IOWA GEOLOGICAL SURVEY
IOWA CITY, IOWA
ARTHUR C. TROWBRIDGE, Director and State Geologist
H. GARLAND HERSHEY, Associate State Geologist

WATER-SUPPLY BULLETIN NO. 2

SURFACE WATER RESOURCES OF IOWA

For the Period

OCTOBER 1, 1940 TO SEPTEMBER 30, 1942

Prepared under the direction of
LAWRENCE C. CRAWFORD, District Engineer

by

THE DISTRICT OFFICE, WATER RESOURCES BRANCH
UNITED STATES GEOLOGICAL SURVEY

Records collected in cooperation with

CORPS OF ENGINEERS, UNITED STATES ARMY
IOWA GEOLOGICAL SURVEY
IOWA INSTITUTE OF HYDRAULIC RESEARCH
IOWA STATE CONSERVATION COMMISSION
CERTAIN IOWA CITIES

PUBLISHED BY
THE STATE OF IOWA
1944

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FOREWORD

Through cooperative agreements with the water-resources branch of the United States Geological Survey, the Iowa Geological Survey in association with other interested Federal and State departments, institutions, groups, and individuals, has been gathering considerable quantities of basic data regarding the surface and underground water supplies of this State. In order that such data may be made useful as they accumulate, a new series of water-supply bulletins was started in 1942 with the publication of No. 1 entitled "Summaries of Yearly and Flood Flow Relating to Iowa Streams" prepared under the direction of Lawrence C. Crawford, district engineer in charge of stream and lake gaging in Iowa. Carrying out the original policy of publishing one or more such bulletins a year, a second paper, also prepared under the direction of Mr. Crawford, is published herein as Water-Supply Bulletin No. 2. Specific acknowledgment is given in the body of the bulletin for the cooperation of others outside the Federal and State Geological Survey.

Bulletin No. 1, which is a condensed compilation of all the earlier stream-flow records that were obtained during the period 1873-1940, serves primarily as a reference guide and is useful in preliminary studies. However, this second bulletin, which presents records of stream flow collected in 1941 and 1942, contains day-by-day records arranged for convenient use, and is designed to facilitate detailed consideration of surface-water problems in Iowa. It should be useful to Federal, State, county, and municipal officials; and to industrial engineers engaged in designing and building dams, bridges, power plants, water works, sewage disposal plants, and other hydraulic structures; or otherwise dealing with rivers and smaller streams.

A. C. Trowbridge
Director and State Geologist

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For the Period

October 1, 1940 to September 30, 1942

Prepared under the direction of

LAWRENCE C. CRAWFORD

SCOPE AND ARRANGEMENT OF RECORDS

The State and Federal cooperative program for the systematic collection of stream-flow records in Iowa was initiated in 1914, although a few records were obtained by special arrangements during an earlier period. Since the beginning of the cooperative program measurements of stage or discharge have been obtained at about 100 stations on Iowa streams and lakes for periods of various lengths. The longest records are those for the Mississippi River at Le Claire and Keokuk where authenticated data have been used to extend the record back to 1873 with decreasing accuracy for the earlier years. In addition to the records of daily stages or discharges, hundreds of measurements of a miscellaneous character also have been made at other points.

The gaging stations that have been maintained on streams and lakes in Iowa at various times are listed in table 1, pages 4 to 6, which shows the periods of operation and other pertinent data. Summaries of stream-flow records, 1873-1940, were published in Iowa Geological Survey Water-Supply Bulletin No. 1 for the stations shown in italics in table 1. The location of all stream-gaging stations and lake gages, that have been operated by the United States Geological Survey in cooperation with other agencies, is shown in plate 1. Although gaging stations are now maintained on nearly all the principal rivers of the State, it will be noted that a relatively large number of stations have been in operation only a few years. Stations with dates followed by a dash in table 1 were active on September 30, 1942.

[1] Published with the approval of the Acting Director, Geological Survey, United States Department of Interior.

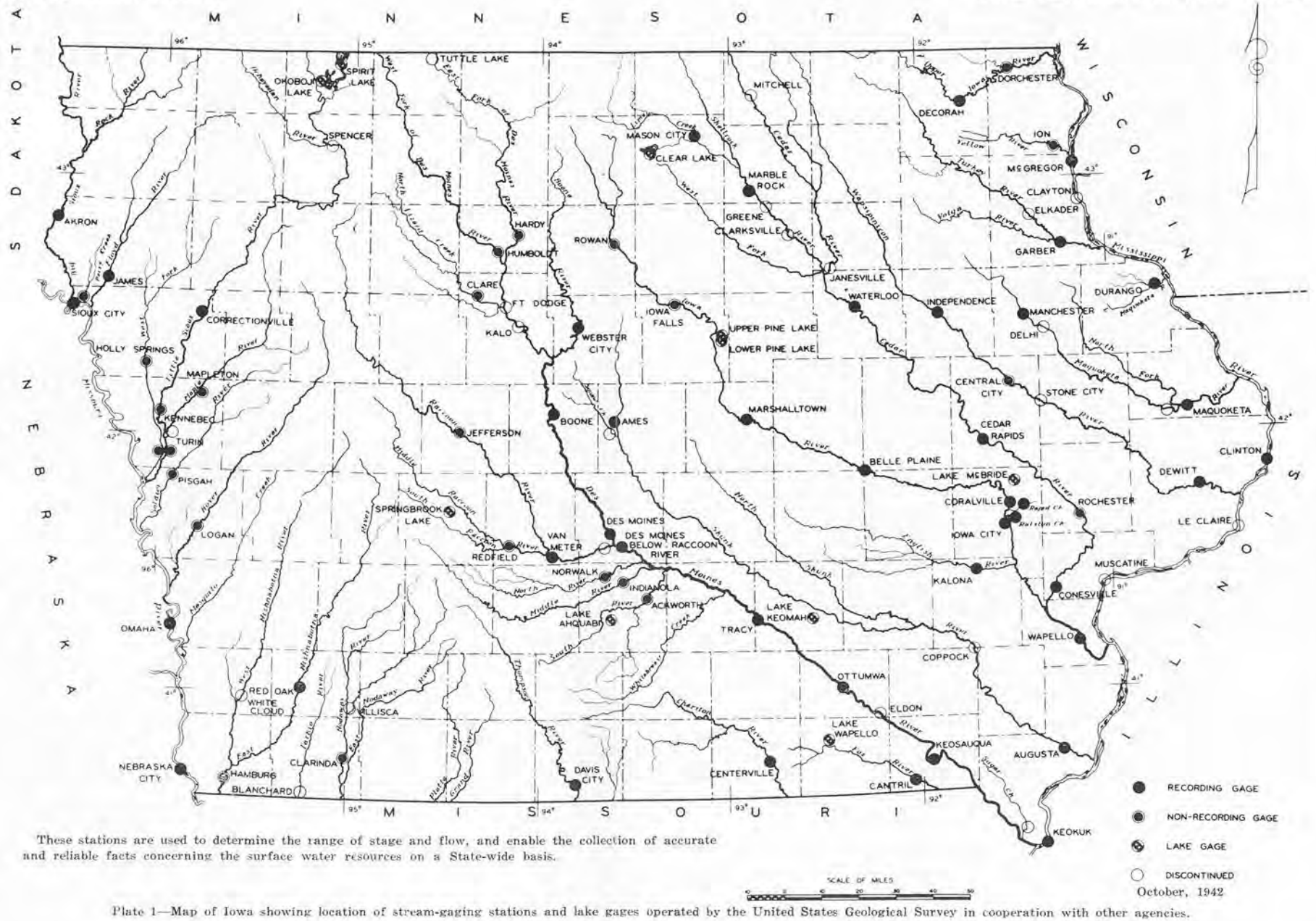
During the period October 1, 1940 to September 30, 1942, about 80 stations were maintained on rivers and lakes in Iowa by the water-resources branch of the United States Geological Survey in cooperation with various State and municipal or other federal agencies, especially the Corps of Engineers, U. S. Army. More than 150 miscellaneous discharge measurements were made at other places where the data were specifically requested or the need for information was evidently of State interest.

The State of Iowa is naturally divided into two major drainage basins (see pl. 1), one of which, comprising about two-thirds of the total area, is in the *Upper Mississippi River Basin,* and includes the Des Moines, Skunk, Iowa-Cedar, Wapsipinicon, Maquoketa, Turkey, Upper Iowa Rivers, and other smaller river systems. The remainder of the State, from the Big Sioux River on the north to the Chariton River on the south, is in the *Missouri River Basin.*

For the purposes of measuring and reporting stream flow, the United States Geological Survey has divided the United States into areas comprising 14 major drainage basins as indicated below:

Part 1. North Atlantic slope basins (St. John River to York River).

2. South Atlantic slope and eastern Gulf of Mexico basins (James River to Mississippi River).
3. Ohio River Basin.
4. St. Lawrence River Basin.
5. *Hudson Bay and Upper Mississippi River Basins.*
6. *Missouri River Basin.*
7. Lower Mississippi River Basin.
8. Western Gulf of Mexico basins.
9. Colorado River Basin.
10. The Great Basin.
11. Pacific slope basins in California.
12. Pacific slope basins in Washington and upper Columbia River Basin.
13. Snake River Basin.
14. Pacific slope basins in Oregon and lower Columbia River Basin.



These stations are used to determine the range of stage and flow, and enable the collection of accurate and reliable facts concerning the surface water resources on a State-wide basis.

October, 1942

Plate 1—Map of Iowa showing location of stream-gaging stations and lake gages operated by the United States Geological Survey in cooperation with other agencies.

In this classification, rivers of Iowa are included in two of the major drainage basins (Part 5 and Part 6) as previously outlined, for each of which a water-supply paper is issued annually by the United States Geological Survey. However, a State publication to be most useful should contain records on a State-wide basis and in one volume. Therefore, this bulletin has been prepared as one of a series of water-supply bulletins of the Iowa Geological Survey presenting results of measurements made on streams and lakes in both the *Upper Mississippi* and *Missouri River Basins* in Iowa during the water years ended September 30, 1941 and 1942. Records of daily flow or lake stages that were obtained at about 80 gaging or lake stations during the two-year period are given, together with other related data and the results of miscellaneous measurements that were made during the same period. These records are also being published in four United States Geological Survey Water-Supply Papers, 925, 926, 955, and 956.

Since 1933 the general cooperative program has included records of lake levels and supplementary discharge measurements as a part of the cooperation because of the authorized jurisdiction of the State Conservation Commission over artificial State-owned lakes, meandered streams, and natural lakes of Iowa. Therefore, the records of stage of water surface in lakes have been included in this publication in order that the data may be readily accessible to all State interests.

The gaging station records, concerning which detailed discussion is given in a later section, are presented in accordance with the regular practice used by the United States Geological Survey in its water-supply papers, the main drainage basin subdivisions included in this report being the *Upper Mississippi* and the *Missouri River Basins* in Iowa. In these basins the stations on the main stem are listed first, in downstream order, and then stations in the major tributary basins are listed in a similar manner beginning with the uppermost basin. In the table of contents the stations are listed in the order in which the records are presented in this report; in the index the stations are arranged alphabetically according to stream and place names; other items of importance are also included in the index.

Table 1.—List of Gaging Stations and Lake Gages Maintained in Iowa Showing Period of Records and Related Summary Data

Stream (or Lake) Station	Place	Drainage area (sq. mi.)	Type of Gage	Altitude of zero above M. S. L. (feet)	Discharge Records Available	Gage Height in Feet		Discharge in Second-Feet				
								Maximum		Minimum		
						Max.	Min.	Date	Flow	Date	Flow	Mean
1	2	3	4	5	6	7	8	9	10	11	12	13
MISSISSIPPI RIVER BASIN												
Boone	Webster City	842	Recorder		1940–	7.52	1.08	June 30, 1942	3,060	July 25, 1940	2.4	
Cedar	Cedar Rapids	6,640	Recorder	700.33	1903–	20.1		Mar. 19, 1929	72,000	Sept. 25 1935	178	2,992
Cedar	Conesville	7,840	Recorder	581.85	1939–	*16.0	3.20	Aug. 6, 1942	31,300	Feb. 2, 1940	323	
Cedar	Janesville	1,660	Chain		1905–6, 15–27, 1932–42	15.43		April 1, 1933	27,700	Oct. 21, 1922	28	664
Cedar	Mitchell	845	Staff		1933–42	89.7		April 4, 1934	13,000	1933–35	5	288
Cedar	Rochester	7,280	Wire-weight	633.55	1940–							
Cedar	Waterloo	5,190	Recorder	824.09	1941–	12.22	4.99	June 4, 1941	23,000	Sept. 2, 1941	468	
Des Moines	Boone	5,490	Recorder	871.52	1920–27, 1933–	20.5		June 6, 1918	32,000	Jan. 28, 1940	**17	1,356
Des Moines	Des Moines	6,180	Recorder	773.74	1893–94, 97–1927, 1932–	††16.5		June 7, 1918	41,500	Jan. 29–30, 1940	**24	1,898
Des Moines below Raccoon River	Des Moines	9,770	Recorder	773.74	1940–	9.03	*4.21	May 12, 1942	17,000	July 27, 1940	**80	
Des Moines	Eldon	13,300	Chain		1930–35	*14.99	*.98	April 8, 1933	35,400	June 11, 1934	44	
Des Moines	Fort Dodge		Chain		1905–6, 11–13		.80	March 26, 1906	12,000		29	
Des Moines	Kalo	4,170	Recorder		1913–27	14.0	*–.15	May 30, 1915	18,500	Oct. 9–15, 1922, Sept. 13, 1925	14	1,451
Des Moines	Keosauqua	13,900	Recorder	558.10	1903–6, 1910–	27.85	*–.58	June 1, 1903	97,000	Jan. 30, 1940	**40	4,715
Des Moines	Ottumwa	13,200	Recorder	622.77	1917–	16.5		June 11, 1917	58,700	Jan. and Feb., 1940	**30	3,998
Des Moines	Tracy	12,400	Recorder	671.78	1920–27, 33–35, 1940–	20.20	*1.98	June 28, 1935	54,600	Feb. 28, 1940	**95	3,572
E. Fk. Des Moines	Hardy	1,230	Wire-weight		1940–	*17.4	1.45	Nov. 7, 1941	3,580	July 24, 25, 1940	**18	
English	Kalona	580	Recorder	633.45	1939–	*19.9	2.41	Nov. 2, 1941	3,340	Jan 25–29, 1940	2	
Fox	Cantril	161	Recorder		1940–	15.42		Oct. 9, 1941	5,220	Aug. and Sept. 1941	0	
Iowa	Belle Plaine	2,420	Recorder	749.82	1939–	14.36	*3.48	June 6, 1942	9,450	Jan 5. 1940	19	
Iowa	Coralville	3,060	Recorder	645.00	1940–							
Iowa	Iowa City	3,230	Recorder	627.27	1903–	19.45		June 7, 1918	36,200	Dec. 26, 1916	**10	1,432
Iowa	Iowa Falls	641	Wire-weight		1911–14, 1940–	16.3						
Iowa	Marshalltown	1,500	Recorder	853.06	1903, 15–27, 33–	17.74		June 4, 1918	42,000	Nov. 24, 1917	2	614
Iowa	Rowan	396	Wire-weight		1940–	9.37	2.98	June 5, 1941	1,450	Sept. 6–7, 1941	23	
Iowa	Wapello	12,480	Recorder	548.98	1915–	16.22		Mar. 19, 1929	67,500	Dec. 15–17, 1916	400	5,742
Lake Ahquabi	Indianola		Staff		1936–	7.65	3.50	June 9, 1941		Dec. 22–25, 1939		

Lake Keomah	Oskaloosa		Staff		1936–	7.00	3.50	Aug. 16, 1938		Nov. 24–Dec. 3, 1936		
Lake Macbride	Solon		Float		1936–	10.05	−.50	Feb. 21, 1937		Dec. 5, 1936		
Lake Wapello	Drakesville	7.6	Recorder		1935–	12.70	7.81	June 12, 1941		Sept. 9–11, 1936		
Lime Creek	Mason City	535	Recorder		1932–	15.70		March 30, 1933	9,400	Aug. and Sept. 1933	0	174
Little Maquoketa	Durango	130	Recorder	612.03	1934–	20.75	*2.64	June 21, 1937	14,800	July 12, 13, 1936	5	66.9
Lower Pine Lake	Eldora		Staff		1936–	7.59	1.54	June 2, 1942		Sept. 25, 1939		
Maquoketa	Delhi	348	Recorder	774.32	1933–1940	89.2		Mar. 4, 1937	6,130		5	136
Maquoketa	Manchester	306	Recorder	895.06	1933–	14.65		Sept. 8, 1941	8,880	June 8, 29, 1934	**6	160
Maquoketa	Maquoketa	957	Chain		1913–14	14.1	1.80					
Maquoketa	Maquoketa	1,550	Recorder	636.52	1913–	*22.18	.81	Mar. 6, 1937	27,500	Sept. 15, 1931	39	921
Middle	Indianola	502	Wire-weight		1940–	19.73	*2.88	June 9, 1941	8,240	July 27, 1940	1.3	
Mississippi	Clayton	79,200	Staff	602.60	1930–36	15.36		April 3, 1936	137,000	Dec. 14, 1933	5,540	
Mississippi	Clinton	85,600	Recorder	568.70	1939–	18.04	−.70	June 13, 1942	**169,600	Dec. 27–30, 1939	**12,000	
Mississippi	Keokuk	119,000	Recorder		1878–			May 18, 1888	314,000	Dec. 27, 1933	5,000	60,470
Mississippi	LeClaire	88,600	Recorder	562.61	1873–1939	14.5		June 25, 1880	250,000	Dec. 25–27, 1933	6,500	47,780
Mississippi	McGregor	67,500	Recorder	605.30	1936–	*18.45	*−.86	June 7, 1942	**113,800	Dec. 9, 1936	**6,200	27,910
Mississippi	Muscatine	99,400	Recorder		1939–41							
North	Norwalk	348	Wire-weight		1940–	20.62	*3.31	May 12, 1942	4,350	Oct. 22–27, 1940		
										Aug. 13–16, 1941	**.2	
N. Lizard Creek	Clare	257	Wire-weight		1940–	6.65	*2.20	June 5, 1942	1,240	Mar. 6, 1940	.2	
Raccoon	Jefferson	1,610	Wire-weight		1940–	10.76	*2.98	Aug. 28, 1940	3,660	July 28, 1940	26	
Raccoon	Van Meter	3,410	Recorder	841.12	1915–	18.96	*1.38	Sept. 20, 1926	40,000	Jan. 22–31, 1940	10	1,020
Raccoon	Des Moines	3,590	Staff		1902–3							
Ralston Creek	Iowa City	3.01	Recorder		1924–	8.25		June 27, 1941	1,360	In every year	0	1.41
Rapid Creek	Iowa City	24.5	Recorder		1938–	12.54		June 27, 1941	3,390	1940 and 1941	0	
Shell Rock	Clarksville	1,660	Chain		1915–27, 32–34	16.7	.05	March 31, 1933	19,800	Aug. 2, 1934	10	558
Shell Rock	Greene	1,375	Staff		1933–42	101.70		June 25, 1938	12,000	1935 and 1936	6	500
Skunk	Ames	320	Recorder		1920–27, 33–	9.2		Sept. 17, 1921	3,540	1934 and 1937	0	108
Skunk	Augusta	4,290	Recorder	521.69	1913, 1915–	22.55	1.0	June 17, 1930	44,500	Aug.–Sept. 1934	7	1,990
Skunk	Coppock	2,890	Wire-weight		1913–42	22.13		June 15, 1930	25,200	Jan. 27, 28, 1940	8	1,298
South	Ackworth	475	Wire-weight		1940–	20.56	*1.34	June 9, 1941	12,100	July 21–25, 1940	.3	
South Raccoon	Redfield	995	Wire-weight		1940–	13.40	2.44	Aug. 28, 1942	6,380	July 26, 1940	18	
Springbrook Lake	Guthrie Center		Staff		1936–	7.00	2.38	July 25, 1942		Aug. 31, 1936		
Squaw Creek	Ames	210	Chain		1919–27	14.5		June 4, 1918	6,900	Aug. Sept.. 1919	0	110
Sugar Creek	Keokuk	113	Recorder		1922–27	*20.6		Sept. 16, 1926	3,040		0	
Turkey	Elkader	892	Wire-weight	701.61	1933–42	*34.3		May 31, 1941	19,300	Jan. 23, 26, 29, 31, 1940	21	484
Turkey	Garber	1,530	Recorder	635.34	1913–16, 19–27, 1929–30, 32–	28.06		Feb. 23, 1922	26,600	June 29, 1934	46	812
Upper Iowa	Decorah	560	Recorder		1913–14, 19–27, 1933–	15.19		May 29, 1941	28,500	1933–34	10	299
Upper Iowa	Dorchester	761	Chain	600.00	1936–	81.8		May 30, 1941	30,400			
Upper Pine Lake	Eldora		Staff		1936–	8.06	−1.18	June 2, 1942		Dec. 16–18, 1939		
Wapsipinicon	Central City	1,270	Wire-weight	812.24	1940–	17.0						
Wapsipinicon	Dewitt	2,300	Recorder	599.73	1934–	*11.65	*.94	Mar. 6, 1937	12,900	Jan. 17–24, 1940	70	1,192
Wapsipinicon	Independence	1,060	Recorder	882.85	1933–	13.46		June 12, 1942	9,060	1933 and 1934	7	445
Wapsipinicon	Stone City	1,310	Chain		1903–14	14.9						
W. Fk. Des Moines	Humbolt	2,295	Wire-weight		1940–	7.32	2.16	June 4, 1942	3,550	July 26, 1941	3	
Yellow	Ion	224	Wire-weight	664.65	1934–	15.2	2.64	May 29, 1941	18,500	Dec. 30–31, 1939	14	109

See footnotes at end of table.

Table 1.—List of Gaging Stations and Lake Gages Maintained in Iowa Showing Period of Records and Related Summary Data—Continued

Stream (or Lake) Station	Place	Drainage area (sq. mi.)	Type of Gage	Altitude of zero above M. S. L. (feet)	Discharge Records Available	Gage Height in Feet		Discharge in Second-Feet				
								Maximum		Minimum		
						Max.	Min.	Date	Flow	Date	Flow	Mean
1	2	3	4	5	6	7	8	9	10	11	12	13
MISSOURI RIVER BASIN												
Big Sioux	Akron	8,851	Recorder	1,118.90	1928–	19.23	.....	June 4, 1942	21,400	Feb. 26–28, 1936	**7	594
Boyer	Logan	810	Wire-weight	1,009.38	1918–25, 37–	19.17	*.89	July 9, 1940	13,600	Sept. 27–29, 1918	0	238
Chariton	Centerville	727	Recorder	.....	1938–	23.40	1.99	Mar. 13, 1939	16,500	1938 and 1940	**.1	.....
E. Nishnabotna	Red Oak	890	Recorder	1,010.45	1918–25, 1936–	18.50	.....	Mar. 4, 1937	9,600	Aug. 18, 1936	**6	266
Floyd	James	918	Recorder	.....	1934–	18.75	*4.74	June 4, 1942	6,280	Aug. 20, 27, 1936	**1	115
Little Sioux	Correctionville	2,450	Recorder	1,096.49	1918–25, 28–32, 1936–	19.57	2.14	June 12, 1919	10,700	July 17–25, 1936	**2.6	608
Little Sioux	Kennebec	2,730	Wire-weight	1,027.89	1939–	21.6	*6.71	June 6, 1942	4,380	Jan. 25–31, 1940	**24	.....
Little Sioux	Spencer	1,030	Wire-weight	1,294.56	1936–42	*15.4	*3.74	Sept. 16, 1938	5,000	Jan.23, 1937	**4.7	198
Little Sioux	Turin	4,460	Wire-weight	1,020.00	1939–	22.0	.....	June 6, 1942	4,130	1939 and 1940	0	.....
Maple	Mapleton	661	Wire-weight	1,085.86	1941–	20.30	*6.29	June 30, 1942	4,950	Jan 6–8, 1942	**30	.....
Maple	Turin	725	Wire-weight	1,028.45	1939–41	19.42	.....	June 4, 1940	2,920	Jan. 18–23, 1940	**4	.....
Missouri	Sioux City	314,600	Recorder	1,076.96	1928–31, 38–	*22.5	*–.97	April 1, 1929	190,000	Jan. 11, 1940	3,050	23,700
Monona-Harrison Ditch	Turin	4,460	Wire-weight	1,020.00	1939–	18.0	.....	July 1, 1942	5,200	Sept. 8, 1941	**3	.....
Nishnabotna	Hamburg	2,800	Wire-weight	894.17	1922–23, 28–	23.0	1.58	Mar. 12, 1939	24,600	Aug. 30, 1934	**4.5	667
Nodaway	Clarinda	740	Wire-weight	.....	1918–25, 36–	*25.4	*.62	May 21, 1937	14,000	Aug. 25, 1919	0	212
Okoboji Lake	Milford	.....	Recorder	1,391.76	1933–	5.37	1.38	Sept. 17, 1938	.....	Nov. 1934, Jan. 1935	.....	.....
Perry Creek	Sioux City	69	Wire-weight	1,091.73	1939–	12.30	*2.16	June 4, 1940	4,680	1939, 1941, 1942	.01	.....
Soldier	Pisgah	417	Wire-weight	1,036.34	1940–	26.10	*4.44	June 28, 1942	17,800	Jan. 10, 1942	**4	.....
Spirit Lake	Orleans	.....	Float	1,387.25	1933–	11.80	6.75	May 26, 1939	.....	Oct. 20, 1935	.....	.....
Tarkio	Blanchard	200	Recorder	940.32	1934–40	23.12	.....	Mar. 12, 1939	9,980	1934, 1937, 1939	0	43.0
Thompson (Grand)	Davis City	702	Recorder	875.55	1918–25, 41–	19.85	.....	July 19, 1922	16,700	Sept. Oct. 1918	**1	.....
W. Fork Ditch	Holly Springs	395	Wire-weight	1,052.82	1939–	19.85	*5.07	June 4, 1940	3,360	Sept. 6, 1941	**1	.....
W. Nishnabotna	White Cloud	920	Chain	.....	1918–24	18.9	2.96	April 19, 1920	12,000	Sept. 15–18, 1918	**9	.....
W. Nodaway	Villisca	360	Chain	.....	1918–25	*21.2	.....	June 9, 1924	6,200	1918, 1921 1925	**1	.....

Summaries of stream-flow records, 1873-1940, were published in Iowa Geological Survey Water-Supply Bulletin No. 1 for the stations shown in italics type.
*Occurred at a time other than date given for extreme of discharge.
**Mean daily discharge.
††Former site.

PREVIOUS STATE AND FEDERAL PUBLICATIONS

The records of the United States Geological Survey and cooperating agencies form the original source of practically all the existing quantitative stream-flow information in Iowa. The annual water-supply papers of the Survey that include basic data for rivers in Iowa are shown (Part 5 and 6) in table 2. This table gives, by years and drainage basins, the serial numbers of the water-supply papers published from 1899 to 1942 that contain results of stream measurements. Table 2 will be convenient as a source reference to daily discharge records and related information. An index of gaging stations maintained in the United States prior to 1904 has been published in Water-Supply Paper 119.

The data for any particular station will, in general, be found in Survey reports covering the years during which the station was maintained. For example, the data for 1941 and 1942 for any station in Iowa, which is covered by Parts 5 and 6, are published in Water-Supply Papers 925 and 955 or 926 and 956, respectively. These reports contain station records for a number of States in the Mississippi and Missouri River Basins for those years except where publication was delayed because of insufficient basic data. Miscellaneous measurements at many points other than regular gaging stations have been made each year and are published under "Miscellaneous discharge measurements" at the end of each of the several reports.

Each of the United States Geological Survey Water-Supply Papers 871 to 884 for the year 1939 (see table 2, p. 8), contains a summary of yearly discharge at gaging stations in the area covered by that report. Only gaging stations at which ten or more complete years of record had been collected were included in those summaries. Such summaries are available also in separate reprints. The records for certain stations in Iowa are presented in Water-Supply Papers 875 and 876 which contain stream-flow records collected in Iowa and adjacent States in 1939.

Records of discharge have been published also in a few reports by State agencies in Iowa. In 1935, the Iowa State Planning Board sponsored and published a State report, "Stream Flow Records of Iowa, 1873-1932." That report was prepared in collaboration between the Iowa Institute of Hydraulic Research, various relief administrations, and the United States Geological Survey. It contains records that are largely based on field data

Table 2—Numbers of United States Geological Survey Water-Supply Papers containing results of stream measurements, 1899-1942

Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1899 a...	35	b35, 36	36	36	36	c36, 37	37	37	d37, 38	38, e39	38, f39	38	38	38
1900 g...	47, h48	48	48, 149	49	49	49, 150	50	50	50	51	51	51	51	51
1901.....	65, 75	65, 75	65, 75	65, 75	k65, 66, 75	66, 75	k65, 66, 75	66, 75	66, 75	66, 75	66, 75	66, 75	66, 75	66, 75
1902.....	82	b82, 83	83	m82, 83	k83, 85	84	k83, 84	84	85	85	85	85	85	85
1903.....	97	b97, 98	98	97	k98, 99, n100	99	k98, 99	99	100	100	100	100	100	100
1904.....	o124, p125, q126	q126, 127	128	129	k128, 130	130, r131	k128, 131	132	133	133, s134	134	135	135	135
1905.....	o165, p166, q167	q167, 168	169	170	171	172	k169, 173	174	175, t177	176, s177	177	178	178	u177, 178
1906.....	o201, p202, q203	q203, 204	205	206	207	208	k205, 209	210	211, t213	212, s213	213	214	214	214
1907-8...	241	242	243	244	245	246	247	248	249	250, s251	251	252	252	252
1909.....	261	262	263	264	265	266	267	268	269	270, s271	271	272	272	272
1910.....	281	282	283	284	285	286	287	288	289	290	291	292	292	292
1911.....	301	302	303	304	305	306	307	308	309	310	311	312	312	312
1912.....	321	322	323	324	325	326	327	328	329	330	331	332-A	332-B	332-C
1913.....	351	352	353	354	355	356	357	358	359	360	361	362-A	362-B	362-C
1914.....	381	382	383	384	385	386	387	388	389	390	391	392	393	394
1915.....	401	402	403	404	405	406	407	408	409	410	411	412	413	414
1916.....	431	432	433	434	435	436	437	438	439	440	441	442	443	444
1917.....	451	452	453	454	455	456	457	458	459	460	461	462	463	464
1918.....	471	472	473	474	475	476	477	478	479	480	481	482	483	484
1919-20..	501	502	503	504	505	506	507	508	509	510	511	512	513	514
1921.....	521	522	523	524	525	526	527	528	529	530	531	532	533	534
1922.....	541	542	543	544	545	546	547	548	549	550	551	552	553	554
1923.....	561	562	563	564	565	566	567	568	569	570	571	572	573	574
1924.....	581	582	583	584	585	586	587	588	589	590	591	592	593	594
1925.....	601	602	603	604	605	606	607	608	609	610	611	612	613	614
1926.....	621	622	623	624	625	626	627	628	629	630	631	632	633	634
1927.....	641	642	643	644	645	646	647	648	649	650	651	652	653	654
1928.....	661	662	663	664	665	666	667	668	669	670	671	672	673	674
1929.....	681	682	683	684	685	686	687	688	689	690	691	692	693	694
1930.....	696	697	698	699	700	701	702	703	704	705	706	707	708	709
1931.....	711	712	713	714	715	716	717	718	719	720	721	722	723	724
1932.....	726	727	728	729	730	731	732	733	734	735	736	737	738	739
1933.....	741	742	743	744	745	746	747	748	749	750	751	752	753	754
1934.....	756	757	758	759	760	761	762	763	764	765	766	767	768	769
1935.....	781	782	783	784	785	786	787	788	789	790	791	792	793	794
1936.....	801	802	803	804	805	806	807	808	809	810	811	812	813	814
1937.....	821	822	823	824	825	826	827	828	829	830	831	832	833	834
1938.....	851	852	853	854	855	856	857	858	859	860	861	862	863	864
1939.....	871	872	873	874	875	876	877	878	879	880	881	882	883	884
1940.....	891	892	893	894	895	896	897	898	899	900	901	902	903	904
1941.....	921	922	923	924	925	926	927	928	929	930	931	932	933	934
1942.....	951	952	953	954	955	956	957	958	959	960	961	962	963	964

a Rating tables and index to Water-Supply Papers 35-39 contained in Water-Supply Paper 39. Tables of monthly discharge for 1899 in 21st Annual Report, part 4.
b James River only.
c Gallatin River.
d Green and Gunnison Rivers and Colorado River above Gunnison River.
e Mojave River only.
f Kings and Kern Rivers and south Pacific slope basins.
g Rating tables and index to Water-Supply Papers 47-52 and data on precipitation, wells, and irrigation in California and Utah contained in Water-Supply Paper 52. Monthly discharge for 1900 in 22d Annual Report, part 4.
h Wissahickon and Schuylkill Rivers to James River.
i Scioto River.
j Loup, Platte, and Elkhorn Rivers and tributaries below Platte River.
k Tributaries of Mississippi River from east.
m Lake Ontario and tributaries to St. Lawrence River proper.
n Hudson Bay only.
o New England rivers only.
p Hudson River to Delaware River, inclusive.
q Susquehanna River to Yadkin River, inclusive.
r Platte and Kansas Rivers.
s The Great Basin in California, except Truckee and Carson River Basins.
t Below mouth of Gila River.
u Rogue, Umpqua, and Siletz Rivers only.

collected by the Survey and previously published (some of which have been revised), as well as some records not included in the annual series of water-supply papers. It presents in one volume of 567 pages the daily stream-flow records for 37 gaging stations in Iowa prior to December 31, 1932, together with a gazetteer of streams supplementing Water-Supply Paper 395-I published in 1915 entitled, "Gazetteer of Surface Waters of Iowa." Unfortunately, it has not been financially possible to publish a similar one-cover summary of all the daily discharge data collected and published in the annual series of water-supply papers of the United States Geological Survey during the period 1932-40.

A condensed compilation report, "Summaries of Yearly and Flood Flow Relating to Iowa Streams, 1873-1940," was published in 1942 as Water-Supply Bulletin No. 1 of this series. The principal basic data in that report consist of summaries for gaging stations on rivers in Iowa and rivers adjacent thereto for which records for five or more complete years had been collected. The summaries include a comprehensive description and history of each station, followed by a table of maximum and minimum daily discharge and yearly mean discharge and runoff for the water years and the calendar years for the period of record prior to 1941. In addition, the results of approximately 300 miscellaneous discharge measurements made within the State of Iowa are included with some other unpublished material. A summary of maximum discharges at 115 places is given, together with other data pertinent to flood flow in Iowa.

For supplementary related technical data, certain reports of the Corps of Engineers, U. S. Army, that contain the results of river surveys and studies are valuable sources of reference.

In connection with local and specialized investigations for the collection of hydrologic information, mention is made of the following reports: (1) A Summary of Hydrologic Data, Ralston Creek Watershed, 1924-35, by F. T. Mavis and Edward Soucek, University of Iowa Studies, Bulletin 9, 1936, published by the Iowa Institute of Hydraulic Research, contains detailed summaries of the data pertaining to rainfall, runoff, and groundwater levels, together with annual summaries of land use within the noteworthy Ralston Creek investigational area; (2) Soil and Water Conservation Investigations, Technical Bulletin No. 558, U. S. Department of Agriculture, 1937, published as a part of a cooperative project with the Iowa State College, gives results of studies of runoff and erosional losses from 5 areas of

less than 5 acres each, on the 200-acre Lawson farm near Clarinda; and (3) Rainfall and Discharge Records for Northern Iowa Drainage Districts, by W. J. Schlick, Bulletin 141, Iowa State College, 1939, is a rainfall and runoff report covering the growing season during 1920-32 in several drainage districts of northern Iowa, released by the Iowa Engineering Experiment Station at Ames, Iowa.

An historical publication entitled, "Iowa: The Rivers of Her Valleys," by William J. Petersen was issued in 1941 in the usual attractive format of the State Historical Society of Iowa. This publication presents interesting material of historical character, together with some associated technical information.

Some of the State and Federal publications to which reference has been given are out of print. Water-Supply Bulletin No. 1 may be obtained from the Iowa Geological Survey. Water-supply papers not out of print may be purchased at nominal cost from the Superintendent of Documents, Government Printing Office, Washington, D. C.; price lists will be furnished on application. Complete sets of these publications may be consulted at the office of the Geological Survey in Iowa City, and at public libraries in the principal cities. Lists of the Geological Survey publications, both for the State of Iowa and the United States, may be obtained upon application.

Although records kept by various commercial interests, such as utilities, railroads, and milling companies may sometimes be a source of data, information of this kind is usually unpublished or not readily available, and therefore frequently overlooked. It should also be mentioned that engineering officials of counties and cities, and occasionally other individuals, have kept records, particularly of flood elevations, that are of considerable value for some purposes. It may be desirable to include such data in future reports as they are discovered, authenticated, and made available to the cooperative program.

COOPERATION AND ACKNOWLEDGMENTS

The data presented in this report were collected by the district office of the water-resources branch of the United States Geological Survey, located since 1932 in the Hydraulics Laboratory of the Iowa Institute of Hydraulic Research at the State University of Iowa. The activities of the Survey office are carried on in cooperation with several agencies and under the general sanction of State and Federal statutes authorizing the investi-

gations and providing modest funds therefor. It should be mentioned that, in the Federal appropriation acts, the availability of the basic Survey funds is made contingent upon the States or municipalities contributing at least one-half of the total cost of the work. Since 1930, these appropriation acts have carried the following important proviso:

> That no part of this appropriation shall be expended in cooperation with States or municipalities except upon the basis of the State or municipality bearing all the expense incident thereto in excess of such an amount as is necessary for the Geological Survey to perform its share of general water resources investigations, such share of the Geological Survey in no case exceeding 50 per centum of the cost of the investigation.

Several municipal, State, and Federal agencies, as well as private organizations, have cooperated in the execution of the work whereby the records of stream flow have been obtained. The various agencies and organizations have cooperated either (1) by furnishing data or (2) by assisting in their collection. Acknowledgments for cooperation of the first kind are usually made in connection with the description for each station affected; cooperation of the second kind in effect at the time of this publication is outlined in some detail in the following paragraphs.

Since the re-establishment of cooperative stream gaging in Iowa in 1932, the Iowa Institute of Hydraulic Research of the State University of Iowa has performed an exemplary function for the State of Iowa. Through the efforts of the late Prof. F. A. Nagler and the subsequent activities of the Institute, an impressive portion of the State cooperative stream-gaging program has been made possible over the years through the facilities of the Institute concerning which some specific references are made with the station records.

The State Conservation Commission has assisted with the State-wide program in several ways, and has provided cooperative funds with specific reference to the interest of the Commission in lake levels and recreational facilities along the streams of Iowa.

During the fiscal years ended June 30, 1941 and 1942, the work in the State program in Iowa was accomplished under cooperative agreements between the United States Geological Survey and the following organizations: Iowa State Conservation Commission, F. T. Schwob, Director; State University of Iowa Institute of Hydraulic Research, F. M. Dawson, Director and

Dean of College of Engineering, and Prof. Hunter Rouse, Associate Director; and the Iowa Geological Survey, Dr. A. C. Trowbridge, Director and State Geologist, and Dr. H. G. Hershey, Associate State Geologist.

The following cities, counties, and other organizations also assisted during 1941 and 1942 by furnishing services of gage observers, or by providing financial cooperation through the Institute of Hydraulic Research, or in various other ways: Iowa State Conservation Commission; School of Civil Engineering at Iowa State College; Appanoose and Decatur Counties; the cities of Ames, Boone, Cedar Rapids, Clarinda, Des Moines, Independence, Marshalltown, Mason City, Ottumwa, Red Oak, Sioux City, Spencer, and Waterloo; Des Moines Water Works; Des Moines Electric Co.; Jacob E. Decker & Sons; Central States Power & Light Corporation; Central States Electric Co.; Interstate Power Co.; Iowa Electric Co.; Iowa Electric Light & Power Co.; and Mississippi River Power Co. Much valuable assistance has thus been afforded the program, the cooperation being of mutual benefit to the State and the agencies involved.

In 1941 and 1942, the Corps of Engineers, U. S. Army, St. Paul, Minnesota, gave financial assistance in the operation and maintenance of gaging stations on the Mississippi, Yellow, and Upper Iowa Rivers in northeastern Iowa. In the Des Moines River Basin and in eastern Iowa, the Corps of Engineers, U. S. Army, Rock Island, Illinois, rendered financial assistance in the establishment of some stations and assistance with the operation of 31 gaging stations. In the Missouri River Basin in western Iowa, the Corps of Engineers, U. S. Army, Omaha, Nebraska, assisted in the maintenance of 10 gaging stations by providing operational funds in connection with which a resident engineer, L. J. Snell, was kept at Onawa, Iowa, in order to obtain high-water measurements during the spring and early summer months. It should be mentioned that during the period 1938-42, an appreciable part of the total funds for stream gaging in Iowa was supplied, as the foregoing remarks indicate, by the several offices of the Army Engineers having jurisdiction in Iowa.

Acknowledgment is made to the United States Weather Bureau for the cooperative collection of several river stage records; for the use of certain climatological data; and, more particularly, for rainfall reports of the Hydrologic Network that are reproduced in special tables with some of the stream-flow records.

Prof. J. W. Howe, Head of the Department of Mechanics and Hydraulics of the College of Engineering at the State University of Iowa, has given continued encouragement and advice in connection with the collection and dissemination of basic hydrologic data, particularly with reference to the Ralston and Rapid Creek project.

The stream-flow records for the stations at Sioux City, Omaha, and Nebraska City on the Missouri River were collected and furnished by the district office of the United States Geological Survey at Rolla, Missouri, in cooperation with the Army Engineers. Also, the district office of the Survey in Minnesota kindly consented to the inclusion of two station records obtained in the cooperative program in that State.

The stream-gaging work in Iowa is conducted by the personnel of the water-resources branch of the United States Geological Survey—L. C. Crawford, district engineer since 1940. The station records were arranged and prepared for State and Federal publications and local requests under his general direction. The computations incident to the presentation of the records and their assembly for publication were made by the technical staff of the United States Geological Survey office in Iowa City where field data were analyzed and the station manuscripts processed under the immediate supervision of the following experienced engineers: W. I. Travis, P. C. Benedict, and G. L. Whitaker. Other engineers, not previously mentioned, who assisted materially in carrying on all the routine field and office work were H. H. Biendarra, C. F. Lindholm, S. Mummey, Jr., and W. A. Shaw. Miss Claire E. Putz and Mrs. Carroll Mullin, district clerk and junior clerk-stenographer, respectively, typed the manuscript for the station histories and text, and assisted with many details of the report. Dr. H. G. Hershey, Associate State Geologist of Iowa, reviewed the manuscript for the text and contributed valuable suggestions, and aid in connection with the arrangements for printing.

So far as practicable, an attempt has been made to give individual and appropriate acknowledgment throughout the report for all data or assistance obtained from the varied sources working in Iowa. Finally, acknowledgment is made of the general effectiveness of the cooperation of the several participating agencies.

EXPLANATION OF FIELD AND OFFICE WORK

This report contains records for the water years ending September 30, 1941 and 1942. At the beginning of January in Iowa and in most parts of the United States, much of the precipitation that occurred in approximately the preceding three months is stored in the form of snow or ice, or in ponds, lakes and swamps, or as ground water, and this accumulation of stored water passes off in the streams during the spring months. At the end of September, on the other hand, the only stored water available for runoff is possibly a small quantity in the ground; therefore, the runoff for the year beginning October 1 may usually be considered to have been derived from the precipitation within that year. For the convenience of the users of the records, however, annual summaries of gaging-station data are now prepared for both calendar and water years.

A gaging station is essentially a selected section in a stream channel equipped with a gage and facilities for measuring the flow of water; in other words, a place on a stream where data can be gathered from which records of discharge can be computed. Basic data systematically collected at gaging stations consist of records of stage, current-meter measurements of flow, and general related information used to supplement the gage heights and discharge measurements in determining the instantaneous and daily flow.

The records of stage are obtained either from direct observations on a nonrecording gage, or from a water-stage recorder that gives a continuous record of the water-level fluctuations in the stream channel. A diagramatic sketch of an installation of a typical structure for housing recording equipment at gaging stations in Iowa is shown in figure 1. A total of 41 water-stage recorders were being operated in Iowa by the Survey on September 30, 1942. (See plate 5). Typical structures and equipment in use at gaging stations are shown on plates 2, 3, 4.

Measurements of discharge are usually made with a United State Geological Survey type-A, pygmy, or other model of the small Price current meter. Occasionally, determinations of extraordinary peak flows must be made from a study of the channel characteristics, particularly the water-surface slope and the cross-sectional area. Examples and general information in regard to the use of these methods, with special references to the conditions under which they were applied by the Survey to various severe floods, are given in United States Geological

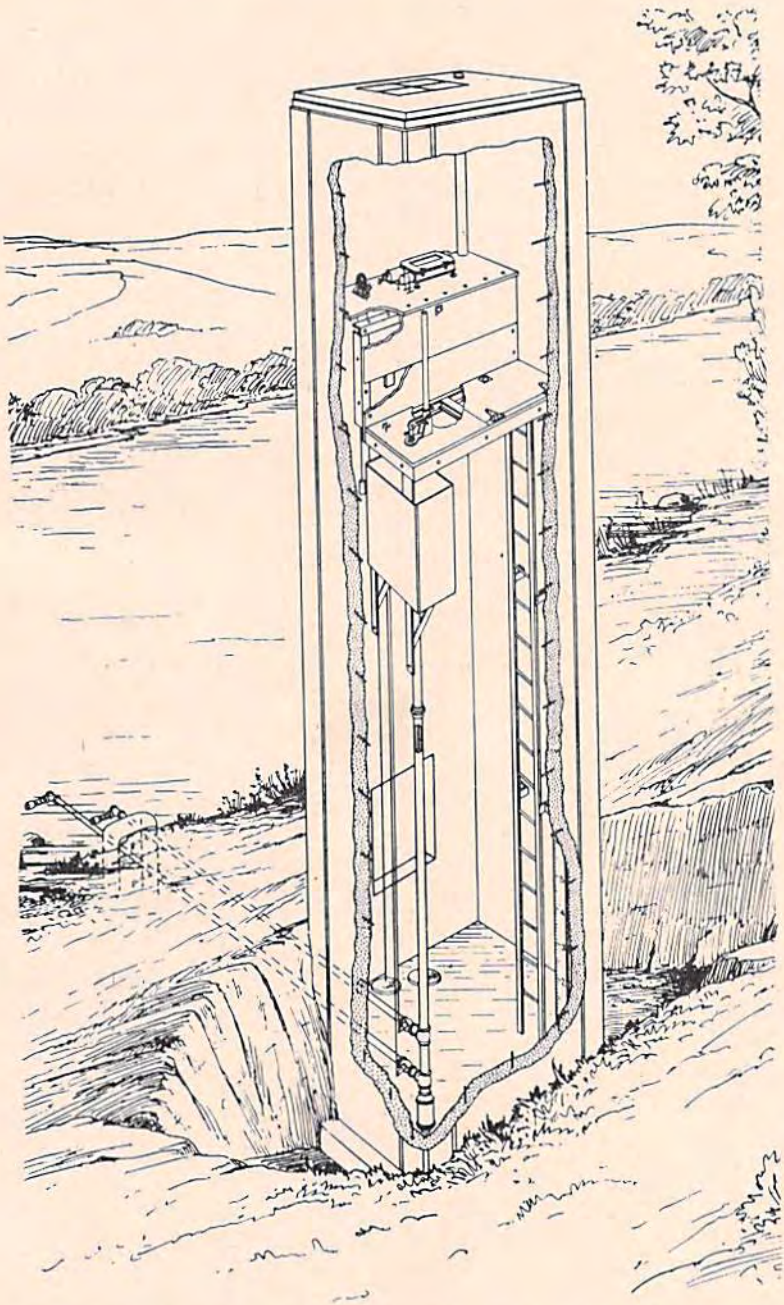


Figure 1.—Typical design of river-measurement station showing reinforced concrete well and house for water-stage recorder.

Survey Water-Supply Papers 773-E, 796-G, 798, 800, and 816. The equipment and methods perfected by the Survey for stream-flow measurements are described in "Stream-gaging Procedure —A manual describing methods and practices of the Geological Survey" recently published as Water-Supply Paper 888.

From the results of discharge measurements, rating curves are prepared that show the relation between stage and discharge. Ordinarily, these curves are well defined, except for extremely low or high stages for which extensions can be made by the use of area and velocity curves, slope-area measurements, weir tables, logarithmic curves, comparison with previous curves, knowledge of the station, or a combination of these methods. After a satisfactory station-rating curve has been developed, the next step in the computation of daily discharge is the preparation of the station-rating table or tables that give the discharge at any stage, with proper consideration for slope, if that is one of the significant variables. Unless otherwise noted, daily discharges are ascertained by applying the rating tables to mean daily gage heights obtained from the water-stage recorder graphs by inspection, or for days of considerable fluctuation in stage by averaging discharges for intervals of a day. The proper application of these rating tables to the daily mean gage heights gives the daily mean discharges from which the monthly and yearly mean dischargese are computed. Discharges thus obtained are usually plotted, often on semi-logarithmic paper for comparison with the flow of comparable streams, and any inconsistencies that appear are either verifed or corrected.

It should be mentioned that a permanent stage-discharge relation as revealed by the station-rating curve is by no means the rule for most gaging stations in Iowa. During the two-year period ended September 30, 1942, more than 1,400 current-meter discharge measurements were made to determine and verify the relations between stage and discharge. In figure 10 on page 175 a number of discharge measurements made at the Correctionville gaging station on the Little Sioux River are plotted together with an area curve. Attention is called to the fact that the zero of this gage, as well as most others, is placed at an arbitrary datum and therefore has no particular significant relation to zero flow or the bottom of the river bed. Gage heights, as obtained by any gage, are referred merely to the origin (or zero) of the gage scale and do not necessarily show actual stream depths, especially when the channel is of a continuously shifting

A. LITTLE MAQUOKETA RIVER NEAR DURANGO, IOWA

B. FOX RIVER AT CANTRIL, IOWA

GAGING STATION STRUCTURES

(Construction funds furnished by Rock Island District, Corps of Engineers, U. S. Army)

A. STATE HIGHWAY BRIDGE AND REINFORCED CONCRETE GAGE HOUSE AND WELL ON DES MOINES RIVER AT KEOSAUQUA, IOWA

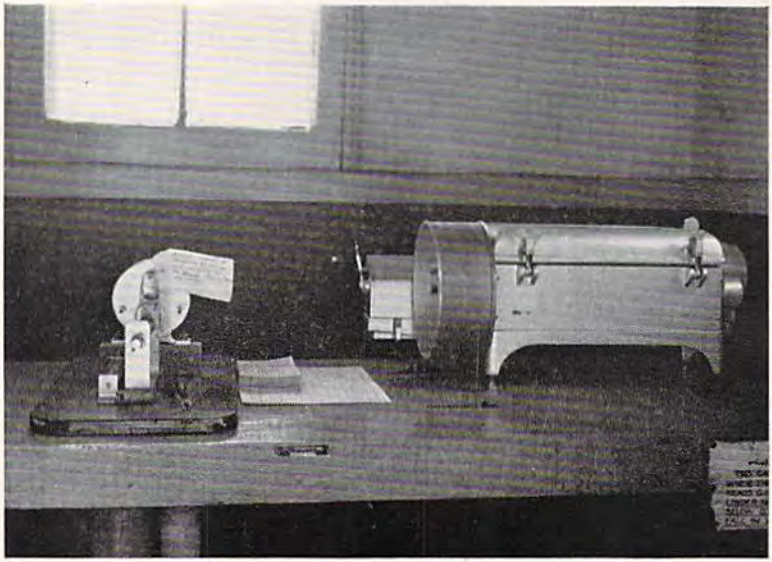
B. ARTIFICIAL CONTROL UNDER STATE HIGHWAY BRIDGE, ROUTE NO. 1, AND RECORDER HOUSE ON RALSTON CREEK AT IOWA CITY, IOWA

A. RECORDER HOUSE AT WATER-LEVEL GAGE ON LAKE WAPELLO NEAR DRAKESVILLE, IOWA

B. ARTIFICIAL CONTROL FOR GAGING STATION ON MAQUOKETA RIVER NEAR MANCHESTER, IOWA

GAGING STATION EQUIPMENT

A. ARTIFICIAL CONTROL, GAGE HOUSE, AND CABLEWAY ON RAPID CREEK NEAR IOWA CITY, IOWA



B. AUTOMATIC WATER-STAGE RECORDER IN GAGE HOUSE AT HYDRAULICS LABORATORY ON IOWA RIVER AT IOWA CITY, IOWA

GAGING STATION EQUIPMENT

character. In fact, the zero of the gage at most stations is usually placed somewhat below the stage of the lowest known flow in order that negative gage readings will be avoided.

At stations on streams subject to sudden or rapid diurnal fluctuation, the discharge obtained from the application of the rating table to the mean daily gage height may not be the true mean discharge for the day. If such stations are equipped with water-stage recorders, the mean daily discharge may be obtained by averaging the discharge at regular intervals during the day, or by means of an instrument known as the discharge integrator in which a flexible curve is set to correspond with the rating curve of a station and the mean daily discharge is determined directly from a continuous gage-height graph.

At most gaging stations in Iowa the stage-discharge relation is affected by ice during the winter, so that it is often impossible to compute the discharge from an open-water relationship of stage and discharge. Discharge for periods of ice effect is computed on the basis of available winter discharge measurements and gage heights, due consideration being given to all available information relative to temperature and precipitation records, notes by gage observers and engineers, and comparable records of discharge for stations in the same or nearby basins. The days during the winter period on which discharge measurements were made are indicated by symbols and footnotes in connection with the station records.

At gaging stations on the Mississippi River the stage-discharge relation is affected by the operation of the locks and dams in the navigation development. The existence of those variable conditions necessitates the use of the slope or fall in a reach of the river as a factor in the determination of discharge. Information requisite for determining the slope or fall is obtained by means of an auxiliary gage located several miles from the base gage. At some other gaging stations, such as on the Nishnabotna River above Hamburg, the stage-discharge relation is at times affected by backwater from tributary streams or other sources; however, with present funds and equipment it is not practicable to determine completely all such conditions, especially those that are relatively insignificant in most respects when compared with the total volume of flow.

ACCURACY OF FIELD DATA AND COMPUTED RESULTS

The station description under the "Gaging station records" gives statements in regard to the equipment and relative to the probable accuracy of the records. "Excellent" indicates that, in general, the daily discharge records are accurate within 5 per cent; "good," within 10 per cent; "fair," within 15 per cent; and "poor," within percentages greater than 15 per cent. These notes are very general, and the appraisal is determined by considering the accuracy of the rating curve, the reliability and number of gage readings, the range and fluctuations in stage, and various local conditions.

The accuracy of stream-flow data depends primarily on (1) the permanency of the stage-discharge relation and (2) the accuracy and frequency of observations of stage, measurements of flow and interpretations of records. The purposes for which the records are collected and the funds available for the work determine to a large extent the ultimate accuracy of the records.[2]

Permanence of the stage-discharge relation will be affected by any change in the control due to growth of vegation in the stream bed, effects of floods, or any artificial change, and may be affected by other natural changes. In general, the error in an individual measurement of discharge by a current meter is considerably less than 5 per cent if it is possible to find suitable conditions for the measurement.

Observations of stage or gage height, as taken from the water-stage recorder graphs or as obtained by gage readers, are used so as to give less than 2 per cent of error if the water-stage recorder operates satisfactorily and there is a free connection between the stilling well and the river.

For uniformity, computations of discharge are generally carried to not more than three significant figures; however, some base data or their uses may not warrant such nicety in computations. The refinement used in the recording and computation of gage heights is such as to permit in no case an average error of more than 2 per cent in the daily discharge, although an accuracy to this degree is not necessarily implied. Technical considerations and field conditions have largely established the practicability of the indicated refinement.

At some stations the stage-discharge relation is known to be affected at times by changing stage for which it is usually not feasible to make a correction, nor is it practical to use the rate

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

of change of stage as a factor in the determination of daily discharge under ordinary conditions of operation at gaging stations in Iowa. There is, nevertheless, at some stations a fairly wide difference between rising stage and falling stage discharge for the same gage height so that a mean curve would not give the true discharge for any particular time except under constant stage conditions or at the crest of a rise. However, it is recognized that in using the ordinary rating curve for computations of daily discharges, such discrepancies tend to compensate to an appreciable degree.

If errors resulting from various sources in the computation of daily discharge are compensating, the actual error in the determination of mean monthly discharge, will be much less than the probable error of the associated determination of individual daily discharges. Experience with records of daily discharges and monthly means computed from them shows that large errors in the daily figures may be compensating to such extent that errors in the monthly means are small. Therefore, the monthly means, and especially the yearly mean, for many stations may represent with comparatively high accuracy the average quantity of water flowing past the gage. For example, it can be demonstrated for fluctuating stages that the average error in the monthly mean discharge resulting from a 2 per cent average error in mean daily discharge is about one-third of 1 per cent.

Even though the averages for periods of a month or longer for any station may represent the flow past the gage with a high degree of accuracy, the related figures showing discharge per square mile and depth of runoff in inches may be subject to errors because of inaccuracies in the determination of drainage areas. In addition, yield of water, or flow, at some stations as indicated by monthly means may vary widely from the natural yield, owing to diversion, consumption, regulation by storage, increase or decrease in evaporation due to artificial causes, or other factors. A table of monthly discharge gives a general idea of the flow at the station and may be used for preliminary consideration; tables of daily or hourly discharge allow more detailed studies of the variation in flow.

Records of flow as originally published in water-supply papers were based on information available at the time. Subsequent field work and office analyses have occasionally indicated the need for revising the original computations. Such revised records, which are usually published in later reports, are often overlooked by the users of the data.

It should be borne in mind, however, that the observations in each succeeding year may be expected to throw new light on data previously published, and that greater degrees of refinement in computations and records may be warranted with the increase in data and the use of improved equipment.

GAGING STATION RECORDS

The data presented in this report cover the two years beginning October 1, 1940, and ending September 30, 1942. The technical data given for each gaging station comprise a descriptive history of the station, yearly tables showing the daily discharge of the stream, yearly tables of monthly and yearly discharge and runoff, and related supplemental information. In addition for some stations, a special supplementary table or illustration giving hourly stage and discharge, as hereinafter explained, has been prepared for important floods of 1941 and 1942. Some flow-duration tables and lake records are also included.

In general, the description of the station gives: location and type of gage, its latitude and longitude and land-line references; drainage area; period for which records are available; average discharge for stations having a complete record of about five or more years; discharge corresponding to maximum and minimum recorded stages or indices with related information, including occasional historical data antedating the period of systematic records; and under "Remarks" notes on general accuracy of the records, diversions and artificial regulations, backwater, frequency of nonrecording gage readings, and other pertinent facts. The description is concluded by statements concerning important items relating to cooperation and illustrations.

Drainage areas and point locations have been determined by planimeter and from the latest and best maps available, or have been obtained from other indicated sources. As opportunities develop, these determinations are reconciled with similar data of other interested agencies. Under "Extremes" are given the maximum discharge and gage height; the minimum discharge if there is little or no regulation; the minimum daily discharge if there is extensive regulation (also the minimum discharge if useful); and the minimum gage height, if of importance. Unless otherwise qualified, the maximum discharge corresponds to the crest stage obtained by use of a water-stage recorder or a nonrecording gage read at the time of the crest. Likewise, the minimum discharge represents the lowest stage, unless otherwise qualified.

The table of daily discharge gives, in general, the discharge in second-feet corresponding to the daily gage height, which may be the mean of two or more readings in the case of a nonrecording gage, or the mean daily gage height obtained from a water-stage recorder graph. For flashy floods the mean daily discharge is determined from gage-height graphs based on gage readings made once or twice daily or oftener, as stated in the station descriptions. The methods for obtaining the true mean daily discharge under conditions of sudden and rapidly changing stage are further discussed in the section "Explanation of field and office work."

In the table of monthly discharges the column headed "Second-foot-days" gives the sum for each month of the daily discharge as listed in the table for that month. The column headed "Maximum" gives the maximum daily discharge, and not the momentary discharge when the water surface was at crest height which is given in the station description under the heading "Extremes." Likewise, in the column headed "Minimum," the quantity given is the minimum daily discharge and not the momentary minimum. The column headed "Mean" is the average flow in cubic feet per second during the month. On this average flow are based the computations recorded in the remaining vertical column or columns, which are defined in the appendix on page 212. It will be noted that runoff in second-feet per square mile and depth in inches on the drainage area are given for stations in the *Upper Mississippi River Basin*, and for stations in the *Missouri River Basin* in Iowa, the runoff in acre-feet is also given. For all of the foregoing headings the horizontal columns show the summaries for the calendar and water years that are discussed in the first paragraph of the section "Explanation of field and office work." (For Ralston and Rapid Creek records on pages 72 and 74 the tables of monthly discharge show yield in million gallons per square mile.)

The daily discharge as reported in each instance on February 9, 1942, is technically the mean for a 23-hour day. The runoff in inches or acre-feet for the month of February was computed, however, in the usual manner, no correction being made for the insignificant error resulting from the fact that at 2 a. m. on February 9 the clocks in all the time zones of the country were set ahead to 3 a. m. Prior to that time, records were collected in Iowa on the basis of central standard time and thereafter by

the use of central war time. In the tabular presentations in this report 12 o'clock noon is designated "N" and 12 o'clock midnight is designated "M."

Supplementary Data and Tables

The tables of mean daily and monthly discharge for stations on the largest Iowa rivers, or on other rivers where the rate of rise is relatively slow, generally give all the detail that is desired or necessary for the consideration of most problems. On smaller rivers and streams, however, there is a recognized need for detailed records of flood characteristics that will show not only the mean daily discharges and the maximum rate of discharge during a flood, as are commonly published for a gaging station, but also the stages and rates of discharge at frequent intervals during the flood period. The determination of the stages and discharges at stations in a basin at any given time during the progress of the flood is satisfactorily made only through the use of data obtained by recording gages.

Such detailed data are essential to a thorough analysis of the characteristics of floods, including the detentive and retentive effects of the land and channel-storage and valley-storage, in modifying the form of the flood hydrograph.[3] In addition, they furnish basic information for studying the behavior of flood crests, such as the time of travel of crests from headwaters of tributaries to the main stream and the simultaneous progress of flood crests in the discharge of flood waters. They further provide information necessary in a determination of the feasibility of detention reservoirs, channel improvements, controlled use of land, soil treatment, and other measures that are proposed for ameliorating damage and losses caused by runoff, erosion, and floods. Only for very large stream systems can average flow rates for periods greater than 6 hours be used to advantage in modern hydraulic methodology involving such procedures as flood routing and the evaluation of the effects of channel storage. Procedures of hydrology relating to stream flow must be based upon reasonably accurate patterns of time and discharge.

The special tables 3-8, 11, 13-16 and graphs (figs. 2-5, 7, 8) showing stage, discharge, runoff, and rainfall at indicated times were designed to meet this recognized need by presenting representative and detailed data pertinent to the rise and recession of relatively important floods that occurred at the gaging stations where the rate of rise and fall of the water was so rapid

[3] Clark, C. O., Storage and the Unit Hydrograph: Am. Soc. Civil Eng. Proc., Vol. 69, No. 9, pp. 1333-1360, 1943.

that the usual tables of daily discharge are inadequate for some purposes, particularly in correlating the causes and results in the flood phase of the hydrologic cycle. The stages at the indicated times, insofar as such records were available, were obtained from the charts of continuous water-stage recorders. Footnotes are used to designate any variable presentation. For a variety of reasons it is cautioned that the relationship between the stage and discharge may not be directly disclosed by the data in the supplementary tables that appear with the daily records. Although these tables are presented in abbreviated and concentrated form, the data are intended to be reasonably complete and explicit with respect to essential information for the delineation of the hydrographs that will show the stage and discharge at any instant throughout the important flood periods.

In addition to the special tables described in the foregoing paragraphs, it should be mentioned that important peak discharges with time of their occurrence have been determined in connection with the analysis of the data for some stations. It has not been found practicable to print these listings in this report but the records are readily available upon request. Such supplementary information has not generally been determined for stations having drainage areas of less than 10 square miles or more than 10,000 square miles, or if the peak discharges usually exceed the corresponding mean discharges for the day by less than 10 per cent.

The duration tables 9, 10, and 15 presented for a few of the gaging stations show the number of days in each year on which the mean daily discharge was equal to or greater than the discharge given in the table. By subtraction the table gives the number of days each year that the mean daily discharge was between the discharges given in the table, and, also by subtraction, the number of days that the mean daily discharge was less than the discharge given. From such tables flow-duration curves (see fig. 9) may be prepared for the analyses of a variety of water-supply and sewage disposal problems.

The records which are included for a number of Iowa lakes are presented after the records from stream-flow measurement stations in each major drainage basin subdivision. These records which are collected at the lake gaging stations constitute a part of the program carried on in cooperation with the Iowa State Conservation Commission. For the lake gages the data presented comprise a general description of the station with de-

tailed summary of annual extremes and a table of daily stage or gage heights during the period 1941-42.

The gaging-station records at most of the stream-flow and lake gages discussed in this report extend over a series of years and other associated data may be found in the State and Federal reports which are described in section "Previous State and Federal publications." Also, in the subsequent sections, "Related gaging stations records collected in adjacent States" and "Miscellaneous discharge measurements in Iowa," references to other available records and measurements are presented, the streams and places of measurements listed appearing in the same relative order as the streams and gaging stations in the main part of this report.

Additional information concerning these and other basic data may be obtained in the district office of the United States Geological Survey in Iowa City.

UPPER MISSISSIPPI RIVER BASIN

Mississippi River at McGregor, Iowa

LOCATION.—Water-stage recorder, lat. 43°01'40", long. 91°10'22", in city park at north end of Main Street in McGregor, 2.6 miles upstream from Wisconsin River and 4.0 miles downstream from Yellow River. Datum of gage is 605.30 feet above mean sea level, adjustment of 1912. Auxiliary gage is a water-stage recorder, lat. 43°12'33", long. 91°06'05", at dam 9, 2½ miles northeast of Harpers Ferry and 14.2 miles upstream from McGregor gage. Datum of gage is 600.00 feet above mean sea level, adjustment of 1912.

DRAINAGE AREA.—67,500 square miles.

RECORDS AVAILABLE.—August 1936 to September 1942.

EXTREMES.—Maximum daily discharge during 1941-42 year, 113,800 second-feet June 7; maximum gage height, 17.38 feet June 9; minimum daily discharge, 13,000 second-feet Jan. 13; minimum gage height, 6.37 feet Aug. 27.

1936-41: Maximum daily discharge, 102,800 second-feet Apr. 20, 1941; maximum gage height observed, 18.45 feet Sept. 18, 1938; minimum daily discharge, 6,200 second-feet Dec. 9, 1936 (discharge measurement); minimum gage height, -0.86 foot Aug. 18, 1936.

Maximum stage known, about 21.0 feet in 1880.

REMARKS.—Records good except those for periods of ice effect, which are fair. Stage-discharge relation affected by backwater from Wisconsin River and dam 10. Discharge computed by using fall as determined by auxiliary water-stage recorder as a factor. Flow regulated by reservoirs and navigation dams.

COOPERATION.—Records collected in cooperation with Army Engineers.

Note.—Graphs of discharge at river-flow measurement stations on the Mississippi River in Iowa are shown in figures 2 and 3.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Discharge in second-feet				Run-off in Inches
		Maximum	Minimum	Mean	Per square mile	
October 1940	419,630	19,000	8,910	13,540	0.201	0.23
November	509,190	23,700	9,790	16,970	.251	.28
December	489,000	17,500	13,500	15,770	.234	.27
Calendar year 1940	6,911,250	52,100	6,700	18,880	.280	3.82
January 1941	493,400	19,000	12,300	15,920	.236	.27
February	372,800	14,500	11,600	13,310	.197	.21
March	804,600	43,200	13,300	25,950	.384	.44
April	2,277,600	102,800	44,400	75,920	1.12	1.25
May	1,382,200	79,900	21,800	44,590	.661	.76
June	1,344,000	53,500	39,100	44,800	.664	.74
July	656,800	39,800	15,400	21,190	.314	.36
August	392,690	20,400	9,510	12,670	.188	.22
September	1,623,800	70,700	20,600	54,130	.802	.89
Water year 1940–41	10,765,710	102,800	8,910	29,500	.437	5.92
October 1941	1,372,400	50,700	35,100	44,270	.656	.76
November	1,221,900	59,800	20,100	40,730	.603	.67
December	661,800	29,000	15,000	21,350	.316	.36
Calendar year 1941	12,603,990	102,800	9,510	34,530	.512	6.93
January 1942	514,800	19,800	13,000	16,610	.246	.28
February	482,500	19,500	15,000	17,230	.255	.27
March	1,031,900	56,000	15,000	33,290	.493	.57
April	1,265,500	58,200	26,400	42,180	.625	.70
May	1,627,400	63,200	35,400	52,500	.778	.90
June	2,413,000	113,800	37,900	80,430	1.19	1.33
July	1,164,300	63,600	14,700	37,560	.556	.64
August	860,600	42,500	17,300	27,760	.411	.47
September	1,520,400	88,300	22,400	50,680	.751	.84
Water year 1941–42	14,136,500	113,800	13,000	38,730	.574	7.79

Mississippi River at McGregor, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940–41												
1....	8,910	11,300	14,000	17,000	12,700	13,300	44,400	70,900	51,400	39,800	20,400	20,600
2....	9,620	10,700	13,500	18,000	12,400	14,100	45,700	78,000	53,500	37,600	18,400	26,300
3....	10,600	10,400	13,500	18,500	12,500	16,500	48,100	76,000	49,900	33,400	16,700	27,900
4....	12,800	10,600	13,500	19,000	13,000	17,600	49,700	73,500	49,100	25,900	15,600	35,000
5....	13,200	9,790	13,500	18,500	14,000	18,300	51,800	71,600	47,800	24,800	14,600	37,700
6....	19,000	10,100	14,000	18,000	14,100	19,000	54,100	70,600	47,200	28,100	13,800	42,000
7....	14,100	11,800	14,000	18,000	14,100	20,000	57,300	68,400	47,700	27,700	13,300	48,200
8....	13,800	14,100	14,000	17,500	14,100	20,000	61,000	65,900	46,600	22,600	12,800	54,000
9....	13,300	15,000	15,500	17,500	14,300	20,000	62,700	62,500	44,100	18,500	12,700	58,200
10....	13,500	16,500	17,000	17,000	14,300	20,000	64,200	59,000	41,100	18,400	13,000	59,200
11....	13,500	22,100	17,000	17,000	14,300	22,000	65,700	56,000	41,100	19,800	13,300	62,300
12....	12,900	23,700	16,500	17,000	14,200	25,000	66,800	52,200	43,400	20,600	13,300	67,500
13....	12,400	22,600	16,000	17,000	14,200	28,000	74,000	45,800	46,100	19,400	12,900	70,200
14....	11,700	21,400	15,000	17,000	14,200	29,000	78,200	40,800	47,000	16,900	13,400	70,700
15....	12,400	20,400	15,000	16,500	14,100	29,000	83,600	36,000	48,400	15,700	12,600	70,100
16....	13,200	18,000	15,500	16,500	14,500	29,000	87,400	33,800	47,700	15,800	12,500	69,000
17....	13,200	15,800	16,000	16,500	13 800	28,000	91,600	32,400	45,900	16,400	12,500	66,800
18....	14,700	14,700	16,000	16,500	14,000	25,000	97,800	26,400	44,400	18,100	12,200	63,100
19....	14,200	13,000	17,000	16,000	13,200	20,000	100,100	21,800	43,900	19,800	11,600	59,000
20....	15,200	14,000	17,000	16,000	13,400	18,000	102,800	23,300	43,600	19,700	11,600	56,000
21....	15,100	18,000	17,500	*16,000	12,600	18,000	100,300	26,400	43,700	19,500	11,000	54,100
22....	14,700	19,800	17,500	15,500	12,000	23,000	97,600	28,200	43,600	18,500	10,200	54,400
23....	13,500	21,200	17,000	15,100	11,900	33,000	94,000	28,300	43,300	18,000	10,600	55,100
24....	13,800	23,000	17,000	14,100	11,600	39,800	91,000	28,200	43,200	17,800	11,200	56,100
25....	14,100	23,200	17,000	12,700	11,700	38,500	90,000	27,800	42,100	17,100	10,800	57,800
26....	14,500	22,800	17,000	12,800	12,100	36,800	87,200	27,100	40,000	16,400	10,200	58,200
27....	15,500	21,400	16,000	12,600	12,600	33,700	84,300	24,900	40,200	15,400	9,940	58,100
28....	15,700	21,800	16,000	12,400	12,900	33,700	83,300	23,100	39,500	15,500	9 540	57,500
29....	15,100	17,700	16,500	12,300	.....	34,900	82,000	24,700	39,100	15,900	10,000	55,200
30....	13,300	14,300	17,000	12,300	.....	38,200	80,900	23,000	39,400	21,400	9,510	53,500
31....	12,100	.....	17,000	12,600	.....	43,200	.....	46,600	.....	22,300	12,500	.....
1 941–42												
1....	50,700	49,300	25,000	19,800	19,500	15,500	56,900	35,400	62,800	60,600	42,500	22,400
2....	44,500	51,500	26,000	17,000	19,500	15,500	57,500	38,200	66,100	63,600	35,500	33,200
3....	38,800	54,200	27,300	14,500	19,500	15,000	58,200	40,100	72,100	63,200	40,300	44,400
4....	35,500	56,200	27,500	14,000	19,500	15,000	57,800	39,500	83,800	59,700	39,100	46,000
5....	35,100	57,000	*26,900	14,500	19,500	15,500	56,400	37,400	99,000	56,200	31,600	44,700
6....	36,300	58,000	24,600	16,500	19,500	16,000	54,800	38,800	111,200	52,600	30,800	42,700
7....	41,700	59,800	23,400	16,500	19,500	18,000	52,900	42,600	113,800	46,400	30,700	41,400
8....	44,800	59,800	19,300	15,000	18,500	19,000	51,700	43,600	108,700	40,500	32,000	37,300
9....	45,000	58,400	20,000	14,500	17,500	19,800	50,300	45,900	109,100	39,800	38,200	29,700
10....	44,900	57,000	19,100	15,000	17,000	20,000	50,100	48,200	111,800	39,500	41,700	26,200
11....	44,100	54,700	17,000	14,500	17,000	19,000	49,200	51,000	113,100	37,800	37,700	26,200
12....	44,700	53,300	16,000	13,500	17,000	19,700	48,800	53,000	110,800	36,900	32,600	28,000
13....	47,900	51,900	15,500	13,000	16,500	20,600	47,200	54,500	104,800	39,800	29,400	35,400
14....	49,600	49,600	16,000	13,500	16,500	21,800	45,400	56,300	98,100	40,200	26,600	43,600
15....	49,800	43,300	16,500	*14,500	16,500	23,200	43,600	55,800	92,300	39,800	28,000	44,100
16....	49,200	36,900	16,000	15,000	17,000	25,300	40,600	56,000	88,600	37,900	28,100	37,100
17....	48,600	34,400	15,500	15,500	17,500	31,700	39,000	55,000	85,600	33,900	26,100	33,600
18....	49,700	31,900	15,000	16,000	18,000	44,100	37,300	56,200	83,000	24,600	24,700	40,900
19....	49,100	31,900	15,000	16,500	*18,000	46,300	35,700	56,800	79,300	27,000	23,700	51,900
20....	47,900	30,400	16,500	18,000	17,000	41,000	34,100	56,600	75,000	34,400	23,200	52,500
21....	46,200	27,200	19,000	18,500	16,000	42,300	33,200	56,700	71,800	36,500	24,000	55,000
22....	43,500	27,300	22,000	18,500	15,500	44,500	34,000	57,300	66,600	29,800	23,800	59,400
23....	41,600	26,700	24,000	18,500	15,000	48,800	34,900	58,700	62,400	20,400	22,100	65,300
24....	39,500	25,900	26,400	18,500	15,000	52,400	30,500	59,400	57,400	14,700	19,100	75,100
25....	40,100	20,100	28,100	18,500	15,000	54,400	27,600	60,500	53,400	17,700	17,800	83,700
26....	41,400	20,500	29,000	18,500	15,000	54,600	27,600	62,200	48,100	24,600	17,300	88,300
27....	45,000	22,800	28,200	19,000	15,000	54,400	26,400	62,300	43,000	28,100	17,800	84,200
28....	43,600	23,600	25,000	19,000	15,500	53,700	26,500	63,200	37,900	26,400	19,100	84,200
29....	43,600	23,700	23,000	19,500	.....	53,900	27,000	62,400	47,800	26,900	19,200	83,700
30....	44,400	24,600	20,000	19,500	.....	54,900	30,300	61,800	55,600	29,100	19,100	80,200
31....	45,600	.....	19,000	19,500	.....	56,000	.....	62,000	.....	35,700	18,800	.....

Note—Stage-discharge relation affected by ice Dec. 1-31, 1940; Jan. 1 to Mar. 23, Dec. 11-23, 26-31, 1941; Jan. 1 to Mar. 8, 1942.

* Winter discharge measurement made on this day.

Mississippi River at Clinton, Iowa

LOCATION.—Water-stage recorder, lat. 41°53'40", long. 90°09'24", in NE¼ sec. 16, T. 22 N., R. 3 E., in lower lock guide wall at dam 13, 1.2 miles upstream from Otter Creek, 2 miles north of Fulton, Ill., and 2.1 miles upstream from crossing of U. S. Highway 30 at Clinton. Datum of gage is 568.70 feet above mean sea level, adjustment of 1912. Auxiliary gage is a water-stage recorder, lat. 41°46'50", long. 90°15'07", in NW¼ sec. 34, T. 81 N., R. 6 E., at foot of Yazoo Street in Camanche, Iowa, 4.9 miles upstream from Wapsipinicon River and 10.7 miles downstream from principal gage. Datum of gage is 563.21 feet above mean sea level, adjustment of 1912.

DRAINAGE AREA.—85,600 square miles at U. S. Highway 30.

RECORDS AVAILABLE.—October 1939 to September 1942. October 1932 to September 1939 in reports of U. S. Geological Survey and June 1873 to December 1932 in report of Iowa State Planning Board entitled "Stream Flow Records of Iowa, 1873-1932," for site 23 miles downstream from U. S. Highway 30 (published as Mississippi River at Le Claire). Records equivalent except for inflow from Wapsipinicon River.

EXTREMES.—Maximum daily discharge during 1941-42 year, 169,600 second-feet June 13; maximum gage height, 18.04 feet June 13; minimum daily discharge, 18,800 second-feet Jan. 3; min. gage height, 1.49 feet Jan. 2.

1939-41: Maximum daily discharge, 128,200 second-feet Apr. 25, 1941; maximum gage height, 15.11 feet Apr. 25, 1941; minimum daily discharge, 12,000 second-feet Dec. 27-30, 1939; minimum gage height, -0.70 foot Dec. 30, 1939. Flow regulated.

Maximum stage known, 19.6 feet June 5, 1880 (21.4 feet at auxiliary gage).

REMARKS.—Records good except those for periods of ice effect, which are fair. Stage-discharge relation affected by backwater from Wapsipinicon River and dam 14. Discharge computed by using fall as a factor.

COOPERATION.—Records collected in cooperation with Army Engineers.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Discharge in second-feet				Run-off in Inches
		Maximum	Minimum	Mean	Per square mile	
October 1940	642,300	21,900	17,200	20,720	0.242	0.28
November	847,300	38,900	17,400	28,240	.330	.37
December	833,700	33,700	21,000	26,890	.314	.36
Calendar year 1940	11,164,100	74,100	12,200	30,500	.356	4.85
January 1941	841,400	33,000	22,100	27,140	.317	.37
February	674,800	31,300	20,700	24,100	.282	.29
March	1,216,600	64,800	21,000	39,250	.459	.53
April	3,021,900	128,200	57,400	100,700	1.18	1.31
May	1,860,600	105,500	31,600	60,020	.701	.81
June	1,939,100	78,400	50,800	64,640	.755	.84
July	901,800	50,800	21,100	29,090	.340	.39
August	572,400	24,900	14,800	18,460	.216	.25
September	2,215,600	100,200	22,700	73,850	.863	.96
Water year 1940–41	15,567,500	128,200	14,800	42,650	498	6.76
October 1941	2,059,100	77,700	50,700	66,420	.776	.89
November	1,874,300	88,400	33,100	62,480	.730	.81
December	970,600	45,600	22,600	31,310	.366	.42
Calendar year 1941	18,148,200	128,200	14,800	49,720	.581	7.87
January 1942	788,600	33,000	18,800	25,440	.297	.34
February	776,000	33,300	23,200	27,710	.324	.34
March	1,411,300	74,400	24,800	45,530	.532	.61
April	1,822,100	79,100	37,100	60,740	.710	.79
May	2,115,600	78,900	37,900	68,250	.797	.92
June	3,425,400	169,600	63,300	114,200	1.33	1.49
July	1,679,500	75,400	30,600	54,180	.633	.73
August	1,259,500	77,300	24,300	40,630	.475	.55
September	1,858,500	118,300	27,000	61,950	.724	.81
Water year 1941–42	20,040,500	169,600	18,800	54,910	.641	8.70

Mississippi River at Clinton, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940–41												
1.....	18,000	17,400	24,800	29,300	23,100	21,000	57,400	105,500	70,500	50,800	24,900	22,700
2.....	18,500	18,000	22,800	30,800	23,300	22,000	59,800	101,000	74,400	48,100	24,500	29,700
3.....	20,000	18,800	22,000	32,800	23,200	23,000	61,600	96,600	78,400	46,600	22,700	34,000
4.....	21,800	18,300	21,500	33,000	23,200	25,000	68,200	94,400	74,800	44,800	21,200	40,200
5.....	21,900	18,400	21,000	30,000	23,100	26,000	74,000	91,500	69,900	39,700	20,600	44,200
6.....	21,600	18,700	21,500	28,000	23,200	28,000	78,000	88,500	65,400	32,500	19,800	47,600
7.....	21,500	20,100	21,200	29,000	23,100	28,000	78,600	85,400	65,400	31,600	20,800	52,100
8.....	21,000	20,500	22,300	30,400	22,800	29,000	80,000	83,400	66,100	31,100	20,600	63,900
9.....	21,000	20,900	23,800	30,600	22,700	29,000	83,500	78,100	66,700	29,600	20,600	86,900
10.....	20,500	22,700	25,000	29,700	23,500	29,000	88,300	75,400	67,000	28,800	19,600	95,500
11.....	20,900	30,200	25,200	29,200	23,600	29,000	91,300	72,900	69,000	32,100	19,700	98,500
12.....	21,600	34,200	26,700	28,400	24,000	30,000	94,200	69,900	73,300	29,000	18,600	95,500
13.....	21,700	35,700	26,800	27,700	26,400	31,000	97,600	65,500	77,000	23,900	19,100	94,000
14.....	21,100	34,200	25,000	27,700	29,500	32,000	99,900	62,200	77,400	23,200	18,100	95,200
15.....	20,900	29,600	24,500	27,400	31,300	32,000	104,800	61,200	74,100	22,900	16,900	98,500
16.....	21,200	27,600	26,500	28,400	30,000	29,000	105,900	55,500	69,000	22,500	16,400	100,200
17.....	21,200	27,800	26,500	28,600	27,100	23,000	108,500	45,900	64,700	22,800	17,300	99,200
18.....	21,400	27,400	27,000	26,700	24,900	26,000	114,100	37,900	62,100	23,400	18,400	95,200
19.....	21,200	26,300	28,500	24,800	25,000	29,000	117,500	36,600	63,800	23,800	17,900	90,300
20.....	21,500	29,000	31,100	25,000	25,400	41,400	121,900	32,000	61,000	25,200	17,800	84,700
21.....	21,500	30,000	32,900	26,100	24,800	51,500	125,700	31,600	57,900	25,700	17,400	78,100
22.....	21,600	32,100	33,700	26,900	24,000	61,600	126,400	33,700	56,900	25,300	16,800	73,700
23.....	21,300	33,500	32,400	26,700	22,500	62,700	127,800	35,500	57,100	25,400	16,400	72,600
24.....	21,500	35,900	31,800	25,700	*20,800	64,800	128,100	36,500	57,700	25,500	16,400	72,200
25.....	21,200	37,500	31,400	24,300	20,700	64,700	128,200	35,800	57,000	25,300	16,500	73,000
26.....	21,300	37,000	30,800	22,700	21,000	64,200	127,200	35,900	54,500	22,700	16,400	73,100
27.....	20,800	38,700	29,800	22,400	21,300	60,800	124,800	35,200	54,000	21,100	15,500	74,000
28.....	19,400	38,900	29,400	22,500	21,300	58,700	120,800	36,200	50,800	21,800	14,800	77,400
29.....	20,000	36,700	30,000	22,100	.....	55,000	116,600	40,600	51,400	22,700	15,300	75,700
30.....	18,000	31,200	29,100	22,100	.....	55,000	111,200	45,200	51,800	26,800	15,200	77,700
31.....	17,200	.....	28,700	22,400	.....	55,200	.....	55,000	.....	27,100	16,200	.....
1941–42												
1.....	77,700	67,800	32,900	25,700	33,300	24,800	74,700	37,900	79,600	73,500	49,900	27,000
2.....	74,000	66,400	33,100	19,100	32,600	24,900	75,600	40,100	81,700	74,800	63,500	29,800
3.....	68,000	78,200	34,400	18,800	32,000	25,100	76,500	48,100	82,700	75,300	77,300	39,900
4.....	62,600	82,100	34,400	19,200	31,900	25,300	76,200	55,500	88,800	75,400	69,200	50,200
5.....	52,100	83,400	35,600	20,600	32,000	26,100	77,000	56,300	92,700	75,100	57,100	53,100
6.....	50,700	81,600	34,900	21,400	30,500	27,400	78,100	54,700	100,400	74,400	48,000	55,600
7.....	54,600	82,200	33,100	21,400	30,000	29,400	79,100	55,700	109,600	73,300	45,400	56,200
8.....	59,400	85,300	32,300	21,700	30,000	30,500	76,600	56,100	118,300	70,400	48,100	57,900
9.....	62,200	88,400	32,000	22,800	28,900	32,300	73,000	57,500	130,000	65,500	48,800	58,500
10.....	65,100	88,200	30,500	22,900	28,900	31,900	69,900	60,400	143,300	59,600	51,500	49,800
11.....	64,000	87,700	*30,400	22,900	28,000	31,000	69,800	64,200	155,200	56,900	54,600	37,700
12.....	64,100	86,100	29,800	22,900	27,700	29,200	69,600	66,900	164,700	53,100	53,200	36,300
13.....	64,400	83,700	27,800	23,000	27,800	27,200	69,000	71,100	169,600	52,100	49,400	36,200
14.....	65,300	83,500	24,500	23,700	27,800	27,900	68,700	73,000	169,500	54,600	41,300	43,200
15.....	68,600	77,200	23,400	23,800	26,700	30,300	69,200	76,800	165,300	58,800	36,800	54,800
16.....	71,500	70,900	22,600	23,700	26,200	34,100	69,200	77,000	160,200	64,600	35,000	54,400
17.....	73,300	64,400	22,900	23,800	26,600	40,700	66,700	76,700	154,100	62,700	34,100	55,300
18.....	75,100	57,300	24,300	24,100	26,600	47,200	60,700	76,300	147,800	57,000	34,000	51,800
19.....	76,700	48,700	25,600	25,400	26,300	56,100	54,700	76,900	140,500	41,800	33,200	56,600
20.....	77,000	46,000	26,000	27,300	26,500	61,300	52,900	77,200	131,700	38,400	31,800	68,100
21.....	75,100	44,900	28,500	28,100	26,800	61,300	50,200	76,800	122,900	41,400	31,300	71,400
22.....	72,600	42,900	31,000	29,500	26,100	64,500	44,700	77,700	111,800	47,400	30,300	71,800
23.....	74,400	40,200	33,400	30,000	23,600	64,100	44,300	78,000	96,600	47,500	29,200	73,200
24.....	70,800	34,600	37,000	29,900	23,200	63,600	44,200	77,900	86,800	40,000	28,100	77,000
25.....	65,400	33,700	37,100	29,900	23,500	64,600	43,400	77,700	78,400	32,400	25,900	81,000
26.....	61,000	34,700	38,700	29,600	24,000	66,300	38,900	77,800	74,100	30,600	24,300	86,800
27.....	62,300	34,300	45,000	*30,400	24,000	69,200	37,200	78,300	71,800	32,100	24,600	92,800
28.....	61,000	33,400	42,500	30,600	*24,500	72,700	37,500	77,900	66,900	35,600	25,400	101,600
29.....	63,200	33,400	32,400	30,600	.....	73,800	37,400	77,700	63,300	36,200	26,800	112,200
30.....	63,200	33,100	27,400	32,800	.....	74,100	37,100	78,500	67,100	39,200	25,300	118,300
31.....	63,700	.....	26,500	33,000	.....	74,400	.....	78,900	.....	39,800	26,100	.....

Note—Stage-discharge relation affected by ice Dec. 3-7, 14-19, 1940; Jan. 4 to Mar. 19, 1941; Jan. 1 to Feb. 27, 1942.

*Winter discharge measurement made on this day.

Mississippi River at Keokuk, Iowa

LOCATION.—Lat. 40°23'35", long. 91°22'25", at Mississippi River Power Co's. dam and power plant at Keokuk, 2.8 miles upstream from Des Moines River.

DRAINAGE AREA.—119,000 square miles.

RECORDS AVAILABLE.—October 1932 to September 1942 in reports of Geological Survey. January 1878 to December 1932 in report of Iowa State Planning Board entitled, "Stream-flow Records of Iowa, 1873-1932." Records for period May 1913, when Keokuk dam was completed, to September 1937 adjusted for change in contents in Keokuk Reservoir, those after September 1937 unadjusted. Records prior to 1913 collected at site at Galland, 8 miles upstream.

AVERAGE DISCHARGE.—64 years, 60,470 second-feet.

EXTREMES.—Maximum daily discharge during 1941-42 year, 200,900 second-feet June 16; minimum daily, 21,500 second-feet Jan. 5.

1878-1941: Maximum discharge, 314,000 second-feet May 18, 1888; minimum daily, 5,000 second-feet Dec. 27, 1933.

Flood of June 6, 1851, reached a stage estimated at 13.5 feet at Galland (discharge, 360,000 second-feet).

REMARKS.—Records good. Discharge computed from records of operation of turbines in power plant and spillway gates in dam. Flow regulated by reservoirs and navigation dams. Five discharge measurements made during year by Geological Survey and two by Army Engineers.

COOPERATION.—Records of daily discharge furnished by Mississippi River Power Co., and measurements of total river flow made periodically by Army Engineers and the Geological Survey to check plant ratings.

NOTE.—Graphs showing trends in precipitation, temperature, runoff and water loss data for the Mississippi River above Keokuk, 1878-1940, are given, page 36, Iowa Geological Survey Water-Supply Bulletin No. 1.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Discharge in second-feet				Run-off in Inches
		Maximum	Minimum	Mean	Per square mile	
October 1940	760,100	26,000	22,000	24,520	0.206	0.24
November	999,800	51,000	20,500	33,330	.280	.31
December	1,136,200	48,700	23,500	36,650	.308	.36
Calendar year 1940	13,528,600	81,700	8,900	36,960	.311	4.22
January 1941	1,099,900	44,400	27,800	35,480	.298	.34
February	1,065,200	54,800	27,700	38,040	.320	.33
March	1,827,200	105,400	30,300	58,940	.495	.57
April	3,694,700	154,400	80,500	123,200	1.04	1.15
May	2,341,200	137,700	41,800	75,520	.635	.73
June	2,556,300	103,900	58,200	85,210	.716	.80
July	1,269,000	82,000	27,500	40,940	.344	.40
August	652,000	29,800	14,300	21,030	.177	.20
September	2,542,300	123,700	26,500	84,740	.712	.79
Water year 1940-41	19,043,900	154,400	14,300	54,640	.459	6.22
October 1941	3,150,100	116,600	79,900	101,600	.854	.98
November	2,961,600	134,100	53,300	98,720	.830	.93
December	1,570,600	65,600	40,600	50,660	.426	.49
Calendar year 1941	24,730,100	154,400	14,300	67,750	.569	7.71
January 1942	1,215,500	57,900	21,500	39,210	.329	.38
February	1,396,900	78,100	31,500	49,890	.419	.44
March	2,030,600	104,000	38,200	65,500	.550	.63
April	2,353,300	101,500	47,200	78,440	.659	.74
May	2,480,900	102,400	47,000	80,030	.673	.78
June	4,199,500	200,900	76,300	140,000	1.18	1.31
July	2,219,500	115,000	44,600	71,600	.602	.69
August	1,909,700	101,600	32,400	61,600	.518	.60
September	2,159,200	113,000	39,200	71,970	.605	.67
Water year 1941-42	27,647,400	200,900	21,500	75,750	.637	8.64

Mississippi River at Keokuk, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940—41												
1.....	22,000	22,500	39,600	41,900	31,700	32,500	80,500	137,700	63,400	82,000	29,800	26,500
2.....	22,000	21,500	35,300	44,000	30,900	30,300	80,500	132,600	83,000	81,900	28,700	32,500
3.....	22,200	21,000	26,300	42,800	32,800	32,700	84,000	126,700	93,000	74,700	27,600	37,200
4.....	22,500	22,000	23,500	42,800	34,000	36,500	86,500	119,900	97,900	66,400	26,100	40,400
5.....	23,500	20,500	24,500	35,800	33,700	36,600	91,300	114,500	102,600	60,300	27,000	41,000
6.....	24,700	21,000	24,700	32,100	33,500	35,000	101,500	113,400	101,600	54,700	25,700	46,000
7.....	25,100	22,600	23,900	27,800	34,200	37,300	106,500	107,000	95,200	50,800	24,100	51,000
8.....	24,700	25,000	24,100	27,800	31,600	36,000	107,800	103,700	91,500	46,500	23,000	55,700
9.....	24,900	26,700	27,500	29,000	27,700	38,700	107,900	99,900	99,200	40,500	21,500	63,700
10.....	25,100	26,100	30,700	32,800	30,500	44,600	109,900	95,300	103,900	37,300	22,400	97,100
11.....	25,400	28,500	32,400	34,700	30,300	42,500	112,400	89,700	94,300	36,700	22,700	110,300
12.....	25,200	31,700	35,400	34,500	31,100	40,400	115,100	82,800	96,500	45,600	24,800	117,400
13.....	24,900	35,700	35,700	39,500	33,200	39,200	117,200	80,000	97,500	43,900	23,900	123,700
14.....	25,700	40,200	33,100	42,200	40,600	42,600	116,600	75,300	101,000	35,700	22,300	118,500
15.....	25,700	37,800	31,200	41,000	46,700	49,400	123,600	72,000	102,900	31,500	21,300	119,000
16.....	25,500	31,000	37,200	40,700	51,200	52,700	122,500	71,500	101,800	29,900	17,500	116,000
17.....	26,000	30,500	36,400	44,400	54,800	50,800	122,400	70,500	98,800	28,300	14,700	117,600
18.....	25,300	30,700	36,600	36,200	52,300	47,700	130,400	62,000	91,500	28,000	18,800	118,400
19.....	25,200	31,700	41,700	31,200	45,300	48,600	131,500	51,600	86,700	27,900	20,900	117,400
20.....	24,900	33,800	45,800	32,100	41,500	50,200	141,000	48,400	80,100	27,500	20,000	115,000
21.....	25,400	34,700	48,400	30,700	42,100	52,500	149,400	45,700	77,800	31,500	20,200	108,700
22.....	26,000	40,300	48,700	31,000	40,100	74,000	147,600	43,200	72,400	32,100	19,300	99,400
23.....	26,000	42,000	48,600	32,300	40,600	100,800	153,500	43,600	69,700	31,200	17,300	91,200
24.....	25,700	42,600	46,200	34,100	41,300	103,300	152,400	42,600	67,600	30,400	16,200	85,600
25.....	26,000	48,300	45,400	38,900	39,700	105,300	153,400	41,800	64,800	31,800	19,700	85,600
26.....	25,000	51,000	45,000	37,000	39,300	105,400	153,900	43,400	64,900	30,100	19,000	81,200
27.....	22,800	46,600	44,200	34,700	38,300	101,600	154,400	42,000	62,400	28,400	17,600	79,800
28.....	23,000	44,400	42,800	31,400	36,200	97,100	152,100	42,000	58,200	28,200	14,300	83,400
29.....	23,400	45,700	39,100	32,700	.....	90,600	148,000	44,800	61,800	29,100	15,000	80,400
30.....	23,100	43,700	40,400	32,000	.....	87,700	140,900	45,600	74,300	32,600	15,000	82,600
31.....	23,200	.....	41,800	31,800	.....	84,600	.....	52,000	.....	33,500	15,000	.....
1941–42												
1.....	85,500	104,100	52,400	51,600	44,300	43,000	98,400	47,200	87,700	75,600	54,900	39,200
2.....	93,800	110,300	52,500	34,000	50,600	44,400	100,300	47,000	88,300	80,500	64,600	42,600
3.....	110,400	115,400	52,500	28,500	52,200	43,700	101,100	47,700	88,200	87,000	77,600	46,500
4.....	97,100	122,600	52,800	23,000	57,100	43,800	97,600	57,400	89,900	90,300	94,500	52,300
5.....	91,600	131,200	50,900	21,500	61,100	45,000	100,500	63,400	97,200	90,300	101,600	56,300
6.....	96,000	131,000	51,000	21,600	78,100	45,000	101,000	64,300	108,400	94,000	99,000	61,800
7.....	87,800	133,200	49,100	24,000	67,700	44,200	101,500	68,300	114,700	100,500	96,400	74,000
8.....	79,900	134,100	50,100	28,000	64,400	42,200	100,400	65,700	120,400	115,000	92,000	72,900
9.....	110,300	132,500	49,400	30,300	59,900	40,700	101,500	66,000	130,000	104,400	95,800	72,300
10.....	110,500	133,800	46,900	32,400	52,600	38,200	99,500	70,400	140,900	85,000	92,400	74,300
11.....	107,100	134,100	45,700	34,700	52,500	42,800	90,500	72,400	153,000	75,100	84,200	74,900
12.....	110,300	133,400	45,400	36,800	51,200	44,900	85,500	75,900	167,700	67,800	80,500	58,600
13.....	105,900	130,900	44,300	37,900	53,100	42,900	83,100	77,600	182,600	66,900	73,500	52,400
14.....	115,900	126,900	40,600	37,800	55,000	43,700	83,600	87,300	194,900	74,900	68,400	52,300
15.....	100,700	119,600	42,900	38,700	52,500	42,400	80,900	90,100	200,100	73,900	63,300	57,700
16.....	98,400	114,500	42,800	38,900	56,500	46,700	83,000	92,200	200,900	76,500	53,200	60,300
17.....	96,600	104,100	42,900	38,900	52,300	54,200	81,800	96,500	198,800	78,200	51,100	65,300
18.....	100,500	92,500	42,700	38,900	43,000	70,100	80,100	102,400	195,000	80,500	50,800	66,900
19.....	99,600	85,500	42,400	39,300	37,700	76,400	75,900	98,700	189,800	74,300	48,000	69,200
20.....	99,500	77,000	42,000	40,900	33,400	83,900	65,000	97,400	183,800	60,000	44,900	70,900
21.....	99,000	68,700	43,600	43,400	31,500	86,200	64,200	94,500	178,000	56,500	43,600	78,500
22.....	98,200	70,000	50,500	44,400	33,600	91,600	59,700	94,000	171,400	57,800	41,600	89,700
23.....	106,700	65,500	53,600	44,400	42,500	91,900	55,600	92,900	162,800	58,700	38,900	87,800
24.....	114,100	62,100	58,100	45,200	41,900	96,500	55,600	90,900	150,200	59,100	40,300	86,800
25.....	116,600	57,500	57,000	46,200	45,300	96,500	55,000	89,900	134,300	57,700	39,500	89,000
26.....	114,800	53,300	58,300	49,000	42,900	93,900	55,000	91,200	118,500	47,800	37,800	90,600
27.....	115,300	54,000	64,300	49,200	42,000	94,900	53,000	90,300	101,200	44,600	35,800	96,500
28.....	101,200	55,400	65,600	50,700	42,000	94,500	49,100	88,000	90,200	45,800	32,400	100,900
29.....	94,500	55,100	63,600	52,400	.....	99,100	47,200	88,100	84,300	45,700	34,900	105,700
30.....	94,500	53,300	59,600	55,000	.....	104,000	47,700	87,000	76,300	45,300	38,200	113,000
31.....	97,800	.....	57,100	57,900	.....	103,300	.....	86,200	.....	49,800	40,000	.....

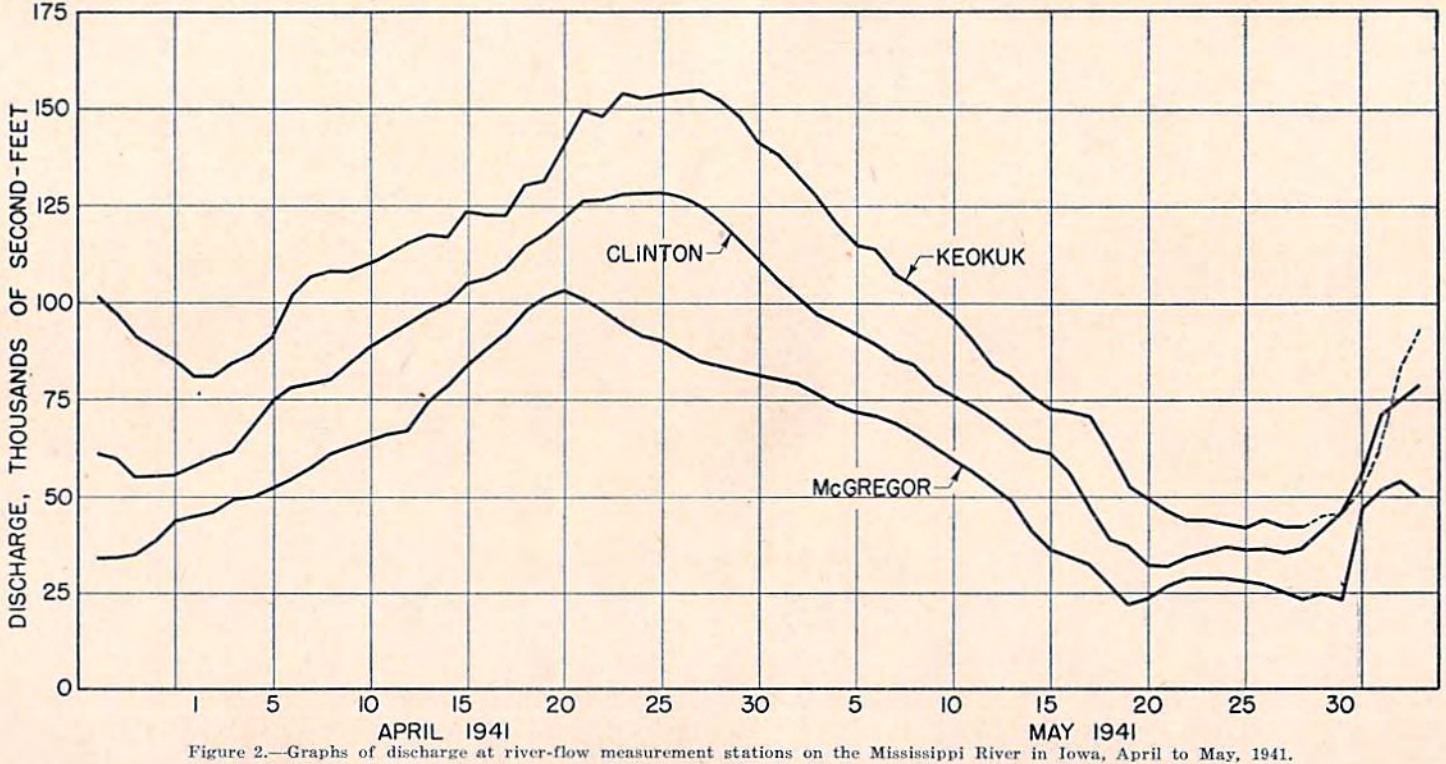


Figure 2.—Graphs of discharge at river-flow measurement stations on the Mississippi River in Iowa, April to May, 1941.

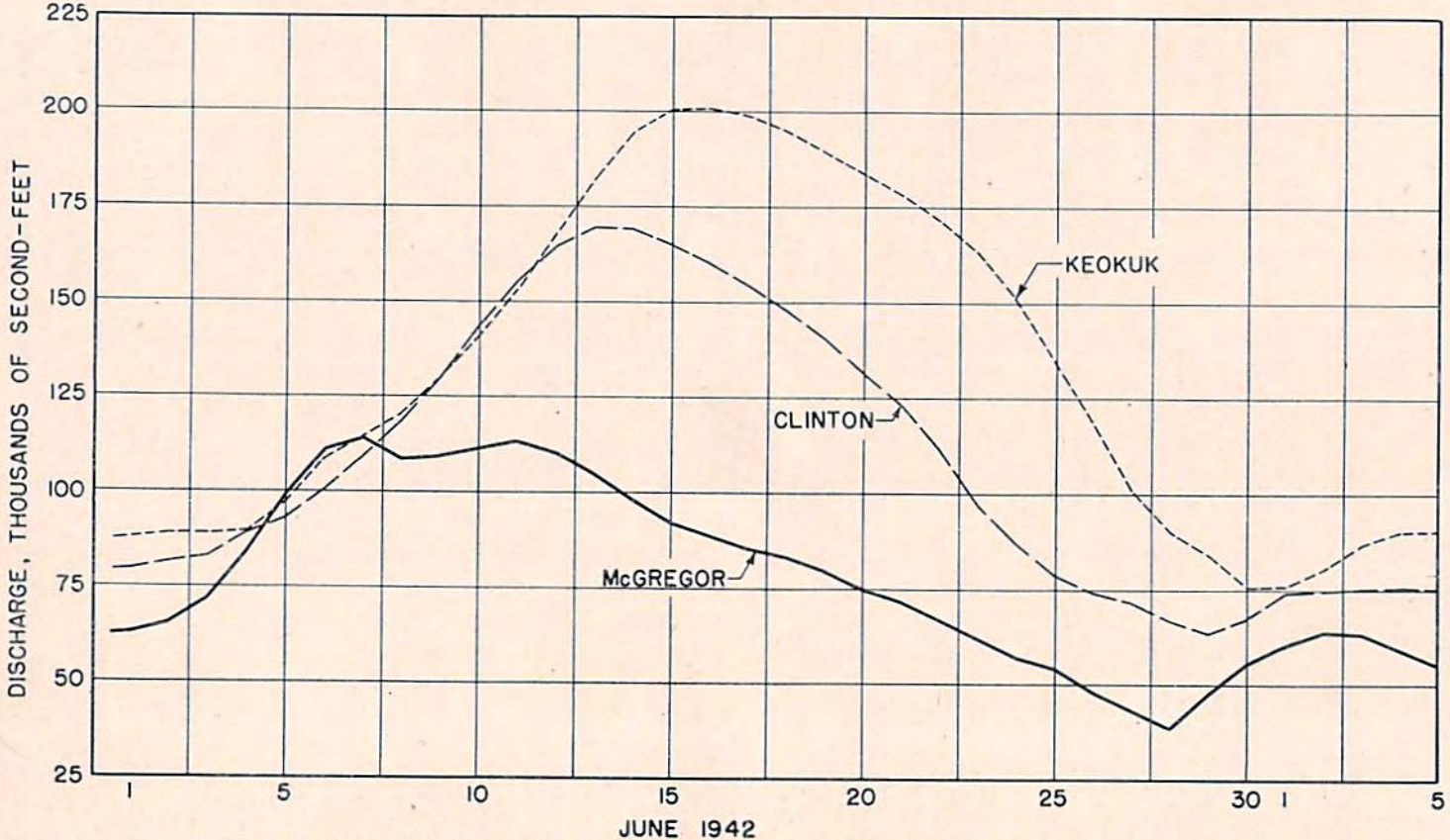


Figure 3.—Graphs of discharge at river-flow measureme nt stations on the Mississippi River in Iowa, June 1942.

Upper Iowa River near Decorah, Iowa

LOCATION.—Water-stage recorder, lat. 43°18'20", long. 91°44'50", in E½ sec. 14, T. 98 N., R 8 W., about 500 feet upstream from highway bridge in village of Freeport, 1.4 miles downstream from Trout Run, and 3 miles downstream from Decorah.

DRAINAGE AREA.—560 square miles.

RECORDS AVAILABLE.—August 1913 to November 1914, May 1919 to June 1927, October 1936 to September 1942. July 1933 to September 1936 at upper power plant of Interstate Power Co.; records equivalent.

AVERAGE DISCHARGE.—16 years (1919-26, 1933-42), 299 second-feet.

EXTREMES.—Maximum discharge during 1941-42 year, 12,500 second-feet June 30 (gage height, 11.09 feet); minimum, 75 second-feet Dec. 10 (gage height, 0.98 foot).

1913-14, 1919-27, 1933-41: Maximum discharge, 28,500 second-feet May 29, 1941 (gage height, 15.19 feet, from floodmarks), by slope-area method; minimum daily discharge, 10 second-feet (regulated) on numerous days during 1933-34.

REMARKS.—Records good except those for periods of ice effect or fragmentary gage-height record, which are fair.

COOPERATION.—Station operated through cooperation of Corps of Engineers, U. S. Army. Gage-height record obtained through cooperation of Iowa Institute of Hydraulic Research with Interstate Power Co., and recorder inspected by employee of Interstate Power Co.

NOTE.—Stage and discharge graph of the Upper Iowa River at Decorah and mass curve of precipitation at Conover, Iowa, during flood of May 1941 is shown in figure 4.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Discharge in second-feet				Run-off in Inches
		Maximum	Minimum	Mean	Per square mile	
October 1940	2,633	170	70	84.9	0.152	0.18
November	4,055	286	73	135	.241	.27
December	4,401	276	97	142	.254	.29
Calendar year 1940	53,806	2,830	34	147	.262	3.58
January 1941	5,536	387	125	179	.320	.37
February	3,634	280	101	130	.232	.24
March	29,817	2,570	106	962	1.72	1.98
April	22,862	2,200	382	762	1.36	1.52
May	20,536	7,380	163	662	1.18	1.36
June	22,091	1,690	327	736	1.31	1.46
July	6,168	331	140	199	.355	.41
August	3,271	134	83	106	.189	.22
September	3,852	523	79	128	.229	.26
Water year 1940–41	128,856	7,380	70	353	.630	8.55
October 1941	6,449	1,330	108	208	.371	.43
November	8,553	793	157	285	.509	.57
December	4,314	216	97	139	.248	.29
Calendar year 1941	137,083	7,380	79	376	.671	9.11
January 1942	4,426	296	85	143	.255	.29
February	4,368	272	115	156	.279	.29
March	25,121	2,890	126	810	1.45	1.67
April	9,837	589	216	328	.586	.65
May	11,226	640	219	362	.646	.75
June	34,746	8,920	252	1,158	2.07	2.31
July	19,256	2,020	280	621	1.11	1.28
August	31,336	5,460	284	1,011	1.81	2.08
September	20,747	3,450	284	692	1.24	1.38
Water year 1941–42	180,379	8,920	85	494	.882	11.99

Note—Stage-discharge relation affected by ice Nov. 14-19, Nov. 29 to Dec. 5, Dec. 13-16, 1940; Jan. 5-17, 29, 31, Feb. 9-11, 19-28, Dec. 11-15, 29-31, 1941; Jan. 1-18, Feb. 18-24, 1942.

Upper Iowa River near Decorah, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940–41												
1	77	90	135	245	132	106	879	462	1,620	331	132	81
2	79	81	125	387	132	111	744	441	1,280	284	121	79
3	77	77	120	292	126	1,470	702	416	917	268	116	81
4	79	79	120	179	121	*528	830	392	749	260	121	92
5	79	77	120	180	126	397	986	378	620	249	118	83
6	99	75	124	190	126	426	934	364	538	234	134	79
7	104	77	129	200	121	543	734	359	497	234	118	88
8	99	73	132	210	106	640	620	340	451	223	108	146
9	86	94	134	200	108	1,100	548	322	431	219	116	151
10	77	121	137	195	116	1,830	502	305	402	219	116	137
11	75	286	121	195	116	1,400	456	296	1,690	212	111	146
12	77	264	116	190	116	830	426	288	1,500	209	106	143
13	75	132	98	185	280	599	407	272	1,570	195	101	108
14	90	110	100	180	219	482	392	264	1,470	199	108	f 83
15	90	110	98	175	185	446	382	260	1,170	188	104	f 202
16	79	120	98	180	157	387	392	245	874	188	104	f 523
17	79	130	97	170	132	163	771	234	749	185	104	195
18	81	140	99	140	101	276	2,200	223	656	234	104	137
19	81	150	101	151	105	309	1,940	219	594	185	97	129
20	f75	151	106	148	115	934	1,360	209	528	173	92	124
21	75	*192	132	151	110	1,660	1,000	199	477	170	99	111
22	75	212	114	148	105	2,230	879	195	431	160	129	106
23	75	188	114	148	110	2,570	787	192	397	163	106	101
24	73	195	114	146	118	1,630	697	185	364	151	101	104
25	71	185	179	140	125	1,640	630	173	345	146	92	111
26	71	179	276	140	108	1,270	584	163	345	143	88	101
27	70	166	256	140	108	1,230	558	170	327	f 143	88	97
28	77	101	241	137	110	1,170	533	340	336	f 146	88	92
29	170	90	223	125	.....	1,250	507	3,620	327	154	83	90
30	124	110	219	129	.....	1,140	482	f7,380	436	163	83	132
31	94	.....	223	140	.....	1,050	.....	f 1,630	.....	140	83	.....
1941–42												
1	129	687	157	120	272	126	589	268	574	2,020	5,460	318
2	114	564	154	110	245	134	569	305	502	1,200	3,060	322
3	108	793	151	100	202	182	543	309	803	952	1,550	345
4	108	564	129	95	205	249	507	554	1,780	787	934	635
5	362	446	132	90	195	327	472	594	2,070	692	744	441
6	249	373	137	87	185	446	446	482	1,450	620	1,180	354
7	1,330	336	151	85	179	512	431	412	874	564	1,140	402
8	384	314	151	87	179	431	402	492	755	502	3,020	340
9	252	300	108	90	176	364	397	436	594	462	2,000	314
10	223	280	97	95	160	309	373	336	533	497	1,290	300
11	192	260	100	100	166	407	345	331	1,050	441	1,020	284
12	182	241	105	104	166	340	336	349	723	402	798	760
13	166	226	110	106	157	322	314	640	538	599	687	497
14	148	219	110	*109	154	309	300	564	462	927	697	961
15	166	216	120	112	157	340	288	412	412	1,240	656	523
16	146	209	129	115	126	1,330	276	340	378	963	564	416
17	137	202	134	120	121	2,860	264	300	349	728	492	359
18	137	195	137	123	117	1,630	252	292	345	528	451	3,450
19	134	199	140	126	115	1,260	249	284	327	472	426	1,860
20	166	199	137	129	116	1,270	238	264	309	528	392	1,300
21	154	192	137	132	118	1,910	234	256	296	477	368	890
22	146	188	154	140	120	2,090	226	245	272	382	349	723
23	148	179	166	146	120	1,110	219	230	264	340	318	713
24	137	160	195	160	120	934	219	223	252	318	300	656
25	134	170	216	182	121	836	216	219	264	300	284	635
26	132	182	205	205	126	841	219	300	276	300	704	604
27	143	179	163	230	121	992	223	364	264	292	614	599
28	134	163	129	272	129	1,140	226	431	2,070	288	574	614
29	140	157	120	292	.....	803	234	331	7,040	280	512	604
30	146	160	110	296	.....	682	230	309	8,920	402	407	528
31	202	.....	130	268	.....	635	.....	354	.....	753	345	.....

*Winter discharge measurement made on this day.
(f) Fragmentary gage-height record; discharge computed from partly estimated gage heights.

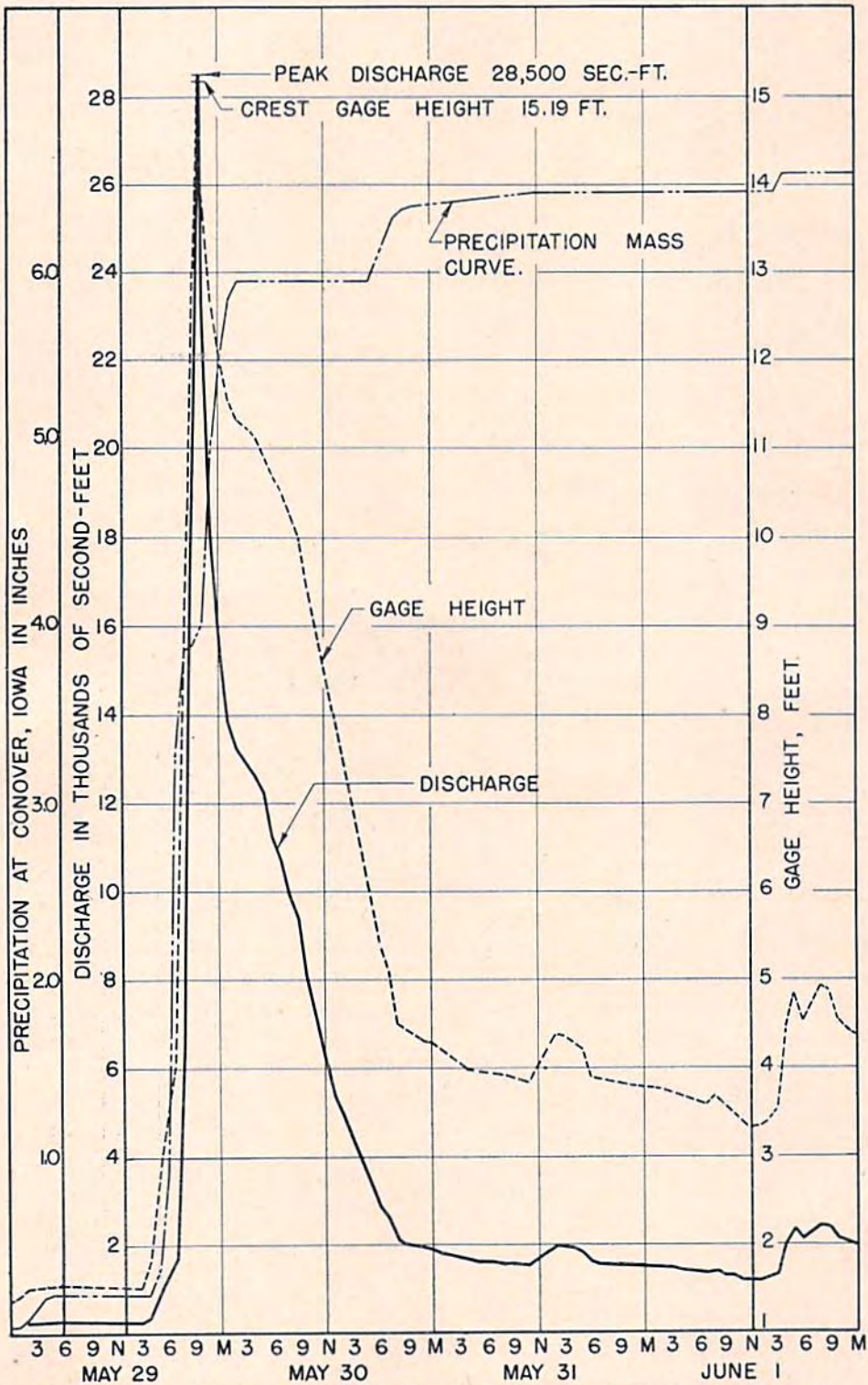


Figure 4.—Stage and discharge graph of the Upper Iowa River near Decorah and mass curve of precipitation at Conover, Iowa, during flood of May 1941.

Upper Iowa River near Decorah, Iowa—Continued

Table 3.—Gage height, in feet, and discharge, in second-feet, at indicated time, May 26—June 6, 1941

HOUR	Feet	Sec.-ft.	Feet	Sec.-ft.	Feet	Sec.-ft.	Feet	Sec.-ft.	Feet	Sec.-ft.	Feet	Sec.-ft.
	May 26		May 27		May 28		May 29		May 30		May 31	
1	.....	.....	.....	.....	4.20	1,810	1.41	188	11.50	14,800	4.16	1,780
2	.....	.....	.....	.....	3.84	1,520	1.50	219	11.30	14,000	4.10	1,730
3	.....	.....	.....	.....	2.40	640	1.52	226	11.22	13,800	4.02	1,670
4	.....	.....	.....	.....	2.13	502	1.52	226	11.12	13,500	3.96	1,620
5	.....	.....	.....	.....	1.93	402	1.53	230	10.95	12,800	3.92	1,590
6	.....	.....	.....	.....	1.80	340	1.53	230	10.68	11,900	3.92	1,590
7	.....	.....	.....	.....	1.70	296	1.53	230	10.50	11,300	3.91	1,580
8	.....	.....	.....	.....	1.64	272	1.52	226	10.21	10,400	3.90	1,570
9	.....	.....	.....	.....	1.60	256	1.52	226	10.00	9,800	3.88	1,550
10	.....	.....	.....	.....	1.57	245	1.52	226	9.40	8,120	3.85	1,530
11	.....	.....	.....	.....	1.55	238	1.52	226	8.95	7,020	3.80	1,490
N	*1.33	*163	*1.35	*170	1.54	234	1.51	223	8.42	5,950	4.00	1,650
1	.....	.....	.....	.....	1.52	226	1.51	223	7.90	5,280	4.20	1,810
2	.....	.....	.....	.....	1.49	216	1.50	219	7.51	4,850	4.35	1,930
3	.....	.....	.....	.....	1.48	212	1.50	219	6.98	4,310	4.31	1,900
4	.....	.....	.....	.....	1.47	209	1.80	340	6.50	3,830	4.26	1,860
5	.....	.....	.....	.....	1.46	205	2.70	798	5.98	3,350	4.18	1,790
6	.....	.....	.....	.....	1.44	199	3.50	1,280	5.38	2,810	3.86	1,540
7	.....	.....	.....	.....	1.41	188	4.00	1,650	5.10	2,560	3.84	1,520
8	.....	.....	.....	.....	1.40	185	8.50	6,080	4.48	2,030	3.83	1,510
9	.....	.....	.....	.....	1.40	185	13.00	20,000	4.40	1,970	3.81	1,500
10	.....	.....	.....	.....	1.38	179	14.00	23,900	4.35	1,930	3.79	1,480
11	.....	.....	.....	.....	1.36	173	12.65	18,800	4.28	1,870	3.78	1,480
M	.....	.....	.....	.....	1.37	176	12.00	16,500	4.24	1,840	3.77	1,470

	June 1		June 2		June 3		June 4		June 5		June 6	
2	3.74	1,450	4.06	1,700	.....	.....	.....	.....	.....	.....	.....	.....
4	3.67	1,400	3.80	1,490	.....	.....	.....	.....	.....	.....	.....	.....
6	3.59	1,340	3.64	1,380	.....	.....	.....	.....	.....	.....	.....	.....
8	3.65	1,380	3.53	1,300	3.00	963	.....	.....	.....	.....	.....	.....
10	3.45	1,240	3.45	1,240	.....	.....	.....	.....	.....	.....	.....	.....
N	3.30	1,140	3.39	1,200	.....	.....	*2.61	* 749	*2.36	*620	*2.20	*538
2	3.36	1,180	3.34	1,170	.....	.....	.....	.....	.....	.....	.....	.....
4	4.38	1,950	3.29	1,130	.....	.....	.....	.....	.....	.....	.....	.....
6	4.50	2,050	3.22	1,090	.....	.....	.....	.....	.....	.....	.....	.....
8	4.88	2,360	3.20	1,080	2.87	890	.....	.....	.....	.....	.....	.....
10	4.50	2,050	3.18	1,070	.....	.....	.....	.....	.....	.....	.....	.....
M	4.35	1,930	3.15	1,050	.....	.....	.....	.....	.....	.....	.....	.....

*Mean for the day.

Table 4.—Hourly precipitation in inches from recording gage at Conover, Iowa for period ending at indicated time, May 1941

Observer: Pearl E. Bradrick

HOURLY PRECIPITATION

MAY

CONOVER, IOWA

Lat. 43° 13′ Long. 91° 54′

Date	A. M.												P. M.												Daily Total Inches
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	
5	.....	.....	.03	.04	.01	.05	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.23	0.36
6	.05	.01	.22	.03	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.01	.....	.....	.01	.01	.01	.....	0.35
7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.05	.....	.....	.....	.....	.....	.....	.....	0.05
8	.....	.....	.....	.....	.....	.01	.01	.05	.03	.01	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.11
20	.....	.....	.....	.....	.10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.01	.....	.....	.....	.....	0.11
22	.....	.....	.....	.21	.24	.03	.01	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.49
26	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.03	.....	.....	.05	.03	.29	.18	.28	.06	.02	.04	0.98
27	.07	.04	.06	.02	.01	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.63	.27	.....	1.10
28	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.08	0.08
29	.04	.03	.07	.06	.02	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.14	.51	2.38	.60	.03	.12	.92	.57	5.49
30	.35	.09	.01	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.14	.14	.09	.04	.01	.....	.....	0.87
31	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.01	.07	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.08

Amounts are for hour ending as shown in column heading. Central Standard Time: Monthly Total: 10.07

NOTE.— Records obtained from Hydrologic Network of United States Weather Bureau. On May 29, 1941, Weather Bureau reports also show that 7.70 inches fell at Decorah, much of it between 2:00 and 11:00 p. m.; and at Waukon, 5.98 inches was measured.

Yellow River at Ion, Iowa

LOCATION.—Wire-weight gage, lat. 43°06'35", long. 91°15'45", in SE¼SW¼ sec. 24, T. 96 N., R. 4 W., at highway bridge at Ion, about 7½ miles northwest of McGregor and 8 miles upstream from mouth. Datum of gage is 664.65 feet above mean sea level, adjustment of 1912.

DRAINAGE AREA.—224 square miles.

RECORDS AVAILABLE.—October 1934 to September 1942.

AVERAGE DISCHARGE.—8 years, 109 second-feet.

EXTREMES.—Maximum discharge observed during 1941-42 year, 7,320 second-feet Aug. 1 (gage height, 12.00 feet); minimum, 29 second-feet (estimated) Jan. 7; minimum gage height observed, 3.80 feet Dec. 29.

1934-41: Maximum discharge, 18,500 second-feet May 29, 1941 (gage height, 15.2 feet, from floodmarks), by slope-area method; minimum observed, 14 second-feet Dec. 30, 31, 1939; minimum gage height observed, 2.64 feet Dec. 30, 1939.

REMARKS.—Records fair except those for May 29, 30, 1941, and those for periods of ice effect, which are poor. Gage read once daily, and more often during high stages.

COOPERATION.—Records collected in cooperation with Corps of Engineers, U. S. Army.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second foot-days	Discharge in second-feet				Run-off in Inches
		Maximum	Minimum	Mean	Per square mile	
October 1940	1,203	73	32	38.8	0.173	0.20
November	1,493	139	31	49.8	.222	.25
December	1,548	139	32	49.9	.223	.26
Calendar year 1940	27,387	2,220	18	74.8	.334	4.55
January 1941	2,390	199	43	77.1	.344	.40
February	1,884	327	33	67.3	.300	.31
March	10,288	1,500	36	332	1.48	1.71
April	6,849	1,520	122	228	1.02	1.14
May	13,398	6,730	87	432	1.93	2.22
June	13,046	1,960	160	435	1.94	2.17
July	3,229	237	71	104	.464	.54
August	1,826	71	51	58.9	.263	.30
September	1,723	81	49	57.4	.256	.29
Water year 1940–41	58,877	6,730	31	161	.719	9.79
October 1941	3,949	782	55	127	.567	.66
November	3,376	512	65	113	.504	.56
December	1,572	67	30	50.7	.226	.26
Calendar year 1941	63,530	6,730	30	174	.777	10.56
January	1,544	80	29	49.8	.222	.26
February	1,487	72	34	53.1	.237	.25
March	6,239	735	45	201	.897	1.04
April	2,666	152	58	88.9	.397	.44
May	2,037	107	52	65.7	.293	.34
June	8,125	2,830	52	271	1.21	1.35
July	4,923	512	79	159	.710	.82
August	9,568	3,930	81	309	1.38	1.59
September	4,931	856	65	164	.732	.82
Water year 1941–42	50,417	3,930	29	138	.616	8.39

Note—Stage-discharge relation affected by ice Nov. 15-18, Nov. 29 to Dec. 8, Dec. 14-24, 1940; Jan. 6-18, Jan. 25 to Feb. 12, Feb. 19 to Mar. 3, Dec. 11-19, 27-31, 1941; Jan. 1 to Feb. 11, Feb. 18 to March 4, 1942.

Yellow River at Ion, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940—41												
1	34	44	38	75	44	45	184	130	748	145	71	50
2	34	41	38	199	50	70	169	126	820	138	69	49
3	34	40	32	150	43	1,500	158	122	418	134	69	52
4	34	39	37	133	47	310	281	119	354	133	68	52
5	35	39	35	96	45	*153	231	116	290	123	68	64
6	36	38	38	98	42	256	186	122	251	125	67	58
7	39	38	40	100	37	259	174	122	239	122	66	58
8	37	37	43	96	33	362	162	116	221	112	65	67
9	34	39	46	86	35	290	155	114	202	112	65	67
10	34	45	48	75	35	427	148	109	197	111	65	64
11	32	52	46	74	40	144	142	106	1,160	102	64	64
12	32	139	45	72	50	105	138	105	1,060	101	60	61
13	32	52	32	71	327	104	132	104	1,060	100	58	59
14	40	48	33	70	274	94	130	102	862	92	58	59
15	46	45	40	68	136	92	126	101	702	92	58	64
16	43	45	45	65	98	94	122	100	495	90	58	76
17	40	47	40	60	93	36	226	95	383	90	57	81
18	40	48	40	52	40	66	1,520	93	339	237	58	64
19	38	48	40	54	45	77	413	93	287	101	56	54
20	38	*49	40	65	42	94	328	92	245	83	54	52
21	38	54	37	*71	40	1,390	248	95	228	82	54	51
22	38	72	37	71	40	1,200	211	95	216	81	53	50
23	38	62	37	63	40	897	197	98	197	81	53	49
24	38	58	40	59	43	450	178	88	174	80	52	49
25	37	56	43	60	45	432	167	87	169	79	52	51
26	37	54	139	60	42	239	158	87	163	78	52	53
27	37	55	101	58	40	221	148	93	176	77	52	51
28	37	31	83	52	38	245	145	428	163	111	51	51
29	50	38	81	44	.....	239	139	2,050	160	74	51	49
30	73	40	79	50	.....	193	133	6,730	167	72	51	54
31	48	.....	75	43	.....	204	.....	1,360	.....	71	51	.....
1941—42												
1	91	512	65	43	55	45	152	65	52	327	3,930	79
2	60	238	65	35	42	70	145	63	119	257	836	81
3	58	180	58	33	60	110	132	76	76	230	423	79
4	55	148	58	32	62	200	132	91	190	223	276	74
5	311	139	58	31	72	173	132	72	84	190	230	70
6	132	135	55	30	72	234	119	76	208	166	234	72
7	782	132	55	29	72	230	119	107	1,280	159	230	97
8	359	116	55	32	70	173	76	84	303	145	194	110
9	132	110	55	35	68	139	107	72	215	139	351	79
10	123	103	46	40	68	119	100	63	184	132	212	72
11	110	100	43	41	67	119	100	72	257	123	187	65
12	100	97	44	43	67	139	94	76	194	113	170	162
13	94	94	44	44	67	119	87	76	156	123	156	103
14	126	91	39	*45	63	107	81	65	170	512	148	856
15	94	87	42	45	63	107	87	63	123	187	261	135
16	81	87	45	45	*72	391	81	63	110	187	162	94
17	81	81	49	45	43	735	76	58	107	139	142	100
18	91	81	52	45	36	355	76	67	100	129	132	647
19	72	81	52	48	35	307	72	58	94	123	129	454
20	76	79	52	50	34	223	72	58	87	113	123	190
21	162	76	52	50	36	339	67	58	81	100	110	159
22	91	76	52	50	37	223	65	55	76	91	107	142
23	81	72	52	52	36	198	63	54	72	81	100	142
24	74	65	56	60	36	187	58	52	65	79	94	152
25	70	65	63	68	37	180	60	52	72	81	97	123
26	70	67	67	78	38	184	63	63	76	198	91	129
27	70	67	50	80	39	176	60	56	67	119	91	132
28	87	65	40	80	40	173	60	58	222	81	97	119
29	70	65	30	80	.....	166	63	55	2,830	81	87	107
30	70	67	35	80	.....	159	67	55	455	94	81	107
31	76	.....	43	75	.....	159	.....	54	.....	201	87	.....

*Winter discharge measurement made on this day.

Turkey River at Elkader, Iowa

LOCATION.—Wire-weight gage, lat. 42°51'15", long. 91°24'15", in sec. 23, T. 93 N., R. 5 W., in tailrace of Central States Power & Light Corporation's hydroelectric plant in Elkader. Datum of gage is 701.61 feet above mean sea level, datum of 1929.

DRAINAGE AREA.—892 square miles.

RECORDS AVAILABLE.—July 1933 to September 1942 (discontinued).

AVERAGE DISCHARGE.—9 years, 484 second-feet.

EXTREMES.—Maximum discharge observed during 1941-42 year, 9,200 second-feet June 30 (gage height, 13.0 feet); minimum daily, 96 second-feet Oct. 3.

1933-41: Maximum discharge observed, 19,300 second-feet, May 31, 1941 (head gage height, 29.1 feet); minimum daily, 21 second-feet Jan. 23, 26, 29, 31, 1940.

The flood of June 1916 reached a stage of 34.3 feet on head gage, from floodmark.

REMARKS.—Records poor. Flow regulated by power plant at gaging station. Gage read hourly.

COOPERATION.—Gage-height record obtained through cooperation of Iowa Institute of Hydraulic Research with Central States Power & Light Corporation.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second foot-days	Discharge in second-feet				Run-off in Inches
		Maximum	Minimum	Mean	Per square mile	
October 1940	6,683	520	153	216	0.242	0.28
November	11,482	1,020	161	383	.429	.48
December	13,132	1,330	127	424	.475	.55
Calendar year 1940	140,759	9,110	21	385	.432	5.87
January 1941	22,213	1,720	180	717	.804	.93
February	9,315	1,070	172	333	.373	.39
March	42,752	5,100	158	1,379	1.55	1.78
April	35,348	2,990	442	1,178	1.32	1.47
May	51,286	16,800	213	1,654	1.85	2.14
June	64,222	7,840	537	2,141	2.40	2.68
July	10,044	565	194	324	.363	.42
August	6,284	220	134	203	.228	.26
September	6,075	899	60	202	.226	.25
Water year 1940–41	278,836	16,800	60	764	.857	11.63
October 1941	9,674	1,830	96	312	.350	.40
November	14,002	1,850	197	467	.524	.58
December	6,650	474	123	215	.241	.28
Calendar year 1941	277,865	16,800	60	761	.853	11.58
January 1942	6,470	360	100	209	.234	.27
February	5,948	330	129	212	.238	.25
March	34,846	3,870	184	1,124	1.26	1.45
April	12,008	719	226	400	.448	.50
May	11,083	604	185	358	.401	.46
June	36,048	7,200	269	1,202	1.35	1.50
July	40,649	3,480	578	1,311	1.47	1.69
August	45,301	7,820	385	1,461	1.64	1.89
September	30,544	3,950	449	1,018	1.14	1.27
Water year 1941–42	253,223	7,820	96	694	.778	10.54

Note—Stage-discharge relation affected by ice Dec. 10-13, 30, 31, 1941; Jan. 1 to Feb. 1, Feb. 20-22, 1942. No tailrace gage readings available June 30 to July 15, 1942; discharge computed on basis of rating for head gage above power dam.

Turkey River at Elkader, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940–41												
1	197	261	425	866	180	361	1,170	442	d7,840	565	205	141
2	191	207	425	1,620	180	361	1,070	425	4,620	442	187	153
3	188	202	127	1,720	180	2,580	1,150	368	3,120	444	200	148
4	197	203	340	1,210	180	1,460	1,950	361	2,180	415	180	141
5	200	180	272	730	180	1,220	2,260	403	1,750	415	182	173
6	197	166	285	611	185	1,020	1,880	392	1,470	415	220	149
7	222	161	296	1,020	177	990	1,470	458	1,290	415	220	155
8	214	180	261	1,370	172	990	1,130	398	1,110	528	220	352
9	207	178	285	1,300	172	1,040	1,030	306	1,060	361	220	305
10	193	229	273	1,100	176	1,390	969	347	990	361	194	253
11	195	604	279	921	180	1,530	905	315	d3,940	361	220	215
12	188	1,020	267	962	180	1,230	905	290	d7,590	345	212	176
13	192	702	173	824	1,070	990	854	297	d5,690	353	212	200
14	203	338	187	824	965	584	802	282	d3,840	314	220	148
15	211	240	236	824	465	415	747	299	2,800	284	220	188
16	188	279	238	824	415	454	747	288	2,070	258	220	899
17	173	311	231	824	356	355	732	244	1,690	258	220	497
18	179	334	232	747	301	158	2,990	243	1,450	339	220	203
19	184	386	249	400	361	204	2,470	262	1,230	338	220	c180
20	176	415	244	361	361	1,290	2,020	235	1,070	290	220	c160
21	153	415	255	361	361	5,100	1,680	240	990	279	220	c150
22	172	731	249	361	361	4,640	1,230	453	933	250	220	c145
23	188	747	255	334	361	3,520	952	293	902	244	220	c140
24	176	704	279	282	361	2,490	824	219	824	232	220	c140
25	178	554	365	311	361	1,790	757	213	824	227	220	c200
26	170	446	1,170	311	361	1,360	675	273	762	235	188	174
27	206	389	1,330	311	361	1,110	548	3,900	544	194	172	70
28	180	288	1,110	311	352	1,030	537	d11,200	537	235	145	60
29	501	292	990	213	.....	990	442	3,310	537	217	166	60
30	520	320	980	180	.....	1,000	452	d7,730	569	217	167	100
31	344	.....	824	180	.....	1,100	.....	d16,800	.....	213	134	.....
1941–42												
1	131	1,850	198	140	330	184	719	368	385	3,320	6,420	519
2	102	1,540	198	120	310	222	647	333	798	1,880	7,820	474
3	96	940	217	115	311	239	522	347	1,970	1,360	4,320	664
4	99	885	211	110	278	449	517	361	2,510	1,200	2,150	732
5	179	802	205	110	300	435	554	361	1,340	998	1,300	606
6	377	705	201	105	300	513	537	418	1,620	850	1,310	490
7	1,830	560	197	100	289	607	537	570	2,220	765	1,130	484
8	1,070	474	191	105	263	735	495	604	983	710	1,080	604
9	537	459	182	105	249	692	474	583	663	678	2,150	605
10	395	415	150	105	240	616	486	532	573	683	2,080	479
11	201	415	130	105	218	603	384	447	754	882	1,400	449
12	345	278	150	110	224	650	361	478	1,300	711	1,070	589
13	218	332	180	*110	213	576	353	595	968	884	878	736
14	432	338	168	200	207	537	415	499	691	3,460	863	1,530
15	213	320	202	200	202	492	415	482	603	3,470	948	1,690
16	211	326	187	180	245	850	381	374	603	3,480	824	965
17	225	279	189	200	171	3,200	361	274	556	1,800	780	679
18	203	290	195	220	148	3,870	281	284	481	1,440	673	1,240
19	192	279	191	240	132	3,010	311	355	415	1,400	673	3,950
20	287	302	195	250	130	2,250	299	272	415	1,200	623	2,820
21	295	273	183	240	140	2,470	311	242	415	887	603	1,640
22	217	226	195	230	150	2,780	311	206	372	814	603	1,100
23	210	220	242	290	154	2,200	311	236	269	685	603	901
24	207	205	349	320	158	965	284	194	281	612	603	1,170
25	202	197	460	350	129	760	276	194	281	620	480	986
26	185	242	474	360	153	647	264	194	311	748	385	841
27	185	225	418	350	155	955	226	185	311	661	709	875
28	192	220	179	350	149	990	311	240	290	603	805	1,020
29	175	204	123	350	.....	904	311	250	6,470	578	747	963
30	144	201	140	350	.....	747	354	264	7,200	1,210	707	743
31	319	.....	150	350	.....	698	.....	341	.....	2,060	564	.....

*Winter discharge measurement made on this day.

(c) Backwater from coffer dam; discharge computed on basis of records for station at Garber.

(d) Tailrace gage-height record doubtful; discharge computed on basis of rating for head gage.

Turkey River at Garber, Iowa

LOCATION.—Water-stage recorder, lat. 42°44'25", long. 91°15'45", in sec. 36, T. 92 N., R. 4 W., at highway bridge at Garber, 800 feet upstream from Wayman Creek, 2,000 feet downstream from Elk Creek, and one mile from Volga River. Datum of gage is 635.34 feet above mean sea level, adjustment of 1912.

DRAINAGE AREA.—1,530 square miles.

RECORDS AVAILABLE.—August 1913 to November 1916, May 1919 to September 1927, November 1932 to September 1942 in reports of U. S. Geological Survey. August 1913 to November 1916, May 1919 to September 1927, April 1929 to September 1930 in report of Iowa State Planning Board entitled "Stream Flow Records of Iowa, 1873-1932."

AVERAGE DISCHARGE.—21 years (1913-16, 1919-27, 1929-30, 1933-42), 812 second-feet.

EXTREMES.—Maximum discharge during 1941-42 year, 12,000 second-feet June 30 (gage height, 17.45 feet); minimum, 225 second-feet Dec. 11 (gage height, 4.43 feet).

Maximum discharge during 1940-41 year, 22,100 second-feet June 12 (gage height, 23.27 feet), from rating curve extended above 15,000 second-feet on basis of measurement near Millville, 14 miles below, at peak of flood of July 27, 1940; minimum discharge recorded, 165 second-feet Mar. 17 (gage height, 4.27 feet).

1913-16, 1919-27, 1929-30, 1932-40: Maximum discharge observed, 26,600 second-feet Feb. 23, 1922 (gage height, 28.06 feet, from floodmarks), from rating curve extended above 11,000 second-feet; minimum observed, 46 second-feet June 29, 1934.

REMARKS.—Records good except those for periods of ice effect, and those computed from wire-weight gage readings, which are poor to fair. Slight diurnal fluctuation caused by hydroelectric plant at Elkader.

COOPERATION.—Some measurements and services from Army Engineers.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second foot-days	Discharge in second-feet				Run-off in Inches
		Maximum	Minimum	Mean	Per square mile	
October 1940	11,592	1,160	269	374	0.244	0.28
November	20,040	2,150	280	668	.437	.49
December	20,595	1,600	300	664	.434	.50
Calendar year 1940	235,462	20,800	49	643	.420	5.73
January 1941	29,800	2,700	350	961	.628	.72
February	17,433	2,350	280	623	.407	.42
March	70,520	9,680	276	2,275	1.49	1.71
April	55,690	4,160	738	1,856	1.21	1.35
May	53,150	13,000	327	1,715	1.12	1.29
June	83,148	14,200	863	2,772	1.81	2.02
July	16,460	1,040	314	531	.347	.40
August	8,054	385	198	260	.170	.20
September	16,708	2,610	204	557	.364	.41
Water year 1940–41	403,190	14,200	198	1,105	.722	9.79
October 1941	23,141	3,130	347	746	.488	.56
November	28,468	4,730	478	949	.620	.69
December	12,206	600	274	394	.258	.30
Calendar year 1941	414,778	14,200	198	1,136	.742	10.07
January 1942	13,590	720	230	438	.286	.33
February	11,570	600	250	413	.270	.28
March	44,475	3,750	400	1,435	.938	1.08
April	20,256	1,190	457	675	.441	.49
May	19,610	2,070	445	633	.414	.48
June	59,734	10,600	554	1,991	1.30	1.45
July	54,996	5,360	793	1,774	1.16	1.34
August	53,156	8,110	527	1,715	1.12	1.29
September	41,881	4,400	622	1,396	.912	1.02
Water year 1941–42	383,083	10,600	230	1,050	.686	9.31

Turkey River at Garber, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940-41												
1	305	470	710	1,150	370	560	1,770	748	10,700	1,040	318	210
2	305	406	700	2,290	400	600	1,750	721	4,430	830	331	204
3	301	355	550	2,700	350	4,580	2,240	688	3,440	775	346	213
4	309	331	600	1,450	300	2,400	4,160	636	2,520	727	322	240
5	331	327	620	1,200	320	1,790	3,720	612	1,960	682	288	223
6	327	301	600	1,200	320	1,400	3,000	636	1,650	688	288	217
7	380	280	550	1,300	300	1,320	2,430	647	1,430	682	269	827
8	350	280	545	1,600	280	1,280	1,960	636	1,280	790	273	2,610
9	346	301	540	1,500	290	1,430	1,770	599	1,170	630	346	1,200
10	322	355	500	1,350	300	1,750	1,690	574	1,180	612	280	764
11	314	768	500	1,200	300	1,630	1,610	536	2,630	587	233	562
12	305	2,150	450	1,200	550	1,260	f1,540	509	14,200	555	230	458
13	297	1,210	350	1,000	2,350	1,170	f1,390	489	7,830	516	198	396
14	318	610	300	950	2,310	906	f1,250	482	5,250	495	217	369
15	341	530	400	950	1,170	858	1,190	452	3,560	489	217	355
16	346	600	450	950	820	785	1,120	495	2,720	464	207	f 1,880
17	309	650	400	950	618	276	1,090	422	2,170	446	240	1,210
18	301	650	400	800	600	446	3,200	396	1,850	587	230	815
19	288	659	400	500	580	699	3,740	385	1,580	647	230	458
20	288	677	410	500	600	2,340	2,920	380	1,370	440	233	411
21	288	764	400	550	550	8,370	2,350	380	1,240	401	385	318
22	276	1,180	400	550	535	9,680	1,700	406	1,140	355	262	301
23	276	1,260	430	*490	540	7,310	1,420	630	1,100	355	236	276
24	284	1,000	500	450	550	4,040	1,210	364	920	350	223	273
25	273	854	650	480	540	2,940	1,090	350	940	322	309	400
26	269	754	1,550	470	540	2,320	1,010	327	925	314	236	390
27	269	636	1,600	490	550	1,860	940	3,410	930	341	230	254
28	273	580	1,470	450	500	1,740	882	11,200	863	360	223	258
29	1,120	502	1,310	400	.....	1,580	810	5,260	1,020	322	220	247
30	1,160	600	1,200	350	.....	1,560	738	6,780	1,150	336	217	369
31	721	.....	1,110	380	.....	1,640	.....	13,000	.....	322	217	.....
1941-42												
1	408	4,730	487	350	600	400	1,190	500	863	4,590	5,890	631
2	392	3,610	483	350	540	505	1,190	478	1,050	2,690	8,110	627
3	373	1,740	470	320	500	644	1,160	445	4,940	1,820	5,460	661
4	347	1,270	461	300	480	699	973	505	5,880	1,530	2,850	747
5	428	1,100	466	270	500	743	914	545	2,630	1,270	1,940	670
6	1,040	1,030	436	240	500	758	867	581	2,460	1,100	1,650	622
7	3,130	1,010	432	230	500	851	828	687	3,970	1,070	1,580	657
8	2,310	896	424	240	480	941	793	743	1,980	954	1,710	687
9	1,080	816	420	250	460	888	758	674	1,460	892	2,940	1,250
10	851	758	343	260	450	808	731	699	1,200	950	2,670	731
11	695	723	274	270	450	797	711	649	1,350	1,010	1,810	703
12	586	687	300	280	450	801	678	691	2,140	901	1,270	687
13	640	622	330	*290	450	766	657	816	1,810	1,200	1,070	758
14	905	657	350	310	470	735	631	747	1,260	3,670	982	3,040
15	707	640	350	330	*490	739	631	711	1,020	5,220	1,160	2,280
16	577	631	340	350	520	1,160	618	666	896	5,360	941	1,480
17	522	591	330	400	400	2,950	595	595	832	2,880	905	1,030
18	595	577	330	450	300	3,750	536	609	789	1,930	843	1,080
19	509	591	330	500	260	3,150	522	613	754	1,700	793	4,400
20	518	622	330	550	250	2,420	518	595	876	1,700	754	3,880
21	695	618	320	530	260	2,650	509	550	747	1,220	723	2,640
22	678	581	340	520	300	3,010	492	492	682	1,060	727	1,970
23	653	536	400	550	320	2,310	492	478	600	941	657	1,590
24	604	509	500	600	330	1,710	478	474	554	851	618	1,480
25	563	478	600	650	300	1,410	461	461	595	804	595	1,440
26	527	492	550	700	320	1,300	457	466	622	1,130	527	1,370
27	536	487	500	720	340	1,800	461	466	609	892	635	1,300
28	522	492	400	700	350	1,760	470	518	595	820	1,070	1,240
29	509	487	300	690	.....	1,600	461	532	5,970	793	820	1,170
30	492	487	290	690	.....	1,270	474	554	10,600	948	774	1,060
31	749	.....	320	690	.....	1,150	.....	2,070	.....	3,100	682	.....

Note—Stage-discharge relation affected by ice Nov. 14-18, Nov. 30 to Dec. 27, 1940; Jan. 5 to Feb. 13, Feb. 18 to Mar. 2, Dec. 12-31, 1941; Jan. 1 to Mar. 1, 1942. Discharge computed on basis of wire-weight gage readings Nov. 12, 13, 28, 29, 1940; Apr. 15-18, Apr. 21 to May 10, June 4-11, 19-29, July 16, 17, July 20 to Aug. 19, 1941.

*Winter discharge measurement made on this day.

(f) Computed on basis of partly estimated gage-height record.

Turkey River at Garber, Iowa—Continued

Table 5.—Gage height, in feet, and discharge, in second-feet, at indicated time, May 26—June 18, 1941

HOUR	Feet	Sec.-ft.	Feet	Sec.-ft.	Feet	Sec.-ft.	Feet	Sec.-ft.	Feet	Sec.-ft.	Feet	Sec.-ft.
	May 25		May 27		May 28		May 29		May 30		May 31	
2	.....	.....	4.76	364	9.12	3,100	14.06	7,680	8.76	2,850	15.19	9,020
4	4.62	301	5.11	574	9.51	3,400	13.81	7,400	9.45	3,350	15.49	9,380
6	.....	.....	5.83	954	15.41	9,280	13.59	7,160	10.81	4,480	16.10	10,200
8	.....	.....	8.81	2,890	17.28	11,800	13.12	6,670	12.75	6,300	16.88	11,200
10	.....	.....	11.71	5,290	18.49	13,700	12.36	5,910	13.58	7,150	17.62	12,300
N	4.69	331	12.22	5,770	19.50	15,300	11.50	5,100	14.74	8,480	18.27	13,300
2	.....	.....	12.05	5,600	19.93	16,000	10.66	4,340	14.73	8,470	18.82	14,200
4	.....	.....	11.67	5,250	19.90	16,000	10.00	3,790	14.72	8,450	19.38	15,100
6	.....	.....	11.28	4,900	19.58	15,400	9.55	3,430	14.75	8,490	19.77	15,800
8	4.70	336	10.82	4,490	18.56	13,800	9.23	3,180	15.00	8,790	20.00	16,200
10	.....	.....	10.08	3,850	16.44	10,600	8.99	3,010	14.90	8,670	20.04	16,200
M	.....	.....	9.46	3,360	14.77	8,510	8.80	2,880	15.10	8,910	19.94	16,100

	June 1		June 2		June 3		June 4		June 5		June 6	
2	19.78	15,800	11.48	5,080	10.51	4,210	.....	.....	.....	.....	.....	.....
4	19.51	15,300	11.37	4,980	10.26	4,000	.....	.....	.....	.....	.....	.....
6	19.15	14,800	11.07	4,710	9.98	3,770	.....	.....	.....	.....	.....	.....
8	18.64	13,900	10.84	4,510	9.74	3,580	.....	.....	.....	.....	.....	.....
10	17.83	12,700	10.72	4,400	9.57	3,450	.....	.....	.....	.....	.....	.....
N	16.82	11,200	10.64	4,330	9.44	3,340	.....	*2,520	.....	*1,960	.....	*1,650
2	15.43	9,310	10.47	4,170	9.33	3,250	.....	.....	.....	.....	.....	.....
4	13.96	7,570	10.33	4,050	9.22	3,170	.....	.....	.....	.....	.....	.....
6	12.77	6,320	10.30	4,030	9.12	3,100	.....	.....	.....	.....	.....	.....
8	12.02	5,570	10.48	4,180	9.03	3,040	.....	.....	.....	.....	.....	.....
10	11.57	5,160	10.64	4,330	8.93	2,970	.....	.....	.....	.....	.....	.....
M	11.33	4,950	10.66	4,340	8.81	2,890	.....	.....	.....	.....	.....	.....

	June 7		June 8		June 9		June 10		June 11		June 12	
2	.....	.....	.....	.....	.....	.....	.....	.....	6.69	1,420	16.74	11,000
4	.....	.....	.....	.....	.....	.....	.....	.....	7.00	1,600	17.93	12,800
6	.....	.....	.....	.....	.....	.....	.....	.....	7.38	1,830	19.18	14,800
8	.....	.....	.....	.....	.....	.....	.....	.....	7.81	2,090	22.71	21,000
10	.....	.....	.....	.....	.....	.....	.....	.....	8.12	2,400	23.20	21,900
N	.....	*1,430	.....	*1,280	.....	*1,170	.....	*1,180	8.35	2,560	22.96	21,500
2	.....	.....	.....	.....	.....	.....	.....	.....	8.58	2,730	21.70	19,100
4	.....	.....	.....	.....	.....	.....	.....	.....	8.81	2,890	19.26	14,900
6	.....	.....	.....	.....	.....	.....	.....	.....	9.00	3,020	16.12	10,200
8	.....	.....	.....	.....	.....	.....	.....	.....	9.13	3,110	14.26	7,900
10	.....	.....	.....	.....	.....	.....	.....	.....	9.35	3,270	14.00	7,610
M	.....	.....	.....	.....	.....	.....	.....	.....	15.56	9,460	14.81	8,560

	June 13		June 14		June 15		June 16		June 17		June 18	
2	15.21	9,040	12.93	6,480	10.38	4,090	8.97	.....	8.14	.....	7.58	.....
4	15.22	9,050	12.57	6,120	10.23	3,970	8.88	.....	8.08	.....	7.54	.....
6	15.00	8,790	12.25	5,800	10.10	3,870	8.79	.....	8.02	.....	7.50	.....
8	14.69	8,420	12.02	5,570	9.97	3,770	8.70	.....	7.97	.....	7.46	.....
10	14.31	7,960	11.82	5,390	9.84	3,660	8.64	.....	7.93	.....	7.42	.....
N	13.93	7,530	11.64	5,230	9.72	3,570	8.56	*2,720	7.89	*2,170	7.38	*1,850
2	13.70	7,280	11.43	5,040	9.59	3,460	8.50	.....	7.83	.....	7.36	.....
4	13.65	7,220	11.22	4,850	9.47	3,370	8.43	.....	7.70	.....	7.32	.....
6	13.66	7,240	11.02	4,670	9.36	3,280	8.38	.....	7.75	.....	7.30	.....
8	13.56	7,130	10.85	4,520	9.25	3,200	8.31	.....	7.71	.....	7.27	.....
10	13.44	6,990	10.67	4,350	9.15	3,120	8.25	.....	7.67	.....	7.25	.....
M	13.23	6,780	10.51	4,210	9.06	3,060	8.19	.....	7.63	.....	7.20	.....

* Mean for the day.
a Daily discharge computed from once daily wire-weight gage readings.

Table 6.—Hourly precipitation in inches from recording gage at Monona and Strawberry Point, Iowa, for period ending at indicated time, May—June 1941

Observer: Otto J. Welter
Gage furnished by Soil Conservation Service

HOURLY PRECIPITATION

MONONA, IOWA

Lat. 43° 03′ Long. 91° 22′

MAY

Date	A. M.												P. M.												Daily Total Inches
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	
5																									
6	.10	.08																.05	.05	.01					0.11
7	.02													.01	.04				.10					.02	0.30
8							.02	.04	.06	.02													.01		0.08
20																									0.14
22					.77	.11	.02	.01	.01	.01	.01						.01		.02	.07					0.10
26																									0.94
27	.20	.18	.08	.01																.09	.12	.12	.60	.22	1.15
28	2.99	.01	.01	.01	.01	.01																	.86	.76	2.09
29	.01	.01																						.11	3.15
30	.27	.02	.09				No Re	cord 7:	20A.M	., May	30 to 6	:45 A.	M.,May	31		.08	.70	.70	.15	.85	.11				2.61
31												.03													

JUNE

6																									
7	.11	.05		.01	.01																	.01		.01	0.02
8																									0.18
9	.03	.01	.01		.01	.01	.03	.01	.01	.01														.01	0.01
10																									0.13
11	.16	.18	.44	.26	.04		.09																	.10	0.10
12			.01											.02	.01	.21	.31	.01	1.14	.29	.27			.09	2.96
14																			.09	.14					0.80
26																			.04	.06	.04	.02	.02	.02	0.20
27		.01	.01										.01	.02	.36										0.39
28																									0.02
29										.06	.21	.01			.03	.11	.01								0.15
																							.07		0.35

Central Standard Time

Monthly Total: 5.31

Table 6.—Hourly precipitation in inches from recording gage at Monona and Strawberry Point, Iowa, for period ending at indicated time, May-June 1941—Continued

Observer: J. H Klingbeil

HOURLY PRECIPITATION

STRAWBERRY POINT, IOWA

Lat. 42° 41′ Long. 91° 31′

MAY

Date	A. M.												P. M.												Daily Total Inches
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	
5																	.18	.07	.01						0.26
6	.06		.01																.04	.01				.30	0.12
14																		.08	.14	.01					0.30
20																									0.23
22						.19	.07	.06											.03						0.32
26																									0.03
29					.31					.01								.17	.25	.11					0.31
30		.04																							0.58
																									Monthly Total 2.15

JUNE

6																								.01	0.01
7	.01	.02																							0.03
8																								.05	0.05
9					.06	.10	.18	.21	.09	.04	.02														0.07
10																								.11	0.11
11	.08		.09	.09		.15	.03	.02	.02				.02	.04	.03	.01	.08	.10	.50	.92	.01	.05	.08	.01	2.23
12												.05	.02	.01	.01			.01	.04						0.15
13																									0.09
14																				.01	.02	.04			0.07
26															.66										0.66
27			.05	.01																					0.06
28															.06										0.06
29										.85	.14		.01		.01										1.01
30																									
31																									
																									Monthly Total: 5.23

Amounts are for hour ending as shown in column heading. Central Standard Time

NOTE.—Records obtained from Hydrologic Network of United States Weather Bureau.

Little Maquoketa River near Durango, Iowa

LOCATION.—Water-stage recorder, lat. 42°33'20", long. 90°44'40", in NE¼ sec. 5, T. 89 N., R. 2 E., at bridge on county road, 500 feet southwest of U. S. Highway 52, 1½ miles east of Durango, 5 miles northwest of Dubuque, and 7.5 miles upstream from mouth. Datum of gage is 612.03 feet above mean sea level, datum of 1929.

DRAINAGE AREA.—130 square miles.

RECORDS AVAILABLE.—October 1934 to September 1942.

AVERAGE DISCHARGE.—8 years, 66.9 second-feet.

EXTREMES.—Maximum discharge during 1941-42 year, 3,640 second-feet June 29 (gage height, 11.59 feet); minimum, 18 second-feet Sept. 3, 4 (gage height, 2.86 feet).

1934-41: Maximum discharge, 14,800 second-feet June 21, 1937 (gage height, 20.75 feet from floodmarks), from rating curve extended above 5,000 second-feet on basis of velocity-area and slope-area studies; minimum observed, 5 second-feet July 12, 13, 1936; minimum gage height observed, 2.64 feet Dec. 10, 1937.

REMARKS.—Records good except those for Aug. 30, 31, Sept. 1, 2, 8, 1941, which are poor, and those for period of ice effect, which are fair.

COOPERATION.—Records collected in cooperation with Corps of Engineers, U. S. Army.

NOTE.—On plate 2-A is shown a photograph of the gaging-station structure near Durango.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Discharge in second-feet				Run-off in Inches
		Maximum	Minimum	Mean	Per square mile	
October 1940	1,186	460	17	38.3	0.295	0.34
November	961	48	24	32.0	.246	.27
December	1,613	163	24	52.0	.400	.46
Calendar year 1940	17,880	1,990	8	48.9	.376	5.12
January 1941	1,758	204	31	56.7	.436	.50
February	1,692	619	24	60.4	.465	.48
March	5,631	1,110	24	182	1.40	1.61
April	2,904	226	51	96.8	.745	.83
May	1,121	51	24	36.2	.278	.32
June	1,697	262	21	56.6	.435	.49
July	631	49	13	20.4	.157	.18
August	493	83	11	15.9	.122	.14
September	2,202	804	10	73.4	.565	.63
Water year 1940–41	21,889	1,110	10	60.0	.462	6.25
October 1941	2,576	349	46	83.1	.639	.74
November	2,717	685	39	90.6	.697	.78
December	1,260	77	29	40.6	.312	.36
Calendar year 1941	24,682	1,110	10	67.6	.520	7.06
January 1942	1,487	70	26	48.0	.369	.43
February	1,338	60	39	47.8	.368	.38
March	2,066	112	46	66.6	.512	.59
April	1,418	94	31	47.3	.364	.41
May	1,755	217	32	56.6	.435	.50
June	3,235	725	36	108	.831	.93
July	1,615	152	28	52.1	.401	.46
August	1,020	106	19	32.9	.253	.29
September	1,245	222	18	41.5	.319	.36
Water year 1941–42	21,732	725	18	59.5	.458	6.23

Note—Stage-discharge relation affected by ice Dec. 29, 1941 to Feb. 21, 1942.

Little Maquoketa River near Durango, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940-41												
1	17	32	29	142	37	24	104	50	31	34	16	f 13
2	17	31	27	204	36	28	91	49	30	26	12	f 11
3	17	30	24	112	35	321	175	45	28	24	12	h 11
4	17	29	26	80	30	69	226	43	26	23	12	h 12
5	17	28	29	92	30	55	151	41	24	20	12	h 10
6	20	26	30	73	29	54	126	45	22	20	11	h 11
7	23	24	33	67	25	43	111	51	22	21	11	h 12
8	19	24	29	62	28	49	99	44	21	22	11	g804
9	17	24	30	55	27	53	91	40	38	20	11	h151
10	17	32	36	49	24	72	92	38	50	42	11	h104
11	18	48	29	49	25	41	84	36	191	49	11	h 61
12	18	44	28	47	106	37	77	34	262	24	12	h 43
13	17	35	24	45	619	44	73	32	90	18	11	h 31
14	20	32	24	42	140	43	68	35	87	18	11	h 28
15	24	28	28	41	74	43	63	36	72	16	12	h 27
16	21	27	95	41	54	44	69	36	54	16	12	h 35
17	18	30	55	44	50	37	83	32	44	16	12	h 27
18	17	29	46	40	43	31	212	30	37	21	13	h 25
19	17	30	45	36	32	46	123	29	32	18	13	h 24
20	17	31	52	34	28	860	124	27	30	16	12	h 23
21	17	38	53	35	27	1,110	95	27	31	15	83	h 21
22	17	48	54	47	27	1,110	84	50	65	16	40	h 20
23	17	36	56	47	27	376	76	49	34	18	19	h 19
24	17	34	76	36	30	236	68	30	27	16	16	h 19
25	17	31	163	36	32	153	64	28	24	15	13	24
26	17	33	121	35	28	118	61	26	23	14	12	22
27	17	34	94	34	25	117	58	25	87	13	12	19
28	f 153	28	84	31	24	114	54	24	78	13	h 18	22
29	f 460	33	74	34	.....	101	51	24	76	13	h 17	22
30	50	32	55	32	.....	97	51	27	61	17	f 14	551
31	36	.....	64	36	.....	105	.....	38	.....	17	f 11	.....
1941-42												
1	73	685	41	30	56	46	56	37	70	67	106	19
2	50	191	41	26	54	55	55	37	97	55	60	19
3	50	143	40	31	53	61	52	43	552	55	37	19
4	46	120	41	35	52	61	50	36	240	51	30	18
5	182	118	43	35	54	64	50	32	114	51	28	19
6	74	108	37	35	55	65	65	58	f 90	49	28	19
7	137	95	36	34	54	55	60	54	84	39	38	222
8	73	87	41	34	52	51	51	40	76	38	38	52
9	65	77	34	35	50	72	49	67	65	39	34	50
10	64	73	30	37	48	54	49	77	64	67	23	40
11	52	67	32	40	50	54	46	72	99	44	27	29
12	47	64	31	42	47	51	45	108	94	37	24	34
13	46	63	35	43	45	52	45	69	64	59	24	30
14	230	64	29	44	45	58	44	59	58	130	26	76
15	65	60	35	*45	45	99	43	51	49	152	36	35
16	54	55	37	46	60	112	40	51	46	74	26	31
17	51	54	38	46	54	88	40	47	44	52	24	30
18	77	52	38	50	50	77	38	52	f 43	44	23	38
19	65	52	36	54	*43	77	37	45	f 43	77	22	118
20	59	58	34	59	40	88	35	40	f 61	45	22	40
21	56	49	32	60	42	72	35	39	68	38	22	32
22	85	47	41	60	44	h 70	35	38	45	34	97	31
23	77	46	61	64	43	h 64	34	36	38	32	40	32
24	64	39	77	68	41	63	31	34	36	31	22	32
25	59	41	55	70	41	61	31	32	46	30	20	27
26	63	43	61	65	40	74	32	95	52	29	20	36
27	83	43	54	62	39	74	92	50	41	28	22	37
28	64	41	41	60	41	65	94	52	39	31	32	28
29	58	41	38	60	.....	64	45	46	725	55	28	27
30	58	41	36	60	.....	60	39	41	92	43	22	25
31	349	.....	35	57	.....	59	.....	217	.....	39	19	.....

*Winter discharge measurement made on this day.
(f) Computed on basis of partly estimated gage-height record.
(g) Computed from graph based on gage readings.
(h) Computed from wire-weight gage readings.

Maquoketa River near Manchester, Iowa

LOCATION.—Water-stage recorder and concrete control, lat. 42°27'20", long. 91°25'50", in sec. 9, T. 88 N., R. 5 W., 2 miles southeast of Manchester and 5 miles downstream from Honey and Prairie Creeks. Datum of gage is 895.06 feet above mean sea level, adjustment of 1912.

DRAINAGE AREA.—306 square miles.

RECORDS AVAILABLE.—April 1933 to September 1942.

AVERAGE DISCHARGE.—9 years, 160 second-feet.

EXTREMES.—Maximum discharge during 1941-42 year, 6,140 second-feet Nov. 1 (gage height, 12.40 feet); minimum, 28 second-feet (regulated) May 2, 4 (gage height, 4.31 feet); minimum daily discharge, 78 second-feet May 2.

1933-41: Maximum discharge, 8,880 second-feet Sept. 8, 1941 (gage height, 14.65 feet); minimum daily discharge, 6 second-feet June 8, 29, 1934.

REMARKS.—Records good except those for periods of no gage-height record, which are fair, and those for periods of ice effect, which are poor. Large diurnal fluctuations caused by operation of power plant 2 miles above station.

COOPERATION.—Gage-height record obtained through cooperation of Iowa Institute of Hydraulic Research with Iowa Electric Co. which also furnished supplementary gage-height readings at hydroelectric plant 2 miles above gaging station.

NOTE.—On plate 4-B is shown a photograph of the artificial control for gaging station near Manchester.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Discharge in second-feet				Run-off in Inches
		Maximum	Minimum	Mean	Per square mile	
October 1940	3,046	334	58	98.3	0.321	0.37
November	5,789	564	62	193	.631	.70
December	6,389	807	100	206	.673	.78
Calendar year 1940	44,815	1,590	22	122	.399	5.44
January 1941	6,095	1,140	86	197	.644	.74
February	3,464	454	73	124	.405	.42
March	11,795	2,190	60	380	1.24	1.43
April	15,552	3,890	125	518	1.69	1.89
May	*3,446	437	54	111	.363	.42
June	4,599	444	68	153	.500	.56
July	2,468	222	47	79.6	.260	.30
August	2,124	220	36	68.5	.224	.26
September	18,092	5,610	57	603	1.97	2.20
Water year 1940-41	82,859	5,610	36	227	.742	10.07
October 1941	15,937	3,040	240	514	1.68	1.94
November	15,450	4,390	187	515	1.68	1.88
December	5,949	431	105	192	.627	.72
Calendar year 1941	104,971	5,610	36	288	.941	12.76
January 1942	6,928	453	90	223	.729	.84
February	4,264	296	107	152	.497	.52
March	8,571	699	118	276	.902	1.04
April	4,459	338	88	149	.487	.54
May	4,689	856	78	151	.493	.57
June	22,988	4,060	154	766	2.50	2.79
July	15,056	2,050	115	486	1.59	1.83
August	6,856	670	79	221	.722	.83
September	11,908	2,200	112	397	1.30	1.45
Water year 1941-42	123,055	4,390	78	337	1.10	14.95

Maquoketa River near Manchester, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940–41												
1	76	153	133	398	100	87	383	132	205	222	36	57
2	88	127	132	1,140	112	83	404	123	169	130	50	61
3	79	111	100	746	82	195	1,980	119	110	107	61	58
4	90	102	136	448	95	440	3,890	95	110	83	46	64
5	100	118	130	232	96	264	1,230	109	78	83	44	59
6	84	100	134	222	91	143	675	136	77	74	54	62
7	84	88	127	159	78	146	532	124	86	83	60	120
8	76	86	142	142	76	143	456	110	68	88	61	5,610
9	69	108	118	102	76	154	406	108	113	96	60	3,730
10	93	118	180	165	85	137	353	84	139	82	50	1,200
11	95	346	156	138	91	142	356	90	150	78	59	564
12	100	512	124	146	103	92	311	103	357	70	45	382
13	58	327	126	116	454	76	284	113	444	56	42	233
14	71	186	106	114	424	84	238	94	302	74	44	170
15	70	143	110	120	254	126	214	90	200	72	42	249
16	80	62	132	142	141	72	216	92	144	68	46	1,100
17	82	144	132	116	96	60	214	99	120	65	46	1,620
18	110	170	124	88	80	93	720	80	114	104	48	500
19	80	158	129	113	90	124	516	82	117	93	43	347
20	62	187	147	111	92	637	406	82	97	66	46	232
21	73	276	135	138	90	1,680	276	110	86	74	220	214
22	77	564	136	108	112	2,190	270	109	76	75	219	182
23	77	337	140	96	98	2,000	186	86	88	62	80	174
24	62	251	209	100	86	695	168	98	90	58	64	158
25	76	223	422	100	94	389	162	70	81	52	93	151
26	74	178	807	103	102	319	168	54	74	62	164	151
27	58	171	606	96	93	255	148	66	86	50	58	126
28	70	125	406	100	73	210	138	68	133	70	68	143
29	310	156	349	86	.....	240	127	86	294	72	68	137
30	334	162	292	115	.....	245	125	197	391	52	52	238
31	188	.....	269	95	.....	274	.....	437	.....	47	55	.....
1941–42												
1	288	4,390	200	90	296	118	320	103	1,030	378	440	144
2	276	2,240	136	95	210	123	338	78	1,210	176	670	130
3	246	698	197	100	185	123	252	100	3,170	178	500	157
4	240	560	200	90	190	142	230	106	4,060	139	280	124
5	368	498	215	115	178	152	204	104	1,320	115	243	136
6	584	612	187	120	149	168	160	124	1,270	248	236	112
7	3,040	534	163	125	150	166	193	130	841	230	202	160
8	1,920	453	165	130	185	180	175	118	574	181	202	147
9	662	344	147	120	175	152	167	132	417	183	366	465
10	572	314	105	130	174	158	135	120	338	417	314	629
11	490	255	136	140	151	165	139	170	1,080	411	202	321
12	326	262	137	*135	157	176	110	201	2,320	204	202	218
13	306	284	149	150	135	162	160	174	812	296	127	190
14	540	282	144	200	140	174	130	152	522	2,050	138	2,200
15	567	265	142	220	137	173	132	156	404	1,750	146	1,440
16	339	259	150	230	181	404	116	118	232	1,300	122	476
17	280	248	158	222	119	699	117	107	260	596	119	352
18	331	224	170	240	166	581	122	180	236	388	112	296
19	306	242	162	234	139	456	92	177	185	259	87	572
20	310	274	164	236	124	394	130	153	228	335	95	706
21	339	290	154	276	125	555	112	128	322	312	79	380
22	352	268	175	208	126	472	105	114	188	177	96	278
23	498	232	287	289	116	328	98	119	198	184	92	262
24	442	212	431	381	108	254	106	88	154	181	93	296
25	332	187	400	453	111	246	121	99	193	166	132	290
26	316	190	268	407	112	298	88	110	204	436	124	282
27	388	195	246	389	107	412	108	112	192	408	160	346
28	335	192	206	362	118	381	98	116	188	387	352	321
29	318	220	164	354	.....	240	95	120	382	1,570	514	256
30	306	226	192	328	.....	245	106	124	458	856	250	222
31	320	.....	199	359	.....	274	.....	856	.....	545	161	.....

Note—No gage-height record Nov. 12-16, 1940; Jan. 5-9, Oct. 16-22, Oct. 27 to Nov. 4, 1941; July 31 to Aug. 24, 1942; discharge based on record at hydroelectric plant 2 miles above station. Stage-discharge relation affected by ice Feb. 17-21, 1941; Jan. 1-5, 1942.

*Winter discharge measurement made on this day.

Maquoketa River near Maquoketa, Iowa

LOCATION.—Water-stage recorder, lat. 42°05'10", long. 90°38'20", in SW¼ NE¼ sec. 17, T. 84 N., R. 3 E., at Bridgeport Bridge, 1,200 feet upstream from Mill Creek, 2 miles downstream from North Fork, and 3 miles northeast of Maquoketa. Datum of gage is 636.52 feet above mean sea level, adjustment of 1912.

DRAINAGE AREA.—1,550 square miles.

RECORDS AVAILABLE.—September 1913 to September 1942.

AVERAGE DISCHARGE.—29 years, 921 second-feet.

EXTREMES.—Maximum discharge during 1941-42 year, 7,060 second-feet Aug. 2 (gage height, 11.94 feet); minimum, 163 second-feet (regulated) Jan. 2 (gage height, 1.36 feet); minimum daily, 420 second-feet Jan. 3.

Maximum discharge during 1940-41 year, 25,600 second-feet Sept. 9 (gage height, 22.08 feet); minimum, 151 second-feet (regulated) Nov. 13 (gage height, 1.26 feet).

1913-40: Maximum discharge, 27,500 second-feet Mar. 6, 1937; maximum gage height, 22.18 feet Feb. 21, 1937 (affected by ice); minimum discharge, 39 second-feet (regulated) Sept. 15, 1931 (gage height 0.81 foot); minimum daily, about 105 second-feet Feb. 11-20, 1936.

REMARKS.—Records good except those for periods of ice effect or fragmentary gage-height record, which are fair to poor. Diurnal fluctuation caused by power plant 4 miles above station.

COOPERATION.—Results of some discharge measurements and part of observer's services furnished by Corps of Engineers, U. S. Army and Mississippi River Power Co.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Discharge in second-feet				Run-off in Inches
		Maximum	Minimum	Mean	Per square mile	
October 1940	14,623	1,720	264	472	0.305	0.35
November	17,969	946	352	599	.386	.43
December	20,104	1,220	345	649	.419	.48
Calendar year 1940	225,704	8,760	130	617	.398	5.40
January 1941	21,661	1,520	485	699	.451	.52
February	22,337	3,010	354	798	.515	.54
March	55,281	10,500	420	1,783	1.15	1.33
April	58,558	5,850	778	1,952	1.26	1.40
May	28,205	6,580	528	910	.587	.68
June	58,839	10,700	672	1,961	1.27	1.41
July	22,726	1,630	378	733	.473	.55
August	14,668	810	318	473	.305	.35
September	90,874	22,400	509	3,029	1.95	2.18
Water year 1940–41	425,845	22,400	264	1,167	.753	10.22
October 1941	56,100	3,790	1,380	1,810	1.17	1.35
November	51,920	6,240	898	1,731	1.12	1.25
December	27,268	1,290	504	880	.568	.65
Calendar year 1941	508,437	22,400	318	1,393	.899	12.21
January 1942	28,290	1,890	420	913	.589	.68
February	22,722	1,250	470	812	.524	.55
March	30,599	1,430	724	987	.637	.73
April	21,073	950	468	702	.453	.51
May	21,816	1,170	538	704	.454	.52
June	70,764	6,260	822	2,359	1.52	1.70
July	42,229	3,650	751	1,362	.879	1.01
August	45,070	5,390	620	1,454	.938	1.08
September	38,696	4,380	560	1,290	.832	.93
Water year 1941–42	456,547	6,260	420	1,251	.807	10.96

Note—Stage-discharge relation affected by ice Dec. 1-4, 1940; Jan. 4-10, Feb. 18-25, Mar. 16, 17, 1941; Jan. 2-29, Feb. 18-22, 1942.

Maquoketa River near Maquoketa, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct	Nov	Dec	Jan	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940–41												
1	396	912	440	952	516	551	928	790	f6,150	1,630	493	682
2	402	640	430	1,070	520	498	1,030	746	2,570	1,310	502	510
3	404	493	380	1,520	560	958	1,920	720	f1,470	1,130	438	647
4	398	566	360	1,100	504	1,790	4,460	721	f1,100	870	524	776
5	402	462	345	850	501	904	5,620	716	f 967	738	514	509
6	450	444	522	850	469	954	3,980	692	f854	760	386	513
7	451	448	568	750	480	832	2,370	889	f759	671	318	791
8	388	402	536	650	438	785	1,950	730	f672	670	348	f10,300
9	393	488	496	700	354	708	1,720	647	f977	660	432	22,400
10	394	447	498	750	415	714	1,590	606	f1,000	689	346	18,400
11	395	622	506	710	452	604	1,560	541	f4,680	696	494	7,430
12	405	419	526	740	488	602	1,430	588	10,700	816	498	2,770
13	370	352	486	784	2,090	592	1,370	560	3,310	632	418	2,210
14	436	*663	470	631	3,010	649	1,240	551	3,700	592	323	1,820
15	374	725	470	618	*1,440	616	1,180	686	3,070	596	f389	1,640
16	348	602	852	632	1,060	500	1,020	1,640	2,160	591	f401	1,540
17	370	671	574	616	872	460	966	918	1,670	590	386	1,530
18	382	664	558	532	500	420	5,850	788	1,480	860	477	2,480
19	375	623	618	584	480	690	3,480	713	1,180	844	494	1,630
20	346	623	614	550	1,200	3,600	2,680	684	1,160	652	402	1,420
21	358	747	658	503	850	*10,500	2,130	634	719	564	478	1,280
22	350	629	604	621	800	8,100	1,700	696	778	1,040	728	1,140
23	404	690	658	642	750	5,500	1,440	780	935	984	810	990
24	264	946	642	644	650	3,670	1,280	755	994	674	586	864
25	392	898	765	596	850	2,190	1,130	704	852	506	589	921
26	368	738	1,090	531	714	1,660	1,070	611	794	526	528	879
27	382	683	1,100	485	630	1,440	984	f528	742	501	444	822
28	524	482	1,220	516	744	1,350	910	f538	786	590	446	823
29	1,720	416	f1,120	556	.....	1,240	792	f553	1,170	468	462	827
30	1,190	474	f968	492	.....	1,210	778	900	1,440	498	436	2,330
31	792	.....	1,030	486	.....	994	.....	f6,580	.....	378	578	.....
1941–42												
1	2,420	4,180	926	950	1,250	724	950	618	822	1,530	1,930	905
2	1,540	5,340	862	480	1,080	807	739	616	1,450	1,250	4,690	1,230
3	1,420	6,240	924	420	894	812	771	644	3,250	1,260	5,390	868
4	1,410	2,610	917	460	1,100	816	f910	682	6,260	1,070	2,490	642
5	1,500	1,950	919	520	1,030	812	906	565	5,980	976	1,700	576
6	1,720	1,920	922	600	1,040	803	856	749	5,290	1,020	1,430	560
7	1,970	1,800	830	650	952	782	885	760	4,220	1,150	1,350	916
8	2,650	1,590	874	670	950	866	918	725	4,130	948	2,160	1,230
9	3,790	1,450	826	700	875	838	834	652	2,310	776	2,780	1,120
10	2,260	1,530	742	680	768	800	830	748	2,010	760	2,320	1,070
11	1,900	1,650	f623	660	842	792	810	722	2,070	789	1,500	1,060
12	1,680	1,470	f504	650	852	800	748	796	4,210	1,030	1,330	1,070
13	1,540	1,470	750	660	804	826	726	1,170	4,620	1,020	1,080	1,020
14	2,090	1,330	712	680	783	788	822	1,100	2,390	f1,880	1,070	992
15	2,080	1,280	673	700	795	830	644	944	1,710	f3,550	1,070	1,310
16	1,620	1,250	802	720	792	833	669	732	1,550	3,650	1,050	2,680
17	1,460	1,220	844	*740	855	1,040	548	668	1,440	2,650	924	1,920
18	1,440	1,200	900	750	600	1,430	590	740	1,280	1,810	877	1,320
19	1,550	1,160	844	760	470	1,380	514	724	1,220	1,540	766	4,380
20	1,630	1,150	811	800	*560	1,310	536	646	2,210	1,440	656	2,510
21	1,380	1,120	804	850	660	1,310	537	596	1,390	1,230	658	1,610
22	1,430	1,060	816	900	740	1,320	468	607	1,330	1,070	648	1,310
23	2,150	1,060	843	1,000	634	1,250	580	592	1,060	1,010	646	1,320
24	1,900	1,050	1,130	1,100	646	1,160	548	598	954	880	728	1,190
25	1,670	1,000	1,290	1,300	695	1,140	592	538	a950	845	755	1,110
26	1,610	1,020	1,260	1,640	670	1,110	548	774	954	801	620	1,040
27	1,620	976	1,230	1,700	686	1,040	629	642	954	773	622	968
28	1,860	976	1,130	1,830	699	1,060	622	627	1,400	751	851	956
29	1,760	898	992	1,890	.....	1,030	702	577	1,080	1,100	1,060	944
30	1,530	970	716	1,450	.....	1,060	642	676	2,270	1,730	972	869
31	1,520	.....	852	1,380	.....	1,030	.....	588	.....	1,940	947	.....

*Winter discharge measurement made on this day.
(a) No gage-height record; discharge interpolated.
(f) Fragmentary gage-height record; discharge computed from partly estimated gage heights.

Maquoketa River near Manchester, Iowa—Continued

Table 7.—Gage height, in feet, and discharge, in second-feet, at indicated time, September 7-12, 1941

HOUR	Feet	Sec.-ft.	Feet	Sec.-ft.	Feet	Sec.-ft.	Feet	Sec.-ft.	Feet	Sec.-ft.	Feet	Sec.-ft.
	Sept 7		Sept 8		Sept 9		Sept 10		Sept 11		Sept 12	
1	5.22	191	5.76	421	12.15	5,840	7.83	1,860	6.29	734	5.79	438
2	5.26	204	6.33	758	11.91	5,560	7.72	1,780	6.25	710	5.78	432
3	5.27	207	7.02	1,240	11.74	5,370	7.62	1,700	6.22	692	5.78	432
4	5.27	207	7.68	1,740	11.58	5,200	7.54	1,630	6.20	680	5.77	426
5	5.27	207	8.60	2,420	11.41	5,010	7.41	1,540	6.17	662	5.77	426
6	5.26	204	10.10	3,680	11.25	4,840	7.32	1,470	6.12	632	5.75	416
7	5.21	187	11.44	5,040	11.06	4,630	7.24	1,410	6.10	620	5.74	410
8	5.05	139	12.14	5,830	10.84	4,400	7.14	1,330	6.08	608	5.74	410
9	4.89	98	12.36	6,090	10.64	4,200	7.06	1,270	6.05	590	5.71	394
10	4.80	79	12.32	6,040	10.46	4,020	7.00	1,220	6 02	572	5.69	383
11	4.73	68	12.52	6,280	10.29	3,950	6.93	1,160	6.00	560	5.67	373
N	4.65	56	12.87	6,700	10.08	3,660	6.84	1,100	5.98	548	5.66	368
1	4.57	47	13.20	7,100	9.86	3,460	6.80	1,070	5.96	536	5.65	363
2	4.48	39	13.41	7,350	9.60	3,230	6.74	1,030	5.95	531	5.64	358
3	4.40	33	13.86	7,890	9.40	3,050	6.69	993	5.92	513	5.63	353
4	4.33	29	13.96	8,010	9.20	2,880	6.64	958	5.90	501	5.63	353
5	4.26	25	14.19	8,290	9.00	2,720	6.59	923	5.88	489	5.62	348
6	4.22	23	14.45	8,620	8.82	2,590	6.55	895	5.87	484	5.61	343
7	4.33	29	14.52	8,710	8.65	2,460	6.50	860	5.85	472	5.61	343
8	4.58	48	14.19	8,290	8.49	2,330	6.46	836	5.84	466	5.61	343
9	4.55	45	13.72	7,720	8.34	2,230	6.41	806	5.82	455	5.61	343
10	5.23	194	13.18	7,080	8.20	2,130	6.37	782	5.81	449	5.60	338
11	5.47	281	12.76	6,570	8.05	2 020	6.34	764	5.80	443	5.59	334
M	5.54	311	12.42	6,160	7.93	1,930	6.31	746	5.79	438	5.49	289

Maquoketa River near Maquoketa, Iowa—Continued

Gage height, in feet, and discharge, in second-feet, at indicated time, September 7-12, 1941

HOUR	Feet	Sec.-ft.	Feet	Sec.-ft.	Feet	Sec.-ft.	Feet	Sec.-ft.	Feet	Sec.-ft.	Feet	Sec.-ft.
	Sept. 7		Sept. 8		Sept. 9		Sept. 10		Sept. 11		Sept. 12	
1	2.96	829	11.71	6,840	18.06	14,600	21.92	25,000	16.76	12,600	7.88	3,780
2	2.55	646	12.20	7,300	18.38	15,100	21.81	24,500	16.56	12,300	7.99	3,780
3	2.15	470	12.63	7,720	18.78	15,800	21.70	24,100	16.34	11,900	7.87	3,700
4	1.89	357	13.04	8,130	19.20	16,600	21.56	23,500	16.08	11,600	7.55	3,490
5	1.77	309	13.40	8,490	19.75	17,800	21.38	22,900	15.86	11,300	7.24	3,280
6	1.70	282	13.76	8,850	20.24	19,200	21.16	22,000	15.53	10,900	7.09	3,190
7	1.67	272	13.99	9,100	20.68	20,500	20.93	21,300	15.18	10,400	6.93	3,090
8	1.64	261	14.19	9,320	21.10	21,800	20.66	20,500	14.80	9,990	6.71	2,940
9	1.61	250	14.58	9,750	21.44	23,100	20.40	19,700	14.55	9,720	6.11	2,570
10	1.59	244	14.78	9,970	21.66	23,900	20.16	19,000	13.48	8,570	5.52	2,210
11	1.73	293	14.98	10,200	21.80	24,500	19.88	18,200	12.63	7,720	5.18	2,010
N	2.38	571	15.22	10,400	21.88	24,800	19.63	17,500	11.52	6,670	5.10	1,960
1	2.64	686	15.45	10,600	21.98	25,200	19.44	17,100	10.86	6,050	5.25	2,050
2	2.65	690	15.66	11,100	22.06	25,500	19.18	16,600	10.27	5,520	5.71	2,320
3	2.55	646	15.77	11,200	22.08	25,600	18.97	16,100	9.85	5,160	6.08	2,560
4	2.42	589	16.08	11,600	22.06	25,500	18.76	15,700	9.54	4,910	6.24	2,650
5	2.31	540	16.29	11,900	22.03	25,400	18.54	15,400	9.07	4,550	6.29	2,680
6	2.25	514	16.50	12,200	22.05	25,500	18.28	15,000	8.20	3,930	6.30	2,690
7	2.22	501	16.71	12,500	22.08	25,600	18.08	14,600	7.34	3,360	6.29	2,680
8	2.54	642	16.92	12,800	22.06	25,500	17.86	14,300	6.83	3,030	6.25	2,660
9	3.06	875	17.13	13,100	22.05	25,500	17.63	13,900	6.65	2,920	6.22	2,640
10	4.05	1,380	17.34	13,400	22.04	25,500	17.41	13,500	6.88	3,070	6.17	2,610
11	7.72	3,600	17.55	13,800	22.02	25,400	17.18	13,200	7.21	3,280	6.15	2,600
M	11.16	6,330	17.75	14,100	21.98	25,200	16.98	12,900	7.59	3,520	6.50	2,820

Table 8.—Hourly and daily precipitation in inches during September 1942 at selected stations in the Maquoketa River Basin

HOURLY PRECIPITATION

Observer: J. H. Klingbeil

SEPTEMBER

STRAWBERRY POINT, IOWA

Lat. 42° 41′ Long. 91°31′

Date	A. M.												P. M.												Daily Total Inches
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	
2																								.37	0.37
3	.05	.01	.02							.52							.07								0.67
4																	.05	.04							0.09
7																		.99	.21	.35	.40	.18	.12	.07	2.32
8	.63	.52	.19	.18	.13	.06	.10	.11						.02	.51		.02								2.47
9					.01		.04	.03	.02	.06	.05	.07	.01	.01											0.30
13																		.08							0.08
14																							.37	.14	0.51
15	.05		.01	.01	.02	.02	.02		.01	.02	.06											.03	.67	.35	1.27
16	.04	.01		.01	.01																				0.07
24																								.04	0.04
25	.01	.04	.01	.01	.01																				0.08
28	.12	.08		.02	.01	.01	.02																		0.26
29																			.05	.05	.05	.14	.11	.13	0.53
30	.18	.20	.08	.02	.04	.01	.02	.02																	0.57

Central Standard Time: Monthly Total: 9.63

Observer: Carl J. Neiers
Gage furnished by SCS.

CASCADE, IOWA

Lat. 42° 18′ Long. 91° 00′

2																						.04	.04	.04	0.12
3	.05	.02	.01								.36	.03		.01											0.48
4																		.55	.01			.01		.01	0.58
7																			.05	1.17	.07	1.11	.34	.08	2.82
8	.08	.13	1.11	.96	.42	.24	.35	.05	.06	.03		.01	.01	.03		.77			.03	.04	.16	.06	.02	.01	4.57
9	.01		.01	.06		.01		.02	.04	.02	.02	.02	.08	.02					.01						0.32
13															.06	.15	.01		.02						0.24
15	.06	.03			.01	.06			.01	.01	.03	.01	.01										.05	.26	0.54
16	.02	.03																							0.05
24																								.16	0.16
25	.06	.07	.03	.02																					0.18
28	.01	.06	.06	.04	.01	.04	.01																		0.23
29																			.03	.05	.16	.02	.01	.03	0.30
30	.17	.50	.33	.09	.03	.02	.01		.01																1.16

Amounts are for hour ending as shown in column heading. Central Standard Time: Monthly Total: 11.75

NOTE.—Records obtained from Hydrologic Network of United States Weather Bureau.

Wapsipinicon River at Independence, Iowa

LOCATION.—Water-stage recorder and concrete control, lat. 42°27'50", long. 91°53'50", in sec. 4, T. 88 N., R. 9 W., at 6th Street in Independence, 1,800 feet downstream from Interstate Power Co.'s hydroelectric plant, 4¾ miles downstream from Otter Creek, and 9½ miles upstream from Pine Creek. Datum of gage is 882.85 feet above mean sea level, datum of 1929. Prior to May 25, 1941, staff gage in tailrace of hydroelectric plant 1,800 feet upstream. Datum of gage was 802.85 feet above mean sea level, datum of 1929.

DRAINAGE AREA.—1,060 square miles.

RECORDS AVAILABLE.—July 1933 to September 1942.

AVERAGE DISCHARGE.—9 years, 445 second-feet.

EXTREMES.—Maximum discharge during 1941-42 year, 9,060 second-feet June 12 (gage height, 13.46 feet), from rating curve extended above 5,300 second-feet; minimum, about 9 second-feet many times when power plant was shut down; minimum daily, 151 second-feet Mar. 1.

1933-41: Maximum discharge, 7,900 second-feet Mar. 8, 1937 (gage height, 93.2 feet, site and datum then in use); minimum, about 7 second-feet many times in period 1933-34.

REMARKS.—Records good, except those below 20 second-feet and those prior to May 25, 1941, which are fair. Diurnal fluctuation during low water caused by power plant above station.

COOPERATION.—Gage-height record during period Oct. 1 to May 24, 1941 furnished by Interstate Power Co., and thereafter water-stage recorder inspected by employee of that Company. City of Independence also assisted with construction and operation of new gage facilities.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Discharge in second-feet				Run-off in Inches
		Maximum	Minimum	Mean	Per square mile	
October 1940	4,959	480	9	160	0.151	0.17
November	12,939	846	136	431	.407	.45
December	11,125	929	110	359	.339	.39
Calendar year 1940	90,107	2,220	9	246	.232	3.15
January 1941	15,064	1,480	136	486	.458	.53
February	7,101	822	9	254	.240	.25
March	32,810	3,600	9	1,058	.998	1.15
April	48,426	3,670	288	1,614	1.52	1.70
May	7,495	980	9	242	.228	.26
June	37,584	4,640	186	1,253	1.18	1.32
July	5,085	422	14	164	1.55	.18
August	2,383	328	11	76.9	.073	.08
September	23,551	3,780	19	785	.741	.83
Water year 1940–41	208,522	3,780	9	571	.539	7.31
October 1941	26,799	3,200	406	864	.815	.94
November	33,448	5,140	319	1,115	1.05	1.14
December	12,237	992	163	395	.373	.43
Calendar year 1941	251,983	5,140	9	690	.651	8.84
January 1942	13,568	1,070	164	438	.413	.48
February	10,960	920	178	391	.369	.38
March	44,833	3,680	151	1,446	1.36	1.57
April	12,539	1,040	200	418	.394	.44
May	12,436	648	200	401	.378	.44
June	59,909	8,320	320	1,997	1.88	2.10
July	49,027	3,510	538	1,582	1.49	1.72
August	31,388	3,730	248	1,013	.956	1.10
September	27,179	2,010	302	906	.855	.95
Water year 1941–42	334,323	8,320	151	916	.864	11.72

Wapsipinicon River at Independence, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept
1940–41												
1.....	199	237	212	885	212	161	989	373	1,750	422	14	67
2.....	250	212	339	1,480	9	9	1,080	314	4,310	394	121	54
3.....	85	148	288	1,480	288	339	1,510	339	4,640	264	14	64
4.....	123	237	301	862	187	466	3,450	237	3,600	235	14	67
5.....	174	161	237	748	136	390	3,670	237	2,910	262	128	68
6.....	9	136	288	729	161	364	3,250	424	2,270	222	16	97
7.....	161	161	288	756	136	440	2,900	212	1,440	321	119	19
8.....	161	161	187	742	187	523	2,720	288	866	123	14	3,010
9.....	136	212	262	729	9	662	2,460	237	688	233	122	3,780
10.....	161	187	288	632	212	729	2,200	212	524	202	14	1,530
11.....	174	364	237	694	148	582	1,830	187	426	118	12	830
12.....	199	490	288	489	136	478	1,460	187	656	209	116	511
13.....	98	389	225	427	520	515	1,190	187	804	134	12	301
14.....	174	477	288	377	822	542	1,090	187	931	122	84	349
15.....	110	567	110	351	686	762	979	187	1,100	118	12	366
16.....	110	567	250	377	593	650	791	212	1,420	118	88	2,650
17.....	187	489	161	338	504	542	796	212	1,850	116	11	3,160
18.....	148	567	187	301	428	593	1,510	9	1,810	107	11	2,000
19.....	187	498	212	225	263	491	3,190	187	1,270	262	117	941
20.....	9	529	161	225	250	522	2,610	180	795	14	12	712
21.....	199	669	174	237	161	2,080	1,740	161	633	135	227	447
22.....	136	678	212	250	187	2,940	1,360	110	466	112	328	308
23.....	136	788	212	212	161	3,180	1,140	136	257	105	12	193
24.....	123	846	250	212	161	3,600	1,000	212	327	104	11	349
25.....	98	795	364	237	136	1,900	882	9	205	69	211	273
26.....	136	700	698	136	136	1,800	753	218	325	91	222	358
27.....	9	729	841	224	136	1,980	681	109	297	16	106	245
28.....	186	394	873	187	136	1,810	598	105	186	113	59	261
29.....	480	212	929	174	.....	1,430	288	237	391	108	61	166
30.....	351	339	889	161	.....	1,210	309	610	437	117	84	375
31.....	250	.....	874	187	.....	1,120	.....	f980	.....	119	11	.....
1941–42												
1.....	548	4,180	425	385	920	151	1,040	220	664	2,670	3,390	361
2.....	543	5,140	291	164	816	245	968	288	1,370	2,010	3,730	02
3.....	465	3,730	405	285	739	252	840	312	3,070	2,180	3,360	498
4.....	466	2,370	332	331	645	416	739	240	3,580	2,590	2,570	793
5.....	676	1,820	349	272	610	447	676	269	2,660	2,540	1,860	920
6.....	1,100	1,690	352	278	454	471	664	443	2,590	2,240	1,750	757
7.....	2,910	1,540	251	322	520	602	648	379	3,570	1,690	1,560	543
8.....	3,200	1,290	392	334	432	633	478	536	3,380	1,020	1,040	508
9.....	2,170	1,040	251	238	440	656	426	551	3,350	784	870	670
10.....	1,740	890	198	249	381	681	440	490	2,790	775	870	673
11.....	1,000	714	163	212	397	766	414	625	3,670	681	890	590
12.....	766	594	234	294	334	793	394	634	8,320	599	811	360
13.....	648	565	253	169	363	793	278	630	6,120	538	840	406
14.....	656	623	203	255	337	793	360	648	3,490	1,790	880	1,920
15.....	811	537	230	216	384	784	330	633	2,050	1,840	775	2,010
16.....	689	572	235	268	300	1,200	332	433	1,200	1,740	689	1,370
17.....	640	455	306	266	255	2,190	328	528	860	1,700	534	1,130
18.....	432	531	227	263	386	2,630	342	457	664	1,790	446	900
19.....	419	434	282	353	313	2,740	200	466	538	2,510	467	920
20.....	406	589	294	349	255	2,580	280	432	594	2,740	421	956
21.....	528	640	252	519	223	3,410	261	382	553	2,480	364	1,260
22.....	730	463	404	494	203	3,680	252	326	542	1,980	390	1,170
23.....	840	496	447	475	222	3,160	232	372	465	1,200	297	1,090
24.....	714	353	860	540	225	2,610	240	200	370	811	248	1,140
25.....	648	410	992	697	178	2,240	256	297	372	664	258	1,100
26.....	511	319	932	775	228	2,170	206	258	320	681	285	1,070
27.....	618	372	793	793	182	2,170	239	258	356	664	389	992
28.....	565	346	640	802	254	1,760	218	238	364	640	302	956
29.....	426	381	324	932	.....	1,420	246	202	557	640	326	944
30.....	410	364	427	968	.....	1,230	212	282	1,480	1,330	387	870
31.....	524	.....	493	1,070	.....	1,160	.....	407	.....	3,510	389	.....

f—Fragmentary gage-height record; discharge computed from partly estimated gage heights.

Wapsipinicon River near Dewitt, Iowa

LOCATION.—Water-stage recorder, lat. 41°46′, long. 90°32′, in sec. 31, T. 81 N., R. 4 E., at bridge on U. S. Highway 61, 3 miles south of Dewitt, 6 miles upstream from Brophy Creek, and 18 miles upstream from mouth. Datum of gage is 599.73 feet above mean sea level, adjustment of 1912.

DRAINAGE AREA.—2,300 square miles.

RECORDS AVAILABLE.—June 1934 to September 1942.

AVERAGE DISCHARGE.—8 years, 1,192 second-feet.

EXTREMES.—Maximum discharge during 1941-42 year, 8,390 second-feet June 19 (gage height, 10.27 feet); minimum, 522 second-feet June 2 (gage height, 2.89 feet).

1934-41: Maximum discharge, 12,900 second-feet Mar. 6, 1937; maximum gage height, 11.65 feet Feb. 21, 1937 (affected by ice); minimum discharge, 70 second-feet Jan. 17-24, 1940; minimum gage height, 0.94 foot Oct. 3, 1937.

REMARKS.—Records good to fair except those for periods of ice effect, which are poor.

COOPERATION.—Services of observer and results of some discharge measurements furnished by Corps of Engineers, U. S. Army.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Discharge in second-feet				Run-off in Inches
		Maximum	Minimum	Mean	Per square mile	
October 1940	9,888	479	270	319	0.139	0.16
November	20,725	1,080	386	691	.300	.34
December	19,830	1,450	450	640	.278	.32
Calendar year 1940	208,963	3,250	70	571	.248	3.39
January 1941	26,410	1,680	560	852	.370	.43
February	21,310	2,000	500	761	.331	.34
March	56,550	4,720	500	1,824	.793	.91
April	106,880	5,110	1,870	3,563	1.55	1.73
May	29,242	1,680	464	943	.410	.47
June	78,970	4,880	1,020	2,632	1.14	1.28
July	20,670	1,970	261	667	.290	.33
August	5,511	252	114	178	.077	.09
September	68,920	7,800	136	2,297	.999	1.11
Water year 1940–41	464,906	7,800	114	1,274	.554	7.51
October 1941	83,750	4,720	1,610	2,702	1.17	1.35
November	86,120	6,750	1,190	2,871	1.25	1.39
December	31,998	1,690	643	1,032	.449	.52
Calendar year 1941	616,331	7,800	114	1,689	.734	9.95
January 1942	40,250	2,500	725	1,298	.564	.65
February	34,960	2,400	725	1,249	.543	.57
March	66,800	4,040	1,040	2,155	.937	1.08
April	39,161	2,770	604	1,305	.567	.63
May	25,130	1,170	562	811	.353	.41
June	110,496	7,940	534	3,683	1.60	1.79
July	71,200	3,010	1,530	2,297	.999	1.15
August	94,940	6,960	970	3,063	1.33	1.54
September	53,333	3,240	947	1,778	.773	.86
Water year 1941–42	738,138	7,940	534	2,022	.879	11.94

Note—Stage-discharge relation affected by ice Nov. 13-20, Nov. 28 to Dec. 31, 1940; Jan. 1 to Mar. 21, 1941; Jan. 2 to Mar. 3, 1942.

Wapsipinicon River near Dewitt, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940–41												
1.....	393	487	650	1,460	550	500	2,680	1,680	4,880	1,970	252	167
2.....	375	650	580	1,540	550	500	2,480	1,480	3,900	1,900	237	160
3.....	347	608	520	1,620	540	600	2,710	1,360	2,560	1,430	237	141
4.....	333	550	490	1,680	540	700	3,830	1,260	2,580	1,160	231	148
5.....	333	506	480	1,550	530	650	3,750	1,170	2,430	988	226	141
6.....	378	475	520	1,320	520	600	3,820	1,140	2,810	874	206	136
7.....	337	433	560	1,000	510	600	4,110	1,140	3,360	770	198	157
8.....	324	426	560	900	510	660	4,530	1,040	3,920	695	187	1,090
9.....	311	407	550	870	510	740	4,840	1,000	3,940	668	174	2,760
10.....	295	393	520	860	500	770	4,860	994	3,680	795	172	3,170
11.....	273	396	500	850	500	780	4,720	898	3,540	1,170	170	3,660
12.....	279	386	490	820	520	780	4,180	852	3,890	709	160	4,580
13.....	286	470	480	790	900	770	3,840	820	2,970	633	157	6,030
14.....	304	500	480	770	2,000	760	3,470	805	2,390	558	155	7,800
15.....	317	550	460	740	1,900	810	2,970	790	3,860	502	155	7,150
16.....	308	590	450	680	1,400	860	2,640	1,520	3,060	506	152	3,010
17.....	298	640	460	630	1,200	860	2,680	1,370	2,350	448	141	2,230
18.....	295	730	460	580	1,000	850	3,110	964	2,120	433	134	2,230
19.....	295	820	470	570	900	830	3,950	795	2,070	418	124	2,660
20.....	286	900	470	560	800	2,000	4,930	722	2,110	396	114	3,020
21.....	289	970	460	580	750	*3,780	5,110	677	2,190	364	118	3,340
22.....	292	1,060	460	620	700	3,830	4,830	659	2,120	361	126	3,110
23.....	289	958	470	640	660	4,720	4,060	633	2,190	361	120	2,250
24.....	292	1,060	530	640	630	4,010	4,100	641	1,620	368	120	1,790
25.....	270	1,080	650	630	600	3,750	3,260	637	1,310	340	185	1,660
26.....	270	1,050	780	610	560	4,010	2,730	591	1,140	317	252	1,390
27.....	270	1,040	920	600	530	4,230	2,480	550	1,020	295	231	1,220
28.....	273	960	1,150	*590	500	3,920	2,280	522	1,620	276	174	1,150
29.....	364	850	1,390	580	.....	3,110	2,060	498	1,920	261	190	1,100
30.....	479	780	1,450	570	.....	2,810	1,870	464	1,420	347	215	1,470
31.....	433	.....	1,420	560	.....	2,760	.....	1,570	.....	357	198	.....
1941–42												
1.....	2,070	3,450	1,200	1,110	2,400	1,040	2,770	595	566	1,680	3,840	1,180
2.....	1,890	3,830	1,170	1,170	2,200	1,160	2,510	570	534	1,530	5,670	1,060
3.....	1,630	3,860	1,150	990	2,100	1,220	2,370	621	626	1,640	5,640	1,040
4.....	1,610	4,100	1,130	910	2,000	1,110	2,230	587	1,850	1,960	5,520	1,070
5.....	1,800	4,800	1,120	1,040	1,900	1,080	2,090	562	2,260	2,300	5,480	976
6.....	1,770	5,760	1,040	1,170	1,800	1,060	2,000	626	3,030	2,600	5,600	947
7.....	2,940	6,510	1,000	1,080	1,700	1,080	1,910	727	3,410	2,580	6,470	1,110
8.....	2,770	6,750	970	1,040	1,600	1,160	1,790	722	3,780	2,620	6,940	1,560
9.....	2,890	6,310	929	995	1,450	1,200	1,680	722	4,170	2,670	6,960	2,390
10.....	3,610	4,530	877	900	1,300	1,270	1,590	768	4,740	2,580	6,000	1,910
11.....	3,880	3,320	816	830	1,200	1,310	1,470	789	5,330	2,220	3,870	1,660
12.....	4,440	2,800	708	810	1,150	1,340	1,320	866	5,640	1,980	2,890	1,500
13.....	4,720	2,520	643	790	1,100	1,380	1,260	895	5,200	2,100	2,460	1,650
14.....	3,980	2,300	670	770	1,050	1,470	1,210	1,130	4,900	2,560	2,210	1,500
15.....	2,870	2,080	652	760	1,000	1,560	1,150	1,170	5,200	2,250	2,150	1,370
16.....	2,390	1,950	670	750	950	1,690	1,100	1,120	5,770	2,100	2,060	1,660
17.....	2,190	1,870	773	*725	900	2,040	1,010	1,070	6,410	2,500	1,960	1,960
18.....	2,170	1,780	848	770	850	2,160	982	1,120	7,280	2,660	1,820	2,390
19.....	2,140	1,740	838	920	770	2,320	935	1,070	7,940	2,550	1,670	3,240
20.....	2,040	1,690	789	1,050	*870	2,560	883	988	7,720	2,350	1,550	2,910
21.....	1,840	1,640	778	1,200	955	2,800	848	994	5,380	2,250	1,370	2,740
22.....	1,930	1,580	763	1,310	955	3,010	783	953	3,200	2,300	1,290	2,270
23.....	4,260	1,590	854	1,460	870	3,190	727	866	2,530	2,520	1,210	2,070
24.....	4,560	1,530	1,200	1,700	820	3,340	703	821	2,140	2,680	1,130	1,940
25.....	3,070	1,420	1,320	2,000	775	3,490	680	763	1,890	2,650	1,130	1,930
26.....	2,660	1,380	1,470	2,100	725	3,770	666	742	1,750	2,340	1,050	1,900
27.....	2,530	1,310	1,640	2,200	750	4,040	643	752	1,580	1,910	970	1,910
28.....	2,360	1,270	1,690	2,300	820	3,950	626	670	1,770	1,720	1,130	1,890
29.....	2,390	1,260	1,600	2,400	.....	3,530	621	643	2,120	1,830	1,410	1,840
30.....	2,260	1,190	1,470	2,500	.....	3,340	604	617	1,780	2,560	2,030	1,760
31.....	2,090	.....	1,220	2,500	.....	3,130	.....	591	.....	3,010	1,460	.....

*Winter discharge measurement made on this day.

Iowa River near Rowan, Iowa

LOCATION.—Wire-weight gage, lat. 42°45'35", long. 93°37'20", in NE¼ sec. 25, T. 92 N., R. 24 W., at county road bridge, 3½ miles northwest of Rowan, and 10¼ miles downstream from confluence of East and West branches.

DRAINAGE AREA.—396 square miles.

RECORDS AVAILABLE.—November 1940 to September 1942.

EXTREMES.—Maximum discharge observed during 1941-42 year, 1,280 second-feet Nov. 4 (gage height, 8.88 feet); minimum observed, 26 second-feet Sept. 15 (gage height, 3.17 feet).

1940-41: Maximum discharge observed, 1,450 second-feet June 5, 1941 (gage height, 9.37 feet); minimum observed, 23 second-feet Sept. 6, 7, 1941 (gage height, 2.98 feet).

REMARKS.—Records fair except those for periods of ice effect, which are poor.

COOPERATION.—Records collected in cooperation with Corps of Engineers, U. S. Army.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Discharge in second-feet				Run-off in Inches
		Maximum	Minimum	Mean	Per square mile	
October 1940						
November	5,242	408	48	175	0.442	0.49
December	3,350	230	50	108	.273	.31
Calendar year 1940						
January 1941	2,610	170	50	84.2	.213	.25
February	3,165	290	40	113	.285	.30
March	11,013	656	55	355	.896	1.03
April	8,687	478	138	290	.732	.82
May	3,848	796	38	124	.313	.36
June	21,564	1,440	132	719	1.82	2.03
July	5,150	729	49	166	.419	.48
August	962	47	24	31.0	.078	.09
September	5,192	708	23	173	.437	.49
Water year 1940–41						
October 1941	9,926	827	113	320	.808	.93
November	16,517	1,250	242	551	1.39	1.55
December	5,727	259	90	185	.467	.54
Calendar year 1941	94,361	1,440	23	259	.654	8.87
January 1942	5,100	360	80	165	.417	.48
February	3,250	220	70	116	.293	.31
March	13,307	1,020	80	429	1.08	1.25
April	6,711	432	117	224	.566	.63
May	8,405	600	121	271	.684	.79
June	9,350	998	77	312	.788	.88
July	7,561	796	77	244	.616	.71
August	3,043	502	35	98.2	.248	.29
September	1,086	60	26	36.2	.091	.10
Water year 1941–42	89,983	1,250	26	247	.624	8.46

Note—Stage-discharge relation affected by ice Nov. 12-20, Nov. 28 to Dec. 31, 1940; Jan. 1 to Mar. 21, Dec. 10-20, 27-31, 1941; Jan. 1 to Mar. 10, 1942.

Iowa River near Rowan, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940–41												
1	.....	50	150	130	50	55	242	114	1,230	729	47	26
2	.....	60	130	170	50	60	217	102	1,380	711	43	26
3	.....	80	120	140	50	340	220	98	1,320	522	40	25
4	.....	81	110	125	50	480	322	96	1,170	333	39	24
5	.....	63	110	125	50	470	478	86	1,440	266	40	25
6	.....	66	110	125	45	550	441	81	1,300	217	39	23
7	.....	53	110	125	45	600	374	75	1,100	184	37	23
8	.....	48	105	125	45	540	346	71	827	163	35	54
9	.....	53	105	*110	40	580	333	66	616	139	33	320
10	.....	85	105	95	40	590	325	63	505	128	31	333
11	.....	150	105	90	40	580	324	57	646	122	31	281
12	.....	130	90	85	210	520	312	53	992	121	30	169
13	.....	200	75	85	*250	350	310	50	1,140	116	29	114
14	.....	240	70	80	250	260	310	49	1,230	103	28	84
15	.....	180	65	80	280	230	358	48	1,180	97	29	92
16	.....	160	60	70	290	200	346	46	929	93	27	272
17	.....	150	50	65	270	160	259	42	680	89	28	556
18	.....	150	50	60	260	210	264	38	483	84	29	580
19	.....	180	55	60	210	280	273	39	366	102	29	708
20	.....	260	60	60	110	370	398	38	295	123	29	295
21	.....	333	65	60	85	500	320	43	247	97	28	225
22	.....	408	70	55	80	656	378	72	220	85	29	162
23	.....	392	80	55	70	496	299	59	187	75	28	131
24	.....	380	90	55	65	360	252	50	168	70	27	109
25	.....	308	110	55	60	272	219	44	149	64	26	103
26	.....	*247	200	55	60	203	192	40	132	57	26	119
27	.....	215	230	55	55	195	159	40	180	55	25	82
28	.....	160	210	55	55	209	139	286	286	55	25	78
29	.....	180	170	55	.....	223	139	540	447	51	26	71
30	.....	180	150	55	.....	230	138	566	719	50	25	82
31	35	.....	140	50	.....	244	.....	796	.....	49	24	.....
1941–42												
1	113	566	239	130	220	80	420	250	535	713	502	33
2	155	1,050	*257	110	200	90	432	247	590	476	348	37
3	149	1,220	259	110	200	100	406	254	869	303	230	39
4	138	1,250	235	110	190	120	390	306	852	215	172	35
5	172	1,100	250	110	180	150	344	342	659	a200	138	33
6	215	971	222	110	160	180	314	364	463	272	123	32
7	362	900	206	100	140	200	282	535	a370	286	106	32
8	758	827	193	100	120	180	273	600	288	207	94	34
9	827	690	178	90	110	180	256	542	244	158	86	33
10	750	585	90	80	110	200	242	454	228	352	80	32
11	590	518	100	80	120	215	222	390	228	a250	73	31
12	422	467	130	80	130	209	204	410	209	184	67	29
13	324	480	160	80	130	199	192	392	182	147	65	29
14	286	516	170	90	130	204	192	354	157	206	67	30
15	273	529	170	90	120	272	178	310	141	428	65	26
16	228	344	180	100	*110	372	174	252	128	346	58	27
17	209	426	180	110	70	a440	166	227	119	240	55	28
18	203	402	190	120	80	a560	158	217	116	174	80	32
19	190	386	180	*140	80	*636	144	204	110	144	61	50
20	190	378	180	150	80	810	140	199	110	126	68	60
21	207	378	178	160	70	1,010	133	182	99	110	70	49
22	206	376	175	180	70	1,020	130	170	84	100	58	38
23	211	295	212	210	70	917	124	158	81	90	49	42
24	207	335	256	250	70	821	120	142	77	82	44	38
25	204	281	242	290	70	654	117	131	88	94	41	37
26	188	263	225	330	70	667	162	128	85	88	44	40
27	237	250	170	360	70	690	187	121	88	77	43	42
28	485	247	120	350	80	690	211	121	a300	77	43	40
29	566	245	110	320	.....	583	206	123	852	89	40	39
30	463	242	130	300	.....	452	192	133	998	531	38	39
31	398	.....	140	260	.....	406	.....	147	.....	796	35	.....

*Winter discharge measurement made on this day.
(a) No gage-height record; discharge interpolated or computed on basis of records for Lime Creek at Mason City.

Iowa River at Marshalltown, Iowa

LOCATION.—Water-stage recorder and concrete control, lat. 42°04′, long. 92°54′, in SW¼ sec. 24, T. 84 N., R. 18 W., in city park at Marshalltown. Burnett Creek enters from left between gage and control. Datum of gage is 853.10 feet (revised) above mean sea level (datum of 1929; levels by Corps of Engineers, U. S. Army, and U. S. Geological Survey).

DRAINAGE AREA.—1,500 square miles (not including that of Burnett Creek).

RECORDS AVAILABLE.—May 1915 to September 1927, February 1933 to September 1942. February to August 1903 at old dam site 1 mile upstream (gage heights only).

AVERAGE DISCHARGE.—21 years, 646 second-feet.

EXTREMES.—Maximum discharge during 1941-42 year, 18,100 second-feet June 3 (gage height, 15.81 feet); minimum daily, 250 second-feet Jan. 4; minimum gage height, 3.93 feet Dec. 10.

1915-27, 1933-41: Maximum discharge observed, 42,000 second-feet June 4, 1918 (gage height, 17.74 feet), from rating curve extended above 18,700 second-feet; minimum, about 2 second-feet (regulated) Nov. 24, 1917.

REMARKS.—Records good except those for periods of ice effect, which are poor. Discharge of Burnett Creek not included in records except during periods of low flow, when it is usually negligible. Some diurnal fluctuation caused by power plant above station.

COOPERATION.—Station operated through cooperation of City of Marshalltown; services of observer furnished by Mississippi River Power Co.

NOTE.—Graphs of discharge at river-flow measurement stations on the Iowa River during the flood of June 1942 are shown in figure 5.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Discharge in second-feet				Run-off in Inches
		Maximum	Minimum	Mean	Per square mile	
October 1940	3,174	293	72	102	0.068	0.08
November	9,639	620	122	321	.214	.24
December	8,228	500	140	265	.177	.20
Calendar year 1940	80,266	1,480	9	219	.146	1.98
January 1941	13,979	800	236	451	.301	.35
February	15,906	2,100	160	568	.379	.39
March	30,068	1,930	160	970	.647	.75
April	22,798	1,090	376	760	.507	.57
May	6,777	675	131	219	.146	.17
June	40,879	2,270	371	1,363	.909	1.01
July	11,881	1,270	122	383	.255	.29
August	2,267	124	50	73.1	.049	.06
September	15,186	2,280	44	506	.337	.38
Water year 1940-41	180,782	2,280	44	495	.330	4.49
October 1941	31,762	2,360	387	1,025	.683	.79
November	50,597	3,890	764	1,687	1.12	1.25
December	20,157	1,130	304	650	.433	.50
Calendar year 1942	262,257	3,890	44	719	.479	6.51
January 1942	24,790	1,800	250	800	.533	.61
February	20,045	1,440	400	716	.477	.50
March	52,876	3,160	530	1,706	1.14	1.31
April	27,198	1,460	495	907	.605	.67
May	40,398	2,920	619	1,303	.869	1.00
June	93,495	13,600	595	3,116	2.08	2.32
July	38,856	3,390	595	1,253	.835	.96
August	31,120	3,040	313	1,004	.669	.77
September	39,716	4,560	517	1,324	.883	.98
Water year 1941-42	471,010	13,600	250	1,290	.860	11.66

Iowa River at Marshalltown, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940–41												
1.....	117	141	240	600	255	160	680	361	1,410	1,270	124	44
2.....	81	141	220	800	236	180	700	342	1,130	1,030	111	44
3.....	89	122	200	700	243	1,350	735	309	1,740	990	94	49
4.....	100	143	*250	500	215	1,430	868	291	2,270	962	94	60
5.....	141	148	280	450	232	850	954	270	2,030	898	94	57
6.....	106	148	340	*500	220	786	998	287	1,880	755	83	51
7.....	85	153	385	600	210	832	1,070	258	1,760	572	85	60
8.....	104	146	385	650	200	832	1,090	239	1,750	497	78	2,280
9.....	91	151	364	630	190	930	1,060	229	1,850	414	83	1,890
10.....	83	196	328	620	180	1,010	1,000	225	1,820	356	91	685
11.....	91	300	348	680	180	978	970	208	1,540	322	78	425
12.....	89	260	300	660	350	950	922	202	1,540	296	67	467
13.....	85	150	258	633	2,100	1,020	872	196	1,770	262	60	437
14.....	92	200	230	577	2,030	1,050	836	193	1,860	251	63	376
15.....	85	250	200	548	1,220	1,060	782	193	1,780	229	55	527
16.....	94	400	170	437	1,150	1,300	715	193	1,710	225	54	1,390
17.....	87	550	140	402	974	755	715	175	1,690	212	75	898
18.....	85	520	140	385	809	655	760	167	1,580	202	85	550
19.....	81	500	160	369	900	*768	685	164	1,340	190	83	622
20.....	85	480	140	354	900	*1,520	690	146	1,080	190	80	644
21.....	78	520	140	314	750	1,930	644	148	881	187	66	638
22.....	75	620	160	296	600	1,560	710	148	675	167	66	539
23.....	73	600	160	300	485	1,370	740	148	572	193	63	387
24.....	75	570	180	266	387	*1,270	730	146	485	184	60	337
25.....	72	500	220	258	300	1,100	644	153	420	164	60	318
26.....	75	450	280	236	240	938	533	153	371	143	59	300
27.....	75	400	310	255	190	764	473	131	685	151	54	262
28.....	87	330	350	236	*160	700	443	136	782	153	52	251
29.....	293	290	400	236	.....	690	403	138	968	146	50	232
30.....	219	260	450	236	.....	650	376	153	1,510	148	50	366
31.....	181	.....	500	251	.....	680	.....	675	.....	122	50	.....
1941–42												
1.....	491	3,360	750	600	1,440	530	1,460	878	595	1,880	2,980	517
2.....	398	3,890	755	500	1,280	650	1,380	822	1,860	1,880	3,040	754
3.....	387	2,800	725	300	1,160	998	1,290	1,220	13,600	1,950	2,820	2,650
4.....	405	2,320	725	250	1,100	1,250	1,230	1,560	11,600	1,700	2,290	2,020
5.....	1,260	2,420	725	300	1,000	1,350	1,180	1,320	5,940	1,300	1,760	1,210
6.....	1,550	3,170	675	400	970	1,380	1,120	1,630	4,440	1,120	1,340	1,000
7.....	2,300	3,000	644	450	906	1,420	1,060	1,780	4,900	994	1,110	866
8.....	2,360	2,600	638	500	866	1,340	962	1,680	3,870	994	938	768
9.....	1,550	2,210	600	500	814	1,220	918	1,590	2,820	934	818	878
10.....	1,310	1,940	408	500	760	1,150	870	1,560	2,460	1,030	739	1,190
11.....	1,250	1,790	351	470	739	1,200	830	2,010	3,740	894	656	797
12.....	1,210	1,650	304	480	700	1,100	772	2,920	3,610	990	575	683
13.....	1,140	1,520	420	460	650	982	747	2,460	5,280	978	534	619
14.....	1,250	1,410	497	460	650	974	730	2,020	3,590	1,400	522	2,560
15.....	922	1,310	550	450	650	962	692	1,660	2,320	1,820	443	4,560
16.....	791	1,270	572	450	600	1,270	687	1,440	1,900	1,430	409	3,070
17.....	685	1,250	567	*460	400	2,600	665	1,340	1,720	1,230	356	1,900
18.....	655	1,210	545	530	450	*3,160	628	1,350	1,580	1,100	608	1,490
19.....	611	1,200	556	600	550	3,060	604	1,260	1,460	1,210	958	1,440
20.....	942	1,210	515	680	600	2,780	570	1,160	1,860	1,160	739	1,240
21.....	1,090	1,110	533	760	560	2,710	554	1,070	2,190	914	559	1,090
22.....	1,300	1,060	*589	830	530	2,600	544	998	1,580	743	460	974
23.....	1,230	994	800	980	500	2,520	522	918	1,300	656	398	942
24.....	930	914	1,130	1,200	470	2,450	500	858	1,150	595	351	962
25.....	809	881	986	1,400	*430	2,330	495	802	1,220	1,120	313	886
26.....	809	863	946	1,600	440	2,210	1,360	751	1,300	1,230	512	922
27.....	872	876	914	1,800	420	2,050	1,370	713	1,180	1,040	822	1,010
28.....	755	814	740	1,800	410	1,810	1,410	683	1,130	858	1,470	970
29.....	695	791	622	1,700	.....	1,660	1,090	674	1,500	866	1,170	902
30.....	745	764	675	1,700	.....	1,600	958	652	1,800	1,450	797	846
31.....	1,060	.....	700	1,680	.....	1,560	.....	619	.....	3,390	633	.....

Note—Stage-discharge relation affected by ice Nov. 12 to Dec. 6, Dec. 14-31, 1940; Jan. 1-12, Feb. 6-13, 19-22, Feb. 25 to Mar. 3, Dec. 31, 1941; Jan. 1-30, Feb. 12 to Mar. 2, 1942.
*Winter discharge measurement made on this day.

Iowa River near Belle Plaine, Iowa

LOCATION.—Water-stage recorder, lat. 41°51'20", long. 92°14'20", in NW¼ sec. 5, T. 81 N., R. 12 W., at bridge on State Highway 212, half a mile downstream from Walnut Creek and 2¾ miles south of Belle Plaine. Datum of gage is 749.82 feet above mean sea level, datum of 1929 (levels by U. S. Geological Survey and Corps of Engineers, U. S. Army).

DRAINAGE AREA.—2,420 square miles.

RECORDS AVAILABLE.—September 1939 to September 1942.

EXTREMES.—Maximum discharge during 1941-42 year, 9,450 second-feet June 6 (gage height, 14.36 feet); minimum, 450 second-feet Jan. 4; minimum gage height, 5.96 feet Oct. 4.

1939-41: Maximum discharge, 3,380 second-feet July 1, 1941; maximum gage-height, 12.38 feet Mar. 22, 1941; minimum daily discharge, 19 second-feet Jan. 5, 1940; minimum gage height, 3.48 feet July 25, 26, 1940.

A discharge of 38,600 second-feet was measured on June 5, 1918, at railroad bridge 1 mile above gage and at a stage somewhat below crest of that flood.

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

COOPERATION.—Records collected in cooperation with Corp of Engineers, U. S. Army.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Discharge in second-feet				Run-off in Inches
		Maximum	Minimum	Mean	Per square mile	
October 1940	3,541	164	102	114	0.047	0.05
November	10,156	700	110	339	.140	.16
December	8,920	520	180	288	.119	.14
Calendar year 1940	101,670	1,920	19	278	.115	1.55
January 1941	15,070	850	270	486	201	.23
February	20,050	2,300	230	716	.296	.31
March	40,558	3,100	340	1,308	.540	.62
April	28,200	1,220	600	940	.388	.43
May	9,974	570	180	322	.133	.15
June	39,942	1,930	196	1,331	.550	.61
July	20,948	3,110	194	676	.279	.32
August	3,800	191	87	123	.051	.06
September	19,539	1,860	86	651	.269	.30
Water year 1940–41	220,698	3,110	86	605	.250	3.38
October 1941	52,285	3,920	578	1,687	.697	.80
November	82,270	5,360	1,290	2,742	1.13	1.26
December	33,500	1,860	734	1,081	.447	.51
Calendar year 1941	366,136	5,360	86	1,003	.414	5.60
January 1942	40,150	2,500	450	1,295	.535	.62
February	38,300	2,300	750	1,368	.565	.59
March	71,520	3,720	1,100	2,307	.953	1.10
April	39,544	2,130	811	1,318	.545	.61
May	56,670	3,040	1,050	1,828	.755	.87
June	111,555	9,020	975	3,718	1.54	1.71
July	54,940	2,340	1,020	1,772	.732	.84
August	46,884	4,340	622	1,512	.625	.72
September	49,607	3,240	927	1,654	.683	.76
Water year 1941–42	677,225	9,020	450	1,855	.767	10.39

Note—Stage-discharge relation affected by ice Nov. 12 to Dec. 31, 1940; Jan. 1 to Mar. 22, Dec. 29-31, 1941; Jan. 1 to Mar. 3, 1942.

Iowa River near Belle Plaine, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940–41												
1.....	126	185	260	650	280	340	890	570	196	3,110	191	86
2.....	125	172	220	850	280	340	885	541	765	2,340	178	86
3.....	124	154	200	700	280	800	912	526	998	1,660	172	97
4.....	122	145	*220	460	270	1,400	1,010	495	1,240	1,200	162	100
5.....	118	136	250	400	270	1,500	1,080	465	1,790	1,080	156	100
6.....	120	135	320	450	270	1,300	1,140	448	1,790	1,010	148	99
7.....	124	140	350	530	260	1,000	1,160	422	1,730	934	144	99
8.....	126	144	380	600	250	950	1,180	400	1,610	873	138	1,000
9.....	120	152	380	600	240	950	1,220	367	1,690	761	133	1,350
10.....	115	160	280	600	230	1,000	1,210	344	1,710	813	126	1,860
11.....	115	173	360	640	230	1,150	1,160	330	1,890	837	122	1,090
12.....	115	170	340	680	400	1,200	1,110	320	1,750	604	121	676
13.....	115	110	300	700	2,200	1,150	1,060	297	1,550	523	118	556
14.....	112	170	280	670	2,300	1,100	1,000	285	1,650	471	112	634
15.....	111	200	250	640	2,200	1,200	957	290	1,740	429	106	676
16.....	110	260	220	540	1,500	1,600	921	373	1,730	391	101	980
17.....	110	380	200	480	1,200	1,600	881	302	1,640	364	110	1,750
18.....	107	500	180	440	1,100	1,300	903	285	1,600	358	122	1,330
19.....	108	640	200	420	1,000	1,200	930	257	1,540	325	124	853
20.....	106	600	180	400	900	1,800	934	238	1,380	302	118	714
21.....	106	600	180	380	850	3,100	873	242	1,180	285	115	714
22.....	107	650	180	380	750	2,600	829	257	998	268	117	679
23.....	105	700	200	380	600	2,190	805	285	865	257	111	641
24.....	102	700	210	380	520	*1,710	837	240	757	246	104	570
25.....	102	650	240	360	470	1,540	837	221	664	244	100	495
26.....	102	580	300	330	430	1,380	805	209	604	233	97	432
27.....	102	500	340	300	400	1,230	746	207	645	219	91	413
28.....	104	400	380	*270	*370	1,080	676	203	1,290	207	96	406
29.....	110	350	420	280	.....	988	649	191	1,020	205	91	419
30.....	108	300	480	280	.....	944	600	184	1,930	205	89	634
31.....	164	.....	520	280	.....	916	.....	180	.....	194	87	.....
1941–41												
1.....	645	4,600	1,260	800	2,300	1,100	2,130	1,270	1,000	2,400	2,620	970
2.....	676	5,360	1,230	700	2,200	1,300	2,050	1,180	975	2,320	3,440	927
3.....	626	4,390	1,200	550	2,100	1,500	1,940	1,160	1,240	2,340	4,340	1,720
4.....	578	4,470	1,190	450	2,000	1,680	1,820	1,310	2,510	2,340	3,860	2,620
5.....	1,150	4,840	1,160	600	1,900	1,840	1,750	1,750	3,590	2,230	3,460	2,500
6.....	1,010	4,820	1,120	700	1,800	1,940	1,690	1,920	8,130	2,070	2,560	1,860
7.....	2,960	4,080	1,070	800	1,700	2,000	1,620	2,050	9,020	1,710	1,990	1,480
8.....	3,920	4,020	1,060	850	1,600	1,990	1,540	2,130	7,300	1,510	1,660	1,320
9.....	3,320	4,080	1,020	*930	1,550	1,910	1,450	2,020	5,830	1,420	1,460	1,580
10.....	2,660	3,790	952	950	1,450	1,790	1,370	1,920	5,510	1,440	1,320	1,250
11.....	2,010	3,080	869	950	1,400	1,750	1,320	1,970	5,840	1,440	1,190	1,500
12.....	1,750	2,720	769	950	1,350	1,750	1,260	2,510	4,910	1,300	1,090	1,230
13.....	1,640	2,520	734	950	1,350	1,690	1,220	2,920	4,340	1,290	990	1,180
14.....	2,220	2,340	769	920	1,300	1,620	1,170	3,010	4,460	2,260	932	1,160
15.....	1,960	2,190	813	900	1,200	1,590	1,140	2,780	4,800	2,200	900	1,580
16.....	1,550	2,050	873	900	1,150	1,750	1,110	2,300	5,360	2,280	837	2,610
17.....	1,320	1,950	912	900	1,000	2,290	1,070	2,040	4,440	1,980	782	2,980
18.....	1,200	1,890	926	1,000	850	2,880	1,050	2,500	2,780	1,680	728	3,240
19.....	1,100	1,870	894	1,150	750	*3,170	995	2,520	2,460	1,540	716	2,630
20.....	1,040	*2,010	877	1,300	900	3,460	950	2,080	2,810	1,490	1,010	2,100
21.....	1,140	1,940	853	1,450	1,050	3,720	940	1,900	3,440	1,560	1,000	1,750
22.....	1,880	1,780	869	1,600	1,150	3,650	909	1,750	3,260	1,310	891	1,510
23.....	2,720	1,660	1,080	1,700	1,150	3,410	886	1,630	2,590	1,140	761	1,360
24.....	2,520	1,540	1,720	1,850	*1,100	3,240	864	1,520	2,110	1,020	684	1,270
25.....	1,770	1,480	1,860	2,000	1,000	3,080	829	1,420	1,890	1,190	634	1,230
26.....	1,540	1,420	1,690	2,200	1,000	3,000	811	1,340	1,900	2,290	622	1,220
27.....	1,630	1,400	1,570	2,300	1,000	2,870	1,020	1,260	1,970	2,070	777	1,200
28.....	1,570	1,360	1,410	2,400	1,000	2,680	1,660	1,200	1,820	1,720	1,380	1,230
29.....	1,400	1,330	1,000	2,500	.....	2,440	1,540	1,140	2,980	1,880	1,510	1,230
30.....	1,290	1,290	900	2,500	.....	2,260	1,440	1,090	2,290	1,560	1,560	1,170
31.....	1,490	.....	850	2,400	.....	2,170	.....	1,050	.....	1,960	1,180	.....

*Winter discharge measurement made on this day.

Iowa River at Iowa City, Iowa

LOCATION.—Water-stage recorder, lat. 41°39'30", long. 91°32'20", in SE¼ sec. 9, T. 79 N., R. 6 W., in Iowa City, 25 feet downstream from State University of Iowa hydraulics laboratory, 175 feet downstream from dam of the University, 1.5 miles upstream from Ralston Creek, and 3.3 miles downstream from Clear Creek. Datum of gage is 39.00 feet above Iowa City datum or 627.27 feet above mean sea level, datum of 1929.

DRAINAGE AREA.—3,230 square miles.

RECORDS AVAILABLE.—June 1903 to July 1906, October 1913 to September 1942 in reports of U. S. Geological Survey; June 1903 to December 1932 in report of Iowa State Planning Board entitled "Stream Flow Records of Iowa, 1873-1932."

AVERAGE DISCHARGE.—39 years, 1,432 second-feet.

EXTREMES.—Maximum discharge during 1941-42 year, 7,800 second-feet June 13 (gage height, 8.89 feet); minimum, 510 second-feet Jan. 4 (gage height, 0.80 foot).

1903-41: Maximum discharge, 36,200 second-feet June 7, 1918 (gage height, 19.45 feet, site and datum then in use), from rating curve extended above 26,000 second-feet; minimum daily, about 10 second-feet Dec. 26, 1916; practically no flow Sept. 3, 1925 (result of regulation).

REMARKS.—Records good except those for periods of ice effect or fragmentary gage-height record, which are poor. Considerable regulation during low stages caused by power plants above station.

COOPERATION.—Stations operated through facilities of Iowa Institute of Hydraulic Research which furnishes services of research students.

NOTE.—On plate 5-B is shown a photograph of automatic water-stage recorder in gage house at Hydraulics Laboratory at Iowa City. Stage-discharge relations pertaining to the gaging station and related gages on the Iowa River at Iowa City are shown in figure 6.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Discharge in second-feet				Run-off in Inches
		Maximum	Minimum	Mean	Per square mile	
October 1940	4,942	240	93	159	0.049	0.06
November	10,935	850	74	364	.113	.13
December	10,166	540	206	328	.102	.12
Calendar year 1940	142,980	2,800	32	391	.121	1.66
January 1941	16,929	921	274	546	.169	.19
February	28,119	2,690	242	1,004	.311	.32
March	54,379	5,110	383	1,754	.543	.63
April	40,672	2,500	804	1,356	.420	.47
May	16,868	1,430	282	544	.168	.19
June	47,386	2,550	292	1,580	.489	.55
July	37,156	3,950	322	1,199	.371	.43
August	6,518	373	126	210	.065	.08
September	41,030	5,510	136	1,368	.424	.47
Water year 1940–41	3,151,100	5,510	74	863	.267	3.64
October 1941	87,030	5,660	1,180	2,807	.869	1.00
November	113,370	6,320	1,780	3,779	1.17	1.31
December	45,532	2,410	952	1,469	.455	.52
Calendar year 1941	534,989	6,320	126	1,466	.454	6.16
January 1942	54,449	2,940	621	1,756	.544	.63
February	55,530	3,020	1,160	1,983	.614	.64
March	85,500	3,880	1,510	2,758	.854	.98
April	48,990	2,620	1,050	1,633	.506	.56
May	65,130	3,060	1,300	2,101	.650	.75
June	117,590	7,590	1,140	3,920	.121	1.35
July	65,080	3,350	1,230	2,099	.650	.75
August	50,542	3,700	720	1,630	.505	.58
September	55,860	4,050	1,160	1,862	.576	.64
Water year 1941–42	844,603	7,590	621	2,314	.716	9.71

Iowa River at Iowa City, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940–41												
1.....	164	180	366	740	297	427	1,280	816	330	3,780	338	144
2.....	189	141	242	921	331	383	1,210	840	314	3,950	291	136
3.....	165	183	215	711	308	495	1,280	687	292	3,840	285	136
4.....	182	329	255	429	323	606	1,630	687	752	2,770	253	664
5.....	182	*268	253	281	335	1,100	1,590	692	1,060	1,990	276	547
6.....	227	233	306	274	297	1,400	1,530	555	1,370	1,660	247	276
7.....	147	190	323	410	319	1,500	1,500	670	1,710	1,670	221	265
8.....	163	216	381	550	305	1,310	1,500	575	1,710	1,580	275	5,290
9.....	168	207	433	650	294	1,060	1,490	565	1,950	1,300	250	5,510
10	153	232	453	530	282	949	1,520	515	2,180	1,200	184	4,060
11.....	137	248	413	600	242	844	1,520	525	2,360	1,260	373	2,350
12.....	156	148	387	622	311	844	1,490	461	2,550	1,560	271	1,840
13.....	217	74	358	770	1,990	921	1,440	474	2,490	1,140	174	1,200
14.....	116	139	335	776	*2,350	1,020	1,370	448	2,550	870	163	1,040
15.....	128	142	365	776	2,640	1,110	1,320	492	2,200	726	226	1,010
16.....	175	219	322	688	2,690	1,150	1,280	1,430	2,020	660	140	1,140
17.....	129	125	298	650	2,630	1,630	1,240	792	1,950	570	198	1,340
18.....	144	279	220	b600	b2,350	*1,940	f1,640	570	1,890	670	184	1,670
19.....	146	348	237	572	b2,000	1,950	f2,500	545	1,810	590	232	1,830
20.....	93	537	216	470	b1,700	3,040	1,570	402	1,710	530	195	f1,500
21.....	171	672	266	422	b1,350	5,110	1,390	423	1,690	465	172	1,260
22.....	136	806	206	495	1,090	4,030	1,240	436	1,500	461	183	1,110
23.....	139	776	240	515	782	4,400	1,160	359	1,290	452	207	972
24.....	131	755	229	638	699	4,020	1,090	446	1,110	444	176	900
25.....	132	850	260	540	699	2,690	1,060	431	998	381	161	864
26.....	155	793	342	485	535	2,240	1,060	384	864	338	138	828
27.....	145	638	358	436	510	2,010	1,060	361	876	335	152	632
28.....	141	380	*400	336	460	1,770	1,020	327	1,380	322	137	654
29.....	240	413	452	354	.....	1,630	888	335	2,160	371	147	632
30.....	178	*414	495	346	.....	1,480	804	282	2,320	852	126	1,230
31.....	193	.....	540	342	.....	1,320	.....	343	.....	419	143	.....
1941–42												
1.....	1,600	5,500	1,740	1,340	b3,000	1,510	2,620	1,710	1,240	3,020	1,780	1,380
2.....	1,360	5,400	1,690	1,160	b3,000	1,650	2,540	1,570	1,230	2,440	2,750	1,250
3.....	1,210	5,220	1,610	750	b3,000	1,850	2,450	1,480	1,170	2,400	3,700	1,160
4.....	1,500	5,660	1,630	621	3,020	2,080	2,340	1,420	1,140	2,360	3,550	1,310
5.....	1,180	6,150	1,580	798	2,900	2,270	2,210	1,460	1,670	2,390	3,530	1,950
6.....	1,620	6,320	1,540	b950	2,730	2,430	2,170	1,900	2,670	3,350	3,700	2,290
7.....	2,080	6,000	1,480	b1,100	2,620	2,820	2,090	2,320	3,380	2,980	3,280	2,410
8.....	2,330	5,690	1,440	b*1,200	2,530	2,520	1,990	2,240	3,690	2,220	2,460	2,020
9.....	3,820	5,620	1,360	b1,250	2,330	2,440	1,900	2,300	4,010	1,870	1,970	4,050
10.....	4,150	5,570	1,330	b1,300	2,150	2,380	1,820	2,360	4,670	1,750	1,760	2,270
11.....	4,120	5,260	1,030	b1,350	2,080	2,290	1,720	2,280	6,200	1,710	1,570	1,770
12.....	3,390	4,940	952	b1,400	1,960	2,120	1,650	2,280	7,560	1,610	1,420	1,520
13.....	2,610	4,480	1,090	1,440	1,940	2,170	1,600	2,550	7,590	1,570	1,300	1,580
14.....	2,610	3,700	1,090	1,410	1,910	2,210	1,530	2,890	7,560	2,840	1,200	1,380
15.....	3,210	3,310	1,060	1,400	1,870	2,150	1,490	3,020	7,160	3,020	1,140	1,480
16.....	3,100	3,020	1,180	1,380	b1,700	2,320	1,440	3,060	6,250	2,660	1,060	1,440
17.....	2,440	2,810	1,270	1,380	b1,600	2,600	1,390	2,800	5,420	2,390	984	1,920
18.....	2,180	2,660	1,180	1,450	1,540	2,700	1,350	2,480	4,890	2,280	939	2,510
19.....	1,950	2,530	1,190	1,660	1,360	3,070	1,310	2,510	4,810	1,970	876	3,060
20.....	1,750	2,460	1,190	1,890	1,250	3,420	1,280	2,880	4,830	1,810	846	2,900
21.....	1,770	2,480	1,160	2,050	1,160	3,630	1,230	2,560	4,200	1,690	786	2,440
22.....	3,540	2,490	1,190	2,160	1,300	3,750	1,210	2,260	4,170	1,630	1,000	2,010
23.....	5,660	2,380	1,460	2,320	1,440	3,850	1,160	2,100	4,050	1,600	984	1,760
24.....	4,880	2,220	1,830	2,560	1,490	3,880	1,130	1,950	3,530	1,420	913	1,610
25.....	4,350	2,110	2,130	2,750	1,460	3,790	1,090	1,790	2,830	1,240	810	1,480
26.....	3,490	2,000	2,410	2,850	1,440	3,690	1,080	1,710	2,420	1,230	756	1,440
27.....	3,460	1,910	2,380	2,850	1,370	3,520	1,060	1,610	2,240	1,830	720	1,410
28.....	3,660	1,870	2,110	2,870	*1,380	3,380	1,050	1,530	2,200	2,260	888	1,360
29.....	2,900	*1,830	1,440	*2,930	.....	3,210	1,420	1,440	2,200	1,860	1,030	1,350
30.....	2,490	1,780	1,370	2,940	.....	3,030	1,670	1,370	2,610	1,920	1,350	1,350
31.....	2,620	.....	1,420	2,940	.....	2,770	.....	1,300	.....	1,760	1,490	.....

*Winter discharge measurement made on this day.
(b) Stage-discharge relation affected by ice.
(f) Fragmentary gage-height record; discharge computed from partly estimated gage heights.

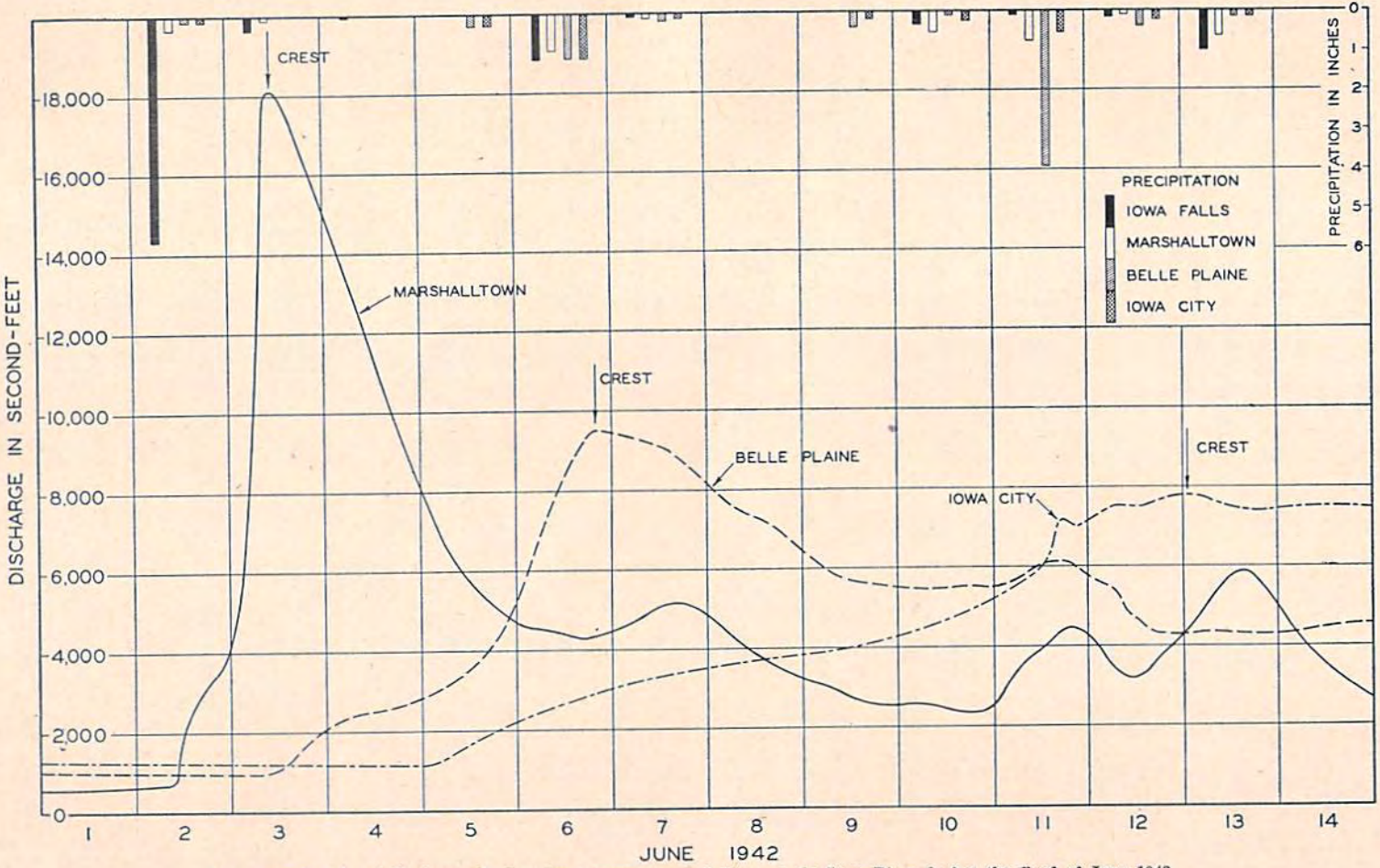


Figure 5.—Graphs of discharge at river-flow measurement stations on the Iowa River during the flood of June 1942.

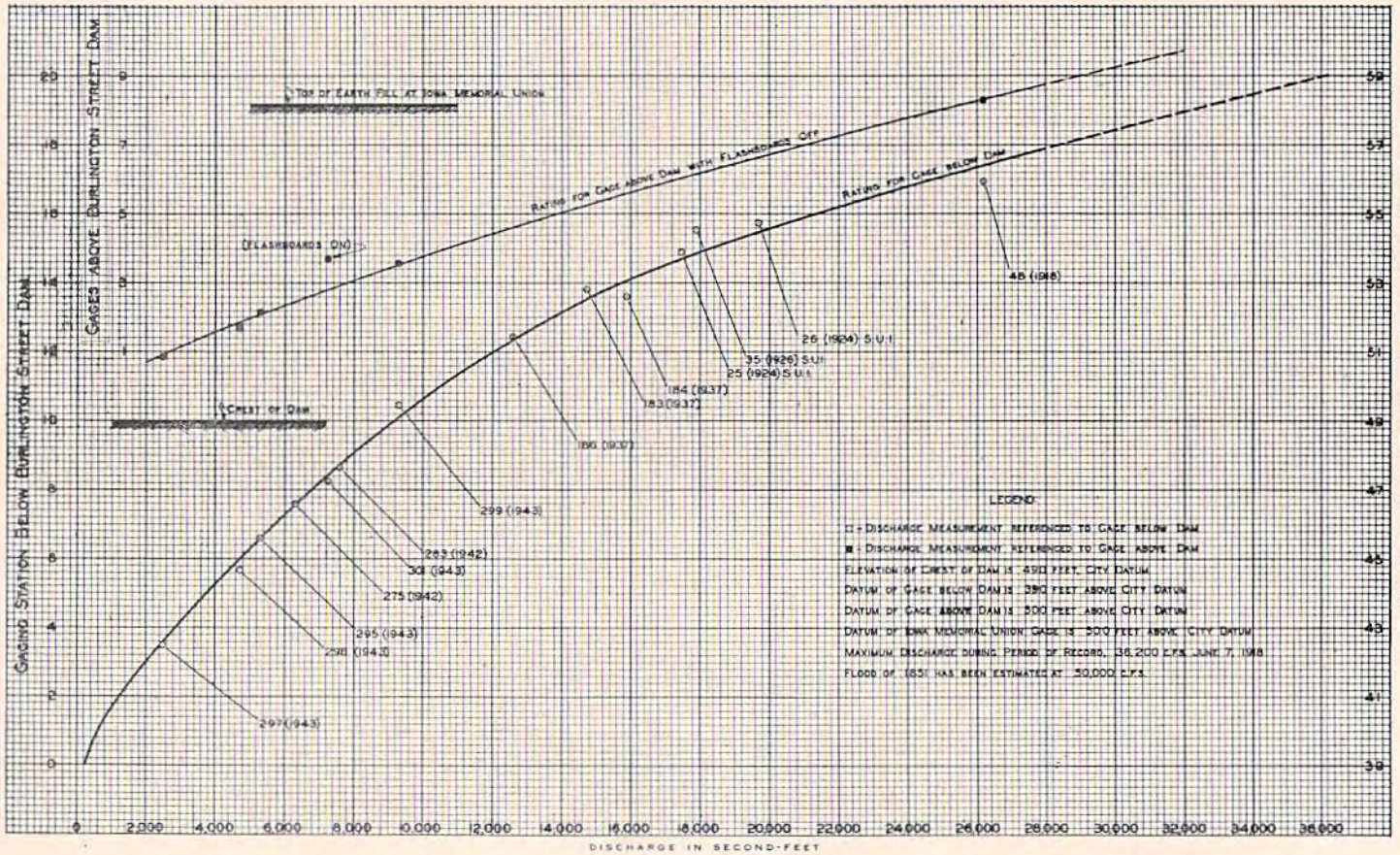


Figure 6.—Stage-discharge relations pertaining to the gaging station and related gages on the Iowa River at Iowa City, Iowa.

Iowa River at Wapello, Iowa

LOCATION.—Water-stage recorder, lat. 41°11′, long. 91°11′, in sec. 27, T. 74 N., R. 3 W., at bridge on State Highway 99 at east edge of Wapello, 13 miles downstream from Cedar River and 15.4 miles upstream from mouth. Datum of gage is 548.98 feet above mean sea level, adjustment of 1912.

DRAINAGE AREA.—12,480 square miles.

RECORDS AVAILABLE.—February 1915 to September 1942.

AVERAGE DISCHARGE.—27 years, 5,742 second-feet.

EXTREMES.—Maximum discharge during 1941-42 year, 36,300 second-feet Aug. 7 (gage height, 11.06 feet); minimum, 1,800 second-feet Jan. 4 (gage height, 0.84 foot).

1915-41: Maximum discharge observed, 67,500 second-feet Mar. 19, 1929 (gage height, 16.22 feet), from rating curve extended above 56,000 second-feet; minimum, about 400 second-feet Dec. 15-17, 1916.

REMARKS.—Records excellent to good except those for periods of ice effect, which are poor. Flood stage, about 10 feet.

COOPERATION.—Results of several discharge measurements furnished by Corps of Engineers, U. S. Army; assistance in computation of records furnished by Mississippi River Power Co. Gage-height record collected in cooperation with U. S. Weather Bureau.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Discharge in second-feet				Run-off in Inches
		Maximum	Minimum	Mean	Per square mile	
October 1940	47,960	1,790	1,320	1,547	0.124	0.14
November	88,610	5,590	1,400	2,954	.237	.26
December	78,680	3,620	1,700	2,538	.203	.23
Calendar year 1940	870,470	7,780	430	2,378	.191	2.59
January 1941	94,840	4,930	2,200	3,059	.245	.28
February	112,900	10,000	1,900	4,032	.323	.34
March	271,050	16,500	2,100	8,744	.701	.81
April	296,000	14,100	7,070	9,867	.791	.88
May	112,390	6,490	1,980	3,625	.290	.33
June	231,010	10,700	2,580	7,700	.617	.69
July	173,100	15,200	2,230	5,584	.447	.52
August	44,680	2,350	1,111	1,441	.115	.13
September	157,810	15,400	1,070	5,260	.421	.47
Water year 1940-41	1,709,030	16,500	1,070	4,682	.375	5.08
October 1941	296,990	17,700	4,490	9,580	.768	.89
November	433,330	23,400	6,800	14,440	1.16	1.29
December	176,080	8,340	3,810	5,680	.455	.52
Calendar year 1941	2,400 180	23,400	1,070	6,576	.527	7.15
January 1942	163,730	9,800	2,000	5,282	.423	.49
February	196,200	10,000	4,700	7,007	.561	.58
March	340,000	17,900	5,430	10,970	.879	1.01
April	223,560	12,700	4,730	7,452	.597	.67
May	225,090	9,540	4,910	7,261	.582	.67
June	435,210	26,800	4,730	14,510	1.16	1.30
July	304,500	15,600	6,650	9,823	.787	.91
August	362,590	35,800	4,830	11,700	.937	1.08
September	218,810	12,100	4,890	7,294	.584	.65
Water year 1941-42	3,376,090	35,800	2,000	9,250	.741	10.06

Note—Stage-discharge relation affected by ice Nov. 13-19, Dec. 4-8, 16-26, 1940; Jan. 7 to Mar. 9, 1941; Jan. 2 to Feb. 27, 1942.

Iowa River at Wapello, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940–41												
1	1,790	1,720	f3,490	4,030	2,300	2,400	8,070	6,490	2,580	11,400	2,350	1,070
2	1,690	1,620	f2,930	4,390	2,200	2,200	7,970	6,120	3,090	15,200	2,130	1,080
3	1,640	1,650	2,210	4,870	2,100	2,100	8,160	5,810	5,200	12,500	1,940	1,120
4	1,610	1,820	2,000	4,910	2,100	2,400	9,320	5,300	6,140	10,600	1,840	1,100
5	1,510	1,910	1,800	4,930	2,100	3,300	10,800	4,990	7,070	9,160	1,740	1,620
6	1,570	1,940	1,700	3,710	2,100	4,000	11,500	4,850	8,020	7,900	1,670	1,960
7	1,620	1,900	2,000	2,600	2,100	4,700	10,900	4,570	8,640	7,650	1,630	1,680
8	1,640	1,860	2,400	2,200	2,000	4,500	10,300	4,490	9,700	6,930	1,510	1,540
9	1,580	1,860	2,700	2,200	1,900	6,000	10,600	4,260	10,400	6,470	1,480	7,990
10	1,550	1,900	3,050	2,500	1,900	7,440	10,800	3,900	9,750	6,300	1,530	14,500
11	1,640	1,900	3,350	2,700	1,900	f6,600	10,500	3,580	10,100	9,840	1,420	15,400
12	1,570	1,820	3,330	3,000	1,900	f5,660	9,890	3,480	9,700	7,950	1,620	14,600
13	1,570	1,600	3,470	*3,100	2,500	5,830	9,160	3,380	9,190	5,810	1,570	9,750
14	1,620	1,400	3,000	3,200	5,000	8,490	8,640	3,240	8,520	4,910	1,400	6,930
15	1,640	1,500	2,560	3,300	10,000	8,740	8,160	3,140	8,220	4,210	1,270	5,640
16	1,500	1,900	2,300	3,400	9,800	10,800	7,810	3,300	8,850	3,790	1,210	4,950
17	1,480	2,400	2,100	3,400	9,200	12,400	7,510	5,260	9,400	3,480	1,360	4,690
18	1,520	2,700	1,900	3,200	8,000	12,400	7,830	3,900	10,300	3,320	1,440	5,220
19	1,510	3,000	1,700	3,000	7,400	f11,400	10,500	3,450	10,700	3,170	1,330	7,000
20	1,470	3,260	1,700	2,800	6,400	f9,350	13,700	2,960	10,200	3,170	1,270	7,040
21	1,520	3,630	1,800	2,600	5,600	11,700	14,100	2,720	9,030	2,920	1,250	6,100
22	1,430	4,410	1,800	2,400	5,000	14,500	11,700	2,680	7,720	2,780	1,240	5,430
23	1,420	5,590	1,900	2,300	4,200	15,100	9,920	2,720	6,800	2,690	1,190	4,890
24	1,390	5,500	2,100	2,200	3,700	16,500	10,400	2,570	6,010	2,930	1,140	4,530
25	1,380	5,060	2,300	2,300	3,200	15,800	11,400	2,380	5,410	2,820	1,220	4,320
26	1,350	5,200	2,600	2,500	3,000	13,500	12,000	2,380	4,950	2,640	1,240	4,060
27	1,320	5,410	2,830	2,700	f2,800	12,900	10,800	2,250	4,450	2,460	1,180	3,720
28	1,350	5,480	3,190	*2,800	2,500	12,200	8,800	2,180	4,770	2,350	1,120	3,410
29	1,540	f4,810	3,400	2,700	.....	10,700	7,690	2,060	7,810	2,230	1,130	3,220
30	1,780	f3,860	3,450	2,500	.....	9,080	7,070	2,000	8,290	2,660	1,150	3,250
31	1,760	.....	3,620	2,400	.....	8,360	.....	1,980	.....	2,860	1,111	.....
1941–42												
1	4,490	12,400	*6,670	5,280	9,900	5,430	12,700	5,410	4,870	8,690	10,600	5,720
2	5,860	17,700	6,580	4,500	10,000	*6,210	12,400	5,640	4,790	8,900	12,500	5,450
3	5,450	20,700	6,470	3,200	9,900	6,450	11,700	5,790	4,730	9,540	15,400	5,090
4	4,830	22,800	6,320	2,100	9,800	6,870	10,800	5,680	5,200	10,700	19,500	4,890
5	5,160	23,200	6,190	2,000	9,600	7,200	10,200	5,750	7,200	11,800	24,900	4,990
6	5,220	23,400	6,030	2,900	9,000	7,290	9,730	5,920	10,000	13,300	32,500	5,790
7	6,560	23,100	5,900	3,500	8,700	7,330	9,510	6,630	12,400	15,600	35,800	7,040
8	8,260	23,200	5,700	4,200	8,500	8,020	9,190	7,530	14,200	14,100	31,800	8,040
9	9,590	23,400	5,640	4,700	8,200	8,020	8,770	7,620	16,200	10,300	24,500	8,900
10	14,000	23,300	5,360	5,000	7,700	8,240	8,340	7,580	19,600	8,930	16,800	11,600
11	14,200	22,100	5,050	5,200	7,000	8,520	8,020	8,090	22,200	8,120	11,200	12,100
12	13,000	19,600	4,650	5,000	6,800	8,490	7,760	8,670	24,700	7,900	9,240	7,310
13	12,000	17,100	4,190	4,800	6,700	8,020	7,460	8,900	26,600	7,580	8,900	6,450
14	10,500	15,000	3,970	4,700	6,600	7,970	7,240	9,350	26,800	7,850	8,520	6,340
15	10,100	12,900	3,810	*4,600	6,500	8,040	6,930	9,430	26,800	11,400	7,830	6,140
16	10,200	11,800	3,860	4,500	6,500	8,490	6,820	9,460	25,300	12,200	7,310	6,190
17	9,460	10,900	3,950	4,450	6,400	9,810	6,630	9,540	23,600	10,500	6,690	7,370
18	8,160	10,300	4,340	4,500	6,200	10,600	6,430	9,510	20,600	9,810	6,230	7,850
19	7,460	9,890	4,610	4,600	5,700	10,800	6,140	8,770	16,600	10,100	5,900	9,350
20	7,090	9,620	4,970	4,800	5,400	11,800	5,940	8,390	14,600	10,800	5,550	10,800
21	6,650	9,380	5,010	5,000	5,000	13,100	5,700	8,540	15,600	11,700	5,260	9,670
22	7,350	9,240	4,690	5,300	4,700	14,600	5,510	7,950	14,900	12,100	5,110	8,360
23	12,800	9,060	4,850	5,500	4,800	16,000	5,340	7,400	13,700	11,000	5,920	7,560
24	17,700	8,640	5,700	5,700	5,000	17,200	5,180	7,020	11,800	9,400	6,580	7,180
25	16,300	8,260	7,000	6,200	5,400	17,900	5,010	6,890	10,700	7,970	6,100	6,980
26	13,000	7,850	7,880	6,800	5,500	17,300	4,910	6,340	9,510	7,070	5,470	6,740
27	10,900	7,510	8,340	7,600	5,400	17,100	4,790	5,990	8,620	6,650	5,050	6,410
28	10,800	7,220	8,320	8,500	5,300	17,400	4,750	5,720	8,020	7,440	4,830	6,300
29	11,300	6,960	7,620	9,200	.....	17,000	4,730	5,450	7,720	7,690	4,950	6,210
30	9,730	6,800	6,690	9,600	.....	15,400	4,930	5,220	7,650	7,200	5,680	5,990
31	8,870	.....	5,720	9,800	.....	13,400	.....	4,910	.....	8,160	5,970	.....

*Winter discharge measurement made on this day.
(f) Computed on basis of partly estimated gage-height record.

Rapid Creek near Iowa City, Iowa

LOCATION.—Water-stage recorder and concrete control with Cippoletti weir, lat. 41°42′, long. 91°29′, in NE¼ sec. 36, T. 80 N., R. 6 W., about 80 feet upstream from bridge on State Highway 261, 3 miles northeast of Iowa City and 3 miles upstream from mouth. Prior to Aug. 18 control was equipped with a 90° V-notch weir.

DRAINAGE AREA.—24.5 square miles.

RECORDS AVAILABLE.—January 1938 to September 1942.

EXTREMES.—Maximum discharge rate during 1941-42 year, 1,350 million gallons a day (2,090 second-feet) 6:00 p. m., Oct. 22 (gage height, 11.32 feet); minimum, 0.0905 million gallons a day (0.14 second-foot) Aug. 25 (gage height, 2.65 feet); minimum gage height, 2.29 feet Dec. 10, 1941.

1938-41: Maximum discharge rate, 2,180 million gallons a day (3,390 second-feet) 8:00 p. m., June 27, 1941 (gage height, 12.54 feet), from rating curve extended above 2,000 second-feet; no flow at times during 1940 and 1941.

REMARKS.—Records fair to good except those for periods of ice effect or no gage-height record, which are poor. Discharge below 4.6 second-feet obtained by weir formula.

COOPERATION.—Station operated through facilities of Iowa Institute of Hydraulic Research which furnishes services of research students.

NOTE.—On plate 5-A is shown a photograph of the artificial control, gage house and cableway on Rapid Creek. Graphs of discharge of Rapid Creek during flood of June 1941 are shown in figure 7.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Daily Discharge				Run-off		
		Million gallons per sq. mile			Second-feet per sq mile	Inches	Per sq mile	
		Maximum	Minimum	Mean			Million gallons	Acre feet
October 1940	2.81	0.055	0.	0.002	0.0037	0.004	0.074	0.227
November	5.89	.026	0.	.005	.0080	.009	.155	.477
December	37.18	.119	0.	.032	.049	.06	.981	3.01
Calendar year 1940	1,735.08	4.33	0.	.125	.193	2.65	45.8	140.
January 1941	60.25	.448	.008	.051	.079	.09	1.59	4.88
February	369.90	5.67	.018	.348	.539	.56	9.76	29.9
March	640.90	6.65	.042	.546	.845	.97	16.9	51.9
April	324.10	.818	.100	.285	.441	.49	8.55	26.2
May	122.91	1.03	.020	.104	.162	.19	3.24	9.95
June	913.77	7.70	.021	.805	1.24	1.39	24.1	74.0
July	323.42	4.17	.019	.274	.424	.49	8.53	26.2
August	6.92	.061	0.	.006	.0091	.01	.183	.560
September	270.74	4.22	0.	.238	.368	.41	7.14	21.9
Water year 1940–41	3,078.79	7.70	0.	.223	.344	4.67	81.2	249.
October 1941	1,131.1	9.18	.150	.963	1.49	1.72	29.8	91.6
November	659.6	3.75	.219	.580	.898	1.00	17.4	53.4
December	275.3	.844	.119	.234	.362	.42	7.26	22.3
Calendar year 1941	5,098.91	9.18	0.	.369	.571	7.74	134.	413.
January 1942	508.1	1.19	.132	.433	.669	.77	13.4	41.1
February	336.4	1.19	.158	.317	.490	.51	8.37	27.2
March	611.	1.13	.290	.520	.804	.93	16.1	49.5
April	228.	.343	.111	.200	.310	.35	6.01	18.5
May	174.8	.369	.069	.149	.230	.27	4.61	14.2
June	617.4	4.83	.058	.543	.841	.94	16.3	50.0
July	413.6	4.67	.047	.351	.543	.63	10.9	33.5
August	153.96	1.13	.004	.131	.203	.23	4.06	12.5
September	305.12	2.69	.024	.269	.416	.46	8.05	24.7
Water year 1941–42	5,414.38	9.18	.004	.390	.604	8.23	143.	438.

Note—Stage-discharge relation affected by ice Dec. 13, 14, 1940; Jan. 22 to Mar. 10, Mar. 16-19, 1941; Jan. 3-25, Feb. 1-4, 10-14, 18-24, 1942.

Rapid Creek near Iowa City, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940-41												
1	0	0.05	0.05	3.1	1.0	2.	5.6	3.6	15.	158.	1.3	0
2	0	.02	.05	4.2	1.2	6.	5.1	3.3	5.7	26.	.55	0
3	0	0	0	2.7	1.5	30.	16.	2.9	2.9	18.0	.39	0
4	0	0	0	1.6	1.6	23.	31.	2.5	3.1	13.	.39	0
5	0	0	0	.75	1.2	15.	20.	2.6	1.6	10.	.33	0
6	.01	0	.01	.75	.9	7.	15.	3.8	1.2	8.8	.25	0
7	0	0	.02	.88	.7	5.	13.	3.1	1.5	9.7	.14	2.0
8	0	0	.07	.94	.7	5.	11.	2.4	1.2	6.7	.10	a160.
9	0	.01	.28	.98	.8	5.	9.9	2.0	22.	f5.5	.07	a10.
10	0	.08	.43	.71	1.4	4.	8.9	1.8	5.6	13.	.03	a3.5
11	0	.46	.33	.88	.9	2.2	7.3	1.9	14.	f5.7	2.3	a2.5
12	0	.23	.25	.94	40.	1.6	6.2	1.6	7.0	f4.0	.48	a2.0
13	0	.08	.15	.88	215.	1.8	5.6	1.5	6.1	3.2	.13	1.7
14	0	.01	.10	.78	23.	4.0	5.2	1.4	8.9	3.1	.04	1.6
15	0	0	.40	.81	13.	14.	4.5	17.	13.	3.0	f.01	1.4
16	0	0	4.5	.88	15.	14.	5.9	39.	6.3	2.5	0	2.0
17	0	.02	2.3	1.3	12.	11.	5.2	5.2	4.5	2.3	.06	1.2
18	0	.05	1.0	.88	10.	10.	18.	3.5	3.6	10.	.24	.80
19	0	.23	.94	.32	4.	100	24.	2.8	2.8	2.2	.02	.60
20	0	.48	1.4	.36	3.	252.	31.	2.2	2.2	1.8	.06	.52
21	0	.97	1.4	.41	3.	43.	15.	2.1	1.8	1.6	.02	.43
22	0	1.0	2.0	17.	3.	18.	11.	3.8	1.6	1.5	.01	.37
23	0	.58	3.3	4.0	3.	14.	9.7	3.7	1.3	1.3	0	.35
24	0	.39	4.3	3.0	3.	9.7	8.1	1.6	1.1	1.1	0	.33
25	0	.31	4.0	2.7	3.	7.3	7.0	1.4	.97	1.2	0	.63
26	0	.28	2.8	2.3	3.	7.1	6.2	1.2	.80	.87	0	.58
27	0	.33	1.9	1.9	3.	6.7	6.2	1.1	274.	.74	0	.31
28	.01	.12	1.5	1.3	2.	5.9	4.7	.87	f178.	.71	0	.37
29	2.1	.11	1.4	1.0	.....	5.1	4.0	.77	34.	2.4	0	.55
30	.55	.08	1.1	1.0	.....	5.6	3.8	.77	292.	2.8	0	77.
31	.14	.....	1.2	1.0	.....	5.9	.....	1.5	.....	2.7	0	.....
1941-42												
1	9.7	142.	8.3	7.2	11.	36.	13.	f4.0	2.4	4.7	1.4	1.4
2	5.7	50.	7.8	7.9	10.	33.	12.	4.0	2.9	4.3	43.	9.9
3	6.7	38.	7.4	11.	11.	21.	11.	f8.5	2.5	4.1	4.8	5.5
4	5.8	31.	7.6	8.	13.	17.	11.	4.6	2.2	3.6	2.7	1.8
5	7.8	36.	7.3	6.	14.	15.	10.	7.3	4.8	3.6	2.1	f1.2
6	7.6	34.	5.7	6.	18.	15.	10.	10.	a70.	177.	15.	f.92
7	53.	28.	6.6	5.	15.	15.	9.9	6.3	a10.	13.	3.1	f2.4
8	14.	23.	6.7	5.	14.	15.	9.3	5.4	4.9	9.1	2.2	102.
9	75.	20.	5.9	5.	9.0	13.	9.1	5.5	4.1	f7.3	1.9	73.
10	19.	19.	4.7	*5.	10.	12.	8.8	14.	5.6	a8.	1.6	8.5
11	16.	18.	4.6	6.	11.	13.	7.9	12.	183.	a9.	1.4	5.5
12	12.	17.	5.3	6.	10.	11.	8.1	8.6	28.	a5.	f1.2	4.0
13	8.9	16.	5.7	7.	9.	14.	7.8	6.8	14.	a35.	a1 0	3.1
14	19.	15.	4.9	7.	10.	*17.	7.8	5.8	11.	a65.	a.8	2.5
15	9.3	14.	5.4	6.	11.	16.	7.3	5.2	9.1	10.	a2.0	2.2
16	8.1	13.	6.1	7.	22.	43.	7.0	5.2	7.9	7.4	a1.3	1.5
17	7.8	13.	5.8	9.	11.	39.	6.8	4.8	7.8	5.5	a.9	1.5
18	9.9	12.	5.6	16.	8.	30.	6.3	7.7	f6.7	4.5	f.60	8.7
19	7.9	13.	5.0	25.	6.	26.	6.1	4.9	a.7	5.3	.56	42.
20	11.	13.	4.5	29.	6.	26.	5.8	4.6	a130.	4.3	f.49	4.6
21	9.9	11.	4.8	24.	7.	23.	5.8	4.6	22.	3.6	f.32	3.1
22	348.	11.	5.6	28.	7.	19.	5.7	4.3	15.	3.3	f.26	2.4
23	112.	10.	32.	40.	8.	18.	f5.4	4.0	11.	3.0	.20	2.4
24	42.	9.1	20.	*45.	7.5	17.	a4.9	3.6	9.9	2.8	.19	2.0
25	32.	10.	15.	35.	9.9	15.	a5.3	3.4	10.	2.6	.15	1.9
26	32.	9.5	17.	33.	12.	19.	a5.8	3.9	9.1	2.5	.62	3.4
27	27.	8.9	14.	28.	11.	16.	a6.1	3.6	7.9	2.2	18.	2.4
28	21.	8.4	12.	25.	45.	15.	f5.3	3.6	7.0	2.1	41.	1.9
29	19.	*8.4	11.	24.	.....	14.	a4.5	3.3	6.3	2.1	2.8	1.7
30	18.	8.3	12.	23.	.....	14.	a4.2	2.7	5.3	1.9	1.4	1.7
31	153.	.....	11.	19.	.....	14.	.....	2.6	.....	1.8	.97	.....

*Winter discharge measurement made on this day.
(a) No gage-height record.
(f) Computed from partly estimated gage-heights.

Ralston Creek at Iowa City, Iowa

LOCATION.—Water-stage recorder and concrete control with sharp crested weir, lat. 41°40'10", long. 91°30'40", in SE¼NW¼ sec. 11, T. 79 N., R. 6 W., at bridge on State Highway 1, at east edge of Iowa City, 2.8 miles upstream from mouth.

DRAINAGE AREA.—3.01 square miles.

RECORDS AVAILABLE.—October 1932 to September 1942 in reports of Geological Survey. September 1924 to December 1935 in University of Iowa Engineering Bulletin No. 9.

AVERAGE DISCHARGE.—10 years (1932-42), 0.905 million gallons a day (1.40 second-feet).

EXTREMES.—Maximum discharge rate during 1941-42 year, 602 million gallons a day (931 second-feet) 8:45 p. m., Sept. 8 (gage height, 7.38 feet); no flow at times during August and September.

1924-41: Maximum discharge rate, 879 million gallons a day (1,360 second-feet) 7:10 p. m., June 27, 1941 (gage height, 8.25 feet); no flow at times in almost every year.

REMARKS.—Records fair except those for periods of ice effect, no gage-height record, and obstructed channel conditions, and those below 0.1 second-foot, all of which are poor.

COOPERATION.—Station operated through facilities of Iowa Institute of Hydraulic Research which furnishes services of research students.

NOTE.—On plate 3-B is shown a photograph of the artificial control under bridge on State Highway 1, and recorder house on Ralston Creek. Graph of runoff rate during flood of June 1941 is shown in figure 8.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Daily Discharge				Run-off		
		Million gallons per sq mile			Second-feet per sq mile	Inches	Per sq mile	
		Maximum	Minimum	Mean			Million gallons	Acre feet
October 1940	0.01	0.002	0.	0.	0.0001	0.0001	0.002	0.066
November	0.	0.	0.	0.	0.	0.	0.	0.
December	1.91	.077	0.	.013	.020	.02	.410	1.26
Calendar year 1940	223.12	6.44	0.	.131	.203	2.75	47.9	147.
January 1941	5.42	.429	0.	.038	.058	.07	1.16	3.57
February	39.48	4.72	.011	.303	.468	.49	8.48	26.0
March	51.91	5.15	.013	.359	.555	.64	11.1	34.2
April	20.24	.580	.041	.145	.224	.25	4.35	13.3
May	3.55	.236	0.	.025	.038	.04	.762	2.34
June	181.54	18.3	0.	1.30	2.01	2.24	39.0	120.
July	50.95	3.65	.004	.352	.545	.63	10.9	33.6
August	.58	.056	0.	.004	.006	.007	.125	.382
September	45.41	6.01	0.	.324	.502	.56	9.75	29.9
Water year 1940–41	401.00	18.3	0.	.736	.365	4.95	86.1	264.
October 1941	166.63	18.0	.039	1.16	1.79	2.06	35.8	110.
November	47.03	2.10	.118	.337	.522	.58	10.1	31.0
December	35.61	2.58	.062	.247	.382	.44	7.65	23.5
Calendar year 1941	648.35	18.3	0.	.382	.591	8.01	139.2	427.
January 1942	58.32	1.18	.086	.404	.625	.72	12.5	38.4
February	28.23	.537	.107	.217	.336	.35	6.06	18.6
March	60.33	1.70	.200	.419	.648	.75	13.0	39.8
April	17.19	.236	.067	.123	.190	.21	3.69	11.3
May	11.84	.258	.024	.082	.127	.15	2.54	7.80
June	46.96	3.22	.017	.337	.522	.58	10.1	30.9
July	17.98	1.20	.004	.125	1.93	.22	3.86	11.8
August	1.72	.236	0.	.012	.018	.02	.369	1.13
September	98.55	19.1	0.	.704	1.09	1.22	21.2	64.9
Water year 1941–42	590.39	19.1	0.	.348	.538	7.29	126.8	389.

Note—Stage-discharge relation affected by ice Jan. 17-27, Feb. 2-10, 18-22, 25-28, Mar. 2-6, 13-18, 1941; Jan. 2-25, Feb. 17-20, 1942.

Ralston Creek at Iowa City, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940-41												
1	0	.....	0	0.29	0.06	0.11	0.46	0.16	0.01	15.	0.26	0
2	0	.....	0	.29	.05	1.	.37	.15	.01	1.8	.08	0
3	0	.....	0	.07	.05	3.	2.6	.12	.04	1.0	.07	0
4	0	.....	0	0	.05	.5	2.0	.11	.05	.74	.05	0
4	0	.....	0	0	.1	.3	1.1	.13	0	.52	.04	0
6	0	.....	0	0	.05	.2	.87	.25	0	.63	.03	0
7	0	.....	0	0	.05	.22	.68	.16	.01	.68	.01	4.1
8	0	.....	0	0	.05	.25	.55	.11	0	.41	.01	28.
9	0	.....	0	0	.05	.39	.52	.08	.47	.28	.01	1.7
10	0	.....	0	0	.05	.28	.43	.07	.05	2.5	0	.26
11	0	.....	0	0	.05	.06	.37	.07	.33	.48	0	f.07
12	0	.....	0	0	8.4	.07	.30	.07	.12	.30	0	f.03
13	0	.....	0	0	22.	.1	.28	.07	.09	.25	0	f.01
14	0	.....	0	0	3.6	.2	.25	.07	.34	.19	0	.02
15	0	.....	0	.11	1.8	.2	.20	.30	.63	.16	0	.05
16	0	.....	.36	.15	1.5	.1	.31	1.1	.13	.15	0	.12
17	0	.....	.05	.2	.41	.1	.26	.10	.09	.18	.01	.03
18	0	.....	.02	.05	.2	.1	1.0	.06	.04	2.1	.01	.01
19	0	.....	.03	.05	.1	24.	2.7	.04	.02	.11	0	0
20	0	.....	.10	0	.1	13.	1.4	f.03	.01	.07	0	0
21	0	.....	.10	0	.1	2.4	.80	f.05	0	.06	0	0
22	0	.....	.16	2.	.1	.86	.58	f.09	0	f.07	0	0
23	0	.....	.26	1.3	.07	.77	.46	.06	0	f.04	0	0
24	0	.....	.28	.5	.09	.55	.33	.03	0	f.04	0	0
25	0	.....	.22	.1	.1	.43	.30	.02	0	f.03	0	0
26	0	.....	.13	.05	.1	.48	.28	.01	0	.02	0	0
27	0	.....	.07	.05	.1	.48	.25	.01	85.	.02	0	0
28	0	.....	.04	.06	.1	.43	.20	0	43.	.02	0	0
29	.01	.....	.03	.05	.....	.37	.20	0	7.1	17.	0	.01
30	0	.....	.02	.05	.....	.46	.19	.01	44.	2.2	0	11.
31	0	.....	.04	.05	.....	.50	.....	.02	.....	3.9	0	.....
1941-42												
1	.34	9.8	.60	.72	.93	2.6	1.1	.29	.10	.13	.02	0
2	.19	3.8	.55	.85	.80	2.3	1.0	.24	.10	.11	.32	0
3	.24	2.8	.52	1.1	.88	1.7	.88	.92	.10	.11	.08	0
4	.18	2.2	.57	1.0	1.1	1.6	.84	.27	.08	.08	.02	0
5	.26	3.3	.50	.80	1.1	1.5	.76	1.2	.08	.11	.01	0
6	.24	2.3	.34	.50	2.0	1.5	.80	.97	11.	5.6	1.10	0
7	3.9	1.9	.43	.40	1.4	1.6	.76	.50	.84	.19	.07	0
8	.42	1.7	e.45	.45	.93	1.5	.69	.41	.31	.15	.03	89.
9	8.3	1.4	e.38	.50	.84	1.0	.72	.36	1.1	.13	.02	7.3
10	1.1	1.2	e.29	.50	1.0	1.1	.66	.32	.66	.23	.02	.60
11	.70	1.2	e.31	.60	.98	1.4	.57	.90	15.	.24	.01	.27
12	.50	1.2	e.36	.80	.93	.93	.66	.52	1.4	.09	0	.16
13	2.6	1.1	.38	90	.88	2.0	.60	.36	.66	5.3	0	.13
14	11.	1.0	.36	1.0	.93	1.8	.60	.29	.45	4.3	0	.11
15	.95	.98	.41	1.0	1.1	1.7	.55	.24	.32	.24	.02	.10
16	.66	.88	e.43	1.1	2.3	7.9	.52	.27	.31	.16	0	.08
17	.66	.88	e.41	1.8	.9	4.7	.55	.31	.36	.11	0	.06
18	1.0	.84	e.41	3.5	.6	3.0	.48	.84	.26	.08	0	.06
19	.66	1.1	e.36	4.0	.5	2.3	.34	.31	.24	.15	0	.05
20	1.7	.90	.32	3.5	.5	2.8	.38	.31	9.4	.10	0	.04
21	.93	.76	.38	3.0	.63	1.9	.41	.29	1.0	.06	0	.04
22	84.	.72	.55	4.5	.63	1.5	.36	.23	.63	.05	0	.04
23	6.2	.66	a12.	5.5	.66	1.4	.32	.20	.41	.04	0	.05
24	3.0	.55	a5.0	*5.0	.60	1.2	.31	.18	.32	.04	0	.04
25	2.2	.74	a2.0	3.6	.80	1.2	.34	.16	.52	.03	0	.05
26	2.7	.69	2.2	2.6	.93	2.0	.36	.20	41	.03	0	.14
27	2.1	.66	1.5	2.0	.88	1.3	.48	.19	.32	.03	0	.08
28	1.4	.57	.93	1.9	2.5	1.3	.38	.18	.24	.03	0	.06
29	1.3	.60	.76	2.0	.....	1.2	.41	.15	.19	.02	0	.04
30	1.2	.60	.93	1.9	.....	1.2	.36	.12	.15	.02	0	.05
31	26.	.....	.98	1.3	.....	1.2	.....	.11	.....	.02	0	.....

*Winter discharge measurement made on this day.
(a) No gage-height record; discharge computed on basis of records for Rapid Creek near Iowa City.
(c) Backwater from debris on control; discharge computed on basis of records from Rapid Creek near Iowa City.
(f) Computed on basis of partly estimated gage-height record.

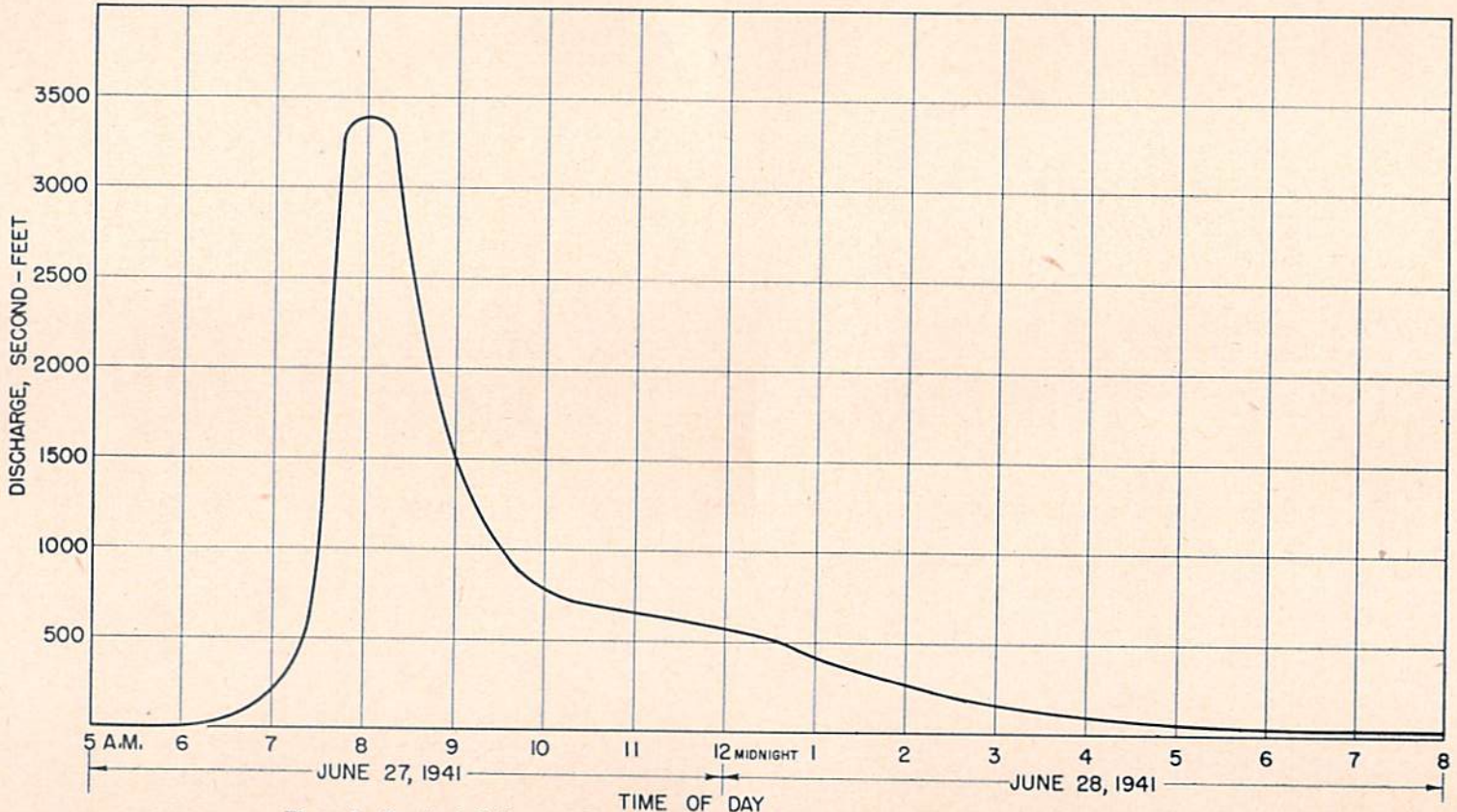


Figure 7.—Graph of discharge of Rapid Creek near Iowa City, Iowa, during flood of June 1941.

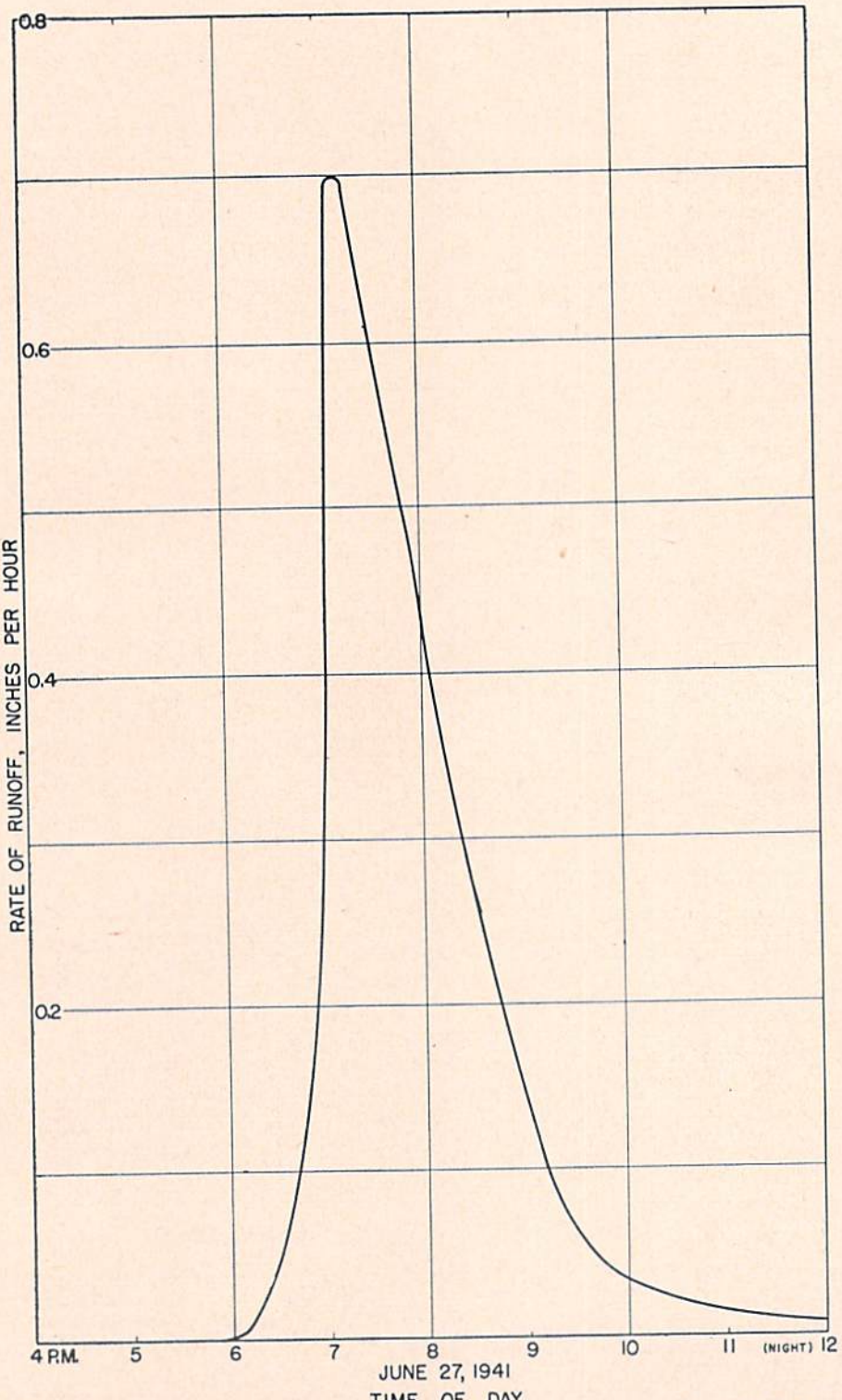


Figure 8.—Graph of runoff rate of Ralston Creek at Iowa City, Iowa, during flood of June 1941.

English River at Kalona, Iowa

LOCATION.—Water-stage recorder, lat. 41°28'10", long. 91°42'40", in SE¼ sec. 13, T. 77 N., R. 8 W., at bridge on State Highway 1, 1 mile south of Kalona, 4 miles downstream from Smith Creek, and 12 miles upstream from mouth. Datum of gage is 633.45 feet above mean sea level, datum of 1929 (levels by Corps of Engineers, U. S. Army).

DRAINAGE AREA.—580 square miles.

RECORDS AVAILABLE.—September 1939 to September 1942.

EXTREMES.—Maximum discharge during 1941-42 year, 3,340 second-feet Nov. 2 (gage height, 11.90 feet); minimum, 9.5 second-feet Aug. 26 (gage height, 2.58 feet).

1939-41: Maximum discharge, 2,490 second-feet July 2,1941 (gage height, 10.00 feet); minimum daily, 2 second-feet (estimated) occurred during period of ice effect Jan. 25-29, 1940; minimum gage height, 2.41 feet Dec. 13, 1940.

Flood of June 1930 reached a stage of 19.9 feet, from floodmark pointed out by observer.

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

COOPERATION.—Records collected in cooperation with Corps of Engineers, U. S. Army.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Discharge in second-feet				Run-off in Inches
		Maximum	Minimum	Mean	Per square mile	
October 1940	167.8	16	2.9	5.41	0.0093	0.01
November	266.6	24	4.2	8.89	.015	.02
December	556.7	88	3.3	18.0	.031	.04
Calendar year 1940	26,897.4	1,230	2.0	73.5	.127	1.73
January 1941	1,088	135	17	35.1	.061	.07
February	7,124	1,410	22	254	.438	.46
March	7,984	1,490	60	258	.445	.51
April	3,660	350	40	122	.210	.23
May	780.8	54	8.0	25.2	.043	.05
June	5,807.8	1,010	8.8	194	.334	.37
July	9,292	2,320	23	300	.517	.60
August	427	24	7.0	13.8	.024	.03
September	3,584	857	6.0	119	.205	.23
Water year 1940-41	40,738.7	2,320	2.9	112	.193	2.62
October 1941	16,957	2,340	126	547	.943	1.09
November	18,655	3,110	176	622	1.07	1.20
December	6,494	795	107	209	.360	.42
Calendar year 1941	81,853.6	3,110	6.0	224	.386	5.26
January 1942	11,020	800	100	355	.612	.71
February	7,630	450	140	272	.469	.49
March	12,158	984	203	392	.676	.78
April	3,571	200	71	119	.205	.23
May	5,262	483	77	170	.293	.34
June	13,490	2,260	50	450	.776	.86
July	4,071	627	37	131	.226	.26
August	800	77	10	25.8	.044	.05
September	1,684	478	11	56.1	.097	.11
Water year 1941-42	101,792	3,110	10	279	.481	6.54

Note—Stage-discharge relation affected by ice Jan. 6, 7, Jan. 17 to Feb. 22, Dec. 10-14, 30, 31, 1941; Jan. 1 to Mar. 5, 1942. Discharge April 20-30, May 1-3, June 1-5, 10-12, July 29 to Aug. 5, 1942, computed from graph on gage readings.

English River at Kalona, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940–41												
1.....	3.2	6.5	4.7	37	32	60	84	37	8.8	2,220	23	6.0
2.....	3.0	4.7	4.2	40	28	61	84	38	64	2,320	20	7.0
3.....	2.9	4.7	3.5	51	28	208	94	39	35	932	17	121
4.....	3.3	4.8	3.5	38	27	458	282	38	34	496	16	857
5.....	3.3	4.8	*3.3	31	27	553	350	38	43	216	16	240
6.....	3.6	4.3	3.3	27	28	260	248	39	33	157	14	162
7.....	4.3	4.5	3.5	23	29	158	182	54	26	419	12	75
8.....	4.2	4.5	3.8	21	28	109	152	41	22	327	11	55
9.....	4.2	4.7	4.3	19	26	88	135	34	225	150	12	196
10.....	4.2	5.0	4.5	18	25	91	133	29	838	322	17	251
11.....	4.3	11	4.5	18	22	78	120	26	962	528	13	142
12.....	4.3	6.5	4.8	20	27	75	107	24	1,010	290	12	84
13.....	4.2	5.8	3.8	22	*1,050	71	96	23	521	144	16	55
14.....	4.3	4.7	4.5	24	1,240	61	92	21	201	93	12	41
15.....	4.7	4.2	4.8	23	1,410	254	92	19	142	75	11	60
16.....	4.7	4.5	7.2	23	780	1,490	92	20	120	66	10	152
17.....	4.7	4.8	5.0	21	550	760	94	25	111	57	14	244
18.....	4.7	4.8	6.5	18	400	315	195	23	86	51	21	162
19.....	4.8	6.5	6.5	17	300	260	150	18	78	46	24	99
20.....	5.0	12	8.0	18	230	695	163	17	67	45	23	67
21.....	5.0	16	9.5	20	180	648	117	16	58	42	16	50
22.....	4.8	21	13	22	150	282	98	20	51	40	15	40
23.....	4.8	24	18	30	122	168	91	25	45	34	11	33
24.....	4.8	24	21	135	104	131	84	21	47	31	9.5	28
25.....	5.0	21	29	85	83	107	78	23	41	28	9.0	26
26.....	5.0	18	55	75	68	96	67	19	38	26	10	24
27.....	6.5	12	88	50	67	92	51	15	37	24	9.5	22
28.....	10	6.5	84	45	63	91	46	12	282	23	10	22
29.....	12	5.8	61	44	.....	92	43	10	274	23	8.5	25
30.....	16	5.0	46	39	.....	88	40	8.8	308	30	7.5	238
31.....	12	.....	38	*34	.....	84	.....	8.0	.....	37	7.0	.....
1941–42												
1.....	542	2,370	176	180	450	500	200	79	95	147	50	18
2.....	251	3,110	179	140	400	700	196	77	67	117	77	15
3.....	190	2,370	*170	100	350	750	187	91	54	103	55	11
4.....	247	1,280	162	105	340	600	170	115	50	103	41	42
5.....	200	816	165	110	350	500	162	101	91	95	33	24
6.....	330	922	152	120	380	360	157	294	313	115	34	17
7.....	364	837	137	130	400	347	162	384	244	101	30	22
8.....	522	660	137	140	380	347	150	229	140	95	25	74
9.....	644	537	135	*150	350	309	142	160	156	111	23	478
10.....	947	454	130	160	300	262	137	142	291	88	21	397
11.....	483	400	120	165	270	262	130	140	478	81	19	173
12.....	302	374	115	160	250	262	124	258	1,530	72	17	79
13.....	193	367	110	160	240	240	119	483	1,350	66	16	42
14.....	244	350	115	170	250	*286	119	320	788	627	16	30
15.....	229	327	119	190	260	305	115	200	380	442	16	25
16.....	144	305	122	210	260	499	111	165	219	274	16	27
17.....	130	282	130	250	250	984	105	152	193	133	16	23
18.....	135	258	137	320	200	675	103	173	190	77	15	18
19.....	140	251	126	370	150	512	99	258	176	67	14	17
20.....	126	270	115	440	140	435	91	179	827	58	13	16
21.....	298	278	107	500	160	438	88	154	2,260	57	12	15
22.....	763	251	113	540	180	374	84	144	1,450	47	12	16
23.....	2,340	229	224	640	*190	309	81	130	564	41	10	13
24.....	1,760	196	795	750	190	278	77	119	347	37	10	12
25.....	894	196	612	800	200	258	74	109	262	40	10	12
26.....	515	203	448	780	210	247	71	107	229	165	12	12
27.....	1,160	212	422	740	230	258	74	103	212	370	14	14
28.....	1,240	190	357	700	300	236	81	99	182	166	29	13
29.....	636	184	274	650	.....	216	81	99	162	75	51	14
30.....	451	176	200	600	.....	206	81	99	190	54	67	15
31.....	537	.....	190	550	.....	203	.....	99	.....	47	26	.....

*Winter discharge measurement made on this day.

Cedar River at Mitchell, Iowa

LOCATION.—Staff gage, lat. 43°19', long. 92°52', in sec. 8, T. 98 N., R. 17 W., in tailrace of hydroelectric plant of Central States Power & Light Corporation at Mitchell, 8 miles downstream from Deer Creek and 10 miles upstream from Rock Creek.

DRAINAGE AREA.—845 square miles.

RECORDS AVAILABLE.—July 1933 to September 1942 (discontinued).

AVERAGE DISCHARGE.—9 years, 288 second-feet.

EXTREMES.—Maximum discharge observed during 1941-42 year, 11,400 second-feet June 29 (gage height, 89.1 feet); minimum, about 27 second-feet many times from Feb. 18 to May 22 when power plant was shut down.

1933-41: Maximum discharge observed, 13,000 second-feet Apr. 4, 1934 (gage height, 89.7 feet), from rating curve extended above 7,000 second-feet; minimum observed, about 5 second-feet many times in period 1933-35 when power plant was shut down.

REMARKS.—Records poor. Flow regulated by power plant at station. Gage read hourly.

COOPERATION.—Gage-height record obtained through cooperation of Iowa Institute of Hydraulic Research with Central States Power & Light Corporation.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Discharge in second-feet				Run-off in Inches
		Maximum	Minimum	Mean	Per square mile	
October 1940	2,610	185	14	84.2	0.100	0.11
November	5,331	383	15	178	.211	.23
December	3,919	246	59	126	.149	.17
Calendar year 1940	50,012	2,940	12	137	.162	2.18
January 1941	4,368	276	57	141	.167	.19
February	3,474	227	63	124	.147	.15
March	30,929	3,480	97	998	1.18	1.36
April	34,453	9,620	262	1,148	1.36	1.52
May	10,331	2,810	54	333	.394	.45
June	24,339	2,740	185	811	.960	1.07
July	9,889	2,160	59	319	.378	.44
August	2,830	145	32	91.3	.108	.12
September	6,543	1,220	40	218	.258	.29
Water year 1940-41	139,016	9,620	14	381	.451	6.10
October 1941	12,047	829	125	389	.460	.53
November	25,210	4,930	197	840	.994	1.11
December	7,896	409	132	255	.302	.35
Calendar year 1941	172,309	9,620	32	472	.559	7.58
January 1942	7,220	458	114	233	.276	.32
February	4,979	263	102	178	.211	.22
March	27,440	4,610	73	885	1.05	1.21
April	10,863	660	172	362	.428	.48
May	14,660	1,750	173	473	.560	.65
June	34,880	5,890	198	1,163	1.38	1.54
July	24,833	6,570	153	801	.948	1.09
August	16,467	3,040	84	531	.628	.72
September	10,956	1,370	86	365	.432	.48
Water year 1941-42	197,451	6,570	73	541	.640	8.70

Cedar River at Mitchell, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940–41												
1	49	117	85	249	123	97	746	200	2,290	2,160	86	65
2	69	165	145	276	102	110	820	243	1,690	1,830	145	74
3	65	15	152	213	97	857	710	257	996	829	62	74
4	90	95	94	164	110	726	1,010	204	866	488	137	118
5	132	98	114	188	97	612	996	177	713	395	128	74
6	48	95	118	233	97	642	1,210	243	453	240	105	110
7	97	95	195	152	123	759	833	204	408	297	98	40
8	97	109	59	176	123	1,550	754	205	312	241	89	355
9	79	149	108	132	63	2,690	710	204	309	241	131	289
10	76	75	119	150	110	3,480	612	230	264	254	32	140
11	94	308	125	187	97	2,030	643	99	469	180	104	131
12	185	173	92	83	110	942	372	194	1,280	224	111	65
13	37	204	83	137	137	689	448	151	1,850	109	60	147
14	82	231	131	123	197	628	599	186	1,590	158	74	57
15	82	122	74	123	161	344	923	151	1,090	156	90	248
16	82	208	126	137	221	585	1,510	151	799	142	114	457
17	94	101	90	123	138	199	1,350	193	710	142	49	1,220
18	37	193	77	123	227	322	9,620	98	471	156	98	679
19	114	182	105	70	137	326	3,140	151	309	210	99	366
20	14	231	114	137	137	678	1,590	131	273	111	90	292
21	88	269	186	123	110	1,420	1,350	124	299	140	82	133
22	64	345	90	119	150	1,870	882	138	189	115	74	366
23	88	383	170	123	83	1,400	664	157	204	131	118	155
24	76	231	110	110	110	989	642	184	194	126	100	112
25	75	301	106	123	97	819	565	54	185	113	85	138
26	113	230	162	57	97	976	503	131	265	149	85	107
27	22	177	175	110	110	1,060	262	138	631	59	82	159
28	174	101	246	110	110	1,200	384	174	1,390	117	74	49
29	64	134	127	110	.....	1,390	335	459	1,100	142	65	129
30	101	194	175	97	.....	781	270	2,200	2,740	117	131	194
31	122	.....	166	110	.....	758	.....	2,810	.....	117	32	.....
1941–42												
1	157	2,420	339	208	231	73	660	501	3,750	1,060	678	125
2	151	4,930	342	143	251	141	660	433	2,230	690	1,020	144
3	169	3,140	325	222	263	201	660	411	1,750	481	1,270	135
4	188	1,490	279	148	232	174	660	379	2,500	311	772	239
5	125	1,290	311	215	223	213	575	375	2,660	237	397	135
6	229	973	328	175	223	277	365	487	2,260	316	452	86
7	829	1,240	132	156	245	317	513	696	1,040	337	2,300	219
8	257	849	285	140	160	234	519	1,080	1,020	212	3,040	198
9	660	708	207	150	214	295	478	754	660	251	804	167
10	476	688	159	157	176	223	403	593	660	153	860	129
11	356	535	159	114	190	223	300	542	539	239	643	148
12	226	426	269	163	163	253	322	530	724	214	433	245
13	225	396	249	137	190	246	281	553	722	1,710	335	230
14	263	587	139	163	256	327	222	535	407	6,570	290	660
15	636	519	221	176	105	256	272	430	410	3,020	295	451
16	598	428	225	176	185	921	214	352	354	1,650	203	198
17	340	455	214	201	140	1,070	262	334	274	1,100	244	216
18	347	462	221	123	116	681	257	280	428	1,040	183	409
19	181	374	219	189	162	962	176	366	347	660	243	1,370
20	316	436	272	228	134	2,120	187	256	276	418	191	1,320
21	299	333	176	182	181	4,610	232	333	245	208	180	694
22	229	404	258	222	120	2,780	177	222	248	321	188	560
23	242	263	350	236	102	1,580	190	236	216	241	96	401
24	386	240	409	323	114	1,310	172	173	207	254	209	324
25	380	254	360	355	138	1,110	272	222	223	223	160	335
26	308	302	309	458	155	1,320	189	374	198	243	191	309
27	641	197	293	436	108	2,100	391	374	311	228	153	262
28	818	257	147	446	202	1,280	373	399	761	213	179	408
29	825	323	216	412	.....	775	503	363	5,890	252	207	450
30	660	291	239	407	.....	708	378	327	3,570	791	84	389
31	530	.....	244	359	.....	660	.....	1,750	.....	1,190	167	.....

Cedar River at Janesville, Iowa

LOCATION.—Chain gage, lat. 42°39′, long. 92°28′, in sec. 35, T. 91 N., R. 14 W., at highway bridge at Janesville, 3 miles upstream from Shell Rock River.

DRAINAGE AREA.—1,660 square miles.

RECORDS AVAILABLE.—April 1905 to September 1906, May 1915 to September 1927, November 1932 to September 1942 (discontinued).

AVERAGE DISCHARGE.—21 years (1915-27, 1933-42), 664 second-feet.

EXTREMES.—Maximum discharge observed during 1941-42 year, 9,660 second-feet July 16 (gage height, 9.11 feet); minimum observed, 206 second-feet Mar. 2 (gage height, 1.52 feet).

1905-6, 1915-27, 1932-41: Maximum discharge observed, 27,700 second-feet Apr. 1, 1933 (gage height, 15.43 feet); minimum observed, 28 second-feet Oct. 21, 1922.

REMARKS.—Records fair except those for periods of ice effect, which are poor. Diurnal fluctuation during low water caused by power plant at Waverly, 9 miles above station. Gage read twice daily.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Discharge in second-feet				Run-off in Inches
		Maximum	Minimum	Mean	Per square mile	
October 1940	8,333	505	173	269	0.162	0.19
November	16,719	1,040	202	557	.336	.37
December	13,899	610	330	448	.270	.31
Calendar year 1940	132,267	3,970	65	361	.217	2.95
January 1941	11,410	900	250	368	.222	.26
February	8,590	480	230	307	.185	.19
March	69,245	6,000	270	2,234	1.35	1.55
April	69,999	8,040	969	2,333	1.41	1.57
May	22,805	3,520	280	736	.443	.51
June	54,460	4,470	625	1,815	1.09	1.22
July	22,368	2,650	254	722	.435	.50
August	7,894	345	165	255	.154	.18
September	13,923	1,640	180	464	.280	.31
Water year 1940–41	319,645	8,040	165	876	.528	7.16
October 1941	19,280	1,030	333	622	.375	.43
November	40,836	4,550	498	1,361	.820	.91
December	15,809	858	291	510	.307	.35
Calendar year 1941	356,619	8,040	165	977	.589	7.98
January 1942	20,597	1,500	300	664	.400	.46
February	20,284	1,400	350	724	.436	.45
March	58,170	6,140	254	1,876	1.13	1.30
April	25,354	1,490	512	845	.509	.57
May	30,590	1,760	540	987	.595	.69
June	77,884	7,440	685	2,596	1.56	1.74
July	68,133	8,820	725	2,198	1.32	1.53
August	37,832	3,170	393	1,220	.735	.85
September	25,119	1,750	484	837	.504	.56
Water year 1941–42	439,888	8,820	254	1,205	.726	9.84

Note—Stage-discharge relation affected by ice Nov. 15-20, Nov. 28 to Dec. 8, Dec. 13-31, 1940; Jan. 1 to Mar. 2, Mar. 11-14, Dec. 11, 12, 1941; Jan. 2 to Feb. 3, Feb. 17-21, 1942.

Cedar River at Janesville, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940–41												
1	457	297	600	500	270	270	2,710	935	4,170	1,620	333	180
2	505	309	600	700	250	350	2,560	867	4,220	2,650	315	228
3	484	321	550	900	230	926	2,110	816	4,470	2,310	220	233
4	387	233	500	600	290	1,540	2,920	749	3,400	1,480	202	280
5	345	202	450	400	260	2,070	3,170	610	2,050	1,140	309	188
6	345	315	*610	450	260	2,000	3,040	648	1,560	733	259	197
7	224	309	500	500	260	2,300	2,970	655	1,360	901	269	184
8	224	254	480	450	240	2,300	2,480	632	1,160	850	291	1,640
9	224	264	444	400	260	2,570	1,880	596	1,070	765	264	678
10	215	285	484	370	280	4,460	1,810	610	994	749	210	505
11	173	387	533	340	290	6,000	1,750	625	1,000	632	165	505
12	197	910	418	320	300	4,500	1,550	393	1,230	610	345	351
13	269	782	350	310	400	3,200	1,560	464	3,690	491	259	303
14	243	625	340	300	480	*2,200	1,220	582	3,260	369	303	333
15	285	550	330	300	*460	1,800	1,210	498	3,220	484	303	280
16	249	500	330	300	440	1,440	1,590	554	2,840	498	243	1,010
17	228	500	330	300	400	1,150	1,910	444	2,010	484	188	424
18	238	550	330	250	310	901	1,710	457	1,640	431	173	547
19	243	650	330	320	360	918	2,700	285	1,300	540	259	618
20	297	749	350	350	350	1,100	8,040	470	1,060	431	321	693
21	180	799	350	310	320	1,210	5,650	444	978	264	249	693
22	224	901	350	320	300	*2,490	3,730	438	867	399	280	662
23	249	1,040	350	280	290	3,400	2,620	457	876	405	224	512
24	264	969	370	270	270	3,540	1,950	381	782	444	238	438
25	233	935	400	270	260	2,860	1,550	431	678	393	220	431
26	228	816	400	260	260	2,300	1,430	280	640	381	259	424
27	180	717	600	260	250	2,050	1,090	444	625	393	291	387
28	177	500	600	270	250	2,120	1,100	1,280	640	254	210	363
29	197	450	580	270	.....	2,340	1,020	1,290	850	418	254	224
30	224	600	540	280	.....	2,340	969	1,950	1,820	444	228	412
31	*345	.....	500	260	.....	2,600	.....	3,520	.....	405	210	.....
1941–42												
1	470	2,070	431	457	1,400	418	1,490	717	3,340	6,420	2,440	575
2	484	2,340	575	350	1,200	254	1,300	944	5,200	6,330	3,170	725
3	484	2,990	484	300	1,150	498	1,310	892	7,440	2,310	2,220	1,160
4	387	4,550	589	400	1,130	610	1,300	944	6,790	1,710	1,910	648
5	533	3,480	540	450	1,040	603	1,220	1,140	4,550	1,220	2,030	589
6	333	2,380	568	450	994	733	1,170	960	5,960	1,400	1,820	554
7	662	2,000	568	430	944	901	1,090	1,220	6,060	1,130	1,050	484
8	725	1,930	547	410	867	833	986	1,520	4,270	994	1,050	610
9	693	1,710	*512	400	717	842	969	1,720	2,920	901	2,610	632
10	749	1,460	345	400	782	816	952	1,760	2,480	969	2,630	505
11	774	1,160	320	400	765	892	952	1,360	4,240	1,060	1,960	533
12	741	1,060	300	370	717	935	918	1,080	2,260	876	1,660	547
13	749	986	369	400	648	816	858	1,280	1,680	858	1,150	519
14	662	918	369	400	568	765	808	1,290	1,570	1,380	1,040	774
15	554	884	291	420	670	774	790	1,140	1,540	2,080	978	824
16	533	850	405	400	412	1,090	693	1,010	1,110	8,820	926	782
17	512	867	321	420	350	2,480	648	960	1,030	6,120	858	790
18	701	808	418	*390	450	3,560	648	892	1,000	3,500	733	774
19	693	824	519	500	600	3,220	640	816	935	2,730	685	1,110
20	561	850	491	550	600	2,250	512	808	1,020	1,880	610	1,220
21	618	808	589	600	600	2,820	582	749	944	1,540	618	1,750
22	512	799	540	650	596	4,100	575	733	910	1,100	575	1,690
23	589	741	618	750	533	6,140	561	693	790	1,060	561	1,140
24	568	774	858	900	625	4,520	547	662	709	1,000	393	1,060
25	533	685	782	1,000	*526	2,860	554	540	741	918	568	944
26	554	625	782	1,200	498	2,540	575	625	685	1,060	603	994
27	603	625	790	1,400	438	2,360	547	540	709	833	554	1,010
28	648	568	670	1,500	464	2,590	685	648	701	749	709	774
29	625	596	431	1,400	.....	3,080	749	858	2,070	725	648	717
30	1,000	498	418	1,400	.....	2,160	725	799	4,230	2,990	603	685
31	1,030	.....	369	1,500	.....	1,710	.....	1,290	.....	3,470	470	.....

*Winter discharge measurement made on this day.

Cedar River at Waterloo, Iowa

LOCATION.—Water-stage recorder, lat. 42°30'00", long. 92°19'40" in NW¼ sec. 25, T. 89 N., R. 13 W., in Waterloo, 0.3 mile upstream from Eleventh Avenue Bridge and about one mile downstream from Blackhawk Creek. Datum of gage is 824.09 feet above mean sea level, datum of 1929.

DRAINAGE AREA.—5,190 square miles.

RECORDS AVAILABLE.—February 1941 to September 1942.

EXTREMES.—Maximum discharge during 1941-42 year, 23,000 second-feet June 4 (gage height, 12.22 feet); minimum, 984 second-feet Aug. 25 (gage height, 5.23 feet).

Maximum discharge during period February to September 1941, 11,700 second-feet Apr. 21 (gage height, 9.23 feet); minimum, 468 second-feet Sept. 2, 1941 (gage height, 4.99 feet).

REMARKS.—Records fair except those for periods of ice effect, which are poor. Some regulation of flow by power plants above station.

COOPERATION.—Station operated through cooperation of Corps of Engineers, U. S. Army, and City of Waterloo; gage-height record collected in collaboration with U. S. Weather Bureau.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Discharge in second-feet				Run-off in Inches
		Maximum	Minimum	Mean	Per square mile	
January 1941						
February 9-17	15,450	2,410	1,110	1,717	0.331	0.11
March 13-31	106,490	9,190	2,390	5,605	1.08	.76
April	156,330	9,580	2,840	5,211	1.00	1.12
May	52,434	5,770	914	1,691	.326	.38
June	154,130	10,300	1,960	5,138	.990	1.10
July	62,900	4,640	1,090	2,029	.391	.45
August	23,352	1,020	630	753	.145	.17
September	53,292	3,150	534	1,776	.342	.38
Water year 1940-41						
October 1941	88,550	5,280	1,300	2,856	.550	.63
November	168,350	12,200	2,760	5,612	1.08	1.21
December	72,300	3,880	1,230	2,332	.449	.52
Calendar year 1941						
January 1942	71,060	4,550	1,000	2,292	.442	.51
February	65,180	4,490	1,450	2,328	.449	.47
March	185,170	12,700	1,540	5,973	1.15	1.33
April	89,790	5,120	1,910	2,993	.577	.64
May	97,300	4,930	1,560	3,139	.605	.70
June	230,960	21,600	2,520	7,699	1.48	1.65
July	188,800	16,300	2,870	6,090	1.17	1.35
August	167,650	21,600	1,880	5,408	1.04	1.20
September	104,080	6,940	1,740	3,469	.668	.75
Water year 1941-42	1,529,190	21,600	1,000	4,190	.807	10.96

Cedar River at Waterloo, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940–41												
1	.....	.....	.....	.....	.....	.....	5,570	2,650	8,060	3,970	1,020	602
2	.....	.....	.....	.....	.....	.....	5,210	2,490	8,300	4,610	930	534
3	.....	.....	.....	.....	.....	.....	4,640	2,440	8,380	4,640	848	615
4	.....	.....	.....	.....	.....	.....	5,150	2,280	10,300	3,850	831	630
5	.....	.....	.....	.....	.....	.....	7,080	2,100	9,040	3,240	814	630
6	.....	.....	.....	.....	.....	.....	7,430	1,840	6,230	2,790	831	561
7	.....	.....	.....	.....	.....	.....	6,980	1,520	5,180	2,570	831	660
8	.....	.....	.....	.....	.....	.....	6,570	1,670	4,330	2,390	831	2,820
9	.....	.....	.....	.....	1,150	.....	5,800	1,600	3,940	2,230	765	3,150
10	.....	.....	.....	.....	1,170	.....	5,340	1,540	3,580	2,160	735	3,150
11	.....	.....	.....	.....	1,110	.....	5,090	1,470	3,550	1,840	690	2,650
12	.....	.....	.....	.....	1,190	.....	4,740	1,560	3,880	1,760	705	2,080
13	.....	.....	.....	.....	1,980	9,190	4,680	1,190	7,400	1,630	765	1,700
14	.....	.....	.....	.....	2,410	7,150	4,270	1,250	9,840	1,580	765	1,450
15	.....	.....	.....	.....	2,330	5,670	3,730	1,300	8,480	1,390	720	1,630
16	.....	.....	.....	.....	2,230	4,770	3,700	1,250	7,740	1,450	705	2,760
17	.....	.....	.....	.....	1,880	2,390	3,730	1,170	6,470	1,430	705	2,960
18	.....	.....	.....	.....	.....	2,520	3,640	1,070	5,180	1,410	660	3,040
19	.....	.....	.....	.....	.....	2,930	3,580	1,060	4,460	1,490	660	2,870
20	.....	.....	.....	.....	.....	3,940	5,020	966	3,760	1,960	750	2,620
21	.....	.....	.....	.....	.....	6,400	9,580	1,110	3,380	1,880	831	2,410
22	.....	.....	.....	.....	.....	8,380	9,550	1,060	3,010	1,560	765	2,200
23	.....	.....	.....	.....	.....	8,830	7,260	1,040	2,600	1,540	690	1,880
24	.....	.....	.....	.....	.....	8,380	5,700	1,040	2,600	1,390	735	1,700
25	.....	.....	.....	.....	.....	6,780	4,710	984	2,310	1,300	720	1,520
26	.....	.....	.....	.....	.....	5,440	4,330	1,020	2,130	1,210	660	1,410
27	.....	.....	.....	.....	.....	4,740	3,760	914	1,960	1,190	690	1,350
28	.....	.....	.....	.....	.....	4,610	3,410	1,520	2,130	1,130	735	1,250
29	.....	.....	.....	.....	.....	4,610	3,240	2,490	2,650	1,110	675	1,210
30	.....	.....	.....	.....	.....	4,610	2,840	3,070	3,260	1,110	660	1,250
31	.....	.....	.....	.....	.....	5,150	.....	5,770	.....	1,090	630	.....
1941–42												
1	1,300	6,060	2,760	1,630	4,490	1,540	5,120	2,930	4,740	10,600	21,600	1,740
2	1,470	9,580	2,710	b1,300	4,060	1,700	4,860	3,040	10,400	11,800	19,100	2,020
3	1,540	12,200	2,730	b1,000	3,580	1,790	4,640	2,900	13,000	9,010	17,500	3,700
4	1,520	12,100	2,650	b1,300	3,260	2,540	4,490	3,120	21,600	5,600	11,200	5,080
5	1,650	11,400	2,650	b1,700	2,960	2,930	4,240	3,580	19,100	4,460	8,410	4,620
6	2,080	9,440	2,540	b1,900	2,900	3,550	4,060	3,640	14,400	4,330	6,130	2,960
7	2,930	8,480	2,440	b2,000	2,760	4,300	3,790	3,910	15,500	4,270	4,770	2,510
8	4,520	7,740	*2,390	b2,100	2,760	4,740	3,550	4,890	14,200	3,640	4,150	2,400
9	5,280	7,080	2,310	b2,000	2,570	4,210	3,350	4,930	10,500	3,260	4,430	2,510
10	5,050	6,270	1,740	b2,000	2,440	3,730	3,260	4,800	7,460	3,150	5,370	2,710
11	4,400	5,600	1,230	b1,950	2,390	3,580	3,100	4,240	9,620	3,610	4,520	3,080
12	3,850	5,120	1,300	b1,800	2,360	3,640	2,980	4,180	10,400	3,350	4,180	2,710
13	3,380	4,830	1,560	b1,700	2,390	3,580	2,840	4,740	8,410	3,150	3,460	2,420
14	3,070	4,770	1,670	b1,700	2,260	3,290	2,760	4,640	8,240	4,640	3,120	3,940
15	2,790	4,580	1,840	b1,700	2,200	3,260	2,650	4,180	6,400	6,200	2,930	6,220
16	2,520	4,490	2,100	b1,650	2,180	3,850	2,520	3,580	5,020	9,330	2,980	6,940
17	2,360	4,270	2,230	*b1,600	1,450	6,640	2,330	3,180	4,430	12,500	2,760	4,440
18	2,390	4,180	2,200	b1,600	1,520	10,900	2,180	3,010	3,970	9,620	2,540	3,260
19	2,360	4,090	2,230	b1,700	b1,600	12,700	2,000	2,960	3,790	7,680	2,980	3,260
20	2,330	3,970	2,230	b1,700	b1,700	11,100	2,160	2,840	3,700	6,570	5,280	3,800
21	2,360	3,970	2,160	b1,850	1,790	9,440	1,980	2,710	3,790	5,370	4,610	3,860
22	2,490	3,880	2,260	b2,100	1,840	11,000	2,000	2,600	3,610	4,360	3,670	3,910
23	2,760	3,610	2,520	2,410	1,720	11,500	1,980	2,180	3,100	3,850	2,840	3,540
24	2,790	3,350	3,460	2,650	1,600	11,100	1,980	2,030	2,600	3,460	2,390	3,390
25	2,540	3,040	3,880	2,960	1,700	8,690	1,960	1,880	2,650	3,260	1,880	3,360
26	2,410	2,900	3,640	3,410	*1,650	7,220	1,910	1,700	2,620	3,640	2,180	3,200
27	2,440	2,930	3,290	3,910	1,560	6,780	2,280	1,650	2,540	3,910	2,520	3,330
28	2,710	2,870	2,460	4,240	1,490	6,840	2,790	1,560	2,520	3,210	2,870	3,310
29	3,320	2,790	1,790	4,460	.....	6,980	3,070	1,860	3,790	2,870	2,730	3,000
30	3,760	2,760	1,490	4,550	.....	6,610	2,960	1,930	8,860	11,800	2,490	2,860
31	4,180	.....	1,840	4,490	.....	5,440	.....	1,910	.....	16,300	2,060	.....

*Winter discharge measurement made on this day.
(b) Stage-discharge relation affected by ice.

Cedar River at Cedar Rapids, Iowa

LOCATION.—Water-stage recorder, lat. 41°58'15", long. 91°40'05", in sec. 28, T. 83 N., R. 7 W., in Cedar Rapids, 500 feet upstream from Eighth Avenue Bridge and 2.7 miles upstream from Prairie Creek. Datum of gage is 700.33 feet above mean sea level, datum of 1929 (levels by Corps of Engineers, U. S. Army).

DRAINAGE AREA.—6,640 square miles.

RECORDS AVAILABLE.—February 1903 to September 1942.

AVERAGE DISCHARGE.—39 years, 2,992 second-feet.

EXTREMES.—Maximum discharge during 1941-42 year, 33,900 second-feet Aug. 3 (gage height, 12.60 feet); minimum, 1,020 second-feet (regulated) Jan. 3 (gage height, 3.02 feet); minimum daily, 1,400 second-feet Jan. 4.

1903-41: Maximum discharge, 72,000 second-feet Mar. 19, 1929 (gage height, 20.1 feet); minimum, 178 second-feet (regulated) Sept. 25, 1935; minimum daily, 236 second-feet July 1, 1934.

Flood of June 1851 reached a stage of about 20 feet.

REMARKS.—Records good except those for periods of ice effect, which are poor. Diurnal fluctuation caused by power plant half a mile above station. Flood stage, about 13 feet.

COOPERATION.—Station operated through cooperation of City of Cedar Rapids; gage-height record collected in collaboration with U. S. Weather Bureau. Results of some discharge measurements furnished by Corps of Engineers, U. S. Army.

NOTE.—A table of precipitation, temperature, runoff and water loss data, duration curves of daily discharge, and graphs showing trends in these data for the Cedar River above Cedar Rapids, 1903-40, are given on pages 58-60 of Iowa Geological Survey Water-Supply Bulletin No. 1.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Discharge in second-feet				Run-off in Inches
		Maximum	Minimum	Mean	Per square mile	
October 1940	35,149	1,420	954	1,134	0.171	0.20
November	73,850	5,440	1,000	2,462	.371	.41
December	60,630	3,360	1,080	1,956	.295	.34
Calendar year 1940	535,219	5,440	280	1,462	.220	2.99
January 1941	67,360	3,860	1,500	2,173	.327	.38
February	53,780	3,720	1,200	1,921	.289	.30
March	176,610	11,900	1,250	5,697	.858	.99
April	209,790	10,600	4,060	6,993	1.05	1.18
May	62,180	3,770	1,140	2,006	.302	.35
June	163,900	9,340	2,270	5,463	.823	.92
July	73,190	4,760	1,220	2,361	.356	.41
August	26,287	1,270	667	848	.128	.15
September	97,648	12,200	655	3,255	.490	.55
Water year 1940–41	1,100,374	12,200	655	3,015	.454	6.18
October 1941	136,720	7,760	2,200	4,410	.664	.77
November	218,000	13,400	3,580	7,267	1.09	1.22
December	94,060	4,790	1,560	3,034	.457	.53
Calendar year 1941	1,379,525	13,400	655	3,780	.569	7.75
January 1942	81,200	5,200	1,400	2,619	.394	.45
February	91,210	5,400	1,900	3,258	.491	.51
March	200,210	12,000	2,340	6,458	.973	1.12
April	117,110	7,210	2,480	3,904	.588	.66
May	124,270	5,590	2,500	4,009	.604	.70
June	255,270	18,100	2,690	8,509	1.28	1.43
July	194,650	9,880	4,110	6,279	.946	1.09
August	257,830	32,900	3,090	8,317	1.25	1.44
September	131,280	6,670	2,920	4,376	.659	.74
Water year 1941–42	1,901,810	32,900	1,400	5,210	.785	10.66

Note—Stage-discharge relation affected by ice Nov. 12-16, Dec. 1, 17, 1940; Jan. 4-7, 17-20, 27, Feb. 3, 4, 6-10, 17-19, 22, 23, 25-28, Mar. 1, 1941; Jan. 4 to Feb. 3, Feb. 12-24, 1942.

Cedar River at Cedar Rapids, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940–41												
1	1,160	1,320	2,100	3,720	1,580	1,300	5,840	3,770	3,720	3,380	1,270	667
2	1,140	1,580	1,920	3,860	1,490	1,250	6,170	3,440	5,700	3,770	1,110	655
3	1,010	1,490	1,920	3,660	1,400	1,520	6,680	3,200	6,960	4,180	1,130	724
4	1,190	1,450	1,470	3,000	1,400	2,230	8,120	3,070	7,760	4,760	1,100	712
5	1,200	1,420	1,080	2,000	1,380	2,120	7,870	2,890	8,080	4,580	1,020	724
6	1,190	1,380	*1,220	1,500	1,350	2,380	7,560	2,840	8,940	3,860	847	724
7	1,130	1,320	1,580	1,700	1,300	3,360	8,150	2,670	9,340	3,520	859	772
8	1,280	1,330	1,900	1,940	1,300	3,940	8,400	2,360	7,100	3,580	886	7,890
9	1,270	1,320	2,250	1,970	1,300	4,150	8,080	2,070	6,000	3,280	873	12,200
10	1,240	1,320	2,450	2,360	1,250	4,240	7,520	2,070	5,180	2,760	886	9,700
11	1,270	1,400	2,520	2,410	1,200	4,330	6,650	2,050	4,640	2,550	847	5,150
12	1,220	1,300	2,250	2,380	1,300	4,480	6,140	1,940	4,480	2,290	822	4,030
13	1,160	1,150	2,550	2,500	2,820	5,280	5,840	1,920	4,270	2,030	797	3,280
14	1,080	1,000	2,360	2,620	3,720	7,200	5,500	1,880	5,050	1,940	701	2,720
15	1,080	1,100	1,670	2,550	3,410	f8,760	5,240	1,730	7,170	1,820	809	2,450
16	1,170	1,150	1,350	2,430	3,220	f8,690	4,830	1,920	8,760	1,730	809	2,890
17	1,130	2,030	1,250	2,400	3,000	6,580	4,990	1,730	8,940	1,520	772	5,280
18	1,080	2,620	1,220	2,200	2,700	3,630	8,330	1,610	8,220	1,730	772	4,830
19	1,130	3,380	1,240	1,900	2,500	2,860	10,600	1,520	6,860	1,630	772	4,030
20	1,040	4,090	1,370	1,700	2,270	*3,940	7,420	1,450	5,500	1,580	797	3,690
21	1,040	5,440	1,520	1,650	2,160	10,400	6,920	1,440	4,640	1,710	667	3,380
22	1,050	4,700	1,580	1,510	2,000	11,900	8,300	1,380	3,940	1,900	809	3,070
23	1,050	4,240	1,600	1,780	1,900	10,100	10,000	1,480	2,600	1,800	859	2,790
24	968	4,390	1,650	1,880	1,780	10,400	10,500	1,420	3,250	1,650	847	2,620
25	981	4,700	1,920	1,820	1,650	10,400	8,550	1,370	2,920	1,580	760	2,340
26	968	4,580	2,360	1,760	1,550	9,700	6,650	1,300	2,720	1,490	747	2,200
27	968	4,150	2,520	1,700	1,450	8,080	5,440	1,280	2,480	1,420	809	1,900
28	954	3,470	2,520	1,630	1,400	6,410	4,960	1,280	2,270	1,370	785	1,880
29	1,420	2,760	2,760	1,670	.....	5,800	4,480	1,140	2,570	1,280	689	1,800
30	1,420	2,270	3,170	1,560	.....	5,540	4,060	1,710	2,840	1,280	701	2,550
31	1,160	.....	3,360	1,600	.....	5,640	.....	2,250	.....	1,220	735	.....
1941–42												
1	2,520	9,150	3,490	2,180	5,400	2,380	7,210	3,220	2,690	5,400	g15,700	3,250
2	2,200	11,200	3,470	1,900	5,300	2,340	6,540	3,120	3,360	7,440	g23,300	2,920
3	2,360	12,400	3,380	1,520	4,700	2,520	6,090	3,440	6,000	8,950	g32,900	3,250
4	2,480	11,100	3,280	1,400	4,250	2,790	5,780	3,490	8,060	9,840	28,900	3,600
5	3,220	12,200	3,360	1,500	4,490	3,220	5,530	3,520	9,940	9,640	21,500	4,640
6	3,630	13,400	3,250	1,800	4,490	3,830	5,340	4,000	12,900	7,280	15,800	5,310
7	4,550	13,200	3,200	2,100	4,170	4,110	5,120	4,340	18,100	5,650	11,400	4,670
8	7,760	12,100	3,040	2,300	4,200	4,460	4,820	4,340	17,800	5,090	8,060	3,770
9	7,370	10,500	2,990	2,500	3,770	4,940	4,550	4,820	15,900	4,670	6,320	4,940
10	7,080	9,250	2,520	2,600	3,520	4,940	4,370	5,310	15,300	4,850	5,500	3,830
11	7,080	8,460	2,360	2,600	3,220	4,700	4,170	5,500	14,800	4,730	5,740	3,550
12	6,540	7,530	1,820	2,400	3,100	4,400	4,020	5,590	14,500	4,220	5,960	3,550
13	5,530	6,700	1,560	2,300	3,000	4,370	3,770	5,340	12,800	4,250	5,340	3,720
14	5,530	6,190	1,940	*2,200	3,000	4,370	3,690	5,490	13,100	6,000	4,940	3,440
15	4,940	5,870	1,860	2,100	2,900	4,280	3,580	5,500	11,500	5,900	4,490	4,730
16	4,340	5,620	2,320	2,000	2,900	4,430	3,520	5,310	9,780	g6,030	4,140	5,470
17	3,830	5,400	2,740	1,900	2,700	5,280	3,330	4,850	8,160	6,600	3,880	6,480
18	3,580	5,280	3,250	1,900	2,200	6,350	3,200	4,550	6,250	7,830	3,720	6,670
19	3,410	5,120	3,300	2,000	2,000	7,570	3,020	4,520	5,500	9,510	3,470	5,900
20	3,380	5,160	2,760	2,100	1,900	9,220	2,860	4,140	5,340	9,880	3,410	4,120
21	3,490	5,060	2,740	2,300	2,200	11,100	2,790	3,940	5,710	8,160	4,400	4,700
22	3,940	4,880	2,720	2,400	2,500	12,000	2,740	3,770	5,090	6,800	5,400	4,700
23	4,850	4,760	3,020	2,500	*2,650	11,000	2,640	3,550	4,850	g5,340	4,820	4,670
24	4,490	4,550	4,020	2,700	2,600	10,700	2,600	3,360	4,370	g4,550	4,110	4,580
25	4,220	4,250	4,460	3,000	2,550	11,200	2,520	3,120	3,940	g4,110	3,520	4,250
26	3,880	4,000	4,790	3,500	2,570	11,400	2,500	2,990	3,690	g4,580	3,090	4,280
27	4,310	3,770	4,730	4,000	2,450	10,400	2,480	2,760	3,600	g4,550	3,150	4,280
28	4,110	3,720	4,250	4,500	2,480	8,750	2,500	2,690	3,490	g4,140	3,490	4,020
29	3,660	3,600	2,940	4,800	.....	7,830	2,740	2,550	4,580	g4,280	3,940	4,080
30	3,860	3,580	2,360	5,000	.....	7,700	3,090	2,500	4,170	g4,700	3,860	3,910
31	4,580	.....	2,140	5,200	.....	7,630	.....	2,740	.....	g9,680	3,580	.....

*Winter discharge measurement made on this day.
(f) Computed on basis of partly estimated gage heights.
(g) Computed from graph based on gage readings.

Cedar River near Conesville, Iowa

LOCATION.—Water-stage recorder, lat. 41°24'30", long. 91°17'25", in SW¼ sec. 2 (revised), T. 76 N., R. 4 W., at bridge on Muscatine County road C, 3½ miles northeast of Conesville, 5 miles downstream from Wapsinonoc Creek, and 9½ miles upstream from mouth. Datum of gage is 581.85 feet above mean sea level, datum of 1929 (levels by Corps of Engineers, U. S. Army).

DRAINAGE AREA.—7,840 square miles.

RECORDS AVAILABLE.—September 1939 to September 1942.

EXTREMES.—Maximum discharge during 1941-42 year, 31,300 second-feet Aug. 6 (gage height, 13.37 feet); minimum, 1,510 second-feet Jan. 4, 5 (gage height, 4.53 feet).

1939-41: Maximum discharge, 13,200 second-feet Mar. 24 (gage height, 10.68 feet); minimum observed, 323 second-feet Feb. 2, 1940, results of discharge measurement; minimum gage height, 3.20 feet July 25, 26, 28, 1940.

Maximum stage known, 16.0 feet in March 1929, from information furnished by local residents to Corps of Engineers, U. S. Army.

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

COOPERATION.—Records collected in cooperation with Corps of Engineers, U. S. Army.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Discharge in second-feet				Run-off in Inches
		Maximum	Minimum	Mean	Per square mile	
October 1940	39,900	1,480	1,130	1,287	0.164	0.19
November	77,320	5,460	1,150	2,577	.329	.37
December	63,890	3,190	1,300	2,061	.263	.30
Calendar year 1940	621,546	5,460	323	1,698	.217	2.94
January 1941	73,460	4,210	1,600	2,370	.302	.35
February	66,150	5,000	1,400	2,362	.301	.31
March	202,520	13,000	1,500	6,533	.833	.96
April	245,870	11,500	5,710	8,196	1.05	1.17
May	86,310	5,230	1,550	2,784	.355	.41
June	186,170	9,060	2,360	6,206	.792	.88
July	106,630	8,320	1,640	3,440	.439	.51
August	37,160	1,540	1,020	1,199	.153	.18
September	118,810	12,100	1,010	3,960	.505	.56
Water year 1940–41	1,304,190	13,000	1,010	3,573	.456	6.19
October 1941	183,980	9,620	3,000	5,935	.757	.87
November	269,560	15,300	4,660	8,985	1.15	1.28
December	119,460	5,580	2,450	3,854	.492	.57
Calendar year 1941	1,696,080	15,300	1,010	4,647	.593	8.05
January 1942	95,840	6,000	1,600	3,092	.394	.45
February	117,680	6,200	2,680	4,203	.536	.56
March	222,580	12,200	3,410	7,180	.916	1.06
April	145,920	8,840	2,840	4,864	.620	.69
May	136,140	5,990	2,720	4,392	.560	.65
June	279,330	17,700	2,760	9,311	1.19	1.33
July	220,050	11,400	4,800	7,098	.905	1.04
August	300,520	30,600	3,790	9,694	1.24	1.43
September	158,270	7,770	3,670	5,276	.673	.75
Water year 1941–42	2,249,330	30,600	1,600	6,163	.786	10.68

Note—Stage-discharge relation affected by ice Nov. 12-18, Dec. 3-9, 16-25, 1940; Jan. 7-10, Jan. 16 to Mar. 3, 1941; Jan. 5 to Feb. 19, 1942.

Cedar River near Conesville, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940–41												
1.....	1,440	1,460	2,540	3,510	1,750	1,600	6,570	5,230	2,360	8,320	1,540	1,020
2.....	1,380	1,350	2,220	3,970	1,700	1,500	6,570	4,870	3,970	7,350	1,470	1,040
3.....	1,340	1,440	2,000	4,210	1,600	1,900	6,990	4,500	5,500	5,230	1,450	1,010
4.....	1,310	1,550	1,700	4,150	1,600	2,340	8,110	4,190	6,390	5,010	1,400	1,060
5.....	1,260	1,520	1,350	3,500	1,600	2,260	9,080	3,920	7,210	5,220	1,380	1,050
6.....	1,350	1,510	1,300	2,160	1,600	2,260	9,300	3,760	7,630	5,330	1,340	1,040
7.....	1,380	1,480	1,400	1,600	1,500	2,500	8,700	3,630	8,180	5,120	1,300	1,040
8.....	1,340	1,460	1,800	1,700	1,500	3,060	8,700	3,480	9,000	4,370	1,230	1,460
9.....	1,290	1,470	2,300	1,800	1,500	3,760	9,080	3,190	8,550	4,080	1,230	7,990
10.....	1,370	1,490	2,570	2,000	1,500	4,170	9,040	2,850	7,690	4,630	1,230	10,500
11.....	1,370	1,520	2,700	2,090	1,400	4,120	8,580	2,730	6,810	7,050	1,280	12,100
12.....	1,340	1,500	2,730	2,530	1,400	3,720	7,870	2,660	6,150	4,080	1,310	10,400
13.....	1,350	1,300	2,780	2,850	2,700	5,330	7,270	2,560	5,650	3,280	1,200	6,150
14.....	1,360	1,150	2,560	2,850	5,000	7,610	6,870	2,460	5,420	2,880	1,180	4,870
15.....	1,310	1,250	2,340	2,840	4,600	7,210	6,470	2,450	6,220	2,630	1,160	4,060
16.....	1,230	1,600	1,800	2,700	4,200	*8,850	6,150	3,400	7,170	2,430	1,110	3,620
17.....	1,230	1,900	1,500	2,600	3,900	9,320	5,860	3,310	8,260	2,310	1,160	3,380
18.....	1,260	2,300	1,400	2,400	*3,700	8,110	6,710	2,610	9,060	2,250	1,180	4,660
19.....	1,230	3,010	1,300	2,200	3,300	7,790	9,520	2,360	8,850	2,260	1,140	5,770
20.....	1,230	3,700	1,300	1,900	3,000	6,450	11,400	2,170	8,010	2,120	1,120	4,910
21.....	1,230	4,780	1,400	1,800	2,800	7,830	11,500	2,030	6,730	2,020	1,100	4,420
22.....	1,180	5,460	1,500	1,700	2,500	9,690	8,470	2,000	5,710	1,940	1,090	4,060
23.....	1,170	4,660	1,600	1,600	2,300	11,700	8,620	2,010	4,990	2,110	1,050	3,870
24.....	1,170	4,610	1,700	1,800	2,100	13,000	9,650	1,870	4,440	2,220	1,100	3,380
25.....	1,160	4,870	1,900	2,000	2,000	11,600	10,600	1,840	4,050	2,030	1,060	3,170
26.....	1,130	4,910	2,230	2,000	1,900	11,300	10,600	1,780	3,630	1,890	1,100	2,920
27.....	1,130	4,570	2,430	1,900	1,800	11,100	8,550	1,710	3,360	1,800	1,060	2,590
28.....	1,140	3,690	2,720	1,800	1,700	10,100	7,070	1,640	4,890	1,740	1,040	2,420
29.....	1,300	f3,010	2,780	1,800	.....	8,360	6,260	1,610	4,680	1,630	1,070	2,320
30.....	1,440	f2,800	2,850	1,750	.....	7,250	5,710	1,550	5,610	1,660	1,060	2,530
31.....	1,480	.....	3,190	1,750	.....	6,730	.....	1,940	.....	1,640	1,020	.....
1941–42												
1.....	3,580	7,690	4,570	3,000	6,200	3,410	8,840	3,170	2,760	5,330	9,530	4,230
2.....	3,670	10,300	4,480	2,170	6,200	3,550	8,630	3,410	2,790	5,480	11,500	3,960
3.....	3,190	12,100	4,420	1,620	6,000	3,620	7,970	3,510	2,870	7,010	14,300	3,810
4.....	3,000	13,500	4,330	1,600	5,900	3,970	7,350	3,530	4,460	8,310	21,200	3,670
5.....	3,410	14,500	4,210	1,650	5,800	4,120	6,950	3,690	6,850	9,340	28,700	3,970
6.....	3,620	14,000	4,190	1,800	5,400	3,970	6,650	3,810	8,690	10,800	30,600	4,480
7.....	5,440	13,900	4,060	2,200	5,400	4,350	6,470	4,170	10,000	11,400	26,800	5,500
8.....	5,540	11,900	3,990	2,700	5,300	4,840	6,180	4,530	11,500	8,190	21,300	6,490
9.....	7,790	15,300	3,870	3,100	5,000	5,020	5,840	4,640	14,000	6,750	14,800	7,110
10.....	9,620	14,400	3,690	3,400	4,500	5,400	5,580	4,820	17,500	6,030	10,100	6,990
11.....	8,750	12,600	3,450	3,500	4,000	5,730	5,350	5,420	17,700	5,630	7,810	5,630
12.....	8,360	11,100	2,900	*3,400	4,000	5,580	5,080	5,800	17,300	5,630	7,170	4,700
13.....	7,930	9,950	2,780	3,100	3,900	5,230	4,850	5,990	17,300	5,140	7,250	4,510
14.....	7,230	8,900	2,540	2,900	3,900	5,200	4,640	5,960	17,000	6,220	6,820	4,440
15.....	7,090	8,190	2,450	2,700	3,800	5,230	4,510	5,780	15,500	8,250	6,360	4,420
16.....	6,530	7,650	2,540	2,500	3,700	5,390	4,370	5,880	14,700	7,530	5,860	5,220
17.....	5,770	7,290	2,680	2,400	3,600	5,860	4,230	5,880	13,400	7,010	5,350	6,090
18.....	5,180	7,030	3,060	2,300	3,300	6,260	4,250	5,690	11,300	6,990	4,990	6,470
19.....	4,950	7,030	3,510	2,300	3,100	6,910	3,850	5,270	8,880	7,770	4,720	7,770
20.....	4,640	6,670	3,790	2,400	2,900	7,890	3,670	5,060	7,650	8,860	4,460	7,450
21	4,440	6,470	3,550	2,500	2,680	9,030	3,500	4,840	7,710	9,850	4,230	6,390
22.....	4,660	6,370	3,310	2,700	2,800	10,300	3,330	4,500	7,210	9,740	4,440	5,610
23.....	8,190	6,180	3,450	2,800	3,060	11,400	3,240	4,260	6,690	8,190	5,560	5,370
24.....	9,170	5,920	3,920	3,000	3,650	12,200	3,120	4,030	6,150	6,750	5,610	5,270
25.....	7,230	5,710	4,570	3,500	3,510	11,900	3,030	3,790	5,670	5,690	4,990	5,180
26.....	6,390	5,440	5,270	4,000	3,480	11,700	2,950	3,580	5,220	5,040	4,370	4,950
27.....	5,900	5,160	5,580	4,500	3,290	12,000	2,900	3,380	4,780	4,890	3,990	4,780
28.....	6,130	4,910	5,540	5,000	3,310	12,200	2,870	3,170	4,550	5,200	3,790	4,760
29.....	5,940	4,740	5,120	5,400	.....	11,400	2,840	3,010	4,350	4,800	4,240	4,570
30.....	5,390	4,660	4,300	5,700	.....	9,850	2,880	2,850	4,850	5,120	5,060	4,480
31.....	5,250	.....	3,340	6,000	.....	9,070	.....	2,720	.....	7,110	4,610	.....

*Winter discharge measurement made on this day.
(f) Computed on basis of partly estimated gage heights.

Shell Rock River at Greene, Iowa

LOCATION.—Staff gage, lat. 42°54', long. 92°48', in sec. 1, T. 93 N., R. 17 W., in tailwater of Central States Power & Light Corporation's hydroelectric plant at Greene, about 5 miles upstream from Coldwater Creek.

DRAINAGE AREA.—1,375 square miles.

RECORDS AVAILABLE.—July 1933 to September 1942 (discontinued).

AVERAGE DISCHARGE.—9 years, 500 second-feet.

EXTREMES.—Maximum discharge during 1941-42 year, 6,800 second-feet June 1 (gage height, 97.4 feet); minimum, 34 second-feet Dec. 10, 12 (gage height, 90.4 feet).

1933-41: Maximum discharge, 12,000 second-feet June 25, 1938 (gage height, 101.70 feet), from rating curve extended above 7,000 second-feet; minimum, about 6 second-feet on many days in period 1935-36 when power plant was shut down.

REMARKS.—Records poor. Flow regulated by power plant at station.

COOPERATION.—Gage-height record obtained through cooperation of Iowa Institute of Hydraulic Research with Central States Power & Light Corporation.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Discharge in second-feet				Run-off in Inches
		Maximum	Minimum	Mean	Per square mile	
October 1940	7,632	385	129	246	0.179	0.21
November	21,329	1,880	280	711	.517	.58
December	13,519	938	260	436	.317	.37
Calendar year 1940	109,763	2,600	15	300	.218	2.99
January 1941	12,379	1,080	133	399	.290	.33
February	8,749	725	183	312	.227	.24
March	48,936	3,490	204	1,579	1.15	1.32
April	61,834	4,300	944	2,061	1.50	1.67
May	22,925	4,570	266	740	.538	.62
June	59,359	6,260	524	1,979	1.44	1.61
July	21,650	1,820	278	698	.508	.59
August	5,707	328	119	184	.134	.15
September	14,932	1,160	129	498	.362	.40
Water year 1940–41	298,951	6,260	119	819	.596	8.09
October 1941	29,881	2,220	459	964	.701	.81
November	52,852	4,840	741	1,762	1.28	1.43
December	18,549	940	318	598	.435	.50
Calendar year 1941	357,753	6,260	119	980	.713	9.67
January 1942	18,257	1,280	298	589	.428	.49
February	14,770	922	318	528	.384	.40
March	46,232	3,760	362	1,491	1.08	1.25
April	26,035	1,530	450	868	.631	.70
May	30,651	3,160	376	989	.719	.83
June	44,705	4,390	458	1,490	1.08	1.21
July	31,477	3,170	467	1,015	.738	.85
August	21,729	1,520	385	701	.510	.59
September	12,315	874	185	410	.298	.33
Water year 1941–42	347,453	4,840	185	952	.692	9.39

Shell Rock River at Greene, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940–41												
1	193	387	481	850	224	204	1,920	967	2,780	1,820	328	140
2	172	370	481	1,680	222	204	1,770	885	3,650	1,460	232	129
3	172	344	415	1,030	222	1,160	1,810	830	6,260	1,260	233	150
4	279	371	414	325	222	1,540	2,670	784	3,280	1,120	223	150
5	283	339	358	366	222	839	2,660	425	2,330	966	203	150
6	271	299	437	582	222	846	2,410	520	1,800	864	246	150
7	365	280	464	574	205	1,240	2,150	557	1,560	833	204	136
8	369	280	406	560	183	2,340	1,940	560	679	809	214	591
9	315	316	427	458	215	3,480	1,940	560	524	666	203	958
10	246	546	417	344	205	3,490	1,940	502	1,120	595	194	770
11	230	1,890	406	365	205	2,170	1,810	502	1,820	560	183	576
12	324	342	324	373	204	1,620	1,650	467	6,230	544	153	467
13	262	406	260	339	357	1,530	1,540	415	3,540	481	173	393
14	254	819	281	331	451	1,510	1,590	393	2,690	481	152	350
15	254	833	306	348	725	1,510	1,750	402	2,470	423	162	344
16	227	809	289	323	725	1,370	1,460	340	2,070	406	171	1,020
17	210	833	281	356	620	820	1,320	288	1,830	423	149	1,160
18	227	859	426	216	413	793	3,000	285	1,550	725	159	1,070
19	210	994	282	231	398	1,010	3,380	321	1,330	1,310	119	932
20	193	1,050	298	323	545	2,110	4,300	266	1,160	957	243	802
21	193	1,120	323	256	337	2,810	3,480	312	1,050	813	141	686
22	193	1,730	290	248	285	2,350	2,180	307	957	679	138	585
23	172	1,340	323	240	256	2,080	2,520	330	868	574	162	516
24	129	1,100	329	229	240	1,540	2,240	319	768	560	151	458
25	195	962	365	221	223	1,280	1,960	296	668	417	204	420
26	183	890	686	215	215	1,240	1,690	286	645	354	161	382
27	150	569	938	215	204	1,300	1,460	541	1,220	306	161	382
28	255	418	748	204	204	1,240	1,270	675	1,590	378	183	360
29	382	348	736	215	.....	1,460	1,030	1,600	1,210	278	161	330
30	385	485	683	133	.....	1,910	994	4,570	1,710	308	161	375
31	339	.....	645	229	.....	1,940	.....	3,420	.....	280	140	.....
1941–42												
1	472	4,040	840	433	852	362	1,530	1,110	4,390	1,050	1,080	344
2	459	4,840	807	298	922	407	1,530	859	4,110	812	905	413
3	507	3,810	665	298	745	496	1,390	895	4,280	585	814	422
4	461	3,260	622	394	669	598	1,270	1,040	3,620	538	812	340
5	526	2,880	585	458	665	690	1,160	1,010	2,310	530	730	185
6	665	3,060	532	468	665	763	1,050	1,100	2,460	663	665	294
7	1,560	2,750	510	426	652	984	1,040	1,700	1,730	513	665	309
8	2,220	2,420	538	383	585	802	1,040	1,600	1,470	510	665	293
9	1,770	1,950	523	362	585	679	1,040	1,270	1,310	513	665	308
10	1,380	1,820	368	369	585	659	949	1,150	1,260	513	788	308
11	1,130	1,610	346	351	585	666	940	1,240	1,160	510	840	279
12	962	1,500	318	351	585	676	861	1,570	1,070	467	711	282
13	822	1,420	502	372	585	665	788	1,280	988	650	665	279
14	739	1,480	482	383	410	665	725	1,060	923	1,940	665	293
15	665	1,420	510	426	549	730	662	890	795	2,620	665	264
16	665	1,280	510	372	471	1,940	662	840	683	3,170	665	264
17	665	1,280	510	404	394	2,970	509	840	618	2,200	665	264
18	665	1,180	582	436	318	2,790	566	836	585	1,530	925	327
19	665	1,100	665	489	450	2,300	585	750	663	1,240	1,520	874
20	665	1,040	665	521	449	2,460	585	750	665	1,060	1,010	727
21	665	1,040	665	553	407	3,760	585	669	662	971	750	585
22	665	997	687	585	420	2,900	585	665	458	838	645	727
23	665	894	857	656	369	2,260	534	642	516	750	585	454
24	658	741	940	741	356	2,030	540	585	532	686	532	468
25	585	840	894	748	403	1,890	450	538	509	665	510	468
26	592	840	788	1,040	369	1,880	648	376	494	612	510	481
27	928	840	595	1,280	369	2,300	821	417	514	585	472	483
28	2,080	840	415	1,240	356	1,990	840	616	1,020	471	445	512
29	2,100	840	469	1,200	.....	1,820	840	608	3,100	545	390	556
30	1,720	840	557	1,160	.....	1,570	1,310	585	1,810	2,500	385	512
31	1,560	.....	602	1,060	.....	1,530	.....	3,160	.....	1,240	385	.....

Lime Creek at Mason City, Iowa

LOCATION.—Water-stage recorder and concrete control, lat. 43°10′, long. 93°11′, in sec. 3, T. 97 N., R. 20 W., about 650 feet upstream from Thirteenth Street bridge in Mason City and about half a mile upstream from Willow Creek.

DRAINAGE AREA.—535 square miles.

RECORDS AVAILABLE.—December 1932 to September 1942.

AVERAGE DISCHARGE.—9 years, 174 second-feet.

EXTREMES.—Maximum discharge during 1941-42 year, 2,290 second-feet Nov. 1 (gage height, 5.77 feet); minimum, 21 second-feet Sept. 3 (gage height, 1.19 feet).

1932-41: Maximum discharge, about 9,400 second-feet Mar. 30, 1933 (gage height, 15.70 feet, present datum, from gage reading at flood crest); practically no flow Aug. 30 to Sept. 1, 1933.

REMARKS.—Records good. Some water diverted above gage for industrial use with resultant effluent and probably some additional water being returned to stream above gage.

COOPERATION.—Water-stage recorder inspected by employee of Jacob E. Decker & Sons, the cooperation of which is furnished through the facilities of the Iowa Institute of Hydraulic Research, and Mason City.

NOTE.—A deficiency-duration table of daily discharge of Lime Creek at Mason City for the period 1933-40 is given on page 64 of Iowa Geological Survey Water-Supply Bulletin No. 1.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Discharge in second-feet				Run-off in Inches
		Maximum	Minimum	Mean	Per square mile	
October 1940	1,818	109	34	58.6	0.110	0.13
November	7,905	697	87	264	.493	.55
December	4,359	310	57	141	.264	.30
Calendar year 1940	33,945	800	7.7	92.7	.173	2.35
January 1941	3,792	516	60	122	.228	.26
February	3,528	418	46	126	.236	.25
March	18,912	1,330	56	610	1.14	1.31
April	22,287	1,130	355	743	1.39	1.55
May	6,213	993	78	200	.374	.43
June	17,445	1,160	174	582	1.09	1.21
July	9,236	802	99	298	.557	.64
August	1,529	93	21	49.3	.092	.11
September	6,247	632	24	208	.389	.43
Water year 1940-41	103,271	1,330	21	283	.531	7.17
October 1941	14,788	1,110	182	477	.892	1.03
November	24,330	1,910	342	811	1.52	1.69
December	7,274	355	99	235	.439	.51
Calendar year 1941	135,581	1,910	21	371	.693	9.42
January	7,126	564	95	230	.430	.50
February	4,344	291	88	155	.290	.30
March	16,101	1,180	99	519	.970	1.12
April	9,581	662	122	319	.596	.67
May	10,225	840	122	330	.617	.71
June	11,020	1,140	95	367	.686	.77
July	7,434	704	80	240	.449	.52
August	6,166	760	80	199	.372	.43
September	2,866	280	45	95.5	.179	.20
Water year 1941-42	121,255	1,910	45	332	.621	8.45

Lime Creek at Mason City, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940–41												
1	40	116	182	259	60	56	697	310	455	718	93	25
2	38	138	156	516	60	60	648	280	776	595	82	29
3	34	138	131	336	58	949	743	242	1,160	500	74	35
4	48	125	137	144	58	564	972	219	818	418	76	34
5	47	114	131	163	60	500	930	193	564	355	74	33
6	78	98	128	202	58	580	855	182	432	310	73	24
7	109	93	125	186	52	767	802	178	411	269	69	25
8	91	87	125	160	52	1,100	773	171	342	233	65	248
9	78	103	125	131	50	1,330	737	160	291	197	60	355
10	72	182	125	117	48	1,020	711	156	264	189	52	304
11	78	428	122	107	46	785	669	144	470	182	51	219
12	78	168	115	104	48	731	648	131	1,020	160	51	160
13	69	293	88	102	244	618	625	122	1,050	150	37	128
14	64	293	80	99	404	556	725	112	1,000	140	44	128
15	57	260	91	97	418	556	648	104	949	134	40	268
16	54	225	76	f88	355	440	588	95	880	134	38	564
17	52	225	60	f78	275	228	595	91	785	140	38	632
18	49	255	57	71	228	259	985	80	676	802	41	540
19	48	378	65	65	193	397	855	78	580	767	44	440
20	44	436	71	71	147	807	1,130	91	485	602	34	369
21	42	563	78	69	112	802	1,020	115	390	404	37	297
22	41	697	84	65	88	749	976	125	317	317	37	242
23	38	595	88	62	80	648	910	115	253	310	41	197
24	38	492	104	f62	76	508	824	99	206	233	33	171
25	37	418	174	f62	71	478	743	88	174	182	37	153
26	37	342	310	64	65	485	655	84	174	167	46	131
27	37	211	304	60	62	492	572	120	632	160	45	120
28	47	115	291	62	60	516	485	163	462	137	21	109
29	87	131	264	64	.....	572	411	524	595	120	38	107
30	f85	186	248	64	.....	648	355	993	834	112	29	160
31	101	.....	224	62	.....	711	.....	648	.....	99	29	.....
1941–42												
1	197	1,910	355	156	291	99	662	376	669	264	310	76
2	197	1,900	349	122	275	109	648	323	1,140	197	269	69
3	197	1,560	342	144	264	137	595	390	1,120	160	248	45
4	182	1,350	336	144	253	171	548	404	980	137	237	62
5	264	1,290	323	140	242	193	485	355	743	122	215	62
6	323	1,290	280	147	206	228	462	508	711	160	197	57
7	959	1,200	269	125	186	275	448	749	523	156	178	69
8	1,040	1,090	259	120	171	228	411	625	432	117	174	67
9	865	985	224	117	153	206	376	548	369	109	178	60
10	697	880	99	104	153	206	342	470	336	102	182	60
11	564	802	122	95	174	233	304	462	310	97	174	56
12	448	773	178	104	167	224	280	478	291	80	163	58
13	376	796	202	104	163	228	275	411	253	153	153	46
14	336	779	182	109	163	233	253	342	224	588	153	52
15	291	743	186	109	150	291	228	286	197	704	150	51
16	259	683	189	115	144	683	211	253	182	690	122	45
17	242	632	197	117	88	610	193	242	156	418	120	45
18	259	588	219	134	112	662	186	242	150	336	587	279
19	280	572	233	160	122	725	182	228	137	329	760	280
20	280	580	224	182	107	944	167	202	131	317	291	153
21	275	548	224	206	99	1,180	150	189	125	264	197	120
22	259	492	264	248	95	980	144	174	115	219	163	107
23	253	432	323	317	95	885	137	163	102	186	140	120
24	242	369	323	397	93	829	122	150	95	160	122	112
25	233	362	286	492	95	807	128	134	104	150	117	99
26	275	349	242	564	97	910	228	131	107	134	117	120
27	915	342	189	540	93	925	280	122	107	140	104	144
28	1,110	342	153	492	93	818	291	144	147	140	93	128
29	1,060	342	153	470	.....	737	297	144	632	128	86	115
30	985	349	171	462	.....	683	548	140	432	301	80	109
31	925	.....	178	390	.....	662	.....	840	.....	376	86	.....

(f) Computed on basis of partly estimated gage heights.

IOWA RIVER BASIN

Lakes in Iowa River Basin

Upper Pine Lake at Eldora, Iowa

LOCATION.—Staff gage, lat. 42°22′, long. 93°04′, in SE¼ sec. 4, T. 87 N., R. 19 W., at Pine Lake State Park at Eldora, Hardin County, Iowa.

OBSERVER.—W. R. Chastain, 1942.

RECORDS AVAILABLE.—June 1936 to September 1942.

EXTREMES.—1936: Maximum gage height observed during period, 1.35 feet Sept. 15; minimum observed, -0.15 foot July 23.

1936-37: Maximum gage height observed during water year, 3.76 feet June 13; minimum observed, -0.11 foot Dec. 7.

1937-38: Maximum gage height observed during water year, 2.54 feet June 1; minimum observed, -0.31 foot Nov. 17.

1938-39: Maximum gage height observed during water year, 2.10 feet Mar. 13; minimum observed, -0.44 foot Sept. 29, 30.

1939-40: Maximum gage height observed during water year, 2.14 feet June 23; minimum observed, -1.18 feet Dec. 16-18.

1940-41: Maximum gage height observed during water year, 2.12 feet Feb. 13; minimum observed, 0.02 foot Sept. 2, 3.

1941-42: Maximum gage height during water year, 8.06 feet June 2; minimum observed, 1.00 foot Aug. 12, 13.

1936-42: Maximum gage height, 8.06 feet June 2, 1942; minimum observed, -1.18 feet Dec. 16-18, 1939.

REMARKS.—Crest of spillway is at gage height 1.0 foot. Gage read once daily.

COOPERATION.—Records collected in cooperation with Iowa State Conservation Commission.

Upper Pine Lake at Eldora, Iowa—Continued

Daily Gage height, in Feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940–41												
1	0.54	1.02	.....	1.26	.....	.....	1.08	1.00	.....	1.12	0.72	0.04
2	.52	1.02	.....	.....	.....	.....	1.10	.96	.....	1.06	.68	.02
3	.48	1.02	.....	1.18	.....	.....	.....	.98	1.40	1.04	.66	.02
4	.....	1.00	.....	1.16	.....	1.24	1.14	.98	1.36	1.02	.64	.08
5	.58	.96	1.04	1.16	.....	1.10	.....	.....	1.10	1.02	.60	.10
6	.60	.96	1.04	1.16	.....	1.04	1.12	.....	1.06	1.08	.60	.08
7	.60	.....	1.04	1.14	.....	1.04	1.18	.98	1.02	1.10	.58	.10
8	.58	.....	1.04	1.14	.....	1.04	1.18	.98	1.02	1.10	.52	1.34
9	.58	1.02	1.04	1.12	.....	1.04	1.16	.96	1.02	1.02	.52	1.10
10	.58	.....	.....	1.12	.....	1.04	1.14	.96	1.06	1.00	.44	1.02
11	.56	.....	1.04	1.12	.....	1.02	1.14	.92	1.10	.98	.42	1.02
12	.54	1.24	1.04	1.12	.....	1.02	1.12	.92	1.12	.96	.38	.96
13	.54	1.22	1.02	1.12	2.12	1.02	1.12	.90	.....	.94	.36	.94
14	.52	.....	.....	1.12	1.36	1.02	1.12	.90	1.12	.92	.32	.94
15	.50	1.12	.....	1.14	1.24	1.02	1.12	.90	1.10	.92	.28	1.12
16	.48	1.12	.....	1.14	1.18	.....	1.12	.90	1.10	.92	.28	1.12
17	.46	1.10	.....	1.12	1.12	1.02	1.12	.88	1.06	.90	.32	1.08
18	.44	1.10	.....	.....	.....	1.02	1.12	.88	1.04	.88	.28	1.04
19	.42	.....	.....	.....	.....	1.34	1.14	.88	.....	.90	.26	1.02
20	.42	.....	.....	.....	.....	1.60	1.12	.....	1.02	.....	.24	1.00
21	.40	1.12	.....	.....	.....	1.34	1.10	.....	1.00	.....	.22	.....
22	.40	1.12	.....	.....	.....	1.24	1.08	.....	.98	.....	.22	.96
23	.38	1.12	.....	.....	.....	1.10	1.06	.....	.94	.....	.20	.96
24	.36	1.14	.....	.....	.....	1.08	1.04	.72	.92	.....	.18	.94
25	.34	1.12	.....	.....	.....	1.06	1.04	.70	.92	.....	.16	.96
26	.32	1.10	1.26	.....	.....	1.04	.....	.68	.90	.....	.14	.94
27	.30	1.10	1.28	.....	.....	1.04	1.02	.68	.90	.78	.10	.90
28	1.10	1.08	1.20	.....	.....	1.02	1.02	.68	1.18	.80	.08	.90
29	1.20	1.08	1.18	.....	.....	1.02	1.02	.66	1.22	.76	.06	.90
30	.....	1.08	1.18	.....	.....	1.06	1.00	.68	1.94	.74	.08	1.06
31	1.08	.....	1.18	.....	.....	1.08	.....	1.04	1.28	.72	.04	.....
1941–42												
1	1.04	1.70	1.14	.....	1.26	1.28	1.30	1.12	1.16	1.10	1.16	1.08
2	1.06	1.40	1.16	1.20	1.26	1.40	1.28	1.12	5.21	1.06	1.12	1.62
3	1.06	1.26	1.18	.....	1.24	1.48	1.30	1.38	1.54	1.06	1.10	1.22
4	1.06	1.24	1.18	.....	1.24	1.42	1.30	1.30	1.26	1.08	1.10	1.10
5	1.44	1.32	1.16	1.14	1.26	1.42	1.22	1.27	1.22	1.08	1.08	1.10
6	1.20	1.36	1.16	1.14	1.26	1.38	1.22	1.32	1.40	1.22	1.06	1.10
7	1.40	1.28	1.12	1.16	1.26	1.38	1.20	1.30	1.46	1.18	1.06	1.10
8	1.20	1.26	1.12	1.22	1.26	1.34	1.20	1.28	1.32	1.12	1.06	1.10
9	1.16	1.22	1.12	1.20	1.26	1.32	1.20	1.26	1.24	1.08	1.04	1.40
10	1.12	1.22	1.12	1.20	1.26	1.30	1.20	1.22	1.56	1.32	1.04	1.14
11	1.10	1.20	1.12	1.18	1.24	1.30	1.20	1.48	1.50	1.20	1.02	1.12
12	1.10	1.20	1.10	1.14	1.24	1.30	1.18	1.38	2.62	1.12	1.00	1.08
13	1.08	1.20	1.10	1.12	1.24	1.30	1.18	1.32	1.52	1.10	1.00	1.56
14	1.08	1.20	1.10	1.12	1.24	1.28	1.18	1.26	1.44	1.32	1.02	2.66
15	1.08	1.18	1.10	1.14	1.24	1.36	1.20	1.24	1.30	1.20	1.04	2.34
16	1.08	1.18	1.10	1.16	1.30	1.40	1.18	1.24	1.22	1.14	1.02	1.20
17	1.06	1.18	1.14	1.18	1.30	1.62	1.18	1.26	1.18	1.12	1.02	1.08
18	1.10	1.20	1.14	1.22	1.28	1.50	1.18	1.30	1.18	1.10	1.40	1.16
19	1.08	1.22	1.14	1.22	1.26	1.42	1.16	1.28	1.16	1.16	1.28	1.18
20	1.30	1.22	1.16	1.26	1.24	1.42	1.16	1.24	1.72	1.12	1.12	1.14
21	1.22	1.18	1.16	1.26	1.20	1.40	1.14	1.24	1.42	1.10	1.04	1.12
22	1.30	1.16	1.18	1.28	1.20	1.36	1.12	1.22	1.36	1.08	1.04	1.10
23	1.20	1.14	1.18	1.30	1.20	1.36	1.12	1.20	1.36	1.08	1.02	1.18
24	1.16	1.16	1.20	1.32	1.20	1.33	1.12	1.18	1.36	1.06	1.04	1.14
25	1.12	1.16	1.22	1.36	1.20	1.30	1.14	1.20	1.50	1.14	1.02	1.12
26	1.16	1.16	1.26	1.38	1.18	1.32	1.22	1.22	1.32	1.08	1.36	1.18
27	1.12	1.14	1.22	1.40	1.18	1.32	1.18	1.22	1.20	1.08	1.22	1.18
28	1.12	1.14	1.26	1.36	1.18	1.30	1.18	1.20	1.16	1.10	1.36	1.16
29	1.10	1.14	1.20	1.34	.....	1.28	1.14	1.20	1.16	1.06	1.26	1.14
30	1.10	1.16	1.22	1.34	.....	1.28	1.14	1.20	1.14	2.00	1.14	1.14
31	1.14	.....	1.22	1.32	.....	1.30	.....	1.18	.....	1.22	1.08	.....

IOWA RIVER BASIN

Lakes in Iowa River Basin

Lower Pine Lake at Eldora, Iowa

LOCATION.—Staff gage, lat. 42°22′, long. 93°05′, in NW¼ sec. 9, T. 87 N., R. 19 W., at Pine Lake State Park at Eldora, Hardin County, Iowa.

DRAINAGE AREA.—15.0 square miles above outlet.

OBSERVER.—W. R. Chastain, 1942.

RECORDS AVAILABLE.—June 1936 to September 1942.

EXTREMES.—1936: Maximum gage height observed during period, 2.36 feet Sept. 5; minimum observed, 1.56 feet Aug. 20-23.

1936-37: Maximum gage height observed during water year, 4.90 feet June 13; minimum observed, 1.66 feet Dec. 19.

1937-38: Maximum gage height observed during water year, 3.54 feet June 1; minimum observed, 1.84 feet Aug. 28 to Sept. 4.

1938-39: Maximum gage height observed during water year, 3.20 feet Mar. 12; minimum observed, 1.54 feet Sept. 25.

1939-40: Maximum gage height observed during water year, 3.62 feet June 23; minimum observed, 1.60 feet Oct. 2.

1940-41: Maximum gage height observed during water year, 3.10 feet June 29; minimum observed, 1.60 feet Aug. 15, 16, 30, 31, Sept. 1.

1941-42: Maximum gage height observed during water year, 7.59 feet June 2; minimum observed, 1.80 feet July 5.

1936-42: Maximum gage height observed, 7.59 feet June 2, 1942; minimum observed, 1.54 feet Sept. 25, 1939.

REMARKS.—Crest of spillway is at gage height 2.00 feet. Gage read once daily.

COOPERATION.—Records collected in cooperation with Iowa State Conservation Commission.

Lower Pine Lake at Eldora, Iowa—Continued

Daily Gage height, in Feet, for Water Years 1941 and 1942

Day	Oct.	Nov	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940-41												
1	1.88	2.24	.....	2.38	2.28	2.24	2.34	2.10	.....	2.22	1.86	1.60
2	1.88	2.20	.....	.....	2.28	2.26	2.34	2.10	2.46	2.12	1.86	1.68
3	1.88	2.16	.....	2.36	2.28	2.85	.....	2.08	2.46	2.10	1.82	1.70
4	.....	2.16	.....	2.36	.....	2.44	2.36	2.04	2.32	2.06	1.80	1.68
5	1.94	2.16	2.20	2.34	.....	2.40	.....	.....	2.28	2.06	1.78	1.68
6	2.00	2.16	2.20	2.32	.....	2.36	2.34	.....	2.20	2.10	1.76	1.66
7	2.00	.....	2.20	2.30	.....	2.36	2.68	2.04	2.20	2.16	1.76	1.72
8	2.00	.....	2.20	2.30	.....	2.34	2.48	2.04	2.20	2.14	1.74	2.30
9	2.00	2.20	2.20	2.30	.....	2.34	2.40	2.04	2.26	2.10	1.74	2.20
10	2.00	.....	.....	2.30	.....	2.34	2.38	2.04	2.28	2.06	1.72	2.10
11	1.98	.....	2.20	2.30	.....	2.32	2.36	1.98	2.28	2.04	1.68	2.08
12	1.98	2.38	2.20	2.30	2.28	2.32	2.36	1.94	.....	2.04	1.68	2.06
13	1.98	2.38	2.20	2.30	2.95	2.32	2.34	1.90	2.20	2.04	1.62	2.04
14	1.98	.....	.....	2.30	2.50	2.30	2.32	1.88	2.22	2.02	1.64	2.04
15	1.98	2.30	2.20	2.32	2.38	2.30	2.32	1.88	2.12	2.00	1.60	2.26
16	2.00	2.30	2.20	2.32	2.38	2.30	2.30	1.88	2.10	1.96	1.60	2.26
17	2.00	2.28	2.20	2.30	2.35	2.30	2.30	1.86	2.10	1.92	1.68	2.20
18	2.00	2.30	2.20	2.28	2.30	2.30	2.24	1.86	.....	1.92	1.66	2.10
19	2.00	.....	2.26	.....	2.30	2.60	2.28	1.86	2.08	1.92	1.66	2.08
20	2.00	.....	2.26	2.28	2.28	2.82	2.28	.....	2.04	.....	1.64	2.08
21	2.00	2.30	2.26	2.28	2.28	2.50	2.26	.....	2.00	.....	1.62	.....
22	2.00	2.30	2.26	2.28	2.26	2.40	2.26	.....	2.00	.....	1.68	2.08
23	2.00	2.30	2.26	2.28	2.26	2.34	2.24	.....	1.98	.....	1.64	2.08
24	2.00	2.30	2.26	2.28	2.26	2.30	2.22	1.86	1.98	.....	1.64	2.06
25	2.00	2.30	2.26	2.28	2.26	2.28	2.22	1.84	1.96	.....	1.64	2.08
26	2.00	2.30	2.32	2.28	2.26	2.26	.....	1.82	1.96	.....	1.64	2.04
27	2.00	2.28	2.34	2.28	2.26	2.24	2.20	1.80	2.10	1.88	1.62	2.02
28	2.46	2.28	2.32	2.28	2.26	2.24	2.24	1.80	2.26	1.90	1.62	2.02
29	2.31	2.26	2.32	2.28	.....	2.24	2.12	1.78	3.10	1.88	1.62	2.02
30	.....	2.26	2.32	2.28	.....	2.24	2.10	1.78	2.36	1.88	1.60	2.12
31	2.24	.....	2.32	.....	.....	2.24	.....	2.04	.....	1.88	1.60	.....
1941-42												
1	2.14	3.08	2.26	.....	2.40	2.42	2.44	2.20	2.26	1.92	2.22	2.02
2	2.12	2.76	2.26	2.30	2.40	2.52	2.42	2.20	5.46	1.89	2.22	2.40
3	2.16	2.60	2.30	.....	2.38	2.60	2.40	2.36	2.28	1.86	2.18	2.20
4	2.16	2.56	2.30	.....	2.38	2.60	2.40	2.30	2.14	1.82	2.14	2.12
5	2.74	2.70	2.32	2.20	2.38	2.60	2.42	2.26	2.10	1.80	2.08	2.08
6	2.50	2.60	2.30	2.20	2.38	2.58	2.44	2.30	2.00	2.14	2.04	2.08
7	2.60	2.46	2.30	2.20	2.38	2.58	2.42	2.28	2.28	2.08	2.04	2.06
8	2.40	2.42	2.30	2.28	2.38	2.52	2.40	2.28	2.04	2.00	2.04	2.06
9	2.40	2.40	2.30	2.30	2.38	2.52	2.40	2.28	1.89	1.90	2.02	2.52
10	2.42	2.38	2.30	2.30	2.38	2.50	2.38	2.28	2.20	2.20	2.02	2.18
11	2.40	2.38	2.30	2.26	2.38	2.50	2.38	2.40	2.12	2.00	2.00	2.08
12	2.40	2.38	2.28	2.30	2.38	2.50	2.34	2.40	3.62	1.92	2.00	2.06
13	2.30	2.38	2.28	2.30	2.38	2.48	2.30	2.40	2.16	1.94	2.00	2.36
14	2.30	2.38	2.28	2.28	2.38	2.50	2.28	2.36	2.20	2.24	2.02	2.80
15	2.30	2.28	2.28	2.28	2.38	2.54	2.32	2.30	2.10	2.18	2.04	2.40
16	2.30	2.28	2.28	2.30	2.44	2.58	2.28	2.30	2.00	2.10	2.02	2.20
17	2.28	2.24	2.32	2.32	2.40	2.70	2.30	2.30	1.96	2.06	2.00	2.10
18	2.20	2.32	2.32	2.34	2.38	2.48	2.32	2.30	1.98	2.04	2.40	2.16
19	2.22	2.38	2.30	2.38	2.34	2.40	2.30	2.28	1.96	2.08	2.22	2.14
20	2.40	2.36	2.32	2.36	2.34	2.42	2.28	2.28	2.26	2.02	2.10	2.12
21	2.41	2.38	2.32	2.38	2.30	2.42	2.28	2.28	2.10	2.02	2.04	2.08
22	2.50	2.40	2.34	2.40	2.30	2.40	2.30	2.26	2.00	2.02	2.02	2.08
23	2.44	2.40	2.36	2.40	2.30	2.40	2.32	2.26	1.94	2.02	2.00	2.14
24	2.40	2.40	2.42	2.40	2.30	2.40	2.30	2.26	1.92	2.00	2.00	2.10
25	2.30	2.36	2.46	2.40	2.30	2.42	2.32	2.30	1.90	2.10	1.98	2.10
26	2.40	2.30	2.50	2.44	2.28	2.44	2.56	2.30	2.00	2.04	2.30	2.18
27	2.34	2.28	2.50	2.46	2.26	2.44	2.40	2.30	1.90	2.04	2.22	2.14
28	2.30	2.28	2.38	2.44	2.30	2.42	2.30	2.34	1.94	2.06	2.46	2.14
29	2.28	2.26	2.30	2.44	.....	2.40	2.26	2.28	2.00	2.04	2.30	2.12
30	2.34	2.28	2.30	2.42	.....	2.40	2.20	2.28	2.04	3.22	2.18	2.10
31	2.34	.....	2.30	2.40	.....	2.44	.....	2.26	.....	2.30	2.06	.....

IOWA RIVER BASIN

Lakes in Iowa River Basin

Lake Macbride near Solon, Iowa

LOCATION.—Float gage in concrete well, lat. 41°48′, long. 91°34′, in NE¼ sec. 29, T. 81 N., R. 6 W., in Macbride State Park about 3 miles west of Solon, Johnson County, Iowa. Datum of gage is 675.54 feet above mean sea level, adjustment of 1912.

DRAINAGE AREA.—26.6 square miles above outlet.

OBSERVER.—L. F. Reed, 1942.

RECORDS AVAILABLE.—October 1936 to September 1942.

EXTREMES.—1936-37: Maximum gage height observed during water year, 10.05 feet Feb. 21; minimum observed, -0.50 foot Dec. 5.

1937-38: Maximum gage height observed during water year, 9.52 feet Aug. 15; minimum observed, 7.75 feet Oct. 17.

1938-39: Maximum gage height observed during water year, 9.82 feet July 11, Aug. 8; minimum observed, 8.02 feet Sept. 17-24, 28-30.

1939-40: Maximum gage height observed during water year, 8.80 feet Mar. 3; minimum observed, 7.16 feet Sept. 30.

1940-41: Maximum gage height observed during water year, 9.87 feet Sept. 7; minimum observed, 7.10 feet Oct. 6-9, 31, Nov. 1.

1941-42: Maximum gage height observed during water year, 8.88 feet Nov. 1, July 6; minimum observed, 7.95 feet Aug. 26.

1936-42: Maximum gage height observed, 10.05 feet Feb. 21, 1937; minimum observed, -0.50 foot Dec. 5, 1936 (gate in dam open).

REMARKS.—Crest of spillway is at gage height 8.00 feet. Gage read once daily.

COOPERATION.—Records collected in cooperation with Iowa State Conservation Commission.

Lake Macbride near Solon, Iowa—Continued

Daily Gage height, in Feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940–41												
1	7.20	7.10	7.40	7.90	8.70	8.15	8.04	8.02	.....	.....	.....	7.93
2	7.20	7.14	7.40	8.00	8.60	8.13	8.04	8.02	.....	.....	.....	7.95
3	7.20	7.14	7.40	8.10	8.50	8.11	8.04	8.02	.....	.....	.....	7.96
4	7.20	7.16	7.38	8.20	8.40	8.09	8.04	8.01	.....	.....	.....	7.97
5	7.20	7.16	7.38	.....	.....	8.06	8.03	8.00	.....	.....	.....	7.98
6	7.10	7.15	7.38	.....	.....	8.06	8.02	8.00	.....	.....	.....	8.02
7	7.10	7.16	7.36	.....	.....	8.05	8.05	8.00	.....	.....	.....	9.87
8	7.10	7.16	7.36	.....	.....	8.05	8.06	8.00	.....	.....	.....	8.26
9	7.10	7.18	7.35	.....	8.40	8.04	8.04	8.00	.....	.....	.....	8.16
10	7.20	.....	7.35	.....	8.30	8.03	8.03	8.00	.....	8.13	.....	.....
11	7.20	.....	7.35	.....	8.28	8.03	8.02	.....	.....	.....	.....	8.12
12	7.20	.....	7.34	.....	8.19	8.01	8.02	.....	.....	.....	.....	8.10
13	7.20	.....	7.34	.....	8.20	8.03	8.03	.....	.....	.....	.....	.....
14	7.30	.....	7.36	8.40	8.40	8.03	8.02	.....	.....	.....	8.04	8.10
15	7.30	7.32	7.36	.....	8.22	8.01	8.02	.....	.....	.....	8.02	.....
16	7.20	7.32	7.36	.....	8.24	8.00	8.02	.....	.....	.....	.....	8.13
17	7.20	7.30	7.36	.....	8.25	8.01	8.02	.....	.....	.....	.....	8.11
18	7.20	7.30	7.38	.....	8.25	8.02	8.02	.....	.....	.....	8.05	8.09
19	7.20	7.30	7.38	.....	8.24	8.02	8.02	.....	.....	.....	.....	8.08
20	7.18	7.32	7.40	.....	8.24	8.04	8.03	.....	.....	7.99	.....	8.07
21	7.16	7.35	7.42	.....	8.23	8.06	8.04	.....	.....	.....	.....	8.07
22	7.14	7.37	7.45	.....	8.23	8.10	8.04	.....	.....	.....	.....	8.06
23	7.12	7.37	7.50	.....	8.22	8.09	8.04	.....	.....	.....	.....	8.06
24	7.12	7.37	7.55	.....	8.21	8.08	8.04	.....	.....	.....	.....	8.06
25	7.12	7.38	7.55	.....	8.20	8.08	8.03	.....	.....	.....	8.04	8.06
26	7.12	7.40	7.60	8.60	8.20	8.06	8.03	.....	.....	7.95	8.03	8.05
27	7.12	7.40	7.65	8.60	8.18	8.05	8.03	.....	.....	.....	8.00	8.05
28	7.12	7.40	7.70	8.60	8.16	8.05	8.02	.....	.....	.....	7.98	8.05
29	7.12	7.42	7.70	8.60	.....	8.05	8.02	.....	.....	.....	7.97	8.04
30	7.12	7.42	7.75	8.60	.....	8.04	8.02	.....	.....	.....	7.95	8.43
31	7.10	.....	7.80	8.60	.....	8.04	.....	.....	.....	.....	7.94	.....
1941–42												
1	8.20	8.88	.....	8.18	8.20	8.22	8.18	8.12	.....	.....	8.10	8.10
2	8.20	8.36	.....	8.18	.....	8.22	.....	.....	.....	8.08	8.51	8.09
3	8.18	.....	8.18	.....	8.20	8.22	8.17	8.14	.....	8.08	.....	.....
4	.....	8.25	8.18	8.18	8.20	8.22	8.17	8.16	.....	8.08	.....	8.08
5	8.16	8.30	8.18	8.18	8.18	.....	8.16	8.16	.....	8.08	8.10	8.07
6	8.18	8.28	8.18	8.16	8.18	8.22	8.24	8.19	.....	8.88	.....	8.06
7	8.31	8.26	8.18	8.16	8.17	.....	8.19	8.15	8.10	8.24	8.10	8.34
8	8.20	8.23	8.18	8.16	8.19	.....	.....	8.13	8.10	8.14	.....	8.64
9	8.42	8.23	.....	8.16	8.19	.....	8.17	8.13	.....	8.12	.....	8.58
10	8.20	8.21	.....	8.14	8.19	.....	8.17	8.16	8.10	8.12	8.10	8.26
11	8.20	.....	8.14	8.14	8.19	8.22	8.16	.....	8.10	8.12	8.09	8.16
12	8.18	.....	8.14	8.14	8.19	.....	8.17	8.17	8.10	8.10	.....	8.14
13	8.18	.....	8.13	8.14	8.19	8.22	8.17	.....	8.10	8.10	.....	8.14
14	8.25	.....	8.13	8.14	8.19	8.22	8.17	.....	8.09	8.23	8.07	8.12
15	8.19	.....	8.12	.....	8.18	8.24	8.16	.....	8.09	8.19	8.07	8.12
16	8.18	.....	8.15	8.14	8.18	8.38	.....	8.14	8.09	8.14	8.06	.....
17	8.18	.....	8.14	8.16	8.17	8.38	8.15	8.13	8.09	8.12	.....	.....
18	8.18	.....	8.14	8.20	8.17	8.30	8.15	8.15	8.09	8.12	8.05	8.14
19	8.18	.....	8.14	8.32	8.17	8.26	8.14	8.14	8.09	8.15	8.05	8.32
20	8.19	.....	8.14	8.24	8.17	8.22	8.14	.....	8.09	.....	8.04	8.17
21	8.22	8.18	8.14	8.24	8.17	8.21	8.14	8.14	.....	8.15	8.03	8.15
22	8.82	8.18	8.18	8.26	8.17	.....	8.13	8.13	.....	8.13	8.03	8.14
23	8.63	8.18	8.44	8.28	8.16	.....	8.13	8.13	8.10	8.13	7.99	8.13
24	8.30	8.18	8.30	8.28	8.16	.....	8.13	8.13	8.10	8.13	7.96	8.12
25	8.28	8.18	8.20	8.27	8.15	8.20	8.12	8.12	8.10	8.12	7.96	8.12
26	8.26	8.18	8.18	8.26	8.15	8.19	8.12	8.12	8.10	8.12	7.95	8.12
27	8.25	8.18	.....	8.25	.....	8.19	8.13	8.12	8.10	8.10	8.00	8.12
28	8.21	8.18	8.18	8.24	8.22	8.19	8.12	8.12	8.10	8.10	.....	8.12
29	8.21	.....	8.18	8.22	.....	8.19	.....	.....	.....	.....	.....	8.12
30	8.19	.....	.....	.....	.....	8.19	.....	.....	8.10	8.10	8.10	8.12
31	8.40	.....	.....	8.22	.....	8.19	.....	8.11	.....	.....	8.12	.....

IOWA RIVER BASIN

Lakes in Iowa River Basin

Clear Lake at Clear Lake, Iowa

LOCATION.—Staff gage, lat. 43°07', long. 93°24', in sec. 25, T. 96 N., R. 22 W., at Clear Lake State Park at town of Clear Lake, Cerro Gordo County, Iowa. Datum of gage is 1,222.24 feet above mean sea level, datum of 1929.

OBSERVER.—L. G. Thomas, 1942.

RECORDS AVAILABLE.—May 1933 to September 1942.

EXTREMES.—1933: Maximum gage height observed during period, 5.02 feet May 20, 22, 23; minimum observed, 3.70 feet Sept. 30.

1933-34: Maximum gage height observed during water year, 3.67 feet Oct. 1; minimum observed, 1.70 feet Aug. 28, 29.

1934-35: Maximum gage height observed during water year, 3.45 feet Apr. 1-6; minimum observed, 1.64 feet Nov. 17.

1935-36: Maximum gage height observed during water year, 2.61 feet Apr. 18; minimum observed, 1.44 feet Aug. 12.

1936-37: Maximum gage height observed during water year, 3.87 feet June 25; minimum observed, 2.00 feet Oct. 30-31.

1937-38: Maximum gage height observed during water year, 3.90 feet Sept. 15, 18-20, 22; minimum observed, 2.58 feet Nov. 17.

1938-39: Maximum gage height observed during water year, 4.58 feet Apr. 28; minimum observed, 3.10 feet Sept. 30.

1939-40: Maximum gage height observed during water year, 3.40 feet Sept. 9-11; minimum observed, 2.50 feet July 18-21.

1940-41: Maximum gage height observed during water year, 5.06 feet July 2, 3, 4; minimum observed, 3.10 feet Nov. 4.

1941-42: Maximum gage height observed during water year, 5.40 feet Nov. 20; minimum observed, 4.32 feet Sept. 17.

1933-42: Maximum gage height observed, 5.40 feet Nov. 20, 1941; minimum observed, 1.44 feet Aug. 12, 1936.

REMARKS.—Crest of outlet dam is at gage height 4.5 feet. Some discharge from lake during 1939, 1941, and 1942. Discharge of 3.20 second-feet measured July 31, 1941, at gage height 4.77 feet (screen on outlet dam clean; discharge increasd by inshore waves). Gage read once daily except during winter months.

COOPERATION.—Records collected in cooperation with Iowa State Conservation Commission.

Clear Lake at Clear Lake, Iowa—Continued

Daily Gage height, in Feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940-41												
1	3.12	3.12	.....	.....	.....	.....	.....	.....	4.50	.....	4.76	4.26
2	3.12	3.12	.....	.....	.....	.....	.....	.....	4.64	5.06	4.72	4.26
3	3.12	3.12	.....	.....	.....	.....	.....	.....	4.70	5.06	4.74	4.30
4	3.12	3.10	.....	.....	.....	.....	.....	.....	4.70	5.06	4.70	4.30
5	3.16	3.18	.....	.....	.....	.....	.....	.....	4.72	5.00	4.68	4.32
6	3.16	3.12	.....	.....	.....	.....	.....	.....	4.72	4.98	4.68	4.28
7	3.16	3.16	.....	.....	.....	.....	.....	.....	4.80	4.96	4.68	4.20
8	3.16	3.12	.....	.....	.....	.....	.....	.....	4.72	4.94	4.66	4.68
9	3.18	3.12	.....	.....	.....	.....	.....	4.20	4.68	4.90	4.62	4.70
10	3.18	3.16	.....	.....	.....	.....	.....	.....	4.68	4.90	4.60	4.70
11	3.18	3.18	.....	.....	.....	.....	.....	.....	4.68	4.90	4.58	4.70
12	3.20	3.18	.....	.....	.....	.....	.....	.....	4.82	4.88	4.58	4.68
13	3.16	.....	.....	.....	.....	.....	.....	.....	4.84	4.88	4.50	4.68
14	3.20	.....	.....	.....	.....	.....	.....	.....	4.90	4.86	4.50	4.68
15	3.16	.....	.....	.....	.....	.....	.....	4.15	4.86	4.86	4.48	4.70
16	3.14	3.36	.....	.....	.....	.....	4.30	.....	4.86	4.84	4.46	4.80
17	3.16	.....	.....	.....	.....	.....	.....	.....	4.88	4.80	4.44	4.84
18	3.16	.....	.....	.....	.....	.....	.....	.....	4.84	4.86	4.46	4.84
19	3.16	.....	.....	.....	.....	.....	.....	.....	4.82	4.88	4.44	4.80
20	3.14	.....	.....	.....	.....	.....	.....	.....	4.82	4.88	4.44	4.82
21	3.14	.....	.....	.....	.....	.....	.....	4.15	4.82	4.82	4.38	4.82
22	3.14	.....	.....	.....	.....	.....	.....	4.15	4.82	4.82	4.40	4.80
23	3.16	.....	.....	.....	.....	.....	.....	4.16	4.82	4.80	4.38	4.80
24	3.14	.....	.....	.....	.....	.....	.....	4.1	4.80	4.80	4.36	4.80
25	3.14	.....	.....	.....	.....	.....	.....	4.1	4.78	4.80	4.38	4.80
26	3.14	.....	.....	.....	.....	.....	.....	4.14	4.76	4.78	4.38	4.76
27	3.12	.....	.....	.....	.....	.....	.....	4.30	4.94	4.78	4.36	4.74
28	3.12	.....	.....	.....	.....	.....	.....	4.32	4.96	4.80	4.34	4.80
29	3.20	.....	.....	.....	.....	.....	.....	4.38	5.00	4.80	4.30	4.80
30	3.13	.....	.....	.....	.....	.....	.....	4.46	5.04	4.80	4.30	4.78
31	3.12	.....	.....	.....	.....	.....	.....	4.50	.....	4.77	4.28	.....
1941-42												
1	4.76	4.98	.....	.....	.....	.....	5.26	5.03	5.05	4.92	4.83	4.46
2	4.76	5.10	.....	.....	.....	.....	5.28	5.04	5.07	4.92	4.81	4.46
3	4.78	.....	.....	.....	.....	.....	5.26	5.10	5.11	4.90	4.79	4.44
4	4.76	.....	.....	.....	.....	.....	5.26	5.10	5.11	4.88	4.80	4.42
5	4.80	.....	.....	.....	.....	.....	5.26	5.04	5.11	4.86	4.78	4.42
6	4.88	.....	.....	.....	.....	.....	5.28	5.10	5.11	4.86	4.76	4.40
7	4.92	.....	.....	.....	.....	.....	5.28	5.10	5.11	4.84	4.76	4.40
8	4.98	.....	.....	.....	.....	.....	5.27	5.10	5.05	4.84	4.74	4.40
9	5.00	5.30	.....	.....	.....	.....	5.25	5.08	5.03	4.84	4.74	4.38
10	5.00	5.30	5.27	.....	.....	.....	5.29	5.06	5.01	4.84	4.74	4.36
11	5.00	5.30	.....	.....	.....	.....	5.17	5.10	5.01	4.85	4.68	4.36
12	5.00	5.28	.....	.....	.....	.....	5.17	5.14	5.09	4.83	4.66	4.36
13	4.98	5.28	.....	.....	.....	.....	5.15	5.14	5.09	4.85	4.62	4.36
14	4.98	5.30	.....	.....	.....	.....	5.15	5.16	4.97	4.89	4.64	4.36
15	4.98	5.30	.....	.....	.....	.....	5.15	5.12	4.93	4.91	4.64	4.36
16	4.96	5.30	.....	.....	.....	.....	5.17	5.12	4.91	4.91	4.62	4.34
17	4.94	5.30	.....	.....	.....	.....	5.15	5.06	4.87	4.89	4.58	4.32
18	4.94	5.30	.....	.....	.....	.....	5.11	5.12	4.86	4.87	4.60	4.34
19	4.92	5.32	.....	.....	.....	.....	5.11	5.10	4.86	4.85	4.60	4.36
20	4.94	5.40	.....	.....	.....	.....	5.11	5.04	4.86	4.85	4.60	4.46
21	4.96	5.32	.....	.....	.....	.....	5.11	5.04	4.86	4.85	4.60	4.46
22	4.94	5.30	.....	.....	.....	.....	5.09	5.02	4.92	4.83	4.62	4.46
23	4.96	5.32	.....	.....	.....	.....	5.05	5.04	4.88	4.79	4.58	4.48
24	4.96	5.32	.....	.....	.....	.....	5.05	5.00	4.84	4.79	4.50	4.48
25	4.96	5.32	.....	.....	.....	.....	5.05	4.97	4.76	4.73	4.46	4.46
26	4.96	5.30	.....	.....	.....	.....	4.99	4.97	4.74	4.75	4.48	4.48
27	5.00	5.30	.....	.....	.....	.....	5.05	4.95	4.76	4.75	4.48	4.48
28	5.00	5.28	.....	.....	.....	.....	5.05	5.01	4.78	4.73	4.48	4.42
29	4.96	5.30	.....	.....	.....	.....	5.05	4.99	4.92	4.73	4.48	4.40
30	4.96	.....	.....	.....	.....	.....	5.05	4.97	4.92	4.83	4.46	4.42
31	5.00	.....	.....	.....	.....	.....	.....	4.97	.....	4.83	4.46	.....

Skunk River near Ames, Iowa

LOCATION.—Water-stage recorder and concrete control, lat. 42°04'06", long. 93°37'02", in SW¼ sec. 23, T. 84 N., R. 24 W., 2½ miles north of Ames, 3½ miles downstream from Keigley Branch, and 5 miles upstream from Squaw Creek.

DRAINAGE AREA.—320 square miles.

RECORDS AVAILABLE.—July 1920 to August 1927, March 1933 to September 1942.

AVERAGE DISCHARGE.—15 years (1920-26, 1933-42), 108 second-feet.

EXTREMES.—Maximum discharge during 1941-42 year, 2,530 second-feet Sept. 14 (gage height, 8.07 feet); minimum, 17 second-feet Jan. 1 (gage height, 2.30 feet).

Maximum discharge during 1940-41 year, 3,050 second-feet Sept. 8 (gage height, 8.58 feet); minimum discharge, 1.5 second-feet Sept. 1, 2 (gage height, 1.93 feet).

1920-27, 1933-40: Maximum discharge, 3,540 second-feet Sept. 17, 1921 (gage height, 9.2 feet), from rating curve extended above 2,500 second-feet; no flow at times in June, July, and August 1934 and on Jan. 25, 1937.

REMARKS.—Records good except those below 5 second-feet and those for periods of faulty intake action, which are fair, and those for periods of ice effect or no gage-height record, which are poor.

COOPERATION.—Gage-height record collected in cooperation with Department of Civil Engineering of Iowa State College, and City of Ames.

NOTE.—See table 10 for flow-duration analysis. Duration curves of daily discharge for Hamburg, Van Meter and Ames are shown in figure 9.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Discharge in second-feet				Run-off in Inches
		Maximum	Minimum	Mean	Per square mile	
October 1940	372.5	26	9.5	12.0	0.038	0.04
November	2,696	220	21	89.9	.281	.31
December	2,200	198	20	71.0	.222	.26
Calendar year 1940	19,707.93	1,000	.10	53.8	.168	2.27
January 1941	3,314	450	37	107	.334	.39
February	2,743	601	31	98.0	.306	.32
March	3,511	236	31	113	.353	.41
April	3,645	220	39	122	.381	.42
May	843	58	13	27.2	.085	.10
June	9,308	1,140	36	310	.969	1.08
July	1,254.4	224	8.9	40.5	.127	.15
August	155.8	15	1.9	5.03	.016	.02
September	4,350.7	1,290	1.9	145	.453	.51
Water year 1940-41	34,393.4	1,290	1.9	94.2	.294	4.01
October 1941	5,138	658	67	166	.519	.60
November	12,101	1,280	154	403	1.26	1.41
December	4,316	276	60	139	.434	.50
Calendar year 1941	50,679.9	1,290	1.9	139	.434	5.91
January 1942	7,199	690	35	232	.725	.84
February	4,267	293	88	152	.475	.50
March	10,600	900	113	342	1.07	1.23
April	4,031	228	84	134	.419	47
May	8,640	789	121	278	.869	1.00
June	11,527	879	121	384	1.20	1.34
July	5,996	742	67	193	.603	.70
August	4,485	679	20	145	.453	.52
September	13,291	1,850	118	443	1.38	1.54
Water year 1941-42	91,591	1,850	20	251	.784	10.65

Skunk River near Ames, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940–41												
1.....	11	21	b52	258	b44	31	86	58	36	224	13	1.9
2.....	11	25	b50	b450	b43	48	84	54	60	130	11	26
3.....	10	26	b36	b300	b43	113	80	51	752	103	8.3	16
4.....	9.5	28	b50	b100	b43	118	95	45	606	84	7.1	9.5
5.....	11	29	b*59	b125	b43	116	191	44	351	71	7.1	5.4
6.....	13	29	65	b*190	b42	95	220	39	251	62	6.0	3.9
7.....	15	29	65	b160	b42	73	206	37	206	48	5.1	352
8.....	13	28	60	b140	b42	75	184	35	191	42	4.8	1,290
9.....	12	39	64	121	b42	93	174	33	314	38	3.9	319
10.....	13	69	64	124	b42	105	164	31	370	26	3.0	177
11.....	12	b100	51	116	b45	91	164	29	757	35	2.7	124
12.....	13	b90	b40	108	62	82	151	28	1,140	32	2.3	86
13.....	12	b75	b20	100	601	75	136	27	895	28	2.1	65
14.....	11	b80	b30	98	438	111	127	25	575	26	2.3	58
15.....	9.5	b85	b35	95	255	124	113	27	409	24	2.3	174
16.....	9.5	b90	b30	93	224	177	100	32	306	22	2.1	342
17.....	10	b100	b24	75	b150	85	98	20	224	20	15	198
18.....	10	127	b28	37	b85	142	103	20	174	19	13	116
19.....	10	164	b32	b50	b70	145	118	18	139	17	6.6	91
20.....	10	158	b36	b58	b60	236	213	19	118	15	4.8	73
21.....	10	164	b38	b56	b55	236	216	18	95	15	3.9	60
22.....	11	220	b40	b54	b48	191	127	19	86	15	4.5	50
23.....	11	202	b45	b50	44	191	103	20	73	13	3.6	44
24.....	10	168	64	b49	42	142	82	17	65	11	3.6	89
25.....	10	145	98	b48	39	105	67	15	58	8.9	3.3	188
26.....	10	133	164	b42	35	88	56	14	50	9.5	3.0	73
27.....	11	111	198	b42	33	100	46	14	251	20	2.7	54
28.....	15	50	188	b43	31	93	39	15	356	24	2.4	45
29.....	26	b55	171	b44	.....	88	44	13	202	31	2.3	40
30.....	17	b56	158	b44	.....	73	58	13	198	24	2.1	180
31.....	16	.....	145	b44	.....	69	.....	13	.....	17	1.9	.....
1941–42												
1.....	127	1,280	151	69	293	113	f228	142	f121	f213	f468	136
2.....	84	1,240	148	b60	263	f136	f220	133	f488	f145	f306	127
3.....	75	773	145	b50	f240	f301	f213	f232	f842	f139	f236	f837
4.....	67	554	142	b45	224	384	f195	f293	508	f209	f188	f674
5.....	130	731	142	b40	213	332	f174	f255	306	f145	f161	f394
6.....	f177	1,060	121	b40	206	310	f148	f346	f869	f133	f136	276
7.....	658	752	*121	b35	191	306	f142	f483	f879	f121	f116	232
8.....	560	544	118	b40	191	259	f139	f409	f773	f111	f98	198
9.....	f324	423	108	b45	181	240	f130	f337	518	103	f84	174
10.....	a250	342	60	b50	164	f220	f127	f267	375	111	f80	148
11.....	a150	314	b65	b60	b150	f228	f127	f503	324	93	f71	f136
12.....	b121	301	b75	b70	b140	f206	f116	f789	638	80	f65	f118
13.....	a110	288	b85	b80	b140	f206	f113	f606	508	71	f60	f148
14.....	a120	276	93	b90	b140	f209	f111	f448	324	f251	f54	1,840
15.....	a150	263	103	b100	b130	228	f108	f342	f232	f158	f51	1,850
16.....	a200	247	103	*118	b120	f360	f105	f301	f168	f121	48	1,100
17.....	a130	236	105	133	b100	f900	f103	f280	f177	f95	44	773
18.....	a90	220	108	171	b100	f853	f100	f314	f177	f73	40	575
19.....	f71	232	103	202	b110	f612	f98	f293	f171	124	38	468
20.....	82	251	100	f251	b120	518	f95	f251	f337	195	37	375
21.....	88	236	103	f272	b130	f539	f93	206	f483	113	32	310
22.....	f287	216	124	f346	f*139	f448	f91	184	f324	84	27	280
23.....	198	188	206	f433	108	384	f88	168	f236	67	24	272
24.....	124	168	276	f539	100	342	f84	154	f198	71	22	251
25.....	103	171	251	586	95	306	f86	142	f206	f100	20	232
26.....	100	164	240	690	98	324	f145	136	f240	f690	f80	263
27.....	113	161	209	690	f88	324	f191	127	f236	f389	f293	314
28.....	103	158	184	534	93	293	f168	121	f216	f314	f679	284
29.....	86	158	158	473	.....	f259	f151	f124	f288	f370	f483	263
30.....	82	154	188	483	.....	f236	142	130	f365	f365	f267	243
31.....	178	.....	181	404	.....	f224	.....	124	.....	f742	f177	.....

*Winter discharge measurement made on this day.
(a) No gage-height record; discharge estimated.
(b) Stage-discharge relation affected by ice.
(f) Faulty intake action; discharge computed from partly estimated gage heights.
(h) Computed from float gage readings.

Skunk River at Coppock, Iowa

LOCATION.—Wire-weight gage, lat. 41°09'26", long. 91°43'05", in sec. 1, T. 73 N., R. 8 W., at bridge on State Highway 78, half a miles west of Coppock and about three quarters of a mile upstream from Crooked Creek.

DRAINAGE AREA.—2,890 square miles.

RECORDS AVAILABLE.—October 1913 to September 1942 (discontinued).

AVERAGE DISCHARGE.—28 years (1914-42, 1,298 second-feet.

EXTREMES.—Maximum discharge observed during 1941-42 year, 7,390 second-feet Nov. 7 (gage height, 12.37 feet); minimum observed, 250 second-feet Aug. 25, 27 (gage height, 3.27 feet).

1913-41: Maximum discharge observed, 25,200 second-feet June 15, 1930 (gage height, 22.13 feet, former site), from rating curve extended above 10,300 second-feet; minimum, 8 second-feet (during period of period of ice effect) Jan. 27, 28, 1940.

A stage of about 22 feet occurred about May 31, 1903.

REMARKS.—Records fair except those for periods of ice effect, which are poor. Gage read once daily during low and medium stages, oftener during high stages.

COOPERATION.—Results of some discharge measurements, services of observer, and assistance in computation of records furnished by Mississippi River Power Co.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Discharge in second-feet				Run-off in Inches
		Maximum	Minimum	Mean	Per square mile	
October 1940	4,380	186	114	141	0.049	0.06
November	7,982	700	40	266	.091	.10
December	7,760	700	70	250	.087	.10
Calendar year 1940	177,786	3,230	8	486	.168	2.30
January 1941	15,165	850	270	489	.169	.20
February	41,300	5,500	310	1,475	.510	.53
March	38,732	3,130	550	1,249	.432	.50
April	27,733	1,480	556	924	.320	.36
May	11,842	534	257	382	.132	.15
June	46,030	4,520	289	1,534	.531	.59
July	36,916	3,900	232	1,191	.412	.48
August	6,245	401	113	201	.070	.08
September	22,692	1,940	97	756	.262	.29
Water year 1940–41	266,777	5,500	40	731	.253	3.44
October 1941	87,897	5,870	785	2,835	.981	1.13
November	117,810	7,340	1,620	3,927	1.36	1.52
December	46,456	3,170	842	1,499	.519	.60
Calendar year 1941	498,818	7,340	97	1,367	.473	6.43
January	61,000	4,500	800	1,968	.681	.78
February	66,510	6,000	1,000	2,375	.822	.86
March	76,120	3,850	1,560	2,455	.849	.98
April	35,505	1,820	755	1,184	.410	.46
May	74,940	4,260	1,070	2,417	.836	.96
June	72,880	4,640	1,060	2,429	.840	.94
July	49,963	3,080	735	1,612	.558	.64
August	20,093	2,330	250	648	.224	.26
September	26,936	2,260	336	898	.311	.35
Water year 1941–42	736,110	7,340	250	2,017	.698	9.48

Note—Stage-discharge relation affected by ice Nov. 11-19, Nov. 26 to Dec. 31, 1940; Jan. 1 to Mar. 9, 1941; Jan. 1 to Feb. 7, Feb. 17-20, 1942.

Skunk River at Coppock, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940-41												
1	181	130	120	800	450	700	800	534	319	2,850	368	102
2	176	178	90	750	410	600	780	525	289	3,150	273	143
3	171	176	70	650	380	550	800	513	492	3,840	247	117
4	168	171	100	550	370	700	1,030	496	365	3,900	226	97
5	166	154	140	460	350	1,000	1,240	496	560	3,300	211	102
6	161	140	170	410	330	1,500	1,250	509	2,170	1,820	194	582
7	156	152	200	330	320	1,300	1,180	476	1,860	1,320	181	379
8	164	150	230	*300	310	1,100	1,150	447	1,360	1,340	174	247
9	168	152	250	280	310	1,000	1,100	424	1,280	1,170	164	235
10	159	152	270	270	320	1,170	1,060	412	3,040	952	401	178
11	154	130	280	280	350	1,470	1,000	394	4,520	1,840	226	1,820
12	150	100	270	330	450	1,180	968	372	4,180	1,790	178	1,940
13	143	50	250	420	1,500	1,240	913	357	2,450	1,470	211	1,470
14	186	40	180	470	5,000	1,250	847	347	2,500	984	203	974
15	134	50	130	480	5,500	1,190	805	333	2,660	700	197	836
16	123	80	110	470	4,000	1,890	800	347	2,460	681	152	880
17	127	120	130	450	4,500	2,810	735	333	1,990	573	174	1,290
18	119	200	150	400	3,000	3,130	1,230	306	1,600	542	254	1,900
19	116	300	180	350	2,000	1,540	996	343	1,470	538	254	1,910
20	119	424	210	300	1,800	1,210	1,480	343	1,260	525	217	1,430
21	114	496	250	330	1,700	1,390	1,070	319	1,120	513	241	1,050
22	114	610	270	450	1,600	1,590	886	286	974	432	200	800
23	116	681	280	600	1,500	1,480	836	316	886	386	150	681
24	119	700	290	800	1,300	1,260	852	289	847	357	143	591
25	116	696	300	850	1,000	1,100	810	319	785	336	138	538
26	116	650	320	750	900	1,050	696	476	696	312	140	467
27	119	450	340	640	850	952	633	354	623	289	220	432
28	123	300	400	600	800	902	652	302	578	270	138	467
29	138	200	480	460	.....	858	578	263	676	241	130	496
30	130	150	600	470	.....	805	556	257	2,020	263	127	538
31	134	.....	700	*465	.....	815	.....	354	.....	232	113	.....
1941-42												
1	785	5,230	*1,580	1,500	5,500	1,560	1,820	1,190	1,520	2,520	1,030	968
2	1,070	6,220	1,560	1,400	6,000	1,830	1,770	1,070	1,300	2,520	1,140	720
3	1,130	6,290	1,520	1,250	4,500	2,080	1,720	1,130	1,180	1,950	1,390	578
4	1,340	5,930	1,470	1,100	4,000	2,280	1,660	1,120	1,100	1,650	1,230	517
5	1,280	6,340	1,450	1,000	3,800	2,470	1,660	1,160	1,060	1,480	1,080	488
6	962	6,970	1,390	900	4,000	2,650	1,610	1,540	1,740	1,300	935	496
7	1,900	7,340	1,300	830	3,500	2,520	1,560	1,940	1,690	1,240	825	1,050
8	2,870	7,240	1,220	800	2,610	2,190	1,470	3,090	1,470	2,860	2,330	924
9	4,180	6,870	1,190	800	2,300	2,110	1,380	2,970	2,070	2,090	836	820
10	5,100	6,240	1,160	820	2,160	1,960	1,290	2,630	2,280	3,080	662	1,110
11	4,710	5,500	1,140	870	1,980	1,810	1,220	2,280	2,260	1,770	578	896
12	3,800	5,020	1,050	920	1,920	1,690	1,160	2,150	3,780	1,500	517	755
13	3,350	4,410	880	970	1,870	1,660	1,140	2,900	4,300	1,210	500	633
14	2,190	3,660	842	1,000	1,820	1,710	1,110	3,820	4,640	2,030	471	525
15	1,840	3,010	974	1,040	1,810	1,730	1,060	3,670	4,180	1,610	447	471
16	1,620	2,770	1,010	1,100	*1,960	2,320	1,050	3,720	3,690	2,770	428	336
17	1,670	2,570	1,060	1,200	2,200	3,850	1,030	4,220	2,340	2,900	412	1,580
18	1,460	2,370	1,070	1,350	1,800	3,130	962	4,260	1,870	1,870	390	2,260
19	1,320	2,240	1,070	1,600	1,300	3,710	935	3,520	1,680	1,480	368	1,960
20	1,220	2,180	1,070	2,000	1,000	3,760	924	3,760	3,430	1,190	347	1,480
21	1,200	2,260	1,040	2,500	1,040	3,640	886	3,610	3,470	1,030	329	1,280
22	2,360	2,400	984	3,000	1,150	3,550	858	2,910	3,460	968	319	1,090
23	4,930	2,230	996	3,200	1,340	3,320	825	2,500	3,800	1,050	296	968
24	5,870	2,080	2,300	3,300	1,340	2,940	815	2,160	3,680	940	283	836
25	5,500	1,860	2,540	3,400	1,430	2,640	790	2,060	2,210	830	250	765
26	5,080	1,800	3,170	3,500	1,340	2,410	770	1,890	1,940	790	254	740
27	4,960	1,760	3,080	3,600	1,390	2,320	755	1,730	1,710	735	250	700
28	4,500	1,740	2,700	3,700	1,450	2,200	805	1,610	1,820	1,010	270	662
29	3,880	1,660	2,260	3,850	.....	2,150	1,200	1,520	1,670	1,400	312	647
30	3,240	1,620	1,850	4,000	.....	2,040	1,270	1,450	1,540	1,170	750	681
31	2,580	.....	1,530	4,500	.....	1,890	.....	1,360	.....	1,020	864	.....

*Winter discharge measurement made on this day.

Skunk River at Augusta, Iowa

LOCATION.—Water-stage recorder, lat. 40°46′, long. 91°17′, in NE¼ sec. 26, T. 69 N., R. 4 W., 300 feet upstream from bridge on State Highway 16 at Augusta, 2 miles upstream from Long Creek, and 12.2 miles upstream from mouth. Datum of gage is 521.69 feet above mean sea level, adjustment of 1912.

DRAINAGE AREA.—4,290 square miles.

RECORDS AVAILABLE.—September to November 1913, May 1915 to September 1942.

AVERAGE DISCHARGE.—27 years (1915-42), 1,990 second-feet.

EXTREMES.—Maximum discharge during 1941-42 year, 12,300 second-feet Oct. 9; maximum gage height, 14.29 feet Feb. 3 (affected by ice); minimum discharge, 160 second-feet sometime during period Aug. 26-28 (gage height, 1.75 feet).

1913, 1915-41: Maximum discharge observed, 44,500 second-feet June 17, 1930 (gage height, 22.55 feet); minimum observed, 7 second-feet Aug. 27 to Sept. 1, 1934 (gage height, 1.0 foot).

REMARKS.—Records good except those for Aug. 22-31, 1942, which are fair and those for periods of ice effect, which are poor. Slight diurnal fluctuation at low stages caused by power plant 25 miles above station.

COOPERATION.—Results of some discharge measurements, services of observer, and assistance in computation of records furnished by Mississippi River Power Co. Results of some discharge measurements furnished by Corps of Engineers, U. S. Army.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Discharge in second-feet				Run-off in Inches
		Maximum	Minimum	Mean	Per square mile	
October 1940	5,749	563	106	185	0.043	0.05
November	9,802	800	90	327	.076	.08
December	10,427	596	160	336	.078	.09
Calendar year 1940	256,970	9,450	13	702	.164	2.22
January 1941	23,075	1,400	400	744	.173	.20
February	62,720	7,000	390	2,240	.522	.54
March	49,390	3,410	990	1,593	.371	.43
April	43,182	3,300	851	1,439	.335	.37
May	19,304	940	348	623	.145	.17
June	60,330	7,920	328	2,011	.469	.52
July	40,991	3,800	242	1,322	.308	.36
August	7,093	506	115	229	.053	.06
September	23,434	1,790	102	781	.182	.20
Water year 1940–41	355,497	7,920	90	974	.227	3.07
October 1941	135,841	9,960	611	4,382	1.02	1.18
November	152,080	10,500	1,950	5,069	1.18	1.32
December	61,100	4,780	960	1,971	.459	.53
Calendar year 1941	678,540	10,500	102	1,859	.433	5.88
January 1942	80,210	6,020	1,100	2,587	.603	.70
February	132,010	11,000	1,700	4,715	1.10	1.14
March	99,870	7,040	2,100	3,222	.751	.87
April	47,600	2,390	1,010	1,587	.370	.41
May	84,390	4,780	1,410	2,722	.634	.73
June	92,850	6,020	1,270	3,095	.721	.80
July	68,260	6,730	970	2,202	.513	.59
August	24,821	1,870	322	801	.187	.22
September	32,485	2,260	674	1,083	.252	.28
Water year 1941–42	1,011,517	11,000	322	2,771	.646	8.77

Note—Stage-discharge relation affected by ice Nov. 12, 13, Nov. 29 to Dec. 9, Dec. 13-27, 1940; Jan. 3-28, Feb. 2 to Mar. 7, 1941; Jan. 2 to Feb. 6, Feb. 16 to Mar. 2, 1942.

Skunk River at Augusta, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940–41												
1.....	226	217	400	h920	640	1,400	950	785	h328	f2,260	506	102
2.....	180	192	220	h1,400	600	1,300	940	776	h585	f2,820	472	142
3.....	212	180	160	1,200	500	1,400	900	757	h368	f3,150	305	142
4.....	176	164	240	1,000	480	1,600	1,340	748	f757	f3,600	277	288
5.....	208	226	260	900	460	2,000	1,950	711	638	f3,800	232	214
6.....	212	180	290	700	440	2,100	1,990	757	766	f3,260	247	294
7.....	150	144	300	600	420	1,900	1,760	794	1,920	f1,890	189	638
8.....	226	161	320	500	400	1,720	1,600	766	1,830	f1,380	223	620
9.....	140	172	360	450	390	1,510	1,510	711	2,620	f1,440	228	585
10.....	168	192	323	425	390	1,400	1,430	638	f3,590	f1,380	247	380
11.....	217	168	387	400	400	1,140	1,360	620	f6,860	f1,250	198	283
12.....	154	160	342	500	500	1,140	1,300	549	f7,920	f1,940	300	1,270
13.....	192	140	400	600	3,000	1,300	1,230	387	f5,590	f2,000	202	1,770
14.....	144	106	320	650	6,000	1,380	1,150	361	f3,300	f1,660	189	1,480
15.....	196	90	220	650	7,000	1,380	1,090	348	f3,110	f1,210	218	1,070
16.....	172	154	170	625	6,300	1,660	1,050	418	f3,020	f881	218	930
17.....	168	200	220	650	5,000	2,270	1,010	940	2,580	f766	237	940
18.....	150	222	240	550	5,500	f3,410	1,430	803	2,170	f702	189	1,260
19.....	154	240	260	500	4,500	f3,120	3,300	620	1,770	f638	237	1,790
20.....	127	482	300	460	3,500	1,840	2,850	395	1,540	f602	232	1,790
21.....	109	482	350	480	3,000	1,480	2,430	441	1,360	f585	252	1,430
22.....	164	505	370	700	2,500	1,580	1,840	490	1,170	f576	232	1,110
23.....	144	640	380	950	2,200	1,730	1,430	684	1,060	490	218	881
24.....	136	732	370	1,000	2,000	1,620	1,280	647	920	449	210	776
25.....	124	714	400	1,400	1,800	1,400	1,230	602	881	402	138	693
26.....	133	800	410	1,000	1,700	1,270	1,110	f481	832	354	163	594
27.....	124	752	400	950	1,600	1,180	1,010	h638	738	348	133	490
28.....	106	467	408	875	1,500	1,110	980	h822	665	311	138	490
29.....	563	440	498	*723	.....	1,050	881	h602	620	305	206	433
30.....	366	480	h513	685	.....	1,010	851	h549	f822	242	142	549
31.....	208	.....	h596	632	.....	990	.....	h464	.....	300	115	.....
1941–42												
1.....	611	10,500	h1,910	2,130	7,000	2,100	2,260	1,470	1,580	1,910	1,170	920
2.....	1,060	10,500	*1,840	1,900	9,000	2,200	2,170	1,410	1,830	2,610	1,150	1,020
3.....	1,960	10,000	1,770	1,700	11,000	*2,460	2,090	1,420	1,510	2,670	1,210	920
4.....	1,450	8,680	1,700	1,500	9,500	2,630	2,040	1,490	1,380	2,290	1,430	871
5.....	1,630	6,840	1,690	1,350	8,000	2,790	2,070	1,410	1,270	1,980	1,350	930
6.....	2,420	8,200	1,610	1,250	9,500	2,890	2,180	1,580	1,280	1,750	1,220	674
7.....	2,900	8,640	1,540	1,150	9,880	2,970	2,240	1,870	1,860	1,560	1,410	822
8.....	3,260	8,170	1,520	1,100	6,720	2,810	2,050	2,510	1,850	6,730	1,360	1,180
9.....	9,810	7,730	1,410	1,100	5,720	2,640	2,000	3,240	1,750	4,460	1,870	1,070
10.....	9,960	7,300	1,320	1,100	7,000	2,550	2,390	3,060	2,360	2,890	1,490	1,040
11.....	7,150	6,530	1,270	1,150	5,550	2,400	2,040	2,970	2,900	3,290	970	1,190
12.....	5,580	5,970	1,240	1,200	4,460	2,250	1,820	2,990	3,400	2,200	766	1,080
13.....	4,770	5,500	1,140	1,250	3,500	2,230	1,580	2,880	5,130	1,940	684	851
14.....	6,630	4,840	1,020	*1,310	2,680	2,700	1,520	3,490	5,620	3,060	620	832
15.....	4,320	4,150	960	1,400	2,550	2,670	1,460	3,960	5,330	3,360	594	861
16.....	3,010	3,530	1,110	1,500	3,500	3,950	1,400	4,000	4,780	2,790	576	822
17.....	2,240	3,220	1,140	1,700	3,800	7,040	1,350	4,300	4,010	3,180	524	1,020
18.....	2,160	2,980	1,200	2,000	3,200	6,370	1,290	4,780	3,070	2,850	490	1,720
19.....	1,870	2,870	1,220	2,500	2,500	4,490	1,240	4,560	2,590	2,020	490	2,260
20.....	1,690	2,850	1,200	3,300	2,000	4,500	1,210	3,820	2,940	1,610	456	2,160
21.....	1,540	2,710	1,180	3,600	1,700	4,410	1,180	3,900	4,880	1,400	426	1,730
22.....	1,880	2,640	1,200	3,800	1,800	4,160	1,130	3,650	6,020	1,270	h410	1,490
23.....	5,600	2,680	1,870	3,850	1,950	3,930	1,100	3,000	5,360	1,170	h481	1,210
24.....	7,700	2,500	3,300	3,900	1,800	3,700	1,080	2,670	4,520	1,200	h498	1,050
25.....	6,980	2,310	4,240	3,950	1,900	3,200	1,060	2,410	3,930	1,110	h490	910
26.....	6,280	2,190	4,520	4,100	1,900	3,010	1,020	2,300	2,900	1,030	h335	861
27.....	7,480	2,090	4,780	4,300	1,900	2,780	1,010	2,100	2,380	970	h322	803
28.....	7,610	2,040	4,020	4,600	2,000	2,640	1,030	1,980	2,170	1,000	h322	757
29.....	6,020	1,970	3,110	5,000	.....	2,550	1,100	1,840	2,190	1,180	h322	720
30.....	5,020	h1,950	2,680	5,500	.....	2,490	1,490	1,720	2,060	1,460	h585	711
31.....	5,250	.....	2,390	6,020	.....	2,360	.....	1,610	.....	1,320	e800	.....

*Winter discharge measurement made on this day.
(e) Estimated.
(f) Computed on basis of partly or wholly estimated gage heights.
(h) Computed from once-daily reading.

SKUNK RIVER BASIN

Lakes in Skunk River Basin

Lake Keomah near Oskaloosa, Iowa

LOCATION.—Staff gage, lat. 41°17'20", long. 92°32'20", in sec. 24, T. 75 N., R. 15 W., at Lake Keomah State Park, 6 miles east of Oskaloosa, Mahaska County, Iowa.

OBSERVER.—W. B. Bayless, 1942.

RECORDS AVAILABLE.—June 1936 to September 1942.

EXTREMES.—1936: Maximum gage height observed during period, 4.99 feet June 10; minimum observed, 3.62 feet Sept. 1.

1936-37: Maximum gage height observed during water year, 6.28 feet May 26; minimum observed, 3.50 feet Nov. 24 to Dec. 3.

1937-38: Maximum gage height observed during water year, 7.00 feet Aug. 16; minimum observed, 4.80 feet Nov. 23-26.

1938-39: Maximum gage height observed during water year, 6.90 feet July 4; minimum observed, 5.28 feet Sept. 30.

1939-40: Maximum gage height observed during water year, 6.26 feet May 19, 20, 26; minimum observed, 4.82 feet Dec. 15-27.

1940-41: Maximum gage height observed during water year, 6.48 feet Feb. 13; minimum observed, 5.04 feet Nov. 7, 8, 10.

1941-42: Maximum gage height observed during water year, 6.77 feet Oct. 9; minimum observed, 5.06 feet Sept. 29, 30.

1936-42: Maximum gage height observed, 7.00 feet Aug. 16, 1938; minimum observed, 3.50 feet Nov. 24 to Dec. 3, 1936.

REMARKS.—Crest of spillway is at gage height 6.12 feet, by levels of June 26, 1939. Gage read twice daily.

COOPERATION.—Records collected in cooperation with Iowa State Conservation Commission.

Lake Keomah near Oskaloosa, Iowa—Continued

Daily Gage height, in Feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940–41												
1	5.29	5.09	5.16	5.32	5.53	6.24	6.18	6.04	5.80	5.94	5.67	5.24
2	5.26	5.09	5.16	5.34	5.56	6.23	6.18	6.04	5.80	5.94	5.65	5.25
3	5.24	5.08	5.16	5.36	5.58	6.22	6.22	6.03	5.82	5.94	5.61	5.35
4	5.27	5.08	5.14	5.36	5.58	6.22	6.23	6.02	5.87	5.92	5.57	5.43
5	5.30	5.06	5.14	5.36	5.58	6.22	6.24	6.00	5.93	5.89	5.55	5.47
6	5.32	5.06	5.12	5.36	5.60	6.20	6.23	6.00	6.10	5.86	5.53	5.49
7	5.30	5.04	5.12	5.36	5.60	6.20	6.22	5.99	6.27	5.84	5.51	5.50
8	5.29	5.04	5.12	5.36	5.60	6.20	6.21	5.98	6.28	5.82	5.49	5.50
9	5.28	5.06	5.12	5.37	5.62	6.20	6.25	5.96	6.33	5.81	5.47	5.50
10	5.26	5.04	5.11	5.38	5.64	6.20	6.25	5.94	6.27	5.80	5.45	5.51
11	5.26	5.06	5.10	5.38	5.67	6.21	6.23	5.94	6.25	5.78	5.41	5.54
12	5.25	5.08	5.12	5.36	5.72	6.22	6.22	5.92	6.23	5.77	5.39	5.55
13	5.24	5.08	5.14	5.34	6.23	6.22	6.21	5.92	6.22	5.75	5.35	5.56
14	5.23	5.07	5.14	5.34	6.43	6.22	6.20	5.92	6.20	5.74	5.31	5.59
15	5.22	5.06	5.17	5.34	6.39	6.22	6.20	5.92	6.18	5.72	5.29	5.68
16	5.20	5.06	5.20	5.36	6.37	6.22	6.18	5.90	6.18	5.72	5.28	5.76
17	5.19	5.06	5.23	5.36	6.35	6.22	6.18	5.90	6.16	5.72	5.40	5.78
18	5.18	5.06	5.24	5.38	6.33	6.22	6.19	5.88	6.14	5.82	5.39	5.78
19	5.16	5.06	5.26	5.37	6.29	6.22	6.22	5.86	6.14	5.80	5.37	5.78
20	5.15	5.08	5.26	5.36	6.27	6.24	6.22	5.86	6.12	5.78	5.36	5.77
21	5.14	5.12	5.26	5.35	6.25	6.24	6.21	5.92	6.11	5.75	5.34	5.76
22	5.14	5.13	5.26	5.34	6.23	6.24	6.20	5.96	6.08	5.71	5.32	5.76
23	5.12	5.14	5.26	5.36	6.22	6.22	6.20	6.00	6.06	5.67	5.30	5.76
24	5.12	5.14	5.26	5.36	6.21	6.21	6.18	6.00	6.05	5.62	5.32	5.74
25	5.11	5.14	5.26	5.36	6.20	6.20	6.17	6.00	6.03	5.60	5.32	5.73
26	5.10	5.14	5.27	5.38	6.19	6.20	6.16	5.97	6.02	5.59	5.30	5.71
27	5.10	5.16	5.28	5.42	6.18	6.20	6.15	5.92	6.00	5.57	5.28	5.69
28	5.10	5.16	5.30	5.43	6.24	6.20	6.13	5.87	6.00	5.55	5.27	5.66
29	5.12	5.16	5.30	5.44	.....	6.19	6.10	5.85	5.98	5.71	5.25	5.68
30	5.10	5.16	5.30	5.46	.....	6.18	6.08	5.84	5.96	5.69	5.24	5.75
31	5.08	.....	5.31	5.49	.....	6.18	.....	5.81	.....	.....	5.24	.....
1941–42												
1	5.88	6.49	6.20	6.36	6.30	6.27	6.22	6.14	5.94	6.04	5.82	5.18
2	5.88	6.42	6.20	6.36	6.30	6.28	6.22	6.14	5.94	6.03	5.77	5.16
3	5.88	6.35	6.20	6.36	6.30	6.28	6.21	6.14	5.92	6.04	5.74	5.16
4	5.88	6.33	6.20	6.28	6.28	6.27	6.20	6.14	5.91	6.02	5.70	5.16
5	5.88	6.37	6.20	6.27	6.28	6.26	6.20	6.13	5.90	6.00	5.68	5.16
6	5.90	6.35	6.19	6.26	6.27	6.28	6.20	6.12	5.90	5.99	5.66	5.18
7	5.93	6.33	6.18	6.26	6.26	6.28	6.18	6.12	5.90	5.98	5.64	5.21
8	5.95	6.31	6.18	6.24	6.28	6.28	6.18	6.12	5.90	6.00	5.60	5.22
9	6.74	6.28	6.18	6.24	6.27	6.27	6.16	6.12	5.88	6.01	5.64	5.22
10	6.48	6.26	6.18	6.24	6.26	6.26	6.15	6.14	5.88	6.00	5.60	5.19
11	6.36	6.24	6.18	6.24	6.26	6.26	6.14	6.15	5.96	5.98	5.56	5.18
12	6.27	6.24	6.18	6.24	6.28	6.26	6.14	6.16	6.06	5.98	5.52	5.18
13	6.26	6.24	6.18	6.24	6.28	6.26	6.12	6.16	6.05	5.98	5.50	5.18
14	6.25	6.23	6.18	6.25	6.28	6.26	6.12	6.16	6.04	6.02	5.48	5.18
15	6.24	6.22	6.18	6.27	6.29	6.26	6.10	6.14	6.04	5.99	5.46	5.17
16	6.24	6.22	6.19	6.29	6.33	6.30	6.10	6.13	6.02	5.98	5.44	5.16
17	6.26	6.22	6.20	6.30	6.34	6.29	6.08	6.10	6.01	5.98	5.40	5.15
18	6.26	6.22	6.20	6.33	6.32	6.28	6.06	6.10	6.00	5.96	5.39	5.12
19	6.27	6.24	6.20	6.34	6.32	6.28	6.08	6.08	5.99	5.96	5.35	5.12
20	6.32	6.24	6.20	6.32	6.30	6.26	6.08	6.08	6.12	5.96	5.30	5.10
21	6.35	6.22	6.20	6.32	6.29	6.26	6.08	6.06	6.14	5.94	5.28	5.10
22	6.39	6.22	6.20	6.32	6.28	6.26	6.08	6.06	6.14	5.94	5.26	5.10
23	6.35	6.20	6.51	6.31	6.26	6.24	6.06	6.04	6.12	5.92	5.26	5.10
24	6.31	6.20	6.40	6.30	6.26	6.24	6.06	6.04	6.12	5.90	5.22	5.10
25	6.28	6.20	6.33	6.30	6.24	6.24	6.06	6.03	6.10	5.90	5.20	5.10
26	6.31	6.20	6.34	6.30	6.24	6.24	6.06	6.02	6.10	5.89	5.20	5.10
27	6.32	6.20	6.34	6.30	6.23	6.26	6.06	6.02	6.10	5.88	5.20	5.08
28	6.34	6.20	6.34	6.30	6.22	6.26	6.08	6.00	6.08	5.88	5.20	5.08
29	6.34	6.20	6.34	6.30	.....	6.24	6.10	6.00	6.07	5.88	5.20	5.06
30	6.35	6.20	6.34	6.30	.....	6.24	6.12	5.98	6.06	5.86	5.20	5.06
31	6.44	.....	6.36	6.30	.....	6.24	.....	5.96	.....	5.84	5.19	.....

West Fork Des Moines River near Jackson, Minn.

LOCATION.—Chain gage, lat. 43°42', long. 95°03', in sec. 28, T. 103 N., R. 35 W., 6 miles northwest of Jackson. Datum of gage is 1,304.85 feet above mean sea level, datum of 1929.

DRAINAGE AREA.—1,170 square miles.

RECORDS AVAILABLE.—August 1930 to September 1942 (winter records incomplete prior to 1936). May 1909 to December 1913 at site 8 miles downstream.

AVERAGE DISCHARGE.—7 years (1935-42), 220 second-feet.

EXTREMES.—Maximum discharge during 1941-42 year, 3,170 second-feet Sept. 3 (gage height, 12.2 feet, from graph based on gage readings); minimum daily discharge, 1.2 second-feet Jan. 8, 9.

1909-13, 1930-41: Maximum discharge observed, 2,320 second-feet Mar. 22, 1936 (gage height, 9.60 feet); no flow at times; maximum gage height observed, 10.05 feet June 30, 1909, site and datum then in use.

REMARKS.—Records during 1940-41 year good except those for periods of ice effect, which are fair, and those estimated, which are poor. Records during 1941-42 year good except those for periods of ice effect or no gage-height record, which are fair. Gage read once or twice daily. Flow partly regulated by storage above station in Yankton, Long, Shetek, and Heron Lake.

NOTE.—Station operated in cooperative program in Minnesota and records furnished by district office of United States Geological Survey, St. Paul, Minn.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Discharge in second-feet				Run-off in Inches
		Maximum	Minimum	Mean	Per square mile	
October 1940	219	19	2.9	7.06	0.0060	0.007
November	826	55	10	27.5	.024	.03
December	826	30	24	26.6	.023	.03
Calendar year 1940	14,265.5	449	0	39.0	.033	.46
January 1941	473	26	10	15.3	.013	.02
February	571	65	11	20.4	.017	.02
March	5,466	850	15	176	.150	.17
April	29,420	1,760	730	980.7	.838	.94
May	10,316	886	80	332.8	.284	.33
June	3,906	308	67	130	.111	.12
July	2,354	115	26	75.9	.065	.07
August	363.6	27	1.8	11.7	.010	.01
September	483.7	35	4.2	16.1	.014	.02
Water year 1940–41	55,224.3	1,760	1.8	151.3	.129	1.77
October 1941	494.2	25	7.3	15.9	.014	.02
November	792	43	19	26.4	.023	.03
December	619	26	12	20.0	.017	.02
Calendar year 1941	55,258.5	1,760	1.8	151	.129	1.77
January 1942	463.7	40	1.2	15.0	.013	.01
February	523	24	15	18.7	.016	.02
March	9,976	1,360	22	322	.275	.32
April	19,899	1,460	222	663	.567	.63
May	23,665	1,080	340	763	.652	.75
June	28,022	1,240	549	934	.798	.89
July	23,798	2,160	331	768	.656	.76
August	41,460	2,340	704	1,337	1.14	1.32
September	65,290	3,090	1,350	2,176	1.86	2.08
Water year 1941–42	215,001.9	3,090	1.2	589	.503	6.85

Note—Stage-discharge relation affected by ice Nov. 14, 1940 to Apr. 2, 1941; Nov. 21, 1941 to Mar. 21, 1942.

West Fork Des Moines River near Jackson, Minn.—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940–41												
1.....	6.3	18	26	26	17	15	900	886	91	115	22	4.2
2.....	6.6	18	26	22	16	26	850	860	85	109	20	4.9
3.....	8.6	15	28	18	16	*55	a850	782	85	103	19	4.9
4.....	6.3	13	28	14	17	36	*860	704	91	103	23	4.9
5.....	7.8	14	28	14	19	24	860	652	85	115	27	4.9
5.....	14	15	28	15	18	60	886	600	85	115	25	9.0
7.....	15	10	28	16	15	60	886	549	74	109	23	25
8.....	11	15	30	17	14	60	886	499	74	109	21	33
9.....	9.4	22	30	15	14	110	860	377	74	103	20	35
10.....	7.0	35	28	15	16	100	860	331	67	97	17	32
11.....	6.3	a38	28	16	18	85	860	331	103	97	16	26
12.....	6.3	a30	26	16	22	75	860	308	222	97	15	21
13.....	6.3	a24	24	15	65	*70	834	308	308	85	15	21
14.....	7.8	16	24	15	44	65	834	308	308	80	14	32
15.....	5.6	17	*26	15	36	65	808	275	275	97	13	33
16.....	4.9	18	26	15	44	60	782	264	222	97	11	29
17.....	4.9	19	24	12	30	55	756	254	202	80	10.	26
18.....	4.9	55	24	10	16	50	730	222	165	80	9.4	21
19.....	4.2	50	26	11	11	50	756	212	142	71	7.0	16
20.....	3.8	50	26	12	12	55	1,060	202	121	61	3.5	13
21.....	3.5	46	26	13	13	130	1,760	192	a112	57	a3.0	9.4
22.....	3.5	*42	26	12	14	300	1,620	183	103	a53	a2.6	8.6
23.....	3.5	38	28	14	15	360	1,310	157	103	50	a2.2	a8.2
24.....	3.5	36	28	15	14	*340	1,180	142	97	42	1.8	7.8
25.....	a3.2	34	28	15	13	300	1,180	134	91	41	2.4	6.3
26.....	2.9	32	26	15	14	300	1,180	128	103	38	2.4	7.0
27.....	2.9	28	26	*15	13	300	1,150	103	103	33	2.9	7.8
28.....	7.0	26	26	15	15	320	1,090	97	103	29	3.5	7.8
29.....	10	26	26	16	.....	440	1,030	85	103	26	3.5	11
30.....	13	26	26	17	.....	650	942	80	109	32	4.2	14
31.....	19	.....	26	17	.....	*850	.....	91	.....	30	4.2	.....
1941–42												
1.....	8.8	26	26	13	19	22	1,430	a340	741	860	2,340	1,350
2.....	7.3	25	a26	10	19	30	1,460	a340	819	808	2,120	2,860
3.....	8.1	25	a26	6.0	19	30	1,430	a340	876	808	2,020	3,090
4.....	12	26	a24	3.6	22	28	1,300	a340	935	782	2,0.0	2,820
5.....	16	28	a24	2.2	22	26	1,200	a340	1,020	782	2,050	2,710
6.....	18	26	a24	1.8	24	32	1,120	425	1,240	782	1,980	2,820
7.....	18	25	a22	1.5	22	32	995	641	1,200	782	1,940	2,820
8.....	17	24	a22	1.2	20	36	935	a750	1,200	782	1,840	2,750
9.....	15	23	a20	1.2	20	36	905	666	1,240	756	1,730	2,600
10.....	15	20	a18	1.5	19	36	792	593	1,200	a780	1,660	2,410
11.....	14	19	a15	2.0	19	*30	741	617	1,200	808	1,590	2,340
12.....	14	20	*12	2.8	a19	28	741	716	1,240	782	1,480	2,270
13.....	17	24	a14	3.6	a19	24	666	876	1,200	756	1,420	2,050
14.....	19	26	15	4.8	a20	28	569	1,020	1,180	756	1,350	1,940
15.....	18	30	17	5.5	a20	34	545	1,060	1,120	756	1,280	1,870
16.....	18	*28	18	*6.5	*20	40	521	1,060	1,060	730	1,250	1,760
17.....	17	26	20	8.5	18	46	497	1,020	970	678	1,180	1,870
18.....	16	27	20	11	17	55	473	1,080	970	600	1,090	2,160
19.....	14	43	19	15	17	130	425	1,080	942	549	1,030	2,520
20.....	14	43	19	18	17	150	401	1,060	886	474	a970	2,340
21.....	a14	32	19	24	16	120	315	1,060	834	354	a914	2,090
22.....	14	22	20	30	15	*139	276	995	782	331	860	2,020
23.....	14	19	22	34	15	258	276	965	678	354	834	1,940
24.....	14	19	22	38	16	691	258	905	574	401	782	1,870
25.....	16	20	24	40	16	a1,000	240	876	549	425	730	1,760
26.....	19	22	24	38	17	1,140	222	819	574	574	730	1,730
27.....	22	26	22	34	17	1,300	240	792	600	730	704	1,730
28.....	25	40	19	32	19	1,020	276	766	626	808	704	1,660
29.....	18	32	16	28	.....	935	315	716	652	1,120	860	1,590
30.....	18	26	16	24	.....	1,140	335	691	914	1,730	942	1,550
31.....	24	.....	14	22	.....	1,360	.....	716	.....	2,160	1,060	.....

*Winter discharge measurement made on this day.
(a) No gage-height record; discharge interpolated or estimated.

Des Moines River near Boone, Iowa

LOCATION.—Water-stage recorder upstream from dam of Boone Water Department, lat. 42°04'40", long. 93°55'55", in NE¼ sec. 24, T. 84 N., R. 27 W., 2 miles northwest of Boone and 2.2 miles upstream from Bluff Creek. Datum of gage is 871.52 feet above mean sea level, adjustment of 1912.

DRAINAGE AREA.—5,490 square miles.

RECORDS AVAILABLE.—October 1924 to September 1927, October 1933 to September 1942. April 1920 to September 1924 at site 1.3 miles upstream.

AVERAGE DISCHARGE.—16 years, 1,356 second-feet.

EXTREMES.—Maximum discharge during 1941-42 year, 9,200 second-feet Nov. 8 (gage height, 6.00 feet); minimum, 560 second-feet Jan. 4; minimum gage height, 0.64 foot Dec. 30.

1920-27, 1933-41: Maximum discharge, 24,500 second-feet Sept. 18, 1938 (gage height, 16.00 feet); no flow for a short time on Jan. 9, 25, 1938, caused by manipulation of gates in control dam; minimum daily, about 17 second-feet (during period of ice effect) Jan. 28, 1940 (unaffected by gate operation).

Highest stage observed at present site, 17.03 feet Apr. 2, 1933 (control dam destroyed). A stage of about 20.5 feet, from floodmarks, occurred June 6, 1918, at site 1.3 miles uppstream (discharge, 32,000 second-feet, from rating curve extended above 17,000 second-feet). A stage of 23.6 feet occurred in 1903 at U. S. Weather Bureau gage on Chicago and North Western Ry. bridge 2.5 miles downstream (discharge, 32,000 second-feet, from rating curve extended above 28,000 second-feet).

REMARKS.—Records excellent except those for periods of ice effect, which are fair. Slight diurnal fluctuation caused by power plants above station.

COOPERATION.—Water-stage recorder inspected by employees of Boone Water Department.

OBSERVER.—Andrew Lindblom.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Discharge in second-feet				Run-off in Inches
		Maximum	Minimum	Mean	Per quare mile	
October 1940	4,690	310	110	151	0.028	0.03
November	28,787	2,240	286	960	.175	.20
December	22,958	1,460	444	741	.135	.16
Calendar year 1940	190,418	4,270	17	520	.095	1.29
January 1941	30,851	2,090	430	995	.181	.21
February	25,997	3,810	362	928	.169	.18
March	74,988	3,500	402	2,419	.441	.51
April	92,370	3,900	2,510	3,079	.561	.63
May	41,327	2,580	656	1,333	.243	.28
June	113,150	6,990	1,580	3,772	.687	.77
July	41,924	3,460	539	1,352	.246	.28
August	7,760	474	110	250	.046	.05
September	38,532	3,370	110	1,284	.234	.26
Water year 1940-41	523,334	6,990	110	1,434	.261	3.56
October 1941	68,732	4,860	941	2,217	.404	.47
November	162,010	9,020	2,580	5,400	.984	1.10
December	56,830	2,560	623	1,833	.334	.38
Calendar year 1941	754,471	9,020	110	2,067	.377	5.12
January 1942	55,510	5,460	560	1,791	.326	.38
February	44,794	3,260	840	1,600	.291	.30
March	110,131	6,160	840	3,553	.647	.75
April	90,930	5,340	1,860	3,031	.552	.62
May	105,690	6,360	1,930	3,409	.621	.72
June	126,370	8,880	2,110	4,212	.767	.86
July	87,600	7,390	1,760	2,826	.515	.59
August	70,220	3,080	1,290	2,265	.413	.48
September	80,420	4,330	1,220	2,681	.488	.54
Water year 1941-42	1,059,237	9,020	560	2,902	.529	7.19

Des Moines River near Boone, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940–41												
1	142	286	b550	1,530	430	430	2,510	2,580	1,580	2,830	474	117
2	151	298	b570	1,780	416	402	2,630	2,490	1,930	3,460	416	110
3	133	323	b470	2,090	430	656	2,680	2,360	3,590	3,350	388	117
4	125	349	490	1,530	388	b2,500	2,830	2,260	4,880	2,830	362	110
5	151	362	673	1,110	402	b3,500	3,060	2,160	4,270	2,540	349	117
6	151	323	941	b1,200	388	b3,000	3,280	2,060	4,430	2,320	375	125
7	151	323	1,050	b1,600	375	b2,800	3,280	1,980	4,270	2,030	375	169
8	151	336	1,020	b1,500	b400	2,580	3,200	1,880	3,670	1,800	310	274
9	160	416	962	1,360	b380	2,630	3,180	1,730	3,200	1,580	310	117
10	169	506	859	1,180	388	2,830	3,200	1,680	2,810	1,390	286	142
11	151	840	822	1,130	362	2,960	3,140	1,580	3,000	1,290	310	962
12	169	803	746	1,070	*375	3,060	3,080	1,430	4,810	1,180	252	1,510
13	151	416	556	1,020	656	2,870	3,020	1,310	5,230	1,110	241	1,390
14	160	b500	444	920	1,220	2,630	2,920	1,270	5,900	1,050	219	1,160
15	133	b700	506	859	1,680	2,490	2,830	1,110	6,630	1,020	188	1,160
16	133	b750	b490	784	2,140	2,360	2,810	1,050	6,990	982	178	1,250
17	142	b800	b450	709	1,860	2,340	2,790	1,000	6,410	941	252	2,060
18	160	878	b500	709	1,980	2,440	2,720	920	5,620	859	230	2,790
19	142	1,130	b505	b650	3,810	2,700	2,680	859	4,980	822	230	3,370
20	125	1,560	b530	b750	2,260	2,740	2,740	822	4,400	765	208	3,370
21	142	1,780	506	b900	1,430	2,650	3,080	803	3,770	746	188	2,960
22	142	2,030	506	840	920	2,560	3,500	803	3,180	746	219	2,650
23	198	2,240	506	859	784	2,790	3,900	784	2,830	746	208	2,490
24	169	2,210	522	728	673	2,650	3,820	765	2,580	728	198	2,320
25	110	2,060	640	673	572	2,360	3,640	746	2,260	765	198	1,910
26	110	1,930	784	606	474	2,410	3,600	690	2,010	840	142	1,480
27	133	1,780	1,020	589	388	2,360	3,520	656	2,060	746	142	1,250
28	151	1,410	1,180	589	416	2,340	3,180	673	1,910	640	160	1,090
29	142	859	1,290	b600	.....	2,290	2,870	784	1,860	606	125	1,000
30	133	589	1,410	556	.....	2,320	2,680	822	2,090	673	117	962
31	310	.....	1,460	430	.....	2,340	.....	1,270	.....	539	110	.....
1941–42												
1	941	3,800	2,560	b650	3,260	840	5,340	1,930	2,510	7,390	3,080	1,220
2	941	4,690	2,490	b600	2,900	941	5,060	1,980	2,870	6,020	3,040	1,390
3	1,110	5,280	2,460	b570	2,560	1,070	4,850	2,390	4,060	4,810	2,940	1,510
4	1,360	5,810	2,410	b560	2,440	1,560	4,700	2,680	7,210	3,770	2,900	1,360
5	1,600	6,950	2,360	b570	2,290	1,980	4,630	2,790	8,880	3,060	2,870	1,460
6	2,010	8,070	2,360	b580	2,190	2,160	4,470	3,020	8,280	2,700	2,870	1,680
7	2,870	8,540	*2,260	b600	2,140	2,290	4,300	3,690	7,230	2,490	2,870	2,030
8	3,430	9,020	2,160	b630	1,980	2,440	4,010	4,630	7,510	2,390	2,920	2,340
9	4,420	8,930	2,110	b660	1,780	2,320	3,670	5,160	7,240	2,390	2,790	2,580
10	4,860	8,040	1,980	b720	1,700	2,340	3,370	5,170	5,900	2,290	2,740	2,700
11	4,530	6,880	1,430	b800	1,660	2,290	3,140	5,850	5,070	2,510	2,720	2,770
12	3,870	6,050	756	b900	1,630	2,290	2,980	6,360	4,500	3,100	2,650	2,830
13	3,240	5,560	941	b960	1,530	2,030	2,850	5,730	4,140	3,020	2,580	3,420
14	2,940	5,630	1,180	b980	1,510	1,880	2,770	5,020	3,660	3,100	2,490	3,720
15	2,610	5,920	1,510	b1,020	1,460	1,930	2,650	4,300	3,240	2,650	2,440	3,100
16	2,260	6,020	1,780	*b1,120	1,460	2,770	2,560	3,720	2,980	2,440	2,390	2,870
17	1,980	5,620	1,880	b1,150	1,390	3,920	2,540	3,440	2,830	2,610	2,240	2,700
18	1,860	5,170	2,060	b1,200	1,110	4,560	2,460	3,330	2,680	2,490	2,110	2,630
19	1,730	4,870	2,060	b1,260	1,020	4,440	2,490	3,140	2,560	2,630	2,010	3,120
20	1,600	4,650	2,010	1,360	1,000	4,540	2,210	3,000	2,740	2,390	1,930	4,330
21	1,530	4,700	1,880	1,480	1,000	5,570	2,210	2,900	2,740	2,440	1,780	4,090
22	1,510	5,070	1,800	1,630	1,090	5,980	2,090	2,790	2,580	2,110	1,660	3,300
23	1,430	4,740	1,960	1,880	1,050	5,560	1,980	2,740	2,460	1,760	1,560	3,020
24	1,390	4,120	2,090	2,340	982	5,210	1,880	2,650	2,260	1,860	1,480	3,000
25	1,360	3,660	2,190	3,260	982	4,910	1,860	2,580	2,110	2,650	1,360	3,040
26	1,340	3,220	2,210	4,600	941	5,030	2,030	2,510	2,140	2,160	1,600	3,060
27	1,310	2,980	2,010	5,290	899	5,570	1,980	2,440	2,240	2,190	1,560	2,920
28	1,360	2,790	1,680	5,460	840	6,020	1,960	2,410	2,580	1,880	1,860	2,810
29	1,880	2,650	941	5,360	.....	6,160	1,960	2,460	4,010	1,830	1,960	2,740
30	2,560	2,580	623	3,800	.....	5,940	1,930	2,440	7,160	1,980	1,530	2,680
31	2,900	.....	b680	3,520	.....	5,590	.....	2,440	.....	2,490	1,290	.....

*Winter discharge measurement made on this day.
(b) Stage-discharge relation affected by ice.

Des Moines River at Des Moines, Iowa

LOCATION.—Water-stage recorder, lat. 41°36'45", long. 93°37'05", in NE¼ sec. 34, T. 79 N., R. 24 W., at 2nd Avenue Bridge in Des Moines, 2.8 miles upstream from Raccoon River, and 4½ miles downstream from Beaver Creek. Control is dam of Iowa Power and Light Co., 1.8 miles downstream. Datum of gage is 773.74 feet above mean sea level, datum of 1929 where, prior to Oct. 1, 17941, float in pipe well was located. Datum was 786.05 feet above mean sea level, datum of 1929.

DRAINAGE AREA.—6,180 square miles.

RECORDS AVAILABLE.—October 1902 to August 1903 (gage heights only), May 1905 to July 1906, October 1914 to February 1915 (gage heights only), March 1915 to September 1927, and October 1932 to September 1942 in reports of Geological Survey. 1893, 1894, 1897-1927 in Iowa State Planning Board report, "Stream Flow Records of Iowa, 1873-1932."

AVERAGE DISCHARGE.—22 years (1915-27, 1932-42), 1,898 second-feet.

EXTREMES.—Maximum discharge during 1941-42 year, 9,330 second-feet Nov. 10; maximum gage height, 17.23 feet May 12; minimum discharge, 760 second-feet (during period of ice effect) Jan. 4; minimum gage height, 13.28 feet Oct. 3.

1915-27, 1932-41: Maximum discharge, about 41,500 second-feet June 7, 1918 (gage height, 16.5 feet, site and datum then in use); minimum unregulated discharge, 24 second-feet Jan. 29, 30, 1940; operation of sluice gates in control dam has caused brief periods of no flow.

Maximum stage known, about 23 feet, site and datum then in use, May 31, 1903 (affected by backwater from Raccoon River).

REMARKS.—Records good except those below 1,000 second-feet, those for no gage-height record, those for period when sluice gates were open, and those for period of ice effect, all of which are fair to poor.

COOPERATION.—In 1941 gage readings obtained by arrangement with Des Moines Electric Co. Thereafter, new recording station operated through cooperation with City of Des Moines and Weather Bureau.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Discharge in second-feet				Run-off in Inches
		Maximum	Minimum	Mean	Per square mile	
October 1940	5,439	238	117	175	0.028	0.03
November	33,122	2,460	146	1,104	.179	.20
December	27,986	1,680	501	903	.146	.17
Calendar year 1940	262,834	6,320	24	718	.116	1.58
January 1941	37,159	2,740	705	1,199	.194	.22
February	31,077	2,250	570	1,110	.180	.19
March	80,112	4,240	675	2,584	.418	.48
April	100,050	4,020	2,560	3,335	.540	.60
May	44,920	2,800	705	1,449	.234	.27
June	147,560	7,980	1,370	4,919	.796	.89
July	50,277	4,050	690	1,622	.262	.30
August	10,080	705	162	325	.053	.06
September	40,479	3,400	138	1,349	.218	.24
Water year 1940–41	608,261	7,980	117	1,666	.270	3.65
October 1941	82,490	5,100	1,100	2,661	.431	.50
November	186,440	9,260	3,510	6,215	1.01	1.12
December	77,830	3,430	850	2,511	.406	.47
Calendar year 1941	888,474	9,260	138	2,434	.394	5.34
January 1942	86,420	7,110	760	2,788	.451	.52
February	69,170	5,080	1,300	2,470	.400	.42
March	129,310	6,610	1,300	4,171	.675	.78
April	114,380	6,170	2,430	3,813	.617	.69
May	146,690	8,940	2,470	4,732	.766	.88
June	140,210	8,390	2,700	4,674	.756	.84
July	112,580	7,050	2,470	3,632	.588	.68
August	89,420	4,100	1,680	2,885	.467	.54
September	92,350	4,470	1,500	3,078	.498	.56
Water year 1941–42	1,327,290	9,260	760	3,636	.588	8.00

Des Moines River at Des Moines, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940–41												
1	238	146	771	1,780	690	675	2,560	2,800	1,370	3,320	705	138
2	229	328	528	2,740	675	675	2,720	2,680	1,760	3,760	585	162
3	229	276	570	2,460	645	922	2,900	2,560	5,700	4,050	514	615
4	238	328	501	1,700	630	1,040	2,920	2,440	6,890	3,760	474	555
5	194	328	630	1,140	645	1,580	3,160	2,280	6,510	3,180	474	276
6	210	328	788	1,010	615	2,560	3,540	2,190	5,560	2,700	447	186
7	194	328	1,120	992	645	2,750	3,700	2,080	5,380	2,410	408	186
8	194	316	1,300	1,210	615	2,700	3,650	2,010	5,010	2,190	420	194
9	186	374	1,300	1,540	645	2,600	3,590	1,880	5,280	1,950	397	474
10	194	488	1,300	1,550	615	2,720	3,590	1,760	5,150	1,760	351	267
11	202	804	1,120	*1,470	570	2,950	3,560	1,680	4,940	1,740	340	194
12	194	738	1,010	1,450	600	2,850	3,450	1,600	5,630	e1,500	328	362
13	178	b700	870	1,430	1,500	3,000	3,340	1,470	6,810	e1,400	305	1,220
14	194	b550	501	1,350	1,640	3,210	3,320	1,340	7,120	e1,280	286	1,320
15	170	b700	645	1,220	1,540	4,240	3,130	1,340	7,470	e1,180	276	1,300
16	178	b800	555	a1,150	1,990	3,590	3,000	1,220	7,980	e1,130	258	1,340
17	162	b900	542	a1,090	2,250	a3,380	2,950	1,120	7,980	e1,100	a293	1,410
18	162	b1,300	615	1,030	2,080	a3,160	3,000	1,060	7,360	e1,020	328	1,900
19	146	1,520	615	705	1,860	2,950	2,950	992	6,210	e980	296	2,750
20	162	1,720	675	a788	1,700	3,030	2,980	975	5,320	e910	267	3,320
21	154	2,010	660	870	1,580	2,950	3,110	905	4,650	e850	258	3,400
22	146	2,010	675	940	1,430	2,850	3,430	958	4,110	e820	248	3,080
23	130	2,300	705	975	1,190	2,750	3,820	958	3,650	e800	248	2,800
24	130	2,460	722	922	1,140	3,050	4,020	888	3,210	e790	229	2,600
25	162	2,410	788	905	1,040	2,820	3,930	820	2,950	e820	229	2,460
26	154	2,300	1,040	a854	922	2,630	3,820	837	2,510	e860	210	2,080
27	117	2,120	1,210	804	837	2,600	3,730	771	3,110	e880	210	1,720
28	146	1,900	1,410	804	788	a2,540	3,760	771	2,900	905	178	1,520
29	146	1,580	1,540	804	.....	a2,470	3,370	705	2,600	837	178	1,280
30	154	1,060	1,600	771	.....	2,410	3,050	820	2,440	705	178	1,370
31	146	.....	1,680	705	.....	2,460	.....	1,010	.....	690	162	.....
1941–42												
1	1,220	5,880	3,430	b870	5,060	b1,300	6,170	2,500	3,020	6,430	3,490	1,700
2	1,120	6,300	3,370	b800	5,080	b1,350	5,930	2,470	3,090	7,050	4,100	1,500
3	1,100	6,520	3,310	b780	4,730	b1,400	5,670	2,850	3,470	5,840	3,910	1,700
4	1,220	6,740	3,210	b760	3,890	1,750	5,460	3,430	4,430	4,810	3,750	1,870
5	1,700	6,980	3,090	b770	3,710	2,120	5,290	3,970	6,410	3,970	3,630	1,720
6	1,940	7,930	3,000	b800	3,430	2,870	5,190	4,620	8,060	3,470	3,530	1,680
7	3,270	8,660	2,940	b900	3,110	2,980	5,020	4,810	8,390	3,110	3,470	1,820
8	4,010	9,080	2,750	b1,000	2,940	2,940	4,890	5,170	7,690	2,900	3,450	2,100
9	4,450	9,260	2,620	b1,200	2,680	3,000	4,680	5,670	7,970	2,810	3,430	2,580
10	4,830	9,260	2,450	b1,300	2,490	2,880	4,500	6,170	7,910	2,850	3,270	2,730
11	5,100	8,730	2,320	b1,400	2,410	2,830	4,240	7,950	7,180	2,700	3,190	2,900
12	4,870	7,620	1,870	b1,450	2,320	2,850	4,030	8,940	5,990	2,880	3,130	2,940
13	4,450	6,630	1,480	b1,500	2,340	2,810	3,850	8,800	5,290	3,390	3,080	3,110
14	4,010	6,060	1,390	b1,600	2,120	2,600	3,710	7,800	4,750	4,450	2,960	3,810
15	3,670	5,990	1,730	b1,700	2,050	2,450	3,570	6,810	4,350	4,080	2,810	4,280
16	3,310	6,060	2,190	b1,800	2,090	2,700	3,430	5,760	3,970	3,530	2,730	4,030
17	2,880	6,210	2,660	b2,000	b2,050	4,600	3,270	5,170	3,750	3,080	2,640	3,810
18	2,520	5,930	2,750	b2,150	b1,900	5,590	3,190	5,060	3,550	3,110	2,470	3,450
19	2,270	5,590	2,790	b2,400	b1,700	5,930	3,090	4,810	3,330	3,080	2,320	3,290
20	2,210	5,360	2,410	b2,650	b1,600	5,800	3,090	4,580	3,570	3,190	2,180	3,710
21	2,140	5,150	2,370	b3,000	b1,600	5,820	2,900	4,370	3,810	2,920	2,140	4,470
22	2,050	5,210	2,320	3,710	b1,550	6,390	2,750	4,160	3,690	2,900	1,980	4,350
23	2,030	5,460	2,660	4,160	b1,500	6,590	2,580	3,950	3,410	2,620	1,890	3,870
24	1,920	5,210	3,190	4,790	b1,450	6,210	2,430	3,810	3,110	2,470	1,780	3,630
25	1,850	4,790	3,170	5,650	b1,400	5,900	2,430	3,690	3,040	3,040	1,680	3,630
26	1,780	4,500	3,230	6,410	b1,350	5,800	2,700	3,510	3,060	3,370	1,920	3,710
27	1,770	4,180	3,110	6,870	b1,320	5,900	2,620	3,350	2,700	3,080	2,710	3,690
28	1,720	3,930	2,790	7,110	b1,300	6,300	2,660	3,210	2,880	4,680	3,230	3,530
29	1,730	3,710	b1,500	6,560	.....	6,560	2,540	3,130	3,890	3,750	3,210	3,410
30	2,140	3,510	b850	5,290	.....	6,610	2,500	3,130	4,450	3,610	3,060	3,330
31	3,210	.....	b880	5,040	.....	6,480	.....	3,040	.....	3,410	2,280	.....

Note—Sluice gates in central dam open July 12-27, 1941; June 26 to Sept. 4, 1942.
*Winter discharge measurement made on this day.
(a) No gage-height record; discharge interpolated.
(b) Stage-discharge relation affected by ice.

Des Moines River below Raccoon River, at Des Moines, Iowa

LOCATION.—Water-stage recorder just upstream from Scott Street Dam, lat. 41°34'53", long. 93°36'45", in NW¼ sec. 10, T. 78 N., R. 24 W., at Scott Street Bridge in Des Moines, 100 feet downstream from Raccoon River, 1 mile downstream from dam of Iowa Power and Light Co., and 2½ miles downstream from dam of Des Moines Water Works on Raccoon River. Datum of gage is 773.74 feet above mean sea level, datum of 1929.

DRAINAGE AREA.—9,770 square miles.

RECORDS AVAILABLE.—April 1940 to September 1942.

EXTREMES.—Maximum discharge during 1941-42 year, 17,000 second-feet May 12 (gage height, 9.03 feet); minimum, 856 second-feet Jan. 2 (gage height, 4.84 feet).

1940-41: Maximum discharge, 13,000 second-feet (estimated) June 16, 1941; minimum daily, 80 second-feet (estimated) July 27, 1940; minimum gage height observed, 4.21 feet July 25, 1940.

On Sept. 19, 1938, a discharge of 27,200 second-feet was measured by current meter near the crest stage (gage-height, 13.56 feet, present site and datum). Flood of May 31, 1903, reached a stage of about 21 feet, present site and datum, from profile by City Engineer's office (discharge, about 70,000 second-feet, from slope-area computation based on flood profile and area taken in 1936 at present gage site).

REMARKS.—Records good except those for periods of ice effect, which are fair. On Raccoon River, about 2½ miles above station, water for municipal supply of Des Moines is taken from infiltration galleries which are 150 to 300 feet from river and generally about 30 feet below grade. Net effect of pumpages, storm water, and diversions not known.

COOPERATION.—Average monthly pumpage from galleries and at sewage plant, in second-feet, computed from records furnished by Des Moines Water Works and by City of Des Moines. Water-stage recorder inspected by employee of Des Moines Water Works.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Discharge in second-feet				Run-off in Inches	Pumpage (sec-ft)	
		Maximum	Minimum	Mean	Per sq mile		Water Plant	Sewerage Plant
October 1940	11,195	431	285	361	0.037	0.04	21.5	13.6
November	47,206	3,530	390	1,574	.161	.18	20.0	15.8
December	43,938	2,600	710	1,417	.145	.17	20.2	20.1
Calendar year 1941	.....	.....	.....	.....	.....	.....	.....	.....
January 1941	60,910	3,500	1,200	1,965	.201	.23	19.3	19.7
February	59,370	4,730	1,000	2,120	.217	.23	19.4	20.9
March	125,870	6,110	1,200	4,060	.416	.48	19.4	22.2
April	124,760	5,000	3,180	4,159	.426	.47	20.1	22.2
May	57,880	3,460	1,060	1,867	.191	.22	23.7	20.9
June	219,910	13,000	1,590	7,330	.750	.84	23.5	22.4
July	67,101	5,650	898	2,165	.222	.26	26.2	19.0
August	16,806	1,300	240	542	.055	.06	27.8	17.1
September	53,930	3,940	209	1,798	.184	.21	23.3	14.5
Water year 1940-41	888,876	13,000	209	2,435	.249	3.39	22.0	18.9
October 1941	107,080	6,030	1,560	3,454	.354	.41	21.4	18.4
November	243,840	11,200	4,860	8,128	.832	.93	20.4	18.4
December	109,780	6,050	1,550	3,541	.362	.42	21.0	17.8
Calendar year 1941	1,247,237	13,000	209	3,417	.350	4.76	22.1	19.3
January 1942	139,116	11,500	976	4,488	.459	.53	21.9	18.1
February	110,070	7,750	2,200	3,931	.402	.42	21.8	17.7
March	208,960	10,300	2,300	6,741	.690	.80	21.6	22.2
April	163,720	8,860	3,720	5,457	.559	.62	22.0	24.8
May	229,100	16,400	3,760	7,390	.756	.87	22.2	26.1
June	211,520	10,600	4,340	7,051	.722	.81	25.1	28.0
July	208,050	10,600	3,880	6,711	.687	.79	27.1	26.6
August	133,380	7,850	2,070	4,303	.440	.51	28.0	24.6
September	127,610	6,100	2,480	4,254	.435	.49	26.1	20.9
Water year 1941-42	1,992,226	16,400	976	5,458	.559	7.60	23.2	22.0

Des Moines River below Raccoon River at Des Moines, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940–41												
1	431	390	a1,300	2,880	a1,200	1,200	3,180	b3,460	1,590	4,650	a870	209
2	417	532	a1,000	b3,500	a1,150	1,320	3,460	a3,250	2,790	5,650	a800	232
3	431	517	a920	b3,300	a1,150	1,840	3,600	a3,100	a10,100	5,480	a700	1,220
4	417	532	a960	b2,700	a1,100	2,240	3,720	a3,000	h8,330	5,020	a650	1,450
5	404	517	1,060	b2,500	a1,100	3,600	3,940	a2,750	7,560	a4,200	a610	730
6	390	532	1,300	b1,700	a1,050	5,520	4,290	a2,650	7,030	a3,700	h566	444
7	404	517	1,780	b1,600	a1,100	5,940	4,490	a2,600	6,770	a3,300	750	356
8	390	517	1,980	b1,900	a1,050	5,650	4,530	a2,500	6,280	a2,900	655	344
9	379	566	2,010	b2,300	b1,100	5,230	4,490	2,420	a7,430	a2,500	584	473
10	417	750	1,950	b2,500	b1,050	5,100	4,450	2,300	a7,560	a2,300	502	417
11	390	966	1,700	2,600	b*1,000	5,180	4,450	2,180	a8,240	a2,200	488	356
12	404	a1,100	1,540	*2,480	b1,100	5,180	4,370	2,040	a10,500	a2,000	473	479
13	390	a950	1,130	2,330	3,390	5,180	4,290	1,920	a11,000	a1,800	549	1,620
14	390	a750	710	2,210	3,530	5,650	4,170	1,780	a11,500	a1,700	458	1,730
15	379	a900	832	2,070	3,280	6,110	3,940	1,670	a12,000	a1,600	417	2,040
16	367	a1,000	710	1,950	4,210	5,060	3,790	1,620	a13,000	a1,550	367	2,510
17	356	a1,200	770	1,890	4,730	4,410	3,720	1,510	a12,000	a1,450	458	2,300
18	344	a1,600	966	1,620	4,450	3,830	3,750	1,400	a11,000	a1,400	a1,100	2,660
19	333	2,120	1,130	1,280	4,020	3,640	4,060	1,350	a9,000	a1,300	a1,300	3,500
20	356	*2,360	1,150	1,400	3,390	4,130	4,020	1,280	a7,500	a1,200	a700	3,860
21	333	2,920	1,150	1,590	2,820	4,210	3,900	1,280	6,330	a1,100	502	3,940
22	304	3,050	1,100	1,700	2,480	3,980	a4,300	1,250	5,560	a1,050	458	3,600
23	295	3,390	1,130	1,730	2,070	3,830	h4,650	a1,220	5,020	h1,060	417	3,250
24	295	3,530	1,150	1,640	1,980	3,940	a5,000	a1,300	4,450	a1,000	379	3,020
25	344	3,500	1,280	1,540	1,730	3,830	a4,900	a1,250	3,940	h898	367	2,820
26	333	a3,300	1,540	a1,450	1,480	3,600	a4,700	a1,150	3,360	a950	304	2,420
27	285	a3,000	1,950	a1,300	1,380	3,500	a4,500	a1,100	3,720	a1,000	323	1,950
28	304	a2,500	2,210	a1,350	1,280	3,320	a4,400	1,080	5,520	a1,100	285	1,950
29	295	a2,000	2,390	a1,400	.....	3,250	a4,100	1,060	5,770	a1,200	276	2,040
30	304	a1,700	2,540	a1,300	.....	3,180	a3,600	1,130	5,060	h943	258	2,010
31	314	.....	2,600	a1,200	.....	3,220	.....	1,280	.....	a900	240	.....
1941–42												
1	2,240	10,300	4,730	b1,800	7,750	b2,300	8,860	3,760	4,340	9,970	7,230	2,860
2	1,730	9,070	4,640	976	7,230	b2,500	8,590	3,800	4,420	10,600	7,850	2,480
3	1,560	8,540	4,550	b1,200	6,450	b3,000	8,120	4,550	4,730	9,600	6,970	2,540
4	1,700	8,430	4,420	b1,300	5,950	b3,300	7,800	5,660	6,100	8,750	6,200	2,860
5	2,730	8,540	*4,340	b1,400	5,700	3,880	7,490	6,350	8,490	7,020	5,800	2,970
6	2,850	9,180	4,130	b1,500	5,370	4,860	7,280	8,330	9,760	5,900	5,370	2,820
7	6,030	10,400	4,000	b1,600	5,000	5,180	7,020	7,960	10,600	5,180	5,040	2,760
8	6,030	11,000	3,840	b1,750	4,860	5,040	6,710	8,010	10,300	4,460	4,820	3,180
9	5,900	11,200	3,680	b1,900	4,510	4,910	6,400	8,490	10,400	4,210	4,680	5,270
10	5,730	11,000	3,490	b2,000	4,340	4,730	6,100	8,910	10,400	4,170	4,380	4,130
11	5,600	10,400	2,860	b2,100	4,210	4,600	5,750	13,300	10,300	4,130	4,170	4,000
12	5,350	9,440	2,010	b*2,260	4,170	4,550	5,510	16,400	9,230	5,460	4,040	3,880
13	4,810	8,540	1,730	b2,300	4,000	4,460	5,460	14,700	8,170	5,660	3,880	4,170
14	4,370	7,900	1,550	b2,400	3,840	4,290	5,090	12,500	7,330	9,230	3,760	5,180
15	4,020	7,800	1,980	b2,500	3,680	4,170	4,860	10,200	6,560	7,850	3,560	5,900
16	3,680	8,010	2,510	b2,700	3,640	4,550	4,770	8,490	5,900	7,850	3,450	6,100
17	3,220	8,270	3,110	b3,000	3,180	8,120	4,600	7,800	5,560	7,640	3,330	5,460
18	3,050	8,060	3,260	b3,400	2,540	9,650	4,510	7,690	5,270	6,400	3,110	5,510
19	2,790	7,750	3,330	b3,700	2,340	9,550	4,420	7,170	4,950	6,150	2,970	4,550
20	2,790	7,430	3,220	b4,300	b*2,210	9,440	4,460	6,860	6,370	5,800	2,820	4,680
21	2,920	7,070	3,150	b5,000	b2,350	9,490	4,290	6,500	6,100	5,320	2,790	5,420
22	3,390	7,070	3,150	b6,200	b2,450	10,000	4,080	6,150	6,450	5,090	2,580	5,370
23	2,920	7,330	4,080	b7,200	b2,550	10,300	3,920	6,150	6,200	4,340	2,370	4,950
24	2,630	7,070	6,050	b8,000	b2,500	9 810	3 720	5,700	5,560	3,880	2,240	4,550
25	2,480	6,970	5,140	b9,000	b2,400	9,280	3,720	5,420	5,270	5,420	2,070	4,460
26	2,390	6,050	5,000	b10,000	b2,350	9,330	4,460	5,140	5,320	7,170	2,580	4,510
27	2,570	5,700	4,770	b11,000	b2,300	9,440	4,130	4,950	5,370	6,300	4,130	4,460
28	2,540	5,370	4,290	b11,500	b2,200	9,600	4,000	4,770	5,580	10,100	6,050	4,340
29	2,330	5,090	2,970	10,000	.....	9,700	3,880	4,550	8,320	8,750	6,500	4,170
30	2,630	4,860	b2,000	8,800	.....	9,600	3,720	4 460	8,170	8,270	5,000	4,080
31	4,100	.....	b1,800	8,330	.....	9,330	.....	4,380	.....	7,380	3,640	.....

*Winter discharge measurement made on this day.
(a) No gage-height record; discharge computed on basis of records for Des Moines River at Des Moines and Raccoon River at Van Meter.
(b) Stage-discharge relation affected by ice.
(h) Computed from wire-weight or float gage readings.

Des Moines River near Tracy, Iowa

LOCATION.—Water-stage recorder, lat. 41°16'55", long. 92°51'30", in SE¼ sec. 19, T. 75 N., R. 17 W., at old Bellefontaine highway bridge, a third of a mile downstream from bridge on State Highway 92, 1 mile east of Tracy, 3 miles upstream from Cedar Creek, and 6 miles downstream from English Creek. Datum of gage is 671.78 feet above mean sea level, adjustment of 1912.

DRAINAGE AREA.—12,400 square miles.

RECORDS AVAILABLE.—March 1920 to September 1927 (winter records fragmentary), March 1933 to December 1935, February 1940 to September 1942. April to December 1910, gage-height records collected at same site by Corps of Engineers, U. S. Army. Fragmentary gage-height records since 1920 available in reports of U. S. Weather Bureau.

AVERAGE DISCHARGE.—11 years (1920-27, 1933-35, 1940-42), 3,572 second-feet.

EXTREMES.—Maximum discharge during 1941-42 year, 28,000 second-feet Nov. 2 (gage height, 15.69 feet); minimum, 1,760 second-feet Jan. 3 (gage height, 3.54 feet).

1920-27, 1933-35, 1940-41: Maximum discharge, 54,600 second-feet June 28, 1935 (gage height, 20.20 feet, from gage reading at crest of flood); minimum, 95 second-feet (during period of ice effect) Feb. 28, 1940; minimum gage height observed, 1.98 feet June 7, 8, 1934.

Maximum stage since 1851, about 25 feet May 31, 1903 (discharge, about 100,000 second-feet). Flood stage, about 14 feet.

REMARKS.—Records good except those for periods of ice effect or no gage-height record, which are fair.

COOPERATION.—Station operated through cooperation of Army Engineers; gage-height record collected in cooperation with U. S. Weather Bureau.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Discharge in second-feet				Run-off in Inches
		Maximum	Minimum	Mean	Per square mile	
October 1940	14,464	642	364	467	0.038	0.04
November	46,337	3,550	400	1,545	.125	.14
December	46,120	2,720	650	1,488	.120	.14
Calendar year 1940	.....	.....	.....	.....	.....	.....
January 1941	68,650	3,460	1,400	2,215	.179	.21
February	105,200	10,800	1,320	3,757	.303	.32
March	134,120	7,940	1,800	4,326	.349	.40
April	140,700	6,920	3,700	4,690	.378	.42
May	72,690	3,980	1,410	2,345	.189	.22
June	259,210	21,000	1,630	8,640	.697	.78
July	80,310	6,340	1,130	2,591	.209	.24
August	25,839	1,860	446	834	.067	.08
September	92,327	12,400	422	3,078	.248	.28
Water year 1940–41	1,085,967	21,000	364	2,975	.240	3.27
October 1941	228,640	17,600	2,170	7,375	.595	.69
November	350,910	27,000	5,880	11,700	.944	1.05
December	168,570	15,100	2,590	5,438	.439	.51
Calendar year 1941	1,727,166	27,000	422	4,732	.382	5.20
January 1942	204,950	14,300	1,800	6,611	.533	.61
February	153,260	9,940	3,100	5,474	.441	.46
March	264,530	14,300	4,120	8,533	.688	.79
April	192,900	10,500	4,360	6,430	.519	.58
May	329,380	23,400	4,490	10,630	.857	.99
June	245,160	13,600	5,100	8,172	.659	.74
July	308,660	19,400	4,860	9,957	.803	.93
August	147,850	8,650	2,370	4,769	.385	.44
September	143,940	8,120	2,900	4,798	.387	.43
Water year 1941–42	2,738,750	27,000	1,800	7,503	.605	8.22

Note—Stage-discharge relation affected by ice Nov. 30, Dec. 7, 20, 1940; Jan. 4 to Mar. 8, 1941; Jan. 4-17, 20-24, Feb. 19-21, 1942.

Des Moines River near Tracy, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940–41												
1	642	400	a1,800	2,820	1,580	1,800	3,760	3,980	1,710	h5,220	1,070	422
2	622	414	a1,600	3,060	1,580	1,900	3,700	3,750	1,630	h5,640	1,030	430
3	574	462	a1,150	3,460	1,600	2,300	3,880	3,630	3,580	h6,240	992	470
4	574	565	a1,000	3,110	1,660	2,500	4,050	3,490	11,300	h5,290	904	3,500
5	574	536	a1,100	2,600	1,770	2,400	4,150	3,370	10,200	h4,820	858	4,220
6	565	565	a1,200	1,950	2,100	2,300	4,320	3,240	8,460	h4,290	788	2,450
7	538	583	1,350	1,500	2,200	2,600	4,570	3,120	7,330	h3,880	777	1,760
8	521	583	f1,700	1,400	1,750	3,000	4,820	3,050	6,820	h3,490	823	1,550
9	521	593	1,940	2,200	1,400	6,950	4,880	2,950	12,800	h3,190	942	1,710
10	503	612	2,000	2,100	1,320	5,840	4,850	2,770	21,000	h2,920	811	967
11	478	734	2,000	2,350	1,400	5,380	4,850	2,610	18,500	h3,070	777	834
12	486	a600	1,880	2,800	*1,550	5,100	4,860	2,470	11,400	h2,900	823	632
13	462	a500	a1 800	2,600	6,800	5,210	4,790	2,340	12,000	h2,580	745	632
14	454	a450	a1,300	2,400	10,800	5,480	4,670	2,350	11,900	h2,140	881	1,030
15	446	a550	a800	2,500	9,000	6,160	4,560	2,060	12,000	h1,980	745	2,770
16	446	a800	a750	2,600	7,800	7,940	4,420	1,980	12,000	h1,800	622	10,400
17	446	a1,200	a700	2,900	7,200	6,690	4,260	1,880	12,100	h1,700	745	12,400
18	438	a2,000	a650	2,200	6,500	f5,140	4,330	1,870	11,600	h1,930	1,030	7,070
19	422	2,370	a750	2,400	5,600	4,570	6,000	1,730	f10,300	h1,880	1,410	4,330
20	407	2,140	900	1,550	4,900	4,420	6,920	1,600	f8,700	h1,640	1,860	3,750
21	400	2,370	1,340	1,600	4,700	4,720	5,570	1,500	f7,640	1,390	1,150	3,850
22	407	*2,800	1,410	1,700	4,350	4,800	4,660	1,430	h6,760	1,290	881	3,890
23	393	3,100	1,410	2,400	3,900	4,500	4,590	1,410	h6,020	1,210	713	3,700
24	378	3,350	1,390	2,300	3,300	4,320	4,780	1,600	h5,290	1,200	692	3,410
25	371	3,550	1,530	2,200	2,920	4,360	4,960	2,110	h4,730	1,200	724	3,200
26	364	3,550	1,690	2,100	2,720	4,280	4,960	1,990	h4,320	1,190	661	3,000
27	393	3,440	1,590	1,800	2,450	4,080	4,820	1,620	h3,880	1,130	521	2,740
28	400	a3,000	1,990	1,400	2,350	3,980	4,720	1,450	h3,630	1,200	486	2,320
29	378	a2,500	2,230	1,450	.....	3,850	4,640	1,420	h5,480	1,290	478	2,110
30	454	2,000	2,450	1,650	.....	3,800	4,360	1,740	h6,130	1,320	454	2,780
31	407	.....	2,720	1,550	.....	3,750	.....	2,180	.....	1,190	446	.....
1941–42												
1	3,050	19,100	5,650	4,080	9,940	4,120	10,500	4,490	5,240	11,500	8,590	4,280
2	3,120	27,000	5,490	2,040	8,700	4,240	10,100	4,490	5,120	12,100	7,870	3,620
3	2,900	26,400	5,370	1,800	7,980	4,730	9,640	4,880	5,100	12,100	8,050	3,110
4	2,170	17,000	*5,240	1,900	7,680	*5,480	9,160	6,560	5,300	14,100	7,370	2,900
5	3,970	15,200	5,140	2,000	7,520	5,690	8,700	7,100	6,050	13,300	6,490	3,060
6	7,520	14,900	4,970	2,200	7,530	5,880	8,380	12,300	8,380	9,740	6,100	3,190
7	7,910	13,900	4,790	2,600	7,300	6,560	8,120	14,000	10,400	7,370	5,620	3,160
8	14,300	13,800	4,660	3,000	6,690	6,850	7,960	11,200	11,500	6,730	5,330	3,270
9	16,700	13,700	4,520	*3,230	6,000	6,420	7,440	10,200	12,300	5,780	5,090	4,140
10	17,600	13,500	4,310	3,500	5,590	6,130	7,140	9,640	11,700	6,560	4,700	5,930
11	15,000	13,200	3,980	3,640	5,320	5,850	6,810	12,600	12,400	5,330	4,570	5,180
12	9,020	12,400	3,550	3,720	5,220	5,610	6,500	20,000	13,600	5,000	4,430	4,540
13	6,940	11,100	3,110	3,800	5,060	5,480	6,220	22,700	11,600	5,720	4,280	4,140
14	6,850	10,300	2,880	3,850	4,980	5,370	6,000	23,400	9,840	11,600	4,190	4,420
15	6,230	9,400	2,590	3,900	4,910	5,480	5,810	20,100	8,230	19,300	4,070	5,290
16	5,400	9,120	2,780	4,200	4,980	5,460	5,640	15,100	7,260	11,600	3,810	6,890
17	4,790	9,160	3,320	5,500	5,350	8,880	5,460	11,600	6,560	9,520	3,680	6,540
18	4,290	9,320	3,810	8,290	4,850	14,300	5,270	14,700	6,130	8,740	3,610	6,000
19	3,900	9,140	4,070	11,100	3,300	13,000	5,120	14,700	5,910	8,940	3,440	8,120
20	3,700	9,120	4,110	10,500	3,100	12,300	5,000	10,900	6,300	19,400	3,290	6,640
21	5,120	9,120	4,040	9,600	3,200	11,700	4,970	9,560	9,020	14,200	3,140	5,750
22	11,200	8,400	3,970	8,600	4,080	11,500	4,880	8,760	8,980	8,740	3,050	5,560
23	16,000	8,060	5,060	8,400	4,110	11,600	4,670	8,190	8,040	7,340	2,860	5,510
24	11,600	8,060	15,100	9,400	3,890	11,600	4,500	8,100	6,980	5,650	2,630	5,140
25	6,050	7,770	14,700	10,500	3,920	11,000	4,360	7,500	6,180	4,860	2,400	4,790
26	5,030	7,250	9,540	14,300	4,190	10,800	4,400	6,920	6,390	6,300	2,370	4,660
27	6,660	6,890	9,000	12,600	3,940	13,000	5,080	6,520	7,070	10,900	2,630	4,640
28	6,740	6,560	7,410	11,800	3,930	11,900	5,180	6,160	6,390	9,840	4,530	4,610
29	5,220	6,160	6,050	11,700	.....	11,400	5,160	5,910	6,690	13,900	6,220	4,500
30	4,530	5,880	a5,000	11,900	.....	11,200	4,730	5,620	10,500	12,000	7,280	4,360
31	5,130	.....	4,350	11,300	.....	11,000	.....	5,480	.....	10,500	5,560	.....

*Winter discharge measurement made on this day.
(a) No gage-height record; discharge computed on basis for stations at Des Moines and Ottumwa.
(h) Computed from wire-weight gage readings.
(f) Computed on basis of partly estimated gage-heights.

Des Moines River at Ottumwa, Iowa

LOCATION.—Water-stage recorder, lat. 41°00', long. 92°24', in NE¼ sec. 25, T. 72 N., R. 14 W., at Vine Street Bridge in Ottumwa, 5½ miles upstream from Village Creek and 10 miles downstream from South Avery Creek. Datum of gage is 622.77 feet above mean sea level, datum of 1929.

DRAINAGE AREA.—13,200 square miles.

RECORDS AVAILABLE.—March 1917 to September 1927, January 1929 to September 1930, October 1930 to March 1935 (at site at Eldon), and March 1935 to September 1942 in reports of Geological Survey. March 1917 to September 1930 in report of Iowa State Planning Board entitled "Stream Flow Records of Iowa, 1873-1932."

AVERAGE DISCHARGE.—25 years, 3,998 second-feet.

EXTREMES.—Maximum discharge during 1941-42 year, 29,000 second-feet Nov. 3 (gage height, 9.96 feet); minimum, 1,270 second-feet Jan. 3 (gage height, 1.06 feet).

1917-41: Maximum discharge observed, 58,700 second-feet June 11, 1917 (gage height, 16.5 feet, site then in use); minimum daily, about 30 second-feet (regulated) Jan. 27-29, 31, Feb. 2, 3, 5-7, 1940.

REMARKS.—Records good except those for periods of ice effect, which are fair. Diurnal fluctuation at low stages caused by power plant above gage. Flood stage, about 9 feet.

COOPERATION.—Station operated under provisions of Federal Power Commission Project No. 925 (City of Ottumwa). Gage-height record collected in cooperation with U. S. Weather Bureau.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Discharge in second-feet				Run-off in Inches
		Maximum	Minimum	Mean	Per square mile	
October 1940	15,382	686	240	496	0.038	0.04
November	45,562	3,740	319	1,519	.115	.13
December	47,797	2,670	390	1,542	.117	.13
Calendar year 1940	594,378	12,760	30	1,624	.123	1.66
January 1941	69,290	3,300	1,200	2,235	.169	.19
February	110,580	10,900	1,350	3,949	.299	.31
March	142,510	8,260	1,690	4,597	.348	.40
April	145,620	7,400	3,740	4,854	.368	.41
May	73,890	4,230	1,340	2,384	.181	.21
June	270,580	22,500	1,730	9,019	.683	.76
July	88,720	6,340	1,140	2,862	.217	.25
August	27,621	1,750	286	891	.068	.08
September	96,802	13,700	413	3,227	.244	.27
Water year 1940-41	1,134,354	22,500	240	3,108	.235	3.18
October 1941	260,840	22,400	2,220	8,414	.637	.73
November	376,980	28,400	6,200	12,570	.952	1.06
December	185,860	18,800	2,810	5,995	.454	.52
Calendar year 1941	1,849,293	28,400	286	5,067	.384	5.19
January 1942	216,790	18,800	1,870	6,993	.530	.61
February	169,300	11,600	3,130	6,046	.458	.48
March	274,680	14,100	4,800	8,861	.671	.77
April	195,030	11,000	4,180	6,501	.492	.55
May	333,510	22,700	4,360	10,760	.815	.94
June	249,210	14,100	5,100	8,307	.629	.70
July	328,010	20,000	14,970	10,580	.802	.92
August	157,690	9,580	2,580	5,087	.385	.44
September	146,610	7,810	2,940	4,887	.370	.41
Water year 1941-42	2,894,510	28,400	1,870	7,930	.601	8.13

Des Moines River at Ottumwa, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940-41												
1	686	394	b2,000	2,830	1,520	2,260	3,740	4,230	1,850	6,320	1,170	462
2	612	392	b1,780	2,920	1,480	1,690	3,770	3,920	1,730	5,670	1,030	413
3	612	319	b1,550	3,300	1,770	2,030	3,840	3,720	2,630	6,340	1,010	946
4	662	457	b720	3,010	1,830	2,520	4,330	3,500	8,360	6,090	1,010	1,130
5	600	589	b390	b2,800	1,540	*2,560	4,360	3,420	11,200	5,320	905	5,900
6	589	480	b930	b2,350	2,010	2,390	4,390	3,330	9,910	4,890	833	3,700
7	625	578	1,100	b1,600	2,150	3,060	4,590	3,160	7,960	4,490	764	3,250
8	578	567	1,800	b1,200	2,280	2,090	4,970	3,010	7,260	3,870	1,040	2,410
9	441	567	1,910	b1,650	b1,500	7,150	4,970	2,900	10,500	3,400	750	2,520
10	556	625	2,630	b*2,200	b1,350	7,120	5,100	2,720	20,200	3,350	1,030	1,650
11	578	750	2,580	b2,100	b1,350	6,200	5,070	2,630	22,500	3,160	805	1,100
12	417	686	2,240	b2,600	1,730	5,510	5,020	2,410	14,600	3,230	819	833
13	545	b415	2,000	2,920	6,600	5,260	4,990	2,340	12,400	2,810	980	662
14	514	b410	1,600	2,670	10,900	5,590	4,910	2,150	12,200	2,410	711	686
15	422	b500	b870	2,450	10,300	6,230	4,750	2,130	12,400	2,260	950	1,980
16	478	649	b650	2,500	8,500	7,900	4,540	2,090	12,400	2,010	750	6,880
17	556	764	b1,020	2,610	7,090	8,260	4,410	1,890	12,500	1,910	750	13,700
18	362	1,170	b600	b3,200	7,290	6,680	4,390	2,030	12,300	1,930	1,030	9,550
19	545	2,200	600	b2,550	6,680	5,290	5,020	1,850	11,400	2,220	1,390	5,110
20	340	2,590	637	b2,000	5,020	4,520	7,400	1,690	9,940	1,810	1,690	3,720
21	567	2,170	1,110	b1,400	4,720	4,620	6,600	1,630	8,320	1,670	1,750	3,570
22	290	2,500	1,290	b1,410	4,490	4,990	5,160	1,710	7,320	1,540	1,010	3,720
23	545	3,010	1,410	b2,100	4,070	4,800	4,700	1,430	6,430	1,410	920	3,600
24	296	3,130	1,480	b2,450	3,370	4,540	4,780	1,670	5,760	1,320	764	3,400
25	529	3,280	1,710	b2,200	3,130	4,410	5,020	2,030	5,100	1,260	737	3,110
26	245	3,700	1,950	b2,100	2,900	4,540	5,210	2,260	4,670	1,240	723	2,940
27	521	3,740	1,950	b2,100	2,340	4,330	5,130	1,710	3,940	1,200	662	2,760
28	330	3,300	1,910	b1,500	2,670	4,180	4,940	1,480	3,770	1,140	498	2,450
29	578	3,090	2,320	1,360	.....	4,050	4,800	1,340	4,880	1,220	430	2,130
30	240	2,540	2,390	*1,480	.....	3,920	4,720	1,380	6,150	2,000	424	2,520
31	523	.....	2,670	1,730	.....	3,820	.....	2,130	.....	1,320	286	.....
1941-42												
1	3,230	20,100	5,920	4,590	11,600	4,800	11,000	4,540	5,510	9,220	9,580	4,990
2	3,130	24,400	5,510	3,230	10,200	4,880	10,400	4,360	5,160	11,500	8,410	4,050
3	3,500	28,400	5,530	2,110	8,890	6,120	9,910	4,650	5,180	12,200	8,530	3,500
4	2,670	27,000	5,450	1,870	8,320	5,400	9,490	5,920	5,100	12,700	8,350	2,940
5	2,220	17,300	5,340	b2,000	7,750	6,200	8,980	7,030	5,510	14,300	6,850	2,940
6	6,230	17,300	5,020	b2,400	8,350	6,230	8,590	9,580	7,200	11,200	6,620	3,110
7	7,460	15,500	4,940	b2,800	8,200	6,680	8,290	14,500	10,000	8,080	6,460	3,210
8	11,200	14,900	4,780	b3,100	7,610	7,290	8,050	12,900	11,300	9,490	6,370	3,230
9	20,400	14,300	4,650	b3,400	6,800	7,090	7,380	10,900	12,300	7,200	6,880	3,720
10	22,400	14,100	4,440	b3,600	6,150	6,650	7,320	10,000	11,900	9,760	5,050	5,160
11	18,800	13,800	4,230	b3,720	5,870	6,290	6,940	10,500	12,100	6,290	4,990	5,980
12	11,600	13,300	3,620	b3,800	5,530	6,010	6,620	17,500	14,100	5,050	4,800	4,990
13	8,170	12,100	3,330	b3,850	5,620	5,840	6,320	21,000	13,300	4,970	4,590	4,280
14	8,860	11,000	3,250	b3,900	5,240	5,730	6,060	22,400	11,000	11,300	4,410	4,070
15	7,260	9,790	2,970	b3,940	5,450	5,780	5,870	22,700	9,040	20,000	4,410	4,800
16	6,090	9,370	2,810	b4,000	5,900	6,040	5,730	18,200	7,530	16,000	4,200	6,180
17	5,420	9,220	2,830	b5,000	6,290	7,350	5,510	13,100	6,940	10,100	3,820	6,820
18	4,590	9,400	3,450	9,340	5,670	13,400	5,260	12,900	6,320	9,130	3,720	6,370
19	4,100	9,400	3,940	10,900	3,370	14,100	5,050	16,200	6,010	8,860	3,540	6,880
20	3,820	9,250	4,100	11,200	3,130	13,100	4,910	12,700	8,470	16,100	3,400	7,810
21	4,150	9,310	4,180	11,000	3,130	12,200	4,990	10,300	8,740	19,700	3,230	6,320
22	9,460	8,920	4,070	8,920	4,280	11,800	4,800	9,130	10,200	11,100	3,090	5,400
23	18,100	8,290	6,880	8,740	4,310	11,700	4,650	8,560	8,620	7,870	2,920	5,640
24	16,400	8,170	13,700	9,280	4,070	11,800	4,520	8,200	7,520	7,120	2,780	5,400
25	8,470	7,810	18,800	10,500	4,100	11,600	4,330	7,930	6,770	5,640	2,720	5,100
26	5,780	7,700	13,300	11,400	4,490	11,000	4,180	7,230	6,150	6,370	2,580	4,800
27	8,950	7,200	10,600	18,800	4,360	12,100	4,570	6,800	7,260	9,160	2,610	4,720
28	9,880	6,910	9,130	12,700	4,620	12,900	5,160	6,430	6,680	10,800	3,420	4,830
29	6,940	6,540	7,670	12,200	.....	11,800	5,160	6,010	6,230	12,000	4,990	4,780
30	5,130	6,200	6,290	12,200	.....	11,500	4,990	5,700	6,970	13,500	7,720	4,590
31	6,430	.....	5,130	12,300	.....	11,300	.....	5,640	.....	11,300	6,650	.....

*Winter discharge measurement made on this day.
(b) Stage-discharge relation affected by ice.

Des Moines River at Keosauqua, Iowa

LOCATION.—Water-stage recorder, lat. 40°44′, long. 91°57′, in sec. 36, T. 69 N., R. 10 W., at bridge on State Highway 1 at Keosauqua, 4 miles downstream from Chequest Creek. Datum of gage is 558.10 feet above mean sea level adjustment of 1912 (by levels of Army Engineers).

DRAINAGE AREA.—13,900 square miles.

RECORDS AVAILABLE.—May 1903 to July 1906, April 1910 to September 1942.

AVERAGE DISCHARGE.—33 years (1903-5, 1911-42), 4,715 second-feet.

EXTREMES.—Maximum discharge during 1941-42 year, 45,000 second-feet (estimated) Jan. 20 (gage height, 14.90 feet, affected by ice); minimum, 1,950 second-feet Jan. 3 (gage height, 1.02 feet, affected by ice).

1903-6, 1910-41: Maximum discharge, about 97,000 second-feet June 1, 1903 (gage height, 27.85 feet); minimum daily, about 40 second-feet (during period of ice effect) Jan. 30, 1940; minimum gage height, -0.58 foot Aug. 30, 1934.

Flood of June 1, 1851, reached a stage of about 24 feet (discharge, about 80,000 second-feet).

REMARKS.—Records during 1940-41 year good except those for period of ice effect, those computed from wire-weight gage readings or partly estimated gage heights, and for day computed on basis of records for station at Ottumwa, all of which are fair. Records during 1941-42 year excellent except those for Dec. 29 to Jan. 1, Jan. 21 to Feb. 25, which are fair, and those for Jan. 2-20, which are poor. Some diurnal fluctuation at medium and low stages caused by Ottumwa power plant.

COOPERATION.—Results of some discharge measurements and services of observer furnished by Corps of Engineers, U. S. Army. Results of some discharge measurements and assistance in computation of records furnished by Mississippi River Power Co.

NOTE.—On plate 3-A is shown a photograph of the State Highway bridge and gage house and well at Keosauqua.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-feet-days	Discharge in second-feet				Run-off in Inches
		Maximum	Minimum	Mean	Per square mile	
October 1940	17,649	846	366	569	0.041	0.05
November	45,796	3,680	384	1,527	.110	.12
December	49,072	2,560	453	1,583	.114	.13
Calendar year 1940	626,403	12,400	40	1,711	.123	1.69
January 1941	71,720	3,280	1,310	2,314	.166	.19
February	115,510	11,400	1,540	4,125	.297	.31
March	146,520	8,480	1,820	4,726	.340	.39
April	152,960	7,480	3,950	5,099	.367	.41
May	82,080	4,960	1,310	2,648	.191	.22
June	285,580	25,500	1,960	9,519	.685	.76
July	95,350	6,810	1,180	3,076	.221	.25
August	30,508	1,800	464	984	.071	.08
September	101,916	12,400	420	3,397	.244	.27
Water year 1940-41	1,194,661	25,500	366	3,273	.235	3.18
October 1941	291,570	27,300	2,640	9,405	.677	.78
November	401,010	29,500	6,790	13,370	.962	1.07
December	198,350	18,600	2,910	6,398	.460	.53
Calendar year 1941	1,973,074	29,500	420	5,406	.389	5.26
January	223,180	17,100	2,000	7,199	.518	.60
February	184,070	11,500	2,930	6,574	.473	.49
March	282,650	14,500	4,580	9,118	.656	.76
April	210,060	11,100	4,440	7,002	.504	.56
May	343,050	23,300	4,760	11,070	.796	.92
June	271,400	14,300	5,480	9,047	.651	.73
July	350,020	19,900	5,610	11,290	.812	.94
August	170,200	10,800	2,560	5,490	.395	.46
September	158,540	8,450	2,960	5,285	.380	.42
Water year 1941-42	3,084,100	29,500	2,000	8,450	.608	8.26

Note—Stage-discharge relation affected by ice Jan. 19 to Feb. 12, 1941; Jan. 2-20, Feb. 16-19, 1942.

Des Moines River at Keosauqua, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940–41												
1.....	846	497	2,260	2,710	1,700	2,390	3,950	4,960	2,140	6,810	1,320	420
2.....	804	442	1,780	2,930	1,560	2,020	3,980	4,460	1,960	6,180	1,210	542
3.....	696	442	1,180	2,970	1,540	1,820	3,980	4,180	2,390	6,280	1,100	453
4.....	722	393	1,700	3,280	1,800	*2,020	4,300	4,020	5,880	6,610	1,080	1,140
5.....	776	384	2,040	2,580	1,900	2,310	4,670	3,840	9,550	6,050	1,080	2,660
6.....	696	696	f1,210	2,280	1,820	2,500	4,620	3,980	10,500	5,290	975	5,450
7.....	630	555	h655	2,100	2,120	2,600	4,670	f3,770	9,000	4,800	888	4,900
8.....	642	655	h1,240	1,740	2,200	3,390	5,170	f3,500	7,660	4,550	818	4,070
9.....	618	655	h1,980	1,310	2,290	4,830	5,310	f3,300	8,770	3,750	1,050	2,890
10.....	453	668	h1,680	1,590	1,740	8,430	5,310	f3,110	20,600	3,500	860	2,520
11.....	630	668	e2,540	2,180	1,620	6,420	5,330	2,860	25,500	3,440	1,000	1,760
12.....	630	682	h2,560	2,120	2,000	6,140	5,260	2,730	20,700	3,330	846	1,190
13.....	411	763	h2,220	2,690	7,290	5,590	5,150	2,560	12,600	3,170	874	930
14.....	722	f630	h2,040	2,820	10,600	5,490	5,100	2,430	12,800	2,780	1,040	763
15.....	555	f519	h1,590	2,750	11,400	5,930	5,030	2,280	12,600	2,640	790	888
16.....	464	f722	h960	2,540	9,790	6,970	4,900	2,640	12,700	2,240	975	3,040
17.....	542	945	h682	2,670	7,680	8,480	4,600	2,600	12,700	1,940	960	11,200
18.....	618	f1,110	h453	2,540	6,730	7,480	4,960	2,040	12,700	1,920	960	12,400
19.....	375	f1,460	h1,080	3,280	6,490	5,880	4,900	2,060	12,100	1,900	1,080	7,760
20.....	592	2,390	h722	2,850	5,790	5,290	6,400	1,840	10,800	2,080	1,430	4,640
21.....	366	2,540	h860	2,240	4,530	4,570	7,480	1,670	9,290	1,780	1,800	3,860
22.....	605	2,220	f1,180	1,800	4,390	4,990	6,230	1,650	8,230	1,680	1,570	3,770
23.....	393	2,560	f1,380	1,740	4,210	5,240	5,080	1,980	7,310	1,550	1,040	3,930
24.....	555	3,000	1,410	2,130	3,590	4,900	4,920	1,650	6,590	1,460	1,000	3,790
25.....	393	3,170	1,500	2,440	3,000	4,670	5,130	1,740	5,910	1,410	888	3,500
26.....	555	3,550	1,760	2,300	2,860	4,640	5,330	2,100	5,360	1,310	832	3,130
27.....	384	3,680	1,960	2,200	2,690	4,640	5,490	2,180	4,800	1,270	790	2,950
28.....	542	3,500	1,980	2,240	2,180	4,440	5,360	1,800	4,410	1,260	736	2,780
29.....	411	3,240	1,980	1,820	.....	4,230	5,220	1,480	4,280	1,180	555	2,390
30.....	630	3,060	2,100	1,480	.....	4,180	5,130	1,310	5,750	1,310	497	2,200
31.....	393	.....	2,390	1,400	.....	4,040	.....	1,360	.....	1,880	464	.....
1941–42												
1.....	2,780	20,300	6,510	5,280	11,500	4,580	11,100	5,110	6,040	10,400	10,800	6,410
2.....	3,570	26,400	*6,210	4,000	10,400	5,140	10,700	4,760	5,810	13,500	9,450	4,810
3.....	3,610	28,200	5,860	2,500	9,510	*5,510	10,300	4,940	5,510	11,800	8,960	4,380
4.....	3,590	29,500	5,860	2,200	8,970	6,440	9,990	5,310	5,580	12,300	9,230	3,390
5.....	2,640	21,800	5,840	2,000	8,650	6,310	9,590	7,160	5,480	13,800	8,400	2,960
6.....	3,990	18,500	5,580	2,500	9,870	6,790	9,260	8,010	6,460	12,600	7,210	3,080
7.....	9,900	16,700	5,240	3,000	10,100	7,030	9,060	12,400	9,320	9,890	7,210	3,270
8.....	9,390	14,800	5,140	3,300	8,860	7,680	8,720	14,000	10,700	11,800	6,970	3,290
9.....	24,400	14,400	4,980	3,600	7,880	7,940	8,490	11,600	11,700	9,380	7,360	3,560
10.....	27,300	14,100	4,810	3,760	6,900	7,360	8,010	10,600	12,100	9,530	6,660	4,340
11.....	22,500	13,900	4,540	3,840	6,510	6,970	7,730	10,400	12,000	9,040	5,280	6,240
12.....	14,600	13,600	4,280	3,900	6,140	6,610	7,340	15,100	13,400	6,280	5,240	5,940
13.....	9,960	13,300	3,580	3,950	5,980	6,440	6,970	20,100	14,300	5,610	5,040	4,960
14.....	8,900	12,500	3,270	4,000	5,980	6,410	6,660	22,100	11,900	9,760	4,860	4,360
15.....	8,870	10,700	3,100	4,050	5,860	6,310	6,410	23,300	10,200	18,200	4,710	4,880
16.....	6,930	9,950	3,050	*4,140	7,500	8,300	6,210	20,800	8,950	19,900	4,740	5,560
17.....	6,020	9,700	2,910	4,500	7,800	8,930	6,040	15,000	7,780	12,200	4,310	7,310
18.....	5,470	9,680	3,220	8,000	6,200	10,400	5,840	12,300	7,230	10,100	4,010	7,230
19.....	4,710	9,800	3,750	10,000	4,500	14,500	5,560	15,300	6,870	10,200	3,920	7,130
20.....	4,180	9,800	4,160	15,000	3,100	13,400	5,380	14,400	10,500	12,400	3,680	8,450
21.....	3,910	9,720	4,260	12,000	2,930	12,700	5,210	11,200	13,500	19,500	3,560	7,700
22.....	5,490	9,660	4,340	10,000	3,290	12,000	5,340	10,100	12,000	15,300	3,370	6,510
23.....	15,500	9,120	5,360	8,950	4,260	11,700	5,060	9,260	9,930	9,820	3,220	5,780
24.....	19,200	8,630	12,500	9,210	4,360	11,700	4,860	8,840	8,950	8,260	3,050	6,080
25.....	13,200	8,580	18,600	10,200	3,990	11,700	4,710	8,720	7,910	7,310	2,740	5,680
26.....	7,380	8,230	16,600	11,100	4,090	11,200	4,510	8,230	7,550	7,550	2,650	5,410
27.....	9,470	7,940	12,400	17,100	4,560	11,000	4,440	7,570	7,230	7,490	2,560	5,040
28.....	11,300	7,550	10,500	14,000	4,380	12,800	5,280	7,130	8,110	11,400	2,690	4,940
29.....	9,310	7,160	8,560	12,400	.....	12,000	5,610	6,790	7,130	10,400	4,110	4,940
30.....	6,420	6,790	7,230	12,200	.....	11,500	5,680	6,410	7,260	12,300	6,310	4,910
31.....	7,080	.....	6,110	12,400	.....	11,300	.....	6,110	.....	12,000	7,960	.....

*Winter discharge measurement made on this day.

(e) Gage reading not representative of average for day; discharge computed on basis of records for station at Ottumwa.

(f) Fragmentary gage-height record; discharge computed from partly estimated gage heights.

(h) Computed from wire-weight gage readings.

Heron Lake Outlet near Heron Lake, Minn.

LOCATION.—Staff gage, lat. 43°48′, long. 95°16′, on line between secs. 21 and 22, T. 104 N., R. 37 W., half a mile downstream from dam at outlet of Heron Lake, 2 miles east of village of Heron Lake, and 12 miles upstream from Des Moines River.

DRAINAGE AREA.—457 square miles.

RECORDS AVAILABLE.—August 1930 to September 1933 (winter records incomplete). October 1934 to September 1942.

AVERAGE DISCHARGE.—9 years (1932-33, 1934-42), 81.5 second-feet.

EXTREMES.—Maximum discharge observed during 1941-42 year, 1,880 second-feet Sept. 6 (gage height, 8.56 feet); no flow at times.
1930-33, 1934-41: Maximum discharge observed, 1,660 second-feet July 5, 1938 (gage height, 8.53 feet); no flow during periods in most years.

REMARKS.—Records good except those for discharges below ten second-feet, those for periods of ice effect or backwater from aquatic vegetation, and those estimated, all of which are poor. Gage read once daily. Flow completely regulated by storage in Heron Lake, usable capacity about 15,000 acre-feet.

NOTE.—Station operated in cooperative program in Minnesota and records furnished by district office of United States Geological Survey, St. Paul, Minn.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Discharge in second-feet				Run-off in Inches
		Maximum	Minimum	Mean	Per square mile	
October 1940	8.5	0.4	0.2	0.27	0.00059	0.0007
November	3.2	.3	0	.11	.00024	.0003
December	0	0	0	0	0	0
Calendar year 1940	5,942.3	184	0	16.2	.035	.49
January 1941	0	0	0	0	0	0
February	0	0	0	0	0	0
March	416.7	180	0	13.4	.029	.03
April	10,774	471	200	359	.786	.88
May	3,857	352	28	124	.271	.31
June	654	31	13	21.8	.048	.05
July	250.8	20	1.9	8.09	.018	.02
August	25.3	1.9	.2	.82	.0018	.002
September	4.2	.3	.1	.14	.00031	.0003
Water year 1940–41	15,993.7	471	0	43.8	.096	1.29
October 1941	3.7	.2	.1	.12		
November	4.4	.2	.1	.15		
December	2.4	.2	0	.08		
Calendar year 1941	15,992.5	471	0	43.8	.096	1.29
January 1942	10.3	1.3	0	.33		
February	53.5	5.5	.1	1.91		
March	3,122.9	800	1.0	101		
April	11,465	810	96	382		
May	8,044	399	65	259		
June	13,165	630	241	439		
July	8,857	610	86	286		
August	25,959	1,380	322	837		
September	37,850	1,880	590	1,262		
Water year 1941–42	108,537.2	1,880	0	297	.650	8.82

Note—Stage-discharge relation affected by ice Nov. 13, 1940 to Apr. 2, 1941; Nov. 5, 1941 to Mar. 31, 1942; and by backwater from aquatic vegetation Oct. 1 to Nov. 10, 1940; May 9 to Sept. 30, 1941.

Heron Lake Outlet near Heron Lake, Minn.—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940–41												
1	0.2	0.3	.....	.....	.....	0	200	352	27	20	1.9	0.2
2	.3	.3	.....	.....	.....	a0	260	322	25	19	1.6	a.2
3	.3	.3	.....	.....	.....	*0	308	294	25	18	1.6	.2
4	.4	.2	.....	.....	.....	a0	*367	280	24	17	1.8	.1
5	.3	.3	.....	.....	.....	0	416	267	24	16	1.6	.1
6	.4	.3	.....	.....	.....	0	399	241	30	15	1.5	.1
7	.3	.3	.....	.....	.....	0	416	173	28	14	a1.4	.1
8	.3	.3	.....	.....	.....	0	399	151	15	14	1.4	.3
9	.3	.3	.....	.....	.....	.4	383	140	13	13	1.3	.3
10	.3	.3	.....	.....	.....	1.0	399	140	14	13	1.3	.1
11	.3	a.2	.....	.....	.....	.6	399	140	26	11	1.1	.1
12	.3	a.1	.....	.....	.....	0	367	140	31	10	1.1	.1
13	.3	0	.....	.....	.....	0	352	130	29	8.3	1.0	.1
14	.3	0	.....	.....	.....	0	337	125	26	7.9	a.9	.1
15	.2	0	*	.....	.....	0	308	105	25	7.5	.8	.1
16	.2	0	.....	.....	.....	0	308	91	23	6.3	.6	.2
17	.2	0	.....	.....	.....	0	294	86	22	5.6	.6	a.3
18	.2	0	.....	.....	.....	0	280	82	22	4.0	.5	.2
19	.2	0	.....	.....	.....	0	254	78	20	3.6	.4	.1
20	.2	0	.....	.....	.....	.6	308	69	16	2.9	a.4	.1
21	.2	0	.....	.....	.....	1.9	308	65	15	2.7	.3	.1
22	.2	0	.....	.....	.....	1.9	337	58	20	2.7	a.3	.1
23	.2	*0	.....	.....	.....	1.8	367	54	20	2.5	.3	a.1
24	.3	0	.....	.....	.....	*1.5	416	47	19	2.3	.2	.1
25	.3	0	.....	.....	.....	1.5	452	40	17	2.3	.2	a.1
26	.3	0	.....	.....	.....	1.5	471	35	16	2.2	a.2	.1
27	.3	0	.....	*	.....	4.0	452	33	19	2.0	.2	.1
28	.3	0	.....	.....	.....	20	434	31	18	2.2	a.2	.1
29	.3	0	.....	.....	.....	70	416	30	23	2.0	.2	a.1
30	.3	0	.....	.....	.....	130	367	30	22	1.9	.2	.2
31	.3	.....	.....	.....	.....	180	.....	28	.....	1.9	.2	.....
1941–42												
1	.1	.1	0.1	0	0.1	2.4	810	195	267	337	810	590
2	a.1	a.1	.1	0	.1	2.6	810	162	308	352	1,050	720
3	.2	a.1	.1	0	.1	2.4	810	115	337	352	1,250	1,250
4	.2	.1	.1	0	.1	1.9	690	91	399	367	1,380	1,730
5	.2	.1	.1	0	.2	1.4	720	65	452	367	1,330	1,830
6	.2	a.1	0	0	.2	1.1	690	151	510	367	1,290	1,880
7	.2	.1	.2	a0	.2	1.0	630	206	550	352	1,250	1,830
8	.2	a.1	.2	a0	.3	2.2	610	173	590	337	1,250	1,780
9	.1	.1	.1	a0	.3	4.4	610	96	610	322	1,210	1,730
10	a.1	a.1	0	a0	.4	5.5	570	151	610	352	1,170	1,630
11	.1	.2	0	a0	.4	*6.5	490	254	630	352	1,090	1,580
12	.1	a.2	*0	a0	.4	6.5	416	352	610	352	1,090	1,480
13	a.1	a.2	.2	a0	.5	6.5	434	308	570	337	1,010	1,380
14	.1	.2	.1	0	.5	9.5	416	294	590	337	930	1,330
15	a.1	*.2	.1	.1	.6	15	383	294	610	322	900	1,290
16	.1	.2	.1	.1	.6	18	352	337	570	308	870	1,210
17	a.1	.2	.1	.5	.7	18	294	383	510	294	a800	1,170
18	.1	.2	.1	1.0	2.2	18	254	383	510	143	780	1,130
19	.1	.2	.1	.9	4.4	18	241	399	490	130	750	1,090
20	.1	.2	.1	1.3	5.0	22	173	383	434	86	690	1,130
21	.1	.2	.1	1.1	5.5	28	130	383	399	115	630	1,130
22	a.1	.1	.1	1.0	5.5	30	105	352	337	130	610	1,130
23	.1	.1	.1	.9	5.0	*38	100	337	322	140	590	1,090
24	a.1	.1	a.1	.9	5.0	44	96	322	280	173	530	1,050
25	.1	.1	.1	.7	4.4	80	96	294	280	184	a500	1,050
26	.1	.2	0	.5	4.2	120	115	280	280	173	452	1,010
27	.1	.2	0	.4	3.6	*140	110	229	280	184	399	930
28	a.1	.2	0	.3	3.0	380	105	254	241	254	352	900
29	a.1	.1	0	.2	.....	600	100	267	267	294	337	900
30	.1	.1	0	.2	.....	700	105	267	322	434	337	900
31	a.1	.....	0	.2	.....	800	.....	267	.....	610	322	.....

*Winter discharge measurement made on this day.
(a) No gage-height record; discharge estimated.

East Fork of Des Moines River near Hardy, Iowa

LOCATION.—Wire-weight gage, lat. 42°48'10", long 94°08'00", in NW¼NE¼ sec. 10, T. 92 N., R. 28 W., 4½ miles west of Hardy, 6 miles northeast of Dakota City, 7½ miles downstream from Lotts Creek and 12 miles upstream from confluence with West Fork of Des Moines River.

DRAINAGE AREA.—1,230 square miles.

RECORDS AVAILABLE.—March 1940 to September 1942.

EXTREMES.—Maximum discharge observed during 1941-42 year, 3,580 second-feet Nov. 7 (gage height, 11.39 feet); minimum daily, 76 second-feet (estimated) Sept. 11; minimum gage height observed, 2.32 feet Sept. 1.

1940-41: Maximum discharge observed, 2,300 second-feet June 15, 1941 (gage height, 9.60 feet); minimum observed, 18 second-feet July 24, 25, 1940 (gage height, 1.45 feet).

Maximum stage known, about 17.4 feet in September 1938, from information furnished by local residents.

REMARKS.—Records good except those for periods of doubtful or no gage-height record, which are fair, and those for periods of ice effect, which are poor. Gage read twice daily.

COOPERATION.—Records collected in cooperation with Corps of Engineers, U. S. Army.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Discharge in second-feet				Run-off in Inches
		Maximum	Minimum	Mean	Per square mile	
October 1940	1,103	46	32	35.6	0.029	0.03
November	7,190	591	51	240	.195	.22
December	7,520	530	150	243	.198	.23
Calendar year 1940						
January 1941	8,398	650	170	271	.220	.25
February	8,252	880	132	295	.240	.25
March	28,946	1,330	200	934	.759	.88
April	29,315	1,330	692	977	.794	.89
May	11,835	905	180	382	.311	.36
June	44,214	2,290	588	1,474	1.20	1.34
July	15,947	1,300	212	514	.418	.48
August	2,702	180	44	87.2	.071	.08
September	21,580	1,690	36	719	.585	.65
Water year 1940-41	187,002	2,290	32	512	.416	5.66
October 1941	32,691	1,880	471	1,055	.858	.99
November	61,270	3,570	1,110	2,042	1.66	1.85
December	23,046	1,080	450	743	.604	.70
Calendar year 1941	288,196	3,570	36	790	.642	8.72
January 1942	14,516	1,000	220	468	.380	.44
February	12,956	840	250	463	.376	.39
March	23,335	1,450	320	753	.612	.71
April	22,060	1,350	422	735	.598	.67
May	22,251	1,210	429	718	.584	.67
June	19,912	1,370	285	664	.540	.60
July	13,050	695	155	421	.342	.39
August	7,891	374	95	255	.207	.24
September	4,679	500	76	156	.127	.14
Water year 1941-42	257,657	3,570	76	706	.574	7.79

Note—Stage-discharge relation affected by ice Nov. 11-18, Nov. 28 to Dec. 31, 1940; Jan. 1 to Mar. 26, Dec. 11-16, 29-31, 1941; Jan. 1 to Mar. 8, 1942.

East Fork Des Moines River near Hardy, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940–41												
1	34	51	240	540	160	200	974	659	1,400	1,300	180	43
2	33	55	240	568	160	210	983	611	1,590	1,160	162	43
3	32	64	230	650	155	890	998	576	1,800	1,100	149	42
4	32	81	215	470	155	740	1,000	545	2,050	1,050	147	41
5	32	106	210	410	160	850	989	507	2,050	1,000	162	40
6	34	102	210	370	145	740	986	484	1,860	890	144	37
7	38	98	230	340	140	770	1,010	461	1,660	716	126	36
8	39	91	250	*310	135	900	1,010	461	1,430	588	119	107
9	35	101	260	280	135	1,120	992	444	908	507	114	568
10	37	104	260	250	135	1,190	950	414	728	444	102	674
11	37	160	250	250	132	1,200	926	387	992	420	94	986
12	37	150	240	260	140	1,250	902	361	1,300	387	87	800
13	37	145	210	260	150	1,310	866	331	1,660	409	83	502
14	37	145	180	250	*590	1,300	854	303	2,090	416	76	476
15	36	150	180	240	820	1,330	842	291	2,290	405	72	617
16	34	170	180	230	880	1,300	830	271	2,240	376	67	1,360
17	34	210	160	210	710	1,140	824	248	2,230	367	74	1,480
18	34	240	150	175	610	1,120	776	231	2,200	354	67	1,620
19	34	259	150	180	450	940	752	217	2,080	346	61	1,660
20	33	307	160	185	390	840	944	229	1,910	354	55	1,680
21	35	409	160	190	330	760	1,140	221	1,720	387	53	1,690
22	34	520	170	195	290	790	1,195	210	1,470	376	53	1,660
23	34	574	180	190	240	950	1,280	221	1,110	361	55	1,500
24	34	591	190	180	220	770	1,330	210	800	367	57	986
25	33	*568	220	180	210	890	1,330	196	704	350	56	686
26	33	565	265	175	210	930	1,250	180	626	293	51	562
27	33	427	310	175	200	938	1,060	182	588	261	50	481
28	38	267	350	175	200	896	884	217	614	265	48	423
29	44	240	430	170	.....	854	746	588	824	255	48	378
30	40	240	510	170	.....	914	692	674	1,290	231	46	402
31	46	.....	530	170	.....	914	.....	905	.....	212	44	.....
1941–42												
1	471	2,050	1,080	430	760	320	1,350	542	608	675	374	78
2	560	2,310	*1,060	300	840	320	1,300	570	958	586	a350	a95
3	656	2,400	1,020	270	820	350	1,180	651	1,300	544	a345	a105
4	810	2,410	998	230	780	400	1,140	673	1,370	500	a340	a105
5	946	2,760	975	220	740	440	1,150	698	1,250	438	a345	a98
6	1,230	3,190	917	230	680	460	987	773	1,200	392	a370	a90
7	1,600	3,570	880	220	600	450	917	1,020	1,060	381	a360	a85
8	1,860	3,420	842	230	580	403	882	1,150	1,080	379	a350	a80
9	1,880	3,110	796	240	560	397	824	1,210	952	321	340	a78
10	1,780	2,760	618	250	530	d410	796	1,210	807	667	312	a78
11	1,760	2,450	640	255	500	d420	773	1,200	a750	695	300	a76
12	1,700	2,240	700	260	470	d430	740	1,130	695	568	277	a80
13	1,560	2,130	680	270	430	d440	703	1,090	a650	514	269	a85
14	1,330	2,050	640	290	420	a470	667	796	602	a505	260	86
15	1,030	1,980	900	300	390	a520	651	773	529	a500	285	91
16	853	1,850	1,000	320	320	a580	640	740	445	495	287	94
17	737	1,780	958	*336	*271	a610	635	740	399	476	281	96
18	695	1,720	678	345	250	a700	662	613	372	478	263	399
19	648	1,670	616	350	270	a760	621	597	370	465	259	a500
20	621	1,720	618	370	285	a820	544	583	361	476	285	327
21	597	1,730	613	400	295	*862	509	570	355	366	329	255
22	591	1,640	640	500	300	993	495	555	306	306	179	210
23	578	1,560	689	600	310	1,050	469	550	291	253	164	206
24	555	1,480	715	750	310	1,110	438	526	285	253	121	206
25	534	1,410	701	900	310	1,150	422	507	340	210	a105	187
26	544	1,310	678	1,000	310	1,300	443	454	350	162	a120	183
27	605	1,200	544	1,000	310	1,440	504	438	361	155	a130	183
28	1,210	1,140	450	950	315	1,450	539	429	383	176	a135	179
29	1,440	1,120	450	950	.....	1,440	542	429	771	247	a132	176
30	1,590	1,110	500	900	.....	1,440	537	495	712	348	a120	168
31	1,720	.....	450	850	.....	1,400	.....	539	.....	519	a95	.....

*Winter discharge measurement made on this day.

(a) No gage height record; discharge computed on basis of records for West Fork of Des Moines River at Humboldt, Iowa.

(d) Doubtful gage height record; discharge computed on basis of records for West Fork of Des Moines River at Humboldt, Iowa.

North Lizard Creek near Clare, Iowa

LOCATION.—Wire-weight gage, lat. 42°32'30", long. 94°20'40", in NE¼ sec. 11, T. 89 N., R. 30 W., at bridge on county road, 3 miles south of Clare, 8 miles upstream from confluence with South Lizard Creek, and 8 miles northwest of Fort Dodge.

DRAINAGE AREA.—257 square miles.

RECORDS AVAILABLE.—March 1940 to September 1942.

EXTREMES.—Maximum discharge observed during 1941-42 year, 1,240 second-feet June 5 (gage height, 6.65 feet, from water mark noted by observer), from rating curve extended above 600 second-feet; minimum discharge observed, 7.0 second-feet Sept. 6 (gage height, 2.71 feet).

1940-41: Maximum discharge observed, 442 second-feet June 14, 1941; maximum gage height observed, 5.45 feet Feb. 16, 1941 (affected by ice); minimum observed, 0.2 second-foot Mar. 6, 1940 (discharge measurement); minimum gage height observed, 2.20 feet July 25, 1940.

REMARKS.—Records fair except those below 5 second-feet and those for periods of ice effect or doubtful gage-height record, which are poor. Gage read twice daily.

COOPERATION.—Records collected in cooperation with Corps of Engineers, U. S. Army.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Discharge in second-feet				Run-off in Inches
		Maximum	Minimum	Mean	Per square mile	
October 1940	115.7	12	2.3	3.73	0.015	0.02
November	1,286.8	134	8.4	42.9	.167	.19
December	1,400	109	20	45.2	.176	.20
Calendar year 1940						
January 1941	1,764	170	30	56.9	.221	.26
February	1,984	380	12	70.9	.276	.29
March	5,258	400	35	170	.661	.76
April	2,273	109	36	75.8	.295	.33
May	706	40	12	22.8	.089	.10
June	3,535.6	416	6.6	118	.459	.51
July	968.5	102	3.1	31.2	.121	.14
August	69.5	6.0	1.2	2.24	.0087	.01
September	908.9	137	1.0	30.3	.118	.13
Water year 1940-41	20,270.0	416	1.0	55.5	.216	2.94
October 1941	2,826	258	30	91.2	.355	.41
November	10,018	625	171	334	1.30	1.45
December	4,410	215	100	142	.553	.64
Calendar year 1941	34,721.5	625	1.0	95.1	.370	5.03
January 1942	3,289	300	33	106	.412	.48
February	3,427	230	60	122	.475	.50
March	5,550	259	90	179	.696	.80
April	3,589	204	69	120	.467	.52
May	4,216	298	72	136	.529	.61
June	9,157	1,200	99	305	1.19	1.33
July	2,366	288	26	76.3	.297	.34
August	743.8	76	7.4	24.0	.093	.11
September	1,481.7	259	7.4	49.4	.192	.21
Water year 1941-42	51,073.5	1,200	7.4	140	.545	7.40

Note—Stage-discharge relation affected by ice Nov. 12-22, Nov. 27 to Dec. 30, 1940; Jan. 3 to Mar. 24, Dec. 11-16, 21-31, 1941; Jan. 1 to Mar. 7, 1942.

North Lizard Creek near Clare, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940–41												
1	2.5	14	45	127	38	35	76	35	12	102	5.0	1.0
2	2.4	11	40	170	35	100	72	32	6.6	90	2.3	1.0
3	2.4	11	35	130	35	270	75	32	107	75	2.2	1.4
4	2.4	10	35	100	34	350	93	31	84	70	2.0	1.6
5	2.3	9.6	35	80	30	400	105	31	61	63	1.9	1.7
6	3.3	8.4	37	60	30	400	105	35	52	59	1.9	1.6
7	3.5	8.4	40	50	30	300	109	40	45	52	1.8	1.3
8	3.5	8.4	37	*57	35	300	107	40	40	45	1.6	3.1
9	3.5	14	40	60	35	350	109	36	40	40	1.9	2.5
10	3.5	a18	37	60	40	300	109	35	37	45	2.7	2.0
11	3.5	16	35	65	45	250	104	29	178	46	2.9	1.9
12	3.3	10	30	65	70	200	102	25	305	40	2.2	1.3
13	3.1	10	20	62	100	150	93	23	392	35	1.8	1.5
14	2.9	10	20	58	250	130	84	20	416	30	1.5	18
15	2.9	15	25	55	310	110	80	18	287	26	1.2	48
16	2.9	20	25	50	380	90	78	17	243	23	1.2	102
17	2.9	25	20	45	150	85	75	16	191	21	2.0	137
18	2.9	40	20	40	100	95	59	16	151	18	2.5	115
19	2.9	50	20	37	50	100	55	13	117	15	2.3	96
20	2.9	80	20	35	35	*99	61	12	93	14	1.9	69
21	2.9	110	25	35	30	105	69	12	78	10	1.8	62
22	2.9	134	35	30	25	110	70	13	74	8.4	3.5	52
23	3.1	124	45	30	20	125	70	12	69	7.2	4.5	37
24	2.9	105	50	30	17	140	59	12	58	6.0	6.0	31
25	2.9	*93	60	30	14	159	54	14	58	4.5	2.2	26
26	3.1	87	70	30	*12	99	45	15	66	3.3	1.7	19
27	3.1	70	90	30	12	81	41	18	61	3.1	1.6	17
28	3.3	60	95	35	22	84	40	15	52	3.5	1.5	15
29	12	65	100	35	.....	81	38	15	72	4.0	1.4	17
30	9.0	50	105	35	.....	80	36	28	90	4.5	1.3	26
31	11	.....	109	38	.....	80	.....	16	.....	5.0	1.2	.....
1941–42												
1	30	173	167	70	230	90	204	72	d144	288	76	7.8
2	37	211	161	50	225	120	191	87	d298	215	76	8.3
3	58	237	*155	40	220	160	179	99	d672	157	74	13
4	66	262	152	35	215	190	165	107	d816	128	53	15
5	80	404	146	33	210	200	155	109	d1200	101	37	11
6	124	625	140	33	200	185	144	123	d964	92	35	7.4
7	235	591	133	34	190	160	137	135	d694	82	32	11
8	258	512	128	34	170	137	135	155	d540	70	23	11
9	222	392	118	35	150	137	130	191	d349	68	23	11
10	170	319	106	37	140	137	123	231	d273	64	22	11
11	140	319	100	39	135	137	119	298	d261	63	22	10
12	112	340	105	40	135	128	107	288	261	62	21	9.2
13	90	380	120	41	140	123	99	240	217	49	18	9.2
14	88	584	100	43	130	123	99	206	191	45	22	10
15	78	475	110	44	100	126	95	163	155	42	20	8.3
16	70	421	130	45	75	144	155	152	148	36	19	8.3
17	66	376	139	*46	*63	154	148	126	131	31	18	9.2
18	63	336	140	48	60	165	133	123	111	26	18	78
19	59	333	144	52	60	183	116	118	111	96	15	130
20	58	415	146	60	61	213	106	112	121	80	13	189
21	58	349	180	80	62	*244	103	106	130	57	12	259
22	55	313	200	120	64	259	98	99	124	49	12	109
23	52	283	210	160	64	249	90	98	126	44	10	95
24	50	240	215	200	63	244	87	87	107	37	8.8	76
25	47	208	205	240	62	249	84	81	114	34	7.8	64
26	58	200	170	280	62	251	84	78	103	39	12	63
27	72	191	140	300	66	233	80	78	101	44	9.6	66
28	78	183	120	290	75	211	78	116	99	42	8.8	63
29	82	175	110	270	.....	191	76	109	263	69	9.6	60
30	84	171	120	250	.....	196	69	111	333	72	8.8	59
31	86	.....	100	240	.....	211	.....	d118	.....	84	7.4	.....

*Winter discharge measurement made on this day.
(a) No gage-height record; discharge estimated.
(d) Doubtful gage-height record; discharge computed from graph based on water marks on bank noted by observer.

Boone River near Webster City, Iowa

LOCATION.—Water-stage recorder, lat. 42°25'50", long. 93'48°10", in sec. 18, T. 88 N., R. 25 W., at bridge on State Highway 60, about 2 miles south of Webster City and 4½ miles downstream from White Fox Creek.

DRAINAGE AREA.—842 square miles.

RECORDS AVAILABLE.—March 1940 to September 1942.

EXTREMES.—Maximum discharge during 1941-42 year, 3,060 second-feet June 30 (gage height 7.52 feet); minimum, 47 second-feet Sept. 17 (gage height, 1.90 feet).

1940-41: Maximum discharge, 1,500 second-feet June 3, 1941; maximum gage-height, 6.42 feet Mar. 5, 1941; minimum discharge, 2.4 second-feet July 25, 1940 (gage height, 1.08 feet).

REMARKS.—Records fair except those for periods of ice effect which are poor.

COOPERATION.—Records collected in cooperation with Corps of Engineers, U. S. Army and U. S. Weather Bureau.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Discharge in second-feet				Run-off in Inches
		Maximum	Minimum	Mean	Per square mile	
October 1940	461	29	10	14.9	0.018	0.02
November	7,565	640	43	252	.299	.33
December	5,094	410	95	164	.195	.22
Calendar year 1940	.....	.....	.....	.....	.....	.....
January 1941	6,131	596	75	198	.235	.27
February	5,317	530	70	190	.226	.23
March	18,699	1,450	140	600	.713	.82
April	13,674	858	175	456	.542	.60
May	2,702	304	31	87.2	.104	.12
June	18,449	1,280	129	615	.730	.81
July	5,077	810	29	164	.195	.22
August	378	28	6.2	12.2	.014	.02
September	4,925.9	632	5.0	164	.195	.22
Water year 1940-41	88,382.9	1,450	5.0	242	.287	3.88
October 1941	12,081	967	107	390	.463	.53
November	24,000	1,730	354	803	.954	1.06
December	7,695	349	130	248	.295	.34
Calendar year 1941	119,138.9	1,730	5.0	326	.387	5.24
January 1942	8,506	960	80	274	.325	.38
February	7,298	520	135	261	.310	.32
March	28,473	2,000	143	918	1.09	1.26
April	13,063	790	240	435	.517	.58
May	19,708	1,170	306	636	.755	.87
June	25,206	2,750	201	840	.998	1.11
July	18,209	2,020	224	587	.697	.80
August	5,979	880	47	193	.229	.26
September	3,346	218	52	112	.133	.15
Water year 1941-42	173,664	2,750	47	476	.565	7.66

Note—Stage-discharge relation affected by ice Nov. 12-17, Nov. 30 to Dec. 28, 1940; Jan. 1 to Mar. 27, Dec. 12-15, 29-31, 1941; Jan. 1 to Feb. 1, Feb. 10-28, 1942.

Boone River near Webster City, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940–41												
1	11	50	135	362	75	140	320	157	289	810	28	5.2
2	11	57	130	491	75	160	320	145	525	770	23	5.0
3	12	63	130	596	78	520	320	132	1,280	564	20	5.5
4	13	61	125	430	78	1,150	448	116	864	434	17	5.7
5	16	61	125	400	75	1,450	609	105	967	337	16	5.4
6	13	54	128	370	73	1,350	645	98	1,050	277	14	5.3
7	20	49	130	*330	72	1,200	692	96	830	224	13	6.9
8	17	43	130	310	72	1,080	560	86	668	188	13	5.9
9	15	57	135	275	72	1,080	544	78	522	154	14	6.0
10	24	96	130	250	72	1,360	531	71	467	132	13	42
11	23	259	125	215	70	1,290	514	63	668	119	11	207
12	26	240	105	210	80	890	494	58	1,110	105	10	134
13	17	220	105	200	*370	550	479	54	1,250	92	10	92
14	11	210	110	180	300	450	467	50	1,220	82	6.9	75
15	12	240	115	150	350	410	448	47	1,030	71	8.4	84
16	11	250	115	140	470	380	420	45	805	73	8.2	194
17	10	250	110	110	530	370	378	40	645	73	12	454
18	10	266	100	90	450	390	354	36	528	66	13	600
19	10	333	95	85	310	380	362	34	451	58	14	632
20	11	431	95	82	270	*375	557	34	374	53	13	511
21	10	508	100	80	230	375	858	31	300	a47	11	390
22	13	640	110	80	190	380	770	40	259	a42	14	293
23	13	596	120	80	160	420	568	64	217	37	11	230
24	12	592	130	80	150	390	463	57	178	34	14	188
25	13	525	150	80	145	350	398	45	148	32	8.4	160
26	13	*467	250	80	140	310	324	48	129	35	8.4	143
27	13	409	350	75	170	280	312	34	213	36	7.2	124
28	14	255	410	75	190	270	234	88	328	32	6.2	107
29	18	143	402	75	.....	262	200	157	444	29	6.9	103
30	20	140	366	75	.....	285	175	304	690	35	7.0	112
31	29	.....	333	75	.....	312	.....	289	.....	36	6.4	.....
1941–42												
1	107	640	*345	130	520	143	790	383	320	2,020	880	74
2	154	1,120	345	115	500	181	775	383	531	1,440	604	77
3	230	1,500	328	100	464	354	735	523	1,590	980	535	154
4	227	1,660	320	92	434	491	685	622	1,970	717	387	123
5	251	1,730	320	85	413	506	631	667	1,570	563	313	97
6	341	1,630	300	82	394	506	587	825	1,230	495	262	85
7	554	1,560	266	80	386	528	539	1,090	1,220	471	221	79
8	705	1,430	270	80	312	506	499	1,150	2,040	507	195	74
9	888	942	255	80	289	476	475	1,170	1,650	467	173	70
10	967	981	220	85	260	444	459	1,090	1,220	575	151	64
11	815	790	137	90	250	457	428	1,020	920	1,040	136	60
12	609	695	140	92	240	416	402	1,050	721	865	119	52
13	511	663	150	95	245	366	390	1,060	583	685	106	57
14	457	690	130	95	230	362	375	941	483	600	110	73
15	413	710	190	95	220	457	356	790	425	511	104	60
16	362	686	285	97	210	1,140	345	685	371	622	114	55
17	320	632	274	100	*181	1,520	323	631	349	600	121	49
18	300	572	277	*103	160	1,510	316	604	320	471	104	190
19	289	547	262	105	160	*1,460	306	551	299	436	92	218
20	274	528	230	110	170	1,770	285	503	313	349	87	190
21	255	534	217	115	175	1,990	272	463	288	330	76	176
22	244	538	244	150	175	2,000	265	444	252	265	70	138
23	241	494	262	220	170	1,770	252	413	221	224	60	134
24	234	470	320	500	160	1,500	240	383	201	243	53	136
25	224	470	349	750	155	1,200	262	368	215	281	47	129
26	217	420	341	900	150	1,210	368	345	278	292	90	140
27	230	394	293	960	140	1,180	432	320	379	252	112	151
28	316	362	175	900	135	1,150	452	316	467	240	272	151
29	431	354	160	800	.....	1,050	425	306	2,030	224	179	146
30	464	358	150	700	.....	915	394	306	2,750	448	117	144
31	451	.....	140	600	.....	825	.....	306	.....	996	89	.....

*Winter discharge measurement made on this day.
(a) No gage-height record; discharge interpolated.

Raccoon River near Jefferson, Iowa

LOCATION.—Wire-weight gage, lat. 42°00'30", long. 94°25'30", in SW¼ sec. 11, T. 83 N., R. 31 W., at bridge on U. S. Highway 30, 3 miles west of Jefferson and 8 miles upstream from Hardin Creek.

DRAINAGE AREA.—1,610 square miles.

RECORDS AVAILABLE.—March 1940 to September 1942.

EXTREMES.—Maximum discharge observed during 1941-42 year, 3,590 second-feet July 15 (gage height, 10.47 feet); minimum observed, 53 second-feet Oct. 1, 2 (gage height, 3.31 feet).

1940-41: Maximum discharge observed, 3,660 second-feet Aug. 28, 1940 (gage height, 10.76 feet), from rating curve extended above 2,900 second-feet; minimum observed, 26 second-feet July 28, 1940; minimum gage height observed, 2.98 feet Sept. 14, 1941.

REMARKS.—Records fair except those for periods of ice effect, which are poor. Gage read twice daily.

COOPERATION.—Records collected in cooperation with Corps of Engineers, U. S. Army.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Discharge in second-feet				Run-off in Inches
		Maximum	Minimum	Mean	Per square mile	
October 1940	2,194	81	57	70.8	0.044	0.05
November	8,921	734	83	297	.184	.21
December	8,064	600	150	260	.161	.19
Calendar year 1940						
January 1941	12,003	905	255	387	.240	.28
February	12,285	900	255	439	.273	.28
March	23,677	1,900	330	764	.475	.55
April	12,962	561	292	432	.268	.30
May	5,518	281	101	178	.111	.13
June	22,598	2,420	101	753	.468	.52
July	4,851	367	65	156	.097	.11
August	1,371	64	28	44.2	.027	.03
September	1,602	138	27	53.4	.033	.04
Water year 1940-41	116,046	2,420	27	318	.198	2.69
October 1941	3,918	192	53	126	.078	.09
November	25,532	1,680	177	851	.529	.59
December	12,671	606	240	409	.254	.29
Calendar year 1941	138,988	2,420	27	381	.237	3.21
January 1942	17,431	1,600	170	562	.349	.40
February	18,445	1,320	330	659	.409	.43
March	26,295	1,390	390	848	.527	.61
April	16,304	923	355	543	.337	.38
May	24,704	1,660	355	797	.495	.57
June	44,652	3,170	539	1,488	.924	1.03
July	42,793	3,040	669	1,380	.857	.99
August	12,134	1,440	141	391	.243	.28
September	8,830	677	141	294	.183	.20
Water year 1941-42	253,709	3,170	53	695	.432	5.86

Note—Stage-discharge relation affected by ice Nov. 11-19, Nov. 29 to Dec. 5, Dec. 12-31, 1940; Jan. 4 to Mar. 7, Dec. 11-17, 1941; Jan. 1 to Mar. 5, 1942.

Raccoon River near Jefferson, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940–41												
1.....	81	95	240	685	255	330	358	281	101	367	64	28
2.....	78	96	220	763	255	520	373	276	108	343	62	29
3.....	78	98	220	905	255	750	385	265	190	303	58	30
4.....	81	98	240	550	260	1,060	410	260	443	270	57	30
5.....	81	93	300	450	260	1,570	446	248	614	250	64	30
6.....	80	88	380	420	260	1,900	504	240	469	226	54	29
7.....	78	85	364	450	260	1,700	539	235	395	203	52	31
8.....	78	83	333	470	265	1,510	522	226	398	190	50	32
9.....	81	88	315	440	270	1,290	525	217	414	173	50	32
10.....	81	121	297	410	270	1,170	546	210	506	165	46	32
11.....	81	200	300	390	275	1,170	561	199	532	161	44	30
12.....	80	140	220	370	280	1,040	546	190	1,570	171	41	29
13.....	78	100	170	*360	460	914	511	182	2,050	177	42	28
14.....	75	110	180	350	650	870	462	173	2,420	161	40	27
15.....	72	130	180	340	800	759	433	169	2,150	149	38	36
16.....	71	160	160	325	870	546	401	165	1,710	141	36	52
17.....	69	220	150	310	900	395	373	161	1,460	130	50	64
18.....	67	360	155	310	770	379	355	153	1,170	126	48	92
19.....	64	500	160	315	720	637	349	149	941	119	46	126
20.....	62	630	165	315	650	587	349	145	759	110	44	138
21.....	61	709	170	310	560	497	361	141	622	105	42	112
22.....	61	734	175	305	460	490	497	145	536	96	40	84
23.....	61	718	180	300	410	483	554	149	476	91	39	75
24.....	60	661	190	290	390	462	497	141	410	86	39	64
25.....	60	576	200	285	380	430	449	134	367	84	36	59
26.....	60	516	250	280	380	410	382	123	337	80	34	59
27.....	59	479	300	270	370	285	346	116	361	81	33	57
28.....	59	403	350	265	350	361	328	112	367	91	33	57
29.....	62	340	400	260	.....	352	308	107	349	70	32	56
30.....	57	290	500	255	.....	355	292	105	373	67	29	54
31.....	78	.....	600	255	.....	355	.....	101	.....	65	28	.....
1941–42												
1.....	53	177	518	200	1,320	390	923	355	539	2,750	1,280	141
2.....	54	265	511	170	1,250	430	879	385	576	2,590	1,440	169
3.....	62	270	504	175	1,200	470	827	417	1,290	1,680	1,020	379
4.....	65	320	486	180	1,100	570	759	459	1,580	1,340	793	245
5.....	75	443	469	180	1,050	700	738	494	2,060	1,120	653	221
6.....	117	726	*459	180	980	914	693	561	2,500	964	591	203
7.....	186	1,160	436	185	900	905	665	645	3,020	814	518	190
8.....	180	1,680	404	190	850	870	614	1,040	3,170	714	452	212
9.....	186	1,180	392	190	800	759	584	1,210	3,050	669	404	208
10.....	190	986	355	195	720	677	546	1,120	2,520	1,380	367	188
11.....	190	879	270	195	690	595	522	1,370	2,070	1,220	328	173
12.....	192	784	240	200	660	554	504	1,640	1,710	950	297	167
13.....	190	776	270	205	640	532	490	1,660	1,440	772	273	219
14.....	173	835	300	210	600	508	469	1,460	1,180	2,460	255	373
15.....	147	1,110	310	*216	580	525	456	1,230	986	3,040	240	343
16.....	138	1,370	450	230	600	614	449	1,050	865	1,870	235	273
17.....	126	1,290	550	250	500	665	483	946	789	1,340	240	245
18.....	123	1,160	606	270	360	776	536	879	709	1,070	276	230
19.....	116	1,050	462	310	330	861	576	805	673	1,280	270	306
20.....	114	1,010	430	400	335	936	522	734	793	1,190	214	528
21.....	112	1,070	392	500	*340	1,100	483	681	1,300	1,260	182	677
22.....	116	1,100	404	620	355	1,200	466	661	1,340	1,030	161	494
23.....	112	1,080	430	800	370	1,230	436	626	1,240	818	153	404
24.....	105	941	462	1,000	385	1,180	420	591	1,080	701	145	352
25.....	101	780	483	1,180	390	1,150	404	550	995	1,060	141	331
26.....	101	734	490	1,400	390	1,190	392	518	941	861	157	320
27.....	110	645	456	1,520	380	1,240	385	497	986	1,540	317	314
28.....	119	603	352	1,600	370	1,390	367	486	1,160	1,620	184	314
29.....	116	569	270	1,580	.....	1,280	361	504	1,620	1,460	205	308
30.....	121	539	250	1,500	.....	1,120	355	576	2,470	1,700	182	303
31.....	128	.....	260	1,400	.....	964	.....	554	.....	1,530	161	.....

*Winter discharge measurement made on this day.

Raccoon River at Van Meter, Iowa

LOCATION.—Water-stage recorder, lat. 41°32'00", long. 93°56'50", in SW¼ sec. 22, T. 78 N., R. 27 W., at highway bridge a third of a mile northeast of railroad station at Van Meter, 1 mile downstream from South Raccoon River, and 30 miles upstream from mouth. Datum of gage is 841.12 feet above mean sea level, adjustment of 1912.

DRAINAGE AREA.—3,410 square miles.

RECORDS AVAILABLE.—April 1915 to November 1927, October 1932 to September 1942 in reports of Geological Survey. April 1915 to December 1932 in report of Iowa State Planning Board entitled "Stream Flow Records of Iowa, 1873-1932."

AVERAGE DISCHARGE.—26 years (1915-32, 1933-42), 1,020 second-feet.

EXTREMES.—Maximum discharge during 1941-42 year, 8,800 second-feet May 11 (gage height, 11.71 feet); minimum, 152 second-feet Jan. 1 (gage height, 2.12 feet).

1915-41: Maximum discharge observed, 40,000 second-feet Sept. 20, 1926 (gage height, 18.96 feet), from rating curve extended above 22,000 second-feet; minimum, 10 second-feet Jan. 22-31, 1940; minimum gage height, probably 1.38 feet Aug. 29, 1934 and Sept. 1, 1936.

REMARKS.—Records good except those for periods of fragmentary gage-height record and those computed from graphs based on wire-weight gage readings, which are fair, and those for periods of ice effect, which are poor. Diurnal fluctuation during low water caused by operation of power plant at Adel, 10 miles above station.

COOPERATION.—Station operated through cooperation of Des Moines Water Works; gage-height record collected in cooperation with U. S. Weather Bureau.

NOTE.—Duration curves of daily discharge for Hamburg, Van Meter and Ames are shown in figure 9.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Discharge in second-feet				Run-off in Inches
		Maximum	Minimum	Mean	Per square mile	
October 1940	4,483	184	121	145	0.043	0.05
November	14,047	1,190	150	468	.137	.15
December	15,344	1,000	342	495	.145	.17
Calendar year 1940	194,387	5,200	10	531	.156	2.13
January 1941	22,570	1,300	500	728	.213	.25
February	25,200	2,500	380	900	.264	.27
March	42,617	4,000	500	1,375	.403	.46
April	24,618	1,190	565	821	.241	.27
May	10,878	576	184	351	.103	.12
June	71,884	5,040	230	2,396	.703	.78
July	14,799	1,740	158	477	.140	.16
August	6,695	1,320	79	216	.063	.07
September	7,880	748	79	263	.077	.09
Water year 1940–41	261,015	5,040	79	715	.210	2.84
October 1941	22,591	3,800	230	729	.214	.25
November	55,930	5,050	1,080	1,864	.547	.61
December	29,607	2,280	386	955	.280	.32
Calendar year 1941	335,269	5,050	79	919	.270	3.65
January 1942	47,050	3,480	420	1,518	.445	.51
February	38,887	2,540	825	1,389	.407	.42
March	75,660	3,680	910	2,441	.716	.83
April	41,870	2,470	934	1,396	.409	.46
May	78,422	7,120	958	2,530	.742	.86
June	69,480	3,670	1,200	2,316	.679	.76
July	93,610	6,740	1,270	3,020	.886	1.02
August	42,498	5,240	329	1,371	.402	.46
September	33,259	2,440	682	1,109	.325	.36
Water year 1941–42	628,864	7,120	230	1,723	.505	6.86

Note—Stage-discharge relation affected by ice Nov. 11-18, 28-30, Dec. 15-31, 1940; Jan. 2 to Mar. 7, Dec. 31, 1941; Jan. 1-25, 1942.

Raccoon River at Van Meter, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940–41												
1	174	211	370	1,040	490	506	f686	f571	230	g1,740	197	79
2	158	201	350	1,200	480	650	f703	f576	2,850	g1,390	171	124
3	155	194	350	1,300	470	1,000	703	544	3,160	g926	152	607
4	162	191	350	1,000	460	1,500	f726	487	1,550	g1.360	132	499
5	143	187	374	800	450	2,500	819	487	1,560	g890	126	191
6	165	180	513	700	430	4,000	860	498	1,540	g920	321	124
7	152	177	614	740	420	3,000	932	447	1,300	g614	211	96
8	155	171	625	800	410	2,140	956	437	1,200	g518	184	94
9	146	211	571	900	400	1,940	956	432	2,250	g452	146	90
10	152	264	528	1,000	*390	1,800	950	398	g2,280	g384	146	113
11	152	300	544	920	380	1,740	956	379	g5,040	g442	126	104
12	149	200	417	830	450	1,670	884	370	g4,160	412	222	92
13	140	150	342	*800	800	1,670	884	338	g4,640	370	149	99
14	140	160	442	750	1,300	1,610	926	312	g4,710	365	113	119
15	132	180	374	700	1,700	1,660	830	295	g4,820	352	92	518
16	129	220	350	650	2,100	1,600	f760	304	g4,400	334	88	726
17	124	280	375	600	2,500	1,110	720	291	g3,500	291	816	437
18	124	400	400	560	2,200	848	890	283	2,780	275	1,320	393
19	140	576	410	520	1,700	968	1,190	264	g2,240	256	427	283
20	129	772	425	550	1,500	1,320	920	271	g1,800	237	325	230
21	132	*962	410	600	1,300	1,150	f819	264	g1,560	222	194	222
22	121	1,140	410	640	1,100	986	f813	312	g1,340	218	149	222
23	129	1,190	420	660	900	914	813	432	g1,110	208	124	197
24	132	1,170	430	600	700	908	866	291	g950	204	116	174
25	129	1,070	450	560	600	884	842	244	g830	158	106	155
26	135	980	500	550	550	860	f778	233	g714	171	106	138
27	138	860	600	540	520	819	f686	222	g1,510	218	94	129
28	155	600	700	530	500	f784	614	260	g3,600	329	92	629
29	155	450	800	520	.....	f714	571	226	g2,660	204	90	248
30	152	400	900	510	.....	f686	565	184	g1,600	171	81	748
31	184	.....	1,000	500	.....	f686	.....	226	.....	168	79	.....
1941–42												
1	422	5,050	1,040	420	2,540	910	2,470	964	1,240	4,140	3,770	862
2	256	2,360	1,020	450	2,360	1,010	2,350	958	1,200	3,800	3,250	726
3	230	2,070	962	480	2,200	1,180	2,210	1,640	1,210	4,180	2,590	715
4	329	1,690	956	500	2,020	1,450	2,060	1,720	1,750	3,350	2,330	982
5	437	1,580	932	520	2,010	1,720	1,910	2,180	2,230	2,320	2,030	1,110
6	993	1,860	*890	540	1,960	2,070	1,850	3,330	2,440	1,880	1,690	844
7	3,800	2,270	860	560	1,820	2,100	1,730	2,450	2,920	1,610	1,460	743
8	2,100	2,380	836	570	1,700	1,940	1,610	2,290	3,260	1,420	1,290	2,440
9	1,490	2,340	789	580	1,580	1,760	1,530	2,350	3,590	1,270	1,170	1,890
10	860	2,180	636	600	1,390	1,620	1,460	2,490	3,650	1,270	1,030	1,060
11	772	2,020	534	620	1,390	1,570	1,380	7,120	3,670	1,970	946	816
12	680	1,830	386	630	1,380	1,400	1,320	5,730	3,390	2,360	844	682
13	576	1,680	398	640	1,340	1,360	1,280	5,460	2,710	1,670	782	990
14	625	1,560	447	*660	1,330	1,360	1,240	4,740	2,220	3,070	704	1,160
15	528	1,520	452	700	1,290	1,380	1,210	3,680	1,820	3,830	666	1,840
16	412	1,720	630	800	1,370	1,990	1,180	3,000	1,570	5,040	602	2,050
17	365	1,940	789	900	1,130	3,590	1,160	2,630	1,430	4,440	591	1,880
18	338	1,930	836	1,300	842	3,590	1,140	2,630	1,340	2,770	554	1,690
19	283	1,900	836	1,600	920	3,340	1,160	2,390	1,230	2,760	523	1,060
20	412	1,760	813	1,800	*968	3,580	1,190	2,270	1,960	2,210	539	904
21	1,100	1,670	807	2,000	962	3,630	1,140	2,120	2,110	2,110	528	946
22	675	1,670	890	2,200	1,020	3,680	1,080	2,210	2,770	1,950	467	1,120
23	445	1,760	2,280	2,400	992	3,580	1,030	2,120	2,370	1,670	388	1,050
24	362	1,620	*2,260	2,600	932	3,250	994	1,840	2,020	1,470	365	910
25	334	1,460	1,690	3,000	884	3,060	982	1,690	1,830	2,130	329	822
26	354	1,390	1,660	3,480	878	3,610	1,200	1,570	2,370	4,220	1,070	816
27	672	1,280	1,490	3,450	854	3,540	1,080	1,480	2,370	3,750	1,220	822
28	397	1,220	1,080	3,370	825	3,490	1,020	1,440	2,090	6,740	5,240	799
29	330	1,140	836	3,360	.....	3,260	970	1,380	3,380	5,560	2,520	765
30	334	1,080	772	3,340	.....	2,970	934	1,290	3,340	4,720	1,810	765
31	1,680	.....	800	2,980	.....	2,670	.....	1,260	.....	3,930	1,200	.....

*Winter discharge measurement made on this day.
(f) Fragmentary gage-height record; discharge computed on basis of partly estimated gage heights.
(g) Computed from graph based on wire-weight gage readings.

Table 9—Days of deficiency in discharge of Raccoon River at Van Meter, Iowa, during the years ending Sept. 30, 1933-42.

Discharge		Number of days when discharge was less than that shown in first two columns and equal to or greater than that shown on preceding line										Period of Record		
												Deficiency		Duration
Sec-ft per sq mile	Sec-ft	*1933	a1934	1935	1936	1937	1938	1939	1940	1941	1942	Total	Days	Percent of time	Percent of time
0.003	10	.....	.....	.....	.....	.....	.....	.....	0	.....	.....	0	0	0	100
.004	14	.....	.....	.....	0	.....	.....	.....	15	.....	.....	15	15	.4	99.6
.005	18	.....	0	.....	2	0	0	0	8	.....	.....	10	25	.7	99.3
.007	25	.....	2	.....	10	28	8	1	13	.....	.....	62	87	2.5	97.5
.010	33	0	22	.....	15	4	17	12	10	.....	.....	80	167	4.8	95.2
.013	45	1	8	0	11	7	53	4	34	.....	.....	118	285	8.2	91.8
.018	60	3	22	12	32	25	18	7	58	0	.....	177	462	13.2	86.8
.023	80	3	57	13	15	48	29	8	27	2	.....	202	664	19.0	81.0
.032	110	7	57	43	28	42	5	7	7	14	.....	210	874	25.1	74.9
.044	150	4	58	54	27	24	9	11	10	34	.....	231	1,105	31.7	68.3
.059	200	8	58	23	32	13	13	20	7	36	0	210	1,315	37.7	62.3
.079	270	20	33	31	30	12	23	42	16	29	2	238	1,553	44.5	55.5
.109	370	29	15	25	35	15	35	66	30	25	11	286	1,839	52.7	47.3
.147	500	28	11	50	26	14	25	59	33	48	15	309	2,148	61.6	38.4
.205	700	18	8	29	23	24	29	44	34	47	28	284	2,432	69.7	30.3
.264	900	28	3	17	23	25	20	21	17	43	37	234	2,666	76.4	23.6
.352	1,200	18	7	17	13	28	14	25	12	34	52	220	2,886	82.7	17.3
.499	1,700	11	1	12	14	24	26	14	11	24	71	208	3,094	88.7	11.3
.674	2,300	6	3	8	6	12	9	6	12	13	64	139	3,233	92.7	7.3
.880	3,000	4	0	10	5	8	11	5	5	5	33	86	3,319	95.2	4.8
1.17	4,000	5	.....	4	5	4	5	4	3	4	38	72	3,391	97.2	2.8
1.61	5,500	5	.....	7	2	2	9	2	4	7	10	48	3,439	98.6	1.4
2.20	7,500	3	.....	9	2	1	6	1	0	0	4	26	3,465	99.3	.7
2.93	10,000	0	.....	1	7	3	1	2	.....	.....	0	14	3,479	99.7	.3
4.11	14,000	.....	.....	0	3	2	0	4	.....	.....	.....	9	3,488	100	.0
5.57	19,000	.....	.....	.....	0	0	.....	0	.....	.....	.....	0	.....	.....	.....
Mean yearly discharge (sec-ft)..		182	751	731	670	734	736	452	715	1,723					
Maximum daily (sec-ft.).....		2,020	8,820	11,200	10,800	7,630	12,000	5,200	5,040	7,120					
Minimum daily (sec.-ft.).....		21	49	16	18	22	24	10	79	230					

*Incomplete record.
aDaily discharges not computed for Oct. 1 to Nov. 15; Dec. 11 to Jan. 23, Jan. 20 to Mar. 3; flat estimates used for periods of several days.
NOTE.— Some diurnal fluctuation during low water caused by operation of power plant at Adel, 10 miles above station.

Table 10—Days of deficiency in discharge of Skunk River near Ames, Iowa, during the years ending Sept. 30, 1934-42.

Discharge		Number of days when discharge was less than that shown in first two columns and equal to or greater than that shown on preceding line										Period of Record		
												Deficiency		Duration
Sec-ft per sq mile	Sec-ft	1934	1935	1936	1937	1938	1939	1940	1941	1942	Total	Days	Percent of time	Percent of time
0	0	0	.....	.....	.....	.....	.....	.....	.....	.....	0	0	0	100
.0003	.1	39	.....	0	.....	0	.....	0	.....	.....	39	39	1.2	98.8
.0006	.2	21	.....	1	.....	1	0	25	.....	.....	48	87	2.6	97.4
.0009	.3	14	.....	11	0	24	13	14	.....	.....	76	163	5.0	95.0
.0016	.5	9	.....	20	12	28	11	19	.....	.....	99	262	8.0	92.0
.0022	.7	28	.....	5	4	12	2	21	.....	.....	72	334	10.2	89.8
.0031	1.0	15	0	14	11	15	3	29	0	.....	87	421	12.8	87.2
.0062	2.0	30	2	12	52	26	8	51	2	.....	183	604	18.4	81.6
.011	3.5	54	3	7	50	18	12	25	13	.....	182	786	23.9	76.1
.016	5	25	1	5	41	6	8	3	8	.....	97	883	26.9	73.1
.025	8	32	21	7	20	7	12	3	6	.....	108	991	30.1	69.9
.034	11	24	11	5	11	2	5	2	16	.....	76	1,067	32.5	67.5
.053	17	33	18	20	11	7	10	16	34	0	149	1,216	37.0	63.0
.078	25	14	37	19	6	29	66	23	21	3	218	1,434	43.6	56.4
.109	35	8	28	18	10	20	63	33	29	2	211	1,645	50.0	50.0
.172	55	6	67	58	22	30	62	42	63	15	365	2,010	61.1	38.9
.250	80	4	49	37	17	23	24	18	38	17	227	2,237	68.1	31.9
.375	120	1	46	39	26	30	24	18	51	65	300	2,537	77.2	22.8
.531	170	1	7	33	23	23	13	8	29	73	210	2,747	83.6	16.4
.812	260	5	30	25	28	25	11	4	35	76	239	2,986	90.8	9.2
1.19	380	1	13	10	10	13	6	4	9	55	121	3,107	94.5	5.5
1.72	550	1	9	5	7	11	7	4	3	27	74	3,181	96.8	3.2
2.50	800	0	9	5	0	6	1	3	5	20	49	3,230	98.3	1.7
3.75	1,200	.....	3	4	1	6	1	1	2	8	26	3,256	99.1	.9
5.62	1,800	.....	7	3	2	1	2	0	1	2	18	3,274	99.6	.4
8.44	2,700	.....	3	3	1	2	1	.....	0	2	12	3,286	100	0
12.5	4,000	.....	1	0	0	0	0	.....	.....	0	1	3,287	100	0
18.8	6,000	.....	0	.....	.....	.....	.....	.....	.....	.....	0	.....	.....	.....
Mean yearly discharge (sec-ft)		11.3	156	118	73.5	110	72.2	39.8	94.2	251				
Maximum daily (sec-ft)		420	2,790	2,520	2,000	2,360	2,420	1,000	1,290	1,850				
Minimum daily (sec-ft)		0	1.4	.18	.3	.15	.21	.10	1.9	20				

South Raccoon River at Redfield, Iowa

LOCATION.—Wire-weight gage, lat. 41°34'30", long. 94°10'40", in SW¼ sec. 3, T. 78 N., R. 29 W., at bridge on county road at Redfield, three-quarters of a mile downstream from bridge on U. S. Highway 6, 1 mile downstream from Middle Raccoon River, and 14½ miles upstream from mouth.

DRAINAGE AREA.—995 square miles.

RECORDS AVAILABLE.—March 1940 to September 1942.

EXTREMES.—Maximum discharge during 1941-42 year, 6,380 second-feet Aug. 28 (gage height, 13.40 feet, from graph based on gage readings), from rating curve extended above 3,800 second-feet; minimum observed, 45 second-feet Aug. 25 (gage height, 2.77 feet).

1940-41: Maximum discharge, 6,100 second-feet July 31, 1940 (gage height, 13.2 feet, from graph based on gage readings); minimum observed, 18 second-feet July 26, 1940 (gage height, 2.44 feet).

REMARKS.—Records fair except those for periods of ice effect, and those for days of rapidly changing stage, all of which are poor. Gage read twice daily. Some diurnal fluctuation during low water caused by power plant at Panora.

COOPERATION.—Records collected in cooperation with Corps of Engineers, U. S. Army.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Discharge in second-feet				Run-off in Inches
		Maximum	Minimum	Mean	Per square mile	
October 1940	887	46	25	28.6	0.029	0.03
November	2,412	149	35	80.4	.081	.09
December	3,202	231	50	103	.104	.12
Calendar year 1940						
January 1941	3,677	459	70	119	.120	.14
February	8,145	800	50	291	.292	.30
March	9,025	900	117	291	.292	.34
April	4,143	378	74	138	.139	.15
May	2,031	282	37	65.5	.066	.08
June	17,764	2,640	113	592	.595	.66
July	4,509	1,580	28	145	.146	.17
August	3,910	1,420	30	126	.127	.15
September	3,074	468	27	102	.103	.11
Water year 1940–41	62,779	2,640	25	172	.173	2.34
October 1941	7,793	2,340	65	251	.252	.29
November	9,442	1,820	140	315	.317	.35
December	5,591	847	70	180	.181	.21
Calendar year 1941	79,104	2,640	27	217	.218	2.95
January 1942	11,851	2,010	90	382	.384	.44
February	8,028	450	180	287	.288	.30
March	18,872	1,030	250	609	.612	.71
April	9,047	525	186	302	.304	.34
May	21,116	3,280	220	681	.684	.79
June	15,262	1,480	200	509	.512	.57
July	21,995	1,800	242	710	.714	.82
August	11,343	3,840	54	366	.368	.42
September	11,874	2,710	162	396	.398	.44
Water year 1941–42	152,214	3,840	54	417	.419	5.68

Note—Stage-discharge relation affected by ice Nov. 12-15, Nov. 29 to Dec. 4, Dec. 13-27, 1940; Jan. 5 to Mar. 7, Dec. 10-17, 29-31, 1941; Jan. 1-24, Feb. 16 to Mar. 3, 1942.

South Raccoon River at Redfield, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940–41												
1	25	48	60	223	70	210	132	88	301	1,580	68	33
2	26	58	60	280	70	240	128	98	272	456	30	39
3	27	41	65	459	65	300	120	77	666	250	34	158
4	31	36	80	290	70	500	134	71	444	206	48	193
5	27	37	97	200	70	900	145	71	540	165	37	68
6	28	37	102	160	65	600	151	74	329	149	206	41
7	28	39	111	100	60	560	147	65	272	117	46	27
8	27	35	100	80	50	540	145	64	326	104	38	34
9	31	74	97	75	50	528	145	70	1,310	88	36	48
10	28	97	90	80	*55	438	149	55	645	100	52	42
11	28	128	93	90	60	429	136	51	1,550	130	40	35
12	32	100	70	100	80	346	140	55	1,030	107	117	33
13	27	80	60	*90	400	282	140	51	1,130	82	58	32
14	30	60	50	90	*600	282	128	46	739	70	40	33
15	27	60	50	95	700	269	111	46	620	70	34	198
16	26	83	52	100	750	280	109	42	435	66	31	315
17	28	97	55	100	800	143	91	46	378	55	1,410	216
18	28	83	70	95	750	188	258	51	258	52	645	160
19	26	83	75	80	600	242	378	44	234	48	326	68
20	30	100	80	70	500	218	193	39	198	58	119	61
21	25	*140	90	80	450	184	160	44	174	38	76	37
22	29	130	100	80	350	149	143	282	145	42	59	39
23	27	107	100	80	300	149	130	115	136	47	47	33
24	27	111	100	75	280	145	104	56	117	38	44	28
25	26	122	110	75	250	140	98	46	113	46	44	32
26	27	95	140	70	230	132	97	39	113	28	44	33
27	26	87	180	70	220	132	90	41	1,270	71	38	32
28	32	85	231	70	200	132	87	72	2,640	85	32	453
29	30	80	218	70	.....	117	74	54	995	49	32	85
30	32	70	210	75	.....	130	80	37	384	38	32	468
31	46	.....	206	75	.....	120	.....	41	.....	74	37	.....
1941–42												
1	122	1,820	136	105	390	250	525	242	290	1,180	547	234
2	68	743	130	100	402	300	507	220	280	568	575	208
3	76	537	132	95	441	400	465	739	357	1,170	390	332
4	65	420	132	90	396	540	429	450	656	504	321	324
5	117	525	130	90	411	578	399	381	516	414	282	245
6	239	432	*111	90	450	652	387	480	340	335	239	169
7	k2,340	381	113	95	384	522	363	648	301	290	218	162
8	731	332	113	105	346	402	338	568	280	269	193	k2,710
9	372	280	109	120	282	343	324	498	250	250	181	610
10	206	239	100	140	315	321	324	465	288	242	167	405
11	143	234	80	160	321	321	299	k3,280	486	540	149	282
12	98	223	70	160	332	285	290	2,000	719	652	126	231
13	104	218	75	162	293	299	280	1,400	465	312	132	310
14	213	210	75	*166	282	299	285	943	307	349	120	492
15	93	206	90	180	269	329	274	708	239	795	111	771
16	74	193	120	190	230	859	264	603	210	1,280	102	540
17	74	186	140	210	190	1,030	269	561	210	1,150	106	1,040
18	77	196	145	230	180	1,030	258	610	208	666	87	459
19	65	223	140	260	180	987	242	547	200	787	90	290
20	80	200	140	290	195	1,010	236	582	537	554	76	242
21	859	193	134	330	*204	991	231	474	1,010	474	72	218
22	203	198	143	420	205	907	236	875	1,010	315	62	196
23	126	145	*847	570	210	783	206	614	483	242	65	186
24	104	153	582	800	220	676	186	519	357	329	65	167
25	97	191	423	2,010	225	676	242	459	363	304	54	162
26	107	153	387	1,210	225	967	293	420	911	1,420	360	198
27	193	162	293	903	220	795	247	393	855	k1,790	k894	184
28	95	153	151	715	230	673	a228	408	474	1,800	k3,840	176
29	90	156	130	676	.....	572	210	372	1,480	1,200	875	169
30	91	140	110	684	.....	544	210	338	1,180	1,120	540	162
31	471	.....	110	495	.....	531	.....	310	.....	694	304	.....

*Winter discharge measurement made on this day.
(a) No gage-height record; discharge interpolated.
(k) Rapidly changing stage on this day.

North River near Norwalk, Iowa

LOCATION.—Wire-weight gage, lat. 41°27'25", long. 93°39'10", in SW¼ sec. 20, T. 77 N., R. 24 W., at bridge on Warren County Road S, about 1¾ miles southeast of Norwalk, 8 miles northwest of Indianola, 9 miles upstream from Middle Creek, and 10 miles south of Des Moines.

DRAINAGE AREA.—348 square miles.

RECORDS AVAILABLE.—February 1940 to September 1942.

EXTREMES.—Maximum discharge observed during 1941-42 year, 4,350 second-feet May 12 (gage height, 20.62 feet); minimum observed, 22 second-feet Aug. 25 (gage height, 5.10 feet).

1940-41: Maximum discharge observed, 1,530 second-feet Sept. 17, 1941; minimum observed, 0.2 second-foot Oct. 22-27, Aug. 13-16, 1941; minimum gage height observed, 3.31 feet July 27, 1940.

REMARKS.—Records fair except those for periods of ice effect and doubtful or no gage-height record, which are poor. Gage read once daily during periods of ice cover, twice daily during open water periods, and more often during high water.

COOPERATION.—Records collected in cooperation with Corps of Engineers, U. S. Army.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Discharge in second-feet				Run-off in Inches
		Maximum	Minimum	Mean	Per square mile	
October 1940	14.4	2.1	0.2	0.46	0.0013	0.002
November	233	32	1.4	7.77	.022	.02
December	394	80	2	12.7	.036	.04
Calendar year 1940						
January 1941	992	92	15	32.0	.092	.11
February	4,962	1,100	11	177	.509	.53
March	2,737	200	37	88.3	.254	.29
April	2,388	611	27	79.6	.229	.26
May	1,684	317	11	54.3	.156	.18
June	6,184	1,080	18	206	.592	.66
July	702.1	177	.3	22.6	.065	.08
August	319.2	127	.2	10.3	.030	.03
September	5,565.2	1,460	.9	186	.534	.59
Water year 1940–41	26,174.9	1,460	.2	71.7	.206	2.79
October 1941	14,825	2,080	55	478	1.37	1.58
November	15,441	2,720	157	515	1.48	1.65
December	8,012	1,860	79	258	.741	.86
Calendar year 1941	63,811.5	2,720	.2	175	.503	6.82
January 1942	12,295	1,000	45	397	1.14	1.31
February	5,519	350	120	197	.566	.59
March	12,428	1,410	180	401	1.15	1.33
April	5,039	343	94	168	.483	.54
May	23,148	4,100	123	747	2.15	2.47
June	10,796	1,600	97	360	1.03	1.15
July	19,558	2,600	70	631	1.81	2.09
August	3,629	361	22	117	.336	.39
September	8,145	1,460	36	272	.782	.87
Water year 1941–42	138,835	4,100	22	380	1.09	14.83

Note—Stage-discharge relation affected by ice Nov. 12, 13, Nov. 28 to Dec. 30, 1940; Jan. 4 to Mar. 18, 1941; Jan. 1 to Feb. 3, Feb. 11 to Mar. 3, 1942.

North River near Norwalk, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940-41												
1	0.4	1.5	4	75	18	50	35	34	18	89	2.5	0.9
2	.4	1.9	3	84	18	60	36	34	26	140	1.8	3.3
3	.4	2.1	3	92	16	90	37	33	403	48	1.4	d145
4	.6	1.9	2	75	18	200	39	31	719	30	.9	d669
5	.6	1.7	2	50	20	150	39	31	198	16	.8	d497
6	.7	1.5	2	40	22	100	36	34	90	11	.7	d107
7	.6	1.4	3	30	16	70	34	34	90	11	.6	d28
8	.4	1.5	3	20	14	80	31	36	115	11	.6	d15
9	.4	2.9	3	15	13	100	31	31	817	9.7	.6	d13
10	.4	2.7	3	15	12	110	33	29	1,080	11	.4	d23
11	.4	5.9	3	*18	*11	120	43	24	486	177	.4	d15
12	.4	5	3	22	14	140	44	18	692	51	.3	8.8
13	.3	3	3	26	500	110	36	16	264	21	.2	9.2
14	.3	3	3	30	*975	95	32	15	175	15	.2	12
15	.3	3	3	32	*1,100	100	28	14	151	11	.2	394
16	.3	4	2.5	31	500	130	29	58	117	8.6	.2	1,230
17	.3	5	2.5	28	550	95	27	41	93	7.1	2.9	1,460
18	.3	7	2.5	22	400	75	112	18	78	5.9	80	541
19	.3	8	2.5	18	200	88	611	14	63	5.0	127	98
20	.3	9	3	15	100	74	318	13	52	4.5	48	60
21	.3	*11	4	22	80	94	211	11	44	2.0	18	44
22	.2	14	5	30	70	124	108	83	37	1.0	9.7	34
23	.2	22	5	28	60	120	81	317	32	.3	5.9	27
24	.2	32	6	24	50	76	72	312	28	1.2	4.0	23
25	.2	27	7	22	50	46	72	106	25	2.7	2.9	20
26	.2	20	15	24	45	44	51	45	22	2.1	2.8	18
27	.2	14	30	24	45	41	47	31	19	1.9	2.1	16
28	.3	10	50	22	45	41	42	36	51	1.5	1.5	15
29	1.0	6	80	22	.....	39	38	79	155	1.7	1.0	16
30	2.1	5	70	18	.....	38	35	69	44	1.8	.8	23
31	1.4	.....	66	18	.....	37	.....	37	.....	3.1	.8	.....
1941-42												
1	75	1,510	159	80	190	180	262	123	139	597	330	56
2	104	2,720	155	70	200	300	251	143	129	223	206	46
3	58	2,440	147	60	240	400	235	316	125	412	191	40
4	55	1,440	142	50	320	431	216	457	115	1,250	203	39
5	829	622	*144	45	280	387	200	494	109	1,100	171	39
6	854	617	138	50	318	350	195	1,360	105	262	128	39
7	1,180	555	131	70	350	331	187	1,740	118	175	108	36
8	1,650	387	118	90	213	317	181	693	930	147	99	110
9	2,080	312	108	110	206	272	170	390	728	148	91	252
10	936	276	104	130	197	220	161	396	302	171	82	718
11	298	269	99	150	210	217	152	1,620	129	127	73	234
12	203	266	99	*170	220	216	143	4,100	310	104	69	72
13	173	260	100	190	210	215	142	3,160	335	96	64	66
14	347	249	104	220	200	220	140	1,840	139	1,070	60	497
15	255	224	110	260	195	245	138	498	111	595	56	744
16	155	211	118	300	190	a350	131	388	97	177	52	380
17	133	203	123	360	160	1,170	123	386	101	85	48	337
18	121	199	125	500	130	1,410	117	902	120	70	42	1,090
19	115	279	120	800	120	647	112	784	113	891	39	1,460
20	210	452	106	1,000	130	466	108	443	590	1,610	36	812
21	591	326	96	900	140	442	105	394	1,450	2,600	30	177
22	694	237	106	700	150	361	101	359	599	1,050	27	135
23	797	198	505	800	155	307	99	341	217	256	24	118
24	413	157	1,390	850	150	281	94	329	169	209	23	102
25	255	159	1,860	870	155	285	102	285	262	305	22	90
26	255	185	914	850	160	573	343	238	279	868	27	84
27	321	184	340	700	160	592	253	218	266	1,350	361	101
28	701	175	106	600	170	396	321	205	179	1,300	308	105
29	359	167	85	570	.....	295	141	195	930	1,370	350	87
30	237	162	81	500	.....	281	116	186	1,600	530	208	79
31	371	.....	79	250	.....	271	.....	165	.....	410	91	.....

*Winter discharge measurement made on this day.
(a) No gage-height record; discharge estimated.
(d) Discharge computed from doubtful gage-height record.

Middle River near Indianola, Iowa

LOCATION.—Wire-weight gage, lat. 41°26'00", long. 93°33'25", in NW¼ sec. 31, T. 77 N., R. 23 W., at bridge on U. S. Highways 65 and 69, 5 miles north of Indianola, 10 miles south of Des Moines, and 13 miles upstream from mouth.

DRAINAGE AREA.—502 square miles.

RECORDS AVAILABLE.—March 1940 to September 1942.

EXTREMES.—Maximum discharge during 1941-42 year, 7,960 second-feet Nov. 1 (gage height, 19.5 feet, from graph based on gage readings); minimum observed, 48 second-feet Aug. 25 (gage height, 3.56 feet).

1940-41: Maximum discharge observed, 8,240 second-feet June 9, 1941 (gage height, 19.73 feet); minimum observed, 1.3 second-feet July 27, 1940; minimum gage-height observed, 2.88 feet Oct. 10, 1940.

REMARKS.—Records fair except those for periods of ice effect and doubtful or no gage-height record, and those for days of rapidly changing stage, all of which are poor. Gage read twice daily, more often during high stages.

COOPERATION.—Records collected in cooperation with Corps of Engineers, U. S. Army.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Discharge in second-feet				Run-off in Inches
		Maximum	Minimum	Mean	Per square mile	
October 1940	157	12	2	5.06	0.010	0.01
November	538	41	6	17.9	.036	.04
December	527	40	9	17.0	.034	.04
Calendar year 1940						
January 1941	1,002	70	20	32.3	.064	.07
February	6,588	2,500	21	235	.468	.49
March	3,442	200	59	111	.221	.25
April	5,079	1,670	48	169	.337	.38
May	2,389	427	30	77.1	.154	.18
June	16,665	6,720	41	556	1.11	1.23
July	1,692	405	14	54.6	.109	.13
August	1,043	204	11	33.6	.067	.08
September	13,974	3,900	12	466	.928	1.04
Water year 1940–41	53,096	6,720	2	145	.289	3.94
October 1941	23,996	3,210	75	774	1.54	1.78
November	19,271	5,780	169	642	1.28	1.43
December	14,677	3,740	120	473	.942	1.09
Calendar year 1941	109,818	6,720	11	301	.600	8.15
January 1942	19,639	2,090	130	634	1.26	1.45
February	7,057	435	170	252	.502	.52
March	16,628	1,960	215	536	1.07	1.23
April	5,004	311	92	167	.333	.37
May	30,320	5,040	114	978	1.95	2.25
June	8,427	1,300	95	281	.560	.62
July	25,650	3,700	92	827	1.65	1.90
August	5,072	634	48	164	.327	.38
September	6,500	1,840	62	217	.432	.48
Water year 1941–42	182,241	5,780	48	499	.994	13.50

Note—Stage-discharge relation affected by ice Nov. 12-18, Nov. 27 to Dec. 31, 1940; Jan. 1 to Feb. 12, Feb. 17 to Mar. 7, Dec. 11-16, 1941; Jan. 1-11, 21-28, Feb. 16 to Mar. 2, 1942.

Middle River near Indianola, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940–41												
1	5	12	14	45	28	90	62	61	43	253	15	12
2	4	10	13	60	28	100	63	58	79	405	15	39
3	2	10	13	70	29	160	66	57	405	131	14	1,240
4	12	9	10	50	29	200	64	59	857	81	14	1,940
5	7	7	11	40	30	180	64	57	528	59	14	236
6	6	6	12	30	27	140	66	60	277	46	13	126
7	6	6	12	24	24	120	62	55	137	41	12	325
8	5	10	13	22	21	105	59	51	360	39	d11	267
9	3	11	13	20	22	198	60	46	6,720	34	d11	128
10	2	16	13	20	23	147	74	37	3,520	46	d11	35
11	2	22	13	*22	*22	126	73	36	872	70	d11	22
12	3	14	11	25	90	162	69	35	427	51	d15	21
13	3	8	10	28	*2,500	122	62	33	301	41	d20	42
14	4	7	9	32	1,210	108	56	32	333	37	d20	175
15	4	8	9	34	*420	135	58	41	269	41	43	2,370
16	4	10	9	34	297	152	50	182	200	37	75	3,900
17	4	22	9	32	280	132	48	61	150	28	204	1,670
18	4	26	10	28	260	92	494	53	128	23	106	366
19	4	27	10	26	220	99	1,670	46	99	20	143	182
20	4	25	11	25	190	96	672	37	95	20	63	122
21	5	*31	12	30	170	92	319	30	84	19	41	83
22	5	35	14	34	140	91	176	36	74	19	24	66
23	5	41	14	36	100	84	140	204	70	19	19	55
24	5	29	18	34	95	74	106	427	63	18	17	37
25	5	25	22	32	86	69	92	100	58	18	16	48
26	5	27	30	30	83	65	79	72	51	18	16	37
27	5	28	34	28	80	62	77	53	41	17	21	37
28	7	22	38	28	84	63	71	122	57	16	18	35
29	8	18	40	27	.....	60	65	116	137	16	15	41
30	8	16	40	28	.....	59	62	89	230	15	12	317
31	11	.....	40	28	.....	59	.....	43	.....	14	14	.....
1941–42												
1	178	k5,780	198	260	265	360	309	114	200	487	352	93
2	196	k3,680	198	240	247	420	311	159	182	249	242	84
3	75	1,400	189	200	287	508	275	469	157	k2,020	211	78
4	157	764	*178	180	364	590	236	585	143	1,850	193	71
5	k3,210	707	166	160	435	518	213	k857	124	778	167	68
6	1,770	741	154	140	369	433	196	2,910	106	360	152	65
7	892	645	142	130	319	358	187	1,080	416	265	139	62
8	2,490	469	137	140	273	309	173	518	k1,040	211	124	193
9	1,330	373	131	150	234	275	162	377	275	182	116	598
10	820	329	128	175	213	249	152	429	171	157	105	265
11	626	287	125	*195	259	228	143	k3,970	159	143	96	124
12	321	263	125	a220	230	215	139	5,040	167	134	93	91
13	200	295	130	a250	211	217	137	k3,110	208	124	88	88
14	371	279	140	a280	200	240	135	946	131	k939	80	91
15	182	275	145	a320	211	333	134	683	118	184	91	323
16	157	271	150	383	220	460	129	505	110	140	88	249
17	147	253	155	917	200	1,960	123	669	104	110	75	255
18	131	238	152	2,020	180	1,040	117	1,860	95	92	69	k1,840
19	116	225	145	2,090	*170	761	114	990	99	k3,700	62	565
20	522	204	126	1,680	180	555	111	664	346	3,120	58	242
21	1,520	189	120	1,200	190	542	108	578	427	1,440	54	143
22	1,900	187	120	1,000	200	1,020	104	518	273	343	54	122
23	k2,480	180	k1,110	1,100	220	783	99	618	217	271	51	110
24	650	175	3,740	1,150	220	585	92	494	173	371	50	99
25	265	169	2,620	1,150	240	503	110	398	140	600	48	96
26	435	171	1,660	1,000	280	1,210	202	352	416	2,320	124	95
27	846	176	1,020	800	300	575	307	337	383	1,610	634	104
28	582	180	460	700	340	390	238	319	175	1,500	265	99
29	420	182	271	678	.....	343	137	287	572	1,020	629	95
30	293	184	271	438	.....	327	111	265	1,300	492	371	92
31	k714	.....	271	293	.....	321	.....	219	.....	438	191	.....

*Winter discharge measurement made on this day.
(a) No gage-height record; discharge estimated.
(d) Doubtful gage-height record; discharge computed on basis of weather records and records for South River near Ackworth.
(k) Rapidly changing stage on this day.

South River near Ackworth, Iowa

LOCATION.—Wire-weight gage, lat. 41°22'20", long. 93°25'40", in sec. 19, T. 76 N., R. 22 W., at bridge on State Highway 92, 2 miles east of Ackworth, 4½ miles downstream from Otter Creek, and 6 miles east of Indianola.

DRAINAGE AREA.—475 square miles.

RECORDS AVAILABLE.—February 1940 to September 1942.

EXTREMES.—Maximum discharge during 1941-42 year, 9,480 second-feet Nov. 1 (gage height, 18.7 feet, from graph based on gage readings); minimum observed, 8 second-feet Sept. 5; minimum gage height observed, 1.87 feet Aug. 24.

1940-41: Maximum discharge observed, 12,100 second-feet June 9, 1941 (gage height, 20.56 feet), from rating curve extended above 9,000 second-feet; minimum observed, 0.3 second-foot July 21-25, 1940; minimum gage height observed, 1.34 feet Oct. 16, 17, 21, 22, 1940.

REMARKS.—Records fair except those for periods of ice effect, those below 5 second-feet, and those for days of rapidly changing stage, all of which are poor. Gage read twice daily, more often during high stages.

COOPERATION.—Records collected in cooperation with Corps of Engineers, U. S. Army.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Discharge in second-feet				Run-off in Inches
		Maximum	Minimum	Mean	Per square mile	
October 1940	40.5	2.2	1.0	1.31	0.0028	0.003
November	88.3	4	1	2.94	.0062	.007
December	342.5	94	2	11.0	.023	.03
Calendar year 1940						
January 1941	525	50	6	16.9	.036	.04
February	5,642	2,840	18	202	.425	.44
March	2,267	398	20	73.1	.154	.18
April	2,614	831	19	87.1	.183	.20
May	932	324	7	30.1	.063	.07
June	12,953	6,530	14	432	.909	1.01
July	878.7	384	2.1	28.3	.060	.07
August	401.5	254	1.0	13.0	.027	.03
September	10,694	3,990	10	356	.749	.84
Water year 1940-41	37,378.5	6,530	1.0	102	.215	2.92
October 1941	25,981	4,340	28	838	1.76	2.03
November	18,212	8,340	85	607	1.28	1.43
December	9,780	2,780	60	315	.663	.77
Calendar year 1941	90,880.2	8,340	1.0	249	.524	7.11
January 1942	16,150	2,000	80	521	1.10	1.26
February	3,801	306	77	136	.286	.30
March	11,128	2,250	103	359	.756	.87
April	2,685	194	49	89.5	.188	.21
May	14,940	2,690	50	482	1.01	1.17
June	3,800	694	33	127	.267	.30
July	14,933	4,390	16	482	1.01	1.17
August	657	66	9	21.2	.045	.05
September	1,539	294	9	51.3	.108	.12
Water year 1941-42	123,606	8,340	9	339	.714	9.68

Note—Stage-discharge relation affected by ice Nov. 12-18, Nov. 28 to Dec. 9, Dec. 14-22, 1940; Jan. 6 to Feb. 12, Feb. 18 to Mar. 3, Dec. 11-16, 1941; Jan. 1 to Feb. 4, Feb. 16-27, 1942.

South River near Ackworth, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940–41												
1.....	1.3	1.4	2.5	19	22	20	42	18	46	384	2.1	10
2.....	1.2	1.5	2	26	22	30	40	18	35	68	1.6	10
3.....	1.1	1.3	2	30	20	40	43	18	1,030	27	1.5	1,500
4.....	2.1	1.2	2.5	44	22	58	47	18	262	18	1.5	398
5.....	2.1	1.2	2.5	37	22	93	45	18	77	13	6	100
6.....	2.2	1.1	2.5	10	19	45	41	22	45	9	5	37
7.....	1.7	1.1	2.5	7	18	36	39	42	32	5	3.7	96
8.....	1.2	1.2	2.5	8	18	20	36	24	35	7	2.0	110
9.....	1.2	1.6	2.5	6	20	45	37	18	6,530	7	2.0	66
10.....	1.3	2.2	2.6	*6	22	71	52	12	3,230	115	1.8	30
11.....	1.2	3.0	3.0	7	20	69	43	10	482	106	1.8	19
12.....	1.2	1	4.4	8	*200	65	36	10	220	23	5	15
13.....	1.2	1	4.0	9	*2,840	85	33	8	178	14	3.7	109
14.....	1.1	1	3.5	9	1,180	60	30	8	178	7	2.0	103
15.....	1.0	1	3.5	10	*318	218	30	9	126	7	1.5	2,220
16.....	1.0	1	3	14	205	398	27	33	82	6	1.5	3,990
17.....	1.0	1	3	14	156	94	26	18	59	3.7	254	1,080
18.....	1.0	2	4	12	120	50	497	11	46	3.7	49	243
19.....	1.0	3.7	5	10	80	81	831	9	36	2.4	16	78
20.....	1.0	7	6	10	60	80	218	8	30	2.3	5	40
21.....	1.0	7	6	14	50	73	120	7	28	2.1	3.8	29
22.....	1.0	*7	7	50	40	62	66	50	25	3.7	3.4	22
23.....	1.0	5	7	25	35	63	48	89	22	3.7	2.3	20
24.....	1.2	7	7	18	35	63	40	18	20	2.1	2.1	18
25.....	1.2	7	8	18	30	56	33	13	18	2.4	2.1	15
26.....	1.2	6	30	18	28	52	28	8	16	2.6	2.1	12
27.....	1.2	3.8	94	16	22	53	25	9	14	10	2.0	10
28.....	1.4	4	46	16	18	49	22	14	19	10	1.5	16
29.....	2.0	3	33	16	.....	48	20	324	18	7	1.5	14
30.....	1.6	3	23	18	.....	45	19	42	14	4.6	1.0	284
31.....	1.6	.....	18	20	.....	45	.....	26	.....	2.4	13	.....
1941–42												
1.....	151	8,340	114	190	170	314	194	97	52	40	66	10
2.....	61	k3,000	112	160	160	318	179	85	49	30	55	25
3.....	28	724	104	130	170	318	151	587	48	801	43	11
4.....	62	418	*104	110	190	298	129	306	44	609	34	9
5.....	875	950	104	90	245	233	115	k1,290	40	140	28	9
6.....	409	703	87	80	306	247	109	1,220	36	54	26	11
7.....	k1,960	437	82	90	188	262	97	348	33	36	22	46
8.....	k849	276	83	90	112	187	90	224	36	29	22	89
9.....	k2,100	212	77	90	80	146	87	162	36	44	18	243
10.....	k1,540	194	61	100	77	141	81	131	40	35	16	80
11.....	290	201	60	*110	115	125	78	k2,450	282	25	14	38
12.....	143	197	65	130	121	103	81	1,190	207	20	15	25
13.....	106	192	70	150	104	109	83	505	121	16	14	16
14.....	158	179	80	170	112	288	80	222	83	k1,840	23	16
15.....	83	160	90	190	109	209	72	151	58	425	16	27
16.....	61	150	100	250	90	342	66	123	51	83	15	30
17.....	58	145	128	400	80	2,250	63	k1,120	46	40	14	23
18.....	55	136	125	1,000	80	642	62	k2,690	46	31	12	294
19.....	51	155	104	2,000	*90	340	60	570	43	k4,390	11	243
20.....	300	212	92	1,500	100	344	56	308	357	1,480	11	57
21.....	k2,640	167	82	1,000	110	346	55	212	254	630	11	30
22.....	k4,340	126	82	1,050	130	230	55	183	231	338	10	26
23.....	3,720	114	k2,520	1,150	140	185	55	143	205	181	10	22
24.....	916	85	2,780	1,250	140	163	49	117	174	235	9	20
25.....	322	118	661	1,200	130	150	51	99	150	423	9	18
26.....	633	138	581	900	140	1,510	81	83	694	1,220	22	29
27.....	1,030	131	462	750	150	452	153	80	181	611	19	30
28.....	444	123	188	650	162	250	110	74	82	658	42	23
29.....	270	115	160	580	.....	222	82	66	72	248	23	20
30.....	226	114	210	400	.....	207	61	54	49	131	15	19
31.....	k2,100	.....	212	190	.....	197	.....	50	.....	90	12	.....

*Winter discharge measurement made on this day.
(k) Rapidly changing stage on this day.

DES MOINES RIVER BASIN

Lakes in Des Moines River Basin

Springbrook Lake near Guthrie Center, Iowa

LOCATION.—Staff gage, lat. 41°46′, long. 94°28′, in sec. 4, T. 80 N., R. 31 W., at Springbrook State Park, 7 miles northeast of Guthrie Center, Guthrie County, Iowa.

OBSERVER.—W. K. Garrard, 1942.

RECORDS AVAILABLE.—June 1936 to September 1942.

EXTREMES.—1936: Maximum gage height observed during period, 4.04 feet June 13; minimum observed, 2.38 feet Aug. 31.

1936-37: Maximum gage height observed during water year, 4.90 feet Aug. 20; minimum observed, 3.44 feet Sept. 23.

1937-38: Maximum gage height observed during water year, 6.20 feet Sept. 13; minimum observed, 3.36 feet Oct. 13-15.

1938-39: Maximum gage height observed during water year, 6.20 feet Aug. 10; minimum observed, 3.42 feet June 17, 18.

1939-40: Maximum gage height observed during water year, 4.20 feet Feb. 10-12; minimum observed, 3.42 feet July 27, 28.

1940-41: Maximum gage height observed during water year, 4.50 feet Aug. 17; minimum observed, 3.46 feet Oct. 31, Nov. 1, 2, 3.

1941-42: Maximum gage height observed during water year, 7.00 feet July 25; minimum observed, 3.90 feet Aug. 24, 25.

1936-42: Maximum gage height observed, 7.00 feet July 25, 1942; minimum observed, 2.38 feet Aug. 31, 1936.

REMARKS.—Crest of spillway is at gage height 3.94 feet. Gage read once daily.

COOPERATION.—Records collected in cooperation with Iowa State Conservation Commission.

Springbrook Lake near Guthrie Center, Iowa—Continued

Daily Gage height, in Feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940–41												
1	3.58	3.46	3.78	4.02	4.16	4.04	4.02	3.96	3.68	4.12	4.00	3.86
2	3.56	3.46	3.78	4.02	4.16	4.04	4.02	3.94	3.78	4.08	3.98	3.86
3	3.56	3.46	3.78	4.02	4.16	4.04	4.02	3.94	3.88	4.04	3.98	3.84
4	3.56	.....	3.80	4.00	.....	4.04	4.02	3.94	3.88	4.02	3.96	3.84
5	3.56	.....	3.80	4.00	.....	4.04	4.02	3.92	3.88	4.00	3.96	3.82
6	3.56	.....	3.80	4.00	.....	4.04	4.02	3.92	3.90	4.00	3.94	3.82
7	3.54	.....	3.82	4.00	.....	4.08	4.02	3.92	3.90	3.90	3.94	3.80
8	3.54	.....	3.82	4.00	.....	4.10	4.02	3.90	4.04	3.90	3.92	3.78
9	3.54	.....	3.82	4.00	4.14	4.10	4.04	3.90	4.30	3.88	3.90	3.78
10	3.54	.....	3.84	4.00	4.14	4.10	4.04	3.90	4.20	3.88	4.08	3.76
11	3.52	.....	3.84	4.00	4.14	4.08	4.04	3.88	4.10	3.86	4.06	3.76
12	3.54	.....	3.84	4.02	4.12	4.08	4.04	3.88	4.06	3.86	4.04	3.74
13	3.54	.....	3.86	4.02	4.12	4.06	4.04	3.86	4.04	3.84	4.02	3.74
14	3.54	3.74	3.86	4.02	4.12	4.06	4.04	3.86	4.04	3.84	4.00	3.72
15	3.54	3.74	3.86	4.02	4.10	4.04	4.04	3.84	4.04	3.82	3.98	3.84
16	3.54	3.74	3.88	4.02	4.10	4.04	4.04	3.84	4.02	3.82	3.96	4.00
17	3.52	3.74	3.88	4.02	4.10	4.04	4.02	3.82	4.02	3.80	4.50	3.98
18	3.52	3.74	3.88	4.02	4.08	4.02	4.02	3.82	4.00	3.80	4.08	3.96
19	3.52	3.74	3.90	4.02	4.08	4.02	4.02	3.80	4.00	3.78	4.02	3.94
20	3.52	3.74	3.90	4.02	4.08	4.02	4.02	3.80	4.00	3.76	4.02	3.92
21	3.52	3.76	3.90	4.02	4.06	4.02	4.02	3.78	3.98	3.74	4.00	3.90
22	3.52	3.76	3.86	4.02	4.06	4.02	4.02	3.78	3.98	3.74	4.00	3.90
23	3.52	3.76	3.86	4.02	4.06	4.02	4.00	3.76	3.98	3.72	4.00	3.88
24	3.50	3.76	3.88	4.02	4.04	4.02	4.00	3.76	3.96	3.70	3.98	3.88
25	3.50	3.76	3.88	4.02	4.04	4.02	4.00	3.74	3.96	3.70	3.98	3.86
26	3.50	3.76	3.88	4.02	4.04	4.02	4.00	3.74	3.94	3.68	3.96	3.86
27	3.50	3.76	3.88	4.02	4.04	4.02	4.00	3.72	4.00	4.10	3.94	3.84
28	3.48	3.76	3.90	4.04	4.04	4.02	3.98	3.72	4.06	4.06	3.92	3.88
29	3.48	3.76	3.90	4.04	.....	4.02	3.96	3.70	4.06	4.04	3.90	3.88
30	3.48	3.76	3.92	4.06	.....	4.02	3.96	3.70	4.16	4.02	3.88	3.96
31	3.46	.....	4.02	4.10	.....	4.02	.....	3.68	.....	4.00	3.88	.....
1941–42												
1	3.96	4.30	4.00	.....	4.04	4.06	4.16	4.02	4.04	4.04	4.06	4.06
2	3.96	.....	4.00	.....	4.04	4.10	4.14	4.12	4.02	4.02	4.10	4.30
3	3.96	.....	4.00	.....	4.04	4.14	4.14	4.16	4.02	4.02	4.08	4.12
4	4.02	.....	.....	.....	4.04	4.10	4.12	4.12	4.02	4.02	4.06	4.08
5	4.02	.....	.....	.....	4.04	4.08	4.12	4.08	4.02	4.02	4.06	4.08
6	4.02	.....	.....	.....	4.04	4.06	4.10	4.06	4.02	4.02	4.06	4.08
7	4.30	.....	.....	.....	4.04	4.06	4.10	4.06	4.02	4.00	4.06	4.08
8	4.20	.....	.....	.....	4.04	4.06	4.08	4.04	4.02	4.00	4.06	4.30
9	4.10	4.10	.....	.....	4.04	4.06	4.08	4.04	4.02	4.00	4.06	4.20
10	4.02	4.08	.....	.....	4.04	4.06	4.06	4.30	4.02	4.00	4.06	4.15
11	4.00	4.08	.....	.....	4.04	4.06	4.06	4.20	4.02	4.00	4.04	4.12
12	4.00	4.06	.....	.....	4.04	4.06	4.06	4.14	4.04	4.00	4.02	4.10
13	4.00	4.06	.....	.....	4.04	4.06	4.04	4.10	4.04	4.10	4.00	4.12
14	4.00	4.04	.....	.....	4.04	4.08	4.04	4.06	4.04	4.06	4.00	4.12
15	3.98	4.04	.....	.....	4.06	4.10	4.04	4.04	4.02	4.04	4.00	4.10
16	3.98	4.02	.....	.....	4.06	4.08	4.04	4.04	4.02	4.02	3.98	4.10
17	3.98	4.02	.....	.....	4.06	4.20	4.02	4.20	4.02	4.00	3.98	4.08
18	3.96	4.00	.....	.....	4.06	4.24	4.02	4.16	4.04	4.00	3.96	4.08
19	3.96	4.00	.....	.....	4.06	4.28	4.02	4.12	4.04	4.30	3.96	4.06
20	3.96	4.10	.....	.....	4.06	4.30	4.02	4.08	4.04	4.20	3.94	4.06
21	3.96	4.08	.....	.....	4.06	4.30	4.02	4.06	4.04	4.10	3.94	4.06
22	3.96	4.06	.....	.....	4.06	4.26	4.02	4.04	4.04	4.12	3.92	4.06
23	3.96	4.06	.....	.....	4.06	4.26	4.02	4.04	4.02	4.10	3.92	4.04
24	3.98	4.04	.....	.....	4.06	4.26	4.02	4.02	4.02	4.08	3.90	4.04
25	3.98	4.04	.....	.....	4.06	4.30	4.02	4.02	4.04	5.53	3.90	4.04
26	3.98	4.02	.....	.....	4.06	4.36	4.04	4.20	4.04	5.50	4.02	4.06
27	3.98	4.02	.....	.....	4.06	4.24	4.04	4.12	4.02	4.70	4.80	4.06
28	3.98	4.00	.....	.....	4.06	4.20	4.02	4.06	4.02	4.16	4.50	4.06
29	3.96	4.00	.....	.....	.....	4.20	4.02	4.04	4.06	4.08	4.20	4.04
30	3.96	4.00	.....	.....	.....	4.16	4.02	4.04	4.04	4.10	4.14	4.04
31	4.00	.....	.....	.....	.....	4.16	.....	4.04	.....	4.08	4.10	.....

DES MOINES RIVER BASIN

Lakes in Des Moines River Basin

Lake Ahquabi near Indianola, Iowa

LOCATION.—Staff gage, lat. 41°17'20", long. 93°35'25", in NW¼ sec. 23, T. 75 N., R. 24 W., at Lake Ahquabi State Park, 5 miles southwest of Indianola, Warren County, Iowa.

OBSERVER.—W. E. Myers, 1942.

RECORDS AVAILABLE.—June 1936 to September 1942.

EXTREMES.—1936: Maximum gage height observed during period, 4.95 feet June 17; minimum observed, 3.61 feet Sept. 1.

1936-37: Maximum gage height observed during water year, 5.65 feet Feb. 18; minimum observed, 3.72 feet Dec. 8, Feb. 10-11.

1937-38: Maximum gage height observed during water year, 7.43 feet May 25; minimum observed, 3.92 feet Dec. 14, Jan. 16, 17.

1938-39: Maximum gage height observed during water year, 6.58 feet Mar. 11; minimum observed, 4.01 feet Aug. 6.

1939-40: Maximum gage height observed during water year, 4.90 feet May 18, 19; minimum observed, 3.50 feet Dec. 22-25.

1940-41: Maximum gage height observed during water year, 7.65 feet June 9; minimum observed, 4.08 feet Nov. 8, Dec. 14.

1941-42: Maximum gage height observed during water year, 7.02 feet July 19; minimum observed, 4.80 feet Aug. 25.

1936-42: Maximum gage height observed, 7.65 feet June 9, 1941; minimum observed, 3.50 feet Dec. 22-25, 1939.

REMARKS.—Spillway crest found by levels of Aug. 1, 1938, to be at gage height 5.11 feet. Gage read once daily with occasional extra readings during rapidly changing stage.

COOPERATION.—Records collected in cooperation with Iowa State Conservation Commission.

Lake Ahquabi near Indianola, Iowa—Continued

Daily Gage height, in Feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940–41												
1.....	4.32	4.16	4.13	4.30	4.62	5.18	5.17	5.14	5.04	5.17	4.68	4.62
2.....	4.31	4.17	4.13	4.29	4.63	5.22	5.17	5.13	5.03	5.13	4.66	4.70
3.....	4.30	4.15	4.09	4.29	4.64	5.25	5.19	5.12	5.27	5.10	4.64	5.80
4.....	4.29	4.13	4.09	4.28	4.65	5.20	5.20	5.11	5.26	5.08	4.62	5.94
5.....	4.36	4.11	4.09	4.22	.....	5.18	5.18	5.11	5.19	5.06	4.62	5.66
6.....	4.37	4.10	4.11	4.21	.....	5.21	5.17	5.09	5.17	5.04	4.60	5.36
7.....	4.36	4.09	4.11	4.20	.....	5.21	5.16	5.08	5.15	5.03	4.58	5.45
8.....	4.34	4.08	4.11	4.21	4.64	5.20	.....	5.07	5.15	5.02	4.56	5.40
9.....	4.33	4.11	4.11	4.23	4.64	5.20	.....	5.05	6.99	5.00	4.54	5.39
10.....	4.32	4.11	4.10	4.24	4.65	5.26	5.22	5.04	5.76	5.08	4.52	5.32
11.....	4.31	4.14	4.10	4.25	4.65	5.29	5.20	5.03	5.54	5.05	4.50	5.26
12.....	4.30	4.12	4.09	4.25	4.67	5.24	5.20	5.02	5.44	5.02	4.50	5.22
13.....	4.29	4.11	4.09	4.25	5.75	5.24	5.27	5.01	5.36	5.00	4.47	5.29
14.....	4.28	4.10	4.08	4.27	5.48	5.21	5.22	5.01	5.30	4.98	4.45	5.32
15.....	4.26	4.10	4.09	4.28	5.41	5.46	5.19	5.10	5.26	4.96	4.42	6.28
16.....	4.25	4.09	4.21	4.30	5.36	5.35	5.17	5.05	5.21	4.95	4.40	6.56
17.....	4.24	4.09	4.20	4.29	5.34	5.32	5.15	5.02	5.18	4.93	4.76	5.78
18.....	4.23	4.10	4.20	4.27	5.32	5.31	5.52	5.01	5.16	4.91	4.74	5.58
19.....	4.22	4.11	4.21	4.27	5.29	5.30	5.70	5.00	5.16	4.89	4.72	5.46
20.....	4.20	4.14	4.22	4.27	5.27	5.28	5.68	4.99	5.14	4.87	4.70	5.39
21.....	4.19	4.18	4.22	4.26	5.24	5.27	5.60	5.00	5.12	4.86	4.68	5.34
22.....	4.19	4.17	4.23	4.54	5.22	5.26	5.44	5.10	5.10	4.85	4.66	5.29
23.....	4.18	4.17	4.23	4.55	5.22	5.25	5.32	5.08	5.08	4.84	4.65	5.26
24.....	4.17	4.16	4.22	4.55	5.22	5.24	5.28	5.07	5.06	4.82	4.63	5.24
25.....	4.17	4.16	4.23	4.55	5.18	5.22	5.24	5.06	5.04	4.80	4.66	5.22
26.....	4.16	4.15	4.24	4.56	5.18	5.21	5.20	5.04	5.02	4.80	4.64	5.22
27.....	4.15	4.14	4.24	4.58	5.18	5.20	5.18	5.05	5.01	4.78	4.62	5.18
28.....	4.18	4.14	4.24	4.58	5.18	5.20	5.17	5.02	5.00	4.76	4.60	5.20
29.....	4.18	4.13	4.24	4.58	.....	5.19	5.16	5.10	4.98	4.74	4.58	5.17
30.....	4.17	4.13	4.24	4.59	.....	5.18	5.14	5.06	4.97	4.72	4.56	5.44
31.....	4.16	.....	4.24	4.60	.....	5.18	.....	5.06	.....	4.70	4.64	.....
1941–42												
1.....	5.38	6.57	5.26	5.40	5.41	5.36	5.42	5.41	5.14	5.28	5.16	4.89
2.....	5.33	5.68	5.26	5.42	5.39	5.38	5.40	5.38	5.13	5.27	5.18	4.89
3.....	5.31	5.54	5.26	5.42	5.36	5.40	5.39	5.59	5.11	5.36	5.15	4.88
4.....	5.84	5.43	5.28	5.39	5.37	5.42	5.38	5.48	5.10	5.31	5.12	4.86
5.....	5.78	5.55	5.25	5.37	5.37	.....	5.37	6.25	5.08	5.30	5.10	4.85
6.....	5.94	5.51	5.25	5.34	5.38	5.43	5.36	5.85	5.06	5.26	5.09	4.86
7.....	6.02	5.46	5.25	5.30	5.38	5.44	5.35	5.68	5.04	5.22	5.07	4.87
8.....	5.75	5.38	5.25	5.28	5.37	5.42	5.34	5.57	5.02	5.20	5.05	5.54
9.....	6.08	5.36	5.25	5.26	5.37	5.41	5.33	5.52	5.00	5.19	5.03	5.38
10.....	5.85	5.30	5.25	5.24	5.36	5.40	5.32	5.47	5.03	5.18	5.03	5.26
11.....	5.69	5.29	5.25	5.24	5.36	5.40	5.31	6.25	5.35	5.16	5.01	5.23
12.....	5.62	5.28	5.26	5.24	5.36	5.38	5.30	5.69	5.37	5.15	4.99	5.17
13.....	5.54	5.27	5.18	5.24	5.36	5.44	5.30	5.60	5.32	5.14	4.97	5.14
14.....	5.42	5.27	5.18	5.26	5.37	5.45	5.29	5.54	5.27	6.28	5.00	5.13
15.....	5.32	5.26	5.17	5.26	5.38	5.47	5.29	5.43	5.23	5.66	4.98	5.16
16.....	5.27	5.26	5.18	5.30	5.46	5.58	5.32	5.32	5.21	5.47	4.97	5.14
17.....	5.23	5.26	5.18	5.64	5.42	5.57	5.31	5.50	5.19	5.36	4.95	5.27
18.....	5.21	5.25	5.19	5.78	5.39	5.55	5.31	5.44	5.18	5.30	4.94	5.23
19.....	5.20	5.30	5.19	5.69	5.38	5.54	5.30	5.40	5.16	6.56	4.92	5.23
20.....	5.26	5.29	5.18	5.64	5.35	5.52	5.28	5.38	5.34	5.69	4.91	5.18
21.....	5.56	5.29	5.19	5.63	5.34	5.50	5.26	5.36	5.30	5.42	4.90	5.16
22.....	6.11	5.28	5.20	5.63	5.34	5.47	5.25	5.30	5.32	5.30	4.88	5.13
23.....	5.90	5.27	6.27	5.62	5.34	5.45	5.24	5.26	5.28	5.24	4.86	5.10
24.....	5.69	5.27	5.84	5.62	5.34	5.42	5.23	5.25	5.24	5.27	4.83	5.07
25.....	5.51	5.26	5.62	5.62	5.34	5.47	5.30	5.24	5.34	5.36	4.80	5.09
26.....	5.54	5.26	5.66	5.60	5.34	5.56	5.27	5.23	5.35	5.54	4.88	5.09
27.....	5.46	5.26	5.55	5.56	5.34	5.52	5.38	5.22	5.34	5.49	4.88	5.07
28.....	5.39	5.26	5.48	5.51	5.35	5.50	5.36	5.20	5.32	5.37	4.93	5.06
29.....	5.34	5.26	.....	5.49	.....	5.47	5.34	5.18	5.30	5.27	4.92	5.05
30.....	5.36	5.26	5.43	5.47	.....	5.45	5.33	5.16	5.29	5.21	4.91	5.04
31.....	5.79	.....	5.40	5.44	.....	5.43	.....	5.15	.....	5.18	4.90	.....

DES MOINES RIVER BASIN

Lakes in Des Moines River Basin

Lake Wapello near Drakesville, Iowa

LOCATION.—Water-stage recorder, lat. 40°49'15", long. 92°34'25", an eighth of a mile northwest of center of sec. 34, T. 70 N., R. 15 W., at Lake Wapello State Park, 5 miles northwest of Drakesville and 9½ miles northwest of Bloomfield, Davis County, Iowa. Datum of gage is 90.00 feet above datum assumed for this lake. Prior to Nov. 28, 1941, staff gage at site ½ mile west.

DRAINAGE AREA.—7.6 square miles above outlet.

OBSERVER.—J. A. Babcock, 1942.

RECORDS AVAILABLE.—June 1936 to September 1942.

EXTREMES.—1936: Maximum gage height observed during period, 9.78 feet June 10, 11; minimum observed, 7.81 feet Sept. 9, 10, 11.

1936-37: Maximum gage height observed during water year, 10.58 feet Feb. 18, 19; minimum observed, 8.24 feet Dec. 13-26.

1937-38: Maximum gage height observed during water year, 10.05 feet June 25 to July 2; minimum observed, 7.93 feet Feb. 12.

1938-39: Maximum gage height observed during water year, 11.30 feet Mar. 12; minimum observed, 8.62 feet Nov. 1-3.

1939-40: Maximum gage height observed during water year, 9.96 feet May 11; minimum observed, 8.44 feet Dec. 18, Jan. 4-8, Feb. 8.

1940-41: Maximum gage height observed during water year, 12.70 feet June 12; minimum observed, 8.29 feet Dec. 26, 28.

1941-42: Maximum gage height observed during water year, 11.54 feet Oct. 9; minimum, 9.18 feet Sept. 25.

1936-42: Maximum gage height observed, 12.70 feet June 12, 1941; minimum observed, 7.81 feet Sept. 9-11, 1936.

REMARKS.—Crest of spillway is at gage height 10.00 feet. Staff gage read once daily prior to Nov. 28, 1941. Water is diverted from lake for fish rearing ponds below lake outlet.

COOPERATION.—Records collected in cooperation with Iowa State Conservation Commission.

NOTE.—On plate 4-A is shown a photograph of the recorder house at water-level gage on Lake Wapello.

Lake Wapello near Drakesville, Iowa—Continued

Daily Gage height, in Feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940–41												
1	8.74	8.62	8.48	.....	9.00	9.44	9.52	9.90	10.44	10.34	9.38	9.10
2	8.74	8.58	8.48	.....	8.88	9.44	9.52	9.90	10.46	10.34	9.36	9.10
3	8.74	8.58	8.48	.....	8.86	9.44	9.52	9.90	10.66	10.34	9.30	10.00
4	8.74	8.56	8.46	.....	8.86	9.46	9.52	9.90	10.70	10.34	9.26	10.10
5	8.74	8.54	8.46	8.32	8.84	9.48	9.54	.....	10.74	10.36	9.22	10.20
6	8.74	8.54	8.46	8.34	8.84	9.48	9.54	9.94	10.68	10.36	9.20	10.22
7	8.76	8.54	8.46	8.40	8.84	9.48	9.56	9.96	10.48	10.37	9.18	10.24
8	8.76	8.52	8.42	8.46	8.82	9.50	9.55	10.00	10.56	10.34	9.16	10.26
9	8.74	8.52	8.42	8.56	8.94	9.44	9.60	10.00	11.69	10.32	9.16	10.29
10	8.74	8.52	8.40	8.56	8.94	9.44	9.60	10.00	12.40	10.32	9.14	10.29
11	8.74	8.52	8.38	8.56	8.96	9.46	9.62	10.00	12.60	10.32	9.14	10.10
12	8.74	8.54	8.38	8.54	8.96	9.46	9.64	10.00	12.70	10.32	9.14	10.00
13	8.74	8.52	8.38	8.54	9.00	9.46	9.68	10.00	12.60	10.32	9.12	9.96
14	8.76	8.52	8.38	8.56	9.22	9.48	9.70	10.00	12.60	10.26	9.10	9.94
15	8.74	8.50	8.38	8.56	9.34	9.50	9.70	10.00	12.10	10.20	9.08	9.92
16	8.72	8.50	8.38	8.58	9.38	9.48	9.70	10.00	11.60	10.05	9.08	9.92
17	8.72	8.50	8.38	8.60	9.44	9.50	9.76	10.32	11.00	10.00	9.08	9.92
18	8.72	8.46	8.36	8.64	9.44	9.48	9.80	10.32	10.48	9.90	9.14	9.90
19	8.72	8.42	8.36	8.64	9.44	9.48	9.88	10.32	10.38	9.94	9.12	9.88
20	8.74	8.44	8.34	8.68	9.44	9.48	9.90	10 32	10.38	9.94	9.10	9.88
21	8.74	8.48	8.34	8.70	9.44	9.46	9.92	10.32	10.36	9.92	9.08	9.88
22	8.72	8.50	8.34	8.72	9.46	9.48	9.92	10.32	10.36	9.88	9.06	9.88
23	8.70	8.52	8.32	8.72	9.46	9.48	9.92	10.32	10.34	9.80	9.06	9.90
24	8.68	8.52	8.30	8.76	9.48	9.50	9.92	10.32	10.34	9.74	9.08	9.94
25	8.66	8.52	8.30	8.78	9.48	9.50	9.92	10.32	10.34	9.70	9.12	9.96
26	8.66	8.52	8.28	8.80	9.48	9.50	9.92	10.32	10.34	9.64	9.14	9.96
27	8.66	8.50	8.28	8.80	9.46	9.50	9.92	10.32	10.34	9.58	9.14	9.98
28	8.66	8.48	8.28	8.82	9.46	9.50	9.92	10.32	10.34	9.52	9.14	9.98
29	8.66	8.46	.....	8.84	.....	9.48	9.92	10.32	10.34	9.48	9.12	10.04
30	8.64	8.46	.....	8.86	.....	9.50	9.92	10.32	10.34	9.42	9.10	10.06
31	8.64	.....	.....	8.88	.....	9.50	.....	10.34	.....	9.40	9.10	.....
1941–42												
1	10.08	10.18	10.11	10.17	10.11	10.16	10.06	10.00	9.93	9.92	9.94	9.44
2	10.08	10.24	10.11	10.16	10.10	10.17	10.06	9.98	9.93	9.90	9.94	9.43
3	10.10	10.26	10.11	10.15	10.10	10.18	10.06	10.03	9.94	9.91	9.92	9.42
4	10.10	10.28	10.11	10.12	10.09	10.18	10.06	10.02	9.93	9.89	9.90	9.41
5	10.60	10.30	10.10	10.11	10.09	10.18	10.05	10.00	9.93	9.88	9.88	9.39
6	10.90	10.26	10.09	10.10	10.39	10.19	10.07	10.05	9.93	9.84	9.87	9.38
7	11.00	10.28	10.09	10.09	10.37	10.19	10.09	10.03	9.88	9.83	9.85	9.37
8	11.20	10.34	.....	10.08	10.25	10.18	10.07	10.02	9.84	9.83	9.84	9.36
9	11.54	10.30	.....	10.08	10.22	10.16	10.07	10.03	9.81	9.83	9.81	9.37
10	11.00	10.28	.....	10.07	10.18	10.14	10.06	10.02	9.76	9.83	9.80	9.35
11	10.64	10.24	.....	10.07	10.16	10.14	10.06	10.09	9.75	9.81	9.78	9.36
12	10.66	10.20	.....	.....	10.16	10.12	10.04	10.12	9.76	9.81	9.75	9.31
13	10.68	10.20	.....	.....	10.15	10.13	10.04	10.12	9.75	9.80	9.73	9.28
14	10.56	10.16	10.03	.....	10.15	10.17	10.05	10.08	9.72	10.00	9.74	9.27
15	10.44	10.14	10.03	.....	10.17	10.17	10.07	10.09	9.70	10.08	9.73	9.27
16	10.30	10.12	10.03	.....	10.33	10.21	10.06	10.08	9.68	10.06	9.71	9.27
17	10.28	10.12	10.04	10.22	10.33	10.25	10.05	10.06	9.67	10.02	9.66	9.27
18	10.22	10.10	10.04	10.25	10.26	10.21	10.06	10.07	9.66	10.00	9.61	9.27
19	10.18	10.09	10.04	10.22	10.19	10.17	10.03	10.06	9.65	10.12	9.58	9.27
20	10.16	10.08	10.04	10.18	10.17	10.16	10.02	10.06	9.89	10.14	9.56	9.27
21	10.14	10.09	10.04	10.18	10.16	10.15	10.00	10.05	9.97	10.08	9.53	9.27
22	10.09	10.09	10.05	10.17	10.15	10.12	9.99	10.03	9.95	10.06	9.51	9.26
23	10.06	10.10	10.36	10.16	10.15	10.11	9.98	10.02	9.93	10.02	9.49	9.23
24	10.00	10.09	10.45	10.15	10.15	10.11	9.95	10.01	9.92	10.02	9.47	9.21
25	10.04	10.09	10.32	10.15	10.15	10.09	9.96	10.00	9.98	10.03	9.47	9.19
26	10.04	10.08	10.31	10.14	10.15	10.12	9.98	9.98	10.05	10.04	9.47	9.21
27	10.06	10.08	10.26	10.14	10.14	10.10	9.99	9.96	10.04	10.04	9.47	9.21
28	10.12	10.08	10.21	10.13	10.16	10.08	10.01	9.95	10.03	10.01	9.50	9.21
29	10.06	10.11	10.17	10.12	.....	10.07	10.00	9.95	10.00	9.99	9.48	9.21
30	10.08	10.11	10.16	10.12	.....	10.06	10.00	9.92	9.96	9.98	9.48	9.20
31	10.10	.....	10.16	10.12	.....	10.06	.....	9.91	.....	9.95	9.46	.....

Fox River at Cantril, Iowa

LOCATION.—Water-stage recorder, lat. 40°39'20", long. 92°03'30", in SW¼ sec. 30, T. 68 N., R. 10 W., at bridge on State Highway 2, a quarter of a mile upstream from Bone Run and 1 mile northeast of Cantril. Prior to Nov. 8, 1940, wire-weight gage at same site and datum.

DRAINAGE AREA.—161 square miles.

RECORDS AVAILABLE.—August 1940 to September 1942.

EXTREMES.—Maximum discharge during 1941-42 year, 5,220 second-feet Oct. 9 (gage height, 15.42 feet); minimum, 0.8 second-foot Sept. 13-18; minimum gage height, 2.78 feet Sept. 14.

1940-41: Maximum discharge, 3,980 second-feet June 10, 1941 (gage height, 13.70 feet); no flow Aug. 9-16, Aug. 31 to Sept. 3, 1941.

REMARKS.—Records fair except those for periods of ice effect or no gage-height record, and those below 5 second-feet, all of which are poor.

COOPERATION.—Records collected in cooperation with Corps of Engineers, U. S. Army.

NOTE.—On plate 2-B is shown a photograph of the gaging-station structure at Cantril.

Monthly Discharge for Calendar and Water Years, as indicated

Month	Second-foot-days	Discharge in second-feet				Run-off	
		Maximum	Minimum	Mean	Per square mile	Inches	Acre feet
October 1940	139.1	54	0.5	4.49	0.028	0.03	276
November	44.4	5	.7	1.48	.0092	.01	88
December	76.1	8.2	.5	2.45	.015	.02	151
January 1941	293.3	35	1	9.46	.059	.07	582
February	1,212	480	8	43.3	.269	.28	2,400
March	303.3	27	2.8	9.78	.061	.07	602
April	1,436.4	161	7.6	47.9	.298	.33	2,850
May	674.3	162	2.0	21.8	.135	.16	1,340
June	6,611.7	2,780	3.6	220	1.37	1.53	13,110
July	480.3	208	.4	15.5	.096	.11	953
August	9.6	1.3	0	.310	.0019	.002	19
September	2,489.4	1,190	0	83.0	.516	.58	49,40
Water year 1940-41	13,769.9	2,780	0	37.7	.234	3.19	27,310
October 1941	11,426	3,640	13	369	2.29	2.64	22,660
November	4,833	2,700	25	161	1.00	1.12	9,590
December	2,461	658	7	79.4	.493	.57	4,880
Calendar year 1941	32,230.3	3,640	0	88.3	.548	7.46	63,930
January 1942	3,213	512	18	104.	.646	.74	6,370
February	5,942	1,720	25	212	1.32	1.37	11,790
March	3,951	906	39	127	.789	.91	7,840
April	965.0	142	9.0	32.2	.200	.22	1,910
May	746.6	115	3.0	24.1	.150	.17	1,480
June	564.0	145	2.2	18.8	.117	.13	1,120
July	1,682.2	753	2.6	54.3	.337	.39	3,340
August	134.9	78	.9	4.35	.027	.03	268
September	39.6	3.6	.8	1.32	.0082	.009	79
Water year 1941-42	35,958.3	3,640	.8	99.0	.612	8.30	71,330

Fox River at Cantril, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940-41												
1	h0.5	h1.1	b1	b7	b8	8.2	7.6	6.9	3.6	8.2	.4	0
2	h.5	h1.1	b1	b9	b9	11	7.6	6.2	16	8.8	.3	0
3	h.5	h.8	b1	b7	b9	14	17	5.6	482	19	.2	0
4	h.6	h.8	b1	b5	b10	8.8	68	4.3	705	11	.2	5.0
5	h.9	h.8	b1.3	b4	b14	5.0	83	7.6	145	6.9	.2	24
6	h1.3	h.8	1.7	b3	b12	*6.2	59	40	85	4.3	.2	37
7	h2.2	h.8	2.2	b2	b11	3.6	40	46	60	3.6	.1	1,190
8	h.9	.8	2.2	b1.5	b10	2.8	30	27	57	3.6	.1	334
9	h.8	.9	2.2	b*1.2	b9	5.6	83	16	815	4.3	0	120
10	h.8	1.1	2.0	b1.2	b9	8.2	74	9.5	2,780	43	0	66
11	h.9	b.9	1.3	b2.5	b36	9.5	51	6.2	604	22	0	46
12	h.8	b.8	b.5	b3	b100	6.2	32	3.0	198	10	0	34
13	h.7	b.7	b.5	b2.5	b480	7.6	2.6	2.4	113	5.6	0	27
14	h2.8	b.7	b.8	b3	193	6.2	20	2.2	132	3.6	0	23
15	h2.2	b.8	b1	b5	71	9.5	16	2.0	96	208	0	56
16	h2.0	b.8	b1	b8	44	20	17	61	66	97	0	193
17	h1.1	b1.0	b1	b7	30	26	16	162	59	12	.6	142
18	h.9	*1.5	b1	b4	18	27	157	54	38	1.7	1.1	56
19	h.9	1.7	b1.5	b2	20	16	161	22	29	.8	1.3	30
20	h.7	3.0	b1.7	b1	12	10	148	12	24	.7	.7	20
21	h.7	5	b2	b1	14	8.2	92	6.9	19	.7	.6	16
22	h.7	4	b3	b10	16	8.2	57	7.6	16	.7	.5	12
23	h.7	3	b4	b30	16	10	42	28	13	.7	.4	8.8
24	h.7	2.4	b6	b35	15	9.5	35	39	10	.7	.4	7.6
25	h.7	2.0	8.2	b34	14	9.5	26	20	9.5	.6	.5	8.2
26	h.7	1.7	6.9	b28	12	8.8	23	8.8	8.2	.5	.6	7.6
27	h.7	1.7	5.6	b24	10	8.8	16	8.2	7.6	.5	.5	6.2
28	h2.2	1.5	3.6	b22	10	8.2	14	47	8.2	.5	.4	6.2
29	h54	b1.2	3.6	b14	.....	7.6	10	6.9	7.6	.5	.2	5.2
30	h54	b1	3.0	b*9.4	.....	6.9	8.2	3.0	5.0	.4	.1	8.6
31	h2.0	.....	4.3	b7	.....	6.2	.....	3.0	.....	.4	0	2
1941-42												
1	13	2,700	26	63	29	152	38	12	3.6	4.3	2.4	.9
2	78	311	24	b45	b25	124	37	12	3.0	3.0	2.0	.9
3	132	139	*23	b35	b30	*118	32	52	2.8	7.0	1.7	1.3
4	101	98	23	b28	b40	114	27	48	2.4	5.0	1.5	3.6
5	91	174	23	b24	57	111	26	24	2.4	2.8	.9	1.3
6	568	346	19	b21	1,720	106	25	47	2.4	2.6	.9	.9
7	1,590	153	16	b20	531	109	61	34	3.0	2.6	1.1	.9
8	278	87	16	b19	183	114	47	22	5.0	44	78	.9
9	3,640	69	15	b18	119	93	96	14	2.6	13	10	1.1
10	1,180	59	10	b21	91	74	142	11	2.2	18	4.3	1.1
11	149	53	b9	b25	b82	69	53	12	2.6	5.6	2.8	.9
12	83	50	b8	b35	b78	63	38	66	15	3.0	2.6	.9
13	61	49	b7	b50	77	81	36	39	43	3.0	2.2	.8
14	84	43	b7	b75	85	127	31	22	16	753	2.6	.8
15	41	39	b8	b130	142	107	26	16	11	207	2.8	.8
16	39	36	b11	b200	855	906	23	18	7.6	67	2.2	.8
17	38	32	19	b300	*418	410	16	14	6.2	22	1.7	.8
18	37	29	18	512	b220	204	15	115	5.0	9.0	1.3	.8
19	31	30	12	262	b170	140	12	42	3.6	77	1.3	2.2
20	26	a29	10	203	b140	123	10	28	36	196	1.1	2.6
21	22	a27	10	170	b120	100	10	20	145	64	1.1	1.1
22	61	a27	13	168	b110	72	10	16	63	26	1.1	1.1
23	139	a29	563	153	b102	58	10	12	21	15	1.1	1.1
24	60	31	658	146	b100	50	9.0	10	10	10	.9	1.3
25	34	36	168	123	b100	44	10	7.6	20	7.6	.9	1.7
26	284	38	201	98	b100	60	10	7.6	50	70	.9	2.4
27	1,120	35	183	79	b105	58	18	7.6	47	18	1.1	2.2
28	215	30	114	51	113	46	52	6.2	18	12	1.5	2.2
29	90	25	a95	46	.....	40	28	5.0	9.0	7.6	1.1	1.3
30	71	29	a80	54	.....	39	17	3.6	5.6	4.3	.9	.9
31	1,070	.....	72	39	.....	39	.....	3.0	.....	2.8	.9	.....

*Winter discharge measurement made on this day.
(a) No gage-height record; discharge computed on basis of weather records.
(b) Stage-discharge relation affected by ice.
(h) Computed from once-daily wire-weight gage readings.

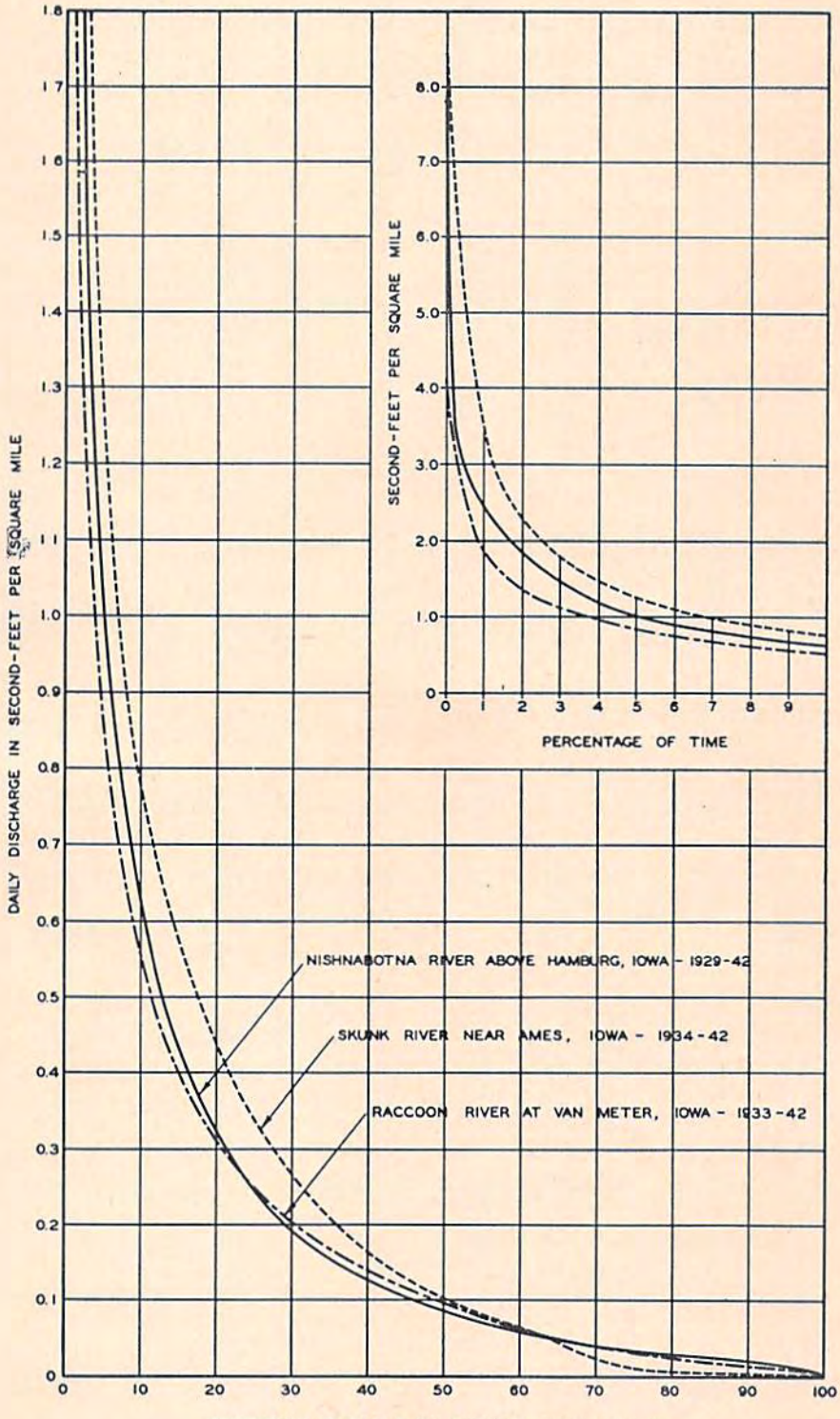


Figure 9.—Duration curves of daily discharge for Nishnabotna River above Hamburg, Raccoon River at Van Meter, and Skunk River near Ames, Iowa.

MISSOURI RIVER BASIN

Missouri River at Sioux City, Iowa

LOCATION.—Water-stage recorder, lat. 42°29′, long. 96°25′, in sec. 17, T. 29 N., R. 9 E., sixth principal meridan (Nebraska land lines), at bridge on U. S. Highway 77 in Sioux City, 2.5 miles downstream from Big Sioux River. Datum of gage is 1,076.96 feet above mean sea level, datum of 1929.

DRAINAGE AREA.—314,600 square miles.

RECORDS AVAILABLE.—September 1928 to September 1931 and October 1938 to September 1942.

AVERAGE DISCHARGE.—7 years, 23,700 second-feet.

EXTREMES.—Maximum discharge during 1941-42 year, 127,000 second-feet June 8 (gage height, 13.77 feet); minimum, 2,500 second-feet Dec. 29 (gage height, -1.40 feet).

1928-31, 1938-41: Maximum discharge observed, 190,000 second-feet Apr. 1, 1929; maximum gage height, 14.35 feet Apr. 3, 1939; minimum discharge, about 3,050 second-feet Jan. 11, 1940 (discharge measurement); minimum gage height, -0.97 foot Dec. 30, 1939.

Maximum stage known, 22.5 feet Apr. 23, 1881.

REMARKS.—Records good except those for periods of ice effect, which are fair. Flow regulated by Fort Peck Reservoir.

COOPERATION.—Records collected in cooperation with Corps of Engineers, U. S. Army, and furnished for this publication by the U. S. Geological Survey office at Rolla, Mo.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Discharge in second-feet				Run-off	
		Maximum	Minimum	Mean	Per square mile	Inches	Acre feet
October 1940	431,950	21,500	9,660	13,930			856,800
November	257,700	14,500	3,900	8,590			511,100
December	241,040	14,100	4,100	7,775			478,100
Calendar year 1940	5,646,990	52,400	3,100	15,430			11,200,000
January 1941	233,500	14,500	6,100	7,532			463,100
February	222,600	13,000	5,900	7,950			441,500
March	433,700	21,200	6,200	13,990			860,200
April	857,100	51,500	19,100	28,570			1,700,000
May	681,400	29,400	20,200	21,980			1,352,000
June	1,601,700	120,000	24,600	53,390			3,177,000
July	846,200	46,800	19,400	27,300			1,678,000
August	687,300	27,000	19,400	22,170			1,363,000
September	781,000	49,100	20,900	26,030			1,549,000
Water year 1940–41	7,275,190	120,000	3,900	19,930			14,430,000
October 1941	698,500	29,000	20,100	22,530			1,385,000
November	521,400	24,200	14,000	17,380			1,034,000
December	248,280	14,000	2,920	8,009			492,500
Calendar year 1941	7,812,680	120,000	2,920	21,400			15,500,000
January 1942	213,400	8,900	4,500	6,884			423,300
February	232,600	9,700	6,600	8,307			461,400
March	652,300	72,500	7,700	21,040			1,294,000
April	867,600	70,600	19,800	28,920			1,721,000
May	2,361,500	123,000	30,200	76,180			4,684,000
June	2,203,000	126,000	40,600	73,430			4,370,000
July	1,165,800	53,500	25,800	37,610			2,312,000
August	784,500	36,800	21,600	25,310			1,556,000
September	728,500	28,800	21,800	24,280			1,445,000
Water year 1941–42	10,677,380	126,000	2,920	29,250			21,180,000

Note—Stage-discharge relation affected by ice Nov. 12-30, Dec. 1-5, 13-30, 1940; Jan. 3 to Mar. 29, 1941; Jan. 1 to Mar. 11, 1942.

Missouri River at Sioux City, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940–41												
1.....	10,000	14,500	6,500	14,500	6,300	6,200	19,100	23,100	28,800	46,800	21,300	22,700
2.....	9,660	14,500	6,600	*13,900	6,700	6,400	20,200	23,600	26,700	37,800	21,100	21,900
3.....	9,660	14,500	6,700	11,600	6,900	7,500	21,700	24,000	26,000	35,200	20,800	21,100
4.....	9,830	14,100	6,800	9,800	7,200	8,400	21,700	24,000	25,800	g35,700	20,900	20,900
5.....	10,000	14,000	7,000	8,600	7,300	9,500	21,300	23,100	24,900	g33,800	20,600	21,300
6.....	11,000	13,600	*7,120	7,100	7,200	11,000	25,100	22,100	24,600	32,900	20,800	21,900
7.....	11,000	13,600	7,120	6,600	6,800	10,800	26,200	21,900	26,500	31,700	19,800	21,900
8.....	11,900	13,400	7,790	6,400	6,600	10,500	25,500	22,300	41,100	30,000	19,400	22,500
9.....	12,200	13,300	8,980	6,400	6,700	10,000	24,900	22,300	g51,500	30,300	19,400	22,100
10.....	12,000	13,600	9,490	6,500	7,200	10,400	24,600	22,500	g46,800	31,400	19,400	21,700
11.....	11,400	13,800	9,320	6,800	7,800	12,000	24,600	21,900	g38,800	29,400	20,000	21,300
12.....	11,200	7,500	*9,320	7,100	8,700	14,200	33,300	20,900	g61,400	29,400	21,500	21,700
13.....	11,400	4,500	7,200	7,000	9,700	16,500	39,900	20,800	97,400	26,700	24,200	22,100
14.....	11,500	4,100	5,500	7,500	11,300	16,400	35,200	20,400	117,000	25,500	27,000	23,600
15.....	11,500	*3,900	4,700	8,000	13,000	14,000	32,100	20,600	120,000	25,500	24,900	g24,600
16.....	11,700	4,000	4,200	7,800	11,900	12,200	33,800	20,600	g108000	25,300	22,700	g36,700
17.....	15,900	4,200	4,100	7,500	10,900	11,800	45,000	20,900	84,200	24,600	21,700	48,500
18.....	20,600	4,500	4,300	7,300	10,000	*11,900	51,500	20,900	65,600	24,400	21,100	49,100
19.....	21,500	4,700	4,700	7,100	9,200	*12,400	41,100	21,100	g55,400	23,800	21,700	37,200
20.....	20,600	5,000	5,400	6,800	8,600	13,000	36,200	21,100	g52,400	23,300	22,100	32,500
21.....	19,400	5,200	5,800	6,700	7,900	13,500	33,300	20,800	g57,200	23,800	22,300	31,700
22.....	18,700	5,400	6,300	6,600	7,300	14,500	30,700	21,100	g63,000	25,800	22,700	27,500
23.....	17,600	5,600	6,900	6,400	6,800	19,500	27,000	21,500	g52,400	25,500	24,600	25,500
24.....	16,800	5,800	7,700	6,300	6,500	21,200	24,600	21,300	g43,000	24,000	26,000	25,300
25.....	15,900	6,500	8,800	6,200	6,200	20,700	23,600	21,500	g40,200	22,300	26,000	24,200
26.....	15,200	6,900	10,000	6,200	*6,000	20,200	23,100	21,100	g38,600	20,800	24,600	23,100
27.....	14,800	7,000	10,700	6,200	5,900	20,700	23,100	20,900	g39,600	20,000	22,900	22,300
28.....	14,800	6,900	11,600	*6,200	6,000	20,700	23,100	20,200	41,600	19,600	22,100	21,500
29.....	15,000	6,600	12,600	6,100	.....	20,000	22,900	20,600	49,100	19,400	21,700	21,900
30.....	14,700	6,500	13,700	6,100	.....	*19,100	22,700	24,900	52,100	g20,200	21,700	22,700
31.....	14,500	.....	14,100	6,200	.....	18,500	.....	29,400	.....	g21,300	22,300	.....
1941–42												
1.....	23,000	23,300	14,000	4,500	6,700	7,700	25,300	30,200	42,000	46,600	26,300	28,200
2.....	21,800	24,200	13,200	h4,900	6,600	7,700	23,100	43,500	43,000	53,500	27,700	28,000
3.....	21,000	21,800	12,700	h5,000	6,600	7,800	21,200	g73,100	40,600	52,900	33,600	27,200
4.....	20,400	19,800	12,300	h4,900	6,900	8,000	20,800	g98,800	65,000	46,600	36,800	27,000
5.....	22,700	18,800	11,800	h4,900	7,200	8,200	22,000	g92,400	g80,000	44,000	36,000	27,700
6.....	21,000	g19,000	11,800	h4,900	7,500	8,400	37,200	g75,600	91,000	41,500	31,700	28,800
7.....	21,500	19,600	11,800	h5,000	7,900	8,800	g42,500	g90,400	116,000	41,000	27,500	27,200
8.....	21,500	18,800	11,400	h5,000	8,200	9,500	44,000	g97,600	126,000	42,000	25,300	24,900
9.....	21,000	18,500	11,100	h5,200	8,500	11,000	g70,600	g92,400	116,000	44,000	24,400	23,300
10.....	20,100	18,300	10,700	h5,400	8,900	13,000	g70,600	g80,600	96,900	43,500	23,500	22,900
11.....	20,100	17,800	9,920	h6,000	9,200	15,000	50,000	g76,000	89,100	40,600	23,300	22,500
12.....	20,100	17,500	6,080	h6,300	9,400	17,300	35,300	g73,100	82,600	38,800	23,100	23,100
13.....	21,500	17,300	4,260	6,800	9,500	17,300	29,300	g77,500	97,600	36,800	24,200	22,500
14.....	23,300	17,000	3,570	7,200	9,600	16,600	26,700	92,400	103,000	33,900	25,100	22,700
15.....	23,900	16,800	3,020	7,500	9,700	15,400	26,500	120,000	89,100	33,600	26,700	22,700
16.....	23,000	16,600	3,130	8,100	9,600	15,000	25,300	123,000	72,500	34,200	26,500	22,900
17.....	22,100	16,600	3,680	8,700	9,400	14,600	23,300	112,000	66,200	34,900	25,800	22,900
18.....	22,400	16,600	5,120	8,900	9,200	14,000	22,000	g96,900	g69,400	36,800	24,400	22,900
19.....	26,300	17,000	6,810	8,700	9,000	13,600	21,600	g93,000	g71,200	38,000	23,100	23,300
20.....	29,000	16,800	8,020	8,700	8,800	14,000	21,000	g103000	g78,100	37,600	22,500	24,600
21.....	27,600	16,300	9,600	8,600	8,600	15,000	21,000	g91,000	g78,800	36,800	22,500	25,100
22.....	26,000	16,100	9,600	8,500	8,400	18,300	21,000	g83,200	67,500	37,200	22,500	24,600
23.....	25,100	15,700	8,640	8,500	8,200	19,300	20,400	77,500	60,000	36,400	22,000	24,000
24.....	23,900	15,200	8,640	8,400	8,100	17,500	20,000	63,800	53,500	34,600	21,800	23,300
25.....	23,000	14,400	8,340	8,400	7,900	41,500	19,800	54,600	48,900	32,600	21,600	23,500
26.....	22,100	14,000	7,870	8,200	7,800	61,200	20,200	g48,300	45,000	31,100	21,600	23,300
27.....	21,000	14,000	6,370	7,800	*7,600	72,500	20,600	g43,000	46,100	29,600	21,800	22,700
28.....	20,700	14,400	5,520	7,400	7,600	60,000	20,800	g42,500	58,800	28,200	22,000	22,200
29.....	21,200	14,800	3,240	7,200	.....	43,500	22,000	g41,000	62,500	26,700	21,800	21,800
30.....	21,200	14,400	2,920	7,000	.....	32,900	23,500	g40,100	46,600	26,000	22,200	22,700
31.....	21,000	.....	3,130	6,800	.....	27,700	.....	g41,000	.....	25,800	27,200	.....

*Winter discharge measurement made on this day.
(g) Computed from graph based on gage readings.
(h) Computed from wire-weight gage reading.

Missouri River at Omaha, Nebr.

LOCATION.—Water-stage recorder, lat. 41°15'40", long. 95°55'15", in sec. 23, T. 15 N., R. 14 E., at Ak-Sar-Ben bridge in Omaha. Datum of gage is 958.24 feet above mean sea level, datum of 1929.

DRAINAGE AREA.—322,800 square miles.

RECORDS AVAILABLE.—September 1928 to September 1942.

AVERAGE DISCHARGE.—14 years, 23,470 second-feet.

EXTREMES.—Maximum discharge during 1941-42 year, 121,000 second-feet June 11 (gage height, 18.30 feet); minimum, 3,420 second-feet Jan. 1 (gage height, 1.23 feet).

1928-41: Maximum discharge, 198,000 second-feet June 7, 1929; maximum gage height, 19.30 feet Apr. 6, 1939; minimum discharge, about 2,200 second-feet Jan. 6, 1937; minimum gage height, 1.56 feet Dec. 14, 1940.

Maximum stage known, 24.65 feet Apr. 25, 1881, present datum (ice jam).

REMARKS.—Records excellent except those for Dec. 23-31, 1941, Jan. 1-3, 28-31, Mar. 1-15, 1942, which are good, and those for periods of ice effect, which are fair. Flow regulated by Fort Peck Reservoir.

COOPERATION.—Records collected in cooperation with Corps of Engineers, U. S. Army, and furnished for this publication by the U. S. Geological Survey office at Rolla, Mo.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Discharge in second-feet				Run-off	
		Maximum	Minimum	Mean	Per square mile	Inches	Acre feet
October 1940	408,410	20,500	9,230	13,170			810,100
November	274,630	13,800	4,260	9,154			544,700
December	248,930	15,800	4,200	8,030			493,700
Calendar year 1940	5,896,170	53,100	3,000	16,110			11,700,000
January 1941	254,170	13,800	6,000	8,199			504,100
February	264,500	16,100	6,700	9,446			524,600
March	491,700	21,500	8,200	15,860			975,300
April	899,000	52,400	17,500	29,970			1,783,000
May	681,400	23,900	19,400	21,980			1,352,000
June	1,614,300	105,000	24,600	53,810			3,202,000
July	892,800	53,800	17,500	28,800			1,771,000
August	688,500	28,200	18,700	22,210			1,366,000
September	818,000	51,100	19,700	27,270			1,622,000
Water year 1940-41	7,536,340	105,000	4,200	20,650			14,950,000
October 1941	727,700	31,800	20,600	23,470			1,443,000
November	557,700	24,400	14,800	18,590			1,106,000
December	303,280	15,800	3,940	9,783			601,500
Calendar year 1941	8,193,050	105,000	3,940	22,450			16,250,000
January 1942	234,290	10,000	3,620	7,558			464,700
February	255,860	11,500	7,440	9,138			507,500
March	731,810	73,700	9,000	23,610			1,452,000
April	965,300	72,700	19,800	30,180			1,796,000
May	2,487,200	114,000	23,800	80,230			4,933,000
June	2,365,600	120,000	49,700	78,850			4,692,000
July	1,338,400	61,400	31,400	43,170			2,655,000
August	851,400	44,200	19,900	27,460			1,689,000
September	742,100	29,500	21,800	24,740			1,472,000
Water year 1941-42	11,500,640	120,000	3,620	31,510			22,810,000

Note—Stage-discharge relation affected by ice Dec. 13, 16-18, 1940; Jan. 19 to Mar. 9, 1941; Jan. 4-27, 1942.

Missouri River at Omaha, Nebr.—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940–41												
1	9,660	13,800	8,020	g12,900	6,700	8,200	17,500	22,100	28,600	53,800	18,700	22,700
2	9,510	13,400	7,630	g13,600	6,800	8,300	18,700	21,500	33,500	51,100	19,400	23,600
3	9,510	13,600	6,640	13,800	7,100	8,800	20,200	22,100	27,500	40,900	19,700	23,300
4	9,370	13,600	6,640	12,900	7,300	9,800	21,800	23,000	25,200	37,600	19,700	21,000
5	9,230	13,200	6,880	10,300	7,700	11,000	22,100	23,900	24,600	36,900	20,000	19,700
6	9,370	12,900	7,500	9,230	7,800	12,000	21,500	23,900	26,900	35,300	20,500	20,200
7	9,660	12,500	8,020	9,090	7,700	g12,700	24,200	23,600	26,200	33,500	20,200	20,200
8	10,100	12,400	8,280	9,660	7,300	15,500	26,900	23,300	27,900	32,400	20,200	21,300
9	10,400	12,900	8,410	8,820	7,100	14,500	26,200	23,000	41,400	31,300	19,200	23,000
10	11,000	12,500	8,820	8,150	7,200	15,600	25,200	23,000	49,700	33,500	19,200	22,700
11	11,500	13,000	9,510	7,630	7,800	g16,800	25,200	23,000	56,000	35,000	19,700	22,400
12	11,400	12,500	10,100	7,500	8,400	g18,000	25,500	22,400	50,600	33,100	20,200	21,300
13	11,200	7,630	7,700	7,630	9,800	g18,200	32,000	21,000	57,800	32,000	20,700	21,000
14	11,000	5,240	5,240	8,150	*14,600	g20,000	38,900	20,700	76,000	29,200	22,400	22,100
15	11,000	4,580	4,580	8,280	15,200	g21,300	37,300	21,000	89,000	27,200	27,500	32,400
16	11,400	4,260	4,300	8,280	16,100	g20,500	34,200	21,800	98,300	26,900	28,200	36,100
17	11,900	4,580	4,200	8,150	14,100	g15,200	35,000	21,300	103,000	25,900	24,900	42,600
18	12,700	5,240	4,400	7,500	12,500	g13,000	43,500	21,300	105,000	24,600	23,900	51,100
19	19,200	5,820	4,910	7,000	11,100	g13,900	52,400	21,800	99,700	23,600	21,800	50,600
20	20,000	6,400	5,020	6,700	10,000	15,800	47,500	22,400	77,800	22,400	21,300	42,600
21	20,500	7,760	5,470	6,500	9,600	16,800	43,100	22,100	61,800	21,500	23,600	34,600
22	19,000	7,130	*6,040	6,300	9,500	13,400	39,300	21,500	60,500	21,500	23,300	32,000
23	17,800	7,000	7,130	6,200	9,400	16,000	35,700	21,300	62,800	21,800	23,900	28,200
24	16,800	6,880	8,410	6,200	9,300	21,500	32,000	21,800	53,800	23,600	25,200	25,200
25	16,000	7,130	9,230	6,200	9,200	21,000	29,200	21,800	44,800	23,000	27,500	25,500
26	15,800	7,380	9,950	6,100	*8,800	20,000	26,900	22,100	39,700	21,800	27,200	24,600
27	15,200	7,630	10,900	6,000	8,200	19,000	25,200	21,800	40,500	20,200	24,200	23,300
28	14,600	7,760	12,000	6,100	8,200	19,000	24,900	21,500	38,000	19,400	21,800	22,400
29	14,600	8,020	12,900	*6,200	.....	19,200	23,900	20,500	39,700	18,500	21,300	21,000
30	14,500	7,890	14,300	6,400	.....	18,700	23,000	19,400	48,000	17,500	21,300	21,300
31	14,500	.....	15,800	6,700	.....	18,000	.....	21,500	.....	17,800	21,800	.....
1941–42												
1	21,800	23,100	15,800	3,620	8,560	9,000	33,100	23,800	49,700	61,400	30,600	g23,600
2	22,200	23,800	15,200	5,070	8,260	9,000	29,500	30,400	58,100	58,900	34,400	g29,500
3	21,200	24,400	14,500	4,500	8,410	9,310	25,800	52,900	53,200	58,900	34,400	29,200
4	21,500	22,800	13,400	5,300	8,850	10,100	22,500	69,500	50,000	55,600	37,000	27,300
5	22,500	20,900	13,400	h5,700	9,000	12,400	20,100	88,500	65,200	50,000	42,000	26,200
6	25,500	20,100	12,600	h5,600	8,560	14,100	g20,400	100,000	81,100	46,900	44,200	27,700
7	27,000	19,800	12,200	h5,600	8,700	g15,200	36,800	100,000	88,700	43,900	38,500	29,500
8	23,800	19,800	12,200	h5,600	8,700	g16,300	44,900	98,500	96,200	42,000	31,800	28,800
9	23,000	19,200	12,000	h5,600	9,160	18,400	47,400	101,000	104,000	45,000	28,800	25,800
10	22,500	18,700	11,500	h5,000	9,000	20,100	64,700	102,000	113,000	44,600	28,000	22,500
11	21,500	18,200	11,100	h5,700	9,620	14,500	72,700	97,400	120,000	45,000	27,300	21,800
12	21,500	17,600	9,780	h6,000	9,780	16,000	55,400	81,900	114,000	43,500	26,600	23,200
13	20,600	17,400	7,980	h6,500	10,100	14,100	39,200	73,200	89,200	41,600	26,200	28,000
14	21,500	17,400	6,530	h6,900	10,400	14,800	32,700	73,600	91,200	39,700	27,700	g25,500
15	23,400	17,100	5,910	h7,400	10,800	15,800	29,500	79,600	93,200	38,200	27,300	g22,100
16	24,800	17,100	5,790	h7,500	11,300	16,000	31,300	86,300	93,200	37,800	27,700	g22,100
17	23,800	16,800	5,670	8,100	11,500	16,500	25,500	95,200	84,400	37,400	28,000	22,100
18	22,800	17,400	5,790	8,500	10,800	16,300	23,400	104,000	75,000	40,100	28,000	22,500
19	22,800	19,000	6,280	9,000	9,310	15,200	22,500	110,000	74,100	51,600	26,200	23,200
20	26,200	20,900	7,300	9,800	8,850	14,800	21,800	114,000	86,800	41,200	24,000	24,400
21	31,800	19,800	9,310	10,000	8,560	15,000	20,400	110,000	87,700	42,000	22,100	25,100
22	31,300	19,000	10,900	9,800	8,560	15,800	19,800	108,000	86,300	42,000	21,000	25,100
23	25,800	17,900	12,600	9,800	8,560	19,200	19,800	106,000	77,300	41,200	21,800	24,700
24	22,800	17,100	11,800	9,800	7,440	22,800	20,400	96,200	67,400	44,600	21,000	23,200
25	21,800	16,300	11,300	9,700	7,440	22,800	20,900	76,900	61,800	40,800	20,700	22,900
26	21,800	15,500	10,900	9,700	7,980	47,900	20,900	62,700	55,600	37,000	21,400	23,200
27	23,100	14,800	10,300	9,700	8,660	65,300	20,600	53,600	54,000	34,400	21,000	24,000
28	22,200	14,800	8,410	9,780	9,000	73,700	20,600	50,400	52,800	34,000	22,100	23,600
29	21,800	15,200	4,840	*9,780	.....	67,900	20,900	48,500	74,100	35,900	21,000	23,200
30	22,500	15,800	3,940	9,620	.....	52,900	21,800	46,900	68,300	31,400	20,700	22,100
31	22,800	.....	4,050	9,620	.....	40,600	.....	46,200	.....	31,800	19,900	.....

*Winter discharge measurement made on this day.
(g) Computed from graph based on gage readings.
(h) Computed from wire-weight gage readings.

Missouri River at Nebraska City, Nebr.

LOCATION.—Water-stage recorder, lat. 40°40'35", long. 95°50'10", in SW¼ sec. 10, T. 8 N., R. 14 E., at Waubonsie Highway Bridge at Nebraska City. Datum of gage is 903.94 feet above mean sea level, datum of 1929.

DRAINAGE AREA.—414,400 square miles.

RECORDS AVAILABLE.—August 1929 to September 1942.

AVERAGE DISCHARGE.—13 years, 27,450 second-feet.

EXTREMES.—Maximum discharge during 1941-42 year, 134,000 second-feet May 21 (gage height, 18.40 feet); minimum, about 5,800 second-feet Jan. 4; minimum gage height observed, 3.1 feet Jan. 1, 3.

1929-41: Maximum discharge, 149,000 second-feet Apr. 6, 1939; maximum gage height, 17.90 feet July 12, 1938; minimum discharge, 3,230 second-feet Dec. 13, 14, 1932; minimum gage height observed, 1.2 feet Jan. 1, 1940.

Maximum stage known prior to 1929, 18.0 feet Apr. 27, 1881.

REMARKS.—Records good prior to Oct. 1, 1941 and excellent thereafter except those for periods of ice effect, which are fair. Flow regulated by Fort Peck Reservoir.

COOPERATION.—Records collected in cooperation with Corps of Engineers, U. S. Army, and furnished for this publication by the U. S. Geological Survey office at Rolla, Mo.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Discharge in second-feet				Run-off	
		Maximum	Minimum	Mean	Per square mile	Inches	Acre feet
October 1940	446,700	21,700	10,700	14,410			886,000
November	358,900	17,600	4,480	11,960			711,900
December	300,720	17,000	4,380	9,701			596,500
Calendar year 1940	7,015,890	61,100	3,700	19,170			13,920,000
January 1941	331,550	21,700	6,220	10,700			657,600
February	404,700	30,800	9,800	14,450			802,700
March	648,800	28,900	11,300	20,930			1,287,000
April	1,033,100	58,600	19,800	34,440			2,049,000
May	779,300	30,800	21,500	25,140			1,546,000
June	1,752,100	105,000	24,700	58,400			3,475,000
July	966,800	55,800	20,100	31,190			1,918,000
August	702,600	26,900	20,200	22,660			1,394,000
September	907,400	56,600	21,700	30,250			1,800,000
Water year 1940–41	8,632,670	105,000	4,380	23,650			17,120,000
October 1941	813,500	37,600	22,300	26,240			1,614,000
November	633,100	26,800	17,200	21,100			1,256,000
December	424,630	20,800	8,060	13,700			842,200
Calendar year 1941	9,397,580	105,000	6,220	25,750			18,640,000
January 1942	318,200	17,200	5,800	10,260			631,100
February	384,200	16,000	11,400	13,720			762,000
March	934,100	71,200	13,200	30,130			1,853,000
April	1,008,200	63,700	22,300	33,610			2,000,000
May	2,770,600	133,000	26,500	89,370			5,495,000
June	2,774,900	127,000	50,200	92,500			5,504,000
July	1,555,200	83,000	33,000	50,170			3,085,000
August	935,700	45,700	24,500	30,180			1,856,000
September	949,600	41,300	25,900	31,650			1,884,000
Water year 1941–42	13,501,930	133,000	5,800	36,990			26,780,000

Note—Stage-discharge relation affected by ice Jan. 22 to Feb. 15, Feb. 19-28, 1941; Jan. 1-27, 1942.

Missouri River at Nebraska City, Nebr.—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940–41												
1	11,400	16,800	g10,100	21,700	9,800	11,300	20,600	27,600	24,700	55,800	20,200	22,700
2	11,300	16,800	g9,820	20,000	10,100	12,600	19,800	26,500	33,400	55,800	20,600	23,500
3	11,000	16,100	g7,960	19,400	10,500	14,200	20,800	27,000	41,600	48,200	21,000	24,200
4	11,100	16,000	g6,350	17,000	10,400	13,400	22,300	27,000	37,500	41,300	22,300	23,600
5	11,000	15,800	g7,140	11,900	10,800	14,200	24,000	30,000	34,500	37,900	22,100	21,700
6	10,700	15,400	9,820	8,940	11,400	17,000	24,000	28,400	35,400	36,700	22,300	22,700
7	10,800	15,400	12,000	8,940	11,600	18,800	25,000	27,800	36,300	36,200	22,100	26,000
8	11,100	15,100	12,000	9,240	10,800	21,300	28,600	26,500	33,700	34,800	21,900	26,700
9	11,600	15,600	12,300	10,500	11,100	24,000	29,400	25,200	42,700	33,800	21,500	25,800
10	12,000	17,600	12,200	9,960	12,600	22,800	30,000	24,700	54,600	34,600	20,800	25,800
11	13,100	17,200	11,900	10,100	13,900	25,700	30,300	25,000	64,800	36,200	20,800	25,400
12	13,100	15,600	11,900	10,500	14,900	28,900	30,000	24,200	60,500	35,600	21,000	24,600
13	13,000	13,000	11,600	11,000	17,200	25,000	31,100	23,700	56,400	34,100	20,600	22,700
14	12,800	g6,480	g7,280	11,000	20,200	23,500	39,800	22,600	70,700	32,800	21,000	23,400
15	12,200	g4,800	g4,900	11,900	19,200	23,700	43,000	22,300	81,100	29,800	22,500	34,100
16	12,000	g4,480	g4,380	12,000	22,600	24,700	40,500	22,600	87,500	28,400	25,000	43,300
17	13,000	g5,960	g4,800	12,300	30,800	22,600	40,800	22,800	101,000	27,400	24,400	44,300
18	13,000	7,000	g5,240	g8,800	24,700	18,600	46,500	21,900	102,000	26,000	24,000	56,200
19	16,100	8,940	g5,840	g6,220	*16,300	17,600	57,800	21,700	105,000	26,000	22,500	56,600
20	21,700	8,520	g5,960	*g6,870	15,200	19,000	58,600	22,800	101,000	25,800	21,200	50,900
21	21,700	10,100	g5,960	g7,280	14,900	21,900	51,100	24,000	74,900	24,600	22,100	39,700
22	20,200	10,400	6,350	g8,100	14,200	20,800	46,500	28,400	62,300	24,600	23,600	33,800
23	19,000	11,000	7,140	g8,900	13,000	19,000	43,000	30,800	62,800	23,600	23,800	30,200
24	18,000	10,500	8,380	g8,800	13,400	21,300	40,100	27,600	63,700	24,000	24,200	27,400
25	17,400	11,300	10,400	g8,700	12,500	26,000	36,600	27,000	56,200	24,400	25,800	26,100
26	16,800	11,400	12,000	g8,500	g10,700	24,400	33,700	25,700	47,500	23,200	26,900	25,800
27	16,300	11,000	13,100	g8,400	*10,800	24,200	31,400	24,700	47,500	22,900	26,100	25,000
28	16,500	10,400	14,200	g8,300	11,100	23,200	30,000	24,000	44,000	21,500	24,200	25,200
29	16,500	9,820	16,000	g8,400	.....	24,000	29,400	23,200	42,000	20,600	22,900	25,000
30	16,000	10,400	16,700	*8,700	.....	23,000	28,400	22,100	46,800	20,100	22,500	25,000
31	16,300	.....	17,000	9,200	.....	22,100	.....	21,500	.....	20,100	22,700	.....
1941–42												
1	24,500	25,300	18,200	g7,000	15,400	13,200	44,500	26,500	50,200	83,000	31,900	25,900
2	25,300	25,000	18,200	g6,200	14,400	13,600	40,200	30,200	57,400	74,600	31,900	29,600
3	24,800	26,800	17,200	g6,000	13,600	13,900	36,500	46,900	65,500	71,600	33,900	32,500
4	23,900	26,200	16,600	g5,800	13,600	15,200	31,200	60,500	57,000	68,000	33,600	32,800
5	24,200	25,000	16,200	g6,000	14,600	22,900	27,400	73,600	61,800	63,200	38,400	38,700
6	27,700	23,400	16,000	g6,100	14,900	32,600	25,600	88,900	82,000	58,600	45,700	38,100
7	37,600	21,800	15,200	g6,200	14,900	34,300	30,200	94,900	92,500	55,200	42,200	38,700
8	32,200	21,300	15,400	g6,300	14,700	28,900	46,100	96,800	96,800	53,800	g37,500	41,300
9	28,300	20,600	15,600	g6,400	14,200	25,900	44,500	98,000	104,000	54,500	32,800	40,600
10	26,500	20,800	15,600	g6,400	14,600	35,000	55,200	103,000	113,000	55,500	31,300	37,800
11	24,500	20,600	14,900	g6,500	14,400	29,600	63,700	108,000	121,000	53,100	30,800	34,200
12	23,100	20,100	13,400	g6,700	13,200	27,700	60,000	105,000	126,000	50,400	29,100	33,300
13	22,600	20,300	11,700	g7,000	13,700	25,600	46,900	95,500	121,000	48,000	28,000	33,600
14	22,300	g19,800	10,100	g7,500	14,600	23,400	38,700	93,700	99,400	46,100	29,100	36,900
15	23,400	g19,800	8,680	g8,000	14,700	22,900	34,700	95,500	101,000	43,500	29,400	31,100
16	25,600	19,800	8,680	g8,500	15,600	21,800	34,000	101,000	102,000	41,900	29,400	28,300
17	26,500	19,100	8,800	g8,800	16,000	21,000	32,900	106,000	95,500	40,900	29,400	28,000
18	25,300	18,400	9,180	g9,500	14,700	20,600	28,300	114,000	86,600	41,600	29,900	g28,000
19	24,500	20,100	10,800	10,100	12,900	20,100	26,800	121,000	80,900	58,300	29,400	g26,900
20	25,000	24,800	12,000	11,000	12,300	19,600	25,600	129,000	107,000	50,100	28,300	g27,400
21	30,600	25,600	12,300	12,000	12,500	19,800	24,500	133,000	120,000	45,100	26,400	g28,800
22	37,600	22,900	14,400	12,700	12,500	19,800	22,600	128,000	127,000	44,400	25,300	g29,600
23	31,200	20,800	20,800	14,000	12,600	20,600	22,300	125,000	115,000	43,500	25,300	g29,400
24	28,300	19,600	18,900	16,000	12,000	22,900	22,900	121,000	93,100	44,100	25,100	g28,800
25	26,200	18,000	16,600	17,000	11,400	24,800	23,100	108,000	86,600	47,400	24,800	28,600
26	24,200	17,400	14,600	16,800	11,400	38,700	23,400	83,700	76,300	40,300	26,400	28,600
27	23,700	17,400	13,200	16,500	12,000	64,100	22,900	68,800	73,700	37,800	26,700	28,600
28	23,700	17,200	12,200	*16,200	12,800	71,200	23,700	59,600	77,600	35,100	28,600	28,300
29	22,600	17,600	11,700	17,000	.....	71,200	24,800	55,200	93,800	37,200	26,100	g28,000
30	23,400	17,600	g9,430	17,200	.....	61,400	25,000	51,000	91,200	35,400	24,500	g27,200
31	24,200	.....	g8,060	16,800	.....	51,800	.....	49,300	.....	33,000	24,500	.....

*Winter discharge measurement made on this day.
(g) Computed from graph based on gage readings.

Big Sioux River at Akron, Iowa

LOCATION.—Water-stage recorder, lat. 42°49'40", long. 96°33'50", in W. ½ sec. 31, T. 93 N., R. 48 W., 300 feet downstream from county highway bridge in Akron and 2½ miles upstream from Union Creek. Datum of gage is 1,118.90 feet above mean sea level, datum of 1929.

DRAINAGE AREA.—8,851 square miles.

RECORDS AVAILABLE.—October 1928 to September 1942.

AVERAGE DISCHARGE.—14 years, 594 second-feet.

EXTREMES.—Maximum discharge during 1941-42 year, 21,400 second-feet June 4 (gage height, 19.23 feet); minimum, 18 second-feet (estimated) Jan. 6, 7; minimum gage height, 1.12 feet Dec. 10.

1928-41: Maximum discharge, 14,000 second-feet Mar. 15, 1929; maximum gage height, 18.63 feet Mar. 15, 1929; Mar. 12, 1936; minimum discharge, 7 second-feet Feb. 26-28, 1936.

A stage of 19.4 feet, from floodmarks, occurred on Sept. 18, 1926.

REMARKS.—Records good except those for periods of ice effect, which are poor, and those above 15,000 second-feet, which are fair.

COOPERATION.—Records collected in cooperation with Corps of Engineers, U. S. Army and U. S. Weather Bureau.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-feet-days	Discharge in second-feet				Run-off	
		Maximum	Minimum	Mean	Per square mile	Inches	Acre feet
October 1940	1,181	57	33	38.1	0.0043	0.005	2,340
November	1,768	76	43	58.9	.0067	.007	3,510
December	1,788	82	46	57.7	.0065	.007	3,550
Calendar year 1940	152,678	9,670	33	417	.047	.64	302,900
January 1941	2,139	83	55	69.0	.0078	.009	4,240
February	8,219	1,640	67	294	.033	.03	16,300
March	99,733	5,580	137	3,217	.363	.42	197,800
April	54,567	4,320	967	1,819	.206	.23	108,200
May	14,832	885	256	478	.054	.06	29,420
June	13,044	1,900	206	435	.049	.05	25,870
July	6,807	700	113	220	.025	.03	13,500
August	1,793	107	37	57.8	.0065	.007	3,560
September	1,161	60	30	38.7	.0044	.005	2,300
Water year 1940-41	207,032	5,580	30	567	.064	.86	410,600
October 1941	2,090	229	33	67.4	.0076	.009	4,150
November	2,380	96	62	79.3	.0090	.01	4,720
December	2,661	122	55	85.8	.0097	.01	5,280
Calendar year 1941	209,426	5,580	30	574	.065	.87	415,300
January 1942	1,540	102	18	49.7	.0056	.006	3,050
February	2,449	102	76	87.5	.0099	.01	4,860
March	11,142	1,860	90	359	.041	.05	22,100
April	12,171	1,680	170	406	.046	.05	24,140
May	93,551	7,190	615	3,018	.341	.39	185,600
June	142,500	20,000	1,150	4,750	.537	.60	282,600
July	45,166	4,990	507	1,457	.165	.19	89,590
August	79,945	15,400	456	2,579	.291	.34	158,600
September	73,850	8,260	1,170	2,462	.278	.31	146,500
Water year 1941-42	469,445	20,000	18	1,286	.145	1.98	931,200

Note—Stage-discharge relation affected by ice Nov. 11 to Dec. 31, 1940; Jan. 1 to Mar. 7, Dec. 10-14, 26-31, 1941; Jan. 1 to Mar. 9, 1942.

Big Sioux River at Akron, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940–41												
1	36	43	53	83	68	137	4,000	885	258	700	107	37
2	37	43	51	82	68	206	4,320	820	256	477	99	37
3	35	46	46	74	68	2,080	3,880	776	312	434	97	38
4	34	50	50	55	70	2,320	3,080	837	380	368	91	39
5	35	53	53	65	72	1,920	2,290	767	346	310	86	36
6	f57	48	55	72	72	1,590	1,810	716	330	270	82	35
7	h40	57	60	*70	68	1,510	1,570	651	306	249	74	35
8	h38	60	62	65	67	2,130	1,450	609	292	223	70	40
9	h40	61	67	61	70	3,810	1,400	561	273	202	67	37
10	h39	62	64	62	68	4,500	1,360	527	262	202	64	37
11	h40	61	62	65	68	4,840	1,320	510	260	196	61	36
12	h40	53	61	70	102	5,430	1,270	488	275	187	57	34
13	h39	55	37	72	1,110	5,340	1,240	469	306	185	54	34
14	h41	47	46	77	1,640	4,640	1,360	455	382	185	51	43
15	38	51	46	77	1,000	3,770	1,440	445	314	183	48	60
16	39	55	47	76	591	3,220	1,410	434	281	181	47	80
17	38	60	48	74	474	2,800	1,520	405	262	181	55	51
18	37	64	47	61	442	2,320	1,410	390	237	178	51	44
19	37	68	47	67	344	2,030	1,370	380	219	176	47	39
20	36	70	51	68	277	1,620	1,620	378	206	174	44	34
21	36	71	51	68	249	2,450	1,990	375	206	172	44	33
22	35	68	53	68	231	4,400	1,910	358	910	170	44	35
23	35	*58	54	67	210	4,930	2,070	332	962	166	43	33
24	35	60	60	67	193	5,410	1,920	314	330	164	41	36
25	35	64	64	67	*172	5,580	1,630	308	253	154	41	33
26	34	76	68	67	150	4,790	1,440	295	299	130	40	30
27	33	68	72	68	141	3,580	1,300	290	606	122	39	32
28	41	64	74	67	134	3,060	1,170	277	351	122	38	31
29	41	70	77	68	.....	2,960	1,050	264	f1,470	118	37	32
30	39	62	80	68	.....	2,950	967	260	1,900	115	37	40
31	41	.....	82	68	.....	3,410	.....	256	.....	113	37	.....
1941–42												
1	33	72	86	60	85	90	f874	f1,370	5,280	4,940	8,200	4,090
2	36	70	85	40	90	95	f741	f895	6,620	4,990	15,400	3,280
3	43	70	80	33	97	105	f678	f796	12,500	4,050	10,100	4,180
4	46	71	*83	25	102	130	f633	735	20,000	2,480	6,450	6,620
5	107	76	86	20	100	135	f582	615	15,200	2,110	3,270	8,260
6	229	74	80	18	99	140	535	1,090	10,500	1,830	2,400	5,610
7	137	77	80	18	90	145	499	2,730	8,500	1,560	2,040	2,890
8	104	76	83	20	88	155	453	2,040	6,870	1,380	1,760	2,240
9	102	70	72	22	87	165	423	2,160	5,260	1,620	1,560	1,880
10	89	67	60	23	85	178	400	2,000	3,820	1,290	1,390	1,650
11	85	71	55	26	85	185	373	2,120	2,950	1,060	1,250	1,480
12	77	78	65	29	84	159	351	3,330	2,460	964	1,130	1,380
13	74	83	75	29	90	152	332	3,800	2,570	894	1,090	1,370
14	71	82	85	29	95	157	317	4,220	1,900	818	1,040	1,390
15	61	80	94	*27	100	166	303	4,730	1,920	775	967	1,420
16	54	77	101	30	91	174	292	4,820	1,760	729	929	1,260
17	47	77	104	36	76	170	268	4,590	1,510	686	891	1,170
18	47	83	109	40	76	161	258	3,560	1,580	655	832	1,260
19	47	96	109	48	*82	163	247	2,820	2,390	629	772	2,210
20	48	94	122	50	83	179	229	2,660	2,940	605	718	3,210
21	50	88	107	54	84	198	214	2,680	2,250	590	670	3,570
22	55	86	99	65	83	*208	204	2,840	1,770	551	637	2,420
23	53	62	96	83	83	208	195	3,020	1,860	530	592	1,860
24	46	86	93	77	83	216	189	2,610	1,640	507	551	1,580
25	43	89	83	80	82	290	183	2,580	1,370	598	517	1,420
26	46	83	78	83	82	524	183	2,120	1,250	598	492	1,310
27	47	82	74	85	82	928	170	2,680	1,150	538	479	1,230
28	43	86	82	93	85	1,500	170	4,520	3,670	1,010	456	1,190
29	51	88	82	100	.....	f1,860	195	6,930	5,700	789	962	1,230
30	54	86	78	102	.....	f1,250	1,680	7,190	5,310	1,830	5,540	1,190
31	65	.....	75	95	.....	f956	.....	5,300	.....	3,560	6,860	.....

*Winter discharge measurement made on this day.
(f) Computed from partly estimated gage heights.
(h) Computed from float gage readings.

Big Sioux River at Akron, Iowa—Continued

Table 11.—Gage height, in feet, and discharge in second-feet, at indicated time, May 25—June 11, 1942

HOUR	May 25		May 26		May 27		May 28		May 29		May 30	
	Feet	Sec.-ft.	Feet	Sec.-ft.	Feet	Sec.-ft.	Feet	Sec.-ft.	Feet	Sec.-ft.	Feet	Sec.-ft.
2	9.57	2,610	9.04	2,370	8.10	1,960	11.49	3,660	13.87	5,710	15.74	7,940
4	9.60	2,620	8.92	2,310	8.32	2,050	11.72	3,820	14.07	5,930	15.73	7,920
6	9.61	2,620	8.81	2,260	8.66	2,200	11.96	3,990	14.28	6,160	15.67	7,840
8	9.61	2,620	8.70	2,220	9.04	2,370	12.17	4,160	14.50	6,400	15.58	7,720
10	9.61	2,620	8.59	2,170	9.41	2,530	12.37	4,320	14.72	6,660	15.47	7,580
N	9.61	2,620	8.49	2,120	9.71	2,680	12.56	4,470	15.07	7,080	15.32	7,390
2	9.57	2,610	8.39	2,080	10.08	2,860	12.73	4,630	15.26	7,310	15.17	7,200
4	9.53	2,590	8.30	2,040	10.37	3,000	12.95	4,820	15.40	7,490	14.98	6,880
6	9.46	2,560	8.22	2,010	10.58	3,120	13.20	5,050	15.51	7,630	14.85	6,820
8	9.37	2,520	8.14	1,980	10.84	3,270	13.42	5,260	15.61	7,760	14.61	6,530
10	9.27	2,470	8.07	1,950	11.06	3,410	13.59	5,430	15.67	7,840	14.37	6,260
M	9.16	2,420	8.06	1,940	11.27	3,530	13.71	5,550	15.72	7,910	14.18	6,050

	May 31		June 1		June 2		June 3		June 4		June 5	
2	13.98	5,830	13.23	5,080	14.04	5,890	15.40	7,490	19.19	21,200	18.49	17,600
4	13.78	5,620	13.24	5,090	14.18	6,050	15.53	7,660	19.22	21,300	18.39	17,200
6	13.64	5,480	13.25	5,100	14.31	6,190	15.67	7,840	19.16	21,000	18.30	16,700
8	13.54	5,380	13.28	5,120	14.45	6,340	15.83	8,060	19.10	20,700	18.20	16,200
10	13.46	5,300	13.29	5,130	14.58	6,500	16.10	8,480	19.05	20,400	18.10	15,700
N	13.38	5,220	13.31	5,150	14.69	6,630	16.47	9,180	19.00	20,200	18.01	15,200
2	13.31	5,150	13.35	5,190	14.79	6,750	17.12	10,900	18.93	19,800	17.91	14,800
4	13.25	5,100	13.39	5,230	14.88	6,860	17.89	14,600	18.86	19,500	17.82	14,300
6	13.23	5,080	13.58	5,420	15.02	7,020	18.58	18,100	18.80	19,200	17.74	13,900
8	13.21	5,060	13.68	5,520	15.11	7,130	18.88	19,600	18.73	18,800	17.65	13,400
10	13.21	5,060	13.78	5,620	15.20	7,240	19.13	20,800	18.66	18,500	17.57	13,000
M	13.21	5,060	13.90	5,740	15.29	7,350	19.05	20,400	18.58	18,100	17.49	12,600

	June 6		June 7		June 8		June 9		June 10		June 11	
2	17.41	12,200	16.51	9,260	15.51	7,630	14.09	5,950	12.47	4,400	10.71	3,200
4	17.34	11,900	16.44	9,120	15.39	7,480	13.97	5,820	12.31	4,270	10.61	3,140
6	17.26	11,500	16.37	8,980	15.30	7,360	13.84	5,680	12.17	4,160	10.53	3,090
8	17.19	11,200	16.30	8,840	15.17	7,200	13.72	5,560	12.02	4,040	10.46	3,050
10	17.11	10,800	16.24	8,730	15.05	7,060	13.59	5,430	11.86	3,920	10.37	3,000
N	17.04	10,600	16.14	8,550	14.92	6,900	13.46	5,300	11.72	3,820	10.29	2,960
2	16.96	10,400	16.06	8,420	14.79	6,750	13.32	5,160	11.56	3,710	10.20	2,920
4	16.88	10,100	15.96	8,260	14.68	6,620	13.18	5,030	11.40	3,610	10.08	2,860
6	16.80	9,920	15.88	8,130	14.57	6,483	13.03	4,900	11.25	3,520	9.97	2,800
8	16.73	9,750	15.78	7,990	14.44	6,330	12.89	4,770	11.10	3,430	9.86	2,750
10	16.66	9,590	15.69	7,870	14.32	6,200	12.76	4,650	10.97	3,350	9.77	2,700
M	16.59	9,440	15.60	7,750	14.21	6,080	12.62	4,530	10.83	3,270	9.64	2,660

Big Sioux River at Akron, Iowa—Continued

Table 11.—Gage height, in feet, and discharge, in second-feet, at indicated time July 29—Aug. 9, 1942—Continued.

HOUR	Feet	Sec.-ft.	Feet	Sec.-ft.	Feet	Sec.-ft.	Feet	Sec.-ft.	Feet	Sec.-ft.	Feet	Sec.-ft.
	July 29		July 30		July 31		Aug 1		Aug 2		Aug 3	
2	4.94	848	5.21	932	10.52	3,080	12.79	4,680	18.19	16,200	17.45	12,400
4	4.86	826	5.14	913	10.80	3,250	13.05	4,920	18.26	16,500	17.35	12,000
6	4.79	808	5.34	967	10.89	3,300	13.40	5,240	18.27	16,600	17.25	11,400
8	4.75	797	6.22	1,250	10.99	3,360	13.82	5,660	18.25	16,400	17.14	11,000
10	4.72	789	7.12	1,570	11.04	3,390	14.32	6,200	18.19	16,200	17.02	10,500
N	4.70	783	7.82	1,850	11.09	3,420	15.00	7,000	18.12	15,800	16.90	10,200
2	4.67	775	8.46	2,110	11.16	3,470	15.72	7,910	18.03	15,400	16.77	9,850
4	4.64	767	9.08	2,390	11.26	3,530	16.47	9,180	17.94	14,900	16.65	9,570
6	4.62	762	9.49	2,580	11.60	3,740	17.16	11,000	17.84	14,400	16.51	9,260
8	4.58	751	9.77	2,700	12.19	4,170	17.55	13,000	17.75	14,000	16.36	8,960
10	4.55	743	10.07	2,860	12.39	4,330	17.80	14,200	17.66	13,500	16.20	8,660
M	4.62	762	10.30	2,970	12.59	4,500	18.05	15,400	17.55	13,000	16.02	8,350

	Aug 4		Aug 5		Aug 6		Aug 7		Aug 8		Aug 9	
2	15.82	8,050	12.19	4,170	9.52	2,580	8.64	2,190	7.87	.....	7.29	.....
4	15.62	7,780	11.77	3,860	9.42	2,540	8.58	2,160	7.81	.....	7.25	.....
6	15.37	7,450	11.42	3,620	9.33	2,500	8.51	2,130	7.77	.....	7.21	.....
8	15.13	7,160	11.13	3,450	9.24	2,460	8.44	2,100	7.71	.....	7.17	.....
10	14.85	6,820	10.82	3,260	9.17	2,430	8.37	2,070	7.66	.....	7.13	.....
N	14.57	6,480	10.59	3,120	9.10	2,400	8.30	2,040	7.60	*1,760	7.10	*1,560
2	14.27	6,150	10.40	3,020	9.02	2,360	8.23	2,010	7.54	.....	7.06	.....
4	13.96	5,810	10.23	2,940	8.96	2,330	8.17	1,990	7.51	.....	7.02	.....
6	13.63	5,470	10.04	2,840	8.90	2,300	8.10	1,960	7.47	.....	6.98	.....
8	13.30	5,140	9.87	2,760	8.83	2,270	8.04	1,940	7.41	.....	6.94	.....
10	12.93	4,810	9.74	2,690	8.77	2,250	7.98	1,910	7.38	.....	6.90	.....
M	12.55	4,460	9.62	2,630	8.71	2,220	7.92	1,890	7.33	.....	6.86	.....

*Mean for day

Table 12.—Days of deficiency in discharge of Big Sioux River at Akron, Iowa, during the years ending Sept. 30, 1935-42

Discharge		Number of days when discharge was less than that shown in first two columns and equal to or greater than that shown on preceding line									Period of Record		
											Deficiency		Duration
Sec.-ft. per sq. mile	Sec.-ft.	1935	1936	1937	1938	1939	1940	1941	1942	Total	Days	Percent of time	Percent of time
0.0006	5	.....	0	.....	.....	.....	.....	.....	.....	0	0	0	100
.0011	10	.....	3	0	.....	.....	.....	.....	.....	3	3	.1	99.9
.0017	15	.....	23	5	.....	.....	.....	.....	0	28	31	1.1	98.9
.0025	22	.....	9	15	.....	.....	.....	.....	4	28	59	2.0	98.0
.0034	30	0	15	14	0	.....	0	0	8	37	96	3.3	96.7
.0045	40	18	32	8	1	.....	7	51	5	122	218	7.5	92.5
.0062	55	47	63	21	60	0	40	50	21	302	520	17.8	82.2
.0085	75	14	41	60	33	9	53	79	21	310	830	28.4	71.6
.011	100	28	18	37	28	6	97	14	78	306	1,136	38.9	61.1
.015	130	53	9	18	16	11	28	7	15	157	1,293	44.3	55.7
.020	175	27	13	13	14	36	17	12	17	149	1,442	49.3	50.7
.026	230	23	13	10	8	59	15	18	16	162	1,604	54.9	45.1
.034	300	26	14	17	9	60	17	23	5	171	1,775	60.7	39.3
.045	400	34	25	15	20	47	17	21	5	184	1,959	67.0	33.0
.061	540	51	18	10	24	33	12	12	13	173	2,132	73.0	27.0
.079	700	11	8	19	28	31	8	5	16	126	2,258	77.3	22.7
.107	950	11	14	20	34	18	24	8	16	145	2,403	82.2	17.8
.141	1,250	11	8	20	24	14	8	7	16	108	2,511	85.9	14.1
.192	1,700	6	7	16	12	12	9	21	27	110	2,621	89.7	10.3
.249	2,200	3	4	11	7	8	2	10	18	63	2,684	91.9	8.1
.339	3,000	2	3	12	10	13	2	7	20	69	2,753	94.2	5.8
.452	4,000	0	3	11	13	3	2	8	11	51	2,804	96.0	4.0
.588	5,200	.....	10	12	7	3	2	8	10	52	2,856	97.7	2.3
.791	7,000	.....	5	1	4	2	3	4	13	32	2,888	98.8	1.2
1.02	9,000	.....	2	0	5	0	1	0	4	12	2,900	99.2	.8
1.36	12,000	.....	3	.....	8	.....	2	.....	2	15	2,915	99.8	.2
1.81	16,000	.....	3	.....	0	.....	0	.....	3	6	2,921	100	0
2.37	21,000	.....	0	.....	.....	.....	.....	.....	1	1	2,922	100	0
3.16	28,000	.....	.....	.....	.....	.....	.....	.....	0	0	.....	.....	.....
Mean yearly discharge (sec.-ft.)		297	708	694	1,046	593	424	567	1,286	.....	.....	.....	.....
Maximum daily (sec.-ft.)		2,960	13,300	5,550	10,800	6,000	9,670	5,580	20,000	.....	.....	.....	.....
Minimum daily (sec.-ft.)		35	7	13	38	70	35	30	18	.....	.....	.....	.....

Floyd River at James, Iowa

LOCATION.—Water-stage recorder, lat. 42°34'40", long. 96°18'40", in NW¼ NW¼ sec. 32, T. 90 N., R. 46 W., at highway bridge at James, 9.5 miles upstream from mouth and 14 miles downstream from West Floyd River.

DRAINAGE AREA.—918 square miles.

RECORDS AVAILABLE.—December 1934 to September 1942.

AVERAGE DISCHARGE.—7 years (1935-42), 115 second-feet.

EXTREMES.—Maximum discharge during 1941-42 year, 6,280 second-feet June 4 (gage height, 18.75 feet); minimum, 6 second-feet Jan. 7; minimum gage height, 6.07 feet Oct. 4.

1934-41: Maximum discharge observed, 3,160 second-feet May 27, 1937; maximum gage height observed, 18.10 feet Mar. 10, 1936 (ice jam); minimum discharge observed, 1 second-foot Aug. 20, 27, 1936; minimum gage height observed, 4.74 feet June 12, 1935.

REMARKS.—Records fair prior to Oct. 1, 1941 and good thereafter except those for periods of ice effect or no gage-height record, which are poor.

COOPERATION.—Station operated through cooperation of City of Sioux City.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Discharge in second-feet				Run-off	
		Maximum	Minimum	Mean	Per square mile	Inches	Acre feet
October 1940	375	23	9	12.1	0.013	0.02	744
November	399	20	10	13.3	.014	.02	791
December	467	20	10	15.1	.016	.02	926
Calendar year 1940	15,767	1,330	2	43.1	.047	.65	31,290
January 1941	501	22	10	16.2	.018	.02	994
February	3,785	750	20	135	.147	.15	7,510
March	17,391	1,500	75	561	.611	.70	34,490
April	4,563	386	92	152	.166	.19	9,050
May	1,967	246	34	63.5	.069	.08	3,900
June	4,354	807	42	145	.158	.18	8,640
July	3,715	978	28	120	.131	.15	7,370
August	543	27	13	17.5	.019	.02	1,080
September	1,507	483	12	50.2	.055	.06	2,990
Water year 1940–41	39,567	1,500	9	108	.118	1.61	78,480
October 1941	1,690	402	22	54.5	.059	.07	3,350
November	1,069	84	21	35.6	.039	.04	2,120
December	930	41	21	30.0	.033	.04	1,840
Calendar year 1941	42,015	1,500	10	115	.125	1.70	83,330
January 1942	696	65	6	22.5	.025	.03	1,380
February	840	50	22	30.0	.033	.03	1,670
March	3,324	466	30	107	.117	.13	6,590
April	3,391	264	50	113	.123	.14	6,730
May	9,017	901	48	291	.317	.37	17,880
June	27,126	4,480	188	904	.985	1.10	53,800
July	8,318	1,730	62	268	.292	.34	16,500
August	4,245	1,000	36	137	.149	.17	8,420
September	8,521	1,460	99	284	.309	.35	16,900
Water year 1941–42	69,167	4,480	6	189	.206	2.81	137,200

Note—Stage-discharge relation affected by ice Nov. 13 to Dec. 31, 1940; Jan. 1 to Mar. 8, Nov. 21-27, Dec. 9-17, 24-31, 1941; Jan. 1 to Mar. 7, 1942.

Floyd River at James, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr	May	June	July	Aug.	Sept.
1940–41												
1	11	14	14	18	22	75	161	97	44	f978	27	13
2	11	13	13	17	22	200	146	91	76	611	25	13
3	12	13	10	14	22	500	129	83	59	261	24	12
4	12	13	12	11	23	1,000	117	81	54	f186	23	13
5	11	12	14	10	25	1,500	103	81	91	f163	22	12
6	18	12	15	11	24	1,400	95	72	89	f144	22	12
7	23	12	15	*12	20	1,200	92	65	64	f121	20	12
8	17	12	15	15	22	1,100	93	61	f54	f95	19	12
9	14	12	15	16	23	1,020	103	57	f46	f73	19	12
10	13	13	15	17	25	1,140	113	56	f42	f86	18	18
11	13	20	15	18	30	1,380	120	54	f86	f108	17	22
12	13	12	14	22	70	1,280	122	50	63	72	17	15
13	12	10	13	20	350	939	128	48	63	65	16	13
14	11	10	12	19	750	a500	120	f51	109	65	16	52
15	11	10	10	18	500	a350	107	f52	145	62	15	f118
16	11	11	10	18	400	a250	107	f44	115	59	15	f483
17	11	12	10	17	300	h220	102	43	91	52	17	f239
18	12	13	10	15	250	a240	95	40	74	48	19	f104
19	11	15	12	15	200	a300	104	36	60	44	19	55
20	11	15	14	15	120	f269	216	60	129	41	17	39
21	10	15	16	15	90	269	303	57	52	39	15	31
22	10	15	17	15	80	*298	386	42	136	40	15	26
23	10	*14	18	15	75	328	314	41	490	39	14	24
24	10	14	20	15	*73	280	247	39	275	37	14	24
25	10	14	20	15	70	243	210	36	117	36	16	25
26	9	14	20	15	68	242	192	34	90	35	15	23
27	9	14	20	16	66	213	166	246	187	33	14	20
28	10	15	20	17	65	181	f143	86	272	32	14	20
29	13	15	20	19	.....	154	121	64	f374	32	13	20
30	13	15	19	20	.....	153	108	46	f807	30	13	25
31	13	.....	19	21	.....	167	.....	54	.....	28	13	.....
1941–42												
1	23	24	41	18	50	30	264	49	561	1,730	a1,000	1,000
2	22	24	40	15	45	34	238	48	847	1,010	h331	1,460
3	22	24	36	12	44	38	229	61	592	514	a220	868
4	46	23	*35	9	42	45	213	72	3,960	386	a170	479
5	402	25	34	8	43	55	192	94	4,480	322	a150	389
6	220	26	32	7	40	65	172	96	2,360	276	139	351
7	138	26	30	6	37	74	155	95	1,180	243	129	320
8	103	27	30	7	34	80	145	178	1,200	218	116	281
9	72	24	28	7	32	79	137	300	837	200	105	250
10	57	24	25	7	30	63	128	275	563	214	97	235
11	45	24	23	8	29	54	119	214	528	253	90	219
12	38	26	22	8	28	49	112	361	448	188	83	213
13	32	24	23	9	29	48	107	734	344	169	67	207
14	29	24	25	10	28	50	102	595	280	140	60	175
15	28	24	27	*11	26	47	98	383	241	131	63	156
16	27	25	30	13	24	47	93	282	214	123	73	144
17	27	24	32	16	23	46	87	222	198	111	66	138
18	28	21	35	18	22	46	82	192	188	103	60	130
19	28	57	36	21	*22	48	75	176	251	95	48	145
20	26	84	38	23	22	50	70	162	748	87	49	190
21	26	80	38	25	22	51	68	148	1,100	79	46	173
22	28	60	34	27	22	50	65	136	1,070	71	42	144
23	26	40	32	29	22	*50	62	155	438	67	38	126
24	25	45	28	32	23	63	59	297	325	63	38	115
25	26	47	27	35	23	95	57	251	274	62	38	107
26	26	45	26	40	24	208	55	187	238	67	36	104
27	26	42	26	45	26	334	54	371	230	140	36	102
28	25	44	26	50	28	466	52	798	351	473	36	99
29	24	42	26	55	.....	409	51	901	1,100	292	36	100
30	23	44	24	65	.....	277	50	705	1,980	a200	42	101
31	22	.....	21	60	.....	273	.....	479	.....	a300	741	.....

*Winter discharge measurement made on this day.
(a) No gage-height record; discharge estimated.
(f) Fragmentary gage-height record; computed from partly estimated gage heights.
(h) Computed from wire-weight gage reading.

Floyd River at James, Iowa—Continued

Table 13.—Gage height, in feet, and discharge, in second-feet, at indicated time, May 26—June 12, 1942

HOUR	May 26		May 27		May 28		May 29		May 30		May 31	
	Feet	Sec.-ft.	Feet	Sec.-ft.	Feet	Sec.-ft.	Feet	Sec.-ft.	Feet	Sec.-ft.	Feet	Sec.-ft.
2	8.42	196	8.04	162	12.70	718	13.98	922	12.70	718	11.76	586
4	8.39	193	8.00	158	12.83	738	14.04	933	12.71	720	11.54	556
6	8.37	191	7.98	156	12.96	757	14.14	951	12.72	721	11.34	528
8	8.36	190	8.27	182	13.07	774	14.21	964	12.73	722	11.15	502
10	8.36	190	9.00	250	13.15	786	14.24	970	12.74	724	10.99	481
N	8.35	190	9.89	344	13.23	798	14.24	970	12.73	722	10.85	462
2	8.34	189	10.60	430	13.34	815	14.21	964	12.71	720	10.75	450
4	8.32	187	11.17	504	13.46	835	14.06	937	12.66	712	10.65	436
6	8.27	182	11.63	568	13.55	849	13.64	864	12.57	700	10.54	422
8	8.21	177	11.95	613	13.64	864	13.17	788	12.42	679	10.48	415
10	8.15	172	12.27	658	13.74	881	12.86	742	12.22	652	10.44	410
M	8.10	167	12.48	687	13.86	901	12.73	722	12.00	620	10.40	405

	June 1		June 2		June 3		June 4		June 5		June 6	
2	10.38	403	13.19	792	12.18	645	13.76	884	18.45	5,440	17.42	3,100
4	10.40	405	13.32	812	11.79	591	14.00	926	18.41	5,340	17.34	2,960
6	10.50	417	13.44	831	11.45	543	14.28	977	18.32	5,090	17.28	2,860
8	10.70	443	13.56	851	11.16	503	15.85	1,440	18.26	4,940	17.18	2,700
10	11.21	509	13.68	871	10.95	476	18.64	5,970	18.20	4,780	17.09	2,570
N	11.52	553	13.78	888	10.86	464	18.72	6,200	18.11	4,560	17.02	2,470
2	11.89	605	13.86	901	10.98	479	18.68	6,080	18.02	4,340	16.93	2,350
4	12.20	648	13.90	908	11.43	540	18.64	5,970	17.92	4,110	16.83	2,230
6	12.55	697	13.90	908	12.03	624	18.65	6,000	17.84	3,930	16.76	2,150
8	12.80	733	13.76	884	12.68	715	18.50	5,580	17.74	3,710	16.65	2,030
10	12.95	756	13.09	776	13.16	787	18.48	5,530	17.63	3,490	16.52	1,910
M	13.07	774	12.60	704	13.50	841	18.50	5,580	17.53	3,300	16.38	1,780

	June 7		June 8		June 9		June 10		June 11		June 12	
2	16.19	1,620	15.09	1,110	15.14	1,130	12.17	616	11.45	515	11.38	505
4	15.97	1,480	15.19	1,140	14.87	1,060	12.07	602	11.38	505	11.29	494
6	15.71	1,340	15.30	1,180	14.54	1,000	11.96	586	11.36	503	11.20	482
8	15.46	1,240	15.40	1,200	14.10	917	11.87	574	11.40	508	11.14	472
10	15.23	1,160	15.48	1,230	13.63	838	11.77	560	11.50	522	11.06	461
N	15.03	1,100	15.53	1,240	13.27	781	11.67	546	11.60	536	11.00	453
2	14.90	1,070	15.58	1,260	13.01	742	11.61	537	11.66	544	10.92	439
4	14.82	1,050	15.60	1,270	12.79	710	11.59	535	11.70	550	10.84	429
6	14.80	1,050	15.56	1,250	12.61	684	11.59	535	11.70	550	10.77	420
8	14.84	1,060	15.51	1,240	12.50	669	11.59	535	11.64	542	10.70	411
10	14.90	1,070	15.46	1,220	12.37	651	11.59	535	11.55	529	10.63	403
M	14.99	1,090	15.35	1,190	12.27	637	11.53	526	11.47	518	10.56	394

Table 14.—Hourly precipitation in inches from recording gage at Sioux Center, Iowa, for period ending at indicated time, May—June, 1942.

Observations by E. Straatsma

MAY

Lat. 43° 05′ Long. 96° 10′

Date	A. M.												P. M.												Daily Total Inches
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	
1				.11								.09		.09				.01							0.30
2	.01																								0.01
5					.06	.09	.09	.01					.03		.16	.11	.21	.14	.28	.12	.16	.12	.12	.08	1.78
6	.06	.05	.03	.03																					0.17
10															.01	.29	.06	.04	.01		.01	.01	.01	.01	0.45
11	1.15	.11	.09	.01	.01																				1.37
13	.24	.10		.01																					0.35
21														.18	.12	.18	.08							.01	0.57
22	.01	.01	.01																						0.03
27																			.91						0.91
29																								.10	0.10
30	.18	.12																							0.30
31								.01	.02																0.03
																							Monthly Total		6.37

JUNE

Date	A. M.												P. M.												Daily Total Inches
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	
1																							.12		0.12
2	.01						.01						.05					.02	.02	.04	1.16	.56	.22	.16	2.25
3	.53		.02	.01																					0.56
9																				.74	.01				0.75
12					.08	.05	.01																		0.14
18					.93	.01	.01																		0.95
19					.08	.50	.47	.22	.08															.08	1.43
20	.01	.03	.08	.04		.01																			0.17
25			.01	.01					.08																0.10
27																					.67	.22			0.89
28		.01	.70	.08				.01		.01					.03	.01	.01								0.86
																							Monthly Total		8.22

Amounts are for hour ending as shown in column heading. Central Standard Time.

NOTE.—Records obtained from Hydrologic Network of United States Weather Bureau.

Little Sioux River at Spencer, Iowa

LOCATION.—Wire-weight gage, lat. 43°08', long. 95°08', in sec. 18, T. 96 N., R. 36 W., at bridge on U. S. Highways 18 and 71 at Spencer, about three-quarters of a mile downstream from Ocheyedan River. Datum of gage is 1,294.56 feet above mean sea level, datum of 1929.

DRAINAGE AREA.—1,030 square miles.

RECORDS AVAILABLE.—April 1936 to September 1942 (discontinued).

AVERAGE DISCHARGE.—6 years, 215 second-feet.

EXTREMES.—Maximum discharge during 1941-42 year, 2,170 second-feet Aug. 31 (gage height, 12.3 feet, from graph based on gage readings); minimum, 12 second-feet (estimated) Jan. 8; minimum gage height observed, 4.65 feet Oct. 2.

1936-41: Maximum discharge observed, about 5,000 second-feet Sept. 16, 1938 (gage height, 14.97 feet), from rating curve extended above 2,000 second-feet on basis of velocity-area studies; minimum observed, 4.7 second-feet Jan. 23, 1937, result of discharge measurement; minimum gage height observed, 3.74 feet Feb. 7, 16, 1937, present datum.

A stage of 15.4 feet, present datum, from floodmarks, occurred in the spring of 1936.

REMARKS.—Records fair except those for periods of ice effect or doubtful or no gage-height record, which are poor. A partly washed out, low, rock-fill dam about 0.7 mile below gage controls low and medium stages.

COOPERATION.—Gage-height record collected in cooperation with City of Spencer. Gage read once daily.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Discharge in second-feet				Run-off	
		Maximum	Minimum	Mean	Per square mile	Inches	Acre feet
October 1940	427	24	11	13.8	0.013	0.01	847
November	791	39	20	26.4	.026	.03	1,570
December	865	42	20	27.9	.027	.03	1,720
Calendar year 1940	15,949	503	8	43.6	.042	.57	31,640
January 1941	768	38	18	24.8	.024	.03	1,520
February	1,523	220	14	54.4	.053	.06	3,020
March	17,373	1,340	14	560	.544	.63	34,460
April	8,749	554	131	292	.283	.32	17,350
May	3,579	210	74	115	.112	.13	7,100
June	4,461	903	39	149	.145	.16	8,850
July	2,360	572	24	76.1	.074	.09	4,680
August	612	34	14	19.7	.019	.02	1,210
September	944	84	14	31.5	.031	.03	1,870
Water year 1940–41	42,452	1,340	11	116	.113	1.54	84,200
October 1941	1,785	246	24	57.6	.056	.06	3,540
November	2,790	127	45	93.0	.090	.10	5,530
December	2,111	99	45	68.1	.066	.08	4,190
Calendar year 1941	47,055	1,340	14	129	.125	1.71	93,320
January 1942	2,092	169	12	67.5	.066	.08	4,150
February	1,906	116	35	68.1	.066	.07	3,780
March	9,960	1,440	47	321	.312	.36	19,760
April	10,547	969	118	352	.342	.38	20,920
May	19,509	1,360	255	629	.611	.70	38,700
June	25,164	1,700	333	839	.815	.91	49,910
July	15,660	1,060	140	505	.490	.57	31,060
August	17,863	1,990	119	576	.559	.64	35,430
September	16,722	1,260	373	557	.541	.60	33,170
Water year 1941–42	126,109	1,990	12	346	.336	4.55	250,100

Note—Stage-discharge relation affected by ice Nov. 12-19, 23-29, Dec. 12-31, 1940; Jan. 1 to Mar. 9, Mar. 21, DDec. 9-17, 26-31; Jan. 1-19, Feb. 16-28, 1942.

Little Sioux River at Spencer, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940–41												
1	12	24	28	38	18	14	333	a210	73	572	23	14
2	12	23	27	38	18	17	331	a200	78	202	25	14
3	11	22	27	35	18	36	333	a180	96	164	a30	15
4	12	22	26	32	19	930	327	a170	87	132	34	15
5	12	20	26	26	24	900	319	a160	74	116	32	16
6	13	21	26	24	22	700	311	a150	63	102	25	a15
7	12	22	28	24	22	610	305	a140	57	79	24	a14
8	12	20	30	*22	20	620	295	a135	52	a70	22	43
9	12	20	30	23	20	600	285	a130	59	a66	22	a42
10	11	22	31	25	20	1,340	261	a130	67	64	20	41
11	13	28	30	24	22	991	224	a120	124	58	17	31
12	12	27	28	25	26	940	217	a115	219	50	14	26
13	14	25	28	26	30	790	a230	a110	195	59	15	22
14	13	24	24	27	28	795	a250	a105	163	57	16	22
15	14	25	22	27	220	792	a200	a105	131	54	15	39
16	13	25	20	28	220	696	a180	a105	104	52	16	46
17	13	26	20	28	210	558	a160	a100	89	48	a20	84
18	12	27	20	24	165	a500	a140	a96	72	41	a25	55
19	13	28	20	24	130	467	131	a94	57	39	a20	45
20	13	32	20	24	90	460	473	a92	46	36	a18	43
21	14	39	20	23	46	a443	554	a94	39	36	a16	43
22	13	39	21	22	26	438	443	a90	108	31	a15	40
23	13	36	22	22	22	443	396	a86	103	28	a17	37
24	14	*30	28	22	22	465	345	a84	97	28	a18	30
25	13	28	30	20	*19	a450	351	a82	85	27	a18	28
26	12	28	35	20	18	436	315	a86	75	26	a17	24
27	12	28	38	20	14	398	a290	a90	270	26	17	24
28	17	27	42	20	14	333	a270	a86	167	25	14	25
29	22	26	41	19	.....	335	a250	a82	708	24	16	26
30	24	27	39	18	.....	341	a230	a78	903	24	16	25
31	24	.....	38	18	.....	*535	.....	a74	.....	24	15	.....
1941–42												
1	25	45	99	50	116	47	969	255	1,430	1,060	1,120	1,260
2	24	76	97	40	103	51	930	426	1,120	991	1,120	811
3	35	74	*96	30	100	58	848	440	1,400	761	1,120	684
4	47	73	97	25	98	64	799	438	1,700	606	1,110	563
5	142	108	89	20	98	68	725	701	1,600	538	1,100	396
6	246	105	76	15	96	68	658	1,090	1,490	540	1,060	373
7	169	106	75	13	96	72	563	1,210	1,400	533	1,020	404
8	88	110	75	12	92	78	d500	1,360	1,180	526	910	597
9	72	70	70	13	88	80	d450	1,200	1,130	528	790	574
10	70	68	60	15	84	84	d400	763	833	665	665	501
11	62	68	50	17	80	88	d350	394	883	549	535	496
12	54	96	52	18	78	87	d300	521	843	a450	369	485
13	54	99	57	20	76	90	d275	677	711	394	343	480
14	49	127	60	21	76	85	270	658	691	388	331	480
15	45	125	62	22	74	83	235	611	623	667	313	476
16	36	121	63	*25	70	88	224	572	597	663	305	489
17	36	116	65	28	50	93	217	551	381	611	284	494
18	36	111	68	35	*42	95	207	547	588	570	268	531
19	36	115	70	45	36	98	188	505	572	508	257	551
20	37	85	74	60	35	104	155	489	565	396	241	554
21	39	84	73	92	37	124	142	462	503	266	202	574
22	39	82	72	111	40	*169	135	426	482	169	156	590
23	36	83	70	145	39	219	130	417	438	140	152	597
24	37	84	68	169	40	396	122	402	367	142	122	577
25	36	85	63	164	40	691	124	417	347	140	120	570
26	40	84	60	163	38	1,000	118	413	333	210	121	558
27	37	88	50	163	41	1,440	118	423	341	209	119	533
28	36	96	45	159	43	1,140	119	643	396	246	121	528
29	39	106	48	140	.....	1,110	118	660	1,040	641	339	514
30	41	100	52	135	.....	1,070	158	658	1,180	595	1,160	482
31	42	.....	55	127	.....	1,020	.....	1,180	.....	958	1,990	.....

*Winter discharge measurement made on this day.
(a) No gage-height record; discharge computed on basis of records for station at Correctionville.
(d) Doubtful gage-height record; discharge computed on basis of records for station at Correctionville.

Little Sioux River at Correctionville, Iowa

LOCATION.—Water-stage recorder, lat. 42°28′, long. 95°47′, in N½ sec. 1, T. 88 N., R. 43 W., at bridge on U. S. Highway 20, 0.2 mile upstream from Bacon Creek, half a miles west of Correctionville, and three quarters of a mile downstream from Pierson Creek. Datum of gage is 1,096.49 feet above mean sea level, datum of 1929.

DRAINAGE AREA.—2,450 square miles.

RECORDS AVAILABLE.—May 1918 to July 1925, October 1928 to July 1932, June 1936 to September 1942.

AVERAGE DISCHARGE.—10 years (1918-20, 1929-31, 1936-42), 608 second-feet.

EXTREMES.—Maximum discharge during 1941-42 year, 3,800 second-feet June 19 (gage height, 15.34 feet); minimum, 106 second-feet Oct. 2; minimum gage height, 5.51 feet Dec. 28.

1918-25, 1928-32, 1936-41: Maximum discharge, about 10,700 second-feet June 12, 1919 (gage height, 19.57 feet, site and datum then in use); minimum observed, 2.6 second-feet July 17, 25, 1936 (gage height, 2.14 feet), caused by construction dam above gage.

REMARKS.—Records good except those for period of no gage-height record, which are fair, and those for periods of ice effect, which are poor.

NOTE.—Rating curves for this station are shown in figure 10.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Discharge in second-feet				Run-off	
		Maximum	Minimum	Mean	Per square mile	Inches	Acre feet
October 1940	1,410	164	30	45.5	0.019	0.02	2,800
November	1,991	85	45	66.4	.027	.03	3,950
December	2,702	136	65	87.2	.036	.04	5,360
Calendar year 1940	65,242	2,590	18	178	.073	.99	129,400
January 1941	3,160	143	85	102	.042	.05	6,270
February	6,602	1,340	80	236	.096	.10	13,090
March	32,942	1,900	101	1,063	.434	.50	65,340
April	26,710	1,350	704	890	.363	.40	52,980
May	10,868	738	153	351	.143	.16	21,560
June	12,630	948	144	421	.172	.19	25,050
July	9,315	958	85	300	.122	.14	18,480
August	1,758	100	37	56.7	.023	.03	3,490
September	9,715	2,600	30	324	.132	.15	19,270
Water year 1940–41	119,803	2,600	30	328	.134	1.81	237,600
October 1941	10,609	1,270	120	342	.140	.16	21,040
November	18,744	1,050	245	625	.255	.28	37,180
December	12,659	616	200	408	.167	.19	25,110
Calendar year 1941	155,712	2,600	30	427	.174	2.35	308,900
January 1942	11,765	1,000	135	380	.155	.18	23,340
February	12,465	880	250	445	.182	.19	24,720
March	22,048	1,800	300	711	.290	.33	43,730
April	28,629	1,950	396	954	.389	.43	56,780
May	33,269	2,030	417	1,073	.438	.51	65,990
June	62,214	3,690	886	2,074	.847	.94	123,400
July	34,994	2,460	563	1,129	.461	.53	69,410
August	22,872	1,250	337	738	.301	.35	45,370
September	26,158	1,530	641	872	.356	.40	51,880
Water year 1941–42	296,426	3,690	120	812	.331	4.49	588,000

Note—Stage-discharge relation affected by ice Nov. 12 to Dec. 31, 1940; Jan. 1 to Mar. 17, Dec. 12-17, 1941; Jan. 1 to Mar. 3, 1942.

Little Sioux River at Correctionville, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940–41												
1	31	85	66	143	86	101	766	738	144	958	100	36
2	30	77	65	137	87	260	769	697	200	902	88	36
3	33	75	67	130	88	850	793	663	278	873	82	44
4	33	76	70	120	88	1,500	815	621	288	800	76	36
5	32	71	75	115	90	1,900	796	576	308	621	74	36
6	43	68	79	116	85	1,500	753	552	310	469	71	33
7	45	66	82	116	80	1,200	719	519	286	429	66	30
8	44	55	85	114	85	1,100	713	478	253	h339	63	57
9	44	67	85	*112	87	1,300	722	441	230	h296	65	51
10	44	69	84	110	88	1,500	728	416	213	h342	61	45
11	41	63	82	108	90	1,400	734	377	253	303	61	46
12	43	55	75	106	190	1,350	719	358	478	256	56	42
13	43	50	70	104	1,340	1,250	707	342	507	224	54	58
14	40	45	68	103	765	1,200	704	323	561	206	51	1,760
15	38	45	67	102	610	1,250	731	308	772	192	50	1,610
16	38	47	68	101	460	1,150	707	288	844	178	48	2,600
17	35	50	70	95	350	1,000	710	273	781	161	57	540
18	35	52	72	90	300	1,090	734	256	633	144	58	466
19	35	57	80	90	250	1,080	704	239	510	129	53	358
20	33	70	87	94	200	1,010	1,220	239	413	123	50	318
21	33	80	92	92	195	1,020	1,350	226	331	114	46	258
22	32	*83	93	89	185	938	1,280	226	276	108	47	209
23	33	82	95	87	170	*944	1,210	219	266	102	45	178
24	34	78	97	86	*152	889	1,290	206	350	93	51	159
25	35	73	102	85	139	870	1,330	194	421	85	45	141
26	35	72	105	85	123	902	1,250	192	371	153	42	129
27	34	71	112	85	114	918	1,100	204	363	192	40	108
28	54	71	118	85	105	915	974	211	475	155	40	99
29	164	70	125	85	.....	892	876	176	567	118	42	99
30	106	68	130	87	.....	857	806	157	948	133	39	133
31	90	.....	136	88	.....	806	.....	153	.....	117	37	.....
1941–42												
1	120	245	616	340	880	300	1,920	417	1,890	2,460	980	784
2	159	262	594	290	770	330	1,950	456	1,560	1,860	928	962
3	379	272	580	260	710	400	1,860	534	2,520	1,850	962	1,160
4	218	282	566	230	670	521	1,770	676	3,160	1,900	1,080	1,300
5	338	361	*543	200	650	560	1,680	734	3,590	1,820	1,190	1,480
6	524	427	510	170	620	527	1,600	826	3,690	1,520	1,250	1,530
7	1,270	501	502	150	600	483	1,500	910	3,630	1,300	1,250	1,200
8	593	549	486	140	570	464	1,370	1,160	3,320	1,160	1,240	952
9	636	581	464	140	530	464	1,250	1,220	2,780	1,040	1,230	844
10	613	555	359	135	510	510	1,140	1,310	2,560	1,050	1,170	790
11	526	526	208	140	470	483	1,050	1,470	2,410	970	1,050	775
12	442	526	200	140	450	505	973	1,670	2,080	952	889	790
13	385	558	240	150	430	494	901	2,030	1,850	1,060	781	725
14	335	568	300	*150	405	478	847	1,950	1,680	1,190	711	667
15	308	632	340	160	400	473	799	1,680	1,540	1,210	644	656
16	282	708	400	170	390	475	760	1,550	1,420	1,050	596	641
17	264	a760	420	190	370	478	705	1,530	1,240	895	568	641
18	252	a700	446	230	340	489	658	1,400	1,100	910	557	769
19	240	a1,050	425	270	310	500	622	1,200	2,060	1,130	521	769
20	234	a960	407	300	*290	516	588	1,050	2,060	962	492	844
21	231	a920	425	330	260	521	557	962	2,230	790	467	826
22	231	914	483	380	250	532	535	928	1,570	682	435	832
23	218	889	441	450	250	*560	508	856	1,290	608	402	820
24	212	826	412	540	255	605	483	811	1,120	733	372	811
25	206	769	435	640	260	820	473	763	987	563	352	808
26	286	714	354	750	270	1,240	467	850	901	577	337	814
27	240	708	250	850	275	1,640	448	787	886	596	337	790
28	188	679	221	920	280	1,660	407	886	1,330	1,020	366	748
29	223	664	323	980	.....	1,560	412	766	2,620	636	339	722
30	236	638	323	1,000	.....	1,660	396	917	3,140	1,430	505	708
31	220	.....	386	970	.....	1,800	.....	970	.....	1,070	871	.....

*Winter discharge measurement made on this day.
(a) No gage-height record; discharge computed on basis of records for station near Kennebec.
(f) Computed from estimated gage heights.
(h) Computed from wire-weight gage readings.

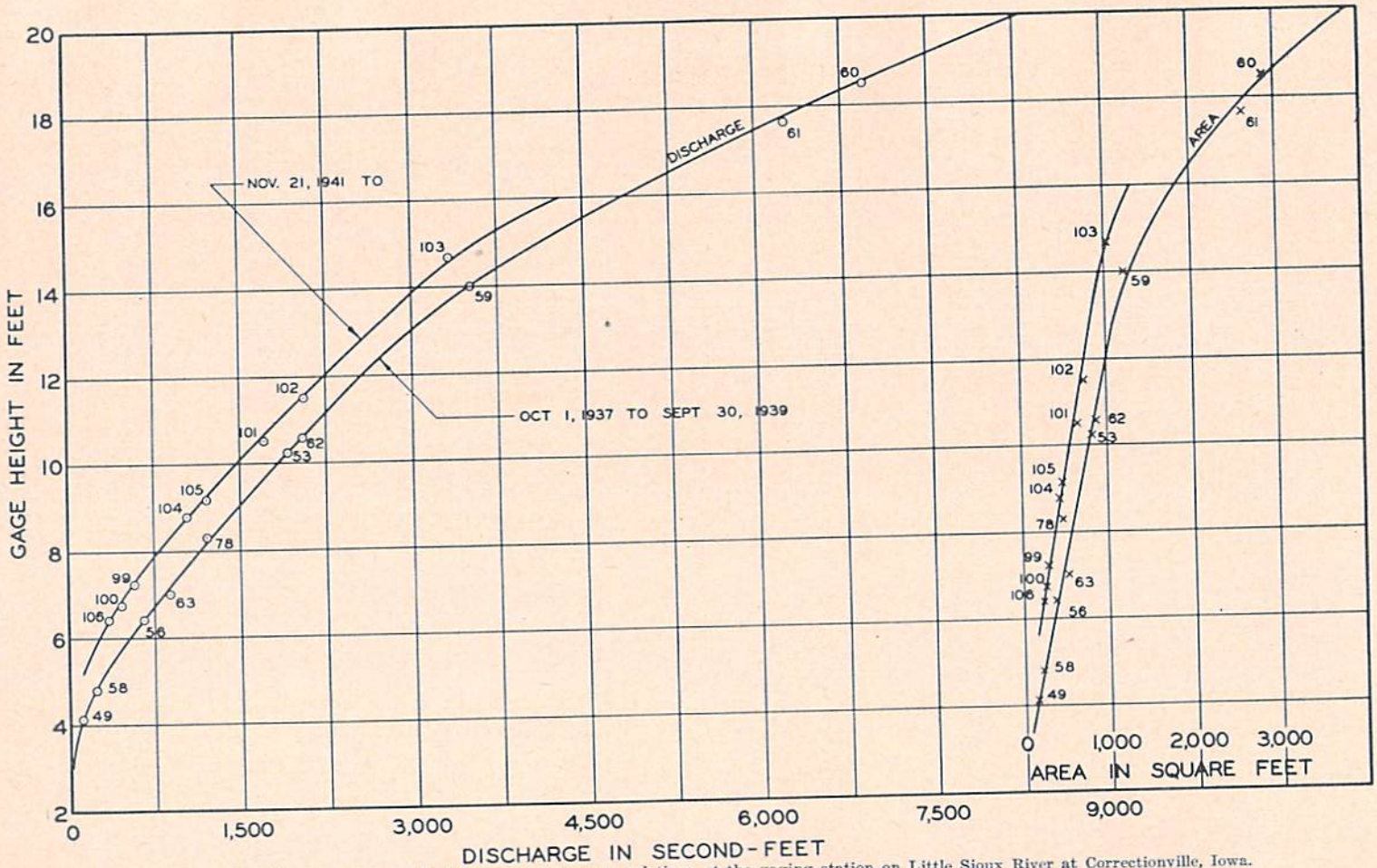


Figure 10.—Changes in stage-discharge and stage-area relations at the gaging station on Little Sioux River at Correctionville, Iowa.

Little Sioux River near Kennebec, Iowa

LOCATION.—Wire-weight gage, lat. 42°05′, long. 96°00′, in S½ sec. 18, T. 84 N., R. 44 W., at bridge on county road A, 1.3 miles south of Kennebec, 5½ miles northeast of Onawa, and 6½ miles upstream from Maple River. Datum of gage is 1,027.89 feet above mean sea level, datum of 1929 (Corps of Engineers, U. S. Army, bench mark).

DRAINAGE AREA.—2,730 square miles.

RECORDS AVAILABLE.—April 1939 to September 1942.

EXTREMES.—Maximum discharge during 1941-42 year, 4,380 second-feet June 6 (gage height, 21.6 feet, from floodmark); minimum, 150 second-feet Jan. 10-12; minimum gage height observed, 8.97 feet Oct. 1.

1939-41: Maximum discharge, 4,120 second-feet June 4, 1940 (gage height 20.85 feet), by slope-area method; minimum, 24 second-feet Jan. 25-31, 1940; minimum gage height observed, 6.71 feet Oct. 7, 1939.

REMARKS.—Records fair except those for periods of ice effect, which are poor. Gage read once daily, more often during high stages.

COOPERATION.—Records collected in cooperation with Corps of Engineers, U. S. Army.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Discharge in second-feet				Run-off	
		Maximum	Minimum	Mean	Per square mile	Inches	Acre feet
October 1940	1,846	146	44	59.5	0.022	0.03	3,660
November	2,577	105	70	85.9	.031	.03	5,110
December	3,489	170	70	113	.041	.05	6,920
Calendar year 1940	82,127	2,410	24	224	.082	1.12	162,900
January 1941	4,420	180	130	143	.052	.06	8,770
February	9,913	1,600	132	354	.130	.14	19,660
March	35,735	2,000	210	1,153	.422	.49	70,880
April	27,815	1,420	722	927	.340	.38	55,170
May	12,247	877	193	395	.145	.17	24,290
June	13,360	874	188	445	.163	.18	26,500
July	12,010	1,040	132	387	.142	.16	23,820
August	2,300	136	44	74.2	.027	.03	4,560
September	12,592	3,340	36	420	.154	.17	24,980
Water year 1940–41	138,304	3,340	36	379	.139	1.89	274,300
October 1941	12,151	1,640	180	392	.144	.17	24,100
November	19,616	1,120	283	654	.240	.27	38,910
December	14,170	635	250	457	.167	.19	28,110
Calendar year 1941	176,329	3,340	36	483	.177	2.41	349,800
January 1942	12,565	1,000	150	405	.148	.17	24,920
February	14,205	950	275	507	.186	.19	28,180
March	22,773	1,820	325	735	.269	.31	45,170
April	31,678	2,010	450	1,056	.387	.43	62,830
May	34,623	2,020	438	1,117	.409	.47	68,670
June	62,744	3,930	954	2,091	.766	.85	124,300
July	36,272	2,790	597	1,170	.429	.49	71,940
August	23,785	1,360	343	767	.281	.32	47,180
September	28,417	1,600	662	947	.347	.39	56,360
Water year 1941–42	312,999	3,930	150	858	.314	4.25	620,900

Note—Stage-discharge relation affected by ice Nov. 11, 1940 to Mar. 8, 1941; Dec. 10, 1941 to Mar. 10, 1942.

Little Sioux River near Kennebec, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Se pt.
1940–41												
1	50	90	70	175	132	210	765	877	188	1,040	136	41
2	51	82	70	180	133	250	762	811	388	961	123	48
3	50	80	75	170	136	750	793	750	440	958	113	44
4	63	79	85	150	138	1,000	820	705	301	928	103	50
5	53	79	100	135	140	2,000	811	652	314	829	96	45
6	50	80	110	132	141	1,800	793	620	388	700	94	42
7	60	79	112	132	143	1,400	740	580	334	515	86	41
8	60	78	116	133	145	1,340	722	525	308	500	80	36
9	60	81	120	135	145	1,320	770	465	301	388	78	88
10	60	86	120	*136	145	1,960	762	446	277	572	77	71
11	60	100	110	141	150	1,650	784	472	293	367	75	45
12	57	84	100	147	220	1,590	765	367	508	351	73	59
13	56	80	80	150	1,600	1,480	758	365	618	316	67	57
14	57	75	85	152	1,300	1,370	738	343	648	293	67	2,020
15	55	70	82	155	900	1,350	735	424	745	292	64	1,350
16	53	70	80	152	800	1,190	758	303	874	262	61	3,340
17	52	80	80	150	625	1,070	722	289	820	256	102	1,700
18	49	92	90	148	420	1,170	770	285	682	229	73	614
19	48	100	95	146	380	1,210	760	259	493	212	67	531
20	48	105	100	144	350	1,320	1,220	262	271	202	65	381
21	47	*105	110	140	300	1,050	1,410	274	226	190	59	330
22	45	105	120	136	*240	1,020	1,420	234	363	180	57	276
23	44	100	130	132	220	952	1,220	236	317	173	57	220
24	44	90	140	130	210	*949	1,250	228	317	160	62	201
25	44	90	150	130	200	895	1,330	208	410	153	62	187
26	45	88	152	130	200	901	1,310	211	440	143	58	167
27	45	88	154	130	200	931	1,190	225	398	193	53	154
28	52	86	158	130	200	934	1,060	228	442	204	50	144
29	136	80	160	130	.....	949	955	211	488	158	48	139
30	146	75	165	134	.....	886	922	199	768	132	50	171
31	106	.....	170	135	.....	838	.....	193	.....	153	44	.....
1941–42												
1	180	283	635	410	950	325	1,930	438	1,560	2,790	1,000	803
2	200	309	605	360	900	350	2,010	460	1,750	1,840	930	938
3	493	392	593	320	820	440	2,000	593	2,510	1,640	930	1,230
4	402	475	581	290	760	540	1,910	597	3,070	1,640	991	1,190
5	426	502	*553	260	720	620	1,820	713	3,480	a1,640	1,120	1,310
6	439	421	542	230	700	610	1,750	810	3,930	1,630	1,360	1,570
7	1,640	475	516	200	680	590	1,660	a850	3,250	1,400	1,260	1,600
8	858	511	502	180	650	570	1,560	890	3,030	1,250	1,220	1,140
9	633	579	493	160	620	560	1,430	1,210	2,930	1,120	1,210	959
10	591	589	420	150	590	570	1,270	1,230	2,530	1,040	1,210	888
11	522	581	300	150	560	525	1,190	1,340	2,320	1,020	1,140	831
12	455	562	250	150	520	506	1,080	1,580	2,110	988	1,020	975
13	408	577	300	*155	510	527	1,020	1,850	1,930	967	906	847
14	365	599	350	160	490	522	955	2,020	1,700	1,090	808	769
15	338	621	400	160	470	504	910	1,930	1,510	1,200	731	951
16	306	687	440	190	460	500	865	1,730	1,460	1,190	677	662
17	290	733	470	220	410	498	808	1,600	1,320	1,040	624	672
18	280	725	500	260	360	504	761	1,540	1,190	1,010	589	782
19	266	1,120	490	300	330	513	713	1,440	1,510	1,560	581	862
20	262	1,080	460	340	310	518	687	1,220	2,730	1,110	533	831
21	257	940	470	380	290	543	637	1,140	2,220	835	520	876
22	272	898	520	420	*275	543	605	1,110	1,840	785	480	893
23	255	880	540	480	280	553	577	990	1,420	692	449	a892
24	239	838	470	540	290	*577	551	915	1,190	866	407	890
25	234	788	500	620	300	695	536	872	1,130	692	384	883
26	234	727	450	730	320	1,080	527	a910	1,110	597	362	874
27	332	695	350	880	320	1,410	513	948	954	607	354	866
28	234	697	300	920	320	1,820	488	875	1,500	1,040	369	854
29	213	675	350	960	.....	1,800	465	822	2,570	792	351	799
30	258	657	370	1,000	.....	1,650	450	930	2,990	991	343	780
31	269	.....	450	990	.....	1,810	.....	1,070	.....	1,210	926	.....

*Winter discharge measurement made on this day.
(a) No gage-height record; discharge interpolated.

Little Sioux River near Blencoe and Turin, Iowa

LOCATION.—Wire-weight gage, lat. 41°58', long. 95°58', on line between secs. 28 and 33, T. 83 N., R. 44 W., at bridge on Brown's grade, 1 mile east of gaging station on Monona-Harrison ditch near Turin, 2.4 miles downstream from equalized ditch connecting Little Sioux River and Monona-Harrison ditch, 3½ miles downstream from Maple River, 3¾ miles south of Turin, 6½ miles northeast of Blencoe, and 16½ miles upstream from mouth. Datum of gage is 1,020.00 feet above mean sea level, datum of 1929 (Corps of Engineers, U. S. Army bench mark). Prior to May 7, 1942, wire-weight gage at site 5.8 miles downstream. Datum of gage was 1,010.26 feet above mean sea level, datum of 1929 (levels by Corps of Engineers, U. S. Army).

DRAINAGE AREA.—4,460 square miles (combined area above this station and above station on Monona-Harrison ditch, 1 mile west). 4,470 square miles prior to May 7, 1942.

RECORDS AVAILABLE.—May to September 1942. April 1939 to May 1942 at site near Blencoe, 5.8 miles downstream, published as Little Sioux River near Blencoe, Iowa (records equivalent).

EXTREMES.—Maximum discharge during 1941-42 year, 4,130 second-feet June 6 (gage height, 22.0 feet, from floodmark); minimum observed, 115 second-feet Aug. 27 (gage height, 8.15 feet).

1939-41: Maximum discharge, 3,250 second-feet Sept. 16, 1941; no flow at times during period September 1939 to October 1940, when all of flow was carried by Monona-Harrison ditch.

REMARKS.—Records fair except those for periods of ice effect, which are poor. Gage read once daily. At times part or all of flow is diverted above station into Monona-Harrison ditch (see page 180).

COOPERATION.—Records collected in cooperation with Army Engineers.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Observed					Adjusted for diversion around station by Monona-Harrison ditch	
	Second-foot-days	Maximum	Minimum	Mean	Run-off in Acre-feet	Per sq mile	Run-off in Inches
October 1940	2,191	233	0	70.7	4,350	0.029	0.03
November	3,669	233	85	122	7,280	.032	.04
December	5,162	245	90	167	10,240	.042	.05
Calendar year 1940	59,821.3	2,480	0	163	118,663	.098	1.32
January 1941	6,547	260	186	211	12,990	.053	.06
February	6,465	1,000	26	231	12,820	.160	.17
March	6,255	900	30	202	12,410	.371	.43
April	6,128	859	22	204	12,150	.266	.30
May	15,651	896	286	505	31,040	.125	.14
June	18,673	1,100	274	622	37,040	.174	.19
July	15,295	1,260	196	493	30,340	.124	.14
August	3,789	360	61	122	7,520	.029	.03
September	16,181	2,930	49	539	32,090	.203	.23
Water year 1940–41	106,006	2,930	0	290	210,270	.134	1.81
October 1941	19,345	1,990	303	624	38,370	.177	.20
November	29,890	1,930	358	996	59,290	.246	.27
December	20,061	923	470	647	39,790	.154	.18
Calendar year 1941	164,280	2,930	22	450	325,800	.173	2.34
January 1942	15,330	1,450	200	495	30,410	.118	.14
February	20,870	1,460	390	745	41,400	.174	.18
March	28,924	2,300	430	933	57,370	.233	.27
April	38,628	2,360	616	1,288	76,620	.309	.34
May	40,526	2,450	585	1,307	80,380	.308	.36
June	54,118	3,720	608	1,804	107,300	.761	.85
July	16,797	2,400	205	542	33,320	.402	.46
August	7,783	692	115	251	15,440	.230	.27
September	7,470	431	164	249	14,820	.274	.31
Water year 1941–42	299,742	3,720	115	821	594,500	.282	3.83

Note—Stage-discharge relation affected by ice Nov. 12-19, Dec. 1-31, 1940; Jan. 1 to Mar. 7, Mar. 17, 18, Dec. 10-20, 26-31, 1941; Jan. 1 to Mar. 13, 1942. Flow diverted into Monona-Harrison ditch 8 miles above station Oct. 1-12, 1940.

Little Sioux River near Blencoe and Turin, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940–41												
1	0	112	95	253	215	45	28	896	274	1,260	193	53
2	0	103	92	260	210	50	22	879	413	1,070	185	63
3	0	97	90	250	200	80	28	819	714	996	167	58
4	0	94	105	220	190	700	32	800	434	916	150	53
5	0	88	120	200	205	750	36	769	416	809	137	57
6	0	85	140	195	210	900	40	739	486	695	125	60
7	0	88	158	192	200	600	49	710	439	655	119	57
8	0	89	167	190	210	365	56	657	405	619	108	49
9	0	121	170	186	225	334	62	633	392	580	101	60
10	0	233	173	*190	230	243	59	592	389	665	98	97
11	0	173	170	210	240	220	54	560	396	700	95	85
12	0	140	160	220	250	206	49	524	750	504	92	69
13	140	120	134	224	1,000	195	74	495	771	450	85	67
14	143	105	136	228	900	178	131	482	798	481	80	942
15	137	94	140	230	700	150	176	522	863	546	73	2,350
16	130	98	135	230	400	143	142	490	990	392	69	2,930
17	108	95	130	230	300	100	150	414	1,040	349	360	2,690
18	106	100	150	210	200	85	155	403	925	334	241	1,440
19	98	130	170	205	100	118	173	371	807	319	164	1,020
20	94	146	180	205	30	152	383	360	673	271	94	647
21	92	*158	185	205	*26	137	482	356	613	266	225	536
22	90	152	190	205	27	108	466	337	683	263	156	437
23	89	149	195	200	28	85	358	331	488	252	77	390
24	88	146	210	197	30	59	336	326	464	239	83	350
25	88	143	210	195	30	*45	342	315	537	225	88	323
26	86	142	210	194	33	35	358	308	554	223	86	290
27	85	137	212	194	36	30	298	322	605	268	72	270
28	86	126	220	200	40	36	285	326	609	288	72	248
29	170	a105	230	204	.....	39	445	317	645	263	66	241
30	233	a100	240	210	.....	36	859	312	1,100	201	61	249
31	128	.....	245	215	.....	31	.....	286	.....	196	67	.....
1941–42												
1	303	358	923	470	1,460	430	2,290	585	1,270	2,400	542	246
2	379	379	884	450	1,430	460	2,360	631	3,820	1,180	692	227
3	545	410	848	420	1,360	510	2,110	689	3,660	926	311	425
4	780	500	799	380	1,260	600	2,210	789	3,160	856	302	363
5	653	579	794	340	1,100	660	2,110	c850	3,450	842	324	363
6	653	680	*763	310	1,020	680	2,050	c900	c3,720	788	347	416
7	1,990	720	725	270	970	690	1,970	c1,070	c2,990	628	355	431
8	1,740	782	693	240	940	700	1,870	c1,070	c2,480	512	350	314
9	1,440	843	689	220	920	700	1,710	c1,310	c1,970	445	342	239
10	1,150	882	610	210	900	700	1,610	c1,430	c1,560	431	340	215
11	871	905	510	200	870	690	1,460	1,820	c1,450	402	326	201
12	713	905	500	200	840	690	1,370	1,870	c1,340	395	304	332
13	607	892	550	*200	780	700	1,270	2,120	1,380	368	271	219
14	543	976	580	210	700	711	1,190	2,450	1,180	380	244	198
15	502	1,050	610	220	650	700	1,170	2,300	c1,060	414	222	190
16	476	1,130	620	240	600	680	1,200	c1,960	c1,020	425	204	171
17	440	1,160	630	270	540	697	987	c1,820	943	353	193	167
18	411	1,160	640	300	480	697	965	c1,730	850	285	182	223
19	392	1,480	640	330	440	706	908	c1,590	920	620	173	393
20	382	1,930	650	360	420	722	821	c1,330	2,240	384	165	223
21	376	1,750	651	400	*405	753	706	c1,170	1,520	284	158	220
22	416	1,510	653	440	400	763	830	c1,250	1,250	223	149	205
23	413	1,400	656	500	395	782	758	c1,420	920	223	138	202
24	361	1,270	656	580	395	*811	715	c1,070	788	684	128	196
25	378	1,200	647	660	390	892	697	1,020	778	267	124	194
26	430	1,100	620	800	395	1,380	684	954	671	205	123	196
27	452	1,040	570	960	400	1,900	673	1,120	608	218	115	185
28	427	987	510	1,100	410	2,300	678	926	1,060	342	228	180
29	403	968	490	1,250	.....	2,090	640	1,120	2,920	414	165	172
30	364	944	480	1,350	.....	1,990	616	932	3,140	333	132	164
31	355	.....	470	1,450	.....	2,140	.....	1,230	.....	570	134	.....

*Winter discharge measurement made on this day.
(a) No gage-height record; discharge estimated.
(c) Backwater from Missouri River.

Monona-Harrison ditch near Blencoe and Turin, Iowa

LOCATION.—Wire-weight gage, lat. 41°58′, long. 95°59′, on line between secs. 29 and 32, T. 83 N., R. 44 W., at bridge on Brown's grade, 1 mile west of gaging station on Little Sioux River near Turin, 1½ miles downstream from equalizer ditch connecting Little Sioux River and Monona-Harrison ditch, 4 miles southwest of Turin, 5½ miles northeast of Blencoe, and about 13 miles upstream from mouth. Datum of gage is 1,020.00 feet above mean sea level, datum of 1929 (Corps of Engineers, U. S. Army bench mark. Prior to May 7, 1942, wire-weight gage at site sea level, datum of 1929 (levels by Army Engineers).

RECORDS AVAILABLE.—May to September 1942. April 1939 to May 1942 at site near Blencoe, 4.8 miles downstream, published as Monona-Harrison ditch near Blencoe, Iowa (records equivalent).

EXTREMES.—Maximum discharge during 1941-42 year, 5,200 second-feet July 1 (gage height, 18.0 feet, from graph based on gage readings); minimum, 8 second-feet Jan. 8-12.

1939-41: Maximum discharge, 4,820 second-feet June 4, 1940; minimum observed, 3 second-feet Sept. 8, 1941.

REMARKS.—Records fair except those for periods of ice effect, doubtful gage-height record, backwater from bridge construction or from Missouri River, all of which are poor. Gage read once daily and sometimes oftener during high stages. Monona-Harrison ditch is a dredged channel and is a continuation of West Fork ditch, roughly paralleling Litle Sioux River into which it empties a quarter of a mile above Missouri River. At times part or all of flow of Little Sioux River is diverted into Monona-Harrison ditch through an equalizer ditch which connects the two channels 1½ miles above station. The diversion is changed by regulating the height of an obstruction composed of earth and rock in the equalizer ditch.

COOPERATION.—Records collected in cooperation with Army Engineers.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Discharge in second-feet				Run-off	
		Maximum	Minimum	Mean	Per square mile	Inches	Acre feet
October 1940	1,808	128	10	58.3			3,590
November	580	34	8	19.3			1,150
December	613	30	12	19.8			1,220
Calendar year 1940	99,650	3,740	8	272			197,660
January 1941	839	33	20	27.1			1,660
February	13,592	2,200	20	485			26,960
March	45,186	3,000	420	1,458			89,630
April	29,616	1,750	107	987			58,740
May	1,718	108	21	55.4			3,410
June	4,714	394	30	157			9,350
July	1,883	500	10	60.7			3,730
August	275	32	4	8.9			545
September	11,048	2,720	3	368			21,910
Water year 1940-41	111,872	3,000	3	306			221,895
October 1941	5,111	819	45	165			10,140
November	3,069	469	52	102			6,090
December	1,267	61	25	40.9			2,510
Calendar year 1941	118,318	3,000	3	324			234,700
January 1942	989	70	8	31.9			1,960
February	963	60	20	34.4			1,910
March	3,364	450	31	109			6,670
April	2,783	261	44	92.8			5,520
May	2,059	121	36	66.4			4,080
June	47,718	4,840	85	1,591			94,650
July	38,709	3,580	702	1,249			76,780
August	24,098	1,710	328	777			47,800
September	29,138	1,440	718	971			57,790
Water year 1941-42	159,268	4,840	8	436			315,900

Note—Stage-discharge relation affected by ice Nov. 12-17, Dec. 1-4, 11-24, 1940; Jan. 4 to Mar. 8, Mar. 17, 18, Dec. 11-17, 31, 1941; Jan. 1 to Mar. 2, 1942.

Monona-Harrison ditch near Blencoe and Turin, Iowa—Continued
Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940–41												
1	116	29	15	31	23	420	897	94	30	d500	10	5
2	116	19	12	32	23	440	858	93	34	d400	10	6
3	116	16	12	30	23	800	986	100	361	d200	10	7
4	117	14	12	25	23	2,500	886	96	167	46	9	6
5	111	12	13	20	23	2,600	880	95	56	44	9	5
6	105	11	14	20	22	3,000	894	101	62	40	9	4
7	102	11	16	20	20	2,800	908	84	61	38	9	4
8	119	11	18	20	20	2,500	914	71	60	24	9	3
9	120	12	22	21	20	2,270	928	58	95	22	9	85
10	118	14	22	*21	20	1,970	931	56	91	30	8	272
11	120	14	20	25	25	1,860	925	50	88	106	8	126
12	109	11	19	28	40	1,800	928	46	256	60	7	38
13	13	10	18	30	2,200	1,740	920	44	282	42	7	17
14	13	9	17	32	1,800	1,450	914	46	c300	43	6	1,060
15	12	8	16	33	1,500	1,390	822	44	c350	42	5	1,570
16	12	9	15	33	1,000	1,290	892	82	c300	42	4	2,720
17	12	9	15	33	900	1,200	878	43	c202	25	32	2,350
18	11	10	16	32	875	1,200	858	38	c100	20	24	933
19	11	19	18	31	825	1,270	830	34	c76	18	13	421
20	12	28	20	30	750	1,340	c1,300	33	c110	15	9	283
21	11	*34	20	30	700	1,160	1,750	108	139	14	5	234
22	11	33	21	30	600	1,150	1,600	39	394	14	8	171
23	11	32	22	29	500	1,100	1,320	40	238	12	7	144
24	11	32	24	28	360	1,060	1,250	30	128	12	8	121
25	11	32	27	28	340	*1,000	1,260	24	105	11	6	116
26	11	31	26	27	320	991	1,200	21	95	11	6	108
27	11	31	27	26	320	1,010	1,130	26	79	10	6	82
28	10	30	28	25	320	997	1,040	34	91	10	7	60
29	128	29	29	24	.....	991	610	29	114	10	5	51
30	82	20	29	23	.....	965	107	29	d250	11	5	46
31	46	.....	30	22	.....	922	.....	30	.....	11	5	.....
1941–42												
1	96	52	61	32	60	32	261	42	85	3,580	1,710	798
2	112	55	58	27	60	31	237	e44	1,660	1,870	1,630	775
3	145	65	54	18	56	d35	238	e47	2,010	1,540	1,010	1,440
4	189	102	52	15	48	d45	142	e50	1,250	1,540	989	1,160
5	618	94	48	13	44	56	118	e53	2,420	1,530	1,030	1,140
6	819	78	*48	11	38	74	104	e57	e3,180	1,470	1,100	1,260
7	791	72	45	9	38	96	103	61	e2,490	1,250	1,120	1,370
8	322	69	44	8	40	73	99	61	e2,560	1,120	1,110	1,090
9	226	66	40	8	38	69	e90	73	e1,950	1,050	1,090	926
10	179	68	36	8	36	54	e85	60	e1,500	1,060	1,090	857
11	140	70	33	8	34	68	e80	95	e1,330	995	1,060	809
12	114	65	29	*8	31	66	77	68	e1,290	986	944	1,350
13	104	60	25	11	33	46	94	66	1,060	947	851	998
14	79	59	26	12	28	69	91	107	e1,000	1,280	785	815
15	68	56	28	16	29	136	87	75	e920	1,130	725	998
16	58	54	30	20	30	74	79	77	e850	1,080	675	872
17	54	52	34	23	24	68	75	e70	775	950	642	718
18	81	54	39	29	20	64	69	e62	680	839	610	1,010
19	54	210	45	36	20	59	69	e60	772	1,260	585	971
20	52	469	48	40	26	59	62	e58	2,920	1,040	552	956
21	52	296	52	46	*30	58	58	e56	2,000	980	520	974
22	77	198	41	49	29	58	58	e54	1,450	765	485	908
23	148	136	35	50	28	59	59	e60	986	702	439	899
24	112	119	30	52	29	*59	55	48	812	1,260	399	872
25	96	98	34	56	30	72	52	42	675	848	369	860
26	64	80	37	62	28	204	51	40	605	722	350	875
27	65	74	40	62	27	450	48	36	615	815	328	881
28	56	68	44	62	29	412	51	121	813	1,460	492	860
29	47	67	46	68	.....	288	47	96	4,220	1,440	620	842
30	45	63	46	70	.....	192	44	116	4,840	1,470	406	854
31	48	.....	39	60	.....	238	.....	104	.....	1,730	382	.....

*Winter discharge measurement made on this day.
(c) Backwater from Missouri River; discharge computed on basis of gage heights, discharge measurements, and record for West Fork ditch at Holly Springs and Little Sioux River near Kennebec.
(d) Doubtful gage-height record; discharge computed on basis of records for West Fork ditch at Holly Springs and stations on Little Sioux River near Kennebec, Blencoe, and Turin.

West Fork ditch at Holly Springs, Iowa

LOCATION.—Wire-weight gage, lat. 42°16', long. 96°05', between secs. 9 and 16, T. 86 N., R. 45 W., at bridge on State Highway 141 at west edge of village of Holly Springs, 12 miles upstream from Wolf Creek, 16½ miles north of Onawa, and 22 miles southeast of Sioux City. Datum of gage is 1,052.82 feet above mean sea level, datum of 1929 (Corps of Engineers, U. S. Army, bench mark).

DRAINAGE AREA.—395 square miles.

RECORDS AVAILABLE.—April 1939 to September 1942.

EXTREMES.—Maximum discharge observed during 1941-42 year, 878 second-feet June 30 (gage height, 13.68 feet); minimum, 3 second-feet Jan. 7, 8; minimum gage height observed, 5.66 feet Aug. 26.

1939-41: Maximum discharge, 3,360 second-feet June 4, 1940 (gage height, 19.85 feet, from floodmark), by slope-area method; minimum observed, 1 second-foot Sept. 6, 1941; minimum gage height observed, 5.07 feet June 21, 1939.

REMARKS.—Records fair except those for periods of ice effect, which are poor. Gage read twice daily. The West Fork ditch is a dredged channel which diverts flow of West Fork of Little Sioux River at Holly Springs and carries it 5½ miles south, thence southeast 6½ miles to a point 1½ miles west of Kennebec, where Wolf Creek enters from the left. From this point the ditch roughly parallels Little Sioux River to a point about 3 miles southwest of Turin where an equalizer ditch connects it with Little Sioux River. From this point south the ditch is known as Monona-Harrison ditch.

COOPERATION.—Records collected in cooperation with Corps of Engineers, U. S. Army.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Discharge in second-feet				Run-off	
		Maximum	Minimum	Mean	Per square mile	Inches	Acre feet
October 1940	387	170	3	12.5	0.032	0.04	768
November	232	14	4	7.7	.019	.02	460
December	298	13	3	9.6	.024	.03	591
Calendar year 1940	15,381	1,800	2	42.0	.106	1.44	30,520
January 1941	303	12	8	9.8	.025	.03	601
February	3,801	1,030	9	136	.344	.36	7,540
March	7,924	1,030	16	256	.648	.75	15,720
April	2,614	404	32	87.1	.221	.25	5,180
May	773	48	13	24.9	.063	.07	1,530
June	1,757	187	16	58.6	.148	.17	3,480
July	529	80	6	17.1	.043	.05	1,050
August	96	6	2	3.1	.0078	.009	190
September	4,317	1,200	1	144	.365	.41	8,560
Water year 1940–41	23,031	1,200	1	63.1	.160	2.19	45,670
October 1941	1,590	541	14	51.3	.130	.15	3,150
November	1,529	244	24	51.0	.129	.14	3,030
December	751	36	15	24.2	.061	.07	1,490
Calendar year 1941	25,984	1,200	1	71.2	.180	2.46	51,520
January 1942	601	50	3	19.4	.049	.06	1,190
February	650	40	13	23.2	.059	.06	1,290
March	2,500	534	22	80.6	.204	.24	4,960
April	1,504	147	23	50.1	.127	.14	2,980
May	1,386	168	22	44.7	.113	.13	2,750
June	5,993	845	32	200	.506	.56	11,890
July	3,912	617	18	126	.319	.37	7,760
August	1,687	536	11	54.4	.138	.16	3,350
September	1,435	307	15	47.8	.121	.14	2,850
Water year 1941–42	23,538	845	3	64.5	.163	2.22	46,690

Note—Stage-discharge relation affected by ice Nov. 22 to Dec. 31, 1940; Jan. 1 to Mar. 19, Nov. 24-27, Dec. 11-21, 26-31, 1941; Jan. 1 to Mar. 11, 1942.

West Fork ditch at Holly Springs, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940–41												
1	5	8	6	12	10	16	35	46	16	80	6	2
2	5	7	5	10	10	95	32	44	46	51	5	2
3	5	6	5	9	10	582	35	43	80	35	4	2
4	6	6	7	8	10	976	35	40	49	27	4	2
5	6	6	9	10	10	1,030	35	44	31	20	4	2
6	7	5	10	11	10	845	35	48	44	18	4	1
7	10	4	12	10	10	364	38	38	38	18	4	2
8	14	6	12	9	10	360	44	33	23	15	4	151
9	10	6	13	*9	9	457	79	31	21	15	4	129
10	7	7	12	10	9	575	82	28	21	33	3	58
11	6	a6	13	11	9	478	80	26	66	24	3	23
12	7	a5	6	10	28	339	68	25	63	22	3	12
13	6	a4	3	10	605	273	60	24	133	17	2	6
14	6	a4	9	10	1,030	259	57	22	187	16	2	1,070
15	5	a5	8	10	791	155	64	24	82	14	2	648
16	6	a8	8	10	553	145	70	20	62	13	2	1,200
17	6	a11	8	9	176	140	50	19	44	12	5	717
18	5	a12	8	9	105	130	44	17	38	11	4	107
19	3	a13	9	10	92	110	77	16	31	9	4	46
20	4	a14	10	11	83	79	379	18	26	8	4	28
21	6	a13	10	10	76	82	404	18	116	8	3	16
22	6	*11	10	9	42	67	194	18	59	7	2	10
23	6	10	11	9	*26	61	158	16	158	7	2	8
24	6	8	11	9	24	*48	98	16	76	7	2	9
25	6	9	11	9	21	35	82	15	59	6	2	11
26	6	9	12	9	16	44	70	13	36	6	2	10
27	6	8	12	9	14	38	59	13	29	6	2	8
28	8	7	12	10	12	36	54	14	28	6	2	7
29	170	7	12	10	.....	36	50	14	39	6	2	8
30	24	7	12	10	.....	35	46	13	56	6	2	22
31	14	.....	12	11	.....	34	.....	17	.....	6	2	.....
1941–42												
1	22	31	32	13	40	22	147	23	46	490	536	78
2	28	26	31	10	35	24	134	24	41	187	142	307
3	62	27	29	8	32	26	116	26	46	135	110	109
4	90	26	28	6	31	30	89	28	542	79	72	51
5	541	27	26	5	32	37	73	30	660	71	48	58
6	167	29	*24	4	30	45	67	31	279	63	42	64
7	72	29	25	3	28	55	62	33	609	53	36	37
8	44	29	24	3	26	65	56	36	342	48	33	28
9	31	28	23	4	25	60	52	37	143	45	30	25
10	25	25	20	4	24	50	48	44	93	42	27	23
11	21	25	17	4	23	45	45	40	82	44	25	20
12	18	29	15	4	23	44	44	37	62	46	24	162
13	18	31	16	4	24	44	43	42	52	33	24	67
14	16	31	18	*5	24	43	43	48	50	30	23	19
15	16	30	20	7	23	43	42	65	40	28	22	29
16	16	28	20	11	20	40	40	63	37	28	21	19
17	15	26	24	15	16	39	38	37	32	26	20	17
18	15	24	25	18	14	40	36	34	32	23	19	16
19	15	244	27	20	13	41	34	32	42	21	17	15
20	14	235	27	23	*16	41	31	31	569	26	16	60
21	28	156	30	25	17	41	30	28	158	25	15	35
22	154	54	36	30	18	41	30	26	80	20	14	25
23	23	46	36	32	18	*41	28	25	52	18	13	21
24	16	45	28	35	19	41	27	24	46	18	12	20
25	16	50	24	38	19	62	27	22	42	18	12	20
26	18	40	22	40	19	205	26	22	37	69	11	21
27	24	33	21	42	20	534	25	92	42	244	48	21
28	15	41	20	45	21	222	25	168	224	392	126	23
29	15	46	21	50	.....	169	23	122	668	617	68	24
30	15	38	22	48	.....	160	23	48	845	356	41	21
31	20	.....	20	45	.....	150	.....	68	.....	617	40	.....

*Winter discharge measurement made on this day.
(a) No gage-height record; discharge computed on basis of records for stations on nearby streams.

Maple River at Mapleton, Iowa

LOCATION.—Wire-weight gage, lat. 42°09′, long. 95°48′, in SE¼ sec. 23, T. 85 N., R. 43 W., at bridge on State Highway 35, 80 feet downstream from Chicago & Northwestern Railway bridge, three quarters of a mile southwest of Mapleton, 12½ miles northeast of Turin, and 16 miles upstream from mouth. Datum of gage is 1,085.86 feet above mean sea level, datum of 1929.

DRAINAGE AREA.—661 square miles.

RECORDS AVAILABLE.—October 1941 to September 1942. April 1939 to October 1941 at site at Turin, 14 miles downstream, published as Maple River at Turin, Iowa.

EXTREMES.—Maximum discharge during year, 4,950 second-feet June 30 (gage height, 20.30 feet, from floodmark); minimum, 30 second-feet Jan. 6-8; minimum gage height observed, 6.29 feet Dec. 27.
1939-42: Maximum discharge, that of June 30, 1942; minimum, 4 second-feet Jan. 18-23, 1940.

REMARKS.—Records fair except those for periods of ice effect, and those estimated or interpolated, all of which are poor. Gage read once daily, more often during high stages.

COOPERATION.—Records collected in cooperation with Corps of Engineers, U. S. Army.

Monthly Discharg for Water Year, 1942

Month	Second-foot-days	Discharge in second-feet				Run-off	
		Maximum	Minimum	Mean	Per square mile	Inches	Acre feet
October 1941	4,215	650	58	136	0.206	0.24	8,360
November	6,708	430	74	224	.339	.38	13,310
December	3,417	200	45	110	.166	.19	6,780
January 1942	3,177	310	30	102	.154	.18	6,300
February	3,381	260	60	121	.183	.19	6,710
March	5,511	397	70	178	.269	.31	10,930
April	3,578	257	69	119	.180	.20	7,100
May	3,650	232	72	118	.179	.21	7,240
June	31,768	4,510	115	1,059	1.60	1.79	63,010
July	8,512	940	114	275	.416	.48	16,880
August	3,882	588	60	125	.189	.22	7,700
September	3,281	300	58	109	.165	.18	6,510
Water year 1941-42	81,080	4,510	30	222	.336	4.57	160,800

Maple River at Mapleton, Iowa—Continued

Daily Discharge, in Second-feet, for Water Year 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1941-42												
1.....	80	74	a145	60	260	70	257	a84	606	940	588	58
2.....	85	148	a139	50	240	75	239	94	4,200	495	296	98
3.....	85	168	132	40	220	90	211	103	2,370	387	239	191
4.....	100	122	126	35	205	140	188	105	877	346	178	253
5.....	125	146	*121	32	200	200	a172	102	1,520	a305	146	117
6.....	170	196	115	30	200	240	155	168	2,120	264	134	114
7.....	650	156	102	30	195	250	145	195	1,080	242	125	81
8.....	430	190	101	30	185	235	135	148	597	218	115	75
9.....	430	224	102	31	170	210	129	135	349	219	109	74
10.....	320	194	98	33	155	185	125	120	352	210	104	69
11.....	170	205	95	36	135	166	116	232	247	283	99	72
12.....	150	186	90	40	110	142	113	162	201	240	95	160
13.....	100	282	95	43	95	120	113	150	174	186	92	78
14.....	90	346	100	*45	85	124	109	135	a152	160	95	74
15.....	85	328	105	50	75	118	105	115	130	186	96	67
16.....	80	314	110	55	65	121	109	104	122	150	a97	67
17.....	70	266	120	65	60	138	102	111	115	127	a94	85
18.....	65	238	130	60	62	126	98	a106	178	191	a89	300
19.....	65	416	150	62	65	a122	94	102	314	280	a84	282
20.....	65	416	170	65	*68	119	89	95	1,860	184	80	191
21.....	65	430	200	75	70	129	86	98	637	144	76	130
22.....	65	316	129	85	70	150	84	194	319	122	72	106
23.....	65	211	130	100	68	145	80	110	224	114	68	92
24.....	60	168	124	150	67	*152	79	93	181	142	66	63
25.....	58	169	100	200	65	229	78	84	308	115	62	61
26.....	61	170	93	235	63	222	76	83	217	158	60	66
27.....	84	164	50	260	63	397	75	81	218	204	75	68
28.....	133	157	45	280	65	337	73	72	3,570	439	210	66
29.....	74	157	55	300	.....	215	69	74	4,510	607	81	63
30.....	70	a151	75	310	.....	268	74	101	4,020	349	76	a60
31.....	65	.....	70	290	.....	276	.....	94	.....	505	81	.....

Note—Stage-discharge relation affected by ice Dec. 10-21, Dec. 27 to Mar. 10. Discharge Oct. 1-24 estimated on basis of records for station at Turin.

*Winter discharge measurement made on this day.

(a) No gage-height record; discharge interpolated or estimated on basis of weather records and records for Boyer River at Logan, Iowa.

Maple River at Turin, Iowa

LOCATION.—Wire-weight gage, lat. 42°01′, long. 95°57′, in SW¼ NE¼ sec. 10, T. 83 N., R. 44 W., at bridge on State Highway 37, a quarter of a miles upstream from Beaver Creek, 0.7 mile east of Turin, and 2 miles upstream from mouth. Datum of gage is 1,028.45 feet above mean sea level, datum of 1929.

DRAINAGE AREA.—725 square miles.

RECORDS AVAILABLE.—April 1939 to October 1941 (discontinued).

EXTREMES.—1939: Maximum discharge during period April to September, 1, 910 second-feet July 4 (gage height, 16.03 feet); minimum, 10 second-feet Sept. 24, 25.

1939-40: Maximum discharge during water year, 2,920 second-feet June 4 (gage height, 19.42 feet, from floodmark), by slope-area method; minimum, 4 second-feet Jan. 18-23.

1940-41: Maximum discharge during water year, 889 second-feet Sept. 16 (gage height, 15.48 feet, affected by backwater); minimum, 9 second-feet Sept. 9, 10, 13.

REMARKS.—Records fair except those for periods of ice effect, no gage-height record, or backwater from Little Sioux River, all of which are poor. Gage read once daily, more often during high stages.

COOPERATION.—Records collected in cooperation with Corps of Engineers, U. S. Army.

Monthly Discharge for Calendar and Water Year, as indicated

Month	Second-foot-days	Discharge in second-feet				Run-off	
		Maximum	Minimum	Mean	Per square mile	Inches	Acre feet
October 1940	1,007	60	26	32.5	0.045	0.05	2,000
November	1,191	60	24	39.7	.055	.06	2,360
December	1,419	57	38	45.8	.063	.07	2,810
Calendar year 1940	40,045	2,440	4	109	.150	2.05	79,420
January 1941	1,309	51	31	42.2	.058	.07	2,600
February	3,366	450	45	120	.166	.17	6,680
March	5,983	500	68	193	.266	.31	11,870
April	3,148	279	59	105	.145	.16	6,240
May	2,693	245	38	86.9	.120	.14	5,340
June	3,803	362	38	127	.175	.20	7,540
July	3,025	352	29	97.6	.135	.16	6,000
August	854	204	13	27.5	.038	.04	1,690
September	3,530	566	9	118	.163	.18	7,000
Water year 1940–41	31,328	566	9	85.8	.118	1.61	62,130

Maple River at Turin, Iowa—Continued

Daily Discharge, in Second-feet, for Water Year 1941

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940-41												
1	34	35	52	45	45	110	68	245	38	352	33	12
2	34	34	51	43	46	200	65	226	156	275	33	20
3	35	34	50	40	47	250	69	190	284	245	29	12
4	33	a34	50	34	48	400	67	181	91	198	26	12
5	34	29	52	32	50	500	66	156	90	162	23	10
6	33	27	53	31	48	350	66	142	81	124	25	19
7	34	28	56	32	46	300	66	133	82	102	22	13
8	35	27	57	33	45	250	71	119	84	96	21	11
9	34	30	57	34	46	300	89	98	78	93	19	9
10	33	31	56	*36	47	350	91	84	72	238	17	9
11	32	30	52	38	52	300	90	74	142	147	*16	10
12	30	27	48	43	125	250	85	68	284	107	52	10
13	31	25	42	47	400	220	75	60	*362	70	22	*9
14	30	24	41	48	450	200	74	57	c296	59	16	c296
15	30	25	41	50	400	195	70	133	c228	130	13	*c292
16	29	27	40	51	300	180	69	59	c160	51	13	*c566
17	*28	30	38	51	175	150	60	54	*c119	46	204	*c527
18	29	40	38	48	150	165	62	51	c100	44	44	c391
19	28	45	38	46	100	175	59	48	*91	a40	26	*c292
20	28	50	38	45	90	164	141	48	72	a38	21	170
21	28	*56	38	45	88	135	*206	*47	57	a37	21	124
22	27	60	40	46	*86	117	234	46	91	a37	19	101
23	27	60	41	46	85	106	191	47	59	a36	17	82
24	26	57	43	44	82	*94	152	45	54	35	17	87
25	26	54	44	43	80	82	148	42	53	33	17	80
26	26	53	43	42	78	79	139	41	54	31	16	79
27	26	53	43	42	77	77	114	40	132	67	15	74
28	28	53	43	42	80	73	96	38	120	35	15	69
29	60	56	44	43	.....	72	86	42	76	30	15	67
30	58	57	45	44	.....	71	279	39	197	38	14	77
31	41	.....	45	45	.....	68	.....	40	.....	29	13	.....

Note—Stage-discharge relation affected by ice Nov. 12 to Mar. 19.
*Discharge measurement made on this day.
(a) No gage-height record; discharge estimated.
(c) Backwater from Little Sioux River; discharge computed on basis of discharge measurements and gage heights.

LITTLE SIOUX RIVER BASIN

Lakes in Little Sioux River Basin

Spirit Lake at Orleans, Iowa

LOCATION.—Float gage in pipe well, lat. 43°27′, long. 95°06′, in sec. 27, T. 100 N., R. 36 W., at State Fish Hatchery at Orleans, Dickinson County, Iowa. Datum of gage is 90.00 feet above Iowa Lake Survey datum and 1,387.25 feet above mean sea level, datum of 1929.

OBSERVER.—John Schwalenburg, 1942.

RECORDS AVAILABLE.—May 1933 to September 1942.

EXTREMES.—1933: Maximum gage height observed during period, 9.88 feet May 20; minimum, 8.68 feet Sept. 29.

1933-34: Maximum gage height observed during water year, 8.70 feet Oct. 7; minimum observed, 7.16 feet Sept. 16-19, 22, 23.

1934-35: Maximum gage height observed during water year, 8.30 feet June 25; minimum observed, 6.94 feet Nov. 7, 8, 9.

1935-36: Maximum gage height observed during water year, 8.41 feet May 24; minimum observed, 6.75 feet Oct. 30.

1936-37: Maximum gage height observed during water year, 8.42 feet June 26; minimum observed, 7.01 feet Oct. 14, 16.

1937-38: Maximum gage height observed during water year, 11.14 feet Sept. 30; minimum observed, 7.65 feet Dec. 11.

1938-39: Maximum gage height observed during water year, 11.80 feet May 26; minimum observed, 10.74 feet Sept. 30.

1939-40: Maximum gage height observed during water year, 10.78 feet June 7; minimum observed, 9.42 feet Sept. 21, 23.

1940-41: Maximum gage height observed during water year, 10.31 feet May 27; minimum observed, 9.26 feet Sept. 26.

1941-42: Maximum gage height observed during water year, 11.47 feet Sept. 19; minimum observed, 9.19 feet Oct. 29, Nov. 4.

1933-42: Maximum gage height observed, 11.80 feet May 26, 1939; minimum observed, 6.75 feet Oct. 30, 1935.

REMARKS.—Gage heights influenced by changes in direction and velocity of wind. No discharge from lake during period of record.

COOPERATION.—Records collected in cooperation with Iowa State Conservation Commission.

Spirit Lake at Orleans, Iowa—Continued

Daily Gage height, in Feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940–41												
1		9.46										
2											9.90	
3				9.59								
4		9.42			9.62							
5												9.36
6								10.09				
7				9.60		9.76			10 09		9.84	
8	9.46			9.60	9.62							
9			9.56				9.95					
10	9.42				9.62			10.08				9.35
11	9.42						9.97					
12							9 97					
13								10 02				
14	9.49						9.97					
15					9.62		9.96					
16								10.08	10.08			
17	9.44				9.63							9.41
18				9.61								
19	9.39						9.96	10.16				
20	9.39						9.99					
21	9.39					9.82				10.00		
22												9.35
23												
24		9.49										
25	9.34			9.61								
26					9.65		9.97					9.26
27								10.31	10.18			
28				9.61		9.85						
29	9.41											
30									10.23			
31				9.62								
1941–42												
1		9.28	9.36						10.40		11.06	11.35
2			9.33			9.41	9.83	9.70	10.46			11.40
3	9.30	9.20	9.28				9.83		10.35			11.35
4		9.19	9.30						10.49			11.33
5		9.35	9.39		9.38	9.45			10.46		11.26	11.33
6	9.38	9.29	9.33						10.52		11.28	
7		9.33									11.27	
8		9.33	9.44			9.41		10.07	10.52	10.54		
9	9.32		9.32					10.11	10.53	10.54		11.36
10	9.35	9.26	9.29						10.52	10.69	11.29	11.35
11	9.34	9.26	9.30					10.12	10.65	10.69		11.33
12	9.36	9.26	9.30					10.17	10.68	10.69	11.28	11.44
13	9.33	9.23	9.30					10.15	10.70	10.71	11.33	
14	9.33	9.26			9.32			10.24		10.67		11.40
15		9.24	9.30	9.35					10.58	10.67	11.29	11.40
16		9.24	9.29	9.36		9.44		10.16	10.58	10.66		11.41
17		9.26	9.30	9.39					10.63	10.63	11.26	11.46
18	9.32	9.25	9.29		9.41			10.20	10.60	10.64	11.24	11.46
19		9.38						10.20	10.63			11.47
20	9.32	9.41	9.29					10.20	10.65		11.24	11.39
21		9.34				9.57		10.18		10.59		11.34
22	9.30	9.43	9.30					10.20		10.57	11.24	11.36
23	9.30		9.30			9.60		10.19	10.61	10.53		11.37
24		9.32		9.37		9.61	9.80		10.55		11.14	11.35
25	9.31	9.33						10.22	10.58	10.59	11.06	11.31
26		9.33			9.37			10.21	10.62		11.09	11.39
27			9.35			9.79	9.81	10.18	10.63	10.57	11.10	11.39
28	9.23	9.32				9.81	9.80	10.25			11.07	11.32
29	9.19						9.82	10.26		10.70	11.32	11.32
30		9.33	9.35				9.90	10.28		10.95		11.35
31	9.20		9.36			9.80		10.39			11.35	

LITTLE SIOUX RIVER BASIN

Lakes in Little Sioux River Basin

Okoboji Lake at Lakeside Laboratory, near Milford, Iowa

LOCATION.—Water-stage recorder, lat. 43°22'40", long. 95°10'40", in W½ sec. 23, T. 99 N., R. 37 W., at pumping station of Lakeside Laboratory on west shore of Okoboji Lake, 4 miles northwest of Milford, Dickinson County, Iowa. Datum of gage is 94.51 feet above Iowa Lake Survey datum and 1,391.76 feet above mean sea level, datum of 1929.

OBSERVER.—A. C. McKinstrey, 1942.

RECORDS AVAILABLE.—June 1938 to September 1942. May 1933 to June 1938 at staff gage, lat. 43°22', long. 95°08', in sec. 29, T. 99 N., R. 36 W., at State Pier in Arnold's Park, and at same datum.

EXTREMES.—1933: Maximum gage height observed during period, 3.53 feet May 16; minimum observed, 2.76 feet Sept. 30.

1933-34: Maximum gage height observed during water year, 2.76 feet Oct. 2; minimum observed, 1.68 feet Sept. 21.

1934-35: Maximum gage height observed during water year, 2.78 feet July 2; minimum observed, 1.38 feet Nov. 17, 19, 24, 25, Jan. 27.

1935-36: Maximum gage height observed during water year, 3.28 feet June 8; minimum observed, 1.50 feet Nov. 23.

1936-37: Maximum gage height observed during water year, 4.34 feet Aug. 21, 27; minimum observed, 1.78 feet Dec. 24.

1937-38: Maximum gage height recorded during water year, 5.37 feet Sept. 17; minimum observed, 3.59 feet Dec. 11.

1938-39: Maximum gage height during water year, 5.04 feet Oct. 1; minimum, 3.28 feet Sept. 30.

1939-40: Maximum gage height during water year, 3.27 feet Oct. 1; minimum, 2.20 feet Sept. 30.

1940-41: Maximum gage height during water year, 3.20 feet July 10; minimum, 1.93 feet (estimated) Oct. 26.

1941-42: Maximum gage height during water year, 4.55 feet Sept. 2, 11; minimum, 2.64 feet Oct. 31, Nov. 3.

1933-42: Maximum gage height, 5.37 feet Sept. 17, 1938; minimum observed, 1.38 feet Nov. 17, 19, 24, 25, 1934, Jan. 27, 1935.

REMARKS.—Mean daily gage heights are occasionally affected by direction and velocity of wind.

COOPERATION.—Records collected in cooperation with Iowa State Conservation Commission.

Okoboji Lake at Lakeside Laboratory, near Milford, Iowa—Continued

Daily Gage height, in Feet, for Water Years 1941 and 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1940–41												
1	2.17	2.01	2.03	2.09	2.12	2.14	2.61	.....	2.95	3.19	3.00	2.57
2	2.15	2.02	2.03	2.09	2.11	2.14	2.63	3.03	2.93	3.19	3.01	2.56
3	2.12	2.02	2.02	2.10	2.11	2.14	2.65	3.03	2.96	3.18	2.99	2.55
4	2.11	2.01	2.02	2.10	2.11	2.14	2.67	3.02	2.96	3.18	3.01	2.52
5	2.10	2.00	2.02	2.10	2.12	2.14	2.68	3.02	2.94	3.16	3.01	2.48
6	2.14	1.99	2.02	2.09	2.12	2.15	2.70	3.02	2.93	3.19	2.99	2.48
7	2.11	1.98	2.02	2.09	2.12	2.15	2.71	2.99	2.89	3.19	2.97	2.51
8	2.08	1.97	2.02	2.09	2.12	2.16	2.72	2.98	2.88	3.17	2.96	2.69
9	2.06	1.97	2.02	2.09	2.12	2.17	2.73	2.90	2.88	3.15	2.94	2.72
10	2.04	1.96	2.01	2.09	2.11	2.18	2.74	2.97	2.87	3.20	2.92	2.70
11	2.03	1.97	2.01	2.10	2.12	2.20	2.76	2.97	3.01	3.19	2.90	2.67
12	2.02	2.02	2.01	2.10	2.13	2.22	2.77	2.95	3.05	3.17	2.87	2.64
13	2.02	2.02	2.01	2.09	2.16	2.25	2.81	2.94	3.06	3.15	2.83	2.63
14	2.00	2.01	2.01	2.09	2.16	2.27	2.81	2.94	3.05	3.15	2.79	2.69
15	2.02	2.01	2.03	2.10	2.16	2.29	2.83	2.96	3.04	3.14	2.78	2.76
16	2.02	2.00	2.07	2.10	2.16	2.32	2.84	2.95	3.04	3.12	2.76	2.85
17	2.01	2.00	2.07	2.10	2.16	2.33	2.84	2.93	3.03	3.09	2.78	2.84
18	1.99	2.00	2.06	2.10	2.16	2.34	2.86	2.90	3.01	3.11	2.75	2.82
19	1.98	1.99	2.06	2.10	2.16	2.36	2.91	2.91	2.99	3.09	2.73	2.81
20	1.98	2.00	2.06	2.10	2.16	2.37	3.03	2.95	3.00	3.07	2.72	2.81
21	1.97	2.03	2.06	2.10	2.16	2.39	3.03	2.95	3.04	3.05	2.71	2.80
22	1.96	2.03	2.05	2.10	2.15	2.41	3.02	2.95	3.07	3.06	2.72	2.82
23	1.95	2.02	2.05	2.09	2.15	2.42	3.03	2.92	3.06	3.05	2.69	2.79
24	1.94	2.02	2.05	2.10	2.15	2.44	3.02	2.89	3.04	3.04	2.68	2.79
25	1.94	2.02	2.05	2.10	2.15	2.45	3.02	2.87	3.03	3.03	2.68	2.76
26	1.93	2.03	2.05	2.12	2.15	2.47	3.02	2.86	3.06	3.03	2.66	2.72
27	1.94	2.02	2.05	2.12	2.15	2.49	.....	2.89	3.13	3.03	2.64	2.72
28	1.97	2.03	2.06	2.12	2.14	2.52	.....	2.89	3.12	3.03	2.62	2.71
29	2.00	2.03	2.06	2.12	.....	2.54	.....	2.92	3.18	3.03	2.60	2.69
30	2.00	2.04	2.07	2.12	.....	2.57	.....	2.95	3.18	3.00	2.59	2.72
31	2.01	.....	2.08	2.12	.....	2.59	.....	2.96	.....	2.99	2.58	.....
1941–42												
1	2.72	2.68	2.78	2.84	2.89	2.93	3.31	3.44	3.93	4.07	4.42	4.54
2	2.72	2.67	2.78	2.85	2.89	2.93	3.33	3.47	3.97	4.06	4.41	4.55
3	2.73	2.65	2.77	2.85	2.89	2.93	3.32	3.47	4.01	4.05	4.41	4.53
4	2.72	2.67	2.78	2.85	2.89	2.94	3.34	3.45	4.02	4.04	4.40	4.51
5	2.82	2.75	2.78	2.85	2.89	2.94	3.37	3.49	4.04	4.04	4.38	4.50
6	2.80	2.72	2.77	2.85	2.89	2.94	3.37	3.59	4.04	4.02	4.39	4.50
7	2.78	2.71	2.76	2.85	2.90	2.94	3.37	3.59	4.07	4.00	4.39	4.53
8	2.79	2.70	2.77	2.85	2.90	2.94	3.37	3.60	4.05	4.01	4.39	4.52
9	2.78	2.69	2.77	2.85	2.91	2.94	3.37	3.63	4.05	4.07	4.38	4.51
10	2.76	2.68	2.75	2.85	2.92	2.94	3.37	3.62	4.07	4.18	4.36	4.49
11	2.75	2.67	2.75	2.85	2.93	2.94	3.36	3.69	4.13	4.19	4.34	4.49
12	.....	2.67	2.76	2.84	2.92	2.94	3.35	3.71	4.12	4.19	4.33	4.53
13	.....	2.68	2.76	2.84	2.92	2.94	3.35	3.71	4.10	4.18	4.33	4.52
14	.....	2.68	2.76	2.84	2.93	2.96	3.34	3.71	4.04	4.17	4.33	4.50
15	2.76	2.69	2.76	2.84	2.94	3.00	3.34	3.71	4.06	4.16	4.30	4.49
16	2.74	2.69	2.76	2.84	2.95	3.01	3.34	3.71	4.06	4.15	4.28	4.47
17	2.73	2.69	2.76	2.84	2.94	3.01	3.34	3.72	4.07	4.13	4.27	4.46
18	2.72	2.70	2.76	2.84	2.94	3.01	3.34	3.70	4.05	4.13	4.26	4.47
19	2.71	2.79	2.76	2.84	2.94	3.02	3.32	3.68	4.07	4.12	4.25	4.43
20	2.71	2.78	2.76	2.84	2.94	3.07	3.31	3.68	4.09	4.09	4.24	4.39
21	2.72	2.78	2.76	2.84	2.93	3.09	3.30	3.67	4.08	4.07	4.22	4.36
22	2.73	2.80	2.76	2.84	2.93	3.09	3.29	3.67	4.05	4.06	4.20	4.36
23	2.73	2.79	2.77	2.85	2.93	3.10	3.29	3.67	4.03	4.05	4.17	4.35
24	2.71	2.78	2.77	2.87	2.93	3.12	3.28	.....	4.02	4.03	4.13	4.31
25	2.71	2.77	2.78	2.87	2.93	3.19	3.26	3.69	4.05	4.05	4.09	4.31
26	2.72	2.77	2.83	2.88	2.93	3.25	3.26	3.72	4.06	4.05	4.09	4.33
27	2.72	2.78	2.83	2.88	2.93	3.26	3.26	3.72	4.07	4.03	4.09	4.31
28	2.67	2.78	2.82	2.88	2.93	3.29	3.26	3.78	4.09	4.10	4.09	4.28
29	2.65	2.78	2.82	2.88	.....	3.30	3.34	3.78	4.09	4.12	4.41	4.27
30	2.65	2.78	2.83	2.88	.....	3.30	3.37	3.91	4.08	4.35	4.51	4.27
31	2.65	.....	2.83	2.89	.....	3.30	.....	3.93	.....	4.41	4.54	.....

Soldier River at Pisgah, Iowa

LOCATION.—Wire-weight gage, lat. 41°50′, long. 95°56′, in NW¼ sec. 14, T. 81 N., R. 44 W., at bridge on County Road D at west edge of Pisgah, 2½ miles downstream from Stowe Creek and 13 miles upstream from mouth. Datum of gage is 1,036.34 feet (revised) above mean sea level, datum of 1929.

DRAINAGE AREA.—417 square miles.

RECORDS AVAILABLE.—March 1940 to September 1942.

EXTREMES.—Maximum discharge during 1941-42 year, 17,800 second-feet June 28 (gage height, 26.10 feet, from gage reading at crest of flood); minimum, 4 second-feet Jan. 10; minimum gage height observed, 4.73 feet Dec. 26.

1940-42: Maximum discharge, that of June 28, 1942; minimum, that of Jan. 10, 1942; minimum gage height observed, 4.44 feet July 6, 1940.

REVISIONS: The maximum discharge for the period March to September 1940 has been revised to 17,000 second-feet June 4, 1940 (gage height, 25.67 feet, from gage reading at crest of flood), superseding figure published in Water-Supply Paper 926.

REMARKS.—Records fair except those for periods of ice effect and those for days of rapidly changing stage, all of which are poor. Gage read twice daily, with additional readings during periods of high water.

COOPERATION.—Records collected in cooperation with Corps of Engineers, U. S. Army.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Discharge in second-feet				Run-off	
		Maximum	Minimum	Mean	Per square mile	Inches	Acre feet
October 1940	398	36	10	12.8	0.031	0.04	789
November	753	50	11	25.1	.060	.07	1,490
December	898	41	22	29.0	.070	.08	1,780
March to December 1940	.....	.....	.....	.....	.....	.....	97,240
January 1941	960	42	25	31.0	.074	.09	1,900
February	2,625	400	37	93.8	.225	.23	5,210
March	2,898	502	22	93.5	.224	.26	5,750
April	996	133	21	33.2	.080	.09	1,980
May	654	44	12	21.1	.051	.06	1,300
June	5,072	1,110	32	169	.405	.45	10,060
July	876	126	12	28.3	.068	.08	1,740
August	943	636	6	30.4	.073	.08	1,870
September	1,928	1,100	6	64.3	.154	.17	3,820
Water year 1940–41	19,001	1,110	6	52.1	.125	1.70	37,690
October 1941	2,727	780	12	88.0	.211	.24	5,410
November	1,378	211	22	45.9	.110	.12	2,730
December	753	70	10	24.3	.058	.07	1,490
Calendar year 1941	21,810	1,110	6	59.8	.143	1.94	43,260
January 1942	1,117	120	4	36.0	.086	.10	2,220
February	1,029	75	13	36.8	.088	.09	2,040
March	2,274	350	32	73.4	.176	.20	4,510
April	1,897	670	29	63.2	.152	.17	3,760
May	3,456	872	39	111	.266	.31	6,850
June	21,794	7,260	71	726	1.74	1.94	43,230
July	6,077	1,640	43	196	.470	.54	12,050
August	2,846	1,020	30	91.8	.220	.25	5,640
September	2,675	594	28	89.2	.214	.24	5,310
Water year 1941–42	48,023	7,260	4	132	.317	4.27	95,240

Note—Stage-discharge relation affected by ice Nov. 12 to Dec. 31, 1940; Jan. 1 to Mar. 1, Mar. 16, 17, Dec. 10-20, 27-31, 1941; Jan. 1 to Mar. 5, 1942.

Soldier River at Pisgah, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct	Nov	Dec	Jan	Feb	Mar.	Apr.	May	June	July	Aug.	Sept.
1940–41												
1	13	36	27	42	37	135	26	36	183	56	11	6
2	13	18	26	42	37	307	24	36	k1,110	35	11	7
3	13	14	25	38	38	502	30	44	294	33	10	8
4	12	12	25	33	40	178	34	29	70	30	10	7
5	12	11	26	30	45	228	28	28	32	28	10	6
6	14	11	27	28	50	185	25	28	357	24	14	6
7	12	11	28	27	52	78	32	26	100	23	10	6
8	12	12	29	27	53	169	36	24	48	23	10	8
9	12	16	32	27	54	169	60	21	112	21	9	8
10	12	15	30	28	60	80	42	21	83	126	9	8
11	12	16	29	*29	70	74	32	20	k484	94	9	8
12	12	15	27	35	200	49	28	19	340	31	9	8
13	11	13	24	35	400	42	27	18	119	23	9	7
14	10	12	23	33	150	47	26	18	77	22	8	11
15	10	11	22	32	180	58	22	17	64	21	8	k504
16	10	15	23	32	200	65	21	19	58	19	10	k1,100
17	10	25	22	30	100	22	21	17	52	17	k636	50
18	10	30	23	26	90	43	22	16	48	16	45	21
19	10	40	24	25	80	68	32	16	45	15	13	16
20	10	50	25	26	70	60	133	17	42	14	9	14
21	10	*47	26	26	*65	46	52	17	40	14	9	12
22	11	44	28	27	67	38	36	21	40	18	8	12
23	10	43	30	28	70	35	32	17	38	18	8	10
24	10	40	32	29	72	32	29	16	38	14	8	12
25	10	39	34	30	75	*26	28	16	36	12	8	12
26	10	37	36	29	80	28	25	14	k261	12	8	11
27	10	30	37	30	90	28	24	14	126	49	7	10
28	13	32	38	31	100	28	23	15	53	21	7	10
29	36	30	39	32	.....	25	22	14	k483	22	7	10
30	24	28	40	36	.....	26	24	12	239	13	7	20
31	24	.....	41	37	.....	27	.....	28	.....	12	6	.....
1941–42												
1	23	26	31	9	75	32	56	39	2,100	137	58	28
2	15	65	31	8	65	33	51	50	k7,260	110	1,020	50
3	146	50	32	7	57	75	45	45	410	410	137	173
4	27	40	31	6	54	350	41	46	164	133	60	45
5	635	65	27	5	57	280	37	45	142	107	56	34
6	199	51	26	5	65	148	37	98	260	96	52	45
7	780	36	*20	5	60	91	37	84	127	92	49	44
8	53	29	22	5	55	48	34	54	101	86	46	39
9	22	27	21	5	50	54	34	48	96	83	42	32
10	18	22	19	4	45	62	34	59	272	168	57	28
11	15	27	16	5	40	54	31	872	205	80	40	36
12	14	37	13	*5	35	43	29	137	94	74	38	410
13	14	50	12	6	30	48	31	86	83	71	40	331
14	13	50	10	8	28	45	35	70	80	65	51	107
15	12	36	10	10	25	51	48	64	75	65	42	44
16	12	29	12	12	23	50	670	63	71	63	36	36
17	12	31	18	17	18	42	88	64	72	60	34	33
18	12	32	25	20	15	37	58	64	222	175	34	594
19	13	211	30	25	13	36	53	58	83	k814	34	131
20	12	96	34	30	14	39	48	57	1,520	60	33	48
21	13	42	40	40	*16	43	45	57	188	48	33	39
22	346	37	54	50	18	37	45	607	103	43	32	37
23	41	38	70	60	22	37	41	131	86	44	30	41
24	19	33	34	75	25	34	37	81	80	k1,640	30	33
25	17	33	23	85	29	108	39	78	219	70	30	35
26	18	36	19	90	31	110	41	70	122	122	34	62
27	148	40	17	95	32	60	42	71	281	52	40	43
28	33	36	15	100	32	54	38	65	k4,460	842	547	34
29	17	38	15	110	.....	41	39	67	k2,640	131	48	32
30	14	35	14	120	.....	67	33	70	178	71	33	31
31	14	.....	12	95	.....	65	.....	56	.....	65	30	.....

*Winter discharge measurement made on this day.
(k) Rapidly changing stage on this day.

Boyer River at Logan, Iowa

LOCATION.—Wire-weight gage, lat. 41°38′, long. 95°47′, in W½ sec. 19, T. 79 N., R. 42 W., at highway bridge 300 feet downstream from Illinois Central Railroad bridge at Logan, 10½ miles upstream from Willow Creek, and 16 miles upstream from mouth. Datum of gage is 1,009.38 feet above mean sea level (Chicago and North Western Ry. bench mark).

DRAINAGE AREA.—810 square miles.

RECORDS AVAILABLE.—May 1918 to July 1925, Nov. 1937 to Sept. 1942.

AVERAGE DISCHARGE.—7 years (1918-19, 1923, 1938-42), 238 second-feet.

EXTREMES.—1939-40: Maximum discharge observed during water year, 13,600 second-feet July 9 (gage height, 19.17 feet); minimum discharge, 2 second-feet Jan. 13-27; minimum gage height observed, 1.14 feet Dec. 21.

1940-41: Maximum discharge during water year, 4,400 second-feet June 11 (gage height, 10.35 feet, from floodmark); minimum observed, 8 second-feet Sept. 29; minimum gage height observed, 1.28 feet Aug. 16.

1941-42: Maximum discharge during water year, 13,400 second-feet June 28 (gage height, 19.00 feet, from floodmark); minimum, 7 second-feet (estimated) Jan. 8-10; minimum gage height observed, 1.54 feet Oct. 20.

1918-25, 1937-42: Maximum discharge, that of July 9, 1940; no flow Sept. 27-29, 1918.

REVISIONS: The maximum discharge observed during the period November 1937 to September 1938 has been revised to 12,900 second-feet Sept. 6, 1938 (gage height, 18.56 feet).

REMARKS.—Records fair except those for periods of ice effect, which are poor. Gage read once daily below three foot stage, and oftener above.

REVISIONS.—Revised figures of discharge for high-water periods in the water years 1938 and 1939 are given in Water-Supply Paper 956 and supersede those published in Water-Supply Papers 856 and 876.

COOPERATION.—Records collected in cooperation with Army Engineers.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Discharge in second-feet				Run-off	
		Maximum	Minimum	Mean	Per square mile	Inches	Acre feet
October 1940	772	61	18	24.9	0.031	0.04	1,530
November	1,320	92	18	44.0	.054	.06	2,620
December	1,203	65	27	38.8	.048	.06	2,390
Calendar year 1940	59,144	7,830	2	162	.200	2.72	117,300
January 1941	1,234	60	34	39.8	.049	.06	2,450
February	5,165	650	48	184	.227	.24	10,240
March	5,690	500	64	184	.227	.26	11,290
April	2,545	163	57	84.8	.105	.12	5,050
May	1,463	146	21	47.2	.058	.07	2,900
June	12,537	2,300	27	418	.516	.58	24,870
July	2,197	204	27	70.9	.088	.10	4,360
August	1,618	654	11	52.2	.064	.07	3,210
September	1,958	642	8	65.3	.081	.09	3,880
Water year 1940–41	37,702	2,300	8	103	.127	1.75	74,790
October 1941	2,015	454	18	65	.080	.09	4,000
November	3,197	220	52	107	.132	.15	6,340
December	2,108	185	45	68	.084	.10	4,180
Calendar year 1941	41,727	2,300	8	114	.141	1.93	82,770
January 1942	3,708	420	7	120	.148	.17	7,350
February	3,686	330	49	132	.163	.17	7,310
March	6,866	1,000	75	221	.273	.32	13,620
April	3,661	319	80	122	.151	.17	7,260
May	7,790	1,300	79	251	.310	.36	15,450
June	32,437	5,080	113	1,081	1.33	1.49	64,340
July	19,915	4,030	115	642	.793	.91	39,500
August	7,221	2,100	60	233	.288	.33	14,320
September	6,827	1,440	73	228	.281	.31	13,540
Water year 1941–42	99,431	5,080	7	272	.336	4.57	197,200

Boyer River at Logan, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept
1940–41												
1	23	60	54	60	48	110	64	64	27	183	24	14
2	22	36	52	48	52	300	64	65	721	178	23	21
3	31	31	40	47	54	500	65	119	266	105	21	156
4	24	31	36	40	56	400	73	74	212	89	20	24
5	21	26	34	35	60	220	78	60	225	79	20	14
6	30	24	34	35	62	350	77	69	518	75	24	13
7	24	21	35	36	61	360	83	53	126	66	18	12
8	23	23	36	36	60	380	90	52	143	61	18	12
9	28	41	38	37	60	420	127	46	325	59	17	10
10	31	52	38	38	64	320	113	46	176	144	16	11
11	24	40	36	*40	90	240	107	47	2,300	98	15	10
12	22	39	34	42	140	200	96	41	1,180	82	14	9
13	21	34	32	42	650	150	86	38	688	77	12	10
14	23	28	31	42	550	136	79	41	644	60	13	10
15	21	19	30	41	400	136	77	39	418	54	12	489
16	20	18	29	41	420	115	69	38	283	51	11	642
17	19	22	28	38	440	97	69	36	210	47	654	215
18	18	26	27	36	300	80	67	36	169	51	258	64
19	19	34	30	34	180	110	64	33	143	41	51	45
20	20	*54	31	35	170	143	163	34	118	37	28	32
21	20	80	33	35	*178	139	148	28	103	36	113	23
22	18	92	34	35	190	121	107	37	94	38	35	18
23	20	75	36	36	200	99	102	34	85	34	29	13
24	18	70	38	37	180	85	89	34	78	33	33	12
25	19	62	40	38	150	75	78	32	74	30	26	13
26	19	54	42	39	140	69	69	30	476	27	24	11
27	19	56	45	39	110	*71	65	24	730	204	21	9
28	27	58	60	40	100	70	60	23	760	58	18	9
29	54	58	65	42	.....	64	59	21	722	41	18	8
30	32	56	55	44	.....	65	57	23	523	32	16	29
31	61	.....	50	46	.....	65	.....	146	.....	27	16	.....
1941–42												
1	44	52	74	50	330	75	178	79	1,680	1,500	404	75
2	26	61	68	35	310	100	178	154	1,750	1,300	2,100	152
3	26	82	66	25	290	300	156	134	2,640	1,180	860	295
4	82	79	64	20	252	1,000	141	129	1,620	780	280	183
5	148	220	61	15	217	681	124	121	760	382	172	112
6	107	150	58	10	212	471	119	123	495	295	150	110
7	454	91	*55	8	202	382	112	228	608	252	136	113
8	194	67	52	7	228	217	107	202	391	217	124	146
9	73	61	65	7	124	180	103	163	444	395	116	102
10	47	80	52	7	150	202	99	1,190	235	608	109	82
11	37	84	50	8	160	197	96	1,300	220	523	100	73
12	32	91	48	*9	150	192	89	594	194	228	94	126
13	29	98	46	10	130	146	90	266	190	174	94	1,440
14	24	119	45	15	110	136	90	183	148	143	540	1,000
15	21	150	45	22	95	136	94	144	124	115	187	344
16	20	154	47	30	80	143	295	138	116	388	116	263
17	20	131	50	40	60	143	319	129	113	210	103	139
18	18	109	55	50	50	129	156	131	126	867	92	123
19	18	146	60	60	49	136	119	124	119	4,030	85	554
20	18	212	70	80	51	143	103	112	817	703	79	202
21	45	148	84	100	*52	154	98	110	1,000	362	76	178
22	85	132	146	140	53	146	95	513	506	244	71	132
23	24	116	185	200	53	148	89	418	292	210	64	116
24	33	83	118	240	53	136	82	192	202	858	60	105
25	24	71	89	280	54	156	82	136	777	283	60	103
26	23	79	64	320	55	192	85	127	760	722	64	116
27	172	89	60	350	56	187	85	123	3,970	372	199	124
28	67	85	50	370	60	176	95	146	4,530	1,360	395	113
29	43	80	46	380	.....	141	102	119	5,080	523	113	106
30	28	77	70	400	.....	141	80	124	2,530	378	95	100
31	33	.....	65	420	.....	180	.....	138	.....	313	83	.....

Note—Stage-discharge relation affected by ice Nov. 13 to Dec. 31, 1940; Jan. 1 to Mar. 13, Mar. 16, 17, Dec. 11-20, 27-31, 1941; Jan. 1 to Feb. 3, Feb. 10 to Mar. 4, 1942.
*Winter discharge measurement made on this day.

Nishnabotna River above Hamburg, Iowa

LOCATION.—Wire-weight gage, lat. 40°38′, long. 95°37′, in SW¼ SE¼ sec. 11, T. 67 N., R. 42 W., 1½ miles downstream from confluence of East and West Forks and 2 miles northeast of Hamburg. Datum of gage is 894.17 feet above mean sea level, datum of 1929.

DRAINAGE AREA.—2,800 square miles.

RECORDS AVAILABLE.—October 1928 to September 1942. March 1922 to September 1923, at site 6 miles downstream.

AVERAGE DISCHARGE.—14 years (1928-42), 667 second-feet.

EXTREMES.—Maximum discharge observed during 1941-42 year, 11,700 second-feet June 20 (gage height, 19.23 feet); minimum observed, 195 second-feet Aug. 24; minimum gage height observed, 4.49 feet Dec. 11. 1922-23, 1928-41: Maximum discharge, 24,600 second-feet Mar. 12, 1939 (gage height, 23.0 feet, from floodmarks); minimum, 4.5 second-feet Aug. 30, 1934 (gage height, 1.58 feet).

REMARKS.—Records good except those for periods of ice effect, which are poor. Gage read once daily below and twice daily or more often above a stage of 10 feet.

COOPERATION.—Records collected in cooperation with Corps of Engineers, U. S. Army.

NOTE.—See table 16 for flow-duration analysis. Duration curves of daily discharge for Hamburg, Van Meter and Ames are shown in figure 9.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Discharge in second-feet				Run-off	
		Maximum	Minimum	Mean	Per square mile	Inches	Acre feet
October 1940	2,668	117	70	86.1	0.031	0.04	5,290
November	4,214	388	48	140	.050	.06	8,360
December	3,833	234	58	124	.044	.05	7,600
Calendar year 1940	164,396	6,760	15	449	.160	2.19	326,100
January 1941	5,451	247	140	176	.063	.07	10,810
February	9,229	1,200	125	330	.118	.12	18,310
March	11,430	1,000	217	369	.132	.15	22,670
April	14,618	3,340	204	487	.174	.19	28,990
May	7,503	851	105	242	.086	.10	14,880
June	77,816	13,700	117	2,594	.926	1.03	154,350
July	15,894	3,270	148	513	.183	.21	31,530
August	4,685	505	61	151	.054	.06	9,290
September	37,916	9,470	58	1,264	.451	.50	75,210
Water year 1940-41	195,257	13,700	48	535	.191	2.58	387,300
October 1941	49,624	7,220	278	1,601	.572	.66	98,430
November	31,241	3,960	432	1,041	.372	.41	61,970
December	24,047	3,900	230	776	.277	.32	47,700
Calendar year 1941	289,454	13,700	58	793	.283	3.82	574,100
January 1942	31,020	2,500	435	1,001	.358	.41	61,530
February	23,709	1,440	530	847	.302	.31	47,030
March	44,376	3,500	680	1,431	.511	.59	88,020
April	25,171	1,590	511	839	.300	.33	49,930
May	71,182	6,120	534	2,296	.820	.95	141,200
June	70,199	7,910	710	2,340	.836	.93	139,200
July	52,269	6,360	427	1,686	.602	.69	103,700
August	19,301	3,370	195	623	.222	.26	38,280
September	25,948	2,990	331	865	.309	.34	51,470
Water year 1941-42	468,087	7,910	195	1,282	.458	6.20	928,500

Note—Stage-discharge relation affected by ice Nov. 14-16, Nov. 30 to Dec. 7, Dec. 12-26, 1940; Jan. 3-13, Jan. 17 to Mar. 11, Dec. 11-14, 30, 31, 1941; Jan. 1-27, Feb. 16 to Mar. 6, 1942.

Nishnabotna River above Hamburg, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept
1940–41												
1	103	110	80	230	155	300	210	221	117	3,270	140	58
2	94	97	78	247	155	340	212	209	245	2,370	124	58
3	94	97	78	220	150	1,000	225	665	3,310	1,680	124	77
4	104	82	80	195	150	700	223	477	3,900	648	115	303
5	97	76	90	185	160	600	223	322	2,430	427	168	151
6	93	73	100	180	165	550	219	378	1,650	347	262	81
7	89	72	110	180	165	520	264	296	1,100	307	361	1,220
8	86	71	119	182	160	500	290	219	2,830	361	204	729
9	88	73	115	182	160	480	422	189	13,700	280	134	200
10	93	318	120	185	165	460	373	173	9,190	262	109	102
11	90	109	130	187	170	420	359	152	7,840	605	95	125
12	86	64	115	*188	200	380	327	148	5,800	595	89	86
13	82	49	105	195	1,200	354	288	142	4,530	345	78	133
14	86	48	96	205	900	331	268	140	3,380	257	176	158
15	80	60	85	202	750	342	264	135	2,510	226	95	8,870
16	79	80	75	198	600	324	234	140	1,900	217	87	9,470
17	76	115	60	190	650	264	223	120	1,420	204	76	5,020
18	76	145	58	165	400	245	2,030	114	1,090	197	81	3,020
19	76	*192	75	150	240	284	3,340	105	973	181	505	1,710
20	74	223	100	148	*244	298	1,340	120	841	168	366	916
21	74	388	120	150	250	298	774	121	586	156	207	631
22	73	313	130	160	270	280	494	851	598	887	322	494
23	72	274	140	155	300	257	333	600	480	290	138	376
24	71	262	150	152	320	258	296	410	427	303	108	290
25	71	212	160	150	300	251	268	221	388	207	95	427
26	70	181	175	148	290	*249	245	157	345	152	95	272
27	70	141	187	145	280	236	240	125	340	148	78	238
28	78	107	204	142	280	232	221	174	886	219	67	217
29	117	97	234	140	.....	232	204	120	2,790	243	63	234
30	111	85	234	145	.....	228	209	140	2,220	173	62	2,250
31	115	.....	230	150	.....	217	.....	119	.....	169	61	.....
1941–42												
1	1,120	3,960	453	850	1,250	680	1,440	534	1,970	4,980	645	477
2	2,590	3,370	448	700	1,000	740	1,300	641	1,310	2,740	582	443
3	1,880	2,120	420	600	978	850	1,260	1,060	1,280	2,920	480	1,260
4	1,210	1,880	424	550	1,090	1,000	1,140	969	1,080	2,080	774	732
5	1,120	2,140	412	520	1,230	2,000	1,590	2,350	991	1,940	483	477
6	1,880	1,650	402	490	1,440	3,500	1,060	1,150	904	1,220	960	679
7	5,640	1,540	402	460	1,340	2,710	951	1,720	c870	973	1,100	488
8	3,480	982	*400	450	1,240	1,400	960	1,160	c850	1,140	608	486
9	2,710	801	390	440	895	1,270	912	986	c840	938	388	1,340
10	1,230	686	266	435	833	1,120	882	982	c830	857	352	608
11	672	641	230	*435	825	1,030	829	5,690	c1,100	973	366	466
12	480	648	320	440	790	882	829	6,120	c1,300	1,050	320	366
13	427	638	430	460	790	912	829	5,640	c900	853	298	331
14	373	621	530	520	829	841	790	3,620	c820	614	307	2,100
15	352	605	466	580	829	801	751	2,570	c760	543	307	2,990
16	352	567	414	610	850	1,190	849	2,130	c740	480	432	2,250
17	336	531	402	650	800	1,730	817	c1,800	c720	522	316	2,430
18	298	488	407	710	700	2,060	817	c2,600	c710	427	274	2,370
19	278	1,080	417	770	600	1,800	729	c1,800	744	4,320	260	1,070
20	338	947	407	880	540	1,990	693	c1,500	7,910	6,360	249	651
21	805	821	407	1,000	530	1,760	662	c1,500	4,740	5,200	236	378
22	7,220	668	869	1,300	550	1,610	621	c5,500	2,990	3,060	221	380
23	4,420	517	3,900	1,600	570	1,340	555	c3,950	2,010	1,440	268	359
24	2,740	448	2,370	1,800	600	1,170	561	c3,000	1,030	1,030	195	352
25	1,560	432	1,590	2,000	650	1,090	567	c2,200	7,250	891	212	364
26	1,510	480	1,380	2,500	650	1,750	589	1,950	6,680	805	845	472
27	857	520	1,230	2,200	650	2,000	576	1,770	3,340	759	904	458
28	759	508	853	1,720	660	1,370	561	1,620	2,920	942	3,370	427
29	555	488	908	1,780	.....	1,240	540	1,590	7,490	805	2,160	388
30	422	464	1,500	1,990	.....	1,180	511	1,680	5,120	759	895	356
31	2,010	.....	1,000	1,580	.....	1,360	.....	1,400	.....	648	494	.....

*Winter discharge measurement made on this day.
(c) Backwater from Missouri River; discharge computed on basis of two discharge measurements, gage heights, and records for station at Red Oak.

Table 15.—Days of deficiency in discharge of Nishnabotna River above Hamburg, Iowa, during the years ending Sept. 30, 1929-42.

Discharge		Number of days when discharge was less than that shown in first two columns and equal to or greater than that shown on preceding line														Period of Record		
																Deficiency		Duration
Sec.-ft. per sq. mile	Sec.-ft.	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	Total	Days	Percent of time	Percent of time
	0	.....	.....	.....	.....	.....	0	.....	.....	.....	.....	.....	.....	.....	.....	0	0	0	100
.002	5	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	1	1	.02	100
.003	7	.....	.....	.....	.....	.....	0	0	.....	.....	.....	.....	.....	.....	.....	0	1	.02	100
.004	10	.....	.....	.....	.....	.....	7	1	0	.....	.....	.....	.....	.....	.....	8	9	.18	99.8
.005	14	.....	.....	0	.....	.....	16	3	6	0	0	.....	0	.....	.....	25	34	.66	99.3
.008	21	.....	.....	1	.....	.....	12	2	16	3	10	.....	21	.....	.....	65	99	1.9	98.1
.011	28	.....	.....	0	.....	.....	8	2	18	9	26	.....	22	.....	.....	85	184	3.6	96.4
.013	35	.....	.....	0	.....	.....	8	5	11	25	21	.....	8	.....	.....	78	262	5.1	94.9
.016	42	.....	0	0	.....	.....	12	14	15	13	47	0	15	0	.....	116	378	7.4	92.6
.021	56	.....	4	0	.....	0	23	17	20	13	46	25	74	2	.....	224	602	11.8	88.2
.026	70	.....	5	20	.....	3	16	21	27	19	22	33	17	10	.....	193	795	15.5	84.5
.037	98	.....	24	76	.....	19	35	52	42	65	37	111	18	59	.....	538	1,333	26.1	73.9
.053	140	.....	24	128	0	30	94	69	32	26	30	41	38	40	0	552	1,885	36.9	63.1
.079	210	0	22	49	7	40	91	63	28	23	33	35	46	81	1	519	2,404	47.0	53.0
.105	280	27	54	14	17	33	12	25	30	38	14	18	29	55	10	376	2,780	54.4	45.6
.131	350	59	75	17	3	30	7	11	15	10	8	19	12	35	10	311	3,091	60.5	39.5
.158	420	21	35	11	2	55	5	13	11	24	5	8	8	13	25	236	3,327	63.1	34.9
.210	560	30	59	7	8	68	4	15	21	31	15	12	9	15	56	350	3,677	71.9	28.1
.262	700	27	23	8	25	31	3	5	9	9	8	8	3	11	38	208	3,885	76.0	24.0
.368	980	57	18	8	46	34	3	9	16	12	11	11	11	11	74	321	4,206	82.3	17.7
.525	1,400	70	8	7	75	9	1	14	11	7	11	9	5	6	53	286	4,492	87.9	12.1
.788	2,100	28	8	9	72	8	3	17	8	7	6	10	9	6	46	237	4,729	92.5	7.5
1.05	2,800	15	6	3	56	3	2	2	6	9	5	5	5	6	20	143	4,872	95.3	4.7
1.31	3,500	9	0	1	20	0	2	2	3	2	4	0	5	6	10	64	4,936	96.5	3.5
1.58	4,200	5	.....	1	10	0	0	0	5	6	4	6	2	1	5	45	4,981	97.4	2.6
2.10	5,600	3	.....	2	8	2	.....	2	7	7	1	7	4	2	7	52	5,033	98.4	1.6
2.62	7,000	8	.....	3	4	0	.....	0	3	7	0	1	5	1	6	38	5,071	99.2	.8
3.68	9,800	4	.....	0	13	.....	.....	1	3	0	1	3	0	4	4	33	5,104	99.8	.2
5.25	14,000	2	.....	.....	0	.....	.....	0	2	.....	0	1	.....	1	0	6	5,110	99.9	.1
7.88	21,000	0	.....	.....	.....	.....	.....	.....	1	.....	.....	2	.....	0	.....	3	5,113	100	.0
10.5	28,000	.....	.....	.....	.....	.....	.....	.....	0	.....	.....	0	.....	.....	.....	.....	.....	.....	.....
Mean yearly discharge (Sec.-ft.)		1,210	420	342	1,860	474	172	362	683	599	331	629	434	535	1,282				
Maximum daily (Sec.-ft.)		11,800	2,580	6,790	9,410	5,480	3,320	7,400	19,100	6,920	7,400	18,600	6,760	13,700	7,910				
Minimum daily (Sec.-ft.)		219	54	20	201	63	4.5	9	10	19	15	46	15	48	195				

East Nishnabotna River at Red Oak, Iowa

LOCATION.—Water-stage recorder, lat. 41°00'55", long. 95°14'30", in sec. 20, T. 72 N., R. 38 W., at bridge on U. S. Highway 34, half a mile west of Red Oak, 28 miles downstream from Indian Creek, and 49 miles upstream from confluence with West Nishnabotna River. Datum of gage is 1,010.45 feet above mean sea level, unadjusted.

DRAINAGE AREA.—890 square miles.

RECORDS AVAILABLE.—May 1936 to September 1942. May 1918 to July 1925, at site half a mile downstream.

AVERAGE DISCHARGE.—9 years (1918-20, 1922, 1936-42), 266 second-feet.

EXTREMES.—Maximum discharge during 1941-42 year, 8,780 second-feet July 20 (gage height, 18.42 feet); minimum, 72 second-feet Aug. 25 (gage height, 3.35 feet).

1918-25, 1936-41: Maximum discharge observed, 9,600 second-feet Mar. 4, 1937 (gage height, 18.50 feet, from floodmarks); minimum discharge, 6 second-feet (estimated) Aug. 18, 1936.

REMARKS.—Records good except those for days of fragmentary gage-height record, which are fair, and those for periods of ice effect or no gage-height record, which are poor.

COOPERATION.—Water-stage recorder inspected by employee of City of Red Oak.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Discharge in second-feet				Run-off	
		Maximum	Minimum	Mean	Per square mile	Inches	Acre feet
October 1940	901	32	26	29.1	0.033	0.04	1,790
November	1,671	131	30	55.7	.063	.07	3,310
December	1,537	89	29	49.6	.056	.06	3,050
Calendar year 1940	61,340	4,180	9	168	.189	2.57	121,700
January 1941	1,768	110	40	57.0	.064	.07	3,510
February	3,883	500	49	139	.156	.16	7,700
March	5,063	500	82	163	.183	.21	10,040
April	7,323	2,510	77	244	.274	.31	14,520
May	3,811	476	49	123	.138	.16	7,560
June	29,011	3,700	48	967	1.09	1.22	57,540
July	5,924	1,330	59	191	.215	.25	11,750
August	2,713	387	30	87.5	.098	.11	5,380
September	7,415	1,740	30	247	.278	.31	14,710
Water year 1940–41	71,020	3,700	26	195	.219	2.97	140,900
October 1941	11,410	2,610	83	368	.413	.48	22,630
November	10,466	1,720	180	349	.392	.44	20,760
December	6,964	997	85	225	.253	.29	13,810
Calendar year 1941	95,751	3,700	30	262	.294	4.01	189,900
January 1942	11,811	847	150	381	.428	.49	23,430
February	9,486	644	190	339	.381	.40	18,820
March	16,354	965	255	528	.593	.68	32,440
April	8,703	506	182	290	.326	.36	17,260
May	27,022	4,310	185	872	.980	1.13	53,600
June	22,400	3,900	247	747	.839	.94	44,430
July	21,221	6,240	152	685	.770	.89	42,090
August	5,785	1,070	74	187	.210	.24	11,470
September	7,137	1,070	94	238	.267	.30	14,160
Water year 1941–42	158,759	6,240	74	435	.489	6.64	314,900

Note—Stage-discharge relation affected by ice Nov. 13-17, Nov. 29 to Dec. 5, Dec. 14-26, 1940; Jan. 3 to Mar. 13, Dec. 11, 12, 1941; Jan. 4-24, Feb. 17-21, 1942.

East Nishnabotna River at Red Oak, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept
1940-41												
1.....	a28	31	40	72	50	115	83	a98	48	1,330	55	30
2.....	a30	30	38	110	49	125	83	a150	686	708	68	35
3.....	a32	31	37	100	51	500	82	h277	3,700	365	f56	146
4.....	a32	32	40	45	50	300	85	a250	3,280	216	f43	116
5.....	h32	33	43	60	55	260	92	a140	624	182	f49	220
6.....	a31	34	44	75	65	260	95	a150	436	159	317	194
7.....	a31	34	44	65	50	220	94	a110	733	143	155	206
8.....	a31	34	f42	60	70	210	111	a90	647	131	79	152
9.....	a31	38	46	62	75	200	132	a80	3,470	117	61	87
10.....	a30	58	50	65	60	210	142	h75	2,460	129	f54	129
11.....	a30	101	52	64	63	195	143	a72	2,340	381	f48	83
12.....	h30	49	48	*62	150	190	118	a70	1,450	235	f153	64
13.....	a30	38	40	60	500	180	100	a68	700	143	132	55
14.....	a29	35	35	60	400	169	88	a67	589	107	58	386
15.....	a29	35	32	58	300	173	81	a66	493	100	f49	1,600
16.....	a29	40	31	57	350	173	77	a68	409	95	h44	f1,740
17.....	a29	47	29	52	250	150	183	h63	f365	83	f44	f482
18.....	a29	56	30	40	150	118	928	a60	f331	75	291	f218
19.....	h29	69	32	50	125	117	2,510	a56	f279	66	387	100
20.....	f26	*131	35	52	105	128	684	a60	250	62	117	71
21.....	27	127	39	51	105	122	285	a250	233	60	63	59
22.....	27	102	43	49	110	111	f196	f476	235	106	f51	49
23.....	27	98	50	48	115	107	f147	f289	209	271	h47	45
24.....	27	81	60	47	130	103	f128	f216	191	108	f45	58
25.....	27	64	70	45	120	103	f123	f94	178	79	f43	51
26.....	26	56	80	44	115	95	h118	h61	166	63	f39	45
27.....	26	56	87	43	110	*91	f113	h97	1,030	60	f36	44
28.....	27	45	89	42	110	88	f107	70	f1,850	122	f34	94
29.....	29	44	84	42	.....	86	f100	82	1,040	99	f33	359
30.....	30	42	78	43	.....	82	h95	57	589	70	f32	497
31.....	30	.....	69	45	.....	82	.....	49	.....	59	30	.....
1941-42												
1.....	556	1,720	173	a240	421	a255	506	185	517	1,050	232	106
2.....	216	1,410	165	a210	375	a270	490	210	602	520	190	96
3.....	126	593	158	a195	384	a300	447	311	436	529	272	94
4.....	83	403	152	180	410	a500	399	452	392	1,150	214	114
5.....	a350	408	148	175	504	965	384	319	356	586	173	119
6.....	a800	432	138	165	644	827	363	635	342	380	309	103
7.....	f2,610	f399	130	160	591	637	356	607	340	321	199	106
8.....	1,270	f305	124	155	434	436	342	384	344	321	152	194
9.....	547	260	*128	150	380	363	323	331	303	307	138	428
10.....	228	f245	99	150	340	340	319	342	307	279	138	221
11.....	160	a250	85	*151	356	352	301	2,740	914	327	134	133
12.....	145	a245	95	155	371	333	283	4,310	563	274	117	105
13.....	138	a235	100	165	352	299	285	1,440	410	219	113	277
14.....	130	a220	105	195	338	295	287	851	307	203	112	683
15.....	153	208	127	225	365	293	281	688	274	187	110	1,070
16.....	144	205	123	250	378	419	274	619	256	177	109	438
17.....	117	201	128	280	280	607	281	651	247	163	105	525
18.....	104	196	139	330	200	796	266	681	258	152	100	575
19.....	96	226	148	410	190	789	234	648	258	2,470	96	289
20.....	95	249	138	490	200	720	224	577	945	6,240	92	184
21.....	437	277	139	520	220	708	217	688	1,060	1,920	f88	134
22.....	890	208	173	550	230	605	219	2,080	563	543	82	123
23.....	596	196	793	600	223	540	208	1,880	331	395	77	117
24.....	224	a190	997	650	*245	499	199	878	277	325	74	113
25.....	140	a200	504	718	268	522	196	681	1,750	270	86	116
26.....	a159	a210	352	847	266	892	212	619	1,340	305	217	140
27.....	178	a205	317	825	272	755	228	584	653	307	293	161
28.....	139	a200	226	722	249	550	208	833	445	321	1,070	139
29.....	127	a190	a260	632	.....	483	189	765	3,710	401	356	120
30.....	113	180	a320	690	.....	494	182	536	3,900	276	210	114
31.....	339	.....	a280	626	.....	510	.....	497	.....	303	127	.....

*Winter discharge measurement made on this day.

(a) No gage-height record; discharge computed on basis of records for Nishnabotna River above Hamburg, Iowa.

(f) Fragmentary gage-height record; discharge computed from partly estimated gage heights.

(h) Computed from wire-weight gage readings.

East Nishnabotna River at Red Oak, Iowa—Continued

Table 16.—Gage height, in feet, and discharge in second-feet, at indicated time, May 10-15, 1942

HOUR	Feet	Sec.-ft.	Feet	Sec.-ft.	Feet	Sec.-ft.	Feet	Sec.-ft.	Feet	Sec.-ft.	Feet	Sec.-ft.
	May 10		May 11		May 12		May 13		May 14		May 15	
2	5.06	317	7.70	992	15.00	4,040	12.00	2,440	7.73	930	6.92	734
4	5.05	315	10.20	1,720	15.33	4,310	11.00	2,040	7.64	907	6.88	724
6	5.04	313	12.00	2,440	15.63	4,590	10.25	1,740	7.58	892	6.84	715
8	5.03	311	13.30	3,050	15.87	4,870	9.65	1,500	7.55	885	6.78	701
10	5.05	315	14.04	3,450	15.87	4,870	9.25	1,380	7.49	871	6.74	692
N	5.05	315	14.00	3,430	15.67	4,610	8.90	1,270	7.44	859	6.74	692
2	5.06	317	14.14	3,510	15.66	4,610	8.60	1,180	7.36	839	6.68	678
4	5.07	319	14.15	3,520	15.56	4,520	8.40	1,120	7.32	830	6.65	672
6	5.45	399	14.15	3,520	15.50	4,470	8.17	1,050	7.21	803	6.62	665
8	5.66	445	14.31	3,620	15.28	4,270	8.00	1,000	7.17	794	6.57	653
10	5.54	419	14.54	3,770	14.65	3,780	7.90	973	7.07	770	6.53	644
M	6.10	545	14.73	3,900	13.35	3,050	7.80	947	7.00	753	6.52	642

Gage height, in feet, and discharge in second-feet, at indicated time, June 28—July 3,1942

HOUR	Feet	Sec.-ft.	Feet	Sec.-ft.	Feet	Sec.-ft.	Feet	Sec.-ft.	Feet	Sec.-ft.	Feet	Sec.-ft.
	June 28		June 29		June 30		July 1		July 2		July 3	
2	5.58	428	12.61	2,700	16.00	4,870	10.50	1,840	6.30	591	.....	.....
4	5.54	419	13.59	3,200	15.85	4,670	9.80	1,560	6.21	570	.....	.....
6	5.47	403	13.80	3,310	15.76	4,570	9.10	1,330	6.17	561	.....	.....
8	5.43	395	14.10	3,490	15.65	4,460	8.46	1,140	6.07	538	.....	.....
10	5.37	382	14.16	3,530	15.44	4,350	8.00	1,000	6.00	522	.....	.....
N	5.30	367	14.31	3,620	15.15	4,130	7.68	917	5.96	513	*6.03	*529
2	5.27	361	14.57	3,750	14.77	3,860	7.33	832	5.93	506	.....	.....
4	5.26	359	14.79	3,870	14.30	3,610	7.11	779	5.87	492	.....	.....
6	5.27	361	15.37	4,280	13.80	3,310	6.89	727	5.82	481	.....	.....
8	5.36	380	15.85	4,670	13.20	3,000	6.70	683	5.75	465	.....	.....
10	6.35	602	16.05	4,940	12.50	2,650	6.56	651	5.72	458	.....	.....
M	9.40	1,420	16.02	4,900	11.50	2,240	6.43	621	5.69	452	.....	.....

Gage height, in feet, and discharge, in second-feet, at indicated time, July 18-23, 1942

HOUR	Feet	Sec.-ft.	Feet	Sec.-ft.	Feet	Sec.-ft.	Feet	Sec.-ft.	Feet	Sec.-ft.	Feet	Sec.-ft.
	July 18		July 19		July 20		July 21		July 22		July 23	
2	.....	.....	4.14	133	14.86	4,010	15.60	4,310	6.56	674	5.50	432
4	.....	.....	4.14	133	16.60	5,020	14.15	4,130	6.40	637	5.45	421
6	.....	.....	9.90	1,660	17.40	6,880	12.10	2,480	6.26	605	5.40	410
8	.....	.....	12.00	2,440	18.00	8,240	11.60	2,280	6.15	580	5.37	403
10	.....	.....	13.40	3,100	18.39	8,850	10.20	1,720	6.02	550	5.33	395
N	*4.16	*152	13.78	3,300	18.30	8,750	9.25	1,380	5.90	522	5.30	388
2	.....	.....	13.72	3,260	18.02	8,270	8.65	1,200	5.81	501	5.27	382
4	.....	.....	13.73	3,270	17.65	7,250	8.10	1,030	5.74	485	5.24	375
6	.....	.....	14.15	3,520	17.27	6,490	7.66	912	5.70	476	5.20	367
8	.....	.....	14.13	3,510	16.90	5,690	7.30	825	5.67	469	5.19	365
10	.....	.....	14.33	3,610	16.52	3,900	7.00	753	5.61	456	5.15	356
M	.....	.....	14.60	3,810	16.12	4,630	6.73	690	5.55	443	5.14	354

*Mean for the day

Nodaway River at Clarinda, Iowa

LOCATION.—Wire-weight gage, lat. 40°44'10", long. 95°00'30", in sec. 32, T. 69 N., R. 36 W., at bridge on State Highway 2, half a mile downstream from Neele Branch, 1.2 miles east of city square of Clarinda, and 7½ miles upstream from East Nodaway River.

DRAINAGE AREA.—740 square miles.

RECORDS AVAILABLE.—May 1918 to July 1925, May 1936 to September 1942.

AVERAGE DISCHARGE.—8 years (1921, 1923, 1936-42), 212 second-feet.

EXTREMES.—Maximum discharge observed during 1941-42 year, 10,800 second-feet Oct. 7 (gage height, 16.01 feet); minimum observed, 29 second-feet Aug. 23, 24 (gage height, 1.70 feet).

1918-25, 1936-41: Maximum discharge observed, 14,000 second-feet May 21, 1937 (gage height 16.5 feet, from floodmarks), from rating curve extended above 5,000 second-feet on basis of partly completed discharge measurement at gage height 12.1 feet; maximum gage height observed, 17.87 feet June 9, 1941; practically no flow Aug. 25, 1919.

Maximum stage known, 25.4 feet, from floodmarks, in August 1903.

REMARKS.—Records fair except those for periods of ice effect or no gage-height record, and those for days of rapidly changing stage, all of which are poor. Gage read once daily, with extra readings during rises. Diversion by City of Clarinda for municipal supply about half a mile above station; reported to average about 0.4 second-foot during 1942.

COOPERATION.—Gage-height record collected in cooperation with city of Clarinda.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Discharge in second-feet				Run-off	
		Maximum	Minimum	Mean	Per square mile	Inches	Acre feet
October 1940	432	17	13	13.9	0.019	0.02	857
November	968	67	15	32.3	.044	.05	1,920
December	905	81	15	29.2	.039	.04	1,800
Calendar year 1940	48,615	4,380	5	133	.180	2.44	96,430
January 1941	1,922	125	37	62.0	.084	.10	3,810
February	5,806	1,500	25	207	.280	.29	11,520
March	2,670	159	54	86.1	.116	.13	5,300
April	6,719	1,580	54	224	.303	.34	13,330
May	4,781	930	32	154	.208	.24	9,480
June	45,493	9,620	168	1,516	2.05	2.29	90,230
July	2,450	304	24	79.0	.107	.12	4,860
August	722	39	15	23.3	.031	.04	1,430
September	15,311	5,440	20	510	.689	.77	30,370
Water year 1940–41	88,179	9,620	13	242	.327	4.43	174,910
October 1941	28,982	7,650	156	935	1.26	1.46	57,480
November	21,172	4,740	204	706	.954	1.06	41,990
December	11,756	2,330	87	379	.512	.59	23,320
Calendar year 1941	147,784	9,620	15	405	.547	7.43	293,100
January 1942	17,576	1,370	223	567	.766	.88	34,860
February	10,547	964	220	377	.509	.53	20,920
March	24,721	2,150	267	797	1.08	1.24	49,030
April	8,587	585	173	286	.386	.43	17,030
May	40,979	5,870	164	1,322	1.79	2.06	81,280
June	22,259	3,850	169	742	1.00	1.12	44,150
July	16,110	3,420	64	520	.703	.81	31,950
August	4,729	900	29	153	.207	.24	9,380
September	5,342	832	51	178	.241	.27	10,600
Water year 1941–42	212,760	7,650	29	583	.788	10.69	422,000

Note—Stage-discharge relation affected by ice Nov. 13-15, Nov. 30 to Dec. 3, Dec. 13-25, 1940; Jan. 2-8, 17-20, Jan. 24 to Feb. 13, Feb. 18 to Mar. 5, Dec. 12-15, 30, 31, 1941; Jan. 1-22, Feb. 16-20, 1942.

Nodaway River at Clarinda, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept
1940–41												
1	14	15	16	96	35	80	54	154	246	190	23	a20
2	15	15	16	125	36	110	55	101	297	165	22	25
3	17	15	15	90	38	100	59	170	7,380	150	21	38
4	17	15	18	50	44	90	59	130	5,430	120	a23	516
5	14	15	21	55	50	100	61	84	1,080	102	28	124
6	15	16	a23	70	40	96	60	75	472	91	30	44
7	14	17	25	80	35	94	61	78	1,240	83	29	257
8	14	17	25	70	45	97	78	70	660	a80	39	486
9	14	20	28	64	50	104	146	70	9,620	78	26	170
10	14	31	28	a61	35	159	150	68	6,710	80	26	88
11	15	a40	a25	60	25	132	148	51	3,780	304	a22	61
12	14	23	a22	*64	300	104	101	49	1,900	152	19	54
13	14	20	18	67	1,500	70	88	45	1,060	83	19	49
14	13	19	17	64	1,320	83	77	a44	692	83	37	442
15	13	20	16	71	695	89	64	43	594	63	21	5,440
16	13	28	15	72	430	88	a60	44	503	58	19	4,120
17	13	36	15	68	449	84	150	37	382	52	19	1,800
18	13	33	15	57	300	89	1,580	39	336	51	33	506
19	13	*49	16	45	*32	106	1,560	a46	298	47	33	172
20	13	61	17	46	32	96	695	54	251	41	37	111
21	13	67	18	49	33	78	290	32	246	40	33	86
22	13	67	20	a70	34	72	200	639	249	40	20	65
23	13	64	22	74	40	70	161	930	200	40	19	68
24	13	51	23	50	43	65	a145	601	172	51	16	50
25	13	50	35	45	40	61	130	142	168	34	16	52
26	13	47	45	44	40	*61	111	97	170	33	16	38
27	13	45	55	43	40	61	102	165	a180	31	15	38
28	14	39	71	45	45	60	99	223	198	a29	15	36
29	15	17	81	50	.....	58	a91	262	695	28	15	34
30	a15	16	72	40	.....	59	84	a150	284	27	15	321
31	15	.....	72	37	.....	54	.....	88	.....	24	16	.....
1941–42												
1	197	4,740	a230	370	420	267	585	164	459	780	282	73
2	156	3,270	219	340	420	377	541	169	a390	429	167	a100
3	269	1,690	209	300	417	514	a509	477	321	682	a168	252
4	1,150	868	204	270	441	1,320	477	521	a296	308	169	80
5	880	972	193	250	626	1,080	405	355	272	399	139	66
6	k1,790	916	182	240	964	1,290	383	1,430	a258	228	269	98
7	7,650	724	175	230	732	1,160	352	1,020	243	197	391	89
8	3,400	623	169	225	438	648	335	521	a227	182	139	69
9	1,020	468	*162	225	380	453	321	435	211	169	129	223
10	480	a426	139	*223	380	483	298	411	223	158	105	199
11	349	385	87	230	332	447	a284	k5,160	352	150	85	80
12	311	399	100	240	360	a412	269	5,870	252	135	a82	51
13	240	388	125	270	332	377	a268	1,980	338	113	78	64
14	a216	366	120	320	321	380	267	1,040	233	a108	73	474
15	193	355	170	360	360	402	250	772	179	102	69	832
16	179	324	162	390	400	a600	245	651	a174	94	66	329
17	a170	308	197	430	330	2,120	235	1,750	169	76	57	290
18	162	292	202	520	240	1,570	226	2,850	169	64	48	588
19	156	318	182	600	220	960	211	1,380	193	619	54	321
20	405	514	175	650	240	960	199	820	k3,850	3,420	48	150
21	411	423	164	700	255	828	195	860	1,930	2,090	43	81
22	2,850	338	160	800	295	728	a187	4,400	740	394	33	81
23	1,280	272	1,540	1,120	a280	541	179	2,530	435	202	29	a81
24	788	204	2,330	1,290	*264	a516	173	1,160	321	245	29	81
25	399	235	1,010	1,280	277	492	182	872	k2,080	377	a35	85
26	511	303	820	1,370	285	2,150	202	764	1,180	1,900	64	109
27	1,400	282	616	1,100	279	1,120	245	716	547	1,220	186	109
28	772	282	453	892	259	768	197	581	487	435	900	119
29	405	247	371	876	.....	630	a188	521	2,230	435	468	92
30	313	240	450	772	.....	547	179	405	3,500	245	228	76
31	480	.....	440	693	.....	581	.....	394	.....	154	96	.....

*Winter discharge measurement made on this day.
(a) No gage-height record; discharge estimated or interpolated.
(k) Rapidly changing stage on this day.

Chariton River near Centerville, Iowa

LOCATION.—Water-stage recorder and grouted stone control, lat. 40°44'05", long. 92°48'25", in NW¼ sec. 34, T. 69 N., R. 17 W., at bridge on State Highway 2, 2½ miles downstream from Cooper Creek and 3 miles east of Centerville.

DRAINAGE AREA.—727 square miles.

RECORDS AVAILABLE.—May 1938 to September 1942.

EXTREMES.—Maximum discharge during 1941-42 year, 4,140 second-feet June 23 (gage height, 15.35 feet); minimum, 7.5 second-feet Sept. 1 (gage height, 2.40 feet).

1938-41: Maximum discharge, 16,500 second-feet Mar. 13, 1939 (gage height, 23.40 feet); minimum, 0.1 second-foot Oct. 11, 1938, Sept. 30, Oct. 1, 1940.

REMARKS.—Records good except those below 2 second-feet, and those for periods of fragmentary or no gage-height record, all of which are fair, and those for periods of ice effect, which are poor.

Monthly Discharge for Calendar and Water Years, 1941 and 1942

Month	Second-foot-days	Discharge in second-feet				Run-off	
		Maximum	Minimum	Mean	Per square mile	Inches	Acre feet
October 1940	48.5	5.1	0.1	1.56	0.0021	0.002	96
November	91.9	9.0	1.2	3.06	.0042	.005	182
December	148.6	18	1.2	4.79	.0066	.008	295
Calendar year 1940	29,310.6	2,080	.1	80.1	.110	1.50	58,140
January 1941	583.6	48	4.7	18.8	.026	.03	1,160
February	5,780	1,000	14	206	.283	.29	11,460
March	1,640	156	14	52.9	.073	.08	3,250
April	1,055	55	12	35.2	.048	.05	2,090
May	748.7	271	3.1	24.2	.033	.04	1,490
June	17,015.6	3,260	8.6	567	.780	.87	33,750
July	1,959.9	380	1.2	63.2	.087	.10	3,890
August	116.0	28	.6	3.74	.0051	.006	230
September	8,412.2	1,390	.3	280	.385	.43	16,690
Water year 1940–41	37,600.0	3,260	.1	103	.142	1.91	74,580
October 1941	18,916	1,840	16	610	.839	.97	37,520
November	22,820	3,100	106	761	1.05	1.17	45,260
December	9,840	1,800	37	317	.436	.50	19,520
Calendar year 1941	88,887.0	3,260	.3	244	.336	4.54	176,300
January 1942	16,625	1,760	44	536	.737	.85	32,980
February	7,797	1,050	125	278	.382	.40	15,470
March	11,839	1,120	149	382	.525	.61	23,480
April	1,989	135	30	66.3	.091	.10	3,950
May	3,477	256	16	112	.154	.18	6,900
June	22,919	3,860	16	764	1.05	1.17	45,460
July	12,699	2,010	28	410	.564	.65	25,190
August	3,474.5	1,040	8.5	112	.154	.18	6,890
September	1,876.5	214	8.5	62.6	.086	.10	3,720
Water year 1941–42	134,272.0	3,860	8.5	368	.506	6.88	266,300

Chariton River near Centerville, Iowa—Continued

Daily Discharge, in Second-feet, for Water Years 1941 and 1942

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept
1940–41												
1	0.1	2.1	a2.8	a9.6	31	b14	41	12	211	46	1.0	0.3
2	.1	1.9	a2.1	a16	36	b16	38	11	63	124	.9	1.3
3	.1	1.6	a1.5	a10	37	28	36	8.6	2,300	149	.9	7.6
4	2.1	1.5	a1.8	a8.6	a39	42	49	7.9	1,200	135	1.5	201
5	2.8	1.5	a1.9	a7.9	a41	28	51	7.6	481	76	2.2	246
6	1.9	1.2	a2.8	a6.8	a39	35	46	12	178	48	1.6	252
7	2.1	1.3	a2.6	a6.1	a37	30	40	12	345	241	1.3	977
8	1.2	1.5	a2.8	a6.1	a35	23	34	9.0	208	380	1.0	1,340
9	.4	1.8	a3.1	*7.9	a33	32	35	6.1	2,200	122	1.0	1,390
10	.3	2.1	a3.3	6.8	a32	50	55	5.1	3,260	70	.9	538
11	.4	b1.8	a2.8	5.8	a39	32	53	4.5	2,100	202	.6	173
12	1.2	b1.2	a2.4	5.4	a440	48	54	3.9	1,700	118	2.8	93
13	1.5	b1.5	a2.2	5.4	a649	50	50	3.1	1,060	93	28	62
14	2.1	b1.5	a1.9	7.1	a861	51	38	3.1	664	44	16	40
15	1.9	b1.5	a1.6	8.3	b1,000	54	31	3.1	332	28	10	44
16	.7	b1.6	a1.5	11	b900	75	29	271	*194	18	7.6	189
17	.9	b1.7	a1.2	11	b700	108	26	131	129	12	7.4	986
18	1.9	1.6	a1.8	7.6	b*400	156	53	27	90	10	6.1	950
19	2.1	3.1	a2.2	b5.5	b200	80	44	18	63	7.6	4.5	315
20	1.3	5.8	a2.8	b4.7	b50	81	37	8.6	48	6.4	3.7	197
21	1.2	5.8	a3.1	b5	b40	78	39	13	37	5.4	2.9	144
22	1.2	4.5	a4.5	b30	b30	75	36	13	30	4.7	2.6	85
23	1.3	3.3	a5.1	b45	b26	68	30	26	27	3.9	2.2	53
24	1.5	3.1	a7.6	b40	b22	58	25	21	22	3.1	1.8	34
25	1.5	4.7	a9.6	b48	b18	53	19	10	18	2.6	1.6	25
26	1.5	6.8	a14	b46	b16	51	16	13	14	2.4	1.5	18
27	1.5	a9.0	a18	b45	b15	49	14	12	12	2.1	1.0	13
28	3.3	a7.6	a14	b44	b14	46	12	8.6	11	1.6	.9	11
29	5.1	a5.4	a10	b46	.....	44	12	6.4	10	1.3	.9	9.0
30	2.9	a3.9	a9.0	42	.....	43	12	5.1	8.6	1.6	.9	18
31	2.4	.....	a8.6	35	.....	42	.....	56	.....	1.2	.7	.....
1941–42												
1	16	3,090	95	b210	226	249	135	80	180	142	63	8.5
2	18	2,470	97	b170	146	264	129	90	264	95	70	14
3	37	2,580	*95	b125	144	383	120	97	217	92	68	58
4	129	3,100	95	b95	142	440	108	252	75	163	38	56
5	228	2,690	97	b70	137	411	99	240	43	240	31	22
6	122	2,160	90	b60	305	454	93	246	31	151	28	15
7	131	1,720	80	b55	372	467	103	256	24	81	1,040	34
8	246	984	66	b52	267	471	104	166	30	55	472	142
9	1,340	605	63	b51	205	386	93	106	18	55	131	200
10	1,840	376	59	b*50	160	302	80	80	16	92	81	93
11	1,730	261	b56	b47	133	252	70	81	21	47	50	133
12	1,650	217	50	b45	b130	223	64	144	101	33	32	108
13	1,160	197	46	b44	b125	214	60	205	240	28	22	58
14	600	180	37	b47	b130	206	59	243	243	785	555	37
15	283	163	f40	b65	140	318	58	176	103	786	372	95
16	176	146	a50	b100	589	522	54	180	69	362	129	70
17	116	137	a60	502	1,030	1,090	50	108	74	129	76	28
18	85	127	a74	1,250	f1,050	1,120	46	68	64	66	40	22
19	72	122	a72	1,620	f594	752	41	60	37	902	28	60
20	64	131	f69	1,760	f322	630	37	103	1,940	2,010	23	214
21	60	205	63	1,740	b250	460	35	78	3,830	1,900	19	95
22	59	186	62	1,590	b215	270	34	92	3,120	1,620	16	55
23	579	156	624	1,390	b185	208	33	86	3,860	1,360	13	36
24	1,020	129	1,730	1,220	b165	168	31	59	3,560	573	11	32
25	801	118	1,800	1,030	b150	151	30	41	1,350	220	12	26
26	493	114	1,620	882	b142	149	30	35	1,090	322	9.5	34
27	796	118	1,160	752	149	240	33	27	1,120	118	9.0	43
28	1,560	120	b600	607	194	246	48	23	584	81	9.5	34
29	1,600	112	b320	429	.....	276	49	21	369	63	9.5	26
30	1,030	106	b230	315	.....	261	63	18	246	59	8.5	28
31	875	.....	b240	252	.....	166	.....	16	.....	69	8.5	.....

*Winter discharge measurement made on this day.

(a) No gage-height record; discharge computed on basis of weather records and recorded range of stage.

(b) Stage-discharge relation affected by ice.

(f) Fragmentary gage-height record; discharge computed from partly or wholly estimated gage heights.

RELATED GAGING STATION RECORDS COLLECTED IN ADJACENT STATES

During the period covered by this report daily discharge records that may be of considerable value in connection with studies concerning runoff conditions in Iowa were collected at several gaging stations in adjacent States but in drainage basins contiguous to the State of Iowa as listed below:

Part 5

Upper Mississippi River Basin

Mississippi River at La Crosse, Wis.
Mississippi River at Alton, Ill.

Minnesota River Basin
- Blue Earth River near Rapidan, Minn.

Root River Basin
- Root River near Lanesboro, Minn.
- Root River near Houston, Minn.
- Root River below South Fork, near Houston, Minn.

Des Moines River Basin
- West Fork Des Moines River near Jackson, Minn. (see p. 110)
- Heron Lake Outlet near Heron Lake, Minn. (see p. 124)

Fox River Basin
- Fox River at Wayland, Mo.

Wyaconda River Basin
- Wyaconda River above Canton, Mo.

Fabius River Basin
- North Fabius River at Monticello, Mo.
- Middle Fabius River near Baring, Mo.

Part 6

Missouri River Basin

Missouri River at Yankton, S. Dak.
Missouri River at Omaha, Nebr. (see p. 158)
Missouri River at Nebraska City, Nebr. (see p. 160)
Missouri River at St. Joseph, Mo.

Tarkio River Basin
- Tarkio River at Fairfax, Mo.

Nodaway River Basin
- Nodaway River near Burlington Junction, Mo.

Platte River Basin (Iowa-Missouri)
- Platte River near Agency, Mo.
- One Hundred and Two River near Maryville, Mo.

Grand River Basin
- Grand River near Gallatin, Mo.
- East Fork of Big Creek near Bethany, Mo.
- Thompson River at Trenton, Mo.
- Weldon River at Mercer, Mo.
- Medicine Creek near Galt, Mo.
- Locust Creek near Linneus, Mo.

Chariton River Basin
- Chariton River at Novinger, Mo.

The data from these stations pertain to streams and rivers draining along or across the boundaries of Iowa. These records have not been included in this Bulletin, except as noted by the above-indicated page references, but are published in United States Geological Survey Water-Supply Papers 925, 926, 955 and 956.

The records for these stations were collected and prepared for publication under the supervision of district engineers of the United States Geological Survey at Rolla, Missouri and St. Paul, Minnesota and in connection with cooperative arrangements with the Missouri Geological Survey and Water Resources, Minnesota Department of Conservation, and the Army Engineers.

MISCELLANEOUS DISCHARGE MEASUREMENTS IN IOWA

In addition to the daily records of stream flow obtained by continuous operations at gaging stations on Iowa streams in the *Upper Mississippi* and *Missouri River Basins* and reported in the preceding pages, measurements of flow of a miscellaneous character were made at other than regular gaging stations as shown in the following table with pertinent data. Additional information concerning these measurements can be obtained in the district office of the Survey in Iowa City.

Table 17.—Miscellaneous measurements of Iowa streams during the years ending Sept. 30, 1941 and 1942.

MISSISSIPPI RIVER BASIN 1940-41

DATE	STREAM	TRIBUTARY TO—	LOCALITY	DISCHARGE SEC.-FT.
June 13	Mississippi River	Gulf of Mexico	0.2 mile below dam 10	59,200
21	do	do	do	51,300
July 3	do	do	do	40,500
Oct. 18	Mississippi River	Gulf of Mexico	Muscatine, Iowa	24,500
Feb. 1	do	do	do	29,100
Mar. 19	do	do	do	32,800
Apr. 23	do	do	do	137,400
28	do	do	do	135,700*
May 13	do	do	do	77,500
27	do	do	do	*40,000
June 25	do	do	do	*64,300
26	do	do	do	62,300
July 11	do	do	do	32,900
Sept. 16	do	do	do	119,700
May 29	Upper Iowa River	Mississippi River	At U.S. Highway 52, Decorah, Iowa	†9,200
Nov. 20	Upper Iowa River	Mississippi River	Above Bear Creek, So. of Dorchester, Iowa	166
Jan. 22	do	do	do	175
Mar. 4	do	do	do	898
23	do	do	do	3,800
Apr. 16	do	do	do	471
May 30	do	do	do	†30,400
30	do	do	do	4,450
31	do	do	do	3,100
31	do	do	do	2,800
June 1	do	do	do	2,140
Aug. 15	do	do	do	128
Sept. 19	do	do	do	166
May 29	Dry Run	Upper Iowa River	Above Decorah, Iowa, SW¼ Sec. 20, T. 98N., R. 8W	[a]14,000
29	Trout Run	Upper Iowa River	Near Decorah, Iowa, above East Branch	[b]20,000
29	East Branch of Trout Run	Trout Run	Near Decorah, Iowa	[c]10,300
Nov. 20	Bear Creek	Upper Iowa River	Dorchester, Iowa	32.2
Jan. 22	do	do	do	35.2
Mar. 23	do	do	do	115
Apr. 16	do	do	do	44.5
May 31	do	do	do	89.0
31	do	do	do	75.2
31	do	do	do	70.1
June 1	do	do	do	54.1
Aug. 15	do	do	do	33.3
Sept. 19	do	do	do	41.7

*Measured by Corps of Engineers, U. S. Army
†Result of slope-area determination.
[a]Result of slope-area determination; drainage area, 20.1 sq. mi.
[b]Result of slope-area determination; drainage area, 37.8 sq. mi.
[c]Result of slope-area determination; drainage area, 11.6 sq. mi.

Table 17.—Miscellaneous measurements of Iowa streams during the years ending Sept. 30, 1941 and 1942—Continued.

MISSISSIPPI RIVER BASIN 1940-41—Continued

Date	Stream	Tributary To—	Locality	Discharge Sec.-ft.
Nov. 2	Maquoketa River	Mississippi River	Below hydroelectric plant near Delhi, Iowa	7.74
2	do	do	do	243
Mar. 21	do	do	do	1,260
Apr. 4	do	do	do	4,610
5	do	do	do	734
5	do	do	do	693
Aug. 2	do	do	do	8.96
Oct. 5	Wapsipinicon River	Mississippi River	Central City ,Iowa	130
Nov. 19	do	do	do	706
Feb. 13	do	do	do	558
Mar. 21	do	do	do	1,880
Apr. 4	do	do	do	3,010
Sept. 9	do	do	do	9,060
Oct. 30	Iowa River	Mississippi River	Iowa Falls, Iowa	17.7
Nov. 26	do	do	do	382
Jan. 7	do	do	do	45.8
Feb. 27	do	do	do	20.0
Mar. 23	do	do	do	886
July 12	do	do	do	162
Aug. 5	do	do	do	26.7
Sept. 25	do	do	do	169
25	do	do	do	25.1
Mar. 25	Iowa River	Mississippi River	Above Coralville, Iowa	2,500
July 1	do	do	do	3,500
Sept. 8	do	do	do	6,770
July 31	Clear Creek	Willow Creek	Outlet of Clear Lake, Clear Lake, Ia.	3.20
Oct. 11	Cedar River	Iowa River	Rochester, Iowa	1,330
Mar. 14	do	do	do	5,450
24	do	do	do	11,400
29	do	do	do	6,640
May 13	do	do	do	2,200
June 10	do	do	do	6,670
July 17	do	do	do	1,870
Aug. 13	do	do	do	937
Sept. 10	do	do	do	13,400
Oct. 10	W. Fk. Des Moines	Des Moines River	Humboldt, Iowa	19.0
Nov. 25	do	do	do	164
Jan. 8	do	do	do	17.3
Mar. 20	do	do	do	492
Apr. 17	do	do	do	1,240
May 4	do	do	do	1,100
June 6	do	do	do	535
July 22	do	do	do	477
Aug. 8	do	do	do	*169

MISSISSIPPI RIVER BASIN 1941-42

June 10-11	Mississippi River	Gulf of Mexico	0.2 mile below dam 10	155,900
Oct. 25	Mississippi River	Gulf of Mexico	Muscatine, Iowa	91,600
Nov. 26	do	do	do	42,500
June 13	do	do	do	178,400*
Nov. 1	Upper Iowa River	Mississippi River	Above Bear Creek, So. of Dorchester, Iowa	810
Dec. 4	do	do	do	314
Jan. 14	do	do	do	216
Feb. 17	do	do	do	232
Mar. 26	26	do	do	1,030
May 7	do	do	do	385
June 21	do	do	do	475
29	do	do	do	12,300
30	do	do	do	8,270
July 14	do	do	do	1,290
Aug. 27	do	do	do	819
Sept. 29	do	do	do	782

*Measured by Corps of Engineers, U. S. Army

Table 17.—Miscellaneous measurements of Iowa streams during the years ending Sept. 30, 1941 and 1942—Continued.

MISSISSIPPI RIVER BASIN 1941-42—Continued

Date	Stream	Tributary To—	Locality	Discharge Sec.-ft.
June 30	Dry Run	Upper Iowa River	½ mile above mouth; in Decorah, Iowa	84.4
Nov. 1	Bear Creek	Upper Iowa River	Route 13 bridge, south of Dorchester, Iowa	140
Dec. 4	do	do	do	34.0
Jan. 14	do	do	do	33.5
Feb. 17	do	do	do	36.1
Mar. 26	do	do	do	21.5
May 7	do	do	do	40.4
June 21	do	do	do	37.8
29	do	do	do	282
30	do	do	do	72
July 14	do	do	do	70.6
Aug. 27	do	do	do	57.3
Sept. 29	do	do	do	56.8
Oct. 24	Wapsipinicon River	Mississippi River	Central City Iowa	1,130
Mar. 20	do	do	do	2,440
June 13	do	do	do	7,950
25	do	do	do	*712
Nov 6	Iowa River	Mississippi River	Iowa Falls, Iowa	1,600
7	do	do	do	1,380
10	do	do	do	927
Mar. 19	do	do	do	1,160
May 2	do	do	do	540
June 2	do	do	do	2,100
Aug. 14	do	do	do	168
Oct 23	Iowa River	Mississippi River	Above Coralville, Iowa	4,900
Nov. 6	do	do	do	6,110
28	do	do	do	1,910
Mar. 21	do	do	do	3,790
May 21	do	do	do	2,570
June 9	do	do	do	*4,450
12	do	do	do	7,650
Sept. 17	Salt Creek	Iowa River	½ mile northwest of Belle Plaine, Iowa	*45.0
Sept. 18	Bear Creek	Iowa River	¼ mile west of Marengo, Iowa	*17
May 6	Cedar River	Iowa River	Cedar Falls, Iowa	3,400
June 5	do	do	do	12,200
Aug. 1	do	do	do	14,090
6	do	do	do	4,570
Dec. 3	Cedar River	Iowa River	Rochester, Iowa	3,680
Apr. 7	do	do	do	6,270
May 19	do	do	do	4,630
June 8	do	do	do	*19,500
July 22	do	do	do	8,450
Aug. 5	do	do	do	30,500
Sept. 25	do	do	do	*4,810
Apr. 19	Lime Creek	Cedar River	Highway 18 bridge S. E. of Mason City, Ia.	223
May 3	do	do	do	490
June 3	do	do	do	489
Aug. 13	do	do	do	174
Sept. 29	do	do	do	147
May 8	Skunk River	Mississippi River	Below Squaw Creek at Ames, Iowa	709
July 7	do	do	do	230
Aug. 31	do	do	do	311
Sept. 15	do	do	do	3,270
16	do	do	do	1,820

*Measured by Corps of Engineers, U. S. Army

Table 17.—Miscellaneous measurements of Iowa streams during the years ending Sept. 30, 1941 and 1942—Continued.

MISSISSIPPI RIVER BASIN 1941-42—Continued

Date	Stream	Tributary To—	Locality	Discharge Sec.-ft.
	West Fork			
Oct. 7	Des Moines River	Des Moines River	Humboldt, Iowa	1,030
Nov. 7	do	do	do	1,950
Jan. 17	do	do	do	183
Mar. 20	do	do	do	794
June 12	do	do	do	1,840
Sept. 1	do	do	do	700
23	do	do	do	*2,590
July 29	Beaver Creek	Des Moines River	So. of Johnson Station near Des Moines, Ia.	948

MISSOURI RIVER BASIN 1940-41

Date	Stream	Tributary To—	Locality	Discharge Sec.-ft.
Oct. 15	Perry Creek	Missouri River	At Sioux City, Iowa	d.15
Jan. 7	do	do	do	.47
Feb. 24	do	do	do	1.24
Mar. 22	do	do	do	7.72
Apr. 9	do	do	do	10.1
13	do	do	do	51.3
May 8	do	do	do	3.21
July 11	do	do	do	18.8
Aug. 9	do	do	do	d.04
Sept. 11	do	do	do	d.04
14	do	do	do	31.4
14	do	do	do	28.6

MISSOURI RIVER BASIN 1941-42

Oct. 23	Perry Creek	Missouri River	At Sioux City, Iowa	5.66
Jan. 15	do	do	do	1.06
Feb. 19	do	do	do	d1.0
Mar. 23	do	do	do	2.54
23	do	do	do	2.55
May 1	do	do	do	2.78
June 16	do	do	do	*.10
19	do	do	do	82.2
19	do	do	do	38.5
July 10	do	do	do	d.01
Sept. 2	do	do	do	20.1
June 6	Floyd River	Missouri River	At Leach Street bridge Sioux City, Iowa	3,210
June 20	Indian Creek	Missouri River	Near north city limits of Council Bluffs, Ia.	*9,200

*Measured by Corps of Engineers, U. S. Army

dDischarge estimated

*Slope-area determination by Corps of Engineers, U. S. Army; drainage area, 7.3 square miles.

APPENDIX

UNITS AND DEFINITIONS

The following definitions of terms are used in connection with the presentation of hydrometric data and are taken largely from the water-supply papers of the United States Geological Survey.

The volume of water flowing in a stream—the "runoff" or "discharge"—is expressed in various terms, each of which has become associated with a certain type of work. These terms may be divided into two groups: (1) those that represent a rate of flow, as second-feet, millions of gallons per day, discharge in second-feet per square mile, and runoff in inches of depth per acre during 24 hours—drainage modulus; and (2) those that represent the actual quantity of water, as runoff in inches of depth on the drainage basin, acre-feet, and million gallons.

"Million gallons" is a unit often mentioned and used in Iowa in connection with pumping and storage for water supplies and related facilities. It should be understood that this term is used with two meanings: (1) to indicate rate of flow and (2) to express an actual quantity of water. In the former sense "million gallons daily" is inferred, 1,000,000 gallons being taken as the unit of quantity and 24 hours as the unit of time. In the latter sense "million gallons" is taken as an absolute quantity.

The units in which stream-flow data are given in this report and other terms of importance may be defined as follows:

"Second-feet" is an abbreviation for "cubic feet per second." A second-foot is a rate of flow of 1 cubic foot per second, or the rate of discharge that is equivalent to a stream flowing in a pipe or open channel when the cross-sectional area is 1 square foot and the average velocity is 1 foot per second. It is generally used as a fundamental unit from which others are computed and is the "natural" unit, as the foot and the second are the units used in making the physical determinations.

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

"Runoff in inches" is the depth to which the drainage area would be covered if all the water flowing from it in a given period were distributed uniformly over its surface. It is principally used for comparing runoff with rainfall, which is usually expressed in depth in inches.

"Acre-feet" is commonly used in connection with storage of water for irrigation or power. An acre-foot, equivalent to 43,560 cubic feet, is the quantity of water required to cover an acre of surface to a depth of 1 foot.

"Second-foot-day" is the volume of water represented by a flow of 1 second-foot for 24 hours. It is equivalent to 86,400 cubic feet, 1.983 acre-feet, or 646,317 gallons and represents a runoff of 0.0372 inch from 1 square mile.

"Control" is a term used to designate a channel condition downstream from the gage that determines the stage-discharge relation at the gage. It may be a natural section, a reach of the channel, or an artificial structure, and is not necessarily the same for all stages.

"Crest" is (1) the top of a dam, spillway or weir, frequently restricted to the overflow portion; (2) the summit of a wave or the peak stage of a flood.

"Datum" is a plane of reference for gage heights.

"Drainage area" may be most appropriately used to refer to numerical units of area drained by a stream system upstream from some designated point on the stream; whereas, "drainage basin" may advantageously be used to refer in a general way to the region drained by a surface stream system; under some usage the terms are synonymous, and with "catchment area."

"Gage height" is the height of water surface in relation to a datum corresponding to the zero of the staff or other type of gage from which the height is obtained; often considered synonymous with the more general term of "stage."

"Stage-discharge relation" is an abbreviation for the term "relation between gage height and discharge." By means of this relation, which is defined by discharge measurements, it is possible to determine the discharge of a stream from the observed or recorded gage heights.

"Point of zero flow" for a gaging station is that point on the gage—the gage height—at which water ceases to flow over the control.

"Water loss" is generally used to designate that part of the total precipitation that is removed from a drainage basin by the evaporation process, that is interception, transpiration, and direct evaporation. Although, it has occasionally been used to represent that part of rainfall which does not produce runoff, including seepage or infiltration. The concept is variously expressed, however, by different authors and by the terms loss, evaporation loss, evaporation, evaporation and transpiration,

evapo-transpiration, consumptive use, or fly-off. As used in some studies,[4] the water loss of a drainage basin is taken as the difference between average precipitation over the basin and the runoff from the basin for a given period, usually several years.

"Water-stage (level) recorder" is an instrument for automatically obtaining a continuous graphical record of the fluctuation of a water surface with respect to time.

"Yield" is the total amount of water that flows from a drainage area. The term runoff should probably, strictly speaking, be confined to that part of the yield which runs off over the land surface into the stream channel; but this quantity is so inseparable from ground water discharge that runoff is generally used to refer to all the water that reaches the stream to which the area drains.

Three general methods for the graphical analysis of streamflow records are as follows: hydrograph, mass diagram, and flow-duration curve. Examples of the use of the hydrograph are demonstrated in figures 2-5, 7-8. The mass, or Rippl method consists in graphically representing in chronological order the cumulative average quantities of water available at any time for storage, or draft from storage. The flow-duration curve involves the frequency of the occurrence of various rates of flow regardless of chronological sequence. (See fig. 9). It indicates the per cent of time for the period of record during which selected rates of flow were equalled or exceeded. A deficiency curve can be obtained directly from a flow-duration curve by simply reversing the scale of the duration curve. Either type of curve is a useful tool in the analysis of water-supply problems, particularly those involving studies of possible sources of domestic or industrial water supply, or those involving the disposal and dilution of sewage or industrial wastes. The flow-duration curve has also been utilized in probability studies to determine the probability of possible rates of flow in relation to time.

[4] Williams, G. R. and others, Natural Water Loss in Selected Drainage Basins: U. S. Geol. Survey Water-Supply Paper 846, 1940.

HYDRAULIC CONVERSION TABLES

(Taken from U.S.G.S. Paper 425-C)

Conversion from one unit to another is a simple arithmetical process. The following tables afford a ready means of conversion between terms commonly used in hydraulic computations. Figures may be chosen from the tables for units, tens, hundreds, etc., and then combined to get the desired results. Attention is called to the fact that although the tables will give results to more than three significant figures, it is seldom that the base data or requirements for which the records are collected will justify the use of more than three significant figures.

Table for converting discharge in second-feet per square mile into runoff depth in inches over the area

[1 second-foot for 1 day = 86,400 cubic feet = $\frac{86,400 \times 12}{27,878,400}$ = 0.03719 inch deep on 1 square mile.]

Discharge (second-feet per square mile)	Runoff (depth in inches)				
	1 day	28 days	29 days	30 days	31 days
1	0.03719	1.041	1.079	1.116	1.153
2	.07438	2.083	2.157	2.231	2.306
3	.11157	3.124	3.236	3.347	3.459
4	.14876	4.165	4.314	4.463	4.612
5	.18595	5.207	5.393	5.578	5.764
6	.22314	6.248	6.471	6.694	6.917
7	.26033	7.289	7.550	7.810	8.070
8	.29752	8.331	8.628	8.926	9.223
9	.33471	9.372	9.707	10.041	10.376

NOTE.—For part of month multiply runoff for 1 day by number of days.

Table for converting discharge in second-feet into runoff in acre-feet

[1 second-foot for 1 day = 86,400 cubic feet = $\frac{43,560}{86,400}$ = 1.983471 acre-feet.]

Discharge (second-feet)	Runoff (acre-feet)				
	1 day	28 days	29 days	30 days	31 days
1	1.983	55.54	57.52	59.50	61.49
2	3.967	111.1	115.0	119.0	123.0
3	5.950	166.6	172.6	178.5	184.5
4	7.934	222.1	230.1	238.0	246.0
5	9.917	277.7	287.6	297.5	307.4
6	11.90	333.2	345.1	357.0	368.9
7	13.88	388.8	402.6	416.5	430.4
8	15.87	444.3	460.2	476.0	491.9
9	17.85	499.8	517.7	535.5	553.4

NOTE.—For part of month multiply runoff for 1 day by number of days.

Table for converting discharge in second-feet into runoff in millions of gallons

Discharge (second-feet)	Runoff (millions of gallons)				
	1 day	28 days	29 days	30 days	31 days
1	0.6463	18.10	18.74	19.39	20.04
2	1.293	36.20	37.48	38.78	40.08
3	1.939	54.30	56.17	58.22	60.12
4	2.585	72.40	74.96	77.56	80.16
5	3.232	90.50	93.70	96.95	100.2
6	3.878	108.6	112.4	116.3	120.2
7	4.524	126.7	131.2	135.7	140.3
8	5.170	144.8	149.9	155.1	160.3
9	5.817	162.9	168.7	174.5	180.4

NOTE.—For part of month multiply runoff for 1 day by number of days.

Table for converting runoff in millions of gallons into runoff in acre-feet

[1 million United States liquid gallons or 231 million cubic inches = 133,680.555 cubic feet, or $\frac{133,680}{43,560}$ = 3.0689 acre-feet.]

Tens	Units									
	0	1	2	3	4	5	6	7	8	9
0	.....	3.07	6.14	9.21	12.28	15.34	18.41	21.48	24.55	27.62
1	30.69	33.76	36.83	39.90	42.96	46.03	49.10	52.17	55.24	58.31
2	61.38	64.45	67.52	70.58	73.65	76.72	79.79	82.86	85.93	89.00
3	92.07	95.14	98.20	101.27	104.34	107.41	110.48	113.55	116.62	119.69
4	122.76	125.82	128.89	131.96	135.03	138.10	141.17	144.24	147.31	150.38
5	153.44	156.51	159.58	162.65	165.72	168.79	171.86	174.93	178.00	181.06
6	184.13	187.20	190.27	193.34	196.41	199.48	202.55	205.62	208.68	211.75
7	214.82	217.89	220.96	224.03	227.10	230.17	233.24	236.30	239.37	242.44
8	245.51	248.58	251.65	254.72	257.79	260.86	263.92	266.99	270.06	273.13
9	276.20	279.27	282.34	285.41	288.48	291.54	294.61	297.68	300.75	303.82

Table for converting discharge in gallons per minute into discharge in second-feet

[1 gallon per minute = $\frac{231}{60}$ cubic inches per second = $\frac{231}{60 \times 1,728}$ = 0.0022278 second-

Tens	Units									
	0	1	2	3	4	5	6	7	8	9
0	.....	0.0022	0.0045	0.0067	0.0089	0.0111	0.0134	0.0156	0.0178	0.0201
1	0.0223	.0245	.0267	.0290	.0312	.0334	.0356	.0379	.0401	.0423
2	.0446	.0468	.0490	.0512	.0535	.0557	.0579	.0602	.0624	.0646
3	.0668	.0691	.0713	.0735	.0757	.0780	.0802	.0824	.0847	.0869
4	.0891	.0913	.0936	.0958	.0980	.1003	.1025	.1047	.1069	.1092
5	.1114	.1136	.1158	.1181	.1203	.1225	.1248	.1270	.1292	.1314
6	.1337	.1359	.1381	.1404	.1426	.1448	.1470	.1493	.1515	.1537
7	.1559	.1582	.1604	.1626	.1649	.1671	.1693	.1715	.1738	.1760
8	.1782	.1805	.1827	.1849	.1871	.1894	.1916	.1938	.1960	.1983
9	.2005	.2027	.2050	.2072	.2094	.2116	.2139	.2161	.2183	.2206

Table for converting velocity in feet per second into velocity in miles per hour

[1 foot per second = 0.681818 mile per hour, or two-thirds mile per hour, very nearly; 1 mile per hour = 1.4666 feet per second. In computing the table the values 0.68182 and 1.4667 were used.]

Feet per second (units)	Miles per hour for tenths of foot per second									
	0	1	2	3	4	5	6	7	8	9
0	0.000	..068	0.136	0.205	0.273	0.341	0.409	0.477	0.545	0.614
1	.682	.750	.818	.886	.995	1.02	1.09	1.16	1.23	1.30
2	1.36	1.43	1.50	1.57	1.64	1.70	1.77	1.84	1.91	1.98
3	2.05	2.11	2.18	2.25	2.32	2.39	2.45	2.52	2.59	2.66
4	2.73	2.80	2.86	2.93	3.00	3.07	3.14	3.20	3.27	3.34
5	3.41	3.48	3.55	3.61	3.68	3.75	3.82	3.89	3.95	4.02
6	4.09	4.16	4.23	4.30	4.36	4.43	4.50	4.57	4.64	4.70
7	4.77	4.84	4.91	4.98	5.05	5.11	5.18	5.25	5.32	5.39
8	5.45	5.52	5.59	5.66	5.73	5.80	5.86	5.93	6.00	6.07
9	6.14	6.20	6.27	6.34	6.41	6.48	6.55	6.61	6.68	6.75

CONVENIENT EQUIVALENTS

(Taken from U.S.G.S. Paper 425-C)

The following is a list of convenient equivalents for use in hydraulic computations:

1 United States gallon of water weighs 8.34 pounds avoirdupois.

1 cubic foot of water weighs 62.5 pounds avoirdupois.

1 second-foot = 7.48 United States gallons per second = 448.8 United States gallons per minute = 26,929.9 United States gallons per hour = 646,317 United States gallons per day.

1 second-foot = 60 cubic feet per minute = 3,600 cubic feet per hour = 86,400 cubic feet per day = 31,536,000 cubic feet per year = 0.000214 cubic inches per year.

1 second-foot = 0.9917 acre-inch per hour = 1.983471 acre-feet per day = 723.966942 acre-feet per year (= 725.950413 acre-feet per year of 366 days).

1 second-foot = 0.028317 cubic meter per second = 1.699 cubic meters per minute = 101.941 cubic meters per hour = 2,446.58 cubic meters per day.

1 second-foot for 1 year (365 days) will cover 1 square mile 1.1312 feet or 13.5744 inches deep.

1 inch deep on 1 square mile = 2,323,200 cubic feet = 0.0737 second-foot for 1 year.

1,000,000,000 (1 United States billion) cubic feet = 11,570 second-feet for one day = 413 second-feet for one 28-day month = 399 second-feet for one 29-day month = 386 second-feet for one 30-day month = 373 second-feet for one 31-day month.

100 United States gallons per minute = 0.223 second-foot = 0.442 acre-foot in one day.

1 foot deep (head of 1 foot) = 0.434 pound pressure on 1 square inch.

1 cubic meter per minute = 0.5886 second-foot = 4.403 United States gallons per second = 1.1674 acre-feet per day.

1 cubic meter, stere, or kiloliter = 1,000,000 cubic centimeters = 1,000 liters = 61,023.4 cubic inches = 264.17 United States gallons = 35.3145 cubic feet = 1.30794 cubic yards = 0.000810708 acre-foot.

1 acre-foot = 325,851 United States gallons = 43,560 cubic feet = 1,613⅓ cubic yards = 1,233.49 cubic meters.

1 million gallons per day = 1.55 second-feet = 3.07 acre-feet per day = 2.629 cubic meters per minute.

1 second-foot falling 8.81 feet = 1 horsepower.

1 second-foot falling 10 feet = 1.135 horsepower.

1 second-foot falling 11 feet = 1 horsepower, 80 per cent efficiency.

1 horsepower = 5,694,120 foot-gallons per day = 550 foot-pounds per second = 33,000 foot-pounds per minute = 1,980,000 foot-pounds per hour = 2,545 British thermal units per hour = 76 kilogrammeters per second = 1.27 kilogrammeters per minute = 746 watts.

1 horsepower, boiler rating, requires the evaporation of 34½ pounds per hour of water at 212° F. to dry steam at the same temperature; or the expenditure of 33,317 British thermal units; and in practice is developed by burning 3¼ to 4¾ pounds per hour of coal under 10 to 12 square feet of heating surface.

1 British thermal unit = 778 foot-pounds.

1 pound of bituminous coal contains about 14,100 British thermal units, or 11,000,000 foot-pounds of energy.

To calculate water power quickly: $\frac{\text{Second-feet} \times \text{fall in feet}}{11} =$ net horsepower on water wheel realizing 80 percent of theoretical power.

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