UNITED STATES DEPARTMENT OF THE INTERIOR
RAY LYMAN WILBUR, Secretary

GEOLOGICAL SURVEY
W. C. MENDENHALL, Director

Water-Supply Paper 715

SURFACE WATER SUPPLY *of the* UNITED STATES

1931

PART 5
HUDSON BAY AND UPPER MISSISSIPPI RIVER BASINS

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Prepared in cooperation with the States of
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ILLUSTRATION

SURFACE WATER SUPPLY OF HUDSON BAY AND UPPER MISSISSIPPI RIVER BASINS, 1931

AUTHORIZATION AND SCOPE OF WORK

This volume is one of a series of 14 reports presenting results of measurements of flow made on streams in the United States during the year ending September 30, 1931.

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, 1895–1932

1895	$12, 500. 00	1920	$175. 000. 00
1896	24, 500. 00	1921–1923	180 000. 00
1897–1899	50, 000. 00	1924–25	170. 000. 00
1900	70, 000. 00	1926	165. 000. 00
1901–2	100, 000. 00	1927	151, 000. 00
1903–1906	200, 000. 00	1928	147, 000. 00
1907	150, 000. 00	1929	270 500. 00
1908–1910	100, 000. 00	1930	275. 000. 00
1911–1917	150, 000. 00	1931	565. 000. 00
1918	175, 000. 00	1932	711, 000. 00
1919	148, 244. 10		

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 6,270 points in the United States and also at many points in Alaska and the Hawaiian Islands. In July, 1931, 2,660 gaging stations were being maintained by the Geological Survey and the cooperating organizations. Many miscellaneous discharge measurements were made at other points. In connection with this work data were also collected in regard to precipitation, evaporation, storage reservoirs, river profiles, and water power in many sections of the country and will be made available in water-supply papers from time to time.

DEFINITION OF TERMS

The volume of water flowing in a stream—the "run-off" or "discharge"—is expressed in various terms, each of which has become associated with a certain class of work. These terms may be divided into two groups—(1) those that represent a rate of flow, as second-feet, gallons per minute, 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 natural 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, 1930, and ending September 30, 1931. 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.

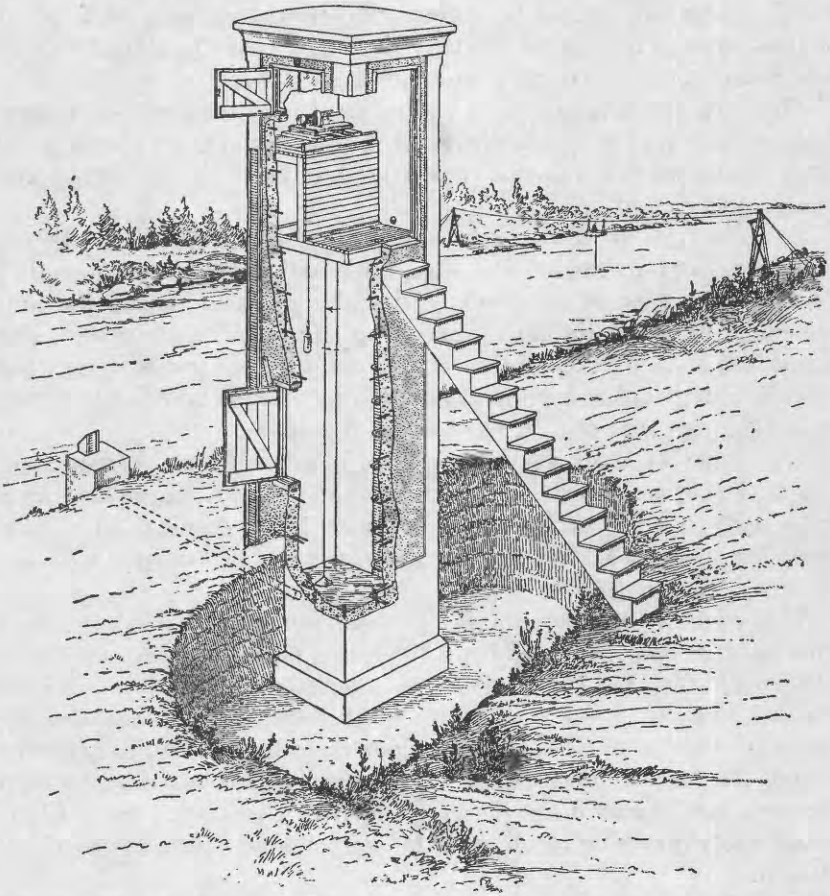

FIGURE 1.—Typical river-measurement station showing concrete well and house for water-stage recorder and staff gages, cable, and car

At the end of September, on the other hand, the only stored water available for run-off is possibly a small quantity in the ground; therefore the run-off for the year beginning October 1 is practically all derived from precipitation within that year.

The base data collected at gaging stations consist of records of stage, measurements of discharge, and general information used to supplement the gage heights and discharge measurements in deter-

mining 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.

Rating tables giving the discharge for any stage are prepared from the discharge measurements. The application of the daily gage height 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 discharges, 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 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," within 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 power, underground waters, and quality of waters. Most of the results of these investigations have been published in the series of water-supply papers, but some have appeared in the bulletins, professional papers, monographs, 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 1. North Atlantic slope basins (St. John River to York River).
2. South Atlantic slope and eastern Gulf of Mexico basins (James River to Mississippi River).
3. Ohio River Basin.
4. St. Lawrence River Basin.
5. Hudson Bay and upper Mississippi River Basins.
6. Missouri River Basin.
7. Lower Mississippi River Basin.
8. Western Gulf of Mexico basins.
9. Colorado River Basin.
10. The Great Basin.
11. Pacific slope basins in California.
12. North Pacific slope basins, 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., 603 State Public Works Building.
Trenton, N. J., 710 Trenton Trust Building.
Harrisburg, Pa., 604 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.
Urbana, Ill., 302 University New Agricultural Building.
Madison, Wis., 337N State Capitol.
St. Paul, Minn., 202 Old State Capitol.
Topeka, Kans., 23 Federal Building.
Rolla, Mo., Rolla 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, 303 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 6,270 points in the United States, and the data obtained have been published in the reports tabulated below and on pages 8 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 River.	1897.
W 16	Descriptions, measurements, and gage heights, western Mississippi River below junction of Missouri and Platte Rivers 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.

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

Report	Character of data	Year
W 381 to 394	completed data	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.
W 696 to 709	do	1930.

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 1931. 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 3 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, 1889–1931

[For basins included, see p. 6]

Year	1	2	3	4	5	6	7	8	9	10	11	12-A	12-B	12-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	565	566	567	568	569	570	571	572	573	574
1924	581	582	583	584	585	586	587	588	589	590	591	592	593	594
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
1930	696	697	698	699	700	701	702	703	704	705	706	707	708	709
1931	711	712	713	714	715	716	717	718	719	720	721	722	723	724

[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 4.
[b] James River only.
[c] Gallatin River.
[d] Green and Gunnison Rivers and Colorado 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 of monthly discharge for 1900 in Twenty-second Annual Report, Part 4.
[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 River.
[k] Tributaries of Mississippi River 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] The 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 in the several States was done under cooperative agreements as follows: In Illinois with the Illinois Department of Purchases and Construction, division of waterways, William F. Mulvihill, supervisor until January, 1931, and Judge Benjamin H. Miller, supervisor thereafter; in Indiana with the department of conservation, Denzil Doggett, assistant State engineer; in Minnesota with the Minnesota Department of Drainage and Waters, E. V. Willard, commissioner; in Missouri with the Missouri Bureau of Geology and Mines, H. A. Buehler, State geologist, and with the State Highway Department, T. H. Cutter, chief highway engineer; in North Dakota with the State engineer, Robert E. Kennedy; in Wisconsin with the Public Service Commission of Wisconsin, C. B. Hayden, chief engineer. Several stations in Montana, North Dakota, and Minnesota were maintained from funds appropriated by the Department of State of the United States.

Acknowledgments are also due the Corps of Engineers, United States Army, for financial assistance in collecting records published herein.

Assistance in collecting records was also rendered by the following municipalities and corporations: In Illinois by the Central Illinois Public Service Co.; in Iowa by the city of Ottumwa; in Minnesota by the Ford Motor Co.; in Wisconsin by the Northern States Power Co. and the Chippewa & Flambeau Improvement Co.

DIVISION OF WORK

The data for the stations in the several States were collected and prepared for publication as follows:

In Illinois and for the station on the Des Moines River at Eldon, Iowa, by J. H. Morgan, district engineer, assisted by L. C. Crawford and C. L. Muntz; in Indiana by H. E. Grosbach, district engineer, assisted by F. L. LeMert, W. D. Mitchell, W. P. Cross, R. L. Spencer, and Mrs. C. Perrin; in Minnesota and North Dakota and for all the stations on the Mississippi River, and for that on the Whetstone River near Big Stone, S. Dak., by C. L. Batchelder, district engineer, assisted by E. F. Chandler, A. H. Frazier, K. B. Nelson, Frank Stermitz, G. L. Oakland, and C. E. Putz; in Missouri by H. C. Beckman, district engineer, assisted by H. C. Bolon, R. D. Schmickle, C. J. Eyberg, and C. H. Jennings; in Montana by W. A. Lamb, district engineer, assisted by A. H. Tuttle, C. S. Heidel, Edward Post, E. H. Bekkedahl, H. C. Smith, and Mrs. G. Thompson; in Wisconsin, except the stations on the Mississippi River, by S. B. Soulé, district engineer, assisted by C. C. Yonker, C. M. Dahlen, Jacob Schmidt, and W. T. Wilson.

The records were reviewed and manuscript assembled by David S. Jenkins.

GAGING-STATION RECORDS

HUDSON BAY DRAINAGE BASIN

ST. MARY RIVER 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, 1929, to September, 1931.
EXTREMES.—Maximum stage during year, 5.40 feet May 18; minimum, 0.80 foot Oct. 28.
1929–1931: Maximum stage, 5.40 feet May 18, 1931; minimum, 0.02 foot Dec. 16, 29–30, 1929, Jan. 1, 1930.
REMARKS.—Records excellent. No diversion.

Daily gage height, in feet, 1930–31

Day	Oct.	May	June	July	Aug.	Sept.	Day	Oct.	May	June	July	Aug.	Sept.
1	------	------	4.40	3.02	2.46	1.42	16	1.30	5.30	3.70	2.56	1.88	1.48
2	------	------	4.68	2.90	2.52	1.38	17	1.25	5.40	3.88	2.52	1.82	1.46
3	------	------	4.78	2.82	2.52	1.40	18	1.20	5.20	3.90	2.48	1.78	------
4	1.34	------	4.52	2.78	2.48	1.38	19	1.15	4.85	3.82	2.46	1.80	------
5	1.30	------	4.42	2.76	2.42	1.36	20	1.10	4.36	3.74	2.44	1.80	------
6	1.28	------	4.25	2.72	2.40	1.38	21	1.10	4.10	3.58	2.42	1.78	------
7	1.28	------	4.20	2.66	2.34	1.40	22	1.10	3.88	3.56	2.40	1.76	------
8	1.34	------	4.34	2.60	2.28	1.44	23	1.00	3.68	3.54	2.38	1.74	------
9	1.38	------	4.32	2.58	2.20	1.54	24	1.00	3.60	3.56	2.34	1.72	------
10	1.40	------	4.34	2.58	2.16	1.52	25	1.00	3.64	3.28	2.32	1.66	------
11	1.38	------	4.44	2.64	2.12	1.48	26	.90	3.96	3.18	2.28	1.62	------
12	1.38	------	4.22	2.60	2.02	1.42	27	.90	4.20	3.20	2.22	1.62	------
13	1.40	------	4.02	2.56	1.98	1.44	28	.80	4.24	3.18	2.18	1.58	------
14	1.34	------	3.86	2.62	1.94	1.46	29	.84	4.20	3.16	2.16	1.56	------
15	1.30	------	3.72	2.58	1.90	1.50	30	.90	4.16	3.08	2.24	1.50	------
							31	.88	4.22	------	2.36	1.48	------

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 southeast of Babb.
RECORDS AVAILABLE.—May, 1929, to September, 1931.
EXTREMES.—Maximum stage during year, 3.20 feet May 18; minimum, 0.05 foot Oct. 23–25.
1929–1931: Maximum stage, 4.10 feet May 26, 1929; minimum, 0.04 foot Oct. 24–25, 1929.
REMARKS.—Records excellent. No diversions. Stage increased by inflow of Swiftcurrent Creek during part of year.

Daily gage height, in feet, 1930–31

Day	Oct.	May	June	July	Aug.	Sept.	Day	Oct.	May	June	July	Aug.	Sept.
1	0.22	------	2.30	1.69	1.78	1.15	16	0.08	2.78	2.00	1.55	1.29	0.20
2	.19	------	2.46	1.67	1.79	1.14	17	.07	3.05	2.10	1.52	1.28	.20
3	.18	------	2.58	1.66	1.77	1.13	18	.06	3.12	2.09	1.52	1.28	.20
4	.17	1.58	2.57	1.61	1.72	1.12	19	.06	2.95	2.10	1.54	1.27	.21
5	.16	1.68	2.47	1.60	1.69	1.04	20	.06	2.68	2.06	1.56	1.26	.25
6	.16	1.74	2.33	1.59	1.66	.78	21	.07	2.42	2.00	1.57	1.25	.32
7	.16	1.81	2.22	1.57	1.62	.60	22	.06	2.18	1.94	1.54	1.24	.35
8	.17	1.86	2.18	1.53	1.57	.53	23	.05	1.95	1.90	1.52	1.23	.38
9	.18	1.90	2.20	1.51	1.48	.54	24	.05	1.78	1.87	1.53	1.22	.39
10	.18	1.90	2.28	1.53	1.43	.44	25	.05	1.73	1.82	1.53	1.20	.40
11	.18	1.88	2.33	1.53	1.38	.35	26	------	1.77	1.76	1.52	1.20	.39
12	.18	1.89	2.36	1.53	1.34	.28	27	------	1.89	1.73	1.51	1.20	.39
13	.17	1.95	2.32	1.52	1.32	.24	28	------	2.05	1.74	1.49	1.20	.39
14	.15	2.13	2.18	1.53	1.31	.23	29	------	2.10	1.76	1.48	1.19	.38
15	.11	2.42	2.06	1.56	1.30	.21	30	------	2.10	1.74	1.54	1.19	.39
							31	------	2.16	------	1.67	1.17	------

ST. MARY RIVER NEAR BABB, MONT.

LOCATION.—Water-stage recorder in SE. ¼ sec. 27, T. 36 N., R. 14 W., 600 feet below 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; May, 1929, to September, 1931, summer records only.

EXTREMES.—Maximum discharge during year, 1,940 second-feet May 17 (gage height, 5.10 feet); minimum recorded discharge, 96 second-feet Apr. 26 (gage height, 1.60 feet).

1902–1925, 1929–1931: Maximum discharge, 7,980 second-feet June 5, 1908 (estimated gage height, 9.4 feet); minimum, 30 second-feet Apr. 3–7, 1904.

REMARKS.—Records good. Storage in Sherburne Reservoir on Swiftcurrent Creek. Intake for St. Mary Canal at left end of dam. Records show only water passing over crest of dam; diversion by canal not included.

Daily and monthly discharge, in second-feet, 1930–31

Day	Apr.	May	June	July	Aug.	Sept.	Day	Apr.	May	June	July	Aug.	Sept.
1	------	268	1,200	589	689	177	16	------	1,640	895	498	294	313
2	------	385	1,300	553	701	177	17	------	1,820	960	488	279	306
3	------	538	1,400	543	689	188	18	------	1,900	968	483	282	306
4	------	713	1,400	523	648	196	19	------	1,750	952	503	282	309
5	------	818	1,300	498	616	405	20	------	1,540	916	513	276	338
6	------	881	1,200	498	568	548	21	150	1,340	874	513	268	354
7	------	923	1,080	488	543	444	22	170	1,000	804	498	258	371
8	------	945	1,040	473	518	416	23	128	1,270	770	488	254	389
9	------	952	1,080	463	449	434	24	100	1,300	725	493	239	389
10	------	930	1,160	483	385	402	25	102	1,270	683	488	229	398
11	------	888	1,240	488	350	371	26	98	1,300	632	478	209	
12	------	881	1,240	493	325	338	27	98	1,400	626	449	217	
13	------	945	1,200	478	309	317	28	108	1,440	627	449	212	400
14	------	1,080	1,040	478	302	317	29	128	1,240	627	434	201	
15	------	1,340	916	493	306	309	30	170	1,120	610	458	188	
							31	------	1,120	-------	574	184	------

Month	Maximum	Minimum	Mean	Run-off in acre-feet
April 21–30	170	98	125	2,480
May	1,900	268	1,130	69,500
June	1,400	610	982	58,400
July	589	434	495	30,400
August	701	184	364	22,400
September	548	177	350	20,800
The period				204,000

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, 1931; September, 1902, to December, 1912, at point half a mile north of international boundary. 1905–1912 records obtained by the Irrigation Branch, Department of the Interior, Canada, half a mile below present station. Three records comparable.

EXTREMES.—Maximum discharge during year, 2,440 second-feet May 18 (gage height, 4.65 feet); minimum, 27.8 second-feet Dec. 18; ice present.

1902–1931: Maximum discharge (estimated), 18,000 second-feet June 5, 1908; minimum, 27.8 second-feet Dec. 18, 1930.

REMARKS.—Records good. 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 Swiftcurrent Creek. Station maintained jointly with the Dominion Water Power & Hydrometric Bureau, Department of the Interior, Canada.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	346	205	155	63	92	125	187	370	1,390	704	935	258
2	332	203	158	61	104	150	170	501	1,520	662	935	252
3	328	199	158	61	104	155	162	679	1,610	679	891	255
4	323	191	161	59	110	155	160	854	1,610	629	838	249
5	314	190	161	59	104	155	159	920	1,490	580	790	363
6	314	186	164	59	104	155	160	966	1,340	613	747	629
7	305	186	178	59	107	161	162	1,060	1,230	606	695	507
8	314	184	175	59	104	141	168	1,090	1,190	573	642	490
9	314	182	172	59	112	128	158	1,080	1,180	553	559	529
10	310	181	169	59	114	114	152	1,060	1,240	566	490	464
11	305	182	166	59	136	107	132	1,060	1,280	566	438	424
12	305	172	164	58	144	104	148	1,030	1,290	573	420	392
13	305	178	133	58	155	104	158	1,120	1,240	566	397	365
14	310	172	117	58	164	101	162	1,260	1,150	566	374	365
15	276	172	104	58	164	110	166	1,590	1,040	580	374	360
16	280	166	30.6	58	164	110	154	2,010	989	573	365	360
17	266	164	30.6	58	130	105	146	2,320	1,050	559	347	356
18	266	158	27.8	58	130	102	128	2,340	1,050	553	343	365
19	266	158	32.0	58	133	90	132	2,070	1,040	566	343	370
20	266	155	34.8	58	141	86	188	1,780	1,000	580	335	388
21	257	164	34.8	58	120	84	199	1,460	966	580	327	433
22	250	172	54	58	128	80	199	1,240	920	553	323	438
23	250	166	56	58	112	90	202	1,290	877	529	323	448
24	238	155	56	58	107	97	146	1,420	854	535	311	448
25	230	158	58	58	102	90	138	1,410	814	535	293	459
26	224	158	58	58	104	63	130	1,520	765	529	282	459
27	221	158	59	63	104	78	125	1,590	738	512	289	459
28	218	155	59	68	110	100	154	1,760	730	490	289	464
29	210	150	61	72	------	120	188	1,460	738	496	279	474
30	206	155	63	72	------	130	240	1,330	756	559	272	469
31	205	------	63	82	------	178	------	1,320	------	806	266	------

Month	Maximum	Minimum	Mean	Run-off in acre-feet
October	346	205	276	17,000
November	205	150	172	10,200
December	178	27.8	100	6,150
January	82	58	60.8	3,740
February	164	92	122	6,780
March	178	63	115	7,070
April	240	125	162	9,640
May	2,340	370	1,320	81,200
June	1,610	730	1,100	65,500
July	806	490	580	35,700
August	935	266	468	28,800
September	629	249	410	24,400
The year	2,340	27.8	409	296,000

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, 1 mile east of Babb.

RECORDS AVAILABLE.—Irrigation seasons, 1918–1931.

REMARKS.—Records good. 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 jointly with the Dominion Water Power & Hydrometric Bureau, Department of the Interior, Canada.

Daily and monthly discharge, in second-feet, 1931

Day	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.
1	0	0	363	593	633	600	632	5.6	105
2	0	0	416	609	643	601	624	5.4	106
3	0	0	455	616	649	600	606	5.6	102
4	0	0	456	616	649	600	576	5.6	97
5	0	0	454	614	651	598	320	5.4	97
6	0	0	456	608	646	600	10.0	5.2	51
7	0	0	463	604	646	612	9.2	5.6	10
8	0	0	482	603	646	620	9.2	5.6	0
9	0	0	500	611	646	616	9.2	5.2	0
10	0	0	528	612	646	619	8.2	5.4	0
11	0	0	551	612	646	624	8.0	5.4	0
12	0	0	556	606	646	620	7.8	8.0	0
13	0	0	556	608	646	628	7.8	11.5	0
14	0	4.6	557	609	646	643	7.8	11.2	0
15	0	4.4	558	609	646	643	7.6	12.4	0
16	0	4.6	563	604	649	643	7.6	12.4	0
17	0	12.4	563	603	649	644	7.6	12.1	0
18	0	30.4	558	614	649	644	7.6	12.1	0
19	0	25.6	542	616	651	644	7.6	12.7	0
20	0	5.8	539	619	646	644	7.4	13	0
21	41.2	6.0	538	624	646	643	7.4	96	0
22	41.2	6.0	536	622	644	643	7.4	187	0
23	47.5	56	158	620	646	641	7.2	218	0
24	0	161	11.2	617	649	641	7.2	221	0
25	0	226	10.6	619	646	640	7.0	223	0
26	0	290	9.8	624	648	640	6.6	225	0
27	0	331	9.8	625	644	638	6.2	225	0
28	0	336	39.2	627	644	638	6.0	225	0
29	0	341	365	630	648	638	5.8	184	0
30	0	348	463	630	648	636	6.0	105	0
31	0	-------	551	-------	617	635	--------	105	--------

Month	Maximum	Minimum	Mean	Run-off in acre-feet
March 21–23	47.5	41.2	43.3	258
April 14–30	348	4.4	129	4,350
May	563	9.8	413	25,400
June	630	593	614	36,500
July	651	617	645	39,700
August	644	598	628	38,600
September	632	5.8	98.2	5,840
October	225	5.2	70.3	4,320
November 1–7	106	10	81.1	1,130
The period	----------	----------	----------	156,000

NOTE.—No records October to December, 1930. No flow during January and February. Canal closed Nov. 7, 1931.

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, 9 miles northeast of Babb, and 10 miles below intake.

RECORDS AVAILABLE.—Irrigation seasons, 1918–1931.

REMARKS.—Records excellent. Station maintained jointly with the Dominion Water Power & Hydrometric Bureau, Department of the Interior, Canada.

Daily and monthly discharge, in second-feet, 1931

Day	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.
1	0	0	314	512	566	514	542	0	95
2	0	0	358	529	564	512	540	0	92
3	0	0	397	535	564	514	529	0	91
4	0	0	399	540	564	509	505	0	84
5	0	0	401	537	562	509	478	0	84
6	0	0	404	533	562	507	100	0	71
7	0	0	404	529	562	520	10	0	3
8	0	0	424	526	558	533	0	0	0
9	0	0	435	542	556	529	0	0	0
10	0	0	455	546	556	526	0	0	0
11	0	0	482	546	554	531	0	0	0
12	0	0	484	546	560	529	0	0	0
13	0	0	486	544	558	533	0	0	0
14	0	0	490	544	556	544	0	0	0
15	0	0	495	544	560	544	0	0	0
16	0	0	501	548	560	542	0	0	0
17	0	0	501	556	558	540	0	0	0
18	0	0	497	554	558	540	0	0	0
19	0	0	488	554	558	542	0	0	0
20	0	0	482	554	560	542	0	0	0
21	0	0	476	554	558	540	0	3[illegible]4	0
22	0	0	472	556	560	540	0	14[illegible]	0
23	21.6	0	296	556	558	542	0	18[illegible]	0
24	22.0	92	22	556	556	544	0	18[illegible]	0
25	15.4	173	7.9	556	554	540	0	18[illegible]	0
26	23.2	237	5.8	556	554	537	0	190	0
27	32.5	284	8.5	554	552	540	0	192	0
28	21.7	288	9.4	558	552	537	0	190	0
29	0	295	222	564	554	540	0	182	0
30	0	301	382	571	558	537	0	102	0
31	0	-------	469	-------	544	535	0	94	-------

Month	Maximum	Minimum	Mean	Run-off in acre-feet
March 23–31	32.5	0	15.2	271
April 24–30	301	92	239	3,320
May	501	5.8	363	22,300
June	571	512	547	32,500
July	566	544	558	34,300
August	544	507	532	32,700
September 1–7	542	10	386	5,360
October 21–31	192	34.4	153	3,340
November 1–7	95	3	74.3	1,030
The period				135,000

NOTE.—No records October to December, 1930. No flow during January and February. Canal closed Nov. 7, 1931.

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

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

RECORDS AVAILABLE.—Irrigation season, 1917–1931.

REMARKS.—Records good. Station maintained jointly with the Dominion Water Power & Hydrometric Bureau, Department of the Interior, Canada.

Daily and monthly discharge, in second-feet, 1931

Day	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.
1	0	297	479	546	528	522	0	98
2	0	325	508	548	515	517	0	95
3	0	3o6	524	555	517	513	0	90
4	0	378	528	557	506	494	0	90
5	0	388	526	548	522	470	0	87
6	0	396	522	548	494	294	0	91
7	0	392	522	550	496	42	0	14.4
8	0	400	519	546	519	10.2	0	0
9	0	416	522	544	522	7.2	0	0
10	0	434	535	546	517	2.8	0	0
11	0	462	528	535	524	.7	0	0
12	0	477	530	530	524	.1	0	0
13	0	481	528	539	522	0	0	0
14	0	485	530	537	530	0	0	0
15	0	491	535	546	537	0	0	0
16	0	500	533	548	537	0	0	0
17	0	500	552	548	535	0	0	0
18	0	491	535	541	533	0	0	0
19	0	491	539	541	528	0	0	0
20	0	485	544	544	528	0	0	0
21	0	479	544	548	528	0	0	0
22	0	475	546	544	526	0	0	0
23	0	438	544	546	526	0	127	0
24	0	158	544	546	524	0	182	0
25	34.8	31.6	544	544	524	0	177	0
26	187	9.0	548	541	519	0	187	0
27	248	4.3	544	541	524	0	188	0
28	280	4.4	544	537	524	0	188	0
29	287	13.2	546	537	524	0	187	0
30	292	271	570	550	517	0	156	0
31	-------	408	-------	555	522	0	103	-------

Month	Maximum	Minimum	Mean	Run-off in acre-feet
April 25–30	292	34.8	221	2,630
May	500	4.3	353	21,700
June	570	479	534	31,800
July	557	530	545	33,500
August	537	494	522	32,100
September	522	0	99.1	5,900
October 23–31	188	103	166	2,960
November 1–7	98	14.4	80.8	1,120
The period				132,000

NOTE.—No records October to December, 1930. No flow during January, February, and March. Canal closed Nov. 7, 1931.

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, Glacier National Park, 14 miles southwest of Babb.

DRAINAGE AREA.—31.4 square miles.

RECORDS AVAILABLE.—June, 1912, to September, 1931.

EXTREMES.—Maximum discharge during year, 1,110 second-feet May 17 (gage height, 4.61 feet); minimum, 28 second-feet Oct. 31 (gage height, 1.63 feet).

1912–1931: Maximum discharge, 1,550 second-feet June 17, 1916; minimum, 10 second-feet Nov. 6, 7, 1921 (gage height, 1.22 feet).

REMARKS.—Records excellent. Observations discontinued during winter. No diversions or regulation. Station maintained jointly with the Dominion Water Power & Hydrometric Bureau, Department of the Interior, Canada

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	May	June	July	Aug.	Sept.	Day	Oct.	May	June	July	Aug.	Sept.
1	52.0	------	584	165	219	58	16	44.6	1,040	284	150	75	90
2	50.0	------	584	142	194	56	17	41.0	965	380	156	78	86
3	48.5	------	529	137	165	58	18	38.6	571	404	142	80	84
4	45.8	------	394	134	148	59	19	36.2	374	336	142	82	90
5	45.8	297	313	150	129	61	20	37.4	277	277	140	84	102
6	45.8	290	303	159	114	62	21	36.2	216	235	137	84	126
7	50	468	340	153	102	66	22	35.0	179	245	137	82	121
8	66	428	418	156	98	69	23	36.2	176	294	137	80	109
9	75	320	446	162	90	77	24	36.2	223	287	131	75	100
10	66	271	446	170	86	61	25	37.4	453	232	129	73	92
11	58	303	411	173	86	53	26	37.4	592	216	124	69	92
12	53	414	336	153	84	56	27	38.6	502	245	121	69	92
13	48.5	610	277	142	84	68	28	38.6	442	258	119	62	96
14	47.0	750	245	145	80	86	29	36.2	380	239	109	61	96
15	47.0	949	245	142	75	92	30	33.0	414	207	137	61	88
							31	29.0	542	------	188	59	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off	
					Inches	Acre-feet
October	75	29.0	44.8	1.43	1.65	2,750
May 5–31	1,040	176	461	14.7	14.7	24,700
June	584	207	334	10.6	11.8	19,900
July	173	109	145	4.62	5.3	8,920
August	219	59	94.5	3.01	3.4	5,810
September	126	53	81.5	2.60	2.9	4,850

SHERBURNE LAKE RESERVOIR AT SHERBURNE, MONT.

LOCATION.—Recording gage in gatehouse 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; June, 1921, to September, 1931.

EXTREMES.—Maximum stage recorded during year, 4,780 feet June 23 (storage, 54,275 acre-feet).

1915, 1917–18, 1921–1931: Maximum stage during period, 4,784.6 feet June 20, 1925 (storage, 60,420 acre-feet).

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

Daily contents, in acre-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	17,800	20,100	22,000	22,000	23,040	23,700	24,900	24,900	43,020	52,840	31,640	6,140
2	------	------	------	------	------	------	24,900	24,470	44,150	52,200	31,070	5,304
3	------	------	------	------	------	------	24,900	24,360	45,350	51,720	30,520	4,358
4	------	------	------	------	------	------	------	24,580	46,340	51,250	29,700	3,700
5	------	------	------	------	------	------	25,000	24,360	47,200	50,800	28,990	2,820
6	------	------	------	------	------	------	25,000	24,140	47,800	50,350	28,220	2,407
7	------	------	------	------	------	------	25,200	24,250	48,550	49,900	27,450	2,466
8	------	------	------	------	------	------	25,400	24,360	49,300	49,300	26,570	2,525
9	------	------	------	------	------	------	25,600	24,360	50,200	48,850	25,910	2,643
10	------	------	------	------	------	------	25,700	24,360	50,800	48,400	25,300	2,702
11	------	------	------	------	------	------	25,750	24,140	51,560	47,650	24,580	2,761
12	------	------	------	------	------	------	25,910	24,030	52,040	47,050	23,920	2,882
13	------	------	------	------	------	------	26,020	24,140	52,200	46,480	23,040	3,068
14	------	------	------	------	------	------	26,240	24,690	52,360	45,920	22,200	3,192
15	------	------	------	------	------	------	26,405	25,500	52,680	45,200	21,400	3,254
16	------	------	------	------	------	24,360	26,570	26,680	52,840	44,450	20,500	3,316
17	------	------	------	------	------	------	26,570	28,440	53,150	43,860	19,600	3,378
18	------	------	------	------	------	------	26,680	30,180	53,450	43,020	18,880	3,378
19	------	------	------	------	------	------	26,680	31,520	53,750	42,340	17,900	3,440
20	------	------	------	------	------	24,415	26,680	32,600	53,900	41,950	17,160	3,505
21	------	------	------	------	------	------	26,790	33,260	53,900	40,390	16,200	3,570
22	------	------	------	------	------	24,470	26,900	33,700	53,900	39,610	15,170	3,830
23	------	------	------	------	------	------	27,120	34,180	53,900	38,700	14,270	4,090
24	------	------	------	------	------	------	27,010	34,780	54,200	37,660	13,440	4,224
25	------	------	------	------	------	------	26,350	35,680	54,050	36,800	12,570	4,358
26	------	------	------	------	------	------	25,700	37,160	53,900	35,810	11,740	4,425
27	------	------	------	------	------	------	25,400	38,570	53,900	35,160	10,618	4,492
28	------	------	------	------	23,700	------	25,200	39,480	53,750	34,180	9,880	4,492
29	------	------	------	------	------	24,800	25,000	40,780	53,450	33,260	9,024	------
30	------	22,000	------	------	------	------	25,000	41,040	53,150	32,710	8,040	------
31	20,100	------	22,000	23,040	------	24,900	------	41,950	------	32,120	7,006	------

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, 1931.
EXTREMES.—Maximum discharge during year, 643 second-feet July 24 (gage height, 4.83 feet); minimum, 12.4 second-feet Apr. 4 (gage height, 1.08 feet).
1912–1931: Maximum discharge, 2,280 second-feet June 17, 1916 (gage height, 7.83 feet); no flow at various 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 jointly with the Dominion Water Power & Hydrometric Bureau, Department of the Interior, Canada.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Apr.	May	June	July	Aug.	Sept.
1	55	-------	556	153	466	623	562
2	56	-------	620	132	472	620	562
3	56	-------	603	53	455	616	559
4	56	12.7	594	41.6	458	613	525
5	56	12.7	552	41.6	472	597	220
6	57	13.0	513	40.9	472	590	61
7	57	13.0	475	40.9	481	587	69
8	57	13.0	438	61.0	484	522	61
9	57	13.0	455	121	519	481	62
10	57	13.0	452	164	540	475	62
11	57	13.0	446	238	540	507	62
12	57	13.0	441	288	537	528	62
13	57	13.0	432	257	537	543	62
14	55	13.0	441	218	543	559	63
15	55	18.7	449	224	552	565	65
16	55	28.6	308	259	546	562	67
17	55	118	206	282	571	565	70
18	55	76	99	284	600	571	73
19	56	45.1	14.2	284	616	565	73
20	34.4	21.0	13.9	297	613	556	74
21	18.6	27.4	13.9	310	607	574	75
22	17.4	36.7	13.6	306	607	571	76
23	16.6	218	13.3	312	623	559	78
24	15.8	286	13.0	344	633	546	79
25	15.0	342	13.0	364	630	546	79
26	14.1	339	13.0	369	626	568	79
27	13.5	337	13.3	408	630	565	78
28	13.2	333	13.6	446	623	559	76
29	12.9	333	13.6	458	607	571	76
30	12.6	427	98	458	616	568	73
31	12.9	-------	153	-------	630	556	-------

Month	Maximum	Minimum	Mean	Run-off in acre-feet
October	57	12.6	40.7	2,500
April 4–30	427	12.7	116	6,210
May	620	13.0	274	16,800
June	458	40.9	242	14,400
July	633	455	558	34,300
August	623	475	562	34,600
September	562	61	139	8,270

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, 1931.

EXTREMES.—Maximum discharge during year, 124 second-feet May 17 (gage height, 1.84 feet); minimum, 4.3 second-feet Oct. 28 (gage height, 0.38 foot).

1918–1931: Maximum discharge (estimated), 500 second-feet May 16, 1922 (gage height, 3.34 feet); minimum, 3.2 second-feet Oct. 26, 1929 (gage height, 0.35 foot).

REMARKS.—Records good except those for estimated periods, Oct. 15–22, Sept. 9–29, which are fair. Observations discontinued during winter. No diversions. Station maintained jointly with the Dominion Water Power & Hydrometric Bureau, Department of the Interior, Canada.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	May	June	July	Aug.	Sept.	Day	Oct.	May	June	July	Aug.	Sept.
1	16.9	------	78	22.2	65	10.2	16	9.0	111	39.5	20.8	15.0	26
2	14.5	------	73	21.3	45.2	10.5	17	8.8	100	48.0	20.0	16.2	26
3	13.6	------	59	22.2	35.3	11.2	18	8.6	63	43.3	20.4	16.2	25
4	11.8	------	41.4	22.2	29.0	11.6	19	8.4	42.3	35.3	20.4	16.6	33
5	11.0	------	36.0	25.7	25.2	12.3	20	8.2	34.6	31.3	20.5	16.6	38
6	10.6	60	37.4	26.7	22.7	13.0	21	8.0	29.0	30.2	20.6	16.6	49
7	11.0	74	45.2	27.9	20.8	12.3	22	7.8	26.7	32.5	20.7	15.8	44
8	12.7	49	57	28.4	19.6	13.0	23	7.6	33.9	33.9	20.8	14.6	37
9	13.1	34.6	59	27.3	18.3	14	24	7.3	49	32.5	20.4	14.6	32
10	11.8	32.5	55	27.3	17.8	12	25	8.0	91	29.0	20.0	13.8	27
11	11.8	38.1	46.2	24.7	17.0	14	26	7.0	87	29.6	19.1	13.0	26
12	11.0	58	37.4	21.7	15.8	18	27	7.6	63	32.5	18.3	13.4	26
13	10.2	81	34.6	21.7	15.8	22	28	7.0	59	31.9	17.4	11.6	26
14	9.4	90	31.3	23.7	15.4	25	29	8.0	50	29.0	15.0	10.9	22
15	9.2	111	33.2	23.2	15.0	28	30	6.7	60	24.7	31.9	10.5	19.1
							31	6.3	71	------	81	10.5	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off	
					Inches	Acre-feet
October	16.9	6.3	9.77	1.40	1.61	601
May 6–31	111	26.7	61.5	8.79	9.50	3,140
June	78	24.7	40.9	5.84	6.52	2,430
July	81	15.0	24.3	3.47	4.00	1,490
August	65	10.5	19.5	2.79	3.22	1,200
September	49	10.2	22.8	3.26	3.64	1,360

RED RIVER BASIN

OTTERTAIL RIVER BELOW PELICAN RIVER, NEAR FERGUS FALLS, MINN.

LOCATION.—Water-stage recorder in NE. ¼ sec. 34, T. 132 N., R. 44 W., 8 miles southwest of Fergus Falls and 9 miles below mouth of Pelican River.
RECORDS AVAILABLE.—October, 1930, to September, 1931.
EXTREMES.—Maximum mean daily discharge during period, 345 second-feet Mar. 26; minimum, 7 second-feet Nov. 28.
REMARKS.—Records good. No records during period of ice effect, Jan. 2 to Mar. 20.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	------	35	34	97	------	138	129	48	81	27	50
2	------	28	65	------	------	97	69	39	82	47	28
3	------	28	55	------	------	125	122	35	74	22	32
4	------	34	58	------	------	242	167	36	44	40	22
5	------	42	52	------	------	110	55	40	110	36	18
6	------	45	34	------	------	174	162	32	70	31	36
7	------	39	39	------	------	201	58	37	78	38	16
8	------	25	59	------	------	207	188	27	47	75	14
9	------	21	69	------	------	168	66	49	40	53	34
10	------	27	78	------	------	137	145	109	96	43	16
11	------	21	110	------	------	88	146	312	58	28	15
12	68	20	81	------	------	127	91	264	178	25	15
13	30	24	57	------	------	154	166	183	90	25	30
14	35	24	72	------	------	60	167	55	81	23	31
15	52	22	66	------	------	163	213	65	42	24	26
16	37	34	67	------	------	89	286	116	79	23	19
17	66	62	64	------	------	86	204	64	37	33	17
18	47	57	73	------	------	120	328	122	60	52	37
19	85	59	64	------	------	98	317	147	54	47	26
20	45	53	53	------	------	164	228	186	65	34	37
21	26	90	48	------	177	204	258	85	45	20	21
22	40	64	39	------	101	76	232	259	44	23	50
23	38	77	86	------	179	62	217	154	51	21	130
24	36	93	78	------	180	183	107	144	37	9	263
25	43	54	83	------	261	198	59	77	80	31	201
26	61	61	69	------	345	85	79	54	62	23	65
27	40	35	77	------	165	195	56	180	42	38	36
28	33	7	70	------	196	196	140	68	39	20	14
29	27	46	72	------	86	119	239	90	34	38	18
30	32	58	76	------	181	157	80	55	23	35	15
31	29	------	46	------	116	------	172	------	18	16	------

Month	Maximum	Minimum	Mean	Run-off in acre-feet
October 12-31	85	26	43.5	1,730
November	93	7	42.8	2,550
December	110	34	64.3	3,950
March 21-31	345	86	181	3,940
April	242	60	141	8,390
May	328	55	160	9,840
June	312	27	104	6,190
July	178	18	62.6	3,850
August	75	9	32.3	1,990
September	263	14	44.4	2,640

RED RIVER AT FARGO, N. DAK.

LOCATION.—Staff gage in sec. 7, T. 139 N., R. 48 W., just above Island Park Dam, Fargo, and 10 miles above mouth of Sheyenne River. Zero of gage is 870.00 feet above mean sea level (1912 adjustment).

DRAINAGE AREA.—6,420 square miles.

RECORDS AVAILABLE.—May, 1901, to September, 1931.

EXTREMES.—Maximum discharge during year, 365 second-feet Apr. 3 (gage height, 8.55 feet); minimum, 1.4 second-feet Sept. 18, 19, 20 (gage height, 7.30 feet).

1901–1931: Maximum discharge, 7,740 second-feet July 11, 1916 (gage height, 17.34 feet); minimum, that of September, 1931.

REMARKS.—Records fair. Crest of dam was raised about 2.3 feet during spring of 1930. Discharge estimated Feb. 24 and July 25, when changes were made in fishway opening.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	16	36	19	a 28	a 32	a 96	235	124	92	102	29	7.7
2	13	a 36	16	28	33	90	311	166	133	115	a 29	6.3
3	16	36	19	25	33	90	365	a 151	154	130	29	4.2
4	21	a 32	19	a 24	33	94	299	136	112	a 118	25	5.6
5	a 20	29	16	24	33	102	a 247	142	118	a 105	20	4.2
6	20	28	16	22	36	100	195	127	80	92	19	9.2
7	25	28	a 18	19	36	107	172	102	a 63	77	25	7.0
8	33	26	20	19	a 34	a 116	231	118	46	73	31	7.0
9	36	a 28	20	21	33	124	199	130	33	69	a 28	7.7
10	25	29	22	20	30	107	184	a 132	39	69	25	7.0
11	34	28	24	a 20	32	102	215	133	57	65	27	8.4
12	a 30	33	25	20	30	104	a 215	130	65	a 74	27	7.0
13	25	46	25	20	28	115	215	142	77	84	33	5.6
14	33	46	a 25	20	32	124	191	124	a 164	75	29	4.2
15	33	36	25	18	a 32	a 128	160	142	251	69	29	5.6
16	29	a 42	26	16	33	133	151	130	275	57	a 29	4.2
17	25	48	26	13	32	133	160	a 139	247	65	29	3.5
18	29	33	26	a 16	32	118	130	148	191	87	24	2.1
19	a 27	33	29	19	32	118	a 146	169	130	a 77	21	2.1
20	25	39	29	19	28	118	163	223	80	67	17	2.1
21	25	61	a 29	16	32	112	133	243	a 96	49	14	4.2
22	24	55	29	16	a 30	a 130	136	267	112	43	10	7.0
23	28	a 50	29	16	29	148	148	295	112	36	7.0	7.0
24	29	46	29	20	56	172	163	a 285	166	36	7.7	8.4
25	48	44	a 30	a 22	69	178	195	275	195	26	7.7	10
26	a 46	a 43	32	25	63	207	a 156	255	160	a 24	8.4	15
27	45	a 41	29	22	75	184	118	255	191	22	14	17
28	42	40	a 28	25	102	184	154	184	a 184	21	13	39
29	48	34	26	25	------	a 152	172	118	178	22	13	108
30	48	a 26	29	25	------	121	154	a 109	160	22	15	141
31	48	------	29	30	------	160	------	a 101	------	37	9.2	------

Month	Maximum	Minimum	Mean	Run-off in acre-feet
October	48	13	30.5	1,880
November	61	26	37.7	2,240
December	32	16	24.6	1,510
January	30	13	21.1	1,300
February	102	28	39.3	2,180
March	207	90	128	7,870
April	365	118	190	11,300
May	295	101	168	10,300
June	275	33	132	7,860
July	130	21	64.8	3,980
August	33	7.0	20.8	1,280
September	141	2.1	15.6	928
The year	365	2.1	72.7	52,600

a Interpolated.

RED RIVER AT GRAND FORKS, N. DAK.

LOCATION.—Staff gage in NW. ¼ sec. 34, T. 152 N., R. 50 W., in Grand Forks, 2 miles below mouth of Red Lake River. Zero of gage is 784.10 feet above mean sea level.

DRAINAGE AREA.—25,500 square miles.

RECORDS AVAILABLE.—May, 1901, to September, 1931 (gage-height record 1882–1901 by United States Engineer Corps).

EXTREMES.—Maximum discharge during year, 1,630 second-feet Apr. 10 (gage height, 6.48 feet); minimum, 20 second-feet Sept. 25 (gage height, 1.18 feet).

1882–1931: Maximum discharge, 43,000 second-feet Apr. 10, 1897 (gage height, 50.2 feet); minimum, that of September, 1931.

REMARKS.—Records good except those for October to February, which are fair. Stage-discharge relation affected by ice Nov. 26 to Apr. 8 and by aquatic growth July 9 to Sept. 30. Discharge estimated Oct. 8–25, Oct. 27 to Nov. 7, Jan. 7–31, Feb. 2–10.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	143	220	275	178	201	365	845	796	596	418	144	113
2	143	250	255	178		365	966	694	596	504	144	113
3	131	240	201	170		365	1,050	796	474	474	152	112
4	131	210	201	163		390	1,130	796	564	474	136	108
5	131	200	201	156		390	1,220	796	534	474	136	101
6	131	200	185	156	200	365	1,260	728	390	418	144	100
7	143	170	189			365	1,310	660	362	362	152	94
8	170	170	193			365	1,440	564	310	336	170	87
9	200	170	185			341	1,490	534	362	310	152	83
10	200	170	185			365	1,580	534	362	297	152	81
11	200	178	193		201	365	1,540	596	418	284	144	70
12	240	178	193		218	390	1,280	564	504	284	144	64
13	240	178	178		236	390	1,160	564	474	260	144	56
14	240	178	185		236	390	1,120	564	297	228	136	47
15	240	178	185		236	443	1,090	564	228	238	136	37
16	200	178	185		236	530	1,120	534	260	249	136	37
17	200	185	185		236	530	1,090	564	323	238	152	32
18	190	218	185		236	530	1,090	534	534	238	152	32
19	190	255	185	160	255	530	1,090	534	830	228	136	32
20	200	318	185		318	530	1,050	534	830	228	128	31
21	200	341	185		275	530	1,120	534	796	238	128	31
22	230	365	185		365	471	902	534	728	218	128	25
23	240	365	185		390	471	902	534	694	208	128	23
24	240	365	185		443	500	1,010	596	628	198	128	22
25	220	365	185		471	500	866	596	534	198	120	20
26	201	365	193		471	530	796	596	534	188	120	22
27	200	365	201		416	530	796	596	504	179	120	22
28	230	318	193		416	530	830	628	418	179	120	67
29	220	318	185		------	885	830	660	323	152	120	64
30	230	318	201		------	806	796	628	362	136	110	58
31	220	------	201		------	731	------	628	------	144	113	------

Month	Maximum	Minimum	Mean	Run-off in acre-feet
October	240	131	197	12,100
November	365	170	251	14,900
December	275	178	194	11,900
January	178	156	161	9,900
February	471	200	273	15,200
March	885	341	477	29,300
April	1,580	796	1,090	64,900
May	796	534	612	37,600
June	830	228	492	29,300
July	504	136	277	17,000
August	170	110	136	8,360
September	113	20	59.5	3,540
The year	1,580	20	351	254,000

RED RIVER AT EMERSON, MANITOBA

LOCATION.—Chain gage on Canadian National Railway bridge in Emerson.
DRAINAGE AREA.—34,600 square miles.
RECORDS AVAILABLE.—March to November, 1902; October, 1929, to September 1931.
EXTREMES.—Maximum daily mean discharge during year, 7,940 second-feet Apr. 10 (gage height, 758.72 feet), maximum gage height, 760.32 feet Apr. 7; minimum discharge, 55 second-feet Sept. 14, 30 (gage height, 744.29 feet).
1929–1931: Maximum discharge, 20,800 second-feet Apr. 10, 1930; minimum, that of September, 1931.
Maximum stage known, 785.16 feet Apr. 24, 1916 (discharge, 46,200 second-feet).
REMARKS.—Stage-discharge relation affected by ice Oct. 16 to Apr. 9. Records furnished by the Dominion Water Power & Hydrometric Bureau, Department of the Interior, Canada.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	176	220	287	230	179	280	1,990	1,090	1,030	618	206	110
2	183	215	287	239	170	315	2,570	1,070	983	582	220	110
3	188	212	276	245	161	361	3,390	1,050	923	547	234	110
4	183	212	264	239	154	412	3,970	1,030	914	512	228	110
5	178	211	252	236	152	472	4,610	977	869	477	220	110
6	174	210	252	232	155	507	5,260	1,030	824	460	193	104
7	169	220	262	224	155	560	6,170	1,020	753	456	181	93
8	162	230	273	215	155	577	6,700	972	710	477	176	85
9	154	233	280	200	155	588	7,400	914	653	484	174	85
10	154	230	287	185	157	595	7,940	900	600	460	169	81
11	159	230	280	173	161	613	7,640	892	512	449	174	79
12	164	228	262	161	167	625	5,920	914	477	425	181	79
13	176	225	245	155	170	630	5,010	869	477	409	169	70
14	188	228	239	143	176	635	4,070	847	495	377	157	55
15	214	230	227	131	185	643	3,570	824	512	352	133	59
16	232	239	221	125	188	660	2,910	824	547	329	138	61
17	238	259	221	125	191	679	2,520	810	571	313	145	66
18	240	280	221	125	200	735	2,220	802	501	288	145	70
19	240	287	215	126	215	795	2,070	792	442	281	145	70
20	240	308	212	131	221	895	1,950	788	377	265	145	79
21	245	322	212	131	239	1,030	1,770	783	409	265	150	85
22	250	322	206	140	259	1,130	1,700	802	425	249	145	89
23	260	343	203	149	280	1,290	1,550	802	547	234	138	89
24	265	343	200	155	287	1,400	1,430	779	802	234	133	73
25	272	350	191	161	280	1,580	1,340	746	788	234	129	73
26	300	350	194	173	262	1,520	1,240	742	779	231	122	70
27	380	334	200	176	259	2,060	1,210	758	779	220	122	70
28	420	325	203	179	257	2,140	1,140	779	733	206	99	70
29	400	315	206	185	------	2,090	1,140	824	698	201	99	70
30	340	308	215	185	------	1,990	1,140	914	653	206	104	55
31	240	------	221	182	------	1,940	------	968	------	206	110	------

Month	Maximum	Minimum	Mean	Run-off in acre-feet
October	420	154	232	14,300
November	350	210	267	15,900
December	287	191	236	14,500
January	245	125	176	10,800
February	287	152	200	11,100
March	2,140	280	960	59,000
April	7,940	1,140	3,380	201,000
May	1,090	742	881	54,200
June	1,030	377	660	39,300
July	618	201	356	21,900
August	234	99	158	9,720
September	110	55	81.0	4,820
The year	7,940	55	631	457,000

BOIS DES SIOUX RIVER NEAR FAIRMOUNT, N. DAK.[1]

LOCATION.—Staff gage near center of sec. 22, T. 130 N., R. 47 W., at Soo Railway bridge 2 miles east of Fairmount, 5 miles west of Tenney, Minn., and 15 miles below Lake Traverse.
DRAINAGE AREA.—1,460 square miles.
RECORDS AVAILABLE.—April, 1919, to September, 1931.
EXTREMES.—1919–1931: Maximum discharge, 390 second-feet Apr. 22, 1922 (gage height, 5.7 feet); no flow in several different years.
REMARKS.—No flow during the entire year.

[1] Formerly published as Bois des Sioux River near Tenney, Minn.

MUSTINKA RIVER ABOVE WHEATON, MINN.

LOCATION.—Chain gage on line between secs. 7 and 8, T. 127 N., R. 46 W., 1 mile upstream from Chicago, Milwaukee, St. Paul & Pacific Railway bridge, 1½ miles northeast of Wheaton, and 8 miles above mouth.

DRAINAGE AREA.—776 square miles.

RECORDS AVAILABLE.—March to September, 1917; June, 1919, to September, 1924; March to September, 1931. June to November, 1916, at a point 3½ miles downstream.

EXTREMES.—Maximum discharge during period, 41 second-feet June 10 (gage height, 1.80 feet); no flow May 4–5, July 18, 20–31, Aug. 1–6, 26–31, Sept. 1, 15–30.

1917, 1919–1924, 1931: Maximum discharge, about 2,340 second-feet Apr. 1, 1917 (gage height, 14.7 feet at former datum; relation to present datum unknown); no flow during several periods.

REMARKS.—Records fair.

Daily and monthly discharge, in second-feet, 1931

Day	Mar.	Apr.	May	June	July	Aug.	Sept.
1		2.8	0.5	0.5	3.7	0	0
2		2.6	.4	.2	3.6	0	36
3		3.0	.1	1.3	4.1	0	26
4		2.4	0	1.0	3.9	0	22
5		3.0	0	.6	3.7	0	21
6		2.3	.3	.4	3.9	0	6.1
7		1.8	.3	.9	4.1	20	5.1
8		1.5	.2	1.0	4.1	4.4	3.4
9		1.3	.5	1.1	3.7	1.0	3.0
10		.9	.5	e 20	1.9	.5	1.3
11		.7	.7	7.5	1.6	8.2	.3
12		e.8	.7	6.5	1.6	15	.3
13		e.9	.9	4.4	1.4	3.1	.4
14		e1.0	1.3	.9	.3	1.0	.3
15		1.1	1.1	1.0	.1	1.0	0
16		1.0	1.5	1.1	.1	1.8	0
17		.6	.6	2.3	.1	1.0	0
18	5.1	.7	.6	2.4	0	.9	0
19	4.8	1.0	e.6	3.1	.2	1.0	0
20	3.7	e 2.2	.7	3.4	0	e.5	0
21	3.4	1.3	1.1	4.1	0	.4	0
22	1.1	.6	.8	4.4	0	.3	0
23	1.6	.5	.4	4.8	0	.1	0
24	6.5	1.0	.5	4.4	0	.2	0
25	5.3	.9	.4	5.1	0	.1	0
26	4.6	1.0	1.0	5.6	0	0	0
27	3.7	.9	.7	4.9	0	0	0
28	e4.0	.9	.9	3.7	0	0	0
29	e4.0	.9	1.1	4.4	0	0	0
30	6.1	.4	.6	4.2	0	0	0
31	5.6	-------	.9	-------	0	0	-------

Month	Maximum	Minimum	Mean	Run-off in acre-feet
March 18–31	6.5	1.1	4.25	118
April	3.0	.4	1.33	79
May	1.5	0	.64	39
June	20	.2	3.51	209
July	4.1	0	1.36	84
August	20	0	1.95	120
September	36	0	4.17	248
The period				897

e Estimated or interpolated.

SHEYENNE RIVER AT SHEYENNE, N. DAK.

LOCATION.—Wire gage in T. 150 N., R. 66 W., about 1 mile north of Sheyenne. Zero of gage is 1,410.14 feet above mean sea level (1912 adjustment).

RECORDS AVAILABLE.—April, 1929, to September, 1931.

EXTREMES.—Maximum discharge during year, 58 second-feet Apr. 9, 10 (gage height, 2.81 feet), maximum stage, 3.33 feet Apr. 3; no flow for several weeks.

1929–1931: Maximum discharge, 990 second-feet Feb. 24, 1930 (gage height, 8.79 feet); no flow for various periods.

REMARKS.—Records poor. No flow July 23 to Sept. 30. Discharge estimated Mar. 23–31.

Daily and monthly discharge, in second-feet, 1930–31

Day	Nov.	Mar.	Apr.	May	June	July
1			9.0	3.1	0.7	0
2			28	1.9	1.1	0
3			36	2.2	.7	0
4	0.3		33	2.9	.7	0
5			43	2.4	.6	.2
6			53	2.9	.6	.4
7			56	2.9	.7	.2
8			56	3.4	.6	.2
9			58	3.4	.4	.1
10			58	3.4	.2	.2
11			53	3.1	.6	.2
12			48	3.1	.6	1.3
13			46	2.9	.6	.9
14			38	2.9	.6	.4
15			33	2.4	.6	.6
16			28	1.8	.4	.9
17			21	1.4	.2	1.1
18			21	3.1	.1	1.1
19			19	3.4	0	.9
20			14	1.3	0	.9
21			8.3	1.3	0	.7
22			7.4	1.7	.2	.2
23			7.0	.9	.2	0
24			5.5	2.4	.1	0
25			4.9	1.1	0	0
26		5.0	4.3	1.3	0	0
27			3.7	.9	0	0
28			3.7	1.5	0	0
29			2.6	1.1	0	0
30			2.6	1.1	0	0
31				.7		0

Month	Maximum	Minimum	Mean	Run-off in acre-feet
March 23–31			5.0	89
April	58	2.6	26.7	1,590
May	3.4	.7	2.19	135
June	1.1	0	.35	21
July	1.3	0	.34	21
The period				1,860

NOTE.—Little or no flow Oct. 1 to Mar. 22. No flow August and September.

SHEYENNE RIVER AT WEST FARGO, N. DAK.

LOCATION.—Chain gage in sec. 6, T. 139 N., R. 49 W., about half a mile north of West Fargo, formerly called Haggart.

RECORDS AVAILABLE.—September, 1929, to September, 1931; at station a quarter of a mile above, March, 1902, to June, 1907, March to August, 1919.

EXTREMES.—Maximum discharge during year, 390 second-feet Apr. 7 (gage height, 7.84 feet); minimum, 6 second-feet Jan. 9, 24, 27, Feb. 5, 9; minimum stage, 2.53 feet July 30, Aug. 26.

1902–1907, 1919, 1929–1931: Maximum discharge, 2,030 second-feet Apr. 9–11, 1902 (gage height, 18.0 feet, former datum); minimum, that of 1931.

REMARKS.—Records good except those for period of ice effect, Nov. 23 to Mar. 22, which are fair.

Daily and monthly discharge, in second-feet, 1930-31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	18	23	44	30	12		168	129	a 65	56	19	17
2	17	22	32	28	12		220	129	66	54	18	18
3	17	23	28	20	16		236	110	64	52	24	18
4	18	25	30	24	12		196	110	66	a 49	a 26	19
5	19	25	28	21	6	80	261	104	92	46	27	19
6	20	22	24	19	7		270	104	86	46	30	19
7	22	21	26	16	9		390	104	92	44	42	18
8	23	24	24	11	10	122	378	98	92	42	34	19
9	24	28	22	6	6	129	320	a 95	10[illegible]	a 40	32	20
10	25	28	17	10	8	105	320	a 93	10[illegible]	38	26	18
11	26	30	17	11	10	81	290	a 90	116	36	21	19
12	28	30	14	12	27	110	236	a 87	20[illegible]	32	22	a 18
13	28	32	14	12	44	110	228	a 84	290	34	a 21	17
14	27	34	14	12	152	110	212	a 82	310	32	20	18
15	26	32	20	12	159	116	212	a 79	320	26	19	18
16	26	34	16	11	122	122	228	a 76	270	25	20	18
17	25	30	12	11	110	98	228	a 74	159	32	20	19
18	24	22	18	10	104	86	252	71	152	28	19	18
19	21	50	28	10	98	92	261	76	123	25	20	17
20	22	54	30	8	64	92	236	76	93	25	21	18
21	19	56	32	10	58	98	228	71	7[illegible]	24	19	19
22	20	50	38	12	61	110	212	71	7[illegible]	23	18	20
23	21	30	26	9	64	116	188	71	7[illegible]	21	a 18	19
24	23	61	24	6	58	152	180	71	7[illegible]	20	18	18
25	24	30	18	8	50	122	159	71	6[illegible]	18	17	a 18
26	26	32	14	11	54	342	159	71	6[illegible]	18	15	17
27	26	36	17	6	50	320	159	66	6[illegible]	17	17	a 18
28	25	36	12	10	50	244	152	66	5[illegible]	16	18	18
29	24	30	22	10	------	a 162	136	64	5[illegible]	16	17	18
30	25	34	18	11	------	81	132	66	5[illegible]	15	17	18
31	24	------	30	11	------	116	------	64	------	17	a 17	------

Month	Maximum	Minimum	Mean	Run-off in acre-feet
October	28	17	23.0	1,410
November	61	21	32.8	1,950
December	44	12	22.9	1,410
January	30	6	12.8	787
February	159	6	51.2	2,840
March	342	----------	122	7,500
April	390	132	228	13,600
May	129	64	84.6	5,200
June	320	54	117	6,960
July	56	15	31.2	1,920
August	42	15	21.7	1,330
September	20	17	18.3	1,090
The year	390	6	63.6	46,000

a Interpolated.

DEVILS LAKE NEAR DEVILS LAKE, N. DAK.

LOCATION.—Staff gage at Lakewood, half a mile from the main lake on east bank of entrance to Creel Bay, an arm of Devils Lake 2 miles long and half a mile wide on north side of the lake about 6 miles southwest of city of Devils Lake.

RECORDS AVAILABLE.—1901–1931 (fragmentary). Single gage heights in 1867, 1879, 1883, 1887, 1890, 1896.

REMARKS.—All gage heights previously published refer to a gage the zero of which was 1,412.21 feet above mean sea level according to levels run by topographic branch of the United States Geological Survey in 1928.

Elevation, in feet, of Devils Lake, 1921–1930

July 7, 1921 ..... 1,417.3	Sept. 3, 1925 ..... 1,415.4	Aug. 10, 1929 ..... 1,412.5
Nov. 11, 1921 ..... 1,417.2	Sept. 7, 1926 ..... 1,414.3	Oct. 5, 1929 ..... 1,411.9
June 25, 1922 ..... 1,417.8	Sept. 1, 1927 ..... 1,414.2	Sept. 27, 1930 ..... 1,411.6
Aug. 27, 1923 ..... 1,416.9	June 19, 1928 ..... 1,413.4	
June 26, 1924 ..... 1,416.8	May 30, 1929 ..... 1,412.8	

NOTE.—The elevations in the above table have been adjusted to agree with the 1928 level adjustment of the topographic branch of the United States Geological Survey.

Daily elevation, in feet, of Devils Lake, 1930–31

Day	Oct.	Nov.	Apr.	May	June	July	Aug.	Sept.
1	11.58	11.76	.....	.....	11.60	11.38	11.09	10.91
2	11.58	.....	.....	.....	11.63	11.36	11.11	10.91
3	11.57	.....	11.91	.....	11.56	11.29	11.11	10.91
4	11.58	11.66	.....	.....	11.61	11.38	11.09	10.94
5	11.60	.....	.....	.....	11.58	11.44	11.02	10.84
6	11.60	.....	.....	11.79	11.40	11.36	11.01	10.89
7	11.66	.....	.....	11.80	11.46	11.36	11.04	10.85
8	11.61	.....	.....	11.83	11.43	11.34	11.04	10.81
9	11.61	.....	.....	11.74	11.44	11.34	11.08	10.81
10	11.61	.....	.....	11.77	11.38	11.34	11.00	10.81
11	11.65	.....	.....	11.76	11.55	11.33	11.04	10.80
12	11.75	.....	.....	11.76	11.52	11.40	11.01	10.78
13	11.72	.....	.....	11.76	11.51	11.39	10.94	10.80
14	11.75	.....	.....	11.81	11.51	11.38	10.94	10.72
15	11.85	.....	.....	11.71	11.54	11.34	10.98	10.73
16	11.95	.....	.....	11.73	11.52	11.35	10.96	10.76
17	.....	.....	.....	11.94	11.50	11.37	10.93	10.78
18	.....	.....	.....	11.71	11.48	11.40	10.94	10.76
19	.....	.....	.....	11.81	11.40	11.34	11.01	10.78
20	.....	.....	.....	11.66	11.44	11.36	10.98	10.81
21	.....	.....	.....	11.64	11.36	11.29	10.98	10.84
22	.....	.....	.....	11.71	11.38	11.24	10.94	10.86
23	.....	.....	.....	11.65	11.41	11.24	10.92	10.77
24	.....	.....	.....	11.66	11.36	11.26	10.88	10.81
25	11.76	.....	.....	11.68	11.39	11.19	10.86	10.85
26	.....	.....	.....	11.62	11.36	11.21	10.88	10.86
27	11.76	.....	.....	11.58	11.38	11.14	11.02	10.86
28	11.74	.....	.....	11.65	11.41	11.08	10.91	10.84
29	11.71	.....	.....	11.66	11.42	11.14	10.96	10.88
30	11.71	.....	.....	11.64	11.41	11.09	11.11	10.82
31	11.71	.....	.....	11.66	.....	11.08	10.96	.....

NOTE.—Add 1,400 feet to elevations in the above table to reduce them to mean sea-level datum.

BUFFALO RIVER NEAR DILWORTH, MINN.

LOCATION.—Chain gage on line between secs. 6 and 7, T. 140 N., R. 47 W., about 6 miles north of Dilworth, Minn.

RECORDS AVAILABLE.—March to September, 1931.

EXTREMES.—Maximum discharge, during period, 44 second-feet Apr. 10 (gage height, 2.36 feet); maximum gage height, 3.92 feet Apr. 5 (ice affected); minimum discharge, 3.6 second-feet Sept. 12 (gage height, 0.49 foot).

REMARKS.—Records good except those for period of ice effect Mar. 29 to Apr. 9, which are fair.

Daily and monthly discharge, in second-feet, 1931

Day	Mar.	Apr.	May	June	July	Aug.	Sept.
1		32	26	31	16	15	5.9
2		34	25	31	14	18	6.5
3		36	24	28	12	20	5.5
4		38	24	27	11	19	5.9
5		42	24	24	13	17	5.5
6		40	24	22	12	17	5.5
7		42	24	23	14	17	5.0
8		40	24	21	14	21	4.6
9		42	25	22	14	20	4.5
10		44	25	20	14	23	4.1
11		38	26	28	14	21	3.8
12		38	26	35	18	19	3.6
13		34	26	37	21	17	4.1
14		34	26	33	27	14	4.8
15		34	25	31	29	13	4.5
16		32	24	31	24	11	4.1
17		32	24	31	24	12	5.6
18		30	28	28	25	11	5.9
19	18	32	28	27	27	9.2	6.0
20		30	32	24	29	8.4	5.2
21		30	32	20	25	7.9	5.4
22		28	34	22	25	7.4	6.8
23		28	32	24	21	7.4	7.9
24		30	30	27	17	6.5	7.8
25		28	28	27	14	6.0	9.1
26		28	30	24	12	5.9	9.5
27		28	30	24	10	6.0	10.0
28		28	29	22	9.2	5.8	9.6
29	22	28	29	20	10	5.9	9.6
30	22	26	29	19	10	6.5	9.1
31	22		29		13	5.9	

Month	Maximum	Minimum	Mean	Run-off in acre-feet
April	44	26	33.5	1,990
May	34	24	27.2	1,670
June	37	19	26.1	1,550
July	29	9.2	17.4	1,070
August	23	5.8	12.7	781
September	10.0	3.6	6.18	368
The period				7,430

WILD RICE RIVER AT TWIN VALLEY, MINN.

LOCATION.—Chain gage in SE. ¼ sec. 22, T. 144 N., R. 44 W., at highway bridge three-quarters of a mile northeast of Twin Valley.
DRAINAGE AREA.—805 square miles.
RECORDS AVAILABLE.—July, 1930, to September, 1931. June, 1909, to September, 1917, at a station a quarter of a mile downstream.
EXTREMES.—Maximum discharge during year, 112 second-feet May 21 (gage height, 1.91 feet); minimum discharge, 6 second-feet Sept. 19 (gage height, 0.60 foot).
1909–1917, 1930–31: Maximum discharge, 9,200 second-feet July 22, 1909 (not referred to present gage); minimum, 4.4 second-feet Aug. 23, 24, 1930 (gage height, 0.62 foot).
REMARKS.—Records fair. No records Dec. 2 to Mar. 23.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	12	38	[a] 27		49	57	60	51	33	13
2	12	21	27		54	40	56	51	38	11
3	12	21			58	43	58	40	38	11
4	12	21			62	45	43	35	36	11
5	13	21			82	45	45	38	36	10
6	13	[a] 23			87	43	47	37	40	11
7	14	[a] 26			82	43	45	35	36	10
8	14	28			82	45	44	31	38	9.2
9	15	29			86	47	38	30	29	8.9
10	14	30			87	45	49	31	28	8.3
11	13	30			86	43	63	33	29	7.8
12	15	29			86	43	80	35	27	7.4
13	14	28			84	45	90	33	26	7.4
14	14	29			84	43	93	35	27	7
15	13	31			82	42	88	35	26	7
16	13	29			77	41	77	33	25	6.6
17	13	29			80	51	60	35	25	6.6
18	14	28			68	62	58	33	25	6.4
19	13	28			71	63	58	33	25	6.2
20	14	29			71	57	63	32	25	6.2
21	13	29			68	92	65	32	25	7.6
22	13	30			80	101	63	32	25	10
23	13	31			75	95	67	32	27	11
24	13	32		45	72	98	70	28	21	13
25	13	32		47	70	71	71	26	18	13
26	14	31		[a] 47	65	51	56	25	13	14
27	14	30		47	64	63	51	16	17	14
28	15	28		46	65	63	51	17	16	14
29	18	27		47	68	77	51	7.8	14	14
30	22	[a] 27		47	68	74	52	9.5	14	14
31	27			49		74		16	14	

Month	Maximum	Minimum	Mean	Run-off in acre-feet
October	27	12	14.3	879
November	38	21	28.2	1,680
March 24–31	49	45	46.9	744
April	87	49	73.8	4,390
May	101	40	58.1	3,570
June	93	38	60.4	3,590
July	51	7.8	30.9	1,900
August	40	13	26.3	1,620
September	14	6.2	9.89	588

[a] Interpolated.

RED LAKE AT WASKISH, MINN.

LOCATION.—On line between secs. 8 and 9, T. 154 N., R. 30 W., on highway bridge across Tamarack River in village of Waskish, about ε quarter of a mile from lake. Zero of gage is 1,100.00 feet above mean sea level.

DRAINAGE AREA.—1,950 square miles above outlet of lower Red Lake.

RECORDS AVAILABLE.—April, 1930, to September, 1931.

EXTREMES.—Maximum stage recorded during year, 74.55 feet Oct. 18; minimum, 72.65 feet Sept. 26.

1930–31: Maximum gage height, 74.85 feet June 2, 1930; minimum, 72.65 feet Sept. 26, 1931.

REMARKS.—Daily gage height subject to fluctuation caused by direction and velocity of wind. A dam was constructed across the outlet of the lake in September, 1931, but gates were not closed.

Daily gage height, in feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	73.40	73.45	------	------	------	------	------	73.35	73.25	73.20	73.05	72.90
2	73.40	------	------	------	------	------	------	73.30	73.20	73.70	73.20	73.05
3	73.45	------	------	73.40	------	------	------	73.55	73.20	73.25	73.15	73.00
4	73.40	------	------	------	------	------	73.35	73.60	73.30	73.10	73.20	72.80
5	73.60	------	------	------	------	------	------	73.30	73.22	73.15	73.05	72.80
6	73.40	------	73.40	------	------	------	------	73.20	73.80	73.60	73.10	72.80
7	73.45	------	------	------	73.42	73.38	------	73.30	73.30	73.10	73.03	72.80
8	73.50	------	------	------	------	------	------	73.30	73.20	73.10	73.00	72.90
9	73.50	73.30	------	------	------	------	73.50	73.30	73.20	73.10	73.00	72.95
10	73.45	73.35	------	73.45	------	------	73.60	73.35	72.90	73.10	72.90	72.85
11	73.40	73.25	------	------	------	------	73.40	73.32	73.20	73.10	73.05	73.05
12	73.40	73.60	------	------	------	------	73.35	73.30	73.25	73.15	72.85	72.95
13	73.45	73.60	73.40	------	------	------	73.40	73.40	73.25	73.15	72.85	72.95
14	73.35	73.60	------	------	73.40	73.38	73.45	73.40	73.55	73.40	73.00	72.80
15	73.45	73.45	------	------	------	------	73.45	73.35	73.30	73.40	72.95	72.80
16	74.20	73.40	------	------	------	------	73.45	73.20	73.35	73.20	73.05	72.85
17	74.50	73.45	------	73.42	------	------	73.40	73.30	73.25	73.20	73.00	73.00
18	74.55	73.50	------	------	------	------	73.40	73.20	73.30	73.05	73.00	72.80
19	74.50	73.45	------	------	------	------	73.50	73.22	73.60	73.20	72.95	72.80
20	74.20	73.55	73.45	------	------	------	73.40	73.20	73.60	73.15	73.05	72.80
21	74.50	73.85	------	------	73.40	------	73.45	73.20	73.10	73.10	73.00	73.05
22	73.95	73.90	------	------	------	------	73.45	73.30	73.05	73.20	73.05	73.10
23	73.60	------	------	------	------	73.35	73.60	73.20	73.10	73.20	73.05	73.20
24	73.40	------	------	73.40	------	------	73.60	73.40	73.10	73.20	73.05	72.80
25	73.40	------	------	------	------	------	73.50	73.30	73.20	73.20	73.00	72.80
26	73.40	------	------	------	------	------	73.45	73.20	73.30	73.10	73.05	72.65
27	73.40	------	73.43	------	------	------	73.45	73.20	73.10	73.10	74.20	72.80
28	73.70	------	------	------	73.38	------	73.40	73.45	73.30	73.10	74.10	72.70
29	73.60	------	------	------	------	------	73.40	73.25	73.35	73.10	73.40	73.05
30	73.40	------	------	------	------	------	73.35	73.25	73.10	73.05	73.05	72.90
31	73.35	------	------	73.45	------	73.50	------	73.22	------	73.10	73.05	------

RED LAKE AT REDBY, MINN.

LOCATION.—Staff gage in sec. 20, T. 151 N., R. 33 W., at mouth of Mud River, a quarter of a mile east of Redby. Zero of gage is 1,100.00 feet above mean sea level.

DRAINAGE AREA.—1,950 square miles above outlet of lower Red Lake.

RECORDS AVAILABLE.—June, 1930, to September, 1931.

EXTREMES.—Maximum gage height recorded during period, 73.38 feet June 10, 14; minimum, 72.49 feet Sept. 21, 22, 29.

1930–31: Maximum stage, 74.71 feet June 5, 6, 1930; minimum, that of Sept. 21, 22, 29, 1931.

REMARKS.—Daily gage height subject to fluctuation caused by direction and velocity of wind. A dam was constructed across the outlet of the lake in September, 1931, but gates were not closed. No record Oct. 2 to May 24.

Daily gage height, in feet, 1930–31

Day	Oct.	May	June	July	Aug.	Sept.	Day	Oct.	May	June	July	Aug.	Sept.
1	73.10	-------	73.18	73.23	73.03	72.74	16	-------	-------	73.18	73.13	72.83	72.64
2	-------	-------	73.18	73.23	73.13	72.69	17	-------	-------	73.18	73.23	72.83	72.54
3	-------	-------	73.23	73.18	73.03	72.59	18	-------	-------	73.28	73.23	72.88	72.59
4	-------	-------	73.13	73.18	73.08	72.64	19	-------	-------	73.33	73.13	72.98	72.54
5	-------	-------	73.08	73.13	73.08	72.59	20	-------	-------	73.33	73.18	72.88	72.59
6	-------	-------	73.08	73.23	73.03	72.59	21	-------	-------	73.23	73.18	72.73	72.49
7	-------	-------	73.08	73.18	73.08	72.59	22	-------	-------	73.28	73.13	72.63	72.49
8	-------	-------	73.17	73.13	73.08	72.69	23	-------	-------	73.18	73.13	72.88	72.59
9	-------	-------	73.18	73.18	73.03	72.69	24	-------	-------	73.23	73.08	72.88	72.54
10	-------	-------	73.38	73.08	73.08	72.64	25	-------	73.23	73.18	72.98	72.83	72.79
11	-------	-------	73.28	73.08	73.08	72.54	26	-------	73.23	73.18	72.98	72.69	72.54
12	-------	-------	73.33	73.13	72.83	72.69	27	-------	73.23	73.23	73.03	72.74	72.59
13	-------	-------	73.33	73.13	72.83	72.74	28	-------	73.33	73.18	73.13	72.94	72.54
14	-------	-------	73.38	73.13	72.83	72.59	29	-------	73.33	73.18	73.13	72.79	72.49
15	-------	-------	73.33	73.08	72.88	72.59	30	-------	73.28	73.18	73.13	72.74	72.59
							31	-------	73.23	-------	73.08	72.69	-------

RED LAKE RIVER AT HIGHLANDING, NEAR GOODRIDGE, MINN.

LOCATION.—Staff gage on line between secs. 28 and 29, T. 153 N., R. 40 W., at bridge at Highlanding, 7 miles south of Goodridge.

RECORDS AVAILABLE.—October, 1930, to September, 1931.

EXTREMES.—Maximum discharge during year, 254 second-feet Apr. 3 (gage height, 2.38 feet, affected by ice), maximum gage height, 2.75 feet Feb. 25, affected by ice); minimum discharge, 1 second-foot Sept. 12 (gage height, 0.00).

REMARKS.—Records good.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	64	111	65	104	92	162	204	153	11[illegible]	49	29	5
2	82	127	64	100	96	153	228	144	11[illegible]	42	29	4
3	93	96	63	96	96	144	254	153	111	38	29	5
4	96	81	65	92	104	127	230	153	111	41	28	5
5	119	63	67	88	104	119	206	144	10[illegible]	51	26	5
6	111	111	70	85	111	111	182	136	10[illegible]	46	25	5
7	104	88	72	92	111	119	172	127	10[illegible]	40	24	5
8	104	95	68	92	111	119	172	162	8[illegible]	44	23	4
9	104	104	72	86	96	111	162	162	9[illegible]	37	22	3
10	104	136	77	90	89	111	162	162	9[illegible]	30	21	2
11	111	104	79	93	79	127	162	162	13[illegible]	25	21	2
12	119	111	90	96	76	136	162	162	17[illegible]	50	24	1
13	104	86	93	93	82	153	162	153	14[illegible]	40	24	4
14	95	78	96	93	85	144	162	144	13[illegible]	49	22	8
15	83	104	104	90	85	127	162	144	10[illegible]	52	21	9
16	104	136	104	88	89	111	144	119	11[illegible]	42	21	13
17	73	144	111	96	96	127	172	127	11[illegible]	45	19	12
18	79	111	90	96	111	136	172	162	10[illegible]	43	18	12
19	83	111	93	85	136	144	172	119	90	42	17	11
20	45	119	96	89	144	153	162	119	81	38	17	12
21	43	136	96	88	144	182	172	111	7[illegible]	35	19	12
22	41	162	96	85	162	193	172	136	9[illegible]	34	16	11
23	18	153	96	82	172	182	172	127	88	32	13	11
24	67	73	96	85	182	182	162	119	11[illegible]	29	9	14
25	104	79	96	89	193	172	162	111	96	29	7	23
26	111	43	96	90	182	162	162	119	8[illegible]	27	7	19
27	104	44	96	88	162	127	162	127	69	26	6	16
28	81	43	104	90	162	96	162	144	6[illegible]	32	3	14
29	85	55	96	79	-------	119	153	136	5[illegible]	29	4	13
30	96	61	96	85	-------	144	172	111	4[illegible]	27	5	12
31	104	-------	90	89	-------	172	-------	119	-------	24	5	-------

Month	Maximum	Minimum	Mean	Run-off in acre-feet
October	119	18	88.1	5,420
November	162	43	98.8	5,880
December	111	63	87.0	5,350
January	104	79	90.1	5,540
February	193	76	120	6,660
March	193	96	141	8,670
April	254	144	175	10,400
May	162	111	138	8,480
June	172	46	101	6,010
July	52	24	37.7	2,320
August	29	3	17.9	1,100
September	23	1	9.07	540
The year	254	1	91.7	66,400

RED LAKE RIVER AT CROOKSTON, MINN.

LOCATION.—Water-stage recorder in sec. 30, T. 150 N., R. 46 W., at highway bridge in Crookston, a quarter of a mile below dam and power house of Crookston Light, Water & Power Co.

DRAINAGE AREA.—5,320 square miles.

RECORDS AVAILABLE.—May, 1901, to September, 1931.

EXTREMES.—Maximum discharge during year, 1,030 second-feet Mar. 26 (gage height, 4.93 feet); minimum, 18 second-feet Sept. 26 (gage height, 2.50 feet). 1901–1931: Maximum discharge, 14,700 second-feet July 5, 1919; minimum, 5 second-feet Aug. 6–8, 1925.

REMARKS.—Records good except those for December to March, which are fair. Stage subject to diurnal fluctuation caused by operation of power plant.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	107	162	235	93	65	125	304	265	143	265	37	26
2	107	181	93	100	93	170	304	219	246	219	38	25
3	107	197	80	80	159	212	284	265	284	128	37	25
4	110	118	93	143	114	265	304	235	125	125	37	23
5	118	75	100	103	66	189	304	151	193	86	37	20
6	121	80	78	121	132	151	635	246	162	96	36	21
7	265	93	107	88	166	159	590	227	227	128	36	22
8	107	162	96	96	107	159	730	231	155	93	32	22
9	103	140	143	70	197	155	730	265	132	93	32	21
10	204	189	170	110	185	200	680	235	304	93	32	22
11	181	110	170	80	324	324	345	246	246	91	32	22
12	140	86	136	86	96	212	159	242	204	93	33	21
13	178	110	204	143	70	132	522	242	132	103	31	21
14	125	118	93	86	65	128	410	246	304	78	32	22
15	118	197	284	143	63	200	304	242	174	61	33	20
16	88	193	246	166	103	324	265	227	304	52	32	20
17	88	193	235	110	304	155	324	265	366	45	31	20
18	91	246	227	103	265	227	304	189	246	41	30	20
19	96	284	246	65	61	151	265	231	151	39	28	20
20	204	284	284	65	59	216	284	246	223	38	27	21
21	132	265	147	185	136	366	284	238	366	33	25	21
22	100	193	265	410	159	151	284	219	223	32	24	21
23	88	162	284	147	212	304	284	246	178	31	25	21
24	136	265	166	91	284	265	246	223	345	30	26	21
25	162	304	96	86	238	388	284	103	235	32	26	20
26	75	212	231	65	170	680	324	200	155	42	26	18
27	143	78	197	63	110	635	265	246	265	42	27	19
28	118	178	78	143	162	522	284	80	284	65	26	20
29	114	162	284	265	------	227	284	246	143	48	26	19
30	70	219	246	86	------	432	265	366	235	45	26	19
31	107	------	219	70	------	345	------	284	------	39	26	------

Month	Maximum	Minimum	Mean	Run-off in acre-feet
October	265	70	126	7,750
November	304	75	175	10,400
December	284	78	178	10,900
January	410	63	118	7,260
February	324	59	149	8,280
March	680	125	264	16,200
April	730	159	362	21,500
May	366	80	231	14,200
June	366	125	225	13,400
July	265	30	77.6	4,770
August	38	24	30.5	1,880
September	26	18	21.1	1,260
The year	730	18	163	118,000

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, 1931.

EXTREMES.—Maximum discharge during year, 32.2 second-feet Apr. 4 (gage height, 4.73 feet); no flow for several months.

1909–1917, 1920–21, 1922–1924, 1928–1931: Maximum discharge, 4,080 second-feet Apr. 23, 1916 (gage height, 14.5 feet); no flow in fall and winter of several years.

REMARKS.—Records poor. Discharge estimated Mar. 16–19, Mar. 26 to Apr. 1.

Daily and monthly discharge, in second-feet, 1930–31

Day	Mar.	Apr.	May	June	July	Aug.	Day	Mar.	Apr.	May	June	July	Aug.
1	0	10	7.6	7.4	0.8	0.4	16		33	4.5	2.8	0.9	0.1
2	0	16	8.5	8.5	1.2	.4	17		25	4.5	2.8	.9	0
3	0	16	6.2	8.5	.8	.6	18	1	21	3.6	2.0	.5	0
4	0	32	6.2	8.5	1.2	.2	19		21	4.5	1.2	.5	0
5	0	25	6.2	8.5	.8	.2	20	8	20	4.5	2.0	.2	0
6	0	20	6.2	8.5	2.8	.1	21	8	16	4.5	.8	.2	0
7	0	20	6.2	7.4	1.2	.1	22	12	16	4.5	1.2	.8	0
8	0	20	4.5	7.4	1.0	.1	23	20	16	4.5	2.0	.2	0
9	0	17	4.5	7.4	1.1	.1	24	20	16	3.6	1.2	.3	0
10	0	16	8.5	6.2	.9	.2	25	25	16	3.6	1.2	.2	0
11	0	15	7.4	7.4	1.0	.2	26		12	3.6	1.2	.2	0
12	0	12	7.4	5.4	.9	.1	27		10	2.8	1.2	.2	0
13	0	6.9	8.5	4.5	2.8	.1	28		10	5.4	.8	.2	0
14	0	5.4	7.4	4.5	2.0	.1	29	8	8.5	4.5	.5	.2	0
15	0	16	6.2	3.6	1.2	.1	30		8.5	3.6	.5	.2	0
							31			3.6		.2	0

Month	Maximum	Minimum	Mean	Run-off in acre-feet
March	25	0	4.68	288
April	33	5.4	16.5	982
May	8.5	2.8	5.40	332
June	8.5	.5	4.17	248
July	2.8	.2	0.83	51
August	.6	0	.10	6.1
The year	33	0	2.64	1,910

NOTE.—No flow during months omitted.

PARK RIVER AT GRAFTON, N. DAK.

LOCATION.—Chain gage in T. 157 N., R. 53 W., at Grafton.
RECORDS AVAILABLE.—April to September, 1931.
EXTREMES.—Maximum discharge during period, 22 second-feet May 1 (gage height, 2.02 feet); no flow for several days.
REMARKS.—Records good.

Daily and monthly discharge, in second-feet, 1931

Day	Apr.	May	June	July	Aug.	Day	Apr.	May	June	July	Aug.
1	------	22	6.2	4.4	e 0.2	16	------	10	2.1	1.3	0.1
2	------	17	6.2	1.7	e .5	17	------	12	1.6	1.0	0
3	------	16	6.9	1.3	.6	18	------	12	1.8	.7	.2
4	------	e 16	6.2	e 1.4	.5	19	------	12	1.6	.7	.1
5	------	e 16	6.2	1.5	.3	20	------	11	1.2	.6	.1
6	------	16	6.2	1.7	.2	21	------	9.0	1.2	.4	0
7	------	17	5.0	1.3	.2	22	------	9.0	1.6	.3	0
8	------	16	3.9	1.3	.2	23	------	9.0	1.3	.3	0
9	------	18	3.9	1.6	.2	24	------	7.3	1.3	.2	0
10	------	18	3.5	1.0	0	25	------	6.5	1.1	.2	0
11	------	18	3.9	1.3	0	26	------	8.1	1.0	e .1	0
12	------	17	3.9	1.8	.2	27	------	6.5	1.1	.1	0
13	------	16	3.3	1.6	.5	28	------	7.3	1.2	.1	.5
14	------	12	e 3.0	1.3	.3	29	20	6.5	1.1	.1	.4
15	------	12	2.6	1.0	.2	30	21	6.5	1.1	.1	e .3
						31	------	6.5	------	.1	e .2

Month	Maximum	Minimum	Mean	Run-off in acre-feet
May	22	6.5	12.5	769
June	6.9	1.0	3.04	181
July	4.4	.1	.98	60
August	.6	0	.19	12
The period				1,020

e Estimated or interpolated.

NOTE.—Practically no flow during September.

SOUTH FORK OF TWO RIVERS AT PELAN, MINN.

LOCATION.—Chain gage in SW. ¼ sec. 30, T. 160 N., R. 44 W., a quarter of a mile west of Pelan.

RECORDS AVAILABLE.—August, 1928, to September, 1931.

EXTREMES.—Maximum discharge during year, 70 second-feet Apr. 7 (gage height, 2.67 feet); maximum stage, 3.32 feet Mar. 24, 25; no flow for several months. 1928–1931: Maximum discharge, 1,810 second-feet May 13, 1930 (gage height, 10.18 feet); no flow frequently.

REMARKS.—Records fair. Stage-discharge relation affected by ice Mar. 22 to Apr. 9. Discharge estimated Mar. 29–31.

Daily and monthly discharge, in second-feet, 1930–31

Day	Mar.	Apr.	May	June	July	Aug.	Day	Mar.	Apr.	May	June	July	Aug.
1	0	14	2.6	15	0.4	0.6	16	0	5.0	3.8	1.8	2.6	0.2
2	0	47	2.6	12	.2	.4	17	0	5.0	3.8	.8	1.5	.2
3	0	60	2.0	3.2	.2	.4	18	0	4.4	4.4	.8	1.0	.2
4	0	45	1.9	3.2	.2	.3	19	0	5.0	5.0	.7	.8	.2
5	0	40	3.2	3.2	.4	.3	20	0	4.4	5.8	.7	.8	.2
6	0	51	5.0	3.8	.4	.3	21	0	3.8	5.8	.6	.7	.2
7	0	70	5.8	2.6	.6	.4	22	.4	3.8	8.2	.4	.7	.2
8	0	51	5.0	2.6	.7	.4	23	4.4	3.2	7.4	.2	.7	.1
9	0	37	4.4	1.3	1.3	.3	24	29	2.6	5.0	.3	.6	.1
10	0	24	9.8	18	1.5	.2	25	29	3.8	5.0	.3	.6	0
11	0	17	9.8	3.2	1.5	.2	26	14	2.6	4.4	.3	.4	0
12	0	12	9.0	1.3	2.0	.2	27	12	2.6	3.8	.3	.4	0
13	0	9.8	7.4	1.3	1.8	.2	28	13	2.0	5.8	.3	.4	0
14	0	8.2	5.8	1.5	1.5	.3	29	13	2.0	22	.2	.4	0
15	0	6.6	5.8	1.8	1.5	.2	30	13	2.6	22	.2	.4	0
							31	14		17		.4	0

Month	Maximum	Minimum	Mean	Run-off in acre-feet
March	29	0	4.57	281
April	70	2.0	18.2	1,080
May	22	1.9	6.75	415
June	18	.2	2.73	162
July	2.6	.2	.858	53
August	.6	0	.203	12
The year	70	0	2.77	2,000

NOTE.—No flow during months omitted.

SOUTH FORK OF TWO RIVERS AT BRONSON, MINN.

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

RECORDS AVAILABLE.—September, 1928, to September, 1931.

EXTREMES.—Maximum discharge during year, 260 second-feet Apr. 9 (gage height, 3.81 feet), maximum stage, 4.22 feet (affected by ice) Mar. 26–28; minimum discharge, 2.8 second-feet Sept. 15.

1928–1931: Maximum discharge, 1,820 second-feet May 15, 1930 (gage height, 8.90 feet); minimum, 2.4 second-feet Sept. 29, 30, 1930.

REMARKS.—Records good except those for extremely low stages, which are fair. No record Nov. 24 to Mar. 21.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	5.4	4.0	-------	41	12	22	7.3	4.4	3.7
2	5.8	3.8	-------	89	12	20	6.0	4.6	3.5
3	5.4	3.8	-------	198	9.4	18	6.0	4.9	3.4
4	5.0	3.8	-------	260	12	14	6.0	5.2	3.3
5	5.4	3.8	-------	215	16	14	6.0	5.2	3.1
6	5.0	3.8	-------	174	14	14	5.6	5.2	3.1
7	4.6	3.8	-------	224	14	13	5.2	4.9	3.1
8	4.6	3.8	-------	260	14	11	4.6	4.9	3.1
9	5.0	4.0	-------	260	14	10	4.4	4.9	2.9
10	5.0	4.0	-------	174	16	9.1	4.2	4.6	2.9
11	5.4	4.4	-------	109	18	8.5	3.9	4.6	2.9
12	5.8	4.4	-------	79	18	7.3	6.0	4.6	2.9
13	5.8	4.0	-------	62	16	6.4	6.0	4.4	2.9
14	5.4	4.0	-------	50	16	6.4	5.6	4.4	2.9
15	5.4	4.0	-------	40	14	6.4	4.9	4.4	2.8
16	5.6	4.4	-------	31	14	6.4	4.9	4.4	2.9
17	5.6	4.4	-------	25	14	6.4	4.6	4.4	3.3
18	5.2	4.4	-------	21	16	6.4	4.6	4.4	3.3
19	5.2	4.4	-------	19	16	6.4	4.9	4.3	3.3
20	5.2	4.4	-------	19	16	6.4	4.9	4.3	3.5
21	4.8	4.8	-------	18	16	6.0	4.6	4.2	3.9
22	4.8	4.8	25	17	14	6.0	4.6	4.2	4.2
23	4.4	4.8	31	16	14	5.6	4.6	4.0	4.4
24	4.4	-------	57	15	14	5.2	4.6	3.9	4.6
25	4.4	-------	130	14	14	5.2	4.4	3.8	4.6
26	4.4	-------	130	14	14	4.9	4.4	3.7	4.6
27	4.0	-------	102	13	14	6.0	4.4	3.9	4.2
28	4.0	-------	79	13	20	6.4	4.4	4.2	3.7
29	4.0	-------	54	12	23	6.0	4.4	4.6	3.5
30	4.0	-------	52	12	24	5.6	4.2	4.4	3.7
31	4.0	-------	43	-------	24	-------	4.2	3.9	-------

Month	Maximum	Minimum	Mean	Run-off in acre-feet
October	5.8	4.0	4.94	304
November 1–23	4.8	3.8	4.17	190
March 22–31	130	25	70.3	1,390
April	260	12	83.1	4,940
May	24	9.4	15.6	959
June	22	4.9	8.97	534
July	7.3	3.9	4.98	306
August	5.2	3.7	4.45	274
September	4.6	2.8	3.47	206

MIDDLE FORK OF TWO RIVERS NEAR HALLOCK, MINN.

LOCATION.—Vertical staff gage in SE. ¼ sec. 17, T. 161 N., R. 48 W., 1½ miles above mouth and 2½ miles southeast of Hallock.
RECORDS AVAILABLE.—April to September, 1931.
EXTREMES.—Maximum discharge during period, 14.1 second-feet Apr. 12 (gage height, 1.70 feet); no flow for several months.
REMARKS.—Records good.

Daily and monthly discharge, in second-feet, 1931

Day	Apr.	May	June	July	Day	Apr.	May	June	July
1	-------	1.2	1.1	1.4	16	6.2	2.4	0.2	0.1
2	-------	7.2	1.1	.1	17	5.8	1.7	.2	.1
3	-------	1.9	1.0	.1	18	4.2	2.4	.1	0
4	-------	1.9	.9	.1	19	4.2	2.0	.1	0
5	-------	1.6	.5	.1	20	3.1	1.6	.1	0
6	-------	2.5	.5	.1	21	3.2	1.9	0	0
7	-------	3.1	.6	.1	22	2.9	2.8	0	0
8	-------	2.8	.4	.5	23	2.8	1.6	0	0
9	-------	3.2	.3	.2	24	2.6	1.7	0	0
10	-------	4.8	.3	.1	25	2.6	1.4	0	0
11	11.8	2.8	.4	.2	26	1.9	1.4	.0	0
12	13.2	3.1	.3	.2	27	2.1	.8	.1	0
13	10.5	2.6	.3	.1	28	1.7	1.1	.1	0
14	8.6	2.8	.3	.1	29	1.6	1.3	.1	0
15	6.7	1.9	.3	.1	30	1.4	1.2	0	0
					31	-------	1.1	-------	0

Month	Maximum	Minimum	Mean	Run-off in acre-feet
April 11–30	13.2	1.4	4.86	193
May	7.2	.8	2.25	138
June	1.1	0	.31	18
July	1.4	0	.12	7
The period	-------	-------	-------	356

NOTE.—No flow during August and September.

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, 1929, to September, 1931.

EXTREMES.—Maximum discharge during year, 38 second-feet Apr. 8 (gage height, 1.90 feet); no flow for several months.

1929–1931: Maximum discharge, 212 second-feet May 12, 1930 (gage height, 3.00 feet).

REMARKS.—Records poor.

Daily and monthly discharge, in second-feet, 1930–31

Day	Mar.	Apr.	May	June	July	Day	Mar.	Apr.	May	June	July
1	0	2	e 0.2	e 0.2	0	16	0	1.5	0.3	0	0
2	0	4	.2	e .2	0	17	0	1.2	e .4	0	0
3	0	5	e .4	e .2	0	18	0	1.1	e .4	0	0
4	0	4	e .5	e .1	0	19	0	e 1.0	e .5	0	0
5	0	e 6	e .6	.1	0	20	0	e 1.0	.6	0	0
6	0	8	.8	.1	0	21	0	e .9	.5	0	0
7	0	11	.9	e .1	0.1	22	0	.8	.4	0	0
8	0	38	.8	e .1	.1	23	0	e .8	e .4	0	0
9	0	37	e .9	e .1	e .1	24	.5	.7	e .4	0	0
10	0	8.1	e .9	.1	.0	25		e .7	.4	0	0
11	0	5.5	1.0	e .1	0	26		e .6	e .2	0	0
12	0	2.7	.8	.1	e 0	27		e .5	.1	0	0
13	0	e 2.3	e .7	.1	.1	28	.5	e .4	.3	0	0
14	0	e 2.0	e .5	e .1	.1	29		.4	.4	0	0
15	0	1.6	.4	e .1	e .1	30		.3	e .3	0	0
						31			e .3		0

Month	Maximum	Minimum	Mean	Run-off in acre-feet
March			0.13	7.9
April	38	0.3	4.97	296
May	1.0	.1	.50	31
June	.2	0	.06	3.6
July	.1	0	.02	1.2
The year	38	0	.47	340

e Interpolated.

NOTE.—No flow during months omitted.

STATE DITCH NO. 85 NEAR LANCASTER, MINN.

LOCATION.—Staff gage in southwest corner of sec. 6, T. 162 N., R. 46 W., 7 miles northeast of Lancaster.

RECORDS AVAILABLE.—April, 1929, to September, 1931.

EXTREMES.—Maximum discharge during year, 99 second-feet Apr. 9 (gage height, 3.12 feet); no flow several months of year.

1929–1931: Maximum discharge, 160 second-feet May 14, 1930 (gage height, 4.23 feet).

REMARKS.—Records poor.

Daily and monthly discharge, in second-feet, 1930–31

Day	Mar.	Apr.	May	June	July	Day	Mar.	Apr.	May	June	July
1	0	10	e 1.8	e 0.8	e 0.4	16	0	13	2.1	0.3	e 0.3
2	0	10	1.6	e .8	.7	17	0	8.9	e 2.2	.2	.2
3	0	12	e 2.0	e .7	.4	18	0	8.5	e 2.4	e .2	e .2
4	0	16	e 2.4	e .6	e .4	19	0	e 7.4	e 2.6	e .2	e .2
5	0	22	e 2.7	.5	e .4	20	0	e 6.3	2.7	e .2	e .1
6	0	29	3.1	.5	e .4	21	0	e 5.2	2.5	e .1	.1
7	0	27	3.9	e .5	.4	22	0	4.1	2.3	e .1	0
8	0	62	4.1	e .4	.3	23	0	e 3.8	e 2.1	.1	0
9	0	98	e 4.4	e .3	e .2	24	1	3.4	e 1.9	e .1	0
10	0	98	e 4.6	.3	.2	25		e 3.1	1.7	.1	0
11	0	77	4.9	e .4	.2	26		e 2.9	e 1.4	.1	0
12	0	52	4.1	.4	e .3	27	1	e 2.6	1.0	e .1	0
13	0	e 41	e 3.6	.3	.4	28		e 2.4	1.3	e .2	0
14	0	e 31	e 3.1	e .3	.4	29		2.1	1.1	.2	0
15	0	19	2.5	e .3	e .3	30		1.9	e 1.0	.1	0
						31			e .9		0

Month	Maximum	Minimum	Mean	Run-off in acre-feet
March			0.26	16
April	98	1.9	22.7	1,350
May	4.9	.9	2.52	155
June	.8	.1	.31	18
July	.7	0	.21	13
The year	98	0	2.14	1,550

e Interpolated.

NOTE.—No flow during months omitted.

PEMBINA RIVER NEAR MANITOU, MANITOBA

LOCATION.—Chain gage on bridge near Lea's farm 9 miles south of Manitou.
DRAINAGE AREA.—2,340 square miles.
RECORDS AVAILABLE.—October, 1929, to September, 1931.
EXTREMES.—Maximum discharge during year, 161 second-feet Apr. 7; minimum, 0.1 second-foot Aug. 18, 21, 23.
1929–1931: Maximum discharge, 581 second-feet Apr. 10, 1930; minimum, that of August, 1931.
REMARKS.—No records Nov. 5 to Apr. 6. Records furnished by the Dominion Water Power and Hydrometric Bureau, Department of the Interior, Canada.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Apr.	May	June	July	Aug.	Sept.
1								
2		24.5		83	35.1		0.8	
3				82				0.8
4						10.1		
5	21.7				26.0		.6	
6								
7			161		22.2	6.5		.6
8				79			.8	
9	23.1		151					
10				68		4.1	.3	
11					16.8			.6
12			158	57				
13	23.1		151			3.0		.6
14				61			.2	
15			141		13.6			
16						2.2		1.1
17	24.0		136	54				
18					11.2		.1	.8
19			127			2.6		
20	24.0			57				
21							.1	.6
22			116		10.1			
23						2.2	.1	
24	25.0			53				
25			104					.3
26	25.5				9.4			.3
27			95	39				
28						.3	1.5	
29			91		36.2	.8		
30	24.0						1.1	
31						1.1		

Month	Maximum	Minimum	Mean *	Run-off in acre-feet
October	25.5	21.7	23.8	1,460
April	161	91	130	7,740
May	83	39	63	3,870
June	36.2	9.4	20	1,190
July	10.1	.3	3.2	197
August	1.5	.1	.6	37
September	1.1	.3	.6	36

* Mean of days when gage was read.

PEMBINA RIVER AT NECHE, N. DAK.

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

DRAINAGE AREA.—2,960 square miles.

RECORDS AVAILABLE.—May, 1903, to September, 1915; April, 1919, to September, 1931.

EXTREMES.—Maximum discharge during year, 1,490 second-feet Apr. 9 (gage height, 12.4 feet, affected by ice); minimum, 0.2 second-foot Sept. 9–19 (gage height, 2.20 feet).

1903–1915, 1919–1931: Maximum discharge, 3,870 second-feet May 2, 1904 (gage height, 20.9 feet); minimum, that of September, 1931.

REMARKS.—Records fair.

Daily and monthly discharge, in second-feet, 1930-31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	28	22				[a] 8	112	134	46	8.0	5.0	0.5
2	28	18				[a] 8	156	112	[a] 46	8.0	3.0	.5
3	28	18		11		[a] 7	480	112	46	8.0	3.0	.5
4	28	16		11		[a] 7	1,030	112	36	8.0	2.0	.5
5	28	16				[a] 6	948	145	36	12	2.0	.5
6	28	16	2.0			[a] 6	640	134	36	12	2.0	.5
7	28	16			5.0	6	885	112	36	12	2.0	.5
8	28	16				[a] 6	1,410	112	[a] 36	12	2.0	.5
9	28	16				[a] 6	1,490	112	36	16	2.0	.2
10	28	12		8		[a] 6	1,050	112	28	18	2.0	.2
11	28	12				[a] 6	885	112	28	21	2.0	.2
12	28	12			6.4	[a] 6	540	112	28	21	1.0	.2
13	28	10	2.0			[a] 6	438	112	21	21	1.0	.2
14	28	10			6.4	6	375	112	21	16	1.0	.2
15	28	10				[a] 6	375	112	21	16	1.0	.2
16	28	10				[a] 6	333	112	16	16	1.0	.2
17	28	[a] 10		5		[a] 6	246	112	16	12	1.0	.2
18	28	[a] 10				[a] 7	223	102	16	8.0	1.0	.2
19	28	[a] 10				[a] 7	223	102	12	8.0	1.0	.2
20	28	[a] 10	2.0			[a] 7	223	102	12	8.0	1.0	.5
21	28	[a] 10			7.0	7	200	102	12	[a] 8.0	1.0	.5
22	21	10				[a] 7	200	102	12	8.0	1.0	.5
23	21	[a] 9				[a] 7	200	102	12	8.0	.5	.5
24	21	[a] 8		4		[a] 7	178	102	12	8.0	.5	.5
25	21	[a] 7				[a] 7	178	92	8.0	8.0	.5	.5
26	21	[a] 6				7	178	[a] 86	8.0	8.0	[a] .7	.5
27	21	[a] 5	5.0			291	178	80	8.0	5.0	.9	.5
28	21	[a] 4			8.0	291	178	72	8.0	5.0	20	.5
29	21	3.0				246	178	57	8.0	5.0	1.0	.5
30	22	3.0				246	156	57	8.0	5.0	1.0	.5
31	21			4		156		46		5.0	1.0	

Month	Maximum	Minimum	Mean	Run-off in acre-feet
October	28	21	25.8	1,590
November	22	3.0	11.2	666
December			[b] 2.75	169
January			[b] 7.17	441
February			[b] 6.56	364
March	291	6	45.2	2,780
April	1,490	112	463	27,600
May	145	46	103	6,330
June	46	8.0	22.3	1,330
July	21	5.0	10.8	664
August	20	.5	2.07	127
September	.5	.2	0.39	23
The year	1,490	.2	58.0	42,100

[a] Estimated or interpolated.
[b] Mean of days when gage was read.

ROSEAU RIVER AT MALUNG, MINN.

LOCATION.—Staff gage in sec. 18, T. 161 N., R. 39 W., half a mile north of Malung.
RECORDS AVAILABLE.—August, 1928, to September, 1931.
EXTREMES.—Maximum discharge during year, 60 second-feet Apr. 5, 6, 9 (gage height, 3.62 feet, ice effect); no flow Aug. 25–28, Sept. 12.
1928–1931: Maximum discharge, 348 second-feet Apr. 6, 1929 (gage height, 7.06 feet); minimum, that of 1931.
REMARKS.—Records good except those for periods of ice effect, Nov. 6–12, 24–30, Mar. 31 to Apr. 10, and those estimated, Oct. 1–31, Aug. 28 to Sept. 30, which are fair. No record Dec. 1 to Mar. 30.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	0.7	4.3		20	22	48	4.3	2.7	0.3
2	.7	4.3		30	22	36	3.9	2.7	.3
3	1.1	4.6		40	22	34	3.9	2.7	.2
4	.6	4.6		48	22	27	3.9	2.7	.2
5	.8	4.6		60	22	23	5.0	2.4	.2
6	.9	4.6		60	25	22	7.7	1.9	.2
7	1.2	4.6		58	25	19	8.6	.9	.2
8	1.7	4.6		58	26	18	6.5	.9	.2
9	.5	4.6		60	25	15	6.5	.9	.1
10	.9	4.6		58	25	15	6.5	1.1	0
11	.9	4.6		38	25	15	6.1	.9	0
12	.9	4.6		32	25	15	5.7	.9	0
13	1.1	5.0		27	25	14	5.7	.6	.5
14	1.2	5.3		27	25	14	5.7	.6	1.1
15	1.7	6.1		26	25	14	5.7	.6	.9
16	1.9	12		26	25	14	5.7	.6	1.1
17	2.2	14		25	25	14	5.7	.4	.9
18	2.4	50		24	24	14	5.7	.3	.8
19	2.4	40		24	24	11	5.0	.3	.6
20	2.4	38		24	22	11	4.6	.3	1.1
21	2.4	34		28	23	9.5	3.9	.3	1.2
22	2.7	32		28	21	9.1	3.3	.3	1.2
23	2.7	28		26	21	8.2	2.7	.1	1.1
24	2.7	25		26	21	7.3	2.4	.1	1.4
25	3.0	23		25	20	6.9	2.2	0	1.7
26	3.3	19		32	21	5.7	1.7	0	1.4
27	3.6	15		23	21	4.6	1.2	0	1.2
28	3.6	12		23	22	3.9	.9	0	1.1
29	3.9	9.5		22	52	3.9	.9	.7	1.1
30	3.6	7.3		22	58	3.3	.9	.7	1.1
31	3.9		13		48		1.1	.5	

Month	Maximum	Minimum	Mean	Run-off in acre-feet
October	3.9	0.5	1.9[illegible]	122
November	50	4.3	14.3	851
April	60	20	34.0	2,020
May	58	20	26.1	1,600
June	48	3.3	15.2	904
July	8.6	.9	4.31	265
August	2.7	0	0.87	53
September	1.7	0	0.71	42

ROSEAU RIVER AT ROSS, MINN.

LOCATION.—Water-stage recorder in SW. ¼ sec. 27, T. 163 N., R. 41 W., a quarter of a 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, 1931.

EXTREMES.—Maximum discharge for year, 653 second-feet Apr. 7; minimum, 6 second-feet Sept. 15 (gage height, 0.16 foot).

1929–1931: Maximum discharge, 1,460 second-feet May 17, 1930 (gage height, 10.74 feet); minimum, 6 second-feet Jan. 23, 24, 1930, Sept. 15, 1931.

REMARKS.—Records excellent except those for periods of ice effect, Nov. 26 to Apr. 9, and those estimated Aug. 29 to Sept. 30, which are fair.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	11	29	83	29	20	21	80	141	233	34	11	17
2	10	27	68	28	20	21	178	133	210	64	25	15
3	11	26	58	27	20	21	377	126	188	68	38	12
4	12	26	54	26	21	20	491	122	170	54	41	11
5	13	23	46	26	21	20	561	145	149	53	36	10
6	15	27	42	26	21	20	621	178	133	71	28	9
7	19	26	42	23	21	20	653	210	119	86	22	9
8	21	25	44	22	21	20	637	228	105	92	20	8
9	22	24	47	22	21	19	621	233	95	89	19	8
10	23	23	46	22	21	18	621	243	83	77	18	8
11	23	23	47	22	20	17	533	248	83	64	19	7
12	28	26	47	23	20	17	477	248	108	63	16	7
13	31	25	47	23	19	18	413	233	130	67	13	7
14	32	26	47	23	18	20	354	214	122	67	12	7
15	31	30	46	23	18	21	321	201	108	58	11	6
16	34	44	42	22	17	22	310	178	92	49	11	7
17	36	71	40	22	17	23	288	161	80	42	10	8
18	44	95	38	22	19	23	278	170	68	36	10	9
19	33	133	38	22	20	24	268	192	56	32	9	9
20	40	137	38	21	20	26	258	206	45	28	10	10
21	35	161	38	21	20	27	248	210	36	25	10	16
22	33	183	38	21	20	28	228	210	31	22	10	26
23	30	188	36	21	21	29	210	201	30	18	12	31
24	25	188	34	20	22	37	196	188	29	15	19	30
25	24	178	32	21	20	83	188	174	28	12	19	30
26	24	165	32	21	20	133	178	161	26	11	15	30
27	25	145	32	21	20	149	170	157	26	10	15	31
28	28	126	32	22	21	133	161	178	25	10	20	30
29	28	108	33	22	-------	119	153	228	23	10	24	28
30	29	92	32	22	-------	105	149	253	22	9	24	25
31	28	-------	30	20	-------	92	-------	253	-------	9	21	-------

Month	Maximum	Minimum	Mean	Run-off in acre-feet
October	44	10	25.7	1,580
November	188	23	80.0	4,760
December	83	30	42.9	2,640
January	29	20	22.8	1,400
February	22	17	20.0	1,110
March	149	17	43.4	2,670
April	653	80	341	20,300
May	253	122	194	11,900
June	233	22	88.4	5,260
July	92	9	43.4	2,670
August	41	9	18.3	1,130
September	31	6	15.4	916
The year	653	6	77.8	56,300

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 200 yards below mouth of State ditch No. 51, locally known as Caribou Cut-off Ditch.

RECORDS AVAILABLE.—April, 1929, to September, 1931.

EXTREMES.—Maximum discharge during year, 1,140 second-feet Apr. 9 (gage height, 6.30 feet); maximum gage height, 6.87 feet Apr. 7, caused by ice jam; minimum discharge, 6.1 second-feet Sept. 15 (gage height, 1.36 feet).

1929–1931: Maximum discharge, 1,380 second-feet May 21, 1930 (gage height, 6.89 feet); minimum, 6 second-feet Sept. 25, 26, 1930 (gage height, 1.40 feet).

REMARKS.—Records excellent except those for periods of ice effect, Nov. 23 to Apr. 8, or of aquatic growth, which are fair. No record Dec. 7 to Mar. 31.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Apr.	May	June	July	Aug.	Sept.
1	8.5	34	85	-------	164	265	35	15	18
2	10	32	72	228	156	250	34	18	17
3	10	34	65	287	143	226	50	17	16
4	11	32	58	436	139	202	67	25	13
5	15	22	47	632	146	178	61	33	14
6	16	30	39	830	170	160	55	32	12
7	18	28	-------	1,020	215	141	65	29	10
8	20	31	-------	950	250	123	81	26	10
9	23	32	-------	1,100	270	110	89	22	9.5
10	26	29	-------	1,020	281	101	85	20	9.5
11	30	29	-------	920	285	96	79	18	8.0
12	35	35	-------	770	287	89	74	16	6.7
13	32	32	-------	658	278	102	65	16	6.7
14	34	34	-------	556	259	125	68	16	6.7
15	36	34	-------	472	239	125	69	14	6.1
16	39	43	-------	412	219	110	63	12	7.5
17	34	53	-------	364	198	95	53	11	7.5
18	23	49	-------	331	184	81	44	10	6.7
19	32	96	-------	314	190	70	42	10	8.5
20	37	126	-------	300	210	62	34	9.5	14
21	36	156	-------	289	223	52	32	8.5	20
22	36	101	-------	276	230	45	29	7.5	17
23	34	182	-------	259	228	37	26	9.0	22
24	32	176	-------	239	221	34	22	8.5	29
25	34	152	-------	226	206	31	20	11	35
26	30	152	-------	215	190	30	18	13	34
27	29	174	-------	200	176	34	16	18	32
28	29	172	-------	192	168	31	16	22	32
29	31	134	-------	182	180	28	13	16	31
30	23	101	-------	170	234	27	11	16	31
31	32	-------	-------	-------	263	-------	10	20	-------

Month	Maximum	Minimum	Mean	Run-off in acre-feet
October	39	8.5	27.0	1,660
November	182	22	77.8	4,630
December 1–6	85	39	61.0	726
April 2–30	1,100	170	478	27,500
May	287	139	213	13,100
June	265	27	102	6,070
July	89	10	46.0	2,830
August	33	7.5	16.7	1,030
September	35	6.1	16.3	970

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, 1931.

EXTREMES.—Maximum discharge during year, 52 second-feet Apr. 6 (gage height, 4.34 feet, affected by ice); no flow at various times.

1911–1914; 1928–1931; Maximum discharge, 1,040 second-feet Oct. 1, 1912 (gage height, 10.3 feet, present datum); no flow occasionally.

REMARKS.—Records fair. No record Dec. 1 to Mar. 30. Discharge estimated because of ice Oct. 17 to Nov. 13, Nov. 25–30, Apr. 1–14.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Mar.	Apr.	May	June	July	Aug.
1	0			11	1.7	12	0.7	0.2
2	0			19	1.5	4.8	.7	.2
3	0			32	1.5	2.4	.7	.2
4	0			42	1.5	2.2	.7	.2
5	0			49	1.9	2.1	2.2	.2
6	0			52	3.5	2.1	8.1	.1
7	0	0.1		52	3.5	1.9	6.9	0
8	0			49	3.5	2.2	1.7	0
9	0			32	3.5	1.0	1.2	0
10	0			18	3.5	.8	.9	0
11	0			17	3.5	5.0	.7	0
12	0			13	3.2	1.1	.7	0
13	0			6.6	2.9	1.1	.6	0
14	0	.3		6.6	2.5	1.1	.6	0
15	0	.5		6.0	2.2	1.0	.5	0
16	0	.5		5.5	1.5	1.0	.5	0
17		.5		5.0	1.5	1.0	.5	0
18		.6		4.0	1.5	.9	.5	0
19		.6		3.2	1.9	.8	.5	0
20		.7		3.2	2.2	.7	.4	0
21		.7		3.5	3.2	.7	.3	0
22		.8		4.0	2.2	.7	.2	0
23		.7		3.5	2.1	.8	.1	0
24	.1	.4		3.5	1.7	.7	0	0
25				3.5	1.3	.7	0	0
26				3.2	1.3	.7	0	0
27		.2		3.2	1.1	.7	0	0
28				2.9	3.0	.6	0	0
29				2.2	3.8	.5	0	0
30				1.9	4.5	.4	0	0
31			7.9		6.0		0	0

Month	Maximum	Minimum	Mean	Run-off in acre-feet
October			0.05	3.1
November			.29	17
April	52	1.9	15.2	904
May	6.0	1.1	2.54	156
June	12	.4	1.72	102
July	8.1	0	.96	59
August			.04	2.5

NOTE.—No flow during September.

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, 1931.

EXTREMES.—Maximum discharge during year, 155 second-feet Apr. 8 (gage height, 6.75 feet, ice affected); minimum, 0.4 second-foot Sept. 15–17 (gage height, 0.60 foot).

1928–1931: Maximum discharge, 1,040 second-feet May 13, 1930 (gage height, 12.34 feet); minimum, that of September, 1931.

REMARKS.—Records excellent except those for Oct. 1–15 and those estimated for periods of ice effect, Nov. 25 to Dec. 4, Mar. 31 to Apr. 9, which are fair. No record Dec. 6 to Mar. 30.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1.1	4.8	26	-------	6.6	44	83	12	3.2	2.1
2	1.1	5.3	23	-------	21	42	70	31	3.5	2.1
3	1.3	6.4	21	-------	41	40	62	23	5.1	2.0
4	1.4	5.7	18	-------	64	38	51	17	9.2	1.9
5	2.0	8.3	15	-------	86	54	44	11	8.5	1.8
6	2.2	5.7	-------	-------	110	72	38	37	6.0	1.6
7	3.2	5.3	-------	-------	130	88	35	39	4.8	1.4
8	5.9	5.0	-------	-------	142	96	33	35	4.3	1.3
9	4.2	4.9	-------	-------	150	96	29	30	3.6	1.1
10	4.5	4.8	-------	-------	150	106	26	25	4.2	1.0
11	6.9	4.8	-------	-------	138	112	26	19	3.4	.9
12	4.8	4.8	-------	-------	126	104	35	20	2.8	.8
13	7.6	4.8	-------	-------	122	97	42	23	2.2	.8
14	8.8	4.8	-------	-------	114	88	36	22	1.8	.7
15	8.1	5.2	-------	-------	114	79	31	17	1.7	.4
16	8.3	9.2	-------	-------	114	72	26	14	1.5	.4
17	8.4	26	-------	-------	110	65	22	11	1.4	.4
18	8.4	40	-------	-------	106	78	18	8.5	1.3	.6
19	9.7	59	-------	-------	100	84	14	7.6	1.2	.7
20	7.6	42	-------	-------	94	88	12	5.9	1.2	1.3
21	8.1	58	-------	-------	90	88	9.8	4.9	1.1	1.8
22	6.6	65	-------	-------	82	84	8.5	4.2	.9	2.4
23	6.3	88	-------	-------	74	79	7.9	3.5	1.2	4.0
24	7.6	66	-------	-------	70	76	7.3	2.9	1.3	5.2
25	5.9	64	-------	-------	66	70	6.9	2.2	.8	5.7
26	5.7	60	-------	-------	64	62	6.3	1.9	1.0	6.0
27	6.0	50	-------	-------	59	56	6.0	1.8	1.6	6.5
28	6.3	40	-------	-------	54	101	5.6	1.3	1.9	6.6
29	6.9	30	-------	-------	50	128	5.4	1.2	1.9	6.0
30	7.3	28	-------	-------	47	112	4.8	1.1	1.8	5.4
31	7.8	-------	-------	4.3	-------	97	-------	.9	1.8	-------

Month	Maximum	Minimum	Mean	Run-off in acre-feet
October	9.7	1.1	5.81	357
November	88	4.8	26.9	1,600
December 1–5	26	15	20.6	204
April	150	6.6	89.8	5,340
May	128	38	80.5	4,950
June	83	4.8	26.7	1,590
July	39	.9	14.0	861
August	9.2	.8	2.78	171
September	6.6	.4	2.43	145

PINE CREEK NEAR PINE CREEK, MINN.

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

DRAINAGE AREA.—76 square miles.

RECORDS AVAILABLE.—August, 1928, to September, 1931.

EXTREMES.—Maximum discharge during year, 229 second-feet Apr. 7 (gage height, 7.33 feet); minimum, 4.4 second-feet Aug. 21, 22 (gage height, 1.16 feet).

1928–1931: Maximum discharge, 449 second-feet May 12, 13, 1930 (gage height, 8.83 feet); minimum, 3.6 second-feet Aug. 17, 18, 20, 1930 (gage height, 1.20 feet).

REMARKS.—Records excellent except those for periods affected by ice, Nov. 25 to Dec. 4, Apr. 1–6, and by débris, Sept. 21–30, which are good. No record Dec. 5 to Mar. 31.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Apr.	May	June	July	Aug.	Sept.
1	7.2	15	21	10	23	26	14	6.9	9.4
2	8.0	13	20	30	22	24	16	27	8.6
3	8.2	11	16	52	21	21	11	26	8.4
4	8.7	10	12	93	23	18	9.6	16	8.0
5	9.7	13	------	144	39	16	12	11	7.7
6	17	20	------	180	50	14	13	8.8	7.4
7	17	15	------	212	60	14	14	8.2	7.0
8	15	13	------	176	60	13	13	7.7	6.9
9	14	13	------	148	60	12	12	7.5	6.6
10	12	12	------	132	65	11	10	7.7	6.2
11	13	13	------	104	60	17	9.2	7.2	6.0
12	17	11	------	88	52	34	12	6.2	6.0
13	24	13	------	75	45	30	13	6.1	6.2
14	21	11	------	66	37	23	11	6.0	6.6
15	18	13	------	61	33	18	8.8	6.0	6.6
16	17	22	------	60	30	15	8.0	5.5	7.2
17	17	49	------	56	29	12	7.7	5.4	10
18	16	70	------	51	46	10	7.0	5.2	9.6
19	18	60	------	48	52	8.8	6.9	5.2	9.2
20	15	46	------	46	58	8.2	7.0	4.9	14
21	19	50	------	42	60	7.8	6.7	4.8	29
22	14	74	------	37	56	8.2	6.1	4.8	36
23	13	68	------	34	50	8.6	5.5	9.8	34
24	16	60	------	31	41	8.6	5.2	12	28
25	12	70	------	30	36	8.2	4.8	8.0	25
26	12	62	------	28	30	7.2	4.6	7.2	28
27	12	52	------	27	28	7.8	4.6	7.7	26
28	12	37	------	26	40	9.6	4.9	16	22
29	15	30	------	24	44	7.7	5.0	18	19
30	12	24	------	23	37	7.0	4.9	15	17
31	21	------	------	------	30	------	5.0	11	------

Month	Maximum	Minimum	Mean	Run-off in acre-feet
October	24	7.2	14.5	892
November	70	10	32.3	1,920
December 1–4	21	12	17.2	137
April	212	10	71.1	4,230
May	65	21	42.5	2,610
June	34	7.0	14.2	845
July	16	4.6	8.79	540
August	27	4.8	9.64	593
September	36	6.0	14.1	839

SOURIS RIVER AT MINOT, N. DAK.

LOCATION.—Staff gage at Ann Street foot bridge, northeast of Great Northern Railway roundhouse at Minot.
DRAINAGE AREA.—10,270 square miles.
RECORDS AVAILABLE.—May, 1903, to March, 1924; April, 1927, to September, 1928; October, 1929, to September, 1931.
EXTREMES.—Maximum discharge during year, 8 second-feet May 2–5 (gage height, 4.80 feet); minimum, 0.1 second-foot Oct. 1 (gage height, 4.25 feet). 1903–1924, 1927–28, 1929–1931: Maximum discharge, 12,000 second-feet Apr. 20, 1904 (gage height, 21.9 feet); no flow at times during Feb. 1930.
REMARKS.—Records poor. Discharge estimated Apr. 2–5, May 15–19, 21–23, July 1 to Aug. 24, Aug. 26 to Sept. 30. Flow during low periods consists chiefly of industrial waste water.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	0.1	0.2	0.2	0.2	1.0	1.0	5.1	7.5	0.9			
2	.2	.2	.2	.2	1.0	1.0	5.0	8.0	.8			
3	.2	.2	.2	.2	1.0	1.0	5.0	8.0	.8			
4	.2	.2	.2	.2	.6	1.0	5.0	8.0	1.0			
5	.2	.2	.2	.2	.6	1.0	5.0	8.0	1.0			
6	.2	.2	.6	.2	.6	1.0	4.9	7.2	.9			
7	.2	.2	.6	.2	.6	1.5	7.0	7.2	.8			
8	.2	.2	.6	.2	.6	1.5	7.0	6.6	.8			
9	.2	.2	.6	.2	.2	1.5	7.0	6.6	1.0			
10	.2	.2	1.0	.2	.2	1.5	7.0	6.6	1.0			
11	.2	.2	1.0	.2	.2	1.5	7.0	5.5	1.0			
12	.2	.2	1.0	.2	.2	2.0	4.9	4.9	1.0		0.4	
13	.2	.6	1.0	.2	.2	2.0	4.9	4.9	1.0			
14	.6	.6	1.0	.2	.2	2.0	4.9	4.1	1.0			
15	.6	1.0	1.0	.2	.2	2.0	3.3	3.7	.8			
16	.6	1.0	.6	.2	.2	2.0	3.3	3.3	.6	0.5		0.3
17	.6	1.0	.6	.2	.2	2.6	3.3	2.9	.6			
18	.2	.6	.6	.2	.2	2.6	3.3	2.5	.6			
19	.2	.6	.2	.2	.6	2.6	3.3	2.1	.5			
20	.2	.6	.2	.2	.6	2.6	3.3	1.7	.5			
21	.2	.2	.2	.2	.6	3.3	4.9	1.7	.5			
22	.2	.2	.2	.2	.6	3.3	4.9	1.7	.4			
23	.2	.2	.2	.2	.6	3.3	4.9	1.6	.6			
24	.2	.6	.2	.2	.6	3.3	6.0	1.5	.6			
25	.2	.6	.2	.2	.6	3.3	7.0	1.5	.4		.4	
26	.2	.6	.2	.6	.6	3.3	7.0	1.4	.3			
27	.2	.6	.2	.6	.6	3.3	7.0	1.3	.5			
28	.2	.6	.2	.6	.6	3.3	7.0	1.2	.5			
29	.2	.6	.2	.6	------	3.3	7.5	1.1	.4		.4	
30	.2	.6	.2	.6	------	3.3	7.5	1.0	.4			
31	.2	------	.2	.6	------	3.3	------	.9	------			------

Month	Maximum	Minimum	Mean	Run-off in acre-feet
October	0.6	0.1	0.25	15
November	1.0	.2	.44	26
December	1.0	.2	.45	28
January	.6	.2	.28	17
February	1.0	.2	.50	28
March	3.3	1.0	2.26	139
April	7.5	3.3	5.44	324
May	8.0	.9	4.01	247
June	1.0	.3	.71	42
July	------	------	.50	31
August	------	------	.40	25
September	------	------	.30	18
The year	8.0	0.1	1.30	940

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, 1929, to September, 1931.

EXTREMES.—Maximum discharge during year, 118 second-feet Apr. 6 (gage height, 2.44 feet, affected by ice); no flow July 20 to Sept. 30.

1929–1931: Maximum discharge, 1,130 second-feet Mar. 31 to Apr. 2, 1930 (gage height, 6.98 feet); minimum, that of 1931.

REMARKS.—Records fair. No record Nov. 16 to Mar. 31.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Apr.	May	June	July	Day	Oct.	Nov.	Apr.	May	June	July
1	3.8	12	25	25	11	0.4	16	14	-------	41	21	5.0	4.2
2	1.8	18	27	25	13	.4	17	14	-------	51	16	5.0	1.0
3	2.2	14	44	24	11	.4	18	14	-------	27	13	1.8	.4
4	2.6	16	54	22	11	2.2	19	14	-------	48	13	.8	.2
5	3.0	20	73	22	8.0	2.6	20	14	-------	52	17	.8	0
6	2.6	20	118	22	8.0	2.6	21	14	-------	48	18	1.4	0
7	3.0	20	118	34	8 8	3.4	22	14	-------	43	28	1.0	0
8	3.0	22	108	34	8.8	6.8	23	14	-------	42	17	1.0	0
9	3.4	27	88	34	8.0	14	24	14	-------	43	14	.8	0
10	3.8	30	98	39	6.8	9.6	25	16	-------	37	14	1.0	0
11	4.2	32	108	44	6.2	9.6	26	22	-------	32	9.6	1.0	0
12	5.6	17	98	41	6.2	2.2	27	14	-------	27	14	1.4	0
13	14	21	88	32	4.6	2.2	28	10	-------	27	12	.8	0
14	10	18	73	27	3.8	3.0	29	14	-------	27	14	.8	0
15	14	18	48	24	6.2	4.2	30	43	-------	25	16	.4	0
							31	22	-------	-------	11	-------	0

Month	Maximum	Minimum	Mean	Run-off in acre-feet
October	43	1.8	11.1	682
November 1–15	32	12	20.3	602
April	118	25	58.4	3,480
May	44	9.6	22.5	1,380
June	13	.4	4.81	286
July	14	0	2.24	138

NOTE.—No flow during August and September.

RAINY RIVER BASIN

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, 1917, to September, 1919, and September, 1923, to September, 1931.

EXTREMES.—Maximum mean daily discharge during year, 2,940 second-feet June 20; minimum, 151 second-feet Sept. 7.

1905–1907; 1912–1919; and 1923–1931: Maximum mean daily discharge, 6,030 second-feet Apr. 26, 1927; no flow a number of times 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. Records collected by Minnesota Power & Light Co., under general supervision of the United States Geological Survey in connection with a Federal Power Commission project.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr	May	June	July	Aug.	Sept.
1	316	663	1,150	895	462	269	289	265	1,470	1,580	511	352
2	348	663	960	895	564	280	224	323	1,330	1,630	462	366
3	348	573	960	928	569	312	236	204	910	1,300	633	417
4	348	559	960	895	570	280	225	371	1,700	1,210	677	384
5	240	576	960	855	570	335	225	355	2,410	1,080	580	362
6	339	445	960	928	538	393	244	289	2,080	1,040	478	333
7	347	425	960	863	570	301	257	289	1,720	967	491	151
8	314	395	1,170	895	448	269	289	269	1,630	988	478	255
9	371	269	1,130	851	473	277	321	337	1,520	924	365	384
10	288	343	1,050	757	635	281	289	356	1,490	891	303	276
11	237	271	1,060	656	702	280	269	317	1,180	859	478	269
12	323	335	992	552	570	280	269	406	2,200	829	452	240
13	256	428	950	760	570	276	476	396	2,280	789	449	236
14	276	363	960	760	502	281	289	396	2,600	891	417	260
15	284	414	960	760	430	384	289	410	2,240	859	442	224
16	427	417	960	760	389	254	354	302	2,260	827	398	226
17	305	461	960	760	468	264	289	443	2,410	962	288	245
18	248	493	960	608	468	280	269	290	2,110	795	449	225
19	269	753	960	643	380	280	269	328	2,900	859	414	192
20	220	964	960	676	373	247	257	579	2,940	795	449	192
21	242	1,330	928	760	365	269	257	812	2,730	766	384	181
22	328	1,570	960	727	333	236	369	936	2,700	659	373	363
23	321	1,710	928	695	288	255	346	1,020	2,710	595	277	329
24	347	1,660	960	727	360	280	342	960	2,670	659	288	213
25	376	1,410	928	698	297	321	350	1,020	2,580	543	417	257
26	351	1,020	895	523	281	289	225	1,020	2,330	576	384	225
27	349	992	960	663	373	280	273	1,200	2,180	839	366	160
28	317	1,120	928	695	333	236	257	1,470	1,960	554	449	213
29	502	1,220	928	727	------	236	321	1,400	1,780	561	316	370
30	671	1,190	928	676	------	224	321	2,350	1,740	561	365	215
31	663	------	960	479	------	224	------	1,680	------	594	255	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	671	220	341	0.284	0.33
November	1,710	269	768	.640	.71
December	1,180	895	979	.816	.94
January	928	479	744	.620	.71
February	702	281	460	.383	.40
March	393	224	280	.233	.27
April	476	224	290	.242	.27
May	2,350	204	671	.559	.64
June	2,940	910	2,090	1.74	1.94
July	1,630	543	870	.725	.84
August	677	255	422	.352	.41
September	417	151	270	.225	.25
The year	2,940	151	682	.568	7.71

UPPER MISSISSIPPI RIVER BASIN

MISSISSIPPI RIVER BELOW SANDY RIVER, NEAR LIBBY, MINN.

LOCATION.—Water-stage recorder in sec. 25, T. 50 N., R. 24 W., 600 feet below mouth of Sandy River and three-quarters of a mile northwest of Libby. Zero of gage is 1,204.62 feet above mean sea level (1912 adjustment). Staff gage about 600 feet upstream from present gage (zero of gage, 1,207.71 feet above mean sea level) used prior to July 28, 1931.

DRAINAGE AREA.—5,060 square miles.

RECORDS AVAILABLE.—April, 1930, to September, 1931.

EXTREMES.—Maximum discharge during year, 2,840 second-feet June 14 (gage height, 7.36 feet, recorder datum); minimum, 180 second-feet Sept. 10 (gage height, 1.79 feet, recorder datum).

1930–31: Maximum discharge, 2,890 second-feet May 16, 1930 (gage height, 7.45 feet, recorder datum); minimum, that of Sept. 10, 1931.

REMARKS.—Records good. Flow regulated by Government reservoirs above.

Daily and monthly discharge, in second-feet, 1930–31

Day	Apr.	May	June	July	Aug.	Sept.	Day	Apr.	May	June	July	Aug.	Sept.
1930							1930						
1	-------	1,150	1,390	1,390	2,180	2,340	16	-------	2,890	1,010	1,150	2,020	2,070
2	-------	1,240	1,340	962	2,180	2,180	17	-------	2,840	1,010	1,390	2,120	2,070
3	-------	1,240	1,240	1,240	2,290	2,120	18	-------	2,730	914	1,480	2,180	2,020
4	-------	1,240	1,290	1,440	2,290	2,070	19	-------	2,620	1,010	1,680	1,820	2,020
5	-------	1,290	1,290	1,920	2,180	2,070	20	-------	2,560	962	1,770	2,020	2,020
6	-------	1,060	1,290	1,480	2,070	2,070	21	-------	2,450	1,580	1,920	2,230	2,020
7	-------	1,150	1,240	868	2,070	2,070	22	-------	2,340	1,480	1,630	2,290	2,020
8	-------	1,390	1,150	914	2,120	2,070	23	-------	2,290	1,580	1,630	2,230	1,970
9	-------	1,530	1,240	1,200	2,180	1,970	24	1,150	2,180	1,630	1,870	2,290	1,970
10	-------	1,630	1,060	1,440	2,180	1,970	25	1,150	1,970	1,200	1,920	2,400	1,970
11	-------	2,120	962	1,290	2,290	2,020	26	1,010	1,820	1,480	1,920	2,290	1,920
12	-------	2,560	1,110	1,200	2,290	2,070	27	1,110	1,680	1,770	1,920	2,230	1,920
13	-------	2,560	1,150	1,240	2,340	2,070	28	1,150	1,680	1,770	2,120	2,290	1,920
14	-------	2,670	1,010	1,340	2,400	2,180	29	868	1,530	1,680	1,820	2,290	1,920
15	-------	2,840	1,060	1,150	2,400	2,120	30	824	1,480	1,630	1,770	2,290	1,870
							31	-------	1,440	-------	2,070	2,290	-------

Daily and monthly discharge, in second-feet, of Mississippi River below Sandy River, near Libby, Minn., 1930–31—Continued

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1930–31												
1	1,770	1,200	1,110	560	648	736	736	692	1,010	1,200	414	262
2	1,770	1,150	1,010	780	495	736	868	648	868	1,240	397	197
3	1,770	1,240	648	824	538	824	1,060	736	692	1,200	431	247
4	1,770	1,060	560	692	495	736	1,110	692	824	1,150	473	290
5	1,720	1,110	648	604	736	736	1,010	736	824	1,680	326	294
6	1,680	1,110	648	648	868	780	1,010	516	736	1,290	368	294
7	1,720	962	560	604	962	780	962	648	736	1,110	410	418
8	1,680	1,010	560	648	914	780	604	692	824	736	570	473
9	1,680	1,110	648	604	824	824	736	736	736	780	757	262
10	1,630	1,150	538	736	736	824	648	736	495	648	757	200
11	1,630	824	560	736	495	692	868	736	962	648	658	310
12	1,720	648	648	824	560	736	692	648	2,070	604	464	318
13	1,480	604	736	824	604	780	516	538	2,730	604	443	318
14	1,440	604	780	736	560	824	432	604	2,840	604	393	418
15	1,480	648	824	692	604	736	411	538	2,730	604	384	486
16	1,530	648	736	692	538	780	648	648	2,400	736	380	294
17	1,530	780	516	736	604	780	692	736	2,120	692	504	243
18	1,480	604	648	824	648	648	692	868	2,070	648	504	264
19	1,530	495	736	824	648	736	692	780	2,020	692	278	264
20	1,390	648	736	736	648	824	736	648	1,870	692	250	327
21	1,340	692	824	604	736	736	692	780	1,720	648	302	453
22	1,390	780	824	780	648	780	648	824	1,770	516	314	516
23	1,290	736	648	736	560	780	692	824	1,770	560	318	306
24	1,390	1,010	560	692	604	914	824	824	1,720	538	355	306
25	1,390	962	604	824	474	736	736	868	1,820	538	426	327
26	1,390	604	736	824	604	692	736	780	1,770	474	290	327
27	1,390	604	736	780	736	824	736	538	1,580	474	306	411
28	1,290	736	516	692	962	868	648	648	1,580	426	368	538
29	1,290	868	604	824	-------	868	648	914	1,630	359	439	516
30	1,290	962	648	868	-------	914	692	1,010	1,480	439	561	285
31	1,200	-------	538	780	-------	1,010	-------	1,110	-------	452	486	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
1930					
April 24–30	1,150	824	1,040	0.206	0.05
May	2,890	1,060	1,940	.383	.44
June	1,770	914	1,280	.253	.28
July	2,120	868	1,520	.300	.35
August	2,400	1,820	2,220	.439	.51
September	2,340	1,870	2,040	.403	.45
1930–31					
October	1,770	1,200	1,520	.300	.35
November	1,240	495	852	.168	.19
December	1,110	516	680	.134	.15
January	868	560	733	.145	.17
February	962	474	659	.130	.14
March	1,010	648	788	.156	.18
April	1,110	411	739	.146	.16
May	1,110	516	732	.145	.17
June	2,840	495	1,550	.306	.34
July	1,680	359	741	.146	.17
August	757	260	430	.085	.10
September	538	197	339	.067	.07
The year	2,840	197	814	.161	2.19

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, 1931.

EXTREMES.—Maximum mean daily discharge during year, 6,710 second-feet June 16; minimum, 591 second-feet Sept. 9.

1924–1931: 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 regulated by Government reservoirs on the headwaters. Records collected by Minnesota Power & Light Co., under general supervision of the United States Geological Survey in connection with a Federal Power Commission project.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	2,890	1,810	975	1,100	1,150	1,320	1,820	1,850	2,180	4,600	2,030	1,010
2	3,050	1,720	1,100	1,110	1,090	1,160	1,720	1,360	2,440	4,790	1,410	1,140
3	2,820	1,600	1,310	1,020	1,090	1,110	1,920	1,580	2,580	3,660	1,380	1,190
4	2,550	1,980	1,280	1,110	1,220	1,310	2,070	1,330	2,630	3,400	1,530	1,140
5	2,660	1,670	1,400	1,110	1,200	1,310	2,220	1,730	2,460	3,310	1,370	940
6	2,430	1,740	1,240	975	1,140	1,250	2,200	1,420	2,040	4,010	1,300	1,040
7	2,580	1,500	1,110	1,060	1,170	1,360	2,880	1,610	2,000	2,800	1,480	741
8	2,650	1,400	1,210	1,140	1,140	1,290	2,380	1,620	1,580	3,640	1,560	774
9	2,680	1,330	1,120	1,070	1,040	1,210	2,340	1,540	1,760	3,240	1,380	591
10	2,590	1,410	1,120	1,120	1,020	1,200	2,500	1,740	1,760	2,650	1,620	783
11	2,440	1,890	1,200	1,050	1,290	1,310	1,840	1,520	2,310	2,760	1,650	917
12	2,400	1,640	1,080	975	1,130	1,300	1,920	1,640	3,310	2,320	2,030	1,180
13	2,190	1,620	1,200	967	1,290	1,360	1,740	1,700	4,900	2,040	1,980	917
14	2,330	1,690	1,200	1,000	1,120	1,370	1,730	1,620	5,660	2,110	1,980	921
15	2,460	1,580	1,200	1,050	1,100	1,110	2,120	1,740	6,320	2,080	1,640	749
16	2,300	1,380	1,130	1,150	1,000	1,240	1,980	1,410	6,710	2,160	1,680	833
17	2,020	1,400	1,180	1,200	909	1,380	1,640	1,360	6,590	1,760	1,580	810
18	2,050	1,120	1,230	1,120	1,090	1,280	1,700	1,410	6,400	1,650	1,280	1,180
19	2,000	1,430	1,290	1,050	966	1,310	1,710	1,410	5,960	1,640	1,430	1,210
20	2,070	1,870	1,350	900	874	1,270	1,850	1,740	6,150	1,330	1,320	894
21	2,220	2,400	1,030	1,000	1,060	1,330	2,000	1,610	6,130	1,180	1,250	919
22	2,220	1,490	1,110	1,050	1,080	1,240	2,010	1,560	6,200	1,200	1,320	648
23	2,100	1,680	1,140	1,070	1,050	1,340	1,800	1,620	6,120	1,530	1,250	733
24	2,120	1,480	1,340	1,030	1,090	1,540	1,700	1,700	6,310	1,440	1,080	987
25	1,940	1,060	1,340	990	1,270	1,380	1,740	1,460	6,020	1,220	1,020	1,420
26	2,350	947	1,180	1,010	1,200	1,510	1,710	1,780	5,570	1,240	990	1,090
27	2,020	992	1,310	883	1,310	1,460	1,620	2,310	5,140	1,110	1,050	1,160
28	1,980	901	1,170	1,110	1,200	1,540	1,620	2,970	4,860	1,210	980	883
29	2,160	1,150	1,150	1,090	-------	1,650	1,650	3,000	4,680	983	860	1,040
30	1,810	1,250	1,060	1,130	-------	1,280	1,590	2,750	4,580	965	886	1,030
31	1,950	-------	1,210	1,110	-------	1,370	-------	2,170	-------	1,190	903	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	3,050	1,810	2,320	0.200	0.23
November	2,400	901	1,500	.129	.14
December	1,400	975	1,190	.103	.12
January	1,200	883	1,060	.091	.10
February	1,310	874	1,120	.097	.10
March	1,650	1,110	1,330	.115	.13
April	2,880	1,590	1,920	.166	.19
May	3,000	1,330	1,750	.151	.17
June	6,710	1,580	4,380	.378	.42
July	4,790	965	2,230	.192	.22
August	2,030	860	1,400	.121	.14
September	1,420	591	962	.083	.09
The year	6,710	591	1,760	.152	2.05

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, 1931.

EXTREMES.—Maximum discharge during year, 8,980 second-feet June 16, 17 (gage height, 5.63 feet); minimum, 800 second-feet Nov. 26 (estimated).

1915–1931: Maximum discharge, 27,000 second-feet Apr. 7, 1916 (gage height, 10.8 feet); minimum, 633 second-feet Feb. 10, 1926.

REMARKS.—Records good. Discharge for period of ice effect, Nov. 24 to Mar. 10, determined by subtracting the discharge of Crow and Rum Rivers from discharge at Coon Rapids as determined from power-house records. Flow partly regulated by Government reservoirs on headwaters.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	2,810	2,070	1,440	1,340	1,490	1,610	2,430	2,250	3,630	5,260	1,230	1,040
2	3,210	2,250	1,440	1,550	1,550	1,650	3,420	2,250	3,210	5,510	1,900	1,110
3	3,630	2,250	1,480	1,440	1,550	1,600	2,620	1,820	3,210	5,260	1,900	1,410
4	3,210	1,980	1,620	1,330	1,560	1,600	3,010	1,980	3,010	4,530	1,570	1,410
5	3,010	2,250	1,710	1,320	1,460	1,610	2,810	1,900	3,210	4,300	1,820	1,410
6	3,420	2,070	1,780	1,410	1,670	1,630	3,010	1,900	3,010	3,630	1,900	1,410
7	3,210	1,900	1,640	1,360	1,480	1,610	3,010	1,980	2,430	4,070	1,820	1,110
8	2,810	1,900	1,540	1,350	1,470	1,650	3,630	1,900	2,430	3,210	2,070	1,260
9	3,210	1,900	1,690	1,370	1,410	1,720	3,630	2,430	1,820	3,850	2,430	1,040
10	3,010	1,820	1,540	1,400	1,370	1,610	3,010	1,980	1,900	3,850	1,980	1,110
11	3,210	1,900	1,550	1,400	1,400	1,570	3,210	2,160	2,160	2,810	1,730	872
12	2,810	1,980	1,590	1,380	1,470	1,730	2,430	1,900	2,810	2,810	1,980	928
13	2,620	1,980	1,620	1,160	1,490	1,730	2,810	1,820	4,530	2,810	2,190	1,340
14	2,160	1,570	1,580	1,080	1,480	1,650	2,160	2,070	6,870	2,160	2,810	1,490
15	2,430	1,820	1,500	1,080	1,500	1,490	2,250	1,820	7,750	2,430	2,430	1,110
16	3,010	2,160	1,450	1,400	1,570	1,570	2,810	1,980	8,980	2,250	2,430	1,340
17	2,810	1,980	1,430	1,320	1,480	1,730	2,810	1,730	8,980	2,250	1,980	1,040
18	2,430	2,250	1,580	1,460	1,290	1,730	2,430	1,650	8,360	2,250	1,900	1,110
19	2,250	1,730	1,740	1,420	1,300	1,570	2,430	1,650	7,750	1,730	1,730	970
20	2,160	1,730	1,600	1,250	1,430	1,730	2,810	1,570	7,450	1,900	1,570	1,410
21	2,430	2,160	1,680	1,090	1,420	1,730	2,250	1,820	7,450	1,730	1,650	1,410
22	2,430	3,010	1,480	1,160	1,400	1,820	2,810	1,900	7,160	1,490	1,570	1,180
23	2,620	2,160	1,370	1,370	1,650	1,900	2,430	1,820	7,450	1,490	1,650	1,110
24	2,430	1,940	1,370	1,260	1,610	2,250	2,620	1,730	7,160	1,490	1,730	1,040
25	2,160	960	1,660	1,340	1,520	2,810	2,250	2,160	7,750	1,650	1,410	1,110
26	2,070	800	1,650	1,360	1,660	3,010	2,250	1,820	7,160	1,650	1,240	1,490
27	2,430	900	1,500	1,250	1,690	3,210	2,430	1,730	6,590	1,340	1,340	1,650
28	2,430	1,060	1,620	1,200	1,690	2,620	1,900	2,810	6,310	1,260	1,180	1,180
29	2,430	1,200	1,320	1,360	-------	3,010	2,160	3,210	6,040	1,410	1,110	1,340
30	2,250	1,440	1,340	1,430	-------	3,210	1,900	4,070	5,510	1,410	1,110	1,180
31	2,430	-------	1,320	1,510	-------	2,620	-------	4,300	-------	1,110	1,260	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	3,630	2,070	2,690	0.186	0.21
November	3,010	800	1,840	.127	.14
December	1,780	1,320	1,540	.106	.12
January	1,550	1,080	1,330	.092	.11
February	1,690	1,290	1,500	.103	.11
March	3,210	1,490	1,970	.136	.16
April	3,630	1,900	2,660	.183	.20
May	4,300	1,570	2,130	.147	.17
June	8,980	1,820	5,400	.372	.42
July	5,510	1,110	2,670	.184	.21
August	2,810	1,110	1,770	.122	.14
September	1,650	872	1,220	.084	.09
The year	8,980	800	2,230	.154	2.08

MISSISSIPPI RIVER AT COON RAPIDS, NEAR ANOKA, MINN.

LOCATION.—Water-stage recorder in sec. 26, T. 31 N., R. 24 W., 1,500 feet downstream from Coon Rapids hydroelectric plant of Northern States Power Co. and 5 miles downstream from Anoka.

DRAINAGE AREA.—19,000 square miles.

RECORDS AVAILABLE.—June to September, 1931.

EXTREMES.—Maximum discharge during period of record, 9,300 second-feet June 16 (gage height, 4.93 feet); minimum, 870 second-feet Sept. 17 (gage height, 0.40 foot).

REMARKS.—Records excellent. Discharge estimated June 18 and 19, when recorder did not operate. Flow partly regulated by Government reservoirs on headwaters.

Daily and monthly discharge, in second-feet, 1931

Day	June	July	Aug.	Sept.	Day	June	July	Aug.	Sept.
1	------	5,570	1,450	1,270	16	9,020	2,600	2,610	1,260
2	------	5,610	1,750	1,160	17	8,860	2,390	2,000	1,280
3	------	5,720	2,310	1,370	18	8,400	2,730	2,130	1,190
4	------	4,730	1,610	1,520	19	8,150	2,020	1,920	1,100
5	------	4,570	1,850	1,560	20	8,260	1,980	1,520	1,370
6	------	4,380	1,890	1,480	21	7,670	1,870	1,740	1,500
7	------	3,970	1,960	1,280	22	7,700	1,690	1,580	1,180
8	------	3,800	1,880	1,370	23	7,740	1,510	1,690	1,380
9	------	3,570	2,250	1,160	24	7,470	1,670	1,780	1,150
10	2,280	4,400	1,940	1,190	25	7,940	1,560	1,630	1,080
11	2,600	3,270	1,850	1,080	26	7,410	1,720	1,410	1,370
12	2,840	3,140	2,110	1,010	27	6,950	1,550	1,310	1,770
13	4,300	3,220	2,120	1,190	28	6,540	1,490	1,330	1,380
14	6,180	2,560	2,570	1,380	29	6,240	1,430	1,310	1,300
15	7,530	2,680	2,410	1,340	30	6,120	1,470	1,300	1,330
					31	------	1,240	1,390	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
June 10-30	9,020	2,280	6,680	0.352	0.27
July	5,720	1,240	2,910	.153	.18
August	2,610	1,300	1,830	.096	.11
September	1,770	1,010	1,300	.068	.08

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 (1912 adjustment).

DRAINAGE AREA.—36,800 square miles (revised).

RECORDS AVAILABLE.—March, 1887, to September, 1931.

EXTREMES.—Maximum mean daily discharge, 9,670 second-feet June 26; minimum, 1,090 second-feet Sept. 13.

1887–1931: 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 excellent except those during period of backwater effect from Hastings Dam Apr. 8 to Sept. 30, which are good. Partial regulation by Government reservoirs on headwaters. Regulation negligible during summer of 1931.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	3,700	3,400	2,430	2,340	2,160	2,610	4,850	3,540	5,330	6,460	1,840	1,610
2	4,200	3,000	2,520	2,250	2,250	2,700	4,620	3,400	4,540	6,550	1,960	1,560
3	4,510	3,300	2,520	2,340	2,250	2,610	4,970	3,620	4,880	6,320	2,840	1,420
4	4,510	3,300	2,520	2,250	2,340	2,610	4,510	2,580	4,630	5,770	2,080	2,010
5	4,100	2,700	2,520	2,160	2,250	2,610	4,850	3,590	4,550	5,250	2,080	1,760
6	4,000	3,100	2,700	2,250	2,340	2,520	4,850	2,880	4,570	5,370	2,290	1,740
7	4,100	3,100	2,700	2,340	2,340	2,520	4,730	3,480	4,050	4,700	2,650	1,420
8	4,000	2,900	2,800	2,250	2,340	2,520	5,070	2,970	3,470	5,070	2,160	1,560
9	3,900	2,900	2,610	2,080	2,160	2,520	5,480	3,180	3,690	3,990	2,640	1,520
10	4,000	2,700	2,610	2,160	2,250	2,700	4,580	3,310	2,990	5,340	2,400	1,350
11	3,900	2,900	2,610	2,080	2,250	2,610	4,620	3,570	3,340	3,820	2,140	1,240
12	4,000	2,800	2,430	2,160	2,160	2,520	4,630	3,550	3,540	3,860	2,510	1,100
13	3,900	2,900	2,520	2,160	2,160	2,900	4,020	2,820	4,760	3,820	2,460	1,090
14	3,800	3,000	2,520	2,160	2,340	2,700	3,920	3,190	6,770	3,440	2,830	1,160
15	3,500	3,000	2,520	2,080	2,160	2,520	3,660	3,200	8,150	3,040	2,900	2,040
16	3,600	3,000	2,520	1,920	2,250	2,340	4,060	3,170	9,280	3,230	3,190	1,460
17	3,900	3,200	2,340	1,840	2,430	2,800	4,300	3,010	9,200	2,960	2,460	1,570
18	3,400	3,000	2,430	2,000	2,340	3,000	4,360	3,110	9,010	2,830	2,400	1,500
19	3,100	2,800	2,340	2,080	2,250	2,900	3,860	3,060	9,380	2,880	2,510	1,600
20	3,400	3,200	2,520	2,160	2,080	2,800	4,310	2,270	9,020	2,590	1,810	1,560
21	3,300	3,300	2,520	2,160	2,250	2,800	3,940	2,610	8,450	2,610	1,990	2,060
22	3,200	3,700	2,520	1,920	2,250	2,900	4,320	2,880	9,010	2,110	1,700	1,790
23	3,200	3,900	2,520	1,760	2,160	3,100	4,140	3,120	8,840	1,980	1,900	1,570
24	3,600	3,200	2,340	1,840	2,520	4,100	3,850	2,650	9,460	1,860	2,130	1,600
25	3,500	3,400	2,160	1,920	2,610	4,200	4,040	2,850	9,570	1,830	2,120	1,570
26	3,300	2,900	2,340	1,840	2,520	4,510	3,420	2,940	9,670	1,830	1,710	1,490
27	3,200	1,920	2,520	2,080	2,610	4,970	4,010	3,070	9,510	1,900	1,640	2,210
28	3,600	1,920	2,430	2,000	2,610	5,230	3,420	3,360	7,540	2,140	1,710	1,740
29	3,300	2,000	2,340	1,920	-------	4,970	3,280	3,910	7,460	1,700	1,610	1,620
30	3,400	2,160	2,430	1,920	-------	5,490	3,520	4,870	7,250	1,680	1,540	1,760
31	3,200	-------	2,160	1,920	-------	5,230	-------	5,340	-------	1,780	1,980	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	4,510	3,100	3,690	0.100	0.12
November	3,900	1,920	2,950	.080	.09
December	2,800	2,160	2,480	.067	.08
January	2,340	1,760	2,080	.057	.07
February	2,610	2,080	2,310	.063	.07
March	5,490	2,340	3,240	.088	.10
April	5,480	3,280	4,270	.116	.13
May	5,340	2,270	3,260	.089	.10
June	9,670	2,990	6,730	.183	.20
July	6,550	1,680	3,510	.095	.11
August	3,190	1,540	2,200	.060	.07
September	2,210	1,090	1,590	.043	.05
The year	9,670	1,090	3,190	.087	1.19

MISSISSIPPI RIVER AT PRESCOTT, WIS.

LOCATION.—Staff gage in lot 4, SE. ¼ sec. 9, T. 26 N., R. 20 W., on Chicago, Burlington & Quincy Railroad bridge over St. Croix River. Zero of gage is 669.28 feet above mean sea level (1912 adjustment).

DRAINAGE AREA.—45,000 square miles.

RECORDS AVAILABLE.—June, 1928, to September, 1931.

EXTREMES.—Maximum discharge during year, 22,400 second-feet June 28 (gage height, 7.26 feet); minimum, 3,010 second-feet Sept. 16 (gage height, −2.92 feet).

1928–1931: Maximum discharge, 49,600 second-feet Mar. 25, 1929 (gage height, 12.3 feet); minimum, that of Sept. 16, 1931.

REMARKS.—Records good except those for period of ice effect, Nov. 27 to Mar. 17, which are fair. Flow partly regulated by reservoirs and power plants above.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	6,520	6,130	4,400	5,360	4,290	5,240	7,770	7,070	6,930	17,700	3,520	3,740
2	6,520	6,130	4,400	5,360	4,400	5,120	7,770	6,930	7,210	15,700	4,070	3,520
3	6,790	6,000	4,640	5,120	4,400	5,000	7,770	6,790	7,210	14,100	3,960	3,410
4	6,790	6,000	4,880	4,880	4,400	5,000	7,770	6,650	7,770	13,400	4,070	3,520
5	6,930	6,000	5,120	4,880	4,640	5,120	7,630	6,650	7,770	12,700	3,960	3,520
6	6,790	5,740	5,240	4,640	4,760	5,240	7,490	6,650	7,920	11,400	3,850	3,520
7	6,790	5,870	5,240	4,640	5,000	5,240	7,350	6,650	8,070	10,700	3,960	3,410
8	6,650	5,870	5,360	4,640	4,880	5,240	7,350	6,650	7,490	10,100	4,180	3,410
9	6,650	5,740	5,360	4,520	4,880	5,120	7,210	6,520	7,210	9,340	4,290	3,310
10	6,790	5,740	5,360	4,520	4,640	5,000	7,210	6,390	7,350	8,680	4,290	3,210
11	6,930	5,610	5,480	4,400	4,640	5,120	7,350	6,390	6,930	8,370	4,180	3,210
12	6,790	5,610	5,480	4,290	4,760	5,240	7,070	6,260	7,350	7,920	4,180	3,110
13	6,930	5,610	5,610	4,070	4,760	5,360	7,210	6,390	7,490	7,490	4,070	3,210
14	6,790	5,740	5,610	4,290	4,760	5,480	6,930	6,390	8,220	7,070	4,070	3,110
15	6,650	5,740	5,480	4,400	4,880	5,610	6,930	6,390	9,900	6,790	4,640	3,010
16	6,650	5,870	5,240	4,400	4,760	5,480	6,930	6,390	12,200	6,520	4,760	3,010
17	6,390	6,130	5,240	4,290	4,640	5,240	6,790	6,390	14,300	6,260	4,640	3,210
18	6,390	6,130	5,240	4,180	4,760	5,480	6,790	6,260	15,700	5,870	4,520	3,110
19	6,260	6,000	5,360	4,070	4,760	5,610	6,930	6,260	16,400	5,480	4,290	3,110
20	6,130	6,260	5,360	3,850	4,880	5,740	6,930	6,390	16,200	5,360	4,290	3,210
21	6,130	6,390	5,240	4,180	4,880	5,740	6,930	6,390	16,200	5,120	4,070	3,410
22	6,000	6,790	5,240	4,290	5,000	5,740	7,070	6,130	15,900	4,760	3,850	4,070
23	6,000	7,350	4,880	4,290	4,880	5,870	7,350	6,000	15,900	4,640	3,740	3,850
24	6,000	7,490	5,000	4,290	4,640	6,000	7,350	5,870	16,400	4,290	3,740	3,740
25	6,130	7,210	5,120	4,290	4,880	6,130	7,210	5,740	18,000	3,960	3,740	3,740
26	6,260	7,210	5,000	4,400	5,000	6,520	7,350	5,610	20,000	3,850	3,630	3,740
27	6,260	6,520	4,760	4,180	5,120	7,490	7,070	5,610	21,800	3,960	3,520	3,740
28	6,260	5,480	4,760	4,290	5,120	8,070	6,930	5,610	22,100	3,850	3,410	3,850
29	6,260	4,880	4,640	4,400	-------	8,070	7,070	5,610	20,900	3,850	3,410	3,850
30	6,260	4,640	4,880	4,400	-------	7,920	6,930	5,870	19,400	3,740	3,310	3,960
31	6,260	-------	5,000	4,290	-------	7,770	-------	6,520	-------	3,520	3,410	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	6,930	6,000	6,480	0.144	0.17
November	7,490	4,640	6,060	.135	.15
December	5,610	4,400	5,120	.114	.13
January	5,360	3,850	4,450	.099	.11
February	5,120	4,290	4,760	.106	.11
March	8,070	5,000	5,840	.130	.15
April	7,770	6,790	7,210	.160	.18
May	7,070	5,610	6,300	.140	.16
June	22,100	6,930	12,500	.278	.31
July	17,700	3,520	7,630	.170	.20
August	4,760	3,310	3,990	.089	.10
September	4,070	3,010	3,460	.077	.09
The year	22,100	3,010	6,150	.137	1.86

MISSISSIPPI RIVER AT ALMA, WIS.

LOCATION.—Staff gage in sec. 11, T. 21 N., R. 13 W., at Alma, on left bank of river near central part of town. Zero of gage is 654.90 feet above mean sea level (1912 adjustment).

DRAINAGE AREA.—57,100 square miles.

RECORDS AVAILABLE.—April, 1930, to September, 1931 (discontinued).

EXTREMES.—Maximum discharge during year, 30,700 second-feet July 2 (gage height, 7.06 feet); minimum, 6,100 second-feet Sept. 19 (gage height, −0.68 foot).

1930–31: Maximum discharge, 38,500 second-feet May 23, 1930 (gage height, 8.42 feet); minimum, 6,100 second-feet Sept. 19, 1931 (gage height, −0.68 foot).

REMARKS.—Records good. Flow partly regulated by reservoirs and power plants above. No record Dec. 1 to Jan. 17.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	10,000	9,800	-------	8,400	9,000	11,000	12,800	9,200	30,200	7,460	6,480
2	10,000	9,800	-------	8,400	9,200	11,300	12,600	9,200	30,200	7,640	6,220
3	10,300	9,600	-------	8,400	9,000	11,600	12,300	9,400	29,200	7,460	6,340
4	10,300	9,600	-------	8,600	9,000	11,800	12,000	9,600	27,200	7,280	6,620
5	10,300	9,600	-------	8,600	9,000	11,800	12,000	9,800	26,200	7,280	6,940
6	10,600	9,600	-------	8,600	9,400	12,000	12,000	9,800	24,200	7,280	7,100
7	10,800	9,400	-------	8,600	9,400	11,800	11,800	10,300	22,200	7,280	6,780
8	10,800	9,400	-------	8,800	9,600	11,800	11,600	10,300	20,900	7,460	6,780
9	10,800	9,400	-------	8,800	9,600	11,800	11,600	10,000	19,700	7,640	6,780
10	11,000	9,200	-------	8,600	9,400	12,000	11,300	9,800	18,900	7,640	6,620
11	11,300	9,200	-------	8,400	9,400	11,800	11,300	10,000	17,400	7,460	6,620
12	11,600	9,200	-------	8,600	9,400	11,800	11,000	10,300	16,800	7,460	6,340
13	11,800	9,000	-------	8,400	9,400	11,800	10,800	11,300	16,200	7,460	6,340
14	11,800	9,000	-------	8,400	9,400	11,300	10,800	11,800	15,300	7,460	6,340
15	11,800	9,000	-------	8,200	9,600	11,800	10,800	12,300	14,700	7,460	6,480
16	11,800	9,400	-------	8,400	9,600	11,800	10,800	12,800	13,800	7,460	6,200
17	12,000	9,400	8,400	8,400	9,400	11,800	10,600	13,800	13,600	7,640	6,340
18	12,000	9,400	8,400	8,400	9,400	11,800	10,600	15,300	12,800	7,640	6,340
19	11,600	9,400	8,400	8,400	9,400	11,800	10,600	16,200	12,300	7,460	6,100
20	11,000	9,600	8,200	8,400	9,200	12,000	10,600	18,500	12,000	7,460	6,340
21	10,600	10,300	8,200	8,500	9,200	12,000	10,600	19,300	11,300	7,460	6,480
22	10,300	10,600	8,200	8,600	9,400	12,300	10,600	20,100	10,800	7,460	6,480
23	10,600	10,800	8,200	8,600	9,400	12,600	10,300	22,700	10,300	7,460	7,100
24	10,600	11,600	8,200	8,600	9,400	12,800	10,000	25,700	9,800	7,280	7,100
25	10,300	11,300	8,200	8,800	9,600	12,800	10,000	27,700	9,600	7,100	7,460
26	10,000	11,000	8,200	8,800	9,600	12,800	9,600	28,200	9,200	6,940	7,640
27	10,000	11,300	8,200	9,000	9,800	13,000	9,400	29,200	8,800	6,780	7,820
28	10,300	11,300	8,000	9,000	10,000	12,800	9,600	28,200	8,200	6,940	7,820
29	10,000	10,800	8,200	-------	10,600	12,800	9,400	29,700	8,000	7,100	7,820
30	10,000	10,300	8,200	-------	10,800	12,800	9,400	29,700	7,820	6,780	7,820
31	10,000	-------	8,400	-------	10,800	-------	9,200	-------	7,640	6,480	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	12,000	10,000	10,800	0.189	0.22
November	11,600	9,000	9,910	.174	.19
January 17–31	8,400	8,200	8,240	.144	.08
February	9,000	8,200	8,560	.150	.16
March	10,800	9,000	9,530	.167	.19
April	13,000	11,000	12,000	.210	.23
May	12,800	9,200	10,800	.189	.22
June	29,700	9,200	16,300	.285	.32
July	30,200	7,640	16,000	.280	.32
August	7,640	6,480	7,330	.128	.15
September	7,820	6,100	6,790	.119	.13

MISSISSIPPI RIVER NEAR FOUNTAIN CITY, WIS.

LOCATION.—Staff gage on Minnesota side of channel in sec. 7, T. 108 N., R. 8 W., at Chimney Rock, 6½ miles above Fountain City, Wis. Zero of gage is 647.56 feet above mean sea level (1912 adjustment).

DRAINAGE AREA.—58,800 square miles.

RECORDS AVAILABLE.—March, 1930, to September, 1931 (discontinued).

EXTREMES.—Maximum discharge during year, 31,000 second-feet July 2 (gage height, 6.00 feet); minimum, 6,640 second-feet Sept. 18, 19 (gage height, −1.60 feet).

1930–31: Maximum discharge, 39,900 second-feet May 23, 1930 (gage height 7.24 feet); minimum, that of Sept. 18, 19, 1931 (gage height, −1.60 feet).

REMARKS.—Records good. Flow partly regulated by reservoirs and power plants above. No record Dec. 1 to Mar. 31.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Apr.	May	June	July	Aug.	Sept.
1	10,500	10,500	11,500	13,000	9,900	30,300	7,920	7,920
2	10,500	10,300	11,600	13,000	9,900	31,000	8,100	8,640
3	10,500	10,300	11,700	12,800	9,900	29,600	8,100	8,640
4	10,700	10,100	11,900	12,500	10,100	28,300	7,760	8,280
5	10,700	10,300	12,100	12,100	10,100	26,500	7,760	7,760
6	10,700	10,100	12,100	12,300	10,300	25,300	7,760	7,600
7	10,900	10,100	12,100	12,100	10,500	23,200	7,760	7,280
8	11,100	9,900	12,100	11,900	10,700	21,700	7,920	7,280
9	11,100	9,900	12,100	11,700	10,500	20,700	8,100	7,120
10	11,100	9,900	12,100	11,700	10,500	19,100	8,100	7,120
11	11,300	9,900	12,100	11,700	10,500	18,300	7,920	6,960
12	11,500	9,900	11,900	11,500	10,500	17,200	7,920	6,800
13	11,900	9,900	12,100	11,300	11,100	16,600	7,920	6,800
14	12,100	9,900	11,900	11,300	11,700	15,700	7,760	6,800
15	12,100	10,100	11,900	11,100	12,100	15,100	7,760	6,800
16	12,100	10,100	12,100	11,100	12,500	14,500	7,920	6,800
17	12,100	10,100	12,100	11,100	13,300	14,000	7,920	6,800
18	12,100	10,100	12,100	10,900	14,500	13,500	7,920	6,640
19	11,900	10,100	12,100	10,900	15,700	12,800	7,920	6,640
20	11,500	10,300	12,100	10,900	17,200	12,500	7,920	6,800
21	11,100	10,300	12,300	10,900	18,300	11,900	7,920	6,800
22	10,900	10,900	12,300	10,900	20,300	11,500	7,760	6,960
23	10,900	11,300	12,500	10,700	22,200	11,100	7,710	7,120
24	10,900	11,700	12,800	10,500	24,700	10,700	7,650	7,440
25	10,700	11,900	13,000	10,500	26,500	10,300	7,600	7,760
26	10,500	11,900	13,300	10,300	27,700	9,900	7,440	8,100
27	10,500	11,900	13,300	10,100	28,900	9,540	7,280	8,100
28	10,500	11,900	13,300	10,100	29,600	9,180	7,280	8,280
29	10,500	11,900	13,000	10,100	27,100	8,640	7,280	8,100
30	10,500	11,900	13,000	10,100	30,300	8,640	7,120	8,280
31	10,500	-------	-------	9,900	-------	8,280	7,120	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	12,100	10,500	11,100	0.189	0.22
November	11,900	9,900	10,600	.180	.20
April	13,300	11,500	12,300	.209	.23
May	13,000	9,900	11,300	.192	.22
June	30,300	9,900	16,200	.276	.31
July	31,000	8,280	16,600	.282	.33
August	8,100	7,120	7,750	.132	.15
September	8,640	6,640	7,410	.126	.14

MISSISSIPPI RIVER AT WINONA, MINN.

LOCATION.—Staff gage in sec. 23, T. 107 N., R. 7 W., on stone pier at right end of highway bridge at Winona. Elevation, 640.12 feet above mean sea level (1912 adjustment) since Apr. 16. Prior to that date staff gage was located 800 feet upstream.

DRAINAGE AREA.—59,200 square miles.

RECORDS AVAILABLE.—June, 1928, to September, 1931.

EXTREMES.—Maximum discharge, 31,600 second-feet July 3 (gage height, 5.44 feet); minimum, 6,790 second-feet Sept. 19, 20 (gage height, —1.70 feet).

1928–1931: Maximum discharge, 78,300 second-feet Apr. 3–4, 1929 (gage height, 11.50 feet); minimum, that of Sept. 19, 20, 1931.

REMARKS.—Records excellent except those for period of ice effect, Nov. 24 to Mar. 7, which are fair. Flow partly regulated by reservoirs and power plants above.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	10,800	10,800	11,200	8,640	9,830	10,000	11,700	13,800	10,300	30,500	8,630	7,940
2	10,800	10,600	9,490	8,470	9,830	10,200	11,700	13,800	10,000	31,600	8,630	9,320
3	10,800	10,600	9,830	8,980	9,830	10,000	11,900	13,500	10,000	31,600	8,630	9,320
4	10,800	10,400	10,200	8,980	9,830	10,000	12,200	13,200	10,500	30,500	8,400	8,860
5	10,800	10,400	10,200	8,810	9,830	10,200	12,400	13,200	10,800	29,400	8,400	8,400
6	11,000	10,600	10,000	8,640	9,830	10,200	12,700	13,000	10,800	27,200	8,170	8,170
7	11,200	10,400	10,000	8,640	9,830	10,400	12,400	13,000	11,000	25,600	8,400	7,710
8	11,200	10,200	9,830	8,300	9,830	10,400	12,400	12,700	11,200	23,600	8,630	7,480
9	11,400	10,200	9,660	8,150	9,830	10,600	12,400	12,500	11,200	22,200	8,630	7,480
10	11,400	10,200	9,660	8,150	10,000	10,600	12,400	12,500	11,000	21,300	8,630	7,250
11	11,400	10,200	9,490	8,150	9,660	10,400	12,700	12,500	11,000	20,000	8,630	7,250
12	11,700	10,000	9,150	8,150	9,660	10,400	12,200	12,200	11,200	18,800	8,400	7,250
13	11,900	10,000	8,980	7,550	9,660	10,400	12,400	12,000	11,500	18,000	8,400	7,020
14	12,400	10,000	8,640	6,800	9,660	10,400	12,200	12,000	12,000	17,000	8,400	7,020
15	12,200	10,000	8,640	6,800	9,660	10,600	12,200	11,700	12,700	16,300	8,170	7,020
16	12,200	10,200	9,490	7,250	9,490	10,600	12,700	11,700	13,000	15,400	8,400	7,250
17	12,400	10,400	9,150	7,850	9,660	10,400	12,700	11,700	13,500	14,800	8,400	7,250
18	12,400	10,600	9,490	8,300	9,660	10,400	13,000	11,500	14,500	14,500	8,400	7,020
19	12,200	10,400	9,830	8,150	9,660	10,400	12,700	11,700	15,700	13,800	8,400	6,790
20	11,900	10,600	9,660	8,000	9,660	10,200	13,000	11,500	17,300	13,500	8,400	6,790
21	11,400	10,800	9,490	6,800	9,660	10,200	13,000	11,700	18,800	13,000	8,400	7,020
22	11,200	11,200	9,490	7,100	9,660	10,400	13,200	11,500	20,400	12,200	8,400	7,480
23	11,200	11,200	9,490	8,470	9,830	10,400	13,200	11,200	22,200	12,000	8,170	7,710
24	11,200	11,700	9,150	9,320	9,830	10,400	13,500	11,200	24,600	11,500	8,170	7,710
25	11,000	12,200	9,320	9,830	9,830	10,600	13,800	11,200	26,100	11,000	7,940	8,170
26	10,800	11,900	9,490	9,660	9,830	10,600	14,000	11,000	27,700	10,500	7,940	8,630
27	10,800	11,900	9,320	10,400	10,000	10,800	14,000	10,500	29,400	10,300	7,710	8,630
28	10,800	11,900	9,320	10,400	10,000	11,000	14,000	10,500	29,900	9,800	7,480	8,630
29	11,000	11,400	9,320	10,000	-------	11,200	13,800	10,500	30,500	9,550	7,710	8,630
30	10,800	11,400	8,300	10,000	-------	11,400	13,800	10,500	30,500	9,090	7,480	8,630
31	10,800	-------	8,640	10,000	-------	11,400	-------	10,300	-------	8,860	7,250	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	12,400	10,800	11,400	0.193	0.22
November	12,200	10,000	10,700	.181	.20
December	11,200	8,300	9,480	.160	.18
January	10,400	6,800	8,540	.144	.17
February	10,000	9,490	9,770	.165	.17
March	11,400	10,000	10,500	.177	.20
April	14,000	11,700	12,800	.216	.24
May	13,800	10,300	11,900	.201	.23
June	30,500	10,000	16,600	.280	.31
July	31,600	8,860	17,900	.302	.35
August	8,630	7,250	8,250	.139	.16
September	9,320	6,790	7,790	.132	.15
The year	31,600	6,790	11,300	.191	2.58

MISSISSIPPI RIVER AT LAMOILLE, MINN.

LOCATION.—Staff gage in sec. 7, T. 106 N., R. 5 W., at upstream end of village of Lamoille. Zero of gage has been 633.24 feet above mean sea level (1912 adjustment) since Mar. 20, 1931. Prior to this date gage was located about 2,000 feet downstream with zero at 634.61 feet above mean sea level.

DRAINAGE AREA.—60,000 square miles.

RECORDS AVAILABLE.—March, 1930, to September, 1931 (discontinued).

EXTREMES.—Maximum discharge during year, 32,200 second-feet July 3 (gage height, 7.69 feet); minimum, 7,030 second-feet Sept. 14 (gage height, 0.14 foot).

1930–31: Maximum discharge, 46,300 second-feet June 17, 1930 (gage height, 7.67 feet, 1930 datum); minimum, that of Sept. 14, 1931.

REMARKS.—Records good except those for period of ice effect, Nov. 28–30, which are fair. No record Dec. 1 to Mar. 19.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	11,200	11,200	-------	12,400	13,900	10,000	30,900	8,450	7,730
2	11,200	11,200	-------	12,600	13,900	9,800	31,500	8,450	9,400
3	11,200	11,000	-------	12,900	13,900	9,800	32,200	8,450	9,600
4	11,200	11,000	-------	13,100	13,600	10,000	30,900	8,270	9,210
5	11,400	11,000	-------	13,400	13,600	10,200	29,500	8,090	8,640
6	11,400	11,000	-------	13,400	13,100	10,400	27,500	8,090	8,270
7	11,600	11,000	-------	13,400	13,100	10,600	25,700	8,090	7,910
8	11,800	10,800	-------	13,400	12,900	10,900	23,600	8,270	7,730
9	12,000	10,800	-------	13,100	12,900	10,900	22,200	8,270	7,550
10	12,000	10,800	-------	13,100	12,900	10,600	21,000	8,270	7,370
11	11,800	10,600	-------	13,100	12,600	10,600	19,900	8,270	7,370
12	12,000	10,400	-------	13,100	12,400	10,900	19,000	8,270	7,200
13	12,200	10,400	-------	12,900	12,100	11,100	18,100	8,090	7,200
14	12,600	10,400	-------	12,900	12,100	11,600	17,500	8,090	7,200
15	12,600	10,400	-------	12,900	11,900	12,400	16,600	8,090	7,370
16	12,600	10,600	-------	12,900	11,600	12,600	16,000	8,090	7,370
17	12,600	11,000	-------	13,100	11,600	13,400	15,200	8,270	7,370
18	12,600	11,000	-------	13,100	11,600	14,400	14,600	8,270	7,370
19	12,600	11,000	-------	13,100	11,600	15,200	14,100	8,270	7,200
20	12,400	11,200	10,600	13,100	11,400	16,900	13,600	8,270	7,200
21	12,200	11,200	10,600	13,400	11,400	18,700	13,100	8,090	7,200
22	11,800	11,600	10,600	13,400	11,400	20,200	12,400	8,090	7,550
23	11,800	11,800	10,600	13,600	11,400	22,200	11,900	8,090	7,910
24	11,600	12,200	10,900	13,900	11,100	23,600	11,400	7,910	8,090
25	11,600	12,600	11,100	13,900	11,100	25,700	10,900	7,910	8,270
26	11,400	12,400	11,100	14,100	10,600	27,500	10,400	7,730	8,640
27	11,400	12,200	11,400	14,400	10,400	28,800	10,000	7,550	9,020
28	11,400	12,200	11,600	14,400	10,200	29,500	9,600	7,550	8,830
29	11,400	12,200	11,600	14,100	10,400	30,200	9,210	7,550	8,830
30	11,200	12,200	12,100	14,100	10,200	30,200	8,830	7,550	8,830
31	11,200	-------	12,400	-------	10,200	-------	8,640	7,370	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	12,600	11,200	11,800	0.197	0.23
November	12,600	10,400	11,200	.187	.21
March 20–31	12,400	10,600	11,200	.187	.08
April	14,400	12,400	13,300	.222	.25
May	13,900	10,200	12,000	.200	.23
June	30,200	9,800	16,300	.272	.30
July	32,200	8,640	17,900	.298	.34
August	8,450	7,370	8,070	.134	.15
September	9,600	7,200	7,980	.133	.15

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 La Crosse. Zero of gage is 626.43 feet above mean sea level (1912 adjustment).

DRAINAGE AREA.—62,800 square miles.

RECORDS AVAILABLE.—June, 1929, to September, 1931.

EXTREMES.—Maximum discharge during year, 31,900 second-feet June 3, 4 (gage height, 5.15 feet); minimum, 7,600 second-feet Sept. 14 (gage height, −1.90 feet).

1929–1931: Maximum discharge, 52,300 second-feet June 18, 1930 (gage height, 8.60 feet); minimum, that of Sept. 14, 1931.

Maximum stage known, 16.2 feet June 19, 1880.

REMARKS.—Records good except those for period of ice effect, Nov. 28 to Feb. 19, which are fair. Flow partly regulated by reservoirs and power plants above.

Daily and monthly discharge, in second-feet, 1930–31

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

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	14,000	11,800	12,800	0.204	0.24
November	13,700	11,300	12,200	.194	.22
December	12,500	9,100	10,800	.172	.20
January	10,900	8,300	9,730	.155	.18
February	12,000	10,900	11,300	.180	.19
March	13,500	11,300	11,900	.189	.22
April	15,600	13,500	14,600	.232	.26
May	15,300	11,300	13,300	.212	.24
June	30,200	10,900	17,000	.271	.30
July	31,300	9,600	19,200	.306	.35
August	9,600	8,000	8,960	.143	.16
September	10,600	7,600	8,840	.141	.16
The year	31,300	7,600	12,600	.201	2.72

MISSISSIPPI RIVER AT GENOA, WIS.

LOCATION.—Staff gage in sec. 29, T. 13 N., R. 7 W., at Genoa. Zero of gage is 616.03 feet above mean sea level (1912 adjustment). Prior to Mar. 25 gage was located a mile downstream, elevation 615.95 feet above mean sea level.
DRAINAGE AREA.—64,700 square miles.
RECORDS AVAILABLE.—March, 1930, to September, 1931 (discontinued).
EXTREMES.—Maximum discharge during year, 32,000 second-feet July 4, 5 (gage height, 6.94 feet); minimum, 8,600 second-feet Sept. 13, 14 (gage height, 0.56 foot).

1930–31: Maximum discharge, 50,500 second-feet June 19, 20, 1930 (gage height, 9.78 feet, 1930 datum); minimum, that of Sept. 13, 14, 1931.

REMARKS.—Records good except those for period of ice effect, Nov. 27–30, which are fair. No record Dec. 1 to Mar. 24.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	12,400	13,000	-------	14,500	16,500	11,600	30,800	10,000	9,000
2	12,400	13,000	-------	14,900	16,200	11,300	31,400	10,400	9,600
3	12,400	12,700	-------	15,200	15,900	11,300	31,400	10,600	10,800
4	12,400	12,700	-------	15,200	15,900	11,300	32,000	10,000	10,800
5	12,400	12,400	-------	15,500	15,900	11,300	32,000	9,800	10,200
6	12,700	12,400	-------	15,500	15,500	11,600	30,800	9,600	10,000
7	13,000	12,400	-------	15,900	15,200	11,800	30,200	9,400	9,400
8	13,300	12,400	-------	15,900	15,200	12,100	29,000	9,200	9,200
9	13,600	12,400	-------	16,200	15,200	12,400	26,800	9,400	9,000
10	13,600	12,400	-------	15,900	15,200	12,100	24,300	9,600	8,800
11	13,600	12,100	-------	15,500	15,200	12,100	22,800	9,600	8,600
12	13,300	12,100	-------	15,500	14,900	12,400	22,400	9,600	8,600
13	13,600	11,800	-------	15,500	14,500	12,400	21,200	9,400	8,600
14	13,600	11,800	-------	15,200	14,200	12,400	19,600	9,400	8,600
15	14,200	11,800	-------	15,200	13,900	12,700	19,600	9,400	8,600
16	14,500	12,100	-------	15,200	13,600	13,300	19,600	9,200	8,800
17	14,500	12,400	-------	14,900	13,600	13,600	18,000	9,200	8,800
18	14,500	12,700	-------	14,900	13,300	14,200	16,500	9,200	8,800
19	14,800	12,700	-------	15,200	13,300	15,200	16,200	9,400	9,000
20	14,500	13,000	-------	15,200	13,300	16,900	15,900	9,400	9,000
21	14,500	13,300	-------	15,500	13,000	18,400	15,200	9,400	9,000
22	14,200	13,300	-------	15,500	13,300	20,400	14,200	9,200	9,000
23	13,900	13,600	-------	15,500	13,300	22,400	13,300	9,200	9,200
24	13,600	13,900	-------	15,900	13,000	23,800	12,700	9,200	9,400
25	13,300	14,200	12,700	16,200	12,700	25,800	12,400	9,000	9,800
26	13,300	14,500	13,000	16,200	12,700	26,800	12,100	9,000	10,000
27	13,000	14,500	13,300	16,200	12,700	28,400	11,600	9,000	10,200
28	13,000	14,200	13,600	16,500	12,100	29,000	11,100	8,800	10,200
29	13,000	14,200	13,900	16,500	12,100	29,000	10,600	8,800	10,200
30	13,000	13,900	14,200	16,500	12,100	30,200	10,400	8,800	10,200
31	13,000	-------	14,500	-------	12,100	-------	10,200	8,800	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	14,800	12,400	13,500	0.209	0.24
November	14,500	11,800	12,900	.199	.22
March 25–31	14,500	12,700	13,600	.210	.05
April	16,500	14,500	15,600	.241	.27
May	16,500	12,100	14,100	.218	.25
June	30,200	11,300	16,900	.261	.29
July	32,000	10,200	20,100	.311	.36
August	10,600	8,800	9,390	.145	.17
September	10,800	8,600	9,380	.145	.16

MISSISSIPPI RIVER AT CLAYTON, IOWA

LOCATION.—Staff gage in sec. 35, T. 94 N., R. 3 W., a quarter of a mile upstream from railroad station in Clayton and 200 feet above junction of Wyalusing Slough with Mississippi River. Zero of gage is 602.63 feet above mean sea level (1912 adjustment).

DRAINAGE AREA.—79,200 square miles.

RECORDS AVAILABLE.—April, 1930, to September, 1931.

EXTREMES.—Maximum discharge during year, 40,100 second-feet July 6 (gage height, 6.62 feet); minimum, 11,800 second-feet Sept. 14 (gage height, −0.29 foot).

1930–31: Maximum discharge, 79,000 second-feet June 25, 1930 (gage height, 10.90 feet); minimum, that of Sept. 14, 1931.

REMARKS.—Records good except those for Oct. 10–29 and for period of ice effect, Dec. 2 to Mar. 8, which are fair.

Daily and monthly discharge, in second-feet, 1930–31

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

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	20,100	14,800	17,700	0.223	0.26
November	20,500	14,400	17,900	.226	.25
December	20,100	14,100	16,700	.211	.24
January	17,300	15,000	15,800	.199	.23
February	18,400	15,300	17,400	.220	.23
March	20,800	17,700	18,400	.232	.27
April	24,600	21,500	23,500	.297	.33
May	25,000	18,000	20,900	.264	.30
June	38,700	16,600	22,100	.279	.31
July	40,100	15,600	28,300	.357	.41
August	15,300	12,300	13,500	.170	.20
September	20,100	11,800	15,100	.191	.21
The year	40,100	11,800	18,900	.239	3.24

CROW WING RIVER AT NIMROD, MINN.

LOCATION.—Chain gage in sec. 32, T. 137 N., R. 33 W., on highway bridge, half a mile north of Nimrod.

DRAINAGE AREA.—1,010 square miles.

RECORDS AVAILABLE.—April, 1910, to September, 1914; July, 1930, to September, 1931.

EXTREMES.—Maximum discharge during period July, 1930, to September, 1931, 440 second-feet June 12 (gage height, 2.98 feet); maximum gage height, 3.18 feet Nov. 7, 1930; minimum discharge, 59 second-feet Aug. 25, 1930 (gage height, 2.52 feet); minimum gage height, 2.42 feet May 26 1931.

1910–1914, 1930–31: Maximum discharge, 2,000 second-feet June 9 . 1914; minimum, that of Aug. 25, 1930.

REMARKS.—Records poor. Stage-discharge relation affected by aquatic growth during most of summer. No records Dec. 1 to Mar. 31.

Daily and monthly discharge, in second-feet, 1930–31

Day	July	Aug.	Sept.	Oct.	Nov.	Apr.	May	June	July	Aug.	Sept.
1		126	136	96	165	*250	223	207	251	218	223
2		155	150	112	165	257	212	202	257	212	218
3		141	150	141	170	262	212	191	262	202	223
4		155	150	141	170	262	212	176	262	196	212
5		136	136	146	176	262	223	170	274	186	218
6		136	131	165	181	262	218	165	304	176	207
7		131	136	176	160	251	212	155	316	218	202
8		131	122	181	160	251	212	150	316	268	196
9		112	122	181	229	246	223	146	310	286	191
10		112	117	181	165	246	223	196	304	268	181
11		126	136	191	170	262	223	341	298	257	181
12		131	155	207	165	280	223	433	292	251	176
13		122	150	212	170	274	218	433	322	251	170
14		126	160	202	181	246	212	354	292	251	170
15		117	170	191	191	280	202	304	274	251	160
16		122	165	170	218	268	191	257	268	262	160
17		122	165	146	223	268	191	246	262	262	160
18		126	165	122	223	268	196	240	257	262	160
19		126	160	176	223	257	196	240	268	262	165
20		122	165	181	304	257	196	246	234	262	165
21		108	160	176	304	246	196	240	176	251	165
22		112	150	262	354	246	186	316	136	251	170
23		96	136	257	298	234	181	328	126	251	170
24		80	108	212	181	246	176	316	117	240	170
25		66	104	202	170	246	165	292	108	240	181
26		76	96	186	234	246	181	274	100	240	186
27		96	88	176	212	240	251	257	96	240	181
28	176	112	84	176	181	229	251	262	92	246	181
29	136	117	84	176	212	223	240	257	88	246	181
30	131	136	76	160	186	223	234	251	126	234	186
31	126	141		165			223		202	229	

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
1930					
August	155	66	120	0.119	0.14
September	170	76	134	133	.15
1930–31					
October	262	96	176	.174	.20
November	354	160	205	.203	.23
April	280	223	253	.250	.28
May	251	165	210	.208	.24
June	433	146	255	.252	.28
July	322	88	225	.223	.26
August	286	176	241	.239	.28
September	223	160	184	.182	.20

* Estimated.

CROW WING RIVER AT MOTLEY, MINN.

LOCATION.—Chain gage in SW. ¼ sec. 7, T. 133 N., R. 31 W., on highway bridge half a mile northeast of Motley. Gage used since July, 1930, is at same site as gage used prior to September, 1917, but at different datum.

DRAINAGE AREA.—2,140 square miles.

RECORDS AVAILABLE.—June to November, 1909 (gage heights and measurements only), April, 1913, to September, 1917; July, 1930, to September, 1931 (discontinued).

EXTREMES.—Maximum discharge during period July, 1930, to September, 1931, 1,250 second-feet June 14 (gage height, 4.76 feet); minimum, 130 second-feet Aug. 26, 1930 (gage height, 3.32 feet); minimum stage, 3.30 feet Nov. 5, 1930. 1909, 1913–1917, 1930–31: Maximum discharge, 9,440 second-feet Apr. 5, 6, 1916 (gage height, 11.5 feet, former datum); maximum gage height, 13.2 feet Apr. 5, 1917; minimum discharge, that of Aug. 26, 1930.

REMARKS.—Records fair. Stage-discharge relation affected by aquatic growth during most of summer and by ice during winter.

Daily discharge, in second-feet, 1930–31

Day	July	Aug.	Sept.	Day	July	Aug.	Sept.	Day	July	Aug.	Sept.
1930				1930				1930			
1		178	187	11		146	204	21		143	184
2		175	172	12		146	194	22		146	181
3		169	166	13		154	194	23		143	184
4		175	175	14		146	200	24		138	166
5		172	187	15		146	214	25		135	175
6		163	190	16		143	208	26		130	163
7		160	194	17		146	211	27		140	170
8		154	187	18		146	200	28	204	140	176
9		143	178	19		140	187	29	187	135	183
10		143	190	20		152	184	30	181	152	190
								31	178	160	

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1930–31												
1	204	292	345	214	320	360	388	388	510	544	325	283
2	222	301	306	225	330	355	388	388	446	510	350	274
3	225	306	310	218	320	388	416	388	416	477	360	274
4	233	306	325	225	315	325	416	388	416	477	350	265
5	245	190	330	233	330	306	480	388	388	581	325	253
6	265	208	345	233	310	310	544	360	360	544	315	249
7	288	278	355	233	292	306	544	360	330	544	360	241
8	283	229	345	233	292	296	544	388	369	544	416	229
9	288	340	355	241	296	292	477	388	407	510	477	229
10	292	350	360	222	292	306	446	388	446	510	477	222
11	278	345	416	225	292	306	446	388	544	510	446	218
12	270	330	388	222	283	310	416	446	890	544	416	214
13	274	278	360	218	274	318	446	416	1,120	659	388	218
14	274	315	355	214	278	325	416	388	1,250	700	388	233
15	270	335	310	225	278	355	477	388	1,180	618	355	245
16	301	388	265	222	283	350	446	388	1,000	544	340	241
17	288	388	270	218	278	315	446	416	840	510	335	245
18	257	388	274	222	283	335	446	360	745	446	330	245
19	278	416	301	225	288	335	477	416	659	388	310	245
20	301	510	306	229	296	340	446	388	659	388	310	253
21	360	544	310	225	310	360	477	388	618	360	310	245
22	320	544	292	233	310	374	477	388	618	340	301	253
23	325	510	285	233	360	388	446	360	700	330	292	241
24	360	510	278	229	360	416	416	355	790	301	283	241
25	345	581	283	233	360	388	416	335	745	288	283	249
26	320	529	265	237	360	446	416	390	700	265	274	265
27	320	477	261	249	360	416	388	446	659	253	288	261
28	301	416	245	257	360	360	388	544	581	245	278	261
29	296	388	237	261		278	388	581	581	241	274	261
30	292	350	241	265		296	388	544	544	241	278	257
31	301		214	292		416		510		315	288	

Monthly discharge, in second-feet, of Crow Wing River at Motley, Minn., 1930-31

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
1930					
August	178	130	150	0.070	0.08
September	214	163	186	.087	.10
1930-31					
October	360	204	286	.134	.15
November	581	190	378	.177	.20
December	416	214	307	.143	.16
January	292	214	233	.109	.13
February	360	274	311	.145	.15
March	446	278	344	.161	.19
April	544	388	444	.207	.23
May	581	335	408	.191	.22
June	1,250	330	650	.304	.34
July	700	241	443	207	.24
August	477	274	339	.158	.18
September	283	214	247	.115	.13
The year	1,250	190	366	.171	2.32

LITTLE SAND LAKE OUTLET NEAR DORSET, MINN.

LOCATION.—Staff gage in NE. ¼ sec. 36, T. 141 N., R. 34 W., 2 miles northeast of Dorset.

RECORDS AVAILABLE.—July, 1930, to September, 1931.

EXTREMES.—Maximum discharge during period, 31 second-feet Aug. 6 (gage height, 5.55 feet); minimum, 0.1 second-foot Oct. 1, 3, 4, Nov. 7–12 (gage height, 3.74 feet).

REMARKS.—Records excellent except those estimated July 1 to Aug. 5, which are poor.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	July	Aug.	Sept.	Day	Oct.	Nov.	July	Aug.	Sept.
1	0.1	0.2			12	16	0.3	------		23	10
2	.2	.2			12	17	.3	------		21	9.7
3	.1	.2		20	11	18	.3	------		20	9.5
4	.1	.2			11	19	.3	------		19	9.1
5	.3	.2			11	20	.2	------		18	9.7
6	.3	.2		31	11	21	.2	------		18	9.7
7	.3	.1		28	10	22	.2	------		17	9.5
8	.3	.1	20	31	10	23	.2	------		16	9.3
9	.3	.1		29	10	24	.2	------	20	16	9.1
10	.3	.1		28	10	25	.2	------		15	9.1
11	.3	.1		27	9.5	26	.2	------		14	9.1
12	.3	.1		27	9.5	27	.2	------		14	9.1
13	.3	.2		25	10	28	.2	------		15	9.1
14	.4	.2		24	10	29	.2	------		14	8.7
15	.3	.2		23	10	30	.2	------		13	8.6
						31	.2	------		13	------

Month	Maximum	Minimum	Mean	Month	Maximum	Minimum	Mean
October	0.4	0.1	0.24	August	31	13	20.6
November 1–15	----------	----------	.16	September	12	8.6	9.88
July	----------	----------	20.0				

LONG PRAIRIE RIVER NEAR MOTLEY, MINN.

LOCATION.—Chain gage in NW. ¼ sec. 19, T. 133 N., R. 31 W., 1 mile south of Motley and 2 miles above mouth. Gage used since July, 1930, is at same site as gage used in 1917, but at different datum.

DRAINAGE AREA.—973 square miles.

RECORDS AVAILABLE.—June, 1909, to September, 1917; July, 1930, to September, 1931 (discontinued).

EXTREMES.—Maximum discharge during period July, 1930, to September, 1931, 163 second-feet Apr. 4 (gage height, 4.81 feet, affected by ice); minimum, 13 second-feet Aug. 27, 1930 (gage height, 3.37 feet); minimum stage, 3.36 feet Sept. 11, 1931.

1909–1917, 1930–31: Maximum discharge, about 4,280 second-feet Apr. 5, 1916 (gage height, 15.0 feet, former datum, determined from flood marks); minimum discharge, that of Aug. 27, 1930.

REMARKS.—Records fair. Stage-discharge relation affected by aquatic growth during most of summer and by ice during winter.

Daily discharge, in second-feet, 1930–31

Day	July	Aug.	Sept.	Day	July	Aug.	Sept.	Day	July	Aug.	Sept.
1930				1930				1930			
1		36	21	11		25	24	21		21	27
2		33	21	12		25	24	22		19	24
3		33	22	13		25	25	23		19	25
4		32	22	14		23	28	24		18	28
5		30	22	15		24	27	25		18	28
6		29	22	16		24	27	26		16	25
7		29	21	17		24	24	27		13	27
8		28	21	18		23	25	28		18	27
9		28	22	19		23	27	29	32	17	27
10		25	24	20		21	28	30	33	16	27
								31	36	16	

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1930–31												
1	28	51	84	28	40	38	88	76	57	57	40	30
2	30	57	72	28	38	35	154	76	50	51	33	28
3	33	51	76	25	36	38	145	80	43	57	24	27
4	36	48	84	25	35	40	160	84	40	59	22	25
5	38	45	68	21	32	38	115	84	38	53	27	24
6	39	42	80	21	32	39	117	82	35	50	36	24
7	40	48	84	21	31	40	117	80	38	51	53	22
8	42	45	84	20	31	38	128	76	33	43	88	20
9	46	51	88	23	32	35	139	80	31	46	68	18
10	46	51	88	22	30	35	151	82	35	45	64	16
11	45	53	92	19	30	36	142	82	45	46	59	15
12	43	55	84	19	28	38	130	84	68	43	51	17
13	43	55	82	21	25	43	128	86	90	35	46	18
14	43	53	82	21	23	45	113	82	97	32	46	21
15	42	57	72	18	27	51	115	76	103	33	39	23
16	38	62	64	18	32	51	110	74	90	29	42	25
17	36	62	64	20	35	53	103	70	78	20	40	27
18	36	64	60	18	35	53	105	72	68	17	38	25
19	42	68	60	18	38	59	107	74	62	17	36	28
20	48	94	53	20	38	59	103	70	92	16	33	31
21	53	99	53	20	43	55	103	66	82	16	31	30
22	50	107	43	22	48	62	104	68	94	17	33	29
23	50	113	43	24	53	64	105	64	94	16	32	25
24	43	115	40	29	53	60	97	55	97	16	31	25
25	55	148	40	31	46	84	92	51	94	15	29	28
26	53	92	40	39	45	76	86	57	103	14	30	31
27	51	74	38	45	46	68	84	68	92	14	32	30
28	50	80	33	48	40	80	88	70	78	16	31	32
29	46	80	33	48		76	82	68	68	17	29	36
30	42	84	31	39		84	76	60	57	32	29	35
31	42		31	35		88		58		38	28	

Monthly discharge, in second-feet, of Long Prairie River near Motley, Minn., 1930–31

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
1930					
August	36	13	23.6	0.024	0.03
September	28	21	24.7	.025	.03
1930–31					
October	55	28	42.9	.044	.05
November	148	42	70.1	.072	.08
December	92	31	62.8	.065	.07
January	48	18	26.0	.027	.03
February	53	23	36.5	.038	.04
March	88	35	53.6	.055	.06
April	160	76	113	.116	.13
May	86	51	72.7	.075	.09
June	103	31	68.4	.070	.08
July	59	14	32.6	.034	.04
August	88	22	39.4	.040	.05
September	36	15	25.5	.026	.03
The year	160	14	53.6	.055	.75

PLATTE RIVER AT ROYALTON, MINN.

LOCATION.—Chain gage in sec. 35, T. 39 N., R. 32 W., on highway bridge at east edge of Royalton, 6 miles above junction with Mississippi River.
DRAINAGE AREA.—338 square miles.
RECORDS AVAILABLE.—May, 1929, to September, 1931.
EXTREMES.—Maximum discharge during year, 1,330 second-feet May 30 (gage height, 5.90 feet); minimum, 7 second-feet Oct. 1 (gage height, 1.28 feet).
1929–1931: Maximum discharge, that of 1931; minimum, 3 second-feet Sept. 19–21, 1930 (gage height, 1.20 feet).
REMARKS.—Records good except those for period of ice effect, Nov. 23 to Apr. 3, and for period affected by aquatic growth, July 5 to Sept. 30, which are fair.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	8	13				14	132	40	993	269	33	26
2	9	14				15	132	38	779	269	35	25
3	10	14				15	140	34	591	236	32	25
4	9	16				16	132	32	462	215	31	23
5	9	14				15	115	32	378	186	34	23
6	12	14				15	104	31	303	167	41	24
7	12	15				15	100	29	236	140	50	22
8	14	14			10	15	96	31	176	140	45	22
9	14	13				16	92	35	149	132	44	21
10	14	14				17	86	35	132	115	44	19
11	12	14				18	84	36	115	107	40	18
12	14	16				18	78	36	226	98	39	19
13	15	17				19	72	34	378	92	38	19
14	14	17				21	68	34	662	82	37	17
15	15	18				21	64	32	905	69	42	19
16	15	20	12	10		21	59	30	905	59	43	20
17	13	20				23	55	28	739	55	39	19
18	14	21				23	53	26	591	55	38	18
19	12	24				25	59	27	462	51	39	21
20	13	33				25	58	28	405	45	35	20
21	12	35				26	55	27	327	40	32	19
22	12	29			12	28	54	28	352	39	30	19
23	13	27				24	53	30	352	36	31	17
24	14	24				43	51	32	405	33	30	18
25	14	23				50	48	34	492	29	29	24
26	13	21				61	48	38	557	27	28	26
27	14	18				78	48	63	524	23	28	27
28	14	15				89	44	352	492	26	28	26
29	13	14			-------	95	43	1,080	433	28	25	25
30	14	12			-------	106	42	1,330	405	27	21	23
31	14	-------			-------	115	-------	1,180	-------	25	23	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	15	8	12.7	0.038	0.04
November	35	12	18.6	.055	.06
December	----------	----------	12.0	.036	.04
January	----------	----------	10.0	.030	.03
February	----------	----------	10.9	.032	.03
March	115	14	34.9	.103	.12
April	140	42	75.5	.223	.25
May	1,330	26	156	.462	.53
June	993	115	464	1.37	1.53
July	269	23	94.0	.278	.32
August	50	21	35.0	.104	.12
September	27	17	21.5	.064	.07
The year	1,330	8	78.6	.233	3.14

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, 1927 to September, 1931.

EXTREMES.—Maximum discharge during year, 678 second-feet Mar. 25 (gage height, 3.76 feet); minimum, 4 second-feet Nov. 22 (gage height, 1.24 feet). 1909–1913, 1929–1931: Maximum discharge, 1,620 second-feet May 11, 1912, gage height not referred to present datum; minimum, that of Nov. 22, 1930.

REMARKS.—Records fair. Stage-discharge relation affected by ice, Nov. 4–8, Nov. 25 to Mar. 11, and by aquatic growth Oct. 1–28, June 13 to Sept. 30. Diurnal fluctuation caused by power plants above.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	53	34	28	28	76	40	226	126	33	43	29	29
2	53	38	22	40	84	34	130	82	42	23	40	19
3	47	33	22	17	54	34	108	53	37	24	37	24
4	38	28	22	40	61	47	110	34	37	18	21	28
5	29	28	12	34	61	40	87	99	26	12	24	29
6	30	28	22	22	61	40	44	108	27	38	30	19
7	35	22	28	34	40	40	94	114	27	34	26	15
8	44	22	28	40	34	40	152	114	22	81	27	21
9	37	17	28	47	61	40	130	110	32	112	24	12
10	50	30	28	34	47	47	103	70	22	67	19	13
11	48	18	22	40	47	47	105	43	40	46	20	14
12	35	19	28	40	40	48	152	110	47	48	22	19
13	35	16	28	22	34	53	35	97	42	46	19	19
14	35	16	22	34	34	46	96	37	30	44	20	12
15	34	21	22	34	28	58	101	39	22	44	30	27
16	33	22	28	34	22	42	114	61	20	46	42	14
17	32	21	28	40	34	61	122	35	20	34	30	18
18	32	14	34	47	28	40	103	37	20	26	26	19
19	34	16	34	47	28	70	112	43	87	26	29	19
20	35	44	28	34	54	35	50	86	118	26	21	24
21	43	43	28	34	54	33	188	82	64	23	22	17
22	33	18	34	47	54	34	82	78	38	23	32	20
23	35	32	12	47	40	43	103	53	152	24	30	19
24	37	27	28	61	54	444	90	33	137	30	27	19
25	44	22	40	40	47	546	86	47	78	28	24	27
26	37	12	22	54	54	424	82	50	44	20	16	37
27	32	17	22	47	40	424	50	84	66	15	12	28
28	38	12	40	61	40	525	110	64	34	14	17	37
29	42	22	47	68	------	269	118	55	35	18	20	28
30	43	22	17	76	------	137	110	29	26	14	17	33
31	40	------	40	68	------	254	------	26	------	19	24	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	53	29	38.5	0.047	0.05
November	44	12	23.8	.029	.03
December	47	12	27.2	.033	.04
January	76	17	42.3	.052	.06
February	84	22	46.8	.057	.06
March	546	33	130	.159	.18
April	226	35	106	.130	.14
May	126	26	67.7	.083	.10
June	152	20	47.5	.058	.06
July	112	12	34.4	.042	.05
August	42	12	25.1	.031	.04
September	37	12	22.0	.027	.03
The year	546	12	51.0	.063	.84

ELK RIVER NEAR BIG LAKE, MINN.

LOCATION.—Chain gage in sec. 23, T. 33 N., R. 27 W., at highway bridge 4 miles east of Big Lake and 4 miles below mouth of St. Francis River. Gage at same site and datum as used 1911–1917.

DRAINAGE AREA.—615 square miles.

RECORDS AVAILABLE.—April, 1911, to September, 1917; April to September, 1931.

EXTREMES.—Maximum discharge during year, 493 second-feet Apr. 1 (gage height, 2.11 feet); minimum, 11 second-feet July 30, 31 (gage height, 0.32 feet).

1911–1917, 1931: Maximum discharge, 5,100 second-feet May 7, 1912 (gage height, 10 feet); minimum, that of July 30, 31, 1931.

REMARKS.—Records good except those affected by aquatic growth, June 29 to Sept. 9, which are fair.

Daily and monthly discharge, in second-feet, 1931

Day	Apr.	May	June	July	Aug.	Sept.	Day	Apr.	May	June	July	Aug.	Sept.
1	493	117	64	38	12	38	16	176	93	67	23	27	39
2	474	112	74	34	16	37	17	161	85	62	20	28	39
3	438	108	70	33	19	36	18	158	89	57	19	26	39
4	385	104	67	34	18	34	19	170	93	56	18	26	44
5	333	115	64	38	18	33	20	178	89	54	18	26	49
6	300	122	62	44	18	32	21	176	89	54	16	26	49
7	267	117	65	40	26	31	22	173	89	57	15	25	46
8	251	112	62	36	39	30	23	164	85	64	14	31	44
9	220	108	65	32	38	29	24	158	78	57	13	29	42
10	205	115	62	32	34	28	25	153	72	54	13	30	44
11	190	120	64	29	31	26	26	148	70	50	12	29	41
12	178	117	80	27	27	29	27	142	67	46	12	27	39
13	167	110	83	27	25	32	28	137	67	44	12	26	37
14	158	106	78	26	24	30	29	132	70	41	12	26	34
15	176	102	72	25	26	28	30	124	67	40	11	26	31
							31		64		11	34	

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
April	493	124	220	0.358	0.40
May	122	64	95.2	.155	.18
June	83	40	61.2	.100	.11
July	44	11	23.7	.039	.04
August	39	12	26.2	.043	.05
September	49	26	36.3	.059	.07

CROW RIVER AT ROCKFORD, MINN.

LOCATION.—Chain gage in sec. 29, T. 119 N., R. 24 W., at Rockford, 1 mile below junction of North and South Forks. Gage used since April, 1929, is at practically same site but at different datum from gage used 1909–1917.

DRAINAGE AREA.—2,520 square miles.

RECORDS AVAILABLE.—June, 1909, to September, 1917; April, 1929, to September, 1931.

EXTREMES.—Maximum discharge during year, 354 second-feet Mar. 27 (gage height, 1.50 feet); minimum, 8 second-feet Sept. 10–12 (gage height, 0.62 foot).

1909–1917, 1929–1931: Maximum discharge, 10,600 second-feet Apr. 2, 3, 1916; minimum, that of September, 1931.

REMARKS.—Records good except those for March, which are fair.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	55	35	58	52	43	86	247	89	53	41	15	19.5
2	61	35	49	52	43	86	247	89	53	41	15	18
3	61	33	47	52	43	86	215	89	53	41	15	18
4	55	33	47	49	43	86	196	89	53	44	15	15
5	55	33	47	49	43	86	196	120	53	44	13	15
6	55	33	47	49	43	86	196	120	53	36	13	15
7	55	33	47	49	43	86	196	120	61	36	12	13
8	61	33	47	52	47	86	196	120	61	36	11	13
9	61	33	47	47	52	94	196	120	61	36	11	10
10	49	33	45	43	52	94	183	120	61	36	9	8.5
11	49	33	43	43	52	94	141	126	61	36	9	8
12	49	33	41	43	52	94	126	150	61	32	9	8
13	55	33	41	43	52	102	114	133	61	32	9	15
14	49	43	41	43	52	110	120	133	84	32	9	15
15	47	52	41	43	47	94	120	133	114	26	15	15
16	47	52	41	43	43	86	120	133	126	24	15	18
17	47	52	41	43	43	86	133	120	133	24	15	18
18	43	58	41	43	47	86	141	120	133	24	13	18
19	43	58	41	39	47	86	171	109	133	24	9	18
20	43	70	41	39	47	102	171	109	150	24	11	18
21	35	74	41	39	47	102	171	109	150	24	13	18
22	35	74	41	39	47	102	171	94	126	19.5	13	15
23	35	74	43	37	47	118	171	89	109	18	18	15
24	39	74	43	35	47	140	150	79	84	16.5	22.5	15
25	39	67	47	35	58	203	133	69	69	15	22.5	21
26	39	74	52	35	70	280	114	69	61	13	21	21
27	39	82	52	39	78	335	99	69	61	11	21	19.5
28	39	86	52	39	86	352	99	69	47	11	21	18
29	39	82	52	39	-------	305	89	61	44	11	18	15
30	39	70	52	39	-------	280	89	61	41	11	18	15
31	39	-------	52	39	-------	280	-------	57	-------	11	19.5	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	61	35	47.0	0.019	0.02
November	86	33	52.5	.021	.02
December	58	41	45.8	.018	.02
January	52	35	42.9	.017	.02
February	86	43	50.5	.020	.02
March	352	86	139	.055	.06
April	247	89	157	.062	.07
May	150	57	102	.040	.05
June	150	41	80.3	.032	.04
July	44	11	26.8	.011	.01
August	22.5	9	14.5	.0058	.007
September	21	8	15.6	.0062	.007
The year	352	8	64.5	.026	.34

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, 1929, to September, 1931.

EXTREMES.—Maximum discharge during year, 1,140 second-feet Mar. 30 (gage height, 4.15 feet); minimum, 74 second-feet Sept. 30 (gage height, 2.27 feet).

1929–1931: Maximum discharge, 3,760 second-feet May 18, 1930 (gage height, 6.53 feet); minimum, 67 second-feet July 30, 31, 1929 (gage height, 2.27 feet).

REMARKS.—Records fair. Stage-discharge relation affected by ice Nov. 26 to Feb. 12.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	122	116	146	140	153	153	437	222	287	237	90	99
2	134	116	143	134	153	159	410	215	358	230	90	99
3	140	116	140	134	153	159	383	207	358	215	90	104
4	146	110	140	131	153	153	333	200	333	193	88	104
5	146	110	140	131	153	146	333	200	266	169	88	104
6	146	110	143	131	156	137	310	204	253	162	88	104
7	150	122	143	131	153	134	310	204	249	159	88	104
8	153	128	143	137	156	122	287	207	245	150	93	104
9	146	128	140	137	153	116	279	207	253	146	93	102
10	140	128	137	137	156	116	270	215	245	146	93	99
11	146	134	131	140	150	122	262	207	245	140	93	99
12	146	140	125	140	143	128	253	207	245	134	90	99
13	143	146	125	143	140	134	253	204	237	128	93	99
14	146	153	122	143	128	140	245	207	237	128	93	99
15	146	162	119	140	116	140	237	204	237	122	93	96
16	146	169	116	140	116	140	230	200	230	116	93	96
17	146	172	119	140	116	146	222	207	230	110	90	93
18	150	179	122	140	116	153	215	204	226	99	90	96
19	153	196	119	137	116	159	215	204	222	93	90	96
20	150	200	125	140	122	166	218	207	215	93	90	96
21	146	207	125	140	128	166	215	207	215	93	90	93
22	140	215	125	143	128	182	222	207	211	88	93	93
23	134	207	125	146	125	204	245	204	200	88	93	93
24	134	204	125	150	134	358	270	204	200	88	93	88
25	128	200	125	150	134	383	279	204	186	82	93	88
26	116	182	131	150	140	495	279	207	186	82	93	82
27	116	162	134	150	146	590	262	222	186	82	93	79
28	119	159	134	159	150	797	249	230	218	82	96	77
29	116	150	134	159	-------	983	237	249	245	88	93	77
30	110	153	137	153	-------	1,060	230	266	241	88	96	74
31	110	-------	140	153	-------	1,060	-------	270	-------	88	99	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	153	110	138	0.101	0.12
November	215	110	156	.115	.13
December	146	116	131	.096	.11
January	159	131	142	.104	.12
February	156	116	139	.102	.11
March	1,060	116	294	.216	.25
April	437	215	273	.200	.22
May	270	200	213	.157	.18
June	358	186	242	.178	.20
July	237	82	126	.093	.11
August	99	88	91.9	.068	.08
September	104	74	94.5	.069	.08
The year	1,060	74	170	.125	1.71

MINNESOTA RIVER NEAR MONTEVIDEO, MINN.

LOCATION.—Chain gage in sec. 19, T. 117 N., R. 40 W., at highway bridge 500 feet below mouth of Chippewa River, 1 mile south of Montevideo.

DRAINAGE AREA.—6,300 square miles.

RECORDS AVAILABLE.—July, 1909, to September, 1931.

EXTREMES.—Maximum discharge during year, 324 second-feet Nov. 22 (gage height, 3.65 feet); minimum, 0.5 second-foot Sept. 17, 18 (gage height, 0.94 foot).

1909–1931: Maximum discharge, about 22,000 second-feet June 25, 1919 (gage height 18.85 feet); minimum, that of Sept. 17, 18, 1931.

REMARKS.—Records good except those for period of ice effect, Nov. 25 to Mar. 6, which are fair.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	52	34	176	59	59	88	261	149	142	44	5.5	7.0
2	49	32	142	57	59	88	242	169	142	43	6.5	3.1
3	46	32	136	53	59	117	242	149	149	49	6.0	2.5
4	44	40	123	53	136	149	281	130	149	44	9.0	2.2
5	45	42	117	55	281	156	242	117	169	32	5.5	2.2
6	46	40	111	53	233	149	216	149	169	57	5.5	2.2
7	47	42	111	53	191	149	199	156	169	42	5.5	2.2
8	48	40	111	52	169	149	216	117	142	44	6.0	1.0
9	45	33	105	50	117	149	261	111	199	31	4.0	1.0
10	42	44	105	50	111	117	199	130	162	29	2.8	1.0
11	49	45	111	46	105	111	233	156	162	29	4.5	1.6
12	52	44	77	41	105	117	162	136	156	20	3.1	.8
13	55	49	88	48	99	111	176	117	149	22	7.0	.8
14	53	51	94	43	99	117	169	117	142	22	4.0	.7
15	45	54	94	41	105	102	184	117	149	21	3.4	.7
16	44	59	82	39	111	88	207	117	149	20	3.4	.8
17	44	94	94	39	111	149	216	117	123	15	5.0	.5
18	44	82	88	41	123	136	207	130	117	12	5.0	.5
19	42	88	88	41	117	136	216	136	136	12	6.0	1.0
20	43	94	82	41	111	111	216	142	142	11	6.0	1.0
21	33	94	72	36	105	136	261	149	142	12	5.5	.7
22	35	324	63	39	111	156	261	117	130	9.0	4.5	.7
23	37	302	63	37	105	142	224	111	142	12	3.4	1.0
24	42	302	61	39	99	281	207	88	99	10	3.1	1.0
25	42	302	57	41	82	224	224	105	123	8.0	2.8	2.8
26	37	281	57	45	88	207	224	94	99	7.5	4.0	2.2
27	40	261	59	50	82	207	199	94	130	6.0	4.0	2.8
28	42	242	57	50	77	224	184	94	72	5.5	.8	2.2
29	45	233	57	59	-------	216	191	105	65	5.0	1.0	2.2
30	37	207	53	61	-------	233	156	224	60	3.4	1.9	2.2
31	35	-------	59	59	-------	261	-------	169	-------	4.0	6.0	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	55	33	43.9	0.0068	0.008
November	324	32	120	.019	.02
December	176	53	90.1	.014	.02
January	61	36	47.5	.0075	.009
February	281	59	116	.018	.02
March	281	88	154	.024	.03
April	281	156	216	.034	.04
May	224	88	129	.020	.02
June	199	60	136	.022	.02
July	57	3.4	22.0	.0035	.004
August	9.0	.8	4.54	.00072	.0008
September	7.0	.5	1.69	.00027	.0003
The year	324	.5	89.5	.014	.19

MINNESOTA RIVER AT MANKATO, MINN.

LOCATION.—Water-stage recorder in sec. 7, T. 108 N., R. 26 W., at Main 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, 1931, at present site; May 1903, to October, 1921, 2 miles upstream.

EXTREMES.—Maximum discharge during year, 1,350 second-feet June 22 (gage height, 4.50 feet); minimum, 40 second-feet Sept. 13 (gage height, 2.02 feet).

1903–1931: Maximum discharge, 43,800 second-feet June 26, 1908 (gage height at old site, 21.2 feet); minimum, that of Sept. 13, 1931.

Maximum known stage, about 27 feet at old site in 1881 (discharge, about 65,000 second-feet).

REMARKS.—Records good except those for periods of ice effect, Nov. 25 to Feb. 15, which are fair.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	276	214	340	214	231	370	630	476	249	307	88	74
2	285	192	340	189	224	316	630	445	253	298	104	67
3	280	189	307	186	246	330	669	476	257	289	93	65
4	272	204	360	214	276	330	724	376	276	257	84	62
5	268	207	345	186	253	345	757	438	298	261	75	58
6	235	214	330	183	276	335	630	445	289	253	70	55
7	238	195	398	183	257	335	692	426	280	242	69	54
8	268	189	340	186	253	398	708	392	261	221	93	52
9	268	189	345	201	289	320	692	426	280	204	81	50
10	265	174	335	189	272	350	749	502	298	198	88	47
11	285	189	335	204	246	365	692	370	294	189	76	43
12	261	183	316	183	268	370	630	451	316	174	72	41
13	238	186	311	180	325	365	556	457	370	147	67	41
14	246	189	345	174	340	387	615	438	426	140	63	42
15	238	189	330	152	345	398	593	426	476	137	67	44
16	242	214	307	145	320	330	593	426	556	125	68	49
17	238	280	311	142	311	325	542	438	445	121	67	49
18	228	253	294	135	280	330	502	370	370	112	64	47
19	218	285	249	128	285	355	522	432	404	104	63	51
20	201	350	249	140	310	381	495	404	966	102	68	59
21	201	381	249	135	335	420	586	426	966	100	70	72
22	211	392	231	133	360	438	578	438	966	97	68	70
23	207	495	242	135	340	415	556	415	1,160	89	65	69
24	211	593	242	140	345	661	556	404	903	84	62	75
25	221	586	211	166	360	669	593	360	708	81	59	91
26	211	253	204	152	355	669	646	370	556	75	59	81
27	201	257	238	152	387	733	556	360	488	72	57	72
28	204	398	257	160	398	782	600	415	457	70	58	68
29	204	404	221	166	-------	669	536	392	365	70	57	62
30	189	360	218	192	-------	578	451	335	340	69	57	59
31	204	-------	224	211	-------	630	-------	265	-------	74	63	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	285	189	236	0.016	0.02
November	593	174	280	.019	.02
December	398	204	291	.020	.02
January	214	128	170	.012	.01
February	398	224	303	.021	.02
March	782	316	442	.030	.03
April	757	451	609	.042	.05
May	502	265	413	.028	.03
June	1,160	249	476	.033	.04
July	307	69	154	.011	.01
August	104	57	70.8	.0048	.01
September	91	41	59.0	.0040	.004
The year	1,160	41	291	.020	.264

WHETSTONE RIVER NEAR BIG STONE, S. DAK.

LOCATION.—Chain gage in sec. 18, T. 121 N., R. 46 W., 1½ miles west of Big Stone.
DRAINAGE AREA.—444 square miles.
RECORDS AVAILABLE.—March to September, 1931. September, 1909, to November, 1912, at a site 2 miles downstream.
EXTREMES.—Maximum discharge during year, 1,320 second-feet May 28 (gage height, 7.1 feet); no flow Sept. 13, 14, 15.
REMARKS.—Records good.

Daily and monthly discharge, in second-feet, 1931

Day	Mar.	Apr.	May	June	July	Aug.	Sept.
1		7.0	3.0	45	5.3	1.3	.02
2		7.5	2.6	34	4.6	1.3	.3
3		8.9	2.6	26	3.7	1.1	.3
4		12	2.6	20	3.3	1.0	.3
5		13	2.6	16	3.9	.5	.3
6		15	2.3	14	3.5	1.6	.3
7		13	2.6	12	2.3	1.6	.3
8		12	2.6	11	2.5	1.0	.3
9		11	2.6	9.5	2.1	1.1	.3
10		10	4.2	9.8	1.8	1.0	.3
11		9.8	4.6	16	1.8	.8	.1
12		8.7	4.0	14	1.7	.8	.1
13		7.8	4.0	30	1.6	.8	0
14		6.7	4.0	77	1.6	.7	0
15		5.8	4.4	43	1.2	.8	0
16		6.0	4.2	29	1.0	.7	.1
17		5.8	3.9	21	.8	1.3	.4
18	4.4	5.6	4.0	17	.8	1.6	1.0
19	4.9	5.6	3.7	12	.8	1.6	.8
20	5.1	6.2	3.7	11	.7	1.3	.7
21	5.1	5.6	3.3	16	.7	1.2	.7
22	5.3	4.9	2.8	22	.5	1.0	.7
23	7.0	4.4	2.6	16	.5	.8	.6
24	8.9	4.2	2.6	26	.5	.7	.7
25	8.1	4.0	2.3	23	.5	.5	1.3
26	8.9	4.0	2.3	16	.4	.5	1.1
27	8.4	3.7	78	12	.3	.5	.8
28	8.4	3.3	874	7.5	.4	.4	.5
29	7.5	3.3	330	6.0	.4	.3	.5
30	7.5	3.3	128	4.6	.5	.3	.4
31	7.5	-------	63	-------	.5	.3	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
March 18-31	8.9	4.4	6.93	0.016	0.008
April	15	3.3	7.27	.016	.02
May	874	2.3	50.2	.114	.13
June	77	4.6	20.5	.046	.05
July	5.3	.3	1.62	.0037	.004
August	1.6	.3	.916	.0021	.002
September	1.3	0	.447	.0010	.001

POMME DE TERRE RIVER NEAR APPLETON, MINN.

LOCATION.—Staff gage in NE. ¼ sec. 1, T. 120 N., R. 43 W., 3 miles northeast of Appleton and 5 miles above mouth.
DRAINAGE AREA.—950 square miles.
RECORDS AVAILABLE.—March to September, 1931.
EXTREMES.—Maximum discharge during period of record, 40 second-feet Apr. 1 (gage height, 0.82 foot); minimum, 2.2 second-feet Sept. 11–15 (gage height, 0.50 foot).
REMARKS.—Records fair. Stage-discharge relation affected by ice Mar. 27–29 and by aquatic growth May 9 to Sept. 30.

Daily and monthly discharge, in second-feet, 1931

Day	Mar.	Apr.	May	June	July	Aug.	Sept
1		40	20	8.1	4.6	2.8	3.0
2		37	19	6.9	4.8	2.5	3.0
3		34	17	5.8	4.8	2.5	2.8
4		34	22	4.6	4.8	2.8	2.8
5		33	24	4.4	4.6	2.8	3.1
6		30	24	3.6	4.6	3.0	3.1
7		27	20	3.8	4.1	3.0	3.0
8		24	19	3.6	4.1	3.0	2.6
9		24	27	3.6	3.6	2.6	2.3
10		22	34	3.8	3.3	2.6	2.3
11		22	37	4.1	3.1	2.6	2.2
12		24	33	4.1	3.8	2.6	2.2
13		27	33	4.4	3.8	2.6	2.2
14		28	33	3.8	4.1	3.0	2.2
15		34	33	4.1	4.1	3.0	2.2
16	29	34	29	4.1	3.6	3.0	2.3
17	42	32	29	4.8	3.6	3.0	2.3
18	62	28	25	5.8	3.6	3.0	2.3
19	40	30	21	6.9	3.6	2.8	2.3
20	29	34	20	7.7	3.6	2.8	2.5
21	29	27	19	8.1	3.3	2.8	2.5
22	29	24	16	8.1	3.3	2.8	2.8
23	28	22	15	7.3	3.3	2.8	2.8
24	37	22	14	6.9	3.0	2.8	3.3
25	34	33	14	6.1	3.0	2.8	4.1
26	63	25	12	5.4	2.8	3.0	4.6
27	58	22	12	5.1	2.8	3.0	4.6
28	56	27	15	5.1	2.5	3.0	4.4
29	51	27	14	4.6	2.5	3.0	4.4
30	42	25	12	5.1	2.5	3.0	4.4
31	39		9.2		2.8	3.0	

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
March 16–31			41.8	0.044	0.03
April	40	22	28.4	.030	.03
May	37	9.2	21.7	.023	.03
June	8.1	3.6	5.33	.006	.007
July	4.8	2.5	3.61	.004	.005
August	3.0	2.5	2.84	.003	.003
September	4.6	2.2	2.95	.003	.003

LAC QUI PARLE RIVER NEAR LAC QUI PARLE, MINN.

LOCATION.—Staff gage on line between secs. 27 and 28, T. 118 N., R. 42 W., 1 mile southwest of Lac qui Parle.

DRAINAGE AREA.—1,040 square miles.

RECORDS AVAILABLE.—March to September, 1931. April, 1910, to November, 1914, at station 2 miles downstream.

EXTREMES.—Maximum discharge during period, 220 second-feet May 28 (gage height, 2.46 feet); no flow on several days.

1910–1914, 1931: Maximum discharge, 1,550 second-feet May 5, 6, 1912 (gage height, 7.6 feet at old station); minimum, that of 1931.

REMARKS.—Records good except those of discharge above 40 second-feet, which are poor.

Daily and monthly discharge, in second-feet, 1931

Day	Mar.	Apr.	May	June	July	Day	Mar.	Apr.	May	June	July
1		21	10	38	2.1	16		2[illegible]	11	14	0
2		25	9.2	29	1.7	17	16	2[illegible]	11	10	0
3		25	8.0	24	1.6	18	5.7	19	11	8.4	0
4		27	8.8	18	1.4	19	10	17	10	8.4	0
5		25	8.0	16	1.6	20	18	18	10	8.0	0
6		24	8.0	15	1.5	21	16	17	10	5.9	0
7		32	8.0	13	1.4	22	15	19	10	5.4	0
8		32	8.0	11	1.2	23	21	18	9.6	4.9	0
9		32	7.7	8.8	1.1	24	29	18	7.0	4.0	0
10		31	9.6	7.0	.7	25	30	18	6.4	3.3	0
11		28	10	7.5	.5	26	25	18	6.2	3.1	0
12		25	11	9.6	.5	27	24	1[illegible]	5.4	2.6	0
13		24	11	13	.4	28	13	1[illegible]	86	2.3	0
14		23	11	28	.3	29	14	1[illegible]	145	2.1	0
15		25	11	25	0	30	16	1[illegible]	75	1.9	0
						31	21		53		0

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
March 17-31	30	5.7	18.2	0.018	0.01
April	32	12	22.1	.021	.02
May	145	5.4	19.5	.019	.02
June	38	1.9	11.6	.011	.01
July	2.1	0	.516	.00050	.0006

NOTE.—No flow during August and September.

CHIPPEWA RIVER NEAR WATSON, MINN.

LOCATION.—Chain gage on line between secs. 22 and 15, T. 118 N., R. 41 W., 1½ miles northeast of Watson, 2 miles below Dry Weather Creek, and 10 miles above mouth. Gage is at same site as gage used 1910–1917, but at different datum.

DRAINAGE AREA.—1,850 square miles.

RECORDS AVAILABLE.—April, 1910, to September, 1917; March to September, 1931.

EXTREMES.—Maximum discharge during period, 179 second-feet Mar. 31 (gage height, 4.50 feet); minimum, 1.4 second-feet July 26 (gage height, 2.42 feet). 1910–1917, 1931: Maximum discharge, 9,600 second-feet Apr. 4, 1917 (gage height, 17.86 feet, old datum); minimum, that of July 26, 1931.

REMARKS.—Records good.

Daily and monthly discharge, in second-feet, 1931

Day	Mar.	Apr.	May	June	July	Aug.	Sept.
1	------	172	84	40	14	5.5	2.6
2	------	156	78	36	13	5.5	2.4
3	------	156	73	33	11	6.0	2.2
4	------	149	73	32	10	6.0	2.2
5	------	126	73	30	9.7	5.5	1.9
6	------	119	73	29	9.7	4.7	1.8
7	------	112	68	29	9.0	4.0	1.9
8	------	97	68	28	9.0	4.0	1.9
9	------	104	68	26	9.0	4.0	2.0
10	------	97	78	24	8.7	3.8	2.1
11	------	97	78	26	11	3.2	2.0
12	------	97	73	28	12	3.0	2.0
13	------	97	73	27	11	2.8	1.8
14	------	90	68	27	8.4	2.2	2.0
15	------	97	68	28	6.8	4.0	2.0
16	68	97	64	27	6.0	5.0	2.1
17	73	112	59	27	5.5	3.4	2.0
18	84	112	64	27	5.2	10	2.1
19	59	112	59	27	4.5	3.1	2.0
20	59	119	59	29	4.0	7.1	2.4
21	73	126	59	28	3.6	5.5	2.8
22	68	134	55	37	3.2	4.0	2.4
23	84	134	55	29	3.0	6.0	2.6
24	97	134	51	23	2.4	3.8	3.2
25	104	134	51	21	2.4	3.4	4.5
26	134	126	48	20	1.6	3.6	4.5
27	156	119	48	20	1.6	3.2	4.2
28	142	112	44	17	1.8	2.8	3.6
29	104	97	42	16	1.8	2.2	3.4
30	172	90	40	13	2.1	2.2	4.5
31	172	------	41	------	2.2	2.2	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
March 16–31	------	------	103	0.056	0.03
April	172	90	117	.063	.07
May	84	40	62.4	.034	.04
June	40	13	26.8	.014	.02
July	14	1.6	6.55	.0035	.004
August	10	2.2	4.57	.0025	.003
September	4.5	1.8	2.57	.0014	.002

YELLOW MEDICINE RIVER NEAR GRANITE FALLS, MINN.

LOCATION.—Chain gage in sec. 35, T. 115 N., R. 39 W., 6 miles above mouth and 8 miles south of Granite Falls.
DRAINAGE AREA.—540 square miles.
RECORDS AVAILABLE.—March to September, 1931.
EXTREMES.—Maximum discharge during period of record, 46 second-feet June 14 (gage height, 2.73 feet); no flow July 26, Aug. 27 (gage height, 1.89 feet).
REMARKS.—Records good except those of discharge above 15 second-feet, which are fair.

Daily and monthly discharge, in second-feet, 1931

Day	Mar.	Apr.	May	June	July	Aug.	Sept.
1	------	14	9.6	4.8	2.2	10	0.4
2	------	14	9.6	6.0	2.5	4.4	.4
3	------	16	8.4	4.4	2.5	3.4	.8
4	------	16	7.2	4.0	1.6	1.9	.6
5	------	20	8.8	3.7	1.9	.7	.8
6	------	22	8.0	4.8	1.9	.9	.4
7	------	21	8.0	3.4	.9	.5	.5
8	------	21	8.0	12	1.3	1.6	.2
9	------	20	8.0	16	.5	.4	.2
10	------	19	8.3	18	.4	.8	.4
11	------	19	8.6	16	.9	.8	.7
12	------	19	8.9	15	.9	.8	.8
13	------	16	9.2	20	.9	.6	.4
14	------	15	10	45	.8	.7	.7
15	------	16	9.2	31	.5	.7	.7
16	13	14	9.6	26	.7	.8	.5
17	14	14	10	21	.1	.6	.7
18	14	12	8.0	14	.4	.6	1.3
19	14	13	7.6	13	.7	.6	.9
20	12	13	8.4	12	.6	.6	2.2
21	14	13	7.2	10	.4	.1	.8
22	14	12	12	9.2	.2	.6	1.9
23	15	11	16	8.4	.3	.6	.7
24	16	11	14	8.4	.4	.8	2.2
25	14	11	11	8.0	.4	.5	3.4
26	14	11	9.2	6.4	0	.6	1.6
27	15	10	8.0	6.8	.5	.2	1.6
28	16	10	7.6	6.0	.3	.5	1.0
29	13	8.8	6.8	4.8	.9	.6	1.0
30	12	9.6	6.4	3.4	.9	.8	1.6
31	13	------	4.0	------	.9	.7	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
March 16–31	16	12	13.9	0.026	0.02
April	22	8.8	14.7	.027	.03
May	16	4.0	8.89	.016	.02
June	45	3.4	12.0	.022	.02
July	2.5	0	.884	.0016	.002
August	10	.1	1.21	.0022	.003
September	3.4	.2	.980	.0018	.002

REDWOOD RIVER NEAR REDWOOD FALLS, MINN.

LOCATION.—Chain gage in NE. ¼ sec. 9, T. 112 N., R. 36 W., 3 miles west of Redwood Falls. Zero of present gage is 0.22 foot higher than zero of gage used 1909–1914.

DRAINAGE AREA.—703 square miles.

RECORDS AVAILABLE.—July, 1909, to September, 1914; August, 1930, to September, 1931.

EXTREMES—Maximum discharge during period August, 1930, to September, 1931, 131 second-feet Sept. 9, 1930 (gage height, 2.32 feet); minimum, 0.4 second-foot July 24, 1931 (gage height, 1.30 feet).

1909–1914, 1930–31: Maximum discharge, 781 second-feet by current-meter measurement July 2, 1909 (gage height, 3.98 feet, present datum); minimum, 0.4 second-foot July 19–22, 1911, and July 24, 1931 (gage height, 1.30 feet).

REMARKS.—Records good. No record Dec. 1 to Mar. 16.

Daily discharge, in second-feet, 1930–31

Day	Aug.	Sept.	Day	Aug.	Sept.	Day	Aug.	Sept.
1930								
1		2.6	11		37	21	2.0	5.6
2		2.6	12		35	22	1.7	3.3
3		1.9	13		32	23	1.6	2.6
4		1.8	14		27	24	1.8	4.9
5		4.9	15		25	25	1.6	3.7
6		3.7	16		23	26	1.4	7.0
7		4.5	17		15	27	1.6	5.2
8		6.0	18		12	28	1.4	5.2
9		90	19		9.0	29	1.3	4.9
0		40	20	2.0	7.0	30	1.2	5.2
						31	3.0	

Day	Oct.	Nov.	Mar.	Apr.	May	June	July	Aug.	Sept.
1930–31									
1	7.0	10		23	9.5	5.2	1.1	1.1	0.9
2	9.0	10		23	10	5.6	1.1	1.0	1.1
3	10	9.0		26	10	5.2	.9	1.0	1.1
4	11	8.0		30	11	5.2	1.1	1.0	1.0
5	10	8.0		37	12	4.5	1.2	1.0	.9
6	11	7.7		35	9.0	4.5	1.3	1.1	.8
7	13	7.3		35	8.5	4.5	1.1	1.1	.6
8	11	7.0		35	9.0	4.1	1.1	1.5	.8
9	11	8.5		32	9.0	4.9	1.0	1.3	.8
10	12	9.0		32	11	4.9	.9	1.0	.8
11	11	9.0		30	12	6.0	1.1	.8	.9
12	10	10		26	12	11	1.1	.8	.9
13	8.5	10		23	12	8.0	1.1	.9	.9
14	8.0	10		22	12	12	1.0	.9	.9
15	9.0	14		21	13	10	.8	1.1	.9
16	9.0	18		16	13	8.0	.8	1.2	1.4
17	8.0	15	16	15	13	6.5	.6	1.1	1.3
18	9.0	15	15	16	26	5.6	.6	1.1	1.2
19	4.1	19	18	18	23	4.1	.6	1.1	1.4
20	6.5	27	19	17	19	3.3	.6	1.1	1.6
21	7.0	33	19	16	16	2.6	.4	1.1	1.5
22	8.0	37	17	15	23	3.0	.4	1.1	1.4
23	7.0	32	22	15	21	3.0	.4	1.1	1.4
24	8.0	32	23	14	16	2.6	.4	1.1	2.0
25	8.0	30	22	13	14	1.9	.6	1.1	2.0
26	8.0	22	23	13	12	1.9	.6	1.0	1.7
27	9.0	20	23	12	10	1.8	.8	.9	1.6
28	10	18	22	13	9.0	1.6	.8	.9	1.4
29	12	15	19	10	8.0	1.4	.8	.9	1.3
30	11	13	20	10	7.0	1.2	.8	.8	1.3
31	10		22		6.0		.8	.8	

Monthly discharge, in second-feet, of Redwood River near Redwood Falls, Minn., 1930–31

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
1930					
August 20–31	3.0	1.2	1.72	0.0024	0.001
September	90	1.8	14.3	.020	.02
1930–31					
October	13	4.1	9.23	.013	.01
November	37	7.0	16.1	.023	.03
March 17–31	23	15	20.0	.028	.02
April	37	10	21.4	.030	.03
May	26	6.0	12.8	.018	.02
June	12	1.2	4.80	.0068	.008
July	1.3	.4	.835	.0012	.001
August	1.5	.8	1.03	.0015	.002
September	2.0	.6	1.19	.0017	.002

COTTONWOOD RIVER NEAR NEW ULM, MINN.

LOCATION.—Chain gage in sec. 31, T. 110 N., R. 30 W., 2 miles southwest of New Ulm and 4 miles above mouth.

DRAINAGE AREA.—1,190 square miles.

RECORDS AVAILABLE.—March to September, 1931. July, 1909, to December, 1913, at station 2 miles downstream, relation between gage datums not determined.

EXTREMES.—Maximum discharge during period, 141 second-feet Apr. 6–8 (gage height, 3.20 feet); minimum, 2.0 second-feet July 25, 26, Sept. 17 (gage height, 2.20 feet).

1909–1913, 1931: Maximum discharge, 3.250 second-feet Mar. 11, 1910 (gage height, 8.68 feet, former site); minimum, that of 1931.

REMARKS.—Records fair.

Daily and monthly discharge, in second-feet, 1931

Day	Mar.	Apr.	May	June	July	Aug.	Sept.
1	------	76	41	29	10	3.0	4.2
2	------	78	36	27	8.2	3.0	5.3
3	------	98	36	29	6.4	2.6	5.3
4	------	108	32	34	6.4	2.6	4.7
5	------	123	31	27	7.3	2.7	4.2
6	------	138	34	27	8.2	2.8	4.7
7	------	141	34	27	8.2	2.9	3.6
8	------	136	34	25	10	3.0	3.0
9	------	131	38	23	10	3.1	2.6
10	------	118	34	31	8.2	3.2	2.6
11	------	108	34	34	8.2	3.3	2.6
12	------	90	38	34	6.4	3.4	2.3
13	------	98	41	41	5.0	3.0	2.3
14	------	92	41	45	4.7	3.6	2.6
15	38	85	45	58	4.2	3.6	2.6
16	53	78	53	66	4.2	4.2	2.3
17	58	73	56	90	3.6	5.3	2.0
18	25	73	53	80	3.6	25	3.0
19	31	68	47	66	3.6	23	5.8
20	38	73	43	53	3.3	11	5.3
21	51	76	47	49	3.0	9.2	4.7
22	49	64	43	38	2.6	8.2	3.6
23	68	60	47	27	2.6	8.2	3.0
24	78	53	47	21	2.3	8.2	5.3
25	76	49	38	16	2.0	5.8	5.8
26	85	45	43	13	2.0	5.3	4.2
27	88	43	40	11	2.3	5.8	3.6
28	92	40	40	9.2	2.6	4.2	4.2
29	62	36	43	8.2	2.6	3.6	3.6
30	80	40	43	6.4	2.6	3.6	3.6
31	78	------	34	------	3.0	4.7	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
March 15–31	92	25	61.8	0.052	0.03
April	141	36	83.0	.070	.08
May	56	31	40.8	.034	.04
June	90	6.4	34.8	.029	.03
July	10	2.0	5.06	.0043	.005
August	25	2.6	5.84	.0049	.006
September	5.3	2.3	3.75	.0032	.004

ST. CROIX RIVER AT SWISS, WIS.

LOCATION.—Chain gage in sec. 33, T. 42 N., R. 15 W., at highway bridge at 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, 1931.

EXTREMES.—Maximum discharge during year, 3,020 second-feet June 24 (gage height, 3.22 feet); minimum, 500 second-feet Sept. 15 (gage height, 0.12 foot).

1914–1931: Maximum discharge, 8,480 second-feet Apr. 22, 1916 (gage height, 6.73 feet); minimum, 500 second-feet Aug. 18, 1930 (gage height, 0.08 foot).

REMARKS.—Records good except those for period of ice effect, Nov. 25 to Mar. 18, which are fair.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1,110	865	790	756	692	885	828	945	905	1,940	828	693
2	1,110	756	790	724	661	865	828	865	988	1,770	988	693
3	1,110	604	790	693	783	885	790	790	945	1,600	828	661
4	988	661	790	724	905	905	790	723	1,030	1,440	693	661
5	945	790	790	756	799	905	756	790	1,030	1,350	756	661
6	790	865	756	756	693	905	756	865	988	1,270	828	661
7	756	865	724	756	742	830	790	865	945	1,190	828	661
8	790	905	693	724	790	756	865	865	905	1,110	828	661
9	865	945	760	693	828	810	865	905	905	1,030	828	661
10	945	905	828	648	865	865	865	945	945	1,030	828	632
11	945	865	792	604	885	885	905	945	1,190	945	790	632
12	790	865	756	604	905	905	945	988	1,440	1,030	756	604
13	693	865	708	604	848	968	865	1,030	1,770	1,030	790	604
14	693	905	661	632	790	1,030	865	1,030	1,600	945	723	577
15	790	945	661	661	773	1,050	905	945	1,440	790	723	525
16	988	988	661	661	756	1,070	865	905	1,190	756	723	577
17	1,110	988	726	661	810	913	828	905	1,110	723	723	632
18	1,110	1,030	790	677	865	756	828	945	1,030	756	693	632
19	1,030	1,110	773	693	865	723	905	945	988	723	693	693
20	828	1,190	756	677	865	756	905	945	1,270	723	693	756
21	865	1,270	740	661	885	828	1,030	905	1,600	693	661	756
22	945	1,270	723	646	905	756	1,190	865	1,770	693	661	756
23	988	1,190	756	632	905	661	1,270	865	2,540	693	693	723
24	1,030	1,030	790	632	905	790	1,190	828	2,920	661	723	661
25	988	790	828	632	885	988	1,270	828	2,540	661	693	756
26	905	828	865	646	865	945	1,190	790	2,450	661	661	865
27	790	828	885	661	885	945	1,030	828	2,360	661	661	828
28	790	790	905	692	905	945	988	865	2,280	661	693	756
29	865	790	885	723	-------	945	1,030	905	2,110	632	693	756
30	905	790	865	723	-------	905	1,030	865	2,110	661	723	756
31	905	-------	810	723	-------	905	-------	865	-------	693	723	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	1,110	693	915	0.590	0.68
November	1,270	604	916	.591	.66
December	905	661	776	.501	.58
January	756	604	680	.439	.51
February	905	661	831	.536	.56
March	1,070	661	880	.568	.65
April	1,270	756	939	.606	.68
May	1,030	723	889	.574	.66
June	2,920	905	1,510	.974	1.09
July	1,940	632	952	.614	.71
August	988	661	746	.481	.55
September	865	525	683	.441	.49
The year	2,920	525	892	.575	7.82

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, 1931.

EXTREMES.—Maximum discharge during year, 7,560 second-feet June 25 (gage height, 8.7 feet); minimum, 835 second-feet July 27 (gage height, 3.55 feet). 1923–1931: Maximum discharge, 13,300 second-feet Mar. 18, 1927 (gage height, 11.4 feet); minimum (estimated), 695 second-feet Dec. 6, 1925.

REMARKS.—Records good except those for period of ice effect, Nov. 25 to Mar. 17, which are fair.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept
1	1,400	1,480	1,240	1,170	1,320	1,400	1,480	1,660	1,480	3,530	1,020	1,020
2	1,480	1,480	1,240	1,170	1,400	1,400	1,400	1,570	1,480	2,980	1,170	1,020
3	1,480	1,400	1,240	1,170	1,320	1,320	1,400	1,480	2,050	2,490	1,240	1,020
4	1,480	1,240	1,240	1,170	1,320	1,400	1,400	1,480	1,660	2,260	1,320	1,020
5	1,480	1,320	1,240	1,240	1,400	1,400	1,400	1,480	1,660	2,050	1,170	1,020
6	1,480	1,320	1,240	1,090	1,320	1,320	1,400	1,570	1,750	1,850	1,170	945
7	1,400	1,320	1,240	1,170	1,320	1,240	1,400	1,570	1,660	1,660	1,170	870
8	1,480	1,480	1,170	1,170	1,320	1,240	1,480	1,570	1,570	1,570	1,170	945
9	1,480	1,400	1,170	1,240	1,320	1,240	1,480	1,570	1,480	1,480	1,170	1,020
10	1,480	1,320	1,240	1,240	1,170	1,170	1,480	2,050	1,570	1,480	1,170	945
11	1,480	1,320	1,240	1,240	1,170	1,170	1,480	1,660	1,850	1,480	1,170	870
12	1,480	1,400	1,240	1,240	1,240	1,320	1,480	1,660	2,490	1,320	1,170	945
13	1,480	1,320	1,320	1,090	1,170	1,400	1,480	1,750	3,810	1,320	1,170	945
14	1,320	1,320	1,320	1,170	1,170	1,400	1,480	1,750	4,730	1,320	1,090	870
15	1,480	1,400	1,320	1,170	1,170	1,320	1,480	1,660	4,570	1,170	1,020	945
16	1,480	1,480	1,170	1,170	1,170	1,320	1,480	1,660	3,530	1,170	1,020	870
17	1,660	1,570	1,170	1,170	1,170	1,400	1,480	1,480	2,730	1,170	945	1,020
18	1,660	1,480	1,240	1,170	1,170	1,320	1,480	1,660	2,260	1,090	1,020	1,020
19	1,480	1,570	1,320	1,170	1,240	1,320	1,480	1,660	1,950	1,020	945	1,020
20	1,660	1,660	1,320	1,170	1,240	1,320	1,660	1,570	2,730	1,020	870	1,090
21	1,480	2,050	1,320	1,170	1,320	1,320	1,660	1,570	3,530	1,020	870	1,170
22	1,570	2,150	1,320	1,090	1,320	1,480	1,850	1,570	4,570	945	945	1,170
23	1,480	2,260	1,170	1,090	1,400	1,480	1,950	1,570	4,730	945	945	1,170
24	1,480	2,150	1,170	1,170	1,400	1,660	2,050	1,570	6,020	945	945	1,170
25	1,480	1,660	1,240	1,170	1,480	1,750	2,050	1,480	7,380	870	945	1,170
26	1,480	1,240	1,240	1,170	1,480	1,660	1,950	1,400	7,040	870	945	1,320
27	1,480	1,240	1,240	1,170	1,480	1,660	1,850	1,400	5,850	870	945	1,320
28	1,400	1,240	1,240	1,170	1,480	1,480	1,750	1,480	5,370	870	1,020	1,320
29	1,480	1,240	1,170	1,170	-------	1,480	1,750	2,150	4,570	945	1,020	1,240
30	1,480	1,240	1,020	1,240	-------	1,480	1,750	1,660	3,960	870	1,020	1,240
31	1,480	-------	1,090	1,240	-------	1,400	-------	1,570	-------	945	1,020	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	1,660	1,320	1,490	0.528	0.61
November	2,260	1,240	1,490	.528	.59
December	1,320	1,020	1,230	.436	.50
January	1,240	1,090	1,180	.418	.48
February	1,480	1,170	1,300	.461	.48
March	1,750	1,170	1,400	.496	.57
April	2,050	1,400	1,600	.567	.63
May	2,150	1,400	1,610	.571	.66
June	7,380	1,480	3,330	1.18	1.32
July	3,530	870	1,400	.496	.57
August	1,320	870	1,060	.376	.43
September	1,320	870	1,060	.376	.42
The year	7,380	870	1,510	.535	7.26

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, 1931.

EXTREMES.—Maximum discharge during year, 15,400 second-feet May 15 (gage height, 8.40 feet); minimum, 980 second-feet July 29–31 (gage height, 2.60 feet).

1923–1931: Maximum discharge, 26,700 second-feet Mar. 18, 1927 (gage height 10.2 feet); minimum, 800 second-feet Aug. 28, 29, 1930 (gage height, 2.40 feet).

REMARKS.—Records good except those for period of ice effect, Nov. 25 to Mar. 17, which are fair.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1,670	1,460	1,450	1,190	1,640	1,940	2,120	2,120	3,080	6,550	1,110	1,110
2	1,670	1,460	1,450	1,190	1,640	1,740	1,890	2,120	2,840	5,300	1,270	1,270
3	1,560	1,460	1,450	1,190	1,640	1,540	1,890	1,890	2,840	4,300	1,460	1,270
4	1,460	1,460	1,360	1,360	1,640	1,540	1,890	1,890	2,840	3,800	1,670	1,110
5	1,460	1,270	1,450	1,360	1,640	1,640	1,890	1,890	3,080	3,320	1,670	1,110
6	1,460	1,270	1,450	1,270	1,640	1,640	1,890	1,890	3,080	2,840	1,670	1,110
7	1,460	1,270	1,450	1,190	1,640	1,640	1,890	1,890	3,080	2,600	1,670	1,110
8	1,460	1,270	1,540	1,190	1,450	1,640	1,890	2,120	2,740	2,360	1,670	1,110
9	1,460	1,460	1,540	1,360	1,450	1,740	1,890	2,120	2,600	2,360	1,670	1,110
10	1,460	1,460	1,540	1,360	1,450	1,740	1,670	1,890	2,740	2,360	1,670	1,110
11	1,460	1,460	1,540	1,360	1,270	1,740	1,670	2,000	3,560	2,120	1,670	1,110
12	1,460	1,460	1,540	1,360	1,270	1,640	1,670	2,360	5,300	1,890	1,670	1,110
13	1,460	1,460	1,540	1,360	1,270	1,640	1,670	2,360	7,050	1,670	1,460	1,110
14	1,460	1,460	1,360	1,360	1,360	1,840	1,670	2,600	8,800	1,670	1,460	1,110
15	1,560	1,460	1,360	1,360	1,360	2,160	1,670	2,600	9,080	1,670	1,460	1,110
16	1,670	1,670	1,360	1,360	1,360	2,160	1,890	2,360	7,550	1,460	1,270	1,110
17	1,670	1,670	1,540	1,360	1,360	1,940	1,890	2,120	6,300	1,460	1,110	1,110
18	1,670	1,670	1,540	1,360	1,360	1,890	1,890	2,120	5,300	1,460	1,110	1,110
19	1,670	1,890	1,540	1,360	1,360	1,890	2,120	2,120	4,550	1,270	1,110	1,110
20	1,890	1,890	1,450	1,540	1,540	1,890	2,120	2,120	6,050	1,270	1,110	1,110
21	1,890	2,120	1,450	1,540	1,640	1,890	2,120	2,120	6,050	1,270	1,110	1,270
22	1,890	2,480	1,270	1,540	1,640	2,120	2,360	1,890	8,550	1,270	1,270	1,460
23	1,670	2,840	1,270	1,540	1,640	2,240	2,360	1,890	10,900	1,110	1,270	1,270
24	1,670	2,840	1,270	1,540	1,740	3,200	2,600	1,890	13,800	1,110	1,110	1,270
25	1,670	2,840	1,270	1,540	1,840	3,560	2,600	1,670	15,400	1,110	1,110	1,270
26	1,460	2,260	1,270	1,540	1,640	2,740	2,600	1,670	14,100	1,110	1,110	1,460
27	1,460	1,840	1,270	1,540	1,640	2,600	2,480	1,670	11,700	1,110	1,110	1,460
28	1,460	1,540	1,190	1,540	1,640	2,600	2,360	2,120	10,100	1,110	1,110	1,460
29	1,460	1,360	1,190	1,540	-------	2,360	2,360	2,840	8,800	980	1,110	1,460
30	1,460	1,450	1,190	1,540	-------	2,120	2,120	3,560	7,800	980	1,110	1,270
31	1,460	-------	1,190	1,540	-------	1,890	-------	3,080	-------	980	1,110	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	1,890	1,460	1,570	0.307	0.35
November	2,840	1,270	1,720	.336	.37
December	1,540	1,190	1,400	.273	.31
January	1,540	1,190	1,400	.273	.31
February	1,840	1,270	1,530	.299	.31
March	3,560	1,540	2,030	.396	.46
April	2,600	1,670	2,040	.398	.44
May	3,560	1,670	2,160	.422	.49
June	15,400	2,600	6,650	1.30	1.45
July	6,550	980	2,060	.402	.46
August	1,670	1,110	1,340	.262	.30
September	1,460	1,110	1,210	.236	.26
The year	15,400	980	2,090	.408	5.51

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, 1931.

EXTREMES.—Maximum mean daily discharge during year, 16,600 second-feet June 26; minimum, 622 second-feet Feb. 22.

1910–1931: Maximum mean daily discharge, 35,800 second-feet Mar. 26 1920; no flow Sept. 30, 1929.

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

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1,640	1,840	1,910	849	909	813	3,090	3,110	3,050	7,520	1,280	1,310
2	1,640	1,700	1,840	1,950	1,840	1,990	3,140	2,250	3,630	6,290	1,600	1,330
3	1,640	2,020	1,860	1,820	1,710	2,220	2,480	1,640	3,410	5,860	1,340	1,280
4	1,640	2,120	2,000	755	1,740	2,060	2,620	2,470	4,070	4,180	1,580	1,430
5	1,640	1,760	1,880	2,000	1,590	2,100	1,690	2,600	3,460	2,580	1,610	1,250
6	1,640	1,870	2,260	1,780	1,620	2,100	2,340	2,550	3,420	4,550	1,880	1,220
7	1,920	1,750	916	1,800	1,840	1,870	2,440	2,530	1,690	3,720	2,020	1,190
8	2,110	1,670	2,040	1,760	955	801	2,280	2,360	3,490	2,740	1,900	1,200
9	2,190	1,780	2,110	1,660	1,900	1,940	2,480	2,370	3,610	2,380	1,600	1,240
10	2,660	1,850	2,090	1,660	1,900	2,110	2,490	1,660	3,990	2,610	1,800	1,270
11	2,010	1,860	2,360	783	1,860	2,060	2,420	2,660	3,020	2,570	1,830	1,290
12	1,700	1,880	2,130	1,770	1,770	2,080	1,600	2,700	3,980	1,940	1,800	1,210
13	1,680	1,680	1,690	1,770	1,790	2,210	2,720	2,830	5,260	2,610	1,920	1,320
14	1,680	1,870	1,040	1,700	1,770	1,960	2,780	2,780	7,760	2,530	1,750	1,240
15	1,640	2,010	2,150	1,750	1,010	888	2,790	2,980	7,860	2,350	1,720	1,250
16	1,940	1,670	2,130	1,830	1,720	1,970	2,630	2,860	8,890	2,200	1,620	1,290
17	1,880	2,110	2,420	1,530	1,890	2,360	2,500	1,890	6,290	2,040	1,600	1,220
18	1,970	2,360	2,080	794	2,290	2,260	2,300	3,210	5,910	1,600	1,550	1,370
19	1,890	2,180	1,690	1,770	2,220	1,960	1,600	3,070	6,140	1,600	1,400	1,320
20	1,820	3,610	1,640	1,790	2,080	1,920	2,730	3,130	5,840	1,670	1,400	1,360
21	2,010	3,020	771	1,800	1,550	2,660	3,410	2,470	4,880	1,600	1,290	1,650
22	1,740	3,670	1,830	1,730	622	1,260	2,980	2,580	5,430	1,600	1,270	1,520
23	2,160	2,100	2,200	1,550	1,700	2,660	2,870	2,260	8,610	1,600	1,220	1,560
24	2,040	2,790	1,780	1,330	2,100	3,090	2,870	1,710	14,400	1,340	1,420	1,600
25	2,260	2,740	851	738	2,120	3,880	3,170	2,380	15,300	1,360	1,220	1,600
26	1,810	2,800	1,830	1,730	1,960	4,170	2,000	2,390	16,600	1,300	1,230	1,600
27	1,980	902	1,830	1,730	2,180	3,310	3,180	2,280	12,500	1,220	1,200	1,600
28	2,050	1,980	960	1,650	1,440	2,990	3,070	2,390	8,360	1,190	1,230	1,600
29	2,040	1,470	1,990	1,660	-------	1,350	3,160	3,060	9,160	1,300	1,230	1,610
30	1,970	832	2,000	1,630	-------	2,930	2,880	4,120	7,190	1,270	1,190	1,600
31	1,990	-------	2,010	1,360	-------	2,610	-------	2,060	-------	1,250	1,400	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	2,660	1,640	1,900	0.320	0.37
November	3,670	832	2,060	.347	.39
December	2,420	771	1,820	.307	.35
January	2,000	738	1,560	.263	.30
February	2,290	622	1,720	.290	.30
March	4,170	801	2,210	.373	.43
April	3,410	1,600	2,620	.442	.49
May	4,120	1,640	2,560	.432	.50
June	16,600	1,690	6,570	1.11	1.24
July	7,520	1,190	2,530	.427	.49
August	2,020	1,190	1,520	.256	.30
September	1,650	1,190	1,380	.233	.26
The year	16,600	622	2,370	.400	5.42

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, 1931. Records collected at Trego, 5 miles upstream (drainage area, 420 square miles) 1914 to 1927.

EXTREMES.—Maximum mean daily discharge during year, 855 second-feet June 28; minimum, 134 second-feet Nov. 27. Extremes caused by regulation. 1927–1931: Maximum mean daily discharge, 1,360 second-feet Sept. 14, 1928; minimum, 113 second-feet Aug. 17, Sept. 7, 1930.

REMARKS.—Records good. Discharge is computed from hourly records of load and head on power plant.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	389	295	326	295	293	280	391	387	411	576	405	301
2	397	155	362	415	449	346	383	485	406	581	373	300
3	405	344	322	431	381	412	372	239	415	630	324	309
4	428	315	331	189	363	389	404	414	428	436	405	312
5	171	296	308	362	363	350	227	371	406	475	406	300
6	380	349	314	347	364	391	448	422	312	460	380	333
7	384	349	167	391	413	495	367	406	344	473	360	382
8	386	355	330	386	260	182	362	398	407	475	380	285
9	395	225	325	401	356	471	369	521	380	475	380	284
10	371	360	361	376	340	335	396	271	496	475	360	282
11	357	350	428	141	278	357	467	403	533	447	344	325
12	155	362	413	394	306	357	299	403	527	489	336	285
13	362	348	427	395	356	374	373	425	680	310	326	347
14	353	353	278	330	370	409	382	403	382	360	326	193
15	361	358	363	341	262	282	404	403	407	410	310	228
16	389	207	380	328	352	373	367	442	427	360	326	443
17	325	373	390	413	356	374	326	369	430	360	325	227
18	420	375	360	230	356	374	565	400	429	389	332	346
19	208	384	365	339	356	362	313	397	405	325	323	330
20	393	376	399	337	356	404	434	403	683	298	306	326
21	366	424	187	337	416	449	438	406	665	373	306	311
22	361	416	371	337	383	210	473	406	728	361	323	307
23	368	265	418	337	399	444	516	435	796	307	316	274
24	370	413	501	429	399	334	500	367	722	307	316	344
25	372	330	203	216	400	382	564	394	711	360	316	375
26	229	321	397	338	369	435	358	425	799	279	299	365
27	360	134	377	349	383	323	445	316	829	359	290	342
28	344	284	193	384	407	448	417	406	855	323	325	365
29	366	420	409	280	------	239	426	372	723	323	363	297
30	357	156	413	315	------	435	447	381	696	322	334	318
31	338	------	422	455	------	304	------	294	------	322	315	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	428	155	350	0.735	0.85
November	424	134	323	.679	.76
December	501	167	350	.735	.85
January	455	141	343	.721	.83
February	449	260	360	.756	.79
March	495	182	365	.767	.88
April	565	227	408	.857	.96
May	521	239	392	.824	.95
June	855	312	548	1.15	1.28
July	630	279	401	.842	.97
August	406	290	340	.714	.82
September	375	193	315	.668	.75
The year	855	134	375	.788	10.69

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, 1931.

EXTREMES.—Maximum mean daily discharge during year, 381 second-feet Nov. 21; minimum, 39 second-feet July 27.

1904–1931: Maximum mean daily discharge, 2,280 second-feet in June, 1905; no flow Sept. 30, 1929.

REMARKS.—Records fair. Regulation at power plant. Records of discharge, computed from power-house records, furnished by Northern States Power Co.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	176	160	154	147	213	195	252	184	157	97	72	137
2	214	144	150	144	173	194	192	184	187	114	68	140
3	193	158	161	166	173	225	207	231	156	156	60	111
4	231	166	108	167	279	219	214	178	151	129	60	113
5	224	210	178	166	186	153	206	201	140	97	88	107
6	227	172	197	166	121	147	191	213	151	85	60	107
7	219	172	196	94	124	160	231	190	191	109	84	101
8	207	166	248	178	144	219	195	178	203	114	101	118
9	298	239	337	160	120	182	229	184	174	87	77	153
10	264	138	297	155	105	166	255	254	176	112	90	73
11	316	126	326	150	172	160	188	190	203	118	76	99
12	172	242	181	167	170	172	302	184	261	99	75	93
13	275	102	204	170	172	213	156	190	286	99	69	92
14	178	190	206	139	156	196	240	209	263	72	93	98
15	265	143	198	159	172	219	241	191	172	94	116	75
16	323	255	166	144	195	135	207	180	149	88	81	104
17	222	167	196	181	190	156	208	174	178	93	90	118
18	190	239	216	163	161	170	181	162	172	66	54	175
19	222	363	237	173	138	158	214	186	195	46	67	238
20	251	314	243	178	144	214	195	168	170	52	85	195
21	255	381	134	144	172	217	337	140	174	55	61	189
22	197	225	197	150	197	239	279	170	197	55	91	185
23	194	341	180	172	160	211	261	170	178	113	74	188
24	184	237	163	173	170	299	266	186	195	164	75	178
25	220	224	232	144	206	291	325	148	160	106	63	208
26	194	209	133	138	178	328	214	148	191	86	87	187
27	201	132	103	161	166	346	230	169	182	39	90	151
28	164	186	188	164	184	289	195	150	115	62	84	118
29	195	172	153	155	-------	178	195	162	143	55	83	171
30	166	156	144	166	-------	145	213	150	143	61	77	182
31	190	-------	195	225	-------	195	-------	146	-------	70	90	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	323	164	220	0.400	0.46
November	381	102	204	.371	.41
December	337	103	194	.353	.41
January	225	94	160	.291	.34
February	279	105	169	.307	.32
March	346	135	206	.375	.43
April	337	156	227	.413	.46
May	254	140	180	.327	.38
June	286	115	180	.327	.36
July	164	39	90.1	.164	.19
August	116	54	78.7	.143	.16
September	238	73	140	.255	.28
The year	381	39	171	.311	4.20

CANNON RIVER AT WELCH, MINN.

LOCATION.—Water-stage recorder in sec. 28, T. 113 N., R. 16 W., at Welch, 3 miles above mouth of Belle Creek.

DRAINAGE AREA.—1,290 square miles.

RECORDS AVAILABLE.—June, 1909, to January, 1914; November, 1930, to September, 1931.

EXTREMES.—Maximum discharge during period, 1,190 second-feet June 24 (gage height, 4.92 feet); minimum, 48 second-feet Aug. 10 (gage height, 1.76 feet).

1909–1914, 1930–31: Maximum discharge, 4,900 second-feet Oct. 17, 1911 (gage height, 9.42 feet, present gage datum); minimum, 40 second-feet Dec. 26, 1913 (gage height, 1.73 feet, present gage datum).

REMARKS.—Records good. Discharge estimated for periods of ice effect, Nov. 25 to Jan. 25, Feb. 10–14. Discharge regulated by power plants upstream.

Daily and monthly discharge, in second-feet, 1930-31

Day	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	-------	118	111	96	176	176	153	72	538	106	93
2	-------	164	102	78	153	176	99	102	582	102	88
3	-------	164	138	104	214	153	104	102	538	94	78
4	-------	164	115	122	214	126	122	101	321	91	72
5	-------	153	88	126	228	122	153	96	228	93	72
6	-------	142	96	140	242	109	138	96	374	93	74
7	-------	113	142	138	242	164	130	90	393	96	67
8	-------	99	164	128	176	164	126	77	374	94	54
9	-------	136	228	104	132	164	122	99	338	82	68
10	-------	136	176	118	214	176	104	98	321	60	72
11	132	128	104	132	214	164	101	96	304	69	72
12	138	122	88	124	242	128	122	90	201	93	73
13	140	124	98	142	214	109	120	88	164	93	73
14	140	113	138	242	214	142	132	84	214	91	73
15	134		164	153	188	130	126	66	201	94	74
16	176		153	120	138	140	67	85	188	88	74
17	153		136	188	188	142	102	88	201	84	74
18	164		91	214	176	142	104	88	188	77	74
19	164		74	214	164	153	117	91	140	73	74
20	164		136	228	153	130	118	104	124	73	73
21	188		214	228	153	153	118	201	142	73	70
22	214	120	188	153	142	153	118	153	142	73	74
23	188		153	132	106	153	113	412	153	73	90
24	142		153	228	188	153	104	920	117	63	87
25	153		132	228	214	153	101	920	111	74	82
26	142		117	214	188	153	102	770	104	75	77
27	142		118	257	176	122	104	674	81	75	75
28	136		113	288	176	142	115	538	102	74	77
29	153		118	-------	136	153	102	516	101	77	77
30	132		117	-------	111	153	104	582	99	85	77
31	-------		113	-------	176	-------	62	-------	101	93	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
November 11-30	214	132	155	0.120	0.09
December	----------	----------	126	.098	.11
January	214	74	132	.102	.12
February	288	78	166	.129	.13
March	242	106	182	.141	.16
April	176	109	147	.114	.13
May	153	62	113	.088	.10
June	920	66	257	.199	.22
July	582	81	232	.180	.21
August	106	60	83.3	.065	.07
September	93	54	75.3	.058	.06

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, 1931.
EXTREMES.—Maximum discharge during year, 1,450 second-feet Dec. 1, 2 (gage height, 5.95 feet); minimum, 80 second-feet Apr. 24–28 (gage height, 3.80 feet).
1912–1931: Maximum discharge, 6,940 second-feet Apr. 22, 1916 (gage height, 9.56 feet); minimum, 14 second-feet Apr. 17–20, 1925 (gage height, 3.25 feet).
REMARKS.—Records excellent except those for period of ice effect, Nov. 27–29, which are fair. Discharge regulated by storage at Chippewa Reservoir.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	116	445	1,450	1,250	1,050	640	228	149	138	170	640	710
2	116	445	1,450	1,250	1,050	640	228	149	138	170	640	710
3	116	445	1,150	1,250	1,050	640	240	138	135	142	352	710
4	113	445	1,100	1,250	1,050	640	244	135	132	132	352	710
5	120	445	1,100	1,250	1,000	610	248	135	132	135	352	710
6	116	445	1,100	1,200	1,000	610	256	129	132	120	352	675
7	116	445	1,050	1,200	1,000	610	260	120	126	113	352	675
8	110	675	1,050	1,200	1,000	580	260	146	129	110	352	675
9	113	960	1,100	1,200	960	495	264	146	132	120	352	675
10	113	960	1,100	1,150	960	445	268	146	160	120	352	675
11	113	960	1,100	1,200	960	398	268	142	142	126	352	710
12	116	960	1,200	1,200	915	375	268	146	149	135	352	675
13	116	960	1,200	1,200	915	352	272	142	146	135	352	675
14	116	915	1,200	1,150	1,150	375	272	149	129	135	470	675
15	116	915	1,200	1,150	960	375	276	149	116	330	750	675
16	113	915	1,200	1,150	870	352	272	135	113	470	750	610
17	113	915	1,200	1,150	830	352	272	135	116	470	750	550
18	181	960	1,150	1,150	830	352	189	135	107	470	750	520
19	470	915	1,150	1,100	830	352	135	135	110	470	750	495
20	470	915	1,200	1,100	790	330	120	135	142	470	750	420
21	470	960	1,250	1,100	790	330	104	156	135	470	750	268
22	470	915	1,250	1,100	790	330	104	149	142	470	750	268
23	470	915	1,350	1,100	750	330	92	149	142	495	750	135
24	445	915	1,350	1,050	710	352	80	142	132	495	710	110
25	445	915	1,250	1,050	710	240	80	135	135	495	710	107
26	445	1,000	1,250	1,050	710	228	80	135	142	790	710	110
27	445	1,050	1,250	1,050	675	189	80	138	132	790	710	116
28	445	1,100	1,250	1,050	675	268	80	138	126	790	710	116
29	445	1,150	1,250	1,050	-------	248	92	135	123	750	710	104
30	445	1,200	1,250	1,000	-------	248	120	138	120	710	710	104
31	445	-------	1,250	1,000	-------	220	-------	135	-------	675	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	470	110	259	+726	530	0.684	0.79
November	1,200	445	839	−983	460	.594	.66
December	1,450	1,050	1,210	−2,403	313	.404	.47
January	1,250	1,000	1,140	−2,555	186	.240	.28
February	1,150	675	892	−2,096	26	.034	.04
March	640	189	403	−209	325	.419	.48
April	276	80	192	+1,733	861	1.110	1.24
May	156	120	140	+778	430	.555	.64
June	160	107	132	+3,369	1,430	1.850	2.06
July	790	110	370	+133	420	.542	.62
August	750	352	582	−617	352	.454	.52
September	710	104	479	−519	279	.360	.40
The year	1,450	80	552	−2,643	468	.604	8.20

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, 1931.

EXTREMES.—Maximum discharge during year, 3,280 second-feet June 11 (gage height, 4.85 feet); minimum, 341 second-feet May 26–28, 31, June 1–8 (gage height, 1.25 feet).

1914–1931: Maximum discharge, 14,900 second-feet Apr. 10, 1922 (gage height, 13.7 feet); minimum, 200 second-feet Aug. 7, 8, 9, 1925 (gage height, 1.00 foot).

REMARKS.—Records good except those for period of ice effect, Nov. 27 to Mar. 25, which are fair. Flow regulated by storage at Chippewa Reservoir.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	402	643	1,190	1,520	1,110	990	467	535	341	718	873	912
2	500	643	1,280	1,440	1,110	912	467	500	341	1,770	951	873
3	500	643	1,360	1,440	1,030	912	500	500	341	1,770	795	873
4	467	643	1,280	1,520	1,030	912	500	500	341	1,190	606	873
5	402	643	1,280	1,520	951	756	535	467	341	795	606	873
6	402	570	1,360	1,520	873	834	535	467	341	873	606	873
7	467	680	1,360	1,520	951	834	570	467	341	756	606	873
8	756	643	1,190	1,440	951	834	570	467	341	606	606	873
9	680	718	1,190	1,440	951	873	606	467	371	535	606	873
10	570	1,030	1,280	1,360	990	795	606	467	434	500	606	873
11	500	1,030	1,360	1,360	990	680	570	500	3,110	500	570	834
12	467	1,030	1,360	1,360	951	756	570	500	3,110	467	570	834
13	434	1,030	1,440	1,360	912	718	570	500	2,590	467	570	834
14	402	1,030	1,440	1,190	795	756	570	467	2,270	434	570	834
15	402	1,190	1,360	1,190	1,190	680	606	434	1,830	434	873	834
16	402	1,360	1,360	1,110	1,360	718	643	402	2,030	434	951	834
17	434	1,440	1,360	1,190	1,360	718	643	402	873	680	951	834
18	467	1,360	1,360	1,190	1,190	756	606	434	756	680	912	718
19	606	1,360	1,520	1,240	1,190	718	606	434	718	643	912	718
20	718	1,360	1,520	1,030	1,110	756	951	402	735	643	912	680
21	718	1,600	1,690	834	1,030	756	1,440	402	873	643	912	680
22	680	1,520	1,600	1,030	1,030	756	1,440	402	1,330	643	912	795
23	680	1,440	1,520	1,110	1,030	795	1,190	371	1,630	643	873	718
24	680	1,360	1,360	1,030	1,030	606	990	371	1,530	643	873	643
25	680	1,280	1,690	1,110	1,030	606	873	371	1,190	643	873	570
26	680	1,190	1,690	1,030	1,030	570	795	341	930	680	873	606
27	680	1,360	1,520	1,030	1,030	535	680	341	1,600	912	873	570
28	680	1,190	1,690	1,110	990	467	606	341	1,190	912	873	535
29	680	1,440	1,690	1,190	-------	500	535	371	873	951	912	500
30	680	1,360	1,520	1,110	-------	535	500	371	756	912	912	467
31	643	-------	1,520	1,110	-------	467	-------	341	-------	873	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	756	402	563	+726	834	0.521	0.60
November	1,600	570	1,090	−983	711	.444	.50
December	1,690	1,190	1,430	−2,403	534	.334	.38
January	1,520	834	1,250	−2,555	297	.186	.22
February	1,360	795	1,040	−2,096	174	.109	.11
March	990	467	726	−209	648	.405	.47
April	1,440	467	691	+1,733	1,380	.850	.95
May	535	341	430	+778	720	.450	.52
June	3,110	341	1,120	+3,369	2,420	1.51	1.68
July	1,770	434	753	+133	893	.502	.58
August	951	570	789	−617	559	.349	.40
September	912	467	760	−519	559	.350	.39
The year	3,110	341	885	−2,643	871	.501	6.80

CHIPPEWA RIVER AT CHIPPEWA FALLS, WIS.

LOCATION.—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, 1931.

EXTREMES.—Maximum mean daily discharge during year, 15,200 second-feet June 22; minimum, 96 second-feet Mar. 22 (gage height, −0.80 foot).

1888–1931: Maximum discharge, 78,000 second-feet Mar. 27, 1920 (gage height, 17.0 feet); minimum, 23 second-feet Sept. 22, 1929.

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

REMARKS.—Records fair. Discharge computed from records of Chippewa Falls power plant and estimated inflow between plant and gaging station. Flow regulated by Chippewa power plant immediately above station, by many others above and by the Chippewa and Flambeau Reservoirs.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1,790	2,100	2,300	1,110	945	446	3,170	3,040	1,670	5,630	990	1,420
2	2,400	1,370	2,680	2,420	2,450	3,390	3,110	3,090	1,780	6,420	780	1,480
3	2,260	2,560	2,060	2,340	2,220	3,540	2,140	1,190	1,870	6,730	1,860	1,540
4	1,580	2,600	2,620	726	2,220	3,470	2,840	2,770	1,810	2,360	3,220	1,540
5	1,330	2,190	2,170	2,380	2,360	3,570	572	2,490	1,420	3,240	3,060	1,530
6	1,970	1,820	2,300	2,390	2,300	3,510	2,170	2,110	1,150	4,750	2,230	830
7	2,310	1,940	1,460	2,790	2,150	2,730	2,500	1,920	750	3,920	2,670	770
8	2,360	1,510	3,360	2,580	830	685	2,580	2,490	1,320	2,630	2,470	1,810
9	3,930	622	2,820	2,430	2,170	2,910	2,320	1,770	1,810	2,950	740	1,670
10	5,620	1,880	2,980	2,600	2,170	2,960	3,390	910	2,880	3,290	2,260	1,260
11	4,350	1,870	3,060	2,160	2,110	2,870	3,100	2,410	6,100	3,220	2,240	1,760
12	2,390	2,140	2,870	2,730	2,080	3,120	858	2,220	6,770	870	1,650	2,190
13	2,610	2,260	2,960	2,830	1,780	2,870	2,980	2,430	5,970	2,390	1,640	835
14	2,440	2,790	1,530	2,350	1,540	1,550	3,200	2,520	4,180	2,350	1,500	1,540
15	2,480	2,940	3,030	2,390	789	595	3,340	2,570	10,700	2,280	1,560	1,240
16	2,380	1,520	2,970	2,320	1,910	2,170	3,140	2,600	8,420	2,380	730	1,670
17	1,940	3,420	2,500	2,400	2,480	2,120	3,300	1,020	6,940	2,080	1,820	1,510
18	1,920	3,710	2,410	1,110	2,140	2,160	2,930	3,030	6,340	1,930	1,860	1,840
19	1,440	3,180	2,410	2,460	2,000	2,120	873	3,010	5,730	780	1,870	1,680
20	2,790	5,260	2,320	2,380	1,580	2,000	4,080	2,540	8,780	1,920	1,880	1,110
21	3,300	4,740	1,330	2,480	1,450	1,630	5,380	1,970	11,600	1,890	1,640	2,200
22	2,720	5,960	2,990	2,280	1,490	96	5,200	1,560	15,200	1,840	1,440	4,670
23	2,210	4,740	3,390	2,430	2,170	1,670	5,250	1,370	15,100	1,640	760	3,510
24	2,450	4,300	2,550	2,300	2,000	1,840	5,400	815	12,000	1,270	1,610	3,110
25	2,330	3,630	1,390	487	1,940	1,640	4,690	1,520	9,730	865	1,860	4,670
26	1,430	3,300	2,590	2,370	2,080	1,560	888	1,750	7,520	810	1,770	4,410
27	2,640	1,260	2,580	2,590	3,000	1,260	5,140	1,630	6,870	1,140	1,800	2,110
28	2,280	2,120	1,690	2,440	1,680	1,570	4,580	1,640	8,030	1,370	1,700	2,730
29	2,220	1,860	3,200	2,270	-------	258	3,700	1,440	7,620	1,160	820	3,370
30	2,280	768	3,210	1,850	-------	2,110	3,780	780	6,480	1,140	780	3,470
31	2,260	-------	2,310	1,810	-------	2,760	-------	780	-------	1,120	1,920	-------

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	5,620	1,330	2,460	+726	2,730	0.488	0.56
November	5,960	622	2,680	−983	2,300	.411	.46
December	3,390	1,330	2,510	−2,403	1,610	.288	.33
January	2,830	487	2,200	−2,555	1,250	.223	.26
February	3,000	789	1,930	−2,096	1,060	.189	.20
March	3,570	96	2,100	−209	2,020	.361	.42
April	5,400	572	3,250	+1,733	3,920	.700	.78
May	3,090	780	1,980	+778	2,270	.405	.47
June	15,200	750	6,220	+3,369	7,520	1.34	1.50
July	6,730	780	2,460	+133	2,510	.448	.52
August	3,220	730	1,710	−617	1,480	.264	.30
September	4,670	770	2,120	−519	1,920	.343	.38
The year	15,200	96	2,630	−2,643	2,550	.457	6.18

CHIPPEWA RIVER AT DURAND, WIS.

LOCATION.—Water-stage recorder in SW. ¼ sec. 21, T. 25 N., R. 13 W., at Durand, 400 feet upstream from toll bridge. Zero of gage is 695.20 feet above mean sea level.

DRAINAGE AREA.—9,010 square miles.

RECORDS AVAILABLE.—July, 1928, to September, 1931.

EXTREMES.—Maximum discharge during year, 21,000 second-feet June 23 (gage height, 7.42 feet); minimum (estimated), 1,500 second-feet Nov. 28 (gage height, 1.60 feet).

1928–1931: Maximum discharge, 38,200 second-feet Mar. 22, 1929 (gage height, 11.2 feet); minimum (estimated), 646 second-feet Feb. 10, 1930.

REMARKS.—Records for Oct. 1 to Dec. 16, fair; those for period of ice effect, Dec. 17 to Feb. 17, poor; those for Feb. 18 to Sept. 30, good. Regulation by operation of power plants and Chippewa and Flambeau Reservoirs.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	3,210	3,420	1,940	4,070	3,000	3,570	3,570	5,000	2,030	8,530	2,170	2,170
2	3,210	3,000	2,260	3,420	2,610	2,790	4,500	4,500	2,620	7,860	2,170	2,620
3	3,850	2,430	3,630	3,210	3,420	3,570	4,500	4,260	2,620	7,860	2,030	2,460
4	3,630	3,630	4,790	3,210	3,630	4,500	4,500	2,970	2,790	7,860	2,310	2,620
5	3,420	3,630	4,540	2,430	4,070	5,000	4,750	3,790	2,970	5,000	3,160	2,620
6	2,800	3,210	4,300	2,610	4,070	5,000	2,970	4,020	2,790	5,000	3,360	2,790
7	3,630	3,210	4,070	3,000	4,070	5,000	3,790	3,570	2,460	6,340	3,160	2,170
8	4,070	3,210	3,000	3,850	4,070	4,020	4,020	3,160	2,030	5,260	3,570	2,170
9	4,070	2,800	4,540	3,420	3,000	2,970	4,020	3,570	2,310	3,790	3,570	2,790
10	5,050	1,940	5,050	3,210	2,800	4,020	4,020	3,360	2,970	4,020	2,620	2,790
11	6,830	2,800	5,050	3,210	3,630	4,020	4,500	2,620	4,020	4,260	2,460	2,310
12	5,900	3,000	4,540	2,610	4,070	4,020	4,500	3,360	7,230	4,020	2,790	2,790
13	4,790	3,000	4,790	3,210	3,850	4,020	3,160	3,790	8,190	2,620	2,970	2,970
14	3,630	3,210	4,300	3,630	4,070	4,260	4,020	3,360	6,930	3,160	2,790	2,310
15	3,850	4,300	2,800	3,210	4,070	3,570	4,500	3,570	6,060	3,360	2,620	2,460
16	4,070	4,540	3,630	3,420	3,630	2,970	4,500	3,570	12,200	3,160	2,620	2,460
17	4,070	2,800	3,420	3,000	3,850	3,570	4,500	3,570	9,930	3,360	2,310	2,790
18	3,420	4,790	3,850	3,210	5,520	3,360	4,020	2,790	8,870	3,160	2,460	2,790
19	3,420	5,050	4,070	2,800	5,260	3,360	4,020	3,570	8,190	3,160	2,790	2,970
20	3,000	5,330	4,070	2,610	5,260	3,360	3,360	4,020	8,530	2,170	2,970	2,790
21	4,070	6,200	3,630	3,000	3,790	3,160	6,340	3,790	13,800	2,970	2,790	2,460
22	4,540	5,900	2,800	3,210	3,570	3,160	6,630	3,160	16,000	2,970	2,620	4,020
23	4,300	6,510	3,630	3,420	3,360	2,460	6,630	3,160	19,600	2,970	2,460	6,060
24	3,630	5,330	3,850	3,420	3,570	2,970	6,930	2,790	16,900	2,790	2,170	5,260
25	3,630	5,610	4,790	3,210	3,570	3,570	6,630	2,310	14,200	2,460	2,310	5,000
26	3,420	5,050	3,210	2,260	3,570	3,790	6,060	2,620	11,400	2,310	2,460	5,520
27	2,610	5,050	3,420	2,800	3,360	4,020	4,020	2,790	9,930	2,030	2,790	5,260
28	3,630	1,720	3,420	3,630	4,260	3,790	5,790	2,790	8,530	2,170	2,620	3,790
29	3,630	3,210	3,000	3,850	-------	3,360	5,790	2,790	9,220	2,170	2,620	4,500
30	3,420	3,850	4,300	3,420	-------	2,620	5,000	2,620	9,220	2,310	2,310	4,500
31	3,420	-------	4,540	3,210	-------	3,160	-------	2,170	-------	2,170	2,170	-------

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	6,830	2,610	3,880	+245	3,970	0.441	0.51
November	6,510	1,720	3,920	−1,443	3,360	.373	.42
December	5,050	1,940	3,850	−2,729	2,830	.314	.36
January	4,070	2,260	3,190	−2,729	2,170	.241	.28
February	5,520	2,610	3,820	−2,117	2,940	.326	.34
March	5,000	2,460	3,650	−195	3,580	.397	.46
April	6,930	2,970	4,720	+2,042	5,510	.612	.68
May	5,000	2,170	3,340	+708	3,600	.400	.46
June	19,600	2,030	7,820	+4,337	9,490	1.053	1.17
July	8,530	2,030	3,910	+521	4,100	.455	.52
August	3,570	2,030	2,650	−624	2,420	.269	.31
September	6,060	2,170	3,270	−450	3,100	.344	.38
The year	19,600	1,720	3,990	−2,434	3,910	.434	.89

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, 1931.
EXTREMES.—Maximum discharge during year, 616 second-feet Oct. 5-7 (gage height, 4.58 feet); minimum, 97 second-feet June 14, 15 (gage height, 3.24 feet).
1927–1931: Maximum discharge, 2,140 second-feet Oct. 21, 1928 (gage height, 6.76 feet); minimum, 11 second-feet June 15, 1930 (gage height, 2.52 feet).
REMARKS.—Records excellent; no ice effect during year. Flow regulated by storage in Flambeau Reservoir.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	364	565	493	426	286	286	344	286	267	286	231	324
2	364	565	493	405	286	286	364	286	267	286	154	324
3	364	565	493	405	286	286	384	286	267	217	154	324
4	470	565	493	405	286	286	384	305	267	217	154	324
5	616	565	493	405	267	286	405	324	249	286	249	324
6	616	565	493	384	305	286	405	324	249	286	324	324
7	616	565	493	384	324	286	267	324	249	286	324	324
8	344	565	493	384	305	286	324	324	249	286	344	324
9	344	565	493	384	305	286	324	324	249	286	324	324
10	470	565	493	384	344	286	324	324	249	286	324	324
11	590	565	493	364	324	286	324	324	221	286	324	324
12	590	565	493	364	305	286	324	324	172	286	324	324
13	590	565	493	364	286	286	324	324	149	286	324	324
14	590	565	493	364	305	286	324	324	97	286	324	324
15	590	565	493	344	286	286	324	324	97	286	324	324
16	590	540	493	344	286	286	324	324	172	286	324	324
17	590	540	493	344	286	286	324	324	197	286	324	324
18	590	540	470	324	267	286	324	324	152	286	324	324
19	590	516	470	324	267	286	324	324	172	286	324	324
20	590	516	470	324	267	286	324	324	142	286	324	249
21	565	516	470	324	267	286	324	324	119	286	324	211
22	565	516	470	305	267	305	324	324	121	305	324	194
23	565	516	448	305	267	305	324	305	102	324	324	217
24	565	516	448	305	286	305	197	286	149	324	324	217
25	565	516	448	305	286	324	197	286	200	324	324	194
26	565	516	448	305	305	344	231	286	178	324	324	166
27	565	516	448	286	305	344	249	286	154	324	324	166
28	565	493	448	286	305	344	249	286	154	324	324	211
29	565	493	448	286	------	324	249	286	197	324	324	231
30	565	493	426	286	------	305	267	286	267	324	324	286
31	565	------	426	286	------	344	------	267	------	344	324	------

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	616	344	538	−481	358	0.577	0.67
November	565	493	541	−460	364	.587	.65
December	493	426	475	−326	353	.569	.66
January	426	286	345	−174	280	.452	.52
February	344	267	291	−21	282	.455	.47
March	344	286	298	+14	303	.489	.56
April	405	197	313	+309	432	.697	.78
May	324	267	309	−70	283	.460	.53
June	267	97	192	+968	565	.911	1.02
July	344	217	294	+388	439	.708	.82
August	344	154	303	−7	300	.484	.56
September	324	166	283	+69	310	.500	.56
The year	616	97	349	+209	356	.574	7.80

FLAMBEAU RIVER NEAR BUTTERNUT, WIS.

LOCATION.—Chain gage in lot 10, sec. 28, T. 41 N., R. 1 E., 6 miles southeast of Butternut.

DRAINAGE AREA.—660 square miles.

RECORDS AVAILABLE.—July, 1914, to September, 1931.

EXTREMES.—Maximum discharge during year, 717 second-feet Oct. 11 (gage height, 2.48 feet); minimum, 241 second-feet Apr. 25, June 3, 6 (gage height, 1.15 feet).

1914–1931: Maximum discharge, 5,430 second-feet Apr. 22, 23, 1916 (gage height, 9.0 feet); minimum, 91 second-feet Sept. 18, 19, 1925 (gage height, 0.25 foot).

REMARKS.—Records fair. Discharge estimated Nov. 29 to Mar. 31 from records of Flambeau River at Flambeau Reservoir. Flow regulated by storage in Flambeau Reservoir.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	398	585	533	456	316	345	382	292	253	266	505	335
2	398	585	533	456	316	326	432	292	253	432	468	335
3	382	585	533	435	316	326	432	306	241	398	432	320
4	366	585	533	435	316	326	350	306	266	279	335	320
5	672	585	533	435	316	326	450	306	253	398	366	320
6	672	585	533	435	297	331	398	350	241	350	398	320
7	672	585	533	414	335	331	366	350	253	335	382	306
8	432	585	533	414	354	331	335	350	253	335	468	306
9	398	585	533	414	335	331	366	350	266	335	366	320
10	398	585	533	414	335	331	366	366	279	335	366	306
11	717	585	533	414	374	331	382	366	253	335	366	306
12	672	585	533	394	354	331	382	366	350	335	366	306
13	672	585	533	394	335	336	382	366	432	320	366	306
14	672	585	533	394	316	336	382	366	398	320	350	306
15	672	585	533	394	335	336	382	350	350	292	335	306
16	672	628	533	374	316	336	382	335	350	292	366	306
17	672	628	528	374	316	336	382	320	468	292	350	306
18	672	585	528	374	316	336	382	335	350	292	335	306
19	672	585	505	354	297	341	382	335	366	292	335	306
20	672	585	505	354	297	341	398	335	398	292	335	366
21	628	628	505	354	302	341	432	320	468	292	335	320
22	628	628	505	354	302	341	450	335	382	292	335	306
23	628	585	505	335	302	360	415	306	335	292	335	292
24	628	585	505	335	302	360	253	279	306	306	335	292
25	628	585	483	335	321	365	241	266	366	320	335	279
26	585	505	483	335	321	384	253	266	382	320	335	266
27	585	432	483	335	340	404	292	266	350	320	335	279
28	628	468	483	316	340	404	279	279	266	320	335	306
29	628	556	483	316	------	404	279	266	266	320	335	306
30	628	533	483	316	------	384	279	253	266	320	335	320
31	628	------	461	316	------	365	------	253	------	382	335	------

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	717	366	593	−481	41[illegible]	0.626	0.72
November	628	432	576	−460	39[illegible]	.605	.68
December	533	461	515	−326	39[illegible]	.595	.69
January	456	316	380	−174	31[illegible]	.477	.55
February	374	297	322	−21	31[illegible]	.474	.49
March	404	326	348	+14	35[illegible]	.533	.61
April	450	241	363	+309	48[illegible]	.730	.81
May	366	253	317	−70	291	.441	.51
June	468	241	322	+968	695	1.05	1.17
July	432	266	323	+388	46[illegible]	.709	.82
August	505	335	364	−7	361	.547	.63
September	366	266	309	+69	33[illegible]	.509	.57
The year	717	241	395	+209	402	.609	8.25

FLAMBEAU RIVER AT BABBS ISLAND, NEAR WINTER, WIS.

LOCATION.—Water-stage recorder on west line of sec. 16, T. 38 N., R. 3 W., 10 miles east of Winter.
DRAINAGE AREA.—964 square miles.
RECORDS AVAILABLE.—August, 1929, to September, 1931.
EXTREMES.—Maximum discharge during period, 2,010 second-feet June 27 (gage height, 12.40 feet); minimum, 233 second-feet Oct. 28 (gage height, 9.40 feet).
1929–1931: Maximum discharge, that of 1931; minimum, 218 second-feet July 9, 1930 (gage height 9.73 feet).
REMARKS.—Records fair. Flow regulated by storage in Flambeau Reservoir. No records Nov. 28 to Apr. 17.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Apr.	May	June	July	Aug.	Sept.
1	480	644	-------	439	501	717	567	400
2	439	606	-------	439	480	830	890	400
3	522	606	-------	480	480	717	995	400
4	522	606	-------	480	480	955	890	420
5	522	624	-------	480	480	567	717	400
6	717	622	-------	522	480	567	544	420
7	772	635	-------	522	590	664	590	346
8	890	613	-------	544	567	664	590	346
9	955	619	-------	567	664	522	590	382
10	614	717	-------	480	1,020	544	590	363
11	614	664	-------	480	1,620	544	544	400
12	717	567	-------	590	1,470	501	522	382
13	772	830	-------	544	1,240	460	567	420
14	717	614	-------	522	1,390	439	501	382
15	772	664	-------	501	1,020	439	480	420
16	717	772	-------	501	830	460	480	439
17	664	717	-------	614	955	480	439	420
18	772	772	522	590	1,320	420	501	400
19	830	614	664	544	1,240	400	420	382
20	614	614	664	567	1,320	400	420	522
21	717	830	717	567	1,780	363	420	567
22	717	772	717	567	1,550	328	400	664
23	772	772	664	522	1,320	328	382	590
24	590	567	664	567	1,090	363	363	567
25	614	772	522	614	830	363	420	501
26	614	-------	522	544	1,090	328	420	664
27	522	-------	480	501	1,850	363	400	614
28	420	-------	501	522	1,700	400	400	567
29	522	-------	522	522	955	480	382	501
30	664	-------	480	522	830	480	400	480
31	682	-------	-------	480	-------	439	400	-------

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	955	420	660	−481	480	0.498	0.57
November 1–25	830	567	673	−399	488	.506	.47
April 18–30	717	480	588	+216	780	.809	.39
May	614	439	527	−70	501	.520	.60
June	1,850	480	1,040	+968	1,410	1.46	1.63
July	955	328	501	+388	646	.670	.77
August	995	363	523	−7	520	.539	.62
September	664	346	459	+69	486	.504	.56
The period	1,850	328	621	+684	657	.682	5.61

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, 1931. January, 1914, to September, 1923, 8 miles below present site. From February, 1903, to December, 1906, at Ladysmith.

EXTREMES.—Maximum mean daily discharge during year, 5,440 second-feet June 22, minimum, 266 second-feet June 7.

1903–1906, 1914–1931: 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 by operation of power plants and storage in Flambeau Reservoir above station. Daily-discharge records furnished by Lake Superior District Power Co.

Daily and monthly discharge, in second-feet, 1930-31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	731	895	894	591	463	479	859	808	5[illegible]	2,630	967	555
2	336	402	825	602	383	586	762	863	537	2,900	888	538
3	677	620	756	731	499	573	657	914	547	2,230	1,720	519
4	908	746	786	633	511	581	872	927	534	1,990	1,810	542
5	422	738	949	714	496	626	801	758	597	1,560	1,470	546
6	877	791	1,130	661	489	458	871	785	935	1,450	1,010	506
7	1,170	700	601	691	521	587	1,010	732	2[illegible]	1,680	880	548
8	1,240	728	879	644	479	507	941	665	4[illegible]	1,650	1,130	469
9	1,370	756	853	619	505	539	907	924	586	1,390	776	490
10	1,360	783	860	778	496	471	729	699	972	1,280	998	487
11	1,120	811	860	525	495	506	564	938	2,630	1,360	1,000	496
12	498	828	942	657	527	516	853	1,060	3,000	1,020	886	486
13	1,090	847	1,070	599	540	522	883	1,160	3,370	1,270	846	407
14	995	789	290	590	576	614	934	1,120	3,550	772	748	545
15	988	1,040	784	584	473	490	921	1,090	3,230	960	975	502
16	994	921	706	566	478	517	870	1,000	2,820	923	571	683
17	1,150	1,230	625	656	498	537	1,040	1,030	2,540	892	650	672
18	1,260	1,100	623	518	488	516	1,050	982	3,200	923	702	604
19	757	1,000	782	558	469	573	1,060	964	3,250	598	620	733
20	975	1,230	905	542	494	507	1,220	875	3,950	712	574	644
21	921	1,400	661	553	536	651	1,600	819	5,240	647	590	1,190
22	938	1,250	778	458	425	501	1,420	793	5,440	597	635	1,580
23	942	1,220	780	518	548	606	1,500	729	4,980	536	481	1,720
24	976	1,310	755	609	534	666	1,390	707	4,090	516	529	1,770
25	1,100	1,100	687	429	564	661	1,150	858	3,130	601	508	1,580
26	692	1,060	696	505	577	782	1,100	861	3,500	476	523	1,810
27	906	283	774	498	615	766	982	706	4,690	507	499	1,730
28	865	656	677	517	653	702	1,000	787	4,460	553	533	1,630
29	925	882	697	517	-------	388	913	731	3,330	571	537	1,570
30	982	779	680	587	-------	847	889	396	2,980	705	539	1,530
31	826	-------	636	508	-------	756	-------	336	-------	821	531	-------

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	1,370	336	935	−481	755	0.395	0.46
November	1,400	283	896	−460	719	.376	.42
December	1,130	290	772	−326	650	.340	.39
January	731	429	586	−174	571	.273	.28
February	653	383	512	−21	573	.263	.30
March	847	388	582	+14	577	.307	.36
April	1,600	564	992	+309	1,110	.582	.65
May	1,160	336	839	−70	813	.426	.49
June	5,440	266	2,650	+968	3,090	1.581	1.76
July	2,900	476	1,120	+388	1,290	.660	.76
August	1,810	481	811	−7	808	.423	.49
September	1,810	407	903	+69	930	.487	.54
The year	5,440	266	966	+209	973	.509	6.90

SOUTH FORK OF FLAMBEAU RIVER NEAR PHILLIPS, WIS.

LOCATION.—Chain gage in NW. ¼ SW. ¼ sec. 10, T. 37 N., R. 2 W., half a mile down stream from mouth of Big Elk River and 12 miles west of Phillips.

DRAINAGE AREA.—666 square miles.

RECORDS AVAILABLE.—August, 1929, to September, 1931.

EXTREMES.—Maximum discharge during year ending Sept. 30, 1931, 3,630 second-feet June 22 (gage height, 9.94 feet); minimum, 172 second-feet Sept. 3–5 (gage height, 4.54 feet).

1929–1931: Maximum discharge, that of June 22, 1931; minimum, 148 second-feet Sept. 25, 26, 1929 (gage height, 4.34 feet).

REMARKS.—Records good except those estimated Nov. 21–30, 1929, Nov. 30, 1930, Apr. 1, 1931, which are fair. Station discontinued during winter.

Daily and monthly discharge, in second-feet, 1929–1931

Day	Aug.	Sept.	Oct.	Nov.	Mar.	Apr.	May	June	July	Aug.	Sept.
1929-30											
1	------	209	256	236	------	209	1,160	622	506	236	186
2	------	193	256	236	------	236	1,360	702	506	226	186
3	------	193	267	267	------	246	1,430	729	506	236	186
4	------	209	193	293	------	256	1,500	785	484	236	186
5	------	209	193	293	------	293	1,500	844	484	236	193
6	------	209	193	293	------	322	1,580	905	462	246	193
7	------	209	193	267	------	340	1,580	1,030	462	226	193
8	------	209	193	246	------	357	1,660	1,030	440	226	186
9	------	209	193	236	------	378	1,660	1,030	440	218	186
10	------	226	193	236	------	398	1,580	1,230	419	218	186
11	------	226	256	236	------	419	1,430	1,360	419	218	193
12	------	226	256	267	------	440	1,230	1,500	419	218	193
13	------	226	218	267	------	419	1,100	1,660	398	209	186
14	------	236	218	280	------	419	1,100	1,730	378	209	186
15	------	226	218	280	------	398	1,100	3,090	340	201	186
16	------	226	218	293	------	484	1,030	2,820	322	201	186
17	------	246	193	293	------	575	1,030	2,650	293	201	179
18	------	246	193	308	------	674	905	2,390	267	201	179
19	------	246	193	308	------	785	844	2,300	246	201	179
20	------	246	236	340	------	785	702	2,140	236	201	172
21	------	246	236	225	------	785	648	1,500	218	201	172
22	------	226	236	225	------	729	552	1,230	209	193	166
23	------	226	226	225	267	674	552	969	218	193	160
24	226	226	226	225	256	575	552	905	218	193	154
25	226	246	226	225	246	484	552	844	236	193	148
26	226	246	226	225	246	440	552	785	256	193	148
27	226	246	226	225	236	398	552	702	256	193	236
28	226	246	226	225	236	378	529	648	246	193	236
29	226	246	226	225	226	529	529	575	236	193	218
30	226	246	226	225	226	905	529	529	218	179	209
31	226	------	236	------	226	------	529	------	226	193	------

Daily and monthly discharge, in second-feet, of South Fork of Flambeau River near Phillips, Wis., 1929–1931—Continued

Day	Oct.	Nov.	Apr.	May	June	July	Aug.	Sept.
1930–31								
1	186	186	218	293	226	1,810	218	193
2	186	186	218	293	226	1,580	246	186
3	193	186	218	280	226	1,360	267	172
4	193	186	218	267	236	1,100	293	172
5	193	186	218	226	293	1,030	322	172
6	193	186	218	201	267	844	378	179
7	193	186	218	226	226	785	440	193
8	186	186	218	246	226	702	506	193
9	209	186	226	267	218	622	398	186
10	226	186	226	293	226	575	378	179
11	236	186	246	340	1,600	552	357	179
12	236	186	246	378	1,360	484	322	179
13	236	186	246	378	1,890	440	293	179
14	226	179	246	340	2,060	357	267	186
15	236	179	256	322	1,980	357	280	193
16	236	186	256	308	1,890	340	246	193
17	226	186	267	308	1,730	322	236	201
18	226	193	280	308	1,980	308	226	209
19	226	201	322	308	2,060	280	226	226
20	218	201	398	308	2,740	267	218	357
21	218	209	484	308	3,090	246	209	529
22	218	218	674	293	3,540	209	193	702
23	209	226	598	293	3,270	193	201	905
24	209	226	575	267	2,650	179	201	1,030
25	209	185	506	267	2,470	193	201	1,030
26	218	185	462	256	2,390	193	193	969
27	209	185	398	246	2,470	209	193	969
28	209	185	357	246	2,560	193	201	905
29	193	185	322	236	2,470	201	209	729
30	201	185	308	226	2,060	209	193	674
31	193	------	------	226	------	209	201	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
1929					
August 24–31	226	226	226	0.339	0.10
September	246	193	228	.342	.38
1929–30					
October	267	193	221	.332	.38
November	340	225	258	.387	.43
March 23–31	267	226	241	.362	.12
April	905	209	478	.718	.80
May	1,660	529	1,020	1.53	1.76
June	3,090	529	1,310	1.97	2.20
July	506	209	341	.512	.59
August	246	179	207	.311	.36
September	236	148	186	.279	.31
1930–31					
October	236	186	211	.317	.37
November	226	179	191	.287	.32
April	674	218	321	.482	.54
May	378	201	282	.423	.49
June	3,540	218	1,620	2.43	2.71
July	1,810	179	527	.791	.91
August	506	193	268	.402	.46
September	1,030	172	412	.619	.69

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, 1931.
EXTREMES.—Maximum discharge during year, 5,180 second-feet June 21 (gage height, 7.60 feet); minimum, 24 second-feet Feb. 9.
1915–1931: Maximum discharge, 15,600 second-feet Mar. 26, 1920 (gage height, 11.48 feet); minimum (estimated), 14 second-feet Jan. 25–31, 1924.
REMARKS.—Records good except those for period of ice effect Nov. 22 to Mar. 22, which are poor.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	74	90	124	44	62	49	214	273	124	461	42	35
2	100	90	106	49	56	49	192	236	106	432	46	35
3	124	74	106	44	49	49	171	227	106	582	46	42
4	240	74	90	40	40	49	214	205	100	432	42	50
5	221	62	74	44	30	49	318	183	80	259	38	67
6	164	40	74	49	30	62	350	183	100	308	35	50
7	230	30	74	56	30	74	376	218	113	283	35	42
8	490	45	90	62	27	74	404	236	100	236	42	32
9	582	100	106	62	24	74	432	236	124	214	50	30
10	1,220	80	106	62	36	82	582	236	175	183	62	30
11	355	74	106	56	49	90	520	250	680	162	62	30
12	280	74	124	49	44	90	432	273	1,810	142	46	30
13	240	69	143	49	40	90	376	264	3,470	124	42	26
14	164	62	108	49	40	90	376	236	4,000	131	35	26
15	143	80	74	49	40	90	376	205	2,840	124	42	26
16	151	106	57	49	44	90	376	175	1,810	142	46	35
17	136	185	40	49	49	90	376	150	1,130	106	46	38
18	136	270	40	49	49	90	404	162	1,310	80	42	42
19	143	270	40	49	49	90	404	313	2,420	80	38	50
20	194	280	44	49	56	98	461	432	3,640	50	38	46
21	208	305	49	49	62	106	970	376	5,180	50	38	106
22	161	305	49	49	46	117	1,220	298	3,820	50	35	326
23	143	280	49	44	30	131	1,220	236	2,990	42	35	550
24	106	255	49	40	35	[a] 184	970	192	2,160	42	30	490
25	106	230	49	44	40	236	820	175	1,310	35	30	461
26	90	230	49	49	44	[a] 293	615	162	930	35	28	490
27	80	185	49	49	49	350	490	142	1,700	32	26	680
28	106	185	44	49	49	[a] 363	432	152	1,810	32	30	520
29	113	143	40	56	-------	376	350	152	970	42	30	376
30	106	143	40	62	-------	[a] 363	323	135	680	42	30	323
31	106	-------	40	62	-------	350	-------	113	-------	42	32	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	1,220	74	217	0.425	0.49
November	305	30	147	.288	.32
December	143	40	72.0	.141	.16
January	62	40	50.4	.099	.11
February	62	24	42.8	.084	.09
March	376	49	142	.278	.32
April	1,220	171	492	.965	1.08
May	432	113	220	.431	.50
June	5,180	80	1,530	3.00	3.35
July	582	32	160	.314	.36
August	62	26	39.3	.077	.09
September	680	26	169	.331	.37
The year	5,180	24	272	.533	7.24

[a] Interpolated.

RED CEDAR RIVER NEAR COLFAX, WIS.

LOCATION.—Water-stage recorder in sec. 27, T. 30 N., R. 11 W., at highway bridge 3½ miles below Trout Creek and 4½ miles north of Colfax.

DRAINAGE AREA.—1,100 square miles.

RECORDS AVAILABLE.—March, 1914, to September, 1931.

EXTREMES.—Maximum discharge during year, 960 second-feet Mar. 25 (gage height, 2.00 feet); minimum, 148 second-feet July 24 (gage height, 0.70 foot).

1914–1931: Maximum discharge, 7,610 second-feet Mar. 26, 1920 (gage height, 6.95 feet); minimum, that of July 24, 1931.

REMARKS.—Records fair except those estimated or interpolated Oct. 1 to Nov. 12, Nov. 15–17, June 20, July 4–7, 11, 12, and those for period of ice effect, Nov. 21 to Feb. 20, which are poor. Flow regulated by four storage reservoirs upstream.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	666	343	404	356	732	454	481	383	274	356	208	256
2	708	370	379	454	568	768	428	379	274	538	293	256
3	514	370	379	356	404	804	356	360	293	486	274	223
4	624	347	379	568	404	804	334	408	274	456	274	240
5	624	370	356	334	768	732	379	314	277	425	256	274
6	666	337	293	428	404	768	356	334	256	395	256	293
7	666	458	334	538	599	698	454	317	256	364	256	293
8	708	311	334	664	880	599	454	317	256	334	274	293
9	744	370	356	538	698	732	481	334	379	334	274	314
10	708	492	379	379	481	664	428	360	538	334	274	334
11	514	524	379	293	454	768	454	360	664	297	293	334
12	624	353	428	240	481	664	481	383	510	260	293	334
13	624	510	428	314	804	664	632	334	481	223	274	334
14	624	510	404	223	664	538	454	293	510	256	256	256
15	624	557	404	404	880	538	428	296	428	240	274	274
16	624	604	379	274	804	538	510	256	404	223	274	334
17	624	651	379	293	599	428	454	277	356	208	274	293
18	514	698	404	314	481	481	404	334	334	208	293	314
19	624	664	379	274	481	379	404	314	334	194	293	379
20	666	632	404	334	538	538	510	360	436	194	274	334
21	599	698	379	240	481	334	568	274	538	208	240	599
22	529	664	379	428	599	454	632	256	481	182	240	632
23	529	568	356	293	454	404	568	256	568	169	240	538
24	492	510	314	314	481	664	481	259	538	169	240	379
25	364	379	293	454	538	960	454	277	404	223	256	404
26	492	182	379	698	481	768	408	274	379	223	240	481
27	556	194	334	404	481	454	515	274	356	256	240	428
28	556	256	568	454	664	481	486	274	334	314	240	428
29	556	314	510	510	------	428	515	277	356	240	223	404
30	556	404	404	599	------	428	459	256	314	223	208	428
31	413	------	404	698	------	379	------	317	------	208	240	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	744	364	591	0.537	0.62
November	698	182	455	.414	.46
December	568	293	384	.349	.40
January	698	223	409	.372	.43
February	880	404	582	.529	.55
March	960	334	591	.537	.62
April	632	334	466	.424	.47
May	408	256	313	.285	.33
June	664	256	393	.357	.40
July	538	169	282	.256	.30
August	293	208	259	.235	.27
September	632	223	356	.324	.36
The year	960	169	422	.384	5.21

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, 1931.

EXTREMES.—Maximum discharge during year, 1,920 second-feet Apr. 20 (gage height, 2.60 feet); minimum, 400 second-feet July 28 (gage height, 1.36 feet). 1907–8, 1913–1923, 1925–1931: Maximum discharge, 14,000 second-feet Mar. 26, 1920 (gage height, 8.0 feet); minimum, 21 second-feet Dec. 9, 1929 (gage height, 0.65 foot).

REMARKS.—Records good. Regulation by operation of power plants at Menomonie and at Cedar Falls and by storage in four reservoirs upstream.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	856	689	594	917	742	856	796	742	466	501	414	466
2	1,110	571	764	584	796	796	742	796	451	466	414	466
3	1,180	617	935	635	796	1,040	742	588	466	538	486	443
4	856	617	796	635	796	1,100	742	648	594	451	421	526
5	1,040	579	641	635	917	1,040	551	696	546	443	421	580
6	1,040	617	796	742	689	1,100	917	648	538	443	447	436
7	1,110	561	562	970	804	696	742	696	521	451	479	458
8	1,110	764	873	796	742	917	635	648	443	443	466	682
9	1,180	519	865	635	742	1,170	1,040	696	588	443	458	504
10	1,240	617	873	796	742	856	748	696	588	451	451	458
11	1,180	820	935	750	742	635	796	696	1,250	543	458	466
12	856	873	873	750	689	635	682	696	1,040	458	466	543
13	1,040	588	944	796	689	635	742	696	796	458	458	466
14	1,040	742	592	682	689	796	588	648	735	466	458	486
15	1,040	935	935	742	689	1,240	856	648	635	466	466	479
16	1,040	696	594	635	689	1,170	648	641	588	458	466	648
17	1,040	979	588	742	689	917	648	641	538	466	474	641
18	1,040	1,240	764	856	796	735	648	696	546	458	474	474
19	856	1,170	1,040	635	796	735	635	641	588	474	474	504
20	1,040	1,170	1,040	750	689	735	1,460	588	735	489	428	538
21	1,110	1,030	635	750	742	796	1,240	635	509	489	428	600
22	998	1,110	696	750	796	796	856	588	735	481	428	1,170
23	882	804	804	750	856	917	856	594	735	443	428	648
24	882	750	856	689	917	1,040	856	588	796	428	428	796
25	820	804	796	635	856	1,070	979	571	796	414	436	641
26	606	804	654	742	742	1,460	796	526	796	407	451	689
27	820	526	635	796	917	1,240	856	474	796	407	451	689
28	926	577	635	796	856	1,240	796	481	519	400	451	742
29	926	594	804	796	------	742	689	474	489	407	451	635
30	926	529	804	796	------	1,040	796	466	474	414	466	696
31	926	------	635	796	------	742	------	466	------	414	509	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	1,240	606	991	0.548	0.63
November	1,240	519	763	.422	.47
December	1,040	562	773	.427	.49
January	970	584	741	.409	.47
February	917	689	772	.427	.44
March	1,460	635	932	.515	.59
April	1,460	551	802	.443	.49
May	796	466	623	.350	.40
June	1,250	443	643	.355	.40
July	543	400	454	.251	.29
August	509	414	452	.250	.29
September	1,170	436	586	.324	.36
The year	1,460	400	711	.393	5.32

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. Gage used since April, 1929, is at same site and datum as gage used 1909–1917.

DRAINAGE AREA.—1,120 square miles.

RECORDS AVAILABLE.—June, 1909, to September, 1917; April, 1929, to September, 1931.

EXTREMES.—Maximum discharge during year, 2,680 second-feet July 1 (gage height, 10.24 feet); minimum, 54 second-feet Dec. 30 (gage height, 4.89 feet). 1909–1917; 1929–1931: Maximum discharge, about 14,800 second-feet Mar. 25, 1917 (gage height, 19.04 feet); minimum, that of Dec. 30, 1930. Maximum stage known, 29.7 feet in April, 1888.

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

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	107	124	143	104	124	112	128	114	160	1,740	305	588
2	112	245	133	102	98	107	121	155	216	588	290	202
3	107	114	166	107	114	168	216	119	216	384	305	158
4	110	112	124	102	112	189	124	173	189	336	245	138
5	245	131	155	104	176	153	121	216	116	202	245	131
6	110	116	112	112	148	189	110	216	107	260	260	131
7	121	121	260	107	230	202	112	131	131	275	275	89
8	112	112	95	124	128	160	110	121	116	290	112	189
9	133	216	98	126	202	119	104	189	163	230	116	128
10	124	112	141	158	290	121	110	141	114	173	176	114
11	121	112	102	114	131	121	110	202	116	260	148	119
12	275	110	93	100	124	116	116	131	110	275	82	104
13	128	114	95	107	116	202	102	114	112	230	95	110
14	153	116	98	124	128	126	104	110	136	163	100	176
15	119	121	74	153	155	121	189	126	100	138	110	176
16	116	275	70	150	116	166	119	202	107	133	119	110
17	110	160	91	160	110	126	110	138	136	260	189	95
18	112	114	100	110	112	202	143	202	112	148	202	100
19	245	121	100	95	110	131	124	216	121	138	202	100
20	[a] 115	119	87	114	107	189	176	216	202	128	107	110
21	[a] 115	110	95	104	104	202	133	189	320	153	98	189
22	102	112	91	158	110	416	138	136	1,220	143	93	189
23	110	202	100	155	124	230	116	116	1,020	107	102	110
24	114	155	91	160	110	230	158	124	970	98	189	107
25	116	124	107	133	104	230	168	112	784	91	176	110
26	275	82	80	202	176	216	116	116	702	93	110	104
27	116	116	93	216	202	216	98	114	662	176	100	100
28	133	126	104	230	119	216	160	114	588	176	100	173
29	121	136	89	245	------	163	173	104	624	110	78	107
30	133	352	80	260	------	216	189	110	624	100	98	107
31	126	------	100	202	------	202	------	112	------	93	518	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	275	102	137	0.122	0.14
November	352	82	143	.128	.14
December	260	70	109	.097	.11
January	260	95	143	.128	.15
February	290	98	139	.124	.13
March	416	107	179	.160	.18
April	216	98	133	.119	.13
May	216	104	148	.132	.15
June	1,220	100	343	.306	.34
July	1,740	91	248	.221	.25
August	305	78	172	.154	.18
September	588	89	145	.129	.14
The year	1,740	70	170	.152	2.04

[a] Estimated.

BLACK RIVER AT NEILLSVILLE, WIS.

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

DRAINAGE AREA.—774 square miles.

RECORDS AVAILABLE.—April, 1905, to March, 1909; December, 1913, to September, 1931.

EXTREMES.—Maximum discharge during year, 2,800 second-feet June 20 (gage height, 7.5 feet); minimum, 7 second-feet Aug. 25–30.

1905–1909, 1913–1931: Maximum discharge, 37,100 second-feet June 6, 1905 (gage height, 22.4 feet); minimum, 5 second-feet during February, 1918.

REMARKS.—Records fair except those for period of ice effect, Dec. 1 to Mar. 12, which are poor.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	86	65	140	19	82	45	302	212	74	123	16	240
2	82	68	110	24	82	39	410	186	62	119	16	86
3	82	68	82	34	39	45	516	151	58	113	16	45
4	162	65	58	34	34	39	694	140	58	110	16	31
5	186	65	58	45	28	51	516	140	58	119	13	34
6	199	62	65	45	28	58	495	140	58	123	12	26
7	199	79	65	45	19	45	430	140	65	130	12	24
8	410	79	82	39	24	51	430	151	65	140	24	21
9	642	54	82	39	28	51	430	162	86	134	21	19
10	495	58	82	39	34	51	473	162	123	119	18	24
11	336	58	82	45	28	51	473	174	162	95	16	21
12	240	58	82	39	34	65	410	212	302	104	19	19
13	212	65	82	100	39	65	372	270	1,360	95	19	19
14	162	65	74	51	28	65	336	270	1,360	82	19	19
15	136	86	74	28	39	65	302	212	980	86	19	45
16	136	104	65	28	65	68	270	186	804	82	19	62
17	140	130	51	34	58	79	286	140	591	91	19	49
18	123	162	51	82	58	82	302	136	372	61	19	34
19	140	186	39	65	58	82	302	115	270	54	16	39
20	151	240	39	110	51	82	336	123	2,530	34	16	162
21	119	319	39	91	51	104	591	140	1,430	19	13	91
22	110	451	39	82	51	119	920	130	1,040	19	10	110
23	110	430	39	100	24	136	920	123	920	19	10	119
24	100	336	45	100	34	199	748	119	804	19	8	140
25	96	302	45	100	39	354	516	110	804	19	7	302
26	86	140	34	100	39	495	542	104	518	19	7	270
27	68	140	45	91	28	473	430	100	354	19	7	199
28	74	174	45	106	34	319	354	91	255	16	7	212
29	82	186	45	100	------	140	286	82	199	16	7	162
30	82	162	28	100	------	240	240	79	151	16	7	140
31	68	------	39	106	------	302	------	74	------	16	16	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	642	68	171	0.221	0.25
November	451	54	149	.193	.22
December	140	28	61.5	.080	.09
January	110	19	65.2	.084	.10
February	82	19	41.3	.053	.06
March	495	39	131	.169	.19
April	920	240	454	.587	.65
May	270	74	148	.191	.22
June	2,530	58	530	.685	.76
July	140	16	71.3	.092	.11
August	24	7	14.3	.018	.02
September	302	19	92.3	.119	.13
The year	2,530	7	160	.207	2.80

LA CROSSE RIVER NEAR WEST SALEM, WIS.

LOCATION.—Chain gage in sec. 32, T. 17 N., R. 6 W., at highway 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, 1931.

EXTREMES.—Maximum discharge during year, 635 second-feet June 23 (gage height 2.90 feet); minimum, 77 second-feet Aug. 23 (gage height, 1.00 foot). 1913–1931: Maximum discharge, 4,780 second-feet Sept. 15, 1928 (gage height, 9.8 feet); minimum, 56 second-feet Feb. 20, 1927 (gage height, 2.40 feet).

REMARKS.—Records fair. Stage-discharge relation affected by ice Dec. 2 to Feb. 3. Slight diurnal fluctuation caused by operation of power plants a few miles above station.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	212	224	266	251	335	224	251	212	237	163	163	190
2	212	155	266	282	316	237	266	237	224	251	155	147
3	200	251	212	237	354	237	282	237	237	190	212	163
4	200	251	212	133	282	237	299	251	224	237	116	180
5	155	237	190	190	251	224	316	237	190	163	200	180
6	180	212	190	212	237	224	316	224	251	212	190	163
7	224	237	212	200	237	224	316	251	155	190	200	190
8	224	140	163	212	237	212	282	237	251	180	171	140
9	299	237	171	190	212	237	251	237	224	163	99	180
10	282	282	171	212	299	224	251	224	237	212	224	163
11	237	237	171	163	224	224	224	251	237	190	237	190
12	212	251	180	180	266	224	224	266	266	212	200	163
13	224	224	171	212	224	224	251	251	251	140	171	115
14	251	212	171	190	299	237	224	237	299	200	190	163
15	171	224	180	224	251	190	251	200	224	171	190	180
16	237	251	212	190	224	237	251	224	251	147	212	163
17	224	374	224	163	224	237	266	147	251	155	200	140
18	237	282	212	163	212	237	237	224	251	163	180	180
19	237	237	155	266	224	237	224	237	163	163	212	212
20	200	266	155	299	224	224	237	266	335	224	212	190
21	224	316	155	282	224	251	299	251	299	224	180	224
22	224	237	163	282	212	224	282	237	436	120	140	200
23	200	237	171	224	224	237	282	237	528	171	82	180
24	200	266	282	224	224	266	282	190	480	180	163	180
25	224	266	251	200	224	299	237	212	394	171	126	224
26	212	237	212	237	224	335	224	200	251	147	190	282
27	212	224	212	200	237	266	190	200	282	133	171	266
28	266	299	171	237	237	299	237	251	212	180	147	224
29	224	335	212	212	-------	251	282	251	282	114	180	140
30	251	237	282	224	-------	266	237	200	224	147	126	212
31	163	-------	251	251	-------	266	-------	212	-------	200	200	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	299	155	220	0.534	0.62
November	374	140	248	.602	.67
December	282	155	201	.488	.56
January	299	133	217	.527	.61
February	354	212	248	.602	.63
March	335	190	242	.587	.68
April	316	190	259	.629	.70
May	266	147	229	.556	.64
June	528	155	272	.660	.74
July	251	114	178	.432	.50
August	237	82	175	.425	.49
September	282	115	184	.447	.50
The year	528	82	222	.539	7.34

ROOT RIVER NEAR HOUSTON, MINN.

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

DRAINAGE AREA.—1,550 square miles.

RECORDS AVAILABLE.—May, 1929, to September, 1931. May, 1909, to September, 1917, 1½ miles downstream.

EXTREMES.—Maximum discharge during year, 4,580 second-feet July 15 (gage height, 8.00 feet); minimum, 175 second-feet Jan. 18 (gage height, 3.16 feet, affected by ice); minimum stage, 2.10 feet Aug. 29.

1909–1917, 1929–1931: Maximum discharge, 17,000 second-feet Mar. 24, 1917; minimum, that of January, 1931.

REMARKS.—Records fair. Stage-discharge relation affected by ice Nov. 27 to Feb. 15. Diurnal fluctuation caused by operation of power plant at Rushford very pronounced during year. High-water peaks exaggerated by flashboards floating off power dam at Rushford.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	262	275	262	225	395	250	262	275	250	320	237	530
2	275	275	262	225	380	250	237	290	262	320	1,710	640
3	275	275	262	237	350	250	275	250	262	350	640	380
4	262	275	262	225	335	250	275	290	250	305	495	395
5	275	275	290	225	290	250	290	290	237	320	410	275
6	275	275	290	225	275	262	275	290	237	305	365	262
7	305	275	290	237	262	250	305	262	250	320	350	275
8	335	275	262	237	250	250	290	275	262	290	305	262
9	290	275	262	237	275	237	250	305	250	262	442	262
10	275	262	262	237	275	237	262	275	262	262	425	250
11	275	290	290	250	275	237	262	290	262	250	380	250
12	275	275	305	262	275	237	225	290	262	275	335	250
13	262	275	225	200	262	250	275	275	237	262	290	250
14	262	275	200	187	250	237	250	290	225	237	275	250
15	275	275	200	187	275	262	275	275	250	2,130	275	250
16	275	320	262	187	262	237	275	275	250	442	262	237
17	290	335	262	212	275	262	320	262	250	395	275	275
18	290	320	212	175	262	262	237	290	237	350	262	262
19	275	290	262	212	305	237	262	275	237	335	290	262
20	275	320	237	187	262	250	290	275	305	365	275	335
21	275	320	237	200	262	250	275	275	290	335	250	460
22	262	305	250	212	262	237	290	262	1,170	320	250	380
23	275	320	237	200	262	237	290	275	820	305	225	350
24	290	275	187	225	262	250	290	250	730	290	237	350
25	275	290	262	237	262	262	305	290	565	250	237	460
26	275	275	262	212	250	262	262	275	495	275	225	600
27	275	275	262	250	250	262	275	275	460	275	212	395
28	262	225	237	262	262	262	290	262	380	275	225	365
29	290	275	250	275	-------	262	290	290	380	275	212	365
30	275	262	212	290	-------	275	275	262	350	250	200	335
31	275	-------	250	335	-------	262	-------	250	-------	262	225	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	335	262	278	0.179	0.21
November	335	225	284	.183	.20
December	305	187	252	.163	.19
January	335	175	228	.147	.17
February	395	250	281	.181	.19
March	275	237	251	.162	.19
April	320	225	274	.177	.20
May	305	250	276	.178	.21
June	1,170	225	356	.230	.26
July	2,130	237	362	.234	.27
August	1,710	200	348	.225	.26
September	640	237	340	.219	.24
The year	2,130	175	294	.190	2.59

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, 1931. December, 1905, to September, 1915, at a station 3 miles upstream.

EXTREMES.—Maximum discharge during year, 2,460 second-feet June 12 (gage height, 3.75 feet); minimum, 256 second-feet Nov. 2 (gage height, 0.90 foot).

1915–1931: 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 fair. Flow regulated by 14 reservoirs and 3 power plants above station. Owing to unsatisfactory operation of gage, discharge for periods indicated by braced figures was determined by comparison with records for Wisconsin River at Merrill.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	730	423							387			376
2	888	350							334			400
3	872	485							334			396
4	910	850							410			396
5	738	586							334			392
			560	770	640	660		600		935	465	
6	685	469					760		294			319
7	895	387							306			325
8	990	372							368			418
9	1,070	306							458			396
10	1,240	485						485	1,070			443
11	1,070	600						722	1,600			485
12	798	559					432	613	2,120			423
13	942	573					760	516	1,900			580
14	990	432					685	432	1,650			448
15	722	613					649	387	1,650			443
			590	730	640	580				670	535	
16	685	1,110					685	516	1,600			432
17	702	910					798	334	1,650			606
18	702	1,030					685	319	1,460			613
19	516	1,110					485	485	1,380			685
20	368	1,150					722	368	1,460			559
21	516	990					798	458	1,200			820
22	368	613					798	485	1,240			1,560
23	368	685					835	516	1,330			1,600
24	372	910					798	368	1,200			1,750
25	448	722			675		760	458	1,150		510	2,010
			570	700		625				380		
26	410	458					516	350	1,560			2,120
27	702						580	387	1,600			1,960
28	580							432				1,650
29	627	460			------		865	458	1,350			1,750
30	627				------			464			474	1,700
31	418	------			------		------	387	------		453	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	1,240	368	708	0.610	0.70
November	1,150	306	634	.547	.61
December	------	------	573	.494	.57
January	------	------	732	.631	.73
February	------	------	650	.560	.58
March	------	------	622	.536	.62
April	------	------	731	.630	.70
May	------	319	495	.427	.49
June	2,120	294	1,140	.983	1.10
July	------	------	653	.563	.65
August	------	------	501	.432	.50
September	2,120	319	868	.748	.83
The year	2,120	294	691	.596	8.08

WISCONSIN RIVER AT MERRILL, WIS.

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

DRAINAGE AREA.—2,630 square miles.

RECORDS AVAILABLE.—November, 1902, to September, 1931.

EXTREMES.—Maximum discharge during year, 8,430 second-feet June 21 (gage height, 7.95 feet); minimum, 525 second-feet Aug. 11 (gage height, 3.20 feet).

1902–1931: 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. Discharge estimated July 9, 18–23. Flow regulated by 17 reservoirs and 8 power plants above station.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1,560	920	1,080	1,170	1,390	1,300	1,460	1,560	920	2,750	1,010	1,190
2	1,560	920	920	1,560	1,470	1,460	1,360	1,460	920	2,980	859	938
3	1,790	850	995	1,260	1,370	1,360	1,460	940	920	2,440	1,010	1,100
4	1,560	785	995	1,560	1,560	1,560	1,460	1,180	995	1,540	948	1,290
5	1,360	1,080	1,670	1,560	1,460	1,460	1,360	1,580	850	1,340	1,110	1,020
6	1,260	1,080	1,790	1,360	1,370	1,460	1,360	1,460	858	1,640	948	1,100
7	1,560	850	1,360	1,910	1,490	1,460	1,560	1,360	858	1,950	1,120	793
8	1,790	995	1,260	1,560	1,240	1,170	1,790	1,260	1,000	1,790	1,230	1,220
9	1,670	1,170	995	1,790	1,270	1,260	2,040	1,470	1,180	1,980	1,720	1,290
10	1,460	920	1,170	1,560	1,190	1,460	2,040	1,370	1,390	2,170	1,530	1,210
11	1,460	1,080	1,460	1,910	1,360	1,260	1,790	1,390	1,640	1,950	897	1,370
12	1,790	1,080	1,460	1,360	1,460	1,170	1,360	1,670	3,320	1,610	1,100	1,310
13	1,670	995	1,080	1,460	1,460	1,460	1,530	1,670	4,950	1,120	1,470	1,020
14	1,560	1,080	1,260	1,560	1,390	1,360	1,810	1,560	3,960	1,580	1,370	1,080
15	1,460	1,460	1,170	1,670	1,400	1,100	1,790	1,560	3,130	1,580	1,300	929
16	1,260	1,560	1,170	1,560	1,190	1,170	1,790	1,360	3,320	1,580	1,190	1,400
17	1,170	1,910	1,560	1,560	1,590	1,170	1,910	793	3,720	1,580	1,100	1,190
18	1,260	2,040	1,260	1,400	1,200	1,360	2,040	1,090	4,080	1,500	1,020	1,210
19	1,170	2,170	1,080	1,460	1,390	1,260	1,690	1,090	4,330	1,420	1,120	1,400
20	1,170	2,440	1,260	1,370	1,360	1,260	1,430	995	5,410	1,330	1,390	1,490
21	1,170	2,300	1,560	1,790	1,390	1,360	2,750	995	7,110	1,250	1,210	1,210
22	1,460	1,460	1,260	1,590	1,170	1,080	2,640	995	6,120	1,170	1,110	884
23	1,360	1,170	1,910	1,490	1,470	1,170	2,490	1,100	5,000	1,080	1,120	2,190
24	1,360	1,460	1,360	1,360	1,470	1,460	2,440	867	3,720	1,000	1,010	2,120
25	1,170	1,260	920	1,370	1,360	1,360	2,170	1,230	3,130	1,100	1,290	2,260
26	995	1,360	1,170	1,560	1,460	1,460	1,470	1,100	3,520	747	1,110	3,130
27	1,170	995	1,260	1,370	1,460	1,460	1,260	1,170	4,560	948	1,210	2,670
28	995	1,170	1,260	1,490	1,790	1,460	1,930	1,200	4,730	1,010	1,390	2,090
29	1,080	995	1,360	1,560	-------	1,080	1,910	1,080	3,320	929	1,640	2,170
30	995	1,080	1,080	1,490	-------	1,270	1,910	995	2,780	920	884	1,670
31	1,080	-------	1,170	1,610	-------	1,460	-------	858	-------	1,020	876	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	1,790	995	1,370	0.521	0.60
November	2,440	785	1,290	.490	.55
December	1,910	920	1,270	.483	.56
January	1,910	1,170	1,530	.582	.67
February	1,790	1,170	1,400	.532	.55
March	1,560	1,080	1,330	.506	.58
April	2,750	1,260	1,800	.684	.76
May	1,670	793	1,240	.471	.54
June	7,110	850	3,060	1.16	1.29
July	2,980	747	1,520	.578	.67
August	1,720	859	1,170	.445	.51
September	3,130	793	1,460	.555	.62
The year	7,110	747	1,530	.582	7.90

WISCONSIN RIVER AT KNOWLTON, WIS.

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

DRAINAGE AREA.—4,360 square miles.

RECORDS AVAILABLE.—July, 1921, to September, 1931.

EXTREMES.—Maximum discharge during year, 9,590 second-feet June 22 (gage height, 6.50 feet); minimum, 860 second-feet Aug. 9 (gage height, 1.38 feet).
1921–1931: 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 excellent except those for period of ice effect, Nov. 25 to Feb. 27, and those estimated June 8–15, which are fair. Flow regulated by many storage reservoirs and power plants above station.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1,780	1,370	1,420	2,190	1,230	2,210	2,490	2,490	1,270	4,940	1,420	1,650
2	2,680	1,620	1,420	1,650	1,650	1,950	2,490	2,490	1,430	3,650	1,270	1,650
3	2,810	1,560	1,420	1,650	2,190	2,190	2,490	1,680	1,230	3,480	920	1,430
4	2,970	1,420	1,420	1,650	1,910	2,190	2,810	1,390	1,550	3,140	1,550	1,910
5	2,490	1,420	1,420	1,910	1,910	2,050	2,360	1,780	1,420	2,490	1,650	2,340
6	2,340	1,320	1,950	2,190	2,190	2,190	2,840	2,340	1,330	2,210	1,230	1,270
7	2,810	1,420	2,490	2,190	2,050	1,910	2,970	1,910	1,180	2,650	1,560	860
8	3,140	1,230	1,910	1,910	1,420	1,870	3,140	1,910	1,420	2,970	1,560	1,270
9	3,480	1,150	1,650	2,340	1,910	1,730	2,970	1,910	1,580	2,810	1,290	1,800
10	3,480	1,460	1,530	1,910	1,910	2,490	3,480	1,430	1,650	3,140	2,280	1,930
11	3,140	1,420	1,420	1,420	1,650	2,190	3,480	1,950	1,900	3,140	2,340	1,670
12	2,050	1,430	1,420	2,190	2,190	2,190	2,840	2,190	2,180	2,490	1,480	1,800
13	2,680	1,320	1,910	2,050	2,050	1,910	2,360	2,490	4,400	2,510	1,420	1,420
14	2,970	1,430	1,930	2,190	2,190	1,910	2,810	2,490	6,300	1,780	1,930	1,250
15	2,340	1,350	1,420	2,190	1,420	1,800	2,810	2,050	4,860	2,490	1,910	1,910
16	2,190	1,950	1,420	2,190	2,190	1,520	2,810	2,190	4,190	2,490	1,520	1,650
17	1,910	2,970	1,230	1,910	2,190	1,650	2,810	1,360	4,750	2,190	1,110	2,050
18	2,050	3,140	1,450	2,190	2,190	1,650	2,810	1,360	5,510	2,490	1,930	2,190
19	1,910	3,140	2,050	1,780	2,190	1,650	2,340	1,420	5,700	1,780	1,430	1,910
20	1,910	3,140	1,430	2,490	1,910	1,650	2,360	1,530	6,500	1,150	1,670	2,210
21	2,150	3,140	1,330	2,190	2,190	1,780	2,510	1,240	7,450	2,190	1,430	1,820
22	1,640	3,830	2,210	2,190	1,420	1,360	3,830	1,320	8,590	1,910	1,650	2,190
23	1,820	2,970	2,050	2,190	2,190	1,140	4,190	1,420	8,590	1,670	1,180	2,360
24	2,220	2,490	1,780	2,340	2,340	2,210	3,830	1,270	6,930	1,650	1,110	2,810
25	2,190	2,190	1,910	1,650	2,340	2,650	3,480	1,090	5,700	1,650	1,420	3,140
26	1,980	2,340	2,050	1,420	1,910	2,650	3,170	1,650	4,940	1,110	1,800	3,690
27	1,750	1,910	1,530	2,490	1,650	2,810	2,810	1,420	5,320	1,180	1,670	4,370
28	1,320	1,650	2,190	2,190	2,650	2,490	2,650	1,430	6,500	1,700	1,670	3,480
29	1,550	1,650	2,050	2,050	-------	1,950	2,190	1,550	6,090	1,460	1,670	3,140
30	1,590	1,420	1,780	2,650	-------	1,600	2,490	1,250	4,750	1,240	2,110	3,140
31	1,820	-------	1,650	2,490	-------	1,910	-------	1,090	-------	1,420	1,130	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	3,480	1,320	2,300	0.528	0.61
November	3,830	1,150	1,960	.450	.50
December	2,490	1,230	1,700	.390	.45
January	2,650	1,420	2,070	.475	.55
February	2,650	1,230	1,970	.452	.47
March	2,810	1,140	1,980	.454	.52
April	4,190	2,190	2,890	.663	.74
May	2,490	1,090	1,710	.392	.45
June	8,590	1,180	4,170	.956	1.07
July	4,940	1,110	2,300	.528	.61
August	2,340	920	1,560	.358	.41
September	4,370	860	2,140	.491	.55
The year	8,590	860	2,230	.511	6.93

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, 1931.

EXTREMES.—Maximum discharge during year, 11,700 second-feet June 23 (gage height, 5.70 feet); minimum, 1,190 second-feet May 19, Aug. 2, 3 (gage height, 0.50 foot).

1914–1931: Maximum discharge, 61,000 second-feet Apr. 12, 1922 (gage height, 16.1 feet); minimum (estimated), 400 second-feet Jan. 13, 1924.

REMARKS.—Records excellent except those for period of ice effect, Dec. 14–15, 24–25, Jan. 19–26, Feb. 9–11, which are fair. Flow regulated by many storage reservoirs and power plants above station.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	2,440	2,010	2,150	2,500	1,890	1,770	2,370	2,790	1,870	4,470	1,630	2,790
2	2,010	1,290	1,750	2,240	1,750	2,130	2,790	2,790	1,870	4,260	1,290	2,010
3	2,820	1,400	1,510	2,110	1,870	2,110	3,100	2,100	1,630	4,470	1,630	1,630
4	2,640	2,110	1,750	1,750	1,990	2,110	3,460	1,750	1,750	1,880	1,510	2,110
5	2,790	1,890	1,630	1,510	1,990	1,990	2,620	1,870	1,750	1,770	1,510	2,110
6	2,520	1,750	1,750	2,370	1,990	1,870	2,500	1,990	1,510	3,000	1,510	1,630
7	3,030	1,510	1,630	2,500	2,110	2,500	3,280	2,640	1,400	4,050	1,510	1,290
8	3,130	1,630	2,580	2,110	1,560	1,770	3,460	2,500	1,400	3,460	1,630	1,630
9	3,310	1,400	2,520	1,990	1,630	1,510	3,460	2,500	1,870	3,100	1,400	1,750
10	3,280	1,630	1,890	2,010	1,630	1,990	3,460	1,790	1,990	2,640	1,650	1,750
11	3,280	1,750	1,770	1,650	1,630	1,990	4,260	1,910	1,870	3,100	1,630	1,870
12	2,770	1,870	1,990	2,030	1,630	1,990	2,880	2,240	2,110	2,940	1,750	1,870
13	2,440	1,510	1,890	2,300	1,870	1,990	2,600	2,500	2,330	2,030	1,750	1,750
14	3,000	1,750	1,990	2,390	1,990	2,110	2,940	2,640	4,050	2,240	1,630	1,630
15	2,940	1,750	1,870	2,790	1,750	1,890	3,100	2,640	6,390	2,240	1,630	1,990
16	2,640	1,510	1,750	2,500	1,630	1,630	3,100	2,640	4,680	2,110	1,510	2,240
17	2,110	2,130	1,870	2,240	1,990	1,870	3,280	1,790	4,260	2,500	1,510	1,990
18	2,110	3,500	1,770	1,650	1,990	1,990	3,100	2,010	4,680	2,240	1,870	2,370
19	1,750	3,650	1,400	2,110	1,870	1,750	2,310	1,870	5,570	1,790	1,510	2,200
20	2,370	3,460	1,870	1,990	1,870	1,990	2,580	1,990	6,810	1,650	1,750	1,760
21	2,260	3,280	1,630	2,500	1,870	2,240	2,940	1,630	7,220	1,750	1,870	2,240
22	2,520	3,190	1,400	2,370	1,890	1,650	3,460	1,750	8,790	1,630	1,870	2,370
23	1,870	3,560	1,990	2,370	1,650	1,770	4,050	1,510	10,500	1,630	1,400	2,500
24	1,870	3,030	1,870	2,370	1,990	2,390	4,260	1,290	9,200	1,750	1,510	2,500
25	2,390	2,790	1,750	2,110	2,110	2,500	4,260	1,770	6,980	1,750	1,400	3,280
26	2,030	2,520	1,630	2,500	2,110	3,100	3,370	1,510	6,030	1,510	1,510	4,260
27	2,170	2,010	1,870	2,110	2,500	2,790	3,000	1,510	5,570	1,750	1,510	3,030
28	2,030	1,990	1,890	1,990	2,240	3,460	2,820	1,870	5,800	1,510	1,750	3,530
29	1,750	2,150	1,630	1,990	-------	2,170	3,530	2,370	6,500	1,750	1,510	4,050
30	1,630	1,750	2,390	1,990	-------	1,890	2,640	1,910	5,570	1,750	1,400	3,460
31	1,750	-------	2,130	2,370	-------	2,240	-------	1,290	-------	1,750	2,010	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	3,310	1,630	2,440	0.444	0.51
November	3,650	1,290	2,190	.398	.44
December	2,580	1,400	1,860	.338	.39
January	2,790	1,510	2,170	.395	.46
February	2,500	1,560	1,890	.344	.36
March	3,460	1,510	2,100	.382	.44
April	4,260	2,310	3,170	.576	.64
May	2,790	1,290	2,040	.371	.43
June	10,500	1,400	4,400	.800	.89
July	4,470	1,510	2,400	.436	.50
August	2,010	1,290	1,600	.291	.34
September	4,260	1,290	2,320	.422	.47
The year	10,500	1,290	2,380	.433	5.87

WISCONSIN RIVER AT MUSCODA, WIS.

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

DRAINAGE AREA.—10,300 square miles.

RECORDS AVAILABLE.—December, 1902, to December, 1903; December, 1913, to September, 1931.

EXTREMES.—Maximum discharge during year, 11,300 second-feet June 29 (gage height, 3.28 feet); minimum, 2,220 second-feet Aug. 24 (gage height 0.33 foot).

1902–3, 1913–1931: Maximum discharge, 72,100 second-feet Apr. 16, 1922 (gage height, 10.60 feet); minimum (estimated), 1,600 second-feet Dec. 20, 1921.

Maximum stage known, 11.1 feet during August, 1868.

REMARKS.—Records good except those for periods of ice effect, Nov. 26 to Dec. 10, Dec. 17 to Feb. 24, which are fair. Flow regulated by storage reservoirs and power plants upstream.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	3,360	3,950	4,700	3,360	4,410	4,700	5,310	6,950	3,360	8,370	4,900	4,130
2	3,360	3,860	3,860	3,600	4,130	5,000	6,280	6,280	3,600	7,650	3,860	3,600
3	3,600	4,130	4,700	3,600	4,410	5,000	5,950	5,950	3,360	8,010	3,600	3,130
4	3,360	4,130	5,000	3,600	5,000	4,700	6,280	5,950	3,130	8,010	3,600	2,910
5	3,600	3,860	5,000	3,130	4,700	5,000	6,610	5,950	3,130	7,300	3,600	2,910
6	3,130	3,860	5,000	3,600	5,000	4,410	6,280	5,000	3,130	7,300	3,130	2,700
7	3,860	3,600	5,310	3,130	4,410	4,410	6,280	5,000	3,130	7,300	2,910	2,700
8	4,130	3,600	5,000	2,910	4,700	4,700	6,950	4,700	3,130	5,630	3,130	2,700
9	3,860	3,130	5,630	2,700	4,700	4,410	7,300	4,700	3,360	4,700	3,130	2,910
10	3,600	3,130	5,000	2,700	4,410	4,410	7,300	4,700	3,130	5,000	2,910	2,700
11	4,410	3,600	4,130	2,700	4,700	4,410	6,610	4,410	3,130	4,700	3,130	2,910
12	5,000	3,600	4,410	2,700	5,630	3,860	6,280	4,700	3,130	4,700	3,130	2,700
13	5,630	3,360	4,130	3,130	5,630	3,860	5,630	5,000	3,130	5,310	2,910	2,500
14	5,630	3,600	4,700	2,310	3,860	4,130	6,610	4,700	3,360	5,000	2,910	2,700
15	5,310	3,360	4,410	2,310	5,310	4,130	7,300	4,410	4,130	5,000	2,700	2,910
16	5,630	3,130	4,700	2,700	6,280	4,410	7,300	4,130	3,860	4,700	2,910	3,130
17	5,310	3,130	3,600	3,360	5,950	4,700	7,650	4,130	4,700	4,410	2,910	2,910
18	5,310	3,600	3,600	3,600	3,860	4,700	7,300	3,600	5,950	4,410	2,910	2,910
19	5,000	3,360	3,860	2,910	3,360	4,410	6,280	4,410	6,610	4,410	2,910	3,130
20	5,310	3,360	3,600	3,600	3,600	4,410	4,700	4,700	7,300	4,700	2,910	4,700
21	5,310	3,600	3,600	3,360	3,360	4,130	6,280	4,700	5,630	4,410	2,700	5,000
22	4,410	3,860	3,600	3,130	3,600	3,860	6,950	4,410	5,950	4,700	2,700	5,310
23	4,700	4,410	3,860	3,600	4,130	4,130	6,280	4,130	6,280	4,410	2,700	5,000
24	4,700	5,310	3,360	3,600	4,700	4,410	5,630	4,130	5,310	4,130	2,700	5,000
25	4,410	5,000	3,600	3,360	4,410	4,410	5,310	4,130	4,700	3,600	3,130	5,950
26	3,600	5,000	3,600	3,600	4,410	4,410	5,630	4,130	5,310	3,860	2,700	6,610
27	4,700	5,000	3,360	3,860	4,700	4,130	5,630	3,860	6,280	3,360	2,700	7,300
28	4,700	5,000	3,360	3,600	5,000	5,310	6,610	3,860	9,830	3,860	2,910	7,650
29	4,130	5,000	3,130	3,860	-------	6,610	6,950	3,860	10,500	3,600	2,910	7,300
30	4,130	4,100	3,360	4,130	-------	6,610	6,950	3,860	8,730	3,130	2,700	7,300
31	4,040	-------	3,130	4,410	-------	5,950	-------	3,600	-------	5,950	2,700	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	5,630	3,130	4,430	0.430	0.50
November	5,310	3,130	3,920	.381	.43
December	5,630	3,130	4,140	.402	.46
January	4,410	2,310	3,300	.320	.37
February	6,280	3,360	4,580	.445	.46
March	6,610	3,860	4,640	.450	.52
April	7,650	4,700	6,410	.622	.69
May	6,950	3,600	4,650	.451	.52
June	10,500	3,130	4,880	.474	.53
July	8,370	3,130	5,210	.506	.58
August	4,900	2,700	3,050	.296	.34
September	7,650	2,500	4,110	.399	.45
The year	10,500	2,310	4,440	.431	5.85

TOMAHAWK RIVER AT TOMAHAWK, WIS.

LOCATION.—In sec. 28, T. 35 N., R. 6 E., at Jersey power plant of Wisconsin Valley Electric Co., 1 mile north of Tomahawk.

DRAINAGE AREA.—546 square miles.

RECORDS AVAILABLE.—January, 1930, to September, 1931.

EXTREMES.—Maximum mean daily discharge during year, 890 second-feet Sept. 7; no flow several times.

1930–31: Maximum mean daily discharge, 1,220 second-feet Sept. 13, 1930; minimum, that of 1931.

REMARKS.—Records good. Records of discharge, computed from power-house records, furnished by Wisconsin Valley Electric Co. Flow completely regulated by four reservoirs operated by Wisconsin Valley Improvement Co. in the interest of power development.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	566	249	302	354	408	374	368	313	263	390	602	741
2	566	249	328	362	425	376	368	287	264	413	555	741
3	566	249	332	455	429	382	368	287	264	410	577	738
4	492	236	400	558	430	370	368	287	264	170	622	696
5	403	238	369	558	439	384	368	279	264	0	649	801
6	539	233	353	558	428	363	371	287	264	258	604	869
7	533	227	289	558	332	415	371	287	292	391	640	890
8	21	227	294	558	208	425	371	287	286	360	638	845
9	0	240	343	555	265	275	414	287	268	251	359	738
10	0	250	350	530	416	305	182	287	282	283	0	630
11	293	250	341	486	442	368	46	287	106	283	254	642
12	769	250	313	538	417	368	102	287	0	259	561	642
13	503	228	276	517	413	368	352	287	145	276	381	621
14	373	227	294	521	404	405	158	287	0	349	178	633
15	378	260	317	510	339	341	0	266	182	522	290	694
16	368	280	345	542	425	368	0	275	0	532	257	298
17	350	271	354	523	414	368	0	272	87	532	109	133
18	328	300	348	439	396	368	147	282	0	532	218	366
19	328	346	355	486	391	462	358	289	121	532	515	412
20	332	296	356	498	410	384	286	267	122	512	706	418
21	308	302	354	493	415	405	107	218	0	518	660	436
22	267	548	355	488	397	386	202	280	79	530	663	344
23	268	50	367	498	406	269	285	286	29	528	606	68
24	286	105	390	487	386	368	285	257	72	523	611	0
25	282	90	330	450	398	371	169	262	0	517	649	79
26	268	77	364	453	378	345	0	265	161	514	747	36
27	268	77	365	456	386	367	241	265	0	517	800	0
28	270	77	334	474	407	368	291	293	0	483	691	51
29	268	104	361	458	------	368	298	276	367	506	442	0
30	268	194	366	461	------	368	286	264	410	521	420	0
31	249	------	363	435	------	368	------	249	------	517	587	------

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	769	0	345	+144	399	0.729	0.84
November	548	50	224	+590	452	.826	.92
December	400	276	342	−271	241	.441	.51
January	558	354	492	−588	272	.497	.57
February	442	208	393	−308	266	.486	.51
March	462	269	369	−95	333	.609	.70
April	414	0	239	+702	510	.932	1.04
May	313	218	277	+186	346	.633	.73
June	410	0	153	+2,703	1,200	2.19	2.44
July	532	0	417	−640	178	.325	.37
August	800	0	503	−822	196	.358	.41
September	890	0	452	+389	602	1.10	1.23
The year	890	0	351	+1,990	414	.757	10.27

[a] Corrected for storage at all 4 reservoirs upstream.

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 June, 1931 (discontinued).
EXTREMES.—Maximum discharge during period, 342 second-feet June 13 (gage height, 2.76 feet); minimum, 71 second-feet Dec. 24.
1914–1931: 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 period of ice effect, Nov. 26 to Mar. 7, which are fair. Discharge interpolated Mar. 9, 11, 13.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	97	89	104	74	85	77	118	105	82
2	126	87	98	76	86	81	112	102	82
3	118	92	98	78	85	85	126	99	80
4	115	94	98	78	84	85	137	97	82
5	118	92	101	78	82	85	148	94	85
6	118	92	101	78	79	86	159	97	82
7	137	94	101	79	80	86	159	97	126
8	170	89	96	80	81	89	159	99	118
9	170	92	98	80	84	90	159	105	137
10	159	94	90	80	86	92	159	129	182
11	159	94	84	80	87	90	170	133	207
12	129	94	79	79	88	87	159	122	309
13	122	92	77	78	86	88	159	115	342
14	108	94	74	77	84	89	159	112	325
15	108	137	72	76	86	89	148	108	293
16	105	207	75	77	88	87	137	102	263
17	105	234	75	78	86	92	137	97	263
18	102	220	86	78	84	89	129	94	248
19	99	182	90	78	82	92	126	94	248
20	102	182	88	76	81	89	148	94	234
21	99	170	84	73	82	87	170	92	234
22	97	159	81	74	84	94	194	89	207
23	97	137	73	76	82	94	182	89	194
24	94	126	71	75	81	118	170	99	182
25	94	133	80	74	81	122	159	89	182
26	97	124	80	78	81	129	137	87	278
27	94	118	82	81	79	126	133	87	325
28	97	110	78	82	77	118	118	85	293
29	97	113	78	84	-------	118	108	85	234
30	94	110	80	84	-------	122	105	85	194
31	92	-------	78	84	-------	118	-------	82	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	170	92	114	0.695	0.80
November	234	87	125	.762	.85
December	104	71	85.5	.521	.60
January	84	73	78.2	.477	.55
February	88	77	83.2	.507	.53
March	129	77	96.6	.589	.68
April	194	105	146	.890	.99
May	133	82	98.8	.602	.69
June	342	80	204	1.24	1.38

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, 1931.

EXTREMES.—Maximum discharge during year, 1,060 second-feet June 22 (gage height, 4.10 feet); minimum, 7 second-feet Dec. 3, 4, 5, 23, 24 (gage height, 1.86 feet).

1925–1931: Maximum discharge, 12,500 second-feet Aug. 21, 1926 (gage height, 10.10 feet); minimum (estimated), 3 second-feet Jan. 23, 1930.

REMARKS.—Records good except those for period of ice effect, Nov. 25 to Mar. 11, and those during periods of extremely low water, which are fair.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	20	30	19	12	20	27	200	124	24	83	20	57
2	30	30	12	13	20	17	293	111	24	72	14	62
3	223	30	7	10	20	17	387	94	20	67	14	43
4	131	30	7	10	20	17	339	83	27	57	20	27
5	118	27	7	10	20	14	387	83	30	62	17	27
6	67	12	11	12	17	14	387	94	34	94	17	17
7	88	11	14	13	17	14	412	118	34	105	27	17
8	436	27	14	13	14	9	461	118	34	72	24	14
9	293	27	25	16	14	9	537	77	43	57	30	14
10	163	24	25	16	12	9	537	118	83	52	30	14
11	157	27	28	16	12	13	412	192	111	48	24	12
12	118	27	25	16	17	20	339	215	131	43	20	12
13	88	27	25	16	17	30	316	185	387	39	20	11
14	62	27	25	13	30	30	293	137	760	39	20	11
15	62	94	14	16	30	30	284	111	512	34	17	11
16	62	293	12	16	30	30	316	94	339	27	20	20
17	67	461	12	16	24	30	293	77	248	24	20	39
18	83	257	8	16	24	30	266	67	512	20	20	39
19	67	232	8	16	24	30	223	52	412	17	20	43
20	57	275	8	16	27	34	240	52	339	30	14	43
21	52	512	10	22	27	34	700	72	590	27	14	67
22	43	486	10	22	27	67	880	67	1,060	20	14	67
23	48	363	7	22	27	67	644	57	940	17	14	118
24	48	200	7	19	39	118	436	52	617	14	14	118
25	48	174	8	16	52	293	387	48	590	12	12	77
26	39	88	10	16	43	266	284	43	248	12	12	215
27	39	43	10	16	43	232	240	39	232	14	14	157
28	34	30	10	19	30	240	200	30	207	14	14	94
29	30	39	10	16	------	88	170	30	157	17	17	72
30	30	28	10	16	------	200	144	30	118	24	14	52
31	30	------	10	13	------	200	------	27	------	20	14	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	436	20	91.4	0.296	0.34
November	512	11	131	.424	.47
December	28	7	13.2	.043	.05
January	22	10	15.5	.050	.06
February	52	12	24.9	.081	.08
March	293	9	71.9	.233	.27
April	880	144	367	1.19	1.33
May	215	27	87	.282	.33
June	1,060	20	295	.955	1.07
July	105	12	39.8	.129	.15
August	30	12	18.1	.059	.07
September	215	11	52.3	.169	.19
The year	1,060	7	100	.324	4.41

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, 1931.
EXTREMES.—Maximum discharge during year, 581 second-feet June 24 (gage height, 7.31 feet); minimum, 10 second-feet Aug. 31 (gage height, 2.52 feet).
1927–1931: Maximum discharge (estimated), 2,660 second-feet Sept. 17, 1928; minimum, that of Aug. 31, 1931.
REMARKS.—Records poor. Stage-discharge relation affected by ice Nov. 26 to Feb. 22, Mar. 1–12. Discharge interpolated for Sundays and holidays.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	23	28	23	17	16	22	64	57	36	71	12	11
2	24	28	22	17	16	20	64	54	35	64	12	17
3	24	27	22	17	16	23	71	51	36	57	13	16
4	25	27	22	16	18	24	85	48	37	53	13	14
5	25	26	21	16	17	19	88	45	33	49	14	13
6	26	27	24	16	16	22	92	45	33	45	13	14
7	28	28	24	16	16	24	92	45	32	42	13	16
8	31	27	23	17	16	24	85	45	30	38	14	17
9	33	28	23	15	17	24	78	45	30	38	14	17
10	37	28	23	15	16	25	75	45	28	37	13	18
11	37	27	22	15	14	26	75	45	31	36	13	17
12	37	26	21	15	14	30	71	48	31	33	12	15
13	37	26	21	15	14	31	67	48	34	30	12	14
14	37	26	22	15	14	27	60	48	58	29	12	14
15	36	27	23	14	14	28	75	48	82	30	12	17
16	34	30	22	14	13	28	75	48	92	26	12	19
17	35	32	23	14	13	28	64	46	88	24	12	21
18	34	38	23	15	14	29	60	45	78	21	11	24
19	33	42	23	16	14	33	58	48	57	20	11	28
20	32	45	22	16	15	32	57	45	54	19	11	30
21	32	45	20	16	17	30	60	45	180	18	11	32
22	30	42	19	16	20	29	64	42	305	18	11	35
23	28	42	18	16	24	28	64	42	540	17	11	39
24	27	42	18	16	28	29	67	42	581	15	11	42
25	26	42	18	16	33	32	71	42	500	15	11	51
26	27	38	18	16	33	64	71	39	336	14	11	51
27	28	34	18	16	30	75	71	39	206	14	11	70
28	28	30	18	16	28	82	71	36	157	14	11	88
29	29	26	17	15	-------	76	64	37	108	13	11	85
30	28	24	17	17	-------	71	60	37	85	12	10	75
31	28	-------	17	15	-------	75	-------	36	-------	12	10	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	37	23	30.3	0.069	0.08
November	45	24	31.9	.073	.08
December	24	17	20.9	.048	.06
January	17	14	15.7	.036	.04
February	33	13	18.4	.042	.04
March	82	19	35.8	.082	.09
April	92	57	70.6	.162	.18
May	57	36	44.7	.103	.12
June	581	28	131	.300	.33
July	71	12	29.8	.068	.08
August	14	10	11.9	.027	.03
September	88	11	30.7	.070	.08
The year	581	10	39.2	.090	1.21

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, 1931.

EXTREMES.—Maximum discharge during year (estimated), 778 second-feet June 4 (gage height, 3.28 feet); minimum, 48 second-feet July 27 (gage height, 0.51 foot).

1913–1931: Maximum discharge, about 6,300 second-feet Mar. 24, 1917 (gage height, 15.05 feet); minimum, that of July 27, 1931.

REMARKS.—Records poor. No ice effect during year.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	256	256	302	286	358	286	480	271	302	196	159	147
2	271	256	302	286	286	286	403	286	302	286	157	240
3	286	240	302	240	286	286	427	286	507	196	150	164
4	256	240	302	256	286	286	564	271	778	196	92	224
5	256	224	286	302	286	286	427	286	339	186	150	215
6	271	224	271	302	286	286	623	286	339	215	85	128
7	339	206	271	302	271	286	427	286	339	206	145	175
8	427	206	302	271	256	286	403	302	320	224	131	159
9	380	224	286	256	286	256	358	302	339	224	126	152
10	256	256	271	256	286	256	358	302	302	215	206	224
11	196	256	286	286	302	271	320	302	286	196	113	196
12	240	256	271	240	302	271	339	286	286	196	175	113
13	271	256	286	240	427	271	320	286	302	206	140	224
14	286	320	224	240	453	271	286	286	302	215	88	224
15	302	403	186	240	427	271	302	286	286	206	172	256
16	320	320	186	256	453	286	320	302	286	119	215	286
17	302	302	175	256	480	302	302	302	271	58	206	302
18	286	286	175	240	507	286	302	302	256	134	131	286
19	286	256	186	256	535	339	302	302	271	108	131	380
20	286	256	186	256	339	339	358	302	302	186	137	403
21	286	256	215	240	302	358	403	286	286	116	131	380
22	286	271	224	286	302	320	403	286	507	119	137	320
23	286	286	240	286	320	358	358	302	746	110	175	320
24	271	286	256	286	320	427	339	302	339	131	175	320
25	256	286	256	271	320	453	320	302	286	134	126	746
26	224	302	240	302	302	480	320	302	256	125	122	535
27	256	302	215	320	302	480	320	302	240	100	109	623
28	271	339	224	339	271	564	286	302	224	110	109	215
29	286	302	224	358	-------	564	271	403	215	162	140	271
30	271	302	224	380	-------	535	271	380	224	159	109	150
31	271	-------	240	358	-------	535	-------	380	-------	162	137	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	427	196	282	0.448	0.52
November	403	206	272	.432	.48
December	302	175	246	.391	.45
January	380	240	280	.445	.51
February	535	256	341	.542	.56
March	564	256	348	.553	.64
April	623	271	364	.579	.65
May	403	271	303	.482	.56
June	778	215	335	.533	.59
July	286	58	168	.267	.31
August	215	85	142	.226	.26
September	746	113	279	.444	.50
The year	778	58	279	.444	6.03

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-quarters of a mile above mouth of Bass Creek. Elevation is 743.18 feet above mean sea level.

DRAINAGE AREA.—3,190 square miles.

RECORDS AVAILABLE.—February, 1914, to September, 1931.

EXTREMES.—Maximum discharge during year, 1,380 second-feet Mar. 28 (gage height, 2.50 feet); minimum, 74 second-feet Sept. 7 (gage height, —0.34 foot).
1914–1931: Maximum discharge, 13,000 second-feet Mar. 23, 1929 (gage height, 10.81 feet); minimum, that of Sept. 7, 1931.

REMARKS.—Records good except those for low stages and those for periods of ice effect, Nov. 27 to Dec. 3, Dec. 16–25, Dec. 29 to Jan. 7, Jan. 14–24, which are fair, and those for extremely low stages, July to September, which are poor. Regulation by operation of power plants above.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	704	704	449	757	449	920	975	865	280	403	299	381
2	757	677	548	757	359	757	1,030	865	625	473	262	359
3	811	338	704	704	677	757	1,030	757	677	625	426	299
4	811	523	677	473	599	757	1,260	865	403	473	523	280
5	426	599	757	426	757	757	1,150	865	523	194	498	338
6	381	811	704	473	757	757	920	865	548	338	498	381
7	757	548	523	426	704	757	975	811	403	381	359	122
8	704	473	381	865	381	1,150	1,030	704	338	338	523	262
9	757	548	625	704	381	757	1,200	704	498	426	403	318
10	865	318	757	599	920	677	1,260	757	403	318	403	318
11	865	449	704	403	704	757	1,150	548	318	318	381	245
12	920	523	704	449	811	757	1,260	548	449	403	403	262
13	359	599	757	625	811	704	1,030	599	473	318	403	245
14	757	426	403	920	757	704	1,030	381	318	449	245	280
15	865	498	449	625	449	651	920	403	338	381	212	523
16	865	548	523	704	625	677	975	299	625	449	299	548
17	757	338	677	599	757	704	975	381	426	359	338	359
18	865	523	757	179	811	704	865	403	338	318	262	449
19	811	473	757	403	865	757	920	757	338	200	338	473
20	381	704	625	548	865	865	920	811	359	359	338	426
21	599	625	299	757	757	757	975	757	166	262	338	359
22	677	625	359	811	757	599	920	704	381	262	200	573
23	523	498	599	704	865	677	865	704	625	381	262	865
24	498	403	757	757	811	757	920	704	975	403	262	811
25	975	573	757	473	811	811	920	757	757	245	228	920
26	625	625	920	338	757	757	975	811	704	228	212	975
27	523	548	573	573	757	1,030	920	704	625	280	200	811
28	548	677	677	548	811	1,320	920	677	262	228	403	811
29	449	811	381	677	-------	1,090	865	473	338	185	473	757
30	599	449	573	757	-------	757	920	280	573	403	114	498
31	811	-------	757	920	-------	920	-------	318	-------	381	359	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	975	359	685	0.215	0.25
November	811	318	548	.172	.19
December	920	299	617	.193	.22
January	920	179	611	.192	.22
February	920	359	706	.221	.23
March	1,320	599	800	.251	.29
April	1,260	865	1,000	.313	.35
May	865	280	648	.203	.23
June	975	166	470	.147	.16
July	625	185	348	.109	.13
August	523	114	337	.106	.12
September	975	122	475	.149	.17
The year	1,320	114	603	.189	2.56

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, 1931.

EXTREMES.—Maximum discharge during year, 4,920 second-feet June 25–27 (gage height, 6.5 feet); minimum, 850 second-feet July 29 (gage height, 3.72 feet).

1914–1931: 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. Stage-discharge relation affected by ice Nov. 27 to Dec. 9, Dec. 22 to Feb. 6. Some diurnal fluctuation at low stages due to power plants upstream. About 100 second-feet diverted above gage to Illinois & Mississippi Canal.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	3,120	2,270	2,050	1,850	3,100	1,980	3,310	2,120	1,980	1,500	915	e1,450
2	3,120	e2,270	1,900	1,750	3,600	1,980	3,500	2,120	1,980	1,320	970	e1,390
3	2,760	e2,120	2,050	2,050	3,500	2,120	3,500	2,270	1,840	1,500	890	e1,330
4	2,590	e1,980	2,200	2,200	3,600	2,120	3,500	2,420	1,700	1,640	915	1,270
5	2,590	e2,120	2,350	2,100	3,600	2,270	3,500	2,420	1,840	1,570	1,000	1,100
6	2,760	2,120	2,400	1,850	3,400	2,120	3,500	2,420	1,840	1,570	1,100	1,100
7	3,120	1,980	2,400	1,750	3,310	2,120	3,500	2,120	2,590	1,500	1,100	1,030
8	3,120	1,700	2,400	1,900	3,310	1,840	2,930	1,980	2,590	1,220	1,180	1,100
9	3,690	1,840	2,250	2,000	2,760	1,840	3,120	1,980	2,590	1,220	1,180	1,030
10	3,890	1,770	2,270	1,900	2,420	1,770	2,930	1,980	2,590	1,270	1,130	1,130
11	3,890	1,980	2,420	2,100	2,760	1,770	2,930	1,980	2,270	1,380	1,180	1,030
12	3,120	2,120	2,270	1,900	2,590	2,120	2,760	2,590	2,270	1,380	1,270	915
13	3,120	2,120	2,270	1,700	2,420	2,120	e2,600	2,270	2,270	1,380	1,220	1,000
14	2,760	1,770	2,420	1,700	e2,500	2,120	e2,450	1,700	1,380	1,380	1,000	970
15	2,590	1,770	2,120	1,700	e2,500	2,120	e2,300	2,120	1,380	1,380	1,130	970
16	2,590	1,840	1,980	1,900	e2,500	1,980	2,120	1,700	1,320	1,440	970	940
17	2,930	1,770	1,640	2,250	e2,250	2,120	2,420	1,570	1,320	1,500	940	970
18	2,930	1,770	1,270	2,400	e2,750	2,120	2,120	1,700	1,320	1,700	1,000	970
19	2,760	1,700	1,220	2,400	2,420	2,120	2,270	3,120	1,570	1,440	1,100	1,180
20	2,590	1,700	1,440	1,700	2,120	2,120	2,420	2,760	1,320	1,380	1,380	1,440
21	2,590	1,840	2,120	1,700	2,270	2,120	2,930	2,420	1,320	1,380	1,100	2,120
22	2,420	2,120	2,100	1,700	2,420	2,120	2,930	2,590	1,320	1,320	1,060	2,120
23	2,420	2,120	2,100	1,750	2,270	2,120	3,500	2,270	1,320	1,320	1,000	1,570
24	2,420	2,270	1,700	1,850	2,120	2,120	2,760	2,760	2,270	1,270	970	1,440
25	2,420	2,270	1,850	2,400	2,120	2,420	2,760	2,760	4,920	1,270	e940	3,500
26	2,420	2,270	2,200	3,000	2,120	2,760	2,760	2,760	4,920	1,220	e920	3,890
27	2,420	1,400	2,250	2,750	2,120	2,420	2,760	2,120	4,920	1,130	890	3,120
28	2,420	1,550	2,250	2,600	1,980	2,420	2,590	2,120	4,710	915	1,700	3,310
29	2,270	2,000	2,050	2,950	-------	2,760	2,420	1,980	3,310	890	e1,640	3,690
30	2,270	2,200	1,500	2,850	-------	3,890	2,420	2,270	1,640	1,100	e1,580	3,690
31	2,270	-------	1,900	3,000	-------	3,890	-------	2,120	-------	970	e1,520	-------

Month	Maximum	Minimum	Mean	Month	Maximum	Minimum	Mean
October	3,890	2,270	2,790	May	3,120	1,570	2,240
November	2,270	1,400	1,960	June	4,920	1,320	2,290
December	2,420	1,220	2,040	July	1,700	890	1,340
January	3,000	1,700	2,120	August	1,700	890	1,130
February	3,600	1,980	2,670	September	3,890	915	1,690
March	3,890	1,770	2,260				
April	3,500	2,120	2,850	The year	4,920	890	2,110

e Estimated.

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, 1931.

EXTREMES.—Maximum discharge during year, 2,280 second-feet Sept. 27 (gage height, 10.98 feet); minimum, 148 second-feet Aug. 25 (gage height, 3.06 feet).

1914–1931: Maximum discharge, 18,400 second-feet Mar. 16, 1929 (gage height, 19.76 feet); minimum, 148 second-feet Aug. 25, 1931.

REMARKS.—Records good except those for periods of ice effect, shown by braced figures, which are poor.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	326	454			1,930	420	575	288	251	215	137	272
2	307	269	270		1,760	420	621	307	251	215	203	290
3	326	326			1,460	381	644	288	251	190	203	506
4	366	410	346		1,130	381	644	269	269	215	237	915
5	307	388	410		865	362	644	288	269	190	254	381
6	326	388	454		740	381	667	288	269	206	237	441
7	366	388	550		715	381	626	288	328	182	212	420
8	478	366	574		740	362	550	288	308	150	212	344
9	550	366	478		715	326	526	288	432	174	506	237
10	410	388	432		644	344	502	307	432	174	254	237
11	388	410	410		575	400	454	346	366	182	212	237
12	368	388	388		552	420	410	366	288	198	220	220
13	366	388	388	260	840	480	346	346	269	190	195	212
14	346	410	388		990	381	346	307	288	206	195	195
15	307	388	388		765	381	346	288	288	251	187	272
16	307	410	326		529	441	346	288	366	215	212	220
17	388	410	288		462	420	307	288	199	206	195	840
18	388	454			506	381	502	269	192	182	254	990
19	388	454			598	400	432	346	223	174	272	690
20	410	346			621	381	388	454	215	224	254	462
21	388	410			552	381	454	600	223	808	237	940
22	388	454			506	381	502	366	269	484	203	1,720
23	388	410			484	400	550	307	269	272	203	1,760
24	388	410			420	420	454	288	410	237	187	1,580
25	410	388	270		420	420	410	288	502	212	164	1,280
26	410	269		410	420	420	366	269	307	212	195	1,860
27	410	251		478	420	441	366	269	251	203	212	2,240
28	410			600	420	441	346	269	223	195	575	2,040
29	410	250		728	------	400	326	269	204	203	552	1,220
30	410			1,280	------	344	307	251	199	203	529	667
31	478	------		1,790	------	462	------	288	------	187	344	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	550	307	385	0.289	0.33
November	454	----------	371	.279	.31
December	574	----------	336	.253	.29
January	1,790	----------	380	.286	.33
February	1,930	420	742	.558	.58
March	462	326	396	.298	.34
April	667	307	465	.350	.39
May	600	251	312	.235	.27
June	502	182	290	.218	.24
July	808	150	231	.174	.20
August	575	164	261	.196	.23
September	2,240	195	790	.594	.66
The year	2,240	150	410	.308	4.17

SUGAR RIVER NEAR BRODHEAD, WIS.

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

DRAINAGE AREA.—529 square miles.

RECORDS AVAILABLE.—February, 1914, to September, 1931.

EXTREMES.—Maximum discharge during year, 775 second-feet Sept. 28 (gage height, 2.78 feet); minimum, 52 second-feet Sept. 14 (gage height 0.40 foot).

1914–1931: 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, Nov. 26 to Jan. 30, Feb. 8–16, which are poor. Flow slightly regulated by operation of power plant in Brodhead.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	210	187	235	248	235	165	235	187	165	143	118	64
2	262	133	248	235	358	165	248	154	176	154	123	78
3	262	210	248	235	324	165	376	135	165	154	143	114
4	222	222	222	198	324	165	376	187	176	143	198	107
5	222	210	210	198	292	187	324	187	176	129	176	116
6	210	198	198	187	308	176	308	187	222	89	176	119
7	198	187	222	187	324	165	292	176	176	61	154	143
8	308	176	248	176	198	154	262	187	176	129	135	143
9	248	143	222	176	277	165	277	176	187	125	165	123
10	187	176	235	262	262	187	222	176	165	154	154	97
11	262	165	222	165	165	198	210	210	165	143	143	54
12	176	176	222	131	198	187	176	235	131	100	133	64
13	198	176	210	154	292	210	187	187	165	143	139	55
14	235	198	198	176	292	198	187	187	165	154	116	53
15	277	222	222	187	198	176	187	222	165	139	83	114
16	308	176	235	210	222	198	210	165	119	116	91	187
17	262	222	262	154	210	187	198	133	165	61	75	248
18	210	210	222	102	222	198	187	176	154	114	94	235
19	165	222	222	154	210	210	210	222	154	133	64	235
20	222	235	210	210	210	187	222	222	97	143	76	222
21	235	248	165	198	222	187	198	210	133	139	94	308
22	222	248	198	198	154	176	324	210	176	114	59	510
23	210	143	187	154	165	187	358	198	222	125	75	490
24	198	222	222	143	210	198	262	154	262	139	71	248
25	198	248	235	107	176	165	222	198	262	133	92	431
26	176	139	176	187	187	210	198	198	235	69	127	551
27	198	165	222	165	198	198	222	165	248	109	143	682
28	248	198	248	165	210	210	222	154	176	85	135	775
29	248	210	248	210	------	176	210	176	198	123	165	490
30	248	154	248	248	------	235	187	154	143	100	92	358
31	210	------	248	412	------	210	------	133	------	105	85	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	308	165	227	0.429	0.49
November	248	133	194	.367	.41
December	262	165	223	.422	.49
January	412	102	191	.361	.42
February	358	154	237	.448	.47
March	235	154	187	.353	.41
April	376	176	243	.459	.51
May	235	133	183	.346	.40
June	262	97	177	.335	.37
July	154	61	122	.231	.27
August	198	59	119	.225	.26
September	775	53	247	.467	.52
The year	775	53	195	.369	5.02

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. Zero of gage is 835.83 feet above mean sea level.

DRAINAGE AREA.—70 square miles.

RECORDS AVAILABLE.—July, 1925, to September, 1931.

EXTREMES.—Maximum discharge during year, 316 second-feet June 23 (gage height, 4.4 feet); minimum, 0.04 second-foot Sept. 29, 30 (gage height, 0.11 foot).

1925–1931: Maximum discharge, 960 second-feet June 12, 1929 (gage height, 8.84 feet); minimum, 0.01 second-foot July 31, 1930 (gage height, 0.07 foot).

REMARKS.—Records good except those for periods of ice effect, Dec. 16 to Jan. 26, Feb. 11, 14, 15, and those estimated, Oct. 19, Nov. 6, 9, 14, 23, 26, 28, Dec. 14, 15, which are fair.

Daily and monthly discharge, in second-feet, 1930-31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	5.9	3.3	25	1.4	11	5.3	55	9.2	12	13	0.5	3.7
2	4.8	2.8	18	1.2	9.2	4.8	43	8.7	10	87	.5	1.4
3	3.3	2.6	13	1.1	7.8	5.3	38	8.4	8.4	91	.5	.8
4	2.6	2.4	11	.9	11	5.0	36	8.1	6.8	51	.5	.6
5	1.4	2.2	10	.9	8.5	4.2	33	7.6	5.1	29	.16	.10
6	1.4	2.2	10	.9	9.2	4.0	30	8.7	43	19	.16	.6
7	27	2.2	10	.8	9.2	2.2	27	7.8	96	15	.16	.06
8	73	2.2	8.8	.8	10	1.7	26	9.2	128	11	.5	.6
9	62	2.2	8.5	.7	14	.8	22	9.2	86	9.8	1.2	.4
10	36	2.2	10	.7	7.2	1.4	20	9.8	58	8.6	1.0	.5
11	25	2.2	10	.7	5.0	1.7	17	11	43	7.3	.8	.9
12	17	2.0	10	.7	3.8	2.2	16	13	36	6.2	.8	.6
13	15	2.0	9.5	.5	3.8	9.2	22	13	28	5.3	.6	.3
14	11	2.0	7.8	.4	3.6	11	14	12	24	4.9	.6	.2
15	9.9	2.0	4.5	.4	3.8	11	13	12	19	4.9	.5	.13
16	12	4.0	4.2	.3	4.2	24	13	9.8	17	3.5	.5	.06
17	21	3.3	4.0	.3	4.8	30	11	7.8	14	3.0	.16	.10
18	18	2.4	3.8	.3	4.8	29	11	8.7	11	2.4	.16	.08
19	30	2.2	3.8	.3	3.8	29	11	13	9.2	2.1	.6	.13
20	24	3.6	3.6	.3	3.6	39	14	18	7.0	2.6	.3	.13
21	20	2.4	3.3	.3	2.8	52	19	22	6.3	2.6	.16	.08
22	7.2	1.8	3.0	.7	3.3	44	23	18	24	2.1	.16	.16
23	5.3	1.8	2.8	3.6	4.0	39	19	15	268	1.6	.10	.13
24	5.3	1.8	2.6	5.0	4.2	36	18	15	246	1.4	.08	.08
25	5.3	1.7	2.4	8.2	4.2	32	16	14	127	1.0	.08	3.1
26	5.3	1.2	2.2	23	4.8	25	15	11	76	.8	.9	.13
27	4.2	.9	2.0	39	5.0	26	13	9.8	43	.8	.9	.06
28	4.0	.7	2.0	44	5.3	104	12	8.4	27	.5	1.2	.05
29	3.6	5.0	1.8	17	-------	128	10	8.7	21	.5	.9	.04
30	3.6	39	1.7	13	-------	82	9.5	13	16	.5	1.0	.04
31	3.3	-------	1.5	12	-------	64	-------	14	-------	.5	.2	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	73	1.4	15.1	0.216	0.25
November	39	.7	3.54	.051	.06
December	25	1.5	6.80	.097	.11
January	44	.3	5.79	.083	.10
February	14	2.8	6.14	.088	.09
March	128	.8	27.5	.393	.45
April	55	9.5	20.9	.299	.33
May	22	7.6	11.4	.163	.19
June	268	5.1	50.5	.721	.80
July	91	.5	12.5	.179	.21
August	1.2	.08	.512	.0073	.008
September	3.7	.04	.509	.0073	.008
The year	268	.04	13.4	.191	2.61

DES MOINES RIVER NEAR JACKSON, MINN.

LOCATION.—Chain gage in sec. 28, T. 103 N., R. 35 W., 8 miles northwest of Jackson. (Present gage not referred to previous datum.)

RECORDS AVAILABLE.—August, 1930, to September, 1931. May, 1909, to December, 1913, at a site 8 miles downstream.

EXTREMES.—Maximum discharge during period August, 1930, to September, 1931, 61 second-feet Nov. 20, 1930 (gage height, 1.58 feet); no flow for several periods.

1909–1913, 1930–31: Maximum discharge, 1,690 second-feet June 29, 1909 (gage height, 10.00 feet); minimum, that of 1931.

REMARKS.—Records good except those of discharge above 25 second-feet and those estimated, Nov. 30 to Dec. 10, which are fair.

Daily discharge, in second-feet, 1930–31

Day	Aug.	Sept.	Day	Aug.	Sept.	Day	Aug.	Sept.
1930			1930			1930		
1		17	11		14	21		8.0
2		18	12		14	22	20	6.9
3		13	13		15	23	18	6.9
4		13	14		15	24	17	6.3
5		10	15		15	25	16	9.7
6		10	16		14	26	12	22
7		11	17		13	27	12	31
8		13	18		9.2	28	11	12
9		15	19		9.2	29	11	13
10		16	20		8.0	30	12	13
						31	13	

Day	Oct.	Nov.	Dec.	Mar.	Apr.	May	June	July	Aug.
1930-31									
1	13	9.2			24	11	3.5	2.4	
2	14	9.2			26	10	3.5	2.4	
3	19	9.2	11		24	11	3.2	2.0	
4	19	10			27	11	3.5	2.8	
5	19	9.2			21	12	3.5	3.5	0
6	18	9.2			19	12	3.5	3.2	
7	24	8.6			17	13	4.2	2.8	
8	20	8.0	10		19	14	3.5	2.0	22.0
9	21	8.0			19	14	3.8	1.6	7.4
10	21	8.6			21	15	4.2	1.2	1.6
11	20	7.4	9.6		24	19	4.9	2.0	.4
12	14	7.4			18	21	5.6	2.8	.2
13	14	9.7			18	19	5.6	2.0	.2
14	16	11			19	18	5.2	.6	.1
15	16	11			22	17	4.2	.4	
16	14	16		16	19	14	4.2	.3	0
17	14	18		16	17	13	3.8	.2	
18	15	17		15	17	33	3.5	.1	
19	15	22		14	14	22	4.9		.2
20	17	61		15	24	16	5.2		4.2
21	15	54		16	28	13	4.6		2.0
22	11	59		16	24	11	4.2		.7
23	10	46		19	22	7.4	3.5		.4
24	10	43		22	21	8.6	3.8		.3
25	11	26		27	19	5.6	2.8	0	.1
26	11	19		17	18	4.9	2.4		
27	12	16		22	17	4.9	2.0		
28	11	14		24	14	4.9	2.0		0
29	11	12		19	13	4.2	2.0		
30	10	12		19	12	4.2	2.0		
31	10			21		3.5			

Monthly discharge, in second-feet, of Des Moines River near Jackson, Minn., 1930–31

Month	Maximum	Minimum	Mean	Month	Maximum	Minimum	Mean
1930				1930–31			
August 22–31	20	11	14.2	March 16–31	27	14	18.6
September	31	6.3	13.0	April	28	12	19.9
1930–31				May	33	3.5	12.5
October	24	10	15.0	June	5.6	2.0	3.76
November	61	7.4	19.0	July	3.5	0	1.04
December 1–11			10.4	August	22	0	1.28

NOTE.—No records January and February. No flow during September, 1931.

DES MOINES RIVER AT ELDON, IOWA

LOCATION.—Chain gage on highway bridge in Eldon, Wapello County, 1 mile above Soap Creek.

DRAINAGE AREA.—13,300 square miles.

RECORDS AVAILABLE.—October, 1930, to September, 1931; comparable records at Ottumwa March, 1917, to September, 1927, January, 1929, to September, 1930.

EXTREMES.—Maximum discharge during year, 11,400 second-feet June 23 (gage height, 8.09 feet); minimum, 89 second-feet Sept. 19 (gage height, 1.13 feet).

1917–1927, 1929–1931: Maximum discharge, 58,700 second-feet June 11, 1917 (gage height at Ottumwa, 16.5 feet); minimum discharge, that of Sept. 19, 1931.

Maximum known stage occurred May 31, 1903 (discharge estimated as 100,000 second-feet).

REMARKS.—Records good except those estimated, which are fair. Power plants above gage cause some diurnal fluctuation at low stages.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	e 430	230	e 540		316	336	960	580	540	1,180	186	4,280
2	e 330	235			336	279	1,240	484	1,340	1,180	190	3,960
3	e 250	246			381	279	1,520	492	1,290	910	181	2,280
4	e 250	240	484		468	329	1,760	400	960	e 860	910	492
5	e 250	246	1,290		407	310	1,640	381	e 1,070	e 860	1,120	310
6	e 250	252	1,180		400	296	1,520	400	e 2,720	1,070	760	274
7	e 540	262	960		414	400	1,340	414	3,480	2,140	715	303
8	e 540	257	810		428	715	1,180	348	4,280	1,880	492	336
9	e 330	262	420		381	284	1,120	414	3,960	1,340	540	240
10	e 330	274	540		274	290	960	414	2,870	910	414	257
11	e 190	303	580		355	296	860	436	1,760	715	186	252
12	e 190	274	428		428	351	381	388	910	860	190	217
13	e 190	290	400	e 260	420	444	420	374	1,240	860	230	212
14	e 190	262	540		172	715	540	400	910	670	226	217
15	e 330	268	355		163	715	580	407	1,070	1,180	226	235
16	e 430	336			428	670	860	407	492	1,400	212	226
17	329	296			420	670	1,180	368	860	1,180	212	194
18	329	362			316	580	1,240	374	580	810	204	128
19	316	336			316	580	2,420	476	460	625	262	89
20	368	860			355	414	3,960	374	e 540	492	420	107
21	444	1,180			374	414	5,980	414	e 4,600	362	810	484
22	407	400			394	400	3,960	374	e 4,940	e 374	960	2,420
23	329	329	e 250		368	394	2,570	362	10,800	715	715	2,280
24	362				310	329	1,880	362	6,160	960	715	1,460
25	348				336	428	1,020	296	3,800	760	540	5,620
26	348	e 350		400	262	316	1,180	226	3,020	540	400	8,080
27	342			e 420	374	368	1,020	262	2,280	468	235	9,620
28	336			444	368	580	960	290	1,760	414	240	6,890
29	310			e 460	------	400	860	436	1,400	316	222	5,110
30	290			468	------	540	760	910	1,340	336	217	3,800
31	246	------		428	------	760	------	540	------	355	322	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	540	190	327	0.025	0.03
November	1,180	230	348	.026	.03
December	1,290	----------	439	.033	.04
January	----------	----------	294	.022	.03
February	468	163	356	.027	.03
March	760	279	449	.034	.04
April	5,980	381	1,530	.115	.13
May	910	226	413	.031	.04
June	10,800	460	2,380	.179	.20
July	2,140	316	862	.065	.07
August	1,120	181	427	.032	.04
September	9,620	89	2,010	.151	.17
The year	10,800	89	815	.061	.85

e Estimated.

HERON LAKE OUTLET NEAR HERON LAKE, MINN.

LOCATION.—Staff gage on line between sec. 15 and 22, T. 104 N., R. 37 W., 3 miles east of Heron Lake.
DRAINAGE AREA.—492 square miles.
RECORDS AVAILABLE.—August, 1930, to September, 1931.
EXTREMES.—Maximum discharge during period of record, 13 second-feet Sept. 29–30, 1930 (gage height, 0.73 foot); no flow June 25 to Sept. 30, 1931.
REMARKS.—Records good except those estimated, Oct. 19 to Dec. 10, Dec. 12–31, Mar. 1–22, which are poor.

Daily and monthly discharge, in second-feet, 1930–31

Day	Aug.	Sept.	Day	Aug.	Sept.	Day	Aug.	Sept.
1930			1930			1930		
1		6.2	11		9.0	21	9.9	9.6
2		6.5	12		9.0	22	9.0	9.6
3		8.2	13		9.3	23	8.4	9.3
4		6.8	14		9.6	24	7.9	9.6
5		6.8	15		9.9	25	7.3	10
6		7.0	16		9.9	26	6.8	11
7		7.0	17		9.9	27	6.2	12
8		7.3	18		9.6	28	6.2	13
9		8.4	19		9.6	29	6.2	13
10		8.7	20		9.6	30	6.5	13
						31	6.2	

Day	Oct.	Nov.	Dec.	Mar.	Apr.	May	June
1930–31							
1	11				7.3	2.1	0.8
2	10				8.2	1.2	.6
3	8.7	6.0	4.0		5.4	e 1.3	.4
4	7.6				4.9	1.4	.2
5	7.9				e 4.4	3.3	.2
6	7.9				4.0	2.4	.2
7	7.6				3.5	1.7	e .6
8	7.6		3.0		e 3.2	1.7	1.0
9	7.6				2.8	1.7	.6
10	7.6				2.8	e 2.6	.8
11	7.6		2.2		2.6	3.5	1.2
12	7.6			3.0	e 2.6	2.8	3.0
13	7.6				2.6	2.4	3.5
14	7.6				3.8	2.4	e 3.2
15	7.6				3.8	2.4	3.0
16	7.6				3.3	2.4	2.6
17	7.0	5.0			2.8	e 2.6	2.1
18	7.0				2.8	2.8	1.2
19					e 3.8	2.4	.8
20					4.9	1.4	.4
21			2.0		3.8	1.4	e .4
22					3.0	1.4	e .3
23				4.6	2.8	1.4	e .2
24				e 4.6	2.8	e 1.2	e .1
25	7.0			4.6	2.8	1.0	e .1
26				5.4	e 2.4	1.0	
27				e 5.7	1.9	2.1	
28				e 6.0	.9	1.7	0.
29				e 6.3	.7	1.7	
30				e 6.6	1.9	e 1.5	
31				e 7.0		e 1.2	

Month	Maximum	Minimum	Mean	Month	Maximum	Minimum	Mean
1930				1930–31			
August 21–31	9.9	6.2	7.33	December			2.49
September	13	6.2	9.28	March			3.77
1930–31				April	8.2	.7	3.42
October	11.0		7.55	May	3.5	1.0	1.94
November			5.17	June	3.5	0	.92

e Interpolated.
NOTE.—No record January and February. No flow July to September, 1931.

TUTTLE LAKE NEAR CEYLON, MINN.

LOCATION.—Staff gage above dam at outlet of Tuttle Lake, 7 miles southeast of Ceylon. Zero of gage is 2.0 feet below crest of dam at outlet.
RECORDS AVAILABLE.—July, 1930, to September, 1931.
EXTREMES.—Maximum stage during period of record, 1.78 feet July 20–22, 1930; minimum, 0.00 several times in September, 1931.
REMARKS.—No discharge from lake during period of record.

Daily gage height, in feet, 1930–31

Day	July	Aug.	Sept.	Day	July	Aug.	Sept.	Day	July	Aug.	Sept.
1930				1930				1930			
1		1.48	1.16	11		1.34	1.08	21	1.78	1.26	1.08
2		1.52	1.10	12		1.34	1.10	22	1.78	1.22	1.10
3		1.48	1.10	13		1.30	1.20	23	1.72	1.20	1.10
4		1.46	1.10	14		1.32	1.22	24	1.68	1.20	1.06
5		1.44	1.12	15		1.28	1.16	25	1.72	1.20	1.08
6		1.42	1.12	16		1.28	1.14	26	1.66	1.18	1.40
7		1.40	1.14	17		1.36	1.10	27	1.64	1.14	1.36
8		1.42	1.14	18		1.26	1.14	28	1.72	1.16	1.36
9		1.54	1.12	19		1.24	1.14	29	1.60	1.14	1.38
10		1.38	1.10	20	1.78	1.24	1.10	30	1.56	1.12	1.36
								31	1.56	1.10	------

Day	Oct.	Nov.	Mar.	Apr.	May	June	Aug.	Sept.
1930-31								
1	1.34	1.32	------	1.36	1.16	1.24	------	0.16
2	1.42	------	------	1.38	1.26	1.20	------	.18
3	1.46	------	------	1.34	1.16	1.18	------	.16
4	1.46	------	------	1.36	1.26	1.16	------	.14
5	1.44	------	------	1.36	1.26	1.10	------	.12
6	1.44	------	------	1.32	1.30	1.10	------	.10
7	1.42	------	------	1.36	1.28	1.10	------	.04
8	1.44	------	------	1.36	1.30	1.10	------	.06
9	1.42	------	------	1.38	1.30	1.08	------	.02
10	1.40	------	------	1.30	1.30	1.08	------	.00
11	1.40	------	------	1.34	1.38	1.08	------	.00
12	1.40	------	------	1.06	1.38	1.10	0.30	.00
13	1.40	------	------	1.30	1.40	1.10	.32	.00
14	1.38	------	------	1.34	1.40	1.08	.28	.00
15	1.34	------	------	1.30	1.30	1.08	.26	.00
16	1.36	------	------	1.26	1.40	1.08	.24	.00
17	1.18	------	------	1.26	1.38	1.08	.24	.00
18	------	------	------	1.10	1.36	1.08	.28	.00
19	------	------	------	1.36	1.34	1.08	.32	.00
20	1.34	------	------	1.32	1.32	1.10	.26	.02
21	1.32	------	------	1.26	1.36	1.10	.28	.00
22	1.32	------	------	1.34	1.36	1.08	.28	.00
23	1.30	------	------	1.34	1.30	1.08	.24	.00
24	1.30	------	1.32	1.32	1.30	1.08	.24	.00
25	1.30	------	1.36	1.30	1.28	1.08	.22	.06
26	1.30	------	1.34	1.24	1.26	1.08	.18	.00
27	1.32	------	1.46	1.16	1.26	1.08	.14	.00
28	1.32	------	1.36	1.12	1.24	1.08	.04	.00
29	1.34	------	1.36	1.26	1.24	------	.16	.00
30	1.34	------	1.36	1.26	1.24	------	.16	.00
31	1.34	------	1.36	------	1.26	------	.18	------

NOTE.—No record Oct. 18, 19, Nov. 2, 1930, to Mar. 23, 1931, June 29 to Aug. 11, 1931.

FOX RIVER AT WAYLAND, MO.

LOCATION.—In NW. ¼ sec. 31, T. 65 N., R. 6 W., at bridge on State highway 4, three-quarters of a mile west of Wayland.

DRAINAGE AREA.—400 square miles.

RECORDS AVAILABLE.—October, 1929, to September, 1931; February, 1922, to September, 1929, at site 2 miles upstream.

EXTREMES.—Maximum discharge during year, 9,940 second-feet June 7 (gage height, 18.35 feet); minimum, 0.2 second-foot Nov. 8, 9 (gage height, 2.04 feet).

1929–1931: Maximum discharge, that of June 7, 1931; no flow Sept. 10, 13, 23, 1930.

Maximum stage known, about 21.8 feet during May, 1908.

REMARKS.—Records fair except those for periods of ice effect, Dec. 21, 22, Dec. 27 to Jan. 2, Jan. 6–9, 12–16, 22, Feb. 10–15, which are poor. Discharge estimated Apr. 6, July 27, 28, Sept. 28.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1.5	0.5	43	0.5	3.0	5	454	74	551	7	3.8	270
2	3.0	.5	25	.5	3.8	5	538	39	184	6	3.4	330
3	1.5	.4	12	.5	4.6	5	695	21	100	5	3.0	517
4	1.0	.4	21	.4	7	5	902	32	72	1,460	3.0	129
5	.5	.4	29	.5	6	5	475	24	1,020	391	3.0	58
6	1.0	.4	70	.5	7	5	334	20	7,780	163	3.0	28
7	16	.3	200	.5	9	5	192	16	8,700	55	2.5	17
8	43	.2	129	1.0	9	7	136	15	2,060	37	2.2	11
9	14	.2	64	1.8	8	8	116	18	551	20	7	9
10	8	.3	47	.5	3.8	10	192	18	323	15	116	7
11	4.6	.4	28	.4	3.0	11	156	26	912	14	290	6
12	9	1.5	21	.4	3.0	53	110	44	3,410	16	86	3.0
13	6	1.5	16	.4	3.0	270	75	40	1,660	14	36	2.0
14	4.6	1.0	14	.4	3.0	330	53	31	494	13	22	2.0
15	5	1.5	9	.4	3.0	310	43	27	242	12	14	62
16	4.6	2.0	8	.4	2.5	270	36	22	142	11	9	17
17	3.0	2.5	7	1.5	4.6	270	242	10	80	12	8	9
18	2.5	3.0	4.6	1.5	4.6	251	649	7	57	12	7	11
19	2.5	1.5	5	8	7	251	251	513	37	11	6	10
20	2.0	3.8	5	14	6	185	2,270	751	27	86	5	4.6
21	10	4.6	4.6	4.6	3.8	142	4,700	216	12	20	4.6	6
22	7	10	3.8	1.5	6	104	4,700	120	1,160	17	3.8	73
23	4.6	7	3.0	.4	7	104	646	48	649	12	2.8	1,300
24	2.5	5	2.5	.5	7	104	361	29	192	10	6	330
25	2.5	4.6	1.5	1.0	8	92	305	20	92	9	3.8	330
26	3.0	5	1.5	9	7	78	513	11	55	8	2.8	1,110
27	2.5	9	1.5	2.5	6	61	380	9	28	7	2.5	370
28	1.5	6	1.5	2.5	5	61	251	4.2	20	6	2.2	222
29	1.5	6	1.5	3.0	-------	61	216	1.8	12	5	2.0	75
30	1.5	55	1.0	3.0	-------	116	113	1,170	9	3.8	1.5	53
31	1.0	-------	1.0	2.5	-------	350	-------	2,100	-------	4.2	3.8	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	43	0.5	5.51	0.014	0.02
November	55	.2	4.48	.011	.01
December	200	1.0	25.2	.063	.07
January	14	.4	2.08	.0052	.006
February	9	2.5	5.38	.013	.01
March	350	5	114	.285	.33
April	4,700	36	670	1.68	1.87
May	2,100	1.8	177	.442	.51
June	8,700	9	1,020	2.55	2.84
July	1,460	3.8	79.4	.198	.23
August	290	1.5	21.5	.054	.06
September	1,300	2.0	179	.448	.50
The year	8,700	.2	191	.478	6.46

WYACONDA RIVER NEAR CANTON, MO.

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

DRAINAGE AREA.—447 square miles.

RECORDS AVAILABLE.—February, 1922, to September, 1931.

EXTREMES.—Maximum discharge during year, 7,460 second-feet June 7 (gage height, 19.00 feet); minimum, 0.5 second-foot Oct. 6 (gage height, 0.52 foot).

1922–1931: Maximum discharge, 16,000 second-feet Nov. 18, 1928 (gage height, 26.7 feet); minimum, 0.2 second-foot Sept. 22–24, 1930 (gage height, 0.40 foot).

REMARKS.—Records good except those for period of ice effect, Dec. 15 to Feb. 20, which are poor. Discharge estimated Sept. 6.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	12	2.5	107	1.3	15	24	362	84	730	21	2.0	166
2	3.6	2.5	57	1.3	15	24	339	70	272	18	1.6	1,520
3	1.6	1.5	67	1.3	15	22	483	58	166	17	1.6	339
4	1.2	1.1	55	1.3	15	20	642	48	118	1,520	1.3	87
5	.7	1.5	53	1.3	15	20	386	43	156	483	2.0	50
6	.5	2.2	107	1.3	20	21	217	45	5,030	146	7	34
7	92	1.8	186	1.3	20	25	146	37	7,220	106	5	19
8	89	1.8	91	1.3	26	25	109	37	4,630	42	3.0	12
9	72	1.5	74	1.3	15	22	92	43	1,620	30	2.3	8
10	56	1.8	69	1.3	6	25	146	50	3,080	21	4.2	5
11	38	2.2	74	1.3	6	26	186	52	3,600	18	316	3.6
12	27	2.8	42	1.3	6	58	118	62	4,010	15	72	2.7
13	21	2.8	33	1.3	6	95	79	166	4,060	15	45	2.0
14	16	4.5	29	1.3	6	483	60	126	1,620	16	28	1.6
15	14	6	26	1.3	6	508	48	70	434	15	18	2.0
16	17	20	20	1.3	10	386	40	50	206	15	12	79
17	21	18	15	1.3	15	239	37	38	109	12	8	30
18	15	14	10	3	15	217	339	32	77	10	7	19
19	13	21	6	3	20	294	166	670	60	9	4.8	28
20	14	22	6	3	20	228	508	1,760	48	14	5	35
21	10	20	3	6	20	146	3,560	533	42	146	4.2	16
22	8	25	3	6	22	64	4,330	217	2,640	34	3.6	16
23	16	25	3	6	27	82	2,400	118	2,360	17	2.7	700
24	14	23	3	6	31	72	434	82	508	9	2.3	760
25	12	20	1.3	6	34	66	316	66	176	7	2.0	294
26	11	16	1.3	6	30	54	586	54	84	4.8	1.3	850
27	9	14	1.3	6	27	62	558	42	58	3.6	1.3	294
28	10	12	1.3	6	25	760	283	34	42	3.6	2.3	166
29	4.2	10	1.3	10	------	586	176	28	32	2.7	3.6	63
30	3.0	217	1.3	10	------	483	118	2,600	25	2.3	2.0	34
31	2.7	------	1.3	15	------	386	------	2,480	------	2.0	2.0	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	92	0.5	20.1	0.045	0.05
November	217	1.1	17.1	.038	.04
December	186	1.3	37.0	.083	.10
January	15	1.3	3.68	.0082	.01
February	34	6	17.4	.039	.04
March	760	20	178	.398	.46
April	4,330	37	575	1.29	1.44
May	2,600	28	316	.707	.82
June	7,220	25	1,440	3.22	3.59
July	1,520	2.0	89.5	.20	.23
August	316	1.3	18.5	.041	.05
September	1,520	1.6	188	.421	.47
The year	7,220	.5	240	.537	7.30

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. Zero of gage is about 541.8 feet above mean sea level.

DRAINAGE AREA.—452 square miles.

RECORDS AVAILABLE.—February, 1922, to September, 1931.

EXTREMES.—Maximum discharge during year, 8,220 second-feet June 6 (gage height, 22.80 feet); minimum, 1.3 second-feet Oct. 5 (gage height, 0.85 foot). 1922–1931: Maximum discharge, 16,000 second-feet Nov. 18, 1928 gage height, 30.0 feet); minimum, 1 second-foot July 9, 192[illegible]; minimum gage height, 0.50 foot Aug. 10, 1926.

REMARKS.—Records fair except those for periods of ice effect, Dec. 18 to Feb. 1, Feb. 10–20, which are poor. Discharge estimated June 14.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	2.3	2.4	22	4.2	15	7	511	118	549	10	3.3	180
2	1.9	2.2	14	3.2	14	7	530	94	264	16	4.1	588
3	1.6	2.4	25	4.2	12	6	568	88	189	264	3.3	111
4	1.4	2.2	24	4.2	10	5	690	69	171	189	3.3	33
5	1.3	2.2	35	4.2	10	5	435	59	264	146	3.3	14
6	1.9	2.2	64	4.2	9	6	283	51	6,630	50	8	10
7	23	2.2	60	4.2	8	17	226	51	6,560	43	5	8
8	26	2.0	59	4.2	7	33	154	51	780	38	3.3	6
9	13	2.0	35	4.2	4.5	30	118	60	473	24	3.8	3.8
10	5	2.0	23	4.2	4.2	10	171	69	2,290	14	20	2.8
11	5	2.2	16	4.2	4.2	10	283	74	2,070	12	64	2.4
12	4.8	2.2	14	4.2	4.2	27	180	88	4,800	14	40	2.0
13	3.7	2.4	12	4.2	4.2	69	83	139	1,870	12	29	2.0
14	3.4	2.4	12	4.2	4.2	283	56	99	500	12	17	2.2
15	3.2	2.4	10	4.2	4.2	530	51	74	236	12	10	64
16	5	2.6	9	4.2	4.2	378	44	56	124	10	8	26
17	3.9	3.3	9	4.2	4.2	216	321	49	78	9	6	12
18	3.7	4.5	7	4.2	4.2	236	492	42	60	8	4.5	7
19	3.7	5	7	4.2	4.2	245	207	804	48	16	12	14
20	3.4	4.5	7	7	4.2	264	804	1,070	40	14	7	28
21	3.4	4.1	4.2	7	7	139	7,100	378	48	64	4.5	16
22	3.2	4.1	4.2	7	7	99	2,220	198	1,070	14	4.5	14
23	3.2	3.6	4.2	7	10	88	608	139	568	14	3.8	2,610
24	3.2	3.6	4.2	7	8	69	416	88	171	12	3.3	1,040
25	3.2	3.6	4.2	7	9	64	397	78	78	7	2.8	900
26	3.2	3.8	4.2	7	9	64	948	69	48	6	2.8	1,090
27	3.2	3.8	4.2	10	8	64	648	53	36	4.5	2.8	416
28	2.8	4.1	4.2	10	8	530	340	42	28	3.6	2.4	124
29	2.8	5	4.2	10	-------	340	216	40	23	3.3	2.0	78
30	2.6	40	4.2	15	-------	378	154	2,190	17	3.0	1.8	46
31	2.6	-------	4.2	15	-------	397	-------	1,310	-------	3.0	1.7	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	26	1.3	4.86	0.011	0.01
November	40	2.0	4.30	.0095	.01
December	64	4.2	16.5	.037	.04
January	15	4.2	6.09	.013	.02
February	15	4.2	7.20	.016	.02
March	530	5	149	.330	.38
April	7,100	44	642	1.42	1.58
May	2,190	40	251	.555	.64
June	6,630	17	1,000	2.21	2.47
July	264	3.0	33.8	.075	.09
August	64	1.7	9.27	.021	.02
September	2,610	2.0	248	.549	.61
The year	7,100	1.3	196	.434	5.89

NORTH FABIUS RIVER AT TAYLOR, MO.

LOCATION.—Chain gage in NE. ¼ SE. ¼ sec. 2, T. 59 N., R. 6 W., at highway bridge at Taylor. Zero of gage is about 470.0 feet above mean sea level.

DRAINAGE AREA.—930 square miles.

RECORDS AVAILABLE.—April, 1930, to September, 1931.

EXTREMES.—Maximum discharge during year, 11,400 second-feet June 8 (gage height, 14.29 feet); minimum, 4.8 second-feet Nov. 6, 8 (gage height, 1.96 feet).

1930–31: Maximum discharge, that of June 8, 1931; minimum, 4.5 second-feet Sept. 13, 1930.

Maximum stage known, 23.5 feet Nov. 19, 1928 (discharge, about 24,000 second-feet).

REMARKS.—Records good.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	9	6	217	9	24	23	960	332	3,590	72	17	72
2	14	5	110	11	25	21	1,180	274	4,220	56	16	1,260
3	9	5	60	9	23	22	1,180	241	1,180	68	16	760
4	8	5	104	9	22	23	1,660	241	470	495	17	520
5	7	5	186	11	23	25	1,260	186	890	960	16	136
6	7	4.8	249	11	25	28	705	164	8,200	792	32	104
7	150	5	225	11	53	25	445	119	10,700	241	28	53
8	221	4.8	202	11	43	25	355	123	11,400	157	19	40
9	86	5	104	11	32	28	355	116	4,040	110	28	32
10	56	6	104	12	28	30	378	130	5,280	77	53	25
11	40	5	98	11	23	23	378	143	4,800	68	38	19
12	32	5	72	9	25	110	355	194	9,410	61	92	17
13	23	5	53	11	23	241	292	241	8,850	56	130	14
14	21	6	46	8	21	570	241	274	3,060	53	68	12
15	17	6	38	9	21	760	179	217	825	43	43	11
16	17	9	28	8	21	960	136	157	520	43	35	143
17	14	11	19	9	23	650	110	116	332	46	28	92
18	11	14	21	9	23	520	732	104	283	43	21	68
19	14	12	19	8	30	422	650	1,420	249	46	23	46
20	12	11	21	8	28	445	595	2,380	217	53	123	81
21	11	11	16	12	25	400	5,580	1,500	1,030	77	72	72
22	13	9	12	14	32	310	8,720	732	1,980	123	35	202
23	11	11	11	14	43	233	4,320	378	960	81	25	732
24	8	10	12	16	30	202	3,590	283	622	68	19	2,550
25	8	11	11	16	32	179	825	241	310	56	16	1,420
26	9	9	9	17	35	172	1,100	157	217	35	16	1,500
27	8	9	8	19	30	164	1,580	104	157	28	14	792
28	8	10	8	21	28	960	960	110	130	25	14	520
29	7	9	11	23	------	825	650	104	104	17	12	274
30	8	400	8	23	------	792	400	4,510	68	16	11	157
31	6	------	12	25	------	760	------	3,770	------	19	12	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	221	6	27.9	0.030	0.03
November	400	4.8	20.8	.022	.02
December	249	8	67.5	.073	.08
January	25	8	12.7	.014	.02
February	53	21	28.2	.030	.03
March	960	21	321	.345	.40
April	8,720	110	1,330	1.43	1.60
May	4,510	104	615	.661	.76
June	11,400	68	2,800	3.01	3.36
July	960	16	132	.142	.16
August	130	11	35.1	.038	.04
September	2,550	11	391	.420	.47
The year	11,400	4.8	478	.514	6.97

MIDDLE FABIUS RIVER NEAR BARING, MO.

LOCATION.—Chain gage in NW. ¼ NW. ¼ sec. 26, T. 64 N., R. 12 W., at highway bridge 6 miles north of Baring. Zero of gage is about 679.1 feet above mean sea level.

DRAINAGE AREA.—156 square miles.

RECORDS AVAILABLE.—April, 1930, to September, 1931.

EXTREMES.—Maximum recorded discharge during year, 4,840 second-feet Apr. 21 (gage height, 19.70 feet); no flow on many days.

1930–31: Maximum recorded discharge, that of Apr. 21, 1931; no flow on many days.

REMARKS.—Records fair; fragmentary, as gage was not read on many days.

Daily discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1			0.7				609	33	368			96
2				0	1.0		504	26	131			15
3		0	.4	0	1.0	1.5	681		90	2,840		
4			.4		1.5		573		57			4.6
5			1.4	.1		1.4	177	11	487			
6		0		0			106		3,730	15		
7	0.8				3.7		79	8				
8	.1	.1	9		1.8		50	9	334	6	9	.6
9	.1		3.6	.1	1.7			15	113			
10			1.6	.1			221					
11	0		.9				84	17	1,780	4.6	1.4	
12			.9					17	2,070			.6
13	.1	0			1.7	68	19	14	1,010	5		
14				0	1.7							.3
15	.1	.1							74			6
16	.1			.2	1.7		66	6				
17	.1	.4		.4	1.9	74	663					
18	.1		.4				191	6	18	2.2	2.5	9
19			.4			137		521			1.2	2.0
20	.1	.7	.4		1.7	66	1,730	283	10	7		
21	.1	.4			1.7		4,700	65				65
22	.1		0	.2			2,010	23		2.6	1.2	
23	.1		0		2.1	22	300					470
24	0	.1	0	.7	1.9		177					27
25					1.9	16	267	9		3.1		60
26				1.2		13		7	6			21
27	0			1.0	2.1	10	283				.8	
28		.1		1.4	2.1			7				7
29		.1	0	1.2				1,880	2.3		.8	5
30			0					3,530	2.3	1.6		
31			0	1.3		538					.8	

SALT RIVER NEAR SHELBINA, MO.

LOCATION.—In SW. ¼ NE. ¼ sec. 17, T. 57 N., R. 10 W., at highway bridge 3 miles north of Shelbina. Zero of gage is about 663.4 feet above mean sea level.

DRAINAGE AREA.—481 square miles.

RECORDS AVAILABLE.—April, 1930, to September, 1931, fragmentary.

EXTREMES.—Maximum recorded discharge during period of record, 6,940 second-feet June 8, 1931 (gage height, 17.88 feet); minimum, 0.1 second-foot Aug. 2, 1930.

REMARKS.—Records fair; fragmentary, as gage was not read on many days. Discharge estimated Jan. 6, 7, 12.

Daily discharge, in second-feet, 1930–31

Day	Apr.	June	July	Aug.	Sept.	Day	Apr.	June	July	Aug.	Sept.
1930						1930					
1	------	------	1,720	0.2	------	16	632	958	1.6	1.8	84
2	------	------	1,030	.1	0.8	17	------	994	------	------	50
3	------	------	191	------	------	18	------	------	------	1.6	18
4	------	------	------	------	------	19	------	------	.9	1.6	4.3
5	------	------	------	------	1.1	20	------	------	------	------	------
6	------	------	------	.8	------	21	------	36	.6	1.6	------
7	30	------	25	.8	------	22	------	------	------	1.4	1.4
8	------	------	------	.8	1.0	23	------	26	------	1.0	------
9	------	3.2	------	.8	------	24	------	26	------	------	------
10	------	3.2	13	------	.7	25	------	320	------	------	.8
11	------	------	------	1.4	.7	26	------	922	.4	.7	------
12	------	3.6	7	1.8	.8	27	------	495	------	.7	1.8
13	------	3.7	------	1.8	.7	28	------	211	------	.7	------
14	------	3.7	------	------	------	29	------	------	------	1.1	------
15	------	------	------	1.8	------	30	------	1,610	------	------	------
						31	------	------	------	------	------

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1930-31												
1	0.5	------	88	------	------	------	814	------	1,350	------	2.4	33
2	.5	------	------	1.6	------	9	------	87	------	10	------	------
3	------	0.5	22	2.2	3.4	------	------	------	------	------	------	------
4	.3	------	------	------	3.4	------	706	56	------	------	------	------
5	------	------	------	------	3.4	------	------	------	------	------	------	------
6	------	.6	87	2.0	3.4	------	204	41	2,110	234	------	------
7	2.4	------	------	2.0	31	------	130	------	------	80	------	------
8	22	.7	84	------	6	------	101	41	6,940	------	2.0	17
9	------	------	------	1.5	------	------	------	------	------	------	------	------
10	3.2	------	43	------	------	------	147	------	------	------	------	3.4
11	------	------	------	------	------	38	198	------	------	10	59	3.1
12	------	------	------	1.5	------	285	------	------	2,570	------	23	------
13	1.5	.9	10	------	3.7	------	87	------	3,360	------	------	------
14	------	------	------	2.0	5	495	------	------	------	------	5	2.2
15	.9	------	5	------	------	------	49	59	670	6	3.1	2.0
16	------	------	------	------	------	372	------	49	------	------	------	2.5
17	1.0	------	------	2.0	6	191	41	------	------	------	------	------
18	.9	------	3.1	------	7	123	185	36	90	3.4	------	------
19	------	------	------	------	7	------	------	958	------	------	2.2	2.8
20	------	3.7	3.2	------	7	------	118	2,070	------	------	77	------
21	------	3.7	------	------	7	94	1,320	------	------	------	------	2.2
22	------	6	3.2	------	------	------	2,230	460	------	------	26	2.2
23	------	------	------	------	------	65	3,890	------	36	------	------	250
24	------	4.3	------	2.5	17	------	1,990	------	------	------	------	------
25	.3	4.3	------	------	14	56	460	------	------	3.7	------	565
26	------	------	------	2.8	14	------	------	------	21	------	38	------
27	.5	------	------	------	12	87	850	71	------	------	------	------
28	------	------	------	3.1	10	635	355	51	------	------	31	285
29	.5	------	------	------	------	------	------	------	17	3.2	------	77
30	------	------	------	3.4	------	886	127	------	------	------	------	------
31	------	------	1.6	3.4	------	886	------	------	------	2.6	3.1	------

SALT RIVER NEAR HUNNEWELL, MO.

LOCATION.—Chain gage in SW. ¼ NW. ¼ sec. 10, T. 56 N., R. 9 W., half a mile below Black Creek and 2 miles west of Hunnewell. Zero of gage is about 615.2 feet above mean sea level.

DRAINAGE AREA.—626 square miles.

RECORDS AVAILABLE.—April, 1930, to September, 1931.

EXTREMES.—Maximum discharge during year, 9,280 second-feet June 8 (gage height, 18.50 feet); minimum, 0.2 second-foot Nov. 4–6, 8, 13.

1930–31: Maximum discharge, that of June 8, 1931; minimum, that of Nov. 4–6, 8, 13, 1930.

Maximum stage known, about 21.8 feet, date unknown.

REMARKS.—Records good except those prior to Apr. 1, which are fair and fragmentary because gage was not read on many days. Discharge estimated Apr. 5, 12.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	2.6	0.5					970	138	1,280	14	5	9
2	2.6			1.3			677	100	433	13	3.6	156
3					3.6		755	71	204	13	2.8	290
4		.2	46				927	63	147	13	2.6	290
5		.2			3.6		600	38	405	175	7	138
6	1.3	.2	78	2.2		9	311	45	3,080	175	7	65
7		.6			7		194	36	7,600	120	4.8	38
8	30	.2			23		156	36	9,020	58	7	28
9			120	2.6			116	34	7,360	30	28	16
10					7		175	29	3,520	22	129	13
11	25		34				232	49	2,000	15	34	9
12			25	2.2		156	200	83	7,040	13	75	8
13	9	.2	19			333	156	97	4,960	13	31	6
14				1.7			102	99	4,180	11	19	4.8
15	4.8						75	70	1,330	8	11	14
16			10	1.7		560	57	60	311	8	7	13
17		.8		2.2		320	46	41	194	8	7	7
18	3.0	.5					107	41	138	8	7	4.2
19				2.6	9		166	1,760	106	8	14	6
20							147	2,820	71	16	129	7
21						1,240	677	2,500	55	19	58	7
22				3.0			2,200	716	46	13	38	6
23	1.7				11	82	3,320	433	38	25	20	6
24		4.2					2,820	270	31	27	13	884
25							638	184	25	18	38	970
26				.8		52	494	138	22	16	52	884
27	.8		3.0	2.6		78	927	92	22	10	32	1,020
28	.6				11	1,060	599	68	22	8	20	356
29	.5						290	52	17	8	36	204
30						1,150	184	120	15	7	19	85
31			1.7	3.0		1,280		1,020		6	11	

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
April	3,320	46	611	0.976	1.09
May	2,820	29	365	.583	.67
June	9,020	15	1,790	2.86	3.19
July	175	6	29.0	.046	.05
August	129	2.6	28.0	.045	.05
September	1,020	4.2	185	.296	.33

SALT RIVER NEAR NEW LONDON, MO.

LOCATION.—Chain gage in NE. ¼ NW. ¼ sec. 36, T. 56 N., R. 5 W., at highway bridge 2 miles north of New London. Zero of gage is about 476.9 feet above mean sea level.

DRAINAGE AREA.—2,480 square miles.

RECORDS AVAILABLE.—February, 1922, to September, 1931.

EXTREMES.—Maximum discharge during year, 33,400 second-feet June 13 (gage height, 22.54 feet); minimum, 5 second-feet Nov. 14 (gage height, 1.56 feet).

1922–1931: Maximum discharge, 58,700 second-feet June 21, 1928 (gage height, 28.8 feet); minimum, 5 second-feet Aug. 21, 24, Sept. 4, 6, Nov. 14, 1930.

REMARKS.—Records good.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	18	10	109	18	18	99	2,810	552	1,070	89	52	691
2	15	9	157	18	18	99	2,210	372	1,620	84	38	422
3	12	9	500	18	18	84	2,610	268	1,260	84	35	1,010
4	15	8	346	18	18	94	1,470	216	662	80	38	1,070
5	15	8	346	18	18	75	1,470	185	448	75	21	749
6	14	7	242	15	21	75	1,260	170	691	62	24	448
7	50	7	193	18	38	71	894	151	2,920	58	21	278
8	151	7	157	18	35	75	579	144	7,210	164	28	185
9	225	7	296	18	28	66	448	132	10,100	193	89	144
10	233	7	397	18	28	80	397	132	8,960	132	66	109
11	233	6	268	18	28	84	346	132	5,670	99	2,410	94
12	229	6	208	15	38	144	397	126	20,800	80	1,200	75
13	157	6	164	18	94	372	500	138	32,400	66	579	54
14	126	5	132	15	84	1,470	448	157	19,300	58	321	50
15	99	6	109	15	80	2,210	346	170	6,990	54	208	71
16	84	89	94	15	71	2,210	259	170	2,920	50	138	138
17	62	18	80	15	80	1,470	216	164	1,130	46	104	225
18	50	8	66	18	75	749	185	151	836	42	80	132
19	42	7	58	18	89	720	178	5,010	606	42	89	89
20	31	8	54	18	84	500	157	14,200	448	397	170	62
21	31	7	54	18	89	397	233	11,100	346	104	296	50
22	26	9	42	18	84	246	208	6,440	296	66	474	80
23	26	9	46	18	104	296	2,710	5,450	321	526	268	80
24	24	18	38	18	121	268	3,910	4,240	321	422	216	836
25	21	18	35	21	109	225	3,910	1,810	250	193	170	836
26	21	18	31	18	109	208	1,400	11,100	201	115	104	1,470
27	18	24	31	18	109	250	778	7,560	157	99	151	1,010
28	18	24	28	18	94	4,900	1,010	2,410	126	89	321	1,540
29	15	24	24	18	------	6,880	1,200	894	115	66	185	836
30	15	157	24	18	------	5,230	778	662	89	54	321	500
31	12	------	24	18	------	3,470	------	1,010	------	50	448	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	233	12	67.4	0.027	0.03
November	157	5	18.2	.0073	.008
December	500	24	140	.056	.06
January	21	15	17.5	.0071	.008
February	121	18	63.6	.026	.03
March	6,880	66	1,070	.431	.50
April	3,910	157	1,110	.448	.50
May	14,200	126	2,430	.980	1.13
June	32,400	89	4,280	1.73	1.93
July	526	42	121	.049	.06
August	2,410	21	280	.113	.13
September	1,540	50	444	.179	.20
The year	32,400	5	836	.337	4.59

CUIVRE RIVER NEAR TROY, MO.

LOCATION.—Chain gage in SE. ¼ sec. 14, T. 49 N., R. 1 W., at highway bridge 2 miles north of Troy and 3 miles upstream from site used prior to Oct. 1, 1930. Zero of gage is 450.4 feet above mean sea level.

DRAINAGE AREA.—903 square miles.

RECORDS AVAILABLE.—October, 1930, to September, 1931. February, 1922, to September, 1930, comparable records, at a site 3 miles downstream.

EXTREMES.—Maximum discharge during year, 21,300 second-feet May 20 (gage height, 23.58 feet); minimum, 1.5 second-feet Feb. 4, 6.

1922–1931: Maximum discharge, about 52,600 second-feet May 18, 1929 (gage height, 25.75 feet); minimum, 0.3 second-foot Aug. 2–9, 1930.

REMARKS.—Records good. Discharge estimated Aug. 9, 10.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	3.5	4.5	45	6	2.0	23	264	45	150	16	12	676
2	2.5	4.5	47	6	1.6	25	207	38	112	12	10	3,100
3	2	4	45	6	1.6	14	165	30	98	11	35	494
4	1.9	5	49	4.8	1.5	10	137	32	89	12	20	237
5	1.8	1.9	67	6	1.6	8	111	34	89	13	15	430
6	1.7	2	48	4.8	1.5	7	96	32	84	11	11	142
7	6	1.9	44	6	1.6	14	81	30	79	10	9	92
8	4.0	2.0	42	4.8	4.8	23	73	36	67	9	10	84
9	111	1.9	35	6	27	19	76	43	67	10	10	49
10	40	1.9	31	4.8	14	17	81	49	2,220	10	15	39
11	38	2	23	9	23	25	78	83	638	7	166	30
12	32	2.5	21	4.2	17	79	66	96	960	6	166	25
13	16	2	19	3.2	27	186	59	90	528	6	87	69
14	8	1.9	19	3.8	55	638	52	76	300	6	63	47
15	6	2	15	3.2	60	600	47	61	158	4.8	37	35
16	6	2	14	3.8	77	312	49	54	105	4.0	26	25
17	11	2.5	15	3.2	75	186	40	45	89	4.8	22	22
18	6	2	14	3.8	96	128	24	40	79	4.0	790	10
19	5	1.9	12	2.2	104	90	28	10,400	58	3.6	376	15
20	4.5	2.5	10	2.8	77	90	30	10,400	54	9	1,860	10
21	6	83	12	2.2	67	65	47	2,360	41	45	494	9
22	2.5	26	10	2.8	48	104	40	2,040	43	52	209	10
23	2.0	8	12	3.2	46	33	34	2,480	39	1,860	112	74
24	1.9	6	10	2.8	37	25	38	830	30	494	63	528
25	1.9	5	9	2.2	35	42	45	1,310	26	150	300	218
26	2.0	5	7	2.0	33	35	49	1,210	23	65	192	105
27	1.8	4.5	8	1.8	29	58	64	830	22	33	89	69
28	1.8	4	6	1.6	25	6,660	61	278	20	30	77	47
29	1.8	3.5	8	1.8	------	1,690	59	209	19	22	82	43
30	4.5	26	7	1.8	------	638	54	174	18	20	105	30
31	4	------	6	1.8	------	350	------	150	------	22	89	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	111	1.7	10.9	0.012	0.01
November	83	1.9	7.40	.0082	.009
December	67	6	22.9	.025	.03
January	9	1.6	3.82	.0042	.005
February	104	1.5	35.3	.039	.04
March	6,660	7	393.	.435	.50
April	264	24	75.2	.083	.09
May	10,400	30	1,080	1.20	1.38
June	2,220	18	210	.233	.26
July	1,860	3.6	95.6	.106	.12
August	1,860	9	179	.198	.23
September	3,100	9	225	.249	.28
The year	10,400	1.5	197	.218	2.95

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 584.10 feet above mean sea level.

DRAINAGE AREA.—705 square miles.

RECORDS AVAILABLE.—November, 1914, to September, 1931.

EXTREMES.—Maximum discharge during year, 2,170 second-feet June 25 (gage height, 4.95 feet); minimum, 3.9 second-feet Nov. 6, Aug. 24, 27 (gage height, 2.49 feet).

1915–1931: Maximum discharge, 5,520 second-feet Mar. 18, 1919; no flow for various dates 1919 and 1925.

REMARKS.—Records fair. No high water spilled into Chicago Sanitary Canal during year.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	9.7	29	17	9.7	a34	52	975	93	313	355	30	87
2	9.7	29	a23	a12	38	21	723	84	264	278	15	125
3	14	a23	29	14	a38	8.5	635	75	236	232	24	120
4	9.7	17	a29	a16	38	14	482	63	188	220	21	106
5	4.7	a11	29	17	a34	21	399	45	84	171	34	78
6	6.4	4.7	a22	a13	29	38	338	59	182	150	27	69
7	17	a11	14	9.7	a37	29	297	80	472	140	24	49
8	45	17	a12	a9.7	45	a25	257	113	624	130	21	34
9	75	29	9.7	9.7	a45	21	208	134	646	125	45	24
10	63	a34	a9.7	a9.7	45	29	250	170	511	106	57	18
11	45	38	9.7	9.7	a54	41	236	188	381	96	61	12
12	38	a42	a7.2	a13	63	63	194	250	313	87	87	38
13	29	45	4.7	17	a63	41	182	346	313	78	69	45
14	17	a37	a4.7	a16	63	29	164	313	313	78	53	34
15	14	29	4.7	14	a41	17	140	257	250	61	45	69
16	17	29	a4.7	a12	19	19	182	229	188	61	38	65
17	29	a34	4.7	9.7	29	32	182	194	146	57	24	57
18	38	38	a7.2	a9.7	19	52	134	146	129	61	24	61
19	45	a42	9.7	9.7	17	194	129	158	103	49	49	61
20	29	45	a9.7	a12	15	182	113	492	80	101	45	49
21	17	a37	9.7	14	14	129	146	745	75	150	30	30
22	17	29	a12	a16	9.7	146	170	915	67	155	24	34
23	29	a23	14	17	14	229	194	800	614	140	12	30
24	29	17	a14	a23	9.7	338	222	482	1,560	74	5.5	34
25	17	a16	14	29	9.7	390	188	330	2,030	53	24	41
26	17	14	a12	a37	11	338	188	272	1,780	34	12	87
27	9.7	a9.4	9.7	45	15	399	146	236	1,300	24	5.5	106
28	14	4.7	a8.0	a37	32	582	129	194	1,090	18	12	87
29	17	a9.0	6.4	29	-------	1,170	129	170	511	45	30	65
30	17	a13	a8.0	a29	-------	1,090	108	444	416	49	69	45
31	17	-------	9.7	29	-------	975	-------	364	-------	41	53	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	75	4.7	24.4	0.035	0.04
November	45	4.7	25.2	.036	.04
December	29	4.7	12.2	.017	.02
January	45	9.7	17.7	.025	.03
February	63	9.7	31.5	.045	.05
March	1,170	8.5	217	.308	.36
April	975	108	261	.370	.41
May	915	45	272	.386	.44
June	2,030	67	506	.718	.80
July	355	18	110	.156	.18
August	87	5.5	34.5	.049	.06
September	125	12	58.7	.083	.09
The year	2,030	4.7	131	.186	2.52

a Estimated.

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, 1931.

EXTREMES.—Maximum mean daily discharge during year occurred June 23, when no record was obtained; minimum, 5,980 second-feet Sept. 28.

1914–1931: Maximum daily discharge, 18,400 second-feet Mar. 18, 1919; minimum daily discharge occurred in August, 1927, when no record was obtained.

REMARKS.—Records good. Discharge includes flow of Chicago Sanitary Canal, diversion averaging about 285 second-feet made to Illinois & Michigan Canal just above gage.

Daily and monthly discharge, in second-feet, 1930–31

Day	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1		7,410	8,520		7,620	8,760	7,620	8,280	8,760		9,140
2		7,200	8,280		7,620	8,520	7,620	8,280	9,000		9,140
3		7,200	8,520	[a]8,050	7,620	8,280	7,620	8,280	9,240	[a]8,790	8,480
4	[a]6,850	7,200	8,520		7,620	8,280	7,620	8,040	9,000		8,260
5		7,410	8,520	8,280	7,620	8,040	7,620	8,040	9,000	9,000	8,920
6		7,410	8,520	8,280	7,620	8,040	8,040	10,300	8,520	9,000	9,380
7		7,410	8,520	8,280	7,620	8,040	8,520	10,600	8,520	9,000	9,380
8	7,200	7,200	8,280	7,830	7,620	7,830	[a]7,900	9,240	9,000	9,000	9,380
9	7,200	6,990	8,280	7,620	7,620	7,830	7,830	8,760	9,000	8,760	9,140
10	6,990	6,990	8,280	7,620	7,620	8,520	9,000	8,520	9,480	9,240	9,140
11	6,990	6,990	8,280	7,620	7,620	7,830	8,520	8,520	8,760	10,600	9,140
12	6,990	6,780	8,280	7,830	7,620	7,830	8,040	8,280	8,760	7,380	9,140
13	7,200	6,780	8,520	7,620	7,620	7,830	7,620	8,280	8,520	8,260	
14	6,990	6,400	8,520	7,620	7,620	7,620	7,830	8,040	8,760	8,480	
15	6,990	6,400	8,520	7,620	7,620	7,830	7,830	8,040	7,830	8,480	
16	6,990	6,780	8,520	7,620	7,620	8,040	7,830	7,410	7,410	8,700	[a]8,650
17	6,990	6,780	8,520	7,830	7,620	7,620	8,040	8,040	7,620	8,700	
18	6,990	6,590	8,280	7,620	7,620	7,620	8,040	8,040	7,830	8,920	
19	6,780	6,590	9,240	7,620	7,620	7,830	10,300	8,040	6,590	7,300	8,700
20	7,200	6,990	8,520	7,620	7,620	7,830	10,800	8,040	7,830	7,800	8,480
21	7,200		8,520	7,620	7,830	8,280	10,000		8,280	8,920	8,480
22	7,200		8,520	7,620	7,830	7,830	9,240		8,280	8,480	6,110
23	7,200		8,520	7,620	7,830	7,830	8,520		7,200	8,480	8,480
24	7,200	[a]7,330	8,520	7,620	8,040	7,830	8,040	[a]9,800	7,620	8,260	8,480
25	7,200		8,520	7,620	7,830	7,830	8,280		7,410	8,260	9,140
26	7,200		8,520	7,620	8,040	8,040	8,040		8,040	8,260	8,260
27	7,200	8,760	8,280	7,620	8,520	7,830	7,830	10,000	7,830	8,480	8,480
28	7,200	9,000	8,520	7,620	9,000	7,620	7,830	9,750	7,620	9,140	5,980
29	7,830	9,000	8,520	-------	8,280	7,620	8,040	9,000	7,200	8,700	6,960
30	9,480	9,480	8,520	-------	8,760	7,620	8,280	8,760	6,990	8,700	8,260
31	-------	9,480	8,280	-------	9,000	-------	8,040	-------	[a]6,120	8,700	-------

Month	Maximum	Minimum	Mean	Month	Maximum	Minimum	Mean
October	----------	----------	[a]7,180	May	10,800	7,620	8,270
November	9,480	6,780	7,140	June	----------	7,410	8,850
December	9,480	6,400	7,390	July	9,480	6,120	8,130
January	9,240	8,280	8,470	August	10,600	7,300	8,650
February	8,280	7,620	7,770	September	9,380	5,980	8,540
March	9,000	7,620	7,850				
April	8,760	7,620	7,940	The year	----------	5,980	8,020

[a] Estimated.

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, 1931; January, 1903, to December, 1904, at station near Minooka.

EXTREMES.—Maximum discharge during year, 21,700 second-feet June 24 (gage height, 11.0 feet); minimum, 7,200 second-feet Nov. 7, 8, 13, 14, 28, 29, Dec. 20 (gage height, 5.0 feet).

1919–1931: Maximum discharge, 60,600 second-feet Apr. 12, 1922 (gage height, 20.1 feet); minimum, 5,120 second-feet Aug. 21, 1929 (gage height, 3.9 feet).

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, 1930–31

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

Month	Maximum	Minimum	Mean	Month	Maximum	Minimum	Mean
October	10,500	7,400	7,820	May	19,300	9,200	12,700
November	9,860	7,200	7,540	June	21,700	10,100	13,500
December	10,100	7,200	8,380	July	12,900	8,400	10,500
January	9,640	8,400	8,970	August	10,300	8,600	9,360
February	9,640	8,000	8,580	September	10,800	8,000	9,610
March	13,600	8,000	9,390				
April	12,200	9,200	10,600	The year	21,700	7,200	9,740

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, 1931; March, 1903, to July, 1906, for station 3½ miles downstream.

EXTREMES.—Maximum discharge during year, 18,600 second-feet June 12 (gage height, 13.75 feet); minimum, 8,100 second-feet Nov. 16 (gage height, 8.55 feet).

1910–1931: Maximum discharge, 58,300 second-feet Oct. 9, 1926 (gage height, 25.05 feet); minimum discharge, about 7,250 second-feet Dec. 11, 1916, to Jan. 10, 1917.

Maximum stage known, 26.6 feet in 1844.

REMARKS.—Record good. Discharge determined on basis of slope as obtained by use of an auxiliary staff gage at highway bridge at Pekin, 9.3 miles downstream. Gage-height record furnished by Engineer Corps United States Army

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	10,100	9,520	10,300	8,960	10,800	10,700	13,300	12,300	15,500	16,500	10,500	10,600
2	10,100	9,600	9,650	8,960	10,800	9,950	13,200	12,300	14,200	15,900	10,200	10,900
3	10,000	9,520	9,950	9,100	10,800	10,000	13,600	12,000	13,800	15,900	10,300	11,000
4	10,000	9,460	10,500	9,750	10,700	10,100	13,600	11,300	14,600	15,600	10,400	11,400
5	9,950	10,300	10,400	10,100	10,700	10,400	13,600	11,400	14,600	14,200	10,500	10,900
6	9,660	9,520	10,400	10,300	11,200	10,400	13,600	11,800	13,000	14,600	10,300	11,500
7	9,560	9,380	10,000	10,700	10,700	11,000	13,000	11,400	13,500	14,800	10,400	11,200
8	10,100	9,180	10,300	10,800	10,600	9,880	13,400	10,800	14,600	14,200	10,100	11,000
9	10,300	9,500	10,200	10,500	10,900	9,700	13,300	10,600	14,600	14,400	10,500	11,000
10	10,400	9,600	10,200	10,600	10,900	10,100	13,200	11,300	16,600	14,200	10,500	10,700
11	10,500	9,600	10,200	10,800	10,100	10,200	13,100	11,700	18,000	14,000	10,700	11,000
12	10,200	9,300	10,300	10,600	10,600	9,800	13,000	12,400	18,600	13,200	10,300	11,000
13	10,100	9,570	10,200	10,300	11,000	9,750	12,800	13,100	18,400	13,400	10,300	10,800
14	10,100	9,570	10,300	10,600	10,800	9,900	12,900	13,400	18,000	13,100	10,100	10,600
15	10,200	9,700	10,500	10,400	9,920	9,900	12,700	13,500	17,900	12,700	10,400	9,560
16	9,980	8,100	10,200	9,560	10,200	9,850	12,500	13,400	18,100	12,500	10,700	9,700
17	9,950	9,750	9,660	10,000	10,600	9,560	12,100	14,400	16,800	12,400	10,800	10,200
18	9,930	9,650	9,480	10,000	10,400	9,590	12,100	13,200	16,700	11,800	10,700	10,900
19	10,200	9,630	9,470	10,000	10,600	10,400	11,900	14,100	17,100	11,900	10,600	10,700
20	10,100	9,230	9,470	10,400	10,400	10,400	11,700	13,700	15,800	11,400	10,400	10,600
21	10,200	9,280	9,730	10,600	10,400	10,600	11,700	14,200	15,900	11,700	10,500	10,700
22	9,980	9,560	9,600	10,500	10,300	10,600	11,700	15,300	15,200	11,400	10,300	10,800
23	9,810	9,560	9,680	10,200	10,600	10,700	12,100	15,700	14,200	11,800	10,200	11,100
24	9,960	9,440	9,420	10,200	10,300	10,400	12,100	15,300	15,100	11,500	10,400	11,100
25	10,000	9,680	9,060	10,400	10,000	11,500	12,100	16,800	16,000	11,400	10,500	10,200
26	9,200	9,600	9,560	10,600	10,400	11,500	12,200	16,800	16,900	11,600	10,400	11,000
27	9,120	9,380	9,560	10,600	10,300	11,800	12,400	16,600	17,400	11,400	10,200	11,400
28	9,620	9,650	9,560	10,600	10,200	10,200	12,300	15,900	17,500	10,800	10,200	11,600
29	9,560	9,310	9,660	10,700	-------	11,800	12,600	15,700	17,100	11,000	10,500	11,400
30	9,780	9,750	9,660	10,300	-------	12,400	12,200	16,100	16,900	10,900	10,900	10,900
31	9,620	-------	9,380	10,900	-------	12,900	-------	15,300	-------	10,700	10,700	------

Month	Maximum	Minimum	Mean	Month	Maximum	Minimum	Mean
October	10,500	9,120	9,940	May	16,800	10,600	13,600
November	10,300	8,100	9,500	June	18,600	13,000	16,100
December	10,500	9,060	9,890	July	16,500	10,700	12,900
January	10,900	8,960	10,300	August	10,900	10,100	10,400
February	11,200	9,920	10,500	September	11,600	9,560	10,800
March	12,900	9,560	10,500				
April	13,600	11,700	12,700	The year	18,600	8,100	11,400

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, 1931.

EXTREMES.—Maximum discharge during year, 23,300 second-feet June 15 (gage height, 11.5 feet); minimum, 9,550 second-feet Dec. 21, Jan. 1 (gage height, 7.5 feet).

1920–1931: Maximum discharge, 105,000 second-feet Oct. 9, 1926; maximum gage height, 26.25 feet Oct. 12, 1926; minimum discharge, 9,550 second-feet Dec. 31, 1930, Jan. 1, 1931 (gage height 7.5 feet).

Maximum discharge known, about 115,000 second-feet Apr. 4, 1904.

REMARKS.—Records good. Gage-height record furnished by United States Weather Bureau.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	11,200	10,200	11,900	9,550	11,200	11,200	14,300	14,300	20,100	18,400	12,200	12,600
2	10,900	10,200	11,900	9,880	11,200	11,200	14,300	13,900	19,800	18,400	11,900	13,900
3	10,500	10,200	11,900	10,500	11,500	10,900	14,600	13,900	19,000	19,400	11,500	14,600
4	10,500	10,200	11,900	10,500	11,500	10,900	14,900	13,900	18,700	20,100	11,500	14,300
5	10,500	10,200	11,900	10,900	11,500	10,900	15,300	13,600	18,400	19,800	11,200	13,600
6	10,500	10,200	11,900	10,900	11,500	10,900	15,300	13,600	19,000	19,400	11,200	12,900
7	10,500	10,200	11,900	11,200	11,500	10,900	15,300	13,200	20,100	19,000	11,200	12,900
8	11,500	10,200	11,900	11,200	11,500	10,500	14,900	13,600	21,200	18,700	11,200	12,600
9	11,500	10,200	11,900	11,200	11,500	10,900	14,900	13,600	21,500	18,400	11,200	12,200
10	11,500	10,200	11,900	11,200	11,500	11,200	14,900	13,600	21,500	18,000	11,200	12,200
11	11,500	10,200	11,500	11,200	11,900	11,200	14,900	13,600	21,500	17,700	11,200	12,200
12	11,500	10,200	11,500	11,200	11,500	10,900	14,900	13,600	21,500	17,300	11,200	11,900
13	11,200	10,200	11,500	10,900	11,500	10,900	14,900	13,900	22,600	17,000	11,500	11,900
14	11,200	10,200	11,500	10,900	11,200	11,200	14,600	14,300	22,900	16,600	11,500	11,500
15	11,200	10,200	11,500	11,200	11,200	11,500	14,600	14,600	23,300	16,300	11,500	11,900
16	11,200	10,200	11,200	11,200	11,200	11,900	14,600	14,600	22,900	16,000	11,200	12,900
17	10,900	10,200	11,200	11,500	11,200	11,900	14,600	14,900	22,200	15,600	11,200	14,300
18	10,500	10,200	11,200	11,500	11,200	11,500	14,300	14,900	21,500	15,300	11,200	14,600
19	10,500	10,200	10,900	11,900	11,200	11,500	13,900	16,600	20,800	14,900	11,200	14,600
20	10,500	10,200	10,900	11,500	11,200	11,900	13,900	19,800	20,400	14,900	11,900	14,300
21	10,500	10,200	10,500	10,900	11,200	11,900	13,900	20,400	21,500	15,300	11,900	13,900
22	10,900	10,200	10,200	10,900	11,200	11,900	13,900	20,100	21,200	14,600	11,900	13,900
23	10,500	9,880	9,880	10,900	11,200	11,900	13,900	20,100	20,400	14,600	11,900	14,600
24	10,500	9,880	9,880	10,900	11,200	11,500	13,900	20,100	19,800	14,600	11,900	14,600
25	10,500	9,880	9,880	11,200	11,200	11,500	13,900	20,100	19,000	14,300	11,500	14,300
26	10,500	9,880	10,200	11,200	11,200	11,900	13,900	20,100	18,700	13,900	11,500	13,900
27	10,500	9,880	10,500	11,200	11,200	12,200	13,900	20,100	18,400	13,600	11,500	13,900
28	10,200	9,880	10,500	11,200	11,200	12,600	13,900	19,800	18,400	13,200	11,200	13,900
29	10,200	9,880	10,500	11,200	-------	14,300	13,900	19,800	18,400	12,900	11,200	13,600
30	10,200	11,200	10,500	11,200	-------	14,600	14,300	19,800	18,400	12,600	11,200	13,600
31	10,200	-------	9,550	11,200	-------	14,300	-------	20,100	-------	12,600	11,500	-------

Month	Maximum	Minimum	Mean	Month	Maximum	Minimum	Mean
October	11,500	10,200	10,800	May	20,400	13,200	16,400
November	11,200	9,880	10,200	June	23,300	18,400	20,400
December	11,900	9,550	11,100	July	20,100	12,600	16,200
January	11,900	9,550	11,000	August	12,200	11,200	11,500
February	11,900	11,200	11,300	September	14,600	11,500	13,400
March	14,600	10,500	11,700	The year	23,300	9,550	13,200
April	15,300	13,900	14,400				

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, 1931.

EXTREMES.—Maximum discharge during year, 125 second-feet May 20 (gage height, 1.90 feet); minimum, 1.6 second-feet Aug. 3, 7 (gage height, 0.21 foot).

1925–1931: Maximum discharge, 1,070 second-feet June 11, 1926 (gage height, 6.5 feet); minimum, that of Aug. 3, 7, 1931.

REMARKS.—Records fair.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	4.5	3.8	35		4.8	4.0	31	6.1	14	6.1	1.9	5.0
2	4.0	3.6	29	*2.5	4.3	4.0	27	5.0	14	7.2	1.7	5.5
3	4.8	3.2	18		4.5	4.0	22	5.3	13	9.5	1.7	5.0
4	5.0	3.0	12	3.8	4.8	4.0	16	4.8	14	6.6	1.9	4.0
5	3.8	3.0	8.2	4.5	4.5	3.8	15	3.6	14	6.6	2.7	3.6
6	3.2	2.8	5.5	5.0	5.0	4.0	13	7.2	26	5.8	2.0	3.2
7	5.0	3.0	5.3	4.8	4.8	4.3	10	7.2	41	5.5	1.7	3.0
8	4.5	2.7	5.5	4.0	4.3	5.0	10	8.8	26	4.5	2.2	3.0
9	4.3	3.0	5.0	3.8	4.8	5.5	9.8	12	20	4.3	2.3	2.7
10	3.8	3.0	4.5	3.4	4.5	5.0	12	17	17	4.0	2.5	2.5
11	3.6	2.8	4.8	2.8	4.8	4.5	10	24	11	3.6	3.4	2.5
12	3.8	2.7	4.3		5.3	4.5	9.5	23	14	4.0	3.8	2.7
13	3.6	3.2	4.0		5.8	4.5	8.8	22	14	3.6	3.2	2.5
14	3.4	3.4	4.8		7.9	5.3	7.9	18	14	3.2	2.7	4.8
15	3.6	4.3	3.8		7.2	5.5	7.5	15	11	3.6	2.7	5.0
16	5.0	3.8	3.2		7.2	6.6	6.6	12	8.5	3.2	2.3	2.8
17	5.5	3.6		*3.0	5.5	13	6.1	9.8	7.9	3.8	2.0	2.5
18	5.0	3.2			5.0	17	6.1	8.5	7.2	4.3	2.7	2.5
19	4.3	3.0			4.5	20	5.5	40	6.6	4.5	3.0	2.7
20	3.6	2.8			4.5	24	6.1	111	5.8	4.0	3.2	2.5
21	3.2	3.0			5.0	30	9.5	74	9.5	6.9	2.8	2.5
22	3.0	2.8			4.5	28	9.1	50	21	3.8	2.7	3.0
23	2.8	3.2		4.3	4.0	27	7.2	40	24	2.8	2.3	2.8
24	3.0	3.4	*2.5	4.8	4.0	27	8.5	30	23	2.7	2.7	2.7
25	3.0			5.3	4.0	25	8.5	23	23	2.7	2.7	7.9
26	2.8	*3.3		5.0	4.0	23	7.9	18	23	2.7	2.3	3.4
27	3.2			4.8	3.8	23	7.2	14	20	2.7	2.3	2.8
28	3.8			4.5	4.0	74	7.2	12	12	2.3	3.4	2.7
29	3.6	48		4.8	-------	53	7.9	10	9.8	2.3	2.5	3.0
30	4.5	47		5.3	-------	38	8.2	15	7.9	2.0	2.8	2.8
31	4.3	-------		5.0	-------	30	-------	15	-------	2.0	3.6	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	5.5	2.8	3.92	0.199	0.23
November	48	2.7	6.15	.312	.35
December	35	----------	6.14	.312	.36
January	5.3	----------	3.75	.190	.22
February	7.9	3.8	4.90	.249	.26
March	74	3.8	17.0	.863	.99
April	31	5.5	10.7	.543	.61
May	111	3.6	21.3	1.08	1.24
June	41	5.8	15.7	.797	.89
July	9.5	2.0	4.22	.214	.25
August	3.8	1.7	2.57	.130	.15
September	7.9	2.5	3.39	.172	.19
The year	111	1.7	8.34	.423	5.74

* Estimated.

KANKAKEE RIVER AT DAVIS, IND.

LOCATION.—Chain gage in sec. 13, T. 34 N., R. 3 W., at highway bridge on United States route 30, 4 miles east of Hanna.
DRAINAGE AREA.—510 square miles.
RECORDS AVAILABLE.—April to September, 1931.
EXTREMES.—Maximum discharge during period, 665 second-feet June 7 (gage height, 5.97 feet); minimum, 243 second-feet on various dates.
REMARKS.—Records good.

Daily and monthly discharge, in second-feet, 1931

Day	Apr.	May	June	July	Aug.	Sept.	Day	Apr.	May	June	July	Aug.	Sept.
1	-------	394	394	378	271	257	16	-------	512	394	300	257	300
2	-------	394	394	362	271	257	17	-------	461	378	315	257	330
3	-------	378	378	362	285	271	18	-------	444	362	330	257	300
4	-------	362	378	346	271	257	19	362	444	362	330	243	285
5	-------	362	394	330	271	257	20	362	512	362	294	257	271
6	-------	362	444	330	271	257	21	461	546	362	378	243	271
7	-------	378	665	330	257	257	22	461	495	362	346	243	271
8	-------	410	648	315	257	243	23	461	444	427	330	243	271
9	-------	427	563	300	285	243	24	444	410	529	315	243	257
10	-------	461	512	300	271	243	25	427	427	495	300	243	271
11	-------	495	495	300	271	243	26	444	394	444	300	243	285
12	-------	512	461	300	271	243	27	461	394	427	285	243	300
13	-------	648	444	300	271	243	28	427	378	410	285	285	300
14	-------	648	427	300	271	243	29	427	362	394	285	271	300
15	-------	631	394	300	257	271	30	394	394	394	271	271	285
							31	-------	394	-------	271	271	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
April 19-30	461	362	428	0.839	0.37
May	648	362	448	.878	1.01
June	665	362	436	.855	.95
July	394	271	319	.625	.72
August	285	243	262	.514	.59
September	330	243	269	.527	.59

KANKAKEE RIVER AT SHELBY, IND.

LOCATION.—Chain gage in sec. 33, T. 32 N., R. 8 W., at highway bridge 1 mile south of Shelby.
DRAINAGE AREA.—1,760 square miles.
RECORDS AVAILABLE.—April, 1930, to September, 1931.
EXTREMES.—Maximum discharge during period of record, 3,870 second-feet Apr. 21, 22, 1930 (gage height, 8.00 feet); minimum, 542 second-feet Aug. 27 to Sept. 1, Sept. 18, 19, 21–23, 1930 (gage height, 1.40 feet).
REMARKS.—Records good except those for periods of ice effect, Dec. 2–6, 25–27, 31, Jan. 1–6, 16–25, which are fair.

Daily discharge, in second-feet, 1930–31

Day	Apr.	May	June	July	Aug.	Sept.	Day	Apr.	May	June	July	Aug.	Sept.
1930							1930						
1	2,510	2,570	1,180	830	587	542	16	2,020	1,470	955	655	570	555
2	2,750	2,510	1,220	790	587	630	17	2,690	1,420	955	630	630	555
3	2,810	2,330	1,180	750	570	685	18	3,170	1,470	1,040	630	607	542
4	2,810	2,220	1,140	750	570	655	19	3,450	1,520	1,000	607	587	542
5	2,750	2,070	1,090	750	570	607	20	3,730	1,620	955	607	570	555
6	2,570	2,020	1,140	750	587	607	21	3,870	1,720	870	607	570	542
7	2,270	1,920	1,180	790	630	587	22	3,870	1,720	910	607	555	542
8	2,120	1,820	1,140	715	630	570	23	3,800	1,620	870	607	570	542
9	1,920	1,720	1,090	715	655	570	24	3,800	1,520	870	607	555	555
10	1,820	1,620	1,090	715	655	570	25	3,730	1,420	830	587	555	555
11	1,770	1,620	1,140	685	655	555	26	3,590	1,420	910	587	555	570
12	1,720	1,570	1,000	685	607	555	27	3,450	1,320	870	607	542	587
13	1,620	1,520	1,000	655	587	555	28	3,310	1,320	870	607	542	555
14	1,620	1,520	1,090	655	587	570	29	2,990	1,320	830	685	542	555
15	1,570	1,520	955	655	570	555	30	2,750	1,270	790	655	542	555
							31	-------	1,270	-------	607	542	------

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1930-31												
1	555	587	1,220	700	685	715	1,820	1,320	1,220	1,090	685	607
2	555	607	1,250	750	655	715	1,620	1,220	1,220	1,040	655	630
3	555	607	1,250	800	655	715	1,620	1,220	1,220	1,040	685	630
4	555	587	1,200	900	655	715	1,570	1,140	1,140	1,000	655	655
5	555	587	1,100	1,000	655	685	1,520	1,140	1,140	955	655	630
6	555	587	1,000	1,100	655	685	1,520	1,140	1,220	910	630	607
7	555	587	955	1,000	685	685	1,420	1,220	1,420	910	607	607
8	587	570	910	790	655	630	1,370	1,320	1,770	870	607	587
9	587	570	870	750	715	607	1,320	1,470	1,920	830	655	587
10	570	587	910	715	715	630	1,370	1,570	1,920	830	655	587
11	555	587	830	685	715	655	1,370	1,620	1,720	750	715	570
12	555	587	830	685	715	655	1,320	1,720	1,570	790	715	587
13	555	587	790	715	715	655	1,270	1,720	1,470	790	630	570
14	555	587	790	685	715	715	1,220	1,720	1,370	750	607	570
15	555	587	790	655	715	715	1,320	1,720	1,270	715	607	587
16	570	607	750	700	750	830	1,370	1,720	1,220	715	607	685
17	607	587	715	800	790	955	1,320	1,570	1,180	750	587	685
18	587	587	790	750	750	1,090	1,220	1,470	1,140	715	587	715
19	587	587	790	725	790	1,180	1,220	1,370	1,090	750	630	685
20	587	587	790	700	750	1,220	1,220	1,470	1,000	830	607	655
21	587	587	715	700	790	1,320	1,320	1,470	1,000	830	607	655
22	587	587	715	725	790	1,470	1,570	1,620	955	870	587	630
23	587	587	715	750	790	1,520	1,620	1,720	1,040	790	587	655
24	587	587	715	750	790	1,520	1,620	1,570	1,140	750	570	655
25	587	587	800	750	750	1,470	1,520	1,420	1,220	715	570	655
26	570	607	900	790	750	1,420	1,520	1,370	1,320	715	587	685
27	587	790	750	750	715	1,420	1,520	1,270	1,270	715	587	715
28	587	790	715	715	715	1,470	1,520	1,220	1,270	685	607	715
29	587	790	715	715	-------	1,670	1,420	1,180	1,090	685	630	715
30	587	910	685	685	-------	1,820	1,370	1,140	1,040	655	630	685
31	570	-------	700	715	-------	1,920	-------	1,180	-------	655	607	------

Monthly discharge, in second-feet, of Kankakee River at Shelby, Ind., 1930–31

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
1930					
April	3,870	1,570	2,760	1.57	1.75
May	2,570	1,270	1,680	.955	1.10
June	1,220	790	1,010	.574	.64
July	830	587	670	.381	.44
August	655	542	583	.331	.38
September	685	542	571	.324	.36
1930–31					
October	607	555	573	.326	.38
November	910	570	620	.352	.39
December	1,250	685	860	.489	.56
January	1,100	655	763	.434	.50
February	790	655	722	.410	.43
March	1,920	607	1,050	.597	.69
April	1,820	1,220	1,430	.812	.91
May	1,720	1,140	1,420	.807	.93
June	1,920	955	1,290	.733	.82
July	1,090	655	810	.460	.53
August	715	570	624	.355	.41
September	715	570	640	.364	.41
The year	1,920	555	900	.511	6.96

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, 1931.

EXTREMES.—Maximum discharge during year, 2,500 second-feet May 12–13 (gage height, 3.10 feet); minimum, 525 second-feet Oct. 1, 2, 18 (gage height, 1.75 feet).

1905–6; 1915–1931: Maximum discharge, 12,600 second-feet Jan. 22, 1916; minimum, 306 second-feet Sept. 1, 16, 17, 1919 (gage height, 1.37 feet).

REMARKS.—Records good except those for ice period, Dec. 21 to Jan. 26, which are fair.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	525	602	580		e 715	e 760	1,940	1,470	1,390	1,190	900	744
2	525	e 620	1,050		738	750	1,860	1,400	1,380	1,190	900	755
3	e 550	624	1,050		738	750	1,860	1,340	1,380	1,190	843	766
4	569	624	1,050		762	774	1,860	1,340	1,320	1,190	843	777
5	e 570	602	1,050		726	774	e1,780	1,340	1,260	1,130	821	744
6	569	602	1,180		726	726	1,690	1,340	1,450	1,130	799	733
7	569	602	e1,120		726	e 740	1,610	1,470	1,800	1,070	755	689
8	591	602	1,050		e 750	e 760	1,540	1,690	2,030	1,020	733	667
9	591	602	990		750	774	1,470	1,860	2,030	1,020	799	645
10	591	602	990		726	613	1,540	2,120	2,030	958	843	645
11	591	602	930		726	657	1,540	2,310	2,030	958	900	623
12	e 590	602	930		750	690	1,540	2,500	1,880	900	900	602
13	591	602	930		774	726	1,470	2,500	1,730	900	843	602
14	569	602	e 930	e 680	774	798	1,400	2,220	1,660	900	788	592
15	569	646	930		e 780	e 860	1,470	2,120	1,520	900	744	623
16	547	646	810		798	930	1,470	2,120	1,380	900	733	777
17	547	646	668		870	1,050	1,470	1,940	1,380	900	722	900
18	525	646	646		810	1,180	1,400	1,860	1,320	900	689	843
19	e 550	624	602		870	1,240	1,400	1,860	1,260	900	766	799
20	580	624	870		810	1,310	1,400	2,220	1,190	1,190	755	777
21	580	580			870	1,580	1,690	2,120	1,130	1,070	832	777
22	602	558			e 870	e1,620	2,030	1,940	1,130	1,070	700	733
23	602	558			870	1,660	1,940	1,860	1,320	1,020	689	755
24	580	558			810	1,660	1,860	1,770	1,520	958	689	755
25	580	580			810	1,660	1,770	1,770	1,380	900	667	777
26	e 590	558	e 660		798	1,580	1,770	1,610	1,450	900	667	799
27	602	e 525		870	798	1,510	1,690	1,540	1,380	900	667	799
28	580	536		786	774	1,830	1,690	1,470	1,320	843	810	821
29	580	558		786	------	e1,380	1,610	1,400	1,260	810	788	843
30	580	e 580		762	------	1,920	1,540	1,400	1,190	788	744	832
31	580	------		714	------	2,020	------	1,400	------	788	733	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	602	525	573	0.245	0.28
November	646	525	597	.255	.28
December	1,180	580	826	.353	.41
January	------	------	697	.298	.34
February	870	715	783	.335	.35
March	2,020	613	1,150	.491	.57
April	2,030	1,400	1,640	.701	.78
May	2,500	1,340	1,780	.761	.88
June	2,030	1,130	1,480	.632	.71
July	1,190	788	983	.420	.48
August	900	667	776	.332	.38
September	900	592	740	.316	.35
The year	2,500	525	1,000	.427	5.81

e Estimated.

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, a quarter of a mile above Horse Creek. Zero of gage is 531.27 feet above mean sea level.

DRAINAGE AREA.—4,870 square miles.

RECORDS AVAILABLE.—November, 1914, to September, 1931.

EXTREMES.—Maximum discharge during year, 6,270 second-feet May 12 (gage height, 8.20 feet); minimum, 439 second-feet Nov. 6 (gage height, 4.98 feet). 1914–1931: 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 fair except those estimated, Dec. 22–31, Jan. 6–14, which are poor. Small amount of regulation above.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	630	680	840	630	960	1,020	2,780	2,220	2,130	1,460	900	730
2	630	680	1,020	567	960	960	2,780	2,130	2,040	1,380	960	785
3	630	680	1,460	840	960	960	2,590	1,960	1,960	1,460	900	840
4	630	680	1,380	840	840	960	2,590	1,780	1,870	2,310	840	1,020
5	630	680	1,380	900	900	900	2,590	1,700	1,780	3,180	785	900
6	630	532	1,380	850	960	900	2,400	1,700	1,870	3,820	785	840
7	621	680	1,460	825	960	960	2,310	1,870	3,180	2,980	785	840
8	630	680	1,460	800	960	960	2,220	2,400	4,980	2,130	680	840
9	612	680	1,460	800	960	1,090	2,130	3,600	5,230	1,700	785	680
10	630	680	1,380	800	960	900	2,220	5,230	4,740	1,380	840	680
11	621	730	1,300	775	960	900	2,130	5,740	4,040	1,230	840	730
12	612	730	1,230	775	960	840	2,130	6,270	3,600	1,160	785	730
13	594	730	1,090	775	960	960	2,130	6,000	4,040	1,090	840	730
14	621	730	1,160	775	785	1,160	2,040	5,230	4,270	1,020	900	680
15	612	730	1,090	730	1,380	1,160	1,960	4,740	4,040	900	840	594
16	621	730	1,230	621	1,020	1,300	1,960	4,270	3,390	960	840	730
17	621	730	1,380	594	960	1,230	1,960	3,600	2,780	900	840	840
18	621	730	680	785	960	1,380	1,870	3,180	2,310	900	680	1,160
19	621	730	730	1,160	960	1,700	1,870	2,980	1,960	960	730	1,300
20	630	730	785	960	960	1,870	1,870	3,820	1,700	1,300	900	1,460
21	630	730	1,090	1,230	960	2,130	2,310	4,740	1,620	2,590	840	1,380
22	630	730	1,020	840	960	2,400	2,980	4,270	1,540	3,390	680	1,300
23	630	730	975	680	960	2,310	3,600	3,820	3,180	3,600	785	1,090
24	630	730	925	785	1,020	2,400	3,820	3,390	3,390	2,590	680	960
25	621	730	900	1,230	960	2,400	3,600	3,180	3,180	1,700	680	960
26	630	630	850	1,090	900	2,310	3,600	2,780	2,590	1,300	680	900
27	680	508	800	1,020	960	2,310	3,390	2,400	2,220	1,160	680	900
28	680	576	775	1,020	960	2,540	2,780	2,220	2,040	1,020	730	960
29	630	900	750	1,020	------	2,780	2,590	2,040	1,700	900	730	900
30	680	1,020	725	960	------	2,780	2,400	1,960	1,540	900	785	1,020
31	680	------	675	960	------	2,590	------	2,130	------	900	840	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	680	594	631	0.130	0.15
November	1,020	508	708	.145	.16
December	1,460	----------	1,080	.222	.26
January	1,230	567	859	.176	.20
February	1,380	785	964	.198	.21
March	2,780	840	1,580	.324	.37
April	3,820	1,870	2,520	.517	.58
May	6,270	1,700	3,330	.684	.79
June	5,230	1,540	2,830	.581	.65
July	3,820	900	1,690	.347	.40
August	960	680	792	.163	.19
September	1,460	594	916	.188	.21
The year	6,270	508	1,490	.306	4.17

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 is 598.27 feet above mean sea level.

DRAINAGE AREA.—2,120 square miles.

RECORDS AVAILABLE.—April, 1923, to September, 1931.

EXTREMES.—Maximum discharge during year, 3,100 second-feet May 11, 12 (gage height, 5.00 feet); minimum, 25 second-feet Nov. 3–5 (gage height, 0.71 foot).

1923–1931: 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 October to January and July 19–24, which are fair. Discharge estimated because of ice Nov. 28–29, Dec. 29 to Jan. 3, Jan. 6–27.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	38	28	84	102	91	74	428	630	620	375	149	121
2	42	28	91	106	91	84	400	570	510	310	133	141
3	42	25	91	110	91	77	375	455	455	790	117	129
4	40	25	98	114	77	71	400	400	428	1,600	110	129
5	35	26	106	114	77	84	400	350	400	2,620	106	117
6	35	52	121	114	84	87	428	345	482	2,520	98	117
7	40	58	145	110	84	81	428	690	970	2,000	98	110
8	45	58	153	110	84	84	375	1,090	2,260	1,300	91	98
9	50	48	178	117	84	84	340	1,940	2,000	760	87	91
10	35	42	190	117	84	91	345	2,700	1,760	482	77	81
11	45	45	199	102	77	84	375	3,100	1,520	400	65	71
12	50	50	207	87	77	77	400	2,930	1,300	325	114	65
13	45	50	216	81	77	87	375	2,720	1,680	262	129	65
14	48	45	216	74	71	87	375	2,430	1,920	220	133	68
15	52	52	225	71	77	117	330	2,080	1,920	199	125	74
16	48	91	230	87	87	141	300	1,600	1,440	182	117	84
17	42	91	203	102	81	173	271	1,300	1,040	207	110	102
18	42	77	186	87	87	220	252	1,100	648	165	102	178
19	42	71	161	81	91	252	252	910	538		98	482
20	42	74	129	74	81	315	252	1,370	455		98	702
21	38	68	106	71	84	330	600	1,520	428	565	91	675
22	38	61	84	71	87	340	950	1,680	350		98	565
23	40	68	84	74	77	375	1,160	1,520	510		98	482
24	40	74	91	77	84	375	1,620	1,230	790		91	375
25	40	87	91	84	84	340	1,300	1,040	702	592	84	315
26	40	102	98	87	84	310	1,090	970	565	455	74	286
27	40	95	91	91	91	335	1,020	850	510	295	65	257
28	35	91	91	91	61	345	880	702	482	271	58	243
29	35	84	91	91	------	330	780	565	428	238	52	230
30	30	77	87	77	------	350	720	482	375	194	68	216
31	30	------	95	84	------	400	------	620	------	161	95	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	52	30	40.8	0.019	0.02
November	----------	25	61.4	.029	.03
December	230	84	137	.065	.07
January	----------	----------	92.2	.043	.05
February	91	61	82.3	.039	.04
March	400	71	200	.094	.11
April	1,620	252	574	.271	.30
May	3,100	345	1,290	.608	.70
June	2,260	350	916	.432	.48
July	2,620	161	655	.309	.36
August	149	52	97.8	.046	.05
September	702	65	222	.105	.12
The year	3,100	25	365	.172	2.33

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, 1931.

DRAINAGE AREA.—1,340 square miles.

EXTREMES.—Maximum discharge during year, 755 second-feet Mar. 30, 31 (gage height, 1.67 feet); minimum, 47 second-feet Sept. 4–6, 11–13 (gage height, 0.74 foot).

1915–1931: Maximum discharge, 7,120 second-feet Mar. 31, 1916 (gage height, 5.3 feet); minimum, that of 1931.

REMARKS.—Records good. Discharge occasionally regulated at dam 16 miles above gage.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	205	246	e 350	219	e 367	367	755	198	254	317	115	72
2	205	246	359	e 219	367	333	690	198	254	350	115	63
3	205	261	e 359	219	e 375	333	660	198	212	359	115	54
4	205	261	359	e 240	384	350	650	185	212	317	110	47
5	205	276	e 359	261	e 375	350	650	142	261	292	105	47
6	192	276	359	e 255	367	333	630	148	284	205	105	47
7	192	205	e 340	246	e 360	269	570	142	317	192	105	54
8	292	131	325	e 246	350	198	580	137	350	160	115	54
9	325	154	e 315	246	e 340	160	580	137	276	137	110	54
10	325	292	309	e 246	333	178	491	160	261	137	95	54
11	342	292	e 309	246	e 325	219	437	212	284	148	86	47
12	325	325	309	e 255	317	261	309	232	269	148	81	47
13	325	359	e 300	261	e 317	333	212	160	269	137	63	50
14	325	464	292	e 270	317	367	219	142	284	137	63	54
15	342	482	e 275	276	e 310	367	269	185	284	148	72	86
16	342	309	261	e 276	300	384	239	212	261	148	72	90
17	309	376	e 270	276	350	384	212	137	226	148	63	90
18	276	428	276	e 276	384	393	219	142	212	148	63	81
19	342	660	e 276	276	393	419	212	178	205	142	72	90
20	342	580	276	e 270	367	419	246	137	205	137	72	90
21	376	580	e 270	261	350	455	261	172	212	126	72	90
22	359	376	261	e 255	350	455	269	269	540	137	72	90
23	359	342	e 245	246	367	473	284	284	550	131	72	90
24	359	292	232	e 246	367	491	284	284	550	115	72	90
25	342	309	e 225	246	350	491	300	317	550	115	63	110
26	325	309	219	e 280	350	530	300	325	530	115	63	131
27	292	309	e 210	309	367	690	300	333	530	115	68	137
28	292	359	205	e 330	401	755	284	284	530	126	81	131
29	292	342	e 205	359	------	755	261	350	446	126	81	120
30	276	342	205	e 365	------	755	212	359	350	115	81	100
31	246	------	e 210	367	------	755	------	300	------	115	77	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	376	192	295	0.220	0.25
November	660	131	339	.253	.28
December	359	205	283	.211	.24
January	367	219	269	.201	.23
February	401	300	354	.264	.27
March	755	160	420	.313	.36
April	755	212	386	.288	.32
May	359	137	215	.160	.18
June	550	205	331	.247	.28
July	359	115	169	.126	.15
August	115	63	83.8	.063	.07
September	137	47	78.7	.059	.07
The year	755	47	273	.204	2.70

e 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, 1931.

EXTREMES.—Maximum mean daily discharge during year, 4,140 second-feet June 24; minimum, 151 second-feet Aug. 17.

1925–1931: Maximum mean daily discharge, 14,300 second-feet Apr. 1, 1929; minimum, that of Aug. 17, 1931.

REMARKS.—Records fair. Daily discharge computed from electrical output of power plant and flow over dam. Records collected by North Counties Hydroelectric Co., under general supervision of United States Geological Survey, in connection with a Federal Power Commission project.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	349	417	853	364	586	445	1,750	460	927	894	244	495
2	304	392	644	305	515	393	1,540	491	745	792	200	586
3	320	332	738	349	610	536	1,450	414	677	897	200	302
4	304	389	762	392	578	540	1,380	403	606	814	184	268
5	304	431	538	393	562	462	1,230	432	460	515	167	244
6	332	432	610	348	514	463	1,200	443	1,080	514	167	282
7	415	392	540	404	602	463	1,340	494	2,330	514	153	200
8	931	351	538	402	562	202	1,090	419	2,750	475	224	183
9	1,030	331	559	393	564	622	996	418	2,350	477	244	184
10	743	331	580	365	582	559	1,010	393	1,750	394	184	182
11	652	321	515	365	522	465	973	436	1,380	365	184	201
12	483	331	482	334	517	437	811	699	1,170	364	167	183
13	444	468	494	303	515	395	699	714	1,100	305	199	166
14	532	390	517	350	405	383	562	602	880	284	302	184
15	555	350	1,170	305	336	492	602	580	809	320	202	184
16	557	348	351	282	514	580	515	538	762	305	184	184
17	564	559	225	349	494	806	775	448	784	285	151	184
18	536	538	607	363	517	947	649	447	564	321	183	184
19	516	534	574	324	445	889	445	694	491	349	223	183
20	378	557	445	245	478	874	489	1,320	538	334	184	200
21	487	873	414	332	540	1,150	828	1,270	488	268	166	183
22	538	629	321	364	478	1,010	988	979	694	363	164	183
23	492	534	440	321	463	992	961	947	3,240	269	184	244
24	491	441	390	378	514	1,010	697	724	4,140	267	201	183
25	463	644	390	492	514	964	709	610	3,220	302	166	515
26	473	492	444	538	494	896	606	709	2,370	245	166	515
27	390	270	332	580	437	964	538	1,080	1,750	224	153	351
28	487	319	472	964	477	1,600	647	540	1,360	183	268	244
29	512	616	334	831	-------	2,740	606	515	1,080	182	166	266
30	432	1,180	226	762	-------	2,300	514	624	1,050	200	223	282
31	473	-------	303	649	-------	2,060	-------	871	-------	222	166	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	1,030	304	500	0.195	0.22
November	1,180	270	473	.184	.21
December	1,170	225	510	.198	.23
January	964	245	424	.165	.19
February	610	336	512	.199	.21
March	2,740	202	859	.334	.39
April	1,750	445	887	.345	.38
May	1,320	393	636	.247	.28
June	4,140	460	1,380	.537	.60
July	897	182	395	.154	.18
August	302	151	193	.075	.09
September	586	166	258	.101	.11
The year	4,140	151	585	.228	3.09

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, 1931.

EXTREMES.—Maximum discharge during year, 2,870 second-feet Sept. 15 (gage height, 6.69 feet); minimum, 31 second-feet Nov. 17–25 (gage height, 0.97 foot).

1921–1931: 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 of discharge below 40 second-feet in August and September, which are fair.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	33	32	81	34	33	33	78	58	370	142	63	73
2	33	32	72	34	33	33	70	55	292	123	57	73
3	33	32	64	34	33	33	81	53	255	123	50	67
4	32	32	59	34	33	33	95	50	230	385	46	54
5	32	32	51	34	33	33	102	46	242	600	43	49
6	32	32	47	34	33	35	90	48	385	400	47	45
7	44	32	43	34	34	36	81	48	560	292	46	39
8	40	32	43	33	34	36	74	60	600	230	44	36
9	36	32	41	33	35	36	70	80	525	183	44	34
10	36	32	41	33	35	36	68	118	430	161	44	34
11	35	32	41	33	34	36	66	118	370	132	43	34
12	35	32	40	33	34	37	63	144	355	121	59	34
13	35	32	40	33	33	38	60	164	292	114	91	34
14	35	32	40	33	33	38	55	175	280	103	70	36
15	35	32	40	33	33	38	55	186	242	99	57	2,160
16	35	32	39	33	36	40	55	164	230	91	52	815
17	33	31	39	33	36	42	54	144	205	81	47	310
18	33	31	37	33	36	44	54	135	183	78	45	242
19	33	31	37	33	36	49	53	330	161	99	255	194
20	32	31	36	33	35	55	53	1,470	152	205	73	161
21	33	31	35	33	35	58	60	1,290	218	255	47	123
22	33	31	35	33	35	59	58	1,020	142	255	45	385
23	33	31	35	33	35	58	59	770	142	255	41	218
24	33	31	34	33	35	55	68	640	268	205	38	172
25	33	31	34	33	34	55	87	525	490	161	38	142
26	33	33	34	33	34	53	82	430	460	116	39	132
27	33	34	34	33	33	56	74	385	325	99	36	123
28	33	34	34	33	33	63	70	325	230	86	78	103
29	32	34	34	33	-------	110	67	280	172	78	86	94
30	32	62	34	33	-------	110	63	280	161	71	73	87
31	32	-------	34	33	-------	89	-------	400	-------	67	67	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	44	32	33.9	0.031	0.04
November	62	31	32.9	.030	.03
December	81	34	42.2	.038	.04
January	34	33	33.2	.030	.03
February	36	33	34.1	.031	.03
March	110	33	49.3	.045	.05
April	102	53	68.8	.063	.07
May	1,470	46	322	.293	.34
June	600	142	299	.272	.30
July	600	67	175	.159	.18
August	255	36	60.1	.055	.06
September	2,160	34	203	.185	.21
The year	2,160	31	113	.103	1.38

SPOON RIVER AT SEVILLE, ILL.

LOCATION.—Chain gage in SW. ¼ sec. 24, T. 6 N., R. 1 E., at Toledo, Peoria & Western Railroad bridge in Seville. Zero of gage is 467.7[illegible] feet above mean sea level.

DRAINAGE AREA.—1,600 square miles.

RECORDS AVAILABLE.—July, 1914, to September, 1931.

EXTREMES.—Maximum discharge during year, 3,560 second-feet June 7 (gage height, 10.36 feet); minimum, 42 second-feet Nov. 28.

1914–1931: 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 poor. Discharge estimated because of ice, Nov. 28, 29, Dec. 19–31, Jan. 1–8, 14–17, 21–26.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	126	72	1,980	44	160	82	582	264	625	180	50	1,020
2	86	64	815	47	144	73	481	264	540	172	47	1,320
3	64	60	481	48	158	78	815	235	444	1,160	124	1,540
4	70	75	500	53	144	79	582	235	405	462	170	815
5	58	64	425	57	126	79	500	221	677	294	144	520
6	50	61	374	57	86	78	425	250	2,690	207	80	408
7	1,220	57	310	72	82	82	390	250	3,500	168	67	310
8	425	55	250	80	310	86	374	279	2,570	130	56	221
9	1,060	66	235	97	194	128	357	444	1,700	111	51	207
10	582	63	207	101	155	111	357	500	1,320	130	294	194
11	310	61	178	105	126	109	341	582	1,120	126	390	180
12	207	59	162	86	122	139	310	520	1,060	130	180	175
13	137	53	144	75	117	294	279	582	1,060	113	91	162
14	124	53	148	66	90	425	264	540	960	119	73	160
15	86	64	139	57	64	540	250	520	765	115	63	3,240
16	180	72	80	62	90	462	235	444	717	109	52	1,120
17	194	75	62	68	111	341	221	408	583	84	47	374
18	113	78	58	79	117	374	235	481	520	84	57	235
19	79	80	91	85	117	341	235	915	481	79	582	194
20	71	117	66	88	115	310	250	1,060	425	500	815	160
21	76	72	63	82	109	279	408	1,060	390	310	965	194
22	79	70	86	76	153	250	815	865	374	221	462	134
23	73	67	76	73	88	221	520	670	341	141	310	101
24	71	67	56	73	86	207	444	625	317	93	250	132
25	76	64	73	76	90	207	425	540	270	88	221	462
26	79	52	68	80	93	194	408	500	264	78	207	374
27	76	45	63	93	101	235	390	462	235	66	194	625
28	72	42	60	117	93	915	341	425	221	66	134	520
29	70	48	48	172	------	1,160	325	390	207	62	180	294
30	67	1,380	48	194	------	865	279	625	194	58	194	194
31	70	------	47	207	------	717	------	625	------	50	194	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	1,220	50	195	0.122	0.14
November	1,380	42	109	.068	.08
December	1,980	47	238	.149	.17
January	207	44	86.1	.054	.06
February	310	64	123	.077	.08
March	1,160	73	305	.191	.22
April	815	221	395	.247	.28
May	1,060	221	509	.318	.37
June	3,500	194	833	.521	.58
July	1,160	50	184	.115	.13
August	965	47	218	.136	.16
September	3,240	101	520	.325	.36
The year	3,500	42	309	.193	2.63

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, 1931.

EXTREMES.—Maximum discharge during year, 1,740 second-feet Sept. 19 (gage height, 10.53 feet); minimum, 3.4 second-feet Oct. 31, Nov. 1 (gage height, 2.0 feet).

1908–1912; 1914–1931: Maximum discharge, 15,400 second-feet Oct. 4, 1926 (gage height, 18.4 feet); minimum, 1 second-foot July 31 to Aug. 3, 1914, Aug. 6–10, 13, 27, 28, Sept. 6, 11–14, 21–23, 1930.

REMARKS.—Records good except those prior to Feb. 22, which are fair, and those estimated, which are poor.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	5.7	3.4	21	e5.0	8.9	e10	37	61	114	72	33	58
2	8.9	e5.0	26	5.0	8.9	9.1	35	46	98	61	e25	41
3	6.8	6.8	21	5.0	8.9	9.1	30	e42	86	119	19	33
4	6.8	11	17	e6.0	8.9	9.1	28	40	82	203	15	52
5	e6.0	8.9	21	6.8	8.9	9.1	e40	38	146	e300	14	37
6	5.0	8.9	31	8.9	8.9	9.9	38	37	155	243	13	e25
7	5.0	8.9	e28	11	11	10	37	37	e175	193	12	17
8	11	6.8	26	11	e14	e13	31	44	213	110	11	15
9	8.9	e8.0	21	8.9	11	12	27	57	193	86	e15	14
10	6.8	8.9	17	8.9	8.9	12	25	e155	146	72	16	13
11	6.8	8.9	14	e8.9	8.9	9.9	24	253	114	55	374	12
12	e6.0	11	14	8.9	11	10	e23	273	102	e45	450	8.9
13	5.0	11	11	11	11	12	22	273	119	41	213	e8.6
14	5.0	8.9	e10	14	8.9	12	22	273	e100	36	119	8.3
15	5.0	8.9	8.9	11	e10	e14	22	243	86	33	82	524
16	5.0	e8.0	e7.6	11	11	17	21	193	69	30	e60	628
17	5.0	6.8	e6.8	8.9	11	22	20	e115	64	23	46	835
18	5.0	6.8	e6.1	e12	11	28	18	57	52	18	38	1,410
19	e5.0	6.8	e5.5	11	11	29	e25	46	46	e35	35	1,740
20	5.0	6.8	e5.4	8.9	11	28	30	69	43	41	29	e1,100
21	5.0	6.8	e5.2	8.9	8.9	26	61	326	e40	164	24	418
22	5.0	6.8	e5.0	8.9	e10	e26	134	504	58	326	20	315
23	5.0	e9.0	e5.0	8.9	10	25	213	338	263	253	e20	243
24	5.0	11	e5.0	8.9	9.6	26	183	e290	628	203	19	203
25	5.0	8.9	e5.0	e8.9	9.6	27	134	253	486	110	16	173
26	e5.0	e7.8	e5.0	8.9	9.6	26	e115	213	388	e85	15	154
27	5.0	e6.8	e5.0	8.9	9.6	28	94	183	213	58	23	e200
28	5.0	e7.8	e5.0	8.9	9.6	34	89	146	e160	46	119	183
29	5.0	17	e5.0	8.9	-------	e45	81	128	110	41	183	136
30	5.0	e19	e5.0	8.9	-------	40	69	119	86	38	e130	102
31	3.4	-------	e5.0	8.9	-------	38	-------	e119	-------	35	86	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	11	3.4	5.71	0.010	0.01
November	19	3.4	8.71	.016	.02
December	31	5.0	12.0	.022	.03
January	14	5.0	9.03	.016	.02
February	14	8.9	10.0	.018	.02
March	45	9.1	20.2	.037	.04
April	213	18	57.6	.105	.12
May	504	37	160	.291	.34
June	628	40	154	.280	.31
July	326	18	102	.185	.21
August	450	11	73.4	.133	.15
September	1,740	8.3	290	.527	.59
The year	1,740	3.4	75.3	.137	1.86

e Estimated.

SANGAMON RIVER AT RIVERTON, ILL.

LOCATION.—Chain gage in SW. ¼ sec. 9, T. 16 N., R. 4 W., at Wabash Railway 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, 1931.

EXTREMES.—Maximum discharge during year, 1,040 second-feet July 5 (gage height, 11.53 feet); minimum, 23 second-feet Nov. 5 (gage height, 7.39 feet). 1908–1912; 1914–1931: 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 except those below 50 second-feet, which are fair. Some regulation of low-water flow and seasonal storage by municipal reservoir at Decatur. Discharge estimated because of ice Dec. 23, 24, 28–31, Jan. 1.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	44	26	71	28	27	34	164	304	365	298	62	82
2	39	26	68	28	27	34	155	272	338	203	62	261
3	31	25	68	28	28	33	128	232	311	182	62	298
4	32	25	73	29	28	33	120	212	286	192	44	298
5	33	23	111	30	30	33	120	192	298	1,040	37	152
6	36	24	146	32	32	36	108	174	532	800	92	77
7	63	25	94	32	33	37	96	183	532	532	67	68
8	44	26	60	29	34	37	92	192	504	476	37	57
9	48	28	46	29	36	39	92	202	590	392	41	52
10	38	28	36	31	36	48	104	212	710	311	44	45
11	32	26	36	31	36	51	120	222	560	236	57	40
12	32	26	35	32	36	48	128	232	476	192	52	34
13	32	27	30	31	37	52	128	304	420	162	40	38
14	33	29	28	31	36	102	120	371	365	128	32	29
15	35	29	28	31	35	155	108	394	311	107	77	29
16	33	28	27	31	35	232	102	394	286	87	142	68
17	32	28	27	31	38	212	102	371	248	80	124	86
18	30	27	29	31	39	192	96	371	203	63	96	162
19	29	27	32	33	40	192	86	371	172	65	74	448
20	29	29	32	34	40	202	91	541	142	532	72	620
21	30	29	30	34	38	183	137	643	152	650	105	740
22	29	29	29	32	37	155	212	770	225	338	96	830
23	28	29	28	30	36	155	272	680	420	214	67	800
24	31	29	28	34	36	120	326	650	740	182	48	710
25	34	28	28	35	36	109	348	650	620	203	38	504
26	39	27	28	34	35	104	394	650	476	203	32	365
27	33	29	29	32	35	120	418	620	476	182	29	274
28	31	34	28	31	34	137	394	532	476	112	72	248
29	29	57	28	31	------	183	348	476	420	87	142	225
30	28	61	28	29	------	192	304	420	365	80	122	192
31	27	------	28	27	------	183	------	365	------	68	79	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	63	27	34.3	0.013	0.01
November	61	23	29.5	.012	.01
December	146	27	44.8	.018	.02
January	35	27	31.0	.012	.01
February	40	27	34.6	.014	.01
March	232	33	111	.043	.05
April	418	86	180	.070	.08
May	770	174	394	.154	.18
June	740	142	401	.157	.18
July	1,040	63	271	.106	.12
August	142	29	69.2	.027	.03
September	830	29	261	.102	.11
The year	1,040	23	155	.061	.81

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 and 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, 1931.

EXTREMES.—Maximum discharge during year, 3,480 second-feet Sept. 18 (gage height, 5.52 feet); minimum, 116 second-feet Jan. 21 (gage height 0.53 foot).

1909–1912, 1914–1919, 1921–22, 1929–1931: Maximum discharge (revised determination), 37,600 second-feet Apr. 14, 1922 (gage height, 19.84 feet); minimum, 85 second-feet Aug. 30, 31, Nov. 27, Dec. 2, 1914.

REMARKS.—Records good except those for period of ice effect, Nov. 27–28, Dec. 14–31, Jan. 1–8, 14–23, which are fair. Discharge estimated Mar. 7, Sept. 20–27. Gage height record furnished by Sanitary District of Chicago.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	222	141	290	155	173	177	530	655	1,230	715	372	578
2	198	158	310	183	161	177	485	630	1,160	660	330	688
3	190	155	495	170	161	177	740	605	1,090	605	310	830
4	172	162	395	165	157	177	555	530	1,020	550	290	770
5	176	144	350	165	161	177	555	530	1,020	830	290	632
6	172	155	328	162	161	177	555	530	1,580	1,300	290	522
7	218	155	328	160	173	240	508	508	2,040	1,440	290	470
8	190	162	305	158	181	305	485	555	2,280	1,020	310	350
9	194	144	263	157	189	157	462	680	1,960	890	310	310
10	214	155	259	173	181	185	462	980	1,800	770	420	290
11	198	155	259	173	185	193	462	1,100	1,650	660	770	270
12	183	155	250	173	181	217	462	1,160	1,510	578	605	254
13	158	162	238	157	201	234	440	1,160	1,160	522	495	242
14	155	162	220	157	181	284	440	1,160	1,230	470	395	242
15	162	162	205	156	185	305	440	1,230	1,090	420	350	578
16	176	162	190	180	193	350	418	1,160	955	395	290	2,280
17	172	186	180	168	205	418	395	1,100	890	350	290	3,390
18	162	176	175	171	201	440	372	1,100	830	350	330	3,300
19	155	172	178	175	201	462	372	1,160	770	330	350	2,040
20	169	169	182	165	205	462	395	1,960	688	372	495	2,000
21	155	169	170	150	197	485	418	3,300	1,090	1,580	495	2,800
22	166	169	167	153	197	485	440	3,210	1,160	2,200	470	3,300
23	176	169	165	157	201	440	508	2,850	890	1,580	372	3,800
24	155	169	163	161	197	440	580	2,520	955	1,160	330	3,700
25	155	169	163	169	197	395	655	2,200	1,300	830	310	3,200
26	158	148	163	173	197	372	680	2,040	1,230	688	290	2,300
27	152	145	160	173	197	372	740	1,880	1,020	605	395	1,600
28	152	145	159	173	181	418	770	1,720	890	578	350	1,230
29	152	206	158	173	-------	462	740	1,510	830	495	522	1,020
30	152	238	157	161	-------	485	710	1,370	830	445	522	955
31	144	-------	156	161	-------	530	-------	1,300	-------	395	495	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	222	144	173	0.035	0.04
November	238	141	164	.033	.04
December	495	----------	232	.046	.05
January	----------	----------	165	.033	.04
February	205	157	186	.037	.04
March	530	157	329	.066	.08
April	770	372	526	.105	.12
May	3,300	508	1,370	.274	.32
June	2,280	688	1,200	.240	.27
July	2,200	330	767	.153	.18
August	770	290	391	.078	.09
September	----------	242	1,460	.292	.33
The year	----------	141	581	.116	1.60

SOUTH FORK OF SANGAMON RIVER AT KINCAID, ILL.[1]

LOCATION.—Chain gage in NE. ¼ sec. 14, T. 13 N., R. 3 W., at highway bridge 100 feet below railway bridge, 1 mile southeast of Kincaid, and 6 miles below mouth of Bear Creek.

DRAINAGE AREA.—510 square miles.

RECORDS AVAILABLE.—May, 1917, to September, 1930; August and September, 1931.

EXTREMES.—Maximum discharge during year not determined; practically no flow Aug. 24–27 (gage height, 2.87 feet).

1917–1931: Maximum discharge, 11,800 second-feet Mar. 15, 1922 (gage height, 26.6 feet); no flow Aug. 29, Oct. 6–23, 1922.

REMARKS.—Records good; estimated values and discharges below 0.15 second-foot fair. No records Oct. 1 to Aug. 16. Discharge estimated Aug. 23, Sept. 13, 20, 27.

Daily and monthly discharge, in second-feet, 1931

Day	Aug.	Sept.	Day	Aug.	Sept.	Day	Aug.	Sept.
1		2.0	11		3.8	21	0.05	9.3
2		4.1	12		2.1	22	.02	10
3		8.4	13		1.0	23	.01	10
4		48	14		.35	24	0	21
5		37	15		1.6	25	0	58
6		29	16		2.2	26	0	55
7		24	17	0.15	2.1	27	0	30
8		18	18	.09	48	28	2.8	13
9		11	19	.09	29	29	17	7.8
10		6.8	20	.05	15	30	12	5.2
						31	5.4	

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
August 17–31	17	0	2.51	0.005	0.003
September	58	.35	17.1	.034	.04

[1] Published 1917–1929 as South Fork of Sangamon River at power plant near Taylorville, Ill.

CROOKED CREEK AT RIPLEY, ILL.

LOCATION.—Chain gage in NE. ¼ sec. 33, T. 1 N., R. 2 W., at highway bridge a quarter of a 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, 1931.

EXTREMES.—Maximum discharge during year, 4,600 second-feet May 19 (gage height, 15.72 feet); minimum, 18 second-feet Nov. 1, 15, Jan. 7, Aug. 18.

1921–1931: Maximum discharge, 12,500 second-feet July 25, 1924 (gage height, 25.0 feet); minimum, 8.9 second-feet Sept. 11–12, 1930.

Maximum known stage, 26.0 feet, date unknown.

REMARKS.—Records good.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	63	18	2,400	20	28	39	530	195	1,310	102	25	2,160
2	63	23	1,060	19	30	34	415	187	560	97	23	4,150
3	59	23	650	19	32	31	340	165	315	590	22	2,200
4	59	23	560	19	33	30	500	229	415	995	20	620
5	55	22	500	19	34	28	440	220	995	1,170	19	203
6	55	22	390	19	34	30	295	187	1,960	590	38	104
7	85	22	365	18	39	30	238	152	3,050	440	36	75
8	1,480	22	315	19	44	30	195	108	3,450	210	31	60
9	620	22	275	19	41	30	187	138	2,650	106	29	49
10	530	20	229	20	39	33	187	187	1,600	90	26	43
11	170	20	203	21	34	78	180	187	1,520	85	26	40
12	90	19	152	21	33	212	165	172	3,000	76	24	38
13	67	19	120	21	32	315	158	158	4,200	71	22	33
14	28	18	108	21	31	710	152	145	4,300	67	21	32
15	26	18	102	21	30	1,030	102	132	3,750	63	20	33
16	26	19	97	20	30	830	65	108	2,160	63	20	1,310
17	25	20	87	19	32	680	65	92	1,880	59	20	1,840
18	24	20	78	20	36	500	78	74	860	55	20	415
19	24	22	69	20	39	530	82	2,950	560	55	55	120
20	23	22	65	20	39	415	87	3,850	440	129	34	79
21	23	23	50	20	39	256	97	2,240	1,170	117	32	56
22	22	24	47	20	39	187	114	960	530	90	28	49
23	22	23	39	20	40	152	365	530	390	76	26	256
24	21	23	32	20	41	132	415	390	238	59	26	60
25	21	24	28	20	41	114	203	275	203	48	26	56
26	20	25	25	20	41	108	195	212	180	36	34	315
27	20	22	23	20	40	340	220	180	172	33	52	470
28	19	28	22	22	40	1,420	256	180	158	31	47	172
29	19	36	22	25	-------	2,000	238	172	138	31	37	93
30	18	1,450	21	27	-------	1,310	220	710	108	29	33	63
31	18	-------	21	28	-------	830	-------	1,310	-------	26	117	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	1,480	18	122	0.093	0.11
November	1,450	18	69.7	.053	.06
December	2,400	21	263	.201	.23
January	28	18	20.5	.016	.02
February	44	28	36.1	.028	.03
March	2,000	28	402	.307	.35
April	530	65	226	.173	.19
May	3,850	74	542	.414	.48
June	4,300	108	1,410	1.08	1.20
July	1,170	26	184	.140	.16
August	117	19	31.9	.024	.03
September	4,150	32	506	.386	.43
The year	4,300	18	317	.242	3.29

MACOUPIN CREEK NEAR KANE, ILL.

LOCATION.—Chain gage in SE. ¼ sec. 11, T. 9 N., R. 12 W., at highway bridge 3½ miles northwest of Kane. Zero of gage is 427.12 feet above mean sea level.

DRAINAGE AREA.—875 square miles.

RECORDS AVAILABLE.—October, 1928, to September, 1931; March, 1921, to September, 1928, at Chicago & Alton Railroad bridge 2 miles upstream.

EXTREMES.—Maximum discharge during year, 2,240 second-feet July 23 (gage height, 12.08 feet); minimum, 2.0 second-feet Sept. 16, 21 (gage height, 2.90 feet).

1921–1931: 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, Oct. 3, 5, 15, 1922.

REMARKS.—Records good. Gage-height record furnished by Sanitary District of Chicago.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	8.8	4.8	46	7.1	7.1	10	26	20	39	8.2	5.5	11
2	8.8	4.8	33	7.1	7.1	6.8	24	16	29	194	4.8	125
3	7.1	4.8	22	7.1	7.1	8.5	20	16	22	84	4.2	250
4	8.8	4.8	16	7.1	7.1	6.8	20	16	19	22	3.6	43
5	8.8	4.8	16	7.1	7.1	6.8	20	13	60	12	3.6	37
6	8.5	4.8	14	5.6	7.1	6.8	16	22	585	9.9	211	40
7	12	4.6	14	5.6	12	6.8	16	24	360	9.2	177	25
8	16	4.6	11	5.6	11	12	16	26	112	8.5	41	16
9	12	4.6	11	7.1	11	16	18	43	60	6.8	185	10
10	10	4.6	11	7.1	7.1	16	24	52	56	4.6	435	7.9
11	8.5	4.6	8.8	7.1	7.1	26	24	62	56	5.0	146	5.1
12	8.5	4.6	7.1	7.1	8.8	38	24	101	35	5.0	64	5.9
13	8.5	4.6	7.1	8.8	14	42	20	80	26	4.8	46	3.9
14	8.5	4.6	7.1	7.1	14	52	20	67	18	4.1	27	3.3
15	8.5	7.4	7.1	7.1	12	64	16	45	15	4.4	17	2.8
16	8.5	7.4	7.1	7.1	12	48	16	28	13	4.4	13	2.4
17	8.2	7.1	7.1	7.1	14	36	16	28	11	3.9	9.2	2.4
18	8.2	7.1	7.1	7.1	14	26	13	24	9.9	4.1	25	2.4
19	8.2	7.1	7.1	7.1	14	22	13	460	9.2	4.1	8.8	2.2
20	8.2	7.1	7.1	7.1	10	20	13	885	8.5	4.1	15	2.4
21	6.4	7.1	7.1	7.1	10	20	20	340	7.8	4.1	52	2.2
22	8.2	7.1	7.1	7.1	10	22	24	211	36	3.5	14	2.6
23	8.2	7.1	7.1	7.1	10	20	36	177	37	1,600	12	2.6
24	8.2	7.1	7.1	7.1	10	20	36	118	18	250	7.9	177
25	8.2	7.1	7.1	5.6	10	20	29	125	12	89	12	47
26	8.2	5.6	7.1	7.1	10	16	36	79	21	26	13	23
27	7.8	7.1	7.1	7.1	10	22	39	56	27	16	4.8	12
28	7.8	7.1	7.1	7.1	10	55	39	43	16	12	12	7.1
29	7.8	8.8	4.4	7.1	------	48	31	31	11	8.8	3.9	5.5
30	6.1	56	5.6	7.1	------	46	24	32	9.6	6.7	13	4.5
31	4.8	------	7.1	7.1	------	31	------	34	------	5.5	7.5	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	16	4.8	8.59	0.0098	0.01
November	56	4.6	7.63	.0087	.01
December	46	4.4	11.0	.013	.01
January	8.8	5.6	6.96	.0080	.009
February	14	7.1	10.1	.012	.01
March	64	6.8	25.5	.029	.03
April	39	13	23.0	.026	.03
May	885	13	106	.121	.14
June	585	7.8	58.0	.066	.07
July	1,600	3.5	78.2	.089	.10
August	435	3.6	51.4	.059	.07
September	250	2.2	29.4	.034	.04
The year	1,600	2.2	34.9	.040	.53

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.

DRAINAGE AREA.—1,980 square miles.

RECORDS AVAILABLE.—February, 1908, to December, 1912; August, 1914, to September, 1931.

EXTREMES.—Maximum discharge during year, 1,150 second-feet Sept 18 (gage height, 5.88 feet); minimum, 13 second-feet Oct. 4 (gage height, 0.24 foot). 1908–1912, 1914–1931: Maximum discharge, 20,000 second-feet Oct. 4, 1926; maximum stage, 23.0 feet June 5, 1917; minimum discharge, 3.5 second-feet Aug. 22, 1911.

REMARKS.—Records good.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	16	18	36	25	27	38	176	420	272	133	30	119
2	16	18	36	25	27	38	176	178	312	95	178	292
3	16	18	48	24	26	36	162	154	292	119	210	292
4	13	19	52	26	26	36	144	147	254	100	106	376
5	15	18	60	26	25	37	126	133	272	95	70	332
6	15	18	60	26	26	37	126	178	292	80	70	147
7	[a] 30	17	52	26	28	45	126	254	202	85	70	119
8	43	16	48	26	28	120	105	332	194	140	48	112
9	64	16	48	26	30	120	105	354	194	133	52	90
10	108	21	44	26	33	120	86	354	202	90	106	80
11	60	22	43	27	33	120	68	398	210	70	126	66
12	[a] 50	23	43	27	34	120	68	332	202	147	80	52
13	[a] 40	23	43	27	35	120	68	312	202	133	66	51
14	[a] 30	23	33	27	36	120	68	254	[a] 190	90	48	51
15	21	23	33	26	41	120	64	236	[a] 180	70	38	162
16	21	23	29	[a] 26	41	114	60	292	[a] 160	70	40	210
17	21	23	26	[a] 25	42	108	56	332	[a] 150	70	44	694
18	21	22	26	[a] 24	44	96	56	332	140	66	42	1,010
19	20	22	26	[a] 24	48	96	56	332	126	39	39	780
20	18	22	26	[a] 22	45	84	68	292	[a] 110	61	50	680
21	18	22	25	22	52	84	81	332	95	162	56	496
22	17	24	25	22	52	79	840	332	85	210	70	518
23	17	25	25	22	52	79	552	332	90	236	162	296
24	17	24	25	22	48	74	420	312	90	194	292	314
25	17	20	25	22	45	74	646	292	106	154	194	370
26	17	19	25	23	42	74	574	272	646	126	202	430
27	17	19	25	26	42	120	598	254	332	90	100	350
28	18	19	25	29	38	176	552	272	218	66	75	278
29	18	19	25	30	------	190	508	254	186	45	80	227
30	18	36	25	27	------	183	464	254	186	31	95	227
31	18	------	25	27	------	176	------	254	------	30	202	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	108	13	26.8	0.014	0.02
November	36	16	21.1	.011	.01
December	60	25	35.1	.018	.02
January	30	22	25.3	.013	.01
February	52	25	37.4	.019	.02
March	190	36	97.9	.049	.06
April	840	56	240	.121	.14
May	420	133	283	.143	.16
June	646	85	206	.104	.12
July	236	30	104	.053	.06
August	292	30	98.1	.050	.06
September	1,010	51	307	.155	.17
The year	1,010	13	123	.062	.85

[a] Estimated.

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, 1931; June, 1908, to December, 1912, at Chicago, Burlington & Quincy Railroad bridge 2 miles upstream.

EXTREMES.—Maximum discharge during year, 3,660 second-feet Sept. 6 (gage height, 17.78 feet); minimum, 3.2 second-feet July 18, 19 (gage height, 1.03 feet).

1914–1931: Maximum discharge, 16,300 second-feet Feb. 1, 1916 (gage height, 30.2 feet); no flow Aug. 18–26, 1914.

REMARKS.—Records good. Discharge estimated Oct. 2, 12.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	54	5.3	11	12	15	41	96	168	52	22	11	168
2	39	5.3	11	12	15	37	83	110	38	18	8.6	1,120
3	23	4.7	12	11	14	33	77	77	28	12	7.4	1,520
4	17	4.7	41	11	14	29	168	59	21	17	7.2	2,280
5	14	5.0	43	13	13	27	278	46	17	420	8.2	3,520
6	12	4.7	59	14	12	27	245	168	15	472	26	3,590
7	12	5.0	245	15	12	408	150	446	15	177	19	3,310
8	18	4.7	537	47	15	970	96	685	24	68	20	2,820
9	27	4.7	459	52	19	1,170	71	811	20	42	13	2,340
10	20	5.0	235	41	24	1,360	602	881	16	26	20	1,390
11	18	5.0	118	37	21	1,620	1,050	839	17	18	30	811
12	20	5.9	77	31	43	1,800	1,080	511	17	13	44	267
13	22	5.9	59	29	54	1,730	970	225	14	8.8	62	65
14	16	5.6	52	31	96	1,410	839	150	12	7.4	103	40
15	16	5.6	45	39	256	867	602	103	11	6.0	65	30
16	13	6.2	41	37	312	372	256	103	10	4.7	38	22
17	18	29	39	33	186	159	118	96	9.0	4.1	26	17
18	16	19	27	25	142	103	83	68	7.8	3.4	19	14
19	13	56	18	21	142	83	65	56	6.5	3.8	13	20
20	10	49	20	18	168	71	52	396	5.3	4.4	68	12
21	11	35	16	18	150	68	96	563	5.0	4.1	205	9.4
22	13	27	15	18	118	71	267	550	4.5	24	602	13
23	12	20	14	15	103	62	420	576	5.2	24	563	12
24	10	16	15	15	77	56	384	485	23	20	205	9.4
25	10	14	14	15	62	49	245	360	256	89	96	7.6
26	8.4	12	14	15	54	44	278	485	324	74	52	5.8
27	7.8	10	13	15	47	42	657	348	256	56	42	5.6
28	7.5	9.6	13	14	43	49	895	142	110	44	32	5.1
29	6.5	10	12	13	------	62	853	77	56	30	24	4.4
30	6.2	10	11	13	------	118	396	56	34	20	96	5.8
31	4.4	------	12	13	------	134	------	56	------	14	289	------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	54	4.4	16.0	0.021	0.02
November	56	4.7	13.3	.018	.02
December	537	11	74.1	.098	.11
January	52	11	22.4	.030	.03
February	312	12	79.5	.106	.11
March	1,800	27	422	.560	.65
April	1,080	52	382	.507	.57
May	881	46	313	.416	.48
June	324	4.5	47.6	.063	.07
July	472	3.4	56.3	.075	.09
August	602	7.2	90.8	.121	.14
September	3,590	4.4	781	1.04	1.16
The year	3,590	3.4	191	.254	3.45

BIG MUDDY RIVER AT MURPHYSBORO, ILL.

LOCATION.—Chain gage in SE. ¼ sec. 8, T. 9 S., R. 2 W., on Illinois Central Railroad bridge across mouth of Lewis Creek at Murphysboro. Zero of gage is 336.00 feet above mean sea level. Prior to June 20, 1931, gage on South Twentieth Street highway bridge 1,300 feet downstream with zero 5 feet lower was used.

DRAINAGE AREA.—2,170 square miles (includes Lewis Creek).

RECORDS AVAILABLE.—December, 1916, to September, 1931.

EXTREMES.—Maximum discharge during year, 6,310 second-feet Sept. 6 (gage height, 14.95 feet); minimum, 8.6 second-feet June 25.

1917–1931: Maximum discharge not determined; minimum discharge, 1.0 second-foot Aug. 1, 1921.

Maximum stage known, 39.6 feet (former datum) Feb. 2, 1916 (discharge, about 28,000 second-feet).

REMARKS.—Records fair. Backwater from Mississippi River Apr. 26–28, May 23–27, June 13–20; discharge estimated.

Daily and monthly discharge, in second-feet, 1930–31

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	440	16	24	34	28	106	170	1,470	295	183	71	224
2	220	16	22	34	26	94	177	892	208	90	52	3,010
3	156	14	20	34	24	89	200	335	163	75	38	5,260
4	105	14	22	37	24	79	258	258	130	78	27	5,260
5	75	14	32	39	24	79	378	177	100	80	37	5,660
6	53	12	40	39	26	170	473	1,590	106	83	90	6,260
7	50	10	39	39	24	1,590	448	3,070	112	123	104	6,210
8	57	10	43	31	26	2,990	401	3,110	137	186	121	5,610
9	42	10	208	26	39	4,280	295	2,510	208	234	150	5,010
10	46	10	241	28	106	4,280	1,430	2,230	192	295	177	4,450
11	42	10	401	46	137	3,880	2,590	2,110	170	174	183	3,820
12	39	10	224	66	124	2,950	2,790	2,030	118	112	201	3,010
13	46	10	200	70	163	2,870	2,470	1,830	80	60	214	2,170
14	53	10	144	66	192	2,990	2,230	1,000	50	32	192	708
15	50	10	137	54	335	2,950	1,870	473	40	29	156	192
16	50	25	106	54	295	2,630	1,510	335	60	23	125	75
17	46	28	89	50	295	2,310	1,000	258	50	21	110	82
18	39	105	74	28	315	2,070	473	241	35	17	99	62
19	33	89	66	130	258	1,670	258	208	30	16	90	56
20	39	66	54	58	208	757	177	634	25	18	83	70
21	42	62	47	50	192	335	448	2,230	21	20	92	59
22	42	70	43	46	200	276	823	2,390	18	18	258	121
23	39	66	37	29	184	156	1,040	1,100	14	19	822	136
24	33	66	31	36	184	137	892	860	11	17	1,530	104
25	27	47	31	33	156	130	857	690	12	14	1,570	76
26	24	32	29	36	137	118	930	600	136	17	1,410	63
27	24	34	26	33	118	118	630	520	250	24	892	50
28	24	29	29	33	112	124	1,390	577	250	30	720	40
29	21	32	46	33	-------	124	1,910	473	258	36	544	29
30	21	29	39	31	-------	144	1,910	224	258	53	211	26
31	19	-------	37	31	-------	150	-------	200	-------	82	132	-------

Month	Maximum	Minimum	Mean	Per square mile	Run-off in inches
October	440	19	64.4	0.030	0.03
November	105	10	31.9	.015	.02
December	401	20	83.3	.038	.04
January	130	26	44.0	.020	.02
February	335	24	141	.065	.07
March	4,280	79	1,310	.604	.70
April	2,790	170	1,010	.465	.52
May	3,110	177	1,120	.516	.59
June	295	11	118	.054	.06
July	295	14	72.9	.034	.04
August	1,570	27	339	.156	.18
September	6,260	26	1,930	.889	.99
The year	6,260	10	523	.241	3.26

MISCELLANEOUS DISCHARGE MEASUREMENTS

Discharge measurements of streams in the Hudson Bay and upper Mississippi River basins at points other than regular gaging stations are listed in the following table:

Miscellaneous discharge measurements in Hudson Bay and upper Mississippi River drainage basins during the year ending Sept. 30, 1931

Date	Stream	Tributary to—	Locality	Gage height	Discharge
				Feet	*Sec.-ft.*
Nov. 6	Ottertail River	Red River	Breckenridge, Minn.	−3.62	9.2
Nov. 30	do	do	do	−3.10	18.5
Jan. 2	do	do	do	−3.04	16.0
Feb. 14	do	do	do	−2.69	30.1
Mar. 21	do	do	do	−1.89	167
Apr. 20	do	do	do	−2.05	89.8
May 16	do	do	do	−1.44	312
June 1	Red Lake River	do	In sec. 28, T. 152 N., R. 36 W., at outlet of Red Lakes, Minn.		131
Aug. 22	do	do	do		7.72
Oct. 23	do	do	Kratka Bridge on line between secs. 20 and 21, T. 153 N., R. 41 W., Minn.	−.81	18.0
Feb. 10	Clearwater River	Red Lake River	About 2 miles above Clearwater Lake and about 6 miles northeast of Leonard, Minn.		28.3
13	do	do	do		30.4
13	do	do	At outlet of Clearwater Lake, Minn.		12.1
12	do	do	Above junction with Hill, Lost, and Poplar Rivers about 3 miles east of Terrebonne, Minn.		13.3
12	do	do	Below mill at Terrebonne, Minn. (including leakage through mill).		22.5
12	Poplar River	Clearwater River	Below Hill and Lost Rivers and half a mile above outlet into Clearwater River about 3 miles east of Terrebonne, Minn.		8.36
May 13	Roseau River	Red River	In SE. ¼ sec. 21, T. 163 N., R. 43 W., about 8 miles northwest of Haug, Minn.	3.89	261
Sept. 24	do	do	do	1.75	39.0
Apr. 7	Badger Creek	Roseau River	In NE. ¼ sec. 2, T. 161 N., R. 42 W., 1 mile northwest of Badger, Minn.	2.02	15.0
9	do	do	do	1.33	4.10
15	do	do	do	.78	.3
May 22	Pike River	Vermilion Lake	In T. 61 N., R. 16 W., about 8 miles southwest of Tower, Minn.		184
Nov. 12	Mississippi River	Gulf of Mexico	Aitkin, Minn.	.07	768
Dec. 17	do	do	do	[a].30	657
Feb. 9	do	do	do	[a].60	711
Mar. 23	do	do	do	[a].18	592
Apr. 29	do	do	do	−.30	815
May 7	do	do	Hastings, Minn.		3,970
15	do	do	do		3,170
Aug. 3	Outlet of Crow Wing Lake No. 3.	Crow Wing River	About 8 miles east of Hubbard, Minn.	1.33	49.0
Feb. 20	Outlet of Spring Lake	Mississippi River	About 6 miles west of Hastings, Minn.		17.5
June 7	St. Croix River	do	Osceola, Wis.	682.95	1,700
July 1	do	do	do	686.68	7,480
14	do	do	do	683.98	2,960
30	do	do	do	682.48	1,190
Sept. 5	Duncan Creek	Chippewa River	Chippewa Falls, Wis., 200 feet above mouth.		51
Apr. 24	Lows Creek	do	Eau Claire, Wis.	8.21	28.2
June 20	Yahara River	Rock River	Johnson Street Bridge, in Madison, Wis.		66
June 21	Blooming Grove drainage ditch.	Yahara River	Sec. 27, T. 7 N., R. 10 E., Dane Co., Wis.		1.7

[a] Affected by ice.

Miscellaneous discharge measurements in Hudson Bay and upper Mississippi River drainage basins during the year ending Sept. 30, 1931—Continued

Date	Stream	Tributary to—	Locality	Gage height	Discharge
				Feet	*Sec.-ft.*
Oct. 18	North Fork of Maquoketa River.	Maquoketa River	Near Fulton, Iowa	1.59	177
Nov. 15	do	do	do	1.33	140
Oct. 18	Wapsipinicon River	Mississippi River	Waubeek, Iowa	2.02	116
Nov. 15	do	do	do	1.66	50.6
Oct. 30	Plum Creek	Spencer Creek	In SE. ¼ NW. ¼ sec. 28, T. 55 N., R. 4 W., at bridge on State highway 61, 2½ miles northwest of Frankford, Mo.	.71	[b].05
Jan. 8	do	do	do	.71	[b].05
Feb. 9	do	do	do	.68	[b].1
Apr. 1	do	do	do	.95	1.0
May 21	do	do	do	1.30	4.0
Nov. 8	Illinois & Michigan Canal.	Des Plaines River	Jackson Street Bridge, in Joliet, Ill.		271
Feb. 5	do	do	do		285
Apr. 19	do	do	do		248
June 29	do	do	do		283
Aug. 11	do	do	do		304
Oct. 22	Vermilion River	Illinois River	Former gaging station at Bloomington Street Bridge, in Streator, Ill.	1.40	1.04
Feb. 4	do	do	do	1.21	1.2
Apr. 17	do	do	do	1.70	35.2
June 18	do	do	do	2.45	159
Oct. 2	South Fork of Sangamon River.	Sangamon River	Gaging station at Chicago & Illinois Midland Railway bridge 6 miles west of Taylorville, Ill.	4.50	0.85

[a] Affected by ice.

[b] Estimated.

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