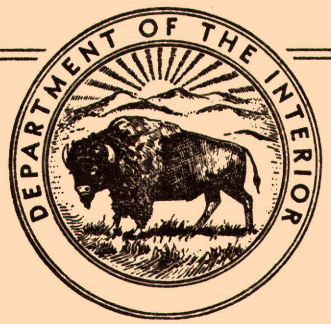
GEOLOGICAL SURVEY CIRCULAR 108



March 1951

MONTHLY AND ANNUAL DISCHARGE OF MISSOURI RIVER BETWEEN FORT BENTON, MONT. AND HERMANN, MO., AND PRINCIPAL TRIBUTARIES

By

Guy C. Stevens and Clayton H. Hardison

UNITED STATES DEPARTMENT OF THE INTERIOR
Oscar L. Chapman, Secretary
GEOLOGICAL SURVEY
W. E. Wrather, Director

Washington, D. C.

Free on application to the Geological Survey, Washington 25, D. C.

MONTHLY AND ANNUAL DISCHARGE OF MISSOURI RIVER BETWEEN FORT BENTON, MONT. AND HERMANN, MO., AND PRINCIPAL TRIBUTARIES

By Guy C. Stevens and Clayton H. Hardison

CONTENTS

ILLUSTRATIONS

INTRODUCTION

Large-scale undertakings have been planned and are now under way for developing and utilizing the water and land resources of the Missouri River basin. Questions have been raised whether the flow of the Missouri River is adequate to meet the anticipated requirements for irrigation, navigation, hydroelectric power, municipal, farm, and industrial water supplies, and for pollution abatement. The flow that occurred at strategic locations during a relatively long period in the past, and the variation in that flow during periods of high, low, and average precipitation, would serve as the best basis for predicting the flow that will be available for use in the future.

The collection of systematic and continuous discharge records by the Geological Survey, in cooperation with State, federal, and other agencies, on the main stem of the Missouri River and its principal tributaries is of rather recent origin. Although the gaging stations on the Missouri River at Craig, Cascade, and Fort Benton, Mont., were started in 1890, 1902, and 1910, respectively, and that on the Yellowstone River at Glendive, Mont., in 1903, some of these early records were intermittent and are of doubtful accuracy. Some records were obtained on the Missouri River at Williston, N. Dak., during 1905-7, at Bismarck, N. Dak., during 1904-5, and at Kansas City, Mo., during 1905-6. Aside from these, the present stream-gaging stations on the main stem of the river between Fort Benton and Hermann were not started until 1928 or later.

In order to provide a basis for appraising the adequacy of the flow of the Missouri River to meet its intended uses, figures of continuous monthly and annual discharge, of the best accuracy obtainable,

were prepared for the 52-year period, covering the water years 1898-1949, for the gaging stations on the Missouri River at Fort Benton, Mont., Williston, N. Dak., Sioux City, Iowa, Kansas City, Mo., and Hermann, Mo., and for a gaging station near the lower end of Yellowstone River in Montana. Accomplishing this purpose required: critical reviewing and revising of some of the previously published discharge records for the earlier periods; computing discharge for some stage stations on the river for periods prior to the establishment of rating curves by applying gage heights to rating curves developed in later years; computing discharge for other sites on the river through correlations of precipitation and discharge; and using for the later periods the discharge records obtained through the actual operation of gaging stations.

This report contains a compilation of these long-term records and a description of the methods used in computing the discharge for the earlier years. It also contains a summary of published records for all other stations on the Missouri River downstream from Fort Benton and for stations on principal tributaries—generally the lowest station on a tributary. The stations on tributary streams were selected on the basis of the length and reliability of their records and on the basis of their applicability in the comparison of discharge in different parts of the Missouri River basin. The locations of all gaging stations for which data are included in this report are shown on figure 1.

The collection of stream-flow records at the principal stations on Missouri River and tributaries since 1928 has been made possible largely through the financial assistance of the Corps of Engineers. The preparation by the Geological Survey of the long-term records contained in this report has been advocated by that office. Similar computations previously prepared by that office have been made available for the fullest use by the Geological Survey. Acknowledgment is due the Corps of Engineers and its personnel for advice and assistance in the preparation of this report, and Paul V. Hodges, in particular, for services and information on previous compilations of Missouri River data.

This report was prepared by Guy C. Stevens and Clayton H. Hardison, hydraulic engineers, under the supervision of J. V. B. Wells, Chief, Surface Water Branch.

EXPLANATION OF DATA

The discharge given in this report is the flow past the station. No adjustments have been made for regulation by storage or for depletion by diversion, and no attempt has been made to compute either the discharge that would have occurred under original or natural conditions or the discharge that might have occurred under any assumed utilization of the waters.

For some stations nearly equivalent records at two or more points on a given reach of a river have been combined to produce a longer or more complete record, in which case the name of the older station is shown in parentheses. Also, some records for adjacent stations have been combined to produce a record longer than was available from a single gaging station, in which case the names of all the combined stations are shown without parentheses.

An acre-foot is the quantity of water required to cover 1 acre to the depth of 1 foot and is equivalent to 43,560 cubic feet. An annual discharge of 1,000,000 acre-feet is equivalent to an average discharge of 1,381 cubic feet per second for a year. In this report the unit of discharge is 1,000 acre-feet. No decimals have been used for quantities greater than 100,000 acre-feet, and one decimal has been used for quantities between 100 and 100,000 acre-feet. For quantities less than 100 acre-feet one significant figure only is given. The selection of significant figures that differ from the significant figures used in the annual water-supply papers and the summation of the monthly discharge, rounded in this manner, results in figures of yearly discharge slightly at variance with perviously published discharge, but these differences are not to be construed as revisions. Any figure shown that supersedes previously published discharge is designated by an asterisk (*). Estimates of winter discharge for scattered months not previously published are designated by a dagger (†). Other periods for which discharge has not been previously published and for which discharge has been computed by indirect methods are indicated in the headnotes.

The data presented in this report have been arranged by water years. The water year extends from October 1 to September 30, and is designated in this report by the calendar year in which it ends.

ACCURACY

In attempting to appraise the accuracy of the discharge figures here presented, it becomes necessary to recognize two distinct types of data: (1) records obtained by the operation of stream gaging stations, and (2) data derived by indirect methods using inadequate stream flow observations, drainage area and discharge ratios, and correlation with weather records. Records of the first type, particularly those collected after 1928 when an intensive program of stream gaging was begun on Missouri River, are of the highest order of accuracy obtainable at stations having the physical conditions typical of Missouri River stations. Data of the second type, generally for years prior to 1928 to provide long-term data for selected stations, are obviously less reliable as their accuracy depends largely upon the applicability of the methods and data that enter into their determination. The periods covered by each of these two types are listed in the descriptive material for each station.

This report contains five long-term compilations of flow for Missouri River and one long-term compilation for Yellowstone River. The revised records for Missouri River at Fort Benton prior to 1920 are generally of a higher order of accuracy than for points downstream, although records for some months and years are of low accuracy because of erratic gage records. The data supplied for Yellowstone River, 1898-1903, to complete the 52-year period are of the same low accuracy as are data for points downstream. The combined average annual discharge derived from years of gaged discharge for Missouri River at Fort Benton and the lower Yellowstone, constitutes about 85 percent of the discharge of Missouri River at Williston and about 60 percent of the discharge at Sioux City.

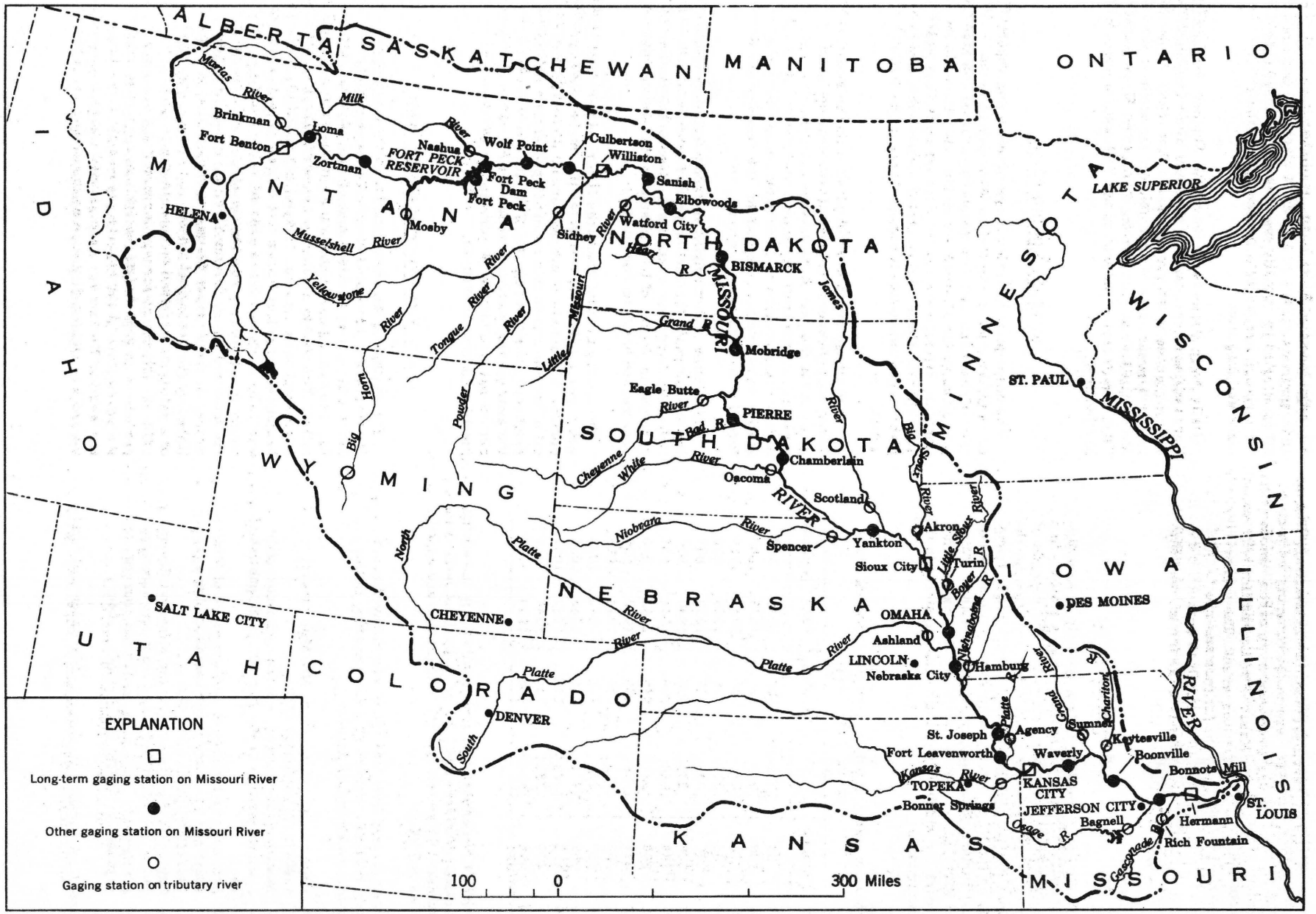


Figure 1.—Map showing location of gaging stations included in this report.

For Williston and Sioux City the discharge for some months in 1898-1928, especially during the winters, may be as much as 30 percent in error, whereas the maximum error for Kansas City and Hermann probably does not exceed 20 percent. The average error in monthly discharge at the four stations for this period is considered to be less than 15 percent. In general, the error in annual discharge for the period is probably less than 10 percent.

REFERENCES

Stream-flow data given herein consists of monthly and annual discharge for selected gaging stations in a form convenient for ready reference. The records of daily discharge and other detailed information for the stations systematically operated were published originally by the U. S. Geological Survey in the series of annual surface water-supply papers for Part 6, Missouri River basin. The numbers of these papers and the years for which they contain data are shown in the following table:

Numbers of water-supply papers for Missouri River basin, 1903-1949

Year	Number	Year	Number	Year	Number
1903	99	1919-20	506	1935	786
1904	130	1921	526	1936	806
1905	172	1922	546	1937	826
1906	208	1923	566	1938	856
1907-08	246	1924	586	1939	876
1909	266	1925	606	1940	896
1910	286	1926	626	1941	926
1911	306	1927	646	1942	956
1912	326	1928	666	1943	976
1913	356	1929	686	1944	1006
1914	386	1930	701	1945	1036
1915	406	1931	716	1946	1056
1916	436	1932	731	1947	1086
1917	456	1933	746	1948	1116
1918	476	1934	761	1949	1146

Monthly and annual discharge published in the annual water-supply papers and revised on basis of later data is indicated by an asterisk (*) in the tables accompanying this report.

Other stream flow data for Missouri River basin closely related to this report are contained in the following water supply papers:

491. Water supply of St. Mary and Milk rivers, 1898-1917; published 1920.
847. Maximum discharges at stream-measurement stations through September 30, 1938; published 1941.
917. Summary of records of surface water of Missouri and St. Mary River basins in Montana, 1881-1938; published 1943.
1077. Gaging-station records in the Missouri River basin; published 1948. (An index and summary giving kinds of records, published sources, and explanation of data to October 1, 1944.)

Geological Survey Circular 37, Discharge and runoff in the Missouri River basin, published November 1948, contains results of a study of discharge and runoff as affected by climatic features and developments for irriation and storage, presented with the aid of maps and diagrams.

Daily river stages collected by the Weather Bureau, Corps of Engineers, and the Missouri River Commission were used in the preparation of this report. Particular use was made of such data for the stations on Missouri River at Fort Benton, Sioux City, Kansas City, and Hermann and that on the Yellowstone River at Glendive.

STATION DESCRIPTIONS

The description of each gaging station in this report gives the location of the station with respect to the town of that name and with respect to at least one major tributary for Missouri River stations. Those on tributary streams are located with respect to the Missouri River. More detailed station descriptions are given in the water-supply papers listed in the References.

The drainage areas were obtained from the latest water-supply papers. In general, the drainage area given is for the part of the stream basin that lies upstream from the latest location of the station. If records for two or more stations shown under the same station name are not comparable, the drainage areas for all of the stations are given.

Description of the indirect methods used in computing discharge for the earlier years for which no published discharge was available is given in the station description of each of the six stations for which a 52-year record has been compiled.

The average annual discharge is for the period of water years indicated, and is for the latest continuous period. A summary of average annual discharge for all of the stations in this report is presented with the discharge tables on page 11. This summary contains the average annual discharge for the latest continuous period and also for the 20-year period 1930-49, and the 10-year period 1940-49.

Missouri River at Fort Benton, Mont.

The gaging station on the Missouri River at Fort Benton, Mont. is located 20 miles upstream from Marias River and 45 miles downstream from Sun River. The drainage area above the gage is 24, 600 square miles. The Geological Survey began discharge measurements at this station in April 1910 but the gage-height record prior to 1920 was fragmentary and often unreliable. For the years 1881-99 and 1901-9 gage-height record during summer months was collected by the Missouri River Commission, the Corps of Engineers, or the Weather Bureau, and discharge as published by the Geological Survey was computed by use of a rating curve based on measurements made in 1910-19. Discharge for winter months and for other periods of no gage-height record was estimated. For the years 1910-17 the gage-height record collected by the Weather Bureau was used where no gage-height record was collected by the Geological Survey, and

the published discharge was computed through use of rating curves based on discharge measurements. For periods of no gage-height record, discharge was estimated. For the years 1918-19 published discharge was based on power-plant records verified by occasional discharge measurements, and is considered to be reliable.

The published discharge record for October 1890 to December 1917 has been revised and will be republished in an annual water-supply paper. The revisions were made necessary by a shift in the stage-discharge relation resulting from the flood in June 1908 and by the erratic gage readings of various observers. The shift in rating which had not previously been recognized, is indicated by a comparison with discharge records at upstream stations and by a series of three discharge measurements made in August 1893 by the Corps of Engineers. The erratic gage readings were detected through study of records for upstream gaging stations and records of power-plant operation. Revisions resulting from the shift in rating have been based on a rating curve prepared for use during the period prior to June 1908, and those revisions resulting from erratic gage readings have been based on study of all available data. Published discharge for water years 1881-90 could not be revised satisfactorily owing to lack of sufficient supporting data, and the discharge as previously published should be given very little weight.

Discharge records obtained as outlined above or through the operation of the stream-gaging station from October 1890 to September 1949, as published or to be published in Geological Survey water-supply papers, have been used in this compilation.

The average annual discharge for the 52 years, 1898-1949, is 5,438 thousands of acre-feet and for the entire record 59 years, 1891-1949, it is 5,572 thousands of acre-feet.

Marias River near Brinkman, Mont.

The gaging station on the Marias River near Brinkman is located 4 miles southwest of Brinkman, 11 miles downstream from Cottonwood Creek, and 30 miles upstream from Missouri River. The station has been operated since October 1921. The drainage area is 6,400 square miles. Average annual discharge for 15 years (1935-49) is 556 thousands of acre-feet. Discharge for most winter months prior to 1935 has not been computed.

Missouri River at Loma, Mont.

The gaging station on the Missouri River at Loma is located half a mile downstream from Marias River, and has been operated since February 1935. The drainage area is 34,100 square miles, and the average annual discharge for 14 years (1936-49) is 5,358 thousands of acre-feet.

Missouri River at power-plant ferry, near Zortman, Mont.

The gaging station on the Missouri River at power-plant ferry near Zortman is located 30 miles west of Zortman and 65 miles upstream from Musselshell River. It has been operated since February 1934. The drainage area is 40,600 square miles. Average annual discharge for 15 years (1935-49) is 5,715 thousands of acre-feet.

Musselshell River at Mosby, Mont.

The gaging station on the Musselshell River at Mosby is located 35 miles upstream from Missouri River, and has been operated from May 1929 to September 1932 and since February 1934. The drainage area is 8,010 square miles, and the average annual discharge for 15 years (1935-49) is 191 thousands of acre-feet.

Fort Peck Reservoir at Fort Peck, Mont.

The gage for Fort Peck Reservoir on the Missouri River is located at Fort Peck Dam, 11 miles upstream from Milk River. The records of stage collected were used with a capacity table to compute the change in contents of the reservoir. The drainage area above Fort Peck Dam is 57,725 square miles. Information on change in contents from the time storage began in November 1937 to September 1938, is from unpublished data furnished by the Corps of Engineers. Data for October 1938 to September 1949 are from water-supply papers.

Missouri River below Fort Peck Dam, Mont.

The gaging station on the Missouri River below Fort Peck Dam is located 8 miles downstream from Fort Peck Dam and $3\frac{1}{2}$ miles upstream from Milk River, and has been operated since March 1934. The drainage area is 57,800 square miles, and the average annual discharge for 15 years (1935-49) is 5,051 thousands of acre-feet.

Milk River at Nashua and Vandalia, Mont.

The gaging station on the Milk River at Nashua is located 5 miles upstream from Porcupine Creek and 10 miles upstream from Missouri River. It has been operated since October 1939. The drainage area is 23,300 square miles. Records were collected at a station about 40 miles upstream near Vandalia from May 1915 to September 1920 and from August 1928 to September 1939. The drainage area at this point is 21,900 square miles. The monthly discharge for the Vandalia station for September 1928 to September 1939 has been compiled with the records beginning October 1939 for the Nashua station. The average annual discharge for complete years at both stations for 17 years (1933-49) is 383 thousands of acre-feet.

Missouri River near Wolf Point, Mont.

The gaging station on the Missouri River near Wolf Point is located 6 miles southeast of Wolf Point and about 50 miles downstream from Milk River. It has been operated since April 1930. The drainage area is 83,200 square miles. From September 1928 to April 1930 a comparable record was obtained at Wolf Point.

The average annual discharge for 21 years (1929-49) is 5,433 thousands of acre-feet.

Missouri River near Culbertson, Mont.

The gaging station on the Missouri River near Culbertson is located 3 miles southeast of Culbertson, 10 miles downstream from Big Muddy Creek and 30 miles upstream from Yellowstone River. It has been operated since July 1941. The drainage area is 92,500 square miles, and the average annual discharge for 8 years (1942-49) is 6,465 thousands of acre-feet.

Yellowstone River at Glendive, Intake, and Sidney, Mont.

Gaging stations have been operated on the lower Yellowstone River at three different sites since August 1903. The station at Glendive, operated from August 1903 to December 1910 and from October 1931 to September 1934, was about 50 miles downstream from Powder River and about 75 miles upstream from Missouri River. It has a drainage area of 65,900 square miles. The station at Intake, operated from January 1911 to September 1931, was about 17 miles downstream from the Glendive station, and has a drainage area of 66,800 square miles. The station 2 miles south of Sidney, operated April 1934 to date, is about 28 miles downstream from the Intake station and 30 miles upstream from Missouri River, and has a drainage area of 69,450 square miles. For the purpose of this compilation, records from these three stations near the lower end of the Yellowstone River were considered to be equivalent and were used interchangeably whenever available. Very little overlapping record was obtained.

For the period from July 1897 to October 1902, a gage height record collected at Glendive by the Corps of Engineers or the Weather Bureau was found to be unsuitable for the determination of discharge. Not only was there an unknown change in datum prior to the time the first discharge measurement was made in 1903, but gage heights after the bridge and gage were washed out in April 1899 were evidently obtained from temporary gages established by the observer.

Annual discharge for 1898-1902 was computed on basis of records for Yellowstone River near Livingston, Mont., Big Horn River at Thermopolis, Wyo., and Missouri River at Fort Benton, Mont. The relation of the annual discharge at each of these stations to the annual discharge at Glendive was established by 8 years of simultaneous record 1903-10. Through the use of these relations, annual discharge at Glendive for the water years 1898-99 was computed independently on the basis of the Livingston record and the Fort Benton record. For the water years 1900-2 the Thermopolis record was used also. Annual discharge for each water year 1898-1902 was selected by inspection of those figures that were based on the various stream-gaging records.

Monthly discharge was obtained by distributing the annual discharge on the basis of the pattern of discharge obtained by applying the gage-height record to a discharge rating curve based on discharge measurements made after 1903.

Discharge for the period January to July 1903 had previously been computed and published by the Geological Survey. In order to complete the discharge record for 1903, discharge for October to December 1902 was computed on the basis of gage-height record for the Glendive station and discharge records for other stations.

The records obtained through the operation of the stream-gaging stations as published or to published in water-supply papers, were used in this compilation as follows: Glendive, from August 1903 to December 1910, and from October 1931 to April 8, 1934; Intake, from January 1911 to September 1931; and Sidney, from April 9, 1934 to date. Winter discharge for some months 1903-10 not previously published have been supplied for this report.

The average annual discharge for the 52 years, 1898-1949 is 9,943 thousands of acre-feet.

Missouri River near Williston, N. Dak.

The gaging station operated on the Missouri River near Williston since September 1928 is 7 miles west of Williston and 25 miles downstream from the Yellowstone River. The drainage area above the station is 164,500 square miles. The gaging station operated during 1905-7 was about 17 miles downstream from the site of the present gage. Published discharge for 1905-7 was found to be in error and has been superseded by the discharge determined in the manner described below.

As about 85 percent of the flow at Williston is gaged at Fort Benton and at a lower Yellowstone River station, correlation of annual discharge at Fort Benton, Williston, and the lower Yellowstone River, based on simultaneous records during water years 1929-48, was used in the computation of annual discharge for water years 1898-1928. The best relationship that could be developed was that obtained by increasing the annual discharge at the Fort Benton station by 46 percent and then adding the annual discharge for the lower Yellowstone River station. Correlation with precipitation measured at representative weather stations between Fort Benton and Williston did not improve the results obtained by the above method. The Williston annual discharge for 1906, computed as described above, was increased by 1,500,000 acre-feet owing to the large flood inflow during June 1906 between Fort Benton and the Yellowstone River.

Monthly discharge for water years 1898-1928 was obtained by distributing the annual discharge on the basis of the pattern of discharge shown by an independent computation of monthly discharge. A study of monthly discharge on the Missouri River between Fort Benton and Williston and on the lower Yellowstone River for the period of simultaneous record during water years 1929-48 formed the basis of this independent computation, although all gaged inflow between Fort Benton and Williston during the period 1898-1928 was considered. To adjust for the unusually large flood inflow in 1906, mentioned above, the June discharge was increased by 1,300,000 acre-feet, and the July discharge was increased by 200,000 acre-feet on the basis of published discharge for tributary streams and precipitation records.

For the period of operation of the stream-gaging station from October 1928 to September 1949, discharge records as published or to be published in water-supply papers were used in this compilation.

The average annual discharge for 52 years, (1898 to 1949) is 17,607 thousands of acre-feet.

Missouri River at Sanish, N. Dak.

The gaging station on the Missouri River at Sanish was located about 50 miles upstream from Little Missouri River and was operated from September 1928 to September 1932. The drainage area is about 166,000 square miles and the average annual discharge for 4 years (1929-32) was 13,835 thousands of acre-feet.

Little Missouri River near Watford City, N. Dak.

The gaging station on the Little Missouri River near Watford City is located 17½ miles south of Watford City, 18 miles upstream from Cherry Creek, and about 70 miles upstream from Missouri River. The station has been operated since October 1934. The drainage area is 8,490 square miles, and the average annual discharge for 15 years (1935-49) is 465 thousands of acre-feet.

Missouri River near Elbowoods, N. Dak.

The gaging station on the Missouri River near Elbowoods is located 2½ miles east of Elbowoods and 2 miles downstream from Little Missouri River, and has been operated since October 1939. The drainage area is 179,800 square miles, and the average annual discharge for 10 years (1940-49) is 16,226 thousands of acre-feet.

Missouri River at Bismarck, N. Dak.

The gaging station on the Missouri River at Bismarck is located 4 miles upstream from Heart River and has been operated from September 1904 to December 1905 and since October 1927. Records for 1904-5 have been found to be unreliable and have not been included in this compilation. The drainage area is 186,400 square miles and the average annual discharge for 21 years (1929-49) is 14,892 thousands of acre-feet.

Missouri River near Mobridge, S. Dak.

The gaging station on the Missouri River near Mobridge is located 3 miles west of Mobridge and 3½ miles downstream from Grand River, and has been operated since August 1928. The drainage area is 208,700 square miles, and the average annual discharge for 21 years (1929-49) is 15,518 thousands of acre-feet.

Cheyenne River near Eagle Butte, S. Dak.

The gaging station on the Cheyenne River near Eagle Butte is located 21 miles south of Eagle Butte, and about 30 miles upstream from Missouri River, and has been operated since August 1928. The drainage area is 24,500 square miles, and the average annual discharge for 20 years (1930-49) is 734 thousands of acre-feet.

Missouri River at Pierre, S. Dak.

The gaging station on the Missouri River at Pierre is located 1½ miles upstream from Bad River and about 45 miles downstream from Cheyenne River, and has been operated since October 1929. The drainage area is 243,500 square miles, and the average annual discharge for 20 years (1930-49) is 16,245 thousands of acre-feet.

Missouri River at Chamberlain, S. Dak.

The gaging station on the Missouri River at Chamberlain is located 14 miles upstream from White River and has been operated from August 1928 to September 1929 and since March 1945. The drainage area is 250,800 square miles, and the average annual discharge for 4 years (1946-49) is 20,895 thousands of acre-feet.

White River near Oacoma, S. Dak.

The gaging station on the White River near Oacoma is located 6 miles southwest of Oacoma and 4 miles upstream from Missouri River, and has been operated since August 1928. The drainage area is 10,200 square miles, and the average annual discharge for 21 years (1929-49) is 369 thousands of acre-feet.

Niobrara River near Spencer and Verdel, Nebr.

The gaging station on the Niobrara River near Spencer is located 5 miles southeast of Spencer and about 40 miles upstream from Missouri River, and has been operated from August 1927 to September 1936 and since June 14, 1940. The drainage area is 10,400 square miles. From April 1938 to June 13, 1940 records collected at a gaging station near Verdel, about 25 miles downstream, have been compiled with those for the Spencer gaging station. The drainage area at the Verdel station is 11,300 square miles. The average annual discharge for 11 years (1939-49) is 961 thousands of acre-feet.

Missouri River at Yankton, S. Dak.

The gaging station on the Missouri River at Yankton is located 7 miles upstream from James River and has been operated since November 1930. The drainage area is 279,500 square miles. The average annual discharge for 18 years (1932-49) is 18,365 thousands of acre-feet.

James River near Scotland, S. Dak.

The gaging station on the James River near Scotland is located 5 miles northeast of Scotland and about 40 miles upstream from Missouri River, and has been

operated since September 1928. The drainage area is 21,550 square miles. The average annual discharge for 19 years (1931-49) is 204 thousands of acre-feet.

Big Sioux River at Akron, Iowa

The gaging station on the Big Sioux River at Akron is located about 30 miles upstream from Missouri River and has been operated since October 1928. The drainage area is 8,851 square miles. The average annual discharge for 20 years (1930-49) is 576 thousands of acre-feet.

Missouri River at Sioux City, Iowa

The gaging station on the Missouri River at Sioux City is 2.5 miles downstream from Big Sioux River, and has a drainage area of 314,600 square miles. The station was operated from September 1928 to September 1932 and from October 1938 to date.

Annual discharge for water years 1898-1928 was based on annual discharge at Williston and precipitation measured at representative weather stations. First the annual discharge of Missouri River at Yankton, S. Dak., was computed by increasing the annual discharge at Williston by 19 to 51 percent, depending on precipitation over the area between Williston and Yankton. Then the annual discharge at Sioux City was computed by increasing the Yankton discharge by 1 to 14 percent, depending on precipitation over the area between Yankton and Sioux City.

The relationship between precipitation and precent increase in discharge was developed through study of the available records of stream flow and precipitation during water years 1929-48. For the area between Williston and Yankton, average monthly precipitation for four groups of stations averaging five stations each was reduced to effective precipitation through the use of a precipitation-effect curve for each month of the year. These curves were based on potential evapotranspiration losses corresponding to the mean monthly temperature. The monthly effective precipitation amounts were added to obtain the effective precipitation for each year, and the results of the four groups were averaged. To obtain a weighted yearly effective precipitation, the effective precipitation for the current year was given a weight of 0.8 and that for the preceding year 0.2. This proportion was determined through a study of precipitation and stream-flow records for water years 1929-48. The relation between the weighted yearly effective precipitation and the ratio of the Yankton annual discharge to the Williston annual discharge, developed on the basis of the records during water years 1929-48, was used to compute the annual discharge for Yankton for water years 1898-1928. Other methods of weighting precipitation and expressing the relationship between precipitation and discharge did not give as good a correlation as that described above.

For the increase in flow between Yankton and Sioux City, a similar relationship was established, using five precipitation stations. The monthly effective precipitation was determined through use of the same curves, but the weight given the precipitation for the current year was 0.6 and for the preceding year 0.4. The relation between the weighted effective precipitation for each year and the ratio of Sioux City annual discharge to Yankton annual discharge, developed on the basis of records during water years 1939-48, was used in computing annual discharge for Sioux City for water years 1898-1928.

Monthly discharge at Sioux City for water years 1898-1928 was obtained by distributing the annual discharge on the basis of the pattern of discharge obtained by applying Weather Bureau gage heights at Sioux City to a discharge rating table based on recent discharge measurements.

During the period of no discharge record at Sioux City from October 1932 to September 1938, stream-gaging stations were operated on Missouri River at Yankton, S. Dak. and at Omaha, Nebr., and on two tributary streams — James River near Scotland, S. Dak., and Big Sioux River at Akron, Iowa. A relationship between the measured flow of the two tributaries and the annual increment in flow between Yankton and Sioux City, based on 9 years of simultanious record during water years 1939-47, was used in computing annual discharge at Sioux City for water years 1933-38. Monthly discharge for these years was obtained by distributing the annual discharge on the basis of the pattern of distribution shown by the Yankton and Omaha discharge records, with consideration given to discharge for the Scotland and Akron stations.

For the periods of operation of the stream-gaging station from September 1928 to September 1932 and from October 1938 to September 1949, discharge records as published or to be published in Geological Survey water-supply papers were used in this compilation.

The average annual discharge for 52-years (1898-1949) is 24,403 thousands of acre-feet.

Little Sioux River near Turin (Blencoe), Iowa

The gaging station on the Little Sioux River near Turin is located 3 3/4 miles south of Turin and 16½ miles upstream from Missouri River, and has been operated since May 1942. The drainage area is 4,460 square miles. From April 1939 to May 1942, comparable records collected at a site 5.8 miles upstream and published as Little Sioux River near Blencoe are shown in the compilation. Figures of discharge shown in the compilation include flow in Monona-Harrison ditch which by-passes the gaging station. The average annual discharge of the river and ditch for 10 years (1940-49) is 877 thousands of acre-feet.

Missouri River at Omaha, Nebr.

The gaging station on Missouri River at Omaha is located about 25 miles upstream from Platte River, and has been operated since September 1928. The drainage area is 322,800 square miles, and the average annual discharge for 21 years (1929-49) is 20,026 thousands of acre-feet.

Platte River near Ashland, Nebr.

The gaging station on the Platte River near Ashland

is located 3 miles northeast of Ashland and about 30 miles upstream from Missouri River, and has been operated since August 1928. The drainage area is 83,800 square miles, and the average annual discharge for 21 years (1929-49) is 3,554 thousands of acre-feet. There are many diversions for irrigation in the Platte River basin.

Missouri River at Nebraska City, Nebr.

The gaging station on the Missouri River at Nebraska City is located about 25 miles downstream from the Platte River that enters Missouri River from the Nebraska side. The station has been operated since August 1929. The drainage area is 414,400 square miles, and the average annual discharge for 20 years (1930-49) is 23,746 thousands of acre-feet.

Nishnabotna River above Hamburg, Iowa

The gaging station on the Nishnabotna River above Hamburg is located 2 miles northeast of Hamburg, $1\frac{1}{2}$ miles downstream from confluence of East Nishnabotna River and West Nishnabotna River, and about 35 miles upstream from Missouri River. The station has been operated since October 1928. The drainage area is 2,800 square miles. From March 1922 to September 1923 comparable records obtained at a site 6 miles downstream are shown in the compilation. The average annual discharge for 21 years (1929-49) is 652 thousands of acre-feet.

Missouri River at St. Joseph, Mo.

The gaging station on the Missouri River at St. Joseph is located 18 miles below Nodaway River and about 50 miles upstream from Leavenworth, and has been operated since August 1928. The drainage area is 424,300 square miles. Average annual discharge for 21 years (1929-49) is 26,172 thousands of acre-feet.

Missouri River at Leavenworth, Kans.

The gaging station on the Missouri River at Leavenworth was located 5 miles upstream from the Platte River that enters Missouri River from the Missouri side. The station was operated from April 1922 to September 1929. The drainage area is 428,000 square miles, and the average annual discharge for 7 years (1923-29) was 38,053 thousands of acre-feet.

Platte River near Agency, Mo.

The gaging station on the Platte River near Agency is located $3\frac{1}{2}$ miles northeast of Agency and about 50 miles upstream from Missouri River, and has been operated since May 1932. The drainage area is 1,760 square miles. From May 1924 to August 1930 a comparable record was obtained at a site 4 miles downstream. The average annual discharge for 17 years (1933-49) is 506 thousands of acre-feet.

Kansas River at Bonner Springs, Kans.

The gaging station on the Kansas River at Bonner Springs is located about 20 miles upstream from Missouri River. It has been operated since July 1917. The drainage area is 59,890 square miles, and the average annual discharge for 31 years (1919-49) is 4,487 thousands of acre-feet.

Missouri River at Kansas City, Mo.

The gaging station operated on the Missouri River at Kansas City since August 1928 is 1 mile downstream from Kansas River, and has a drainage area of 489,200 square miles. During 1905-6, eight discharge measurements were made by the Geological Survey and discharge was published for April 1905 to December 1906. However, those discharge figures were not used in this report because they were considered less accurate than figures computed by the method described below.

Discharge for October 1897 to March 1922 was computed by applying Weather Bureau gage-heights to a rating curve based on the average of all current-meter discharge measurements made by the Geological Survey and Corps of Engineers in 1905-6 and 1928-31. These discharge measurements were all made before the stage-discharge relation was affected by pile dikes constructed to stablize the river channel. When necessary during winter periods, discharge was corrected for backwater from ice.

Discharge for April 1922 to July 1928 was computed by adding the discharge published in water-supply papers for Missouri River at Leavenworth, Kans., Kansas River at Bonner Springs, Kans., Platte River near Agency or Conception Junction, Mo., and the unmeasured inflow computed from drainage area ratios.

For the period of operation of the stream-gaging station from August 1928 to September 1949, discharge records as published or to be published in water-supply papers were used in this compilation.

The average annual discharge for 52-years (1898-1949) is 41,294 thousands of acre-feet.

Missouri River at Waverly, Mo.

The gaging station on the Missouri River at Waverly is located about 30 miles upstream from Grand River, and has been operated since March 1929. The drainage area is 491,200 square miles. Average annual discharge for 20 years (1930-49) is 31,908 thousands of acre-feet.

Grand River near Sumner, Mo.

The gaging station on the Grand River near Sumner is located 2 miles southwest of Sumner and about 25 miles upstream from Missouri River, and has been operated since April 1924. The drainage area is 6,880 square miles, and the average annual discharge for 25 years (1925-49) is 2,789 thousands of acre-feet.

Chariton River near Keytesville, Mo.

The gaging station on the Chariton River near Keytesville is located 4½ miles northeast of Keytesville and about 20 miles upstream from Missouri River, and has been operated since April 1929. The drainage area is 1,950 square miles, and the average annual discharge for 20 years (1930-49) is 785 thousands of acre-feet.

Missouri River at Boonville, Mo.

The gaging station on the Missouri River at Boonville, located about 35 miles downstream from Chariton River, has been operated since October 1925. The drainage area is 505,700 square miles, and the average annual discharge for 24 years (1926-49) is 40,632 thousands of acre-feet.

Osage River near Bagnell, Mo.

The gaging station on the Osage River near Bagnell is located 1½ miles upstream from Bagnell, 3 miles downstream from Lake of the Ozarks, and about 65 miles upstream from Missouri River. The station has been operated since May 1925; storage in the Lake of the Ozarks began in 1931. The drainage area is 14,000 square miles, and the average annual discharge for 24 years (1926-49) is 7,512 thousands of acre-feet.

Missouri River near Bonnots Mill (Isbell), Mo.

The gaging station on the Missouri River near Bonnots Mill, located 1½ miles east of Bonnots Mill and half a mile downstream from Osage River, was operated from October 1931 to September 1936. The drainage area is 523,400 square miles. From December 1928 to September 1931 a comparable record was obtained at Isbell 2 miles downstream. The average annual discharge for 6 years (1930-35) was 36,753 thousands of acre-feet.

Gasconade River near Rich Fountain, Mo.

The gaging station on the Gasconade River near Rich Fountain is located 4 miles east of Rich Fountain and about 45 miles upstream from Missouri River. It has been operated since October 1921. The drainage area is 3,180 square miles, and the average annual discharge for 27 years (1923-49) is 2,177 thousands of acre-feet.

Missouri River at Hermann, Mo.

The gaging station operated on the Missouri River at Hermann since August 1928 is 6 miles downstream from the Gasconade River and has a drainage area of 528,200 square miles.

Annual discharge for water years 1898-1922 is the average of annual discharge computed by two different methods. By one method, discharge was computed by applying Weather Bureau or Corps of Engineer gage-heights to a rating curve based on current-meter discharge measurements made by the Geological Survey in 1928-31. By the other method, discharge was computed by increasing the discharge for Missouri River at Kansas City by inflow based on records for Osage River near Bagnell, Mo. 1/ The relation of the flow at Bagnell to the total inflow was developed from 20 years of simultaneous record, 1929-48.

Annual discharge for water years 1923-25 was computed by increasing the discharge for Missouri River at Kansas City by inflow based on records for the Osage, Grand, Chariton, Lamine, Blackwater, and Gasconade Rivers. Additional tributary inflow was computed from drainage-area ratios.

Annual discharge for water years 1926-28 was computed by increasing the discharge for Missouri River at Boonville by inflow based on records for the Osage and Gasconade Rivers and additional inflow computed from drainage-area ratios.

Monthly discharge for October 1897 to July 1928 was obtained by distributing the annual discharge on the basis of the pattern of discharge obtained by applying Weather Bureau or Corps of Engineers' gage heights at Hermann to the rating table described above.

For the period of operation of the stream-gaging station from August 1928 to September 1949, discharge records as published or to be published in water-supply papers were used in this compilation.

The average annual discharge for 52 years (1898-1949) is 59,067 thousands of acre-feet.

1 Annual discharge water years 1898 to 1925 taken from Surface Waters of Missouri, Missouri Geological Survey Vol. 26.

SUMMARY OF AVERAGE ANNUAL DISCHARGE

Station	Drainage area sq. mi.	Water years	Average Discharge[a] All years	20 years 1930-49	10 years 1940-49
Missouri River at Fort Benton, Mont.	24,600	1891-1949	[b]5,572	4,374	5,139
Marias River near Brinkman, Mont.	6,400	1935-49	556		595
Missouri River at Loma, Mont.	34,100	1936-49	5,358		5,910
Missouri River near Zortman, Mont.	40,600	1935-49	5,715		6,452
Musselshell River at Mosby, Mont.	8,010	1935-49	191		229
Missouri River below Fort Peck Dam, Mont.	57,800	1935-49	5,051		5,278
Milk River at Nashua and Vandalia, Mont.	23,300	1933-49	383		381
Missouri River near Wolf Point, Mont.	83,200	1929-49	5,433	5,404	5,688
Missouri River near Culbertson, Mont.	92,500	1942-49	6,465		
Yellowstone River at Glendive, Intake, and Sidney, Mont.	69,450	1898-1949	9,943	8,253	9,372
Missouri River near Williston, N. Dak.	164,500	1898-1949	17,607	13,886	15,371
Missouri River at Sanish, N. Dak.	166,000	1929-32	13,835		
Little Missouri River near Watford City, N. Dak.	8,490	1935-49	465		540
Missouri River near Elbowoods, N. Dak.	179,800	1940-49	16,226		16,226
Missouri River at Bismarck, N. Dak.	186,400	1929-49	14,892	14,705	16,524
Missouri River near Mobridge, S. Dak.	208,700	1929-49	15,518	15,321	17,496
Cheyenne River near Eagle Butte, S. Dak.	24,500	1930-49	734		927
Missouri River at Pierre, S. Dak.	243,500	1930-49	16,245		18,677
Missouri River at Chamberlain, S. Dak.	250,800	1946-49	20,895		
White River near Oacoma, S. Dak.	10,200	1929-49	369	368	446
Niobrara River near Spencer, Nebr.	10,400	1939-49	961	961	965
Missouri River at Yankton, S. Dak.	279,500	1932-49	18,365		20,709
James River near Scotland, S. Dak.	21,550	1931-49	204		335
Big Sioux River at Akron, Iowa	8,851	1930-49	576		771
Missouri River at Sioux City, Iowa	314,600	1898-1949	24,403	19,010	22,167
Little Sioux River near Turin, Iowa	4,460	1940-49	877		877
Missouri River at Omaha, Nebr.	322,800	1929-49	20,026	19,700	23,223
Platte River near Ashland, Nebr.	83,800	1929-49	3,554	3,474	3,598
Missouri River at Nebraska City, Nebr.	414,400	1930-49	23,746		27,432
Nishnabotna River above Hamburg, Iowa	2,800	1929-49	652	641	855
Missouri River at St. Joseph, Mo.	424,300	1929-49	26,172	25,706	29,985
Missouri River at Leavenworth, Kans.	428,000	1923-29	38,053		
Platte River near Agency, Mo.	1,760	1933-49	506		668
Kansas River at Bonner Springs, Kans.	59,890	1919-49	4,487	4,713	6,439
Missouri River at Kansas City, Mo.	489,200	1898-1949	41,294	31,596	38,002
Missouri River at Waverly, Mo.	491,200	1930-49	31,908		38,230
Grand River near Sumner, Mo.	6,880	1925-49	2,789	2,491	3,090
Chariton River near Keytesville, Mo.	1,950	1930-49	785		923
Missouri River at Boonville, Mo.	505,700	1926-49	40,632	37,213	44,658
Osage River near Bagnell, Mo.	14,000	1926-49	7,512	6,750	8,959
Missouri River near Bonnots Mill, Mo.	523,400	1930-35	36,753		
Gasconade River near Rich Fountain, Mo.	3,180	1923-49	2,177	2,075	2,402
Missouri River at Hermann, Mo.	528,200	1898-1949	59,067	49,333	59,966

[a] In thousands of acre-feet.
[b] Average discharge 1898 to 1949, 5,438 thousands of acre-feet.

Monthly and annual discharge in thousands of acre-feet

[Actual flow past the station]

Water year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Annual
1891	180	204	187	156	139	283	492	1,064	1,443	1,124	464	239	5,975
1892	295	266	256	215	230	298	275	704	2,382	1,535	386	300	7,142
1893	343	329	246	215	167	344	457	1,154	1,728	875	327	282	6,467
1894	412	350	277	215	222	344	806	1,759	2,364	1,064	431	338	8,582
1895	376	372	290	151	194	331	541	1,036	1,050	607	242	239	5,429
1896	276	240	207	154	230	341	321	672	2,053	878	379	476	6,227
1897	430	298	369	246	222	358	875	1,424	1,068	616	228	197	6,131
1898	260	270	247	256	259	271	624	1,386	1,940	877	291	253	6,934
1899	302	265	255	225	180	215	617	1,214	2,163	1,427	507	326	7,696
1900	353	382	301	302	246	431	546	1,380	992	280	166	208	5,587
1901	277	253	286	212	180	317	372	1,523	946	361	146	166	5,039
1902	217	227	203	198	174	223	256	1,018	1,167	659	207	167	4,716
1903	228	253	215	246	194	269	440	776	1,456	675	246	193	5,191
1904	281	268	329	277	258	362	611	1,227	1,356	626	263	194	6,052
1905	243	286	293	246	219	317	279	360	698	401	195	147	3,684
1906	180	228	220	206	228	292	430	717	1,053	402	167	210	4,333
1907	217	218	216	180	255	420	590	983	1,965	1,634	495	356	7,529
1908	377	327	287	266	238	362	585	834	3,191	1,163	362	348	8,340
1909	512	456	347	298	304	440	495	947	2,181	802	357	428	7,567
1910	440	392	271	282	260	726	925	1,272	762	240	170	250	5,990
1911	316	324	282	194	227	401	421	681	1,561	565	255	229	5,456
1912	322	328	275	243	265	335	564	1,203	1,732	643	392	371	6,673
1913	422	403	281	202	213	280	857	1,320	2,177	807	418	260	7,640
1914	475	438	280	283	291	443	597	1,253	1,414	410	205	234	6,323
1915	418	360	278	268	360	559	622	886	1,267	686	458	378	6,540
1916	430	371	316	245	384	691	588	1,069	1,874	1,431	440	370	8,209
1917	395	351	296	322	322	431	650	1,611	2,323	965	277	276	8,219
1918	308	365	300	359	315	454	533	848	1,150	352	318	268	5,570
1919	319	317	317	307	281	383	475	556	327	149	115	123	3,669
1920	150	166	170	223	268	375	400	1,210	1,400	587	259	256	5,464
1921	278	336	270	246	255	331	568	1,060	1,460	459	203	234	5,700
1922	247	275	310	257	220	376	562	1,270	1,640	323	260	274	6,014
1923	245	287	280	275	249	351	643	941	1,140	562	328	248	5,549
1924	273	299	288	266	350	334	543	1,060	583	258	216	221	4,691
1925	245	254	258	262	271	333	601	1,110	1,180	539	264	325	5,642
1926	417	418	376	307	319	412	744	978	402	346	282	287	5,288
1927	309	295	285	286	260	365	412	1,320	2,720	769	389	417	7,827
1928	468	439	349	314	350	574	607	1,700	1,070	695	326	306	7,198
1929	328	321	307	296	291	345	377	824	940	363	285	299	4,976
1930	310	270	292	289	230	274	732	592	370	205	197	219	3,980
1931	233	223	235	247	258	299	358	331	322	165	162	173	3,006
1932	184	168	151	146	149	299	399	676	922	319	256	212	3,881
1933	248	241	184	215	208	348	375	695	1,090	277	200	186	4,267
1934	199	285	295	322	257	307	599	528	423	164	97	112	3,588
1935	171	174	180	188	163	260	268	442	632	204	213	224	3,119
1936	236	201	194	188	165	212	274	689	476	235	219	220	3,309
1937	244	225	223	164	138	260	258	*278	273	216	173	169	2,621
1938	219	184	184	170	169	184	*246	708	1,150	760	194	186	4,354
1939	233	298	271	235	197	384	461	697	543	238	203	194	3,954
1940	217	204	200	194	174	248	304	508	510	209	196	174	3,138
1941	194	195	240	219	202	259	274	255	473	232	187	232	2,962
1942	358	313	329	268	245	352	732	916	1,400	440	210	211	5,774
1943	264	308	306	289	298	436	881	869	1,895	731	319	268	6,864
1944	300	303	301	286	269	332	317	434	1,177	699	288	257	4,963
1945	281	285	290	275	260	332	285	477	986	422	217	238	4,348
1946	283	274	271	293	265	328	468	598	654	356	227	278	4,295
1947	353	342	388	311	269	497	664	1,219	1,294	514	251	305	6,407
1948	410	354	355	331	315	372	678	1,345	2,183	733	386	321	7,783
1949	319	347	291	277	265	395	603	867	798	290	195	212	4,859

*Supersedes previsouly published discharge.

Monthly and annual discharge in thousands of acre-feet

[Actual flow past the station]

Water year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Annual
1922	-	-	-	-	-	-	-	178	186	59.4	21.5	12.8	-
1923	13.3	14.7	-	-	-	-	48.3	154	174	106	38.2	16.8	-
1924	32.1	25.3	-	-	-	-	49.4	175	225	63.3	25.2	14.2	-
1925	15.9	24.1	-	-	-	-	176	283	192	65.8	25.6	19.8	-
1926	25.3	26.8	-	-	-	-	47.6	61.4	50.5	24.0	8.7	25.5	-
1927	55.3	29.9	29.9	-	-	-	82.7	330	515	163	68.2	81.5	-
1928	65.8	-	-	-	-	-	79.7	263	158	141	61.0	34.7	-
1929	40.0	29.9	18.4	15.4	11.1	44.8	47.9	144	138	37.3	12.5	10.6	550
1930	16.2	13.9	-	-	-	-	142	137	95.8	28.0	12.9	14.8	-
1931	15.9	-	-	-	-	-	17.3	92.2	57.1	17.3	14.4	12.0	-
1932	14.1	10.5	12.2	9.0	24.8	60.6	49.3	149	141	39.2	18.2	7.5	535
1933	9.0	24.5	18.0	-	-	-	52.2	169	252	67.6	-	-	-
1934	-	-	-	-	-	74.0	171	200	218	56.5	14.2	8.7	-
1935	25.9	66.2	27.0	32.5	45.9	37.9	85.7	153	128	54.2	11.9	5.2	673
1936	9.4	8.9	8.7	6.6	3.2	25.0	61.6	115	59.9	15.4	8.1	5.6	327
1937	5.2	7.1	5.8	2.4	4.8	19.1	49.4	107	171	43.0	9.9	11.0	436
1938	7.1	9.2	8.2	12.2	5.0	41.6	52.5	160	168	66.3	18.1	14.6	563
1939	12.4	10.8	13.7	11.6	6.0	28.6	62.6	131	71.4	23.8	5.4	5.4	383
1940	9.8	13.8	11.6	4.8	3.0	15.9	35.9	85.5	43.3	11.2	8.5	10.6	254
1941	18.0	9.3	6.0	5.8	9.1	15.6	20.3	42.5	48.8	39.7	8.4	21.2	245
1942	26.8	20.0	39.4	16.6	14.5	26.2	59.2	117	139	46.8	26.9	23.4	556
1943	20.5	16.9	23.2	13.9	42.6	52.8	127	194	379	143	28.8	20.4	1,062
1944	20.5	16.9	12.1	10.8	8.3	13.1	26.2	55.7	56.0	33.7	14.0	13.2	280
1945	17.8	13.3	12.2	8.7	8.8	21.7	21.0	132	198	48.8	15.9	15.1	513
1946	17.8	20.1	14.5	14.3	10.1	27.2	45.6	107	102	37.9	10.2	19.0	426
1947	24.5	25.1	24.0	20.0	36.9	93.6	108	209	151	54.3	22.9	24.7	794
1948	39.8	31.7	17.0	14.6	9.8	16.9	84.1	236	675	143	49.2	28.2	1,345
1949	29.7	18.1	8.5	6.5	7.9	30.4	74.1	146	102	31.8	11.4	10.7	477

Monthly and annual discharge in thousands of acre-feet

[Actual flow past the station]

Water year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Annual
1935	-	-	-	-	-	307	382	604	785	256	232	229	-
1936	250	212	199	167	183	263	344	796	527	251	228	223	3,643
1937	247	224	198	174	144	273	314	394	449	248	174	168	3,007
1938	217	191	201	184	181	233	296	836	1,265	807	231	229	4,871
1939	248	316	289	250	204	413	521	828	622	277	215	204	4,387
1940	234	222	211	195	183	277	351	597	558	228	209	191	3,456
1941	219	212	252	229	211	281	296	298	518	268	206	259	3,249
1942	377	336	350	291	262	398	807	1,067	1,569	475	228	226	6,386
1943	293	328	337	311	380	548	1,054	1,097	2,348	911	361	288	8,256
1944	322	327	322	297	278	366	368	504	1,244	754	306	274	5,362
1945	301	301	305	284	270	361	316	619	1,236	488	234	252	4,967
1946	303	298	280	314	288	360	518	712	772	405	250	305	4,805
1947	384	372	420	339	310	624	771	1,428	1,465	568	277	326	7,284
1948	444	388	374	357	336	404	792	1,670	3,092	979	474	371	9,681
1949	377	400	317	293	288	453	714	1,077	956	328	216	234	5,653

MISSOURI RIVER AT POWER-PLANT FERRY, NEAR ZORTMAN, MONT.

Monthly and annual discharge in thousands of acre-feet

[Actual flow past the station]

Water year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Annual
1934	-	-	-	-	-	508	769	754	727	259	128	149	-
1935	201	256	222	204	238	309	412	598	821	296	236	235	4,028
1936	255	236	205	181	144	374	381	806	541	264	235	229	3,851
1937	254	248	192	172	147	300	364	403	486	268	192	187	3,213
1938	240	213	206	209	202	309	319	826	1,430	948	237	258	5,397
1939	265	373	334	281	218	458	541	854	642	308	226	215	4,715
1940	258	248	231	213	213	328	368	619	609	243	225	207	3,762
1941	237	220	272	241	228	313	324	323	545	314	214	271	3,502
1942	410	365	376	309	274	512	863	1,119	1,864	544	270	244	7,150
1943	322	354	308	318	470	680	1,139	1,132	2,514	1,056	405	319	9,017
1944	352	354	353	313	289	438	435	527	1,318	832	345	295	5,851
1945	341	341	341	321	288	423	353	618	1,331	563	254	285	5,459
1946	342	350	320	356	330	434	552	756	864	468	270	328	5,370
1947	414	405	468	380	336	709	806	1,617	1,625	700	332	356	8,148
1948	496	439	420	399	370	444	802	1,669	3,289	1,086	494	396	10,304
1949	402	416	300	299	303	464	719	1,116	1,029	372	264	271	5,955

Monthly and annual discharge in thousands of acre-feet

[Actual flow past the station]

Water year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Annual
1929	-	-	-	-	-	-	-	-	25.1	4.8	.001	0	-
1930	0	0	-	-	-	-	32.7	14.0	.3	2.1	6.5	.3	-
1931	.3	.06	0	1.8	3.8	1.6	.2	0	2.8	.008	2.9	.002	13.5
1932	0	0	0	0	0	0	1.4	1.9	53.0	15.7	12.0	7.0	91.0
1934	-	-	-	-	-	7.7	3.0	.01	43.4	.3	0	0	-
1935	0	0	0	0	.2	4.7	3.0	1.0	.1	9.2	.1	0	18.3
1936	0	0	0	0	0	44.8	25.0	19.1	7.5	.06	.02	0	96.5
1937	0	0	0	0	0	9.7	8.3	3.9	45.5	10.3	0	.05	77.8
1938	3.5	0	1.1	6.1	20.3	16.7	6.2	28.6	101	79.7	7.0	1.8	272
1939	4.5	7.3	5.0	4.7	4.9	36.6	11.7	7.7	34.8	4.6	.02	0	122
1940	0	0	0	0	1.4	8.6	3.3	.9	2.1	.009	.002	0	16.3
1941	.008	0	0	0	.7	2.7	.4	.9	24.7	2.8	.3	16.6	49.1
1942	8.4	4.0	8.2	9.9	8.4	36.3	17.5	92.4	200	30.6	19.2	8.3	443
1943	9.6	10.2	8.2	5.0	68.9	44.6	62.1	59.8	176	27.8	6.6	3.0	482
1944	4.3	7.9	6.8	5.2	4.6	5.8	6.6	6.7	189	68.1	16.5	3.8	325
1945	5.0	6.8	7.4	7.1	11.7	21.3	6.6	4.3	45.3	7.8	1.7	.5	126
1946	.4	4.1	2.8	4.6	10.2	16.7	12.0	5.1	16.8	13.0	1.2	2.5	89.4
1947	4.6	3.2	8.3	6.8	7.4	54.3	36.6	45.3	35.2	6.6	3.4	1.3	213
1948	2.2	2.9	7.3	5.8	5.9	12.3	16.6	38.6	152	93.1	11.1	2.3	350
1949	2.2	5.1	4.3	2.4	2.4	63.5	40.6	37.6	24.6	7.2	.6	1.9	192

FORT PECK RESERVOIR AT FORT PECK, MONT.

Monthly and annual change in contents in thousands of acre-feet

[Data for water year 1938, not previously published, furnished by Corps of Engineers.]

Water year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Annual
1938	0	+24.0	+48.6	+62.4	+133	-204	+266	+690	+1,068	+338	-626	-578	+1,222
1939	-59.0	-35.1	-30.2	-27.7	-3.3	+269	-242	-23.2	+28.1	-193	-192	-11.7	-1,108
1940	+42.2	+.4	+96.2	+145	+188	+278	+193	+472	+550	-460	-810	-29.9	+665
1941	+56.3	+67.5	+192	+158	+168	+208	-246	+96.1	+527	-318	-467	+118	+560
1942	+345	+284	+285	+215	+237	+454	+639	+1,029	+1,998	+324	-492	-517	+4,801
1943	-407	-4.0	+226	+278	+582	+744	+1,061	+1,029	+2,886	+870	-530	-860	+5,875
1944	-790	-480	-494	-212	+79.0	+617	+380	+470	+1,750	+610	-670	-480	+780
1945	-580	-470	-410	-280	+280	+440	+280	+500	+1,200	+410	-390	-810	+170
1946	-580	-10.0	+150	+270	+340	+370	+380	+530	+690	+270	-910	-570	+930
1947	-290	+170	+190	+180	+320	+1,130	+250	+720	+960	-170	-1,040	-1,170	+1,250
1948	-1,050	-270	-130	+50.0	+70.0	+240	+350	+940	+2,650	-180	-1,100	-1,280	+290
1949	-1,340	-380	-240	-160	-120	+560	+190	+620	+720	-480	-1,190	-1,030	-2,850

Monthly and annual discharge in thousands of acre-feet

[Actual flow past the station]

Water year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Annual
1934	-	-	-	-	-	-	723	781	812	289	140	136	-
1935	204	256	210	198	237	310	428	591	820	409	229	229	4,121
1936	261	183	191	179	167	612	430	824	569	264	230	220	4,130
1937	246	244	196	168	145	341	384	386	577	343	182	185	3,397
1938	260	139	88.4	124	70.6	803	59.4	60.4	603	990	901	888	4,987
1939	329	678	574	281	211	620	822	890	835	496	397	220	6,353
1940	196	243	127	54.0	58.1	121	224	144	64.1	690	997	236	3,154
1941	187	119	68.6	67.6	61.1	150	568	224	78.7	643	683	185	3,035
1942	63.7	65.6	61.9	69.3	59.8	174	186	112	76.5	214	777	782	2,642
1943	724	350	79.8	61.5	56.3	50.1	34.0	62.8	40.8	59.3	894	1,120	3,533
1944	1,177	837	820	508	210	64.5	56.7	58.4	49.5	216	996	749	5,742
1945	882	786	670	655	65.5	65.5	50.9	63.4	63.4	71.5	576	1,066	5,015
1946	906	290	91.6	85.4	65.8	66.6	100	137	133	189	1,086	922	4,072
1947	646	124	209	235	94.2	87.0	691	747	536	711	1,289	1,480	6,849
1948	1,542	670	502	317	286	254	510	656	601	1,416	1,562	1,614	9,930
1949	1,729	786	492	482	417	280	573	457	218	829	1,369	1,179	8,811

MILK RIVER AT NASHUA AND VANDALIA, MONT.

Monthly and annual discharge in thousands of acre-feet

[Actual flow past the Vandalia station for water years 1928-39 and the Nashua station for water years 1940-49]

Water year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Annual
1928	-	-	-	-	-	-	-	-	-	-	-	34.6	-
1929	-	-	-	-	-	-	-	77.5	83.9	12.0	4.3	7.9	-
1930	10.9	14.0	5.5	-	-	-	147	16.4	1.9	2.4	2.6	7.6	-
1931	9.4	6.1	5.0	4.6	13.9	7.9	2.6	.2	.2	.5	1.4	.8	52.6
1932	.8	3.4	1.6	-	-	34.4	51.9	22.0	125	6.7	11.7	9.7	-
1933	5.7	6.8	5.0	4.5	2.2	30.4	22.6	64.0	13.3	9.6	67.6	20.5	252
1934	4.0	12.1	3.7	4.9	120	105	50.6	1.5	21.7	2.9	3.4	3.8	334
1935	4.0	7.7	4.1	2.4	6.2	161	83.3	11.4	5.5	56.2	2.7	1.4	346
1936	4.9	6.5	4.2	4.6	4.2	78.4	157	6.4	1.2	.7	.4	1.1	270
1937	.6	4.4	2.9	1.6	2.6	18.7	64.2	.4	60.3	13.3	.6	2.4	172
1938	19.6	5.9	4.0	2.5	2.1	163	76.0	30.0	87.9	138	6.3	25.7	561
1939	10.4	14.3	10.8	8.8	6.1	317	85.5	68.6	186.	45.7	8.5	2.5	764
1940	7.5	6.8	9.2	2.4	5.1	39.6	299	102	63.8	13.6	11.2	6.5	567
1941	6.2	9.4	6.6	5.0	4.4	60.1	50.2	4.4	21.7	5.6	4.8	6.3	185
1942	4.1	7.2	10.8	3.3	4.0	96.2	29.2	8.6	134	68.7	15.2	14.7	396
1943	11.8	17.9	9.9	8.6	7.7	176	356	33.7	213	59.7	16.6	13.5	924
1944	14.8	20.3	11.4	8.1	7.4	107	76.6	12.6	79.0	34.8	10.8	3.9	387
1945	6.2	9.4	5.9	5.0	10.3	65.0	22.6	4.4	7.7	3.7	4.5	4.1	149
1946	4.0	5.5	5.5	5.6	12.8	98.8	10.7	3.7	15.9	33.4	4.2	10.4	210
1947	5.3	5.0	6.0	7.9	6.6	108	246	23.5	39.5	11.1	38.7	11.2	509
1948	10.8	10.5	9.0	7.3	4.3	14.3	46.5	28.8	93.3	70.2	25.2	13.3	334
1949	18.9	17.3	4.8	2.4	2.2	38.1	27.9	13.0	5.7	3.0	7.6	8.2	149

Monthly and annual discharge in thousands of acre-feet

[Actual flow past the station]

Water year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Annual
1929	387	382	309	287	250	454	524	1,030	1,300	510	299	298	6,030
1930	329	302	207	308	437	563	1,020	885	557	303	222	245	5,378
1931	312	*228	*269	*218	*299	*452	389	433	425	231	226	212	3,694
1932	222	183	159	197	162	341	588	848	1,540	523	437	252	5,452
1933	266	226	200	227	213	521	460	978	1,430	441	344	278	5,584
1934	231	353	180	321	582	630	815	818	919	314	147	137	5,447
1935	209	262	199	186	241	453	514	597	824	508	254	226	4,473
1936	257	203	206	186	170	675	664	852	589	267	231	215	4,515
1937	238	260	174	173	151	343	462	383	613	367	189	186	3,539
1938	290	157	92.9	142	59.1	1,020	179	99.7	645	1,167	906	891	5,649
1939	394	658	559	320	206	1,050	1,043	974	1,016	595	413	230	7,458
1940	202	256	136	56.2	60.4	148	571	275	131	663	986	267	3,752
1941	190	127	74.8	67.8	66.3	203	625	257	96.3	616	672	222	3,217
1942	70.6	70.0	70.4	70.6	64.5	257	228	131	233	252	746	778	2,971
1943	708	390	82.3	61.2	66.4	278	468	102	274	139	827	1,107	4,503
1944	1,158	850	825	521	239	177	169	79.7	145	232	1,010	750	6,156
1945	900	778	673	653	77.9	142	87.5	72.7	75.4	72.0	536	1,044	5,112
1946	929	325	92.4	87.1	75.1	198	119	134	149	234	1,039	944	4,326
1947	693	138	213	236	107	213	967	819	630	757	1,409	1,483	7,665
1948	1,568	719	526	329	295	279	538	684	690	1,458	1,615	1,565	10,266
1949	1,732	838	480	451	426	346	591	496	227	796	1,328	1,202	8,913

*Supersedes previously published discharge.

MISSOURI RIVER NEAR CULBERTSON, MONT.

Monthly and annual discharge in thousands of acre-feet

[Actual flow past the station]

Water year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Annual
1941	-	-	-	-	-	-	-	-	-	581	650	249	-
1942	76.0	67.0	65.2	64.5	64.8	268	271	146	228	228	703	774	2,956
1943	694	411	97.3	62.1	87.9	655	681	143	293	205	784	1,105	5,218
1944	1,162	874	816	507	286	196	209	98.5	158	211	977	748	6,242
1945	863	765	686	694	92.9	190	117	83.2	81.3	78.2	472	988	5,111
1946	952	364	98.8	83.9	77.4	241	138	145	161	357	976	941	4,535
1947	725	155	198	250	99.2	330	1,078	858	686	728	1,472	1,499	8,078
1948	1,528	815	518	318	285	324	695	773	652	1,494	1,556	1,582	10,540
1949	1,757	875	441	423	415	381	618	553	240	773	1,353	1,209	9,038

Monthly and annual discharge in thousands of acre-feet

[Actual flow past the stations. Discharge for water years 1898-1903 and for some winter months 1903-22 not previously published, computed by indirect methods as described in the accompanying text. Glendive records used 1903-10, 1931-34; Intake, 1911-31; Sidney, 1934-49.]

Water year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Annual
1898	400	390	410	280	250	360	780	1,740	4,050	2,100	760	580	12,100
1899	500	300	250	280	230	310	1,400	1,260	3,820	4,430	920	500	14,200
1900	300	250	290	300	250	740	680	1,840	3,060	840	390	360	9,300
1901	410	300	280	240	240	730	410	2,750	2,450	1,370	630	490	10,300
1902	500	440	300	280	330	530	480	1,030	2,550	1,130	670	460	8,700
1903	490	290	290	307	389	615	*650	664	2,420	1,730	862	460	9,167
1904	422	340	350	350	328	350	829	1,660	3,270	2,060	797	492	11,248
1905	369	†327	†298	†277	†266	†471	260	594	2,850	1,800	683	342	8,537
1906	364	315	†307	†307	†278	†625	637	1,540	2,470	1,620	947	525	9,935
1907	345	*318	†277	†277	†250	†404	413	1,270	3,170	3,940	1,480	690	12,834
1908	505	363	†298	†295	†282	†400	†462	1,310	3,620	2,750	1,010	513	11,808
1909	584	†386	†338	†295	†277	†500	335	861	4,420	3,090	1,030	720	12,836
1910	470	†336	†295	338	278	1,160	593	1,760	1,920	953	497	432	9,032
1911	358	328	277	215	222	570	351	787	3,320	1,690	953	589	9,660
1912	411	283	246	246	230	1,050	1,340	1,300	3,250	2,790	1,260	797	13,203
1913	836	562	304	312	253	601	1,040	1,370	3,520	1,760	1,150	489	12,197
1914	461	377	330	307	250	491	555	1,810	3,170	1,320	554	379	10,004
1915	479	387	234	192	173	341	511	1,020	2,710	2,120	1,090	768	10,025
1916	701	339	398	369	345	1,230	553	1,070	2,760	2,910	928	404	12,007
1917	460	409	354	†307	†277	†479	†1,440	1,620	3,680	3,390	824	595	13,835
1918	467	396	405	400	389	1,170	690	1,190	4,600	2,070	781	523	13,081
1919	614	460	453	306	267	646	631	818	690	204	217	224	5,530
1920	303	440	389	363	†300	†490	564	1,470	3,180	2,310	670	405	10,884
1921	386	390	380	320	330	542	342	990	3,840	1,100	358	249	9,227
1922	229	†220	†277	†330	†280	†635	541	1,090	2,930	1,120	599	342	8,593
1923	298	314	275	307	278	492	569	1,070	2,650	1,850	787	517	9,407
1924	1,790	720	536	652	834	1,020	2,330	2,150	2,850	1,680	486	380	15,428
1925	581	472	*389	806	855	1,130	797	1,530	2,930	2,090	732	509	12,821
1926	627	541	496	520	519	627	666	1,790	1,560	1,140	528	514	9,528
1927	544	440	503	409	490	713	537	1,740	3,880	2,400	1,200	774	13,630
1928	594	587	492	369	345	830	511	2,340	2,390	2,770	781	483	12,492
1929	485	450	343	301	241	1,300	887	1,390	2,770	1,410	432	430	10,439
1930	480	371	357	281	661	726	631	916	1,560	910	867	547	8,307
1931	646	483	375	282	298	320	352	769	1,810	291	295	162	6,083
1932	339	253	180	201	196	422	526	1,540	2,560	1,510	405	431	8,563
1933	412	333	202	221	187	738	437	1,210	2,840	836	414	450	8,280
1934	340	345	207	275	260	348	423	780	728	226	154	142	4,228
1935	294	250	193	170	246	323	325	600	2,473	1,491	345	199	6,909
1936	259	269	228	200	155	681	495	1,195	1,898	625	359	207	6,571
1937	321	328	214	128	158	418	405	805	2,369	1,381	230	202	6,959
1938	376	270	190	268	189	574	370	965	2,940	1,910	481	378	8,911
1939	400	388	254	296	167	738	424	1,066	1,613	703	285	193	6,527
1940	331	348	249	134	221	335	378	795	1,593	525	160	164	5,233
1941	582	293	328	214	240	362	411	1,033	1,656	604	600	952	7,275
1942	889	577	464	279	319	824	689	1,387	2,527	1,300	393	321	9,969
1943	451	456	284	270	792	1,221	1,092	1,157	3,461	2,854	822	477	13,337
1944	402	443	349	265	259	942	735	1,269	4,028	2,022	462	370	11,546
1945	432	414	243	327	305	722	429	790	2,409	2,132	651	509	9,363
1946	558	434	260	394	300	642	548	909	2,066	1,106	288	533	8,038
1947	620	481	367	231	294	1,130	714	1,748	2,460	1,956	624	394	11,019
1948	564	499	388	300	347	763	657	1,172	3,467	1,510	461	253	10,381
1949	403	422	195	200	232	717	625	1,166	2,133	913	238	313	7,557

*Supersedes previously published discharge.
†Estimated.

Monthly and annual discharge in thousands of acre-feet

[Actual flow past the station. Discharge for water years 1898-1928, not previously published, computed by indirect methods as described in the accompanying text.]

Water year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Annual
1898	700	700	700	600	600	900	1,900	3,500	7,000	3,500	1,200	900	22,200
1899	800	600	500	500	500	800	4,000	2,700	6,600	6,100	1,500	800	25,400
1900	700	800	600	700	700	1,700	1,600	3,600	4,500	1,400	600	600	17,500
1901	800	600	600	500	500	1,400	1,100	4,700	3,900	2,100	800	700	17,700
1902	700	700	500	500	600	1,400	900	2,400	4,100	2,200	900	700	15,600
1903	800	600	500	600	700	1,200	1,500	1,700	4,400	2,800	1,200	700	16,700
1904	800	700	700	700	700	1,100	1,900	3,200	5,200	3,100	1,200	800	20,100
1905	700	600	600	600	600	1,300	800	1,100	*3,800	*2,400	*900	*500	13,900
1906	600	600	500	600	500	1,200	1,400	2,500	*5,300	*2,600	*1,200	*800	17,800
1907	*600	600	500	500	600	*1,400	*1,400	2,600	6,000	6,300	2,200	1,100	23,800
1908	1,000	800	600	600	700	1,200	1,500	2,500	7,900	4,600	1,600	1,000	24,000
1909	1,300	900	700	700	700	1,500	1,200	2,100	7,600	4,400	1,500	1,300	23,900
1910	1,100	800	600	700	700	1,800	2,100	3,600	3,300	1,500	800	800	17,800
1911	700	700	500	400	500	1,400	1,100	1,700	5,500	2,600	1,300	1,200	17,600
1912	900	700	500	500	600	1,700	2,900	2,900	5,500	3,700	1,800	1,200	22,900
1913	1,400	1,100	600	600	600	1,200	2,500	3,100	6,700	3,100	1,700	800	23,400
1914	1,100	900	600	700	700	1,500	1,600	3,400	5,200	2,000	800	700	19,200
1915	1,000	800	500	500	700	1,600	1,600	2,200	4,500	3,300	1,700	1,200	19,600
1916	1,200	800	700	700	900	2,600	1,700	2,400	5,500	5,100	1,500	900	24,000
1917	900	800	700	700	700	1,400	3,100	3,800	6,800	4,800	1,200	900	25,800
1918	800	800	700	900	800	2,200	1,900	2,300	6,100	2,700	1,200	800	21,200
1919	1,000	800	800	700	700	1,400	1,500	1,600	1,200	500	300	400	10,900
1920	500	600	600	600	700	1,300	1,400	3,200	5,100	3,200	1,000	700	18,900
1921	700	800	700	600	700	1,300	1,300	2,400	6,000	1,900	600	500	17,500
1922	500	600	600	600	600	1,500	1,500	2,800	5,300	1,800	900	700	17,400
1923	600	700	600	600	600	1,200	1,700	2,300	4,400	2,800	1,200	800	17,500
1924	2,100	1,100	800	1,000	1,300	1,700	3,300	3,500	3,800	2,200	800	700	22,300
1925	900	800	700	1,100	1,300	1,800	1,900	3,000	4,600	3,000	1,100	900	21,100
1926	1,100	1,000	900	900	1,000	1,500	1,900	3,000	2,300	1,800	900	900	17,200
1927	900	800	800	800	900	1,500	1,300	3,500	7,800	3,600	1,800	1,400	25,100
1928	1,200	1,100	900	800	900	2,000	1,600	4,500	4,000	3,900	1,200	900	23,000
1929	904	809	713	555	454	1,750	1,590	2,390	4,110	2,200	682	696	16,853
1930	855	678	545	670	1,040	1,300	1,900	1,810	2,190	1,300	1,070	762	14,120
1931	824	678	633	446	716	769	756	1,090	2,210	615	516	364	9,617
1932	556	416	309	402	324	652	1,240	2,320	4,110	2,190	806	655	13,980
1933	676	544	411	471	394	1,520	1,030	2,090	4,250	1,360	640	809	14,200
1934	592	691	374	615	925	1,076	1,146	1,689	1,636	573	332	277	9,926
1935	504	508	392	328	484	743	923	1,119	3,234	2,063	648	439	11,385
1936	502	426	429	346	293	1,398	1,305	1,965	2,497	935	597	428	11,121
1937	520	570	382	296	309	746	964	1,110	2,876	1,836	475	372	10,456
1938	688	438	285	408	241	1,736	598	1,016	3,417	3,260	1,413	1,240	14,740
1939	847	1,029	723	646	374	2,000	1,619	2,031	2,653	1,396	718	438	14,474
1940	544	608	407	187	275	474	949	1,142	1,801	1,135	1,133	495	9,150
1941	765	416	404	285	318	535	1,070	1,326	1,840	1,186	1,273	1,194	10,612
1942	964	624	516	345	397	1,090	993	1,484	2,817	1,543	1,119	1,113	13,005
1943	1,159	837	347	332	859	1,798	2,074	1,291	3,595	2,982	1,600	1,602	18,476
1944	1,627	1,362	1,140	814	553	1,097	1,062	1,297	4,201	2,370	1,424	1,107	18,054
1945	1,296	1,181	935	986	416	1,119	558	832	2,497	2,194	1,120	1,493	14,627
1946	1,500	772	361	501	393	1,034	688	1,044	2,220	1,602	1,277	1,504	12,896
1947	1,353	591	514	541	568	1,527	1,854	2,679	3,211	2,720	2,097	1,885	19,540
1948	2,078	1,266	865	636	604	1,065	1,383	1,953	3,926	3,023	2,061	1,851	20,711
1949	2,134	1,318	571	654	643	1,160	1,359	1,713	2,296	1,653	1,578	1,557	16,636

*Supersedes previously published discharge.

MISSOURI RIVER AT SANISH, N. DAK.

Monthly and annual discharge in thousands of acre-feet

[Actual flow past the station]

Water year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Annual
1929	910	851	652	584	444	1,670	1,700	2,400	4,170	2,230	682	690	16,983
1930	836	696	546	591	916	1,290	2,010	1,890	2,260	1,450	1,070	827	14,382
1931	916	678	601	425	650	750	768	1,080	2,190	676	518	336	9,588
1932	550	418	310	408	326	713	1,430	2,230	4,190	2,310	830	672	14,387

LITTLE MISSOURI RIVER NEAR WATFORD CITY, N. DAK.

Monthly and annual discharge in thousands of acre-feet

[Actual flow past the station]

Water year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Annual
1935	0.09	0.09	0.06	0	0	8.9	6.0	12.1	45.3	111	7.5	1.5	193
1936	.4	.1	.2	.006	0	145	60.2	6.1	1.1	3.7	1.6	.08	218
1937	.08	.1	.001	0	0	41.0	51.8	8.1	148	72.2	86.4	13.4	421
1938	5.4	.5	.2	0	1.9	182	18.4	19.1	68.2	77.6	11.1	15.0	399
1939	3.7	.7	.6	.2	0	198	25.4	6.5	46.9	51.4	8.1	1.7	343
1940	.4	.3	.3	.04	0	26.9	48.5	26.4	27.2	23.1	34.6	19.9	208
1941	14.7	1.5	.04	.02	.6	33.8	41.8	13.8	190	19.8	24.6	69.8	410
1942	27.8	3.9	1.6	.02	0	118	55.0	72.8	101	11.4	8.8	9.4	410
1943	2.2	2.2	.5	.4	168	186	72.6	12.9	68.2	53.4	25.9	8.2	600
1944	1.6	3.3	.2	.04	.03	4.7	497	45.7	336	56.5	15.7	7.5	968
1945	4.3	8.8	.3	0	9.1	308	37.2	10.4	34.3	8.6	6.1	6.6	434
1946	5.6	.8	.1	.2	15.6	30.5	16.9	16.9	98.2	31.2	4.2	9.1	229
1947	50.4	24.4	8.5	4.2	77.6	370	233	18.3	159	76.6	38.9	3.2	1,064
1948	2.5	1.5	.9	.1	14.8	191	68.2	27.7	60.9	66.6	23.8	2.2	460
1949	1.2	3.8	.7	.1	.06	352	223	18.4	7.6	5.1	2.8	1.0	616

MISSOURI RIVER NEAR ELBOWOODS, N. DAK.

Monthly and annual discharge in thousands of acre-feet

[Actual flow past the station]

Water year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Annual
1940	545	608	437	196	265	416	1,062	1,151	1,789	1,139	1,203	599	9,410
1941	801	407	419	317	320	466	1,274	1,260	2,173	1,208	1,385	1,272	11,302
1942	1,048	670	504	332	424	1,064	1,134	1,529	3,038	1,727	1,188	1,182	13,840
1943	1,207	902	345	356	832	1,782	2,890	1,352	3,686	3,138	1,649	1,614	19,753
1944	1,666	1,418	1,031	828	653	1,031	2,110	1,286	4,399	2,540	1,498	1,176	19,636
1945	1,374	1,199	945	957	499	1,595	686	841	2,424	2,260	1,139	1,496	15,415
1946	1,507	738	377	500	385	1,159	742	1,049	2,270	1,734	1,252	1,484	13,197
1947	1,458	623	501	546	635	1,766	2,161	2,619	3,401	2,938	2,181	1,915	20,744
1948	2,088	1,258	808	640	549	1,254	1,696	1,951	3,947	3,131	2,111	1,837	21,270
1949	2,136	1,356	485	703	651	1,442	2,129	1,702	2,295	1,668	1,581	1,548	17,696

Monthly and annual discharge in thousands of acre-feet

[Actual flow past the station]

Water year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Annual
1928	1,330	-	-	-	-	-	2,250	3,870	4,620	4,900	1,730	833	-
1929	904	922	590	658	477	2,000	1,990	2,400	4,720	2,420	867	678	18,626
1930	848	750	487	539	889	1,760	2,120	1,950	2,310	1,420	1,080	898	15,051
1931	818	744	540	411	561	824	780	1,000	2,050	775	556	364	9,423
1932	578	433	318	400	320	769	1,660	2,210	4,120	2,670	848	708	15,034
1933	713	552	478	503	419	1,750	1,180	2,410	4,210	1,540	558	952	15,265
1934	574	717	367	546	854	1,170	1,146	1,601	1,693	676	384	271	9,999
1935	462	515	337	309	457	638	1,038	1,033	3,202	2,411	737	469	11,608
1936	488	380	512	349	361	1,349	1,400	1,871	2,409	1,047	603	450	11,219
1937	511	608	323	371	301	750	1,138	1,028	2,869	2,045	587	370	10,901
1938	648	444	276	389	236	1,922	668	950	3,241	3,567	1,472	1,218	15,031
1939	927	910	652	664	395	2,213	1,907	1,942	2,807	1,661	785	466	15,329
1940	544	608	464	207	265	382	1,052	1,133	1,810	1,140	1,213	644	9,462
1941	797	382	452	324	324	462	1,287	1,232	2,212	1,241	1,328	1,323	11,364
1942	1,072	681	467	334	445	1,011	1,188	1,489	3,148	1,789	1,163	1,159	13,946
1943	1,209	964	340	366	472	1,680	3,698	1,362	3,546	3,306	1,648	1,658	20,249
1944	1,722	1,465	1,014	837	729	850	2,429	1,238	4,317	2,690	1,563	1,204	20,058
1945	1,398	1,260	963	940	618	1,799	754	872	2,284	2,416	1,150	1,458	15,912
1946	1,554	735	375	397	367	1,318	732	1,017	2,206	1,824	1,229	1,536	13,290
1947	1,493	665	490	560	627	1,768	2,341	2,580	3,449	2,910	2,232	1,891	21,006
1948	2,087	1,250	791	653	528	1,272	2,042	1,937	3,934	3,179	2,124	1,819	21,616
1949	2,161	1,386	492	765	688	1,253	2,732	1,734	2,321	1,690	1,582	1,530	18,334

MISSOURI RIVER NEAR MOBRIDGE, S. DAK.

Monthly and annual discharge in thousands of acre-feet

[Actual flow past the station]

Water year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Annual
1928	-	-	-	-	-	-	-	-	-	-	-	1,080	-
1929	916	970	572	689	511	2,170	2,140	2,290	5,000	2,560	935	690	19,443
1930	873	744	461	528	833	2,050	2,220	2,010	2,330	1,410	1,050	898	15,407
1931	892	714	467	415	525	824	845	959	2,000	885	563	354	9,443
1932	556	434	314	383	337	873	1,740	2,160	4,280	2,800	898	726	15,501
1933	664	553	422	468	401	1,560	1,230	2,180	4,140	1,730	571	934	14,853
1934	579	711	415	482	786	1,246	1,053	1,572	1,671	753	405	274	9,947
1935	451	516	318	309	449	653	1,133	1,005	3,204	2,608	828	477	11,951
1936	482	340	494	356	295	1,541	1,481	1,795	2,387	1,125	614	470	11,380
1937	498	617	315	378	288	793	1,336	989	3,078	2,207	659	386	11,544
1938	627	438	268	380	263	2,020	755	945	3,132	3,967	1,528	1,236	15,559
1939	948	874	621	673	408	2,200	2,245	1,877	2,860	1,876	816	487	15,885
1940	543	607	490	208	260	369	1,071	1,210	1,750	1,181	1,242	692	9,623
1941	789	369	454	333	325	562	1,353	1,252	2,474	1,264	1,289	1,369	11,833
1942	1,097	701	438	336	463	1,026	1,306	1,695	3,305	1,936	1,189	1,144	14,636
1943	1,190	1,033	320	427	489	2,330	4,405	1,461	3,701	3,488	1,632	1,706	22,182
1944	1,663	1,496	1,017	828	758	705	3,346	1,226	4,799	3,079	1,591	1,281	21,789
1945	1,439	1,330	959	1,016	708	2,254	914	838	2,202	2,521	1,220	1,439	16,840
1946	1,650	847	419	486	449	1,321	866	1,069	2,122	1,916	1,160	1,500	13,805
1947	1,517	759	480	551	590	1,722	2,828	2,680	3,785	3,053	2,192	1,837	21,994
1948	2,110	1,305	792	646	549	1,765	2,717	1,944	3,882	3,250	2,115	1,792	22,867
1949	2,183	1,509	505	761	711	1,465	3,371	1,780	2,306	1,722	1,570	1,507	19,390

CHEYENNE RIVER NEAR EAGLE BUTTE, S. DAK.

Monthly and annual discharge in thousands of acre-feet

[Actual flow past the station]

Water year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Annual
1928	-	-	-	-	-	-	-	-	-	-	-	54.1	-
1929	29.8	27.0	-	-	-	-	408	255	702	96.5	48.2	64.3	-
1930	52.0	25.2	20.0	12.3	87.8	109	59.3	80.0	86.3	30.3	81.8	45.4	689
1931	57.7	16.2	14.4	17.3	28.6	22.8	41.1	16.0	39.9	35.9	31.9	6.7	328
1932	15.7	11.0	7.7	6.8	14.4	119	166	212	181	50.4	60.6	17.1	862
1933	19.5	13.4	6.2	5.5	3.1	81.8	134	581	102	29.9	91.0	71.4	1,139
1934	15.6	14.3	9.8	8.0	16.7	17.7	19.2	5.4	37.2	32.0	25.1	7.0	208
1935	29.9	12.5	7.4	5.5	20.0	51.5	74.6	96.4	333	34.0	8.7	6.7	680
1936	6.0	5.0	8.5	3.8	1.8	94.7	50.4	10.1	11.1	5.5	5.3	2.8	205
1937	2.5	9.9	2.6	.6	.7	25.5	48.8	9.9	129	364	12.6	15.2	620
1938	6.5	5.3	4.0	4.8	8.4	85.1	18.2	23.5	97.1	67.2	22.9	46.3	389
1939	7.8	6.4	7.2	5.9	1.2	62.7	14.1	69.0	51.2	30.2	15.5	9.1	280
1940	9.0	6.8	4.8	.5	2.6	60.9	51.0	32.7	68.0	10.8	7.0	5.2	259
1941	10.0	3.0	1.9	1.6	5.5	19.6	114	26.3	598	65.7	38.9	26.4	911
1942	19.1	15.5	10.1	4.5	7.5	16.4	43.1	683	241	61.3	45.5	19.0	1,166
1943	20.1	14.2	3.5	2.8	71.4	146	114	22.3	302	79.2	16.3	14.0	806
1944	10.3	11.6	5.4	1.9	2.7	69.2	406	84.4	450	101	43.9	32.6	1,219
1945	18.5	16.1	8.1	13.4	37.9	381	86.3	58.9	196	51.3	40.3	27.2	935
1946	22.8	18.7	6.4	9.2	11.5	33.1	32.8	312	529	118	30.5	69.7	1,194
1947	79.4	34.6	20.0	15.4	68.2	144	126	46.0	384	150	31.0	17.0	1,116
1948	14.3	11.2	16.6	9.8	18.3	134	59.1	46.9	116	84.6	45.6	17.9	574
1949	13.4	19.0	7.0	2.3	.6	612	226	80.2	57.2	32.5	21.4	19.8	1,091

MISSOURI RIVER AT PIERRE, S. DAK.

Monthly and annual discharge in thousands of acre-feet

[Actual flow past the station]

Water year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Annual
1930	904	768	449	537	800	2,420	2,320	2,150	2,390	1,480	1,080	982	16,280
1931	922	726	469	424	616	848	946	935	1,980	1,020	599	371	9,856
1932	573	469	320	379	353	1,060	1,830	2,330	4,490	3,070	1,060	756	16,690
1933	664	555	371	464	394	1,600	1,480	2,730	4,220	1,990	633	1,020	16,121
1934	601	736	474	447	705	1,302	1,136	1,528	1,642	901	447	283	10,202
1935	468	534	311	303	466	730	1,223	1,091	3,385	2,748	871	501	12,631
1936	483	335	472	350	338	1,649	1,561	1,763	2,358	1,200	655	486	11,650
1937	497	606	340	361	289	832	1,425	960	3,259	2,742	749	390	12,450
1938	610	442	265	381	295	2,064	846	954	3,028	4,170	1,591	1,297	15,943
1939	972	873	591	692	423	1,934	2,624	1,873	2,934	1,992	854	538	16,300
1940	547	610	515	200	256	394	1,116	1,291	1,752	1,208	1,247	755	9,891
1941	811	377	456	339	332	546	1,515	1,293	3,201	1,407	1,326	1,359	12,962
1942	1,125	733	424	348	449	1,071	1,416	2,477	3,659	2,054	1,240	1,144	16,140
1943	1,225	1,083	321	445	545	2,284	4,978	1,470	3,882	3,717	1,632	1,716	23,298
1944	1,665	1,530	1,013	834	780	669	4,131	1,315	5,075	3,296	1,619	1,271	23,198
1945	1,405	1,381	917	905	955	2,799	1,134	833	2,410	2,678	1,395	1,431	18,243
1946	1,645	973	455	490	424	1,347	861	1,299	2,643	2,205	1,206	1,585	15,133
1947	1,632	821	487	546	656	1,521	3,437	2,682	4,079	3,251	2,230	1,869	23,211
1948	2,162	1,357	764	683	556	1,968	2,865	1,980	3,947	3,495	2,188	1,740	23,705
1949	2,236	1,586	520	735	695	2,192	3,893	1,836	2,334	1,811	1,607	1,542	20,987

MISSOURI RIVER AT CHAMBERLAIN, S. DAK.

Monthly and annual discharge in thousands of acre-feet

[Actual flow past the station]

Water year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Annual
1928	-	-	-	-	-	-	-	-	-	-	-	1,210	-
1929	941	988	606	670	552	2,700	2,770	2,390	6,130	2,920	1,080	732	22,479
1945	-	-	-	-	-	-	1,178	811	2,328	2,751	1,412	1,419	-
1946	1,664	1,008	471	493	470	1,308	927	1,271	2,612	2,284	1,236	1,630	15,374
1947	1,666	856	480	566	658	1,260	3,623	2,579	3,973	3,319	2,314	1,845	23,139
1948	2,161	1,428	730	696	548	1,975	2,954	1,966	3,966	3,488	2,278	1,756	23,946
1949	2,221	1,653	536	704	690	2,188	3,974	1,826	2,329	1,826	1,611	1,562	21,120

WHITE RIVER NEAR OACOMA, S. DAK.

Monthly and annual discharge in thousands of acre-feet

[Actual flow past the station]

Water year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Annual
1928	-	-	-	-	-	-	-	-	-	-	-	8.6	-
1929	15.7	19.6	10.5	3.3	3.6	121	92.8	37.1	55.2	26.5	8.6	12.0	406
1930	21.2	25.8	7.6	3.2	56.6	87.3	53.9	108	22.8	9.5	41.5	16.2	454
1931	40.6	7.3	5.8	9.2	30.0	24.2	52.5	20.3	12.7	8.4	12.5	2.8	226
1932	6.8	6.8	4.7	4.0	29.0	76.2	45.0	133	108	19.1	31.5	3.3	467
1933	5.9	4.8	3.7	4.0	3.1	23.4	30.0	66.4	9.8	5.9	19.5	29.9	206
1934	3.5	5.7	4.6	3.7	8.3	10.9	22.9	-5.8	21.0	6.8	12.8	3.2	109
1935	16.9	6.1	3.0	2.0	12.1	23.0	139	114	87.1	35.3	5.0	7.8	451
1936	1.9	2.5	2.8	.9	1.1	103	27.8	11.8	10.5	.06	.05	6.2	169
1937	2.1	11.6	4.0	2.4	14.6	79.6	51.5	9.6	81.1	43.9	2.7	.9	304
1938	1.7	1.7	.8	1.8	2.6	35.9	40.8	57.8	36.9	26.3	17.2	23.5	247
1939	3.6	8.3	6.1	5.8	1.9	71.9	19.7	51.9	46.1	20.4	11.0	8.8	256
1940	12.6	4.0	3.5	.8	.9	45.6	29.8	23.5	8.4	1.5	5.3	3.6	140
1941	2.2	1.1	1.5	1.1	2.7	13.8	44.0	13.1	74.5	34.4	7.1	13.8	209
1942	25.1	5.9	1.7	1.5	6.9	16.1	86.7	838	202	33.4	16.2	18.2	1,252
1943	10.1	8.7	4.1	6.1	3.3	41.6	37.5	15.3	103	21.2	7.1	4.0	262
1944	3.3	7.2	2.9	4.2	3.8	241	69.1	78.3	174	71.6	29.5	8.4	693
1945	6.6	19.3	12.5	10.1	25.0	77.8	31.0	16.9	40.3	24.3	27.4	10.0	301
1946	7.2	6.2	5.0	5.3	8.5	39.0	25.4	65.2	60.7	14.8	9.1	54.0	300
1947	30.8	12.2	12.6	9.1	16.2	79.3	44.6	23.2	175	87.8	11.2	3.5	506
1948	5.8	5.6	11.9	12.1	9.3	53.9	31.2	38.3	162	39.5	29.6	4.0	403
1949	5.0	20.0	4.9	2.3	3.5	210	50.6	39.1	31.0	11.0	14.4	3.9	396

Monthly and annual discharge in thousands of acre-feet

[Actual flow past the Spencer station for water years 1927-36, 1940-49 and the Verdel station for water years 1938-40.]

Water year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Annual
1927	-	-	-	-	-	-	-	-	-	-	62.7	51.8	-
1928	71.3	54.6	37.0	71.9	82.2	126	92.2	76.9	77.4	73.8	55.3	61.3	880
1929	76.2	80.3	72.6	39.7	48.9	129	80.3	83.0	104	66.4	50.2	70.8	901
1930	78.1	85.1	55.5	54.7	114	101	120	145	89.3	50.1	60.1	66.6	1,020
1931	81.8	73.8	78.7	80.6	101	92.2	94.0	76.9	58.7	47.6	52.1	50.2	888
1932	62.7	56.8	76.2	58.6	98.4	97.8	83.3	105	107	52.8	51.7	51.2	902
1933	67.6	65.5	47.4	75.6	61.6	110	76.8	96.5	49.4	53.8	67.6	54.5	826
1934	65.0	71.4	59.0	79.7	71.7	91.0	70.1	62.3	59.3	39.6	49.3	74.9	793
1935	69.0	70.2	56.4	51.2	96.9	91.4	107	88.0	97.8	55.8	46.9	51.7	882
1936	61.4	71.0	57.5	58.3	57.8	156	88.9	94.4	55.2	33.7	42.3	47.4	824
1938	-	-	-	-	-	-	-	133	97.6	98.8	40.2	65.3	-
1939	71.7	70.0	83.5	86.6	52.2	184	76.3	85.5	72.1	54.9	41.8	41.9	920
1940	67.9	65.7	64.1	43.4	79.8	151	118	77.2	72.8	35.5	45.5	45.8	867
1941	57.6	60.6	81.8	55.6	69.1	96.4	86.4	62.7	66.0	60.3	48.6	53.6	799
1942	71.9	66.8	60.8	62.7	67.2	105	94.9	249	109	62.1	57.2	62.2	1,069
1943	68.5	66.8	64.5	50.0	86.7	101	86.5	72.5	101	53.9	47.0	48.2	847
1944	62.1	68.5	55.0	66.5	64.8	130	134	106	161	102	76.1	57.5	1,084
1945	75.0	79.1	63.9	84.2	97.4	157	102	84.9	126	65.8	82.4	59.1	1,077
1946	72.5	71.0	47.4	78.8	89.6	121	74.2	81.4	65.8	57.4	53.6	85.2	898
1947	115	85.6	69.1	73.1	80.3	127	116	84.8	160	76.2	48.8	59.1	1,095
1948	66.0	80.2	74.1	54.4	74.2	119	81.1	73.8	85.9	64.9	65.4	51.4	890
1949	69.4	75.1	55.2	58.6	65.2	210	122	108	82.4	57.2	55.6	62.6	1,021

MISSOURI RIVER AT YANKTON, S. DAK.

Monthly and annual discharge in thousands of acre-feet

[Actual flow past the station]

Water year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Annual
1931	-	839	486	523	889	1,010	1,130	947	1,900	1,290	664	495	-
1932	640	583	381	430	495	1,320	1,900	2,610	4,610	3,300	1,360	857	18,486
1933	738	595	371	551	490	1,650	1,890	2,640	4,250	2,420	892	1,120	17,607
1934	723	787	565	448	628	1,567	1,223	1,610	1,774	1,162	556	406	11,449
1935	527	607	353	345	582	855	1,440	1,421	3,415	2,985	1,072	604	14,206
1936	542	404	454	444	417	2,349	1,715	1,754	2,377	1,312	735	607	13,110
1937	570	666	431	438	352	1,004	1,543	1,017	3,347	2,970	966	479	13,783
1938	653	532	320	435	392	2,057	1,220	1,123	2,752	4,548	1,726	1,452	17,210
1939	1,102	945	659	795	516	1,613	3,289	1,882	2,970	2,222	1,017	624	17,634
1940	603	678	624	231	320	543	1,241	1,440	1,690	1,328	1,272	919	10,889
1941	835	482	519	430	398	671	1,594	1,288	3,260	1,560	1,355	1,493	13,885
1942	1,293	927	480	419	476	1,188	1,615	4,459	4,163	2,270	1,488	1,271	20,049
1943	1,334	1,242	430	514	477	2,040	5,585	1,641	3,851	4,104	1,694	1,804	24,716
1944	1,739	1,698	1,067	913	863	905	4,546	1,554	5,249	4,225	1,890	1,450	26,099
1945	1,457	1,579	865	903	1,188	3,214	1,572	895	2,434	2,823	1,657	1,394	19,981
1946	1,766	1,148	548	580	594	1,461	1,263	1,433	2,640	2,513	1,337	1,766	17,049
1947	1,911	1,135	431	624	745	1,485	4,039	2,745	4,397	3,813	2,321	1,938	25,584
1948	2,239	1,610	750	768	702	2,071	3,194	2,029	4,380	3,783	2,454	1,761	25,741
1949	2,219	1,834	617	727	792	2,630	4,480	2,041	2,467	1,942	1,639	1,711	23,099

Monthly and annual discharge in thousands of acre-feet

[Actual flow past the station]

Water year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Annual
1928	-	-	-	-	-	-	-	-	-	-	-	9.8	-
1929	11.9	9.5	-	-	-	-	96.4	61.2	28.9	8.3	3.2	1.2	-
1930	1.6	2.2	-	-	-	15.0	26.0	36.0	15.8	7.8	6.5	2.4	-
1931	2.4	1.6	1.2	1.0	1.2	2.1	6.7	9.2	6.1	1.3	.7	.4	33.9
1932	.3	.4	.6	.5	3.2	43.7	29.5	18.7	8.6	6.1	1.9	1.3	115
1933	.5	.4	.2	.4	.3	2.0	1.3	6.4	1.9	4.1	1.2	.7	19.4
1934	.5	.4	.3	.2	.4	1.1	1.1	.5	.4	.3	0	4.8	10.0
1935	1.2	.5	.4	.6	.9	1.2	6.3	5.6	4.7	5.4	.6	.5	27.9
1936	.2	.3	.2	.1	.2	31.8	5.3	12.4	3.2	.05	.4	.7	54.8
1937	.01	.09	.4	.1	2.1	34.9	37.0	18.1	12.0	1.8	15.0	.7	122
1938	.4	.4	.4	.4	5.4	45.6	7.4	33.4	5.7	1.4	.2	.9	102
1939	.2	.2	.2	.3	.4	10.9	16.8	1.4	.9	2.8	.9	.04	35.0
1940	0	0	.2	.09	.1	1.0	5.8	4.9	14.0	1.4	.8	.02	28.3
1941	0	.005	.2	.3	.7	12.2	15.3	2.7	1.2	1.0	.2	.02	33.8
1942	0	0	1.0	.3	.5	3.8	6.8	308	90.2	36.0	32.8	16.0	495
1943	7.3	5.1	2.6	2.3	7.8	53.1	152	130	90.4	50.8	33.0	14.6	549
1944	6.6	5.2	3.5	2.5	7.1	61.0	105	89.5	115	71.6	45.6	17.2	530
1945	5.4	5.3	4.2	1.8	14.8	63.3	67.9	53.3	101	27.9	11.2	2.7	359
1946	1.4	1.3	1.3	1.0	8.7	63.0	37.7	9.0	7.2	15.2	3.8	9.4	159
1947	17.4	10.8	6.2	3.0	8.7	9.1	95.2	59.8	63.2	22.3	7.5	3.1	306
1948	1.5	3.4	2.6	1.4	5.1	94.0	237	72.8	89.8	70.2	38.5	5.6	622
1949	2.7	3.7	2.9	3.0	1.8	86.4	91.0	36.1	29.2	4.9	4.2	3.6	270

BIG SIOUX RIVER AT AKRON, IOWA

Monthly and annual discharge in thousands of acre-feet

[Actual flow past the station]

Water year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Annual
1929	14.8	12.6	10.6	-	-	-	75.6	72.6	79.7	44.4	16.0	11.4	-
1930	18.2	18.3	8.5	4.8	43.2	43.0	22.4	68.9	58.6	10.8	5.3	9.9	312
1931	8.9	9.3	6.2	4.6	7.1	7.6	8.3	6.6	7.7	3.1	11.7	5.5	86.8
1932	5.2	10.5	9.5	7.9	36.0	251	60.1	34.7	58.7	19.4	35.0	18.0	546
1933	6.7	4.7	4.2	4.6	6.7	43.1	34.9	16.5	6.0	11.4	14.0	113	266
1934	11.7	7.5	6.2	5.5	5.6	7.9	12.5	4.5	85.4	22.1	6.9	5.3	181
1935	9.4	6.0	2.7	2.5	27.9	63.1	24.6	21.4	19.1	13.7	19.2	5.7	215
1936	3.1	3.3	4.0	1.7	.7	326	42.3	55.0	23.2	5.0	13.3	36.7	514
1937	4.7	4.6	3.9	2.0	4.4	101	156	121	61.8	21.9	15.7	4.9	502
1938	5.1	4.4	3.0	3.0	11.6	289	46.6	69.3	37.0	138	22.2	128	757
1939	20.1	14.7	12.8	18.5	8.2	151	42.3	21.6	36.6	50.0	47.0	6.8	430
1940	4.8	5.1	4.6	2.9	4.0	35.2	160	32.4	34.2	13.2	8.0	3.5	308
1941	2.3	3.5	3.6	4.2	16.3	198	108	29.4	25.9	13.5	3.6	2.3	411
1942	4.2	4.7	5.3	3.0	4.9	22.1	24.1	186	283	89.6	159	146	932
1943	40.4	22.5	12.5	8.1	88.5	83.6	81.8	29.8	246	120	74.5	38.3	846
1944	20.7	24.2	22.0	11.5	112	121	76.9	202	244	167	106	77.1	1,184
1945	41.9	32.4	24.7	9.8	51.8	213	75.8	95.2	252	92.5	46.7	22.1	958
1946	16.9	15.1	8.5	5.9	63.9	284	76.2	35.4	41.2	50.9	19.2	31.6	649
1947	55.6	39.9	21.1	12.6	28.4	47.2	226	130	213	82.9	22.5	14.1	893
1948	14.0	17.2	9.2	5.8	28.4	272	139	97.7	46.3	117	71.3	32.7	851
1949	21.7	15.3	10.9	6.2	14.8	237	229	51.4	34.2	21.1	17.8	17.5	677

Monthly and annual discharge in thousands of acre-feet

[Actual flow past the station. Discharge for water years 1898-1928, 1933-38, not previously published, computed by indirect methods as described in the accompanying text]

Water year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Annual
1898	900	800	500	500	800	1,400	2,500	3,700	7,700	6,700	2,200	1,200	28,900
1899	1,000	1,000	600	600	900	2,200	6,700	4,000	5,700	6,400	3,000	1,300	33,400
1900	1,000	1,100	600	600	1,000	2,100	2,800	3,700	5,000	3,700	1,500	1,200	24,300
1901	1,100	900	600	600	800	1,200	2,000	2,900	3,600	4,800	2,300	1,800	25,600
1902	1,100	800	600	600	800	1,400	2,300	2,500	4,100	3,500	2,400	1,400	21,500
1903	1,100	1,000	600	600	800	1,700	2,200	2,700	4,100	4,700	3,300	2,100	24,900
1904	1,400	1,000	700	700	1,000	1,700	4,300	3,100	5,400	4,300	2,100	1,300	27,000
1905	900	800	500	500	900	1,600	1,200	1,800	3,600	5,200	2,400	900	20,300
1906	700	800	700	600	700	1,700	3,000	2,800	6,900	4,100	3,000	2,500	27,500
1907	1,600	1,300	900	900	1,100	4,000	3,900	3,700	6,000	6,500	3,000	1,600	34,500
1908	1,800	1,600	900	800	1,200	1,900	2,500	3,300	9,100	6,100	2,700	1,300	33,200
1909	1,300	1,400	1,300	900	1,600	2,500	2,900	2,100	8,700	7,600	3,700	1,900	35,900
1910	1,300	1,100	700	700	1,800	4,900	2,200	3,100	3,700	2,300	1,400	900	24,100
1911	900	800	500	500	700	1,400	1,700	1,700	4,500	4,200	2,500	2,100	21,500
1912	1,600	1,000	800	800	1,000	2,000	5,700	3,200	4,900	4,800	3,300	2,400	31,500
1913	2,000	1,800	1,700	1,100	1,100	1,700	3,900	2,800	5,300	4,500	2,900	1,900	30,700
1914	1,500	1,500	1,300	900	1,100	1,800	2,500	3,300	5,800	4,200	2,100	1,500	27,500
1915	1,600	2,000	1,100	1,100	1,300	1,900	4,200	3,000	5,200	5,100	3,700	2,500	32,700
1916	2,200	1,600	1,000	800	1,200	4,100	4,900	3,500	4,400	6,600	2,600	1,300	34,200
1917	1,400	1,400	800	800	1,400	2,400	5,900	4,500	6,000	5,200	2,000	1,500	33,300
1918	1,400	1,400	800	800	1,300	3,600	2,600	2,600	4,500	5,400	2,300	1,300	28,000
1919	700	800	400	1,200	1,000	2,000	2,300	1,500	2,100	1,300	500	400	14,200
1920	600	500	500	500	1,000	3,200	3,900	4,800	5,500	4,800	2,000	1,000	28,300
1921	800	800	900	600	1,200	1,700	2,000	2,500	6,600	4,100	1,600	900	23,700
1922	500	600	500	500	1,000	2,300	3,300	2,800	5,200	3,600	2,200	900	23,400
1923	800	1,000	500	500	800	1,800	2,800	2,700	5,200	5,200	3,700	1,600	26,600
1924	3,200	2,200	1,400	1,000	1,300	2,500	4,300	3,000	5,000	3,500	2,000	1,000	30,400
1925	1,300	1,400	800	800	1,100	2,600	4,000	2,800	5,400	4,300	1,600	900	27,000
1926	1,200	1,100	700	700	1,000	1,900	1,400	3,100	4,000	3,300	1,700	1,700	21,800
1927	1,500	1,100	600	600	1,100	2,100	4,000	6,000	9,800	5,200	2,600	2,100	36,700
1928	1,600	1,100	800	800	3,300	3,400	2,500	2,900	4,700	5,500	3,000	1,300	30,900
1929	1,100	1,120	658	627	639	3,280	3,430	2,450	6,600	3,260	1,290	803	25,257
1930	1,000	893	504	589	911	2,930	2,580	2,530	2,500	1,640	1,210	1,170	18,457
1931	1,050	857	485	534	905	1,030	1,150	898	1,950	1,350	664	499	11,372
1932	640	600	380	450	530	1,600	2,020	2,680	4,730	3,440	1,420	910	19,400
1933	750	600	370	560	500	1,700	1,930	2,660	4,260	2,430	910	1,230	17,900
1934	730	750	560	460	650	1,580	1,240	1,600	1,840	1,190	580	420	11,600
1935	520	620	360	350	590	920	1,430	1,460	3,360	3,020	1,150	620	14,400
1936	540	430	450	440	410	2,720	1,800	1,820	2,400	1,380	750	660	13,800
1937	570	630	480	420	350	1,140	1,760	1,170	3,400	3,100	1,170	510	14,700
1938	660	570	330	440	460	2,420	1,360	1,280	2,800	4,850	1,830	1,600	18,600
1939	1,218	999	650	821	524	1,610	3,560	1,867	2,982	2,355	1,089	665	18,340
1940	607	678	648	230	321	592	1,376	1,437	1,763	1,380	1,302	955	11,289
1941	857	511	478	463	442	860	1,700	1,352	3,177	1,678	1,363	1,549	14,430
1942	1,385	1,034	492	423	461	1,294	1,721	4,684	4,370	2,312	1,556	1,445	21,177
1943	1,370	1,372	465	543	556	1,792	5,506	1,948	4,067	4,118	1,827	1,766	25,330
1944	1,693	1,678	1,068	926	984	1,138	4,700	2,185	5,463	5,032	2,285	1,660	28,812
1945	1,594	1,668	862	913	1,294	3,625	1,867	1,116	2,994	2,999	1,726	1,405	22,063
1946	1,781	1,192	565	588	686	1,880	1,477	1,449	2,652	2,600	1,350	1,835	18,055
1947	2,179	1,351	456	692	826	1,533	4,479	3,104	4,624	3,781	2,421	1,977	27,423
1948	2,300	1,744	752	802	798	2,498	3,792	2,222	4,636	3,963	2,569	1,855	27,931
1949	2,347	1,996	672	735	842	3,022	4,903	2,265	2,654	2,109	1,748	1,822	25,115

Monthly and annual discharge in thousands of acre-feet

[Includes flow in Monona-Harrison ditch which by-passes gaging station.]

Water year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Annual
1939	-	-	-	-	-	-	-	41.6	31.7	39.9	42.7	6.0	-
1940	6.0	5.1	4.7	2.7	2.7	24.4	34.4	17.9	73.6	55.2	63.3	14.3	304
1941	7.9	8.4	11.5	14.6	39.8	102	70.9	34.4	46.4	34.1	8.1	54.0	432
1942	48.5	65.4	42.3	32.4	43.3	64.0	82.1	84.5	202	110	63.2	72.6	910
1943	38.3	20.7	11.4	8.8	146	128	58.6	42.1	137	249	93.9	45.3	979
1944	18.7	25.2	26.6	14.5	49.9	76.2	63.5	195	333	221	143	89.0	1,256
1945	46.7	34.5	23.2	14.3	68.4	315	129	180	375	145	215	39.6	1,586
1946	30.8	25.1	23.2	29.3	206	172	69.6	103	82.4	42.7	21.6	26.8	832
1947	40.3	52.7	33.3	19.0	57.5	129	170	192	237	165	26.1	13.1	1,135
1948	13.0	19.5	17.2	14.3	102	260	59.0	56.2	33.7	43.9	39.3	10.1	668
1949	6.5	11.4	8.9	19.2	28.9	236	112	67.8	81.2	27.5	16.0	56.6	672

MISSOURI RIVER AT OMAHA, NEBR.

Monthly and annual discharge in thousands of acre-feet

[Actual flow past the station]

Water year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Annual
1929	1,210	1,210	658	571	655	3,440	3,970	2,430	6,780	3,380	1,380	851	26,535
1930	1,010	916	487	621	994	3,170	2,620	2,610	2,490	1,700	1,190	1,230	19,038
1931	1,030	922	499	550	911	1,050	1,190	885	1,900	1,410	689	578	11,614
1932	640	672	384	464	548	1,680	2,060	2,690	4,740	3,460	1,430	982	19,750
1933	750	660	342	590	529	1,790	2,040	2,360	3,950	2,580	990	1,220	17,801
1934	752	733	558	462	731	1,497	1,253	1,387	1,903	1,408	614	437	11,735
1935	510	627	376	358	584	966	1,421	1,514	3,305	3,129	1,235	640	14,665
1936	544	456	436	419	399	2,853	1,914	1,792	2,286	1,428	752	751	14,030
1937	575	590	525	407	352	1,267	1,800	1,226	3,374	3,234	1,406	541	15,297
1938	641	576	317	418	499	2,459	1,437	1,384	2,560	4,832	1,859	2,044	19,026
1939	1,308	1,017	641	826	528	1,663	3,624	1,825	3,001	2,504	1,172	710	18,819
1940	617	680	678	228	327	620	1,412	1,435	1,883	1,498	1,437	1,008	11,823
1941	810	545	494	504	525	975	1,783	1,352	3,202	1,771	1,366	1,622	14,949
1942	1,443	1,106	602	465	508	1,452	1,796	4,933	4,704	2,655	1,689	1,472	22,825
1943	1,381	1,339	499	579	782	1,695	5,593	1,937	4,159	4,560	1,986	1,850	26,360
1944	1,719	1,721	1,039	941	1,061	1,469	4,582	2,300	5,974	5,172	2,433	1,733	30,144
1945	1,592	1,705	836	930	1,442	4,002	2,160	1,523	3,439	3,237	2,058	1,434	24,358
1946	1,797	1,206	592	666	855	1,904	1,519	1,508	2,525	2,522	1,345	1,795	18,234
1947	2,113	1,387	517	714	865	1,582	4,679	3,165	4,708	4,567	2,486	1,961	28,744
1948	2,213	1,739	724	784	1,046	2,907	3,604	2,215	4,498	4,092	2,678	1,883	28,383
1949	2,339	2,040	686	742	951	3,321	5,477	2,309	2,739	2,158	1,831	1,814	26,407

PLATTE RIVER NEAR ASHLAND, NEBR.

Monthly and annual discharge in thousands of acre-feet

[Actual flow past the station]

Water year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Annual
1928	-	-	-	-	-	-	-	-	-	-	-	126	-
1929	257	444	261	215	189	762	637	652	952	408	132	254	5,163
1930	410	337	123	191	600	419	512	990	637	143	272	336	4,970
1931	501	434	403	400	479	435	466	348	226	117	107	139	4,055
1932	148	217	347	196	513	713	323	345	744	144	349	170	4,209
1933	222	213	148	277	240	539	387	542	218	298	159	210	3,453
1934	200	264	279	222	299	358	236	126	169	90.6	94.2	130	2,468
1935	166	170	110	143	300	323	322	587	1,217	229	152	187	3,906
1936	140	218	220	128	115	790	223	260	160	53.8	66.0	119	2,493
1937	116	135	117	51.0	166	625	236	221	294	151	119	126	2,357
1938	137	158	180	241	143	493	257	401	281	364	99.4	286	3,040
1939	139	183	252	254	121	479	369	238	228	125	98.8	54.9	2,542
1940	90.4	116	125	78.0	136	351	213	188	446	63.5	96.5	53.4	1,957
1941	101	129	115	116	269	317	296	230	273	107	40.5	167	2,160
1942	179	166	152	153	168	412	243	765	746	298	116	322	3,720
1943	170	177	178	164	457	273	311	247	537	273	73.6	93.0	2,954
1944	106	180	130	226	282	386	593	732	945	297	143	190	4,210
1945	178	222	200	258	273	468	320	419	855	445	158	130	3,926
1946	229	209	147	273	355	397	230	238	323	134	77.4	192	2,804
1947	522	409	306	202	293	445	491	321	1,616	598	124	132	5,459
1948	163	232	254	187	362	882	305	205	288	238	426	142	3,684
1949	155	228	210	177	243	1,215	740	533	826	412	146	220	5,105

MISSOURI RIVER AT NEBRASKA CITY, NEBR.

Monthly and annual discharge in thousands of acre-feet

[Actual flow past the station]

Water year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Annual
1929	-	-	-	-	-	-	-	-	-	-	-	1,120	-
1930	1,480	1,430	627	824	1,690	3,600	3,150	3,960	3,210	2,120	1,520	1,670	25,281
1931	1,560	1,480	928	904	1,410	1,520	1,690	1,310	2,140	1,590	806	762	16,100
1932	824	910	744	695	1,060	2,580	2,520	3,000	5,560	3,770	1,940	1,210	24,813
1933	1,030	946	458	959	778	2,330	2,530	2,960	4,210	2,950	1,210	1,520	21,881
1934	965	995	893	731	1,062	1,857	1,552	1,518	2,092	1,510	705	600	14,480
1935	680	834	502	474	928	1,320	1,701	2,238	4,657	3,476	1,453	846	19,109
1936	707	722	624	466	490	3,862	2,199	2,123	2,463	1,509	832	896	16,893
1937	681	740	666	413	586	1,963	2,065	1,490	3,688	3,517	1,617	688	18,114
1938	772	737	486	660	701	2,949	1,759	1,851	2,810	5,211	2,071	2,405	22,412
1939	1,482	1,214	882	1,056	702	2,161	3,994	2,038	3,235	2,673	1,300	780	21,517
1940	718	797	815	308	466	1,045	1,627	1,662	2,355	1,580	1,599	1,080	14,052
1941	886	712	596	658	803	1,287	2,049	1,546	3,475	1,918	1,394	1,800	17,124
1942	1,614	1,256	842	631	762	1,853	2,000	5,495	5,504	3,085	1,856	1,884	26,782
1943	1,538	1,581	698	785	1,287	2,005	5,821	2,197	4,975	5,053	2,092	2,004	30,036
1944	1,855	1,901	1,130	1,168	1,311	2,028	5,406	3,343	7,352	5,680	2,740	1,920	35,834
1945	1,740	1,890	962	1,181	1,779	4,603	2,779	2,117	4,609	3,860	2,304	1,550	29,374
1946	2,002	1,414	673	912	1,215	2,295	1,790	1,718	2,989	2,710	1,463	1,980	21,161
1947	2,709	1,810	881	911	1,191	2,054	5,099	3,492	6,592	5,429	2,608	2,054	34,830
1948	2,369	2,047	1,037	930	1,437	3,969	3,840	2,474	4,611	4,404	3,227	2,150	32,495
1949	2,504	2,234	963	963	1,275	5,105	6,188	2,948	3,642	2,712	2,026	2,075	32,635

NISHNABOTNA RIVER ABOVE HAMBURG, IOWA

Monthly and annual discharge in thousands of acre-feet

[Actual flow past the station]

Water year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Annual
1922	-	-	-	-	-	-	149	33.6	48.9	92.8	111	53.3	-
1923	16.9	32.9	15.4	17.1	10.3	99.5	56.5	42.8	-	-	93.8	59.3	-
1929	23.9	53.3	67.6	26.1	26.1	226	130	83.0	70.2	124	24.8	21.1	876
1930	26.3	35.3	25.7	17.1	53.0	25.4	18.9	35.2	40.2	9.6	11.4	6.1	304
1931	7.0	8.8	6.5	6.5	6.8	7.1	7.4	14.7	99.4	21.6	20.6	41.3	248
1932	59.7	132	89.2	140	147	123	84.5	109	165	69.5	184	49.1	1,352
1933	27.2	29.5	30.4	65.2	20.8	33.0	35.6	23.2	14.5	15.4	21.9	26.1	343
1934	7.9	6.3	8.2	18.3	9.2	9.5	7.7	4.2	21.9	15.2	1.0	15.3	125
1935	12.0	17.1	7.0	33.7	25.1	30.9	5.5	15.2	78.2	18.1	13.7	5.5	262
1936	11.8	18.6	5.6	3.9	31.8	236	21.6	24.3	39.1	3.2	2.1	98.1	496
1937	16.9	5.6	8.0	6.1	132	106	24.4	54.4	27.0	27.1	22.6	2.6	433
1938	2.4	2.6	1.7	1.9	4.2	8.5	11.0	27.0	32.3	31.0	43.0	73.9	240
1939	6.9	8.6	4.4	4.4	20.0	191	10.8	6.7	56.4	76.8	64.5	4.4	455
1940	4.0	2.9	3.0	1.3	1.7	41.2	13.2	10.6	15.6	60.9	151	9.3	315
1941	5.3	8.4	7.6	10.8	18.3	22.7	29.0	14.9	154	31.5	9.3	75.2	387
1942	98.4	62.0	47.7	61.5	47.0	88.0	49.9	141	139	104	38.3	51.5	928
1943	18.3	13.9	19.1	13.6	100	56.1	27.5	75.1	163	43.4	65.2	20.1	615
1944	7.7	10.0	7.4	10.8	15.6	34.0	70.4	182	298	106	96.5	31.2	870
1945	35.4	20.6	11.8	16.1	38.0	149	146	334	278	133	106	32.7	1,301
1946	24.5	21.1	17.6	65.8	127	108	39.2	65.3	105	38.1	75.5	120	807
1947	98.8	65.4	39.2	32.4	42.8	66.0	163	123	978	178	53.0	22.3	1,862
1948	20.2	26.4	21.0	17.8	93.0	253	65.0	39.6	18.5	60.2	36.4	24.7	676
1949	9.9	18.1	15.6	84.1	67.0	292	47.8	46.0	124	48.1	19.4	17.5	790

MISSOURI RIVER AT ST. JOSEPH, MO.

Monthly and annual discharge in thousands of acre-feet

[Actual flow past the station]

Water year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Annual
1928	-	-	-	-	-	-	-	-	-	-	3,230	2,270	-
1929	1,660	1,960	1,260	818	1,120	4,430	4,790	3,300	8,270	4,880	1,810	1,200	35,498
1930	1,570	1,590	787	873	1,810	3,670	3,200	4,140	3,420	2,150	1,560	1,760	26,530
1931	1,590	1,540	972	910	1,430	1,560	1,760	1,350	2,310	1,800	855	940	17,017
1932	984	1,320	1,090	1,250	1,500	2,780	2,780	3,170	5,860	4,160	2,360	1,420	28,674
1933	1,090	1,040	547	1,090	811	2,270	2,680	2,940	4,220	3,130	1,300	1,600	22,718
1934	1,006	999	960	768	1,098	1,835	1,564	1,513	2,115	1,614	718	657	14,847
1935	757	907	548	507	966	1,416	1,687	2,424	5,032	3,759	1,527	912	20,442
1936	746	828	649	492	599	4,273	2,338	2,311	2,686	1,620	865	1,114	18,521
1937	743	744	657	413	824	2,243	2,162	1,660	3,492	3,811	1,815	773	19,337
1938	767	770	467	656	728	2,840	1,952	2,094	2,835	5,315	2,272	2,549	23,245
1939	1,561	1,246	900	1,027	778	2,570	4,022	1,990	3,515	2,989	1,482	856	22,936
1940	728	800	847	309	483	1,139	1,637	1,730	2,384	1,715	1,940	1,165	14,877
1941	901	783	612	702	857	1,323	2,137	1,667	3,883	2,051	1,406	2,116	18,438
1942	2,184	1,636	1,016	822	904	2,162	2,160	5,850	5,956	3,401	2 095	2,027	30,213
1943	1,618	1,569	832	884	1,446	1,967	5,901	2,487	5,642	5,262	2,224	2,043	31,875
1944	1,870	1,955	1,154	1,167	1,300	2,172	5,740	4,086	7,337	6,234	3,105	2,190	38,310
1945	1,884	1,951	1,030	1,346	1,964	5,009	3,489	3,184	5,272	4,192	2,607	1,629	33,557
1946	2,121	1,510	614	981	1,430	2,690	2,022	1,872	3,354	2,912	1,638	2,451	23,595
1947	2,872	2,019	1,008	956	1,154	2,082	5,541	3,771	8,234	6,196	2,729	2,145	38,707
1948	2,434	2,236	1,122	966	1,522	4,541	3,978	2,655	4,513	4,580	3,560	2,190	34,297
1949	2,509	2,425	1,056	1,067	1,539	5,636	6,271	3,028	4,836	3,150	2,177	2,288	35,982

Monthly and annual discharge in thousands of acre-feet

[Actual flow past the station]

Water year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Annual
1922	-	-	-	-	-	-	5,530	3,870	8,030	5,880	3,060	1,360	-
1923	1,090	1,530	793	1,150	1,160	2,410	4,200	2,920	7,970	9,100	5,470	2,160	39,953
1924	4,380	2,320	1,770	984	1,520	3,420	5,190	3,510	8,150	6,050	2,880	1,520	41,694
1925	1,540	1,650	824	824	1,850	2,900	4,120	2,990	7,910	5,980	2,570	1,460	34,618
1926	1,800	1,840	965	1,220	1,950	2,430	2,010	2,800	3,450	2,930	1,990	3,030	26,415
1927	2,180	1,380	947	1,130	1,880	2,730	6,130	6,950	10,300	8,480	3,480	2,180	47,767
1928	2,110	1,620	762	1,550	2,380	3,540	3,790	3,310	6,550	6,400	3,870	2,340	38,222
1929	1,760	2,420	1,410	892	1,210	4,540	5,120	3,360	8,750	4,980	1,990	1,270	37,702

PLATTE RIVER NEAR AGENCY, MO.

Monthly and annual discharge in thousands of acre-feet

[Actual flow past the station]

Water year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Annual
1924	-	-	-	-	-	-	-	-	213	78.4	17.9	22.1	-
1925	4.2	3.3	14.0	4.0	36.9	21.6	32.9	21.2	109	7.8	48.5	46.7	350
1926	61.8	26.7	10.6	36.4	46.5	22.4	28.2	9.0	78.2	16.7	9.4	467	813
1927	242	21.3	13.3	6.8	23.3	39.1	317	42.3	40.1	9.0	14.7	3.7	773
1928	41.4	5.7	2.7	4.8	24.3	6.6	15.2	5.0	172	118	27.4	183	606
1929	53.7	244	86.8	10.7	58.0	324	290	81.0	219	140	13.4	5.4	1,526
1930	20.7	50.2	13.0	6.6	53.4	18.6	17.5	69.0	74.0	15.9	-	-	-
1932	-	-	-	-	-	-	-	-	121	25.3	105	9.4	-
1933	2.7	10.4	28.3	12.6	4.4	14.1	28.0	22.3	4.0	10.6	30.3	34.4	202
1934	6.4	2.2	3.2	4.2	1.9	3.6	4.2	6.6	5.4	.9	.2	10.0	48.8
1935	14.5	54.4	15.0	8.4	19.1	20.4	6.5	125	340	22.5	1.7	4.2	632
1936	1.9	16.9	4.9	2.0	64.9	98.7	5.5	48.3	10.2	.6	.2	30.1	284
1937	11.2	1.2	5.8	13.3	93.6	101	22.5	42.8	13.1	80.6	5.9	.8	392
1938	.7	.4	.5	.8	.8	.8	4.5	24.3	44.2	1.2	14.8	8.2	101
1939	.3	.8	.3	.5	.9	96.4	17.1	4.0	97.9	35.7	5.8	.5	260
1940	.3	.8	.4	.2	.8	10.6	4.6	16.0	19.1	10.6	50.1	2.6	116
1941	.6	1.0	.9	4.8	20.3	8.5	24.3	14.4	191	5.1	1.2	67.5	340
1942	162	129	49.1	95.9	31.5	148	21.6	83.1	255	26.1	42.7	20.3	1,064
1943	15.8	11.2	30.0	9.5	38.1	14.8	8.2	96.5	450	22.0	40.7	8.6	745
1944	2.8	2.0	1.9	4.1	7.1	43.1	292	278	76.3	5.1	74.8	7.1	794
1945	17.5	9.0	43.2	28.4	55.1	157	244	257	205	54.0	19.2	10.6	1,100
1946	17.9	3.5	4.3	100	15.2	152	34.6	71.4	54.4	9.2	2.6	6.3	471
1947	4.4	3.9	2.2	2.7	6.1	34.8	202	65.1	812	32.1	3.1	2.1	1,170
1948	1.9	2.8	9.7	2.3	25.1	122	27.6	34.0	36.5	29.2	18.1	2.8	312
1949	2.4	2.9	1.6	40.5	141	94.9	29.4	10.1	160	67.4	9.8	9.4	569

Monthly and annual discharge in thousands of acre-feet

[Actual flow past the station]

Water year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Annual
1917	-	-	-	-	-	-	-	-	-	-	253	173	-
1918	122	87.5	-	-	-	144	110	378	337	135	116	143	-
1919	132	176	106	173	205	885	732	781	1,210	308	148	280	5,136
1920	303	169	141	170	200	153	445	330	201	289	189	358	2,948
1921	99.6	107	107	124	124	188	163	726	478	520	352	226	3,215
1922	103	77.4	83.0	76.9	90.5	373	666	406	233	682	197	93.4	3,081
1923	53.4	282	103	103	76.6	120	152	387	1,710	750	304	206	4,247
1924	422	154	133	112	148	165	197	173	273	344	332	197	2,650
1925	77.5	61.9	86.1	49.5	154	138	286	186	976	232	291	179	2,717
1926	95.9	90.5	76.2	73.2	154	152	331	158	146	141	135	690	2,243
1927	555	183	125	111	125	187	1,810	589	1,160	493	1,250	708	7,296
1928	633	197	145	148	253	167	293	181	545	904	1,010	289	4,765
1929	207	756	327	188	365	601	1,170	806	1,370	418	221	109	6,538
1930	128	132	103	85.5	170	123	237	1,270	833	213	275	350	3,920
1931	270	259	197	134	136	163	236	352	276	192	309	408	2,932
1932	191	965	336	343	318	346	280	221	575	477	225	304	4,581
1933	109	77.7	72.1	86.2	78.9	116	191	369	105	125	183	407	1,920
1934	120	80.2	95.0	84.9	76.5	97.0	78.2	126	172	72.6	28.0	90.3	1,121
1935	71.8	107	75.0	54.7	66.3	70.4	54.4	1,160	2,422	686	200	506	5,474
1936	240	257	169	126	222	279	114	617	251	68.0	34.0	92.3	2,469
1937	102	37.0	45.1	42.8	441	292	122	105	314	232	191	113	2,037
1938	52.3	38.6	39.2	49.6	58.8	85.6	95.6	894	935	366	334	178	3,127
1939	80.6	65.2	51.1	59.6	48.0	239	332	135	658	293	286	49.4	2,297
1940	32.6	30.9	36.1	25.1	45.9	117	75.5	223	204	89.2	189	168	1,236
1941	59.4	57.5	61.3	115	165	154	260	236	1,616	406	421	699	4,250
1942	2,270	697	410	396	307	409	433	1,004	1,570	558	442	1,103	9,599
1943	404	205	332	234	451	201	275	449	2,659	499	227	96.4	6,032
1944	90.2	82.0	69.2	84.9	98.6	504	2,113	1,649	953	709	1,233	792	8,378
1945	297	194	776	252	244	804	1,777	2,401	1,662	1,669	404	173	10,653
1946	241	136	100	194	155	310	244	294	379	513	232	807	3,605
1947	675	479	235	183	157	428	1,296	493	2,375	725	187	98.6	7,332
1948	79.7	74.4	132	104	202	1,273	325	372	484	1,294	539	175	5,054
1949	97.6	106	105	558	1,155	1,170	493	983	1,795	969	287	528	8,247

MISSOURI RIVER AT KANSAS CITY, MO.

Monthly and annual discharge in thousands of acre-feet

[Actual flow past the station. Discharge for water years 1898-1928, not previously published, computed by indirect methods as described in the accompanying text.]

Water year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Annual
1898	1,300	1,500	1,000	1,400	1,700	2,300	2,800	5,400	10,000	7,500	3,200	2,200	40,300
1899	1,900	1,700	1,600	1,700	1,500	2,700	7,500	7,700	10,100	11,200	5,600	2,200	55,400
1900	1,600	1,700	1,600	1,500	1,400	3,300	4,000	5,800	6,800	5,400	3,100	2,700	38,900
1901	2,400	2,400	1,500	1,500	1,900	3,000	5,000	3,600	8,500	5,200	2,800	2,400	40,200
1902	2,300	2,000	1,400	1,600	1,500	3,100	4,200	4,300	7,900	10,800	4,500	3,700	47,300
1903	4,000	2,300	1,500	1,900	1,700	5,100	3,600	6,900	13,300	6,900	7,100	5,700	60,000
1904	3,100	2,500	1,600	1,800	1,800	2,900	6,900	7,100	10,600	10,300	3,800	2,400	54,800
1905	2,000	1,800	1,300	800	1,500	4,500	*3,100	*5,000	*6,700	*9,200	*4,700	*4,200	44,800
1906	*2,300	*2,400	*1,800	1,700	1,900	2,800	5,600	4,300	8,000	5,600	4,300	3,500	44,200
1907	2,600	2,500	1,500	1,800	3,100	5,300	5,200	4,100	9,400	12,200	6,600	2,900	57,200
1908	2,400	2,000	1,700	1,300	2,300	3,400	3,000	4,800	17,900	10,700	4,700	2,500	56,700
1909	2,500	2,400	1,700	1,300	1,900	5,600	4,200	3,700	10,200	13,700	4,600	2,900	54,700
1910	2,200	3,600	2,400	4,100	2,100	6,500	3,500	4,400	4,600	2,900	2,300	2,100	40,700
1911	1,600	1,300	900	1,100	2,000	2,300	2,600	2,200	3,700	4,500	3,200	2,400	27,800
1912	2,800	1,600	1,500	900	1,400	4,100	10,800	4,800	5,700	5,200	3,800	2,800	45,400
1913	3,100	2,700	1,600	1,300	1,400	2,700	6,600	5,800	6,800	5,900	3,400	2,400	43,700
1914	2,300	2,200	2,400	1,400	1,200	3,000	3,600	4,100	8,700	6,000	2,700	3,200	40,800
1915	2,600	2,100	1,300	1,400	3,200	4,000	6,900	6,700	14,100	16,300	10,500	4,800	73,900
1916	4,700	3,000	2,200	1,800	3,500	6,700	7,900	6,600	7,200	9,700	4,800	2,800	60,900
1917	2,400	2,400	1,400	1,400	1,700	3,500	8,500	6,600	13,400	8,900	3,700	2,200	56,100
1918	2,000	1,900	1,500	1,500	2,100	4,700	5,200	4,500	7,100	6,700	3,900	3,300	44,400
1919	2,500	2,900	2,200	1,900	2,600	4,800	6,700	5,000	6,400	3,500	1,600	1,600	41,700
1920	2,000	1,900	1,200	1,800	2,100	4,200	7,800	9,300	8,400	9,000	3,600	2,500	53,800
1921	1,800	2,000	1,900	1,500	2,200	2,800	2,900	4,200	8,200	7,000	3,400	2,700	40,600
1922	1,800	1,800	1,500	1,300	1,800	4,200	6,300	4,400	8,300	7,100	3,300	1,600	43,400
1923	1,200	2,000	900	1,300	1,200	2,700	4,400	3,400	9,800	9,900	5,800	2,400	45,000
1924	4,800	2,500	1,900	1,200	1,800	3,700	5,500	3,800	9,000	6,600	3,300	1,800	45,900
1925	1,600	1,700	900	900	2,100	3,100	4,500	3,200	9,200	6,400	3,000	1,800	38,400
1926	2,000	2,000	1,100	1,400	2,200	2,600	2,400	3,200	3,800	3,100	2,100	4,900	30,800
1927	3,300	1,600	1,100	1,300	2,100	3,000	8,700	7,600	11,600	9,000	4,800	2,900	57,000
1928	2,800	1,800	900	1,700	2,700	3,700	4,100	3,500	7,500	7,600	4,650	2,710	43,660
1929	1,970	3,440	1,950	1,290	1,670	5,520	6,550	4,750	10,600	5,600	2,180	1,360	46,880
1930	1,730	1,890	916	972	2,040	3,840	3,460	5,610	4,370	2,450	1,850	2,180	31,308
1931	1,870	1,820	1,200	1,070	1,580	1,740	2,020	1,730	2,560	2,090	1,220	1,430	20,330
1932	1,290	2,800	1,550	1,820	1,810	3,170	3,300	3,480	6,840	4,750	2,710	1,740	35,260
1933	1,220	1,150	676	1,210	889	2,370	3,010	3,380	4,330	3,300	1,550	2,040	25,125
1934	1,189	1,072	1,105	827	1,185	1,912	1,668	1,624	2,275	1,735	767	786	16,145
1935	872	1,080	684	564	1,061	1,512	1,726	3,883	8,010	4,760	1,754	1,487	27,393
1936	1,029	1,161	833	561	905	4,709	2,589	2,994	3,000	1,756	919	1,255	21,711
1937	904	787	701	468	1,361	2,641	2,308	1,858	3,642	4,290	2,144	914	22,018
1938	813	854	486	705	797	2,775	2,228	3,120	3,816	5,705	2,692	2,736	26,727
1939	1,680	1,338	971	1,065	852	2,894	4,409	2,095	4,339	3,433	1,880	933	25,889
1940	760	831	910	308	535	1,294	1,694	2,041	2,604	1,865	2,212	1,410	16,464
1941	994	860	679	954	1,073	1,474	2,411	1,941	5,831	2,566	1,816	2,911	23,510
1942	4,814	2,633	1,574	1,295	1,314	2,717	2,816	7,118	7,988	4,291	2,705	3,319	42,584
1943	2,121	1,869	1,283	1,231	1,917	2,174	6,174	3,149	9,149	5,913	2,576	2,191	39,747
1944	2,024	2,069	1,316	1,242	1,414	2,891	8,529	6,254	8,469	7,276	4,495	3,129	49,108
1945	2,289	2,302	2,159	1,614	2,321	6,223	5,910	6,155	7,430	6,175	3,205	1,817	47,600
1946	2,374	1,683	764	1,361	1,572	3,079	2,330	2,175	3,579	3,436	1,865	3,071	27,289
1947	3,448	2,446	1,257	1,089	1,242	2,616	7,321	4,485	11,480	7,428	2,873	2,157	47,842
1948	2,473	2,342	1,344	1,099	1,615	6,050	4,452	3,123	5,166	6,119	4,282	2,394	40,459
1949	2,552	2,502	1,232	1,615	2,798	6,980	6,782	4,010	6,897	4,522	2,491	3,034	45,415

*Supersedes previously published discharge.

MISSOURI RIVER AT WAVERLY, MO.

Monthly and annual discharge in thousands of acre-feet

[Actual flow past the station]

Water year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Annual
1929	-	-	-	-	-	6,580	7,680	4,780	10,800	5,820	2,280	1,410	-
1930	1,760	1,920	941	984	2,070	3,860	3,470	5,630	4,390	2,470	1,860	2,200	31,555
1931	1,880	1,830	1,220	1,050	1,580	1,770	2,040	1,780	2,590	2,130	1,220	1,430	20,520
1932	1,310	2,900	1,670	1,910	1,790	3,180	3,390	3,550	6,840	4,900	2,780	1,770	35,990
1933	1,240	1,170	732	1,210	894	2,310	3,100	3,370	4,360	3,380	1,560	2,030	25,356
1934	1,239	1,056	1,151	806	1,195	1,875	1,688	1,608	2,248	1,773	787	799	16,225
1935	901	1,135	750	568	1,108	1,524	1,745	4,051	8,311	5,034	1,783	1,513	28,423
1936	1,068	1,222	903	582	937	4,753	2,656	3,031	3,056	1,804	941	1,264	22,217
1937	930	791	698	514	1,597	2,700	2,331	1,906	3,500	4,414	2,250	939	22,570
1938	822	875	486	699	799	2,642	2,383	3,163	3,813	5,688	2,794	2,761	26,925
1939	1,714	1,359	995	1,048	862	2,808	4,484	2,054	4,382	3,498	1,920	965	26,089
1940	764	830	926	309	531	1,294	1,685	2,095	2,596	1,888	2,235	1,466	16,619
1941	952	871	683	1,003	1,149	1,458	2,453	1,960	5,785	2,643	1,803	2,868	23,628
1942	4,726	2,764	1,652	1,290	1,370	2,627	2,971	7,059	7,843	4,425	2,751	3,388	42,866
1943	2,244	2,031	1,347	1,273	1,899	2,227	6,228	3,391	9,292	5,996	2,646	2,194	40,768
1944	2,008	2,060	1,373	1,229	1,359	2,824	8,891	6,104	8,224	7,053	4,594	3,200	48,919
1945	2,338	2,323	2,316	1,562	2,302	6,503	6,441	6,095	7,143	5,978	3,157	1,759	47,917
1946	2,366	1,690	774	1,405	1,561	3,103	2,426	2,193	3,484	3,419	1,846	2,981	27,248
1947	3,409	2,422	1,352	1,030	1,241	2,753	7,488	4,454	11,430	7,822	2,874	2,194	48,469
1948	2,455	2,402	1,421	1,129	1,565	6,363	4,511	3,135	5,084	6,077	4,263	2,378	40,783
1949	2,495	2,494	1,299	1,634	2,836	6,731	6,835	4,004	6,656	4,509	2,533	3,054	45,080

GRAND RIVER NEAR SUMNER, MO.

Monthly and annual discharge in thousands of acre-feet

[Actual flow past the station]

Water year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Annual
1924	-	-	-	-	-	-	-	25.7	848	543	106	65.3	-
1925	25.8	17.6	36.4	18.8	204	112	392	89.5	442	53.3	89.2	272	1,753
1926	402	189	160	236	353	146	370	47.4	516	55.1	42.2	1,672	4,189
1927	964	93.6	113	47.2	190	193	1,434	207	423	49.6	50.2	19.4	3,784
1928	454	34.2	23.4	37.7	258	73.5	124	32.2	627	405	192	708	2,969
1929	333	1,653	296	129	226	1,337	1,261	278	1,141	475	29.7	41.0	7,200
1930	180	188	39.0	22.7	277	123	96.0	329	165	57.7	16.7	16.2	1,510
1931	13.6	13.7	36.2	8.1	9.7	87.3	356	92.2	252	27.8	20.6	303	1,220
1932	363	1,730	443	904	177	197	206	91.0	357	83.6	521	50.1	5,123
1933	30.3	53.0	152	98.4	47.9	75.0	115	247	33.1	23.9	132	108	1,116
1934	29.5	8.4	10.6	9.6	7.1	16.1	52.9	21.6	18.3	3.2	13.2	75.5	266
1935	64.2	436	212	116	172	180	98.9	1,460	1,676	258	21.5	37.4	4,732
1936	10.7	67.3	29.7	22.1	370	297	39.9	110	19.1	4.4	2.5	86.4	1,059
1937	117	11.3	10.4	95.9	797	418	98.1	295	98.2	174	30.3	5.6	2,151
1938	4.2	4.2	5.2	6.2	7.3	13.2	47.8	69.7	96.5	7.8	58.1	25.6	346
1939	3.6	6.2	3.4	3.5	3.2	364	247	19.4	486	128	127	7.1	1,398
1940	4.9	5.6	4.1	2.0	8.2	139	53.7	136	63.7	60.8	310	18.3	806
1941	6.8	8.3	10.0	87.7	140	60.6	97.4	61.3	532	38.0	6.9	76.0	1,125
1942	388	441	287	212	447	606	183	378	1,187	159	78.8	52.0	4,419
1943	37.2	126	360	111	175	98.5	91.7	552	1,440	114	144	28.8	3,278
1944	13.0	11.6	10.1	24.2	38.3	309	1,358	632	373	35.3	253	61.6	3,119
1945	78.2	83.7	336	73.7	250	670	861	1,113	1,185	179	25.8	58.4	4,914
1946	101	21.6	52.9	874	83.5	635	187	405	190	134	60.7	33.0	2,778
1947	64.1	37.6	72.4	46.7	29.4	366	1,125	419	4,003	317	21.2	23.5	6,525
1948	15.7	29.0	138	30.6	264	709	114	155	198	50.5	24.6	11.1	1,740
1949	6.4	8.6	7.6	77.5	550	430	188	60.7	490	188	91.1	99.3	2,197

CHARITON RIVER NEAR KEYTESVILLE, MO.

Monthly and annual discharge in thousands of acre-feet

[Actual flow past the station]

Water year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Annual
1929	-	-	-	-	-	-	-	134	177	135	17.4	35.7	-
1930	79.3	98.8	20.4	15.3	107	49.0	33.5	43.8	57.6	21.7	3.9	2.4	533
1931	1.8	2.1	9.4	1.9	2.8	28.8	125	54.8	153	9.7	3.8	36.0	429
1932	105	344	165	220	46.5	57.3	56.2	34.1	45.0	22.9	299	26.2	1,421
1933	19.6	23.3	99.0	65.8	22.8	47.0	83.3	144	34.8	18.5	14.6	13.8	586
1934	14.4	3.1	2.9	3.0	2.4	7.5	33.9	10.5	1.5	.8	3.2	37.8	121
1935	16.5	55.5	82.3	62.7	74.4	91.6	51.9	376	440	200	12.4	9.3	1,473
1936	2.9	22.6	14.6	7.7	77.4	113	11.0	25.6	3.9	1.2	.5	53.6	334
1937	29.2	5.1	5.6	30.9	228	145	24.6	104	33.7	10.1	16.9	1.3	634
1938	.9	.9	1.2	6.2	9.5	23.7	65.2	27.9	52.4	6.2	15.5	8.0	218
1939	2.1	18.3	3.3	4.4	2.4	256	173	15.2	119	41.1	76.1	4.2	715
1940	2.0	2.1	1.6	.9	3.9	58.9	51.0	46.3	11.8	1.8	31.4	3.2	215
1941	1.1	1.4	4.3	33.2	41.4	13.6	18.7	13.5	122	9.4	2.5	18.5	280
1942	131	135	69.4	58.9	129	90.3	65.9	80.8	123	57.5	16.4	8.2	965
1943	4.9	28.8	79.1	60.8	68.4	36.2	45.4	278	326	42.4	30.3	9.0	1,009
1944	2.6	3.7	2.7	4.1	12.1	140	372	206	134	5.1	16.1	23.5	922
1945	39.8	27.9	72.9	13.7	107	176	172	297	379	45.9	4.8	23.1	1,359
1946	26.7	7.8	12.8	278	28.3	264	75.6	73.2	180	121	55.1	43.2	1,166
1947	37.5	29.6	50.9	28.8	25.3	111	378	132	882	158	4.6	7.1	1,845
1948	3.4	10.6	54.9	17.5	104	310	30.6	43.7	12.1	19.6	3.1	2.3	612
1949	1.3	2.9	2.2	35.9	124	182	80.5	23.8	185	128	48.3	46.6	860

MISSOURI RIVER AT BOONVILLE, MO.

Monthly and annual discharge in thousands of acre-feet

[Actual flow past the station]

Water year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Annual
1926	2,720	2,420	1,970	1,830	3,160	3,370	3,830	3,220	5,410	3,490	2,320	7,200	40,940
1927	5,210	2,160	1,730	1,590	2,550	4,270	13,600	10,400	13,000	9,280	4,940	3,050	71,780
1928	4,910	2,120	1,380	1,870	3,670	3,790	6,010	3,470	9,040	8,480	5,200	3,980	53,920
1929	2,480	7,380	2,870	1,590	1,940	8,120	10,400	6,580	12,300	6,580	2,500	1,540	64,280
1930	2,070	2,390	1,030	1,060	2,750	4,080	3,630	6,090	4,680	2,650	1,880	2,250	34,560
1931	1,910	1,860	1,340	1,050	1,620	1,970	2,610	2,120	3,110	2,230	1,350	1,860	23,030
1932	1,920	5,060	2,710	3,310	2,040	3,470	3,820	3,700	7,320	5,270	3,710	1,890	44,220
1933	1,320	1,270	1,250	1,510	1,000	2,470	3,460	4,050	4,410	3,590	1,760	2,160	28,250
1934	1,435	1,058	1,226	808	1,221	1,898	1,864	1,657	2,214	1,858	880	1,060	17,179
1935	1,158	1,793	1,422	974	1,536	2,047	1,940	6,576	11,810	5,972	1,931	1,617	38,776
1936	1,141	1,504	1,050	620	1,375	5,350	2,800	3,212	3,144	1,884	982	1,519	24,581
1937	1,340	877	775	841	3,404	3,584	2,636	2,778	3,617	4,819	2,448	1,040	28,159
1938	835	914	495	747	830	2,628	2,987	3,973	4,236	5,728	2,959	2,768	29,100
1939	1,859	1,436	1,092	1,083	910	3,560	5,390	2,197	5,189	3,792	2,269	1,038	29,815
1940	794	849	957	302	558	1,648	1,863	2,404	2,733	1,999	2,740	1,572	18,419
1941	1,002	941	779	1,422	1,459	1,569	2,678	2,055	6,276	2,877	1,853	3,044	25,955
1942	6,000	3,830	2,206	1,671	2,403	3,702	3,742	7,985	9,339	5,656	2,824	3,665	53,023
1943	2,433	2,296	2,097	1,577	2,339	2,471	6,316	5,759	11,430	6,312	2,884	2,324	48,238
1944	2,089	2,079	1,466	1,223	1,532	3,829	11,750	7,757	8,432	7,302	4,878	3,468	55,805
1945	2,544	2,436	2,746	1,646	2,729	7,470	8,150	7,731	9,395	6,451	3,277	2,098	56,673
1946	2,664	1,811	892	3,003	1,791	4,083	2,941	3,101	3,748	3,832	2,121	3,012	32,999
1947	3,623	2,750	1,616	1,178	1,332	3,523	9,799	4,948	16,880	9,534	2,969	2,293	60,445
1948	2,482	2,570	1,760	1,318	1,852	7,706	4,760	3,595	5,792	6,439	4,388	2,444	45,106
1949	2,477	2,568	1,339	2,005	3,736	7,453	7,337	4,212	7,680	5,107	2,658	3,350	49,922

Monthly and annual discharge in thousands of acre-feet

[Actual flow past the station]

Water year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Annual
1925	-	-	-	-	-	-	-	-	316	50.0	37.2	369	-
1926	366	821	349	270	361	418	944	190	198	53.8	273	1,002	5,246
1927	2,004	569	574	560	648	1,818	4,823	1,649	2,046	600	2,386	160	17,837
1928	1,944	429	738	481	929	591	1,149	441	1,764	640	562	178	9,846
1929	71.7	1,444	874	983	294	806	2,194	3,877	1,338	342	103	43.7	12,370
1930	71.0	142	77.5	405	819	219	100	400	353	70.0	31.2	152	2,840
1931	70.1	67.9	210	59.8	79.6	22.1	26.9	43.5	30.6	30.3	75.1	196	912
1932	206	643	633	490	656	451	119	38.6	71.4	529	116	82.7	4,036
1933	100	85.7	373	652	561	566	297	1,130	334	109	168	217	4,593
1934	170	130	184	144	275	327	110	123	86.6	50.7	59.1	64.1	1,724
1935	179	343	804	806	612	729	608	1,184	4,651	538	79.5	172	10,706
1936	174	859	627	198	254	322	126	71.9	90.5	46.5	54.5	44.3	2,868
1937	407	596	252	960	1,161	897	731	1,116	1,902	167	134	98.9	8,422
1938	50.4	69.9	60.2	70.0	346	557	872	1,977	1,518	245	136	110	6,012
1939	104	88.9	91.7	69.1	300	500	564	733	347	165	115	212	3,290
1940	71.4	46.9	44.1	36.0	35.5	130	290	360	430	78.3	179	162	1,863
1941	42.2	55.2	109	821	588	147	1,677	224	553	139	112	798	5,265
1942	3,647	2,337	621	355	636	619	1,047	989	1,978	417	179	630	13,455
1943	437	407	1,165	1,065	382	323	381	5,673	2,437	393	152	82.8	12,898
1944	246	135	168	210	251	1,586	2,530	1,811	346	131	806	595	8,815
1945	615	172	518	283	313	2,071	3,593	2,045	2,071	1,203	249	719	13,852
1946	838	190	155	1,023	741	732	563	778	171	107	1,049	116	6,463
1947	116	1,459	571	267	199	767	3,114	1,057	1,490	621	275	210	10,146
1948	282	174	157	346	239	708	477	247	1,885	1,867	1,062	266	7,710
1949	206	172	210	1,160	1,928	1,289	586	678	1,392	877	248	379	9,125

MISSOURI RIVER NEAR BONNOTS MILL (ISBELL), MO.

Monthly and annual discharge in thousands of acre-feet

[Actual flow past the station]

Water year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Annual
1929	-	-	3,930	2,550	1,950	9,160	13,000	12,900	14,900	6,820	2,540	1,620	-
1930	2,130	2,560	1,140	1,490	3,830	4,310	3,740	6,520	5,070	2,800	1,920	2,460	37,970
1931	2,020	1,940	1,600	1,120	1,700	2,150	2,670	2,540	3,210	2,400	1,500	2,150	25,000
1932	2,240	5,610	3,680	4,060	2,720	4,020	4,060	3,740	7,380	6,080	3,870	2,070	49,530
1933	1,480	1,430	1,760	2,440	1,640	3,140	4,120	5,930	4,790	3,860	1,990	2,380	34,960
1934	1,844	1,233	1,469	959	1,524	2,314	2,123	1,858	2,259	2,009	1,046	1,443	20,081
1935	1,612	2,220	2,555	2,030	2,225	3,305	2,716	7,742	17,290	7,167	2,213	1,902	52,977
1936	1,335	2,570	1,879	861	1,670	5,679	3,110	3,318	3,307	-	-	-	-

Monthly and annual discharge in thousands of acre-feet

[Actual flow past the station]

Water year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Annual
1922	-	126	182	93.4	109	435	737	213	62.2	61.6	37.0	30.1	-
1923	36.4	37.5	46.2	85.1	162	303	152	205	236	73.0	68.8	39.1	1,444
1924	36.7	65.9	253	89.6	113	121	136	295	444	194	218	126	2,092
1925	71.8	53.1	330	156	156	140	164	164	51.4	44.1	36.4	158	1,525
1926	256	227	134	76.0	140	189	192	87.7	52.8	33.8	53.0	81.0	1,522
1927	260	314	185	300	210	403	1,132	500	656	131	576	81.6	4,749
1928	231	365	397	156	150	232	708	287	760	176	89.8	52.9	3,605
1929	43.9	46.2	89.4	140	99.3	319	427	735	227	80.5	86.8	46.8	2,341
1930	88.0	159	93.5	364	283	235	86.3	93.0	52.7	33.8	33.5	83.8	1,606
1931	44.9	74.8	121	48.2	164	199	182	257	82.7	41.6	82.5	60.0	1,358
1932	42.2	59.1	111	311	108	101	73.2	44.1	78.6	99.0	48.8	32.4	1,108
1933	34.1	57.9	150	192	70.5	186	339	750	95.8	47.7	41.0	46.8	2,011
1934	74.6	46.8	39.4	55.8	35.3	124	162	75.3	38.5	23.7	78.2	222	976
1935	91.9	93.5	149	190	65.2	719	226	310	1,179	226	64.4	39.9	3,354
1936	45.8	164	104	50.4	52.5	68.8	82.2	56.8	38.6	28.9	20.5	63.3	776
1937	94.6	161	63.1	429	302	145	153	416	244	81.4	37.0	24.7	2,151
1938	28.1	28.8	75.6	148	377	219	368	588	165	53.2	36.7	41.5	2,129
1939	39.0	184	72.4	97.4	322	298	488	243	104	76.3	60.0	33.5	2,018
1940	31.1	37.2	35.8	43.1	47.5	233	288	170	99.6	48.8	91.9	44.4	1,170
1941	31.4	31.8	85.0	157	84.4	45.9	543	150	55.9	43.5	34.2	102	1,364
1942	328	331	200	111	330	160	281	308	528	93.7	65.4	62.2	2,798
1943	57.7	299	535	247	86.6	203	203	1,077	458	101	53.8	38.4	3,360
1944	44.6	53.9	42.0	56.7	72.0	338	222	221	87.0	34.3	84.3	66.5	1,322
1945	81.9	40.8	48.0	45.4	220	900	1,352	358	636	108	54.4	229	4,074
1946	275	98.9	64.8	260	374	199	200	458	204	66.0	433	62.6	2,695
1947	45.2	517	247	128	67.9	153	711	251	164	137	44.9	44.0	2,510
1948	56.0	104	57.6	184	107	417	187	139	429	202	58.1	37.2	1,978
1949	35.5	90.7	53.3	399	424	373	153	162	487	274	82.6	213	2,747

Monthly and annual discharge in thousands of acre-feet

[Actual flow past the station. Discharge for water years 1898-1928, not previously published, computed by indirect methods as described in the accompanying text.]

Water year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Annual
1898	2,100	1,700	1,300	2,100	2,200	5,400	4,500	10,000	11,200	8,400	4,200	3,500	56,600
1899	3,200	2,600	2,600	2,300	1,900	4,900	8,200	9,900	11,200	10,900	6,000	3,100	66,800
1900	2,300	2,200	2,100	1,900	1,700	5,900	4,600	5,700	6,400	5,800	3,400	3,000	45,000
1901	3,600	3,500	2,400	2,200	1,900	4,900	7,100	3,500	7,000	4,800	2,900	2,200	46,000
1902	2,300	2,000	1,700	1,900	1,700	3,900	4,200	4,700	8,300	12,400	5,900	6,600	55,600
1903	6,800	3,600	4,000	2,600	3,200	9,200	5,900	7,600	18,100	7,600	7,200	8,100	83,900
1904	5,000	3,700	2,400	2,400	2,600	4,400	11,200	11,400	15,700	14,000	5,400	3,800	82,000
1905	5,600	2,300	1,900	1,100	1,800	6,600	4,100	6,200	6,300	10,500	7,700	10,300	64,400
1906	5,500	4,600	3,000	4,300	3,900	5,800	7,300	4,700	8,000	6,300	5,100	4,000	62,500
1907	3,700	3,500	3,000	6,300	3,900	6,000	5,600	7,200	10,500	12,500	7,100	3,500	72,800
1908	3,300	2,900	2,800	2,500	3,700	5,200	6,300	7,700	20,600	13,400	5,900	3,700	78,000
1909	3,400	3,800	3,800	2,300	3,900	6,800	6,400	6,300	11,600	17,900	5,400	3,800	75,400
1910	2,900	4,900	4,200	5,500	3,100	6,600	4,700	8,300	8,100	4,500	3,000	3,700	59,500
1911	4,000	1,800	1,500	1,600	3,000	3,900	4,000	3,100	3,400	4,200	3,300	3,400	37,200
1912	4,100	2,400	2,800	1,400	2,300	9,200	15,500	8,300	7,700	5,700	3,900	3,000	66,300
1913	3,200	3,100	2,000	2,000	1,700	5,100	9,200	6,000	6,300	5,700	3,100	2,600	50,000
1914	2,500	2,400	3,300	1,800	1,800	3,700	6,100	3,700	7,800	6,200	3,000	5,500	47,800
1915	4,900	2,500	1,900	2,400	5,800	6,900	7,300	8,100	21,700	19,200	14,900	9,800	105,400
1916	5,800	3,900	3,200	6,400	7,100	8,000	11,200	9,500	12,600	10,500	5,100	3,300	86,600
1917	2,400	2,400	1,700	1,600	2,100	3,300	8,400	8,200	15,500	9,300	4,700	3,000	62,600
1918	2,600	2,500	2,300	2,200	2,600	4,300	5,900	5,200	7,000	6,700	3,800	3,700	48,800
1919	2,300	3,400	2,800	2,400	3,000	6,200	7,300	8,900	9,700	4,800	2,400	2,200	55,400
1920	4,100	4,500	1,900	2,200	2,600	6,700	11,700	11,000	8,100	9,100	4,200	4,300	70,400
1921	2,700	2,500	2,300	1,900	2,800	4,400	6,200	7,200	9,000	8,800	4,900	6,500	59,200
1922	2,800	2,400	2,100	2,000	2,000	8,900	18,100	6,000	6,400	8,300	4,300	2,900	66,200
1923	2,400	3,300	2,100	2,100	2,100	4,600	5,100	4,300	11,400	10,400	5,600	3,300	56,700
1924	5,500	3,500	4,000	1,700	3,400	5,000	7,200	5,800	12,900	10,200	4,900	3,300	67,400
1925	2,800	2,600	1,900	2,100	3,600	4,900	6,400	4,300	8,900	6,300	3,800	3,100	50,700
1926	3,600	3,800	2,800	2,400	3,700	4,300	5,400	3,600	4,900	4,000	3,300	8,000	49,800
1927	9,600	3,900	3,100	2,500	3,700	6,900	21,200	12,600	15,600	9,900	8,300	3,900	101,400
1928	7,800	3,600	3,200	3,000	4,800	4,600	7,600	4,300	12,100	10,000	6,210	4,380	71,590
1929	2,530	7,970	4,100	2,710	2,040	9,530	13,500	14,000	15,200	6,950	2,660	1,670	82,860
1930	2,280	2,780	1,280	1,940	4,230	4,590	3,830	6,640	5,140	2,880	1,960	2,590	40,140
1931	2,070	2,040	1,850	1,180	1,880	2,360	2,920	2,930	3,340	2,500	1,580	2,180	26,830
1932	2,390	5,390	4,060	4,530	2,880	4,030	4,260	3,710	7,260	6,390	3,950	2,150	51,000
1933	1,550	1,520	1,940	2,730	1,710	3,250	4,610	6,760	4,930	4,020	2,060	2,440	37,520
1934	1,961	1,308	1,555	1,019	1,581	2,540	2,347	1,963	2,307	2,066	1,179	1,713	21,539
1935	1,721	2,341	2,801	2,314	2,309	4,192	3,024	8,196	19,080	7,659	2,323	1,970	57,930
1936	1,425	2,785	2,056	931	1,814	5,757	3,260	3,410	3,369	2,063	1,119	1,840	29,829
1937	2,057	2,036	1,252	2,893	5,124	4,834	3,776	4,836	6,487	5,271	2,848	1,299	42,713
1938	952	1,073	745	1,144	1,840	3,777	5,279	7,090	6,714	6,114	3,295	2,978	41,001
1939	2,142	1,864	1,447	1,312	1,871	4,744	7,519	3,636	5,710	4,276	2,630	1,341	38,492
1940	933	990	1,061	420	706	2,243	2,517	3,081	3,371	2,211	3,024	1,960	22,517
1941	1,142	1,110	1,031	2,545	2,247	1,739	5,573	2,633	6,801	3,403	1,999	4,065	34,288
1942	10,890	7,526	3,304	2,371	3,835	4,780	5,555	10,000	12,020	7,707	3,375	4,614	75,977
1943	3,065	3,144	4,162	3,809	2,999	3,223	7,116	14,230	14,860	7,295	3,441	2,547	69,891
1944	2,501	2,444	1,852	1,566	2,042	6,343	14,480	11,370	8,868	7,791	5,873	4,504	69,634
1945	3,438	2,720	3,433	2,047	3,466	10,860	14,080	10,860	13,150	8,130	3,784	3,427	79,395
1946	4,090	2,270	1,196	4,668	3,145	5,106	3,951	4,861	4,161	4,247	3,973	3,181	44,849
1947	3,798	5,662	2,638	1,686	1,692	4,710	14,690	6,722	18,210	12,000	3,459	2,677	77,944
1948	2,863	3,044	2,092	2,005	2,108	9,367	5,804	4,389	8,243	9,346	5,888	2,873	58,022
1949	2,780	3,172	1,830	4,292	6,479	9,693	8,876	5,351	10,110	6,807	3,251	4,499	67,140

Interior—Duplicating Section, Washington, D. C. 92561