feet); minimum stage, 2.00 feet at 6 p. m. October 1, 1922 (discharge, 64 second-feet).

REGULATION.—Slight diurnal fluctuation in the flow at low stages is caused by gristmills above.

ACCURACY.—Stage-discharge relation permanent except as affected by ice. Rating curve fairly well defined. Gage read to hundredths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table, except for period of ice effect January 3–21, 1924, when gage heights were first corrected by means of observer's notes and weather records. Records good except for discharges less than 200 second-feet and for period of ice effect, for which they are fair.

Discharge measurements of Big River at Byrnesville, Mo., during the year ending September 30, 1924

Date	Gage height	Discharge	Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Oct. 24	3.52	234	Feb. 19	6.98	1,820	Apr. 11	9.80	3,390
Dec. 5	4.46	575	Feb. 20	6.13	1,400	Do	8.37	2,630
Feb. 18	6.29	1,520	Mar. 21	4.69	687	May 10	3.95	327
Feb. 19	7.40	2,040	Apr. 10	17.19	10,900	Aug. 20	3.65	314

Daily discharge, in second-feet, of Big River at Byrnesville, Mo., for the years ending September 30, 1922–1924

Day	May	June	July	Aug.	Sept.	Day	May	June	July	Aug.	Sept.
1922						1922—Con.					
1	-------	246	246	133	133	16	600	185	178	139	133
2	-------	236	440	145	128	17	520	164	157	139	111
3	-------	227	600	139	133	18	560	157	145	122	106
4	-------	209	480	106	246	19	460	157	370	81	100
5	-------	209	280	111	209	20	404	164	323	106	122
6	-------	209	246	100	185	21	370	200	200	139	106
7	-------	200	209	122	151	22	354	236	178	139	100
8	-------	520	185	90	139	23	308	170	151	520	86
9	-------	294	164	95	116	24	338	151	170	690	81
10	870	218	157	90	170	25	323	164	185	404	90
11	780	200	164	100	209	26	294	145	151	338	95
12	780	200	185	90	236	27	520	133	133	227	95
13	645	192	520	72	192	28	440	151	139	178	100
14	600	236	280	72	157	29	387	218	133	157	81
15	600	209	192	81	151	30	294	209	133	151	68
						31	256	-------	133	139	-------

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1922–23												
1	68	133	139	3,700	2,910	480	404	404	1,700	256	145	128
2	86	170	256	2,040	4,630	460	370	370	1,860	236	151	128
3	128	170	227	1,200	6,000	440	370	308	2,040	236	440	645
4	95	192	218	870	2,580	520	370	338	3,470	256	645	520
5	90	185	192	735	1,530	915	560	404	1,750	256	600	645
6	90	164	370	560	1,050	1,200	780	1,200	2,100	404	480	404
7	200	145	308	520	960	2,340	690	870	1,700	404	294	268
8	2,700	178	280	440	870	2,040	560	645	1,640	256	280	236
9	780	178	387	387	780	1,420	440	560	1,000	218	280	236
10	440	157	387	354	735	1,100	387	480	825	192	192	236
11	294	151	280	294	645	1,640	404	440	1,100	178	218	227
12	218	145	236	280	1,050	7,700	370	387	2,580	200	227	185
13	192	145	209	256	1,800	10,400	2,640	338	1,420	192	185	157
14	178	157	218	280	1,860	2,840	7,100	520	915	178	164	133
15	164	164	209	370	1,150	3,620	3,540	2,220	915	185	151	133
16	157	200	192	560	870	7,800	1,860	8,800	1,860	246	151	128
17	157	209	192	480	735	10,700	1,200	11,100	1,640	404	690	122
18	157	218	178	480	690	2,770	1,050	3,330	1,920	645	209	122
19	133	178	164	354	560	1,800	915	7,200	1,750	370	164	122
20	133	209	151	308	480	1,420	780	2,400	1,310	246	192	145
21	133	192	151	735	422	1,200	690	1,580	915	200	404	157
22	116	170	151	915	422	1,000	645	1,200	690	185	1,580	145
23	122	170	151	915	370	915	645	1,000	600	178	735	139
24	139	157	157	735	338	870	560	915	480	164	600	164
25	122	157	151	600	308	780	520	1,100	440	145	338	145
26	111	139	157	600	323	645	480	1,860	370	139	236	133
27	122	151	256	825	404	600	460	2,840	370	128	209	116
28	111	145	4,020	1,700	560	560	480	3,120	323	145	185	111
29	116	151	3,780	1,580	-------	560	560	2,640	370	145	170	90
30	128	139	1,530	1,100	-------	520	440	2,340	338	139	157	116
31	128	-------	2,770	1,480	-------	460	-------	2,340	-------	145	139	-------
1923–24												
1	128	338	227	460	308	422	1,700	480	1,920	560	308	600
2	116	370	236	422	308	404	1,310	480	1,480	480	370	422
3	133	404	236	338	294	354	1,050	480	1,310	387	308	280
4	133	404	308	308	780	354	915	440	1,100	387	294	227
5	128	600	560	256	960	338	825	404	915	354	308	185
6	139	825	1,000	236	1,260	338	735	370	1,150	338	256	185
7	116	560	1,050	236	825	308	645	387	1,150	294	227	178
8	100	870	960	218	600	280	1,000	370	1,000	294	236	170
9	90	370	915	218	520	280	7,800	387	1,000	280	246	164
10	106	308	2,100	280	460	308	10,800	387	735	280	387	227
11	95	280	2,980	280	404	308	3,400	370	3,260	280	825	151
12	90	280	2,840	280	404	308	1,860	370	8,600	280	2,840	145
13	95	256	4,100	256	387	308	1,310	338	4,630	294	1,980	139
14	111	236	4,720	218	387	370	1,000	308	2,280	870	915	139
15	111	227	2,280	236	387	480	1,000	294	1,530	825	645	139

Daily discharge, in second-feet, of Big River at Byrnesville, Mo., for the years ending September 30, 1922–1924—Continued

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1923–24												
16	133	209	1,420	236	404	520	915	280	1,150	645	480	157
17	338	209	1,100	236	645	520	780	280	1,000	825	404	145
18	256	200	960	236	1,200	520	735	280	1,640	735	370	151
19	370	192	780	218	1,980	645	690	268	3,700	1,360	308	164
20	1,100	185	870	185	1,310	735	600	338	1,800	6,300	268	1,050
21	560	192	870	170	1,000	735	560	1,580	1,640	2,910	256	3,860
22	387	178	1,150	236	825	915	520	1,000	1,750	1,580	236	1,310
23	280	192	1,360	268	645	1,360	480	825	1,260	1,100	227	780
24	236	200	1,530	338	645	1,860	460	6,600	1,260	870	520	520
25	227	218	1,200	354	600	1,530	440	5,710	1,150	870	370	370
26	209	209	1,050	323	560	1,200	440	1,920	870	825	915	308
27	185	200	870	280	560	1,000	440	2,160	825	600	480	256
28	192	185	735	308	480	915	404	5,440	1,360	460	308	236
29	209	185	600	308	440	3,620	404	9,710	1,310	404	256	236
30	280	209	560	294	-------	8,400	440	9,930	735	354	218	218
31	308	-------	520	280	-------	3,260	-------	3,330	-------	323	218	-------

Monthly discharge of Big River at Byrnesville, Mo., for the years ending September 30, 1922–1924

[Drainage area, 892 square miles]

Month	Discharge in second-feet				Run-off in inches
	Maximum	Minimum	Mean	Per square mile	
1922					
May 10–31	870	256	486	0.545	0.45
June	520	133	207	.232	.26
July	600	133	233	.261	.30
August	690	72	168	.188	.22
September	246	68	134	.150	.17
1922–23					
October	2,700	68	252	.283	.33
November	218	133	167	.187	.21
December	4,020	139	583	.654	.75
January	3,700	256	828	.928	1.07
February	6,000	308	1,250	1.40	1.46
March	10,700	440	2,250	2.52	2.90
April	7,100	370	1,010	1.13	1.26
May	11,100	308	2,040	2.29	2.64
June	3,470	323	1,280	1.43	1.60
July	645	128	235	.263	.30
August	1,580	139	342	.383	.44
September	645	90	208	.233	.26
The year	11,100	68	869	.974	13.22
1923–24					
October	1,100	90	225	.252	.29
November	870	178	310	.348	.39
December	4,720	227	1,290	1.45	1.67
January	460	170	275	.308	.36
February	1,980	294	675	.757	.82
March	8,400	280	1,060	1.19	1.37
April	10,800	404	1,460	1.64	1.83
May	9,930	268	1,790	2.01	2.32
June	8,600	735	1,780	2.00	2.23
July	6,300	280	850	.953	1.10
August	2,840	218	515	.577	.67
September	3,860	139	437	.490	.55
The year	10,800	90	889	.997	13.60

HEADWATER DIVERSION CHANNEL BASIN

CASTOR RIVER AT ZALMA, MO.

LOCATION.—In S. ½ sec. 29, T. 29 N., R. 9 E., at highway bridge in Zalma, Bollinger County, 2 miles below Perkins Creek, 4 miles above Cato Slough, and 7 miles above levee of headwater diversion channel of Little River drainage district.

DRAINAGE AREA.—395 square miles (measured on topographic maps, soil survey maps, and base map of Missouri).

RECORDS AVAILABLE.—September 12, 1921, to September 30, 1924. The Little River drainage district, Cape Girardeau, Mo., has records of stage from July 1, 1919, to September 11, 1921.

GAGE.—Chain gage bolted to handrail on downstream side of bridge; read by Lowell King and John Carr. Zero of gage 300 feet above mean sea level.

DISCHARGE MEASUREMENTS.—Made from downstream side of bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of silt, sand, and gravel; fairly permanent. No well-defined control. Banks are wooded and are overflowed at a stage of about 74 feet.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 64.60 feet at 8 a. m. May 30 (discharge, 3,160 second-feet); minimum stage, 51.10 feet at 8 a. m. August 31 (discharge, 30 second-feet).

1921–1924: Maximum stage 74.0 feet November 20, 1921, and February 2, 1923 (discharge, 8,100 second-feet); minimum stage, 51.10 feet August 31, 1924 (discharge, 30 second-feet).

DIVERSIONS.—During extremely high stages the river overflows the neck of a horseshoe bend and total flow does not pass the bridge section. Records, however, show entire flow of the stream. Entire flow is diverted 7 miles below into headwater diversion channel, which empties into Mississippi River 3½ miles south of Cape Girardeau.

ACCURACY.—Stage-discharge relation changed during high water in December; not affected by ice. Rating curve used until December 21 well defined below 5,200 second-feet; curve used after that date well defined above 50 second-feet. Gage read to hundredths once daily; readings rather unreliable prior to February 1. Daily discharge ascertained by applying daily gage height to rating table except as described in footnote to table of daily discharge. Records rather poor until January 31 and fair afterwards.

Discharge measurements of Castor River at Zalma, Mo., during the year ending September 30, 1924

Date	Gage height	Discharge	Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Oct. 10	51.60	53	Mar. 25	55.90	700	July 26	54.59	457
Dec. 18	55.08	494	May 3	52.65	164	Sept. 12	51.59	65

Daily discharge, in second-feet, of Castor River at Zalma, Mo., for the year ending September 30, 1924

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	74	135	140	419	262	248	584	109	862	248	208	32
2	69	135	135	509	248	248	603	234	700	248	277	91
3	64	157	130	491	262	402	455	114	780	150	277	91
4	60	225	140	419	455	402	660	221	437	172	862	78
5	55	249	179	369	437	603	680	419	385	161	402	73
6	53	261	299	322	455	248	473	292	369	139	385	73
7	50	249	409	277	277	248	660	184	322	139	419	65
8	47	237	556	221	437	248	603	109	322	139	277	67
9	46	237	556	196	437	248	292	114	322	118	234	69
10	94	213	1,460	196	322	248	221	161	248	118	150	65
11	168	213	1,460	184	322	234	603	150	248	114	161	65
12	325	201	940	184	322	234	248	221	2,360	118	114	56
13	312	201	525	184	307	234	473	139	1,400	402	114	61
14	273	190	312	172	277	262	660	184	622	262	208	65
15	249	179	225	161	248	248	603	221	603	262	150	65
16	237	168	273	161	292	419	292	196	527	353	150	65
17	237	157	249	196	322	419	221	139	437	455	134	69
18	225	157	273	221	622	221	603	150	369	455	161	73
19	225	140	540	262	883	385	248	123	353	455	139	32
20	225	135	960		883	419	455	114	322	883	118	65
21	213	135	1,490		760	455	221	221	353	161	118	34
22	213	146	1,760		455	603	221	184	603	437	109	184
23	201	179	1,050		546	660	221	184	641	419	82	196
24	179	201	680	262	546	680	221	184	385	402	100	184
25	157	299	740		527	641	641	221	437	353	128	172
26	135	249	509		491	660	513	221	353	527	118	118
27	140	225	353		455	473	385	234	473	353	109	100
28	130	190	248		369	491	221	292	473	307	96	109
29	124	168	208	262	402	473	161	883	322	262	91	104
30	130	146	208	248	-------	680	134	3,160	322	234	34	100
31	135	-------	184	262	-------	680	-------	1,380	-------	208	30	-------

NOTE.—Discharge estimated Jan. 20–28, Mar. 12, Apr. 26, and Sept. 7; braced figures show mean discharge for period indicated.

Monthly discharge of Castor River at Zalma, Mo., for the year ending September 30, 1924

[Drainage area, 395 square miles]

Month	Discharge in second-feet				Run-off in inches
	Maximum	Minimum	Mean	Per square mile	
October	325	46	156	0.395	0.46
November	299	135	193	.489	.55
December	1,760	130	555	1.41	1.63
January	509	161	267	.676	.78
February	883	248	435	1.10	1.19
March	680	221	410	1.04	1.20
April	680	134	419	1.06	1.18
May	3,160	109	347	.878	1.01
June	2,360	248	545	1.38	1.54
July	883	114	292	.739	.85
August	862	30	192	.486	.56
September	196	32	87.4	.221	.25
The year	3,160	30	324	.820	11.20

WHITEWATER RIVER AT WHITEWATER, MO.

LOCATION.—In grant No. 2271, T. 30 N., R. 11 E., at Missouri Pacific Railroad bridge, 1,000 feet northwest of depot in Whitewater, Cape Girardeau County, 1 mile above Crooked Creek, 3 miles above headwater diversion channel, and 10 miles below Byrds Creek.

DRAINAGE AREA.—326 square miles (measured on United States soil survey maps).

RECORDS AVAILABLE.—September 12, 1921, to September 30, 1924. The Little River Drainage District, Cape Girardeau, has records of stage from February to September, 1921.

GAGE.—Chain gage fastened to guardrail on upstream side of railroad bridge read by William Fingerhut. Prior to November 30, 1921, a vertical staff gage in two sections, from 32 to 59 feet, fastened to downstream side of bridge piers. Zero of both gages 300 feet above mean sea level.

DISCHARGE MEASUREMENTS.—Made from upstream side of highway bridge 2,000 feet below gage or by wading.

CHANNEL AND CONTROL.—Bed composed of sand, gravel, and silt; shifting; obstructed at times by driftwood at railroad bridge. Control is a section of rocks and boulders just above highway bridge; practically permanent.

EXTREMES OF STAGE.—Maximum stage recorded during year, 49.16 feet June 12; minimum stage, 31.57 feet October 13.

1921–1924: Maximum stage recorded, 55.5 feet November 20, 1921; minimum stage, 31.08 feet August 10, 1922.

ACCURACY.—Stage-discharge relation not permanent; not affected by ice but affected by backwater from headwater diversion channel during high stages of the channel. Gage read to hundredths once daily. Daily discharge not determined.

Discharge measurements of Whitewater River at Whitewater, Mo., during the year ending September 30, 1924

Date	Gage height	Discharge	Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Oct. 9	31.71	35	May 2	32.86	133	June 13	42.10	1,760
Dec. 19	34.10	311	May 3	32.65	101	June 14	37.64	648
Mar. 22	37.39	817	June 13	46.05	3,550	July 25	33.38	197
Mar. 23	36.45	655	Do	43.78	2,370	Sept. 12	31.69	30

Daily gage height, in feet, of Whitewater River at Whitewater, Mo., for the year ending September 30, 1924

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	31.85	32.25	33.34	33.75	33.99	33.54	34.41	33.34	37.00	33.10	38.10	31.80
2	32.08	32.16	32.86	33.35	33.91	33.47	33.98	32.92	35.20	32.96	34.66	32.46
3	31.88	32.20	32.70	33.18	33.66	33.32	33.70	32.68	34.18	33.02	39.22	31.98
4	31.78	39.55	32.68	33.23	33.85	33.21	33.52	32.56	33.74	33.00	34.57	31.88
5	31.78	35.81	33.88	33.00	36.95	33.95	33.42	32.48	33.30	32.82	33.06	31.78
6	31.78	34.15	35.25	32.75	35.02	33.26	33.31	32.60	33.06	32.52	32.60	31.74
7	31.78	34.15	34.72	32.82	34.20	33.10	33.17	34.26	33.22	32.39	32.30	31.71
8	31.76	33.55	34.05	32.80	33.70	32.96	33.63	36.51	32.89	32.34	32.08	31.70
9	31.72	33.18	34.02	32.80	33.43	32.88	33.08	33.85	32.74	32.32	32.20	31.72
10	31.66	32.94	44.72	33.10	33.35	39.09	33.65	33.12	40.66	32.30	32.63	31.70
11	31.66	32.80	39.80	40.16	33.30	33.07	33.32	32.98	43.93	32.26	32.21	31.68
12	31.65	32.72	36.20	35.50	33.30	33.26	33.14	32.98	49.16	32.20	32.24	31.70
13	31.57	32.63	39.20	34.40	33.23	34.77	33.01	32.80	48.50	39.42	32.18	31.70
14	31.62	32.54	45.73	33.80	33.14	34.36	32.96	32.71	37.95	33.65	32.12	31.68
15	31.62	32.48	38.65	33.51	33.04	34.49	32.90	32.59	35.44	38.50	32.03	31.70
16	31.62	32.42	36.17	34.93	32.96	34.20	32.83	32.50	34.45	33.65	32.06	31.68
17	31.96	32.34	35.10	37.90	33.03	33.95	32.78	32.56	33.83	34.05	32.37	31.72
18	34.70	32.32	34.48	35.22	39.46	34.30	32.72	32.52	33.50	33.20	32.20	31.76
19	40.80	32.31	34.06	34.55	37.25	34.23	32.62	32.44	34.35	33.09	32.04	31.82
20	34.63	32.26	31.31	34.10	37.87	34.05	32.60	34.47	33.65	34.35	31.97	31.80
21	33.30	32.24	37.60	33.33	36.30	35.86	32.54	33.58	41.16	34.10	31.93	40.46
22	32.84	32.20	39.11	33.55	35.20	36.83	32.94	32.93	38.05	33.16	31.88	33.12
23	32.60	32.23	44.60	33.28	34.65	36.50	32.76	32.70	37.55	38.31	31.86	33.65
24	32.45	32.30	41.27	33.14	34.73	36.12	32.50	33.32	37.21	33.41	31.86	32.60
25	32.38	32.24	38.04	33.77	34.65	35.70	32.46	33.98	34.81	33.95	32.98	32.34
26	32.28	32.18	36.35	33.46	34.43	35.10	32.44	33.08	33.90	33.25	32.48	32.20
27	32.24	32.18	35.41	32.98	34.12	34.58	32.42	33.05	33.48	32.61	32.06	32.14
28	32.20	32.14	34.96	32.94	33.88	34.16	32.40	33.65	33.35	32.40	31.96	32.08
29	32.17	32.16	34.36	32.94	33.68	34.26	32.40	40.54	36.12	32.32	31.88	32.04
30	32.22	33.65	34.06	33.10	-------	36.27	33.40	45.35	34.70	32.32	31.83	31.98
31	32.40	-------	33.87	33.50	-------	35.20	-------	38.95	-------	32.59	31.81	-------

NOTE.—Stage-discharge relation affected by backwater from headwater diversion channel during high stages of the channel.

ST. FRANCIS RIVER BASIN

ST. FRANCIS RIVER NEAR PATTERSON, MO.

LOCATION.—In N. ½ sec. 16, T. 29 N., R. 5 E., at Black's highway bridge, 1½ miles above Clark Creek, 4 miles below Big Creek, and 3 miles east of Patterson, Wayne County.

DRAINAGE AREA.—956 square miles (measured on topographic maps and base map of Missouri).

RECORDS AVAILABLE.—June 16, 1921, to September 30, 1924.

GAGE.—Chain gage fastened to handrail on upstream side of bridge; read by Wm. A. Harris.

DISCHARGE MEASUREMENTS.—Made from downstream side of bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of clean sand and gravel; fairly permanent. Right bank high and rocky. Left bank sandy, thinly wooded, and subject to overflow at stage of 20 feet. Control is a heavy gravel bar 1,000 feet below gage; practically permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 13.50 feet at 5 p. m. May 29 (discharge, 16,600 second-feet); minimum stage, 2.12 feet at 5 p. m. October 15 (discharge, 56 second-feet).

1921–1924: Maximum stage determined from floodmarks, 20.0 feet November 19, 1921 (discharge, 36,600 second-feet); minimum stage, 2.10 feet August 21, 1922 (discharge, 5 second-feet).

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

ACCURACY.—Stage-discharge relation permanent during the year. Rating curve fairly well defined. Gage read to hundredths once or twice daily. Daily discharge ascertained by applying mean daily gage height to rating table. Records good.

Discharge measurements of St. Francis River near Patterson, Mo., during the year ending September 30, 1924

Date	Gage height	Discharge	Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Oct. 10	2.18	64	Mar. 26	4.73	1,520	Sept. 13	2.30	76
Dec. 14	8.60	6,390	June 28	4.03	948			

Daily discharge, in second-feet, of St. Francis River near Patterson, Mo., for the year ending September 30, 1924

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	75	149	129	715	482	715	1,500	356	1,780	394	610	129
2	69	134	201	577	577	680	1,230	452	1,500	394	4,340	124
3	69	223	210	544	645	577	1,150	422	1,230	394	2,700	114
4	66	319	237	544	1,150	544	910	345	1,070	324	1,680	106
5	69	830	266	482	4,760	482	830	300	870	261	1,030	101
6	64	790	715	394	2,920	452	715	290	750	228	830	97
7	64	715	990	335	1,500	452	645	314	610	218	577	90
8	66	544	870	350	1,150	422	577	309	513	201	513	83
9	62	422	1,880	345	910	394	544	330	482	193	422	80
10	63	335	12,600	394	830	422	2,080	361	544	169	345	80
11	63	290	4,340	422	750	482	1,230	324	2,080	156	324	77
12	62	232	2,920	422	680	452	950	290	11,200	990	335	74
13	60	205	3,920	452	610	544	830	271	4,480	228	950	73
14	58	189	5,600	482	680	830	680	223	2,590	295	544	68
15	57	166	2,480	452	680	950	577	214	2,080	1,150	335	70

Daily discharge, in second-feet, of St. Francis River near Patterson, Mo., for the year ending September 30, 1924—Continued

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
16	60	142	1,880	513	645	910	513	210	1,680	482	345	73
17	201	129	1,410	544	910	950	452	176	1,320	366	335	68
18	300	129	1,230	610	5,460	910	422	159	950	830	324	75
19	790	124	1,320	610	3,400	870	394	152	910	482	295	88
20	1,150	134	1,410	482	2,380	950	366	266	1,070	750	256	3,920
21	610	139	3,040	422	1,680	1,150	350	214	2,180	1,680	193	1,320
22	422	145	3,040	422	1,320	1,150	319	261	1,320	1,500	176	1,500
23	366	139	4,760	394	1,150	1,780	261	300	830	1,230	162	645
24	271	129	3,400	422	1,070	2,280	276	356	1,320	2,080	422	513
25	205	119	2,480	422	990	2,080	271	1,230	1,590	2,280	285	452
26	214	110	1,880	513	1,030	1,680	252	790	950	1,590	266	356
27	197	101	1,410	422	990	1,320	232	680	680	1,070	295	285
28	173	93	1,150	394	910	1,150	214	1,030	610	750	232	242
29	139	101	950	482	790	1,500	237	12,300	830	610	176	201
30	129	110	830	422	-------	5,040	309	6,880	645	680	162	184
31	139	-------	830	422	-------	2,810	-------	2,700	-------	577	142	-------

Monthly discharge of St. Francis River near Patterson, Mo., for the year ending September 30, 1924

[Drainage area, 956 square miles]

Month	Discharge in second-feet				Run-off in inches
	Maximum	Minimum	Mean	Per square mile	
October	1,150	57	204	0.213	0.25
November	830	93	246	.257	.29
December	12,600	129	2,210	2.31	2.66
January	715	335	465	.486	.56
February	5,460	482	1,420	1.49	1.61
March	5,040	394	1,130	1.18	1.36
April	2,080	214	644	.674	.75
May	12,300	152	1,050	1.10	1.27
June	11,200	482	1,620	1.69	1.89
July	2,280	156	727	.760	.88
August	4,340	142	632	.661	.76
September	3,920	68	376	.393	.44
The year	12,600	57	892	.933	12.72

LITTLE RIVER DITCH NO. 1 AT KIRK, MO.

LOCATION.—In sec. 27, T. 19 N., R. 10 E., at St. Louis-San Francisco Railway bridge at Kirk, Dunklin County, 9½ miles below ditch No. 63, the nearest lateral, and 20 miles above the Arkansas State line where the ditch empties into Big Lake.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—September 13, 1921, to September 30, 1924. The Little River Drainage District, Cape Girardeau, Mo., has records of stage from May, 1920, to September, 1921.

GAGE.—Chain gage bolted to downstream guardrail of railroad pile trestle; read by B. F. Brewer. Prior to December 2, 1921, a painted vertical staff gage fastened to pile trestle on downstream side. Zeros of both gages 200 feet above mean sea level.

CHANNEL AND CONTROL.—Bed composed of clean sand and small gravel; fairly permanent; some snags lodged in bed. No well-defined control.

DISCHARGE MEASUREMENTS.—Made from highway bridge 1½ miles below gage or by wading near bridge.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 53.90 feet at 8 a. m. December 15 (discharge, 4,100 second-feet); minimum stage, 44.90 feet October 13–16 (discharge, 133 second-feet).

1921–1924: Maximum stage recorded, 56.25 feet April 4, 1922 (discharge, 5,940 second-feet); minimum discharge, 110 second-feet September 17 and 19–21, 1921.

DIVERSIONS.—Entire flow of Castor and Whitewater Rivers, and other small streams formerly flowing into Little River, are now diverted into Mississippi River 70 miles north of the station. The drainage west and south of ditch No. 44, which enters 17 miles above, is diverted into ditch No. 81; and the drainage south of ditch No. 63, which enters 9½ miles above, is diverted into ditch No. 66. The three main ditches, Nos. 1, 66, and 81, run parallel from 9 miles above the station to the Arkansas State line, where the drainage district ends.

ACCURACY.—Stage-discharge relation permanent during year; not affected by ice. Rating curve well defined. Gage read to half-tenths once daily; not entirely reliable. Daily discharge ascertained by applying daily gage height to rating table except as described in footnote to table of daily discharge. Records fair.

Discharge measurements of Little River ditch No. 1 at Kirk, Mo., during the year ending September 30, 1924

Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Oct. 8	45.02	157	June 16	47.36	856
Mar. 24	47.80	1,050	Sept. 11	45.08	173

Daily discharge, in second-feet, of Little River ditch No. 1 at Kirk, Mo., for the year ending September 30, 1924

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	155	238	670	1,380	1,160	915	810	1,090	1,700	480	740	225
2	155	238	670	1,260	1,160	880	810	1,050	1,460	480	740	225
3	155	238	600	1,260	1,120	845	740	915	1,260	420	775	213
4	155	420	600	1,230	1,090	810	705	880	1,090	405	810	201
5	155	670	600	1,190	1,160	810	670	810	950	390	950	201
6	155	670	635	1,160	1,380	775	670	740	880	360	845	201
7	155	600	635	1,090	1,090	740	670	670	810	360	740	190
8	155	540	705	1,050	1,020	740	670	705	810	346	880	178
9	155	510	740	1,020	950	740	635	775	810	331	810	166
10	144	450	1,300	1,020	915	740	600	740	705	317	740	166
11	144	450	1,660	1,460	880	740	600	740	670	303	670	166
12	144	420	1,460	2,070	880	740	600	670	670	303	600	166
13	133	405	1,540	1,700	915	740	600	635	1,300	303	570	166
14	133	390	3,770	1,500	915	740	570	600	1,230	331	540	155
15	133	390	4,100	1,340	880	775	540	570	985	331	480	155
16	133	390	3,280	1,460	845	775	540	570	880	510	480	155
17	178	360	2,550	2,330	845	775	540	540	775	420	420	155
18	225	360	2,070	2,660	915	740	510	510	705	360	420	155
19	250	360	1,790	2,120	985	740	510	510	670	390	375	155
20	290	346	1,700	1,700	1,160	810	510	510	600	1,840	346	155
21	317	346	2,380	1,540	1,230	950	510	705	570	2,220	331	178
22	303	331	2,830	1,380	1,230	1,160	480	600	540	2,070	317	178
23	276	331	3,340	1,230	1,160	1,090	480	600	540	2,070	303	166
24	263	331	3,340	1,190	1,090	1,020	480	600	570	1,840	290	155
25	250	331	3,100	1,160	1,090	950	480	1,050	600	1,920	276	155
26	250	390	2,490	1,120	1,090	915	480	1,120	600	1,790	263	155
27	250	420	2,070	1,090	1,050	880	480	915	540	1,300	250	155
28	250	450	1,920	1,020	1,020	810	450	880	510	1,840	238	155
29	250	480	1,660	1,020	950	810	450	740	480	880	225	144
30	250	600	1,580	1,020	-------	880	670	540	480	810	225	144
31	250	-------	1,460	1,090	-------	880	-------	740	-------	740	225	-------

NOTE.—Discharge interpolated Nov. 27–28 because of probable error in gage readings.

Monthly discharge of Little River ditch No. 1 at Kirk, Mo., for the year ending September 30, 1924

Month	Discharge in second-feet			Month	Discharge in second-feet		
	Maximum	Minimum	Mean		Maximum	Minimum	Mean
October	317	133	200	May	1,120	510	733
November	670	238	415	June	1,700	480	813
December	4,100	600	1,850	July	2,220	303	854
January	2,660	1,020	1,380	August	950	225	512
February	1,380	845	1,040	September	225	144	171
March	1,160	740	836				
April	810	450	582	The year	4,100	133	784

LITTLE RIVER DITCH NO. 81 AT KIRK, MO.

LOCATION.—In sec. 27, T. 19 N., R. 10 E., at the St. Louis-San Francisco Railway bridge at Kirk, Dunklin County, 1 mile below the nearest lateral entering above and 20 miles above the outlet into Big Lake at the Arkansas State line.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—September 13, 1921, to September 30, 1924. The Little River Drainage District, Cape Girardeau, Mo., has records of stage from May, 1920, to September, 1921.

GAGE.—Chain gage bolted to guard timber on downstream side of railroad pile bridge; read by B. F. Brewer. Prior to December 2, 1921, a painted vertical staff gage fastened to downstream side of pile bent of railroad bridge. Zeros of both gages 200 feet above mean sea level.

DISCHARGE MEASUREMENTS.—Made from highway bridge 1½ miles below gage or by wading near bridge.

CHANNEL AND CONTROL.—Bed composed of clean sand and small gravel. Channel is artificial ditch section; fairly permanent. No well-defined control.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 52.50 feet at 5 p. m. December 14 (discharge, 1,950 second-feet); minimum stage, 43.90 feet September 6, 9, and 29–30 (discharge, 57 second-feet).

1921–1924: Maximum stage recorded, 54.05 feet April 4–5, 1922 (discharge, 2,390 second-feet); minimum discharge, 20 second-feet August 11–20, 1922.

DIVERSIONS.—This ditch drains all the area west and south of ditch No. 44 in the Little River Basin, and diverts the natural flow from ditch No. 1, which is now the main stream. (See Little River ditch No. 1 at Kirk, Mo.)

ACCURACY.—Stage-discharge relation permanent during year; not affected by ice. Rating curve fairly well defined. Gage read to half-tenths once daily; readings not entirely reliable. Daily discharge ascertained by applying daily gage height to rating table. Records fair.

Discharge measurements of Little River ditch No. 81 at Kirk, Mo., during the year ending September 30, 1924

Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Oct. 8	44.10	88	June 16	45.22	247
Mar. 24	46.24	444	Sept. 11	44.03	66

Daily discharge, in second-feet, of Little River ditch No. 81 at Kirk, Mo., for the year ending September 30, 1924

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	92	118	433	640	564	379	343	526	545	168	224	80
2	118	118	397	602	507	379	325	451	488	168	224	80
3	92	118	361	621	488	361	308	397	415	161	224	74
4	80	564	343	564	507	361	308	379	343	154	208	68
5	74	583	361	507	526	361	308	343	343	154	208	62
6	74	488	379	451	526	343	291	325	325	154	200	57
7	74	397	379	415	488	343	274	308	325	146	192	62
8	74	343	415	379	433	325	274	379	224	139	224	62
9	74	308	469	488	415	325	257	397	224	139	208	57
10	68	308	875	488	415	325	257	343	274	118	192	68
11	68	274	900	760	415	325	257	325	274	105	176	68
12	68	257	782	875	433	325	240	308	274	98	168	68
13	68	240	1,000	720	433	325	240	291	291	98	161	68
14	68	224	1,920	640	433	325	240	274	192	132	154	68
15	68	224	1,920	583	415	308	240	274	257	132	146	68
16	68	208	1,700	720	397	308	224	257	240	118	139	68
17	105	200	1,290	1,290	397	308	224	240	240	118	132	68
18	161	192	1,050	1,160	397	308	224	240	240	118	132	68
19	168	192	925	850	397	325	224	240	208	118	118	68
20	208	192	875	760	469	379	224	240	208	900	112	68
21	240	184	1,050	660	507	469	208	257	208	1,260	105	68
22	274	176	1,610	602	507	526	208	240	192	1,030	105	68
23	192	168	1,750	545	488	451	200	240	125	640	105	68
24	176	161	1,610	526	469	415	192	240	176	875	98	62
25	161	161	1,590	526	488	397	192	240	240	740	92	62
26	146	208	1,000	526	451	379	192	224	240	545	86	62
27	139	291	900	507	433	379	184	308	224	415	86	62
28	132	291	850	488	415	343	184	308	200	325	86	62
29	132	291	782	488	397	343	184	379	184	274	80	57
30	125	397	720	507	-------	361	379	826	176	240	80	57
31	125	-------	680	526	-------	361	-------	760	-------	240	80	-------

Monthly discharge of Little River ditch No. 81 at Kirk, Mo., for the year ending September 30, 1924

Month	Discharge in second-feet			Month	Discharge in second-feet		
	Maximum	Minimum	Mean		Maximum	Minimum	Mean
October	274	68	120	May	826	224	341
November	583	118	263	June	545	125	263
December	1,920	343	946	July	1,260	98	323
January	1,290	379	626	August	224	80	147
February	564	397	455	September	80	57	65.9
March	526	308	360				
April	379	184	247	The year	1,920	57	348

LITTLE RIVER DITCH NO. 66 AT KIRK, MO.

LOCATION.—In sec. 27, T. 19 N., R. 10 E., at the St. Louis-San Francisco Railway bridge at Kirk, Dunklin County, half a mile below ditch No. 72, half a mile above ditch No. 73, 8 miles below ditch No. 64, the most northerly lateral, and 20 miles above outlet into Big Lake at the Arkansas State line.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—September 13, 1921, to September 30, 1924. The Little River Drainage District, Cape Girardeau, has records of stage from May, 1920, to September, 1921.

GAGE.—Chain gage bolted to downstream guardrail of railroad pile bridge; read by B. F. Brewer. Prior to December 2, 1921, a painted vertical staff gage fastened to downstream side of pile trestle. Zero of both gages 200 feet above mean sea level.

DISCHARGE MEASUREMENTS.—Made from highway bridge 1½ miles below gage or by wading at bridge.

CHANNEL AND CONTROL.—Bed composed of clean sand and small gravel; channel is artificial ditch section; fairly permanent. Some snags lodged in bed of stream. No well-defined control.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 52.10 feet December 14 and 15 (discharge, 1,240 second-feet); minimum stage, 43.60 feet August 29 to September 30 (discharge, 8 second-feet).

1921–1924: Maximum stage recorded, 53.85 feet May 21, 1923 (discharge, 1,580 second-feet); minimum stage, 43.2 feet October 30 to November 17, 1921 (discharge, 1 second-foot).

DIVERSIONS.—This ditch drains the old Little River channel below ditch No. 51, the last diversion into ditch No. 1, and all the Little River Basin south and east of ditch No. 63 (see Little River ditch No. 1 at Kirk, Mo.).

ACCURACY.—Stage-discharge relation changed slightly during the year; not affected by ice. Rating curve fairly well defined. Gage read to half-tenths once daily; readings not entirely reliable. Daily discharge ascertained by applying daily gage height to rating table; indirect method for shifting control used during August and September. Records fair.

Discharge measurements of Little River ditch No. 66 at Kirk, Mo., during the year ending September 30, 1924

Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Oct. 8	44.17	37	June 16	44.72	89
Mar. 24	45.81	209	Sept. 11	43.59	7.5

Daily discharge, in second-feet, of Little River ditch No. 66 at Kirk, Mo., for the year ending September 30, 1924

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	51	51	260	273	260	185	142	209	333	55	63	8
2	59	51	221	247	234	173	132	209	273	51	55	8
3	55	51	197	273	221	162	127	162	221	47	71	8
4	55	221	173	260	221	162	127	152	185	39	55	8
5	47	333	185	247	247	157	122	132	157	35	47	8
6	43	247	209	234	234	152	117	127	142	39	35	8
7	39	185	197	221	197	147	112	122	132	39	39	8
8	39	162	221	209	197	142	107	142	122	35	35	8
9	39	152	273	197	185	142	102	152	122	35	35	8
10	35	132	848	197	173	142	102	147	102	32	32	8
11	35	132	920	516	247	142	102	142	127	32	32	8
12	32	112	812	567	234	142	93	132	112	32	32	8
13	28	112	992	468	221	137	93	112	112	32	32	8
14	28	93	1,240	393	221	132	93	102	102	35	28	8
15	28	88	1,240	333	197	132	88	93	112	35	25	8
16	28	84	1,170	652	197	132	84	84	84	35	25	8
17	51	84	992	938	197	132	84	75	84	28	22	8
18	75	84	704	866	197	137	84	75	80	28	19	8
19	84	88	516	686	197	142	84	75	71	28	13	8
20	93	88	484	533	363	173	80	75	63	55	13	8
21	102	84	550	393	363	273	75	84	67	63	13	8
22	88	80	992	318	333	260	71	84	59	63	13	8
23	80	75	1,080	273	318	221	67	67	63	67	13	8
24	84	75	1,050	273	303	197	67	67	71	67	13	8
25	84	75	812	273	303	173	67	132	127	132	13	8
26	84	102	601	260	288	173	67	137	122	93	13	8
27	63	142	484	247	247	162	67	162	98	75	13	8
28	59	142	423	221	221	152	67	185	80	59	10	8
29	59	142	363	221	197	152	67	221	63	43	8	8
30	59	247	333	221	-------	152	142	618	59	39	8	8
31	55	-------	303	273	-------	152	-------	516	-------	35	8	-------

Monthly discharge of Little River ditch No. 66 at Kirk, Mo., for the year ending September 30, 1924

Month	Discharge in second-feet			Month	Discharge in second-feet		
	Maximum	Minimum	Mean		Maximum	Minimum	Mean
October	102	28	56.8	May	618	67	155
November	333	51	124	June	333	59	118
December	1,240	173	608	July	132	28	47.8
January	938	197	364	August	63	8	26.9
February	363	173	242	September	8	8	8.00
March	273	132	162				
April	142	67	94.4	The year	1,240	8	168

WHITE RIVER BASIN

WHITE RIVER AT BEAVER, ARK.

LOCATION.—In sec. 20, T. 21 N., R. 26 W., at Missouri & North Arkansas Railroad bridge, a quarter of a mile east of depot at Beaver, Carroll County, 3 miles above Leatherwood Creek, and 6 miles below Cedar Creek.

DRAINAGE AREA.—1,270 square miles (measured on topographic maps and base map of Arkansas).

RECORDS AVAILABLE.—July 17, 1909, to December 31, 1910, and May 16, 1923, to September 30, 1924.

GAGE.—Chain gage on upstream side of bridge; read by Harvey Skelton. During 1909–10 a chain gage on upstream side of bridge with datum 1.50 feet lower than datum of present gage.

DISCHARGE MEASUREMENTS.—Made from downstream side of bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of clean sand and gravel fairly permanent. Right bank high and rocky. Left bank thinly wooded and subject to overflow at extreme high stages. Control is a clean gravel bar half a mile below gage; practically permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 18.35 feet at 7.25 a. m. May 1 (discharge, 23,500 second-feet); minimum stage, 2.40 feet September 17–18 (discharge, 90 second-feet).

1923–24: Maximum stage recorded that of May 1, 1924, as given above; minimum stage, 2.15 feet August 25 and September 1, 1923 (discharge, 45 second-feet).

1909–10: Maximum stage recorded, 17.35 feet May 17, 1910 (discharge, 21,500 second-feet); minimum stage, 1.55 feet October 1–8, 1909 (discharge, 42 second-feet). These gage heights refer to datum of present gage.

ACCURACY.—Stage-discharge relation permanent during the year; not affected by ice. Rating curve well defined. Gage read to hundredths twice daily. Daily discharge ascertained by applying mean daily height to rating table. Records good.

Discharge measurements of White River at Beaver, Ark., during the year ending September 30, 1924

Date	Gage height	Discharge	Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Dec. 30	4.84	1,620	May 23	3.41	438	Sept. 3	2.67	159
Apr. 28	8.10	5,630	Do	3.40	432			

Daily discharge, in second-feet, of White River at Beaver, Ark., for the year ending September 30, 1924

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	128	335	3,250	1,100	1,020	570	1,640	21,500	2,680	315	2,350	126
2	123	540	2,900	970	930	540	1,440	9,240	2,040	295	5,530	163
3	110	2,900	2,140	810	850	510	1,240	5,530	1,640	278	2,240	158
4	139	4,630	1,940	700	772	570	1,100	2,900	1,540	260	1,240	225
5	155	4,330	1,740	665	735	632	1,020	3,010	1,340	242	850	225
6	136	2,140	1,540	600	700	665	970	2,460	970	225	665	210
7	128	1,440	1,240	510	665	540	890	2,040	850	225	570	178
8	139	1,100	1,100	455	600	510	772	1,840	810	210	2,460	155
9	147	850	1,060	430	540	480	735	1,440	735	195	1,060	136
10	134	665	2,040	430	510	455	665	1,240	632	192	700	128
11	117	570	2,680	405	600	430	1,240	1,100	970	183	540	123
12	108	510	2,460	405	850	405	1,020	970	3,510	335	430	112
13	108	480	5,380	405	2,040	430	890	850	3,900	632	405	108
14	166	700	11,200	380	1,840	405	772	772	2,140	510	358	99
15	295	1,740	6,730	380	1,540	480	700	665	1,540	380	315	97
16	278	1,540	3,900	358	1,340	570	632	600	1,150	315	380	94
17	260	1,100	2,900	335	1,340	810	600	570	1,540	278	295	90
18	295	810	2,350	405	1,640	890	540	540	2,240	1,060	260	90
19	358	665	1,940	540	1,740	970	570	480	1,240	2,240	242	405
20	295	570	1,940	540	1,640	1,060	510	480	850	1,940	242	665
21	242	510	2,570	600	1,440	1,020	480	540	1,540	970	225	632
22	210	455	3,770	510	1,240	1,640	430	480	2,040	665	210	772
23	180	430	8,120	455	1,100	2,570	405	455	1,540	510	186	600
24	161	405	7,330	540	1,020	3,770	405	430	1,100	405	172	430
25	155	570	4,480	700	930	3,640	405	540	810	358	161	335
26	144	510	3,250	2,240	850	2,900	1,940	510	700	315	150	295
27	139	540	2,570	1,940	772	2,460	13,400	540	540	278	142	260
28	144	735	2,140	1,540	700	2,040	6,130	480	480	260	131	260
29	152	772	1,840	1,340	632	2,140	4,480	3,120	405	242	126	242
30	315	1,740	1,540	1,240	-------	2,140	12,600	11,500	358	225	120	225
31	358	-------	1,340	1,150	-------	1,940	-------	4,930	-------	810	115	-------

Monthly discharge of White River at Beaver, Ark., for the year ending September 30, 1924

[Drainage area, 1,270 square miles]

Month	Discharge in second-feet				Run-off in inches
	Maximum	Minimum	Mean	Per square mile	
October	358	108	188	0.148	0.17
November	4,630	335	1,140	.898	1.00
December	11,200	1,060	3,210	2.53	2.92
January	2,240	335	744	.586	.68
February	2,040	510	1,050	.827	.89
March	3,770	405	1,230	.969	1.12
April	13,400	405	1,950	1.54	1.72
May	21,500	430	2,670	2.10	2.42
June	3,900	358	1,390	1.09	1.22
July	2,240	183	495	.390	.45
August	5,530	115	738	.581	.67
September	772	90	255	.201	.22
The year	21,500	90	1,260	.992	13.48

JAMES RIVER AT GALENA, MO.

LOCATION.—In NW. ¼ sec. 7, T. 24 N., R. 23 W., at highway bridge in Galena, Stone County, a quarter of a mile above Missouri Pacific Railway bridge, half a mile above Railey Creek, 8 miles below Crane Creek, and 40 miles above mouth.

DRAINAGE AREA.—1,000 square miles (measured on topographic and soil survey maps).

RECORDS AVAILABLE.—October 28, 1921, to September 30, 1924.

GAGE.—Chain gage on upstream side of bridge; read by B. W. Stewart.

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

CHANNEL AND CONTROL.—Bed composed of sand, gravel, and small boulders; clean and fairly permanent. Small trees and brush grow on gravel bars which are exposed at low stages. Low-water control is a heavy gravel riffle 100 feet below gage; practically permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 13.50 feet at 7 p. m. July 12 (discharge, 15,600 second-feet); minimum stage, 0.90 foot at 8.15 a. m. October 12 (discharge, 95 second-feet).

1922–1924: Maximum stage recorded, that of July 12, 1924, as given above; minimum stage, 0.74 foot October 17, 1922 (discharge, 77 second-feet).

ACCURACY.—Stage-discharge relation permanent during the year; not affected by ice. Rating curve fairly well defined. Gage read to hundredths twice daily; readings not entirely reliable. Daily discharge ascertained by applying mean daily gage height to rating table. Records fair.

Discharge measurements of James River at Galena, Mo., during the year ending September 30, 1924

Date	Gage height	Discharge	Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Dec. 29	3.48	1,150	Apr. 23	1.86	330	Sept. 4	2.69	676
Apr. 23	1.86	314	June 26	5.32	2,560			

Daily discharge, in second-feet, of James River at Galena, Mo., for the year ending September 30, 1924

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	154	269	410	930	555	555	1,610	1,760	2,850	1,410	870	1,110
2	144	430	430	810	605	505	1,350	1,410	2,200	1,170	870	990
3	133	720	630	750	580	455	1,170	1,170	1,680	1,050	930	870
4	154	1,050	555	630	555	455	1,050	990	1,470	930	810	750
5	154	1,110	530	580	530	430	990	870	1,290	870	690	660
6	144	930	630	530	530	455	930	720	1,170	750	690	580
7	118	750	690	580	530	430	930	605	990	690	720	690
8	116	660	750	505	555	455	810	810	930	630	690	505
9	108	580	660	480	555	455	660	930	930	580	580	480
10	108	505	630	480	580	430	690	810	3,090	530	1,760	430
11	101	455	690	455	605	410	605	580	2,200	505	7,950	410
12	97	430	1,110	430	605	390	555	505	4,730	6,150	11,600	410
13	104	370	3,340	410	605	370	530	480	1,920	4,460	5,280	370
14	122	455	6,150	410	660	390	480	390	1,920	2,850	3,600	370
15	154	1,680	4,020	390	690	390	455	370	2,100	4,940	2,730	350
16	190	2,010	2,620	370	690	410	455	350	3,600	2,510	5,420	333
17	202	1,470	2,010	350	690	390	480	316	2,300	2,100	6,300	316
18	190	1,170	1,680	350	810	410	455	300	2,200	1,840	4,020	316
19	166	990	1,470	370	990	410	410	300	2,400	1,840	2,850	410
20	166	870	1,470	370	1,050	430	370	810	2,010	1,680	2,100	5,140
21	166	810	1,540	350	990	455	316	1,410	6,000	1,760	1,840	3,340
22	166	630	1,680	370	930	455	316	1,290	6,150	3,340	1,540	2,010
23	154	580	1,920	350	930	605	333	1,110	3,340	4,300	1,350	1,290
24	144	530	2,200	390	930	870	316	1,540	2,300	2,400	1,170	1,050
25	144	480	2,010	690	810	990	316	1,470	2,730	1,840	1,050	930
26	190	455	1,840	870	690	990	410	1,230	3,600	1,410	990	750
27	144	410	1,470	720	660	930	430	1,170	4,460	1,230	930	660
28	144	390	1,350	630	630	870	430	3,600	3,340	1,170	870	605
29	166	410	1,230	605	605	1,540	555	7,800	2,620	930	720	580
30	177	455	1,110	580	-------	3,470	1,350	6,300	1,680	930	605	580
31	166	-------	990	555	-------	2,200	-------	4,160	-------	870	750	-------

Monthly discharge of James River at Galena, Mo., for the year ending September 30, 1924

[Drainage area, 1,000 square miles]

Month	Discharge in second-feet				Run-off in inches
	Maximum	Minimum	Mean	Per square mile	
October	202	97	148	0.148	0.17
November	2,010	269	735	.735	.82
December	6,150	410	1,540	1.54	1.78
January	930	350	525	.525	.61
February	1,050	530	695	.695	.75
March	3,470	370	710	.710	.82
April	1,610	316	659	.659	.74
May	7,800	300	1,470	1.47	1.70
June	6,150	930	2,610	2.61	2.91
July	6,150	505	1,860	1.86	2.14
August	11,600	580	2,330	2.33	2.69
September	5,140	316	910	.910	1.02
The year	11,600	97	1,180	1.18	16.15

NORTH FORK OF WHITE RIVER AT TECUMSEH, MO.

LOCATION.—In sec. 16, T. 22 N., R. 12 W., at bridge on State highway at west edge of Tecumseh, Ozark County, half a mile below Bryant Creek, 3 miles above Lick Creek, and 8 miles above Missouri-Arkansas line.

DRAINAGE AREA.—1,180 square miles (measured on United States soil survey maps).

RECORDS AVAILABLE.—October 24, 1921, to September 30, 1924.

GAGE.—Prior to June 29 a vertical staff gage on left bank 200 feet below bridge; after that date a chain gage on downstream side of bridge set to read same as the staff gage; read by Edward Hodo.

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

CHANNEL AND CONTROL.—Bed composed of sand, gravel, and boulders; clean and fairly permanent. Control is a bar composed of outcropping rock and coarse gravel 400 feet below gage; practically permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year ending September 30, 1924, 20.0 feet at 5 p. m. June 11 (discharge, 38,300 second-feet); minimum stage, 0.52 foot October 12 and 13 (discharge, 460 second-feet).

1922–1924: Maximum stage recorded, that of June 11, 1924; minimum discharge, 426 second-feet several days in September and October, 1922.

REGULATION.—Natural regulation due to flow from large springs.

ACCURACY.—Stage-discharge relation changed slightly during August and September, 1923; not affected by ice. Both rating curves well defined. Gage read to hundredths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table; shifting-control method used August 1 to September 30, 1923. Records good.

Discharge measurements of North Fork of White River at Tecumseh, Mo., during the year ending September 30, 1924

Date	Gage height	Discharge	Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Oct. 5	0.60	550	May 21	1.14	982	Sept. 5	0.84	669
Apr. 27	.72	631	June 29	2.08	1,870			

Daily discharge, in second-feet, of North Fork of White River at Tecumseh, Mo., for the years ending September 30, 1922–1924

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1921–22												
1	-------	590	1,180	792	750	1,460	5,050	2,140	1,140	792	552	485
2	-------	590	1,640	750	920	1,360	3,710	1,940	1,090	920	552	470
3	-------	590	1,840	750	1,000	1,270	3,180	1,840	1,040	1,360	552	470
4	-------	552	1,640	792	920	1,270	2,760	1,940	1,000	878	552	552
5	-------	552	1,460	792	920	1,270	3,290	1,940	962	750	552	710
6	-------	552	1,360	792	878	1,360	3,080	1,940	920	710	552	590
7	-------	552	1,270	750	835	1,360	2,760	1,940	920	710	552	515
8	-------	552	1,180	792	750	1,360	2,560	1,740	920	670	552	515
9	-------	590	1,090	792	750	1,740	3,710	1,640	920	670	515	500
10	-------	552	1,040	792	750	2,870	4,580	1,550	878	670	515	515
11	-------	552	1,000	792	750	2,560	6,120	1,460	878	750	515	508
12	-------	552	962	792	710	2,140	3,920	1,460	835	792	515	492
13	-------	552	920	750	710	1,940	3,400	1,360	835	750	515	485
14	-------	552	878	750	670	2,560	2,870	1,360	792	710	515	478
15	-------	552	835	750	670	2,870	2,760	1,270	792	710	515	470
16	-------	552	835	710	630	2,340	2,560	1,270	792	670	515	470
17	-------	590	835	710	630	2,040	3,290	1,270	750	670	515	455
18	-------	2,040	835	710	630	1,940	2,660	1,270	750	670	515	455
19	-------	6,260	792	710	630	1,940	2,340	1,180	750	630	590	455
20	-------	2,450	792	710	710	1,940	2,140	1,140	750	630	515	448
21	-------	1,640	750	670	2,140	1,840	1,940	1,090	710	630	515	448
22	-------	1,360	750	670	1,550	1,740	1,840	1,180	710	630	515	455
23	-------	1,180	750	670	3,710	1,640	1,740	1,140	710	590	515	440
24	590	2,340	878	630	3,180	1,550	1,740	1,640	710	590	500	440
25	552	2,340	962	630	2,340	1,460	1,740	1,550	750	590	492	440
26	590	1,740	962	670	1,940	2,040	1,640	1,360	710	670	492	426
27	552	1,550	962	630	1,740	3,080	1,840	1,460	710	670	492	426
28	552	1,270	920	630	1,550	2,760	2,870	2,140	710	630	485	440
29	590	1,180	878	630	-------	2,560	2,660	1,360	670	590	485	433
30	590	1,040	835	630	-------	4,810	2,240	1,270	670	590	485	433
31	590	-------	835	630	-------	8,000	-------	1,140	-------	590	485	-------
1922–23												
1	426	470	485	1,360	26,700	920	1,140	1,740	2,760	1,180	878	670
2	440	470	500	1,040	8,000	920	1,140	1,640	2,140	1,180	835	630
3	440	462	515	920	5,570	920	1,180	1,550	4,810	1,140	878	670
4	440	455	515	792	3,500	1,000	1,550	1,550	3,710	1,090	835	670
5	426	455	500	750	2,660	1,000	1,940	1,550	2,870	1,090	792	630
6	630	470	492	670	2,240	1,550	1,550	1,460	2,450	1,040	792	630
7	590	470	515	670	2,040	1,640	1,460	1,460	2,340	1,000	750	630
8	552	470	590	590	1,840	1,550	1,360	1,460	2,040	1,000	750	630
9	515	470	552	590	1,640	1,460	1,270	1,270	1,840	962	750	590
10	500	455	515	552	1,550	1,360	1,270	1,270	3,500	962	750	590
11	470	455	508	552	1,460	2,340	1,180	1,180	5,180	962	750	552
12	462	455	500	515	1,460	4,810	1,180	1,180	3,710	920	710	552
13	455	500	478	515	1,460	3,290	1,270	1,180	2,980	1,550	710	552
14	455	515	470	552	1,360	2,560	1,360	1,460	2,560	1,270	670	552
15	470	515	470	590	1,270	3,820	1,270	4,470	2,240	1,040	670	515
16	485	508	470	590	1,180	8,000	1,270	8,720	2,040	1,000	670	552
17	470	485	455	590	1,180	3,920	1,270	4,250	2,140	1,270	670	552
18	455	515	440	590	1,140	3,080	1,270	3,180	2,140	1,090	670	552
19	448	515	440	590	1,090	2,450	1,180	2,560	2,040	962	670	630
20	440	508	440	1,090	1,090	2,240	1,180	2,240	1,840	1,000	670	630
21	448	485	440	3,920	1,040	2,040	1,550	2,040	1,640	962	630	590
22	440	470	440	2,340	1,000	1,940	1,740	1,840	1,550	920	670	552
23	455	462	448	1,640	962	1,740	1,640	1,740	1,460	920	670	552
24	455	455	440	1,460	962	1,640	1,740	1,940	1,460	878	630	552
25	455	455	440	1,270	920	1,550	1,640	5,310	1,360	878	630	552
26	455	440	426	1,140	962	1,460	1,550	4,360	1,360	878	630	515
27	448	440	670	1,180	962	1,360	1,460	3,500	1,270	878	590	515
28	455	440	835	1,270	920	1,360	1,940	2,980	1,460	920	590	508
29	455	440	750	1,270	-------	1,270	2,140	2,560	1,270	920	590	500
30	455	440	962	1,180	-------	1,270	1,940	3,500	1,270	962	590	515
31	455	-------	1,550	2,660	-------	1,180	-------	2,450	-------	920	590	-------

Daily discharge, in second-feet, of North Fork of White River at Tecumseh, Mo., for the years ending September 30, 1922–1924—Continued

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1923–24												
1	505	512	560	765	680	600	895	1,790	1,690	1,490	895	1,030
2	498	505	560	765	680	600	850	1,490	1,490	1,400	895	940
3	490	560	505	722	640	600	808	1,300	1,490	1,400	850	808
4	520	560	560	722	680	600	765	1,160	1,300	1,300	808	722
5	520	560	560	680	680	600	765	1,120	1,160	1,210	765	680
6	520	560	560	600	680	600	722	985	1,030	1,160	765	680
7	498	520	560	640	640	560	680	895	985	1,120	722	680
8	475	520	560	640	640	560	680	895	940	1,080	765	640
9	475	520	722	640	600	560	722	850	895	1,080	722	640
10	475	490	895	640	600	560	680	808	1,300	1,030	1,400	600
11	475	490	1,120	640	640	560	680	765	31,400	940	1,210	560
12	468	490	1,030	600	640	560	640	765	6,120	1,080	2,320	600
13	460	490	2,840	600	640	560	640	680	3,160	1,400	1,490	600
14	475	505	2,320	600	600	560	600	680	2,520	1,690	1,210	600
15	475	512	1,590	600	600	560	640	680	2,420	2,320	1,120	600
16	498	498	1,300	600	600	560	640	640	2,630	1,690	1,120	600
17	520	482	1,120	600	640	560	640	640	2,210	1,400	1,210	600
18	520	482	1,030	600	640	560	600	640	2,420	1,490	1,080	600
19	520	475	940	600	680	560	600	600	2,000	1,400	940	680
20	498	475	985	560	680	600	600	722	1,790	1,400	940	1,030
21	482	475	940	560	680	640	600	985	6,400	1,400	895	1,080
22	475	505	1,160	560	640	600	600	895	2,840	1,300	850	895
23	475	520	1,400	520	680	680	600	850	2,630	1,160	722	765
24	475	520	1,300	600	640	680	560	808	2,210	1,120	765	722
25	475	505	1,210	640	640	680	560	808	1,900	1,300	808	722
26	475	512	1,120	640	640	680	600	808	2,740	1,120	808	722
27	475	505	1,030	600	640	680	600	765	2,100	1,030	722	680
28	482	475	985	640	640	680	600	895	2,210	940	680	680
29	498	520	895	640	600	940	1,300	4,140	1,790	940	722	600
30	512	560	895	680	-------	985	1,900	3,050	1,590	940	640	560
31	520	-------	850	640	-------	985	-------	2,100	-------	895	680	-------

Monthly discharge of North Fork of White River at Tecumseh, Mo., for the years ending September 30, 1922–1924

[Drainage area, 1,180 square miles]

Month	Discharge in second-feet				Run-off in inches
	Maximum	Minimum	Mean	Per square mile	
1921–22					
November	6,260	552	1,200	1.02	1.14
December	1,840	750	1,030	.873	1.01
January	792	630	718	.608	.70
February	3,710	630	1,190	1.01	1.05
March	8,000	1,270	2,230	1.89	2.18
April	6,120	1,640	2,900	2.46	2.74
May	2,140	1,090	1,520	1.29	1.49
June	1,140	670	826	.700	.78
July	1,360	590	706	.598	.69
August	590	485	520	.441	.51
September	710	426	481	.408	.46
1922–23					
October	630	426	469	.397	.46
November	515	440	472	.400	.45
December	1,550	426	556	.471	.54
January	3,920	515	1,080	.915	1.05
February	26,700	920	2,720	2.31	2.40
March	8,000	920	2,120	1.80	2.08
April	2,140	1,140	1,450	1.23	1.37
May	8,720	1,180	2,500	2.12	2.44
June	5,180	1,270	2,310	1.96	2.19
July	1,550	878	1,020	.864	1.00
August	878	590	699	.592	.68
September	670	500	578	.490	.55
The year	26,700	426	1,320	1.12	15.21

Monthly discharge of North Fork of White River at Tecumseh, Mo., for the years ending September 30, 1922–1924—Continued

Month	Discharge in second-feet				Run-off in inches
	Maximum	Minimum	Mean	Per square mile	
1923–24					
October	520	460	491	0.416	0.48
November	560	475	510	.432	.48
December	2,840	505	1,040	.881	1.02
January	765	520	630	.534	.62
February	680	600	644	.546	.59
March	985	560	636	.539	.62
April	1,900	560	726	.615	.69
May	4,140	600	1,100	.932	1.07
June	31,400	895	3,180	2.69	3.00
July	2,320	895	1,270	1.08	1.24
August	2,320	640	952	.807	.93
September	1,080	560	711	.603	.67
The year	31,400	460	989	.838	11.41

BLACK RIVER AT LEEPER, MO.

LOCATION.—In SW. ¼ NE. ¼ sec. 27, T. 28 N., R. 3 E., on Missouri Southern Railroad Co.'s bridge at Leeper, Wayne County, 1½ miles above Greenwood Valley Creek and 3 miles below McKenzie Creek.

DRAINAGE AREA.—957 square miles (measured on United States soil survey maps).

RECORDS AVAILABLE.—June 15, 1921, to September 30, 1924.

GAGE.—Chain gage fastened to guard timber on downstream side of railroad bridge; read by Pearl Church.

DISCHARGE MEASUREMENTS.—Made from downstream side of railroad or highway bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of coarse sand and gravel; control is a bar of coarse gravel and boulders 800 feet below gage; practically permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year ending September 30, 1924, 7.50 feet at 7.30 a. m. June 12 (discharge, 7,250 second-feet); minimum stage, 2.28 feet October 8–14 (discharge, 260 second-feet).

1921–1924: Maximum stage recorded, 13.40 feet November 19, 1921 (discharge, 24,000 second-feet); minimum discharge, 210 second-feet September 25, 30, October 2, 3, and 5, 1922.

The river reached a stage of 21.3 feet in August, 1915 (determined by levels to high-water marks by United States Weather Bureau).

ACCURACY.—Stage-discharge relation changed somewhat several times during 1922–1924; not affected by ice. Rating curves either well or fairly well defined. Gage read to hundredths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table. Records good.

Discharge measurements of Black River at Leeper, Mo., during the year ending September 30, 1924

Date	Gage height	Discharge	Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Oct. 11	2.32	288	Mar. 27	3.43	974	June 26	3.35	924
Dec. 14	5.52	3,530	May 1	2.76	498	Sept. 13	2.43	285
Mar. 26	3.50	1,020						

Daily discharge, in second-feet, of Black River at Leeper, Mo., for the years ending September 30, 1922–1924

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1921–22												
1	870	300	1,170	815	1,760	960	14,600	2,560	465	400	262	300
2	800	300	1,170	780	1,760	920	6,000	1,980	465	400	280	280
3	765	280	1,360	710	1,560	815	3,580	1,560	465	400	262	280
4	765	300	1,560	745	1,360	780	3,110	1,460	440	400	262	280
5	700	300	1,460	780	1,170	780	3,760	1,360	440	420	262	300
6	610	300	1,360	745	1,040	920	3,110	1,170	465	400	262	320
7	610	300	1,170	710	920	1,260	3,260	1,170	465	380	245	320
8	560	300	1,080	710	850	1,260	2,680	1,080	440	380	245	300
9	510	360	1,000	710	815	1,360	2,440	920	440	380	245	280
10	488	360	920	680	465	1,760	2,440	850	400	360	245	280
11	465	340	850	680	680	1,980	5,200	815	400	360	228	280
12	442	320	815	620	650	1,980	4,340	780	400	340	262	262
13	420	320	745	620	620	1,760	3,260	780	380	360	228	262
14	400	320	680	650	590	3,110	2,440	745	420	340	228	245
15	360	320	650	620	565	3,580	2,440	710	420	340	262	245
16	360	300	650	620	540	2,960	2,440	680	400	340	320	245
17	340	360	620	540	540	1,980	4,240	650	380	340	300	228
18	340	1,100	620	540	515	1,760	7,300	650	360	360	262	210
19	340	20,300	620	515	490	1,660	3,260	620	360	360	262	228
20	320	9,600	590	515	490	3,580	2,200	590	340	360	262	245
21	300	3,580	565	490	780	2,960	1,870	590	340	360	262	245
22	300	2,440	540	490	1,360	2,200	1,560	565	340	380	320	245
23	300	1,980	620	490	1,170	1,560	1,360	540	320	400	465	228
24	300	1,980	1,080	465	1,040	1,170	1,260	540	320	320	515	228
25	300	2,820	2,440	465	960	850	1,170	565	320	320	440	210
26	280	2,200	1,980	465	1,080	1,260	1,360	590	340	340	400	228
27	280	1,870	1,460	440	1,000	2,090	2,090	540	360	340	380	228
28	300	1,760	1,260	420	1,000	2,820	5,600	515	380	320	340	228
29	320	1,460	1,170	400	-------	2,820	4,420	515	400	300	320	228
30	340	1,260	960	380	-------	3,580	2,820	490	420	300	320	210
31	320	-------	885	710	-------	17,800	-------	490	-------	280	320	-------
1922–23												
1	228	340	340	3,580	12,700	850	752	828	1,900	680	360	295
2	210	400	360	2,090	13,200	815	752	828	1,680	645	360	610
3	210	400	380	1,560	9,360	850	828	1,190	2,940	610	360	980
4	228	420	360	1,080	4,140	1,080	828	4,100	2,790	575	335	828
5	210	400	360	885	2,090	1,260	980	6,420	1,900	542	335	680
6	228	380	340	885	1,980	1,360	980	3,420	1,580	542	315	575
7	245	380	360	815	1,980	1,760	940	2,390	1,380	478	315	542
8	440	380	400	710	1,660	1,760	940	1,900	1,190	478	315	478
9	490	380	420	680	1,560	1,560	902	1,580	1,100	445	385	445
10	440	340	420	620	1,360	1,360	828	1,480	1,020	478	445	415
11	380	340	400	565	1,260	1,980	828	1,280	1,020	445	385	415
12	360	340	400	565	1,170	8,880	790	1,140	1,060	415	385	360
13	320	380	420	515	1,360	5,800	980	1,060	940	445	360	360
14	320	440	400	540	1,360	3,260	1,380	1,020	902	445	360	335
15	300	465	380	540	1,260	3,110	1,580	6,200	1,480	415	335	315
16	320	490	380	590	1,170	16,600	1,380	18,100	2,650	445	335	315
17	320	490	380	590	1,080	6,000	1,190	7,950	2,260	510	335	315
18	340	490	360	540	1,000	3,250	1,140	3,930	2,020	542	335	315
19	340	490	360	540	1,000	2,390	1,020	3,090	1,480	478	335	335
20	340	490	360	515	960	1,900	980	2,650	1,190	415	315	360
21	320	465	340	1,360	920	3,090	1,020	2,020	1,060	415	315	385
22	300	465	320	1,360	885	1,580	980	1,900	980	385	415	335
23	300	465	320	1,260	815	1,380	940	1,580	890	360	415	335
24	300	420	320	1,170	815	1,280	1,380	1,480	828	360	445	315
25	300	380	320	1,080	815	1,190	1,100	1,380	752	360	315	315
26	300	380	320	1,080	815	1,140	980	1,280	715	360	360	295
27	300	380	850	1,260	850	1,060	940	1,280	680	360	360	295
28	300	360	2,320	1,760	850	980	1,060	1,280	1,140	385	335	295
29	280	360	2,090	2,090	-------	902	980	1,280	890	360	315	295
30	300	340	1,560	1,660	-------	828	890	2,140	752	385	295	278
31	300	-------	2,820	2,440	-------	828	-------	2,260	-------	385	278	-------

Daily discharge, in second-feet, of Black River at Leeper Mo., for the years ending September 30, 1922–1924—Continued

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1923–24												
1	295	445	360	752	445	715	1,480	445	1,580	610	575	385
2	295	445	360	752	445	715	1,280	478	828	542	2,020	360
3	278	478	360	715	445	680	1,100	445	1,140	542	1,680	360
4	278	510	385	645	715	645	1,020	445	1,060	510	2,650	360
5	278	610	415	610	1,580	645	890	445	940	478	1,100	335
6	278	645	445	610	1,280	575	828	415	890	478	890	335
7	278	610	575	575	1,020	575	790	478	828	445	790	335
8	260	575	645	510	940	575	715	510	790	415	715	335
9	260	575	752	510	828	575	715	510	680	415	645	315
10	260	542	4,630	478	838	542	1,100	478	645	415	610	315
11	260	478	2,940	478	790	542	940	478	610	385	645	315
12	260	478	2,140	510	752	510	828	415	5,200	828	1,190	315
13	260	478	2,260	542	715	510	752	385	1,100	445	1,280	315
14	260	445	3,760	510	680	510	715	360	890	542	940	315
15	278	415	2,390	478	680	542	680	385	1,140	1,140	828	295
16	278	385	1,680	510	645	575	645	360	890	902	940	315
17	415	385	1,900	510	645	575	575	360	890	828	890	315
18	510	360	1,580	478	1,680	645	542	360	790	715	828	315
19	828	385	1,020	478	1,790	790	542	360	752	752	752	335
20	940	360	1,010	445	1,100	715	510	415	715	1,100	645	335
21	478	360	1,280	415	1,280	715	478	478	1,060	1,480	542	2,140
22	610	360	1,680	415	1,100	680	478	445	1,280	1,020	542	1,480
23	575	360	1,900	415	1,020	645	445	385	1,100	902	510	1,100
24	542	335	1,900	415	940	940	445	445	902	890	542	890
25	510	360	1,480	415	890	1,100	445	510	1,020	940	510	680
26	478	360	1,380	385	790	980	415	715	902	902	445	645
27	445	335	1,190	385	828	940	385	645	940	790	478	542
28	415	335	1,100	415	752	902	385	680	828	752	445	510
29	415	360	1,020	415	715	980	385	4,270	715	980	415	478
30	415	360	940	415	-------	3,590	478	4,820	645	680	415	445
31	415	-------	902	445	-------	2,650	-------	2,520	-------	610	360	-------

Monthly discharge of Black River at Leeper, Mo., for the years ending September 30, 1922–1924

[Drainage area, 957 square miles]

Month	Discharge in second-feet				Run-off in inches
	Maximum	Minimum	Mean	Per square mile	
1921–22					
October	870	280	445	0.465	0.54
November	20,300	280	1,920	2.01	2.24
December	2,440	540	1,030	1.08	1.24
January	815	380	597	.624	.72
February	1,760	465	920	.961	1.00
March	17,800	780	2,400	2.51	2.89
April	14,600	1,170	3,520	3.68	4.11
May	2,560	490	873	.912	1.05
June	465	320	396	.414	.46
July	420	280	357	.373	.43
August	515	228	299	.312	.36
September	320	210	256	.268	.30
The year	20,300	210	1,080	1.13	15.34
1922–23					
October	490	210	309	.323	.37
November	490	340	408	.426	.48
December	2,820	320	618	.646	.74
January	3,580	515	1,130	1.18	1.36
February	13,200	815	2,440	2.55	2.66
March	16,600	815	2,580	2.70	3.11
April	1,580	752	1,010	1.06	1.18
May	18,100	828	2,850	2.98	3.44
June	2,940	680	1,370	1.43	1.60
July	680	360	456	.476	.55
August	445	278	353	.369	.43
September	980	278	414	.433	.48
The year	18,100	210	1,160	1.21	16.40

Monthly discharge of Black River at Leeper, Mo., for the years ending September 30, 1922–1924—Continued

Month	Discharge in second-feet				Run-off in inches
	Maximum	Minimum	Mean	Per square mile	
1923–24					
October	940	260	398	0.416	0.48
November	645	335	438	.458	.51
December	4,630	360	1,430	1.49	1.72
January	752	385	504	.527	.61
February	1,790	445	908	.949	1.02
March	3,590	510	848	.886	1.02
April	1,480	385	700	.731	.82
May	4,820	360	788	.823	.95
June	5,200	610	1,060	1.11	1.24
July	1,480	385	724	.757	.87
August	2,650	360	833	.870	1.00
September	2,140	295	517	.540	.60
The year	5,200	260	763	.797	10.84

CURRENT RIVER NEAR EMINENCE, MO.

LOCATION.—In SE. ¼ NW. ¼ sec. 15, T. 29 N., R. 3 W., at foot of Coot Mountain, 1 mile below Jacks Fork and 8 miles northeast of Eminence, Shannon County.

DRAINAGE AREA.—1,230 square miles (measured on United States soil survey maps).

RECORDS AVAILABLE.—August 24, 1921, to September 30, 1924. The Western Tie & Timber Co., St. Louis, has records of stage from December, 1920, to August, 1921.

GAGE.—Vertical staff gage from 0 to 10 feet bolted to outcropping ledge on right bank, and another section from 10 to 26 feet fastened to near-by tree. Prior to October 19, 1921, a painted vertical staff gage at independent datum on right bank 1,200 feet above present gage was used; relation between gages determined by simultaneous readings.

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

CHANNEL AND CONTROL.—Bed composed of clean, coarse gravel. Control is a coarse gravel bar below gage; clean and practically permanent.

EXTREMES OF STAGE.—Maximum stage recorded during year, 6.35 feet at 9 a. m. June 21; minimum stage 1.16 feet at 10.30 a. m. September 16.

1921–1924: Maximum stage recorded, 14.20 feet November 19, 1921; minimum stage, that of September 16, 1924.

REGULATION.—Natural regulation through large tributary springs.

ACCURACY.—Stage-discharge relation practically permanent; not affected by ice. Gage read to hundredths once daily. Daily discharge not determined.

Discharge measurements of Current River near Eminence, Mo., during the year ending September 30, 1924

Date	Gage height	Discharge	Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Oct. 4	1.32	608	May 1	2.12	1,130	Sept. 15	1.18	568
Dec. 12	3.14	1,960	June 24	3.39	2,360			

Daily gage height, in feet, of Current River near Eminence, Mo., for the year ending September 30, 1924

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1.30	1.38	1.40	1.98	1.43	1.58	2.58	2.10	3.90	2.66	1.60	1.48
2	-------	1.36	1.40	1.88	1.48	1.56	2.48	1.98	3.22	2.52	1.74	1.56
3	1.28	1.48	1.40	1.82	-------	1.54	2.40	1.80	2.90	2.40	-------	1.58
4	1.28	-------	1.44	1.78	1.68	1.56	2.30	1.74	2.72	2.24	1.64	1.48
5	1.32	1.54	1.58	1.72	1.88	1.56	2.18	1.52	2.44	2.18	1.60	1.38
6	1.32	1.52	1.62	1.60	1.96	1.54	2.08	1.50	2.38	2.04	1.58	1.32
7	1.32	1.50	1.66	1.64	1.92	1.50	2.00	1.64	2.24	1.98	1.48	1.30
8	1.30	1.46	1.64	1.62	1.80	1.44	1.96	1.68	2.12	1.94	1.44	1.30
9	1.28	1.42	3.00	1.60	1.68	1.50	1.90	1.54	2.04	1.92	1.40	1.30
10	1.28	1.40	3.45	1.72	1.64	1.46	2.02	1.48	2.04	1.96	1.40	1.28
11	1.28	1.36	3.80	1.70	1.60	1.46	1.98	1.46	2.02	1.90	1.50	1.26
12	1.28	1.34	3.12	1.64	1.56	1.42	1.92	1.42	3.04	2.12	1.88	1.24
13	1.26	1.34	3.84	1.58	1.58	1.46	1.88	1.40	2.42	2.04	1.94	1.24
14	1.26	1.34	3.40	1.52	1.58	1.62	1.80	1.40	2.32	2.00	2.30	1.20
15	1.28	1.34	3.20	1.50	1.52	1.62	1.74	1.38	2.20	2.14	2.26	1.18
16	1.40	1.32	3.14	1.56	1.46	1.60	1.70	1.36	2.20	2.12	2.20	1.16
17	1.68	1.32	2.80	1.52	1.48	1.70	1.68	1.32	2.24	2.08	-------	1.20
18	1.82	1.30	2.46	1.48	1.90	1.72	1.64	1.30	2.32	2.02	2.04	1.24
19	1.60	1.30	1.40	1.46	1.96	1.72	1.62	1.30	2.32	1.94	1.92	1.24
20	1.54	1.30	2.44	1.44	1.90	1.88	1.60	1.44	3.00	2.00	1.80	4.60
21	1.46	1.30	2.66	1.42	1.84	1.86	1.58	1.48	6.35	2.12	1.70	3.80
22	1.40	1.30	2.86	1.40	1.80	2.08	1.54	1.46	5.15	2.02	1.68	2.88
23	1.38	1.32	3.16	1.40	1.80	2.20	1.48	1.44	4.00	1.94	1.62	1.92
24	1.36	1.32	3.12	1.46	1.78	2.50	1.46	1.48	3.50	1.94	1.66	1.78
25	1.36	1.30	2.94	1.42	1.70	2.40	1.46	1.74	3.02	1.90	1.60	1.62
26	1.34	1.30	2.72	1.40	1.64	2.18	1.46	1.76	5.35	1.86	1.52	1.52
27	1.34	1.28	2.54	1.40	1.62	2.08	1.46	1.76	4.40	1.80	1.50	1.50
28	1.34	1.28	2.40	1.42	1.62	2.14	1.44	2.28	4.05	1.76	1.44	1.46
29	1.36	1.36	2.26	1.44	1.60	4.15	1.62	5.40	3.80	1.64	1.40	1.40
30	1.46	1.40	2.18	1.46	-------	3.65	1.74	6.00	3.00	1.60	1.38	1.38
31	1.42	-------	2.08	1.46	-------	3.08	-------	4.25	-------	1.58	1.38	-------

CURRENT RIVER AT VAN BUREN, MO.

LOCATION.—In NE. ¼ NW. ¼ sec. 25, T. 27 N., R. 1 W., at highway bridge in Van Buren, Carter County, half a mile below Davis Creek, 3 miles below Henpeck Creek, 3 miles above Carlos Creek, 4 miles above Big Spring, and 5 miles below Mill Creek.

DRAINAGE AREA.—Approximately 1,640 square miles (measured on United States soil survey maps).

RECORDS AVAILABLE.—June 18, 1921, to September 30, 1924. The Missouri Engineering Experiment Station has records at the same site from August 25, 1912, to July 30, 1921.[3]

GAGE.—Chain gage on downstream side of bridge; read by Bernice Rose.

DISCHARGE MEASUREMENTS.—Made from downstream side of bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of clean, coarse gravel; fairly permanent. No well-defined control; low-water control probably at constricted section of channel at former bridge site 800 feet below gage; stage-discharge relation practically permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 6.70 feet at 8.10 a. m. May 31 (discharge, 9,500 second-feet); minimum discharge, 712 second-feet (measured by current meter) September 14.

1921–1924: Maximum stage recorded, 10.25 feet November 20, 1921 (discharge, 22,100 second-feet); minimum stage, 0.97 foot November 15–16, 1921; minimum discharge that of September 14, 1924, as given above.

[3] See Missouri Univ. Eng. Exp. Sta. Bull., ser. 22, vol. 21, No. 35.

The Missouri Engineering Experiment Station has published a maximum discharge of 125,000 second-feet on August 21, 1915, and a minimum discharge of 540 second-feet in September, 1913. On March 26, 1904, the river reached a stage about 3 feet higher than the flood of 1915.

REGULATION.—Natural regulation through large springs.

ACCURACY.—Stage-discharge relation changed slightly during high water in May; not affected by ice. Rating curves well defined. Gage read to hundredths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table, except as described in footnote to table of daily discharge. Records good.

Discharge measurements of Current River at Van Buren, Mo., during the year ending September 30, 1924

Date	Gage height	Discharge	Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Oct. 18	1.73	817	Mar. 29	2.52	1,520	Sept. 14	1.63	712
Dec. 12	3.30	2,440	June 26	4.70	4,830			

Daily discharge, in second-feet, of Current River at Van Buren, Mo., for the year ending September 30, 1924

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	870	870	870	1,450	930	1,000	2,420	1,250	3,460	1,900	990	812
2	870	870	870	1,450	870	1,000	1,780	1,250	2,710	1,660	1,070	845
3	870	870	870	1,160	1,000	1,000	1,660	1,250	2,280	1,660	990	880
4	870	870	870	1,080	1,160	1,000	1,550	1,160	2,020	1,550	990	812
5	870	930	930	1,080	1,160	1,000	1,450	1,160	1,780	1,450	990	812
6	870	870	965	1,080	1,000	1,000	1,350	1,160	1,550	1,450	952	812
7	870	870	1,000	1,080	1,080	1,000	1,350	1,160	1,550	1,350	952	812
8	870	870	1,000	1,080	1,160	1,000	1,250	1,160	1,350	1,250	952	812
9	810	870	1,450	1,080	1,160	930	1,160	1,080	1,350	1,160	952	780
10	870	870	2,280	1,000	1,080	930	1,250	1,000	1,350	1,160	990	767
11	870	870	2,560	1,000	1,080	930	1,250	930	1,250	1,160	1,070	753
12	810	870	2,420	1,000	1,080	930	1,160	930	1,250	1,250	1,070	739
13	810	870	2,560	1,000	1,080	930	1,160	930	1,450	1,350	1,160	725
14	810	870	4,920	1,000	1,160	1,000	1,160	870	1,450	1,350	1,160	712
15	870	870	3,160	1,000	1,080	1,000	1,080	870	1,450	1,450	1,500	720
16	810	870	2,710	1,000	1,160	1,000	1,080	870	1,450	1,450	1,500	780
17	870	870	2,150	930	1,080	1,000	1,080	870	1,350	1,450	1,400	720
18	870	870	1,780	1,000	1,160	1,080	1,080	870	1,350	1,450	1,250	845
19	870	870	1,660	1,000	1,250	1,080	1,000	870	1,450	1,450	1,160	952
20	870	870	1,660	1,000	1,250	1,080	1,160	930	1,550	1,250	1,160	1,160
21	870	870	1,780	870	1,250	1,080	1,000	1,000	7,600	1,250	1,070	3,000
22	870	870	1,900	870	1,250	1,080	1,000	1,000	5,740	1,250	990	1,450
23	870	870	1,900	870	1,220	1,160	1,000	1,000	3,630	1,160	990	1,160
24	870	870	2,420	870	1,180	1,450	930	1,000	2,860	1,250	990	990
25	870	870	2,420	870	1,140	1,660	930	1,080	3,460	1,350	1,070	952
26	870	870	2,280	870	1,110	1,660	930	1,080	4,730	1,250	990	915
27	870	870	1,780	870	1,080	1,550	1,000	1,080	4,350	1,350	780	880
28	870	870	1,660	870	1,000	1,450	870	1,160	3,010	1,350	880	880
29	870	870	1,550	870	1,000	1,450	1,000	3,160	2,860	1,070	845	845
30	870	870	1,350	930	-------	2,860	1,080	8,120	2,280	990	845	812
31	870	-------	1,450	930	-------	2,420	-------	6,400	-------	990	915	-------

NOTE.—Daily discharge interpolated Dec. 6 and July 31; estimated from discharge of Current River near Eminence for Feb. 23–26, Aug. 15–17, and Sept. 10–15 and 21.

Monthly discharge of Current River at Van Buren, Mo., for the year ending September 30, 1924

Month	Discharge in second-feet				Run-off in inches
	Maximum	Minimum	Mean	Per square mile	
October	870	810	860	0.524	0.60
November	930	870	872	.532	.59
December	4,920	870	1,840	1.12	1.29
January	1,450	870	1,000	.610	.70
February	1,250	870	1,110	.677	.73
March	2,860	930	1,220	.744	.86
April	2,420	870	1,210	.738	.82
May	8,120	870	1,500	.915	1.06
June	7,600	1,250	2,460	1.50	1.67
July	1,900	990	1,340	.817	.94
August	1,500	780	1,050	.640	.74
September	3,000	712	938	.572	.64
The year	8,120	712	1,280	.780	10.64

CURRENT RIVER AT DONIPHAN, MO.

LOCATION.—In N. ½ sec. 27, T. 23 N., R. 2 E., at highway bridge three-fourths of a mile west of Doniphan, Ripley County, 2 miles above Briar Creek, and 12 miles below Buffalo Creek.

DRAINAGE AREA.—2,030 square miles (measured on United States soil survey maps).

RECORDS AVAILABLE.—June 14, 1921, to September 30, 1924. The United States Engineer Office, Memphis, Tenn., has records of stage from August, 1918, to June, 1921.

GAGE.—Chain gage on upstream side of bridge; read by T. B. Swindel. Prior to May 10, 1922, a painted staff gage on bridge pier and auxiliary staff gage from 0 to 4 feet on right bank.

DISCHARGE MEASUREMENTS.—Made from downstream side of bridge.

CHANNEL AND CONTROL.—Bed composed of clean, coarse gravel; practically permanent. No well-defined control.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year ending September 30, 1924, 5.48 feet at 7 a. m. May 31 (discharge, 8,300 second-feet); minimum stage, 0.48 foot at 7 a. m. September 17 (discharge, 1,490 second-feet).

1921–1924: Maximum stage recorded, 13.00 feet February 3, 1923 (discharge, 29,600 second-feet); minimum discharge, 1,240 second-feet December 25 and 26, 1922.

The flood of August, 1915, reached a stage of 25.5 feet (determined by levels to floodmarks by United States Engineer Corps).

REGULATION.—Natural regulation through numerous large springs.

ACCURACY.—Stage-discharge relation changed slightly several times during 1923–1924; not affected by ice. Rating curves fairly well defined. Gage read to hundredths once or twice daily. Daily discharge ascertained by applying mean daily gage height to rating table. Records good.

Discharge measurements of Current River at Doniphan, Mo., during the year ending September 30, 1924

Date	Gage height	Discharge	Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Oct. 7	0.64	1,650	Mar. 30	2.44	3,430	Sept. 9	0.56	1,480
Dec. 17	2.30	3,190	June 30	2.59	3,900			

Daily discharge, in second-feet, of Current River at Doniphan, Mo., for the years ending September 30, 1923 and 1924

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1922–23												
1	1,330	1,520	1,420	6,370	7,760	2,680	3,240	3,380	4,520	2,780	2,300	1,800
2	1,330	1,520	1,420	5,720	22,600	2,580	3,120	3,240	4,370	2,680	2,210	1,800
3	1,330	1,520	1,420	4,080	29,600	2,580	3,120	3,240	4,670	2,680	2,120	1,880
4	1,330	1,520	1,520	3,380	16,900	2,680	3,380	4,820	8,900	2,580	2,120	1,960
5	1,330	1,520	1,420	2,850	8,500	2,780	3,940	7,760	7,220	2,480	2,040	1,960
6	1,330	1,520	1,420	2,610	7,050	3,800	3,800	7,940	5,880	2,480	2,040	1,880
7	1,330	1,420	1,520	2,370	6,040	4,080	3,660	6,370	5,720	2,390	1,960	1,960
8	1,330	1,420	1,520	2,250	5,270	4,220	3,660	5,420	4,820	2,390	1,960	1,960
9	1,520	1,420	1,520	2,140	4,820	4,080	3,380	4,820	4,520	2,480	2,040	1,960
10	1,520	1,420	1,520	1,920	4,520	3,800	3,240	4,520	4,370	2,300	2,040	1,880
11	1,520	1,420	1,620	1,920	4,220	5,720	3,120	4,080	4,370	2,300	2,040	1,800
12	1,420	1,420	1,520	1,820	3,940	9,700	3,000	3,940	4,220	2,300	2,040	1,800
13	1,420	1,420	1,520	1,820	3,940	13,100	3,520	3,800	3,660	2,300	1,960	1,800
14	1,330	1,620	1,420	1,820	3,800	10,100	3,940	3,660	3,800	2,300	1,960	1,800
15	1,330	1,620	1,420	1,820	3,660	7,400	4,220	14,200	7,580	2,390	1,960	1,720
16	1,420	1,520	1,420	1,820	3,380	17,100	3,940	16,600	9,300	2,300	1,880	1,720
17	1,420	1,520	1,330	1,920	3,240	20,800	3,660	20,300	8,900	2,390	1,880	1,720
18	1,420	1,620	1,330	1,920	3,240	14,500	3,380	14,900	6,370	2,480	1,880	1,800
19	1,420	1,620	1,330	1,920	3,120	9,100	3,240	9,700	5,420	2,390	1,880	1,800
20	1,330	1,620	1,330	1,920	2,880	7,220	3,240	7,760	4,820	2,300	1,880	1,800
21	1,330	1,620	1,330	7,580	2,880	6,200	3,240	6,200	4,370	2,210	1,880	1,800
22	1,330	1,520	1,330	6,540	2,780	5,720	3,240	5,570	3,940	2,210	1,960	1,800
23	1,330	1,520	1,330	6,200	2,680	5,120	3,240	5,270	3,800	2,120	1,960	1,720
24	1,330	1,420	1,330	4,820	2,580	5,120	3,120	4,970	3,660	2,120	1,960	1,720
25	1,330	1,420	1,240	4,370	2,580	4,800	3,120	4,520	3,240	2,120	1,880	1,720
26	1,330	1,420	1,240	4,080	2,680	4,240	3,000	4,370	3,120	2,120	1,880	1,720
27	1,330	1,420	1,620	3,940	2,680	3,800	3,000	4,220	3,000	2,040	1,880	1,720
28	1,330	1,420	2,030	3,940	2,680	3,660	3,120	4,670	3,000	2,040	1,880	1,720
29	1,330	1,330	3,240	4,370	-------	3,520	4,220	4,520	2,880	2,040	1,800	1,720
30	1,330	1,330	3,380	4,370	-------	3,380	3,660	4,520	2,830	2,040	1,800	1,720
31	1,330	-------	3,800	4,520	-------	3,240	-------	4,820	-------	2,300	1,800	-------
1923–24												
1	1,720	1,720	1,720	2,210	1,720	1,960	3,520	2,210	6,540	3,260	1,960	1,630
2	1,720	1,720	1,720	2,210	1,720	1,960	2,880	2,300	4,820	2,880	1,870	1,630
3	1,720	1,720	1,720	2,120	1,800	1,960	2,780	2,300	4,080	2,770	1,960	1,630
4	1,720	1,720	1,720	1,960	1,880	1,960	2,580	2,300	3,520	2,550	1,960	1,630
5	1,720	1,800	1,720	1,960	2,040	1,960	2,480	2,120	3,130	2,450	1,960	1,560
6	1,720	1,800	1,800	1,960	2,300	1,960	2,480	2,040	2,880	2,250	1,960	1,560
7	1,640	1,720	1,880	1,960	2,300	1,960	2,390	2,040	2,770	2,150	1,870	1,560
8	1,640	1,720	1,880	1,880	2,300	1,880	2,300	2,040	2,660	2,150	1,790	1,560
9	1,640	1,720	1,960	1,880	2,120	1,880	2,300	2,040	2,450	2,050	1,790	1,560
10	1,640	1,720	2,480	1,960	2,120	1,880	2,210	1,960	2,450	2,050	1,790	1,490
11	1,640	1,720	3,240	1,880	2,040	1,800	2,120	1,960	2,450	1,960	1,870	1,490
12	1,640	1,720	3,520	1,880	2,040	1,800	2,120	1,960	2,350	1,960	1,790	1,490
13	1,640	1,720	3,380	1,800	1,960	1,880	2,120	1,960	2,880	2,550	1,790	1,490
14	1,640	1,720	4,080	1,800	1,960	1,880	2,040	1,880	2,770	2,350	1,790	1,560
15	1,640	1,640	5,270	1,800	1,960	1,880	2,040	1,880	2,660	2,450	1,870	1,490
16	1,640	1,640	3,800	1,880	1,880	1,880	2,040	1,800	2,450	2,450	1,870	1,490
17	1,800	1,640	3,120	1,880	1,880	1,880	2,040	1,800	2,350	2,350	2,050	1,490
18	1,880	1,640	2,780	1,880	2,040	1,960	1,960	1,720	2,350	2,350	2,250	1,490
19	1,960	1,640	2,580	1,880	2,120	1,960	1,960	1,720	2,350	2,250	2,150	1,490
20	1,960	1,640	2,480	1,800	2,210	2,040	1,960	1,880	2,350	2,250	2,050	1,490
21	1,880	1,640	2,580	1,800	2,210	2,120	1,960	2,040	2,450	2,250	1,960	2,350
22	1,800	1,640	2,780	1,800	2,210	2,120	1,880	2,040	7,400	2,250	1,870	2,660
23	1,720	1,640	3,240	1,720	2,210	2,210	1,880	2,040	6,040	2,150	1,870	2,150
24	1,720	1,640	3,380	1,720	2,120	2,300	1,880	2,120	4,520	2,150	1,870	2,050
25	1,640	1,640	3,240	1,720	2,040	2,480	1,800	2,040	3,660	2,450	1,790	1,960
26	1,640	1,640	3,120	1,720	2,040	2,580	1,800	2,040	4,820	2,350	1,790	1,870
27	1,640	1,640	2,880	1,720	2,040	2,580	1,800	2,210	6,040	2,250	1,790	1,710
28	1,640	1,640	2,580	1,720	1,960	2,480	1,800	2,300	5,270	2,050	1,710	1,630
29	1,720	1,640	2,580	1,720	1,960	2,480	1,800	3,120	4,520	1,960	1,710	1,560
30	1,720	1,720	2,580	1,720	-------	3,120	2,040	6,040	4,080	1,960	1,710	1,560
31	1,720	-------	2,390	1,720	-------	3,800	-------	8,300	-------	1,960	1,710	-------

NOTE.—Gage not read June 16, 30, and Sept. 30, 1923; discharge estimated.

Monthly discharge of Current River at Doniphan, Mo., for the years ending September 30, 1923 and 1924

[Drainage area, 2,030 square miles]

Month	Discharge in second-feet				Run-off in inches
	Maximum	Minimum	Mean	Per square mile	
1922-23					
October	1,520	1,330	1,370	0.675	0.78
November	1,620	1,330	1,490	.734	.82
December	3,800	1,240	1,640	.808	.93
January	7,580	1,820	3,460	1.70	1.96
February	29,600	2,580	6,070	2.99	3.11
March	20,800	2,580	6,350	3.13	3.61
April	4,220	3,000	3,430	1.69	1.89
May	20,300	3,240	6,580	3.24	3.74
June	9,300	2,830	4,910	2.42	2.70
July	2,780	2,040	2,320	1.14	1.31
August	2,300	1,800	1,960	.966	1.11
September	1,960	1,720	1,810	.892	1.00
The year	29,600	1,240	3,430	1.69	22.96
1923-24					
October	1,960	1,640	1,710	.842	.97
November	1,800	1,640	1,690	.833	.93
December	5,270	1,720	2,720	1.34	1.54
January	2,210	1,720	1,860	.916	1.06
February	2,300	1,720	2,040	1.00	1.08
March	3,800	1,800	2,150	1.06	1.22
April	3,520	1,800	2,170	1.07	1.19
May	8,300	1,720	2,390	1.18	1.36
June	7,400	2,350	3,640	1.79	2.00
July	3,260	1,960	2,300	1.13	1.30
August	2,250	1,710	1,880	.926	1.07
September	2,660	1,490	1,680	.828	.92
The year	8,300	1,490	2,180	1.07	14.64

JACKS FORK AT EMINENCE, MO.

LOCATION.—In W. ½ sec. 26, T. 29 N., R. 4 W., at highway bridge half a mile north of Eminence, Shannon County, 1 mile below Mahans Creek, 6 miles below Alley Spring branch, and 8 miles above mouth.

DRAINAGE AREA.—Approximately 376 square miles (measured on United States soil survey maps).

RECORDS AVAILABLE.—October 18, 1921, to September 30, 1924.

GAGE.—Chain gage on upstream side of bridge; read by E. J. Ward.

DISCHARGE MEASUREMENTS.—Made from downstream side of bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of sand, gravel, and boulders; clean and fairly permanent. Control is a coarse gravel bar 300 feet below gage; fairly permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 4.69 feet at noon June 21 (discharge, 2,970 second-feet); minimum stage, 0.90 foot at 9.20 a. m. September 16 (discharge, 128 second-feet).

1922–1924: Maximum stage recorded, 10.00 feet at noon February 1, 1923 (discharge, 12,200 second-feet); minimum stage, that of September 16, 1924, as given above.

REGULATION.—Natural regulation through flow from several large springs.

ACCURACY.—Stage-discharge relation not permanent; not affected by ice. Rating curves well defined below 3,500 second-feet. Gage read to hundredths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table except for period February 10 to June 5, when indirect method for shifting control was used. Records good.

Discharge measurements of Jacks Fork at Eminence, Mo., during the year ending September 30, 1924

Date	Gage height	Discharge	Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Oct. 3	1.00	150	Apr. 30	1.28	223	Sept. 16	0.90	133
Dec. 11	2.94	1,150	July 1	1.50	334			

Daily discharge, in second-feet, of Jacks Fork at Eminence, Mo., for the year ending September 30, 1924

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	155	176	185	310	216	206	415	415	770	330	213	167
2	155	179	196	290	216	202	370	350	605	310	220	167
3	155	185	199	272	220	202	330	290	482	290	206	161
4	158	199	206	255	248	196	310	255	415	272	185	155
5	155	213	213	234	290	196	290	238	392	255	179	150
6	155	206	230	213	350	188	272	220	370	248	173	144
7	155	185	241	234	330	176	255	210	330	241	173	144
8	155	185	244	234	272	170	252	196	310	234	164	139
9	155	179	370	234	272	170	252	192	290	227	167	144
10	152	173	330	252	230	179	238	188	272	220	202	139
11	150	170	1,280	248	230	179	224	182	272	213	255	136
12	152	161	830	230	227	176	216	170	1,280	224	370	139
13	150	161	1,280	220	224	176	216	167	605	290	330	139
14	152	161	1,360	220	216	188	216	164	460	310	272	133
15	155	161	770	216	210	210	210	158	415	310	272	131
16	161	158	555	213	206	216	206	155	392	330	330	133
17	220	155	505	202	224	230	202	152	482	350	505	133
18	241	155	460	199	227	241	188	147	415	310	415	133
19	227	155	415	202	272	244	182	147	370	290	330	144
20	202	155	415	199	272	255	179	182	630	330	272	188
21	176	155	530	199	248	272	176	227	2,610	330	255	220
22	173	152	580	185	244	272	173	238	1,360	310	238	173
23	167	155	710	179	248	370	170	224	900	290	220	161
24	167	161	655	185	238	415	170	230	655	330	206	161
25	167	161	605	192	234	415	170	238	555	310	206	150
26	164	161	530	192	224	392	170	255	655	272	192	142
27	167	158	460	192	216	350	164	255	580	255	185	144
28	167	155	415	192	213	330	161	438	505	234	176	142
29	173	170	392	199	210	415	170	1,830	438	220	170	139
30	179	173	350	206	-------	555	230	1,930	370	213	164	136
31	173	-------	330	206	-------	460	-------	1,040	-------	206	161	-------

Monthly discharge of Jacks Fork at Eminence, Mo., for the year ending September 30, 1924

[Drainage area, 376 square miles]

Month	Discharge in second-feet				Run-off in inches
	Maximum	Minimum	Mean	Per square mile	
October	241	150	169	0.449	0.52
November	213	152	169	.449	.50
December	1,360	185	511	1.36	1.57
January	310	179	219	.582	.67
February	350	210	242	.644	.69
March	555	170	266	.707	.82
April	415	161	226	.601	.67
May	1,930	147	358	.952	1.10
June	2,610	272	606	1.61	1.80
July	350	206	276	.734	.85
August	505	161	239	.636	.73
September	220	131	150	.399	.45
The year	2,610	131	286	.761	10.37

BIG SPRING NEAR VAN BUREN, MO.

LOCATION.—In sec. 6, T. 26 N., R. 1 E., 1,000 feet above mouth of Spring Branch, up 4,000 feet below St. Louis-San Francisco Railway bridge over Current River, and 4 miles southeast of Van Buren, Carter County.

RECORDS AVAILABLE.—January 8 to June 30, 1922, and April 1, 1923, to September 30, 1924.

GAGE.—Vertical staff bolted to face of large rock on right bank of Spring Branch, 150 feet below outlet of spring.

DISCHARGE MEASUREMENTS.—Made from temporary wagon bridge 500 feet below gage or by wading.

CHANNEL AND CONTROL.—Bed composed of sand and heavy gravel; practically permanent. Moderate growth of moss and weeds in channel. Gravel ford across branch 400 feet below gage somewhat controls low flow. Stage-discharge relation is affected part of time by backwater from Current River.

EXTREMES OF DISCHARGE.—Maximum discharge during year, 472 second-feet June 13; minimum discharge, 318 second-feet September 15–18.

1922–1924: Maximum discharge during periods of records, 840 second-feet May 27, 1923; minimum discharge, 318 second-feet September 15–18, 1924.

ICE.—Stage-discharge relation never affected by ice.

REGULATION.—Entire flow from the naturally regulated spring.

ACCURACY.—Stage-discharge relation permanent except for being affected by backwater from Current River whenever the river was above gage height 2.8 feet at Van Buren. Rating curve fairly well defined; constructed by subtracting from gage heights for discharge measurements the amount that Current River was above 2.8 feet. Gage read to hundredths two or three times a week. Daily discharge ascertained by applying gage heights (corrected by amount that Current River was above 2.8 feet, whenever that occurred) to rating table and interpolating discharge for days when gage was not read. Records fair.

Discharge measurements of Big Spring near Van Buren, Mo., during the year ending September 30, 1924

Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Oct. 12	0.73	330	Mar. 28	1.00	351
Dec. 13	1.30	354	Sept. 14	.64	319

Daily discharge, in second-feet, of Big Spring near Van Buren, Mo., for the year ending September 30, 1924

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	344	330	330	365	330	344	373	380	416	404	358	330
2	344	330	330	358	330	344	380	372	420	400	358	330
3	344	330	330	351	330	344	388	368	424	396	358	330
4	344	330	330	344	335	344	378	365	424	392	358	330
5	344	330	330	344	339	344	368	362	424	388	358	330
6	344	330	330	344	344	344	358	358	424	383	353	330
7	344	330	330	344	349	344	353	353	430	377	349	330
8	344	330	330	344	353	340	349	349	435	372	344	330
9	344	330	330	344	358	337	344	344	440	367	344	330
10	344	330	327	344	358	334	344	344	446	363	344	330
11	344	330	324	344	358	330	344	344	455	358	344	330
12	339	330	321	344	358	330	344	344	463	370	351	330
13	335	330	318	344	358	330	344	344	472	381	358	326
14	330	330	327	344	354	330	349	344	444	392	353	322
15	337	330	335	339	351	337	353	344	416	404	349	318

[4] Records for 1922 and 1923 published as "Big Spring near Chicopee, Mo."

Daily discharge, in second-feet, of Big Spring near Van Buren, Mo., for the year ending September 30, 1924—Continued

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
16	344	330	344	335	348	344	358	344	388	399	344	318
17	344	330	353	330	344	344	354	344	380	393	351	318
18	344	330	363	330	344	344	351	344	372	388	358	318
19	344	330	372	330	344	344	348	366	372	383	353	324
20	344	330	383	330	344	349	344	388	372	377	349	331
21	344	330	393	330	348	353	339	393	362	372	344	338
22	344	330	404	330	351	358	335	399	351	380	342	344
23	344	330	396	330	354	368	330	404	340	388	344	337
24	344	330	388	330	358	378	330	396	330	388	344	330
25	344	330	388	330	358	388	330	388	342	388	339	330
26	344	330	388	330	358	383	330	392	353	383	335	330
27	344	330	388	330	358	377	330	396	365	377	330	330
28	344	330	388	330	351	372	330	400	376	372	330	330
29	339	330	383	330	344	365	359	404	388	367	330	330
30	335	330	377	330	-------	358	388	408	396	363	330	330
31	330	330	372	330	-------	366	-------	412	-------	358	330	-------

NOTE.—Stage-discharge relation affected by backwater from Current River Dec. 10–17 and 22–26, Mar. 30 to Apr. 1, May 29 to June 4, June 30 to July 1, and Sept. 21.

Monthly discharge of Big Spring near Van Buren, Mo., for the year ending September 30, 1924

Month	Discharge in second-feet			Month	Discharge in second-feet		
	Maximum	Minimum	Mean		Maximum	Minimum	Mean
October	344	330	342	May	412	344	371
November	330	330	330	June	472	330	401
December	404	318	355	July	404	358	381
January	365	330	338	August	358	330	346
February	358	330	349	September	344	318	329
March	388	330	351				
April	388	330	351	The year	472	318	354

ELEVEN POINT RIVER NEAR BARDLEY, MO.

LOCATION.—In NW. ¼ sec. 20, T. 23 N., R. 2 W., at bridge on State highway No. 42, 7 miles southwest of Bardley, Oregon County, 7 miles above Fredericks Fork, and 12 miles above Missouri-Arkansas line.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—October 22, 1921, to September 30, 1924.

GAGE.—Chain gage bolted to handrail on upstream side of bridge; read by J. S. Johnson.

DISCHARGE MEASUREMENTS.—Made from downstream side of bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of sand, gravel, and some outcropping rock; clean and fairly permanent. Low-water control is a contracted section of clean, coarse gravel 300 feet below gage; practically permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year ending September 30, 1924, 3.95 feet at 6.30 p. m. August 10 (discharge, 1,680 second-feet); minimum stage, 1.52 feet at 7 a. m. September 30 (discharge, 315 second-feet).

1922–1924: Maximum stage recorded, 10.64 feet March 16, 1923 (discharge, 9,450 second-feet); minimum discharge, that of September 30, 1924.

REGULATION.—Natural regulation through flow from large springs.

ACCURACY.—Stage-discharge relation practically permanent; not affected by ice. Rating curves well defined below and fairly well defined above 4,000 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 Eleven Point River near Bardley, Mo., during the year ending September 30, 1924

Date	Gage height	Discharge	Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Oct. 6	1.75	403	Apr. 28	1.55	331	June 30	2.46	734
Dec. 16	2.08	534	Do	1.55	326	Sept. 8	1.65	369

Daily discharge, in second-feet, of Eleven Point River near Bardley, Mo., for the years ending September 30, 1923 and 1924

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1922–23												
1	405	405	360	700	1,680	700	980	920	1,620	920	650	505
2	405	380	360	600	5,460	700	980	920	1,480	920	650	505
3	405	380	360	550	3,150	700	980	920	1,480	920	650	600
4	405	380	360	505	2,260	700	1,040	1,220	1,620	860	600	550
5	405	380	360	505	1,820	700	1,220	1,480	1,420	860	600	505
6	405	380	360	470	1,480	1,100	1,160	1,360	1,360	860	600	505
7	405	380	360	470	1,420	1,220	1,100	1,290	1,360	800	600	505
8	405	380	360	435	1,290	1,160	1,100	1,160	1,290	800	600	505
9	405	380	360	435	1,220	1,040	1,040	1,100	1,220	800	600	505
10	405	380	360	435	1,160	980	1,040	1,040	1,420	800	600	470
11	405	380	360	435	1,040	1,620	980	1,040	3,060	800	600	470
12	405	360	360	405	1,040	3,790	980	980	2,110	800	600	470
13	380	380	340	405	1,100	2,570	1,100	920	1,680	800	600	470
14	380	380	360	405	1,040	1,890	1,160	980	1,480	860	550	470
15	380	380	360	405	920	2,330	1,100	5,460	1,750	800	550	470
16	380	380	360	380	920	9,150	1,040	5,350	1,890	800	550	470
17	380	380	360	380	920	3,330	1,040	3,420	1,680	800	550	470
18	380	380	340	380	860	2,410	980	2,410	1,620	800	550	470
19	380	380	340	380	860	1,960	920	2,110	1,480	750	550	470
20	380	380	340	405	800	1,820	920	1,960	1,360	750	550	470
21	380	380	340	3,600	800	1,680	1,040	1,680	1,290	750	550	470
22	380	360	340	1,480	750	1,550	980	1,550	1,100	700	550	470
23	380	360	340	1,160	750	1,480	980	1,550	1,160	700	550	470
24	380	360	340	1,040	750	1,360	920	1,620	1,100	700	550	435
25	380	360	340	920	700	1,290	920	1,420	1,100	700	505	435
26	380	360	340	860	750	1,290	920	1,360	1,040	700	505	435
27	380	360	380	860	750	1,220	920	1,360	1,040	700	505	435
28	380	360	435	920	750	1,160	1,100	1,290	1,040	700	505	435
29	380	360	435	860	------	1,100	1,040	1,220	980	700	505	435
30	380	360	435	860	------	1,100	980	1,360	920	750	505	435
31	380	------	550	920	------	1,040	------	1,680	------	650	505	------
1923–24												
1	425	385	350	505	385	425	505	750	920	700	485	405
2	425	368	332	505	385	425	485	650	800	700	485	425
3	425	405	332	465	385	425	465	600	800	650	485	425
4	425	405	350	465	550	405	465	550	750	650	465	405
5	425	405	350	445	650	405	465	550	700	600	465	405
6	405	385	350	425	600	405	445	505	700	600	445	385
7	405	385	350	425	550	405	425	505	650	600	445	385
8	405	368	350	425	505	385	425	485	650	550	425	385
9	405	368	368	405	465	385	425	465	600	550	425	368
10	385	368	385	445	465	385	405	465	650	550	1,550	368
11	385	368	425	425	465	368	405	445	650	550	800	350
12	385	368	445	405	445	368	385	425	650	550	1,290	350
13	385	368	505	405	445	368	385	405	600	550	700	350
14	385	350	600	385	425	368	385	405	600	550	650	350
15	385	350	550	385	425	385	385	405	600	550	550	350

Daily discharge, in second-feet, of Eleven Point River near Bardley, Mo., for the years ending September 30, 1923 and 1924—Continued

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
16	385	350	550	405	425	385	385	385	750	550	550	350
17	425	350	505	405	425	385	385	385	700	550	660	332
18	425	350	505	405	445	385	385	385	700	550	550	332
19	425	350	485	405	465	385	368	368	650	550	505	350
20	405	350	505	385	465	405	368	445	650	550	505	350
21	405	350	650	385	485	425	368	600	800	505	485	368
22	385	368	650	385	465	425	368	600	1,290	505	485	350
23	385	350	800	385	465	485	350	550	980	505	465	350
24	385	350	750	385	465	505	350	600	920	505	465	350
25	385	350	700	385	445	485	350	550	860	550	445	350
26	385	350	700	385	445	485	350	550	860	600	445	350
27	385	332	650	368	445	485	350	550	860	505	425	332
28	385	332	600	368	445	465	350	600	800	505	425	332
29	385	368	600	385	425	505	385	980	750	485	405	332
30	385	350	550	385	-------	550	700	1,040	750	505	405	315
31	385	-------	550	385	-------	550	-------	980	-------	485	405	-------

Monthly discharge of Eleven Point River near Bardley, Mo., for the years ending September 30, 1923 and 1924

Month	Discharge in second-feet			Month	Discharge in second-feet		
	Maximum	Minimum	Mean		Maximum	Minimum	Mean
1922-23				1923-24			
October	405	380	390	October	425	385	399
November	405	360	374	November	405	332	363
December	550	340	368	December	800	332	509
January	3,600	380	728	January	505	368	410
February	5,460	700	1,300	February	650	385	464
March	9,150	700	1,750	March	550	368	426
April	1,220	920	1,020	April	700	350	409
May	5,460	920	1,680	May	1,040	368	554
June	3,060	920	1,440	June	1,290	600	755
July	920	650	782	July	700	485	558
August	650	505	566	August	1,550	405	556
September	600	435	477	September	425	315	362
The year	9,150	340	904	The year	1,550	315	481

GREER SPRING AT GREER, MO.

LOCATION.—In SE. ¼ SW. ¼ sec. 36, T. 25 N., R. 4 W., 250 feet below Greer Spring Milling Co.'s dam, 500 feet below second spring, 850 feet below first spring, 1 mile north of Greer, Oregon County, and 1¼ miles above mouth of Spring Branch.

RECORDS AVAILABLE.—August 10 to December 31, 1904, and November 18, 1921, to September 30, 1924.

GAGE.—Vertical staff gage fastened to tree on right bank at same location as gage used in 1904. Gages not set to same datum. Gage read by E. L. Williams and J. C. Dunigan.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—Bed composed of coarse gravel and boulders; clean and fairly permanent. Control is a section of boulders and rocks just below the gage; clean and fairly permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 1.42 feet June 22 (discharge, 579 second-feet); minimum stage, 0.98 foot November 28 to December 8; minimum discharge, 210 second-feet March 21–25 and April 19–30.

1922–1924: Maximum stage recorded, 1.68 feet April 11, 1922 (discharge, 835 second-feet); minimum stage, 0.88 foot December 23–26, 1922 (discharge, 204 second-feet).

1904: Maximum stage recorded, 1.00 foot August 10–28; minimum stage, 0.60 foot November 5 to December 30. These gage heights not to same datum as those for 1922–1924.

REGULATION.—Dam 250 feet above does not utilize entire flow and causes no noticeable fluctuation at the gage.

ACCURACY.—Stage-discharge relation not permanent; not affected by ice. Rating curve well defined. Gage read to hundredths once daily. Daily discharge ascertained by indirect method for shifting control October 28 to March 20 and by applying daily gage height to rating table for remainder of the year. Records good.

Discharge measurements of Greer Spring at Greer, Mo., during the year ending September 30, 1924

Date	Gage height	Discharge	Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Oct. 6	1.08	268	Apr. 30	1.15	323	Sept. 8	1.08	268
Dec. 16	1.11	333	June 29	1.29	448			

Daily discharge, in second-feet, of Greer Spring at Greer, Mo., for the year ending September 30, 1924

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	285	255	225	302	248	225	240	370	503	465	336	285
2	285	255	225	302	248	225	240	319	484	465	336	285
3	285	270	225	285	248	225	240	285	484	465	336	285
4	285	270	225	285	248	225	240	270	465	446	336	285
5	270	255	225	270	248	225	240	270	446	446	336	285
6	270	255	225	255	248	225	240	270	446	446	336	285
7	270	240	225	255	248	225	240	285	427	427	336	285
8	270	240	225	255	248	225	240	285	389	408	336	285
9	270	240	248	255	248	225	240	285	370	389	319	285
10	270	225	248	255	248	225	240	285	370	389	319	285
11	270	232	262	240	248	225	240	285	370	370	319	285
12	270	232	278	240	248	225	240	285	370	370	353	270
13	270	232	294	240	248	225	240	285	353	353	353	270
14	255	232	310	240	248	225	240	285	353	353	353	255
15	255	232	328	240	248	225	225	270	353	389	353	255
16	255	232	328	240	248	225	225	270	370	389	353	240
17	270	232	328	240	248	225	225	270	370	389	353	240
18	270	232	328	240	248	225	225	270	446	370	336	225
19	270	232	328	240	248	225	210	270	408	370	336	225
20	270	232	310	240	248	225	210	270	389	370	336	225
21	270	232	310	240	248	210	210	285	465	370	336	225
22	270	232	328	240	248	210	210	285	579	370	336	225
23	255	248	328	240	240	210	210	270	560	370	336	225
24	240	248	328	240	240	210	210	285	541	353	319	225
25	240	240	344	240	240	210	210	285	522	353	319	225
26	240	240	344	240	225	225	210	353	503	353	302	225
27	240	240	344	232	225	225	210	370	484	353	302	225
28	255	225	328	232	225	225	210	370	484	353	302	225
29	255	225	328	232	225	240	210	560	465	353	285	225
30	255	225	328	232	-------	240	210	541	465	353	285	225
31	255	-------	310	248	-------	240	-------	503	-------	353	285	-------

Monthly discharge of Greer Spring at Greer, Mo., for the year ending September 30, 1924

Month	Discharge in second-feet			Month	Discharge in second-feet		
	Maximum	Minimum	Mean		Maximum	Minimum	Mean
October	285	240	264	May	560	270	316
November	270	225	239	June	579	353	441
December	344	225	291	July	465	353	387
January	302	232	250	August	353	285	328
February	248	225	244	September	285	225	253
March	240	210	224				
April	240	210	226	The year	579	210	289

ARKANSAS RIVER BASIN

EAST FORK OF ARKANSAS RIVER NEAR LEADVILLE, COLO.

LOCATION.—In sec. 16, T. 9 S., R. 80 W., at highway bridge 200 yards above mouth of Tennessee Fork and 3 miles northwest of Leadville, Lake County.

DRAINAGE AREA.—52 square miles (measured on topographic map).

RECORDS AVAILABLE.—April 25 to August 31, 1890; June 18 to October 11, 1903; June 5, 1911, to November 20, 1924, when station was discontinued.

GAGE.—Vertical staff on left bridge abutment, near upstream end; read by Clyde Heller. No known relation between present gage and gages used prior to 1911.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of coarse gravel and small boulders. Control 30 feet downstream from gage; practically permanent. Banks low, subject to overflow at extreme high water.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 1.64 feet June 14 (discharge, 287 second-feet from discharge measurement); minimum discharge on January 18, when stream was reported to be frozen solid (discharge, 0 second-foot).

1911–1924: Maximum stage recorded, 2.03 feet at 8.30 a. m. June 15, 1921 (discharge, 794 second-feet); minimum discharge recorded in 1924.

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

DIVERSIONS.—The Leadville Water Co. makes a continuous diversion of 2 second-feet from East Fork above station. During the winter this diversion may be increased to 3 second-feet.

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

ACCURACY.—Stage-discharge relation practically permanent. Rating curve well defined. Gage read to hundredths twice daily from May 14 to November 2 and at irregular intervals during remainder of year. Daily discharge ascertained by applying mean daily gage height to rating table. Records good.

Discharge measurements of East Fork of Arkansas River near Leadville, Colo., during the year ending September 30, 1924

Date	Gage height	Discharge	Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Jan. 18	------	*0	Apr. 16	------	17.8	June 14	1.64	287
Feb. 17	------	8.6	May 18	0.93	134	July 27	.42	28.0

*Ice frozen solid.

Daily discharge, in second-feet, of East Fork of Arkansas River near Leadville, Colo., for the period October 4, 1923, to November 20, 1924

Day	Oct.	Nov.	Jan.	Feb.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.
1						25	75	77	32	13	13	13
2						30	75	75	29	12	14	13
3						35	75	71	26	12	14	
4	26					40	80	69	26	13	16	
5						35	106	67	26	13	16	
					12							
6						30	126	67	23	13	16	
7						30	200	128	18	13	16	
8						35	207	113	18	13	15	
9						45	211	77	17	14	15	
10						48	211	77	15	16	14	
11						55	211	67	15	16	14	
12						65	250	63	16	18	14	
13	32					75	240	59	18	18	14	
14					15	82	285	52	18	18	13	
15						108	275	48	17	18	13	
16					18	123	245	48	17	16	12	
17				9	18	128	203	59	16	16	12	
18			0		18	131	181	52	14	14	18	
19					18	133	181	40	14	13	16	13
20					18	128	175	40	13	13	16	13
21					18	133	139	36	13	13	14	
22					18	131	139	35	13	12	13	
23		21			18	128	139	34	12	12	13	
24					18	103	133	30	12	12	13	
25					18	103	128	29	12	12	13	
26					16	126	123	28	12	12	13	
27					14	113	116	28	12	12	13	
28					13	113	113	35	12	12	13	
29					14	103	84	34	13	12	13	
30					15	84	80	33	13	13	13	
31						75		32	13		13	

NOTE.—Discharge Apr. 1-24, 26-27, 29-30, May 1-9, 11-13, and July 29-31, when gage was not read, estimated on basis of temperature record and 1 discharge measurement. Backwater from débris on control June 12-16; discharge based on 1 discharge measurement and comparison with flow of Tennessee Fork. Braced figures show mean discharge for period indicated.

Monthly discharge of East Fork of Arkansas River near Leadville, Colo., for the period April 1 to October 31, 1924

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
April	18		14.9	887
May	133	25	83.6	5,140
June	285	75	160	9,520
July	128	28	54.9	3,380
August	32	12	16.9	1,040
September	18	12	13.8	821
October	18	12	14.0	861
The period				21,600

ARKANSAS RIVER AT GRANITE, COLO.

LOCATION.—In sec. 31, T. 11 S., R. 79 W., at Granite, Lake County, below mouth of Lake Creek and above Lost Canyon and Clear Creeks.

DRAINAGE AREA.—431 square miles (measured on topographic map).

RECORDS AVAILABLE.—May 1, 1897, to September 10, 1899; April 6, 1910, to September 30, 1924.

GAGE.—Bristol water-stage recorder of float type on right bank 200 feet below highway bridge at Granite. Prior to October 26, 1917, inclined gage located at left bank half a mile upstream. Relation between gages not determined.

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

CHANNEL AND CONTROL.—Bed composed of coarse gravel and small boulders. Control shifting. Banks not subject to overflow.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 4.57 feet at 9 a. m. June 16 (discharge, 2,900 second-feet); minimum discharge, 74 second-feet on March 9.

1910–1924: Maximum discharge that of June 16, 1924; minimum discharge recorded, 11 second-feet on March 15, 1918.

ICE.—Stage-discharge relation affected by ice.

DIVERSIONS.—Water diverted from Arkansas River for irrigation of 1,800 acres between this station and junction of Tennessee and East Forks.

REGULATION.—Discharge affected by operation of Twin Lakes Reservoir, which has a storage decree for 54,450 acre-feet.

COOPERATION.—Complete records furnished by State engineer.

Daily discharge, in second-feet, of Arkansas River at Granite, Colo., for the year ending September 30, 1924

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	178	248	149			87	100	197	573	1,120	884	506
2	168	241	139			87	100	231	549	1,110	932	182
3	178	238	128			86	92	284	667	1,030	940	131
4	178	241	112			79	92	349	806	932	1,010	155
5	181	234	107			86	129	382	837	860	1,010	140
6	186	234	105			92	276	501	1,230	768	988	131
7	191	238	114			79	209	490	1,910	753	1,000	131
8	194	244	119			79	209	478	1,930	1,050	1,020	129
9	189	252	121			74	179	506	1,790	900	709	134
10	186	241	110			79	179	561	1,730	932	451	145
11	186	248	123			79	209	606	1,730	798	446	152
12	202	161	116			79	225	667	1,500	632	396	127
13	200	126	110			86	241	746	2,100	599	358	119
14	191	126	123			79	296	702	2,580	580	358	117
15	186	137	132		87	79	358	739	2,600	555	354	117
16	181	126	126	89		79	179	1,020	2,790	561	580	121
17	174	114	116			79	166	1,110	2,580	606	845	119
18	154	114	126			79	140	1,160	2,330	586	791	123
19	176	137	128			79	129	1,080	2,060	524	783	150
20	164	126	123			79	152	1,020	1,510	451	783	194
21	166	126	110			79	179	1,180	1,160	391	822	200
22	171	128	109			92	225	1,320	1,000	400	892	166
23	184	130	100			79	258	1,250	868	549	908	131
24	186	137	101			79	307	1,120	876	518	908	127
25	186	139	102			86	241	1,200	996	490	924	123
26	186	130	104			92	203	1,320	1,150	660	908	121
27	176	130	105			92	166	1,260	1,260	626	916	121
28	176	114	105			92	166	1,050	1,290	646	940	129
29	186	130	105			86	166	768	1,290	783	908	134
30	168	142	100		-------	86	168	716	1,190	852	768	123
31	191	-------	90		-------	86	-------	606	-------	860	674	-------

NOTE.—Stage-discharge relation affected by ice Dec. 24–31; discharge based on temperature record and 1 discharge measurement. Mean discharge estimated for January and February, based on temperature record, 1 discharge measurement and comparison with records for Arkansas River at Salida.

Monthly discharge of Arkansas River at Granite, Colo., for the year ending September 30, 1924

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	202	154	181	11,100
November	252	114	171	10,200
December	149	90	115	7,070
January	----------	----------	89	5,470
February	----------	----------	87	5,000
March	92	74	83	5,100
April	358	92	191	11,400
May	1,320	197	794	48,800
June	2,790	549	1,500	89,300
July	1,120	391	714	43,900
August	1,020	354	781	48,000
September	506	117	150	8,930
The year	2,790	----------	405	294,000

ARKANSAS RIVER AT SALIDA, COLO.

LOCATION.—In sec. 32, T. 50 N., R. 9 E., at Salida, Chaffee County, some distance above mouth of South Fork of Arkansas River, the nearest important tributary.

DRAINAGE AREA.—1,210 square miles (measured on base map of Colorado).

RECORDS AVAILABLE.—April 11, 1895, to October 31, 1903; November 3, 1909, to September 30, 1924.

GAGE.—Bristol water-stage recorder on right bank in city park 400 feet below highway bridge; inspected by water commissioner. Datum lowered 1.0 foot January 1, 1922.

DISCHARGE MEASUREMENTS.—Made from highway bridge.

CHANNEL AND CONTROL.—Bed composed of coarse gravel; shifts at intervals. No well-defined control. Banks not subject to overflow.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 7.2 feet at 3 a. m. June 16 (discharge, 5,100 second-feet); minimum discharge, 199 second-feet at 5 p. m. on February 5 and March 10.

1909–1924: Maximum stage recorded in 1924; minimum stage, 0.10 foot, January 28, 1915 (discharge, 155 second-feet).

ICE.—Stage-discharge relation not affected by ice as river is kept open by springs.

DIVERSIONS.—Water diverted from Arkansas River between Granite and Salida for irrigation of 2,800 acres.

REGULATION.—Flow at station regulated to some extent by Twin Lakes and Clear Creek Reservoirs, which have storage decrees for 54,450 and 11,500 acre-feet, respectively.

COOPERATION.—Complete records furnished by State engineer.

Daily discharge, in second-feet, of Arkansas River at Salida, Colo., for the year ending September 30, 1924

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	581	536	356	268	268	243	223	340	864	1,840	1,080	725
2	571	536	353	260	268	243	247	379	847	1,760	1,110	658
3	592	517	346	260	246	250	253	441	882	1,740	1,160	335
4	571	517	331	257	223	246	290	565	1,160	1,600	1,180	285
5	598	503	324	240	220	240	294	625	1,460	1,570	1,210	310
6	635	503	331	253	268	227	348	686	1,930	1,500	1,210	296
7	619	494	342	275	268	240	426	747	2,990	1,530	1,190	288
8	576	489	338	275	260	246	460	836	3,260	1,640	1,220	289
9	551	498	356	275	264	220	460	808	2,850	1,620	1,220	288
10	556	494	346	253	268	223	371	922	2,600	1,570	839	294
11	541	531	317	279	264	250	366	964	2,530	1,530	581	306
12	576	503	314	260	246	246	353	1,020	2,930	1,290	577	314
13	592	438	317	243	253	236	412	1,120	3,890	1,200	528	290
14	566	406	324	272	264	240	512	1,170	4,590	1,140	491	283
15	556	402	317	264	246	250	576	1,220	4,620	1,050	492	282
16	556	390	314	268	283	246	446	1,420	4,780	1,030	489	268
17	536	375	307	257	268	227	340	1,600	4,480	1,070	716	302
18	508	383	293	260	260	233	298	1,800	3,780	1,080	982	286
19	512	379	287	268	253	230	286	1,770	3,320	1,010	929	290
20	508	371	307	243	253	236	290	1,660	2,530	970	922	315
21	489	364	310	253	250	253	323	1,780	2,210	934	923	335
22	498	353	314	260	246	253	349	1,890	1,980	893	963	335
23	485	353	293	253	246	230	441	1,810	1,800	928	1,030	290
24	526	364	300	279	240	240	506	1,670	1,730	922	1,050	264
25	512	371	290	260	233	246	496	1,760	1,760	882	1,050	257
26	498	353	287	279	233	246	398	1,920	1,930	958	1,070	253
27	498	349	297	253	253	257	349	1,700	1,970	964	1,050	243
28	494	328	268	260	246	264	327	1,500	1,990	946	1,060	233
29	494	342	290	264	246	240	315	1,220	1,990	988	1,090	253
30	494	353	304	260	-------	236	327	1,160	1,930	1,080	1,060	243
31	467	-------	274	268	-------	217	-------	958	-------	1,080	918	-------

NOTE.—No gage-height record Aug. 10 to Sept. 15; discharge based on comparison with flow of Arkansas River at Granite and Canon City.

Monthly discharge of Arkansas River at Salida, Colo., for the year ending September 30, 1924

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	635	467	541	33,300
November	536	328	426	25,300
December	356	268	314	19,300
January	279	240	262	16,100
February	283	220	253	14,600
March	264	217	240	14,800
April	576	223	369	22,000
May	1,920	340	1,210	74,400
June	4,780	847	2,520	150,000
July	1,840	882	1,240	76,200
August	1,220	489	948	58,300
September	725	233	314	18,700
The year	4,780	217	720	523,000

ARKANSAS RIVER AT CANON CITY, COLO.

LOCATION.—Just below Hot Springs Hotel at mouth of canyon and 1 mile above Canon City, Fremont County. Nearest important tributary, Grape Creek, enters some distance above.

DRAINAGE AREA.—3,090 square miles (measured on base map of Colorado).

RECORDS AVAILABLE.—May 1, 1888, to September 30, 1924.

GAGE.—Bristol float-type water-stage recorder. Moved 200 yards downstream March 27, 1922.

DISCHARGE MEASUREMENTS.—Made from car and cable.

CHANNEL AND CONTROL.—Bed composed of gravel; very shifting. No well-defined control.

EXTREMES OF DISCHARGE.—Maximum stage during year, 4.55 feet at 2 p. m. June 16 (discharge, 5,580 second-feet); minimum discharge, 225 second-feet on September 16.

1888–1924: Maximum stage recorded, 10.7 feet at 8 p. m. August 2, 1921 (discharge, 19,000 second-feet); minimum discharge, 108 second-feet on April 10, 1897.

ICE.—Stage-discharge relation affected by ice.

DIVERSIONS.—Water diverted from Arkansas River between Salida and Canon City for irrigation of 3,000 acres.

REGULATION.—Flow regulated to slight extent by operation of reservoirs on headwaters.

COOPERATION.—Complete records furnished by State engineer.

Daily discharge, in second-feet, of Arkansas River at Canon City, Colo., for the year ending September 30, 1924

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	782	700	507	401	406	360	401	557	1,690	2,010	1,010	713
2	772	754	480	395	425	377	458	550	1,400	1,940	1,060	640
3	772	727	480	383	383	401	528	589	1,330	1,850	1,070	396
4	832	718	460	412	350	406	644	695	1,580	1,680	1,090	360
5	852	709	442	377	355	395	766	794	2,060	1,550	1,130	321
6	872	674	454	412	425	360	832	803	2,620	1,550	1,120	315
7	842	691	473	458	471	372	988	872	3,560	1,580	1,090	304
8	792	709	494	464	464	406	1,120	923	3,950	1,690	1,100	304
9	736	718	494	484	464	360	1,060	966	3,540	1,850	1,120	272
10	709	718	480	477	464	372	832	1,030	3,210	1,670	844	299
11	709	700	480	458	458	395	738	1,120	2,990	1,630	640	299
12	782	727	467	499	451	406	661	1,210	3,340	1,420	624	293
13	832	682	473	451	471	383	678	1,320	4,230	1,270	581	293
14	802	617	467	477	520	377	775	1,480	4,850	1,190	559	293
15	812	609	473	499	620	383	902	1,560	5,060	1,130	484	245
16	812	609	430	499	644	383	757	1,650	5,260	1,060	484	240
17	763	564	418	471	596	389	604	1,890	5,040	1,120	713	250
18	718	549	436	444	550	366	535	2,090	4,470	1,160	1,000	261
19	674	557	480	513	513	366	499	2,230	3,960	1,020	871	266
20	674	571	527	438	471	366	499	2,150	3,290	930	790	266
21	658	557	534	444	444	401	513	2,240	2,760	862	826	293
22	658	557	514	520	431	401	550	2,400	2,360	808	890	310
23	658	542	442	513	395	389	604	2,400	2,140	773	960	321
24	763	514	454	499	395	383	729	2,150	1,920	862	980	266
25	802	514	494	499	377	389	812	2,280	1,920	781	980	261
26	772	507	500	477	377	406	729	2,500	2,050	713	980	240
27	736	514	542	484	383	451	653	2,420	2,120	871	970	235
28	736	514	460	464	377	542	620	2,240	2,150	826	980	261
29	745	527	430	477	377	528	565	1,980	2,180	808	980	277
30	745	542	480	412	-------	477	573	1,960	2,150	920	900	255
31	691	-------	424	412	-------	406	-------	2,090	-------	1,000	880	-------

NOTE.—Stage-discharge relation affected by ice Jan. 1 to Feb. 10. Discharge based on discharge measurements and comparison with flow of near-by stations.

Monthly discharge of Arkansas River at Canon City, Colo., for the year ending September 30, 1924

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	872	658	758	46,600
November	754	507	620	36,900
December	542	418	474	29,100
January	520	377	458	28,200
February	644	350	450	25,900
March	542	360	400	24,600
April	1,120	401	688	40,900
May	2,500	550	1,590	97,800
June	5,260	1,330	2,970	177,000
July	2,010	713	1,240	76,200
August	1,130	484	894	55,000
September	713	235	312	18,600
The year	5,260	235	904	657,000

ARKANSAS RIVER AT PUEBLO, COLO.

LOCATION.—150 feet below Main Street Bridge in Pueblo, Pueblo County. Nearest tributary, Fountain Creek, enters 2 miles below.

DRAINAGE AREA.—4,820 square miles (measured on base map of Colorado).

RECORDS AVAILABLE.—May 1, 1885, to September 30, 1886; September 19, 1894, to September 30, 1924. From June 1 to September 30, 1887, and May 1 to August 31, 1889, station maintained at point 9 miles above Pueblo.

GAGE.—Bristol float-type water-stage recorder on right bank.

DISCHARGE MEASUREMENTS.—Made from Main Street Bridge.

CHANNEL AND CONTROL.—Bed composed of gravel and sand; shifting. No well-defined control.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 7.86 feet at 7 p. m. on June 15 (discharge, 6,510 second-feet); minimum discharge, 142 second-feet on September 27.

1894–1924: Maximum stage from high-water mark, 24.66 feet at midnight, June 3, 1921 (discharge estimated at 100,000 second-feet); minimum discharge, 25 second-feet on September 11, 1908.

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

DIVERSIONS.—Water diverted from Arkansas River between Canon City and Pueblo for irrigation of 23,000 acres.

COOPERATION.—Complete records furnished by State engineer.

Daily discharge, in second-feet, of Arkansas River at Pueblo, Colo., for the year ending September 30, 1924

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	661	969	669	470	493	330	341	545	2,170	1,630	788	652
2	654	1,020	600	420	503	305	364	545	1,820	1,550	724	600
3	867	1,070	647	360	416	298	416	550	1,670	1,580	756	483
4	1,030	1,030	647	350	402	308	493	600	1,640	1,610	802	270
5	1,010	1,050	627	350	420	322	647	706	1,820	1,500	836	230
6	1,020	996	676	400	473	247	788	870	2,180	1,460	863	207
7	1,040	996	698	480	561	233	1,120	984	3,150	1,440	863	187
8	1,020	961	698	500	664	230	1,370	984	4,160	1,440	842	185
9	952	969	620	490	629	279	1,280	870	4,050	1,620	870	180
10	852	935	567	488	606	298	1,010	969	3,400	1,460	856	167
11	816	969	573	468	572	305	877	1,010	2,840	1,460	540	171
12	961	1,100	560	407	578	368	877	1,040	2,680	1,330	567	190
13	1,180	1,030	580	411	556	352	870	1,140	3,440	1,090	623	190
14	1,040	952	554	390	556	247	940	1,310	4,590	1,030	595	182
15	1,080	875	600	410	578	255	1,090	1,370	5,780	1,160	572	171
16	1,080	842	510	420	618	402	976	1,390	5,760	962	567	167
17	987	816	486	420	606	373	750	1,180	5,660	976	561	158
18	987	768	474	440	534	373	1,030	1,810	5,000	998	905	167
19	944	768	474	463	519	398	712	2,050	4,180	912	919	182
20	918	760	510	410	463	394	694	2,100	3,470	808	877	190
21	884	721	516	425	463	381	682	1,960	3,280	712	856	182
22	875	698	504	463	498	381	682	2,080	2,340	652	808	212
23	875	669	480	514	463	377	652	2,180	2,270	641	842	220
24	1,160	684	468	519	448	381	756	1,970	1,750	682	836	204
25	1,160	661	486	483	488	377	891	1,880	1,550	664	836	171
26	987	647	522	488	478	377	856	1,940	1,680	635	842	160
27	1,030	684	535	488	478	398	618	2,160	1,620	670	829	153
28	1,030	669	510	488	407	425	589	2,050	1,590	718	782	158
29	1,100	647	535	453	368	430	519	1,770	1,650	676	775	162
30	1,060	706	573	453	-------	402	534	2,000	1,690	718	694	171
31	1,050	-------	522	483	-------	349	-------	2,260	-------	788	635	-------

NOTE.—Stage-discharge relation affected by ice Jan. 1–9 and 14–21; discharge based on temperature records, 1 discharge measurement, and comparison with flow of Arkansas River at Canon City using records of inflow and outflow between the 2 stations.

Monthly discharge of Arkansas River at Pueblo, Colo., for the year ending September 30, 1924

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	1,180	654	978	60,100
November	1,100	647	855	50,900
December	698	468	562	34,600
January	519	350	445	27,400
February	664	368	512	29,500
March	430	230	342	21,000
April	1,370	341	781	46,500
May	2,260	545	1,430	87,900
June	5,780	1,550	2,960	176,000
July	1,630	635	1,080	66,400
August	919	540	763	46,900
September	652	153	224	13,300
The year	5,780	153	910	660,000

ARKANSAS RIVER AT HOLLY, COLO.

LOCATION.—Between secs. 14 and 15, T. 23 S., R. 42 W., at highway bridge half a mile south of Holly, Prowers County. Nearest tributary, Wildhorse Creek on intermittent tributary, enters 1 mile upstream.

DRAINAGE AREA.—25,000 square miles (measured on base map of Colorado).

RECORDS AVAILABLE.—October 15, 1907, to September 30, 1924.

GAGE.—Bristol float-type water-stage recorder on upstream side of bridge.

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

CHANNEL AND CONTROL.—Bed composed of sand and gravel; shifting. No well-defined control.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 5.30 feet at 6.30 p. m. on October 10 (discharge, 8,940 second-feet); river dry on August 9.

1907–1924: Maximum stage recorded, 11 feet at noon October 20, 1908 (discharge determined from slope measurements, 136,000 second-feet); minimum discharge, river dry.

DIVERSIONS.—Water diverted from Arkansas River between Pueblo and Holly for irrigation of 300,000 acres.

COOPERATION.—Complete records furnished by State engineer.

Daily discharge, in second-feet, of Arkansas River at Holly, Colo., for the year ending September 30, 1924

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	596	1,480	339	595	1,460	420	1,200	468	250	50	2	3
2	955	1,320	433	750	1,440	370	799	542	230	58	2	1
3	1,130	1,160	492	1,170	1,310	330	671	340	306	24	3	3
4	866	1,060	364	1,180	1,170	430	555	274	237	34	3	3
5	1,130	889	384	1,140	1,150	430	733	130	90	31	2	2
6	2,950	810	364	1,160	1,170	380	656	114	90	35	2	1
7	4,090	778	455	1,030	1,250	410	518	98	90	32	2	1
8	3,030	788	470	1,020	955	420	733	81	8	24	2	2
9	1,980	900	632	1,040	901	410	816	46	27	36	0	2
10	4,600	844	530	867	937	410	901	35	158	36	4	1
11	4,690	833	345	1,090	1,180	380	628	75	1,240	24	20	5
12	3,150	757	492	1,190	1,340	410	1,030	90	555	16	13	2
13	2,650	596	462	1,160	1,220	306	1,030	60	380	13	13	1
14	2,440	605	499	1,200	865	410	973	50	250	8	18	2
15	2,320	596	555	1,130	991	420	1,180	40	380	8	17	5

Daily discharge, in second-feet, of Arkansas River at Holly, Colo., for the year ending September 30, 1924—Continued

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
16	2,070	596	571	1,070	1,180	542	1,280	60	955	4	9	6
17	1,940	514	1,010	1,090	750	670	1,220	40	1,550	46	1	10
18	1,890	514	960	1,090	973	420	1,640	56	1,010	30	2	13
19	2,020	530	855	1,060	955	542	1,180	44	955	98	8	26
20	1,280	499	878	1,110	973	686	901	40	1,240	66	7	15
21	1,120	492	866	1,120	919	686	782	75	1,140	30	4	16
22	1,110	492	720	1,120	700	542	380	306	1,140	20	1	16
23	972	470	635	1,180	832	1,220	455	380	955	11	6	13
24	1,110	440	625	1,140	1,040	832	442	204	380	7	2	16
25	1,210	455	590	1,320	955	1,010	492	130	218	16	4	12
26	1,720	426	465	1,290	991	1,200	290	130	90	7	3	16
27	1,980	391	430	1,350	570	1,160	480	90	90	7	3	14
28	1,640	440	480	1,370	505	1,100	542	130	75	7	1	14
29	1,470	405	430	1,360	420	919	750	204	60	2	1	14
30	1,500	351	480	1,450	-------	1,100	782	555	60	2	1	14
31	1,480	-------	560	1,510	-------	1,120	-------	430	-------	2	2	-------

NOTE.—Stage-discharge relation affected by ice Dec. 22 to Feb. 7; discharge based on 2 discharge measurements and comparison with near-by stations using records of inflow, outflow, and seepage.

Monthly discharge of Arkansas River at Holly, Colo., for the year ending September 30, 1924

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	4,690	596	1,970	121,000
November	1,480	351	681	40,500
December	1,010	339	560	34,400
January	1,510	595	1,140	70,100
February	1,460	420	1,000	57,500
March	1,220	306	635	39,000
April	1,640	290	801	47,700
May	555	35	172	10,600
June	1,550	8	474	28,200
July	98	2	25.3	1,560
August	20	0	5.1	314
September	26	1	8.3	494
The year	1,640	0	622	451,000

ARKANSAS RIVER AT SYRACUSE, KANS.

LOCATION.—In NW. ¼ sec. 18, T. 24 S., R. 40 W., at highway bridge half a mile south of Syracuse, Hamilton County.

DRAINAGE AREA.—25,500 square miles (measured by State irrigation commissioner).

RECORDS AVAILABLE.—August 21, 1902, to November 30, 1905; April 1 to July 31, 1906; June 20, 1921, to September 30, 1924.

GAGE.—Gurley water-stage recorder on downstream side of bridge pier near center of channel. From 1902 to 1906 a vertical staff gage fastened to downstream pile of one of the bents of the bridge was used; not referred to same datum.

DISCHARGE MEASUREMENTS.—Made from downstream side of highway bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of loose, clean sand; shifting. No well-defined control.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year from water-stage recorder, 4.57 feet at 8 p. m. October 10 (discharge, 8,860 second-feet); minimum discharge occurred on August 8 (discharge, 5 second-feet).

1921–1924: Maximum stage recorded, 6.35 feet on August 23, 1923 (discharge, 18,000 second-feet), on June 6, 1921, river reached stage of 9.75 feet (discharge, about 45,000 second-feet); minimum stage recorded, 0.93 foot on October 5 and 29, 1922 (discharge, 4 second-feet).

1902–1906: Maximum stage recorded, 7.5 feet July 11, 1903 (discharge, 28,300 second-feet); minimum discharge, 3 second-feet in January, 1905.

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

DIVERSIONS.—Nearly all low-water flow is diverted for irrigation.

ACCURACY.—Stage-discharge relation not permanent. Rating curve fairly well defined. Mean daily gage heights determined to hundredths from automatic records. Daily discharge ascertained by applying mean daily gage heights to rating table. Records fair.

COOPERATION.—Complete records furnished by Kansas State Board of Agriculture through G. S. Knapp, State irrigation commissioner.

Discharge measurements of Arkansas River at Syracuse, Kans., during the year ending September 30, 1924

Date	Gage height	Discharge	Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Nov. 9	2.46	1,100	Apr. 10	2.38	1,030	June 14	2.15	570
Dec. 3	2.16	644	May 12	1.75	180	July 19	1.55	74.3
Mar. 24	2.69	1,290	May 22	1.72	208	Aug. 26	1.13	8.3

Daily discharge, in second-feet, of Arkansas River at Syracuse, Kans., for the year ending September 30, 1924

Day	Oct.	Nov.	Dec.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	603	1,928	686	435	1,061	964	409	114	6	8
2	540	1,691	686	382	1,042	820	328	97	6	8
3	1,100	1,484	669	382	1,061	636	374	81	6	8
4	702	1,346	702	382	983	465	420	68	6	8
5	636	1,369	669	382	803	317	305	52	7	7
6	2,780	1,280	653	382	837	235	186	20	6	7
7	4,175	1,061	669	382	769	205	150	16	6	11
8	3,550	1,022	752	328	820	186	132	11	5	7
9	2,454	1,042	735	334	983	172	110	14	6	6
10	4,265	1,120	719	334	1,003	168	94	84	11	6
11	5,530	1,140	719	334	1,140	164	925	31	44	7
12	4,670	1,100	752	334	1,369	181	1,042	15	66	6
13	3,750	925	719	334	1,439	181	752	11	36	6
14	3,035	837	525	334	1,346	177	555	11	46	6
15	2,810	752	363	340	1,392	159	570	10	38	6
16	2,196	752	328	455	1,346	150	669	10	38	6
17	2,112	719	450	455	1,484	139	1,369	17	34	7
18	2,056	686	786	455	1,576	132	1,415	52	26	10
19	1,976	686	786	455	1,669	150	1,392	78	21	54
20	1,880	702	669	455	1,553	150	1,369	97	16	56
21	1,809	719	636	455	1,240	172	1,392	68	14	31
22	1,714	752	653	455	1,081	200	1,081	38	13	26
23	1,622	752	653	570	1,003	450	1,200	13	13	18
24	1,714	752	702	1,280	964	397	871	8	13	15
25	1,928	719	735	1,042	925	266	587	7	11	13
26	1,952	653	735	964	871	235	386	6	9	10
27	2,936	653	702	983	918	225	235	6	9	9
28	2,840	686	702	983	918	220	177	6	9	9
29	2,660	669	735	888	918	210	146	6	9	10
30	2,338	669	735	983	918	279	128	6	8	11
31	2,112	-------	702	1,260	-------	409	-------	6	7	-------

NOTE.—Discharge for January and February not published because of uncertainty in regard to extent to which stage-discharge relation was affected by ice.

Monthly discharge of Arkansas River at Syracuse, Kans., for the year ending September 30, 1924

[Drainage area, 25,500 square miles]

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	5,530	603	2,400	147,000
November	1,930	653	957	56,800
December	786	328	668	41,000
March	1,280	328	565	34,700
April	1,670	803	1,110	66,100
May	964	132	284	17,400
June	1,420	94	627	37,200
July	114	6	34.2	2,100
August	66	5	17.6	1,080
September	56	6	12.6	776

ARKANSAS RIVER AT GARDEN CITY, KANS.

LOCATION.—In NW. ¼ sec. 19, T. 24 S., R. 32 W., at highway bridge half a mile south of Garden City, Finney County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—June 21, 1922, to September 30, 1924.

GAGE.—Stevens automatic water-stage recorder on downstream side of cylinder bridge pier near center of channel; inspected by irrigation commissioner. Gage records height of underground water after surface flow ceases.

DISCHARGE MEASUREMENTS.—Made from downstream side of bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of loose, clean sand and gravel; shifting. No well-defined control. Surface flow ceases at gage height 2.60 feet.

EXTREMES OF STAGE.—Maximum stage from water-stage recorder, 5.70 feet at 2 a. m. October 13 (discharge, 6,570 second-feet); minimum discharge, no flow on days in July, August, and September.

1922–1924: Maximum stage recorded, 7.82 feet August 24, 1923 (discharge, 19,200 second-feet); minimum discharge, no flow during several periods.

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

REGULATION.—Flow is regulated by diversion and storage of water in western Kansas and eastern Colorado for irrigation.

ACCURACY.—Stage-discharge relation not permanent. Rating curves fairly well defined. Mean daily gage height determined to hundredths from automatic gage charts by inspection or planimeter. Daily discharge ascertained by applying mean daily gage height to rating table; shifting-control method used October 10 to March and May 14 to September 30. Records fair.

Discharge measurements of Arkansas River at Garden City, Kans., during the year ending September 30, 1924

Date	Gage height	Discharge	Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Oct. 9	5.00	3,550	Mar. 29	4.88	1,970	June 2	3.45	39
Nov. 8	4.21	897	May 13	3.38	47	July 17	2.86	1.1
Mar. 10	4.07	593						

Daily discharge, in second-feet, of Arkansas River, at Garden City, Kans., for the year ending September 30, 1924

Day	Oct.	Nov.	Dec.	Mar.	Apr.	May	June	July	Sept.
1	1,180	1,620	619		1,880	1,100	131	4	
2	1,620	1,520	535	300	1,690	1,000	48	4	
3	1,520	1,410	549		1,420	873	28	4	
4	2,090	1,320	549	422	1,330	750	22	2	
5	1,410	1,150	510	460	1,240	549	17	2	
6	1,520	1,060	510	577	1,090	370	14	2	
7	3,000	982	563	577	1,070	320	14	2	
8	3,370	889	577	549	1,020	275	15	1	
9	3,790	841	563	591	1,090	230	16	1	
10	4,240	795	422	675	1,160	185	13	1	
11	5,960	921	522	735	1,240	140	12	1	
12	6,470	1,050	549	735	1,330	96	12	6	
13	5,700	1,160	448	795	1,510	63	102	2	
14	4,020	1,070	448	873	1,600	75	52	1	
15	3,790	873	448	825	1,330	56	25	1	
16	4,240	780	435	633	1,420	48	41	1	
17	4,020	795	448	350	1,420	32	20	1	
18	3,370	795	549	265	1,600	30	22	2	
19	3,580	795	1,190	300	1,780	27	247	1	4
20	3,180	810	1,240	600	1,780	25	247	1	2
21	2,840	750	1,070	800	1,600	50	274	1	1
22	2,520	720	1,140	1,000	1,330	41	605		1
23	2,360	675	937	1,200	1,100	28	320		1
24	2,360	619	889	1,400	921	19	113		1
25	2,520	605	857	1,600	905	34	212		2
26	2,520	591	889	1,800	937	52	100		1
27	2,360	591	795	1,970	905	164	50		1
28	2,090	535	765	1,970	780	90	20		2
29	1,970	549	720	1,900	889	86	5		2
30	1,850	591	619	1,600	969	71	4		2
31	1,850		500	1,880		79			

NOTE.—No gage height record Dec. 31, Mar. 19–21, May 7–11, June 7, 8, 26–28, and Aug. 4–8; discharge interpolated. No flow July 22 to Sept. 18. Discharge not determined for January and February because of lack of data for estimating the effect of ice.

Monthly discharge of Arkansas River at Garden City, Kans., for the year ending September 30, 1924

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	6,470	1,180	3,010	185,000
November	1,620	535	895	53,300
December	1,240	422	673	41,400
March	1,970	265	903	55,500
April	1,880	780	1,280	76,200
May	1,100	19	224	13,800
June	605	4	93.4	5,560
July	6	0	1.32	81
August	0	0	0	0
September	4	0	.667	40

ARKANSAS RIVER AT LARNED, KANS.

LOCATION.—In NE. ¼ sec. 5, T. 22 S., R. 16 W., at highway bridge half a mile above Pawnee River and half a mile south of Larned, Pawnee County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—June 22, 1922, to September 30, 1924.

GAGE.—Stevens water-stage recorder on downstream side of cylinder bridge pier near center of channel. Gage records height of ground water after surface flow ceases. Datum lowered 0.10 foot sometime during 1923 due to gage settling; records not corrected but indirect method for shifting control used.

DISCHARGE MEASUREMENTS.—Made from downstream side of bridge or by wading.

CHANNEL AND CONTROL.—Bed is composed of loose, clean sand and gravel; shifting. No definite control. Surface flow ceases at gage height of 2.7 feet.

EXTREMES OF DISCHARGE.—Maximum stage from water-stage recorder, 8.16 feet at 4 p. m. October 11 (discharge, 8,910 second-feet); minimum discharge, no flow on days in July, August, and September.

1922–1924: Maximum stage recorded, 9.5 feet on August 25, 1923 (discharge, 14,300 second-feet). Minimum discharge, zero flow during several periods.

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

REGULATION.—Large portion of flow diverted in western Kansas and eastern Colorado for irrigation.

ACCURACY.—Stage-discharge relation not permanent. Rating curve fairly well defined. Mean daily gage height determined to hundredths from gage-height graph by planimeter or inspection. Daily discharge ascertained by indirect method for shifting control. Records fair.

Discharge measurements of Arkansas River at Larned, Kans., during the year ending September 30, 1924

Date	Gage height	Discharge	Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Oct. 1	5.15	1,270	Mar. 4	4.92	695	June 21	3.68	13.7
Nov. 19	5.05	968	Mar. 31	5.72	1,940	July 21	3.57	6.5
Nov. 30	4.77	662	May 9	4.69	480			

Daily discharge, in second-feet, of Arkansas River at Larned, Kans., for the year ending September 30, 1924

Day	Oct.	Nov.	Dec.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1,270	1,990	616	955	2,060	1,420	187	14	------	------
2	1,210	2,060	602	880	2,160	981	164	19	------	------
3	1,120	2,030	638	804	1,910	856	139	15	------	------
4	1,070	1,940	653	698	1,720	839	128	10	------	------
5	1,030	1,760	623	670	1,540	786	112	4	------	------
6	1,070	1,630	616	643	1,400	683	94	2	------	------
7	1,110	1,540	630	616	1,290	602	76	2	------	------
8	2,330	1,510	630	612	1,200	527	74	------	------	------
9	3,240	1,350	616	608	1,120	476	72	------	------	------
10	2,870	1,240	602	605	1,110	429	66	------	------	------
11	4,430	1,210	602	601	1,070	389	61	------	------	------
12	5,970	1,210	616	597	1,140	359	55	------	------	------
13	5,910	1,200	553	594	1,260	334	52	------	------	------
14	5,410	1,210	464	590	1,320	303	48	2	12	------
15	4,150	1,140	553	586	1,290	282	41	6	64	------
16	3,240	1,100	507	582	1,320	256	36	3	18	------
17	3,220	1,070	488	579	1,320	227	29	2	9	------
18	3,170	1,010	581	575	1,300	210	32	16	8	------
19	2,800	970	534	571	1,150	196	28	24	------	------
20	2,470	931	527	567	1,250	177	18	25	------	------
21	2,290	893	714	827	1,340	161	15	12	------	------
22	2,160	856	722	1,090	1,290	145	12	4	------	------
23	2,060	839	706	1,350	1,180	131	8	------	------	------
24	1,940	821	874	1,610	1,040	122	24	------	------	------
25	1,860	778	931	1,870	856	117	43	------	------	------
26	1,810	770	874	2,130	778	120	52	------	------	------
27	2,170	762	912	2,390	698	168	70	------	------	------
28	2,140	730	931	2,280	706	152	48	------	------	------
29	2,780	706	903	2,180	1,840	158	22	------	------	------
30	2,430	668	912	2,070	2,120	152	17	------	------	------
31	2,140	------	918	1,960	------	168	------	------	------	------

NOTE.—No record Dec. 31, Mar. 1, 2, 5, 6, 8–19, 21–26, 28–30, Apr. 1, June 6, and Sept. 1–30; discharge interpolated. No flow July 8–13, July 23 to Aug. 13, and Aug. 19 to Sept. 30. Discharge not determined for January and February because of lack of data for estimating effect of ice.

Monthly discharge of Arkansas River at Larned, Kans., for the year ending September 30, 1924

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	5,970	1,030	2,610	160,000
November	2,060	668	1,200	71,400
December	931	466	679	41,800
March	2,390	567	1,050	64,600
April	2,160	698	1,330	79,100
May	1,420	117	385	23,700
June	187	8	60.8	3,620
July	25	0	5.16	317
August	64	0	3.58	220
September	0	0	0	0

ARKANSAS RIVER NEAR WICHITA, KANS.

LOCATION.—Near center of section line between sections 7 and 18, T. 27 S., R. 1 E., at Thirteenth Avenue highway bridge, 1½ miles above Little Arkansas River and 2 miles northwest of Wichita, Sedgwick County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—June 11, 1921, to September 30, 1924.

GAGE.—Gurley water-stage recorder on downstream side of bridge pier. Prior to January 13, 1922, chain gage on upstream handrail of highway bridge. Read by P. L. Brockway, city engineer.

DISCHARGE MEASUREMENTS.—Made from downstream side of bridge or by wading.

CHANNEL AND CONTROL.—Wide, flat bed composed of clean sand, shifting. No well-defined control.

EXTREMES OF DISCHARGE.—Maximum stage from water-stage recorder during year, 14.04 feet at 7 a. m. May 1 (discharge, 5,120 second-feet); minimum stage from water-stage recorder, 9.10 feet at 5 p. m. September 27 (discharge, 4 second-feet).

1921–1924: Maximum discharge 8,510 second-feet on June 10, 1923. Minimum stage, 8.91 feet on October 21, 1922 (no discharge).

ICE.—Stage-discharge relation slightly affected by ice and ice jams.

REGULATION.—Most of low-water flow is diverted for irrigation in western Kansas and eastern Colorado.

ACCURACY.—Stage-discharge relation permanent during year. Rating curve fairly well defined below 4,000 second-feet. Mean daily gage heights determined to hundredths from recorder graph by planimeter and inspection. Daily discharge ascertained by applying mean daily gage heights to rating table. Records fair.

Discharge measurements of Arkansas River at Wichita, Kans., during the year ending September 30, 1924

Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Apr. 19	11.27	1,150	July 24	9.70	144
June 2	10.61	598	Sept. 6	9.22	6.2

Daily discharge, in second-feet, of Arkansas River at Wichita, Kans., for the year ending September 30, 1924

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1,260	1,980	695	660	1,100	1,050	2,260	4,660	625	172	81	26
2	1,200	1,980	660	695	1,380	1,050	1,980	3,600	625	164	81	23
3	1,200	1,980	660	730	1,560	1,100	1,840	3,300	625	164	61	14
4	1,260	1,840	660	730	2,120	1,050	1,980	2,850	590	156	55	11
5	1,320	1,840	660	770	1,840	1,000	1,840	2,120	530	144	52	9
6	1,260	1,700	660	810	1,560	950	1,840	1,700	470	148	84	6
7	1,150	1,630	695	855	1,700	855	1,700	1,560	416	153	180	6
8	1,100	1,500	695	855	1,840	810	1,440	1,320	416	158	152	6
9	1,320	1,440	660	855	1,980	730	1,200	1,100	390	162	144	5
10	1,840	1,440	625	810	2,120	695	1,150	1,000	390	166	201	5
11	3,300	1,380	625	730	3,000	660	1,150	855	364	171	279	5
12	3,450	1,320	625	810	3,600	660	1,100	810	340	176	257	5
13	4,820	1,200	625	770	2,400	695	1,100	730	340	180	201	5
14	4,970	1,150	625	900	1,840	695	1,100	695	316	180	137	4
15	4,350	1,100	625	810	1,700	730	1,100	660	316	176	115	4
16	3,750	1,100	660	855	1,630	855	1,100	625	311	160	101	4
17	3,000	1,100	560	770	1,560	1,000	1,100	590	302	148	91	4
18	2,550	1,100	560	730	1,500	950	855	560	293	160	77	4
19	2,400	1,050	560	695	1,380	855	1,100	530	284	213	61	6
20	2,400	1,000	560	695	1,260	950	1,100	500	275	222	74	13
21	2,200	900	590	770	1,260	950	1,200	470	270	213	77	14
22	2,120	855	590	770	1,320	855	1,100	443	270	201	77	10
23	2,120	855	590	855	1,320	855	1,200	443	266	176	74	6
24	1,980	810	770	950	1,200	950	1,320	416	257	148	37	5
25	1,700	810	950	950	1,100	1,840	1,320	416	244	119	31	5
26	1,560	810	1,000	1,000	1,050	2,120	1,320	390	213	122	28	4
27	1,440	770	1,000	1,050	1,260	2,120	1,260	390	213	81	52	4
28	1,380	770	1,000	1,150	1,100	2,550	1,100	416	197	74	61	4
29	1,630	770	855	1,050	1,100	2,700	1,980	470	192	68	61	4
30	1,840	770	770	900	-------	2,400	4,820	500	180	58	42	4
31	2,260	-------	660	1,000	-------	2,400	-------	590	-------	58	28	-------

NOTE.—Stage-discharge relation affected by ice jam Feb. 6–10; discharge estimated. Gage heights estimated May 11–17. No gage-height record and discharge interpolated Jan. 1–7, June 8–14, July 6–12, and Sept. 28–30.

Monthly discharge of Arkansas River at Wichita, Kans., for the year ending September 30, 1924

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	4,970	1,100	2,200	135,000
November	1,980	770	1,230	73,200
December	1,000	560	693	42,600
January	1,150	660	838	51,500
February	3,600	1,050	1,650	94,900
March	2,700	660	1,200	73,800
April	4,820	855	1,490	88,700
May	4,660	390	1,120	68,900
June	625	180	351	20,900
July	222	58	151	9,280
August	279	28	98.5	6,060
September	26	4	7.50	446
The year	4,970	4	916	665,000

ARKANSAS RIVER AT ARKANSAS CITY, KANS.

LOCATION.—In NW. ¼ sec. 25, T. 34 S., R. 3 E., at Chestnut Avenue highway bridge, half a mile west of Arkansas City, Cowley County, 5 miles above mouth of Walnut River, and 8 miles below mouth of Ninnescah River.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—September 23, 1902, to July 31, 1906; September 10, 1921, to September 30, 1924.

GAGE.—Chain on upstream handrail of bridge; read by S. S. Farrar.

1902–1906: Painted staff at different datum from present gage spiked to west end of south pile on second bent of old Chestnut Avenue highway bridge.

DISCHARGE MEASUREMENTS.—Made from upstream side of bridge or by wading.

CHANNEL AND CONTROL.—Bed is clean sand; shifting. No well-defined control.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 18.52 feet at noon May 2 (discharge from extention of rating curve, 22,400 second-feet); minimum stage, 7.02 feet at 7.55 a. m. September 7 (discharge, 104 second-feet).

1902–1906; 1921–1924: Maximum stage recorded 25.46 feet on June 11, 1923 (discharge not determined); minimum discharge, 12 second-feet in March and April, 1923.

REGULATION AND DIVERSION.—Diversions in western Kansas and eastern Colorado for irrigation takes large part of the natural flow. Canal of Kansas Gas & Electric Co., with diversion dam across river, 2 miles upstream, formerly diverted about 600 second-feet during high water and practically entire flow at low stages. This diversion dam was washed out in June, 1923.

ACCURACY.—Stage-discharge relation permanent during year. Rating curve well defined below 10,000 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 Arkansas River at Arkansas City, Kans., during the year ending September 30, 1924

Date	Gage height	Discharge	Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Dec. 10	8.80	1,190	June 1	9.18	1,680	Sept. 5	7.21	199
Apr. 10	9.42	1,760	July 24	8.24	801			

Daily discharge, in second-feet, of Arkansas River at Arkansas City, Kans., for the year ending September 30, 1924

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	4,820	3,840	1,410	972	1,410	1,500	3,440	13,000	1,500	395	395	205
2	3,980	3,180	1,410	755	1,500	1,600	3,310	22,400	1,600	395	368	176
3	3,050	3,050	1,410	755	1,600	1,500	2,980	15,100	1,600	395	395	195
4	2,930	2,930	1,410	790	1,800	1,500	2,810	9,600	1,500	425	318	176
5	2,450	2,930	1,320	425	2,120	1,500	2,690	6,380	1,410	395	296	172
6	2,230	2,690	1,320	515	1,800	1,500	2,810	4,540	1,410	368	455	144
7	2,120	2,570	1,320	650	1,600	1,410	2,570	3,840	1,240	340	548	176
8	2,010	2,450	1,320	860	1,240	1,320	2,450	3,180	1,240	307	515	149
9	1,900	2,450	1,320	935	1,080	1,410	2,230	2,930	1,160	340	455	136
10	2,010	2,340	1,240	898	1,240	1,240	2,120	2,690	1,080	318	548	131
11	1,800	2,230	1,240	935	1,320	1,240	2,010	2,570	1,010	368	898	122
12	3,980	2,230	1,240	898	1,800	1,240	1,900	2,230	972	425	1,080	167
13	6,540	2,120	1,500	825	3,440	1,240	1,800	2,120	898	340	755	131
14	10,700	2,120	1,500	860	2,930	1,160	1,900	2,010	898	650	720	131
15	11,700	2,120	1,410	860	2,340	1,240	1,800	1,900	825	860	685	131
16	7,420	2,010	1,320	860	2,230	1,240	1,800	1,800	860	1,240	548	140
17	5,580	1,900	1,320	898	2,120	1,800	1,800	1,700	755	1,410	455	113
18	4,540	1,900	1,240	650	2,120	2,120	1,800	1,600	720	1,160	425	131
19	3,840	1,900	1,240	615	2,010	2,120	1,700	1,600	650	1,160	395	548
20	3,440	1,800	1,240	860	1,900	2,010	1,700	1,500	615	1,160	340	685
21	3,180	1,800	1,240	790	1,800	2,570	1,700	1,410	615	935	296	296
22	2,930	1,700	1,160	825	1,900	2,810	1,700	1,320	580	1,010	296	225
23	2,810	1,700	1,240	972	1,900	2,450	1,600	1,320	580	935	318	225
24	2,690	1,600	1,160	898	2,010	2,340	1,700	1,320	580	825	290	215
25	2,570	1,600	1,240	898	1,800	2,450	2,810	1,410	515	650	245	195
26	2,450	1,500	1,410	898	1,700	2,930	4,260	1,240	548	615	235	185
27	2,450	1,500	1,500	935	1,500	3,440	3,570	1,320	485	548	225	260
28	2,230	1,410	1,410	972	1,700	3,700	2,690	1,240	425	455	225	180
29	2,340	1,410	1,500	1,080	1,600	4,960	2,690	1,240	515	455	245	158
30	3,980	1,410	1,410	1,320	-------	3,980	6,880	1,320	395	395	255	162
31	4,260	-------	1,240	1,500	-------	3,570	-------	1,320	-------	395	230	-------

Monthly discharge of Arkansas River at Arkansas City, Kans., for the year ending September 30, 1924

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	11,700	1,800	3,840	236,000
November	3,840	1,410	2,150	128,000
December	1,500	1,160	1,330	81,800
January	1,500	425	868	53,400
February	3,440	1,080	1,850	106,000
March	4,960	1,160	2,100	129,000
April	6,880	1,600	2,510	149,000
May	22,400	1,240	3,780	232,000
June	1,600	395	906	53,900
July	1,410	307	634	39,000
August	1,080	225	434	26,700
September	685	113	202	12,000
The year	22,400	113	1,720	1,250,000

TENNESSEE FORK NEAR LEADVILLE, COLO.

LOCATION.—In sec. 16, T. 9 S., R. 80 W., at highway bridge a few hundred yards above junction with East Fork and 3 miles northwest of Leadville, Lake County.

DRAINAGE AREA.—45 square miles (measured on topographic map).

RECORDS AVAILABLE.—May 10 to October 31, 1890; June 18 to October 16, 1903; February 8, 1911, to September 30, 1924, when station was discontinued.

GAGE.—Vertical staff on downstream side of left bridge abutment; datum lowered 0.40 foot October 6, 1914. Read by Clyde Heller. Relation between present gage and gages used in 1890 and 1903 not known.

DISCHARGE MEASUREMENTS.—Made from single-span bridge or by wading.

CHANNEL AND CONTROL.—Bed rough and composed of small boulders. Control a short distance below gage at rapids; slightly shifting at long intervals. Banks subject to overflow at extreme high water. High-water control changed during last few years.

EXTREMES OF DISCHARGE.—Maximum stage recorded, 1.80 feet on June 14 (discharge, 327 second-feet); minimum stage recorded, 0.18 foot from August 24 to September 3 (discharge, 4 second-feet).

1911–1924: Maximum discharge recorded, 448 second-feet on May 24, 1914; minimum discharge, 1 second-foot October 26 to November 3, 1917 (gage-height 0.10 foot).

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

DIVERSIONS.—Court decrees for diversions of 8 second-feet above the station; also a decree for diversions of 18.5 second-feet from the basin of Eagle River through Ewing ditch to that of Tennessee Fork above station.

ACCURACY.—Stage-discharge relation slightly shifting. Rating curves well defined. Gage read to hundredths twice daily May 14 to September 30, and at irregular intervals during remainder of year. Daily discharge ascertained by applying mean daily gage heights to rating tables, except period June 21–30, when shifting-control method was used. Records fair.

Discharge measurements of Tennessee Fork near Leadville, Colo., during the year ending September 30, 1924

Date	Gage height	Discharge	Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Jan. 18	0.29	6.1	Apr. 16	0.90	70	June 14	1.80	319
Feb. 17	.39	7.5	May 18	1.36	197	July 27	.50	20.3

Daily discharge, in second-feet, of Tennessee Fork near Leadville, Colo., for the year ending September 30, 1924

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1							10	60	105	67	18	4
2						7	10	65	105	61	16	4
3							11	75	108	58	16	4
4	24						11	85	111	56	16	5
5							11	70	145	54	20	5
6				6			15	65	173	56	16	5
7						7	25	65	211	120	12	5
8							40	75	217	101	11	5
9				6	8		45	85	229	54	10	6
10							50	88	223	54	10	7
11							55	95	223	47	10	7
12							65	105	296	42	10	7
13	24						75	100	259	36	12	8
14							75	118	327	31	12	8
15							72	145	308	29	12	9
16							70	154	296	29	12	8
17					9		71	170	193	70	10	8
18		19		6			72	188	173	51	6	7
19							73	179	170	28	6	7
20							74	170	116	27	6	6
21							75	188	108	25	6	6
22							76	190	103	25	5	6
23		13					77	188	100	25	5	5
24							78	132	95	24	4	5
25							80	132	88	20	4	5
26							60	173	88	18	4	5
27							50	168	90	18	4	5
28							46	143	85	19	4	5
29						8	50	143	88	19	4	5
30							55	132	68	18	4	5
31								126		18	4	

NOTE.—No gage-height record Apr. 1–4, 6–15, 17–24, 26, 27, 29, 30, May 1–9, 11–13, and July 29–31; discharge based on temperature record and 1 discharge measurement. Backwater from Beaver Dam Sept. 4–30; discharge based on comparison with records of East Fork of Arkansas River.

Monthly discharge of Tennessee Fork near Leadville, Colo., for the year ending September 30, 1924

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October			20	1,230
November			18	1,070
December			9	553
January			6	369
February			8	460
March			8	492
April	80	10	52.6	3,130
May	190	60	125	7,690
June	327	68	163	9,700
July	120	18	41.9	2,580
August	20	4	9.3	572
September	9	4	5.9	351
The year	327		38.9	28,200

NOTE.—Mean discharge for October, November, December, January, February, and March based on temperature record, gage-height readings at irregular intervals, and 2 discharge measurements.

WEST BEAVER CREEK NEAR VICTOR, COLO.

LOCATION.—In sec. 30, T. 16 S., R. 68 W., at Skaguay power station of Southern Colorado Power Co., about 7 miles southeast of Victor, Fremont County. Nearest tributary, East Beaver Creek, enters 2 miles downstream.

DRAINAGE AREA.—66 square miles (revised drainage area above reservoir outlet).

RECORDS AVAILABLE.—January 1, 1905, to September 30, 1924.

DETERMINATION OF DISCHARGE.—Water used through power house is brought by pipe line from reservoir 3½ miles upstream; quantity measured hourly by weir, and a quantity representing the gain or loss in the reservoir during the period is added or subtracted. To determine the natural flow of the stream, the seepage through the dam is measured by weir and added to the total quantity thus obtained. This method takes no account of evaporation from the surface of the reservoir.

DIVERSIONS.—Above the power reservoir are three reservoirs from which the town of Victor obtains its municipal supply. In the upper basin are four reservoirs from which water is diverted through St. John Tunnel into Lake Moraine, and thence by natural channels to Colorado Springs, where it is used as municipal supply. During 1924, 2,070 acre-feet were diverted through St. John Tunnel. Below the power plant, adjudicated decrees for diversions of 126 second-feet from Beaver Creek, which is formed by East and West Beaver Creeks. In addition, there is an irrigation reservoir in operation which has a filing for 4,760 acre-feet.

COOPERATION.—Records are furnished through courtesy of Southern Colorado Power Co.

Monthly discharge of West Beaver Creek near Victor, Colo., for the year ending September 30, 1924

Month	Mean discharge in second-feet	Run-off in acre-feet	Month	Mean discharge in second-feet	Run-off in acre-feet
October	47.0	2,890	May	42.1	2,590
November	22.2	1,320	June	59.4	3,530
December	13.8	848	July	21.5	1,320
January	6.71	413	August	5.86	360
February	9.37	539	September	5.70	339
March	6.97	429			
April	35.4	2,110	The year	23.0	16,700

BOEHMER CREEK NEAR PIKES PEAK, COLO.

LOCATION.—In NW. ¼ sec. 32, T. 14 S., R. 68 W., 3½ miles south of Pikes Peak, El Paso County, above Little Beaver and Sackett Creeks. Elevation of station, 11,000 feet.

DRAINAGE AREA.—7.2 square miles (measured on topographic map). About 75 per cent of this area is above timber line. To the natural drainage has been added that of West Beaver Creek above intake of Strickler Tunnel.

RECORDS AVAILABLE.—October 1, 1909, to September 30, 1924.

DETERMINATION OF DISCHARGE.—Flow measured by sharp-crested weir, 60 inches long, with complete end contraction. A stake is driven into bed of stream in pool above weir, so that its head is level with crest of weir; depth of water over stake is measured by steel scale. Discharge is computed by Francis formula.

REGULATION.—Flow regulated by series of three reservoirs having an aggregate capacity of 1,400 acre-feet; reservoirs operated by Colorado Springs water department.

DIVERSIONS.—Water diverted above weir for use in Victor is measured and is added to flow over Boehmer Creek weir to show total run-off.

COOPERATION.—Monthly discharge computed from records furnished by Colorado Springs water department.

Monthly discharge of Boehmer Creek near Pikes Peak, Colo., for the year ending September 30, 1924

[Drainage area, 7.2 square miles]

Month	Discharge in second-feet				Run-off	
	Maximum	Minimum	Mean	Per square mile	Inches	Acre-feet
October	8.63	7.01	7.49	1.04	1.20	461
November	8.21	3.81	6.06	.842	.94	361
December	3.81	2.07	3.33	.462	.53	205
January	2.07	1.35	1.93	.268	.31	119
February	1.35	1.02	1.22	.169	.18	70.2
March	1.13	1.02	1.07	.149	.17	65.8
April	3.50	.92	1.01	.140	.16	60.1
May	25.7	3.50	11.9	1.65	1.90	732
June	28.7	5.50	22.0	3.06	3.41	1,310
July	6.54	3.20	5.19	.721	.83	319
August	3.20	1.82	2.62	.364	.42	161
September	30.5	1.02	14.2	1.97	2.20	845
The year	30.5	.92	6.49	.901	12.25	4,710

LITTLE BEAVER CREEK NEAR PIKES PEAK, COLO.

LOCATION.—In NW. ¼ NW. ¼ sec. 32, T. 14 S., R. 68 W., just above mouth of creek and 3½ miles south of Pikes Peak, El Paso County. Little Beaver Creek enters Boehmer Creek from west 0.3 mile above Reservoir No. 4. Elevation of station, 11,000 feet.

DRAINAGE AREA.—1.00 square mile (measured on topographic map). About 25 per cent of area above timber line; remainder sparsely timbered.

RECORDS AVAILABLE.—October 1, 1909, to September 30, 1924.

DETERMINATION OF DISCHARGE.—Flow measured by sharp-crested weir, 24 inches long, with complete end contraction. A stake is driven into bed of stream in pool above weir, so that its head is level with crest of weir; depth of water over stake is measured by steel scale. Discharge is computed by Francis formula.

DIVERSIONS.—None.

REGULATION.—None.

COOPERATION.—Monthly discharge computed from records furnished by Colorado Springs water department.

Monthly discharge of Little Beaver Creek near Pikes Peak, Colo., for the year ending September 30, 1924

[Drainage area, 1.0 square mile]

Month	Discharge in second-feet				Run-off	
	Maximum	Minimum	Mean	Per square mile	Inches	Acre-feet
October	1.04	0.82	0.95	0.95	1.10	58.4
November	.82	.29	.54	.54	.60	32.1
December	.29	.22	.25	.25	.29	15.4
January	.22	.10	.19	.19	.22	11.7
February	.10	.10	.10	.10	.11	5.8
March	.10	.10	.10	.10	.12	6.1
April	.36	.10	.11	.11	.12	6.5
May	2.32	.16	.92	.92	1.06	56.6
June	4.15	1.28	3.11	3.11	3.47	185
July	1.28	.54	.83	.83	.96	51.0
August	.54	.22	.37	.37	.43	22.8
September	.25	.18	.23	.23	.26	13.7
The year	4.15	.10	.64	.64	8.74	465

SACKETT CREEK NEAR PIKES PEAK, COLO.

LOCATION.—In SE. ¼ NW. ¼ sec. 32, T. 14 S., R. 68 W., just above mouth of creek and 4 miles southeast of Pikes Peak, El Paso County. Sackett Creek enters Boehmer Creek from north a short distance above Reservoir No. 4. Elevation of station, 11,000 feet.

DRAINAGE AREA.—0.65 square mile (measured on topographic map). About 30 per cent of area above timber line; remainder sparsely timbered.

RECORDS AVAILABLE.—October 1, 1909, to September 30, 1924.

DETERMINATION OF DISCHARGE.—Flow measured by sharp-crested weir 24 inches long with complete end contraction. A stake is driven into bed of stream in pool above weir so that its head is level with crest of weir; depth of water over stake is measured by steel scale. Discharge is computed by Francis formula.

DIVERSIONS.—None.

REGULATION.—None.

COOPERATION.—Monthly discharge computed from records furnished by Colorado Springs water department.

Monthly discharge of Sackett Creek near Pikes Peak, Colo., for the year ending September 30, 1924

[Drainage area, 0.65 square mile]

Month	Discharge in second-feet				Run-off	
	Maximum	Minimum	Mean	Per square mile	Inches	Acre-feet
October	0.45	0.29	0.44	0.677	0.78	27.1
November	.29	.10	.21	.323	.36	12.5
December	.10	.01	.05	.077	.09	3.1
January	0	0	0	0	0	0
February	0	0	0	0	0	0
March	0	0	0	0	0	0
April	.29	0	.04	.062	.07	2.4
May	3.62	.29	1.39	2.14	2.47	85.5
June	3.62	.36	1.73	2.66	2.97	103
July	.36	.05	.18	.277	.32	11.1
August	.03	.03	.03	.046	.05	1.8
September	.02	.02	.02	.031	.03	1.2
The year	3.62	0	.34	.523	7.14	248

LION CREEK NEAR HALFWAY, COLO.

LOCATION.—In NE. ¼ sec. 15, T. 14 S., R. 68 W., at mouth of creek, half a mile southwest of Halfway, El Paso County. Lion Creek enters Ruxton Creek from west. Elevation of station, 9,250 feet.

DRAINAGE AREA.—2.0 square miles (measured on topographic map). Includes all area above The Crater apparently tributary to Sheep Creek. About 30 per cent of area above timber line; remainder sparsely timbered.

RECORDS AVAILABLE.—April 1, 1908, to September 30, 1924.

DETERMINATION OF DISCHARGE.—Flow measured by sharp-crested weir 30 inches long, with complete end contraction. A stake is driven into bed of stream in pool above weir, so that its head is level with crest of weir; depth of water over stake is measured by steel scale. Discharge is computed by Francis formula.

DIVERSIONS.—None.

REGULATION.—None.

COOPERATION.—Monthly discharge computed from records furnished by Colorado Springs water department.

Monthly discharge of Lion Creek near Halfway, Colo., for the year ending September 30, 1924

[Drainage area, 2.0 square miles]

Month	Discharge in second-feet				Run-off	
	Maximum	Minimum	Mean	Per square mile	Inches	Acre-feet
October	2.10	1.75	1.89	0.945	1.09	116
November	1.83	1.38	1.58	.790	.88	94.0
December	1.48	1.03	1.20	.600	.69	73.8
January	1.03	.79	.89	.445	.51	54.7
February	.79	.67	.73	.365	.39	42.0
March	.73	.56	.63	.315	.36	38.7
April	2.23	.61	1.21	.605	.68	72.0
May	2.57	1.38	1.90	.950	1.10	117
June	2.07	1.17	1.47	.735	.82	87.5
July	2.40	1.45	1.82	.910	1.05	112
August	1.90	1.17	1.43	.715	.82	87.9
September	1.90	1.03	1.20	.600	.67	71.4
The year	2.57	.56	1.33	.665	9.06	967

SHEEP CREEK NEAR HALFWAY, COLO.

LOCATION.—In SW. ¼ sec. 11, T. 14 S., R. 68 W., a quarter of a mile west of Halfway, El Paso County. No tributary between station and mouth, a short distance below. Sheep Creek enters Ruxton Creek from west a short distance above Halfway. Elevation of station, 9,100 feet.

DRAINAGE AREA.—0.73 square mile (measured on topographic map). Does not include any area above The Crater, as this is most probably tributary to Lion Creek. Practically all below timber line, but sparsely timbered.

RECORDS AVAILABLE.—April 1, 1908, to September 30, 1924.

DETERMINATION OF DISCHARGE.—Flow measured by sharp-crested weir 30 inches long with complete end contraction. A stake is driven into bed of stream in pool above weir, so that its head is level with crest of weir; depth of water over stake is measured by steel scale. Discharge is computed by Francis formula.

DIVERSIONS.—None.

REGULATION.—None.

COOPERATION.—Monthly discharge computed from records furnished by Colorado Springs water department.

Monthly discharge of Sheep Creek near Halfway, Colo., for the year ending September 30, 1924

[Drainage area, 0.73 square mile]

Month	Discharge in second-feet				Run-off	
	Maximum	Minimum	Mean	Per square mile	Inches	Acre-feet
October	1.30	0.91	1.11	1.52	1.75	68.2
November	.91	.51	.70	.959	1.07	41.7
December	.51	.32	.42	.575	.66	25.8
January	.32	.27	.30	.411	.47	18.4
February	.27	.20	.23	.315	.34	13.2
March	.27	.13	.17	.233	.27	10.5
April	1.24	.16	.75	1.03	1.15	44.6
May	2.07	.91	1.54	2.11	2.43	94.7
June	1.60	.51	1.05	1.44	1.61	62.5
July	1.17	.56	.73	1.00	1.15	44.9
August	.79	.20	.42	.575	.66	25.8
September	.27	.20	.22	.301	.34	13.1
The year	2.07	.13	.64	.877	11.90	463

SOUTH RUXTON CREEK AT HALFWAY, COLO.

LOCATION.—In SW. ¼ sec. 11, T. 14 S., R. 68 W., just above hydroelectric intake at Halfway, El Paso County. No tributary between station and mouth, a short distance below. South Ruxton Creek enters Ruxton Creek from south at Halfway. Elevation of station, 9,000 feet.

DRAINAGE AREA.—3.95 square miles (measured on topographic map). Practically all below timber line and heavily timbered.

RECORDS AVAILABLE.—June 1, 1906, to September 30, 1924.

DETERMINATION OF DISCHARGE.—Flow measured by two sharp-crested weirs with complete end contraction. Discharge is computed by Francis formula. The main weir is one-third mile above mouth of creek and a short distance above hydroelectric intake which has a capacity of 4.63 feet. The second weir is halfway between main weir and mouth of creek and measures inflow chiefly from springs below intake and a small amount of seepage. At all times, except during high water, capacity of intake is sufficient to take entire flow passing main weir, and flow at two weirs is combined to give total run-off of the basin. During high water, excess passing intake and recorded at the lower weir does not represent increased flow between weirs, and is discarded. In its place is used a constant quantity based on inflow and seepage at other times.

DIVERSIONS.—None.

REGULATIONS.—None.

COOPERATION.—Monthly discharge computed from records furnished by Colorado Springs water department.

Monthly discharge of South Ruxton Creek at Halfway, Colo., for the year ending September 30, 1924

[Drainage area, 3.95 square miles]

Month	Discharge in second-feet				Run-off	
	Maximum	Minimum	Mean	Per square mile	Inches	Acre-feet
October	4.21	3.50	3.75	0.949	1.09	231
November	3.57	2.38	2.90	.734	.82	173
December	2.23	1.60	1.85	.468	.54	114
January	1.60	1.24	1.42	.359	.41	87.3
February	1.30	1.03	1.22	.309	.33	70.2
March	1.24	1.03	1.09	.276	.32	67.0
April	3.31	1.03	2.14	.542	.60	127
May	7.38	3.22	5.47	1.38	1.59	336
June	8.15	4.84	6.87	1.74	1.94	409
July	4.95	2.84	3.66	.927	1.07	225
August	2.75	1.90	2.35	.595	.69	144
September	1.98	1.45	1.80	.456	.51	107
The year	8.15	1.03	2.88	.729	9.91	2,090

CABIN CREEK NEAR HALFWAY, COLO.

LOCATION.—In SW. ¼ NW. ¼ sec. 11, T. 14 S., R. 68 W., just above hydroelectric intake, about three-eighths of a mile north of Halfway, El Paso County. Cabin Creek enters Ruxton Creek half a mile below Halfway. Elevation of station, about 9,000 feet.

DRAINAGE AREA.—2.4 square miles (measured on topographic map). About 15 per cent of area above timber line; remainder sparsely timbered.

RECORDS AVAILABLE.—October 1, 1906, to September 30, 1924.

DETERMINATION OF DISCHARGE.—Flow measured by two sharp-crested weirs with complete end contraction. Discharge computed by Francis formula. The main weir is about one-third of a mile above mouth of creek and just above hydroelectric intake. The second weir is 50 feet above mouth of creek and measures flow from springs and small tributaries entering below intake. Except during high water, measured flow at weirs is combined to give the run-off from basin. During high water, record from lower weir is discarded and inflow estimated. (See description of South Ruxton Creek at Halfway, Colo.)

DIVERSIONS.—None.

REGULATION.—None.

COOPERATION.—Monthly discharge computed from records furnished by Colorado Springs water department.

Monthly discharge of Cabin Creek near Halfway, Colo., for the year ending September 30, 1924

[Drainage area, 2.4 square miles]

Month	Discharge in second-feet				Run-off	
	Maximum	Minimum	Mean	Per square mile	Inches	Acre-feet
October	3.90	2.75	3.30	1.38	1.59	203
November	2.75	1.75	2.24	.933	1.04	133
December	1.63	1.03	1.29	.538	.62	79.3
January	1.03	.73	.88	.367	.42	54.1
February	.73	.61	.67	.279	.30	38.5
March	.67	.61	.62	.258	.30	38.1
April	2.93	.61	1.69	.704	.79	101
May	4.84	3.90	4.55	1.90	2.19	280
June	4.52	2.49	3.64	1.52	1.70	217
July	3.31	1.80	2.50	1.04	1.20	154
August	2.40	.97	1.49	.621	.72	91.6
September	1.10	.79	.90	.375	.42	53.6
The year	4.84	.61	1.99	.829	11.29	1,440

SUTHERLAND CREEK NEAR MANITOU, COLO.

LOCATION.—In SW. ¼ sec. 9, T. 14 S., R 67 W., 1½ miles southeast of Manitou, El Paso County. No large tributary between station and mouth, 1 mile below. Elevation of station, 6,600 feet.

DRAINAGE AREA.—4.4 square miles (measured on topographic map). Practically all below timber line.

RECORDS AVAILABLE.—January 1, 1918, to September 30, 1924.

DETERMINATION OF DISCHARGE.—Flow measured by sharp-crested weir, 30 inches long, with complete end contraction. A stake is driven into bed of stream in pool above weir, so that its head is level with crest of weir; depth of water over stake is measured by steel scale. Discharge is computed by Francis formula.

DIVERSIONS.—None.

REGULATION.—None.

COOPERATION.—Monthly discharge computed from records furnished by Colorado Springs water department.

Monthly discharge of Sutherland Creek near Manitou, Colo., for the year ending September 30, 1924

[Drainage area, 4.4 square miles]

Month	Discharge in second-feet				Run-off	
	Maximum	Minimum	Mean	Per square mile	Inches	Acre-feet
October	1.90	1.30	1.62	0.368	0.42	99.6
November	1.60	1.30	1.57	.357	.40	93.4
December	1.45	.91	1.19	.270	.31	73.2
January	.67	.46	.51	.116	.13	31.4
February	.67	.46	.56	.127	.14	32.2
March	.79	.56	.66	.150	.17	40.6
April	3.31	.91	1.65	.375	.42	98.2
May	9.37	2.23	4.47	1.02	1.18	275
June	8.31	2.93	5.69	1.29	1.44	339
July	1.90	1.17	1.58	.359	.41	97.2
August	1.03	.67	.88	.200	.23	54.1
September	.67	.56	.63	.143	.16	37.5
The year	9.37	.46	1.75	.398	5.41	1,270

BEAR CREEK NEAR COLORADO SPRINGS, COLO.

LOCATION.—In NE. ¼ sec. 21, T. 14 S., R. 67 W., 3½ miles west of Colorado Springs, El Paso County. Nearest tributary, Hunters Run, enters a short distance above. Elevation of station, 6,615 feet.

DRAINAGE AREA.—6.9 square miles (measured on topographic map). Practically all below timber line.

RECORDS AVAILABLE.—March 1, 1918, to September 30, 1924.

DETERMINATION OF DISCHARGE.—Flow measured by sharp-crested weir, 30 inches long, with complete end contraction. A stake is driven into bed of stream in pool above weir, so that its head is level with crest of weir; depth of water over stake is measured by steel scale. Discharge is computed by Francis formula.

DIVERSIONS.—None.

REGULATION.—None.

COOPERATION.—Monthly discharge computed from records furnished by Colorado Springs water department.

Monthly discharge of Bear Creek near Colorado Springs, Colo., for the year ending September 30, 1924

[Drainage area, 6.9 square miles]

Month	Discharge in second-feet				Run-off	
	Maximum	Minimum	Mean	Per square mile	Inches	Acre-feet
October	5.40	2.57	3.39	0.493	0.57	208
November	5.40	2.75	3.87	.561	.63	230
December	2.75	1.45	2.28	.330	.38	140
January	1.52	1.30	1.42	.206	.24	87.3
February	1.52	1.24	1.34	.194	.21	77.1
March	2.75	1.03	1.34	.194	.22	82.4
April	6.20	1.75	4.31	.625	.70	256
May	9.66	4.95	6.10	.884	1.02	375
June	10.2	3.60	6.43	.932	1.04	383
July	3.60	1.75	2.55	.370	.43	157
August	1.60	.85	1.25	.181	.21	76.9
September	1.03	.67	.84	.122	.14	50.0
The year	10.2	.67	2.93	.425	5.79	2,120

AMAZON CANAL NEAR HARTLAND, KANS.

LOCATION.—In SW. ¼ sec. 8, T. 25 S., R. 37 W., 1 mile below head gates and 2 miles west of Hartland, Kearny County.

RECORDS AVAILABLE.—Irrigation seasons of 1921 to 1924.

GAGE.—Gurley water-stage recorder on north bank of canal 50 feet below highway bridge.

DISCHARGE MEASUREMENT.—Made from highway bridge.

CHANNEL AND CONTROL.—Bed composed of drifted sand; control and banks permanent.

ACCURACY.—Stage-discharge relation practically permanent. Rating curve well defined. Mean daily gage height determined to hundredths from automatic records by inspection and planimeter. Daily discharge ascertained by applying mean daily gage height to rating table. Records good.

COOPERATION.—Complete records furnished by Kansas State Board of Agriculture through G. S. Knapp, State irrigation commissioner.

Water for the Amazon Canal is diverted from the north bank of Arkansas River in NW. ¼ sec. 7, T. 25 S., R. 37 W., for irrigation.

The following discharge measurements were made:

April 26, 1924: Gage height, 3.62 feet; discharge, 146 second-feet.

June 14, 1924: Gage height, 4.2 feet; discharge, 181 second-feet.

June 28, 1924: Gage height, 3.72 feet; discharge, 142 second-feet.

Daily discharge, in second-feet, of Amazon Canal near Hartland, Kans., for the year ending September 30, 1924

Day	Oct.	Mar.	Apr.	May	June	July	Day	Oct.	Mar.	Apr.	May	June	July
1	------	70	------	158	136	14	16	53	------	------	------	199	------
2	------	82	------	138	85	14	17	39	------	------	------	209	------
3	------	91	------	145	53	------	18	------	------	------	------	207	------
4	------	86	------	167	97	------	19	------	------	------	------	203	------
5	------	90	------	149	143	------	20	------	------	------	------	207	------
6	------	88	------	150	93	------	21	------	------	22	------	201	------
7	------	89	------	146	10	------	22	------	------	129	------	154	------
8	------	67	------	134	------	------	23	------	------	143	------	146	------
9	------	------	------	132	------	------	24	------	------	144	------	137	------
10	------	------	------	127	------	------	25	------	------	142	------	131	------
11	------	------	------	121	------	------	26	------	------	142	------	129	------
12	------	------	------	123	187	------	27	------	------	137	------	142	------
13	------	------	------	------	171	------	28	------	------	124	------	137	------
14	------	------	------	------	178	------	29	------	------	153	------	104	------
15	------	------	------	------	181	------	30	------	------	173	------	34	------
							31	------	------	------	53	------	------

NOTE.—No flow on days for which discharge is not given.

Monthly discharge of Amazon Canal near Hartland, Kans., for the year ending September 30, 1924

Month	Discharge in second-feet		Run-off in acre-feet
	Maximum	Mean	
October (2 days)	53	46.0	182
March (8 days)	91	82.9	1,310
April (10 days)	173	131	2,590
May (13 days)	167	145	3,450
June (26 days)	209	141	7,270
July (2 days)	14	14.0	55
The year			14,900

SOUTH SIDE DITCH NEAR HARTLAND, KANS.

LOCATION.—In SW. ¼ sec. 15, T. 25 S., R. 37 W., half a mile south of Hartland, Kearny County, and 1 mile below head gates.

RECORDS AVAILABLE.—Irrigation seasons of 1921 to 1924.

GAGE.—Gurley water-stage recorder on south bank of canal 100 feet above highway bridge.

DISCHARGE MEASUREMENTS.—Made from highway bridge.

CHANNEL AND CONTROL.—Bed composed of drifted sand; control and banks practically permanent.

ACCURACY.—Stage-discharge relation not permanent. Rating curve fairly well defined. Mean daily gage heights determined to hundredths from automatic records by inspection and planimeter. Daily discharge ascertained by applying mean daily gage heights to rating table. Records fair.

COOPERATION.—Complete records furnished by Kansas Board of Agriculture through G. S. Knapp, State irrigation commissioner.

Water for the South Side ditch is diverted from the south bank of Arkansas River in SW. ¼ sec. 16, T. 25 S., R. 37 W., for irrigation. A waste gate is located 200 feet below gage.

The following discharge measurements were made:

June 14, 1924: Gage height, 2.53 feet; discharge, 152 second-feet.

July 5, 1924: Gage height, 0.92 foot; discharge, 22.4 second-feet.

July 12, 1924: Gage height, 0.80 foot; discharge, 23.0 second-feet.

Daily discharge, in second-feet, of South Side ditch near Hartland, Kans., for the year ending September 30, 1924

Day	Nov.	Apr.	May	June	July	Aug.	Sept.
1			12		89		28
2			24		121		20
3					106		17
4					101	103	13
5					79	81	14
6					120	97	13
7				47	122	16	7
8				60	124		
9				26	81		
10					65		
11					79		
12					93		
13					159		
14							
15					78	49	
16					135	104	
17					107	202	
18				21	73	149	37
19				52	92	90	33
20				37	78	73	50
21				53	73	78	30
22	42			59	109	80	18
23	43		16	55		72	9
24	44		144			67	5
25	44		98			83	
26	46		97			92	
27	14	113	65			79	
28		21			135	65	
29				85	151	52	
30				86	158	60	
31						37	

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

Monthly discharge of South Side ditch near Hartland, Kans., for the year ending September 30, 1924

Month	Discharge in second-feet		Run-off in acre-feet
	Maximum	Mean	
November (6 days)	46	38.8	461
April (2 days)	113	67.0	265
May (7 days)	144	65.1	903
June (11 days)	86	52.8	1,150
July (24 days)	159	105	5,010
August (21 days)	202	82.3	3,420
September (14 days)	50	21.0	582
The year			11,800

GREAT EASTERN CANAL NEAR HARTLAND, KANS.

LOCATION.—In NW. ¼ sec. 15, T. 25 S., R. 37 W., half a mile south of Hartland, Kearny County, and 1 mile below head gates.

RECORDS AVAILABLE.—Irrigation seasons of 1921 to 1924.

GAGE.—Gurley water-stage recorder on south bank of canal 150 feet above highway bridge.

DISCHARGE MEASUREMENTS.—Made from highway bridge.

CHANNEL AND CONTROL.—Bed composed of sand, shifting. Banks permanent.

ACCURACY.—Stage-discharge relation not permanent. Rating curve fairly well defined. Mean daily gage heights determined to hundredths from automatic charts by inspection or planimeter. Daily discharge ascertained by applying mean daily gage heights to rating table. Records fair.

COOPERATION.—Complete records furnished by Kansas State Board of Agriculture through G. S. Knapp, State irrigation commissioner.

Water for the Great Eastern Canal is diverted from the north bank of Arkansas River in NW. ¼ sec. 16, T. 25 S., R. 37 W., for irrigation. A spillway, seldom used during irrigation season, is located 1 mile below gage.

In addition to water diverted during the irrigation season from March to November, about 20,000 acre-feet is diverted for storage in Lake McKinney.

Discharge measurements of Great Eastern Canal near Hartland, Kans., during the year ending September 30, 1924

Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Nov. 10	1.4	28.6	May 24	3.42	398
May 17	2.1	111	June 14	2.18	121

Daily discharge, in second-feet, of Great Eastern Canal near Hartland, Kans., for the year ending September 30, 1924

Day	Oct.	Nov.	May	June	July	Day	Oct.	Nov.	May	June	July
1	211	49		265		16	44	28	26	20	
2	146	51		66		17	39	27	109	222	
3	40	45				18	75	26	97	372	
4	28	40				19	85	26	94	359	
5	36	37				20	62	26	109	412	
6	46	34				21	54	27	140	448	
7		26				22	44	39	154	376	
8		21				23	40	49	258	412	
9		21				24	50	45	376	434	
10		27				25	67	41	313	270	
11		31		92		26	63	36	224	132	
12		27		337		27	113	33	176	48	
13		26		219	19	28	86	64	178		
14		30		127		29	67	100			
15		29		34		30	64	109			
						31	51				

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

Monthly discharge of Great Eastern Canal near Hartland, Kans., for the year ending September 30, 1924

Month	Discharge in second-feet		Run-off in acre-feet
	Maximum	Mean	
October (22 days)	211	68.6	2,990
November	109	39.0	2,320
May (13 days)	376	173	4,460
June (19 days)	448	245	9,210
July (1 day)	19	19	38
The year			20,000

FARMERS DITCH NEAR GARDEN CITY, KANS.

LOCATION.—In NW. ¼ sec. 5, T. 24 S., R. 34 W., 1½ miles below head gates and 11 miles west of Garden City, Finney County.

RECORDS AVAILABLE.—Irrigation seasons of 1921 to 1924.

GAGE.—Gurley water-stage recorder on north bank of canal at downstream side of bridge.

DISCHARGE MEASUREMENTS.—Made from highway bridge.

CHANNEL AND CONTROL.—Slightly sandy bed; permanent banks and control.

ACCURACY.—Stage-discharge relation permanent. Rating curve well defined. Mean daily gage heights determined to hundredths from automatic records by inspection and planimeter. Daily discharge ascertained by applying daily gage heights to rating table. Records good.

COOPERATION.—Complete records furnished by Kansas State Board of Agriculture through G. S. Knapp, State irrigation commissioner.

Water for the Farmers ditch is diverted from the north bank of Arkansas River in SE. ¼ sec. 12, T. 24 S., R. 35 W., for irrigation. Waste gate not used.

Discharge measurements of Farmers ditch near Garden City, Kans., for the year ending September 30, 1924

Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*
May 17	1.04	20.7	May 31	2.63	147
May 24	1.73	63.4	June 28	1.06	25.8

Daily discharge, in second-feet, of Farmers ditch near Garden City, Kans., for the year ending September 30, 1924

Day	Mar.	Apr.	May	June	July	Aug.	Sept.
1		33	63	37	82	47	84
2		16	57	28	67	28	87
3	80		36	27	57		101
4	65	16	33	32	41		90
5	30	26	26	23	54		83
6	58		24	25	33	66	78
7	57		19	25	22	81	69
8	57			13	17	86	61
9	56					87	59
10	57					34	68
11	64					64	75
12	64					75	63
13	58					76	58
14	54				103	65	51
15	23		59		34	44	60
16	21		39		79	50	61
17	23		27		116	84	20
18	18		20				
19	16						
20	12						
21	11		43		62	31	
22	16		37		96	71	
23	20		52		110	42	
24			52		133		
25			72		148		
26		90	99		141		
27	12	63	93		156	63	
28	53	42	51	33		94	
29	56	27	60	106	61	76	
30	46	18	49	104	83	42	
31	36		47		72	65	

NOTE.—No flow on days for which discharge is not given.

Monthly discharge of Farmers ditch near Garden City, Kans., for the year ending September 30, 1924

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
March (26 days)	80	90	40.9	2,100
April (9 days)	90	0	36.8	655
May (22 days)	99	0	48.1	2,100
June (11 days)	106	0	41.2	897
July (22 days)	156	0	80.3	3,500
August (22 days)	94	0	62.3	2,710
September (17 days)	101	0	68.7	2,310
The year				14,300

GARDEN CITY CANAL NEAR GARDEN CITY, KANS.

LOCATION.—In NW. ¼ sec. 4, T. 24 S., R. 34 W., half a mile below head gates and 10 miles west of Garden City, Finney County.

RECORDS AVAILABLE.—Irrigation seasons of 1921 to 1924.

GAGE.—Gurley water-stage recorder on right bank of canal 40 feet downstream from highway bridge.

DISCHARGE MEASUREMENTS.—Made from footbridge at gage.

CHANNEL AND CONTROL.—Bed is loose, clean sand. Control shifting; banks permanent.

ACCURACY.—Stage-discharge relation not permanent. Rating curve fairly well defined. Mean daily gage heights determined from automatic records by inspection and planimeter. Daily discharge ascertained by applying mean daily gage heights to rating table. Records fair.

COOPERATION.—Complete records furnished by the Kansas State Board of Agriculture through G. S. Knapp, State irrigation commissioner.

Water for the Garden City Canal is diverted from the north bank of Arkansas River in the SE. ¼ sec. 5, T. 24 S., R. 34 W., for irrigation. No waste gate is provided.

No discharge measurements were obtained during the year.

Daily discharge, in second-feet, of Garden City Canal near Garden City, Kans., for the year ending September 30, 1924

Day	Mar.	June	Day	Mar.	June
16	18		21	30	54
17	32	40	22	21	55
18	31	53	23		56
19	31	54	24		57
20	31	54	25		41

NOTE.—No flow on days for which no discharge is given. Total discharge during year, 1,300 acre-feet.

PAWNEE RIVER NEAR LARNED, KANS.

LOCATION.—In sec. 1, T. 22 S., R. 17 W., at highway bridge 2½ miles west of Larned, Pawnee County.

DRAINAGE AREA.—2,300 square miles. (Authority, State irrigation commissioner.)

RECORDS AVAILABLE.—April 8 to September 30, 1924.

GAGE.—Water-stage recorder in wooden well and shelter fastened to downstream side of bridge pier near center of stream. Attended by V. W. Stambaugh.

DISCHARGE MEASUREMENTS.—Made from downstream side of bridge.

CHANNEL AND CONTROL.—Deep, narrow channel eroded through silt and clay permanent. Control is low, rock fill dam half a mile below gage. Additional rock was added once or twice during period, causing control to change.

EXTREMES OF STAGE.—Maximum stage recorded during period from water-stage recorder, 4.58 feet at 11.30 p. m. August 16; minimum stage from water-stage recorder, 0.53 foot at 7 p. m. September 12.

REGULATION.—Most of low-water flow pumped from river above for irrigation.

ACCURACY.—Stage-discharge relation not permanent. Rating curve not developed. Mean daily gage heights determined to hundredths from recorder charts by inspection and planimeter. Data not sufficient for determination of daily discharge. Records good.

The following discharge measurements were made:

April 17, 1924: Gage height, 1.32 feet; discharge, 28.9 second-feet.

May 9, 1924: Gage height, 1.26 feet; discharge, 34.6 second-feet.

June 5, 1924: Gage height, 2.28 feet; discharge, 13.8 second-feet.

Daily gage height, in feet, of Pawnee River near Larned, Kans., for the year ending September 30, 1924

Day	Apr.	May	June	July	Aug.	Sept.	Day	Apr.	May	June	July	Aug.	Sept.
1	------	3.08	2.90	1.28	1.04	0.96	16	1.36	1.89	2.28	1.39	2.47	0.61
2	------	3.59	2.92	1.24	1.01	.88	17	1.32	2.05	2.22	1.47	3.90	.59
3	------	2.75	2.75	1.19	.98	.81	18	1.31	1.89	2.16	1.60	2.94	.57
4	------	2.16	2.52	1.22	.92	.77	19	1.31	1.81	2.06	1.65	2.75	.72
5	------	1.94	2.29	1.26	.85	.73	20	1.25	2.01	1.93	1.68	2.55	.75
6	------	1.79	2.16	1.28	.96	.67	21	.88	2.93	1.85	1.67	2.40	.74
7	------	1.59	2.00	1.26	.98	.64	22	1.19	3.32	1.78	1.61	1.98	.73
8	1.58	1.33	2.13	1.28	1.02	.63	23	1.65	2.99	1.72	1.55	1.67	.73
9	1.56	1.27	2.19	1.29	1.06	.63	24	1.69	2.79	1.65	1.48	1.46	.72
10	1.52	1.32	2.26	1.30	1.10	.62	25	1.62	2.41	1.58	1.43	1.33	.72
11	1.50	1.48	2.30	1.35	1.17	.60	26	1.52	2.17	1.52	1.37	1.22	.76
12	1.48	1.45	2.32	1.35	1.20	.56	27	1.37	2.28	1.47	1.32	1.14	1.46
13	1.43	1.39	2.36	1.32	1.21	.56	28	1.18	3.26	1.42	1.24	1.10	1.93
14	1.40	1.40	2.36	1.29	1.22	.58	29	2.38	3.25	1.35	1.24	1.09	2.00
15	1.40	1.37	2.32	1.31	1.23	.60	30	2.33	2.99	1.30	1.17	1.04	1.99
							31	------	2.88	------	1.10	1.00	------

LITTLE ARKANSAS RIVER AT VALLEY CENTER, KANS.

LOCATION.—In SW. ¼ sec. 1, T. 26 S., R. 1 W., at highway bridge half a mile west of Goodrich station on the Arkansas Valley Interurban Railroad, 1 mile south of Valley Center, Sedgwick County, and 14 miles above mouth.

DRAINAGE AREA.—1,340 square miles (measured on topographic map, scale 1:125,000).

RECORDS AVAILABLE.—June 10, 1922, to September 30, 1924.

GAGE.—Chain gage on upstream handrail of bridge; read by Clarence Corr.

DISCHARGE MEASUREMENTS.—Made from upstream side of bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of silt and gravel; shifting. Lodged snags and driftwood are frequent. Control is sand and gravel bar under bridge; fairly permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 15.50 feet at 7 a. m. April 30 (discharge, 6,980 second-feet); minimum stage, 1.02 feet at 7.30 a. m. September 15 (discharge, 24 second-feet).

1922–1924: Maximum stage recorded, 18.02 feet on June 10, 1923 (discharge, 10,500 second-feet); minimum discharge, 4 second-feet on December 17, 1922.

ACCURACY.—Stage-discharge relation not permanent. Rating curve fairly well defined. Gage read to hundredths once daily. Daily discharge ascertained by indirect method for shifting control. Records good.

Discharge measurements of Little Arkansas River at Valley Center, Kans., during the year ending September 30, 1924

Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Apr. 20	1.68	62.5	July 25	1.72	86.2
June 2	2.39	129	Sept. 6	1.09	31.5

Daily discharge, in second-feet, of Little Arkansas River at Valley Center, Kans., for the year ending September 30, 1924

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	674	125	100	77	90	77	386	4,160	155	49	51	35
2	626	125	100	77	90	77	218	3,490	142	50	49	35
3	1,080	125	95	77	90	77	148	3,560	120	50	58	35
4	494	125	95	59	90	77	125	1,860	110	50	86	35
5	366	130	95	59	86	77	115	794	110	51	308	34
6	254	125	90	72	82	77	105	472	105	49	155	33
7	225	115	90	72	82	72	100	346	95	50	82	32
8	406	115	90	72	82	72	95	272	90	48	64	31
9	272	110	86	72	82	72	90	218	86	52	58	31
10	195	110	86	77	86	72	86	188	82	51	53	31
11	174	110	86	72	90	68	82	167	82	49	53	31
12	218	110	86	82	90	68	82	155	77	77	53	36
13	4,010	115	86	77	95	72	82	148	77	346	49	35
14	1,910	120	86	77	95	72	77	142	77	120	47	33
15	1,210	115	86	77	95	72	77	130	77	866	46	24
16	698	110	86	77	95	82	77	125	72	174	46	29
17	428	105	86	59	90	86	72	125	72	254	44	31
18	308	105	86	77	90	90	68	115	68	167	44	31
19	254	100	86	68	86	100	68	110	68	105	44	31
20	202	105	86	64	82	115	64	105	64	90	54	36
21	188	105	86	72	82	125	64	100	59	136	49	33
22	167	100	86	68	77	142	59	95	59	210	44	38
23	155	100	86	68	77	188	59	95	59	100	40	35
24	148	100	86	72	77	326	59	90	59	130	40	33
25	142	100	82	72	77	604	68	95	56	90	40	31
26	136	100	82	72	77	824	72	95	56	72	40	29
27	130	95	86	77	77	674	95	95	57	64	54	38
28	130	90	86	72	77	236	82	105	54	59	46	33
29	125	90	86	77	77	450	105	120	52	58	40	28
30	125	95	39	82	-------	450	6,890	188	51	54	36	28
31	130	-------	34	90	-------	308	-------	272	-------	54	35	-------

Monthly discharge of Little Arkansas River at Valley Center, Kans., for the year ending September 30, 1924

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	4,010	125	503	30,900
November	130	90	109	6,500
December	100	34	84.7	5,210
January	90	59	73.1	4,490
February	95	77	85.0	4,890
March	824	68	190	11,700
April	6,890	59	326	19,400
May	4,160	90	582	35,800
June	155	51	79.7	4,740
July	866	48	122	7,490
August	308	35	61.5	3,780
September	38	24	32.5	1,930
The year	6,890	24	188	137,000

WALNUT RIVER AT WINFIELD, KANS.

LOCATION.—In NE. ¼ sec. 33, T. 32 S., R. 4 E., at concrete highway bridge 1 mile south of Winfield, Cowley County, 1 mile above Black Creek, and 3 miles below Timber Creek.

DRAINAGE AREA.—1,860 square miles.

RECORDS AVAILABLE.—November 14, 1921, to September 30, 1924.

GAGE.—Chain on upstream handrail of bridge; read by William Mason.

DISCHARGE MEASUREMENTS.—Made from downstream side of bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of silt, sand, and rock; shifting. Control is gravel bar 500 feet below gage; shifting.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 19.75 feet at 7 a. m. May 1 (discharge, 9,570 second-feet); minimum stage, 3.15 feet at 6 p. m. September 10 (discharge, 1 second-foot).

1921–1924: Maximum stage recorded, 38.7 feet on June 10, 1923 (discharge, 30,500 second-feet); minimum discharge, 1 second-foot on August 24, 1923, and September 10, 1924.

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

REGULATION.—Low-water flow affected by operation of mill upstream.

ACCURACY.—Stage-discharge relation not permanent. Rating curve is fairly well defined throughout. Gage read to hundredths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table using shifting-control method October 1 to March 31, April 9 to July 23, and August 26 to September 13. Records fair.

Discharge measurements of Walnut River at Winfield, Kans., during the year ending September 30, 1924

Date	Gage height	Discharge	Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Dec. 10	5.07	217	June 1	5.24	411	Sept. 5	4.44	109
Apr. 19	5.11	290	July 24	4.81	188			

Daily discharge, in second-feet, of Walnut River at Winfield, Kans., for the year ending September 30, 1924

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	435	750	172	160	128	150	660	9,170	395	108	81	69
2	355	525	200	130	130	116	525	4,600	458	100	77	48
3	245	615	230	150	98	172	315	1,480	435	89	44	69
4	215	930	245	138	140	130	480	1,220	395	74	110	51
5	245	975	215	132	124	262	435	885	335	73	215	112
6	185	660	200	138	124	230	458	705	335	77	4,280	94
7	140	502	215	172	114	185	435	660	335	6	2,690	51
8	262	435	185	138	114	160	415	570	262	57	355	14
9	298	355	185	150	132	136	395	525	280	67	262	6
10	130	335	185	160	112	200	355	525	525	66	215	7
11	132	335	172	172	140	138	335	480	355	71	1,580	37
12	315	280	160	150	215	102	355	458	395	66	435	40
13	1,780	315	215	150	280	200	335	415	262	49	375	33
14	1,820	298	570	150	298	126	335	415	262	140	245	46
15	1,080	280	415	150	315	150	355	375	230	1,220	215	30
16	840	280	298	140	280	185	315	375	215	975	215	32
17	615	280	262	150	245	840	298	355	185	750	124	34
18	458	245	230	160	245	1,620	280	335	130	840	136	39
19	435	245	215	172	215	1,620	262	315	122	660	110	298
20	355	230	230	97	200	2,390	245	335	134	355	97	215
21	298	230	215	160	185	2,150	262	298	200	262	92	110
22	262	215	215	122	185	1,980	230	280	458	795	104	120
23	215	230	215	116	160	2,690	230	280	262	315	92	84
24	185	215	200	132	160	1,980	230	280	150	185	84	70
25	215	215	200	132	160	2,080	3,590	570	138	130	104	54
26	200	185	200	122	150	1,420	7,570	480	120	120	106	54
27	185	172	200	122	150	975	2,150	660	160	97	78	63
28	150	172	185	122	140	1,480	930	705	104	104	83	46
29	355	172	172	140	138	3,110	1,930	795	122	81	78	70
30	3,770	200	172	140	-------	2,150	8,290	525	122	92	64	46
31	1,980	-------	172	140	-------	1,020	-------	480	-------	77	83	-------

Monthly discharge of Walnut River at Winfield, Kans., for the year ending September 30, 1924

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	3,770	130	586	36,000
November	975	172	363	21,600
December	570	160	224	13,800
January	172	97	142	8,730
February	315	98	175	10,100
March	3,110	102	972	59,800
April	8,290	230	1,100	65,500
May	9,170	280	953	58,600
June	525	104	263	15,600
July	1,220	6	261	16,000
August	4,280	44	414	25,500
September	298	6	68.1	4,050
The year	9,170	6	462	335,000

VERDIGRIS RIVER AT INDEPENDENCE, KANS.

LOCATION.—In NE. ¼ sec. 31, T. 32 S., R. 16 E., at highway bridge 1 mile east of Independence, Montgomery County, 2½ miles below Elk River and 4½ miles above Drum Creek.

DRAINAGE AREA.—2,800 square miles.

RECORDS AVAILABLE.—November 14, 1921, to September 30, 1924. Intermittent records of stage were obtained April 24 to September 24, 1904.

GAGE.—Gage on upstream side of bridge; read by Ben Wainscott.

DISCHARGE MEASUREMENTS.—Made from upstream side of bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of silt and rock; permanent. Control is rock riffle 30 feet below gage; permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 23.92 feet at 10 a. m. October 17 (discharge, 13,800 second-feet); minimum stage, 1.64 feet at 10 a. m. July 11 (discharge, 49 second-feet).

1921–1924: Maximum stage recorded, 44.11 feet on June 12, 1923 (discharge, 35,900 second-feet); minimum stage, 1.02 feet on October 24, 25, and 27 (discharge, 10 second-feet).

1904: Maximum stage, 46.7 feet on July 8, referred to present datum.

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

ACCURACY.—Stage-discharge relation not permanent. Rating curve fairly well defined throughout. Gage read to hundredths once daily. Daily discharge ascertained by applying daily gage height to rating table using shifting-control method May 31 to September 30. Records fair.

The following discharge measurements were made:

April 18, 1924: Gage height, 3.98 feet; discharge, 657 second-feet.

May 31, 1924: Gage height, 5.09 feet; discharge, 1,060 second-feet.

September 4, 1924: Gage height, 2.66 feet; discharge, 284 second-feet.

Daily discharge, in second-feet, of Verdigris River at Independence, Kans., for the year ending September 30, 1924

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	80	2,590	430	355	325	355	2,780	11,900	896	128	88	822
2	146	1,020	3,530	325	325	325	1,470	6,610	822	106	88	616
3	460	2,330	5,140	280	310	310	1,280	2,720	750	92	1,020	460
4	370	4,930	2,460	266	340	310	1,140	1,830	858	85	2,140	310
5	168	3,810	1,280	238	370	280	1,330	1,470	682	78	682	226
6	113	1,720	976	224	325	340	1,190	1,140	490	76	7,310	143
7	92	1,100	822	210	252	400	1,060	1,020	400	73	13,100	118
8	80	822	682	196	266	370	936	822	355	61	8,570	94
9	75	682	490	238	280	340	858	716	12,600	61	1,380	107
10	83	584	552	252	355	280	716	648	11,400	64	584	100
11	86	520	460	266	1,420	295	682	584	1,520	49	2,400	102
12	116	490	5,210	280	4,020	310	584	584	786	584	3,670	96
13	385	460	7,870	266	3,810	340	584	552	616	1,060	2,400	151
14	4,930	460	1,950	266	2,850	490	648	552	460	4,370	858	252
15	2,460	490	1,140	252	1,950	584	648	520	400	3,670	1,060	124
16	12,100	490	896	252	1,830	896	584	460	355	2,660	3,320	106
17	13,800	400	822	238	5,910	1,950	682	430	310	716	4,370	96
18	4,860	370	750	224	2,850	7,170	682	385	266	490	1,280	80
19	1,520	355	682	224	1,100	8,500	520	325	238	400	616	8,010
20	822	340	682	190	750	7,800	430	490	310	2,720	370	12,800
21	552	310	716	157	648	7,030	385	310	400	1,470	310	2,980
22	460	310	1,330	174	584	5,560	340	295	3,250	1,520	340	858
23	370	280	1,100	196	552	4,440	340	252	1,140	1,420	1,140	552
24	310	266	822	370	520	3,600	355	224	520	1,330	6,400	400
25	280	266	716	460	490	3,390	896	822	716	520	1,280	355
26	266	252	584	552	430	3,040	1,830	1,470	490	310	858	716
27	266	238	490	490	400	1,830	3,670	2,330	355	224	490	616
28	295	224	490	340	385	9,060	2,400	3,040	266	160	355	1,770
29	340	266	460	340	370	6,050	5,280	8,010	210	130	252	2,980
30	2,720	280	490	325	-------	7,660	12,100	4,370	154	97	193	1,770
31	9,340	-------	430	340	-------	5,140	-------	1,230	-------	91	252	-------

NOTE.—Gage not read July 4 and Sept. 5; discharge interpolated.

Monthly discharge of Verdigris River at Independence, Kans., for the year ending September 30, 1924

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	13,800	75	1,870	115,000
November	4,930	224	888	52,800
December	7,870	430	1,430	87,900
January	552	157	283	17,400
February	5,910	252	1,170	67,300
March	9,060	280	2,850	175,000
April	12,100	340	1,550	92,200
May	11,900	224	1,810	111,000
June	12,600	154	1,400	83,300
July	4,370	49	800	49,200
August	13,100	88	2,170	133,000
September	12,800	80	1,260	75,000
The year	13,800	49	1,460	1,060,000

NEOSHO RIVER NEAR IOLA, KANS.

LOCATION.—In NE. ¼ sec. 9, T. 25 S., R. 18 E., 2½ miles south and 1½ miles west of Iola, Allen County, 1 mile below Elm Creek, and 8 miles above Owl Creek.

DRAINAGE AREA.—3,800 square miles.

RECORDS AVAILABLE.—October 12, 1917, to September 30, 1924; August 1, 1895, to November 30, 1903, at city water and power dam 4 miles upstream.

GAGE.—Stevens water-stage recorder on left bank three-fourths of a mile above pipe line ford; inspected by D. B. Bremer.

1895–1903: Vertical staff fastened to head gates of flume near city water and power house, 4 miles above present gage.

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

CHANNEL AND CONTROL.—Bed composed of shale, gravel, and silt; permanent. Control is a long shale riffle half a mile below the gage; practically permanent.

EXTREMES OF DISCHARGE.—Maximum stage as determined from reading on United States Weather Bureau gage 4 miles upstream, 13.2 feet at 1 p. m. July 15 (discharge, 10,800 second-feet); minimum stage from water-stage recorder, 3.06 feet at 5 a. m. September 19 (discharge, 82 second-feet).

1917–1924: Maximum stage recorded, 27.33 feet June 15, 1923 (discharge, 31,400 second-feet); minimum stage recorded, 1.9 feet on June 23, 1920 (discharge, 1 second-foot).

1895–1903: Maximum stage recorded, 22.0 feet on June 3, 1903 (discharge, 39,100 second-feet); minimum discharge, no flow on several days in September and October, 1897.

A stage of 24 feet, referred to datum of old gage, on July 10, 1904, was determined by levels from high-water marks (discharge estimated, 74,600 second-feet).

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

REGULATION.—Low-water flow regulated by dams upstream.

ACCURACY.—Stage-discharge relation not permanent. One rating curve, well defined throughout, used. Mean daily gage heights determined to hundredths from recorder records by inspection and planimeter. Daily discharge ascertained by applying mean daily gage height to rating table. Records during periods when water-stage recorder operated, good; during estimated periods, fair.

The following discharge measurements were made:

March 17, 1924: Gage height, 4.12 feet; discharge, 490 second-feet.

May 30, 1924: Gage height, 5.70 feet; discharge, 1,610 second-feet.

September 3, 1924: Gage height, 5.37 feet; discharge, 1,160 second-feet.

Daily discharge, in second-feet, of Neosho River near Iola, Kans., for the year ending September 30, 1924

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	2,500	920	347	360	252	270	5,200	4,720	1,200	270	220	595
2	1,280	540	645	326	255	262	1,840	8,060	1,480	234	278	1,660
3	601	540	780	313	259	259	1,280	8,840	1,440	217	197	1,300
4	570	1,600	540	278	270	450	1,100	8,580	1,160	194	156	466
5	920	850	540	230	282	402	990	6,370	920	188	137	282
6	681	634	490	207	252	301	885	1,840	734	188	1,480	209
7	406	709	392	204	227	282	843	1,560	618	188	2,600	158
8	274	634	305	200	217	270	801	1,240	580	179	2,600	158
9	237	510	305	217	223	262	734	1,060	990	173	1,720	164
10	210	435	278	237	241	262	681	955	767	164	1,200	170
11	194	397	266	252	289	262	628	885	540	154	1,020	173
12	200	374	560	223	735	259	596	815	450	1,280	520	176
13	293	383	1,320	244	1,100	286	585	850	421	1,600	313	176
14	808	378	640	237	1,130	339	560	741	580	6,760	230	170
15	2,060	370	606	230	1,020	383	540	675	550	5,200	430	138
16	5,460	356	485	230	767	378	540	640	465	1,600	1,320	105
17	4,240	365	430	220	864	570	535	601	450	990	815	110
18	1,520	392	416	210	748	955	490	560	388	2,020	728	95
19	1,280	330	388	204	623	836	485	525	343	1,600	669	1,300
20	645	347	416	200	565	1,020	450	505	618	1,600	505	1,700
21	490	347	411	194	455	1,640	440	475	1,100	687	334	636
22	490	339	411	188	406	1,930	430	450	540	535	721	352
23	540	286	430	182	388	1,880	430	465	687	416	5,410	244
24	490	289	406	282	356	2,400	426	794	715	392	1,510	197
25	392	266	392	634	326	2,930	612	899	634	326	795	176
26	197	266	379	575	318	3,640	1,930	1,800	555	297	723	152
27	230	230	356	313	294	4,480	1,320	990	416	278	515	348
28	266	230	352	266	274	4,120	767	1,100	374	237	360	2,140
29	140	230	360	259	262	3,880	1,200	1,360	392	204	262	1,260
30	4,600	230	356	255	-------	3,880	5,460	1,440	326	194	218	412
31	1,600	-------	356	252	-------	5,590	-------	1,480	-------	182	206	-------

NOTE.—Stage-discharge relation affected by ice Jan. 16–18 and 20–22; discharge estimated from automatic record and a study of climatological data. Water-stage recorder did not operate Oct. 18 to Nov. 4, Nov. 25 to Dec. 8, Mar. 31 to Apr. 2, July 13–20, and Sept. 7–14; gage heights estimated from record of U. S. Weather Bureau gage 4 miles upstream by determining relation between readings of the 2 gages.

Monthly discharge of Neosho River near Iola, Kans., for the year ending September 30, 1924

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	5,460	140	1,090	67,000
November	1,600	230	459	27,300
December	1,320	266	463	28,500
January	634	182	265	16,300
February	1,130	217	462	26,600
March	5,590	259	1,440	88,500
April	5,460	426	1,090	64,900
May	8,840	450	1,980	122,000
June	1,480	326	681	40,500
July	6,760	154	921	56,600
August	5,410	137	909	55,900
September	2,140	95	507	30,200
The year	8,840	95	860	624,000

NEOSHO RIVER NEAR PARSONS, KANS.

LOCATION.—In NW. ¼ sec. 22, T. 31 S., R. 21 E., at the bridge on the Parsons-Pittsburg highway, 500 feet above the St. Louis-San Francisco Railroad bridge, 800 feet below Hickory Creek, 10 miles east of Parsons, Labette County, and 18 miles above Lightning Creek.

DRAINAGE AREA.—4,860 square miles.

RECORDS AVAILABLE.—October 18, 1921, to September 30, 1924.

GAGE.—Chain on upstream handrail of bridge; read by Mrs. H. Burris.

DISCHARGE MEASUREMENTS.—Made from downstream side of bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of flat solid rock; permanent. No well-defined control. Bank-full stage, 24 feet.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 19.94 feet at 6 p. m. October 17 (discharge, 18,800 second-feet); minimum stage, 1.92 feet July 9 and 10 (discharge, 130 second-feet).

1921–1924: Maximum stage recorded, 24.9 feet on April 13 and 14, 1922 (discharge, 28,400 second-feet); minimum stage, 1.12 feet on December 3, 1921 (discharge, 18 second-feet).

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

REGULATION.—Flow apparently not affected by operation of power plants upstream.

ACCURACY.—Stage-discharge relation permanent. Rating curve well defined throughout. Gage read to hundredths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table. Records good.

Discharge measurements of Neosho River near Parsons, Kans., during the year ending September 30, 1924

Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Dec. 9	3.04	530	May 31	4.78	1,540
Apr. 17	3.10	600	Sept. 4	6.26	2,520

Daily discharge, in second-feet, of Neosho River near Parsons, Kans., for the year ending September 30, 1924

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	164	3,990	497	359	497	359	3,660	10,200	1,640	359	194	684
2	3,100	1,260	1,320	302	472	320	3,500	8,030	1,440	320	188	1,570
3	2,620	1,950	2,700	284	576	320	2,090	11,400	1,440	250	234	2,300
4	1,080	3,660	2,380	266	740	284	1,440	13,200	1,510	218	359	2,460
5	630	3,180	1,510	250	796	302	1,260	12,900	1,510	218	320	964
6	549	1,950	1,320	234	796	796	1,200	5,890	1,200	158	8,030	576
7	852	1,260	796	234	472	497	1,080	2,300	964	137	16,700	380
8	522	964	630	218	338	320	964	1,640	740	139	6,590	266
9	359	908	522	191	338	284	908	1,380	5,990	135	3,100	218
10	218	796	472	250	359	284	740	1,140	2,230	139	2,380	169
11	151	603	447	250	1,260	266	740	1,080	1,700	153	3,340	177
12	174	497	2,300	549	3,820	284	684	964	1,640	2,460	2,940	156
13	174	684	16,700	401	4,170	284	684	964	852	7,190	1,880	191
14	908	576	6,690	359	3,900	302	630	852	740	4,800	964	603
15	1,640	472	1,760	338	2,860	359	603	852	908	10,600	3,500	472
16	9,710	422	1,140	302	4,440	422	576	796	1,080	9,590	6,490	284
17	17,800	380	908	266	15,100	522	549	740	1,380	2,540	3,260	196
18	9,110	338	684	250	6,490	630	549	684	740	1,380	1,760	171
19	3,180	302	796	234	1,760	1,640	522	684	497	2,940	1,080	284
20	1,760	380	796	302	1,320	1,080	472	630	422	1,950	1,020	11,300
21	1,200	359	740	284	964	1,260	447	576	603	3,420	684	5,250
22	740	338	796	302	740	2,020	401	522	1,320	2,620	1,640	1,820
23	576	320	2,090	359	630	2,090	380	497	1,080	2,230	7,090	740
24	422	302	1,510	1,320	630	2,020	359	2,300	1,200	1,140	6,690	522
25	338	302	908	3,100	576	2,540	497	2,090	1,080	630	3,020	401
26	320	284	740	1,760	522	2,860	1,760	1,080	796	472	1,320	320
27	320	266	603	1,140	447	3,420	1,950	1,700	684	338	1,080	497
28	320	266	549	964	401	11,700	1,760	1,760	522	320	908	1,700
29	320	284	497	852	380	6,790	2,780	8,030	447	250	630	2,540
30	422	320	472	603	-------	4,260	12,400	2,300	401	250	497	1,510
31	4,350	-------	422	522	-------	3,990	-------	1,510	-------	218	472	-------

Monthly discharge of Neosho River near Parsons, Kans., for the year ending September 30, 1924

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	17,800	151	2,070	127,000
November	3,990	266	920	54,700
December	16,700	422	1,730	106,000
January	3,100	191	550	33,800
February	15,100	338	1,920	110,000
March	11,700	266	1,690	104,000
April	12,400	359	1,520	90,400
May	13,200	497	3,180	196,000
June	5,990	401	1,220	72,600
July	10,600	135	1,860	114,000
August	16,700	188	2,850	175,000
September	11,300	156	1,290	76,800
The year	17,800	135	1,740	1,260,000

NEOSHO RIVER NEAR WAGONER, OKLA.

LOCATION.—Between lots 1 and 2 on section line on north side of sec. 33, T. 17 N., R. 19 E., at highway bridge 4½ miles above Double Springs Creeks, 3 miles south and 5 miles east of Wagoner, Wagoner County, and 14 miles above mouth.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—March 26 to September 30, 1924.

GAGE.—Chain on upstream handrail of bridge; read by B. Spencer.

DISCHARGE MEASUREMENTS.—Made from downstream side of bridge.

CHANNEL AND CONTROL.—Bed composed of silt, sand, and heavy gravel. Control is long, low riffle half a mile below gage; fairly permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during period, 21.27 feet at 6 p. m. May 31 (discharge, estimated from extension of rating curve, 55,400 second-feet); minimum stage, 1.57 feet at 6 a. m. September 17 (discharge, 1,200 second-feet).

REGULATION.—Flow is partly regulated by operation of hydroelectric plant at Baxter Springs, Kans.

ACCURACY.—Stage-discharge relation permanent. Rating curve well defined below 35,000 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 Neosho River near Wagoner, Okla., during the period ending September 30, 1924

Date	Gage height	Discharge	Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Mar. 26	6.22	9,520	July 14	11.92	25,800	Sept. 12	1.75	1,410
May 15	3.21	3,230	July 29	3.36	3,450			

Daily discharge, in second-feet, of Neosho River near Wagoner, Okla., for the period ending September 30, 1924

Day	Mar.	Apr.	May	June	July	Aug.	Sept.
1		14,500	42,300	42,300	3,540	2,430	2,560
2		11,200	31,200	20,800	4,010	2,820	2,430
3		9,170	20,800	12,700	2,690	4,520	3,690
4		8,670	15,600	8,920	2,430	4,180	4,180
5		7,200	14,800	7,920	2,690	3,540	4,520
6		5,880	14,500	34,900	2,560	3,090	4,890
7		5,270	15,400	13,500	2,430	4,520	4,010
8		4,520	15,600	8,170	2,180	15,900	2,690
9		3,850	10,400	6,510	2,060	22,600	2,180
10		4,180	8,170	11,700	1,940	16,400	1,940
11		4,700	6,090	40,700	1,820	9,420	1,700
12		4,180	5,270	50,400	2,820	12,200	1,420
13		3,390	4,700	38,400	5,270	30,200	1,420
14		3,240	4,010	22,300	25,000	25,000	1,370
15		3,090	3,240	11,700	25,900	13,000	1,370
16		2,690	3,540	12,400	24,100	7,440	1,260
17		3,390	3,540	11,900	22,600	11,900	1,260
18		2,950	3,390	13,700	22,600	20,500	1,480
19		2,950	2,820	12,400	15,100	15,400	2,430
20		2,820	4,010	8,420	17,600	10,700	4,010
21		2,560	13,500	6,960	15,400	5,460	15,400
22		2,560	20,200	10,700	11,400	4,010	17,900
23		2,060	13,000	14,800	10,700	3,690	13,500
24		2,180	8,420	13,500	9,170	3,390	6,960
25		4,890	9,420	14,500	9,920	10,900	5,270
26	9,420	13,700	16,700	9,420	6,510	10,700	3,690
27	8,670	16,400	11,700	6,960	4,520	6,960	3,390
28	8,420	14,500	9,920	7,200	3,850	4,180	3,090
29	10,900	14,500	19,600	5,670	3,240	3,540	2,690
30	20,800	30,900	43,500	4,180	2,950	2,950	2,820
31	20,800		53,400		2,820	2,560	

Monthly discharge of Neosho River near Wagoner, Okla., for the year ending September 30, 1924

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
March 26-31	20,800	8,420	13,200	157,000
April	30,900	2,060	7,070	421,000
May	53,400	2,820	14,500	892,000
June	50,400	4,180	16,100	958,000
July	25,900	1,820	8,700	535,000
August	30,200	2,430	9,490	584,000
September	17,900	1,260	4,180	249,000
The period				3,796,000

COTTONWOOD RIVER AT ELMDALE, KANS.

LOCATION.—In NW. ¼ sec. 26, T. 19 S., R. 7 E., at highway bridge one-fourth of a mile above Middle Creek, 1 mile east of Elmdale, Chase County, and 2 miles above Diamond Creek.

DRAINAGE AREA.—1,040 square miles (measured on topographic map).

RECORDS AVAILABLE.—May 9, 1922, to September 30, 1924.

GAGE.—Chain on upstream handrail of bridge; read by Miss Rowena Starkey.

DISCHARGE MEASUREMENTS.—Made from downstream side of bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of clean, coarse sand, gravel, and rock; practically permanent. Control is gravel and rock riffle extending from 200 feet above to 100 feet below gage. Dam at Cottonwood Falls may affect the stage-discharge relation at medium and high stages. Bank-full stage, 32 feet.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 29.5 feet at 6.30 p. m. April 30 (discharge, 13,600 second-feet); minimum stage, 3.35 feet at 7 a. m. September 11 (discharge, 12 second-feet).

1922–1924: Maximum stage recorded, 35.5 feet at 4 p. m. June 11, 1923 (discharge, estimated by extending rating curve, 20,000 second-feet); minimum stage, 3.33 feet on September 9 and 12, 1922 (discharge, 10 second-feet).

REGULATION.—None.

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

ACCURACY.—Stage-discharge relation permanent. Rating curve well defined below 400 second-feet and fairly well defined from 400 to 3,000 second-feet. Gage read to hundredths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table. Records good for low stages and fair for medium and high stages.

Discharge measurements of Cottonwood River at Elmdale, Kans., during the year ending September 30, 1924

Date	Gage height	Discharge	Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Apr. 20	4.21	152	Aug. 6	4.20	182	Aug. 7	8.20	1,300
June 3	4.39	263	Do	4.32	212	Do	8.32	1,310
July 23	3.76	65.9	Aug. 7	6.96	982	Sept. 6	3.43	25.6
Aug. 6	4.03	127	Do	7.69	1,160			

Daily discharge, in second-feet, of Cottonwood River at Elmdale, Kans., for the year ending September 30, 1924

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	526	286	118	92	72	78	430	11,000	889	84	58	26
2	354	286	105	92	74	72	370	1,370	250	78	68	54
3	182	266	105	92	76	76	370	697	246	76	54	54
4	164	258	105	92	79	82	340	636	216	68	48	48
5	150	204	105	92	82	76	305	548	204	68	46	30
6	156	164	102	92	82	72	286	480	186	54	72	17
7	162	147	102	92	84	72	286	400	178	51	1,080	41
8	168	141	97	92	92	72	266	370	175	41	456	38
9	175	118	100	92	132	77	266	340	161	41	118	26
10	370	118	102	92	182	82	266	322	158	43	68	15
11	504	118	124	92	216	92	246	306	158	41	58	14
12	370	113	124	92	164	105	225	291	158	58	54	15
13	204	113	113	92	141	113	225	276	158	58	54	20
14	354	108	108	88	124	118	216	261	158	526	54	24
15	504	118	105	82	118	124	199	246	158	657	63	26
16	305	118	105	72	105	124	202	246	158	322	124	26
17	175	118	102	72	88	158	204	241	150	127	113	26
18	168	110	105	72	72	191	204	225	141	97	82	63
19	161	105	105	72	72	233	191	225	138	86	72	456
20	154	105	102	72	72	286	182	225	132	78	58	161
21	124	102	105	72	72	305	182	225	127	70	41	63
22	124	100	105	72	72	845	182	225	118	67	636	51
23	456	102	105	72	72	1,490	182	225	113	65	233	38
24	430	105	105	72	72	1,950	182	1,730	113	68	105	38
25	430	105	105	72	76	2,950	199	1,140	113	61	76	32
26	430	105	105	72	76	3,060	233	677	168	51	68	32
27	400	105	105	72	78	1,190	246	456	108	46	54	51
28	370	105	105	74	82	456	258	2,380	84	41	51	38
29	340	108	105	72	80	2,990	2,020	1,140	59	51	51	31
30	322	118	105	72	-------	867	11,700	677	65	46	51	26
31	305	-------	105	72	-------	504	-------	456	-------	46	48	-------

NOTE.—Stage-discharge relation affected by ice Jan. 1–8, discharge estimated from observer's notes and a study of climatological data. Gage not read and discharge interpolated Oct. 1, 2, 6, 7, 14, 18, 19, Feb. 2, 4, 17, Mar. 9, 17, Apr. 16, and May 11–14. Discharge estimated from rainfall data May 19 to June 1.

Monthly discharge of Cottonwood River at Elmdale, Kans., for the year ending September 30, 1924

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October	526	124	292	18,000
November	286	100	139	8,270
December	124	97	106	6,520
January	92	72	81.3	5,000
February	216	72	96.8	5,570
March	3,060	72	610	37,500
April	11,700	182	689	41,000
May	11,000	225	904	55,600
June	889	59	175	10,400
July	657	41	105	6,460
August	1,080	41	136	8,360
September	456	14	52.7	3,140
The year	11,700	14	283	206,000

SPRING RIVER NEAR WACO, MO.

LOCATION.—On line between SE. ¼ sec. 7 and NE. ¼ sec. 18, T. 29 N., R. 33 W., at highway bridge on Joplin-Waco road 700 feet below Brier Branch, 1 mile below Blackberry Creek, and 1½ miles east of Waco, Jasper County.

DRAINAGE AREA.—1,160 square miles (measured on topographic maps).

RECORDS AVAILABLE.—April 25 to September 30, 1924.

GAGE.—Chain gage on downstream side of bridge; read by Mrs. W. F. Hollingsworth.

DISCHARGE MEASUREMENTS.—Made from downstream side of bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of gravel and rock. Left bank is overflowed at a stage of about 19 feet; overflow on right bank is slight. Control is a coarse gravel bar 1,000 feet below gage; practically permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during period of record, 20.12 feet at 7.40 p. m. May 29 (discharge, 18,200 second-feet); minimum stage, 1.70 feet at 6 a. m. May 19 (discharge, 134 second-feet).

REGULATION.—Flow during low stages is subject to slight diurnal fluctuation from gristmills above.

ACCURACY.—Stage-discharge relation permanent during the period. Rating curve well defined between 150 and 18,000 second-feet. Gage read to hundredths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table. Records good except for very low stages, for which they are fair.

Discharge measurements of Spring River near Waco, Mo., during the year ending September 30, 1924

Date	Gage height	Discharge	Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Apr. 25	2.71	528	May 1	3.51	873	May 30	19.43	17,200
Apr. 26	2.04	248	May 21	10.31	6,510	Sept. 1	2.39	345
May 1	3.79	1,030	May 22	5.40	2,080			

Daily discharge, in second-feet, of Spring River near Waco, Mo., for the year ending September 30, 1924

Day	Apr.	May	June	July	Aug.	Sept.	Day	Apr.	May	June	July	Aug.	Sept.
1		1,040	2,710	615	540	360	16		165	3,190	4,610	2,010	205
2		422	1,330	565	490	445	17		154	2,710	2,150	5,350	205
3		307	1,150	540	380	540	18		145	1,730	840	3,190	205
4		290	1,040	490	380	422	19		790	1,040	790	1,210	740
5		273	990	468	360	366	20		6,950	2,390	890	940	2,390
6		490	890	445	1,040	324	21		7,050	7,480	1,520	790	1,210
7		615	790	422	1,590	307	22		1,940	6,750	1,270	690	740
8		307	740	400	940	290	23		1,090	5,250	1,270	640	540
9		224	5,850	380	515	273	24		3,190	2,950	840	590	380
10		214	15,900	380	2,310	273	25	490	3,270	1,730	640	515	307
11		186	14,200	360	5,450	256	26	256	1,040	990	590	515	256
12		192	7,590	1,210	9,460	256	27	211	1,210	990	515	468	256
13		171	2,080	7,260	6,150	240	28	205	2,950	840	445	445	307
14		186	2,230	10,500	1,800	240	29	1,210	17,600	740	422	400	290
15		168	2,230	7,810	1,330	224	30	2,150	17,100	690	380	400	224
							31		8,690		400	360	

Monthly discharge of Spring River near Waco, Mo., for the year ending September 30, 1924

[Drainage area, 1,160 square miles]

Month	Discharge in second-feet				Run-off in inches
	Maximum	Minimum	Mean	Per square mile	
May	17,600	145	2,530	2.18	2.51
June	15,900	690	3,310	2.85	3.18
July	10,500	360	1,590	1.37	1.58
August	9,460	360	1,650	1.42	1.64
September	2,390	205	436	.376	.42

SHOAL CREEK NEAR JOPLIN, MO.

LOCATION.—In S. ½ sec. 28, T. 27 N., R. 33 W., at Grand Falls hydroelectric plant of Empire District Electric Co. in Newton County, 2 miles below Silver Creek, 2½ miles below Spring Creek, and 4 miles south of Joplin, Jasper County.

DRAINAGE AREA.—458 square miles (measured on topographic maps).

RECORDS AVAILABLE.—April 1 to September 30, 1924.

GAGE.—Float in tailrace connected with indicator on scaleboard in power plant; read by plant engineer.

DISCHARGE MEASUREMENTS.—Made by wading 300 feet below gage during ordinary stages and from highway bridge 2½ miles above gage during high stages.

CHANNEL AND CONTROL.—Bed composed of clean gravel; likely to shift only during high stages. Control is a coarse gravel bar 400 feet below gage; practically permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during period, 13.1 feet at 5 a. m. July 13; minimum stage, 0.0 foot during numerous short periods when plant was shut down and water stored (discharge, 13 second-feet).

REGULATION.—During ordinary stages the flow is controlled completely by the plant. Plant is run until pond is drawn down to a certain elevation and then shut down until pond is filled, when operation is resumed. During high stages water flows over dam and regulation is small.

ACCURACY.—Stage-discharge relation permanent during the period. Rating curve fairly well defined below 2,500 second-feet. Gage read to inches hourly. Daily discharge ascertained by averaging results obtained by applying hourly gage heights to rating table. Records good except for discharges greater than 2,500 second-feet, which are fair.

COOPERATION.—Gage-height record furnished by Empire District Electric Co., P. J. Sergeant, chief engineer.

Discharge measurements of Shoal Creek near Joplin, Mo., during the year ending September 30, 1924

Date	Gage height	Discharge	Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Apr. 21	1.46	445	Apr. 22	1.10	249	May 22	1.65	442
Do	0	14	Do	1.10	263	May 30	4.08	1,960
Do	0	13	May 21	2.17	724	Sept. 2	1.75	465
Apr. 22	1.61	451	May 22	1.66	458	Do	1.75	474

Daily discharge, in second-feet, of Shoal Creek near Joplin, Mo., for the year ending September 30, 1924

Day	Apr.	May	June	July	Aug.	Sept.	Day	Apr.	May	June	July	Aug.	Sept.
1	3,060	786	1,200	352	713	382	16	2,630	267	735	692	1,070	254
2	3,050	606	1,040	353	470	542	17	1,810	265	996	581	2,130	293
3	3,010	540	975	317	705	457	18	313	272	705	552	795	251
4	2,970	492	825	346	418	362	19	318	262	622	815	645	457
5	2,820	450	735	322	370	333	20	314	588	590	632	590	752
6	2,800	436	675	236	534	318	21	203	790	879	512	540	518
7	2,780	654	615	244	540	314	22	191	450	590	470	492	409
8	2,720	570	573	253	421	306	23	193	390	645	450	492	352
9	2,870	444	761	226	402	307	24	209	2,230	615	450	438	297
10	2,640	390	1,960	279	416	285	25	236	959	515	376	439	316
11	2,740	391	1,480	196	1,070	249	26	280	645	515	381	411	231
12	2,630	313	1,710	2,770	3,760	319	27	286	740	540	337	389	363
13	2,710	340	933	6,250	1,010	262	28	272	3,570	470	347	365	308
14	2,640	343	882	1,140	765	266	29	340	6,550	416	318	368	312
15	2,670	298	891	817	675	238	30	626	2,960	409	290	369	296
							31		2,080		314	337	

NOTE.—No gage readings Apr. 6 and May 31; discharge interpolated.

Monthly discharge of Shoal Creek near Joplin, Mo., for the year ending September 30, 1924

[Drainage area, 458 square miles]

Month	Discharge in second-feet				Run-off in inches
	Maximum	Minimum	Mean	Per square mile	
April	3,060	191	1,680	3.67	4.10
May	6,550	262	970	2.12	2.43
June	1,960	409	817	1.78	1.99
July	6,250	196	697	1.52	1.75
August	3,760	337	714	1.56	1.80
September	752	231	345	.753	.84

ILLINOIS RIVER NEAR GORE, OKLA.

LOCATION.—At NE. corner of lot 4, sec. 4, T. 12 N., R. 21 E., 500 feet below Smith's ferryboat, 2½ miles northeast of Gore, Sequoyah County, 3¼ miles above Deep Creek, 3¾ miles above highway bridge and Missouri Pacific Railroad bridge, and 5½ miles above mouth.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—March 25 to September 30, 1924.

GAGE.—Staff gage fastened to sycamore tree at edge of water on right bank 500 feet below ferryboat; read by B. C. Prater.

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

CHANNEL AND CONTROL.—Bed composed of silt, sand, and small rock. Control is riffle 500 feet below gage; fairly permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during period, 9.4 feet at 6.15 a. m. April 27 (discharge, 16,400 second-feet); minimum stage, −0.41 foot at 6.45 p. m. September 17 (discharge, 116 second-feet).

REGULATION.—None.

ACCURACY.—Stage-discharge relation permanent. Rating curve well defined below 4,000 second-feet. Gage read to hundredths twice daily. Daily discharge determined by applying mean daily gage height to rating table. Records good.

Discharge measurements of Illinois River near Gore, Okla., for the year ending September 30, 1924

Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Mar. 25	3.04	3,460	July 17	0.85	948
May 16	1.36	1,250	Sept. 11	.27	194

Daily discharge, in second-feet, of Illinois River near Gore, Okla., for the year ending September 30, 1924

Day	Mar.	Apr.	May	June	July	Aug.	Sept.
1		2,450	10,800	4,640	800	625	192
2		2,190	12,400	3,560	765	590	302
3		1,930	6,080	3,000	765	555	225
4		1,800	5,000	2,580	730	555	225
5		1,680	4,160	2,320	660	520	425
6		1,560	3,560	6,620	625	488	395
7		1,450	3,420	4,320	590	488	353
8		1,350	2,860	2,860	555	455	302
9		1,260	2,580	4,320	555	455	247
10		1,260	2,320	6,800	520	555	208
11		1,350	2,060	4,480	520	730	192
12		1,350	1,800	4,640	520	625	181
13		1,260	1,680	4,160	625	625	176
14		2,320	1,560	4,000	1,350	625	160
15		1,350	1,450	2,580	1,180	488	145
16		1,260	1,350	2,190	940	455	130
17		1,560	1,260	1,930	870	425	120
18		1,350	1,180	2,190	940	395	130
19		1,350	1,100	2,190	1,020	377	2,060
20		1,260	1,020	1,560	3,420	425	1,180
21		1,180	1,100	2,580	2,450	455	870
22		1,180	1,180	1,450	1,560	425	980
23		1,100	1,180	1,680	1,260	377	1,020
24		1,100	1,450	1,350	1,100	341	870
25	3,420	3,840	1,260	1,180	1,020	313	765
26	3,420	12,400	1,350	1,180	940	291	660
27	3,000	16,400	1,260	1,020	905	269	555
28	2,720	12,600	1,930	980	835	258	520
29	2,720	7,560	7,560	905	765	236	488
30	2,580	8,950	12,200	870	695	225	455
31	3,000		11,300		660	208	

Monthly discharge of Illinois River near Gore, Okla., for the year ending September 30, 1924

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
March 25-31	3,420	2,580	2,980	41,400
April	16,400	1,100	3,260	194,000
May	12,400	1,020	3,530	217,000
June	6,800	870	2,800	167,000
July	3,420	520	972	59,800
August	625	208	447	27,500
September	2,060	120	484	28,800
The period				736,000

CANADIAN RIVER NEAR AMARILLO, TEX.

LOCATION.—At highway bridge on Colorado to Gulf crossing, 1½ miles below mouth of Amarillo Creek, 20 miles by road north of Amarillo, Potter County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—January 16 to September 30, 1924.

GAGE.—Chain gage attached to downstream handrail of the bridge; read by D. L. Snider.

DISCHARGE MEASUREMENTS.—Made from bridge to which gage is attached or by wading.

CHANNEL AND CONTROL.—Bed composed of sand; shifts. Channel is straight for half a mile below and one-fourth of a mile above gage. Left bank composed of rock and clay, clean, steep, and not subject to overflow; right bank composed of sand, clean, medium in height, and subject to overflow at about a stage of 14 feet. Control not known but shifts.

EXTREMES OF DISCHARGE.—Maximum stage recorded during the year, 7.95 feet at 10.15 a. m. August 14 (discharge not determined); no flow June 25 and 27 and September 27 and 28.

ICE.—None reported during the year.

DIVERSIONS.—None.

REGULATION.—None.

ACCURACY.—Stage-discharge relation not permanent. Rating curve fairly well defined from 40 to 4,000 second-feet; poorly defined to 15,000 second-feet; and above this, extended and subject to some error. Gage read to hundredths twice daily. Daily discharge determined by shifting-control method. Records fair.

Discharge measurements of Canadian River near Amarillo, Tex., during the year ending September 30, 1924

Date	Gage height	Discharge	Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Jan. 16	4.03	373	May 13	4.32	430	July 4	4.91	2,790
Feb. 7	4.47	961	May 14	4.29	369	July 21	3.75	261
Feb. 8	4.21	580	May 29	4.41	454	Aug. 12	3.18	51
Feb. 22	4.18	208	June 24	3.30	[a] 2	Aug. 14	6.46	15,200
Feb. 23	4.43	454	Do		[b]	Aug. 26	4.16	1,020
Apr. 9	4.22	232	July 3	4.82	1,240	Do	5.21	3,760
Apr. 10	4.45	541	July 4	5.08	3,240	Sept. 26	3.12	8.1

[a] Estimated. [b] No flow.

Daily discharge, in second-feet, of Canadian River near Amarillo, Tex., for the year ending September 30, 1924

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1		463	205	783	591	452	152	107	889
2		463	217	674	736	452	1,100	68	382
3		494	161	400	628	818	1,040	4,440	4,740
4		872	217	235	616	463	3,000	644	1,160
5		736	265	211	410	355	364	229	925
6		1,140	302	166	242	644	250	223	591
7		1,060	181	211	217	295	1,080	118	421
8		690	142	295	199	166	100	110	295
9		591	124	265	400	124	75	88	205
10		517	170	530	517	100	100	166	133
11		410	161	783	644	91	88	86	82
12		410	147	925	889	72	84	50	59
13		644	319	1,180	400	54	91	364	56
14		628	319	1,180	382	42	70	10,400	52
15		364	337	517	463	30	84	1,340	38
16	373	229	382	579	463	32	79	783	32
17	1,300	235	319	554	566	32	59	554	156
18	1,550	223	288	628	542	1.6	54	328	288
19	659	242	391	706	554	7.0	205	328	181
20	554	288	337	960	579	8.5	442	337	93
21	463	199	242	628	494	14	199	193	52
22	382	205	591	505	721	242		91	37
23	382	295	768	337	484	16		128	29
24	505	265	265	452	554	1.6		70	25
25	463	280	229	452	616	0		310	14
							180		
26	421	280	175	400	421	.8		889	10
27	421	355	193	517	364	0		706	0
28	442	295	175	644	400	1.6		1,940	0
29	421	272	114	907	494	1.6		1,390	5.5
30	442		223	542	442	114	161	1,300	1.6
31	463		337		505		86	872	

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

Monthly discharge of Canadian River near Amarillo, Tex., for the year ending September 30, 1924

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
January 16–31	1,550	373	578	18,300
February	1,140	199	453	26,100
March	768	114	268	16,500
April	1,180	166	572	34,000
May	889	199	501	30,800
June	818	0	154	9,180
July	3,000	54	336	20,600
August	10,400	50	924	56,800
September	4,740	0	365	21,700
The period				234,000

CANADIAN RIVER NEAR CANADIAN, TEX.

LOCATION.—At highway bridge 1½ miles by road northeast of Canadian, Hemphill County, 5 miles below mouth of Horse Creek, and 6 miles above mouth of Clear Creek.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—July 1 to September 30, 1924.

GAGE.—Chain gage attached to downstream handrail of bridge; read by Charles or W. H. Peet.

DISCHARGE MEASUREMENTS.—Made from bridge to which gage is attached or by wading.

CHANNEL AND CONTROL.—Bed of stream composed of deep sand; clean; shifts badly. Channel curved above the station and straight for 1½ miles below. Numerous and changing channels at low stages. One channel at high stages. Left bank is of sand; slightly wooded; shifting; subject to overflow at a stage of 8 feet. Right bank of clay; slightly wooded; fairly permanent; low and subject to overflow at a stage of about 17 feet. The control is the sand of the bed of the stream and shifts badly both from water and wind.

EXTREMES OF DISCHARGE.—Maximum stage recorded during period of record, 7.10 feet at 1 p. m. July 5 (discharge not determined); no flow September 27–30.

ICE.—None.

DIVERSIONS.—None.

REGULATION.—None.

ACCURACY.—Stage-discharge relation not permanent. On account of shifting control no rating curve defined. Gage read to hundredths twice daily, but owing to the changing channel of the river it was necessary to move the gage several times and, although the gage was set to the same datum each time, the gage readings varied according to the location. Daily discharge not published on account of the badly shifting channel and control.

Discharge measurements of Canadian River near Canadian, Tex., during the year ending September 30, 1924

Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*
July 2	3.18	[a] 1.6	Aug. 5	4.63	1,130
July 31	2.88	[a] 2.0	Aug. 21	[b] 4.18	330

[a] Estimated. [b] Gage moved to new location at same datum.

Daily gage height, in feet, of Canadian River near Canadian, Tex., for the year ending September 30, 1924

Day	July	Aug.	Sept.	Day	July	Aug.	Sept.	Day	July	Aug.	Sept.
1	3.18	2.89	4.65	11	3.75	3.90	4.05	21	3.84	4.13	4.30
2	3.18	2.89	4.74	12	3.68	3.42	3.90	22	4.21	4.28	4.33
3	3.18	2.88	4.55	13	3.52	3.56	3.68	23	4.05	4.08	4.22
4	3.18	4.40	4.45	14	3.52	3.45	3.58	24	3.90	3.82	4.12
5	5.25	4.97	5.14	15	3.45	3.46	3.50	25	3.74	3.96	4.04
6	4.45	4.50	4.72	16	3.35	4.68	4.05	26	3.54	4.26	3.88
7	4.14	3.69	4.51	17	3.28	4.74	4.35	27	3.29	4.48	3.80
8	4.12	3.30	4.35	18	3.75	4.30	4.40	28	3.03	4.66	3.80
9	4.10	3.60	4.31	19	3.54	3.78	4.25	29	2.89	4.62	3.80
10	3.88	3.75	4.16	20	3.92	3.76	4.35	30	2.89	4.92	3.80
								31	2.89	4.58	------

RED RIVER BASIN

PRAIRIE DOG TOWN FORK OF RED RIVER NEAR CANYON, TEX.

LOCATION.—At Palo Duro Country Club, 1½ miles above Palo Duro Club Dam, 3 miles above road crossing between Amarillo and Canyon, 4 miles northeast of Canyon, Randall County, and 16 miles southwest of Amarillo.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—January 15 to September 30, 1924.

GAGE.—Au 60-day recorder in timber house over concrete well on left bank. Attended by E. S. Hancock. Prior to September 13 gage was a staff gage on left bank, 1½ miles downstream; read by E. O. Dolcater. Gages not at the same datum and relation between gages not known.

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

CHANNEL AND CONTROL.—Channel straight for 150 feet above and below station. Bed composed of compacted earth; permanent. Right bank of earth, sand, and rock; high, covered with brush, weeds, and trees, and not subject to overflow. Left bank low, of earth and sand, sodded with grass and is subject to overflow. Low-water control is concrete road crossing, 170 feet below gage, and high-water control is 10-foot dam, 1½ miles downstream.

EXTREMES OF DISCHARGE.—Maximum stage recorded during the period of record, 1.70 feet at 4.15 p. m. July 4 (discharge, 800 second-feet, determined from extension of curve and subject to error); no flow August 5–17.

ICE.—None of consequence.

DIVERSIONS.—None.

REGULATION.—During the summer the Palo Duro Club fills its swimming pool from wells and drains it into the river above once every two weeks. This only affects low stages, for the capacity of the pool is 10,000 cubic feet and it drains slowly.

ACCURACY.—Stage-discharge relation permanent. Rating curve well defined from 0 to 50 second-feet, fairly well defined to 400 second-feet, and extended to cover the range of stage for the year. Gage read to hundredths twice daily. Daily discharge determined by applying mean daily gage height to the rating table. Though a water-stage recorder was installed on September 13 at a new location, the records from the recorder were not used to determine discharge, as the lower staff gage station was rated and there was no rating for the new location, and staff gage readings were obtained for the entire period. Daily discharge fair; monthly discharge good.

Discharge measurements of Prairie Dog Town Fork of Red River near Canyon, Tex., during the year ending September 30, 1924

Date	Gage height	Discharge	Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Jan. 15	0.77	26	May 28	0.66	8.1	Aug. 8		0
Feb. 6	.74	23	June 24	.47	[a].8	Aug. 25	0.63	4.0
Feb. 23	.72	18	July 5	1.35	394	Sept. 18	[b]1.06	2.0
Apr. 10	.71	11	July 22	.64	4.2	Sept. 27	.76	[a].5
May 13	.70	9.3	Do	.64	3.6			

[a] Estimated. [b] Gage moved to new location 1½ miles upstream on Sept. 13.

Daily discharge, in second-feet, of Prairie Dog Town Fork of Red River near Canyon, Tex., for the year ending September 30, 1924

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1		20	12	11	10	8.0	0.5	0.5	8.0
2		20	12	12	10	8.0	.6	.3	6.0
3		14	14	12	11	7.0	3.1	.2	4.4
4		12	12	12	11	6.0	632	.1	5.1
5		16	12	12	10	9.0	243	0.0	4.4
6		20	12	16	14	11	107	0	2.8
7		20	14	12	11	6.0	38	0	2.2
8		20	16	12	11	8.0	16	0	2.2
9		16	20	12	10	8.0	11	0	1.9
10		16	20	12	10	8.0	10	0	1.9
11		20	20	11	11	8.0	10	0	1.9
12		20	20	12	12	7.0	8.0	0	1.6
13		20	22	12	10	3.8	8.0	0	1.6
14		18	20	12	11	3.4	6.0	0	.8
15	26	12	20	11	10	3.4	7.0	0	.6
16	32	14	24	10	10	3.4	6.0	0	.6
17	28	16	20	10	10	3.4	6.0	0	.6
18	24	16	22	10	10	1.6	4.4	44	3.4
19	24	16	24	10	8.0	.8	4.4	16	2.8
20	20	16	24	9.0	8.0	.8	3.8	3.4	2.2
21	20	16	22	10	8.0	.6	10	1.2	1.9
22	26	12	26	10	8.0	.6	6.0	.7	2.2
23	28	16	26	10	5.1	.6	3.4	28	2.2
24	28	16	24	8.0	4.4	.7	2.8	10	2.2
25	26	12	22	12	4.4	.8	2.8	10	1.9
26	24	14	22	11	6.0	.7	1.9	7.0	1.1
27	20	14	16	11	6.0	.5	1.1	59	.8
28	20	12	4.4	11	7.0	.3	.8	8.0	.8
29	20	12	2.5	12	8.0	.2	.8	4.4	.8
30	20		12	10	8.0	.4	.8	4.4	.8
31	20		12		8.0		.7	10	

Monthly discharge of Prairie Dog Town Fork of Red River near Canyon, Tex., for the year ending September 30, 1924

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
January 15-31	32	20	23.9	805
February	20	12	16.1	924
March	26	2.5	17.7	1,090
April	16	8	11.2	664
May	14	4.4	9.06	557
June	11	.2	4.00	238
July	632	.5	37.3	2,290
August	59	0	6.68	411
September	8	.6	2.32	138
The period				7,120

PRAIRIE DOG TOWN FORK OF RED RIVER NEAR ESTELLINE, TEX.

LOCATION.—At highway bridge on the Colorado to Gulf highway, 1½ miles north of Estelline, Hall County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—January 10 to September 30, 1924.

GAGE.—Chain gage attached to downstream handrail of bridge; read by J. R. Lawrence.

DISCHARGE MEASUREMENTS.—Made from bridge to which gage is attached or by wading near the gage. Low stage measuring conditions poor.

CHANNEL AND CONTROL.—Channel straight for half a mile above and below the gage. Bed of stream composed of sand; shifts. Right bank composed of sand, medium in height, clean and not subject to overflow. Left bank of sand; wooded and not subject to overflow. Both banks subject to scour. Many channels at low and medium stages. Control is the bed of the stream which is composed of deep sand and shifts badly.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 5.50 feet at 11 a. m. August 22 (discharge, 19,700 second-feet, determined from extension of rating curve, and subject to large error); no flow for several periods.

ICE.—Some ice reported but open-channel conditions applicable.

DIVERSIONS.—None.

REGULATION.—None.

ACCURACY.—Stage-discharge relation not permanent. Rating curve fairly well defined below 230 second-feet, and poorly defined to 15,000 second-feet. Gage read to hundredths twice daily. Daily discharge not sufficiently accurate to justify publication. Monthly figures only fair.

Discharge measurements of Prairie Dog Town Fork of Red River near Estelline, Tex., during the year ending September 30, 1924

Date	Gage height	Discharge	Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Jan. 11	3.66	34	Apr. 23		0	June 21		0
Jan. 25	3.64	24	May 3		0	July 16		0
Feb. 1	3.55	13	May 28		0	July 23	3.92	758
Feb. 5	3.44	.7	June 1		0	July 26	3.63	52
Feb. 13	3.59	15	June 3	3.85	47	Aug. 18	3.87	222
Feb. 18	3.50	.8	June 6	3.50	[a].8	Aug. 23	5.14	13,600
Mar. 5		0	June 7		0	Aug. 30	3.32	471
Apr. 1		0	June 16		0	Sept. 25		0

[a] Estimated.

Monthly discharge of Prairie Dog Town Fork of Red River near Estelline, Tex.' for the year ending September 30, 1925

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
January 10-31	73	15	35.6	1,560
February	66		5.09	293
March	730	0	75.4	4,640
April	13	0	1.26	75
May	0	0	0	0
June	6.0	0	.63	38
July	2,120	0	174	10,700
August	11,700	0	809	49,800
September	36	0	1.58	94
The period				67,200

RED RIVER NEAR BURKBURNETT, TEX.

LOCATION.—At toll bridge between Burkburnett and Raudlett, Okla., 2¼ miles northeast of Burkburnett, Wichita County, 3 miles below Devol toll bridge, 8 miles from Raudlett, and 18 miles north of Wichita Falls.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—July 11 to September 30, 1924.

GAGE.—Chain gage attached to downstream handrail of the bridge; read by Gilbert Maples. Gage moved several times owing to shifting channel.

DISCHARGE MEASUREMENTS.—Made from bridge to which gage is attached, or from Devol Bridge, or by wading near gage.

CHANNEL AND CONTROL.—Channel straight for 1 mile above and below gage. Bed of stream composed of loose sand, shifts badly. At low stages channel changes frequently necessitating moving of gage. Right bank of hard sand and clay; permanent, with few trees and underbrush, and not subject to overflow. Left bank of sand, shifts, and is overflowed at a stage of about 9 feet. Control indefinite but shifts.

EXTREMES OF DISCHARGE.—Maximum stage recorded during the period, 7.70 feet at 7 p. m. August 24 (discharge, not determined); no flow August 12.

ICE.—None reported.

DIVERSIONS.—None.

REGULATION.—None.

ACCURACY.—Stage-discharge relation not permanent. Rating curve poorly defined on account of shifting control. Gage read to half-tenths twice daily. Daily discharge determined by applying mean daily gage height to rating table; shifting-control method used July 11 to August 24, except discharge estimated August 12 and 13. Records fair.

Discharge measurements of Red River near Burkburnett, Tex., during the year ending September 30, 1924

Date	Gage height	Discharge	Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*		*Feet*	*Sec.-ft.*
July 11	4.94	192	Aug. 25	6.73	6,330	Sept. 6	4.47	204
Aug. 2	4.54	118	Aug. 26	5.48	1,620	Sept. 20	4.03	61
Aug. 24	6.04	1,290						

Daily discharge, in second-feet, of Red River near Burkburnett, Tex., for the year ending September 30, 1924

Day	July	Aug.	Sept.	Day	July	Aug.	Sept.	Day	July	Aug.	Sept.
1		160	1,550	11	201	0.2	12	21	5.0	152	43
2		113	2,160	12	216	0	20	22	440	294	48
3		52	1,320	13	172	} 15	12	23	4,720	1,010	65
4		37	752	14	90		5.0	24	4,960	3,180	40
5		24	294	15	54	100	5.0	25	1,660	5,480	25
6		13	233	16	34	75	4.8	26	1,150	1,410	17
7		15	164	17	18	52	7.1	27	829	918	11
8		5.0	65	18	11	422	18	28	599	3,180	7.4
9		1.8	37	19	7.4	396	55	29	547	4,280	3.0
10		.5	20	20	6.5	396	59	30	387	1,790	1.0
								31	245	1,660	

Monthly discharge of Red River near Burkburnett, Tex., for the year ending September 30, 1924

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
July 11–31	4,960	5.0	779	32,400
August	5,480	0	814	50,100
September	2,160	1.0	235	14,000
The period				96,500

RED RIVER NEAR DENISON, TEX.

LOCATION.—At Denison-Colbert toll bridge, half a mile below Missouri, Kansas & Texas Railway bridge, 4½ miles northeast of Denison, Grayson County, and 10 miles below mouth of Washita River.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—October 9, 1923, to September 30, 1924. United States Weather Bureau has obtained readings of stage from gage on Missouri, Kansas & Texas Railway bridge, half a mile upstream, since January 1, 1906. Relation between gages not known.

GAGE.—Chain gage attached to downstream side of bridge. Read by E. W. Findley.

DISCHARGE MEASUREMENTS.—Made from bridge to which gage is attached, or from Missouri, Kansas & Texas Railway bridge, half a mile upstream.

CHANNEL AND CONTROL.—Channel straight for half a mile above and below station. Bed of stream composed of sand, clean and shifts. Banks of sand and subject to shift. Left bank is clean and is not subject to overflow. Right bank covered with trees and brush and is subject to overflow at the highway bridge at extremely high stages. Control is indefinite; shifts badly.

EXTREMES OF DISCHARGE.—Maximum stage recorded during period, 19.4 feet at 8.15 a. m. October 17 (discharge, 132,000 second-feet); minimum stage, 1.70 feet at 8 a. m. August 18 (discharge, 580 second-feet).

ICE.—None of consequence.

DIVERSIONS.—None.

REGULATION.—None.

ACCURACY.—Stage-discharge relation not permanent. Rating curve fairly well defined from 775 to 140,000 second-feet and extended beyond. Gage read to hundredths twice daily. Daily discharge determined by shifting-control method. Records fair.

Discharge measurements of Red River near Denison, Tex., during the year ending September 30, 1924

Date	Gage height	Discharge	Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Oct. 10	6.42	8,180	Oct. 19	12.82	43,300	May 9	5.67	7,140
Oct. 17	19.16	130,000	Nov. 27	5.11	5,410	June 26	3.03	1,860
Do	17.90	98,100	Dec. 22	5.88	8,920	Aug. 5	2.32	1,340
Oct. 18	13.96	52,200	Feb. 9	2.93	2,130	Aug. 19	2.25	900
Do	13.92	54,600	Mar. 26	5.40	8,810			

Daily discharge, in second-feet, of Red River near Denison, Tex., for the year ending September 30, 1924

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1		23,300	4,510	3,530	2,230	1,150	6,120	19,700	3,720	3,350	1,840	1,600
2		22,200	3,900	4,300	2,230	1,150	5,400	16,400	3,000	3,180	1,600	1,500
3		19,200	4,300	3,900	2,520	1,150	4,940	12,600	2,520	2,680	1,500	1,960
4		14,700	4,100	3,180	2,230	1,150	4,720	10,400	2,230	2,380	1,290	2,100
5		12,200	4,100	3,350	2,230	1,150	4,720	9,140	2,100	1,960	1,290	1,720
6		16,000	3,900	3,350	2,230	1,150	4,510	8,260	1,960	1,600	1,200	1,500
7		14,700	4,100	3,180	2,100	1,150	4,300	7,700	1,840	1,500	1,200	1,290
8		11,800	4,100	2,840	2,230	1,150	3,900	6,880	1,840	1,500	1,020	1,150
9	10,100	10,100	3,900	2,230	1,960	1,200	3,530	7,420	1,960	1,500	940	1,060
10	8,550	8,840	4,300	2,230	1,960	1,150	3,180	6,370	1,960	1,600	940	902
11	9,760	8,840	7,980	2,230	2,230	1,150	2,840	5,170	2,230	1,720	1,020	830
12	7,700	7,700	22,200	2,520	2,230	1,150	2,840	4,510	2,230	1,600	902	830
13	6,620	6,620	25,500	2,380	2,230	1,150	2,840	4,300	3,350	1,500	830	795
14	7,150	19,200	22,800	2,230	2,230	1,720	2,680	5,640	3,900	1,500	865	702
15	55,700	26,100	21,200	3,000	1,960	3,530	3,000	4,720	5,400	1,500	730	650
16	114,000	26,700	19,700	3,350	1,600	3,720	2,840	3,900	4,940	1,500	702	730
17	114,000	25,500	15,600	3,350	1,290	6,620	2,840	3,720	4,300	1,290	650	730
18	58,600	21,700	10,100	3,180	1,200	7,700	2,680	3,350	3,720	1,200	625	702
19	46,300	16,400	9,450	3,180	1,150	5,400	2,520	3,180	3,000	1,150	865	730
20	36,000	12,200	9,140	2,840	1,150	13,000	2,520	2,840	2,230	1,060	902	1,200
21	28,400	10,100	8,260	2,680	1,200	11,100	2,520	3,530	1,960	1,020	940	1,720
22	24,400	8,840	8,840	2,230	1,150	9,140	2,380	4,720	2,520	940	1,500	1,500
23	21,200	7,700	7,980	2,680	1,200	9,450	2,230	4,720	3,530	865	1,600	1,150
24	18,300	6,620	6,620	2,840	1,200	9,140	1,960	3,530	2,840	865	1,720	795
25	17,400	6,120	5,640	2,520	1,200	7,700	17,800	3,000	2,230	940	1,840	702
26	16,400	5,640	5,400	2,680	1,200	7,980	28,400	6,370	1,720	940	1,600	1,500
27	15,100	5,640	4,720	2,520	1,150	10,400	26,100	6,370	1,600	940	1,500	1,020
28	30,900	4,510	4,720	2,230	1,200	9,450	29,000	3,720	1,500	2,380	2,100	830
29	35,300	4,940	4,720	2,230	1,150	8,550	30,900	3,720	1,390	3,180	3,530	730
30	29,000	4,720	4,300	2,380	-------	7,420	24,400	3,350	2,380	2,520	2,520	675
31	24,400	-------	3,900	2,230	-------	6,880	-------	3,900	-------	2,230	1,840	-------

Monthly discharge of Red River near Denison, Tex., for the year ending September 30, 1924

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
October 9–31	114,000	6,620	32,000	1,460,000
November	26,700	4,510	13,000	771,000
December	25,500	3,900	8,710	535,000
January	4,300	2,230	2,820	174,000
February	2,520	1,150	1,720	98,900
March	13,000	1,150	4,960	305,000
April	30,900	1,960	7,950	473,000
May	19,700	2,840	6,230	383,000
June	5,400	1,390	2,670	159,000
July	3,350	865	1,680	103,000
August	3,530	625	1,340	82,500
September	2,100	650	1,110	66,100
The period	----------	----------	----------	4,610,000

PEASE RIVER NEAR CROWELL, TEX.

LOCATION.—At toll bridge on Quanah-Crowell highway, 1 mile below mouth of Devils Creek, 8 miles north of Crowell, Foard County, and 14 miles from Quanah.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—January 8 to September 30, 1924.

GAGE.—Chain gage attached to the downstream handrail of bridge; read by W. H. Roberts.

DISCHARGE MEASUREMENTS.—Made by wading or from bridge. Measurements at low stages are poor, owing to poor measuring section.

CHANNEL AND CONTROL.—Channel straight for half a mile above and below gage. Bed of stream composed of sand, clean and shifts. Banks of clay, fairly clean, and not subject to overflow. Control is bed of stream, which is deep sand that shifts badly.

EXTREMES OF DISCHARGE.—Maximum stage recorded, 8.20 feet at 5 p. m. August 22 (discharge not determined); no flow for numerous periods from March to September.

ICE.—None reported.

DIVERSIONS.—None.

REGULATION.—None.

ACCURACY.—Stage-discharge relation not permanent. Rating curve fairly well defined below 1,700 second-feet and extended above. Gage read to hundredths twice daily. Owing to badly shifting channel and infrequency of measurements, daily discharge not deemed of sufficient accuracy to justify publication. Monthly records fair.

Discharge measurements of Pease River near Crowell, Tex., during the year ending September 30, 1924

Date	Gage height	Discharge	Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Jan. 8	3.31	14	May 6	3.60	30	June 23	4.50	112
Jan. 28	3.23	8.8	May 19		(a)	July 15		(a)
Feb. 14	3.24	9.0	May 27		(a)	July 24	4.80	353
Mar. 4	2.82	(a)	June 4	4.08	111	Aug. 4	3.82	b. 25
Apr. 2		(a)	June 6	5.08	1,220	Aug. 19	3.75	6.0
Apr. 15	3.62	36	June 10	5.30	1,190	Aug. 24	4.59	346
Apr. 21		(a)	June 17		(a)	Aug. 29	5.24	1,610
May 2	3.49	16	June 20		(a)	Sept. 24	3.32	b. 25

[a] No flow. [b] Estimated.

Monthly discharge of Pease River near Crowell, Tex., for the year ending September 30, 1924

Month	Discharge in second-feet			Run-off in inches
	Maximum	Minimum	Mean	
January 8-31	15	5.9	9.66	460
February	9.6	.8	4.97	286
March	438	0	46.8	2,880
April	2,060	0	99.2	5,900
May	53	0	11.4	702
June	3,160	0	330	19,600
July	9,800	0	507	31,200
August	2,980	0	435	26,700
September	70	0	5.79	345
The period				88,100

WASHITA RIVER NEAR ANADARKO, OKLA.

LOCATION.—In SW. ¼ sec. 10, T. 7 N., R. 9 W., at highway bridge 5½ miles east of Anadarko, McCurtain County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—May 25 to September 30, 1924.

Records were obtained at a station at Anadarko from October 25, 1902, to June 30, 1908. For reference to records and description of station see Water-Supply Paper 173, page 95.

GAGE.—Chain on upstream handrail of bridge; read by S. J. McLane.

DISCHARGE MEASUREMENTS.—Made from downstream side of bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of sand and silt; not permanent. No well-defined control.

EXTREMES OF DISCHARGE.—Maximum stage recorded during period, 13.46 feet at 6.40 p. m. June 11 (discharge from extension of rating curve, 2,730 second-feet); minimum stage, −0.29 foot at 7.05 a. m. September 15 (discharge, 53 second-feet).

REGULATION.—Low-water flow regulated by operation of dam at Anadarko.

ACCURACY.—Stage-discharge relation permanent. Rating curve well defined between 100 and 1,000 second-feet. Gage read to hundredths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table. Records fair.

The following discharge measurements were made:

May 24, 1924: Gage height, 4.43 feet; discharge, 648 second-feet.
May 27, 1924: Gage height, 4.04 feet; discharge, 605 second-feet.
July 28, 1924: Gage height, 3.06 feet; discharge, 454 second-feet.

Daily discharge, in second-feet, of Washita River near Anadarko, Okla., for the year ending September 30, 1924

Day	May	June	July	Aug.	Sept.	Day	May	June	July	Aug.	Sept.
1	-------	487	502	223	197	16	-------	502	316	2,050	122
2	-------	502	532	210	172	17	-------	457	249	1,670	112
3	-------	487	386	249	172	18	-------	428	262	1,300	117
4	-------	532	316	236	249	19	-------	414	249	607	172
5	-------	457	302	249	249	20	-------	372	236	414	137
6	-------	442	316	330	210	21	-------	358	249	344	137
7	-------	457	330	262	197	22	-------	344	236	517	127
8	-------	557	288	184	172	23	-------	457	236	386	117
9	-------	1,500	262	154	137	24	-------	958	236	302	117
10	-------	2,280	288	142	127	25	607	592	249	275	92
11	-------	2,530	330	132	117	26	592	517	288	249	92
12	-------	2,510	288	184	112	27	607	428	622	236	117
13	-------	1,720	275	172	102	28	562	358	487	223	172
14	-------	850	275	160	117	29	517	316	316	210	1,090
15	-------	562	302	1,870	53	30	487	344	249	197	781
						31	457	-------	236	184	-------

Monthly discharge of Washita River near Anadarko, Okla., for the year ending September 30, 1924

Month	Discharge in second-feet			Run-off in inches
	Maximum	Minimum	Mean	
May 25–31	607	457	547	1,080
June	2,530	316	758	45,100
July	622	236	313	19,200
August	2,050	132	449	27,600
September	1,090	53	196	11,500
The period				104,000

WASHITA RIVER NEAR BERWYN, OKLA.

LOCATION.—In. W. ½ sec. 16, T. 3 S., R. 3 E., at highway bridge 3 miles northeast of Berwyn, Carter County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—March 27 to September 30, 1924.

GAGE.—Chain gage on upstream handrail of bridge; read by O. C. Oaks.

DISCHARGE MEASUREMENTS.—Made from downstream side of bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of sand, gravel, and rock; fairly permanent. Control is low riffle 1,000 feet below gage.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 10.2 feet on April 25 and 27 (discharge, 6,270 second-feet); minimum stage, 0.84 foot at 6.10 a. m. on September 21 (discharge, 221 second-feet).

REGULATION.—None.

ACCURACY.—Stage-discharge relation permanent. Rating curve well defined below 2,000 second-feet. Gage read to hundredths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table. Records fair.

Discharge measurements of Washita River near Berwyn, Okla., during the period ending September 30, 1924

Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Mar. 27	4.20	1,870	July 24	1.68	556
June 20	2.58	911	Sept. 4	1.30	377

Daily discharge, in second-feet, of Washita River near Berwyn, Okla, for the year ending September 30, 1924

Day	Mar.	Apr.	May	June	July	Aug.	Sept.
1		1,620	2,310	1,500	1,390	584	408
2		1,500	2,240	1,330	1,160	628	474
3		1,390	2,180	1,220	856	518	364
4		1,390	2,110	1,160	718	452	345
5		1,500	2,110	1,160	764	408	364
6		1,500	2,050	1,160	764	345	326
7		1,440	1,990	1,010	764	345	309
8		1,390	1,990	1,160	718	345	292
9		1,220	1,930	1,440	628	386	277
10		1,060	1,860	1,220	628	386	309
11		1,110	1,800	1,160	584	386	326
12		1,110	1,740	1,560	540	562	309
13		1,160	1,740	2,580	540	718	277
14		1,160	1,740	2,650	518	452	277
15		1,270	1,680	2,310	518	386	262
16		1,270	1,620	2,240	496	326	262
17		1,110	1,500	2,240	496	309	262
18		954	1,390	1,860	475	326	248
19		856	1,270	1,110	475	496	262
20		902	3,660	954	475	1,500	234
21		902	4,240	2,510	475	1,680	221
22		856	2,580	2,370	475	1,500	248
23		856	1,860	1,010	454	1,160	292
24		856	1,390	856	454	810	248
25		5,780	1,160	764	430	672	248
26		6,100	1,270	718	430	584	248
27		6,270	1,270	672	430	628	248
28	1,800	5,380	1,620	672	430	562	234
29	2,650	2,370	2,860	764	430	474	234
30	2,860	2,370	3,440	1,440	408	408	221
31	1,990		1,990		430	386	

NOTE.—Gage not read, Apr. 30 to May 12, July 13-26; discharge interpolated.

Monthly discharge of Washita River near Berwyn, Okla., for the year ending September 30, 1924

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
March 28-31	2,860	1,800	2,320	18,400
April	6,270	856	1,890	112,000
May	4,240	1,160	2,020	124,000
June	2,650	672	1,430	85,100
July	1,390	408	592	36,400
August	1,680	309	604	37,100
September	474	221	288	17,100
The period				430,000

MOUNTAIN FORK RIVER NEAR BROKEN BOW, OKLA.

LOCATION.—In SE. ¼ sec. 7, T. 6 S., R. 26 W. on highway bridge 7 miles east of Broken Bow, McCurtain County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—March 30 to September 30, 1924.

GAGE.—Chain on upstream handrail of bridge; read by J. A. Spencer.

DISCHARGE MEASUREMENTS.—Made from downstream side of bridge or by wading at riffle half a mile above gage.

CHANNEL AND CONTROL.—Bed composed of gravel and rock; permanent. Control is at rapids 2½ miles below gage.

EXTREMES OF DISCHARGE.—Maximum stage recorded during period, 12.45 feet at 6.30 a. m. April 30 (discharge not determined); minimum discharge, 1 second-foot August 14, 15, and 20.

REGULATION.—None.

ACCURACY.—Stage-discharge relation permanent. Rating curve poorly defined below 2,000 second-feet; extended above. Gage read to hundredths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table. Records fair for discharges below 2,000 second-feet, poor for those above.

The following discharge measurements were made:

March 29, 1924: Gage height, 3.93 feet; discharge, 1,320 second-feet.

September 3, 1924: Gage height, 0.57 foot; discharge, 5.2 second-feet.

Daily discharge, in second-feet, of Mountain Fork River near Broken Bow, Okla., for the year ending September 30, 1924

Day	Mar.	Apr.	May	June	July	Aug.	Sept
1		1,090	3,200	638	66	4	3
2		890	2,200	430	59	4	5
3		825	1,540	386	56	3	5
4		890	1,300	308	54	3	5
5		1,090	1,090	244	51	2	4
6		1,090	890	216	48	2	3
7		890	760	190	46	3	2
8		825	638	166	44	2	2
9		760	528	166	41	2	2
10		668	430	155	39	2	2
11		638	346	825	36	2	2
12		610	308	1,540	35	2	13
13		555	291	1,160	33	2	23
14		478	274	792	31	1	30
15		408	274	503	29	1	27
16		386	308	346	27	2	20
17		366	259	274	26	2	17
18		346	216	230	25	2	20
19		308	190	203	23	2	17
20		291	178	155	21	1	15
21		274	190	144	20	2	15
22		244	190	134	18	8	19
23		230	190	124	17	8	39
24		216	825	115	15	6	35
25		2,920	291	102	15	10	35
26		8,280	1,780	95	12	13	34
27		4,430	1,780	85	10	12	33
28		2,740	2,020	78	9	9	33
29		1,940	1,860	68	8	7	30
30	1,540	7,900	1,230	69	7	4	21
31	1,300		890		5	4	

Monthly discharge of Mountain Fork River near Broken Bow, Okla., for the year ending September 30, 1924

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
April	8,280	216	1,420	84,500
May	3,200	178	854	52,500
June	1,540	68	331	19,700
July	66	5	29.9	1,840
August	13	1	4.10	252
September	39	2	17.0	1,010
The period				160,000

SULPHUR RIVER NEAR DARDEN, TEX.

LOCATION.—At St. Louis Southwestern Railway bridge, half a mile below new highway bridge, 1 mile south of Darden, Bowie County, and 2 miles below mouth of White Oak Creek.

DRAINAGE AREA.—2,750 square miles (measured on base map of Texas).

RECORDS AVAILABLE.—From October 1, 1923 (gaging station established June 27, 1924), to September 30, 1924. Records of stage by the United States Weather Bureau have been obtained since December 1, 1909.

GAGE.—United States Weather Bureau staff gage, attached to the downstream side of the center pile bent of the bridge.

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

CHANNEL AND CONTROL.—Bed of stream composed of mud and sunken logs; fairly permanent. Channel curved above and straight for a short distance below gage. Both banks of earth, subject to overflow at high stages. Low-water control consists of old piles and drift immediately below gage; shifts during floods. Medium and high-stage control is bed and banks of the stream and will probably shift. Above a 22-foot stage, the river overflows its banks for 4,000 feet, dividing into two channels 4 or 5 miles above gage; at these times the control is indefinite.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 27.8 feet at 7 a. m. December 18 (discharge, 19,100 second-feet, determined from extension of rating curve). Minimum stage, 0.10 foot, August 12–18, 31, and September 1–13 (discharge, 0.2 second-foot).

ICE.—None reported.

DIVERSIONS.—None.

REGULATION.—None.

ACCURACY.—Stage-discharge relation permanent. Rating curve poorly defined from 0 to 9,000 second-feet and extended to cover range of stage and extension subject to error. Gage read to tenths once daily. Daily discharge determined by applying daily gage heights to rating table, but daily records not sufficiently accurate for publication. Monthly records fair.

COOPERATION.—Records of stage furnished by the United States Weather Bureau.

The following discharge measurement was made:

June 27, 1924: Gage height, 1.31 feet; discharge, 26 second-feet.

Monthly discharge of Sulphur River near Darden, Tex., for the year ending September 30, 1924

[Drainage area, 2,750 square miles]

Month	Discharge in second-feet				Run-off	
	Maximum	Minimum	Mean	Per square mile	Inches	Acre-feet
October	580	30	181	0.066	0.08	11,200
November	424	30	110	.040	.04	6,550
December	13,400	30	6,160	2.24	2.58	379,000
January	8,560	184	2,160	.785	.90	133,000
February	7,920	226	1,410	.513	.55	81,200
March	9,240	238	3,550	1.29	1.49	218,000
April	3,580	94	513	.187	.21	30,500
May	5,110	35	715	.260	.30	44,000
June	10,800	21	2,950	1.07	1.20	176,000
July	184	1.0	18.2	.0066	.008	1,120
August	8.0	.2	1.0	.00036	.0004	61.7
September	769	.2	159	.058	.06	9,480
The year	13,400	.2	1,500	.545	7.41	1,090,000

CYPRESS CREEK NEAR JEFFERSON, TEX.

LOCATION.—At Farrell Bridge on Jefferson-Harleton highway, 7 miles south of Lasseter, 8 miles west of Jefferson, Marion County, 14 miles above mouth of Black Cypress Creek, and 17 miles above mouth of Little Cypress Creek.

DRAINAGE AREA.—848 square miles (measured on base map of Texas).

RECORDS AVAILABLE.—July 19 to September 30, 1924.

GAGE.—Staff gage in two sections on the right bank, attached to tree and to trestle of bridge; read by Leonard Pierson.

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

CHANNEL AND CONTROL.—Channel straight for 250 feet above and half a mile below gage. Bed of stream composed of firm earth and large gravel. One channel at all stages. Left bank does not overflow. Right bank, which is covered with grass and trees, is overflowed at a stage of 10 feet for a distance of 300 feet. Control is small rapids half a mile below gage; fairly permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during period, 3.18 feet at 7 a. m. September 24 (discharge, 88 second-feet); minimum stage, 0.45 foot at 5 p. m. August 17 (discharge, 0.2 second-foot).

ICE.—None of importance.

DIVERSIONS.—None.

REGULATION.—None.

ACCURACY.—Stage-discharge relation permanent. Rating curve well defined for all stages. Gage read once daily to hundredths, and oftener during floods. Daily discharge determined by applying daily gage height to rating table. Records good.

The following discharge measurements were made:

July 19, 1924: Gage height, 1.04 feet; discharge, 5.2 second-feet.

September 8, 1924: Gage height, 0.60 foot; discharge, 0.70 second-foot.

Daily discharge, in second-feet, of Cypress Creek near Jefferson, Tex., for the year ending September 30, 1924

Day	July	Aug.	Sept.	Day	July	Aug.	Sept.	Day	July	Aug.	Sept.
1		1.2	2.2	11		0.4	0.2	21	3.7	0.9	6.7
2		1.2	2.0	12		.4	.6	22	3.3	5.0	8.0
3		1.0	2.0	13		.2	.4	23	3.1	8.0	7.4
4		.9	1.9	14		.2	2.7	24	2.7	6.4	88
5		.6	1.7	15		.2	2.4	25	2.6	5.5	48
6		.6	1.3	16		.2	.9	26	2.2	8.0	19
7		.6	1.0	17		.2	1.3	27	2.2	7.4	18
8		.6	.7	18		.6	2.2	28	1.9	5.8	13
9		.6	.6	19	5.3	.9	4.0	29	1.5	1.4	11
10		.5	.4	20	4.5	.9	4.2	30	1.3	.3	12
								31	1.3	2.8	

Monthly discharge of Cypress Creek near Jefferson, Tex., for the year ending September 30, 1924

[Drainage area, 848 square miles]

Month	Discharge in second-feet				Run-off	
	Maximum	Minimum	Mean	Per square mile	Inches	Acre-feet
July 19–31	5.3	1.3	2.74	0.003	0.002	70.6
August	8.0	.2	2.05	.002	.003	126
September	88	.2	8.79	.010	.01	523
The period						720

OUACHITA RIVER NEAR HOT SPRINGS, ARK.

LOCATION.—In SW. ¼ sec. 29, T. 3 S., R. 19 W., at Smith Ferry highway bridge, half a mile below Fourche a Loup Creek, 1 mile above Hot Springs Creek, 3½ miles below Little Mazarn Creek, and 5 miles south of Hot Springs, Garland County.

DRAINAGE AREA.—1,420 square miles (measured on base map of Arkansas).

RECORDS AVAILABLE.—June 27, 1922, to September 30, 1924.

GAGE.—Chain gage on downstream side of bridge; read by J. E. Woodward.

DISCHARGE MEASUREMENTS.—Made from downstream side of bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of gravel and rock; practically permanent. Channel is obstructed by outcropping rock dikes on which small trees grow. Control is a series of rock dikes 400, 1,000, and 1,500 feet below gage; the upper dike forms the low-water control, and lower dike the high-water control; practically permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 18.08 feet at 5 p. m. December 13 (discharge, 23,400 second-feet); minimum stage, 5.18 feet at 6.50 a. m. August 11 (discharge, 58 second-feet).

1922–1924: Maximum stage determined by levels to floodmarks 43.9 feet May 15, 1923 (discharge determined by extending rating curve for main channel and computing overflow by Kutter's formula, 143,000 second-feet, revised); minimum stage, 5.18 feet August 11, 1924; minimum discharge, 42 second-feet September 9–16, 18–19, and 30, 1922.

ACCURACY.—Stage-discharge relation changed during 1923, permanent during 1924. Rating curve fairly well defined below 60,000 second-feet. Gage read to hundredths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table. Records for 1923 fair except for extreme stages, which may be considerably in error; for 1924 records good.

The following discharge measurements were made:

November 27, 1923: Gage height, 6.39 feet; discharge, 547 second-feet.

April 2, 1924: Gage height, 7.38 feet; discharge, 1,310 second-feet.

July 24, 1924: Gage height, 5.32 feet; discharge, 78 second-feet.

Daily discharge, in second-feet, of Ouachita River near Hot Springs, Ark., for the years ending September 30, 1923 and 1924

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1922–23												
1	54	78	163	2,800	22,500	4,580	622	4,170	1,520	655	545	44
2	54	130	163	2,140	21,900	3,390	765	3,780	2,470	200	900	48
3	54	82	171	1,340	45,600	3,030	3,150	3,030	2,250	187	858	46
4	54	72	195	998	20,300	2,360	6,880	2,140	3,780	182	775	44
5	54	71	290	955	7,440	2,690	9,110	1,820	4,040	178	695	858
6	54	69	392	860	6,520	21,200	2,580	1,920	14,800	151	695	695
7	105	59	440	675	4,170	24,400	2,140	1,720	15,600	122	545	735
8	85	54	568	517	2,030	14,800	3,520	1,430	4,170	116	205	655
9	95	61	860	412	2,690	5,190	3,150	1,190	2,360	105	114	408
10	195	69	675	348	3,390	3,390	2,140	998	8,240	101	261	270
11	203	75	675	312	4,580	3,030	2,250	500	12,600	101	218	162
12	137	101	622	342	3,030	2,920	2,470	360	9,260	105	155	178
13	125	275	585	290	3,150	2,860	2,690	622	5,920	139	116	326
14	163	412	517	306	2,360	2,580	2,360	6,520	2,580	187	105	174
15	125	765	425	290	2,580	4,730	2,140	125,000	2,140	214	101	133
16	82	1,140	360	373	2,140	27,700	1,920	37,000	1,920	232	59	127
17	95	1,090	348	386	1,920	18,000	1,520	8,890	1,520	285	98	985
18	93	765	260	348	2,470	5,670	1,430	8,030	1,340	354	300	1,340
19	82	399	241	440	955	4,300	1,280	7,630	1,160	408	300	2,910
20	71	718	260	399	1,280	3,150	1,090	6,000	858	408	223	2,580
21	95	500	212	9,800	1,190	2,800	1,050	2,690	695	366	119	6,880
22	71	622	203	11,400	998	2,030	1,340	2,690	618	343	74	2,800
23	69	386	171	5,030	955	2,140	2,690	3,520	510	320	56	1,620
24	89	336	171	3,390	808	1,820	4,580	8,450	475	280	62	1,170
25	78	290	167	2,910	902	1,620	8,030	7,250	440	232	56	890
26	78	250	163	2,910	23,700	1,280	6,520	9,340	440	205	76	738
27	74	203	373	2,910	12,600	998	5,030	5,510	377	178	66	590
28	78	163	860	5,670	7,440	902	8,450	3,390	343	139	59	490
29	74	133	1,050	6,700	-------	902	8,890	2,580	310	162	58	372
30	78	163	765	34,000	-------	955	4,580	2,180	251	320	54	362
31	78	-------	2,470	18,000	-------	860	-------	1,720	-------	275	49	-------
1923–24												
1	320	1,170	1,350	1,260	1,820	970	1,530	12,800	625	555	80	66
2	291	1,090	1,440	1,170	1,620	850	1,260	4,580	522	246	82	890
3	263	930	1,530	1,010	1,440	812	1,170	2,910	459	170	70	428
4	246	1,720	2,250	930	1,440	775	1,440	2,250	400	140	65	282
5	237	3,780	2,690	850	1,260	738	1,350	1,720	351	124	62	216
6	277	2,030	2,140	775	1,090	700	1,350	1,440	310	116	60	192
7	228	1,440	1,530	700	1,010	625	1,170	1,170	286	114	152	184
8	208	1,170	1,440	662	930	625	1,090	1,010	268	111	73	146
9	192	930	5,190	625	850	700	1,090	850	254	106	62	116
10	181	775	10,700	590	775	738	1,920	738	263	111	59	101
11	166	700	9,800	590	812	662	1,920	625	400	174	62	92
12	156	555	11,900	700	890	662	1,720	555	1,260	140	121	96
13	152	490	23,400	775	890	700	1,440	522	930	133	88	98
14	166	459	17,800	700	890	890	1,170	490	590	133	68	101
15	181	428	7,630	775	890	1,720	1,090	459	428	181	68	101
16	192	400	4,580	2,580	890	2,250	970	428	336	149	86	96
17	204	362	3,270	2,910	970	2,800	890	400	277	127	181	101
18	192	341	2,580	2,580	1,010	3,030	775	372	246	116	127	127
19	174	310	2,250	2,140	1,440	2,800	700	330	212	106	106	166
20	166	291	2,030	1,820	2,250	4,440	625	301	188	106	101	351
21	159	272	2,360	1,530	2,140	6,170	590	282	196	106	92	372
22	156	272	5,830	1,350	1,920	4,880	522	263	216	104	80	212
23	152	282	12,300	1,170	1,820	3,910	490	254	212	96	78	152
24	146	296	6,520	1,820	1,720	3,150	459	625	181	90	111	133
25	146	301	4,170	3,650	1,530	2,580	459	428	146	121	121	121
26	146	400	3,030	3,910	1,440	2,140	662	555	130	101	106	116
27	146	555	2,360	2,910	1,260	1,920	2,690	1,440	118	98	88	111
28	146	700	2,140	2,470	1,170	1,620	3,150	1,440	106	84	76	625
29	146	1,010	1,920	2,470	1,010	2,250	2,580	1,440	286	76	73	372
30	200	1,170	1,620	2,360	-------	2,140	18,000	970	459	76	71	315
31	1,010	-------	1,440	2,140	-------	1,820	-------	738	-------	78	68	-------

NOTE.—Records for the year ending Sept. 30, 1923, supersede those published in Water-Supply Paper 567, because of revision of rating curve.

Monthly discharge of Ouachita River near Hot Springs, Ark., for the years ending September 30, 1923 and 1924

[Drainage area, 1,420 square miles]

Month	Discharge in second-feet				Run-off in inches
	Maximum	Minimum	Mean	Per square mile	
1922–23					
October	203	54	91.7	0.065	0.07
November	1,140	54	318	.224	.25
December	2,470	163	478	.337	.39
January	34,000	290	3,780	2.66	3.07
February	45,600	808	7,490	5.27	5.49
March	27,700	860	5,690	4.01	4.62
April	9,110	622	3,480	2.45	2.73
May	125,000	360	8,780	6.18	7.12
June	15,600	251	3,430	2.42	2.70
July	655	101	234	.165	.19
August	900	49	258	.182	.21
September	6,880	44	953	.671	.75
The year	125,000	44	2,890	2.04	27.59
1923–24					
October	1,010	146	218	0.154	0.18
November	3,780	272	821	.578	.64
December	23,400	1,350	5,140	3.62	4.17
January	3,910	590	1,610	1.13	1.30
February	2,250	775	1,280	.901	.97
March	6,170	625	1,940	1.37	1.58
April	18,000	459	1,810	1.27	1.42
May	12,800	254	1,370	.965	1.11
June	1,260	106	355	.250	.28
July	555	76	135	.095	.11
August	181	59	88.3	.062	.07
September	890	66	216	.152	.17
The year	23,400	59	1,260	.887	12.00

NOTE.—Records for year ending Sept. 30, 1923, supersede those published in Water-Supply Paper 567.

OUACHITA RIVER NEAR MALVERN, ARK.

LOCATION.—In NW. ¼ sec. 16, T. 4 S., R. 17 W., at Rockport highway bridge, 1¾ miles northwest of Malvern, Hot Springs County.

DRAINAGE AREA.—1,570 square miles (measured on base map of Arkansas).

RECORDS AVAILABLE.—March 3, 1903, to April 30, 1905, and June 29, 1922, to September 30, 1924, when station was discontinued.

GAGE.—Chain gage on upstream side of bridge; read by Whit Halton.

1903–1905: Vertical staff gage fastened to web between cylinders of bridge pier; datum 2.0 feet above present gage.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of coarse gravel and outcropping dikes; practically permanent. Small trees grow on the rocks projecting above low water. Control is a rock outcrop and the remains of an old timber crib and rock filled dam, 100 feet below gage. Trees and brush grow at control, and may cause backwater by catching drift; otherwise the control is practically permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during periods of 1924 record, 13.14 feet during afternoon December 15 (discharge, 13,400 second-feet); minimum stage, 1.50 feet August 15–16 (discharge, 98 second-feet).

1922–1924: Maximum stage determined from levels to floodmarks, 30.3 feet May 15, 1923 (discharge determined from extension of rating curve, 89,000 second-feet revised); minimum stage recorded during periods of record, 1.28 feet October 1 and 3, 1922 (discharge, 61 second-feet).

1903–1905: Maximum stage recorded, 20 feet March 11, 1903 (discharge, 36,900 second-feet); minimum stage recorded, 0 foot December 18–20, 1904 (discharge, 40 second-feet).

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

ACCURACY.—Stage-discharge relation changed during 1923 and 1924. Rating curves fairly well defined between 3,000 and 14,000 second-feet and poorly defined between 100 and 3,000 second-feet. Gage read to hundredths twice daily during intermittent periods only; readings rather unreliable. Daily discharge ascertained by applying mean daily gage height to rating table except as described in footnote to table of daily discharge. Records poor.

Discharge measurements of Ouachita River near Malvern, Ark., during the year ending September 30, 1924

Date	Gage height	Discharge	Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Nov. 26	2.58	444	Apr. 3	4.38	1,500	July 22	1.87	153
Apr. 1	5.16	2,080	Apr. 4	4.68	1,650			

Daily discharge, in second-feet, of Ouachita River near Malvern, Ark., for the years ending September 30, 1923 and 1924

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1922–23												
1	63	92	217	3,460	13,000	6,010	1,210	6,170	1,480	220	-------	79
2	63	98	217	2,650	10,900	4,450	760	4,550	910	196	-------	86
3	63	92	217	1,840	43,000	3,370	2,650	4,050	2,830	174	-------	102
4	63	92	262	1,750	30,600	2,920	8,270	3,100	2,650	163	-------	102
5	63	98	306	1,410	8,830	2,830	5,570	2,560	2,740	152	-------	126
6	77	92	478	1,070	5,570	22,900	4,790	2,020	20,200	134	-------	790
7	158	98	478	730	4,250	30,200	3,750	1,750	26,500	134	-------	670
8	126	98	478	615	4,690	13,200	3,010	1,670	18,900	134	-------	478
9	126	92	615	565	5,130	5,850	2,920	1,390	9,400	126	-------	420
10	240	92	-------	499	5,570	4,790	-------	1,210	5,290	126	-------	274
11	306	98	-------	438	6,010	3,950	-------	910	19,500	145	-------	196
12	228	694	-------	402	4,450	3,650	-------	910	10,200	126	-------	163
13	186	1,390	-------	386	3,850	3,370	-------	850	4,350	126	-------	152
14	150	458	-------	370	3,550	3,010	-------	3,550	3,550	118	-------	196
15	142	420	-------	370	3,190	3,100	-------	-------	2,650	126	-------	170
16	142	945	-------	354	2,740	25,800	-------	-------	1,570	134	-------	145
17	134	945	-------	438	2,110	22,200	-------	-------	1,390	642	-------	118
18	134	790	-------	565	1,750	8,270	-------	-------	1,210	760	-------	219
19	134	670	-------	520	1,570	6,170	-------	-------	980	642	-------	320
20	126	730	-------	478	1,210	4,350	1,210	-------	730	402	-------	3,190
21	112	790	-------	4,790	980	3,460	1,300	-------	615	320	-------	7,370
22	104	565	-------	16,500	910	2,830	1,390	-------	499	220	-------	6,020
23	104	478	-------	8,450	850	2,740	1,210	-------	438	185	-------	4,670
24	98	420	240	5,570	820	2,020	-------	-------	402	145	-------	3,370
25	98	338	228	5,030	820	1,750	-------	14,000	420	145	-------	2,350
26	98	322	228	3,460	32,300	1,300	-------	15,900	438	163	-------	1,330
27	95	287	240	3,370	29,400	1,130	-------	7,190	402	145	-------	690
28	92	252	1,390	5,290	10,900	980	-------	4,350	352	126	-------	615
29	92	228	1,130	6,830	-------	910	-------	3,190	274	134	-------	448
30	92	217	760	30,200	-------	850	-------	2,650	246	144	-------	408
31	92	-------	2,290	28,300	-------	850	-------	2,110	-------	154	-------	-------

Daily discharge, in second-feet, of Ouachita River near Malvern, Ark., for the years ending September 30, 1923 and 1924—Continued

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1923–24												
1		1,000	1,340			940						196
2			1,700			940						980
3		940	1,930			880					142	499
4			2,410			824					134	438
5		4,910	3,130			770			359		142	278
6		3,750	2,490			716			344	217	134	186
7	314	3,460	1,850			666		1,340	302	176	126	176
8	302	2,970	1,410					1,340		176	126	166
9	268	2,490	7,190				2,410	940		166	126	158
10	279	1,620	6,650		824		2,090	716		166	119	154
11	258	1,060	8,640		940		1,930	716		158	112	150
12	238	593	12,400		1,060		1,770			158	112	150
13	228	570		1,200	1,060					158	104	142
14	248	504		1,410	1,200	940				166	98	126
15	268	484		2,570	1,340	940				158	98	126
16	268	427			1,340					150	98	134
17	504				1,410					150	542	134
18	484				1,270					142	240	196
19	408				1,130			427		142	166	186
20	329							374		142	134	176
21	290							344		142	134	550
22	268						524	290			126	700
23	258				1,930	4,790	504	268			112	322
24	258				2,010	3,210	504	268			112	206
25	248				1,770	2,730	484	547			104	176
26	248				1,620		524				112	176
27	248	524		4,150	1,270		824				112	176
28	248	593		3,850		2,090	1,620				119	160
29	248	824		3,290		2,970					126	910
30	258	1,060		2,810							126	438
31	248			2,410							134	

NOTE.—Records for year ending Sept. 30, 1923, supersede those published in Water-Supply Paper 567, because of revision of rating curve above gage height of 12 feet. Gage-height record incomplete for both 1923 and 1924. Gage not read Oct. 14 and 27–28, 1923, and Sept. 10, 19, 21, and 28, 1924; discharge estimated from discharge of Ouachita River near Hot Springs.

Monthly discharge of Ouachita River near Malvern, Ark., for the years ending September 30, 1923 and 1924

[Drainage area, 1,570 square miles]

Month	Discharge in second-feet				Run-off in inches
	Maximum	Minimum	Mean	Per square mile	
1922–23					
October	306	63	123	0.078	0.09
November	1,390	92	399	.254	.28
January	30,200	354	4,410	2.81	3.24
February	43,000	820	8,530	5.43	5.65
March	30,200	850	6,430	4.10	4.73
June	26,500	246	4,700	2.99	3.34
July	760	118	215	.137	.16
September	7,370	79	1,180	.752	.84
1923–24					
October 7–31	504	228	289	.184	.17
December 1–12	12,400	1,340	4,260	2.71	1.21
July 6–21	217	142	160	.102	.06
August 3–31	542	98	140	.089	.10
September	980	126	286	.182	.20

NOTE.—Records for year ending Sept. 30, 1923, supersede those published in Water-Supply Paper 567.

MISSISSIPPI RIVER DELTA

BAYOU COCODRIE NEAR MEEKER, LA.

LOCATION.—On north and south line between secs. 4 and 5, T. 1 S., R. 1 E., at Meeker-Meridian highway bridge, three-eighths of a mile east of Rock Island Railroad crossing, three-fourths of a mile below Lake Cocodrie, 4 miles southwest of Meeker, Rapides Parish, 20 miles above mouth of Bayou Chicot, and 26 miles southeast of Alexandria.

DRAINAGE AREA.—278 square miles (measured on post-route map and project map of Louisiana Gravity Canal Co., scale, 1: 380,000).

RECORDS AVAILABLE.—May 12, 1922, to September 30, 1924.

GAGE.—Vertical staff attached to downstream pile bent of bridge; read by Hart Johnson.

DISCHARGE MEASUREMENTS.—Made from bridge at gage.

CHANNEL AND CONTROL.—Channel curved at station and general course is very crooked. Bed composed of leaves, twigs, sinkers, and mud, and subject to shift. Right bank composed of clay, wooded, and not subject to overflow. Left bank of clay, wooded, and subject to overflow above a stage of about 12.5 feet. Control not known.

EXTREMES OF DISCHARGE.—Maximum stage recorded during the year, 13.65 feet at 6 p. m. December 24 (discharge, 1,520 second-feet); minimum stage, 0.50 foot September 28–30 (discharge, 58 second-feet).

1922–1924: Maximum stage recorded, 14.7 feet at 6 a. m. April 14, 1923 (discharge, 1,790 second-feet); negative flow November 13–15, 1922.

ICE.—None during year.

DIVERSIONS.—None.

REGULATION.—Flow regulated by swampy areas and Lake Cocodrie about three-fourths of a mile above station.

ACCURACY.—Stage-discharge relation not permanent. Rating curve well defined for all stages above 100 second-feet. Curve below this discharge extended and subject to error. Gage read to nearest half-tenth twice daily. Mean daily discharge determined by shifting-control method and for several periods lack of measurements made determination poor. Records poor.

Discharge measurements of Bayou Cocodrie near Meeker, La., during the year ending September 30, 1924

Date	Gage height	Discharge	Date	Gage height	Discharge	Date	Gage height	Discharge
	Feet	*Sec.-ft.*		*Feet*	*Sec.-ft.*		*Feet*	*Sec.-ft.*
Oct. 30	1.70	149	Feb. 1	10.70	766	May 1	5.45	397
Dec. 28	12.95	1,380	Mar. 18	9.00	568			

Daily discharge, in second-feet, of Bayou Cocodrie near Meeker, La., for the year ending September 30, 1924

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	165	142	401	1,190	772	622	447	401	142	95	77	65
2	160	165	447	1,210	744	596	423	390	165	95	77	65
3	160	340	447	1,270	716	570	412	380	180	93	75	65
4	160	410	469	1,290	688	544	401	360	192	93	75	65
5	160	544	483	1,270	674	557	380	350	192	91	75	63
6	160	596	495	1,220	648	570	370	330	175	91	75	63
7	160	596	507	1,190	622	557	360	310	165	89	73	63
8	160	570	483	1,140	609	544	350	283	142	89	73	62
9	155	557	471	1,110	596	609	340	258	129	87	71	62
10	150	519	471	1,080	570	648	360	234	123	89	71	62
11	150	495	483	1,060	544	661	380	220	117	87	71	62
12	146	471	483	1,050	544	648	390	192	111	87	71	62
13	146	447	519	1,020	544	648	390	170	109	87	71	62
14	142	423	557	970	519	648	390	160	107	87	71	62
15	142	412	596	955	495	622	380	155	105	87	71	62
16	165	390	596	1,030	471	596	370	150	101	85	69	61
17	180	370	583	1,060	471	583	360	146	99	85	69	60
18	199	340	583	1,050	471	570	360	142	99	87	69	60
19	220	320	570	1,030	469	544	350	135	97	85	69	60
20	220	283	570	985	471	557	330	129	99	83	69	59
21	213	266	648	970	471	583	320	126	103	83	71	59
22	206	242	1,000	926	447	570	258	126	109	83	73	59
23	199	206	1,430	898	447	557	283	123	111	79	71	59
24	186	192	1,500	926	435	544	292	123	109	79	71	59
25	175	175	1,500	926	423	531	301	120	107	79	71	59
26	170	175	1,460	940	507	519	301	120	103	79	69	59
27	160	180	1,410	926	583	507	320	120	103	79	67	59
28	155	186	1,380	884	622	495	340	123	101	79	67	58
29	150	274	1,340	856	622	483	360	120	99	77	67	58
30	150	330	1,290	828	-------	471	380	123	97	77	65	58
31	146	-------	1,240	800	-------	469	-------	129	-------	77	65	-------

Monthly discharge of Bayou Cocodrie near Meeker, La., for the year ending September 30, 1924

[Drainage area, 278 square miles]

Month	Discharge in second-feet				Run-off	
	Maximum	Minimum	Mean	Per square mile	Inches	Acre-feet
October	220	142	168	0.604	0.70	10,300
November	596	142	354	1.27	1.42	21,000
December	1,500	401	787	2.83	3.27	48,400
January	1,290	800	1,030	3.71	4.29	63,600
February	772	423	558	2.01	2.17	32,100
March	661	469	568	2.04	2.36	35,000
April	447	258	357	1.28	1.43	21,200
May	401	120	201	.723	.84	12,400
June	192	97	123	.442	.49	7,320
July	95	77	85.3	.307	.35	5,240
August	77	65	70.9	.255	.29	4,360
September	65	58	61.1	.220	.25	3,630
The year	1,500	58	365	1.31	17.86	265,000

MISCELLANEOUS DISCHARGE MEASUREMENTS

Discharge measurements of streams in the lower Mississippi River Basin at points other than regular gaging stations are listed in the following table:

Miscellaneous discharge measurements in lower Mississippi River drainage basin during the year ending September 30, 1924

Date	Stream	Tributary to—	Locality	Discharge
				Sec.-ft.
Sept. 26	Evans Spring	Meramec River	1 mile southeast of Steelville, Mo.	5.5
26	do	do	do	5.1
Nov. 25	Reelfoot Lake outlet	Mississippi River	Tiptonville, Tenn.	9.4
24	Obion River	do	Lanes Ferry Bridge near Newbern, Tenn.	609
Nov. 23	North Fork of Forked Deer River.	Forked Deer River	Dyersburg, Tenn.	297
23	South Fork of Forked Deer River.	do	Jackson, Tenn.	750
22	do	do	Bells, Tenn.	306
23	Big Hatchie River	Mississippi River	Hatchie, Tenn.	553
6	Double Spring	North Fork of White River.	12 miles west of Pottersville, Mo.	163
Oct. 2	Montauk Spring	Crooked Creek	Montauk, Mo.	63
2	Welch Spring	Current River	3 miles southeast of Cedar Grove, Mo.	115
June 22	do	do	do	331
22	Cave Spring	do	12 miles northwest of Eminence, Mo.	72
Oct. 3	Pulltight Spring	do	10 miles northwest of Eminence, Mo.	31
June 22	do	do	do	141
23	Round Spring	do	9 miles northwest of Eminence, Mo.	156
Oct. 11	Blue Spring	do	12 miles east of Eminence, Mo.	84
June 25	do	do	do	214
Sept. 8	Turner Mill Spring	Eleven Point River	12 miles east of Alton, Mo.	2.3
Aug. 7	Buffalo Spring	North Canadian River	Bridge near Perico, Tex.	1.2
13	Tacovas Spring	South Canadian River	Old Frying Pan ranch headquarters near Bushland, Tex.	.1
July 16	Salt Hole	Prairie Dog Town Fork of Red River.	1 mile east of Estelline, Tex.	.4

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