IOWA GEOLOGICAL SURVEY
IOWA CITY, IOWA
H. GARLAND HERSHEY, Director and State Geologist

WATER-SUPPLY BULLETIN NO. 5

QUALITY OF SURFACE WATERS OF IOWA
1886 – 1954

Records collected in cooperation with

IOWA GEOLOGICAL SURVEY
SOIL CONSERVATION SERVICE, DEPARTMENT OF AGRICULTURE
CORPS OF ENGINEERS, DEPARTMENT OF THE ARMY
IOWA INSTITUTE OF HYDRAULIC RESEARCH
IOWA STATE CONSERVATION COMMISSION
UNITED STATES GEOLOGICAL SURVEY
CERTAIN IOWA CITIES

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FOREWORD

There was a time when the only important qualities of a water for most uses were that it be wet and, in certain cases, free from harmful bacteria. Today in addition, however, with the ever increasing demand for water for many uses, the concentration and type of dissolved minerals, the temperature, and the solid materials carried in suspension or along the bottom of a stream are highly important and of great interest to water users and to workers in the vital field of water resources.

This report, Water-Supply Bulletin No. 5, contains information on the quality of surface waters in Iowa. It continues the policy to make basic data on water resources more useful through publication and selective distribution of a series of Water-Supply Bulletins. Bulletins No. 1 to 3 contain streamflow records of Iowa. Bulletin No. 4 is devoted to the geology and ground-water resources of Webster County. Other similar reports are in preparation.

Material contained in this report was gathered from numerous sources, the bulk of it was collected in recent years as a part of the cooperative program of the U. S. Geological Survey and the Iowa Geological Survey. Measurements of stage, flow, sediment and mineral content, and temperature of Iowa lakes, rivers, and streams is being continued on a systematic state-wide basis.

H. GARLAND HERSHEY
State Geologist

Iowa City, Iowa
September 1, 1955

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1886—1954

INTRODUCTION

The State and Federal cooperative quality-of-water investigations are concerned with the chemical and physical characteristics of the surface and ground water supplies of Iowa. The records of chemical analysis, suspended sediment, and temperatures for surface water given in this bulletin will serve as a basis for determining the suitability of the waters for industrial, agricultural, and domestic uses insofar as such use is affected either by the temperature of the water, or by the dissolved or suspended mineral matter in the water. In addition the sediment records will assist in evaluation of the soil erosion problem in Iowa.

This bulletin is arranged with a description of how the samples are collected and examined, and how the results are expressed. Next, the factors which affect the quality of the water are presented as background information essential to the understanding of the records. Following this section the chemical and physical qualities of the surface water of Iowa are discussed and interpreted insofar as the records permit. The final section of the bulletin contains the basic data.

The cooperative program for the systematic collection of data on the quality of the surface water resources in Iowa began in 1943, although a few records were collected prior to that date by special arrangement. This bulletin contains the results of this cooperative effort from October 1943 to September 1954 and, in addition, records collected prior to that period. A search of the publications of both the Iowa Geological Survey and the U. S. Geological Survey was made so as to include in this volume the results of all of their investigations in the quality-of-surface-water field. The quality-of-surface-water stations that have been maintained in Iowa are listed in table 1. The location of those stations where daily quality-of-surface-water records were obtained is shown in fig. 1. Certain other State and Federal agencies have collected or are collecting sediment load data. An inventory of these published and unpublished data was assembled in table 2.

The cooperative program between the Iowa Geological Survey and U. S. Geological Survey is part of the Federal program to gather basic information about the water resources of the United States.

Table 1. Quality-of-surface-water stations maintained in Iowa showing period of records.

Stream	Location	Drainage Area (sq. mi.)	Quality of Water Records Available		
			Chemical	Temperature	Sediment
Cedar River	Cedar Rapids, Iowa	6,640	1906-07, 1944-54	1944-54	1943-54
Davids Creek	Near Hamlin, Iowa	26.1	....	1952-	1952-
Des Moines River	Below Raccoon River at Des Moines, Iowa (at E. 14th St.)	9,770	1944-45	1944-45	1944-47
Des Moines River	Des Moines, Iowa (2nd Ave.)	6,180	....	....	1948-49
Des Moines River	Keosauqua, Iowa	13,000	1906-07	....	....
East Fork Hardin Creek	Near Churdan, Iowa	22.7	....	1952-	1952-
Honey Creek	Near Russell, Iowa	13.8	....	....	1952-
Iowa River	Iowa City, Iowa	3,230	1906-07, 1944-54	1944-	1943-
Iowa River	Above Coralville, Iowa	3,035	....	....	1943-47
Little Sioux River	Correctionville, Iowa	2,450	....	1951-	1950-
Little Sioux River	Near Kennebec, Iowa	2,730	....	1951-	1950-
Mississippi River	Moline, Ill.	88,600	1907	....	....
Missouri River	Florence, Nebr.	322,800	1906-07	....	....
Missouri River	Nebraska City, Nebr.	414,000	1951-	....	....
Paint Creek	Waterville, Iowa	42.7	....	1952-	1952-
Raccoon River	Des Moines, Iowa	3,590	1945-47	1945-46	....
Ralston Creek	Iowa City, Iowa	3.01	....	1952-	1952-
Shell Rock River	Marble Rock, Iowa	1,330	....	1944-45	....
Shell Rock River	Shell Rock, Iowa	1,770	....	1953-	....
Tarkio River	Blanchard, Iowa	200	....	....	1934-40
West Tarkio Creek	Near Westboro, Mo.	105	....	....	1934-40

For purposes of collecting and publishing these data, the U. S. Geological Survey has divided the United States into areas comprising fourteen 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 basin
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

By nature, the State of Iowa is divided into two major drainage basins; about two-thirds of the total area of the State is in the upper Mississippi River basin, Part 5 of the Federal reports, and the other one-third of the State is in the Missouri River basin, Part 6.

Measurements of stage, discharge, and content of streams, lakes, and reservoirs for each of these parts are published annually in U. S. Geological Survey Water-Supply Papers (WSP) in the

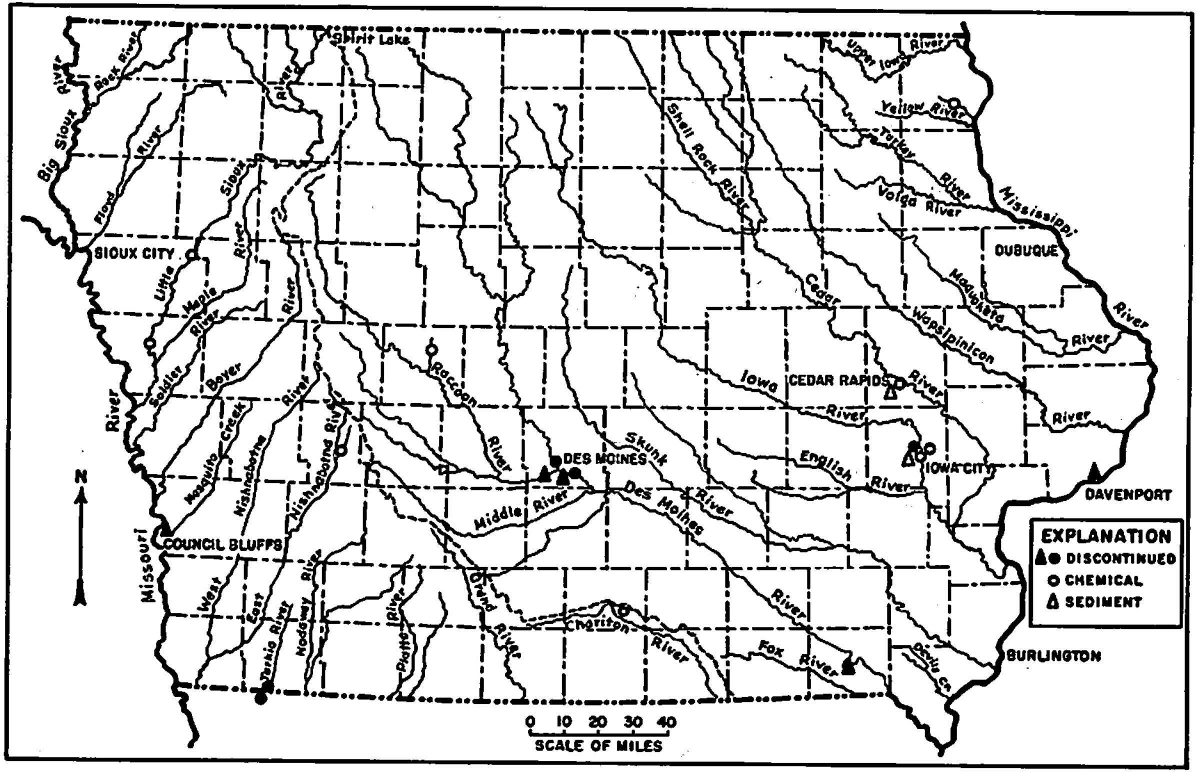


Figure 1. Location of daily chemical and sediment stations.

series Surface Water Supply in the United States. For a list of these Water-Supply Papers, see Iowa Water-Supply Bulletin No. 3. Also, since 1941, yearly Water-Supply Papers containing the records of chemical analyses, suspended sediment, and water temperature for these major drainage basins have been published. Quality-of-water records collected prior to 1941 were published in special Water-Supply Papers. A list of Water-Supply Papers that contain quality-of-water records for Iowa appears on page 5.

This bulletin has been prepared as No. 5 in a series of Water-Supply Bulletins published by the Iowa Geological Survey. It presents the results of the quality-of-surface-water investigations in Iowa from 1886 to 1954. Water-Supply Bulletin Nos. 1, 2, and 3 contain the results of measurements of streamflow made in Iowa from 1873 to 1950, and Bulletin No. 4 presents the geology and ground water resources of Webster County, Iowa.

The quality-of-water records are presented in accordance with the regular practice used by the U. S. Geological Survey in its Water-Supply Papers. The main drainage basin subdivisions included in this report are those portions of the upper Mississippi River basin and Missouri River basin in Iowa. In these basins, in a downstream direction along the main stem all stations in a tributary entering above a main-stem station are listed before that station. If a tributary enters between two main-stem stations, it is listed between them. A similar order is followed in listing stations on first rank, second rank, and other ranks of tributaries.

PUBLICATIONS

Reports made by the U. S. Geological Survey giving chemical analyses, suspended-sediment loads, and water temperatures for surface water in Iowa are:

Professional Paper

*No. 135	The composition of the river and lake waters of the United States, 1924

Bulletins

*No. 479	The geochemical interpretation of water analyses, 1911
No. 770	The data of geochemistry, 1924

Water-Supply Papers

*No. 236	The quality of surface waters in the United States, Part 1, Analyses of waters east of the one hundredth meridian, 1909
No. 658	The industrial utility of public water supplies in the United States, 1932
No. 1022	Quality of surface waters of the United States, 1944
No. 1030	Quality of surface waters of the United States, 1945
No. 1050	Quality of surface waters of the United States, 1946
No. 1102	Quality of surface waters of the United States, 1947
No. 1132	Quality of surface waters of the United States, Parts 1-6, 1948
No. 1162	Quality of surface waters of the United States, Parts 1-6, 1949
No. 1187	Quality of surface waters of the United States, Parts 5-6, 1950
No. 1198	Quality of surface waters of the United States, Parts 5-6, 1951
No. 1251	Quality of surface waters of the United States, Parts 5-6, 1952
No. 1291	Quality of surface waters of the United States, Parts 5-6, 1953
No. 1300	The industrial utility of public water supplies in the United States, 1952
No. 1351	Quality of surface waters of the United States, Parts 5-6, 1954
No. 1401	Quality of surface waters of the United States, Parts 5-6, 1955

*Out of print.

Reports of the Iowa Geological Survey that contain quality-of-surface-water records are:

*Volume 6 Lead and zinc, and artesian wells, 1897
*Volume 21 Annual reports, 1910 and 1911
*Volume 26 Annual report, 1915

Some of the State and Federal publications to which reference has been made are out of print. Water-Supply Bulletins not out of print may be purchased from the Iowa Geological Survey, Iowa City. List of Iowa Geological Survey publications may be obtained upon application. Water-Supply Papers not out of print may be purchased from the Superintendent of Documents, Government Printing Office, Washington 25, D. C.; price lists will be furnished upon application. Complete sets of these publications may be consulted at either the office of the U. S. Geological Survey or the Iowa Geological Survey in Iowa City, and also at most public libraries in principal cities.

Besides the reports of the U. S. Geological Survey and the Iowa Geological Survey, other State and Federal agencies have published and unpublished quality-of-surface-water data for Iowa.

The Institute of Hydraulic Research at the State University of Iowa, Iowa City, Hunter Rouse, Director, as a part of its research in hydraulics has conducted many investigations in the field of fluvial sediment. The results of these studies by members of the Institute staff have been published as bulletins, *Iowa Studies in Engineering*, or as reprints of articles and papers in the various technical publications such as the *Transactions of American Geophesical Union*, and *Transactions and Proceedings of the American Society of Civil Engineers*. Many of these bulletins and reprints are available for a modest fee.

The Agricultural Experiment Station of Iowa State College at Ames, Dr. G. M. Browning, Associate Director, has conducted many investigations on the quality of surface water. The Station has also taken a very active part in the investigation and study of erosion on the farms of Iowa. Reports and publications of these various experiments and research projects are available at Ames.

The Corps of Engineers and the Soil Conservation Service have spent considerable time and money investigating soil erosion and the sediment problem, and both agencies have published reports of their work.

Records of the quality of water are kept by various commercial interests, such as utilities, railroads, and packing houses. Also, most large cities have some record of the quality of their water

*Out of print

supply. Information from these sources is usually unpublished or not readily available but should be kept in mind as a source of additional data.

An inventory of unpublished and published sediment load data for Iowa is contained in table 2. This inventory does not include data published in this bulletin. It was assembled from Bulletins No. 1 and No. 4 of the Subcommittee on Sedimentation of the Federal Inter-Agency River Basin Committee, *Inventory of Published and Unpublished Sediment Load Data in the United States.* These bulletins were supplemented by contacting the Iowa Institute of Hydraulic Research at Iowa City, the Agricultural Experiment Station at Ames, the U. S. Soil Conservation Service, the Iowa Natural Resources Council, and the St. Paul, Rock Island, Kansas City, and Omaha Districts, and the Missouri Basin Division of the Corps of Engineers.

Table 2. Inventory of published and unpublished sediment load data for Iowa.

Stream	Location	Drainage Area (sq. mi.)	Period of Record	Collected or Published by
MISSISSIPPI RIVER MAIN STEM				
Mississippi River	LaCrosse, Wis.	62,800	1932-1933 1937-1938	1
Mississippi River	Clayton, Iowa	79,200	1881 1932-1933	9 1
Mississippi River	East Dubuque, Ill.	81,078	1942-1954	2
Mississippi River	Burlington, Iowa	114,000	1942-1954	2
Mississippi River	Keokuk, Iowa	119,000	1943-1954	2
UPPER IOWA RIVER BASIN				
Upper Iowa River	New Albin, Iowa	1,057	1932-1933	1
WAPSIPINICON RIVER BASIN				
Wapsipinicon River	DeWitt, Iowa	2,300	1942-1954	2
IOWA RIVER BASIN				
Iowa River	Marshalltown, Iowa	1,500	1944-1954	2
Iowa River	Belle Plaine, Iowa	2,420	1941-1942	2
Iowa River	North Liberty, Iowa	3,035	1941-1942	2
Iowa River	Coralville, Iowa	3,035	1941-1943	2
Iowa River	Iowa City, Iowa	3,230	1925-1926 1937-1941	6 7
Salt Creek	Elberon, Iowa	200	1946	2
Bear Creek	Ladora, Iowa	185	1946	2
Cedar River	Cedar Rapids, Iowa	6,640	1942-1943	2
DES MOINES RIVER BASIN				
West Fork Des Moines River	Humboldt, Iowa	2,295	1940-1941	2
Des Moines River	Fort Dodge, Iowa	....	1912-1913	8
Des Moines River	Boone, Iowa	5,490	1940-1954	2
Des Moines River	Des Moines, Iowa	6,160	1912-1913	8
Des Moines River	Tracy, Iowa	12,400	1940-1954	2
Des Moines River	Ottumwa, Iowa	13,200	1912-1913	8
Raccoon River	Van Meter, Iowa	3,410	1940-1954	2
Middle River	Indianola, Iowa	502	1944-1946	2
MISSOURI RIVER MAIN STEM				
Missouri River	Sioux City, Iowa	314,600	1929-1930 1946	10 5
Missouri River	Omaha, Nebr.	322,800	1930-1932 1939-1954	10 3, 5
Missouri River	Plattsmouth, Nebr.	414,000	1930-1932	10
Missouri River	Above and below Platte River, Nebr.	....	1931	10
BIG SIOUX RIVER BASIN				
Big Sioux River	Akron, Iowa	8,851	1929-1930 1940-1951	10 3, 5
PERRY CREEK BASIN				
Perry Creek	Sioux City, Iowa	60	1939-1941	5

Table 2. Inventory of published and unpublished sediment load data for Iowa.—Continued.

Stream	Location	Drainage Area (sq. mi.)	Period of Record	Collected or Published by
LITTLE SIOUX RIVER BASIN				
Little Sioux River	Correctionville, Iowa	2,450	1929-1930	10
			1939-1941	3, 5
Little Sioux River	Near Kennebec, Iowa	2,730	1939-1949	3, 5
Little Sioux River	Near Turin, Iowa	4,460	1943-1951	3, 5
Little Sioux River	Near Blencoe, Iowa	4,470	1939-1942	3, 5
Maple River	Mapleton, Iowa	661	1941-1951	3, 5
Maple River	Near Turin, Iowa	725	1939-1941	3, 5
West Fork Ditch	Holly Springs, Iowa	395	1939-1941	3, 5
Monona-Harrison Ditch	Near Turin Iowa	4,460	1943-1951	3, 5
Monona-Harrison Ditch	Near Blencoe, Iowa	4,470	1939-1942	3, 5
SOLDIER RIVER BASIN				
Soldier River	Pisgah, Iowa	417	1940-1951	3, 5
Soldier Ditch	Near Mondamin, Iowa	....	1939-1945	5
BOYER RIVER BASIN				
Boyer River	Logan, Iowa	810	1939-1951	3, 5
NISHNABOTNA RIVER BASIN				
Nishnabotna River	Near Hamburg, Iowa	2,800	1939-1951	3, 5
TARKIO RIVER BASIN				
Small watersheds	Clarinda, Iowa	....	1934-1938	11
			1934-1942	13
Tarkio River	Blanchard, Iowa	200	1934-1940	12
West Tarkio Creek	Near Westboro, Mo.	105	1934-1940	12
GRAND RIVER BASIN				
Thompson River	Davis City, Iowa	702	1949-1954	4, 5
CHARITON RIVER BASIN				
Chariton River	Centerville, Iowa	727	1949-1954	4, 5

Collected or Published by

1. Corps of Engineers, U. S. Army, St. Paul Dist., St. Paul, Minn.
2. Corps of Engineers, U. S. Army, Rock Island Dist., Rock Island, Ill.
3. Corps of Engineers, U. S. Army, Omaha Dist., Omaha, Nebr.
4. Corps of Engineers, U. S. Army, Kansas City Dist., Kansas City, Mo.
5. Corps of Engineers, U. S. Army, Missouri River Division, Omaha, Nebr.
6. 71st Congress, 2nd Session, House Document 134, 1930
7. Iowa Institute of Hydraulic Research, State University of Iowa, Iowa City, Iowa
8. 71st Congress, 3rd Session, House Document 682, 1931
9. Corps of Engineers, U. S. Army, Waterworks Experiment Station, Vicksburg, Miss.
10. 73rd Congress, 2nd Session, House Document 238, 1935
11. U. S. Soil Conservation Service, Technical Publication 31
12. U. S. Soil Conservation Service, Technical Publication 42
13. U. S. Soil Conservation Service, Unpublished data

In table 2, if the period of record is for a number of years each year is not listed separately even though there may have been a short break in the record, a variation in methods of sampling or equipment used, or a variation in units of expression. The only years listed separately are long breaks in the record, a year or more, or a different source of information.

COOPERATION AND ACKNOWLEDGMENTS

The data presented in this report, except for the miscellaneous chemical analyses, were obtained from published reports or open files of the U. S. Geological Survey as a result of cooperative work with the Iowa Geological Survey. The miscellaneous chemical analyses that were made in the Eighteen Hundreds and early part of the Nineteen Hundreds were obtained from the reports of the Iowa Geological Survey.

The various state, municipal, and federal organizations who now cooperate in the quality-of-surface-water program are: Iowa Geological Survey, H. Garland Hershey, Director and State Geologist; State University of Iowa Institute of Hydraulic Research, F. M. Dawson, Dean of College of Engineering, and Hunter Rouse, Director; cities of Des Moines, Cedar Rapids, and Iowa City; U. S. Soil Conservation Service; U. S. Corps of Engineers; and U. S. Geological Survey.

COLLECTION AND EXAMINATION OF SAMPLES

CHEMICAL QUALITY

Samples for daily chemical analysis were usually collected at, or near, points on streams where stream gaging stations are maintained. Most of the analyses were made on 10-day composites of daily samples collected for a period of a year at each sampling point. Three composite samples were usually prepared each month by mixing together equal or weighted volumes of daily samples collected from the 1st to the 10th, from the 11th to the 20th, and from the 21st to the end of the month. The weighted volumes were weighted by selecting portions of the samples to be composited in relation to the discharge at the time of sampling. Weighted volume composites were used for analyses made for the Missouri River at Nebraska City, Nebr., and for the Iowa and Cedar Rivers after April 1948. All other analyses were made with equal volume composites.

Miscellaneous analyses reported were obtained from Volume VI and XXVI of the Annual Reports, Iowa Geological Survey. The analyses from Volume VI were obtained by the Iowa Geological Survey from the railroad companies in Iowa. These analyses which were made in the late Eighteen Hundreds are reported in this bulletin as they were originally, except that grains per gallon was converted to parts per million (ppm). The railroad chemists reported their analyses as combined radicals with each chemist using his individual judgment as how they were combined. Many of these early analyses are recomputed in ionic form in U. S. Geological Survey Professional Paper 135.

Analyses reported in Volume XXVI were made on samples obtained in gallon glass jugs as near midstream as possible, above any possible sewage or other local contamination. Samples were shipped direct to the Experiment Station at Ames, Iowa, for analyses. Methods of determining the constituents reported are given in Volume XXVI and appear to be essentially the same as methods in use by the U. S. Geological Survey at that time.

Samples were analyzed, except those made by railroad chemists, according to methods regularly used by the U. S. Geological Survey. These methods are essentially the same as or are modifications of methods described in recognized authoritative publications for mineral analysis of water samples (Collins, 1928 and Am. Public Health Assoc., 1946).

For those waters containing moderately large quantities of soluble salts, the value reported for dissolved solids is the sum of the quantities of the various determined constituents using the carbonate equivalent of the reported bicarbonate. In other analyses the value reported as dissolved solids is the residue on evaporation after drying at 180°C for 1 hour. Specific conductance is given for most analyses and was determined by means of a conductance bridge using a standard potassium chloride solution as reference.

SUSPENDED SEDIMENT

Suspended-sediment samples after 1943 were collected with either a U. S. D-43 or a DH-48 depth-integrating sampler from a fixed sampling point at one vertical in the cross-section. Samples collected prior to 1943 were taken with the standard U. S. Geological Survey brass bucket sampler. This type sampler was also used after 1943 during periods of cold weather when the D-43 or DH-48 type sampler would freeze and become inoperative.

The U. S. D-43 sampler was developed as a part of a cooperative study (Joint Study, Reports 1 to 9) by several agencies of the United States Government and the Iowa Institute of Hydraulic Research. It is designed to take a mean sample in the vertical by giving uniform weight to increments of the water-sediment mixture at various levels. The DH-48 sampler is constructed on the same principles as the D-43. These two samplers are illustrated in plates 2A and B.

As sediment concentration is not always uniformly distributed in the stream cross-section, samples were obtained periodically from three to five verticals in the stream, located at centroids of equal water discharge, and their mean concentration compared with the concentration at the fixed sampling vertical. If these comparisons indicated that the concentration at the fixed sampling vertical differed materially from the mean of the cross-section, a correction was applied to the daily concentrations. All effort was made to assure that a sample from the fixed sampling vertical was the mean concentration for the cross-section at the time it was taken.

The sediment concentration in a stream not only varies across a section but also changes with time. When streamflow is changing slowly concentration commonly changes slowly. Conversely, if stream flow is changing rapidly the sediment concentration will also change rapidly. The greatest change of sediment concentration very often occurs at the beginning of a rise or shortly afterwards, but some investigators have discovered concentration peaks coming days after the streamflow peak. Samples were collected at as small a time interval as was needed to define the variation in concentration. When streamflow was uniform, samples were normally collected once daily. When the flow was changing rapidly, samples were collected at intervals ranging from 15 minutes to every 4 hours on the rise, and from hourly to twice daily on the fall. During winter months, when flow and concentration are low, samples were commonly collected once or twice a week. If not enough samples were collected to define adequately the changing concentration, the records for that period were appropriately footnoted.

Sediment concentrations were determined by filtration or evaporation of the samples. These concentrations were plotted against time on a print of the record from a continuous water-stage recorder. Through the plotted points a smooth line curve was drawn following in general the configuration of the stage hydrograph. From this curve a mean daily concentration was computed. At times, when the streamflow and concentration were not fluctuating a concentration graph was not drawn. Then the concentration of the daily sample or composited mean of several daily samples was used for the mean daily concentration. Suspended-sediment loads were computed by multiplying mean daily sediment concentration in parts per million by the mean daily discharge and a conversion factor to convert to tons per day. When the streamflow and concentration were changing rapidly the day was subdivided into smaller time intervals for computing the sediment load. Since the measurement of suspended-sediment discharge is dependent upon a continuous record of water discharge, sediment stations are located at or near stream gaging stations.

For periods when no samples were collected, daily sediment loads were estimated on the basis of water discharge, sediment concentrations observed immediately preceding and following the periods, and sediment loads for other periods of similar discharge. The estimates were further guided by weather and seasonal conditions and sediment discharge for other stations.

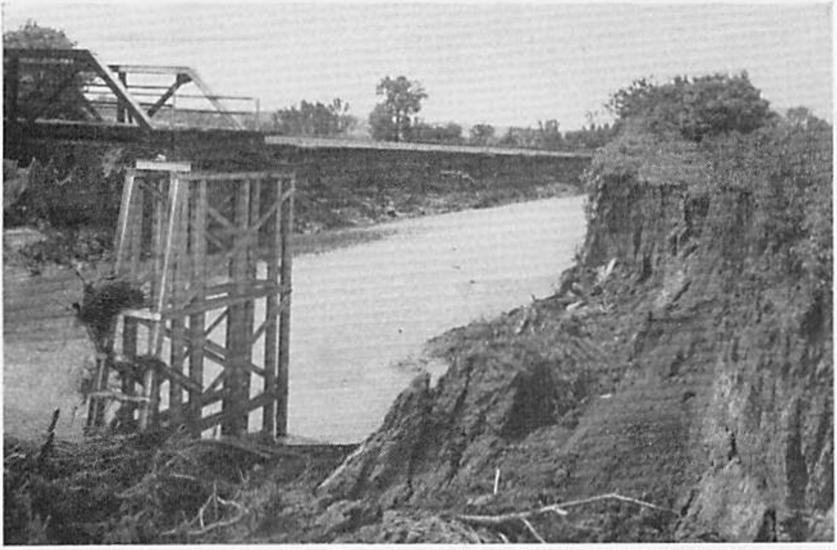
Particle-size distribution of the suspended sediment was also determined. The sieve-pipette method of analysis was used for most analyses reported in this bulletin. In this method particles coarser than 62 microns are separated from the finer by a combination of wet and dry sieving. The portion coarser than 62 microns is subdivided into different size classifications by dry sieving; the portion finer subdivided according to sedimentation diameters by the pipette method. A few determinations of particle-size distribution were made by the bottom-withdrawal tube method. Methods used are described in Report No. 4 *Methods of Analyzing Sediment Samples* and No. 7 *A Study of New Methods of Size Analysis of Suspended Sediment Samples* (Joint Study).

Dispersion medium, distilled water with a dispersing agent added, was used for most of the analyses so as to give absolute sedimentation diameters. A few analyses were made in native water (water obtained with the suspended-sediment sample) to determine the degree of flocculation. These native water analyses aid in estimating the rates and actions of the sediments in slow moving parts of the stream and reservoirs.

TEMPERATURE

The daily water temperatures for most of the stations were obtained at the same time the chemical or sediment samples were collected. So far as practicable the water temperatures were observed at or about the same time each day for an individual river station in order that the data would be relatively unaffected by diurnal variations in temperature. The thermometers used for the determination of water temperature were accurate to $\pm$ 0.5° Fahrenheit (F).

A thermograph, an instrument which obtains a continuous record of the water temperature, was used to record temperatures of the Shell Rock River at Marble Rock and at Shell Rock. The maximum and minimum temperatures for each day were reported from these thermograph charts.

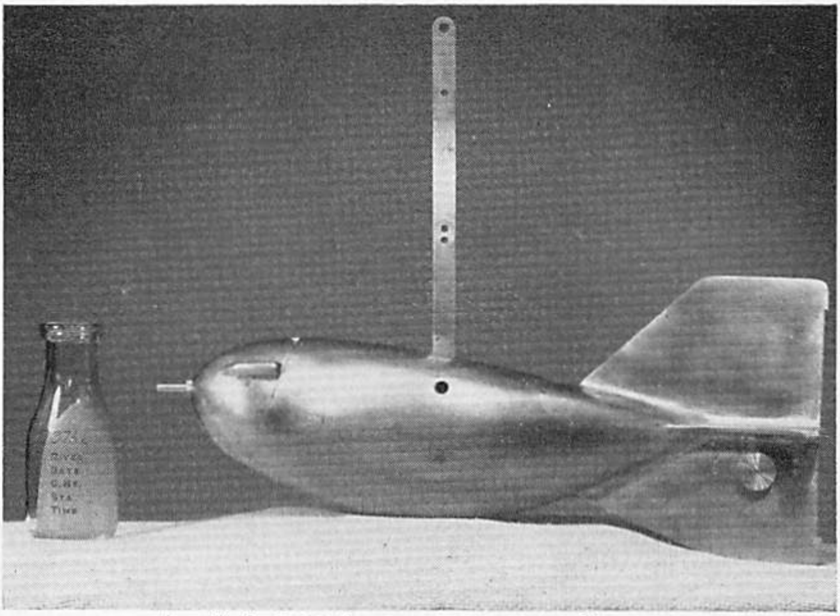


(Courtesy Soil Conservation Service)

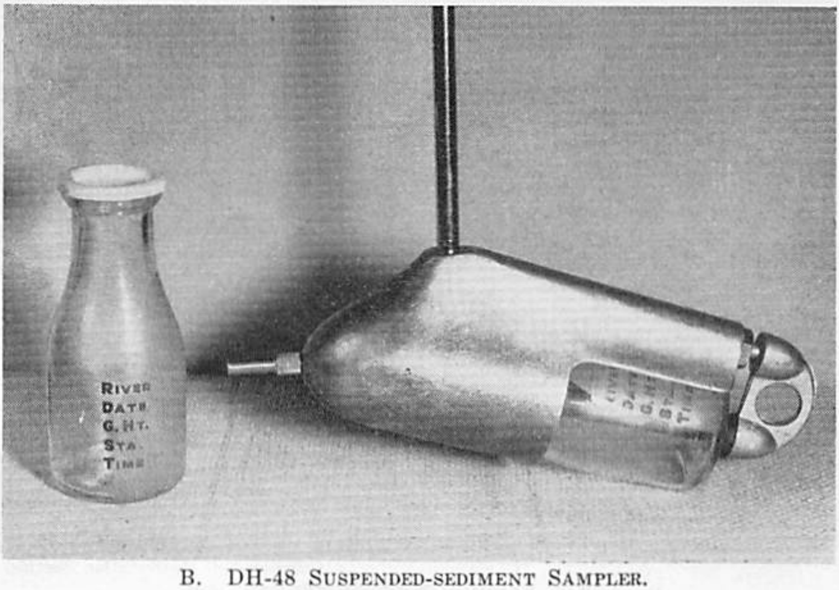
A. STREAMBANK EROSION, SOLDIER RIVER NEAR UTE, IOWA.

(Courtesy Soil Conservation Service)

B. GULLY EROSION, MONONA COUNTY, IOWA.

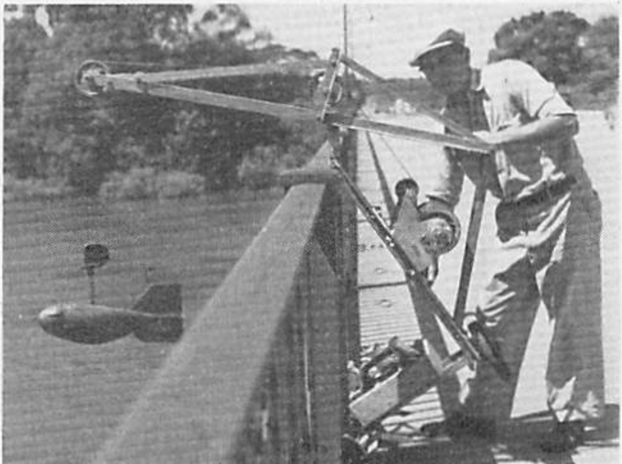


A. U. S. D-43 SUSPENDED-SEDIMENT SAMPLER.

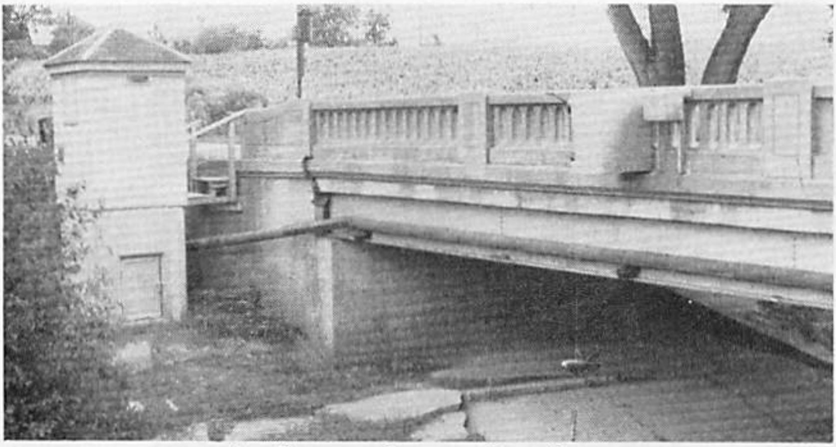


B. DH-48 SUSPENDED-SEDIMENT SAMPLER.

A. REMOVING SEDIMENT SAMPLE FROM U. S. D-43 SAMPLER.



B. CRANE-MOUNTED SEDIMENT SAMPLER USED FOR CROSS-SECTIONS.



A. Ralston Creek at Iowa City.
Suspended-sediment and Streamflow Measuring Station.

B. Little Sioux River near Kennebec.
Suspended-sediment and Streamflow Measuring Station.

EXPRESSION OF RESULTS

CHEMICAL QUALITY AND TEMPERATURE

The expression of results with some modification are in accordance with those listed in U. S. Geological Survey Water-Supply Paper 1162 (1954, p. 5-7) as follows:

The dissolved mineral constituents are reported in parts per million. A part per million is a unit weight of a constituent in a million unit weights of water. Equivalents per million are not given in this report although the expression of analyses in equivalents per million is sometimes preferred. An equivalent per million is a unit chemical combining weight of a constituent in a million unit weights of water and is calculated by dividing the concentration in parts per million by the chemical combining weight of the constituent. For convenience in making this conversion the reciprocals of chemical combining weights of the most commonly reported constituents (ions) are given in the following table:

Constituent	Factor	Constituent	Factor
Iron (Fe^{++})	0.0358	Carbonate (CO_3^{--})	0.0333
Iron (Fe^{+++})	.0537	Bicarbonate (HCO_3^{-})	.0164
Calcium (Ca^{++})	.0499	Sulfate (SO_4^{--})	.0208
Magnesium (Mg^{++})	.0822	Chloride (Cl^{-})	.0282
Sodium (Na^{+})	.0435	Fluoride (F^{-})	.0526
Potassium (K^{+})	.0256	Nitrate (NO_3^{-})	0.161

Results given in parts per million can be converted to grains per United States gallon by dividing by 17.12. A calculated quantity of sodium and potassium is given in some analyses and is the quantity of sodium needed in addition to the calcium and magnesium to balance the acid constituents.

The total hardness, as calcium carbonate ($CaCO_3$), is calculated from the equivalents of calcium and magnesium. . . . The hardness caused by calcium and magnesium (and other ions if significant) equivalent to the carbonate and bicarbonate is called carbonate hardness; the hardness in excess of this quantity is called noncarbonate hardness.

After October 1, 1949, for the Iowa River at Iowa City; April 4, 1950, for the Cedar River at Cedar Rapids and for the Missouri River at Nebraska City, Nebr., total hardness was determined using disodium dihydrogen ethylene diamine tetraacetate titration.

In the analyses of most waters used for irrigation, the quantity of dissolved solids is given in tons per acre-foot as well as in parts per million. Percent sodium has been computed for those analyses where sodium and potassium are reported separately by dividing the equivalents per million of sodium by the sum of equivalents per million of calcium, magnesium, sodium, and potassium and multiplying the quotient by 100. In analyses where sodium and potassium were calculated and reported as a combined value, the value reported for percent sodium will include the equivalent quantity of potassium. In most waters of moderate to high concentration, the proportion of potassium is much smaller than that of sodium.

Specific conductance values are expressed in reciprocal ohms (micromhos at 25°C). . . . Hydrogen-ion concentration (pH) is given as the negative logarithm of the number of moles of ionized hydrogen per liter of water.

An average of analyses (arithmetical or weighted) for the water year is given for most daily sampling stations. An arithmetical average represents the composition of water that would be contained in a vessel or reservoir that had received equal quantities of water from the river each day for the water year. A weighted average represents approximately the theoretical composition of all water that passes a section of a stream in a given time. The weighted average of the analyses is computed by multiplying the discharge for the sampling period by the quantities of the individual constituents for the corresponding period and dividing the sum of the products by the sum of the discharges. Water as represented by the weighted average is less concentrated than that represented by the average of the individual analyses for most streams because at times of high discharge the rivers generally have lower concentrations of dissolved solids.

The chemical analyses of the composited daily samples are presented in table form and arranged by water years. A water year starts October 1 and ends the following September 30. Analyses showing the variation of constituents in the cross-section are included in the report following water year tabulations and were not used in computing weighted average. Miscellaneous samples are tabulated at the end of the bulletin under "Miscellaneous Analyses in Iowa."

Temperature is reported to the nearest degree Fahrenheit in all the tables.

SUSPENDED SEDIMENT

Mean daily sediment concentrations are expressed in parts per million (ppm) by weight. A part per million of sediment is computed as 1,000,000 times the ratio of the weight of sediment to the weight of water-sediment mixture. This definition is slightly different from the term parts per million used in reporting chemical analyses. Daily sediment loads are expressed in tons per day which may be converted into acre-feet or some other linear expression if the specific weight is known to determine the volume the suspended sediment will occupy in a reservoir.

Tables are arranged with the mean daily water discharge, sediment concentration, and suspended load given first, followed by a tabulation giving monthly and yearly totals of streamflow and sediment load; maximum, minimum, and mean daily load; suspended-sediment yield rate, in tons per square mile; acre-feet; and maximum and weighted mean concentration. Tons per square mile is obtained by dividing the total monthly or yearly loads by the drainage area. Acre-feet is the volume the suspended sediment would occupy in a reservoir when the deposit has not been compacted for a period of many years or under the weight of appreciable quantities of overlaying deposits. Monthly and yearly loads in tons were converted to acre-feet using a specific weight of 55 pounds per cubic foot. The derivation or estimation of this figure is discussed in the section, "Specific Weight of Fluvial Sediment," page 50.

Stream concentrations are not reported for West Tarkio Creek near Westboro, Mo., or Tarkio River at Blanchard, Iowa, as records were computed during that period without reporting concentration.

Table 3. Sediment grade scale.

Size in Millimeters		Microns	Inches	Approximate Sieve Mesh Openings per Inch		Class
				Tyler	U. S. Standard	
4000-2000			160-80			Very large boulders
2000-1000			80-40			Large boulders
1000-500			40-20			Medium boulders
500-250			20-10			Small boulders
250-130			10-5			Large cobbles
130-64			5-2.5			Small cobbles
64-32			2.5-1.3			Very coarse gravel
32-16			1.3-0.6			Coarse gravel
16-8			0.6-0.3	2½		Medium gravel
8-4			0.3-0.16	5	5	Fine gravel
4-2			0.16-0.08	9	10	Very fine gravel
2-1	2.00-1.00	2000-1000		16	18	Very coarse sand
1-1/2	1.00-0.50	1000-500		32	35	Coarse sand
1/2-1/4	0.50-0.25	500-250		60	60	Medium sand
1/4-1/8	0.25-0.125	250-125		115	120	Fine sand
1/8-1/16	0.125-0.062	125-62		250	230	Very fine sand
1/16-1/32	0.062-0.031	62-31				Coarse silt
1/32-1/64	0.031-0.016	31-16				Medium silt
1/64-1/128	0.016-0.008	16-8				Fine silt
1/128-1/256	0.008-0.004	8-4				Very fine silt
1/256-1/512	0.004-0.0020	4-2				Coarse clay
1/512-1/1024	0.0020-0.0010	2-1				Medium clay
1/1024-1/2048	0.0010-0.0005	1-0.5				Fine clay
1/2048-1/4096	0.0005-0.00024	0.5-0.24				Very fine clay

(Rouse, others, 1950, p. 776)

Particle-size analyses are expressed in percentages finer than indicated sizes in millimeters. Other pertinent data for each analysis is included in the table. The size classification used in this bulletin is given in table 3.

STREAMFLOW

Water records and discharges reported were collected according to standard U. S. Geological Survey methods described in WSP 888 (Corbett, 1943). Terms used to express the discharge are defined in the glossary. Discharge reported for a composite sample is usually the average of the mean daily discharges for the normal composite period. For analysis in which the composite periods differ from the normal 10- or 11-day period, the discharges reported are the averages of the mean daily discharges for the days indicated. The discharges reported in the tables of single analysis are either mean daily discharges, or discharges at the time samples were collected.

FACTORS AFFECTING QUALITY OF SURFACE WATERS

CLIMATE

Iowa's climate is subhumid and is fairly uniform in areal extent. Precipitation ranges from a normal annual total of 27 inches in the northwest to 34 inches in the southeast, with a yearly mean of 31.5 inches for the entire State. The annual average temperature ranges from 46°F in the northern portion to 51°F in the south. Although areally the climate is fairly uniform, the seasonal variation is large. Seasonal variation is clearly illustrated by the average monthly temperature and precipitation for 45 years (1899-1943) as computed by the U. S. Weather Bureau (table 4). January is usually the dryest and coldest month with an average annual precipitation of about 1.0 inch and an average annual temperature of 20°F; while June, usually the wettest month, has an average annual precipitation of about 4.6 inches. The hottest month is July with an average annual temperature of about 75°F.

Table 4. Temperature and precipitation means (1899-1943).

Temperature (°F).

District	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Northwest	15.9	19.4	32.7	47.0	58.8	68.3	73.9	71.5	63.0	50.6	34.6	21.7
North Central	16.0	19.2	32.7	46.9	58.8	68.0	73.4	70.9	62.5	50.5	35.1	21.5
Northeast	17.1	19.7	33.0	47.1	59.0	67.9	73.1	70.9	62.5	50.8	35.7	22.4
West Central	19.9	22.8	36.0	49.4	60.6	69.9	75.3	72.9	64.5	52.7	37.3	24.5
Central	19.9	22.8	35.9	48.9	60.6	69.8	75.1	72.7	64.5	52.9	37.8	24.6
East Central	20.9	23.5	36.1	48.9	60.9	69.9	75.0	72.5	64.4	52.8	38.2	25.3
Southwest	22.7	25.7	38.4	51.0	61.8	71.4	76.7	74.6	66.0	54.2	39.2	26.3
South Central	22.9	25.8	38.1	50.5	61.5	70.7	76.3	74.1	66.0	54.4	39.9	27.0
Southeast	23.7	26.4	38.6	50.9	62.1	71.2	76.4	74.1	66.4	54.6	40.3	27.7

Precipitation (inches)

District	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Northwest	0.68	0.84	1.31	2.47	3.78	4.32	3.38	3.38	3.53	1.70	1.32	0.77
North Central	.99	1.00	1.59	2.42	4.24	4.55	3.49	3.85	4.02	2.18	1.75	1.02
Northeast	1.12	1.10	1.85	2.49	4.17	4.36	3.91	3.86	4.11	2.48	1.91	1.24
West Central	.83	.99	1.34	2.34	3.68	4.46	3.55	3.70	3.72	2.02	1.47	.89
Central	1.07	1.07	1.69	2.69	4.08	4.52	3.66	3.80	4.33	2.36	1.75	1.10
East Central	1.28	1.25	2.07	2.76	3.87	4.48	3.73	3.83	4.15	2.54	1.95	1.36
Southwest	.86	1.07	1.52	2.53	3.85	4.83	3.50	3.95	3.02	2.46	1.61	.99
South Central	1.04	1.17	1.78	2.90	4.02	4.79	3.51	3.89	4.29	2.54	1.83	1.15
Southeast	1.33	1.37	2.22	3.01	3.98	4.74	3.66	3.64	4.10	2.54	1.98	1.41

(U. S. Weather Bureau)

Approximately 70 percent of the yearly rainfall occurs from April to September. This concentration of the rainfall during the growing season is one of the reasons why Iowa is a great agricultural state.

Precipitation during the growing season is in the form of general rains or thunderstorms. The usual form of precipitation in the winter months is snow, although rain and sleet are not uncommon. Runoff from rain on snow or frozen ground can and has caused severe floods. However, because of the frozen condition of the soil, the sediment load from such a storm is undoubtedly smaller than that from an equal flood at some other season of the year. Rainfall intensity has been greater than 12 inches in a 24 hour period, but such an extreme is unusual. The amount of rainfall to be expected in a 24 hour period at any one point once in 25 years varies from 4.5 inches in the northwest to 5.5 inches in the southeast (Yarnell, 1935). An examination of the weather records indicates that at least once each year some point in the State will experience a rainfall in excess of 6 inches in 24 hours.

Floods have been experienced nearly every month of the year. However, a high proportion of the major floods have occurred in late March, early April, and June (Schwob, 1953, p. 5). The greatest floods of record have occurred in June.

GEOLOGIC FORMATIONS

Iowa lies in the central lowlands of the United States. In general the land surface is a plain that descends gently from a maximum elevation of 1,675 feet in the northwest to 480 feet on the floor of the Mississippi Valley in the southeast.

The bedrock beneath Iowa consists of a number of sedimentary formations (table 5). All formations older than Cretaceous have been deformed into a syncline that pitches gently toward the southwestern part of the State. Were they not mantled almost everywhere with glacial deposits, these formations would be exposed at the surface as belts, the oldest formations farthest north (fig. 2). Formations of the Cretaceous system, present only in the western part of the State, are spread across the beveled edges of the older formations. Bedrock crops out prominently only in the two most northeasterly counties; elsewhere it appears mainly in the deeper valleys cut below the glacial deposits. Because the surface waters now flow in drainage systems developed predominantly on glacial drift, description of the bedrock formations is restricted to the summary given in table 5. For more detailed information, reference may be made to various publications of the Iowa Geological Survey, particularly the geologic map of Iowa by Tester (1937).

Deposits of glacial origin cover the bedrock to an average depth of 150 feet, and the surface features of the State are developed almost wholly on these deposits.

Deposits of all four stages of glaciation are present in Iowa. These are listed in table 6 and their areal distribution shown in fig. 3. The bibliography of the glacial geology of Iowa is extensive, but the principal sources of information are Kay and Apfel (1928), Kay and Graham (1941), and, more recently, Smith and Riecken (1947) and Ruhe (1950).

The glacial stages are represented by sheetlike deposits, in the aggregate referred to as glacial drift. The drift consists mainly of till, which is unsorted material ranging in size from clay to boulders, that was transported and deposited by the ice. It also includes some lenses of waterlain sand and gravel. Interglacial stages are represented mainly by zones of weathering and soil formation in earlier deposits, and to a lesser extent by deposits of sand, gravel, and peat. Loess, or wind-blown silt, accumulated to considerable thicknesses during certain of the glacial and interglacial stages.

The oldest ice sheet, the Nebraskan, spread over the entire State and left deposits that buried the preglacial topography and produced a rolling plain of low relief. This drift averages more than 100 feet in thickness and is as much as 300 feet thick in preglacial valleys cut into bedrock. Except for a few small areas in northeastern Iowa, the Nebraskan till is covered by drift of later stages, and is exposed only in a few gullies and artificial cuts.

Fresh, unaltered Nebraskan till is a blue-gray gritty clay enclosing scattered pebbles, cobbles, and boulders. Lenses of sand and gravel are common near the upper surface of the drift sheet. To a depth of about 8 feet the drift has been weathered to a dense clay, very sticky when wet, that is called gumbotil. Within this zone all but the quartzose constituents have been chemically weathered to clay. Calcium carbonate has been leached and other minerals oxidized to a considerably greater depth. During the long span of time required for such deep weathering, a mature drainage system developed and valleys were cut which were obliterated by the advance of ice in the subsequent Kansan glaciation.

Kansan drift was deposited over the entire State except the northeastern corner. This drift sheet, together with a loess cover, forms the present-day surface exposures of approximately the southern half of Iowa (see fig. 3). Kansan drift averages only 50 feet in thickness but is remarkably similar to the Nebraskan in both texture and composition. However, the strongly weathered gumbotil zone averages 11 feet in thickness.

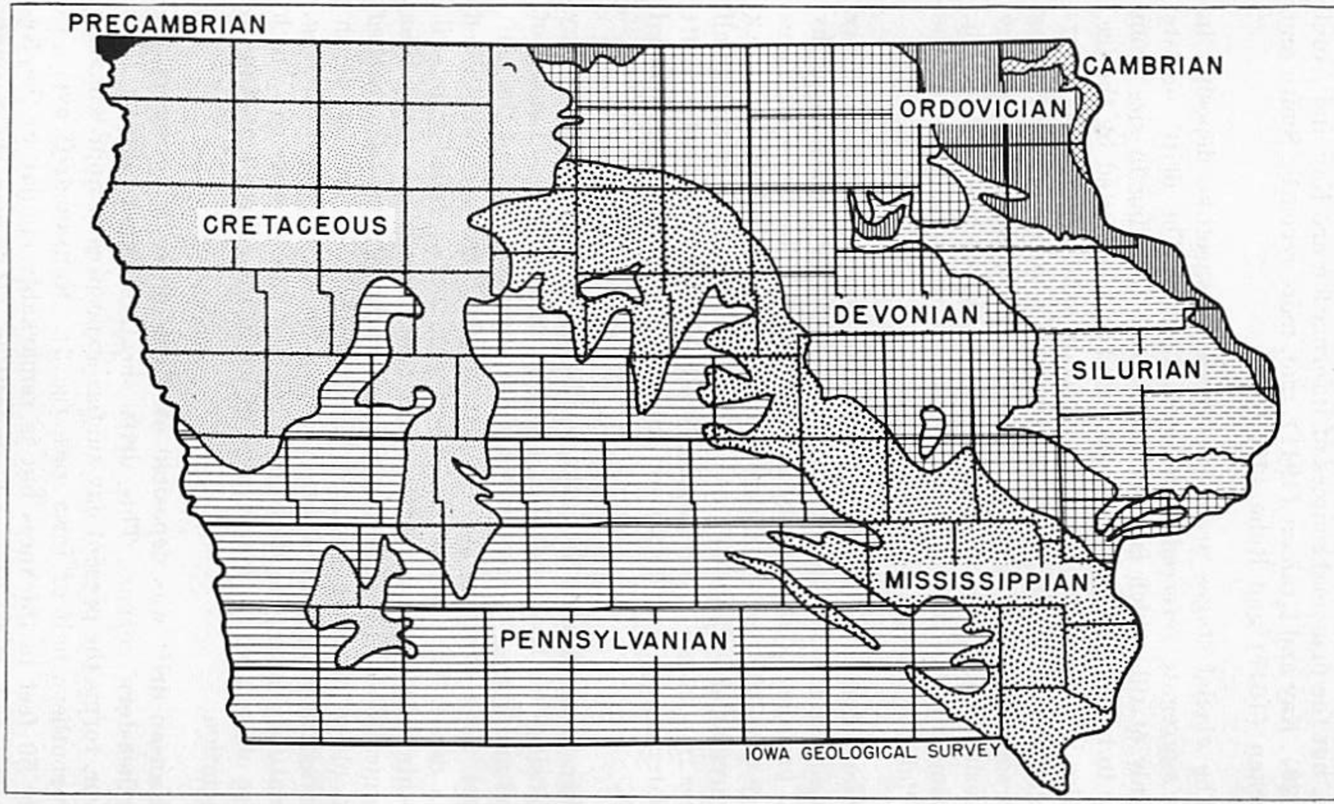


Figure 2. Geologic map of Iowa.

Where they have not been covered by later glaciation, the tabular upland remains of the Kansan drift plain are cut by valleys of considerable depth and width. Subsequent loess deposits did not materially affect this topography except in the area immediately east of the Missouri River, where they have filled in and subdued many irregularities of the drift surface.

Table 5. Bedrock formations in Iowa.

Age	Formation	Description
Cretaceous	Carlisle shale Greenhorn limestone Graneros shale Dakota formation	Shale, green, calcareous Limestone, soft; shale, gray, calcareous Shale, dark, non-calcareous Sandstone and shale
Permian	Fort Dodge formation	Gypsum and some shale
Pennsylvanian	Wabaunsee group Shawnee group Douglas-Pedee groups Lansing group Kansas City group Pleasanton group Marmaton group Cherokee group	Dominantly shales; a few thick beds of sandstone; a number of coal seams and thin beds of limestone
Mississippian	Ste. Genevieve formation St. Louis-Spergen formations Warsaw formation Keokuk dolomite Burlington limestone Gilmore City limestone "Hampton" formation English River siltstone Maple Mill shale	Mainly limestones and dolomites, with shale beds becoming prominent at top of section and chert in central and lower parts Mainly thick beds of shale, some calcareous
Devonian	Sheffield shale Lime Creek formation Shell Rock limestone Cedar Valley limestone Wapsipinicon formation	Shale with some calcareous beds Mostly limestone; in some places much shale Limestone and dolomite Limestone with some dolomite Limestone, dolomite and shale
Silurian	Gower-Hopkinton dolomites Kankakee dolomite Edgewood dolomite	Massive, strong dolomite Dolomite, cherty Dolomite and shale
Ordovician	Maquoketa formation Galena dolomite Decorah-Platteville formations St. Peter sandstone Prairie du Chien formation	Shale, thick Dolomite, thick, massive, cherty in lower part Shales with interbedded thin limestones Sandstone, medium-grained Dolomite, massive, with some sandstone
Cambrian	Jordan sandstone St. Lawrence dolomite Franconia formation Dresbach sandstone "Red Clastics"	Sandstone, medium-grained Dolomite, massive Shale, sandy, partly calcareous Sandstone, partly calcareous, some shale Sandstone, coarse, partly siliceous
Precambrian	Sioux quartzite	Quartzite, massive, bedded

Illinoian drift is present only in a small area in the southeastern part of Iowa (fig. 3). This drift is about 30 feet thick in most places, but is several times thicker where it fills deep valleys eroded into Kansan drift along the margin of the Mississippi Valley. A gumbotil zone 5 feet thick has been developed, and calcium carbonate has been leached to a depth of 8 feet.

The northern half of Iowa is covered by drift deposited by repeated advances of ice during substages of the Wisconsin glacial stage. Ice of the Iowan substage covered the northern

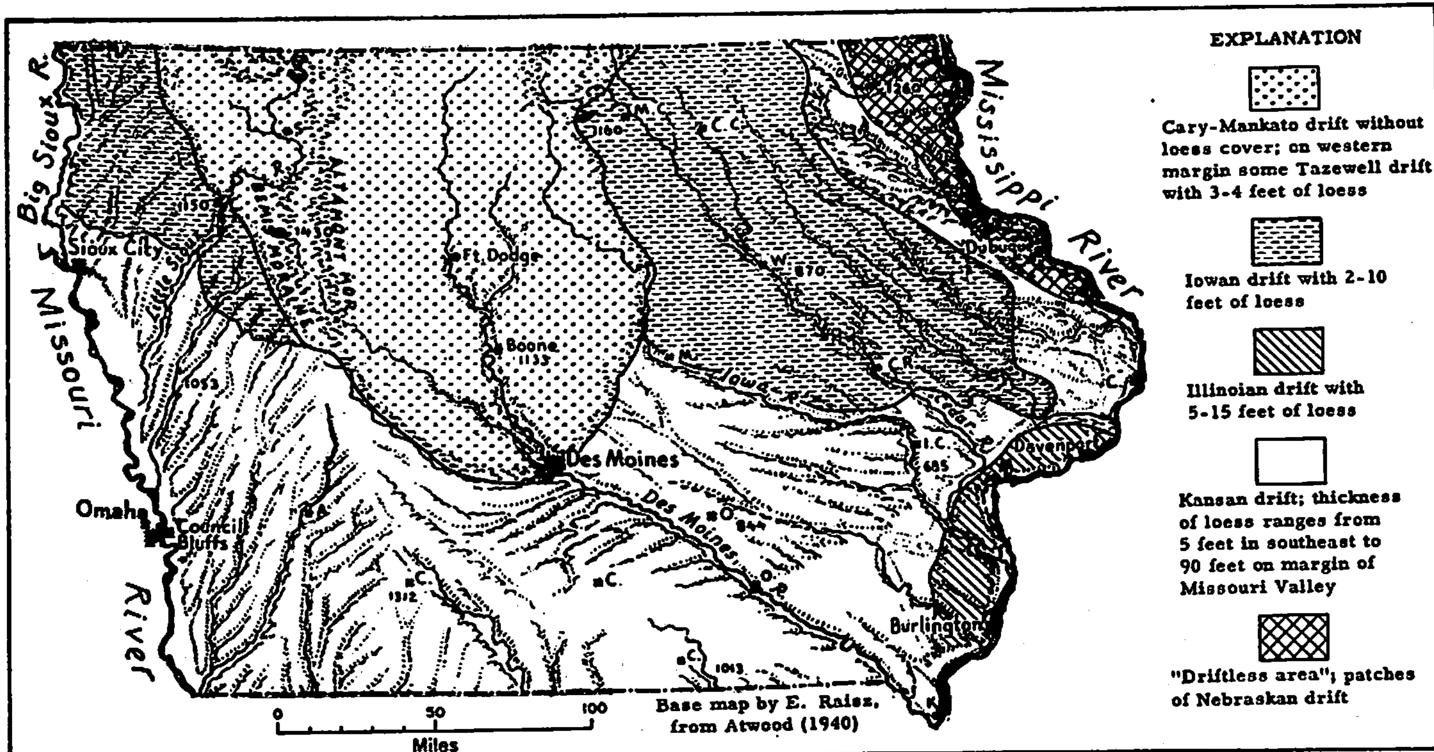


Figure 3. Topography and generalized glacial geology of Iowa.

part of the State except for a strip in the east. Most of the ice lobes of the later substages (Tazewell, Cary, and Mankato) spread farther south but less widely to the east and west.

The Iowan drift is only about 10 feet thick and subdues rather than obliterates the topography of the Kansan drift plain. An integrated drainage system has developed on the Iowan drift, but there has not been time for much dissection of the uplands or for development of a gumbotil zone. However, calcium carbonate has been leached from the upper 5 feet.

Table 6. Subdivisions of the Pleistocene Glacial Epoch.

Stage	Substage	Events	Deposits
Wisconsin glacial	Mankato glacial Cary glacial	Ice spreads drift in north central Iowa.	
	Tazewell glacial	Ice spreads drift in north central Iowa.	Deposition of Peorian loess
	Iowan glacial	Ice spreads drift widely across north Iowa.	
Sangamon interglacial			
Illinoian glacial		Ice spreads drift over a small portion of southeast Iowa.	Deposition of Loveland loess
Yarmouth interglacial		Weathering and erosion of Kansan drift.	
Kansan glacial		Ice sheet spreads drift sheet over all but northeast Iowa.	
Aftonian interglacial		Weathering and erosion of Nebraskan drift.	
Nebraskan glacial		Ice sheet spreads glacial drift over all of state.	

The Tazewell drift was deposited in the central part of northern Iowa and where still exposed (fig. 3) is similar to the Iowan in both composition and drainage characteristics. However, it has been leached less extensively.

The drift of the last two substages of the Wisconsin, the Cary and Mankato, was deposited in a lobate area (Des Moines lobe) in central northern Iowa and averages 35 feet in thickness. It is a gray stony clay similar to earlier drift. Iron compounds have been partly oxidized to a depth of several feet; carbonate leached to an average depth of 2½ feet. The topography is gently rolling, largely undrained ground moraine, except where morainal belts mark the outer limits of ice advance. Several belts of less conspicuous moraine across the lobe indicate recessional stages of the ice sheets.

Large amounts of silt, sand, and gravel were deposited by the water released from melting ice of all stages. These alluvial deposits are more than 200 feet thick along some stretches of the Mississippi and Missouri valleys, and although usually thinner along the valleys in the interior of Iowa, occupy a large area.

There were at least two major periods of loess deposition during the glacial epoch. They were the Loveland, deposited prior to the Iowan glaciation, and the Peorian, deposited in the interval between the Iowan and Cary substages. The Peorian loess mantles the surface throughout Iowa, except where covered by Cary-Mankato drift.

The floodplains of the rivers, principally the Missouri, appear to have been the main source of the loess. Deposits are almost 100 feet thick at some places along the eastern bluffs of the Missouri, but thin rapidly to the east. They are only 5 feet thick on the uplands of south central and southeastern Iowa. Loess lies thick on the margins of the eastern portion of the Iowan drift plain, apparently having been derived from local sources. It is 2-4 feet thick on the Iowan drift in the eastern part of the State, 4-10 feet thick on the Iowan drift in the western portion of the State, and 3-4 feet thick on the Tazewell drift west of the Cary-Mankato lobe.

The loess consists principally of fine silt and very fine sand between the sizes of 16 and 125 microns. When fresh it is calcareous but it has been leached to varying depths, depending on its age and on local conditions of topography and rainfall.

SOILS

The soils through most of Iowa are dark-colored prairie soils developed under grass and a climate that is marginal between that of the humid east and that of the semi-arid west. The distribution of the major types of soils corresponds in a broad way to the pattern of the glacial deposits (fig. 3) which are the parent materials of the soils. Most of the soil types recognized by soil scientists in Iowa are modifications of a few major types, produced by local variations in topography, moisture and drainage; the remainder are soils developed on the patches of outcropping bedrock that are very limited in size through most of the state. Excellent descriptions of Iowa soils and their susceptibility to erosion are found in Bennett (1939), Marbut (1935), and Soils and Men (1938).

Soils of the Clarion-Webster types, with very dark upper horizons, rich in organic matter and very fertile, occupy most of the rolling plain on the Cary-Mankato drift. Little-weathered calcareous drift is the parent material. The Clarion soils which are developed on the higher and better drained areas are lighter in color and in texture than the heavy and very dark Webster soils on the level and poorly drained areas. Erosion of these soils is negligible except along the margins of the few principal valleys that cross the tract.

Silty loams of Tama-Marshall type prevail through the region covered with loess that is leached of carbonates to depths of but a few feet. This region includes the loess-covered Wisconsin drift in the northwestern part of Iowa, and almost all the loess-covered uplands in Kansan drift except a marginal area in south central and southeastern Iowa. Drainage is good through all the rolling terrain these soils occupy. The soils are not as rich in organic matter or as dark as the Clarion-Webster type. Marshall soils prevail where the loess has the most calcium carbonate, that is, in the western part of the region, and Tama soils prevail farther east where more of the original calcium carbonate has been leached. These soils erode easily along the margins of the uplands, and are highly erodible in the western hilly area that is drained by many small tributaries to the Missouri River.

Silty loams of Carrington-Clyde type have developed on the relatively thin loess that covers the Iowan drift in the western part of the State. These are dark colored fertile soils which tend to be slightly acid in reaction, due to the fact that most of the calcium carbonate has been removed from the parent material to an average depth of about 5 feet. The heavy clay drift at shallow depth beneath thin loess creates poor drainage conditions in the more level places. Over most of the area the slopes are sufficient to provide adequate drainage, yet not so steep as to create much hazard of erosion. The heavier, darker Clyde soils occur in the lowlands; the lighter Carrington silt loams on the uplands.

Soils in the south central and southeastern part of Iowa are in general acid in reaction because of fairly complete removal of calcium carbonate from the parent materials. This is the wettest part of the State, and forest originally covered the valley floors and much of the slopes. On the uplands the Grundy type of soil is developed on thin loess underlain by the heavy and poorly drained clay formed by weathering of Kansan drift. On the slopes the Shelby type of soil, a heavy, gritty loam, is developed on the old drift in various stages of weathering. Shelby soil is very erodible because of its relative low permeability and position on slopes.

In the belt of hilly country bordering the Mississippi valley a variety of parent materials have given rise to a variety of soil types. Most of the soils are acid in reaction, for the loess is thin and discontinuous, precipitation is large for Iowa, and forest was the original vegetation. Soils range from light and sandy types on the outcrops of sandy formations to heavy residual clays derived by the weathering of limestones and dolomites. The prevailing slopes make these soils highly subject to erosion, but the slopes are generally kept out of cultivation.

Alluvial soils that are prevailingly clayey silts and infreqently sandy occupy large areas in the bottomlands of the broad valleys of the State. Outside the area of Wisconsin glaciation the higher bottomlands normally have a covering of loess. Most of these bottomland soils are deficient in calcium carbonate, for they developed under a cover of forest which promotes leaching more than does a cover of grass. They are also subject to much cutting along stream banks during periods of high flow and contribute much sediment load to streams.

CULTURE

Climate, geology, and soils which were previously described are environmental factors which affect the quality of water in a stream or river. In addition to these natural factors, the human element must be included, for man by his use or misuse of the water and land in a watershed greatly affects the quality of the water. Furthermore, this is the only factor over which society has any degree of control.

Man as a factor affects the quality of surface water in many ways. His evolution from crude, primitive ways to the present atomic era, has had its effect on the quality of surface water. Most of this early change was the result of agricultural adaptation of the land in the watershed. By cutting the forest, plowing the ground, and continued cultivation of the soil, man has made Iowa a leading agricultural state. At the same time, this constant agrarian useage has increased the sediment load that is carried by the rivers. It would take approximately 50 years to remove seven inches of soil under clean tillage but 15,000 years to remove this same amount under a dense cover, according to tests run by the Soil Conservation Service at Clarinda, Iowa (Soils and Men, 1938, p. 594). Besides wasting a vital natural resource, this erosion contributes to the degeneration of the surface water. The sediment load may be reduced by proper farming methods and soil conservation techniques.

Man, by straightening stream channels to eliminate the meanders may also increase the sediment load. Meanders may be eliminated to increase the water carrying capacity of a stream, increase drainage, reclaim land, increase the accessibility to the land, eliminate numerous bridges, improve channel conditions at a bridge, or decrease the cost of constructing and maintaining levees.

Straightening the channel increases the slope of the stream and changes the natural drainage pattern of the basin. Increasing the slope of stream beds in erodible soil zones may cause the channel to degrade resulting in increased erosion on upstream tributaries. Lower sections of the stream unable to transport this additional sediment load may aggrade, increasing the possibility of floods. Channel straightening unless done with great care and study may result in more flooding, destroy more land, and increase bridge maintenance and construction costs, and thus oppose the very purpose for which the stream meanders were originally removed.

Although little mining is done in Iowa, it is another of man's activities that affects the quality of water. The strip mining in the lower Des Moines River basin probably increases the sediment load and alters other chemical and physical properties of adjacent waterways.

Industrial and muncipal use of the streams of Iowa to transport wastes greatly increases the mineral and organic content of the streams. The present practice of dumping large quantities of untreated wastes into surface waters, thereby adding solids, organic substances, acids and alkaline materials, and toxic chemicals, and also increasing temperature and changing color results in large economic cost to industries and municipalities in order to obtain the desired quality of water. Not only does this pollution place a burden on the downstream user, but it may destroy fish, wildlife, and recreational features of a stream.

The use of water to carry refuse is not the only way that a stream may be harmed. Steam-electric power plants and other industries which use surface water for cooling increase the temperature of the water. This increase in temperature if great enough may kill fish, reduce the normal processes of purification, and decrease the efficiency of the stream as a cooling medium for a downstream user.

Most of the activities of man which affect the quality of water are difficult to change even though the change greatly reduces erosion or pollution. Sometimes the use of water by society has advanced so far that society is unable to make the necessary change. Such a condition may exist where an industry that is polluting water may be an important or even the principal asset of the community, but it is unable to afford the necessary changes to stop the pollution. There are times when changes are not made because of the lack of knowledge as to what is the most effective way to reduce erosion or pollution. However, it is often the resistance of society to change that prevents the effective control of the misuse of the land and water.

Thus it seems that by his very progress and by the development of his environment, man has a detrimental effect on the quality of surface water.

CHEMICAL QUALITY OF SURFACE WATERS

Water is nature's most important solvent, and as such dissolves many minerals which occur naturally in the earth's crust. Thus, all natural waters contain dissolved mineral matter. The quantity of these substances depends primarily on the type of rocks and soil that the water has contacted and the duration of this contact. Ground water usually will be more highly concentrated than surface water as it has been in contact longer and with a more varied number of chemical compounds. The streams of Iowa are fed by both underground sources and surface runoff and reflect different proportions of chemical constituents at various times of the year. During periods of high flow when a larger percentage of the streamflow is composed of surface runoff, concentration of dissolved minerals would be less than during the time of low flow or drought period when the basic flow would be largely from ground-water sources.

The various ions in solution along with physical characteristics determine the value and suitability of water for agricultural, industrial, or domestic utilization. The quality of water needed for various activities in Iowa are discussed in the following sections.

AGRICULTURE

The chemical content of streams in Iowa is important mainly for domestic supply and industrial development as there is at present no large scale irrigation project in operation. However, it is expected that irrigation may be practical in the future as it has been shown that supplemental water at the right time can materially increase crop yield. With certain portions of the State feeling the reduction of crop yield because of drought or near-drought conditions in the last few years, some such project may be economically feasible. Although most dissolved solids are needed for plant growth, some are detrimental in too high concentrations. Some constituents in solution, in addition to being harmful to plant growth either by preventing water uptake or causing unfavorable reactions in the plants, harm the soil structure, reduce permeability, and lower aeration. Therefore, the suitablity of the water supply either from ground or surface sources should be known before starting any irrigation project.

The factors that appear to be the most important in determining the suitability of water for irrigation are: total concentration of soluble salts; concentration of boron or other elements which may be toxic; the ratio of sodium to calcium and magnesium; and in some instances, the bicarbonate concentration (U. S. Dept. Agriculture, 1954).

The concentration of soluble salts in the irrigation water is important not as to the amount applied but the amount that will be retained in the root zone. High concentration of soluble salts will alter normal osmotic processes. Boron is essential to plant growth, but is exceedingly toxic at concentrations slightly above optimum. Other ions such as chloride and sulphate are toxic but at much higher relative concentrations than boron. An accumulation of exchangeable sodium in the soil owing to dispersion of soil particles by sodium ions may result in an alkali soil with poor tilth and low permeability. Calcium and magnesium in the irrigation water reduce the sodium hazard. Application of irrigation water relatively rich in calcium and magnesium is likely to benefit the soil and not likely to harm crops (Soils and Men, 1938, p. 713). Bicarbonate in high concentrations often results in precipitation of calcium and magnesium as carbonates, increasing the concentration of exchangeable sodium (Eaton, 1949, 1950).

Criteria for classification of irrigation waters, which take into consideration the characteristics which present knowledge indicates are most harmful, are given by the U. S. Department of Agriculture (1954). This classification is for average conditions of soil texture, infiltration rate, drainage, salt tolerance, and climate. Water used for supplemental irrigation in Iowa where there is sufficient rainfall to leach out any accumulation of salts could be of lower quality, as established by these criteria, and still be satisfactory.

Irrigation water has a low-sodium hazard and can be used for irrigation of any soils if the sodium-adsorption-ratio (SAR) is less than 10. The value SAR is defined by $Na^+/\sqrt{(Ca^{++}+Mg^{++})/2}$ where Na^+, Ca^{++}, and Mg^{++} represent the concentration in milliequivalents per liter of the respective ions. Surface water of Iowa has a SAR ratio much lower than this limit of 10; in fact, the most adverse ratio, that of the Missouri River, is less than 2. Irrigation water has a low salinity (concentration of soluble salts) if the electric conductivity is less than 250 micromhos at 25°C, and medium salinity if the conductivity is less than 750 micromhos at 25°C. Medium-salinity water may be used for irrigation if a moderate amount of leaching occurs. Salinity of the surface water of Iowa should not be a factor as available electric conductivity is seldom above 750 micromhos at 25°C. Boron concentration, as shown by the analyses available, is well below the maximum allowable of 0.33 ppm for boron sensitive crops. Bicarbonate ion concentration is not a factor owing to the low concentration of sodium and low SAR of the surface water of Iowa.

Although the quality of surface water is suitable for irrigation, considerable study is needed to determine the amount of water available especially in a prolonged period of deficient precipitation.

INDUSTRY

The selection of an industrial site requires information on the supply of water and its chemical and physical qualities. Industry not only needs an ample supply of water—estimated industrial use in 1950 was 81 billion gallons (Lohr and Love, 1954)—but also a water that meets the specific requirements of its processes. The quality necessary depends upon the particular use of the water, and the standards required cover a wide range. In fact, some industries may even need several different qualities of water.

Probably water used for cooling has the lowest quality requirements. However, it may cause trouble by depositing scale or by corroding equipment and therefore may need some treatment. Whereas cooling water may need little or no treatment, boiler water may need extensive treatment to prevent boiler scale, foaming, and corrosion.

In all probability the highest standards for quality in water is required by processing plants such as canneries, breweries, meat packers, bottlers of carbonated beverages, and numerous other industries that turn out products for human consumption. Even among these industries, however, the requirements are greatly varied.

The water quality requirements of industry are so varied that no attempt will be made to classify the quality of the surface water of Iowa as to its suitability for any specific industry. The quality-of-water data in this bulletin will materially aid any industry to determine if the water will be satisfactory for their usage. If the quality of the raw water is not suitable, these data will enable industry to determine the type of treatment needed and cost of this treatment.

DOMESTIC NEEDS

So far we have dealt only with some aspects of the quality of water and its effects on industry and agriculture. There are also a great many domestic demands for water with a relatively high quality. The rapid progress of industry has brought to the American home many devices such as automatic dish washers, steam irons, laundromats, and air conditioners which utilize high quality water. With these household goods becoming more common in the average home, the domestic water supply may need treatment in addition to that required to insure a bacterially safe water free of bad taste and odor.

Probably the most desired additional treatment of domestic water supply would be the reduction of hardness which may be greatly reduced by treatment with lime and soda ash or by the use of zeolite. The average hardness, as shown by analyses available, in Iowa ranges from 136 ppm for the Mississippi River at Moline, Ill., to 293 ppm for the Des Moines River below the Raccoon River at Des Moines (table 8). Although hardness is a relative matter, water with a hardness above 120 ppm is classified as hard and may profitably be softened.

An example of what may be accomplished by treatment with lime and soda ash is the analyses of the water supply for the city of Des Moines (Lohr and Love, 1954, p. 175). The average hardness before treatment was 290 ppm and after treatment 83 ppm. Similar success was reported for other Iowa cities that softened their water.

Additional information as published in WSP 1300 (Lohr and Love, 1954) on the source and significance of the mineral constituents, and properties and characteristics of water may be valuable to the user of the data. Therefore, the following paragraphs are included in this bulletin.

MINERAL CONSTITUENTS IN SOLUTION

Silica (SiO_2).—The element silicon is not found free in nature but it occurs as silica in sand, in quartz, and as silicates in feldspar, kaolinite, and other minerals. Silica is dissolved from practically all rocks. Its state in solution in natural water is not definitely known, but it is assumed to be colloidal, and it does not enter into the ionic balance between the acids and bases of a water analysis.

Many natural surface waters, especially lakes, contain less than 5 parts per million and few contain more than 30 parts per million. . . .

Silica affects the industrial use of water because it contributes to the formation of boiler scale, or it may help to cement other scale-forming substances into a hard scale; it is usually removed from feed water for high-pressure boilers. Silica also forms troublesome deposits on the blades of steam turbines. . . .

Aluminum (Al).—Although aluminum is relatively abundant in many rocks and ores some of which are readily soluble, aluminum is present only in negligible quantities in most natural waters for it precipitates from the waters. Acid waters and water that has been in contact with certain types of rocks or ores may contain considerable quantities of aluminum. Aluminum contributes to hardness in water and may be deposited as scale in boilers. . .

Iron (Fe).—Iron is dissolved from practically all rocks, and practically all natural water supplies contain iron in solution. Surface waters, unless acid, rarely contain more than several tenths of a part per million. Acid waters may carry relatively large quantities. Iron in water upon being exposed to air is readily oxidized to ferric hydroxide which will readily settle out of a surface supply unless acid; therefore surface waters generally carry relatively small quantities of iron.

Many ground waters may carry several parts per million of iron. Such waters on exposure to air become turbid with ferric hydroxide as a result of the oxidation of the iron. The ferric iron will settle out and the water will eventually clear up if it is quiescent. Iron in solution will cause reddish-brown stains on white enamelware, porcelain fixtures, and fabrics. . . (These waters) are objectionable also for other domestic and industrial uses.

Many natural waters may be corrosive to the supply system, dissolving sufficient quantities of iron from the pipes to be objectionable in the use of the water for many purposes. Much of the iron in natural waters is removed by the treatment as practiced at the modern water-purification plants, but sometimes such treatment will leave the waters corrosive so that they will dissolve objectionable quantities of iron from pipes in the supply system or household installations.

Manganese (Mn).—Manganese is found in many natural waters, sometimes in appreciable quantities. Water impounded in large reservoirs may contain manganese that has been dissolved from the mud on the bottom of the reservoir. Some ground waters may contain very objectionable quantities of manganese. Waters that contain appreciable quantities of manganese usually contain also objectionable quantities of iron. Manganese is especially objectionable in water used in laundering and textile manufacturing, for it causes dark-brown stains on the fabrics. It will also stain porcelain fixtures. Water supplies containing objectionable quantities of manganese require special treatment for its removal.

Calcium (Ca) and magnesium (Mg).—Calcium and magnesium are dissolved from many rocks but more particularly from limestone, dolomite, and gypsum. Limestone, which is primarily calcium carbonate, and dolomite and dolomitic limestone made up of both calcium and magnesium carbonates are readily soluble in water containing carbon dioxide. Caves and solutions channels in these rocks are the result of this action of water. Comparatively large quantities of calcium are also dissolved from gypsum (calcium sulfate). Calcium is frequently the principal basic constituent in waters that contain relatively small quantities of dissolved solids. . . . Calcium and magnesium are the most universally characteristic constituents of natural waters.

Calcium and magnesium cause hardness in water and contribute to the formation of boiler scale and deposits in hot-water heaters and pipes and in water systems. The calcium and magnesium content and hardness of waters . . . greatly affect the industrial value of the waters.

Sodium (Na) and potassium (K).—The very active metals sodium and potassium are not found free in nature, but their compounds are relatively abundant in the earth's crust and are highly soluble in water. Sodium and potassium are found in all natural waters. Natural waters that contain only 3 or 4 parts of the two together are likely to contain about equal quantities of each. As the total quantity of these constituents increases the proportion of sodium becomes much greater. Waters carrying from 40 to 50 parts per million of the two may carry one-fourth or one-tenth of the quantity as potassium; waters containing more sodium may even have a smaller proportion of potassium. . . .

The quantity of sodium and potassium found in the water of most public supplies has comparatively little effect on the industrial use of the water.

Carbonate (CO_3) and bicarbonate (HCO_3).—Carbonate as such is present in relatively few natural waters. Some waters that have been treated with lime contain carbonate or even hydroxide. Free carbon dioxide in rain water increased by a larger amount from decaying organic matter in percolating water, in lakes, and in streams in contact with carbonate rocks or calcareous material is converted into bicarbonate. Bicarbonate is the chief anion in a great many natural waters and in most of the waters used for public supplies. Waters that have been in contact with granitic rocks and rocks of similar characteristics usually contain less than 50 parts per million of bicarbonate and frequently less than 25 parts, whereas those that have been in contact with carbonate rocks may contain as much as 500 parts. Carbonate and bicarbonate are often reported as alkalinity which is expressed as calcium carbonate. One part of alkalinity as calcium carbonate corresponds to 1.22 parts of bicarbonate.

Sulfate (SO_4).—Sulfate is present in most natural waters, although in many it may be a relatively small quantity. Sulfate may be dissolved in relatively large quantities from beds of gypsum and shale. Some surface waters receiving acid mine drainage may contain considerable quantities of sulfate some of which may be the result of oxidation of the sulfides of iron. . . . .

Sulfate in waters that contain much calcium and magnesium contributes to the formation of hard scale in steam boilers and affects the use of waters in other industrial processes. Aluminum sulfate as a coagulant in the treatment of public supplies increases the sulfate content and decreases the bicarbonate content of the water.

Chloride (Cl).—Chloride is found in practically all natural waters, although many surface waters contain only a few parts per million. . . . Sewage increases the chloride content of river waters. Drainage from oil wells or other deep wells, salt springs, and industrial wastes may add large quantities of chloride to stream waters. Most public supplies from surface sources contain less than 25 parts per million of chloride. Ground waters usually contain larger quantities than surface waters and some public-supply wells may contain as much as 100 parts per million. The larger quantities of chloride may affect the industrial use of the water.

Fluoride (F).—Fluoride occurs in nature in fluorspar, cryolite, and in both sedimentary and igneous rocks. In most natural surface waters it is present only in very small concentrations; in ground waters it is present in larger concentrations, in some waters as much as several parts per million. . . . The fluoride content of public water supplies may be of little importance as far as the industrial use of the water is concerned.

Refer to health aspect for additional information.

Nitrate (NO_3).—Nitrate is considered the final oxidation product of nitrogenous matter and its presence in water supplies of more than several parts per million may indicate previous contamination by sewage or other organic matter. The effect of nitrate present in most public water supplies on the industrial use of the water is practically negligible.

Refer to health aspect for additional information.

> **Dissolved solids.**—The results reported as dissolved solids represent approximately the total quantity of dissolved mineral matter in each water analyzed. (Howard, 1933, p. 4-6). The quantity of dissolved solids in most instances was determined by evaporating a given volume of water, drying the residue at some definite temperature (180° C by U. S. Geol. Survey), and weighing the dried residue. In some instances the quantity reported was obtained by a summation of the individual constituents shown in the analysis, bicarbonate being included as carbonate. . . . Ground-water supplies usually contain more dissolved material than surface-water supplies. Part of the material reported as dissolved solids in colored waters is organic matter, which is not shown in the analyses.

Some health aspects.—Water is not only nature's greatest solvent but in addition carries and dissolves many man-made compounds. Some of these chemical compounds if consumed in sufficient quantity may be toxic or at least somewhat detrimental to the human body. Although it is not yet known just what effect some of these elements may have on physical health, several significant facts are known about a few of them. Probably the best known is fluoride and its alleged effect on teeth. The introducing of fluoride to water is a relatively new activity, while having too much fluoride in water and attempting to remove it is an older problem. It appears that about 1.0 ppm of fluoride in natural water is most desirable. Amounts above 1.5 may have a tendency to cause mottling of the teeth.

However, controlled amounts of fluoride can be very beneficial as reported by Okun (1953, p. 15). Extensive epidemiological studies have shown that there is an inverse relationship between the prevalence of dental caries and fluoride in the water supply, if the fluoride is ingested during the years of tooth development. These studies show that when there is about 1.0 ppm of naturally occurring fluoride in the water supply some six times as many children show no caries development and the caries experience rate is reduced about 60 per cent over areas where the water supply contains no fluoride. Well controlled studies are now in progress to determine whether the addition of about 1.0 ppm of fluoride to a fluoride free public water supply would have beneficial effect similar to those experienced with waters naturally containing fluoride. These studies show very favorable results and as fluoridation is continued over a period of years, it is expected that the benefits will approach those reported for cities using waters containing naturally occurring fluoride.

In Iowa the fluoride content on the Cedar and Iowa Rivers is about 0.2 ppm, while on the Des Moines and Raccoon it is about 0.4 ppm. From the available data it appears that probably nowhere in the state is there a problem of excessive fluoride in surface water.

Nitrate is another chemical element which is known to have some noticeable effect on body condition. In 1945 the death of two infants in Iowa was traced to the nitrate content of their water supply (Comly, 1945). The following noteworthy information is quoted from WSP 1162: "Studies made in Illinois indicate that nitrates in excess of 70 parts per million (as NO_3) may contribute to methemoglobinemia ('blue babies') (Faucett and Miller, 1946, p. 593), and more recent investigations conducted in Ohio show that drinking water containing nitrates in the range of 44 to 88 parts per million or more (as NO_3) may be the cause of methemoglobinemia in infants (Waring, 1949). In a report published by the National Research Council, Maxey (1950, p. 271) concludes that a nitrate content in excess of 44 parts per million (as NO_3) should be regarded as unsafe for infant feeding."

In most rivers in Iowa, the nitrate content does not approach these limits except perhaps for some areas immediately below sewer outfalls.

PROPERTIES AND CHARACTERISTICS OF WATER

(Lohr and Love, 1954)

Hydrogen-ion concentration.—Hydrogen-ion concentration in an aqueous solution or in water on the pH scale is represented by a number which is the negative logarithm of the hydrogen-ion concentration in moles per liter of solution. The pH range is from 0 to 14. A solution with a pH of 7 is said to be neutral. Progressive values of pH below 7 denote increasing acidity, and progressive values above 7 denote increasing alkalinity. The pH values are logarithmic, for example, a water with a pH of 6 has 10 times the concentration of hydrogen-ions as one with a pH of 7.

There is a definite relationship between pH and acidity although acidity should not be confused with pH, for a water with a pH value of 6.0 may have a low total acidity whereas another highly buffered water having a pH of 7 may have a high total acidity. Acidity is the results of the effects of a combination of substances and conditions in water, and may be defined as the power of the water to neutralize hydroxyl ions. Acidity is usually caused by the presence of free carbon dioxide, mineral acids, and (hydrolysis) of salts of strong acids and weak bases.

A definite relationship also exists in waters between pH and alkalinity (carbonate, bicarbonate, and hydroxide): (Langelier, 1946). Alkalinity in a water may be defined as its power to neutralize hydrogen ions. Alkalinity is caused by the presence of carbonates, bicarbonates, hydroxides and, to a lesser degree, by silicates, phosphates, borates, and organic substances. Although pH values and alkalinity are interrelated, high alkalinity may not be necessarily associated with high pH values; for example, a relative dilute water with a pH of 7 may have a low total alkalinity, whereas, a buffered water with a pH of 6.0 may have a high total alkalinity. The combined effects of the several substances and conditions in the water affect the relationship between alkalinity and pH values.

The pH value of most natural water ranges between 6 and 8. Waters containing free mineral acids have pH values below 4.5. Some ground waters have pH values above 8, some below 6. On account of the relation between the pH of water and its corrosive properties, many water-treatment plants make final adjustment of the pH of the supplies to prevent or minimize corrosion in the distribution system and household installations. The pH values of public supplies have a very considerable and definite bearing on the utility of the supplies for many industrial purposes.

Specific conductance ($K \times 10^6$ at 25°C).—The specific conductance of a water is a measure of its capacity to conduct an electric current. The conductance varies with the concentration and degree of ionization of the different minerals in solution and with the temperature of the water. It furnishes a rough measure of the mineral content of the water but does not give any indication of the relative quantities of the constituents in solution. It is useful in following the changes in the total quantity of dissolved minerals in a water through a series of samples.

Corrosiveness, causes and prevention.—Corrosiveness of water is that property which makes the water aggressive to metal surfaces and frequently results in "red water" caused by solution of iron, although all red-water troubles may not be the result of corrosion . . . many well waters contain considerable quantities of iron in solution and when these supplies are exposed to the air the iron separates out as a precipitate. Some of this precipitate may be carried along in the mains and pipes in suspension in the water giving red-water effects. Corrosive waters causes the deterioration of water pipes, steam boilers, and water-heating equipment. Many waters that do not appreciably attack cold-water lines may aggressively attack hot-water lines.

The phenomena of corrosion are not thoroughly understood (Speller, 1951). The active agents in water aside from the solvent action of water itself are acids, substances which upon hydrolysis or decomposition produce acid reactions, carbon dioxide, oxygen, and hydrogen sulfide. The problem of prevention of corrosion, therefore, is the problem of controlling these active agents or minimizing their effects. Books and papers have been written on various aspects of the problem (Proc. A. S. T. M., 1940; Betz and Betz, 1953).

The principal methods used in the treatment of municipal water supplies to prevent corrosion and red-water trouble involve treatment to maintain proper alkalinity, pH values and stability in the treated waters (Amer. Water Work Assoc., 1950; Baker, 1948). Effluent from filter plants where alum is used in the treatment, many unfiltered supplies, and some naturally soft supplies, contain free carbon dioxide and have low pH values, may aggressively corrode metal surfaces in distribution mains and plumbing installations, producing red-water troubles, pitting, and tuberculation. To increase the alkalinity and to raise the pH values, agents such as lime or soda ash are added to the supplies before they enter the distribution system. Where the supplies are softened, the alkalinity and residual hardness can be controlled so that the effluent may be left in a slightly unstable condition with respect to calcium carbonate, and a light protective coating of calcium carbonate may be deposited in the mains of the distribution system (Langelier, 1936). A stability test may indicate whether a water is corrosive or will form a protective film (Enslow, 1939).

Deaerators and degasifiers for the removal of dissolved gases are used to some extent in the treatment of boiler feed waters and in private installations (Powell and Burns, 1936; Powell, Bacon, and Lill, 1946). Aeration removes to some extent carbon dioxide and hydrogen sulfide, although in the treatment of public water supplies this process is used more for the purpose of removal of iron and of tastes and odors than for corrosion control.

Phosphates, metaphosphates, and silicates, classed as anodic inhibitors, are used to some extent in the treatment of public supplies and in industrial and private installations for prevention of corrosion. The compounds are effective because not only do they neutralize the agents of corrosion but also, it is thought, they form protective films on the metal surfaces. Sodium hexametaphosphate has been found not only to be effective in stopping corrosion but also to promote removal of corrosion products from pipelines (Rice, 1947).

Corrosion inside of steel tanks and standpipes may be prevented by a process known as cathodic protection. Special electrical equipment is required which in operation reverses the electrochemical processes set up in the corrosion of metal, thereby rendering the metal surface passive (Pallo, 1948).

Hardness.—Hardness of water is that characteristic or quality shown by water containing certain substances in solution. Calcium and magnesium are the principal constituents causing hardness. Other substances, such as aluminum, iron, manganese, strontium, zinc, and free acid also cause hardness, but most of these are not present in water supplies in sufficient quantities to affect appreciably the hardness.

The terms "carbonate" and "noncarbonate" hardness are roughly equivalent to or are used in the same sense as the older terms "temporary" and "permanent" hardness. Carbonate hardness refers to the hardness in equivalence with carbonate and bicarbonate; noncarbonate hardness to the remainder of the hardness. A water has no noncarbonate hardness if the total hardness does not exceed in chemical equivalence the carbonate and bicarbonate (the alkalinity) present in the water. Waters of high noncarbonate hardness usually contain large quantities of calcium and magnesium sulfates, chlorides, or nitrates in solution. The character of scale formed in steam boilers is affected by the relation of carbonate to noncarbonate hardness. The selection of the proper methods for softening is based largely on the type and degree of hardness present in the waters.

Hardness in water in respect to both domestic and industrial use receives great attention. In domestic use hardness is recognized by the difficulty in obtaining a lather without an excessive consumption of soap; the insoluble, sticky curd that results with the use of soap, and the scale formed in vessels in which the water is boiled. Industry gives great attention to hardness in water supplies because of its effects in the various processes of manufacturing and on the manufactured product, and because of the scale deposited in the use of hard water in hot-water pipes, hot-water heaters, and steam boilers, resulting in economic loss through loss of heat transfer, increased fuel consumption, and breakdown of equipment. Large sums of money are expended in softening supplies to make them suitable for both domestic and industrial uses.

INTERPRETATION OF CHEMICAL DATA

The preceding sections have dealt with the quality of water in Iowa insofar as it is significant for industrial, domestic, and agricultural needs, and in a general way the source of the mineral constituents in solution. However, a broader interpretation of these chemical analyses may be made, and some questions such as the following ones may then be answered. Did the water come from one definite geologic location, or is it a blend of waters from many areas? What was the influence of the geological formations upon the quality? What influence, if any, has climate had? Does noticeable change of mineral content indicate pollution? Do the mineral constituents vary in Iowa from one river basin to the next?

The chemical quality of water in Iowa is a result of climate, geology, soils, topography, and culture. Various combinations of these factors over a period of years have produced the various chemical constituents found in Iowa rivers.

Iowa's subhumid climate has had considerable influence upon the quality of the surface waters, as it has promoted alteration of the soils by leaching and weathering. Weathering breaks the soil into smaller fragments and simpler compounds, while leaching removes the more soluble chemicals. Iowa's climate is fairly uniform in areal extent and its influence is relatively the same for the entire State. Storms of about the same intensity and frequency occur across the State, and natural vegetation is not more pronounced in one sector than in another. Thus, the rocks and soils of one area have been subject to the same weathering and leaching as those of another area. As a whole, climate has been responsible for the progressive alteration of the physical properties of the watershed area. The quality of the water from a watershed is principally the result of this alteration.

There is considerable similarity between the chemical quality of the Illinois River in central Illinois, the rivers of Iowa, the Mississippi River at Moline, and the Delaware River in eastern Kansas. The percentages of the chemical constituents in solution in the waters of these various rivers are given in table 7. The high chloride content of the Illinois River at Kempsville, Ill., is attributed to sewage from the Chicago drainage canal (Clark, 1924, p. 112). Other rivers in Illinois show a better correlation with the rivers of Iowa. The waters of the Smoky Hill River in western Kansas show marked difference in chemical composition. Smoky Hill River is in a relatively arid region and is fairly typical of an arid to semiarid stream. The quality of its water is high in dissolved solids, low in carbonates, high in sodium and chloride; whereas the waters from the more humid regions of Iowa and Illinois are low in dissolved solids, sodium and chloride but high in carbonate.

Table 7. Comparison, by percentage, the mineral constituents in solution in rivers in and around Iowa (1906-1908).

	A	B	C	D	E	F	G	H	I	J
CO_3	42.13	38.42	44.80	42.17	34.96	42.27	22.42	14.40	39.47	31.78
SO_4	13.04	16.30	13.08	14.70	23.37	13.58	37.69	26.87	12.17	15.14
Cl	2.77	5.82	1.48	1.47	1.58	2.09	1.99	21.61	3.85	10.18
NO_3	1.92	1.67	1.35	1.15	1.09	1.01	.40	.21	1.07	.57
Ca	18.86	18.24	20.91	20.00	19.09	18.68	14.58	12.93	20.78	18.12
Mg	8.02	7.76	6.97	6.94	6.91	7.35	4.48	2.41	4.75	3.98
Na }	5.62	6.98	5.23	5.67	5.59	5.65	9.64	18.26	9.79	12.66
K }							1.70			
SiO_2	6.84	4.65	6.10	7.76	7.24	9.09	6.95	3.18	6.82	7.19
Fe_2O_3	.20	.16	.08	.14	.17	.28	.15	.13	1.30	.38
Percent	100	100	100	100	100	100	100	100	100	100
Dissolved solids	248	267	228	247	312	179	464	882	337	403

A Kaskaskia River at Carlyle, Ill., mean of 34 composits, Aug. 1, 1906 to July 31, 1907.
B Illinois River near Kempsville, Ill., mean of 36 composits, Aug. 1, 1906 to July 31, 1907.
C Cedar River near Cedar Rapids, Iowa, mean of 37 composits, Sept. 6, 1906 to Sept. 17, 1907.
D Iowa River at Iowa City, Iowa, mean of 36 composits, Sept. 6, 1906 to Sept. 16, 1907.
E Des Moines River at Keosauqua, Iowa, mean of 36 composits, Sept. 10, 1906 to Sept. 9, 1907.
F Mississippi River near Moline, Ill., mean of 18 composits, Feb. 1 to July 31, 1906.
G Missouri River near Florence, Nebr., mean of 36 composits, Oct. 1, 1906 to Oct. 14, 1907.
H Smoky Hill River at Lindsborg, Kan., mean of 28 composits, Nov. 27, 1906 to Nov. 27, 1907.
I Delaware River at Perry and Valley Falls, Kan., mean of 27 composits, Jan. 4 to Nov. 29, 1907.
J Kansas River at Holliday, Kan., mean of 72 composits, Dec. 29, 1906 to Dec. 31, 1908.
(Clark, 1924)

The Kansas River at Holliday, Kan., and the Missouri River near Florence, Nebr., are different in quality from any of the others. They are a blend of waters from watersheds of different environments. River water is the average of all its tributaries plus the influence of rain and ground water (Clark, 1924, p. 69). It is of note that the chemical quality of the rivers in Iowa and Illinois are similar in character to the rivers in other subhumid regions in the United States; high in carbonate and low in sodium and chloride.

Besides the total effect climate has had, through time, on the quality of water of Iowa, in the changes it has made on geology, there is the effect of day-to-day and month-to-month variation in the climate. When there have been long periods with little or no precipitation, streamflow will be low and concentration of dissolved solids will be high; while during periods of high precipitation, streamflow will be high and the concentration of dissolved solids will be low.

The available data on the quality of surface water in Iowa is summarized in table 8. As is to be expected the principal constituent in all of the rivers analyzed is the bicarbonate radical. With the exception of the analyses for the Missouri River, calcium is the next principal constituent with sulfate, magnesium and silica following in close order. For the Missouri River the concentration of sulfate is much higher than that of calcium.

Table 8. Summary of chemical analysis of surface waters in Iowa.

Mineral constituents, parts per million

Station and Period	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na) & Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate
Iowa River at Iowa City, Iowa.															
(a)Sept. 6, 1906, to Sept. 16, 1907	....	19	0.25	49	17	14	210	0.0	36	3.6	....	2.8	247	192	....
(b)October 1944 to September 1951	1,960	14	.11	49	15	7.6	175	....	38	4.4	0.2	11	240	185	41
(b)October 1944 to September 1954	1,800	....	....	....	....	....	181	....	39	4.8	....	....	246	190	41
Cedar River at Cedar Rapids, Iowa.															
(a)Sept. 6, 1906, to Sept. 17, 1907	....	14	.09	48	16	12	209	.0	30	3.4	....	3.1	228	188	....
(b)October 1944 to September 1951	3,960	12	.08	47	13	9.3	169	....	32	8.6	.2	8.0	227	172	33
(b)October 1944 to September 1954	3,640	....	....	....	....	....	176	....	33	9.7	....	....	235	178	34
Raccoon River at Des Moines, Iowa.															
(c)October 1945 to September 1946	....	17	.12	71	25	12	268	....	60	5.1	.4	12	341	280	60
Des Moines R. below Raccoon R. at Des Moines, Iowa..															
(c)October 1944 to September 1945	7,090	d19	.06	76	25	10	258	....	66	4.2	.4	22	d365	293	....
Des Moines River at Keosauqua, Iowa.															
(a)Sept. 10, 1906, to Sept. 9, 1907	....	22	.36	58	21	17	216	.0	71	4.8	....	3.3	312	231	....
Mississippi River near Moline, Ill.															
(a)February to July 1907	....	16	.39	33	13	10	152	.0	24	3.7	....	1.8	179	136	....
Missouri River near Florence, Nebr.															
(a)Oct. 1, 1906, to Oct. 14, 1907	....	31	.44	65	20	49	203	.0	168	8.9	....	1.8	454	245	....
Missouri River at Nebraska City, Nebr.															
(b)October 1951 to September 1953	48,778	....	....	60	17	e52	190	....	157	14	....	4.1	434	219	64

a mean; b weighted average; c average; d computation contains estimate; e does not include potassium.

The mineral constituents of the Iowa and Cedar Rivers at the place of sampling have not varied to any noticeable degree in the 50 years between records, except, that in both rivers the nitrate has at least tripled, and on the Cedar the chloride also has had a marked increase. An increase in either or both of these minerals may indicate an increase in pollution. This increase is probably a reflection of the industrial growth of the State.

All the mineral constituents of both the Iowa River and the Cedar River are in very close agreement except for the increase in chloride in the Cedar River. This agreement may seem odd since the drainage area above Marshalltown on the Iowa River is mainly Cary-Mankato drift, with some Iowan drift; and, that the area below this point is mainly Kansan drift. On the other hand, the drainage area of the Cedar River is almost entirely Iowan drift. Thus, it may be assumed that the various parent soils have been weathered to such an extent, that for all practical purposes, they display the same quality and quantity of chemical constituents.

With the exception of nitrate, the chemical constituents in solution in the Raccoon River at Des Moines and the Des Moines River below the Raccoon at Des Moines are also similar to each other. That nitrate is higher in concentration at the station below the mouth of the Raccoon River may indicate some sort of industrial or domestic pollution on the Des Moines River immediately upstream. The similarity in concentrations at these two stations is not altogether unexpected as the greater portion of the drainage of the Raccoon River and all of the Des Moines River above the stations is from the same glacial drift (Cary-Mankato). There is a marked increase in the amount of sulfate in both the Raccoon and Des Moines Rivers at Des Moines as compared to the Iowa or Cedar Rivers. This is to be expected since there are large areas of gypsum in the watershed, especially in the Fort Dodge area. Also there are small deposits below the city of Des Moines in Marion County and vicinity which may increase the sulfate constituent downstream. The Des Moines and Raccoon River stations also have higher concentrations of dissolved solids, bicarbonate, and hardness than either the Iowa or Cedar River stations. Even though the concentrations are higher, by percentage, the waters are quite similar (table 7). The increase of some mineral constituents in solution in the Des Moines River may be related to the fact that the Cary-Mankato drift has been subject to leaching for a shorter period of time than has the Iowan and Kansan drift.

The quality of water analyses for the Des Moines River at Keosauqua appear to show some dilution when compared with the upper Des Moines River analyses. However, a just comparison cannot be made because of the 40-year difference in period of record. It is of interest to note that the high concentration of sulfate ion is evident for the entire stream length.

The mineral constituents in solution in the Mississippi River near Moline closely resemble those in the Iowa and Cedar Rivers even though total dissolved solids, sulfate, hardness and bicarbonate are lower for the Mississippi. This similarity is illustrated in table 7. This is readily understood since the watershed areas are roughly in the same glacial, geological, and climatical zones. Waters flow mainly through sandstone in the upper reaches of the Mississippi River.

Analyses for the Missouri River show a very marked increase in dissolved solids, sulfates, chlorides, sodium and silica over all of the others, owing to the westward tributaries of the Missouri River which drain an arid or semiarid region. The two Missouri River stations have similar concentration of chemical constituents even though the older station was located above Omaha, Council Bluffs, and the Platte River and the younger one below them; there is a difference of 44 years in the records.

PHYSICAL QUALITY OF SURFACE WATERS TEMPERATURE

Industry not only requires an adequate supply of water with specified chemical properties, but also demands certain other physical characteristics. Probably one of the most important of these requirements is water temperature. About one-third of the water used by industry is for cooling, according to *Water in Industry* a report of a joint survey in 1950 by National Association of Manufacturers and the Conservation Foundation.

Steam-electric power plants, oil refineries, steel mills, and foundries are only a few of the numerous and varied forms of industry which need an adequate supply of water for cooling purposes. Ground water is the best source of cooling water, as its temperature is low and very uniform throughout the year. However, ground water is often too expensive to obtain, inadequate in volume, or both. For example, large steam-electric power plants will use 500,000 gallons of water per minute (about 1,000 cfs) or more for surface condenser operations. Volumes of this magnitude must come from a surface source.

River water, although it is often the cheapest and most accessible source of cooling water, has a temperature which approximates that of the air, and is subject to seasonal fluctuations as shown in fig. 4. The use of cooling towers and large volumes of water are often necessary to compensate for the temperature being higher than desired. Some industries are forced to use cooling towers to recool used water when the water supply is insufficient to meet their demands.

Although most of the temperatures reported in this bulletin are once-daily random readings, experience has shown and data have verified that the temperature of fairly deep and swiftly flowing rivers such as those in Iowa will not fluctuate greatly during the day. For instance compare the maximum and minimum temperature reported for the Shell Rock River. It is a fairly safe assumption that for most of the time the random, once-daily reading on the larger rivers in Iowa will be within 10% of the daily mean.

To indicate the degree of correlation between mean monthly water temperature and the mean monthly air temperature fig. 4 was prepared from the daily random readings. Included in this figure is the mean monthly water discharge, which shows that a critical period for the Iowa and Cedar Rivers insofar as temperature and water volume are concerned is the late summer period July through September. At that time water temperature is usually in the seventies and the flow is usually low. Fig. 4 supports a conclusion by Collins that the mean monthly temperature

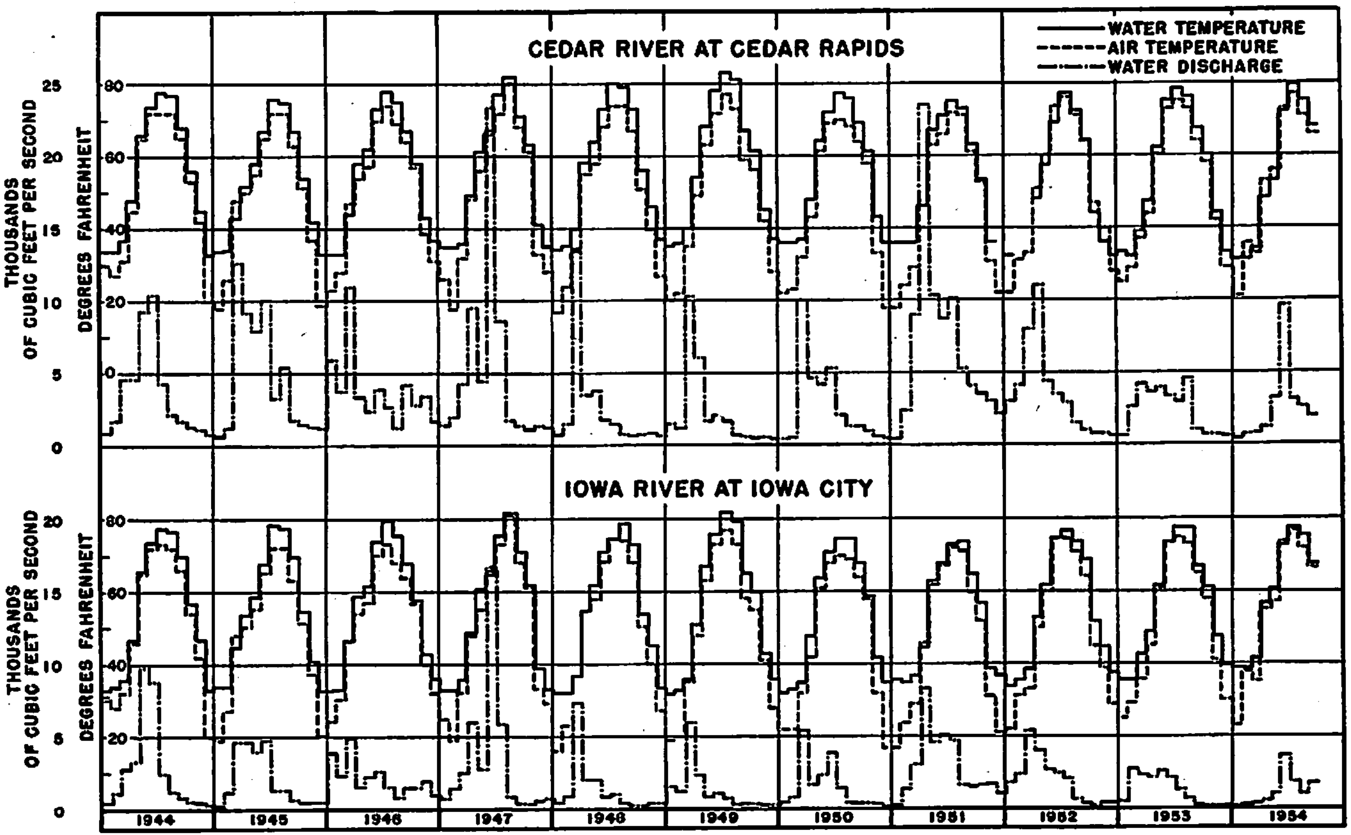


Figure 4. Comparison of mean monthly air and water temperature, and streamflow.

of a surface water at any place is generally within a few degrees of the mean monthly air temperature when air temperature is above the freezing point (Collins, 1925).

Temperature duration, streamflow duration curves for the Iowa River at Iowa City, and the Cedar River at Cedar Rapids were prepared based on once-daily random readings (figs. 5 and 6). They indicate that the water temperature of the Iowa River at Iowa City was below 60°F 57% of the time; and that the Cedar River at Cedar Rapids was below 60°F 58% of the time.

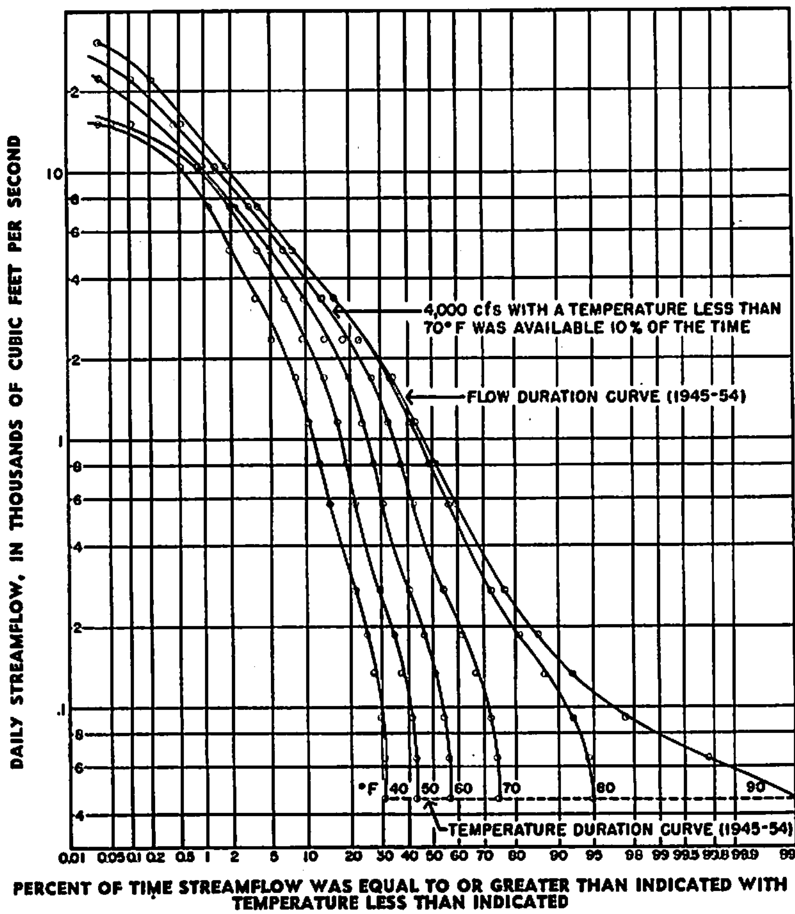


Figure 5. Streamflow duration, temperature duration curves for the Iowa River at Iowa City (1945-54).

These figures also show the percentage of time a certain streamflow with temperature less than a certain degree was available from October 1944 to September 1954. From these figures various interpretations may be made of the temperature and streamflow. In these interpretations the limitations of the data should be kept in mind, i.e. temperatures are from random once-daily readings, streamflow for the period of record was above average.

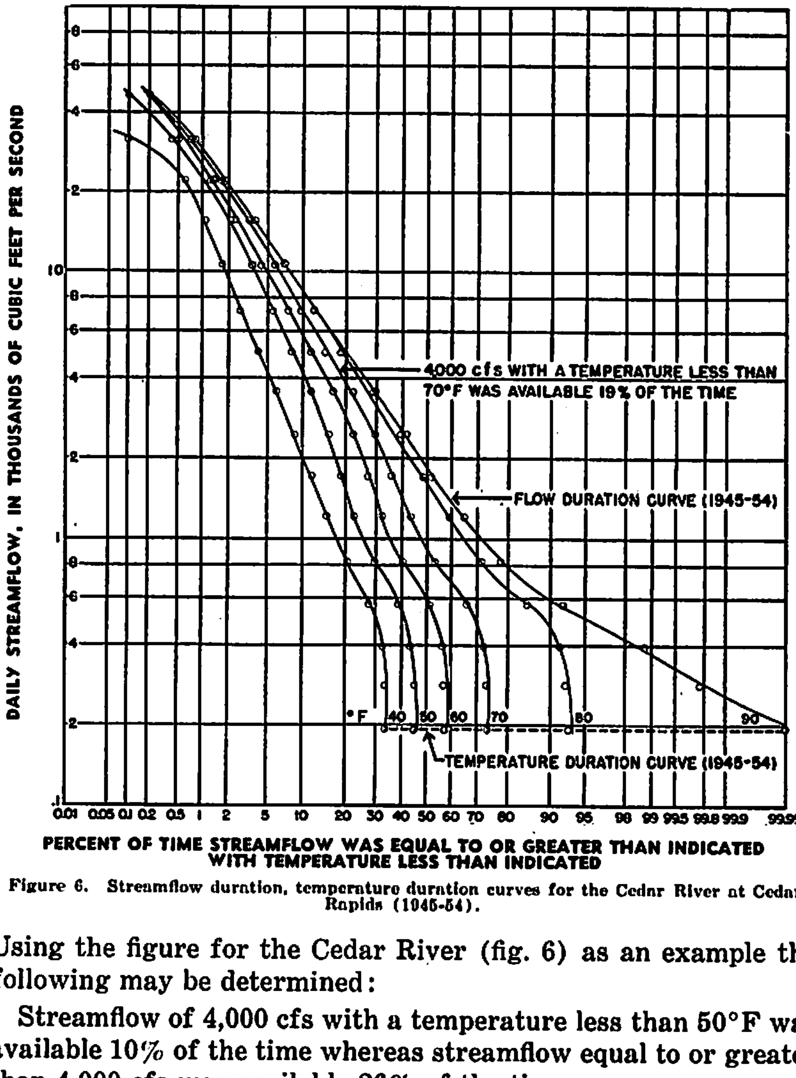


Figure 6. Streamflow duration, temperature duration curves for the Cedar River at Cedar Rapids (1945-54).

Using the figure for the Cedar River (fig. 6) as an example the following may be determined:

Streamflow of 4,000 cfs with a temperature less than 50°F was available 10% of the time whereas streamflow equal to or greater than 4,000 cfs was available 26% of the time.

Only 2,400 cfs was available with a temperature less than 70° F for 30% of the time but an extra 700 cfs (3,100-2,400 cfs) was available with a temperature between 70° and 80° F.

As a temperature duration curve, the figure indicates that water temperature was below 40°F 34% of the time and below 70°F 74% of the time.

As a streamflow duration curve, the figure indicates that a streamflow equal to or greater than 700 cfs was available 84% of the time and equal to or greater than 5,000 cfs, 20% of the time.

Tables and graphs similar to those computed for the Iowa and Cedar Rivers were not prepared for any other river in the State as temperature records and other data pertinent to them were of too short a duration to justify any conclusions. Other available temperature records are shown in table 1.

PHYSICAL QUALITY OF SURFACE WATERS FLUVIAL SEDIMENT

Fluvial sediment, the sediment that is transported by, suspended in, or deposited by water, presents a problem of vital importance in the design of projects for flood control, soil conservation, irrigation, navigation, domestic water supply, and water-power development. Many projects have had costly maintenance, loss of efficiency and in some cases complete destruction owing to the filling of reservoirs with sediment, filling or scouring of irrigation, drainage, or navigation channels, and erosion and gullying on arable lands. Furthermore, the problem of sediment must be considered in the design of highway bridges as scour may destroy a bridge or sediment filling the channel may reduce capacity to carry flood flow. The need of sediment records is clearly indicated by the suspended sediment carried by the Iowa River at Iowa City in the 11 water years 1944-54 (14,617,758 tons). Assuming a specific weight of 55 pounds per cubic foot this amount of sediment would completely fill a reservoir which has a capacity of 12,200 acre-feet.

Sediments are transported by water either suspended by the turbulence of the stream (suspended-sediment load), or rolled and pushed along the bed by the tractive force (bed load). The two modes of transport make it difficult to determine the total load, although total load may be measured if a site is available with enough turbulence to suspend all the sediment. Suspended-sediment load is determined by measuring the dry weight of sediment in the water-sediment mixture and multiplying this by the weight of the water-sediment mixture flowing in a unit of time. Bed load is usually determined by the use of various formulas as sites generally do not exist for measuring total load. Some of these formulas are presented in *Engineering Hydraulics* (Rouse, others, 1950), and in U. S. Geological Survey Circular 170 (Colby, others, 1952). The circular also demonstrates the use of the formulas and a comparison of the results obtained from the different formulas. Since definitions of terms used in the study of fluvial sediments are not standardized, those used in this bulletin are defined in the glossary.

The quantities of sediment transported in Iowa as reported in this volume are suspended-sediment loads. Since the suspended-sediment sampler only samples within about 0.3 ft. of the bed, there is some error in computing the suspended-sediment load. However, this error is negligible for deep rivers and for sediments finer than 62 microns, the silt and clay sizes. Bed load of most of the streams of Iowa is a small fraction of the total load, probably less than 15%, as stream slopes are low and the particle sizes of the suspended sediments are small.

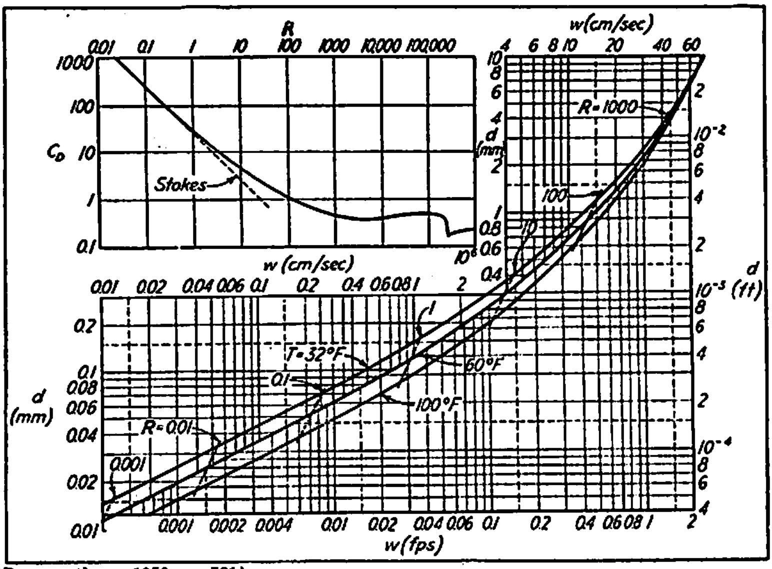
SIZE COMPOSITION OF FLUVIAL SEDIMENT

Probably the most fundamental property governing the action of fluvial sediments is their fall velocity. It is an important parameter in the basic principles of movement. Fall velocity is needed to predict the length of time water should remain in a settling basin to separate sediments from the water, to determine the location of sediment deposits in a reservoir, to select the slope for a stable channel (one that neither scours nor fills). It is also used in the formulas to compute sediment load.

Sediment particles are not usually classified in terms of fall velocity but in terms of particle size, the property that is the most important in determining fall velocity. Actually, particle size of the finer sediments is determined by fall velocity and expressed as the diameter of a quartz sphere with the same fall velocity as the particle. This diameter determined by elutriation methods is defined as a sedimentation diameter.

Besides size, the specific gravity and shape of the particle, and the fluid viscosity are important in determining fall velocity. Owing to the relatively constant specific gravity of waterborne sediments, size is almost synonymous with weight, and the specific gravity of sediment particles is considered a constant, usually that of quartz (2.65). Shape is only important in sediment sizes larger than 100 microns (the approximate limit where fall velocity no longer varies according to Stokes Law). If elutriation methods of size determination were used for all sizes the shape factor would not be important since the size as determined would include the effect of shape on the fall velocity. Elutriation methods are normally used for sizes smaller than 62 microns and sieves are used above this size. Standard practice was followed in determining particle size by the use of sieves.

When fall velocity of the sediments is needed instead of size, such as for the design of a settling basin, sedimentation diameter may be converted to fall velocity by the relationship between these two factors as shown in fig. 7. Sieve diameters for suspended sediment of Iowa may be converted to fall velocity with negligible error utilizing fig. 7. This error is small because the percentage of particles coarser than 62 microns is small and in the range of the coarser particles found in the suspended sediment of Iowa the difference between sedimentation diameter and sieve diameter is small.



(Rouse, others, 1950, p. 781)

Figure 7. Relationship between fall velocity and sedimentation diameter in water. (R, Reynolds No.; C_d, Coefficient of drag; W, Fall velocity; d, Sedimentation diameter).

Because sediments are an assortment of particles of many different sizes, it is the distribution of sizes in the suspended load, or the bed material, alluvium, soil, and the rock mantle from which fluvial sediments are derived that is important. The size distribution is determined in this bulletin as the percent finer than the indicated size. From the distribution, the amount of sediment in a size class may be determined or some characteristic size selected to represent the sediments as a whole, such as the mean size or the median size. Size distribution is a primary factor in determining the specific weight of sediment. Specific weight of the poorly sorted sediments increases as the particle size increases.

In Iowa particle-size distribution of suspended sediment was determined for samples from seven sediment stations. Sufficient analyses were made for the two stations on the Little Sioux River to define adequately the particle-size distribution under all conditions and rates of discharge. For the other five stations from one to eight samples obtained during the 1954 water year were analyzed for size distribution. The average particle-size distribution of all the suspended-sediment samples analyzed in dispersion medium is compared in fig. 8. These averages are simply arithmetic averages of the size distribution of the particles, that is, particle sizes were not weighted with sediment discharge except that more samples were collected for particle-size analysis during periods of high flow than during periods of low flow.

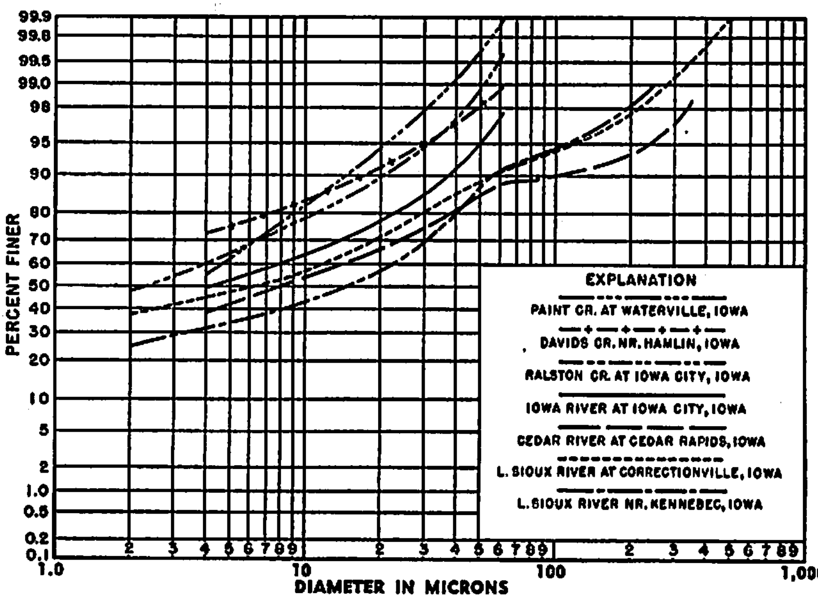


Figure 8. Average particle-size distribution of all suspended-sediment samples analyzed in dispersion medium.

Fine sediments in natural water will often indicate a size that is larger than the individual particle owing to flocculation. Knowledge of the degree of flocculation is helpful in estimating the rates and location of sediment deposition. As an indication to the amount of flocculation taking place, some duplicate analyses were run in native water. However, the degree of flocculation in a reservoir may not be the same as in the sedimentation cylinder in the laboratory. The degree of flocculation in the sedimentation cylinder for the Little Sioux River stations was large for particle sizes finer than 31 microns (figs. 9 and 10).

Particle-size analyses available indicate that most of the suspended sediment transported by the creeks and rivers of Iowa is finer than 62 microns. Median particle size was 4 microns or finer for samples from four of the sediment stations. From fig. 8 it appears that the coarser sediment is transported by the larger rivers, but until more data are available no valid conclusion of this nature can be made.

SPECIFIC WEIGHT OF FLUVIAL SEDIMENT

The volume and probable location of sediment deposits is a significant factor in the design of a reservoir, settling basin or other project affected by sedimentation. Average specific weight of the fluvial sediments must be known or estimated to convert weight to volume of deposit as sediment loads are determined in units of weight. Over-estimating the specific weight of deposited

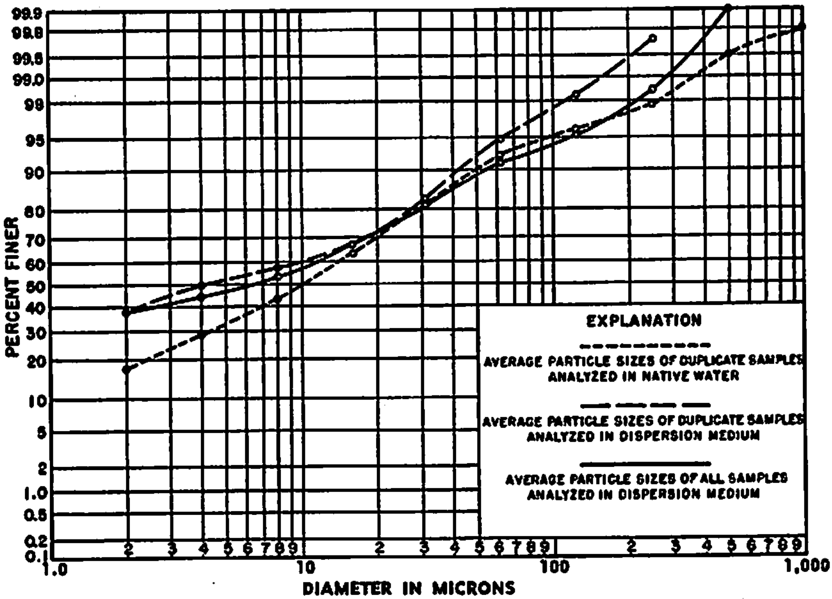


Figure 9. Average particle-size distribution of suspended-sediment samples, Little Sioux River at Correctionville.

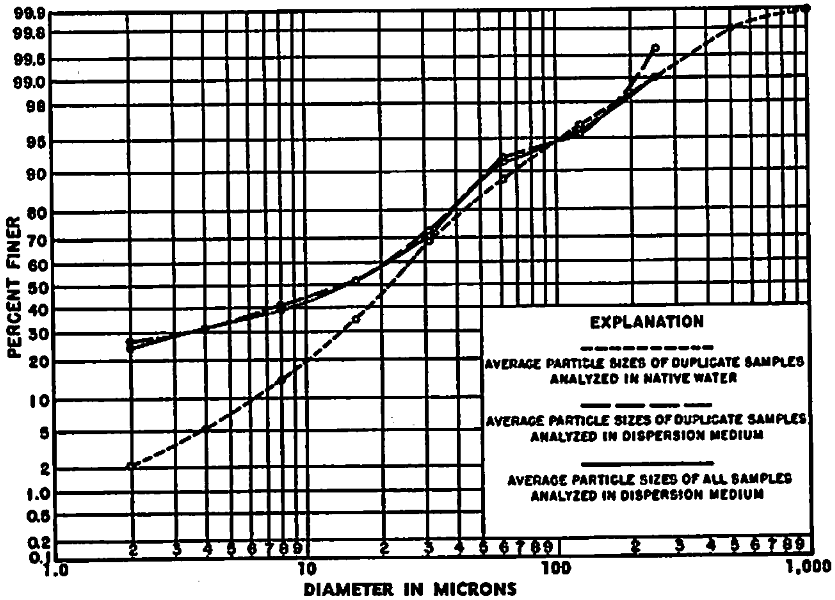


Figure 10. Average particle-size distribution of suspended-sediment samples, Little Sioux River near Kennebec.

sediments will result in over-estimating the life of a reservoir, whereas, underestimating increases the needed capacity which may weaken the economic feasibility of a project. Measured specific weight of deposited sediment has ranged from 20 to 115 pounds per cubic foot (Joint Study, Report 9). The larger specific weights are associated with the coarser deposits.

The location of the deposited sediments is dependent on inflow-outflow relationship or elevation of water surface in the reservoir, fall velocity of particles in transport, dissolved solid constituents, and effect of density currents. The rate of deposition of sediment in the upper reaches of a reservoir is a function of the stream velocity, turbulence and the fall velocity of the material in transport. The coarsest material will be deposited where backwater begins. However, some of the finest material will eventually reach the downstream end of the reservoir because of density currents, or reservoir drawdown, or both. Reservoir operation may result in deposition of coarse and fine material in alternate lenses at the same location.

The specific gravity of waterborne sediments is so nearly a constant, that the specific weight of deposited sediment depends primarily on the porosity of the deposit. Principal factors affecting porosity are: the degree of assortment of the deposit, the particle size of the sediment, and the amount of compaction. The degree of assortment is important as sediments of completely uniform particle size would have the greatest porosity. Commonly the coarser deposits have a greater range in particle size than the finer ones. Thus they have a lower porosity and are subject to less compaction. Porosity and degree of possible compaction increases as the size decreases in sediments as they normally occur in nature.

The ultimate amount of compaction depends primarily on the weight of the overburden, the readjustment of position the sediment particles can make, the time available for compaction under added weight, and the method of operating the reservoir. The rate of compaction, although influenced by the same factors as the ultimate amount of compaction, is determined primarily by the rate the interstitial water is forced out. Fine-grained sediments not only have greater porosity but also have smaller interstitial openings and more total surface area, and thereby offer greater resistance to the flow of interstitial water. Cementation often takes place in the fine-grained sediments further decreasing their permeability and compaction. The finer sediments will have a slower rate of compaction, but as they have greater porosity they will be subject to a relatively greater total compaction. Lane and Koelzer assumed the porosity of sediment decreased logarithmically with time, thus the density increases logarithmically with time (Joint study, Report 9). The same hypothesis is presented by Brown (Rouse, others, 1950, p. 785).

Exposure to the air increases the rate water is removed from the sediments, thereby the rate and ultimate amount of compaction is increased. Hence, the drawdown of the reservoir is important as it determines whether or not the sediments are submerged all the time, part of the time, or rarely. The Soil Conservation Service surveyed 30 small reservoirs, of which 23 were in western Iowa, and determined the average specific weight of 26 deposits which were always ponded to be 58.8 pounds per cubic foot, and that of 4 reservoirs and desilting basins that were often dry to be 77.1 pounds per cubic foot (Gottschalk and Brune, 1950).

The specific weight of the deposited sediment will vary with location in a reservoir. Therefore, an average density is necessary to compute the volume of sediment. The accuracy of this density computation is affected not only by reservoir operation but by inaccuracies in measuring total sediment discharge and particle size. Thus, only an approximate figure can be computed for the average specific weight of the deposited sediment.

To estimate specific weight of deposited sediment a method was developed which uses the median particle size of the suspended sediment in relationship to the suspended-sediment load, and the relationship determined for medium particle size and measured specific weight of deposited sediments (Colby, others, 1952, 1953). Using this method, an average specific weight of 59.9 pounds per cubic foot was computed for deposits derived from the suspended-sediment load of the Little Sioux River at Kennebec; and 51.7 pounds per cubic foot for deposits from Little Sioux River at Correctionville. These computed specific weights would be for deposits which had been under water for a few years and not subject to a large amount of compaction. The large difference in specific weight between the two stations is readily explained by the difference in the size distribution of the suspended-sediment load. Suspended sediment passing the Kennebec station contains a larger amount of coarser material, probably from gully and channel erosion, which would increase the specific weight of deposits derived from its load. These computed specific weights compare very favorably with specific weights measured by Gottschalk and Brune and reported in a preceding paragraph. Specific weight was not computed for any other station because of insufficient data.

Lane and Koelzer reported specific weight for deposits in the Iowa River, Cedar River, and Lake Macbride. These were determined by the Iowa Institute of Hydraulic Research and have an average value of 60.9 pounds per cubic foot excluding 3 of the highest values which were from sandbars (Joint Study, Report 9). The average of the 5 determinations of Lake Macbride deposits which were continually submerged and not over 4 years old was 59.2 pounds per cubic foot.

From data available, an average specific weight of 55 pounds per cubic foot would give a reasonable estimate for deposits in Iowa that are continually submerged and not subject to a great degree of compaction. A specific weight of 55 pounds per cubic foot was used in computing acre-feet in this bulletin. Compaction would probably increase the specific weight above 55 pounds per cubic foot if the reservoir would be dry for long periods of time or have a volume large enough to increase the thickness of the sediment overburden and time for settlement. However, if the reservoir was so small that it would be filled in a comparatively short time, then the specific weight may be lower than the 55 pounds per cubic foot.

SUSPENDED-SEDIMENT DISCHARGE

The sediment problem in Iowa is closely related to the geology of the State. From available records, the State is apparently divided into five typical areas with various parts of each area having similar suspended-sediment yield rate and sediment problems. These areas in approximate order of the magnitude of their sediment problem starting with the greatest are (fig. 3): (1) Missouri River loess of western Iowa (the thick loess deposits on Kansan drift and the southern portion of the Iowan drift); (2) Kansan drift (this includes all the Kansan drift outside the Missouri River loess area and the small portion of Illinoian drift in the southeast); (3) the so-called "Driftless area" of northeastern Iowa; (4) Iowan drift; (5) Cary-Mankato drift. Each area will probably be further subdivided and the magnitude of the problem better defined when additional sediment records are available.

This division of the state is based on the geology and topography of the areas and the sediment yield rates indicated by available records. Although the sediment problem in each area and the exact boundaries of the areas, with the exception of the geologic boundaries, are not well defined, the sediment records show a definite change in the sediment yield rate from one area to another.

The change in sediment yield rate is large from one area to another. The average annual suspended-sediment yield of the Iowa River at Iowa City (most of its length in Kansan drift) was over three times that of the Cedar River at Cedar Rapids, a parallel river basin but in Iowan drift. Annual suspended-sediment yield of these two rivers is compared in fig. 11. For the Little Sioux River near Kennebec the average annual suspended-sediment yield for the two years with the smallest load was almost seven times that of the Iowa River at Iowa City. The suspended-sediment records of five small-area stations which are located in different parts of the State show a change in suspended-sediment yield rate (table 9). The records of these small areas are much too short to be conclusive; for the smaller the drainage area of a streamflow or sediment station the longer the record must be to insure sampling under all hydrologic conditions.

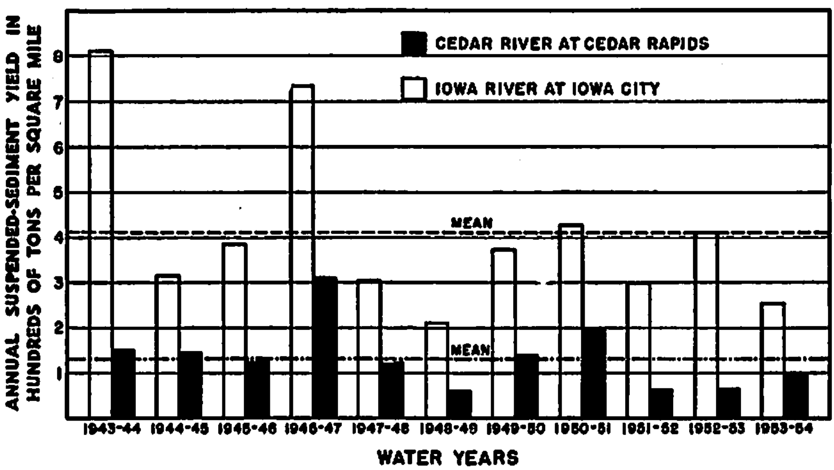


Figure 11. Comparison of annual suspended-sediment yield, Iowa River at Iowa City and Cedar River at Cedar Rapids.

Table 9. Comparison of suspended-sediment load and yield rate for small drainage area sediment stations.

Water year	Suspended sediment loads (tons)				
	Davids Creek 26.1 square miles	Honey Creek 13.8 square miles	Ralston Creek 3.01 square miles	Paint Creek 42.7 square miles	East Fork Hardin Creek 22.7 square miles
1952-53	18,917.6	5,097.8	8,947.3	....	767.0
1953-54	3,286.9	1,268.3	639.5	23,509.1	925.1

Water year	Annual suspended-sediment yield (tons per square mile)				
	Davids Creek 26.1 square miles	Honey Creek 13.8 square miles	Ralston Creek 3.01 square miles	Paint Creek 42.7 square miles	East Fork Hardin Creek 22.7 square miles
1952-53	724.8	369.4	2,973	....	33.8
1953-54	125.9	91.9	212.5	550.6	40.8

The relationship between streamflow and sediment load, on an areal basis also indicates the different sediment yield rates of these various areas (figs. 14, 15, 17, and 18). With a mean monthly streamflow of 1.0 cubic foot per square mile, the mean monthly suspended-sediment yield was 230 tons per square mile for the Little Sioux River at Kennebec, 88 tons per square mile for the Little Sioux River at Correctionville, 45 tons per square mile for the Iowa River at Iowa City, and 17 tons per square mile for the Cedar River at Cedar Rapids.

Since the magnitude of the suspended-sediment load appears to be correlative with the geology of the State, the sediment records will be discussed in conjunction with the areas they represent. In the following discussion, the geology of each drainage basin was obtained from Kay and Apfel (1928), and Kay and Graham (1941). Sediment deposition in acre-feet was computed using a specific weight of 55 pounds per cubic foot and assuming reservoir trap efficiency of 100%. Soil loss in inches, the depth of sediment that would be eroded uniformly from an area equal to the drainage area of the basin, is given. It is somewhat erroneous to compute soil loss in this manner as erosion is not uniform over a basin but is divided into sheet, gully, and stream erosion. A specific weight of 85 pounds per cubic foot was used to compute the soil loss in inches. This specific weight is low for gully and streambank soil but is more representative of cultivated topsoil. Stream slopes reported, unless stated otherwise, were computed from data in the reports of the Iowa State Planning Board (1936).

MISSOURI RIVER LOESS AREA

The sediment problem in Iowa is greatest in the Missouri River loess area of western Iowa. There the thick deposits of fertile loess combined with a rolling to steep topography, intensive cultivation, and high rate of precipitation, result in one of the highest sediment yield rates in the United States. The loess is thickest along the edge of the Missouri River flood plain and decreases in thickness eastward. Observed instantaneous sediment concentrations in this area are higher than in any other section of the State; 276,000 ppm (27.6%) on Waubonsie Creek near Bartlett, and 105,000 ppm (10.5%) on the Little Sioux River near Kennebec. Concentrations greater than these are quite possible.

The sediment problem in this area is very complex. The high fertility of the loess has resulted in cultivation of hillsides that in other areas of the State would be in grass. The incentive for soil conservation measures in the past was small as the fertility of the loess decreases very little with depth. However, gully growth, which not only destroyed the land but also made adjoining areas inaccessible, has resulted in more activity among the farmers in this area to practice modern soil conservation methods.

Stream channels in this area have often been straightened to increase drainage and reduce flooding. In many cases this channel improvement has increased gully growth and sheet erosion on the upper tributaries. Lower sections of the stream owing to lower gradients are often unable to transport the additional load derived from the accelerated erosion in the upland areas. Therefore aggradation occurs decreasing the capacity of the channel to carry flood flows. Additional knowledge of the basic nature of sediment transport, more sediment records, and the study and application of an effective soil conservation program are needed to help solve this problem of channel improvement. Channel improvement should only be done after an extensive study of the entire drainage basin.

Sediment records are available for five stations—two on the Little Sioux River in northwestern Iowa; one on Davids Creek, a small tributary of the East Nishnabotna River; and two in the Tarkio River basin near the Iowa-Missouri boundary.

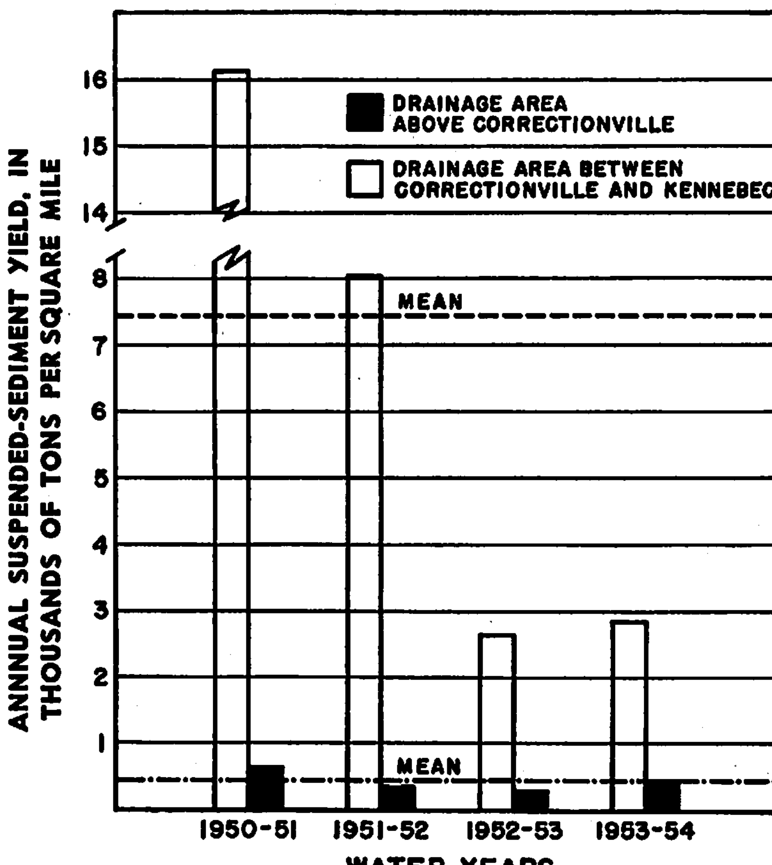


Figure 12. Comparison of suspended-sediment yield rate of drainage area above Little Sioux River at Correctionville and drainage area between Correctionville and Kennebec

The Little Sioux River records are particularly valuable as they differentiate the load from the thicker loess and more rolling topography of the Missouri River bluff area from that of the remainder of the watershed. The importance of this is illustrated in fig. 12 which compares the suspended-sediment yield rate of the Missouri River bluff area with that of the remainder of the watershed.

Little Sioux River

The Little Sioux River originates in the Cary-Mankato drift of northwestern Iowa (fig. 3). From the headwaters, the river traverses an area which has an ever-increasing thickness of loess deposits until it reaches the alluvium of the Missouri River flood plain. This loess mantle increases in thickness from a few feet in the Tazewell drift to 90 feet or more at the edge of the Missouri River flood plain. Most of the sediment load in the Little Sioux River originates in the loess-covered area southwest of the Cary-Mankato drift.

The main stem of the river has been straightened at various times during the past 50 years from below Smithland to its confluence with the Missouri River. The slope of the main channel is about 1.8 feet per mile from the Kennebec gage to Correctionville, and about 2 feet per mile from Correctionville to Spirit Lake (computed from sea level elevations given in Water-Supply Bulletin No. 3). Slope of the main stem is considerably less than the slope of the tributaries. Slopes for some of the major tributaries are: Maple River, 5.5 feet per mile; West Fork, 6.3 feet per mile; and Elliott Creek, 8.3 feet per mile (Congressional documents, 1943). Minor tributaries and gullies in the lower part of the basin, as the topography in that area is very rough, have slopes greater than the main river and major tributaries.

Two sediment stations were established in May 1950 at the gaging stations near Kennebec and at Correctionville. Kennebec, the lower station, is 16 miles upstream from the mouth, approximately where the river leaves the Missouri River bluff area and enters the flood plain. Correctionville is 39 miles upstream from Kennebec, approximately where the river enters the thicker loess of the Missouri River bluff area.

Streamflow records at Correctionville were obtained from May 1918 to July 1925, October 1928 to July 1932, and June 1936 to date; and at Kennebec since April 1939. Average streamflow for the period of sediment record was 40% and 62% greater than the averages for the total period-of-record for Kennebec and Correctionville, respectively. The streamflow duration curve for

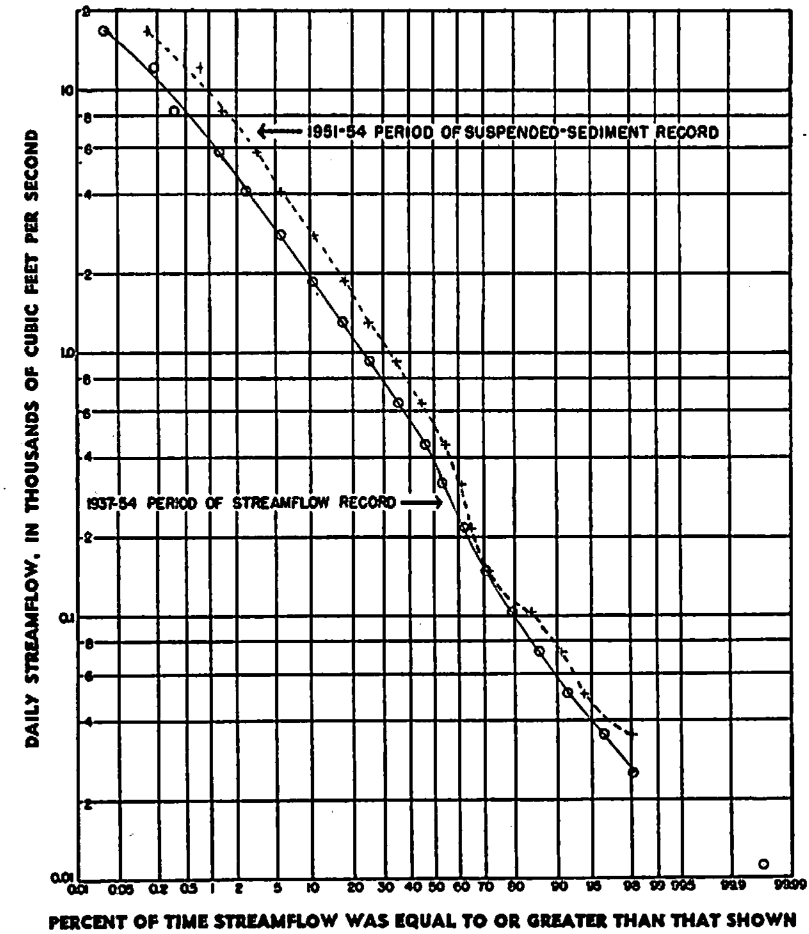


Figure 13. Streamflow duration curve for Little Sioux River at Correctionville.

the Correctionville station for the period of sediment record is compared with that for the period of streamflow record (1937-54) in fig. 13. Streamflow for the period of sediment record for both stations was above average; therefore, it is reasonable to assume that suspended-sediment load also was above average. This hypothesis is substantiated to some extent by the relationship between streamflow and suspended-sediment yield rate for these two stations (figs. 14 and 15).

The suspended-sediment load at Correctionville from May 1950 to September 1954 was 4,806,180 tons. This load amounts to 4,010 acre-feet of deposited sediment and represents a soil loss over the entire drainage area above the station of 0.02 inch. The load at Kennebec for the same period was 15,044,548 tons which amounts to 12,600 acre-feet of deposited sediment. The increase in suspended-sediment load between Correctionville and Kennebec represents a soil loss of 0.37 inch from the intervening area.

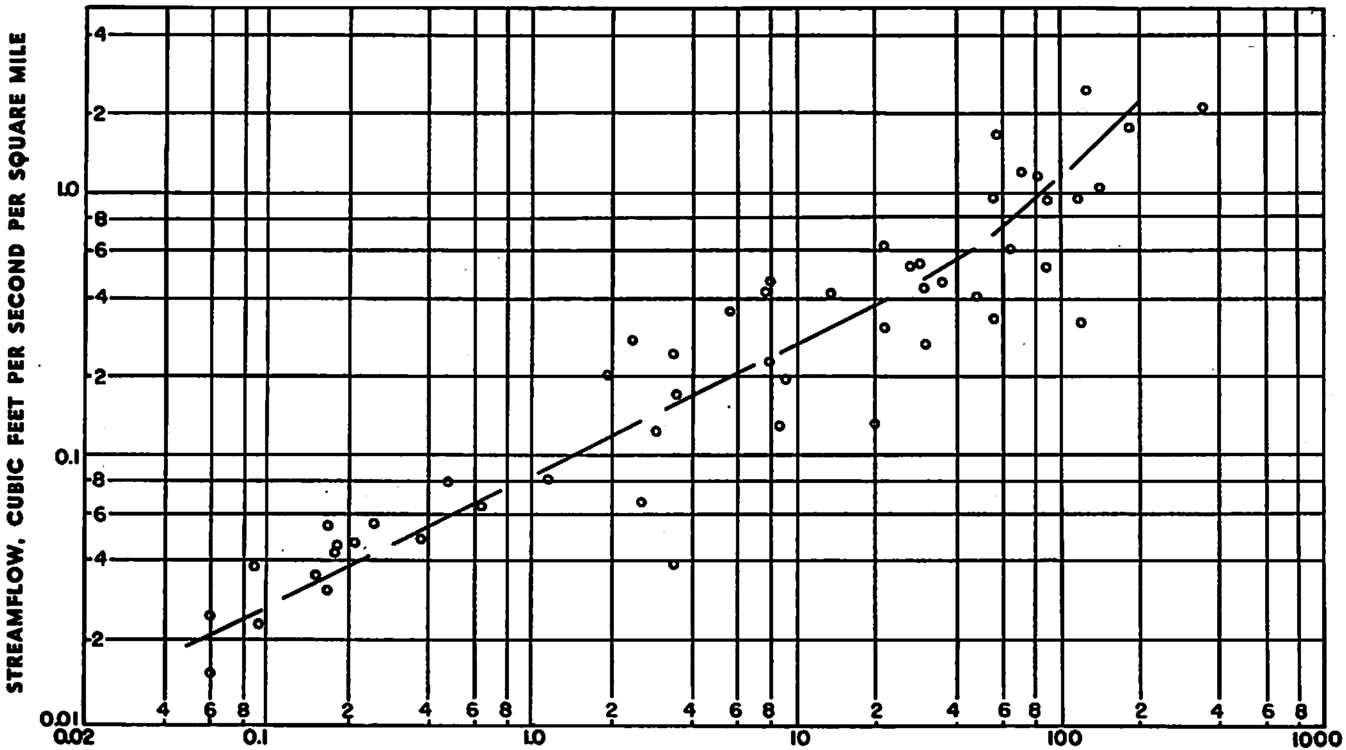


Figure 14. Relationship between streamflow and suspended-sediment yield rate, Little Sioux River at Correctionville.

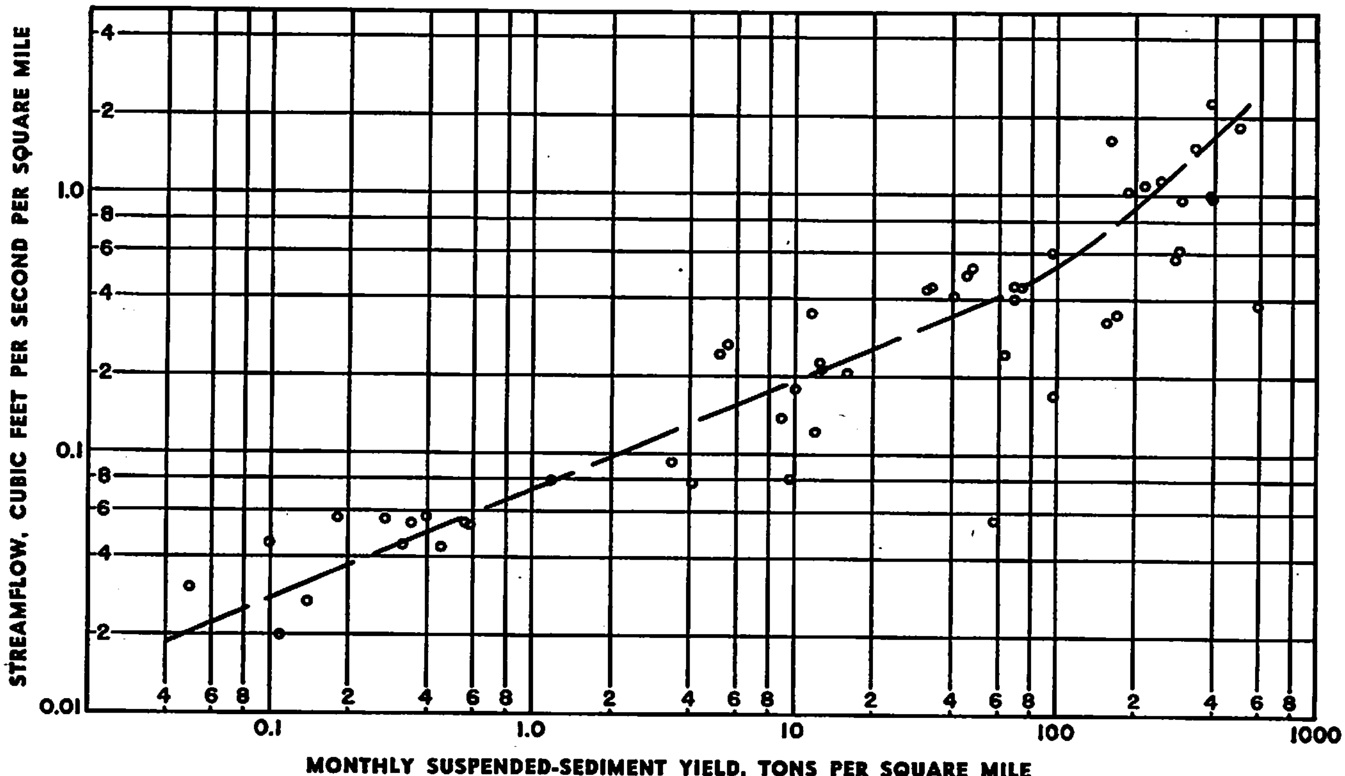


Figure 15. Relationship between streamflow and suspended-sediment yield rate, Little Sioux River at Kennebec.

The drainage area above Correctionville is 2,450 square miles. Over half of this area is in the Cary-Mankato glacial terrain which has a low sediment yield rate. The drainage area of Kennebec is 2,730 square miles, an increase of 280 square miles or 11.4% over the drainage area at Correctionville. The streamflow increased 10% between Correctionville and Kennebec but the suspended-sediment load increased 213%. A large part of this increase in suspended-sediment load occurred during the 1951 and 1952 water years as shown in table 10. Streamflow at

Table 10. Comparison of suspended-sediment load and yield rate, drainage area above Little Sioux River at Correctionville and drainage area between Correctionville and Kennebec.

Water year	Suspended-sediment load (tons)		Suspended-sediment yield rate (tons per square mile)	
	Drainge area above Correctionville 2,450 sq. mi.	Drainage area between Correctionville and Kennebec 280 sq. mi.	Drainage area above Correctionville 2,450 sq. mi.	Drainage area between Correctionville and Kennebec 280 sq. mi.
1950-51	1,506,974	4,512,031	615.1	16,115
1951-52	879,823	2,258,583	359.1	8,066
1952-53	734,701	747,504	299.9	2,670
1953-54	1,195,818	807,895	488.1	2,885
Total	4,317,316	8,326,063	....	....
Mean	1,079,329	2,081,516	440.6	7,434

the two stations for these two water years was greater than average. The average streamflow in 1951 was over twice and in 1952 was about one and a half times the average discharge for the periods of record. Streamflow at both stations for the 1953 and 1954 water years was a little greater than the average for their periods of record. The increase in load between Correctionville and Kennebec is exceedingly large, even excluding the abnormal runoff years of 1951 and 1952. The increase in sediment load between Correctionville and Kennebec in 1953 was 102% and in 1954 was 68%. Such a large increase in load from a small increase in drainage area, and the fact that suspended sediment at Kennebec has a coarser size distribution (figs. 9 and 10) indicates that gully and channel erosion is the principal cause of the increase.

Davids Creek

Davids Creek, a tributary to the East Nishnabotna River, is located at about the eastern edge of the Missouri River loess area. The topography is gently rolling and the loess cover is from 20 to 25 feet thick.

The sediment and stream-gaging station was started July 1, 1952. The drainage area above the gage is 26.1 square miles. Total suspended-sediment load from July 1952 to September 1954 was 35,984.4 tons or about 30 acre-feet of deposited sediment, representing an average soil loss from the area of 0.01 inch. Average annual suspended-sediment yield for the two water years of record was 425 tons per square mile. The average particle-size distribution of the samples analyzed is shown in fig. 8. The suspended sediment analyzed was 98.8% finer than 62 microns and 72% finer than 4 microns.

Tarkio River

The Tarkio River is located in the southeastern part of the Missouri River loess area. This area is rolling loess mantle with the loess thickness varying from 15 to 20 feet, and is thicker on the top of the hills and thinner across the valleys. The slope of the river is mild, probably not greater than 3 feet per mile.

Two sediment and stream-gaging stations were established in the Tarkio River basin in April 1934 as part of a cooperative project with the Soil Conservation Service. This cooperative study was discontinued in June 1940. One station was established on West Tarkio Creek near Westboro, Missouri, with a drainage area of 105 square miles; the other on the Tarkio River at Blanchard, Iowa, with a drainage area of 200 square miles. The drainage basins are contiguous for almost their entire length and their main channels are from 1 to 6 miles apart.

Streamflow records were good as an artificial control was installed at each streamflow station, and discharge measurements were made once a week during low flow and more often during high flow. Both artificial controls were washed out in March 1939 and were never replaced. Streamflow data obtained after this event were less accurate.

Sediment records were good with the greatest source of error originating in the type of sampler used. Samples were obtained by depth integration using the standard U. S. Geological Survey brass-bucket sampler. This sampler does not obtain the correct stream concentration, and the error increases with increasing sediment size (Joint Study, Report 1). This is not too large a source of error for finer sediments. Although the samples were obtained with a bucket sampler, the finenes of the suspended sediment would indicate that the samples were fairly representative of the stream concentration.

The sediment and streamflow records were part of a study conducted to investigate the relationship between rainfall, runoff, and soil losses on two watersheds; one, West Tarkio Creek watershed, was progressively subjected to the improved land-use and conservation practices of the Soil Conservation Service, and the other, Tarkio River watershed, was permitted to continue under prevailing agricultural use and management. The complete hydrologic study was published by the Soil Conservation Service from which part of the information in the preceding paragraphs was obtained (Potter and Love, 1941). The annual suspended-sediment yield of the two areas is given in table 11.

Table 11. Annual suspended-sediment yield, Tarkio River at Blanchard, Iowa, and West Tarkio Creek near Westboro, Mo.

Station	Drainage area	Tons per square mile					
		1934-35	1935-36	1936-37	1937-38	1938-39	Mean
Tarkio River..............	200 sq. mi.	1,298	3,179	7,219	2,250	5,998	3,989
West Tarkio Creek.........	105 sq. mi.	2,297	3,466	5,304	2,376	5,204	3,729

KANSAN DRIFT AREA

Erosion of the Kansan drift has resulted in deep valleys and a well-developed drainage system. Loess is deposited over the Kansan glacial drift with varying thickness. Thicker deposits are in the western section and along the edge of the Iowan drift. Deposits in these areas vary from 10 to 20 feet in thickness and there are some 50-foot deposits along the southern edge of the Iowan drift. The deposits are much thinner, approximately 2 to 4 feet deep, in the south central and southeastern sections of the Kansan drift.

There are records from five sediment stations available for this area: Honey Creek, a small tributary to the Chariton River; Des Moines River below the mouth of the Raccoon River; Ralston Creek, a small tributary to the Iowa River at Iowa City; and two on the Iowa River, one at Iowa City, and the other above Coralville. These records do not begin to define the sediment problems in this area. However, the suspended-sediment yield rate of these stations indicates that after the Missouri River loess area, the Kansan drift area produces more sediment than other parts of the State.

The two stations on the Iowa River are only a few miles apart. The station above Coralville is about 10 miles upstream and separated by two small dams from the station at Iowa City. The difference in drainage area is about 195 square miles. Records for these two stations are particularly valuable as they demonstrate the effect of small dams on sediment load.

The sediment station on the Des Moines River below the Raccoon River at Des Moines is discussed in the Cary-Mankato drift section since the greater portion of its drainage area is in that region.

Honey Creek

Honey Creek, a small tributary to the Chariton River, is located in about the center of the Kansan drift area of southern

Iowa. The topography changes from gently rolling at the headwaters in the vicinity of Russell to hilly at the edge of the Chariton River flood plain. Average slope of the stream (computed from elevations furnished by the Soil Conservation Service) from Russell to the sediment station is about 17.9 feet per mile. Drainage area above the sediment station is 13.8 square miles. The surface geology is Kansan drift with some loess deposits. Erosion in the area has removed most of the original loess material and now the loess deposits are only on the crest of the hills and on the gently rolling area at the headwaters. These deposits are less than 3 feet thick.

Honey Creek is one of 60 small watersheds in the United States for which Congress authorized a small watershed protection program. This authorization was to provide experience in developing sound procedures for Local-State-Federal cooperation in achieving watershed objectives of local people, and to demonstrate actual physical results of planned watershed programs. As a result of this program, a comprehensive land treatment, gully control, and other soil conservation measures were planned for the Honey Creek drainage area. The initiation of this plan was in 1954 with completion expected in 5 years.

The stream-gaging and sediment station was established June 6, 1952. The suspended-sediment load from June 1952 to September 1954 was 11,511.1 tons or about 0.008 inch of soil loss from the entire drainage area. This load would form a deposit of 9.6 acre-feet in a reservoir. Average annual suspended-sediment yield for the two water years of record was 231 tons per square mile. A comparison of suspended-sediment yield rates of the small area stations is given in table 9.

Streamflow at this station was below normal as this area has had below normal precipitation during the last few years. Average streamflow for the Chariton River near Centerville for the 1953 and 1954 water years was 55.7% and 8.8% of the 16-year average for that station.

Iowa River

The headwaters and upper one-third of the Iowa River are in the gently rolling to flat area of the Cary-Mankato drift. Leaving this area near Iowa Falls, Hardin County, the river flows through Kansan glacial drift with thick loess deposits for most of its length, crossing two small Iowan drift areas near Grinnell and North Liberty and a small section of the Illinoian drift prior to entering the Mississippi River flood plain. Most tributaries to the river below Iowa Falls are in the Kansan drift area south of the river (fig. 3). Loess deposits on the Kansan drift in this area are thick, in places reaching a depth of 50 feet or more. This is in sharp contrast to the Iowan drift, which the Iowa River parallels for most of its length, which has loess deposits varying from 2 to 4 feet in thickness.

River slope is not large—an average of about 2.1 feet per mile. Slope increases gradually from the mouth to about Iowa Falls where an abrupt increase in gradient occurs, and this steeper slope prevails until the river flattens out near the Franklin County line. Slope from the mouth to Amana is about 1.5 feet per mile, Amana to Iowa Falls about 2.5 feet per mile, Iowa Falls to Franklin County line about 7.5 feet per mile, and above Franklin County line 1.5 feet per mile. Although the slope of the Iowa River is not great, tributaries in the Kansan drift area have steeper slopes.

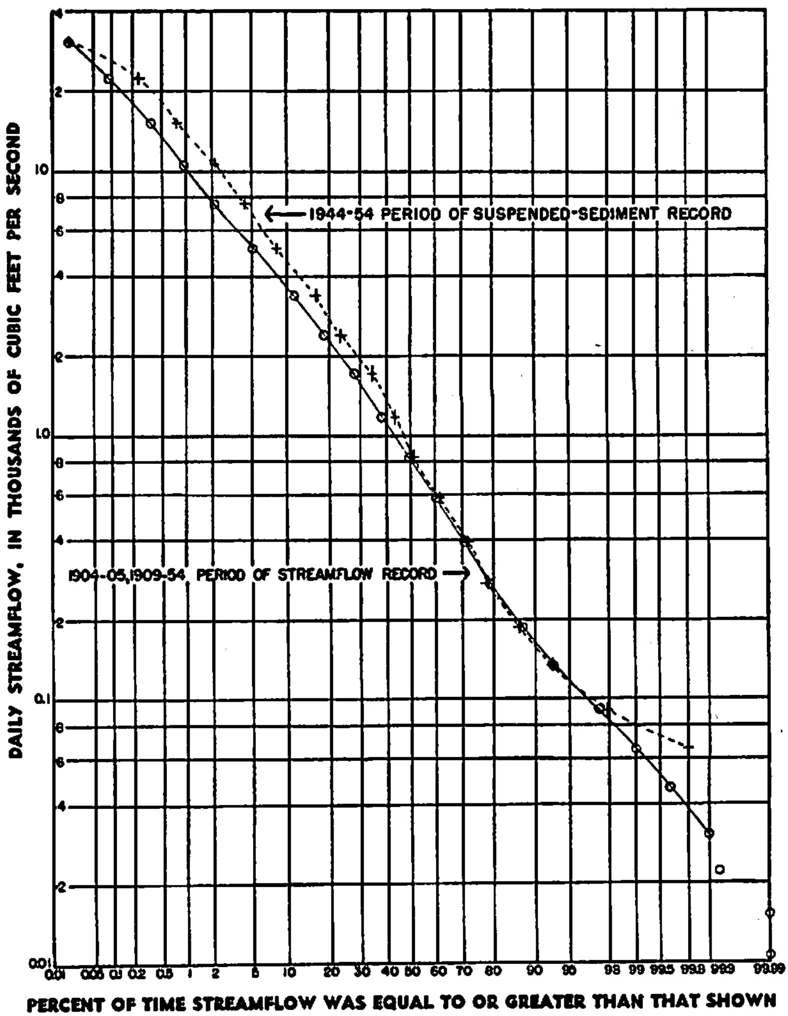


Figure 16. Streamflow duration curve for the Iowa River at Iowa City.

Records are available for the sediment station at Iowa City, drainage area of 3,230 square miles, since October 1943; and for the sediment station above Coralville, drainage area of 3,035 square miles, for the spring and summer from October 1943 to September 1947. Total suspended-sediment load of the Iowa River at Iowa City for the 11 water years of record (1944-54) was 14,617,758 tons, an annual suspended-sediment yield of 411 tons per square mile. This load is equivalent to 12,200 acre-feet in a reservoir and represents a soil loss over the entire drainage area of 0.05 inch.

Streamflow at Iowa City for the 11 years of sediment record was 22% greater than the average for the 51 years of record (1903-54). A streamflow duration curve for the period of sediment record (1944-54) is compared with the 1904-05, 1909-54 period of streamflow record in fig. 16. Streamflow for the period of sediment record was above average, presumably suspended-sediment loads were also. The relationship between streamflow and suspended-sediment yield rate is given in fig. 17.

Average particle-size distribution of the suspended-sediment samples analyzed indicated that 97% was finer than 62 microns (fig. 8). Median particle size was 4.1 microns.

The major portion of the suspended sediment that passes Iowa City must come from the area below Iowa Falls as the sediment yield rate of the Cary-Mankato drift is low. Just what the sediment yield rate was for the area below Iowa Falls cannot be determined, but an annual yield of 513 tons per square mile, derived by dividing the annual load at Iowa City by the area below Iowa Falls, would represent a rate greater than the actual rate for this area.

Thus, the suspended-sediment yield rate for the 11 years of record for the Iowa River drainage area in Kansan drift would be between 411 and 513 tons per square mile.

As previously stated, the records for the Iowa River above Coralville and at Iowa City demonstrate the influence of small dams on sediment loads. Suspended-sediment load and streamflow for these stations for the period of record at Coralville are tabulated in table 12. From March to November 1944, March to October 1945, and April to September 1947, the suspended-sediment load at Iowa City was larger than the load above Coralville. However, the Iowa City load was less during the period March to September 1946. Records for this period of seven months showed that 175,771 tons or about 237,000 cubic yards of sediment were deposited behind the two dams. The amount may have been larger than this as there are 195 square miles of intervening drainage area that contribute sediment to the stream below Coralville.

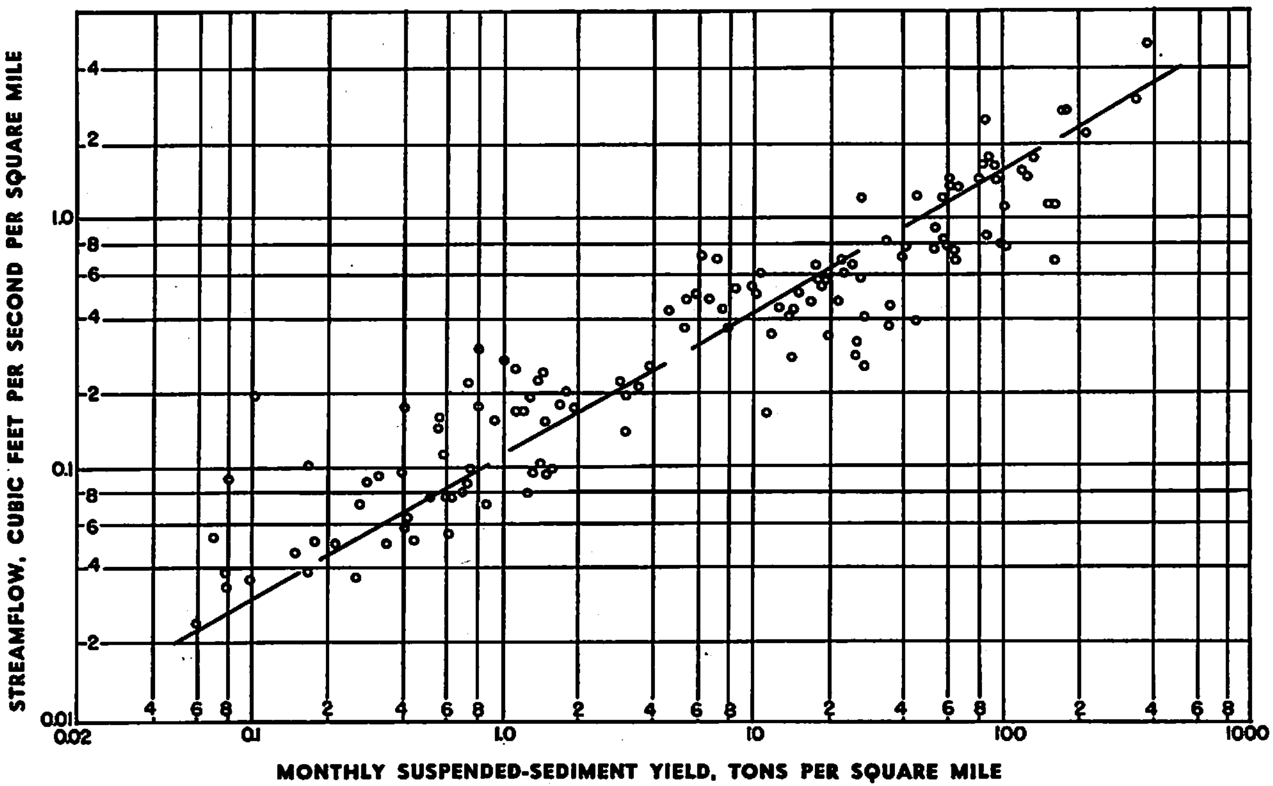


Figure 17. Relationship between streamflow and suspended-sediment yield rate, Iowa River at Iowa City.

Table 12. Comparison of suspended-sediment load and streamflow, Iowa River above Coralville and Iowa River at Iowa City.

Suspended-sediment load (tons)

Month	1944		1945		1946		1947	
	Coralville	Iowa City	Coralville	Iowa City	Coralville	Iowa City	Coralville	Iowa City
March	262,413	282,070	235,110	306,569	394,400	400,620	....	....
April	268,600	328,470	212,250	195,610	29,391	19,520	284,370	427,240
May	626,680	1,121,320	137,744	146,492	139,827	81,896	130,364	111,984
June	208,080	561,750	212,300	261,420	332,471	331,237	654,590	1,250,340
July	167,190	131,706	54,096	46,578	150,184	114,002	141,611	282,604
August	67,117	26,117	89,312	41,311	38,920	12,883	10,038	5,921
September	11,567	4,786	9,306	4,154	122,586	71,040	1,616	1,278
October	4,928	3,714	7,550	3,946	....	....	....	....
November	1,376	1,847	....	....	....	....	....	....
Total	1,707,951	2,461,780	957,668	1,006,080	1,207,869	1,032,008	1,222,589	2,085,367

Streamflow (cfs—days)

Month	1944		1945		1946		1947	
	Coralville	Iowa City	Coralville	Iowa City	Coralville	Iowa City	Coralville	Iowa City
March	81,580	87,331	140,900	144,330	145,580	150,430	....	....
April	105,870	110,710	137,050	140,730	40,910	48,584	171,280	179,360
May	296,220	305,540	120,670	124,860	65,065	66,679	81,260	83,730
June	252,100	264,450	136,670	142,970	74,050	77,050	481,200	494,960
July	77,290	78,300	41,340	43,422	43,835	45,900	102,610	160,380
August	30,455	37,718	43,210	43,478	24,082	25,954	20,050	20,947
September	23,282	23,894	18,424	18,878	45,045	46,477	9,223	9,538
October	10,763	17,090	16,389	16,976	....	....	....	....
November	13,930	14,336	....	....	....	....	....	....
Total	903,496	939,369	654,653	675,644	445,167	461,074	925,629	968,915

Some of the increase in load at Iowa City over the load above Coralville in 1944 and 1947 was from deposits behind the dams because the increase in load is too large to be attributed to the intervening drainage area. The increase in load in 1945 is small enough, 48,412 tons, that the drainage area in between could have contributed at least this amount. If the 195 square miles between the two stations had only a monthly yield of 34 tons per square mile (the annual yield of Iowa River at Iowa City divided by 12) it would have amounted to 53,040 tons. Actually, there probably was some fill behind the dams in 1945.

The proportion of the increased load at Iowa City in 1944 and 1947 derived from scour behind the two dams is problematical, as no sediment records were collected on the 195 square miles of drainage area between the two stations. The increase in load was 753,829 tons in 1944, and 862,778 tons in 1947. If all this increase was from scour behind the dams, the increase amounted to about 1,020,000 cubic yards and 1,160,000 cubic yards, respectively. If the increase in load was entirely from the intervening drainage area the average monthly sediment yield for those 15 months would be about 550 tons per square mile. Obviously this monthly yield is too high. A monthly yield of about 200 tons per square mile would be more likely for those 15 months. This would amount to a load of about 600,000 tons whereas the increase in load for 1944 to 1947 was 1,616,607 tons.

The records for these two stations illustrate that small river-run dams, after a period of years, alternately fill and scour depending upon the volume of streamflow.

Ralston Creek

The State University of Iowa has conducted extensive hydrologic investigations on Ralston Creek since 1924. This investigation consists of the collection and publication in an annual progress report of the rainfall, runoff, ground-water, and land-use data for the 3.01 square mile drainage area above the streamflow gage. Since April 1952, suspended-sediment records have been incorporated into the investigation. The U. S. Geological Survey staff assists in the collection of streamflow and suspended-sediment data.

The topography of the area above the gage is rolling to rough and cultivation is extensive. Stream slope is about 35 feet per mile (U. S. Geological Survey topographic map). Suspended-sediment load from April 1952 to September 1954 was 13,147.9 tons or 11 acre-feet of deposited sediment or a soil loss from the entire drainage area of 0.04 inch. The average annual suspended-sediment yield for the two water years of record was 1,593 tons per square mile.

Streamflow was 22% above the 22 year average of 1.47 cfs in 1953, and 89% below this average in 1954. The suspended-sediment load for the two water years of record represents abnormal conditions. In 1953 the load probably was higher than average. In 1954 streamflow was abnormally low; there was only one other year (1934 water year) that had a lower yearly average streamflow during the 22 years of record. Hence, suspended-sediment load for 1954 probably represents an infrequent occurrence.

Average particle-size distribution of suspended-sediment samples analyzed were 96% finer than 62 microns and 59% finer than 4 microns (fig. 8). Median particle size was 2.3 microns.

"DRIFTLESS AREA"

The northeastern section of Iowa has scarred and furrowed landscape with deep valleys, sharp ridges, and a well-developed dendritic stream system. Bluffs and hills are from 100 to 1,100 feet above the stream valleys. Nowhere in Iowa is the relief as rough or is as much bed rock exposed as in this section. Difference in relief of this area from the rest of Iowa is so striking that it has been aptly called "the Switzerland of Iowa." Stream gradients are high and vary from 5 to 10 feet per mile on the larger rivers, such as the Upper Iowa and Yellow Rivers, and the smaller tributaries have even steeper slopes. Many of the smaller tributaries will fall a couple of hundred feet in only a few miles. Although this area at one time was called driftless, remnants of the Nebraskan drift have been found, but their extent is limited. Loess deposits in the area are thin and not continuous. Erosion in this area would be severe if it were not that most of the streams are on or very near bed rock and the steeper slopes are not cultivated. Streams in this area are normally clear except after a storm or in the spring runoff period.

The one suspended-sediment station in this area is Paint Creek near Waterville. This stream is typical of this section of the State.

Paint Creek

Paint Creek is a small tributary to the Mississippi River and originates near the city of Waukon. The stream channel is deep, about 150 feet below the upland ridges at Waterville and 350 feet below them at the Mississippi River flood plain. Valley walls have a slope gentle enough for cultivation in the vicinity of Waukon but their slope increases rapidly so that a few miles downstream the walls are very steep. Bottom lands and flat uplands are farmed but the steep slopes between are in grass and forests.

The streamflow and suspended-sediment station was established on Paint Creek at Waterville in November 1952. The station is about half way between Waukon and the Mississippi River. Gradient of the stream above the station is about 31.2 feet per mile (U. S. Geological Survey topographic map); drainage area is 42.7 square miles. Total suspended-sediment load from November 1952 to September 1954 was 54,346.5 tons or about 45 acre-feet of deposited sediment or a soil loss from the entire drainage agea of 0.01 inch. Suspended-sediment yield rate for the one water year of record was 551 tons per square mile.

Most small streams transport the larger portion of their load during brief periods of high runoff. Paint Creek, no exception, carries a very small portion of its total load during periods of base flow. One or two storms a month cause direct runoff which will transport the major portion of the monthly load. One such storm occurred July 26, 1953, and caused a suspended-sediment load of 23,000 tons, which was 42% of the total suspended load for the almost two complete water years of record. Streamflow for that day was 858 cfs. It would have taken a reservoir with 1,700 acre-feet capacity to have held this flow and the sediment load would have reduced the storage by 19 acre-feet.

Result of one particle-size distribution analysis is shown in fig. 8.

IOWAN DRIFT AREA

Iowan drift is divided into an eastern and western section by the Cary-Mankato drift (fig. 3). Both sections have similar topography, undulating to gently rolling, with fairly broad rivers and valleys. Slope of the main rivers are low, 2 to 4 feet per mile, and tributary slopes increase but slightly over those of the parent streams. Although relief is not great, the streams branch and subdivide in dendritic fashion so that all parts of the Iowan drift area are well drained. There are no natural lakes in this area. Loess deposits are thicker in the western section, 4 to 10 feet thick, and from 2 to 4 feet thick in the eastern portion.

One suspended-sediment station, the Cedar River at Cedar Rapids, is located in the Iowan drift. The Cedar River drains most of the Iowan drift east of the Cary-Mankato drift. The suspended-sediment yield rate of this station was well below that of the stations in the preceding geologic areas and not much greater than the rate of the stations in the Cary-Mankato drift. Presumably the sediment yield rate of the Iowan drift west of the Cary-Mankato drift would also be lower than that of the preceding stations. However, as the loess deposits are thicker in this western section it might be expected that the sediment yield rate there would be higher than in the eastern section.

Cedar River

The Cedar River originates and flows for most of its length in the area of Iowan glacial drift although a small headwater area is in Cary-Mankato marginal morain and another small area below Cedar Rapids is in Kansan drift. River slope is moderate and increases slightly upstream. Slope from the mouth to the confluence with the Shell Rock River averages about 1.8 feet per mile, Shell Rock River to Charles City about 2.6 feet per mile, and above Charles City about 3.9 feet per mile. Average slope is about 2.5 feet per mile. The Shell Rock River, a main tributary in the upper part of the Iowan drift, has an average slope of 3.4 feet per mile.

A suspended-sediment station was established at Cedar Rapids in 1943, drainage area 6,640 square miles. Total suspended-sediment load for the 11 years of record from October 1943 to September 1954 was 9,760,696 tons, an average annual yield of 134 tons per square mile. This compares to an average annual yield of 411 tons per square mile for the Iowa River at Iowa City.

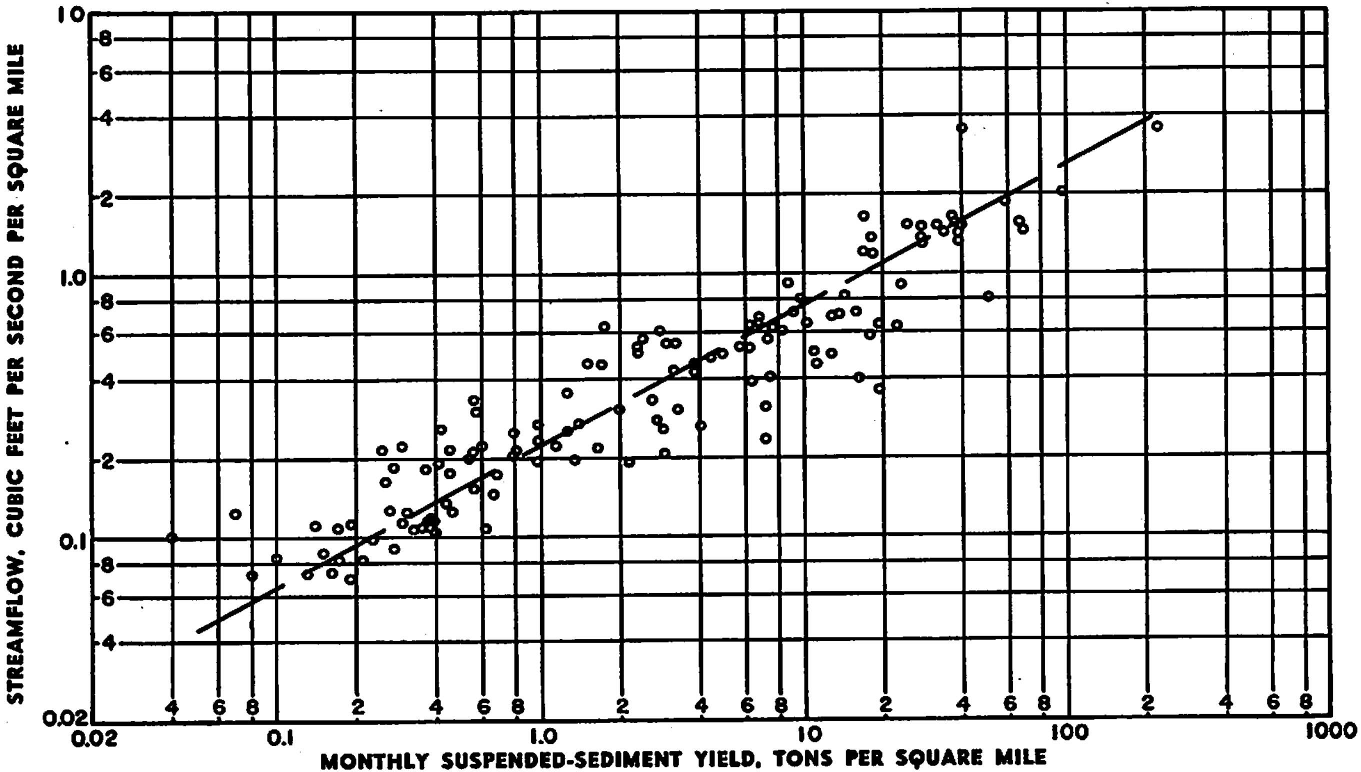


Figure 18. Relationship between streamflow and suspended-sediment yield rate, Cedar River at Cedar Rapids.

Table 13. Comparison of suspended-sediment load and yield rate, Iowa River at Iowa City and Cedar River at Cedar Rapids.

Water year	Suspended-sediment load (tons)		Suspended-sediment yield rate (tons per square mile)	
	Iowa River 3,230 square miles	Cedar River 6,640 square miles	Iowa River 3,230 square miles	Cedar River 6,640 square miles
1943-44	2,617,590	1,000,004	810.4	150.6
1944-45	1,026,019	991,517	317.7	144.8
1945-46	1,251,520	812,356	387.5	122.3
1946-47	2,367,124	2,055,074	732.9	309.5
1947-48	978,113	818,201	302.8	123.2
1948-49	678,615	397,845	210.1	59.9
1949-50	1,208,851	906,057	374.3	136.5
1950-51	1,380,907	1,323,058	427.5	199.3
1951-52	962,464	409,606	298.0	61.7
1952-53	1,329,988	411,781	411.8	62.0
1953-54	816,567	665,197	252.8	100.2
Total	14,617,758	9,760,696	....	....
Mean	1,328,887	887,336	411.4	133.6

The annual load and suspended-sediment yield of the two parallel rivers is compared in table 13. The load of 9,760,696 tons would amount to 8,150 acre-feet of deposited sediment or a soil loss of 0.01 inch from the basin. The relationship between streamflow and suspended-sediment yield rate for the Cedar River is shown in fig. 18.

Average streamflow for the 11 water years of suspended-sediment record at Cedar Rapids (1944-54) was 19% above the average for the 51 years of streamflow record (1903-54). Streamflow duration curves for both periods are given in fig. 19. The suspended-sediment load for the Cedar River at Cedar Rapids for the 11 year period was above average, as the streamflow for this period was above average.

Average particle-size distribution of the suspended-sediment samples analyzed is shown in fig. 8. The average particle size of the 3 samples obtained during the peak flow of June 1954 is 88% finer than 62 microns and 38% finer than 4 microns. Median particle size was 8.3 microns.

CARY-MANKATO DRIFT AREA

Sediment yield rate for the Cary-Mankato drift must be small. This drift is in an early stage of stream development with many bogs, swamps, ponds, and lakes. Most of the streams have young valleys. Only the lower courses of the secondary streams and the larger rivers have valleys formed by erosion, and these valleys are steep sided and narrow. The streams are youthful and drain only a comparatively small part of the area. Drainage of the area has been improved by the creation of drainage districts to lay tile drains, dig drainage ditches, and straighten and deepen the original streams. Slopes of the major rivers, except where they

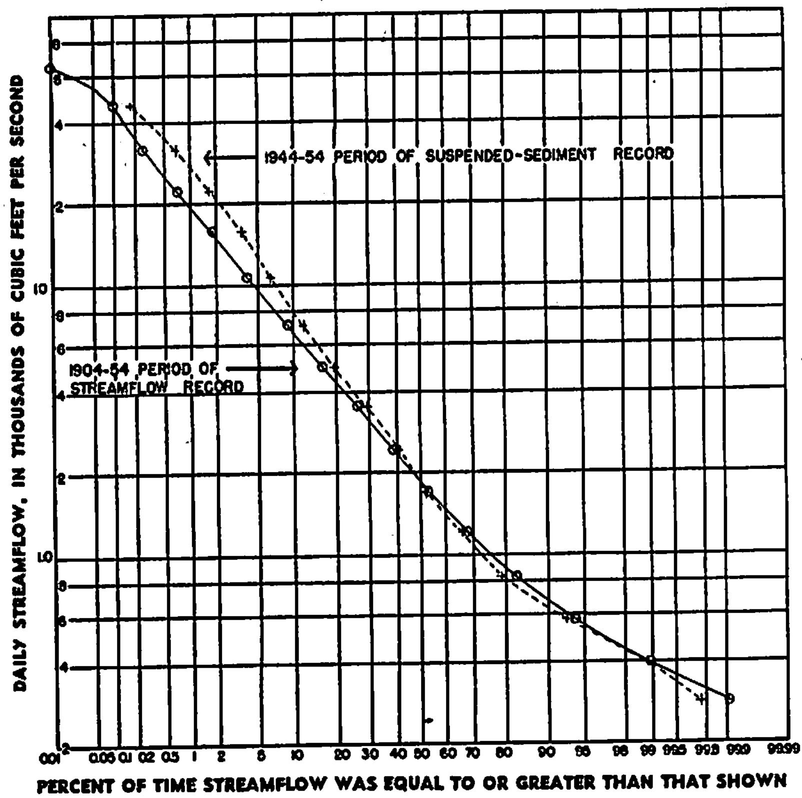


Figure 19. Streamflow duration curve for the Cedar River at Cedar Rapids.

flow through marginal and terminal moraines, are not steep and range from about 1.5 to 3.5 feet per mile. Tributaries to the main rivers are also at flat gradients. Contrary to most other areas in the State, gradient of the smaller streams will often be lower than that of the parent stream. Loess deposits on the Cary-Mankato drift are thin to nonexistent.

The major source of sediment in this area is probably limited to the vicinity of the larger tributaries and rivers and to the rougher regions of the lateral and terminal moraines.

There are suspended-sediment records available from three stations; two on the Des Moines River at Des Moines, and one on a small tributary to the Raccoon River near Churdan.

Des Moines River

The Des Moines River is the largest river in the State of Iowa. About one half of its total drainage area is in the Cary-Mankato drift. The Cary-Mankato area is above the city of Des Moines and includes the drainage area of the Raccoon River above its confluence with Middle Raccoon and South Raccoon Rivers. The remaining drainage area is in the loess covered Kansan drift of southeastern Iowa. Thickness of the loess on the Kansan drift varies from 3 to 5 feet over most of the area and from 5 to 20 feet in the area drained by the South Raccoon and Middle Raccoon Rivers. Topography of the upper half of the Des Moines River basin is youthful and is practically as the glacier left it; gently rolling with a large number of lakes, bogs, and sloughs, whereas, the topography of the lower area is more mature, the result of a long period of erosion, with uplands of various widths separated by valleys of considerable depth.

Average river slope of the Des Moines River is about 2.0 feet per mile. The slope is about 1.6 feet per mile from the confluence with the Mississippi River to Kalo, about 3.8 feet per mile from Kalo to Bradgate, and about 2.3 feet per mile above Bradgate. Tributaries in the Cary-Mankato drift area have flat slopes; the Boone and Raccoon Rivers have a slope of about 3.4 and 2.8 feet per mile respectively. On the average, tributaries in the Kansan drift area have a steeper slope; the slope of the South Raccoon River is about 6.8 feet per mile.

The two suspended-sediment stations on the Des Moines River were at Des Moines; one above the mouth of the Raccoon (Des Moines River at Des Moines), and the other below it (Des Moines River below Raccoon River at Des Moines). Unfortunately they were not operated concurrently and their period of record is short. Size analyses are not available for these two stations.

The sediment station on the Des Moines River at Des Moines, drainage area 6,180 square miles, was operated from April to September during 1948 and 1949. The maximum monthly suspended-sediment yield was 25.3 tons per square mile and the minimum was 0.21 ton per square mile during these periods. The low suspended-sediment yield rate for this highwater period of both years would indicate that the sediment yield rate is low for the Cary-Mankato drift.

The sediment station on the Des Moines River below the Raccoon River at Des Moines, drainage area 9,770 square miles, was operated from October 1944 to September 1947. This station was about 1 mile downstream from the confluence of the Des Moines and Raccoon Rivers. Mixing of the flow from the two rivers is incomplete which results in a variation of the sediment concentration in the cross-section. Although many measurements were made to determine this variation, its unpredictable nature precluded the possibility of a reliable suspended-sediment record.

The total suspended-sediment load for the 3 water years of record (1945-47) was 14,773,379 tons or 12,800 acre-feet and represents a soil loss of 0.02 inch from the entire drainage area.

Average annual suspended-sediment yield was 504 tons per square mile. The maximum monthly suspended-sediment yield for the periods April to September 1944 to 1947 was 338 tons per square mile and the minimum was 0.25 ton per square mile.

The major portion of the load at the Des Moines River below the Raccoon River station comes from the Raccoon River, as the records at the Des Moines River station show that the sediment yield rate of the Des Moines River above the Raccoon River is low. Other records in the State indicate that it is possible that the major portion of the sediment load in the Raccoon originates in the Kansan drift area of the South Raccoon and Middle Raccoon Rivers. The sediment yield rates for these two rivers would have to be extremely high if they are to account for the high yield recorded below the Raccoon River at Des Moines. Additional stations are needed in this area to delineate the sediment problem areas.

East Fork Hardin Creek

East Fork Hardin Creek, a small tributary to the Raccoon River near Churdan, is in the Cary-Mankato drift. The drainage area above the station is 22.7 square miles and its topography is gently undulating to flat. The channel was straightened in 1917.

The suspended-sediment station was established in July 1952. Suspended-sediment load from July 1952 to September 1954 was 1718.2 tons, which is equal to 1.4 acre-feet or a soil loss of 0.0008 of an inch from the basin.

Average annual suspended-sediment yield was 37 tons per square mile. This rate is very low in comparison with the other small area stations located in geologically different areas of the State (table 9).

There has been no flow past the station for about 6 months in the winter since the station was established, which would lower the average annual sediment yield. However, the period of record also includes flows of flood proportions. Maximum daily concentration for the period of record was only 668 ppm or 0.07%. Records for this station indicate that erosion in the flat area of the Cary-Mankato drift is low.

SUMMARY

The observed chemical quality of the water in the rivers of Iowa shows a general similarity. These streams such as the Iowa and Cedar Rivers that have adjacent drainage areas demonstrate similar characteristics and have similar chemical constituents in solution even though surface geology is different. Perhaps the greatest single difference in the comparison of the river waters is in the sulfate content, which is markedly greater in the surface waters of the Des Moines River than in the Iowa and Cedar Rivers. This difference is attributed to the gypsum beds in the Des Moines River basin. Most of the rivers in Iowa have chemical-quality characteristics that are typical of other subhumid regions in the United States in that the surface waters are high in carbonate but low in dissolved solids, particularly sodium and chloride.

Although sufficiently long-term chemical-quality records are available on only a few rivers in Iowa, these, along with intermediate records, indicate that, except for chloride and nitrate, there has not been any large change in the various dissolved constituents in the rivers over a period of 48 years. These two constituents have increased considerably in places and are usually regarded as indicators of pollution. This increase in chloride and nitrate is the result of the extensive growth of industry, the expansion of urban population, and perhaps even the intensive use of commercial fertilizers. There are insufficient data at this time to determine whether these two constituents are reaching alarming proportions.

Available data indicate that water temperatures of the larger streams in Iowa do not have large daily fluctuations. This is true only for the deeper streams as water temperature in shallow streams will fluctuate greatly with daily air temperature. The mean monthly water temperatures for the Iowa and Cedar Rivers were generally within a few degrees of the mean monthly air temperature when the air temperature was above freezing. This is probably true for the other larger streams in the State.

The State of Iowa is divided into different geologic areas, and each area appears to have the same general pattern of sediment yield. These areas are not well defined and the magnitude of the sediment problem in some areas can only be inferred as the total station years of record is small. One fact appears to stand out above all others; the sediment problem is closely related to the thickness of the loess deposits. The reasons for this are many, some of which are: the fine-grained composition of the loess which makes it easily eroded; its fertility which does not diminish with depth, thereby encouraging cultivation on steep slopes, and slow adoption of soil conservation measures; and the rougher terrain of the Kansan drift on which most of the loess is deposited.

The geologic areas, arranged in approximate order of their sediment problem as indicated by this study, are: (1) the Missouri River loess area of the Kansan drift in western Iowa, (2) Kansan drift of south central and eastern Iowa, (3) "Driftless Area" of northeastern Iowa, (4) Iowan drift with the sediment yield rate probably greater in the western section, and (5) the Cary-Mankato drift. The average annual suspended-sediment yield of these areas varied from 7,434 tons per square mile for the area between the two sediment stations on the Little Sioux River in the Missouri River loess area, to 37 tons per square mile for East Fork Hardin Creek in the Cary-Mankato drift area.

Most of the suspended sediment transported by the streams of Iowa is fine material. The suspended sediment of the Cedar River is the coarsest of the size analyses available with 12% in the sand range. Median particle diameter varies from less than 2 microns (coarse clay) for Davids Creek near Hamlin to 15 microns (fine silt) for Little Sioux River near Kennebec. Suspended sediment in the streams with smaller drainage areas is finer than that from the larger more complex rivers. Whether there is any correlation between sediment size and drainage area in Iowa cannot be determined at this time.

Low channel slopes and small particle size indicate that for most of the streams in Iowa bed load would be a small fraction of the total load. The "Driftless Area" of northeastern Iowa might be an exception as the channel slopes are relatively high.

From the data available on measured specific weight of deposited sediment and the calculated specific weight for the Little Sioux River, it appears that a value of 55 pounds per cubic foot would be a reasonable figure to use for sediments deposited for a short period of time and completely submerged. The specific weight could be increased if the deposits were subject to aeration and to compaction by layers of overburden over a long period of time.

GLOSSARY

Acre-feet: the quantity of water required to cover an acre of surface to a depth of one foot. The term is commonly used in connection with storage of water for irrigation or power; in this bulletin it is used to indicate depletion of storage by fluvial sediment. It is equivalent to 43,560 cubic feet.

Bed load: the sediment that is rolled or moved along the bed, essentially in continuous contact with the streambed; includes sediment that moves in short skips or leaps.

Cubic feet per second, cfs: rate of streamflow; one cfs is the rate of flow in a channel having a cross-sectional area of one square foot with an average velocity of one foot per second. One cfs flowing for a day (24 hours) equals 86,400 cubic feet, 1.983 acre-feet or 646,317 gallons. See streamflow.

Cubic feet per second per square mile, cfsm: 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 as regards both to time and area.

Depth-integrated sample: a sediment sample that is accumulated continuously in a sampler that moves vertically at a constant transit rate and admits sediment-water mixture at a velocity about equal to the stream velocity at every point. Because depth-integrated sediment samplers are not designed to collect water-sediment mixture within about 0.3 feet of the streambed, the suspended sediment load based on such samples is less than the total suspended sediment discharge. However, for deep rivers or sediment in silt and clay sizes the difference is usually negligible.

Dispersion medium: distilled water with a dispersion agent added. Used to obtain absolute sedimentation diameters.

Drainage area: area of land surface drained by a stream and its tributaries above some designated point on the stream.

Fall velocity: the terminal velocity at which particles would fall through a fluid under their own weight. Depends primarily upon size, shape and specific gravity of the body and viscosity of the fluid.

Flocculation: the gathering together of the sediment particles into clusters or flocks whereby they fall with a velocity of a larger particle.

Fluvial sediment: sediment that is transported by, suspended in, or deposited by water.

Interstitial water: water in the pores of the deposited sediment.

Median or median diameter: the mid-point in the size distribution of a sediment of which one-half of the weight is composed of particles larger in diameter than the median and one half of smaller diameter. (Twenhofel and Tyler, 1941, p. 110).

Native water: water in the water-sediment mixture collected by the sediment sampler. Contains all the principal mineral constituents in solution at that point in river at time sample was taken.

Parts per million, ppm: the number of parts by weight of a substance in a million parts by weight of water.

Sediment: fragmental material that originates from weathering of rocks and is transported by, suspended in, or deposited by water or air or is accumulated in beds by other natural agencies.

Sedimentation diameter: diameter of a hypothetical sphere with the specific gravity of quartz (2.65) that in the same fluid would have the same terminal fall velocity as the particle.

Sediment concentration: the ratio of dry weight of sediment to total weight of the water-sediment mixture, usually expressed in parts per million.

Sediment yield rate: The average number of tons yielded from each square mile of area drained, on the assumption that erosion from the drainage area drained is uniform in areal extent and time. Expressed as tons per day per square mile, monthly tons per square mile, or annual tons per square mile.

Sediment sample: a quantity of water-sediment mixture that is collected to represent the average concentration of suspended sediment, or the average size distribution of suspended sediment.

Slope, gradient: rate of decrease in elevation of the river as it flows from one point to another. Determines the energy of the stream to erode or transport sediment.

Specific weight: dry weight of solids per unit volume either of soil or sediment deposits.

Streamflow—water discharge: rate of flow of water in the stream, usually expressed in cubic feet per second (cfs). The volume of flow is often expressed in cfs-days. One cfs-day is the volume of water represented by a flow of a cubic feet of water per second for 24 hours. See cubic feet per second.

Suspended sediment: sediment that moves in suspension in water and is maintained in suspension by the upward components of turbulent currents or by colloidal suspension.

Suspended sediment load or discharge: dry weight of sediment transported past a section of a stream in a given time. Computed from samples collected with depth-integrated sampler and usually expressed in tons per day. For additional information see depth-integrated sampler.

Total load: The total amount of sediment that is transported or deposited by water in a given length of time. The sum of the bed load and suspended-sediment load.

Water year: a period of 12 months beginning October 1 and ending September 30, the following year, and bearing the same yearly designation as the month of September.

Weighted mean concentration: the approximate sediment concentration of a water mass if all the water passing a point on the stream during a given time were mixed.

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Report 1 Field practice and equipment used in sampling suspended sediment.

Report 2 Equipment used for sampling bed load and bed material.

Report 3 Analytical study of methods of sampling suspended sediment.

Report 4 Methods of analyzing sediment samples.

Report 5 Laboratory investigation of suspended sediment samplers.

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UPPER MISSISSIPPI RIVER BASIN

Paint Creek at Waterville, Iowa

LOCATION.—At gaging station, on downstream side of bridge on State Highway 373, and 0.5 mile northwest of Waterville, Allamakee County.

DRAINAGE AREA.—42.7 square miles.

RECORDS AVAILABLE.—Water temperatures: November 1952 to September 1954.

Sediment records: November 1952 to September 1954.

EXTREMES, water years 1953, 1954 given in following table:

Water year	Daily suspended sediment								Temperature*	
	Concentrations (ppm)				Loads (tons)				°Fahrenheit	
	Max.	Date	Min.	Date	Max.	Date	Min.	Date	Max.	Date
1952-53(a)	6,700	July 26	....	....	23,000	July 26	(b)	....	72	May 10
1953-54...	9,290	April 15	....	....	7,470	April 15	(b)	....	69	Oct. 5, 8

* Minimum temperature, freezing point on several days during winter months.
a November to September.
b Minimum daily load less than 1.0 ton on many days during year.

EXTREMES, 1952-54.—Water temperatures: Maximum, 72°F May 10, 1953; minimum, freezing point on several days during winter months.

Sediment concentrations: Maximum daily, 9,290 ppm Apr. 15, 1954; minimum daily, not determined.

Sediment loads: Maximum daily, 23,000 tons July 26, 1953; minimum daily, less than 1.0 ton on many days each year.

Paint Creek at Waterville, Iowa—Continued

Temperature (°F) of water, November 1952 to September 1953

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	......	......	......	......	......	......	38	46	65	69	66	......
2	......	......	......	35	......	33	......	43	61	67	58	64
3	......	......	......	......	33	......	34	45	59	69	54	65
4	......	......	37	......	......	33	......	48	69	67	55	63
5	......	......	......	......	......	......	......	59	67	69	56	62
6	......	......	......	32	34	32	......	59	67	70	57	63
7	......	......	37	......	......	......	......	60	66	70	56	62
8	......	......	......	......	......	......	......	68	68	68	57	61
9	......	......	......	33	......	40	40	70	67	69	56	61
10	......	......	......	......	35	38	38	72	67	70	58	61
11	......	......	......	......	......	32	34	57	67	71	57	62
12	......	......	......	......	......	32	33	68	60	69	57	57
13	......	......	......	36	33	32	33	54	66	70	57	56
14	......	......	32	......	......	......	33	54	66	68	56	56
15	......	42	......	......	......	......	42	59	......	70	56	54
16	......	42	......	32	......	32	39	60	69	67	57	53
17	......	44	......	......	33	......	35	59	70	66	58	51
18	......	49	38	......	......	35	36	52	70	68	58	......
19	......	42	......	......	......	......	36	......	......	66	59	......
20	......	39	......	......	38	......	38	57	......	68	59	......
21	......	38	......	......	......	......	39	52	67	65	60	......
22	......	......	......	......	......	......	40	51	......	67	60	......
23	......	......	......	38	35	35	43	56	65	68	60	......
24	......	......	38	......	33	......	43	48	......	......	61	50
25	......	......	......	......	......	......	46	49	60	69	60	......
26	......	39	......	......	34	......	38	59	68	61	62	......
27	......	......	......	36	36	......	40	61	59	63	62	......
28	......	......	......	......	36	......	48	58	60	64	63	49
29	......	......	......	......	......	......	46	61	65	64	63	......
30	......	32	......	33	......	36	48	......	68	65	63	......
31	......	......	......	......	......	36	......	68	......	63	64	......
Average	......	......	......	......	......	......	39	57	66	67	59	......

Temperature (°F) of water, water year October 1953 to September 1954

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	......	......	......	46	37	33	34	53	48	62	60	62
2	......	......	......	......	......	......	36	52	51	62	59	63
3	......	56	54	......	......	......	36	48	51	58	59	63
4	......	......	52	36	30	......	......	50	48	59	58	63
5	69	......	51	......	......	......	43	......	49	60	58	63
6	......	57	......	......	......	......	38	......	50	59	58	......
7	......	......	50	......	......	......	37	......	50	60	59	63
8	69	......	49	32	35	38	36	52	52	60	......	62
9	......	56	50	......	36	......	37	52	55	61	59	61
10	......	......	......	......	35	38	45	53	51	62	57	58
11	......	......	46	......	33	......	40	54	56	63	56	59
12	......	51	......	33	......	34	38	54	56	62	......	......
13	68	......	......	......	32	......	50	55	58	62	58	59
14	......	......	......	......	34	......	52	......	58	63	57	56
15	......	......	44	......	32	34	50	57	58	63	62	57
16	67	50	......	......	32	33	43	57	57	63	63	59
17	......	......	......	......	32	34	45	56	59	62	......	59
18	......	......	47	33	33	42	49	56	59	63	61	59
19	65	46	......	......	33	40	48	56	57	65	60	57
20	......	......	......	......	34	36	49	56	54	64	61	59
21	......	......	......	32	32	39	46	56	52	61	63	58
22	......	......	34	......	32	36	43	55	55	62	64	58
23	66	58	......	......	32	40	57	55	......	62	65	......
24	......	......	......	......	32	41	54	55	60	64	60	57
25	......	......	36	32	33	37	54	55	60	63	60	......
26	......	......	......	......	32	34	53	56	61	64	59	56
27	61	52	......	......	33	38	56	......	60	64	60	......
28	......	......	48	33	33	......	55	51	61	62	61	56
29	......	......	......	......	......	38	53	51	62	62	62	55
30	58	56	......	......	......	33	55	52	62	63	62	55
31	......	......	......	......	......	34	......	......	......	58	62	......
Average	......	......	......	......	......	......	46	54	56	62	60	59

Paint Creek at Waterville, Iowa—Continued

Suspended sediment, November 1952 to September 1953

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	....	....	....	....	....	....	9.8	....	
2	....	....	....	....	....	....	9.8	....	
3	....	....	....	....	....	....	9.8	....	
4	....	....	....	....	....	....	11	35	
5	....	....	....	....	....	....	10	....	
6	....	....	....	....	....	....	10	....	e0.9
7	....	....	....	....	....	....	9.8	31	
8	....	....	....	....	....	....	10	....	
9	....	....	....	....	....	....	10	....	
10	....	....	....	....	....	....	10	....	
11	....	....	....	....	....	....	10	....	
12	....	....	....	....	....	....	9.8	....	
13	....	....	....	....	....	....	9.8	....	
14	....	....	....	9.8			9.8	26	
15	....	....	....	9.8	50	1.6	9.2	....	
16	....	....	....	10			9.2	....	e.7
17	....	....	....	13			9.2	....	
18	....	....	....	13			9.2	25	
19	....	....	....	9.8			9.8	....	
20	....	....	....	9.8	38	1.1	10	....	
21	....	....	....	9.8			9.8	....	
22	....	....	....	9.8	....		9.8	....	
23	....	....	....	9.8	....		9.8	....	
24	....	....	....	9.8	....		9.2	35	
25	....	....	....	9.2	....	e1.0	9.2	....	
26	....	....	....	8.0	89		9.8	....	e.9
27	....	....	....	9.3	....		9.2	....	
28	....	....	....	9.7	....		9.2	....	
29	....	....	....	9.8	....		9.2	....	
30	....	....	....	9.8	34		9.2	....	
31	....	....	....	....	....	....	9.2	....	

Day	January			February			March		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1	9.2	....		7.4	....		11	....	
2	9.2	38		7.4	....		9.8	23	
3	9.2	....		7.4	11		9.8	....	
4	9.2	....		7.4	....		9.2	18	
5	8.6	....		8.0	....	e0.3	9.2	....	e0.6
6	8.6	30		8.6	11		8.6	32	
7	8.6	....		8.0	....		8.0	....	
8	8.6	....		8.0	....		8.0	....	
9	8.9	33		7.4	....		14	55	s2.3
10	9.2	....	e0.8	8.0	17		141	1,010	s947
11	8.6	....		9.2	....		164	874	s642
12	8.6	....		8.6	....		179	906	s625
13	8.6	24		8.6	31		86	710	s210
14	8.6	....		8.0	....		83	660	sa200
15	11	....		8.0	....	e.6	77	500	a105
16	9.0	34		7.4	....		35	170	16
17	8.8	....		7.4	24		56	490	sa100
18	8.6	....		7.4	....		40	260	28
19	8.4	....		8.0	....		29	180	a14
20	8.2	6		44	186	s30	23	....	
21	8.0	....		15			23	....	e10
22	7.8	....		13			23	....	
23	7.6	11		13			39	360	sb40
24	7.5	....		13			26	70	a4.9
25	7.5	....	e.3	11	26	.9	22	....	
26	7.4	....		11			19	....	
27	7.4	28		14			18	....	e2.0
28	7.4	....		15			17	....	
29	7.4	....		....	....	....	16	....	
30	7.4	11		....	....	....	16	36	
31	7.4	....		....	....	....	18	37	

e Estimated.
s Computed by subdividing day.
a Computed from an estimated concentration graph.
b Computed from a partly estimated concentration graph.

Note—Flow affected by ice Nov. 25-28, Jan. 16-25, and Feb. 21. No gage-height record June 27 to July 22.

Paint Creek at Waterville, Iowa—Continued

Suspended sediment, November 1952 to September 1953—Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	18	60	2.9	24			18		
2	18	....	e3.0	23	50	3.1	18		
3	24	90	5.8	23			18		
4	21	....	e5.0	23			17		
5	19	....		22			17		
6	18	....	e2.0	21			18	147	7.0
7	18	....		21	39	2.2	18		
8	18	....		20			18		
9	20	48	2.6	19			18		
10	37	297	30	21	42	s2.6	18		
11	27	132	9.6	20	146	7.9	18		
12	24	90	5.8	18	86	4.2	18		
13	22	88	5.2	17	65	3.0	17		
14	21	73	4.1	18			50	3,770	s988
15	30	150	12	17			23	920	57
16	28	180	14	16	49	2.3	20	320	a17
17	25	116	7.8	16			18	282	14
18	24	117	7.6	17			16	242	10
19	23	72	4.5	17			15	173	
20	21			17			15	....	
21	20	62	3.3	20	....	....	15	....	
22	19			25	84	5.7	14	172	e6.0
23	18			19	99	5.1	13	....	
24	20			51	3,280	s878	12	153	
25	26	70	4.9	31	2,010	s207	12	....	
26	21	64	3.6	24	286	19	13	390	14
27	20			23			17	220	10
28	20	42	2.3	20			13	185	6.5
29	20			20	183	9.9	30	....	e25
30	21			19			19	94	4.8
31	....	....	....	18			15	104	4.2

Day	July			August			September		
1	14			25	84	5.7	15		
2	13	123	4.3	141	1,900	sb1,100	15		
3	12			117	1,130	s410	14		
4	12			80	356	77	15		
5	15	....	e10	55	186	28	15	22	0.9
6	17	....	e12	49	138	18	15		
7	13			42	200	23	15		
8	12			37	119	12	15		
9	12			36	67	6.5	15		
10	11	27	.9	32			15		
11	11			30	66	5.3	14		
12	12			30			14		
13	14			27			14	29	1.1
14	13	46	1.6	26			14		
15	11	137	4.1	25			14		
16	11	100	3.0	25	52	3.5	14		
17	40	....	e60	23			13		
18	15	....	e12	23			13	....	
19	12			21			13	....	
20	12	84	2.9	21			13	....	
21	15			20	29	1.6	13	....	
22	13			19			13	....	
23	10			19			13	....	
24	10	73	2.0	18			13	41	e1.0
25	10			18			13	....	
26	858	6,700	sb23,000	17			14	....	
27	57	800	123	17			13	....	
28	36	170	17	16	43	1.9	13	40	
29	30	102	8.3	16			13	....	
30	26	72	5.1	16			13	....	
31	27	89	6.5	16			....	....	....

e Estimated.
s Computed by subdividing day.
a Computed from an estimated concentration graph.
b Computed from a partly estimated concentration graph.

Paint Creek at Waterville, Iowa—Continued

Suspended sediment, water year October 1953 to September 1954

Day	October: Mean discharge (cfs)	October: Suspended sediment, Mean concentration (ppm)	October: Suspended sediment, Tons per day	November: Mean discharge (cfs)	November: Suspended sediment, Mean concentration (ppm)	November: Suspended sediment, Tons per day	December: Mean discharge (cfs)	December: Suspended sediment, Mean concentration (ppm)	December: Suspended sediment, Tons per day
1	13	...		19	...		18	...	
2	13	...		20	...		18	...	
3	13	...	e2.0	18	14		22	105	e4.0
4	13	...		18	...	e0.7	27	87	
5	12	45		18	...		21	47	
6	11	...		18	14		22	...	
7	11	...		18	...		20		
8	11	45		19	...		19		
9	12	...		18	34		19		
10	12	...	e1.3	19	...	e1.7	18	42	1.8
11	12	...		19	...		15		
12	11	...		19	34		10		
13	11	45		18	...		9.8		
14	10	...		19	...		9.8	...	
15	11	...		19	...		9.0	42	
16	10	37		20	59		8.0	...	
17	11	...		19	...		5.2	...	
18	12	...		18	...		5.0	42	e.8
19	13	37		21	59		5.2	...	
20	13	...		26	...		8.0	...	
21	14	...		23	...		8.2	...	
22	14	...		19	...		8.4	42	
23	16	29	e1.0	18	59	e3.0	8.6	...	
24	17	...		18	...		8.6	...	
25	18	...		18	...		8.6	32	
26	18	...		17	...		8.6	...	
27	18	20		18	56		8.6	...	e.7
28	18	...		18	...		8.6	32	
29	18	...		18	...		8.6	...	
30	19	19		18	56		8.6	...	
31	20	...		...	...	...	8.6	...	

Day	January: Mean discharge (cfs)	January: Mean concentration (ppm)	January: Tons per day	February: Mean discharge (cfs)	February: Mean concentration (ppm)	February: Tons per day	March: Mean discharge (cfs)	March: Mean concentration (ppm)	March: Tons per day
1	8.6	68		6.8	17		8.0	28	
2	8.6	...		6.8	...	e0.3	7.4	...	
3	8.6	...		6.8	...		6.2	...	
4	8.6	26		11	76	sb4.8	6.0	...	
5	8.6	...	e0.6	23.	55	a3.4	6.4	...	e0.5
6	8.6	...		18	...	e2.0	6.4	...	
7	8.6	...		9.8	...	e.7	6.8	...	
8	8.6	26		15	44	sb3.0	6.8	28	
9	8.0	...		39	127	s19	6.8	...	
10	7.0	...		35	182	17	6.8	21	
11	7.0	...		13	26	.9	6.8	...	
12	7.2	26		10	22	a.6	7.4	21	e.4
13	7.4	...		9.2	19	.5	7.4	...	
14	7.4	...	e.5	36	127	s27	7.4	...	
15	7.4	...		54	199	29	6.8	21	
16	7.4	...		20	90	4.9	10	28	s.9
17	6.8	...		9.8			13	55	1.9
18	6.8	20		9.8	25	.7	12	70	2.3
19	6.8	...		9.8			16	72	3.1
20	7.4	...		17	74	s4.9	9.2		
21	6.8	20	e.4	35	275	26	8.6		
22	6.8	...		12	102	3.3	8.6	40	.9
23	6.8	...		11			8.0		
24	6.8	...		9.8			8.8		
25	6.8	13		9.8	28	.7	55	1,140	s205
26	6.8	...		8.6			14	365	s15
27	6.8	...	e.2	8.6			10	155	4.2
28	6.8	13		8.0			9.8	110	a2.9
29	6.8	...		...	...	...	8.6	100	2.3
30	6.8	...		...	...	...	8.0	61	1.3
31	6.8	...		...	...	...	8.0	55	1.2

e Estimated. a Computed from an estimated concentration graph.
s Computed by subdividing day. b Computed from a partly estimated concentration graph.
Note.—Flow affected by ice Dec. 15-22, Jan. 10-12, Feb. 11, 12, Mar. 3, 4.

Paint Creek at Waterville, Iowa—Continued

Suspended sediment, water year October 1953 to September 1954—Continued

Day	April Mean discharge (cfs)	April Mean concentration (ppm)	April Tons per day	May Mean discharge (cfs)	May Mean concentration (ppm)	May Tons per day	June Mean discharge (cfs)	June Mean concentration (ppm)	June Tons per day
1	7.4			229	3,640	s4,280	18	116	s6.0
2	7.4	41	0.8	88	1,760	s476	12	110	3.6
3	6.8			55	690	s113	77	2,120	s579
4	6.8			40	144	16	23	375	23
5	8.3	73	s2.2	34	....	e10	17	120	5.5
6	29	921	72	27	....	e7.0	15		
7	30	1,360	112	24			15	94	3.9
8	13	845	s32	23	74	4.5	16		
9	9.8	260	6.9	21			15		
10	9.2	180	4.5	19			16	146	s6.8
11	8.6	155	3.6	17			13		
12	7.4	162	3.2	16	48	2.0	13		
13	6.8	132	2.4	15			13		
14	6.8	108	2.0	14			13	87	3.0
15	115	9,290	s7,470	13			12		
16	30	2,270	s227	12			13		
17	17	520	24	12			12		
18	13	295	10	11			13		
19	10	222	6.0	11			33	414	s63
20	9.2	165	4.1	10			129	4,560	s3,500
21	23	520	s40	9.8	26	.7	76	2,500	sb1,100
22	13	1,090	38	9.8			53	1,700	sb360
23	9.2	310	7.7	9.8			27	246	18
24	9.8	220	5.8	9.2			24	162	10
25	25	369	s30	9.2			22	130	7.7
26	17	1,130	52	9.2			18		
27	15	395	16	11			18		
28	12	210	6.8	20	310	sb18	18	111	5.2
29	11	155	4.6	12	27	.9	17		
30	139	1,840	s2,960	9.8	15	.4	16		
31	....	....	....	15	140	sa13	....	....	....

Day	July Mean discharge (cfs)	July Mean concentration (ppm)	July Tons per day	August Mean discharge (cfs)	August Mean concentration (ppm)	August Tons per day	September Mean discharge (cfs)	September Mean concentration (ppm)	September Tons per day
1	16	70	3.0	11			9.2		
2	56	2,220	s644	10			6.8		
3	28	900	68	9.0			7.4		
4	22	255	15	8.6			8.0		
5	16	148	6.4	8.6	48	1.2	8.6		
6	14			8.6			9.2	63	1.5
7	13			8.0			9.2		
8	13	149	5.3	8.0			9.2		
9	13			7.4			9.2		
10	13			7.4			9.8		
11	13			7.4			7.4		
12	13			7.4			6.8		
13	12			6.8	46	.9	8.6		
14	12			6.8			10	51	1.2
15	12	59	1.9	6.8			8.6		
16	12			6.8			8.0		
17	11			6.8			9.2		
18	11			25	335	s25	11		
19	11			8.6	196	4.6	11		
20	11			8.0			10		
21	11			8.0	62	1.3	10	61	1.7
22	11			8.0			10		
23	11			8.0			10		
24	11			17	345	s17	10		
25	11	69	2.1	30	600	sb61	10		
26	12			15	426	17	9.8		
27	11			11	124	3.7	8.6		
28	11			11			6.8	56	1.3
29	11			10	66	1.8	7.4		
30	11			10			9.8		
31	30	570	sb70	10			....	....	....

e Estimated.
s Computed by subdividing day.
a Computed from an estimated concentration graph.
b Computed from a partly estimated concentration graph.

Paint Creek at Waterville, Iowa—Continued

Monthly discharge for calendar and water years 1952 to 1954

Month	Water discharge (cfs-days)	Suspended sediment							
		Load (tons)	Daily loads (tons)			Tons per sq. mi.	Acre-feet (a)	Concentration (ppm)	
			Max.	Min.	Mean			Maximum daily	Weighted mean
Nov. 14-30, 1952	170.2	19.8	....	....	1.2	0.46	0.02	....	43
December	299.8	25.9	....	....	.8	.61	.02	....	32
January 1953	260.5	18.3	....	....	.0	.43	.02	....	26
February	299.2	54.6	39	....	20	1.28	.05	188	68
March	1,237.6	2.983.0	947	....	96	69.9	2.5	1,010	893
April	661	162.1	30	....	5.4	3.80	.1	297	91
May	660	1,223.8	878	....	39	28.7	1.0	3,280	687
June	549	1,270.5	988	4.2	43	29.9	1.1	3,770	861
July	1,374	23,303.7	23,000	....	752	545.7	19	6,700	6,280
August	1,057	1,730.6	1,100	....	56	40.7	1.5	1,900	610
September	416	30.1	....	....	1.0	.70	.03	....	27
October 1953	425	39.0	....	....	1.8	.91	.03	....	34
November	568	63.5	....	....	2.1	1.49	.05	....	41
December	383	50.1	....	....	1.6	1.17	.04	....	48
Calendar year 1953	7,890.3	30,944.3	23,000	....	84.8	724.7	26	6,700	1,450
January 1954	230.2	13.7	....	....	.4	.32	.01	....	22
February	462.6	154.2	29	....	5.5	3.61	.1	275	123
March	311.0	251.4	205	....	8.1	5.89	.2	1,140	209
April	625.5	11,146.0	7,470	....	372	261.0	9.3	9,290	6,600
May	815.8	4,968.2	4,280	....	160	116.4	4.1	3,640	2,260
June	777	5,748.2	3,500	....	192	134.6	4.8	4,580	2,740
July	463	872.9	644	....	28	20.4	.7	2,220	698
August	315.0	158.4	61	....	5.1	3.71	.1	600	186
September	269.6	43.5	....	....	1.4	1.02	.04	....	60
Water year 1953-54	5,645.7	23,509.1	7,470	....	64	550.6	20	9,290	1,540

a Computed using a specific weight of 55 pounds per cubic foot.

Paint Creek at Waterville, Iowa—Continued

Particle-size analyses of suspended sediment, March 1954

(Methods of analysis: B, bottom-withdrawal tube; P, pipette; S, sieve; N, in native waters; W, in distilled water; C, chemically dispersed; M, mechanically dispersed.)

Date	Time	Instantaneous discharge (cfs)	Water temperature (°F)	Suspended sediment											Methods of analysis
				Concentration (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters									
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	
Mar. 25, 1954....	11:00 a.m.....	74	39	2,560	5,230	....	55	....	93	....	100	....	....	....	SPWCM

Mississippi River near Moline, Ill.

LOCATION.—At waterworks intake for Moline, Rock Island County, downstream from gaging station at Le Claire, Iowa, and upstream from Rock River.

DRAINAGE AREA.—88,600 square miles.

RECORDS AVAILABLE.—Chemical analyses: February to July 1907.

EXTREMES, 1907.—Dissolved solids: Maximum, 241 ppm Feb. 1-9; minimum, 124 ppm Apr. 11-20.

Chemical analyses, in parts per million, February to July 1907

Date of collection	Mean gage height (feet)	Turbidity	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Total solids
Feb. 1-9, 1907	4.4	15	29	0.32	36	19	13	203	0.0	25	4.5	1.7	241
Feb. 10-18	3.2	20	19	.56	41	18	7.6	205	.0	29	4.5	1.7	219
Feb. 19-28	4.8	70	11	.20	33	13	11	158	.0	21	7.0	2.3	188
Mar. 1-10	5.3	65	15	....	30	13	15	144	.0	19	4.0	3.2	168
Mar. 11-20	5.3	60	18	.38	32	12	11	168	.0	15	3.8	3.0	185
Mar. 21-31	6.6	150	18	.39	32	8.4	18	151	.0	23	4.0	4.0	168
April 1-10	9.9	....	....	....	....	....	....	....	....	....	....	....	....
April 11-20	12.8	55	11	.24	20	10.0	11	91	.0	24	3.5	2.2	124
April 21-30	10.3	25	8.0	.23	24	11	7.1	118	.0	17	2.5	1.7	128
May 1-10	7.8	20	18	.24	26	8.2	8.7	123	.0	21	2.5	1.0	152
May 11-20	6.5	55	12	.8	27	9.8	11	131	.0	24	8.3	0.4	156
May 21-31	6.8	100	10	.50	27	12	5.9	116	.0	21	2.0	1.1	149
June 1-10	7.1	90	12	.34	31	13	11	....	.0	17	1.8	2.0	172
June 11-20	7.4	145	16	.31	37	16	7.7	155	.0	20	2.5	0.4	189
June 21-30	6.6	210	14	.65	42	15	6.8	161	.0	27	3.0	1.7	186
July 1-10	6.8	185	13	.31	40	14	8.1	166	.0	31	2.5	0.3	203
July 11-20	8.3	372	19	.42	41	15	8.6	173	.0	35	2.0	1.8	212
July 21-31	7.7	350	22	.32	41	16	10.0	171	.0	34	4.5	2.7	208
Mean	....	117	16	0.39	33	13	10	152	0.0	24	3.7	1.8	179

Iowa River above Coralville, Iowa

LOCATION.—At gaging station at Mahaffey Bridge on county road "Y", 3 miles northeast of North Liberty, Johnson County, and 6.5 miles north of Coralville.

DRAINAGE AREA.—3,035 square miles.

RECORDS AVAILABLE.—Sediment records: October 1943 to September 1947 (station not operated during winter months).

EXTREMES, water years 1944 to 1947 given in following table:

Water year	Daily suspended sediment							
	Concentrations (ppm)				Loads (tons)			
	Max.	Date	Min.	Date	Max.	Date	Min.	Date
1943-44(a).........	2,950	Aug. 6	14(b)	Nov. 25-29	106,000	May 22	22(b)	Nov. 29
1944-45(a).........	3,200	April 5	8(b)	Nov. 30	36,300	April 5	10(b)	Nov. 30
1945-46(a).........	5,450	Mar. 7	18(b)	Oct. 26	61,200	Mar. 7	19(b)	Oct. 26
1946-47(a).........	2,270	April 5	38(b)	Sept. 26	98,800	June 16	27(b)	Sept. 26

a Partial year.
b May have been lower during periods of no record.

EXTREMES, 1943-47.—Sediment concentrations: Maximum daily, 5,450 ppm Mar. 7, 1946; minimum daily, 8 ppm Nov. 30, 1944.

Sediment loads: Maximum daily, 106,000 tons May 22, 1944; minimum daily, 10 tons Nov. 30, 1944.

REMARKS.—Records of water discharge never published; available in District Office, U. S. Geological Survey, Iowa City, Iowa.

Iowa River above Coralville, Iowa—Continued

Suspended sediment, water year October 1943 to September 1944

Day	October			November			December		
		Suspended sediment			Suspended sediment			Suspended sediment	
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1	712	132	254	700	152	291	609	18	30
2	697	103	194	720	152	295	581	20	31
3	686	82	152	690	148	276	581	21	33
4	678	71	130	634	109	187	574	22	34
5	667	67	121	616	52	86	584	24	38
6	660	66	118	693	110	as213	682	58	107
7	660	67	119	1,050	555	1,570	820	116	257
8	652	68	120	1,070	448	1,290	807	233	504
9	634	68	116	950	555	1,440	911	188	462
10	560	69	104	840	285	651	887	112	268
11	578	71	111	794	190	s407	851	72	165
12	602	78	127	756	98	200	802	79	171
13	609	76	125	768	59	122	....	....	....
14	602	50	a81	773	48	100	....	....	....
15	581	37	a58	768	45	93	....	....	....
16	584	36	57	760	46	94	....	....	....
17	595	30	58	732	48	95	....	....	....
18	578	36	56	709	50	96	....	....	....
19	598	45	73	690	47	88	....	....	....
20	550	58	86	690	44	82	....	....	....
21	547	63	93	701	39	74	....	....	....
22	592	57	91	705	27	51	....	....	....
23	588	53	84	690	19	35	....	....	....
24	588	52	83	660	16	29	....	....	....
25	574	52	81	631	14	24	....	....	....
26	554	48	72	609	14	a23	....	....	....
27	554	36	54	616	14	23	....	....	....
28	550	33	49	602	14	23	....	....	....
29	550	53	79	592	14	a22	....	....	....
30	533	69	99	606	16	20	....	....	....
31	606	122	s208	....	....	....	....	....	....

Day	January			February			March		
1	....	....	....	....	....	....	1,480	525	2,100
2	....	....	....	....	....	....	1,320	465	1,660
3	....	....	....	....	....	....	1,230	365	1,210
4	....	....	....	....	....	....	1,340	350	1,270
5	....	....	....	....	....	....	1,410	450	1,710
6	....	....	....	....	....	....	1,370	435	1,610
7	....	....	....	....	....	....	1,150	350	a1,090
8	....	....	....	....	....	....	750	250	a503
9	....	....	....	....	....	....	700	150	a284
10	....	....	....	....	....	....	750	90	a182
11	....	....	....	....	....	....	1,200	275	891
12	....	....	....	....	....	....	2,290	955	5,900
13	....	....	....	....	....	....	2,650	2,110	15,100
14	....	....	....	....	....	....	3,660	2,760	27,300
15	....	....	....	....	....	....	4,080	1,870	20,600
16	....	....	....	....	....	....	4,100	1,880	20,800
17	....	....	....	....	....	....	4,300	1,950	22,600
18	....	....	....	....	....	....	4,510	1,400	17,000
19	....	....	....	....	....	....	4,650	1,000	12,600
20	....	....	....	....	....	....	4,680	860	10,900
21	....	....	....	....	....	....	3,970	830	8,900
22	....	....	....	....	....	....	3,140	825	6,990
23	....	....	....	....	....	....	3,150	830	7,060
24	....	....	....	....	....	....	3,190	1,240	s11,200
25	....	....	....	....	....	....	3,420	1,320	12,200
26	....	....	....	....	....	....	3,560	2,220	21,500
27	....	....	....	....	....	....	3,170	1,320	11,300
28	....	....	....	....	....	....	2,830	825	6,300
29	....	....	....	....	....	....	2,650	650	4,650
30	....	....	....	....	....	....	2,500	555	3,750
31	....	....	....	....	....	....	2,360	510	3,250

s Computed by subdividing day.
a Computed from an estimated concentration graph.

Iowa River above Coralville, Iowa—Continued

Suspended sediment, water year October 1943 to September 1944—Continued

Day	April			May			June		
		Suspended sediment			Suspended sediment			Suspended sediment	
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1.....	2,300	515	3,200	3,840	680	7,050	9,530	112	2,860
2.....	2,280	560	3,450	3,700	685	6,840	8,920	102	2,460
3.....	2,180	505	2,970	3,740	740	7,470	8,240	96	2,140
4.....	2,070	460	2,570	3,780	905	9,240	7,440	102	2,050
5.....	1,990	435	2,340	4,020	1,360	14,800	6,820	144	2,650
6.....	1,930	420	2,190	4,260	1,220	14,000	6,200	184	3,080
7.....	1,940	410	2,150	4,410	655	7,800	5,240	265	s3,840
8.....	1,990	420	2,260	4,600	490	6,090	4,010	405	s4,440
9.....	2,000	425	2,300	4,840	315	4,120	4,230	500	5,710
10.....	2,040	455	2,510	5,220	245	3,450	4,540	732	s9,100
11.....	2,280	665	4,090	5,720	195	3,010	4,790	610	7,890
12.....	2,580	820	5,710	5,960	175	2,820	5,170	600	8,360
13.....	3,250	1,820	16,000	5,660	240	3,670	5,350	398	5,750
14.....	3,670	2,040	20,200	5,060	355	4,850	6,600	315	s5,710
15.....	4,230	1,810	20,700	4,080	520	5,730	10,700	330	9,530
16.....	4,420	2,230	26,600	3,420	555	5,120	14,500	595	23,300
17.....	4,560	1,360	16,700	3,060	545	4,500	14,800	439	17,600
18.....	4,680	825	10,400	2,800	535	4,040	19,500	828	s45,800
19.....	4,580	775	9,580	3,200	1,180	s11,400	20,500	860	s48,700
20.....	4,380	865	10,200	9,160	2,800	s70,800	13,000	445	s16,100
21.....	4,190	805	9,110	12,800	1,590	s52,800	9,540	300	7,730
22.....	4,450	910	10,900	23,000	1,710	106,000	9,570	489	12,600
23.....	5,250	1,250	s18,000	29,700	1,200	a96,200	8,920	372	s9,260
24.....	5,280	915	13,000	28,600	940	72,600	7,610	245	5,030
25.....	5,050	680	s9,360	22,900	615	s38,400	7,760	330	s7,030
26.....	4,860	660	s8,690	18,700	365	18,400	7,340	355	s7,030
27.....	4,590	865	10,700	18,200	330	16,200	6,230	215	s3,700
28.....	4,450	705	8,470	16,200	310	s13,800	5,560	275	4,130
29.....	4,340	630	7,380	12,900	180	6,270	5,010	640	8,660
30.....	4,060	625	6,850	11,800	155	4,940	4,480	485	5,870
31.....	....	....	....	10,900	145	4,270	....	....	....
	July			**August**			**September**		
1.....	3,780	475	4,850	1,370	405	1,500	1,310	403	1,440
2.....	3,550	550	5,270	1,240	335	1,120	1,190	328	1,050
3.....	3,280	520	4,610	1,180	325	1,040	1,110	282	845
4.....	3,390	560	5,130	1,270	485	1,660	1,030	237	659
5.....	3,660	1,320	13,200	1,700	791	3,630	955	205	529
6.....	3,910	990	10,500	2,600	2,950	20,700	887	179	429
7.....	4,070	580	6,370	2,140	1,540	s8,740	833	148	333
8.....	3,840	545	5,650	1,950	1,300	6,840	789	142	302
9.....	3,140	530	4,490	1,560	785	3,310	752	132	268
10.....	2,820	520	3,960	1,360	432	1,590	720	123	236
11.....	2,560	510	3,530	1,240	350	1,170	744	121	243
12.....	2,740	1,140	8,430	1,140	273	840	756	125	255
13.....	2,800	1,040	7,860	1,060	257	736	744	133	267
14.....	2,890	1,150	8,070	970	235	615	720	135	262
15.....	2,700	1,750	12,800	906	172	421	705	127	242
16.....	2,290	1,230	7,610	860	122	283	686	112	207
17.....	2,110	600	3,420	930	394	989	671	87	158
18.....	1,960	518	2,740	897	268	649	652	79	139
19.....	2,310	2,300	s14,700	1,000	323	872	645	150	261
20.....	1,780	698	s3,410	940	402	1,020	690	216	402
21.....	1,610	410	1,780	833	428	963	828	319	713
22.....	1,550	350	1,460	785	290	615	740	324	647
23.....	1,430	330	1,270	760	199	408	678	231	423
24.....	1,520	496	s1,940	716	152	294	652	135	238
25.....	1,360	451	1,660	701	117	221	652	108	190
26.....	1,320	345	1,230	701	92	174	646	111	193
27.....	1,250	355	1,200	744	90	181	638	113	195
28.....	1,730	515	s2,500	842	148	336	631	102	174
29.....	2,430	1,220	8,000	1,090	342	1,010	616	80	133
30.....	1,920	1,140	s6,000	1,500	624	s2,570	613	81	134
31.....	1,560	630	2,650	1,470	650	s2,620	....	....	....

s Computed by subdividing day.
a Computed from an estimated concentration graph.

Iowa River above Coralville, Iowa—Continued

Suspended sediment, water year October 1944 to September 1945

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	631	95	162	460	73	90	250	17	11
2	645	114	199	456	85	105	240	21	14
3	660	186	331	507	118	162	300	14	11
4	660	152	271	481	74	98	350	13	12
5	709	348	666	475	37	47	430	13	15
6	656	184	326	504	34	46	425	13	15
7	627	139	235	494	37	49	460	13	16
8	609	129	212	491	44	58	420	19	22
9	592	92	147	491	49	65	...	...	...
10	592	75	120	488	45	59	...	...	...
11	581	82	129	472	39	50	...	...	...
12	554	80	120	453	39	48	...	...	...
13	547	86	127	447	50	60	...	...	...
14	533	100	144	456	63	78	...	...	...
15	527	103	147	463	53	66	...	...	...
16	514	91	126	453	35	43	...	...	...
17	510	87	120	478	25	32	...	...	...
18	504	80	109	475	21	27	...	...	...
19	494	88	117	463	20	25	...	...	...
20	488	107	141	453	19	23	...	...	...
21	488	111	146	438	17	20	...	...	...
22	488	92	121	432	15	17	...	...	...
23	475	72	92	426	13	a15	...	...	...
24	472	72	92	426	12	14	...	...	...
25	469	69	87	432	11	13	...	...	...
26	460	66	82	453	12	15	...	...	...
27	453	50	61	460	12	15	...	...	...
28	456	55	68	472	12	15	...	...	...
29	460	57	71	472	10	13	...	...	...
30	456	61	75	460	8	10	...	...	...
31	453	69	84	...	...	...	...	...	...

Day	January			February			March		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1	...	...	...	...	...	...	1,850	210	1,050
2	...	...	...	...	...	...	1,980	260	1,390
3	...	...	...	...	...	...	2,350	410	2,600
4	...	...	...	...	...	...	2,750	660	4,900
5	...	...	...	...	...	...	3,000	690	5,590
6	...	...	...	...	...	...	3,300	535	a4,770
7	...	...	...	...	...	...	3,600	420	4,080
8	...	...	...	...	...	...	3,850	440	4,570
9	...	...	...	...	...	...	3,650	460	4,530
10	...	...	...	...	...	...	3,350	1,020	9,230
11	...	...	...	...	...	...	3,220	1,070	9,300
12	...	...	...	...	...	...	3,340	1,300	11,700
13	...	...	...	...	...	...	3,420	1,360	12,600
14	...	...	...	...	...	...	3,530	1,320	12,600
15	...	...	...	...	...	...	3,710	1,220	12,200
16	...	...	...	...	...	...	3,980	1,170	12,600
17	...	...	...	...	...	...	4,200	1,350	15,300
18	...	...	...	...	...	...	4,400	1,120	13,300
19	...	...	...	...	...	...	4,630	830	10,400
20	...	...	...	...	...	...	4,900	580	7,670
21	...	...	...	...	...	...	5,860	385	6,090
22	...	...	...	...	...	...	7,980	270	5,820
23	...	...	...	...	...	...	8,160	167	3,680
24	...	...	...	...	...	...	7,360	138	2,740
25	...	...	...	...	...	...	7,720	800	16,700
26	...	...	...	...	...	...	7,900	390	8,320
27	...	...	...	...	...	...	6,370	450	7,740
28	...	...	...	...	...	...	5,350	630	9,100
29	...	...	...	...	...	...	5,010	476	6,440
30	...	...	...	...	...	...	5,000	330	4,460
31	...	...	...	...	...	...	5,180	260	3,640

a Computed from an estimated concentration graph.

Note.—Flow affected by ice Dec. 1-8, Mar. 1-10.

Iowa River above Coralville, Iowa—Continued

Suspended sediment, water year October 1944 to September 1945—Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	5,090	225	3,090	3,760	264	2,690	4,940	285	3,800
2	3,810	400	4,110	3,750	240	2,430	4,860	980	12,900
3	3,080	410	3,410	3,490	223	2,100	4,870	352	4,630
4	3,610	1,690	s17,000	3,140	215	1,820	4,660	710	8,930
5	4,200	3,200	36,300	2,870	214	1,660	4,370	490	5,780
6	3,980	1,060	11,400	2,670	212	1,530	4,370	340	4,010
7	3,870	850	8,880	2,520	202	1,370	4,570	242	2,990
8	3,940	570	6,060	2,430	200	1,310	4,830	168	2,190
9	3,630	480	4,700	2,300	192	1,190	5,340	165	2,380
10	3,320	485	4,350	2,190	168	993	6,120	1,130	21,800
11	3,260	460	4,050	2,150	153	888	7,350	450	8,930
12	3,280	440	3,900	2,080	162	910	7,550	465	9,480
13	3,410	490	4,510	2,020	160	873	7,980	275	5,920
14	3,960	1,730	18,500	2,810	1,030	s8,130	7,300	198	3,900
15	4,130	820	9,140	4,260	1,020	11,700	6,230	223	3,750
16	4,690	1,240	15,700	4,690	1,340	17,000	4,810	375	4,870
17	5,210	1,180	16,600	5,360	575	8,320	4,180	555	6,260
18	5,320	510	7,330	5,640	330	5,030	4,060	590	6,470
19	6,020	270	4,390	5,680	195	2,990	4,000	615	6,640
20	6,450	210	3,660	5,870	140	2,220	3,780	508	5,180
21	6,370	168	2,890	5,920	134	2,140	3,270	374	3,300
22	6,430	128	2,220	5,200	425	5,970	3,020	354	2,890
23	6,620	113	2,020	4,010	538	5,820	3,110	1,070	8,990
24	6,460	115	2,000	3,670	434	4,300	2,800	1,350	10,200
25	6,020	137	2,230	3,830	740	7,650	2,700	690	5,030
26	5,370	178	2,580	4,140	885	9,890	2,580	1,190	8,290
27	4,250	255	2,930	4,500	800	9,720	2,840	1,570	12,000
28	3,800	260	2,670	4,790	400	5,170	2,720	1,490	10,900
29	3,730	277	2,790	4,930	365	4,860	2,520	1,140	7,760
30	3,750	280	2,840	4,990	257	3,460	2,940	1,150	9,130
31	.....	.....	.....	4,990	268	3,610	.....	.....	.....
	July			August			September		
1	2,430	1,510	9,910	662	200	357	959	204	528
2	2,230	700	4,210	658	194	345	874	202	477
3	2,320	590	3,700	635	202	346	820	200	443
4	2,340	825	5,210	610	255	a420	781	200	422
5	2,130	1,090	6,270	653	300	529	724	198	387
6	1,980	480	2,570	653	220	388	676	176	321
7	1,860	395	1,980	635	190	326	635	150	257
8	1,760	362	1,720	612	174	288	616	170	283
9	1,680	380	1,720	593	162	259	598	128	207
10	1,560	395	1,660	575	155	241	598	124	200
11	1,430	320	1,240	561	145	220	580	107	168
12	1,490	520	s2,240	603	155	s259	552	88	131
13	1,440	440	s1,760	879	1,070	2,540	557	89	134
14	1,270	260	892	805	1,250	2,720	607	100	164
15	1,190	234	752	676	550	1,000	607	92	151
16	1,130	228	696	1,240	980	s3,710	521	78	110
17	1,090	214	630	2,180	2,330	13,700	495	82	110
18	1,050	206	584	2,440	1,520	10,000	460	86	107
19	1,010	205	559	2,280	875	5,390	447	73	88
20	979	211	558	2,410	800	5,210	435	54	63
21	985	220	a585	2,600	870	6,110	418	48	54
22	959	222	575	2,750	805	5,980	443	55	66
23	919	227	563	3,010	755	6,140	447	55	66
24	879	228	540	3,180	1,170	10,000	482	260	s346
25	854	223	514	2,790	675	5,080	435	86	101
26	805	220	a478	2,070	485	2,710	439	75	89
27	752	215	437	1,670	380	1,710	570	220	s378
28	728	203	399	1,390	308	1,160	805	410	891
29	709	213	408	1,230	262	870	854	405	934
30	700	199	376	1,130	234	714	989	610	1,630
31	681	196	360	1,030	212	590	.....	.....	.....

s Computed by subdividing day.
a Computed from an estimated concentration graph.

Iowa River above Coralville, Iowa—Continued

Suspended sediment, water year October 1945 to September 1946

Day	October			November			December		
		Suspended sediment			Suspended sediment			Suspended sediment	
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1	1,120	714	2,160	....	....	....	....	....	....
2	984	583	s1,550	....	....	....	....	....	....
3	844	433	s989	....	....	....	....	....	....
4	772	270	563	....	....	....	....	....	....
5	704	206	392	....	....	....	....	....	....
6	649	140	245	....	....	....	....	....	....
7	603	132	215	....	....	....	....	....	....
8	561	118	179	....	....	....	....	....	....
9	557	85	128	....	....	....	....	....	....
10	543	64	94	....	....	....	....	....	....
11	517	61	85	....	....	....	....	....	....
12	495	72	96	....	....	....	....	....	....
13	482	72	94	....	....	....	....	....	....
14	486	61	80	....	....	....	....	....	....
15	482	48	62	....	....	....	....	....	....
16	477	54	70	....	....	....	....	....	....
17	464	58	73	....	....	....	....	....	....
18	443	58	69	....	....	....	....	....	....
19	439	53	63	....	....	....	....	....	....
20	422	35	40	....	....	....	....	....	....
21	414	29	32	....	....	....	....	....	....
22	414	29	32	....	....	....	....	....	....
23	409	25	28	....	....	....	....	....	....
24	405	21	23	....	....	....	....	....	....
25	401	20	22	....	....	....	....	....	....
26	393	18	19	....	....	....	....	....	....
27	393	21	22	....	....	....	....	....	....
28	388	27	28	....	....	....	....	....	....
29	384	31	32	....	....	....	....	....	....
30	380	33	34	....	....	....	....	....	....
31	364	32	31	....	....	....	....	....	....

Day	January			February			March		
1	....	....	....	....	....	....	2,240	434	2,620
2	....	....	....	....	....	....	1,810	266	1,300
3	....	....	....	....	....	....	1,790	235	1,140
4	....	....	....	....	....	....	1,830	253	1,250
5	....	....	....	....	....	....	1,940	319	1,670
6	....	....	....	....	....	....	3,240	2,320	s21,700
7	....	....	....	....	....	....	4,190	5,450	s61,200
8	....	....	....	....	....	....	4,430	2,790	s33,300
9	....	....	....	....	....	....	4,430	1,860	22,200
10	....	....	....	....	....	....	4,180	1,190	13,400
11	....	....	....	....	....	....	4,200	950	10,800
12	....	....	....	....	....	....	4,270	780	8,990
13	....	....	....	....	....	....	4,300	1,090	12,700
14	....	....	....	....	....	....	4,610	2,560	s31,700
15	....	....	....	....	....	....	5,020	1,180	16,000
16	....	....	....	....	....	....	5,500	660	9,800
17	....	....	....	....	....	....	6,260	560	9,470
18	....	....	....	....	....	....	6,800	390	7,160
19	....	....	....	....	....	....	8,370	290	6,550
20	....	....	....	....	....	....	8,360	170	3,840
21	....	....	....	....	....	....	7,400	140	2,800
22	....	....	....	....	....	....	6,620	170	3,040
23	....	....	....	....	....	....	5,980	210	3,390
24	....	....	....	....	....	....	5,090	360	4,950
25	....	....	....	....	....	....	4,270	690	7,960
26	....	....	....	....	....	....	4,640	1,850	s24,200
27	....	....	....	....	....	....	5,280	2,510	s35,700
28	....	....	....	....	....	....	5,440	900	13,200
29	....	....	....	....	....	....	5,440	580	8,520
30	....	....	....	....	....	....	4,180	770	8,690
31	....	....	....	....	....	....	3,470	560	5,250

s Computed by subdividing day.

Iowa River above Coralville, Iowa—Continued

Suspended sediment, water year October 1945 to September 1946—Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	3,120	490	4,130	880	103	245	2,190	490	2,900
2	2,820	457	3,480	885	82	196	2,290	490	3,030
3	2,580	434	3,020	1,060	120	343	2,250	444	2,700
4	2,370	400	2,560	2,690	1,480	s13,000	2,090	388	2,190
5	2,170	335	1,960	4,060	2,490	s27,200	1,880	317	1,610
6	2,030	207	1,460	4,210	1,350	15,300	1,670	273	1,230
7	1,890	232	1,160	3,820	1,020	10,500	1,500	250	1,010
8	1,820	215	1,060	3,100	710	5,940	1,370	244	903
9	1,750	197	931	2,730	534	3,940	1,260	231	786
10	1,640	173	760	2,450	430	2,840	1,160	224	702
11	1,590	157	674	2,230	355	2,140	1,100	420	1,250
12	1,580	134	572	2,080	294	1,650	1,470	1,840	s8,350
13	1,580	130	555	1,910	272	1,400	1,590	1,300	5,580
14	1,560	155	653	1,770	245	1,170	1,470	2,600	10,300
15	1,510	159	648	1,690	230	1,050	1,260	1,490	5,070
16	1,440	143	556	1,620	232	1,010	1,300	870	3,050
17	1,370	129	477	1,580	252	1,080	1,850	3,160	s16,800
18	1,310	137	485	1,570	210	890	2,580	2,430	16,900
19	1,250	128	432	1,590	215	923	3,470	2,920	29,600
20	1,200	127	411	1,630	225	990	4,440	3,930	47,100
21	1,150	127	394	1,660	299	1,360	4,460	3,700	44,800
22	1,100	130	386	1,620	280	1,220	4,580	1,860	23,000
23	1,100	136	404	1,550	237	1,010	4,480	1,090	13,200
24	1,100	142	422	1,770	339	1,020	4,130	880	9,810
25	1,080	149	434	2,430	1,750	11,500	3,700	1,610	16,100
26	1,040	123	345	2,290	1,340	8,290	3,270	1,010	8,920
27	995	109	293	2,330	892	5,610	3,080	1,620	13,500
28	950	90	231	2,040	1,660	s9,180	2,700	1,300	9,480
29	915	92	227	1,880	680	3,450	2,500	1,610	10,900
30	900	101	245	1,800	482	2,360	2,940	2,710	s21,700
31	....	....	....	2,000	448	2,420	....	....	....

Day	July			August			September		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1	3,460	2,350	22,000	1,370	1,270	4,700	462	147	183
2	3,730	3,680	37,100	1,500	1,030	4,170	438	153	a181
3	3,280	3,470	30,700	1,230	535	1,780	415	133	140
4	2,450	1,890	12,500	1,060	425	1,220	400	125	135
5	2,040	860	4,740	925	333	832	377	118	120
6	1,810	569	2,780	845	257	586	368	130	129
7	1,640	458	2,030	796	247	531	430	575	a668
8	1,540	412	1,710	757	231	472	945	1,990	5,080
9	1,520	424	1,740	733	224	443	1,100	1,300	3,860
10	1,400	443	1,670	708	215	411	2,120	2,160	12,400
11	1,350	480	1,750	640	196	343	2,190	1,610	9,520
12	1,560	1,170	s5,040	601	157	255	2,080	1,160	6,510
13	1,390	1,480	5,550	577	131	204	2,190	1,100	6,500
14	1,160	1,020	3,190	586	135	214	1,890	990	5,050
15	1,060	500	1,430	577	142	221	1,550	600	2,510
16	990	346	925	567	257	s511	1,370	410	1,520
17	1,000	319	861	1,350	1,850	s10,300	1,220	337	1,110
18	955	300	774	945	1,060	2,700	1,060	295	860
19	900	299	727	1,020	1,170	3,220	965	240	625
20	860	280	650	772	850	1,770	970	242	634
21	821	263	583	684	350	646	930	203	510
22	845	289	659	635	234	401	985	200	532
23	915	321	793	586	184	291	2,190	1,280	s8,560
24	885	347	a829	533	148	213	3,900	2,550	26,900
25	830	330	745	572	150	232	4,260	1,100	12,700
26	791	277	592	601	345	s563	3,670	630	6,240
27	777	233	a489	644	315	548	2,150	510	2,960
28	757	202	413	635	262	449	1,780	442	s2,150
29	767	209	483	586	203	321	1,750	385	1,830
30	816	418	921	533	147	212	1,470	619	2,460
31	1,530	1,430	s5,860	505	118	161	....	....	....

s Computed by subdividing day.
a Computed from an estimated concentration graph.

Iowa River above Coralville, Iowa—Continued

Suspended sediment, water year October 1946 to September 1947

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	2,340	442	2,790	4,020	602	6,530	5,530	626	s9,450
2	2,250	380	2,310	3,880	651	6,820	6,550	524	9,270
3	2,150	328	1,900	3,690	789	7,860	7,820	483	10,200
4	2,560	773	s5,570	3,370	521	4,740	16,300	640	28,200
5	5,670	2,270	s35,900	3,040	430	3,530	16,900	376	17,200
6	6,360	1,840	31,600	2,790	368	2,770	18,300	437	s22,700
7	6,030	1,030	16,800	2,610	332	2,340	26,200	786	s55,500
8	5,830	595	9,370	2,450	319	2,110	25,000	680	45,900
9	5,570	660	9,930	2,330	300	1,890	20,500	422	23,400
10	5,380	1,440	s21,400	2,170	265	1,550	16,100	300	13,000
11	5,700	1,440	22,200	2,090	245	1,380	12,300	163	5,410
12	5,750	825	12,800	1,970	217	1,150	10,200	153	4,210
13	6,570	510	9,050	1,920	192	a995	10,600	385	s11,100
14	7,410	337	6,740	1,870	192	969	11,100	346	10,400
15	7,610	241	4,950	1,880	219	1,110	21,400	1,010	s61,000
16	7,230	184	3,590	1,910	211	a1,090	32,100	1,140	s98,800
17	7,150	172	3,320	1,990	228	1,220	30,400	907	74,400
18	7,120	155	2,980	2,260	335	2,040	24,000	620	40,200
19	7,260	158	3,100	2,380	509	3,270	17,700	348	16,600
20	8,420	329	7,480	2,370	377	2,410	14,000	220	8,320
21	7,750	232	4,850	2,330	384	2,420	13,000	202	7,090
22	7,540	164	3,340	2,230	374	2,250	14,000	260	9,830
23	7,570	131	2,680	2,160	320	1,870	16,300	353	15,500
24	6,860	142	2,630	2,090	280	1,580	16,000	270	11,700
25	5,990	240	3,880	2,050	260	1,440	14,300	226	8,730
26	4,780	411	5,300	2,010	275	1,490	15,800	318	13,600
27	4,130	876	9,770	1,920	380	a1,970	14,600	255	10,100
28	3,870	617	6,450	2,210	800	a4,770	12,400	155	5,190
29	3,760	669	6,790	4,050	1,500	16,500	11,100	120	3,600
30	4,670	1,020	s24,900	4,420	2,070	24,700	10,700	138	3,990
31	....	....	....	4,770	900	15,600	....	....	....
	July			August			September		
1	12,600	278	9,460	1,200	273	885	400	61	66
2	14,300	642	24,800	1,150	264	820	382	66	68
3	11,300	315	9,610	1,090	251	739	394	66	70
4	9,390	216	5,480	1,040	259	a727	370	65	a65
5	9,240	228	5,690	980	255	675	361	63	61
6	9,940	218	5,850	920	247	614	352	63	60
7	8,630	188	4,380	875	238	562	340	63	a58
8	7,690	192	3,990	815	233	513	328	65	58
9	7,070	200	3,820	775	222	465	320	66	a57
10	6,490	198	3,470	740	232	464	313	69	58
11	6,020	216	3,510	701	245	a464	325	94	82
12	5,900	286	4,560	662	212	379	319	79	68
13	6,250	549	s9,040	622	189	317	307	60	a50
14	5,590	302	4,560	618	176	294	295	66	53
15	4,990	362	4,850	582	153	240	295	70	56
16	4,550	405	4,980	538	144	209	304	68	56
17	3,950	438	4,670	554	132	197	310	74	62
18	3,350	455	4,120	542	125	183	295	70	56
19	3,020	445	3,630	522	128	180	286	62	48
20	2,870	427	3,310	502	98	133	283	64	40
21	2,500	438	2,960	478	97	125	304	71	58
22	2,260	431	2,630	463	92	115	280	70	53
23	2,080	369	2,070	449	85	103	271	61	45
24	1,910	323	1,670	434	80	a94	271	62	45
25	1,850	316	1,560	418	79	89	259	48	34
26	1,700	310	a1,420	400	84	91	259	38	27
27	1,620	298	1,300	391	73	77	256	50	a35
28	1,520	288	a1,180	418	73	82	253	58	a40
29	1,420	278	1,070	404	70	76	250	62	42
30	1,340	273	988	391	62	65	241	55	a36
31	1,270	272	a933	382	59	61	....	....	....

s Computed by subdividing day.
a Computed from an estimated concentration graph.

Iowa River above Coralville, Iowa—Continued

Monthly discharge for calendar and water years 1943 to 1947

Month	Water discharge (cfs-days)	Suspended sediment							
		Load (tons)	Daily loads (tons)			Tons per sq. mi.	Acre-feet (a)	Concentration (ppm)	
			Max.	Min.	Mean			Maximum daily	Weighted mean
October 1943	18,719	3,253	254	49	105	1.07	2.7	132	64
November	21,830	8,006	1,570	22	267	2.64	6.7	555	136
December 1-12	8,779	2,160	564	30	180	.71	1.8	233	91
March 1944	81,580	262,413	27,300	182	8,460	86.5	219	2,760	1,190
April	105,870	268,600	26,600	2,150	8,950	88.5	224	2,230	940
May	296,220	626,680	106,000	2,820	20,200	206.5	523	2,800	784
June	252,100	298,080	48,700	2,050	9,940	98.2	249	860	438
July	77,290	167,190	14,700	1,200	5,390	55.1	140	2,300	801
August	36,455	67,117	20,700	174	2,160	22.1	56	2,950	682
September	23,282	11,567	1,440	133	386	3.81	9.7	408	184
October 1944	16,763	4,928	666	61	159	1.62	4.1	348	109
November	13,936	1,376	162	10	46	.45	1.1	118	37
December 1-8	2,875	116	22	11	14	.04	.1	21	15
March 1945	140,900	235,110	16,700	1,050	7,580	77.5	196	1,360	618
April	137,050	212,250	36,300	2,000	7,080	69.9	177	3,200	574
May	120,670	137,744	17,000	873	4,440	45.4	115	1,340	423
June	136,670	212,300	24,800	2,190	7,080	70.0	177	1,570	575
July	41,340	54,096	9,910	360	1,740	17.8	45	1,510	485
August	43,210	89,312	13,700	220	2,880	29.4	75	2,330	766
September	18,424	9,306	1,630	54	310	3.07	7.8	610	187
October 1945	16,389	7,550	2,160	19	244	2.49	6.3	714	171
March 1946	145,580	304,490	61,200	1,140	12,700	130.0	329	5,450	1,000
April	46,910	29,391	4,130	227	980	9.68	25	490	232
May	65,065	139,827	27,200	196	4,510	46.1	117	2,490	796
June	74,050	332,471	47,100	702	11,100	109.5	278	3,930	1,660
July	43,835	150,184	37,100	413	4,840	49.5	125	3,680	1,270
August	24,082	38,920	10,300	161	1,260	12.8	32	1,850	599
September	45,645	122,586	26,900	120	4,090	40.4	102	2,550	995
April 1947	171,280	284,370	35,900	1,900	9,480	93.7	237	2,270	615
May	81,260	130,364	24,700	969	4,200	43.0	109	2,070	594
June	481,200	654,590	98,800	3,600	21,800	215.7	546	1,140	504
July	162,610	141,611	24,800	933	4,570	46.7	118	642	323
August	20,056	10,038	885	61	324	3.31	8.4	273	185
September	9,223	1,616	82	27	54	.53	1.3	94	65

a Computed using a specific weight of 55 pounds per cubic foot.

Iowa River at Iowa City, Iowa

LOCATION.—At Benton Street Bridge at Iowa City, Johnson County, half a mile downstream from gaging station, 1.0 mile upstream from Ralston Creek, and 3.8 miles downstream from Clear Creek.

DRAINAGE AREA.—3,230 square miles.

RECORDS AVAILABLE.—Chemical analyses: September 1906 to September 1907; August 1912 and June to September 1913 (fragmentary) (a); January 1944 to September 1954 (discontinued).

Water temperatures: January 1944 to September 1954.

Sediment records: October 1943 to September 1954.

EXTREMES, 1906-07, water years 1944 to 1954 given in following table:

Water year	Chemical composites							
	Dissolved solids (ppm)				Total hardness (ppm)			
	Max.	Period	Min.	Period	Max.	Period	Min.	Period
1906-07...	319	April 19-28	129	Feb. 18-27	......	....	......	....
1943-44...	402	Jan. 11-20	167	May 21-31	337	Jan. 11-20	133	May 21-31
1944-45...	400	Dec. 21-31	203	Mar. 1-10	345	Dec. 21-31	156	Mar. 1-10
1945-46...	384	Dec. 21-31	96	Jan. 5-10	331	Dec. 21-31	54	Jan. 5-10
1946-47...	382	Jan. 1-10	137	June 16-19	330	Jan. 1-10	101	June 16-19
1947-48...	436	Jan. 26-Feb. 17	126	Feb. 19	340	Jan. 26-Feb. 17	73	Mar. 10-19,21-24
1948-49...	304	Sept. 1-11	100	Feb. 24-Mar. 12	232	Dec. 1-31	72	Feb. 24-Mar. 12
1949-50...	326	Dec. 1-31	116	Mar. 1-31	258	Dec. 1-31	63	Feb. 10-16
1950-51...	384	Dec. 1-31	131	Feb. 19-27	308	Dec. 1-31	68	Feb. 19-27
1951-52...	342	May 1-22	163	Mar. 11-18	272	July 1-31	107	Mar. 11-18
1952-53...	338	Dec. 28-Jan. 14	110	Feb. 20-27	277	Oct. 1-31	70	Feb. 20-27
1953-54...	410	Jan. 1-31	180	Aug. 26-Sept. 3	335	Jan. 1-31	130	Aug. 26-Sept. 3

Water year	Daily suspended sediment								Temperature*	
	Concentrations (ppm)				Loads (tons)				°Fahrenheit	
	Max.	Date	Min.	Date	Max.	Date	Min.	Date	Max.	Date
1906-07...	......	....	......	....	......	....	......	....	......	....
1943-44...	3,860	May 20	5	Nov. 22, 23	177,000	May 23	0	Jan. 25	84	Aug. 10-16
1944-45...	3,590	June 30	4	Feb. 10-12	51,700	June 10	3	Jan. 24, Feb. 9-12	87	Aug. 3
1945-46...	5,200	June 20	7	Jan. 26, 27	67,800	June 20	0	Dec. 30	85	July 10
1946-47...	3,810	April 5	4	Feb. 5	152,000	June 16	6	Feb. 5	87	Aug. 24
1947-48...	3,110	Feb. 28	17	Nov. 12	80,520	Mar. 19	7	Feb. 15	88	Aug. 26
1948-49...	3,330	Mar. 24	10	Feb. 6	43,480	Mar. 8	8	Feb. 17	89	July 4
1949-50...	5,700	June 18	11	Dec. 24	109,300	July 2	3	Dec. 24	88	Aug. 7
1950-51...	3,040	June 4	7	Feb. 5	46,600	April 3	2	Jan. 28, Feb. 2-8, 10	80	July 29
1951-52...	4,310	June 17	6	Jan. 6, 7	55,900	May 23	12	Jan. 6, 7	84	June 19, July 19
1952-53...	7,800	June 13	......	....	83,000	June 28	......	....	87	Aug. 31
1953-54...	3,270	June 14	......	....	31,700	June 4	......	....	83	July 18

* Minimum temperature, freezing point on many days each year.

EXTREMES, 1943-54.—Dissolved solids (1906-07, 1944-54): Maximum, 436 ppm Jan. 26 to Feb. 17, 1948; minimum, 96 ppm Jan. 5-10, 1946.

Total hardness (1944-54): Maximum, 345 ppm Dec. 21-31, 1944; minimum, 54 ppm Jan. 5-10, 1946.

Water temperatures (1944-54): Maximum, 89°F July 4, 1949; minimum, freezing point on many days during winter months.

Sediment concentrations: Maximum daily, 7,800 ppm June 13, 1953; minimum daily, 4 ppm Feb. 10-12, 1945, Feb. 5, 1947.

Sediment loads: Maximum daily, 177,000 tons May 23, 1944; minimum daily, 2 tons Jan. 28, Feb. 2-8, 10, 1951.

REMARKS.—Records of specific conductance of daily samples for period October 1945 to September 1946 and July 1947 to September 1954 available in Regional Office, U.S. Geological Survey, Lincoln, Nebr.

a Reported under Miscellaneous Analyses in Iowa.

Iowa River at Iowa City, Iowa—Continued

Chemical analyses, in parts per million, September 1906 to September 1907

Date of collection	Turbidity	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Total dissolved Solids
Sept. 6-15, 1906	90	28	...	57	20	17	245	a7.7	31	3.8	0.2	253
Sept. 16-25	105	28	0.30	47	18	19	222	.0	...	5.0	1.8	264
Sept. 26-Oct. 6	125	24	.10	51	21	13	223	.0	36	6.7	1.7	265
Oct. 7-16	75	22	.10	56	23	14	273	.0	32	4.0	1.1	273
Oct. 17-26	50	36	Tr.	64	26	13	283	.0	44	3.9	.5	312
Oct. 27-Nov. 5	25	21	Tr.	63	22	12	262	.0	35	5.4	1.3	269
Nov. 6-15	20	14	Tr.	60	20	16	268	.0	30	4.4	1.5	291
Nov. 16-25	15	10	.10	59	21	17	275	.0	36	3.7	Tr.	276
Nov. 26-Dec. 5	35	15	.15	53	20	16	253	.0	36	4.5	4.4	270
Dec. 6-16	20	26	.10	61	18	16	282	.0	42	4.0	4.4	312
Dec. 17-Jan. 4, 1907	70	27	.05	61	24	...	281	.0	31	4.0	3.5	306
Jan. 5-15	135	14	.6	23	10	11	90	.0	31	2.1	5.2	139
Jan. 16-28	115	18	.7	21	7.5	...	83	.0	30	2.7	1.7	134
Jan. 29-Feb. 7	10	.12	.15	39	15	14	160	.0	39	3.4	2.3	196
Feb. 8-17	15	8.8	.07	44	13	12	165	.0	44	6.7	2.2	211
Feb. 18-27	75	6.2	.15	...	9.2	12	79	.0	34	1.4	6.9	129
Feb. 28-Mar. 9	240	9.2	.9	...	11	14	118	.0	51	1.8	6.4	187
Mar. 10-19	170	18	.05	35	11	18	141	.0	36	2.0	4.0	192
Mar. 20-29	90	...	.16	46	15	12	195	.0	38	3.3	1.3	231
Mar. 30-April 8	285	15	.45	44	16	9.5	208	.0	36	...	4.1	221
April 9-18	50	14	.10	59	21	12	228	.0	49	3.2	1.0	285
April 19-28	30	13	.03	61	23	15	270	.0	49	4.2	Tr.	319
April 30-May 8	50	13	.40	46	18	15	...	.0	47	5.4	.6	284
May 9-18	50	9.8	.15	57	24	12	270	.0	38	3.3	Tr.	284
May 19-28	540	36	1.4	48	14	11	202	.0	36	2.4	5.4	278
May 29-June 7	190	17	.10	47	16	9.1	181	.0	37	3.2	2.9	232
June 8-16	650	23	.40	38	13	11	161	.0	30	1.9	3.5	217
June 17-26	255	25	.30	47	17	26	...	.0	32	4.3	3.4	270
June 27-July 7	350	26	.30	55	20	11	252	.0	33	2.6	4.4	268
July 8-17	1,200	25	.35	30	8.2	...	114	.0	40	...	3.0	172
July 18-27	375	22	.7	35	9.6	9.9	153	.0	22	...	7.2	192
July 28-Aug. 7	162	22	.06	55	16	15	238	.0	29	1.6	3.1	266
Aug. 8-17	175	20	.10	48	17	11	218	.0	32	2.4	3.9	249
Aug. 18-27	75	24	.19	59	18	8.9	245	.0	34	2.8	3.0	288
Aug. 28-Sept. 6	80	16	.11	52	19	...	222	.0	33	4.2	3.0	243
Sept. 7-16	50	17	.02	57	20	18	267	.0	38	3.8	.6	285
Mean	168	19	0.25	49	17	14	210	0.0	36	3.6	2.8	247

a Abnormal calculated as bicarbonate.

Iowa River at Iowa City, Iowa—Continued

Chemical analyses, in parts per million, January to September 1944

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Specific conductance (micromhos at 25°C)	pH
Jan. 1-10, 1944	360	16	0.03	80	28	11	3.5	334	0	65	9.0	0.2	6.2	0.00	392	0.53	381	330	56	7	621	7.8
Jan. 11-20	284	17	.02	89	28	12	3.6	342	0	67	9.5	.2	5.8	.02	402	.55	308	337	57	7	630	7.8
Jan. 21-31	963	12	.04	59	21	9.6	4.7	232	0	49	8.0	.2	5.6	.02	285	.39	741	234	44	8	460	7.7
Feb. 1-10	1,076	14	.04	64	21	7.3	4.3	238	0	45	7.0	.2	8.0	.02	292	.40	848	246	51	6	476	7.6
Feb. 11-20	468	16	.02	82	27	9.6	3.7	311	0	59	8.5	.2	7.6	.06	372	.51	470	316	61	6	596	7.7
Feb. 21-29	2,304	13	.49	49	14	5.8	5.5	177	0	38	5.0	.2	9.0	.02	239	.33	1,490	180	35	6	379	7.4
Mar. 1-10	1,345	15	.10	61	20	7.2	5.9	226	0	46	6.0	.2	8.6	.04	287	.39	1,040	234	49	6	462	7.5
Mar. 11-20	3,832	14	.36	45	13	6.5	5.2	162	0	36	4.5	.2	11	.04	220	.31	2,340	165	33	8	352	7.4
Mar. 21-31	3,233	16	.02	59	20	8.5	3.6	202	12	43	6.5	.3	7.4	.04	282	.38	2,460	229	44	7	443	8.3
April 1-10	2,237	17	.03	68	22	9.5	3.7	262	0	49	6.5	.2	9.3	.04	319	.43	1,930	260	45	7	505	8.1
April 11-20	3,878	15	.03	62	20	9.2	3.6	228	0	47	5.0	.3	13	.04	293	.40	3,070	236	49	8	455	8.4
April 21-30	4,956	15	.03	64	20	7.4	3.5	238	0	47	4.5	.3	14	.04	303	.41	4,050	242	47	6	475	8.2
May 1-10	4,265	15	.02	66	22	8.0	3.4	240	0	46	4.0	.3	16	.06	310	.42	3,570	255	58	6	478	8.2
May 11-20	4,979	15	.04	69	23	7.8	3.8	260	0	47	4.5	.3	15	.06	329	.45	4,420	266	53	6	505	8.3
May 21-31	19,370	12	.07	36	11	5.0	4.2	128	0	25	3.5	.4	5.5	.02	167	.23	8,730	133	28	7	276	7.3
June 1-10	7,002	17	.03	60	22	6.9	4.0	250	0	42	4.5	.4	13	.02	304	.41	5,750	255	50	5	500	7.3
June 11-20	11,740	12	.06	43	14	6.0	4.0	167	0	30	3.5	.3	9.2	.02	204	.28	6,470	165	36	7	333	7.5
June 21-30	7,698	15	.04	55	17	6.3	4.5	208	0	35	4.0	.4	9.2	.02	254	.35	5,280	207	38	6	416	7.6
July 1-10	3,582	18	.02	67	21	6.4	4.1	246	0	43	4.5	.4	15	.02	307	.42	2,970	254	52	5	493	7.0
July 11-20	2,452	16	.04	67	22	7.4	3.6	257	0	44	6.5	.2	12	.02	314	.43	2,080	258	47	6	504	7.3
July 21-31	1,633	15	.12	66	22	8.0	3.9	255	0	44	6.5	.3	8.0	.02	307	.42	1,350	255	46	6	492	7.3
Aug. 1-10	1,693	13	.06	57	19	7.1	4.2	223	0	40	6.5	.3	8.0	.02	272	.37	1,240	220	37	6	440	7.3
Aug. 11-20	1,063	14	.04	66	23	9.1	4.0	258	0	50	8.5	.3	5.5	.02	317	.43	910	259	47	7	508	7.4
Aug. 21-31	924	8.0	.04	62	22	8.2	4.3	245	0	46	8.0	.3	4.6	.02	293	.40	731	245	44	7	481	7.3
Sept. 1-10	1,003	12	.02	65	24	8.0	4.9	275	0	47	6.5	.4	8.0	.02	327	.44	886	260	34	6	528	7.5
Sept. 11-20	709	12	.18	59	26	9.1	4.9	256	0	50	3.0	.3	1.5	.02	293	.40	561	254	44	7	491	7.2
Sept. 21-30	678	12	.18	60	25	9.9	5.4	260	0	48	2.0	.3	1.5	.02	296	.40	542	260	47	8	496	7.3
Weighted average	....	14	0.07	54	18	6.8	4.1	a202	....	38	4.6	0.3	9.7	0.02	255	0.35	2,420	209	43	7	410	....

Chemical analyses, in parts per million, water year October 1944 to September 1945

Oct. 1-10, 1944	674	13	0.09	64	20	8.8	4.0	268	0	48	6.0	0.3	2.5	0.04	305	0.41	555	266	46	7	505	7.5
Oct. 11-20	530	12	.21	58	28	10	2.5	254	0	52	6.0	.3	1.0	.02	294	.40	421	260	52	8	491	7.6
Oct. 21-31	459	6.3	.18	59	26	15	2.7	258	0	36	9.0	.3	.5	.02	297	.40	368	254	42	11	486	7.9
Nov. 1-10	505	10	.16	65	27	11	2.5	266	0	48	9.0	.2	1.5	.02	304	.41	415	273	55	8	493	7.9
Nov. 11-20	472	9.9	.02	69	28	11	2.2	284	0	51	8.0	.3	2.5	.02	320	.44	408	287	54	8	517	7.9
Nov. 21-26, 28-29	456	12	.01	68	29	10	2.3	278	0	50	7.5	.3	2.5	.02	320	.44	394	288	60	7	511	8.1
Dec. 1-10	383	12	.02	72	26	8.5	2.0	286	0	55	10	.2	4.3	.04	331	.45	342	287	52	6	556	7.7
Dec. 11-20	329	12	.02	77	27	9.0	1.9	300	0	57	10	.2	5.5	.04	348	.47	309	303	57	6	582	7.8
Dec. 21-31	297	13	.02	87	31	9.7	1.8	342	0	65	10	.2	6.5	.02	400	.54	321	345	65	6	654	7.8
Jan. 1, 3-10, 1945	267	14	.02	86	29	8.4	1.3	332	0	63	11	.2	5.9	.07	385	.52	278	334	62	5	635	7.7
Jan. 11-20	245	18	.05	78	28	12	2.0	308	0	60	10	.2	5.6	.06	366	.50	242	310	57	8	593	7.7
Jan. 21-31	267	15	.02	76	26	11	2.0	298	0	56	8.8	.2	6.2	.02	353	.48	254	296	52	7	583	7.5
Feb. 1-10	258	15	.03	80	27	12	2.1	310	0	58	10	.2	5.6	.02	368	.50	256	310	56	8	608	7.5
Feb. 11-17, 19-20	1,528	12	.28	50	17	7.3	4.2	193	0	38	6.0	.2	6.7	.02	240	.33	1,010	195	37	7	401	7.3
Feb. 21-28	1,961	12	.30	50	17	5.3	4.6	182	0	38	4.1	.2	8.6	.04	249	.34	1,320	195	46	5	384	7.6
Mar. 1-10	2,979	12	.24	41	13	4.5	4.5	145	0	31	3.5	.2	7.6	.06	203	.28	1,630	156	37	6	315	7.5
Mar. 11-20	3,953	13	.12	50	15	4.8	3.6	176	0	35	3.2	.2	11	.00	240	.33	2,560	186	42	5	370	7.6
Mar. 21-31	6,819	14	.06	55	17	5.1	3.3	178	0	42	3.8	.4	24	.02	255	.35	4,090	207	61	5	401	8.1
April 1-10	4,005	16	.10	65	21	6.1	2.2	227	0	48	4.2	.4	17	.00	302	.41	3,270	248	62	5	475	8.0
April 11-20	4,658	14	.08	60	19	6.3	2.2	206	0	44	3.5	.4	19	.02	275	.37	3,460	228	59	6	434	8.3
April 21-30	5,410	16	.06	68	22	6.1	1.9	238	0	49	4.2	.4	25	.04	313	.43	4,570	260	65	5	497	8.0
May 1-10	2,981	15	.04	72	24	7.3	1.9	259	0	50	4.2	.2	18	.02	335	.46	2,700	278	66	5	523	8.0
May 11-12, 14-20	4,263	12	.06	55	18	5.7	2.2	195	0	41	3.8	.2	12	.02	263	.36	3,030	211	51	6	414	7.9
May 21-31	4,765	15	.05	63	21	6.0	2.2	226	0	44	4.0	.3	17	.02	293	.40	3,770	244	59	5	463	8.0
June 1-9	5,189	14	.05	59	20	5.0	2.2	217	0	39	3.2	.2	16	.06	276	.38	3,870	229	51	5	433	7.3
June 11-18, 20	6,051	15	.05	60	19	5.2	2.2	214	0	39	3.4	.2	17	.04	274	.37	4,480	228	53	5	429	7.3
June 21-30	3,057	15	.07	67	21	6.8	2.2	244	0	43	4.1	.3	17	.06	306	.42	2,530	254	54	6	477	7.4
July 1-10	2,132	19	.06	69	22	7.5	2.2	256	0	45	4.2	.3	12	.04	322	.44	1,850	262	52	6	511	7.6
July 11-20	1,293	18	.06	75	25	8.7	2.0	284	0	49	5.4	.3	12	.04	347	.47	1,210	290	57	6	553	7.8
July 23-26, 28-31	834	16	.06	72	25	8.7	2.0	284	0	52	4.8	.3	8.6	.00	338	.46	761	282	49	6	545	7.9
Aug. 1-10	660	15	.06	72	25	9.5	2.4	277	0	52	5.8	.3	4.4	.06	325	.44	579	282	55	7	534	7.8
Aug. 11-15, 18-20	1,400	14	.06	55	19	6.9	2.8	208	0	59	4.5	.4	7.2	.02	351	.48	1,330	215	44	6	420	7.7
Aug. 21-24, 26-31	2,080	19	.05	56	17	6.6	3.3	215	0	32	3.4	.5	7.6	.00	258	.35	1,450	210	34	6	416	7.6
Sept. 1-8, 10	740	15	.15	62	23	10	3.6	255	0	43	6.0	.5	2.0	.02	293	.40	585	249	40	8	483	7.7
Sept. 11-20	509	8.5	.12	53	23	13	3.3	230	0	46	7.2	.3	.7	.06	265	.36	364	226	37	11	449	7.7
Sept. 21-30	639	9.5	.20	48	22	8.7	4.5	220	0	44	6.4	.3	1.0	.04	260	.35	449	210	30	8	440	7.7
Weighted average	2,033	14	0.08	60	20	6.4	2.6	219	....	43	4.3	0.2	14	0.02	284	0.39	1,560	232	52	6	447	....

a Includes carbonate as bicarbonate.

Iowa River at Iowa City, Iowa—Continued

Chemical analyses, in parts per million, water year October 1945 to September 1946

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Specific conductance (micromhos at 25°C)	pH
Oct. 1-10, 1945	793	12	0.08	57	20	8.2	4.6	222	0	45	6.2	0.3	3.3	0.06	271	0.37	581	224	42	7	446	7.8
Oct. 11-20	470	11	.20	60	25	9.8	5.9	264	0	50	7.2	.3	.5	.07	300	.41	382	252	36	8	497	7.8
Oct. 21-31	394	7.1	.06	66	25	10	2.8	266	0	53	7.5	.2	1.2	.04	306	.42	328	268	50	7	517	7.9
Nov. 1-10	499	5.0	.08	64	25	10	2.8	261	0	51	7.2	.2	1.0	.06	301	.41	405	262	48	7	507	8.0
Nov. 11-20	607	9.5	.08	53	19	8.4	3.7	213	0	46	6.2	.2	5.2	.06	258	.35	421	210	36	8	437	7.7
Nov. 21-30	423	11	.03	68	25	9.4	2.4	284	0	53	6.9	.2	4.4	.07	317	.44	369	272	40	7	533	7.8
Dec. 1-10	863	11	.06	57	21	7.8	3.0	221	0	50	6.0	.2	8.2	.02	273	.37	632	228	48	7	455	7.9
Dec. 11-20	377	15	.04	78	28	10	2.9	309	0	63	8.0	.3	6.9	.00	365	.50	373	310	56	6	601	8.0
Dec. 21-31	296	16	.06	85	29	11	2.4	324	0	64	8.0	.2	6.0	.00	384	.52	305	331	66	7	631	7.9
Jan. 1-4, 1946	337	13	.06	76	26	10		291	0	61	8.2	.2	5.8	.02	350	.48	320	296	58	7	581	7.8
Jan. 5-10	9,283	9.8	.50	15	3.9	6.9		58	0	14	2.0	.2	3.8	.02	96	.13	2,390	54	6	22	131	7.2
Jan. 11-20	5,425	10	.27	33	11	3.8	5.5	122	0	28	3.0	.2	5.6	.02	168	.23	2,470	128	28	6	269	7.4
Jan. 21-31	9,745	15	.04	60	21	6.8	4.6	220	0	40	6.0	.2	7.5	.02	286	.39	7,530	236	51	6	462	7.9
Feb. 1-5	1,024	14	.05	64	22	6.4		239	0	52	6.0	.2	6.2	.09	294	.40	811	250	54	5	482	7.8
Feb. 6-10	3,190	9.6	.53	24	8.4	11		100	0	26	3.5	.2	4.4	.06	141	.19	1,200	94	12	20	211	7.0
Feb. 11-20	2,997	11	.06	35	11	8.1		130	0	31	3.8	.3	5.8	.00	179	.24	1,420	132	26	12	285	7.2
Feb. 21-28	1,641	14	.04	53	16	6.2		195	0	39	4.2	.2	5.7	.02	242	.33	1,070	198	38	6	401	7.5
Mar. 1-10	3,052	12	.05	44	14	7.6		165	0	34	4.5	.3	7.6	.00	210	.29	1,750	168	32	9	346	7.4
Mar. 11-20	5,888	12	.08	39	12	4.8		131	0	32	3.6	.3	13	.02	193	.26	3,030	147	40	7	308	7.4
Mar. 21-31	5,548	15	.04	55	18	5.5		195	0	44	3.8	.3	13	.02	269	.37	4,060	211	51	5	422	7.4
April 1-10	2,322	16	.02	72	23	4.6		258	0	53	5.0	.3	12	.00	328	.45	2,070	274	62	4	521	7.7
April 11-20	1,478	13	.04	66	24	4.8		250	0	53	5.4	.3	6.4	.02	326	.44	1,290	263	58	4	504	7.7
April 21-30	1,058	5.6	.10	48	23	7.1		204	0	53	5.2	.2	.2	.02	256	.35	733	214	48	7	426	7.6
May 1-10	2,621	9.2	.07	50	19	3.4		182	0	45	4.6	.2	9.5	.02	254	.35	1,820	203	54	4	404	7.5
May 11-20	1,861	13	.04	64	22	5.8		239	0	49	4.4	.2	11	.00	311	.42	1,550	250	54	5	488	7.9
May 21-31	1,987	12	.08	62	22	6.7		238	0	46	4.5	.2	11	.04	305	.41	1,610	245	50	6	476	7.9
June 1-10	1,793	18	.05	67	22	3.2		244	0	45	3.0	.1	16	.00	318	.43	1,530	258	58	3	487	7.8
June 11-20	2,260	14	.03	53	18	3.4		195	0	40	4.9	.1	6.2	.00	246	.33	1,480	206	46	4	396	7.7
June 21-30	3,652	7.0	.06	58	17	.7		198	0	36	3.9	.1	13	.00	260	.35	2,530	215	52	1	407	7.7
July 1-10	2,161	15	.05	64	21	2.3		236	0	42	4.1	.1	9.5	.02	202	.40	1,870	246	52	2	455	7.9
July 11-20	1,208	15	.04	70	22	3.9		254	0	46	5.5	.1	11	.00	314	.43	1,030	265	57	3	496	7.9
July 21-31	928	16	.04	69	23	7.1		266	0	47	5.5	.2	7.5	.04	311	.42	772	266	48	5	509	7.8
Aug. 1-10	1,082	16	.04	60	20	6.4		234	0	37	4.8	.3	8.0	.04	272	.37	793	232	39	6	451	7.7
Aug. 11-20	848	9.5	.28	50	20	6.9		206	0	42	5.2	.3	1.0	.02	241	.33	554	207	38	7	408	7.6

Aug. 21-31........	605	11	.01	55	20	6.0	218	0	40	6.0	.2	2.8	.02	250	.35	419	219	40	6	433	7.7
Sept. 1-10.........	733	8.6	.06	54	20	10	225	0	43	5.8	.2	1.0	.04	258	.35	508	216	32	9	438	7.0
Sept. 11-22........	1,493	15	.08	54	18	4.6	209	0	33	4.1	.2	7.6	.04	248	.34	1,010	208	37	5	413	7.6
Sept. 23-26........	3,442	8.8	.50	30	9.7	6.2	124	0	20	2.5	.2	2.6	.04	146	.20	1,360	115	14	11	236	7.2
Sept. 27-30........	1,865	10	.04	52	17	5.3	196	0	37	4.5	.3	5.4	.04	234	.32	1,180	200	39	5	390	7.6
Weighted average	1,905	12	0.13	50	16	6.2	182	....	38	4.2	0.2	8.2	0.02	237	0.32	1,207	191	42	7	374	....

Iowa River at Iowa City, Iowa—Continued

Chemical analyses, in parts per million, water year October 1946 to September 1947

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Specific conductance (micromhos at 25°C)	pH
Oct. 1-10, 1946	981	14	0.04	69	23	6.9		268	0	48	4.8	0.3	4.8	0.04	314	0.43	832	266	46	5	519	7.8
Oct. 11-20	1,290	10	.04	64	22	3.7		242	0	45	5.5	.3	4.2	.04	287	.39	1,000	250	52	3	482	7.7
Oct. 21-31	2,270	16	.12	58	19	6.9		225	0	40	4.0	.3	6.2	......	271	.37	1,660	222	38	6	438	7.3
Nov. 1-10	2,420	19	.01	72	23	7.8		276	0	48	4.9	.2	8.8	......	332	.45	2,060	274	48	6	526	7.6
Nov. 11-20	1,950	18	.01	74	24	6.7		284	0	49	4.2	.2	8.8	......	338	.46	1,780	283	50	5	538	7.6
Nov. 21-30	1,490	18	.01	79	25	8.0		304	0	51	4.8	.2	8.8	......	353	.48	1,420	300	51	5	563	7.7
Dec. 1-10	1,160	17	.02	78	24	5.3		296	0	51	4.8	.2	8.2	......	352	.48	1,100	298	55	5	562	7.7
Dec. 11-20	788	15	.01	76	26	8.7		302	0	52	5.0	.2	8.2	......	348	.47	741	296	48	6	567	7.7
Dec. 21-31	744	15	.01	79	26	7.6		302	0	55	5.4	.2	8.4	......	352	.48	707	304	56	5	575	7.8
Jan. 1-10, 1947	472	17	.01	86	28	7.6		328	0	59	6.1	.2	8.2	......	382	.52	487	330	61	5	624	7.7
Jan. 11-20	928	14	.02	66	23	4.8		248	0	48	6.1	.2	9.2	......	303	.41	759	259	56	4	500	7.4
Jan. 21-31	781	13	.02	68	23	4.1		254	0	47	6.0	.2	8.6	......	307	.42	647	264	56	3	506	7.6
Feb. 1-10	552	14	.02	69	23	7.1		264	0	48	5.8	.2	8.5	......	316	.43	471	266	50	5	511	7.8
Feb. 11-20	1,890	12	.05	54	18	8.5		207	0	40	5.2	.2	10	......	262	.36	1,340	208	38	8	425	7.5
Feb. 21-28	1,860	13	.03	54	18	5.3		201	0	38	4.5	.1	11	......	258	.35	1,300	208	43	5	415	7.6
Mar. 1-10	1,000	15	.02	62	21	7.1		240	0	43	5.0	.1	9.2	......	289	.39	858	241	44	6	470	7.6
Mar. 11-20	2,870	11	.08	43	14	4.1		148	0	32	4.8	.2	14	......	209	.28	1,620	165	44	5	335	7.2
Mar. 21-31	3,310	13	.03	55	17	7.6		206	0	38	4.2	.3	10	......	258	.35	2,310	207	38	7	416	7.4
April 1-10	4,730	13	.07	55	17	5.1		198	0	40	4.4	.2	10	......	253	.34	3,230	207	45	5	407	7.5
April 11-20	7,190	13	.05	50	16	3.9		175	0	37	3.8	.2	14	......	242	.33	4,700	191	47	4	382	7.5
April 21-30	6,020	14	.03	63	20	5.8		226	0	46	4.1	.2	15	......	301	.41	4,890	239	54	5	464	7.7
May 1-10	3,160	13	.02	69	23	6.0		253	0	48	4.1	.2	14	......	326	.44	2,780	262	55	4	505	7.7
May 11-20	2,070	11	.02	68	23	6.2		256	0	49	5.8	.2	10	......	310	.42	1,730	264	54	5	506	7.7
May 21-31	2,860	13	.00	64	22	6.2		246	0	44	4.4	.2	12	......	295	.40	2,280	250	48	5	481	7.7
June 1-10	15,900	12	.23	34	11	4.1		122	0	26	2.0	.3	9.8	......	169	.23	7,260	130	30	6	264	7.2
June 16-19	27,700	18	......	28	7.6	...		88	0	18	......	......	7.0	......	137	.19	10,200	101	29	0	192	7.8
June 11-15, 20	12,800	15	.06	48	15	3.0		172	0	31	3.0	.3	12	......	230	.31	7,950	182	41	3	354	7.7
June 21-30	14,800	14	.13	45	14	6.2		172	0	28	3.5	.2	12	......	227	.31	9,070	170	29	7	347	7.8
July 1-3	13,600	23	.08	49	13	2.5		153	8	28	2.0	.4	12	......	222	.30	8,390	176	37	3	336	8.6
July 4-7	10,600	24	.08	55	15	5.2		168	12	36	2.0	.4	14	......	248	.34	7,100	199	42	5	371	9.0
July 8-12	7,410	28	.10	64	18	4.8	3.2	205	18	35	3.2	.4	13	......	292	.40	5,840	234	36	4	436	8.6
July 13-14	7,100	20	.07	60	15	12		180	8	59	2.6	.4	12	......	262	.36	5,020	211	50	11	386	8.5
July 15	5,370	29	.00	66	18	4.3	2.4	202	18	38	3.5	.3	12	......	289	.39	4,190	239	43	4	435	8.6

July 16-17	4,620	30	.00	62	20	11		234	0	53	3.0	.4	12	......	310	.42	3,620	237	45	10	476	7.5
July 18-31	2,180	22	.08	73	21	11	1.2	252	13	44	4.5	.3	12	......	329	.45	1,940	269	40	8	509	8.5
Aug. 1-19	825	20	.10	75	22	6.7	.4	245	16	58	6.5	.2	8.5	......	329	.45	733	278	51	5	507	8.6
Aug. 20-31	439	21	.08	62	22	11	4.8	214	13	58	2.5	.4	1.8	......	293	.40	347	245	48	9	464	8.5
Sept. 1-15	369	18	.08	62	21	12	2.8	215	13	58	13	.2	2.1	......	294	.40	293	241	43	10	470	8.6
Sept. 16-24	277	15	.08	65	23	9.0	.8	224	15	58	9.8	.3	1.6	......	312	.42	233	257	49	7	493	8.6
Sept. 25-30	251	13	.15	59	24	3.3	1.6	216	10	55	8.0	.4	.8	......	286	.39	206	246	61	3	461	8.3
Weighted average	3,399	16	0.09	52	16	5.3		a190	....	36	3.3	0.3	11	......	245	0.33	2,250	196	40	6	383	....

Chemical analyses, in parts per million, water year October 1947 to September 1948

Oct. 1-7, 1947	254	11	0.10	66	25	3.0	2.8	242	6	48	9.0	0.3	0.5	0.09	304	0.41	208	267	59	2	494	8.2
Oct. 8-22	236	6.8	.08	60	24	2.8	.0	212	10	49	9.5	.3	.5	.07	287	.39	183	248	58	2	464	8.4
Oct. 23-30	241	10	.10	62	25	2.1	1.2	238	6	49	9.0	.3	.7	.09	302	.41	197	258	53	2	488	8.3
Oct. 31	522	16	.00	49	22	21		208	0	70	8.0	.4	2.4	......	280	.38	395	213	43	21	465	7.5
Nov. 1	522	12	.00	50	22	20		199	0	76	10	.4	.3	......	280	.38	395	215	52	20	407	7.4
Nov. 2-9	615	16	.06	54	20	2.8	.8	183	6	49	8.5	.3	6.0	.07	268	.36	445	217	57	3	419	8.3
Nov. 10-12	528	18	.20	62	23	3.3	.8	204	10	49	7.0	.6	9.0	......	306	.42	436	249	65	3	467	8.4
Nov. 13-19	478	19	.12	68	25	3.9	1.6	235	10	56	8.0	.2	7.4	.00	326	.44	421	272	63	3	499	8.4
Nov. 20-Dec. 5	488	20	.04	73	22	12	2.8	271	0	57	9.6	.3	7.2	.01	344	.47	453	273	51	9	422	8.1
Dec. 6-17	642	19	.06	64	19	12	6.0	230	0	56	7.9	.2	12	.01	312	.42	541	238	49	10	469	8.2
Dec. 13b	539	18	.03	63	20	8.8	3.6	224	0	47	11	.1	14	......	312	.42	454	239	55	7	481	8.1
Dec. 18-Jan. 25, 1948	394	21	.06	78	26	13	.4	291	0	64	11	.2	10	.00	372	.51	396	302	63	9	521	8.0
Jan. 5b	350	20	.02	78	24	8.8	1.6	292	0	56	10	.2	8.0	......	366	.50	348	293	54	6	554	8.0
Jan 26-Feb. 17	185	23	.04	90	28	19	14	348	0	76	15	.2	7.1	.05	436	.59	216	340	55	10	634	8.0
Feb. 18b	1,990	11	.46	40	11	4.4	2.8	134	0	30	6.0	.5	1.0	.01	192	.26	1,030	145	35	6	290	8.2
Feb. 18, 20, 22-27	998	9.5	.20	32	10	4.3	3.2	90	0	39	9.0	.3	10	.00	186	.25	501	121	47	7	242	7.5
Feb. 19	2,190	7.5	.02	27	6.5	1.0		60	0	26	4.0	.0	12	......	126	.17	745	94	45	1	198	6.6
Feb. 21	600	6.8	.06	23	6.3	1.8		56	0	24	3.6	.0	14	......	132	.18	214	83	37	5	187	6.5
Feb. 28-Mar. 4	6,750	10	.30	20	6.6	6.1	2.4	57	0	30	5.8	.3	11	.14	170	.23	3,100	77	30	14	154	7.1
Mar. 5-15	3,280	11	.06	35	11	9.2		111	0	40	4.7	.2	16	.02	214	.29	1,900	133	42	13	278	7.4
Mar. 16-19, 21-24	12,200	8.5	.30	20	5.5	9.5		60	0	33	1.8	.2	8.0	.00	150	.21	5,140	73	24	22	159	7.3
Mar. 20	14,600	8.5	.20	25	5.5	.5		49	0	35	.2	.0	10	......	138	.19	5,440	85	45	1	134	6.6
Mar. 25-31	6,320	12	.04	38	11	8.1	.8	125	0	33	32	.3	13	.00	210	.29	3,580	140	38	11	280	7.8
April 1-30	1,870	21	.02	67	17	5.4	2.4	216	0	46	6.0	.5	18	.00	312	.42	1,580	237	60	5	454	8.0
May 1-31	1,860	23	.02	67	20	10	1.2	230	0	51	7.0	.1	18	.23	304	.41	1,530	249	60	8	480	7.9
June 1-30	695	14	.03	54	21	10	1.6	210	0	50	8.0	.1	4.8	.08	252	.34	473	221	49	9	435	7.8
July 1-31	923	18	.04	41	13	5.5	2.0	146	0	34	5.0	.1	8.7	.11	184	.25	458	156	36	7	309	8.0
Aug. 1-31	284	11	.02	58	23	13	4.4	237	0	53	8.0	.2	1.8	.04	282	.38	216	239	45	10	448	8.1
Sept. 1-30	190	11	.02	58	20	13	3.6	230	0	52	8.6	.2	2.3	.15	272	.37	140	227	38	11	443	8.0
Weighted average	1,298	14	0.12	44	13	7.9	1.7	a149	....	41	7.9	0.2	12	0.06	233	0.32	818	164	42	9	321	....

a Includes carbonate as bircarbonate.
b Not included in weighted average.

Iowa River at Iowa City, Iowa—Continued

Chemical analyses, in parts per million, water year October 1948 to September 1949

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Specific conductance (micromhos at 25°C)	pH
Oct. 1-31, 1948	179	11	0.03	55	20	10	5.2	208	0	54	10	0.2	2.8	0.12	254	0.35	123	220	49	9	423	7.7
Nov. 1-30	256	9.0	.02	55	21	11	5.6	221	0	54	10	.2	3.1	.09	260	.35	180	224	43	9	438	7.5
Dec. 1-31	255	15	.02	60	20	14	3.2	228	0	49	11	.2	7.8	.03	270	.37	186	232	45	11	511	8.0
Jan. 1-31, 1949	1,435	11	.05	28	9.3	6.7	4.0	101	0	28	4.5	.1	9.6	.02	160	.22	622	108	25	11	256	7.5
Feb. 1-23	486	16	.04	59	17	1.6	.8	189	8	40	7.0	.2	8.8	.11	276	.38	362	217	49	2	438	8.5
Feb. 24-Mar. 12	7,080	10	.30	20	5.3	2.2	.8	64	0	18	1.5	.2	5.0	.26	100	.14	1,910	72	20	6	157	7.9
Mar. 13-31	4,350	15	.04	39	11	3.3	.8	139	0	35	2.5	.1	11	.13	194	.26	2,280	143	37	5	294	8.0
April 1-30	2,249	18	.04	57	16	4.0	1.6	177	8	48	4.0	.2	11	.10	264	.36	1,600	208	50	4	418	8.5
May 1-31	718	13	.02	56	22	8.5	5.6	196	14	52	6.0	.4	3.0	.29	270	.38	535	230	46	7	434	8.5
June 1-23	646	12	.02	47	17	5.4	1.2	182	0	44	6.5	.2	3.5	.20	242	.33	422	188	39	6	388	7.0
June 24-30	1,840	11	.14	32	9.8	5.2	4.0	112	0	34	6.2	.4	3.2	.10	170	.23	845	121	29	8	243	7.0
July 1-13	875	20	.02	52	15	5.8	1.6	173	7	37	5.6	.2	16	.06	258	.35	597	191	38	6	390	8.2
July 14-31	479	15	.03	52	18	12	.8	201	0	42	8.2	.3	4.8	.10	262	.36	330	204	39	11	414	7.9
Aug. 1-31	210	9.4	.03	55	21	11	2.0	219	0	47	11	.2	2.8	.10	284	.39	161	224	44	10	453	8.1
Sept. 1-11	184	7.4	.04	56	22	14	3.2	232	0	48	12	.2	2.8	.10	304	.41	151	230	40	12	451	7.3
Sept. 12-18	588	9.6	.04	38	15	9.3	5.6	157	0	36	8.8	.3	3.4	.05	246	.33	391	157	28	11	336	7.3
Sept. 19-30	143	7.8	.04	43	16	10	3.6	177	0	36	9.2	.2	3.7	.05	218	.30	84	174	29	11	360	7.3
Weighted average	1,182	13	0.11	39	12	4.7	1.9	a136	....	34	4.0	0.2	7.7	0.15	191	0.26	609	147	35	6	301	....

Chemical analyses, in parts per million, water year October 1949 to September 1950

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Specific conductance (micromhos at 25°C)	pH
Oct. 1-20, 1949	153	8.8	0.02	62	22	15	4.1	247	0	51	12	0.2	2.1	0.20	310	0.42	128	245	42	12	494	7.6
Oct. 21-23	906	10	.10	26	6.1	9.2	7.8	106	0	21	4.0	.2	2.4	.10	152	.21	372	90	3	17	228	7.5
Oct. 24-31	204	12	.02	44	15	10	5.9	172	0	30	9.0	.2	4.7	.10	238	.32	131	171	30	11	324	7.6
Nov. 1-30	160	9.4	.02	59	23	14	3.6	244	0	51	12	.2	2.1	.10	300	.41	134	241	41	11	481	7.7
Dec. 1-31	148	11	.02	63	24	16	2.9	256	0	55	14	.2	2.4	.10	326	.44	130	258	48	12	510	7.9
Jan. 1-31, 1950	314	10	.20	40	14	9.6	7.7	156	0	38	9.0	.2	3.6	.10	226	.31	192	159	31	11	338	7.5
Feb. 1-9	383	9.7	.10	37	12	8.4	8.3	141	0	32	8.0	.3	5.3	.10	212	.29	219	141	25	11	308	6.9

Feb. 10-16	1,793	6.7	.40	16	5.5	7.4	9.4	72	0	17	3.5	.3	9.2	.10	122	.17	591	63	4	18	161	6.7
Feb. 17-28	375	7.1	.20	25	7.7	5.2	10	100	0	20	4.5	.3	4.7	.10	154	.21	156	94	12	10	217	6.8
Mar. 1-31	5,266	7.7	.40	19	5.6	3.2	5.4	74	0	14	2.5	.2	5.5	.10	116	.16	1,650	71	10	8	158	6.8
April 1-18	1,889	17	.02	49	12	6.2	4.3	165	0	41	5.5	.3	11	.20	228	.31	1,160	171	36	7	363	7.5
April 19	955	17	.04	66	20	8.4	3.8	230	0	58	6.0	.1	9.4	......	310	.42	799	247	59	7	478	7.5
April 20	892	19	.04	64	20	11	3.9	252	0	50	6.0	.1	1.7	......	316	.43	761	242	35	9	486	7.4
April 21-30	1,111	19	.02	60	17	8.8	3.6	215	0	53	7.0	.2	7.1	.20	286	.39	858	219	43	8	446	7.6
May 1-31	2,250	16	.26	54	15	6.7	3.3	178	0	46	5.5	.3	15	.20	252	.34	1,530	195	49	7	397	7.6
June 1-16	1,587	15	.20	60	14	8.2	3.0	212	0	43	5.5	.3	13	.20	276	.38	1,180	208	34	8	439	7.8
June 17	2,100	15	.04	57	16	7.4	3.4	200	0	43	4.0	.2	18	......	264	.36	1,500	208	44	7	424	7.5
June 18-20	4,627	16	......	30	8.0	5.2	2.7	129	0	8.0	2.0	.3	2.2	.10	154	.21	1,920	108	2	9	225	7.2
June 21	5,610	12	.60	26	6.0	5.5	3.8	94	0	20	2.0	.2	1.1	......	138	.19	2,090	90	13	11	192	7.4
June 22-23	6,400	13	.14	27	5.7	7.5	3.6	93	0	25	2.0	.2	5.0	.10	142	.19	2,450	91	15	15	208	7.3
June 24-26	6,683	14	.09	34	9.8	4.9	3.8	122	0	26	3.0	.2	12	.10	176	.24	3,180	126	26	7	273	7.3
June 27-29	9,610	17	.09	34	9.2	4.4	3.8	121	0	27	2.5	.2	8.6	.20	178	.24	4,620	123	24	7	268	7.3
June 30-July 1	3,965	24	.11	54	15	6.5	3.5	194	0	40	4.0	.2	13	.20	264	.36	2,830	198	39	6	407	7.7
July 2	7,770	12	.50	30	7.9	4.0	3.1	116	0	22	2.0	.1	.6	......	150	.20	3,150	109	13	7	243	7.0
July 3-30	952	15	.13	61	20	9.0	2.4	230	0	51	6.0	.2	7.0	.10	294	.40	756	234	45	8	473	7.6
July 31	2,370	7.9	.50	30	10	5.6	4.2	120	0	28	4.0	.2	1.7	......	152	.21	973	116	18	9	263	7.1
Aug. 1-31	343	10	.42	56	21	10	3.0	222	0	53	8.5	.2	2.5	.20	284	.39	203	224	42	9	466	7.5
Sept. 1-8	191	6.7	.40	58	23	13	3.0	233	0	58	11	.2	2.4	.10	300	.41	155	230	48	10	496	7.6
Sept. 9	193	6.1	.04	58	25	14	2.9	240	0	65	11	.2	2.0	......	312	.42	163	248	51	11	505	7.5
Sept. 10-23	161	6.2	.20	59	24	15	3.0	240	0	60	11	.2	1.6	.10	304	.41	132	244	47	12	508	7.6
Sept. 24	223	9.1	.04	58	25	13	2.9	250	0	63	11	.2	3.3	......	320	.44	193	248	43	10	517	7.9
Sept. 25-30	872	14	.20	41	13	7.6	2.8	157	0	32	5.5	.2	5.9	.10	210	.29	494	165	26	9	335	7.6
Weighted average	1,372	12	0.25	37	11	5.9	4.4	136	....	30	4.3	0.2	7.9	0.14	191	0.26	708	138	26	8	291	....

a Includes carbonate as bicarbonate

Iowa River at Iowa City, Iowa—Continued

Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Specific conductance (micromhos at 25°C)	pH
Oct. 1-31, 1950	322	13	0.20	54	21	9.6	4.3	220	2	52	9.5	0.2	5.3	0.06	294	0.40	256	220	36	9	442	8.3
Nov. 1-30	161	13	.04	67	25	14	2.7	256	0	58	11	.2	2.2	.16	333	.46	147	270	45	10	524	8.3
Dec. 1-31	108	12	.02	78	28	16	3.0	291	8	65	16	.2	4.2	.00	384	.52	112	308	56	10	597	8.3
Jan. 1-31, 1951	117	12	.02	74	20	15	4.8	268	0	48	16	.2	5.6	.06	354	.48	112	266	46	11	609	7.4
Feb. 1-18	267	11	.10	52	12	9.6	8.3	172	0	50	10	.2	7.0	.00	262	.36	189	180	39	10	403	7.1
Feb. 19-27	3,156	7.2	.13	26	5.2	2.8	9.7	78	0	33	3.0	.0	5.9	.00	131	.18	1,120	68	4	6	169	6.7
Feb. 28-Mar. 28	2,754	12	.04	39	11	5.6	5.3	130	0	32	5.0	.3	12	.06	198	.27	1,460	141	34	8	298	7.9
Mar. 29-April 2	7,348	12	.09	28	6.6	4.8	3.4	86	0	28	3.5	.3	12	.07	148	.20	2,940	97	26	9	226	6.0
April 3-5	13,700	9.6	.10	25	6.4	5.3	3.1	83	0	24	2.5	.3	12	.11	132	.18	4,880	89	21	11	162	7.1
April 6-30	7,426	13	.03	43	11	4.5	2.5	135	0	36	3.5	.3	16	.09	226	.31	4,530	154	43	6	320	7.6
May 1-June 2	4,355	16	.04	59	17	5.6	2.6	195	0	51	5.0	.2	19	.02	318	.43	3,740	218	58	5	436	7.5
June 3-7	5,372	11	.07	36	7.8	3.6	2.8	117	0	29	2.5	.2	8.6	.04	186	.25	2,700	122	26	6	263	7.3
June 8-10	10,820	13	.10	43	10	3.3	2.5	142	0	31	2.5	.2	13	.07	220	.30	6,430	149	33	4	311	7.4
June 11-30	4,366	15	.10	59	16	5.4	2.2	198	0	44	4.0	.2	17	.04	296	.40	3,490	212	50	5	425	7.8
June 15b	3,490	11	.20	57	21	14		235	0	47	5.0	.4	12	......	286	.39	2,690	228	35	12	386	7.6
July 1-31	4,596	18	.04	55	16	5.2	2.8	199	0	40	4.0	.2	13	.07	274	.37	3,400	203	40	5	407	7.6
Aug. 1-31	1,645	17	.04	60	18	7.8	2.6	224	0	45	4.0	.2	8.7	.06	284	.39	1,260	222	38	7	447	7.8
Sept. 1-30	1,535	22	.02	72	24	7.8	2.8	281	0	49	6.5	.2	9.2	.05	338	.46	1,400	277	47	6	533	8.0
Weighted average	2,543	15	0.05	49	14	5.4	3.1	a168	....	40	4.3	0.2	14	0.06	251	0.34	1,720	180	42	6	365	....

Chemical analyses, in parts per million, water year October 1951 to September 1952

Oct. 1-31, 1951	1,643	......	......	......	......	......	......	182	14	42	6.0	......	......	......	266	0.36	1,180	212	40	......	420	8.2
Nov. 1-30	1,698	......	......	......	......	......	......	195	9	52	6.2	......	......	......	272	.37	1,250	223	49	......	444	8.2
Dec. 1-31	991	......	......	......	......	......	......	242	0	55	6.3	......	......	......	300	.41	803	252	54	......	498	7.8
Jan. 1-14, 1952	717	......	......	......	......	......	......	245	0	57	8.3	......	......	......	308	.42	596	254	53	......	509	7.8
Jan. 15-Feb. 11	2,553	......	......	......	......	......	......	178	0	37	3.5	......	......	......	232	.32	1,600	184	38	......	378	8.0
Feb. 12-Mar. 10	2,044	......	......	......	......	......	......	201	10	45	6.0	......	......	......	279	.38	1,540	226	45	......	444	8.5
Mar. 11-18	9,224	......	......	......	......	......	......	94	0	27	8.0	......	......	......	163	.22	4,060	107	30	......	242	7.9
Mar. 19-31	5,877	......	......	......	......	......	......	171	6	43	5.0	......	......	......	254	.35	4,030	197	47	......	398	8.4
April 1-30	3,946	......	......	......	......	......	......	231	5	50	5.5	......	......	......	317	.43	3,380	252	54	......	491	8.3
May 1-22	2,007	......	......	67	23	......	......	254	0	51	6.0	......	......	......	342	.47	1,850	263	55	......	515	8.1
May 23-27	4,692	......	......	44	13	......	......	154	0	32	3.5	......	......	......	224	.30	2,840	163	37	......	334	7.6
May 28-June 5	2,512	......	......	67	21	......	......	245	0	46	5.5	......	......	......	324	.44	2,200	252	51	......	497	8.1
June 6-30	2,462	......	......	......	......	......	......	204	0	44	5.0	......	......	......	258	.35	1,720	209	42	......	425	7.6
July 1-31	1,950	......	......	......	......	......	......	275	0	45	5.5	......	......	......	336	.46	1,770	272	46	......	527	8.1
Aug. 1-31	588	......	......	......	......	......	......	244	0	53	8.0	......	......	......	295	.40	468	242	42	......	481	8.0
Sept. 1-30	261	......	......	......	......	......	......	262	0	60	11	......	......	......	320	.44	226	263	48	......	525	7.8
Weighted average	2,126	......	......	......	......	......	......	a209	......	44	5.7	......	......	......	274	0.37	1,570	216	45	......	432	....

a Includes carbonate as bicarbonate.
b Not included in weighted average.

Iowa River at Iowa City, Iowa—Continued

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Specific conductance (micromhos at 25°C)	pH
Oct. 1-31, 1952	165							276	0	64	12				336	0.46	150	277	51		554	7.7
Nov. 1-16	171							274	0	64	13				330	.46	155	274	49		558	8.0
Nov. 17-20	1,011							131	0	37	7.0				184	.25	502	130	23		301	7.3
Nov. 21-23	307							175	0	50	14				258	.35	214	186	42		418	7.5
Nov. 24-30	289							209	0	58	12				286	.39	223	220	49		472	7.6
Dec. 1-19	230							259	0	55	13				332	.45	212	262	50		538	7.9
Dec. 20-27	495							170	0	37	8.0				240	.33	329	180	36		388	7.4
Dec. 28-Jan. 14, 1953	219							273	0	58	14				338	.46	200	270	46		561	8.0
Jan. 15-30	521							147	0	33	8.0				204	.28	287	150	20		334	7.4
Jan. 31-Feb. 5	328							247	0	54	13				316	.43	282	248	45		523	7.3
Feb. 6-19	1,619							106	0	27	6.0				162	.22	708	107	20		249	7.1
Feb. 20-27	5,973							75	0	11	3.0				110	.15	1,770	70	8		164	7.0
Feb. 28-Mar. 3	2,993							122	0	23	3.5				178	.24	1,440	125	25		284	7.1
Mar. 4-10	1,459							187	0	41	7.0				264	.30	1,040	193	40		403	7.6
Mar. 11-31	2,584							173	0	43	6.0				266	.36	1,860	189	47		397	7.7
April 1-4	3,373							177	0	51	6.5				278	.38	2,530	195	50		414	7.6
April 5-30	1,958							233	0	56	7.5				318	.43	1,680	250	59		498	7.9
May 1-23	2,311							228	0	57	7.0				318	.43	1,980	248	61		493	7.3
May 24-27	4,555							108	0	32	3.0				164	.22	2,020	119	30		259	6.8
May 28-June 6	1,842							220	0	51	6.5				308	.42	1,530	235	55		405	7.4
June 7-17	2,794							142	0	32	5.0				186	.25	1,400	141	25		306	7.3
June 18-27	1,324							251	0	54	8.0				324	.44	1,160	258	52		516	7.7
June 28-July 1	4,370							133	0	26	5.5				172	.23	2,030	128	19		278	7.2
July 2-6	2,430							175	0	39	5.5				227	.31	1,490	184	40		381	7.4
July 7-15	1,444							222	0	49	6.0				279	.38	1,090	226	44		454	7.8
July 16-22	892							242	0	52	7.5				300	.41	723	241	43		485	7.8
July 23-Aug. 7	631							216	0	51	8.0				269	.37	458	216	40		449	7.6
Aug. 8-18	830							232	0	44	7.5				286	.39	646	234	44		468	7.9
Aug. 19-23	415							198	0	55	8.5				252	.34	282	206	44		426	7.6
Aug. 24-31	286							222	0	57	9.5				281	.38	217	227	45		471	7.6
Sept. 1-30	168																				533	
Weighted ave. (a)	1,261							178		37	6.4				246	0.33	838	186	40		387	

Chemical analyses, in parts per million, water year October 1953 to September 1954

Oct. 1-31, 1953	120							263	0	68	15				337	0.46	109	270	54		557	7.8
Nov. 1-30	127							268	0	63	17				330	.45	113	268	48		561	8.0
Dec. 1-31	122							278	0	64	18				354	.48	117	284	56		589	7.9
Jan. 1-31, 1954	78.8							326	0	77	18				410	.56	87.2	335	68		671	8.0
Feb. 1-14	90.1							306	0	71	17				391	.53	95.1	313	62		642	7.7
Feb. 15-28	250							203	0	49	16				269	.37	182	209	43		455	7.9
Mar. 1-31	235							226	0	53	16				291	.40	185	229	44		486	7.8
April 1-8	365							203	0	56	16				287	.39	283	216	50		471	7.4
April 9-17	357							154	0	44	11				230	.31	222	168	42		376	7.7
April 18-26	498							193	0	51	13				268	.36	360	204	46		445	7.6
April 27-30	839							158	0	44	10				230	.31	521	171	41		379	7.3
May 1-7	2,143							133	0	39	7.5				209	.28	1,210	150	41		333	7.6
May 8-28	815							225	0	61	11				325	.44	715	255	70		519	7.6
May 29-June 1	1,079							190	0	52	11				254	.35	740	201	45		430	7.5
June 2-6	3,736							140	0	32	5.5				217	.30	2,190	159	37		339	7.3
June 7-13	2,684							213	0	62	7.0				342	.47	2,460	240	65		483	7.5
June 14-19	3,778							178	0	33	5.0				250	.34	2,550	185	39		376	7.2
June 20-July 5	5,119							180	0	30	3.5				243	.33	3,360	178	30		362	7.5
July 6-17	1,564							270	0	52	6.5				363	.40	1,530	284	63		545	7.5
July 18-30	654							291	0	64	9.0				384	.52	678	303	64		581	8.0
July 31-Aug. 25	465							226	0	60	9.5				322	.44	404	238	53		482	7.8
Aug. 26-Sept. 3	3,999							126	0	22	3.0				180	.24	1,940	130	27		266	7.3
Sept. 4-14	2,375							248	0	43	5.5				316	.43	2,030	250	47		482	7.6
Sept. 15-30	780							280	0	56	8.5				351	.48	739	284	54		546	7.6
Weighted average	910							199		42	6.8				274	0.37	673	207	43		419	

a Includes estimate where data are missing.

Iowa River at Iowa City, Iowa—Continued

Determination of variation in chemical constituents in cross-section Benton Street Bridge

Chemical analyses, in parts per million

April 2, 1948 (Mean discharge 5,070 cfs)

Station	255	320	365	375	440
Silica (SiO_2)	18	16	15	16	16
Iron (Fe)	.00	.00	.10	.00	.00
Calcium (Ca)	44	50	51	50	42
Magnesium (Mg)	17	13	14	14	14
Sodium (Na) & Potassium (K)	4.6	.6	.5	4.4	8.6
Bicarbonate (HCO_3)a	156	158	161	158	158
Sulfate (SO_4)	42	34	34	41	30
Chloride (Cl)	2.0	.2	.2	2.6	3.0
Nitrate (NO_3)	19	18	16	20	20
Total dissolved solids	238	240	236	242	238
Hardness as $CaCO_3$					
Calcium & Magnesium	180	178	185	182	162
Non carbonate	52	48	53	52	32
Percent sodium	5	1	0	5	10
Specific conductance					
Micromhos at 25° C	348	329	323	345	346
pH	7.2	7.4	7.1	7.2	7.4

June 4, 1949 (Mean discharge 1,210 cfs)

Station	255	320	365	375	440
Specific conductance Micromhos at 25° C	390	394	402	395	404

July 3, 1951 (Mean discharge 4,300 cfs)

Station	155	220	280	315	340
Specific conductance Micromhos at 25°C	336	334	325	323	323

a Includes carbonate as bicarbonate.

Iowa River at Iowa City, Iowa—Continued

Temperature (°F) of water, January to September 1944

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	33	33	36	40	61	79	77	78	71
2	33	33	38	40	62	81	77	80	72
3	33	34	40	41	58	80	77	81	75
4	33	35	37	42	56	79	77	77	78
5	33	35	36	44	58	76	78	78	76
6	33	34	35	46	51	68	77	77	72
7	32	35	34	48	50	67	78	78	70
8	32	35	33	48	50	65	78	80	70
9	32	35	32	48	52	64	78	80	70
10	33	34	33	49	56	63	80	84	70
11	33	33	34	46	60	63	79	84	69
12	33	32	34	44	64	66	78	84	67
13	33	32	33	46	67	72	79	84	66
14	33	....	33	46	69	74	79	84	65
15	33	....	34	45	71	78	80	84	....
16	33	32	34	45	73	78	77	84	65
17	33	32	35	44	75	80	78	81	71
18	33	32	36	44	73	81	78	79	73
19	33	32	36	46	71	65	79	78	74
20	33	33	37	47	64	71	77	76	74
21	33	33	38	48	66	72	77	76	74
22	33	33	38	48	69	74	77	77	71
23	33	33	38	50	70	78	77	76	67
24	33	33	40	53	71	78	77	....	66
25	33	34	42	52	71	79	78	76	66
26	34	34	41	52	72	79	78	68	65
27	34	35	40	54	73	80	78	66	67
28	35	36	39	54	74	81	77	66	66
29	33	37	40	55	75	....	77	68	66
30	32	....	37	58	78	78	77	68	66
31	32	....	36	....	79	....	78	69	....
Average	33	34	36	47	66	74	78	77	70

Temperature (°F) of water, water year October 1944 to September 1945

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	66	56	32	32	34	34	60	55	69	73	83	82
2	63	50	34	......	34	34	59	54	65	74	82	80
3	61	56	33	32	35	34	55	54	61	75	87	76
4	60	53	33	33	34	34	48	55	62	77	77	76
5	60	50	33	33	34	32	47	56	61	78	78	78
6	63	48	33	32	35	33	49	58	60	78	77	80
7	61	48	34	33	34	33	55	59	60	76	74	80
8	59	49	33	33	35	34	51	58	61	77	74	79
9	56	49	33	32	36	35	57	55	63	78	74	......
10	55	49	33	32	35	35	60	55	......	75	74	75
11	54	49	33	34	35	34	61	57	64	76	75	70
12	54	49	33	34	36	38	61	59	65	77	77	68
13	54	49	33	35	35	40	60	......	68	77	79	66
14	55	49	32	35	34	42	58	53	70	78	79	63
15	55	50	33	35	34	44	53	52	69	77	79	64
16	55	51	33	34	33	40	52	52	68	77	......	63
17	55	49	32	34	32	50	50	51	68	73	......	64
18	55	48	33	34	......	54	50	53	71	73	75	66
19	56	48	33	35	32	52	49	55	......	77	77	66
20	55	45	33	35	35	51	51	58	69	78	79	69
21	55	43	33	36	35	49	54	64	70	......	79	66
22	55	43	33	35	33	52	56	64	72	......	78	66
23	56	42	33	35	34	54	58	65	75	85	76	66
24	55	42	33	34	35	57	54	68	75	86	76	67
25	55	40	32	34	33	57	52	69	77	85	......	67
26	55	39	32	32	33	58	53	69	76	84	72	66
27	55	......	32	34	34	60	52	68	77	......	75	64
28	55	36	32	33	34	59	55	68	77	81	77	63
29	55	34	33	34	......	60	56	67	79	82	80	63
30	56	......	32	34	......	60	56	69	76	80	83	63
31	56	......	32	35	......	60	......	68	......	84	82	......
Average	57	47	33	34	34	46	54	60	69	78	78	70

Iowa River at Iowa City, Iowa—Continued

Temperature (°F) of water, water year October 1945 to September 1946

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	62	51	35	33	33	35	60	64	66	77	78	69
2	54	......	35	33	33	35	60	63	64	78	76	70
3	55	47	35	33	33	38	59	59	65	......	81	69
4	57	48	25	33	34	43	55	55	66	......	82	69
5	59	46	35	34	35	42	53	54	60	78	79	70
6	60	45	34	33	33	40	55	54	72	80	78	72
7	60	42	33	33	33	41	55	55	75	80	70	72
8	55	40	34	33	33	36	54	57	76	81	80	77
9	50	38	32	33	33	34	54	58	76	84	79	74
10	52	44	32	33	33	34	53	57	78	85	79	73
11	55	44	32	33	33	36	50	57	78	84	76	72
12	55	45	33	32	33	37	50	57	76	82	73	69
13	55	44	33	32	33	40	54	56	77	81	73	69
14	54	44	32	32	33	43	55	57	77	82	70	69
15	55	44	32	32	33	48	57	62	76	79	72	......
16	55	45	32	33	33	48	58	62	78	73	76	......
17	55	44	32	33	33	47	60	61	80	78	78	70
18	58	42	32	33	33	46	62	62	76	84	78	72
19	58	40	32	33	33	49	64	63	66	82	78	71
20	57	40	32	33	33	51	62	......	64	83	78	70
21	55	33	......	......	34	53	64	65	65	82	78	70
22	54	37	32	32	34	54	64	64	68	83	77	......
23	52	33	32	32	34	51	68	63	71	83	75	63
24	51	33	32	32	34	52	69	65	74	80	74	62
25	50	34	33	33	34	55	68	64	75	79	74	62
26	50	35	34	33	34	55	65	66	78	80	74	63
27	50	37	33	33	34	56	63	68	80	76	74	65
28	50	......	33	34	34	58	62	70	81	73	71	63
29	51	35	33	33	......	59	63	71	81	79	70	63
30	52	35	33	33	......	58	65	......	79	81	68	61
31	51	......	33	32	......	58	......	73	......	80	69	......
Average	54	41	33	33	33	46	59	61	74	80	76	67

Temperature (°F) of water, water year October 1946 to September 1947

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	59	57	37	32	33	33	43	62	58	75	79	81
2	60	57	34	32	33	33	44	58	62	75	78	79
3	60	52	34	32	33	33	43	58	59	74	84	78
4	63	......	34	32	32	33	45	58	62	70	84	78
5	65	......	35	32	32	33	48	50	64	74	84	78
6	67	50	36	32	32	34	45	58	64	74	84	78
7	66	48	40	33	32	33	45	57	68	75	80	78
8	66	47	43	33	32	34	46	58	68	75	82	76
9	65	46	47	33	32	34	46	58	72	75	83	78
10	65	45	47	33	32	34	46	60	74	78	83	78
11	60	45	45	33	32	34	47	61	70	78	83	78
12	50	44	44	33	33	34	47	63	65	76	83	77
13	56	42	40	33	33	34	47	62	59	76	83	74
14	55	37	35	33	33	34	50	64	57	77	83	74
15	56	39	34	33	33	34	48	64	57	79	84	69
16	57	38	33	33	33	34	47	66	59	79	78	67
17	56	37	32	33	33	34	48	65	61	84	80	76
18	58	38	32	33	33	34	50	65	......	80	80	68
19	51	40	32	33	33	34	56	66	63	75	83	70
20	52	41	33	33	33	......	45	65	64	75	84	72
21	53	40	34	33	33	33	49	64	64	70	85	72
22	55	40	33	33	33	36	48	64	64	70	86	66
23	55	39	33	34	33	38	53	63	68	70	86	64
24	......	40	34	34	33	36	53	62	69	72	87	66
25	55	40	34	34	33	39	58	62	71	72	84	62
26	56	39	34	34	33	38	57	64	72	74	82	61
27	57	39	34	34	......	38	53	62	75	78	81	67
28	58	38	34	33	33	42	58	58	77	76	84	61
29	60	37	32	33	......	40	59	52	78	80	78	59
30	60	......	32	33	......	43	60	53	77	82	80	56
31	58	......	32	33	......	43	......	55	......	82	81	......
Average	58	43	36	33	33	36	40	61	65	76	82	71

Iowa River at Iowa City, Iowa—Continued

Temperature (°F) of water, water year October 1947 to September 1948

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	56	54	33	32	32	32	43	59	69	70	75	78
2	60	54	34	32	32	32	44	58	70	70	74	74
3	59	54	34	32	32	32	44	55	72	70	73	74
4	60	53	34	32	32	32	48	57	72	72	72	74
5	64	53	34	32	32	32	50	58	74	72	71	70
6	63	50	33	32	32	32	50	58	76	74	72	77
7	65	47	34	32	32	32	49	57	69	70	71	75
8	65	43	33	32	32	32	51	57	68	76	72	75
9	64	42	33	32	32	32	50	58	69	78	72	76
10	62	40	34	32	32	32	52	55	70	78	75	76
11	62	38	33	32	32	32	54	57	73	78	76	69
12	66	35	32	32	32	32	54	54	73	82	77	70
13	62	35	33	32	32	32	49	53	75	81	78	74
14	62	35	33	32	32	33	50	55	72	78	77	74
15	63	35	33	32	32	33	54	56	70	72	81	73
16	64	35	32	32	32	33	54	60	70	75	80	77
17	64	35	32	32	32	32	54	60	69	77	79	74
18	64	35	34	32	33	33	57	63	68	78	80	75
19	65	35	33	32	32	38	58	65	68	77	81	79
20	63	37	32	32	32	42	57	67	68	78	82	78
21	63	37	32	32	32	......	57	70	68	75	82	76
22	64	37	32	32	32	41	57	69	69	76	83	72
23	63	37	32	32	32	44	57	71	71	74	82	68
24	61	36	32	32	33	......	59	68	75	74	84	68
25	61	34	33	32	33	48	65	68	75	76	87	67
26	62	34	32	32	33	48	66	68	77	74	88	67
27	61	33	32	32	34	52	65	69	75	75	84	64
28	59	32	33	32	33	48	64	70	72	77	84	64
29	57	32	32	32	32	47	62	70	71	77	84	64
30	56	32	32	32	......	45	62	72	71	76	81	64
31	54	......	32	32	......	47	......	70	......	74	78	......
Average	62	39	33	32	32	37	55	62	71	75	79	73

Temperature (°F) of water, water year October 1948 to September 1949

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	64	54	34	32	32	32	43	64	67	84	79	70
2	63	54	34	32	32	32	42	64	74	84	75	70
3	64	55	34	33	32	33	46	64	72	87	76	71
4	50	55	34	33	32	33	46	68	74	89	81	73
5	59	56	34	32	32	34	47	72	76	88	76	72
6	60	53	34	32	32	34	47	73	75	86	76	70
7	58	54	34	32	32	35	48	71	73	85	78	68
8	54	51	34	32	32	33	50	68	71	82	81	65
9	53	49	34	32	32	33	50	67	69	82	83	66
10	54	46	32	32	32	33	54	63	70	82	83	65
11	54	45	32	32	33	33	51	62	73	70	83	67
12	53	44	36	32	33	33	54	64	76	70	82	65
13	52	43	35	32	32	33	55	67	76	79	79	65
14	52	43	34	32	32	33	56	69	68	79	82	62
15	63	41	34	33	33	33	50	71	74	70	82	63
16	54	43	33	32	33	33	45	70	73	80	81	62
17	53	41	32	32	33	33	47	69	76	81	81	64
18	50	44	32	32	33	33	45	69	78	79	79	66
19	50	45	33	32	34	33	45	70	82	81	79	64
20	48	45	33	32	33	34	47	67	81	81	79	68
21	49	44	33	32	33	35	50	64	82	82	78	67
22	50	42	32	32	33	46	50	63	81	78	78	65
23	49	39	32	33	33	38	53	62	81	80	80	66
24	52	38	32	32	33	42	55	63	77	82	79	62
25	49	37	32	32	33	42	55	67	78	81	79	63
26	50	35	32	32	33	42	63	63	77	83	80	62
27	50	36	32	32	33	42	61	65	78	84	79	63
28	51	38	33	32	32	43	61	65	78	80	79	60
29	51	35	33	......	......	46	61	70	78	81	80	56
30	53	35	32	......	......	47	63	71	81	78	81	56
31	55	......	32	32	......	45	......	72	......	81	77	......
Average	54	45	33	32	33	36	51	67	76	82	80	65

Iowa River at Iowa City, Iowa—Continued

Temperature (°F) of water, water year October 1949 to September 1950

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	56	45	39	34	32	32	48	48	75	70	77	72
2	62	46	36	34	32	32	40	51	71	68	75	71
3	63	47	37	34	34	32	43	54	70	70	78	74
4	63	45	39	32	32	35	41	58	68	74	75	73
5	63	45	38	32	32	34	43	64	73	73	76	60
6	63	46	38	32	34	34	45	64	73	73	76	68
7	63	44	37	32	34	37	47	61	76	75	88	60
8	63	45	34	32	34	32	47	64	78	74	70	69
9	67	46	34	32	34	32	44	59	78	76	78	70
10	69	48	36	32	36	33	44	64	68	68	77	74
11	66	48	41	32	34	32	44	59	68	79	75	73
12	62	51	35	32	32	32	44	64	68	78	76	68
13	63	51	35	32	34	32	43	64	72	72	76	68
14	63	50	34	32	33	35	45	67	67	75	74	67
15	61	46	35	33	33	34	47	69	68	72	73	67
16	61	46	35	32	33	34	49	64	68	75	74	68
17	63	44	35	32	33	34	55	64	68	76	78	68
18	59	43	37	32	33	34	54	68	68	76	75	69
19	......	42	37	32	33	33	54	64	72	75	74	......
20	62	42	37	32	34	34	53	64	64	72	73	......
21	......	40	35	32	33	35	54	64	68	76	68	69
22	58	37	33	32	33	34	59	67	68	75	69	68
23	58	38	33	35	33	34	59	70	72	75	70	67
24	53	39	32	35	32	37	58	71	73	77	72	66
25	51	38	35	33	32	38	49	73	74	76	73	60
26	48	37	33	32	32	38	48	70	76	77	74	60
27	58	38	33	32	33	41	47	70	76	77	74	59
28	58	37	34	32	34	40	46	66	73	80	74	61
29	59	37	35	32	......	40	46	69	72	81	73	64
30	50	38	35	32	......	42	44	70	71	81	73	65
31	48	......	36	32	......	44	......	71	......	75	70	......
Average	60	43	36	32	33	35	48	64	71	75	75	68

Temperature (°F) of water, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	68	58	40	37	33	36	38	65	70	72	77	74
2	69	55	38	39	33	36	35	64	71	69	77	72
3	64	54	35	34	35	38	35	66	67	71	75	70
4	61	......	36	37	35	37	37	65	66	68	78	68
5	59	......	39	37	35	37	42	65	63	68	70	68
6	56	52	36	34	36	40	46	58	64	67	......	67
7	58	55	34	35	32	41	47	56	60	69	76	67
8	58	42	36	35	33	36	43	54	60	74	78	66
9	57	44	36	34	32	37	44	62	64	69	73	69
10	58	40	37	35	36	36	47	58	66	73	77	67
11	58	40	37	36	40	35	47	55	64	71	79	68
12	58	41	34	36	38	34	44	56	68	68	74	73
13	59	38	34	40	32	37	43	63	68	68	75	62
14	58	38	34	37	33	34	42	63	70	71	76	66
15	62	41	35	38	36	34	......	63	70	75	76	64
16	60	42	34	39	36	35	41	67	69	74	74	66
17	62	39	35	40	36	34	39	67	74	74	75	62
18	63	39	33	38	38	33	46	68	74	76	74	64
19	64	43	37	38	36	34	42	69	74	74	......	66
20	63	39	36	......	36	33	42	69	71	74	77	66
21	61	39	37	33	36	33	39	68	72	75	68	67
22	64	39	34	34	35	35	47	64	66	66	68	62
23	57	34	35	35	37	38	47	64	68	75	67	63
24	56	34	35	35	37	36	48	64	68	67	68	61
25	54	33	34	34	38	38	46	66	67	76	68	58
26	53	36	34	34	35	38	47	63	67	78	66	62
27	54	38	34	34	35	43	50	64	72	78	66	59
28	54	36	36	34	35	44	55	61	70	78	73	56
29	55	37	36	33	......	40	50	64	70	80	74	54
30	54	39	33	32	......	42	63	68	69	77	76	61
31	57	......	35	33	......	38	......	67	......	78	78	......
Average	59	42	35	36	35	37	45	63	68	73	74	65

Iowa River at Iowa City, Iowa—Continued

Temperature (°F) of water, water year October 1951 to September 1952

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	59	45	40	32	38	37	50	68	67	78	74	74
2	64	42	......	32	38	34	49	68	67	79	74	76
3	65	37	47	33	37	37	48	67	67	78	77	67
4	68	34	46	33	37	33	46	64	69	80	74	68
5	67	36	46	33	35	34	46	72	69	78	69	67
6	66	35	48	34	37	37	48	68	70	79	70	70
7	58	35	44	34	38	34	48	65	77	79	69	68
8	54	36	45	34	36	36	48	61	79	71	73	67
9	56	33	40	34	37	37	53	60	79	73	73	69
10	62	37	34	33	38	36	52	58	74	75	74	69
11	56	43	36	35	37	37	48	56	73	76	78	70
12	67	46	36	36	34	38	47	53	75	77	77	78
13	57	52	34	35	......	38	46	54	80	78	70	67
14	64	47	34	36	34	37	43	56	76	77	75	74
15	58	44	33	37	36	38	46	58	81	73	75	72
16	......	43	32	36	36	38	46	58	76	75	74	72
17	64	42	32	36	38	40	48	57	75	76	78	72
18	52	37	33	36	38	43	52	60	80	75	76	71
19	50	36	33	36	38	44	55	57	84	84	73	66
20	50	36	34	33	36	43	56	59	75	80	75	64
21	51	37	34	34	34	42	62	59	69	81	74	66
22	50	34	34	35	33	42	62	59	73	82	72	62
23	51	37	......	33	34	36	58	59	72	78	70	61
24	51	34	35	33	35	37	55	64	74	77	78	64
25	50	36	34	35	35	38	56	67	77	76	70	64
26	53	35	34	35	37	41	56	67	78	78	71	69
27	57	36	34	33	36	42	63	67	74	78	71	72
28	57	36	36	32	37	41	62	62	77	82	74	70
29	48	36	36	32	36	43	64	61	83	78	76	66
30	51	39	34	......	......	52	67	......	79	77	76	66
31	48	......	35	......	......	51	......	64	......	75	78	......
Average	57	39	37	34	36	39	53	62	75	77	74	69

Temperature (°F) of water, water year October 1952 to September 1953

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	67	49	36	37	33	36	44	54	72	78	83	80
2	62	50	37	37	36	36	46	54	71	78	82	78
3	59	46	37	36	36	38	47	54	70	77	82	81
4	59	49	38	37	36	35	47	55	74	78	84	80
5	60	48	38	33	38	38	47	56	74	78	78	72
6	54	47	43	35	38	35	49	56	69	76	76	......
7	53	45	44	33	37	34	51	58	70	77	75	66
8	50	46	39	37	37	36	52	62	68	74	73	67
9	51	44	39	36	36	37	52	60	73	76	76	68
10	54	43	38	38	36	38	49	68	68	73	73	74
11	52	42	37	36	35	43	48	63	71	74	74	69
12	55	44	36	36	38	44	48	63	74	78	74	67
13	52	43	36	36	36	47	47	57	74	75	74	67
14	52	46	36	38	37	48	50	59	74	74	74	64
15	49	42	37	......	34	40	50	63	74	75	75	65
16	50	48	38	34	34	41	47	62	70	78	73	62
17	42	52	38	34	35	42	46	63	74	78	74	67
18	47	54	35	33	36	45	44	61	76	78	79	69
19	58	52	38	38	37	45	48	62	80	82	81	65
20	47	49	38	36	38	47	45	65	81	81	77	67
21	48	46	38	37	33	48	49	64	81	78	77	61
22	48	45	39	37	37	52	54	63	78	78	80	59
23	47	43	38	38	38	50	54	62	75	78	79	60
24	49	44	38	37	37	44	57	61	75	78	79	66
25	50	42	36	37	36	46	55	63	74	78	80	64
26	55	36	36	36	36	50	51	65	73	80	......	61
27	50	35	36	38	38	46	49	66	74	80	76	62
28	46	36	36	38	38	48	51	65	75	80	77	62
29	48	37	37	35	......	48	52	66	72	81	77	63
30	48	39	38	36	......	48	54	70	76	81	83	63
31	49	......	38	36	......	43	......	73	......	82	87	......
Average	52	45	38	36	36	43	49	62	74	78	78	67

Iowa River at Iowa City, Iowa—Continued

Temperature (°F) of water, water year October 1953 to September 1954

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	63	57	39	42	39	40	44	58	65	77	80	71
2	65	54	44	41	42	40	48	67	62	78	76	73
3	67	49	41	38	39	36	44	57	59	78	78	70
4	66	52	44	38	40	33	45	48	64	78	76	72
5	61	48	42	38	42	35	47	49	62	78	75	75
6	60	47	41	36	40	30	59	52	65	78	73	74
7	57	52	42	38	42	42	58	51	68	79	76	77
8	65	44	43	30	43	40	55	52	68	76	74	72
9	58	46	42	35	40	42	54	52	68	76	74	69
10	59	45	38	36	39	43	55	54	73	77	74	67
11	63	45	38	38	37	39	60	56	75	79	74	66
12	60	48	35	34	34	40	54	58	74	80	73	......
13	59	46	38	38	38	40	56	60	74	80	73	67
14	58	48	38	42	43	37	61	62	75	82	74	......
15	60	52	38	44	43	37	65	64	77	80	78	......
16	62	47	34	36	39	40	57	67	78	79	76	......
17	61	47	35	34	38	40	59	67	75	78	74	64
18	70	52	38	36	38	43	58	63	77	83	75	......
19	64	53	45	46	38	46	60	63	78	79	74	......
20	64	56	40	42	42	44	58	63	79	78	73	75
21	64	51	44	34	42	48	58	60	78	76	75	66
22	66	48	38	37	37	43	55	65	78	78	78	64
23	61	48	36	42	35	44	57	68	76	74	78	59
24	59	48	38	39	39	42	61	69	76	75	78	60
25	60	46	39	40	40	50	65	58	77	78	80	63
26	58	38	30	39	34	46	65	67	80	74	76	65
27	56	40	39	37	40	48	62	68	80	75	77	64
28	53	39	39	42	39	51	60	66	77	78	73	67
29	52	42	41	41	......	40	61	65	79	78	74	68
30	53	41	37	38	......	41	61	67	78	72	73	69
31	55	......	40	40	......	45	......	70	......	74	71	......
Average	61	48	40	39	39	42	57	61	73	78	76	68

Iowa River at Iowa City, Iowa—Continued

Suspended sediment, water year October 1943 to September 1944

Day	October			November			December		
		Suspended sediment			Suspended sediment			Suspended sediment	
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1	807	62	135	788	58	123	641	9	16
2	774	66	138	866	59	138	653	9	16
3	749	62	125	713	36	69	613	8	13
4	743	46	92	707	26	a50	618	7	12
5	707	46	88	683	24	44	565	7	11
6	659	55	a102	701	33	s70	731	12	24
7	707	65	124	1,360	224	823	985	32	85
8	695	69	a129	1,290	202	704	1,030	30	83
9	683	72	133	1,150	172	534	1,030	50	139
10	641	71	123	992	126	337	1,030	49	136
11	695	78	140	866	87	203	892	41	99
12	560	89	135	892	57	137	930	29	a73
13	665	99	178	846	36	82	431	25	29
14	635	89	153	852	23	53	374	22	a22
15	618	61	102	860	18	42	336	19	17
16	598	47	70	872	14	33	360	17	17
17	591	41	65	840	12	27	352	20	19
18	580	42	66	788	10	21	490	23	30
19	641	46	80	794	9	19	550	27	40
20	586	54	85	725	8	16	565	28	43
21	624	83	140	768	6	12	555	30	45
22	635	101	173	768	5	10	521	31	44
23	613	91	151	737	5	10	485	32	42
24	635	71	122	707	6	11	449	33	40
25	570	49	75	683	8	15	417	33	37
26	570	38	58	653	10	18	405	33	36
27	575	33	a51	653	14	25	413	33	37
28	516	32	45	641	11	a19	384	32	33
29	535	33	s48	641	8	14	402	28	30
30	555	37	a55	591	8	13	388	25	26
31	695	42	79	....	....	....	352	22	21

Day	January			February			March		
1	391	22	23	1,690	825	s3,860	1,790	425	2,050
2	380	19	19	1,420	380	1,460	1,600	340	1,470
3	402	17	18	1,320	302	1,080	1,460	320	1,260
4	356	16	15	1,180	292	930	1,600	325	1,400
5	346	15	14	1,040	230	646	1,710	345	1,590
6	352	14	13	957	164	424	1,670	365	1,650
7	380	13	13	906	120	294	1,340	275	995
8	335	13	12	846	89	203	781	130	274
9	341	13	12	768	68	141	719	65	126
10	317	14	12	635	50	a86	781	45	95
11	337	14	13	380	37	38	1,360	95	s410
12	297	13	10	336	25	23	2,630	828	s5,930
13	245	13	9	320	21	18	2,920	1,600	s12,600
14	269	12	9	481	20	26	4,040	2,860	31,200
15	332	12	11	485	20	26	4,640	2,740	34,300
16	287	11	8	530	19	a27	4,450	1,920	23,100
17	263	11	a8	560	18	27	4,440	2,010	24,100
18	234	12	8	560	18	27	4,510	1,740	21,200
19	282	13	10	516	18	25	4,610	1,360	16,900
20	298	14	11	508	18	25	4,720	1,070	13,600
21	296	16	13	473	18	23	4,340	935	s10,800
22	284	18	14	950	154	s605	3,280	893	7,930
23	284	14	11	2,020	560	3,050	3,280	910	8,060
24	311	10	8	2,080	905	s5,180	3,330	1,040	9,350
25	329	7	a6	3,220	2,010	sb18,900	3,340	1,150	10,400
26	404	7	8	4,690	3,840	48,600	3,590	1,390	13,500
27	1,670	1,860	s12,200	3,130	2,060	s18,000	3,410	1,060	9,760
28	1,660	1,550	s7,130	2,320	1,300	8,140	2,990	825	6,660
29	1,450	660	2,580	1,850	680	s3,480	2,780	575	4,320
30	1,630	1,210	sb6,000	....	....	....	2,660	480	3,450
31	2,270	1,590	s9,530	....	....	....	2,560	490	3,390

s Computed by subdividing day.
a Computed from an estimated concentration graph.
b Computed from a partly estimated concentration graph.
Note.—Flow affected by ice Feb. 22-24.

Iowa River at Iowa City, Iowa—Continued

Suspended sediment, water year October 1943 to September 1944—Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	2,450	490	3,240	3,920	685	7,250	10,700	435	12,600
2	2,420	460	3,010	3,760	705	7,200	9,740	440	11,600
3	2,350	430	2,730	3,780	760	7,760	9,050	455	11,100
4	2,260	400	2,440	3,840	835	8,660	8,070	375	8,170
5	2,160	375	2,190	3,960	1,020	10,900	7,230	340	6,640
6	2,090	375	2,120	4,270	1,520	17,500	6,500	345	6,050
7	2,100	455	2,580	4,400	748	9,010	5,640	380	5,790
8	2,130	475	2,730	4,620	565	7,050	4,280	500	5,780
9	2,150	475	2,760	4,870	480	6,310	4,270	650	7,490
10	2,260	510	3,110	5,150	440	6,120	4,540	740	9,070
11	2,440	675	4,450	5,580	480	7,230	4,760	710	9,120
12	2,710	760	5,560	5,990	490	7,920	5,190	725	10,200
13	3,100	1,050	ab8,880	5,820	460	7,230	5,380	700	10,200
14	3,590	1,920	18,600	5,300	485	6,940	6,010	595	9,660
15	4,330	2,420	s27,600	4,200	500	5,750	9,810	972	s26,900
16	4,480	2,060	24,900	3,410	500	4,600	14,200	1,440	s55,900
17	4,520	1,780	21,700	3,060	495	4,090	15,800	1,020	43,500
18	4,640	1,090	13,700	2,780	490	3,680	18,700	1,290	s67,400
19	4,520	890	10,900	3,090	982	s8,520	22,200	1,510	90,500
20	4,450	920	11,100	10,500	3,860	109,000	15,400	835	s36,000
21	4,260	870	10,000	11,800	2,440	s79,200	10,700	545	15,700
22	4,890	1,430	s20,100	20,700	3,060	171,000	9,950	723	s18,500
23	6,160	2,590	s43,700	27,700	2,400	s177,000	9,900	751	s20,400
24	5,960	1,360	s22,100	30,100	1,840	150,000	8,330	440	s9,790
25	5,360	850	12,300	25,400	1,380	94,600	8,000	555	12,000
26	5,000	720	9,720	20,600	960	53,900	8,030	520	s11,400
27	4,760	820	10,500	19,100	930	48,000	6,700	380	6,870
28	4,540	760	9,320	18,200	790	38,800	5,710	500	7,710
29	4,430	710	8,490	14,500	580	22,700	5,090	595	8,160
30	4,200	700	7,940	12,800	515	17,800	4,570	610	7,530
31	....	....	....	12,000	480	15,600	....	....	....
	July			August			September		
1	3,900	560	5,900	1,480	190	759	1,380	119	443
2	3,610	635	6,190	1,360	130	477	1,330	99	356
3	3,320	590	5,290	1,300	102	358	1,190	87	280
4	3,320	585	5,240	1,310	121	428	1,090	87	256
5	3,630	1,140	11,200	1,570	178	755	984	86	228
6	3,850	1,260	13,100	2,650	1,050	7,510	926	76	190
7	4,060	906	9,930	2,100	968	5,490	870	61	144
8	4,000	585	6,320	2,030	482	2,640	774	59	123
9	3,270	535	4,720	1,680	375	1,700	762	58	119
10	2,860	460	3,550	1,450	220	861	714	58	112
11	2,660	480	3,450	1,310	134	474	687	58	108
12	2,700	490	3,570	1,230	100	332	774	58	121
13	2,750	578	4,290	1,120	82	248	750	57	115
14	2,790	998	7,520	1,010	71	194	834	56	126
15	2,890	940	s7,320	965	66	172	698	56	a106
16	2,380	1,350	8,680	906	67	164	704	55	105
17	2,130	588	3,380	1,090	72	212	687	55	102
18	1,970	372	1,980	965	88	229	670	55	99
19	2,290	582	s3,700	1,000	92	248	600	65	105
20	1,960	790	4,180	1,030	89	248	687	69	128
21	1,650	305	1,360	882	101	240	858	76	176
22	1,510	206	840	792	111	237	792	82	175
23	1,490	150	603	804	113	245	670	83	150
24	1,540	150	624	732	109	215	670	80	145
25	1,440	149	579	704	99	188	638	73	126
26	1,380	134	499	704	82	156	648	74	129
27	1,330	121	435	756	70	143	632	76	130
28	1,500	138	s556	698	66	124	654	77	136
29	2,380	359	s2,380	1,040	73	205	605	77	126
30	2,060	516	2,870	1,490	92	370	610	77	127
31	1,680	315	1,430	1,560	118	497	....	....	....

s Computed by subdividing day.
a Computed from an estimated concentration graph.
b Computed from a partly estimated concentration graph.

Iowa River at Iowa City, Iowa—Continued

Suspended sediment, water year October 1944 to September 1945

Day	October: Mean discharge (cfs)	October: Suspended sediment: Mean concentration (ppm)	October: Suspended sediment: Tons per day	November: Mean discharge (cfs)	November: Suspended sediment: Mean concentration (ppm)	November: Suspended sediment: Tons per day	December: Mean discharge (cfs)	December: Suspended sediment: Mean concentration (ppm)	December: Suspended sediment: Tons per day
1	620	73	122	439	84	100	261	9	6
2	674	71	129	473	84	107	245	9	6
3	696	70	132	504	91	139	295	10	8
4	708	71	136	550	83	123	354	11	11
5	862	93	216	447	69	83	452	13	16
6	702	112	212	517	66	92	435	15	18
7	669	102	184	545	63	93	400	17	22
8	642	83	144	508	62	85	435	17	20
9	579	71	111	536	62	90	408	17	19
10	594	66	104	473	61	78	452	17	21
11	589	65	103	404	59	79	264	16	11
12	579	67	105	504	58	79	320	16	14
13	540	73	106	452	58	71	304	15	12
14	550	87	129	464	58	73	334	14	13
15	536	88	127	481	57	74	331	13	12
16	504	80	109	452	56	68	361	9	9
17	508	74	101	473	47	60	351	13	12
18	522	76	107	490	39	53	348	18	17
19	490	81	107	464	34	43	334	21	19
20	480	86	113	439	30	36	344	24	22
21	490	91	120	468	26	33	338	28	26
22	481	95	123	435	23	27	307	29	24
23	473	94	120	435	21	25	313	30	25
24	464	89	111	435	20	23	301	30	24
25	468	84	106	427	18	21	298	30	24
26	460	80	99	452	17	21	293	31	25
27	456	76	94	504	16	22	257	32	22
28	416	72	81	456	15	18	302	33	27
29	443	69	83	404	13	17	289	33	26
30	447	68	82	456	11	14	292	34	27
31	452	80	98	....	....	....	273	34	25

Day	January: Mean discharge (cfs)	January: Mean concentration (ppm)	January: Tons per day	February: Mean discharge (cfs)	February: Mean concentration (ppm)	February: Tons per day	March: Mean discharge (cfs)	March: Mean concentration (ppm)	March: Tons per day
1	332	34	30	276	8	6	2,110	192	1,090
2	294	34	a27	276	7	5	2,110	163	929
3	237	32	20	276	7	5	2,300	214	1,330
4	305	28	23	273	7	5	2,730	580	4,280
5	235	21	13	243	7	5	2,920	670	5,280
6	265	15	11	246	7	5	3,150	530	4,510
7	257	14	10	257	7	5	3,450	415	3,870
8	266	14	10	224	6	4	3,600	485	4,980
9	226	13	8	251	5	3	3,670	500	4,950
10	251	12	8	254	4	3	3,550	850	8,150
11	251	11	7	277	4	3	3,450	1,030	9,590
12	243	12	8	310	4	3	3,360	1,040	9,430
13	240	12	8	390	13	14	3,450	1,170	10,900
14	241	12	8	1,300	85	s316	3,580	1,210	11,700
15	242	12	8	2,150	316	1,830	3,750	1,190	12,000
16	223	12	7	2,200	267	1,590	4,000	1,170	12,600
17	290	12	9	2,160	355	2,070	4,180	1,230	13,900
18	229	11	7	2,250	372	2,260	4,390	1,310	15,500
19	250	10	7	2,310	238	1,480	4,570	1,110	13,700
20	244	9	6	1,920	141	731	4,800	890	11,500
21	257	8	6	1,600	89	384	5,420	770	11,300
22	256	7	5	1,610	61	265	7,440	1,020	20,500
23	259	6	4	1,490	51	205	8,470	660	15,100
24	253	5	3	1,370	43	159	7,760	410	8,590
25	265	5	4	1,710	74	s367	8,230	1,130	s26,000
26	277	7	5	2,820	282	2,150	9,270	1,020	25,500
27	274	9	7	2,710	273	2,000	7,280	520	10,200
28	302	10	8	2,380	247	1,590	5,710	690	10,600
29	247	10	7	....	....	....	5,160	600	8,360
30	301	10	8	....	....	....	5,070	420	5,750
31	245	9	6	....	....	....	5,200	319	4,480

s Computed by subdividing day.
a Computed from an estimated concentration graph.
Note.—Flow affected by ice Feb. 13-15, Mar. 6-8, 10-12.

Iowa River at Iowa City, Iowa—Continued

Suspended sediment, water year October 1944 to September 1945—Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	5,260	295	4,190	3,810	238	2,450	5,270	480	6,830
2	4,130	360	4,010	3,840	218	2,260	5,070	1,070	14,600
3	3,220	330	2,870	3,610	192	1,870	4,920	580	7,700
4	3,640	990	a10,500	3,260	170	1,500	4,800	560	7,260
5	4,350	2,160	25,400	2,980	151	1,210	4,490	575	6,970
6	4,210	1,820	20,700	2,740	143	1,060	4,440	370	4,440
7	4,000	780	8,420	2,580	134	933	4,560	265	3,260
8	4,020	650	7,060	2,480	124	830	4,790	200	2,590
9	3,820	455	4,690	2,360	116	739	5,190	162	2,270
10	3,400	415	3,810	2,150	102	592	8,360	2,200	a51,700
11	3,310	400	3,570	2,200	72	428	8,240	640	14,200
12	3,360	390	3,540	2,120	62	355	7,460	560	11,300
13	3,450	390	3,630	2,070	51	285	8,210	415	9,200
14	3,960	1,000	a10,900	3,060	430	a4,180	7,750	270	5,650
15	4,200	1,090	12,400	4,740	1,080	13,800	6,720	265	4,810
16	4,890	1,050	a14,300	4,870	1,360	17,000	5,430	385	5,640
17	5,510	1,380	20,500	5,750	920	14,300	4,400	445	5,290
18	5,420	700	10,200	5,950	490	7,870	4,220	560	6,380
19	5,970	455	7,330	5,870	300	4,750	4,110	520	5,770
20	6,510	350	6,150	6,000	215	3,480	3,970	550	5,900
21	6,510	268	4,710	6,140	196	3,250	3,460	360	3,360
22	6,460	208	3,630	5,570	295	4,440	3,120	290	2,440
23	6,670	190	3,420	4,350	440	5,170	3,200	310	2,680
24	6,610	170	3,030	3,820	335	3,460	2,950	1,060	8,440
25	6,240	159	2,680	3,900	420	4,420	2,790	499	3,760
26	5,600	168	2,540	4,190	770	8,710	2,660	340	2,440
27	4,540	207	2,540	4,500	1,200	14,600	2,920	700	5,520
28	3,910	225	2,380	4,860	620	8,170	2,920	830	6,540
29	3,780	238	2,430	4,950	410	5,510	2,640	670	4,780
30	3,760	248	2,530	5,020	295	4,000	3,010	3,590	a39,700
31	....	....	....	5,070	290	3,970	....	....	....
	July			August			September		
1	2,660	1,150	8,260	685	93	172	967	82	214
2	2,350	580	3,680	707	100	191	885	72	172
3	2,340	425	2,690	680	116	213	819	68	150
4	2,460	375	2,400	660	116	207	784	85	180
5	2,250	430	2,610	670	125	226	746	72	145
6	2,060	385	2,140	712	116	223	702	60	114
7	1,950	225	1,180	675	100	182	654	73	129
8	1,840	192	954	654	102	180	649	67	118
9	1,780	174	836	565	103	157	552	64	95
10	1,630	174	766	587	102	162	639	72	124
11	1,500	152	616	583	100	157	550	76	113
12	1,620	510	ab3,700	583	102	161	543	72	106
13	1,860	1,930	ab11,900	1,120	130	393	531	66	95
14	1,310	185	654	825	190	423	525	62	88
15	1,230	145	482	712	220	423	610	58	96
16	1,160	116	363	1,010	195	532	539	58	84
17	1,120	112	339	2,090	430	a2,520	432	59	69
18	1,060	90	258	2,450	850	5,620	479	59	76
19	1,060	95	272	2,280	480	2,950	436	58	68
20	1,010	84	229	2,350	350	2,220	443	49	59
21	1,030	87	242	2,550	380	2,620	408	57	63
22	1,000	84	227	2,630	410	2,980	457	69	85
23	941	90	229	2,880	440	3,420	429	68	79
24	843	91	207	3,110	670	5,630	543	74	108
25	873	85	200	2,890	680	5,310	436	66	78
26	813	90	198	2,140	310	a1,850	468	71	90
27	756	84	171	1,730	175	817	571	84	130
28	751	77	156	1,460	125	493	1,090	150	441
29	734	85	168	1,260	104	354	941	180	457
30	724	92	180	1,120	92	278	1,050	116	329
31	707	95	181	1,050	87	247	....	....	....

a Computed by subdividing day.
b Computed from a partly estimated concentration graph.

Iowa River at Iowa City, Iowa—Continued

Suspended sediment, water year October 1945 to September 1946

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	1,220	136	448	374	53	54	547	56	83
2	1,110	206	s618	399	41	a44	819	343	ab770
3	922	183	456	374	30	30	1,460	264	1,040
4	837	137	310	377	23	23	1,190	460	1,480
5	778	91	191	381	32	33	1,000	222	599
6	702	77	146	374	39	39	861	115	267
7	654	85	150	377	42	43	825	60	134
8	610	72	119	392	53	56	837	32	72
9	569	66	101	596	68	109	707	18	34
10	531	52	75	1,350	125	456	380	38	39
11	543	53	78	746	260	524	200	37	20
12	494	65	87	629	260	442	300	22	18
13	502	61	83	629	126	214	400	17	18
14	463	50	63	649	85	149	425	17	20
15	463	61	76	675	94	171	460	18	22
16	463	60	75	629	93	158	440	21	25
17	459	62	77	556	83	125	410	22	24
18	459	65	81	543	48	70	359	23	22
19	433	66	77	506	28	38	399	25	27
20	425	72	83	506	28	38	377	27	27
21	425	63	72	518	21	29	338	29	26
22	406	46	50	359	22	a21	316	28	24
23	392	41	43	284	21	16	239	26	17
24	418	46	52	271	20	15	370	24	24
25	384	45	47	338	18	16	265	20	14
26	374	40	40	392	18	19	285	17	13
27	395	35	37	535	20	29	236	12	8
28	377	43	44	510	21	29	320	10	9
29	392	50	53	522	20	28	316	10	9
30	392	53	56	502	17	23	288	8	6
31	384	56	58	....	....	....	281	10	8

Day	January			February			March		
1	295	11	9	930	11	28	2,050	306	s1,700
2	327	11	10	940	11	28	1,980	245	1,310
3	316	10	9	900	16	39	1,840	144	715
4	410	119	132	900	32	78	1,860	128	643
5	5,000	2,140	28,900	1,450	75	294	1,940	115	602
6	8,000	1,180	25,500	2,300	128	795	3,160	1,080	s10,300
7	4,800	710	9,200	3,000	278	2,250	4,310	3,980	s46,700
8	10,600	1,440	41,200	3,350	297	2,690	4,520	3,680	44,900
9	14,500	920	36,000	3,500	243	2,300	4,530	2,080	25,400
10	12,800	480	16,600	3,800	189	1,940	4,330	1,030	12,000
11	11,900	380	12,200	3,900	178	1,870	4,320	880	10,300
12	11,900	305	9,800	4,300	132	1,530	4,590	838	10,400
13	8,800	170	4,040	4,500	104	1,260	4,570	965	11,900
14	6,300	96	1,630	4,700	79	1,000	4,750	2,460	s31,700
15	4,700	47	596	3,900	51	537	5,080	1,360	18,700
16	2,750	44	327	2,250	36	219	5,470	945	14,000
17	2,300	40	248	1,750	48	227	6,410	580	10,000
18	2,050	38	210	1,650	36	160	6,830	550	10,100
19	1,800	42	204	1,550	45	188	7,990	566	12,300
20	1,750	23	109	1,470	53	210	8,870	435	10,400
21	1,250	13	44	1,460	37	146	7,920	200	4,280
22	1,000	13	35	1,480	38	152	7,030	200	3,800
23	1,050	12	34	1,520	42	172	6,310	220	3,750
24	1,020	10	28	1,560	61	257	5,560	335	5,030
25	1,060	9	26	1,670	73	329	4,570	555	6,850
26	960	7	18	1,820	100	491	4,780	1,290	s17,400
27	880	7	17	1,810	100	489	5,410	2,490	36,400
28	870	8	19	1,810	130	635	5,510	1,130	s16,700
29	850	9	21	....	....	....	5,690	560	8,600
30	860	10	23	....	....	....	4,590	750	9,290
31	920	11	27	....	....	....	3,660	450	4,450

s Computed by subdividing day.
a Computed from an estimated concentration graph.
b Computed from a partly estimated concentration graph.

Note.—Flow affected by ice Dec. 10-16, 25, 26, Jan. 5-7, Jan. 13 to Feb. 23.

Iowa River at Iowa City, Iowa—Continued

Suspended sediment, water year October 1945 to September 1946—Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	3,260	395	3,450	867	42	98	2,140	217	1,250
2	2,930	350	2,770	922	33	82	2,270	223	1,370
3	2,690	330	2,400	1,070	32	92	2,260	208	1,270
4	2,460	295	1,960	2,470	265	s2,160	2,130	174	1,000
5	2,280	246	1,510	4,040	1,760	s19,400	1,930	125	651
6	2,130	198	1,140	4,260	1,500	17,300	1,720	99	460
7	2,000	148	799	4,000	1,050	11,300	1,540	89	370
8	1,900	123	631	3,250	630	5,530	1,420	80	307
9	1,840	112	556	2,820	410	3,120	1,310	70	248
10	1,730	102	476	2,510	302	2,050	1,210	70	229
11	1,660	84	376	2,360	230	1,470	1,170	86	272
12	1,590	66	283	2,180	161	948	1,630	263	s1,250
13	1,630	63	277	2,020	135	736	1,710	478	2,210
14	1,620	64	280	1,880	110	558	1,690	396	1,810
15	1,560	60	253	1,780	80	413	1,380	434	1,620
16	1,490	49	197	1,700	85	390	1,350	303	1,100
17	1,420	49	188	1,660	95	426	1,900	448	2,300
18	1,290	58	202	1,660	93	417	3,190	2,470	s21,800
19	1,280	57	197	1,670	87	392	3,750	2,460	s27,700
20	1,240	65	218	1,700	83	381	4,830	5,200	67,800
21	1,200	42	130	1,770	86	411	4,560	4,760	58,600
22	1,170	97	306	1,680	86	390	4,590	2,920	s36,000
23	1,160	52	163	1,650	90	401	4,530	1,470	18,000
24	1,120	45	136	1,790	88	425	4,210	1,010	11,500
25	1,120	48	145	2,390	225	s1,460	3,920	1,950	s20,700
26	1,060	47	135	2,310	405	2,530	3,330	1,320	11,900
27	1,000	30	81	2,330	373	2,350	3,140	1,310	11,100
28	941	18	46	2,120	528	s2,990	2,740	1,270	9,400
29	928	35	88	1,920	339	1,760	2,500	980	6,620
30	885	38	91	1,900	184	a944	3,000	1,530	12,400
31	....	....	....	2,000	180	972	....	....	....
	July			August			September		
1	3,490	2,210	s22,100	1,420	308	s1,160	502	69	94
2	3,920	3,140	s32,800	1,040	716	s3,830	482	55	72
3	3,380	3,000	a27,400	1,310	249	s894	479	60	78
4	2,540	1,700	a11,700	1,130	148	452	399	65	70
5	2,080	820	4,610	1,000	142	383	410	57	63
6	1,870	420	2,120	948	100	256	410	53	59
7	1,710	335	1,550	740	80	160	471	52	a66
8	1,600	250	1,080	807	69	150	1,000	131	s440
9	1,560	220	927	790	72	154	1,170	323	1,020
10	1,460	190	749	734	60	119	2,010	343	s1,980
11	1,340	187	677	690	46	80	2,210	670	4,030
12	1,640	243	1,080	639	50	86	2,080	409	2,030
13	1,520	370	1,520	547	52	77	2,150	374	2,170
14	1,280	353	1,220	625	58	98	1,960	339	1,790
15	1,150	222	689	724	96	188	1,610	238	a1,030
16	1,080	179	522	592	74	118	1,420	167	a640
17	1,100	202	600	1,530	301	s1,420	1,280	117	404
18	1,060	128	366	1,110	252	755	1,140	93	286
19	980	115	304	1,120	130	393	1,020	93	256
20	934	107	270	903	160	390	1,030	93	259
21	903	90	219	729	211	415	954	90	232
22	790	92	196	639	139	240	1,060	112	a321
23	960	88	228	601	85	138	2,200	450	s2,770
24	909	75	184	556	83	125	3,720	1,850	s18,800
25	873	112	264	535	78	113	4,070	1,420	15,600
26	861	119	277	634	69	118	3,780	965	9,850
27	825	97	216	634	60	103	2,230	370	s2,300
28	795	81	174	670	69	125	1,920	284	1,470
29	807	90	196	596	78	126	1,760	252	s1,190
30	903	80	195	543	72	106	1,550	255	1,070
31	1,580	110	469	518	75	105	....	....	....

s Computed by subdividing day.
a Computed from an estimated concentration graph.

Iowa River at Iowa City, Iowa—Continued

Suspended sediment, water year October 1946 to September 1947

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1.....	1,320	215	766	2,040	190	1,050	1,270	62	213
2.....	1,200	115	373	2,210	224	1,340	1,200	59	191
3.....	1,120	94	284	3,280	742	a6,710	1,140	51	157
4.....	1,040	83	233	3,140	804	6,820	1,080	58	169
5.....	967	80	209	2,660	445	3,200	1,120	49	148
6.....	903	74	180	2,370	283	1,810	1,080	49	143
7.....	861	73	170	2,230	195	1,170	1,140	54	166
8.....	825	78	174	2,130	160	920	1,190	38	122
9.....	795	75	161	2,040	140	771	1,190	62	199
10.....	778	71	149	2,100	152	862	1,170	68	215
11.....	801	72	156	2,130	138	794	1,130	53	162
12.....	807	45	98	2,140	182	1,050	1,160	49	153
13.....	825	38	85	2,000	170	918	993	58	156
14.....	915	38	94	1,940	142	744	1,010	43	117
15.....	922	35	87	1,880	122	619	960	34	88
16.....	960	38	98	1,880	142	721	948	44	113
17.....	986	42	112	1,920	154	798	520	33	46
18.....	2,350	602	a3,890	1,950	147	774	320	28	24
19.....	2,270	522	3,200	1,840	128	636	380	31	32
20.....	2,050	267	1,480	1,780	104	500	460	23	29
21.....	1,600	234	1,010	1,720	104	483	718	22	43
22.....	1,410	146	556	1,650	95	423	807	28	61
23.....	1,310	85	301	1,580	79	337	954	28	72
24.....	1,460	85	335	1,540	79	328	825	33	74
25.....	2,840	619	a5,080	1,480	67	268	773	30	63
26.....	3,800	1,840	18,900	1,490	64	257	790	41	87
27.....	3,090	850	7,090	1,410	66	251	795	42	90
28.....	2,710	540	3,950	1,370	64	237	915	30	74
29.....	2,440	415	2,730	1,320	58	207	762	23	47
30.....	2,210	290	1,730	1,310	59	209	506	27	37
31.....	2,100	230	1,300	....	....	....	340	18	17
	January			February			March		
1.....	340	26	24	535	14	20	1,130	25	76
2.....	400	28	30	482	8	10	1,050	23	65
3.....	460	19	24	482	9	12	1,000	15	40
4.....	480	21	27	527	5	7	1,010	17	46
5.....	480	29	38	539	4	6	870	21	49
6.....	490	30	40	580	5	8	891	17	41
7.....	500	37	50	600	7	11	954	19	49
8.....	510	34	47	600	6	10	1,140	34	105
9.....	530	36	52	570	7	11	1,360	46	169
10.....	530	28	40	600	13	21	1,620	93	407
11.....	530	30	43	530	13	19	1,760	127	604
12.....	530	32	46	550	10	15	1,850	136	679
13.....	580	26	41	592	12	19	2,210	230	1,370
14.....	1,310	76	269	950	24	64	2,970	578	4,630
15.....	1,350	116	423	1,680	95	431	3,180	522	4,480
16.....	1,220	73	240	2,700	272	a2,040	3,300	459	4,090
17.....	1,030	94	261	2,940	344	2,730	3,250	498	4,370
18.....	960	71	184	2,900	347	2,720	3,240	540	4,720
19.....	807	49	119	3,120	294	2,480	3,500	564	5,330
20.....	873	26	61	2,900	230	1,800	3,430	636	5,880
21.....	784	18	38	2,520	157	1,070	3,480	1,140	10,700
22.....	750	16	32	2,220	98	587	3,630	1,360	13,300
23.....	760	16	33	2,160	65	379	3,020	930	7,580
24.....	760	12	25	2,210	41	245	3,630	1,330	13,000
25.....	762	12	25	1,780	38	183	4,050	1,810	19,800
26.....	795	19	41	1,460	32	126	3,900	2,720	28,600
27.....	873	17	40	1,300	30	105	3,550	1,760	16,900
28.....	915	14	35	1,210	30	98	3,160	1,370	11,700
29.....	922	15	37	....	....	....	2,860	705	5,440
30.....	680	15	28	....	....	....	2,650	505	3,610
31.....	587	13	21	....	....	....	2,520	410	2,790

a Computed by subdividing day.

Note.—Flow affected by ice Dec. 17-20, Dec. 31 to Jan. 13, Jan. 22-24, Feb. 6-12, Feb. 17 to Mar. 5.

Iowa River at Iowa City, Iowa—Continued

Suspended sediment, water year October 1946 to September 1947—Continued

Day	April: Mean discharge (cfs)	April: Suspended sediment: Mean concentration (ppm)	April: Suspended sediment: Tons per day	May: Mean discharge (cfs)	May: Suspended sediment: Mean concentration (ppm)	May: Suspended sediment: Tons per day	June: Mean discharge (cfs)	June: Suspended sediment: Mean concentration (ppm)	June: Suspended sediment: Tons per day
1	2,460	340	2,260	4,270	698	8,050	5,480	975	s14,600
2	2,370	295	1,890	4,100	625	6,920	6,610	951	17,000
3	2,200	220	1,310	3,870	726	7,590	7,070	680	13,000
4	2,670	460	s3,590	3,490	566	5,330	12,900	1,660	s60,300
5	6,000	3,810	s65,000	3,140	358	3,040	17,700	1,190	56,900
6	7,580	2,450	s50,500	2,850	269	2,070	17,000	803	36,900
7	6,420	1,440	25,000	2,700	210	1,530	24,200	1,410	s93,300
8	6,010	850	13,800	2,520	189	1,290	27,400	1,270	94,000
9	5,860	750	11,900	2,370	171	1,090	23,000	905	56,200
10	5,750	1,090	16,900	2,270	156	956	17,700	690	33,000
11	6,220	1,850	31,100	2,140	135	780	13,200	331	11,800
12	5,960	1,140	18,300	2,020	118	644	10,800	238	6,940
13	6,340	829	14,200	1,940	130	681	11,100	760	22,800
14	7,170	843	16,300	1,910	119	614	10,900	746	22,000
15	7,580	699	14,300	1,900	122	626	15,700	1,390	s64,900
16	7,430	462	9,270	1,900	110	564	29,500	1,860	s152,000
17	7,360	416	8,270	1,960	119	630	32,600	1,650	s146,000
18	7,220	361	7,040	2,170	130	762	27,900	1,070	80,600
19	7,250	344	6,730	2,400	189	1,220	20,700	716	40,000
20	9,330	754	19,000	2,360	221	1,410	15,400	478	19,900
21	8,720	500	11,800	2,340	198	1,250	13,800	428	15,900
22	7,710	369	7,680	2,260	208	1,270	14,200	458	17,600
23	7,760	346	7,250	2,190	178	1,050	16,300	555	24,400
24	7,250	287	5,620	2,090	157	886	17,200	558	25,900
25	6,350	273	4,680	2,080	151	848	15,800	497	21,200
26	5,180	350	4,900	2,040	137	755	15,600	493	22,000
27	4,450	516	6,200	1,930	129	672	15,900	528	22,700
28	4,060	673	7,380	2,200	161	956	13,600	408	15,000
29	3,810	464	4,770	4,740	1,680	s21,700	12,100	369	12,100
30	4,890	2,260	s30,300	4,710	1,610	20,500	12,700	1,030	s37,400
31	....	....	....	4,870	1,240	16,300	....	....	....
	July			**August**			**September**		
1	13,600	742	27,200	1,240	128	429	404	....	e51
2	15,200	828	34,000	1,200	110	356	421	....	e61
3	12,700	539	18,500	1,150	115	357	424	....	e55
4	10,500	376	10,700	1,090	111	327	398	....	e57
5	9,850	391	10,400	1,060	117	335	387	....	e46
6	12,000	1,220	s39,400	1,000	131	354	404	....	e40
7	10,200	584	16,100	946	148	378	376	....	e42
8	8,650	370	8,640	898	115	279	342	....	e44
9	7,880	330	7,020	830	116	260	340	....	e46
10	7,250	321	6,280	781	111	234	331	....	e46
11	6,600	320	5,700	742	117	234	354	....	e71
12	6,680	714	s14,200	694	126	236	350	....	e62
13	7,630	1,540	31,700	673	106	193	340	....	e43
14	6,580	724	12,900	657	109	193	323	....	e45
15	5,370	432	6,260	594	108	173	334	....	e47
16	4,910	451	5,980	559	119	180	300	....	e45
17	4,330	499	5,830	555	114	171	248	....	e35
18	3,640	419	4,120	527	110	157	309	....	e44
19	3,170	385	3,300	486	76	100	269	....	e36
20	3,010	369	3,000	483	74	97	282	....	e39
21	2,700	337	2,460	480	85	110	309	....	e47
22	2,340	319	2,020	465	99	124	255	....	e35
23	2,160	262	1,530	459	115	143	247	....	e20
24	2,050	200	1,110	453	....	e81	254	....	e27
25	1,930	183	954	444	....	e72	276	....	e32
26	1,810	165	806	410	....	e73	245	....	e30
27	1,730	151	705	401	....	e66	250	....	e30
28	1,620	120	525	421	....	e59	298	....	e36
29	1,540	105	437	441	....	e57	218	....	e27
30	1,410	104	396	407	....	e46	221	....	e30
31	1,340	119	431	401	....	e47	....	....	....

e Estimated.
s Computed by subdividing day.

Iowa River at Iowa City, Iowa—Continued

Suspended sediment, water year October 1947 to September 1948

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	231	84	52	522	69	a97	250	58	39
2	211	82	47	568	66	101	390	54	57
3	225	113	69	652	67	118	531	50	72
4	250	86	58	674	70	127	670	47	a85
5	227	74	45	697	69	130	860	55	128
6	357	68	66	652	68	120	775	113	236
7	277	64	a48	594	62	99	890	115	276
8	290	66	52	577	46	72	948	102	261
9	280	69	52	505	34	a46	461	86	107
10	256	63	44	543	27	40	465	78	98
11	236	85	54	526	21	a30	469	64	81
12	241	92	a60	514	17	24	518	41	a57
13	241	86	56	489	18	24	539	19	28
14	222	77	46	481	40	52	670	38	69
15	216	74	43	457	35	43	805	44	96
16	233	66	42	466	27	34	630	32	54
17	241	56	36	477	24	31	539	40	58
18	211	83	47	489	22	a29	625	43	73
19	203	95	52	489	20	26	599	39	63
20	206	91	51	505	18	25	599	40	65
21	256	88	a61	522	19	a27	573	36	56
22	209	86	49	505	23	31	568	33	51
23	201	84	46	501	29	39	564	31	a47
24	196	84	a44	518	36	50	518	30	42
25	176	85	40	518	58	81	510	40	a55
26	191	80	41	485	61	a80	510	54	74
27	211	90	51	539	60	87	505	56	76
28	253	87	59	409	58	64	497	50	67
29	329	83	74	330	60	53	465	41	51
30	372	78	78	280	62	47	481	41	53
31	522	73	103	....	....	....	461	41	51
	January			February			March		
1	380	38	39	171	54	25	6,400	2,450	43,340
2	260	35	25	169	44	20	8,600	1,510	35,060
3	250	34	23	167	50	23	7,500	760	15,390
4	320	35	a30	167	34	15	7,400	621	12,410
5	350	37	35	165	33	15	8,500	611	14,020
6	370	45	a45	154	34	14	7,500	386	7,820
7	394	54	a57	160	43	19	4,040	243	2,650
8	433	55	64	151	41	17	3,130	199	1,680
9	437	41	48	150	33	13	2,500	182	1,230
10	417	32	36	155	27	11	2,100	152	862
11	402	49	53	149	26	10	1,700	97	445
12	417	50	56	151	25	10	1,350	79	288
13	394	40	43	155	20	8	1,150	70	217
14	340	36	33	145	24	9	1,300	95	333
15	325	39	34	150	18	7	2,850	381	2,900
16	310	29	24	150	23	a9	6,260	785	s13,940
17	220	34	20	670	38	69	8,730	1,050	24,750
18	225	27	16	1,090	193	1,040	10,600	1,330	s38,480
19	230	37	23	2,190	276	1,630	15,200	1,950	s80,520
20	256	28	19	1,020	214	589	14,600	1,400	s56,310
21	256	24	a17	600	224	363	14,800	1,650	65,930
22	253	24	16	420	160	181	16,500	1,580	70,390
23	236	26	17	440	130	154	13,300	1,260	45,250
24	203	28	15	610	160	264	12,500	1,130	38,140
25	200	32	a17	810	268	586	10,200	710	19,550
26	190	35	18	620	151	253	8,280	460	10,280
27	180	35	17	2,070	976	5,450	6,990	386	7,280
28	180	42	20	6,640	3,110	55,760	5,520	1,160	17,290
29	183	54	27	3,980	2,260	24,290	4,570	1,860	22,950
30	179	35	17	....	....	....	4,230	1,970	22,500
31	171	45	a21	....	....	....	4,440	1,990	23,860

s Computed by subdividing day.
a Computed from an estimated concentration graph.
Note.—Flow affected by ice Nov. 29 to Dec. 1, Jan. 1-6, 14-18, 25-28, Feb. 9, 10, Feb. 13 to Mar. 5, Mar. 9-15.

Iowa River at Iowa City, Iowa—Continued

Suspended sediment, water year October 1947 to September 1948—Continued

Day	April			May			June		
		Suspended sediment			Suspended sediment			Suspended sediment	
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1	4,750	1,010	12,950	1,470	114	452	684	67	124
2	5,070	647	8,810	1,690	131	598	746	64	129
3	3,960	480	5,130	2,020	238	1,300	648	72	126
4	2,800	446	3,370	2,520	405	2,760	670	76	137
5	2,400	348	2,260	2,320	500	3,130	688	78	145
6	2,160	303	1,780	2,320	338	2,120	738	82	163
7	2,020	266	1,450	3,120	b672	5,660	850	102	234
8	1,900	252	1,290	3,490	1,720	16,210	738	120	239
9	1,800	218	1,060	3,280	1,150	10,180	692	116	217
10	1,770	227	1,080	3,070	715	5,930	674	100	182
11	1,850	238	1,190	2,760	505	3,760	634	94	161
12	1,700	389	1,790	2,540	362	2,480	661	116	207
13	1,550	990	4,140	2,340	300	1,900	666	82	147
14	1,470	399	1,580	2,170	234	1,370	660	79	142
15	1,570	294	1,250	2,120	193	1,100	670	78	141
16	1,460	268	1,060	2,010	168	912	670	74	134
17	1,210	278	908	1,870	141	712	666	73	131
18	1,140	213	656	1,720	104	483	670	71	128
19	1,180	172	548	1,580	101	431	674	78	142
20	1,070	167	482	1,470	82	325	688	85	158
21	998	119	321	1,410	85	324	692	85	159
22	965	106	276	1,300	86	300	674	86	157
23	998	65	175	1,290	72	251	625	71	120
24	1,030	66	184	1,180	77	245	510	69	95
25	1,060	71	203	1,080	73	213	473	72	92
26	1,680	94	426	1,010	60	164	489	77	102
27	1,810	199	973	954	53	137	733	563	1,110
28	1,700	323	1,480	900	46	112	1,240	1,160	3,880
29	1,570	176	746	870	47	110	885	798	1,910
30	1,490	126	507	840	41	93	742	315	631
31	....	....	....	810	57	125	....	....	....
	July			August			September		
1	938	231	585	670	215	389	201	99	54
2	1,080	160	467	547	155	229	326	104	92
3	875	286	a676	469	144	182	312	118	99
4	692	377	704	421	118	134	183	85	42
5	815	304	669	398	111	119	160	61	26
6	652	178	313	375	102	103	183	62	31
7	652	134	236	357	108	104	227	72	44
8	621	145	243	329	111	99	214	80	46
9	543	108	158	316	91	78	206	78	43
10	518	105	147	329	96	85	196	71	38
11	461	126	157	309	100	83	188	69	35
12	461	143	178	283	89	68	170	71	34
13	581	153	240	283	80	61	167	82	37
14	830	249	558	274	87	64	162	65	28
15	607	281	461	265	71	51	158	67	29
16	473	201	257	247	67	45	145	77	30
17	453	158	193	225	66	40	143	70	27
18	738	126	251	241	66	43	141	67	26
19	855	114	263	233	67	42	137	52	19
20	679	570	1,040	219	70	41	165	58	26
21	2,580	1,900	13,240	211	70	40	256	92	64
22	2,170	820	4,800	211	69	39	236	150	96
23	1,450	1,420	5,560	209	64	36	216	121	71
24	970	695	1,830	188	60	30	209	107	60
25	1,090	580	sb2,140	183	58	29	196	102	54
26	1,610	1,270	b5,520	181	57	28	188	84	43
27	1,180	486	1,550	165	59	26	171	88	41
28	905	375	916	156	58	24	160	88	38
29	746	395	796	143	54	21	151	84	34
30	1,450	400	sb1,720	165	55	25	139	78	29
31	921	490	1,220	201	79	43	....	....	....

s Computed by subdividing day.
a Computed from an estimated concentration graph.
b Computed from a partly estimated concentration graph.

Iowa River at Iowa City, Iowa—Continued

Suspended sediment, water year October 1948 to September 1949

Day	October			November			December		
		Suspended sediment			Suspended sediment			Suspended sediment	
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1.....	123	158	52	133	51	18	225	46	28
2.....	118	90	29	184	58	29	198	33	18
3.....	110	100	32	188	69	35	186	21	11
4.....	123	81	27	158	70	30	216	23	13
5.....	119	72	23	156	71	30	233	39	25
6.....	127	82	28	162	75	33	259	56	39
7.....	470	172	sb243	171	70	32	244	74	40
8.....	552	402	599	176	64	30	203	136	75
9.....	275	267	108	181	64	31	158	60	s30
10.....	203	215	118	170	61	28	131	45	16
11.....	234	156	99	147	69	27	116	33	10
12.....	199	90	48	142	104	40	154	60	25
13.....	184	69	34	131	41	14	188	30	15
14.....	193	54	28	167	47	21	219	32	19
15.....	188	40	20	171	47	22	423	72	s103
16.....	179	75	30	253	42	29	648	272	s508
17.....	171	144	66	208	56	45	421	163	185
18.....	209	60	34	322	92	80	176	229	109
19.....	201	56	30	287	132	102	216	261	s162
20.....	106	67	19	518	138	193	208	99	72
21.....	135	59	22	514	170	248	450	168	207
22.....	137	52	19	522	164	231	300	57	60
23.....	123	51	17	368	175	174	127	34	12
24.....	123	52	17	378	118	119	112	32	10
25.....	123	47	15	343	122	113	290	51	40
26.....	123	55	18	375	64	65	271	17	12
27.....	135	54	20	268	59	43	129	26	9
28.....	149	50	20	290	40	31	110	50	16
29.....	141	52	20	265	47	34	474	49	63
30.....	133	63	23	253	66	45	522	38	54
31.....	129	53	18	....	....	....	143	45	17

Day	January			February			March		
1.....	256	63	44	550	12	a18	3,800	311	3,190
2.....	413	22	25	540	20	29	3,900	312	3,290
3.....	417	28	32	520	28	30	4,300	400	4,640
4.....	1,110	128	sb621	540	23	34	5,400	650	9,480
5.....	2,370	361	2,310	520	15	21	6,200	848	14,200
6.....	2,100	271	1,540	520	10	14	5,800	819	12,830
7.....	1,810	320	1,560	510	12	17	7,000	1,010	19,090
8.....	2,150	250	1,450	510	18	25	12,200	1,320	43,480
9.....	2,150	221	1,280	500	50	68	13,200	1,020	36,350
10.....	2,070	190	1,060	250	78	53	13,700	772	28,560
11.....	1,590	107	459	518	32	45	13,300	512	18,390
12.....	1,210	64	209	526	54	77	11,400	345	10,620
13.....	1,020	44	121	497	47	s65	9,630	275	7,150
14.....	965	58	151	489	384	507	7,960	250	5,370
15.....	1,440	174	sb915	233	152	96	5,940	310	4,970
16.....	2,500	577	b3,890	413	13	14	3,980	368	3,950
17.....	2,070	329	1,840	277	11	8	3,100	295	2,470
18.....	2,150	260	1,510	340	11	10	2,560	218	1,510
19.....	3,380	245	2,240	343	14	13	2,230	210	1,260
20.....	2,800	200	1,510	560	18	27	1,990	168	903
21.....	2,400	134	868	648	24	42	1,910	130	670
22.....	1,600	112	484	625	32	54	2,390	300	s2,000
23.....	1,000	86	232	740	150	sb427	3,660	1,600	s17,070
24.....	900	76	185	4,000	968	s15,210	4,650	3,330	s41,410
25.....	800	48	104	4,600	592	s9,740	4,780	2,150	27,750
26.....	750	41	83	4,000	495	5,340	4,180	1,400	15,800
27.....	700	28	53	3,600	400	3,890	4,480	1,100	13,310
28.....	650	22	38	3,700	342	3,420	4,580	1,220	15,090
29.....	610	16	26	....	....	....	4,580	1,340	16,570
30.....	560	12	a18	....	....	....	4,580	1,170	14,470
31.....	540	12	a17	....	....	....	5,390	2,420	35,220

s Computed by subdividing day.
a Computed from an estimated concentration graph.
b Computed from a partly estimated concentration graph.

Note.—Flow affected by ice Jan. 5-7, 16, Jan. 20 to Feb. 9, Feb. 23 to Mar. 7.

Iowa River at Iowa City, Iowa—Continued

Suspended sediment, water year October 1948 to September 1949—Continued

Day	April			May			June		
		Suspended sediment			Suspended sediment			Suspended sediment	
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1.....	5,600	1,520	22,570	1,050	56	159	715	56	108
2.....	5,390	950	13,830	992	72	193	738	99	197
3.....	4,980	730	9,820	965	90	234	992	265	710
4.....	4,380	536	6,340	910	85	209	1,210	353	[a]1,180
5.....	3,580	438	4,230	860	85	197	1,020	728	2,000
6.....	3,100	348	2,910	810	98	214	910	736	1,810
7.....	2,740	290	2,150	785	90	191	738	434	865
8.....	2,470	237	1,580	760	77	158	648	335	586
9.....	2,230	200	1,200	760	78	160	603	278	453
10.....	1,990	155	833	738	79	157	560	209	316
11.....	1,830	116	573	715	67	129	531	165	237
12.....	1,710	97	448	692	53	99	518	143	200
13.....	1,590	83	356	670	50	90	344	146	136
14.....	1,430	77	297	670	61	110	692	178	333
15.....	1,550	88	368	625	100	169	539	299	435
16.....	1,550	80	335	625	77	130	603	156	254
17.....	1,670	88	397	625	75	127	539	160	233
18.....	1,750	109	515	603	75	122	603	247	402
19.....	1,750	119	562	648	72	126	481	188	244
20.....	1,750	118	558	648	77	135	514	155	215
21.....	1,710	110	508	648	78	136	489	145	191
22.....	1,750	100	472	760	67	137	477	140	180
23.....	1,710	92	425	760	85	174	389	200	210
24.....	1,630	83	365	715	75	145	1,720	1,900	[a]9,040
25.....	1,510	75	306	670	75	136	2,650	2,740	19,600
26.....	1,430	63	243	648	70	122	1,790	2,600	12,570
27.....	1,320	58	207	625	67	113	2,150	2,550	14,800
28.....	1,210	55	180	603	77	125	1,870	2,080	10,500
29.....	1,140	54	166	581	86	135	1,470	980	3,890
30.....	1,110	55	165	560	72	109	1,240	750	2,510
31.....	....	....	....	526	63	89	....	....	....

Day	July			August			September		
1.....	1,080	281	819	316	146	125	141	75	29
2.....	992	230	616	296	159	127	101	72	20
3.....	938	196	496	262	150	106	137	80	30
4.....	1,140	189	582	247	120	80	230	68	42
5.....	965	234	610	219	85	50	193	74	39
6.....	910	343	843	201	68	37	174	55	26
7.....	910	319	784	219	59	35	253	55	38
8.....	885	204	487	203	52	29	198	66	35
9.....	860	184	427	186	52	26	206	77	43
10.....	760	210	431	219	56	33	174	56	26
11.....	670	207	374	368	68	68	216	74	43
12.....	560	172	260	409	90	99	1,040	228	640
13.....	469	158	200	259	94	66	882	526	1,250
14.....	514	135	187	183	56	28	581	374	587
15.....	473	100	128	203	57	31	557	194	292
16.....	433	106	124	186	63	32	506	143	195
17.....	409	105	116	191	52	27	261	166	117
18.....	409	94	104	188	61	31	287	258	200
19.....	406	89	98	198	62	33	278	198	149
20.....	469	95	120	193	64	33	82	211	47
21.....	535	95	137	186	62	31	181	150	73
22.....	473	95	121	178	64	31	165	100	45
23.....	409	87	96	147	59	23	152	88	36
24.....	482	135	176	175	72	34	139	73	27
25.....	433	244	285	170	47	22	131	55	19
26.....	421	150	171	169	45	21	134	70	25
27.....	810	146	319	141	40	15	126	65	22
28.....	596	260	418	141	69	26	122	70	23
29.....	603	150	244	147	70	28	105	80	23
30.....	429	126	146	160	58	25	105	50	14
31.....	326	133	117	149	78	31	....	....	....

[a] Computed by subdividing day.

Iowa River at Iowa City, Iowa—Continued

Suspended sediment, water year October 1949 to September 1950

Day	October: Mean discharge (cfs)	October: Suspended sediment, Mean concentration (ppm)	October: Suspended sediment, Tons per day	November: Mean discharge (cfs)	November: Suspended sediment, Mean concentration (ppm)	November: Suspended sediment, Tons per day	December: Mean discharge (cfs)	December: Suspended sediment, Mean concentration (ppm)	December: Suspended sediment, Tons per day
1	94	54	14	168	40	18	165	40	18
2	101	50	14	165	50	22	156	40	17
3	114	40	12	148	51	20	158	45	19
4	114	47	14	164	35	16	151	37	15
5	105	53	15	142	61	23	138	36	13
6	123	48	16	151	94	38	144	26	10
7	121	51	17	157	60	25	144	28	11
8	123	58	19	154	51	21	96	30	8
9	125	60	20	158	39	17	94	26	7
10	177	68	32	161	63	27	94	28	7
11	272	65	48	153	36	15	140	44	17
12	231	72	45	177	40	19	181	42	21
13	199	58	31	203	57	31	92	39	10
14	182	58	29	191	59	30	101	40	11
15	155	63	26	211	60	34	117	43	14
16	165	61	27	213	68	39	134	35	13
17	155	64	27	198	46	25	149	47	19
18	160	44	18	172	48	22	169	38	17
19	158	49	21	174	36	17	174	43	20
20	189	71	36	167	29	13	198	43	23
21	1,340	186	673	150	27	11	181	33	16
22	602	392	849	144	28	10	105	25	7
23	575	260	404	162	26	11	90	17	4
24	199	173	93	162	26	11	85	11	3
25	274	150	111	156	23	10	125	15	5
26	231	110	69	150	22	9	129	14	5
27	210	104	59	158	23	10	126	17	6
28	192	130	67	158	20	12	113	27	8
29	177	68	32	156	43	18	103	33	9
30	181	54	26	158	30	13	111	41	12
31	168	50	23	....	....	....	630	67	114
	January			**February**			**March**		
1	610	159	262	131	26	9	1,620	69	302
2	313	200	169	127	27	9	1,940	61	320
3	280	104	79	116	22	7	1,700	80	395
4	162	59	26	116	19	6	1,340	101	s385
5	138	46	17	115	18	6	4,980	444	s6,570
6	153	30	12	236	26	17	6,860	818	15,200
7	149	20	8	1,020	61	168	5,720	1,070	s16,600
8	129	14	5	678	36	66	8,980	1,860	s46,000
9	121	19	6	906	55	135	11,400	1,280	s39,600
10	127	46	16	1,460	113	445	12,800	820	28,300
11	123	45	15	1,940	145	760	13,300	600	21,500
12	117	70	22	2,340	420	2,650	12,800	425	14,700
13	1,020	109	sb474	2,580	388	2,700	11,400	335	10,300
14	1,140	459	1,410	2,260	262	1,600	9,760	290	7,640
15	381	297	306	1,260	135	459	7,240	250	4,890
16	387	188	196	708	81	155	3,940	295	3,140
17	385	135	140	524	69	98	3,310	435	3,890
18	344	102	95	470	58	74	3,140	438	3,710
19	275	109	81	405	51	56	2,820	350	2,710
20	248	131	88	408	56	62	2,660	290	2,080
21	235	130	82	380	39	41	2,420	223	1,460
22	203	122	67	355	30	29	2,260	172	1,050
23	196	120	64	333	26	23	2,420	214	1,400
24	192	108	56	275	23	17	2,900	568	4,450
25	656	204	361	278	20	15	3,400	1,580	s14,600
26	634	117	200	258	18	13	4,390	1,090	20,000
27	201	81	44	266	17	12	4,300	1,070	s12,600
28	186	52	26	537	35	51	3,580	598	5,780
29	282	34	26	....	....	....	3,490	540	5,090
30	193	33	17	....	....	....	3,310	575	5,140
31	149	30	12	....	....	....	3,060	482	3,980

s Computed by subdividing day.
b Computed from a partly estimated concentration graph.

Iowa River at Iowa City, Iowa—Continued

Suspended sediment, water year October 1949 to September 1950—Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	2,660	330	2,370	1,220	95	313	1,380	170	633
2	2,500	255	1,720	1,140	80	246	1,260	130	442
3	2,660	250	1,800	1,060	70	200	1,220	100	329
4	2,820	280	2,130	1,620	236	1,030	1,300	125	439
5	2,660	270	1,940	1,260	333	1,130	1,380	150	559
6	2,340	210	1,330	1,100	165	490	1,340	125	452
7	2,020	160	873	1,300	100	351	1,220	105	346
8	1,760	120	577	2,420	258	1,690	1,140	128	394
9	1,660	102	457	2,950	674	sb5,490	1,060	128	366
10	1,760	135	649	2,980	945	s8,260	990	108	289
11	1,860	198	994	4,030	3,660	39,800	920	99	246
12	1,700	123	548	4,210	4,020	45,700	2,020	150	818
13	1,540	112	466	4,210	2,500	28,400	3,140	900	7,630
14	1,420	125	479	4,210	1,400	15,900	2,340	790	4,990
15	1,300	100	351	3,850	900	9,360	2,660	1,400	10,500
16	1,180	75	239	2,980	480	3,860	2,020	700	3,820
17	1,100	75	223	2,420	300	1,960	2,100	810	4,590
18	1,025	79	219	2,100	198	1,120	4,120	5,700	s68,400
19	955	79	204	1,860	145	728	4,780	4,870	s62,800
20	892	72	173	1,620	122	534	4,980	4,740	s63,300
21	822	71	158	1,740	100	470	5,610	2,820	42,700
22	720	78	152	1,700	142	652	6,520	2,100	37,000
23	864	82	191	2,020	157	856	6,260	1,410	23,900
24	1,100	139	413	2,660	474	3,400	6,050	1,000	16,300
25	1,820	345	1,700	1,980	1,250	s6,710	6,280	1,140	19,300
26	1,200	215	731	1,700	595	2,730	7,720	1,480	30,800
27	1,180	97	309	1,780	360	1,730	10,300	1,500	41,700
28	1,100	75	223	2,420	1,110	s7,330	10,200	1,040	28,600
29	1,100	136	404	2,020	2,780	15,200	8,330	700	15,700
30	1,140	100	308	1,660	1,400	6,270	4,640	460	5,760
31	....	....	....	1,500	320	1,300	....	....	....

Day	July			August			September		
1	3,290	828	sb12,400	848	365	836	287	100	77
2	7,770	4,560	s109,300	537	280	406	191	100	52
3	2,500	860	5,800	289	185	144	132	87	31
4	2,020	408	2,210	484	182	238	150	104	44
5	1,740	220	1,030	408	154	170	262	94	66
6	1,540	152	632	366	125	124	112	85	26
7	1,250	116	392	366	126	125	280	127	96
8	1,220	107	352	355	116	111	105	88	25
9	1,140	83	255	374	114	115	193	60	31
10	1,060	77	220	532	102	sb377	100	55	15
11	955	72	186	390	234	246	232	67	42
12	1,110	255	sb960	413	214	239	132	72	26
13	1,290	470	s1,760	378	228	233	147	69	27
14	857	163	377	246	159	106	139	69	26
15	649	118	207	408	110	121	167	53	24
16	690	108	201	247	96	64	166	52	23
17	829	107	239	295	93	74	153	53	22
18	660	114	205	246	99	66	115	49	15
19	969	357	sb1,080	344	107	99	227	58	36
20	787	416	s918	218	108	64	158	51	22
21	640	189	327	289	118	92	218	58	34
22	610	142	234	436	122	144	143	71	27
23	565	127	194	140	95	37	158	56	24
24	466	110	138	344	80	74	223	72	43
25	436	120	141	197	89	47	1,420	171	s662
26	470	109	138	249	82	55	1,140	541	s1,630
27	497	111	149	159	90	39	857	360	833
28	520	100	140	386	121	126	684	238	440
29	510	83	114	281	76	58	605	171	279
30	668	210	sb688	234	95	60	524	140	198
31	2,370	1,090	s7,800	172	85	39	....	....	....

s Computed by subdividing day.
b Computed from a partly estimated concentration graph.

Iowa River at Iowa City, Iowa—Continued

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	488	135	178	166	80	36	123	43	14
2	399	130	140	270	86	63	181	50	24
3	453	165	202	177	89	43	100	27	7
4	323	125	109	110	90	27	123	21	7
5	379	115	118	160	92	a40	204	34	19
6	326	100	88	255	89	61	88	36	9
7	264	86	61	123	63	21	90	27	7
8	424	107	122	140	63	24	106	31	9
9	368	82	81	264	57	41	110	31	9
10	361	74	72	101	58	16	110	55	16
11	408	72	79	255	45	31	111	29	9
12	327	80	71	134	45	16	109	36	11
13	383	65	67	181	42	21	111	27	8
14	358	74	72	150	28	11	110	22	7
15	424	80	92	163	30	13	106	21	6
16	402	94	102	238	35	22	100	22	6
17	333	100	90	93	38	10	100	18	5
18	259	85	59	215	36	21	105	22	6
19	305	83	68	120	62	20	107	19	5
20	302	80	65	201	97	53	97	15	4
21	292	81	64	158	65	28	95	12	3
22	285	83	64	214	40	23	101	15	4
23	264	87	62	112	35	11	100	19	5
24	328	83	74	97	26	7	100	23	6
25	250	94	63	101	32	9	100	29	8
26	196	60	32	123	35	12	94	31	8
27	237	59	38	124	30	10	103	28	8
28	175	67	32	124	27	9	100	28	8
29	109	62	33	124	23	8	95	25	6
30	252	66	45	127	31	11	90	25	6
31	229	78	48	....	....	....	93	30	8

Day	January			February			March		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1	96	31	8	93	10	3	5,000	720	9,720
2	98	28	7	92	9	2	5,800	1,040	16,300
3	98	33	9	92	9	2	5,500	520	7,720
4	96	33	9	92	8	2	5,400	445	6,490
5	96	29	8	92	7	2	6,000	620	b10,000
6	90	24	6	92	8	2	5,830	875	13,800
7	92	24	6	92	9	2	4,210	660	7,500
8	94	26	7	91	9	2	3,670	590	5,850
9	92	23	6	89	15	4	3,760	830	8,430
10	92	29	7	88	8	2	3,580	940	9,090
11	92	29	7	102	13	4	2,900	555	4,350
12	92	32	8	600	22	36	2,100	230	1,300
13	92	55	14	360	23	22	1,420	68	261
14	92	46	11	445	25	30	1,220	37	122
15	92	39	10	570	38	58	1,380	31	116
16	93	35	9	372	48	49	1,460	38	150
17	95	45	12	450	74	90	1,460	52	205
18	140	47	18	1,000	170	sb670	1,300	90	316
19	280	60	45	3,900	548	5,770	1,200	84	272
20	230	37	23	3,700	331	3,310	1,000	61	165
21	140	37	14	2,500	159	1,070	940	58	147
22	149	37	15	2,300	110	683	1,000	69	186
23	210	26	15	2,200	83	493	1,150	105	326
24	125	23	8	2,100	118	669	1,050	73	207
25	130	20	7	4,000	981	10,600	1,000	54	146
26	120	20	6	4,000	560	6,050	1,140	50	154
27	105	12	3	3,700	565	5,640	1,700	175	803
28	100	8	2	4,300	900	10,400	3,400	852	s8,240
29	105	16	5	....	....	....	5,390	1,790	26,000
30	100	22	6	....	....	....	6,050	1,600	s26,300
31	95	14	4	....	....	....	6,520	875	15,400

s Computed by subdividing day.
a Computed from an estimated concentration graph.
b Computed from a partly estimated concentration graph.

Note.—Flow affected by ice Jan. 8-10, 19, 20, Jan. 25 to Feb. 2, Feb. 12, 13, Feb. 17 to Mar. 5, Mar. 18-25.

Iowa River at Iowa City, Iowa—Continued

Suspended sediment, water year October 1950 to September 1951—Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	8,060	880	19,200	5,610	355	5,380	2,260	146	891
2	10,700	975	28,200	5,720	252	3,890	2,340	197	1,240
3	15,000	1,140	s40,600	5,720	259	4,000	3,490	1,260	s13,000
4	14,300	595	s23,400	5,280	349	4,980	4,560	3,040	s37,100
5	11,800	355	11,300	4,980	415	5,580	4,950	2,020	s27,000
6	10,700	317	9,160	4,980	328	4,410	5,610	1,120	17,000
7	10,700	395	11,400	5,160	238	3,330	8,200	960	21,300
8	10,300	325	9,040	5,390	197	2,870	12,000	720	23,300
9	9,630	303	7,880	5,940	178	2,860	11,100	310	9,290
10	8,980	255	6,180	7,240	220	4,300	9,370	190	4,810
11	8,300	225	5,050	7,960	427	9,180	7,960	165	3,550
12	8,460	248	5,660	6,760	350	6,390	6,880	313	s5,960
13	9,110	239	5,880	6,160	260	4,320	5,940	858	s14,200
14	10,000	233	6,290	5,390	320	4,660	4,030	310	3,370
15	10,200	212	5,840	4,030	414	s4,560	3,490	310	2,920
16	9,630	176	4,580	3,400	238	2,180	3,760	460	sb4,030
17	8,850	160	3,820	3,060	216	1,780	4,120	1,540	17,100
18	8,090	149	3,250	2,980	230	1,850	4,300	1,650	19,200
19	7,600	156	3,200	2,740	270	2,000	3,940	901	9,580
20	7,000	165	3,120	2,900	304	2,380	3,140	800	6,780
21	6,520	205	3,610	3,400	1,260	s11,800	3,560	1,050	b10,100
22	5,610	238	3,600	2,980	1,750	s14,300	4,880	2,710	35,700
23	4,120	255	2,840	2,660	796	s5,790	4,880	2,850	37,600
24	3,760	255	2,590	2,420	445	2,910	5,610	1,590	24,100
25	4,030	280	3,050	2,260	540	3,300	4,980	715	9,610
26	4,210	365	4,150	4,680	1,900	s25,000	3,670	764	s7,650
27	4,480	430	5,200	5,610	2,660	s40,600	3,140	450	3,820
28	4,880	1,090	14,400	5,080	1,530	s21,300	2,980	475	3,820
29	5,080	900	12,300	3,670	844	s7,530	2,900	525	b4,130
30	5,390	610	8,880	2,580	326	2,270	3,140	1,120	9,500
31	....	....	....	2,340	191	1,210	....	....	....

Day	July			August			September		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1	3,580	1,060	10,200	1,820	265	1,300	3,060	446	3,680
2	3,760	990	10,100	1,380	160	596	2,500	263	1,780
3	4,300	720	8,360	1,420	112	429	2,260	238	1,450
4	4,680	695	8,780	1,380	100	373	2,020	217	1,180
5	4,680	450	5,690	1,300	91	319	1,820	162	796
6	4,880	380	5,010	1,220	100	329	1,660	130	583
7	5,080	400	5,490	1,140	120	369	1,540	116	482
8	5,830	568	9,720	1,260	116	395	1,420	106	a406
9	7,600	1,800	36,900	1,020	88	242	1,340	101	365
10	7,360	520	10,300	920	103	256	1,420	100	383
11	8,330	403	9,060	871	105	247	1,380	77	287
12	9,500	368	9,440	822	125	277	1,500	91	369
13	8,980	318	7,710	836	104	235	1,980	130	695
14	7,720	264	5,500	843	106	241	1,820	145	713
15	7,000	250	4,720	885	94	225	1,580	147	627
16	6,160	260	4,320	913	97	239	1,580	92	392
17	4,950	400	5,350	1,020	87	240	1,660	101	453
18	4,390	465	5,510	1,140	85	262	1,580	94	401
19	3,940	481	5,120	1,220	81	267	1,540	69	287
20	3,580	724	7,000	1,300	81	284	1,500	87	352
21	3,140	468	3,970	1,380	87	324	1,460	90	355
22	2,900	470	3,680	1,460	105	414	1,380	99	369
23	2,660	403	2,890	1,540	109	453	1,220	104	343
24	2,500	359	2,420	1,460	101	398	1,140	75	231
25	2,340	348	2,200	1,460	156	615	1,060	76	218
26	2,260	308	1,880	2,980	496	3,990	1,060	67	192
27	2,260	307	1,870	3,060	620	5,120	955	63	162
28	2,260	298	1,820	3,490	840	7,920	913	56	138
29	2,100	243	1,380	3,850	856	8,900	864	40	93
30	1,900	201	1,030	3,850	742	7,710	843	43	98
31	1,820	192	943	3,760	690	7,000	....	....	....

s Computed by subdividing day.
a Computed from an estimated concentration graph.
b Computed from a partly estimated concentration graph.

Iowa River at Iowa City, Iowa—Continued

Suspended sediment, water year October 1951 to September 1952

Day	October			November			December		
		Suspended sediment			Suspended sediment			Suspended sediment	
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1.....	787	42	89	1,740	82	385	1,420	43	165
2.....	774	46	96	1,620	64	280	1,460	58	229
3.....	756	45	92	1,540	50	208	1,500	68	b275
4.....	738	64	128	1,420	62	238	1,460	62	244
5.....	625	76	128	1,300	76	267	1,460	47	185
6.....	774	92	192	1,180	78	249	1,460	46	181
7.....	1,430	78	301	1,100	50	148	1,380	55	205
8.....	1,900	160	821	1,140	58	179	1,340	36	130
9.....	1,540	240	a1,000	1,140	42	129	1,300	29	102
10.....	1,340	120	434	1,220	24	79	1,260	29	99
11.....	1,220	85	280	1,220	38	125	1,220	29	b96
12.....	1,140	97	299	1,620	74	324	1,100	28	83
13.....	1,060	118	338	2,660	283	2,030	702	27	51
14.....	955	107	276	3,140	542	a4,020	486	21	b28
15.....	920	79	196	3,140	774	6,560	389	18	19
16.....	955	104	268	2,740	677	a5,000	355	18	17
17.....	1,580	192	a801	2,420	354	2,310	520	18	25
18.....	2,340	284	1,790	2,180	206	1,210	635	21	36
19.....	1,900	209	1,070	1,980	138	738	774	16	33
20.....	1,540	158	657	1,820	110	541	857	14	32
21.....	1,940	164	a930	1,700	86	395	927	14	35
22.....	2,980	542	4,360	1,700	80	367	920	10	25
23.....	2,740	548	4,050	1,700	72	330	948	11	28
24.....	2,980	492	3,960	1,540	67	279	948	14	36
25.....	2,950	510	4,100	1,210	60	196	955	15	39
26.....	2,560	424	2,950	1,340	71	257	934	16	40
27.....	2,340	222	1,400	1,140	44	135	843	17	39
28.....	2,180	166	977	1,380	52	194	815	17	37
29.....	2,100	132	748	1,460	77	304	794	17	36
30.....	1,980	112	599	1,460	46	181	780	17	36
31.....	1,860	102	512	....	....	....	768	15	31
	January			February			March		
1.....	762	12	25	1,900	63	323	2,260	228	1,390
2.....	878	11	26	2,180	94	553	2,180	246	1,450
3.....	801	10	22	2,500	97	655	1,940	200	1,050
4.....	774	9	19	2,980	160	1,290	1,540	160	665
5.....	732	7	14	3,310	202	1,810	1,380	74	276
6.....	726	6	12	3,220	170	1,480	1,380	41	153
7.....	720	6	12	2,820	125	952	1,500	46	186
8.....	690	8	15	2,340	84	531	1,700	58	266
9.....	666	9	16	2,100	66	374	1,700	60	275
10.....	650	8	14	1,940	51	267	3,120	437	a4,640
11.....	655	8	14	1,980	59	316	6,940	1,730	b32,700
12.....	660	9	16	2,020	63	344	8,360	1,830	b41,500
13.....	655	13	23	2,020	74	404	8,850	1,220	29,200
14.....	666	15	27	2,020	100	545	9,370	778	19,700
15.....	1,220	46	152	2,100	82	465	10,300	714	19,900
16.....	1,340	94	340	2,020	70	382	10,300	540	15,000
17.....	1,780	102	490	2,100	71	403	10,300	448	12,500
18.....	2,100	112	635	2,160	76	447	9,370	420	10,600
19.....	3,490	543	b6,050	2,180	76	447	9,240	400	9,980
20.....	4,390	730	b8,820	2,180	67	394	7,840	284	6,010
21.....	4,030	428	4,660	2,180	76	447	6,280	500	8,480
22.....	3,850	460	4,780	2,100	72	408	5,830	530	8,340
23.....	3,500	262	2,480	2,100	90	510	6,160	470	7,820
24.....	3,200	166	1,430	2,020	78	425	5,940	324	5,200
25.....	2,900	132	1,030	1,940	63	330	5,940	294	4,710
26.....	2,500	88	594	1,940	100	524	5,720	280	4,320
27.....	2,300	59	366	2,420	384	2,510	5,390	276	4,020
28.....	2,100	49	278	2,580	556	3,870	4,880	290	3,820
29.....	1,900	36	185	2,420	266	1,740	4,580	300	3,710
30.....	1,800	37	180	....	....	....	4,300	340	3,950
31.....	1,800	42	204	....	....	....	4,300	340	3,950

a Computed by subdividing day.
b Computed from a partly estimated concentration graph.
Note.—Flow affected by ice Jan. 28 to Feb. 1.

Iowa River at Iowa City, Iowa—Continued

Suspended sediment, water year October 1951 to September 1952—Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1.....	4,390	386	4,580	2,420	120	784	2,340	262	1,660
2.....	4,580	526	6,500	2,340	108	682	2,180	210	1,240
3.....	4,680	526	6,650	2,180	90	530	2,020	182	993
4.....	4,780	494	6,380	2,100	79	448	2,020	168	916
5.....	4,880	340	4,480	2,020	73	398	2,180	304	1,790
6.....	5,090	260	3,570	1,980	71	380	2,020	624	3,400
7.....	5,280	230	3,280	2,100	78	442	1,820	470	2,310
8.....	5,390	204	2,970	2,180	107	630	2,080	464	3,200
9.....	5,390	220	3,200	2,100	100	567	2,240	938	a5,870
10.....	4,580	214	2,650	2,100	111	629	1,980	326	1,740
11.....	3,670	214	2,120	2,100	80	454	2,100	642	3,640
12.....	3,310	210	1,880	2,100	93	527	1,740	647	3,040
13.....	3,400	206	1,890	2,020	78	425	1,580	320	1,370
14.....	3,670	214	2,120	1,980	62	331	2,580	618	4,300
15.....	3,760	190	1,930	1,940	60	314	2,260	726	a4,550
16.....	3,760	180	1,830	1,860	58	291	2,980	2,460	19,800
17.....	3,760	192	1,950	1,860	63	316	3,310	4,310	38,500
18.....	3,850	239	2,480	1,860	54	271	3,060	3,200	26,400
19.....	3,760	264	2,680	1,780	54	260	2,660	1,140	8,190
20.....	3,670	237	2,350	1,700	50	230	2,500	690	4,660
21.....	3,490	225	2,120	1,660	49	220	2,820	760	5,790
22.....	3,760	442	b4,490	1,780	90	433	3,140	1,150	9,750
23.....	3,670	360	3,570	4,830	4,170	a55,900	3,220	1,750	15,200
24.....	3,580	262	2,530	4,880	2,540	33,500	2,980	1,160	9,330
25.....	3,490	237	2,230	4,680	3,080	38,900	2,580	680	4,740
26.....	3,310	224	2,000	4,680	2,200	27,800	2,340	466	2,940
27.....	3,140	190	1,610	4,390	1,060	12,600	2,610	756	a5,390
28.....	2,980	175	1,410	3,490	672	6,330	2,500	1,020	6,880
29.....	2,740	151	1,120	2,980	482	3,880	2,840	1,260	7,960
30.....	2,580	146	1,020	2,820	416	3,170	2,100	770	4,370
31.....	....	....	....	2,580	398	2,770	....	....	....
	July			August			September		
1.....	2,180	562	3,310	836	98	221	344	133	124
2.....	2,100	478	2,710	780	75	158	409	117	129
3.....	2,020	333	1,820	806	70	a160	328	126	112
4.....	2,100	510	2,890	1,100	150	446	331	107	96
5.....	2,100	666	3,780	750	148	300	309	98	82
6.....	1,980	805	4,300	768	126	261	330	114	102
7.....	1,780	404	1,940	780	135	284	227	104	64
8.....	1,620	332	1,450	720	128	249	358	130	126
9.....	1,580	218	930	768	129	267	306	118	97
10.....	1,540	190	790	815	134	295	287	113	88
11.....	2,100	364	2,060	690	110	205	227	104	64
12.....	2,580	708	4,930	660	102	182	360	79	77
13.....	2,580	688	4,790	605	104	170	156	89	37
14.....	2,580	674	4,700	533	104	150	349	120	113
15.....	2,660	814	5,850	660	101	180	233	110	69
16.....	2,500	640	4,320	690	109	203	317	94	80
17.....	2,420	490	3,200	635	95	163	226	84	51
18.....	2,580	548	3,820	546	88	130	237	88	56
19.....	2,580	576	4,010	515	106	147	162	82	36
20.....	2,580	490	3,410	449	113	137	283	97	b74
21.....	2,420	414	2,710	432	120	140	178	110	b53
22.....	2,100	360	2,040	423	120	137	232	109	68
23.....	1,860	298	1,500	412	120	133	196	97	51
24.....	1,700	246	1,130	412	104	116	347	117	110
25.....	1,540	222	923	408	108	119	98	118	31
26.....	1,420	206	790	389	113	119	239	105	68
27.....	1,300	181	635	385	118	123	110	115	30
28.....	1,050	150	a438	271	117	86	250	94	65
29.....	1,020	111	306	396	109	117	115	92	29
30.....	990	117	313	309	120	100	275	101	75
31.....	835	97	232	300	120	104	....	....	....

a Computed by subdividing day.
b Computed from a partly estimated concentration graph.

Iowa River at Iowa City, Iowa—Continued

Suspended sediment, water year October 1952 to September 1953

Day	October Mean discharge (cfs)	October Suspended sediment Mean concentration (ppm)	October Suspended sediment Tons per day	November Mean discharge (cfs)	November Suspended sediment Mean concentration (ppm)	November Suspended sediment Tons per day	December Mean discharge (cfs)	December Suspended sediment Mean concentration (ppm)	December Suspended sediment Tons per day
1	130			124			225		
2	102			160			200		
3	288			223			250		
4	100			161			260		
5	100	100	42	169			260	31	21
6	214			199			272		
7	110			128			260		
8	237			107	56	26	250		
9	102			202			265		
10	174			147			250		
11	158			183			270		
12	146			179			250		
13	215			214			110		
14	159			160			120		
15	111			160			303	35	21
16	244	60	36	157			246		
17	89			1,630	350	sb1,600	219		
18	244			1,207	482	1,570	192		
19	85			642	240	416	274		
20	294			566	190	290	807	70	153
21	92			391	123	120	813	100	220
22	170			310			504	59	90
23	209			250			454	39	48
24	113			290			489		
25	147			350			310		
26	246	67	31	440	78	60	245		
27	163			270			280	17	14
28	158			220			255		
29	170			100			228		
30	169			260			302		
31	167			....	....	....	252		

Day	January Mean discharge (cfs)	January Mean concentration (ppm)	January Tons per day	February Mean discharge (cfs)	February Mean concentration (ppm)	February Tons per day	March Mean discharge (cfs)	March Mean concentration (ppm)	March Tons per day
1	266			250			3,100	500	4,190
2	232			210	34	23	2,510	256	1,730
3	222			310			2,110	170	968
4	228			238			1,450		
5	216			630	100	sb260	1,400		
6	98			2,350	553	3,510	1,500	37	142
7	200	27	14	2,110	410	2,340	1,360		
8	194			2,030	419	2,300	1,310		
9	231			1,950	365	1,920	1,470		
10	116			1,870	311	1,570	1,700	200	sb1,100
11	188			1,750	221	1,040	2,910	1,150	9,040
12	264			1,870	258	1,300	2,430	850	5,580
13	125			2,000	232	1,250	2,510	795	5,390
14	333	48	43	2,100	342	1,940	2,830	1,200	sb10,000
15	800	180	a390	1,500	230	931	3,260	1,290	11,400
16	740	158	316	960	210	544	3,260	1,430	12,600
17	320			700	110	208	3,090	1,280	10,600
18	806	76	138	620	72	121	2,750	600	4,460
19	860			860	110	sb310	2,590	420	2,940
20	698			7,910	2,900	s70,400	2,430	350	2,300
21	592			6,070	1,300	s25,900	2,270	245	1,500
22	590	58	82	5,200	920	12,900	2,110	250	1,420
23	494			5,400	890	13,000	2,270	310	1,900
24	422			5,400	965	14,100	2,750	910	6,160
25	380			5,600	700	10,600	3,080	1,570	13,100
26	320			5,700	555	8,640	2,590	945	6,610
27	350			5,600	530	8,010	2,270	410	2,510
28	310	22	20	4,250	505	5,790	2,030	215	1,180
29	327			....	....	....	1,830	185	914
30	316			....	....	....	2,030	360	sb2,200
31	329			....	....	....	2,990	770	6,220

s Computed by subdividing day.
a Computed from an estimated concentration graph.
b Computed from a partly estimated concentration graph.

Note.—Flow affected by ice Nov. 22 to Dec. 4, Dec. 9-14, 26-28, Jan. 15-17, 25-28, Feb. 1-3, 13-19, Mar. 1, 4-7.

Iowa River at Iowa City, Iowa—Continued

Suspended sediment, water year October 1952 to September 1953—Continued

Day	April: Mean discharge (cfs)	April: Suspended sediment: Mean concentration (ppm)	April: Suspended sediment: Tons per day	May: Mean discharge (cfs)	May: Suspended sediment: Mean concentration (ppm)	May: Suspended sediment: Tons per day	June: Mean discharge (cfs)	June: Suspended sediment: Mean concentration (ppm)	June: Suspended sediment: Tons per day
1	3,020	1,000	9,770	2,830	478	3,650	1,710	230	1,060
2	3,530	910	8,670	2,910	530	4,160	1,590	200	859
3	3,350	720	6,510	3,170	1,090	9,330	1,470	190	754
4	2,990	555	4,480	3,170	1,040	8,900	1,390	150	563
5	2,670	390	2,810	3,170	740	6,330	1,390	150	563
6	2,510	306	2,070	2,990	570	4,600	1,910	310	1,600
7	2,350	252	1,600	2,910	450	3,540	2,190	1,600	9,460
8	2,190	229	1,350	2,750	360	2,670	2,350	1,920	12,200
9	2,110	205	1,170	2,590	340	2,380	2,830	3,800	29,000
10	2,070	182	1,020	2,430	361	2,370	3,080	5,220	43,400
11	1,990			2,270	309	1,890	2,750	3,700	27,500
12	1,950			2,190	270	1,600	2,670	2,840	20,500
13	1,910			2,030	247	1,350	3,440	7,800	72,400
14	1,870	136	695	1,830	137	1,670	3,800	5,500	56,400
15	1,870			1,710	190	877	3,060	3,180	26,400
16	1,870			1,630	188	827	2,510	1,670	11,300
17	1,790			1,630	167	735	2,030	1,060	5,920
18	1,710			1,500	178	721	1,790	510	2,460
19	1,670			1,470	146	579	1,630	360	1,580
20	1,630			1,430	126	486	1,470	270	1,070
21	1,670	99	439	1,470	120	476	1,310	250	884
22	1,670			2,240	790	ab5,900	1,200	250	810
23	1,590			2,830	1,830	14,000	1,160	220	689
24	1,550			4,400	5,370	a72,900	1,090	210	618
25	1,710	282	1,300	5,400	5,500	80,200	1,020	190	523
26	1,790	129	623	4,900	4,380	57,900	1,020	180	496
27	2,030	265	1,450	3,520	2,060	19,600	1,550	430	ab2,200
28	2,110	525	2,990	2,670	885	6,380	4,160	7,100	ab83,000
29	2,110	378	2,150	2,270	520	3,190	4,800	6,000	77,600
30	2,510	436	2,950	2,110	320	1,820	4,900	2,500	33,100
31	....	....	....	1,910	250	1,290	....	....	....

Day	July: Mean discharge (cfs)	July: Mean concentration (ppm)	July: Tons per day	August: Mean discharge (cfs)	August: Mean concentration (ppm)	August: Tons per day	September: Mean discharge (cfs)	September: Mean concentration (ppm)	September: Tons per day
1	3,620	1,440	14,100	692			244		
2	2,670	1,300	9,370	662			228		
3	2,510	1,300	8,810	439			130		
4	2,270	2,120	13,000	656	117	187	154		
5	2,270	1,500	9,190	424			198		
6	2,430	1,9[illegible]	13,000	462			178		
7	1,830	600	2,960	805			268		
8	1,870	810	1 090	1,020			180	106	55
9	1,630	730	3,210	1,020			216		
10	1,550	470	1,970	950	170	452	159		
11	1,390	521	1,960	950			192		
12	1,270	475	1,630	980			242		
13	1,200	263	852	890			112		
14	1,200	230	745	830			194		
15	1,060			752	144	312	191		
16	980			710			102		
17	860			650			268		
18	890	179	441	443			100		
19	860			406			214		
20	920			443			100		
21	980			484	100	104	265		
22	752			388			98		
23	656			355			128	102	40
24	662			416			99		
25	662			227			144		
26	746			319			118		
27	722	119	213	322	133	116	98		
28	686			312	185	156	236		
29	662			250			94		
30	628			264	88	54	90		
31	534			174			....	....	....

a Computed by subdividing day.
b Computed from a partly estimated concentration graph.

Iowa River at Iowa City, Iowa—Continued

Suspended sediment, water year October 1953 to September 1954

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	95	88	23	60			72		
2	118	91	29	179			175		
3	92	64	16	57			182		
4	135	143	52	195			195		
5	94	112	28	59	72	20	165	33	14
6	105			60			172		
7	80			164			162		
8	132	89	26	54			190		
9	77			103			96		
10	173			209			118		
11	74			64			226		
12	151			92			147		
13	73			108	42	14	84		
14	119			97			246		
15	140			183			76	19	6
16	76	77	25	140			65		
17	187			72			67		
18	73			104			71		
19	186			185			75		
20	70			157			81		
21	207			142	64	26	134		
22	71			165			94		
23	70			133			86		
24	258			159			88		
25	74			149			91		
26	70	80	29	163			95	24	7
27	218			123			91		
28	57			146	33	13	94		
29	181			150			90		
30	69			145			173		
31	182			....	....	....	74		

Day	January			February			March		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1	114			65			212		
2	78			65			230		
3	155			66			225		
4	78			69			145	16	8
5	69			71	22	4	132		
6	158			76			126		
7	83	18	5	83			161		
8	81			91			241		
9	84			95			222		
10	91			104			211		
11	84			115			220	35	20
12	80			110	27	9	259		
13	76			115			213		
14	74			127			177		
15	73			188			208		
16	71			244			227		
17	70	33	6	212			231		
18	68			264			222		
19	67			317			229		
20	67			257			217	41	25
21	67			322	15	10	223		
22	66			216			222		
23	65			236			259		
24	65			216			203		
25	64			253			312		
26	66	47	8	217			388		
27	67			273			238	66	55
28	67			279			356		
29	66			....	....	....	254		
30	65			....	....	....	268		
31	65			....	....	....	342		

Note.—Flow affected by ice Dec. 18, 19, 22, 23, Jan. 12, 13, 16-18, 21-23, Mar. 2, 3.

Iowa River at Iowa City, Iowa—Continued

Suspended sediment, water year October 1953 to September 1954—Continued

Day	April			May			June		
		Suspended sediment			Suspended sediment			Suspended sediment	
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1	198			2,010	1,270	6,890	1,850	365	1,820
2	236			2,200	1,460	8,790	3,100	2,170	18,200
3	265	39	24	2,290	1,610	9,950	3,370	3,200	29,100
4	148			2,290	1,490	9,210	3,910	3,000	31,700
5	275			2,160	1,360	7,930	4,100	2,620	29,000
6	309	78	65	2,200	1,100	6,530	4,200	1,740	19,700
7	789	255	543	1,850	965	4,820	4,100	1,480	16,400
8	702	233	442	1,690	476	2,170	3,190	1,200	10,300
9	502	1,070	1,620	1,490	322	1,300	2,500	920	6,360
10	485	390	511	1,330	244	876	2,200	625	3,710
11	330	372	331	1,210	192	627	1,890	495	2,530
12	330	250	223	1,050	162	459	1,930	460	2,400
13	281			980	150	397	2,920	2,560	20,200
14	275			910	143	351	3,370	3,270	29,800
15	338	187	146	850	157	360	3,820	2,000	20,600
16	259			790	160	341	4,100	1,670	18,500
17	349	208	281	730	158	311	4,100	1,670	18,500
18	482	165	215	675	144	262	3,640	1,220	12,000
19	462	142	177	635	124	213	3,640	2,530	24,900
20	440	204	242	580	117	183	3,910	2,060	21,700
21	427	207	239	514			4,200	1,480	16,800
22	429	202	234	525			4,800	1,640	21,300
23	641	170	294	476			4,900	1,440	19,100
24	570	168	259	548	118	157	5,110	2,240	30,900
25	557	197	296	446			4,600	1,690	21,000
26	473	350	447	495			4,200	1,160	13,200
27	998	388	1,050	445			4,300	1,000	11,600
28	730	560	1,100	753	100	sb430	4,400	895	10,600
29	730	292	570	665	188	334	4,700	825	10,500
30	806	270	653	800	145	313	5,110	810	11,200
31	....	....	....	1,000	155	419	....	....	....
	July			August			September		
1	5,990	890	14,400	433			4,700	1,030	13,100
2	7,300	1,050	21,300	417			4,900	810	10,700
3	7,560	800	16,300	433	84	101	5,110	726	10,000
4	6,820	575	10,600	429			5,770	610	9,500
5	4,000	500	6,370	512			5,770	575	8,960
6	2,740	530	3,920	384			2,920	350	2,760
7	2,290	428	2,650	485			2,110	235	1,340
8	1,980	405	2,170	539			1,770	173	827
9	1,770	312	1,490	552	83	107	1,610	88	383
10	1,610	278	1,210	457			1,450	117	458
11	1,490	200	1,050	460			1,290	115	401
12	1,410	238	906	465			1,210	....	e330
13	1,250	205	692	325			1,170	96	303
14	1,170	195	616	483			1,050	....	e240
15	1,090	182	536	232	68	64	960	....	
16	1,020	175	482	353			910	....	
17	945	172	439	455			910	70	e190
18	880	192	456	476			850	....	
19	820	198	372	507			820	....	
20	670	159	288	451	88	125	799	98	211
21	730	150	296	710			786	81	172
22	702	140	265	567			756	79	161
23	675	142	259	485			668		
24	655	128	226	546			617		
25	625	119	201	490	100	132	702	72	129
26	582	114	179	2,020	840	b4,600	675		
27	589	106	169	2,650	940	sb8,300	655		
28	576	163	253	3,010	2,170	22,900	670		
29	532	95	136	4,000	1,470	15,900	730	80	158
30	460	78	97	4,200	1,250	14,200	945	84	214
31	444	87	104	4,500	1,320	16,000	....	....	....

e Estimated.
s Computed by subdividing day.
b Computed from a partly estimated concentration graph.

Iowa River at Iowa City, Iowa—Continued

Monthly discharge for calendar and water years 1943 to 1954

Month	Water discharge (cfs-days)	Suspended sediment							
		Load (tons)	Daily loads (tons)			Tons per sq. mi.	Acre-feet (a)	Concentration (ppm)	
			Max.	Min.	Mean			Maximum daily	Weighted mean
October 1943	10,885	3,272	178	45	106	1.01	2.7	101	61
November	24,433	3,672	823	10	122	1.14	3.1	224	56
December	17,946	1,315	130	11	42	.41	1.1	50	27
January 1944	17,032	37,748	12,200	6	1,220	11.7	32	1,860	863
February	36,171	115,364	48,600	18	3,980	35.7	96	3,840	1,180
March	87,331	282,070	34,300	95	9,100	87.3	235	2,860	1,200
April	110,710	328,470	43,700	2,120	11,000	101.7	274	2,590	1,100
May	305,540	1,121,320	177,000	3,680	36,200	347.2	936	3,860	1,360
June	264,450	561,750	90,500	5,780	18,700	173.9	469	1,510	787
July	78,300	131,706	13,100	435	4,250	40.8	110	1,350	623
August	37,718	26,117	7,510	124	842	8.09	22	1,050	256
September	23,894	4,786	443	90	160	1.48	4.0	119	74
Water year 1943-44	1,023,410	2,617,590	177,000	6	7,150	810.4	2,180	3,860	948
October 1944	17,090	3,714	216	81	120	1.15	3.1	112	80
November	14,336	1,847	130	14	62	.57	1.5	91	48
December	10,383	563	27	6	18	.17	.5	34	20
Calendar year 1944	1,002,955	2,615,455	177,000	6	7,150	809.7	2,180	3,860	966
January 1945	8,057	298	30	3	10	.09	.2	34	14
February	33,533	17,463	2,260	3	624	5.41	15	372	193
March	144,330	306,569	26,000	929	9,890	94.9	256	1,310	787
April	140,730	195,610	25,400	2,360	6,520	60.6	163	2,160	515
May	124,860	146,492	17,900	285	4,730	45.4	122	1,360	435
June	142,970	261,420	51,700	2,270	8,710	80.9	218	3,500	677
July	43,422	46,578	11,900	156	1,500	14.4	39	1,930	397
August	43,478	41,311	5,630	157	1,330	12.8	34	850	352
September	18,878	4,154	457	59	138	1.29	3.5	180	81
Water year 1944-45	742,067	1,026,019	51,700	3	2,810	317.7	856	3,590	512
October 1945	16,976	3,946	618	37	127	1.22	3.3	209	86
November	15,293	3,041	524	15	101	.94	2.5	260	74
December	15,650	4,905	1,480	6	158	1.52	4.1	460	116
Calendar year 1945	748,177	1,031,787	51,700	3	2,830	319.4	861	3,590	511
January 1946	122,018	187,216	41,200	9	6,040	58.0	156	2,140	568
February	64,170	20,314	2,690	28	726	6.29	17	297	117
March	150,430	400,620	46,700	602	12,900	124.0	334	3,980	986
April	48,584	19,520	3,480	46	651	6.04	16	395	149
May	66,670	81,896	19,400	82	2,640	25.4	68	1,760	455
June	77,050	331,237	67,800	229	11,000	102.6	276	5,200	1,590
July	45,900	114,902	32,800	174	3,710	35.6	96	3,140	927
August	25,954	12,883	3,830	77	416	3.99	11	716	184
September	46,477	71,040	18,600	59	2,370	22.0	59	1,850	566
Water year 1945-46	695,181	1,251,520	67,800	6	3,430	387.5	1,040	5,200	667
October 1946	47,665	54,981	18,900	85	1,770	17.0	46	1,840	427
November	58,530	35,207	6,820	207	1,170	10.9	29	804	223
December	27,646	3,308	215	17	107	1.02	2.8	68	44
Calendar year 1946	781,103	1,333,124	67,800	9	3,650	412.7	1,110	5,200	632
January 1947	22,588	2,414	423	21	78	.75	2.0	116	40
February	39,267	15,227	2,730	6	544	4.71	13	347	144
March	76,165	170,620	28,600	40	5,500	52.8	142	2,720	830
April	170,360	427,240	65,000	1,310	14,200	132.3	357	3,810	882
May	83,730	111,984	21,700	564	3,610	34.7	93	1,680	495
June	494,960	1,256,340	152,000	6,940	41,900	389.0	1,050	1,860	940
July	180,380	282,604	39,400	396	9,120	87.5	236	1,540	580
August	20,947	5,921	429	46	191	1.83	4.9	148	105
September	9,538	1,278	71	27	426	.40	1.1	....	50
Water year 1946-47	1,240,776	2,367,124	152,000	6	6,480	732.9	1,980	3,810	707

a Computed using a specific weight of 55 pounds per cubic foot.

Iowa River at Iowa City, Iowa—Continued

Monthly discharge for calendar and water years 1948 to 1954—Continued

Month	Water discharge (cfs-days)	Suspended sediment							
		Load (tons)	Daily loads (tons)			Tons per sq. mi.	Acre-feet (a)	Concentration (ppm)	
			Max.	Min.	Mean			Maximum daily	Weighted mean
October 1947	7,770	1,666	103	30	54	0.52	1.4	113	79
November	15,483	1,827	130	24	61	.57	1.5	70	44
December	17,885	2,626	276	28	85	.81	2.2	115	54
Calendar year 1947	1,148,073	2,270,747	152,000	6	6,250	705.8	1,900	3,810	735
January 1948	8,961	925	64	15	39	.29	.8	55	38
February	24,569	90,854	55,760	7	3,130	28.1	76	3,110	1,370
March	222,740	696,065	80,520	217	22,400	215.5	581	2,450	1,160
April	56,151	58,075	12,950	175	1,940	18.0	48	1,010	383
May	57,614	63,887	16,210	93	2,060	19.8	53	1,720	411
June	20,856	11,443	3,880	92	381	3.54	9.6	1,160	203
July	28,602	47,008	13,240	147	1,520	14.6	39	1,900	609
August	8,803	2,401	389	21	77	.74	2.0	215	101
September	5,715	1,336	99	10	45	.41	1.1	150	86
Water year 1947-48	475,149	978,113	80,520	7	2,670	302.8	816	3,110	762
October 1948	5,563	1,972	599	15	64	.61	1.6	402	132
November	7,686	1,972	248	14	66	.61	1.6	179	95
December	7,912	2,012	508	9	65	.62	1.7	272	94
Calendar year 1948	455,162	977,860	80,520	7	2,670	302.7	816	3,110	796
January 1949	44,481	24,875	3,890	17	802	7.70	21	577	207
February	31,269	39,303	15,210	8	1,400	12.2	33	968	405
March	182,820	431,063	43,480	670	13,900	133.5	360	3,330	873
April	67,460	72,909	22,570	165	2,430	22.6	61	1,520	400
May	22,247	4,530	234	89	146	1.40	3.8	100	75
June	27,743	84,405	19,600	108	2,810	26.1	70	2,740	1,130
July	19,769	10,036	843	96	324	3.11	8.4	343	188
August	6,509	1,383	127	15	45	.43	1.2	159	79
September	7,857	4,155	1,250	14	138	1.29	3.5	526	196
Water year 1948-49	431,306	678,615	43,480	8	1,860	210.1	566	3,330	583
October 1949	7,402	2,887	849	12	93	.89	2.4	392	144
November	4,903	586	39	9	20	.18	.5	94	43
December	4,593	479	114	3	15	.15	.4	67	39
Calendar year 1949	427,143	676,611	43,480	3	1,850	209.5	565	3,330	587
January 1950	9,729	4,382	1,410	5	141	1.36	3.7	469	167
February	20,491	9,683	2,700	6	346	3.00	8.1	420	175
March	163,260	303,787	46,000	302	9,800	94.1	254	1,860	689
April	46,958	22,331	2,370	152	744	6.91	19	345	176
May	69,750	213,210	45,700	200	6,880	66.0	178	4,020	1,130
June	113,300	493,103	68,400	246	16,400	152.7	412	5,700	1,610
July	40,084	148,783	109,300	114	4,800	46.1	124	4,560	1,380
August	10,637	4,729	836	37	153	1.46	3.9	365	165
September	9,426	4,890	1,630	15	163	1.52	4.1	541	192
Water year 1949-50	500,623	1,208,851	109,300	3	3,310	374.3	1,010	5,700	894
October 1950	9,093	2,491	202	32	80	.77	2.1	165	92
November	4,820	718	63	7	24	.22	.6	97	55
December	3,362	258	24	3	8	.08	.2	55	28
Calendar year 1950	501,810	1,208,371	109,300	3	3,310	374.1	1,010	5,700	892
January 1951	3,621	315	45	2	10	.10	.3	60	32
February	37,512	45,666	10,600	2	1,630	14.1	38	981	451
March	93,530	180,066	26,300	116	5,810	55.7	150	1,790	713
April	245,540	279,680	46,600	2,590	9,320	86.6	233	1,140	422
May	139,100	216,920	40,600	1,210	7,000	67.2	181	2,680	578
June	151,250	388,551	37,600	891	13,000	120.3	324	3,040	951
July	142,470	198,393	36,000	943	6,400	61.4	166	1,800	510
August	51,000	49,989	8,000	225	1,610	15.5	42	856	363
September	48,055	17,880	3,680	93	596	5.54	15	446	144
Water year 1950-51	928,253	1,380,907	46,600	2	3,760	427.5	1,150	3,040	551

a Computed using a specific weight of 55 pounds per cubic foot.

Iowa River at Iowa City, Iowa—Continued

Monthly discharge for calendar and water years 1943 to 1954—Continued

Month	Water discharge (cfs-days)	Suspended sediment							
		Load (tons)	Daily loads (tons)			Tons per sq. mi.	Acre-feet (a)	Concentration (ppm)	
			Max.	Min.	Mean			Maximum daily	Weighted mean
October 1951	50,934	33,911	4,360	89	1,090	10.5	28	548	240
November	50,950	28,258	6,560	79	942	8.75	24	774	205
December	30,710	2,617	275	17	84	.81	2.2	68	31
Calendar year 1951	1,042,672	1,442,226	46,600	2	3,950	446.5	1,200	3,040	512
January 1952	54,235	32,929	8,820	12	1,060	10.2	27	730	225
February	65,790	23,145	3,870	267	798	7.17	19	556	130
March	108,890	265,761	41,500	153	8,570	82.3	222	1,830	583
April	118,380	87,590	6,650	1,020	2,920	27.2	73	526	274
May	79,490	194,412	55,900	220	6,270	60.2	162	4,170	906
June	72,280	200,949	38,500	916	7,000	65.0	175	4,310	1,080
July	60,445	76,027	5,850	232	2,450	23.5	63	814	465
August	18,243	5,602	446	80	181	1.73	4.7	150	114
September	7,831	2,263	129	20	75	.70	1.9	133	106
Water year 1951-52	778,178	962,464	55,900	12	2,630	298.0	803	4,310	458
October 1952	5,115	1,126	....	....	36	.35	.9	....	82
November	9,718	5,152	1,800	....	172	1.60	4.3	482	196
December	9,475	1,022	220	....	33	.32	.9	100	40
Calendar year 1952	669,892	904,978	55,900	....	2,470	280.2	755	4,310	500
January 1953	11,566	1,951	390	....	63	.60	1.6	180	62
February	76,338	188,876	70,400	....	6,750	58.5	158	2,900	916
March	72,200	127,464	13,100	....	4,110	39.5	106	1,570	654
April	64,390	58,851	9,770	....	1,960	18.2	49	1,000	339
May	80,330	322,321	80,200	476	10,400	99.8	269	5,500	1,490
June	67,290	525,109	83,000	496	17,500	162.6	438	7,800	2,890
July	40,970	90,332	14,100	....	2,910	28.0	75	2,120	817
August	17,695	6,359	....	....	205	1.97	5.3	....	133
September	5,039	1,425	....	....	48	.44	1.2	....	105
Water year 1952-53	460,126	1,329,968	83,000	....	364	411.8	1,110	7,800	1,070
October 1953	3,707	848	52	....	27	.26	.7	143	85
November	3,817	565	....	....	19	.17	.5	....	55
December	3,775	269	....	....	9	.08	.2	....	26
Calendar year 1953	447,117	1,324,370	83,000	....	3,630	410.0	1,100	7,800	1,100
January 1954	2,444	194	....	....	6	.06	.2	....	20
February	4,755	220	....	....	8	.07	.2	....	17
March	7,272	868	....	....	28	.27	.7	....	44
April	13,966	10,502	1,620	....	350	3.25	8.8	1,070	279
May	34,687	64,565	9,950	....	2,080	20.0	54	1,610	691
June	112,220	503,620	31,700	1,820	16,800	155.9	420	3,270	1,660
July	59,375	88,432	21,300	97	2,850	27.4	74	1,080	552
August	32,926	84,542	22,900	....	2,730	26.2	71	2,170	951
September	53,303	61,942	13,100	....	2,060	19.2	52	1,030	430
Water year 1953-54	332,147	816,507	31,700	....	2,240	252.8	682	3,270	911

a Computed using a specific weight of 55 pounds per cubic foot.

Iowa River at Iowa City, Iowa—Continued

Particle-size analyses of suspended sediment, water year October 1953 to September 1954

(Methods of analysis: B, bottom-withdrawal tube; P, pipette; S, sieve; N, in native waters; W, in distilled water; C, chemically dispersed; M, mechanically dispersed.)

Date	Time	Instantaneous discharge (cfs)	Water temperature (°F)	Suspended sediment: Concentration (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters: 0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	Methods of analysis
April 9, 1954	11:35 a.m.	585	....	1,060	3,940	....	95	....	98	....	100	....	....	....	SPWCM
June 2	7:50 p.m.	3,280	62	3,120	5,060	44	58	78	93	97	100	....	....	....	SPWCM
June 5	11:20 a.m.	4,100	....	3,120	5,160	....	49	....	77	....	100	....	....	....	SPWCM
June 15	1:35 p.m.	3,820	....	1,900	3,620	....	48	....	73	....	99	....	....	....	SPWCM
June 23	8:15 a.m.	4,900	....	1,230	4,310	....	38	....	63	....	96	....	....	....	SPWCM
July 1	2:10 p.m.	5,090	....	879	3,350	....	35	....	56	....	94	....	....	....	SPWCM
July 2	9:10 a.m.	7,180	....	1,050	3,150	....	35	....	60	....	94	98	100	....	SPWCM
August 31	1:40 p.m.	4,500	....	1,280	4,640	....	38	....	61	....	99	....	....	....	SPWCM

Ralston Creek at Iowa City, Iowa

LOCATION.—At gaging station, on upstream side of bridge on State Highway 1, at east edge of Iowa City, Johnson County, and 2.8 miles upstream from mouth.

DRAINAGE AREA.—3.01 square miles.

RECORDS AVAILABLE.—Water temperatures: June 1952 to September 1954. Sediment records: April 1952 to September 1954.

EXTREMES, water years 1952 to 1954 given in following table:

Water year	Daily suspended sediment								Temperature*	
	Concentrations (ppm)				Loads (tons)				°Fahrenheit	
	Max.	Date	Min.	Date	Max.	Date	Min.	Date	Max.	Date
1951-52(a)	4,850	June 14	....	....	1,430	June 14	t	Many days	......	....
1952-53...	4,970	May 24	No flow	Many days	1,980	May 24	0	Many days	......	....
1953-54...	2,490	May 2	No flow	Many days	226	April 30	0	Many days	......	....

* Minimum temperature, freezing point on many days each year.
t Less than 0.05 ton.
a April to September.

EXTREMES, 1952-54.—Water temperatures: Minimum, freezing point on many days during winter months.

Sediment concentrations: Maximum daily, 4,970 ppm May 24, 1953; minimum daily, no flow on many days each year.

Sediment loads: Maximum daily, 1,980 tons May 24, 1953; minimum daily, 0 ton on many days each year.

Ralston Creek at Iowa City, Iowa—Continued

Temperature (°F) of water, June to September 1952

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	......	......	......	......	......	......	......	......	......	78	72	......
2	......	......	......	......	......	......	......	......	......	84	82	......
3	......	......	......	......	......	......	......	......	......	78	76	......
4	......	......	......	......	......	......	......	......	66	78	74	......
5	......	......	......	......	......	......	......	......	78	78	74	......
6	......	......	......	......	......	......	......	......	78	82	......	......
7	......	......	......	......	......	......	......	......	74	80	......	......
8	......	......	......	......	......	......	......	......	76	76	......	......
9	......	......	......	......	......	......	......	......	78	70	......	......
10	......	......	......	......	......	......	......	......	80	80	......	......
11	......	......	......	......	......	......	......	......	80	......	......	......
12	......	......	......	......	......	......	......	......	81	82	......	......
13	......	......	......	......	......	......	......	......	84	76	......	......
14	......	......	......	......	......	......	......	......	78	73	......	68
15	......	......	......	......	......	......	......	......	84	72	......	......
16	......	......	......	......	......	......	......	......	83	78	......	......
17	......	......	......	......	......	......	......	......	77	70	......	......
18	......	......	......	......	......	......	......	......	78	78	......	......
19	......	......	......	......	......	......	......	......	74	79	......	......
20	......	......	......	......	......	......	......	......	60	82	......	......
21	......	......	......	......	......	......	......	......	71	90	......	......
22	......	......	......	......	......	......	......	......	72	82	......	......
23	......	......	......	......	......	......	......	......	79	78	......	......
24	......	......	......	......	......	......	......	......	80	79	......	......
25	......	......	......	......	......	......	......	......	76	79	......	......
26	......	......	......	......	......	......	......	......	......	83	......	......
27	......	......	......	......	......	......	......	......	78	85	......	......
28	......	......	......	......	......	......	......	......	......	84	......	......
29	......	......	......	......	......	......	......	......	78	75	......	......
30	......	......	......	......	......	......	......	......	79	82	......	......
31	......	......	......	......	......	......	......	......	......	77	......	......
Average	......	......	......	......	......	......	......	......	77	79	......	......

Temperature (°F) of water, water year October 1952 to September 1953

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	......	......	......	......	32	......	42	52	......	82	......	......
2	......	......	......	32	......	......	......	52	57	......	......	......
3	......	......	......	......	......	......	51	56	60	62	70	......
4	......	......	......	......	......	......	52	58	60	84	......	......
5	......	......	33	......	......	......	53	64	65	83	......	......
6	......	43	......	......	......	......	56	64	65	80	......	......
7	......	......	......	......	......	......	52	66	60	......	70	......
8	......	......	......	......	......	......	48	72	60	67	......	......
9	......	......	......	......	......	......	50	......	60	74	......	......
10	......	......	......	......	36	36	50	......	60	78	76	......
11	......	......	......	32	......	44	52	74	60	70	......	......
12	......	......	......	......	......	......	50	64	60	70	......	......
13	......	......	......	......	......	......	54	70	60	70	......	......
14	......	43	......	......	......	34	52	72	60	......	76	......
15	......	......	......	35	......	......	52	......	60	......	......	......
16	......	......	......	......	......	42	54	68	60	72	......	......
17	......	......	34	......	32	54	46	74	......	......	76	......
18	......	......	......	......	......	......	52	72	......	70	......	......
19	......	......	......	......	32	......	44	68	......	74	......	......
20	......	......	33	......	32	61	54	72	66	......	......	......
21	......	......	......	......	......	......	59	70	......	......	76	......
22	......	......	33	......	32	......	62	69	......	......	......	......
23	......	......	......	32	......	......	64	60	......	......	......	......
24	......	......	......	......	......	......	50	54	66	......	76	......
25	......	......	......	......	......	......	62	65	60	......	......	......
26	......	......	......	......	......	......	47	......	......	......	......	......
27	......	......	......	......	......	......	58	......	......	......	......	......
28	......	......	......	......	......	......	56	60	80	......	......	......
29	......	......	......	......	......	41	52	......	84	......	......	......
30	......	......	......	......	......	39	56	......	80	......	......	......
31	......	......	......	......	......	43	......	......	......	......	......	......
Average	......	......	......	......	......	......	53	......	......	......	......	......

Ralston Creek at Iowa City, Iowa—Continued

Temperature (°F) of water, water year October 1953 to September 1954

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	......	......	......	......	37	......	47	......	59	......	......	......
2	......	......	37	......	35	......	39	52	57	......	......	......
3	......	......	37	......	32	36	38	43	......	......	......	......
4	......	......	......	......	......	......	......	59	54	......	......	......
5	......	......	......	......	35	......	60	42	61	......	......	......
6	......	......	......	......	......	34	64	......	......	......	......	......
7	......	......	......	......	......	33	58	57	68	......	......	......
8	......	......	......	......	......	34	......	57	......	......	......	......
9	......	......	......	......	......	......	......	......	67	......	......	......
10	......	......	......	......	32	......	50	62	......	......	......	......
11	......	......	......	......	......	......	66	......	......	......	......	......
12	......	......	......	......	......	33	......	60	......	......	......	......
13	......	......	......	......	......	38	64	74	87	......	......	......
14	......	......	......	......	33	37	62	......	......	......	......	......
15	......	......	......	......	......	......	60	......	77	......	......	......
16	......	......	......	......	33	41	44	61	......	......	......	......
17	......	......	......	......	......	......	43	......	71	......	......	......
18	......	......	......	......	......	48	......	68	......	......	......	......
19	......	......	......	......	33	......	52	......	80	......	......	......
20	......	......	......	......	33	47	50	67	......	......	......	......
21	......	......	......	......	......	......	60	......	77	......	......	......
22	......	......	......	......	......	46	48	......	......	......	......	......
23	......	......	......	......	......	51	50	60	......	......	......	......
24	......	......	......	......	33	42	......	......	......	......	......	......
25	......	......	......	......	......	47	......	......	......	......	70	......
26	......	......	......	......	......	34	71	60	......	......	70	......
27	......	......	......	......	......	38	61	71	......	......	68	......
28	......	......	......	......	......	42	53	60	......	70	......	......
29	......	......	......	......	......	......	......	56	......	70	......	64
30	......	33	......	......	......	38	57	69	......	......	......	......
31	......	......	......	......	......	......	......	69	......	......	......	......
Average	......	......	......	......	......	......	......	......	......	......	......	......

Ralston Creek at Iowa City, Iowa—Continued

Suspended sediment, April to September 1952

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	2.8	51	0.4	1.4	34	0.1	1.2	18	0.1
2	2.3	33	.2	1.3	37	.1	1.2	36	.1
3	2.0	30	.2	1.3	79	.3	1.3	65	.2
4	1.9	32	.2	1.1	98	.3	1.1	25	.1
5	1.8	35	.2	1.0	106	.3	.88	43	.1
6	1.7	38	.2	.98	105	.3	.66	78	.1
7	1.5	36	.1	4.4	338	s7.3	.60	83	.1
8	1.5	32	.1	1.9	112	.6	8.6	3,260	s348
9	1.6	28	.1	2.6	178	sb2.2	1.4	483	sb2.5
10	1.4	21	.1	2.0	83	.4	.88	135	.3
11	1.3	19	.1	1.8	52	.3	.69	127	.2
12	1.6	25	.1	1.5	40	.2	.69	103	.2
13	5.9	270	sb5.7	1.4	41	.2	1.1	216	s1.7
14	2.4	63	.4	1.3	41	.1	21	4,850	sb1,430
15	2.0	28	.2	1.2	50	.2	1.6	99	.4
16	1.8	23	.1	1.6	63	.3	1.1	107	.3
17	1.7	25	.1	1.3	45	.2	.80	87	.2
18	1.7	27	.1	1.1	61	.2	.63	56	.1
19	1.6	37	.2	.08	70	a.2	.55	58	.1
20	1.4	30	.1	.98	46	.1	2.7	738	sb12
21	1.6	38	s.2	.08	40	a.1	9.0	1,060	sb42
22	5.2	381	sb8.8	7.9	512	sb197	2.3	68	.4
23	6.1	188	sb3.2	27	3,040	s1,220	1.7	90	.4
24	4.2	112	1.3	5.8	223	3.5	1.7	160	.7
25	3.2	66	.6	3.8	73	.8	.98	102	.3
26	2.4	65	a.4	2.6	54	.4	.88	90	a.2
27	2.2	69	.4	2.2	47	.3	4.7	4,080	sb154
28	1.8	61	.3	1.9	35	a.2	1.0	35	a.1
29	1.7	42	.2	1.7	22	.1	.72	30	.1
30	1.5	33	.1	1.6	17	a.1	.60	84	.1
31	....	....	....	1.4	17	.1	....	....	....

Day	July			August			September		
1	0.57	74	0.1	0.10	57	t	0.20	....	
2	.50	59	.1	.11	40	t	.20	....	
3	.43	46	.1	4.2	998	sb55	.12	....	
4	.36	43	t	.50	208	.4	.13	....	
5	.34	42	t	.23	45	t	.12	....	
6	.31	37	t	.19	....		.09	....	
7	.29	58	t	.16	....		.05	....	t
8	.31	37	t	.21	....		.04	....	
9	.31	57	t	.19	....		.02	....	
10	.26	52	t	.12	....	t	.01	....	
11	.24	50	t	.18	....		.01	....	
12	.20	56	t	.13	....		.01	....	
13	.23	81	.1	.11	....		.01	....	
14	2.6	1,020	s22	.11	....		.22	206	s.1
15	.48	218	s.3	2.1	1,200	sb16	.05	....	
16	.36	87	.1	.36	....		.01	....	
17	.41	164	sb.3	.16	....		.01	....	
18	3.0	034	sb14	.13	....		.01	....	
19	.66	53	.1	.10	....		.01	....	
20	.41	46	.1	.12	....		.01	....	
21	.31	40	t	.14	....		.01	....	
22	.23	54	t	.09	....	t	.01	....	t
23	.27	85	.1	.07	....		.02	....	
24	.19	34	t	.06	....		.01	50	
25	.19	48	t	.06	....		.01	....	
26	.15	74	t	.12	....		.01	....	
27	.14	60	t	.23	....		.02	....	
28	.15	63	t	.21	....		.01	....	
29	.14	60	t	.21	....		.01	....	
30	.12	30	t	.19	....		.01	....	
31	.11	19	t	.14	....		....	....	....

s Computed by subdividing day.
t Sediment discharge less than 0.05 ton.
a Computed from an estimated concentration graph.
b Computed from a partly estimated concentration graph.

Ralston Creek at Iowa City, Iowa—Continued

Suspended sediment, water year October 1952 to September 1953

Day	October Mean discharge (cfs)	October Suspended sediment Mean concentration (ppm)	October Suspended sediment Tons per day	November Mean discharge (cfs)	November Suspended sediment Mean concentration (ppm)	November Suspended sediment Tons per day	December Mean discharge (cfs)	December Suspended sediment Mean concentration (ppm)	December Suspended sediment Tons per day
1	0.01	....		0.05	....		0.31	....	
2	.01	....		.04	....		.36	....	
3	.01	....		.04	....		.36	....	
4	.01	....		.02	....		.41	....	
5	.01	....		.03	....		.45	52	
6	.01	....		.04	106		.41	....	e0.1
7	.01	....		.02	....		.41	....	
8	.02	....		.02	....	t	.60	....	
9	.02	....		.02	....		.60	....	
10	.02	....		.02	....		.48	....	
11	.02	....		.04	....		.38	....	
12	.02	....		.05	....		.34	....	
13	.04	....		.06	....		.27	....	
14	.03	....		.05	85		.22	....	
15	.02	....	t	.06	....		.20	....	t
16	.06	....		6.3	693	s158	.23	....	
17	.05	....		48	3,750	s1,080	.26	76	
18	.04	....		2.0	130	.7	.29	....	
19	.03	....		.60	40	.1	2.6	190	sa9.3
20	.03	....		.41	70	.1	13	350	sb19
21	.02	....		.32	....	.1	1.9	....	e1.6
22	.04	....		.27	....	t	1.7	297	1.4
23	.04	....		.27	53	t	1.8	....	e1.2
24	.03	....		.36	80	a.1	1.3	....	e.5
25	.03	....		3.7	519	s12	.70	....	
26	.03	....		1.3	200	a.7	.56	....	
27	.03	....		.50	....		.40	....	
28	.05	....		.34	....	e.1	.40	....	e.1
29	.06	....		.38	....		.48	....	
30	.08	....		.31	....		.45	....	
31	.07	....		....	....	....	.45	....	

Day	January Mean discharge (cfs)	January Suspended sediment Mean concentration (ppm)	January Suspended sediment Tons per day	February Mean discharge (cfs)	February Suspended sediment Mean concentration (ppm)	February Suspended sediment Tons per day	March Mean discharge (cfs)	March Suspended sediment Mean concentration (ppm)	March Suspended sediment Tons per day
1	0.45	....		0.14	43		0.66	....	
2	.48	17		.14	....	t	.72	....	
3	.38	....		.18	....		.72	....	
4	.30	....		1.0	110	sa.6	.72	....	e0.2
5	.20	....		40	1,100	s366	.72	....	
6	.16	....	t	18	730	sb89	.57	....	
7	.24	....		4.5	150	1.8	.48	....	
8	.29	....		2.2	....	.6	.60	....	
9	.29	....		.98	....		.98	180	a.5
10	.31	....		1.2	51		15	3,000	sb410
11	.24	71		2.0	....		2.8	170	1.3
12	.26	84	.1	1.6	....		2.4	160	1.0
13	1.4	130	sa.8	.80	....	e.2	1.8	101	.5
14	5.9	300	sa6.4	.60	....		20	3,920	s649
15	3.0	290	sb3.2	.50	....		5.5	210	3.1
16	.50	100	a.1	.40	....		3.0	143	1.2
17	.41	....	e.1	.47	158		2.4	117	.8
18	.38	38		.54	....		2.8	74	.6
19	.36	....		59	2,010	s1,560	1.9	94	.5
20	.32	....		92	2,900	sb1,500	1.8	106	1.0
21	.32	....		1.8	....	e1.5	1.8	134	.7
22	.36	....		1.2	131	.4	2.1	134	.8
23	.43	36		1.0	....		3.0	99	.8
24	.36	....	t	.90	....		1.8		
25	.27	....		.98	....	e.2	1.6		
26	.23	....		1.0	....		1.4	56	.2
27	.20	....		.93	....		1.3		
28	.19	....		.72	....		1.1		
29	.18	....		....	....	....	1.0		
30	.21	....		....	....	....	13	1,520	s72
31	.23	....		....	....	....	12	930	30

e Estimated.
s Computed by subdividing day.
t Sediment discharge less than 0.05 ton.
a Computed from an estimated concentration graph.
b Computed from a partly estimated concentration graph.

Note.—Flow affected by ice Dec. 14-17, 25-28, Jan. 4-6, 15-17, 26-29, Feb. 4, 5, 13-18, 22-24.

Ralston Creek at Iowa City, Iowa—Continued

Suspended sediment, water year October 1952 to September 1953—Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	7.4	160	3.2	11	630	sb25	0.52		
2	4.7	...	e1.2	6.1	102	2.7	.52		
3	3.8	85	.9	4.2	99	1.1	.50		
4	2.8			3.6			.52	44	0.1
5	2.4			3.2			.60		
6	2.2			2.8	89	.7	.47		
7	2.0			2.3			.43		
8	2.0			1.0			4.5	1,200	sb40
9	2.2	49	.3	1.6			.76		
10	1.8			1.5			.55		
11	1.6			1.3	48	.2	.57		
12	1.6			1.1			.50	177	.2
13	1.2			1.0			.55		
14	1.2			1.1			.48		
15	1.8			.98			.34		
16	1.3			.92			.30		
17	1.1			.86	76	.2	.31	...	
18	.98			.80			.26	...	e.1
19	.93	28	.1	.76			.23	...	
20	.88			.69			.18	43	
21	.84			1.9	105	s1.6	.18	...	
22	.84			4.1	1,160	s25	.15	...	
23	.72	88	.2	1.3	78	.3	.12	...	t
24	1.9	96	s.6	24	4,970	s1,980	.12	149	
25	1.6	70	.3	2.5	117	.8	.18	156	
26	1.6			1.8	...	e.4	.14	...	
27	1.3	56	.2	1.2	...		7.3	2,120	s302
28	1.2			1.2	60		2.1	1,500	sb26
29	1.2			.93	...	e.2	.30	192	.2
30	16	3,800	sb270	.80	...		.24	118	.1
31	...	...	...	.63	...		...	...	...
	July			August			September		
1	0.19			0.09	...		...	...	...
2	.18	83	t	.13	...		...	...	...
3	.14			.05	84		...	...	...
4	.18			.04	...		...	...	...
5	5.2	2,460	s102	.03	...		...	...	...
6	2.4	1,200	sb27	.04	...		...	...	...
7	.32			.04	81		...	...	...
8	.23			.02	...		...	...	...
9	.18			.02	...		...	...	...
10	.16	100	.1	.01	48	t	...	...	...
11	.15			.05	60		...	...	...
12	.13			.13	72		...	...	...
13	.13			.04	...		...	...	...
14	.44	260	b.3	.02	49		...	...	...
15	.15	190	a.1	.01	...		...	...	...
16	.12	178	.1	.01	...		...	...	...
17	.11	...		.01	53		...	...	...
18	.11	108	t	.02	...		...	...	...
19	.09	62		.01	...		...	...	...
20	.11	...		.01	45		...	...	...
21	.72	260	sa1.2	0	...	0	...	...	...
22	.14	...		0	...	0	...	...	...
23	.09	...		.01	...	t	...	...	...
24	.06	...		0	...	0	...	...	...
25	.05	...		0	...	0	...	...	...
26	.04	...	t	0	...	0	...	...	...
27	.05	...		0	...	0	...	...	...
28	.05	...		0	...	0	...	...	...
29	.04	...		0	...	0	...	...	...
30	.03	...		0	...	0	...	...	...
31	.05	...		0	...	0	...	...	...

e Estimated.
s Computed by subdividing day.
t Sediment discharge less than 0.05 ton.
a Computed from an estimated concentration graph.
b Computed from a partly estimated concentration graph.

Ralston Creek at Iowa City, Iowa—Continued

Suspended sediment, water year October 1953 to September 1954

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	...	...	...	0	...	0	0	...	0
2	...	...	...	0	...	0	.05	12	
3	...	...	...	0	...	0	.11	5	
4	...	...	...	0	...	0	.05	...	
5	...	...	...	0	...	0	.02	...	
6	...	...	...	0	...	0	.05	...	
7	...	...	...	0	...	0	.04	...	
8	...	...	...	0	...	0	.03	...	t
9	...	...	...	0	...	0	.03	...	
10	...	...	...	0	...	0	.04	...	
11	...	...	...	0	...	0	.04	...	
12	...	...	...	0	...	0	.02	...	
13	...	...	...	0	...	0	.01	...	
14	...	...	...	0	...	0	.01	...	
15	...	...	...	0	...	0	.01	...	
16	...	...	...	0	...	0	0	...	0
17	...	...	...	0	...	0	0	...	0
18	...	...	...	0	...	0	0	...	0
19	...	...	...	0	...	0	0	...	0
20	...	...	...	0	...	0	.01	...	
21	...	...	...	.01	...		.10	...	t
22	...	...	...	.01	...		0	...	0
23	...	...	...	.02	...		0	...	0
24	...	...	...	.02	...		0	...	0
25	...	...	...	.01	...	t	0	...	0
26	...	...	...	.01	...		0	...	0
27	...	...	...	.01	...		0	...	0
28	...	...	...	.01	...		0	...	0
29	...	...	...	.01	...		0	...	0
30	...	...	...	.01	14		0	...	0
31	...	...	...	...	...	...	0	...	0

Day	January			February			March		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1	...	...	...	0	...	0	0.05	...	t
2	...	...	...	.04	22		.02	...	
3	...	...	...	.10	30		0	...	0
4	...	...	...	.07	32	t	0	...	0
5	...	...	...	.15	35		0	...	0
6	...	...	...	.02	...		0	...	0
7	...	...	...	0	...	0	.10		
8	...	...	...	.01	...		.43		
9	...	...	...	.05	...		.23	25	t
10	...	...	...	.05	11		.30		
11	...	...	...	.08	...	t	.25		
12	...	...	...	.01	...		.10		
13	...	...	...	.04	...		.11		
14	...	...	...	.09	23		.03		
15	...	...	...	.20	...		.05		
16	...	...	...	.18	5		.05		
17	...	...	...	.16	...		.06	14	t
18	...	...	...	.15	...	t	.08		
19	...	...	...	.10	2		.24		
20	...	...	...	.17	5		.11		
21	...	...	...	.15	...		.05		
22	...	...	...	.12	...		.05		
23	...	...	...	.11	...		.03		
24	...	...	...	.18	10		.87	235	s.7
25	...	...	...	.30	...	t	1.2	630	s2.8
26	...	...	...	.18	...		.20		
27	...	...	...	.13	11		.16		
28	...	...	...	.10	...		.20	37	t
29	...	...	...	...	...	...	.15		
30	...	...	...	...	...	...	.19		
31	...	...	...	...	...	...	.15		

s Computed by subdividing day.
t Sediment discharge less than 0.05 ton.
Note.—Flow affected by ice Dec. 21, Feb. 2-5, Feb. 26 to Mar. 2.

Ralston Creek at Iowa City, Iowa—Continued

Suspended sediment, water year October 1953 to September 1954—Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	0.26			1.5	851	s6.2	1.8	862	s7.4
2	.31			4.7	2,400	s52	1.2	573	s11
3	.11	21	t	1.2	303	s1.3	1.0	426	1.2
4	.13			.60	51	.1	.43	69	
5	.15			.38			.24	101	e.1
6	1.6	403	s3.0	.27			.21	....	
7	.29			.20	48	t	.14	121	
8	.14	26	t	.16			.09	....	t
9	.11			.14			.11	128	
10	.11			.14			.18	....	
11	.09			.12			.05	....	
12	.05	27	t	.10			.03	....	
13	.05			.09			.01	79	
14	.05			.08	60	t	.02	....	t
15	.47	28	t	.09			.01	93	
16	.16			.09			.01	....	
17	.08	21	t	.08			.01	40	
18	.06			.07			0	....	0
19	.06			.05	....		.05	103	
20	.63	107	.2	.05	66		.05	....	
21	.27			.05	....		.03	88	
22	.15			.04	....		.08	....	t
23	.11	56	t	.05	62	t	.02	....	
24	.09			.05	....		.01	....	
25	.09			.02	....		.01	....	
26	3.0	1,670	s83	.03	....		0	....	0
27	.85	974	s3.3	.08	39		0	....	0
28	.27	98	.1	.22			0	....	0
29	.21	80	t	.08	80	t	0	....	0
30	5.9	2,210	s220	.04			0	....	0
31	....	....	....	.08			....	....	....

Day	July			August			September		
1	0	....	0	0	....	0	0	....	0
2	0	....	0	0	....	0	0	....	0
3	0	....	0	0	....	0	0	....	0
4	0	....	0	0	....	0	0	....	0
5	0	....	0	0	....	0	0	....	0
6	0	....	0	0	....	0	0	....	0
7	0	....	0	0	....	0	0	....	0
8	0	....	0	0	....	0	0	....	0
9	0	....	0	0	....	0	0	....	0
10	0	....	0	0	....	0	0	....	0
11	0	....	0	0	....	0	0	....	0
12	0	....	0	0	....	0	0	....	0
13	0	....	0	0	....	0	0	....	0
14	0	....	0	0	....	0	0	....	0
15	0	....	0	0	....	0	0	....	0
16	0	....	0	0	....	0	0	....	0
17	0	....	0	0	....	0	0	....	0
18	0	....	0	0	....	0	0	....	0
19	0	....	0	0	....	0	0	....	0
20	0	....	0	0	....	0	0	....	0
21	0	....	0	0	....	0	0	....	0
22	0	....	0	0	....	0	0	....	0
23	0	....	0	0	....	0	0	....	0
24	0	....	0	0	....	0	0	....	0
25	0	....	0	7.2	881	s145	0	....	0
26	0	....	0	7.5	1,090	s60	0	....	0
27	0	....	0	.48	214	s.4	0	....	0
28	1.4	753	s15	.05	90	t	0	....	0
29	.07	432	s.2	0	....	0	2.4	952	s19
30	0	....	0	0	....	0	0	....	0
31	0	....	0	0	....	0	....	....	....

e Estimated.
s Computed by subdividing day.
t Sediment discharge less than 0.05 ton.

Ralston Creek at Iowa City, Iowa—Continued

Monthly discharge for calendar and water years 1952 to 1954

Month	Water discharge (cfs-days)	Suspended sediment							
		Load (tons)	Daily loads (tons)			Tons per sq. mi.	Acre-feet (a)	Concentration (ppm)	
			Max.	Min.	Mean			Maximum daily	Weighted mean
April 1, 1952	69.8	24.4	8.8	0.1	0.81	8.11	0.02	381	129
May	88.02	1,436.5	1,220	0.1	46.3	477.2	1.2	3,040	6,040
June	72.26	1,990.1	1,430	0.1	66.3	661.2	1.7	4,850	10,200
July	14.27	38.0	22	t	1.23	12.6	.03	1,020	5,950
August	11.03	71.9	55	t	2.32	23.9	.06	1,200	2,410
September	1.45	0.2	.1	t	.007	.07	.0002	206	54
October 1952	0.95	0.2	....	t	.006	.07	.0002	....	78
November	65.62	1,252.4	1,080	t	42	416.1	1.0	3,760	7,070
December	32.38	35.1	19	t	1.1	11.7	.03	360	401
January 1953	18.85	11.4	6.4	t	.4	3.79	.01	300	224
February	234.78	3,523.2	1,560	t	126	1,170	2.9	2,900	5,560
March	105.67	1,176.6	649	....	38	390.9	1.0	3,920	4,120
April	71.04	281.5	270	....	9.4	93.5	0.2	3,800	1,470
May	88.07	2,043.8	1,980	....	66	679.0	1.7	4,970	8,590
June	24.04	431.2	362	t	14.4	143.3	.4	2,120	6,640
July	12.04	191.8	162	t	6.2	63.7	.2	2,480	5,900
August	0.70	0.1	....	0	.003	.03	.00008	....	47
September	0	0	0	0	0	0	0	0	0
Water year 1952-53	654.23	8,947.3	1,980	0	25	2,973	7.5	4,970	5,070
October 1953	0	0	0	0	0	0	0	0	0
November	0.12	t	t	0	.0002	....	....	....	19
December	0.62	t	t	0	.0006	....	....	....	12
Calendar year 1953	556.02	7,650.6	1,980	0	21	2,545	6.4	4,970	5,100
January 1954	0	0	0	0	0	0	0	0	0
February	3.00	0.1	....	0	.004	.03	.00008	....	12
March	5.57	3.8	2.8	0	0.1	1.26	.003	630	253
April	15.85	315.9	226	t	11	105.0	.3	2,210	7,380
May	10.82	60	52	t	1.9	19.9	.05	2,490	2,050
June	5.70	20.1	11	0	0.7	6.68	.02	862	1,200
July	1.47	15.2	15	0	0.5	5.05	.01	753	3,830
August	15.23	205.4	145	0	6.6	68.2	.2	1,090	5,000
September	2.4	19	19	0	0.6	6.31	.02	952	2,930
Water year 1953-54	60.87	639.5	226	0	1.8	212.5	0.5	2,490	3,890

t Sediment discharge less than 0.05 ton.
a Computed using a specific weight of 55 pounds per cubic foot.

Ralston Creek at Iowa City, Iowa—Continued

Particle-size analyses of suspended sediment, water year October 1953 to September 1954

(Methods of analysis: B, bottom-withdrawal tube; P, pipette; S, sieve; N, in native waters; W, in distilled water; C, chemically dispersed; M, mechanically dispersed.)

Date	Time	Instantaneous discharge (cfs)	Water temperature (°F)	Suspended sediment											Methods of analysis
				Concentration (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters									
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	
April 6, 1954	7:30 a.m.	1.5	50	1,040	2,410	....	92	....	98	....	100	....	....	....	SPWCM
April 26	9:25 p.m.	22	....	11,500	3,580	....	55	....	87	....	100	....	....	....	SPWCM
April 30	8:45 p.m.	78	....	12,600	4,440	....	46	....	74	....	99	....	....	....	SPWCM
June 2	7:10 p.m.	7.7	55	1,050	4,020	48	59	76	91	....	100	....	....	....	SPWCM
August 25	10:35 p.m.	80	70	5,120	7,220	....	45	....	78	....	99	....	....	....	SPWCM

Shell Rock River at Marble Rock, Iowa

LOCATION.—At gaging station on left bank 20 ft upstream from dam at Marble Rock, Floyd County, 0.5 mile upstream from unnamed creek entering from right, and 10 miles downstream from Lime Creek.

DRAINAGE AREA.—1,330 square miles.

RECORDS AVAILABLE.—Water temperatures: April 1944 to March 1945.

Sediment records: June 1944 (a).

EXTREMES, 1944, 1945 given in following table:

Period	Temperature (°F)			
	Max.	Date	Min.	Date
April 23 to September 30, 1944	87	Aug. 3, 11, 12	38	May 6
October 1, 1944 to March 14, 1945	62	Oct. 6	33	Many days

EXTREMES, 1944-45.—Water temperatures: Maximum, 87°F Aug. 3, 11, 12, 1944; minimum, 33°F many days during winter months.

a Reported under Miscellaneous Analyses in Iowa.

Shell Rock River at Marble Rock, Iowa—Continued

Temperature (°F) of water, April to September 1944

(Friez, 7 day thermograph)

Day	Oct.		Nov.		Dec.		Jan.		Feb.		Mar.		Apr.		May		June		July		Aug.		Sept.	
	Mx	Mn	Mx	Mn	Mx	Mn	Mx	Mn	Mx	Mn	Mx	Mn	Mx	Mn	Mx	Mn	Mx	Mn	Mx	Mn	Mx	Mn	Mx	Mn
1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	62	56	81	76	75	71	82	75	71	63
2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	62	60	80	78	72	71	84	77	75	65
3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	60	57	79	77	75	71	87	80	80	71
4	...	...	...	...	...	...	...	...	...	...	...	...	...	...	56	44	78	75	76	73	85	76	77	72
5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	44	40	75	66	79	74	80	76	74	72
6	...	...	...	...	...	...	...	...	...	...	...	...	...	...	43	38	67	62	77	74	82	79	71	68
7	...	...	...	...	...	...	...	...	...	...	...	...	...	...	49	42	67	62	78	74	83	79	68	64
8	...	...	...	...	...	...	...	...	...	...	...	...	...	...	53	48	65	62	79	75	84	79	67	63
9	...	...	...	...	...	...	...	...	...	...	...	...	...	...	58	52	63	62	77	73	85	78	71	64
10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	58	54	64	62	74	71	86	80	69	66
11	...	...	...	...	...	...	...	...	...	...	...	...	...	...	61	58	67	64	73	72	87	82	67	65
12	...	...	...	...	...	...	...	...	...	...	...	...	...	...	66	61	72	67	73	70	87	80	67	65
13	...	...	...	...	...	...	...	...	...	...	...	...	...	...	69	64	74	67	70	72	85	76	65	64
14	...	...	...	...	...	...	...	...	...	...	...	...	...	...	72	66	76	73	76	73	82	76	64	63
15	...	...	...	...	...	...	...	...	...	...	...	...	...	...	73	70	78	75	...	...	81	78	66	62
16	...	...	...	...	...	...	...	...	...	...	...	...	...	...	74	71	79	76	...	...	80	76	72	64
17	...	...	...	...	...	...	...	...	...	...	...	...	...	...	75	72	80	77	...	...	75	71	71	66
18	...	...	...	...	...	...	...	...	...	...	...	...	...	...	75	68	79	78	...	...	77	71	72	69
19	...	...	...	...	...	...	...	...	...	...	...	...	...	...	66	62	76	70	...	...	76	70	75	71
20	...	...	...	...	...	...	...	...	...	...	...	...	...	...	68	64	71	60	...	...	75	71	73	70
21	...	...	...	...	...	...	...	...	...	...	...	...	...	...	69	67	73	69	...	...	78	70	70	68
22	...	...	...	...	...	...	...	...	...	...	...	...	...	...	71	67	76	73	76	72	78	71	68	63
23	...	...	...	...	...	...	...	...	...	...	...	...	50	45	71	70	78	75	78	72	75	72	63	59
24	...	...	...	...	...	...	...	...	...	...	...	...	50	44	71	70	78	74	79	74	76	71	65	58
25	...	...	...	...	...	...	...	...	...	...	...	...	44	42	73	70	79	76	77	75	75	70	67	59
26	...	...	...	...	...	...	...	...	...	...	...	...	45	42	73	70	80	79	78	74	70	65	67	59
27	...	...	...	...	...	...	...	...	...	...	...	...	51	41	73	69	81	79	79	73	65	61	67	62
28	...	...	...	...	...	...	...	...	...	...	...	...	54	49	74	71	80	77	76	72	70	60	65	62
29	...	...	...	...	...	...	...	...	...	...	...	...	55	52	75	71	77	75	76	71	70	63	63	61
30	...	...	...	...	...	...	...	...	...	...	...	...	57	55	78	73	77	73	81	71	69	67	62	58
31	...	...	...	...	...	...	...	...	...	...	...	...	...	...	80	76	...	...	80	74	68	65	...	...
Average	...	...	...	...	...	...	...	...	...	...	...	...	51	46	66	62	75	72	77	73	79	73	69	65

Temperature (°F) of water, October 1944 to March 1945

(Friez, 7 day thermograph)

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

Shell Rock River at Shell Rock, Iowa

LOCATION.—At gaging station on right bank 400 ft upstream from bridge on State Highway 8 in Shell Rock, Butler County, and 11 miles upstream from mouth.

DRAINAGE AREA.—1,770 square miles.

RECORDS AVAILABLE.—Water temperatures: June 1953 to September 1954.

EXTREMES, water years 1953, 1954 given in following table:

Water year	Temperature (°F)			
	Max.	Date	Min.	Date
1952-53(a)	88	June 19	53	Sept. 22
1953-54	80	June 26, 27	Freezing point	Several days during Dec. and Jan.

a June to September.

EXTREMES, 1953-54.—Water temperatures: Maximum, 88°F June 19, 1953; minimum, freezing point on several days during December 1953 and January 1954.

Shell Rock River at Shell Rock, Iowa—Continued

Temperature (°F) of water, June to September 1953

(Stevens Type A35T thermograph)

Day	Oct.		Nov.		Dec.		Jan.		Feb.		Mar.		Apr.		May		June		July		Aug.		Sept.	
	Mx	Mn	Mx	Mn	Mx	Mn	Mx	Mn	Mx	Mn	Mx	Mn	Mx	Mn	Mx	Mn	Mx	Mn	Mx	Mn	Mx	Mn	Mx	Mn
1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	78	74	79	76	77	71
2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	76	72	78	75	76	73
3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	75	72	77	73	73	69
4	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	74	72	76	73	67	63
5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	73	69	74	73	67	61
6	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	72	67	73	72	64	61
7	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	72	68	74	72	63	57
8	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	69	67	74	72	65	60
9	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	68	66	73	71	65	63
10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	70	67	74	71	65	61
11	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	70	68	74	73	67	62
12	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	79	70	70	69	74	72	62	57
13	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	78	74	69	66	74	72	60	57
14	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	74	72	71	68	75	73	60	56
15	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	80	74	77	70	75	71	63	59
16	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	79	77	78	73	73	69	63	57
17	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	81	74	78	74	72	69	63	59
18	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	85	77	80	74	72	69	62	58
19	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	88	81	81	75	72	69	62	56
20	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	87	81	79	76	72	69	61	59
21	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	82	79	78	74	72	69	58	55
22	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	82	77	79	72	73	69	62	53
23	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	82	71	78	76	73	69	58	55
24	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	68	67	76	73	74	70	60	56
25	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	69	63	78	74	75	71	60	58
26	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	72	68	78	74	75	70	60	56
27	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	72	64	78	72	75	69	58	54
28	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	70	66	78	76	75	70	61	56
29	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	76	69	77	74	75	70	62	59
30	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	80	72	75	72	77	71	60	56
31	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	76	74	77	73	...	...
Average	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	78	72	75	72	74	71	63	59

Temperature (°F) of water, water year October 1953 to September 1954

(Stevens Type A35T thermograph)

Day	Oct.		Nov.		Dec.		Jan.		Feb.		Mar.		Apr.		May		June		July		Aug.		Sept.	
	Mx	Mn	Mx	Mn	Mx	Mn	Mx	Mn	Mx	Mn	Mx	Mn	Mx	Mn	Mx	Mn	Mx	Mn	Mx	Mn	Mx	Mn	Mx	Mn
1	59	56	48	47	38	36	32	32	36	34	39	37	42	41	58	54	62	60	77	74	73	71	70	68
2	61	56	49	47	42	37	34	32	36	35	39	38	42	42	54	52	60	58	76	73	74	72	71	70
3	62	58	49	47	43	39	33	32	38	37	38	38	42	39	52	47	58	57	76	74	73	70	70	68
4	59	56	47	44	42	40	34	32	39	37	36	35	42	38	47	44	58	56	75	74	72	70	70	66
5	57	53	44	42	41	37	33	33	38	37	36	35	48	42	46	45	61	58	77	74	72	68	72	69
6	53	52	42	40	41	39	33	33	38	37	38	36	53	48	48	46	64	60	77	76	72	69	72	70
7	52	50	40	39	38	36	33	33	38	37	37	36	55	53	48	48	68	64	79	76	72	69	71	69
8	54	50	40	38	36	36	33	33	39	37	38	36	53	48	50	48	69	66	77	74	71	68	67	65
9	54	51	40	39	36	36	33	33	39	37	38	36	50	48	49	48	70	68	74	72	72	68	66	62
10	55	51	41	40	35	34	33	33	38	37	38	38	52	48	51	49	70	67	74	72	72	69	63	60
11	56	52	42	41	34	33	33	33	37	36	39	38	54	50	53	50	74	70	75	72	72	68	64	61
12	54	52	43	41	34	34	33	33	36	36	39	36	54	50	57	53	77	72	78	74	70	66	63	61
13	56	53	43	42	35	34	34	33	36	36	37	36	55	52	60	56	76	74	77	75	70	66	63	61
14	56	52	44	42	35	33	34	33	37	36	37	36	61	55	62	58	76	72	77	76	70	67	61	59
15	58	54	44	43	34	33	34	33	39	37	39	36	61	56	64	59	76	73	77	75	74	69	59	59
16	58	56	46	44	34	34	33	33	39	37	39	37	56	52	66	62	76	74	77	74	74	72	60	59
17	58	57	46	44	34	33	33	33	38	38	40	39	55	51	64	60	74	70	76	72	74	66	61	58
18	60	57	48	46	35	34	33	33	39	37	42	40	56	54	64	60	74	69	77	73	68	64	65	61
19	60	58	49	48	34	33	34	33	39	38	42	41	56	55	61	58	70	69	78	74	72	66	66	64
20	61	59	49	48	33	33	33	33	39	39	41	39	56	54	62	57	71	71	78	73	72	70	64	62
21	60	58	48	44	33	33	33	33	39	37	41	38	58	55	62	58	71	70	73	71	72	70	63	58
22	61	59	45	42	33	33	33	33	37	36	41	40	58	54	60	58	72	70	75	70	71	68	58	55
23	60	52	44	42	33	33	33	33	36	36	42	39	60	56	66	59	73	71	74	73	74	69	58	56
24	53	51	43	41	33	33	33	33	39	36	42	41	60	58	65	63	75	73	73	71	72	70	58	56
25	52	50	42	41	33	33	33	33	39	37	41	41	59	58	65	60	78	73	76	72	72	72	59	56
26	51	49	42	39	35	33	33	33	37	36	42	38	62	59	65	59	80	79	77	73	72	72	61	57
27	48	46	39	38	34	33	34	33	37	36	44	41	62	59	60	57	80	78	77	73	72	70	63	59
28	47	46	38	36	34	32	34	34	37	36	44	41	59	57	62	58	78	75	76	73	70	69	62	61
29	47	45	38	36	34	32	36	34	...	...	41	38	58	56	62	56	77	75	77	72	72	70	64	61
30	49	47	38	38	32	32	34	33	...	...	41	38	58	56	62	60	77	75	78	76	72	70	64	61
31	48	48	...	...	33	32	35	34	...	...	43	40	...	...	62	62	...	...	76	73	70	69	...	...
Average	55	53	44	42	36	34	33	33	38	37	40	38	55	52	58	55	72	69	76	73	72	69	64	62

Cedar River at Cedar Rapids, Iowa

LOCATION.—At 8th Avenue bridge at Cedar Rapids, Linn County, 500 ft downstream from gaging station, and 2.6 miles upstream from Prairie Creek.

DRAINAGE AREA.—6,640 square miles.

RECORDS AVAILABLE.—Chemical analyses: September 1906 to September 1907; August 1893, August 1912 and June to August 1913 (fragmentary) (a); January 1944 to September 1954 (discontinued).

Water temperatures: January 1944 to September 1954 (discontinued).

Sediment records: October 1948 to September 1954 (discontinued).

EXTREMES, 1906-07 and water years 1944 to 1954 given in following table:

Water year	Chemical composites							
	Dissolved solids (ppm)				Total hardness (ppm)			
	Max.	Period	Min.	Period	Max.	Period	Min.	Period
1906-07...	311	Dec. 17-26	119	Feb. 16-26	......	....	......	....
1943-44...	374	Jan. 11-20	207	Mar. 11-20	293	Jan. 11-20	154	Mar. 11-20
1944-45...	370	Dec. 21, 23-31	193	Aug. 11-20	300	Dec. 21, 23-31	151	Aug. 11-20
1945-46...	355	Dec. 11-20	120	Jan. 5-10	288	Dec. 11-20	89	Jan. 5-10
1946-47...	367	Jan. 1-10	121	June 14-16	300	Jan. 1-10	74	June 14-16
1947-48...	388	Jan. 17-Feb. 1	148	Mar. 19-24	334	Jan. 17-Feb. 1	86	Mar. 19-24
1948-49...	334	Dec. 1-31	130	Mar. 5-13	260	Dec. 1-31	95	Mar. 5-13
1949-50...	400	Jan. 1-31	118	Mar. 5-13	234	Jan. 1-31	71	Mar. 12-13
1950-51...	302	Jan. 1-31	98	Mar. 31-April 3	264	Dec. 1-Jan. 31	68	Mar. 31-April 3
1951-52...	356	Dec. 19-31	194	April 5	284	Dec. 19-31	135	April 5
1952-53...	366	Jan. 1-15	144	Feb. 20-28	261	Jan. 1-15	99	Feb. 20-28
1953-54...	834	April 8	174	Aug. 18-20	287	Jan. 1-22	114	Aug. 18-20

Water year	Daily suspended sediment								Temperature*	
	Concentrations (ppm)				Loads (tons)				°Fahrenheit	
	Max.	Date	Min.	Date	Max.	Date	Min.	Date	Max.	Date
1906-07...	......	....	......	....	......	....	......	....	......	....
1943-44...	1,140	June 17	1	Jan. 20, 21	78,700	June 17	2	Jan. 20, 21	85	Aug. 11, 14, 15
1944-45...	820	June 10	1	Jan. 31	73,700	Mar. 19	2	Jan. 31	84	July 23-26, Aug. 1
1945-46...	1,680	July 1	4	Jan. 21-Feb. 3	53,300	Sept. 23	12	Jan. 3	83	July 10
1946-47...	1,700	June 15	1	Feb. 11	245,000	June 15	3	Feb. 11	87	Aug. 22-23
1947-48...	1,230	Mar. 19	10	Nov. 17, Dec. 20, Feb. 16	89,550	Mar. 20	18	Feb. 16	85	July 6, 7, 9, 10, Aug. 24
1948-49...	1,000	June 25	4	Feb. 7	46,400	Mar. 7	8	Dec. 28	89	July 4
1949-50...	2,050	June 25	4	Feb. 4, 5	74,100	June 25	3	Feb. 4, 5	81	July 29-31
1950-51...	1,500	Feb. 27	3	Feb. 19	77,300	Feb. 27	4	Feb. 9, 11, 19	81	July 28
1951-52...	558	Mar. 11	2	Dec. 24, 27, Jan. 2	21,600	April 4	7	Dec. 16	83	July 22
1952-53...	1,030	July 6	......	....	14,500	July 6	......	....	83	July 31
1953-54...	1,380	June 23	......	....	87,400	June 25	......	....	83	July 12-14, 29, 30

* Minimum temperature, freezing point some days each year except 1948-49, 1949-50, 1950-51.

EXTREMES, 1943-54.—Dissolved solids (1906-07, 1944-54): Maximum, 834 ppm Apr. 8, 1954; minimum, 98 ppm Mar. 31 to Apr. 3, 1951.

Total hardness (1944-54): Maximum, 334 ppm Jan. 17 to Feb. 1, 1948; minimum, 68 ppm Mar. 31 to Apr. 3, 1951.

Water temperatures (1944-54): Maximum, 89°F July 4, 1949; minimum, freezing point some days most years.

Sediment concentrations: Maximum daily, 2,050 ppm June 25, 1950; minimum daily, 1 ppm Jan. 20, 21, 1944, Jan. 31, 1945, Feb. 11, 1947.

Sediment loads: Maximum daily, 245,000 tons June 15, 1947; minimum daily, 2 tons Jan. 20, 21, 1944, Jan. 31, 1945.

REMARKS.—Records of specific conductance of daily samples for period October 1945 to September 1946 and July 1947 to September 1954 available in Regional Office, U. S. Geological Survey, Lincoln, Nebr.

a Reported under Miscellaneous Analyses in Iowa.

Cedar River at Cedar Rapids, Iowa—Continued

Chemical analyses, in parts per million, 1906 to 1907

Date of collection	Mean gage height (feet)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Total dissolved solids
Sept. 6-15, 1906	3.5	20	....	29	18	14	153	[a]4.8	24	4.3	0.0	171
Sept. 16-25	4.1	25	0.10	32	....	8.7	149	.0	27	3.0	2.4	203
Sept. 27-Oct. 6	4.1	26	.10	48	16	....	217	.0	23	4.0	3.3	236
Oct. 7-16	3.4	23	Tr.	55	21	15	246	.0	28	3.2	4.4	269
Oct. 17-27	3.3	26	Tr.	52	19	20	229	.0	29	3.3	.4	248
Oct. 28-Nov. 6	3.7	27	Tr.	58	20	11	255	.0	29	4.6	1.8	277
Nov. 7-16	3.5	17	Tr.	60	19	14	263	.0	28	3.5	2.2	285
Nov. 17-26	3.6	15	.05	64	20	16	262	.0	33	3.8	2.6	281
Nov. 27-Dec. 6	4.0	17	.04	51	20	15	240	.0	33	3.8	.9	258
Dec. 7-16	3.7	21	.10	62	22	17	273	.0	37	3.8	4.4	309
Dec. 17-26	4.3	13	.10	64	26	16	309	.0	40	4.0	4.8	311
Dec. 27-Jan. 5, 1907	4.2	12	.20	51	17	13	207	.0	....	3.1	4.4	228
Jan. 6-15	4.4	9.2	.08	47	17	9.7	175	.0	....	2.5	5.2	193
Jan. 16-26	4.9	15	Tr.	42	13	13	167	.0	29	2.3	3.6	193
Jan. 27-Feb. 5	4.5	11	.05	61	19	....	258	.0	31	3.0	5.2	260
Feb. 6-15	4.2	6.4	.05	58	15	14	221	.0	46	4.8	5.2	242
Feb. 16-26	5.7	4.6	.10	24	6.6	11	87	.0	21	2.2	5.8	119
Feb. 27-Mar. 7	5.3	9.8	.25	26	9.6	14	....	.0	35	2.2	4.6	151
Mar. 8-19	4.7	14	.18	32	12	12	....	.0	21	8.8	3.8	178
Mar. 20-29	4.6	12	.15	37	9.4	16	149	.0	26	2.7	2.6	175
Mar. 30-April 8	4.7	15	Tr.	41	14	9.9	175	.0	29	2.3	2.8	203
April 9-18	4.0	11	.03	53	16	....	213	.0	34	2.7	2.6	246
April 19-28	3.6	3.0	.05	54	19	8.1	210	.0	46	3.9	.6	250
April 29-May 8	3.6	3.0	.05	51	20	8.6	230	.0	35	3.8	Tr.	241
May 9-18	3.3	4.0	.01	48	21	11	226	.0	33	3.4	.5	241
May 19-28	3.4	5.8	.18	....	17	9.8	204	.0	32	4.2	3.0	225
May 29-June 8	3.7	11	.02	43	16	8.8	207	.0	....	3.4	2.2	230
June 9-18	5.4	14	.02	47	14	7.0	179	.0	29	1.9	4.8	215
June 19-28	5.0	10	.05	48	13	9.8	209	.0	28	2.6	4.2	244
June 29-July 9	4.5	15	.15	49	11	15	201	.0	22	2.9	8.0	230

July 10-19	6.3	20	.48	38	11	6.4	145	.0	22	....	3.1	179
July 20-29	6.4	14	.05	43	13	12	189	.0	22	2.5	2.8	207
July 30-Aug. 8	4.8	15	.01	55	15	15	234	.0	27	4.0	4.4	248
Aug. 9-18	5.2	20	.20	40	13	8.6	166	.0	22	2.8	2.2	192
Aug. 19-28	4.5	10	.05	42	14	9.1	198	.0	23	3.3	2.3	213
Aug. 29-Sept. 7	4.6	20	.15	51	14	11	201	.0	29	2.5	1.6	228
Sept. 8-17	3.8	13	.18	57	18	10	253	.0	31	3.8	1.9	253
Mean	....	14	0.09	48	16	12	209	0.0	30	3.4	3.1	228

a Abnormal calculated as bicarbonate.

Cedar River at Cedar Rapids, Iowa—Continued

Chemical analyses, in parts per million, January to September 1944

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Specific conductance (micromhos at 25°C)	pH
Jan. 1-10, 1944	729	11	0.02	76	24	19	3.0	294	0	45	24	0.2	12	0.02	361	0.49	711	288	47	12	599	7.7
Jan. 11-20	719	12	.04	78	24	21	2.7	300	0	45	28	.2	9.9	.02	374	.51	726	293	47	13	619	7.8
Jan. 21-31	1,204	9.4	.06	59	18	18	3.0	222	0	37	24	.2	11	.02	290	.39	943	221	39	15	487	7.6
Feb. 1-10	1,592	11	.06	59	18	17	4.3	215	0	36	21	.2	9.2	.02	287	.39	1,230	221	45	14	478	7.3
Feb. 11-20	846	13	.02	74	22	18	4.3	276	0	42	22	.2	12	.04	348	.47	795	275	49	12	575	7.6
Feb. 21-29	2,943	10	.19	53	15	11	5.0	188	0	32	14	.2	6.3	.04	253	.34	2,010	194	40	11	410	7.4
Mar. 1-10	2,796	9.9	.07	48	14	11	5.8	165	0	30	12	.2	11	.02	232	.32	1,750	178	43	11	376	7.3
Mar. 11-20	6,297	10	.22	42	12	7.0	5.3	141	0	28	9.0	.2	12	.04	207	.28	3,520	154	38	9	329	7.3
Mar. 21-31	4,936	12	.04	48	14	11	4.5	176	0	32	12	.3	8.4	.04	237	.32	3,160	178	34	12	379	7.9
April 1-10	3,660	13	.02	59	17	9.4	3.8	220	0	36	10	.2	7.6	.04	274	.37	2,710	217	37	8	444	7.7
April 11-20	4,703	13	.02	62	18	11	3.7	226	0	40	9.0	.3	7.8	.04	287	.39	3,640	228	43	9	458	8.1
April 21-30	5,813	14	.04	68	21	10	3.1	250	0	45	9.5	.3	9.2	.04	317	.43	4,980	256	51	8	499	7.9
May 1-10	7,660	12	.02	62	19	8.8	3.0	224	0	41	8.0	.3	12	.06	295	.40	6,100	232	48	7	457	8.2
May 11-20	6,733	11	.02	66	21	10	3.8	244	0	44	9.5	.2	13	.02	314	.43	5,710	251	51	8	486	8.3
May 21-31	13,430	14	.16	53	15	6.6	4.8	196	0	32	6.5	.4	4.8	.02	241	.33	8,740	194	33	7	390	7.4
June 1-10	5,638	15	.10	68	21	9.1	4.7	265	0	38	9.0	.4	6.0	.02	308	.42	4,690	250	39	7	508	7.3
June 11-20	14,940	12	.04	49	14	7.2	4.5	183	0	29	7.0	.4	6.2	.02	224	.30	9,040	180	30	8	370	7.5
June 21-30	11,040	14	.10	54	16	7.1	3.6	203	0	32	8.5	.3	8.6	.04	252	.34	7,510	201	35	7	411	7.6
July 1-10	5,602	14	.03	54	17	7.6	3.6	206	0	34	8.5	.3	7.9	.02	256	.35	3,930	205	36	7	420	7.6
July 11-20	4,051	13	.08	63	19	9.2	3.7	238	0	37	12	.2	5.9	.02	291	.40	3,180	235	40	8	469	7.4
July 21-31	3,294	9.9	.08	55	17	8.8	4.0	217	0	32	11	.3	3.6	.02	258	.35	2,290	208	30	8	424	7.4
Aug. 1-10	2,701	7.4	.14	51	18	11	3.8	205	0	35	13	.4	2.1	.02	248	.34	1,810	202	34	10	416	7.4
Aug. 11-20	2,187	4.8	.16	39	17	11	4.2	169	0	34	15	.3	.6	.02	215	.29	1,270	168	20	12	367	7.3
Aug. 21-31	1,840	5.2	.12	49	19	11	3.6	203	0	36	15	.3	2.2	.02	240	.34	1,240	200	34	10	422	7.3
Sept. 1-10	1,726	4.4	.10	43	20	12	4.0	187	0	38	16	.3	.8	.02	238	.32	1,110	190	37	12	406	7.3
Sept. 11-20	1,457	6.1	.07	44	20	13	4.3	192	0	38	15	.3	2.0	.04	230	.32	928	200	43	13	414	7.2
Sept. 21-30	1,836	9.0	.06	52	21	13	5.0	219	0	37	16	.3	4.5	.04	261	.35	1,290	216	37	11	445	7.2
Weighted average	....	12	0.08	54	17	9.0	4.1	204	....	34	9.9	0.3	7.4	0.02	257	0.35	3,110	205	38	8	416	....

Chemical analyses, in parts per million, water year October 1944 to September 1945

Oct. 1-10, 1944	1,591	11	0.02	58	22	12	3.8	234	0	38	13	0.3	5.7	0.02	276	0.38	1,190	235	43	10	465	7.4
Oct. 11-20	1,322	10	.08	48	24	14	2.2	210	0	39	14	.2	2.0	.02	246	.33	878	218	46	12	414	7.7
Oct. 21-28, 30-31	1,160	7.1	.10	43	24	8.4	1.7	196	0	38	16	.2	1.0	.02	240	.33	752	206	45	8	404	7.9
Nov. 1-10	1,181	6.3	.05	48	23	14	2.1	210	0	36	16	.2	2.5	.02	271	.37	864	214	42	12	428	7.9
Nov. 11-20	1,153	6.0	.02	56	25	14	2.0	224	0	38	18	.2	4.6	.02	272	.37	847	243	59	11	457	7.7
Nov. 21-30	1,160	6.7	.04	62	26	16	2.2	246	0	39	18	.2	5.5	.02	300	.41	940	262	60	12	469	7.9
Dec. 1-10	964	8.5	.02	68	23	14	1.8	259	0	42	20	.2	8.0	.04	316	.43	822	264	52	10	540	7.6
Dec. 11-20	787	11	.03	72	23	14	1.7	274	0	43	23	.2	9.8	.00	336	.46	714	274	49	10	579	7.0
Dec. 21, 23-31	708	11	.02	79	25	17	1.8	300	0	45	26	.2	11	.03	370	.50	707	300	54	11	680	7.6
Jan. 1-10, 1945	690	11	.02	76	24	17	2.0	287	0	43	27	.2	11	.03	362	.49	674	288	53	11	617	7.6
Jan. 11-20	652	12	.02	72	23	17	1.7	276	0	42	28	.1	11	.04	354	.48	623	274	48	12	603	7.4
Jan. 21-31	662	12	.02	70	21	20	2.4	263	0	39	27	.2	11	.02	352	.48	629	261	45	14	579	7.3
Feb. 1-10	638	12	.10	75	23	23	2.2	282	0	42	29	.2	11	.02	360	.50	630	282	51	15	615	7.4
Feb. 11-20	1,390	11	.02	55	17	16	3.2	198	0	36	20	.2	11	.02	275	.37	1,030	208	46	14	467	7.2
Feb. 21-28	2,109	13	.12	53	16	12	4.0	189	0	36	15	.2	12	.00	274	.37	1,560	198	43	11	429	7.5
Mar. 1-10	3,692	9.6	.11	46	12	7.3	4.2	156	0	29	9.1	.2	11	.02	224	.30	2,230	164	36	9	357	7.5
Mar. 11-20	19,884	10	.12	45	9.7	4.6	4.5	149	0	24	5.8	.2	9.4	.00	204	.28	10,950	152	30	6	321	7.5
Mar. 21-31	14,286	12	.12	52	14	6.0	3.6	166	0	38	6.9	.2	13	.00	256	.35	9,870	188	52	6	350	7.6
April 1-10	7,159	13	.08	62	18	7.8	2.2	210	0	41	10	.4	12	.09	275	.37	5,320	228	56	7	444	8.0
April 11-20	10,444	12	.07	57	17	7.0	2.2	194	0	40	6.5	.4	14	.00	260	.35	7,330	212	53	7	416	8.1
April 21-30	10,153	12	.06	60	18	6.8	2.2	208	0	41	6.2	.4	14	.02	274	.37	7,510	224	53	6	430	8.1
May 1-10	6,046	11	.04	67	21	7.5	2.2	240	0	43	7.5	.3	10	.00	305	.41	4,980	254	57	6	486	8.1
May 11-20	6,395	9.8	.03	58	18	7.8	2.2	210	0	40	6.8	.3	10	.02	269	.37	4,640	218	46	7	436	8.2
May 21-31	11,291	10	.06	50	15	6.3	2.1	176	0	32	5.5	.3	9.8	.02	235	.32	7,160	186	42	7	373	7.7
June 1-10	15,010	13	.08	52	15	5.6	2.1	182	0	31	4.6	.2	10	.02	241	.33	9,770	191	42	6	372	8.0
June 11-20	9,470	13	.06	61	18	5.9	2.1	218	0	35	5.9	.2	11	.04	271	.37	6,930	226	47	5	429	7.3
June 21-30	5,801	13	.06	65	20	6.8	2.0	236	0	37	7.0	.1	12	.04	285	.39	4,460	244	50	6	460	7.4
July 1-10	4,815	13	.05	66	19	7.1	2.0	241	0	38	7.5	.2	11	.02	292	.40	3,800	242	44	6	469	7.5
July 11-20	3,044	20	.07	62	20	10	2.1	236	0	38	8.4	.3	8.2	.02	293	.40	2,410	236	42	8	465	7.7
July 21-31	2,184	14	.10	56	20	10	2.3	222	0	40	11	.3	3.0	.06	270	.37	1,590	222	40	9	451	7.5
Aug. 1-10	3,074	14	.12	56	19	11	2.3	216	0	38	12	.3	5.4	.06	273	.37	2,270	218	41	10	451	7.6
Aug. 11-20	8,555	14	.08	44	10	6.2	2.9	160	0	23	5.0	.4	4.3	.02	193	.26	4,460	151	20	8	315	7.5
Aug. 21-31	4,922	15	.08	53	18	7.9	2.5	210	0	32	6.6	.3	3.3	.00	245	.33	3,260	206	34	8	410	7.6
Sept. 1-10	2,063	10	.15	42	20	11	2.4	190	0	36	10	.3	.5	.00	225	.31	1,250	187	31	11	391	7.0
Sept. 11-20	1,607	10	.11	44	21	11	1.5	197	0	37	12	.2	.4	.02	231	.31	1,000	196	34	11	403	7.7
Sept. 21-30	1,715	7.7	.12	44	20	11	1.9	192	0	35	12	.2	1.2	.04	226	.31	1,050	192	35	11	397	7.6
Weighted average	4,682	11	0.08	55	16	7.6	2.7	195	....	35	7.9	0.3	9.7	0.02	254	0.35	3,210	201	41	7	400	....

Cedar River at Cedar Rapids, Iowa—Continued

Chemical analyses, in parts per million, water year October 1945 to September 1946

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Specific conductance (micromhos at 25°C)	pH
Oct. 1-10, 1945	1,849	8.8	0.04	53	21	11	2.0	222	0	39	12	0.2	3.4	0.02	260	0.35	1,280	219	36	10	442	7.7
Oct. 11-20	1,407	6.5	.12	49	21	12	2.0	211	0	39	12	.2	1.0	.07	249	.34	947	209	36	11	434	7.9
Oct. 21-31	1,248	3.8	.06	52	21	13	2.0	221	0	39	14	.2	1.7	.04	257	.35	865	216	35	12	451	7.8
Nov. 1-10	1,441	6.3	.07	55	21	13	2.0	226	0	39	14	.2	4.4	.06	266	.36	1,030	224	38	11	458	7.9
Nov. 11-20	1,584	6.7	.05	61	20	12	2.2	235	0	40	12	.2	5.2	.04	276	.38	1,190	232	42	10	480	7.9
Nov. 21-30	1,177	5.1	.04	63	22	13	1.8	248	0	41	15	.2	6.2	.00	292	.40	932	248	44	10	507	7.9
Dec. 1-10	1,895	7.8	.04	59	19	11	2.8	228	0	41	12	.2	8.8	.02	279	.38	1,430	225	38	10	476	7.6
Dec. 11-20	950	9.0	.04	76	24	17	1.8	294	0	47	20	.2	10	.02	355	.48	903	288	47	11	606	7.9
Dec. 21-31	935	11	.06	76	23	17	2.2	290	0	44	20	.2	11	.00	350	.48	889	284	46	11	600	7.6
Jan. 1-4, 1946	948	10	.07	72	22	16		272	0	42	21	.2	10	.04	332	.45	845	270	47	11	567	7.7
Jan. 5-10	18,350	6.2	.41	25	6.4	6.4		94	0	16	4.2	.2	3.6	.02	120	.16	5,810	89	12	14	191	7.4
Jan. 11-20	4,977	8.4	.08	34	11	6.1	4.6	128	0	23	6.8	.2	5.4	.02	169	.23	2,270	130	25	9	279	7.4
Jan. 21-31	1,984	15	.04	59	17	8.2	4.2	226	0	36	9.1	.2	8.0	.00	272	.37	1,450	217	32	7	440	7.6
Feb. 1-5	2,032	15	.02	64	19	15		246	0	39	14	.2	8.4	.02	300	.41	1,650	238	36	12	488	7.8
Feb. 6-10	6,084	7.4	.12	27	8.8	14		115	0	24	7.2	.2	4.8	.02	150	.20	2,410	104	10	22	243	7.3
Feb. 11-20	4,221	6.6	.04	32	9.4	12		124	0	25	8.9	.3	5.7	.02	169	.23	1,920	118	17	19	283	7.3
Feb. 21-28	3,046	10	.05	48	14	9.7		176	0	30	12	.2	7.5	.02	227	.31	1,870	178	34	11	385	7.5
Mar. 1-10	8,424	12	.09	39	10	7.6		137	0	25	9.2	.3	3.3	.04	187	.25	4,170	138	26	11	297	7.3
Mar. 11-20	16,190	9.6	.12	35	9.5	4.8		114	0	26	5.8	.3	9.0	.02	172	.23	7,370	126	33	8	267	7.2
Mar. 21-31	8,669	12	.01	58	17	3.4		199	0	41	7.2	.2	7.6	.02	265	.36	6,180	214	52	3	424	7.5
April 1-10	4,858	10	.02	65	19	7.6		235	0	43	8.5	.3	7.5	.00	294	.40	3,850	240	48	6	479	7.6
April 11-20	3,098	2.2	.08	50	20	5.8		201	0	38	10	.3	.5	.00	241	.33	2,020	207	42	6	417	7.5
April 21-30	2,100	5.6	.04	40	20	13		180	0	42	12	.3	.0	.00	232	.32	1,330	182	34	13	384	7.6
May 1-10	2,118	3.0	.04	45	19	10		188	0	40	11	.3	.6	.00	228	.31	1,300	190	36	10	400	7.5
May 11-20	1,830	2.6	.08	44	20	12		190	0	40	13	.3	.4	.02	235	.32	1,160	192	36	12	411	7.5
May 21-31	3,062	4.6	.05	48	19	10		196	0	38	11	.3	3.5	.02	255	.35	2,120	198	37	10	417	7.6
June 1-10	2,588	9.6	.09	52	21	9.9		219	0	40	10	.2	2.5	.02	265	.36	1,840	216	36	9	436	7.7
June 11-20	3,652	9.2	.16	43	16	9.9		170	0	33	9.2	.2	1.4	.02	212	.29	2,100	173	34	8	352	7.7
June 21-30	5,380	15	.08	54	16	3.0		191	0	32	6.5	.2	9.3	.02	248	.34	3,630	201	44	3	391	7.7
July 1-10	4,855	13	.07	56	16	4.8		203	0	34	6.0	.2	6.4	.00	250	.34	3,270	206	39	5	403	7.8

July 11-20........	1,767	5.4	.02	46	19	9.0	192	0	38	10	.2	1.5	.00	232	.32	1,120	193	36	9	396	7.8
July 21-31........	1,463	5.2	.08	33	18	13	166	0	30	12	.1	.2	.02	194	.26	753	156	20	15	353	7.5
Aug. 1-10.........	1,570	5.6	.08	34	18	17	178	0	28	14	.2	.2	.02	205	.28	870	159	13	18	358	7.5
Aug. 11-20........	1,277	6.6	.10	34	19	17	178	0	29	16	.2	.2	.04	210	.29	733	163	17	18	370	7.6
Aug. 21-31........	1,066	5.1	.26	38	19	15	184	0	34	14	.1	.1	.04	218	.30	633	173	22	16	393	7.6
Sept. 1-10.........	1,941	6.1	.21	37	16	16	174	0	30	42	.1	.2	.02	202	.27	1,040	158	16	17	357	7.5
Sept. 11-21........	5,364	13	.02	54	15	4.4	192	0	32	6.8	.3	4.8	.04	237	.32	3,400	198	38	5	393	7.7
Sept. 22-24........	9,937	7.4	1.1	34	6.7	1.6	120	0	13	2.5	......	.4	.04	136	.18	3,540	112	14	3	224	7.7
Sept. 25-30........	3,427	11	.02	60	17	9.7	228	0	37	7.5	.2	4.7	.04	265	.36	2,440	220	32	9	445	7.7
Weighted average	3,568	9.0	0.12	46	14	8.1	170	....	31	8.6	0.2	5.0	0.02	216	0.29	2,049	170	30	9	356	....

Cedar River at Cedar Rapids, Iowa—Continued

Chemical analyses, in parts per million, water year October 1946 to September 1947

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Specific conductance (micromhos at 25°C)	pH
Oct. 1-10, 1946	1,990	9.4	0.26	50	20	8.0		208	0	39	8.5	0.3	0.5	0.02	243	0.33	1,310	297	37	8	425	7.6
Oct 11-20	2,540	10	.04	58	20	7.1		225	0	40	9.0	.3	3.2	.02	267	.36	1,830	226	42	6	456	7.7
Oct. 21-31	3,920	14	.04	60	17	7.8		222	0	38	7.2	.2	5.7	......	270	.37	2,860	220	38	7	435	7.4
Nov. 1-10	4,040	14	.02	66	19	9.0		244	0	42	7.8	.3	8.2	......	299	.41	3,260	242	42	7	483	7.5
Nov. 11-20	3,690	13	.01	73	21	8.5		268	0	45	9.0	.2	8.8	......	324	.44	3,230	268	48	6	523	7.6
Nov. 21-30	2,820	13	.02	76	21	8.3		273	0	46	10	.2	9.4	......	335	.46	2,550	276	52	6	543	7.6
Dec. 1-10	2,130	12	.01	74	21	13		276	0	46	12	.2	9.8	......	335	.46	1,930	286	60	9	546	7.7
Dec. 11-20	1,500	10	.01	75	22	15		280	0	46	16	.2	11	......	333	.45	1,350	278	48	10	555	7.7
Dec. 21-31	1,540	9.8	.02	77	23	14		288	0	47	15	.2	12	......	346	.47	1,440	286	50	9	579	7.6
Jan. 1-10, 1947	1,100	11	.02	81	24	13		298	0	49	17	.2	12	......	367	.50	1,090	300	56	9	608	7.6
Jan. 11-20	1,510	10	.01	70	20	12		248	0	43	17	.2	12	......	318	.43	1,300	256	53	9	532	7.5
Jan. 21-31	1,660	10	.02	60	18	12		219	0	38	14	.2	12	......	285	.39	1,280	224	44	10	474	7.4
Feb 1-10	1,160	11	.18	67	20	16		251	0	41	18	.1	12	......	320	.44	1,000	249	43	12	527	7.5
Feb. 11-20	2,560	9.8	.02	57	16	12		205	0	36	14	.2	9.5	......	270	.37	1,870	208	40	11	444	7.3
Feb. 21-28	2,520	10	.02	55	16	11		201	0	35	13	.2	9.0	......	266	.36	1,810	203	38	11	434	7.4
Mar. 1-10	1,840	10	.02	61	17	9.9		220	0	36	12	.2	10	......	278	.38	1,380	222	42	9	462	7.4
Mar. 11-20	5,170	8.2	.06	44	12	9.4		156	0	29	10	.2	9.2	......	215	.29	3,000	160	32	12	348	7.3
Mar. 21-31	5,880	10	.07	51	14	6.7		182	0	31	8.1	.2	7.0	......	238	.32	3,780	184	35	7	382	7.5
April 1-10	7,360	11	.02	57	15	6.9		197	0	37	7.5	.2	9.0	......	253	.34	5,030	204	42	7	412	7.4
April 11-20	13,890	12	.06	53	14	4.4		175	0	36	5.1	.2	13	......	242	.33	9,060	190	46	5	380	7.5
April 21-30	7,490	12	.02	66	19	4.6		232	0	42	6.4	.2	12	......	301	.41	6,090	242	52	4	476	7.6
May 1-10	4,820	11	.02	69	20	5.5		246	0	43	8.4	.2	8.4	......	306	.42	3,980	254	52	4	494	7.6
May 11-20	3,750	8.2	.08	48	20	16		216	0	42	9.6	.2	2.1	......	266	.36	2,690	202	25	15	440	8.0
May 21-31	4,930	9.2	.02	56	19	6.7		216	0	38	8.4	.2	3.9	......	266	.36	3,540	218	41	6	434	7.8
June 1-10	24,200	13	.37	36	9.0	4.8		128	0	21	3.4	.3	5.4	......	167	.23	10,000	127	22	8	258	7.7
June 14-16	49,600	19	......	21	5.2	1.2		72	0	13	.0	.4	3.9	......	121	.16	16,200	74	15	3	147	7.6
June 11-13, 17-20	21,400	12	.14	46	12	5.1		159	0	29	4.9	.2	10	......	216	.29	12,500	164	34	6	332	8.0
June 21-30	16,100	13	.07	56	15	3.4		196	0	30	5.0	.2	11	......	252	.34	11,000	201	40	4	392	8.0
July 1	11,400	19	.00	48	15	30		183	0	53	24	.2	9.0	......	260	.35	8,000	181	31	26	395	7.4
July 2-10	15,000	16	.10	50	16	1.5		180	0	25	5.0	.4	3.9	......	223	.30	9,030	191	39	2	346	8.1

July 11-12........	10,800	19	.14	58	18	8.9	0.8	216	0	27	4.0	.6	8.5	......	262	.36	7,640	219	42	1	406	8.1
July 13-18, 20-Aug. 2	4,890	16	.05	64	20	1.7		238	0	34	6.0	.3	7.3	.05	275	.37	3,630	242	47	2	431	7.8
July 19...........	7,480	15	.00	46	14	18		159	0	54	6.0	.2	7.3	......	236	.32	4,810	172	42	18	372	7.4
Aug. 3-6..........	2,430	14	.05	49	21	.7		192	6	31	6.0	.3	1.8	......	251	.34	1,650	209	42	1	388	8.4
Aug. 7-22.........	1,770	7.0	.05	36	20	7.5		166	0	32	12	.2	3.1	.03	219	.30	1,050	172	36	9	359	7.7
Aug. 15a..........	1,720	6.5	.00	47	19	22		137	0	76	32	.2	4.2	......	264	.36	1,230	193	81	20	430	7.0
Aug. 23-Sept. 12...	1,520	7.0	.05	32	19	10		152	0	31	14	.2	3.4	.01	197	.27	808	158	33	12	352	7.5
Sept. 13-30........	1,310	7.0	.05	33	19	15		160	0	35	16	.2	3.8	.05	207	.28	732	160	29	17	366	7.3
Weighted average	5,430	13	0.10	51	15	6.4		b185	....	32	6.8	0.3	7.6	......	237	0.32	3,460	188	37	7	375	....

a Not included in weighted average.
b Includes carbonate as bicarbonate.

Cedar River at Cedar Rapids, Iowa—Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Specific conductance (micromhos at 25°C)	pH
Oct. 1-19, 1947	1,110	6.0	0.05	37	19	9.8		158	0	35	16	0.2	3.4	0.05	203	0.28	608	170	40	11	366	7.2
Oct. 20-24	984	7.0	.05	36	21	17		183	0	33	18	.2	3.1	......	229	.31	608	176	26	17	397	8.2
Oct. 26a	1,220	11	.04	58	17	24		222	0	49	21	.4	5.0	......	284	.39	936	215	33	20	481	7.0
Oct. 27a	1,140	10	.04	65	20	10		228	0	48	20	.2	2.1	......	282	.38	868	244	57	9	481	7.9
Oct. 25-Nov. 2	1,530	12	.05	50	18	15		204	0	35	16	.2	6.1	......	256	.35	1,060	199	32	14	420	8.2
Nov. 3-7	1,700	14	.05	56	19	16		212	5	39	16	.2	6.4	......	282	.38	1,290	218	36	14	452	8.2
Nov. 8-10	1,510	15	.05	62	21	16		232	6	41	18	.2	9.4	......	304	.41	1,240	241	41	13	465	8.2
Nov. 11-28	1,390	14	.00	70	20	16	0.8	250	0	45	20	.2	9.0	.01	316	.43	1,190	287	82	12	512	7.9
Nov. 29-Dec. 3	949	16	.00	81	21	12		268	0	49	23	.1	11	.00	344	.47	882	288	68	8	555	8.0
Dec. 4-16	1,540	18	.02	72	19	14	3.2	243	0	49	20	.2	10	.05	336	.46	1,400	278	79	10	470	7.7
Dec. 17-Jan. 9, 1948	1,060	15	.02	78	21	18	.8	268	0	49	22	.1	12	.00	356	.48	1,020	308	88	12	510	7.8
Jan. 10-16	924	12	.05	78	20	13		265	0	46	23	.1	10	.00	346	.47	863	282	65	9	485	7.8
Jan. 17-Feb. 1	681	15	.05	84	23	23	2.4	301	0	50	32	.1	12	.06	388	.53	716	334	87	14	631	7.5
Feb. 2-20	676	21	.03	70	21	22	1.2	264	0	39	30	.1	6.6	.06	334	.45	610	261	45	15	567	8.1
Feb. 21-23	2,030	14	.03	75	18	21	2.4	228	0	47	30	.2	10	......	314	.43	1,720	249	62	15	528	7.7
Feb. 24-27	2,150	11	.04	48	11	5.1		138	0	32	16	.3	8.0	......	208	.28	1,210	165	52	6	342	7.4
Feb. 28-Mar. 3, 6-9	13,000	12	.06	35	7.7	2.6		100	0	22	9.0	.2	8.0	.02	178	.24	6,250	119	37	4	262	7.8
Mar. 4	29,400	10	.04	27	6.2	9.8		84	0	30	5.0	.4	7.4	......	156	.21	12,400	93	26	19	204	7.8
Mar. 5	18,500	9.5	.04	30	5.5	1.7		76	0	22	5.0	.5	9.4	......	152	.21	7,590	97	35	4	196	7.6
Mar. 10-12	3,930	15	.02	46	13	3.5		160	0	26	10	.2	14	.00	249	.34	2,630	168	45	4	365	7.8
Mar. 13-15	3,610	14	.02	53	14	9.7	2.4	178	0	30	14	.1	14	......	278	.38	2,710	190	41	10	415	8.1
Mar. 16-18	13,300	8.5	.03	32	7.5	4.8	2.8	112	0	19	6.0	.1	8.4	......	170	.23	6,100	111	19	8	248	7.8
Mar. 19-24	25,700	7.9	.04	25	5.8	3.6	2.0	77	0	21	2.0	.3	10	.01	148	.20	10,300	86	23	8	186	7.7
Mar. 25-31	8,190	15	.01	43	11	1.8	1.6	136	0	30	6.0	.2	13	.09	222	.30	4,910	153	41	2	323	8.1
April 1-8	4,460	15	.01	64	17	5.2	.0	216	0	34	10	.2	12	.03	304	.41	3,660	230	53	5	463	7.8
April 9-30	3,180	29	.03	61	15	9.9	2.8	190	6	46	11	.1	6.8	.01	258	.35	2,220	214	48	9	435	8.2
May 1-31	3,820	16	.02	58	15	11	2.0	198	0	41	9.5	.2	11	.02	250	.34	2,580	206	44	10	426	8.0
June 1-30	1,870	25	.02	46	17	11	2.4	179	0	38	14	.1	6.6	.04	218	.30	1,100	185	38	11	399	8.1
July 1-31	1,480	16	.05	39	16	13	2.4	175	0	23	16	.1	1.9	.09	222	.30	887	192	48	14	380	7.9
Aug. 1-5	834	13	.05	36	19	18	1.6	180	0	34	20	.5	.9	.00	218	.30	491	168	20	19	410	7.9
Aug. 6-31	769	5.3	.03	36	19	16	2.8	172	0	31	24	.4	.5	......	268	.36	556	168	27	17	376	7.6
Sept. 1-30	700	6.0	.03	37	20	15	3.2	185	0	27	28	.2	.5	......	234	.32	442	175	22	15	375	7.6
Weighted average	2,686	14	0.03	46	13	8.7		b158	......	32	11	0.2	8.6	......	225	0.31	1,630	169	39	10	351	....

Chemical analyses, in parts per million, water year October 1948 to September 1949

Oct. 1-31, 1948	753	8.2	0.03	43	20	16	0.4	188	0	30	30	0.3	1.2	......	270	0.37	549	190	36	15	411	7.9
Nov. 1-30	849	7.8	.03	48	20	17	2.0	209	0	32	26	.1	2.0	......	290	.39	665	202	31	15	439	8.0
Dec. 1-31	731	14	.05	68	22	20	1.2	254	0	42	29	.4	14	0.02	334	.45	659	260	52	14	546	7.8
Jan. 1-31, 1949	1,575	13	.07	45	13	11	1.6	154	0	34	16	.4	7.9	.03	244	.33	1,040	166	40	12	355	7.4
Feb. 1-Mar. 4	1,560	13	.01	45	17	8.1	2.8	175	0	35	16	.2	6.3	.06	254	.35	1,070	183	39	9	391	7.6
Mar. 5-13	18,900	11	.19	27	6.6	4.1		99	0	14	3.5	.2	4.3	.00	130	.18	6,630	95	14	9	202	7.5
Mar. 14-31	7,430	14	.05	35	14	5.7	4.0	139	0	34	8.0	.2	9.7	.00	236	.31	4,530	145	31	8	313	7.7
April 1-6	12,800	16	.04	43	11	1.0	.8	116	0	36	4.5	.1	13	.15	198	.27	6,840	153	58	1	323	7.3
April 7-30	4,420	15	.04	57	15	9.3	.8	168	10	44	8.5	.2	9.2	.13	252	.34	3,010	204	50	9	418	8.5
May 1-31	1,684	8.8	.02	42	17	16	4.0	173	0	41	14	.3	2.9	.17	222	.30	1,010	175	33	16	377	8.0
June 1-27	1,820	9.2	.04	43	15	13	5.6	178	0	32	15	.2	4.0	.20	230	.31	1,130	169	23	14	362	7.3
June 28-30	4,540	14	.06	43	10	2.3	5.6	146	0	30	10	.2	8.6	.30	204	.28	2,500	149	29	11	321	8.2
July 1-9	2,650	16	.02	48	11	8.5	2.4	165	0	27	12	.3	7.4	.06	228	.31	1,630	165	30	10	357	7.8
July 10-Aug. 5	1,250	8.6	.02	40	16	15	1.6	153	0	35	19	.2	4.5	.10	228	.31	770	166	41	16	376	8.0
Aug. 6-31	667	7.7	.03	33	20	21	2.0	161	0	31	28	.3	4.3	.10	232	.32	418	165	33	21	405	7.7
Sept. 1-30	606	6.6	.04	31	19	19	5.2	172	0	27	28	.2	.8	.05	220	.30	360	156	15	20	391	7.2
Weighted average	2,369	12	0.07	41	13	8.8	2.4	b151	....	31	12	0.2	6.9	0.07	216	0.29	1,380	156	32	11	338	....

Chemical analyses, in parts per million, water year October 1949 to September 1950

Oct. 1-31, 1949	549	10	0.03	44	18	26	2.7	202	0	30	33	0.1	2.2	0.04	276	0.38	409	184	18	23	457	8.1
Nov. 1-30	583	12	.04	47	19	27	2.6	207	5	34	35	.2	3.8	.20	298	.41	468	196	18	23	492	8.2
Dec. 1-31	488	12	.04	55	19	30	2.6	240	0	39	37	.2	4.2	.20	348	.47	459	215	18	23	520	8.2
Jan. 1-31, 1950	466	15	.04	64	18	30	4.0	252	0	41	39	.2	9.3	.20	400	.54	503	234	27	21	561	8.1
Feb. 1-9	350	18	.04	61	16	28	4.6	244	0	36	36	.2	8.1	.20	382	.52	361	218	18	21	549	7.6
Feb. 10-17	979	12	.04	41	9.5	18	7.4	152	0	26	22	.1	9.5	.20	270	.37	714	142	17	21	377	7.2
Feb. 18-Mar. 4	494	15	.04	55	14	25	5.6	212	0	34	31	.1	7.4	.20	324	.44	432	195	21	21	494	7.5
Mar. 5-11	10,110	8.6	.10	24	3.3	3.0	5.4	88	0	2.0	2.0	.1	10	.20	118	.16	6,090	74	2	8	179	7.0
Mar. 12-13	19,200	7.1	.10	22	3.8	2.8	5.6	74	0	7.0	5.0	.2	9.1	.20	118	.16	6,120	71	10	7	168	7.1
Mar. 14-30	6,722	11	.10	33	7.0	5.3	5.2	112	0	21	7.0	.1	6.1	.20	170	.24	3,190	112	20	9	250	7.2
Mar. 31-April 3	15,660	11	.10	39	5.1	4.0	4.6	128	0	19	5.0	.1	5.8	.20	176	.24	7,440	119	14	6	262	7.5
April 4-30	3,644	14	.02	53	12	11	4.7	186	0	38	12	.1	6.8	.10	252	.34	2,480	182	30	11	402	7.5
May 1-31	4,218	15	.10	52	13	9.7	2.9	178	0	39	10	.2	6.4	.20	246	.33	2,800	182	36	10	392	7.5
June 1-24	4,844	13	.20	47	10	9.7	3.2	165	0	32	9.0	.1	4.8	.30	214	.29	2,800	160	25	11	346	7.6
June 25-26	13,550	12	.40	43	9.4	5.0	2.4	152	0	24	7.0	.2	4.6	.20	194	.26	7,100	146	21	7	305	7.6
June 27-July 31	2,380	15	.04	52	14	11	3.0	192	0	36	13	.2	5.7	.20	250	.34	1,610	186	20	11	396	7.8
Aug. 1-31	1,311	11	.04	41	14	16	4.4	178	0	30	19	.2	.4	.20	222	.30	786	162	16	17	386	7.6
Sept. 1-21	731	6.5	.02	31	17	18	3.0	165	0	26	24	.2	.3	.30	208	.28	411	146	11	21	375	7.4
Sept. 22-25	4,645	9.1	.50	33	5.7	7.4	3.3	118	0	18	8.0	.2	1.4	.20	148	.20	1,860	106	9	13	244	7.4
Sept. 26-30	1,524	11	.30	50	14	14	3.3	190	0	35	16	.2	2.9	.20	240	.33	988	181	25	14	402	7.4
Weighted average	2,656	12	0.11	42	9.9	9.6	4.1	b152	....	26	11	0.1	6.1	0.20	209	0.28	1,500	146	21	12	327	....

a Not included in weighted mean. b Includes carbonate as bicarbonate.

Cedar River at Cedar Rapids, Iowa—Continued

Chemical analyses, in parts per million, water year October 1950 to September 1951

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Specific conductance (micromhos at 25°C)	pH
Oct. 1-31, 1950	985	9.4	0.20	45	18	20	2.5	196	0	36	24	0.2	3.4	0.10	262	0.36	697	188	27	19	435	7.8
Nov. 1-30	648	13	.30	56	20	23	2.8	235	0	36	33	.1	3.1	.00	314	.43	549	222	29	18	526	8.0
Dec. 1-31	543	13	.20	71	21	29	2.9	275	6	34	38	.1	5.8	.00	376	.51	551	264	29	19	595	8.3
Jan. 1-31, 1951	480	14	.10	76	18	30	2.5	274	0	42	40	.1	5.5	.06	392	.53	508	264	39	20	621	7.6
Feb. 1-24	503	15	.02	71	17	28	3.7	254	0	48	37	.1	6.7	.00	376	.51	511	248	40	19	589	7.4
Feb. 25-27	10,100	9.6	.30	32	7.8	4.4	6.0	128	0	6.0	4.0	.2	8.9	.03	142	.19	3,870	112	7	7	246	7.6
Feb. 28-Mar. 5	19,350	9.0	.08	27	6.0	4.7	5.6	96	0	18	6.0	.3	5.1	.13	140	.19	7,310	92	13	9	213	7.0
Mar. 6-27	4,186	14	.02	47	12	9.9	3.4	163	0	37	11	.2	10	.05	238	.32	2,690	168	34	11	367	7.4
Mar. 28-30	19,370	6.6	.04	27	4.5	3.8	2.7	85	0	20	4.0	.2	6.2	.04	128	.17	6,690	86	16	9	197	7.3
Mar. 31-April 3	32,750	5.2	.02	19	5.0	2.7	2.3	58	0	15	3.0	.2	7.9	.10	98	.13	8,670	68	20	8	142	6.9
April 4-7	18,030	7.8	.03	29	6.7	5.1	2.2	96	0	22	5.0	.2	10	.08	152	.21	7,400	100	21	10	225	7.0
April 8-12	42,740	9.3	.03	27	5.5	3.9	2.5	88	0	15	3.0	.2	9.8	.12	144	.20	16,600	90	18	8	202	7.1
April 13-18	26,320	12	.04	38	9.5	5.4	2.3	117	0	31	5.5	.2	15	.15	208	.28	14,800	134	38	8	288	7.2
April 19-29	13,810	13	.03	51	13	6.4	2.4	159	0	43	6.5	.3	17	.12	278	.38	10,400	181	51	7	375	7.4
April 30-May 6	23,410	13	.04	42	9.0	6.1	2.3	133	0	37	4.5	.2	13	.05	208	.28	13,100	142	33	9	313	7.4
May 7-11	12,140	16	.03	62	16	6.0	2.2	201	0	48	7.5	.2	15	.05	304	.41	9,960	219	54	6	449	7.6
May 12-June 2	5,771	9.4	.02	60	17	8.0	2.2	210	0	53	9.0	.3	7.2	.21	274	.37	4,270	218	46	7	445	7.3
June 3-9	14,960	11	.02	44	11	5.1	2.2	149	0	34	4.5	.2	12	.22	206	.28	8,320	154	32	7	320	7.4
June 10-28	5,279	13	.02	63	18	7.7	1.7	222	0	46	3.0	.1	11	.33	290	.39	4,130	229	47	7	457	7.7
June 11a	7,770	9.8	.02	61	16	6.7		207	0	40	7.0	.1	15	......	286	.39	6,000	219	49	6	440	7.7
June 29-July 3	22,060	9.0	.02	37	6.2	3.1	1.8	119	0	22	3.0	.2	5.5	.08	170	.23	10,100	118	20	5	244	7.2
July 4-31	8,866	14	.08	53	13	7.5	2.6	189	0	37	8.0	.2	8.0	.03	242	.33	5,790	186	31	8	401	7.9
Aug. 1-31	5,318	13	.06	52	15	7.7	3.3	195	0	37	9.0	.1	7.1	.03	242	.33	3,470	190	30	8	395	7.7
Sept. 1-30	4,054	15	.04	66	19	9.5	2.2	249	0	43	11	.2	9.1	.04	302	.41	3,310	242	38	8	491	7.8
Weighted average	6,352	11	0.05	44	11	6.8	2.6	b153	....	33	7.2	0.2	9.7	0.10	217	0.30	3,720	155	30	9	334	....

Chemical analyses, in parts per million, water year October 1951 to September 1952

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Specific conductance (micromhos at 25°C)	pH
Oct. 1-31, 1951	3,647	....	......	......	......	......	....	267	0	39	12	......	....	......	280	0.38	2,760	222	3	......	464	7.7
Nov. 1-30	3,079	....	......	......	......	......	....	255	0	43	13	......	....	......	308	.42	2,560	253	44	......	513	8.0
Dec. 1-18	2,344	....	......	......	......	......	....	263	0	44	15	......	....	......	324	.44	2,050	261	45	......	529	8.1
Dec. 19-31	2,023	....	......	......	......	......	....	286	0	50	19	......	....	......	356	.48	1,940	284	49	......	585	8.0

Jan. 1-27, 1952	3,061							214	0	38	16				274	.37	2,260	214	38		461	7.7
Jan. 28-Feb. 29	4,031							192	0	35	12				249	.34	2,710	192	35		412	7.7
Mar. 1-31	7,973							165	0	35	8.5				228	.31	4,910	171	36		364	7.8
April 1-2	10,980							160	2	33	6.5				246	.33	7,290	172	38		354	8.3
April 3-4	19,900							132	6	26	4.5				214	.29	11,500	145	27		308	8.5
April 5	26,600							124	4	26	4.0				194	.26	13,930	135	27		286	8.4
April 6-7	21,250							150	0	27	5.0				222	.30	12,740	155	32		329	7.9
April 8-9	12,500							188	0	37	6.5				266	.36	8,980	193	39		403	7.8
April 10-30	8,320							214	0	41	9.0				306	.42	6,870	220	45		454	7.8
May 1-31	4,362							205	0	42	11				272	.37	3,200	208	40		439	7.8
June 1-30	3,451							216	0	42	12				270	.37	2,520	216	39		449	7.6
July 1-31	2,880							212	0	42	13				268	.36	2,080	209	35		439	8.2
Aug. 1-31	1,472							171	0	32	20				217	.30	862	163	23		383	7.4
Sept. 1-30	1,016							176	0	34	22				219	.30	601	165	21		396	7.4
Weighted average	4,020							b204		38	11				264	0.36	2,870	202	35		425	

Chemical analyses, in parts per million, water year October 1952 to September 1953

Oct. 1-31, 1952	769							195	0	39	28				251	0.34	521	182	23		450	7.4
Nov. 1-28	804							226	0	31	25				276	.38	599	204	19		491	7.6
Nov. 29-Dec. 31	687							258	0	43	33				338	.46	627	247	35		572	7.4
Jan. 1-15, 1953	651							272	0	48	37				366	.50	643	261	38		624	7.9
Jan. 16-19	988							170	0	28	23				238	.32	635	167	28		407	7.3
Jan. 20-Feb. 5	733							255	0	54	34				349	.47	691	247	38		588	7.7
Feb. 6-19	1,290							170	0	38	23				247	.34	860	172	33		421	7.2
Feb. 20-28	5,781							122	0	27	7.0				144	.20	2,250	99	0		247	7.3
Mar. 1-31	4,173							171	0	44	13				257	.35	2,900	182	42		401	7.6
April 1-30	3,627							209	0	53	13				284	.39	2,780	224	53		464	7.2
May 1-31	4,025							255	0	48	13				266	.36	2,890	208	40		435	7.1
June 1-17	3,176							204	0	43	14				266	.36	2,280	202	35		433	7.5
June 18-20	5,733							163	0	28	9.0				200	.27	3,100	155	21		330	7.5
June 21-July 5	3,112							197	0	38	13				252	.34	2,120	195	33		415	7.6
July 6-10	4,538							152	0	30	8.0				190	.26	2,330	147	22		320	7.5
July 11-Aug. 4	2,638							200	0	39	15				260	.35	1,850	199	35		428	7.6
Aug. 5-6	6,215							184	0	32	12				234	.32	3,930	175	24		377	7.4
Aug. 7-10	12,420							162	0	27	6.5				208	.28	6,980	159	26		331	7.5
Aug. 11-12	8,350							224	0	36	9.0				280	.38	6,310	218	34		439	7.6
Aug. 13-Sept. 13	2,041							209	0	38	17				260	.35	1,430	204	33		444	7.5
Sept. 14-30	848							175	0	29	26				230	.32	540	169	25		416	7.4
Weighted average	2,447							192		37	15				255	0.35	1,680	192	34		419	

a Not included in weighted mean.
b Includes carbonate as bicarbonate.

Cedar River at Cedar Rapids, Iowa—Continued

Chemical analyses, in parts per million, water year October 1953 to September 1954

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Specific conductance (micromhos at 25°C)	pH
Oct. 1-31, 1953	714	...	...	...	...	...	...	180	0	32	30	...	...	...	243	0.33	468	174	26	...	436	7.3
Nov. 1-30	753	...	...	...	...	...	...	207	0	35	35	...	...	...	278	.38	565	200	30	...	498	7.3
Dec. 1-31	714	...	...	...	...	...	...	265	0	47	35	...	...	...	357	.49	688	257	40	...	596	7.6
Jan. 1-22, 1954	531	...	...	...	...	...	...	292	0	47	43	...	...	...	402	.55	576	287	48	...	672	7.9
Jan. 23-Feb. 20	564	...	...	...	...	...	...	257	0	41	45	...	...	...	365	.50	556	253	42	...	625	7.4
Feb. 21-Mar. 23	839	...	...	...	...	...	...	228	0	37	32	...	...	...	305	.41	691	218	31	...	523	7.6
Mar. 24-April 7	970	...	...	...	...	...	...	208	0	40	29	...	...	...	281	.38	736	203	32	...	488	7.4
April 8	952	...	...	...	...	...	...	140	0	54	347	...	...	...	834	1.13	2,140	202	87	...	1,520	6.7
April 9-30	1,440	...	...	...	...	...	...	180	0	38	22	...	...	...	255	.35	991	180	32	...	428	7.4
May 1-10	5,807	...	...	...	...	...	...	182	0	44	13	...	...	...	267	.36	4,190	196	47	...	423	7.4
May 11-31	2,118	...	...	...	...	...	...	170	0	45	18	...	...	...	261	.35	1,490	190	43	...	428	7.3
June 1-20	4,130	...	...	...	...	...	...	188	0	41	13	...	...	...	258	.35	2,880	196	42	...	420	7.8
June 21-24	13,350	...	...	...	...	...	...	153	0	22	5.5	...	...	...	194	.26	6,990	145	20	...	304	7.6
June 25-27	35,600	...	...	...	...	...	...	159	0	22	4.5	...	...	...	206	.28	19,800	156	26	...	320	7.4
June 28	22,100	...	...	...	...	...	...	186	0	29	3.0	...	...	...	248	.34	14,800	188	35	...	379	7.3
June 29-30	13,050	...	...	...	...	...	...	218	0	37	8.0	...	...	...	291	.40	10,250	223	44	...	445	7.7
July 1-12	5,303	...	...	...	...	...	...	254	0	43	12	...	...	...	337	.46	4,830	254	46	...	511	7.4
July 13-26	2,084	...	...	...	...	...	...	214	0	45	16	...	...	...	299	.41	1,680	217	42	...	463	7.4
July 27-Aug. 17	1,463	...	...	...	...	...	...	160	0	41	20	...	...	...	261	.35	1,030	178	47	...	395	7.2
Aug. 18-20	2,590	...	...	...	...	...	...	119	0	21	7.5	...	...	...	174	.24	1,220	114	16	...	253	7.2
Aug. 21-25	1,546	...	...	...	...	...	...	158	0	39	20	...	...	...	253	.34	1,060	165	35	...	389	7.2
Aug. 26-Sept. 2	6,653	...	...	...	...	...	...	189	0	34	9.5	...	...	...	252	.34	4,530	187	32	...	393	7.5
Sept. 3-30	1,834	...	...	...	...	...	...	189	0	44	16	...	...	...	272	.37	1,350	194	39	...	427	7.5
Weighted average	2,210	...	...	...	...	...	...	193	...	37	16	...	...	...	266	0.36	1,590	194	36	...	425	...

Cedar River at Cedar Rapids, Iowa—Continued

Determination of variation in chemical constituents in cross-section 8th Avenue Bridge

Chemical analyses, in parts per million

May 20, 1948 (Mean discharge 3,800 cfs)

Station	120	230	300	300	325	420	500
Silica (SiO_2)	15	14	18	14	13	16	14
Iron (Fe)	.00	.00	.00	.00	.00	.00	.00
Calcium (Ca)	58	44	67	65	54	58	50
Magnesium (Mg)	18	17	18	13	17	17	18
Sodium (Na) & Potassium (K)	2.3	20	8.0	10	13	4.8	12
Bicarbonate (HCO_3)	202	202	248	208	209	205	204
Sulfate (SO_4)	37	35	35	47	38	36	37
Chloride (Cl)	6.0	6.6	6.0	6.0	7.0	6.4	6.0
Nitrate (NO_3)	14	15	13	13	14	13	13
Total dissolved solids	278	270	282	260	274	280	274
Hardness as $CaCO_3$							
Calcium & Magnesium	219	180	241	216	205	215	199
Non carbonate	53	14	38	45	34	47	32
Percent sodium	2	20	7	10	12	5	12
Specific conductance Micromhos at 25°C	408	398	417	418	403	412	413
pH	7.6	7.5	7.7	7.4	7.5	.75	7.4

August 6, 1948 (Mean discharge 821 cfs)

Station	120	230	300	420	500
Silica (SiO_2)	7.0	7.2	6.6	4.8	7.7
Iron (Fe)	.06	.06	.04	.10	.04
Calcium (Ca)	41	39	38	44	41
Magnesium (Mg)	16	17	17	19	17
Sodium (Na) & Potassium (K)	7.3	9.1	14	6.5	13
Bicarbonate (HCO_3)	164	166	174	160	172
Sulfate (SO_4	24	26	26	42	32
Chloride (Cl)	16	16	16	18	18
Nitrate (NO_3)	1.5	.1	.6	.4	.4
Total dissolved solids	230	230	226	230	234
Hardness as $CaCO_3$					
Calcium & Magnesium	168	167	165	188	172
Non carbonate	34	31	22	57	31
Percent sodium	9	11	15	7	14
Specific conductance Micromhos at 25°C	366	364	367	367	366
pH	7.3	7.5	7.5	7.5	7.4

December 16, 1948 (Mean discharge 810 cfs)

Station	120	230	300	325	420	500
Specific conductance Micromhos at 25°C	509	513	505	533	504	507

June 6, 1949 (Mean discharge 2,110 cfs)

Station	120	230	300	325	420	500
Specific conductance Micromhos at 25°C	399	402	404	413	407	408

Cedar River at Cedar Rapids, Iowa—Continued

Determination of variation in chemical constituents in cross-section 8th Avenue Bridge

Chemical analyses, in parts per million

October 4, 1949 (Mean discharge 490 cfs)

Station	120	230	300	325	420	500
Bicarbonate (HCO_3)	172	169	174	170	162	....
Sulfate (SO_4)	33	28	24	25	30	....
Chloride (Cl)	35	35	35	35	35	....
Nitrate (NO_3)	5.1	4.9	2.7	2.7	2.7	....
Specific conductance Micromhos at 25°C	434	429	422	428	428	430
pH	8.1	8.1	8.0	8.2	8.3	....

November 7, 1949 (Mean discharge 550 cfs)

Station	120	230	300	325	420	500
Specific conductance Micromhos at 25°C	508	502	503	497	503	513

June 12, 1950 (Mean discharge 4,310 cfs)

Station	120	230	300	325	420	500
Specific conductance Micromhos at 25°C	370	372	347	347	355	361

July 5, 1951 (Mean discharge 10,200 cfs)

Station	120	230	300	325	420	500
Specific conductance Micromhos at 25°C	415	419	416	418	418	407

Cedar River at Cedar Rapids, Iowa—Continued

Temperature (°F) of water, January to September 1944

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	33	34	35	39	58	78	76	79	71
2	35	34	36	41	63	80	77	81	72
3	35	34	39	40	61	80	80	83	77
4	34	34	36	41	54	80	80	78	77
5	33	35	37	44	52	74	80	79	75
6	33	34	34	47	51	66	80	80	72
7	32	34	32	48	52	67	80	80	70
8	34	34	33	50	52	63	78	80	70
9	34	34	32	52	54	63	79	81	70
10	35	34	34	40	56	....	78	84	69
11	33	33	34	39	61	64	78	85	66
12	33	35	33	45	65	67	77	84	65
13	35	34	33	47	65	71	78	....	65
14	35	34	34	48	70	75	78	85	65
15	35	34	34	45	73	73	79	85	65
16	35	34	34	42	74	75	80	84	64
17	35	34	35	46	75	75	78	77	64
18	35	35	35	47	72	78	80	75	64
19	36	36	37	48	71	74	78	76	72
20	35	35	37	48	69	73	76	74	74
21	35	34	38	49	70	72	76	77	72
22	34	35	38	51	72	75	77	77	69
23	34	35	41	55	70	77	78	76	65
24	34	34	44	52	69	77	79	75	62
25	35	35	44	53	70	80	78	72	62
26	35	34	40	51	72	79	78	68	65
27	35	34	40	53	71	82	78	65	67
28	34	35	40	55	73	82	75	65	67
29	34	36	38	54	74	78	76	69	64
30	34	....	38	58	76	78	76	70	63
31	34	....	40	....	75	....	70	70	....
Average	34	34	37	48	66	74	78	77	68

Temperature (°F) of water, water year October 1944 to September 1945

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	64	57	33	32	33	35	58	55	67	72	84	80
2	61	50	33	33	34	34	50	53	65	70	82	78
3	57	57	35	33	33	34	52	53	60	70	79	73
4	58	52	34	33	34	34	45	55	59	71	76	73
5	60	49	34	33	35	34	43	55	60	76	74	76
6	61	46	34	32	34	33	45	57	59	75	76	76
7	62	43	34	34	34	33	49	57	58	75	73	78
8	59	50	33	34	35	34	54	55	58	74	75	77
9	54	50	34	33	35	34	55	54	61	77	75	75
10	55	47	33	33	35	34	58	52	61	73	72	72
11	54	47	33	35	34	34	58	52	61	73	71	67
12	54	46	32	35	35	38	58	56	63	78	71	66
13	55	47	32	35	35	39	58	58	65	76	75	63
14	56	47	33	36	35	40	54	52	69	76	75	61
15	55	45	34	35	35	42	55	48	69	74	73	61
16	55	47	32	35	33	44	54	52	68	73	72	61
17	55	47	33	34	35	40	40	52	66	72	74	62
18	55	46	33	35	35	46	47	53	69	73	75	65
19	57	45	35	35	34	40	47	56	68	75	75	67
20	56	45	34	35	35	46	47	57	68	76	78	65
21	55	43	33	35	35	46	49	64	68	78	76	62
22	55	42	......	35	33	47	52	63	71	80	75	62
23	54	40	33	......	34	48	48	61	74	84	73	64
24	54	41	33	34	34	54	52	64	74	84	73	67
25	53	40	33	35	35	40	52	65	74	84	72	67
26	53	40	32	35	33	57	53	65	73	84	71	65
27	53	38	32	34	34	59	52	66	74	82	73	62
28	53	37	33	34	34	60	54	65	74	77	75	59
29	......	36	33	34	......	58	53	65	75	77	79	54
30	55	33	34	33	......	60	55	66	75	77	80	52
31	56	......	33	34	......	60	......	66	......	81	82	......
Average	56	45	33	34	34	44	52	58	67	76	75	67

Cedar River at Cedar Rapids, Iowa—Continued

Temperature (°F) of water, water year October 1945 to September 1946

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	52	54	33	33	33	34	58	62	62	72	79	69
2	54	54	32	34	34	34	59	60	64	72	78	66
3	54	55	33	34	33	33	57	54	66	74	82	68
4	57	53	32	34	34	33	52	55	68	77	82	68
5	59	45	34	34	34	38	51	58	70	75	77	71
6	60	47	34	34	31	39	51	57	75	80	73	72
7	58	51	35	33	33	36	52	57	70	79	77	76
8	57	52	35	32	34	35	52	58	76	78	76	75
9	54	45	32	33	33	33	52	60	75	82	80	72
10	52	42	32	32	34	34	50	54	75	83	76	73
11	55	40	32	32	34	34	48	56	78	80	73	68
12	55	43	32	31	33	36	50	56	70	79	73	66
13	54	47	32	32	32	42	55	56	75	80	71	64
14	53	43	32	34	32	44	58	60	75	80	71	65
15	53	39	31	33	33	45	58	62	74	77	70	68
16	53	42	32	33	33	46	58	65	80	73	72	67
17	57	43	32	32	32	46	59	64	79	73	80	68
18	61	41	32	33	33	45	61	64	75	78	80	70
19	61	43	32	33	33	45	62	62	63	82	76	69
20	57	......	32	33	32	46	62	61	62	81	74	66
21	55	38	32	32	34	49	64	62	61	80	78	66
22	53	36	32	33	33	51	66	65	65	78	76	61
23	52	33	32	33	33	50	67	65	75	81	74	60
24	50	34	32	......	32	49	67	66	72	78	74	59
25	50	34	32	34	33	51	66	63	74	75	72	59
26	47	34	33	33	33	53	64	65	70	75	73	61
27	47	34	33	34	32	55	62	68	78	74	73	66
28	47	34	34	....	33	56	61	69	81	74	73	66
29	55	34	34	34	......	58	62	69	75	76	68	60
30	54	34	33	34	......	57	65	69	75	70	66	58
31	51	......	33	33	......	57	......	68	......	79	71	......
Average	54	42	33	33	33	44	58	62	73	78	75	67

Temperature (°F) of water, water year October 1946 to September 1947

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	58	55	36	34	35	33	43	63	60	76	78	80
2	58	53	34	33	34	34	42	59	59	77	78	79
3	59	51	35	33	34	36	43	59	61	72	81	80
4	60	50	35	32	34	36	44	60	61	74	84	80
5	64	49	34	34	35	35	46	60	63	74	84	80
6	64	48	40	35	34	36	45	58	66	73	85	80
7	65	48	42	34	34	35	43	58	68	75	85	79
8	64	47	46	35	35	35	45	58	69	76	85	80
9	64	46	49	35	34	34	43	60	70	76	82	80
10	64	44	48	35	35	35	44	58	74	77	83	80
11	61	44	44	36	35	34	46	60	68	77	81	77
12	54	43	43	35	36	35	45	63	63	77	83	75
13	52	42	37	36	35	35	47	62	58	80	84	74
14	52	42	37	34	35	35	47	62	54	78	82	70
15	54	44	34	34	36	35	49	65	55	80	79	67
16	57	46	34	35	35	35	47	67	56	81	78	66
17	56	40	34	35	35	34	47	64	62	81	80	67
18	52	40	34	35	35	35	48	65	62	78	82	69
19	54	40	35	35	35	35	47	66	64	76	82	72
20	53	41	35	34	34	35	49	64	66	71	85	74
21	54	44	35	33	35	35	47	65	65	73	86	71
22	55	38	35	34	35	35	50	63	65	73	87	67
23	58	36	35	35	35	36	55	64	70	73	87	64
24	56	38	34	36	34	43	52	62	68	74	85	64
25	55	38	35	35	34	39	55	62	72	74	80	62
26	55	36	35	35	36	35	57	65	75	77	80	61
27	57	36	35	35	35	37	56	63	77	80	79	58
28	56	38	34	35	34	38	60	58	78	79	80	57
29	59	38	33	34	......	38	58	52	76	82	79	61
30	62	38	33	34	......	40	61	52	77	83	80	60
31	58	......	33	36	......	42	......	58	......	82	80	......
Average	58	43	37	35	35	36	49	61	66	77	82	71

Cedar River at Cedar Rapids, Iowa—Continued

Temperature (°F) of water, water year October 1947 to September 1948

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	57	54	35	35	34	35	48	58	72	74	78	75
2	57	54	35	35	34	35	46	56	74	77	78	76
3	60	54	34	34	35	35	51	58	78	78	75	77
4	63	55	35	34	35	34	52	62	78	78	74	78
5	65	53	33	35	35	34	55	63	65	81	75	78
6	68	51	34	34	34	35	58	60	64	85	75	76
7	71	48	34	35	34	35	55	61	70	85	75	78
8	68	42	34	36	34	35	53	59	68	84	72	75
9	65	40	35	35	35	34	53	55	72	85	75	72
10	68	38	35	35	35	35	55	55	72	85	79	72
11	63	37	35	34	35	34	55	54	77	84	80	73
12	62	36	34	34	34	31	53	53	75	83	83	72
13	65	36	35	34	34	37	53	55	74	81	83	75
14	66	36	35	34	34	35	55	55	74	78	81	75
15	68	30	34	34	35	36	56	60	73	75	77	75
16	66	34	35	33	35	34	58	63	72	79	81	75
17	68	39	35	33	35	35	50	67	71	80	80	76
18	68	37	35	34	36	36	60	67	70	80	81	77
19	65	40	35	34	34	39	60	68	69	80	80	76
20	64	41	35	34	35	40	60	71	67	81	80	77
21	64	43	35	33	35	44	61	72	68	82	81	74
22	65	41	35	33	35	44	59	69	72	82	81	71
23	65	38	35	33	35	45	64	71	75	79	83	68
24	62	37	35	33	36	51	66	69	77	78	85	66
25	60	32	35	33	35	51	69	71	77	74	84	66
26	60	34	35	33	36	52	67	72	78	77	83	65
27	59	34	35	33	36	50	67	74	76	80	81	65
28	58	34	33	34	35	48	65	74	75	81	83	68
29	55	34	35	34	35	48	64	69	75	80	80	66
30	55	34	35	34	......	48	61	67	75	80	82	66
31	55	......	35	34	......	48	......	70	......	79	77	......
Average	63	41	35	34	35	40	58	64	73	80	79	73

Temperature (°F) of water, water year October 1948 to September 1949

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	66	56	37	36	35	37	44	64	78	86	80	71
2	66	56	36	37	35	37	45	64	73	86	78	70
3	62	56	38	37	35	37	48	67	75	86	78	70
4	61	56	40	36	35	37	46	73	75	89	79	71
5	60	55	42	35	35	37	48	76	77	88	80	71
6	60	52	41	35	35	37	50	77	79	88	80	69
7	58	49	38	36	36	36	53	71	76	83	84	67
8	56	50	38	37	34	36	50	68	71	82	86	68
9	56	40	35	36	35	36	55	68	70	80	88	68
10	54	40	35	37	35	35	53	65	73	82	85	68
11	52	46	36	37	36	36	55	66	76	81	82	67
12	55	45	37	36	36	36	57	68	80	81	81	68
13	55	45	37	35	35	36	61	72	80	82	81	68
14	58	45	37	36	35	39	57	70	78	81	82	65
15	59	46	35	36	35	38	48	70	77	80	84	64
16	58	46	35	35	36	36	48	69	78	80	84	66
17	54	46	36	35	36	38	48	70	80	83	84	65
18	50	46	36	34	36	38	48	70	81	83	83	68
19	50	48	36	35	36	37	48	69	83	84	80	68
20	51	48	36	35	37	40	52	65	84	82	76	68
21	52	45	37	35	35	44	55	61	83	81	78	66
22	52	43	35	35	36	42	56	61	81	81	79	65
23	52	39	35	35	37	42	56	66	81	81	78	64
24	49	37	35	35	36	42	58	65	79	83	80	65
25	52	39	35	35	37	45	61	66	79	85	81	65
26	53	42	35	35	35	47	65	67	80	84	80	65
27	50	41	37	35	35	45	65	69	80	83	81	65
28	55	40	35	34	35	42	65	70	81	83	79	63
29	55	39	37	34	......	46	65	70	80	83	78	62
30	55	38	36	35	......	47	66	71	83	81	77	60
31	55	......	36	35	......	46	......	75	......	81	74	......
Average	56	46	37	35	36	40	54	68	78	83	81	67

Cedar River at Cedar Rapids, Iowa—Continued

Temperature (°F) of water, water year October 1949 to September 1950

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	62	48	41	38	35	35	40	49	71	71	80	75
2	62	47	40	37	35	35	42	52	68	74	75	72
3	64	44	40	36	37	35	44	55	67	76	75	73
4	68	45	40	35	36	......	41	60	66	75	74	72
5	65	46	39	36	36	35	45	58	71	77	78	72
6	66	47	39	35	36	35	44	60	74	77	78	71
7	69	48	38	33	37	36	48	60	70	77	78	71
8	71	50	37	37	38	36	43	58	77	78	77	71
9	70	53	37	38	37	35	45	59	78	78	79	70
10	70	55	35	36	37	35	44	58	75	76	79	72
11	68	56	36	38	36	35	46	60	70	78	77	73
12	64	55	35	38	36	35	45	60	72	79	73	70
13	62	54	34	37	36	35	46	65	71	75	74	67
14	62	50	37	36	35	35	47	68	75	75	77	68
15	60	46	40	36	35	37	49	70	70	76	78	60
16	59	45	......	35	36	36	52	65	76	78	80	69
17	60	42	37	37	36	37	56	67	74	78	80	69
18	62	44	37	36	35	36	55	67	66	75	78	72
19	62	43	36	36	36	37	55	64	62	72	75	72
20	64	41	37	36	36	37	52	63	65	75	72	72
21	64	41	37	37	36	38	53	65	66	75	74	70
22	59	40	37	38	36	39	58	67	71	75	73	67
23	57	40	37	37	36	40	57	69	74	76	75	65
24	55	39	37	37	34	40	55	72	73	76	77	65
25	52	37	37	36	35	39	52	72	73	75	78	62
26	50	39	37	35	36	41	47	70	75	78	75	65
27	50	39	36	35	38	42	45	68	73	79	75	65
28	52	40	38	37	37	40	45	68	74	80	74	67
29	55	41	37	36	......	37	45	66	73	81	72	68
30	53	43	37	35	......	39	48	70	74	81	71	68
31	50	......	37	36	......	39	......	70	......	81	71	......
Average	61	46	37	36	36	37	48	64	72	77	76	69

Temperature (°F) of water, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	70	62	37	35	35	35	35	69	75	70	80	74
2	71	59	38	35	34	36	36	66	71	72	78	68
3	62	52	37	37	36	36	36	68	66	72	79	66
4	59	50	37	37	37	35	39	66	65	70	74	68
5	50	47	35	37	35	36	41	65	62	66	74	66
6	60	49	34	35	35	38	45	65	64	68	76	67
7	65	50	36	36	35	39	45	62	64	71	75	66
8	59	48	36	36	36	36	45	63	62	72	78	65
9	60	44	36	37	35	35	42	57	65	71	78	66
10	61	40	36	36	37	35	42	58	70	70	76	66
11	61	36	37	37	37	36	42	59	71	70	76	68
12	61	38	37	38	35	35	41	65	74	69	76	68
13	61	38	37	37	36	35	42	67	75	68	78	66
14	61	40	37	37	35	35	41	68	75	71	73	64
15	62	45	35	37	37	35	41	71	74	71	72	62
16	65	46	35	37	37	35	41	72	75	76	70	60
17	67	45	36	37	38	35	43	73	76	78	72	62
18	68	44	35	37	38	35	45	70	75	78	70	63
19	67	42	35	37	37	35	48	71	78	78	70	62
20	65	40	36	37	37	35	50	70	76	78	68	62
21	65	39	37	36	37	36	48	70	72	76	68	63
22	61	37	37	35	37	37	49	69	69	77	70	60
23	58	35	37	35	36	35	50	71	68	78	70	60
24	58	34	38	35	38	36	50	72	70	80	68	58
25	57	34	35	35	36	39	50	71	72	80	66	57
26	53	35	35	35	38	43	49	68	75	80	70	60
27	54	36	36	36	36	41	55	65	76	80	72	56
28	54	38	37	34	38	39	57	68	73	81	74	52
29	56	37	36	35	......	38	60	70	72	79	73	51
30	57	37	35	35	......	35	65	70	71	80	76	52
31	63	......	35	35	......	35	......	72	......	80	76	......
Average	61	43	36	36	36	36	46	67	71	75	73	63

Cedar River at Cedar Rapids, Iowa—Continued

Temperature (°F) of water, water year October 1951 to September 1952

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	58	40	32	32	32	32	45	65	60	78	74	64
2	62	38	34	32	......	......	42	65	62	80	75	63
3	64	38	40	32	31	......	42	68	64	78	75	64
4	67	34	42	32	31	......	40	68	62	78	70	64
5	62	32	40	32	32	......	38	67	66	79	68	66
6	60	31	40	32	32	......	38	64	70	78	68	66
7	58	32	38	33	31	......	41	56	65	74	72	64
8	52	31	38	33	32	......	45	53	66	72	70	64
9	54	36	36	32	32	31	43	50	64	72	70	68
10	55	38	32	32	32	33	42	51	65	74	70	70
11	56	40	......	34	32	......	41	48	68	75	71	71
12	58	46	......	32	......	32	37	48	71	77	70	72
13	......	49	......	32	32	33	38	52	72	76	71	72
14	56	45	......	32	......	33	39	52	74	74	73	71
15	58	42	......	33	......	32	41	54	74	72	74	64
16	56	40	......	33	......	32	44	52	73	75	75	63
17	54	39	......	33	......	35	40	52	73	74	74	62
18	50	35	......	35	......	30	40	53	71	75	74	66
19	50	34	......	32	......	30	50	54	70	78	74	65
20	48	35	......	32	......	37	56	55	63	80	73	66
21	49	35	......	32	......	34	56	55	63	82	72	67
22	50	35	......	32	......	34	54	54	64	83	70	65
23	48	34	32	......	......	......	50	58	67	80	70	60
24	48	34	32	32	......	31	50	60	72	76	70	57
25	48	34	31	32	......	32	54	60	74	78	68	50
26	47	34	32	32	......	37	54	63	72	80	68	59
27	46	34	32	32	......	......	56	60	74	80	70	59
28	46	34	33	......	......	36	60	58	74	78	72	60
29	46	32	35	......	......	36	63	58	80	76	73	62
30	46	32	34	......	......	44	65	58	81	75	72	60
31	42	......	34	32	......	46	......	56	......	74	73	......
Average	53	36	......	32	......	......	48	57	69	77	72	64

Temperature (°F) of water, water year October 1952 to September 1953

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	60	42	32	32	32	31	41	51	73	80	82	82
2	56	42	32	32	32	31	44	51	71	80	82	80
3	51	41	32	32	33	32	46	50	72	80	82	75
4	48	40	32	34	33	32	44	52	75	80	78	72
5	47	40	32	33	32	32	45	52	71	80	76	70
6	44	37	32	32	32	31	48	54	70	72	76	68
7	40	37	32	34	33	31	48	56	68	72	74	66
8	42	36	32	34	33	31	47	60	70	71	74	66
9	44	34	32	32	32	32	48	64	72	70	74	66
10	46	33	32	34	32	34	45	63	74	70	74	68
11	47	34	32	33	33	38	44	64	74	75	73	66
12	45	34	32	35	33	42	46	62	80	76	76	65
13	45	36	32	35	33	41	48	58	76	75	76	64
14	44	38	32	34	32	40	48	59	76	75	76	63
15	42	39	32	34	32	36	46	61	75	76	75	65
16	41	40	32	34	32	38	45	62	75	79	79	66
17	39	44	32	34	32	40	44	62	77	80	75	68
18	40	42	32	34	33	42	44	64	78	80	74	68
19	40	30	32	33	33	43	43	64	77	81	74	65
20	40	36	32	33	32	44	45	68	81	80	74	65
21	38	32	32	34	32	48	49	64	79	80	75	61
22	40	32	32	35	32	48	54	61	78	80	74	62
23	42	32	32	33	32	46	53	60	76	80	74	62
24	43	82	32	32	32	43	54	61	74	79	78	62
25	45	32	32	32	32	40	51	63	73	80	78	64
26	44	32	32	33	32	42	48	72	75	80	78	65
27	44	32	32	32	32	44	47	68	73	80	76	66
28	40	32	32	32	32	45	47	64	73	81	78	66
29	38	32	32	32	......	46	47	70	78	81	76	68
30	38	32	32	32	......	44	50	74	80	82	82	67
31	40	......	32	32	......	42	......	74	......	83	82	......
Average	44	36	32	33	32	39	47	62	75	78	76	67

Cedar River at Cedar Rapids, Iowa—Continued

Temperature (°F) of water, water year October 1953 to September 1954

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	66	55	35	32	31	32	37	52	59	78	80	72
2	67	55	34	32	31	32	39	50	58	81	78	77
3	65	53	37	31	31	32	36	43	55	78	77	72
4	65	50	38	32	31	32	32	38	53	76	76	76
5	63	45	38	32	31	32	40	40	57	77	74	78
6	66	42	36	32	31	32	43	41	61	81	76	76
7	55	40	36	32	31	32	50	42	61	78	74	77
8	55	40	37	32	31	32	46	42	78	80	74	72
9	57	40	35	31	31	32	46	42	73	75	76	67
10	58	42	34	32	31	33	46	44	72	77	76	65
11	59	42	32	31	31	32	48	46	71	81	75	66
12	60	44	33	31	31	32	40	50	74	83	74	67
13	59	44	33	31	31	32	51	53	76	83	73	64
14	60	46	32	31	31	32	53	55	78	83	74	64
15	61	48	32	31	31	32	50	59	77	82	74	65
16	63	51	31	31	31	32	48	58	74	81	80	62
17	64	52	31	31	31	32	50	58	78	78	74	64
18	67	53	32	31	31	35	51	59	80	78	69	68
19	68	54	32	31	31	36	52	57	80	79	68	72
20	67	54	33	31	32	37	50	55	80	80	71	68
21	68	50	34	31	36	37	50	57	78	76	74	63
22	66	45	31	31	32	36	49	58	74	77	75	60
23	60	43	32	32	32	36	51	59	73	74	80	60
24	58	41	32	32	33	36	55	64	74	76	81	61
25	56	36	32	32	32	36	55	63	76	77	81	63
26	54	36	31	31	31	35	56	68	79	80	80	65
27	52	34	32	31	31	38	55	57	78	81	73	67
28	50	33	32	31	32	37	53	58	75	78	74	67
29	50	32	31	31	......	36	50	56	81	83	76	69
30	51	32	31	31	......	40	51	60	80	83	76	66
31	53	......	32	31	......	41	......	63	......	80	72	......
Average	60	44	33	31	31	34	48	53	72	79	75	68

Cedar River at Cedar Rapids, Iowa—Continued

Suspended sediment, water year October 1943 to September 1944

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	1,450	52	204	1,420	30	115	1,370	....	
2	1,440	29	113	1,350	27	98	1,220	....	
3	1,380	16	60	1,320	23	82	1,320	....	e38
4	1,250	12	40	1,240	21	70	1,280	....	
5	1,280	11	38	1,290	20	69	1,330	....	
6	1,250	16	54	1,380	20	75	1,670	....	
7	1,190	20	64	1,540	25	104	1,780	....	
8	1,220	26	86	1,730	38	177	1,820	....	e134
9	1,130	33	101	1,600	28	121	1,600	....	
10	1,110	40	120	1,520	23	94	1,670	....	
11	1,110	48	144	1,630	20	88	1,450	....	
12	1,050	56	159	1,730	16	75	1,280	....	e68
13	1,140	70	215	1,600	13	59	1,100	....	
14	1,050	24	68	1,600	....	e51	620	....	
15	1,110	17	51	1,650	10	45	600	....	e8
16	1,050	19	55	1,610	9	39	550	....	
17	1,130	21	64	1,630	9	40	650	....	
18	1,140	24	74	1,450	9	35	940	....	e32
19	1,110	27	81	1,520	8	33	1,000	....	
20	1,110	30	90	1,470	7	28	1,000	....	
21	1,160	29	91	1,510	9	37	920	....	
22	1,240	27	90	1,520	11	45	880	....	
23	1,320	27	96	1,510	13	53	840	....	e52
24	1,240	26	87	1,490	15	60	840	....	
25	1,200	28	91	1,400	....		840	....	
26	1,190	31	100	1,470	....		847	....	
27	1,160	34	106	1,440	....	e51	809	....	
28	1,100	37	110	1,400	....		847	23	53
29	1,110	40	120	1,370	....		822	21	47
30	1,170	38	123	1,330	....		747	20	40
31	1,300	34	119	....	....	....	822	19	42
	January			February			March		
1	724	14	27	2,070	110	615	4,080	308	3,390
2	735	11	22	1,670	61	275	4,710	352	4,480
3	735	8	16	1,840	41	204	4,260	208	2,390
4	735	....		2,070	....	e190	3,560	122	1,170
5	730	....		1,730	30	140	3,060	88	727
6	730	....	e10	1,420	24	92	2,780	64	480
7	730	....		1,470	20	79	2,090	....	e265
8	710	....		1,270	14	48	1,220	33	109
9	720	....		1,190	12	39	1,160	22	69
10	740	....		1,100	12	36	1,040	14	39
11	740	....	e23	760	....		1,450	12	47
12	720	....		700	....		3,060	86	s890
13	720	....		700	....	e10	4,260	134	1,540
14	700	....		700	....		4,600	289	s3,860
15	700	....		800	....		7,600	796	16,300
16	720	....	e15	900	....		8,670	520	12,200
17	740	....		950	....		9,160	380	9,400
18	760	....		1,000	....	e13	9,230	265	6,600
19	712	....		950	....		8,570	250	5,780
20	678	1	2	1,000	....		6,370	185	3,180
21	611	1	2	920	....		4,770	138	1,780
22	644	3	5	1,250	29	111	4,290	115	1,330
23	689	3	6	3,680	335	3,330	4,230	138	1,580
24	667	4	7	2,600	275	1,930	4,620	188	2,350
25	747	6	12	2,380	162	1,040	5,080	342	4,690
26	873	15	35	4,200	540	6,120	5,390	375	5,460
27	1,140	....	e84	4,400	600	8,130	6,050	348	5,680
28	1,520	53	218	3,500	240	2,270	5,990	255	4,120
29	1,710	....	e429	3,560	222	2,130	5,300	165	2,360
30	2,140	....	e809	....	....	....	4,500	115	1,400
31	2,500	153	1,030	....	....	....	4,080	98	1,080

e Estimated.
s Computed by subdividing day.
Note.—Flow affected by ice Dec 18-25, Jan. 5-17, Feb. 12-22, 27, Mar. 14, 15.

Cedar River at Cedar Rapids, Iowa—Continued

Suspended sediment, water year October 1943 to September 1944—Continued

Day	April			May			June		
		Suspended sediment			Suspended sediment			Suspended sediment	
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1.....	4,020	100	1,090	5,670	146	2,240	8,630	217	5,060
2.....	3,910	111	1,170	5,170	161	2,250	7,310	197	3,890
3.....	3,620	111	1,080	5,050	188	2,560	6,370	195	3,350
4.....	3,560	109	1,050	5,450	214	3,150	5,670	189	2,890
5.....	3,730	108	1,090	6,150	216	3,590	5,080	176	2,410
6.....	3,820	107	1,100	7,580	282	5,770	4,710	161	2,050
7.....	3,620	106	1,040	8,930	270	6,510	4,380	139	1,640
8.....	3,480	105	987	10,400	277	7,780	4,360	123	1,450
9.....	3,420	98	905	11,400	245	7,540	4,770	135	1,740
10.....	3,420	87	803	10,800	176	s5,260	5,080	196	2,690
11.....	3,450	74	689	9,060	132	s3,310	5,270	173	2,460
12.....	4,200	168	s2,020	7,940	117	2,510	6,440	350	6,090
13.....	5,020	322	4,360	7,250	132	2,580	7,480	385	7,780
14.....	5,110	298	4,110	6,530	144	2,540	8,530	355	8,180
15.....	5,300	258	3,690	6,180	152	2,540	8,930	280	6,750
16.....	4,990	212	2,860	6,340	159	2,720	12,500	420	s14,500
17.....	4,680	167	2,110	5,990	163	2,640	25,000	1,140	s78,700
18.....	4,770	162	2,090	5,270	182	2,590	28,400	952	73,000
19.....	4,770	150	1,930	5,420	237	3,470	26,700	620	44,700
20.....	4,680	131	1,660	7,350	901	s18,500	20,200	375	20,500
21.....	4,560	116	1,430	9,230	1,020	25,400	15,700	300	s12,400
22.....	4,560	109	1,340	10,800	750	21,900	15,700	655	27,800
23.....	4,990	145	1,950	13,200	620	22,100	19,100	984	50,700
24.....	5,480	200	2,960	16,600	580	26,000	17,100	630	s29,800
25.....	5,770	198	3,080	17,800	445	21,400	11,600	495	s13,100
26.....	6,090	182	2,990	17,300	395	18,500	8,070	270	5,880
27.....	6,470	172	3,000	15,400	257	10,700	6,630	222	3,970
28.....	6,820	164	3,020	13,700	216	7,990	6,020	184	2,990
29.....	6,980	158	2,980	12,600	204	6,940	5,480	174	2,570
30.....	6,410	148	2,560	11,100	200	5,990	4,990	159	2,140
31.....	....	....	....	9,970	200	5,380	....	....	....

Day	July			August			September		
1.....	4,800	161	2,090	2,430	69	453	2,120	62	355
2.....	4,650	237	2,980	2,270	67	411	2,010	65	353
3.....	4,470	178	2,150	2,120	69	395	1,990	72	387
4.....	4,650	163	2,050	2,340	79	499	1,800	83	403
5.....	5,520	420	6,260	2,720	115	840	1,710	65	300
6.....	6,820	405	7,460	3,480	178	1,670	1,650	69	307
7.....	8,070	295	6,430	3,230	132	1,150	1,560	63	265
8.....	8,140	205	s4,560	3,040	98	804	1,510	60	245
9.....	5,420	181	2,650	2,830	83	634	1,420	61	234
10.....	4,380	135	1,600	2,550	79	544	1,490	49	197
11.....	4,200	120	1,360	2,340	78	493	1,520	57	234
12.....	4,020	120	1,300	2,120	76	435	1,450	54	211
13.....	3,970	126	1,350	1,970	68	362	1,420	60	230
14.....	4,000	169	1,830	1,780	60	288	1,370	65	240
15.....	3,820	148	1,530	1,610	58	252	1,440	59	229
16.....	3,850	136	1,410	1,650	72	321	1,400	55	208
17.....	3,390	102	934	2,720	193	1,420	1,380	57	212
18.....	3,620	94	919	3,040	200	1,640	1,370	62	229
19.....	5,050	217	s3,000	2,410	136	885	1,490	62	249
20.....	4,590	234	s2,930	2,230	78	470	1,730	66	308
21.....	3,820	144	1,490	1,970	65	346	1,600	75	324
22.....	3,390	112	1,030	1,840	65	323	1,670	70	316
23.....	3,120	96	809	1,990	71	381	1,820	73	359
24.....	3,010	82	666	1,800	77	374	1,990	55	296
25.....	2,720	90	661	1,730	84	392	2,160	51	300
26.....	2,650	73	522	1,610	71	309	2,030	55	301
27.....	3,660	131	s1,360	1,650	56	249	1,860	51	256
28.....	4,380	256	s2,950	1,820	53	260	1,800	59	287
29.....	3,700	190	s1,920	1,860	60	301	1,740	65	305
30.....	3,090	128	1,070	1,940	63	330	1,670	60	271
31.....	2,700	95	693	2,030	63	345	....	....	....

s Computed by subdividing day.

Cedar River at Cedar Rapids, Iowa—Continued

Suspended sediment, water year October 1944 to September 1945

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	1,630	62	273	1,140	54	166	740	10	20
2	1,610	55	239	1,130	60	183	655	10	18
3	1,600	40	173	1,200	61	198	611	10	16
4	1,580	40	171	1,220	56	184	655	10	18
5	1,560	44	185	1,190	36	116	913	9	22
6	1,600	43	186	1,190	32	103	1,170	9	28
7	1,610	48	200	1,220	20	96	1,260	9	30
8	1,580	46	198	1,240	37	124	1,110	8	24
9	1,560	41	173	1,170	48	152	1,320	8	29
10	1,580	37	158	1,110	42	126	1,220	8	26
11	1,520	40	164	1,160	20	91	1,020	7	19
12	1,380	46	171	1,140	36	111	800	7	15
13	1,400	46	174	1,140	47	145	800	7	15
14	1,370	51	189	1,140	61	188	740	6	12
15	1,330	46	165	1,130	53	162	750	8	16
16	1,250	44	148	1,100	38	113	780	7	a15
17	1,270	43	147	1,130	29	88	760	5	10
18	1,280	50	173	1,170	22	69	740	4	a8
19	1,170	58	183	1,220	21	69	740	4	8
20	1,250	55	186	1,200	23	75	740	3	6
21	1,240	53	177	1,200	19	62	720	3	6
22	1,200	53	172	1,190	15	48	700	3	6
23	1,200	55	178	1,140	13	40	700	3	6
24	1,190	58	186	1,130	15	46	700	3	6
25	1,130	46	140	1,140	15	46	700	3	6
26	1,100	39	116	1,220	9	30	680	3	6
27	1,190	34	109	1,200	9	29	650	2	4
28	1,110	27	81	1,220	8	26	700	3	6
30	1,130	34	a104	1,220	10	33	720	6	12
30	1,130	42	128	040	10	25	740	6	12
31	1,140	45	139	....	....	....	750	5	10

Day	January			February			March		
1	760	5	10	620	2	3	1,040	28	147
2	740	5	10	620	3	5	2,720	70	s551
3	720	5	10	640	4	7	3,550	140	1,340
4	700	5	9	640	4	7	3,750	112	1,130
5	660	5	9	640	3	5	3,940	105	1,120
6	680	5	9	640	3	5	4,800	230	2,980
7	680	5	9	640	3	5	4,710	120	s1,580
8	660	5	9	640	4	7	4,110	90	999
9	640	4	7	640	4	7	3,600	80	778
10	640	3	5	660	3	5	3,800	180	1,850
11	650	2	4	680	2	4	4,800	475	6,160
12	650	2	4	710	2	4	4,830	470	6,130
13	650	3	5	760	2	4	5,800	335	5,250
14	650	3	5	1,200	23	s77	7,250	490	9,590
15	650	3	5	1,900	82	421	8,960	530	12,800
16	640	3	5	2,100	72	408	12,500	610	s21,100
17	650	3	5	1,800	60	292	22,300	620	37,300
18	680	3	5	1,600	26	112	35,000	600	58,200
19	660	3	5	1,500	17	69	49,600	550	73,700
20	660	3	5	1,650	14	62	46,900	380	48,100
21	660	3	5	1,700	30	138	32,000	270	23,300
22	660	3	5	1,900	20	103	20,600	200	11,100
23	660	4	7	1,850	9	45	14,800	125	5,000
24	680	10	18	1,750	8	38	11,500	100	3,100
25	700	11	21	2,300	30	s208	12,000	640	20,700
26	700	4	8	3,200	116	1,000	11,300	300	9,150
27	680	8	15	2,350	60	s405	10,200	210	5,780
28	660	12	21	1,820	20	98	11,300	260	7,930
29	640	9	16	....	....	....	12,500	185	6,240
30	620	4	7	....	....	....	11,400	150	4,620
31	020	1	2	....	....	....	9,550	128	3,300

s Computed by subdividing day.
a Computed from an estimated concentration graph.
Note.—Flow affected by ice Nov. 30, Dec. 1, Dec. 12 to Feb. 27, Mar. 3, 4, 9-11.

Cedar River at Cedar Rapids, Iowa—Continued

Suspended sediment, water year October 1944 to September 1945—Continued

Day	April			May			June		
		Suspended sediment			Suspended sediment			Suspended sediment	
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1.....	7,940	130	2,700	8,080	80	1,750	17,200	170	7,890
2.....	6,890	132	2,460	7,240	78	1,520	14,000	150	5,670
3.....	6,120	120	1,980	6,640	75	1,340	11,800	160	5,100
4.....	8,030	630	s14,100	6,220	66	1,110	14,400	420	16,300
5.....	7,840	370	s7,990	5,980	66	1,070	20,500	310	17,200
6.....	7,380	145	2,890	5,880	80	1,270	19,700	210	11,200
7.....	7,480	165	3,330	5,660	81	1,240	16,600	145	6,500
8.....	6,780	125	2,290	5,350	80	1,160	13,500	125	4,560
9.....	6,300	115	1,960	4,840	71	928	10,900	135	3,970
10.....	6,780	135	2,470	4,570	57	703	11,500	820	25,500
11.....	7,380	140	2,790	4,370	52	614	10,200	285	s8,150
12.....	8,120	140	3,070	4,210	47	534	8,600	175	4,060
13.....	8,960	160	3,870	4,050	42	459	9,020	235	5,720
14.....	8,740	115	2,710	6,050	170	sb3,190	10,500	205	5,810
15.....	8,640	110	2,570	8,540	430	9,910	11,300	185	5,640
16.....	11,000	370	s11,500	8,120	250	5,480	11,100	165	4,950
17.....	12,500	270	9,110	8,120	195	4,280	10,000	160	4,320
18.....	13,000	175	6,140	8,010	165	3,570	8,740	156	3,680
19.....	12,900	150	5,220	6,640	120	2,150	8,040	164	3,560
20.....	13,200	115	4,100	5,840	105	1,660	7,200	148	2,880
21.....	12,600	90	3,060	5,420	98	1,430	6,500	125	2,190
22.....	11,300	82	2,500	5,110	100	1,380	6,120	116	1,920
23.....	9,660	85	2,220	4,770	78	1,000	6,050	128	2,090
24.....	8,320	86	1,930	6,020	140	s2,330	5,560	160	2,400
25.....	7,590	80	1,640	8,180	265	5,850	6,470	530	sb9,560
26.....	8,360	90	2,030	10,400	190	5,340	5,280	195	2,780
27.....	9,900	118	3,150	13,600	190	6,980	5,080	225	3,090
28.....	11,500	115	3,570	17,100	300	13,900	5,380	320	4,650
29.....	12,100	102	3,330	16,600	255	11,400	5,490	265	3,930
30.....	10,200	90	2,480	17,700	230	11,000	6,080	260	4,270
31.....	....	....	....	19,300	190	9,900	....	....	....

Day	July			August			September		
1.....	6,300	310	5,270	2,130	76	437	2,490	39	262
2.....	5,980	260	4,200	2,130	86	495	2,330	35	220
3.....	5,560	205	3,080	2,330	78	491	2,190	45	266
4.....	5,080	175	2,400	2,330	70	440	2,070	50	279
5.....	4,700	160	2,030	2,280	58	357	1,960	53	280
6.....	4,280	125	1,440	2,280	60	369	1,860	54	271
7.....	4,050	95	1,040	2,220	55	330	1,900	45	231
8.....	3,930	100	1,060	2,790	52	392	2,090	50	282
9.....	3,830	82	848	5,110	102	s1,450	1,880	66	335
10.....	4,440	110	1,320	7,140	220	4,240	1,860	54	271
11.....	4,240	102	1,170	8,290	260	5,820	1,760	40	190
12.....	3,710	98	982	6,620	150	s2,640	1,700	38	181
13.....	3,410	85	783	4,740	106	1,360	1,670	42	189
14.....	3,160	65	555	6,330	360	s6,780	1,720	44	204
15.....	2,940	60	476	7,450	510	10,300	1,670	35	158
16.....	2,780	58	435	8,180	405	8,940	1,610	38	165
17.....	2,610	56	395	9,340	355	8,950	1,430	41	158
18.....	2,510	56	380	10,800	335	9,770	1,570	45	191
19.....	2,490	56	376	12,200	270	8,890	1,500	57	231
20.....	2,590	55	385	12,000	186	6,030	1,380	38	142
21.....	2,590	50	350	9,760	148	3,900	1,480	32	128
22.....	2,560	60	415	7,730	145	3,030	1,480	30	120
23.....	2,370	60	384	6,680	186	3,350	1,500	32	130
24.....	2,260	55	a336	5,660	150	2,290	1,470	39	155
25.....	2,190	54	319	4,700	102	1,290	1,540	44	183
26.....	2,110	61	348	4,080	83	914	1,650	42	187
27.....	2,020	72	393	3,710	75	751	1,700	40	184
28.....	2,070	81	453	3,350	65	588	2,170	73	428
29.....	1,880	73	371	2,970	52	417	2,090	53	299
30.....	1,960	65	344	2,840	46	353	2,070	30	168
31.....	2,020	75	409	2,660	43	309	....	....	....

s Computed by subdividing day.
a Computed from an estimated concentration graph.
b Computed from a partly estimated concentration graph.

Cedar River at Cedar Rapids, Iowa—Continued

Suspended sediment, water year October 1945 to September 1946

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	2,260	30	238	1,170	22	60	1,570	31	131
2	2,170	27	158	1,200	25	81	2,490	57	383
3	1,980	29	155	1,220	24	79	2,610	57	402
4	1,900	32	164	1,250	20	68	2,280	36	222
5	1,860	35	176	1,280	20	69	1,920	16	83
6	1,800	34	165	1,280	23	79	1,760	12	57
7	1,720	41	190	1,280	28	97	1,800	11	53
8	1,670	42	189	1,680	50	a293	1,840	10	50
9	1,630	31	136	2,350	174	1,100	1,480	9	36
10	1,500	29	117	1,700	54	248	1,200	8	26
11	1,470	31	123	1,560	36	152	720	8	16
12	1,520	37	152	1,590	24	103	600	8	13
13	1,500	34	138	1,720	51	237	740	8	16
14	1,450	33	129	1,720	42	195	1,020	8	22
15	1,450	29	114	1,590	23	99	1,100	9	27
16	1,380	27	101	1,610	20	87	1,120	9	27
17	1,330	32	115	1,570	21	89	1,100	9	27
18	1,310	39	138	1,540	21	87	1,070	9	26
19	1,280	41	142	1,470	18	71	1,040	8	22
20	1,380	33	123	1,470	13	52	990	10	27
21	1,310	29	103	1,450	8	31	960	11	29
22	1,280	24	83	1,010	7	19	930	11	28
23	1,260	24	82	899	10	24	940	10	25
24	1,300	30	105	769	11	23	950	9	23
25	1,260	30	102	839	8	18	960	7	18
26	1,250	22	74	1,050	8	23	940	7	18
27	1,260	22	75	1,280	9	31	920	6	15
28	1,250	24	81	1,470	12	48	920	6	15
29	1,220	38	125	1,500	13	53	940	6	15
30	1,180	36	115	1,500	15	61	920	7	17
31	1,160	30	94	....	....	....	910	8	20

Day	January			February			March		
1	1,000	8	22	1,850	4	20	3,560	32	308
2	980	6	16	2,000	4	22	3,650	45	444
3	920	5	12	2,060	4	22	4,540	92	1,130
4	890	9	22	1,450	8	31	4,340	75	879
5	3,700	211	2,110	2,800	45	340	4,540	104	1,270
6	16,000	1,100	a46,300	4,900	150	1,980	8,920	1,320	a32,900
7	19,100	490	25,300	5,280	95	1,350	9,690	846	22,100
8	23,500	425	27,000	5,980	135	2,180	11,200	550	16,600
9	26,000	358	25,100	6,640	170	3,050	14,300	482	18,600
10	21,800	327	a19,100	7,620	100	2,060	19,500	421	22,200
11	15,600	175	7,370	8,040	80	1,740	18,000	220	10,700
12	9,940	100	2,680	6,920	45	841	13,300	150	5,390
13	5,350	45	650	5,630	30	456	11,100	358	10,700
14	3,500	45	425	4,280	23	266	11,800	355	11,300
15	3,000	15	122	3,530	17	162	14,900	355	14,300
16	2,500	12	81	2,940	10	79	21,800	320	18,800
17	2,450	10	66	2,840	8	61	23,200	244	15,300
18	2,500	8	54	2,780	8	60	19,300	175	9,120
19	2,480	7	47	2,640	10	71	15,600	115	4,840
20	2,450	5	33	2,610	11	78	12,900	100	3,480
21	2,430	4	26	2,420	11	72	11,700	85	2,690
22	2,400	4	26	2,440	11	72	10,800	85	2,480
23	2,100	4	23	2,640	12	86	9,520	100	2,570
24	1,900	4	21	2,940	15	119	8,600	95	2,210
25	2,000	4	22	3,190	20	172	7,800	80	1,680
26	2,050	4	22	3,560	25	240	8,150	90	1,980
27	2,100	4	23	3,620	26	254	8,220	105	2,330
28	1,850	4	20	3,560	30	288	8,040	120	2,600
29	1,720	4	19	....	....	....	7,800	130	2,740
30	1,600	4	17	....	....	....	7,590	115	2,360
31	1,670	4	18	....	....	....	7,140	100	1,930

a Computed by subdividing day.

Note.—Flow affected by ice Dec. 10 to Jan. 6, Jan. 14 to Feb. 6.

Cedar River at Cedar Rapids, Iowa—Continued

Suspended sediment, water year October 1945 to September 1946—Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean dischagre (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	6,500	90	1,580	1,740	33	155	3,050	55	542
2	6,050	95	1,550	1,820	30	147	3,270	48	424
3	5,660	105	1,600	2,070	26	145	2,970	40	369
4	5,180	105	1,470	2,330	30	189	2,760	40	298
5	4,810	85	1,100	2,370	34	218	2,640	45	321
6	4,570	70	864	2,330	28	176	2,490	48	323
7	4,280	60	693	2,300	25	155	2,350	44	279
8	4,090	55	600	2,150	25	145	2,110	45	256
9	3,830	52	538	2,070	23	129	1,900	40	205
10	3,620	55	538	2,000	28	151	1,740	38	179
11	3,560	50	481	1,940	30	157	1,650	39	174
12	3,620	50	488	1,900	36	185	2,000	45	243
13	3,560	45	433	1,740	34	160	2,940	155	1,230
14	3,380	40	365	1,760	32	152	2,890	192	1,500
15	3,210	40	347	1,800	32	156	2,510	155	1,050
16	2,970	40	321	1,840	34	169	2,540	138	946
17	2,840	35	268	1,840	34	169	2,490	125	840
18	2,740	35	259	1,780	36	173	4,980	640	a10,000
19	2,610	35	247	1,840	37	184	6,820	1,030	a18,600
20	2,490	30	202	1,860	36	181	7,700	865	18,000
21	2,350	30	190	1,820	32	157	6,470	530	9,260
22	2,260	32	195	1,780	30	144	6,680	440	7,940
23	2,330	30	189	1,860	32	161	6,120	290	4,790
24	2,330	30	189	2,110	34	194	5,250	230	3,260
25	2,190	33	195	2,240	35	212	5,460	275	4,050
26	2,020	32	175	2,420	38	248	4,640	215	2,690
27	1,960	28	148	3,160	40	341	4,050	150	1,640
28	1,900	26	133	4,700	58	736	3,650	105	1,030
29	1,860	32	161	5,010	82	1,110	4,370	609	a8,120
30	1,800	32	156	4,500	80	972	7,200	1,020	19,800
31	....	....	....	4,080	65	710	....	....	....
	July			August			September		
1	10,500	1,680	a49,800	1,760	84	399	1,030	39	108
2	9,520	1,190	30,600	2,090	82	463	1,050	50	142
3	6,100	680	11,400	1,960	72	381	1,000	47	127
4	4,840	294	3,840	1,700	72	330	961	53	138
5	3,740	194	1,960	1,430	78	301	935	53	134
6	3,270	102	900	1,470	72	286	1,280	49	169
7	2,860	53	409	1,400	68	257	1,180	73	233
8	2,760	72	537	1,330	55	198	2,090	176	a1,130
9	2,590	79	552	1,300	62	218	4,080	183	a2,000
10	2,280	92	566	1,260	62	211	5,800	170	2,660
11	2,070	87	486	1,100	57	169	7,940	298	a6,420
12	2,020	78	425	1,330	55	198	9,440	409	a10,500
13	1,940	69	361	1,500	57	231	8,640	378	a8,860
14	1,780	64	308	1,200	55	178	7,140	255	4,920
15	1,700	85	390	1,200	48	156	5,490	153	2,270
16	1,670	70	316	1,230	46	153	4,440	130	1,560
17	1,680	68	308	1,400	46	174	3,710	95	952
18	1,590	66	283	1,420	60	230	3,350	62	561
19	1,630	74	326	1,160	77	241	3,020	55	448
20	1,590	64	275	1,230	57	189	3,020	55	448
21	1,500	49	206	1,110	50	150	2,810	75	569
22	1,540	65	270	1,250	54	182	2,910	315	a3,360
23	1,540	62	258	1,160	59	185	12,700	1,540	a53,300
24	1,480	65	260	1,080	57	166	14,200	592	22,700
25	1,360	60	220	1,100	49	146	5,020	179	2,430
26	1,350	56	204	1,100	49	146	3,710	64	641
27	1,330	66	237	1,030	51	142	3,330	56	503
28	1,380	58	216	1,010	50	136	3,050	60	494
29	1,330	51	183	961	33	86	2,810	36	273
30	1,420	72	276	961	35	91	2,640	36	257
31	1,800	82	399	961	35	91	....	....	....

a Computed by subdividing day.

Cedar River at Cedar Rapids, Iowa—Continued

Suspended sediment, water year October 1946 to September 1947

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	2,420	33	216	3,800	84	875	2,370	17	109
2	2,330	25	157	4,770	155	2,000	2,090	18	102
3	2,220	29	174	5,110	146	2,010	1,940	16	84
4	2,110	33	188	4,670	130	1,640	1,920	18	93
5	2,020	38	207	4,050	72	787	2,110	18	103
6	1,900	38	195	3,770	51	519	2,110	16	91
7	1,820	39	192	3,650	50	493	2,220	22	132
8	1,740	39	183	3,590	53	514	2,260	40	244
9	1,680	40	181	3,500	42	397	2,150	31	180
10	1,700	42	193	3,440	41	381	2,150	28	163
11	1,780	36	173	3,470	42	393	2,040	18	99
12	1,860	22	110	3,470	40	375	2,040	20	110
13	1,880	21	107	3,440	39	362	2,020	15	82
14	2,240	17	103	3,710	39	391	1,880	16	81
15	2,560	29	200	3,830	42	434	1,820	18	88
16	2,840	36	276	4,050	53	580	1,450	16	63
17	2,860	38	293	4,050	39	426	1,280	17	59
18	3,160	40	341	3,830	39	403	900	15	36
19	3,190	43	370	3,590	39	378	620	28	47
20	3,000	36	292	3,500	35	331	987	33	88
21	2,860	33	255	3,380	29	265	1,330	28	101
22	2,660	40	287	3,190	35	301	1,570	19	81
23	2,370	77	493	3,100	28	234	1,760	16	76
24	3,600	359	s4,090	2,940	17	135	1,840	18	89
25	6,400	492	s8,710	2,780	17	128	1,720	22	102
26	4,410	162	1,930	2,760	17	127	1,520	18	74
27	3,860	90	923	2,610	19	134	1,560	11	46
28	4,240	116	1,330	2,490	22	148	1,740	19	89
29	4,410	106	1,260	2,470	24	160	1,650	8	36
30	4,310	95	1,110	2,490	22	148	1,350	8	29
31	4,020	80	868	....	....	....	950	13	33
	January			February			March		
1	950	8	21	850	10	23	1,730	4	19
2	1,020	9	25	870	9	21	1,660	6	27
3	1,080	14	41	960	10	26	1,580	5	21
4	1,100	23	68	1,050	8	23	1,550	2	8
5	1,120	14	42	1,180	6	19	1,520	7	29
6	1,140	12	37	1,280	7	24	1,570	8	34
7	1,150	12	a37	1,330	6	22	1,780	24	115
8	1,160	13	41	1,350	4	15	2,020	22	120
9	1,160	13	41	1,340	5	18	2,300	25	155
10	1,170	36	114	1,310	4	14	2,680	29	210
11	1,180	22	70	1,270	1	3	3,020	33	269
12	1,230	7	23	1,280	2	7	3,350	44	398
13	1,300	11	39	1,310	3	11	3,770	64	651
14	1,360	28	103	1,480	3	12	4,810	129	1,680
15	1,440	26	101	2,460	45	321	5,660	118	1,800
16	1,520	15	62	3,410	68	626	5,420	93	1,360
17	1,600	9	39	3,470	47	440	5,910	92	1,470
18	1,700	17	78	3,470	33	309	6,400	109	1,880
19	1,860	11	55	3,650	38	374	6,920	109	2,040
20	1,940	11	58	3,650	38	374	6,400	114	1,970
21	2,070	14	78	3,560	40	384	5,840	173	2,730
22	1,800	15	73	3,420	35	323	5,150	152	2,110
23	1,280	13	45	2,980	16	129	4,340	74	867
24	1,430	7	27	2,500	9	61	4,540	85	1,040
25	1,650	7	31	2,030	9	49	5,010	112	1,520
26	1,800	8	39	1,950	15	80	5,600	126	1,910
27	1,940	11	58	1,890	12	61	6,440	138	2,400
28	1,980	12	64	1,820	7	34	7,310	246	s4,930
29	1,880	13	66	....	....	....	7,730	280	5,840
30	1,420	15	58	....	....	....	6,720	221	4,010
31	1,060	9	26	....	....	....	6,050	166	2,710

s Computed by subdividing day.
a Computed from an estimated concentration graph.
Note.—Flow affected by ice Dec. 17-19, Dec. 30 to Jan. 17, Feb. 1-12, Feb. 22 to Mar. 5.

Cedar River at Cedar Rapids, Iowa—Continued

Suspended sediment, water year October 1946 to September 1947—Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	5,520	140	2,090	6,050	138	2,250	10,900	1,040	s36,100
2	5,080	115	1,580	5,840	135	2,130	26,100	1,340	s93,100
3	4,770	96	1,240	5,490	100	1,480	35,400	1,150	s111,000
4	5,150	124	1,720	5,090	99	1,360	32,900	914	s81,700
5	7,760	670	s15,200	4,600	70	869	32,500	885	s79,300
6	8,600	533	12,400	4,540	65	797	35,400	1,080	s104,000
7	7,340	248	4,910	4,500	62	753	25,500	646	44,500
8	7,660	228	4,720	4,340	59	691	19,700	460	24,900
9	8,920	252	6,070	4,020	57	619	13,300	419	15,000
10	12,800	951	s35,300	3,770	60	611	10,600	374	10,700
11	16,200	781	34,200	3,590	55	533	9,520	290	7,450
12	14,500	362	14,200	3,470	41	384	8,960	228	5,520
13	12,500	340	11,500	3,350	48	434	17,800	956	s53,700
14	13,600	341	12,500	3,350	44	398	43,800	1,610	s192,000
15	16,300	322	14,200	3,350	49	443	53,300	1,700	245,000
16	17,800	242	11,600	3,410	45	414	51,800	1,060	148,000
17	15,300	167	6,900	3,900	57	600	38,700	468	s49,400
18	11,700	124	3,920	4,370	63	743	30,100	408	33,200
19	10,400	120	3,370	4,410	67	798	24,100	382	24,900
20	10,600	137	3,920	4,340	75	879	20,700	336	18,800
21	9,160	125	3,090	4,280	76	878	21,900	265	15,700
22	8,500	102	2,340	4,120	60	667	22,100	252	15,000
23	7,730	112	2,340	3,830	64	662	19,200	239	12,400
24	7,400	104	2,080	3,800	59	605	16,600	245	11,000
25	7,060	102	1,940	3,740	50	505	15,700	263	11,100
26	7,310	141	2,780	3,770	47	478	15,500	235	9,830
27	7,380	154	3,070	3,620	45	440	14,300	191	7,370
28	7,140	168	3,240	3,650	77	759	12,700	180	6,170
29	6,780	125	2,290	8,360	531	s12,800	11,900	272	8,740
30	6,400	119	2,060	8,180	320	7,070	11,500	291	9,040
31	....	....	....	6,920	190	3,550	....	....	....

Day	July			August			September		
1	11,400	466	14,300	2,640	75	535	1,700	47	216
2	13,000	467	16,400	2,640	63	449	1,820	49	241
3	15,400	420	17,500	2,560	68	470	1,940	51	267
4	17,300	270	12,600	2,470	65	433	1,880	52	264
5	18,800	273	13,900	2,390	67	432	1,740	48	226
6	17,800	443	21,300	2,300	65	404	1,610	54	235
7	15,600	390	16,400	2,240	72	435	1,540	49	204
8	12,800	323	11,200	2,130	77	443	1,480	42	168
9	12,000	274	8,880	2,020	63	344	1,400	66	249
10	12,300	233	7,740	1,880	70	355	1,330	63	226
11	11,600	207	6,480	1,920	76	394	1,330	49	176
12	9,900	213	5,690	1,840	63	313	1,380	46	171
13	8,360	166	3,750	1,840	63	313	1,540	47	195
14	7,000	125	2,360	1,780	57	274	1,500	50	202
15	6,540	134	2,370	1,720	54	251	1,430	57	220
16	6,360	129	2,220	1,700	66	303	1,330	53	190
17	6,640	140	2,620	1,680	70	318	1,430	47	181
18	6,960	172	3,230	1,630	65	286	1,470	44	175
19	7,480	241	4,870	1,610	51	222	1,420	44	169
20	6,440	180	3,130	1,430	42	162	1,470	45	179
21	5,770	151	2,350	1,450	36	141	1,400	47	178
22	5,210	156	2,190	1,480	50	200	1,220	37	122
23	4,740	104	1,330	1,450	46	180	1,350	32	117
24	4,410	101	1,200	1,420	60	230	1,200	37	120
25	4,150	95	1,060	1,380	86	320	1,180	39	124
26	3,900	101	1,060	1,380	55	205	1,230	33	110
27	3,530	93	886	1,400	52	197	1,060	44	126
28	3,380	80	730	1,350	38	139	1,140	36	111
29	3,240	82	717	1,360	41	151	1,040	47	132
30	3,020	92	750	1,520	40	164	1,100	34	101
31	2,890	81	632	1,610	48	209	....	....	....

s Computed by subdividing day.

Cedar River at Cedar Rapids, Iowa—Continued

Suspended sediment, water year October 1947 to September 1948

Day	October			November			December		
		Suspended sediment			Suspended sediment			Suspended sediment	
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1	1,110	22	66	1,820	20	143	640	23	40
2	1,080	56	163	1,760	34	162	935	19	48
3	1,110	40	120	1,740	37	174	1,430	15	58
4	1,220	42	138	1,780	40	192	1,700	45	207
5	1,280	42	145	1,780	43	207	2,040	36	198
6	1,250	48	162	1,630	25	110	2,190	61	361
7	1,180	57	a182	1,590	20	112	2,300	51	317
8	1,280	69	238	1,560	22	93	1,900	39	200
9	1,100	83	247	1,500	27	109	1,300	24	84
10	1,140	49	151	1,470	24	95	900	16	39
11	1,120	64	194	1,360	15	55	880	20	48
12	1,100	64	190	1,420	20	77	1,100	17	50
13	1,010	41	112	1,310	22	78	1,400	17	64
14	1,030	64	178	1,310	13	46	1,450	15	59
15	1,080	40	117	1,330	16	57	1,500	13	53
16	987	48	128	1,420	18	69	1,350	13	47
17	987	40	107	1,300	10	37	800	14	30
18	1,010	36	98	1,430	14	54	680	24	44
19	987	41	109	1,470	36	143	920	26	65
20	1,000	48	130	1,420	18	69	1,150	22	68
21	1,000	69	186	1,420	26	100	1,300	34	119
22	987	41	109	1,430	29	112	1,350	22	80
23	974	38	100	1,430	36	139	1,300	16	56
24	961	47	122	1,470	35	139	1,150	17	53
25	1,030	36	100	1,520	34	140	1,100	17	50
26	1,220	48	158	1,450	25	98	1,150	17	53
27	1,140	39	120	1,380	17	63	1,100	15	45
28	1,500	38	154	1,170	22	69	1,100	12	36
29	1,650	36	160	990	20	53	1,150	10	31
30	1,780	30	a187	750	13	26	1,100	15	45
31	1,860	39	196	....	....	....	1,150	32	99

Day	January			February			March		
1	1,050	19	54	590	23	37	17,800	862	41,430
2	850	17	39	600	26	42	25,100	760	51,510
3	780	33	69	600	19	31	31,800	474	40,700
4	860	30	70	590	20	32	29,400	295	23,420
5	970	46	120	580	19	30	18,500	190	s9,760
6	1,050	52	152	580	18	28	9,830	120	3,180
7	1,140	32	98	560	17	27	5,960	100	1,610
8	1,060	31	39	570	20	31	5,210	95	1,340
9	1,060	47	135	570	16	25	4,640	79	990
10	1,080	33	96	560	21	33	4,180	45	508
11	1,060	23	66	590	24	38	4,050	58	a634
12	1,050	28	79	590	19	30	3,560	75	721
13	1,010	17	46	580	23	36	3,130	62	a524
14	880	27	64	590	18	29	3,410	47	433
15	670	30	54	600	14	23	4,280	59	682
16	720	29	56	650	10	18	8,320	306	6,870
17	740	22	44	700	12	23	13,300	618	22,190
18	740	20	40	800	90	194	18,300	690	34,090
19	730	15	30	1,100	80	238	22,600	1,230	s80,570
20	720	30	58	1,400	46	174	32,500	1,030	89,550
21	700	33	62	1,700	21	96	32,500	620	54,410
22	700	28	53	2,000	11	59	30,200	596	48,600
23	710	33	63	2,400	22	143	21,600	368	21,460
24	710	23	44	2,300	26	161	14,600	230	9,070
25	700	20	38	2,200	26	154	9,970	170	4,580
26	680	17	31	2,100	39	221	7,600	864	18,200
27	660	18	32	2,000	98	s540	8,680	1,190	27,890
28	660	27	48	6,400	1,210	20,910	7,980	532	11,460
29	640	31	54	10,600	858	24,560	8,010	595	12,870
30	620	54	90	....	....	....	7,840	538	11,390
31	600	36	58	....	....	....	7,060	348	6,600

s Computed by subdividing day.
a Computed from an estimated concentration graph.
Note.—Flow affected by ice Nov. 27-30, Dec. 7 tto Feb. 21, Mar. 6-18.

Cedar River at Cedar Rapids, Iowa—Continued

Suspended sediment, water year October 1947 to September 1948—Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	6,200	190	3,210	3,500	108	1,020	1,700	77	353
2	5,420	139	2,030	3,800	207	2,740	1,470	72	286
3	4,770	124	1,600	4,700	220	2,790	1,650	56	249
4	4,370	111	1,310	4,120	116	1,290	1,570	56	237
5	4,020	100	1,090	3,710	94	912	1,590	258	1,110
6	3,800	95	a975	4,470	284	3,430	3,330	267	2,400
7	3,620	92	a899	4,640	234	2,930	4,210	193	2,190
8	3,380	90	821	4,810	157	2,040	3,270	138	1,220
9	3,380	147	1,340	4,700	140	1,780	2,420	110	719
10	3,560	254	2,440	4,470	147	1,770	2,190	141	834
11	3,620	219	2,140	4,640	154	1,930	1,940	112	587
12	3,500	131	1,240	5,150	144	2,000	1,920	116	601
13	3,500	165	1,560	5,110	160	2,210	1,860	126	633
14	3,470	128	1,200	5,250	197	2,790	1,780	106	509
15	3,270	166	1,470	5,150	132	1,840	1,720	101	469
16	3,050	143	1,180	5,110	112	1,550	1,700	91	418
17	2,890	80	624	5,520	141	2,100	1,560	104	438
18	2,710	64	468	4,940	260	3,470	1,590	113	485
19	2,610	51	359	4,310	215	2,500	1,560	92	388
20	2,470	172	1,150	3,800	149	1,530	1,420	99	380
21	2,370	68	435	3,500	112	1,060	1,480	90	360
22	2,300	79	491	3,160	102	870	1,420	78	299
23	2,420	84	549	2,840	88	675	1,560	82	345
24	3,130	156	1,320	2,560	88	608	1,470	73	290
25	3,470	176	1,650	2,420	79	516	1,350	70	255
26	3,470	120	1,120	2,240	70	423	1,400	58	219
27	3,680	110	1,090	2,110	58	330	1,360	90	a330
28	3,930	123	1,270	2,020	61	333	1,430	139	537
29	3,740	125	1,260	1,880	82	a416	1,860	103	517
30	3,500	139	1,310	1,840	103	512	2,190	99	585
31	....	....	....	1,780	79	380	....	....	....

Day	July			August			September		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1	2,780	122	916	834	49	110	967	71	185
2	2,970	204	1,640	834	53	119	795	50	107
3	2,740	140	1,040	834	52	117	860	40	93
4	2,370	110	704	834	50	113	860	43	100
5	2,110	97	553	834	36	81	821	40	89
6	1,880	89	452	821	38	84	747	52	105
7	1,670	91	410	808	48	105	699	58	109
8	1,420	84	322	808	40	87	711	58	111
9	1,350	73	266	771	32	67	711	79	152
10	1,350	58	211	834	34	77	711	45	86
11	1,250	40	135	783	28	59	653	35	62
12	1,050	33	94	759	18	37	565	42	64
13	1,170	37	117	783	24	51	664	31	56
14	1,420	106	406	795	29	62	631	38	65
15	1,250	99	334	771	28	58	631	41	70
16	1,430	78	301	723	29	57	631	42	72
17	1,500	78	316	711	42	81	620	42	70
18	1,420	99	380	808	34	74	620	36	60
19	1,060	86	240	783	33	70	587	47	74
20	1,300	60	211	808	46	100	620	39	65
21	1,250	52	176	795	32	69	711	35	67
22	1,310	62	219	699	31	59	687	44	82
23	1,250	64	216	687	38	70	631	48	82
24	1,140	52	160	699	34	64	699	43	81
25	886	55	132	687	38	70	700	42	79
26	1,300	57	200	687	41	76	720	44	86
27	1,180	57	182	642	38	a66	740	47	94
28	1,080	46	134	631	34	58	631	47	80
29	967	46	a120	631	48	82	740	36	72
30	1,080	58	169	899	42	102	631	32	55
31	899	40	119	1,170	73	231	....	....	....

a Computed from an estimated concentration graph.

Cedar River at Cedar Rapids, Iowa—Continued

Suspended sediment, water year October 1948 to September 1949

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1.....	687	37	69	565	31	47	847	13	30
2.....	664	29	52	642	33	57	808	13	28
3.....	600	38	62	642	36	62	821	15	33
4.....	555	30	45	631	37	63	1,000	11	30
5.....	609	38	62	653	37	65	1,200	14	45
6.....	642	34	59	664	30	54	1,100	18	53
7.....	1,060	36	103	759	21	43	1,020	13	36
8.....	1,100	68	202	771	30	62	783	11	23
9.....	981	41	109	873	26	61	648	25	44
10.....	771	28	58	886	25	60	429	16	19
11.....	939	25	63	860	21	49	485	21	27
12.....	834	30	68	711	24	46	465	16	20
13.....	886	29	69	834	25	56	582	17	27
14.....	771	25	52	808	24	52	953	24	62
15.....	772	37	77	698	31	58	950	43	110
16.....	664	56	100	899	28	68	810	39	85
17.....	687	26	48	808	23	50	730	26	51
18.....	747	29	58	747	21	42	700	12	23
19.....	664	17	30	912	33	81	670	12	22
20.....	735	19	38	1,180	57	182	642	14	24
21.....	687	26	48	1,100	40	110	711	11	21
22.....	747	23	46	873	17	40	860	8	19
23.....	834	24	54	1,020	15	41	653	9	16
24.....	834	22	50	1,100	15	45	631	10	17
25.....	808	27	59	1,080	15	44	680	10	18
26.....	759	28	57	899	18	44	720	8	16
27.....	642	29	50	1,040	26	73	550	9	13
28.....	664	28	50	1,010	23	63	490	6	8
29.....	665	32	57	900	18	44	600	9	15
30.....	664	32	57	912	15	37	560	7	11
31.....	653	28	49	....	....	....	550	10	15
	January			February			March		
1.....	600	8	13	1,020	8	22	3,400	44	404
2.....	580	16	25	970	15	39	3,350	45	407
3.....	560	37	56	840	9	20	4,000	88	950
4.....	1,200	100	324	860	7	16	5,000	262	3,540
5.....	2,400	109	706	920	5	12	8,000	430	9,480
6.....	2,200	64	380	960	5	13	11,000	491	14,500
7.....	2,000	43	232	920	4	10	23,700	700	s46,400
8.....	1,800	29	141	850	5	11	28,500	408	s31,550
9.....	1,950	24	126	800	8	17	26,300	217	15,410
10.....	1,800	16	78	840	9	20	24,100	170	11,060
11.....	1,600	13	56	830	7	16	21,600	107	6,240
12.....	1,430	12	46	810	6	13	15,800	80	3,410
13.....	1,450	12	47	700	5	11	11,000	89	2,640
14.....	1,550	9	38	790	6	13	7,800	83	1,750
15.....	1,700	16	73	810	6	13	6,580	69	1,230
16.....	2,400	161	1,040	750	9	18	5,350	48	693
17.....	2,800	128	968	730	11	22	4,670	29	366
18.....	2,700	82	598	750	7	14	4,340	27	310
19...	2,200	68	404	840	6	14	3,900	25	263
20.....	1,850	54	270	820	6	13	3,560	30	288
21.....	1,650	56	249	770	8	17	3,440	35	325
22.....	1,500	38	154	740	7	14	4,340	217	s2,570
23.....	1,400	31	117	1,000	9	24	5,010	212	2,870
24...	1,500	26	105	1,500	49	108	5,700	337	5,190
25.....	1,300	22	77	3,600	73	710	6,750	208	3,790
26.....	1,200	20	65	3,300	45	401	8,320	258	5,800
27.....	1,100	15	45	3,100	40	335	9,550	559	14,410
28.....	1,140	12	37	3,400	45	413	11,000	594	17,640
29.....	1,180	14	45	....	....	....	12,400	502	16,810
30.....	1,020	9	25	....	....	....	14,100	422	16,070
31.....	1,070	6	17	....	....	....	16,000	400	18,250

s Computed by subdividing day.

Note.—Flow affected by ice Dec. 15-19, Dec. 25 to Mar. 6.

Cedar River at Cedar Rapids, Iowa—Continued

Suspended sediment, water year October 1948 to September 1949—Continued

Day	April			May			June		
		Suspended sediment			Suspended sediment			Suspended sediment	
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1	16,900	237	10,810	2,470	41	273	2,640	662	s4,520
2	14,100	159	6,050	2,390	40	258	1,740	472	s2,290
3	11,000	145	4,310	2,240	39	236	1,980	225	1,200
4	11,300	143	4,360	2,130	32	184	1,880	210	1,070
5	12,400	149	4,990	2,020	32	174	1,960	145	767
6	11,000	123	3,650	1,980	34	182	2,110	127	724
7	8,500	117	2,690	1,940	38	199	2,040	106	584
8	7,100	107	2,050	1,880	42	213	1,940	110	576
9	6,400	92	1,590	1,840	39	194	1,570	93	394
10	5,700	67	1,030	1,780	35	168	1,420	73	280
11	5,180	70	979	1,650	33	147	1,380	67	250
12	4,670	69	870	1,570	32	136	1,310	63	223
13	4,340	57	668	1,500	42	170	1,050	45	128
14	4,020	56	608	1,520	42	172	1,230	42	139
15	4,020	41	445	1,570	47	199	1,310	46	163
16	3,900	37	390	1,570	59	250	1,310	40	141
17	4,160	44	497	1,560	47	198	1,420	46	176
18	4,340	51	598	1,560	36	152	1,160	44	138
19	4,020	55	597	1,480	40	160	1,050	43	122
20	4,180	52	587	1,420	37	142	1,050	45	128
21	4,340	52	609	1,450	34	133	1,310	60	212
22	4,340	55	644	1,610	35	152	1,310	109	386
23	4,340	54	633	1,610	31	135	1,180	109	347
24	4,020	57	619	1,420	32	123	2,640	433	s3,350
25	3,710	53	531	1,670	34	153	3,990	1,000	10,780
26	3,380	47	429	1,380	44	164	3,410	616	s5,730
27	3,190	49	422	1,560	36	152	3,680	295	2,930
28	2,970	49	393	1,310	30	106	5,010	328	4,440
29	2,740	50	370	1,330	28	101	4,840	280	3,660
30	2,540	44	302	1,280	29	100	3,770	180	1,830
31	....	....	....	1,430	28	108	....	....	....

Day	July			August			September		
1	3,080	160	1,330	1,040	50	140	405	61	77
2	2,860	110	849	1,100	58	172	475	48	62
3	2,710	110	805	1,140	51	157	505	38	52
4	2,860	128	988	1,050	47	133	620	30	50
5	2,860	200	1,540	1,010	37	101	735	40	79
6	2,190	182	1,080	939	36	91	545	35	52
7	2,370	240	1,540	795	36	77	587	34	54
8	1,940	174	911	834	35	79	675	41	64
9	2,970	460	s3,780	711	30	58	576	46	72
10	1,900	213	1,090	711	36	69	565	44	67
11	1,610	130	565	779	49	103	620	40	67
12	1,330	110	395	923	40	100	847	41	94
13	1,330	91	327	847	37	85	912	44	108
14	1,250	101	341	735	39	77	834	42	95
15	1,170	87	275	711	39	75	675	47	86
16	1,110	75	225	687	47	87	735	42	83
17	1,040	67	188	699	39	74	699	35	66
18	1,040	63	177	653	32	56	687	29	54
19	1,020	62	171	687	47	87	862	38	88
20	1,050	72	204	620	58	97	555	38	57
21	1,360	83	305	609	38	62	565	32	49
22	1,920	82	425	565	35	53	565	28	43
23	1,800	78	379	555	33	49	505	23	31
24	1,590	91	391	576	25	39	515	36	50
25	1,310	78	276	565	20	31	505	37	50
26	1,250	65	219	495	19	25	475	32	41
27	1,170	60	190	642	30	52	505	26	35
28	1,100	53	157	565	35	53	495	28	37
29	1,020	40	110	475	31	40	495	32	43
30	995	37	99	456	26	32	405	31	39
31	912	47	116	505	49	67	....	....	....

s Computed by subdividing day.

Cedar River at Cedar Rapids, Iowa—Continued

Suspended sediment, water year October 1949 to September 1950

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	480	30	39	550	18	27	614	36	60
2	470	28	36	580	18	28	543	28	41
3	480	30	39	570	18	28	926	26	65
4	490	35	46	560	17	26	595	31	50
5	490	37	49	520	15	21	740	29	58
6	510	32	44	540	10	15	434	23	27
7	540	29	42	550	18	27	554	37	55
8	610	36	59	570	24	37	321	24	21
9	550	43	64	520	30	42	270	14	10
10	520	53	74	520	28	39	212	13	7
11	520	35	49	540	20	42	380	13	13
12	520	27	38	646	25	44	677	17	31
13	510	29	40	590	24	38	559	14	21
14	460	29	36	646	26	45	217	16	9
15	460	29	36	580	14	22	280	16	12
16	480	56	73	640	10	17	315	25	21
17	470	44	56	670	8	14	754	24	49
18	440	38	45	590	10	16	686	16	30
19	520	42	59	659	36	64	670	15	27
20	560	34	51	550	31	46	896	13	31
21	580	26	41	550	26	39	536	12	17
22	550	16	24	530	24	34	499	12	16
23	838	18	41	580	22	34	329	10	9
24	706	28	53	590	23	37	280	11	8
25	540	26	38	560	14	21	256	11	8
26	646	14	24	560	10	24	392	18	19
27	646	10	17	530	22	31	500	23	31
28	682	25	46	520	25	35	540	19	28
29	634	40	68	540	25	36	329	24	21
30	580	36	50	910	28	69	418	31	35
31	540	20	29	....	....	....	392	31	33
	January			**February**			**March**		
1	420	26	29	350	7	6	778	11	23
2	580	13	20	320	7	6	754	7	14
3	407	12	16	310	8	7	694	40	75
4	680	22	40	310	4	3	634	157	269
5	450	18	22	310	4	3	2,600	190	1,330
6	230	28	17	310	6	5	7,800	640	13,500
7	346	48	45	310	8	7	11,600	1,220	38,200
8	320	44	38	400	8	9	23,600	675	[a]43,000
9	323	37	32	530	10	14	25,600	318	22,000
10	312	13	11	1,020	18	50	30,200	341	27,800
11	246	7	5	1,590	32	137	32,400	257	22,500
12	329	14	12	1,380	37	138	24,400	158	[a]10,600
13	400	16	17	1,200	23	75	14,000	100	3,780
14	760	43	88	950	19	49	6,840	60	1,110
15	700	90	170	700	14	26	6,050	48	784
16	600	132	214	520	10	14	5,700	112	1,720
17	540	87	127	470	9	11	5,000	90	1,210
18	540	85	124	430	6	7	4,310	53	617
19	600	23	37	420	6	7	4,240	67	767
20	600	20	32	450	5	6	4,070	112	1,230
21	470	14	18	420	5	6	3,870	104	1,090
22	480	42	54	400	8	9	4,140	72	805
23	490	22	29	410	9	10	4,650	103	1,290
24	470	5	6	420	9	10	5,880	121	1,920
25	490	9	12	370	10	10	7,280	193	3,790
26	540	10	15	360	6	6	8,500	188	4,310
27	500	7	9	370	5	5	9,550	213	5,490
28	400	9	10	500	7	9	9,900	199	5,320
29	390	9	9	....	....	....	11,000	300	8,910
30	380	17	17	....	....	....	13,300	413	14,800
31	370	11	11	....	....	....	20,000	548	[a]20,600

[a] Computed by subdividing day.

Note.—Flow affected by ice Dec. 9, 15, 27, 28, Jan. 4, 5, Jan. 18 to Feb. 8, Feb. 13-28, Mar. 5-7.

Cedar River at Cedar Rapids, Iowa—Continued

Suspended sediment, water year October 1949 to September 1950—Continued

Day	April			May			June		
		Suspended sediment			Suspended sediment			Suspended sediment	
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1	21,500	436	a25,900	2,950	142	1,130	2,560	75	518
2	13,000	212	7,440	2,720	97	712	3,280	205	1,810
3	8,150	170	3,740	2,490	78	524	4,650	175	2,200
4	7,100	125	2,400	2,840	125	958	4,650	198	2,490
5	6,050	112	1,830	2,840	147	1,130	3,870	120	1,250
6	5,350	95	1,370	2,840	78	598	3,410	118	1,090
7	4,550	67	823	3,530	200	a2,020	2,950	100	798
8	4,110	56	621	4,820	908	a11,800	2,540	78	535
9	3,830	68	703	5,860	1,010	16,000	2,340	70	442
10	3,830	62	641	5,880	789	a12,800	2,180	90	530
11	3,630	60	588	6,750	650	11,800	2,750	195	1,450
12	3,260	50	443	8,500	881	a20,000	4,310	409	4,760
13	3,250	36	316	8,680	541	a12,600	4,820	548	7,130
14	3,370	36	328	6,920	305	5,700	3,340	295	2,660
15	3,190	47	405	5,180	195	2,730	4,870	1,020	a13,600
16	2,860	41	317	4,190	120	1,360	4,460	841	a10,200
17	2,650	35	250	3,030	80	784	4,140	767	a8,590
18	2,410	30	195	3,220	85	738	7,060	1,810	a35,000
19	2,150	30	174	2,950	80	637	8,150	1,560	a34,000
20	2,020	23	125	2,810	70	531	7,800	1,070	a22,400
21	1,980	27	144	2,720	70	514	8,320	930	20,900
22	1,920	53	275	2,780	72	540	8,850	715	17,100
23	1,940	131	686	3,130	160	1,350	7,010	342	6,470
24	3,100	232	1,940	4,040	330	3,600	7,030	711	a10,400
25	4,310	486	a5,940	3,800	327	3,350	13,600	2,050	a74,100
26	5,180	963	a13,600	3,770	380	3,850	13,500	960	35,000
27	5,000	671	9,060	4,140	410	a4,730	5,090	760	12,300
28	4,320	495	5,770	5,700	989	a15,000	4,480	377	a4,690
29	3,700	335	3,340	4,650	343	a8,820	3,660	196	1,940
30	3,310	240	2,140	3,470	185	1,730	3,000	105	867
31	....	....	....	2,950	110	876	....	....	....
	July			August			September		
1	2,880	135	1,050	1,590	100	429	814	64	141
2	6,660	271	ab4,880	1,480	89	350	754	79	161
3	3,190	210	1,810	1,700	86	395	754	82	167
4	2,510	117	793	2,510	94	637	754	83	169
5	2,240	78	472	2,540	102	700	742	72	144
6	2,040	79	435	2,200	118	701	718	70	136
7	1,840	56	278	1,840	88	437	634	69	118
8	1,800	78	379	1,700	93	427	646	64	112
9	1,630	88	387	1,540	76	316	718	80	155
10	1,600	88	380	1,380	79	294	658	64	114
11	1,460	70	304	1,290	78	272	634	60	103
12	1,360	69	257	1,240	83	278	754	74	151
13	1,380	90	335	1,150	66	205	706	81	154
14	1,450	103	403	1,370	67	248	646	62	108
15	1,140	63	194	1,400	64	242	778	54	113
16	1,380	51	190	1,330	56	201	754	68	138
17	1,300	65	228	1,150	66	205	658	92	163
18	1,270	71	243	1,160	60	188	670	85	154
19	1,370	96	355	1,110	80	240	610	72	119
20	2,720	137	1,010	1,080	77	225	658	75	133
21	3,470	169	1,580	1,110	64	192	1,300	94	330
22	2,750	150	1,110	876	68	161	7,100	444	ab8,660
23	2,590	136	951	954	68	175	5,440	292	a4,400
24	2,560	123	825	889	68	163	3,500	163	1,540
25	2,340	106	670	863	64	149	2,540	79	542
26	2,180	87	512	826	86	192	1,880	88	447
27	2,000	91	491	876	88	208	1,630	67	295
28	1,800	90	437	863	68	158	1,430	72	278
29	1,540	88	366	876	86	203	1,380	79	294
30	1,670	112	505	814	70	154	1,300	72	253
31	1,940	120	629	928	65	163	....	....	....

a Computed by subdividing day.
b Computed from a partly estimated concentration graph.

Cedar River at Cedar Rapids, Iowa—Continued

Suspended sediment, water year October 1950 to September 1951

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	1,200	78	253	802	60	130	530	43	62
2	1,090	76	224	730	55	108	570	38	58
3	1,110	68	204	778	33	69	622	25	42
4	1,140	50	154	706	26	50	560	15	23
5	1,120	46	139	778	25	53	540	15	22
6	1,050	55	156	730	31	61	530	15	21
7	1,050	51	145	694	34	64	510	21	29
8	1,120	53	160	778	33	69	400	19	21
9	1,140	54	166	706	25	48	420	16	18
10	1,080	56	163	706	18	37	480	19	25
11	1,200	66	214	658	18	32	520	20	28
12	1,120	62	187	718	18	35	470	10	13
13	1,120	52	157	694	15	28	460	13	16
14	1,120	72	218	682	16	29	440	35	42
15	1,050	59	167	718	18	35	470	15	19
16	1,020	55	151	778	30	63	600	13	21
17	980	52	138	706	31	59	670	15	27
18	941	46	117	730	23	45	620	16	27
19	876	47	111	778	17	36	540	30	44
20	915	49	121	706	15	29	560	36	54
21	889	46	110	646	17	30	530	26	37
22	889	48	115	660	16	29	500	29	39
23	863	40	93	500	18	24	510	23	32
24	850	36	83	370	24	24	540	36	52
25	850	35	80	300	51	41	640	42	73
26	790	32	68	320	41	35	660	31	55
27	814	40	88	401	50	54	620	15	25
28	814	46	101	540	45	66	600	14	23
29	814	49	108	530	47	67	560	32	50
30	778	48	101	530	52	74	570	36	55
31	754	48	98	....	....	....	560	38	57

Day	January			February			March		
1	550	17	25	430	25	29	22,000	285	16,900
2	540	9	13	430	20	23	20,500	255	14,100
3	530	15	21	420	18	20	20,500	247	13,700
4	520	15	21	420	17	19	16,700	155	6,990
5	530	20	29	410	12	13	11,000	172	5,110
6	510	18	25	410	6	7	9,100	196	4,820
7	490	22	29	410	10	11	9,860	235	6,260
8	470	36	46	410	8	9	9,480	208	5,320
9	470	18	23	400	4	4	8,530	195	4,490
10	470	10	13	400	6	6	7,020	78	1,480
11	490	10	13	400	4	4	5,040	53	721
12	490	13	17	450	4	5	3,340	58	523
13	490	24	32	440	5	6	2,860	32	247
14	490	12	16	420	5	6	2,720	36	264
15	470	5	6	370	6	6	2,850	23	177
16	480	14	18	350	6	6	3,000	44	356
17	470	12	15	400	9	10	3,000	55	446
18	470	10	13	420	5	6	2,850	45	346
19	460	8	10	540	3	4	2,600	32	225
20	450	9	11	900	12	29	2,400	15	97
21	460	10	12	800	23	50	2,200	24	143
22	470	7	9	750	24	49	2,100	25	142
23	460	4	5	800	20	43	2,100	30	170
24	450	4	5	000	19	46	2,200	25	149
25	500	4	5	4,300	191	2,220	2,300	28	174
26	470	6	8	8,000	424	9,160	2,300	41	265
27	460	12	15	18,000	1,590	77,300	4,160	128	a1,680
28	450	10	12	25,400	596	a41,200	11,600	658	a20,700
29	450	12	15	....	....	....	19,700	402	a25,400
30	440	21	25	....	....	....	26,600	373	a27,000
31	440	25	30	....	....	....	38,100	274	a27,700

a Computed by subdividing day.

Note.—Flow affected by ice Nov. 22-25, Dec. 6 to Feb. 27, Mar. 15-25.

Cedar River at Cedar Rapids, Iowa—Continued

Suspended sediment, water year October 1950 to September 1951—Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	37,700	170	17,300	17,100	305	s14,900	4,060	50	548
2.....	31,700	135	11,600	34,100	540	s49,100	7,580	332	s7,890
3.....	23,600	135	8,570	34,500	342	31,900	15,900	1,170	s51,300
4.....	18,600	115	5,780	23,200	178	11,100	17,100	625	s29,300
5.....	16,300	114	5,020	19,000	135	6,930	15,900	424	18,200
6.....	16,300	170	7,480	19,700	137	7,290	16,700	270	12,200
7.....	20,900	191	10,800	16,700	120	5,410	15,600	158	6,650
8.....	27,700	169	14,100	13,300	85	3,050	13,300	147	5,280
9.....	37,700	191	19,400	11,000	96	2,850	10,200	150	4,130
10.....	48,100	247	32,100	10,200	98	2,700	8,910	157	3780
11.....	53,700	242	35,100	9,480	97	2,480	7,770	142	2,980
12.....	46,500	150	18,800	8,910	83	2,000	6,840	124	2,290
13.....	35,700	104	10,000	8,340	72	1,620	5,760	116	1,800
14.....	27,700	85	6,360	7,390	74	1,480	5,400	100	1,460
15.....	24,700	115	7,670	6,660	83	1,490	5,040	102	a1,390
16.....	23,900	105	6,760	6,120	75	1,240	5,040	136	1,850
17.....	23,900	....	e6,100	5,760	76	1,180	5,040	138	1,860
18.....	22,000	75	4,460	5,400	75	1,090	4,690	103	1,370
19.....	17,800	91	4,370	5,220	67	944	4,300	101	1,170
20.....	14,400	85	3,300	5,940	110	1,760	4,340	138	1,620
21.....	12,100	70	2,200	6,120	157	2,590	4,520	154	a1,880
22.....	11,000	77	2,290	5,760	165	2,570	4,860	143	1,880
23.....	10,200	64	1,760	5,400	130	1,900	4,520	117	1,430
24.....	10,600	65	1,860	5,040	79	1,050	4,240	91	1,040
25.....	12,100	94	3,070	4,690	218	s2,810	3,850	77	a800
26.....	14,800	90	3,600	6,120	212	3,500	3,640	75	737
27.....	15,900	120	5,150	5,760	150	2,330	3,960	80	855
28.....	16,300	143	6,290	4,690	70	880	7,580	525	s11,600
29.....	16,700	98	4,420	4,340	53	621	14,800	878	35,100
30.....	16,300	92	4,050	3,880	44	461	30,900	571	s47,300
31.....	....	....	....	3,760	45	459	....	....	....
	July			August			September		
1.....	27,000	242	17,600	3,860	185	1,940	7,390	100	2,000
2.....	20,500	220	12,200	3,850	129	1,340	6,120	80	1,320
3.....	17,100	168	7,760	3,460	100	940	5,400	65	948
4.....	13,300	172	6,180	2,950	116	924	4,860	66	866
5.....	10,200	173	4,760	2,860	90	695	4,340	69	809
6.....	10,200	197	5,480	2,750	63	468	3,880	66	691
7.....	9,480	448	11,500	2,670	67	483	3,710	64	641
8.....	9,100	716	17,600	2,860	97	749	3,510	63	597
9.....	13,300	618	22,200	3,130	84	710	3,380	56	511
10.....	16,700	502	22,600	3,610	85	828	3,640	61	600
11.....	17,800	380	18,300	4,060	78	855	4,160	71	797
12.....	15,000	276	11,800	3,610	52	507	4,690	72	912
13.....	14,400	238	9,250	3,220	55	478	4,860	75	984
14.....	11,800	168	5,350	3,160	60	512	4,520	59	720
15.....	10,200	172	4,740	3,130	70	592	4,340	51	598
16.....	9,480	264	6,760	3,960	92	984	4,690	55	696
17.....	8,910	266	6,400	5,400	93	1,360	4,860	52	682
18.....	7,960	158	3,400	5,400	105	1,530	5,220	57	803
19.....	6,840	115	2,120	5,040	90	1,220	4,690	65	823
20.....	6,120	137	2,260	4,860	83	1,090	4,060	56	614
21.....	5,580	75	1,130	4,520	74	903	3,080	45	447
22.....	5,940	140	2,250	4,860	79	1,040	3,480	41	385
23.....	6,060	148	2,660	5,040	87	1,180	3,220	35	304
24.....	6,300	135	2,300	4,860	85	1,120	3,040	27	222
25.....	5,580	120	1,810	5,400	88	1,280	2,890	28	218
26.....	5,400	111	1,720	6,300	193	3,280	2,720	30	220
27.....	5,220	113	1,590	8,910	284	6,830	2,640	32	228
28.....	4,520	102	1,240	10,200	265	7,300	2,640	27	192
29.....	4,060	108	1,180	12,500	248	8,370	2,540	25	171
30.....	3,680	110	1,090	15,000	235	10,100	2,460	26	173
31.....	3,610	129	1,260	12,500	136	4,590	....	....	....

e Estimated.
s Computed by subdividing day.
b Computed from a partly estimated concentration graph.

Cedar River at Cedar Rapids, Iowa—Continued

Suspended sediment, water year October 1951 to September 1952

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	2,330	40	251	3,710	37	371	3,160	43	367
2	2,270	54	331	3,080	35	348	2,720	36	264
3	2,200	55	327	2,890	29	226	2,670	38	274
4	2,320	56	351	2,810	39	296	2,720	37	272
5	2,980	70	563	2,270	40	245	2,840	33	253
6	3,780	71	725	2,180	54	318	2,920	40	315
7	4,100	63	697	2,200	46	273	3,040	31	254
8	3,640	56	550	2,720	22	162	3,160	20	171
9	3,220	47	409	3,030	38	311	3,190	29	250
10	3,010	50	406	3,040	36	295	3,070	19	157
11	2,890	63	492	2,640	48	342	2,890	31	242
12	2,840	59	452	3,070	42	348	2,290	35	216
13	2,720	80	588	3,780	62	633	2,110	17	97
14	2,620	110	778	4,270	68	784	1,880	9	34
15	2,490	69	464	4,340	51	598	1,060	7	20
16	2,510	53	359	4,160	45	505	850	3	7
17	2,590	50	350	3,820	36	371	928	9	23
18	2,750	41	304	3,820	35	361	1,200	19	62
19	2,860	36	278	3,850	37	385	1,500	11	45
20	2,860	37	286	3,440	55	511	1,900	17	87
21	3,440	71	659	3,220	29	252	2,100	8	45
22	4,520	83	1,010	3,220	20	174	2,200	5	30
23	5,220	88	1,240	3,010	21	171	2,200	9	53
24	6,120	122	2,020	2,560	14	97	2,300	2	12
25	6,460	123	2,150	2,560	31	214	2,300	4	25
26	6,300	84	1,430	2,090	78	440	2,200	7	42
27	5,760	72	1,120	2,130	64	368	2,100	2	11
28	5,220	52	733	2,340	34	215	2,000	4	22
29	4,690	65	823	2,560	42	290	1,900	4	21
30	4,340	65	762	2,950	26	207	1,800	4	19
31	3,990	56	603	....	....	....	1,800	5	24

Day	January			February			March		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1	1,900	3	15	2,500	13	88	3,710	29	290
2	1,800	2	10	2,900	49	384	4,300	34	395
3	1,700	8	37	3,700	34	340	4,520	46	561
4	1,700	18	83	4,520	29	354	4,160	43	a483
5	1,600	33	143	4,340	32	375	3,190	33	284
6	1,600	30	130	4,100	28	310	3,280	26	230
7	1,500	21	85	3,570	18	174	3,680	26	a258
8	1,500	34	138	3,100	19	159	3,410	26	239
9	1,500	29	117	3,010	15	122	3,190	28	241
10	1,400	31	117	3,070	21	174	5,220	139	s2,620
11	1,400	26	98	3,340	26	234	10,600	558	16,000
12	1,400	10	38	3,820	42	433	11,400	372	11,500
13	1,400	20	76	4,520	44	537	11,000	306	9,090
14	1,500	38	154	5,220	42	a592	11,400	307	9,450
15	1,700	28	129	5,580	43	648	10,600	274	7,840
16	2,200	23	137	5,760	45	700	9,860	230	6,120
17	3,000	35	284	6,120	34	562	8,530	178	4,100
18	3,960	28	299	6,120	42	694	7,020	129	2,450
19	4,860	63	827	6,120	41	677	7,960	152	3,270
20	6,840	120	2,220	5,760	34	529	8,530	168	3,870
21	7,390	92	1,840	4,860	23	302	9,480	215	5,500
22	6,300	98	1,670	4,340	53	621	11,800	240	7,650
23	5,760	47	731	3,880	47	492	13,300	181	6,500
24	5,940	39	625	3,570	49	472	14,000	160	6,050
25	5,220	34	479	3,820	37	382	13,700	120	4,440
26	3,900	21	226	3,440	22	204	10,600	99	2,830
27	3,600	16	156	3,380	29	265	8,340	85	1,910
28	3,200	13	112	3,740	29	293	7,440	75	1,510
29	2,900	13	102	3,510	25	237	7,390	84	1,680
30	2,700	17	124	....	....	....	7,390	82	1,640
31	2,500	22	148	....	....	....	8,150	116	2,550

s Computed by subdividing day.
a Computed from an estimated concentration graph.
Note.—Flow affected by ice Dec. 18 to Jan. 17, Jan. 27 to Feb. 8.

Cedar River at Cedar Rapids, Iowa—Continued

Suspended sediment, water year October 1951 to September 1952—Continued

Day	April			May			June		
		Suspended sediment			Suspended sediment			Suspended sediment	
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1	9,860	188	5,000	4,600	80	1,010	3,710	83	831
2	12,100	185	6,040	4,340	74	867	3,850	76	790
3	16,300	260	11,400	4,160	72	809	3,880	74	775
4	23,500	340	21,600	3,820	87	897	3,540	94	898
5	26,600	218	15,700	3,640	67	658	3,570	119	1,150
6	23,900	115	7,420	3,480	49	460	3,340	105	947
7	18,600	85	4,270	3,440	56	520	3,160	200	1,710
8	14,000	91	3,440	3,710	57	571	3,540	421	4,020
9	11,000	88	2,610	3,860	48	503	4,690	462	5,850
10	9,480	70	1,790	4,520	41	500	3,360	376	3,430
11	8,720	70	1,650	4,860	47	617	2,840	159	1,220
12	8,530	61	1,400	5,220	56	789	2,690	102	741
13	8,720	62	1,460	5,220	59	832	2,520	95	646
14	9,100	68	1,670	4,860	62	814	3,040	190	1,560
15	9,480	68	1,740	4,520	71	866	3,130	293	2,480
16	9,860	69	1,840	4,270	71	819	2,980	160	1,290
17	10,200	90	2,480	4,020	61	662	3,710	122	1,220
18	11,000	92	2,730	3,680	59	586	4,270	112	1,290
19	11,000	79	2,350	3,510	60	569	4,690	113	1,430
20	10,200	82	2,260	3,340	57	514	4,130	127	1,420
21	9,290	87	2,180	3,100	52	435	3,920	105	1,110
22	8,530	87	2,000	3,610	94	s909	3,510	80	758
23	7,560	86	1,760	5,760	525	s8,200	3,220	78	678
24	7,390	75	1,500	6,300	283	4,810	2,980	89	716
25	6,840	72	1,330	5,940	237	3,800	2,720	97	712
26	6,660	67	1,200	5,580	252	3,800	2,640	88	627
27	6,300	76	1,200	4,860	175	2,300	2,560	71	491
28	5,760	87	1,360	4,520	105	1,260	2,750	68	505
29	5,220	90	1,270	4,340	92	1,080	3,860	80	838
30	4,860	90	1,160	4,160	80	890	4,690	99	1,250
31	....	....	....	3,880	84	860	....	....	....

Day	July			August			September		
1	4,270	108	1,250	1,520	31	127	1,260	40	136
2	3,850	114	1,190	1,520	49	201	1,270	39	134
3	3,710	106	1,060	1,520	46	189	1,220	40	a132
4	3,280	88	779	1,740	62	291	1,220	45	148
5	2,980	99	707	1,650	82	365	1,120	44	133
6	2,670	90	649	1,480	67	268	1,330	44	158
7	2,460	93	618	1,410	58	221	1,300	54	190
8	2,460	98	651	1,390	53	199	1,160	46	144
9	2,460	90	598	1,480	57	204	1,200	42	136
10	3,190	87	749	1,630	68	209	1,140	42	129
11	4,020	78	847	1,410	74	282	1,050	46	130
12	3,820	76	784	1,410	68	259	1,040	43	121
13	3,540	78	746	1,270	73	250	1,010	45	123
14	3,190	77	663	1,350	87	317	1,050	43	122
15	3,010	74	601	1,360	67	246	850	46	106
16	2,720	79	580	1,430	56	216	967	49	128
17	3,280	110	974	1,470	51	202	1,110	40	120
18	3,540	86	822	1,350	56	204	954	38	98
19	3,570	69	665	1,630	65	286	967	39	102
20	3,250	95	a834	1,520	67	275	902	38	93
21	2,810	107	812	1,380	72	268	902	41	100
22	2,540	100	686	1,360	58	213	850	44	101
23	2,540	88	604	1,430	50	193	889	48	115
24	2,670	90	649	1,740	59	277	863	66	154
25	2,390	107	690	1,450	67	262	766	52	108
26	2,220	75	450	1,590	68	292	889	47	113
27	2,040	70	386	1,620	63	259	790	67	143
28	1,900	63	323	1,640	60	249	814	58	127
29	1,760	49	233	1,450	68	266	802	46	100
30	1,610	48	209	1,330	65	233	790	41	87
31	1,540	39	162	1,290	49	171	....	....	....

s Computed by subdividing day.
a Computed from an estimated concentration graph.

Cedar River at Cedar Rapids, Iowa—Continued

Suspended sediment, water year October 1952 to September 1953

Day	October			November			December		
		Suspended sediment			Suspended sediment			Suspended sediment	
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1	778			790			520		
2	766			768			540	53	79
3	916			754			600		
4	980			766			706		
5	838			790			730		
6	742			670			802		
7	718			778			814		
8	706	39	80	754	42	85	820	19	40
9	600			766			876		
10	670			754			876		
11	718			730			850		
12	622			730			838		
13	814			682			730		
14	754			802			510		
15	802			694			470		
16	730			838	52	118	470		
17	790			1,140	96	295	540	45	71
18	754			1,040	59	166	660		
19	778			1,050	30	85	780		
20	766			876			850	15	34
21	778			916			814	17	37
22	802			850			790	39	83
23	754	36	80	826	19	44	814	184	405
24	814			802			850	110	253
25	790			820			802		
26	790			860			778		
27	790			706	42	80	560		
28	730			570	34	52	530	31	51
29	778			490	72	95	500		
30	730			460	57	69	560		
31	850						658		

Day	January			February			March		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1	706			670			3,200		
2	730			670			2,780		
3	730			580	18	31	2,400	70	522
4	730	51	88	622			2,200		
5	670			790	48	102	2,000		
6	560			1,500	91	369	1,800		
7	470			1,560	88	371	1,700	20	99
8	490			1,520	76	312	1,800		
9	530			1,210	37	121	2,020		
10	580	80	142	1,060	32	92	2,810	48	sb460
11	660			1,700	60	275	3,710	221	2,210
12	650			1,920	74	384	3,920	158	1,670
13	646			1,670	48	216	4,520	180	2,200
14	670	43	98	1,420			5,220	170	2,400
15	950			1,200			7,020	388	7,350
16	1,300			1,000	22	59	7,390	298	5,950
17	1,010			800			6,840	226	4,170
18	700			700			6,300	138	2,350
19	850			800			5,400		
20	803	30	85	4,500	859	a12,300	4860	101	1,360
21	876			6,070	530	a9,600	4,860		
22	863			7,960	245	5,270	4,860		
23	838			7,600	200	4,100	5,560	142	2,140
24	850			6,800	170	3,120	6,120	174	2,880
25	876			5,800	118	1,850	5,760	178	2,770
26	780			5,000			5,040	110	1,500
27	700	19	37	4,500	88	1,050	4,340		
28	670			3,800			3,920		
29	640						3,460	63	650
30	610						3,480		
31	570						3,860		

a Computed by subdividing day.
b Computed from a partly estimated concentration graph.
Note.—Flow affected by ice Nov. 25, 26, Jan. 10-12, 15-17, 26-29, Feb. 14-20, 23-28, Mar. 1, 5-8.

Cedar River at Cedar Rapids, Iowa—Continued

Suspended sediment, water year October 1952 to September 1953—Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	4,020			4,860	85	1,120	3,250		
2	4,130			5,040	90	1,220	2,840		
3	3,920			5,580	120	1,810	2,560		
4	3,710			6,300	157	2,670	2,460	89	649
5	3,510			6,650	145	2,610	2,640		
6	3,540			6,660	133	2,390	2,460		
7	3,510	68	675	6,120			2,220	170	1,020
8	3,250			5,220	110	1,520	3,350	370	sb3,700
9	3,250			4,860			3,220	468	4,070
10	3,280			4,300			2,950	192	1,530
11	3,480			3,960			3,220	190	1,650
12	3,920			3,640			3,280	210	1,860
13	4,160			3,250	96	889	4,060	437	4,790
14	3,820			3,190			4,520	667	8,140
15	3,480	108	1,010	3,100			4,060	440	4,820
16	3,480			2,890			3,160	380	3,070
17	3,480	59	609	2,780			3,710	90	902
18	3,990			2,640	82	582	6,300	329	5,600
19	4,340			2,510			6,600	360	s6,840
20	3,940	73	sb820	2,320			4,240	122	1,400
21	3,520	86	sb890	3,220	260	sb2,500	3,100		
22	3,220			4,060	560	6,140	2,750		
23	3,100			3,640	607	5,970	2,340		
24	2,890			3,380	370	3,420	2,040	95	628
25	2,920			3,710	420	4,210	2,110		
26	3,070	64	597	3,380	220	2,010	2,270		
27	3,310			3,130	161	1,360	2,540	150	b1,030
28	3,780			3,130	140	1,160	3,340	267	2,410
29	4,270			3,250	111	974	3,920	420	4,450
30	4,520			4,200	100	1,130	4,600	539	6,830
31	....	....	....	3,760	72	735	....	....	....

Day	July			August			September		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1	4,270	367	4,230	3,250			1,350		
2	3,920	200	2,120	3,220	102	870	1,240		
3	3,540	102	1,550	2,890			1,140		
4	2,980	115	925	3,260			1,210		
5	2,780	126	940	5,040	200	a2,880	1,200		
6	5,220	1,030	14,500	7,390	473	9,440	1,210		
7	4,520	860	10,500	9,480	495	12,700	1,150	61	187
8	4,520	800	9,760	11,800	408	13,000	1,110		
9	4,860	692	9,080	14,000	377	14,300	1,040		
10	3,570	350	3,370	14,400	290	11,300	967		
11	2,670	140	1,010	9,860	170	4,530	1,040		
12	2,290			6,840	129	2,360	1,080		
13	2,070			5,580	110	1,660	1,040		
14	1,940	99	551	4,860	100	1,310	954		
15	1,800			4,240			902		
16	2,200			3,710			902		
17	2,460			3,440			778		
18	2,750			3,130	91	793	967		
19	2,070	143	992	2,810			863		
20	2,670			2,720			863		
21	2,290			2,540			902	51	117
22	1,940			2,340			802		
23	1,840	89	452	2,200			850		
24	1,860			2,090			780		
25	2,840			1,860			889		
26	3,740			1,700	64	303	790		
27	3,740	110	928	1,610			838		
28	3,250			1,540			802		
29	2,750			1,400			766		
30	2,590			1,400			754		
31	2,950			1,380			....	....	....

a Computed by subdividing day.
b Computed from a partly estimated concentration graph.

Cedar River at Cedar Rapids, Iowa—Continued

Suspended sediment, water year October 1953 to September 1954

Day	October Mean discharge (cfs)	October Suspended sediment Mean concentration (ppm)	October Suspended sediment Tons per day	November Mean discharge (cfs)	November Suspended sediment Mean concentration (ppm)	November Suspended sediment Tons per day	December Mean discharge (cfs)	December Suspended sediment Mean concentration (ppm)	December Suspended sediment Tons per day
1	718			604			580		
2	802			706			924		
3	730			694			768		
4	706			580			845		
5	706	63	127	670	43	79	871		
6	754			718			938		
7	838			730			938	18	43
8	670			658			950		
9	766			708			1,020		
10	790			682			952		
11	730			718			994		
12	706			694			832		
13	658			730			900		
14	670			718			800		
15	646			694	59	116	480		
16	718	63	117	720			390	26	28
17	694			720			330		
18	670			756			320		
19	604			684			455		
20	682			832			648		
21	706			832			756		
22	670			845			606		
23	766	310	641	845			606		
24	670	66	119	845			525		
25	718			910	21	48	515	19	33
26	754			845			637		
27	754	52	100	924			672		
28	694			810			672		
29	610			910			660		
30	742			708			680		
31	706			....	....	....	672		

Day	January Mean discharge (cfs)	January Suspended sediment Mean concentration (ppm)	January Suspended sediment Tons per day	February Mean discharge (cfs)	February Suspended sediment Mean concentration (ppm)	February Suspended sediment Tons per day	March Mean discharge (cfs)	March Suspended sediment Mean concentration (ppm)	March Suspended sediment Tons per day
1	602			400			952		
2	614			402			938	20	50
3	648			411			897		
4	696			445			426		
5	648	14	23	475	15	20	465	25	35
6	591			495			515		
7	626			535			650		
8	602			545			910		
9	620			525			858	33	76
10	560			602			793		
11	500			626			750		
12	530			640			819	68	147
13	480			550			832		
14	445			500	15	28	780		
15	450	37	47	744			768	26	50
16	480			924			696		
17	500			871			684		
18	440			1,120			637		
19	411			1,060			756		
20	420			910	32	87	793	52	114
21	430			980			884		
22	390			952			980		
23	368			1,020			1,080		
24	400			1,050			1,090		
25	420	29	31	986	23	65	1,200	50	173
26	390			1,080			1,240		
27	377			1,020			1,080		
28	410			1,080			1,040		
29	400			....	....	....	994		
30	402			....	....	....	871	36	86
31	410			....	....	....	897		

Note.—Flow affected by ice Dec. 13-17, Jan. 9-13, 15-18, 20-22, 24-26, 28-29, 31, Feb. 1, 12-14, Mar. 7-8.

Cedar River at Cedar Rapids, Iowa—Continued

Suspended sediment, water year October 1953 to September 1954—Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	800			5,220	954	a14,300	5,290	1,080	15,400
2	810	57	129	5,040	752	10,200	5,040	660	9,250
3	819			5,760	625	9,720	5,760	505	7,850
4	800			6,120	495	8,180	6,440	542	9,420
5	793	73	ab190	6,660	472	8,400	5,560	320	4,820
6	980	82	217	7,390	472	9,420	4,830	262	3,420
7	1,020	100	275	6,840	290	5,300	4,340	255	2,990
8	952	84	216	6,120	215	3,550	3,850	205	2,130
9	1,090	76	224	4,800	126	1,650	3,250	146	1,280
10	1,040	60	168	4,000	123	1,350	3,340	216	1,950
11	980			3,570	111	1,070	3,380	404	3,690
12	952	62	158	3,070	107	887	3,190	284	2,450
13	952			2,900	116	927	3,960	478	5,110
14	884			2,720	130	955	4,100	626	6,930
15	1,040	90	253	2,480	128	857	2,960	322	2,570
16	1,190	93	299	2,300	119	739	2,690	190	1,380
17	1,310	67	237	2,110	117	667	2,600	134	941
18	1,260	66	225	1,950	100	527	2,640	136	969
19	1,130	61	186	1,720	93	432	3,960	250	2,670
20	1,180	86	274	1,660	87	390	5,400	382	5,570
21	1,450	108	423	1,610	81	352	7,690	845	17,500
22	1,360	82	301	1,500	72	292	10,300	1,310	36,400
23	1,260	104	354	1,520	69	283	14,000	1,380	52,200
24	1,450	180	ab820	1,470	52	206	21,400	965	55,800
25	2,410	478	3,110	1,420	67	257	34,900	926	87,400
26	2,130	382	2,200	1,400	69	261	40,000	612	66,100
27	2,070	160	894	1,360	100	367	31,900	352	30,300
28	2,110	148	843	2,050	87	482	22,100	182	10,900
29	2,130	119	684	2,220	120	719	15,100	172	7,010
30	2,300	129	601	2,500	110	743	11,000	210	6,240
31	....	....	....	2,880	122	949	....	....	....

Day	July			August			September		
1	8,530	152	3,500	1,440			5,400		
2	7,390	150	2,900	1,610			4,340	127	1,510
3	6,480	193	3,380	1,760			3,510		
4	5,700	94	1,460	1,740	71	317	3,100	114	591
5	5,400	103	1,500	1,720			2,690		
6	5,400	115	1,680	1,660			2,520		
7	5,040	144	1,960	1,520			2,320	68	424
8	4,690	112	1,420	1,470	44	171	2,090		
9	4,240	73	836	1,400			2,010		
10	3,920	77	815	1,370			1,990	72	387
11	3,540	80	705	1,260			1,070		
12	3,250	75	658	1,190			1,790		
13	2,960	72	575	1,280			1,740	57	264
14	2,640	90	642	1,220	37	126	1,700		
15	2,570	85	500	1,250			1,640		
16	2,370	71	464	1,310			1,610		
17	2,110	83	473	1,300			1,630		
18	2,010	94	510	3,640	323	a4,160	1,590		
19	1,950			2,410	382	2,490	1,550	55	233
20	1,870			1,720	248	1,150	1,500		
		80	408						
21	1,910			1,500	121	498	1,520		
22	1,830			1,550			1,480		
23	1,760			1,500			1,400		
24	1,720			1,500	52	219	1,470		
25	1,740	87	405	1,680			1,420	56	209
26	1,740			6,120	240	ab4,600	1,340		
27	1,660			7,960	482	10,400	1,260		
28	1,570			7,960	317	6,810	1,300		
29	1,470	84	342	7,300	296	5,910	1,590	78	335
30	1,570			7,390	282	5,630	1,630	68	299
31	1,420			6,660	208	3,740	....	....	....

a Computed by subdividing day.
b Computed from a partly estimated concentration graph.

Cedar River at Cedar Rapids, Iowa—Continued

Monthly discharge for calendar and water years 1943 to 1954

Month	Water discharge (cfs-days)	Suspended sediment: Load (tons)	Daily loads (tons): Max.	Daily loads (tons): Min.	Daily loads (tons): Mean	Tons per sq. mi.	Acre-feet (a)	Concentration (ppm): Maximum daily	Concentration (ppm): Weighted mean
October 1943	36,920	3,014	216	38	97	0.45	2.5	70	30
November	44,890	1,999	177	28	67	.30	1.7	38	16
December	33,464	1,758	....	....	57	.26	1.5	....	19
January 1944	27,720	2,946	1,030	2	95	.44	2.5	153	39
February	50,870	26,910	8,130	....	928	4.05	22	600	196
March	145,230	104,746	16,300	39	3,380	15.8	87	796	267
April	141,760	61,144	4,360	689	2,040	9.21	51	322	160
May	291,630	262,350	26,000	2,240	8,400	39.5	219	1,020	333
June	316,220	441,180	78,700	1,450	14,700	66.4	368	1,140	517
July	133,660	67,984	7,460	522	2,190	10.2	57	420	188
August	69,120	17,582	1,670	249	567	2.65	15	200	94
September	50,190	8,411	403	197	280	1.27	7	83	62
Water year 1943-44	1,341,674	1,000,004	78,700	2	2,730	150.6	835	1,140	276
October 1944	41,890	5,193	273	81	168	.78	4.3	62	46
November	34,940	2,944	198	25	98	.44	2.5	61	31
December	25,304	435	30	4	14	.07	.4	10	6
Calendar year 1944	1,328,534	1,001,805	78,700	2	2,740	150.9	830	1,140	279
January 1945	20,700	260	21	2	8	.04	.2	12	5
February	37,150	3,544	1,000	3	127	.53	3.0	116	35
March	392,910	391,025	73,700	147	12,600	58.9	326	940	369
April	277,560	119,250	14,100	1,640	3,980	18.0	100	630	159
May	248,610	114,448	13,900	459	3,690	17.2	96	430	....
June	302,810	189,510	25,500	1,910	6,320	28.5	158	820	232
July	102,620	32,747	5,270	319	1,060	4.93	27	310	118
August	170,430	95,673	10,300	309	3,090	14.4	80	510	208
September	53,850	6,488	428	120	216	.98	5.4	73	45
Water year 1944-45	1,708,774	961,517	73,700	2	2,630	144.8	803	820	208
October 1945	46,290	4,002	238	74	129	.60	3.3	42	32
November	42,017	3,680	1,100	18	123	.56	3.1	174	32
December	38,740	1,880	402	13	61	.28	1.6	57	18
Calendar year 1945	1,733,687	962,522	73,700	2	2,640	145.0	803	820	206
January 1946	185,480	156,747	46,300	12	5,060	23.6	131	1,100	313
February	107,160	16,172	3,050	20	578	2.44	13	170	56
March	341,500	245,931	32,900	308	7,930	37.0	205	1,320	267
April	100,560	15,681	1,600	133	523	2.30	13	105	58
May	73,160	8,287	1,110	129	267	1.25	6.9	82	42
June	116,290	118,359	19,800	174	3,940	17.8	99	1,030	377
July	82,310	106,771	49,800	183	3,440	16.1	89	1,680	480
August	40,193	6,484	463	86	209	.98	5.4	84	60
September	128,776	128,347	53,300	108	4,280	19.3	107	1,540	369
Water year 1945-46	1,302,476	812,356	53,300	12	2,230	122.3	678	1,680	231
October 1946	88,300	25,407	8,710	103	820	3.83	21	492	106
November	105,560	15,469	2,010	127	516	2.33	13	165	54
December	53,347	2,810	244	29	91	.42	2.3	40	20
Calendar year 1946	1,422,726	846,465	53,300	12	2,320	127.5	707	1,680	220
January 1947	44,400	1,660	114	21	54	.25	1.4	36	14
February	57,330	3,803	626	3	136	.57	3.2	68	25
March	134,780	44,323	5,840	8	1,430	6.68	37	280	122
April	287,360	227,370	35,300	1,240	7,580	34.2	190	951	293
May	140,040	45,100	12,300	384	1,460	6.79	38	531	119
June	702,480	1,484,620	245,000	5,520	49,500	223.6	1,240	1,700	783
July	267,920	189,845	21,300	632	6,120	28.6	158	467	262
August	56,220	9,272	535	139	299	1.40	7.7	86	61
September	42,660	5,395	267	101	180	.81	4.5	66	47
Water year 1946-47	1,980,577	2,055,074	245,000	3	5,630	309.5	1,720	1,700	384

a Computed using a specific weight of 55 pounds per cubic foot.

Cedar River at Cedar Rapids, Iowa—Continued

Monthly discharge for calendar and water years 1943 to 1954—Continued

Month	Water discharge (cfs-days)	Suspended sediment							
		Load (tons)	Daily loads (tons)			Tons per sq. mi.	Acre-feet (a)	Concentration (ppm)	
			Max.	Min.	Mean			Maximum daily	Weighted mean
October 1947	36,163	4,567	247	60	147	0.69	3.8	83	47
November	43,470	3,021	207	26	101	.45	2.5	43	26
December	39,515	2,747	361	30	89	.41	2.3	61	26
Calendar year 1947	1,852,428	2,021,723	245,000	3	5,540	304.5	1,690	1,700	404
January 1948	25,630	2,032	152	30	66	.31	1.7	54	29
February	45,140	47,963	24,560	18	1,650	7.22	40	1,210	394
March	422,130	637,242	89,550	433	20,600	95.0	532	1,230	559
April	105,680	37,001	3,210	359	1,250	5.60	31	254	132
May	118,250	48,775	3,470	330	1,570	7.35	41	284	153
June	55,970	18,243	2,400	219	608	2.75	15.2	267	121
July	45,832	10,881	1,640	94	351	1.64	9.1	204	88
August	24,163	2,556	231	37	82	.38	2.1	73	39
September	20,994	2,573	185	55	86	.39	2.1	79	45
Water year 1947-48	982,937	818,201	89,550	18	2,240	123.2	683	1,230	308
October 1948	23,334	2,001	202	30	65	.30	1.7	68	32
November	25,477	1,808	182	37	60	.27	1.5	57	26
December	22,668	961	110	8	31	.14	.8	43	16
Calendar year 1948	935,268	812,630	89,550	8	2,220	122.4	678	1,230	322
January 1949	48,830	6,557	1,040	13	212	.99	5.5	161	50
February	34,310	2,439	710	10	87	.37	2.0	73	26
March	319,460	254,702	46,400	263	8,220	38.4	213	594	295
April	182,820	52,721	10,810	302	1,760	7.94	44	237	107
May	52,120	5,234	273	100	169	.79	4.4	59	37
June	62,690	47,708	10,780	122	1,590	7.18	40	1,000	282
July	52,117	19,448	3,780	99	627	2.93	16	460	138
August	22,679	2,421	172	25	78	.36	2.0	58	39
September	18,165	1,845	108	31	62	.28	1.5	61	38
Water year 1948-49	864,670	397,845	46,400	8	1,090	59.9	332	1,000	170
October 1949	17,022	1,412	74	17	46	.21	1.2	50	31
November	17,466	998	69	14	33	.15	.8	36	21
December	15,116	863	65	7	28	.13	.7	37	21
Calendar year 1949	842,795	396,348	46,400	7	1,090	59.7	331	1,000	174
January 1950	14,453	1,286	214	5	41	.19	1.1	132	33
February	15,530	645	138	3	23	.10	.5	37	15
March	309,340	267,854	43,000	14	8,640	40.3	224	1,220	321
April	141,040	91,504	25,900	125	3,050	13.8	76	963	240
May	130,770	148,912	20,000	514	4,800	22.4	124	1,010	422
June	160,550	341,418	74,100	442	11,400	51.4	285	2,050	788
July	66,100	22,459	4,880	190	725	3.38	19	271	126
August	40,635	8,914	701	149	288	1.34	7.4	118	81
September	41,560	19,702	8,660	103	660	2.98	17	444	176
Water year 1949-50	969,582	900,057	74,100	3	2,460	1,365	756	2,050	346
October 1950	30,547	4,390	253	68	142	.66	3.7	78	53
November	19,433	1,524	130	24	51	.23	1.3	60	29
December	16,822	1,110	73	13	36	.17	.9	43	29
Calendar year 1950	986,760	909,808	74,100	3	2,490	137.0	759	2,050	342
January 1951	14,890	537	46	5	17	.08	.4	30	13
February	67,780	130,291	77,300	4	4,650	19.6	109	1,590	712
March	279,000	186,095	27,700	97	6,000	28.0	155	658	247
April	704,800	269,870	35,100	1,760	9,000	40.6	225	247	142
May	323,600	169,721	49,100	459	5,470	25.6	142	540	194
June	262,340	259,710	51,300	548	8,660	39.1	217	1,170	367
July	312,840	216,440	22,600	1,090	6,980	32.6	181	716	256
August	104,870	64,198	10,100	468	2,070	9.67	54	284	144
September	121,630	19,172	2,000	171	639	2.89	16	100	58
Water year 1950-51	2,318,552	1,323,058	77,300	4	3,620	199.3	1,100	1,590	211

a Computed using a specific weight of 55 pounds per cubic foot.

Cedar River at Cedar Rapids, Iowa—Continued

Monthly discharge for calendar and water years 1943 to 1954—Continued

Month	Water discharge (cfs-days)	Suspended sediment							
		Load (tons)	Daily loads (tons)			Tons per sq. mi.	Acre-feet (a)	Concentration (ppm)	
			Max.	Min.	Mean			Maximum daily	Weighted mean
October 1951	113,050	21,511	2,150	251	694	3.24	18	123	70
November	92,360	10,111	784	97	337	1.52	8.4	78	40
December	68,108	3,714	367	7	120	.56	3.1	43	20
Calendar year 1951	2,525,658	1,351,370	77,300	4	3,700	203.5	1,130	1,590	198
January 1952	93,960	11,350	2,220	10	366	1.71	9.5	120	45
February	121,710	11,354	700	88	392	1.71	9.5	53	35
March	247,150	121,551	16,000	230	3,920	18.3	101	558	182
April	330,580	113,010	21,600	1,150	3,800	17.2	95	340	128
May	135,230	42,346	8,200	435	1,370	6.38	35	525	116
June	103,530	41,383	5,850	491	1,380	6.23	35	462	148
July	89,290	21,061	1,250	162	679	3.17	18	114	87
August	45,620	7,584	365	127	245	1.14	6.3	87	62
September	30,475	3,731	190	87	124	.56	3.1	67	45
Water year 1951-52	1,471,463	409,608	21,600	7	1,120	61.7	342	558	103
October 1952	23,847	2,480	....	....	80	.37	2.1	....	39
November	23,459	2,543	205	....	85	.38	2.1	96	40
December	21,724	2,215	405	....	71	.33	1.8	184	38
Calendar year 1952	1,266,575	381,508	21,600	....	1,040	57.5	318	558	112
January 1953	22,858	2,511	....	....	81	.38	2.1	....	41
February	73,422	42,110	12,300	....	1,500	6.34	35	859	212
March	129,360	49,746	7,350	....	1,600	7.49	42	388	142
April	108,810	19,979	1,010	....	666	3.00	17	108	68
May	124,760	54,884	6,140	....	1,770	8.27	46	607	163
June	100,360	71,774	8,140	....	2,390	10.8	60	667	265
July	93,490	73,558	14,500	....	2,370	11.1	61	1,030	291
August	142,000	85,561	14,300	....	2,760	12.9	71	495	223
September	29,189	4,420	....	....	147	.67	3.7	....	56
Water year 1952-53	893,299	411,781	14,500	....	1,130	62.0	344	1,030	171
October 1953	22,138	4,134	641	....	133	.62	3.5	310	69
November	22,587	2,430	....	....	81	.37	2.0	....	40
December	22,126	1,138	....	....	37	.17	.9	....	19
Calendar year 1953	891,120	412,245	14,500	....	1,130	62.1	344	1,030	171
January 1954	15,260	1,041	....	....	34	.16	.9	....	25
February	20,928	1,243	....	....	44	.19	1.0	....	22
March	26,283	3,107	....	....	100	.47	2.6	....	44
April	38,764	14,342	3,110	....	478	2.16	12	478	137
May	102,540	84,582	14,300	206	2,730	12.7	71	254	306
June	290,990	460,640	87,400	941	15,400	69.4	384	1,380	586
July	100,510	29,233	3,500	....	943	4.40	24	193	108
August	83,480	50,011	10,400	....	1,610	7.53	42	482	222
September	61,100	13,298	....	....	443	2.00	11	....	81
Water year 1953-54	806,706	665,107	87,400	....	1,820	100.2	555	1,380	305

a Computed using a specific weight of 55 pounds per cubic foot.

Cedar River at Cedar Rapids, Iowa—Continued

Particle-size analyses of suspended sediment, water year October 1953 to September 1954.

(Methods of analysis: B, bottom-withdrawal tube; P, pipette; S, sieve; N, in native waters; W, in distilled water; C, chemically dispersed; M, mechanically dispersed.)

Date	Time	Instantaneous discharge (cfs)	Water temperature (°F)	Suspended sediment											Methods of analysis
				Concentration (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters									
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.350	0.500	
June 23, 1954	2:40 p.m.	14,400		945	2,890		38		63		91	95	98		SPWCM
June 25	1:35 p.m.	36,900		765	2,150		41		67		89	92	99		SPWCM
June 26	10:30 a.m.	40,900		462	3,270		35		57		85	87	98		SPWCM

Des Moines River at Des Moines, Iowa

LOCATION.—At gaging station at Second Avenue Bridge in Des Moines, Polk County, 1.8 miles upstream from Iowa Power and Light Co. dam, 2.8 miles upstream from Raccoon River, and 4.5 miles downstream from Beaver Creek.

DRAINAGE AREA.—6,180 square miles.

RECORDS AVAILABLE.—Chemical analyses: March 1887, July 1912 and June to September 1913 (fragmentary) (a); miscellaneous cross-sections, October 1944 to July 1945.

Sediment records: June 1944, May 1945 (fragmentary) (a); April to September 1948; April to August 1949.

EXTREMES, 1948, 1949 given in following table:

Year	Concentrations (ppm)				Loads (tons)			
	Max.	Date	Min.	Date	Max.	Date	Min.	Date
1948	957	April 13	39	Aug. 27	7,700	April 13	19	Sept. 20
1949	614	April 1	14	July 14	16,250	April 1	13	July 24

EXTREMES, 1944-49.—Total hardness (1944-45): Maximum observed, 458 ppm Nov. 17, 1944; minimum observed, 228 ppm Mar. 19, 1945.

Sediment concentrations (1948-49): Maximum daily, 957 ppm Apr. 13, 1948; minimum daily, 14 ppm July 14, 1949.

Sediment loads (1948-49): Maximum daily, 16,250 tons Apr. 1, 1949; minimum daily, 13 tons July 24, 1949.

a. Reported under Miscellaneous Analyses in Iowa.

Des Moines River at Des Moines, Iowa—Continued

Determination of variation in chemical constituents in cross-section 2nd Avenue Bridge

Chemical analyses, in parts per million

October 23, 1944

Station	150	210	270	340
Time of collection	6:26 p.m.	6:29 p.m.	6:31 p.m.	6:34 p.m.
Bicarbonate (HCO_3)	270	272	274	276
Chloride (Cl)	8	8	8	7
Nitrate (NO_3)	2.0	2.0	2.0	2.0
Total hardness as $CaCO_3$	330	333	333	336
Specific conductance (Micromhos at 25°C)	650	650	650	640
pH	7.4	7.4	7	7.5
Temperature (°F)	56	55	55.5	55

November 17, 1944

Station	150	210	270	340
Time of collection	11:50 a.m.	11:53 a.m.	11:55 a.m.	11:58 a.m.
Bicarbonate (HCO_3)	294	296	294	292
Chloride (Cl)	11	10	10	10
Nitrate (NO_3)	1.0	.0	2.5	2.5
Total hardness as $CaCO_3$	435	442	458	450
Specific conductance (Micromhos at 25°C)	669	669	668	668
pH	7.4	7.4	7.4	7.4
Temperature (°F)	44	44	44	44

March 19, 1945

Station	140	250	360	430
Time of collection	4:30 p.m.	4:28 p.m.	4:25 p.m.	4:20 p.m.
Bicarbonate (HCO_3)	210	212	216	210
Sulfate (SO_4)	60	61	62	57
Chloride (Cl)	2	1	2	2
Nitrate (NO_3)	22	20	20	16
Total hardness as $CaCO_3$	262	231	249	228
Specific conductance (Micromhos at 25°C)	481	481	479	476
Temperature (°F)	47	47	47	40

Des Moines River at Des Moines, Iowa—Continued

Determination of variation in chemical constituents in cross-section 2nd Avenue Bridge

Chemical analyses, in parts per million

April 18, 1945

Station	150	210	270	340
Time of collection	11:45 a.m.	11:32 a.m.	11:29 a.m.	11:27 a.m.
Bicarbonate (HCO_3)	276	268	268	268
Sulfate (SO_4)	76	75	79	77
Chloride (Cl)	3	2	7	4
Nitrate (NO_3)	27	27	26	25
Total hardness as $CaCO_3$	322	308	338	300
Specific conductance (Micromhos at 25°C)	584	582	583	584
Temperature (°F)	45	45	45	45

July 9, 1945

Station	210	270	340
Bicarbonate (HCO_3)	302	(a)300	300
Sulfate (SO_4)	113	115	113
Chloride (Cl)	4	3	3
Nitrate (NO_3)	14	16	15
Total hardness as $CaCO_3$	360	345	352
Specific conductance (Micromhos at 25°C)	679	675	679
Temperature (°F)	77	77	77

a Includes equivalent of 8 parts per million of carbonate (CO_3)

Des Moines River at Des Moines, Iowa—Continued

Suspended sediment, April to September 1948

Day	April Mean discharge (cfs)	April Suspended sediment Mean concentration (ppm)	April Suspended sediment Tons per day	May Mean discharge (cfs)	May Suspended sediment Mean concentration (ppm)	May Suspended sediment Tons per day	June Mean discharge (cfs)	June Suspended sediment Mean concentration (ppm)	June Suspended sediment Tons per day
1	4,930	392	5,220	2,520	286	1,950	1,010	55	150
2	4,890	372	4,910	2,710	283	2,070	975	44	116
3	4,820	364	4,740	2,650	326	2,330	915	42	104
4	4,240	371	4,250	2,650	238	1,700	870	54	127
5	3,710	298	2,990	2,690	304	2,210	795	60	129
6	3,530	269	2,560	2,670	302	2,160	765	70	145
7	3,290	303	2,690	2,880	402	3,130	720	88	171
8	3,230	575	5,010	3,070	410	3,400	690	84	156
9	3,510	669	6,340	3,010	208	1,690	648	106	185
10	3,610	558	5,440	2,820	222	1,690	634	103	176
11	3,270	740	6,530	2,580	188	1,310	564	79	120
12	3,210	574	4,970	2,430	146	958	550	163	242
13	2,980	957	7,700	2,300	125	776	564	138	210
14	2,730	371	2,730	2,360	131	835	564	83	126
15	2,540	208	1,430	2,390	147	949	564	94	143
16	2,340	195	1,230	2,410	151	983	564	83	126
17	2,290	155	958	2,670	260	1,870	550	100	148
18	2,160	138	805	2,540	387	2,650	538	94	137
19	1,960	138	730	2,670	385	2,780	514	94	130
20	1,670	112	505	2,580	320	2,230	514	116	161
21	1,640	113	500	2,380	259	1,660	578	94	147
22	1,610	93	404	2,120	205	1,170	578	54	84
23	1,780	140	673	1,900	220	1,130	578	73	114
24	1,780	283	1,360	1,740	164	770	606	73	119
25	1,760	154	732	1,590	136	584	690	68	127
26	1,860	134	673	1,450	128	501	690	64	119
27	2,110	182	1,040	1,360	115	422	765	92	190
28	2,650	368	2,620	1,260	91	310	1,330	686	b2,460
29	2,820	448	3,410	1,180	59	188	1,250	492	1,660
30	2,670	310	2,230	1,130	58	177	1,210	333	1,090
31	....	....	....	1,090	72	212	....	....	....

Day	July Mean discharge (cfs)	July Mean concentration (ppm)	July Tons per day	August Mean discharge (cfs)	August Mean concentration (ppm)	August Tons per day	September Mean discharge (cfs)	September Mean concentration (ppm)	September Tons per day
1	1,260	213	725	840	251	569	378	97	99
2	1,330	189	679	662	219	391	290	88	69
3	1,230	125	415	592	155	248	271	64	47
4	1,120	91	275	526	114	162	243	89	58
5	960	75	194	490	122	161	217	103	60
6	840	45	102	466	126	159	199	95	51
7	765	42	87	454	111	136	173	150	70
8	662	46	82	430	112	130	182	82	40
9	592	83	133	409	89	98	173	94	44
10	550	80	119	368	86	85	164	94	42
11	478	219	283	348	97	91	156	88	36
12	466	122	154	348	107	101	156	84	35
13	478	117	151	430	99	115	139	126	47
14	578	192	300	538	110	160	130	124	44
15	676	211	385	578	83	130	147	72	29
16	502	160	217	538	72	105	130	60	23
17	578	90	140	514	66	92	130	102	36
18	760	81	171	466	54	68	130	95	33
19	825	147	327	514	65	90	122	107	35
20	810	104	227	442	81	97	147	48	19
21	930	136	a341	368	71	71	164	126	56
22	825	93	207	327	94	83	147	127	50
23	915	101	250	308	57	47	122	155	51
24	885	95	227	290	88	69	130	108	38
25	1,040	182	a511	271	103	75	122	79	26
26	1,720	566	2,630	234	77	49	130	81	30
27	1,180	350	1,120	225	39	24	130	107	38
28	825	170	379	234	56	35	122	111	37
29	780	151	318	225	50	30	156	101	43
30	900	210	510	271	67	49	130	88	33
31	1,090	238	700	399	87	94	....	....	....

s Computed by subdividing day.
a Computed from an estimated concentration graph.
b Computed from a partly estimated concentration graph.

Des Moines River at Des Moines, Iowa—Continued

Suspended sediment, April to August 1949

Day	April: Mean discharge (cfs)	April: Suspended sediment, Mean concentration (ppm)	April: Suspended sediment, Tons per day	May: Mean discharge (cfs)	May: Suspended sediment, Mean concentration (ppm)	May: Suspended sediment, Tons per day	June: Mean discharge (cfs)	June: Suspended sediment, Mean concentration (ppm)	June: Suspended sediment, Tons per day
1	9,800	614	16,250	2,800	103	779	1,250	93	314
2	9,550	510	13,150	2,620	98	693	1,290	100	348
3	10,000	515	13,900	2,430	86	564	1,150	79	245
4	9,800	480	12,700	2,270	93	570	1,230	74	246
5	9,050	455	11,120	2,110	94	536	1,440	82	319
6	8,320	420	9,430	2,000	88	475	1,810	77	376
7	7,840	384	8,130	1,950	80	421	1,590	79	339
8	6,910	390	7,280	1,810	66	323	1,370	100	370
9	6,230	342	5,750	1,760	47	223	1,250	62	209
10	5,790	309	4,830	1,670	43	194	1,120	47	142
11	5,240	281	3,980	1,590	39	167	1,010	46	125
12	5,040	255	3,470	1,340	37	134	930	41	103
13	4,930	241	3,210	1,410	34	129	870	42	99
14	4,720	240	3,130	1,370	96	355	870	54	127
15	4,620	240	2,990	1,370	121	448	795	56	120
16	4,720	234	2,980	1,410	131	499	780	43	91
17	4,720	234	2,980	1,360	59	217	765	47	97
18	5,460	250	3,690	1,280	27	93	578	50	78
19	5,790	280	4,380	1,250	29	98	592	131	209
20	5,790	245	3,830	1,250	31	105	606	133	218
21	5,790	212	3,310	1,450	59	231	609	103	169
22	5,570	200	3,010	1,610	76	330	634	103	176
23	5,350	182	2,630	1,520	68	279	720	101	196
24	4,820	178	2,320	1,490	42	169	1,390	114	428
25	4,400	160	1,900	1,740	88	413	1,570	104	441
26	3,990	150	1,620	1,840	140	696	1,500	105	425
27	3,690	140	1,390	1,830	111	548	1,410	93	354
28	3,390	137	1,250	1,720	60	279	1,910	93	480
29	3,190	126	1,090	1,560	47	198	1,860	94	472
30	3,000	115	932	1,390	46	173	1,670	102	460
31	....	....	....	1,290	50	174	....	....	....

Day	July: Mean discharge (cfs)	July: Mean concentration (ppm)	July: Tons per day	August: Mean discharge (cfs)	August: Mean concentration (ppm)	August: Tons per day	September: Mean discharge (cfs)	September: Mean concentration (ppm)	September: Tons per day
1	1,560	121	510	1,610	75	326	....	....	....
2	1,420	109	418	1,280	74	256	....	....	....
3	1,310	102	361	1,090	81	238	....	....	....
4	1,250	111	375	960	76	197	....	....	....
5	1,040	102	286	810	53	116	....	....	....
6	915	120	296	606	50	82	....	....	....
7	720	122	237	514	43	60	....	....	....
8	648	70	122	466	45	57	....	....	....
9	606	48	79	409	46	51	....	....	....
10	538	49	71	368	44	44	....	....	....
11	490	30	40	420	43	49	....	....	....
12	442	23	27	358	44	43	....	....	....
13	430	18	21	327	80	71	....	....	....
14	378	14	14	308	132	a110	....	....	....
15	358	19	18	280	185	140	....	....	....
16	327	16	14	262	180	127	....	....	....
17	308	17	14	262	170	120	....	....	....
18	337	17	15	234	165	104	....	....	....
19	327	16	14	478	110	142	....	....	....
20	337	17	15	358	98	95	....	....	....
21	299	18	15	368	99	98	....	....	....
22	280	19	14	358	48	46	....	....	....
23	280	18	14	318	26	22	....	....	....
24	262	18	13	280	25	19	....	....	....
25	253	25	17	253	29	20	....	....	....
26	271	29	21	234	36	23	....	....	....
27	280	38	29	217	36	21	....	....	....
28	253	35	24	208	35	20	....	....	....
29	234	44	28	208	36	20	....	....	....
30	1,240	68	228	208	....	....	....	....	....
31	1,930	76	396	182	....	....	....	....	....

a Computed from an estimated concentration graph.

Des Moines River at Des Moines, Iowa—Continued

Monthly discharge for calendar and water years 1948 to 1949

Month	Water discharge (cfs-days)	Suspended sediment							
		Load (tons)	Daily loads (tons)			Tons per sq. mi.	Acre-feet (a)	Concentration (ppm)	
			Max.	Min.	Mean			Maximum daily	Weighted mean
April 1948	85,590	85,380	7,700	404	2,850	13.8	71	957	369
May	69,800	44,815	3,400	177	1,450	7.25	37	410	238
June	21,783	9,112	2,460	84	304	1.47	7.6	686	155
July	26,570	12,359	2,630	82	3,990	2.00	10	566	172
August	13,105	3,814	569	24	123	.62	3.2	251	108
September	5,057	1,319	99	19	44	.21	1.1	155	97
April 1949	177,510	156,632	16,250	932	5,220	25.3	131	614	327
May	52,490	10,513	779	93	339	1.70	8.8	140	74
June	34,566	7,776	450	78	259	1.26	6.5	133	83
July	19,823	3,746	510	13	121	.61	3.1	122	72
August	14,234	2,717	326	19	94	.44	2.3	185	71

a Computed using a specific weight of 55 pounds per cubic foot.

East Fork Hardin Creek near Churdan, Iowa

LOCATION.—At gaging station on upstream side of highway bridge on county road "D", 4.4 miles upstream from mouth, and 6.5 miles southeast of Churdan, Greene County.

DRAINAGE AREA.—22.7 square miles.

RECORDS AVAILABLE.—Water temperatures: July 1952 to September 1954.

Sediment records: July 1952 to September 1954.

EXTREMES, water years 1952 to 1954 given in following table:

Water year	Daily suspended sediment								Temperature*	
	Concentrations (ppm)				Loads (tons)				°Fahrenheit	
	Max.	Date	Min.	Date	Max.	Date	Min.	Date	Max.	Date
1951-52(a)..	241	Sept. 4	35	Aug. 27	1.7	July 25	t	Sept. 28-30	79	Aug. 27
1952-53.....	490	June 10	No flow	Many days	120	June 10	0	Many days	82	July 22
1953-54.....	668	Mar. 17	No flow	Many days	200	Aug. 26	0	Many days	76	July 24

* Minimum temperature, freezing point on most days during winter months.
t Less than 0.05 ton.
a July to September.

EXTREMES, 1952-54.—Water temperatures: Maximum, 82°F July 22, 1953; minimum, freezing point on many days during winter months.

Sediment concentrations: Maximum daily, 668 ppm Mar. 17, 1954; minimum daily, no flow many days each year.

Sediment loads: Maximum daily, 200 tons Aug. 26, 1954; minimum daily, 0 ton on many days each year.

East Fork Hardin Creek near Churdan, Iowa—Continued

Temperature (°F) of water, July to September 1952

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1											70	65
2										60	69	
3											68	72
4											64	
5											61	
6											60	
7												
8											64	70
9												
10											62	
11												69
12												
13											62	
14											64	70
15												
16											66	
17												73
18											68	
19												
20											72	
21												
22											70	
23										72		
24										72		52
25										69		
26										70		56
27										74	70	
28										68	74	68
29										61	70	
30										65		
31										65		
Average												

Temperature (°F) of water, water year October 1952 to September 1953

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	58	50					38	46	64	60		
2							41	43	53	68		
3				32			40		56	74	75	
4							39		60	73		
5									54	71		
6		38		32			39		59	70		
7					33	32	40		54	58	67	
8		35					44	56	56	70		
9	48					36	41	61	57		74	
10				32		38	42		58	68		
11	52					36	42		62	65		
12			32			44	42	52				
13						38	42	54		70		
14					32	36	42	55		64	78	
15	40	45			32	34	40	45	64	75		
16			34			36	40	56	64	75		
17		46		32		38	36	53	62	74		
18	50					37	38	52	72	78		
19						35		55	74			
20		34	32		33	42	42	58	66			
21						50	43		60		72	
22					32		58	51	58	82		
23					32	45	58	48	58			
24	52			33		35	41					
25	53					30	43	58	58			
26			32			34	46	58	64		74	
27						48	47	55	57	60		
28	38				33	46	48	62	65			
29							46	62	72	80		
30						40	48	64	66			
31				33		39		64				
Average			a32	a32	a32		43		61			

a Includes estimated temperature, 32°F, on missing days.

East Fork Hardin Creek near Churdan, Iowa—Continued

Temperature (°F) of water, water year October 1953 to September 1954

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1						32	35	45	54	71		66
2									52	64		
3								38	51	64		
4								46	59			70
5								45				
6							67	48		67		
7							54	44	60			63
8						35	42	58		69		
9												
10								48	60	68		
11								53				64
12									65		63	
13								55				57
14									61			58
15								62	64			58
16									60	70		56
17								56		66		58
18									67			61
19						38	59	51	64			
20										74		61
21							57		62	68		49
22							40	59	58	67	66	
23							47				63	50
24						39	60	61		76	62	
25											62	
26					33		65	57	69	70	62	
27						40		56		67	64	56
28									67		66	59
29									66			57
30							52		61	72		52
31								62		68	64	
Average												

Suspended sediment, July to September 1952

Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1				2.9	97	0.8	0.57	54	0.1
2				2.5	112	.8	.50	142	a.2
3				2.5	115	.8	.43	230	.3
4				2.3	138	.9	.36	241	a.2
5				2.2	126	.7	.29	210	a.2
6				1.9	120	.6	.30	191	a.2
7				1.8	120	a.6	.36	178	a.2
8				2.9	118	.9	.36	170	.2
9				2.2	110	a.7	.29	160	a.1
10				1.8	105	.5	.26	152	a.1
11				1.7	108	a.5	.24	147	.1
12				1.6	112	a.5	.24	153	a.1
13				1.4	111	.4	.22	161	a.1
14				1.6	98	.4	.24	167	.1
15				1.3	89	a.3	.19	151	a.1
16				1.2	85	.3	.16	130	a.1
17				1.1	97	a.3	.24	112	.1
18				.98	107	.3	.29	113	a.1
19				.98	93	a.2	.29	117	a.1
20				.98	78	.2	.16	123	a.1
21				.84	66	a.1	.16	128	a.1
22				.77	55	.1	.24	132	a.1
23	6.5	78	1.4	.70	48	a.1	.24	138	a.1
24	6.0	60	1.0	.77	45	a.1	.19	142	.1
25	5.7	110	1.7	.70	41	a.1	.16	143	a.1
26	4.7	104	1.3	.70	37	a.1	.19	145	.1
27	4.5	120	1.5	1.2	35	.1	.14	146	a.1
28	3.8	75	.8	.84	41	.1	.12	145	
29	3.6	103	1.0	1.3	48	.2	.06	135	t
30	3.3	122	1.1	.77	54	a.1	.04	120	
31	2.7	114	.8	.57	42	a.1			

t Sediment discharge less than 0.05 ton.
a Computed from an estimated concentration graph.

East Fork Hardin Creek near Churdan, Iowa—Continued

Suspended sediment, water year October 1952 to September 1953

Day	October Mean discharge (cfs)	October Suspended sediment Mean concentration (ppm)	October Suspended sediment Tons per day	November Mean discharge (cfs)	November Suspended sediment Mean concentration (ppm)	November Suspended sediment Tons per day	December Mean discharge (cfs)	December Suspended sediment Mean concentration (ppm)	December Suspended sediment Tons per day
1	0	...	0	0.14	143		0.11	...	
2	0	...	0	.14	...	0.1	.14	...	
3	0	...	0	.14	...		.14	...	
4	0	...	0	.14	...		.14	...	
5	.01	...	t	.14	...		.14	...	
6	.14	...	t	.14	100		.14	...	
7	.16	...	t	.14	...		.14	...	
8	.19	...		.14	108	t	.14	...	
9	.20	123		.11	...		.16	...	
10	.19	...		.11	...		.16	...	
11	.16	141		.11	...		.19	...	
12	.14	...		.11	...		.19	19	
13	.14	...		.11	...		.19	...	
14	.14	...		.11	...		.20	...	
15	.14	102		.11	213		.22	...	
16	.14	...		.11	...		.22	27	
17	.14	...	e.1	.44	112		.22	...	
18	.14	153		.33	...		.22	...	
19	.14	...		.19	...		.26	...	
20	.14	...		.14	136	e.1	.26	54	
21	.14	...		.14	...		.29	...	
22	.14	...		.16	...		.29	...	
23	.14	...		.14	...		.29	...	
24	.16	170		.16	...		.29	...	
25	.14	184		.26	...		.29	...	
26	.14	...		.50	...		.27	41	
27	.14	...		.30	...		.24	...	
28	.14	121		.14	...		.22	...	
29	.14	...	t	.08	...	t	.24	...	
30	.14	...		.05	...		.27	...	
31	.14	...		...	...	...	.33	...	

Day	January Mean discharge (cfs)	January Mean concentration (ppm)	January Tons per day	February Mean discharge (cfs)	February Mean concentration (ppm)	February Tons per day	March Mean discharge (cfs)	March Mean concentration (ppm)	March Tons per day
1	0.33	...		0.19	...		5.2	...	
2	.29	...		.23	...		4.0	...	
3	.23	30		.19	...		3.5	...	e0.6
4	.20	...		.16	...		3.1	...	
5	.20	...		.22	...	t	2.8	...	
6	.21	34		.22	...		2.6	...	
7	.23	...		.33	43		2.3	90	.6
8	.20	...	t	.38	...		2.3	76	a.5
9	.26	...		.50	...		4.7	72	.9
10	.22	53		10	97	sa4.2	8.0	40	.9
11	.21	...		16	76	sa3.3	8.0	24	.5
12	.20	...		2.6	40	a.3	7.1	70	1.3
13	.19	...		13	100	sa5.6	6.0	100	1.6
14	.19	...		25	145	9.8	13	191	s8.4
15	.23	...		20	190	sb11	18	229	11
16	.27	...		14	47	a1.8	14	86	3.3
17	.26	112	e.1	4.2	30	a.3	10	78	2.1
18	.24	...		1.7	30	a.1	8.0		
19	.22	...		3.4	31	a.3	6.8		
20	.19	...		50	83	sb13	6.5	76	1.3
21	.16	...		35	120	a11	6.2		
22	.16	...		24	82	5.3	5.2		
23	.16	...		20	78	sb7.6	5.2		
24	.14	86		35	130	a12	5.0		
25	.16	...	t	20	65	a5.1	4.4		
26	.16	...		24	...	e4.0	4.2	66	.7
27	.14	...		16	58	a2.5	4.0		
28	.16	...		12	47	1.5	3.8		
29	.16	...		...	...	...	3.6		
30	.16	...		...	...	...	7.1	90	1.7
31	.16	81		...	...	...	13	112	s5.0

e Estimated.
s Computed by subdividing day.
t Sediment discharge less than 0.05 ton.
a Computed from an estimated concentration graph.
b Computed from a partly estimated concentration graph.

Note.—Flow affected by ice Nov. 25-28, Dec 14, 25-30, Jan. 3-7, 11, 12, 15-18, 26, 28, Feb. 1-3, 10, 11, 13-15, Feb. 19 to Mar. 8.

East Fork Hardin Creek near Churdan, Iowa—Continued

Suspended sediment, water year October 1952 to September 1953—Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	25	139	9.4	23	52	3.2	7.4		
2	20	141	7.6	22	46	2.7	7.4	70	1.5
3	33	187	17	22	....		7.1		
4	25	91	6.1	22	....		9.3	150	sb4.9
5	21	80	4.5	20	....		13	156	5.5
6	18	70	3.4	19	....	e2.5	8.0	113	2.4
7	16			17	....		11	110	sb7.1
8	15			15	....		47	370	sb52
9	14			15	60	2.4	23	179	11
10	16			14	....	e2.1	90	490	sb120
11	16			11	....	e1.8	43	259	s36
12	15	52	1.9	8.7			26	220	15
13	12			8.0			22	210	12
14	11			8.3			19	....	e10
15	11			7.7			16	153	6.6
16	11			7.4	69	1.4	14	171	6.5
17	11			7.4			11		
18	9.2			7.1			9.2		
19	8.7			7.1			8.0		
20	8.0	39	.9	7.4	50	1.0	7.4	150	3.0
21	8.7			11	70	a2.1	6.5		
22	7.7			23	349	s24	6.0		
23	6.8			18	55	2.7	5.7		
24	12	68	sb2.6	29	370	sa36	5.4		
25	21	89	5.0	23	114	7.1	13	186	s6.9
26	19			19			12	168	5.4
27	18			17			16	219	9.5
28	17	44	2.0	15	70	2.0	12	204	6.6
29	16			12			8.7	195	4.6
30	16			10			7.7	180	3.7
31	....	....	....	8.0			....	....	....

Day	July			August			September		
1	7.1	230	4.4	0.63	....	e0.1	....	....	....
2	6.0	320	5.2	.56	....	e.1	....	....	....
3	5.0	428	5.8	1.2	201	.7	....	....	....
4	4.7	160	1.9	.79	....		....	....	....
5	4.2	148	1.7	.63	....	.2	....	....	....
6	3.8	334	3.4	.70	....		....	....	....
7	3.4	181	1.7	.63	144		....	....	....
8	2.8	100	.8	.56	....		....	....	....
9	2.6			.50	79		....	....	....
10	2.4			.44	....		....	....	....
11	2.3			.44	....		....	....	....
12	2.6			.38	....		....	....	....
13	2.3	61	.4	.33	....		....	....	....
14	2.2			.29	104		....	....	....
15	2.0			.29	....	e.1	....	....	....
16	1.8			.26	....		....	....	....
17	1.7			.33	....		....	....	....
18	1.7			.33	....		....	....	....
19	1.6	....		.33	....		....	....	....
20	1.6	....	e.3	.29	....		....	....	....
21	1.4	....		.38	58		....	....	....
22	1.2	83		.26	....		....	....	....
23	1.1	....		.14	....		....	....	....
24	.97	....		.08	....	t	....	....	....
25	.88	....	e.2	.05	....		....	....	....
26	.88	....		.02	54		....	....	....
27	.88	93		0	....	0	....	....	....
28	.79	....		0	....	0	....	....	....
29	1.2	119	.4	0	....	0	....	....	....
30	.97	....	e.2	0	....	0	....	....	....
31	.71	....	e.1	0	....	0	....	....	....

e Estimated.
s Computed by subdividing day.
t Sediment discharge less than 0.05 ton.
a Computed from an estimated concentration graph.
b Computed from a partly estimated concentration graph.

East Fork Hardin Creek near Churdan, Iowa—Continued

Suspended sediment, water year October 1953 to September 1954

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	...	...	...	...	...	...	...	...	...
2	...	...	...	...	...	...	...	...	...
3	...	...	...	...	...	...	...	...	...
4	...	...	...	...	...	...	...	...	...
5	...	...	...	...	...	...	...	...	...
6	...	...	...	...	...	...	...	...	...
7	...	...	...	...	...	...	...	...	...
8	...	...	...	...	...	...	...	...	...
9	...	...	...	...	...	...	...	...	...
10	...	...	...	...	...	...	...	...	...
11	...	...	...	...	...	...	...	...	...
12	...	...	...	...	...	...	...	...	...
13	...	...	...	...	...	...	...	...	...
14	...	...	...	...	...	...	...	...	...
15	...	...	...	...	...	...	...	...	...
16	...	...	...	...	...	...	...	...	...
17	...	...	...	...	...	...	...	...	...
18	...	...	...	...	...	...	...	...	...
19	...	...	...	...	...	...	...	...	...
20	...	...	...	...	...	...	...	...	...
21	...	...	...	...	...	...	...	...	...
22	...	...	...	...	...	...	...	...	...
23	...	...	...	...	...	...	...	...	...
24	...	...	...	...	...	...	...	...	...
25	...	...	...	...	...	...	...	...	...
26	...	...	...	...	...	...	...	...	...
27	...	...	...	...	...	...	...	...	...
28	...	...	...	...	...	...	...	...	...
29	...	...	...	...	...	...	...	...	...
30	...	...	...	...	...	...	...	...	...
31	...	...	...	...	...	...	...	...	...

Day	January			February			March		
1	...	...	...	0	...	0	0.1	272	0.1
2	...	...	...	0	...	0	0	...	0
3	...	...	...	0	...	0	0	...	0
4	...	...	...	0	...	0	0	...	0
5	...	...	...	0	...	0	0	...	0
6	...	...	...	0	...	0	0	...	0
7	...	...	...	0	...	0	0	...	0
8	...	...	...	0	...	0	.1	440	
9	...	...	...	0	...	0	.2	...	
10	...	...	...	0	...	0	.1	...	e.1
11	...	...	...	0	...	0	.1	...	
12	...	...	...	0	...	0	.1	...	
13	...	...	...	0	...	0	0	...	0
14	...	...	...	0	...	0	0	...	0
15	...	...	...	0	...	0	0	...	0
16	...	...	...	0	...	0	.1	...	e.1
17	...	...	...	0	...	0	.3	668	.5
18	...	...	...	0	...	0	.3	...	
19	...	...	...	0	...	0	.6	3	
20	...	...	...	0	...	0	.3	...	t
21	...	...	...	.1	240	a.1	.2	...	
22	...	...	...	0	...	0	.2	...	
23	...	...	...	0	...	0	.2	...	
24	...	...	...	0	...	0	.2	12	
25	...	...	...	.1	...		.3	...	
26	...	...	...	.1	220	e.1	.2	...	
27	...	...	...	.1	...		.1	5	t
28	...	...	...	.1	...		.1	...	
29	...	...	...	...	...	...	.1	...	
30	...	...	...	...	...	...	.1	...	
31	...	...	...	...	...	...	.1	...	

e Estimated.
t Sediment discharge less than 0.05 ton.
a Computed from an estimated concentration graph.

East Fork Hardin Creek near Churdan, Iowa—Continued

Suspended sediment, water year October 1953 to September 1954—Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	0.1	1		4.0	29	0.3	121	280	sb94
2	.1	....		9.7	94	sa3.5	78	225	47
3	.1	....	t	9.6	35	.9	57	100	sb17
4	.1	....		5.7			32	84	7.3
5	.1	....		4.2			24	70	a4.5
6	1.3	52	sb.3	3.8			18	....	e2.8
7	.3	....		2.8	5	t	14	43	1.6
8	.2	9		2.4			9.6	....	
9	.1	....	t	2.0			8.3	....	
10	.1	....		1.8			7.4	40	e.9
11	.1	....		1.7			6.5	....	
12	0	....	0	1.6	....		6.0		
13	0	....	0	1.4	10		5.7		
14	0	....	0	1.3	....	t	5.2		
15	0	....	0	1.2	25		5.2		
16	.1	....	t	1.0	....		5.7	46	.7
17	0	....	0	.9	6		5.7		
18	0	....	0	.9	....		5.0		
19	.1	39	t	.8	4		4.7		
20	0	....	0	.7	....		8.4	49	sa1.7
21	5.6	208	s4.2	.7	....		111	220	sb72
22	1.4	27	.1	.6	7	t	44	98	12
23	.8	12	t	.7	....		24	....	
24	.6	23		.7	7		18	....	e4.0
25	.9	41	.1	.6	....		14	....	
26	.6	17		.6	2		9.6		
27	.5	....	t	1.0	10		8.0		
28	.3	....		4.9	100	sa1.8	7.1	76	1.5
29	.3	....		2.8	20	a.2	6.0		
30	2.9	51	.4	1.9	....	e.1	5.2		
31	....	....	....	31	120	sb14	....	....	....

Day	July			August			September		
1	4.4			0.2	....		64	....	e9.0
2	3.6	81	0.8	.2	....		44	....	e8.0
3	3.4			.2	....		26	....	e7.0
4	3.0			.2	....		20	120	6.5
5	2.6	....		.2	....		14	....	e4.2
6	2.3	65	e.4	.1	....		9.6	....	
7	2.2	....		.1	....		7.7	141	e2.9
8	1.8	72		.2	....	t	6.5	....	
9	1.6	....		.2	....		6.5	....	
10	1.4	42		.1	....		6.0	....	
11	1.3	....		.1	....		5.2	85	e1.2
12	1.1	....	e.2	.1	81		4.7	....	
13	.9	....		.1	....		4.4		
14	.8	....		.1	....		4.0		
15	.7	....		.1	....		4.0		
16	.6			0	....	0	4.2	80	.9
17	.6			1.7	140	sa1.0	4.2		
18	.6			1.2	95	a.3	4.0		
19	.6	53	.1	.4	....	e.1	3.4		
20	.6			.2	....	e.1	3.4		
21	.6			23	280	sa32	2.8		
22	.5			67	100	sb25	2.8		
23	.4			83	130	sb33	2.8		
24	.4			31	108	9.0	2.8	76	.6
25	.3			18	166	8.1	2.6		
26	.2	50	t	306	230	sb200	2.4		
27	.2			269	98	70	2.4		
28	.2			224	108	65	2.6		
29	.2			175	....	e35	3.0		
30	.2			123	....	e20	6.0	84	1.4
31	.2			82	....	e10	....	....	....

e Estimated.
s Computed by subdividing day.
t Sediment discharge less than 0.05 ton.
a Computed from an estimated concentration graph.
b Computed from a partly estimated concentration graph.

East Fork Hardin Creek near Churdan, Iowa—Continued

Monthly discharge for calendar and water years 1952 to 1954

Month	Water discharge (cfs-days)	Suspended sediment							
		Load (tons)	Daily loads (tons)			Tons per sq. mi.	Acre-feet (a)	Concentration (ppm)	
			Max.	Min.	Mean			Maximum daily	Weighted mean
July 23-31, 1952	40.8	10.6	1.7	0.8	1.18	0.47	0.009	122	96
August	45.0	11.9	.9	.1	.38	.52	.01	138	98
September	7.59	3.6	.3	t	.12	.16	.003	241	176
October 1952	3.87	2.0	....	0	.06	.09	.002	....	191
November	5.03	2.2	....	....	.07	.10	.002	....	162
December	6.60	0.7	....	....	.02	.03	.0006	....	39
January 1953	6.35	1.2	....	....	.04	.05	.001	....	70
February	365.32	99.1	13	....	3.5	4.37	.08	190	100
March	197.6	53.4	11	....	1.7	2.35	.04	229	100
April	458.1	91.9	17	....	3.1	4.05	.08	187	74
May	454.1	126.9	36	....	4.1	5.59	.1	349	104
June	491.8	354.2	120	....	12	15.6	.3	490	267
July	72.78	32.1	5.8	....	1.0	1.41	.03	428	163
August	10.96	3.3	.7	0	.1	.15	.003	....	111
September	0	0	0	0	0	0	0	0	0
Water year 1952-53	2,072.51	767.0	120	0	2.1	33.8	0.6	490	137
October 1953	0	0	0	0	0	0	0	0	0
November	0	0	0	0	0	0	0	0	0
December	0	0	0	0	0	0	0	0	0
Calendar year 1953	2,057.01	767.0	120	0	2.1	33.8	0.6	490	138
January 1954	0	0	0	0	0	0	0	0	0
February	.5	.5	....	0	.02	.02	.0004	....	370
March	4.1	1.3	....	0	.04	.06	.001	....	117
April	16.7	5.4	4.2	0	.2	.24	.005	208	120
May	103	51.4	44	t	1.7	2.26	.04	120	185
June	674.3	288.6	94	....	9.6	12.7	.2	280	159
July	37.5	7.4	....	....	.2	.33	.006	....	73
August	1,406.7	508.9	200	0	16	22.4	.4	280	134
September	276	61.6	9.0	....	2.1	2.71	.05	....	83
Water year 1953-54	2,518.8	925.1	200	0	2.5	40.8	0.8	280	136

t Sediment discharge less than 0.05 ton.
a Computed using a specific weight of 55 pounds per cubic foot.

Raccoon River at Des Moines, Iowa

LOCATION.—At 18th Street bridge (Fleur Drive) in Des Moines, Polk County, 1.5 miles upstream from confluence with Des Moines River.

DRAINAGE AREA.—3,590 square miles.

RECORDS AVAILABLE.—Chemical analyses: June and July 1912 (fragmentary) (a); miscellaneous cross-sections, October 1944 to July 1945; October 1945 to January 1947.

Water temperatures: October 1945 to September 1946.

EXTREMES, water years 1946, 1947 given in following table:

Water year	Chemical composites								Temperature*	
	Dissolved solids (ppm)				Total hardness (ppm)				°Fahrenheit	
	Max.	Period	Min.	Period	Max.	Period	Min.	Period	Max.	Date
1945-46...	490	Dec. 21-31	141	Sept. 8-10	423	Dec. 21-31	110	Jan. 6-10	83	July 10
1946-47(b)	500	Jan. 1-10	331	Oct. 11-20	418	Jan. 1-10	278	Oct. 11-20	......	....

* Minimum temperature, freezing point on many days during winter months.
b October to January.

EXTREMES, 1945-47.—Dissolved solids: Maximum, 500 ppm Jan. 1-10, 1947; minimum, 141 ppm Sept. 8-10, 1946.

Total hardness: Maximum, 423 ppm Dec. 21-31, 1945; minimum, 110 ppm Jan. 6-10, 1946.

Water temperatures (1945-46): Maximum, 83°F July 10, 1946; minimum, freezing point on many days during winter months.

REMARKS.—Records of specific conductance of daily samples available in Regional Office, U. S. Geological Survey, Lincoln, Nebr.

a Reported under Miscellaneous Analyses in Iowa.

Raccoon River at Des Moines, Iowa—Continued

Chemical analyses, in parts per million, water year October 1945 to September 1946

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Hardness as $CaCO_3$: Total	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Specific conductance (micromhos at 25°C)	pH
Oct. 1-10, 1945	....	16	0.03	75	28	11	3.3	290	68	6.8	0.3	5.2	0.2	364	0.50	302	64	7	587	7.9
Oct. 11-20	....	13	.02	71	31	12	2.0	293	70	6.5	.3	3.7	.1	358	.49	304	64	8	585	8.0
Oct. 21-31	....	9.7	.06	71	32	12	3.4	302	71	7.4	.3	2.0	.4	363	.49	309	61	8	589	8.0
Nov. 1-10	....	6.9	.07	71	31	12	2.9	300	69	6.5	.3	1.7	.5	356	.48	304	58	8	582	8.1
Nov. 11-20	....	6.0	.04	71	31	12	2.8	298	70	6.8	.3	3.1	.2	356	.48	304	56	8	581	8.2
Nov. 21-30	....	6.4	.05	74	33	13	2.1	316	74	7.2	.3	3.3	.1	376	.51	320	61	8	613	8.0
Dec. 1-10	....	10	.07	76	30	12	2.3	306	72	6.9	.3	8.2	.2	372	.51	313	62	8	611	8.0
Dec. 11-20	....	16	.04	100	38	14	3.0	394	88	8.4	.3	11	.2	479	.65	406	82	7	765	8.0
Dec. 21-31	....	17	.06	107	38	13	3.3	413	82	9.0	.3	9.8	.0	490	.67	423	84	6	781	7.8
Jan. 1-5, 1946	....	15	.07	87	31	10		336	71	7.9	.3	6.3	.1	405	.55	344	69	6	658	7.7
Jan. 6-10	....	13	.78	29	9.0	11		124	23	2.2	.3	4.3	.1	159	.22	110	8	18	233	7.5
Jan. 11-12, 17-20	....	15	.04	57	19	6.1	6.4	215	46	4.2	.3	10	.1	279	.38	220	44	6	447	7.4
Jan. 21-31	....	18	.02	72	25	8.7	5.3	281	59	5.5	.3	10	.0	352	.48	282	52	6	564	7.7
Feb. 1	....	....	....	....	....	....	....	336	....	8	....	11	....	....	....	338	62	....	695	7.2
Feb. 2-10	....	12	.54	36	12	4.3	5.6	136	30	3.6	.3	4.5	.1	191	.26	140	28	6	305	7.4
Feb. 11-20	....	11	.06	44	13	3.9	6.5	109	31	3.2	.3	6.2	.1	217	.30	164	25	5	346	7.6
Feb. 21-28	....	16	.11	53	16	5.3	4.8	107	43	3.8	.4	5.9	.0	245	.33	198	30	5	398	7.5
Mar. 1-10	....	18	.06	60	18	5.6	3.8	212	47	3.9	.3	7.5	.1	274	.37	224	50	5	439	7.6
Mar. 11-20	....	18	.08	65	20	5.8	2.8	216	55	3.8	.4	20	.1	312	.42	244	67	5	469	7.6
Mar. 21-31	....	23	.04	86	26	8.3	2.7	282	73	4.8	.5	28	.1	402	.55	321	90	5	619	7.7
April 1-10	....	27	.04	90	28	9.4	2.3	312	76	5.0	.5	29	.1	432	.59	340	81	6	665	7.8
April 11-20	....	21	.06	89	30	9.1	2.0	312	74	5.2	.5	21	.1	421	.57	345	90	5	650	8.0
April 21-30	....	17	.04	71	30	10	2.2	207	74	5.6	.4	16	.1	367	.50	300	82	7	586	7.7
May 1-10	....	18	.20	70	26	9.4	2.0	259	64	5.5	.5	18	.1	351	.48	282	70	7	554	7.7
May 11-20	....	22	.06	83	28	9.0	2.5	300	67	5.0	.6	23	.1	400	.54	322	76	6	610	8.0
May 21-31	....	22	.06	70	22	6.7	2.3	236	52	4.1	.5	26	.1	324	.44	265	72	5	517	7.8
June 1-10	....	25	.06	86	27	8.2	2.1	290	72	4.5	.6	29	.1	406	.55	326	88	5	625	7.9
June 11-20	....	22	.05	78	24	8.0	2.4	268	63	4.6	.5	21	.1	376	.51	293	74	6	561	7.9
June 21-30	....	23	.07	76	23	6.1	1.8	254	54	3.6	.5	32	.1	357	.49	284	76	4	551	7.8
July 1-10	....	25	.04	86	28	8.6	2.1	310	63	4.0	.6	25	.1	419	.57	330	76	5	628	8.0
July 11-20	....	24	.03	87	30	9.7	2.3	314	68	4.8	.5	21	.1	412	.56	340	83	6	640	8.0
July 21-31	....	22	.06	72	27	9.0	2.5	274	63	4.8	.4	16	.2	358	.49	290	66	6	567	8.0
Aug. 1-10	....	18	.22	56	27	9.4	2.8	230	63	5.5	.4	2.0	.2	305	.41	250	62	7	494	7.9

Aug. 11-20	....	14	.25	52	23	8.5	3.4	214	57	4.9	.3	2.0	.2	280	.38	224	48	7	457	7.7
Aug. 21-31	....	16	.26	55	17	5.4	3.4	206	36	3.0	.3	5.6	.2	248	.34	207	38	5	407	7.7
Sept. 1-7	....	17	.47	76	26	8.3		206	57	4.6	.3	5.7	.3	350	.48	296	54	6	505	8.0
Sept. 8-10	....	11	.06	32	8.1	4.8		128	16	.0	.4	1.8	.8	141	.19	114	8	8	231	7.7
Sept. 11-20	....	18	.07	79	21	6.6	2.5	297	52	4.0	.3	8.2	.2	350	.48	284	40	5	565	7.8
Sept. 21-30	....	16	.08	72	22	7.5	3.0	274	49	4.4	.3	7.2	.2	325	.44	270	46	6	523	7.7

Chemical analyses, in parts per million, October 1946 to January 1947

																				1
Oct. 1-10, 1946	....	18	0.02	82	27	9.2	3.1	319	57	5.1	0.4	7.0	....	372	0.51	316	54	6	580	8.0
Oct. 11-20	....	19	.02	72	24	7.9	3.3	278	50	4.9	.3	9.4	....	331	.45	278	50	6	549	8.0
Oct. 21-31	....	20	.02	79	25	7.3	3.0	302	52	3.9	.4	12	....	356	.48	300	52	5	570	7.2
Nov. 1-3	....	21	.02	89	29	9.0	3.3	344	62	4.0	.3	14	....	402	.55	341	58	5	633	8.3
Nov. 18-20	....	21	.02	90	30	7.9	2.4	352	57	3.0	.3	16	....	407	.55	348	59	5	638	8.1
Nov. 21-30	....	19	.04	90	30	9.7	1.6	347	66	4.9	.4	16	....	416	.57	348	64	0	655	8.
Dec. 1-10	....	20	.04	92	31	9.0	1.8	349	67	4.8	.3	16	....	420	.57	357	71	5	670	8.0
Dec. 11-20	....	19	.05	90	33	10	1.6	350	69	5.5	.3	13	....	417	.57	360	73	0	667	8.0
Dec. 21-31	....	17	.04	96	34	9.8	1.7	369	68	5.5	.3	16	....	421	.57	380	77	5	695	8.0
Jan. 1-10, 1947	....	21	.04	108	36	12	1.8	414	79	6.1	.3	17	....	500	.68	418	78	6	783	7.8
Jan. 11-17	....	18	.06	89	29	9.6	1.7	335	66	5.4	.3	13	....	401	.55	341	66	6	650	8.0

Raccoon River at Des Moines, Iowa—Continued

Determination of variation in chemical constituents in cross-section 18th Street Bridge

Chemical analyses, in parts per million

October 23, 1944

Station	355	425	450	475
Time of collection	7:02 p.m.	6:59 p.m.	6:56 p.m.	6:53 p.m.
Bicarbonate (HCO_3)	280	280	282	278
Chloride (Cl)	6	6	5	6
Nitrate (NO_3)	3.8	3.5	3.1	3.6
Total hardness as $CaCO_3$	285	282	282	282
Specific conductance (Micromhos at 25°C)	567	567	567	568
pH	7.6	7.6	7.6	7.6
Temperature (°F)	57	57	57	57

November 17, 1944

Station	355	425	450	475
Time of collection	1:11 p.m.	1:08 p.m.	1:06 p.m.	1:04 p.m.
Bicarbonate (HCO_3)	312	312	312	310
Chloride (Cl)	6.0	5.0	6.0	6.0
Nitrate (NO_3)	8.1	8.3	7.7	7.8
Total hardness as $CaCO_3$	375	398	382	368
Specific conductance (Micromhos at 25°C)	596	597	598	598
pH	7.9	7.7	7.7	7.7
Temperature (°F)	43	44	44	44

March 19, 1945

Station	355	425	450	475
Time of collection	5:06 p.m.	5:02 p.m.	4:59 p.m.	4:45 p.m.
Bicarbonate (HCO_3)	264	264	262	260
Sulfate (SO_4)	70	70	72	73
Chloride (Cl)	3	2	2	2
Nitrate (NO_3)	32	28	30	31
Total hardness as $CaCO_3$	....	308	300	300
Specific conductance (Micromhos at 25°C)	580	581	582	580
Temperature (°F)	49	49	49	50

Raccoon River at Des Moines, Iowa—Continued

Determination of variation in chemical constituents in cross-section 18th Street Bridge

Chemical analyses, in parts per million

April 18, 1945

Station	355	425	450	475
Time of collection	11:52 a.m.	11:57 a.m.	12:03 p.m.	12:08 p.m.
Bicarbonate (HCO_3)	270	270	268	270
Sulfate (SO_4)	80	76	74	78
Chloride (Cl)	3	2	2	2
Nitrate (NO_3)	29	31	32	29
Total hardness as $CaCO_3$	322	308	308	308
Specific conductance (Micromhos at 25°C)	591	589	590	589
Temperature (°F)	46	45	46	45

July 9, 1945

Station	355	425	450	475
Time of collection	4:30 p.m.	....	....	4:20 p.m.
Bicarbonate (HCO_3)	316	310	316	a316
Sulfate (SO_4)	36	73	70	40
Chloride (Cl)	3	3	3	....
Nitrate (NO_3)	20	22	22	26
Total hardness as $CaCO_3$	315	322	322	315
Specific conductance (Micromhos at 25°C)	644	645	645	645
Temperature (°F)	77	77	77	77

a Includes equivalent of 6 parts per million of carbonate (CO_3).

Raccoon River at Des Moines, Iowa—Continued

Temperature (°F) of water, water year October 1945 to September 1946

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	50	50	33	33	32	33	60	62	64	78	79	67
2	50	50	34	32	32	34	60	62	61	78	80	64
3	52	40	35	32	32	35	66	59	60	79	82	65
4	55	44	33	32	32	37	57	54	61	76	80	67
5	56	43	33	33	34	37	54	54	63	75	75	70
6	51	42	32	33	34	35	51	55	66	78	74	73
7	57	43	33	34	35	35	51	54	69	79	74	73
8	55	45	33	33	33	34	50	56	71	80	......	71
9	52	40	32	33	33	33	50	57	72	82	78	70
10	52	37	32	32	34	33	49	58	73	83	78	69
11	52	37	32	32	32	34	46	52	75	77	74	70
12	53	42	32	32	32	33	46	54	76	78	70	69
13	52	44	32	......	32	40	48	50	76	78	68	68
14	53	36	32	......	32	44	53	58	76	78	67	68
15	50	38	32	......	32	46	54	59	72	77	68	67
16	51	41	32	......	33	47	55	59	77	76	75	67
17	54	43	32	32	32	46	58	63	76	75	75	67
18	58	43	32	33	32	46	58	64	76	78	77	67
19	55	40	32	33	33	45	60	63	71	80	78	67
20	54	40	32	32	32	45	60	62	68	77	73	64
21	53	38	32	32	32	46	58	65	62	77	73	64
22	48	35	32	32	32	48	59	67	65	78	66	......
23	48	34	32	32	32	49	64	67	67	79	68	60
24	48	33	32	32	32	49	63	64	71	76	67	62
25	48	33	32	32	32	50	64	62	72	76	67	......
26	47	33	32	32	32	51	60	62	73	73	67	62
27	46	32	32	32	32	52	64	61	74	72	68	62
28	49	32	32	32	32	53	59	58	77	74	67	63
29	50	32	32	32	......	55	58	65	77	76	68	59
30	51	33	32	32	......	56	61	66	......	78	67	57
31	48	......	32	32	......	57	......	67	......	79	69	......
Average	51	39	32	32	32	43	57	60	70	77	72	66

Des Moines River below Raccoon River at Des Moines, Iowa

LOCATION.—At 14th Street bridge, in Des Moines, Polk County, 1 mile downstream from gaging station and mouth of Raccoon River.

DRAINAGE AREA.—9,770 square miles.

RECORDS AVAILABLE.—Chemical analyses: October 1944 to September 1945.

Water temperatures: October 1944 to September 1945.

Sediment records: June 1944 (a); October 1944 to September 1947.

EXTREMES, water years 1945 to 1947 given in following table:

Water year	Chemical composites							
	Dissolved solids (ppm)				Total hardness (ppm)			
	Max.	Period	Min.	Period	Max.	Period	Min.	Period
1944-45...	574	Jan 13, 15-20	294	Mar. 11, 13-20	486	Jan. 7-8, 10	228	Mar. 11, 13-20
1945-46...	....	....	....	....	....	....	....	....
1946-47...	....	....	....	....	....	....	....	....

Water year	Daily suspended sediment								Temperature*	
	Concentrations (ppm)				Loads (tons)				°Fahrenheit	
	Max.	Date	Min.	Date	Max.	Date	Min.	Date	Max.	Date
1944-45...	5,370	May 22	15	Dec. 20	232,000	May 22	27	Dec. 21	81	Aug. 3
1945-46...	5,210	Aug. 22	7	Jan. 15	164,700	Mar. 14	16	Jan. 1	....	....
1946-47...	4,960	April 10	16	Jan. 24	590,000	June 13	49	Sept. 25	....	....

* Minimum temperature, freezing point on several days during January and February.

EXTREMES, 1944-47.—Dissolved solids (1944-45): Maximum, 574 ppm Jan. 13, 15-20, 1945; minimum, 294 ppm Mar. 11, 13-20, 1945.

Total hardness (1944-45): Maximum, 486 ppm Jan. 7-8, 10, 1945; minimum, 228 ppm Mar. 11, 13-20, 1945.

Water temperatures (1944-45): Maximum, 81°F Aug. 3, 1945; minimum, freezing point on many days in winter months.

Sediment concentrations: Maximum daily, 5,370 ppm May 22, 1945; minimum daily, 7 ppm Jan. 15, 1946.

Sediment loads: Maximum daily, 590,000 tons June 13, 1947; minimum daily, 16 tons Jan. 1, 1946.

a Reported under Miscellaneous Analyses in Iowa.

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

Chemical analyses, in parts per million, water year October 1944 to September 1945

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids	Total hardness as $CaCO_3$	Specific conductance (micromhos at 25°C)	pH
Oct. 1-10, 1944	1,746	20	0.02	79	35	13	5.2	298	90	10	0.4	13	0.2	414	341	647	7.3
Oct. 11-20	1,290	18	.02	73	38	14	4.0	292	103	9.5	.4	8.3	.2	415	338	645	7.3
Oct. 21-31	1,040	13	.03	69	39	15	3.9	282	104	9.0	.4	5.2	.3	401	332	630	7.4
Nov. 1-9	906	12	.05	73	40	15	2.7	288	104	10	.4	2.0	.2	404	340	622	7.9
Dec. 21, 26-28	479	....	.05	103	40	25		384	133	10	.4	8.8	.5	....	422	808	....
Jan. 7-8, 10, 1945	400	....	.08	122	44	25		438	148	13	.4	8.0	.5	....	486	916	....
Jan. 13, 15-20	452	20	.02	117	41	17	2.7	408	132	16	.3	10	.4	574	460	870	7.8
Jan. 21-29, 31	523	18	.02	108	39	19	2.6	394	114	14	.3	10	.3	538	430	806	7.6
Feb. 1-10	566	18	.02	112	40	20	2.5	400	116	12	.3	11	.3	556	444	835	7.6
Feb. 11-20	4,148	17	.06	68	22	8.9	3.8	242	60	6.0	.2	9.6	.1	330	260	525	7.4
Feb. 21-24, 26-28	3,096	18	.09	78	25	7.6	3.9	267	64	4.8	.4	21	.1	378	298	552	7.9
Mar. 1-10	5,480	18	.11	69	22	6.8	3.4	236	54	4.2	.3	21	.1	339	262	501	7.6
Mar. 11, 13-20	21,044	17	.12	62	18	5.0	3.7	205	48	3.2	.3	17	.1	294	228	442	7.8
Mar. 21-31	11,596	20	.05	84	26	7.9	2.6	272	79	4.5	.5	26	.3	408	316	602	8.1
April 1-10	8,598	19	.06	85	27	8.6	2.2	277	77	5.0	.5	26	.4	397	323	609	8.0
April 11-20	17,020	20	.06	80	25	8.0	2.2	261	68	4.2	.5	37	.4	380	302	616	8.5
April 21-22, 24-30	18,733	21	.04	77	25	7.1	2.1	251	64	3.8	.4	28	.1	366	295	556	8.0
May 1-7, 9-10	10,292	21	.03	89	30	8.6	1.8	301	78	4.5	.4	29	.2	430	346	640	8.0
May 11-15, 17-20	10,596	20	.04	81	26	8.1	2.0	272	68	4.5	.4	25	.1	385	309	580	8.2
May 21-31	21,733	18	.07	70	22	6.4	2.2	235	55	3.5	.5	22	.2	323	265	501	7.3
June 1-10	23,930	17	.04	68	21	6.3	2.1	226	53	3.2	.4	21	.4	319	256	490	7.3
June 11-20	17,640	19	.05	76	24	7.3	2.0	255	61	3.5	.4	21	.2	360	289	546	7.4
June 21-30	10,291	21	.07	91	30	8.6	2.0	303	84	4.2	.4	24	.3	434	350	645	7.6
July 1-7, 9-10	7,010	23	.06	89	31	9.4	2.2	302	84	4.4	.5	23	.2	434	350	660	7.7
July 11-20	4,293	22	.06	82	29	9.2	1.9	286	80	4.8	.5	19	.2	407	324	624	7.7
July 21-31	3,886	24	.08	83	28	9.8	2.4	292	72	4.8	.5	21	.2	408	322	624	7.7
Aug. 1-10	4,981	21	.04	73	23	8.1	3.0	253	60	3.9	.5	16	.1	340	276	536	7.7
Aug. 11-20	7,606	23	.04	72	24	7.9	3.0	256	56	3.2	.5	14	.2	335	278	529	7.7
Aug. 21-31	4,771	27	.03	84	28	8.5	3.0	304	66	4.0	.5	13	.1	390	324	606	7.8
Sept. 1-10	1,668	21	.14	62	31	11	3.1	249	85	5.9	.5	2.0	.1	348	282	548	7.7
Sept. 11-20	1,012	18	.31	59	33	12	3.1	252	93	6.9	.4	.2	.2	360	282	562	7.6
Sept. 21-30	1,101	14	.20	62	30	12	3.3	248	89	7.4	.3	1.0	.2	348	278	553	7.7

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

Determination of variation in chemical constituents in cross-section 14th Street Bridge

Chemical analyses, in parts per million

October 23, 1944

Station	125	160	180	215	265
Time of collection	4:35 p.m.	4:38 p.m.	4:40 p.m.	4:43 p.m.	4:45 p.m.
Bicarbonate (HCO_3)	280	280	278	270	268
Chloride (Cl)	8.0	7.0	8.0	7.0	9.0
Nitrate (NO_3)	8.1	1.0	.0	.0	.8
Total hardness as $CaCO_3$	309	338	345	338	352
Specific conductance (Micromhos at 25°C)	583	598	604	604	610
pH	7.4	7.5	7.5	7.5	7.5
Temperature (°F)	56	56	57	57	57

November 17, 1944

Station	125	160	180	215	265
Time of collection	11:24 a.m.	11:27 a.m.	11:22 a.m.	11:19 a.m.	11:17 a.m.
Bicarbonate (HCO_3)	304	296	302	316	292
Chloride (Cl)	8.0	9.0	9.0	10	10
Nitrate (NO_3)	7.7	8.1	5.6	5.0	4.9
Total hardness as $CaCO_3$	352	375	360	428	420
Specific conductance (Micromhos at 25°C)	610	632	644	650	667
pH	7.7	7.5	7.5	7.5	7.5
Temperature (°F)	44	44	44	44	45

January 30, 1945

Station	125	160	180	265
Bicarbonate (HCO_3)	382	396	392	400
Sulfate (SO_4)	113	123	133	96
Chloride (Cl)	15	15	14	15
Nitrate (NO_3)	13	14	14	11
Total hardness as $CaCO_3$	405	420	450	458
Specific conductance (Micromhos at 25°C)	806	838	855	878
Temperature (°F)	32	32	32	32

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

Determination of variation in chemical constituents in cross-section 14th Street Bridge

Chemical analyses, in parts per million

March 19, 1945

Station	120	160	250	325	415
Time of collection	5:33 p.m.	5:35 p.m.	5:37 p.m.	5:40 p.m.	5:40 p.m.
Bicarbonate (HCO_3)	254	232	208	208	208
Sulfate (SO_4)	74	67	60	58	63
Chloride (Cl)	4	2	3	2	3
Nitrate (NO_3)	39	30	26	23	26
Total hardness as $CaCO_3$	276	270	246	246	252
Specific conductance (Micromhos at 25°C)	569	531	488	482	481
Temperature (°F)	49	48	47	47	47

April 18, 1945

Station	125	160	180	215	265
Time of collection	2:14 p.m.	2:17 p.m.	2:20 p.m.	2:22 p.m.	2:25 p.m.
Bicarbonate (HCO_3)	260	268	268	270	272
Sulfate (SO_4)	78	76	77	78	79
Chloride (Cl)	4	3	2	4	3
Nitrate (NO_3)	31	20	29	30	26
Total hardness as $CaCO_3$	345	316	308	316	322
Specific conductance (Micromhos at 25°C)	593	590	596	591	592
Temperature (°F)	47	46	46	46	45

July 9, 1945

Station	125	160	180	215	265
Bicarbonate (HCO_3)	312	308	a304	302	306
Sulfate (SO_4)	77	93	97	106	114
Chloride (Cl)	3	4	4	4	4
Nitrate (NO_3)	24	18	17	16	15
Total hardness as $CaCO_3$	338	330	330	368	345
Specific conductance (Micromhos at 25°C)	651	659	667	675	679
Temperature (°F)	77	77	77	77	77

September 28, 1945

Station	125	160	180	215	265
Bicarbonate (HCO_3)	222	226	224	232	232
Nitrate (NO_3)	.1	1.8	1.0	.1	4.5
Total hardness as $CaCO_3$	248	232	248	255	270
Specific conductance (Micromhos at 25°C)	467	478	473	490	518
Temperature (°F)	56	56	56	56	56

a Includes equivalent of 10 parts per million of carbonate (CO_3).

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

Determination of variation in chemical constituents in cross-section U. S. Highway 60 Bridge four miles downstream from 14th Street Bridge

Chemical analyses, in parts per million

October 23, 1944

Station	260	350	410	500
Time of collection	2:16 p.m.	2:13 p.m.	2:09 p.m.	2:05 p.m.
Bicarbonate (HCO_3)	272	272	272	272
Chloride (Cl)	10	10	11	11
Nitrate (NO_3)	2.5	3.1	2.2	2.3
Total hardness as $CaCO_3$	308	306	312	306
Specific conductance (Micromhos at 25°C)	641	643	643	645
pH	7.3	7.3	7.3	7.4
Temperature (°F)	57	56	57	62

November 17, 1944

Station	260	350	410	500
Time of collection	10:40 a.m.	10:46 a.m.	10:44 a.m.	10:40 a.m.
Bicarbonate (HCO_3)	298	296	300	298
Chloride (Cl)	14	14	13	14
Nitrate (NO_3)	7.1	7.6	5.6	8.1
Total hardness as $CaCO_3$	435	442	428	435
Specific conductance (Micromhos at 25°C)	669	668	672	672
pH	7.4	7.4	7.4	7.4
Temperature (°F)	49	49	50	51

March 19, 1945

Station	110	225	375	500
Time of collection	3:35 p.m.	3:40 p.m.	3:45 p.m.	3:50 p.m.
Bicarbonate (HCO_3)	218	224	222	222
Sulfate (SO_4)	67	65	63	62
Chloride (Cl)	4	3	3	2
Nitrate (NO_3)	22	25	24	24
Total hardness as $CaCO_3$	270	262	270	265
Specific conductance (Micromhos at 25°F)	507	510	506	504
Temperature (°F)	50	49	49	49

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

Determination of variation in chemical constituents in cross-section U. S. Highway 60 Bridge four miles downstream from 14th Street Bridge

Chemical analyses, in parts per million

April 18, 1945

Station	200	350	410	500
Time of collection	1:30 p.m.	1:35 p.m.	1:33 p.m.	1:30 p.m.
Bicarbonate (HCO_3)	268	270	272	266
Sulfate (SO_4)	74	78	88	79
Chloride (Cl)	3	3	3	3
Nitrate (NO_3)	27	31	31	25
Total hardness as $CaCO_3$	300	300	308	300
Specific conductance (Micromhos at 25°C)	592	593	594	593
Temperature (°F)	46	46	46	47

July 9, 1945

Station	260	350	410	500
Bicarbonate (HCO_3)	306	306	306	302
Sulfate (SO_4)	32	40	102	104
Chloride (Cl)	5	5	5	17
Nitrate (NO_3)	15	16	18	14
Total hardness as $CaCO_3$	338	338	352	360
Specific conductance (Micromhos at 25°C)	677	677	679	718
Temperature (°F)	77	77	77	79

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

Temperature (°F) of water, water year October 1944 to September 1945

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	62	56	......	33	32	33	53	51	65	73	78	77
2	60	59	......	33	32	33	53	55	63	71	80	71
3	64	59	......	33	32	34	51	52	61	74	81	77
4	58	54	......	33	32	33	50	52	58	73	80	72
5	60	51	....	33	32	33	40	54	59	74	78	74
6	58	48	......	33	32	33	42	53	57	73	77	71
7	58	48	......	33	32	33	46	54	55	73	76	76
8	62	50	......	33	32	33	47	......	55	......	72	73
9	55	50	......	33	32	33	49	53	57	73	72	75
10	55	......	......	33	32	33	52	51	57	73	71	73
11	56	......	......	33	32	34	54	50	59	72	70	68
12	54	......	......	33	32	......	54	53	61	72	73	71
13	56	......	......	33	33	35	54	53	62	73	74	70
14	56	......	......	......	32	37	54	54	65	74	74	65
15	56	......	......	33	33	39	51	53	67	74	73	67
16	55	......	......	33	33	39	48	......	66	73	74	68
17	54	......	......	33	......	45	45	50	66	72	74	69
18	55	......	......	33	......	40	45	52	65	72	75	69
19	55	......	......	33	......	49	46	52	65	72	75	68
20	55	......	......	33	33	46	47	58	65	......	74	64
21	55	......	33	33	33	46	48	59	67	71	77	61
22	55	......	33	33	32	46	......	59	68	77	75	62
23	54	......	33	33	33	48	......	57	70	70	73	65
24	53	......	33	33	33	49	53	57	73	79	75	66
25	54	......	33	33	......	53	52	......	72	80	75	66
26	54	......	33	33	33	53	51	61	73	78	74	66
27	53	......	33	33	33	54	52	64	71	78	73	65
28	53	......	33	33	33	53	53	63	72	78	76	59
29	54	......	33	33	......	51	......	63	73	77	76	52
30	53	......	33	......	......	51	55	63	73	75	78	52
31	54	......	33	32	......	53	......	65	......	77	79	......
Average	56	......	......	33	33	42	50	55	65	74	75	67

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

Suspended sediment, water year October 1944 to September 1945

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	2,120	284	1,630	935	45	114	400	31	a33
2	1,900	144	739	935	45	114	355	31	30
3	1,800	106	515	935	40	101	491	31	41
4	1,730	106	495	911	34	84	630	31	53
5	1,700	106	487	863	29	68	672	31	56
6	1,800	106	515	887	26	62	754	31	63
7	1,730	107	500	887	27	65	863	32	75
8	1,600	80	359	911	39	96	839	30	68
9	1,570	66	280	887	41	98	911	29	71
10	1,510	54	220	887	32	77	774	27	a56
11	1,480	53	212	863	26	61	595	26	42
12	1,420	52	199	863	31	72	560	24	a36
13	1,390	51	191	863	44	103	630	23	39
14	1,360	48	176	863	51	119	650	22	39
15	1,300	45	158	887	45	108	795	20	43
16	1,240	44	147	839	33	75	865	19	44
17	1,220	44	145	935	23	58	840	18	41
18	1,190	44	141	935	22	56	755	18	37
19	1,160	45	141	935	22	56	755	16	33
20	1,140	43	132	911	22	54	775	15	31
21	1,110	43	129	911	25	61	595	17	a27
22	1,110	44	132	887	24	57	560	24	36
23	1,080	43	125	863	24	56	575	44	a68
24	1,080	42	122	839	25	57	510	74	102
25	1,060	41	117	839	25	57	510	79	109
26	1,030	40	111	887	25	60	425	82	94
27	1,060	38	109	935	25	63	440	84	100
28	1,030	37	103	887	26	62	455	86	106
29	983	39	104	863	28	65	475	85	109
30	983	41	109	630	29	49	490	80	106
31	1,010	44	120	....	....	....	510	78	107
	January			February			March		
1	490	76	a101	475	52	67	2,890	182	1,420
2	455	74	a91	510	50	69	4,290	625	7,240
3	440	70	83	540	50	73	5,230	635	8,970
4	440	62	a74	560	51	77	6,060	738	12,100
5	425	56	64	560	50	76	6,990	774	14,600
6	400	53	58	575	49	76	6,730	335	6,090
7	400	52	56	595	49	79	5,620	350	5,310
8	400	51	54	610	48	79	4,990	390	5,250
9	400	50	54	610	48	79	5,320	585	8,400
10	400	50	54	630	48	82	6,680	1,440	26,000
11	425	50	57	630	48	82	10,000	3,900	105,000
12	440	50	59	630	133	225	15,500	3,130	131,000
13	457	49	60	1,000	485	1,310	19,200	1,480	76,700
14	457	46	57	1,900	702	3,600	20,600	952	53,000
15	440	40	48	3,500	2,020	19,100	24,200	762	49,800
16	425	37	42	5,230	1,510	21,300	25,500	1,440	99,100
17	440	36	43	7,520	1,130	a22,900	26,200	620	43,900
18	457	35	43	8,340	605	a13,600	24,000	585	37,900
19	474	34	44	7,260	264	a5,170	21,300	530	30,500
20	474	33	42	5,470	188	2,780	18,400	525	26,100
21	491	32	42	4,850	262	3,430	15,700	505	21,400
22	525	31	44	3,610	88	s890	14,000	450	17,000
23	525	32	45	3,060	68	562	12,100	455	14,900
24	542	31	45	2,980	130	1,050	11,200	593	18,000
25	540	31	45	2,980	325	2,610	14,000	4,510	170,000
26	540	32	47	2,300	202	a1,250	12,700	1,650	s58,300
27	525	34	48	2,340	47	297	11,600	620	19,400
28	525	41	58	2,400	35	232	10,500	485	13,700
29	525	50	71	....	....	....	9,460	410	10,500
30	510	52	72	....	....	....	8,450	370	8,440
31	490	52	69	....	....	....	7,740	350	7,310

s Computed by subdividing day.
a Computed from an estimated concentration graph.
Note.—Flow affected by ice Nov. 30 to Dec. 2, Dec. 11 to Jan. 12, Jan. 15-17, Jan. 25 to Feb. 9, Feb. 16-18, Feb. 22 to Mar. 10.

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

Suspended sediment, water year October 1944 to September 1945—Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	7,050	330	6,280	13,400	435	15,700	23,100	2,130	133,000
2	6,420	294	5,100	12,000	405	13,100	22,200	2,880	173,000
3	6,270	585	9,900	11,300	415	12,700	25,200	1,310	89,100
4	9,630	2,650	68,900	10,900	435	12,800	28,400	625	47,900
5	8,500	911	20,900	10,500	440	12,500	28,300	515	39,400
6	7,850	640	13,600	9,970	370	9,960	27,100	415	30,400
7	8,060	791	17,200	9,180	330	8,180	26,600	1,310	94,100
8	9,400	650	16,500	8,400	320	a7,260	23,300	718	45,200
9	11,000	762	22,600	7,790	305	6,420	17,900	959	s54,600
10	11,800	711	22,700	7,690	340	7,060	17,200	2,250	104,000
11	12,100	724	23,700	7,150	400	7,720	17,000	831	38,100
12	14,000	2,210	83,500	6,780	310	5,670	19,100	1,190	61,400
13	14,300	856	33,100	6,630	325	5,820	20,900	605	34,100
14	15,000	672	27,200	10,600	1,630	s54,600	19,200	460	23,800
15	16,300	787	34,600	16,300	2,710	119,000	17,500	460	21,700
16	19,700	1,730	92,000	15,400	1,560	64,900	17,800	590	28,400
17	21,300	1,640	94,300	14,100	706	26,900	17,500	683	32,300
18	19,900	787	42,300	12,300	535	17,800	16,700	550	24,800
19	19,400	560	29,300	11,200	445	13,500	15,600	465	19,600
20	18,200	495	24,300	10,300	415	11,500	15,100	1,070	43,600
21	16,100	450	19,600	10,400	685	s26,500	13,700	515	19,000
22	13,200	420	15,000	16,000	5,370	232,000	12,400	385	12,900
23	11,800	415	13,200	22,100	2,240	s126,000	11,600	370	11,600
24	13,900	777	s36,200	20,100	754	53,100	10,700	350	10,100
25	18,600	2,060	103,000	28,000	580	43,800	10,300	655	18,200
26	22,200	681	40,800	27,200	460	33,800	9,630	745	19,400
27	23,500	560	35,500	25,000	455	30,700	9,060	440	10,800
28	23,500	470	29,800	23,400	793	50,100	8,400	430	9,750
29	20,900	400	22,600	20,900	898	s50,600	8,340	390	8,780
30	16,700	430	19,400	19,600	555	29,400	8,780	400	9,480
31	....	....	....	20,800	2,050	s109,000	....	....	....

Day	July			August			September		
1	9,010	490	11,900	3,270	380	3,360	2,230	116	698
2	8,670	475	11,100	3,480	455	4,280	2,040	126	694
3	8,010	390	8,430	3,700	515	5,140	1,870	80	404
4	7,200	355	6,900	4,610	615	7,650	1,830	62	306
5	6,840	340	6,280	5,710	1,650	25,400	1,700	60	275
6	6,370	325	5,590	6,630	2,720	48,700	1,540	64	266
7	5,910	320	5,110	5,710	1,420	21,900	1,480	68	272
8	5,710	325	a5,010	5,470	649	9,590	1,390	56	210
9	5,710	390	6,010	5,520	632	9,420	1,300	45	158
10	5,370	375	5,440	5,710	533	8,220	1,300	50	176
11	4,900	290	3,900	4,990	438	5,900	1,220	44	145
12	4,660	246	3,100	4,290	420	4,860	1,190	42	135
13	4,360	220	2,600	4,190	904	s10,600	1,110	39	117
14	4,060	212	2,320	4,610	510	6,350	1,060	43	123
15	3,830	198	2,050	5,180	490	6,850	1,010	54	147
16	3,660	188	1,860	9,320	545	9,300	959	74	192
17	3,750	192	1,940	9,160	680	16,900	935	60	151
18	4,240	355	4,060	10,900	640	18,800	911	49	121
19	4,800	355	s4,450	12,900	480	16,700	887	54	129
20	4,560	620	7,630	13,500	360	13,100	839	54	122
21	4,560	465	5,730	10,200	340	9,360	839	56	127
22	4,470	405	4,890	7,420	310	6,210	863	72	168
23	4,190	350	3,960	6,160	292	4,860	863	112	261
24	3,970	310	3,320	5,320	296	4,250	911	68	167
25	3,830	298	3,080	4,660	256	3,220	863	60	140
26	3,790	350	3,580	4,010	182	1,970	911	66	162
27	3,790	400	4,090	3,530	168	1,600	1,140	98	302
28	3,700	435	4,350	3,180	138	1,180	1,540	330	1,370
29	3,570	425	4,100	2,850	124	954	1,510	380	1,550
30	3,480	400	3,760	2,630	136	968	1,570	275	1,170
31	3,400	365	3,350	2,460	140	930	....	....	....

s Computed by subdividing day.
a Computed from an estimated concentration graph.

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

Suspended sediment, water year October 1945 to September 1946

Day	October			November			December		
		Suspended sediment			Suspended sediment			Suspended sediment	
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1	1,450	211	826	610	52	86	712	149	286
2	1,390	171	642	630	103	175	983	85	226
3	1,300	119	418	610	71	117	730	98	193
4	1,240	104	348	610	46	76	630	52	88
5	1,140	77	237	593	24	38	559	35	53
6	1,160	63	197	610	32	53	692	32	60
7	1,030	59	164	630	57	97	400	35	46
8	935	63	159	651	251	441	560	45	68
9	983	52	138	692	55	103	400	48	64
10	839	44	100	672	45	82	440	49	58
11	815	46	101	672	39	71	384	49	51
12	839	42	95	672	43	78	370	54	54
13	794	38	81	672	52	94	370	58	58
14	794	45	96	651	49	86	370	66	66
15	794	37	79	630	40	78	360	75	73
16	774	38	79	651	43	76	360	82	80
17	774	34	71	651	42	74	370	89	89
18	754	48	98	630	40	68	370	91	91
19	733	66	131	630	37	63	370	87	87
20	712	46	88	610	36	59	370	80	80
21	692	62	116	540	37	54	370	71	71
22	672	56	102	330	34	30	328	68	60
23	672	49	89	280	33	25	314	63	53
24	651	49	86	425	32	37	314	60	51
25	630	66	112	525	29	41	290	58	45
26	630	55	94	542	28	41	268	55	40
27	630	62	105	593	26	42	268	52	38
28	630	46	78	630	23	39	279	50	38
29	630	58	99	651	27	47	279	47	35
30	610	57	94	630	103	s179	300	40	32
31	630	48	82	....	....	....	300	27	22

Day	January			February			March		
1	320	19	16	1,940	131	686	6,060	543	8,880
2	340	20	18	1,270	40	137	5,620	489	7,420
3	342	22	20	1,190	27	87	5,760	538	8,370
4	380	173	177	1,450	52	204	5,910	558	8,900
5	8,000	314	6,780	4,660	263	3,310	6,420	615	10,700
6	12,000	1,420	46,000	8,900	438	10,500	8,560	2,740	s65,400
7	8,400	1,490	33,800	8,010	451	9,750	10,900	4,680	138,000
8	7,580	662	13,500	8,560	356	8,230	11,100	3,570	107,000
9	6,580	408	7,250	8,400	245	5,560	9,060	1,530	37,400
10	4,560	271	3,340	6,560	250	4,440	7,520	585	11,900
11	3,000	197	1,600	5,760	271	4,210	6,780	608	11,100
12	2,400	120	778	5,180	232	3,240	7,470	1,330	26,800
13	2,000	25	135	4,700	148	1,880	10,800	3,550	103,500
14	1,600	9	39	3,920	54	572	15,600	3,910	164,700
15	1,190	7	22	3,310	45	402	18,300	2,530	125,000
16	1,080	12	35	3,100	40	335	18,900	1,150	58,700
17	1,140	12	37	3,020	28	228	18,400	959	47,600
18	1,220	17	56	2,850	29	223	16,400	780	34,500
19	1,190	17	55	2,730	45	332	13,500	653	23,800
20	1,140	12	37	2,730	55	405	11,300	570	17,400
21	1,110	15	45	2,650	55	394	10,300	492	13,700
22	1,080	17	50	3,140	156	1,320	9,230	450	11,200
23	1,190	24	77	3,660	332	3,280	8,900	486	11,700
24	1,160	28	88	4,520	342	4,170	9,290	690	17,300
25	1,140	35	108	5,620	478	7,250	10,300	1,120	31,100
26	815	13	29	5,810	596	9,350	13,000	1,120	39,300
27	733	21	42	5,420	399	5,840	14,100	793	30,200
28	692	59	110	6,160	400	6,650	13,600	748	27,500
29	692	33	62	....	....	....	11,200	559	17,600
30	1,270	43	147	....	....	....	11,000	558	16,600
31	2,500	75	506	....	....	....	10,500	552	15,600

s Computed by subdividing day.

Note.—Flow affected by ice Nov. 21-25, Dec. 3, 4, 7-9, 12-20.

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

Suspended sediment, water year October 1945 to September 1946—Continued

Day	April			May			June		
		Suspended sediment			Suspended sediment			Suspended sediment	
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1	10,600	522	14,900	2,610	64	451	14,000	448	16,900
2	11,000	561	17,300	2,610	73	514	9,660	464	12,100
3	10,300	498	13,800	2,850	308	2,370	8,060	440	9,580
4	9,060	482	11,800	3,600	3,170	30,800	7,200	398	7,740
5	8,340	400	9,010	4,300	3,420	39,700	6,520	376	6,620
6	7,360	349	6,940	4,100	1,850	20,500	5,810	335	5,260
7	6,690	323	a5,820	4,000	559	6,040	5,370	306	4,440
8	6,270	286	4,840	3,850	400	4,100	4,850	276	3,610
9	5,860	251	3,970	3,700	332	3,320	4,520	242	2,950
10	5,660	246	3,760	3,500	264	2,490	4,100	231	2,560
11	5,520	245	3,650	3,400	218	2,000	3,700	253	2,530
12	5,520	210	3,130	3,400	177	1,620	3,610	238	2,320
13	5,420	180	2,630	3,500	184	1,740	3,360	194	1,760
14	5,280	183	2,610	3,600	178	1,730	3,180	177	1,520
15	5,080	175	2,400	3,700	194	1,940	4,190	324	3,670
16	4,890	166	2,190	3,900	208	2,190	5,280	700	9,980
17	4,660	152	1,910	4,100	286	3,170	5,180	2,210	30,900
18	4,380	135	1,600	4,100	365	4,040	7,630	1,830	37,700
19	4,060	148	1,620	4,200	333	a3,780	12,700	3,040	104,000
20	3,790	124	1,270	4,700	310	3,930	16,900	3,210	146,000
21	3,400	101	927	6,010	666	10,800	17,200	1,120	e57,000
22	3,230	103	898	6,220	1,170	19,600	16,000	590	26,800
23	3,100	103	a862	6,220	614	s10,500	15,700	463	19,600
24	2,980	99	797	6,220	567	s9,440	14,200	464	17,800
25	2,770	90	673	7,150	1,130	s26,300	12,000	549	17,800
26	2,650	79	565	12,000	2,100	68,000	13,000	1,020	35,800
27	2,540	63	432	16,100	943	s44,100	11,600	1,420	44,500
28	2,460	65	432	20,600	660	36,700	9,350	704	17,800
29	2,460	60	399	22,600	589	35,900	8,730	539	12,700
30	2,500	60	405	20,500	514	28,400	9,400	1,260	a32,000
31	....	....	....	17,000	490	22,500	....	....	....
	July			August			September		
1	8,730	1,480	34,900	1,600	64	276	1,160	83	260
2	8,230	610	13,600	1,450	60	235	1,010	84	229
3	7,900	562	12,000	1,300	55	193	935	75	189
4	7,200	454	8,830	1,300	65	228	935	94	237
5	6,470	387	6,760	1,270	64	219	863	64	149
6	5,910	346	5,520	1,270	54	185	839	60	136
7	5,520	323	4,810	1,270	52	178	983	163	433
8	5,040	309	4,200	1,270	72	247	7,850	2,250	s72,800
9	4,400	294	3,490	1,480	217	867	13,600	2,560	94,000
10	4,050	263	2,880	1,140	542	1,670	10,100	1,950	s54,900
11	3,600	347	2,400	935	279	s684	4,040	724	9,660
12	3,500	244	2,310	863	154	359	3,750	467	4,730
13	3,300	219	1,950	815	118	260	3,100	344	2,880
14	3,000	212	a1,720	794	93	199	2,810	238	1,810
15	2,900	210	1,640	774	90	188	2,570	153	1,060
16	2,700	219	1,600	794	84	180	2,190	148	875
17	2,600	261	1,830	1,510	618	s2,700	1,870	123	621
18	2,690	277	2,010	1,240	428	1,430	1,630	133	585
19	2,570	277	1,920	935	518	1,310	1,480	186	743
20	2,400	245	1,590	774	254	531	1,570	146	619
21	2,500	284	1,920	839	348	788	1,570	163	691
22	2,600	446	3,130	4,890	5,210	s71,500	1,570	270	a1,140
23	2,450	386	2,550	2,890	3,430	26,800	2,610	581	4,090
24	2,200	258	1,530	3,270	1,610	s13,400	2,120	608	3,480
25	1,940	203	1,060	9,520	1,240	s31,300	1,660	533	2,390
26	1,900	153	785	7,790	1,540	s31,400	1,460	275	1,100
27	1,850	139	694	3,230	686	5,980	1,480	169	675
28	1,800	120	583	2,340	390	2,460	1,480	208	831
29	1,800	108	525	1,800	249	1,210	2,120	950	5,440
30	1,900	91	467	1,510	178	726	1,480	694	2,770
31	1,750	75	354	1,320	123	438	....	....	....

s Computed by subdividing day.
a Computed from an estimated concentration graph.

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

Suspended sediment, water year October 1946 to September 1947

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	1,480	418	1,670	2,980	147	1,180	2,340	83	524
2	1,220	171	563	2,890	134	1,050	1,900	88	451
3	1,140	113	348	2,850	146	1,120	1,660	115	515
4	1,080	93	271	2,770	146	a1,090	1,600	97	419
5	1,010	81	221	2,610	146	a1,030	1,900	104	534
6	935	56	141	2,500	146	a986	2,060	85	477
7	911	57	140	2,500	149	a1,010	2,160	90	525
8	1,030	67	186	2,460	147	a976	2,300	79	491
9	983	55	146	2,380	148	a951	2,300	66	410
10	1,240	338	1,130	2,420	154	a1,010	2,270	56	343
11	1,630	294	1,290	2,690	160	a1,160	2,230	55	331
12	1,830	362	1,790	2,690	166	1,210	2,000	55	297
13	2,080	498	2,790	2,650	163	a1,170	1,700	52	239
14	2,120	455	2,600	2,690	157	a1,140	1,400	43	163
15	2,040	241	1,330	2,730	156	a1,150	1,000	62	167
16	2,080	144	809	2,810	143	a1,080	800	51	110
17	2,190	147	869	2,810	108	a819	700	42	79
18	5,390	2,230	32,500	2,810	92	698	525	45	64
19	5,280	3,330	47,500	2,850	93	716	692	54	101
20	3,920	1,060	11,200	3,060	89	735	983	69	183
21	3,360	552	5,010	3,180	103	884	1,200	94	305
22	2,960	320	2,650	3,060	99	818	1,250	100	338
23	2,770	238	1,780	2,940	105	833	1,300	72	253
24	4,210	384	4,360	2,810	93	706	1,400	51	193
25	6,320	1,430	24,400	2,730	95	700	1,350	43	157
26	4,800	998	12,900	2,610	99	698	1,000	30	81
27	4,010	498	5,390	2,340	84	531	700	44	83
28	3,440	275	2,550	2,230	81	488	600	89	144
29	3,360	215	1,950	2,190	94	556	500	109	147
30	3,230	194	1,690	2,270	91	558	450	69	84
31	3,100	159	1,330	....	....	....	500	52	70
	January			February			March		
1	550	61	91	900	28	68	1,950	28	147
2	600	63	102	880	26	62	1,900	22	113
3	800	63	136	850	22	50	1,850	29	145
4	1,000	51	138	880	38	90	1,850	32	160
5	1,150	53	165	900	63	153	1,850	54	270
6	1,150	50	155	950	59	151	1,870	62	313
7	1,000	49	132	1,000	119	321	1,900	84	431
8	900	37	90	1,000	120	324	1,940	64	335
9	700	32	60	1,110	53	159	2,040	51	281
10	790	35	75	1,300	30	a105	2,460	59	392
11	850	62	142	1,400	30	a113	3,140	113	958
12	1,000	26	70	1,500	30	a122	3,920	1,920	20,300
13	1,160	38	119	1,600	45	a194	6,940	2,830	53,000
14	1,190	33	106	1,800	144	700	7,200	2,400	46,700
15	1,240	31	104	2,250	253	1,540	7,050	1,170	22,300
16	1,150	29	90	2,500	261	1,760	6,890	666	12,400
17	1,080	33	96	2,750	258	1,920	6,890	670	12,500
18	1,100	27	80	3,100	272	2,280	6,580	736	13,100
19	1,200	24	78	3,480	151	1,420	6,110	598	9,870
20	1,200	21	68	3,530	121	1,150	5,620	457	6,930
21	1,150	20	62	3,600	95	923	5,620	496	7,530
22	1,200	28	91	3,500	66	624	5,910	480	7,660
23	1,240	24	80	3,300	52	a463	5,710	776	12,000
24	1,240	16	54	3,000	50	405	6,470	889	15,500
25	1,240	18	60	2,700	44	a321	6,040	1,000	16,700
26	1,420	22	84	2,400	42	a272	7,470	1,020	20,600
27	1,400	20	76	2,200	39	a232	7,050	836	15,900
28	1,270	28	96	2,000	35	189	6,420	492	8,530
29	1,150	33	102	....	....	....	6,060	447	7,310
30	1,050	20	57	....	....	....	5,660	329	5,030
31	1,000	25	68	....	....	....	5,320	294	4,220

a Computed from an estimated concentration graph.

Note.—Flow affected by ice Dec. 12-17, Dec. 21 to Jan. 12, Jan. 16-22, Jan. 27 to Feb. 8, Feb. 21 to Mar. 5.

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

Suspended sediment, water year October 1946 to September 1947—Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	4,990	240	3,230	10,000	1,160	31,300	10,700	1,970	56,900
2	4,610	200	2,600	9,900	716	19,100	17,000	2,800	129,000
3	4,420	190	2,270	9,810	635	16,800	22,600	2,430	148,000
4	5,420	1,210	17,700	9,200	428	10,600	26,300	1,040	73,900
5	6,520	2,770	48,800	8,500	361	8,280	31,200	2,540	414,000
6	6,600	1,220	21,700	7,600	360	7,390	35,200	1,350	128,000
7	6,800	1,100	20,200	7,000	348	6,580	27,300	783	57,700
8	7,200	711	13,800	6,600	295	5,260	20,800	876	49,200
9	8,000	1,200	25,900	6,500	257	4,510	16,900	880	40,200
10	11,000	4,960	147,000	6,420	247	4,280	14,200	922	35,300
11	14,000	4,770	180,000	5,800	230	3,600	10,400	819	23,000
12	16,700	4,220	190,000	5,600	223	3,370	18,800	940	34,700
13	17,000	1,490	68,400	5,500	256	3,800	54,100	4,040	590,000
14	16,700	1,260	56,800	5,600	230	3,480	45,400	1,560	191,000
15	15,600	1,070	45,100	6,000	361	5,850	37,700	601	61,200
16	14,500	906	35,500	6,500	1,040	18,300	34,000	580	53,200
17	13,400	862	31,200	7,400	1,510	30,200	29,600	446	35,600
18	12,100	673	22,000	7,700	1,500	31,200	25,500	474	32,600
19	11,700	783	24,700	8,200	1,060	23,500	25,000	752	50,800
20	14,300	1,590	61,400	7,900	799	17,000	26,300	702	49,800
21	12,400	1,260	42,200	7,300	558	11,000	27,000	821	59,900
22	11,000	707	21,000	6,700	487	8,810	29,000	1,620	127,000
23	10,200	546	15,000	6,600	678	12,100	34,000	1,440	132,000
24	9,870	488	13,000	6,500	644	11,300	33,200	1,280	115,000
25	9,870	435	11,600	6,400	637	11,000	46,300	1,810	226,000
26	10,000	418	11,300	6,580	531	9,430	74,000	1,240	248,000
27	9,870	388	10,300	6,470	361	6,310	61,100	867	143,000
28	9,400	423	10,700	8,730	957	22,600	48,300	543	70,800
29	9,010	1,560	38,000	14,100	2,820	107,000	38,000	628	65,500
30	11,400	4,210	130,000	12,000	1,190	38,600	29,300	632	50,000
31	....	....	....	10,700	1,180	34,100	....	....	....

Day	July			August			September		
1	23,600	598	38,100	2,400	85	551	600	59	96
2	23,100	646	40,300	2,300	110	683	600	55	89
3	25,900	529	37,000	2,200	60	356	570	59	91
4	25,600	371	25,600	2,100	59	335	550	64	95
5	25,000	593	40,000	2,000	51	275	540	58	85
6	24,600	1,880	125,000	1,900	54	277	520	60	84
7	20,500	1,030	57,000	1,800	49	238	480	57	74
8	18,200	589	28,900	1,700	45	207	460	57	71
9	17,100	524	24,200	1,600	46	199	450	61	74
10	16,000	459	19,800	1,500	49	198	457	61	75
11	14,200	436	16,700	1,400	45	170	550	72	107
12	12,400	431	14,400	1,350	40	146	630	86	146
13	9,750	414	10,900	1,250	46	155	712	81	156
14	8,400	400	9,070	1,190	58	186	559	72	a109
15	7,690	403	8,370	1,080	57	166	508	69	95
16	7,050	376	7,160	1,030	62	172	508	74	101
17	6,520	375	6,600	983	55	146	491	75	99
18	6,420	403	8,550	911	56	138	426	68	78
19	6,000	400	6,480	887	59	141	457	64	79
20	5,400	384	5,600	863	51	119	370	64	64
21	4,900	295	3,900	704	58	124	384	69	72
22	4,600	274	3,400	754	67	136	412	52	58
23	4,400	250	2,970	794	66	141	356	55	53
24	4,200	219	2,480	800	65	a140	342	54	50
25	4,100	196	2,170	850	64	147	328	55	49
26	4,060	185	2,030	900	94	228	328	62	55
27	3,600	138	1,340	850	109	250	314	60	51
28	3,100	152	1,270	750	67	136	314	69	58
29	2,900	120	940	700	65	123	314	69	a58
30	2,700	104	758	640	66	114	328	69	a61
31	2,500	94	634	620	69	116	....	....	....

a Computed from an estimated concentration graph.

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

Monthly discharge for calendar and water years 1944 to 1947

Month	Water discharge (cfs-days)	Suspended sediment							
		Load (tons)	Daily loads (tons)			Tons per sq. mi.	Acre-feet (a)	Concentration (ppm)	
			Max.	Min.	Mean			Maximum daily	Weighted mean
October 1944	41,899	8,693	1,030	103	280	0.89	7.3	284	77
November	26,473	2,228	119	49	74	.23	1.9	51	31
December	19,454	1,895	109	27	61	.19	1.6	86	36
January 1945	14,477	1,770	101	42	57	.18	1.5	76	45
February	71,725	101,145	22,900	67	3,610	10.4	84	2,020	522
March	387,150	1,107,330	170,000	1,420	35,700	113.3	924	4,510	1,060
April	436,590	1,023,080	103,000	5,100	34,100	104.7	854	2,650	868
May	451,290	1,217,990	232,000	5,670	39,300	124.7	1,020	5,370	1,000
June	518,010	1,268,510	178,000	8,780	42,300	129.8	1,060	2,880	906
July	154,480	149,960	11,900	1,800	4,840	15.4	125	620	360
August	178,350	288,532	48,700	930	9,310	29.5	241	2,720	599
September	37,811	10,258	1,550	117	342	1.05	8.6	380	100
Water year 1944-45	2,338,296	5,181,411	232,000	27	14,200	530.3	4,320	5,370	821
October 1945	26,327	5,205	826	71	168	.53	4.3	.211	73
November	17,923	2,550	441	25	95	.26	2.1	251	53
December	13,290	2,356	286	22	76	.24	2.0	149	66
Calendar year 1945	2,308,013	5,143,706	232,000	22	14,100	526.5	4,200	5,370	825
January 1946	76,844	114,959	46,000	16	371	11.8	96	1,490	554
February	125,240	92,985	10,500	87	332	9.52	76	596	275
March	335,780	1,249,070	164,700	7,420	40,300	127.8	1,040	4,680	1,380
April	157,820	121,540	17,300	399	4,050	12.4	101	581	285
May	214,340	448,725	68,000	451	14,500	45.9	375	3,420	775
June	263,570	694,840	146,000	1,520	23,200	71.1	580	3,210	976
July	115,400	129,558	34,900	354	4,180	13.3	108	1,480	416
August	62,183	198,141	71,500	178	6,390	20.3	165	5,210	1,180
September	81,765	269,523	94,000	136	8,980	27.6	225	2,560	1,220
Water year 1945-46	1,490,472	3,329,462	164,700	16	9,120	340.8	2,780	5,210	827
October 1946	81,169	171,504	47,500	140	5,530	17.6	143	3,330	783
November	80,510	27,053	1,210	488	902	2.77	23	106	124
December	42,790	8,278	534	64	267	.85	6.9	115	72
Calendar year 1946	1,637,401	3,526,176	164,700	16	9,660	361.0	2,940	5,210	798
January 1947	33,170	2,027	165	54	94	.30	2.4	63	33
February	56,380	16,111	2,280	50	575	1.65	13	272	106
March	148,580	323,725	63,000	113	10,400	33.1	270	2,830	807
April	314,580	1,321,400	190,000	2,270	44,000	135.2	1,100	4,960	1,560
May	230,810	526,650	107,000	3,370	17,000	53.9	440	2,820	813
June	949,600	3,304,300	590,000	23,000	110,000	338.2	2,760	4,040	1,290
July	344,490	551,622	125,000	634	17,800	56.5	460	1,880	593
August	38,896	6,513	683	114	210	.67	5.4	110	62
September	13,858	2,433	156	49	81	.25	2.0	86	65
Water year 1946-47	2,344,033	6,262,616	590,000	49	17,200	641.0	5,230	4,960	990

a Computed using a specific weight of 55 pounds per cubic foot.

Des Moines River at Keosauqua, Iowa

Location.—Midstream of bridge on State Highway 1 at Keosauqua, Van Buren County, and 4 miles downstream from Chequest Creek.

Drainage Area.—13,900 square miles.

Records Available.—Chemical analyses: September 1906 to September 1907; July 1912(a).
Sediment records: May 1944, July 1947 (fragmentary) (a).

Extremes, 1906-07.—Dissolved solids: Maximum, 492 ppm Dec. 19-28, 1906; minimum, 207 ppm Jan. 18-27, 1907.

Chemical analyses, in parts per million, September 1906 to September 1907

Date of collection	Turbidity	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Total dissolved solids
Sept. 10-19, 1906	275	35	Tr.	50	21	27	233	0.0	51	4.5	2.2	303
Sept. 20-29	425	23	0.10	47	12	20	188	.0	40	4.8	2.5	256
Sept. 30-Oct. 9	150	23	.10	58	....	14	233	.0	49	4.8	2.2	294
Oct. 10-19	65	32	.10	68	34	17	....	.0	....	6.1	1.8	368
Oct. 20-29	20	31	Tr.	70	30	31	....	.0	92	8.1	.6	396
Oct. 30-Nov. 8	115	23	.05	64	25	20	....	.0	65	5.4	3.1	336
Nov. 9-18	50	22	.05	71	28	19	272	.0	....	3.5	1.3	361
Nov. 19-28	60	17	.05	80	28	26	310	.0	90	5.1	1.8	399
Nov. 29-Dec. 8	85	26	.15	74	27	22	315	.0	91	5.3	2.0	407
Dec. 9-18	30	27	.05	83	28	18	....	.0	96	5.5	3.5	431
Dec. 19-28	5	18	.10	100	38	27	412	.0	107	8.1	2.6	492
Dec. 29-Jan. 7, 1907	525	34	....	61	22	18	220	.0	83	4.6	2.6	345
Jan. 8-17	135	20	.9	50	17	13	167	.0	61	6.5	4.4	259
Jan. 18-27	235	29	1.2	30	10	11	99	.0	52	4.0	3.9	207
Jan. 28-Feb. 8	40	18	.45	48	17	16	168	.0	69	6.5	1.4	261
Feb. 10-19	220	23	.5	65	23	18	231	.0	104	8.5	2.2	346
Feb. 20-Mar. 1	95	14	.35	40	13	16	134	.0	61	4.7	5.1	214
Mar. 2-12	650	20	1.0	41	14	12	129	.0	60	5.3	7.5	245
March 13-22	950	23	.9	43	15	22	....	.0	70	3.8	7.3	258
March 23-31	450	18	.6	45	16	18	175	.0	64	3.3	4.2	258
April 2-11	300	18	.5	55	19	13	218	.0	62	3.5	2.6	288
April 12-21	75	15	.10	67	24	17	266	.0	76	3.9	4.0	339
April 22-May 1	35	19	.05	60	30	20	274	.0	89	6.2	.5	286
May 2-11	20	11	.15	71	24	20	266	.0	105	8.8	Tr.	383

a Reported under Miscellaneous Analyses in Iowa.

Des Moines River at Keosauqua, Iowa—Continued

Chemical analyses, in parts per million, September 1906 to September 1907—Continued

Date of collection	Turbidity	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Total dissolved solids
May 12-21, 1907	80	5.2	0.05	57	27	19	238	0.0	94	9.6	1.1	335
May 22-31	1,740	30	1.0	53	19	13	175	.0	82	3.7	3.4	316
June 1-10	1,750	18	.5	51	16	12	154	.0	74	2.8	6.3	275
June 11-20	1,400	26	.8	....	17	10	....	.0	67	2.5	9.5	303
June 21-30	1,200	21	.16	60	19	12	218	.0	62	2.1	2.8	299
July 1-10	1,300	24	.6	55	20	15	214	.0	69	4.6	3.3	296
July 11-20	1,670	33	.8	....	....	13	155	.0	44	2.5	6.2	231
July 21-30	1,100	17	.16	42	14	8.4	185	.0	35	1.2	1.9	212
July 31-Aug. 9	830	33	.12	62	21	7.1	249	.0	52	1.8	5.0	310
Aug. 11-20	2,400	31	.6	47	13	19	175	.0	51	2.8	7.1	259
Aug. 21-30	550	9.2	.04	64	22	23	243	.0	71	5.0	2.0	327
Aug. 31-Sept. 9	500	....	.18	49	16	20	165	.0	....	3.4	2.2	251
Mean	542	22	0.36	58	21	17	216	0.0	71	4.8	3.3	312

MISSOURI RIVER BASIN

Little Sioux River at Correctionville, Iowa

LOCATION.—At gaging station at bridge on U. S. Highway 20, 0.2 mile upstream from Bacon Creek, a half mile west of Correctionville, Woodbury County, and three-quarters of a mile downstream from Pierson Creek.

DRAINAGE AREA.—2,450 square miles.

RECORDS AVAILABLE.—Water temperatures: May 1951 to September 1954.

Sediment records: May 1950 to September 1954.

EXTREMES, water years 1950 to 1954 given in following table:

Water year	Daily suspended sediment								Temperature* °Fahrenheit	
	Concentrations (ppm)				Loads (tons)					
	Max.	Date	Min.	Date	Max.	Date	Min.	Date	Max.	Date
1949-50(a)..	12,200	July 12	80	June 9, 10, Sept. 9	190,000	June 18	20	Sept. 9	......	....
1950-51.....	5,080	June 19	......	....	62,100	Aug. 14	......	....	79	July 27
1951-52.....	9,620	July 7	......	....	111,000	July 7	25	Sept. 30	81	June 13
1952-53.....	7,390	June 8	......	....	85,500	June 8	......	....	79	June 19, July 26
1953-54.....	11,900	June 19	......	....	257,000	June 19	......	....	81	July 12

* Minimum temperature, freezing point on many days during winter months.
a May to September.

EXTREMES, 1950-54.—Water temperatures (1951-54): Maximum, 81°F June 13, 1952, July 12, 1954; minimum, freezing point on many days during winter months.

Sediment concentrations: Maxium daily, 12,200 ppm July 12, 1950; minimum daily, not determined.

Sediment loads: Maximum daily, 257,000 tons June 19, 1954; minimum daily, not determined.

Little Sioux River at Correctionville, Iowa—Continued

Temperature (°F) of water, May to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	......	......	......	......	......	......	......	......	67	67	77	71
2	......	......	......	......	......	......	......	......	65	67	75	68
3	......	......	......	......	......	......	......	......	......	68	76	67
4	......	......	......	......	......	......	......	......	58	67	......	65
5	......	......	......	......	......	......	......	......	57	66	......	64
6	......	......	......	......	......	......	......	......	58	67	......	67
7	......	......	......	......	......	......	......	......	60	71	......	63
8	......	......	......	......	......	......	......	......	59	71	......	65
9	......	......	......	......	......	......	......	58	68	72	......	66
10	......	......	......	......	......	......	......	55	64	70	......	63
11	......	......	......	......	......	......	......	57	64	67	73	65
12	......	......	......	......	......	......	......	58	66	66	72	63
13	......	......	......	......	......	......	......	59	67	65	69	62
14	......	......	......	......	......	......	......	59	69	68	65	61
15	......	......	......	......	......	......	......	60	69	71	68	60
16	......	......	......	......	......	......	......	62	69	74	68	58
17	......	......	......	......	......	......	......	64	72	75	65	57
18	......	......	......	......	......	......	......	64	72	76	67	59
19	......	......	......	......	......	......	......	65	70	76	69	61
20	......	......	......	......	......	......	......	65	68	76	70	61
21	......	......	......	......	......	......	......	66	68	77	69	62
22	......	......	......	......	......	......	......	66	67	77	68	57
23	......	......	......	......	......	......	......	65	65	77	68	58
24	......	......	......	......	......	......	......	66	68	77	68	55
25	......	......	......	......	......	......	......	66	69	77	68	54
26	......	......	......	......	......	......	......	66	71	77	68	55
27	......	......	......	......	......	......	......	61	73	79	68	52
28	......	......	......	......	......	......	......	61	70	78	70	49
29	......	......	......	......	......	......	......	64	71	78	74	51
30	......	......	......	......	......	......	......	67	68	77	75	53
31	......	......	......	......	......	......	......	67	......	76	75	......
Average	......	......	......	......	......	......	......	......	66	72	......	60

Temperature (°F) of water, water year October 1951 to September 1952

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	......	40	39	......	......	......	40	63	62	77	71	68
2	60	38	41	......	......	33	39	69	66	79	74	63
3	60	......	39	......	......	......	39	65	66	76	72	59
4	63	......	39	......	......	......	39	67	68	75	69	63
5	60	35	38	......	......	......	39	72	70	74	67	62
6	57	34	41	......	......	......	38	64	73	75	66	68
7	53	......	39	......	......	33	42	61	76	68	69	68
8	50	38	......	......	......	......	47	57	75	67	69	69
9	56	40	......	......	......	34	42	55	70	68	67	70
10	52	43	34	......	......	36	41	53	72	71	70	71
11	54	41	......	......	......	35	40	50	74	73	69	70
12	55	46	......	33	......	33	40	51	78	75	65	69
13	58	45	......	......	......	33	38	53	81	74	68	69
14	58	40	......	......	......	35	38	58	77	72	73	67
15	......	38	......	......	......	34	40	60	74	68	76	62
16	55	......	......	......	34	34	43	57	77	70	69	[illegible]
17	56	......	......	......	35	38	48	56	70	75	70	63
18	50	......	......	......	35	35	51	57	75	76	70	64
19	46	37	......	34	35	35	53	56	70	78	72	57
20	45	37	......	......	......	35	56	57	70	79	76	58
21	48	37	......	......	......	36	58	59	70	76	70	53
22	44	......	......	......	......	......	56	60	72	78	67	56
23	43	33	......	......	......	......	54	60	74	74	68	50
24	41	......	......	......	......	33	53	60	77	74	67	56
25	44	......	......	......	......	33	54	62	78	76	68	56
26	47	......	......	32	......	34	57	64	75	74	67	57
27	43	37	......	......	36	38	59	65	73	76	73	58
28	42	36	......	......	33	38	61	62	77	77	73	61
29	43	38	34	......	......	36	63	59	78	68	71	58
30	48	38	......	......	......	41	64	62	80	70	70	62
31	42	......	......	......	......	41	......	61	......	70	70	......
Average	51	......	......	......	......	......	48	60	73	74	70	62

Little Sioux River at Correctionville, Iowa—Continued

Temperature (°F) of water, water year October 1952 to September 1953

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	60	53	......	......	......	......	44	48	69	76	78	77
2	53	......	......	......	......	......	43	47	68	78	78	77
3	51	47	32	32	......	......	41	47	68	75	78	71
4	50	49	......	......	......	......	......	49	71	76	75	64
5	46	......	......	......	32	32	......	57	67	75	75	62
6	......	......	34	......	......	......	46	53	62	71	75	64
7	44	41	......	......	......	......	45	56	......	72	72	61
8	44	42	......	......	......	......	46	60	60	73	71	64
9	45	39	......	......	......	......	45	62	62	71	70	66
10	46	41	......	32	......	......	42	62	65	70	71	68
11	49	47	......	......	......	......	......	59	70	71	74	68
12	50	46	......	......	......	......	......	54	74	70	70	63
13	48	44	32	......	......	......	41	48	75	70	73	60
14	45	47	......	......	33	......	46	53	76	73	74	60
15	......	48	......	......	......	......	43	54	77	73	70	61
16	44	......	......	......	......	......	40	58	74	74	71	59
17	......	......	......	32	......	......	......	58	74	74	70	62
18	53	45	......	......	......	......	......	60	77	76	70	63
19	......	41	......	......	......	......	......	60	79	78	70	60
20	47	41	32	......	......	40	......	64	78	78	70	62
21	46	41	......	......	......	50	......	58	75	76	70	56
22	......	40	......	......	......	43	50	58	74	73	68	53
23	52	40	......	......	32	40	52	60	74	75	66	57
24	......	31	......	32	......	......	56	60	75	74	70	55
25	......	35	......	......	......	......	57	68	71	77	73	50
26	......	......	......	......	......	......	44	67	......	79	73	57
27	48	......	33	......	......	39	44	66	71	77	74	56
28	41	......	......	......	......	......	48	64	70	77	73	58
29	43	32	......	......	......	42	47	70	73	77	75	64
30	48	......	......	......	......	46	48	72	76	74	76	55
31	49	......	......	32	......	43	......	69	......	76	77	......
Average	......	......	......	a32	a32	......	......	59	72	74	73	62

Temperature (°F) of water, water year October 1953 to September 1954

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	......	47	......	......	......	36	45	47	59	75	71	......
2	......	48	......	35	......	......	39	46	57	77	72	74
3	......	48	......	......	......	......	38	44	56	77	71	73
4	......	46	......	......	......	......	37	43	56	76	72	73
5	......	42	35	......	......	33	40	47	61	77	71	74
6	......	40	......	......	33	40	45	48	65	78	70	74
7	......	40	......	......	......	38	57	46	68	75	71	70
8	50	40	......	......	......	38	48	49	67	76	69	68
9	48	39	......	......	......	34	48	47	70	77	72	67
10	51	42	......	......	......	37	50	51	71	77	73	61
11	51	41	......	33	......	36	49	53	71	77	73	62
12	53	42	35	34	......	......	48	55	73	81	69	65
13	55	42	......	......	35	......	52	56	73	80	70	67
14	56	43	......	......	......	......	57	61	75	80	70	66
15	57	45	......	......	......	37	61	63	70	76	73	64
16	58	45	......	33	35	37	50	65	70	77	77	64
17	60	45	......	......	......	37	51	63	......	77	72	65
18	61	51	......	......	......	40	54	63	75	76	70	65
19	60	47	36	......	36	38	54	60	67	75	70	65
20	62	44	......	......	36	41	55	59	69	77	72	64
21	62	40	......	......	34	41	52	60	69	73	73	58
22	58	......	......	......	35	39	50	63	70	73	71	55
23	55	......	......	33	34	40	54	60	72	72	73	57
24	52	......	32	......	34	41	59	65	74	71	74	60
25	50	......	......	......	38	39	58	61	77	73	75	56
26	47	......	......	......	35	38	63	63	80	76	76	58
27	47	......	......	......	39	38	60	60	78	76	76	62
28	52	35	......	......	35	38	58	62	79	75	76	65
29	52	......	......	......	......	37	58	62	......	72	78	63
30	58	......	......	33	......	39	49	64	75	70	76	57
31	48	......	......	......	......	40	......	67	......	72	73	......
Average	......	......	......	......	......	38	51	57	70	76	73	65

a Includes estimated temperature, 32°F, on missing days.

Little Sioux River at Correctionville, Iowa—Continued

Suspended sediment, May to September 1950

Day	April			May			June		
		Suspended sediment			Suspended sediment			Suspended sediment	
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1	....	....	....	....	....	....	250	110	74
2	....	....	....	....	....	....	265	170	120
3	....	....	....	....	....	....	265	150	110
4	....	....	....	....	....	....	236	100	64
5	....	....	....	....	....	....	208	100	56
6	....	....	....	....	....	....	198	120	64
7	....	....	....	....	....	....	183	110	54
8	....	....	....	....	....	....	173	90	42
9	....	....	....	....	....	....	150	80	34
10	....	....	....	....	....	....	144	80	31
11	....	....	....	....	....	....	138	90	34
12	....	....	....	....	....	....	729	7,010	s28,600
13	....	....	....	....	....	....	458	850	s1,210
14	....	....	....	....	....	....	310	500	430
15	....	....	....	....	....	....	303	570	470
16	....	....	....	....	....	....	250	420	290
17	....	....	....	....	....	....	394	1,400	s1,980
18	....	....	....	....	....	....	0,180	11,400	190,000
19	....	....	....	....	....	....	2,230	3,040	s20,900
20	....	....	....	....	....	....	1,400	2,300	8,690
21	....	....	....	....	....	....	1,440	1,920	7,460
22	....	....	....	....	....	....	1,620	3,740	s17,200
23	....	....	....	....	....	....	1,260	2,110	7,290
24	....	....	....	439	210	250	1,000	1,100	2,970
25	....	....	....	420	200	230	860	750	1,780
26	....	....	....	401	140	150	760	620	1,310
27	....	....	....	358	120	120	672	560	1,020
28	....	....	....	323	110	96	565	430	660
29	....	....	....	337	210	sb220	475	330	420
30	....	....	....	340	280	260	420	300	340
31	....	....	....	284	120	92	....	....	....

Day	July			August			September		
1	371	220	220	640	450	780	131	120	42
2	336	180	160	625	600	1,010	127	120	41
3	301	170	140	565	650	990	120	110	36
4	290	160	130	505	400	550	112	90	27
5	270	150	110	460	350	430	108	90	26
6	244	130	86	420	260	290	103	90	25
7	219	120	71	445	910	sb1,200	99	90	24
8	199	90	48	432	800	930	95	90	23
9	232	160	100	350	250	240	91	80	20
10	279	200	150	336	250	230	89	90	22
11	293	1,300	sb2,000	411	990	sb3,800	88	100	24
12	1,820	12,200	s62,800	1,070	6,100	sb30,000	85	90	21
13	800	2,650	s6,260	347	600	560	82	130	29
14	655	800	1,410	312	600	510	82	100	22
15	725	2,100	sb5,400	279	400	300	82	110	24
16	1,000	7,620	s23,200	255	270	190	81	110	24
17	708	1,370	2,620	336	790	s760	81	110	24
18	980	2,430	s7,000	259	260	180	79	110	23
19	1,080	2,980	8,690	219	200	120	77	120	25
20	980	1,250	3,310	195	140	74	114	130	sb48
21	1,440	2,380	930	182	150	74	201	360	b200
22	1,540	1,730	720	172	170	79	445	990	s1,240
23	1,490	1,340	540	162	170	74	505	1,500	2,050
24	1,720	1,630	760	150	160	65	445	950	1,140
25	1,580	1,250	530	142	150	58	383	600	620
26	1,240	960	320	138	130	48	301	300	240
27	1,080	960	280	142	120	46	249	200	130
28	1,000	1,730	4,670	145	110	43	206	150	83
29	840	980	2,220	140	110	42	187	190	96
30	725	590	1,150	138	130	48	173	150	70
31	672	400	730	136	130	48	....	....	....

s Computed by subdividing day.
b Computed from a partly estimated concentration graph.

Little Sioux River at Correctionville, Iowa—Continued

Suspended sediment, water year October 1950 to September 1951

Day	October Mean discharge (cfs)	October Suspended sediment Mean concentration (ppm)	October Suspended sediment Tons per day	November Mean discharge (cfs)	November Suspended sediment Mean concentration (ppm)	November Suspended sediment Tons per day	December Mean discharge (cfs)	December Suspended sediment Mean concentration (ppm)	December Suspended sediment Tons per day
1	178	143	60	98	80	21	67	....	
2	336	257	233	97	45	12	68	67	
3	268	225	163	102	34	9	67	....	
4	219	111	66	97	30	8	66	....	
5	226	85	52	96	32	8	66	....	e9
6	253	130	89	95	38	10	64	....	
7	253	162	111	94	46	11	62	....	
8	236	125	80	95	48	12	62	....	
9	215	103	60	90	27	7	60	36	
10	201	120	65	81	....		60	....	
11	183	113	56	77	....		58	....	
12	166	98	44	79	....		58	....	
13	158	89	38	92	....		56	....	
14	148	88	35	94	52		56	....	
15	140	97	37	103	59	e13	54	....	e6
16	134	100	36	100	....		54	44	
17	130	100	35	94	55		52	....	
18	127	102	35	96	55		52	....	
19	121	108	35	99	....		50	....	
20	117	95	30	79	....		50	....	
21	115	82	25	77	....		50	....	
22	112	78	24	94	....		50	....	
23	111	43	13	75			50	49	
24	109	33	10	85			50	....	
25	109	39	11	67			50	....	e7
26	109	47	14	66	....	e12	48	....	
27	109	66	19	69			48	....	
28	105	64	18	68			46	....	
29	104	59	16	67			46	....	
30	102	54	15	67			45	45	
31	102	79	22	....	....	....	45	....	
	January			**February**			**March**		
1	44	....		28	....		800	....	e2,200
2	44	....		27	....		580	....	e950
3	42	....		27	59		445	....	e420
4	42	....		27	....		347	280	262
5	40	....	e4	27	....		300	150	122
6	40	40		27	113		578	....	e600
7	38	....		27	....		400	....	e320
8	38	....		27	....		264	....	e100
9	38	....		27	....		240		
10	37	....		27	50		210		
11	37	....		30	....	e5	200		
12	37	85		35	....		190	....	e30
13	37	69		40	....		180		
14	37	....		35	....		170		
15	37	....	e7	32	....		165		
16	37	....		30	....		160		
17	37	....		28	10		157		
18	37	....		27	....		157		
19	37	....		30	....		160		
20	37	55		35	....		145	....	e50
21	36	....		40	....		130		
22	34	....		50	....	e6	128		
23	34	....		60	....	e7	197	....	e80
24	32	....		70	....	e8	371	....	e300
25	32	....		100	36	10	340	....	e280
26	30	52	e4	200	....	e200	2,500	2,410	s33,900
27	30	....		395	....	e800	6,900	2,540	47,000
28	30	....		1,200	2,000	s7,380	7,680	1,260	26,100
29	28	....		....	....	....	7,680	920	19,100
30	28	....		....	....	....	7,250	770	15,100
31	28	....		....	....	....	7,120	580	11,100

e Estimated.
s Computed by subdividing day.
Note.—Flow affected by ice Dec. 6 to Feb. 26, Mar. 5-7, 9-16, 26.

Little Sioux River at Correctionville, Iowa—Continued

Suspended sediment, water year October 1950 to September 1951—Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	6,480	530	9,270	4,920	3,460	46,000	1,400	1,160	4,380
2	5,600	770	11,600	5,100	1,200	16,500	2,350	1,660	10,500
3	5,200	1,160	16,300	5,400	650	9,480	2,700	1,400	b10,000
4	6,360	980	16,800	5,400	520	7,580	2,850	850	6,540
5	8,540	1,020	23,500	5,400	470	6,850	3,000	620	5,020
6	12,400	830	27,800	5,700	360	5,540	3,100	530	4,440
7	17,000	580	26,600	5,200	330	4,630	3,370	740	6,730
8	16,600	430	19,300	4,360	475	5,590	3,550	760	7,280
9	12,800	370	12,800	3,850	2,300	s24,800	3,000	660	5,350
10	10,200	270	7,440	3,790	1,070	10,900	2,400	500	3,240
11	8,160	310	6,830	3,490	710	6,690	2,080	420	2,360
12	7,120	340	6,540	3,050	600	4,940	1,900	410	2,100
13	6,360	360	6,180	2,800	530	4,010	1,720	380	1,760
14	5,800	420	6,580	2,700	480	3,500	1,540	380	1,580
15	5,200	530	7,440	2,450	470	3,110	1,490	410	1,650
16	4,680	640	8,090	2,160	1,020	5,950	1,400	400	1,510
17	4,060	800	8,770	2,120	1,830	10,500	1,400	390	1,470
18	3,670	830	8,220	1,800	600	2,920	1,670	1,420	s6,730
19	3,310	780	6,970	1,760	460	2,180	2,320	5,090	s40,200
20	2,900	750	5,870	1,720	410	1,900	2,300	2,550	s17,200
21	2,850	740	5,690	1,720	410	1,900	1,900	750	3,850
22	2,750	710	5,270	1,760	480	2,280	1,900	580	2,980
23	2,600	660	4,630	1,720	390	1,810	1,940	1,130	s6,380
24	2,550	620	4,280	1,580	370	1,580	2,120	2,140	12,200
25	2,600	620	4,350	1,440	350	1,360	2,030	1,620	8,880
26	2,600	550	3,860	1,360	340	1,250	2,300	2,520	15,600
27	2,550	610	4,200	1,240	320	1,070	2,650	1,660	11,900
28	2,500	570	3,850	1,120	300	907	2,850	1,220	9,390
29	2,600	630	4,420	1,080	280	816	2,750	720	5,350
30	3,460	2,320	s28,000	1,000	270	729	2,750	590	4,380
31	....	....	....	1,080	880	2,570	....	....	....

Day	July			August			September		
1	2,850	560	4,310	1,120	570	1,720	1,760	500	2,380
2	3,000	610	4,940	1,670	3,630	s18,600	1,540	420	1,750
3	3,430	650	6,020	1,440	1,600	6,220	1,400	350	1,320
4	3,790	1,350	13,800	1,280	650	a2,200	1,320	280	998
5	4,440	960	11,500	1,280	550	a1,900	1,240	310	1,040
6	5,100	500	6,880	1,200	550	a1,800	1,160	320	1,000
7	3,990	510	5,490	1,120	850	a2,600	1,080	300	875
8	3,610	500	4,870	1,120	700	a2,100	1,040	300	842
9	3,490	500	4,710	1,080	900	a2,600	1,400	2,240	s9,550
10	3,490	700	6,600	1,120	1,500	4,540	1,670	1,240	5,590
11	2,750	640	4,750	1,040	590	1,660	2,850	1,370	10,500
12	2,500	600	4,050	1,040	650	1,820	4,520	2,760	33,700
13	3,000	670	5,430	1,850	2,480	12,400	4,360	1,130	13,300
14	3,100	550	4,600	5,400	4,260	62,100	4,520	620	7,570
15	3,050	480	3,950	5,800	840	13,200	4,130	600	6,690
16	2,950	490	3,900	4,600	860	10,700	3,790	530	5,420
17	3,000	570	4,620	5,600	2,130	s34,700	3,850	480	4,990
18	3,100	570	4,770	3,790	670	6,860	3,920	470	4,970
19	2,850	570	4,390	3,250	660	5,790	3,920	470	4,970
20	2,650	770	5,510	3,490	1,490	s14,600	3,430	600	5,560
21	2,750	1,900	14,100	2,750	790	5,860	2,450	550	3,640
22	2,900	1,480	11,600	2,210	640	3,820	2,030	475	2,600
23	2,850	1,160	8,930	1,940	590	3,090	1,800	360	1,750
24	2,650	720	5,150	1,720	580	2,690	1,720	320	1,490
25	2,650	640	4,580	1,620	670	2,930	1,670	300	1,350
26	2,550	590	4,060	1,490	550	2,210	1,670	280	1,260
27	1,980	620	3,310	2,030	2,940	s17,200	1,580	270	1,150
28	1,580	770	3,280	2,800	3,510	26,500	1,580	250	1,070
29	1,440	750	2,920	2,500	1,140	7,700	1,490	220	885
30	1,320	680	2,420	2,300	760	4,720	1,400	220	832
31	1,240	600	2,010	2,030	590	3,230	....	....	....

s Computed by subdividing day.
a Computed from an estimated concentration graph.
b Computed from a partly estimated concentration graph.

Little Sioux River at Correctionville, Iowa—Continued

Suspended sediment, water year October 1951 to September 1952

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	1,300	220	772	980	125	331	722	110	214
2	1,220	190	626	920	81	201	820	160	354
3	1,220	320	1,050	860	80	a100	860	220	511
4	1,500	910	3,680	640	85	a150	840	222	503
5	1,340	420	1,520	470	88	112	860	188	436
6	1,380	300	1,120	560	104	157	860	209	485
7	1,340	220	796	660	107	191	840	210	476
8	1,340	169	611	800	111	240	820	....	e440
9	1,260	182	619	860	137	318	800	....	e360
10	1,180	156	497	860	160	369	740	145	290
11	1,140	156	480	820	133	294	705	....	e260
12	1,100	158	469	840	141	320	654	....	e220
13	1,060	158	452	860	148	344	413	....	e130
14	1,060	152	435	840	122	277	227	....	e60
15	1,000	147	397	800	107	231	368	....	e220
16	960	138	365	760	100	a200	450	....	e380
17	940	132	335	705	95	a180	523	....	e420
18	920	137	340	622	90	a150	560		
19	900	120	292	540	88	128	570		
20	900	104	253	560	110	166	570		
21	920	110	273	600	116	188	560		
22	1,000	165	446	620	97	b162	550		
23	1,060	146	418	460	82	100	530		
24	1,100	135	401	420	80	a90	510	....	e200
25	1,140	135	416	360	80	a80	500		
26	1,180	155	494	430	85	a100	480		
27	1,180	140	446	520	86	121	470		
28	1,140	120	369	570	85	131	460		
29	1,100	103	306	620	93	156	460		
30	1,060	113	323	670	115	208	450		
31	1,020	132	364	....	....	....	440		
	January			February			March		
1	430	....	e140	580	....	e170	1,430	460	1,780
2	420	....	e140	660	....	e220	1,230	310	1,030
3	410	....	e130	740	....	e280	1,100	....	e750
4	400	....	e130	830	....	e360	950	....	e550
5	385	124	126	780	....	e200	900	....	e340
6	380	....	e130	660	....	e100	900	....	e200
7	380	....	e110	560	34	51	1,420	107	410
8	380	....	e90	640	....	e100	1,260	120	a400
9	375	....	e70	730	....	e280	1,060	178	509
10	370	....	e50	940	....	e460	820	395	874
11	370	....	e40	1,700	....	e1,600	900	460	1,120
12	370	40	40	2,500	....	e2,800	2,300	3,000	sb31,000
13	370	....	e40	3,000	....	e3,700	4,060	2,860	s34,200
14	370	....	e40	3,700	....	e5,200	1,850	920	4,600
15	370	....	e50	3,300	....	e4,300	2,100	1,440	8,160
16	370	57	57	3,000	460	3,730	2,200	1,240	7,360
17	375	85	86	2,600	410	2,890	2,550	1,750	12,000
18	375	....	e70	2,400	....	e2,600	3,150	3,250	27,600
19	540	43	63	2,150	....	e2,300	4,580	3,170	39,200
20	1,800	....	e1,500	2,000	....	e2,200	5,000	1,390	18,800
21	1,040	....	e550	1,800	....	e2,200	4,240	1,490	17,000
22	800	....	e300	1,500	....	e2,000	3,540	1,000	a9,600
23	690	....	e200	1,370	....	e1,900	3,000	650	a5,300
24	580	....	e130	1,200	....	e1,800	2,700	540	3,940
25	530	....	e80	1,100	....	e1,700	2,400	600	3,890
26	500	44	59	1,000	....	e1,600	2,100	670	3,600
27	470			1,100	1,110	3,300	1,900	630	3,230
28	460			1,200	1,030	3,340	2,300	800	4,970
29	440	....	e50	1,280	600	a2,100	3,760	3,410	s44,200
30	430			....	....	....	5,800	2,470	38,700
31	490			....	....	....	6,460	1,290	22,600

e Estimated.
s Computed by subdividing day.
a Computed from an estimated concentration graph.
b Computed from a partly estimated concentration graph.

Note.—Flow affected by ice Nov. 4-7, 19-30, Dec. 18 to Mar. 6, Mar. 23-27.

Little Sioux River at Correctionville, Iowa—Continued

Suspended sediment, water year October 1951 to September 1952—Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	7,390	720	14,400	1,460	233	918	688	146	271
2	6,480	540	9,450	1,380	250	932	638	189	326
3	7,830	590	12,500	1,340	204	738	605	173	282
4	10,100	420	11,400	1,300	186	653	556	153	230
5	8,760	300	7,100	1,220	177	583	572	360	556
6	7,250	260	5,090	1,180	166	529	556	181	272
7	6,480	267	4,670	1,140	263	810	539	169	246
8	5,800	317	4,960	1,140	332	1,020	740	2,100	sb4,800
9	5,200	438	6,150	1,100	228	677	638	1,380	s2,460
10	4,580	534	6,600	1,140	212	652	572	352	544
11	4,120	553	6,150	1,140	198	609	539	274	399
12	3,820	562	5,800	1,100	183	544	507	269	368
13	3,760	502	5,100	1,100	178	529	507	179	245
14	3,540	471	4,500	1,060	177	506	608	1,240	s2,510
15	3,260	438	3,860	1,020	212	584	588	1,070	1,700
16	3,050	430	3,540	1,020	220	606	588	430	683
17	2,900	430	3,370	980	150	397	622	520	873
18	2,800	412	3,110	940	172	436	820	830	1,840
19	2,650	416	2,980	900	159	386	1,020	1,100	3,030
20	2,500	386	2,600	860	174	404	1,390	3,150	s12,500
21	2,400	384	2,490	840	232	526	1,180	1,200	3,820
22	2,350	401	2,540	840	215	488	1,020	730	2,010
23	2,300	386	2,400	960	465	1,200	940	570	1,450
24	2,200	341	2,020	960	353	915	860	570	1,320
25	2,100	308	1,750	920	250	621	860	680	1,580
26	2,050	292	1,620	880	195	463	820	590	1,310
27	1,950	290	1,530	880	238	565	920	880	2,180
28	1,800	269	1,310	860	205	476	900	620	1,510
29	1,660	240	1,080	800	185	400	980	670	1,770
30	1,580	234	998	760	183	376	980	750	1,980
31	....	....	....	705	161	306	....	....	....

Day	July			August			September		
1	1,060	800	2,290	383	240	248	556	431	647
2	1,340	1,810	6,550	428	600	sb800	491	319	423
3	1,140	1,590	4,890	475	640	s889	360	193	108
4	980	980	2,590	345	217	202	315	117	100
5	860	670	1,560	320	190	164	271	184	135
6	928	2,100	sb8,200	312	150	126	241	174	113
7	4,840	9,620	s111,000	310	167	140	225	148	90
8	4,280	2,630	30,400	305	176	145	209	146	82
9	2,750	1,810	13,400	295	191	152	194	133	70
10	2,450	1,160	7,670	292	179	141	180	110	53
11	2,050	900	4,980	266	154	111	174	117	55
12	1,800	780	3,790	262	146	103	168	129	58
13	1,500	750	3,040	266	141	101	162	142	62
14	1,340	900	3,260	275	139	103	178	139	67
15	1,180	670	2,130	273	112	82	168	116	53
16	1,060	510	1,460	418	193	s237	162	117	51
17	1,000	461	1,240	350	180	170	159	130	56
18	940	435	1,100	318	151	130	154	126	53
19	900	402	977	278	108	81	149	106	43
20	820	408	903	273	104	77	146	103	41
21	780	388	817	247	95	63	141	107	41
22	705	370	704	225	123	75	145	98	38
23	671	400	725	213	134	77	142	90	34
24	622	357	600	204	143	79	138	92	34
25	588	340	540	192	140	73	138	92	34
26	539	323	470	188	132	67	136	78	29
27	507	292	400	183	140	69	131	78	28
28	491	278	368	365	357	s368	129	81	28
29	459	258	320	507	631	864	125	76	26
30	428	257	297	491	507	672	124	74	25
31	413	202	225	507	494	676	....	....	....

s Computed by subdividing day.
b Computed from a partly estimated concentration graph.

Little Sioux River at Correctionville, Iowa—Continued

Suspended sediment, water year October 1952 to September 1953

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	120	65	21	118	65	21	75	....	
2	115	55	17	117	66	21	75	....	
3	117	28	9	114	60	18	75	26	
4	113	23	7	117	58	18	76	....	
5	111	55	16	118	58	18	78	....	
6	111	61	18	117	61	19	80	58	
7	113	37	11	112	40	15	82	....	
8	118	52	17	117	45	14	84	....	
9	119	62	20	116	45	14	86	....	
10	120	66	21	117	40	13	88	....	
11	119	75	24	119	46	15	90	....	
12	121	78	25	119	49	16	88	....	
13	123	70	23	121	56	18	86	35	
14	121	58	19	121	63	21	82	....	
15	116	50	a16	121	58	19	80	....	e13
16	116	46	15	121	68	22	78	....	
17	120	45	15	124	80	27	76	....	
18	116	53	17	124	82	27	73	....	
19	119	49	16	123	57	19	70	....	
20	119	48	15	121	44	14	70	42	
21	116	60	19	124	40	13	72	....	
22	119	41	13	124	25	8	72	....	
23	118	53	17	124	21	7	72	....	
24	116	60	a19	124	16	6	74	....	
25	119	65	21	126	14	5	74	....	
26	119	63	20	84	13	a3	72	....	
27	117	65	21	80	....		76	146	
28	114	30	11	78	....	e7	76	....	
29	115	32	10	76	35		78	....	
30	119	32	10	75	....		78	....	
31	116	32	10	....	....	....	80	....	

Day	January			February			March		
1	80	....		105	....		170	....	
2	82	....		105	....		210	....	
3	82	46		105	....		220	....	
4	84	....		105	....		210	....	
5	84	....		105	18		203	10	e7
6	86	....		105	....		190	....	
7	86	....		105	27		160	18	
8	88	....		105	....		160	....	
9	88	14		105	....		200		
10	90	45		105	....		300	....	e100
11	90	....		105	....		450		
12	90	....		105	....		800	580	1,250
13	92	....		105	....		1,240	1,020	3,410
14	92	....		105	14		1,990	1,980	10,600
15	94	....	e7	105	....	e16	2,140	1,520	8,780
16	94	....		105	....		1,790	1,010	4,880
17	96	22		105	....		1,740	1,010	4,750
18	96	....		105	....		2,090	1,260	7,110
19	96	....		105	....		2,490	1,440	9,680
20	99	....		105	....		2,340	1,160	7,330
21	99	....		105	....		2,140	1,060	6,120
22	99	....		105	....		2,090	926	5,230
23	100	....		105	150		2,090	817	4,610
24	100	17		105	....		1,740	715	3,360
25	100	....		105	....		1,500	580	2,350
26	105	....		110	....		1,320	466	1,660
27	105	....		120	....		1,190	300	964
28	105	....		150	....		1,070	316	913
29	105	....		....	....	....	990	345	922
30	105	....		....	....	....	1,110	754	2,260
31	105	9		....	....	....	1,110	502	1,500

e Estimated.
s Computed by subdividing day.
a Computed from an estimated concentration graph.
Note.—Flow affected by ice Nov. 27 to Mar. 12.

Little Sioux River at Correctionville, Iowa—Continued

Suspended sediment, water year October 1952 to September 1953—Continued

Day	April: Mean discharge (cfs)	April: Suspended sediment, Mean concentration (ppm)	April: Suspended sediment, Tons per day	May: Mean discharge (cfs)	May: Suspended sediment, Mean concentration (ppm)	May: Suspended sediment, Tons per day	June: Mean discharge (cfs)	June: Suspended sediment, Mean concentration (ppm)	June: Suspended sediment, Tons per day
1	1,070	291	841	1,220	309	1,020	587	204	323
2	1,070	291	841	1,380	431	1,610	566	188	287
3	1,110	286	857	1,550	540	2,260	550	208	309
4	1,070	256	740	1,660	560	2,510	552	188	280
5	1,030	253	704	1,730	596	2,780	545	194	286
6	1,010	242	660	1,740	673	3,160	552	203	303
7	970	223	584	1,660	598	2,680	880	3,000	sb13,000
8	950	190	488	1,550	570	2,390	4,500	7,390	s85,500
9	910	170	a420	1,420	547	2,100	7,780	2,950	62,000
10	870	156	366	1,320	560	b2,000	9,940	1,350	36,200
11	830	139	312	1,210	437	1,430	6,750	720	13,100
12	790	135	288	1,090	361	1,060	13,600	1,100	40,400
13	755	159	324	1,010	300	818	13,400	494	17,900
14	720	179	348	962	235	610	9,350	340	8,580
15	772	225	469	918	222	550	7,790	295	6,200
16	850	249	571	890	247	594	7,000	295	5,580
17	850	208	477	834	216	486	6,060	310	5,070
18	810	144	315	822	211	468	5,170	448	6,250
19	790	122	260	772	238	496	4,110	688	7,630
20	755	101	206	727	124	243	3,440	752	6,980
21	738	97	193	706	186	355	2,960	720	5,750
22	702	117	222	734	224	444	2,600	683	4,790
23	668	127	229	724	228	446	2,300	584	3,630
24	685	160	296	762	260	535	2,020	595	3,250
25	755	164	334	822	218	484	4,240	4,650	53,200
26	755	115	234	776	127	266	3,190	2,260	19,500
27	810	110	241	720	239	465	2,200	1,560	9,300
28	930	176	412	682	207	381	2,530	2,800	19,100
29	1,030	269	748	654	213	376	2,300	1,430	8,880
30	1,150	294	913	629	204	346	2,250	1,060	6,440
31	....	....	....	594	218	350	....	....	....

Day	July: Mean discharge (cfs)	July: Mean concentration (ppm)	July: Tons per day	August: Mean discharge (cfs)	August: Mean concentration (ppm)	August: Tons per day	September: Mean discharge (cfs)	September: Mean concentration (ppm)	September: Tons per day
1	2,390	988	6,380	720	513	997	337	113	103
2	2,840	1,220	9,350	910	1,210	2,970	324	98	86
3	3,240	854	7,470	1,400	1,980	7,490	312	97	82
4	3,140	670	5,680	1,500	1,660	6,720	303	88	72
5	2,590	607	4,240	1,500	1,090	4,410	285	76	58
6	2,140	538	3,110	2,240	2,060	s13,100	271	78	57
7	1,840	504	2,500	2,390	1,450	9,360	257	70	49
8	1,640	494	2,190	2,140	895	5,170	247	69	46
9	1,600	555	2,400	1,990	715	3,840	234	81	51
10	1,550	578	2,420	1,550	620	2,590	225	83	50
11	1,370	500	1,850	1,420	745	2,860	213	81	47
12	1,240	459	1,540	1,280	660	2,280	201	64	35
13	1,150	456	1,420	1,150	466	1,450	192	59	31
14	1,070	443	1,280	1,150	484	1,500	186	58	29
15	1,010	419	1,140	1,240	572	1,920	182	62	31
16	950	390	1,000	1,190	446	1,430	174	65	31
17	890	393	945	1,030	387	1,080	167	59	27
18	850	390	895	930	361	906	160	52	22
19	790	360	768	850	331	760	155	64	27
20	755	372	758	773	315	657	148	61	24
21	738	364	725	720	303	589	141	57	22
22	720	349	678	650	273	479	138	58	22
23	685	300	555	615	251	417	135	67	24
24	650	294	516	562	221	335	134	64	23
25	615	286	475	528	203	289	133	65	22
26	598	293	473	494	176	235	131	63	22
27	598	310	501	462	166	207	128	59	20
28	562	290	440	431	150	175	127	66	23
29	650	850	sb1,800	388	137	144	125	76	26
30	1,010	1,700	b4,600	375	130	132	123	77	26
31	910	1,220	3,000	362	126	123	....	....	....

s Computed by subdividing day.
a Computed from an estimated concentration graph.
b Computed from a partly estimated concentration graph.

Little Sioux River at Correctionville, Iowa—Continued

Suspended sediment, water year October 1953 to September 1954

Day	October: Mean discharge (cfs)	October: Suspended sediment: Mean concentration (ppm)	October: Suspended sediment: Tons per day	November: Mean discharge (cfs)	November: Suspended sediment: Mean concentration (ppm)	November: Suspended sediment: Tons per day	December: Mean discharge (cfs)	December: Suspended sediment: Mean concentration (ppm)	December: Suspended sediment: Tons per day
1.....	120	....		117			130	....	e10
2.....	118	....		117			141	....	
3.....	110	....	e25	117	60	19	174	....	e20
4.....	113	....		116			213	....	e35
5.....	111	....		111			203	55	30
6.....	109			105			169	....	
7.....	108			110	34	.10	160	....	e17
8.....	110	91	27	116			182	....	
9.....	112			122			129	....	
10.....	114			130			132	....	
11.....	117			131			140	....	e13
12.....	119			131			145	32	
13.....	122	102	34	134	66	24	150	....	
14.....	125			136			140	....	
15.....	128			137			130	....	
16.....	132	107	38	136			128	....	e9
17.....	133	108	39	135			127	....	
18.....	139	155	58	134	121	44	122	....	
19.....	122	119	39	144	131	51	120	54	
20.....	118			179	97	47	120	....	
21.....	117	108	34	182	56	28	118	....	
22.....	116			176	....	e20	116	....	e13
23.....	116			166	....		114	....	
24.....	116			165	....	e15	112	42	
25.....	117			164	....		110	....	
26.....	118			156	....		108	....	
27.....	118	72	23	150	....		107	....	
28.....	118			142	25	e10	106	....	
20.....	118			136	....		103	....	e7
30.....	118			130	....		102	....	
31.....	117			....	....	....	100	....	

Day	January: Mean discharge (cfs)	January: Mean concentration (ppm)	January: Tons per day	February: Mean discharge (cfs)	February: Mean concentration (ppm)	February: Tons per day	March: Mean discharge (cfs)	March: Mean concentration (ppm)	March: Tons per day
1.....	97	....		40	....		628	476	807
2.....	95	18		40	....		548	360	a530
3.....	94	....		40	....		300	120	a97
4.....	92	....		42	....	e2	220	100	a59
5.....	91	....		44	....		250	199	134
6.....	90	....		46	20		300	200	162
7.....	83	....		48	....		350	117	111
8.....	78	....		52	....		400	188	203
9.....	74	....		55	....		501	267	361
10.....	70	....		60	....	e3	568	373	572
11.....	60	22		66	....		738	772	1,530
12.....	62	18		72	....		724	590	a1,200
13.....	59	....		84	14		520	280	a390
14.....	56	....		100	....		370	175	a170
15.....	54	....		115	....		397	190	ab210
16.....	54	86	e5	145	33	e10	556	275	s430
17.....	52	....		150	....		1,030	1,870	s6,020
18.....	50	....		160	....		1,810	3,120	15,200
19.....	48	....		190	19		2,100	3,460	19,600
20.....	46	....		560	858	s1,540	1,940	2,410	12,600
21.....	45	....		761	845	1,740	1,900	2,060	10,600
22.....	44	....		952	1,210	3,110	1,990	1,880	10,100
23.....	43	64		866	1,120	2,620	2,170	1,830	10,700
24.....	42	....		826	852	1,900	2,140	1,500	8,670
25.....	42	....		1,060	1,420	s5,000	1,560	1,240	5,200
26.....	41	....		872	1,020	s2,480	1,300	935	3,250
27.....	40	....		795	642	1,380	1,220	808	2,660
28.....	40	....		761	652	1,340	1,110	749	2,240
29.....	40	....		....	....	....	1,070	624	1,800
30.....	40	36		....	....	....	956	565	1,460
31.....	40	....		....	....	....	866	426	996

e Estimated.
s Computed by subdividing day.
a Computed from an estimated concentration graph.
b Computed from a partly estimated concentration graph.
Note.—Flow affected by ice Dec. 9 to Feb. 19, Mar. 3-8.

Little Sioux River at Correctionville, Iowa—Continued

Suspended sediment, water year October 1953 to September 1954—Continued

Day	April: Mean discharge (cfs)	April: Suspended sediment: Mean concentration (ppm)	April: Suspended sediment: Tons per day	May: Mean discharge (cfs)	May: Suspended sediment: Mean concentration (ppm)	May: Suspended sediment: Tons per day	June: Mean discharge (cfs)	June: Suspended sediment: Mean concentration (ppm)	June: Suspended sediment: Tons per day
1	705	356	764	501	214	289	1,820	6,080	s35,200
2	744	304	611	564	220	335	1,070	2,410	6,960
3	694	266	408	727	400	785	1,300	2,220	7,790
4	644	220	383	956	698	1,800	1,180	1,490	4,750
5	612	220	364	1,150	815	2,530	1,080	1,020	2,970
6	564	262	399	1,180	855	2,720	1,000	950	2,570
7	621	799	s1,420	1,110	698	2,090	913	846	2,090
8	704	1,760	3,350	994	522	1,400	816	692	1,520
9	628	645	1,090	902	450	1,100	734	600	1,190
10	598	420	676	795	392	841	1,370	6,100	sb27,000
11	564	342	521	727	350	687	3,550	7,400	sb70,000
12	532	300	431	660	312	556	2,820	3,590	27,800
13	516	285	397	612	293	484	2,960	2,270	18,100
14	501	276	373	533	300	432	1,940	1,350	7,070
15	516	515	717	505	612	834	1,290	1,050	3,660
16	532	463	665	480	520	682	1,070	900	2,600
17	596	500	805	442	375	448	1,000	755	2,040
18	612	550	909	414	300	335	1,400	9,400	sb50,000
19	628	498	844	400	247	267	9,210	11,900	s257,000
20	612	430	711	383			12,800	3,320	s120,000
21	596	370	595	358	158	140	17,500	2,000	94,500
22	564	317	483	337			12,400	764	25,600
23	516	258	359	329			12,600	554	18,800
24	501	251	340	342			13,200	415	14,800
25	486			380	174	179	11,700	357	11,300
26	486			350	200	189	9,430	380	9,680
27	456	221	274	442	830	sb1,200	7,590	432	8,850
28	428			710	2,060	3,950	6,480	470	8,220
29	428			620	1,270	2,130	5,570	500	7,520
30	471			583	785	1,240	4,720	720	9,180
31	....	....	....	1,820	7,700	s47,300	....	....	....

Day	July: Mean discharge (cfs)	July: Mean concentration (ppm)	July: Tons per day	August: Mean discharge (cfs)	August: Mean concentration (ppm)	August: Tons per day	September: Mean discharge (cfs)	September: Mean concentration (ppm)	September: Tons per day
1	4,120	916	10,200	456			848	468	1,070
2	3,680	898	8,920	442			710	400	767
3	3,070	932	7,730	442	216	251	628	342	580
4	2,620	927	6,560	414			504	320	487
5	2,220	899	5,390	394			516	249	347
6	1,990	828	4,450	369			548	840	1,240
7	1,810	762	3,720	356			486	420	551
8	1,630	663	2,920	350	179	169	442	233	278
9	1,500	632	2,560	348			428	228	263
10	1,380	586	2,180	321			428	211	244
11	1,260	575	1,960	308			400	208	225
12	1,150	570	1,770	287			380	222	228
13	1,070	508	1,470	271	166	124	372		
14	994	472	1,270	263			367		
15	920	461	1,150	256			356		
16	866	415	970	263			350	171	168
17	830	398	892	306	210	174	358		
18	778	366	769	318	217	183	372		
19	727	300	589	375	333	337	367		
20	677	317	579	400	278	300	367		
21	644			372	225	226	375		
22	628	282	474	394	230	245	378		
23	596			389	207	217	369	140	136
24	564			389	210	221	348		
25	548	249	365	353	172	164	323		
26	510			630	730	sb1,500	308		
27	480			994	1,460	3,920	295		
28	471			1,160	1,410	s4,480	282	114	88
29	471	242	308	1,160	1,240	3,880	274		
30	471			1,070	708	2,050	276		
31	456			994	589	1,580	....	....	....

a Computed by subdividing day.
b Computed from a partly estimated concentration graph.

Little Sioux River at Correctionville, Iowa—Continued

Monthly discharge for calendar and water years 1950 to 1954

Month	Water discharge (cfs-days)	Suspended sediment							
		Load (tons)	Daily loads (tons)			Tons per sq. mi.	Acre-feet (a)	Concentration (ppm)	
			Max.	Min.	Mean			Maximum daily	Weighted mean
May 24-31, 1950...	2,902	1,418	260	92	177	....	1.2	280	181
June..............	23,617	293,903	190,000	31	9,800	120.0	245	11,400	4,610
July..............	25,109	137,355	62,800	48	4,430	56.1	115	12,200	2,030
August............	10,117	49,769	36,000	42	1,610	20.3	42	6,100	1,830
September.........	5,021	6,419	2,050	20	214	2.62	5.4	1,500	473
October 1950......	4,998	1,556	233	10	50	.64	1.3	257	115
November..........	2,593	363	....	....	12	.15	.3	....	52
December..........	1,710	227	....	....	7	.09	.2	....	49
January 1951......	1,115	154	....	....	5	.06	.1	....	51
February..........	2,703	8,516	7,380	....	304	3.48	7.1	2,000	1,160
March.............	46,234	159,374	47,900	....	5,140	65.1	133	2,540	1,280
April.............	179,500	311,440	28,000	3,850	10,400	127.1	260	2,320	643
May...............	88,270	199,842	46,000	729	6,450	81.6	167	3,460	838
June..............	68,730	220,950	40,200	1,470	7,360	90.2	184	5,080	1,190
July..............	90,050	177,450	14,100	2,010	5,720	72.4	148	1,900	730
August............	71,080	288,060	62,100	1,660	9,290	117.6	240	4,260	1,490
September.........	70,290	139,042	33,700	832	4,630	56.8	116	2,760	733
Water year 1950-51	627,876	1,506,974	62,100	....	4,130	615.1	1,260	5,080	889
October 1951......	34,980	19,365	3,680	253	625	7.90	16	910	205
November..........	20,247	5,891	369	80	196	2.40	4.9	159	108
December..........	18,651	8,559	511	60	276	3.49	7.1	....	170
Calendar year 1951	692,465	1,531,643	62,100	....	4,200	625.2	1,280	5,080	819
January 1952......	15,670	4,674	1,500	40	151	1.91	3.9	....	110
February..........	45,080	53,271	5,200	51	1,840	21.7	44	....	438
March.............	78,070	348,113	44,200	200	11,200	142.1	291	3,410	1,650
April.............	122,660	141,068	14,400	998	4,700	57.6	118	720	426
May...............	31,925	18,849	1,200	306	608	7.69	16	465	219
June..............	22,762	53,065	12,500	230	1,770	21.7	44	3,150	863
July..............	39,421	216,896	111,000	225	7,000	88.5	181	9,620	2,040
August............	9,766	7,305	889	63	236	2.98	6.1	....	277
September.........	6,031	2,767	647	25	92	1.13	2.3	431	170
Water year 1951-52	445,263	879,823	111,000	25	2,400	359.1	734	9,620	732
October 1952......	3,653	513	25	7	17	.21	.4	78	52
November..........	3,395	439	27	....	15	.18	.4	82	48
December..........	2,416	403	....	....	13	.16	.3	....	62
Calendar year 1952	380,849	847,363	111,000	....	2,320	345.9	707	9,620	824
January 1953......	2,917	217	....	....	7	.09	.2	....	28
February..........	3,005	448	....	....	16	.18	.4	....	55
March.............	35,483	88,035	10,600	....	2,840	35.9	73	1,980	919
April.............	26,205	13,923	913	193	464	5.68	12	294	197
May...............	32,268	33,713	3,160	243	1,090	13.8	28	673	387
June..............	129,718	450,108	85,500	280	15,000	183.7	376	7,390	1,290
July..............	40,781	71,099	9,350	440	2,290	29.0	59	1,700	646
August............	32,939	74,615	13,100	123	2,410	30.5	62	2,060	839
September.........	5,888	1,188	103	20	40	.48	1.0	113	75
Water year 1952-53	318,668	734,701	85,500	....	2,010	299.9	613	7,390	854
October 1953......	3,675	924	....	....	30	.38	.8	....	93
November..........	4,134	612	....	....	20	.25	.5	....	55
December..........	4,160	409	....	....	13	.17	.3	....	36
Calendar year 1953	321,173	735,291	85,500	....	2,010	300.1	614	7,390	848
January 1954......	1,808	155	....	....	5	.06	.1	....	31
February..........	9,002	21,202	5,000	....	757	8.65	18	1,420	872
March.............	30,560	118,188	19,600	59	3,810	84.2	99	3,460	1,430
April.............	17,143	19,349	3,350	....	645	7.90	16	1,760	418
May...............	20,312	75,548	47,300	....	2,440	30.8	63	7,700	1,380
June..............	150,513	858,260	257,000	1,190	28,600	350.3	716	11,900	2,110
July..............	39,143	70,106	10,200	....	2,260	28.6	59	932	663
August............	14,829	22,321	4,480	....	720	9.11	19	1,460	557
September.........	12,515	8,744	1,240	....	291	3.57	7.3	840	259
Water year 1953-54	307,844	1,195,818	257,000	....	3,260	488.1	998	11,900	1,440

a Computed using a specific weight of 55 pounds per cubic foot.

Little Sioux River at Correctionville, Iowa—Continued

Particle-size analyses of suspended sediment, May to September 1950

(Methods of analysis: B, bottom-withdrawal tube; P, pipette; S, sieve; N, in native waters; W, in distilled water; C, chemically dispersed; M, mechanically dispersed.)

Date	Time	Instantaneous discharge (cfs)	Water temperature (°F)	Suspended sediment											Methods of analysis
				Concentration (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters									
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	
May 24, 1950	10:30 a.m.	439	...	228	700	...	39	...	58	...	73	100	...	...	SPWCM
June 18	7:00 a.m.	6,730	...	13,800	9,070	...	45	...	74	...	84	100	...	...	SPWCM
June 18	7:45 p.m.	6,360	...	5,120	4,760	58	71	83	...	89	96	100	...	...	SPWCM
June 18	7:45 p.m.	6,360	...	5,120	4,870	34	56	74	87	90	96	100	...	...	SPNM
July 6	7:30 p.m.	236	...	76	700	...	45	...	75	...	99	100	...	...	SPWCM
July 12	7:00 a.m.	2,400	...	13,800	10,700	...	37	...	63	...	99	100	...	...	SPWCM
July 12	9:10 a.m.	2,650	...	16,200	7,060	30	42	54	70	90	100	...	...	...	SPWCM
July 12	9:10 a.m.	2,650	...	16,200	6,830	4	11	26	61	89	99	100	...	...	SPNM
July 12	4:25 p.m.	1,625	...	8,920	17,800	...	50	...	83	...	100	...	...	...	SPWCM
July 14	7:00 a.m.	640	...	730	1,060	...	65	...	89	...	100	...	...	...	SPWCM
July 16	7:00 a.m.	1,280	...	10,500	14,300	...	41	...	77	...	100	...	...	...	SPWCM
July 17	7:00 a.m.	672	...	1,190	1,720	...	52	...	81	...	100	...	...	...	SPWCM
July 18	9:20 p.m.	1,240	...	3,310	4,880	...	43	...	67	...	100	...	...	...	SPWCM
July 20	7:00 a.m.	900	...	1,210	1,590	...	48	...	66	...	99	100	...	...	SPWCM
July 21	3:00 p.m.	1,580	...	2,420	9,340	...	35	...	58	...	97	100	...	...	SPWCM
July 24	12:55 p.m.	1,805	...	1,950	3,190	...	24	...	59	...	97	100	...	...	SPWCM
July 26	6:55 p.m.	1,160	...	886	1,370	...	35	...	60	...	97	100	...	...	SPWCM
Aug. 8	5:05 p.m.	395	...	601	1,230	47	68	71	80	92	100	...	...	...	SPWCM
Aug. 8	5:05 p.m.	395	...	601	766	35	47	67	81	91	97	100	...	...	BN
Aug. 12	7:00 a.m.	1,200	...	6,720	4,360	...	46	...	80	...	99	100	...	...	SPWCM
Aug. 12	10:00 a.m.	655	...	3,440	1,930	...	50	...	85	...	99	100	...	...	SPWCM
Sept. 22	7:00 a.m.	420	...	699	1,000	...	35	...	52	...	96	100	...	...	SPWCM
Sept. 23	7:00 a.m.	505	...	1,720	2,640	...	55	...	83	...	100	...	...	...	SPWCM
Sept. 23	6:30 p.m.	505	...	1,560	2,290	...	64	...	88	...	99	100	...	...	SPWCM
Sept. 24	7:00 a.m.	460	...	830	1,180	...	60	...	84	...	99	100	...	...	SPWCM

Little Sioux River at Correctionville, Iowa—Continued

Particle-size analyses of suspended sediment, water year October 1950 to September 1951

(Methods of analysis: B, bottom-withdrawal tube; P, pipette; S, sieve; N, in native waters; W, in distilled water; C, chemically dispersed; M, mechanically dispersed.)

Date	Time	Instantaneous discharge (cfs)	Water temperature (°F)	Suspended sediment: Concentration (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters: 0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	Methods of analysis
Oct. 11, 1950	9:50 a.m.	188	60	115	728	....	69	....	67	....	93	100	....	....	SPWCM
Nov. 14	12:55 p.m.	90	34	56	402	....	....	....	56	60	64	73	88	98	BWCM
Dec. 2	3:45 p.m.	68	32	67	508	....	20	22	25	27	39	69	97	100	BWCM
Jan. 12, 1951	9:45 a.m.	37	32	85	....	....	....	....	....	....	16	56	100	....	SW
April 4	3:15 p.m.	6,640	39	870	2,510	....	49	....	67	....	85	89	97	100	SPWCM
April 6	6:50 p.m.	13,200	39	797	829	22	35	44	63	74	81	85	91	97	BN
April 6	6:50 p.m.	13,200	39	797	1,690	....	58	....	71	....	90	100	....	....	SPWCM
April 7	9:20 a.m.	16,600	39	563	1,500	....	53	....	74	....	90	100	....	....	SPWCM
April 17	1:40 p.m.	3,080	....	794	2,200	....	37	....	59	....	94	97	99	100	SPWCM
June 20	6:45 a.m.	2,500	66	3,480	5,190	....	44	....	70	....	98	100	....	....	SPWCM
July 3	3:15 p.m.	3,380	67	502	....	....	....	....	....	....	78	86	93	99	SW
July 23	6:50 a.m.	2,960	77	1,310	2,200	....	55	....	75	....	98	99	99	100	SPWCM
Aug. 2	4:40 p.m.	2,210	77	4,680	11,700	....	38	....	62	....	98	100	....	....	SPWCM
Aug. 10	6:35 a.m.	1,160	....	1,840	2,260	....	34	....	64	....	99	100	....	....	SPWCM
Aug. 14	12:45 p.m.	6,300	68	5,010	7,640	....	49	....	62	....	97	99	100	....	SPWCM
Aug. 27	5:15 p.m.	1,850	74	1,430	2,000	....	43	....	68	....	96	99	100	....	SPWCM
Sept. 5	8:00 a.m.	1,240	65	338	982	....	34	....	61	....	98	100	....	....	SPWCM
Sept. 11	9:00 a.m.	2,770	66	1,510	1,960	....	28	....	45	....	94	98	100	....	SPWCM
Sept. 12	11:00 a.m.	4,870	65	2,980	4,020	....	40	....	62	....	97	99	99	100	SPWCM
Sept. 15	6:55 p.m.	3,920	60	781	1,820	....	34	....	51	....	89	94	100	....	SPWCM
Sept. 20	6:35 p.m.	3,160	64	726	1,290	....	31	....	48	....	85	91	100	....	SPWCM

Particle-size analyses of suspended sediment, water year October 1951 to September 1952

Date	Time	Instantaneous discharge (cfs)	Water temperature (°F)	Concentration (ppm)	Concentration of suspension analyzed (ppm)	0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	Methods of analysis
Oct. 2, 1951	6:30 p.m.	1,220	66	170	673	....	21	....	69	....	97	98	100	....	SPWCM
April 2, 1952	5:35 p.m.	6,240	43	558	1,270	39	40	42	49	54	58	63	75	95	SPWCM
April 3	7:30 p.m.	9,000	42	634	1,750	44	46	49	58	67	79	83	93	100	SPWCM
April 4	7:15 a.m.	10,400	39	443	1,250	50	53	55	68	73	81	85	99	99	SPWCM
May 8	5:40 p.m.	1,140	54	300	....	....	....	....	....	....	59	62	80	100	SW

June 5	12:45 p.m.	559	74	226	801	37	46	44	60	88	97	99	100	...	SPWCM
July 1	6:50 p.m.	1,180	85	819	1,300	38	47	59	69	86	97	100	...	...	SPWCM
July 7	5:30 p.m.	5,400	68	4,370	7,350	39	50	64	73	84	89	92	94	99	SPWCM
Aug. 6	5:10 p.m.	315	72	134	...	...	...	...	...	...	96	97	100	...	SW

Particle-size analyses of suspended sediment, water year October 1952 to September 1953

Oct. 7, 1952	10:10 a.m.	113	46	35	...	...	...	...	...	...	97	98	100	...	S
Dec. 3	12:40 p.m.	a75	32	26	...	...	...	...	...	...	86	94	97	100	S
Feb. 5, 1953	11:30 a.m.	a105	32	18	...	...	...	...	...	...	85	90	100	...	S
Mar. 5	10:55 a.m.	a203	32	10	...	...	...	...	...	...	95	100	...	...	S
Mar. 20	1:55 p.m.	2,240	45	1,160	3,350	2	8	20	39	66	90	94	98	100	SPNM
Mar. 20	1:55 p.m.	2,240	45	1,160	3,060	23	30	38	52	74	90	94	98	100	SPWCM
April 2	11:25 a.m.	1,070	44	283	1,430	3	13	32	50	77	93	95	98	100	SPNM
April 2	11:25 a.m.	1,070	44	283	1,220	26	29	41	54	73	93	96	100	...	SPWCM
May 5	11:30 a.m.	1,740	55	604	2,610	12	32	39	53	77	92	96	99	100	SPWCM
June 2	8:15 a.m.	566	66	184	754	38	39	56	67	84	96	98	99	100	SPWCM
June 10	11:00 a.m.	10,100	...	1,570	6,380	66	82	90	91	95	98	98	99	100	SPWCM
July 3	6:35 a.m.	3,180	75	864	2,440	32	35	38	52	76	93	97	99	100	SPWCM
Aug. 4	10:00 a.m.	1,520	74	1,690	5,060	29	42	55	74	89	97	98	98	100	SPWCM

Particle-size analyses of suspended sediment, water year October 1953 to September 1954

Feb. 20, 1954	3:00 p.m.	710	34	1,990	3,100	...	44	57	...	...	97	98	100	...	SPWCM
Mar. 16	4:00 p.m.	580	37	691	3,750	...	35	47	...	...	93	94	96	...	SPWCM
April 13	5:00 p.m.	501	54	307	3,100	...	41	...	72	...	96	99	100	...	SPWCM
May 5	11:35 a.m.	1,150	...	798	4,770	...	30	...	59	...	94	97	100	...	SPWCM
June 4	10:55 a.m.	1,180	56	1,460	5,090	...	42	...	70	...	98	...	...	...	SPWCM
June 11	7:55 a.m.	3,730	70	9,740	3,830	...	40	...	72	...	98	...	...	...	SPWCM
June 11	3:35 p.m.	3,950	74	5,610	4,360	...	50	...	78	...	97	...	...	...	SPWCM
June 19	11:00 a.m.	10,400	...	10,600	4,180	...	45	...	76	...	99	...	...	...	SPWCM
June 20	1:00 p.m.	11,800	73	2,170	5,030	...	78	...	93	97	99	...	...	...	SPWCM
June 30	6:10 p.m.	4,520	81	754	2,160	...	24	...	47	...	91	95	...	...	SPWCM

a Mean daily discharge.

Little Sioux River near Kennebec, Iowa

LOCATION.—At gaging station at bridge on county road "A", 1.3 miles south of Kennebec, Monona County, 5.5 miles northeast of Onawa, and 6.5 miles upstream from Maple River.

DRAINAGE AREA.—2,730 square miles.

RECORDS AVAILABLE.—Water temperatures: May 1951 to September 1954.

Sediment records: May 1950 to September 1954.

EXTREMES, water years 1950 to 1954 given in following table:

Water year	Daily suspended sediment								Temperature*	
	Concentrations (ppm)				Loads (tons)				°Fahrenheit	
	Max.	Date	Min.	Date	Max.	Date	Min.	Date	Max.	Date
1949-50(a)..	40,800	June 18	90	Sept. 12, 19	520,000	June 18	27	Sept. 19	......	....
1950-51.....	24,100	May 1	......	....	331,000	May 1	......	....	80	July 19
1951-52.....	21,300	June 27	......	....	277,000	July 7	......	....	83	June 24
1952-53.....	15,900	June 25	......	....	137,000	June 25	......	....	82	July 26
1953-54.....	20,700	May 27	......	....	255,000	June 19	......	....	82	July 13

* Minimum temperature, freezing point on many days during winter months.
a May to September.

EXTREMES, 1950-54.—Water temperatures (1951-54): Maximum, 83°F June 24, 1952; minimum, freezing point on many days during winter months.

Sediment concentrations: Maximum daily, 40,800 ppm June 18, 1950; minimum daily, not determined.

Sediment loads: Maximum daily, 520,000 tons June 18, 1950; minimum daily, not determined.

Little Sioux River near Kennebec, Iowa—Continued

Temperature (°F) of water, May to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	.....	.....	.....	.....	.....	.....	.....	.....	70	66	78	71
2	.....	.....	.....	.....	.....	.....	.....	.....	65	69	79	68
3	.....	.....	.....	.....	.....	.....	.....	.....	60	67	75	67
4	.....	.....	.....	.....	.....	.....	.....	.....	60	66	72	65
5	.....	.....	.....	.....	.....	.....	.....	.....	59	67	72	64
6	.....	.....	.....	.....	.....	.....	.....	.....	58	66	76	68
7	.....	.....	.....	.....	.....	.....	.....	.....	60	69	76	63
8	.....	.....	.....	.....	.....	.....	.....	.....	60	.....	75	64
9	.....	.....	.....	.....	.....	.....	.....	59	63	.....	75	66
10	.....	.....	.....	.....	.....	.....	.....	55	65	.....	74	64
11	.....	.....	.....	.....	.....	.....	.....	56	64	.....	72	65
12	.....	.....	.....	.....	.....	.....	.....	58	67	.....	72	65
13	.....	.....	.....	.....	.....	.....	.....	59	68	.....	70	61
14	.....	.....	.....	.....	.....	.....	.....	60	68	.....	74	66
15	.....	.....	.....	.....	.....	.....	.....	61	69	75	67	59
16	.....	.....	.....	.....	.....	.....	.....	62	69	74	69	69
17	.....	.....	.....	.....	.....	.....	.....	64	72	75	67	59
18	.....	.....	.....	.....	.....	.....	.....	64	70	76	67	59
19	.....	.....	.....	.....	.....	.....	.....	64	71	80	69	61
20	.....	.....	.....	.....	.....	.....	.....	67	68	77	69	61
21	.....	.....	.....	.....	.....	.....	.....	67	67	78	68	61
22	.....	.....	.....	.....	.....	.....	.....	66	68	75	67	55
23	.....	.....	.....	.....	.....	.....	.....	65	68	76	67	59
24	.....	.....	.....	.....	.....	.....	.....	67	65	72	68	55
25	.....	.....	.....	.....	.....	.....	.....	67	68	77	68	54
26	.....	.....	.....	.....	.....	.....	.....	64	71	77	69	57
27	.....	.....	.....	.....	.....	.....	.....	64	72	79	69	51
28	.....	.....	.....	.....	.....	.....	.....	67	72	77	70	50
29	.....	.....	.....	.....	.....	.....	.....	70	69	79	72	51
30	.....	.....	.....	.....	.....	.....	.....	72	.....	77	73	55
31	.....	.....	.....	.....	.....	.....	.....	76	.....	75	74	.....
Average	.....	.....	.....	.....	.....	.....	.....	.....	66	.....	71	61

Temperature (°F) of water, water year October 1951 to September 1952

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	56	40	34	.....	.....	35	40	63	69	75	72	70
2	60	40	40	33	.....	.....	40	70	.....	79	75	64
3	66	.....	.....	.....	.....	.....	43	73	66	82	70	67
4	62	35	.....	.....	.....	.....	40	75	69	73	70	.....
5	60	.....	41	.....	.....	.....	39	70	73	75	69	69
6	56	34	30	.....	.....	.....	40	70	73	75	66	69
7	55	.....	39	.....	.....	.....	42	63	.....	.....	69	.....
8	49	40	38	.....	.....	.....	49	58	77	65	69	71
9	52	40	35	.....	.....	.....	39	58	72	67	70	72
10	53	42	.....	.....	.....	36	45	55	72	69	71	71
11	56	45	.....	.....	.....	37	42	52	74	71	71	72
12	55	45	.....	34	.....	34	41	60	78	76	71	71
13	57	45	.....	.....	.....	35	40	.....	79	74	72	71
14	58	.....	.....	.....	.....	35	39	70	.....	70	77	70
15	55	.....	.....	.....	34	35	45	.....	75	69	77	.....
16	55	.....	.....	.....	33	38	44	57	77	70	70	.....
17	53	.....	.....	.....	35	40	48	.....	72	75	72	66
18	51	.....	.....	.....	35	39	50	63	74	75	72	66
19	47	35	.....	.....	33	35	52	63	71	.....	75	64
20	45	38	.....	.....	.....	36	57	.....	71	.....	75	61
21	42	35	.....	.....	35	35	57	60	71	79	76	.....
22	44	.....	.....	.....	34	.....	51	60	76	79	69	59
23	46	.....	.....	.....	38	.....	55	60	80	75	72	55
24	46	.....	.....	.....	.....	.....	54	61	83	77	77	.....
25	47	.....	.....	.....	39	.....	57	61	75	77	.....	57
26	43	.....	34	.....	40	37	57	.....	75	77	60	61
27	43	34	.....	.....	37	40	60	65	69	77	.....	.....
28	44	35	.....	.....	36	42	61	65	76	78	75	64
29	43	37	.....	.....	.....	40	62	.....	79	70	74	.....
30	45	39	.....	.....	.....	45	63	65	82	72	72	60
31	44	.....	.....	.....	.....	43	.....	68	.....	72	72	.....
Average	51	.....	.....	.....	.....	.....	47	61	74	74	72	.....

Little Sioux River near Kennebec, Iowa—Continued

Temperature (°F) of water, water year October 1952 to September 1953

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1							42	46		74	76	70
2		52					42	44	68	78	74	
3		50			32		40	45	68	76	74	70
4		53	32				40	40	68	76	74	62
5		50					40	48	66	77	70	62
6		47				32	46		63	74	70	64
7		48					44		64	72	70	60
8	61	45				37	46		64	70	66	64
9	61	45				32	46		62	70	66	66
10	60	45	33		32	32	40		64	71		68
11		47	35			32	40		70	72		68
12	58		34			36	40		74	69		62
13	55	50		32		36	40		74	70		
14	53	48				40	44		76	72		59
15	52	40				32			78	72		60
16	50					32	39			74		58
17	51					38			74	75	66	62
18	57	46			32	38			78	75		62
19		43				36			78		66	
20	49	43		32		40			78	76	70	
21	50	42				48			78	78	70	54
22	56	42				42	51		74		68	54
23		42				40	52		74	76	70	55
24	59	40			32		54		74	74	70	54
25	57		33				50		68	70	72	56
26	58					38	50		70	82	74	56
27	50					38	50				72	52
28	46			32		38	47		70	72	72	58
29	50					42	45		74	72	73	63
30	52					45	48		70	70	76	54
31										72	74	
Average				a32	a32		45		71	74		60

Temperature (°F) of water, water year October 1953 to September 1954

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1		64		32	32	35	45	48	60	76	70	72
2	60						42	46	63	78		74
3	60	66					40	42	56	76		72
4	52	64						44	50	78		
5	50					33	50	46	60	78	70	
6						36	58	49	64	78	70	72
7	48				32	36	51	46	68	76	70	68
8	48		34			38	48	48	66	78	66	64
9	48					40	48	50	68	78	68	66
10	48	46		32		40	52	52		80	70	59
11	60					40	50	50	76		70	62
12		55		32		32	50	52	78	80	66	64
13	62	56					52	58	74	82	68	66
14	65	58					56	60	74	81	70	
15	66	58				36	60	64	72	78	72	64
16		58			34	35	50	64	72	77	74	65
17	58	58			38	44	50	62	75	76	70	64
18	60	54		32			62	62	74	80	70	68
19	68				38	36	54	59	70	78	70	66
20	58	44			33	39	54	60	75	80	72	
21	62				32	40	52	57	72	76	72	58
22	60				36	40	52	60		74	70	78
23	52				36	40	58		78	70	72	66
24	52		33		36	38	58	64	76	72	72	60
25	58				34	38	60	62	78	77	74	
26					35	42	64	62	80	78	74	60
27	64			32	34	44	58	60	80	78	74	62
28	66				38	37	58	62	78	74	80	64
29	67	38					58	60	80	74	80	61
30	68					40	50	62	81	77	78	61
31	66					40		63		78	64	
Average	59			a32			53	56	71	77	71	65

a Includes estimated temperature, 32°F, on missing days.

Little Sioux River near Kennebec, Iowa—Continued

Suspended sediment, May to September 1950

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	....	....	....	....	....	....	283	920	700
2	....	....	....	....	....	....	305	2,280	1,880
3	....	....	....	....	....	....	316	1,520	1,300
4	....	....	....	....	....	....	283	820	630
5	....	....	....	....	....	....	247	600	400
6	....	....	....	....	....	....	235	510	320
7	....	....	....	....	....	....	227	410	250
8	....	....	....	....	....	....	210	360	220
9	....	....	....	....	....	....	197	330	180
10	....	....	....	....	....	....	176	360	170
11	....	....	....	....	....	....	167	310	140
12	....	....	....	....	....	....	2,040	33,200	a316,000
13	....	....	....	....	....	....	1,120	20,900	a74,800
14	....	....	....	....	....	....	398	4,400	4,730
15	....	....	....	....	....	....	931	29,600	a122,000
16	....	....	....	....	....	....	643	13,700	a27,800
17	....	....	....	....	....	....	422	2,000	2,280
18	....	....	....	....	....	....	4,650	40,800	a520,000
19	....	....	....	....	....	....	4,850	8,800	a121,000
20	....	....	....	....	....	....	1,850	5,000	25,000
21	....	....	....	....	....	....	1,700	5,800	26,600
22	....	....	....	....	....	....	2,290	22,100	a149,000
23	....	....	....	420	1,300	1,470	2,050	28,800	a170,000
24	....	....	....	398	1,120	1,200	1,280	7,900	27,300
25	....	....	....	398	1,020	1,100	998	2,240	6,040
26	....	....	....	410	800	890	866	1,840	4,300
27	....	....	....	386	680	710	802	1,390	3,010
28	....	....	....	362	550	540	680	870	1,600
29	....	....	....	410	4,300	ab8,200	592	560	900
30	....	....	....	510	12,000	ab19,000	522	510	720
31	....	....	....	328	1,660	1,470	....	....	....

Day	July			August			September		
1	454	510	630	725	6,200	12,100	182	260	130
2	402	480	520	680	3,100	5,690	180	230	110
3	376	400	410	665	2,200	3,950	173	210	98
4	340	320	290	802	11,000	23,800	162	180	79
5	340	340	310	578	7,300	11,400	152	130	53
6	293	280	220	536	2,600	3,760	144	120	47
7	260	250	180	635	4,520	a9,510	138	130	48
8	245	220	150	680	8,100	14,900	136	140	51
9	251	270	b180	467	2,000	2,520	133	140	50
10	271	320	230	402	1,200	1,300	129	190	66
11	293	380	300	376	870	880	125	120	41
12	1,410	20,400	a101,000	1,890	27,400	a154,000	125	90	30
13	1,410	12,900	a54,300	650	6,550	a12,500	122	130	43
14	620	3,600	6,030	467	1,800	2,270	121	140	46
15	620	1,750	2,930	402	1,020	1,110	118	110	35
16	1,030	5,000	13,900	364	820	810	118	110	35
17	834	8,000	18,000	508	3,900	b5,400	117	110	35
18	930	4,080	a11,200	428	2,000	2,310	116	100	31
19	1,660	8,480	38,000	352	860	820	113	90	27
20	1,140	3,600	11,100	304	500	410	115	110	34
21	1,390	3,520	13,200	282	400	300	233	1,200	ab1,200
22	1,810	4,580	22,400	271	380	280	225	820	500
23	1,770	3,250	15,500	271	810	590	508	1,680	2,310
24	1,810	2,800	13,700	236	470	300	564	1,700	2,590
25	1,970	3,000	16,000	219	290	170	522	1,220	1,720
26	1,740	3,250	15,300	207	250	140	441	820	980
27	1,390	2,280	8,560	201	250	140	352	550	520
28	1,250	1,850	4,560	225	330	200	293	330	260
29	1,170	1,400	4,420	211	260	150	260	290	200
30	930	1,260	3,160	203	240	130	240	310	200
31	1,500	19,200	a97,000	189	250	130	....	....	....

a Computed by subdividing day.
b Computed from a partly estimated concentration graph.

Little Sioux River near Kennebec, Iowa—Continued

Suspended sediment, water year October 1950 to September 1951

Day	October Mean discharge (cfs)	October Suspended sediment Mean concentration (ppm)	October Suspended sediment Tons per day	November Mean discharge (cfs)	November Suspended sediment Mean concentration (ppm)	November Suspended sediment Tons per day	December Mean discharge (cfs)	December Suspended sediment Mean concentration (ppm)	December Suspended sediment Tons per day
1	228	360	222	127	117	40	93	....	
2	650	9,270	s18,400	127	75	26	92	120	
3	415	3,560	s4,220	129	65	23	90	....	e30
4	304	790	648	133	73	26	88	....	
5	271	430	315	134	85	31	86	....	
6	282	430	327	131	88	31	84	....	
7	304	410	a336	129	86	30	82	....	
8	304	360	295	129	93	32	80	....	
9	282	300	228	126	93	32	80	37	
10	260	260	182	113	94	29	78	....	
11	247	240	164	120	125	40	76	....	
12	230	210	130	124	200	67	76	....	
13	215	127	74	113	145	44	74	....	e8
14	203	154	84	120	150	49	72	....	
15	199	170	91	130	133	47	70	....	
16	188	170	86	130	111	39	70	....	
17	180	157	76	131	140	50	70	....	
18	173	204	95	127	135	46	68	39	
19	164	174	77	127	122	a42	68	....	
20	158	125	53	125	198	67	68	....	
21	155	120	50	134	170	62	66	....	
22	149	115	46	122	149	49	66	....	
23	149	100	40	120			66	....	
24	147	97	38	115			64	....	
25	144	95	37	110			64	64	
26	141	105	40	105	....	e40	64	....	e11
27	141	110	42	105			62	....	
28	137	119	44	100			62	....	
29	136	112	41	96			62	....	
30	133	102	37	94			62	....	
31	130	101	35	....	....	....	60	64	

Day	January Mean discharge (cfs)	January Mean concentration (ppm)	January Tons per day	February Mean discharge (cfs)	February Mean concentration (ppm)	February Tons per day	March Mean discharge (cfs)	March Mean concentration (ppm)	March Tons per day
1	60	....		40	....		1,890	9,580	s59,400
2	60	....		40	....		984	2,650	6,900
3	60	....		40	....		665	1,300	a2,330
4	60	....		40	....		592	1,100	1,760
5	60	....	e13	38	....		680	1,900	3,490
6	60	92		38	50		1,390	11,000	sb44,000
7	60	....		38	88		834	2,350	s5,640
8	60	....		38	....		550	....	e1,600
9	58	....		38	....	e6	450	....	e850
10	58	....		38	....		400	....	e600
11	57	59		40	....		350	....	e380
12	57	....		45	....		300	....	e240
13	56	....	e8	50	42		270	....	e170
14	56	42		45	....		250	....	e130
15	56	....		40	....		230	....	e100
16	55	....		39	....		210	....	e75
17	55	....		38	....		200	....	e65
18	55	....		38	302	31	190	....	e55
19	54	....		38	....	e30	180	....	e45
20	54	....		40	....	e32	175	....	e45
21	54	64		48	....	e38	175	91	43
22	54	....		54	....	e60	170	....	e40
23	52	....		60	....	e80	250	....	e300
24	52	....	e8	80	....	e130	500	....	e2,200
25	52	....		100	....	e260	1,000	....	e13,000
26	51	....		500	....	e3,500	3,590	....	e120,000
27	50	....		802	2,500	5,410	8,000	11,800	255,000
28	48	....		1,890	21,400	s150,000	7,600	6,050	124,000
29	46	....		....	....	....	6,550	3,900	69,000
30	45	54		....	....	....	6,820	2,640	48,600
31	43	....		....	....	....	6,910	2,310	43,100

e Estimated.
s Computed by subdividing day.
a Computed from an estimated concentration graph.
b Computed from a partly estimated concentration graph.
Note.—Flow affected by ice Nov. 23 to Feb. 26, Mar. 8-25.

Little Sioux River near Kennebec, Iowa—Continued

Suspended sediment, water year October 1950 to September 1951—Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1.....	6,550	1,940	34,300	5,090	24,100	331,000	1,380	2,420	9,020
2.....	5,920	2,130	34,000	5,170	3,910	54,600	2,150	2,660	15,400
3.....	5,410	2,440	35,600	5,250	2,150	30,500	3,220	2,500	21,700
4.....	5,090	2,700	37,100	5,250	1,820	25,800	3,480	1,630	15,300
5.....	6,100	2,590	43,300	5,010	1,420	19,200	3,600	1,370	13,300
6.....	7,900	2,880	61,400	5,000	1,420	19,500	3,740	1,100	11,100
7.....	9,340	2,600	65,600	5,090	1,080	14,800	3,940	1,760	18,700
8.....	11,000	2,440	72,500	4,780	1,030	13,300	4,570	1,870	23,100
9.....	11,900	1,910	61,400	4,290	2,030	23,500	4,150	1,250	14,000
10.....	11,600	1,510	47,300	4,290	4,080	47,200	3,340	940	8,480
11.....	12,000	1,420	46,000	4,010	1,430	15,500	2,760	810	6,040
12.....	11,600	1,160	36,300	3,740	1,170	11,800	2,400	640	4,150
13.....	10,300	1,100	30,600	3,280	1,090	9,650	2,100	570	3,230
14.....	8,440	1,320	30,100	3,100	1,040	8,700	1,840	580	2,880
15.....	7,100	1,420	27,200	3,040	930	7,630	1,720	620	2,880
16.....	6,280	1,310	22,200	2,660	830	5,960	1,560	1,090	4,590
17.....	5,650	1,300	19,800	2,660	1,860	13,400	1,770	4,200	sb37,000
18.....	5,090	1,470	20,200	2,350	1,410	8,950	2,220	13,800	s92,000
19.....	4,710	1,380	17,500	2,150	780	4,530	2,990	17,100	s161,000
20.....	4,290	1,270	14,700	2,100	780	4,420	3,540	12,800	s128,000
21.....	3,940	1,370	14,600	2,010	680	3,690	2,350	3,900	24,700
22.....	3,800	1,200	12,300	2,100	700	3,970	2,010	2,070	11,200
23.....	3,600	1,200	11,700	2,010	650	3,530	2,200	6,500	sb52,000
24.....	3,340	1,090	9,830	1,960	575	3,040	2,880	19,400	s160,000
25.....	3,340	1,110	10,000	1,800	585	2,840	2,150	4,300	25,000
26.....	3,340	1,020	9,200	1,640	580	2,570	2,880	15,300	s124,000
27.....	3,280	1,010	8,940	1,460	570	2,280	2,400	4,400	28,500
28.....	3,150	980	8,330	1,340	480	1,740	2,710	3,370	24,600
29.....	3,150	3,400	sb32,000	1,240	460	1,540	2,710	2,000	14,600
30.....	3,740	18,000	sb200,000	1,170	420	1,330	2,600	1,600	b11,000
31.....	....	....	....	1,200	4,900	b15,000	....	....	....

Day	July			August			September		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1.....	2,660	1,470	10,600	1,280	920	3,180	2,200	1,240	7,360
2.....	2,860	1,680	13,100	1,240	1,440	s5,240	1,800	1,020	5,000
3.....	5,170	16,200	s267,000	2,060	4,980	27,700	1,640	860	3,810
4.....	3,940	2,700	28,700	1,460	2,450	9,790	1,520	700	2,870
5.....	4,080	2,450	27,000	1,360	1,260	4,690	1,450	660	2,580
6.....	4,500	1,850	22,500	1,380	1,080	4,020	1,380	675	2,520
7.....	4,570	1,450	17,900	1,240	880	2,950	1,310	580	2,050
8.....	3,800	1,290	13,200	1,240	910	3,050	1,200	560	1,810
9.....	3,670	1,040	10,300	1,140	1,460	4,490	1,800	15,700	s88,300
10.....	3,600	1,030	10,000	1,170	3,710	11,700	1,720	5,460	s27,200
11.....	3,280	1,170	10,400	1,110	1,700	5,090	2,300	3,750	23,300
12.....	2,600	1,100	7,720	1,080	2,210	s7,230	5,330	8,510	s133,000
13.....	2,820	1,030	7,840	1,480	11,000	44,000	6,100	3,400	56,000
14.....	3,150	1,090	9,270	3,700	12,600	s140,000	5,920	1,940	31,000
15.....	3,100	920	7,700	6,000	9,250	150,000	5,170	1,600	22,300
16.....	3,040	950	7,800	5,700	1,850	28,500	4,640	1,370	17,200
17.....	3,040	950	7,800	6,500	8,540	s158,000	4,430	1,230	14,700
18.....	3,150	1,770	15,000	6,550	2,120	37,500	4,430	1,080	12,900
19.....	2,980	930	7,480	4,430	1,860	22,200	4,430	1,030	12,300
20.....	2,820	960	7,310	4,500	5,540	67,300	4,290	970	11,200
21.....	2,600	1,270	8,920	4,430	2,460	29,400	3,480	960	9,020
22.....	2,710	1,900	13,900	3,150	1,370	11,600	2,710	870	6,360
23.....	2,930	2,000	15,800	2,600	1,150	8,070	2,250	740	4,500
24.....	2,760	1,410	10,500	2,200	1,120	6,650	2,010	640	3,470
25.....	2,710	1,070	7,830	1,960	950	5,030	1,880	570	2,800
26.....	2,710	1,010	7,390	1,800	960	4,660	1,880	520	2,400
27.....	2,500	990	6,680	2,710	11,100	s95,600	1,720	520	2,410
28.....	1,920	1,070	5,550	3,340	10,400	s97,200	1,640	455	2,010
29.....	1,720	1,070	4,970	3,280	3,700	32,800	1,480	420	1,680
30.....	1,520	1,070	4,390	2,880	2,000	15,600	1,340	400	1,450
31.....	1,420	1,020	3,910	2,500	1,520	10,300	....	....	....

s Computed by subdividing day.
b Computed from a partly estimated concentration graph.

Little Sioux River near Kennebec, Iowa—Continued

Suspended sediment, water year October 1951 to September 1952

Day	October Mean discharge (cfs)	October Suspended sediment Mean concentration (ppm)	October Suspended sediment Tons per day	November Mean discharge (cfs)	November Suspended sediment Mean concentration (ppm)	November Suspended sediment Tons per day	December Mean discharge (cfs)	December Suspended sediment Mean concentration (ppm)	December Suspended sediment Tons per day
1	1,240	370	1,240	1,050	240	680	810	430	940
2	1,170	500	1,580	990	168	449	840	432	980
3	1,200	1,910	6,190	840	142	b322	930	431	b1,080
4	1,800	8,590	41,700	700	149	282	930	420	1,050
5	1,600	1,990	8,600	610	158	b260	930	409	1,030
6	1,450	950	3,800	536	170	246	960	570	1,480
7	1,480	730	2,920	676	180	b328	960	430	1,110
8	1,480	520	2,080	780	191	402	930	302	758
9	1,450	470	1,840	870	235	552	930	374	939
10	1,380	430	1,600	960	290	752	870		
11	1,310	410	1,450	930	304	763	840	....	e600
12	1,240	380	1,270	960	268	651	740		
13	1,170	360	1,140	900	244	593	640		
14	1,140	372	1,140	900	196	476	380		
15	1,110	311	932	900	180	a440	430		
16	1,050	330	936	870	170	a400	490	....	e200
17	1,020	290	799	840	160	a360	560		
18	990	286	764	750	190	a380	580		
19	960	288	746	662	536	958	590		
20	990	254	679	600	845	1,370	600		
21	990	270	722	620	526	880	500	....	
22	1,020	250	688	640	360	a600	500	....	
23	1,080	262	764	570	320	a500	570	....	
24	1,140	520	1,600	510	280	a380	550	....	
25	1,170	327	1,030	460	260	a320	530	....	
26	1,200	318	1,030	400	252	272	515	68	e110
27	1,280	330	1,140	520	263	369	500	....	
28	1,240	260	870	620	257	430	490	....	
29	1,170	231	730	705	347	660	480	....	
30	1,140	220	677	750	441	893	475	....	
31	1,110	259	776	....	....	....	470	....	

Day	January Mean discharge (cfs)	January Mean concentration (ppm)	January Tons per day	February Mean discharge (cfs)	February Mean concentration (ppm)	February Tons per day	March Mean discharge (cfs)	March Mean concentration (ppm)	March Tons per day
1	460	....		730	....	e2,000	1,530	780	3,220
2	450	89		840	....	e4,500	1,400	....	e2,500
3	440	....		960	....	e7,000	1,200	....	e1,800
4	435	....		1,060	....	e9,000	1,080	....	e1,400
5	430	....		1,000	....	e8,000	940	....	e1,100
6	425	....		820	3,050	6,750	1,080	....	e1,700
7	420	....		710	....	e5,000	1,560	....	e4,200
8	415	....		640	....	e3,500	1,240	....	e2,000
9	405	....		780	....	e5,000	1,040	....	e1,300
10	400	....	e85	950	....	e9,000	1,000	370	999
11	400	....		1,400	....	e17,000	1,040	540	1,520
12	400	66		2,450	....	e32,000	1,410	3,900	sb20,000
13	400	....		3,300	2,750	24,500	5,220	11,700	s164,000
14	400	....		4,000	2,640	28,500	3,370	3,500	31,800
15	400	....		3,600	2,160	21,000	2,180	1,690	9,950
16	410	....		3,100	2,210	18,500	2,460	1,800	12,000
17	410	....		2,750	1,400	10,400	2,610	1,960	13,800
18	410	....		2,500	1,580	10,700	3,180	4,840	s43,700
19	800	....	e2,100	2,350	1,510	9,580	4,830	7,910	103,000
20	2,000	....	e16,000	2,100	1,000	a6,500	4,990	3,980	53,600
21	1,300	....	e7,000	1,700	870	3,990	4,670	2,540	32,000
22	960	....	e3,000	1,540	580	2,410	3,660	2,300	a23,000
23	760	....	e1,500	1,390	470	1,760	3,060	1,500	a12,000
24	680			1,280	450	b1,560	2,500	2,100	a14,000
25	620			1,200	420	1,360	2,000	1,400	a7,600
26	560			1,100	460	1,370	2,100	1,170	6,630
27	540	....	e400	1,280	1,020	3,520	2,150	1,570	9,110
28	520			1,450	1,690	6,620	2,360	1,290	8,220
29	500			1,600	1,400	a6,000	3,120	3,660	sb37,700
30	480			....	....	....	6,490	9,300	163,000
31	630	....	e1,000	....	....	....	6,850	2,790	51,600

e Estimated.
s Computed by subdividing day.
a Computed from an estimated concentration graph.
b Computed from a partly estimated concentration graph.

Note.—Flow affected by ice Nov. 3-5, 20-27, Dec. 12 to Mar. 6, Mar. 24-27.

Little Sioux River near Kennebec, Iowa—Continued

Suspended sediment, water year October 1951 to September 1952—Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	7,150	2,820	54,400	1,740	580	2,720	842	560	1,270
2	7,350	1,980	38,300	1,630	510	2,240	700	560	b1,190
3	6,580	1,600	28,400	1,560	480	2,020	738	550	1,100
4	7,850	1,930	40,900	1,490	480	1,930	702	520	986
5	8,950	1,620	39,100	1,420	470	1,800	668	410	739
6	9,060	1,200	29,400	1,350	430	1,570	668	430	776
7	7,960	1,140	24,500	1,320	2,100	b7,500	650	410	720
8	6,670	1,160	21,200	1,320	1,870	6,660	620	400	670
9	5,870	1,370	21,700	1,280	1,170	4,040	965	2,360	6,150
10	5,150	1,110	15,400	1,280	570	1,970	738	1,850	3,690
11	4,590	1,100	13,600	1,240	500	1,670	620	650	1,090
12	4,350	1,230	14,400	1,240	540	1,810	560	490	741
13	4,280	1,080	12,500	1,240	460	1,540	530	450	644
14	4,140	950	10,600	1,210	410	1,340	515	440	a600
15	3,930	770	8,170	1,210	420	b1,370	790	12,300	s29,900
16	3,720	780	7,830	1,180	590	1,880	515	3,380	4,700
17	3,480	760	7,140	1,140	550	a1,700	530	1,660	2,380
18	3,300	760	6,770	1,070	370	1,070	605	1,820	2,970
19	3,120	780	6,570	1,000	310	837	930	2,890	7,260
20	2,880	730	5,680	1,000	380	a1,000	1,240	3,640	12,200
21	2,710	750	5,490	1,070	550	1,590	1,800	17,600	s99,200
22	2,660	910	6,540	1,040	10,500	s50,000	1,240	4,110	13,800
23	2,610	770	5,430	1,240	18,300	61,300	1,100	2,340	6,580
24	2,510	660	4,470	1,140	3,150	9,700	1,040	1,950	5,480
25	2,360	580	3,700	1,070	2,100	6,070	965	5,080	13,200
26	2,310	620	3,870	1,040	1,400	3,930	1,000	2,290	6,180
27	2,220	590	3,540	1,070	1,820	5,260	2,000	21,300	s140,000
28	2,100	520	2,950	1,070	1,190	3,440	1,320	6,510	23,200
29	1,940	540	2,830	1,040	960	2,700	1,140	4,590	14,100
30	1,840	510	2,530	965	840	2,190	1,180	3,350	10,700
31	....	....	....	895	680	1,640	....	....	....

Day	July			August			September		
1	1,320	7,100	25,300	428	740	855	605	930	1,520
2	1,380	7,190	s30,300	402	520	564	650	770	1,350
3	1,600	11,700	s51,600	590	860	1,370	560	550	832
4	1,320	4,300	15,300	545	600	883	442	450	537
5	1,100	2,300	6,830	415	390	437	374	410	414
6	965	1,700	4,430	415	399	447	324	410	359
7	3,920	17,300	s277,000	402	348	378	280	383	b290
8	6,220	8,500	143,000	402	381	414	260	352	247
9	4,750	4,480	57,400	388	382	400	260	484	340
10	3,060	3,310	27,300	374	394	398	201	558	303
11	2,560	2,340	16,200	361	411	401	208	412	231
12	2,180	1,820	10,700	336	358	325	216	388	226
13	1,980	1,730	9,250	324	348	304	208	375	211
14	1,880	13,000	s74,900	336	331	300	208	645	362
15	1,630	2,410	10,600	336	318	288	216	467	272
16	1,420	1,380	5,290	388	2,090	s2,320	208	355	199
17	1,280	1,070	3,700	485	830	1,090	201	290	157
18	1,180	940	2,990	402	500	543	176	240	114
19	1,100	890	2,640	374	1,260	1,270	160	217	94
20	1,000	820	2,210	388	740	775	182	285	140
21	930	770	1,930	324	510	446	176	320	b150
22	860	710	1,650	301	450	366	176	405	192
23	790	700	1,490	280	420	b318	176	220	104
24	720	700	1,360	260	390	274	170	192	88
25	668	630	1,140	260	450	316	170	209	96
26	620	600	1,000	242	430	281	170	227	104
27	575	620	962	251	440	b298	165	210	b94
28	530	680	973	324	2,660	s2,400	165	207	92
29	500	610	824	456	1,770	2,180	160	209	b90
30	470	580	736	590	1,210	1,930	155	211	88
31	442	640	764	560	1,270	1,920	....	....	....

s Computed by subdividing day.
a Computed from an estimated concentration graph.
b Computed from a partly estimated concentration graph.

Little Sioux River near Kennebec, Iowa—Continued

Suspended sediment, water year October 1952 to September 1953

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	150	....		150			125	331	112
2	145	171		150			130	....	
3	140	96		150			130	....	
4	140	....		150			132	39	
5	145	....	e50	150			135	....	
6	145	....		155			135	....	
7	145	122		150	90	30	140	....	
8	145	130		150			140	60	
9	150			150			140	....	
10	150			150			140	86	
11	150	130	53	150			140	114	
12	145			150			140	78	
13	155			150			135	....	
14	155			155			135	....	
15	150			155	110	47	130	....	e26
16	150			160			125	....	
17	150			165			120	....	
18	150	100	40	150			115	....	
19	150			150			110	....	
20	150			150			110	....	
21	150			155			110	....	
22	150			155	55	23	110	....	
23	150			155			110	....	
24	155	140	57	155			110	....	
25	150			155			110	105	
26	155			140			115	....	
27	150			135			115	....	
28	150			130	....	e20	115	....	
29	150	120	40	125			115	....	
30	150			120			115	....	
31	155			....	....	....	115	....	
	January			February			March		
1	115	....		138	....		350	....	
2	115	....		138	....		330	....	
3	115	....		138	28		320	....	
4	115	36		138	....		310	....	
5	115	....		138	....		300	....	e130
6	119	20		140	....		298	167	
7	120	....		140	....		300	....	
8	120	....		140	....		320	131	
9	120	....		140	....		361	200	195
10	120	....		140	32		402	1,110	1,200
11	120	....		140	....		470	1,000	1,270
12	120	....		140	....	e12	808	2,130	4,650
13	120	27		140	....		1,240	2,550	8,540
14	120	....		140	....		1,630	3,340	14,700
15	120	....	e9	130	....		2,180	4,030	23,700
16	125	....		120	....		2,060	2,420	13,500
17	125	....		130	....		1,880	1,920	9,750
18	125	....		130	42		1,980	2,100	11,200
19	125	....		130	....		2,310	2,500	15,600
20	125	26		130	....		2,510	2,500	16,900
21	130	....		120	....		2,260	1,990	12,100
22	130	....		130	....		2,180	1,780	10,500
23	130	....		135	....		2,180	1,570	9,240
24	130	....		140	30		2,020	1,310	7,140
25	130	....		170			1,770	1,080	5,160
26	135	....		200	....	e120	1,600	687	2,970
27	135	....		350			1,420	1,050	4,030
28	135	16		400			1,240	938	3,140
29	135	....		....	....	....	1,140	958	2,920
30	135	....		....	....	....	1,140	1,080	3,320
31	135	....		....	....	....	1,240	1,200	4,020

e Estimated.
s Computed by subdividing day.
Note.—Flow affected by ice Nov. 27 to Mar. 8.

Little Sioux River near Kennebec, Iowa—Continued

Suspended sediment, water year October 1952 to September 1953—Continued

Day	April: Mean discharge (cfs)	April: Suspended sediment: Mean concentration (ppm)	April: Suspended sediment: Tons per day	May: Mean discharge (cfs)	May: Suspended sediment: Mean concentration (ppm)	May: Suspended sediment: Tons per day	June: Mean discharge (cfs)	June: Suspended sediment: Mean concentration (ppm)	June: Suspended sediment: Tons per day
1	1,210	690	2,250	1,260	635	2,160	710	360	690
2	1,180	598	1,910	1,390	706	2,650	713	390	751
3	1,240	684	2,290	1,590	1,010	4,340	674	370	673
4	1,210	542	1,770	1,700	1,020	4,680	660	347	618
5	1,140	517	1,590	1,770	1,030	4,920	644	396	689
6	1,140	505	1,550	1,820	1,030	5,060	644	370	643
7	1,100	471	1,400	1,810	978	4,780	705	1,100	sb2,400
8	1,070	398	1,150	1,760	890	4,230	2,350	10,500	s71,600
9	1,040	414	1,160	1,650	1,020	4,540	5,510	6,570	97,700
10	1,000	405	1,090	1,550	1,250	5,230	8,380	4,900	110,900
11	965	281	732	1,450	900	3,520	9,070	2,480	60,700
12	895	282	681	1,320	695	2,460	7,150	2,270	43,800
13	878	286	678	1,220	553	1,820	9,840	2,340	62,200
14	825	119	265	1,150	455	1,410	11,200	1,610	48,700
15	790	130	a280	1,110	460	1,380	10,800	1,280	37,300
16	895	374	904	1,090	2,360	6,950	9,300	1,330	33,400
17	930	310	a800	1,040	740	2,080	7,070	1,190	22,700
18	930	416	1,040	976	460	1,210	5,790	1,250	19,500
19	878	390	a900	948	525	1,340	4,790	1,350	17,500
20	878	326	773	909	500	b1,200	3,800	1,420	14,600
21	842	330	750	888	1,900	b4,600	3,150	1,380	11,700
22	790	290	619	808	1,700	b4,100	2,760	1,300	b9,700
23	738	275	548	802	950	2,050	2,480	1,070	7,160
24	738	358	764	888	686	1,640	2,250	1,500	sb9,700
25	790	232	495	954	850	2,190	3,100	15,900	137,000
26	808	303	720	951	530	1,360	4,080	5,280	58,200
27	825	305	679	902	460	1,120	2,480	2,430	16,300
28	920	390	979	864	460	1,070	2,460	1,880	12,500
29	1,080	525	1,530	818	463	1,020	2,470	2,300	15,300
30	1,200	622	2,020	772	445	928	2,350	1,590	10,100
31	....	....	....	730	393	775	....	....	....

Day	July: Mean discharge (cfs)	July: Mean concentration (ppm)	July: Tons per day	August: Mean discharge (cfs)	August: Mean concentration (ppm)	August: Tons per day	September: Mean discharge (cfs)	September: Mean concentration (ppm)	September: Tons per day
1	2,380	1,280	8,230	872	1,350	3,180	373	320	322
2	2,580	1,310	9,130	802	910	1,970	349	290	a280
3	3,010	1,470	11,900	1,060	1,430	4,090	335	281	254
4	3,210	1,320	11,400	1,620	2,390	10,500	316	196	167
5	2,860	1,110	8,570	1,540	2,210	9,190	302	133	108
6	2,420	986	6,440	1,660	1,680	7,530	284	188	144
7	2,100	880	4,990	2,420	2,640	17,200	274	152	112
8	1,820	836	4,110	2,220	1,920	11,500	261	137	97
9	1,700	811	3,720	2,140	1,390	8,030	245	218	144
10	1,700	798	3,660	1,940	1,070	5,600	236	223	142
11	1,540	803	3,340	1,580	938	4,000	224	192	116
12	1,380	752	2,800	1,540	944	3,930	216	168	98
13	1,280	732	2,530	1,310	868	3,070	212	122	70
14	1,200	1,300	sb4,700	1,200	675	2,190	203	160	88
15	1,030	2,540	7,060	1,280	699	2,420	195	168	88
16	960	1,200	3,110	1,380	694	2,590	191	159	82
17	908	984	2,410	1,240	602	2,020	188	157	80
18	855	812	1,870	1,060	557	1,590	178	168	81
19	802	780	a1,700	960	452	1,400	173	151	71
20	755	751	1,630	872	520	1,250	169	113	a50
21	725	694	1,360	802	524	1,130	168	106	48
22	695	691	1,300	740	576	1,150	166	140	63
23	680	676	1,240	680	486	892	167	119	54
24	620	641	1,070	635	466	799	165	129	57
25	575	638	990	590	483	769	170	195	90
26	560	810	b1,200	560	434	656	167	152	69
27	545	851	1,250	515	409	569	164	141	62
28	530	692	990	470	370	470	163	141	62
29	470	700	888	441	361	430	157	175	74
30	695	1,350	b2,500	414	351	392	157	215	91
31	1,140	2,270	6,990	388	312	325	....	....	....

s Computed by subdividing day.
a Computed from an estimated concentration graph.
b Computed from a partly estimated concentration graph.

Little Sioux River near Kennebec, Iowa—Continued

Suspended sediment, water year October 1953 to September 1954

Day	October Mean discharge (cfs)	October Suspended sediment Mean concentration (ppm)	October Suspended sediment Tons per day	November Mean discharge (cfs)	November Suspended sediment Mean concentration (ppm)	November Suspended sediment Tons per day	December Mean discharge (cfs)	December Suspended sediment Mean concentration (ppm)	December Suspended sediment Tons per day
1	158			144			167	....	
2	154			144			170	....	e20
3	148			144			199	....	e25
4	148			143			242	....	e45
5	148	141	57	143			258	....	e50
6	146			142			238	....	e45
7	146			135	76	29	203	69	38
8	148			138			190	....	
9	147			141			178	....	e20
10	148			142			170	....	
11	151			144			160	....	
12	148			145			160	....	
13	148			144			160	....	e10
14	146			148			160	....	
15	148	142	57	150			150	....	
16	153			150	101	41	140	....	
17	150			140			130	....	
18	151			148			120	....	
19	156			155			120	....	
20	148			188	140		120	....	e7
21	145			199	....	e71	110	....	
22	141			100	....		110	....	
23	142			190	....		110	....	
24	142			180	....		120	22	
25	144	112	44	178	....		140	....	
26	146			178	....		140	....	
27	145			172	....	e20	140	....	
28	147			168	....		140	....	e9
29	146			165	45		130	....	
30	146			155	....		130	....	
31	144			....	....	....	130	....	

Day	January Mean discharge (cfs)	January Mean concentration (ppm)	January Tons per day	February Mean discharge (cfs)	February Mean concentration (ppm)	February Tons per day	March Mean discharge (cfs)	March Mean concentration (ppm)	March Tons per day
1	120	17		50	21		770	722	1.500
2	120	....		50	....		605	640	a1,000
3	120	....		50	....		400	400	a430
4	120	....		50	....		250	250	a170
5	118	....	e6	50	....	e3	190	380	105
6	115	....		52	....		250	885	507
7	110	....		54	20		404	520	567
8	105	....		58	....		410	590	663
9	100	....		60	....		430	490	569
10	100	22		70	....	e8	542	515	754
11	95	....		80	....		652	725	1,280
12	92	22		90	....		897	1,400	3,610
13	88	....	e5	100	....		644	950	a1,700
14	85	....		110	....	e20	416	720	a810
15	82	....		120	....		302	376	307
16	80	....		130	112	39	357	645	622
17	77	....		150	228	92	505	1,060	s1,820
18	75	8		174	190	a89	1,500	4,000	s17,600
19	72	....		190	298	153	2,110	4,620	26,300
20	70	....		307	1,600	sb1,800	2,330	4,260	26,800
21	68	....		616	1,750	2,910	2,180	2,950	17,400
22	66	....		834	1,820	4,100	2,130	2,540	14,600
23	65	....	e3	1,030	2,160	6,010	2,380	2,600	16,700
24	64	....		908	1,470	3,600	2,530	2,640	18,000
25	62	....		960	1,420	3,680	2,260	2,080	12,700
26	60	....		1,140	1,840	5,660	1,690	1,650	7,530
27	58	36		872	1,210	2,850	1,440	1,260	4,900
28	56	....		872	885	2,060	1,320	1,080	3,850
29	54	....		....	....	....	1,280	880	a3,000
30	53	....		....	....	....	1,200	789	2,560
31	52	....		....	....	....	1,040	720	2,020

e Estimated.
s Computed by subdividing day.
a Computed from an estimated concentration graph.
b Computed from a partly estimated concentration graph.
Note.—Flow affected by ice Dec. 10 to Feb. 17, Mar. 3-6.

Little Sioux River near Kennebec, Iowa—Continued

Suspended sediment, water year October 1953 to September 1954—Continued

Day	April			May			June		
		Suspended sediment			Suspended sediment			Suspended sediment	
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1	928	698	1,750	528	595	848	2,450	13,100	86,700
2	850	460	1,060	620	1,240	2,080	1,520	7,210	29,600
3	788	451	960	686	620	1,150	1,440	5,690	22,100
4	720	450	a870	839	695	1,570	1,470	2,070	11,800
5	669	426	769	1,040	1,000	2,810	1,310	2,000	7,070
6	636	595	1,020	1,160	1,180	3,700	1,190	1,620	5,210
7	542	460	673	1,200	1,090	3,530	1,060	1,510	4,320
8	721	1,000	sb2,100	1,050	875	2,550	935	1,300	3,280
9	737	1,630	3,240	964	698	1,820	822	1,100	2,440
10	652	945	1,660	892	520	1,250	784	1,200	2,540
11	636	596	1,020	788	487	1,040	2,400	8,080	s57,500
12	620	425	711	737	462	919	3,420	6,820	s64,600
13	604	428	698	686	390	722	3,050	4,210	34,700
14	572	415	641	636	346	594	2,030	2,800	22,200
15	572	600	927	556	445	668	1,770	1,910	9,130
16	588	900	1,430	528	730	1,040	1,300	1,470	5,160
17	588	495	786	500	496	670	1,130	1,360	4,150
18	652	536	944	472	400	510	1,030	1,350	3,750
19	652	600	1,060	444	325	390	4,750	18,400	s255,000
20	686	645	1,190	416	265	298	9,650	5,930	s151,000
21	720	2,210	4,300	404	290	316	11,600	9,240	199,000
22	636	745	1,280	380	300	308	13,100	2,210	78,200
23	588	450	714	368	300	a300	13,100	1,560	55,200
24	528	450	642	368	216	215	13,000	1,360	47,700
25	528	495	706	368	195	194	12,600	1,320	44,900
26	487	426	560	392	250	265	12,700	1,210	41,500
27	472	375	478	1,050	20,700	s75,300	11,400	1,110	34,200
28	444	310	372	771	17,500	36,400	8,910	1,200	28,900
29	430	486	564	754	6,090	12,400	6,740	1,560	28,400
30	472	704	897	620	3,650	6,110	5,660	1,710	26,200
31	....	....	....	790	4,870	s11,800	....	....	....

Day	July			August			September		
1	4,760	1,810	23,300	515			1,140	800	2,460
2	4,220	1,610	18,300	515			900	625	1,620
3	3,650	1,500	14,800	515	480	660	820	510	a1,100
4	3,180	1,410	12,100	485			715	500	a970
5	2,730	1,260	9,290	470			650	480	a840
6	2,450	1,120	7,410	440			620	410	686
7	2,180	1,090	6,420	426			620	340	569
8	2,000	984	5,310	426	427	488	582	400	629
9	1,810	903	4,440	420			560	5,900	sb9,300
10	1,660	840	3,760	399			485	671	879
11	1,500	806	3,260	380			470	409	519
12	1,380	750	2,700	380			440	377	448
13	1,260	704	2,400	360			412		
14	1,140	652	2,010	334	426	403	386		
15	1,030	610	1,700	321			373		
16	960	564	1,460	313			373		
17	890	524	1,260	347	892	836	373		
18	855	503	1,300	412	732	814	386	208	311
19	802			412	546	607	380		
20	768	509	1,020	485	600	786	373		
21	715			515	575	800	360		
22	680			485	595	779	399		
23	665			545	800	1,180	426		
24	635			500	480	648	386		
25	605	508	850	500	400	621	360		
26	575			455	410	504	847	194	186
27	530			957	1,680	s4,460	329		
28	500	513	693	1,180	1,720	5,480	351	1,300	sb1,300
29	485			1,490	1,800	7,240	340	1,500	sb1,500
30	485			1,340	1,680	6,080	296	500	400
31	500	601	892	1,300	1,590	5,680	....	....	....

s Computed by subdividing day.
a Computed from an estimated concentration graph.
b Computed from a partly estimated concentration graph.

Little Sioux River near Kennebec, Iowa—Continued

Monthly discharge for calendar and water years 1950 to 1954

Month	Water discharge (cfs-days)	Suspended sediment								
		Load (tons)	Daily loads (tons)			Tons per sq. mi.	Acre-feet (a)	Concentration (ppm)	
			Max.	Min.	Mean			Maximum daily	Weighted mean
May 23-31, 1950	3,022	34,580	19,000	540	3,840	12.7	29	12,000	3,540
June	31,330	1,609,270	520,000	140	53,600	589.5	1,340	40,800	19,000
July	29,909	473,780	101,000	150	15,300	173.5	395	20,400	5,870
August	14,426	271,970	154,000	130	8,770	99.6	227	27,400	6,980
September	6,357	11,569	2,590	27	386	4.24	9.7	1,700	674
October 1950	6,819	26,553	18,400	35	856	9.73	22	9,270	1,440
November	3,626	1,222	67	23	41	.45	1.0	200	125
December	2,263	391	....	....	13	.14	0.3	....	64
January 1951	1,698	288	....	....	9	.11	0.2	....	63
February	4,335	159,673	150,000	....	5,700	58.5	133	21,400	13,600
March	52,335	803,158	255,000	40	25,900	294.2	670	....	5,680
April	191,040	1,074,000	200,000	8,330	35,800	393.4	896	18,000	2,080
May	96,350	711,470	331,000	1,330	23,000	260.6	594	24,100	2,730
June	81,360	1,076,470	169,000	2,880	35,900	394.3	899	19,400	4,900
July	94,350	598,460	267,000	3,910	19,300	219.2	500	16,200	2,350
August	85,510	1,053,540	158,000	2,950	34,000	385.9	879	12,600	4,560
September	83,450	513,830	133,000	1,450	17,100	188.2	429	15,700	2,280
Water year 1950-51	703,136	6,019,055	331,000	....	16,500	2,205	5,020	24,100	3,170
October 1951	37,800	91,433	41,700	677	2,950	33.5	76	8,590	896
November	22,059	15,968	4,370	246	532	5.85	13	845	268
December	20,700	14,377	1,480	....	464	5.27	12	570	257
Calendar year 1951	770,087	6,112,667	331,000	....	16,700	2,239	5,100	24,100	2,940
January 1952	17,880	34,930	16,000	....	1,130	12.8	29	....	724
February	48,580	267,020	32,000	1,360	9,210	97.8	223	....	2,040
March	82,320	828,449	163,000	999	26,700	303.5	692	11,700	3,730
April	133,640	448,910	54,400	2,350	15,000	164.4	375	2,820	1,240
May	37,560	201,087	61,300	837	6,490	73.7	168	18,300	1,980
June	27,001	412,586	140,000	600	13,800	151.1	344	21,300	5,600
July	48,950	789,769	277,000	736	25,500	289.3	659	17,300	5,980
August	11,930	24,581	2,490	274	793	9.00	21	2,660	762
September	7,622	9,296	1,520	88	310	3.41	7.8	930	452
Water year 1951-52	496,051	3,138,406	277,000	....	8,570	1,150	2,620	21,300	2,340
October 1952	4,625	1,566	....	....	51	.57	1.3	....	125
November	4,465	967	....	....	32	.35	0.8	....	80
December	3,847	892	....	....	29	.33	0.7	....	86
Calendar year 1952	428,429	3,020,053	277,000	....	8,250	1,106	2,520	21,300	2,610
January 1953	3,859	279	....	....	9	.10	0.2	....	27
February	4,365	768	....	....	27	.28	0.6	....	65
March	38,549	186,785	23,700	....	6,030	68.4	156	4,030	1,790
April	28,935	32,317	2,290	265	1,080	11.8	27	690	414
May	37,070	86,833	6,950	775	2,800	31.8	72	2,360	868
June	127,470	934,724	137,000	618	31,200	342.4	780	15,900	2,720
July	41,725	122,978	11,900	888	3,970	45.0	103	2,540	1,090
August	34,929	110,832	17,200	325	3,580	40.6	93	2,640	1,180
September	6,566	3,264	322	48	109	1.20	2.7	320	184
Water year 1952-53	336,405	1,482,205	137,000	....	4,060	542.9	1,240	15,900	1,630
October 1953	4,578	1,624	....	....	52	.59	1.4	....	131
November	4,718	1,098	....	....	37	.40	0.9	....	86
December	4,835	479	....	....	15	.18	0.4	....	37
Calendar year 1953	337,599	1,481,981	137,000	....	4,060	542.8	1,240	15,900	1,630
January 1954	2,602	133	....	....	4	.05	0.1	....	19
February	9,287	33,174	6,010	....	1,180	12.2	28	2,160	1,320
March	33,510	190,554	26,800	170	6,150	69.8	159	4,620	2,110
April	18,724	34,022	4,300	372	1,130	12.5	28	2,210	673
May	21,037	171,767	75,300	104	5,540	62.9	143	20,700	3,020
June	153,441	1,366,450	255,000	2,440	45,500	500.5	1,140	18,400	3,300
July	45,610	132,454	23,300	....	4,270	48.5	111	1,810	1,080
August	17,640	44,573	7,240	....	1,440	16.3	37	1,600	936
September	14,718	27,385	9,300	....	913	10.0	23	5,900	689
Water year 1953-54	330,700	2,003,713	255,000	....	5,490	734.0	1,670	20,700	2,240

a Computed using a specific weight of 55 pounds per cubic foot.

Little Sioux River near Kennebec, Iowa—Continued

Particle-size analyses of suspended sediment, May to September 1950

(Methods of analysis: B, bottom-withdrawal tube; P, pipette; S, sieve; N, in native waters; W, in distilled water; C, chemically dispersed; M, mechanically dispersed.)

Date	Time	Instantaneous discharge (cfs)	Water temperature (°F)	Suspended sediment											Methods of analysis
				Concentration (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters									
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	
May 23, 1950	6:35 p.m.	422	...	1,390	4,750	...	20	...	36	...	99	100	...	...	SPWCM
June 12	1:10 p.m.	4,330	...	74,400	15,780	...	28	...	52	...	99	100	...	...	SPWCM
June 12	3:10 p.m.	4,330	...	56,600	25,200	...	29	...	57	...	100	...	...	...	SPWCM
June 12	7:00 p.m.	3,460	...	53,000	14,430	...	38	...	70	...	100	...	...	...	SPWCM
June 14	7:10 p.m.	351	...	1,880	1,550	...	46	...	68	...	99	100	...	...	SPWCM
June 18	8:00 a.m.	5,800	...	60,800	26,300	...	25	...	47	...	99	100	...	...	SPWCM
June 18	10:00 a.m.	6,080	...	59,800	23,300	...	28	...	52	...	99	100	...	...	SPWCM
June 18	2:45 p.m.	6,140	...	34,700	13,200	...	34	...	60	...	99	100	...	...	SPWCM
June 18	3:55 p.m.	6,080	...	25,600	14,000	28	...	46	59	82	99	100	...	...	SPWCM
June 18	3:55 p.m.	6,080	...	25,600	27,840	2	4	9	46	86	99	100	...	...	SPNM
July 6	10:35 a.m.	304	...	291	990	...	39	...	50	...	92	100	...	...	SPWCM
July 12	8:50 a.m.	1,100	...	20,500	16,700	...	30	...	59	...	97	100	...	...	SPWCM
July 12	6:30 p.m.	2,170	...	32,900	17,300	27	35	45	60	60	99	100	...	...	SPWCM
July 12	6:30 p.m.	2,170	...	32,900	32,270	1	2	4	31	89	98	100	...	...	SPNM
July 13	6:00 p.m.	964	...	8,210	10,900	...	41	...	67	...	99	100	...	...	SPWCM
July 17	5:50 p.m.	665	...	6,360	8,400	...	53	...	85	...	99	100	...	...	SPWCM
July 19	7:10 a.m.	1,740	...	9,600	13,000	...	26	...	46	...	98	100	...	...	SPWCM
July 20	6:10 p.m.	1,030	...	2,920	3,930	...	39	...	59	...	98	100	...	...	SPWCM
July 22	11:35 a.m.	1,850	...	3,950	6,030	...	28	...	45	...	96	100	...	...	SPWCM
July 25	6:40 a.m.	2,050	...	3,070	4,080	...	24	...	39	...	93	100	...	...	SPWCM
July 30	8:00 a.m.	930	...	46,300	8,560	24	28	30	53	81	100	...	...	...	SPWCM
July 30	8:00 a.m.	930	...	46,300	15,300	1	3	7	40	81	100	...	...	...	SPNM
Aug. 8	10:20 a.m.	695	...	10,200	10,200	28	38	51	66	83	99	100	...	...	SPWCM
Aug. 8	10:20 a.m.	695	...	10,200	9,690	...	2	6	26	91	96	99	100	...	BN
Aug. 12	7:10 a.m.	2,500	...	36,400	14,400	...	27	...	49	...	100	...	...	...	SPWCM
Aug. 12	9:00 a.m.	2,580	...	29,100	12,200	...	29	...	49	...	100	...	...	...	SPWCM
Aug. 12	11:05 a.m.	2,460	...	36,200	14,300	...	28	...	50	...	99	100	...	...	SPWCM
Sept. 21	6:15 p.m.	282	...	1,780	2,660	...	51	...	77	...	100	...	...	...	SPWCM
Sept. 23	5:50 p.m.	550	...	1,780	2,750	...	29	...	48	...	98	100	...	...	SPWCM
Sept. 24	6:25 p.m.	564	...	1,650	2,490	...	41	...	63	...	98	100	...	...	SPWCM
Sept. 26	6:30 a.m.	454	...	873	1,420	...	44	...	62	...	98	100	...	...	SPWCM

Little Sioux River near Kennebec, Iowa—Continued

Particle-size analyses of suspended sediment, water year October 1950 to September 1951

(Methods of analysis: B, bottom-withdrawal tube; P, pipette; S, sieve; N, in native waters; W, in distilled water; C, chemically dispersed; M, mechanically dispersed.)

Date	Time	Instantaneous discharge (cfs)	Water temperature (°F)	Suspended sediment: Concentration (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters: 0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	Methods of analysis
Oct. 2, 1950	10:05 a.m.	834	....	10,800	8,750	....	25	....	45	....	98	100	....	....	SPWCM
Oct. 2	12:30 p.m.	930	....	10,800	7,710	....	29	....	52	....	99	100	....	....	SPWCM
Oct. 2	2:35 p.m.	930	....	16,300	11,800	....	31	....	61	....	98	100	....	....	SPWCM
Oct 10	8:40 a.m.	260	55	260	8,520	....	31	....	....	....	94	100	....	....	SPWCM
Dec. 2	11:35 a.m.	92	32	120	320	....	....	....	....	....	35	72	89	100	SW
Mar. 21, 1951	12:20 p.m.	175	32	70	479	....	79	....	90	....	98	100	....	....	SPWCM
April 3	2:00 p.m.	5,250	39	2,340	5,960	....	27	....	41	....	90	97	100	....	SPWCM
April 7	6:20 p.m.	9,700	38	2,480	7,040	....	26	....	37	....	73	81	....	....	SPWCM
April 8	12:00 m.	10,800	37	2,240	1,610	....	9	14	20	29	39	85	95	98	BN
April 8	12:00 m.	10,800	37	2,240	2,940	....	27	....	38	....	69	76	....	....	SPWCM
April 9	6:00 p.m.	11,900	40	1,530	3,510	....	25	....	36	....	67	74	92	100	SPWCM
May 9	4:15 p.m.	4,150	59	1,200	3,300	....	28	....	43	....	87	100	....	....	SPWCM
July 2	2:35 p.m.	2,760	70	1,360	....	....	....	....	....	....	78	88	97	100	SW
Aug. 7	6:20 a.m.	1,280	76	915	1,350	....	37	....	55	....	93	95	98	100	SPWCM
Aug. 15	3:10 p.m.	6,000	69	3,920	5,560	....	30	....	46	....	95	97	99	100	SPWCM
Aug. 15	7:35 p.m.	5,800	68	2,800	10,780	....	29	....	44	....	94	98	99	100	SPWCM
Aug. 25	12:10 p.m.	2,010	71	939	1,400	....	27	....	36	....	93	97	100	....	SPWCM
Sept. 6	10:15 a.m.	1,380	69	764	2,410	....	25	....	48	....	82	87	94	100	SPWCM
Sept. 11	6:20 a.m.	1,880	65	3,600	5,200	....	16	....	28	....	94	98	99	100	SPWCM
Sept. 11	9:30 p.m.	3,100	67	4,140	6,010	....	20	....	34	....	92	96	98	100	SPWCM
Sept. 12	5:05 p.m.	6,460	65	11,900	17,900	20	27	34	47	71	96	98	99	100	SPWCM
Sept. 19	11:55 a.m.	4,430	64	941	1,420	....	12	....	28	....	72	82	94	100	SPWCM

Particle-size analyses of suspended sediment, water year October 1951 to September 1952

Date	Time	Instantaneous discharge (cfs)	Water temperature (°F)	Concentration (ppm)	Concentration of suspension analyzed (ppm)	0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	Methods of analysis
Feb. 6, 1952	5:05 p.m.	820	....	3,050	5,130	4	11	22	34	61	96	99	100	....	SPN
Feb. 6	5:05 p.m.	820	....	3,050	5,050	22	24	31	41	74	97	99	100	....	SPWCM
April 2	11:20 a.m.	7,550	42	2,200	4,490	18	22	25	30	43	62	75	93	100	SPWCM
April 4	11:45 a.m.	7,960	38	1,980	5,250	20	24	30	37	54	76	86	98	100	SPWCM
June 3	11:35 a.m.	738	68	522	1,850	....	18	28	38	58	89	94	99	100	SPWCM

June 27	3:25 p.m.	1,880	76	19,800	17,200	21	31	43	60	85	100	...	...	...	SPWCM
July 1	12:15 p.m.	1,460	81	5,860	23,300	13	17	22	30	55	94	99	...	...	SPWCM
July 7	3:45 p.m.	7,150	...	34,000	40,000	21	30	40	56	85	98	99	100	...	SPWCM
Aug. 5	7:20 p.m.	415	72	408	1,440	30	32	42	50	72	91	94	96	100	SPWCM

Particle-size analyses of suspended sediment, water year October 1952 to September 1953

Oct. 9, 1952	2:55 p.m.	155	48	102	...	...	...	...	...	...	94	96	100	...	S
Nov. 14	12:00 m.	155	42	97	...	...	...	...	...	...	77	86	97	100	S
Dec. 4	3:15 p.m.	a132	32	39	...	...	...	...	...	...	92	96	98	100	S
Feb. 3, 1953	10:35 a.m.	a138	32	18	...	...	...	...	...	...	92	96	100	...	S
Mar. 19	5:00 p.m.	2,460	42	2,460	6,680	3	6	15	30	57	91	96	99	100	SPNM
Mar. 19	5:00 p.m.	2,460	42	2,460	5,960	14	22	28	42	64	91	96	99	100	SPWCM
April 3	1:05 p.m.	1,240	45	660	1,340	2	4	20	30	60	85	94	98	100	SPNM
April 3	1:05 p.m.	1,240	45	660	1,330	22	27	35	46	66	85	94	98	100	SPWCM
May 7	9:25 a.m.	1,800	56	922	4,390	20	26	33	42	72	88	94	99	100	SPWCM
June 1	12:10 p.m.	702	70	344	...	...	...	...	...	...	88	94	98	100	S
June 10	7:00 p.m.	9,100	67	4,320	8,450	2	5	29	57	71	91	95	99	100	SPNM
June 10	7:00 p.m.	9,100	67	4,320	8,730	46	50	55	59	73	91	95	99	100	SPWCM
July 1	4:00 p.m.	2,380	78	1,100	3,360	33	37	46	57	74	86	92	99	100	SPWCM
Aug. 5	11:15 a.m.	1,460	75	1,780	6,040	26	38	50	66	83	92	95	97	100	SPWCM
Sept. 1	10:50 a.m.	373	78	326	...	...	...	...	...	...	96	98	100	...	S

Particle-size analyses of suspended sediment, water year October 1953 to September 1954

Feb. 24, 1954	10:15 a.m.	908	36	1,440	2,080	...	52	58	...	...	92	...	...	...	SPWCM
April 13	11:45 a.m.	604	52	460	4,410	...	38	...	68	...	93	96	100	...	SPWCM
May 4	5:50 p.m.	874	...	809	2,530	...	23	...	42	...	82	95	...	...	SPWCM
May 27	7:00 a.m.	1,360	60	76,800	3,790	...	25	...	48	...	98	...	...	...	SPWCM
June 3	11:50 a.m.	1,620	...	6,080	4,460	...	36	...	63	...	97	...	...	...	SPWCM
June 11	10:35 a.m.	2,030	75	7,640	6,650	...	34	...	65	...	94	98	...	...	SPWCM
June 11	6:30 p.m.	3,270	75	10,100	4,320	...	30	...	60	...	95	97	...	...	SPWCM
June 12	7:00 a.m.	3,740	72	8,290	7,340	...	33	...	66	...	96	98	...	...	SPWCM
June 19	11:40 p.m.	5,090	72	24,900	4,070	...	28	...	54	...	98	99	...	...	SPWCM
June 20	10:05 a.m.	9,100	...	5,370	4,790	...	54	...	72	...	95	98	...	...	SPWCM
June 30	2:00 p.m.	5,690	81	1,700	4,400	...	24	...	40	...	88	94	100	...	SPWCM

a Mean daily discharge.

Missouri River near Florence, Nebr.

Location.—Near Florence, Douglas County, and 5 miles upstream from gaging station at Omaha.

Drainage Area.—322,800 square miles.

Records Available.—Chemical analyses: October 1906 to October 1907.

Extremes.—Dissolved solids: Maximum, 663 ppm Dec. 14-23, 1906; minimum, 300 ppm Aug. 24 to Sept. 3, 1907.

Chemical analyses, in parts per million, October 1906 to October 1907

Date of collection	Mean gage height (feet)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Total dissolved solids
Oct. 1-10, 1906	7.1	30	0.20	53	17	57	...	0.0	197	8.0	1.3	442
Oct. 11-20	6.2	18	.05	88	37	34	215	.0	178	8.7	.9	467
Oct. 21-31	6.7	44	.6	68	25	72	...	.0	175	9.0	.3	490
Nov. 1-10	6.4	36	.5	73	25	53	231	.0	184	8.7	1.0	526
Nov. 11-20	5.8	27	.5	82	30	57	247	.0	195	9.1	.9	543
Nov. 21-30	5.1	29	.20	94	30	45	298	.0	212	9.5	1.8	597
Dec. 2-13	4.7	24	.18	92	38	51	305	.0	211	12	.9	565
Dec. 14-23	3.7	25	.10	102	38	58	337	.0	237	12	1.0	663
Dec. 25-Jan. 3, 1907	...	23	.05	91	33	52	300	.0	222	14	.9	608
Jan. 4-13	...	23	.05	82	30	...	270	.0	199	14	.9	545
Jan. 15-26	...	28	.10	97	27	60	309	.0	233	15	1.4	615
Jan. 27-Feb. 6	...	34	Tr.	96	32	60	310	.0	224	15	1.6	620
Feb. 7-16	...	27	.15	80	27	50	251	.0	178	12	1.5	499
Feb. 17-27	...	36	1.2	50	13	38	154	.0	132	6.2	1.6	340
Feb. 28-Mar. 12	10.4	37	1.4	56	13	38	156	.0	143	5.5	2.6	403
Mar. 14-23	12.6	39	2.0	51	18	38	156	.0	144	8.7	2.9	393
Mar. 24-April 2	12.0	16	1.0	45	10	62	160	.0	153	10	1.2	394
April 3-12	12.2	43	.7	54	15	49	176	.0	128	7.1	1.2	402
April 14-23	12.8	55	1.2	61	...	56	162	.0	204	6.9	1.5	540
April 25-May 4	11.5	67	.65	53	...	56	152	.0	217	6.0	1.2	548
May 5-14	11.0	21	.35	52	17	50	163	.0	154	6.9	3.6	390
May 15-24	10.3	41	.8	56	18	43	177	.0	167	8.2	1.1	435
May 25-June 3	14.0	16	.10	58	16	50	164	.0	197	4.6	1.7	455
June 4-13	14.8	10	.18	58	16	56	164	.0	190	6.2	3.8	444
June 14-24	15.9	76	1.2	59	...	50	162	.0	180	6.1	3.8	530
June 25-July 4	15.8	21	.07	61	12	40	166	.0	...	5.0	1.8	...
July 5-14	16.6	20	.9	51	16	51	152	.0	179	...	3.1	416

July 15-24	16.9	16	.13	50	12	44	161	.0	113	7.0	5.0	325
July 25-Aug. 3	15.2	19	.04	49	7.9	50	171	.0	109	7.6	5.5	340
Aug. 4-13	13.3	21	.05	47	14	44	163	.0	110	14	2.0	326
Aug. 14-23	11.9	20	.04	66	20	37	262	.0	81	6.0	1.6	353
Aug. 24-Sept. 3	10.6	25	.38	46	14	36	146	.0	96	8.8	.9	300
Sept. 4-13	9.7	33	.06	48	13	42	158	.0	115	7.0	.9	322
Sept. 14-23	9.2	36	.10	48	13	40	146	a4.8	113	8.4	.7	332
Sept. 24-Oct. 3	8.8	35	.35	54	17	44	150	a7.2	....	7.8	Tr.	362
Oct. 4-14	8.5	33	.14	54	14	46	161	a4.8	134	9.6	1.2	373
Mean	....	31	0.44	65	20	49	203	0.0	168	8.9	1.8	454

a Abnormal; computed as HCO_3 in the average.

Missouri River at Nebraska City, Nebr.

LOCATION.—At gaging station on Waubonsie Highway bridge at Nebraska City, Otoe County.

DRAINAGE AREA.—414,000 square miles.

RECORDS AVAILABLE.—Chemical analyses: January 1951 to September 1954 (a).

EXTREMES, water years 1951 to 1953 given in following table:

Water year	Chemical composites							
	Dissolved solids (ppm)				Total hardness (ppm)			
	Max.	Period	Min.	Period	Max.	Period	Min.	Period
1950-51 (b)	532	Jan. 4-31	280	Mar. 27-29	272	Jan. 4-31	180	Aug. 1-31
1951-52	600	Jan. 1-10	330	April. 17-18	344	Jan. 1-10	168	April 17-18
1952-53	589	Jan. 4-14	348	June 10-13	307	Jan. 1-3	180	July 5-31

b January to September.

EXTREMES, 1951-53.—Dissolved solids: Maximum, 600 ppm Jan. 1-10, 1952; minimum, 280 ppm Mar. 27-29, 1951.

Total hardness: Maximum, 344 ppm Jan. 1-10, 1952; minimum, 168 ppm Apr. 17-18, 1952.

REMARKS.—Records of specific conductance of daily samples available in Regional Office, U. S. Geological Survey, Lincoln, Nebr.

a Records for 1954 water year were not available in time for this bulletin.

Missouri River at Nebraska City, Nebr.—Continued

Chemical analyses, in parts per million, January to September 1951

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Specific conductance (micromhos at 25°C)	pH
Jan. 4-31, 1951 ...	20,750	22	0.10	67	26	67	5.7	228	0	190	24	0.5	3.5	0.13	532	0.72	29,810	272	85	34	708	8.1
Feb. 1-28.........	21,440	21	.02	66	22	60	5.1	220	0	165	24	.6	3.6	.10	514	.70	29,750	256	76	33	747	7.9
Mar. 1-24.........	28,400	21	.02	61	19	51	5.5	202	0	151	20	.4	4.6	.10	456	.62	35,080	232	66	32	650	7.0
Mar. 25-26........	61,200	18	.06	54	14	30	6.4	182	0	88	11	.2	5.7	.06	332	.45	54,860	192	43	25	505	7.8
Mar. 27-29........	140,700	13	.06	55	11	20	6.2	182	0	68	7.0	.1	6.3	.10	260	.38	106,400	184	35	18	442	7.8
Mar. 30-April 17...	118,200	13	.02	49	15	34	5.1	164	0	100	9.0	.3	5.3	.09	348	.47	111,100	184	50	28	498	7.9
April 18-20........	91,100	13	.04	56	15	39	4.8	188	0	110	9.5	.4	5.5	.06	382	.52	93,960	202	48	29	555	7.5
April 21-29........	64,320	15	.04	58	15	40	5.3	192	0	118	13	.3	5.8	.07	410	.56	71,200	206	49	29	569	7.7
April 30-May 3....	90,750	16	.04	65	15	28	6.4	224	0	89	9.5	.3	4.0	.08	378	.51	92,620	224	40	21	545	7.3
May 4-31..........	60,450	19	.10	64	18	48	6.3	208	0	148	13	.3	5.8	.08	428	.58	69,860	234	63	30	652	7.6
June 1-2..........	133,500	14	.04	58	12	28	6.4	193	0	76	11	.4	3.3	.08	316	.43	113,900	194	36	23	478	7.5
June 3-5..........	105,000	16	.10	56	13	36	6.1	182	0	106	10	.3	6.6	.08	346	.47	98,930	193	44	28	533	7.4
June 6-8..........	93,200	17	.10	61	16	42	6.3	188	0	140	12	.3	6.2	.13	396	.54	99,650	219	65	29	599	7.3
June 9-19.........	81,920	17	.10	53	15	48	6.4	180	0	128	11	.3	5.8	.09	374	.51	82,720	192	44	34	575	7.7
June 20-22........	94,870	15	.10	52	13	30	5.9	178	0	88	9.0	.3	6.9	.06	314	.43	80,430	182	36	26	483	7.6
June 23-28........	75,730	15	.04	57	14	37	6.4	174	0	123	11	.3	6.2	.08	356	.48	72,790	199	56	28	547	7.4
June 29-July 31....	72,240	19	.02	57	14	40	5.8	189	0	115	12	.4	5.5	.09	369	.50	71,970	200	45	30	560	7.6
Aug. 1-31.........	63,270	17	.02	51	13	36	5.3	168	0	106	12	.4	5.0	.04	338	.46	57,740	180	42	30	519	7.7
Sept. 1-30.........	63,200	16	.02	56	16	47	5.3	186	0	133	12	.5	4.0	.08	395	.54	67,400	207	54	32	602	7.7
Weighted avg. (a)..	60,400	17	0.04	57	16	42	5.7	187	....	122	13	0.4	5.1	0.08	384	0.52	62,620	208	55	30	575	....

a Represents 86 percent of runoff for water year October 1950 to September 1951.

Missouri River at Nebraska City, Nebr.—Continued

Chemical analyses, in parts per million, water year October 1951 to September 1952

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Specific conductance (micromhos at 25°C)	pH
Oct. 1-31, 1951	53,860	....	......	65	19	52	....	208	0	157	15	......	4.6	0.18	474	0.64	68,930	241	72	32	689	8.0
Nov. 1-30	47,550	....	......	69	17	52	....	213	0	155	15	......	4.0	.18	454	.62	58,290	242	67	31	678	7.9
Dec. 1-15	33,530	....	......	70	23	53	....	237	0	164	17	......	4.8	.08	498	.68	45,080	270	76	29	728	7.7
Dec. 27-28	11,600	....	......	76	26	55	....	266	0	162	23	......	6.7	.17	530	.72	16,600	296	78	28	786	8.0
Jan. 1-10, 1952	14,450	....	......	92	28	59	....	304	0	183	29	......	6.8	.08	600	.82	23,410	344	95	26	884	7.8
Jan. 16-Feb. 10	27,730	....	......	71	22	56	....	237	0	161	21	......	5.8	.17	500	.68	37,440	266	72	31	744	7.7
Feb. 11-Mar. 9	46,190	....	......	66	20	44	....	213	0	143	15	......	8.2	.17	440	.60	54,870	247	72	27	661	7.8
Mar. 10-30	51,880	....	......	64	17	40	....	195	0	133	16	......	8.4	.05	408	.55	57,150	229	69	27	617	7.9
Mar. 31-April 5	127,800	....	......	62	17	39	....	183	0	142	11	......	7.6	.05	398	.54	137,300	225	75	27	603	7.8
April 6-9	154,300	....	......	64	17	51	....	158	0	189	10	......	5.3	.05	436	.59	181,600	228	98	32	660	7.7
April 10-16	225,400	....	......	52	13	45	....	150	0	149	8.5	......	3.5	.07	364	.50	221,500	185	62	33	562	8.0
April 17-18	335,000	14	......	46	13	40	4.5	156	0	114	7.7	0.2	2.0	.07	336	.46	303,900	168	40	33	509	7.7
April 19	390,000	19	......	46	13	40	4.3	159	0	114	6.8	.2	3.5	.06	348	.47	366,400	169	39	33	510	7.9
April 20-23	270,800	17	......	46	14	42	4.7	162	0	120	7.7	.2	3.6	.06	350	.48	255,900	174	41	34	524	7.9
April 24-May 2	133,000	....	......	54	15	46	....	180	0	139	9.0	......	4.6	.11	377	.51	135,400	198	50	32	583	8.0
May 3-6	83,400	....	......	54	15	47	....	176	4	135	11	......	3.8	.09	379	.52	85,340	197	46	33	585	8.3
May 7-22	73,140	....	......	57	17	50	....	193	0	143	13	......	4.0	.11	426	.58	84,130	211	53	33	622	7.7
May 23-June 2	71,990	....	......	57	15	45	....	196	0	121	12	......	5.1	.12	412	.56	80,080	203	42	32	586	7.6
June 3-7	64,940	....	......	57	16	57	....	193	0	166	14	......	3.7	.12	468	.64	82,060	208	50	36	655	7.8
June 8-13	64,880	....	......	53	16	51	....	175	0	144	14	......	2.9	.17	428	.58	74,980	196	52	35	600	7.9
June 14-19	59,730	....	......	60	17	61	....	175	0	185	15	......	4.3	.19	518	.70	83,540	219	75	37	695	7.9
June 20-July 6	71,830	....	......	56	13	36	....	189	0	105	16	......	4.2	.11	343	.47	66,520	193	38	27	534	7.5
July 7-8	75,600	....	......	71	15	61	....	196	0	196	11	......	7.8	.14	502	.68	102,500	240	79	34	726	7.7
July 9-21	52,140	....	......	56	12	43	....	178	0	116	12	......	5.6	.14	361	.49	50,820	188	42	32	561	7.8
July 22-Aug. 27	34,530	....	......	55	16	54	....	179	0	151	18	......	3.0	.14	416	.57	38,780	202	55	35	633	7.8
Aug. 28-Sept. 3	40,130	17	......	56	15	48	....	178	0	143	16	.4	2.9	.14	390	.53	42,260	202	56	33	604	7.7
Sept. 4-30	33,330	17	......	60	18	56	....	190	0	168	17	.5	2.0	.11	440	.60	39,600	225	69	34	671	7.8
Weighted average	58,180	....	......	59	16	47	....	a189	....	144	13	......	4.7	0.12	415	0.56	65,190	213	58	31	621	....

a Includes carbonate as bicarbonate.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Oct. 1-31, 1952....	34,300	....	......	58	21	56	....	196	0	169	17	......	2.2	0.12	452	0.61	41,880	232	71	34	687	7.7
Nov. 1-28.........	31,410	....	......	61	20	56	....	202	0	167	17	......	2.4	.09	450	.61	38,160	234	68	33	690	7.9
Nov. 29-Dec. 1....	13,670	....	......	68	22	60	....	229	0	170	24	......	3.0	.11	494	.67	18,100	259	71	33	748	7.8
Dec. 2-7..........	14,120	....	......	74	25	66	....	258	0	178	31	......	3.4	.11	534	.73	20,360	286	74	32	814	7.8
Dec. 8-20.........	17,500	....	......	70	22	58	....	244	0	157	25	......	3.5	.10	496	.67	23,440	267	67	31	750	7.7
Dec. 21-31........	12,760	....	......	64	35	64	....	280	0	173	30	......	3.8	.11	558	.76	19,220	304	74	31	838	8.0
Jan. 1-3, 1953.....	16,900	....	......	81	26	67	....	274	0	190	27	......	4.3	.12	577	.78	26,330	307	82	31	863	7.9
Jan. 4-14.........	20,760	....	......	80	26	73	....	265	0	211	26	......	3.7	.11	559	.80	33,050	306	89	33	878	7.9
Jan. 15-30........	17,960	....	......	78	25	71	....	260	0	201	26	......	4.1	.13	572	.78	27,740	297	84	33	860	7.9
Jan. 31-Feb. 22....	25,950	....	......	64	20	54	....	216	0	158	20	......	3.6	.10	465	.63	32,580	242	65	32	704	7.8
Feb. 23-28........	22,130	....	......	69	20	56	....	231	0	165	22	......	4.4	.13	482	.66	28,800	256	67	31	736	7.9
Mar. 1-13.........	30,020	....	......	65	20	50	....	216	0	144	19	......	5.1	.06	445	.61	36,070	244	67	30	686	7.8
Mar. 14-23........	64,900	....	......	63	18	46	....	187	0	152	13	......	5.1	.07	434	.59	76,050	233	80	30	639	8.1
Mar. 24-31........	67,680	....	......	67	19	58	....	172	0	210	13	......	4.6	.08	490	.67	89,540	240	105	33	728	8.0
April 1-18........	47,320	....	......	63	17	57	....	180	0	180	15	......	3.5	.06	454	.62	58,000	226	78	35	691	7.7
April 19-30.......	33,310	....	......	67	20	57	....	199	0	183	18	......	3.2	.06	486	.66	43,710	248	85	33	725	8.0
May 1-5..........	53,980	....	......	72	19	52	....	205	0	179	16	......	4.8	.10	488	.66	71,120	258	90	30	716	7.4
May 6-7..........	109,500	....	......	77	20	67	....	195	0	241	13	......	2.9	.12	570	.78	168,500	276	116	34	816	7.7
May 8-11.........	73,780	....	......	76	20	76	....	188	0	257	13	......	4.7	.14	586	.80	116,700	271	117	37	844	7.6
May 12-31........	45,690	....	......	69	18	63	....	197	0	194	16	......	4.2	.11	498	.68	61,430	246	84	35	749	7.4
June 1-9..........	44,320	....	......	66	18	67	....	198	0	193	17	......	3.2	.10	496	.67	59,350	237	75	37	748	7.5
June 10-13........	89,880	....	......	56	12	39	....	167	0	119	9.5	......	3.8	.09	348	.47	84,450	189	52	31	538	7.4
June 14-19........	82,030	....	......	59	16	62	....	174	0	184	12	......	3.9	.12	452	.61	100,100	213	70	38	682	7.2
June 20-25........	101,500	....	......	61	17	77	....	169	0	225	10	......	3.6	.15	510	.69	139,800	220	81	43	759	7.5
June 26-July 4.....	99,760	....	......	57	14	63	....	174	0	181	9.0	......	4.5	.12	444	.60	119,600	198	55	39	663	7.6
July 5-31.........	42,800	....	......	50	13	54	....	160	0	143	13	......	2.8	.11	386	.52	44,610	180	44	38	591	7.8
Aug. 1-31.........	36,910	....	......	51	14	55	....	168	0	146	17	......	2:3	.14	396	.54	39,460	185	47	38	609	7.7
Sept. 1-30.........	35,030	....	......	62	17	67	....	184	0	200	17	......	1.0	.13	474	.64	44,830	224	73	38	722	7.5
Weighted average	39,370	....	......	62	18	59	....	191	....	177	16	......	3.3	0.11	462	0.63	49,110	229	72	35	697	....

Davids Creek near Hamlin, Iowa

LOCATION.—At gaging station, on downstream side of bridge on State Highway 64, 5.2 miles east of Hamlin, Audubon County, and 8 miles upstream from mouth.

DRAINAGE AREA.—26.1 square miles.

RECORDS AVAILABLE.—Water temperatures: July 1952 to September 1954.

Sediment records: July 1952 to September 1954.

EXTREMES, water years 1952 to 1954 given in following table:

Water year	Daily suspended sediment								Temperature*	
	Concentrations (ppm)				Loads (tons)				°Fahrenheit	
	Max.	Date	Min.	Date	Max.	Date	Min.	Date	Max.	Date
1951-52(a)	4,860	July 7	122	July 29, Aug. 27	4,540	July 7	2.7	July 29	80	July 16
1952-53...	6,570	June 4	......	....	6,290	June 4	0	Sept. 1-14, 16-20, 23	83	July 30, Aug. 1, 14
1953-54...	7,200	June 15	......	....	1,000	June 15, 21	0	Jan. 14	93	June 27

* Minimum temperature, freezing point on many days during winter months.
a July to September.

EXTREMES, 1952-54.—Water temperatures: Maximum, 93°F June 27, 1954; minimum, freezing point on many days during winter months.

Sediment concentrations: Maximum daily, 7,200 ppm June 15, 1954; minimum daily, no flow Sept. 1-14, 16-20, 23, 1953, Jan. 14, 1954.

Sediment loads: Maximum daily, 6,290 tons June 4, 1953; minimum daily, 0 ton Sept. 1-14, 16-20, 23, 1953, Jan. 14, 1954.

Davids Creek near Hamlin, Iowa—Continued

Temperature (°F) of water, July to September 1952

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	......	......	......	......	......	......	......	......	......	70	62	59
2	......	......	......	......	......	......	......	......	......	69	67	54
3	......	......	......	......	......	......	......	......	......	73	70	52
4	......	......	......	......	......	......	......	......	......	70	68	56
5	......	......	......	......	......	......	......	......	......	76	59	57
6	......	......	......	......	......	......	......	......	......	76	60	66
7	......	......	......	......	......	......	......	......	......	66	64	62
8	......	......	......	......	......	......	......	......	......	60	66	62
9	......	......	......	......	......	......	......	......	......	61	64	62
10	......	......	......	......	......	......	......	......	......	68	65	63
11	......	......	......	......	......	......	......	......	......	76	68	64
12	......	......	......	......	......	......	......	......	......	65	59	68
13	......	......	......	......	......	......	......	......	......	67	65	70
14	......	......	......	......	......	......	......	......	......	66	68	63
15	......	......	......	......	......	......	......	......	......	59	68	60
16	......	......	......	......	......	......	......	......	......	80	64	57
17	......	......	......	......	......	......	......	......	......	70	68	58
18	......	......	......	......	......	......	......	......	......	70	64	59
19	......	......	......	......	......	......	......	......	......	70	68	52
20	......	......	......	......	......	......	......	......	......	72	70	50
21	......	......	......	......	......	......	......	......	......	69	62	51
22	......	......	......	......	......	......	......	......	......	72	60	52
23	......	......	......	......	......	......	......	......	......	65	58	49
24	......	......	......	......	......	......	......	......	......	64	62	53
25	......	......	......	......	......	......	......	......	......	67	60	53
26	......	......	......	......	......	......	......	......	......	69	64	61
27	......	......	......	......	......	......	......	......	......	73	68	53
28	......	......	......	......	......	......	......	......	......	72	72	57
29	......	......	......	......	......	......	......	......	......	64	67	55
30	......	......	......	......	......	......	......	......	......	65	63	58
31	......	......	......	......	......	......	......	......	......	63	63	......
Average	......	......	......	......	......	......	......	......	......	69	65	58

Temperature (°F) of water, water year October 1952 to September 1953

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	57	42	......	......	......	32	40	47	69	70	83	......
2	48	48	......	32	32	32	39	43	63	70	77	73
3	45	......	......	32	......	32	38	46	74	67	75	......
4	47	38	......	......	......	32	37	45	67	70	70	......
5	43	39	......	......	32	32	37	52	59	75	69	68
6	38	......	32	......	32	32	38	57	55	63	68	......
7	37	33	......	32	32	32	41	55	62	67	69	......
8	40	34	32	......	......	32	40	62	60	66	66	......
9	42	37	......	......	33	33	41	64	71	75	68	60
10	43	......	......	32	32	38	37	59	65	75	77	......
11	45	......	......	......	32	40	38	58	68	68	74	......
12	48	40	......	......	32	41	36	49	75	50	68	59
13	48	......	32	32	32	35	36	39	69	49	71	......
14	......	......	......	......	33	44	44	55	70	50	83	......
15	38	38	......	......	32	37	34	59	71	49	68	......
16	44	......	......	......	......	35	33	57	74	60	68	60
17	46	43	......	......	......	30	33	54	66	54	77	......
18	37	41	32	......	32	40	38	55	64	55	60	......
19	42	38	......	......	32	34	35	62	81	59	75	56
20	......	32	32	32	......	40	34	65	74	56	65	......
21	43	......	......	......	......	50	50	52	64	72	68	......
22	47	32	......	......	......	39	55	64	75	71	77	......
23	48	......	......	......	32	38	56	65	76	78	65	58
24	......	......	32	......	33	34	40	58	68	70	68	......
25	47	......	......	......	34	33	45	60	64	74	68	......
26	40	......	......	......	32	32	43	65	59	78	......	53
27	......	......	......	......	......	35	39	67	65	78	......	......
28	40	......	......	32	......	37	51	65	67	76	......	......
29	40	......	32	......	......	39	45	75	69	79	73	......
30	45	......	......	33	......	41	50	67	78	83	......	65
31	......	......	......	......	......	38	......	61	......	76	......	......
Average	44	......	a32	a32	a32	36	41	58	68	67	71	......

a Includes estimated temperature, 32°F, on missing days.

Davids Creek near Hamlin, Iowa—Continued

Temperature (°F) of water, water year October 1953 to September 1954

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	......	......	......	......	......	......	50	52	58	......	......	67
2	......	......	......	34	......	......	......	......	58	87	......	82
3	66	......	45	......	......	......	34	38	55	76	70	68
4	......	......	......	......	33	......	......	41	59	90	......	69
5	......	......	35	......	......	......	......	......	69	73	......	69
6	......	......	......	......	......	37	55	62	......	88	......	68
7	43	36	......	......	......	......	53	55	73	......	67	......
8	......	......	......	33	......	......	......	59	75	72	......	70
9	......	......	......	......	......	......	......	......	67	......	......	65
10	47	......	......	......	......	......	59	59	......	85	......	......
11	......	......	......	......	......	......	......	......	85	......	66	64
12	......	......	33	......	......	......	......	......	78	82	......	......
13	......	......	......	......	33	......	......	68	......	......	......	68
14	......	40	......	......	......	36	65	......	82	......	86	......
15	......	......	......	......	34	......	......	68	67	80	......	58
16	......	......	......	......	......	......	42	62	81	......	......	......
17	66	......	......	......	......	......	60	67	72	85	......	......
18	......	......	......	......	......	......	......	62	82	......	74	70
19	......	......	33	......	......	......	59	......	82	......	......	......
20	......	46	......	......	36	40	52	63	80	82	......	59
21	......	34	......	......	......	......	52	......	68	......	69	......
22	......	......	......	......	......	......	57	69	73	75	69	......
23	......	......	......	......	......	......	......	......	69	......	68	......
24	49	......	......	......	......	......	72	58	84	70	74	......
25	......	......	......	......	......	40	......	......	88	......	76	67
26	......	......	33	......	......	......	68	56	88	......	......	......
27	......	......	......	......	39	55	54	......	93	77	72	......
28	......	32	......	......	......	......	......	65	86	......	81	......
29	......	34	......	......	......	......	62	70	74	82	78	60
30	......	......	......	......	......	......	52	......	87	......	72	58
31	44	......	......	......	......	......	......	62	......	72	79	......
Average	......	......	......	......	......	......	......	......	75	......	......	......

Suspended sediment, July to September 1952

Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	23	410	25	9.1	172	4.2	27	266	s20
2	30	784	sb237	8.2	152	3.4	23	194	12
3	103	2,770	sb1,360	17	332	sa23	20	194	10
4	22	440	26	12	170	s6.3	19	200	10
5	19	300	15	10	176	4.8	17	192	8.8
6	24	429	s71	9.5	154	4.0	15	180	7.3
7	328	4,800	s4,540	8.7	144	3.4	15	210	8.5
8	50	720	97	39	3,170	sb407	14	238	9.0
9	32	426	37	14	320	s13	12	242	7.8
10	28	302	23	10	154	4.2	12	246	8.0
11	23	308	19	9.1	148	3.6	11	234	6.9
12	20	322	17	8.2	168	3.7	11	222	6.6
13	20	272	15	7.8	136	2.9	10	220	a5.9
14	22	268	16	20	1,000	s67	16	444	sb21
15	20	186	20	239	2,540	sb2,830	12	246	8.0
16	18	178	8.7	27	320	s24	11	258	7.7
17	17	196	9.0	19	220	11	11	230	6.8
18	17	202	9.3	16	206	8.9	10	212	5.7
19	17	192	8.8	14	196	7.4	9.5	220	5.6
20	15	220	8.9	16	210	9.1	10	202	5.5
21	14	246	9.3	17	190	8.7	10	194	5.2
22	12	266	8.6	12	168	5.4	10	212	5.7
23	12	266	8.6	11	170	5.0	9.5	202	5.2
24	11	208	6.2	10	152	4.1	8.7	178	4.2
25	10	220	5.9	10	180	4.9	8.7	160	3.8
26	9.1	250	6.1	9.5	180	4.6	8.2	156	a3.5
27	8.7	164	3.9	8.7	122	2.9	7.8	188	4.0
28	8.2	196	4.3	35	1,150	sb510	7.4	174	3.5
29	8.2	122	2.7	329	2,580	s2,770	7.0	180	3.4
30	7.8	144	3.0	45	454	55	7.0	182	3.4
31	8.2	184	4.1	31	406	34	......	......	......

s Computed by subdividing day. a Computed from an estimated concentration graph.
b Computed from a partly estimated concentration graph.

Davids Creek near Hamlin, Iowa—Continued

Suspended sediment, water year October 1952 to September 1953

Day	October: Mean discharge (cfs)	October: Suspended sediment, Mean concentration (ppm)	October: Suspended sediment, Tons per day	November: Mean discharge (cfs)	November: Suspended sediment, Mean concentration (ppm)	November: Suspended sediment, Tons per day	December: Mean discharge (cfs)	December: Suspended sediment, Mean concentration (ppm)	December: Suspended sediment, Tons per day
1	6.6			4.4			55	....	e60
2	6.1			4.4			27	....	e15
3	6.1			4.1			12	....	e6.0
4	6.1			4.4			9.1	....	
5	6.1			4.4	175	2.0	7.4	....	
6	6.1	180	3.0	3.8			6.6	83	
7	6.1			4.1			5.7	....	
8	6.6			4.1			6.6	126	e2.0
9	6.6			3.8			5.7	....	
10	6.1			3.8			7.0	....	
11	6.1			3.8	....		6.1	....	
12	5.7			3.8	140		7.0	....	
13	5.7			3.8	....		5.7	127	
14	5.7			3.8	....	e1.4	5.0	....	
15	5.7			3.6	130		4.7	....	
16	5.3			3.8	....		5.3	....	
17	5.3	168	2.5	17	260	sb13	5.0	....	
18	5.3			7.0	249	4.7	4.4	135	
19	5.3			5.3	142	2.0	4.4	....	
20	5.3			4.7	134		4.4	115	
21	5.3			4.7	....		4.4	....	
22	5.3			4.4	100	e1.7	4.4	....	e1.5
23	4.7			4.1	....		4.4	....	
24	5.3			4.4	....		4.4	127	
25	5.3	131	1.8	3.8	....		4.1	....	
26	5.3			.2	....		3.7	....	
27	5.0			.6	....	e1.0	3.4	....	
28	4.4	102	1.0	1.0	....		3.1	....	
29	4.7	194	2.5	2.7	....		3.8	100	
30	4.7	177	2.2	29	....	e20	4.4	....	
31	4.7	....	e2.2	....	....	....	6.6	....	

Day	January: Mean discharge (cfs)	January: Mean concentration (ppm)	January: Tons per day	February: Mean discharge (cfs)	February: Mean concentration (ppm)	February: Tons per day	March: Mean discharge (cfs)	March: Mean concentration (ppm)	March: Tons per day
1	7.4	....		4.5	....		16	290	sb13
2	3.5	116		3.8	96	e1.0	19	190	sb11
3	3.1	118		3.5	....		20	190	10
4	2.9	....	e1.3	7.0	116	a2.2	12	101	3.3
5	2.7	....		20	322	17	12	97	3.1
6	2.7	....		16	225	9.7	14	110	4.2
7	2.9	187		23	406	25	15	190	sb8.8
8	3.1	....		18	400	19	17	240	sb14
9	3.1	....		20	428	23	18	386	s23
10	3.4	93		106	2,070	s705	20	530	29
11	3.1	....		53	390	s68	22	472	28
12	3.6	....		44	950	b110	20	370	20
13	3.8	100	e1.0	34	1,100	101	19	282	14
14	3.8	....		25	720	49	37	2,050	s221
15	3.0	....		20	170	9.2	32	524	s48
16	2.5	....		17	100	b4.6	23	314	19
17	2.9	....		14	140	b5.3	21	281	16
18	3.6	....		11	240	7.1	21	340	19
19	4.4	....		101	....	e1,600	18	187	9.1
20	3.1	108		149	....	e1,600	18	202	9.8
21	3.1	....		46	800	b99	16	265	11
22	3.1	....		21	320	b18	15	170	6.9
23	3.1	....		37	670	sb95	15	180	7.7
24	3.1	....		34	620	57	13	160	5.8
25	2.0	....	e.8	23	340	21	12		
26	2.9	....		18	240	12	12		
27	2.9	....		15	230	a9.3	12	126	3.0
28	2.9	80		19	240	a12	11		
29	2.9	....		....	....	....	11		
30	3.2	92		....	....	....	35	1,630	s193
31	5.0	....		....	....	....	27	313	23

e Estimated.
s Computed by subdividing day.
a Computed from an estimated concentration graph.
b Computed from a partly estimated concentration graph.

Note.—Flow affected by ice Nov. 28, Dec. 14, 15, 26-30, Jan. 2-7, 15-17, Jan. 23 to Feb. 8, Feb. 7-9, 16-18, Mar. 7-10.

Davids Creek near Hamlin, Iowa—Continued

Suspended sediment, water year October 1952 to September 1953—Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	29	350	27	27	310	23	8.2		
2	23	237	15	23	218	14	8.2	125	2.8
3	34	870	sb89	21	201	11	8.2		
4	22	232	14	20	178	9.6	112	6,570	s6,290
5	20	186	10	18	160	7.3	47	2,310	s498
6	20	163	8.8	17	162	7.0	20	460	25
7	19			17	142	6.5	24	1,000	sb220
8	18	139	6.9	15			60	3,000	sb960
9	19			14			13	410	14
10	18			13	98	3.4	178	4,400	sb3,700
11	15			12			25	490	33
12	15	96	3.8	12			19	410	21
13	14			12			18	354	17
14	15			12			15	340	14
15	18	174	8.5	11			15	313	13
16	14	120	sb4.9	11	51	1.6	13		
17	12	75	2.4	11			12	268	8.7
18	12	101	3.3	12			11		
19	11	89	2.6	12			9.5		
20	11			13			8.7		
21	11	54	1.6	12	137	4.4	9.1	240	5.7
22	11			11	90	2.7	8.7		
23	10			9.5	58	1.5	7.8		
24	20	300	sb28	40	2,500	sb440	8.7		
25	19	323	17	17	430	20	13	847	34
26	14	180	6.8	14	236	8.9	8.2		
27	14	125	4.7	12			8.2		
28	12	120	3.9	11			7.8	188	3.9
29	18	300	sb16	11	186	5.2	7.4		
30	36	1,160	113	9.1			6.0		
31	....	....	....	8.7			....	....	....

Day	July			August			September		
1	6.6	166	3.0	1.8			0	....	0
2	11	509	s16	1.6			0	....	0
3	7.0	356	6.7	1.8	61	0.3	0	....	0
4	7.0			2.1			0	....	0
5	6.6	136	2.3	2.3			0	....	0
6	6.0			8.0	700	sb19	0	....	0
7	5.7			2.9	134	1.0	0	....	0
8	5.0			2.1	104	.6	0	....	0
9	4.7			1.8	94	.5	0	....	0
10	4.4	60	.7	1.8			0	....	0
11	4.1			1.6			0	....	0
12	4.7			1.6			0	....	0
13	5.3			1.4			0	....	0
14	6.1			1.2	41	.1	0	....	0
15	5.0	87	1.2	1.2			.1	....	t
16	4.4			1.2			0	....	0
17	4.3			1.0			0	....	0
18	4.2	155	1.8	1.0			0	....	0
19	3.4	60	.6	.9			0	....	0
20	3.4	52	.5	.9			0	....	0
21	12	1,400	sb82	.8	55	.1	.1	....	t
22	4.1	131	1.5	.7			.1	....	t
23	3.4			.7			0	....	C
24	3.1			.7			.1	....	
25	2.7			.6			.1	....	
26	2.5	78	.5	.5	....		.1	92	
27	2.7			.3	....		.1	....	t
28	2.3			.2	....	e.1	.1	....	
29	2.5			.3	80		.1	....	
30	2.3			.2	....		.1	69	
31	2.0			.4	....		....	....	....

e Estimated.
s Computed by subdividing day.
t Sediment discharge less than 0.05 ton.
b Computed from a partly estimated concentration graph.

Davids Creek near Hamlin, Iowa—Continued

Suspended sediment, water year October 1953 to September 1954

Day	October Mean discharge (cfs)	October Suspended sediment Mean concentration (ppm)	October Suspended sediment Tons per day	November Mean discharge (cfs)	November Suspended sediment Mean concentration (ppm)	November Suspended sediment Tons per day	December Mean discharge (cfs)	December Suspended sediment Mean concentration (ppm)	December Suspended sediment Tons per day
1	0.1			0.2			0.4		
2	.2			.2			.6		
3	.1	87		.2			1.0	60	
4	.1		t	.2			1.0		e0.1
5	.2			.2		t	.6	64	
6	.1			.2			.6		
7	.1	125		.2	83		.6		
8	.3			.2			.5		
9	.3			.2			.3		
10	.2	123		.2			.3		
11	.2			.3			.3		
12	.1			.5			.3	55	
13	.3			1.2			.3		t
14	.2			.6	87		.2		
15	.3			.4		e.1	.2		
16	.1			.5			.2		
17	.3	83		.4			.1		
18	.3			.4			.1		
19	.3		e.1	.8			.2	25	
20	.3			1.4	60	.2	.2		
21	.2			.9	65	.2	.2		
22	.3			.6			.1		
23	.3			.6			.1		
24	.3	75		.6			.1		
25	.3			.3		e.1	.2		t
26	.4			.3			.2	26	
27	.6			.6			.2		
28	.3			.3	118		.2		
29	.3			.4	57		.2		
30	.3			.6			.2		
31	.2	80	t	...	...	...	.2		

Day	January Mean discharge (cfs)	January Mean concentration (ppm)	January Tons per day	February Mean discharge (cfs)	February Mean concentration (ppm)	February Tons per day	March Mean discharge (cfs)	March Mean concentration (ppm)	March Tons per day
1	0.2			0.2			0.8		
2	.2	22		.2			.6		
3	.2			.2			.4		
4	.2			.2	25		.3		t
5	.2			.3			.3		
6	.2			.3			.4	37	
7	.2		t	.3		t	.6		
8	.2	22		.3			.8		
9	.1			.3			.8		
10	.1			.3			.8		e.1
11	.1			.3			.7		
12	.1			.3			.6		
13	.1			.4	25		.3		
14	0		0	.9	45	a.1	.2	24	t
15	.1			1.0	148	.4	.4		
16	.1			.7			1.2		
17	.1			.6		e.2	1.0		e.4
18	.1			.6			1.3		
19	.1			1.2	140	a.5	1.3		
20	.1			3.8	102	2.0	.8	77	
21	.1			1.2			.7		
22	.1			.8		e.3	.8		e.2
23	.1		t	1.2			.7		
24	.1			.7			1.0		
25	.1			1.3			1.4	72	.3
26	.1			1.0		e.1	.8		e.1
27	.1			1.3	26		.8	49	.1
28	.1			.8			2.5	96	a.6
29	.1			...	...	...	.8		
30	.1			...	...	...	1.3		e.3
31	.1			...	...	...	1.4		

e Estimated.
t Sediment discharge less than 0.05 ton.
a Computed from an estimated concentration graph.
b Computed from a partly estimated concentration graph.

Note.—Flow affected by ice Dec. 12-14, 16, 21, 22, 28-30, Jan. 5, 9, 10, 12, Jan. 16 to Feb. 14, Mar. 3.

Davids Creek near Hamlin, Iowa—Continued

Suspended sediment, water year October 1953 to September 1954—Continued

Day	April Mean discharge (cfs)	April Suspended sediment Mean concentration (ppm)	April Suspended sediment Tons per day	May Mean discharge (cfs)	May Suspended sediment Mean concentration (ppm)	May Suspended sediment Tons per day	June Mean discharge (cfs)	June Suspended sediment Mean concentration (ppm)	June Suspended sediment Tons per day
1.....	1.3	79		3.6	188	1.8	2.4	77	0.5
2.....	1.4	....	e0.2	10	540	sa20	1.6	142	.6
3.....	.7	53		6.1	410	6.8	3.4	199	1.8
4.....	.7	....		3.1	128	1.1	1.8	125	.6
5.....	1.2	70	a.2	2.0	100	a.5	1.2	....	e.4
6.....	2.5	190	1.3	1.8	110	sb.6	.9		
7.....	1.5	160	.6	1.5	79		.9		
8.....	.8	....		1.2	77	e.2	.7		
9.....	.7	....		1.0	....		.7		
10.....	.7	116	e.2	1.0	52		.7	116	.2
11.....	.6	....		1.3	83	sb.4	.6		
12.....	.6	....		1.2	100	a.3	.6		
13.....	.5	....		.7			.6		
14.....	.4	99		.7			.7		
15.....	.6	....		.7			36	7,200	sb1,000
16.....	.7	73	e.1	.7			4.7	650	8.2
17.....	.4	122		.6			2.3	292	1.8
18.....	.4	....		.6	67	.1	1.5	200	.8
19.....	.4	73		.7			1.2	198	.6
20.....	.6	....		.6			1.4	140	sb1.0
21.....	3.1	190	sb2.0	.6			50	5,800	sb1,000
22.....	1.3	100	a.4	.6			6.1	1,050	17
23.....	.7			.6			2.3	346	2.1
24.....	.7			.8	65	sb.2	1.5	200	.8
25.....	.8			.8	75	a.2	1.4	167	.6
26.....	.8	83	.2	.6	64	.1	.9		
27.....	.9			1.4	....	e.2	.7		
28.....	.7			2.1	61	.3	.7	79	.2
29.....	.6			1.3	78	.3	.7		
30.....	2.6	110	sb.8	.6	....	e.2	.6		
31.....	....	....	....	.8	102	.2	....	....	....

Day	July Mean discharge (cfs)	July Mean concentration (ppm)	July Tons per day	August Mean discharge (cfs)	August Mean concentration (ppm)	August Tons per day	September Mean discharge (cfs)	September Mean concentration (ppm)	September Tons per day
1.....	0.5			0.1	....		1.3		
2.....	.3			.1	....		1.0		
3.....	.4			.1	36		.9		
4.....	.5			.1	....		.7		
5.....	.4	88	0.1	.1	....	t	.6	71	0.1
6.....	.3			.1	....		.4		
7.....	.2			.2	48		.4		
8.....	.3			.3	....		.5		
9.....	.2			.3	....		.6		
10.....	.2			.3	....		.6		
11.....	.2			.3	41		.4	49	.1
12.....	.1			.3	....		.3	....	
13.....	.1			.3	....		.3	37	t
14.....	.1			.3	47		.4	....	
15.....	.2	50	t	.1	....	t	.7	73	sb.2
16.....	.2			.2	....		.5	....	
17.....	.1			.4	....		.6	....	
18.....	.1			.3	29		.5	61	e.1
19.....	.2			.3	....		.4	....	
20.....	.2			.3	....		.5	57	
21.....	.1			6.5	760	sa76	.3	....	
22.....	.1			22	990	sb150	.4	....	
23.....	.2			90	2,400	sb890	.3	....	
24.....	.1			19	700	sb43	.3	....	t
25.....	.1			4.7	248	3.1	.3	36	
26.....	.1	39	t	6.2	250	sb4.6	.3	....	
27.....	.1			9.7	365	9.6	.3	....	
28.....	.1			5.3	192	2.7	.6	....	e.1
29.....	.1			2.7	147	1.1	.9	83	.2
30.....	.1			1.8	100	.5	1.2	107	.3
31.....	.1			2.1	62	.4	....	....	....

e Estimated.
s Computed by subdividing day.
t Sediment discharge less than 0.05 ton.
a Computed from an estimated concentration graph.
b Computed from a partly estimated concentration graph.

Davids Creek near Hamlin, Iowa—Continued

Monthly discharge for calendar and water years 1952 to 1954

Month	Water discharge (cfs-days)	Suspended sediment: Load (tons)	Daily loads (tons): Max.	Daily loads (tons): Min.	Daily loads (tons): Mean	Tons per sq. mi.	Acre-feet (a)	Concentration (ppm): Maximum daily	Concentration (ppm): Weighted mean
July, 1952	957.2	6,015.4	4,540	2.7	213	253.5	5.5	4,800	2,560
August	1,031.8	6,941.5	2,830	2.9	224	260.0	5.8	3,170	2,490
September	369.8	223	21	3.4	7.43	8.54	0.2	444	2,240
October 1952	172.6	78.3	....	....	2.5	3.00	.07	....	168
November	152.8	82.3	20	....	2.7	3.15	.07	....	199
December	240.8	128	60	....	4.1	4.90	.1	....	197
January 1953	103.7	30.7	....	....	1.0	1.18	.03	....	110
February	902.8	4,681.4	1,600	....	107	179.4	3.9	....	1,920
March	573	700.2	221	....	25	30.3	.7	2,050	511
April	524	424.1	113	....	14	16.2	.4	1,160	300
May	458.3	613.5	440	....	20	23.5	.5	2,500	496
June	710.3	11,927.2	6,290	....	398	457.0	10	6,570	6,220
July	149.1	130.9	82	....	4.4	5.25	.1	1,400	340
August	43.0	24.8	19	....	.8	.95	.02	700	211
September	1.0	.2	t	0	.007	.008	.0002	....	74
Water year 1952-53	4,032.0	18,917.6	6,290	0	52	724.8	16	6,570	1,740
October 1953	7.0	2.5	....	....	.08	.10	.002	....	122
November	13.7	2.6	....	....	.09	.10	.002	....	70
December	9.9	1.3	....	t	.04	.05	.001	....	49
Calendar year 1953	3,497	18,635.4	6,290	0	51	714.0	16	6,570	1,970
January 1954	3.8	0.2	....	0	.006	.008	.0002	....	19
February	20.7	5.4	2.0	t	.2	.21	.005	....	97
March	26.4	5.5	....	t	.2	.21	.005	....	77
April	28.9	9.3	2.0	....	.3	.36	.008	....	119
May	49.3	35.1	20	....	1.1	1.34	.03	540	264
June	128.8	2,039.6	1,000	....	68	78.1	1.7	7,200	5,860
July	6.0	1.3	....	t	.04	.05	.001	....	80
August	174.5	1,181.5	890	t	38	45.3	1.0	2,400	2,510
September	16.5	2.6	....	t	.09	.10	.002	....	58
Water year 1953-54	486.1	3,286.9	1,000	0	9.0	125.9	2.7	7,200	2,500

t Sediment discharge less than 0.05 ton.
a Computed using a specific weight of 55 pounds per cubic foot.

Davids Creek near Hamlin, Iowa—Continued

Particle-size analyses of suspended sediment, water year October 1953 to September 1954

(Methods of analysis: B, bottom-withdrawal tube; P, pipette; S, sieve; N, in native waters; W, in distilled water; C, chemically dispersed; M, mechanically dispersed.)

Date	Time	Instantaneous discharge (cfs)	Water temperature (°F)	Suspended sediment											Methods of analysis
				Concentration (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters									
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.350	0.500	
June 15, 1954	10:00 a.m.	44	67	9,360	6,980	....	69	....	92	....	99	....	....	....	SPWCM
June 21	8:15 a.m.	107	68	10,100	6,660	....	60	....	85	....	97	97	100	....	SPWCM
August 22	10:20 a.m.	20	69	971	3,710	....	86	....	95	....	100	....	....	....	SPWCM
August 27	2:00 p.m.	14	75	405	1,500	....	77	....	96	....	99	....	....	....	SPWCM

Tarkio River at Blanchard, Iowa

LOCATION.—At gaging station at bridge on State Highway No. 333, 1 mile north of Blanchard, Page County, and 8¼ miles downstream from Snake Creek.

DRAINAGE AREA.—200 square miles.

RECORDS AVAILABLE.—Chemical analyses: December 1934, May 1935 (fragmentary) (a).

Sediment records: April 1934 to June 1940.

EXTREMES, water years 1934 to 1940 given in following table:

Water year	Daily suspended sediment							
	Concentrations (ppm) (b)				Loads (tons)			
	Max.	Date	Min.	Date	Max.	Date	Min.	Date
1933-34(c)	.....	.....	.....	.....	5,090	May 13	0	July 25
1934-35	.....	.....	.....	.....	42,000	June 26	.01	Several days, Oct., Dec., April
1935-36	.....	.....	.....	.....	132,000	April 28	.02	Dec. 28, Jan. 17, 30, Feb. 21
1936-37	.....	.....	.....	.....	298,000	May 21	t	Many days, Jan., Feb., Sept.
1937-38	.....	.....	.....	.....	95,800	May 31	0	Dec. 11
1938-39	.....	.....	.....	.....	208,000	Mar. 12	t	Several days, Oct., Dec., Feb., Sept.
1939-40(d)	.....	.....	.....	.....	4,170	April 29	t	Many days, Oct., Nov., Dec., Jan., Feb.

t Less than 0.005 ton.
b Concentrations not reported.
c April to September.
d October to June.

EXTREMES, 1934-40.—Sediment concentrations: Not reported.

Sediment loads: Maximum daily, 298,000 tons May 21, 1937; minimum daily, 0 ton July 25, 1934, Dec. 11, 1937.

REMARKS.—Compilation of rainfall, runoff, and soil loss data, 1934-40, published by U. S. Department of Agriculture, Soil Conservation Service, Technical Publication 42 "Hydrologic Studies at the West Tarkio Creek Demonstration Project, SCS-IA-1, Shenandoah, Iowa."

a Reported under Miscellaneous Analyses in Iowa.

Tarkio River at Blanchard, Iowa—Continued

Suspended sediment, April to Septetmber 1934

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	6.25	....	0.9	0.75	....	0.1	0.13	....	0.02
2	7.38	....	1.3	.60	....	.1	.19	....	.02
3	8.06	....	1.3	.92	....	.2	.19	....	.02
4	12.9	....	8.9	.75	....	.1	.13	....	.02
5	16.7	....	25	4.04	....	.7	.13	....	.02
6	10.8	....	13	3.16	....	.5	.13	....	.01
7	8.74	....	4.5	1.68	....	.2	.36	....	.04
8	8.06	....	1.5	1.38	....	.1	5.12	....	646
9	7.38	....	1.3	1.68	....	.3	21.3	....	1,170
10	5.68	....	.6	3.60	....	16	1.38	....	5.3
11	3.60	....	.6	1.38	....	.7	.48	....	.9
12	2.38	....	.3	8.06	....	400	.36	....	.2
13	1.68	....	.1	96.0	....	5,090	.13	....	.04
14	2.64	....	.3	17.5	....	380	.36	....	.08
15	2.75	....	.2	6.81	....	40	.48	....	.1
16	2.75	....	.2	4.04	....	10	.48	....	.09
17	3.60	....	.6	2.75	....	2.1	.75	....	.1
18	3.60	....	.0	2.04	....	.9	.75	....	.1
19	2.75	....	.3	1.68	....	.4	.92	....	.1
20	2.04	....	.3	1.13	....	.2	.26	....	.03
21	2.04	....	.1	.75	....	.07	.26	....	.03
22	2.04	....	.2	.48	....	.04	14.3	....	455
23	1.68	....	.2	.48	....	.05	16.7	....	300
24	1.38	....	1.7	.36	....	.04	5.12	....	24
25	1.38	....	.2	.36	....	.05	2.38	....	6.7
26	2.04	....	.2	.36	....	.06	.92	....	1.0
27	1.38	....	.1	.36	....	.05	.36	....	.2
28	.92	....	.1	.19	....	.02	.26	....	.1
29	.92	....	.1	.13	....	.02	.10	....	.03
30	1.13	....	.1	.09	....	.01	.09	....	.01
31	....	....	....	.06	....	.01	....	....	....

Day	July			August			September		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1	0.13	....	0.01	0.11	....		27.5	....	222
2	.06	....	t	.06	....		12.1	....	78
3	.26	....	.01	.04	....		4.14	....	12
4	.26	....	.01	.09	....	t	17.7	....	76
5	2.04	....	12	.09	....		4.00	....	16
6	3.60	....	39	.09	....		1.37	....	3.9
7	2.04	....	5.7	.16	....	.02	.64	....	1.2
8	1.13	....	3.5	.04	....		.43	....	.6
9	.60	....	1.0	.03	....		.37	....	.2
10	.48	....	.5	.03	....		.56	....	.3
11	.48	....	.1	.09	....	t	.27	....	.09
12	.26	....	.06	.11	....		.23	....	.04
13	.26	....	.02	.13	....		.16	....	.07
14	.26	....	.02	.09	....		.16	....	.06
15	.19	....	.01	.11	....		.23	....	.1
16	.09	....	t	.13	....	.01	10.1	....	38
17	.06	....	t	.11	....	.01	6.56	....	27
18	.13	....	.01	.11	....		2.51	....	7.6
19	.04	....		.09	....		.89	....	2.5
20	.04	....		.09	....		.49	....	1.1
21	.04	....	t	.11	....		.49	....	.7
22	.04	....		.09	....		.37	....	.5
23	.04	....		.09	....		.27	....	.2
24	.09	....		.09	....	t	.23	....	.09
25	0	....	0	.09	....		.27	....	.1
26	.09	....	.01	.09	....		76.8	....	948
27	.06	....		.09	....		54.9	....	386
28	.06	....		.07	....		26.0	....	102
29	.06	....	t	.06	....		31.8	....	136
30	.05	....		.06	....		13.3	....	52
31	.05	....		5.02	....	43	....	....	....

t Sediment discharge less than 0.005 ton.

Tarkio River at Blanchard, Iowa—Continued

Suspended sediment, water year October 1934 to September 1935

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	7.02	…	15	0.43	…	0.1	3.66	…	2.9
2	3.52	…	5.5	.43	…	.2	3.66	…	2.5
3	1.72	…	2.7	31.8	…	281	4.23	…	2.3
4	1.23	…	1.7	31.8	…	172	5.25	…	1.4
5	.72	…	.8	8.20	…	22	3.93	…	.8
6	.56	…	.4	3.41	…	5.0	2.55	…	.3
7	.37	…	.2	2.76	…	4.7	3.18	…	.4
8	.27	…	.1	1.83	…	2.0	2.55	…	.3
9	.23	…	.1	1.23	…	.8	2.76	…	.2
10	.23	…	.04	.99	…	.4	2.15	…	.2
11	.23	…	.04	.89	…	.2	1.67	…	.07
12	.23	…	.02	.72	…	.2	1.30	…	.03
13	.19	…	.02	.72	…	.1	1.67	…	.05
14	.19	…	.01	.72	…	.2	2.15	…	.1
15	.19	…	.02	.72	…	.1	3.18	…	.2
16	.27	…	.03	.72	…	.2	6.82	…	1.2
17	.27	…	.03	2.76	…	11	9.80	…	2.4
18	.49	…	.05	13.0	…	71	8.20	…	1.5
19	216	…	5,260	4.89	…	13	6.40	…	1.1
20	141	…	1,610	10.7	…	35	5.25	…	.6
21	33.0	…	181	17.5	…	68	4.89	…	.7
22	10.9	…	38	35.6	…	278	4.89	…	.5
23	5.25	…	13	11.4	…	56	5.62	…	1.1
24	2.97	…	5.2	6.40	…	15	5.62	…	.9
25	1.83	…	2.7	6.40	…	15	3.41	…	.4
26	1.36	…	1.8	30.4	…	164	4.30	…	.4
27	.80	…	.7	17.2	…	70	1.23	…	.05
28	.64	…	.3	15.4	…	69	1.36	…	.03
29	.56	…	.2	8.70	…	17	1.23	…	.03
30	.49	…	.09	3.93	…	5.7	1.36	…	.03
31	.49	…	.2	…	…	…	1.36	…	.01

Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	1.10	…	0.02	2.97	…	0.3	9.25	…	3.9
2	1.23	…	.02	2.97	…	.3	37.6	…	227
3	1.36	…	.02	4.55	…	.7	56.0	…	591
4	1.51	…	.04	6.82	…	1.4	45.4	…	318
5	1.23	…	.02	9.25	…	1.9	40.6	…	720
6	1.99	…	.03	6.40	…	.5	12.3	…	61
7	3.41	…	.07	4.89	…	.8	4.55	…	8.2
8	8.20	…	1.4	5.25	…	.6	5.25	…	6.2
9	8.20	…	2.4	5.62	…	.5	7.72	…	4.9
10	5.25	…	1.0	4.55	…	.9	13.1	…	10
11	4.55	…	.8	6.40	…	1.1	13.1		9.7
12	6.82	…	1.8	7.72	…	3.0	8.20	…	3.8
13	5.06	…	1.7	7.72	…	5.9	9.25	…	3.9
14	3.41	…	.5	121	…	6,320	7.26	…	2.7
15	2.97	…	.3	179	…	4,650	5.62	…	3.9
16	1.99	…	.05	48.3	…	371	5.62	…	1.9
17	2.35	…	.08	16.8	…	49	3.66	…	.6
18	3.18	…	.09	14.2	…	30	7.72	…	2.5
19	617	…	13,600	8.70	…	14	7.72	…	2.8
20	105	…	352	4.89	…	6.1	6.40	…	2.1
21	16.0	…	18	6.00	…	4.9	4.55	…	.8
22	16.0	…	11	5.25	…	4.0	3.66	…	.3
23	17.8	…	10	4.23	…	3.1	2.76	…	.1
24	11.4	…	5.7	.80	…	.4	2.15	…	.03
25	4.89	…	2.2	.99	…	.4	2.35	…	.05
26	5.25	…	1.8	1.67	…	.08	2.15	…	.05
27	5.62	…	1.6	.89	…	.03	1.83	…	.2
28	3.93	…	.9	1.99	…	.05	1.36	…	.02
29	3.93	…	.8	…	…	…	1.10	…	.05
30	3.41	…	.4	…	…	…	1.10	…	.07
31	3.18	…	.3	…	…	…	1.10	…	.03

Note.—Flow affected by ice Jan. 20-25, Feb. 24, 25.

Tarkio River at Blanchard, Iowa—Continued

Suspended sediment, water year October 1934 to September 1935—Continued

Day	April: Mean discharge (cfs)	April: Suspended sediment: Mean concentration (ppm)	April: Suspended sediment: Tons per day	May: Mean discharge (cfs)	May: Suspended sediment: Mean concentration (ppm)	May: Suspended sediment: Tons per day	June: Mean discharge (cfs)	June: Suspended sediment: Mean concentration (ppm)	June: Suspended sediment: Tons per day
1	1.36		0.02	0.99		0.03	573		30,100
2	1.51		.02	1.83		.06	554		20,800
3	1.36		.02	1.83		.06	144		2,110
4	1.23		.02	1.51		.04	116		2,480
5	1.36		.03	1.36		.06	85.1		1,300
6	1.67		.02	1.10		.06	171		5,300
7	3.41		.5	.99		.05	52.2		73
8	4.55		.1	.99		.03	41.0		36
9	3.66		.07	.89		.02	39.7		34
10	3.60		.1	.72		.04	65.8		1,300
11	4.23		.3	.80		.1	33.5		100
12	3.93		.2	3.18		.6	23.8		21
13	2.97		.05	18.7		300	20.9		17
14	2.55		.05	17.8		303	19.6		27
15	1.36		.02	9.25		38	19.0		3.8
16	1.10		.01	15.4		51	18.4		2.8
17	1.10		.02	7.72		30	47.3		2,800
18	1.23		.02	4.89		7.8	623		16,400
19	1.36		.02	41.6		604	124		515
20	1.23		.02	114		2,550	76.7		172
21	1.23		.01	56.0		590	60.6		127
22	.99		.02	23.1		73	47.4		50
23	.89		.02	35.5		416	38.6		35
24	.89		.01	17.8		79	172		5,870
25	.89		.01	12.6		21	78.4		1,050
26	.64		.01	8.70		7.9	655		42,000
27	.64		.01	11.4		8.0	205		4,790
28	.72		.02	361		22,000	59.8		202
29	.72		.01	66.6		1,060	45.2		65
30	.64		.01	36.5		158	80.4		1,010
31				492		34,300			

Day	July: Mean discharge (cfs)	July: Mean concentration (ppm)	July: Tons per day	August: Mean discharge (cfs)	August: Mean concentration (ppm)	August: Tons per day	September: Mean discharge (cfs)	September: Mean concentration (ppm)	September: Tons per day
1	52		138	2.1		0.8	16		47
2	35		37	1.9		.5	18		43
3	29		22	2.5		.4	5.7		7.0
4	24		19	2.5		.3	3.5		1.8
5	21		15	2.1		.3	1.9		.3
6	19		8.7	1.6		.2	1.3		.2
7	18		9.3	1.3		.2	1.2		.1
8	46		450	1.2		.2	19		234
9	383		19,100	1.1		.2	27		114
10	80		1,480	1.1		.1	6.8		9.5
11	32		105	1.1		.2	3.4		3.7
12	28		37	.95		.1	1.9		.7
13	21		16	.84		.09	1.5		.2
14	17		10	.63		.1	1.1		.2
15	13		4.1	.54		.1	.84		.2
16	11		2.3	.54		.09	9.2		34
17	9.2		1.2	.84		.1	6.4		25
18	7.7		1.3	1.3		.3	2.5		4.5
19	6.8		.9	.84		.1	1.3		1.0
20	6.0		.9	.84		.1	.95		.6
21	5.7		1.0	.73		.1	.73		.4
22	5.4		1.1	1.5		.2	.63		.3
23	5.1		1.1	1.8		.2	.54		.2
24	18		5.2	1.3		.2	.46		.1
25	21		60	1.3		.1	.65		.3
26	6.8		12	.95		.07	31		140
27	4.3		3.4	.84		.08	15		45
28	3.9		1.9	.73		.09	4.3		6.5
29	3.4		1.9	.63		.04	2.5		2.4
30	3.0		1.2	.63		.03	1.9		1.3
31	2.6		1.2	1.1		.09			

Tarkio River at Blanchard, Iowa—Continued

Suspended sediment, water year October 1935 to September 1936

Day	October: Mean discharge (cfs)	October: Suspended sediment, Mean concentration (ppm)	October: Suspended sediment, Tons per day	November: Mean discharge (cfs)	November: Suspended sediment, Mean concentration (ppm)	November: Suspended sediment, Tons per day	December: Mean discharge (cfs)	December: Suspended sediment, Mean concentration (ppm)	December: Suspended sediment, Tons per day
1	1.2		0.2	80		913	20		5.7
2	.95		.2	17		62	8.7		1.4
3	1.1		.2	205		3,770	12		1.7
4	.84		.1	133		1,460	11		.6
5	.63		.09	30		91	15		3.6
6	.54		.06	18		19	23		3.6
7	.95		.08	15		8.4	25		6.8
8	.95		.06	13		3.5	20		3.3
9	1.1		.1	12		2.7	16		1.6
10	1.8		.1	9.8		2.4	12		.8
11	2.1		.1	8.7		1.3	6.4		.07
12	1.9		.2	7.7		.9	8.2		.3
13	1.6		.3	8.2		.8	18		2.4
14	1.6		.2	8.7		.6	16		1.3
15	1.3		.2	7.7		.6	14		.9
16	1.3		.4	7.2		.5	12		1.0
17	98		1,520	7.2		.4	7.7		.08
18	81		648	7.2		.4	19		1.9
19	13		25	8.2		.6	3.5		.09
20	5.4		4.9	7.7		.7	3.5		.09
21	4.3		2.2	8.2		1.2	3.5		.09
22	3.5		1.0	5.4		.2	3.7		.1
23	3.0		.5	4.5		.1	4.8		.1
24	2.6		.2	6.4		.4	4.5		.1
25	2.6		.1	6.0		.3	4.1		.07
26	2.8		.2	16		107	3.8		.04
27	3.4		.2	80		635	3.5		.04
28	3.0		.2	48		180	3.0		.02
29	2.8		.05	10		22	2.8		.03
30	3.2		.3	23		14	2.8		.05
31	87		1,100				3.4		.05

Day	January: Mean discharge (cfs)	January: Suspended sediment, Mean concentration (ppm)	January: Suspended sediment, Tons per day	February: Mean discharge (cfs)	February: Suspended sediment, Mean concentration (ppm)	February: Suspended sediment, Tons per day	March: Mean discharge (cfs)	March: Suspended sediment, Mean concentration (ppm)	March: Suspended sediment, Tons per day
1	4.3		0.07	8.2		0.04	668		5,150
2	5.1		.07	8.7		.05	1,180		34,300
3	6.8		.07	8.7		.09	1,150		36,700
4	9.2		.1	8.7		.09	714		20,000
5	9.2		.1	8.7		.1	209		1,980
6	9.2		.1	8.7		.1	144		740
7	7.7		.08	9.2		.1	177		990
8	7.7		.04	8.7		.2	149		963
9	7.7		.06	8.2		.2	121		518
10	8.2		.07	8.2		.2	127		658
11	8.2		.09	7.7		1.3	88		209
12	8.7		.09	7.2		1.2	56		74
13	8.7		.09	7.2		1.2	54		58
14	7.2		.06	7.2		1.3	51		38
15	8.2		.07	6.8		1.2	47		40
16	8.2		.07	7.7		.1	40		24
17	8.7		.02	8.2		.1	36		18
18	8.7		.05	8.2		.04	32		12
19	8.7		.05	7.7		.04	30		28
20	8.2		.09	7.7		.1	28		12
21	8.7		.07	7.7		.02	25		10
22	9.2		.1	7.7		.1	28		16
23	8.7		.1	7.2		.2	738		85,100
24	8.7		.9	85		148	69		1,470
25	8.2		.07	762		5,460	33		138
26	7.7		.2	692		4,460	26		58
27	7.7		.2	404		1,370	23		32
28	8.2		.07	510		6,060	21		12
29	8.2		.07	864		7,650	18		6.8
30	8.6		.02				15		5.7
31	8.2		.07				11		4.2

Note.—Flow affected by ice Dec. 20, 25, 26, Jan. 7, 8, 15-17, 19, 20, Jan. 22 to Feb. 11, Feb. 13, 14, 16-19, 21, 22.

Tarkio River at Blanchard, Iowa—Continued

Suspended sediment, water year October 1935 to September 1936—Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	12	....	7.6	502	....	42,100	14	....	3.6
2	15	....	5.4	94	....	1,780	11	....	1.1
3	14	....	2.6	44	....	125	9.8	....	.7
4	22	....	29	35	....	52	10	....	.6
5	23	....	23	28	....	36	160	....	20,300
6	19	....	7.8	32	....	86	572	....	48,300
7	19	....	9.6	24	....	22	44	....	287
8	15	....	5.8	43	....	997	28	....	44
9	14	....	2.7	663	....	53,700	80	....	4,220
10	14	....	1.7	346	....	16,600	66	....	1,810
11	15	....	2.0	86	....	618	28	....	123
12	13	....	.9	170	....	6,160	20	....	39
13	13	....	.8	72	....	182	17	....	16
14	12	....	.6	53	....	69	15	....	6.8
15	10	....	.4	47	....	57	14	....	4.5
16	9.2	....	.6	42	....	41	12	....	1.5
17	8.4	....	.2	39	....	31	9.8	....	1.1
18	8.4	....	.2	38	....	26	8.8	....	.7
19	9.2	....	.4	34	....	17	8.8	....	.7
20	9.5	....	.7	31	....	14	7.8	....	1.1
21	9.5	....	.5	28	....	5.4	5.7	....	.7
22	8.4	....	.4	24	....	4.3	5.5	....	.5
23	8.1	....	.1	27	....	2.6	5.5	....	.4
24	8.1	....	.1	31	....	3.7	5.5	....	.7
25	7.8	....	.1	30	....	4.6	5.0	....	.5
26	8.8	....	.2	26	....	4.6	4.3	....	.4
27	11	....	.4	24	....	3.0	4.0	....	.4
28	687	....	132,000	19	....	2.4	3.9	....	.4
29	208	....	15,400	17	....	1.6	3.6	....	.6
30	48	....	164	16	....	1.0	11	....	1.5
31	....	....	....	15	....	1.0	....	....	....

Day	July			August			September		
1	6.5	....	5.3	0.36	....	0.08	0.73	....	0.07
2	3.3	....	2.1	.36	....	.08	2.8	....	8.3
3	2.7	....	.8	.41	....	.2	.67	....	.3
4	2.0	....	.3	.53	....	.09	29	....	813
5	1.7	....	.2	.78	....	.1	94	....	2,400
6	1.4	....	.2	.53	....	.09	27	....	244
7	1.1	....	.2	.47	....	.06	18	....	165
8	1.1	....	.2	.53	....	.06	13	....	124
9	.98	....	.2	.47	....	.06	4.1	....	13
10	.98	....	.1	.53	....	.08	1.7	....	4.4
11	.88	....	.2	.47	....	.07	1.1	....	1.5
12	.78	....	.2	.47	....	.07	561	....	37,400
13	.69	....	.1	.41	....	.06	131	....	2,740
14	.69	....	.2	.41	....	.06	28	....	132
15	.69	....	.1	.53	....	.07	7.8	....	14
16	.69	....	.1	.41	....	.04	49	....	1,580
17	.61	....	.07	.41	....	.04	21	....	100
18	.69	....	.1	.41	....	.04	5.7	....	9.7
19	.78	....	.2	.53	....	.09	3.9	....	4.0
20	.98	....	.2	8.1	....	100	2.9	....	2.9
21	.98	....	.2	.98	....	1.2	2.2	....	1.6
22	.78	....	.1	.61	....	.3	1.8	....	.6
23	.69	....	.1	.88	....	.3	1.8	....	.3
24	.53	....	.06	.83	....	.2	1.0	....	.2
25	.47	....	.05	.79	....	.2	.80	....	.1
26	.41	....	.05	.74	....	.2	149	....	8,000
27	.53	....	.07	.63	....	.2	95	....	1,580
28	.53	....	.06	.52	....	.1	22	....	70
29	.41	....	.04	.38	....	.04	9.9	....	11
30	.36	....	.04	.38	....	.05	7.6	....	4.3
31	.36	....	.04	.50	....	.05	....	....	....

Tarkio River at Blanchard, Iowa—Continued

Suspended sediment, water year October 1936 to September 1937

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	5.9	....	1.4	3.2	....	0.09	1.9	....	0.1
2	4.6	....	.6	7.1	....	123	1.8	....	.09
3	3.7	....	.5	30	....	901	2.3	....	.07
4	87	....	7,500	7.5	....	33	1.9	....	.08
5	852	....	59,900	4.1	....	9.3	1.6	....	.06
6	55	....	680	4.3	....	7.7	1.4	....	.06
7	21	....	55	3.7	....	4.4	.87	....	.03
8	13	....	11	2.3	....	1.6	.87	....	.02
9	11	....	5.0	2.4	....	.6	1.1	....	.02
10	6.2	....	2.0	2.9	....	.8	1.2	....	.03
11	6.8	....	1.9	3.6	....	.9	1.1	....	.02
12	5.9	....	1.7	3.7	....	.7	1.5	....	.04
13	5.3	....	.4	3.3	....	.3	1.9	....	.06
14	4.8	....	.4	3.3	....	.2	2.0	....	.04
15	4.7	....	.4	3.0	....	.2	2.4	....	.05
16	4.8	....	.4	2.5	....	.1	3.3	....	.1
17	4.4	....	.1	2.5	....	.2	3.9	....	.2
18	3.9	....	.1	2.4	....	.1	4.3	....	.3
19	3.7	....	.1	2.7	....	.1	4.6	....	.2
20	3.7	....	.5	2.7	....	.1	4.1	....	.2
21	3.2	....	.4	2.6	....	.2	3.5	....	.1
22	2.8	....	.1	2.3	....	.09	3.0	....	.1
23	2.7	....	.1	2.4	....	.5	2.9	....	.09
24	2.5	....	.1	2.2	....	.09	4.0	....	.1
25	2.8	....	.1	1.7	....	.3	17	....	55
26	3.2	....	.1	1.7	....	.08	36	....	658
27	2.8	....	.1	2.0	....	.08	18	....	466
28	3.0	....	.05	2.5	....	.08	7.8	....	28
29	2.9	....	.05	2.5	....	.08	5.3	....	5.5
30	3.1	....	.08	2.1	....	.08	248	....	34,800
31	3.0	....	.08	....	....	....	51	....	2,720
	January			February			March		
1	7.1	....	80	0.03	....		8.1	....	2.0
2	8.4	....	71	.03	....		1,150	....	35,300
3	5.5	....	30	.03	....		1,150	....	51,600
4	3.7	....	4.8	.03	....		2,050	....	90,800
5	3.2	....	1.2	.03	....	} t	448	....	42,400
6	2.2	....	.8	.05	....		304	....	30,700
7	.94	....	.06	.03	....		128	....	8,040
8	1.0	....	.08	.06	....		62	....	1,870
9	1.1	....	.03	.05	....		13	....	87
10	.94	....	.05	.03	....		10	....	30
11	.73	....	.04	11	....	16	13	....	35
12	.87	....	.05	300	....	2,600	10	....	16
13	.73	....	.04	955	....	9,400	9.6	....	11
14	.73	....	.03	551	....	1,690	3.8	....	1.4
15	.52	....	.02	256	....	442	3.4	....	1.1
16	.43	....	.03	326	....	3,640	4.6	....	.8
17	.32	....	.02	803	....	9,540	11	....	10
18	.23	....	.01	1,420	....	36,900	12	....	12
19	.20	....	.01	1,230	....	14,700	14	....	58
20	.16	....	t	426	....	3,610	35	....	277
21	.13	....	t	22	....	17	24	....	159
22	.10	....	.01	7.4	....	9.8	15	....	32
23	.08	....	.01	3.8	....	7.1	23	....	371
24	.06	....	t	4.0	....	1.0	84	....	2,900
25	.05	....	.02	6.5	....	1.7	67	....	3,580
26	.04	....	t	3.1	....	.4	27	....	296
27	.03	....	t	2.4	....	.3	18	....	53
28	.03	....	t	3.2	....	.5	20	....	60
29	.05	....	.01	....	....	....	15	....	26
30	.11	....	.01	....	....	....	13	....	17
31	.08	....	.03	....	....	....	12	....	15

t Sediment discharge less than 0.005 ton.

Note.—Flow affected by ice Jan. 15 to Feb. 10.

Tarkio River at Blanchard, Iowa—Continued

Suspended sediment, water year October 1936 to September 1937—Continued

Day	April: Mean discharge (cfs)	April: Suspended sediment, Mean concentration (ppm)	April: Suspended sediment, Tons per day	May: Mean discharge (cfs)	May: Suspended sediment, Mean concentration (ppm)	May: Suspended sediment, Tons per day	June: Mean discharge (cfs)	June: Suspended sediment, Mean concentration (ppm)	June: Suspended sediment, Tons per day
1	13	...	35	16	...	485	12	...	14
2	14	...	31	30	...	3,060	19	...	40
3	13	...	19	121	...	12,900	14	...	26
4	12	...	25	47	...	1,030	10	...	4.1
5	9.1	...	5.4	28	...	185	42	...	2,000
6	5.9	...	2.8	159	...	26,900	21	...	320
7	54	...	2,540	38	...	1,260	6.9	...	22
8	123	...	6,320	15	...	25	5.6	...	5.2
9	55	...	629	16	...	27	8.3	...	6.0
10	36	...	140	12	...	13	7.6	...	3.3
11	27	...	79	9.9	...	8.6	5.6	...	1.9
12	21	...	44	10	...	5.5	5.0	...	2.6
13	18	...	40	8.3	...	3.1	285	...	34,800
14	14	...	22	7.4	...	.3	34	...	646
15	11	...	10	7.6	...	2.0	135	...	17,100
16	8.8	...	7.4	8.1	...	1.1	1,300	...	120,000
17	8.8	...	5.4	8.1	...	1.1	88	...	2,000
18	7.8	...	2.9	6.1	...	.2	24	...	126
19	7.2	...	1.6	4.6	...	.5	14	...	14
20	156	...	40,100	508	...	105,000	10	...	5.1
21	120	...	20,400	2,050	...	298,000	8.6	...	1.4
22	23	...	542	55	...	1,470	6.9	...	.3
23	37	...	4,600	24	...	135	5.4	...	.9
24	52	...	6,060	12	...	25	4.6	...	.2
25	28	...	288	9.4	...	12	4.3	...	.7
26	18	...	76	876	...	117,000	4.1	...	.4
27	14	...	33	87	...	5,670	4.0	...	.4
28	12	...	17	28	...	291	3.9	...	.4
29	12	...	16	21	...	46	3.6	...	.5
30	101	...	17,500	23	...	123	3.1	...	.2
31	...	...	...	20	...	147	...	...	...

Day	July: Mean discharge (cfs)	July: Mean concentration (ppm)	July: Tons per day	August: Mean discharge (cfs)	August: Mean concentration (ppm)	August: Tons per day	September: Mean discharge (cfs)	September: Mean concentration (ppm)	September: Tons per day
1	2.9	...	0.2	2.4	...	0.8	0.16	...	
2	2.0	...	.2	3.2	...	1.5	.12	...	t
3	1.2	...	.4	2.1	...	.2	.12	...	
4	1.2	...	.3	1.4	...	.5	.20	...	.01
5	1.1	...	.2	1.4	...	.2	.33	...	.02
6	1.1	...	.1	1.1	...	.08	.33	...	.01
7	1.1	...	.1	.50	...	.03	.28	...	.01
8	1.1	...	.1	.50	...	.03	.28	...	.01
9	1.1	...	.1	3.6	...	1.4	.24	...	.01
10	.91	...	.06	1.4	...	.4	.28	...	.01
11	.80	...	.05	.80	...	.1	.20	...	.01
12	24	...	716	.20	...	.01	.16	...	
13	73	...	6,670	.20	...	.01	.12	...	t
14	295	...	34,300	.51	...	.09	.20	...	
15	40	...	786	.45	...	.01	.20	...	.02
16	8.6	...	33	.39	...	.06	.16	...	
17	3.6	...	6.1	.39	...	.01	.20	...	
18	305	...	41,000	.33	...	.01	.24	...	t
19	725	...	45,900	.85	...	.03	.24	...	
20	64	...	969	4.5	...	.3	.20	...	
21	15	...	120	4.2	...	.2	.24	...	.01
22	7.9	...	17	1.7	...	.5	.24	...	.01
23	5.5	...	5.0	.94	...	.09	.28	...	.01
24	5.0	...	1.5	.85	...	.06	.85	...	.03
25	6.1	...	.7	.63	...	.04	.63	...	.02
26	4.5	...	.2	.51	...	.03	1.4	...	.02
27	3.2	...	.1	.45	...	.02	.77	...	.02
28	3.6	...	.09	.33	...	.02	.94	...	.02
29	8.6	...	435	.24	...	.01	.63	...	.03
30	37	...	2,090	.24	...	.01	.33	...	t
31	4.1	...	8.6	.20	...	.01	...	...	...

t Sediment discharge less than 0.005 ton.

Tarkio River at Blanchard, Iowa—Continued

Suspended sediment, water year October 1937 to September 1938

Day	October Mean discharge (cfs)	October Suspended sediment Mean concentration (ppm)	October Suspended sediment Tons per day	November Mean discharge (cfs)	November Suspended sediment Mean concentration (ppm)	November Suspended sediment Tons per day	December Mean discharge (cfs)	December Suspended sediment Mean concentration (ppm)	December Suspended sediment Tons per day
1	0.33		0.01	0.51		0.02	0.45		
2	.33		t	.28		.01	.39		t
3	.28		.01	.24		.01	.85		
4	.24		.01	.24		t	.69		.01
5	.24		.01	.28		.01	.45		
6	.24		.01	.20		t	.24		
7	.16		t	.28		t	.24		t
8	.20		t	.69		.03	.09		
9	.45		.01	1.5		.04	.05		
10	.28		t	1.2		.04	.02		
11	.33		t	.85		.01	0		0
12	.39		.01	.69		.01	.02		
13	.39		.01	.63		.04	.09		
14	.28		.01	.45		.02	.12		
15	.39		t	.33		.01	.12		
16	.77		.04	.24		.01	.16		
17	1.4		.04	.24		.01	.12		
18	1.7		.1	.28		.01	.20		
19	1.5		.06	.28		.01	.33		
20	1.0		.05	.16			.24		t
21	.85		.02	.12			.12		
22	.57		.01	.02		t	.24		
23	.51		.01	.09			.20		
24	.51		.01	.24			.24		
25	.45		.01	.57		.01	.24		
26	.39		.01	.57			.24		
27	.33		.01	.57		t	.33		
28	.33		.01	.51			.51		
29	.33		t	.57		.01	.51		.01
30	.28		.01	.33		t	.77		.01
31	.33		.01				.94		.01

Day	January Mean discharge (cfs)	January Mean concentration (ppm)	January Tons per day	February Mean discharge (cfs)	February Mean concentration (ppm)	February Tons per day	March Mean discharge (cfs)	March Mean concentration (ppm)	March Tons per day
1	0.85		0.02	0.07			5.3		3.1
2	.77		.01	.12		t	3.8		1.3
3	.77		t	.20			3.0		.8
4	.51		t	.69		.01	2.3		.6
5	.63		.01	2.7		.2	1.5		.1
6	.63		.01	3.4		1.3	.85		.06
7	.24			2.6		.7	.94		.04
8	.24			3.0		1.2	.94		.03
9	.16			5.0		2.3	2.1		.1
10	.20			1.3		.4	3.6		.2
11	.24			2.0		.5	3.4		.3
12	.33			2.4		.3	2.3		.1
13	.28			5.3		1.4	1.7		.06
14	.33			2.4		.5	1.4		.04
15	.33			.85		.1	1.5		.07
16	.51			.85		.06	1.4		.05
17	.45			1.4		.03	.94		.04
18	.45		t	.69		.02	.94		.04
19	.45			.63		.02	.85		.05
20	.45			.77		.01	.63		.02
21	.51			.77		.01	.39		.03
22	.57			.77		t	.39		.1
23	.63			.77		.01	.33		.03
24	.69			.94		.01	.20		.01
25	.09			1.0		t	.28		.01
26	.09			2.1		.06	.12		.01
27	.20			3.2		.2	.16		.01
28	.12			12		5.4	.20		.02
29	.20						.39		.02
30	.20		.01				.69		.08
31	.07		t				.77		.04

t Sediment discharge less than 0.005 ton.

Tarkio River at Blanchard, Iowa—Continued

Suspended sediment, water year October 1937 to September 1938—Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	1.4	....	0.1	0.25	....	0.2	325	....	23,000
2	.77	....	.03	.21	....	.1	81	....	4,240
3	.03	....	.03	.16	....	.07	16	....	173
4	.45	....	.01	223	....	26,000	8.8	....	38
5	.57	....	.03	88	....	5,720	4.5	....	10
6	20	....	360	14	....	254	2.7	....	4.1
7	19	....	244	207	....	16,900	1.8	....	1.3
8	7.7	....	43	53	....	1,600	1.3	....	.3
9	10	....	23	15	....	90	.83	....	.08
10	8.4	....	20	6.2	....	12	15	....	198
11	5.1	....	11	4.0	....	3.6	399	....	41,900
12	1.9	....	1.5	2.7	....	1.8	39	....	910
13	.83	....	.4	1.8	....	.5	8.8	....	45
14	.42	....	.2	1.9	....	.6	82	....	9,200
15	152	....	31,500	1.6	....	.2	47	....	1,190
16	151	....	15,000	1.5	....	1.1	15	....	164
17	23	....	330	6.2	....	22	5.1	....	20
18	14	....	229	7.4	....	5.8	2.5	....	3.8
19	3.8	....	25	6.4	....	17	1.4	....	1.5
20	1.6	....	6.4	94	....	5,300	.83	....	.3
21	1.3	....	3.3	27	....	683	.61	....	.2
22	.93	....	.6	8.0	....	76	.54	....	.08
23	.68	....	.4	3.8	....	19	.42	....	.05
24	.75	....	.3	2.1	....	4.2	.37	....	.04
25	.61	....	.2	2.5	....	2.3	.42	....	.04
26	.47	....	.2	14	....	159	.54	....	.04
27	1.7	....	2.3	5.3	....	46	.37	....	.02
28	1.3	....	2.3	2.5	....	15	.33	....	.02
29	.78	....	1.2	1.5	....	4.5	.33	....	.03
30	.83	....	1.1	1.2	....	1.4	.25	....	.04
31	....	....	....	661	....	95,800	....	....	....
	July			**August**			**September**		
1	0.19	....	0.02	0.61	....	0.7	106	....	2,470
2	.29	....	.05	.29	....	.3	30	....	162
3	.19	....	.02	.21	....	.2	7.7	....	12
4	.07	....	.01	.19	....	.07	3.1	....	3.8
5	.07	....	.01	.19	....	.1	16	....	494
6	.37	....	.04	46	....	1,940	7.0	....	30
7	8.9	....	107	18	....	160	5.6	....	9.4
8	1.8	....	3.8	11	....	120	4.0	....	2.3
9	1.2	....	.01	2.7	....	4.0	4.0	....	3.9
10	.54	....	.1	1.2	....	1.7	15	....	1,080
11	.33	....	.04	.61	....	.4	403	....	27,900
12	.19	....	.01	.33	....	.1	116	....	1,470
13	.19	....	.01	.25	....	.1	355	....	16,600
14	.16	....	.04	.19	....	.1	193	....	6,160
15	.13	....	.01	3.6	....	22	23	....	93
16	.16	....	.01	6.5	....	17	9.6	....	14
17	1.3	....	.4	4.5	....	6.6	6.4	....	5.7
18	.37	....	.1	2.1	....	1.6	5.3	....	2.2
19	.21	....	.02	.75	....	.6	4.5	....	1.5
20	.19	....	.03	724	....	47,600	3.0	....	.6
21	.18	....	.03	518	....	18,600	2.9	....	.2
22	.25	....	.03	28	....	121	2.5	....	.09
23	5.0	....	2.6	7.0	....	14	2.2	....	.06
24	1.8	....	4.3	3.1	....	5.4	1.9	....	.09
25	.68	....	1.2	1.6	....	1.7	1.8	....	.05
26	.54	....	.7	.83	....	.7	1.4	....	.05
27	.54	....	.3	.68	....	.6	1.2	....	.04
28	18	....	202	678	....	39,000	1.0	....	.02
29	5.3	....	25	148	....	1,550	.93	....	.03
30	3.4	....	9.9	15	....	31	.93	....	.04
31	1.4	....	5.0	87	....	2,230	....	....	....

Tarkio River at Blanchard, Iowa—Continued

Suspended sediment, water year October 1938 to September 1939

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	0.75		0.04	0.47		0.05	0.54		0.01
2	.68		.04	.83		.1	1.0		.03
3	.68		.05	53		479	2.4		.3
4	.61		.05	40		288	4.2		.5
5	.54		.05	9.2		30	3.4		.4
6	.47		.04	3.6		6.3	2.2		.2
7	.42		.05	1.9		2.2	2.4		.2
8	.54		.06	1.3		1.0	2.1		.1
9	.37		.02	1.3		.7	1.4		.08
10	.37		.03	1.2		.7	1.4		.08
11	.61		.06	1.3		.3	1.5		.09
12	.61		.05	1.4		.2	.75		.01
13	.54		.05	1.2		.1	.75		.02
14	.47		.05	.93		.05	.61		.02
15	.47		.05	.93		.05	.47		.01
16	.54		.05	.93		.05	.68		.01
17	.47		.05	.93		.04	.47		.01
18	.42		.02	.93		.1	.54		.01
19	.33		.02	.93		.05	.42		.01
20	.29		.01	.83		.03	.42		.01
21	.29		.01	.83		.03	.33		.01
22	.33		.05	.42		.02	.37		.01
23	.33		.01	.47		.02	.47		.01
24	.29		.01	.25		.01	.47		.01
25	.29		t	.29		.01	.54		.02
26	.33		.01	.19		.01	.61		.01
27	.33		.02	.13		.01	.21		t
28	.37		.01	.21		.01	.16		.01
29	.42		.02	.37		.01	.16		t
30	.37		.01	.42		.01	.07		t
31	.37		.01				.10		.01

Day	January			February			March		
1	0.10		0.02	2.9		0.2	1.8		0.7
2	.42		.03	2.4		.1	1.5		.5
3	.54		.01	1.9		.1	.83		.3
4	1.3		.04	1.4		.07	1.2		.4
5	2.7		.6	1.3		.06	6.4		1.9
6	2.5		.3	1.5		.03	8.4		4.4
7	2.2		.2	1.8		.06	78		369
8	2.5		.2	.75		.02	1,050		28,100
9	5.1		1.0	.47		.03	917		26,000
10	4.7		1.2	.16		.01	660		30,400
11	3.1		.5	.02		t	2,600		100,000
12	2.2		.3	.02		t	4,790		208,000
13	2.7		.2	8.0		15	261		12,000
14	1.3		.1	34		70	90		1,540
15	1.2		.02	20		31	14		144
16	.83		.01	8.8		8.8	9.3		36
17	.75		.02	4.2		3.4	13		34
18	.61		.02	7.7		5.2	8.5		15
19	.54		.01	120		2,340	13		18
20	.54		.02	16		70	12		15
21	.83		.05	5.9		12	8.5		8.7
22	.54		.01	7.7		12	7.2		5.4
23	.61		.03	5.6		4.9	6.1		3.5
24	.68		.02	4.7		3.6	5.6		2.7
25	.68		.02	3.3		2.6	21		482
26	.68		.01	3.1		1.8	16		274
27	.54		.02	2.7		1.3	6.1		64
28	.76		.03	2.1		1.2	4.3		11
29	1.0		.03				5.2		8.6
30	1.5		.04				6.1		9.6
31	2.4		.09				6.1		5.1

t Sediment discharge less than 0.005 ton.

Note.—Artificial control washed out March 1939; records based on wire-weight readings, frequent discharge measurements, and high-water marks.

Tarkio River at Blanchard, Iowa—Continued

Suspended sediment, water year October 1938 to September 1939—Continued

Day	April			May			June		
		Suspended sediment			Suspended sediment			Suspended sediment	
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1	6.6	....	3.8	1.2	....	0.05	0.50	....	0.2
2	6.6	....	7.9	1.4	....	.04	2.3	....	60
3	4.8	....	4.0	1.2	....	.03	11	....	191
4	8.5	....	576	1.2	....	.04	3.9	....	29
5	41	....	1,240	1.0	....	.04	.90	....	4.2
6	10	....	150	.90	....	.06	.70	....	1.5
7	4.3	....	17	1.0	....	.07	390	....	91,800
8	3.9	....	5.6	.80	....	.00	497	....	43,700
9	3.5	....	2.7	.90	....	.00	511	....	38,200
10	4.3	....	5.3	.80	....	.07	760	....	70,200
11	3.9	....	3.6	.70	....	.08	222	....	8,040
12	1.7	....	.5	.60	....	.06	16	....	138
13	2.3	....	.5	.60	....	.03	232	....	14,300
14	2.7	....	.7	.60	....	.09	48	....	1,190
15	6.6	....	20	.60	....	.05	12	....	64
16	8.5	....	11	.60	....	.06	5.6	....	16
17	7.2	....	4.6	.60	....	.05	1.4	....	3.4
18	18	....	56	1.2	....	.3	27	....	3,200
19	14	....	20	4.8	....	4.1	428	....	44,900
20	11	....	7.5	2.3	....	3.4	34	....	710
21	6.6	....	1.5	1.2	....	.7	1,000	....	86,800
22	4.3	....	.07	1.0	....	.8	745	....	49,000
23	3.5	....	.4	.90	....	.3	84	....	1,340
24	2.0	....	.2	.00	....	.3	26	....	91
25	1.7	....	.1	4.3	....	20	154	....	9,000
26	1.2	....	.03	24	....	188	38	....	810
27	1.4	....	.03	5.0	....	26	16	....	35
28	1.2	....	.04	3.5	....	9.1	11	....	12
29	1.2	....	.04	1.7	....	1.7	13	....	17
30	1.0	....	.02	1.2	....	.9	8.0	....	5.1
31	....	....	....	.90	....	.4	....	....	....

Day	July			August			September		
1	9.0	....	10	1.8	....	1.6	0.34	....	0.01
2	8.2	....	9.1	35	....	522	.39	....	.05
3	6.0	....	2.8	12	....	82	.23	....	.04
4	1,150	....	64,900	3.1	....	5.9	.34	....	.05
5	1,240	....	86,000	2.1	....	2.7	.28	....	.04
6	136	....	3,300	1.4	....	1.2	.28	....	.03
7	23	....	128	18	....	750	.28	....	.03
8	11	....	24	177	....	8,320	.23	....	.02
9	7.3	....	7.1	42	....	476	.17	....	.01
10	5.4	....	2.8	21	....	425	.17	....	.02
11	3.8	....	.4	690	....	28,400	.12	....	.01
12	3.1	....	.1	62	....	450	.10	....	.01
13	2.1	....	.09	7.3	....	12	.10	....	.01
14	2.3	....	.08	4.4	....	3.8	.09	....	.01
15	1.7	....	.08	2.7	....	1.7	.10	....	.01
16	1.6	....	.1	2.4	....	1.0	.09	....	t
17	2.4	....	.3	166	....	1,990	.09	....	.01
18	2.9	....	.3	22	....	58	.10	....	.01
19	2.6	....	.2	15	....	24	.17	....	.01
20	6.2	....	.6	5.2	....	17	.23	....	.02
21	2.7	....	.2	2.6	....	4.6	.23	....	.02
22	1.6	....	.1	2.6	....	2.5	.23	....	.01
23	1.7	....	.1	11	....	39	.28	....	.01
24	1.2	....	.07	2.0	....	7.5	.28	....	.01
25	167	....	10,100	2.0	....	3.4	.34	....	.02
26	49	....	995	1.0	....	.5	.28	....	.01
27	11	....	43	.73	....	.2	.28	....	.01
28	195	....	13,600	.50	....	.1	.28	....	.02
29	36	....	600	.34	....	.08	.82	....	.1
30	6.8	....	21	.48	....	.1	.48	....	.03
31	2.7	....	4.2	.34	....	.08	....	....	....

t Sediment discharge less than 0.005 ton.

Note.—Artificial control washed out March 1939; records based on wire-weight readings, frequent discharge measurements, and high-water marks.

Tarkio River at Blanchard, Iowa—Continued

Suspended sediment, October 1939 to June 1940

Day	October Mean discharge (cfs)	October Suspended sediment Mean concentration (ppm)	October Suspended sediment Tons per day	November Mean discharge (cfs)	November Suspended sediment Mean concentration (ppm)	November Suspended sediment Tons per day	December Mean discharge (cfs)	December Suspended sediment Mean concentration (ppm)	December Suspended sediment Tons per day
1	0.5			0.3			1.4		0.01
2	.3			.4			1.4		
3	.3			.4			.9		
4	.3			.4			.8		
5	.3		t	.5		t	.7		
6	.3			.5			.6		
7	.3			.6			.7		
8	.7			.6			.6		
9	3.1		.08	.7		.01	.6		
10	2.9		.05	.7			.6		
11	1.7		.01	.6			.6		
12	1.0			.6			.6		
13	.8			.6			.6		
14	.6			.6			.6		
15	.6			.6			.6		
16	.6			.6			.6		
17	.6		t	.6			.6		
18	.6			.6			.6		
19	.4			.6		t	.6		
20	.4			.6			.4		.01
21	.3			.5			.3		
22	.4			.5			.2		
23	.4		.02	.6			.2		
24	.4			.6			.3		
25	.5			.6			.3		t
26	.5			.6			.2		
27	.5		t	.4			.3		
28	.4			.5			.3		
29	.6			.7			.3		.03
30	.3			.7			.3		t
31	.4						.3		t

Day	January Mean discharge (cfs)	January Mean concentration (ppm)	January Tons per day	February Mean discharge (cfs)	February Mean concentration (ppm)	February Tons per day	March Mean discharge (cfs)	March Mean concentration (ppm)	March Tons per day
1	0.3		0.01	0.4		t	4.8		0.4
2	.2		.01	.5		.01	13		15
3	.2			.5		.01	16		14
4	.1		t	.6		.01	22		21
5	.1			.5		.01	18		16
6	.1		.03	.6		t	37		126
7	.1		.01	.6		.01	16		39
8	.1		.02	.5		.01	31		87
9	.1		.01	.5		.01	16		31
10	.1		.01	.5		.01	12		16
11	.1		.01	.6		.01	4.8		4.2
12	.1		.02	.6		.01	3.8		1.5
13	.1			.7		.02	7		1.0
14	.1			.8		.02	10		14
15	.1			.9		.02	16		21
16	.1		t	1.3		.06	14		28
17	.1			1.3		.04	61		624
18	.1			1.3		.05	95		4,020
19	.3		.01	5		.2	51		455
20	.4		.01	5		.3	30		91
21	.4			4.2		.2	9		17
22	.3			2.8		.2	12		9.2
23	.2			2.1		.1	8		2.9
24	.2		t	2.2		.09	6		1.1
25	.1			2.3		.1	9		5.7
26	.1			3.2		.09	8		3.8
27	.2			3.4		.08	9		5.7
28	.5		.01	3.6		.2	12		8.6
29	.5		.01	3.8		.2	15		19
30	.4		.01				9		6.2
31	.4		.01				6		2.2

t Sediment discharge less than 0.005 ton.

Note.—Artificial control washed out March 1939; records based on wire-weight readings, frequent discharge measurements, and high-water marks. Flow affected by ice Nov. 27-29, Dec. 12, 18, Dec. 21 to Feb. 29.

Tarkio River at Blanchard, Iowa—Continued

Suspended sediment, October 1939 to June 1940—Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	4.7	....	0.5	24	....	43	2.2	....	0.7
2	4.0	....	.5	19	....	17	2.2	....	.7
3	3.3	....	.2	16	....	10	2.2	....	.8
4	2.6	....	.2	13	....	5.5	43	....	1,500
5	2.1	....	.09	12	....	4.8	24	....	375
6	1.8	....	.05	12	....	7.2	5	....	22
7	8	....	3.1	12	....	2.4	2.4	....	4.0
8	16	....	6.9	14	....	3.8	1.8	....	1.7
9	11	....	1.9	11	....	2.3	1.8	....	.8
10	7	....	.6	8	....	.5	1.8	....	.7
11	6	....	.7	7	....	.5	1.9	....	.2
12	4.2	....	.3	6	....	.3	4.0	....	.9
13	3.8	....	.1	5	....	.1	6	....	1.3
14	4.2	....	.1	4.7	....	.06	3.8	....	.5
15	4.7	....	.3	3.3	....	.06	2.0	....	.3
16	5	....	.09	4.7	....	.2	1.8	....	.2
17	6	....	.3	4.7	....	.05	1.1	....	.09
18	7	....	.3	13	....	6.7	.8	....	.1
19	5	....	.2	30	....	39	.6	....	.1
20	3.6	....	.09	11	....	4.8	1.2	....	.3
21	2.9	....	.06	17	....	146	1.0	....	.1
22	3.1	....	.05	10	....	32	.8	....	.2
23	8	....	1.0	5	....	3.3	24	....	632
24	10	....	.7	4.2	....	2.0	19	....	266
25	8	....	.4	3.3	....	1.1	5	....	17
26	62	....	1,490	3.1	....	.7	2.2	....	4.0
27	30	....	223	2.6	....	.5	1.2	....	.9
28	28	....	394	2.6	....	.3	39	....	2,120
29	106	....	4,170	2.6	....	.4	6	....	136
30	42	....	358	2.2	....	.4	1.9	....	9.0
31	....	....	....	2.5	....	.6	....	....	....

Note.—Artificial control washed out March 1939; records based on wire-weight readings, frequent discharge measurements, and high-water marks.

Tarkio River at Blanchard, Iowa—Continued

Monthly discharge for calendar and water years 1934 to 1940

Month	Water discharge (cfs-days)	Suspended sediment: Load (tons)	Daily loads (tons): Max.	Daily loads (tons): Min.	Daily loads (tons): Mean	Tons per sq. mi.	Acre-feet (a)	Concentration (ppm) Weighted mean
April 1934	134.05	64.8	25	0.1	2.2	0.32	0.05	179
May	163.57	5,943.02	5,090	.01	192	29.7	5.0	13,500
June	74.61	2,010.26	1,170	.01	87	13.1	2.2	13,000
July	12.99	61.99	39	0	2.0	.31	.05	1,770
August	7.66	43.13	43	t	1.4	.22	.04	2,090
September	295.74	2,112.35	948	.04	70	10.6	1.8	2,650
October 1934	433.22	7,130.95	5,260	.01	230	35.7	6.0	6,100
November	271.65	1,370.90	281	.1	46	6.88	1.1	1,880
December	115.69	22.70	2.9	.01	.7	.11	.02	73
January, 1935	877.22	14,015.04	13,600	.02	452	70.1	12	5,920
February	489.82	11,470.94	6,320	.03	410	57.4	9.6	8,670
March	336.43	1,985.80	720	.02	64	9.93	1.7	2,190
April	53.08	1.74	.5	.01	.06	.009	.001	12
May	1,360.75	62,597.85	34,300	.02	2,020	313 0	52	17,000
June	4,297.3	138,650.6	42,000	2.8	4,620	693.3	116	11,900
July	931.9	21,547.7	19,100	.9	695	107.7	18	8,560
August	37.33	5.08	.8	.03	.2	.03	.005	56
September	187.2	723.5	234	.1	24	3.62	.6	1,430
Water year 1934-35	9,307.59	259,538.40	42,000	0.01	711	1,298	217	10,200
October 1935	335.46	3,095.44	1,520	.05	119	18.5	3.1	4,080
November	827.8	7,359.6	3,770	.1	245	36.8	6.1	3,290
December	310.9	37.92	6.8	.02	1.2	.19	.03	45
Calendar year 1935	16,051.19	262,091.21	42,000	0.01	718	1,310	219	9,660
January 1936	250.7	3.31	.9	.02	.1	.02	.003	5
February	3,501.2	25,156.07	7,650	.02	867	125.8	21	2,660
March	6,111.0	198,364.7	85,100	4.2	6,400	991.8	166	12,000
April	1,279.4	147,667.8	132,000	.1	4,920	738.3	123	42,700
May	2,679.0	122,767.8	53,700	1 0	3,960	613.8	102	17,000
June	1,100.0	75,167.5	48,300	.4	2,510	375.8	63	23,400
July	35.29	11.88	5.3	.04	.4	.06	.01	125
August	24.36	104.28	100	.04	3.4	.52	.09	1,590
September	1,293.5	55,424.87	37,400	.07	1,850	277.1	46	15,900
Water year 1935-36	17,838.61	635,760.57	132,000	0.02	1,740	3,179	531	13,200
October 1936	1,142.4	68,163.66	59,900	.05	2,200	340.8	57	22,100
November	119.2	1,085.97	901	.08	36	5.43	.9	3,370
December	440.54	38,734.66	34,800	.02	1,250	193.7	32	32,600
Calendar year 1936	18,066.59	732,652.50	132,000	0.02	2,000	3,663	612	15,000
January, 1937	39.76	188.36	80	t	6.1	.94	.2	1,750
February	6,336.77	82,275.8	36,900	t	2,950	412.9	69	4,830
March	5,757.5	268,760.3	90,800	.8	8,670	1,344	224	17,300
April	1,040.6	99,951.5	40,100	1.6	3,330	499.8	83	35,600
May	4,265.5	573,876.4	298,000	.2	18,500	2,869	470	49,800
June	2,185.5	177,321.6	120,000	.2	5,910	886.6	148	30,100
July	1,653.27	133,080.1	45,900	.05	4,290	566.4	111	29,800
August	36.51	6.76	1.5	.01	.2	.03	.006	69
September	10.57	.28	.03	t	.01	.001	.0002	10
Water year 1936-37	23,028.12	1,443,745.39	298,000	t	3,960	7,219	1,210	23,200

t Sediment discharge less than 0.005 ton.
a Computed using a specific weight of 55 pounds per cubic foot.

Tarkio River at Blanchard, Iowa—Continued

Monthly discharge for calendar and water years 1934 to 1940—Continued

Month	Water discharge (cfs-days)	Suspended sediment						
		Load (tons)	Daily loads (tons)			Tons per sq. mi.	Acre-feet (a)	Concentration (ppm) Weighted mean
			Max.	Min.	Mean			
October, 1937	15.78	0.49	0.06	t	0.02	0.002	0.0001	12
November	13.16	.31	.04	t	.01	.002	.0003	9
December	9.21	.04	.01	0	.001	.0002	.00003	2
Calendar year 1937	21,364.13	1,335,761.94	208,000	0	3,660	6,679	1,110	23,200
January 1938	12.19	.06	.02	t	.002	.0003	.00005	2
February	57.92	14.74	5.4	t	.5	.07	.01	94
March	43.31	7.46	3.1	.01	.2	.01	.006	64
April	431.92	47,811.6	31,600	.01	1,590	320.1	40	41,000
May	1,463.22	152,719.37	95,800	.07	4,930	763.6	127	38,700
June	1,061.74	81,097.92	41,900	.02	2,700	405.5	68	28,300
July	53.89	362.79	202	.01	12	1.81	.3	2,490
August	2,310.43	111,429.97	47,600	.07	3,590	557.1	93	17,900
September	1,334.96	56,515.07	27,900	.02	1,880	282.6	47	15,700
Water year 1937-38	6,807.72	449,959.82	95,800	0	1,230	2,250	370	24,500
October, 1938	13.9	1.09	.06	t	.03	.005	.0008	27
November	126.69	809.21	479	.01	27	4.05	.7	2,370
December	31.14	2.17	.5	t	.07	.01	.002	26
Calendar year 1938	6,941.31	450,771.36	95,800	t	1,230	2,254	376	24,100
January 1939	46.11	5.15	1.2	.01	.2	.03	.004	41
February	268.42	2,583.48	2,340	t	92	12.9	2.2	3,560
March	10,628.12	497,553.8	208,000	.3	16,100	2,488	415	17,300
April	193.5	2,138.13	1,240	.02	71	10.7	1.8	4,090
May	68.1	256.06	188	.03	8.3	1.28	.2	1,400
June	5,358.3	471,957.4	91,800	.2	15,700	2,360	394	32,600
July	3,099.3	182,649.72	88,900	.07	5,890	913.2	152	21,800
August	1,314.95	41,601.96	28,400	.08	1,340	208.0	35	11,700
September	7.40	.67	.1	t	.02	.003	.0006	34
Water year 1938-39	21,155.94	1,199,559.65	208,000	t	3,290	5,998	1,000	21,000
October 1939	21.0	.21	.08	.001	.007	.001	.0001	4
November	16.8	.06	.006	.001	.002	.0003	.00005	1
December	17.1	.08	.008	0	.003	.0004	.00007	2
Calendar year 1939	21,039.11	1,198,747.62	208,000	0	3,280	5,994	1,000	21,100
January 1940	6.20	.22	.03	.002	.007	.001	.0002	13
February	50.3	2.73	.3	.005	.07	.01	.002	15
March	190.4	5,706.5	4,020	.4	184	28.5	4.8	3,580
April	410.0	6,653.73	4,170	.05	222	33.3	5.6	6,010
May	285.5	335.57	146	.05	11	1.68	.3	435
June	210.3	5,095.59	2,120	.09	170	25.5	4.3	8,970

t Sediment discharge less than 0.005 ton.
a Computed using a specific weight of 55 pounds per cubic foot.

West Tarkio Creek near Westboro, Mo.

LOCATION.—At gaging station at bridge on county road "C", 3½ miles west of Westboro, Atchinson County, 6 miles upstream from Middle Tarkio Creek, and 8 miles upstream from confluence with Tarkio River.

DRAINAGE AREA.—105 square miles.

RECORDS AVAILABLE.—Chemical analyses: December 1934, May 1935 (fragmentary) (a).

Sediment records: April 1934 to June 1940.

EXTREMES, water years 1934 to 1940 given in following table:

Water year	Daily suspended sediment							
	Concentrations (ppm) (b)				Loads (tons)			
	Max.	Date	Min.	Date	Max.	Date	Min.	Date
1933-34(c)	......	......	......	......	2,660	May 13	t	Many days June, July Aug.
1934-35	......	......	......	......	54,500	June 26	t	Oct. 15-17
1935-36	.....	......	......	......	124,000	April 28	.01	July 31
1936-37	......	......	......	......	163,000	July 29	t	Several days Jan., Feb.
1937-38	......	......	......	......	88,600	June 11	t	Many days Nov., Dec., Jan., Feb., Mar., April
1938-39	......	......	......	......	134,000	Mar. 11	t	Several days Nov., Dec., Jan., Feb., Sept.
1939-40(d)	......	......	......	......	882	April 29	t	Many days Oct., Nov., Dec., Jan., Feb.

t Less than 0.005 ton.
b Concentrations not reported.
c April to September.
d October to June.

EXTREMES, 1934-40.—Sediment concentrations: Not reported.

Sediment loads: Maximum daily, 163,000 tons July 29, 1937; minimum daily, less than 0.005 ton on several days most years.

REMARKS.—Compilation of rainfall, runoff and soil loss data, 1934-40, published by U. S. Department of Agriculture, Soil Conservation Service, Technical Publication 42, "Hydrologic Studies at the West Tarkio Creek Demonstration Project, SCS-IA-1, Shenandoah, Iowa."

a Reported under Miscellaneous Analyses in Iowa.

West Tarkio Creek near Westboro, Mo.—Continued

Suspended sediment, April to September 1934

Day	April Mean discharge (cfs)	April Suspended sediment Mean concentration (ppm)	April Suspended sediment Tons per day	May Mean discharge (cfs)	May Suspended sediment Mean concentration (ppm)	May Suspended sediment Tons per day	June Mean discharge (cfs)	June Suspended sediment Mean concentration (ppm)	June Suspended sediment Tons per day
1	0.77	......	0.1	0.63	......	0.08	0.02	......	t
2	3.16	......	.2	.63	......	.05	.07	......	.01
3	1.50	......	.2	.63	......	.08	.02	......	t
4	4.72	......	5.2	.77	......	.08	.07	......	.01
5	3.89	......	2.2	2.83	......	.5	.14	......	.02
6	2.51	......	1.0	1.50	......	.2	.07	......	.01
7	4.30	......	.8	.77	......	.1	.04	......	t
8	2.51	......	.4	.93	......	.09	12.9	......	2,110
9	3.16	......	.8	1.50	......	.1	19.3	......	1,710
10	2.22	......	.3	3.89	......	53	.51	......	2.8
11	1.72	......	.2	.77	......	5.8	.30	......	1.0
12	1.11	......	.1	30.1	......	820	.07	......	.1
13	1.30	......	.09	54.4	......	2,600	.14	......	.05
14	1.11	......	.05	13.9	......	220	.51	......	.4
15	.77	......	.06	3.52	......	22	.30	......	.06
16	1.50	......	.1	2.83	......	7.7	.22	......	.03
17	1.72	......	.2	1.98	......	3.2	.30	......	.05
18	1.50	......	.1	1.11	......	1.1	.14	......	.01
19	1.30	......	.1	.93	......	.4	.12	......	.02
20	1.30	......	.1	.51	......	.1	.10	......	.01
21	1.11	......	.08	.63	......	.08	.05	......	.01
22	1.50	......	.1	.30	......	.01	2.06	......	1.0
23	1.30	......	.2	.40	......	.02	.65	......	1.1
24	1.30	......	.08	.40	......	.03	.65	......	.9
25	1.11	......	.08	.40	......	.02	1.72	......	1.4
26	1.30	......	.1	.30	......	.01	.92	......	1.2
27	1.11	......	.06	.40	......	.02	.43	......	.5
28	.93	......	.1	.14	......	.01	.37	......	.3
29	1.50	......	.1	.14	......	.01	.13	......	.08
30	.77	......	.07	.14	......	.02	.16	......	.1
31	......	......	......	.07	......	.01	......	......	......

Day	July Mean discharge (cfs)	July Mean concentration (ppm)	July Tons per day	August Mean discharge (cfs)	August Mean concentration (ppm)	August Tons per day	September Mean discharge (cfs)	September Mean concentration (ppm)	September Tons per day
1	0.13	......	0.03	0.03	......	t	1.45	......	0.2
2	.05	......	t	.10	......	.01	2.15	......	7.4
3	.05	......	.01	.03	......	t	1.35	......	8.8
4	.06	......	.01	.05	......	.01	3.70	......	18
5	.21	......	.09	.04	......	t	.83	......	1.2
6	.13	......	.1	.04	......	t	.31	......	.4
7	.06	......	.01	.03	......	t	.13	......	.1
8	.08	......	.01	.03	......	t	.10	......	.05
9	.08	......	.01	.02	......	t	.10	......	.05
10	.43	......	.2	.02	......	t	.26	......	.2
11	.21	......	.03	.04	......	t	.10	......	.05
12	.10	......	.01	.04	......	t	.08	......	.02
13	.10	......	.02	.05	......	.01	.05	......	.02
14	.10	......	.03	.05	......	.01	2.69	......	38
15	.13	......	.03	.10	......	.01	42.0	......	854
16	.08	......	.02	.08	......	.01	5.80	......	23
17	.05	......	.01	.06	......	.01	1.89	......	4.2
18	.03	......	t	.06	......	.01	1.72	......	2.4
19	.01	......	t	.05	......	t	1.10	......	1.9
20	.01	......	t	.06	......	t	.65	......	1.0
21	.01	......	t	.06	......	t	.65	......	.7
22	.01	......	t	.04	......	t	.37	......	.4
23	.01	......	t	.04	......	t	.26	......	.2
24	.01	......	t	.04	......	t	.16	......	.1
25	.01	......	t	.04	......	t	4.97	......	86
26	.02	......	t	.05	......	t	76.5	......	1,260
27	.03	......	t	.06	......	.01	15.4	......	52
28	.03	......	t	.04	......	t	16.6	......	142
29	.03	......	t	.04	......	t	9.85	......	52
30	.03	......	t	.04	......	t	5.80	......	17
31	.03	......	t	.10	......	.01	......	......	......

t Sediment discharge less than 0.005 ton.

West Tarkio Creek near Westboro, Mo.—Continued

Suspended sediment, water year October 1934 to September 1935

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	3.90		7.0	0.31		0.05	2.23		1.1
2	2.23		3.5	.37		.1	3.96		1.4
3	1.32		1.8	14.6		171	2.80		.8
4	.92		1.1	4.74		19	2.80		.5
5	.57		.7	1.58		2.7	2.61		.4
6	.31		.3	1.20		1.1	1.72		.2
7	.21		.2	1.01		.8	1.45		.1
8	.16		.1	.83		.4	1.45		.05
9	.13		.04	.74		.3	1.45		.06
10	.13		.03	.65		.1	1.01		.04
11	.10		.02	.65		.06	.74		.02
12	.08		.01	.65		.04	.83		.01
13	.08		.01	.65		.03	1.10		.02
14	.08		.01	.50		.02	1.32		.03
15	.08			.37		.02	1.89		.04
16	.06		t	.43		.02	4.22		.9
17	.06			1.68		10	4.48		.6
18	.21		.02	3.96		15	3.96		.4
19	394		22,300	1.58		1.3	4.22		.4
20	76		1,960	5.00		5.1	2.80		.3
21	13.9		54	6.70		11	2.80		.2
22	9.52		21	12.3		120	2.80		.1
23	11.8		156	3.46		9.8	3.46		.7
24	3.70		5.5	3.00		3.7	2.42		.3
25	2.06		1.9	5.05		28	1.58		.1
26	1.32		1.0	9.85		70	1.01		.02
27	.92		.8	10.9		130	.50		.01
28	.57		.4	9.56		95	.74		.01
29	.43		.3	3.70		4.3	.74		.01
30	.50		.3	1.58		1.4	.65		.01
31	.43		.2				.74		.02

Day	January			February			March		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1	0.57		0.01	3.00		1.7	8.75		34
2	.74		.06	5.80		3.3	13.9		90
3	.74		.02	6.40		2.0	12.4		64
4	.50		.01	5.00		1.1	15.9		92
5	.74		.01	4.74		2.3	13.2		43
6	1.10		.03	4.74		3.1	7.71		16
7	1.89		.1	3.96		2.9	3.96		5.3
8	4.48		1.1	2.61		1.7	6.10		7.9
9	3.70		.8	2.42		1.4	5.80		4.9
10	2.80		.5	2.61		1.0	5.52		5.6
11	2.80		.4	2.80		1.6	4.74		3.6
12	5.52		1.2	3.46		2.6	3.96		1.4
13	4.24		2.1	4.48		2.7	4.22		1.6
14	1.10		.2	17.6		140	4.22		1.0
15	1.45		.06	18.6		68	3.46		1.4
16	1.58		.06	47.9		401	4.48		.9
17	1.89		.08	23.2		105	2.61		.5
18	3.90		21	14.0		57	3.70		1.9
19	153		5,370	10.3		55	3.46		.9
20	44		133	6.25		35	3.00		.3
21	41		77	5.26		13	2.61		.2
22	15		33	5.00		8.9	2.23		.1
23	8.21		13	2.61		3.4	1.72		.08
24	3.96		5.0	2.42		3.2	1.45		.04
25	2.01		2.9	.31		.2	1.72		.06
26	3.70		3.1	.21		.04	1.32		.06
27	1.26		1.0	.31		.02	1.01		.1
28	.92		.7	1.32		.1	.83		.03
29	3.46		2.3				.65		.02
30	3.00		2.4				.65		.07
31	2.01		1.4				.65		.2

t Sediment discharge less than 0.005 ton.

Note.—Flow affected by ice Jan. 20 to Feb. 15.

West Tarkio Creek near Westboro, Mo.—Continued

Suspended sediment, water year October 1934 to September 1935—Continued

Day	April			May			June		
		Suspended sediment			Suspended sediment			Suspended sediment	
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1	0.83	....	0.01	0.92	....	0.2	199	....	25,500
2	.74	....	.02	1.32	....	.1	222	....	3,910
3	.74	....	.02	.74	....	.05	79.3	....	386
4	.74	....	.01	.57	....	.03	84.5	....	1,400
5	1.01	....	.04	.50	....	.03	38.8	....	2,400
6	1.10	....	.02	.37	....	.02	156	....	8,010
7	2.80	....	.6	.37	....	.03	26.0	....	37
8	1.58	....	.08	.50	....	.04	10.9	....	14
9	1.58	....	.06	.43	....	.03	17.1	....	9.5
10	2.42	....	.6	.26	....	.02	17.7	....	89
11	2.42	....	.3	.83	....	27	13.4	....	6.2
12	1.72	....	.05	2.42	....	13	12.9	....	4.0
13	1.20	....	.03	8.86	....	138	10.5	....	1.8
14	1.01	....	.04	5.92	....	17	9.60	....	2.5
15	.65	....	.02	7.02	....	28	8.50	....	1.1
16	.65	....	.02	6.29	....	33	8.50	....	1.1
17	.74	....	.04	3.70	....	5.7	321	....	31,800
18	.83	....	.03	3.96	....	5.1	518	....	15,800
19	.83	....	.03	23.5	....	441	79.3	....	272
20	.74	....	.02	99.0	....	4,700	57.6	....	162
21	.57	....	.02	30.1	....	209	43.5	....	101
22	.43	....	.03	15.4	....	51	31.3	....	33
23	.31	....	.02	12.4	....	27	21.7	....	18
24	.50	....	.03	7.76	....	16	60.4	....	1,200
25	.57	....	.06	6.29	....	4.6	20.8	....	123
26	.37	....	.02	6.29	....	3.8	666	....	54,500
27	.26	....	.01	6.29	....	4.7	72.6	....	751
28	.50	....	.03	247	....	17,700	48.8	....	385
29	.50	....	.03	42.8	....	650	29.0	....	68
30	.37	....	.02	19.9	....	65	70.2	....	1,640
31	....	....	....	308	....	29,600	....	....	....

Day	July			August			September		
1	31	....	106	1.4	....	0.2	11	....	52
2	20	....	23	1.4	....	.3	4.2	....	8.3
3	16	....	13	1.5	....	.2	1.6	....	1.0
4	14	....	9.5	1.5	....	.2	1.2	....	.3
5	12	....	9.4	1.2	....	.08	.79	....	.04
6	11	....	8.6	1.0	....	.1	.69	....	.05
7	10	....	8.1	.89	....	.08	.69	....	.05
8	8.4	....	8.0	.79	....	.09	2.8	....	.6
9	88	....	4,030	.79	....	.1	2.4	....	1.3
10	73	....	1,670	1.0	....	.1	2.7	....	.4
11	14	....	60	.89	....	.1	1.5	....	.2
12	11	....	21	.79	....	.1	1.0	....	.08
13	8.0	....	5.2	.60	....	.08	.79	....	.09
14	7.2	....	3.9	.53	....	.05	.79	....	.07
15	6.5	....	2.3	.53	....	.04	.60	....	.07
16	5.8	....	1.2	.53	....	.05	6.9	....	84
17	5.5	....	1.6	.53	....	.06	6.5	....	29
18	4.6	....	.7	.46	....	.06	2.7	....	4.1
19	4.2	....	.9	.53	....	.05	1.2	....	1.4
20	4.2	....	.6	.79	....	.08	.60	....	.6
21	3.9	....	.5	.60	....	.04	.46	....	.3
22	3.7	....	.5	1.4	....	.1	.39	....	.2
23	3.4	....	.6	1.1	....	.06	.34	....	.2
24	5.5	....	4.7	.69	....	.03	.29	....	.1
25	3.7	....	.4	.60	....	.08	.80	....	1.8
26	3.1	....	.3	.60	....	.04	15	....	105
27	2.5	....	.2	.60	....	.02	2.4	....	2.8
28	2.2	....	.2	.46	....	.03	1.1	....	.7
29	2.1	....	.2	.53	....	.02	.89	....	.3
30	1.9	....	.2	.60	....	.02	.79	....	.2
31	1.6	....	.2	1.6	....	.09	....	....	....

West Tarkio Creek near Westboro, Mo.—Continued

Suspended sediment, water year October 1935 to September 1936

Day	October: Mean discharge (cfs)	October: Suspended sediment, Mean concentration (ppm)	October: Suspended sediment, Tons per day	November: Mean discharge (cfs)	November: Suspended sediment, Mean concentration (ppm)	November: Suspended sediment, Tons per day	December: Mean discharge (cfs)	December: Suspended sediment, Mean concentration (ppm)	December: Suspended sediment, Tons per day
1	0.69	....	0.1	18	....	81	8.2	....	3.6
2	.60	....	.06	11	....	4.3	4.4	....	.8
3	.60	....	.08	115	....	3,930	6.2	....	1.3
4	.53	....	.06	38	....	195	5.8	....	.6
5	.53	....	.07	19	....	83	7.2	....	.8
6	.53	....	.08	13	....	61	11	....	2.1
7	1.0	....	.1	7.6	....	18	9.3	....	1.3
8	1.0	....	.09	5.8	....	13	7.6	....	.7
9	.89	....	.09	5.2	....	8.4	6.9	....	.7
10	1.4	....	.1	4.4	....	4.8	5.4	....	2.3
11	1.1	....	.1	3.7	....	2.5	5.5	....	.2
12	1.1	....	.07	4.2	....	1.5	5.5	....	.5
13	.89	....	.1	3.9	....	.6	6.5	....	1.8
14	.89	....	.1	3.7	....	.4	5.8	....	.4
15	.79	....	.08	3.9	....	1.1	4.9	....	.2
16	1.0	....	.1	3.9	....	1.1	4.6	....	.1
17	21	....	110	3.3	....	.8	3.9	....	.01
18	8.9	....	16	3.4	....	.4	4.7	....	.3
19	11	....	18	4.4	....	1.0	3.7	....	.2
20	7.6	....	11	3.8	....	1.0	1.9	....	.08
21	3.9	....	3.3	3.7	....	.3	1.6	....	.04
22	2.1	....	1.9	2.7	....	.1	2.1	....	.06
23	1.9	....	1.3	2.5	....	.09	2.4	....	.08
24	1.6	....	.6	4.2	....	.2	2.2	....	.05
25	1.5	....	.3	3.4	....	.1	1.8	....	.04
26	1.6	....	.3	12	....	125	2.1	....	.05
27	1.9	....	.3	29	....	181	1.9	....	.03
28	1.6	....	.1	16	....	22	1.6	....	.01
29	1.5	....	.09	12	....	13	1.5	....	.02
30	1.7	....	.1	12	....	8.7	1.6	....	.01
31	90	....	4,070	....	....	....	1.9	....	.03

Day	January: Mean discharge (cfs)	January: Mean concentration (ppm)	January: Tons per day	February: Mean discharge (cfs)	February: Mean concentration (ppm)	February: Tons per day	March: Mean discharge (cfs)	March: Mean concentration (ppm)	March: Tons per day
1	3.7	....	0.1	3.0	....	0.02	378	....	3,830
2	2.9	....	.08	3.0	....	.02	439	....	6,090
3	3.7	....	.1	2.9	....	.05	402	....	16,000
4	4.2	....	.08	2.9	....	.05	378	....	9,750
5	3.3	....	.09	3.1	....	.4	140	....	1,510
6	3.1	....	.06	3.8	....	.5	75	....	335
7	2.8	....	.05	4.4	....	.6	73	....	282
8	2.7	....	.02	2.5	....	.3	68	....	192
9	2.9	....	.02	2.6	....	.3	57	....	127
10	2.9	....	.02	2.8	....	.2	51	....	102
11	3.1	....	.02	2.9	....	.2	40	....	44
12	3.3	....	.02	2.9	....	.2	33	....	28
13	3.3	....	.02	3.1	....	.2	27	....	18
14	3.1	....	.5	3.0	....	.1	26	....	16
15	3.1	....	.5	2.9	....	.1	23	....	11
16	2.9	....	.09	2.8	....	.1	20	....	13
17	3.1	....	.1	3.1	....	.2	17	....	7.8
18	2.9	....	.2	2.9	....	.1	17	....	5.8
19	2.7	....	.2	2.8	....	.08	17	....	8.3
20	2.5	....	.2	2.8	....	.05	14	....	2.0
21	2.7	....	.2	2.8	....	.07	14	....	2.5
22	3.1	....	.08	2.8	....	.05	14	....	13
23	3.2	....	.2	2.8	....	.2	21	....	122
24	3.3	....	.02	60	....	183	90	....	2,880
25	3.4	....	.1	230	....	765	20	....	122
26	3.4	....	.1	302	....	1,080	16	....	29
27	3.0	....	.1	350	....	977	13	....	10
28	3.0	....	.08	384	....	5,660	13	....	3.8
29	3.0	....	.08	352	....	2,940	11	....	2.1
30	3.0	....	.04	....	....	....	10	....	2.6
31	3.0	....	.04	....	....	....	4.2	....	.6

Note.—Flow affected by ice Dec. 17-19, Jan. 7, 8, 10, 19-21, 23-25, Jan. 27 to Feb. 11, Feb. 13, 14, 16, 19-26.

West Tarkio Creek near Westboro, Mo.—Continued

Suspended sediment, water year October 1935 to September 1936—Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	3.7	....	1.8	397	....	45,600	8.9	....	1.5
2	7.1	....	2.9	46	....	328	7.4	....	1.9
3	4.6	....	1.0	31	....	240	7.1	....	.4
4	12	....	4.9	21	....	38	7.1	....	.7
5	10	....	3.9	17	....	21	260	....	26,500
6	14	....	5.3	16	....	17	157	....	8,420
7	10	....	4.0	13	....	9.1	163	....	3,340
8	9.3	....	2.1	130	....	12,500	23	....	65
9	8.9	....	1.0	330	....	22,200	96	....	6,880
10	8.9	....	.6	105	....	1,460	28	....	131
11	8.2	....	.4	59	....	377	25	....	62
12	7.8	....	.3	342	....	21,000	13	....	29
13	7.1	....	.3	51	....	184	10	....	10
14	6.8	....	.3	34	....	66	9.3	....	5.8
15	5.8	....	.2	33	....	52	8.9	....	3.5
16	5.2	....	.3	26	....	20	7.8	....	1.4
17	5.2	....	.2	24	....	13	7.8	....	2.9
18	5.2	....	.1	23	....	13	6.5	....	.5
19	5.8	....	.1	19	....	5.2	6.8	....	.5
20	6.2	....	.4	18	....	3.2	6.2	....	.6
21	5.2	....	.6	16	....	2.1	5.2	....	.3
22	5.2	....	.2	14	....	1.2	5.2	....	.2
23	5.5	....	.2	26	....	15	5.2	....	.3
24	4.9	....	.1	18	....	6.7	5.2	....	.3
25	4.9	....	.3	17	....	7.3	4.6	....	.3
26	6.2	....	.2	16	....	3.4	3.9	....	.3
27	7.1	....	.2	14	....	2.3	3.7	....	.4
28	723	....	124,000	13	....	1.3	3.4	....	.3
29	121	....	14,500	12	....	1.3	3.3	....	.3
30	62	....	3,250	10	....	.7	4.2	....	.3
31	....	....	....	9.7	....	.9	....	....	....

Day	July			August			September		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1	3.5	....	0.2	0.45	....	0.04	0.45	....	0.1
2	3.3	....	.2	.45	....	.04	1.7	....	.3
3	2.7	....	.2	.46	....	.07	.63	....	.4
4	2.1	....	.1	.53	....	.09	83	....	3,050
5	1.7	....	.1	.84	....	.1	57	....	1,200
6	1.6	....	.07	.69	....	.07	14	....	46
7	1.2	....	.06	.63	....	.07	7.9	....	13
8	1.0	....	.04	.58	....	.06	2.7	....	3.6
9	.93	....	.04	.53	....	.07	1.0	....	1.1
10	.93	....	.04	.45	....	.06	1.6	....	1.2
11	.84	....	.04	.45	....	.06	.84	....	.8
12	.84	....	.05	.41	....	.06	116	....	2,080
13	.84	....	.08	.38	....	.07	106	....	1,400
14	.76	....	.04	.38	....	.07	16	....	57
15	.69	....	.05	.41	....	.07	7.0	....	17
16	.58	....	.05	.41	....	.07	4.5	....	4.5
17	.63	....	.05	.41	....	.1	1.9	....	1.3
18	.63	....	.06	.38	....	.1	3.3	....	2.1
19	.69	....	.07	.45	....	.07	3.8	....	1.0
20	.76	....	.06	13	....	25	1.9	....	2.2
21	.69	....	.05	.69	....	1.0	1.3	....	1.1
22	.69	....	.04	1.0	....	1.0	1.2	....	.7
23	.58	....	.03	1.2	....	.4	1.2	....	.5
24	.49	....	.03	.53	....	.2	.84	....	.2
25	.41	....	.03	.41	....	.1	.63	....	.09
26	.38	....	.03	.38	....	.1	12	....	149
27	.38	....	.03	.35	....	.1	41	....	370
28	.38	....	.02	.41	....	.1	22	....	76
29	.38	....	.02	.35	....	.08	7.9	....	15
30	.41	....	.02	.38	....	.08	5.4	....	4.8
31	.45	....	.01	.38	....	.06	....	....	....

West Tarkio Creek near Westboro, Mo.—Continued

Suspended sediment, water year October 1936 to September 1937

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	3.5	....	1.7	2.5	....	0.1	1.0	....	0.04
2	3.1	....	.8	3.5	....	8.0	1.2	....	.05
3	2.5	....	1.7	2.5	....	.4	1.6	....	.05
4	41	....	1,850	1.9	....	.2	1.3	....	.03
5	332	....	11,400	2.7	....	.4	1.3	....	.03
6	62	....	670	2.7	....	.2	1.3	....	.05
7	16	....	50	2.7	....	.1	.60	....	.03
8	9.2	....	11	1.4	....	.08	.76	....	.02
9	7.0	....	4.7	2.7	....	.1	1.4	....	.06
10	5.8	....	2.2	2.7	....	.2	1.6	....	.05
11	5.1	....	1.1	2.7	....	.2	1.4	....	.05
12	4.5	....	.8	2.5	....	.1	1.4	....	.07
13	3.8	....	.4	2.3	....	.1	1.2	....	.04
14	3.5	....	.4	2.7	....	.2	1.6	....	.03
15	3.5	....	.2	2.1	....	.1	1.9	....	.05
16	3.1	....	.2	1.6	....	.07	2.9	....	.1
17	2.7	....	.2	2.1	....	.1	3.3	....	.2
18	2.7	....	.1	2.1	....	.06	3.1	....	.1
19	2.5	....	.09	1.9	....	.09	3.1	....	.1
20	2.3	....	.09	1.9	....	.05	2.9	....	.08
21	1.9	....	.04	1.6	....	.04	2.5	....	.09
22	1.6	....	.04	1.3	....	.04	1.9	....	.06
23	1.7	....	.04	1.7	....	.2	2.1	....	.05
24	1.9	....	.06	1.2	....	.03	3.8	....	.1
25	1.9	....	.06	1.4	....	.05	9.2	....	7.1
26	2.5	....	.08	1.2	....	.05	14	....	13
27	1.6	....	.05	1.4	....	.04	14	....	89
28	2.1	....	.04	2.5	....	.1	6.4	....	15
29	2.1	....	.04	1.7	....	.06	5.4	....	13
30	1.9	....	.04	1.2	....	.03	30	....	998
31	2.1	....	.04	....	....	....	45	....	1,060
	January			February			March		
1	12	....	133	0.07	....	t	6.1	....	1.2
2	4.8	....	52	.07	....	t	433	....	12,100
3	2.7	....	12	.06	....	.01	711	....	24,600
4	2.5	....	6.8	.06	....	.01	821	....	37,900
5	2.7	....	5.0	.06	....	.01	310	....	17,400
6	2.3	....	2.3	.06	....	.01	131	....	5,650
7	.03	....	.2	.05	....		41	....	848
8	.41	....	.02	.05	....	t	20	....	188
9	.35	....	.02	.05	....		10	....	40
10	.35	....	.01	.05	....		7.7	....	18
11	.33	....	.01	17	....	24	6.2	....	9.2
12	.33	....	.02	276	....	2,130	5.9	....	6.5
13	.33	....	.02	534	....	5,540	6.2	....	4.4
14	.35	....	.01	388	....	804	2.2	....	.3
15	.38	....	.01	153	....	106	3.3	....	.4
16	.37	....	.01	270	....	3,420	4.6	....	.6
17	.31	....	.01	423	....	5,300	5.4	....	4.5
18	.25	....	.01	552	....	10,800	5.4	....	3.6
19	.23	....	.01	690	....	7,700	7.1	....	6.2
20	.20	....	.01	214	....	1,280	11	....	42
21	.18	....	.01	15	....	11	8.0	....	9.5
22	.16	....	.01	6.5	....	9.9	7.1	....	8.5
23	.15	....	.01	7.8	....	3.4	10	....	54
24	.14	....	.01	6.2	....	4.1	23	....	304
25	.13	....	.01	4.4	....	2.5	17	....	81
26	.12	....	.01	3.1	....	.7	15	....	62
27	.11	....	.01	2.9	....	.3	8.7	....	17
28	.10	....	.01	3.7	....	.4	9.5	....	42
29	.10	....		....	....	....	8.3	....	14
30	.09	....	t	....	....	....	6.8	....	6.5
31	.08	....		....	....	....	7.7	....	9.4

t Sediment discharge less than 0.005 ton.

Note.—Flow affected by ice Jan. 16 to Mar. 4.

West Tarkio Creek near Westboro, Mo.—Continued

Suspended sediment, water year October 1936 to September 1937—Continued

Day	April			May			June		
		Suspended sediment			Suspended sediment			Suspended sediment	
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1	7.7	....	10	5.9	....	4.0	12	....	158
2	8.0	....	6.5	10	....	86	8.7	....	62
3	8.0	....	6.6	25	....	536	14	....	66
4	6.8	....	6.2	18	....	178	8.3	....	30
5	5.6	....	3.2	13	....	81	12	....	196
6	4.9	....	2.0	42	....	1,050	49	....	2,260
7	31	....	714	60	....	3,680	9.5	....	80
8	38	....	676	9.9	....	49	4.5	....	19
9	28	....	188	7.1	....	27	6.8	....	17
10	19	....	62	7.1	....	3.3	4.9	....	5.1
11	16	....	27	6.2	....	7.7	4.7	....	2.5
12	14	....	17	5.4	....	.7	4.3	....	1.4
13	12	....	10	4.1	....	.3	170	....	12,700
14	9.5	....	7.8	3.1	....	.09	62	....	1,650
15	6.2	....	4.9	4.1	....	1.0	34	....	832
16	5.9	....	3.0	3.8	....	.5	589	....	22,200
17	5.9	....	5.6	3.8	....	.7	39	....	850
18	5.1	....	.7	2.9	....	1.3	11	....	49
19	5.1	....	.6	3.1	....	1.0	7.1	....	17
20	70	....	16,600	118	....	21,400	5.9	....	5.3
21	40	....	3,430	596	....	49,000	4.9	....	20
22	8.7	....	141	100	....	5,180	4.3	....	.4
23	103	....	21,000	14	....	130	3.3	....	.2
24	37	....	2,560	9.1	....	22	2.0	....	.1
25	16	....	271	9.1	....	10	2.7	....	.2
26	12	....	55	204	....	13,800	4.5	....	23
27	9.1	....	14	369	....	11,200	2.7	....	.5
28	8.7	....	9.0	18	....	232	2.2	....	.3
29	7.7	....	5.9	12	....	36	1.9	....	.3
30	7.1	....	5.4	9.5	....	13	1.9	....	.2
31	....	....	....	64	....	2,670	....	....	....

Day	July			August			September		
1	1.7	....	0.2	2.9	....	2.1	0.14	....	0.02
2	1.6	....	.2	2.7	....	1.2	.17	....	.02
3	1.3	....	.2	1.9	....	.2	.21	....	.03
4	1.0	....	.2	1.6	....	.2	.29	....	.03
5	.80	....	.1	1.4	....	.9	.17	....	.02
6	.63	....	.08	1.0	....	.08	.25	....	.02
7	.54	....	.05	1.0	....	.06	.25	....	.04
8	.47	....	.05	1.1	....	.08	.21	....	.02
9	.41	....	.04	.74	....	.05	.14	....	.02
10	.29	....	.03	.47	....	.02	.17	....	.03
11	.41	....	.02	.54	....	.03	.17	....	.02
12	45	....	1,760	.54	....	.04	.17	....	.02
13	17	....	200	.63	....	.04	.14	....	.01
14	85	....	3,420	.54	....	.04	.17	....	.02
15	77	....	2,140	.29	....	.03	.14	....	.01
16	24	....	690	.29	....	.02	.14	....	.02
17	4.5	....	10	.29	....	.03	.17	....	.01
18	11	....	38	.29	....	.02	.21	....	.01
19	450	....	15,200	19	....	780	.21	....	.03
20	227	....	2,120	27	....	765	.25	....	.05
21	31	....	326	2.9	....	6.7	.25	....	.02
22	6.2	....	23	1.0	....	1.1	.21	....	.03
23	4.1	....	8.5	.86	....	.3	.35	....	.06
24	22	....	1,060	.63	....	.1	.54	....	.08
25	4.3	....	2.3	.47	....	.04	.35	....	.02
26	3.6	....	.7	.54	....	.09	.21	....	.02
27	3.3	....	.5	.41	....	.05	.17	....	.02
28	1.9	....	.3	.35	....	.3	.41	....	.08
29	758	....	163,000	.29	....	.63	.29	....	.05
30	197	....	15,000	.35	....	.04	.17	....	.02
31	4.9	....	9.3	.25	....	.03	....	....	....

West Tarkio Creek near Westboro, Mo.—Continued

Suspended sediment, water year October 1937 to September 1938

Day	October: Mean discharge (cfs)	October: Suspended sediment, Mean concentration (ppm)	October: Suspended sediment, Tons per day	November: Mean discharge (cfs)	November: Suspended sediment, Mean concentration (ppm)	November: Suspended sediment, Tons per day	December: Mean discharge (cfs)	December: Suspended sediment, Mean concentration (ppm)	December: Suspended sediment, Tons per day
1	0.17	....	0.02	0.29	....	0.02	0.41	....	t
2	.21	....	.04	.29	....	.03	.47	....	.01
3	.17	....	.02	.29	....	.03	1.1	....	.01
4	.14	....	.02	.35	....	.02	.63	....	.02
5	.14	....	.02	.47	....	.01	.21	....	
6	.14	....	.01	.47	....	.03	.03	....	
7	.14	....	.01	.54	....	.03	.10	....	
8	.25	....	.02	.63	....	.06	.05	....	
9	.54	....	.03	.54	....	.02	.01	....	
10	.35	....	.02	.47	....	.02	.01	....	
11	.21	....	.02	.47	....	.02	.01	....	
12	.29	....	.03	.47	....	.01	.05	....	
13	.29	....	.01	.35	....	.02	.03	....	
14	.25	....	.01	.21	....	.01	.05	....	t
15	.29	....	.02	.25	....	.01	.12	....	
16	.74	....	.03	.21	....	.01	.10	....	
17	2.0	....	.4	.14	....	.01	.10	....	
18	.86	....	.07	.12	....		.14	....	
19	.63	....	.04	.14	....		.21	....	
20	.47	....	.03	.08	....		.25	....	
21	.35	....	.02	.03	....	t	.25	....	
22	.25	....	.01	.06	....		.47	....	
23	.25	....	.01	.08	....		.54	....	
24	.35	....	.02	.17	....		.54	....	.01
25	.41	....	.02	.63	....	.01	.47	....	
26	.35	....	.02	1.1	....	.01	.29	....	t
27	.29	....	.01	.86	....	.07	.41	....	
28	.35	....	.03	.41	....	.1	.47	....	.01
29	.35	....	.02	.29	....	.01	.86	....	.01
30	.35	....	.02	.29	....	t	1.6	....	.04
31	.29	....	.02	....	....	....	2.2	....	.1

Day	January: Mean discharge (cfs)	January: Mean concentration (ppm)	January: Tons per day	February: Mean discharge (cfs)	February: Mean concentration (ppm)	February: Tons per day	March: Mean discharge (cfs)	March: Mean concentration (ppm)	March: Tons per day
1	1.1	....	0.01	0.05	....		2.4	....	2.5
2	.74	....		.10	....	t	3.3	....	5.7
3	.54	....		.10	....		2.2	....	2.3
4	.54	....		.54	....	.01	1.7	....	.8
5	.47	....		3.1	....	2.9	1.0	....	.4
6	.41	....		1.3	....	.7	.47	....	.02
7	.21	....		.54	....	.2	.86	....	.07
8	.08	....	t	1.6	....	.2	1.0	....	.06
9	.08	....		1.9	....	2.0	2.7	....	3.0
10	.12	....		.29	....	.08	2.7	....	2.6
11	.14	....		.63	....	.1	1.4	....	.6
12	.14	....		1.9	....	.7	1.6	....	.3
13	.14	....		2.5	....	2.1	1.4	....	.2
14	.14	....		.54	....	.05	1.0	....	.07
15	.21	....		.10	....	.01	1.1	....	.2
16	.29	....	.02	.21	....	.01	.86	....	.1
17	.35	....		.54	....	.02	.47	....	.01
18	.47	....	t	.54	....	.02	.41	....	.02
19	.54	....		.29	....	t	.35	....	.03
20	.63	....		.35	....	t	.29	....	.02
21	.63	....	.01	.74	....	.01	.17	....	.03
22	.86	....	.01	.74	....	.02	.14	....	.01
23	1.0	....	.01	.63	....	.01	.17	....	.06
24	.63	....	.02	.63	....	.01	.14	....	.01
25	.74	....	.02	.74	....	.1	.10	....	t
26	.08	....		2.0	....	.1	.10	....	.01
27	.05	....		3.8	....	1.3	.12	....	t
28	.06	....	t	3.6	....	6.6	.21	....	.01
29	.10	....		....	....	....	.47	....	.04
30	.14	....		....	....	....	.54	....	.1
31	.08	....	.01	....	....	....	.25	....	.01

t Sediment discharge less than 0.005 ton.

West Tarkio Creek near Westboro, Mo.—Continued

Suspended sediment, water year October 1937 to September 1938—Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	0.17		0.01	0.86		0.4	65		5,000
2	.21		.01	.47		.1	40		1,850
3	.25		t	.29		.1	24		694
4	.25		.02	78		11,500	5.6		51
5	.41		.07	50		3,030	2.9		19
6	8.4		540	18		520	2.0		7.3
7	1.9		13	77		6,060	1.1		2.3
8	3.5		11	49		1,460	.74		.9
9	6.1		20	12		103	.41		.1
10	6.2		25	5.1		18	48		298
11	3.6		7.7	3.3		6.3	692		88,600
12	1.1		.7	3.6		8.1	92		3,920
13	.54		.2	2.2		1.7	13		122
14	.47		.3	2.4		2.2	96		11,100
15	17		5,500	1.3		.4	16		198
16	40		4,700	1.0		.3	146		13,300
17	14		402	7.4		38	9.9		25
18	9.1		129	2.7		1.8	4.5		2.6
19	4.1		39	4.3		8.6	3.3		1.1
20	1.7		7.3	22		4,080	2.4		.3
21	1.0		3.4	8.0		62	2.0		.2
22	.47		.4	4.3		16	1.7		.2
23	.35		.06	2.2		7.4	1.4		.07
24	.54		.1	1.3		1.7	1.1		.07
25	.35		.03	41		4,140	1.1		.1
26	.21		.02	3.5		26	1.1		.06
27	.41		.1	1.1		1.1	.63		.04
28	2.0		18	15		322	.47		.04
29	1.4		1.1	4.7		31	.35		.03
30	1.9		.9	2.4		6.4	.35		.04
31				34		2,460			

Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	0.25		0.04	0.35		0.1	47		381
2	.63		.2	.17		.02	18		55
3	.25		.02	.12		.01	6.5		6.9
4	.14		.01	.10		.02	3.3		2.1
5	.12		.02	.08		.01	62		2,660
6	.29		.06	54		2,570	5.1		14
7	16		890	1.0		3.4	2.7		2.2
8	.47		.2	.74		.8	1.9		.3
9	.21		.06	.47		.8	2.7		.5
10	.17		.05	.14		.09	157		12,200
11	.14		.04	.12		.08	142		4,100
12	.14		.02	.08		.02	126		1,840
13	.17		.04	.06		.01	202		7,620
14	.14		.03	3.0		18	89		1,120
15	.14		.02	8.4		45	20		59
16	.21		.04	2.0		3.9	8.3		9.0
17	1.1		.1	.63		.3	5.9		3.6
18	.29		.04	.29		.1	4.5		1.9
19	.25		.03	.21		.1	3.8		.8
20	.17		.01	433		30,000	3.5		.3
21	.25		.1	147		3,620	2.9		.2
22	.35		.04	68		696	2.7		.1
23	.25		.03	12		25	2.4		.2
24	.14		.02	4.1		4.2	2.2		.1
25	.14		.01	2.0		1.2	2.0		.08
26	.29		.02	1.1		.4	1.7		.05
27	.47		.05	.74		.2	1.4		.05
28	.21		.02	99		6,200	1.3		.06
29	.14		.02	248		4,560	1.1		.04
30	.35		.08	42		160	1.0		.04
31	1.9		.8	22		74			

t Sediment discharge less than 0.005 ton.

West Tarkio Creek near Westboro, Mo.—Continued

Suspended sediment, water year October 1938 to September 1939

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	1.1	....	0.09	0.74	....	0.03	1.0	....	0.01
2	1.0	....	.06	1.6	....	.2	1.7	....	.05
3	.86	....	.03	22	....	222	2.4	....	.2
4	.74	....	.09	9.1	....	21	2.5	....	.3
5	.74	....	.03	13	....	23	2.7	....	.4
6	.74	....	.05	5.4	....	6.6	1.7	....	.2
7	.74	....	.07	3.6	....	2.2	1.9	....	.6
8	.74	....	.05	2.4	....	.8	2.0	....	.5
9	.74	....	.05	2.5	....	.8	.86	....	.07
10	.54	....	.02	2.0	....	.6	1.3	....	.1
11	.74	....	.02	2.0	....	.2	1.6	....	.1
12	1.1	....	.1	2.0	....	.2	.47	....	.03
13	.74	....	.04	1.9	....	.1	.47	....	.04
14	.47	....	.02	1.6	....	.05	.54	....	.06
15	.41	....	.09	1.6	....	.07	.86	....	.05
16	.47	....	.03	1.6	....	.06	1.1	....	.06
17	.41	....	.04	1.4	....	.05	.63	....	.03
18	.47	....	.03	1.3	....	.08	.63	....	.02
19	.47	....	.05	1.1	....	.03	.74	....	.03
20	.54	....	.01	1.4	....	.05	.74	....	.01
21	.54	....	.02	1.1	....	.07	.54	....	.01
22	.54	....	.05	.47	....	.02	.41	....	.01
23	.47	....	.02	.35	....	.01	.74	....	.02
24	.54	....	.02	.25	....	.01	.74	....	.01
25	.54	....	.02	.25	....	.01	1.0	....	.02
26	.54	....	.02	.21	....	.01	.86	....	.03
27	.47	....	.02	.08	....		.35	....	.02
28	.47	....	.02	.14	....	t	.21	....	.01
29	.47	....	.02	.35	....		.17	....	.01
30	.54	....	.01	.54	....	.01	.08	....	t
31	.54	....	.02	....	....	....	.10	....	t
	January			**February**			**March**		
1	0.17	....	0.02	2.4	....	0.03	1.7	....	0.3
2	.25	....	.01	2.0	....	.05	1.7	....	.3
3	.74	....	.03	1.1	....	.01	1.9	....	.3
4	2.7	....	.1	.74	....	.02	2.0	....	.3
5	2.4	....	.1	1.3	....	.01	2.2	....	.7
6	1.3	....	.2	1.6	....	.01	4.9	....	1.9
7	1.6	....	.2	1.7	....	.03	20	....	31
8	2.0	....	.3	.4	....	.02	507	....	21,900
9	4.9	....	.5	.2	....	.01	362	....	15,200
10	2.2	....	.8	.1	....	.04	374	....	14,800
11	1.3	....	.4	.01	....	t	1,670	....	134,000
12	1.1	....	.1	.08	....	.02	2,020	....	81,800
13	1.4	....	.3	1.0	....	.5	213	....	3,760
14	1.3	....	.4	3.6	....	2.4	36	....	676
15	.54	....	.07	2.2	....	1.1	21	....	87
16	.5	....	.06	1.0	....	.3	16	....	35
17	.4	....	.02	5.0	....	4.0	13	....	20
18	.3	....	.01	6.5	....	4.4	11	....	21
19	.41	....	.01	6.2	....	5.5	10	....	22
20	.54	....	.01	3.1	....	2.3	9	....	16
21	1.0	....	.01	2.5	....	1.2	8	....	7.5
22	.63	....	.01	2.2	....	1.1	7	....	6.4
23	.41	....	.01	2.7	....	1.4	6	....	5.6
24	.41	....	t	4.3	....	1.8	5	....	7.8
25	.54	....	t	3.5	....	1.8	4.8	....	4.3
26	.74	....	.01	3.3	....	1.1	3.8	....	2.5
27	.86	....	t	2.9	....	.9	4.0	....	1.5
28	1.4	....	.02	2.4	....	.7	3.8	....	.8
29	1.9	....	.07	....	....	....	4.3	....	1.0
30	1.9	....	.04	....	....	....	4.6	....	2.6
31	2.0	....	.05	....	....	....	4.0	....	1.3

t Sediment discharge less than 0.005 ton.

Note.—Artificial control washed out March 1939; records based on wire-weight readings, frequent discharge measurements, and high-water marks. Flow affected by ice Jan. 16-18, Feb. 8-10, 21-23, Mar. 2.

West Tarkio Creek near Westboro, Mo.—Continued

Suspended sediment, water year October 1938 to September 1939—Continued

Day	April: Mean discharge (cfs)	April: Suspended sediment: Mean concentration (ppm)	April: Suspended sediment: Tons per day	May: Mean discharge (cfs)	May: Suspended sediment: Mean concentration (ppm)	May: Suspended sediment: Tons per day	June: Mean discharge (cfs)	June: Suspended sediment: Mean concentration (ppm)	June: Suspended sediment: Tons per day
1	4.3	....	2.4	1.3	....	0.09	0.90	....	0.5
2	3.8	....	2.0	.69	....	.04	22	....	2,020
3	2.0	....	.8	1.0	....	.04	2.3	....	25
4	17	....	870	1.3	....	.07	1.1	....	3.0
5	15	....	620	1.3	....	.05	.69	....	1.5
6	5.4	....	12	1.1	....	.05	.60	....	.5
7	4.6	....	5.9	.90	....	.04	31	....	5,100
8	3.5	....	4.2	1.3	....	.05	76	....	7,310
9	3.8	....	2.6	.90	....	.04	343	....	36,900
10	4.8	....	10	.90	....	.04	328	....	31,000
11	3.8	....	1.9	.79	....	.04	157	....	3,240
12	3.5	....	1.4	.79	....	.04	23	....	272
13	3.3	....	.8	.79	....	.05	30	....	510
14	3.3	....	.7	.79	....	.04	50	....	718
15	6.0	....	23	.70	....	.03	12	....	116
16	3.5	....	3.6	.69	....	.03	5.1	....	22
17	4.8	....	23	122	....	24,400	2.9	....	6.6
18	9.1	....	37	13	....	880	60	....	8,800
19	6.6	....	6.1	1.9	....	10	137	....	6,480
20	6.0	....	4.6	1.9	....	1.6	181	....	9,860
21	4.6	....	3.0	1.0	....	1.3	723	....	51,000
22	3.8	....	.6	1.1	....	.6	752	....	34,400
23	2.4	....	.3	1.0	....	.3	78	....	940
24	1.7	....	.2	.90	....	.2	22	....	87
25	1.9	....	.1	5.4	....	398	63	....	3,200
26	1.6	....	.09	30	....	4,700	18	....	74
27	1.7	....	.08	18	....	1,730	14	....	20
28	1.3	....	.05	4.6	....	26	11	....	12
29	1.1	....	.06	2.4	....	2.8	7.3	....	4.5
30	1.0	....	.09	1.4	....	.8	6.3	....	2.1
31	....	....	....	1.0	....	.3	....	....	....

Day	July: Mean discharge (cfs)	July: Mean concentration (ppm)	July: Tons per day	August: Mean discharge (cfs)	August: Mean concentration (ppm)	August: Tons per day	September: Mean discharge (cfs)	September: Mean concentration (ppm)	September: Tons per day
1	6.6	....	4.1	2.3	....	2.6	0.31	....	0.01
2	6.3	....	2.7	1.3	....	.9	.52	....	.02
3	5.1	....	2.0	1.0	....	.2	.37	....	.04
4	203	....	14,000	1.1	....	.2	.17	....	.01
5	76	....	1,000	.90	....	.1	.17	....	t
6	246	....	4,230	.69	....	.1	.17	....	.01
7	27	....	155	33	....	2,050	.14	....	.01
8	13	....	34	55	....	1,470	.14	....	.01
9	8.7	....	6.5	13	....	32	.14	....	.01
10	6.6	....	3.7	13	....	55	.21	....	.01
11	4.3	....	.3	4.0	....	5.7	.17	....	.01
12	3.3	....	.3	113	....	1,760	.11	....	}
13	2.6	....	.04	32	....	76	.09	....	}
14	2.3	....	.03	4.0	....	4.3	.07	....	}
15	2.3	....	.1	3.3	....	1.9	.11	....	} t
16	1.9	....	.05	3.1	....	2.6	.11	....	}
17	3.3	....	1.0	2.4	....	.4	.09	....	}
18	2.4	....	.08	1.4	....	.08	.11	....	}
19	2.1	....	.03	1.4	....	.04	.14	....	.01
20	5.6	....	9.6	1.4	....	.02	.17	....	}
21	5.4	....	9.2	1.3	....	.02	.17	....	} t
22	2.3	....	1.9	1.3	....	.09	.21	....	}
23	1.1	....	.6	2.1	....	.08	.21	....	.01
24	.79	....	.6	1.1	....	.01	.21	....	.01
25	108	....	7,000	3.1	....	.2	.17	....	.01
26	17	....	113	1.3	....	.04	.17	....	.01
27	9.8	....	3.9	.90	....	.04	.21	....	t
28	81	....	5,600	.69	....	.02	.25	....	.01
29	5.4	....	17	.52	....	.03	.52	....	.03
30	10	....	51	.52	....	.03	.37	....	.01
31	4.0	....	9.1	.44	....	.03	....	....	....

t Sediment discharge less than 0.005 ton.

Note.—Artificial control washed out March 1939; records based on wire-weight readings, frequent discharge measurements, and high-water marks.

West Tarkio Creek near Westboro, Mo.—Continued

Suspended sediment, October 1939 to June 1940

Day	October Mean discharge (cfs)	October Mean concentration (ppm)	October Tons per day	November Mean discharge (cfs)	November Mean concentration (ppm)	November Tons per day	December Mean discharge (cfs)	December Mean concentration (ppm)	December Tons per day
1	0.2			0.3			1.9		0.03
2	.2			.2			.9		
3	.2			.4			.7		
4	.2			.3			.7		
5	.2		t	.4			.6		
6	.1			.4			.6		
7	.2			.4			.6		
8	.2			.4			.6		
9	3.1		.2	.4			.6		
10	1.1		.01	.6			.5		t
11	.5			.5			.4		
12	.3			.4			.4		
13	.2			.4			.4		
14	.1			.4			.2		
15	.2			.3		t	.4		
16	.2			.3			.5		
17	.2			.4			.5		
18	.2			.4			.5		
19	.2			.5			.5		.01
20	.2			.4			.4		.02
21	.2		t	.2			.4		.02
22	.2			.4			.3		.01
23	.3			.4			.3		.01
24	.3			.5			.4		.01
25	.3			.5			.5		t
26	.3			.5			.6		.01
27	.3			.5			.7		.02
28	.3			.5			.6		
29	.3			.5			.5		t
30	.3			1.1		.01	.4		
31	.3						.2		.02

Day	January Mean discharge (cfs)	January Mean concentration (ppm)	January Tons per day	February Mean discharge (cfs)	February Mean concentration (ppm)	February Tons per day	March Mean discharge (cfs)	March Mean concentration (ppm)	March Tons per day
1	0.2		0.1	0.8		0.01	2.1		0.6
2	.2		.05	.6		.01	.7		13
3	.1		t	1.0			9		9.5
4	.1		.02	1.0			9		8.9
5	.1		.03	1.7		t	10		14
6	.1		.02	1.6			13		37
7	.1		.01	1.3		.05	13		57
8	.1		.02	1.0		.03	17		87
9	.1		.07	1.0		.04	17		79
10	.2		.05	1.0		.05	15		85
11	.4		.05	1.0		.06	14		37
12	.6		.06	1.0		.03	12		32
13	.7		.05	1.6		.03	9		25
14	.7		.09	2.1		.1	9		18
15	.8		.1	2.6		.2	6		16
16	.7		.1	2.6		.2	13		75
17	.7		.09	2.6		.1	19		152
18	.6		.08	2.6		.1	22		183
19	.3		.04	2.6		.2	19		122
20	.2		.03	2.3		.3	13		38
21	.2		.07	1.3		.3	10		15
22	.1		.01	.9		.4	6		4.1
23	.1		.01	.6		.1	4.8		2.0
24	.1		.01	.4		.05	6		2.9
25	.2		.01	.3		.08	3.5		2.1
26	.3		.01	.9		.2	3.5		1.7
27	.4		.02	1.1		.2	3.3		1.7
28	.9		.05	1.1		.2	6		5.1
29	1.0		.4	1.1		.2	4.8		2.4
30	1.0		.4				4.6		1.3
31	.9		.06				3.8		.7

t Sediment discharge less than 0.005 ton.

Note.—Artificial control washed out March 1939; records based on wire-weight readings, frequent discharge measurements, and high-water marks. Flow affected by ice Nov. 2-5, Dec. 13-16, Dec. 20 to Mar. 16.

West Tarkio Creek near Westboro, Mo.—Continued

Suspended sediment, October 1939 to June 1940—Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	3.8	....	0.4	18	....	62	1.0	....	0.1
2	3.3	....	.2	12	....	14	.5	....	.08
3	1.9	....	.09	9	....	8.8	.5	....	.1
4	1.7	....	.06	9	....	4.8	3.8	....	80
5	1.6	....	.08	7	....	3.0	2.9	....	4.6
6	1.6	....	2.6	7	....	4.6	2.6	....	1.9
7	5	....	2.4	7	....	1.1	3.1	....	4.7
8	4.6	....	1.2	7	....	.8	1.7	....	.5
9	4.3	....	.5	7	....	.6	.9	....	.2
10	4.6	....	.5	7	....	.2	.9	....	.1
11	2.9	....	.4	5	....	.2	2.1	....	.4
12	1.4	....	.1	4.8	....	.1	3.3	....	1.3
13	1.9	....	.1	3.8	....	.1	2.1	....	.5
14	1.9	....	.08	3.1	....	.08	1.7	....	.2
15	2.1	....	.06	3.5	....	.1	1.6	....	.2
16	1.7	....	.1	2.9	....	.08	.9	....	.08
17	4.6	....	1.8	3.3	....	.1	.6	....	.05
18	2.6	....	.1	11	....	56	.3	....	.03
19	2.1	....	.06	8	....	3.7	.2	....	.02
20	2.1	....	.08	28	....	825	1.7	....	.9
21	2.1	....	.06	9	....	39	1.1	....	.4
22	2.6	....	.3	9	....	27	.8	....	.08
23	4.6	....	1.7	3.8	....	27	1.7	....	.5
24	2.9	....	.1	2.9	....	8.8	4.3	....	20
25	4.3	....	1.1	2.4	....	2.8	15	....	49
26	12	....	59	2.3	....	.9	3.8	....	9.6
27	17	....	89	2.3	....	.5	2	....	4.9
28	24	....	550	2.3	....	.4	1.1	....	1.4
29	42	....	882	2.1	....	.2	3.3	....	5.0
30	36	....	582	2.1	....	.4	2.9	....	9.2
31	....	....	....	1.7	....	.2	....	....	....

Note.—Artificial control washed out March 1939; records based on wire-weight readings, frequent discharge measurements, and high-water marks.

West Tarkio Creek near Westboro, Mo.—Continued

Monthly discharge for calendar and water years 1934 to 1940

Month	Water discharge (cfs-days)	Suspended sediment						
		Load (tons)	Daily loads (tons)			Tons per sq. mi.	Acre-feet (a)	Concentration (ppm) Weighted mean
			Max.	Min.	Mean			
April 1934	54.0	13.27	5.2	0.05	0.4	0.13	0.01	91
May	127.43	3,794.82	2,660	.01	122	36.1	3.2	11,000
June	42.48	3,831.18	2,110	t	128	36.5	3.2	33,400
July	2.32	.66	.2	t	.02	.006	.0006	105
August	1.53	.18	.01	t	.006	.002	.0002	44
September	197.02	2,591.39	1,280	.02	86	24.7	2.2	4,870
October 1934	525.84	24,516.86	22,300	t	791	233.5	20	17,300
November	107.66	730.34	171	.02	24	6.96	.6	2,510
December	64.48	8.85	1.4	.01	.3	.08	.007	51
January 1935	322.4	5,662.54	5,370	.01	183	53.9	4.7	6,510
February	207.31	918.16	401	.02	33	8.74	.8	1,640
March	145.93	356.16	99	.02	11	3.39	.3	904
April	28.71	2.31	.6	.01	.08	.02	.002	30
May	869.71	53,709.45	29,600	.02	1,740	512.4	45	22,900
June	3,275.9	148,916.1	54,500	1.1	4,960	1,418	124	16,800
July	388.0	5,991.0	4,030	.2	193	57.1	5.0	5,720
August	26.43	2.65	.3	.02	.09	.03	.002	37
September	73.11	205.25	105	.04	6.8	2.81	.2	1,500
Water year 1934-35	6,035.48	241,199.67	54,500	t	661	2,297	201	14,800
October 1935	171.64	4,234.94	4,070	.06	137	40.3	3.5	9,140
November	372.70	4,750.30	3,930	.09	159	45.3	4.0	4,730
December	139.70	18.48	3.6	.03	.6	.18	.02	49
Calendar year 1935	6,021.54	224,956.43	54,500	0.01	616	2,142	188	13,800
January 1936	96.3	3.48	.2	.02	.1	.03	.003	13
February	1,809.6	12,509.09	5,660	.02	431	119.1	10	2,560
March	2,617.2	41,569.5	16,000	.6	1,340	395.9	35	5,880
April	1,096.8	141,781.9	124,000	.1	4,730	1,350	118	47,900
May	1,894.7	104,188.7	45,600	.7	3,360	992.3	87	20,400
June	902.7	45,459.7	26,600	.2	1,520	432.9	38	18,700
July	31.46	1.91	.2	.01	.06	.02	.002	22
August	28.36	29.59	25	.04	1.0	.28	.02	386
September	525.59	9,404.89	3,050	.09	313	89.6	7.9	6,630
Water year 1935-36	9,683.75	363,961.57	124,000	0.01	994	3,466	304	13,900
October 1936	538.0	13,996.21	11,400	.04	451	133.3	12	9,640
November	62.4	11.49	8.0	.03	.4	.11	.01	68
December	169.25	2,194.0	1,060	.02	71	20.9	1.8	4,800
Calendar year 1936	9,769.36	371,151.06	124,000	0.01	1,010	3,535	310	14,100
January 1937	33.48	211.55	133	t	6.8	2.01	.2	2,340
February	3,567.18	37,136.34	10,800	t	1,330	353.7	31	3,860
March	2,675.1	99,436.8	37,900	.3	3,210	947.0	83	13,800
April	556.0	46,742.4	21,900	.6	1,560	445.2	39	31,100
May	1,817.9	109,416.56	40,000	.06	3,530	1,042	91	22,300
June	1,088.0	41,251.5	22,200	.1	1,380	392.9	34	14,000
July	1,986.01	205,018.77	163,000	.02	6,610	1,953	171	38,200
August	72.27	1,558.11	780	.02	50	14.8	1.3	7,990
September	6.72	.85	.08	.01	.03	.008	.0007	47
Water year 1936-37	12,572.31	556,969.18	163,000	t	1,530	5,304	465	16,400

t Sediment discharge less than 0.005 ton.
a Computed using a specific weight of 55 pounds per cubic foot.

West Tarkio Creek near Westboro, Mo.—Continued

Monthly discharge for calendar and water years 1934 to 1940—Continued

Month	Water discharge (cfs-days)	Suspended sediment						
		Load (tons)	Daily loads (tons)			Tons per sq. mi.	Acre-feet (a)	Concentration (ppm) Weighted mean
			Max.	Min.	Mean			
October 1937	11.87	1.07	0.4	0.01	0.03	0.01	0.0009	33
November	10.70	.56	.1	t	.02	.005	.0005	19
December	12.18	.21	.1	t	.007	.002	.0002	6
Calendar year 1937	11,837.41	540,768.72	163,000	t	1,480	5,150	451	16,000
January 1938	11.71	.11	.02	t	.004	.001	.00009	3
February	30.0	17.25	6.6	t	.6	.16	.01	213
March	30.22	19.28	5.7	t	.6	.18	.02	236
April	127.63	11,419.42	5,500	t	381	108.8	9.5	33,100
May	458.42	33,912.6	11,500	.1	1,090	323.0	28	27,400
June	1,281.05	125,192.45	88,600	.03	4,170	1,192	104	36,200
July	25.77	892.22	890	.01	29	8.50	.7	12,800
August	1,150.9	47,983.76	30,000	.01	1,550	457.0	40	15,400
September	929.9	30,077.52	12,200	.04	1,000	286.5	25	12,000
Water year 1937-38	4,080.35	249,516.45	88,600	t	684	2,370	208	22,600
October 1938	19.42	1.21	.1	.01	.04	.01	.001	23
November	81.98	278.26	222	t	9.3	2.65	.2	1,260
December	31.04	3.00	.6	t	.1	.03	.003	36
Calendar year 1938	4,178.04	249,797.08	88,600	t	684	2,379	209	22,100
January 1939	37.84	3.86	.8	t	.1	.04	.003	38
February	64.03	30.75	5.5	t	1.1	.29	.03	178
March	5,351.7	272,413.1	134,000	.3	8,790	2,594	227	18,900
April	136.7	1,636.57	870	.05	55	15.6	1.4	4,430
May	220.93	32,152.64	24,400	.03	1,040	306.2	27	53,900
June	3,067.19	202,124.7	51,000	.5	6,740	1,925	169	24,400
July	963.19	32,290.93	14,000	.03	1,040	307.5	27	12,400
August	300.56	5,462.73	2,050	.01	176	52.0	4.6	6,730
September	6.00	.29	.08	t	.01	.003	.0002	18
Water year 1938-39	10,280.58	540,308.04	134,000	t	1,500	5,204	456	19,700
October 1939	11.1	.24	.2	t	.008	.002	.0002	8
November	12.9	.04	.01	t	.001	.0004	.00003	1
December	16.8	.18	.03	t	.006	.002	.0002	4
Calendar year 1939	10,188.04	546,116.03	134,000	t	1,500	5,201	456	19,900
January 1940	12.2	2.11	.4	t	.07	.02	.002	64
February	30.7	3.26	.4	t	.1	.03	.003	39
March	304.4	1,128.0	183	.6	36	10.7	.9	1,370
April	203.2	2,182.17	882	.06	73	20.8	1.8	3,980
May	203.3	1,092.56	825	.08	35	10.4	.9	1,990
June	68.4	196.04	80	.02	6.5	1.87	.2	1,060

t Sediment discharge less than 0.005 ton.
a Computed using a specific weight of 55 pounds per cubic foot.

Honey Creek near Russell, Iowa

LOCATION.—On downstream side of county bridge, at gaging station, 0.7 mile upstream from mouth and Chariton River, and 5.5 miles southeast of Russell, Lucas County.

DRAINAGE AREA.—13.8 square miles.

RECORDS AVAILABLE.—Sediment records: June 1952 to September 1954.

EXTREMES, water years 1952 to 1954 given in following table:

Water year	Daily suspended sediment							
	Concentrations (ppm)				Loads (tons)			
	Max.	Date	Min.	Date	Max.	Date	Min.	Date
1951-52(a)	9,840	June 20	....	....	e2,500	June 21	0	Many days
1952-53	1,500	June 8	....	....	970	Mar. 30	0	Many days
1953-54	2,400	April 26	....	....	940	April 26	0	Many days

e Estimated.
a June to September.

EXTREMES, 1952-54.—Sediment concentrations: Maximum daily, 9,840 ppm June 20, 1952; minimum daily, no flow many days each year.

Sediment loads: Maximum daily, 2,500 tons (estimated) June 21, 1952; minimum daily, 0 ton many days each year.

Honey Creek near Russell, Iowa—Continued

Suspended sediment, June to September 1952

Day	April: Mean discharge (cfs)	April: Suspended sediment: Mean concentration (ppm)	April: Suspended sediment: Tons per day	May: Mean discharge (cfs)	May: Suspended sediment: Mean concentration (ppm)	May: Suspended sediment: Tons per day	June: Mean discharge (cfs)	June: Suspended sediment: Mean concentration (ppm)	June: Suspended sediment: Tons per day
1	....	....	....	....	....	....	....	....	....
2	....	....	....	....	....	....	....	....	....
3	....	....	....	....	....	....	....	....	....
4	....	....	....	....	....	....	....	....	....
5	....	....	....	....	....	....	....	....	....
6	....	....	....	....	....	....	0.74	120	0.2
7	....	....	....	....	....	....	.70	117	a.2
8	....	....	....	....	....	....	2.3	929	s25
9	....	....	....	....	....	....	.74	308	s.6
10	....	....	....	....	....	....	.54	259	.4
11	....	....	....	....	....	....	.41	220	a.2
12	....	....	....	....	....	....	.36	188	.2
13	....	....	....	....	....	....	.26	198	.1
14	....	....	....	....	....	....	.28	230	a.2
15	....	....	....	....	....	....	.36	304	s.3
16	....	....	....	....	....	....	.20	195	.1
17	....	....	....	....	....	....	.16	....	}
18	....	....	....	....	....	....	.13	....	e.1
19	....	....	....	....	....	....	.15	....	}
20	....	....	....	....	....	....	102	9,840	s2,070
21	....	....	....	....	....	....	372	....	e2,500
22	....	....	....	....	....	....	60	210	34
23	....	....	....	....	....	....	20	100	5.4
24	....	....	....	....	....	....	10	52	1.4
25	....	....	....	....	....	....	6.5	200	3.5
26	....	....	....	....	....	....	4.6	80	1.0
27	....	....	....	....	....	....	12	2,000	sa92
28	....	....	....	....	....	....	3.6	332	s3.6
29	....	....	....	....	....	....	1.3	210	.7
30	....	....	....	....	....	....	.80	128	.3
31	....	....	....	....	....	....	....	....	....

Day	July: Mean discharge (cfs)	July: Mean concentration (ppm)	July: Tons per day	August: Mean discharge (cfs)	August: Mean concentration (ppm)	August: Tons per day	September: Mean discharge (cfs)	September: Mean concentration (ppm)	September: Tons per day
1	0.84	99	0.2	0	....	0	0.09	112	s0.1
2	.74	117	.2	0	....	0	.13	130	}
3	1.1	88	.3	0	....	0	.10	....	}
4	.62	110	.2	0	....	0	.04	....	t
5	.36	126	.1	0	....	0	.02	....	}
6	.26	90	.1	0	....	0	.01	....	}
7	.24	88	.1	0	....	0	0	....	0
8	.41	100	a.1	0	....	0	0	....	0
9	.26	45	}	.21	270	sa.5	0	....	0
10	.16	....	}	1.9	300	sa8.5	0	....	0
11	.10	....	t	62	1,400	sb260	0	....	0
12	.05	....	}	4.4	186	2.2	0	....	0
13	.07	40	}	.30	130	.1	0	....	0
14	1.5	375	s3.8	1.9	550	sb10	7.6	830	sa38
15	.54	172	.3	14	570	sa31	.33	160	.1
16	.31	108	a.1	1.2	180	a.6	.12	....	}
17	.22	80	t	.33	142	.1	.06	....	t
18	.30	60	.1	.24	126	a.1	.03	....	}
19	.26	80	.1	.18	119	a.1	.01	....	}
20	.15	59	}	3.9	845	s17	0	....	0
21	.09	35	t	2.4	173	sa1.6	0	....	0
22	.02	....	}	.28	....	e.1	0	....	0
23	0	....	0	.16	....	}	0	....	0
24	0	....	0	.12	....	}	0	....	0
25	0	....		.09	....	}	0	....	0
26	0	....	0	.09	....	}	0	....	0
27	0	....	0	.06	....	t	0	....	0
28	0	....	0	.04	....	}	0	....	0
29	0	....	0	.03	....	}	0	....	0
30	0	....	0	.02	....	}	0	....	0
31	0	....	0	.02	....	}	....	....	....

e Estimated.
s Computed by subdividing day.
t Sediment discharge less than 0.05 ton.
a Computed from an estimated concentration graph.
b Computed from a partly estimated concentration graph.

Honey Creek near Russell, Iowa—Continued

Suspended sediment, water year October 1952 to September 1953

Day	October Mean discharge (cfs)	October Suspended sediment Mean concentration (ppm)	October Suspended sediment Tons per day	November Mean discharge (cfs)	November Suspended sediment Mean concentration (ppm)	November Suspended sediment Tons per day	December Mean discharge (cfs)	December Suspended sediment Mean concentration (ppm)	December Suspended sediment Tons per day
1	....	....	....	0	....	0	1.3	13	
2	....	....	....	0	....	0	1.3	....	
3	....	....	....	0	....	0	1.2	....	
4	....	....	....	0	....	0	1.2	....	t
5	....	....	....	0	....	0	1.2	....	
6	....	....	....	0	....	0	1.2	....	
7	....	....	....	0	....	0	1.3	....	
8	....	....	....	0	....	0	1.7	....	
9	....	....	....	0	....	0	2.0	....	
10	....	....	....	0	....	0	2.0	....	
11	....	....	....	0	....	0	2.0	22	e.1
12	....	....	....	0	....	0	1.7	....	
13	....	....	....	0	....	0	1.1	....	
14	....	....	....	0	....	0	.7	....	
15	....	....	....	0	....	0	.8	....	
16	....	....	....	0	....	0	.8	....	t
17	....	....	....	95	770	sb240	.9	....	
18	....	....	....	11	120	sa6.3	1.0	....	
19	....	....	....	2.6	....		1.1	....	
20	....	....	....	1.8	....		3.0	....	
21	....	....	....	1.3	....	e.5	2.4	....	e.5
22	....	....	....	1.3	....		2.0	....	
23	....	....	....	1.1	....		1.6	....	
24	....	....	....	1.2	....		1.4	....	
25	....	....	....	4.6	110	sa2.3	1.2	....	
26	....	....	....	22	520	sa62	1.1	....	
27	....	....	....	2.7	....	e1.5	1.0	....	
28	....	....	....	1.9	....		.9	....	e.1
29	....	....	....	1.6	....	e.3	.8	....	
30	....	....	....	1.5	....		.9	....	
31	....	....	....	....	....	....	1.0	....	

Day	January Mean discharge (cfs)	January Mean concentration (ppm)	January Tons per day	February Mean discharge (cfs)	February Mean concentration (ppm)	February Tons per day	March Mean discharge (cfs)	March Mean concentration (ppm)	March Tons per day
1	1.0	....		2.0	....		1.3		
2	1.0	....		.8	....	e0.7	1.3		
3	.7	....		.9	....		1.5		
4	.6	....		1.5	....		2.0		
5	.5	....		30	560	sa93	1.8	28	0.1
6	.4	....	t	40	500	sb50	1.8		
7	.5	....		43	170	20	1.9		
8	.5	....		20	140	b7.6	1.9		
9	.6	....		5.0	100	1.4	11	240	sb12
10	.7	8		14	390	sa18	49	720	sb140
11	.6	....		9.0	135	3.3	76	690	sb150
12	.8	22		4.0	....		34	363	s38
13	6.5	82	sa1.5	2.5	....	e1.2	16	160	6.5
14	11	120	sb4.8	3.0	....		79	1,200	s384
15	14	92	3.5	1.3	....		58	692	s171
16	4.0	32	sa.7	.8	....	e.3	14	170	6.4
17	.8	....		1.1	....		10	120	b3.2
18	.9	....	e.3	1.3	....		37	759	s98
19	1.0	....		16	380	sa77	11	192	5.7
20	1.0	....		122	1,200	sb480	8.1	156	3.4
21	1.1	12		12	160	b5.2	14	1,060	s69
22	1.1	....		5.0	....	e1.0	19	600	sa40
23	1.1	....	t	3.7	....		97	860	sb290
24	1.0	....		3.3	....		14	230	8.7
25	.9	....		4.0	....	e.4	9.0	160	a3.9
26	1.0	....		4.3	....		6.9	90	1.7
27	.9	....		4.2	33	.4	5.6	49	.7
28	2.0	51		2.2	29	.2	4.0	50	b.5
29	1.0	....	e.3	....	....	....	11	120	sb15
30	1.4	....		....	....	....	287	1,200	sb970
31	4.0	....	e2.5	....	....	....	208	690	388

e Estimated.
s Computed by subdividing day.
t Sediment discharge less than 0.05 ton.
a Computed from an estimated concentration graph.
b Computed from a partly estimated concentration graph.

Note.—Flow affected by ice Dec. 13-20, 23-29, Jan. 3-6, 16-18, 23, 24, Jan. 30 to Feb. 1, Feb. 4-17, 21-25 and by backwater from Chariton River Mar. 12, 13, April 1-4, May 1, 2, June 10-14.

Honey Creek near Russell, Iowa—Continued

Suspended sediment, water year October 1952 to September 1953—Continued

Day	April: Mean discharge (cfs)	April: Suspended sediment: Mean concentration (ppm)	April: Suspended sediment: Tons per day	May: Mean discharge (cfs)	May: Suspended sediment: Mean concentration (ppm)	May: Suspended sediment: Tons per day	June: Mean discharge (cfs)	June: Suspended sediment: Mean concentration (ppm)	June: Suspended sediment: Tons per day
1	92	273	s91	12	115	s4.1	0.7		
2	14	110	a4.2	5.8			.7		
3	10	90	a2.4	5.9	51	.8	.7		
4	8.5	65	1.5	5.5			.7	136	0.3
5	7.4	...	e1.2	5.3			.9		
6	5.9			10	111	3.0	.9		
7	4.7			6.4	50	.9	.9		
8	4.2			4.3			7.8	1,600	sb74
9	4.3			3.4			20	920	sb250
10	4.2	40	.4	3.1			86	1,100	sb450
11	3.2			2.6			1.9	100	a.5
12	3.1			2.4	41	.3	.9	70	a.2
13	2.4			2.2			.7	46	
14	3.4	110	sb1.4	2.4			.5	...	
15	12	520	17	2.4			.4	...	
16	6.2	150	sa2.9	2.2			.4	...	e.1
17	2.8	26	.2	2.4			.3	105	
18	2.0	...		2.7			.2	...	
19	1.7	...		2.0			.2	...	
20	1.7	26	e.1	1.9			.1	...	
21	1.3	24		2.4	75	.4	.1	...	
22	1.0	...		2.0			.1	...	
23	.8	...		1.8			.1	...	t
24	11	338	s20	2.0			.1	...	
25	12	203	s8.0	1.9			.1	...	
26	4.9	90	b1.2	1.3			.1	...	
27	2.4			1.2	130	.4	4.7	1,400	sa93
28	1.6	45	.3	1.2	154	.5	5.5	980	sb22
29	2.2			1.1	...		.4	160	a.2
30	38	440	sb50	.9	...	e.3	.2	100	a.1
31	...	...	...	.7	...		...	...	...

Day	July: Mean discharge (cfs)	July: Mean concentration (ppm)	July: Tons per day	August: Mean discharge (cfs)	August: Mean concentration (ppm)	August: Tons per day	September: Mean discharge (cfs)	September: Mean concentration (ppm)	September: Tons per day
1	0.4	220	sa0.4	...	...	...	...	...	...
2	.8	270	a.6	...	...	...	...	...	...
3	.2	230	a.1	...	...	...	...	...	...
4	.1	210	a.1	...	...	...	...	...	...
5	3.3	1,400	sa62	...	...	...	...	...	...
6	.4	180	sa.4	...	...	...	...	...	...
7	.1	...	e.1	...	...	...	...	...	...
8	.1	...	t	...	...	...	...	...	...
9	0	...	0	...	...	...	...	...	...
10	0	...	0	...	...	...	...	...	...
11	0	...	0	...	...	...	...	...	...
12	0	...	0	...	...	...	...	...	...
13	0	...	0	...	...	...	...	...	...
14	0	...	0	...	...	...	...	...	...
15	0	...	0	...	...	...	...	...	...
16	0	...	0	...	...	...	...	...	...
17	0	...	0	...	...	...	...	...	...
18	0	...	0	...	...	...	...	...	...
19	0	...	0	...	...	...	...	...	...
20	0	...	0	...	...	...	...	...	...
21	0	...	0	...	...	...	...	...	...
22	0	...	0	...	...	...	...	...	...
23	0	...	0	...	...	...	...	...	...
24	0	...	0	...	...	...	...	...	...
25	0	...	0	...	...	...	...	...	...
26	0	...	0	...	...	...	...	...	...
27	0	...	0	...	...	...	...	...	...
28	0	...	0	...	...	...	...	...	...
29	0	...	0	...	...	...	...	...	...
30	0	...	0	...	...	...	...	...	...
31	0	...	0	...	...	...	...	...	...

e Estimated.
s Computed by subdividing day.
t Sediment discharge less than 0.05 ton.
a Computed from an estimated concentration graph.
b Computed from a partly estimated concentration graph.

Honey Creek near Russell, Iowa—Continued

Suspended sediment, water year October 1953 to September 1954

Day	October			November			December		
	Mean discharge (cfs)	Suspedned sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sedimen	
		Mean concen- tration (ppm)	Tons per day		Mean concen- tration (ppm)	Tons per day		Mean concen- tration (ppm)	Tons per day
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									
31									

Day	January			February			March		
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									
31									

Honey Creek near Russell, Iowa—Continued

Suspended sediment, water year October 1953 to September 1954—Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	0	...	0	2.1	45	0.3	7.8	590	s13
2	0	...	0	11	1,600	sb64	6.3	410	sb8.9
3	0	...	0	4.7	340	4.3	7.1	330	sb7.2
4	0	...	0	2.3	85	a.5	4.6	170	sa2.5
5	0	...	0	1.5	49	.2	2.2	...	e.6
6	0	...	0	1.2	28	.1	1.4	...	e.3
7	0	...	0	.8	...	e.1	.8	...	e.1
8	0	...	0	.5	23		.4	44	
9	0	...	0	.4	...		.4	46	
10	0	...	0	.4	...	t	.3	...	t
11	0	...	0	.3	...		.2	45	
12	0	...	0	.2	...		1.0	130	a.4
13	0	...	0	.2	...		.6	...	.2
14	0	...	0	.1	...		.2	91	t
15	0	...	0	0	...	0	1.7	1,700	sb26
16	0	...	0	0	...	0	1.7	400	b1.8
17	0	...	0	0	...	0	.9	...	e.4
18	0	...	0	0	...	0	.2	...	e.1
19	0	...	0	0	...	0	0	...	0
20	0	...	0	0	...	0	0	...	0
21	0	...	0	0	...	0	0	...	0
22	0	...	0	0	...	0	.3	138	.1
23	0	...	0	0	...	0	0	...	0
24	0	...	0	0	...	0	0	...	0
25	1.3	290	sa2.5	0	...	0	0	...	0
26	49	2,400	sb940	0	...	0	0	...	0
27	17	1,100	sb100	.2	...		0	...	0
28	2.7	155	1.1	.2	25	t	0	...	0
29	1.5	45	.2	.1	...		0	...	0
30	1.3	42	.1	0	...	0	0	...	0
31	...	...	...	2.3	710	sa22	...	...	...

Day	July			August			September		
1	...	...	...	0	...	0	...	...	...
2	...	...	...	0	...	0	...	...	...
3	...	...	...	0	...	0	...	...	...
4	...	...	...	0	...	0	...	...	...
5	...	...	...	0	...	0	...	...	...
6	...	...	...	0	...	0	...	...	...
7	...	...	...	0	...	0	...	...	...
8	...	...	...	0	...	0	...	...	...
9	...	...	...	0	...	0	...	...	...
10	...	...	...	0	...	0	...	...	...
11	...	...	...	0	...	0	...	...	...
12	...	...	...	0	...	0	...	...	...
13	...	...	...	0	...	0	...	...	...
14	...	...	...	0	...	0	...	...	...
15	...	...	...	0	...	0	...	...	...
16	...	...	...	0	...	0	...	...	...
17	...	...	...	0	...	0	...	...	...
18	...	...	...	0	...	0	...	...	...
19	...	...	...	0	...	0	...	...	...
20	...	...	...	0	...	0	...	...	...
21	...	...	...	0	...	0	...	...	...
22	...	...	...	.6	600	sa6.9	...	...	...
23	...	...	...	0	...	0	...	...	...
24	...	...	...	0	...	0	...	...	...
25	...	...	...	0	...	0	...	...	...
26	...	...	...	6.7	2,100	sa62	...	...	...
27	...	...	...	3.2	170	sa1.9	...	...	...
28	...	...	...	.2	...	e.1	...	...	...
29	...	...	...	0	...	0	...	...	...
30	...	...	...	0	...	0	...	...	...
31	...	...	...	0	...	0	...	...	...

e Estimated.
s Computed by subdividing day.
t Sediment discharge less than 0.05 ton.
a Computed from an estimated concentration graph.
b Computed from a partly estimated concentration graph.

Honey Creek near Russell, Iowa—Continued

Monthly discharge for calendar and water years 1952 to 1954

Month	Water discharge (cfs-days)	Suspended sediment							
		Load (tons)	Daily loads (tons)			Tons per sq. mi.	Acre-feet (a)	Concentration (ppm)	
			Max.	Min.	Mean			Maximum daily	Weighted mean
June 6-30, 1952	600.22	4,730.7	2,500	0.1	190	343.5	4.0	9,840	2,920
July	8.66	5.8	3.8	0	0.2	.42	.005	375	248
August	93.93	361.1	280	0	13	26.2	.3	1,400	1,420
September	8.54	38.4	38	0	1.3	2.78	.03	830	1,670
October 1952	0	0	0	0	0	0	0	0	0
November	149.6	316.0	240	0	11	22.9	.3	770	782
December	41.8	5.2	....	t	0.2	.38	.004	....	46
January, 1953	62.6	15.4	4.8	t	0.5	1.12	.01	120	91
February	356.0	772.3	480	....	28	56.0	.6	1,200	801
March	1,092.1	2,806.9	970	....	91	203.4	2.3	1,200	952
April	268.9	205.7	91	....	6.9	14.9	.2	520	283
May	101.4	19.7	4.1	....	0.6	1.43	.02	....	72
June	136.3	892.9	450	t	30	64.7	.7	1,500	2,430
July	5.4	63.7	62	0	2.1	4.62	.05	1,400	4,370
August	0	0	0	0	0	0	0	0	0
September	0	0	0	0	0	0	0	0	0
Water year 1952-53	2,216.0	5,097.8	970	0	14	369.4	4.3	1,500	852
October 1953	0	0	0	0	0	0	0	0	0
November	0	0	0	0	0	0	0	0	0
December	0	0	0	0	0	0	0	0	0
Calendar year 1953	2,023.6	5,007.8	970	0	14	369.4	4.3	1,500	933
January, 1954	0	0	0	0	0	0	0	0	0
February	0	0	0	0	0	0	0	0	0
March	0	0	0	0	0	0	0	0	0
April	72.8	1,043.9	940	0	35	75.6	.9	2,400	5,310
May	28.5	91.7	64	0	3	6.64	.08	1,600	1,190
June	38.1	61.8	26	0	2.1	4.48	.05	1,700	601
July	0	0	0	0	0	0	0	0	0
August	10.7	70.0	62	0	2.3	5.14	.06	2,100	2,450
September	0	0	0	0	0	0	0	0	0
Water year 1953-54	150.1	1,268.3	940	0	3.5	91.9	1.1	2,400	313

t Sediment discharge less than 0.05 ton.
a Computed using a specific weight of 55 pounds per cubic foot.

MISCELLANEOUS ANALYSES IN IOWA

MISCELLANEOUS CHEMICAL ANALYSES

Chemical analyses, in parts per million, 1886 to 1894(a)

Stream and Location	Date	Calcium carbonate ($CaCO_3$)	Magnesium carbonate ($MgCO_3$)	Alkaline carbonate (Na & K, CO_3)	Ferrous carbonate ($FeCO_3$)	Calcium sulfate ($CaSO_4$)	Magnesium sulfate ($MgSO_4$)	Sodium sulfate (Na_2SO_4)	Potassium sulfate (K_2SO_4)	Alkali sulfates (Na & K, SO_4)	Sodium chloride (NaCl)	Alkali chlorides (Na & K, Cl)	Silica (SiO_2)	Oxides of iron alumina [$(Fe, AL)_2O_3$]	Oxides of iron alumina silica [SiO_2, $(Fe, AL)_2O_3$]	Alkalies by difference (Na & K)	Lime and magnesia (CaO, MgO)	Total Dissolved solids
UPPER MISSISSIPPI RIVER BASIN																		
Wapsipinicon River, Anamosa (d)	June 10, 1893	102.5	34.6	7.5	...	...	...	...	...	9.1	...	2.9	...	...	1.4	...	...	158.0
Cedar R., Cedar Rapids (e)	Aug. 25, 1893	(b)176.8	(b)99.0	...	1.4	9.4	...	5.1	8.9	...	3.4	...	6.5	0.7	...	...	...	311.2
(f)	(c)	112.3	42.5	...	...	5.0	18.3	...	...	4.8	...	11.0	4.8	4.8	...	...	...	213.8
Mississippi River. Burlington (g)	Jan. 10, 1887	103.6	42.0	...	...	4.5	11.9	...	...	...	...	...	2.5	4.3	...	29.5	162.0	175.1
Skunk River, Rome (g)	Jan. 26, 1887	68.8	17.7	...	...	11.6	17.4	...	...	...	...	...	16.1	6.0	...	27.9	115.4	143.3
Mississippi R., Dallas (g)	Dec. 27, 1886	154.5	87.2	...	...	2.3	13.1	...	...	...	...	...	27.4	4.8	...	9.3	257.1	294.5
Mississippi River, Fort Madison (g)	Feb. 8, 1887	87.2	39.8	...	...	4.3	11.6	...	...	...	...	...	17.0	3.8	...	11.3	142.9	173.3
East Fork Des Moines River, Algona (h)	Feb. 10, 1889	42.6	28.4	...	...	3.8	...	...	...	13.2	...	5.1	...	...	1.7	...	...	94.8
East Fork Des Moines River, Dakota City (h)	Feb. 12, 1889	239.7	128.7	...	...	Tr.	...	...	...	96.0	...	10.3	...	...	5.0	...	...	479.7
Des Moines River, Moingona (h)	May 24, 1894	199.6	64.9	...	...	7.2	89.0	...	...	36.8	...	9.8	9.9	1.5	...	...	...	418.8
Des Moines River, Des Moines (g)	Mar. 17 1887	147.1	11.8	...	...	35.5	2.3	...	...	...	...	...	58.4	13.0	...	37.4	196.7	282.4
North Fork Coon, Maple River Jct. (h)	Feb. 10, 1889	104.3	52.7	...	...	5.5	...	...	...	49.3	...	14.0	...	...	5.3	...	...	231.1
Des Moines River, Ottumwa (g)	Jan. 26, 1887	139.8	38.0	...	...	12.9	36.0	...	...	...	...	...	14.3	4.0	...	43.2	226.7	258.4
MISSOURI RIVER BASIN																		
Boyer River, Early (h)	Feb. 10, 1889	144.5	79.1	...	...	15.4	...	...	...	76.9	...	19.5	...	...	2.2	...	...	337.6
Missouri River, Council Bluffs (g)	Dec. 17, 1887	151.5	31.9	...	...	38.5	60.0	...	...	...	...	...	26.1	4.0	...	110.6	281.9	425.3
(d)	Dec. 16, 1891	117.1	59.7	...	...	49.3	...	...	...	90.9	...	12.5	...	...	5.3	...	...	334.9
West Nishnabotna R., Anderson (g)	Sept. 16, 1887	131.2	45.9	...	...	4.6	4.3	...	...	...	...	...	31.6	2.9	...	46.1	186.0	268.4
Nodaway R., Massena (g)	June 11, 1887	130.1	56.8	...	...	7.6	23.6	...	...	...	...	...	18.6	6.0	...	3.0	218.0	240.0
Thompson River, Davis City (g)	April 16, 1887	92.8	26.1	...	...	10.8	11.0	...	...	...	...	...	18.3	5.4	...	11.6	140.6	181.9
Chariton R., Chariton (g)	Mar. 30, 1887	55.5	31.1	...	...	12.4	4.5	...	...	...	...	...	28.5	9.0	...	24.1	103.5	173.0

a From Volume VI, Iowa Geological Survey, 1897.
b Bicarbonate.
c Average of several analyses at different seasons of the year.
d Analysis by Gibbs, chemist, Chicago, Milwaukee & St. Paul Railway.
e Analysis by Prof. Smith.
f Analysis by Bates, chemist, Burlington, Cedar Rapids & Northern Railway.
g Analysis by Ellis, chemist, Chicago, Burlington & Quincy Railway.
h Analysis by Davieson, chemist, Chicago & Northwestern Railway.

Chemical analyses, in parts per million, 1912, 1913(a)

Stream and location	Date	Turbidity	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Alkalies (Na & K)	Bicarbonate (HCO_3)	Carbon dioxide (CO_2)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Dissolved solids
IOWA RIVER BASIN													
Iowa River, Iowa Falls	Sept. 15, 1912	140	14	0.5	58	23	16	235	21	36	2.0	0.5	306
	June 18, 1913	200	24.0	3.	93.0	14.0	34.0	301	20.0	51.0	5.0	.12	419.0
	July 3	180	28.2	.1	85.3	27.4	14.5	309	13.7	52.0	2.0	.13	379.4
	July 15	180	20.2	.15	67.6	25.8	13.1	314	....	53.8	2.8	.18	338.0
	July 29	200	14.0	.5	70.8	30.8	11.8	206	6.8	66.8	7.0	.35	357.4
	Aug. 12	170	21.4	.2	71.6	23.0	26.1	324	....	54.6	3.2	.44	372.4
	Aug. 31	240	23.0	.89	70.0	23.3	6.7	254	9.8	67.6	3.6	4.0	341.6
Iowa River, Marshalltown	June 17, 1913	70	11.8	.13	57.3	27.0	19.3	263	0	47.2	3.0	1.24	392.0
	July 1	180	12.8	.14	68.5	27.4	19.3	291	16.0	41.8	3.0	2.5	338.8
	July 14	50	11.2	.13	67.8	20.3	14.1	254	14.7	49.5	3.4	.34	302.4
	July 28	20	17.4	.15	62.8	26.7	12.6	268	17.6	42.8	9.2	.17	332.2
	Aug. 11	60	10.8	.12	53.2	22.6	17.8	236	....	45.8	3.4	.53	286.8
	Aug. 30	70	17	.25	60.0	24.5	13.5	246	11.6	48.0	4.0	3.52	307.8
Iowa River, Iowa City	Aug. 18, 1912	b5	8.0	1.0	65	26	14	288	....	61	7.0	.5	324
	Aug. 19	340	7.0	.5	56	23	9	100	9	76	7.0	.3	275
	June 19, 1913	190	11.6	.4	77.4	18.0	26.4	245	12.3	55.2	6.8	.7	315.0
	July 1	380	15.2	.1	74.3	6.5	23.4	214	8.2	68.2	6.4	7.0	329.0
	July 17	200	15.6	.11	43.2	18.5	12.0	250	....	33.4	5.2	.18	256.0
	Aug. 13	170	7.2	.2	57.6	11.8	20.4	204	8.9	55.6	5.2	.62	269.0
	Sept. 1	190	23.0	.12	59.2	15.7	5.2	198	5.9	51.5	6.0	1.76	269.0
Cedar River, Charles City	Sept. 14, 1912	80	8.0	.06	58.0	19.0	12.0	208	21.0	24.0	6.0	.4	258
	June 18, 1913	40	22.8	.06	61.6	17.2	9.6	232	13.6	16.6	11.3	.7	272.0
	July 2	70	16.0	.1	42.1	12.7	15.8	166	....	22.4	3.5	3.52	197.2
	July 15	15	14.8	.08	60.0	19.4	17.4	222	9.8	28.6	7.0	.88	252.0
	Aug. 12	80	10.0	.11	50.0	15.7	23.6	216	19.5	34.9	11.0	.88	270.2
	Aug. 31	110	16.4	.12	64.4	14.9	15.1	218	5.8	44.1	8.0	3.16	293.0
Cedar River, Waterloo	June 18, 1913	30	9.6	.16	56.0	16.8	32.8	218	9.8	34.0	5.7	.88	285.0
	July 2	60	15.4	.05	50.0	15.5	6.8	170	5.9	20.2	1.4	4.4	208.0
	July 15	80	7.4	.1	59.0	19.8	21.2	221	12.7	29.5	3.4	1.32	258.8
	Aug. 12	50	6.8	1.1	48.6	15.3	8.7	192	11.7	36.2	4.0	.35	230.0
	Aug. 31	60	7.6	.06	30.6	14.9	17.6	162	11.6	44.1	6.0	2.64	224.0

a From Volume XXVI, Iowa Geological Survey, 1915. Analyses made at Experiment Station at Ames, Iowa.

MISCELLANEOUS CHEMICAL ANALYSES—Continued

UPPER MISSISSIPPI RIVER BASIN—Continued

Chemical analyses, in parts per million, 1912, 1913(a)—Continued

Stream and location	Date	Turbidity	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Alkalies (Na & K)	Bicarbonate (HCO_3)	Carbon dioxide (CO_2)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Dissolved solids
IOWA RIVER BASIN—Continued													
Cedar River, Cedar Rapids	Aug. 19, 1912	575	6.0	0.8	35	9.0	32	162	....	55	8.0	0.3	231.1
	Aug. 20(b)	5	6.0	.2	54	21	8	167	....	88	6.0	2.0	276
	June 19, 1913	70	17.2	.24	56.8	19.1	21.2	186	9.8	49.6	4.9	.35	269.6
	July 1	160	11.8	....	51.3	14.1	13.2	182	13.7	40.7	6.2	2.64	251.2
	July 17	60	20.0	.07	44.4	19.7	20.4	182	....	50.0	3.8	.18	257.8
	Aug. 13	80	6.6	.13	28.8	15.3	9.3	146	....	28.8	5.0	.35	173.4
	Sept. 1	70	5.0	.1	27.2	11.2	14.7	120	7.8	38.0	6.4	.88	177.0
DES MOINES RIVER BASIN													
West Fork Des Moines R., Estherville	July 23, 1912	60	5.0	.02	92	32	16	246	12	169	9.0	.4	486
West Fork Des Moines R., Emmetsburg	July 25, 1912	70	4.0	.04	81	32	17	248	....	140	3.0	.3	439
Des Moines River, Fort Dodge	July 23, 1912	50	7.0	.04	74	23	11	126	....	64	5.0	.4	359
	June 23, 1913	60	16.1	.1	86.1	22.4	41.2	280	34.1	134.4	4.4	1.06	484.8
	July 3	100	18.8	.3	73	23.0	19.0	210	12.7	102.8	3.0	2.64	368.0
	July 29	15	18.6	.11	68.4	29.9	23.6	252	....	118.5	12.4	.09	417.6
	Aug. 22	200	16.2	1.0	77.2	28.2	17.0	238	5.8	153.5	11.6	.35	416.8
Des Moines River, Boone	Aug. 15, 1912	15	10	.06	60	25	21	220	....	100	8.0	.06	340
Des Moines River, Des Moines (c)	July 22, 1912	430	11	3.0	54	17	17	103	....	60	7.0	.5	249
	June 24, 1913	90	16.4	.05	73.7	21.8	42.5	243	13.3	114.4	5.4	.88	425.6
	July 9	100	15.2	.5	65.8	21.4	26.4	232	5.9	108.2	4.8	.35	370.2
	July 29	110	18.6	.2	82.0	16.5	26.0	238	9.8	120.0	7.2	.35	427.4
	Aug. 14	150	21.0	.16	72.8	28.2	21.9	256	....	141.5	7.4	.35	422.0
	Sept. 2	110	19.2	.12	60.8	14.1	19.3	188	7.8	113.1	5.0	2.2	387.0
Raccoon River, Valley Junction	June 25, 1912	385	17.6	8.6	71	22	1.0	230	....	169	4.0	.04	460
Raccoon River, Des Moines	June 25, 1912	220	21	4.0	92	22	21	274	....	110	4.2	41	428
	July 22,	3,560	10	1.4	54	20	14	184	....	94	11	.5	297
Des Moines River, Harvey	July 23, 1912	490	10	.4	63	19	12	198	....	89	11	.2	320
Des Moines River, Ottumwa	July 23, 1912	625	14	.4	70	21	3.0	212	....	76	7.0	.5	335
	June 24, 1913	2,000	18.0	.28	55.8	8.3	15.5	151	....	46.3	4.4	4.4	218.0
	July 10	80	10.2	.07	63.7	23.4	17.8	260	....	88.4	5.8	.18	344.0
	July 30	120	16.6	.1	72.4	28.2	26.3	276	....	102.7	10.2	.35	410.6
	Aug. 14	160	11.0	.06	64.0	27.7	18.7	204	13.7	112.2	8.0	.88	355.0
	Sept. 2	320	12.0	.25	67.2	26.1	17.0	232	....	118.7	6.8	.88	372.4
Des Moines River, Keosauqua	July 23, 1912	720	16	.4	70	24	8.0	218	....	101	13	.2	353

a From Volume XXVI, Iowa Geological Survey, 1915. Analyses made at Experiment Station at Ames, Iowa.
b Filtered river water.
c Information available indicate samples were obtain from above confluence of Raccoon River.

MISSOURI RIVER BASIN

Chemical analyses, in parts per million, 1934, 1935

Stream and location	Date	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Total dissolved Solids	Total Hardness as ($CaCO_3$)
TARKIO RIVER BASIN															
Tarkio River at Blanchard, Iowa	Dec. 31, 1934	1.36	18	0.05	62	18	19	6.2	232	53	5.9	0.2	15	313	229
	May 20, 1935	177	14	.12	29	9.1	4.8	8.9	102	29	7.1	....	7.5	174	110
West Tarkio Creek near Westboro, Mo.	Dec. 31, 1934	.83	14	.04	69	21	17	6.4	267	58	5.1	.3	11	337	259
	May 20, 1935	157	14	.11	25	7.4	2.5	9.7	98	19	5.2	....	2.0	149	93

MISCELLANEOUS SEDIMENT DETERMINATIONS

Instantaneous suspended sediment discharge, 1943 to 1948

Stream and location	Drainage area (sq. mi.)	Date	Discharge (a) (cfs)	Sediment concentration (ppm)	Sediment discharge(c)	
					Tons per day	Tons per day per sq. mi.
UPPER MISSISSIPPI RIVER BASIN						
MISSISSIPPI RIVER MAIN STEM						
Mississippi River at McGregor	67,500	Oct. 22, 1946	30,600	40	*3,387	0.05
LITTLE MAQUOKETA RIVER BASIN						
Little Maquoketa River near Durango	130	June 26, 1944	6,120	18,800	311,000	2,390
MAQUOKETA RIVER BASIN						
Maquoketa River near Maquoketa	1,550	June 27, 1944	43,700	5,440	642,000	414
WAPSIPINICON RIVER BASIN						
Wapsipinicon River at Independence	1,060	June 14, 1947	19,300	536	27,900	26.3
Wapsipinicon River at Central City	1,270	June 18, 1944	9,270	431	10,800	8.50
Wapsipinicon River near Dewitt	2,300	June 27, 1944	23,100	1,580	99,000	43.0
		June 29,	17,000	856	39,300	17.1
IOWA RIVER BASIN						
Iowa River near Belle Plaine	2,420	June 17, 1944	b16,500	860	38,300	15.8
Bear Creek at Ladora	185	June 28, 1948	b72	5,540	1,080	5.83
Rapid Creek near Iowa City	24.5	June 29, 1948	13	2,590	91	3.71
Ralston Creek at Iowa City (Benton St.)	....	June 1, 1947	93	3,570	898	....
English River near Kalona	580	May 3, 1946	985	2,530	6,730	11.0
		June 13,	1,700	7,620	35,000	60.3
		July 30, 1948	1,550	5,900	24,700	42.6
Lime Creek at Mason City	535	June 12, 1944	6,510	826	14,500	27.1
Shell Rock River at Marble Rock	1,330	June 13, 1944	13,000	463	16,300	12.3
Cedar River at Waterloo	5,190	June 15, 1944	18,800	150	7,610	1.47
		Mar. 17, 1945	54,300	365	53,500	10.3
Cedar River at Rochester	7,280	Sept. 28, 1943	1,700	112	514	.07
		June 19, 1944	30,900	684	57,100	7.84
		Mar. 21, 1945	48,800	330	43,500	5.98
Cedar River near Conesville	7,480	May 29, 1944	19,800	178	9,520	1.21
		June 20,	30,400	524	43,000	5.48
		Mar. 21, 1945	49,100	384	50,900	6.49
Iowa River at Wapello	12,480	May 29, 1944	45,900	309	38,300	3.07
		June 21,	51,600	440	61,300	4.91
		Mar. 22, 1945	57,700	270	42,100	3.37
		June 6, 1947	58,200	563	88,500	7.09
SKUNK RIVER BASIN						
Skunk River near Oskaloosa	1,640	May 23, 1946	1,300	3,780	13,300	8.11
		June 13,	2,730	10,400	76,700	46.8
		June 3, 1947	5,260	1,240	17,600	10.7
North Skunk River near Signourey	750	June 13, 1946	2,620	2,840	20,100	26.8
Skunk River at Coppock	2,890	May 25, 1944	35,300	1,210	115,000	39.8
Skunk River at Augusta	4,290	May 26, 1944	43,700	1,750	206,000	48.0
MISSISSIPPI RIVER MAIN STEM						
Mississippi River at Keokuk	119,000	July 1, 1944	209,000	765	432,000	3.63
		April 6, 1945	180,500	311	152,000	1.28

* Including slough.
a Determined by current-meter measurement, except as noted.
b Discharge determined from stage-discharge relation.
c Sediment discharge at time of sampling only, not indicative of average conditions.

MISCELLANEOUS SEDIMENT DETERMINATIONS—Continued

Instantaneous suspended sediment discharge, 1943 to 1948—Continued

Stream and location	Drainage area (sq. mi.)	Date	Discharge (a) (cfs)	Sediment concentration (ppm)	Sediment discharge(c)	
					Tons per day	Tons per day per sq. mi.
UPPER MISSISSIPPI RIVER BASIN—Continued						
DES MOINES RIVER BASIN						
Des Moines River near Boone	5,490	June 17, 1944	b17,700	212	10,100	1.84
Des Moines River at Des Moines	6,180	June 17, 1944	29,100	409	32,100	5.19
		May 17, 1945	6,370	240	4,130	67
		May 24,	13,530	473	17,300	2.88
South Raccoon River at Redfield	995	April 25, 1945	3,690	2,880	28,700	2.80
		May 22,	8,790	4,210	99,900	100
		May 23,	5,150	4,050	56,300	56.6
		June 2, 1947	13,300	5,730	206,000	207
Raccoon River at Van Meter	3,410	June 17, 1944	b14,200	388	14,000	4.37
		April 27, 1945	9,740	671	17,600	5.16
		May 23,	11,900	2,300	73,900	21.7
		June 3, 1947	19,100	2,280	118,000	34.6
		June 25,	39,700	2,760	296,000	86.8
Des Moines River below Raccoon River at Des Moines	9,770	June 17, 1944	43,800	553	65,400	6.69
North River near Norwalk	348	April 17, 1945	2,530	1,400	9,560	27.5
Middle River near Indianola	502	April 17, 1945	3,640	6,820	67,000	133
		June 20, 1946	2,270	8,820	54,100	108
South River near Ackworth	475	April 17, 1945	4,720	9,080	116,000	244
		June 18, 1946	5,660	8,700	133,000	280
Whitebreast Creek near Knoxville	380	June 20, 1946	6,500	2,920	51,200	135
		June 5, 1947	11,200	7,870	238,000	626
Des Moines River at Tracy	12,400	May 25, 1944	61,400	960	159,000	12.8
		May 20,	44,700	474	57,200	4.61
Des Moines River at Ottumwa	13,200	May 26, 1944	63,200	1,030	176,000	13.3
		May 29,	52,800	671	95,700	7.25
		April 20, 1945	34,100	564	51,900	3.93
Des Moines River at Keosauqua	13,900	May 26, 1944	b67,200	1,110	201,000	14.5
		June 29, 1947	78,800	970	206,000	14.8
MISSOURI RIVER BASIN						
LITTLE SIOUX RIVER BASIN						
Maple River at Mapleton	661	July 18, 1945	4,350	7,030	82,600	125
BOYER RIVER BASIN						
Boyer River at Logan	810	April 23, 1945	11,600	23,100	723,000	893
		July 18,	6,850	13,100	242,000	299
WAUBONSIE CREEK BASIN						
Waubonsie Creek near Bartlett	30	May 28, 1947	40	37,900	41,300	1,380
		June 4,	446	276,000	332,000	11,100
NISHNABOTNA RIVER BASIN						
East Nishnabotna River at Red Oak	890	May 22, 1945	11,320	9,600	293,000	329
		May 22,	15,700	8,020	340,000	382
		May 23,	5,480	3,880	57,400	64.5
		May 29, 1947	3,440	9,920	92,100	103
		June 2,	13,000	6,880	258,000	290
Nishnabotna River above Hamburg	2,800	April 19, 1945	2,240	3,330	20,100	78
		May 23,	20,000	5,720	309,000	110
		June 27,	7,160	23,500	454,000	16.2
		May 29, 1947	5,660	16,600	254,000	90.7
		June 3,	9,290	7,330	184,000	65.7
NODAWAY RIVER BASIN						
Nodaway River at Clarinda	740	June 5, 1947	14,700	10,400	413,000	558
THOMPSON RIVER BASIN						
Thompson River at Davis City	702	April 17, 1945	8,840	4,110	98,100	140
CHARITON RIVER BASIN						
Chariton River near Centerville	727	April 18, 1945	7,040	920	17,500	24.1
		June 20, 1946	18,000	880	42,800	58.9

a Determined by current-meter measurement, except as noted.
b Discharge determined from stage-discharge relation.
c Sediment discharge at time of sampling only, not indicative of average conditions.

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