UNITED STATES DEPARTMENT OF THE INTERIOR
RAY LYMAN WILBUR, Secretary
GEOLOGICAL SURVEY
W. C. MENDENHALL, Director

Water-Supply Paper 685

SURFACE WATER SUPPLY *of the* UNITED STATES 1929

PART V

HUDSON BAY AND UPPER MISSISSIPPI RIVER BASINS

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SURFACE WATER SUPPLY OF HUDSON BAY AND UPPER MISSISSIPPI RIVER BASINS, 1929

AUTHORIZATION AND SCOPE OF WORK

This volume is one of a series of 14 reports presenting records of measurements of flow made on streams in the United States during the year ending September 30, 1929.

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. 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, 1895–1930

1895	$12, 500. 00	1919	$148, 244. 10
1896	24, 500. 00	1920	175, 000. 00
1897–1899	50, 000. 00	1921–1923	180, 000. 00
1900	70, 000. 00	1924–25	170, 000. 00
1901–2	100, 000. 00	1926	165, 000. 00
1903–1906	200, 000. 00	1927	151, 000. 00
1907	150, 000. 00	1928	147, 000. 00
1908–1910	100, 000. 00	1929	270, 500. 00
1911–1917	150, 000. 00	1930	275, 000. 00
1918	175, 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 5,830 points in the United States and also at many points in Alaska and the Hawaiian Islands. In July, 1929, 2,240 gaging stations were being maintained by the Geological Survey and the cooperating organiza-

tions. Many miscellaneous discharge measurements were made at other points. In connection with this work data were also collected in regard to precipitation, evaporation, storage reservoirs, river profiles, and water power in many sections of the country and will be made available in water-supply papers from time to time.

DEFINITION OF TERMS

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

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

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

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

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

The following terms not in common use are here defined:

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

"Control," a term used to designate the section or stretch of the channel or artificial structure below the gage which determines the stage-discharge relation at the gage.

EXPLANATION OF DATA

The data presented in this report cover the year beginning October 1, 1928, and ending September 30, 1929. 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 underground 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

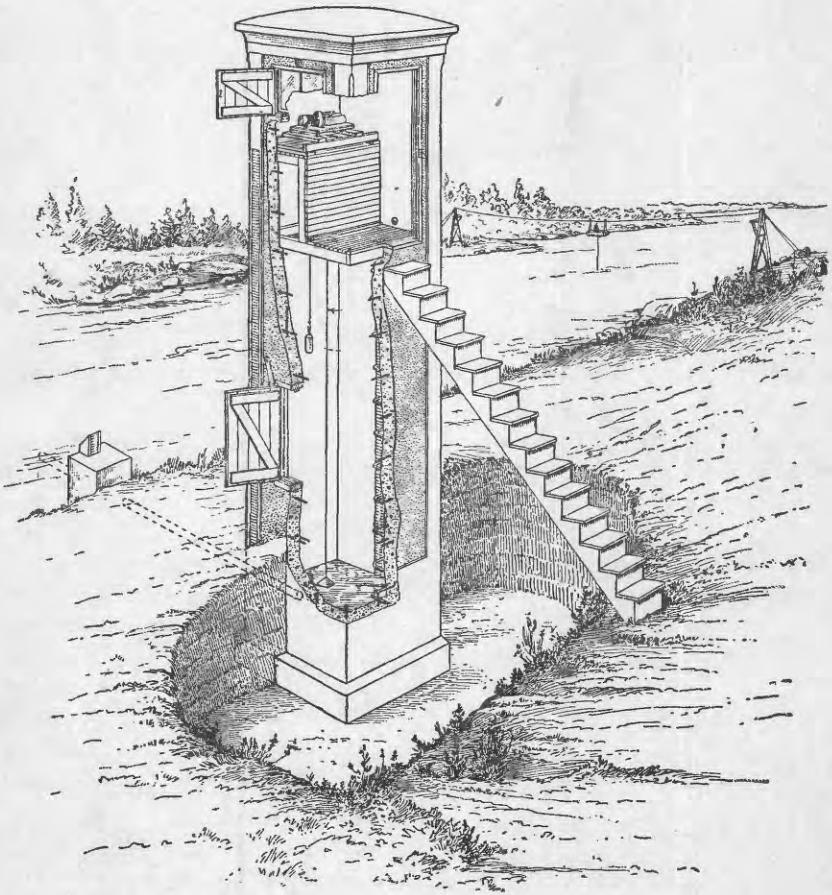

FIGURE 1.—Typical river-measurement station showing concrete well and house for water-stage recorder and staff gages, cable, and car.

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 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 by the general methods 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 daily discharge from which the monthly and yearly mean discharge is computed.

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

The description of the station gives, in addition to statements regarding location and type of gage, information as to diversions that decrease the flow at the gage, artificial regulation, maximum and minimum recorded discharge, and the accuracy of the records. The maximum discharge given under "Extremes" does not represent the crest discharge unless a water-stage recorder was in operation or unless a nonrecording gage was read at the time of the crest.

The table of daily discharge gives, in general, the discharge in second-feet corresponding to the daily gage height which may be a once daily reading or the mean of twice daily readings of a nonrecording gage, or the mean daily gage height obtained from a water-stage recorder graph.

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 for obtaining mean daily discharge from a continuous gage-height graph and containing as an essential element the rating curve of the station.

In the table of monthly discharge the column headed "Maximum" gives the maximum daily discharge, and not the discharge when the water surface was at crest height. Likewise, in the column headed "Minimum" the quantity given is the minimum daily discharge. The column headed "Mean" is the average flow in cubic feet per second during the month. On this average flow are based computations recorded in the remaining columns, which are defined on page 2.

ACCURACY OF FIELD DATA AND COMPUTED RESULTS

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

The station description gives a statement in regard to the general accuracy of the records. "Excellent" indicates that records are

accurate within 5 per cent; "good" within 10 per cent; "fair," within 15 per cent; and "poor," 20 per cent or more.

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.

The tables of monthly discharge give a general idea of the flow at the station. The table of daily discharge allows 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.

Many gaging stations on streams in the irrigated areas of the United States are situated 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.

PUBLICATIONS

Investigation of water resources by the United States Geological Survey has consisted in large part of measurements of the volume of flow of streams and studies of the conditions affecting that flow, but it has comprised also investigation of such closely allied subjects as irrigation, water storage, water powers, underground waters, and quality of waters. Most of the results of these investigations have been published in the series of water-supply papers, but some have appeared in the bulletins, monographs, professional papers, and annual reports.

The result 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. Hudson Bay and upper Mississippi River Basins.
VI. Missouri River Basin.
VII. Lower Mississippi River Basin.
VIII. Western Gulf of Mexico basins.
IX. Colorado River Basin.

Part X. The Great Basin.
XI. Pacific slope basins in California.
XII. North Pacific slope basins drainage, in three parts:
A, Pacific slope basins in Washington and upper Columbia River Basin.
B, Snake River Basin.
C, Pacific slope basins in Oregon and lower Columbia River Basin.

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

Augusta, Me., Statehouse.
Boston, Mass., 2500 Customhouse.
Hartford, Conn., 318 State Office Building.
Albany, N. Y., 506 Broadway-Arcade Building.
Trenton, N. J., 710 Trenton Trust Building.
Harrisburg, Pa. Claster Building
Charlottesville, Va., Brooks Museum, University of Virginia.
South Charleston, W. Va., Naval Ordnance Plant.
Asheville, N. C., 220 Post Office Building.
Columbia, S. C., 801 National Loan & Exchange Bank Building.
Ocala, Fla., Post Office Building.
Tuscaloosa, Ala., Post Office Building.
Chattanooga, Tenn., 630 Power Building.
Columbus, Ohio, Engineering Experiment Station, Ohio State University.
Indianapolis, Ind., 319 Federal Building.
Chicago, Ill., 1503 Consumers Building.
Madison, Wis., 337N State Capitol.
St. Paul, Minn., 202 Old State Capitol.
Topeka, Kans., 23 Federal Building.
Rollo, Mo., Rollo Building, School of Mines and Metallurgy.
Fort Smith, Ark., Post Office Building.
Austin, Tex., State Capitol.
Santa Fe, N. Mex., State Capitol.
Tucson, Ariz., 210 Post Office Building.
Denver, Colo., 403 Post Office Building.
Salt Lake City, Utah, 313 Federal Building.
Idaho Falls, Idaho, 228 Federal Building.
Boise, Idaho, Federal Building.
Helena, Mont., 416 Power Block.
Tacoma, Wash., 406 Federal Building.
Portland, Oreg., 606 Post Office Building.
San Francisco, Calif., 303 Customhouse.
Los Angeles, Calif., 751 South Figueroa Street, room 510.
Honolulu, Hawaii, Territorial Office Building.

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

Stream-flow records have been obtained at about 5,830 points in the United States, and the data obtained have been published in the reports tabulated on pages 7 and 9.

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	
B 140	Descriptions, measurements, gage heights, ratings, and monthly discharge (also many data covering earlier years).	1895.
W 11	Gage heights (also gage heights for earlier years)	1896.
18th A, pt. 4	Descriptions, measurements, ratings, and monthly discharge (also similar data for some earlier years).	1895 and 1896.
W 15	Descriptions, measurements, and gage heights, eastern United States, eastern Mississippi River, and Missouri River above junction with Kansas.	1897.
W 16	Descriptions, measurements, and gage heights, western Mississippi River below junction of Missouri and Platte, and western United States.	1897.
19th A, pt. 4	Description, measurements, ratings, and monthly discharge (also some long-time records).	1897.
W 27	Measurements, ratings, and gage heights, eastern United States, eastern Mississippi River, and Missouri River.	1898.
W 28	Measurements, ratings, and gage heights, Arkansas River and western United States.	1898.
20th A, pt. 4	Monthly discharge (also for many earlier years)	1898.
W 35 to 39	Descriptions, measurements, gage heights, and ratings	1899.
21st A, pt. 4	Monthly discharge	1899.
W 47 to 52	Descriptions, measurements, gage heights, and ratings	1900.
22d A, pt. 4	Monthly discharge	1900.
W 65, 66	Descriptions, measurements, gage heights, and ratings	1901.
W 75	Monthly discharge	1901.
W 82 to 85	Complete data	1902.
W 97 to 100	do	1903.
W 124 to 135	do	1904.
W 165 to 178	do	1905.
W 201 to 214	do	1906.
W 241 to 252	do	1907–8.
W 261 to 272	do	1909.
W 281 to 292	do	1910.
W 301 to 312	do	1911.
W 321 to 332	do	1912.
W 351 to 362	do	1913.
W 381 to 394	do	1914.
W 401 to 414	do	1915
W 431 to 444	do	1916.
W 451 to 464	do	1917.
W 471 to 484	do	1918.
W 501 to 514	do	1919–20.
W 521 to 534	do	1921.
W 541 to 554	do	1922.
W 561 to 574	do	1923.
W 581 to 594	do	1924.
W 601 to 614	do	1925.
W 621 to 634	do	1926.
W 641 to 654	do	1927.
W 661 to 674	do	1928.
W 681 to 694	do	1929.

The records at most of the stations discussed in these reports extend over a series of years. Miscellaneous measurements at many

points other than regular gaging stations have been made each year, and are published under "Miscellaneous discharge measurements" at the end of each report in the same relative order as the regular gaging stations. 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 1929. 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 1910–1920 for any station in the area covered by Part III are published in Water-Supply Papers 283, 303, 323, 353, 383, 403, 433, 453, 473, and 503, which contain records for the Ohio River Basin for those years.

Numbers of water-supply papers containing results of stream measurements, 1889–1929

[For basins included see p. 5]

Year	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII-A	XII-B	XII-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, [s] 213	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	465	566	567	568	569	570	571	572	573	574
1924	581	582	583	584	585	586	587	588	589	590	591	592	593	594
1925	601	602	603	604	605	606	607	608	609	610	611	612	613	614
1926	621	622	623	624	625	626	627	628	629	630	631	632	633	634
1927	641	642	643	644	645	646	647	648	649	650	651	652	653	654
1928	661	662	663	664	665	666	667	668	669	670	671	672	673	674
1929	681	682	683	684	685	686	687	688	689	690	691	692	693	694

[a] Rating tables and index to Water-Supply Papers 35–39 contained in Water-Supply Paper 39. Tables for 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 Kern Rivers and south Pacific slope basins.
[g] Rating tables and index to Water-Supply Papers 47–52 and data on precipitation, wells, and irrigation in California and Utah contained in Water-Supply Paper 52. Tables for 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

The work was done in cooperation with the several State organizations as follows: In North Dakota with the State engineer, Robert E. Kennedy; in Minnesota with the Minnesota Department of Drainage and Waters, E. V. Willard, commissioner; in Wisconsin with the Railroad Commission of Wisconsin, C. B. Hayden, chief engineer; in Illinois with the Illinois Department of Purchases and Construction, division of waterways, William F. Mulvihill, supervisor; and in Missouri with the Missouri Bureau of Geology and Mines, H. A. Buehler, State geologist.

The Dominion Water Power and Reclamation Service, Department of the Interior, Canada, and the United States Geological Survey jointly maintained seven stations in Montana.

The United States Department of State furnished financial assistance for work along the international boundary in Montana, North Dakota, and Minnesota.

Acknowledgment is due also to the Corps of Engineers, U. S. Army, for financial assistance in collecting records published herein.

Financial assistance was also rendered by the following cities, corporations, and individuals: In Minnesota by the Ford Motor Co.; in Wisconsin by the Northern States Power Co., Wisconsin Power & Light Co., and the Inter-County Park Association; in Illinois by the Central Illinois Public Service Co.; and in Iowa by the city of Ottumwa.

DIVISION OF WORK

Data for stations in Montana were collected and prepared for publication under the direction of W. A. Lamb, district engineer, assisted by A. H. Tuttle, C. S. Heidel, G. C. Sanders, W. J. Parsons, and Mrs. G. Thompson.

Data for stations in North Dakota and in the Hudson Bay Basin in Minnesota were collected and prepared for publication under the direction of C. L. Batchelder, district engineer, assisted by E. F. Chandler, K. B. Nelson, and G. L. Oakland. Data for stations in the Mississippi River Basin in Minnesota were collected under the direction of S. B. Soulé, district engineer, and prepared for publication under the direction of S. B. Soulé and C. L. Batchelder, district engineers, assisted by A. H. Frazier, S. H. Crowell, George Guesmer, and G. L. Oakland.

Data for stations in Wisconsin were collected and prepared for publication under the direction of S. B. Soulé, district engineer, assisted by A. H. Frazier, S. H. Crowell, and Jacob Schmidt.

Data for stations in Illinois and for the station on the Des Moines River at Ottumwa, Iowa, were collected and prepared for publication under the direction of H. E. Grosbach, district engineer, assisted by F. L. LeMert and E. F. Rutkowski.

Data for stations in Missouri were collected and prepared for publication under the direction of H. C. Beckman, district engineer, assisted by V. L. Austin, H. C. Bolon, R. D. Schmickle, and C. H. Jennings.

The records were reviewed and the manuscript assembled by J. I. Perrey.

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GAGING-STATION RECORDS

HUDSON BAY DRAINAGE BASIN

UPPER ST. MARY LAKE AT ST. MARY CHALET, MONT.

LOCATION.—Staff gage in NE. ¼ sec. 4, T. 34 N., R. 14 W., at St. Mary Chalet, half a mile above outlet.
RECORDS AVAILABLE.—May to September, 1929.
EXTREMES.—Maximum stage during year, 4.44 feet June 18; minimum stage 0.82 foot Sept. 30.
REMARKS.—Records excellent. No diversion.

Daily gage height, in feet, 1929

Day	June	July	Aug.	Sept.	Day	June	July	Aug.	Sept.
1		3.68	2.39	1.66	16		3.04	1.94	1.05
2		3.64	2.36	1.66	17		3.04	1.90	1.06
3		3.60	2.34	1.64	18	4.44	3.00	1.88	1.06
4		3.60	2.32	1.60	19	4.44	3.00	1.86	1.05
5		3.54	2.30	1.56	20	3.96	3.00	1.84	1.04
6		3.44	2.28	1.50	21	3.69	3.00	1.76	1.04
7		3.46	2.24	1.50	22	3.51	2.80	1.70	1.00
8		3.40	2.20	1.40	23	3.42	2.76	1.64	.98
9		3.34	2.16	1.28	24	3.40	2.68	1.60	.94
10		3.30	2.12	1.00	25	3.38	2.68	1.56	.90
11		3.24	2.10	.98	26	3.38	2.65	1.56	.92
12		3.10	2.06	1.00	27	3.44	2.60	1.54	.94
13		3.06	2.06	.98	28	3.54	2.50	1.56	.90
14		3.04	2.02	1.00	29	3.60	2.46	1.56	.86
15		3.04	1.98	1.10	30	3.68	2.44	1.58	.82
					31		2.40	1.60	

LOWER ST. MARY LAKE NEAR BABB, MONT.

LOCATION.—Water-stage recorder in NE. ¼ sec. 3, T. 35 N., R. 14 W., half a mile above outlet and 3 miles from Babb.
RECORDS AVAILABLE.—May to September, 1929.
EXTREMES.—Maximum stage during year, 4.10 feet May 26; minimum, 0.48 foot Sept. 28.
REMARKS.—Records excellent. No diversions.

Daily gage height, in feet, 1929

Day	May	June	July	Aug.	Sept.	Day	May	June	July	Aug.	Sept.
1		2.70	1.90	1.22	1.00	16		3.46	1.50	1.19	0.79
2		3.02	1.90	1.22	1.02	17		3.35	1.48	1.19	.77
3		3.27	1.87	1.23	1.04	18		3.24	1.48	1.19	.75
4		3.44	1.86	1.27	1.06	19		3.06	1.46	1.17	.72
5		3.50	1.82	1.28	1.06	20		2.83	1.48	1.14	.69
6		3.43	1.79	1.29	1.06	21		2.56	1.42	1.14	.64
7		3.33	1.91	1.27	1.02	22		2.33	1.41	1.13	.60
8		3.31	1.97	1.25	1.00	23		2.10	1.40	1.12	.60
9		3.37	2.00	1.23	.98	24	3.30	1.93	1.38	1.11	.58
10		3.50	1.99	1.21	.93	25		1.80	1.35	1.08	.55
11		3.62	1.95	1.20	.91	26	4.06	1.75	1.32	1.08	.56
12		3.63	1.81	1.20	.91	27	3.93	1.74	1.30	1.07	.53
13		3.55	1.77	1.22	.86	28	3.60	1.77	1.30	1.05	.49
14		3.53	1.60	1.21	.84	29	3.23	1.81	1.28	1.04	.51
15		3.50	1.53	1.20	.81	30	2.83	1.86	1.26	1.02	.49
						31	2.58		1.23	1.01	

ST. MARY RIVER NEAR BABB, MONT.

LOCATION.—Water-stage recorder in NE. ¼ sec. 27, T. 36 N., R. 14 W., at the headworks of St. Mary Canal on the Blackfeet Indian Reservation and 1 mile east of Babb.

DRAINAGE AREA.—278 square miles (includes area of Swiftcurrent Creek above point of diversion into St. Mary Lake).

RECORDS AVAILABLE.—April, 1902, to September, 1925, and May to September, 1929.

EXTREMES.—Maximum discharge during year, 3,580 second-feet May 26 (gage height, 2.28 feet); minimum discharge, 115 second-feet Sept. 27 (gage height, 0.20 foot).

REMARKS.—Records good. Discharge interpolated Sept. 6–8. St. Mary Canal diverts water from the river just above gage. Storage on Swiftcurrent Creek.

Daily and monthly discharge, in second-feet, 1929

Day	May	June	July	Aug.	Sept.	Day	May	June	July	Aug.	Sept.
1		1,730	868	322	273	16		2,720	438	285	145
2		1,950	884	344	359	17		2,510	428	279	196
3		2,180	838	344	291	18		2,220	428	279	240
4		2,250	838	252	273	19		2,060	428	285	225
5		2,360	822	366	285	20		1,880	448	273	200
6		2,320	877	373	272	21		1,580	428	267	172
7		2,220	1,560	366	259	22		1,340	428	255	149
8		2,160	1,120	359	246	23		1,170	408	255	128
9		2,180	900	352	233	24		932	408	235	128
10		2,320	868	337	220	25	3,320	822	388	235	128
11		2,480	822	337	200	26	3,450	760	373	245	128
12		2,530	731	322	177	27	3,190	716	359	255	124
13		2,650	600	309	167	28	2,940	731	359	250	154
14		2,680	526	297	154	29	2,480	760	352	245	186
15		2,700	478	291	158	30	2,020	806	337	250	177
						31	1,680		330	285	

Month	Maximum	Minimum	Mean	Run-off in acre-feet
May 25–31	3,450	1,680	2,730	37,900
June	2,720	716	1,860	111,000
July	1,560	330	615	37,800
August	373	235	296	18,300
September	359	124	202	12,000
The period				217,000

ST. MARY RIVER NEAR KIMBALL, ALBERTA

LOCATION.—Water-stage recorder in SW. ¼ sec. 25, T. 1 N., R. 25 W. fourth meridian, 1 mile south and 1 mile west of Kimball, Alberta, and 5 miles north of international boundary. During winter a chain gage on highway bridge 3 miles downstream was used.

DRAINAGE AREA.—497 square miles.

RECORDS AVAILABLE.—January, 1913, to September, 1929. September, 1902, to December, 1912, records were obtained at point half a mile north of international boundary. Records were also obtained by the irrigation branch, Department of the Interior, Canada, at a point half a mile below present station, from 1905 to 1912. Discharge at the three points is practically the same.

EXTREMES.—Maximum discharge during year, 3,750 second-feet May 25 (gage height, 5.49 feet); minimum, 84 second-feet Jan. 12.

1902–1929: Maximum discharge (estimated), 18,000 second-feet June 5, 1908; minimum, 46 second-feet Dec. 1, 1919.

REMARKS.—Records good except those for period of ice effect (Nov. 24 to Apr. 10), which are fair. Chain gage used Dec. 1 to Apr. 19. St. Mary Canal diverts water near Babb, Mont., to North Fork of Milk River; Alberta Railway & Irrigation Co.'s canal diverts 2 miles below station. Regulation on tributary upstream. Station maintained in cooperation with the Department of the Interior, Canada.

Daily and monthly discharge, in second-feet, of St. Mary River near Kimball, Alberta, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	378	610	260	166	110	190	175	522	1,900	1,060	446	323
2	391	578	223	163	110	223	181	621	2,540	1,060	457	332
3	382	572	223	157	110	242	190	657	2,730	1,030	457	344
4	378	578	241	152	110	223	213	708	2,770	1,020	470	327
5	400	546	241	146	110	223	238	782	2,790	989	470	327
6	405	511	260	143	110	223	234	797	2,770	959	489	340
7	443	488	260	140	110	216	227	804	2,600	1,140	483	319
8	438	478	260	138	110	223	220	863	2,540	1,250	470	297
9	540	473	241	127	110	190	220	959	2,580	1,240	451	280
10	759	494	241	115	110	160	253	1,040	2,660	1,220	430	267
11	1,020	488	241	98	108	146	226	1,070	2,790	1,160	409	245
12	1,230	488	241	84	108	160	264	1,000	2,830	1,050	409	220
13	1,390	473	241	91	108	138	284	974	2,940	930	414	217
14	1,490	458	245	96	108	160	336	1,070	2,960	848	414	194
15	1,770	453	253	101	108	169	350	1,170	2,960	789	398	191
16	1,860	453	234	103	106	163	292	1,230	2,920	760	384	183
17	1,830	438	218	108	106	206	313	1,250	2,790	723	375	191
18	1,700	414	216	110	106	223	304	1,260	2,490	708	370	277
19	1,530	433	213	110	106	234	296	1,300	2,300	701	370	267
20	1,440	448	213	110	106	206	274	1,400	2,030	701	352	242
21	1,380	429	213	110	103	175	277	1,570	1,650	679	336	212
22	1,270	419	213	110	103	154	294	1,860	1,390	650	327	189
23	1,150	400	210	108	103	160	291	2,270	1,220	621	315	176
24	1,040	350	203	108	103	166	304	2,940	1,090	599	308	170
25	942	350	197	108	103	172	332	3,570	1,000	578	287	174
26	862	325	190	108	101	179	398	3,610	950	564	294	180
27	796	304	187	110	101	186	470	3,430	952	536	319	176
28	759	293	181	110	101	319	502	3,110	982	522	308	172
29	723	281	178	110	-------	181	398	2,680	1,000	509	301	217
30	687	274	172	110	-------	184	414	2,180	1,030	477	294	214
31	645	-------	169	110	-------	190	-------	1,870	-------	464	332	-------

Month	Maximum	Minimum	Mean	Run-off in acre-feet
October	1,860	378	969	59,600
November	610	274	443	26,400
December	260	169	222	13,600
January	166	84	188	7,260
February	110	101	107	5,940
March	319	138	193	11,900
April	502	175	292	17,400
May	3,610	522	1,570	96,500
June	2,960	952	2,140	127,000
July	1,250	464	824	50,700
August	489	287	385	23,700
September	344	170	242	14,400
The year	3,610	84	628	454,000

ST. MARY CANAL AT INTAKE, NEAR BABB, MONT.

LOCATION.—Water-stage recorder and staff gage in NW. ¼ NE. ¼ sec. 27, T. 36 N., R. 14 W., 600 feet below intake of canal on Blackfeet Indian Reservation and 1 mile east of Babb.

RECORDS AVAILABLE.—Irrigation seasons, 1918–1929.

REMARKS.—Records good except those for estimated periods, which are fair. Discharge estimated Apr. 22–23 and May 6–26. This canal diverts from west bank of St. Mary River near Babb and discharges into North Fork of Milk River. The water then flows in the natural channel of Milk River through Canada and is finally used for irrigation in Milk River Valley, east of Havre, Mont. Water may be returned to St. Mary River at St. Mary Crossing. Station maintained in cooperation with the Department of the Interior, Canada.

Daily and monthly discharge, in second-feet, 1929

Day	Apr.	May	June	July	Aug.	Sept.
1		164	367	474	534	419
2		107	415	481	534	415
3		107	419	491	536	415
4		107	438	492	539	415
5		20	446	506	538	400
6			456	532	538	386
7			464	534	538	384
8			471	533	538	382
9			471	548	536	379
10			476	552	534	377
11			477	552	534	376
12			432	551	534	373
13			254	546	536	372
14			184	546	539	371
15			173	544	546	370
16		20	129	544	551	368
17			245	542	550	294
18			327	540	548	232
19			322	540	545	230
20			346	542	532	229
21			379	542	530	226
22	50		417	542	528	224
23	50		442	540	528	223
24	54		440	540	527	223
25	54		438	539	526	223
26	67		442	539	510	223
27	67	128	462	538	478	218
28	118	218	462	536	477	177
29	140	229	462	534	476	141
30	164	276	459	534	460	138
31		295		534	425	

Month	Maximum	Minimum	Mean	Run-off in acre-feet
April 22–30	164	50	84.9	1,520
May	295	20	66.8	4,110
June	477	129	390	23,200
July	552	474	533	32,800
August	551	425	524	32,200
September	419	138	307	18,300
The period				112,000

ST. MARY CANAL AT ST. MARY CROSSING, NEAR BABB, MONT.

LOCATION.—Water-stage recorder in NE. ¼ sec. 30, T. 37 N., R. 13 W. Montana meridian, 500 feet east of outlet of St. Mary River siphon, 10 miles below intake, and 9 miles northeast of Babb.

RECORDS AVAILABLE.—Irrigation seasons, 1918–1929.

REMARKS.—Records good. Station maintained in cooperation with the Department of the Interior, Canada.

Daily and monthly discharge, in second-feet, 1929

Day	Apr.	May	June	July	Aug.	Sept.	Day	Apr.	May	June	July	Aug.	Sept.
1		138	318	409	457	368	16		25.6	116	464	464	320
2		98	375	415	457	361	17		22.4	111	463	470	278
3		98	402	423	457	361	18		22.0	290	463	466	198
4		89	394	423	459	357	19		21.2	292	463	464	194
5		28.0	396	428	457	354	20		20.4	316	466	453	192
6		28.0	406	455	457	325	21		19.2	327	455	455	191
7		23.2	409	463	455	325	22		19.6	361	463	453	191
8		22.8	419	461	446	325	23		23.2	392	461	455	190
9		24.4	425	472	453	325	24		12.8	390	461	447	190
10		26.8	423	484	455	325	25		4.8	387	459	446	190
11		29.0	423	480	455	321	26	45.0	1.7	387	459	447	191
12		26.8	423	474	453	323	27	46.2	26.0	406	459	411	191
13		25.2	266	470	455	321	28	51	190	408	457	406	169
14		27.6	163	470	455	320	29	114	194	404	457	406	124
15		28.5	158	468	459	321	30	141	244	396	453	402	120
							31		253		455	368	

Month	Maximum	Minimum	Mean	Run-off in acre-feet
April 26–30	141	45	79.4	787
May	253	1.7	58.5	3,600
June	425	111	346	20,600
July	484	409	457	28,100
August	470	368	447	27,500
September	368	120	265	15,800
The period				96,400

ST. MARY CANAL AT HUDSON BAY DIVIDE, NEAR BROWNING, MONT.

LOCATION.—Water-stage recorder in sec. 5, T. 37 N., R. 11 W., 3 miles above canal outlet and 30 miles north of Browning, on Blackfeet Indian Reservation.

RECORDS AVAILABLE.—Irrigation seasons, 1917–1929.

REMARKS.—Records good except those for estimated periods, which are fair. Discharge estimated May 7–27. Station maintained in cooperation with the Department of the Interior, Canada.

Daily discharge, in second-feet, 1929

Day	Apr.	May	June	July	Aug.	Sept.	Day	Apr.	May	June	July	Aug.	Sept.
1		132	259	391	450	359	16			151	458	463	313
2		132	341	404	450	350	17			119	461	467	308
3		93	378	406	454	352	18		37	207	458	465	236
4		93	385	414	456	350	19			282	458	467	200
5		38	389	418	452	350	20			276	463	458	194
6		33	391	440	454	336	21			302	458	452	195
7			398	475	458	327	22			229	458	450	191
8		32	410	469	456	325	23		24	265	461	446	187
9			412	463	454	323	24			281	458	444	190
10			418	473	454	321	25			380	458	444	190
11			422	475	454	321	26		23	276	463	444	190
12			416	471	452	316	27		23	280	452	416	191
13		38	356	467	454	318	28	66	139	293	456	404	184
14			226	465	456	314	29	79	168	295	458	402	151
15			167	463	454	314	30	116	213	287	454	402	126
							31		229		454	385	

Monthly discharge, in second-feet, of St. Mary Canal at Hudson Bay divide, near Browning, Mont., 1929

Month	Maximum	Minimum	Mean	Run-off in acre-feet
April 28-30	116	66	87.0	518
May	229	23	62.5	3,840
June	422	119	336	20,000
July	475	391	452	27,800
August	467	385	446	27,400
September	359	126	267	15,900
The period				95,500

SWIFTCURRENT CREEK AT MANY GLACIER, MONT.

LOCATION.—Water-stage recorder in sec. 12, T. 35 N., R. 16 W., at outlet of McDermott Lake at Many Glacier, in Glacier National Park, 14 miles southwest of Babb.

DRAINAGE AREA.—31.4 square miles.

RECORDS AVAILABLE.—June, 1912, to September, 1929.

EXTREMES.—Maximum discharge during year, 884 second-feet May 24 (gage height, 4.24 feet); minimum, 28.3 second-feet Sept. 29–30 (gage height, 1.56 feet).

1912–1929: Maximum discharge, 1,550 second-feet June 17, 1916; Minimum discharge, 10 second-feet Nov. 6 and 7, 1921 (gage height, 1.22 feet).

REMARKS.—Records good except those for estimated periods, which are fair. Discharge estimated Oct. 1–31 and May 1–4. Observations discontinued during winter. No diversions or regulation. Station maintained in cooperation with the Department of the Interior, Canada.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	May	June	July	Aug.	Sept.	Day	Oct.	May	June	July	Aug.	Sept.
1		80	625	259	131	94	16		327	458	211	96	41.0
2		83	734	248	126	87	17		281	399	200	89	44.0
3	105	85	549	256	121	76	18	181	294	365	189	85	39.5
4		100	419	245	126	59	19		365	317	187	83	35.0
5		92	416	219	124	50	20		486	252	195	77	56
6		88	489	200	117	41.0	21		592	193	179	70	56
7		83	528	245	114	35.0	22		677	190	152	68	56
8	579	85	553	262	112	33.5	23	64	795	205	141	68	45.5
9		104	596	251	112	32.2	24		852	214	141	66	42.5
10		107	585	242	112	29.6	25		761	239	141	64	42.5
11		114	538	225	112	28.3	26		489	287	147	66	36.5
12		152	517	195	109	28.3	27		348	284	136	66	33.5
13	286	291	503	184	107	33.5	28		288	284	129	70	30.9
14		506	520	189	103	38.0	29	48	288	302	126	76	28.3
15		436	506	214	98	41.0	30		348	287	129	83	28.3
							31		464	------	131	92	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off	
					Inches	Acre-feet
October			205	6.53	7.53	12,600
May	852	80	325	10.4	11.99	20,000
June	734	190	412	13.1	14.62	24,500
July	262	126	193	6.15	7.09	11,900
August	131	64	94.9	3.02	3.48	5,840
September	94	28.3	44.1	1.40	1.56	2,620

SHERBURNE RESERVOIR NEAR BABB, MONT.

LOCATION.—Staff gage on gate house in sec. 35, T. 36 N., R. 15 W., at Sherburne Dam. Zero of gage is 4,700.0 feet above mean sea level.

DRAINAGE AREA.—64 square miles.

RECORDS AVAILABLE.—May to June, 1915; May, 1917, to September, 1918; and June, 1921, to September, 1929.

EXTREMES.—Maximum stage recorded during year, 77.6 feet July 8 (contents, 49,300 acre-feet).

1915, 1917–18, 1921–1929: Maximum stage recorded, 84.6 feet June 20, 1925 (contents, 60,420 acre-feet).

REMARKS.—Records good. Complete records furnished by United States Bureau of Reclamation.

Daily contents, in acre-feet, 1928–29

Day	Oct.	Nov.	Dec.	Apr.	May	June	July	Aug.	Sept.
1	37,040	29,100	28,440	-------	30,850	44,000	47,200	44,900	24,250
2	-------	-------	-------	-------	30,850	44,300	48,100	44,450	23,700
3	-------	-------	-------	-------	30,850	45,200	48,700	43,860	23,150
4	-------	-------	-------	-------	30,960	45,200	48,550	43,020	22,600
5	-------	-------	-------	-------	31,070	45,500	48,850	42,470	22,000
6	-------	-------	-------	-------	31,400	45,050	48,850	42,210	21,400
7	-------	-------	-------	-------	31,400	44,900	49,150	41,560	20,700
8	-------	-------	-------	-------	30,960	45,200	49,300	41,040	20,200
9	-------	-------	-------	-------	30,960	45,500	49,150	40,390	19,600
10	39,740	-------	-------	-------	30,960	45,640	48,850	39,740	19,150
11	40,520	-------	-------	-------	31,070	46,060	48,550	39,090	18,700
12	40,650	-------	-------	-------	31,180	46,060	48,400	38,310	18,600
13	42,340	-------	-------	-------	32,120	45,920	48,550	37,400	17,800
14	41,950	-------	-------	-------	32,820	45,780	48,700	36,920	17,160
15	-------	-------	-------	-------	33,700	46,060	48,700	36,440	16,800
16	-------	-------	-------	-------	35,290	46,060	48,700	35,550	16,300
17	-------	-------	-------	-------	36,320	46,060	48,700	34,780	15,800
18	-------	-------	-------	-------	37,660	46,060	48,700	34,060	15,440
19	-------	-------	-------	-------	38,700	45,780	48,620	33,150	15,080
20	-------	-------	-------	-------	40,000	45,500	48,400	32,360	14,360
21	33,370	-------	-------	-------	41,040	45,200	48,250	31,640	13,760
22	-------	-------	-------	30,410	43,160	45,200	48,100	31,070	13,280
23	-------	-------	-------	30,410	44,750	45,350	48,100	30,180	13,110
24	30,060	-------	-------	30,410	45,050	45,500	47,950	29,340	12,930
25	-------	-------	-------	30,740	44,600	45,920	47,800	28,550	12,750
26	-------	-------	-------	30,740	44,300	46,340	47,500	27,780	12,570
27	-------	-------	-------	30,740	43,300	46,480	47,200	26,900	13,600
28	-------	-------	-------	30,850	43,580	46,340	46,900	26,460	13,280
29	-------	-------	-------	30,850	43,720	47,200	46,340	25,910	13,110
30	-------	28,440	-------	30,850	43,720	47,050	45,930	25,400	12,930
31	29,100	-------	27,780	-------	43,720	-------	45,500	24,800	-------

SWIFTCURRENT CREEK AT SHERBURNE, MONT.

LOCATION.—Water-stage recorder in sec. 35, T. 36 N., R. 15 W., 800 feet below spillway of Sherburne Lake Dam at Sherburne.

DRAINAGE AREA.—64 square miles.

RECORDS AVAILABLE.—July, 1912, to September, 1929.

EXTREMES.—Maximum discharge during year, 1,360 second-feet Oct. 14 (gage height, 6.50 feet); minimum, 3.5 second-feet May 18 (gage height, 0.50 foot). 1912–1929: Maximum discharge, 2,280 second-feet June 17, 1916 (gage height, 7.85 feet); no flow at times when gates in dam were closed.

REMARKS.—Records good. Observations discontinued during winter. No diversions. Flow regulated by gate operations at dam. Station maintained in cooperation with the Department of the Interior, Canada.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Apr.	May	June	July	Aug.	Sept.
1	107		360	162	230	397	392
2	107		360	219	191	400	389
3	107		360	552	210	429	386
4	131		348	834	212	460	383
5	187		348	925	217	456	378
6	182		348	720	223	456	368
7	166		378	562	491	453	353
8	170		397	562	491	450	336
9	187		331	565	491	447	327
10	260		184	670	491	447	302
11	463		166	774	338	469	298
12	640		63	763	221	475	295
13	721		4.8	652	198	481	291
14	1,010		4.8	600	198	494	287
15	1,230		4.4	614	201	501	284
16	1,020		3.8	618	203	494	287
17	896		3.6	618	212	497	267
18	635		3.5	618	259	497	245
19	632		3.6	618	291	494	191
20	624		3.8	426	291	491	144
21	407		3.9	324	291	501	148
22	277	20	5.4	223	291	501	148
23	217	291	549	116	306	488	151
24	147	291	1,110	93	331	478	162
25	128	291	1,160	95	331	472	162
26	128	336	1,160	122	341	466	160
27	130	336	1,160	184	355	447	160
28	128	336	894	184	355	438	148
29	128	360	582	201	353	432	137
30	128	360	221	238	353	429	136
31	128		160		358	403	

Month	Maximum	Minimum	Mean	Run-off in acre-feet
October	1,230	107	368	22,600
April 22–30	360	20	291	5,190
May	1,160	3.5	345	21,200
June	925	93	462	27,500
July	491	191	301	18,500
August	501	397	463	28,500
September	392	136	257	15,300

CANYON CREEK NEAR MANY GLACIER, MONT.

LOCATION.—Water-stage recorder at edge of heavy timber area, Glacier National Park, half a mile above mouth and 2 miles southeast of Many Glacier.

DRAINAGE AREA.—7.0 square miles.

RECORDS AVAILABLE.—July, 1918, to September, 1929.

EXTREMES.—Maximum discharge during year, 280 second-feet May 24 (gage height, 2.38 feet); minimum, 4.3 second-feet Sept. 30 (gage height, 0.40 foot). 1918–1929: Maximum discharge (estimated), 500 second-feet May 16, 1922 (gage height, 3.34 feet); minimum, 3.3 second-feet Oct. 4, 1919 (gage height, 0.56 foot).

REMARKS.—Records good except those for estimated periods, which are fair. Discharge estimated May 1–5, 10–23, June 15–19, Aug. 30–31, and Sept. 10–18. Observations discontinued during winter. No diversions. Station maintained in cooperation with the Department of the Interior, Canada.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	May	June	July	Aug.	Sept.	Day	Oct.	May	June	July	Aug.	Sept.
1	8.8	9.0	104	42.3	19.7	14.2	16	29.0	60	85	36.4	13.0	6.0
2	15.2	11.0	120	43.3	19.7	14.6	17	51.0	40	70	33.1	13.0	6.0
3	13.8	16.0	83	43.3	19.1	13.8	18	49.0	40	55	31.6	12.6	6.0
4	12.0	18.0	68	39.7	18.2	11.0	19	41.2	60	40	31.6	12.2	6.9
5	12.9	20.0	65	36.4	18.2	9.9	20	34.3	90	33.9	30.8	11.4	7.2
6	16.1	19.1	76	36.4	17.8	8.8	21	27.0	130	34.7	26.9	10.2	6.6
7	50.0	18.6	79	45.2	17.3	8.4	22	27.6	200	37.2	24.1	9.9	6.4
8	127	16.8	83	46.2	16.4	8.1	23	22.7	250	38.8	23.5	9.5	5.9
9	155	12.2	88	49.1	16.4	5.6	24	20.6	280	42.3	22.9	9.5	5.6
10	155	15.0	80	46.2	16.0	5.0	25	19.5	150	47.2	23.5	9.5	5.6
11	85	30.0	76	38.8	16.0	5.0	26	18.5	53	52	22.9	11.0	5.6
12	53	45.0	76	37.2	16.0	5.0	27	17.6	43.3	48.2	21.6	11.4	5.6
13	41.2	60	79	35.6	15.0	5.5	28	16.1	40.5	49.1	19.1	12.2	5.6
14	34.3	90	102	35.6	13.8	5.5	29	15.2	42.3	50	18.6	13.4	5.1
15	30.3	80	100	37.2	13.4	6.0	30	14.7	50	47.2	19.1	14.0	4.3
							31	14.2	73		19.1	14.0	

Month	Maximum	Minimum	Mean	Per square mile	Run-off	
					Inches	Acre-feet
October	155	8.8	39.6	5.66	6.52	2,430
May	280	9.0	66.5	9.50	10.95	4,090
June	120	33.9	67.0	9.57	10.68	3,990
July	49.1	18.6	32.8	4.69	5.41	2,020
August	19.7	9.5	14.2	2.03	2.34	873
September	14.6	4.3	7.16	1.02	1.14	426

RED RIVER AT FARGO, N. DAK.

LOCATION.—Staff gage in sec. 7, T. 139 N., R. 48 W., at Island Park Dam, Fargo and 10 miles above mouth of Sheyenne River. Zero of gage is 870.00 feet above mean sea level. Gage datum was lowered 3.70 feet Aug. 1, 1928.

DRAINAGE AREA.—6,420 square miles.

RECORDS AVAILABLE.—May, 1901, to September, 1929.

EXTREMES.—Maximum discharge during year 4,440, second-feet Mar. 20 and 21 (gage height, 12.8 feet); minimum, 16 second-feet Sept. 7 (gage height, 4.2 feet).

1901–1929: Maximum discharge, 7,740 second-feet July 11, 1916 (gage height, 21.04 feet on present gage); minimum, 8 second-feet Sept. 3, 1924 (gage height, 0.5 foot on Weather Bureau gage).

REMARKS.—Records fair except those for extremely low stages and estimated periods, which are poor.

Daily discharge, in second-feet, 1924–1929

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1924–25												
1	100	205	a 74	a 48	a 35	a 35	375	340	340	340	175	100
2	125	a 178	80	a 48	a 35	a 35	490	340	270	410	a 175	80
3	150	150	a 64	48	a 35	a 35	670	a 340	235	410	175	80
4	125	a 115	48	a 48	35	35	575	340	270	a 472	175	100
5	a 112	80	a 64	a 48	a 39	a 44	a 422	235	270	a 534	175	125
6	100	125	80	a 48	a 44	a 54	270	175	235	575	150	a 118
7	100	205	a 64	48	48	63	235	175	a 252	490	175	a 109
8	100	188	48	a 44	a 48	a 82	235	305	270	410	175	100
9	175	a 134	a 64	a 39	a 48	100	235	305	375	340	a 162	100
10	175	80	80	35	a 48	a 112	235	a 270	510	305	150	125
11	205	80	a 80	a 35	48	125	270	235	645	305	150	150
12	a 228	80	a 80	a 35	a 48	a 142	a 252	270	720	a 330	175	175
13	252	80	80	a 35	a 48	a 158	235	235	775	375	150	a 162
14	235	125	a 72	35	48	175	235	205	a 747	375	125	150
15	252	150	63	a 35	a 45	a 162	205	175	720	340	80	125
16	252	a 115	a 56	a 35	a 42	150	205	175	720	270	a 90	125
17	220	80	48	35	a 38	a 142	205	a 175	720	235	100	175
18	162	80	a 48	a 32	35	a 134	270	175	720	205	125	205
19	a 131	125	a 48	a 30	a 35	125	a 270	150	775	a 180	100	150
20	100	125	48	a 27	a 35	a 138	270	150	885	175	100	a 125
21	100	150	a 42	24	35	150	235	150	a 885	175	125	100
22	125	220	a 36	a 28	a 35	a 178	205	175	885	175	125	80
23	175	a 198	a 30	a 31	a 35	205	235	205	775	150	a 132	125
24	235	175	24	35	a 35	a 238	340	a 220	670	150	150	205
25	205	a 128	a 28	a 35	35	270	375	235	620	175	150	205
26	a 178	80	a 31	a 35	a 35	a 270	a 305	205	620	a 162	125	125
27	150	a 74	35	a 35	a 35	a 270	235	235	575	150	100	a 125
28	100	a 69	a 38	35	35	288	270	235	a 532	125	125	125
29	100	63	a 42	a 35	-------	a 314	270	270	490	150	150	100
30	150	a 69	a 45	a 35	-------	340	270	a 297	410	150	a 125	100
31	205	-------	48	35	-------	340	-------	a 323	-------	a 162	100	-------

a Interpolated.

Daily discharge, in second-feet, of Red River at Fargo, N. Dak., 1924–1929—Contd.

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1925-26												
1	168	a 112	102	a 40	38	83	534	254	194	122	a 38	51
2	168	122	83	a 39	a 40	a 96	488	a 238	227	122	38	38
3	144	122	83	38	a 43	a 109	444	223	223	122	27	27
4	a 123	144	102	a 40	a 46	122	a 444	254	254	a 122	51	18
5	102	144	83	a 42	a 48	a 122	444	288	254	122	51	a 21
6	102	122	a 83	a 44	51	a 122	402	288	a 211	102	51	a 24
7	102	144	83	a 47	a 51	a 122	324	223	167	102	66	27
8	168	a 144	a 78	a 49	51	122	288	194	167	38	a 52	27
9	194	144	a 72	51	a 53	a 122	288	a 208	194	27	38	27
10	254	122	66	a 51	a 56	a 122	324	223	194	38	27	38
11	a 211	a 122	a 70	a 51	a 58	a 122	a 343	223	168	a 32	27	51
12	168	122	a 74	a 51	a 60	122	362	254	144	27	18	a 58
13	168	a 117	a 79	51	a 62	a 122	488	223	a 156	27	18	66
14	144	a 112	83	a 51	a 64	a 122	362	194	168	38	27	102
15	122	a 107	a 72	a 51	66	122	488	168	168	51	a 32	83
16	122	102	a 62	51	a 69	a 155	534	a 156	144	51	38	83
17	144	102	51	a 51	a 73	a 188	444	144	168	51	38	66
18	a 154	102	a 51	a 51	a 76	a 221	a 384	144	168	a 51	27	102
19	a 164	122	a 51	a 51	a 80	a 255	324	168	144	51	38	a 84
20	a 174	122	a 51	a 51	83	288	288	194	a 159	38	51	66
21	a 184	102	a 51	a 51	a 79	a 616	223	194	168	51	38	66
22	194	a 112	51	a 51	a 74	943	254	194	144	51	a 44	51
23	168	122	a 50	51	a 70	1,302	254	a 194	144	38	51	51
24	122	102	a 49	a 51	66	1,600	254	194	168	51	51	51
25	a 133	66	a 48	a 51	a 69	1,370	a 271	168	144	a 44	51	66
26	144	a 84	a 47	a 51	a 73	1,370	288	194	168	38	66	a 66
27	144	102	a 46	a 51	a 76	1,302	254	194	a 158	38	122	66
28	102	144	a 44	a 51	a 80	a1,092	254	194	144	38	122	51
29	66	a 123	a 43	51	------	882	223	168	144	27	a 86	66
30	102	102	a 42	a 46	------	738	288	a 177	122	38	51	66
31	102	------	a 41	a 42	------	632	------	a 186	------	38	51	------
1926-27												
1	66	83	a 38	a 38	a 28	402	1,170	a 466	632	488	254	194
2	66	66	38	a 38	a 32	402	1,370	444	582	444	254	223
3	a 66	66	66	38	a 35	362	1,370	444	632	a 444	254	223
4	66	102	38	a 42	38	288	1,370	444	632	a 444	223	a 213
5	66	102	a 41	a 46	a 42	288	1,690	402	a 632	444	223	a 204
6	122	144	a 44	a 50	a 46	a 306	1,440	402	582	444	194	194
7	122	a 133	a 48	a 54	a 50	324	1,300	444	632	402	a 209	194
8	102	122	51	a 58	a 54	362	1,040	a 466	582	362	223	144
9	144	83	a 58	a 62	a 58	402	1,100	488	582	324	223	168
10	a 133	66	66	66	a 62	444	a1,040	488	582	a 343	223	223
11	122	66	66	a 56	66	488	974	488	582	362	194	a 223
12	102	83	a 58	a 47	a 60	582	974	488	a 582	362	194	223
13	102	102	51	a 37	a 53	a 632	738	488	632	324	144	254
14	83	a 92	a 47	a 28	a 47	684	738	488	738	324	a 144	254
15	102	83	a 42	18	a 40	1,100	794	a 488	738	324	144	288
16	122	102	38	a 22	a 33	1,600	738	488	738	324	144	288
17	a 102	83	a 34	a 26	27	2,270	a 794	534	738	a 324	144	288
18	83	83	a 30	a 30	a 27	2,470	852	534	794	324	122	a 306
19	51	83	a 26	a 34	a 27	2,650	912	534	a 766	324	144	324
20	102	66	a 22	38	a 27	a2,220	912	534	738	324	168	254
21	122	a 58	18	a 38	27	1,780	852	534	684	324	168	223
22	122	51	a 29	38	a 55	1,170	794	a 534	632	324	168	254
23	122	38	a 40	a 41	83	852	738	534	582	324	168	223
24	a 112	51	51	a 43	122	738	a 684	534	582	a 306	144	194
25	102	a 45	a 55	a 46	a 158	632	632	582	582	288	144	a 209
26	83	38	a 58	a 48	194	444	582	632	a 558	288	168	223
27	102	51	a 62	51	a 224	a 423	488	684	534	324	194	223
28	122	a 51	66	a 34	254	402	488	632	532	288	194	223
29	144	51	a 57	18	------	362	488	a 632	534	254	223	194
30	122	38	a 47	a 21	------	402	488	a 632	478	223	194	194
31	a 102	------	38	a 25	------	738	------	632	------	a 238	194	------

a Interpolated.

Daily discharge, in second-feet, of Red River at Fargo, N. Dak., 1924–1929—Contd.

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1927–28												
1	194	194	------	------	------	------	1,520	488	254	a 208	90	212
2	a 194	194	------	------	102	------	1,040	488	223	223	90	a 177
3	194	223	102	------	------	122	852	488	a 223	223	90	a 143
4	194	223	------	------	102	------	738	444	223	a 223	90	108
5	223	223	------	83	------	102	684	444	223	223	a 99	108
6	288	a 209	------	------	------	------	582	a 466	223	288	108	108
7	254	194	102	------	51	------	488	488	223	444	128	108
8	254	194	------	------	------	122	a 425	534	194	a 444	90	108
9	a 238	223	------	102	------	------	362	488	168	444	74	a 99
10	223	194	102	------	102	------	288	a 466	a 168	402	74	90
11	223	223	------	83	------	------	362	444	168	324	90	74
12	223	223	102	------	------	------	362	362	168	288	a 82	90
13	254	a 184	------	------	------	168	324	a 325	168	288	74	90
14	223	144	------	------	------	------	362	288	168	324	74	128
15	194	144	------	------	83	------	a 362	288	168	a 324	74	152
16	a 194	144	------	------	------	------	362	324	168	324	60	a 121
17	194	144	102	------	------	144	324	324	a 168	288	60	90
18	168	144	------	102	------	a 169	288	324	168	254	74	90
19	168	144	------	------	------	194	324	362	168	254	a 74	90
20	223	a 169	83	------	83	194	402	a 343	488	254	74	108
21	223	194	------	102	------	288	444	324	974	254	60	90
22	223	168	------	------	------	444	a 444	324	823	a 328	60	108
23	a 196	168	66	122	------	794	444	324	632	402	48	a 118
24	168	a 145	------	------	------	1,600	402	324	a 517	402	48	128
25	168	122	------	------	83	2,900	402	362	402	324	60	108
26	194	a 129	------	------	------	------	3,480	444	288	362	288	a 75	128
27	194	a 136	83	------	------	------	3,760	488	a 288	324	254	90	152
28	194	144	------	102	83	------	3,840	488	288	288	223	90	108
29	194	144	------	------	------	------	3,760	a 488	288	223	a 223	60	74
30	a 194	144	------	102	------	------	3,300	488	254	194	223	74	a 91
31	194	------	------	------	------	------	2,470	------	254	------	144	90	------
1928–29												
1	108	180	152	a 108	60	a 74	670	420	248	108	24	a 24
2	108	a 173	a 140	a 108	a 60	a 74	620	420	a 248	90	24	24
3	90	a 166	128	108	a 60	a 74	520	420	248	74	30	24
4	108	a 159	128	a 104	a 60	a 74	570	374	248	a 74	a 27	24
5	90	152	a 121	a 99	60	74	570	a 397	248	74	24	24
6	74	108	a 115	a 94	a 64	a 74	570	420	212	60	20	24
7	a 91	108	108	90	a 67	74	a 520	a 397	180	a 67	20	16
8	108	152	a 108	a 86	a 70	a 82	470	374	212	74	20	a 18
9	90	212	a 108	a 83	74	a 91	420	374	a 196	74	20	20
10	90	180	108	a 81	a 62	a 100	420	330	180	60	20	24
11	128	a 180	a 108	a 78	a 50	108	420	330	180	48	a 20	24
12	108	180	108	74	38	152	374	a 352	152	74	20	24
13	90	152	a 115	a 74	a 50	248	420	374	152	108	20	24
14	a 99	180	a 121	a 74	a 62	720	a 445	374	152	a 99	24	24
15	108	180	128	a 74	74	1,690	470	374	152	90	24	a 24
16	128	212	a 140	74	a 74	2,740	470	374	a 166	74	20	24
17	152	212	152	a 72	a 74	3,480	520	374	180	90	20	24
18	180	a 182	a 152	a 70	74	3,880	470	374	180	108	a 22	a 24
19	152	152	152	a 67	a 77	4,280	570	a 352	180	90	24	a 24
20	152	152	a 146	a 64	a 80	4,440	570	330	180	74	24	a 24
21	a 166	152	a 139	a 62	a 84	4,440	a 570	374	128	a 74	24	a 24
22	180	152	a 133	60	a 87	4,120	570	374	108	74	24	a 24
23	180	128	a 127	a 60	90	3,480	570	330	a 118	74	24	a 24
24	212	108	a 120	a 60	a 90	2,170	570	330	128	74	24	24
25	212	a 108	a 114	a 60	90	1,440	570	330	128	74	a 24	24
26	180	108	108	a 60	a 85	1,100	520	a 330	152	74	24	24
27	180	108	a 108	a 60	a 79	1,040	470	330	152	38	24	30
28	180	108	108	60	74	980	a 495	330	152	a 56	30	30
29	a 180	a 118	a 108	a 60	------	1,100	520	288	128	74	30	a 34
30	152	128	a 108	a 60	------	870	470	a 268	a 118	60	24	38
31	152	------	108	a 60	------	a770	------	248	------	48	24	------

a Interpolated.

Monthly discharge, in second-feet, of Red River at Fargo, N. Dak., 1924–1929

Month	Maximum	Minimum	Mean	Run-off in acre-feet
1924–25				
October	252	100	162	9,960
November	220	63	124	7,380
December	80	24	54.5	3,350
January	48	24	37.1	2,280
February	48	35	39.9	2,220
March	340	35	158	9,720
April	670	205	297	17,700
May	340	150	236	14,500
June	885	235	564	33,600
July	575	125	284	17,500
August	175	80	138	8,480
September	205	80	129	7,680
The year	885	24	185	134,000
1925–26				
October	254	66	147	9,040
November	144	66	117	6,960
December	102	41	64.2	3,950
January	51	38	48.3	2,970
February	83	38	62.7	3,480
March	1,600	83	474	29,100
April	534	223	352	20,900
May	288	144	204	12,500
June	254	122	172	10,200
July	122	27	57.6	3,540
August	122	18	47.9	2,950
September	102	18	55.3	3,290
The year	1,600	18	151	109,000
1926–27				
October	144	51	103	6,330
November	144	38	76.0	4,520
December	66	18	45.9	2,820
January	66	18	39.7	2,440
February	254	27	70.3	3,900
March	2,650	288	846	52,000
April	1,690	488	918	54,600
May	684	402	520	32,000
June	794	488	629	37,400
July	488	223	343	21,100
August	254	122	186	11,400
September	324	144	228	13,600
The year	2,650	18	335	242,000
1927–28				
October	288	168	208	12,800
November	223	122	174	10,400
December	----------	----------	92	5,660
January	----------	----------	97	5,960
February	----------	----------	86	4,950
March	3,840	102	951	58,500
April	1,520	288	499	29,700
May	534	254	371	22,800
June	974	168	295	17,600
July	444	144	294	18,100
August	128	48	78.2	4,810
September	212	74	113	6,720
The year	3,840	48	273	198,000
1928–29				
October	212	74	136	8,360
November	212	108	153	9,100
December	152	108	123	7,560
January	108	60	75.6	4,650
February	90	38	70.3	3,900
March	4,440	74	1,420	87,300
April	670	374	513	30,500
May	420	248	357	22,000
June	248	108	174	10,400
July	108	38	75.2	4,620
August	30	20	23.3	1,430
September	38	16	24.6	1,460
The period	4,440	16	264	191,000

RED RIVER AT GRAND FORKS, N. DAK.

LOCATION.—Staff gage in NW. ¼ sec. 34, T. 152 N., R. 50 W., in Grand Forks, N. Dak., 2 miles below mouth of Red Lake River. Gage moved 1½ miles downstream from former site on Jan. 1, 1926. Zero of gage is 784.10 feet above mean sea level.

DRAINAGE AREA.—25,500 square miles.

RECORDS AVAILABLE.—May, 1901, to September, 1929. Gage-height record, 1882–1901 by United States Engineer Corps.

EXTREMES.—Maximum discharge during year ending Sept. 30, 1929, 17,100 second-feet Mar. 24; minimum, 268 second-feet Sept. 17–19.

1882–1929: Maximum discharge, 43,000 second-feet Apr. 10, 1897 (gage height, 50.2 feet); minimum, about 100 second-feet during early part of February, 1912 (stage-discharge relation affected by ice).

REMARKS.—Records fair except those for estimated periods, which are poor.

Daily discharge, in second-feet, 1924–1929

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1924-25												
1	470	550					6,770	1,830	1,400	4,790	498	
2	470					140	6,090	1,880	1,310	4,610	498	
3	470	553	300	125			5,270	1,930	1,350	4,380	470	300
4	443					138	4,200	1,930	1,350	4,140	470	
5	443			123			3,730	1,880	1,490	3,910	443	
6	470	500					3,390	1,880	2,300	3,620	443	
7	498						2,870	1,780	3,000	3,330	443	
8	498		250				2,530	1,780	4,380	2,980	443	
9	[a] 498	417				200	2,250	1,680	6,630	2,580	443	440
10	498	417					2,040	1,580	7,640	2,530	417	
11	498	417					1,880	1,490	8,320	2,530	443	
12	498	417					1,730	1,350	9,690	2,420	443	680
13	526	417				234	1,490	1,260	9,120	2,470	417	
14	585	417					1,400	1,220	8,950	2,420	417	823
15	585	417	200		140		1,260	1,220	8,870	2,360	417	
16	615						1,260	1,180	8,790	2,250	392	
17	615			130		200	1,180	1,180	8,790	2,040	392	640
18	646						1,090	1,180	7,940	1,930	368	
19	678						970	1,050	7,640	1,730	368	
20	678						646	1,050	7,050	1,630	368	
21	678						646	1,010	7,050	1,400		
22	615					189	711	1,050	6,700	1,260		
23	585	350				555	930	1,090	6,500	970	330	480
24	585					745	1,440	1,130	6,030	891		
25	585					1,350	1,540	1,310	5,710	711		
26	615		150			2,200	1,680	1,440	5,330	615		
27	615					4,180	1,680	1,400	5,090	585		
28	585					4,260	1,680	1,310	4,910	526	300	460
29	555					4,790	1,780	1,180	4,910	526		
30	555			140		5,770	1,780	1,050	4,790	498		
31	498			140		6,290		1,260		498		

[a] Interpolated.

Daily discharge, in second-feet, of Red River at Grand Forks, N. Dak., 1924–1929—Continued

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1925–26												
1		678	646				6,910	1,400				
2		678	646				6,490	1,350				
3	1,100	678	646				5,770	1,310				
4		615	646				5,390	1,310				
5		585	646				[a] 5,160	1,310				
6		585	646				[a] 4,920	1,310				
7		585	646				[a] 4,680	1,260				
8	900	615	646			600	[a] 4,450	1,260				
9		615	646				4,220	1,090				
10		615	646				4,020	1,090				
11		678	646				4,220	1,090				
12		678	646				4,610	1,010				
13		678	[a] 646				5,090					
14	800	678	646				5,090					
15		678	[a] 636		480		5,090					
16		678	[a] 625	480		853	4,730		1,900	1,300	460	420
17	745	678	615			853	4,320					
18	745	678	[a] 615			890	3,970					
19	745	711	[a] 615			1,050	3,970					
20	711	853	[a] 615			1,090	3,270					
21	711	853	[a] 615			1,490	3,270	1,000				
22	711	853	615			1,830	2,420					
23	780	853	[a] 608			2,580	2,250					
24	780	853	[a] 600			4,850	2,250					
25	780	853	[a] 592			6,290	1,680					
26	780	780	585			6,910	1,680					
27	816	745	[a] 585			7,490	1,580					
28	816	745	[a] 585			7,720	1,580					
29	780	646	585			7,640	1,580					
30	745	646	[a] 585			7,490	1,440					
31	745		[a] 585			7,340						
1926–27												
1		891	555				5,520	4,910	7,340	2,980	1,260	
2		745	555				6,220	4,730	6,980	2,980	1,260	
3		816	555				7,270	4,910	6,630	[a] 2,840	1,400	1,250
4		816	526				8,320	5,030	6,290	2,700	1,400	
5		780	526			320	9,280	5,960	6,290	2,700	1,260	
6		711	526		310		9,690	6,290	5,960	2,700	1,260	
7		678	498				9,690	6,290	5,960	2,700	1,260	
8	820	678	498			555	9,280	6,290	5,640	2,700	1,180	
9		711	498			615	9,200	6,290	5,330	2,700	1,260	
10		[a] 718	470	350		615	8,790	6,430	5,090	2,700	1,260	
11		[a] 725	470			745	9,120	7,860	4,970	2,420	1,260	
12		[a] 731	443			891	9,690	8,870	4,670	2,420	1,260	
13		[a] 738	[a] 443			1,010	10,600	9,360	4,440	2,420	1,180	
14		745	443			1,400	9,780	9,440	4,140	2,420	1,260	
15		816	417			2,300	9,690	9,440	4,140	2,250	1,180	
16	816	780	[a] 417			3,620	9,610	9,360	3,910	2,250	1,180	
17	853	1,090	[a] 417		300	5,150	9,120	9,200	3,910	2,090	1,260	
18	853	1,050	417			6,630	8,870	8,870	3,560	1,880	1,180	1,200
19	745	1,050	443			7,340	8,790	8,480	3,560	1,880		
20	816	1,050	[a] 436			7,790	8,640	7,850	3,440	1,880		
21	816	816	[a] 430	330		7,720	8,640	7,340	3,270	1,880		
22	853	745	[a] 423			7,560	8,400	6,980	3,500	1,880		
23	816	678	417			7,270	8,090	6,630	3,730	1,880	1,200	
24	816	646	[a] 392			6,980	7,420	6,910	4,020	1,780		
25	891	585	368			6,910	6,770	7,860	3,560	1,780		
26	816	526	368		310	6,360	6,290	8,480	3,560	1,780		
27	816	498	345			5,640	5,960	8,870	3,210	1,780		
28	853	555	345	310		5,210	5,770	9,280	3,390	1,680		
29	891	555	345			5,150	5,520	9,280	3,270	1,680	1,250	
30	891	585	392			5,270	4,790	8,480	3,150	1,680		
31	891		392			5,330		7,720		1,490		

[a] Interpolated.

Daily discharge, in second-feet, of Red River at Grand Forks, N. Dak., 1924–1929—Continued

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1927–28												
1		1,010				615	11,600	2,980	1,490	2,980	1,440	2,580
2		1,010				a 615	12,200	2,980	1,490	2,700	1,440	3,440
3	1,050	1,010				615	11,700	2,700	1,490	2,700	1,010	2,980
4		1,010				a 615	10,100	2,870	1,490	2,420	1,130	2,530
5		1,010				615	8,870	2,870	1,490	2,420	1,180	2,300
6		1,010				a 615	6,980	2,870	1,400	2,140	1,220	2,140
7		1,010				615	6,290	2,640	1,400	2,420	1,260	2,040
8	1,060	1,010				a 615	5,640	2,420	1,400	2,420	1,260	1,880
9		1,010				a 615	5,330	2,420	1,400	2,420	1,260	1,880
10		1,010				615	5,030	2,420	1,630	2,420	1,260	1,880
11		1,010				a 648	4,440	2,420	1,630	2,420	1,260	2,250
12		970				a 681	4,490	2,420	1,630	2,420	1,260	2,040
13	1,200	970				a 714	4,020	2,420	1,630	2,420	1,260	1,400
14		970				a 747	3,560	2,420	1,630	2,420	1,260	1,630
15		970	730	580	600	780	3,560	2,140	1,630	2,300	1,260	1,830
16		970				780	3,330	2,140	1,630	2,140	1,310	2,090
17		970				780	2,980	2,140	1,630	2,040	1,310	2,200
18	1,150	930				816	2,980	2,140	1,880	2,040	1,350	2,750
19		930				853	2,980	2,140	2,420	2,040	1,350	2,750
20		930				853	2,980	2,140	3,100	2,040	1,350	2,750
21		930				1,050	2,980	2,140	3,560	2,040	1,400	2,580
22		930				1,090	2,700	1,880	4,140	2,040	1,350	2,420
23	1,100	930				1,260	2,420	1,880	4,140	1,930	1,310	2,420
24		930				1,780	2,420	1,880	3,910	1,830	1,260	2,420
25		930				4,020	2,420	1,880	3,910	1,680	1,180	2,140
26		930				5,770	2,420	1,880	3,560	1,630	1,130	2,140
27		891				7,420	2,700	1,880	3,560	1,630	1,130	1,880
28	1,080	a 878				8,870	2,980	1,880	3,330	1,580	1,050	1,880
29		a 866				10,000	2,980	1,400	3,330	1,490	1,400	1,880
30		853			-------	10,800	2,980	1,400	2,980	1,440	1,630	1,880
31		-------			-------	11,300	-------	1,400	-------	1,440	2,250	------
1928–29												
1	a 1,640	1,880	845	a 966	695	695	6,700	2,420	1,830	1,220	497	313
2	1,400	1,780	845	a 966	a 695	a 695	5,960	2,420	1,830	1,130	473	308
3	1,400	1,580	845	966	a 695	695	5,900	2,420	1,880	1,050	452	304
4	1,400	1,400	845	a 946	695	a 750	5,150	2,420	1,780	966	443	298
5	1,400	1,400	845	925	a 684	806	4,610	2,420	1,730	885	443	298
6	1,400	1,400	885	a 925	a 672	a 781	4,140	2,250	1,730	845	452	298
7	1,400	1,310	925	925	660	a 756	4,020	2,250	1,730	768	452	298
8	a 1,400	1,400	966	a 925	a 660	731	4,440	2,250	1,730	806	443	292
9	1,400	1,490	966	a 925	660	a 768	4,730	2,250	1,400	806	437	288
10	1,400	1,400	a 966	925	a 643	806	4,610	2,250	1,400	806	432	288
11	1,400	1,400	a 966	a 925	626	a 806	4,140	2,250	1,400	768	438	288
12	a 1,400	1,400	966	925	a 626	806	3,850	2,250	1,400	806	447	288
13	1,400	1,350	966	925	a 626	806	3,270	2,140	1,260	845	432	288
14	1,400	1,350	966	a 912	626	1,400	3,440	2,140	1,130	806	423	288
15	1,400	1,350	966	a 898	a 626	2,420	3,270	2,140	1,050	806	402	284
16	1,400	1,310	966	885	626	3,910	2,980	2,140	966	768	387	278
17	1,400	1,310	966	a 885	626	6,840	2,980	1,980	1,050	768	358	268
18	1,400	1,260	a 966	885	a 609	9,690	2,980	1,980	1,130	806	363	268
19	1,400	1,260	a 966	a 865	593	11,400	2,980	1,980	1,130	806	372	268
20	1,400	1,220	a 966	845	a 585	14,000	2,980	1,980	1,090	768	372	278
21	1,400	1,180	a 966	a 845	a 577	15,600	2,980	1,980	1,090	731	358	288
22	1,400	1,130	966	845	a 569	16,100	2,980	1,830	1,050	695	333	282
23	1,400	1,050	966	a 832	561	16,900	2,870	1,830	1,010	695	328	278
24	1,400	1,010	a 966	a 819	561	17,100	2,980	1,830	966	660	320	288
25	1,400	966	a 966	806	a 606	16,700	2,870	1,830	925	654	313	298
26	1,400	885	966	a 787	a 650	16,600	2,870	1,830	1,090	638	313	308
27	1,310	845	a 966	768	695	14,000	2,980	1,880	a 1,140	676	320	313
28	1,400	845	966	a 750	a 695	13,700	2,980	1,930	1,180	606	320	320
29	1,540	845	a 966	731	-------	10,700	2,700	1,830	1,260	558	333	320
30	1,630	885	a 966	a 719	-------	8,710	2,420	1,830	1,260	549	333	310
31	1,780	-------	966	a 707	-------	7,200	-------	1,830	-------	549	320	------

a Interpolated.

Monthly discharge, in second-feet, of Red River at Grand Forks, N. Dak., 1924–1929

Month	Maximum	Minimum	Mean	Run-off in acre-feet
1924–25				
October	678	443	553	34,000
November			411	24,500
December			206	12,700
January			130	7,990
February			140	7,780
March	6,290		1,110	68,200
April	6,770	646	2,220	131,600
May	1,930	1,010	1,410	86,700
June	9,690	1,310	5,770	343,000
July	4,790	498	2,170	133,000
August			388	23,900
September			503	29,900
The year	9,690		1,250	903,000
1925–26				
October		711	845	52,000
November	853	585	702	41,800
December	646	585	623	38,300
January			480	29,500
February			480	26,700
March	7,720		2,430	149,000
April	6,910	1,440	3,870	230,000
May	1,400		1,090	67,000
June			1,900	113,000
July			1,300	79,900
August			460	28,300
September			420	25,000
The year	7,720		1,220	880,000
1926–27				
October	891	745	830	51,000
November	1,090	498	750	44,600
December	555	345	444	27,300
January			336	20,700
February			306	17,000
March	7,790		3,560	219,000
April	10,600	4,790	8,160	486,000
May	9,440	4,730	7,540	464,000
June	7,340	3,150	4,560	271,000
July	2,980	1,490	2,220	136,000
August	1,400	1,180	1,240	76,200
September			1,210	72,000
The year	10,600		2,600	1,880,000
1927–28				
October			1,110	68,200
November	1,010	853	960	57,100
December			730	44,900
January			580	35,700
February			600	34,500
March	11,300	615	2,490	153,000
April	12,200	2,420	4,870	290,000
May	2,980	1,400	2,230	137,000
June	4,140	1,400	2,330	139,000
July	2,980	1,440	2,130	131,000
August	2,250	1,010	1,310	80,600
September	3,440	1,400	2,230	133,000
The year	12,200		1,790	1,300,000
1928–29				
October	1,780	1,310	1,430	87,900
November	1,880	845	1,260	75,000
December	966	845	943	58,000
January	966	707	869	53,400
February	695	561	637	35,400
March	17,100	695	6,870	422,000
April	6,700	2,420	3,730	222,000
May	2,420	1,830	2,090	129,000
June	1,880	925	1,320	78,600
July	1,220	549	783	48,100
August	497	313	390	24,000
September	320	268	293	17,400
The year	17,100	268	1,730	1,250,000

BOIS DES SIOUX RIVER NEAR TENNEY, MINN.

LOCATION.—Staff gage near center of sec. 22, T. 130 N., R. 47 W., at Soo Railway bridge, 5 miles west of Tenney and 15 miles below Lake Traverse.
DRAINAGE AREA.—1,460 square miles.
RECORDS AVAILABLE.—April, 1919, to September, 1929.
EXTREMES.—Maximum discharge during year, 53 second-feet Apr. 19 to May 1 (gage height, 3.9 feet); minimum, no flow for several months.
1919–1929: Maximum discharge, 390 second-feet Apr. 22, 1922 (gage height, 5.7 feet); no flow in several different years.
REMARKS.—Records poor.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	a 1	2	a 0	a 11	53	25	a 11	4	a 1
2	1	2	a 0	a 12	a 51	a 25	11	a 4	a 1
3	a 1	2	a 1	a 12	a 49	a 25	a 10	4	a 1
4	a 1	2	a 4	a 12	48	25	a 9	a 4	1
5	a 1	2	a 7	a 13	a 46	a 25	a 8	a 3	a 1
6	1	2	a 10	a 13	44	a 24	7	3	a 1
7	a 1	2	a 13	13	a 45	a 23	a 7	a 3	1
8	a 1	2	a 16	a 19	a 46	22	a 7	a 3	a 1
9	a 1	2	a 19	25	a 46	a 21	a 7	a 3	a 1
10	a 1	2	a 22	a 27	a 47	a 20	a 7	3	a 1
11	a 1	2	25	a 28	48	a 20	a 7	a 3	a 1
12	a 1	2	a 27	a 30	a 40	19	a 7	a 2	a 1
13	1	1	a 30	32	32	a 19	7	a 2	a 1
14	a 1	1	32	a 37	a 32	a 19	a 8	2	1
15	a 2	1	a 34	a 43	a 32	19	a 8	a 2	a 1
16	2	1	a 37	48	a 32	a 19	9	a 2	0
17	a 2	1	a 39	a 50	a 32	a 19	a 9	2	0
18	a 2	1	a 42	a 51	32	a 19	a 9	a 2	0
19	a 2	1	44	53	a 32	19	a 9	a 2	0
20	2	1	a 45	a 53	a 31	a 19	9	2	0
21		1	a 46	a 53	a 30	a 19	a 9	a 2	0
22		1	a 47	53	a 30	19	a 9	a 2	0
23		1	48	a 53	a 29	a 16	a 9	a 2	0
24		0	a 40	a 53	a 28	a 14	9	2	0
25		0	a 32	a 53	28	11	a 9	a 2	0
26	2	0	a 24	a 53	a 28	a 11	a 9	a 2	0
27		0	16	53	28	a 11	9	a 1	0
28		0	a 14	a 53	a 28	a 11	a 8	1	0
29		0	a 13	a 53	a 27	11	a 7	a 1	0
30		0	11	a 53	a 26	a 11	a 6	a 1	0
31			a 11		a 25		a 5	1	

Month	Maximum	Minimum	Mean	Run-off in acre-feet
October	2	1	1.5	92
November			.8	48
March	48	0	24.2	1,490
April	53	11	37.1	2,210
May	53	25	36.3	2,230
June	25	11	18.7	1,110
July	11	5	8.2	504
August	4	1	2.3	141
September	1	0	.5	30
The year	53	0	10.8	7,855

a Interpolated.

NOTE.—No flow during December, January, and February.

SHEYENNE RIVER AT SHEYENNE, N. DAK.

LOCATION.—Staff gage in T. 150 N., R. 66 W., about 1 mile north of Sheyenne, N. Dak.

RECORDS AVAILABLE.—April to September, 1929.

EXTREMES.—Maximum discharge during period, 41 second-feet May 31 (gage height, 2.42 feet); no flow Aug. 17 to Sept. 30.

REMARKS.—Daily gage heights and current-meter measurements furnished by R. E. Kennedy, State engineer of North Dakota. Records fair except those for July 1 to Sept. 30, which were estimated.

Daily and monthly discharge, in second-feet, 1929

Day	Apr.	May	June	July	Aug.
1		14	37		
2		14	33		
3		13	17		
4		12	13		
5		11	12		
6		10	11		
7		8.9	10		
8		7.7	10		
9		6.6	10		0.1
10		12	11	0.3	
11		12	11		
12		11	10		
13		10	11		
14		10	11		
15		8.9	11		
16		8.3	8.9		
17		6.6	9.2		0
18		5.5	9.4		0
19		6.1	9.7		0
20		6.1	10		0
21		5.5	7.4		0
22		7.7	6.1		0
23		6.6	5.0		0
24		5.0	4.6		0
25		5.5	3.8	.2	0
26	8.9	5.5	3.4		0
27	8.3	11	3.0		0
28	5.0	9.4	2.3		0
29	5.0	9.4	1.6		0
30	12	41	1.0		0
31		41			0

Month	Maximum	Minimum	Mean	Run-off in acre-feet
April 26–30			7.84	77.8
May	41	5.5	11.0	676
June	37	1.0	10.1	601
July			.258	15.9
August			.052	3.2
The period				1,370

NOTE.—No flow during September.

RED LAKE RIVER AT THIEF RIVER FALLS, MINN.

LOCATION.—Staff gage in sec. 33, T. 154 N., R. 43 W., one-third mile below dam at Thief River Falls and 1 mile below mouth of Thief River.

DRAINAGE AREA.—3,430 square miles.

RECORDS AVAILABLE.—July, 1909, to September, 1918; March, 1920, to September, 1929.

EXTREMES.—Maximum discharge during year, 4,000 second-feet Mar. 18 (gage height, 11.53 feet, affected by ice); minimum, 127 second-feet Aug. 8 (gage height, 3.75 feet).

1909–1918, 1920–1929: Maximum discharge (estimated), 8,000 second-feet Apr. 16, 1916 (gage height, 15.0 feet, affected by ice); no flow July 17 and Aug. 27, 1911, caused by regulation.

REMARKS.—Records good except those for period of ice effect (Nov. 28 to Mar. 21) and for August and September, when operation of power plant above station causes fluctuation in discharge, which are poor.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	850	755	541	a 348	a 368	a 415	2,020	900	800	622	182	273
2	800	581	a 491	356	391	427	1,940	1,060	800	409	409	374
3	800	800	a 441	a 404	a 391	a 427	1,780	850	800	522	409	182
4	622	755	391	a 453	a 391	a 427	1,460	850	900	409	182	409
5	665	900	a 449	502	a 391	427	1,320	800	800	522	409	409
6	755	800	a 506	a 502	391	a 427	1,700	800	800	483	409	409
7	755	1,060	a 564	a 502	a 380	a 427	2,110	800	755	409	409	211
8	755	850	622	a 502	a 368	a 427	1,780	850	800	409	127	211
9	755	850	a 600	502	356	427	1,700	900	622	374	154	339
10	800	850	a 581	a 502	a 368	a 439	1,620	900	710	444	409	182
11	800	710	a 561	a 502	a 380	a 452	1,390	900	800	483	242	444
12	800	1,000	541	502	391	464	1,390	800	710	483	339	182
13	850	850	a 517	a 502	a 368	427	1,250	900	710	483	444	339
14	800	950	a 490	a 502	a 324	427	1,120	950	710	409	154	339
15	800	800	464	a 502	a 290	800	1,390	900	622	464	182	211
16	800	800	a 474	502	257	1,000	1,390	900	622	374	154	211
17	800	850	a 483	a 490	a 273	2,550	1,250	1,000	622	444	374	182
18	850	665	a 492	a 471	a 290	4,000	1,120	900	622	444	226	167
19	800	850	502	464	a 306	2,020	1,120	800	541	374	444	182
20	755	541	a 528	a 455	322	2,820	1,120	900	541	483	374	182
21	755	391	a 554	a 445	a 345	2,370	1,000	850	409	211	391	427
22	850	356	581	a 436	a 368	2,730	1,000	900	409	339	182	182
23	800	427	a 516	427	391	2,550	800	800	374	444	211	154
24	850	502	a 452	a 392	a 391	1,860	1,000	850	541	374	154	182
25	800	289	a 387	a 357	a 391	2,110	1,000	900	541	306	211	211
26	800	502	322	322	a 391	1,860	1,120	900	522	409	339	182
27	800	444	a 322	a 322	391	2,280	1,120	900	541	409	409	182
28	755	541	a 322	a 322	a 403	2,730	1,120	900	541	273	444	211
29	800	581	322	a 322	-------	3,700	1,000	900	622	444	182	211
30	950	541	a 330	322	-------	3,600	800	850	409	444	242	339
31	900	-------	a 339	a 345	-------	2,820	-------	900	-------	409	409	-------

Month	Maximum	Minimum	Mean	Run-off in acre-feet
October	950	622	796	48,900
November	1,060	289	693	41,200
December	-------	-------	474	29,100
January	-------	-------	435	26,700
February	-------	-------	359	19,900
March	4,000	-------	1,540	94,700
April	2,110	800	1,330	79,200
May	1,060	800	881	54,200
June	900	374	640	38,100
July	622	211	423	26,000
August	444	127	297	18,300
September	444	154	257	15,300
The year	4,000	127	679	492,000

a Interpolated.

RED LAKE RIVER AT CROOKSTON, MINN.

LOCATION.—Chain gage in sec. 30, T. 150 N., R. 46 W., at highway bridge in Crookston. one-fourth mile below dam and power house of Crookston Light, Water & Power Co.

DRAINAGE AREA.—5,320 square miles.

RECORDS AVAILABLE.—May, 1901, to September, 1929.

EXTREMES.—Maximum discharge during year, 7,910 second-feet Mar. 19 (gage height, 14.9 feet, affected by ice); minimum, 90 second-feet Sept. 20 (gage height, 3.4 feet, affected by aquatic growth).

1901–1929, Maximum discharge, 14,700 second-feet July 5, 1919; minimum, 5 second-feet Aug. 6–8, 1925, caused by regulation.

REMARKS.—Records good for April and May; fair for October, November, June to September, and poor for period of ice effect, December to March. Stage subject to diurnal fluctuation caused by operations at power plant just above station.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	940	800	755	a 767	a 530	a 500	3,750	1,380	1,040	590	360	260
2	940	800	a 703	800	510	510	2,760	1,320	1,040	550	360	260
3	940	755	a 652	a 743	a 510	a 497	1,500	1,560	1,040	550	360	325
4	940	800	a 601	a 686	510	a 484	2,340	845	1,040	470	360	290
5	890	890	550	630	a 494	470	2,280	1,260	1,040	470	360	260
6	940	890	a 550	a 686	a 478	a 520	2,280	1,320	890	395	360	200
7	940	940	a 550	a 743	a 462	a 570	2,340	1,320	845	470	300	290
8	940	940	550	800	a 446	a 620	2,620	1,200	890	550	325	290
9	940	1,040	a 697	a 757	430	670	2,620	1,200	890	470	a 325	325
10	940	890	a 844	a 714	a 443	a 670	2,280	1,320	940	550	a 325	290
11	940	990	990	670	a 456	a 670	2,210	1,200	845	550	325	290
12	940	990	a 957	a 691	470	670	2,140	1,200	710	395	300	200
13	940	990	a 924	a 712	a 470	a 1,400	1,950	1,320	845	590	360	140
14	940	845	890	a 733	a 470	a 2,130	1,950	1,380	845	590	300	140
15	990	800	a 845	755	a 470	a 2,860	1,950	1,320	670	590	325	140
16	890	940	a 800	a 726	470	3,590	1,820	1,200	800	590	a 325	115
17	940	990	a 755	a 698	a 470	a 5,030	1,690	1,200	1,040	510	a 325	260
18	a 940	940	710	670	a 470	a 6,470	1,760	1,140	800	510	325	290
19	a 940	940	a 710	a 654	470	7,910	1,690	1,320	800	430	325	290
20	a 940	940	a 710	a 638	a 470	a 7,300	1,690	1,320	670	430	325	90
21	940	940	a 710	a 622	a 470	a 6,700	1,690	1,260	550	430	325	170
22	940	590	710	a 606	a 470	a 6,090	1,690	1,090	590	430	260	260
23	1,040	590	a 690	590	470	5,480	1,320	990	510	430	260	260
24	940	510	670	a 590	a 470	a 5,280	1,320	990	510	395	200	260
25	940	430	a 670	a 590	a 470	a 5,090	1,440	1,040	510	395	170	260
26	940	395	a 670	590	470	4,890	1,440	1,040	510	325	200	260
27	950	360	a 670	a 590	a 480	a 4,950	1,260	990	550	325	200	230
28	940	395	a 670	a 590	a 490	a 5,020	1,320	1,260	510	360	200	230
29	940	a 515	670	590	------	a 5,080	1,440	1,200	510	395	325	230
30	940	a 635	a 702	a 570	------	5,140	1,440	1,200	510	395	290	230
31	845	------	a 734	a 550	------	a 4,450	------	1,140	------	395	260	------

Month	Maximum	Minimum	Mean	Run-off in acre-feet
October	1,040	845	939	57,700
November	1,040	360	782	46,500
December	990	550	720	44,300
January	800	550	669	41,100
February	530	430	475	26,400
March	7,910	470	3,280	202,000
April	3,750	1,260	1,930	115,000
May	1,560	845	1,210	74,400
June	1,040	510	765	45,500
July	590	325	469	28,800
August	360	170	302	18,600
September	325	90	238	14,200
The year	7,910	90	987	714,000

a Interpolated.

THIEF RIVER NEAR THIEF RIVER FALLS, MINN.

LOCATION.—Chain gage in sec. 3, T. 154 N., R. 43 W., 5 miles north of Thief River Falls.

DRAINAGE AREA.—1,010 square miles.

RECORDS AVAILABLE.—July, 1909, to September, 1917; April, 1920, to September, 1921; October, 1922, to September, 1924; October, 1928, to September, 1929.

EXTREMES.—Maximum discharge during year, 1,780 second-feet Mar. 18 and 19 (gage height, 13.5 feet, affected by ice); no flow Aug. 19 to Sept. 30.

1909–1917, 1920–21, 1922–1924, 1928–29: Maximum discharge, 4,080 second-feet Apr. 23, 1916 (gage height, 14.5 feet); no flow in fall and winter several years.

Maximum stage known, 16.3 feet in July, 1919 (discharge, about 4,900 second-feet).

REMARKS.—Records fair except those for estimated periods, which are poor. Discharge estimated Nov. 18–30, Mar. 1–16, and May 5–20. No record for December, January, and February.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Mar.	Apr.	May	June	July	Aug.
1	e 40	e 12		482	e 205	63	5.0	e 0.2
2	36	e 11		e 476	e 176	e 56	e 5.0	e .2
3	e 43	10		e 470	e 148	49	e 4.0	.2
4	e 50			e 462	120	e 46	e 4.0	e .2
5	e 56			e 456		e 44	e 3.0	.2
6	63			450		e 41	3.0	e .2
7	e 63			e 443		e 39	e 3.0	e .2
8	e 63			e 436		36	3.0	e .2
9	e 63		2	e 429		e 42	e 3.0	.2
10	e 63	10		e 422		49	e 3.0	e .2
11	e 63			e 415		e 44	e 3.0	e .1
12	e 63			e 408	100	e 39	e 3.0	.1
13	e 63			e 401		e 35	3.0	e .1
14	63			e 494		e 30	e 3.0	e .1
15	e 59			387		25	3.0	e .1
16	e 55			e 375		e 18	e 3.0	e .1
17	e 50	10	63	e 362		10	e 3.0	.1
18	e 45		1,780	e 350		e 9	e 2.0	e .1
19	e 40		1,780	e 337		e 8	e 2.0	0
20	36		1,580	325		e 7	2.0	0
21	e 34		1,580	e 316	79	e 6	e 2.0	0
22	e 31		1,540	e 307	e 58	5	1.0	0
23	e 28		1,380	e 298	36	e 5	e .9	0
24	e 26	5	1,020	e 289	63	5	e .8	0
25	e 24		1,020	e 279	e 68	e 5	e .7	0
26	e 21		e 932	e 269	e 74	e 5	e .6	0
27	e 18		e 844	e 260	79	e 5	.5	0
28	16		e 754	e 251	e 76	e 5	e .4	0
29	e 15		e 666	e 242	e 73	5	.2	0
30	e 14		578	233	e 69	e 5	e .2	0
31	e 13		450		e 66		e .2	0

Month	Maximum	Minimum	Mean	Run-off in acre-feet
October	63	13	42.5	2,610
November	12		7.9	470
March	1,780		516	31,700
April	482	233	371	22,100
May	205	36	96.5	5,930
June	63	5	24.7	1,470
July	5	.2	2.27	140
August	.2	0	.09	6
The year	1,780	0	89.0	64,400

e Interpolated.

NOTE.—No flow during September.

SOUTH FORK OF TWO RIVERS AT PELAN, MINN.

LOCATION.—Chain gage in S. ¼ sec. 30, T. 160 N., R. 44 W., one-fourth mile west of Pelan.

RECORDS AVAILABLE.—August, 1928, to September, 1929.

EXTREMES.—Maximum discharge during year and period of record, 718 second-feet Mar. 21 (gage height, 6.4 feet); no flow at times during winter and from Aug. 5 to Sept. 30, 1929.

REMARKS.—Records good except those for period of ice effect (Nov. 1 to Mar. 13), which are poor.

Daily and monthly discharge, in second-feet, 192?-29

Day	Oct.	Nov.	Dec.	Mar.	Apr.	May	June	July	Aug.
1	6.0	2.7		0	88	19	60	3.9	0.1
2	5.6			0	70	18	44	1.4	.1
3	5.2			0	65	16	32	2.0	.1
4	4.7			0	56	15	21	1.4	.1
5	5.2			0	54	14	15	.7	0
		2.5							
6	5.6			0	107	11	11	.7	0
7	6.6			0	160	11	6.6	1.0	0
8	6.6			0	154	9.8	7.8	1.0	0
9	7.2			0	118	9.8	6.6	1.0	0
10	7.2	1.8		0	97	9.8	6.0	.6	0
11	6.6			0	92	17	5.2	.6	0
12	6.0			0	83	42	4.3	1.3	0
13	6.0			6	78	34	3.6	1.1	0
14	5.6			17	74	27	3.0	.8	0
15	6.0			78	65	22	3.3	.8	0
16	6.6		1.0	260	60	19	3.6	1.6	0
17	5.2			414	54	17	3.0	1.3	0
18	5.6			638	50	15	2.4	.8	0
19	5.2			618	48	12	2.2	.6	0
20	5.2			678	47	11	2.2	.6	0
		2.0							
21	4.7			718	41	9.8	2.4	1.2	0
22	5.2			618	37	8.4	1.8	2.2	0
23	4.7			432	34	7.2	2.4	1.1	0
24	5.2			308	35	6.6	3.6	.4	0
25	4.7			200	37	6.0	3.9	.5	0
26	3.6			136	33	7.8	3.9	.6	0
27	3.6			214	29	9.0	3.6	.3	0
28	3.3			214	26	17	4.7	.3	0
29	3.3			200	22	48	6.0	.2	0
30	3.0			148	20	60	3.9	.2	0
31	2.7	-------		83	-------	78	-------	.1	0

Month	Maximum	Minimum	Mean	Run-off in acre-feet
October	7.2	2.7	5.22	320
November	-------	-------	2.15	128
December	-------	-------	1.0	61
March	718	0	193	11,900
April	160	20	64.5	3,840
May	78	6.0	19.6	1,210
June	60	1.8	9.30	553
July	3.9	.1	.98	60
August	.1	0	.01	6
The year	718	0	24.9	18,100

NOTE.—No flow during January, February, and September.

SOUTH FORK OF TWO RIVERS AT BRONSON, MINN.

LOCATION.—Chain gage in SW. ¼ sec. 30, T. 161 N., R. 46 W., one-fourth mile west of Bronson.

RECORDS AVAILABLE.—September, 1928, to September, 1929.

EXTREMES.—Maximum discharge during year, 910 second-feet Mar. 20 (gage height, 6.90 feet); minimum discharge occurred during estimated period in August and September and was less than 1 second-foot.

REMARKS.—Records good Apr. 1 to July 31 and fair for rest of year. Mean monthly discharge estimated for August and September.

Daily and monthly discharge, in second-feet, 1928–29

Day	Sept.	Oct.	Mar.	Apr.	May	June	July
1		7		242	40	109	13
2		8		198	40	102	11
3		8		198	38	74	9
4		11		206	36	59	9
5		12		206	30	42	8
6		9		242	28	30	8
7		10		300	27	22	8
8		9		386	27	21	8
9		12		320	27	18	8
10		14		260	28	15	8
11		14		242	30	15	7
12		12		206	40	14	7
13		12		224	57	8	7
14		13	15	190	52	4	7
15		13	76	158	40	6	7
16		10	158	158	40	7	9
17		11	588	144	30	8	8
18		13	820	130	30	8	8
19		14	850	116	30	9	8
20		13	910	102	28	10	9
21		10	760	89	22	10	8
22		10	850	76	19	9	7
23		10	880	59	15	10	6
24	11	11	700	59	15	9	6
25	9	10	510	59	18	9	5
26	9	9	410	57	21	10	5
27	9	4	386	54	21	12	5
28	7	4	434	52	36	13	5
29	7	4	484	47	59	14	5
30	7	6	484	40	86	14	5
31		7	320		109		5

Month	Maximum	Minimum	Mean	Run-off in acre-feet
September 24–30	11	7	8.43	117
October	14	4	10.0	615
March 14–31	910	15	535	19,100
April	386	40	161	9,580
May	109	15	36.1	2,220
June	109	4	23.0	1,370
July	13	5	7.39	454
August			1.0	61
September			1.5	89

NOTE.—No record Nov. 1 to Mar. 13.

TWO RIVERS[1] AT HALLOCK, MINN.

LOCATION.—Chain gage in NE. ¼ sec. 13, T. 161 N., R. 49 W., half a mile below mouth of Middle Fork, half a mile east of Hallock, and half a mile above former station.

DRAINAGE AREA.—776 square miles.

RECORDS AVAILABLE.—April, 1911, to September, 1914; April to September, 1929.

EXTREMES.—Maximum discharge during year, 99 second-feet June 1 and 2 (gage height, 6.35 feet); minimum, 0.6 second-foot occasionally in August and September (gage height, 4.0 feet).

1911–1914, 1929: Maximum discharge, 1,200 second-feet Apr. 13, 1913 (not referred to present gage); minimum, 0.4 second-foot Aug. 13–17, 1914 (not referred to present gage).

REMARKS.—Records good except those for extremely low stages, which are fair.

Daily and monthly discharge, in second-feet, 1929

Day	Apr.	May	June	July	Aug.	Sept.	Day	Apr.	May	June	July	Aug.	Sept.
1	------	52	94	10	1.4	0.6	16	------	42	21	17	1.0	1.0
2	------	48	94	11	1.2	.6	17	------	38	18	12	.9	1.0
3	------	45	84	10	1.2	.6	18	------	32	8	10	.8	1.0
4	------	42	68	10	1.5	.6	19	------	32	5	8.0	.8	1.0
5	------	38	52	10	1.5	.6	20	------	32	14	7.0	.8	1.0
6	------	38	45	9.0	1.2	.6	21	------	32	15	7.0	.8	1.0
7	------	35	38	8.0	1.2	.6	22	------	31	12	6.0	.8	1.0
8	------	32	32	8.0	1.2	.8	23	------	30	12	6.0	.8	1.0
9	------	32	32	8.0	1.2	.9	24	------	30	13	6.0	.6	1.4
10	------	32	30	8.0	1.0	1.0	25	------	30	12	5.0	.6	2.1
11	------	32	27	7.0	1.0	1.0	26	------	30	12	5.0	.6	2.8
12	------	32	24	7.0	1.0	1.0	27	76	30	12	4.0	.6	4.0
13	------	32	24	6.0	1.0	1.0	28	68	42	11	3.0	.6	5.0
14	------	45	22	6.0	1.0	1.0	29	64	42	11	2.8	.6	6.0
15	------	45	22	6.0	1.0	1.0	30	60	64	10	2.1	.6	6.0
							31	------	80	------	1.5	.6	------

Month	Maximum	Minimum	Mean	Run-off in acre-feet
April 27–30	----------	----------	67.0	531
May	80	30	38.6	2,370
June	94	5	29.1	1,730
July	17	1.5	7.30	449
August	1.5	.6	.94	58
September	6	.6	1.57	93
The period	----------	----------	----------	5,230

[1] Formerly published as "South Fork of Two Rivers at Hallock, Minn."

NORTH FORK OF TWO RIVERS NEAR LANCASTER, MINN.

LOCATION.—Staff gage in NW. ¼ sec. 6, T. 162 N., R. 47 W., 8 miles northeast of Lancaster.

RECORDS AVAILABLE.—April to September, 1929.

EXTREMES.—Maximum discharge during period, 5.8 second-feet Apr. 8 (gage height, 0.94 foot); no flow June 12 to Sept. 30.

REMARKS.—Records fair.

Daily and monthly discharge, in second-feet, 1929

Day	Apr.	May	June	Day	Apr.	May	June	Day	Apr.	May	June
1	3.0	e0.5	0.8	11	e3.7	e0.6	e0.1	21	e1.2	e0.3	0
2		e.5	e.7	12	3.4	e.6	e0	22	1.1	.3	0
3		e.5	e.6	13	3.2	.7	0	23	1.0	e.3	0
4		.5	.4	14	e2.9	.6	0	24	e.9	e.3	0
5	3.4	e.4	e.3	15	2.6	e.5	0	25	e.9	.3	0
6	e4.2	.4	.2	16	2.3	.4	0	26	.8	.3	0
7	e5.0	e.4	.2	17	e2.0	.4	0	27	.6	.2	0
8	5.8	.4	e.2	18	1.8	.4	0	28	e.6	e.3	0
9	4.4	e.4	e.1	19	1.5	e.4	0	29	.5	e.6	0
10	e4.1	.5	e.1	20	e1.4	.3	0	30	.5	e.8	0
								31		.9	

Month	Maximum	Minimum	Mean	Run-off in acre-feet
April	5.8	0.5	2.39	142
May	.9	.2	.45	28
June	.8	0	.12	7.1
The period				177

e Interpolated.

NOTE.—No flow during July, August, and September.

STATE DITCH NO. 85 NEAR LANCASTER, MINN.

LOCATION.—Staff gage in southwest corner sec. 6, T. 162 N., R. 46 W., 7 miles northeast of Lancaster, Minn.
RECORDS AVAILABLE.—April to September, 1929.
EXTREMES.—Maximum discharge during year, 102 second-feet Apr. 8 (gage height, 3.28 feet); ditch dry several months of year.
REMARKS.—Records fair.

Daily and monthly discharge, in second-feet, 1929

Day	Apr.	May	June	July
1	60	*3.5	2.6	*0.1
2		*3.2	*2.3	.1
3		*2.9	*1.9	.1
4	68	2.6	1.6	*.1
5	87	*2.4	*1.3	*.1
6	*92	2.3	1.0	.1
7	*97	*2.0	.7	*0
8	102	1.7	*.7	0
9	68	*1.9	*.6	0
10	*68	2.1	*.5	
11	*68	*2.3	*.4	
12	68	*2.6	*.3	
13	63	2.8	.3	.1
14	*54	2.4	*.3	
15	46	*2.2	.3	
16	38	1.9	*.2	
17	*30	1.7	.1	.4
18	23	1.6	.1	.2
19	20	*1.4	.1	*.1
20	*18	1.1	*.1	0
21	*15	*1.0	*.1	0
22	13	.8	*.1	0
23	11	*.9	*.1	0
24	*9	*.9	.1	0
25	*8	1.0	*.1	0
26	5.9	1.1	*.1	0
27	4.9	.7	.1	0
28	*4.6		.2	0
29	4.3	1.0	.1	0
30	3.8		*.1	0
31	-------	3.2	-------	0

Month	Maximum	Minimum	Mean	Run-off in acre-feet
April	102	3.8	42.3	2,520
May	3.5	.7	1.85	114
June	2.6	.1	.55	33
July	.4	0	.06	3.7
The period	----------	----------	----------	2,670

* Interpolated.

NOTE.—No flow during August and September.

PEMBINA RIVER AT NECHE, N. DAK.

LOCATION.—Staff gage in sec. 36, T. 164 N., R. 54 W., two-thirds mile north of Neche, N. Dak.

DRAINAGE AREA.—2,960 square miles.

RECORDS AVAILABLE.—April, 1903, to September, 1915; April, 1919, to September, 1929.

EXTREMES.—Maximum discharge during year, 750 second-feet Mar. 21 (gage height, 9.0 feet, affected by ice); minimum, 1.0 second-foot July 5–7 (gage height, 2.2 feet).

1903–1915, 1919–1929: Maximum discharge, 3,870 second-feet May 2, 1904 (gage height, 20.9 feet); minimum, 1.0 second-foot several days in September, 1911, and July, 1929.

REMARKS.—Records fair except those for estimated periods, which are poor. Affected by ice and discharge estimated Nov. 5, 1924, to Apr. 4, 1925; Dec. 24, 1925, to Mar. 28, 1926; Nov. 13, 1926, to April 5, 1927; Nov. 11, 1927, to Mar. 28, 1928; and Nov. 19, 1928, to Mar. 29, 1929. Discharge also estimated Sept. 3–9, 1925, and July 3–6, 1928.

Daily discharge, in second-feet, 1924–1929

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1924-25												
1	100	174					960	257	144	257	43	28
2	100	154					960	257	144	234	43	28
3	100	154					696	257	144	234	28	
4	100	154					608	234	144	234	28	
5	117	154					494	234	166	234	28	
6	135	135					494	234	166	211	28	25
7	154	135					494	234	166	211	28	
8	154	135					471	234	166	188	28	
9	174	135					471	234	188	166	28	
10	174	135					471	234	304	144	28	62
11	174						471	211	328	102	18	62
12	194						471	211	352	102	18	62
13	194					8	448	211	400	82	18	62
14	194						424	188	400	82	18	62
15	194						400	188	376	82	18	62
16	194						352	188	376	82	18	62
17	194						328	188	328	82	13	62
18	194						280	188	280	82	13	62
19	194						280	166	257	62	9	62
20	194						280	166	257	62	9	62
21	194	85					280	166	234	62	6	62
22	194						280	166	234	62	6	62
23	194						280	166	234	62	4	62
24	194						280	166	257	62	6	62
25	194						280	166	257	62	6	62
26	174					1,710	280	166	257	62	9	62
27	174					2,280	280	166	257	43	9	82
28	174					2,350	280	166	257	43	18	82
29	174					2,300	257	166	257	43	18	102
30	174					1,730	257	144	257	43	18	102
31	174					1,360		144		43	28	

Daily discharge, in second-feet, 1924–1929—Cont'nued

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1925–26												
1	102	123					191	110	82	96	18	13
2	102	123					174	110	82	69	18	13
3	123	123					174	110	69	48	13	13
4	123	123					174	110	69	48	13	18
5	123	123					174	110	69	82	13	18
6	123	102	28				174	110	69	318	13	18
7	123	102					157	110	69	262	13	24
8	144						157	110	69	226	13	58
9	144						157	110	69	208	13	141
10	144						157	110	58	141	13	69
11	144						157	110	58	141	13	69
12	144					2	157	110	58	125	13	58
13	166						157	110	58	125	13	58
14	166						157	110	58	110	13	48
15	166	62					157	110	58	110	13	48
16	188						157	96	48	96	13	48
17	188						157	96	48	96	13	48
18	188						157	96	48	82	13	48
19	188						141	96	48	82	13	48
20	188				2	2	141	96	48	69	13	48
21	166					2	125	96	110	58	13	48
22	166	28				96	125	96	141	58	13	48
23	144					174	110	96	157	39	13	48
24	123			6		280	110	96	174	31	13	48
25	123					157	110	96	191	31	13	48
26	123				2	141	110	96	208	31	13	48
27	123		18			141	110	82	191	24	13	58
28	123					191	110	82	174	24	13	69
29	123					208	110	82	157	18	13	58
30	123			4		191	110	82	141	18	13	48
31	123					191		82		18	13	
1926–27												
1	48	58		31			157	542	896	542	208	208
2	48	48					226	564	784	520	208	208
3	48	48					318	608	762	457	191	226
4	58	48	31				416	652	740	396	191	226
5	58	48				4	608	740	740	396	191	226
6	58	48					1,400	938	696	376	191	244
7	69						2,060	1,000	652	356	191	244
8	69						1,970	1,160	608	337	191	262
9	69						1,600	1,330	542	337	174	262
10	69						1,580	1,710	499	318	174	299
11	69						1,510	2,590	478	318	157	299
12	58					4	1,470	3,050	478	299	157	299
13	58	48	31			4	1,360	2,650	499	289	141	299
14	58					4	1,220	2,060	436	280	141	299
15	58					499	1,360	1,620	436	244	141	299
16	58					960	1,360	1,490	416	226	141	299
17	58					1,140	1,380	1,220	416	318	141	299
18	48					1,160	1,380	1,050	396	299	174	299
19	58				4	894	1,290	916	396	280	191	299
20	58	39				652	1,200	894	396	262	226	280
21	58			9		478	1,070	740	416	262	226	280
22	58					416	960	630	416	244	226	280
23	58					499	850	828	674	244	226	380
24	58					318	806	938	718	226	226	280
25	58		31			299	740	894	696	226	208	280
26	58					318	696	894	630	226	208	280
27	58					262	630	894	608	226	208	280
28	58					226	608	872	608	226	208	280
29	58			4		191	586	850	586	226	208	280
30	58					174	564	828	564	226	208	280
31	58					174		817		208	208	

Daily discharge, in second-feet, 1924–1929—Continued

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1927-28												
1	292	172					674	239	124	140	95	40
2	292	156					674	222	140	140	95	40
3	292	156					652	205	140	140	95	40
4	292	156					652	188	140	140	82	40
5	274	156					630	172	124	140	82	49
6	274	156					525	156	109	140	82	49
7	274	156					484	156	109	328	82	49
8	274	156					444	156	109	292	82	49
9	274	156					424	172	124	274	70	49
10	274	156				25	366	172	140	256	59	49
11	256	140					366	188	156	222	59	59
12	256	140					328	188	188	205	59	59
13	256	140					328	188	188	188	59	59
14	256						292	188	222	140	59	70
15	256				25		292	205	239	140	59	70
16	256		50	40			274	256	239	140	59	70
17	239						256	292	239	140	49	70
18	239					32	256	310	256	140	49	82
19	222					40	239	328	274	124	49	82
20	205					49	239	328	292	124	49	82
21	188					70	239	310	256	124	49	95
22	188	100				95	239	292	222	124	49	95
23	156					784	222	274	156	124	49	95
24	156					1,250	222	256	205	109	40	95
25	156					1,270	222	239	205	109	40	95
26	172					1,180	222	205	188	95	40	95
27	172					1,070	239	172	188	95	40	95
28	172					1,070	239	124	156	95	40	109
29	172					1,030	239	95	156	95	40	109
30	172					894	239	95	140	95	40	109
31	172					740		95		95	40	
1928-29												
1	114	97					240	132	97	25	5.5	2.5
2	114	63					350	132	97	16	5.5	2.5
3	114	63					350	132	114	8.5	5.5	2.5
4	114	63					312	132	114	2.5	5.5	2.5
5	114	63				6	240	132	114	1.0	5.5	5.5
6	114	63					240	132	114	1.0	5.5	5.5
7	114	63					240	132	114	1.0	5.5	5.5
8	114	63					258	132	114	1.5	5.5	2.5
9	114	63	25				276	114	114	1.5	5.5	1.5
10	114	63				8	312	114	114	2.5	5.5	1.5
11	132	47				8	330	114	114	2.5	5.5	1.5
12	132	47				8	294	114	97	2.5	5.5	1.5
13	132	47				8	204	114	97	2.5	5.5	1.5
14	132	36				12	240	114	97	2.5	5.5	1.5
15	132	36			8	12	240	114	97	2.5	2.5	1.5
16	132	36		12		16	186	97	80	2.5	2.5	1.5
17	132	36				16	168	97	80	2.5	2.5	1.5
18	132	36				25	168	97	63	2.5	2.5	2.5
19	132					168	168	97	63	8.5	2.5	2.5
20	132					350	168	97	63	8.5	2.5	5.5
21	132					750	168	97	63	5.5	2.5	5.5
22	132					670	168	97	63	8.5	2.5	5.5
23	132					550	168	97	47	8.5	2.5	5.5
24	114	30	20			530	168	97	47	12	2.5	8.5
25	114					510	168	97	36	12	2.5	8.5
26	114					430	168	97	36	12	2.5	8.5
27	114					350	168	97	36	8.5	2.5	12
28	114					312	168	97	36	8.5	2.5	12
29	114					212	132	97	30	8.5	2.5	12
30	114					312	132	97	30	5.5	2.5	12
31	114					276		97		5.5	2.5	

Monthly discharge, in second-feet, of Pembina River at Neche, N. Dak., 1924–1929

Month	Maximum	Minimum	Mean	Run-off in acre-feet
1924–25				
October	194	100	169	10,400
November	174		106	6,310
December			20	1,230
January			2	123
February			2	111
March	2,350		385	23,700
April	960	257	420	25,000
May	257	144	197	12,100
June	400	144	253	15,100
July	257	43	114	7,010
August	43	4	19	1,170
September	102	28	55.1	3,280
The year	2,350		146	106,000
1925–26				
October	188	102	143	8,790
November	123		67	3,990
December			25	1,540
January			12	738
February			3	167
March	230		58.5	3,600
April	191	110	145	8,630
May	110	82	101	6,210
June	208	48	96	5,710
July	318	18	93	5,720
August	18	13	13.3	818
September	141	13	47.6	2,830
The year	318		67.3	48,700
1926–27				
October	69	48	58.5	3,600
November			43	2,560
December			31	1,910
January			15	922
February			4	220
March			281	17,300
April	2,060	157	1,050	62,500
May	3,050	542	1,160	71,300
June	806	396	570	33,900
July	542	208	303	18,600
August	226	141	190	11,700
September	299	208	273	16,200
The year	3,050		332	240,000
1927–28				
October	292	156	230	14,100
November	172		123	7,320
December			50	3,070
January			40	2,460
February			25	1,440
March	1,270		323	19,900
April	674	222	357	21,200
May	328	95	209	12,900
June	292	109	181	10,800
July	328	95	152	9,350
August	95	40	59.4	3,650
September	109	40	71.6	4,260
The year	1,270		152	110,000
1928–29				
October	132	114	122	7,500
November	97		44.8	2,670
December			22.4	1,380
January			12.0	738
February			8.0	444
March	750		183	11,300
April	350	132	220	13,100
May	132	97	110	6,760
June	114	30	79.4	4,720
July	25	1.0	6.21	382
August	5.5	2.5	3.86	237
September	12	1.5	4.77	284
The year	750	1.0	68.3	49,500

ROSEAU RIVER AT MALUNG, MINN.

LOCATION.—Staff gage in sec. 18, T. 161 N., R. 39 W., half a mile north of Malung post office.

RECORDS AVAILABLE.—August, 1928, to September, 1929.

EXTREMES.—Maximum discharge during year and period of record, 348 second-feet Apr. 6; maximum gage height, 7.80 feet Mar. 18 (caused by ice jam); minimum discharge, 0.1 second-foot Aug. 31 (gage height, 1.02 feet).

REMARKS.—Records good except those for period affected by ice, Nov. 1 to Apr. 5, which are poor.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	29	19					60	37	39	19	1.7	0.4
2	29	19					50	35	43	18	1.4	.4
3	29	19					39	33	39	16	1.2	.6
4	29	21					37	31	35	14	1.1	1.1
5	29	21					35	31	31	14	1.1	2.4
6	29	21	10.0				332	31	31	14	1.4	1.9
7	29	21				2	332	31	27	14	1.4	1.7
8	29	21					292	31	25	14	.9	1.4
9	29	21					206	31	23	13	.8	1.2
10	29	19					157	31	23	12	.8	1.2
11	29	19					126	37	21	12	.6	1.2
12	29	19					102	39	19	12	.8	1.2
13	29	19	8.6				87	43	18	12	.9	1.2
14	29	23					81	46	17	11	1.2	1.2
15	29	27		4	2	10	78	43	17	11	1.2	1.2
16	31	27				144	70	39	16	11	1.2	1.2
17	30	27				228	66	37	15	11	1.2	1.2
18	29	27				300	63	35	14	9.5	1.2	1.2
19	29	27				220	60	35	13	8.2	1.2	1.2
20	27	27				157	58	31	14	6.9	.9	1.2
21	27	27	8.0			120	53	31	14	5.7	.9	1.2
22	27	25				108	53	31	23	5.3	.9	1.2
23	27	25				76	50	31	23	5.0	.9	3.9
24	27	21				48	50	31	23	4.6	.8	3.9
25	27	21				29	50	31	25	3.9	.6	3.9
26	27	21				27	48	33	25	3.9	.5	3.9
27	25	16				33	48	35	25	3.9	.5	3.0
28	25		7.4			63	48	35	25	3.9	.4	3.0
29	25	14				66	48	35	25	3.3	.3	3.0
30	25		6.0			73	39	37	23	3.3	.3	3.0
31	25	-------			-------	63	-------	39	-------	2.2	.1	-------

Month	Maximum	Minimum	Mean	Run-off in acre-feet
October	31	25	28.0	1,720
November	27	----------	21.4	1,270
December	----------	----------	8.6	528
January	----------	----------	4.0	246
February	----------	----------	2.0	111
March	300	----------	57.8	3,550
April	332	35	93.9	5,590
May	46	31	34.7	2,130
June	43	13	23.7	1,410
July	19	2.2	9.6	590
August	1.7	.1	.92	56
September	3.9	.4	1.81	108
The year	332	.1	23.9	17,300

ROSEAU RIVER AT ROSS, MINN.

LOCATION.—Water-stage recorder in SW. ¼ sec. 27, T. 163 N., R. 41 W., one-fourth mile north of Ross. Zero of gage is 1,018.44 feet above mean sea level.

DRAINAGE AREA.—1,030 square miles.

RECORDS AVAILABLE.—July, 1928, to September, 1929.

EXTREMES.—Maximum discharge for year and period of record, 953 second-feet Apr. 8 (gage height, 8.72 feet); minimum, 9 second-feet Aug. 27–29 and Aug. 31 to Sept. 1.

REMARKS.—Records excellent for October and April to July, 1929; good August and September; fair during period of ice effect, November to March.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	85	51	54	30	a 19	a 16	426	202	390	130	18	9
2	82	54	48	a 28	a 18	a 16	414	194	378	118	17	10
3	78	54	48	a 26	18	a 16	402	186	354	102	16	10
4	75	57	42	25	a 18	a 16	342	178	339	96	14	14
5	75	54	37	a 24	a 18	16	277	170	277	86	14	14
6	75	57	32	a 22	18	a 16	390	162	259	84	14	15
7	78	54	28	20	a 18	a 16	878	150	229	86	13	12
8	75	57	29	21	a 18	a 16	948	146	206	87	14	12
9	78	54	30	a 21	18	16	856	134	190	92	13	12
10	72	57	32	a 20	a 18	a 16	812	138	192	99	13	13
11	72	60	34	a 19	a 18	a 16	772	170	174	102	12	12
12	72	60	31	18	18	16	698	220	172	99	12	12
13	72	66	34	a 18	a 16	18	650	242	146	89	16	11
14	75	60	37	19	14	a 18	608	247	138	79	15	11
15	72	92	42	20	a 14	a 20	566	238	126	68	14	12
16	75	146	40	a 19	a 15	29	540	224	118	58	14	12
17	78	122	37	a 18	a 16	162	488	206	106	54	13	12
18	75	122	a 34	17	a 16	594	438	194	99	46	12	11
19	75	138	32	a 18	16	636	390	182	91	40	11	11
20	78	114	27	18	a 15	608	354	174	96	36	12	11
21	75	130	a 27	a 19	14	566	331	166	99	35	12	11
22	75	122	27	a 19	a 14	566	309	158	99	39	14	11
23	75	106	a 28	20	a 15	540	287	150	102	39	12	13
24	75	99	a 29	a 20	a 15	514	287	146	102	36	12	18
25	72	85	30	a 19	a 16	488	277	138	102	36	12	26
26	72	72	32	19	16	438	267	142	102	36	10	27
27	72	69	32	a 19	a 16	426	252	154	110	33	9	25
28	69	60	32	a 20	16	426	238	194	106	31	9	24
29	60	57	31	20	-------	438	224	257	146	26	9	23
30	54	54	a 32	a 20	-------	414	211	320	146	22	10	23
31	54	-------	32	19	-------	414	-------	390	-------	20	9	-------

Month	Maximum	Minimum	Mean	Run-off in acre-feet
October	85	54	73.2	4,500
November	146	51	79.4	4,720
December	54	27	34.2	2,100
January	30	17	20.5	1,260
February	19	14	16.5	916
March	636	16	242	14,900
April	948	211	464	27,600
May	390	134	193	11,900
June	390	91	172	10,200
July	130	20	64.6	3,970
August	18	9	12.7	781
September	27	9	14.6	869
The year	948	9	116	83,700

a Interpolated.

ROSEAU RIVER AT CARIBOU, MINN.

LOCATION.—Chain gage in sec. 34, T. 164 N., R. 45 W., at highway bridge in Caribou, 1 mile south of international boundary.

DRAINAGE AREA.—1,650 square miles.

RECORDS AVAILABLE.—April to October, 1917; April, 1920, to September, 1929.

EXTREMES.—Maximum discharge during year, 978 second-feet Apr. 10; maximum stage, 9.65 feet Mar. 29 (ice jam). Minimum discharge, 10 second-feet several times in August and September (gage height, 3.25 feet).

1917, 1920–1929: Maximum discharge, 3,160 second-feet May 24, 1927 (gage height, 12.8 feet); minimum, 4 second-feet Sept. 10–12, 29, and 30, 1917 (gage height, 3.15 feet).

REMARKS.—Records good except those for period of ice effect (Nov. 25 to Apr. 2), which are fair.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	85	52	90				528	224	373	140	28	10
2	85	48	78	25			528	217	390	126	22	10
3	80	48	67				554	210	390	120	22	10
4	80	53	56	24			510	188	356	107	22	10
5	74	53	45			16	408	181	324	94	17	10
					18							
6	74	53	33				373	174	292	88	17	10
7	74	53	30				576	167	262	74	17	12
8	68	53	26				818	160	232	74	12	12
9	68	53	27			18	944	153	210	74	12	12
10	68	53	28			18	978	153	195	88	10	12
11	68	48	30			18	912	146	181	100	10	12
12	68	48				20	880	174	174	114	10	12
13	68	48				26	818	224	160	100	10	10
14	68	48				26	758	262	146	88	12	10
15	68	48				26	702	262	133	81	17	10
			31									
16	68	53				43	650	262	126	68	17	10
17	63	53				158	600	232	120	62	17	10
18	63	53		20		287	554	224	107	56	17	10
19	68	53				415	488	210	94	50	17	10
20	68	63				405	426	188	94	44	17	10
					16							
21	68	74				424	390	181	88	38	12	10
22	68	90				424	356	167	88	38	12	10
23	68	102				424	324	167	94	38	10	10
24	68	114	32			424	324	153	100	38	10	12
25	68	114				424	292	160	100	38	10	17
26	68	126				424	292	153	100	38	10	22
27	63	132				424	277	160	107	38	10	28
28	63	114	31			597	262	167	120	33	10	28
29	58	102	30			646	262	224	126	33	10	28
30	58	90	29			464	232	247	140	28	10	22
31	55		28			550		324		28	10	

Month	Maximum	Minimum	Mean	Run-off in acre-feet
October	85	55	68.7	4,220
November	132	48	69.7	4,150
December	90	26	36.5	2,240
January			20.6	1,270
February			16.7	928
March	646		222	13,600
April	978	232	534	31,800
May	324	146	197	12,100
June	390	88	181	10,800
July	140	28	68.9	4,240
August	28	10	14.1	867
September	28	10	13.2	791
The year	978	10	120	87,000

ROSEAU RIVER BELOW CUT-OFF DITCH, NEAR CARIBOU, MINN.

LOCATION.—Water-stage recorder in SW. ¼ sec. 34, T. 164 N., R. 45 W., 1 mile west of Caribou and about 200 yards below mouth of State ditch No. 51, locally known as Cut-off ditch.

RECORDS AVAILABLE.—April to September, 1929.

EXTREMES.—Maximum discharge during period, 980 second-feet Apr. 10 (gage height, 6.00 feet); minimum, 12 second-feet Sept. 20 and 21 (gage height, 1.39 feet).

REMARKS.—Records excellent except those for period of ice effect (Apr. 1–4), which are good. Discharge estimated Apr. 1–4 and Sept. 26–30.

Daily and monthly discharge, in second-feet, 1929

Day	Apr.	May	June	July	Aug.	Sept.	Day	Apr.	May	June	July	Aug.	Sept.
1	532	232	400	141	23	12	16	676	254	130	72	19	12
2	532	226	412	128	22	14	17	628	248	117	65	16	14
3	544	212	412	112	18	18	18	580	228	107	56	16	14
4	532	198	388	101	17	17	19	532	210	96	50	14	12
5	484	188	340	95	17	16	20	472	194	96	44	16	12
6	448	182	311	88	16	17	21	424	178	96	38	14	12
7	580	168	274	82	16	19	22	388	168	96	36	13	12
8	830	160	243	82	16	18	23	352	164	96	35	15	16
9	920	148	223	82	16	17	24	336	154	99	37	16	18
10	980	148	204	88	16	16	25	316	148	104	35	15	18
11	950	146	188	93	16	15	26	311	146	102	34	14	22
12	890	178	178	99	16	14	27	298	146	108	37	14	28
13	830	226	160	95	16	15	28	278	166	109	33	13	28
14	778	263	148	83	16	14	29	265	208	117	30	12	28
15	726	274	139	81	17	15	30	248	267	137	30	11	22
							31	------	340	------	26	11	------

Month	Maximum	Minimum	Mean	Run-off in acre-feet
April	980	248	555	33,000
May	340	146	199	12,200
June	412	96	188	11,200
July	141	26	68.0	4,180
August	23	11	15.7	965
September	28	12	16.8	1,000
The period				62,500

SOUTH FORK OF ROSEAU RIVER NEAR MALUNG, MINN.

LOCATION.—Staff gage in center of sec. 7, T. 161 N., R. 39 W., 1 mile northwest of Malung.

DRAINAGE AREA.—265 square miles.

RECORDS AVAILABLE.—May, 1911, to September, 1914; July, 1928, to September, 1929.

EXTREMES.—Maximum discharge during year, 425 second-feet Apr. 7 (gage height, 7.34 feet.); no flow Aug. 11 to Sept. 30.

1911–1914, 1928–29: Maximum discharge, 1,040 second-feet Oct. 1, 1912 (gage height, 11.5 feet); no flow occasionally.

REMARKS.—Records good except those for period of ice effect, Nov. 20 to Apr. 2.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.
1	5.3	4.2					72	13.5	25	4.4	0.4
2	4.7	3.9					50	13.5	24	4.0	.3
3	4.7	3.9					40	12.7	20	4.0	.3
4	4.4	3.9					31	12.3	16	4.4	.2
5	4.2	3.9					24	11.5	13.5	3.1	.2
6	3.9	3.9					219	11.5	11.8	2.8	.1
7	3.9	3.9	3.0				425	11.5	10.5	2.5	.1
8	3.9	3.9				1	395	11.1	8.9	2.5	.1
9	4.2	3.9					255	11.1	8.4	2.5	.1
10	4.2	3.9					174	10.8	7.6	2.5	.1
11	4.2	3.9					140	12.7	6.7	2.5	0
12	4.2	3.9					124	16	5.9	2.3	0
13	4.2	3.9	2.7				100	19	5.4	2.2	0
14	4.2	4.2					80	20	4.6	2.0	0
15	4.2	5.0		1.5	1.0	10	72	18	4.1	1.9	0
16	4.2	5.0				124	58	16	4.6	1.9	0
17	4.2	5.0				291	47	15	4.0	1.9	0
18	4.2	5.0				395	38	12.7	2.5	1.7	0
19	4.2	5.0				395	35	12.3	2.2	1.6	0
20	4.2	5.0				355	31	11.5	2.2	1.4	0
21	4.2	5.0	2.0			273	29	11.1	2.2	1.4	0
22	4.2	5.0				183	27	10.4	2.3	1.0	0
23	4.2	5.0				100	24	10.1	3.1	.8	0
24	4.2	5.0				80	24	9.7	3.7	.6	0
25	4.2	5.0				61	20	9.7	4.0	.5	0
26	4.2	5.0				54	19	10.1	4.4	.5	0
27	4.2	5.0				68	18	12.3	4.4	.5	0
28	4.2	5.0	1.7			92	18	13.5	4.4	.5	0
29	4.2	4.5			-------	116	17	17	4.4	.5	0
30	4.2	4.5	1.5		-------	92	16	18	4.4	.5	0
31	4.2	-------			-------	96	-------	19	-------	.4	0

Month	Maximum	Minimum	Mean	Run-off in acre-feet
October	5.3	3.9	4.25	261
November	5.0	3.9	4.47	266
December	-------	-------	2.35	144
January	-------	-------	1.5	92.2
February	-------	-------	1.0	55.3
March	395	-------	90.3	5,550
April	425	16	87.4	5,200
May	20	9.7	13.3	818
June	25	2.2	7.51	447
July	4.4	.4	1.91	117
August	.4	0	.06	3.7
The year	425	0	17.9	13,000

MUD CREEK NEAR SPRAGUE, MANITOBA

LOCATION.—Water-stage recorder in NE. ¼ sec. 34, T. 164 N., R. 38 W., half a mile south of international boundary, 3½ miles south of Sprague, Manitoba, and 14 miles northeast of Roseau, Minn.

DRAINAGE AREA.—162 square miles.

RECORDS AVAILABLE.—September, 1928, to September, 1929.

EXTREMES.—Maximum discharge during period of record, 170 second-feet May 30 (gage height, 6.30 feet); minimum, 0.4 second-foot Sept. 20, 1929 (gage height, 0.64 foot).

REMARKS.—Records good except those for period of ice effect (Oct. 29 to Apr. 7), which are poor. Discharge interpolated May 11–13.

Daily and monthly discharge, in second-feet, 1928–29

Day	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1		23	14	8				28	40	150	38	3.6	0.6
2		23	13	7				20	39	140	35	2.8	.7
3		23	12	5				15	38	125	31	2.5	.8
4		23	13	4				18	38	115	29	2.6	1.0
5		23	13	3				20	34	100	29	3.0	1.2
6		23	13					38	31	88	30	1.5	1.2
7		23	13				1	65	31	78	32	1.4	1.2
8		23	13					65	30	70	34	1.5	.8
9		23	13					64	30	65	42	1.4	1.0
10		23	13					52	30	59	43	1.4	.8
11		23	16					40	37	54	38	1.4	1.4
12		23	15					33	45	48	36	1.5	1.4
13		25	15					33	53	44	33	1.9	1.1
14		23	39				2	30	60	40	29	1.6	.8
15		23	40			1	7	31	56	38	24	1.4	.7
16	35	23	41		2		18	42	52	35	20	1.3	.7
17	33	22	23				28	43	50	32	17	1.2	.6
18	29	22	45				36	42	47	28	15	1.0	.6
19	29	22	21	3			29	43	43	27	13	.8	.7
20	29	21	21				34	47	40	28	11	1.0	.5
21	27	23	21				27	44	38	30	11	1.3	.6
22	25	21	21				23	46	36	28	12	1.3	.9
23	29	21	21				17	47	36	27	10	1.2	1.7
24	27	21	21				13	50	36	25	10	1.1	2.2
25	27	21	17				7	52	36	25	14	1.0	2.0
26	27	23	12				4	48	38	28	12	1.2	2.2
27	27	19	10				5	46	40	30	10	1.3	2.2
28	27	19	10				12	43	65	47	8.4	.9	2.4
29	25	19	8				24	41	115	48	6.6	.7	2.4
30	23	15	8			------	38	40	165	42	4.8	.6	2.0
31	------	15	------			------	38	------	165	------	4.0	.6	------

Month	Maximum	Minimum	Mean	Run-off in acre-feet
1928				
September 16–30	35	23	27.9	831
1928–29				
October	25	15	21.7	1,330
November	45	8	18.5	1,100
December	8	3	3.39	208
January	------	------	2.00	123
February	------	------	1.00	55.5
March	38	------	12.1	744
April	65	15	40.9	2,430
May	165	30	51.4	3,160
June	150	25	56.5	3,360
July	43	4.0	22.0	1,350
August	3.6	.6	1.48	91.0
September	2.4	.5	1.21	72.0
The year	165	.5	19.4	14,000

PINE CREEK NEAR PINE CREEK, MINN.

LOCATION.—Water-stage recorder in NW. ¼ sec. 35, T. 164 N., R. 41 W., 2 miles northeast of Pine Creek post office, half a mile south of international boundary. Zero of gage is 1,046.27 feet above mean sea level.

DRAINAGE AREA.—76 square miles.

RECORDS AVAILABLE.—August, 1928, to September, 1929.

EXTREMES.—Maximum discharge during year and period of record, 115 second-feet Apr. 8 (gage height, 5.25 feet, affected by backwater from ice jam); minimum, occurred during period when discharge was estimated on account of ice effect.

REMARKS.—Records good except those for period of ice effect (Nov. 1 to Apr. 11), which are poor. Discharge interpolated July 3–8.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	14	14					68	31	107	16	6.0	5.8
2	14	13					44	30	95	16	5.8	6.0
3	14	14					34	30	73	16	6.4	8.0
4	14	14					37	28	50	16	7.6	11
5	15	14					48	27	41	16	7.2	10
6	15	13					76	25	35	16	7.6	8.0
7	14	13	12			2	95	23	31	16	6.6	7.4
8	15	13					115	21	28	16	6.4	7.4
9	15	14					95	21	27	16	5.7	7.4
10	15	14					60	24	27	17	5.7	7.2
11	15	14					60	43	25	17	5.8	6.8
12	15	14					44	60	24	15	6.0	6.6
13	15	19	11			3	46	62	22	14	6.6	6.6
14	15	22				4	47	56	20	12	6.7	6.6
15	15	25			3	4	48	50	19	10	6.8	6.6
16	15	56		5		10	48	44	18	9.9	6.0	6.4
17	15	60				28	48	39	17	10	5.7	6.4
18	15	54				56	48	36	17	8.0	5.7	7.0
19	16	36				80	50	33	20	7.4	5.6	7.2
20	16	32				76	48	31	20	7.4	6.4	7.6
21	16	31				56	46	29	22	8.3	8.6	8.0
22	16	28	9			31	42	28	22	8.6	7.2	8.0
23	16	25				10	41	27	20	7.6	6.4	9.8
24	15	22				10	41	27	19	8.3	6.0	18
25	15	19				6	41	27	18	12	6.4	25
26	14	16				10	40	29	18	10	5.2	19
27	15	15				10	38	37	20	7.8	5.4	16
28	14	14				10	36	60	22	8.0	6.0	15
29	15	14			-------	56	35	73	21	7.2	6.0	15
30	15	14			-------	31	31	89	18	6.4	6.0	13
31	15	-------			-------	80	-------	101	-------	6.0	5.8	-------

Month	Maximum	Minimum	Mean	Run-off in acre-feet
October	16	14	14.9	916
November	60	13	22.2	1,320
December	-------	-------	10.2	627
January	-------	-------	5.0	307
February	-------	-------	3.0	167
March	80	-------	19.2	1,180
April	115	31	51.7	3,080
May	101	21	40.0	2,460
June	107	17	30.5	1,810
July	17	6	11.7	719
August	8.6	5.2	6.33	389
September	25	5.8	9.76	575
The year	115	-------	18.7	13,600

BADGER CREEK NEAR BADGER, MINN.

LOCATION.—In NE. ¼ sec. 2, T. 161 N., R. 42 W., half a mile west and 1 mile north of Badger.
RECORDS AVAILABLE.—April to September, 1929.
EXTREMES.—Maximum discharge during period, 17.4 second-feet Apr. 7 (gage height, 1.97 feet); no discharge for large part of year.
REMARKS.—Records fair.

Daily and monthly discharge, in second-feet, 1929

Day	Apr.	May	June	Day	Apr.	May	June	Day	Apr.	May	June
1	------	0.6	1.9	11	7.8	1.8	0	21	1.9	0.2	0
2	------	.6	1.0	12	6.1	1.2	0	22	1.5	.2	0
3	------	.5	.5	13	6.0	.9	0	23	1.3	.2	0
4	11.8	.4	.4	14	4.9	.7	0	24	1.3	.2	0
5	8.4	.4	.2	15	4.0	.6	0	25	1.3	.3	0
6	15.6	.4	.1	16	3.1	.5	0	26	1.0	.4	0
7	17.4	.4	.1	17	1.6	.4	0	27	.9	.6	0
8	11.6	.3	.1	18	2.0	.4	0	28	.7	1.0	.1
9	8.4	.3	0	19	1.4	.3	0	29	.7	2.2	0
10	6.2	.3	0	20	1.9	.3	0	30	.6	4.2	0
								31	------	2.5	------

Month	Maximum	Minimum	Mean	Run-off in acre-feet
April 4-30	17.4	0.6	4.79	257
May	4.2	.2	.75	46.1
June	1.9	0	.15	8.9
The period	------	------	------	312

NOTE.—No flow during July, August, and September.

SOURIS RIVER NEAR MINOT, N. DAK.

LOCATION.—At Saugstad Bridge, 5 miles southeast of Minot.
RECORDS AVAILABLE.—October, 1928, to September, 1929. Records available at Minot from May, 1903, to March, 1924, and April, 1927, to September, 1928.
EXTREMES.—Maximum discharge during year, 397 second-feet June 7 (gage height, 2.73 feet); minimum, 3 second-feet several times during July, August, and September.
REMARKS.—Record furnished by Robt. E. Kennedy, State engineer of North Dakota. The low-water discharge past this station is about 3 second-feet greater than that through Minot, owing to the effluence from the sewage-disposal plant of Minot. Discharge estimated Oct. 1 to Nov. 3 and interpolated Apr. 21 and 22. No records Nov. 4 to Apr. 13.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Apr.	May	June	July	Aug.	Sept.
1	29	20	------	87	132	50		
2	29	20	------	82	162	43		
3	29	20	------	72	152	41		
4	29	------	------	67	142	39		
5	26	------	------	62	182	39		
6	24	------	------	67	232	43		
7	24	------	------	60	397	38		
8	24	------	------	52	287	32		
9	24	------	------	49	298	30		4
10	24	------	------	47	309	28		
11	24	------	------	44	309	27		
12	24	------	------	41	309	22		
13	22	------	------	38	320	19		
14	20	------	112	37	298	19		
15	20	------	117	36	232	17		
16	20	------	122	31	192	16	3	
17	22	------	132	39	172	14		
18	24	------	142	43	127	14		
19	26	------	152	43	112	8		
20	26	------	152	51	97	9		
21	29	------	152	39	72	9		
22	26	------	152	36	222	8		
23	26	------	152	34	112	7		
24	24	------	152	39	82	7		7
25	24	------	142	43	77	6		
26	24	------	122	82	62	6		
27	22	------	122	117	67	5		
28	20	------	132	112	60	3		
29	20	------	122	107	58	3		
30	20	------	142	117	54	3		
31	20	------	------	117	------	3		------

Month	Maximum	Minimum	Mean	Run-off in acre-feet
October	29	20	24	1,480
April 14–30	152	112	136	4,600
May	117	31	61	3,750
June	397	54	178	10,600
July	50	3	19.6	1,200
August	----------	----------	3.0	184
September	----------	----------	5.3	315

SOURIS RIVER NEAR WESTHOPE, N. DAK.

LOCATION.—Chain gage in T. 163 N., R. 79 W., 2½ miles east of Westhope. Zero of gage is 1,404.72 feet above mean sea level.
RECORDS AVAILABLE.—July to September, 1929.
EXTREMES.—Maximum discharge during period, 48 second-feet July 26 (gage height, 1.00 foot); minimum, 3 second-feet several days in August and September (gage height, 0.36 foot).
REMARKS.—RECORDS fair.

Daily and monthly discharge, in second-feet, 1929

Day	July	Aug.	Sept.	Day	July	Aug.	Sept.	Day	July	Aug.	Sept.
1		37	3	11		21	5	21		e 6	3
2		17	e 3	12		21	e 5	22		7	6
3		22	e 3	13		14	5	23		e 7	e 8
4		22	e 3	14		21	3	24		e 6	e 9
5		22	e 3	15		13	3	25		6	11
6		22	3	16		9	e 4	26	44	e 6	10
7		21	e 7	17		13	5	27	e 38	6	e 10
8		21	11	18		e 11	6	28	33	e 4	11
9		19	e 10	19		e 8	e 5	29	44	3	e 12
10		19	10	20		6	e 4	30	35	e 3	e 15
								31	37	3	

Month	Maximum	Minimum	Mean	Run-off in acre-feet
July 26–31	44	33	38.5	458
August	37	3	13.4	824
September	15	3	6.5	387
The period				1,670

e Interpolated.

KAWISHIWI RIVER NEAR WINTON, MINN.

LOCATION.—In lot 3, sec. 20, T. 63 N., R. 11 W., at power plant of Minnesota Power & Light Co., just above Fall Lake and 2½ miles east of Winton.

DRAINAGE AREA.—1,200 square miles.

RECORDS AVAILABLE.—June, 1905, to June, 1907; October, 1912, to September, 1919; and September, 1923, to September, 1929.

EXTREMES.—Maximum mean daily discharge during year, 3,000 second-feet Oct. 1; minimum, 194 second-feet Mar. 10.

1905-1907, 1912–1919, and 1923–1929: Maximum mean daily discharge, 6,030 second-feet Apr. 26, 1927; no flow a number of times in 1905–1907 and 1923–1928.

REMARKS.—Records good except those for periods of high water, which are fair. Flow is entirely regulated by several reservoirs. Discharge obtained from power-house records furnished by Minnesota Power & Light Co.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	3,000	1,580	1,030	668	632	346	448	1,680	1,080	859	824	388
2	2,660	1,390	995	679	632	338	387	1,500	1,060	708	760	312
3	2,040	1,260	1,090	613	577	246	283	1,550	1,080	772	755	613
4	1,940	1,100	1,050	613	637	372	411	1,610	1,090	508	723	423
5	1,970	1,580	1,010	613	642	329	560	1,590	1,080	639	792	484
6	2,020	1,510	977	645	700	359	778	1,480	1,080	671	760	443
7	2,430	1,510	1,010	613	637	427	621	1,340	1,120	671	792	475
8	2,320	1,500	994	581	635	354	636	1,330	1,080	623	792	507
9	2,430	1,450	968	645	578	360	672	1,350	1,170	639	764	572
10	2,720	1,300	984	581	511	194	640	1,380	1,010	648	796	547
11	2,410	1,350	952	613	461	287	703	1,230	1,410	581	630	503
12	1,950	1,310	952	581	513	305	703	1,260	1,200	628	592	502
13	2,110	1,120	952	581	513	449	856	1,240	1,220	887	627	534
14	2,180	1,130	920	524	516	385	934	1,200	1,260	616	588	548
15	2,550	1,050	892	473	513	442	892	1,200	1,320	867	573	424
16	2,520	1,200	857	639	560	571	1,160	1,200	1,220	808	508	411
17	2,640	1,090	792	818	361	442	1,250	1,200	1,280	760	540	448
18	2,620	1,060	857	759	481	460	1,410	1,150	1,150	792	508	507
19	2,650	1,060	828	893	496	541	1,430	1,200	1,090	675	612	378
20	2,610	1,050	844	873	481	441	1,150	1,150	956	700	555	442
21	2,660	1,110	823	763	484	478	1,260	1,240	956	635	652	442
22	2,630	980	792	827	451	446	1,340	1,100	807	635	588	446
23	2,410	1,150	824	792	418	381	1,470	1,210	891	700	620	412
24	1,940	952	760	700	392	555	1,500	1,210	827	532	560	402
25	1,970	1,020	700	883	326	436	1,490	1,310	859	589	410	434
26	1,380	1,140	732	765	396	635	1,560	1,210	891	565	448	434
27	1,690	1,060	700	765	258	635	1,460	1,280	891	617	433	539
28	1,960	1,030	700	635	314	508	1,460	1,150	859	702	438	462
29	1,340	770	700	700	------	509	1,590	1,210	859	621	362	448
30	1,970	1,050	668	668	------	509	1,590	1,210	795	865	487	452
31	1,390	------	668	668	------	411	------	1,050	------	751	416	------

Month	Maximum	Minimum	Mean	Run-off in acre-feet
October	3,000	1,340	2,230	137,000
November	1,580	770	1,200	71,400
December	1,090	668	872	53,600
January	893	473	683	42,000
February	700	258	504	28,000
March	635	194	424	26,100
April	1,590	283	1,020	60,700
May	1,680	1,050	1,290	79,300
June	1,410	795	1,050	62,500
July	887	508	686	42,200
August	824	362	610	37,500
September	613	312	464	27,600
The year	3,000	194	923	668,000

UPPER MISSISSIPPI RIVER BASIN

MISSISSIPPI RIVER ABOVE SANDY RIVER, NEAR LIBBY, MINN.

LOCATION.—Water-stage recorder in SE. ¼ sec. 2, T. 50 N., R. 24 W., 4 miles north of Libby post office and 4 miles above mouth of Sandy River. Zero of gage is 1,200.00 feet above mean sea level.

DRAINAGE AREA.—4,560 square miles.

RECORDS AVAILABLE.—August, 1925, to May, 1928, and July, 1929, to November, 1929, when station was discontinued. September, 1895, to September, 1915, just above mouth of Sandy River, 4 miles downstream.

EXTREMES.—Maximum discharge during period, 2,560 second-feet Aug. 1 (gage height, 23.00 feet); minimum (estimated), 650 second-feet the later part of November, 1929.

1895–1915, 1925–1929: Maximum discharge, 9,572 second-feet Sept. 20, 1900; minimum, 115 second-feet Feb. 22, 1896.

REMARKS.—Records fair. Flow regulated by three Government reservoirs upstream; total capacity, 82,000,000,000 cubic feet.

Daily and monthly discharge, in second-feet, 1929

Day	July	Aug.	Sept.	Oct.	Nov.	Day	July	Aug.	Sept.	Oct.	Nov.
1	------	2,560	2,190	2,430	2,430	16	2,190	2,190	2,310	2,490	828
2	------	2,490	2,310	2,490	2,490	17	2,080	2,190	2,310	2,490	871
3	------	2,430	2,310	2,560	2,490	18	2,080	2,190	2,370	2,490	1,040
4	------	2,430	2,130	2,560	2,430	19	2,030	2,190	2,310	2,430	700
5	------	2,430	2,080	2,430	2,250	20	1,980	2,080	2,250	2,370	700
6	------	2,430	2,080	2,430	2,080	21	1,880	2,190	2,310	2,490	
7	------	2,490	2,130	2,370	1,480	22	1,980	2,190	2,310	2,490	
8	------	2,430	2,130	2,310	914	23	2,080	2,190	2,370	2,490	
9	------	2,310	2,190	2,310	828	24	2,190	2,250	2,310	2,370	
10	------	2,310	2,190	2,310	871	25	2,190	2,190	2,310	2,250	
11	------	2,310	2,130	2,370	914	26	1,880	2,190	2,370	2,250	650
12	------	2,250	2,190	2,490	828	27	1,380	2,130	2,430	2,310	
13	2,190	2,190	2,250	2,560	828	28	1,630	2,080	2,430	2,310	
14	2,190	2,190	2,310	2,560	828	29	2,080	2,090	2,430	2,370	
15	2,310	2,250	2,310	2,490	828	30	2,430	2,110	2,430	2,430	
						31	2,560	2,130	------	2,430	

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
July 13–31	2,560	1,380	2,070	0.454	0.32
August	2,560	2,080	2,260	.496	.57
September	2,430	2,080	2,270	.498	.56
October	2,560	2,250	2,420	.531	.61
November	2,490	650	1,100	.241	.27

MISSISSIPPI RIVER NEAR FORT RIPLEY, MINN.

LOCATION.—Chain gage in sec. 27, T. 43 N., R. 32 W., at highway bridge 500 feet above mouth of Nokasippi River.

DRAINAGE AREA.—10,700 square miles.

RECORDS AVAILABLE.—June, 1909, to September, 1910, and May to November, 1929, when station was discontinued.

EXTREMES.—Maximum discharge during period, 4,040 second-feet several times in May, August, September, October, and November; minimum, 2,270 second-feet June 15 and 16 and July 8 and 9.

REMARKS.—Records fair. Flow controlled to a considerable extent by Government reservoirs near the headwaters.

Daily and monthly discharge, in second-feet, 1929

Day	May	June	July	Aug.	Sept.	Oct.	Nov.
1	-------	3,790	3,080	2,650	3,550	3,550	3,310
2	-------	3,790	3,080	2,650	3,550	3,550	3,790
3	-------	3,550	2,860	3,310	3,550	3,550	4,040
4	-------	3,310	2,650	3,550	3,550	3,550	4,040
5	-------	3,080	2,650	3,550	3,310	3,550	4,040
6	-------	3,080	2,450	3,550	3,550	3,550	4,040
7	-------	3,080	2,650	3,550	3,790	3,550	3,790
8	-------	2,860	2,270	3,790	3,790	3,550	3,790
9	-------	2,650	2,270	3,790	3,790	3,310	3,790
10	3,550	2,650	2,450	3,790	4,040	3,310	3,790
11	3,790	2,450	2,650	3,790	4,040	3,310	------
12	3,550	2,650	2,650	3,790	4,040	3,310	------
13	3,310	2,450	3,550	3,790	4,040	3,550	------
14	3,550	2,450	3,310	4,040	3,790	3,550	------
15	3,550	2,270	3,080	4,040	3,790	3,550	------
16	3,790	2,270	3,310	4,040	3,790	3,790	------
17	3,550	2,650	3,310	3,790	3,790	3,790	------
18	3,550	2,650	3,550	3,790	3,790	3,790	------
19	3,550	2,860	3,550	3,550	3,550	4,040	------
20	3,550	3,080	3,550	3,550	3,550	4,040	------
21	3,550	3,080	3,080	3,550	3,550	4,040	------
22	3,310	3,550	2,650	3,790	3,550	3,790	------
23	3,310	3,550	2,650	3,790	3,550	3,790	------
24	3,310	3,550	2,450	3,790	3,550	3,790	------
25	3,550	3,550	2,450	3,790	3,790	3,790	------
26	3,550	3,550	3,080	4,040	4,040	3,550	------
27	3,550	3,080	3,310	4,040	3,790	3,550	------
28	3,550	3,080	2,860	4,040	3,790	3,550	------
29	3,550	3,080	2,450	4,040	4,040	3,550	------
30	4,040	3,080	2,450	4,040	3,550	3,310	------
31	4,040	-------	2,450	3,790	-------	3,310	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
May 10–31	4,040	3,310	3,570	0.334	0.27
June	3,790	2,270	3,030	.283	.32
July	3,550	2,270	2,860	.267	.31
August	4,040	2,650	3,710	.347	.40
September	4,040	3,310	3,730	.349	.39
October	4,040	3,310	3,610	.337	.39
November 1–10	4,040	3,310	3,840	.359	.13

MISSISSIPPI RIVER NEAR ROYALTON, MINN.

LOCATION.—In lot 2, sec. 20, T. 39 N., R. 32 W., at power plant of Minnesota Power & Light Co., 5 miles northwest of Royalton and 5 miles below mouth of Swan River.

DRAINAGE AREA.—11,600 square miles.

RECORDS AVAILABLE.—March, 1924, to September, 1929.

EXTREMES.—Maximum mean daily discharge during year, 8,690 second-feet Mar. 20; minimum, 1,810 second-feet Dec. 5.

1924–1929: Maximum mean daily discharge, 12,600 second-feet Apr. 22, 1927; minimum, 351 second-feet Jan. 4, 1925.

REMARKS.—Records good except those for periods of high water, which are fair. Flow largely regulated by Government reservoirs on the headwaters. Discharge obtained from power-house records furnished by Minnesota Power & Light Co.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	7,050	6,330	2,990	2,600	2,350	2,320	6,230	4,340	3,460	2,710	2,990	3,250
2	6,500	6,430	3,120	2,590	2,320	2,210	7,180	4,200	3,310	2,750	3,300	3,130
3	6,350	5,790	3,160	2,620	2,410	2,200	6,630	4,140	3,090	2,900	3,440	3,020
4	6,450	5,150	2,450	2,590	2,340	2,370	4,960	4,290	3,030	2,540	3,380	3,250
5	6,440	4,990	1,810	2,460	2,420	2,370	5,210	4,220	3,020	2,380	3,090	3,460
6	6,080	4,570	2,040	2,660	2,530	2,370	5,020	3,880	3,100	2,850	3,470	3,360
7	6,160	4,520	2,880	2,510	2,450	2,380	5,530	4,300	2,570	2,630	3,400	3,380
8	6,360	4,510	3,070	2,520	2,440	2,320	5,840	4,090	2,460	2,520	3,440	3,280
9	6,270	4,100	3,130	2,540	2,450	2,380	5,980	3,640	2,500	2,210	3,400	3,370
10	6,270	4,290	3,230	2,590	2,440	2,240	5,490	3,780	2,660	2,420	3,620	3,670
11	6,300	3,970	3,390	2,510	2,450	2,520	5,270	3,740	2,400	2,980	3,420	3,420
12	6,300	4,400	3,480	2,510	2,460	2,650	5,240	3,930	2,300	2,950	3,380	3,430
13	6,030	4,290	3,580	2,420	2,490	2,650	4,850	3,560	2,520	3,570	3,470	3,480
14	6,070	4,280	3,720	2,510	2,410	3,340	4,800	3,580	2,440	3,210	3,390	3,450
15	6,660	4,540	3,770	2,450	2,480	3,930	5,100	3,740	2,500	2,600	3,040	3,380
16	7,100	4,390	3,920	2,510	2,460	4,610	5,060	3,960	2,980	3,650	3,380	3,050
17	7,120	4,140	3,640	2,460	2,300	5,960	5,420	3,960	2,700	3,420	3,230	3,450
18	7,370	4,260	3,140	2,530	2,350	6,840	5,460	3,580	3,140	3,000	3,190	3,300
19	7,820	4,150	3,000	2,450	2,370	7,420	5,740	3,210	3,020	2,970	2,950	3,350
20	7,690	4,130	2,930	2,460	2,420	8,690	5,160	3,580	3,250	2,830	3,240	3,350
21	7,660	3,740	3,020	2,410	2,390	8,540	5,190	3,420	3,040	2,830	3,360	3,090
22	7,520	3,900	2,950	2,490	2,420	7,410	5,220	3,310	3,510	2,680	3,420	3,290
23	7,450	3,530	3,120	2,430	2,220	6,700	5,120	3,430	3,540	3,060	3,300	3,070
24	7,550	3,520	3,110	2,470	2,400	6,410	5,380	3,300	3,010	2,930	3,370	3,400
25	7,420	2,770	2,920	2,380	2,340	6,200	5,080	3,160	3,440	2,820	3,490	3,470
26	7,930	2,150	2,930	2,380	2,440	6,010	5,020	3,140	3,360	2,930	3,410	3,430
27	6,800	2,730	3,150	2,120	2,390	6,320	4,370	3,160	3,210	3,060	3,330	3,640
28	6,730	2,920	3,320	2,360	2,370	6,600	4,790	3,270	2,910	2,920	3,330	3,540
29	6,550	3,420	2,910	2,310	-------	6,470	4,320	3,310	2,780	2,530	3,480	3,570
30	6,700	3,130	2,740	2,400	-------	7,140	4,400	3,370	2,750	2,710	3,390	3,200
31	6,110	-------	2,710	2,470	-------	7,420	-------	3,000	-------	2,500	3,100	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	7,930	6,030	6,800	0.586	0.68
November	6,430	2,150	4,170	.359	.40
December	3,920	1,810	3,080	.266	.31
January	2,660	2,120	2,470	.213	.25
February	2,530	2,220	2,400	.207	.22
March	8,690	2,200	4,740	.409	.47
April	7,180	4,320	5,300	.457	.51
May	4,340	3,000	3,660	.316	.36
June	3,540	2,300	2,930	.253	.28
July	3,650	2,210	2,840	.245	.28
August	3,620	2,950	3,330	.287	.33
September	3,670	3,020	3,350	.289	.32
The year	8,690	1,810	3,770	.325	4.41

MISSISSIPPI RIVER AT SARTELL, MINN.

LOCATION.—Chain gage in sec. 16, T. 36 N., R. 31 W., at highway bridge in Sartell.

DRAINAGE AREA.—12,400 square miles.

RECORDS AVAILABLE.—May to November, 1929, when station was discontinued.

EXTREMES.—Maximum discharge during period, 5,270 second-feet Nov. 3; minimum, 960 second-feet Nov. 22 and 28.

REMARKS.—Records poor. Flow controlled to a considerable extent by Government reservoirs near the headwaters.

Daily and monthly discharge, in second-feet, 1929

Day	May	June	July	Aug.	Sept.	Oct.	Nov.
1	------	4,190	2,720	2,830	3,430	3 680	4,990
2	------	4,190	2,720	3,930	3,430	3 680	4,720
3	------	4,720	3,070	3,930	2,950	3 680	5,270
4	------	3,680	3,070	3,930	3,430	3 930	4,450
5	------	3,680	3,070	3,680	3,430	3,680	4,190
6	------	3,680	2,270	3,680	3,680	3 930	4,990
7	------	3,430	3,190	3,930	3,680	3 430	4,450
8	------	2,600	2,830	3,930	3,930	3,680	4,190
9	------	2,600	2,720	3,930	3,680	3 680	4,720
10	------	2,950	2,160	3,930	3,430	3 430	3,680
11	------	3,070	2,720	4,190	4,190	3 930	3,070
12	------	2,720	3,430	3,430	3,930	3,680	2,600
13	------	2,600	3,680	3,930	3,930	3,430	2,160
14	------	2,600	3,680	3,930	3,930	3,930	2,270
15	------	1,510	3,190	3,430	3,430	3,430	2,270
16	4,450	2,950	2,950	3,190	3,190	3 930	1,960
17	4,190	3,190	3,680	3,680	3,430	4 190	2,380
18	4,990	3,930	3,430	3,930	3,680	4 190	1,770
19	4,450	3,430	3,190	3,190	3,680	4 720	1,680
20	4,450	3,190	3,190	3,190	3,430	3,930	1,960
21	4,190	3,190	2,950	3,430	3,430	3,680	1,080
22	3,680	4,190	2,950	3,680	3,190	3,930	960
23	3,680	4,450	2,720	3,430	3,680	4 190	1,290
24	4,190	3,680	3,430	3,430	3,070	3,930	1,590
25	4,190	3,680	2,720	3,930	3,430	3 430	1,220
26	3,430	3,680	3,190	3,430	3,680	3,680	1,360
27	4,190	3,930	2,830	3,680	3,430	3,930	1,770
28	3,930	3,430	3,190	3,430	4,190	3 430	960
29	3,930	3,070	2,720	3,430	3,430	3,190	1,080
30	4,190	3,430	1,960	3,430	3,680	3,430	1,360
31	4,190	------	2,490	3,430	------	4 190	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
May 15–31	4,990	3,430	4,140	0.334	0.20
June	4,720	1,510	3,390	.273	.30
July	3,680	1,960	2,970	.240	.28
August	4,190	2,830	3,630	.293	.34
September	4,190	2,950	3,570	.288	.32
October	4,720	3,190	3,780	.305	.35
November	5,270	960	2,680	.216	.34

MISSISSIPPI RIVER AT ELK RIVER, MINN.

LOCATION.—Chain gage in sec. 10, T. 121 N., R. 23 W., at highway bridge in Elk River, 2,500 feet below mouth of Elk River.

DRAINAGE AREA.—14,500 square miles.

RECORDS AVAILABLE.—July, 1915, to September, 1929.

EXTREMES.—Maximum discharge during year, 23,900 second-feet Mar. 21 (gage height, 9.92 feet); minimum (estimated), 2,130 second-feet Dec. 7.

1915–1929: Maximum discharge, 27,000 second-feet Apr. 7, 1916 (gage height, 10.8 feet); minimum, 633 second-feet Feb. 10, 1926.

REMARKS.—Records good. Flow partly regulated by Government reservoirs on headwaters.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	9,840	8,240	3,610	3,330	2,750	2,760	10,800	5,500	3,840	3,400	3,030	3,610
2	9,520	8,240	3,840	2,460	2,930	2,700	10,800	5,800	3,840	3,030	3,030	3,840
3	8,880	7,930	3,610	2,800	2,610	2,710	8,880	5,500	4,080	3,210	3,840	3,610
4	8,240	7,620	3,400	3,120	2,760	2,550	8,560	5,500	4,080	3,400	3,840	3,610
5	9,200	7,000	2,220	3,170	2,850	2,600	7,620	5,200	3,610	3,210	3,610	3,610
6	8,560	6,100	2,470	2,920	2,820	2,740	7,930	4,910	3,610	3,210	3,840	4,080
7	7,930	5,800	2,130	3,200	2,860	2,660	7,930	5,200	3,400	3,030	3,840	3,840
8	8,560	5,500	2,230	2,700	2,840	2,580	7,310	4,910	3,610	3,400	4,080	4,080
9	8,240	5,800	3,000	2,780	2,940	2,910	8,240	4,620	3,210	3,210	3,840	4,080
10	8,880	6,400	3,940	3,210	2,750	2,540	8,240	4,620	3,030	3,210	4,080	4,080
11	7,930	6,700	3,680	2,990	2,830	2,760	7,930	5,200	2,860	2,860	4,080	3,840
12	8,240	6,400	4,300	3,020	2,860	2,790	7,930	4,620	3,610	3,400	4,080	3,840
13	7,930	6,100	4,150	2,910	2,900	3,310	7,310	4,340	2,550	3,610	3,840	3,210
14	8,880	6,400	4,580	2,900	2,820	4,120	7,310	4,620	2,550	3,840	3,840	4,340
15	10,200	6,100	4,740	2,800	2,870	5,720	7,000	4,340	2,860	4,080	3,840	4,080
16	8,880	5,800	4,930	2,840	2,860	6,510	7,620	4,080	3,210	3,840	3,610	3,840
17	9,520	5,800	4,660	3,010	2,840	8,140	7,620	4,080	3,400	3,610	3,610	3,610
18	9,520	5,800	3,860	2,930	2,900	9,960	7,930	4,080	3,400	4,080	3,840	3,610
19	9,840	5,800	4,200	2,980	2,780	13,800	7,620	4,080	3,400	3,610	4,080	3,840
20	10,200	4,910	3,300	2,850	2,700	16,900	7,620	3,840	3,840	3,400	3,610	3,840
21	10,200	4,620	2,410	2,940	2,760	18,800	7,620	4,340	4,080	3,210	3,400	3,840
22	10,500	5,200	2,960	2,890	2,720	15,000	7,310	4,080	4,080	3,030	4,080	3,840
23	10,800	4,910	3,930	2,970	2,760	13,000	7,000	3,610	4,080	3,210	4,080	3,610
24	10,500	4,910	4,190	2,720	2,760	13,000	7,000	3,610	3,610	3,210	3,610	4,080
25	10,200	4,340	4,130	2,340	2,670	10,800	7,000	3,840	3,400	3,610	4,080	3,840
26	10,500	3,840	4,120	2,890	2,770	11,800	7,000	3,610	3,610	3,210	4,080	4,080
27	9,200	3,610	3,570	2,950	2,710	11,800	6,700	3,030	3,840	3,610	3,840	4,080
28	10,200	3,210	3,790	2,830	2,750	11,400	6,100	4,080	4,080	3,610	4,080	4,080
29	9,200	3,210	3,610	2,510	-------	10,800	5,800	4,340	3,610	3,400	3,610	4,080
30	8,880	3,610	3,390	2,770	-------	11,400	5,500	4,080	3,610	3,210	4,080	3,610
31	8,880	-------	4,040	2,730	-------	10,800	-------	4,080	-------	2,860	3,840	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	10,800	7,930	9,290	0.641	0.74
November	8,240	3,210	5,660	.390	.44
December	4,930	2,130	3,640	.251	.29
January	3,330	2,340	2,890	.199	.23
February	2,940	2,610	2,800	.193	.20
March	18,800	2,540	7,720	.532	.61
April	10,800	5,500	7,640	.527	.59
May	5,800	3,030	4,440	.306	.35
June	4,080	2,550	3,530	.243	.27
July	4,080	2,860	3,380	.233	.27
August	4,080	3,030	3,810	.263	.30
September	4,340	3,210	3,850	.266	.30
The year	18,800	2,130	4,900	.338	4.59

MISSISSIPPI RIVER AT ST. PAUL, MINN.

LOCATION.—Water-stage recorder 300 feet above Robert Street Bridge in St. Paul, 6 miles below mouth of Minnesota River. Zero of gage is 684.16 feet above mean sea level by the 1912 adjustment.

DRAINAGE AREA.—35,700 square miles.

RECORDS AVAILABLE.—March, 1887, to September, 1929.

EXTREMES.—Maximum discharge during year, 45,800 second-feet Mar. 23 (gage height, 13.0 feet); minimum, 2,820 second-feet Mar. 5 (gage height, —1.3 feet).

1887–1929: Maximum discharge, 80,800 second-feet Apr. 6, 1897 (gage height, 18.0 feet); minimum, 1,060 second-feet Feb. 4, 1895.

Maximum known discharge, 117,000 second-feet July 22, 1867.

REMARKS.—Records good except those for period of ice effect, Jan. 1 to Mar. 4, which are fair. Flow regulated somewhat by reservoirs at the headwaters.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	11,400	11,000	5,010	4,610	3,540	3,500	27,000	15,600	7,800	5,290	4,150	4,390
2	11,200	10,400	4,710	3,220	3,640	3,400	25,300	15,600	7,480	5,150	4,040	4,390
3	10,400	10,000	4,860	3,500	3,410	3,520	23,800	14,900	7,800	5,020	4,630	4,390
4	10,000	9,440	3,910	3,900	3,530	3,410	21,200	14,100	8,120	4,890	4,890	4,510
5	10,200	9,260	3,120	4,000	3,560	2,820	20,000	13,400	7,800	5,020	5,430	4,630
6	10,200	8,900	2,820	3,910	3,740	3,120	19,000	12,600	7,030	4,890	5,430	4,390
7	10,200	8,360	3,020	3,840	3,620	3,330	18,700	11,900	6,880	5,430	4,630	4,760
8	9,440	8,000	2,920	3,750	3,630	3,120	18,700	11,400	6,880	5,150	5,290	4,760
9	10,000	7,820	3,120	3,620	3,470	3,440	19,000	11,300	6,430	5,710	5,290	5,290
10	9,620	7,310	4,300	4,120	3,500	3,670	19,500	10,800	5,430	5,850	5,020	5,570
11	9,620	7,140	4,430	3,990	3,600	4,570	19,700	10,300	5,990	5,290	4,890	5,290
12	9,440	7,140	4,570	3,850	3,480	5,160	19,200	9,930	6,430	4,890	5,570	4,510
13	9,620	7,310	4,860	3,810	3,650	7,820	18,500	9,590	5,990	5,710	5,570	4,890
14	9,440	7,310	5,320	3,780	3,610	10,600	18,000	9,590	5,990	5,570	5,430	5,150
15	9,260	7,650	5,640	3,640	3,560	13,500	17,500	9,420	5,990	5,850	5,150	5,430
16	9,620	7,480	5,800	3,700	3,600	16,800	17,500	9,080	5,430	5,850	5,290	5,150
17	10,400	7,480	5,960	3,820	3,500	21,500	17,700	9,250	5,290	5,290	5,020	4,890
18	11,000	7,650	5,640	3,880	3,640	25,300	18,200	9,250	5,850	5,570	5,020	4,890
19	11,800	7,310	4,710	3,680	3,560	31,800	18,700	8,760	5,570	5,430	5,430	4,510
20	12,500	7,310	4,300	3,660	3,360	39,400	18,500	8,760	6,130	5,290	6,880	4,630
21	12,700	6,970	3,910	3,750	3,490	45,000	18,200	8,280	5,430	5,150	6,430	4,760
22	12,700	6,800	4,430	3,700	3,510	45,000	18,000	8,280	5,570	4,890	4,510	4,630
23	13,100	6,800	4,860	3,660	3,480	45,000	17,200	8,280	5,570	4,890	4,150	4,760
24	13,500	6,630	5,960	3,720	3,530	44,200	16,500	7,640	6,130	4,760	4,630	4,890
25	13,100	6,120	5,960	3,380	3,550	42,600	15,800	7,640	6,280	4,890	4,760	4,390
26	13,100	5,160	5,640	3,270	3,440	41,000	15,600	7,800	5,850	5,150	4,760	5,570
27	12,700	4,860	5,320	3,770	3,510	38,600	15,400	7,800	7,330	4,760	4,630	5,430
28	12,000	5,160	4,710	3,710	3,460	37,100	15,200	7,800	6,280	5,020	4,630	5,710
29	12,300	4,570	4,710	3,420	-------	34,300	15,000	7,800	5,990	4,760	4,760	5,710
30	11,400	4,300	4,430	3,540	-------	32,400	15,200	7,960	5,430	4,760	4,890	5,570
31	10,800	-------	4,040	3,450	-------	29,500	-------	7,960	-------	4,390	4,760	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	13,500	9,260	11,100	0.311	0.36
November	11,000	4,300	7,390	.207	.23
December	5,960	2,920	4,610	.129	.15
January	4,610	3,220	3,730	.104	.12
February	3,740	3,360	3,540	.099	.10
March	45,000	2,820	20,800	.583	.67
April	27,000	15,000	18,600	.521	.58
May	15,600	7,640	10,100	.283	.33
June	8,120	5,290	6,340	.178	.20
July	5,850	4,390	5,180	.145	.17
August	6,880	4,040	5,030	.141	.16
September	5,710	4,390	4,930	.138	.15
The year	45,000	2,820	8,470	.237	3.22

MISSISSIPPI RIVER AT PRESCOTT, WIS.

LOCATION.—Staff gage in lot 4 in SE. ¼ sec. 9, T. 26 N., R. 20 W., on Chicago, Burlington & Quincy Railroad bridge over St. Croix River.

DRAINAGE AREA.—44,000 square miles.

RECORDS AVAILABLE.—June, 1928, to September, 1929.

EXTREMES.—Maximum discharge during year, 49,600 second-feet Mar. 25 (gage height, 12.3 feet); minimum, 6,400 second-feet Sept. 4, 6, and 7 (gage height, 0.0 foot).

1928–29: Maximum and minimum, that of 1929.

REMARKS.—Records good except those for period of ice effect, Dec. 20 to Mar. 5, which are fair. Flow regulated somewhat by reservoirs at the headwaters.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	18,100	19,000	10,300	9,470	8,380	9,470	46,900	23,200	12,000	8,900	6,920	6,660
2	17,300	18,400	10,300	9,270	8,450	9,680	45,500	23,200	12,000	8,400	6,790	6,530
3	16,400	17,800	9,890	9,270	8,350	9,680	44,200	22,800	11,700	8,730	6,660	6,530
4	16,100	17,300	9,270	9,060	8,250	9,680	42,900	22,100	11,700	8,730	6,660	6,400
5	16,100	16,800	8,560	9,060	8,150	10,200	39,700	20,800	12,000	9,080	6,660	6,530
6	15,900	15,900	8,090	9,470	8,050	10,700	37,900	19,600	11,700	8,900	6,790	6,400
7	15,500	15,500	8,090	9,470	8,260	10,900	35,600	19,000	11,500	9,080	6,920	6,400
8	15,200	15,000	7,790	9,060	8,460	11,100	33,900	18,100	11,100	8,900	6,790	6,530
9	15,200	14,600	7,790	9,060	8,660	11,300	33,900	17,600	10,700	8,730	6,920	6,660
10	15,000	14,100	7,790	9,060	8,660	11,200	34,500	17,300	10,300	8,900	7,060	6,920
11	15,000	13,700	7,790	9,270	8,660	11,100	34,500	17,100	9,680	9,080	7,060	7,060
12	15,200	13,300	8,400	9,680	8,660	11,600	34,500	16,400	9,680	8,900	7,200	7,060
13	15,000	12,800	8,730	9,480	8,660	12,000	33,900	15,700	9,680	8,900	7,340	7,200
14	15,000	13,300	9,080	9,270	8,800	13,800	32,300	15,200	9,680	8,730	7,340	7,200
15	15,000	13,500	9,470	9,160	8,930	15,700	30,700	15,000	9,470	8,560	7,340	7,490
16	14,800	13,700	10,100	9,060	9,060	17,600	29,200	14,600	9,470	8,400	7,200	7,640
17	15,500	13,700	10,300	9,060	8,860	19,700	29,700	14,400	9,080	8,730	7,340	7,640
18	16,400	13,300	10,300	9,060	8,660	21,800	30,200	14,400	8,900	8,730	7,340	7,640
19	17,800	13,300	10,300	9,060	8,560	25,500	30,700	14,400	8,900	8,730	7,340	7,640
20	19,000	12,800	10,100	8,860	8,450	29,200	31,200	14,100	8,900	8,730	7,340	7,490
21	20,200	12,800	9,890	8,660	8,660	34,400	31,200	13,700	8,730	8,730	7,940	7,490
22	20,800	12,600	9,890	8,460	8,860	39,600	30,700	13,300	8,730	8,730	7,790	7,490
23	21,400	12,400	9,680	8,250	9,060	44,900	29,700	13,300	8,560	8,240	7,340	7,640
24	22,100	12,400	9,680	8,380	8,960	47,300	28,700	13,000	8,730	8,090	7,060	7,490
25	22,100	12,200	9,680	8,520	8,860	49,600	28,200	12,600	8,730	8,090	7,060	7,340
26	22,100	12,000	9,680	8,660	8,960	49,200	26,400	12,400	8,730	8,090	7,060	7,640
27	22,100	11,500	9,680	8,460	9,060	48,900	25,200	12,400	8,900	7,790	6,920	7,940
28	21,400	10,700	9,680	8,250	9,260	48,600	24,800	12,600	9,470	7,790	6,790	7,940
29	20,800	10,500	9,680	8,250	------	48,400	23,600	12,400	9,270	7,640	6,790	8,090
30	20,200	10,300	9,680	8,250	------	48,200	23,200	12,200	9,270	7,340	6,790	8,090
31	19,600	------	9,680	8,320	------	47,600	------	12,200	------	7,200	6,790	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	22,100	14,800	17,800	0.405	0.47
November	19,000	10,300	13,800	.314	.35
December	10,300	7,790	9,330	.212	.24
January	9,680	8,250	8,920	.203	.23
February	9,260	8,050	8,670	.197	.21
March	49,600	9,470	25,400	.577	.67
April	46,900	23,200	32,800	.745	.83
May	23,200	12,200	16,000	.364	.42
June	12,000	8,560	9,910	.225	.25
July	9,080	7,200	8,500	.193	.22
August	7,940	6,660	7,080	.161	.19
September	8,090	6,400	7,230	.164	.18
The year	49,600	6,400	13,800	.314	4.26

MISSISSIPPI RIVER AT WINONA, MINN.

LOCATION.—Staff gage in lot 1, sec. 23, T. 107 N., R. 7 W., in the crib connected with the pivot pier of the Chicago & Northwestern Railway bridge at Winona. Elevation, 660.3 feet above mean sea level.

DRAINAGE AREA.—58,500 square miles.

RECORDS AVAILABLE.—June, 1928, to September, 1929.

EXTREMES.—Maximum discharge during year, 78,300 second-feet Apr. 3–4 (gage height, 11.50 feet); minimum, 11,700 second-feet Sept. 8 (gage height, 0.50 feet).

1928–29: Both maximum and minimum, that of 1929.

REMARKS.—Records excellent except those for period of ice effect Dec. 22 to Mar. 17, which are fair. Flow regulated somewhat by reservoirs at the headwaters in the interests of navigation.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	30,200	35,700	18,300	17,900	14,600	14,400	75,600	44,700	22,400	17,100	14,400	12,400
2	30,200	34,400	17,900	15,600	14,600	14,600	77,400	42,600	21,300	17,900	14,400	12,400
3	29,000	33,200	17,500	15,100	14,600	14,600	78,300	41,900	20,800	18,700	13,900	12,100
4	28,400	32,600	17,500	15,100	14,600	14,600	78,300	40,500	20,800	19,500	13,900	11,900
5	27,800	31,400	17,100	15,100	14,600	14,600	76,500	39,800	20,300	19,900	13,600	11,900
6	27,300	29,600	16,500	15,100	14,900	14,600	73,900	39,100	20,300	19,900	13,300	11,900
7	26,200	29,000	16,200	15,100	14,900	14,400	73,000	37,000	20,300	19,500	13,300	11,900
8	25,600	27,800	15,900	15,100	14,600	14,400	72,200	35,700	20,300	19,500	13,300	11,700
9	25,100	27,300	15,600	15,100	14,400	14,600	71,400	34,400	19,900	19,500	13,300	11,900
10	24,500	26,200	15,900	14,900	14,400	14,600	71,400	33,200	19,500	19,100	13,300	12,100
11	23,400	25,600	15,600	14,900	14,200	15,100	72,200	32,000	19,900	18,700	13,300	12,100
12	24,000	25,100	15,600	14,900	14,200	15,600	73,000	31,400	22,900	18,700	13,600	11,900
13	24,000	24,000	15,600	14,900	14,200	16,800	72,200	31,400	28,400	18,700	13,900	12,100
14	24,000	22,900	14,700	14,900	14,200	19,100	68,900	29,600	27,300	18,700	13,600	12,400
15	24,500	21,800	14,700	14,900	14,200	24,000	65,600	28,400	25,100	18,300	13,600	12,400
16	25,600	22,400	14,700	14,900	14,200	30,800	62,400	27,800	22,900	17,900	13,300	12,400
17	26,200	22,400	15,300	14,600	14,200	42,600	60,000	27,300	21,800	17,500	13,300	12,400
18	26,200	21,800	15,600	14,600	14,400	57,700	58,400	26,200	20,800	17,500	13,600	12,400
19	26,700	21,300	15,300	14,600	14,200	60,000	57,700	26,200	19,900	17,500	13,600	12,100
20	27,800	21,300	15,000	14,600	14,000	61,600	56,100	25,600	19,500	17,500	13,300	12,100
21	29,600	20,800	15,900	14,600	13,900	59,200	55,300	25,100	19,100	17,100	13,300	12,100
22	32,000	20,800	15,300	14,600	13,900	59,200	54,500	24,000	18,700	16,800	13,300	11,900
23	34,400	20,800	15,600	14,600	13,900	64,000	53,000	24,500	18,300	16,800	13,300	11,900
24	35,700	20,300	15,600	14,600	14,000	69,700	51,500	24,000	17,900	16,800	13,300	12,100
25	37,000	20,300	16,200	14,600	14,200	73,900	52,200	23,400	17,500	16,500	13,300	12,100
26	38,400	20,300	16,800	14,600	14,200	75,600	50,700	22,900	16,800	16,500	13,300	12,400
27	39,100	19,900	17,500	14,600	14,400	75,600	50,000	22,900	16,800	16,200	13,000	12,600
28	39,100	19,500	17,100	14,900	14,400	75,600	50,000	22,400	16,800	16,200	12,800	12,800
29	39,100	19,100	16,200	15,100	-------	74,700	49,200	21,800	16,800	15,600	12,800	13,300
30	38,400	18,700	16,500	15,100	-------	73,900	46,900	22,400	16,800	15,300	12,600	13,300
31	37,000	-------	17,900	15,100	-------	73,900	-------	22,400	-------	14,700	12,400	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	39,100	23,400	29,900	0.511	0.59
November	35,700	18,700	24,500	.419	.47
December	18,300	14,700	16,200	.277	.32
January	17,900	----------	15,000	.256	.30
February	14,900	13,900	14,300	.244	.25
March	75,600	14,400	40,800	.697	.80
April	78,300	46,900	63,600	1.09	1.21
May	44,700	21,800	30,000	.513	.59
June	22,400	16,800	20,300	.347	.39
July	19,900	14,700	17,700	.303	.35
August	14,400	12,400	13,400	.229	.26
September	13,300	11,700	12,200	.209	.23
The year	78,300	11,700	24,900	.426	5.76

MISSISSIPPI RIVER AT LA CROSSE, WIS.

LOCATION.—Staff gage in sec. 31, T. 16 N., R. 7 W., on left pier of wagon bridge in city of La Crosse, Wis. Zero of gage is 626.43 feet above mean sea level.
DRAINAGE AREA.—62,800 square miles.
RECORDS AVAILABLE.—June to September, 1929.
EXTREMES.—Maximum discharge during period, 30,500 second-feet June 14 and 15 (gage height, 4.9 feet); minimum, 13,300 second-feet Sept. 6–8 (gage height, 0.7 foot).

Maximum stage known, 16.2 feet June 19, 1880, from records of United States Weather Bureau.
REMARKS.—Records good.

Daily and monthly discharge, in second-feet, 1929

Day	June	July	Aug.	Sept.	Day	June	July	Aug.	Sept.
1		20,300	17,100	14,100	16	28,500	21,600	15,300	14,100
2		20,300	17,100	13,800	17	27,000	21,100	15,300	14,100
3		21,100	16,800	13,800	18	26,000	20,700	15,300	14,100
4		22,000	16,200	13,600	19	25,000	20,700	15,600	14,100
5		22,500	16,200	13,600	20	23,500	20,700	15,600	13,800
6		22,500	15,900	13,300	21	23,000	20,300	15,600	13,800
7		23,500	15,600	13,300	22	22,500	20,300	15,300	13,600
8		23,500	15,600	13,300	23	22,500	19,900	15,300	13,600
9		23,500	15,600	13,600	24	22,000	20,300	15,000	13,600
10	23,000	23,000	15,600	13,600	25	21,600	20,300	15,000	13,600
11	23,500	22,500	15,600	13,600	26	20,700	19,900	15,000	14,100
12	25,000	22,000	15,600	13,800	27	20,300	19,500	15,000	14,400
13	28,000	22,000	15,600	13,800	28	20,300	18,700	14,700	15,000
14	30,500	22,000	15,600	13,800	29	20,300	18,300	14,700	15,300
15	30,500	22,000	15,600	14,100	30	20,700	17,900	14,400	15,600
					31		17,900	14,400	

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
June 10–30	30,500	20,300	24,000	0.382	0.30
July	23,500	17,900	21,000	.334	.39
August	17,100	14,400	15,500	.247	.28
September	15,600	13,300	13,900	.221	.25

LEECH LAKE RIVER AT FEDERAL DAM, MINN.

LOCATION.—Staff gage in sec. 29, T. 144 N., R. 28 W., 600 feet below Government dam and half a mile northwest of Federal Dam post office.
DRAINAGE AREA.—1,160 square miles.
RECORDS AVAILABLE.—May to November, 1929 (discontinued).
EXTREMES.—Maximum discharge during period, 635 second-feet July 12 (gage height, 3.81 feet); minimum, 10 second-feet Aug. 26–28 and Oct. 31 to Nov. 2 (leakage through gates).
REMARKS.—Discharge past gage is completely regulated by Government dam 600 feet above. Capacity of reservoir, 33,000,000,000 cubic feet. Records fair.

Daily and monthly discharge, in second-feet, 1929

Day	May	June	July	Aug.	Sept.	Oct.	Nov.
1	------	525	482	591	400	525	10
2	------	525	461	591	400	525	10
3	------	525	461	613	380	503	98
4	------	503	482	591	525	525	93
5	------	503	461	569	613	547	98
6	------	503	461	569	591	503	103
7	------	503	482	569	547	482	80
8	------	503	482	591	591	503	80
9	------	503	503	569	591	440	88
10	------	503	503	569	591	440	84
11	------	482	591	569	591	503	84
12	------	482	635	547	613	525	80
13	------	461	635	547	569	547	98
14	------	482	613	400	591	525	88
15	------	482	635	321	591	547	84
16	------	461	635	302	547	525	93
17	------	461	635	340	547	525	80
18	------	355	613	321	525	525	80
19	------	125	547	321	525	525	80
20	------	264	503	340	547	525	80
21	------	473	547	321	503	503	80
22	------	503	547	321	569	420	80
23	------	420	569	283	503	440	80
24	------	420	569	302	525	461	80
25	------	461	591	265	482	503	80
26	------	461	591	10	482	482	80
27	547	461	79	10	482	482	80
28	547	461	340	10	525	420	80
29	525	461	321	340	525	400	80
30	547	482	440	380	525	155	80
31	525	------	591	400	------	10	------

Month	Maximum	Minimum	Mean	Month	Maximum	Minimum	Mean
May 27–31	547	525	538	September	613	380	533
June	525	125	458	October	547	10	469
July	635	79	516	November	103	10	79.7
August	613	10	402				

SWAN RIVER NEAR SWAN RIVER, MINN.

LOCATION.—Chain gage in sec. 22, T. 53 N., R. 23 W., on State highway No. 5, 5 miles from town of Swan River.
DRAINAGE AREA.—290 square miles.
RECORDS AVAILABLE.—June to November, 1929, when station was discontinued.
EXTREMES.—Maximum discharge during period, 444 second-feet June 18 (gage height, 8.06 feet); minimum, 27 second-feet Sept. 1 (gage height, 5.60 feet).
REMARKS.—Records are fair except those for November, which are poor on account of lack of information regarding ice.

Daily and monthly discharge, in second-feet, 1929

Day	June	July	Aug.	Sept.	Oct.	Nov.	Day	June	July	Aug.	Sept.	Oct.	Nov
1	------	130	36	27	54	61	16	412	77	31	41	65	70
2	------	116	36	28	54	74	17	412	72	30	41	57	61
3	------	116	35	28	50	74	18	444	67	29	38	54	65
4	------	110	34	28	54	65	19	412	63	28	38	54	61
5	------	104	36	30	54	65	20	412	59	30	38	54	54
6	------	104	36	31	54	70	21	382	55	30	38	54	65
7	116	98	38	30	50	65	22	339	55	32	34	50	74
8	110	104	37	31	50	65	23	286	55	34	36	50	74
9	104	110	36	34	50	65	24	250	48	36	34	50	70
10	137	98	41	37	70	65	25	216	44	34	34	50	74
11	216	92	41	44	98	65	26	196	44	34	36	50	74
12	250	87	33	41	93	61	27	177	44	32	38	50	78
13	286	87	33	38	88	61	28	177	41	29	44	50	88
14	353	82	36	37	83	54	29	160	41	29	44	47	88
15	382	77	32	41	74	70	30	144	38	28	44	47	88
							31	------	36	28	------	54	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
June 7-30	444	104	266	0.917	0.82
July	130	36	75.9	.262	.30
August	41	28	33.4	.115	.13
September	44	27	36.1	.124	.14
October	98	47	58.4	.201	.23
November	88	54	68.8	.237	.26

WILLOW RIVER NEAR PALISADE, MINN.

LOCATION.—Chain gage on highway bridge on section-line road between secs. 20 and 21, T. 49 N., R. 25 W., 1.9 miles west and 0.6 mile north of Palisade.
DRAINAGE AREA.—442 square miles.
RECORDS AVAILABLE.—June to November, 1929, when station was discontinued.
EXTREMES.—Maximum discharge during period, 191 second-feet June 13 (gage height, 5.12 feet); minimum, 19 second-feet Sept. 3 (gage height, 3 67 feet).
REMARKS.—Records fair except those for November, when the stage-discharge relation was affected by ice.

Daily and monthly discharge, in second-feet, 1929

Day	June	July	Aug.	Sept.	Oct.	Nov.	Day	June	July	Aug.	Sept.	Oct.	Nov.
1	------	90	25	23	40	48	16	148	60	39	34	56	62
2	------	83	25	22	42	62	17	125	56	37	33	50	50
3	------	76	25	19	51	68	18	118	50	35	32	47	44
4	------	70	26	20	51	72	19	118	46	31	31	47	48
5	------	64	30	20	48	66	20	125	43	28	29	44	28
6	------	60	33	20	44	59	21	132	43	28	28	40	28
7	------	57	37	21	40	56	22	118	43	29	29	39	38
8	------	62	38	22	39	53	23	111	41	31	29	39	50
9	------	68	51	27	36	52	24	104	37	31	28	37	57
10	------	76	47	33	36	51	25	97	37	29	28	37	58
11	------	72	46	39	37	50	26	90	36	28	30	34	53
12	------	66	40	40	46	49	27	90	36	26	37	34	57
13	191	79	44	49	54	49	28	90	35	25	40	34	54
14	181	72	42	36	59	33	29	97	33	25	44	33	62
15	156	66	41	35	60	38	30	97	30	22	43	36	55
							31	------	28	22	------	40	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
June 13-30	191	90	122	0.276	0.18
July	90	28	55.3	.125	.14
August	51	22	32.8	.0743	.09
September	49	19	30.7	.0695	.08
October	60	33	42.9	.0971	.11
November	72	28	51.7	.117	.13

PINE RIVER BELOW PINE RIVER RESERVOIR, MINN.

LOCATION.—Staff gage in sec. 21, T. 137 N., R. 27 W., just below Government dam at Pine River Reservoir. Elevation of zero of gage is 1,216.66 feet above mean sea level.

DRAINAGE AREA.—452 square miles.

RECORDS AVAILABLE.—January, 1895, to September, 1916; May to November, 1929; discontinued.

EXTREMES.—Maximum discharge, 426 second-feet July 17 to November 6 (gage height, 1.70 feet); minimum, 37 second-feet November 28–29 (gage height, 0.19 foot).

1895–1916, 1929: Maximum discharge, 1,586 second-feet June 29, 1901; no flow June 8–15, 17, 19, and 20, 1906.

Daily and monthly discharge, in second-feet, 1929

Day	May	June	July	Aug.	Sept.	Oct.	Nov.
1	------	66	155	426	426	426	426
2	------	66	155	426	426	426	426
3	------	66	153	426	426	426	426
4	------	66	153	426	426	426	426
5	------	66	153	426	426	426	426
6	------	66	153	426	426	426	426
7	------	67	153	426	426	426	40
8	------	67	153	426	426	426	39
9	------	69	153	426	426	426	39
10	------	69	155	426	426	426	39
11	------	168	287	426	426	426	39
12	------	153	303	426	426	426	38
13	------	150	303	426	426	426	38
14	------	150	303	426	426	426	38
15	------	150	303	426	426	426	38
16	------	150	407	426	426	426	38
17	------	150	426	426	426	426	38
18	------	153	426	426	426	426	38
19	------	153	426	426	426	426	38
20	------	155	426	426	426	426	38
21	------	155	426	426	426	407	44
22	------	155	426	426	426	426	48
23	------	155	426	426	426	426	38
24	------	155	426	426	426	426	38
25	------	155	426	426	426	426	38
26	67	155	426	426	426	426	37
27	67	155	426	426	426	426	37
28	67	155	407	426	426	426	37
29	67	155	426	426	426	426	37
30	67	155	426	426	426	426	38
31	66	------	426	426	------	426	------

Month	Maximum	Minimum	Mean	Month	Maximum	Minimum	Mean
May 26–31	67	66	66.8	September	426	426	426
June	168	66	125	October	426	407	425
July	426	153	317	November	426	37	116
August	426	426	426				

GULL RIVER AT GULL LAKE RESERVOIR, MINN.

LOCATION.—Staff gage in sec. 20, T. 134 N., R. 29 W., at footbridge about 500 feet below Government dam.
DRAINAGE AREA.—270 square miles.
RECORDS AVAILABLE.—May to November, 1929, when station was discontinued.
EXTREMES.—Maximum discharge during period, 165 second-feet Aug. 10 (gage height, 9.53 feet); minimum, 16 second-feet Nov. 8–11.
REMARKS.—Records poor. Stage-discharge relation affected by weeds in channel during most of summer. Flow entirely controlled by storage in reservoir above station.

Daily and monthly discharge, in second-feet, 1929

Day	May	June	July	Aug.	Sept.	Oct.	Nov.
1	------	28	34	34	134	100	94
2	------	28	33	33	134	100	94
3	------	27	60	33	127	94	94
4	------	27	28	120	127	94	88
5	------	23	28	127	120	88	88
6	------	23	27	149	120	94	24
7	------	23	29	157	113	88	18
8	------	22	30	157	113	82	16
9	------	22	28	157	127	82	16
10	------	24	30	165	120	82	16
11	------	24	28	157	113	100	16
12	------	23	27	142	113	100	18
13	------	23	35	142	113	100	18
14	------	24	30	134	106	94	18
15	------	24	33	120	106	94	20
16	------	20	28	134	100	94	20
17	------	20	29	134	113	88	20
18	------	21	26	127	100	88	24
19	------	21	27	127	100	88	23
20	------	21	20	134	94	100	25
21	------	21	24	134	88	88	25
22	------	24	24	134	88	88	25
23	------	24	24	134	88	82	25
24	21	36	25	134	88	74	25
25	21	29	30	134	94	71	25
26	22	29	30	127	88	70	25
27	22	31	60	120	100	75	25
28	23	22	45	120	94	73	25
29	27	24	45	120	94	73	25
30	28	31	35	127	94	72	25
31	29	------	33	142	------	82	------

Month	Maximum	Minimum	Mean	Month	Maximum	Minimum	Mean
May 24–31	29	21	24.1	September	134	88	107
June	36	20	24.6	October	100	70	87.0
July	60	20	31.8	November	94	16	33.3
August	165	33	126				

NOKASIPPI RIVER NEAR FORT RIPLEY, MINN.

LOCATION.—Chain gage in SE. ¼ sec. 10, T. 43 N., R. 31 W., 8½ miles northeast of Fort Ripley.
DRAINAGE AREA.—210 square miles.
RECORDS AVAILABLE.—May to November, 1929, when station was discontinued.
EXTREMES.—Maximum discharge during period, 87 second-feet May 19 (gage height, 2.44 feet); minimum, 5 second-feet Sept. 4 (gage height, 1.31 feet).
REMARKS.—Records poor.

Daily and monthly discharge, in second-feet, 1929

Day	May	June	July	Aug.	Sept.	Oct.	Nov.
1	------	68	50	1[illegible]	7	10	18
2	------	64	46	1[illegible]	6	10	19
3	------	61	46	1[illegible]	6	10	21
4	------	56	47	1[illegible]	5	9	21
5	------	54	42	1[illegible]	6	8	21
6	------	50	41	1[illegible]	6	8	17
7	------	46	40	1[illegible]	6	8	16
8	------	41	41	1[illegible]	6	7	15
9	73	41	46	12	7	8	14
10	73	40	40	1[illegible]	14	8	14
11	78	38	45	9	14	8	14
12	78	37	42	1[illegible]	12	11	14
13	73	38	55	14	15	12	14
14	73	36	49	14	15	12	14
15	73	36	47	1[illegible]	14	10	14
16	82	36	45	12	11	10	14
17	82	35	41	12	10	9	14
18	87	35	40	1[illegible]	9	9	14
19	87	37	37	9	8	10	14
20	82	46	35	9	8	10	15
21	78	45	36	8	7	10	9
22	73	46	33	1[illegible]	7	10	11
23	68	50	28	9	7	9	12
24	64	51	28	8	7	9	12
25	59	48	25	1[illegible]	8	8	12
26	56	51	23	9	10	8	12
27	55	55	21	8	12	8	13
28	54	56	19	8	13	8	14
29	68	53	15	8	13	8	14
30	73	52	14	7	12	9	15
31	68	------	11	7	------	11	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
May 9-31	87	54	72.0	0.343	0.29
June	68	35	46.7	.222	.25
July	55	11	36.4	.173	.20
August	14	7	10.0	.0476	.05
September	15	5	9.37	.0446	.05
October	12	7	9.19	.0438	.05
November	21	9	14.7	.0700	.08

PLATTE RIVER AT ROYALTON, MINN.

LOCATION.—Chain gage in sec. 35, T. 39 N., R. 32 W., on county road bridge at east edge of Royalton, 6 miles above junction with Mississippi River.
DRAINAGE AREA.—338 square miles.
RECORDS AVAILABLE.—May to September, 1929.
EXTREMES.—Maximum discharge, 132 second-feet May 18 (gage height, 2.37 feet); minimum, 6 second-feet July 26 (gage height, 1.26 feet).
REMARKS.—Records good.

Daily and monthly discharge, in second-feet, 1929

Day	May	June	July	Aug.	Sept.	Day	May	June	July	Aug.	Sept.
1	------	115	21	9	14	16	123	28	17	14	36
2	------	123	20	12	14	17	132	26	19	14	37
3	------	115	21	15	14	18	132	30	16	14	35
4	------	107	19	14	15	19	132	28	17	14	35
5	------	98	17	13	15	20	123	28	19	14	34
6	------	88	18	12	15	21	123	28	12	14	34
7	------	81	18	9	15	22	123	28	12	15	34
8	------	72	21	12	17	23	123	28	13	17	33
9	------	66	18	12	26	24	123	28	12	16	34
10	123	61	17	12	30	25	115	27	14	15	38
11	123	55	19	14	28	26	115	26	8	16	44
12	123	45	19	14	29	27	107	26	9	15	45
13	123	43	20	14	33	28	107	26	9	10	46
14	123	38	19	15	33	29	107	24	8	10	44
15	132	32	19	15	36	30	115	22	10	13	46
						31	115	------	9	14	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
May 10–31	132	107	121	0.358	0.29
June	123	22	51.4	.152	.17
July	21	8	15.8	.047	.05
August	17	9	13.5	.040	.05
September	46	14	30.3	.090	.10

SAUK RIVER NEAR ST. CLOUD, MINN.

LOCATION.—Chain gage in sec. 8, T. 124 N., R. 28 W., on county bridge 3 miles west of St. Cloud and 4 miles above junction with Mississippi River.

DRAINAGE AREA.—816 square miles.

RECORDS AVAILABLE.—July, 1909, to December, 1913; May to September, 1929.

EXTREMES.—Maximum discharge during period, 164 second-feet May 11 (gage height, 2.36 feet); minimum, 11 second-feet Sept. 3 (gage height, 1.60 feet, stage-discharge relation affected by aquatic growth).

1909-1913, 1929: Maximum discharge, 1,620 second-feet May 11, 1912; minimum, 5 second-feet Sept. 5, 1912.

REMARKS.—Records good.

Daily and monthly discharge, in second-feet, 1929

Day	May	June	July	Aug.	Sept.	Day	May	June	July	Aug.	Sept
1	------	141	44	30	33	16	130	70	38	47	47
2	------	99	84	47	18	17	126	63	54	50	49
3	------	43	79	61	11	18	126	78	53	35	54
4	------	110	64	43	28	19	110	44	35	24	51
5	------	114	33	26	34	20	42	53	36	48	33
6	------	116	60	46	44	21	114	57	38	55	30
7	148	108	48	55	47	22	108	54	39	27	27
8	134	110	38	34	34	23	108	58	40	20	24
9	110	90	73	20	32	24	99	39	50	37	28
10	134	40	69	24	57	25	110	69	33	33	57
11	139	76	78	27	46	26	90	75	47	24	64
12	90	81	72	27	61	27	44	66	26	21	43
13	61	73	96	27	55	28	99	82	32	43	30
14	116	78	61	24	71	29	164	78	21	26	27
15	128	79	33	43	50	30	150	84	17	33	19
						31	73	------	21	43	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
May 7-31	164	42	110	0.135	0.15
June	141	39	77.6	.095	.11
July	96	17	50.1	.061	.07
August	61	20	35.5	.044	.05
September	71	11	39.9	.049	.05

ELK RIVER ABOVE ST. FRANCIS RIVER, NEAR BIG LAKE, MINN.

LOCATION.—Chain gage in sec. 7, T. 33 N., R. 27 W., 2½ miles north of Big Lake and 1 mile above junction with St. Francis River.
DRAINAGE AREA.—384 square miles.
RECORDS AVAILABLE.—April to November, 1929, when station was discontinued.
EXTREMES.—Maximum discharge during period, 184 second-feet Apr. 22 (gage height, 3.01 feet); minimum, 11 second-feet Aug. 1 (gage height, 2.14 feet).
REMARKS.—Records poor. Stage discharge relation affected by aquatic growth June 1 to Oct. 20 and affected by ice Nov. 21–30.

Daily and monthly discharge, in second-feet, 1929

Day	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.
1	------	132	83	30	11	30	83	96
2	------	132	77	30	15	29	83	89
3	------	132	77	39	20	30	77	89
4	------	124	72	37	20	32	77	89
5	------	117	67	31	19	35	77	89
6	------	117	67	32	19	38	72	89
7	------	110	67	40	14	35	72	89
8	------	102	61	42	18	38	75	89
9	------	102	62	41	19	51	77	83
10	------	102	61	36	21	57	83	83
11	------	110	64	36	21	54	83	83
12	------	110	66	39	27	55	89	83
13	------	110	62	38	32	54	89	83
14	------	110	57	36	27	56	89	83
15	------	110	53	34	27	51	83	77
16	------	124	50	31	31	53	83	77
17	------	110	46	29	29	52	77	77
18	------	110	42	25	23	53	77	77
19	------	110	40	21	21	51	77	77
20	------	102	51	24	27	50	76	70
21	------	96	45	24	26	50	76	70
22	184	96	46	24	23	49	73	70
23	184	89	36	19	24	47	72	70
24	175	89	36	20	26	45	72	70
25	175	89	35	20	32	69	71	70
26	166	83	36	18	30	117	70	70
27	166	89	37	16	30	110	69	65
28	158	83	38	17	28	102	67	65
29	149	96	36	17	27	96	69	65
30	140	96	36	14	30	89	75	65
31	------	89	------	14	29	------	89	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
April 22-30	184	140	166	0.432	0.14
May	132	83	106	.276	.32
June	83	35	53.5	.139	.16
July	42	14	28.2	.073	.08
August	32	11	24.1	.063	.07
September	117	29	55.9	.146	.16
October	89	67	77.5	.202	.23
November	96	65	78.4	.204	.23

CROW RIVER AT ROCKFORD, MINN.

LOCATION.—Chain gage in sec. 29, T. 119 N., R. 24 W. at Rockford and 1 mile below junction of North and South Forks.

DRAINAGE AREA.—2,520 square miles.

RECORDS AVAILABLE.—June, 1909, to September, 1917, and April to September, 1929.

EXTREMES.—Maximum discharge during year, 696 second-feet Apr. 23 and 25 (gage height, 2.33 feet); minimum, 27 second-feet Aug. 28 (gage height, 0.93 foot).

1909–1917, 1929: Maximum discharge 10,600 second-feet on Apr. 2 and 3, 1916; minimum, 27 second-feet Aug. 28, 1929.

REMARKS.—Records fair.

Daily and monthly discharge, in second-feet, 192?

Day	Apr.	May	June	July	Aug.	Sept.	Day	Apr.	May	June	July	Aug.	Sept.
1	------	584	239	77	132	34	16	------	332	128	73	40	73
2	------	530	215	77	128	54	17	------	312	128	73	40	65
3	------	503	201	77	123	54	18	------	307	119	73	34	61
4	------	476	168	77	123	54	19	------	277	105	73	34	54
5	------	449	177	77	123	43	20	------	282	97	65	34	50
6	------	422	155	77	123	40	21	------	292	93	65	34	50
7	------	395	150	77	119	37	22	------	282	93	65	34	43
8	------	368	146	81	81	43	23	696	277	93	57	34	43
9	------	347	132	81	43	43	24	668	287	85	54	34	50
10	------	332	132	81	40	54	25	696	263	85	50	34	61
11	------	322	132	81	40	73	26	696	268	97	50	34	97
12	------	322	141	77	40	81	27	696	263	97	50	34	114
13	------	322	132	73	40	81	28	696	234	85	43	34	119
14	------	327	128	73	40	81	29	640	263	85	43	34	141
15	------	337	128	73	40	73	30	612	253	81	37	34	141
							31	------	253	------	101	34	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
April 23–30	696	612	675	0.268	0.08
May	584	234	338	.134	.15
June	239	81	128	.051	.06
July	101	37	68.7	.027	.03
August	132	34	57.8	.023	.03
September	141	34	66.9	.027	.03

RUM RIVER NEAR ST. FRANCIS, MINN.

LOCATION.—Chain gage on bridge between secs. 19 and 30, T. 33 N., R. 24 W., 5 miles south of St. Francis and 15¾ miles above junction with Mississippi River.
DRAINAGE AREA.—1,360 square miles.
RECORDS AVAILABLE.—May to September, 1929.
EXTREMES.—Maximum discharge during period, 444 second-feet May 9 (gage height, 3.19 feet); minimum, 67 second-feet July 30 and 31 (gage height, 2.27 feet).
REMARKS.—Records fair.

Daily and monthly discharge, in second-feet, 1929

Day	May	June	July	Aug.	Sept.	Day	May	June	July	Aug.	Sept.
1	------	371	148	72	80	16	420	186	102	91	118
2	------	371	148	74	80	17	420	178	96	91	121
3	------	347	148	77	82	18	420	170	91	88	124
4	------	324	141	80	85	19	420	170	85	85	134
5	------	300	134	80	85	20	395	170	80	85	138
6	444	300	128	85	85	21	395	170	80	80	134
7	420	291	128	85	88	22	371	163	77	80	141
8	444	282	124	91	91	23	371	163	74	80	148
9	444	228	121	96	96	24	371	159	80	80	156
10	420	219	121	102	99	25	395	156	74	80	163
11	420	219	118	99	102	26	395	156	77	80	170
12	420	210	115	96	105	27	395	156	72	80	178
13	420	202	108	96	108	28	395	156	69	82	186
14	420	194	108	96	112	29	395	152	69	85	190
15	420	194	105	94	115	30	395	148	69	82	190
						31	371	------	69	80	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
May 6-31	444	371	408	0.300	0.29
June	371	148	217	.160	.18
July	148	69	102	.0750	.09
August	102	72	85.5	.0629	.07
September	190	80	123	.090	.10

MINNESOTA RIVER NEAR MONTEVIDEO, MINN.

LOCATION.—Chain gage in sec. 17, T. 117 N., R. 40 W., at high way bridge 1 mile south of Montevideo, 500 feet below mouth of Chippewa River.

DRAINAGE AREA.—6,300 square miles.

RECORDS AVAILABLE.—July, 1909, to September, 1929.

EXTREMES.—Maximum discharge during year, 3,080 second-feet Mar. 19 (gage height, 10.91 feet); minimum, 32 second-feet Sept. 4 (gage height, 1.35 feet).

1909–1929: Maximum discharge, about 22,000 second-feet June 25, 1919 (gage height, about 18.85 feet); minimum, 6.8 second-feet, measured by current meter Feb. 9, 1912.

REMARKS.—Records good except those for period of ice effect, Dec. 1 to Mar. 17, which have not been determined.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	120	114	------	1,570	936	347	74	59	34
2	126	114	------	1,490	876	324	88	49	35
3	120	93	------	1,380	817	301	70	52	36
4	114	93	------	1,340	846	301	66	59	33
5	146	98	------	1,270	817	279	74	49	37
6	146	103	------	1,230	759	268	62	46	40
7	139	103	------	1,160	731	248	66	46	38
8	139	103	------	1,130	703	219	62	52	36
9	126	108	------	1,130	675	201	74	52	38
10	146	108	------	1,060	648	201	74	49	56
11	126	108	------	1,030	703	201	70	56	46
12	126	139	------	998	675	219	74	59	46
13	146	126	------	998	648	219	98	49	46
14	146	126	------	936	595	176	108	66	62
15	153	139	------	906	569	168	132	52	52
16	176	160	------	936	569	153	146	40	52
17	168	160	------	967	569	132	120	38	46
18	168	168	2,760	936	595	120	114	39	56
19	153	168	2,960	967	621	139	108	43	59
20	168	184	2,860	967	543	120	98	38	59
21	184	160	2,560	936	493	139	93	35	52
22	238	168	2,410	876	468	126	103	34	52
23	210	168	2,320	846	468	120	114	40	39
24	228	146	2,180	846	468	108	120	38	39
25	228	184	2,100	906	468	103	114	36	52
26	238	188	2,050	906	395	103	98	34	126
27	184	153	2,000	967	371	93	98	37	146
28	139	139	1,960	1,030	371	132	93	36	168
29	132	146	1,780	1,030	347	93	83	34	153
30	126	146	1,740	936	395	74	66	37	153
31	120	------	1,610	------	371	------	59	36	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	238	114	157	0.0249	0.03
November	188	93	137	.0217	.02
March 18-31	2,960	1,610	2,240	.356	.19
April	1,570	846	1,060	.168	.19
May	936	347	597	.0948	.11
June	347	74	181	.0287	.03
July	146	59	90.9	.0144	.02
August	66	34	44.8	.00711	.01
September	163	33	62.9	.00998	.01

MINNESOTA RIVER AT MANKATO, MINN.

LOCATION.—Water-stage recorder in sec. 7, T. 108 N., R. 26 W., at Mair Street highway bridge in Mankato, 2 miles below mouth of Blue Earth River.

DRAINAGE AREA.—14,600 square miles.

RECORDS AVAILABLE.—March, 1922, to September, 1929, at present site; May, 1903, to October, 1921, at Sibley Park 2 miles upstream. Drainage area practically same at the two sites.

EXTREMES.—Maximum discharge during year, 21,400 second-feet Mar. 18 (gage height, 19.0 feet); minimum, 162 second-feet Sept. 23 (gage height, 2.78 feet).

1903–1929: Maximum discharge, 43,800 second-feet June 26, 1908 (gage height at old site, 21.2 feet); minimum, 89 second-feet Aug. 31 to Sept. 2, 1911.

A discharge of about 65,000 second-feet occurred in 1881 (gage height at old site, about 27 feet).

REMARKS.—Records poor. Observations discontinued during winter.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	755	755	525	-------	7,300	8,000	2,460	595	335	210
2	935	755	525	-------	6,910	7,440	2,790	525	305	198
3	845	712	525	-------	6,390	6,910	3,010	525	480	186
4	712	712	460	-------	6,650	6,520	2,680	525	375	198
5	712	632	395	-------	7,170	6,000	2,460	460	378	225
6	712	712	460	-------	8,000	5,480	2,240	460	280	240
7	670	712	460	-------	9,120	4,960	2,130	460	280	240
8	670	712	460	-------	8,840	4,570	2,020	428	280	240
9	670	712	460	-------	8,280	4,200	1,801	492	280	225
10	670	670	460	-------	7,580	3,840	1,610	560	280	240
11	670	800	395	-------	7,440	3,600	1,610	632	280	225
12	632	800	395	755	6,910	3,360	1,810	670	280	225
13	595	800	365	3,120	6,910	3,240	1,810	712	460	225
14	525	845	395	7,440	7,440	2,900	1,810	712	492	225
15	460	845	395	13,500	8,420	3,010	1,710	670	525	225
16	632	755	460	15,600	8,560	2,900	1,610	595	712	210
17	755	712	460	18,900	8,280	2,900	1,420	595	845	225
18	845	712	460	21,100	7,860	2,570	1,420	560	755	210
19	845	755	460	19,900	7,440	2,240	1,320	525	395	198
20	980	755	492	18,800	7,040	2,020	935	460	335	186
21	1,030	755	595	17,400	6,910	2,020	935	395	280	186
22	1,030	755	670	16,200	6,650	1,910	1,080	365	280	176
23	1,180	755	670	15,200	6,390	1,910	1,230	365	280	166
24	1,030	670	560	14,100	6,000	1,810	1,130	335	280	198
25	1,030	632	525	13,400	6,000	1,810	1,030	428	260	186
26	1,030	492	525	12,600	6,390	1,810	935	525	260	210
27	980	492	525	11,100	8,000	1,910	845	595	240	225
28	935	525	525	10,700	9,120	2,020	800	632	225	240
29	800	525	460	10,400	9,400	2,020	712	595	225	260
30	890	560	460	8,420	9,120	2,020	670	492	225	240
31	845	-------	395	7,720	-------	2,130	-------	460	210	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	1,180	460	809	0.0554	0.06
November	845	492	701	.0480	.05
December	670	365	481	.0329	.04
March 12-31	21,100	755	12,800	.877	.65
April	9,400	6,000	7,550	.517	.58
May	8,000	1,810	3,480	.238	.27
June	3,010	670	1,600	.110	.12
July	712	335	527	.0361	.04
August	845	210	357	.0245	.03
September	260	166	215	.0147	.02

ST. CROIX RIVER AT SWISS, WIS.

LOCATION.—Chain gage in sec. 33, T. 42 N., R. 15 W., at highway bridge near Swiss, 10 miles northeast of Danbury. Namakagon River enters 3½ miles above station.

DRAINAGE AREA.—1,550 square miles.

RECORDS AVAILABLE.—March, 1914, to September, 1929.

EXTREMES.—Maximum discharge during year, 3,460 second-feet Mar. 31; maximum gage height, 4.35 feet March 22; minimum discharge, 588 second-feet Aug. 27 (gage height, 0.42 foot).

1914–1929: Maximum discharge, 8,480 second-feet Apr. 22, 1916 (gage height, 6.73 feet); minimum, 518 second-feet several times during Aug., 1925 (gage height, 0.22 foot).

REMARKS.—Records fair except those for period of ice effect, Dec. 5 to Mar. 27, which are poor.

Daily and monthly discharge, in second-feet, 192?–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1,490	1,760	1,230	875	940	810	3,350	1,760	1,310	1,230	750	693
2	1,400	1,760	1,230	875	940	840	3,350	1,670	1,230	1,150	693	693
3	1,400	1,670	1,230	875	940	875	3,240	1,580	1,230	1,150	750	693
4	1,400	1,670	1,150	875	1,010	910	3,240	1,580	1,230	1,080	750	693
5	1,490	1,580	1,150	875	1,010	940	3,240	1,490	1,150	1,080	810	750
6	1,580	1,490	1,080	875	1,010	975	3,130	1,490	1,080	1,080	810	750
7	1,490	1,490	1,010	875	940	1,010	3,130	1,490	1,080	1,080	810	750
8	1,400	1,490	940	875	940	1,010	3,020	1,400	1,080	1,010	875	810
9	1,400	1,490	875	875	940	1,010	3,020	1,310	1,080	1,080	875	875
10	1,310	1,490	810	875	940	975	2,920	1,310	1,080	1,080	875	1,080
11	1,310	1,490	810	875	940	940	3,020	1,400	1,150	1,080	875	1,150
12	1,400	1,490	875	875	910	1,040	2,920	1,400	1,230	1,080	940	1,150
13	1,490	1,400	875	875	875	1,150	2,820	1,310	1,400	1,580	1,010	1,150
14	1,580	1,400	875	875	875	1,230	2,720	1,230	1,400	1,580	1,010	1,150
15	1,670	1,490	940	875	875	1,310	2,620	1,310	1,310	1,490	940	1,150
16	1,940	1,490	940	875	875	1,310	2,620	1,310	1,150	1,490	875	1,150
17	2,420	1,490	940	875	875	1,310	2,720	1,310	1,150	1,400	810	1,150
18	2,620	1,490	875	875	875	1,400	2,620	1,310	1,080	1,230	750	1,080
19	2,620	1,400	810	875	875	1,490	2,620	1,310	1,010	1,150	639	1,080
20	2,720	1,400	810	875	825	1,580	2,520	1,230	1,010	1,150	639	1,010
21	2,820	1,310	750	940	875	1,760	2,520	1,230	1,010	1,080	693	1,010
22	2,820	1,400	750	940	875	1,850	2,420	1,310	1,010	1,010	750	940
23	2,820	1,310	810	940	875	1,940	2,220	1,230	940	875	750	875
24	2,620	1,230	810	940	840	2,120	2,120	1,230	940	875	750	875
25	2,520	1,150	810	940	810	2,220	2,030	1,150	1,010	875	693	1,010
26	2,420	1,230	875	940	810	2,420	1,940	1,150	1,150	875	639	1,150
27	2,320	1,400	875	940	810	2,620	1,760	1,150	1,150	875	588	1,310
28	2,220	1,310	875	940	810	2,820	1,760	1,230	1,310	810	639	1,400
29	2,030	1,230	875	940	-------	3,130	1,760	1,310	1,400	810	693	1,310
30	1,940	1,230	875	940	-------	3,240	1,760	1,400	1,490	750	750	1,080
31	1,850	-------	875	940	-------	3,350	-------	1,400	-------	750	750	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	2,820	1,310	1,950	1.26	1.45
November	1,760	1,150	1,440	.929	1.04
December	1,230	750	924	.596	.69
January	940	875	898	.579	.67
February	1,010	810	899	.580	.60
March	3,350	810	1,600	1.03	1.19
April	3,350	1,760	2,640	1.70	1.90
May	1,760	1,150	1,350	.871	1.00
June	1,490	940	1,160	.748	.83
July	1,580	750	1,090	.703	.81
August	1,010	588	780	.503	.58
September	1,400	693	999	.645	.72
The year	3,350	588	1,310	.845	11.48

ST. CROIX RIVER NEAR GRANTSBURG, WIS.

LOCATION.—Chain gage near center of sec. 30, T. 40 N., R. 18 W., at Norway Point ferry, half a mile below mouth of Sand Creek and 10 miles north of Grantsburg.

DRAINAGE AREA.—2,820 square miles.

RECORDS AVAILABLE.—April, 1923, to September, 1929.

EXTREMES.—Maximum discharge during year, 7,740 second-feet Apr. 1 (gage height, 8.6 feet); minimum, 1,020 second-feet Sept. 3 (gage height, 3.85 feet). 1923–1929: Maximum discharge, 13,300 second-feet Mar. 18, 1927 (gage height, 11.4 feet); minimum (estimated), 695 second-feet Dec. 6, 1925.

REMARKS.—Records fair except those for period of ice effect, Dec. 6 to Mar. 27, which are poor.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	2,490	2,980	2,270	1,760	1,490	1,580	7,740	2,980	2,160	2,490	1,170	1,170
2	2,380	2,980	2,160	1,670	1,490	1,670	7,000	2,980	2,160	2,270	1,170	1,170
3	2,380	2,850	2,060	1,670	1,490	1,670	6,640	2,980	2,060	2,160	1,170	1,090
4	2,270	2,730	2,060	1,670	1,670	1,580	6,280	2,850	1,960	2,380	1,170	1,170
5	2,490	2,730	2,060	1,670	1,490	1,670	6,280	2,730	1,760	1,860	1,170	1,170
6	2,380	2,490	2,060	1,670	1,580	1,670	6,280	2,730	1,760	1,580	1,170	1,170
7	2,490	2,610	1,960	1,670	1,760	1,670	6,280	2,610	1,580	1,670	1,250	1,090
8	2,610	2,610	1,960	1,580	1,670	1,580	6,280	2,490	1,580	1,670	1,330	1,170
9	2,490	2,730	1,860	1,580	1,760	1,580	6,100	2,490	1,580	1,580	1,330	1,490
10	2,380	2,730	1,860	1,580	1,860	1,580	5,740	2,490	1,670	2,160	1,330	1,860
11	2,490	2,610	1,860	1,670	1,670	1,580	5,560	2,490	1,760	1,670	1,330	1,960
12	2,490	2,490	1,860	1,580	1,670	1,670	5,200	2,380	1,860	1,580	1,250	1,960
13	2,490	2,380	1,860	1,580	1,760	1,760	4,840	2,490	1,960	1,760	1,170	1,860
14	2,610	2,490	1,960	1,580	1,670	1,860	4,840	2,270	1,960	2,490	1,170	1,860
15	2,409	2,490	1,960	1,490	1,760	2,060	5,020	2,490	1,960	2,380	1,250	1,860
16	3,540	2,490	1,960	1,490	1,670	2,270	5,200	2,490	1,760	2,270	1,330	1,860
17	4,490	2,610	2,060	1,490	1,670	2,380	5,560	2,490	1,670	2,060	1,330	1,670
18	5,020	2,610	1,960	1,580	1,670	2,610	5,740	2,380	1,670	1,960	1,250	1,760
19	5,380	2,610	1,860	1,490	1,670	2,850	5,740	2,270	1,580	1,760	1,250	1,760
20	5,560	2,490	1,670	1,490	1,670	3,110	5,380	2,270	1,580	1,670	1,090	1,670
21	5,380	2,490	1,580	1,490	1,670	3,390	5,200	2,270	1,580	1,580	1,250	1,670
22	5,380	2,490	1,580	1,490	1,670	3,540	4,840	2,160	1,580	1,580	1,170	1,580
23	5,380	2,380	1,670	1,490	1,670	3,840	4,490	2,160	1,580	1,330	1,170	1,580
24	5,020	2,380	1,760	1,490	1,670	4,160	4,320	2,060	1,580	1,330	1,170	1,490
25	4,840	2,270	1,860	1,490	1,670	4,490	4,160	2,060	1,490	1,330	1,250	2,060
26	4,490	2,270	1,860	1,490	1,670	5,010	3,840	1,860	1,580	1,330	1,170	1,860
27	4,160	2,270	1,860	1,490	1,490	5,560	3,840	1,860	1,580	1,330	1,170	2,060
28	3,840	2,270	1,860	1,490	1,490	6,100	3,540	2,160	1,760	1,330	1,170	2,270
29	3,540	2,270	1,860	1,490	------	6,460	3,390	1,960	1,860	1,330	1,170	2,380
30	3,390	2,270	1,860	1,490	------	7,000	3,250	2,160	2,060	1,170	1,170	2,380
31	3,250	------	1,860	1,580	------	7,550	------	2,270	------	1,170	1,170	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	5,560	2,270	3,540	1.26	1.45
November	2,980	2,270	2,540	.901	1.01
December	2,270	1,580	1,900	.674	.78
January	1,760	1,490	1,560	.553	.64
February	1,860	1,490	1,650	.585	.61
March	7,550	1,580	3,080	1.09	1.26
April	7,740	3,250	5,290	1.88	2.10
May	2,980	1,860	2,400	.851	.98
June	2,160	1,490	1,760	.624	.70
July	2,490	1,170	1,750	.621	.72
August	1,330	1,090	1,220	.433	.50
September	2,380	1,090	1,670	.592	.66
The year	7,740	1,090	2,360	.837	11.41

ST. CROIX RIVER NEAR RUSH CITY, MINN.

LOCATION.—Chain gage in SW. ¼ sec. 8, T. 37 N., R. 20 W., at Northern Pacific Railway bridge 5 miles east of Rush City and 10 miles below mouth of Snake River.

DRAINAGE AREA.—5,120 square miles.

RECORDS AVAILABLE.—April, 1923, to September, 1929.

EXTREMES.—Maximum discharge during year, 13,500 second-feet Mar. 30 to Apr. 1; maximum gage height, 13.90 feet March 22; minimum discharge, 1,100 second-feet Aug. 4–5 and Aug. 28 to Sept. 4 (gage height, 2.7 feet).

1923–1929: Maximum discharge, 26,700 second-feet Mar. 18, 1927; minimum, 820 second-feet several days in August and December, 1925, and January and March, 1926.

REMARKS.—Records good except those for period of ice effect (Dec. 4 to Mar. 26) and those from Oct. 1 to Dec. 3, which are poor.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	3,330	4,450	2,350	2,120	1,900	1,900	13,500	4,350	3,190	2,370	1,270	1,100
2	3,070	4,160	2,350	2,120	1,900	1,900	12,900	3,870	2,930	2,700	1,270	1,100
3	3,070	3,880	2,350	2,120	1,900	1,900	11,800	3,390	2,820	2,480	1,270	1,100
4	2,820	3,600	2,350	2,120	1,900	1,900	11,200	3,630	2,370	2,480	1,100	1,100
5	3,070	3,600	2,350	2,120	1,900	1,900	10,700	3,630	2,480	2,160	1,100	1,270
6	3,330	3,330	2,350	2,120	1,900	1,900	10,400	3,630	2,230	2,260	1,270	1,270
7	3,600	3,330	2,120	2,120	1,900	1,900	10,100	3,160	2,230	2,050	1,270	1,270
8	3,330	3,330	2,120	2,120	1,900	1,900	10,100	3,390	1,910	1,840	1,270	1,270
9	3,070	3,070	2,350	2,120	1,900	1,900	10,100	3,390	2,050	1,940	1,270	1,540
10	3,070	3,070	2,350	2,120	1,900	1,900	9,570	3,160	2,050	1,840	1,360	1,840
11	2,820	3,070	2,350	2,120	1,900	1,900	9,030	2,930	2,050	1,640	1,450	2,050
12	2,820	2,820	2,350	2,120	1,900	1,900	8,490	3,160	2,050	1,840	1,450	2,260
13	3,330	2,820	2,350	2,120	1,900	1,900	7,680	3,160	2,230	1,840	1,450	2,260
14	3,330	2,820	2,350	2,120	1,900	2,120	8,490	3,160	2,230	1,940	1,270	2,050
15	3,880	3,070	2,350	2,120	1,900	2,820	8,490	2,930	2,230	2,820	1,270	2,050
16	5,630	3,070	2,350	2,120	1,900	3,600	9,570	3,160	2,050	2,700	1,270	2,050
17	7,500	3,070	2,350	2,120	1,900	4,160	9,840	3,160	2,050	2,260	1,450	2,050
18	8,100	3,070	2,350	1,900	1,900	5,030	10,100	3,160	2,050	2,370	1,450	2,050
19	8,550	3,070	2,350	1,900	1,900	5,630	10,100	2,930	2,050	2,050	1,360	1,940
20	8,340	3,070	2,120	1,900	1,900	6,550	9,570	3,160	1,840	2,050	1,270	1,840
21	8,100	3,070	2,120	1,900	1,900	7,180	9,030	2,930	1,840	1,940	1,270	1,740
22	8,100	2,820	2,120	1,900	1,900	8,100	8,490	2,930	1,840	1,640	1,270	1,640
23	8,340	2,580	2,120	1,900	1,900	8,720	7,950	2,700	1,840	1,640	1,270	1,540
24	8,340	2,580	2,120	1,900	1,900	9,140	7,160	2,930	1,640	1,450	1,270	1,450
25	8,100	2,350	2,120	1,900	1,900	9,530	6,380	2,820	1,840	1,640	1,270	1,740
26	7,500	2,350	2,120	1,900	1,900	10,000	6,120	2,700	1,840	1,540	1,270	1,940
27	6,860	2,350	2,120	1,900	1,900	11,800	5,860	2,700	1,840	1,270	1,180	2,370
28	6,240	2,350	2,120	1,900	1,900	12,100	5,350	2,930	2,050	1,450	1,100	2,480
29	5,630	2,350	2,120	1,900	-------	12,900	4,850	2,930	2,050	1,450	1,100	2,480
30	5,030	2,350	2,120	1,900	-------	13,500	4,850	3,160	1,840	1,360	1,100	2,480
31	4,450	-------	2,120	1,900	-------	13,500	-------	2,930	-------	1,270	1,100	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	8,550	2,820	5,250	1.03	1.19
November	4,450	2,350	3,030	.592	.66
December	2,350	2,120	2,250	.439	.51
January	2,120	1,900	2,020	.395	.46
February	1,900	1,900	1,900	.371	.39
March	13,500	1,900	5,520	1.08	1.24
April	13,500	4,850	8,930	1.74	1.94
May	4,350	2,700	3,170	.619	.71
June	3,160	1,640	2,130	.416	.46
July	2,820	1,270	1,940	.379	.44
August	1,450	1,100	1,270	.248	.29
September	2,480	1,100	1,780	.348	.39
The year	13,500	1,100	3,270	.639	8.68

ST. CROIX RIVER NEAR ST. CROIX FALLS, WIS.

LOCATION.—In sec. 18, T. 34 N., R. 18 W., at power plant of Northern States Power Co., near St. Croix Falls.

DRAINAGE AREA.—5,930 square miles.

RECORDS AVAILABLE.—January, 1910, to September, 1929.

EXTREMES.—Maximum mean daily discharge during year, 16,900 second-feet Apr. 1–2; minimum, 0 second-foot Sept. 30.

1910–1929: Maximum mean daily discharge, 35,800 second-feet Mar. 26, 1920; no flow Sept. 30, 1929, caused by regulation.

REMARKS.—Records good. Flow computed from power-house records. Low-water flow controlled by operation of gates of power plant and by operation at Never's Dam, 10 miles upstream. Daily discharge records furnished by Northern States Power Co.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	3,170	5,830	2,660	1,350	1,960	2,010	16,900	6,800	3,470	3,200	1,570	1,460
2	4,110	5,750	1,420	3,390	2,070	2,340	16,900	5,930	2,500	3,350	1,440	1,300
3	4,340	4,370	3,280	2,820	262	204	16,200	4,720	3,680	3,480	1,600	1,230
4	4,140	4,200	2,920	2,000	2,360	2,560	14,300	3,250	3,320	2,730	1,240	1,300
5	4,040	4,350	2,680	2,250	2,450	2,200	13,700	3,170	2,690	2,710	1,250	1,420
6	3,740	4,390	1,930	588	2,190	2,280	11,700	3,910	2,620	2,400	1,380	1,440
7	3,270	3,830	1,810	2,310	2,040	2,350	14,500	4,280	2,650	1,640	1,490	1,230
8	4,740	4,010	1,750	2,170	2,410	2,370	15,600	4,360	2,490	3,200	1,510	1,350
9	4,220	3,980	841	2,490	1,860	1,860	14,600	4,490	2,460	2,640	1,710	1,580
10	4,240	3,490	2,690	2,250	806	179	13,900	4,650	2,190	2,610	1,760	1,660
11	3,910	1,660	2,720	2,080	2,400	3,170	14,100	3,770	2,400	2,610	1,450	2,200
12	4,100	4,780	2,580	1,990	2,710	2,900	12,100	3,070	3,050	1,910	1,660	2,330
13	4,170	4,380	2,650	497	2,340	2,930	12,900	3,500	2,470	2,140	1,870	2,760
14	2,280	4,220	3,430	2,430	2,230	3,340	10,600	3,450	2,520	1,230	1,760	2,260
15	3,840	4,110	3,460	2,250	2,040	3,630	8,150	3,290	2,120	3,390	1,710	1,690
16	4,890	3,810	2,110	2,240	2,070	6,190	11,200	3,310	2,020	2,940	1,710	2,730
17	6,440	4,230	3,620	2,340	270	12,500	11,500	4,180	2,480	2,930	1,940	2,580
18	6,490	3,520	3,580	2,040	2,380	15,500	12,700	4,600	2,410	2,930	1,300	2,300
19	9,370	3,600	3,930	2,160	2,390	12,700	12,600	3,550	2,230	3,050	1,710	2,680
20	8,910	3,810	3,900	405	2,540	13,400	10,800	3,600	2,180	2,740	1,780	2,320
21	9,420	3,730	3,100	2,640	2,290	14,900	11,900	3,290	2,530	1,750	1,680	2,260
22	9,100	3,440	1,970	2,420	2,130	15,800	7,740	4,200	2,100	2,200	1,530	1,680
23	8,360	3,660	840	2,320	2,100	14,400	8,500	3,370	2,640	2,360	1,500	2,170
24	8,200	3,850	2,750	2,110	275	14,600	7,700	3,520	2,140	2,070	1,570	2,160
25	8,360	4,000	1,290	2,300	2,550	13,300	7,400	3,250	2,190	2,030	1,260	2,330
26	7,700	1,980	4,390	1,990	2,380	13,800	7,590	4,060	2,050	1,740	1,620	2,210
27	7,450	2,400	2,790	260	2,760	14,500	6,990	4,060	2,120	2,240	1,490	2,540
28	7,140	3,440	3,190	2,460	2,010	15,900	6,280	2,880	2,820	1,630	1,360	2,560
29	6,500	3,010	2,520	1,920	------	15,800	6,960	3,040	1,970	1,560	1,390	2,190
30	6,810	3,080	870	2,070	------	16,200	6,410	2,580	1,310	1,390	1,440	0
31	6,230	------	3,080	1,880	------	16,600	------	3,740	------	1,590	1,570	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	9,420	2,280	5,800	0.978	1.13
November	5,830	1,660	3,830	.646	.72
December	4,390	840	2,600	.438	.50
January	3,390	260	2,010	.339	.39
February	2,760	262	2,010	.339	.35
March	16,600	179	8,400	1.42	1.64
April	16,900	6,280	11,400	1.92	2.14
May	6,800	2,580	3,870	.653	.75
June	3,680	1,310	2,460	.415	.46
July	3,480	1,230	2,400	.405	.47
August	1,940	1,240	1,560	.263	.30
September	2,760	0	1,930	.325	.36
The year	16,900	0	4,020	.678	9.27

NAMAKAGON RIVER NEAR TREGO, WIS.

LOCATION.—In SW. ¼ sec. 17, T. 40 N., R. 12 W., at power house of Wisconsin Hydroelectric Co., 5 miles northwest of Trego.

DRAINAGE AREA.—476 square miles.

RECORDS AVAILABLE.—October, 1927, to September, 1929. Records were collected at Trego, 5 miles farther upstream (drainage area, 420 square miles) March, 1914, to September, 1927.

EXTREMES.—Maximum mean daily discharge during year, 1,150 second-feet Oct. 20, minimum, 185 second-feet Aug. 18. Both maximum and minimum discharges are the result of regulation.

1927–1929: Maximum mean daily discharge, 1,360 second-feet Sept. 14, 1928; minimum, 123 second-feet Jan. 22, 1928.

REMARKS.—Records fair. The discharge is computed from hourly records of load and head on power plant.

Daily and monthly discharge, in second-feet, 1927–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	670	800	671	543	466	452	971	654	677	582	360	194
2	759	800	511	526	464	471	947	611	599	671	365	304
3	668	785	682	392	288	386	929	542	577	604	356	337
4	460	514	589	416	656	462	901	539	682	459	224	332
5	680	709	477	419	464	460	909	516	617	558	437	233
6	745	878	410	297	403	375	976	539	521	574	517	336
7	516	757	376	519	400	402	840	530	535	342	411	369
8	588	798	389	457	400	545	1,010	504	595	578	420	249
9	698	785	307	509	408	429	1,030	464	431	547	416	527
10	550	721	444	458	344	326	983	394	620	526	462	625
11	650	532	524	439	398	458	975	495	693	524	258	486
12	635	711	549	484	310	480	968	380	722	543	425	486
13	674	714	628	403	368	381	890	521	754	535	331	551
14	676	567	719	416	386	584	808	517	573	605	469	486
15	694	741	826	428	380	658	817	513	530	693	480	249
16	891	756	591	437	380	657	817	400	518	640	432	508
17	1,100	738	732	437	374	593	817	516	551	644	411	532
18	1,080	569	416	480	369	696	817	580	530	507	185	415
19	1,070	761	430	449	358	693	817	372	574	611	407	375
20	1,150	638	361	403	445	745	809	613	527	620	396	376
21	1,050	779	413	462	483	900	807	569	526	273	353	396
22	1,120	695	456	454	480	840	740	516	540	400	366	208
23	962	679	304	438	488	807	737	578	349	530	377	427
24	938	677	511	438	339	665	727	526	521	484	364	352
25	953	488	463	438	572	574	666	452	532	459	235	364
26	952	505	638	438	474	566	670	297	561	470	408	487
27	933	636	640	403	486	539	712	472	551	427	337	532
28	734	704	640	453	445	669	662	562	560	241	354	611
29	798	631	645	386	------	918	521	582	671	422	298	245
30	799	665	553	285	------	1,020	524	631	417	378	585	550
31	797	------	642	440	------	924	------	657	------	344	354	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	1,150	460	806	1.69	1.95
November	878	488	691	1.45	1.62
December	826	304	533	1.12	1.29
January	543	285	437	.918	1.06
February	656	288	422	.887	.92
March	1,020	326	602	1.26	1.45
April	1,030	521	827	1.74	1.94
May	657	297	517	1.09	1.26
June	754	349	559	1.17	1.30
July	693	241	509	1.07	1.23
August	585	185	380	.798	.92
September	625	194	405	.851	.95
The year	1,150	185	558	1.17	15.89

APPLE RIVER NEAR SOMERSET, WIS.

LOCATION.—In sec. 21, T. 31 N., R. 19 W., at power plant of Northern States Power Co., 3½ miles below Somerset.

DRAINAGE AREA.—550 square miles.

RECORDS AVAILABLE.—January, 1901, to September, 1929.

EXTREMES.—Maximum mean daily discharge during year, 1,140 second-feet Mar. 20; no flow Sept. 30.

1904–1929: Maximum mean daily discharge, 2,280 second-feet in June, 1905; no flow Sept. 30, 1929, caused by regulation.

REMARKS.—Records fair. Discharge computed from power-house records by engineers of the Northern States Power Co.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	234	333	165	150	219	333	718	392	255	201	132	133
2	254	283	271	201	207	219	708	344	315	236	109	150
3	236	312	222	213	202	325	678	299	238	207	105	127
4	212	263	224	249	231	219	642	358	226	115	135	132
5	294	321	197	195	219	244	574	204	237	201	140	155
6	206	188	156	237	228	280	619	318	222	219	132	150
7	228	223	103	196	197	205	600	323	190	170	126	133
8	238	187	263	197	240	273	589	311	201	239	140	132
9	195	242	241	237	178	283	583	259	121	254	144	166
10	259	327	195	219	193	213	594	175	275	266	154	144
11	227	158	178	197	257	315	520	203	184	219	156	144
12	338	301	190	184	219	261	589	180	190	201	167	178
13	198	212	201	144	257	472	482	202	219	160	150	157
14	296	280	337	213	226	539	564	239	254	259	167	103
15	310	214	304	190	213	550	565	267	178	213	171	195
16	465	278	239	201	234	654	539	297	260	144	150	254
17	519	262	299	201	220	832	465	248	160	126	115	178
18	673	242	255	225	238	938	503	255	178	178	120	154
19	686	285	243	207	202	1,050	561	204	207	115	166	207
20	604	295	208	174	194	1,140	578	238	201	154	132	194
21	530	255	127	219	207	1,050	300	196	166	97	144	184
22	537	268	166	213	222	1,010	507	287	120	154	172	138
23	365	285	209	185	184	913	531	247	260	190	150	150
24	504	120	280	213	248	911	496	265	184	225	126	184
25	343	98	155	196	223	802	473	230	166	138	117	229
26	300	179	294	178	245	749	426	269	164	150	172	250
27	311	160	260	219	236	654	347	183	238	150	132	178
28	320	288	289	213	242	671	265	237	190	162	140	194
29	309	201	260	207	------	684	405	219	232	149	144	166
30	279	261	242	219	------	702	390	279	149	120	121	[illegible]0
31	287	------	201	207	------	733	------	257	------	120	150	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	686	195	347	0.631	0.73
November	333	98	244	.444	.50
December	337	103	225	.409	.47
January	249	144	203	.369	.43
February	257	178	221	.402	.42
March	1,140	205	588	1.07	1.23
April	718	265	527	.958	1.07
May	392	175	258	.469	.54
June	315	120	206	.375	.42
July	266	97	178	.324	.37
August	172	105	141	.256	.30
September	254	0	162	.295	.33
The year	1,140	0	275	.500	6.81

CHIPPEWA RIVER AT BISHOPS BRIDGE, NEAR WINTER, WIS.

LOCATION.—Chain gage in sec. 23, T. 39 N., R. 6 W., at highway bridge 3 miles below Chippewa Reservoir Dam and 4 miles northwest of Winter.

DRAINAGE AREA.—775 square miles.

RECORDS AVAILABLE.—February, 1912, to September, 1929.

EXTREMES.—Maximum discharge during year, 3,660 second-feet Oct. 19 (gage height, 7.75 feet); minimum, 87 second-feet Mar. 17 (gage height, 3.80 feet). Both discharges caused by regulation.

1912–1929: Maximum discharge, 6,940 second-feet Apr. 22, 1916 (gage height, 9.56 feet); minimum, 14 second-feet Apr. 17-20 and May 1–5, 1925 (gage height, 3.25 feet).

REMARKS.—Records excellent. Discharge regulated by storage at Chippewa Reservoir.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	580	1,450	1,050	1,450	1,450	1,650	145	162	7[illegible]0	145	960	710
2	580	1,450	1,050	1,450	1,450	1,650	145	162	7[illegible]0	145	790	710
3	710	1,450	1,050	1,450	1,450	1,650	162	162	7[illegible]0	145	790	710
4	870	1,450	1,050	1,450	1,450	1,650	180	162	7[illegible]0	139	790	710
5	1,050	1,450	1,050	1,450	1,450	1,650	215	152	7[illegible]0	330	790	710
6	1,250	1,450	1,050	1,450	1,450	1,760	215	162	1,000	640	790	710
7	1,250	1,100	1,050	1,450	1,450	1,870	180	162	1,000	610	790	710
8	1,250	790	1,050	1,450	1,450	1,870	180	162	1,000	610	790	710
9	1,250	790	1,250	1,450	1,450	1,870	180	162	1,000	610	790	710
10	1,250	790	1,250	1,450	1,450	1,650	180	162	1,000	610	790	710
11	1,250	790	1,250	1,450	1,450	1,550	180	152	995	610	750	710
12	1,150	790	1,250	1,450	1,450	1,650	180	162	790	1,000	790	710
13	445	790	1,250	1,450	1,450	1,650	180	162	198	1,000	790	710
14	115	790	1,250	1,450	1,450	1,550	180	375	198	1,000	790	710
15	145	790	1,250	1,450	1,350	470	180	375	180	1,000	790	710
16	270	790	1,250	1,450	1,350	198	180	375	139	1,000	790	710
17	1,050	790	1,250	1,450	1,350	87	180	375	180	1,000	790	710
18	2,820	790	1,250	1,450	1,450	101	162	445	870	1,000	790	710
19	3,660	790	1,250	1,450	1,450	115	162	520	660	1,050	750	710
20	3,080	790	1,250	1,450	1,450	115	162	520	660	1,150	710	710
21	2,560	790	1,250	1,450	1,450	115	162	520	660	1,150	710	710
22	2,560	790	1,450	1,450	1,450	115	162	520	660	1,150	710	710
23	2,440	790	1,450	1,450	1,450	115	162	520	660	1,150	710	710
24	2,320	790	1,450	1,450	1,550	115	162	520	660	1,150	710	710
25	2,320	915	1,450	1,450	1,650	115	162	550	660	1,150	710	710
26	1,760	830	1,450	1,450	1,650	115	162	550	660	1,150	710	420
27	1,200	830	1,450	1,450	1,650	130	162	550	660	1,150	710	198
28	1,200	830	1,450	1,350	1,650	162	162	750	162	1,150	710	198
29	1,350	960	1,450	1,350	-------	198	162	750	152	1,150	710	198
30	1,450	1,050	1,450	1,350	-------	198	162	750	145	1,150	710	330
31	1,450	-------	1,450	1,450	-------	180	-------	750	-------	1,150	710	-------

Month	Observed			Gain or loss in storage at Chippewa Reservoir (millions of cubic feet)	Corrected for storage		
	Maximum	Minimum	Mean		Mean	Per square mile	Run-off in inches
October	3,660	115	1,440	+14	1,440	1.86	2.14
November	1,450	790	955	−295	841	1.09	1.22
December	1,450	1,050	1,260	−2,067	488	.630	.73
January	1,450	1,350	1,440	−2,519	499	.644	.74
February	1,650	1,350	1,470	−2,502	436	.563	.59
March	1,870	87	849	+724	1,120	1.45	1.67
April	215	145	172	+5,337	2,230	2.88	3.21
May	750	152	381	+1,062	778	1.00	1.15
June	1,050	145	602	+173	669	.863	.96
July	1,150	139	853	−1,072	453	.585	.67
August	960	710	762	−1,533	190	.245	.28
September	710	198	636	−751	346	.446	.50
The year	3,660	87	901	−3,429	792	1.02	13.86

CHIPPEWA RIVER NEAR BRUCE, WIS.

LOCATION.—Chain gage in sec. 4, T. 35 N., R. 7 W., 1 mile east of Bruce, just below mouth of Thornapple River.

DRAINAGE AREA.—1,600 square miles.

RECORDS AVAILABLE.—December, 1913, to September, 1929.

EXTREMES.—Maximum discharge during year, 6,800 second-feet Oct. 19 (gage height, 7.8 feet); minimum, 434 second-feet Sept. 30 (gage height, 1.40 feet), caused by regulation at Chippewa Reservoir.

1914–1929: Maximum discharge, 14,900 second-feet Apr. 10, 1922 (gage height, 13.7 feet); minimum, 200 second-feet Aug. 7, 8, and 9, 1925 (gage height, 1.00 foot).

REMARKS.—Records excellent except those for period of ice effect, Dec. 6 to Mar. 30, which are poor. Discharge regulated by Chippewa Reservoir.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1,060	2,040	1,370	1,690	1,690	1,940	4,230	912	1,690	2,740	1,190	873
2	1,010	1,940	1,370	1,690	1 690	1,860	3,280	873	1,360	1,770	1,030	873
3	968	1,940	1,370	1,600	1,690	1,770	3,100	873	1,190	1,190	990	873
4	968	1,940	1,280	1,600	1,690	1,770	3,280	834	1,190	990	990	873
5	1,240	1,940	1,190	1,600	1,690	1,860	3,680	795	1,110	834	1,030	951
6	1,370	1,940	1,190	1,600	1,690	1,860	4,590	756	1,190	1,030	1,030	951
7	1,460	1,940	1,190	1,600	1,690	1,860	4,350	643	1,280	1,520	990	912
8	1,560	1,750	1,190	1,600	1,690	1,690	4,110	643	1,190	1,600	1,030	912
9	1,560	1,560	1,280	1,600	1,690	1,690	3,280	643	1,190	1,440	1,030	951
10	1,650	1,370	1,360	1,600	1,690	1,690	2,740	643	1,360	1,360	1,030	951
11	1,560	1,280	1,440	1,600	1,690	1,770	2,120	643	1,600	1,190	1,030	951
12	1,840	1,280	1,520	1,600	1,690	1,860	1,860	643	1,770	1,110	990	951
13	1,560	1,280	1,520	1,520	1,690	1,940	1,690	606	1,520	3,480	1,030	990
14	1,190	1,280	1,520	1,520	1,600	2,030	1,860	606	1,190	3,280	990	951
15	1,060	1,370	1,520	1,520	1,600	2,120	2,470	643	1,030	2,120	990	912
16	2,820	1,460	1,520	1,600	1,600	1,110	2,210	756	873	1,770	951	912
17	4,460	1,460	1,520	1,690	1,520	795	2,300	912	718	1,520	951	912
18	5,640	1,370	1,520	1,600	1,520	645	2,210	834	718	1,440	951	873
19	6,800	1,370	1,520	1,600	1,690	795	1,940	873	951	1,360	951	873
20	6,440	1,370	1,520	1,520	1,600	950	1,860	951	1,030	1,360	951	873
21	5,420	1,280	1,520	1,440	1,600	1,190	1,690	951	951	1,360	951	873
22	4,770	1,280	1,520	1,440	1,600	1,440	1,520	951	951	1,440	912	873
23	4,350	1,280	1,690	1,520	1,600	1,690	1,360	873	912	1,360	912	873
24	3,820	1,280	1,860	1,520	1,690	1,940	1,190	873	951	1,360	912	873
25	3,620	1,370	1,860	1,520	1,690	2,210	1,190	912	951	1,360	912	873
26	3,220	1,370	1,860	1,520	1,690	2,470	1,110	912	1,190	1,360	912	756
27	2,320	1,190	1,860	1,520	1,860	2,830	1,030	951	2,030	1,360	873	718
28	2,130	1,140	1,770	1,520	2,030	3,190	990	1,110	2,210	1,360	873	500
29	1,940	1,190	1,770	1,600	-------	3,780	912	1,440	1,690	1,360	912	467
30	1,940	1,240	1,690	1,600	-------	4,590	912	1,860	2,650	1,360	912	434
31	2,130	-------	1,690	1,690	-------	5,390	-------	2,120	-------	1,280	912	-------

Month	Observed			Gain or loss in storage at Chippewa Reservoir (millions of cubic feet)	Corrected for storage		
	Maximum	Minimum	Mean		Mean	Per square mile	Run-off in inches
October	6,800	968	2,640	+14	2,640	1.65	1.90
November	2,040	1,140	1,480	−295	1,370	.856	.95
December	1,860	1,190	1,520	−2,067	748	.468	.54
January	1,690	1,440	1,580	−2,519	639	.399	.46
February	2,030	1,520	1,670	−2,502	636	.398	.41
March	5,390	645	2,020	+724	2,290	1.43	1.65
April	4,590	912	2,300	+5,337	4,360	2.72	3.04
May	2,120	606	904	+1,062	1,300	.812	.94
June	2,650	718	1,290	+173	1,360	.850	.95
July	3,480	834	1,550	−1,072	1,150	.719	.83
August	1,190	873	972	−1,533	400	.250	.29
September	990	434	852	−751	562	.351	.39
The year	6,800	434	1,570	−3,429	1,460	.912	12.35

CHIPPEWA RIVER AT CHIPPEWA FALLS, WIS.

LOCATION.—Water-stage recorder in SE. ¼ sec. 6, T. 28 N., R. 8 W., at Chippewa Falls, 2,500 feet below mouth of Duncan Creek.

DRAINAGE AREA.—5,600 square miles.

RECORDS AVAILABLE.—June, 1888, to September, 1929.

EXTREMES.—Maximum discharge during year, 44,000 second-feet Apr. 7 (gage height, 12.5 feet); minimum, 23 second-feet Sept. 22. Both maximum and minimum discharges are the result of regulation.

1888–1929: Maximum discharge, 78,000 second-feet Mar. 27, 1920 (gage height, 17.0 feet); minimum, 23 second-feet Sept. 22, 1929 (regulation).

Maximum stage known, 26.94 feet Sept. 10, 1884.

REMARKS.—Records good except those for Oct. 12–20, Nov. 4–10, Dec. 29 to Mar. 20, May 18 to June 22, and Sept. 15–21, which are fair. Flow regulated by Chippewa power plant immediately above station, and many other plants above, also by Chippewa and Flambeau Reservoirs.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	5,690	7,790	3,070	1,600	3,890	5,350	30,200	5,530	5,660	11,400	1,900	660
2	3,970	6,690	1,140	4,110	3,330	4,310	22,200	5,530	848	9,840	2,610	528
3	4,130	6,420	2,880	3,680	584	1,190	20,200	6,820	4,780	9,180	1,890	1,390
4	4,410	1,340	2,870	3,040	3,600	5,490	16,900	5,480	4,670	2,150	112	1,630
5	3,690	5,430	2,460	2,900	4,260	5,760	19,700	482	4,780	1,680	2,640	1,370
6	4,070	5,790	3,000	1,160	4,080	4,840	25,900	4,540	4,820	4,050	2,010	1,260
7	1,030	5,040	2,970	3,440	3,460	6,390	32,600	4,410	4,820	215	2,540	665
8	4,410	4,960	1,910	4,130	3,940	6,420	36,200	4,830	3,670	4,410	2,970	44
9	5,750	4,980	1,300	4,200	3,580	6,320	32,600	5,100	920	6,420	2,970	1,360
10	6,050	4,450	908	3,710	1,120	2,290	24,400	4,830	4,470	6,970	2,940	1,540
11	7,110	488	894	3,510	3,760	5,900	20,000	4,280	5,690	6,970	535	1,300
12	8,140	3,830	1,630	3,760	4,330	6,290	15,000	297	7,090	7,520	3,480	1,570
13	7,710	3,540	1,630	926	4,010	6,100	14,100	3,540	7,590	4,280	3,750	1,300
14	3,430	3,540	3,210	3,650	3,930	6,020	13,200	3,830	6,740	2,890	2,720	1,810
15	7,510	3,250	3,320	4,520	3,780	5,850	16,300	3,590	6,190	9,550	3,300	699
16	8,710	3,270	838	3,490	3,760	5,340	17,500	3,540	920	7,240	3,410	2,280
17	8,570	3,070	3,240	3,520	1,100	990	16,000	3,380	5,810	5,930	2,470	2,460
18	11,100	672	4,120	3,440	5,180	5,320	14,700	3,570	4,830	5,930	454	2,390
19	14,800	3,250	3,510	3,360	5,140	6,220	13,100	836	4,690	4,830	3,030	2,310
20	14,500	3,400	3,250	975	5,060	9,270	11,700	3,560	4,400	2,810	1,810	2,290
21	19,400	4,450	2,010	3,440	4,800	26,600	8,900	3,570	3,620	928	2,710	1,900
22	20,000	4,010	1,550	4,010	4,110	25,000	13,800	3,510	2,790	3,630	2,450	79
23	17,300	4,080	764	4,140	4,270	25,500	9,840	4,400	644	3,550	2,510	1,220
24	16,900	3,260	1,210	4,270	961	19,400	10,100	4,810	2,190	3,690	2,360	1,180
25	15,400	693	699	3,860	4,870	20,000	7,670	3,800	2,140	3,140	978	1,290
26	12,600	3,170	2,850	3,350	4,240	17,600	7,950	1,040	2,230	2,510	2,770	1,200
27	10,900	2,820	3,600	636	4,620	15,500	5,070	4,420	2,870	1,830	1,540	1,440
28	6,200	1,950	4,130	3,580	4,580	18,800	4,000	4,380	7,790	339	2,100	1,050
29	6,480	1,110	5,390	4,180	-------	27,700	10,200	4,600	9,840	3,250	1,700	490
30	7,600	2,880	1,500	4,170	-------	27,800	5,480	1,380	10,300	3,220	2,030	1,370
31	7,310	-------	2,990	3,700	-------	29,400	-------	4,880	-------	3,030	1,070	-------

Month	Observed			Gain or loss in storage[a] (millions of cubic feet)	Corrected for storage		
	Maximum	Minimum	Mean		Mean	Per square mile	Run-off in inches
October	20,000	1,030	8,870	+450	9,070	1.61	1.86
November	7,790	488	3,650	−846	3,330	.593	.66
December	5,390	699	2,410	−2,693	1,400	.250	.29
January	4,520	636	3,310	−3,947	1,870	.329	.38
February	5,180	584	3,730	−3,943	2,100	.375	.39
March	29,400	990	11,600	+1,149	12,000	2.14	2.47
April	36,200	4,000	16,500	+8,358	19,700	3.52	3.93
May	6,820	297	3,830	+1,368	4,370	.775	.89
June	10,300	644	4,550	−125	4,500	.804	.90
July	11,400	215	4,630	−2,056	3,880	.689	.79
August	3,750	112	2,250	−3,532	933	.166	.19
September	2,460	44	1,340	−1,054	933	.167	.19
The year	36,200	44	5,560	−6,873	5,370	.954	12.94

[a] Chippewa and Flambeau Reservoirs.

CHIPPEWA RIVER AT DURAND, WIS.

LOCATION.—Chain gage in SW. ¼ sec. 21, T. 25 N., R. 13 W., at Durand.
DRAINAGE AREA.—9,010 square miles.
RECORDS AVAILABLE.—July, 1928, to September, 1929.
EXTREMES.—Maximum discharge during year, 38,200 second-feet Mar. 2[illegible] (gage height, 11.2 feet); minimum, 1,900 second-feet Sept. 3 (gage height, 1.52 feet).

1928–29: Both maximum and minimum, that of 1929.

REMARKS.—Records fair. Considerable diurnal fluctuation caused by operation of power plants. Discharge regulated by storage at Chippewa and Flambeau Reservoirs.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	4,080	9,900	6,500	6,770		6,500	31,400	9,900	6,770	10,700	4,760	4,530
2	7,320	9,600	6,500	3,660		7,040	30,000	9,600	8,440	11,800	5,000	2,660
3	6,240	8,720	3,660	6,770		6,500	24,100	11,000	3,660	11,400	5,000	1,990
4	5,990	8,440	6,500	5,490		4,530	24,100	11,400	6,770	9,300	4,580	3,660
5	6,240	4,530	6,770	4,530		5,990	24,600	9,900	6,770	4,300	2,660	3,870
6	5,990	8,160	6,770	6,240	5,250	7,600	25,000	4,530	6,770	8,160	4,300	3,870
7	5,490	8,160	6,770	3,660		7,320	29,100	8,160	6,770	6,500	4,760	3,870
8	3,660	7,040	6,240	3,250		8,160	33,600	8,440	6,500	3,250	5,000	3,660
9	5,000	7,040	6,240			9,300	36,300	8,440	5,990	7,880	5,460	2,370
10	6,500	7,320	3,250			9,010	34,500	8,440	3,050	7,880	5,740	3,870
11	7,040	6,770	6,500			5,490	27,700	8,720	6,240	8,160	5,460	4,300
12	7,600	4,080	6,500		4,300	8,440	22,800	8,160	7,320	8,160	3,660	4,530
13	10,300	7,040	5,000		5,740	9,900	19,200	4,080	9,010	7,320	5,240	4,760
14	10,700	7,040	5,990		5,740	11,400	17,800	7,320	9,900	5,740	5,980	4,760
15	5,990	7,320	6,770		5,240	14,200	18,300	7,040	8,160	4,760	5,740	4,080
16	9,300	6,500	8,160		5,240	17,800	20,500	7,600	7,600	9,600	5,740	2,280
17	10,700	6,500	4,760		5,240	21,400	22,300	7,600	3,460	8,440	5,460	3,660
18	12,600	7,040	8,440		3,250	22,800	20,100	8,160	6,770	7,600	5,240	3,870
19	16,900	4,080	7,600		5,490	27,300	17,800	7,040	6,770	7,320	2,850	3,870
20	20,100	7,040	8,160	5,500	5,990	32,300	16,500	4,080	6,500	6,770	4,760	4,080
21	21,900	7,040	8,160		6,240	36,800	13,800	6,770	5,990	5,490	5,240	4,080
22	20,100	7,600	6,770		6,240	38,200	11,400	5,990	5,240	3,250	4,580	3,660
23	19,600	7,600	6,770		5,990	33,200	14,700	6,500	4,530	5,740	4,580	2,090
24	17,800	7,600	5,240		5,990	30,000	12,600	6,770	3,050	5,740	4,580	4,080
25	16,500	7,040	4,530		3,660	25,500	12,600	7,040	4,530	5,740	4,080	4,300
26	16,500	4,080	4,530		5,490	23,200	12,600	5,990	5,240	5,240	2,850	4,530
27	13,800	7,040	8,160		6,240	19,600	13,000	3,660	5,240	5,240	4,080	4,300
28	13,000	6,500	7,600		6,770	21,000	10,700	7,040	7,040	4,300	4,580	5,000
29	8,440	6,500	7,600		-------	25,000	9,900	6,770	9,300	2,850	4,080	5,000
30	9,300	4,760	6,770		-------	29,600	11,400	6,500	11,400	3,870	4,300	3,250
31	8,720	-------	4,080		-------	30,500	-------	5,000	-------	4,530	4,300	-------

Month	Observed			Gain or loss in storage at Chippewa and Flambeau Reservoirs (millions of cubic feet)	Corrected for storage		
	Maximum	Minimum	Mean		Mean	Per square mile	Run-off in inches
October	21,900	3,660	10,800	+450	11,000	1.22	1.41
November	9,900	4,080	6,940	−846	6,610	.734	.82
December	8,440	3,250	6,360	−2,693	5,350	.594	.68
January	-------	-------	5,380	−3,947	3,910	.434	.50
February	-------	-------	5,380	−3,943	3,750	.416	.43
March	38,200	4,530	17,900	+1,149	18,300	2.03	2.34
April	36,300	9,900	20,600	+8,358	23,800	2.64	2.94
May	11,400	3,660	7,340	+1,368	7,850	.871	1.00
June	11,400	3,050	6,490	−125	6,440	.715	.80
July	11,800	2,850	6,680	−2,056	5,910	.656	.76
August	5,990	2,660	4,660	−3,532	3,340	.371	.43
September	5,000	1,990	3,830	−1,054	3,220	.357	.40
The year	38,200	1,990	8,550	−6,873	8,330	.924	12.51

FLAMBEAU RIVER AT FLAMBEAU RESERVOIR, WIS.

LOCATION.—Chain gage near north line of sec. 3, T. 41 N., R. 2 E., a quarter of a mile below dam of Flambeau Reservoir.
DRAINAGE AREA.—620 square miles.
RECORDS AVAILABLE.—September, 1927, to September, 1929.
EXTREMES.—Maximum discharge during year, 2,140 second-feet Oct. 21 (gage height, 6.76 feet); minimum, 149 second-feet Apr. 7 (gage height, 3.43 feet). 1927–1929: Both maximum and minimum discharge, that of 1929.
REMARKS.—Records excellent. Flow regulated by storage in Flambeau Reservoir.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	860	1,060	860	925	990	990	335	606	632	418	990	860
2	860	925	860	925	990	1,060	335	606	659	355	990	860
3	860	925	860	925	990	1,060	335	606	659	355	990	960
4	860	925	860	925	990	1,060	335	606	659	355	990	860
5	860	925	860	925	990	1,060	335	606	659	355	990	860
6	860	925	860	925	990	1,060	204	632	800	686	990	580
7	860	925	860	925	990	1,060	149	606	860	860	990	355
8	860	925	860	925	990	1,060	156	606	860	860	990	335
9	860	925	860	925	1,060	1,060	156	632	860	714	990	335
10	860	925	860	925	1,060	1,060	156	632	860	714	990	335
11	860	860	860	925	1,060	1,060	156	632	860	686	990	335
12	659	860	860	925	1,060	1,060	156	632	860	686	990	531
13	462	860	860	925	1,060	990	276	632	860	580	990	531
14	531	860	860	925	1,060	860	335	632	860	484	990	531
15	686	860	860	925	1,060	800	335	632	860	686	990	531
16	606	860	860	925	1,060	800	335	632	860	686	990	531
17	484	860	860	990	1,060	632	335	632	860	686	990	531
18	556	860	860	990	1,060	508	335	632	860	800	990	531
19	632	860	860	1,060	1,060	439	335	632	860	860	925	531
20	1,200	860	860	1,060	1,060	335	335	632	860	860	925	531
21	2,060	860	800	990	1,060	335	335	632	860	860	925	531
22	1,980	860	800	990	1,060	335	335	632	860	860	1,610	531
23	1,820	860	800	990	1,060	335	335	632	860	860	1,610	531
24	1,400	860	800	990	1,060	335	335	632	860	860	925	531
25	1,200	860	800	990	1,060	335	335	632	860	860	925	531
26	1,200	860	800	990	1,060	335	335	632	860	860	925	531
27	1,200	860	860	990	1,060	335	335	632	860	860	860	531
28	1,200	860	860	990	990	335	462	632	659	925	860	531
29	1,200	860	860	990	-------	335	632	632	659	925	860	531
30	1,200	860	860	990	-------	335	632	632	462	990	860	531
31	1,200	-------	925	990	-------	355	-------	632	-------	990	860	------

Month	Observed			Gain or loss in storage at Flambeau Reservoir (millions of cubic feet)	Corrected for storage		
	Maximum	Minimum	Mean		Mean	Per square mile	Run-off in inches
October	2,060	462	998	+436	1,160	1.87	2.16
November	1,060	860	886	−551	673	1.09	1.22
December	925	800	850	−626	616	.994	1.15
January	1,060	925	961	−1,428	428	.690	.80
February	1,060	990	1,040	−1,442	444	.716	.75
March	1,060	335	700	+424	858	1.38	1.59
April	632	149	317	+3,021	1,480	2.39	2.67
May	632	606	626	+305	740	1.19	1.37
June	860	462	797	−298	682	1.10	1.23
July	990	355	727	−984	360	.581	.67
August	1,610	860	996	−1,999	250	.403	.46
September	860	335	555	−303	438	.706	.79
The year	2,060	149	787	−3,444	678	1.09	14.86

FLAMBEAU RIVER NEAR BUTTERNUT, WIS.

LOCATION.—Chain gage in lot 10, sec. 28, T. 41 N., R. 1 E., 6 miles southeast of Butternut and 7 miles upstream from Park Falls.

DRAINAGE AREA.—660 square miles.

RECORDS AVAILABLE.—July, 1914, to September, 1929.

EXTREMES.—Maximum discharge during year, 2,370 second-feet Oct. 2[illegible] (gage height, 5.40 feet); minimum, 306 second-feet Sept. 8 (gage height, 1.38 feet).

1914–1929: Maximum discharge, 5,430 second-feet Apr. 22 and 23, 1916 (gage height, 9.0 feet); minimum, 91 second-feet Sept. 18 and 19, 1925 (gage height, 0.25 foot).

REMARKS.—Records good except those for period of ice effect, Dec. 4–8, 16–21, and Jan. 1 to Mar. 31, which are fair. Flow regulated by storage in Flambeau Reservoir.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	855	1,350	950	1,020	1,080	1,080	505	762	762	505	1,050	902
2	950	1,050	950	1,020	1,080	1,080	505	762	762	398	1,050	902
3	950	1,050	950	1,020	1,080	1,080	505	762	717	350	1,050	855
4	950	1,050	1,000	1,020	1,080	1,150	585	717	717	335	1,000	855
5	950	1,050	890	1,020	1,080	1,080	762	717	717	335	1,000	808
6	950	1,050	890	1,020	1,080	1,080	902	717	717	505	1,050	762
7	950	1,050	890	1,020	1,080	1,150	950	672	950	950	1,050	320
8	950	1,050	890	1,020	1,080	1,080	1,000	672	902	950	1,050	306
9	950	1,050	950	1,020	1,080	1,080	855	672	902	808	1,050	320
10	950	1,050	950	1,020	1,080	1,080	672	672	902	808	1,050	320
11	950	1,050	950	1,020	1,080	1,080	762	672	950	762	1,050	320
12	808	1,000	950	1,020	1,080	1,080	544	672	1,000	762	1,050	505
13	717	1,000	950	1,020	1,080	1,010	595	672	950	762	1,050	505
14	672	1,000	950	1,020	1,080	880	855	672	950	628	1,050	505
15	855	1,050	950	1,020	1,080	820	544	717	950	544	1,050	505
16	1,050	1,050	890	1,020	1,080	850	544	717	950	585	1,050	505
17	855	1,050	890	1,020	1,080	709	544	717	950	762	1,000	505
18	855	1,050	890	1,020	1,080	581	544	808	950	762	1,000	505
19	902	1,000	890	1,080	1,080	534	505	762	950	950	1,000	505
20	950	1,050	890	1,080	1,080	405	505	717	950	950	1,000	505
21	2,230	1,050	890	1,080	1,080	405	544	717	950	950	950	505
22	2,370	1,050	920	1,080	1,080	405	544	717	950	950	1,470	505
23	2,230	1,000	950	1,080	1,080	405	505	762	902	950	1,500	505
24	1,950	1,000	950	1,080	1,080	405	505	762	950	902	950	505
25	1,350	1,000	950	1,080	1,080	405	505	762	950	902	950	505
26	1,410	1,000	950	1,080	1,080	475	505	762	950	902	902	544
27	1,410	1,000	950	1,080	1,080	475	486	762	1,000	902	902	585
28	1,410	1,000	950	1,080	1,080	475	450	762	808	950	902	628
29	1,350	950	950	1,080	-------	475	762	808	672	1,000	902	585
30	1,150	950	950	1,080	-------	475	762	808	544	1,050	902	585
31	1,350	-------	950	1,080	-------	475	-------	855	-------	1,050	902	-------

Month	Observed			Gain or loss in storage at Flambeau Reservoir (millions of cubic feet)	Corrected for storage		
	Maximum	Minimum	Mean		Mean	Per square mile	Run-off in inches
October	2,370	672	1,170	+436	1,330	2.02	2.33
November	1,350	950	1,040	−551	827	1.25	1.40
December	1,000	890	931	−626	698	1.06	1.22
January	1,080	1,020	1,050	−1,428	517	.783	.90
February	1,080	1,080	1,080	−1,442	484	.733	.76
March	1,150	405	767	+424	925	1.40	1.61
April	1,000	450	622	+3,021	1,790	2.71	3.02
May	855	672	733	+305	847	1.28	1.48
June	1,000	544	876	−298	761	1.15	1.28
July	1,050	335	772	−984	405	.614	.71
August	1,590	902	1,030	−1,999	284	.430	.50
September	902	306	556	−303	439	.665	.74
The year	2,370	306	885	−3,444	776	1.18	16.05

FLAMBEAU RIVER NEAR LADYSMITH, WIS.

LOCATION.—In sec. 35, T. 36 N., R. 5 W., at Big Falls power plant of Lake Superior District Power Co., 14 miles above Ladysmith.

DRAINAGE AREA.—1,910 square miles.

RECORDS AVAILABLE.—October, 1923, to September, 1929. January, 1914, to September, 1923, at a station 8 miles below present site. February, 1903, to December, 1906, at Ladysmith, 14 miles below present site.

EXTREMES.—Maximum mean daily discharge during year, 7,240 second-feet Apr. 7; minimum, 541 second-feet Aug. 18.

1903–1906, 1914–1929: Maximum discharge, 19,500 second-feet Apr. 11, 1922; minimum, 176 second-feet Aug. 30, 1925.

REMARKS.—Records good. Discharge computed from power house records. Regulation caused by operation of power plants and storage in Flambeau Reservoir above station. Daily-discharge record furnished by Lake Superior District Power Co.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1,630	2,390	1,510	737	1,360	1,370	5,240	2,230	1,830	1,810	1,250	749
2	1,560	2,180	1,310	1,210	1,500	1,570	4,720	2,180	1,520	1,710	1,150	909
3	1,600	1,850	1,630	1,280	1,020	918	4,580	2,090	1,560	1,350	1,600	1,080
4	1,680	1,740	1,450	1,480	1,380	1,300	4,520	1,930	1,230	721	821	1,030
5	1,730	1,820	980	1,380	1,420	1,340	5,470	2,120	1,270	1,250	1,380	1,160
6	1,740	1,820	924	886	1,390	1,310	6,700	1,650	1,350	924	1,050	1,070
7	1,610	1,800	1,320	1,250	1,380	1,350	7,240	1,650	1,330	542	1,180	1,080
8	1,730	1,950	837	1,190	1,440	1,450	6,680	1,760	1,210	1,970	1,260	844
9	1,720	1,980	987	1,240	1,610	1,450	6,360	1,710	952	1,990	1,440	656
10	1,720	2,040	1,610	1,330	990	1,010	5,230	1,540	1,640	1,820	1,760	633
11	1,700	1,160	1,520	1,440	1,270	1,300	4,540	1,420	1,880	1,540	1,080	680
12	1,990	1,670	1,580	1,550	1,420	1,490	4,020	1,610	2,080	1,300	1,650	655
13	2,500	1,820	1,650	1,020	1,390	1,660	3,080	1,660	2,330	1,420	1,390	676
14	2,400	1,820	1,510	1,280	1,310	1,740	3,150	1,550	2,230	1,670	1,380	875
15	2,350	1,890	1,580	1,250	1,460	1,960	3,330	1,350	1,830	1,660	1,420	880
16	2,800	2,110	1,690	1,170	1,450	1,930	3,590	1,630	1,680	1,270	1,520	855
17	3,770	1,880	1,640	1,290	1,020	2,030	3,570	1,640	1,800	1,190	1,630	741
18	4,030	1,980	1,480	1,400	1,330	2,160	3,260	1,610	1,720	1,200	541	851
19	4,300	1,820	1,530	1,470	1,360	2,800	3,270	1,410	1,580	1,190	1,350	860
20	4,320	1,890	1,170	1,110	1,310	2,870	3,250	1,570	1,580	1,260	966	813
21	4,330	1,730	1,150	1,390	1,230	3,080	2,840	1,680	1,610	888	1,300	924
22	5,460	1,680	1,220	1,390	1,380	2,910	2,440	1,640	1,560	1,100	1,230	672
23	4,920	1,500	949	1,390	1,540	2,840	2,360	1,540	739	1,290	1,670	789
24	4,610	1,680	1,470	1,340	990	2,670	2,230	1,530	1,500	1,230	1,890	758
25	3,780	1,080	1,400	1,330	1,300	2,480	2,260	1,520	1,230	1,200	834	809
26	3,270	1,560	1,290	1,440	1,320	2,280	2,060	1,590	1,330	1,280	1,310	869
27	3,040	1,700	1,580	1,140	1,300	2,640	1,900	1,380	1,760	1,410	835	871
28	2,880	1,920	1,580	1,320	1,270	3,380	1,900	1,480	2,220	878	1,110	1,080
29	2,660	1,260	1,430	1,370	-------	4,410	2,120	1,790	2,100	1,340	1,120	784
30	2,500	1,600	938	1,470	-------	5,520	1,800	1,760	2,000	1,000	1,110	976
31	2,160	-------	1,340	1,370	-------	5,610	-------	1,900	-------	1,280	1,430	-------

Month	Observed			Gain or loss in storage at Flambeau Reservoir (millions of cubic feet)	Corrected for storage		
	Maximum	Minimum	Mean		Mean	Per square mile	Run-off in inches
October	5,460	1,560	2,790	+436	2,950	1.54	1.78
November	2,390	1,080	1,780	−551	1,570	.822	.92
December	1,690	837	1,360	−626	1,130	.592	.68
January	1,550	737	1,290	−1,428	757	.396	.46
February	1,610	990	1,330	−1,442	734	.384	.40
March	5,610	918	2,280	+424	2,440	1.28	1.48
April	7,240	1,800	3,790	+3,021	4,980	2.60	2.90
May	2,230	1,350	1,680	+305	1,790	.937	1.08
June	2,330	739	1,620	−298	1,500	.785	.88
July	1,990	542	1,310	−984	943	.494	.57
August	1,890	541	1,280	−1,999	534	.280	.32
September	1,160	633	854	−303	737	.386	.43
The year	7,240	541	1,780	−3,444	1,670	.874	11.90

JUMP RIVER AT SHELDON, WIS.

LOCATION.—Chain gage in sec. 26, T. 33 N., R. 5 W., at highway bridge in Sheldon, 11 miles above mouth.
DRAINAGE AREA.—510 square miles.
RECORDS AVAILABLE.—July, 1915, to September, 1929.
EXTREMES.—Maximum discharge during year, 7,470 second-feet Mar. 18 (gage height, 8.60 feet); minimum, 20 second-feet Aug. 4 (gage height, 2.7? feet). 1915–1929: Maximum discharge, 15,600 second-feet Mar. 26, 192? (gage height, 11.48 feet); minimum (estimated), 14 second-feet Jan. 25–31, 1924.
REMARKS.—Records good except those for period of ice effect, Dec. 5 to Mar. 16, which are poor, and those for extremely low water, which are fair. Discharge interpolated Nov. 26, 28, and 30, and Dec. 2 and 4.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	151	330	208	75	65	65	3,300	855	380	2,420	40	26
2	136	330	175	75	65	65	2,700	970	355	1,500	29	30
3	113	280	143	75	65	65	2,700	855	270	930	24	24
4	113	240	147	75	65	65	3,300	715	240	490	20	24
5	113	240	150	75	65	65	4,000	615	185	330	34	24
6	136	221	150	75	65	65	5,610	550	177	330	47	26
7	136	230	145	75	65	70	6,510	435	124	490	47	26
8	230	221	145	70	65	75	6,740	380	113	680	72	30
9	330	230	145	70	65	85	4,970	330	100	1,050	96	30
10	615	208	145	70	65	105	3,300	330	143	1,220	1?3	56
11	648	194	145	70	65	125	2,160	280	194	750	110	124
12	820	208	135	70	65	185	1,700	240	820	380	93	90
13	1,220	208	135	65	65	355	1,600	270	2,990	582	100	90
14	1,700	208	135	65	65	580	1,920	221	3,140	715	121	90
15	1,700	221	135	65	65	930	2,420	280	1,920	820	77	74
16	1,600	240	130	65	65	1,500	2,560	280	1,220	435	100	66
17	1,920	270	125	65	65	2,840	2,290	435	890	305	77	62
18	1,920	280	125	60	65	7,470	1,920	615	615	216	93	56
19	2,420	280	120	60	65	3,470	1,600	490	380	172	64	62
20	2,290	255	120	60	65	4,570	1,500	408	330	139	52	56
21	1,920	280	120	60	65	4,570	1,400	380	435	124	41	62
22	1,700	255	115	60	65	4,000	1,130	330	380	103	38	56
23	1,600	240	105	60	65	3,300	930	280	221	103	32	38
24	1,310	270	105	60	65	2,840	820	280	221	72	41	38
25	1,050	330	105	60	65	2,290	750	240	185	54	45	38
26	890	330	100	60	65	1,920	820	194	270	43	38	47
27	750	330	100	60	65	2,420	750	221	462	54	38	59
28	615	280	95	65	65	3,640	750	280	3,640	47	41	72
29	490	230	85	65	------	4,570	820	270	4,190	47	32	87
30	435	219	85	65	------	4,770	750	280	3,640	54	22	93
31	380	------	75	65	------	4,970	------	355	------	43	25	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	2,420	113	950	1.86	2.14
November	330	194	255	.500	.56
December	208	75	127	.249	.29
January	75	60	66.5	.130	.15
February	65	65	65.0	.127	.13
March	7,470	65	2,000	3.92	4.52
April	6,740	750	2,390	4.69	5.23
May	970	194	409	.802	.92
June	4,190	100	941	1.85	2.06
July	2,420	43	474	.929	1.07
August	121	20	58.1	.114	.13
September	124	24	55.2	.108	.12
The year	7,470	20	651	1.28	17.32

RED CEDAR RIVER NEAR COLFAX, WIS.

LOCATION.—Water-stage recorder in sec. 27, T. 30 N., R. 11 W., at highway bridge 4½ miles north of Colfax. Trout Creek enters 3½ miles above station.
DRAINAGE AREA.—1,100 square miles.
RECORDS AVAILABLE.—March, 1914, to September, 1929.
EXTREMES.—Maximum discharge during year, 4,850 second-feet Mar. 20 (gage height, 9.90 feet).

1914–1929: Maximum discharge, 7,610 second-feet Mar. 26, 1920 (gage height, 6.95 feet); minimum, 218 second-feet Nov. 23, 1925 (gage height, 0.55 foot).

REMARKS.—Records fair except those for estimated periods and for period of ice effect (Nov. 25 to Mar. 24), which are poor. Flow regulated by four storage reservoirs upstream.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1		1,030	715	565	655	850	2,260	1,030			623	
2		1,190	685	565	655	885	1,940	956			782	
3		1,030	685	565	685	885	2,260	885			410	
4			685	565	685	885	2,590	956			538	
5	495		685	565	685	955	2,830	815			565	
6			655	565	685	885	3,070	748	510	570	565	365
7			655	565	685	885	2,710	850			594	
8			655	565	685	1,030	2,710	748			565	
9	684		625	565	715	815	2,710	716			716	
10	654	970	625	565	715	750	2,480	748			748	
11	623		625	595	715	485	2,370	654			594	
12	748		625	595	715	850	1,840	623			538	
13			625	595	715	1,190	1,540	623			565	
14			625	595	715	1,450	1,190	510			654	
15			595	595	750	2,150	1,110	458			623	
16	1,390	885	595	595	750	2,590	1,190	538	460		565	380
17		885	595	595	750	2,710	1,360	623				
18		956	595	595	750	2,830	1,360	623		460		
19		885	595	595	750	3,840	1,360					
20	1,740	850	595	625	750	4,850	1,360					
21	1,740	885	595	625	780	3,320	1,190					
22	1,450	885	565	625	780	1,840	1,270					
23	1,190	815	565	625	780	1,940	1,270					
24	1,030	782	565	625	780	2,260	1,360				285	
25	885	780	565	625	815	1,940	1,360	530	535	538		460
26	885	780	565	625	815	2,040	1,190			568		
27	956	750	565	625	815	2,150	1,190			623		
28	1,190	750	565	625	850	2,370	1,190			484		
29	1,110	715	565	655	-------	2,260	1,110			565		
30	850	715	565	655	-------	1,940	1,030			654		
31	850	-------	565	655	-------	2,150	-------		-------	654		-------

Month	Maximum	Minimum	Mean	Month	Maximum	Minimum	Mean
October	1,740	----------	977	May	1,030	----------	645
November	1,190	----------	907	June	----------	----------	502
December	715	565	612	July	----------	----------	523
January	655	565	600	August	782	----------	449
February	850	655	737	September	----------	----------	402
March	4,850	485	1,810				
April	3,070	1,030	1,750	The year	4,850	----------	826

RED CEDAR RIVER AT MENOMONIE, WIS.

LOCATION.—Water-stage recorder in sec. 26, T. 28 N., R. 13 W., at Menomonie, 900 feet below power house of Northern States Power Co. and 1,000 feet below mouth of Wilson Creek.

DRAINAGE AREA.—1,810 square miles.

RECORDS AVAILABLE.—June, 1907, to September, 1908; May, 1913, to September, 1923; March, 1925, to September, 1929.

EXTREMES.—Maximum discharge during year, 12,500 second-feet Mar. 21 (gage height, 6.70 feet); minimum, 21 second-feet Dec. 9 (gage height, 0.65 foot). 1907–1908, 1913–1923, 1925–1929: Maximum discharge, 14,000 second-feet Mar. 26, 1920 (gage height, 8.0 feet); minimum, 21 second-feet Dec. 9, 1929, caused by regulation (gage height, 0.65 foot).

REMARKS.—Records excellent except that for Apr. 1, which was estimated. Considerable diurnal fluctuation caused by operation of power plants at Menomonie and at Cedar Falls. Flow also regulated by storage in four reservoirs upstream.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	806	1,110	1,030	1,030	506	1,030	3,090	1,070	1,310	1,120	667	448
2	771	1,170	970	970	806	980	3,390	1,380	457	806	667	448
3	782	1,370	867	970	759	850	2,980	1,310	690	867	759	448
4	795	736	1,030	970	806	850	2,630	1,050	795	589	448	374
5	795	1,030	989	928	667	850	2,260	600	782	782	656	439
6	867	806	622	611	867	850	1,640	1,280	771	806	736	448
7	664	1,030	683	567	771	850	2,630	1,140	759	568	611	547
8	629	956	611	622	782	798	3,390	782	910	1,170	910	466
9	782	928	303	506	724	850	2,820	910	421	795	787	724
10	782	1,030	572	867	537	547	2,440	910	748	1,380	970	457
11	748	867	1,030	713	690	633	2,240	798	806	970	600	806
12	1,240	867	919	928	706	919	2,060	547	1,120	850	771	867
13	1,210	867	928	557	867	1,030	1,590	633	1,120	795	782	457
14	759	1,030	1,030	645	919	2,280	1,380	748	632	594	759	806
15	867	980	1,570	667	667	2,080	2,160	782	795	798	771	589
16	1,660	970	1,030	633	858	3,830	2,080	806	430	771	690	782
17	2,280	1,030	1,660	622	779	5,800	1,910	806	759	736	611	627
18	2,600	919	980	672	733	7,150	2,130	858	771	782	448	448
19	2,790	806	616	919	649	10,400	1,760	506	667	713	421	616
20	2,600	1,030	694	667	694	10,700	1,340	806	690	690	369	439
21	2,200	1,030	541	771	867	12,500	1,310	782	656	430	374	606
22	2,790	1,030	638	678	1,030	10,700	1,110	748	526	724	430	425
23	2,070	1,030	557	645	919	4,550	1,450	713	318	724	421	547
24	1,710	1,030	367	806	748	3,390	1,380	806	706	771	430	724
25	1,480	806	566	690	980	3,830	1,620	713	656	667	439	416
26	1,480	806	970	627	1,030	3,240	1,240	690	806	667	516	461
27	1,540	1,030	1,030	694	1,030	2,980	1,260	910	782	506	439	667
28	771	1,030	970	701	970	3,240	837	806	1,220	439	537	980
29	1,380	782	806	638	-------	3,910	1,270	867	1,240	656	466	980
30	1,030	1,030	771	556	-------	3,650	1,310	506	600	656	466	910
31	1,080	-------	867	1,030	-------	2,790	-------	1,260	-------	656	466	-------

Month	Maximum	Minimum	Mean	Month	Maximum	Minimum	Mean
October	2,790	629	1,350	May	1,380	506	856
November	1,370	736	971	June	1,310	318	765
December	1,660	303	846	July	1,380	430	757
January	1,030	506	739	August	970	369	594
February	1,030	506	799	September	980	374	598
March	12,500	547	3,490				
April	3,390	837	1,960	The year	12,500	303	1,150

ZUMBRO RIVER AT ZUMBRO FALLS, MINN.

LOCATION.—Chain gage near east line of sec. 36, T. 110 N., R. 14 W., at Zumbro Falls, 1,500 feet below mouth of Spring Creek.

DRAINAGE AREA.—1,120 square miles.

RECORDS AVAILABLE.—June, 1909, to September, 1917; April to September, 1929.

EXTREMES.—Maximum discharge during period, 11,500 second-feet June 11 (gage height, 17.40 feet); minimum, 80 second-feet Sept. 21 (gage height, 4.90 feet).

1909–1917, 1929: Maximum discharge, about 14,800 second-feet Mar. 25, 1917 (gage height, 19.04 feet); minimum occurred in 1929. High-water marks indicate a stage of 26.7 feet in June, 1908, and 29.7 feet April, 1888.

REMARKS.—Records fair. Diurnal fluctuation caused by operation of power plant 10½ miles upstream.

Daily and monthly discharge, in second-feet, 1929

Day	Apr.	May	June	July	Aug.	Sept.	Day	Apr.	May	June	July	Aug.	Sept.
1	-------	828	484	484	189	202	16	-------	518	874	230	168	155
2	-------	702	416	552	305	107	17	-------	518	874	245	140	145
3	-------	702	484	552	189	136	18	-------	484	784	176	368	116
4	-------	588	484	368	368	166	19	662	433	662	202	352	109
5	-------	552	484	400	384	136	20	588	518	588	160	163	112
6	-------	588	484	216	171	107	21	518	518	588	352	140	102
7	-------	588	216	433	155	112	22	552	416	588	384	136	320
8	-------	552	168	260	176	352	23	588	320	518	245	121	336
9	-------	552	384	384	202	202	24	552	484	552	189	114	131
10	-------	552	450	275	153	145	25	588	484	552	230	336	136
11	-------	518	6,240	216	368	124	26	3,800	450	552	260	336	138
12	-------	484	8,600	189	216	116	27	2,220	484	484	216	160	624
13	-------	518	3,400	189	202	158	28	1,500	518	230	400	158	588
14	-------	518	1,680	352	150	119	29	1,170	518	230	484	145	384
15	-------	518	1,220	484	176	352	30	922	484	433	484	133	484
							31	-------	518	-------	484	114	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
April 19–30	3,800	518	1,140	1.02	0.46
May	828	320	530	.473	.55
June	8,600	168	1,120	1.00	1.12
July	552	160	326	.291	.34
August	384	114	209	.187	.22
September	624	102	214	.191	.21

BLACK RIVER AT NEILLSVILLE, WIS.

LOCATION.—Chain gage in sec. 15, T. 24 N., R. 2 W., in Neillsville. C'Neill Creek enters 1 mile above gage and Cunningham Creek 1½ miles below.

DRAINAGE AREA.—774 square miles.

RECORDS AVAILABLE.—April, 1905, to March, 1909; December, 1913, to September, 1929.

EXTREMES.—Maximum discharge during year, 9,530 second-feet Mar. 20 (gage height, 12.50 feet); minimum, 19 second-feet Aug. 27 to Sept. 8 (gage height, 2.30 feet).

1905–1909, 1913–1929: Maximum discharge, 37,100 second-feet June 6, 1905 (gage height, 22.4 feet); minimum, 5 second-feet during month of February, 1918.

REMARKS.—Records fair except those for period of ice effect, Dec. 2 to Mar. 18, which are poor.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	114	216	89	65	45	40	2,400	1,130	599	350	2[illegible]	19[illegible]
2	136	202	35	65	50	40	1,720	1,250	446	314	2[illegible]	19[illegible]
3	114	187	50	70	50	40	2,400	1,070	297	264	25	19[illegible]
4	114	160	55	50	65	40	5,150	794	174	174	2[illegible]	19[illegible]
5	900	155	110	60	80	40	4,660	554	160	132	19	19
6	646	141	200	50	80	50	6,360	446	125	125	19	19
7	743	155	175	60	75	45	7,080	368	125	232	19	19
8	1,070	187	125	40	80	75	7,700	297	94	350	125	19
9	2,040	160	105	60	80	60	5,800	247	80	794	900	31
10	900	174	80	80	80	50	3,290	187	63	694	1,010	41
11	900	160	60	70	75	40	1,960	232	90	599	247	63
12	743	129	70	70	75	40	1,720	247	125	406	160	94
13	1,250	108	155	60	70	95	1,510	280	125	280	85	125
14	1,650	129	185	55	75	2,150	3,290	232	118	368	573	114
15	1,370	153	215	40	70	7,100	4,300	232	98	332	264	68
16	3,290	174	265	45	80	2,500	3,090	1,370	80	264	187	60
17	4,060	216	245	70	85	3,850	2,130	1,650	85	187	125	47
18	3,950	264	230	80	75	4,900	1,650	1,130	68	148	87	47
19	3,400	264	230	75	85	9,360	1,310	743	76	104	57	41
20	2,590	202	175	85	80	9,530	1,070	554	63	80	47	36
21	1,720	187	200	80	75	7,540	846	406	68	73	3[illegible]	36
22	1,370	187	200	75	55	6,220	743	297	125	60	3[illegible]	36
23	900	202	175	55	60	4,180	646	280	73	50	3[illegible]	36
24	743	187	110	70	55	3,840	554	387	47	47	29	36
25	599	247	85	55	55	2,790	1,370	467	53	38	25	31
26	467	247	55	45	45	2,310	1,650	368	47	36	21	31
27	387	187	55	40	45	2,690	1,190	247	90	36	1[illegible]	57
28	350	158	70	40	40	3,730	794	202	136	36	1[illegible]	136
29	297	141	80	40	------	3,950	694	202	187	34	1[illegible]	148
30	247	108	70	50	------	3,730	694	350	280	31	1[illegible]	114
31	247	------	65	45	------	3,510	------	694	------	29	1[illegible]	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	4,060	114	1,200	1.55	1.79
November	264	108	180	.233	.26
December	265	35	130	.168	.19
January	85	40	59.5	.0769	.09
February	85	40	67.3	.0870	.09
March	9,530	40	2,730	3.53	4.07
April	7,700	554	2,590	3.35	3.74
May	1,650	187	546	.705	.81
June	599	47	140	.181	.20
July	794	29	215	.278	.32
August	1,010	19	138	.178	.21
September	148	19	52.7	.0681	.08
The year	9,530	19	675	.872	11.85

LA CROSSE RIVER NEAR WEST SALEM, WIS.

LOCATION.—Chain gage in sec. 32, T. 17 N., R. 6 W., at higl way bridge 2 miles west of West Salem and 6 miles below mouth of Dutch Creek.

DRAINAGE AREA.—412 square miles.

RECORDS AVAILABLE.—December, 1913, to September, 1929.

EXTREMES.—Maximum discharge during year, 1,070 second-feet June 20; minimum, 215 second-feet Sept. 8 (gage height, 1.52 feet).

1913–1929: Maximum discharge, 4,780 second-feet Sept. 15, 1928 (gage height, 9.8 feet); minimum, 56 second-feet Feb. 20, 1927.

REMARKS.—Records poor. Stage-discharge relation affected by ice Dec. 5–11 and Dec. 20 to Mar. 21. Slight diurnal fluctuation is caused by operation of power plants a few miles above station.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	350	292	292	310	310	275	372	419	395	350	247	235
2	350	292	292	310	310	275	395	497	329	350	276	224
3	329	310	292	310	310	275	419	470	310	329	276	224
4	329	310	310	310	310	275	554	419	292	372	261	224
5	350	310	275	310	310	275	682	350	276	372	261	224
6	372	310	310	310	290	290	682	350	276	350	276	276
7	395	292	310	310	290	290	584	350	276	372	276	247
8	329	329	330	310	290	290	470	329	276	372	292	215
9	329	329	330	310	290	310	444	329	247	350	276	276
10	350	310	350	310	290	310	419	310	292	350	276	276
11	329	310	350	310	275	310	395	372	329	329	235	276
12	329	310	329	310	275	310	419	444	444	310	292	247
13	229	292	329	310	275	330	497	554	615	310	276	261
14	350	310	395	310	275	350	497	470	830	350	292	261
15	310	292	419	310	275	395	444	395	830	310	261	276
16	329	292	395	310	275	395	419	395	615	310	261	276
17	554	310	350	310	275	419	395	395	470	292	261	261
18	717	372	329	310	275	445	372	372	372	292	235	247
19	554	395	310	310	275	470	350	372	790	276	247	247
20	444	372	290	310	275	495	310	350	1,030	276	276	235
21	395	350	275	310	275	555	350	329	753	276	276	247
22	372	310	275	310	275	584	350	310	525	292	261	247
23	310	329	275	310	260	525	329	372	395	350	261	247
24	310	310	275	310	260	525	329	372	372	329	247	247
25	292	292	275	310	260	525	419	372	395	310	261	224
26	310	261	290	310	260	497	615	329	372	350	247	261
27	310	292	290	310	260	419	682	350	350	292	261	310
28	292	292	290	310	260	419	584	350	419	276	235	419
29	310	310	290	310	-------	395	497	350	470	276	235	419
30	276	310	310	310	-------	350	419	350	395	276	235	329
31	310	-------	310	310	-------	350	-------	419	-------	276	224	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	717	276	362	0.879	1.01
November	395	261	313	.760	.85
December	419	275	314	.762	.88
January	310	310	310	.752	.87
February	310	260	281	.682	.71
March	584	275	385	.934	1.08
April	682	310	456	1.11	1.24
May	554	310	382	.927	1.07
June	1,030	247	458	1.11	1.24
July	372	276	320	.777	.90
August	292	224	261	.633	.73
September	419	215	265	.643	.72
The year	1,030	215	342	.830	11.30

ROOT RIVER NEAR HOUSTON, MINN.

LOCATION.—Chain gage in sec. 32, T. 104 N., R. 6 W., 1 mile west of Houston, 2½ miles above mouth of South Fork of Root River.

DRAINAGE AREA.—1,550 square miles.

RECORDS AVAILABLE.—May to September, 1929. Gage located 1½ miles downstream was read from May, 1909, to September, 1917. Relation between gage datum planes not determined.

EXTREMES.—Maximum discharge during period, 3,130 second-feet June 12 (gage height, 7.29 feet); minimum, 263 second-feet Sept. 23 (gage height, 2.77 feet).

1909–1917, 1929: Maximum discharge (estimated), 17,000 second-feet Mar. 24, 1917; minimum, 231 second-feet Jan. 23, 1914, determined by current-meter measurement.

REMARKS.—Records good.

Daily and monthly discharge, in second-feet, 1929

Day	May	June	July	Aug.	Sept.	Day	May	June	July	Aug.	Sept.
1	------	724	448	382	382	16	676	1,230	426	360	360
2	------	724	515	404	276	17	724	920	426	339	382
3	------	630	515	382	318	18	630	630	382	339	339
4	970	584	426	382	318	19	630	630	382	276	318
5	920	561	426	360	318	20	584	584	382	360	360
6	820	561	382	404	318	21	561	584	382	297	318
7	772	561	515	382	318	22	538	515	382	318	297
8	772	538	426	448	318	23	724	515	382	339	263
9	676	515	404	360	382	24	772	515	630	360	318
10	676	515	426	382	426	25	772	492	538	318	297
11	724	515	404	360	448	26	724	492	515	276	448
12	820	3,130	448	318	448	27	676	470	515	360	339
13	772	1,350	676	404	448	28	676	448	448	318	382
14	676	920	772	382	426	29	724	470	426	318	382
15	676	820	492	360	426	30	970	448	404	360	339
						31	920	------	404	360	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
May 4–31	970	538	735	0.474	0.49
June	3,130	448	720	.465	.52
July	772	382	461	.297	.34
August	448	276	355	.229	.26
September	448	263	357	.230	.26

WISCONSIN RIVER AT WHIRLPOOL RAPIDS, NEAR RHINELANDER, WIS.

LOCATION.—Water-stage recorder in sec. 4, T. 35 N., R. 8 E., at head of Whirlpool Rapids, 1 mile below outlet of Crescent Lake and 10 miles southwest of Rhinelander.

DRAINAGE AREA.—1,160 square miles.

RECORDS AVAILABLE.—September, 1915, to September, 1929. December, 1905, to September, 1915, at station 3 miles upstream.

EXTREMES.—Maximum discharge during year, 5,410 second-feet Apr. 10 (gage height, 5.70 feet); minimum, 452 second-feet Sept. 29 (gage height, 1.55 feet).

1915–1929: Maximum discharge, 5,410 second-feet Apr. 10, 1929 (gage height, 5.70 feet); minimum, 165 second-feet July 7, 1918 (gage height, 0.65 foot).

REMARKS.—Records excellent except those for period of ice effect, Dec. 30 to Mar. 17, which are poor. Discharge interpolated Dec. 6–7, 20–22, and June 15. Flow is regulated by 14 reservoirs and 3 power plants above station.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1,510	2,830	1,240	1,390	1,040	1,170	2,230	2,230	1,800	2,120	1,160	720
2	1,700	2,340	942	1,710	1,320	1,320	2,460	2,230	1,420	2,120	900	660
3	1,700	2,120	1,070	1,250	1,250	1,250	2,460	2,230	1,800	2,230	820	820
4	1,900	1,420	1,420	1,110	983	1,100	2,580	2,010	1,900	1,600	785	860
5	2,120	1,510	1,160	1,110	1,040	1,400	3,400	1,900	1,700	1,600	820	900
6	2,120	1,700	1,090	1,250	1,040	1,400	4,520	2,010	1,600	1,700	820	860
7	1,800	1,700	1,020	1,250	1,040	1,170	4,180	2,230	1,510	1,900	785	820
8	1,800	1,600	942	1,320	1,040	1,100	4,690	2,010	1,510	2,120	1,070	690
9	2,010	1,600	750	1,110	985	1,040	4,870	1,900	1,070	2,580	1,160	942
10	1,800	1,510	860	1,250	865	1,040	4,870	1,800	1,330	2,700	1,330	1,160
11	1,700	1,510	985	1,390	755	1,310	4,020	1,600	1,700	2,340	1,160	1,160
12	1,800	1,800	985	1,710	865	1,580	4,350	1,240	1,700	2,460	1,070	1,070
13	1,800	1,600	1,240	1,250	865	1,850	3,860	1,420	1,600	3,110	1,420	1,070
14	1,600	1,600	1,330	1,670	985	1,850	3,550	1,600	1,600	3,110	1,420	1,070
15	2,010	1,600	1,600	1,320	865	2,040	3,110	1,600	1,420	2,460	1,240	860
16	2,010	1,510	1,420	1,580	865	2,550	2,700	1,800	1,240	2,830	1,330	985
17	2,230	1,510	1,420	1,490	705	2,350	2,700	1,800	1,330	2,460	1,240	1,240
18	2,340	1,070	1,600	1,170	985	1,600	2,580	1,900	1,420	2,230	820	1,070
19	2,460	1,070	1,600	1,100	1,250	1,900	2,460	1,600	1,510	2,010	1,070	942
20	2,830	1,420	1,490	1,100	1,100	1,700	2,460	1,800	1,420	2,010	1,240	1,070
21	2,970	1,600	1,380	1,040	925	1,800	2,230	2,230	1,420	1,420	985	942
22	2,830	1,600	1,270	1,320	1,040	1,800	2,120	2,010	1,420	1,700	985	900
23	2,700	1,420	1,160	1,490	1,040	1,900	2,230	2,010	1,160	1,700	1,070	785
24	2,700	1,600	785	1,490	925	1,510	2,120	2,010	1,510	1,510	942	660
25	2,970	1,240	900	1,490	1,050	1,600	2,010	2,010	1,510	1,800	750	690
26	2,970	1,330	860	1,170	1,170	2,010	1,900	1,420	1,420	1,800	985	1,070
27	2,460	1,240	1,420	1,170	1,170	2,230	2,010	1,800	1,700	1,420	1,070	1,070
28	3,110	1,240	1,330	1,170	1,250	2,830	1,600	2,580	2,230	1,240	860	985
29	2,830	1,160	1,420	1,320	-------	3,400	1,800	2,230	2,120	1,330	860	750
30	2,230	1,240	1,180	1,400	-------	3,250	2,120	2,230	1,600	1,420	860	320
31	2,700	-------	1,390	1,400	-------	2,700	-------	2,010	-------	1,240	860	-------

Month	Maximum	Minimum	Mean	Month	Maximum	Minimum	Mean
October	3,110	1,510	2,250	May	2,580	1,240	1,920
November	2,830	1,070	1,560	June	2,230	1,070	1,560
December	1,600	750	1,200	July	3,110	1,240	2,010
January	1,710	1,040	1,320	August	1,420	750	1,080
February	1,320	705	1,010	September	1,240	660	921
March	3,400	1,040	1,800				
April	4,870	1,600	2,940	The year	4,870	660	1,630

WISCONSIN RIVER AT MERRILL, WIS.

LOCATION.—Water-stage recorder on line between secs. 12 and 13, T. 31 N., R. 6 E., at highway bridge at east end of Merrill, half a mile below mouth of Prairie River.

DRAINAGE AREA.—2,630 square miles.

RECORDS AVAILABLE.—November, 1902, to September, 1929.

EXTREMES.—Maximum discharge during year, 21,900 second-feet Apr. 7 (gage height, 12.2 feet); minimum, 725 second-feet Aug. 4 (gage height, 3.56 feet).

1902–1929: Maximum discharge, 45,000 second-feet July 24, 1912 (gage height, 17.5 feet); minimum, about 90 second-feet Sept. 26, 1908 (gage height, 2.45 feet).

REMARKS.—Records good except those for periods of ice effect (Dec. 19–22 and Jan. 6 to Mar. 1) and for periods estimated because no gage height records were available (Oct. 19 to Jan. 5, Mar. 12, 13, Apr. 17–23, June 16, 23, July 5, 24, Aug. 12, and Sept. 13), which are fair. Flow is regulated by 17 reservoirs and 8 power plants above station.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	4,510	2,980	1,960	2,160	3,100	2,750	8,430	5,880	3,680	4,080	1,670	1,670
2	4,510	2,820	2,020	2,560	2,300	2,590	6,120	6,120	2,300	3,480	2,040	2,440
3	4,510	2,630	1,950	2,560	2,920	2,920	6,860	5,640	2,300	3,480	1,910	2,040
4	4,510	2,290	1,410	3,140	2,750	2,750	8,160	4,950	2,920	3,100	1,170	2,300
5	10,700	1,770	2,520	2,290	2,170	2,440	11,000	4,510	3,290	3,100	1,910	2,440
6	9,820	2,030	1,550	2,030	2,300	3,100	16,700	3,880	2,590	3,100	2,440	2,170
7	8,430	2,060	1,410	2,030	2,300	3,100	20,500	4,080	2,590	5,180	2,750	2,170
8	7,630	2,060	1,370	2,290	2,300	2,590	18,700	3,880	2,300	5,880	2,750	1,910
9	8,160	1,810	1,830	2,290	2,300	2,440	15,000	3,680	2,040	6,860	2,920	2,440
10	8,160	2,010	1,800	2,420	2,170	2,300	12,200	3,680	2,040	6,610	3,100	2,590
11	7,890	1,960	1,930	2,030	1,910	2,300	9,820	3,480	6,120	6,120	2,920	1,910
12	8,430	1,960	1,930	2,290	1,670	2,890	8,700	2,920	6,860	5,640	3,010	2,300
13	11,900	2,060	1,850	3,290	1,910	3,490	8,700	2,750	9,260	6,120	3,100	2,300
14	10,700	1,620	1,990	2,750	1,910	4,080	8,430	3,100	7,110	6,860	2,920	2,300
15	10,100	1,810	1,970	3,680	2,170	4,080	8,700	4,080	5,880	6,610	2,750	1,910
16	11,300	1,810	2,050	2,920	1,910	4,510	8,160	6,120	4,320	4,950	2,590	2,300
17	13,100	1,690	1,950	3,480	1,910	5,640	7,820	5,410	2,750	4,950	2,440	2,590
18	11,900	1,690	1,950	3,290	1,560	5,180	7,470	5,410	3,100	4,290	2,440	2,040
19	9,800	1,800	2,050	2,590	2,170	7,630	7,130	4,510	3,680	3,100	2,300	2,040
20	5,620	2,180	1,980	2,440	2,750	7,370	6,780	3,880	2,590	2,920	2,440	1,790
21	5,370	2,290	1,920	2,440	2,440	7,370	6,440	3,290	2,440	2,750	2,440	1,910
22	5,000	2,460	1,930	2,300	2,040	6,860	6,100	3,880	2,300	2,040	2,300	1,460
23	4,620	2,310	2,000	2,920	2,300	7,370	5,750	3,680	2,300	2,920	2,440	1,910
24	4,080	2,210	1,810	3,290	2,300	6,860	5,410	3,880	2,300	3,400	2,300	1,560
25	5,260	2,310	1,600	3,290	2,040	6,360	5,180	3,290	2,590	3,880	1,910	1,560
26	3,880	2,110	1,810	3,290	2,320	5,880	4,950	3,100	2,440	3,680	2,040	1,460
27	3,610	2,080	1,720	2,590	2,590	6,360	4,510	2,590	3,290	3,100	2,170	1,910
28	3,420	2,040	2,090	2,590	2,590	8,430	4,950	3,680	7,110	2,300	2,300	1,790
29	3,280	1,960	1,970	2,590	------	9,820	3,880	4,730	7,370	2,440	2,170	2,040
30	2,970	1,840	2,090	2,920	------	11,600	4,730	4,510	7,110	2,040	1,910	1,460
31	2,800	------	2,560	3,100	------	9,820	------	4,290	------	2,300	2,170	------

Month	Maximum	Minimum	Mean	Month	Maximum	Minimum	Mean
October	13,100	2,800	6,930	May	6,120	2,590	4,160
November	2,980	1,620	2,090	June	9,260	2,040	3,900
December	2,560	1,370	1,900	July	6,860	2,040	4,110
January	3,680	2,030	2,700	August	3,100	1,170	2,380
February	3,100	1,560	2,250	September	2,590	1,460	2,020
March	11,600	2,300	5,190				
April	20,500	3,880	8,580	The year	20,500	1,170	3,860

WISCONSIN RIVER AT KNOWLTON, WIS.

LOCATION.—Water-stage recorder in N. ½ sec. 29, T. 26 N., R. 7 E., 50 feet below left end of combination railroad and highway bridge of Chicago, Milwaukee, St. Paul & Pacific Railway at Knowlton, 1½ miles below mouth of Big Eau Pleine River.

DRAINAGE AREA.—4,360 square miles.

RECORDS AVAILABLE.—July, 1921, to September, 1929.

EXTREMES.—Maximum discharge during year, 40,500 second-feet Apr. 8 (gage height, 16.80 feet); minimum, 1,150 second-feet Nov. 15 (gage height, 1.90 feet).

1921–1929: Maximum discharge, 49,800 second-feet Apr. 10, 1922 (gage height, 19.5 feet); minimum, 670 second-feet Aug. 15, 1921 (gage height, 1.0 foot).

REMARKS.—Records good except those for period of ice effect (Dec. 8 to Mar. 14) and for June 18–23 and Sept. 3–7, which are fair. Flow is regulated by many storage reservoirs and power plants above station.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	4,010	3,140	2,810	2,870	3,190	2,570	20,400	7,850	6,500	8,840	3,140	2,050
2	4,010	3,480	2,650	2,420	2,280	2,020	13,000	9,090	5,320	6,090	2,810	1,650
3	3,830	3,310	2,810	2,870	3,190	3,190	11,400	9,340	4,940	6,500	2,970	3,020
4	4,010	2,810	3,140	2,870	3,030	3,190	14,200	8,340	3,650	4,940	2,650	2,810
5	6,930	2,970	3,140	3,520	3,700	3,360	20,400	7,380	3,830	4,560	2,190	3,160
6	11,400	2,490	2,810	2,570	3,520	3,520	25,900	6,090	4,190	4,010	2,810	3,180
7	9,590	2,190	2,810	2,280	3,190	3,520	31,900	5,510	3,930	3,830	2,650	2,620
8	7,850	2,650	2,020	2,280	3,030	3,190	37,800	5,510	4,010	6,500	2,970	2,650
9	9,340	2,490	1,790	2,570	2,870	3,030	35,800	5,510	2,650	9,590	3,480	2,340
10	10,400	2,490	1,790	2,570	3,190	4,230	23,300	5,320	1,780	10,900	4,010	3,140
11	8,840	2,050	2,870	2,720	2,870	3,870	17,800	4,940	3,310	8,840	4,370	3,310
12	7,610	2,490	3,030	2,280	3,360	4,230	14,800	5,320	5,890	7,850	4,010	3,480
13	11,400	2,490	3,190	2,570	3,360	4,770	13,600	4,940	7,850	6,500	3,650	3,310
14	13,600	2,490	3,030	2,720	3,030	8,050	15,100	4,560	10,100	7,610	4,010	3,480
15	11,400	1,230	2,870	2,870	2,570	13,000	18,300	4,370	8,340	7,610	3,830	2,650
16	8,340	1,650	2,870	3,190	2,280	17,500	19,200	6,290	7,380	7,150	4,010	2,490
17	15,100	2,050	2,720	3,190	2,870	20,700	17,800	10,900	5,510	5,890	3,650	3,140
18	19,500	2,050	2,570	3,190	2,870	23,800	15,400	9,590	4,440	6,090	3,480	2,970
19	17,500	1,910	2,570	2,570	2,870	17,100	12,200	8,090	4,440	5,320	3,140	2,970
20	14,500	1,910	2,570	3,190	2,870	34,500	11,100	6,710	4,560	4,560	3,650	2,970
21	12,500	2,650	2,570	3,030	3,030	26,500	9,590	5,700	3,680	4,010	3,310	2,810
22	9,340	3,480	2,420	3,360	2,870	21,200	9,090	5,700	3,740	3,830	3,310	2,050
23	8,340	3,310	2,420	3,520	2,280	17,500	7,610	5,700	3,380	3,830	3,140	1,910
24	7,380	3,480	2,570	3,520	2,870	15,400	7,380	5,320	3,650	3,480	2,970	2,650
25	6,710	3,140	2,870	3,360	2,870	13,000	7,850	5,510	3,830	3,480	2,490	2,810
26	5,700	3,140	2,570	2,870	3,190	10,900	6,500	4,940	3,650	4,940	2,340	2,490
27	6,090	3,140	2,570	2,870	3,360	11,100	8,340	4,750	3,650	4,560	2,970	2,340
28	4,940	3,140	2,870	3,190	2,870	14,500	7,610	4,010	5,700	4,370	2,970	2,490
29	4,370	2,970	2,720	3,520	-------	18,600	7,150	5,320	9,340	3,480	3,140	2,490
30	4,560	2,970	2,870	3,520	-------	20,900	6,090	6,290	9,590	3,830	2,970	2,810
31	3,480	-------	2,720	3,520	-------	23,000	-------	6,930	-------	3,650	2,970	-------

Month	Maximum	Minimum	Mean	Month	Maximum	Minimum	Mean
October	19,500	3,480	8,790	May	10,900	4,010	6,320
November	3,480	1,230	2,660	June	10,100	1,780	5,090
December	3,190	1,790	2,680	July	10,900	3,480	5,700
January	3,520	2,280	2,950	August	4,370	2,190	3,230
February	3,700	2,280	2,980	September	3,480	1,650	2,740
March	34,500	2,020	12,300				
April	37,800	6,090	15,600	The year	37,800	1,230	5,940

WISCONSIN RIVER NEAR NEKOOSA, WIS.

LOCATION.—Water-stage recorder in sec. 15, T. 21 N., R. 5 E., 1½ miles below Nekoosa. Tenmile Creek enters 4 miles below station.

DRAINAGE AREA.—5,500 square miles.

RECORDS AVAILABLE.—May, 1914, to September, 1929.

EXTREMES.—Maximum discharge during year, 46,600 second-feet Apr. 9 (gage height, 14.30 feet); minimum, 1,430 second-feet Sept. 2 (gage height, 0.68 foot).

1914–1929: Maximum discharge, 61,000 second-feet Apr. 12, 1922 (gage height, 16.1 feet); minimum (estimated), 400 second-feet Jan. 13, 1924, caused by regulation.

REMARKS.—Records good except those for periods of ice effect (Dec. 16–23 and Jan. 2 to Mar. 12), which are poor, and those for estimated periods (Nov. 7, 25–27, and Nov. 29 to Dec. 6), which are fair. Flow is regulated by many storage reservoirs and power plants above station.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	4,680	6,500	3,760	3,280	4,260	3,460	26,100	11,200	6,500	9,950	3,850	2,440
2	4,680	6,030	3,590	3,460	3,850	3,100	20,400	11,700	6,740	7,460	3,460	1,510
3	4,470	6,740	3,420	2,920	2,750	2,440	15,100	12,500	4,680	6,500	3,460	1,910
4	4,260	5,570	3,250	3,460	3,850	3,850	16,100	11,200	4,680	5,570	2,440	2,750
5	5,120	5,570	3,080	3,460	3,650	3,850	17,500	9,950	4,680	5,120	2,590	2,920
6	10,200	6,030	2,920	4,260	4,470	4,050	25,700	11,000	5,120	4,900	2,920	3,280
7	12,700	5,250	2,750	3,100	4,260	4,260	32,500	7,220	3,850	3,280	2,750	3,100
8	11,500	4,470	3,100	2,750	3,850	4,260	38,800	5,570	3,280	5,570	3,100	2,300
9	12,500	5,570	2,440	2,750	3,650	3,850	45,200	6,740	2,750	9,700	2,750	3,100
10	15,600	5,120	2,160	3,100	3,460	3,650	40,600	6,500	2,750	11,200	3,100	2,920
11	14,800	4,470	2,160	3,100	3,850	5,120	28,200	6,260	3,650	10,700	3,280	3,100
12	12,500	4,900	3,460	3,280	3,460	4,680	20,800	6,980	3,280	9,200	4,470	3,100
13	11,500	5,120	3,650	2,750	4,050	5,120	17,800	6,030	8,200	7,700	3,850	3,280
14	14,500	5,340	3,850	3,100	4,050	5,800	16,700	5,570	9,700	7,460	3,650	3,850
15	15,300	4,680	3,650	3,280	3,650	9,700	18,400	4,900	9,700	8,450	3,850	2,440
16	14,500	3,850	3,460	3,460	3,100	14,300	20,400	6,500	8,200	7,950	3,850	3,460
17	13,700	4,260	3,460	3,850	2,750	16,400	21,800	9,950	7,220	6,030	3,650	2,920
18	20,400	4,680	3,280	3,850	3,460	18,100	19,000	11,700	5,120	6,260	3,100	2,920
19	25,300	5,120	3,100	3,850	3,460	22,900	16,400	10,200	5,800	5,340	3,280	3,460
20	24,300	4,680	3,100	3,100	3,460	25,300	13,700	8,200	5,120	5,120	3,460	3,100
21	20,800	4,680	3,100	3,850	3,460	33,900	12,500	6,740	4,470	4,260	3,460	3,280
22	18,100	4,260	3,100	3,650	3,650	37,600	11,000	6,500	4,050	4,470	3,460	2,440
23	15,300	4,470	2,920	4,050	3,460	29,000	10,200	6,980	4,680	3,850	3,280	2,160
24	13,500	4,260	2,920	4,260	2,750	24,300	9,200	5,570	4,050	4,260	3,460	2,440
25	12,000	4,260	3,100	4,260	3,460	20,800	9,950	6,500	4,260	4,260	3,100	2,590
26	10,500	4,260	3,460	4,050	3,460	17,200	10,700	5,800	4,260	4,050	1,800	3,100
27	10,200	4,260	3,100	3,460	3,850	15,300	11,500	5,120	4,680	4,260	2,300	2,920
28	9,700	4,260	3,100	3,460	4,050	16,700	10,500	5,120	4,260	3,850	3,280	2,920
29	7,950	4,090	3,460	3,850	------	19,700	9,950	5,120	8,950	4,260	3,100	2,160
30	7,950	3,920	3,280	4,260	-------	22,500	8,450	6,980	9,950	3,850	2,750	2,440
31	7,460	-------	3,460	4,260	-------	24,600	--------	6,980	-------	3,460	3,100	------

Month	Maximum	Minimum	Mean	Month	Maximum	Minimum	Mean
October	25,300	4,260	12,400	May	12,500	4,900	7,650
November	6,740	3,850	4,890	June	9,950	2,750	5,490
December	3,850	2,160	3,180	July	11,200	3,280	6,070
January	4,260	2,750	3,530	August	4,470	1,800	3,220
February	4,470	2,750	3,620	September	3,850	1,500	2,810
March	37,600	2,440	13,700				
April	45,200	8,450	19,200	The year	45,200	1,500	7,170

WISCONSIN RIVER AT MUSCODA, WIS.

LOCATION.—Chain gage in sec. 1, T. 8 N., R. 1 W., at highway bridge 1 mile north of Muscoda and half a mile above Eagle Mill Creek. Zero of gage, 664.3 feet above sea level.

DRAINAGE AREA.—10,300 square miles.

RECORDS AVAILABLE.—December, 1902, to December, 1903; December, 1913, to September, 1929.

EXTREMES.—Maximum discharge during year, 51,800 second-feet Apr. 14 (gage height, 9.26 feet); minimum (estimated), 3,510 second-feet Jan. 20 and 22.

1902–3, 1913–1929: Maximum discharge, 72,100 second-feet Apr. 16, 1922 (gage height, 10.60 feet); minimum (estimated), 1,600 second-feet Dec. 20, 1921.

A stage of 11.1 feet during August, 1868, is reported by United States Weather Bureau (discharge not determined).

REMARKS.—Records fair except those for period of ice effect, Dec. 19 to Mar. 20, which are poor. Flow regulated by many storage reservoirs and power plants above station.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	9,400	16,500	10,100	13,500	4,120	6,800	28,000	18,200	10,100	7,390	7,700	6,230
2	11,300	13,100	10,100	10,900	3,710	6,520	33,100	19,400	9,400	9,400	8,020	5,480
3	11,700	14,500	9,770	9,400	4,330	6,520	30,900	19,400	7,700	9,770	8,020	5,240
4	11,300	14,500	10,500	9,400	5,000	6,800	32,400	18,200	9,400	9,770	7,090	6,520
5	10,900	12,200	10,100	8,350	4,550	7,090	35,400	17,000	13,500	9,770	5,990	6,250
6	10,900	11,300	10,500	7,390	4,330	7,700	36,900	18,800	11,300	12,600	7,090	5,000
7	10,900	11,700	9,400	6,520	4,120	8,350	34,600	18,200	10,100	10,900	7,090	4,770
8	11,300	11,700	8,020	6,800	4,120	8,350	30,100	17,000	9,770	10,900	6,520	4,770
9	10,900	11,300	8,350	6,800	3,910	8,690	29,400	18,800	9,040	11,300	6,520	5,240
10	12,600	11,300	7,090	6,800	4,120	9,400	30,100	15,500	7,390	10,100	6,520	6,250
11	18,200	10,500	8,350	6,250	4,330	9,400	43,000	12,600	9,040	10,500	6,250	5,990
12	16,500	8,690	7,700	5,480	4,770	9,770	47,000	12,200	8,020	11,300	5,240	5,480
13	15,500	10,500	8,690	4,120	5,000	10,500	47,000	13,100	8,690	10,500	6,520	5,240
14	21,200	10,500	9,770	4,770	5,240	11,300	51,800	11,700	8,350	10,900	6,520	5,730
15	22,500	10,500	10,100	4,770	4,770	12,600	49,400	11,700	7,390	13,500	5,990	5,000
16	17,000	10,500	9,770	4,550	4,770	14,000	39,900	12,600	8,020	12,200	6,250	5,730
17	14,500	11,300	11,300	4,770	5,000	16,000	31,600	12,600	6,800	9,770	6,520	5,730
18	22,500	11,700	12,200	4,550	5,000	18,200	31,600	11,300	11,300	9,770	6,250	5,480
19	23,100	9,770	10,900	4,120	5,480	21,800	25,200	10,900	15,500	10,100	5,730	5,730
20	20,000	12,200	10,100	3,510	5,730	26,600	28,000	10,500	10,900	10,900	6,520	5,730
21	19,400	12,200	9,400	3,910	6,250	33,100	35,400	15,000	10,100	9,770	6,800	5,990
22	25,200	11,300	9,770	3,510	5,990	40,600	30,900	14,000	10,900	8,020	6,800	5,480
23	27,300	10,900	12,600	4,120	5,730	38,400	26,600	15,000	9,400	9,770	6,520	5,730
24	28,700	10,500	13,500	4,120	5,990	40,600	21,200	12,600	7,700	9,770	7,390	5,730
25	30,900	10,100	12,200	4,120	5,480	44,600	22,500	11,300	9,400	9,040	6,800	5,730
26	30,900	9,400	14,500	3,910	5,990	47,800	21,200	12,600	9,770	10,100	5,730	5,730
27	26,600	10,500	12,600	4,330	6,800	47,800	18,800	10,900	11,700	9,040	6,800	5,990
28	23,100	10,500	12,600	4,120	6,520	43,000	19,400	11,300	9,770	8,690	6,800	5,730
29	19,400	10,900	13,100	4,770	-------	38,400	21,800	10,500	9,400	7,390	6,800	6,250
30	15,000	8,690	14,500	4,330	-------	33,900	22,500	10,500	9,400	8,350	6,520	5,730
31	16,000	-------	14,000	4,330	-------	30,100	-------	8,690	-------	8,020	6,520	-------

Month	Maximum	Minimum	Mean	Month	Maximum	Minimum	Mean
October	30,900	9,400	18,200	May	19,400	8,690	13,900
November	16,500	8,690	11,300	June	15,500	6,800	9,640
December	14,500	7,090	10,700	July	13,500	7,390	9,980
January	13,500	3,510	5,750	August	8,690	5,240	5,640
February	6,800	3,710	5,040	September	6,520	4,770	5,660
March	47,800	6,520	21,400				
April	51,800	18,800	31,900	The year	51,800	3,510	12,600

TOMAHAWK RIVER NEAR BRADLEY, WIS.

LOCATION.—Water-stage recorder in sec. 16, T. 36 N., R. 6 E., 4 miles below mouth of Bearskin Creek and 4 miles north of Bradley.

DRAINAGE AREA.—422 square miles.

RECORDS AVAILABLE.—September, 1914, to September, 1927, and October, 1928, to September, 1929, when station was discontinued.

EXTREMES.—Maximum discharge during period, 886 second-feet Oct. 19–20; minimum, 265 second-feet May 26.

1914–1927, 1929: Maximum discharge, 2,200 second-feet Apr. 24, 1916; minimum, 120 second-feet May 23–29, 1927.

REMARKS.—Records fair; gage-height record fragmentary. Flow regulated by several storage reservoirs above station.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	May	July	Aug.	Sept.
1	------	544	447	------	------	447	502
2	------	544	460	------	------	447	488
3	------	544	447	------	------	e04	474
4	------	544	460	------	------	e19	488
5	------	544	------	------	------	e34	474
6	------	530	------	------	------	e34	474
7	------	530	------	------	------	e50	474
8	------	516	------	------	------	e50	474
9	------	502	------	------	------	e50	502
10	------	488	------	------	604	e50	544
11	------	488	------	------	604	e50	530
12	------	474	------	------	589	e50	516
13	------	474	------	------	619	e50	502
14	------	460	------	365	650	e50	502
15	763	474	------	434	619	e50	488
16	763	488	------	488	604	650	488
17	815	474	------	488	604	634	488
18	850	474	------	488	604	530	488
19	886	502	------	367	604	516	474
20	886	502	------	347	604	516	460
21	850	544	------	308	604	516	460
22	850	559	------	278	604	516	460
23	850	574	------	271	604	516	460
24	850	559	------	271	421	516	460
25	850	559	------	271	530	516	460
26	798	460	------	265	544	516	460
27	746	421	------	280	516	516	460
28	681	434	------	320	516	516	474
29	589	447	------	324	488	516	474
30	559	447	------	------	460	516	460
31	559	------	------	------	460	516	------

Month	Maximum	Minimum	Mean	Month	Maximum	Minimum	Mean
October 15–31	886	559	773	July 10–31	650	421	566
November	574	421	503	August	650	447	573
May 14–29	488	265	348	September	544	460	482

PRAIRIE RIVER NEAR MERRILL, WIS.

LOCATION.—Chain gage on line between secs. 20 and 29, T. 32 N., R. 7 E., at highway bridge 4½ miles northeast of Merrill.

DRAINAGE AREA.—164 square miles.

RECORDS AVAILABLE.—January, 1914, to September, 1929.

EXTREMES.—Maximum discharge during year, 2,580 second-feet Apr. 7 (gage height, 6.4 feet); minimum (estimated), 85 second-feet Jan. 6–10.

1914–1929: Maximum discharge, 3,580 second-feet Aug. 21, 1926 (gage height, 7.4 feet); minimum (estimated), 55 second-feet Jan. 21, 1925.

REMARKS.—Records good except those for periods of ice effect (Dec. 7–12 and Dec. 16 to Mar. 16), which are fair. Discharge interpolated July 8–18.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	182	207	129	110	100	100	1,060	509	220	450	122	99
2	159	207	133	100	100	105	911	509	207	359	118	99
3	159	182	137	95	100	110	679	509	194	325	115	97
4	137	182	137	95	100	110	863	509	182	278	115	99
5	309	182	133	90	100	110	1,110	359	182	182	108	99
6	234	182	137	85	100	110	2,020	309	148	148	108	100
7	220	170	135	85	100	110	2,580	293	137	133	105	102
8	293	170	135	85	100	105	2,200	293	129	135	102	105
9	309	170	135	85	105	105	1,860	263	122	137	108	108
10	325	170	135	85	100	105	1,060	207	122	140	105	148
11	325	159	135	95	95	115	770	248	376	142	102	133
12	342	159	135	95	90	125	679	248	431	144	102	133
13	359	159	129	100	90	170	679	234	679	146	105	133
14	450	170	129	100	90	205	635	234	509	148	112	133
15	431	170	133	100	95	220	679	263	450	151	112	129
16	592	159	135	95	95	280	592	550	394	153	108	129
17	679	159	135	90	95	394	509	550	376	155	105	126
18	679	159	135	95	95	431	431	469	194	157	102	122
19	679	170	130	95	95	509	394	394	182	159	102	118
20	724	170	130	95	95	592	376	359	170	137	99	118
21	770	170	130	90	95	679	325	325	159	133	99	116
22	635	170	130	90	95	635	309	263	148	122	97	118
23	550	170	125	90	100	592	278	234	148	118	99	118
24	550	159	120	90	100	592	263	220	148	115	99	116
25	469	159	120	90	105	550	263	207	194	122	99	118
26	450	159	120	90	105	431	263	182	182	394	99	220
27	325	129	115	90	105	550	263	194	207	293	99	234
28	293	129	110	95	100	724	278	278	431	220	99	220
29	263	128	110	95	-------	960	263	278	679	207	102	207
30	234	126	105	95	-------	1,010	394	263	509	159	102	194
31	220	-------	100	95	-------	1,060	-------	234	-------	133	99	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	770	137	398	2.43	2.80
November	207	126	165	1.01	1.13
December	137	100	128	.780	.90
January	110	85	93.1	.568	.65
February	105	90	98.0	.598	.62
March	1,060	100	384	2.34	2.70
April	2,580	263	766	4.67	5.21
May	550	182	322	1.96	2.26
June	679	122	274	1.67	1.86
July	450	115	187	1.14	1.31
August	122	97	105	.640	.74
September	234	97	133	.811	.90
The year	2,580	85	255	1.55	21.08

RIB RIVER AT RIB FALLS, WIS.

LOCATION.—Chain gage in NW. ¼ sec. 27, T. 29 N., R. 5 E., at highway bridge in Rib Falls, 6 miles below mouth of Black Creek.
DRAINAGE AREA.—309 square miles.
RECORDS AVAILABLE.—May, 1925, to September, 1929.
EXTREMES.—Maximum discharge during year, 9,820 second-feet Apr. 7 (gage height, 9.17 feet); minimum, 24 second-feet Sept. 4 (gage height, 1.74 feet). 1925–1929: Maximum discharge, 12,500 second-feet Aug. 21, 1926 (gage height, 10.10 feet); minimum, 10 second-feet Feb. 25–27, 1926.
REMARKS.—Records good except those for periods of ice effect (Dec. 20, 21, and Jan. 1 to Mar. 12), which are fair.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	80	150	64	60	40	75	880	1,000	644	537	27	27
2	80	150	64	55	40	80	940	537	177	461	27	27
3	80	137	64	50	40	90	1,000	590	163	170	29	25
4	67	120	64	45	40	95	2,940	486	144	98	32	24
5	1,130	120	60	45	40	105	4,870	436	87	98	32	29
6	880	108	56	45	40	115	7,160	275	98	82	32	29
7	564	114	53	40	40	120	8,180	232	87	1,000	32	29
8	700	103	49	40	40	135	5,510	211	73	1,060	37	29
9	122	103	46	40	40	140	2,310	170	73	672	39	42
10	134	103	46	35	40	160	1,270	137	73	293	69	46
11	228	103	46	35	40	170	940	157	73	275	60	53
12	461	103	42	35	40	185	730	275	73	60	42	49
13	1,840	103	39	35	40	203	730	207	157	293	49	49
14	1,270	108	103	35	40	1,420	1,130	177	125	207	64	42
15	820	108	170	35	40	2,940	2,020	412	114	192	46	42
16	1,270	120	157	35	40	3,400	2,310	1,840	108	131	39	39
17	6,190	120	150	35	40	2,800	1,660	1,060	87	108	37	39
18	2,110	103	131	35	40	2,540	1,200	1,060	73	108	37	37
19	1,500	103	114	35	40	3,740	820	436	64	69	29	37
20	1,200	103	105	35	45	3,400	760	114	64	73	32	37
21	820	98	90	35	45	2,800	590	125	56	60	29	37
22	672	87	78	35	50	2,110	486	140	56	42	29	34
23	564	87	78	35	50	1,930	412	82	53	42	29	34
24	512	82	78	35	55	1,500	363	73	56	42	27	29
25	90	82	64	35	60	1,200	275	257	56	60	27	29
26	293	64	69	35	60	1,270	880	78	53	39	27	42
27	252	64	69	35	65	1,840	672	177	316	42	25	42
28	244	69	64	35	70	2,420	339	170	461	46	25	39
29	167	78	69	35	------	2,310	412	436	590	42	27	42
30	167	78	64	35	------	3,240	144	436	564	37	27	42
31	167	------	56	40	------	2,020	------	1,000	------	32	27	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	6,190	67	796	2.58	2.97
November	150	64	102	.330	.37
December	170	39	77.5	.251	.29
January	60	35	38.5	.125	.14
February	70	40	45.0	.146	.15
March	3,740	75	1,440	4.66	5.37
April	8,180	144	1,730	5.60	6.25
May	1,840	73	412	1.33	1.53
June	644	53	161	.521	.58
July	1,060	32	209	.676	.78
August	69	25	35.2	.114	.13
September	53	24	36.7	.119	.13
The year	8,180	24	426	1.38	18.69

YELLOW RIVER AT SPRAGUE, WIS.

LOCATION.—Chain gage in NW. ¼ sec. 11, T. 19 N., R. 3 E., 1 mile southeast of Sprague and 10 miles above Necedah Dam.

DRAINAGE AREA.—436 square miles.

RECORDS AVAILABLE.—September, 1926, to September, 1929.

EXTREMES.—Maximum discharge during year, 2,200 second-feet Mar. 20 (gage height, 12.70 feet); minimum, 22 second-feet Sept. 3, 4, 7, and 25.

1926–1929: Maximum discharge, 2,660 second-feet (estimated), Sept. 17, 1928; minimum, 22 second-feet Sept. 3, 4, 7, and 25, 1929.

REMARKS.—Records good except those for period of ice effect (Dec. 21 to Mar. 19), which are fair.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	219	275	146	75	54	60	1,450	789	136	206	36	a 24
2	206	261	a 141	71	54	57	1,190	924	a 141	168	37	a 23
3	180	247	136	67	52	57	981	1,070	146	136	34	22
4	180	a 226	136	64	51	57	924	1,130	117	a 118	a 32	22
5	261	206	100	60	51	54	1,160	a 935	117	100	30	23
6	336	206	100	57	51	54	1,650	740	108	92	33	23
7	a 630	193	146	54	51	54	a 1,660	540	100	a 100	33	22
8	924	193	126	51	48	51	1,680	441	92	108	42	a 24
9	1,010	193	a 113	54	48	51	1,580	352	a 89	100	57	27
10	1,040	180	100	57	48	51	1,580	305	85	136	64	28
11	1,290	a 180	100	60	48	51	1,520	336	85	117	a 57	29
12	1,380	180	100	64	48	51	1,220	a 352	92	117	51	27
13	1,450	180	100	64	48	57	981	369	100	100	48	29
14	a 1,260	168	108	64	51	67	a 981	336	126	a 93	48	28
15	1,070	157	136	64	51	117	981	336	136	85	51	a 27
16	841	157	a 193	64	51	290	1,220	352	a 127	78	51	25
17	764	157	247	64	52	710	1,550	352	117	71	51	28
18	924	a 202	261	64	54	1,130	1,550	336	108	64	a 46	25
19	1,320	247	233	64	51	1,650	1,380	a 313	146	57	42	25
20	1,650	290	233	62	51	2,200	1,100	290	336	57	36	25
21	a 1,600	305	193	60	51	2,090	a 862	247	320	a 57	39	25
22	1,550	305	157	60	51	1,820	624	219	290	57	37	a 24
23	1,380	290	146	57	51	1,620	540	206	a 255	51	34	23
24	1,160	290	136	54	52	a 1,600	441	219	219	51	33	23
25	841	a 275	117	56	54	1,580	540	180	261	57	a 31	22
26	646	261	108	57	54	1,550	841	a 169	247	54	29	24
27	520	247	100	56	60	1,550	981	157	219	48	28	24
28	a 445	193	92	54	60	1,480	a 1,060	146	219	a 47	27	24
29	369	a 175	88	54	-------	1,450	1,130	136	233	45	26	a 26
30	352	157	82	54	-------	1,450	952	a 136	a 220	39	26	27
31	290	-------	78	54	-------	a 1,450	-------	136	-------	39	25	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	1,650	180	842	1.93	2.22
November	305	157	220	.505	.56
December	261	78	137	.314	.36
January	75	51	60.0	.138	.16
February	60	48	51.6	.118	.12
March	2,200	51	791	1.81	2.09
April	1,680	441	1,140	2.61	2.91
May	1,130	136	405	.929	1.07
June	336	85	166	.381	.43
July	206	39	85.4	.196	.23
August	64	25	39.2	.0899	.10
September	29	22	24.9	.0571	.06
The year	2,200	22	332	.761	10.31

a Interpolated.

KICKAPOO RIVER AT GAYS MILLS, WIS.

LOCATION.—Chain gage in sec. 28, T. 10 N., R. 4 W., at highway bridge just below dam and power plant of Interstate Power Co. in Gays Mills, 2 miles below mouth of Tainter Creek.

DRAINAGE AREA.—629 square miles.

RECORDS AVAILABLE.—December, 1913, to September, 1929.

EXTREMES.—Maximum discharge during year, 5,840 second-feet Mar. 15 (gage height, 12.80 feet); minimum, 257 second-feet Aug. 31 (gage height, 1.74 feet).

1913–1929: Maximum discharge, about 6,300 second-feet Mar. 24, 1917 (gage height, 15.05 feet); minimum, about 100 second-feet during latter part of January, 1915.

REMARKS.—Records poor. Stage-discharge relation affected by ice Dec. 23–25 and Jan. 5 to Mar. 10.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	350	365	382	336	300	325	482	698	505	382	323	288
2	350	400	382	323	310	335	583	640	505	382	323	299
3	336	400	382	323	300	335	698	556	505	365	323	299
4	336	400	382	336	300	365	952	482	460	400	323	299
5	505	365	350	300	300	365	1,120	460	439	382	323	311
6	759	365	336	325	310	365	886	439	419	382	323	299
7	640	382	336	325	310	350	1,260	419	419	350	323	299
8	400	439	323	300	300	365	1,600	419	400	336	323	299
9	365	400	336	310	300	400	2,440	400	382	400	323	299
10	365	382	350	300	290	350	1,760	419	382	419	323	311
11	365	365	350	300	275	439	1,560	505	400	382	323	299
12	365	350	350	300	275	482	1,480	530	790	365	323	288
13	400	288	698	300	275	2,640	1,370	505	1,520	460	323	323
14	400	350	1,160	300	265	3,960	1,230	530	1,340	439	365	365
15	382	365	886	310	265	5,210	952	505	986	382	382	365
16	400	350	556	310	265	4,130	790	482	611	382	336	350
17	365	439	505	325	265	3,280	583	482	460	365	323	336
18	365	640	460	325	265	2,340	382	482	419	350	323	336
19	698	611	419	310	275	2,140	336	482	439	336	323	336
20	530	583	336	325	275	1,760	323	482	400	336	323	311
21	460	505	323	325	275	1,260	323	439	365	323	323	311
22	439	460	336	335	290	1,020	323	439	400	323	336	311
23	460	439	335	325	290	854	323	439	382	336	323	311
24	439	419	350	325	275	790	482	460	382	790	323	311
25	419	419	350	310	300	669	886	505	400	439	323	299
26	400	365	350	300	300	698	1,300	482	382	400	323	299
27	365	365	336	290	310	698	952	505	365	382	323	299
28	365	365	350	290	325	583	854	482	439	365	323	439
29	382	382	365	290	------	530	790	482	400	336	323	460
30	365	382	350	290	------	482	728	530	382	336	323	439
31	365	------	336	300	------	460	------	530	------	323	277	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	759	336	424	0.674	0.78
November	640	288	411	.653	.73
December	1,160	323	421	.669	.77
January	336	290	312	.496	.57
February	325	265	289	.459	.48
March	5,210	325	1,230	1.96	2.26
April	2,440	323	925	1.47	1.64
May	698	400	491	.781	.90
June	1,520	365	523	.831	.93
July	790	323	385	.612	.71
August	382	277	326	.518	.60
September	460	288	326	.518	.58
The year	5,210	265	506	.804	10.95

ROCK RIVER AT AFTON, WIS.

LOCATION.—Chain gage on line between secs. 22 and 27, T. 2 N., R. 12 E., at highway bridge in Afton, three-fourths mile above mouth of Bass Creek.

DRAINAGE AREA.—3,190 square miles.

RECORDS AVAILABLE.—February, 1914, to September, 1929.

EXTREMES.—Maximum discharge during year, 13,000 second-feet Mar. 23 (gage height, 10.81 feet); minimum, 446 second-feet Oct. 3 (gage height, 0.73 foot). 1914–1929: Maximum discharge, 13,000 second-feet Mar. 23, 1929 (gage height, 10.81 feet); minimum, 274 second-feet Dec. 9, 1922 (gage height, 0.08 foot).

REMARKS.—Records good except those for period of ice effect (Dec. 21–26 and Jan. 3 to Mar. 2), which are fair. Slight diurnal fluctuation caused by operation of power plants at Janesville and above.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	775	1,700	3,500	2,890	1,420	1,700	11,000	5,370	2,100	1,630	3,390	928
2	728	1,860	3,290	2,800	1,350	1,630	10,300	5,500	2,020	1,630	3,290	1,100
3	518	1,940	3,290	2,710	1,420	1,630	9,900	5,240	1,860	1,560	3,190	983
4	683	1,700	3,290	2,530	1,420	1,700	9,500	4,980	1,700	1,420	2,990	824
5	683	1,630	2,620	2,440	1,490	1,780	9,300	4,740	1,560	1,280	2,800	1,220
6	728	1,560	2,990	2,350	1,490	1,940	8,730	4,740	1,560	775	2,800	1,420
7	683	1,780	2,890	2,260	1,490	1,860	9,500	4,620	1,490	983	2,800	1,220
8	983	2,020	3,090	2,180	1,560	2,020	10,100	4,380	1,490	928	2,620	1,160
9	1,220	1,940	3,190	2,100	1,490	2,020	9,900	4,380	1,420	775	2,440	1,280
10	983	1,940	2,990	2,020	1,420	2,100	10,100	4,160	1,280	1,040	2,530	1,350
11	875	1,940	2,800	1,940	1,490	2,180	10,100	4,160	775	1,160	2,440	1,280
12	928	2,020	2,710	1,860	1,420	5,110	9,500	4,050	683	1,220	2,180	1,160
13	728	2,020	2,800	1,860	1,420	9,110	9,500	3,720	824	1,220	2,020	1,040
14	928	1,940	3,720	1,780	1,420	8,550	9,500	3,830	775	1,350	1,490	1,040
15	1,160	1,630	3,500	1,700	1,420	8,200	9,500	3,720	824	1,350	1,560	1,040
16	983	1,940	3,610	1,700	1,420	8,730	9,110	3,610	4,160	1,490	1,350	1,100
17	1,040	2,800	3,940	1,630	1,350	9,700	8,730	3,500	3,610	1,490	1,220	1,160
18	1,490	4,160	4,050	1,560	1,420	10,800	8,370	3,390	1,940	1,490	1,280	1,160
19	1,420	3,390	4,160	1,560	1,420	11,600	8,030	3,500	2,020	1,560	1,220	1,220
20	1,280	3,610	4,160	1,490	1,420	12,100	8,200	3,290	2,020	1,490	1,220	1,160
21	1,350	3,610	4,050	1,420	1,490	12,500	7,700	3,090	1,940	1,350	1,220	1,040
22	1,420	4,050	3,940	1,490	1,350	12,700	7,220	2,890	2,350	1,350	1,160	1,040
23	1,630	4,160	3,940	1,490	1,280	13,000	6,760	2,710	2,440	1,350	1,160	983
24	1,700	4,160	3,940	1,490	1,350	13,000	6,460	2,710	2,350	1,350	928	1,100
25	1,630	4,160	3,830	1,490	1,420	12,700	6,460	2,710	2,180	2,620	1,040	983
26	1,630	3,610	3,940	1,420	1,560	12,500	6,320	2,620	2,020	2,710	928	1,040
27	1,700	3,830	3,940	1,350	1,560	12,100	5,760	2,530	1,940	2,710	1,420	1,040
28	1,700	3,720	3,290	1,350	1,630	11,600	5,760	2,440	1,940	2,800	1,560	983
29	1,700	3,610	3,190	1,420	-------	11,400	5,630	2,350	2,780	3,090	1,350	983
30	1,700	3,720	2,990	1,420	-------	11,000	5,630	2,350	1,700	3,290	1,100	1,100
31	1,700	-------	2,990	1,420	-------	11,000	-------	2,180	-------	3,290	1,100	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	1,700	518	1,180	0.370	0.43
November	4,160	1,560	2,740	.859	.96
December	4,160	2,620	3,440	1.08	1.24
January	2,890	1,350	1,840	.577	.67
February	1,630	1,280	1,440	.451	.47
March	13,000	1,630	7,680	2.41	2.78
April	11,000	5,630	8,420	2.64	2.94
May	5,500	2,180	3,660	1.15	1.33
June	4,160	683	1,830	.574	.64
July	3,290	775	1,670	.524	.60
August	3,390	928	1,860	.583	.67
September	1,420	824	1,100	.345	.38
The year	13,000	518	3,080	.966	13.11

ROCK RIVER AT LYNDON, ILL.

LOCATION.—Chain gage in NE. ¼ sec. 21, T. 20 N., R. 5 E., at highway bridge in Lyndon, 14 miles above Rock Creek.

DRAINAGE AREA.—9,010 square miles.

RECORDS AVAILABLE.—November, 1914, to September, 1929.

EXTREMES.—Maximum discharge during year, about 37,200 second-feet Mar. 17; minimum, 1,940 second-feet Sept. 19 and 20 (gage height, 5.03 feet).

1914–1929: Maximum discharge, 39,500 second-feet Mar. 28, 1916; maximum gage height, backwater from ice, 19.6 feet Feb. 16, 1918; minimum discharge, 655 second-feet Sept. 27, 1918 (gage height, 3.72 feet).

REMARKS.—Records good except those for period of ice effect (Jan. 8 to Mar. 12) and estimated period (Mar. 17–23), which are poor. Some diurnal fluctuation at low stages caused by operation of power plants upstream. About 100 second-feet diverted above gage to Illinois & Mississippi Canal.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	2,560	4,470	9,350	7,140			21,400	15,100	6,440	7,380	5,100	2,560
2	2,560	4,470	9,100	5,980			22,500	14,500	6,210	7,140	6,210	2,560
3	2,910	4,470	9,100	5,540			24,600	13,300	5,980	6,900	6,440	2,230
4	2,910	4,470	9,350	5,100			23,600	12,700	5,760	6,670	6,440	2,230
5	2,910	4,680	9,100	5,100			21,100	[a] 12,400	4,890	4,890	6,440	3,090
6	2,560	[a] 4,810	9,100	4,890			20,000	12,100	4,470	[a] 5,100	6,210	3,090
7	2,080	[a] 4,940	8,600	4,470		25,000	19,000	10,600	4,470	5,320	5,980	2,560
8	2,560	[a] 5,060	8,600				18,300	10,400	4,260	4,890	4,060	2,910
9	2,560	[a] 5,190	7,860				18,000	10,100	4,260	4,890	3,860	[a] 3,190
10	2,560	5,320	6,210				18,000	9,600	4,470	4,470	3,660	3,470
11	2,910	6,440	6,440				18,300	9,850	4,470	4,890	4,060	3,280
12	2,910	6,670	7,140				19,000	10,800	4,470	6,210	4,260	2,730
13	2,730	6,210	9,100			24,600	20,400	11,100	6,670	5,980	4,260	2,910
14	3,280	6,210	10,400			32,000	19,700	11,600	9,100	4,680	4,260	2,910
15	2,910	6,670	13,900		7,500	33,600	19,000	11,800	9,600	4,470	4,060	2,560
16	3,470	6,210	15,700			36,000	18,300	10,400	7,380	4,470	4,060	2,910
17	4,060	6,670	15,100			37,200	18,000	10,400	9,850	4,680	2,730	3,090
18	4,470	8,100	15,400			36,800	16,600	10,100	13,300	4,680	2,730	2,730
19	4,890	15,700	15,100			36,400	16,600	9,100	12,700	4,680	2,910	1,940
20	4,890	16,600	15,400	7,500		35,600	18,300	8,850	11,600	4,470	3,280	2,080
21	5,100	16,300	15,100			34,800	21,800	8,850	9,600	3,470	3,280	[a] 2,330
22	5,760	16,300	12,400			34,000	25,000	8,600	8,600	2,910	3,280	[a] 2,580
23	6,210	16,600	10,400			33,200	23,200	8,350	7,620	2,730	3,280	[a] 2,840
24	6,440	15,400	6,670			32,400	[a] 22,600	8,100	6,670	2,910	3,280	3,090
25	6,210	15,400	[a] 7,280			29,200	[a] 22,000	8,100	6,440	3,090	2,910	2,730
26	6,210	15,100	[a] 7,880			28,000	[a] 21,400	[a] 8,100	6,440	3,470	3,090	2,730
27	6,210	11,800	[a] 8,490			26,000	20,800	8,100	5,980	5,320	3,280	3,090
28	5,760	[a] 11,100	9,100			25,000	19,700	8,100	4,470	5,760	2,910	2,910
29	5,320	[a] 10,300	10,100		-------	22,500	19,000	7,860	4,470	6,670	2,910	2,910
30	4,470	9,600	8,600		-------	21,100	15,400	7,140	4,680	5,980	2,910	3,660
31	4,470	-------	8,100		-------	20,800	-------	6,670	-------	5,760	2,910	-------

Month	Maximum	Minimum	Mean	Month	Maximum	Minimum	Mean
October	6,440	2,080	4,030	May	15,100	6,670	10,100
November	16,600	4,470	9,040	June	13,300	4,260	6,840
December	15,700	6,210	10,100	July	7,380	2,730	5,000
January	-------	4,470	7,040	August	6,440	2,730	4,030
February	-------	-------	7,500	September	3,660	1,940	2,800
March	-------	20,800	28,300				
April	25,000	15,400	20,100	The year	-------	1,940	9,590

[a] Interpolated.

PECATONICA RIVER AT FREEPORT, ILL.

LOCATION.—Chain gage in NW. ¼ sec. 32, T. 27 N., R. 8 E., at Hancock Avenue Bridge in Freeport, 2 miles above mouth of Yellow Creek. Zero of gage is 739.52 feet above mean sea level.

DRAINAGE AREA.—1,330 square miles.

RECORDS AVAILABLE.—September, 1914, to September, 1929.

EXTREMES.—Maximum discharge during year, 18,400 second-feet Mar. 16 (gage height, 19.76 feet); minimum, 417 second-feet Sept. 3 (gage height, 4.39 feet).

1914–1929: Maximum discharge occurred Mar. 16, 1929; minimum, 200 second-feet Dec. 14, 1917.

REMARKS.—Records good except those for periods of ice effect, Dec. 21–24 and Jan. 4 to Mar. 11, which are poor.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	565	790	1,760	1,160	1,220	1,680	2,140	2,000	990	1,100	585	525
2	565	915	1,650	1,130	1,190	1,650	2,210	1,860	965	915	645	565
3	565	1,460	1,900	1,070	1,190	1,650	2,140	1,760	940	840	665	469
4	565	1,650	2,000	1,100	1,400	1,820	2,140	1,720	940	790	665	469
5	645	1,310	1,860	1,190	1,310	2,280	2,100	1,620	940	790	645	605
6	665	1,220	1,460	1,160	1,280	2,580	1,930	1,520	915	765	605	645
7	815	1,130	1,310	1,220	1,220	2,940	1,900	1,460	915	1,130	625	585
8	665	1,460	1,220	1,250	1,220	3,270	2,320	1,430	890	1,250	605	565
9	525	1,720	1,550	1,280	1,190	3,690	2,900	1,370	865	1,130	605	545
10	565	1,620	1,250	1,250	1,160	3,620	3,330	1,340	865	990	585	565
11	565	1,400	1,370	1,280	1,160	3,500	3,560	1,400	940	1,220	625	545
12	585	1,280	1,340	1,280	1,130	3,900	3,380	1,520	1,370	990	605	525
13	815	1,220	1,580	1,220	1,130	7,600	3,020	1,550	1,130	915	645	525
14	1,070	1,130	2,780	1,190	1,130	10,700	2,620	1,460	1,040	940	605	525
15	890	1,100	3,070	1,130	1,130	14,800	2,240	1,400	1,220	990	625	525
16	585	1,100	3,170	1,100	1,130	17,000	1,930	1,370	1,130	1,310	605	525
17	890	2,540	3,170	1,100	1,130	14,800	1,760	1,310	990	890	565	565
18	2,320	3,900	2,740	1,160	1,130	11,500	1,650	1,280	1,130	790	565	565
19	2,380	4,210	2,180	1,160	1,100	8,400	1,680	1,220	1,100	740	545	565
20	1,760	4,050	1,620	1,160	1,040	6,150	2,700	1,190	1,040	715	545	525
21	1,130	3,760	1,280	1,160	1,040	4,940	2,780	1,160	1,220	690	545	506
22	1,040	3,120	1,430	1,190	1,040	4,050	2,210	1,130	990	665	565	506
23	1,340	2,320	1,580	1,190	1,040	3,440	1,860	1,100	840	690	565	487
24	1,340	1,860	1,580	1,220	1,070	2,980	1,680	1,220	840	665	565	506
25	1,100	1,650	1,580	1,220	1,100	2,660	2,240	1,280	790	690	565	506
26	1,020	1,520	1,400	1,220	1,160	2,240	2,500	1,220	790	665	545	506
27	915	1,400	1,340	1,160	1,280	1,930	2,620	1,130	790	645	545	506
28	865	1,400	1,370	1,160	1,520	1,790	2,580	1,130	1,620	645	525	506
29	840	1,400	1,370	1,190	-------	1,620	2,460	1,100	1,860	625	525	740
30	790	1,550	1,280	1,190	-------	1,520	2,240	1,100	1,490	605	525	715
31	790	-------	1,220	1,220	-------	1,650	-------	1,040	-------	605	525	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	2,380	525	941	0.708	0.82
November	4,210	790	1,840	1.38	1.54
December	3,170	1,220	1,760	1.32	1.52
January	1,280	1,070	1,180	.887	1.02
February	1,520	1,040	1,170	.880	.92
March	17,000	1,520	4,920	3.70	4.27
April	3,560	1,650	2,360	1.77	1.98
May	2,000	1,040	1,370	1.03	1.19
June	1,860	790	1,050	.790	.88
July	1,310	605	851	.640	.74
August	665	525	586	.441	.51
September	740	469	547	.411	.46
The year	17,000	469	1,550	1.17	15.85

SUGAR RIVER NEAR BRODHEAD, WIS.

LOCATION.—Chain gage in sec. 26, T. 2 N., R. 9 E., at highway bridge 2 miles southwest of Brodhead. Jordan Creek enters 2 miles below station.

DRAINAGE AREA.—529 square miles.

RECORDS AVAILABLE.—February, 1914, to September, 1929.

EXTREMES.—Maximum discharge during year, 11,400 second-feet Mar. 14 (gage height, 9.95 feet); minimum, 133 second-feet Aug. 25 (gage height 1.15 feet). 1914–1929: Maximum discharge, about 13,000 second-feet Sept. 13, 1915 (gage height, 11.4 feet); minimum, about 47 second-feet Aug. 26, 1923.

REMARKS.—Records fair except those for period of ice effect (Dec. 22–25 and Jan. 4 to Mar. 10), which are poor. Flow is subject to slight diurnal fluctuation caused by operation of power plant in Brodhead.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	210	358	593	341	310	395	682	593	358	262	143	165
2	235	431	637	262	290	410	871	551	324	248	248	210
3	262	470	728	277	220	430	1,020	470	324	262	235	187
4	235	530	728	250	275	450	1,020	412	324	222	187	176
5	248	530	682	260	340	470	1,020	358	324	248	235	187
6	308	412	682	275	310	510	970	358	308	248	198	262
7	292	376	551	290	360	550	1,120	394	324	341	176	235
8	324	431	450	260	340	590	2,600	376	324	470	176	210
9	262	490	324	250	360	635	1,930	358	292	324	222	210
10	262	470	324	250	340	680	1,120	358	248	292	198	187
11	248	431	412	210	375	823	920	431	358	292	176	187
12	262	412	394	185	325	1,810	1,070	431	324	292	235	198
13	248	394	450	155	325	8,680	1,170	470	341	277	198	198
14	248	412	970	200	325	10,800	1,020	376	358	277	235	248
15	292	394	1,570	235	340	6,280	728	358	358	292	187	187
16	308	412	1,510	250	375	3,660	637	530	510	262	198	277
17	324	728	1,070	260	325	2,180	593	450	823	235	187	262
18	431	1,870	775	260	325	1,510	530	412	920	187	165	248
19	551	2,320	637	235	340	1,330	530	394	637	210	235	248
20	682	1,630	593	210	310	1,270	682	358	412	210	165	222
21	431	1,020	551	260	275	1,170	728	341	358	187	165	222
22	510	775	450	260	275	1,020	637	324	308	198	210	187
23	682	593	395	290	275	1,020	551	376	248	165	210	248
24	728	470	340	260	290	970	530	358	262	198	187	248
25	551	394	325	250	310	920	593	394	235	235	139	235
26	470	431	412	275	325	871	682	341	262	324	210	235
27	394	431	376	200	360	775	728	394	358	308	176	222
28	292	431	412	260	375	682	728	341	308	198	235	210
29	341	412	376	275	------	637	775	376	341	210	198	176
30	358	530	394	290	------	551	728	358	324	187	210	235
31	376	------	394	310	------	551	------	341	------	187	198	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	728	210	367	0.694	0.80
November	2,320	358	633	1.20	1.34
December	1,570	324	597	1.13	1.30
January	341	155	253	.478	.55
February	375	220	321	.607	.63
March	10,800	395	1,700	3.21	3.70
April	2,600	530	897	1.70	1.90
May	593	324	399	.754	.87
June	920	235	373	.705	.79
July	470	165	253	.478	.55
August	248	139	198	.374	.43
September	277	165	217	.410	.46
The year	10,800	139	519	.981	13.32

SOUTH BRANCH OF KISHWAUKEE RIVER AT DE KALB, ILL.

LOCATION.—Chain gage in NE. ¼ sec. 22, T. 40 N., R. 4 E., at Lincoln Highway Bridge in De Kalb.

DRAINAGE AREA.—70 square miles.

RECORDS AVAILABLE.—July, 1925, to September, 1929.

EXTREMES.—Maximum discharge during year, 960 second-feet June 12 (gage height, 8.84 feet); minimum, 0.1 second-foot Sept. 15 (gage height, 0.68 foot). 1925–1929: Maximum discharge occurred June 12, 1929; minimum, 0.1 second-foot Sept. 28, 29, Oct. 5, 1925 (gage height, 0.50 foot).

REMARKS.—Records good except those for period of ice effect Jan. 12 to Mar. 4, which are poor.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	0.5	6.6	96	37	32	268	582	136	32	106	5.1	1.0
2	e.4	6.9	e 91	75	32	200	385	113	31	78	12	1.0
3	.4	32	86	47	29	367	344	99	26	63	66	e.9
4	.4	37	161	41	26	534	244	88	23	51	33	.8
5	1.8	36	68	78	23	472	200	e 80	21	42	22	1.0
6	.9	26	62	118	20	427	152	72	19	39	17	e.8
7	.9	36	59	110	18	292	128	63	18	34	13	.7
8	.9	56	56	72	15	211	120	57	16	29	9.4	1.7
9	.9	53	47	62	11	170	106	54	14	26	5.1	2.1
10	e.7	44	44	53	11	128	92	51	14	25	6.3	e 1.5
11	.5	38	38	34	11	106	152	60	23	48	7.8	e.9
12	1.1	37	38	47	11	120	136	75	924	113	5.7	.3
13	1.4	28	72	42	11	331	120	66	765	72	5.4	e.2
14	1.8	28	292	38	11	371	e 104	69	518	57	4.0	.2
15	1.6	27	256	32	11	318	88	75	399	45	3.2	.1
16	2.2	26	211	20	11	487	78	106	e 310	36	3.0	1.0
17	4.2	518	292	26	11	442	78	82	222	31	3.0	.7
18	11	663	244	26	6.9	371	63	69	180	23	2.5	e 1.0
19	12	550	190	26	6.9	292	88	60	331	16	2.3	1.4
20	12	413	143	29	6.9	244	487	51	222	16	2.1	e 1.0
21	7.3	318	126	32	9.0	222	534	45	161	12	2.7	.7
22	12	268	126	44	11	280	534	41	120	11	2.7	e.7
23	26	222	118	75	15	280	268	72	99	9.4	1.7	.7
24	23	190	110	118	15	e 246	233	113	88	8.6	1.4	e 1.0
25	17	161	103	75	20	211	457	82	75	6.3	e 1.4	1.4
26	18	134	65	62	75	180	344	e 71	66	51	1.4	e 1.0
27	13	118	e 62	50	143	152	256	60	60	25	1.4	.7
28	e 11	103	e 60	44	222	128	222	54	69	19	1.4	.7
29	8.1	96	e 58	38	-------	113	170	48	57	11	e 1.4	e 2.4
30	7.3	103	e 55	32	-------	99	144	38	63	8.6	e 1.4	4.0
31	6.9	-------	53	32	-------	128	-------	36	-------	6.3	1.4	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	26	0.4	6.6	0.094	0.11
November	663	6.6	146	2.08	2.32
December	292	38	112	1.60	1.84
January	118	20	52.1	.744	.86
February	222	6.9	29.4	.420	.44
March	534	99	264	3.77	4.35
April	582	63	230	3.28	3.66
May	136	36	70.5	1.01	1.16
June	924	14	166	2.37	2.64
July	113	6.3	36.1	.516	.59
August	66	1.4	7.9	.113	.13
September	4.0	.1	1.1	.016	.02
The year	924	.1	93.6	1.34	18.12

e Interpolated.

IOWA RIVER AT IOWA CITY, IOWA

LOCATION.—Water-stage recorder in sec. 15, T. 79 N., R. 6 W., 200 feet below highway bridge in Iowa City and 100 feet below Iowa State University hydraulic laboratory.

DRAINAGE AREA.—3,140 square miles.

RECORDS AVAILABLE.—June, 1903, to July, 1906; October, 1913, to September, 1929.

EXTREMES.—Maximum discharge during year, 21,900 second-feet Mar. 16 (gage height, 16.53 feet); minimum, 294 second-feet Sept. 9 (gage height, 0.91 foot) due to regulation.

1903–1906, 1913–1929: Maximum discharge, 36,200 second-feet June 7, 1918 (gage height, 19.45 feet); practically no flow at 5 p. m. Sept. 3, 1925, caused by regulation.

REMARKS.—Records good except those for period of ice effect, Jan. 12 to Mar. 11, which are fair. Records of stage and three discharge measurements furnished by Prof. Floyd A. Nagler, of Iowa State University.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	795	1,220	2,800	2,220	845	1,200	5,270	5,600	2,060	2,290	795	625
2	795	1,310	2,710	1,760	805	1,180	4,610	5,600	2,140	1,340	7,720	602
3	745	1,760	2,800	1,420	805	1,710	4,400	5,600	2,220	1,280	8,070	580
4	772	2,540	2,890	1,130	840	2,420	4,100	5,600	2,300	1,480	5,820	602
5	758	3,250	2,620	1,070	815	3,090	3,900	5,600	2,140	1,520	5,600	531
6	795	3,340	2,300	1,040	815	3,800	3,800	5,600	1,980	1,310	6,930	553
7	770	3,070	2,300	930	795	5,240	3,700	5,270	1,900	1,250	8,310	576
8	795	2,800	1,550	902	795	4,610	3,700	4,000	1,760	1,190	8,310	540
9	745	2,620	1,660	958	769	4,510	3,800	3,250	1,660	1,130	7,410	530
10	648	2,540	1,660	1,070	791	4,340	4,000	2,890	1,550	1,190	6,700	540
11	670	2,540	1,760	1,250	860	3,960	4,400	2,620	1,520	1,160	3,880	517
12	675	2,540	1,980	1,300	925	4,830	4,720	2,620	2,060	985	2,710	512
13	985	2,460	2,380	1,300	905	7,540	4,940	2,710	2,300	902	2,220	870
14	848	2,460	3,890	1,280	855	10,300	4,720	3,070	1,900	930	1,830	1,040
15	848	2,540	3,700	1,230	805	18,400	4,400	3,520	1,830	1,230	1,720	958
16	770	2,540	4,100	1,190	769	21,900	4,400	3,800	1,690	2,470	1,520	902
17	1,360	4,500	4,200	1,160	710	20,700	4,400	3,900	1,480	2,980	1,340	848
18	1,990	5,600	4,300	1,150	701	17,800	4,300	3,900	1,310	2,890	1,220	720
19	1,410	5,050	4,300	1,130	714	15,800	4,100	3,900	1,340	2,800	1,130	720
20	1,620	4,830	3,800	1,120	870	14,000	4,610	3,800	1,160	2,380	1,040	695
21	1,580	4,830	3,010	1,110	830	12,300	4,300	3,430	1,070	1,980	958	695
22	1,830	4,500	1,830	1,100	835	11,900	3,900	2,890	1,010	1,760	930	670
23	1,900	4,000	1,760	1,090	860	12,600	3,520	2,620	985	1,550	902	602
24	1,900	3,520	1,720	1,080	835	11,900	3,580	2,620	902	1,410	848	648
25	1,830	3,250	1,760	1,050	755	10,800	5,380	2,380	875	1,340	795	602
26	1,720	2,980	1,900	1,000	865	9,980	4,720	2,220	848	1,340	770	602
27	1,660	2,800	2,220	965	945	8,840	4,720	2,140	795	1,160	745	580
28	1,520	2,620	2,460	930	1,100	7,790	5,050	1,980	820	1,070	745	576
29	1,410	2,540	2,540	920	-------	7,050	5,270	1,900	770	958	695	615
30	1,340	2,800	2,540	1,000	-------	6,370	5,490	1,980	770	902	720	580
31	1,280	-------	2,380	900	-------	5,930	-------	1,980	-------	848	670	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	1,990	648	1,190	0.379	0.44
November	5,600	1,220	3,110	.990	1.10
December	4,300	1,550	2,640	.841	.97
January	2,220	900	1,150	.366	.42
February	1,100	701	829	.264	.27
March	21,900	1,180	8,800	2.80	3.23
April	5,490	3,520	4,410	1.40	1.56
May	5,600	1,900	3,520	1.12	1.29
June	2,300	770	1,500	.477	.53
July	2,980	848	1,520	.484	.56
August	8,310	670	3,000	.955	1.10
September	1,040	512	654	.208	.23
The year	21,900	512	2,710	.863	11.70

DES MOINES RIVER AT OTTUMWA, IOWA

LOCATION.—Chain gage at Market Street Bridge in Ottumwa.
DRAINAGE AREA.—13,200 square miles.
RECORDS AVAILABLE.—March, 1917, to September, 1927, January to September, 1929.
EXTREMES.—Maximum discharge during period, 46,700 second-feet Mar. 17 (gage height, 14.5 feet); minimum, 510 second-feet Aug. 22 (gage height, 1.6 feet).

1917–1927, 1929: Maximum discharge, 58,700 second-feet June 11, 1927 (gage height, 16.5 feet); minimum (estimated), less than 350 second-feet several days during December, 1917.

Maximum discharge known (estimated), 100,000 second-feet May 31, 1903.
REMARKS.—Records good; power plant above gage causes some diurnal fluctuation at low stages. Gage not read during ice-affected period, Jan. 15 to Mar. 6. Gage-height record furnished by United States Weather Bureau.

Daily and monthly discharge, in second-feet, 1929

Day	Jan.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	4,240	-------	13,000	22,600	4,780	1,980	1,270	720
2	3,470	-------	12,600	21,400	6,450	1,790	1,120	610
3	2,370	-------	11,300	19,500	8,500	1,790	970	610
4	2,370	-------	10,000	16,900	10,700	1,610	1,270	610
5	2,170	-------	9,410	14,000	8,200	1,790	1,120	720
6	2,370	-------	9,410	12,600	6,450	2,170	1,610	610
7	1,980	16,900	9,720	11,300	5,890	2,570	1,980	610
8	2,570	14,700	10,700	10,000	5,330	2,170	1,790	610
9	1,790	15,400	15,100	8,800	5,050	2,170	1,610	1,270
10	1,440	16,900	13,300	8,200	5,890	1,980	1,610	970
11	2,370	15,400	12,000	7,610	6,450	1,790	1,790	840
12	3,230	15,400	12,000	7,900	5,890	1,610	1,610	840
13	3,230	24,200	15,400	10,300	5,330	1,610	1,120	970
14	3,470	34,900	15,400	11,600	4,780	1,610	970	840
15	-------	42,200	14,700	14,000	4,510	2,780	970	720
16	-------	45,500	14,000	13,300	3,980	5,330	840	720
17	-------	46,700	13,000	12,000	3,720	10,000	840	720
18	-------	44,900	11,600	10,700	3,470	8,200	840	610
19	-------	41,700	10,700	9,410	3,230	6,170	720	840
20	-------	42,700	16,100	8,200	3,000	5,050	720	970
21	-------	44,900	22,200	7,610	2,780	4,240	1,120	840
22	-------	43,300	23,800	7,030	2,370	3,470	510	610
23	-------	37,200	20,700	6,450	2,370	2,780	840	720
24	-------	27,700	15,400	6,170	2,170	2,370	970	720
25	-------	19,200	24,200	5,610	1,980	2,370	720	610
26	-------	14,700	26,100	5,610	1,790	2,170	610	610
27	-------	13,700	19,500	5,330	1,790	1,980	610	720
28	-------	12,300	22,200	5,050	1,790	1,980	970	610
29	-------	10,700	23,000	5,050	1,610	1,610	840	610
30	-------	9,720	23,400	5,050	1,270	1,610	840	610
31	-------	10,300	-------	4,510	-------	1,270	720	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in Inches
January 1–14	4,240	1,440	2,650	0.201	0.105
March 7–31	46,700	9,720	26,400	2.00	1.86
April	26,100	9,410	15,700	1.19	1.33
May	22,600	4,510	10,100	.765	.88
June	10,700	1,270	4,380	.332	.37
July	10,000	1,270	2,900	.220	.25
August	1,980	510	1,080	.082	.09
September	1,270	610	736	.056	.06

FOX RIVER NEAR WAYLAND, MO.

LOCATION.—Chain gage in NE. ¼ sec. 25, T. 65 N., R. 7 W., at highway bridge 1 mile above Chicago, Burlington & Quincy Railroad bridge 2½ miles northwest of Wayland.

DRAINAGE AREA.—392 square miles.

RECORDS AVAILABLE.—February, 1922, to September, 1929 (discontinued).

EXTREMES.—Maximum discharge during year, 16,100 second-feet Nov. 18 (gage height, 20.0 feet); minimum, 3 second-feet Aug. 5 and 6 (gage height, 2.06 feet).

1922–1929: Maximum discharge, that of Nov. 18, 1928; minimum, 0.6 second-foot Nov. 7, 1923.

REMARKS.—Records poor. Ice effect Dec. 9-12 and Jan. 1 to Mar. 4. Discharge estimated May 24–29, 31, June 11–18, 29, and July 21–30.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	19	248	189	49	115	2,400	2,240	340	710	13	6	4
2	18	950	180	41	115	1,820	1,340	246	5,030	8	6	4
3	18	2,640	145	34	89	1,680	684	162	3,410	8	5	4
4	18	1,870	137	28	77	1,540	198	145	1,580	7	4	4
5	1,560	2,560	115	23	67	1,370	96	129	502	16	3	5
6	1,070	590	72	28	57	1,070	77	83	384	53	3	6
7	87	248	56	28	49	930	77	54	216	96	580	9
8	2,080	221	53	28	41	874	154	54	77	83	502	7
9	2,080	186	57	28	34	790	129	53	67	67	216	180
10	212	186	57	28	28	790	115	49	62	65	162	162
11	138	195	57	28	23	818	89	47	56	2,320	145	129
12	130	186	57	28	23	1,720	77	1,160	50	846	137	154
13	58	178	502	28	23	3,530	77	406	44	129	66	41
14	44	204	1,310	28	23	4,670	62	318	38	77	18	24
15	36	221	2,400	28	23	4,070	58	236	32	2,280	8	18
16	1,560	1,250	2,690	23	18	3,190	49	162	27	1,750	8	13
17	515	3,720	1,580	23	18	1,540	44	51	23	246	7	9
18	1,560	15,200	606	23	18	1,370	44	41	20	198	7	7
19	815	8,010	554	23	18	902	1,040	34	77	180	9	18
20	465	902	318	23	18	340	6,020	28	72	145	8	44
21	380	554	236	23	18	115	11,200	26	58	120	4	41
22	2,880	340	171	102	18	49	2,880	23	41	100	4	25
23	2,600	67	129	362	18	49	606	22	38	75	4	20
24	1,560	55	72	1,160	18	48	2,480	21	30	55	5	16
25	1,340	55	49	606	1,160	129	6,650	20	24	40	6	14
26	1,280	54	35	554	1,820	115	7,090	19	20	28	6	10
27	2,640	54	34	362	2,000	86	1,190	19	14	20	6	9
28	1,700	53	35	256	2,200	57	874	18	15	15	6	7
29	715	52	64	145	-------	51	762	18	15	11	5	6
30	302	198	58	129	-------	49	1,440	502	15	8	5	6
31	178	-------	55	115	-------	874	-------	600	-------	6	5	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	2,880	18	905	2.31	2.66
November	15,200	52	1,370	3.49	3.89
December	2,690	34	389	.992	1.14
January	1,160	23	141	.360	.42
February	2,200	18	290	.740	.77
March	4,670	48	1,190	3.04	3.50
April	11,200	44	1,590	4.06	4.53
May	1,160	18	164	.418	.48
June	5,030	14	425	1.08	1.20
July	2,320	6	292	.745	.86
August	580	3	63.1	.161	.19
September	180	4	33.2	.085	.09
The year	15,200	3	572	1.46	19.73

WYACONDA RIVER NEAR CANTON, MO.

LOCATION.—Chain gage in SE. ¼ SW. ¼ sec. 33, T. 62 N., R. 6 W., at highway bridge three-fourths mile below Sugar Creek and 3 miles southwest of Canton.

DRAINAGE AREA.—447 square miles.

RECORDS AVAILABLE.—February, 1922, to September, 1929.

EXTREMES.—Maximum discharge during year, 16,000 second-feet Nov. 18 (gage height, 26.7 feet); minimum, 4 second-feet Aug. 19, 20. Minimum gage height, 0.89 foot Aug. 20.

1922–1929: Maximum discharge, that of Nov. 18, 1928; minimum, 0.5 second-foot Jan. 8, 9, and 19–23, 1924. Minimum gage height, 0.58 foot Sept. 10, 1928.

REMARKS.—Records fair except those above 10,000 second-feet and those for periods of ice effect, (Dec. 20–27, 31, and Jan. 1 to Feb. 27), which are poor. Discharge interpolated Nov. 19.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	19	502	146	24	69	3,160	5,340	302	188	14	10	6
2	12	1,800	188	18	48	2,720	4,060	210	3,160	18	8	6
3	8	2,520	137	18	39	2,520	880	156	5,400	13	7	6
4	7	2,080	119	24	31	2,000	326	128	4,430	10	6	6
5	474	700	74	24	24	1,800	210	98	1,240	10	5	36
6	199	232	76	24	24	2,120	137	91	286	3,360	34	23
7	60	146	79	31	24	1,480	110	87	208	1,200	1,240	31
8	232	119	53	31	18	1,100	188	81	243	254	374	19
9	558	104	60	31	18	558	374	69	558	128	107	13
10	350	81	62	31	18	278	188	60	188	62	58	398
11	84	76	56	24	18	221	177	52	98	41	46	188
12	41	74	58	24	18	2,760	199	790	95	2,800	33	64
13	28	62	88	24	18	4,100	146	398	232	1,590	21	48
14	23	76	2,760	24	18	4,530	254	1,030	95	1,380	14	34
15	18	104	3,000	24	18	3,400	166	730	62	4,980	9	25
16	502	1,100	1,100	18	18	3,650	119	326	46	6,490	6	20
17	730	7,300	2,920	18	18	2,400	92	177	37	4,780	5	17
18	1,480	12,500	2,200	12	18	614	76	446	29	910	5	12
19	502	8,390	670	12	12	374	69	1,240	1,310	221	4	13
20	146	4,280	232	12	12	278	3,160	221	502	107	4	39
21	101	670	95	18	12	278	7,380	119	137	71	8	146
22	1,920	350	58	422	12	166	6,850	81	62	52	7	74
23	2,480	243	48	940	12	146	3,830	65	42	42	10	46
24	730	188	48	1,170	12	128	2,440	53	75	34	12	33
25	221	137	48	850	2,280	119	5,700	56	110	31	16	23
26	128	128	48	700	3,200	302	6,850	50	50	43	14	19
27	1,590	110	58	502	3,280	146	4,430	54	31	26	12	16
28	2,040	107	84	326	3,830	98	642	50	23	20	10	15
29	502	104	95	210	-------	77	2,080	45	19	14	7	13
30	199	110	62	128	-------	69	760	88	13	12	6	56
31	128	-------	48	81	-------	2,680	-------	422	-------	10	6	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	2,480	7	500	1.12	1.29
November	12,500	62	1,480	3.31	3.69
December	3,000	48	476	1.06	1.22
January	1,170	12	187	.418	.48
February	3,830	12	469	1.05	1.09
March	4,530	69	1,430	3.20	3.69
April	7,380	69	1,910	4.27	4.76
May	1,240	45	251	.562	.65
June	5,400	13	634	1.42	1.58
July	6,490	10	927	2.07	2.39
August	1,240	4	67.9	.152	.18
September	398	6	48.2	.108	.12
The year	12,500	4	696	1.56	21.14

NORTH FABIUS RIVER AT MONTICELLO, MO.

LOCATION.—Chain gage in SE. ¼ sec. 6, T. 61 N., R. 7 W., at highway bridge 1 mile south of Monticello.

DRAINAGE AREA.—452 square miles.

RECORDS AVAILABLE.—February, 1922, to September, 1929.

EXTREMES.—Maximum discharge during year, 16,000 second-feet Nov. 18 (gage height, 30.0 feet); minimum discharge, 4 second-feet June 30 and July 4 and 5; minimum gage height, 1.08 feet July 5.

1922–1929: Maximum discharge, that of Nov. 18, 1928; minimum discharge, 1 second-foot July 9, 1922; minimum gage height, 0.50 foot Aug. 10, 1926.

REMARKS.—Records fair except those for periods of ice effect (Dec. 6–11, and Dec. 21 to Mar. 6), which are poor.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	37	288	163	21	93	2,350	6,700	370	320	7	29	7
2	27	1,850	186	15	80	2,160	924	256	6,000	5	28	7
3	20	3,450	170	15	58	1,980	428	163	6,860	5	28	6
4	17	972	106	15	50	1,820	240	134	1,160	4	24	6
5	492	514	50	15	42	1,640	208	106	320	4	21	21
6	163	256	42	21	35	1,480	141	85	256	924	24	45
7	73	224	42	21	28	1,510	134	78	320	646	27	22
8	52	178	50	21	28	924	224	73	1,070	256	38	13
9	428	148	58	28	28	428	193	55	408	240	47	780
10	178	163	58	28	21	320	163	42	134	134	39	320
11	45	148	58	28	21	256	240	38	100	156	34	148
12	27	141	83	28	21	1,980	208	80	76	1,590	29	45
13	23	134	208	28	21	6,000	178	288	53	288	19	31
14	20	120	4,920	21	15	2,220	304	320	44	1,720	16	24
15	16	224	1,160	21	15	1,190	148	646	35	5,400	15	21
16	900	428	1,210	21	15	1,930	141	288	32	10,500	13	21
17	408	6,210	2,480	21	15	690	127	134	28	5,280	15	17
18	1,360	13,600	996	21	15	408	120	470	48	428	16	13
19	536	8,220	536	28	15	256	558	208	224	256	15	10
20	163	1,160	352	35	15	208	6,420	120	75	178	13	106
21	120	448	272	50	15	178	7,340	69	45	141	10	170
22	2,100	320	208	69	21	156	6,140	47	25	106	9	100
23	1,820	240	178	1,020	35	134	1,610	38	28	100	10	45
24	690	208	134	1,140	193	93	4,800	34	113	73	50	28
25	288	148	93	558	1,020	240	8,760	38	42	65	78	24
26	272	106	80	492	1,510	193	4,470	39	15	52	19	15
27	3,530	106	69	352	2,040	106	1,430	38	10	45	14	13
28	1,260	127	50	272	2,670	65	2,160	36	8	39	10	11
29	558	141	42	208	-------	58	924	30	7	36	9	10
30	208	148	35	163	-------	52	624	35	4	32	9	12
31	178	-------	28	120	-------	580	-------	208	-------	31	8	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	3,530	16	516	1.14	1.31
November	13,600	106	1,350	2.99	3.34
December	4,920	28	455	1.01	1.16
January	1,140	15	158	.350	.40
February	2,670	15	291	.644	.67
March	6,000	52	1,020	2.26	2.61
April	8,760	120	1,870	4.14	4.62
May	646	30	147	.325	.37
June	6,860	4	595	1.32	1.47
July	10,500	4	927	2.05	2.36
August	78	8	23.1	.051	.06
September	780	6	69.7	.154	.17
The year	13,600	4	617	1.37	18.54

SALT RIVER NEAR NEW LONDON, MO.

LOCATION.—Chain gage in NE. ¼ NW. ¼ sec. 36, T. 56 N., R. 5 W., at bridge on State highway No. 61, 2 miles north of New London.

DRAINAGE AREA.—2,480 square miles.

RECORDS AVAILABLE.—February, 1922, to September, 1929.

EXTREMES.—Maximum discharge during year, 37,800 second-feet Nov. 19 and 20 (gage height, 24.0 feet); minimum, 37 second-feet Aug. 30 (gage height, 1.80 feet).

1922–1929: Maximum discharge, 58,700 second-feet June 21, 1928 (gage height, 28.8 feet); minimum (estimated), 12 second-feet Aug. 20, 1922.

REMARKS.—Records fair except those for period of ice effect, Jan. 1 to Mar. 8, which are poor. Discharge interpolated Oct. 17, 19, and 22.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	81	900	555	375	2,050	5,400	20,000	1,600	11,900	1,260	103	40
2	55	2,160	522	266	1,870	5,200	22,400	7,840	14,500	845	101	42
3	55	5,480	522	222	1,600	5,100	16,400	19,400	18,800	555	91	45
4	81	3,170	490	266	1,340	4,900	10,100	9,100	10,600	460	85	40
5	114	2,730	430	375	1,170	4,800	3,670	3,220	7,200	490	79	50
6	268	2,070	375	1,420	1,000	4,700	1,690	3,670	6,000	555	925	45
7	3,720	1,020	325	2,140	845	5,040	1,170	3,490	3,800	3,940	3,670	50
8	3,280	700	320	2,320	770	4,420	1,080	2,770	4,900	2,950	2,230	53
9	500	245	320	2,410	625	4,140	3,760	2,140	6,000	1,780	2,050	50
10	205	245	280	1,870	490	3,040	8,540	1,260	3,220	2,770	1,000	93
11	155	184	248	2,410	430	1,340	9,800	1,080	1,730	4,230	4,140	101
12	127	102	198	3,670	375	5,600	6,520	2,410	885	3,490	3,040	93
13	114	72	125	2,590	325	20,000	3,670	16,000	1,000	1,340	1,870	214
14	114	55	430	1,170	266	14,700	1,870	25,800	3,800	2,410	555	130
15	7,000	127	3,130	925	222	16,200	1,690	26,700	3,500	9,660	350	174
16	1,890	5,150	3,940	770	222	30,000	1,690	10,800	1,510	7,840	275	158
17	1,760	22,600	13,000	695	266	34,400	1,510	5,200	1,030	6,160	158	147
18	1,620	30,600	17,600	695	375	24,600	1,340	9,520	555	5,300	130	105
19	1,240	36,700	9,960	1,000	430	10,400	315	27,900	8,120	4,040	115	65
20	860	35,500	6,640	3,490	555	3,670	732	28,200	6,830	2,050	85	325
21	940	25,800	1,260	3,040	695	2,140	5,500	6,280	7,400	1,690	73	130
22	1,140	12,500	2,050	3,490	770	1,690	12,400	2,590	5,000	1,080	65	115
23	1,350	3,670	2,050	6,760	925	1,420	15,100	1,870	2,570	460	62	1,170
24	2,070	1,600	1,600	8,120	1,170	1,170	16,000	1,340	1,690	460	53	490
25	1,350	1,080	490	6,760	1,340	1,080	23,900	1,000	4,770	660	47	222
26	595	732	555	6,160	3,670	965	29,100	885	2,670	1,340	85	158
27	390	625	460	5,600	6,760	885	19,600	845	1,170	1,000	95	144
28	290	625	460	5,100	5,600	845	11,400	625	815	375	53	130
29	245	625	460	4,610	-------	660	7,420	770	1,080	198	45	120
30	245	590	490	3,220	-------	660	3,490	1,510	1,670	161	37	130
31	290	-------	460	2,770	-------	1,870	-------	5,000	-------	130	45	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	7,000	55	1,040	0.419	0.48
November	36,700	55	6,590	2.66	2.97
December	17,600	125	2,250	.907	1.05
January	8,120	222	2,730	1.10	1.27
February	6,760	222	1,290	.520	.54
March	34,400	660	7,130	2.88	3.32
April	29,100	315	8,730	3.52	3.93
May	28,200	625	7,450	3.00	3.46
June	18,800	555	4,840	1.95	2.18
July	9,660	130	2,250	.907	1.05
August	4,140	37	700	.282	.33
September	1,170	40	161	.065	.07
The year	36,700	37	3,770	1.52	20.65

CUIVRE RIVER NEAR TROY, MO.

LOCATION.—Chain gage in SW. ¼ sec. 18, T. 49 N., R. 1 E., at Frenchman Bluff highway bridge 3 miles northeast of Troy. Zero of gage is 446.78 feet above mean sea level.

DRAINAGE AREA.—908 square miles.

RECORDS AVAILABLE.—February, 1922, to September, 1929.

EXTREMES.—Maximum discharge during year, about 52,600 second-feet May 18 (gage height, 25.75 feet); minimum, 8 second-feet Oct. 3 (gage height, 1.50 feet).

1922–1929: Maximum discharge, that of May 18, 1929; minimum, 4 second-feet Sept. 9–25, 1925.

REMARKS.—Records fair except those for periods of ice effect (Jan. 1–5, 13–31, and Feb. 1–25), which are poor. Discharge estimated Mar. 7, June 10, Aug. 26–30, and Sept. 15, 17, and 24.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	9	48	68	82	310	655	3,310	760	5,700	123	53	24
2	9	45	65	68	208	524	1,720	14,200	3,590	114	48	19
3	8	43	63	68	188	370	480	12,600	2,010	92	45	20
4	6,300	41	60	188	168	370	290	6,520	1,200	79	43	20
5	730	37	55	340	150	460	243	2,190	588	71	43	30
6	460	33	53	5,800	132	524	210	3,230	460	71	2,270	41
7	430	31	48	2,270	114	492	243	2,010	1,410	71	1,100	45
8	10,100	43	48	810	98	460	3,820	980	3,670	325	355	33
9	10,200	41	45	1,410	82	254	1,370	725	1,410	9,510	690	31
10	2,970	39	45	2,130	82	198	2,590	510	810	4,370	810	39
11	1,150	39	41	1,410	82	141	2,190	450	370	3,590	655	25
12	492	35	43	1,150	82	524	1,100	14,400	5,800	2,970	492	24
13	267	31	50	730	68	11,900	630	20,800	15,000	690	325	23
14	92	30	198	310	55	3,110	570	15,200	2,830	228	150	23
15	82	41	492	208	55	11,000	510	4,000	1,770	6,400	55	22
16	5,200	13,800	2,070	188	55	38,500	450	1,890	1,410	11,100	45	20
17	588	3,590	6,610	188	98	8,140	420	16,000	1,150	3,830	39	20
18	556	2,550	2,270	1,890	82	1,420	365	34,900	850	2,550	39	19
19	340	1,100	460	5,000	55	900	290	32,700	2,480	1,350	35	19
20	267	655	280	3,270	33	690	243	3,920	2,200	524	33	23
21	132	400	198	1,890	19	600	2,380	1,300	1,100	168	33	21
22	108	188	178	2,550	19	480	2,660	1,100	295	150	31	21
23	104	159	150	6,000	15	450	865	900	241	114	28	20
24	95	132	141	4,100	15	450	540	620	2,130	108	27	20
25	85	101	132	3,270	168	450	4,540	460	1,890	108	25	20
26	68	76	132	2,550	6,000	6,300	1,620	370	620	82	25	18
27	63	76	132	1,300	2,270	900	630	295	280	108	25	17
28	60	74	132	810	1,300	510	510	241	228	79	25	17
29	55	74	114	690	------	450	450	198	178	71	25	17
30	53	76	114	588	------	420	570	159	150	63	25	178
31	50	------	108	460	------	315	------	2,010	------	53	25	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	10,200	8	1,330	1.46	1.68
November	13,800	30	788	.868	.97
December	6,610	41	471	.519	.60
January	6,000	68	1,670	1.84	2.12
February	6,000	15	429	.472	.49
March	38,500	141	2,970	3.27	3.77
April	4,540	210	1,190	1.31	1.46
May	34,900	159	6,310	6.95	8.01
June	15,000	150	2,060	2.27	2.53
July	11,100	53	1,590	1.75	2.02
August	2,270	25	246	.271	.31
September	178	17	29.0	.032	.04
The year	38,500	8	1,610	1.77	24.00

DES PLAINES RIVER AT LEMONT, ILL.

LOCATION.—Staff gage in NW. ¼ sec. 20, T. 37 N., R. 11 E., at highway bridge on Stephens Street, a quarter of a mile north of Lemont and 8 miles above confluence with Chicago Sanitary Canal. Zero of gage is 574.10 feet above mean sea level.

DRAINAGE AREA.—705 square miles.

RECORDS AVAILABLE.—November, 1914, to September, 1929.

EXTREMES.—Maximum discharge during year, about 3,750 second-feet Mar. 5; minimum, 5.3 second-feet Sept. 13–16 (gage height, 2.50 feet).

1915–1929: Maximum discharge, 5,520 second-feet Mar. 18, 1919; no flow various dates 1919 and 1925.

REMARKS.—Records fair. Discharge interpolated every other day from Jan. 2 to Feb. 28 and estimated Mar. 2–17. During high water part of flow spills into Chicago Sanitary Canal 7 miles above gage. (For amount of overflow see next page.)

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	65	190	835	835	398	2,680	2,680	1,300	408	620	106	21
2	65	280	790	858	350	2,870	3,510	1,150	371	500	196	21
3	65	315	745	880	335	3,070	3,750	1,060	336	445	266	21
4	90	385	745	925	315	3,510	3,280	880	301	408	231	36
5	106	445	700	970	310	3,750	2,870	835	301	336	196	27
6	118	460	660	970	306	3,510	2,500	790	408	371	166	21
7	178	445	620	970	301	3,510	2,030	660	371	371	166	21
8	118	460	580	925	273	3,070	1,780	540	301	357	136	21
9	90	422	540	880	245	2,500	1,670	500	371	301	106	36
10	65	422	540	812	245	2,170	1,450	500	500	231	136	14
11	65	445	460	745	245	2,030	1,200	540	540	266	106	14
12	56	460	460	722	228	1,900	1,450	620	925	287	95	8.0
13	65	460	620	700	210	2,030	1,670	660	1,450	196	80	5.3
14	65	422	970	620	194	2,500	1,350	700	880	136	106	5.3
15	75	385	1,900	540	178	2,870	1,200	790	745	136	106	5.3
16	90	422	2,200	462	163	3,280	1,020	835	620	136	95	5.3
17	118	540	2,500	385	148	3,510	790	880	500	118	80	27
18	166	1,560	2,680	378	148	3,280	700	925	540	106	80	118
19	385	2,680	2,870	371	148	3,070	540	790	580	95	56	90
20	315	3,070	2,780	360	154	2,680	970	700	660	80	36	65
21	245	3,070	2,680	350	160	2,330	2,870	660	540	80	36	56
22	280	2,680	2,680	445	169	2,030	3,280	620	500	65	27	44
23	301	2,500	2,170	540	178	2,030	3,280	700	445	56	21	27
24	315	2,030	1,780	620	1,170	1,900	2,870	660	408	56	21	27
25	315	1,780	1,450	700	2,170	1,900	2,680	660	371	80	36	27
26	315	1,560	1,060	620	2,250	1,670	2,500	620	357	231	36	21
27	301	1,300	970	540	2,330	1,560	2,330	620	336	266	56	21
28	280	970	790	520	2,500	1,450	2,030	540	430	266	48	14
29	245	925	620	500	-------	1,150	1,900	500	500	166	36	65
30	231	880	620	472	-------	1,020	1,560	500	540	154	27	118
31	210	-------	620	445	-------	880	-------	445	-------	136	21	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	385	56	174	0.247	0.28
November	3,070	190	1,070	1.52	1.70
December	2,870	460	1,280	1.82	2.10
January	970	350	647	.918	1.06
February	2,500	148	565	.801	.83
March	3,750	880	2,440	3.46	3.99
April	3,750	540	2,060	2.92	3.26
May	1,300	445	715	1.01	1.16
June	1,450	301	518	.735	.82
July	620	56	227	.322	.37
August	266	21.0	93.9	.133	.15
September	118	5.3	33.4	.047	.05
The year	3,750	5.3	819	1.16	15.77

Daily overflow, in second-feet, of Des Plaines River into Chicago Sanitary Canal, 1928–29

Day	Nov.	Dec.	Feb.	Mar.	Apr.	Day	Nov.	Dec.	Feb.	Mar.	Apr.
1				490	600	16		300		1,100	
2				710	1,600	17		460		1,460	
3				965	1,450	18		640		1,280	
4				1,460	895	19	410	650		750	
5				1,560	465	20	895	465		335	
6				1,480	215	21	850	290		35	850
7				1,380	20	22	370	210			1,460
8				870		23	150	35			1,020
9				370		24					555
10				95		25					410
11				20		26					370
12						27					105
13				20		28			90		5
14				210		29					
15		65		595		30					
						31					

DES PLAINES RIVER AT JOLIET, ILL.

LOCATION.—Water-stage recorder in NE. ¼ sec. 9, T. 35 N., R. 10 E. at Jackson Street Bridge, Joliet. Zero of gage is 524.31 feet above mean sea level.

RECORDS AVAILABLE.—December, 1914, to September, 1929.

EXTREMES.—Maximum mean daily discharge during year, 15,700 second-feet Dec. 17; minimum mean daily discharge, 4,750 second-feet Aug. 20.

1914–1929: Maximum mean daily discharge, 18,400 second-feet Mar. 18, 1919; minimum, that of Aug. 20, 1929.

REMARKS.—Records good except those for days when recorder was not operating, which are fair. Discharge includes flow of Chicago Sanitary Canal; diversion averaging about 400 second-feet made to Illinois & Michigan Canal just above gage.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	10,200	10,200	a11,000	10,900	b10,600	b13,800	b13,200	8,000	a 7,850	12,200	a10,600	a 5,750
2	10,300	11,300	11,100	b11,200	b10,600	a14,400	b12,100	7,680	7,700	11,300	a10,700	b 6,100
3	10,500	10,900	11,400	b11,300	b10,600	14,800	b13,100	6,910	7,610	11,300	10,600	b 7,250
4	10,600	10,600	11,200	b11,300	b10,600	15,100	b12,600	6,720	8,340	a13,900	10,700	a10,300
5	11,900	10,800	11,100	a12,600	b10,600	14,600	b11,200	6,530	a 8,700	b11,100	10,700	10,300
6	10,700	10,800	11,000	a11,300	a10,500	14,800	a 9,900	6,470	10,200	a12,200	10,900	10,200
7	10,900	11,600	11,000	b11,300	10,700	13,900	11,200	6,350	a10,600	14,000	10,600	10,200
8	11,200	10,900	a10,800	b11,300	10,500	14,500	10,500	6,310	a10,600	10,900	10,400	10,500
9	10,600	11,200	10,600	b11,300	a10,400	13,300	8,770	6,550	b10,600	10,400	9,640	12,100
10	10,600	11,200	b10,800	11,100	b10,500	13,100	9,450	6,620	b10,900	10,700	a 9,900	12,200
11	10,700	10,700	b10,600	a11,100	b10,600	a12,800	8,720	8,040	b11,200	11,000	b 9,600	12,200
12	11,300	10,900	b10,700	b11,100	a10,600	b12,500	a 8,050	6,680	b13,400	9,590	b 9,100	12,300
13	11,100	10,800	b11,900	b11,100	11,100	b12,900	a 8,050	6,550	b12,500	8,370	b 8,350	12,200
14	10,500	10,700	b13,300	b10,900	11,100	b13,100	8,010	7,720	b12,400	8,340	b 8,350	11,900
15	10,500	10,900	a13,800	b10,800	11,100	b12,900	8,200	9,330	a11,000	7,200	b 7,700	11,700
16	10,900	11,700	13,000	b10,700	11,000	a12,200	7,490	8,170	12,200	5,840	b 7,000	a11,500
17	11,200	14,200	15,700	b10,600	11,200	12,400	6,700	8,000	11,400	5,690	b 5,700	b11,700
18	10,600	14,300	15,100	b11,500	11,200	11,400	6,530	8,680	11,800	5,880	c 6,750	b12,200
19	10,400	14,200	14,000	a11,200	11,100	9,750	7,680	7,380	a11,600	6,150	b 6,300	a12,200
20	a10,400	14,100	13,200	a10,200	11,000	9,040	a11,700	7,630	b11,000	5,730	b 4,750	12,200
21	10,500	13,600	a13,000	a10,500	11,000	8,300	11,200	5,920	a11,200	5,580	b 8,600	12,300
22	11,000	13,400	a13,000	12,300	10,900	a 8,250	10,100	5,830	11,200	5,530	b13,900	12,400
23	10,500	12,500	11,900	11,300	a10,700	a 7,800	9,850	7,500	11,400	7,050	b13,600	12,400
24	10,600	12,300	11,600	11,300	b12,200	7,960	10,200	7,510	11,100	9,170	b13,700	12,100
25	10,500	11,900	11,200	a11,000	b12,900	8,160	10,800	6,740	10,500	a11,100	b13,200	11,900
26	10,500	11,800	11,400	b11,000	b13,600	7,490	a 8,600	6,760	10,900	b11,200	b12,500	12,200
27	10,400	11,700	11,400	b10,500	b13,000	7,220	8,520	6,830	a11,000	a10,500	b12,300	12,200
28	10,500	a11,500	a11,100	b10,500	b13,200	7,200	8,440	6,550	b11,800	a10,500	a11,700	12,500
29	10,400	a11,400	a11,000	b10,400	-------	7,040	7,720	a 6,700	a11,200	a10,500	11,100	13,500
30	10,500	a11,200	11,300	b10,600	-------	a 6,700	7,440	b 6,700	11,900	a10,600	10,500	13,400
31	10,400	-------	11,500	b10,700	-------	a10,000	-------	b 6,650	-------	a10,600	a 5,600	-------

Month	Maximum	Minimum	Mean	Month	Maximum	Minimum	Mean
October	11,900	10,200	10,700	May	9,330	5,830	7,100
November	14,300	10,200	11,800	June	13,400	7,610	10,800
December	15,700	10,600	11,900	July	14,000	5,530	9,490
January	12,600	10,200	11,100	August	13,900	4,750	9,840
February	13,600	10,400	11,200	September	13,500	5,750	11,300
March	15,100	6,700	11,200				
April	13,200	6,530	9,530	The year	15,700	4,750	10,500

a Partly estimated. b Estimated. c Interpolated.

NOTE.—The above table does not include discharge into Illinois & Michigan Canal.

ILLINOIS RIVER AT MORRIS, ILL.

LOCATION.—Chain gage in NE. ¼ sec. 9, T. 33 N., R. 7 E., at highway bridge in Morris and 10 miles below mouth of Kankakee River. Zero of gage is 478.97 feet above mean sea level.

RECORDS AVAILABLE.—October, 1919, to September, 1929.

EXTREMES.—Maximum discharge during year, 46,500 second-feet Mar. 17 (gage height, 17.5 feet); minimum, 5,120 second-feet Aug. 21 (gage height, 3.9 feet).

1919–1929: Maximum discharge, 60,600 second-feet Apr. 12, 1922; maximum gage height, 24.4 feet, Jan. 21, 1916; minimum occurred Aug. 21, 1929. Maximum stage known, 26.2 feet in 1831.

REMARKS.—Records good. Discharge includes flow of Chicago Sanitary Canal. Gage-height record furnished by United States Weather Bureau.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	11,000	11,400	13,800	14,800	15,400	25,800	30,000	18,500	12,200	15,400	11,400	8,600
2	11,000	11,900	13,800	13,100	14,600	25,800	35,100	17,400	11,900	13,800	11,400	6,800
3	11,000	12,600	13,800	12,900	14,400	24,400	29,000	18,700	11,900	13,800	12,600	6,400
4	11,000	12,400	13,800	12,900	13,600	27,500	27,200	21,400	11,700	13,800	11,900	9,860
5	11,900	12,400	13,800	13,400	13,100	26,300	25,200	22,500	11,200	16,400	11,700	11,000
6	12,200	12,400	13,100	15,600	13,100	24,700	26,300	22,500	11,700	14,400	12,200	11,000
7	11,900	12,200	13,100	16,100	13,100	23,100	23,100	21,200	13,400	16,100	12,200	10,800
8	11,900	13,400	12,200	16,700	13,100	21,200	22,500	19,500	12,900	19,000	11,900	11,200
9	11,900	12,400	12,400	16,700	12,900	20,600	24,700	18,000	12,900	17,400	11,900	11,900
10	11,900	12,900	12,600	16,700	12,900	19,300	24,700	17,200	12,900	16,900	11,900	12,900
11	11,700	12,400	12,600	15,800	12,900	17,700	26,900	19,500	12,400	16,100	11,400	12,400
12	11,700	12,200	12,600	15,100	12,900	17,200	32,200	16,400	20,400	15,800	11,200	12,600
13	12,900	12,200	12,600	14,400	12,900	17,200	29,000	15,400	36,000	13,100	10,100	12,600
14	11,700	12,200	17,200	14,400	12,400	19,300	26,600	14,800	36,500	11,900	9,420	12,600
15	11,700	12,200	20,600	13,800	12,400	20,900	24,700	16,400	34,200	11,000	8,000	12,400
16	11,400	12,200	20,400	13,800	12,600	37,500	22,000	19,300	29,300	9,000	8,600	12,400
17	11,400	14,800	21,400	13,800	12,600	46,500	19,800	18,000	26,300	8,200	8,400	12,400
18	12,400	20,900	26,600	13,800	13,100	39,000	17,400	17,400	23,600	8,000	7,800	12,400
19	11,900	22,500	26,000	16,900	13,100	33,400	16,100	17,400	21,200	8,400	7,400	12,400
20	11,900	21,400	23,600	19,500	13,400	28,700	18,500	17,200	19,000	7,800	6,800	12,900
21	11,700	20,400	20,400	19,800	14,100	25,800	26,000	17,700	18,000	7,600	5,120	12,600
22	11,700	19,500	18,700	20,400	14,100	25,800	24,900	17,400	16,400	7,200	12,900	12,600
23	11,700	18,000	17,200	29,000	13,400	27,800	22,200	16,700	15,400	7,200	14,400	12,600
24	11,700	17,400	16,400	28,700	14,400	24,900	20,400	17,700	14,600	9,000	14,400	12,600
25	11,700	16,100	16,100	26,600	14,400	22,800	20,900	14,400	13,800	11,200	14,100	12,600
26	11,700	15,400	15,600	26,600	21,700	20,900	24,400	13,800	13,400	12,400	13,800	12,600
27	11,400	15,100	15,600	23,900	29,300	19,300	24,700	13,100	13,800	11,400	13,600	12,900
28	11,400	14,800	15,400	19,300	25,800	17,400	23,300	12,600	14,400	11,400	13,100	12,900
29	11,400	14,400	15,100	17,200	-------	16,700	21,700	11,900	13,100	11,400	12,200	13,400
30	11,400	13,800	15,100	17,200	-------	15,800	19,500	11,900	13,100	11,400	11,400	13,400
31	11,400	-------	14,800	16,300	-------	15,800	-------	12,200	-------	11,400	9,640	-------

Month	Maximum	Minimum	Mean	Month	Maximum	Minimum	Mean
October	12,900	11,000	11,700	May	22,500	11,900	17,000
November	22,500	11,400	14,700	June	36,500	11,200	17,600
December	26,600	12,200	16,300	July	19,000	7,200	12,200
January	29,000	12,900	17,600	August	14,400	5,120	11,100
February	29,300	12,400	14,700	September	13,400	6,400	11,800
March	46,500	15,800	24,200				
April	35,100	16,100	24,300	The year	46,500	5,120	16,100

ILLINOIS RIVER AT PEORIA, ILL.

LOCATION.—Staff gage in NW. ¼ sec. 2, T. 8 N., R. 8 E., at foot of Grant Street, Peoria, 4½ miles above mouth of Kickapoo Creek. Zero of gage is 428.92 feet above mean sea level.

RECORDS AVAILABLE.—March, 1910, to September, 1929; March, 1903, to July, 1906, for station 3½ miles downstream.

EXTREMES.—Maximum discharge, 46,900 second-feet Mar. 22 (gage height, 22.75 feet); minimum, 11,600 second-feet Sept. 9 and 10 (gage height, 11.15 feet).

1910–1929: Maximum discharge, 58,300 second-feet Oct. 9, 1926 (gage height, 25.05 feet); minimum, somewhat less than 7,250 second-feet during period Dec. 11, 1916, to Jan. 10, 1917.

Maximum stage known, 26.6 feet in 1844.

REMARKS.—Records fair. Discharge includes flow from Chicago Sanitary Canal. Gage-height record furnished by United States Engineer Corps.

Daily and monthly discharge, in second-feet, 1928–29

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

Month	Maximum	Minimum	Mean	Month	Maximum	Minimum	Mean
October	13,800	11,800	13,100	May	37,800	22,100	28,500
November	23,000	13,800	17,200	June	28,800	17,900	22,800
December	26,300	18,600	22,200	July	24,800	16,200	20,900
January	33,400	21,300	24,900	August	16,200	11,600	14,200
February	31,600	21,300	25,000	September	13,800	11,600	12,500
March	46,900	29,900	38,100				
April	43,300	35,400	39,100	The year	46,900	11,600	23,200

ILLINOIS RIVER AT BEARDSTOWN, ILL.

LOCATION.—Staff gage in NE. ¼ sec. 15, T. 18 N., R. 12 W., at highway bridge on State Street, Beardstown, 9½ miles below mouth of Sangamon River. Zero of gage is 420.33 feet above mean sea level.

RECORDS AVAILABLE.—October, 1920, to September, 1929.

EXTREMES.—Maximum discharge during year, 63,300 second-feet Apr. 16 and 17; maximum gage height, 21.2 feet Apr. 6; minimum discharge, 12,200 second-feet Sept. 10–14 (gage height, 8.7 feet).

1920–1929: Maximum discharge, 105,000 second-feet Oct. 9, 1926; maximum gage height, 26.25 feet Oct. 12, 1926; minimum discharge, 9,620 second-feet Dec. 19–22, 1922, Sept. 10–12, 1925 (gage height, 7.7 feet).

REMARKS.—Records fair. Discharge determined from stage and slope. Gage-height record furnished by United States Weather Bureau.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	13,900	16,200	28,000	33,300	48,100	39,000	53,600	57,800	42,500	33,900	30,400	14,100
2	13,900	16,200	28,000	31,500	46,400	42,400	55,700	56,700	43,600	32,800	28,400	14,100
3	13,400	17,000	27,400	30,200	44,200	47,900	58,400	52,300	43,400	33,300	27,200	14,400
4	13,400	17,000	27,400	29,300	42,600	49,400	60,200	54,000	42,500	33,300	26,000	13,900
5	13,900	17,400	27,100	29,800	40,700	49,700	62,400	53,200	42,200	33,300	25,400	13,900
6	13,600	16,500	26,400	29,000	37,900	48,700	62,100	55,000	42,400	35,200	26,400	13,400
7	13,600	16,000	26,200	27,600	36,600	50,100	60,400	54,300	40,600	35,400	25,700	13,300
8	12,300	16,400	26,200	24,500	35,300	50,100	60,600	55,300	40,500	38,400	25,800	12,400
9	13,700	16,400	26,000	26,100	35,700	48,700	62,000	56,200	36,600	43,900	25,500	13,100
10	14,800	16,400	25,400	26,400	35,200	47,600	59,900	56,100	36,100	49,200	24,600	12,200
11	14,200	16,400	25,000	28,200	33,300	47,400	59,500	56,000	34,400	53,000	24,300	12,200
12	14,600	16,700	24,800	28,000	31,200	46,500	59,800	54,800	35,000	55,000	24,000	12,200
13	13,800	16,700	23,700	28,300	30,000	46,900	60,900	53,500	37,100	54,700	22,800	12,200
14	14,100	16,700	24,100	27,300	29,100	45,800	61,800	50,200	38,200	55,100	23,000	12,200
15	14,100	17,000	24,100	26,000	29,300	48,300	62,200	48,600	38,600	54,700	22,100	12,600
16	14,100	16,700	24,100	26,100	27,600	46,700	63,300	48,500	39,900	55,100	21,800	12,600
17	14,100	17,000	25,000	27,600	24,700	46,200	63,300	47,900	41,200	55,200	20,700	12,200
18	14,100	19,400	25,300	26,200	26,900	53,200	62,200	47,600	41,200	58,400	19,800	12,200
19	14,900	21,200	27,900	27,900	25,400	56,000	62,500	46,000	42,100	57,800	19,400	12,800
20	14,900	22,000	29,100	27,300	26,400	59,800	61,100	45,900	41,900	56,500	18,400	13,300
21	14,900	23,800	29,700	27,900	27,700	58,900	60,800	48,400	39,800	52,400	18,600	13,300
22	15,400	24,800	31,500	28,400	27,400	61,600	58,800	50,600	40,800	50,500	16,800	13,000
23	15,100	25,800	33,600	34,200	26,100	60,900	58,400	52,500	40,200	46,300	16,700	13,700
24	16,000	25,400	33,800	34,700	25,500	60,200	57,400	53,700	39,900	43,000	16,500	13,700
25	16,000	26,600	34,400	39,400	26,200	60,900	58,400	53,900	39,500	41,300	15,400	13,700
26	15,600	26,600	34,600	41,500	28,200	60,600	57,500	52,600	38,900	39,200	14,900	13,400
27	16,200	27,500	35,400	43,400	31,400	60,200	56,400	51,400	38,200	36,600	14,900	13,400
28	16,400	27,900	35,400	44,300	34,400	58,800	56,400	49,800	35,000	35,000	14,900	13,400
29	16,400	28,300	34,100	47,600	-------	56,700	57,800	47,800	35,400	34,400	14,900	13,900
30	16,400	28,000	33,900	47,600	-------	56,000	56,300	45,800	34,500	32,400	14,900	14,100
31	16,200	-------	33,600	47,600	-------	55,200	-------	45,400	-------	33,300	14,900	-------

Month	Maximum	Minimum	Mean	Month	Maximum	Minimum	Mean
October	16,400	12,300	14,600	May	57,800	45,400	51,700
November	28,300	16,000	20,300	June	43,600	34,400	39,400
December	35,400	23,700	28,700	July	58,400	32,400	44,100
January	47,600	24,500	32,200	August	30,400	14,900	21,100
February	48,100	24,700	32,600	September	14,400	12,200	13,200
March	61,600	39,000	52,300				
April	63,300	53,600	59,700	The year	63,300	12,200	34,200

SPRING CREEK AT JOLIET, ILL.

LOCATION.—Staff gage in SE. ¼ sec. 10, T. 35 N., R. 10 E., at Benton Street Bridge in Joliet, half a mile above mouth.

DRAINAGE AREA.—19.7 square miles.

RECORDS AVAILABLE.—July, 1925, to September, 1929.

EXTREMES.—Maximum discharge during year, 425 second-feet Mar. 15 (gage height, 3.2 feet); minimum, 3.0 second-feet Aug. 20 (gage height, 0.23 foot).
1925–1929: Maximum discharge, 1,070 second-feet June 11, 1926 (gage height, 6.5 feet); minimum, 2.0 second-feet Aug. 5 and Aug 10 to Sept. 3, 1926.

REMARKS.—Records fair except those for period of ice effect Jan. 10–17, which are poor.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	5.8	3.8	12	12	9.0	165	255	30	6.1	12	5.6	5.6
2	4.4	9.2	13	12	10	84	150	27	5.9	11	7.8	4.3
3	4.2	10	12	12	10	90	136	20	5.6	10	6.8	3.6
4	4.2	8.0	12	11	7.8	78	62	16	5.9	9.5	6.1	4.3
5	4.6	6.7	12	15	6.1	73	43	15	5.4	13	5.9	5.6
6	3.6	5.8	11	30	6.1	68	35	14	5.2	14	5.4	3.8
7	3.8	7.4	10	29	5.9	48	30	12	5.0	13	5.2	3.6
8	3.8	8.0	10	22	6.4	32	29	11	4.5	12	5.0	3.3
9	4.0	7.4	8.8	12	5.9	35	35	10	4.0	10	5.2	3.4
10	4.4	6.7	8.0	12	5.9	16	34	9.5	3.8	9.5	4.7	3.6
11	4.4	7.4	6.7	10	6.1	14	78	9.2	9.5	14	4.3	3.3
12	6.1	6.4	9.6	6.4	6.4	16	62	8.8	20	18	3.8	3.8
13	6.1	6.1	136	6.4	6.8	73	43	9.2	19	15	5.0	3.7
14	4.8	5.4	91	8.0	5.9	54	33	13	122	14	4.7	3.4
15	4.4	4.8	76	10	5.6	425	27	12	52	12	3.8	3.3
16	5.8	11	124	6.4	6.4	216	20	13	27	11	3.6	7.1
17	8.0	124	168	6.4	5.9	165	19	13	20	10	3.4	3.7
18	10	86	96	26	14	78	17	12	19	8.8	3.3	4.3
19	6.4	76	37	23	7.1	60	19	9.5	16	8.1	3.2	3.7
20	5.4	62	23	8.0	6.1	47	235	8.8	15	7.1	3.0	3.8
21	4.6	44	15	7.4	6.4	40	181	8.5	9.2	6.4	3.2	3.6
22	8.0	30	12	380	5.2	41	84	7.8	8.8	6.1	3.1	3.3
23	6.4	18	13	33	5.2	43	52	8.1	8.5	5.9	5.0	3.1
24	5.4	8.0	16	52	181	40	40	8.5	7.8	5.4	4.7	6.1
25	4.6	17	15	27	41	41	62	8.8	6.8	6.1	4.3	5.2
26	4.8	12	12	20	158	35	52	8.1	5.8	5.6	3.8	4.7
27	5.1	11	16	14	235	25	48	12	5.2	5.4	3.7	4.3
28	4.4	9.6	14	12	198	24	43	8.5	5.0	5.6	3.4	6.1
29	4.0	12	14	12	-------	20	33	7.8	5.2	5.2	3.3	6.1
30	3.8	13	13	9.5	-------	19	32	7.1	20	5.9	3.6	4.7
31	4.0	-------	12	8.8	-------	109	-------	5.9	-------	6.1	3.8	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	10	3.6	5.14	0.261	0.30
November	124	3.8	21.2	1.08	1.20
December	168	6.7	33.2	1.68	1.94
January	380	6.4	27.5	1.40	1.61
February	235	5.2	34.8	1.77	1.84
March	425	14	73.3	3.72	4.29
April	255	17	66.3	3.36	3.75
May	30	5.9	11.7	.594	.68
June	122	3.8	15.1	.766	.85
July	18	5.2	9.54	.484	.56
August	7.8	3.0	4.44	.225	.46
September	7.1	3.1	4.28	.217	.22
The year	425	3.0	25.5	1.29	17.52

KANKAKEE RIVER AT MOMENCE, ILL.

LOCATION.—Chain gage in NE. ¼ sec. 24, T. 31 N., R. 13 E., at highway bridge in Momence, 1½ miles above Tower Creek. Zero of gage is 610.32 feet above mean sea level.

DRAINAGE AREA.—2,340 square miles.

RECORDS AVAILABLE.—February, 1905, to July, 1906, December, 1914, to September, 1929.

EXTREMES.—Maximum discharge during year, 9,650 second-feet Jan. 24 and 25 (backwater from ice, gage height, 7.06 feet); minimum, 739 second-feet Sept. 24 (gage height, 1.88 feet).

1905–6, 1915–1929: Maximum discharge, 12,600 second-feet Jan. 22, 1916 (gage height, 6.4 feet); minimum, 306 second-feet Sept. 1, 16, and 17, 1919 (gage height, 1.37 feet).

REMARKS.—Records good except those for ice-affected period Jan. 7 to Feb. 26, which are poor.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	790	960	1,220	1,770	4,470	3,960	5,020	5,020	2,490	1,820	1,040	928
2	790	960	1,220	1,770	3,960	3,960	5,020	5,310	2,490	1,900	1,100	928
3	790	1,020	1,220	1,770	3,490	3,960	4,740	6,890	2,310	1,820	1,170	928
4	845	1,020	1,290	1,770	3,060	4,210	4,470	6,890	2,310	1,740	1,440	928
5	900	1,020	1,290	1,770	2,860	3,960	4,470	6,890	2,140	1,740	1,580	870
6	900	960	1,290	1,940	2,670	3,720	4,470	6,560	2,060	1,660	1,580	870
7	900	960	1,290	3,060	2,670	3,720	4,210	5,920	1,980	1,820	2,060	870
8	900	900	1,360	3,270	2,490	3,270	5,310	5,920	1,980	1,740	2,140	870
9	900	960	1,360	3,490	2,490	3,060	5,310	5,610	1,980	1,660	2,140	870
10	900	960	1,360	3,490	2,310	2,860	5,310	5,310	1,980	1,580	2,060	870
11	845	960	1,440	3,270	2,310	2,670	5,920	5,310	1,980	1,510	1,980	870
12	845	960	1,440	3,060	2,310	2,490	6,240	5,310	3,270	1,580	1,660	870
13	845	1,020	1,520	2,860	2,310	2,310	6,560	5,310	3,270	1,510	1,660	848
14	845	1,020	1,600	2,860	2,490	2,670	6,240	5,310	3,270	1,510	1,660	826
15	845	1,020	1,600	2,670	3,060	3,060	5,920	5,610	3,270	1,440	1,370	804
16	900	1,020	1,680	2,670	3,270	5,610	5,310	5,310	3,270	1,370	1,230	804
17	960	1,080	1,770	2,670	2,860	5,920	5,020	5,310	3,490	1,370	1,230	782
18	960	1,080	1,860	3,060	2,310	6,240	4,740	5,310	3,270	1,370	1,170	782
19	960	1,080	1,860	3,720	2,490	6,240	4,740	5,310	2,860	1,370	1,170	782
20	960	1,080	1,860	4,210	2,310	5,920	5,020	5,310	2,670	1,370	1,100	760
21	960	1,080	1,860	4,740	2,140	5,610	5,310	4,740	2,490	1,370	1,100	760
22	960	1,080	1,940	5,310	2,310	6,560	5,020	4,210	2,310	1,370	1,100	760
23	960	1,150	1,860	8,600	2,490	6,560	4,470	4,210	2,140	1,230	1,100	760
24	960	1,150	1,860	9,650	2,670	6,240	4,470	3,960	2,060	1,230	1,040	739
25	900	1,150	1,860	9,650	2,860	5,920	4,740	3,720	1,980	1,300	985	804
26	900	1,150	1,860	9,300	3,270	5,920	5,920	3,490	1,820	1,370	985	804
27	900	1,150	1,860	8,600	3,720	5,610	5,920	3,490	1,740	1,300	985	782
28	900	1,150	1,860	7,560	4,210	5,020	5,610	3,060	1,660	1,170	985	782
29	900	1,150	1,860	6,560	-------	4,470	5,310	2,860	1,660	1,100	985	826
30	900	1,150	1,770	5,610	-------	4,470	5,020	2,860	1,660	1,100	928	848
31	900	-------	1,770	5,020	-------	4,740	-------	2,860	-------	1,100	928	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	960	790	894	0.382	0.44
November	1,150	900	1,050	.449	.50
December	1,940	1,220	1,610	.688	.79
January	9,650	1,770	4,380	1.87	2.16
February	4,470	2,140	2,850	1.22	1.27
March	6,560	2,310	4,550	1.94	2.24
April	6,560	4,210	5,190	2.22	2.48
May	6,890	2,860	4,940	2.11	2.43
June	3,490	1,660	2,400	1.03	1.15
July	1,900	1,100	1,470	.628	.72
August	2,140	928	1,340	.573	.66
September	928	739	831	.355	.40
The year	9,650	739	2,630	1.12	15.24

KANKAKEE RIVER AT CUSTER PARK, ILL.

LOCATION.—Chain gage in NW. ¼ sec. 19, T. 32 N., R. 10 E., at Wabash Railroad bridge in Custer Park, one-fourth mile above Horse Creek.

DRAINAGE AREA.—4,870 square miles.

RECORDS AVAILABLE.—November, 1914, to September, 1929.

EXTREMES.—Maximum discharge during year, 23,900 second-feet Jan. 23 (gage height, 13.8 feet; backwater from ice); minimum, 730 second-feet Sept. 30 (gage height, 5.40 feet).

1914–1929: Maximum discharge, 31,200 second-feet Apr. 11, 1922 (gage height, 15.05 feet); minimum, 250 second-feet Nov. 15, 1914 (gage height, 4.09 feet).

REMARKS.—Records good except those for ice-affected period Jan. 2 to Mar. 7, which are poor.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1,020	1,160	2,390	3,190	9,220	17,400	7,680	7,980	4,740	2,400	1,300	960
2	1,090	1,300	2,300	3,190	6,540	17,400	9,220	8,900	4,270	2,590	1,300	900
3	1,090	1,370	2,300	3,190	5,740	14,000	10,500	11,900	3,830	3,180	1,460	900
4	1,090	1,680	2,020	2,780	4,740	13,300	10,900	14,400	4,740	3,180	1,460	960
5	1,230	1,850	2,110	2,580	4,500	12,600	9,870	15,500	3,190	3,180	1,540	1,020
6	1,370	1,850	2,020	4,780	4,500	11,200	8,590	14,800	2,930	2,980	1,780	900
7	1,850	1,760	2,390	6,070	4,270	7,680	8,590	12,200	2,730	4,500	2,220	900
8	2,110	1,680	2,780	6,070	4,270	5,740	10,500	11,200	1,870	6,540	2,310	900
9	2,020	1,680	2,390	6,070	4,500	4,980	12,600	9,870	960	6,540	2,310	900
10	1,680	1,600	2,300	6,070	4,270	4,500	14,400	9,220	900	6,000	2,220	840
11	1,600	1,600	2,200	6,630	4,040	3,820	17,400	8,280	2,980	4,980	2,220	840
12	1,440	1,680	1,760	7,210	3,600	3,600	18,500	7,680	10,900	4,040	2,040	900
13	1,370	1,600	2,200	7,210	3,180	3,600	17,000	7,100	17,000	3,390	1,870	900
14	1,370	1,520	3,190	6,920	3,180	4,270	18,900	7,390	17,000	2,980	1,620	785
15	1,300	1,520	3,980	6,920	3,390	11,600	13,300	8,900	15,500	2,590	1,620	840
16	1,300	1,600	4,780	6,630	3,820	20,800	11,600	9,540	13,300	2,400	1,540	840
17	1,370	1,940	6,630	6,630	4,980	18,900	10,200	8,900	10,900	2,310	1,540	840
18	1,440	3,190	8,430	7,510	7,100	17,400	8,590	8,590	8,900	2,220	1,460	840
19	1,440	4,780	8,120	12,300	7,390	16,200	8,280	9,870	7,100	2,040	1,380	900
20	1,440	5,030	7,810	15,700	7,100	14,800	8,590	10,500	6,000	1,960	1,460	900
21	1,440	4,540	6,920	16,400	6,820	13,000	8,590	10,500	4,980	1,700	1,230	900
22	1,520	4,070	5,800	17,800	6,540	13,300	8,280	9,870	4,270	1,620	1,230	900
23	1,520	3,840	5,030	23,900	7,100	13,000	7,980	8,590	3,820	1,620	1,090	900
24	1,520	3,400	4,540	23,500	7,980	11,600	7,680	7,100	3,180	1,620	1,090	900
25	1,520	3,190	3,840	22,700	8,900	10,500	7,390	6,540	2,980	1,540	1,230	900
26	1,520	3,190	3,620	21,200	11,900	9,220	11,900	5,740	2,590	1,540	1,230	960
27	1,440	2,780	3,400	19,200	14,000	7,980	11,600	5,230	2,590	1,620	1,160	960
28	1,440	2,580	3,400	16,200	15,900	7,390	10,900	4,740	2,400	1,540	1,020	960
29	1,370	2,390	3,190	13,700	-------	6,820	9,870	4,500	2,220	1,460	840	1,020
30	1,370	2,390	3,190	13,000	-------	6,540	8,900	4,980	2,040	1,380	960	785
31	1,300	-------	2,980	11,900	-------	6,270	-------	4,740	-------	1,300	900	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	2,110	1,020	1,440	0.296	0.34
November	5,030	1,160	2,430	.499	.56
December	8,430	1,760	3,810	.782	.90
January	23,900	2,580	10,600	2.18	2.51
February	15,900	3,180	6,410	1.32	1.38
March	20,800	3,600	10,600	2.18	2.51
April	18,900	7,390	10,900	2.24	2.50
May	15,500	4,500	8,880	1.82	2.10
June	17,000	900	5,700	1.17	1.30
July	6,540	1,300	2,800	.575	.66
August	2,310	840	1,500	.308	.36
September	1,020	785	898	.184	.21
The year	23,900	785	5,500	1.13	15.33

IROQUOIS RIVER NEAR CHEBANSE, ILL.

LOCATION.—Chain gage in SW. ¼ sec. 10, T. 29 N., R. 13 W., at highway bridge 3 miles below Beaver Creek, 4½ miles east of Chebanse, and 6 miles above confluence with Kankakee River. Zero of gage, 598.27 feet above mean sea level.

DRAINAGE AREA.—2,120 square miles.

RECORDS AVAILABLE.—April, 1923, to September, 1929.

EXTREMES.—Maximum discharge during year, 12,300 second-feet Jan. 24 (gage height, 12.06 feet; backwater from ice); minimum, 30 second-feet Sept. 8, 9, and 16 (gage height, 0.70 foot).

1923–1929: Maximum discharge, 21,400 second-feet Oct. 5, 1926 (gage height, 16.1 feet); minimum, 12 second-feet Sept. 4, 1925 (gage height, 0.60 foot).

Maximum stage known, approximately 19.6 feet in spring of 1913.

REMARKS.—Records good except those for ice-affected period Jan. 6 to Mar. 2, which are poor.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	84	230	400	950	2,300	7,420	2,030	1,940	1,540	428	225	55
2	84	238	400	845	1,860	7,280	3,870	2,500	1,620	1,300	225	50
3	91	238	375	950	1,700	7,000	5,230	5,230	1,460	1,460	216	45
4	91	315	400	1,160	1,620	6,440	4,590	6,580	1,160	1,160	216	40
5	153	325	375	1,020	1,460	4,350	3,760	6,300	1,020	750	207	40
6	482	325	375	1,300	1,460	2,800	3,430	5,750	880	1,940	190	35
7	455	335	400	3,100	1,460	2,030	2,800	5,360	780	3,990	182	35
8	375	325	428	3,210	1,380	1,700	4,590	4,590	720	4,110	173	30
9	350	315	428	2,700	1,380	1,620	6,860	3,540	660	4,230	165	30
10	286	305	455	2,600	1,300	1,090	8,000	2,500	660	3,870	157	35
11	248	295	455	2,500	1,230	880	8,300	2,030	2,120	2,800	157	35
12	230	295	780	2,300	1,230	950	8,900	1,860	8,150	1,620	149	40
13	212	305	1,020	2,210	1,160	1,020	8,600	2,030	11,100	1,300	149	40
14	194	600	1,380	2,210	1,160	1,020	8,150	2,400	11,300	1,020	141	40
15	186	780	1,780	2,120	1,090	4,470	5,750	3,760	10,200	810	133	35
16	178	1,230	2,300	2,120	1,090	8,150	4,590	5,100	8,300	720	125	30
17	212	1,300	2,800	2,800	1,460	9,510	3,540	4,710	5,360	630	95	35
18	238	1,380	3,760	4,350	1,780	8,600	2,800	4,590	4,230	482	55	40
19	266	1,300	3,870	5,230	2,500	7,850	2,120	3,990	3,320	428	55	45
20	286	1,230	3,540	6,300	3,100	7,850	2,120	5,490	2,500	375	50	45
21	286	1,160	3,210	7,000	3,990	5,620	2,120	4,710	2,120	320	50	45
22	286	1,160	2,500	8,900	4,710	4,590	2,300	3,540	1,620	300	50	50
23	295	1,020	2,120	11,800	5,230	4,110	2,300	2,700	1,160	281	50	50
24	276	880	1,380	12,300	5,750	3,210	2,300	2,300	1,020	271	50	45
25	257	720	1,160	12,100	6,440	2,800	2,400	2,030	880	262	50	45
26	238	600	1,020	10,800	7,000	2,400	2,900	1,780	880	252	55	40
27	212	540	1,020	7,560	6,860	2,120	3,540	1,780	630	252	61	40
28	194	510	1,090	7,420	7,140	1,780	3,760	1,380	570	234	61	40
29	194	482	1,160	4,840	-------	1,620	3,000	1,300	510	234	61	45
30	212	428	1,090	3,430	-------	1,540	2,600	1,230	455	234	61	45
31	220	-------	1,160	2,900	-------	1,380	-------	1,380	-------	225	61	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	482	84	238	0.112	0.13
November	1,380	230	639	.301	.34
December	3,870	375	1,380	.651	.75
January	12,300	845	4,480	2.11	2.43
February	7,140	1,090	2,820	1.33	1.38
March	9,510	880	3,970	1.87	2.16
April	8,900	2,030	4,240	2.00	2.23
May	6,580	1,230	3,370	1.59	1.83
June	11,300	455	2,900	1.37	1.53
July	4,230	225	1,170	.552	.64
August	225	50	119	.056	.06
September	55	30	40.8	.019	.02
The year	12,300	30	2,110	.995	13.50

FOX RIVER NEAR MUKWONAGO, WIS.

LOCATION.—Chain gage in SE. ¼ sec. 24, T. 5 N., R. 18 E., 1½ miles northeast of Mukwonago.

DRAINAGE AREA.—231 square miles.

RECORDS AVAILABLE.—April, 1927, to September, 1929.

EXTREMES.—Maximum discharge during year, 1,560 second-feet Mar. 15 (gage height, 7.24 feet); minimum, 14 second-feet July 23.

1927–1929: Maximum discharge, 1,560 second-feet Mar. 15, 1929 (gage height, 7.24 feet); minimum, 13 second-feet Aug. 20, 1928.

REMARKS.—Records poor. Stage-discharge relation affected by ice Dec. 7–10 and Dec. 21 to Mar. 13.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	22	51	229	140	85	80	431	385	35	69	783	e 55
2	23	75	e 243	140	75	75	501	319	e 37	63	677	52
3	29	83	257	140	70	75	550	277	28	54	575	52
4	24	e 72	298	125	70	75	600	238	24	55	e 469	63
5	23	61	277	125	70	95	677	e 200	22	55	363	90
6	22	53	298	120	75	110	729	162	21	47	229	73
7	e 20	78	220	115	70	130	e 798	139	19	e 46	132	78
8	18	178	170	115	60	125	866	132	23	46	64	e 67
9	26	170	140	140	65	145	894	124	e 23	37	e 67	56
10	24	139	140	455	60	140	866	117	24	31	e 71	132
11	25	e 136	146	130	55	140	838	178	21	51	e 74	132
12	26	132	139	125	55	240	783	e 218	23	50	e 78	81
13	39	103	117	110	60	550	756	257	34	55	81	90
14	e 33	90	431	95	65	1,530	e 730	277	37	52	63	82
15	27	96	600	90	55	1,560	703	298	33	42	53	e 89
16	43	90	e 664	90	55	1,440	625	319	e 43	32	54	96
17	47	277	729	105	55	e 1,260	550	319	51	29	72	139
18	76	e 477	703	105	55	1,070	454	319	73	24	e 60	103
19	66	677	677	90	55	952	385	e 270	103	23	47	90
20	60	729	575	90	60	866	431	220	124	20	57	90
21	e 62	729	550	95	50	683	e 454	117	124	e 19	63	90
22	63	703	475	95	50	729	477	90	117	18	64	e 84
23	139	625	375	95	50	729	431	83	e 117	15	83	79
24	139	550	275	85	45	e 729	385	117	117	25	59	69
25	82	e 424	210	80	40	729	454	124	110	34	e 58	70
26	61	298	185	80	50	729	501	e 114	103	501	57	66
27	60	229	170	80	60	677	525	103	93	923	52	73
28	e 60	178	160	85	70	625	e 525	83	93	e 982	53	75
29	60	139	160	80	-------	525	525	68	87	1,040	52	e 104
30	52	170	140	95	-------	454	477	64	e 73	923	59	132
31	52	-------	125	90	-------	e 442	-------	50	-------	838	58	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	139	18	48.5	0.210	0.24
November	729	51	260	1.13	1.26
December	729	117	319	1.38	1.59
January	155	80	107	.463	.53
February	85	40	60.2	.261	.27
March	1,560	75	574	2.48	2.86
April	894	385	597	2.58	2.88
May	385	50	186	.805	.93
June	124	18	61.8	.268	.30
July	1,040	15	200	.866	1.00
August	783	47	152	.658	.76
September	139	52	85.1	.368	.41
The year	1,560	15	222	.961	13.03

e Interpolated.

FOX RIVER AT ALGONQUIN, ILL.

LOCATION.—Staff gage in NW. ¼ sec. 34, T. 43 N., R. 8 E,. at Chicago Street Bridge in Algonquin , 300 feet above Crystal Lake outlet. Zero of gage is 729.75 feet above mean sea level.

RECORDS AVAILABLE.—October, 1915, to September, 1929.

DRAINAGE AREA.—1,340 square miles.

EXTREMES.—Maximum discharge during year, 5,450 second-feet Mar. 16, 20–22 (gage height, 4.37 feet); minimum, 222 second-feet Oct. 11 (gage height, 1.07 feet).

1915–1929: Maximum discharge, 7,120 second-feet Mar. 31, 1916 (gage height, 5.3 feet); minimum, 67 second-feet Aug. 31, 1918 (gage height, 0.59 foot).

REMARKS.—Records fair October to May, poor June and July, and good August and September. Discharge occasionally regulated during summer at dam 16 miles above gage.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	358	358	2,220	1,680	647	985	3,830	2,900	764	1,540	1,050	292
2	342	286	2,060	1,540	a 647	a 1,260	3,830	2,900	540	1,540	1,190	292
3	342	358	1,840	1,540	647	1,540	3,830	2,720	286	540	1,330	279
4	328	358	1,840	a 1,540	a 647	a 1,690	3,640	2,720	286	540	1,330	292
5	312	358	1,840	1,540	647	1,840	3,260	2,380	647	540	1,330	305
6	312	358	1,840	1,540	a 647	a 2,030	3,260	2,220	647	540	1,330	305
7	286	358	1,540	a 1,540	647	2,220	2,260	2,060	647	540	1,330	320
8	286	860	1,470	1,540	a 647	a 2,300	3,260	1,840	647	443	1,260	305
9	286	647	1,330	a 1,260	647	2,380	3,260	1,680	647	443	1,190	322
10	286	860	1,330	985	a 594	2,380	3,080	1,540	647	443	985	322
11	222	860	1,540	a 922	540	3,080	3,080	1,540	647	358	800	305
12	358	860	1,680	860	a 540	a 3,170	3,080	1,680	647	358	800	292
13	286	860	1,840	a 860	540	3,260	2,900	1,840	647	358	704	305
14	286	860	1,840	860	a 540	a 4,140	2,900	1,840	540	358	680	279
15	286	764	1,840	a 812	540	5,030	2,900	1,680	540	358	636	240
16	286	764	1,840	764	a 540	5,450	2,900	1,840	540	358	550	398
17	286	1,540	2,220	a 764	540	5,240	2,720	1,840	540	358	530	390
18	286	2,060	2,380	764	a 540	5,240	2,720	1,840	1,680	358	570	380
19	358	2,380	2,380	a 764	540	5,240	2,720	1,840	1,680	358	550	380
20	286	2,380	2,220	764	a 549	5,450	2,720	1,840	1,680	358	380	380
21	286	2,550	1,840	a 764	540	5,450	2,900	1,840	1,680	358	365	380
22	358	2,550	1,540	764	a 540	5,450	3,450	1,680	1,680		365	380
23	358	2,550	1,540	a 764	540	5,240	3,450	1,680	1,680		358	380
24	286	2,550	1,540	764	a 540	5,030	3,260	1,680	1,680		338	365
25	286	2,550	1,540	a 764	540	4,630	3,450	1,680	1,540	a 600	358	390
26	286	2,220	1,540	764	a 540	4,630	3,450	1,540	1,400		358	365
27	860	2,220	1,540	a 706	540	4,630	3,450	1,540	1,400		358	390
28	860	2,220	1,540	647	a 762	3,830	3,450	1,540	1,400		358	550
29	860	2,220	1,540	a 647	-------	3,640	3,450	1,540	1,260		350	680
30	358	2,220	1,540	647	-------	3,450	2,900	1,400	1,680	658	320	680
31	358	-------	1,540	a 647	-------	3,450	-------	985	-------	704	305	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	860	222	362	0.270	0.31
November	2,550	286	1,400	1.04	1.16
December	2,380	1,330	1,750	1.31	1.51
January	1,680	647	991	.740	.85
February	762	540	584	.436	.45
March	5,450	985	3,660	2.73	3.15
April	3,830	2,720	3,210	2.40	2.68
May	2,900	985	1,870	1.40	1.61
June	1,680	286	1,010	.754	.84
July	1,540	358	555	.414	.48
August	1,330	305	722	.539	.62
September	680	240	364	.272	.30
The year	5,450	222	1,380	1.03	13.96

a Estimated.

FOX RIVER AT DAYTON, ILL.

LOCATION.—Float gages above and below dam in SE. ¼ sec. 29, T. 34 N., R. 4 E., at plant of North Counties Hydroelectric Co. in Dayton, 6 miles above mouth of river.

DRAINAGE AREA.—2,570 square miles.

RECORDS AVAILABLE.—April, 1925, to September, 1929.

EXTREMES.—Maximum mean daily discharge during year, 14,300 second-feet Apr. 1; minimum, 352 second-feet Sept. 3.

1925-1929: Maximum mean daily discharge occurred Apr. 1, 1929; minimum, 168 second-feet June 22, 1925.

REMARKS.—Records fair. Daily discharge computed from electrical output of power plant and flow over dam. Power-house data furnished by North Counties Hydroelectric Co.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	442	976	3,380	2,520	1,140	7,290	14,300	3,850	1,380	1,940	924	440
2	450	1,130	3,250	1,400	1,080	6,400	10,200	3,860	1,340	1,940	1,080	412
3	865	1,430	2,960	1,480	1,030	7,730	7,760	3,850	1,220	1,940	1,740	352
4	454	1,700	2,720	1,530	1,010	9,140	6,830	3,600	1,360	1,640	2,150	436
5	735	1,540	2,520	1,920	1,080	8,680	5,980	3,130	1,270	1,340	2,000	491
6	500	1,460	2,000	2,520	1,050	7,620	5,580	2,860	1,130	1,520	1,940	464
7	442	1,270	2,340	2,020	1,020	5,210	4,800	2,770	1,000	1,560	1,820	420
8	453	1,340	1,920	1,750	976	4,810	4,860	2,540	1,020	1,360	1,680	408
9	544	1,490	1,900	2,050	1,000	3,810	4,380	2,350	985	1,480	1,730	406
10	566	1,600	2,030	2,370	953	3,830	4,470	2,300	995	1,280	1,610	420
11	453	1,510	2,370	2,200	953	4,120	5,160	2,520	1,380	1,340	1,370	514
12	466	1,430	2,540	1,710	1,010	3,770	5,190	2,340	10,200	1,860	1,300	422
13	542	1,420	2,540	1,420	1,000	5,490	4,460	2,350	6,830	1,860	1,130	436
14	444	1,350	4,920	1,380	1,020	7,170	4,330	2,560	4,460	1,460	1,010	419
15	442	1,300	5,140	1,360	976	8,040	4,170	2,520	3,500	1,140	880	394
16	608	1,160	4,800	1,420	1,000	11,800	3,840	2,520	2,530	995	886	395
17	697	3,240	5,970	1,390	967	10,100	3,540	2,560	2,300	924	748	453
18	1,020	9,040	6,380	1,410	1,000	8,610	3,400	2,520	2,330	806	726	393
19	1,310	7,170	4,800	1,530	908	7,670	3,520	2,450	2,070	636	614	477
20	1,170	5,890	4,070	1,390	886	7,690	10,300	2,360	2,140	649	594	461
21	1,030	5,520	2,280	1,380	860	7,230	13,100	2,360	2,160	682	612	435
22	1,080	4,740	2,350	2,550	839	7,240	5,860	2,160	2,160	610	500	534
23	1,240	4,770	2,750	3,840	820	7,710	6,850	2,190	2,000	518	566	447
24	1,270	4,600	3,270	2,960	1,050	7,220	6,470	2,190	2,140	631	497	479
25	1,360	5,120	3,270	2,540	1,520	6,890	7,770	2,520	2,150	540	495	582
26	1,350	3,740	3,270	1,830	7,330	6,460	7,800	2,180	1,900	886	516	464
27	1,350	3,460	3,550	1,620	5,600	6,030	6,420	2,030	1,800	1,080	493	447
28	1,320	3,520	5,190	1,420	5,950	5,230	5,350	2,180	1,800	1,030	536	536
29	1,040	3,510	3,260	1,440	-------	4,500	5,210	1,940	1,800	1,430	516	672
30	1,160	3,480	2,750	1,390	-------	4,040	4,520	1,860	1,830	970	463	809
31	982	-------	2,990	1,310	-------	5,970	---------	1,690	---------	880	495	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	1,360	442	832	0.324	0.37
November	9,040	976	3,000	1.17	1.30
December	6,380	1,900	3,340	1.30	1.50
January	3,840	1,310	1,870	.727	.84
February	7,330	820	1,570	.611	.64
March	11,800	3,810	6,700	2.61	3.01
April	14,300	3,400	6,210	2.42	2.70
May	3,860	1,690	2,550	.992	1.14
June	10,200	985	2,320	.903	1.01
July	1,940	518	1,190	.463	.53
August	2,150	463	1,020	.397	.46
September	809	352	467	.182	.20
The year	14,300	352	2,590	1.01	13.70

VERMILION RIVER AT STREATOR, ILL.

LOCATION.—Chain gage in SE. ¼ sec. 2, T. 30 N., R. 3 E., at South Bloomington Street Bridge, Streator. Zero of gage is 555.61 feet above mean sea level.

DRAINAGE AREA.—1,080 square miles.

RECORDS AVAILABLE.—July, 1914, to September, 1929.

EXTREMES.—Maximum discharge during year, 7,550 second-feet Mar. 16 (gage height, 14.5 feet); minimum, 1.8 second-feet Oct. 3 and 4 (gage height, 1.24 feet).

1914–1929: Maximum discharge, 16,500 second-feet Apr. 20, 1920 (gage height, 22.9 feet); no flow Aug. 25–28, Sept. 16–30, 1920, and Aug. 24–27, Sept. 3 and 4, 1923.

REMARKS.—Records good except those for period of ice effect Jan. 13–20, which are poor. Water supply for city of Streator is diverted 1 mile above station and is returned to river as sewage through Prairie Creek 2 miles below gage.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	4.6	52	455	515	1,370	3,050	2,630	1,000	720	1,730	59	5.0
2	3.0	69	380	455	1,270	2,700	1,910	1,080	645	1,270	156	7.4
3	1.8	67	260	430	1,040	2,270	1,730	1,570	610	880	130	5.0
4	1.8	57	165	515	800	2,770	1,520	2,090	515	575	122	7.4
5	7.0	54	114	455	575	3,190	1,320	2,030	485	380	88	9.8
6	4.6	69	98	485	405	2,510	1,220	1,970	430	355	69	8.6
7	19	64	92	575	355	1,850	1,420	1,910	355	840	50	9.8
8	19	77	81	645	310	1,270	1,320	1,670	290	2,390	19	7.4
9	9.4	91	87	760	290	920	1,220	1,520	430	1,730	11	6.2
10	5.4	85	87	840	270	720	2,210	1,320	575	1,270	5.0	4.2
11	3.8	80	90	880	250	610	3,120	1,170	645	1,000	11	5.0
12	16	75	92	575	230	760	2,770	1,040	800	800	29	5.0
13	13	69	122	575	211	680	2,450	960	1,420	575	47	4.2
14	12	75	114	575	183	2,090	2,150	920	2,270	485	38	4.2
15	25	122	104	645	174	3,550	1,910	840	2,150	405	19	5.0
16	19	260	114	720	156	7,550	1,730	800	1,730	355	17	4.2
17	43	760	106	760	183	7,010	1,620	720	1,470	290	16	4.2
18	41	760	102	840	310	6,560	1,470	680	1,080	240	14	3.4
19	45	800	96	1,000	455	6,200	1,320	645	800	211	13	3.4
20	45	920	130	1,120	840	5,750	1,730	610	575	174	8.6	4.2
21	97	880	211	1,320	880	2,840	1,850	545	485	156	8.6	4.2
22	106	800	310	1,420	760	2,980	1,850	515	405	139	11	3.4
23	97	760	405	1,620	515	2,840	1,670	485	355	122	11	4.2
24	88	720	455	2,090	1,520	1,910	1,570	575	270	106	9.8	4.2
25	72	645	575	2,330	2,450	1,370	1,470	515	240	94	11	2.6
26	54	610	610	2,770	4,030	1,170	1,370	515	202	88	9.8	2.6
27	41	575	720	2,330	6,110	1,040	1,320	485	174	77	9.8	4.2
28	35	545	680	1,970	4,270	880	1,220	455	183	106	8.6	5.0
29	29	515	610	1,670	-------	800	1,170	430	174	94	6.2	5.0
30	25	485	515	1,570	-------	720	1,080	405	515	77	8.6	8.6
31	21	-------	455	1,420	-------	645	-------	380	-------	69	6.2	-------

Month	Maximum	Minimum	Mean
October	106	1.8	32.4
November	920	52	371
December	720	81	272
January	2,770	430	1,090
February	6,110	156	1,080
March	7,550	610	2,550
April	3,120	1,080	1,710
May	2,090	380	963
June	2,270	174	700
July	2,390	69	551
August	156	5.0	33
September	9.8	2.6	5.3
The year	7,750	1.8	779

MACKINAW RIVER NEAR GREEN VALLEY, ILL.

LOCATION.—Chain gage in sec. 15, T. 23 N., R. 5 W., at Chicago & Northwestern Railway bridge 3 miles north of Green Valley.

DRAINAGE AREA.—1,100 square miles.

RECORDS AVAILABLE.—March, 1921, to September, 1929.

EXTREMES.—Maximum discharge during year, 10,200 second-feet July 6 (gage height, 11.19 feet); minimum, 53 second-feet Oct. 1 (gage height, 1.54 feet). 1921–1929: Maximum discharge, 21,800 second-feet May 19, 1927 (gage height, 14.2 feet); minimum, 30 second-feet various dates September and October, 1922.

REMARKS.—Records good except those for ice-affected period Jan. 5 to Mar. 2, which are poor.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	53	80	191	510	1,500	5,220	1,780	1,120	1,710	1,640	365	114
2	61	83	191	605	1,360	3,350	2,250	1,000	1,240	4,050	345	114
3	56	111	179	532	1,430	2,250	2,010	1,120	1,180	4,050	555	111
4	55	133	167	405	1,430	1,240	1,500	1,640	1,120	2,610	1,120	104
5	68	141	156	605	1,430	1,240	1,180	1,710	820	1,360	765	101
6	66	167	156	1,180	1,360	1,060	1,120	1,500	765	10,200	765	94
7	62	167	133	1,300	1,240	940	1,060	1,240	655	4,250	532	91
8	85	156	118	1,640	1,000	710	1,120	1,000	555	4,150	445	88
9	94	145	121	1,570	765	605	1,430	940	510	6,240	365	88
10	88	133	118	1,300	710	532	1,850	880	465	7,520	310	85
11	77	118	114	1,430	710	488	1,500	820	425	4,250	294	85
12	66	114	141	1,360	655	510	2,700	765	820	2,610	294	85
13	56	111	133	1,300	655	555	2,340	710	1,120	1,930	277	85
14	59	107	145	1,120	655	1,000	1,850	765	1,120	1,500	262	84
15	62	104	710	820	605	1,120	1,570	1,430	940	1,570	246	84
16	61	111	765	765	605	4,350	1,360	1,240	820	1,930	232	83
17	57	191	940	820	880	5,110	1,240	1,180	710	1,360	217	83
18	104	345	1,430	1,240	880	5,000	1,060	1,240	555	1,120	204	80
19	465	555	1,780	3,150	880	3,450	940	2,430	488	1,000	179	78
20	232	710	1,710	3,950	1,000	3,060	1,060	2,170	425	820	167	78
21	191	555	1,430	3,950	1,060	2,340	1,060	2,010	385	682	167	77
22	156	445	1,060	4,450	1,060	2,010	1,180	1,570	345	630	167	77
23	129	385	880	5,820	1,120	1,850	1,060	1,240	295	555	156	75
24	125	345	940	6,400	1,120	1,570	1,000	1,120	240	532	156	77
25	114	310	655	6,580	1,000	1,430	1,240	1,000	385	488	156	80
26	104	262	555	6,580	4,560	1,360	2,010	880	385	445	145	80
27	111	246	532	3,650	5,220	1,300	1,780	820	325	510	141	78
28	104	246	510	2,790	5,820	1,240	1,570	1,570	295	445	137	77
29	91	217	465	2,340	-------	1,240	1,360	1,180	232	385	133	77
30	85	217	425	2,010	-------	1,180	1,180	765	217	365	125	83
31	83	-------	385	1,710	-------	1,300	-------	2,610	-------	345	118	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	465	53	104	0.095	0.11
November	710	80	234	.213	.24
December	1,780	114	556	.505	.58
January	6,580	405	2,320	2.11	2.43
February	5,820	605	1,450	1.32	1.38
March	5,220	488	1,890	1.72	1.98
April	2,700	940	1,480	1.35	1.51
May	2,610	710	1,280	1.16	1.34
June	1,710	217	652	.593	.66
July	10,200	345	2,240	2.04	2.35
August	1,120	118	308	.280	.32
September	114	75	86.5	.079	.09
The year	10,200	53	1,050	.955	12.99

SPOON RIVER AT SEVILLE, ILL.

LOCATION.—Chain gage in SW. ¼ sec. 24, T. 6 N., R. 1 E., at Toledo, Peoria & Western Railway bridge at Seville. Zero of gage is 467.78 feet above mean sea level.

DRAINAGE AREA.—1,600 square miles.

RECORDS AVAILABLE.—July, 1914, to September, 1929.

EXTREMES.—Maximum discharge during year, 15,100 second-feet July 17 (gage height, 23.15 feet); minimum, 95 second-feet Oct. 4 and 12 (gage height, 3.67 feet).

1914–1929: Maximum discharge, 28,900 second-feet Aug. 22, 1924 (gage height, 30.5 feet); minimum, 3.8 second-feet July 31, Aug. 27–29, 1914 (gage height, 1.35 feet).

REMARKS.—Records good except those for ice-affected period, Jan. 6 to Feb. 28, which are poor.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	130	222	1,010	760	1,660	10,900	9,350	3,340	670	1,890	717	264
2	118	715	910	625	1,550	9,850	11,400	2,760	1,550	6,030	717	250
3	114	960	860	580	1,440	6,770	13,000	2,440	1,720	5,470	1,430	221
4	95	304	810	1,500	1,330	5,400	8,700	2,190	1,060	1,550	2,750	221
5	210	520	715	2,760	1,220	4,560	3,930	1,890	810	1,280	1,480	279
6	520	440	580	3,540	1,220	3,740	3,150	1,770	715	7,010	2,150	221
7	248	368	580	3,540	1,160	2,630	2,760	1,600	760	10,800	2,210	235
8	351	335	625	3,670	1,110	1,720	3,020	1,500	1,380	7,250	1,120	235
9	540	335	580	3,600	910	1,330	2,070	1,330	715	7,490	965	221
10	141	289	580	3,600	910	1,010	1,890	1,280	670	5,400	865	235
11	118	275	625	3,480	810	910	2,010	1,220	580	7,330	1,220	235
12	95	275	625	2,960	715	1,600	2,130	1,110	8,970	6,100	1,600	207
13	114	261	715	2,370	670	3,930	2,070	1,160	8,610	3,020	765	180
14	120	261	1,060	2,010	715	6,380	2,370	1,380	6,530	2,190	625	180
15	130	275	1,440	1,830	715	5,540	1,550	1,550	3,080	13,500	625	194
16	186	275	1,220	1,770	760	8,610	1,440	1,380	2,440	14,200	582	180
17	248	5,330	2,960	1,770	1,890	8,790	1,330	1,330	1,550	15,100	500	160
18	304	6,930	3,930	2,370	3,740	6,100	1,220	2,070	1,280	10,800	915	150
19	760	7,730	2,960	2,700	3,150	4,280	1,220	1,500	1,890	2,870	520	194
20	368	4,770	2,370	2,130	2,010	3,150	2,700	1,110	1,550	2,210	408	221
21	222	2,960	1,660	1,830	1,380	2,890	6,030	1,010	1,060	1,870	390	221
22	248	2,130	1,380	7,980	1,060	2,560	5,330	910	860	1,650	341	194
23	625	1,720	1,440	9,060	910	2,500	4,560	860	715	1,430	374	160
24	500	1,600	1,440	7,570	1,440	2,130	3,540	860	1,010	1,320	374	165
25	235	1,440	1,330	7,570	7,730	1,950	6,930	1,010	670	3,560	357	165
26	210	1,280	1,160	5,540	9,850	1,950	8,790	860	625	1,980	341	160
27	368	1,220	1,110	3,930	13,700	1,770	8,520	760	540	2,210	310	150
28	319	1,110	1,060	3,080	14,900	1,600	5,610	670	520	1,980	310	150
29	261	1,060	1,010	2,630	-------	1,550	4,910	910	480	1,380	294	235
30	235	1,010	910	2,370	-------	1,330	4,070	1,550	421	915	279	264
31	198	-------	715	1,950	-------	1,500	-------	1,010	-------	815	279	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	760	95	269	0.168	0.19
November	7,730	222	1,550	.969	1.08
December	3,930	580	1,240	.775	.89
January	9,060	580	3,260	2.04	2.35
February	14,900	670	2,810	1.76	1.83
March	10,900	910	3,840	2.40	2.77
April	13,000	1,220	4,520	2.82	3.15
May	3,340	670	1,430	.894	1.03
June	8,970	421	1,780	1.11	1.24
July	15,100	815	4,860	3.04	3.50
August	2,750	279	833	.521	.60
September	279	150	205	.128	.14
The year	15,100	95	2,210	1.38	18.77

SANGAMON RIVER AT MONTICELLO, ILL.

LOCATION.—Chain gage in SW. ¼ sec. 12, T. 18 N., R. 5 E., at Illinois Central Railroad bridge half a mile west of Monticello.

DRAINAGE AREA.—550 square miles.

RECORDS AVAILABLE.—February, 1908, to December, 1912; June, 1914, to September, 1929.

EXTREMES.—Maximum discharge during year, 7,270 second-feet July 8 (gage height, 14.7 feet); minimum, 10 second-feet Sept. 14 (gage height, 2.2 feet). 1908–1912, 1914–1929: Maximum discharge, 15,400 second-feet Oct. 4, 1926 (gage height, 18.4 feet); minimum, 1.0 second-foot July 31 to Aug. 3, 1914 (gage height, 1.5 feet).

REMARKS.—Records good except those for ice-affected periods (Jan. 11–17, Jan. 30 to Feb. 27), which are poor.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	51	58	166	307	384	1,530	1,970	515	610	268	112	e 21
2	34	72	e 160	307	324	700	2,150	835	e 630	805	140	17
3	25	97	155	282	301	e 615	2,350	1,530	650	930	324	14
4	25	e 116	135	270	290	530	1,810	1,740	570	1,000	e 397	14
5	88	135	125	346	257	470	1,470	e 1,900	485	1,040	470	14
6	72	135	115	e 648	224	410	865	2,060	440	5,100	384	17
7	e 108	115	88	950	202	360	e 1,660	1,810	38[illegible]	e 6,180	324	30
8	145	106	80	1,170	202	324	2,460	1,290	360	7,270	268	e 32
9	106	115	e 93	1,050	170	268	2,810	1,090	e 330	5,550	213	35
10	97	135	106	735	150	e 240	3,820	865	30[illegible]	3,690	170	30
11	65	e 145	115	690	130	213	4,090	750	257	2,570	e 150	21
12	51	155	177	630	121	235	3,170	e 725	550	1,810	130	14
13	45	135	270	590	112	257	3,050	700	750	1,410	121	12
14	e 37	125	403	550	94	301	e 2,360	1,140	700	e 1,070	121	10
15	29	125	590	481	94	865	1,670	1,350	550	725	103	e 16
16	51	106	e 725	433	94	1,670	1,290	1,350	e 49[illegible]	630	94	21
17	88	210	860	403	112	e 2,010	1,140	1,470	440	515	94	14
18	388	e 338	1,400	760	130	2,350	895	1,670	372	485	e 82	12
19	418	465	1,450	1,850	191	1,970	775	e 2,060	30[illegible]	372	69	21
20	403	590	1,350	e 1,740	170	1,470	725	2,460	27[illegible]	348	69	17
21	e 312	532	1,250	1,630	191	1,140	e 795	2,060	23[illegible]	e 314	47	14
22	222	418	785	3,180	224	865	865	1,290	22[illegible]	279	41	e 14
23	177	360	e 688	4,940	235	775	775	1,240	e 20[illegible]	224	191	14
24	145	333	590	4,780	384	e 662	675	965	19[illegible]	224	85	12
25	135	e 296	515	4,630	590	550	725	895	160	246	e 73	14
26	106	258	481	4,480	1,040	530	725	e 785	167	268	61	17
27	106	234	481	e 3,090	1,190	550	805	675	149	224	47	17
28	e 89	210	433	1,700	1,410	500	e 698	590	140	e 197	41	12
29	72	188	403	1,010	------	440	590	570	112	170	41	e 16
30	72	188	e 374	690	------	397	530	515	e 190	160	30	21
31	72	------	346	498	------	e 1,180	------	750	------	130	25	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	418	25	124	0.225	0.26
November	590	58	216	.393	.44
December	1,450	80	481	.875	1.01
January	4,940	270	1,450	2.64	3.04
February	1,410	94	322	.585	.61
March	2,350	213	787	1.43	1.65
April	4,090	530	1,590	2.89	3.22
May	2,460	515	1,210	2.20	2.54
June	750	112	374	.680	.76
July	7,270	130	1,430	2.60	3.00
August	470	25	146	.265	.31
September	35	10	17.8	.032	.04
The year	7,270	10	683	1.24	16.88

e Interpolated.

SANGAMON RIVER AT RIVERTON, ILL.

LOCATION.—Chain gage in SW. ¼ sec. 9, T. 16 N., R. 4 W., at Wabash Railroad bridge in Riverton, 5 miles below mouth of South Fork. Zero of gage is 503.15 feet above mean sea level.

DRAINAGE AREA.—2,560 square miles.

RECORDS AVAILABLE.—February, 1908, to December, 1912; August, 1914, to September, 1929.

EXTREMES.—Maximum discharge during year, 14,000 second-feet May 20 (gage height, 24.8 feet); minimum, 64 second-feet Sept. 25 and 26 (gage height, 7.79 feet).

1908–1912, 1914–1929: Maximum discharge, 30,200 second-feet Oct. 4, 1926 (gage height, 32.0 feet); minimum, 3.0 second-feet, Oct. 3–15, 1914 (gage height, 6.9 feet).

REMARKS.—Records good. Some regulation of low water flow by municipal reservoir at Decatur.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	108	311	545	1,280	3,560	3,320	5,200	3,560	5,410	770	740	145
2	139	311	545	1,240	2,340	3,030	6,330	5,630	5,740	800	680	136
3	147	353	495	1,170	1,660	2,980	6,210	9,580	6,710	770	650	136
4	139	332	570	995	1,820	2,780	5,850	11,000	5,630	740	620	120
5	1,100	332	420	1,060	1,240	2,380	5,300	11,200	6,090	1,000	590	109
6	1,620	332	375	1,780	1,140	2,060	5,000	10,700	5,000	2,930	680	105
7	1,310	375	353	2,400	1,070	1,820	4,710	10,500	3,960	4,350	1,000	105
8	1,060	397	332	2,950	830	1,740	8,420	9,750	3,560	6,450	930	100
9	1,100	420	332	3,150	680	1,740	11,000	9,070	3,140	6,710	965	97
10	865	470	332	2,800	650	1,380	11,200	8,260	2,580	7,810	740	97
11	595	470	332	2,060	650	1,420	11,200	6,970	2,580	9,930	710	93
12	545	420	375	1,780	650	1,420	11,200	6,090	4,190	9,930	620	90
13	470	420	775	1,590	650	1,420	11,200	6,330	6,710	9,930	565	84
14	397	495	1,240	1,530	650	1,500	11,400	8,580	7,100	8,900	650	81
15	375	495	1,780	1,480	680	2,020	10,700	11,200	6,330	8,110	465	81
16	332	625	1,820	1,420	710	4,620	10,300	12,700	5,850	8,740	440	78
17	397	1,240	3,050	2,510	710	5,630	9,930	12,700	5,100	8,580	390	79
18	495	1,200	3,720	3,610	710	6,330	8,580	12,900	4,440	7,660	365	78
19	895	1,280	3,780	4,700	710	6,090	7,380	13,300	3,500	6,580	320	73
20	1,170	1,310	3,840	6,570	680	5,850	6,210	14,000	2,580	5,410	300	69
21	1,100	1,310	3,960	6,690	895	5,850	6,580	13,100	1,980	4,440	280	66
22	960	1,310	3,780	6,690	895	5,410	8,900	11,600	1,580	2,880	250	66
23	835	1,280	3,780	7,080	930	4,190	9,240	10,500	1,820	2,140	220	66
24	865	1,140	3,100	8,880	965	3,750	8,680	9,240	1,350	1,660	220	66
25	545	1,200	2,700	10,400	1,070	3,320	8,110	7,960	1,280	1,580	220	64
26	495	805	2,700	9,700	4,350	3,140	8,260	7,100	1,180	1,420	210	64
27	470	745	2,450	8,400	4,440	3,750	7,960	5,100	1,070	1,240	190	68
28	470	685	1,860	8,400	4,030	3,890	6,970	4,110	930	1,320	190	65
29	420	655	1,520	7,940	-------	4,110	5,850	3,500	860	1,000	163	68
30	353	595	1,450	6,220	-------	3,960	4,620	3,560	965	930	154	84
31	353	-------	1,340	4,860	-------	3,820	-------	5,200	-------	965	154	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	1,620	108	649	0.254	0.29
November	1,310	311	710	.277	.31
December	3,960	332	1,730	.676	.78
January	10,400	995	4,230	1.65	1.90
February	4,440	650	1,410	.551	.57
March	6,330	1,380	3,380	1.32	1.52
April	11,400	4,620	8,080	3.16	3.53
May	14,000	3,500	8,870	3.46	3.99
June	7,100	860	3,640	1.42	1.58
July	9,930	740	4,380	1.71	1.97
August	1,000	154	473	.185	.21
September	145	64	87.8	.034	.04
The year	14,000	64	3,150	1.23	16.69

SANGAMON RIVER NEAR OAKFORD, ILL.

LOCATION.—Chain gage in sec. 6, T. 19 N., R. 7 W., at highway bridge 3 miles northeast of Oakford, 1¼ miles above Crane Creek. Zero of gage is 458.88 feet above mean sea level.

DRAINAGE AREA.—5,000 square miles.

RECORDS AVAILABLE.—October, 1909, to March, 1912; August, 1914, to June, 1919; March, 1921, to August, 1922; October, 1928, to September, 1929.

EXTREMES.—Maximum discharge during year, 30,100 second-feet July 8 (gage height, 18.37 feet); minimum, 305 second-feet Oct. 1 (gage height, 1.13 feet).

1909–1912, 1914–1919, 1921–22, 1928–29: Maximum discharge, 35,600 second-feet Apr. 14, 1922 (gage height, 19.84 feet); minimum, 85 second-feet Aug. 30, 31, Nov. 27, and Dec. 2, 1914.

REMARKS.—Records fair. Gage-height record furnished by Sanitary District of Chicago.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	305	700	1,230	2,450	12,900	6,560	4,800	6,670	8,260	1,730	2,130	550
2	305	700	1,160	2,210	9,270	5,500	5,900	7,020	9,270	2,290	1,970	525
3	325	700	e1,100	1,970	6,780	5,200	6,780	8,540	9,420	2,530	1,810	525
4	325	700	1,040	1,730	6,010	4,700	7,020	11,000	9,730	2,290	2,780	e508
5	478	700	980	1,970	5,500	4,220	6,450	12,900	9,730	2,130	2,450	e490
6	1,300	700	920	2,050	e5,100	4,130	6,340	14,000	8,680	6,900	2,450	e472
7	1,890	700	920	2,960	4,700	3,770	6,010	15,300	7,870	15,800	2,450	455
8	1,810	700	865	6,900	4,500	3,410	e6,880	15,300	6,120	29,300	2,450	432
9	1,650	700	810	8,130	3,950	3,050	7,740	14,000	5,400	27,300	2,130	432
10	1,440	755	810	7,740	3,680	2,610	10,900	12,500	5,100	22,800	2,050	432
11	1,370	755	865	8,000	3,590	3,230	13,400	11,000	4,310	20,300	1,890	432
12	1,100	755	810	e8,400	3,410	2,210	15,800	9,570	6,560	18,800	e1,740	432
13	920	755	810	8,130	3,410	2,290	17,600	8,260	8,400	14,300	1,580	410
14	755	700	920	e8,000	3,410	2,530	18,200	7,740	8,970	12,100	1,440	410
15	e702	700	1,810	e7,870	4,130	3,050	17,900	8,400	8,540	12,500	1,300	388
16	650	810	2,780	e7,620	3,050	6,450	17,000	9,730	8,130	16,800	1,230	388
17	650	1,230	3,500	e7,620	3,500	8,820	15,600	11,800	6,780	17,000	1,160	365
18	980	2,050	4,500	e8,130	3,950	9,730	13,400	15,000	6,340	12,900	1,100	365
19	1,300	2,530	5,900	e12,900	4,130	9,120	11,600	20,300	5,900	10,700	1,040	e361
20	1,580	2,530	6,340	15,600	3,410	8,680	9,890	22,400	5,000	8,820	920	e357
21	1,650	2,370	6,120	16,800	3,320	8,260	8,260	23,400	3,950	7,870	920	e353
22	1,650	2,290	5,900	19,100	3,050	7,500	7,380	23,800	3,410	5,900	865	e349
23	1,440	2,210	5,600	25,300	3,230	7,020	7,740	22,400	2,960	5,300	810	345
24	1,370	1,970	5,300	26,500	3,410	6,340	8,540	19,400	2,780	e4,440	810	345
25	e1,200	1,810	4,700	26,900	4,310	5,300	9,570	16,300	2,610	3,590	755	345
26	1,040	1,650	4,310	27,700	7,500	4,700	10,000	13,100	2,450	3,590	755	325
27	920	1,510	3,500	28,100	8,400	4,310	9,890	10,700	2,370	3,410	700	345
28	865	1,370	e3,290	25,300	8,540	4,800	9,420	8,820	2,130	3,050	700	e352
29	865	1,300	e3,080	23,400	.....	4,800	8,820	7,740	1,970	2,870	625	e358
30	755	1,300	e2,870	21,000	.....	4,800	7,740	7,140	1,730	2,450	600	365
31	700	.....	e2,660	17,600	.....	4,800	.....	8,260	.....	2,290	575	.....

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	1,890	305	1,040	0.208	0.24
November	2,530	700	1,260	.252	.28
December	6,340	810.	2,750	.550	.63
January	28,100	1,730	12,500	2.50	2.88
February	12,900	3,050	5,000	1.00	1.04
March	9,730	2,210	5,220	1.04	1.20
April	18,200	4,800	10,200	2.04	2.28
May	23,800	6,670	13,000	2.60	3.00
June	9,730	1,730	5,830	1.17	1.30
July	29,300	1,730	9,740	1.95	2.25
August	2,780	575	1,430	.286	.33
September	550	325	407	.081	.09
The year	29,300	305	5,720	1.14	15.52

e Interpolated or estimated.

SOUTH FORK OF SANGAMON RIVER AT POWER PLANT NEAR TAYLORVILLE, ILL.

LOCATION.—Chain gage in NE. ¼ sec. 14, T. 13 N., R. 3 W., at Chicago & Illinois Midland Railway bridge 6 miles west of Taylorville and 6 miles below mouth of Bear Creek.

DRAINAGE AREA.—510 square miles.

RECORDS AVAILABLE.—May, 1917, to September, 1929.

EXTREMES.—Maximum discharge during year, 8,500 second-feet May 15 (gage height, 23.3 feet); minimum, 4 second-feet Sept. 24 (gage height, 5 05 feet). 1917–1929: Maximum discharge, 11,800 second-feet Mar. 15, 1922 (gage height, 26.6 feet); no flow Aug. 29 and Oct. 6–23, 1922.

REMARKS.—Records good.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	e 8.1	59	100	e 166	252	1,090	1,210	540	835	104	104	12
2	6.2	56	104	e 188	211	670	985	885	935	104	100	9.0
3	9.0	62	100	211	174	320	730	2,650	1,440	92	84	10
4	6.2	76	88	252	138	525	650	5,140	1,120	88	80	9.0
5	e 433	e 76	e 80	e 286	e 138	e 638	e 510	4,780	860	e 96	e 84	e 8.2
6	860	76	73	320	138	750	369	4,330	750	104	88	7.5
7	e 648	73	66	369	156	610	320	3,360	730	165	112	10
8	436	73	66	525	129	369	1,270	2,030	690	369	120	12
9	290	76	66	610	120	285	1,590	1,930	690	860	84	10
10	183	76	62	690	156	211	1,630	1,120	670	1,480	84	12
11	174	76	59	570	138	192	1,790	910	590	1,830	70	12
12	100	80	62	422	138	156	1,830	1,180	860	2,080	66	9.0
13	92	80	70	231	104	174	1,880	3,200	1,670	1,930	56	9.0
14	56	88	147	211	76	192	1,590	6,400	1,630	1,710	70	7.5
15	45	80	510	156	84	395	1,550	8,500	2,080	1,830	70	6.2
16	39	274	610	120	120	1,180	1,550	7,700	2,080	2,710	56	6.2
17	320	156	835	138	147	2,850	1,440	5,680	1,750	2,130	52	6.2
18	540	274	1,120	320	156	3,130	1,270	3,760	1,400	1,670	36	5.0
19	540	320	1,440	710	138	2,230	1,010	3,680	885	1,210	30	6.2
20	e 430	e 320	e 1,475	e 1,230	e 129	e 1,700	e 1,050	e 3,800	e 602	e 1,060	e 28	6.2
21	320	320	1,510	1,750	120	1,180	1,090	3,920	320	910	26	5.0
22	211	252	1,300	2,130	104	710	1,790	3,060	274	650	26	6.2
23	156	211	985	3,360	120	510	2,180	1,880	231	320	20	6.2
24	120	183	710	2,990	100	408	2,180	1,630	231	285	20	4.0
25	120	156	525	2,590	138	320	2,030	1,180	211	211	20	6.2
26	100	138	320	2,230	860	690	2,080	835	211	192	20	6.2
27	84	120	296	1,710	1,120	1,590	1,830	570	174	192	18	5.0
28	76	100	274	1,180	1,150	1,880	1,440	570	156	183	14	7.5
29	70	84	211	710	-------	1,830	1,210	570	138	156	14	7.5
30	70	84	120	395	-------	1,750	910	570	120	138	12	7.5
31	62	-------	e 143	320	-------	1,480	-------	1,120	-------	120	12	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	860	6.2	213	0.418	0.48
November	320	56	137	.269	.30
December	1,510	59	437	.857	.99
January	3,360	120	874	1.71	1.97
February	1,150	76	234	.458	.48
March	3,130	156	968	1.90	2.19
April	2,180	320	1,370	2.69	3.00
May	8,500	540	2,820	5.53	6.38
June	2,080	120	811	1.59	1.77
July	2,710	88	805	1.58	1.82
August	120	12	54.0	.106	.12
September	12	4.0	7.8	.015	.02
The year	8,500	4.0	733	1.44	19.52

e Interpolated.

CROOKED CREEK AT RIPLEY, ILL.

LOCATION.—Chain gage in NE. ¼ sec. 33, T. 1 N., R. 2 W., at highway bridge one-fourth mile east of Ripley. Zero of gage is 431.31 feet above mean sea level.

DRAINAGE AREA.—1,310 square miles.

RECORDS AVAILABLE.—March, 1921, to September, 1929.

EXTREMES.—Maximum discharge during year, 10,200 second-feet Mar. 16 (gage height, 25.87 feet); minimum, 59 second-feet Sept. 29 (gage height, 3.47 feet).

1921–1929: Maximum discharge, 12,500 second-feet July 25, 1924 (gage height, 25.0 feet); minimum, 9 second-feet Sept. 8 and 9, 1922.

Old high-water marks are at gage height 26.0 feet.

REMARKS.—Records fair except those for ice-affected periods (Jan. 5–11 and Feb. 2–5), which are poor. Backwater from Illinois River, Dec. 24 to Jan. 2. Jan. 23 to Feb. 11, and Feb. 28 to July 30, discharge estimated from stages on Illinois River at Beardstown.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	123	1,030	680	880	750	8,500	5,770	1,930	3,050	750	680	95
2	250	2,850	590	1,080	660	8,900	7,620	2,100	4,590	780	590	90
3	315	1,840	560	1,240	680	8,290	7,380	2,020	5,270	820	415	90
4	530	1,200	470	1,520	700	5,450	6,390	1,800	5,750	850	250	95
5	680	1,030	440	1,480	670	3,060	4,880	2,360	7,320	920	240	100
6	560	890	365	2,080	670	1,560	2,360	2,080	6,550	1,000	240	129
7	260	650	315	1,720	700	1,140	850	1,810	4,120	1,880	260	142
8	1,520	500	315	1,640	550	830	920	1,350	2,790	1,480	315	155
9	390	390	315	1,520	470	750	1,370	1,280	2,770	2,140	365	177
10	210	280	302	1,450	390	750	1,750	1,060	2,540	2,340	290	415
11	111	202	302	1,340	415	950	1,650	1,270	1,940	3,330	270	240
12	100	193	280	1,200	415	1,120	1,480	1,860	5,700	2,600	250	210
13	90	185	530	860	415	2,570	1,170	2,120	6,080	2,180	240	177
14	100	185	860	800	415	5,800	790	3,210	5,350	4,020	220	162
15	117	177	960	770	415	8,730	650	2,790	3,670	6,370	177	142
16	129	1,200	1,380	770	415	10,200	670	2,310	3,250	7,300	155	123
17	142	4,300	1,880	740	440	7,580	750	1,860	2,220	7,060	135	106
18	170	5,490	4,300	1,170	500	7,180	1,060	3,080	1,600	5,950	117	100
19	177	5,490	3,750	2,320	590	5,850	1,610	4,700	2,600	4,820	111	95
20	155	5,550	2,240	2,520	740	5,050	1,900	4,350	2,280	4,200	111	106
21	142	6,030	1,720	2,750	890	4,280	1,990	3,090	1,370	2,700	106	80
22	123	6,090	1,520	2,750	1,170	3,320	3,650	2,100	900	1,970	106	71
23	230	4,450	1,200	2,670	1,520	1,570	2,960	1,610	480	1,400	100	67
24	290	1,340	1,050	2,700	2,320	1,110	3,020	1,190	480	1,600	100	67
25	415	1,310	970	2,590	3,150	880	3,140	760	1,170	1,820	100	63
26	590	1,240	800	2,500	4,250	580	3,870	550	2,200	1,570	100	63
27	710	1,140	720	1,830	5,550	650	4,030	500	1,670	1,570	100	63
28	710	1,030	660	1,720	6,100	630	4,180	530	1,370	1,550	100	63
29	650	860	570	1,060	-------	600	4,200	580	990	1,360	95	59
30	560	770	570	940	-------	590	1,550	900	850	1,020	95	71
31	530	-------	570	860	-------	3,060	-------	1,840	-------	830	95	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	1,520	90	357	0.273	0.31
November	6,090	177	1,930	1.47	1.64
December	4,300	280	1,010	.771	.89
January	2,750	740	1,600	1.22	1.41
February	6,100	390	1,280	.978	1.02
March	10,200	580	3,600	2.75	3.17
April	7,620	650	2,790	2.13	2.38
May	4,700	500	1,900	1.45	1.67
June	7,320	480	3,030	2.31	2.58
July	7,300	750	2,520	1.92	2.21
August	680	95	211	.161	.19
September	415	59	121	.092	.11
The year	10,200	59	1,700	1.30	17.58

MACOUPIN CREEK NEAR KANE, ILL.

LOCATION.—Chain gage in SE. ¼ sec. 11, T. 9 N., R. 11 W., at highway bridge 3½ miles northwest of Kane. Zero of gage is 427.12 feet above mean sea level. Gage moved Oct. 1, 1928, from former site at Chicago & Alton Railway bridge 2 miles upstream.

DRAINAGE AREA.—875 square miles.

RECORDS AVAILABLE.—March, 1921, to September, 1929.

EXTREMES.—Maximum discharge during year, 16,000 second-feet May 15 (gage height, 21.4 feet); minimum, 16 second-feet Sept. 14 and 15.

1921–1929: Maximum discharge, 22,200 second-feet Oct. 4, 1926 (maximum gage height at former gage, 24.6 feet Mar. 15, 1922); minimum discharge, 1 second-foot Sept. 29 and Oct. 3, 5, and 15, 1922.

REMARKS.—Records good. Gage-height records furnished by Sanitary District of Chicago.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	20	31	52	74	180	275	1,540	520	1,240	89	45	19
2	25	44	44	89	188	215	1,430	4,600	1,360	83	45	19
3	20	40	40	84	156	275	695	10,600	1,330	83	45	19
4	18	40	40	84	120	940	445	12,200	1,090	72	37	19
5	1,990	34	37	177	120	820	370	12,200	670	72	37	27
6	1,440	37	34	485	120	445	275	10,100	470	67	180	24
7	760	37	31	510	127	215	245	6,440	770	78	197	37
8	960	34	28	460	120	164	6,290	2,700	720	127	95	30
9	1,080	40	28	320	95	134	8,500	1,240	520	1,710	72	27
10	360	34	22	360	95	114	10,100	940	320	1,850	227	22
11	139	37	28	360	89	95	9,600	745	275	745	215	19
12	94	34	28	360	83	95	5,730	5,730	850	370	225	19
13	64	34	48	360	72	320	1,920	9,600	2,600	225	107	19
14	56	34	154	177	72	850	1,300	14,000	1,820	770	53	16
15	48	31	220	154	62	2,020	2,750	16,000	880	545	45	16
16	74	230	240	146	83	7,300	2,320	12,800	520	345	40	19
17	320	280	610	146	215	4,510	1,180	4,800	370	320	45	19
18	118	220	1,200	1,230	255	1,780	770	3,920	275	570	45	19
19	74	154	885	2,850	197	940	595	12,200	235	320	37	19
20	69	125	360	2,360	197	720	880	11,100	206	142	34	58
21	60	106	211	1,640	164	545	5,600	6,140	172	114	30	27
22	56	79	132	3,050	101	470	8,300	1,780	156	95	30	22
23	48	64	118	3,710	95	370	7,700	940	142	89	30	19
24	44	56	112	3,100	107	345	4,510	745	225	72	27	19
25	40	48	100	1,780	420	275	2,400	645	320	72	27	19
26	44	52	94	570	2,160	4,000	2,750	570	197	95	27	19
27	37	48	94	370	1,120	3,850	1,920	495	142	107	27	19
28	34	48	94	215	545	2,000	940	520	114	67	27	19
29	34	40	84	255	-------	910	745	520	101	58	27	24
30	34	48	84	188	-------	670	620	470	83	53	19	89
31	31	-------	74	180	-------	595	--------	1,710	-------	49	19	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	1,990	18	264	0.302	0.35
November	280	31	71.3	.082	.09
December	1,200	22	172	.197	.23
January	3,710	74	834	.953	1.10
February	2,160	62	263	.300	.31
March	7,300	95	1,190	1.36	1.57
April	10,100	245	3,080	3.52	3.93
May	16,000	470	5,390	6.16	7.10
June	2,600	83	606	.693	.77
July	1,850	49	305	.348	.40
August	225	19	67.9	.077	.09
September	89	16	24.7	.028	.03
The year	16,000	16	1,030	1.18	15.97

KASKASKIA RIVER AT VANDALIA, ILL.

LOCATION.—Chain gage in SE. ¼ sec. 16, T. 6 N., R. 1 E. at Gallatin Street Bridge, Vandalia, 3½ miles above Hickory Creek. Zero of gage is 455.30 feet above mean sea level (revised).

DRAINAGE AREA.—1,980 square miles.

RECORDS AVAILABLE.—February, 1908, to December, 1912; August, 1914, to September, 1929.

EXTREMES.—Maximum discharge during year, 11,800 second-feet May 14 (gage height, 20.6 feet); minimum, 52 second-feet Sept. 21 and 22 (gage height, 1.01 feet).

1908–1912, 1914–1929: Maximum discharge, 20,000 second-feet Oct. 4, 1926 (maximum stage, 23.0 feet June 5, 1917); minimum, 3.5 second-feet Aug. 22, 1911.

REMARKS.—Records good. Discharge estimated Jan. 7 and 14–19, when affected by ice.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	60	230	340	1,020	1,200	1,820	5,070	2,120	2,200	540	420	96
2	60	230	340	1,050	1,080	1,610	5,850	3,120	3,790	540	400	96
3	60	214	320	900	840	1,540	4,040	6,770	4,590	515	380	96
4	60	230	320	750	840	2,200	2,840	9,340	4,410	490	380	96
5	400	230	300	640	810	2,120	2,520	9,980	3,790	490	380	90
6	720	206	282	2,280	810	1,960	2,080	9,660	3,790	490	360	90
7	720	206	264	1,920	750	1,780	2,120	7,440	3,990	515	400	84
8	440	206	230	1,960	640	1,400	7,320	6,090	5,070	1,200	400	84
9	380	206	230	2,200	565	1,330	10,800	4,590	4,770	2,400	380	90
10	320	206	230	2,240	515	1,050	11,000	3,590	3,200	2,840	360	84
11	300	206	214	2,200	465	990	8,740	2,720	2,520	3,290	340	84
12	247	206	230	2,080	465	870	6,460	4,830	5,210	3,590	320	79
13	214	198	1,260	1,860	465	1,200	5,070	7,560	6,090	3,690	960	69
14	198	206	1,920	1,750	440	6,180	5,930	11,800	6,360	3,840	870	60
15	183	360	2,720	1,580	440	6,460	6,180	10,100	6,560	3,990	590	64
16	230	420	1,820	1,470	465	6,460	6,270	8,600	5,770	4,470	440	64
17	840	540	2,680	1,580	490	6,460	5,700	7,680	3,490	5,700	340	64
18	665	640	5,280	1,680	515	5,420	4,470	8,190	2,760	6,010	198	60
19	565	665	5,350	4,470	515	4,710	3,290	9,500	1,860	2,560	190	60
20	490	690	4,950	5,420	490	3,840	2,760	9,180	1,580	1,500	168	56
21	515	640	3,440	6,660	465	3,160	4,470	7,680	1,400	1,170	161	52
22	380	540	2,920	6,180	465	2,880	6,990	6,180	1,200	990	147	52
23	465	490	2,520	5,850	440	2,200	7,800	5,350	1,080	870	120	56
24	465	465	2,280	5,930	440	1,960	5,770	4,710	990	750	108	56
25	420	440	1,960	5,850	590	2,000	5,070	4,090	930	720	127	56
26	360	440	1,720	5,210	2,200	6,010	4,290	3,490	870	640	114	56
27	540	420	1,330	4,830	2,720	8,320	3,640	3,000	780	615	114	56
28	320	400	1,200	4,290	2,200	8,740	3,040	2,560	720	590	108	60
29	282	380	1,080	2,480	-------	5,420	2,880	2,640	640	565	102	60
30	247	360	1,060	2,080	-------	3,590	2,480	2,560	590	515	102	60
31	230	-------	1,040	1,640	-------	2,960	-------	2,400	-------	440	102	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	840	60	367	0.185	0.21
November	690	198	362	.183	.20
December	5,350	214	1,610	.813	.94
January	6,660	640	2,900	1.46	1.68
February	2,720	440	797	.402	.42
March	8,740	870	3,430	1.73	1.99
April	11,000	2,080	5,160	2.60	2.90
May	11,800	2,120	6,050	3.06	3.53
June	6,560	590	3,030	1.53	1.71
July	6,010	440	1,820	.919	1.06
August	960	102	309	.156	.18
September	96	52	71	.036	.04
The year	11,800	52	2,170	1.10	14.86

BIG MUDDY RIVER AT PLUMFIELD, ILL.

LOCATION.—Chain gage in W. ½ sec. 20, T. 7 S., R. 2 E., at highway bridge at Plumfield, 1½ miles below mouth of Middle Fork.

DRAINAGE AREA.—753 square miles.

RECORDS AVAILABLE.—August, 1914, to September, 1929; June, 1908, to December, 1912, at Chicago, Burlington & Quincy Railroad bridge 2 miles upstream.

EXTREMES.—Maximum discharge during year, 8,100 second-feet Jan. 27 (gage height, 23.06 feet); minimum, 3.4 second-feet Sept. 3 and 4 (gage height, 0.97 foot).

1914–1929: Maximum discharge, 16,300 second-feet Feb. 1, 1916 (gage height, 30.2 feet); no flow Aug. 18–26, 1914.

REMARKS.—Records fair.

Daily and monthly discharge, in second-feet, 1928–29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	4.6	47	1,160	166	4,220	4,430	542	96	149	32	13	5.4
2	4.5	334	1,350	133	2,920	4,360	880	474	461	26	11	3.7
3	6.1	850	1,380	125	1,960	3,800	1,020	820	322	18	7.5	3.4
4	7.0	1,140	1,140	110	1,200	3,430	e 734	1,240	133	16	6.6	3.4
5	10	1,240	e 1,090	e 182	700	3,020	448	1,400	70	13	6.0	7.7
6	125	1,160	1,040	253	298	2,970	242	1,770	50	76	20	7.2
7	133	e 784	980	598	133	2,970	175	2,100	58	474	19	61
8	15	409	685	790	110	2,770	141	2,670	322	556	12	44
9	8.5	e 260	346	730	125	2,330	850	3,550	820	760	8.8	30
10	7.8	110	184	514	133	1,650	1,600	4,150	925	820	7.7	16
11	7.3	96	157	500	e 96	895	2,250	3,940	940	435	7.2	10
12	8.1	73	133	556	e 76	422	2,970	3,310	1,000	117	6.2	12
13	7.2	55	e 646	500	e 64	528	3,610	3,310	1,600	52	6.6	14
14	7.2	50	1,160	222	e 64	1,040	3,730	3,550	2,210	34	6.2	14
15	22	50	1,420	222	e 58	1,320	2,670	5,620	3,870	37	5.8	11
16	175	474	1,680	175	e 70	1,580	2,490	7,600	6,060	76	5.6	12
17	925	865	2,370	e 498	157	1,710	2,250	8,000	6,420	322	3.7	13
18	1,220	1,380	2,970	820	275	1,740	2,030	7,700	5,970	253	3.9	13
19	1,500	1,580	3,800	2,060	346	1,680	1,740	7,050	4,980	157	3.9	12
20	1,600	1,680	4,360	3,550	435	e 1,360	1,200	6,240	3,800	61	3.7	10
21	1,320	1,740	4,430	5,140	383	1,040	612	5,300	2,620	32	3.9	9.0
22	775	1,620	4,080	5,540	253	655	275	4,580	1,600	20	3.9	8.0
23	275	1,060	3,550	5,620	166	598	157	4,080	835	16	3.7	8.0
24	141	487	2,770	5,790	166	556	141	3,490	474	13	7.8	7.3
25	82	222	1,890	6,600	514	435	133	2,820	275	12	9.3	7.0
26	64	141	1,080	7,600	1,890	310	133	1,960	275	9.7	9.8	8.0
27	52	103	556	8,100	2,820	298	184	1,180	286	8.0	58	7.0
28	44	86	275	7,800	4,080	409	264	730	175	7.5	21	6.1
29	50	117	222	7,410	-------	396	193	461	89	6.7	12	4.9
30	73	805	232	6,510	-------	487	125	370	50	6.1	9.2	5.2
31	61	-------	202	5,380	-------	448	-------	212	-------	12	6.9	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	1,600	4.5	282	0.374	0.43
November	1,740	47	634	.842	.94
December	4,430	133	1,530	2.03	2.34
January	8,100	110	2,720	3.61	4.16
February	4,220	58	847	1.12	1.17
March	4,430	298	1,600	2.12	2.44
April	3,730	125	1,130	1.50	1.67
May	8,000	96	3,220	4.28	4.93
June	6,420	50	1,560	2.07	2.31
July	820	6.1	144	.191	.22
August	58	3.7	10	.013	.02
September	61	3.4	12.4	.016	.02
The year	8,100	3.4	1,150	1.53	20.65

e Interpolated or estimated.

BIG MUDDY RIVER AT MURPHYSBORO, ILL.

LOCATION.—Chain gage in SW. ¼ sec. 8, T. 9 S., R. 2 W., at South Twentieth Street highway bridge in Murphysboro, a quarter of a mile below mouth of Louis Creek. Zero of gage is 331.00 feet above mean sea level.

DRAINAGE AREA.—2,170 square miles.

RECORDS AVAILABLE.—December, 1916, to September, 1929.

EXTREMES.—Maximum and minimum discharge during year not determined. 1917–1929: Maximum discharge determined, 15,600 second-feet Jan. 10, 1917; minimum discharge, 1.0 second-foot Aug. 1, 1921.

In February, 1916, discharge estimated at 28,000 second-feet (gage height, 39.6 feet).

REMARKS.—Records fair. Backwater from Mississippi River Oct. 1–15, Oct. 19 to Jan. 8, Jan. 12 to Feb. 6, Feb. 26 to Aug. 15; discharge not determined.

Daily gage height, in feet, 1928-29

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	July	Aug.	Sept.
1	2.64	6.29	14.63	4.31	26.91	23.80	17.04	21.24	-------	7.49	3.43
2	2.64	9.69	14.78	3.66	25.86	24.70	16.09	21.89	-------	6.29	3.23
3	2.76	11.43	13.63	3.71	23.41	24.80	16.84	21.49	-------	5.14	3.13
4	2.70	11.11	13.88	3.68	21.76	24.85	17.04	23.01	-------	4.89	3.17
5	5.85	11.04	14.68	3.76	20.42	24.90	17.74	23.61	-------	5.29	3.12
6	5.55	10.97	13.83	4.86	16.41	24.75	17.84	25.14	-------	6.03	3.72
7	4.90	10.64	12.68	5.16	13.21	24.00	18.29	25.63	-------	4.48	4.12
8	4.65	10.29	11.38	6.41	10.51	23.30	18.19	26.04	-------	4.88	3.97
9	4.45	9.09	12.36	7.21	5.64	21.21	19.94	26.24	-------	4.83	4.11
10	4.10	7.94	10.43	8.01	4.09	19.97	21.34	26.64	-------	5.63	3.91
11	3.85	7.23	8.67	8.05	3.44	17.65	23.29	26.64	-------	5.47	4.11
12	3.35	6.48	7.37	7.40	2.79	14.45	23.84	26.33	-------	5.27	4.51
13	3.10	5.78	6.87	7.30	2.44	13.65	24.39	26.78	-------	4.47	4.51
14	2.80	4.98	10.88	6.90	2.89	13.70	24.54	27.43	-------	8.27	4.70
15	3.35	4.43	11.48	4.30	3.16	15.05	25.04	28.90	-------	7.57	4.60
16	14.65	7.28	13.68	7.85	3.49	17.20	25.54	30.01	-------	4.56	5.15
17	15.90	12.06	13.88	10.36	4.09	18.55	25.29	30.78	-------	4.26	5.05
18	15.55	13.83	14.48	13.26	4.79	19.65	24.09	30.88	-------	4.11	4.75
19	14.85	14.53	15.83	18.76	6.69	14.45	22.99	31.63	-------	3.86	4.49
20	14.35	15.68	19.40	20.76	6.84	13.65	20.84	31.23	-------	3.56	4.09
21	13.84	16.58	21.87	21.86	7.03	13.70	19.93	31.08	-------	3.50	3.89
22	12.49	17.23	22.37	24.26	6.48	15.05	21.04	30.38	-------	3.35	3.79
23	11.09	18.58	20.77	25.01	5.53	17.20	21.09	30.08	-------	3.25	3.69
24	8.79	19.33	19.37	27.06	8.33	17.35	22.34	29.73	-------	3.20	3.73
25	6.49	18.53	18.17	28.41	14.30	17.05	21.19	29.08	-------	3.25	3.58
26	5.39	17.23	14.37	29.06	18.35	16.85	20.04	-------	-------	3.14	3.43
27	5.09	14.63	13.17	30.38	20.21	16.25	18.98	-------	-------	3.14	3.38
28	4.79	13.33	11.82	31.08	21.90	16.20	20.20	-------	-------	3.09	3.28
29	4.69	13.88	8.66	31.16	-------	16.40	20.89	-------	4.05	3.24	3.22
30	4.64	13.48	6.11	30.68	-------	16.90	21.04	-------	3.60	3.34	4.22
31	4.54	-------	4.46	28.26	-------	17.00	-------	-------	8.60	3.58	-------

Daily discharge, in second-feet, 1928–29

Day	Oct.	Jan.	Feb.	Aug.	Sept.	Day	Oct.	Jan.	Feb.	Aug.	Sept.
1	-------	-------	-------	-------	50	16	3,650	-------	79	156	280
2	-------	-------	-------	-------	40	17	4,300	-------	143	115	250
3	-------	-------	-------	-------	34	18	4,150	-------	260	98	190
4	-------	-------	-------	-------	34	19	-------	-------	705	75	148
5	-------	-------	-------	-------	32	20	-------	-------	735	55	98
6	-------	-------	-------	-------	64	21	-------	-------	795	52	79
7	-------	-------	2,990	-------	98	22	-------	-------	645	44	71
8	-------	-------	1,960	-------	84	23	-------	-------	404	37	64
9	-------	855	426	-------	98	24	-------	-------	1,200	37	68
10	-------	1,100	143	-------	79	25	-------	-------	3,500	40	58
11	-------	1,100	75	-------	98	26	-------	-------	-------	34	50
12	-------	-------	35	-------	148	27	-------	-------	-------	34	47
13	-------	-------	21	-------	148	28	-------	-------	-------	32	42
14	-------	-------	40	-------	180	29	-------	-------	-------	40	37
15	-------	-------	54	-------	163	30	-------	-------	-------	44	109
						31	-------	-------	-------	58	-------

Monthly discharge, in second-feet, of Big Muddy River at Murphysboro, Ill., 1928–29

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
February 7–25	3,500	21	748	0.345	0.24
August 16–31	156	32	59.4	.027	.02
September	280	32	98.0	.045	.05

MISCELLANEOUS DISCHARGE MEASUREMENTS

Discharge measurements of streams in the upper Mississippi River Basin at points other than regular gaging stations are listed in the following table:

Miscellaneous discharge measurements in the upper Mississippi River drainage basin during the year ending Sept. 30, 1929

Date	Stream	Tributary to—	Locality	Gage height	Discharge
				Feet	*Sec-ft.*
July 27	Mississippi River		Aitkin, Minn	3.60	2,550
Sept. 7	do	do	do	3.91	2,480
July 30	do	do	Red Wing, Minn	1.10	7,640
Sept. 13	do	do	do	.40	7,380
23	do	do	do	.48	7,510
Apr. 3–4	do	do	Lyons, Iowa		141,000
Nov. 24	Maquoketa River	Mississippi River	Near Manchester, Iowa	4.32	285
May 17	do	do	do	4.26	270
18	do	do	do	4.06	215
18	do	do	do	4.03	197
Sept. 5	do	do	do	3.34	18.2
Nov. 24	do	do	Below Delhi, Iowa	3.26	490
Mar. 14	do	do	do	9.82	7,360
14	do	do	do	9.57	7,130
16	do	do	do	4.51	1,370
16	do	do	do	4.98	1,710
16	do	do	do	4.54	1,430
May 17	do	do	do	1.97	271
Sept. 5	do	do	do	1.88	233
Apr. 17	North Fork of Maquoketa River.	Maquoketa River	Near Fulton, Iowa	3.16	413
May 1	do	do	do	3.89	572
16	do	do	do	3.16	417
18	do	do	do	2.80	332
July 5	do	do	do	2.18	225
8	do	do	do	3.84	516
Sept. 5	do	do	do	1.71	152
Apr. 30	Wapsipinicon River	Mississippi River	Oxford Mills, Iowa	4.96	3,200
May 17	do	do	do	3.10	1,860
July 5	do	do	do	1.70	425
8	do	do	do	2.18	928
Sept. 5	do	do	do	.52	8.7
Apr. 3	do	do	Near Folletts, Iowa		4,860
Nov. 2	Iowa River	do	Wapello, Iowa	3.18	6,580
Mar. 19	do	do	do	14.38	55,700
Nov. 1	Skunk River	do	Coppock, Iowa	4.69	846
Oct. 30	Des Moines River	do	Keosauqua, Iowa	1.45	3,110
26	Sugar Creek	Des Moines River	Near Keokuk, Iowa	1.02	26.0

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