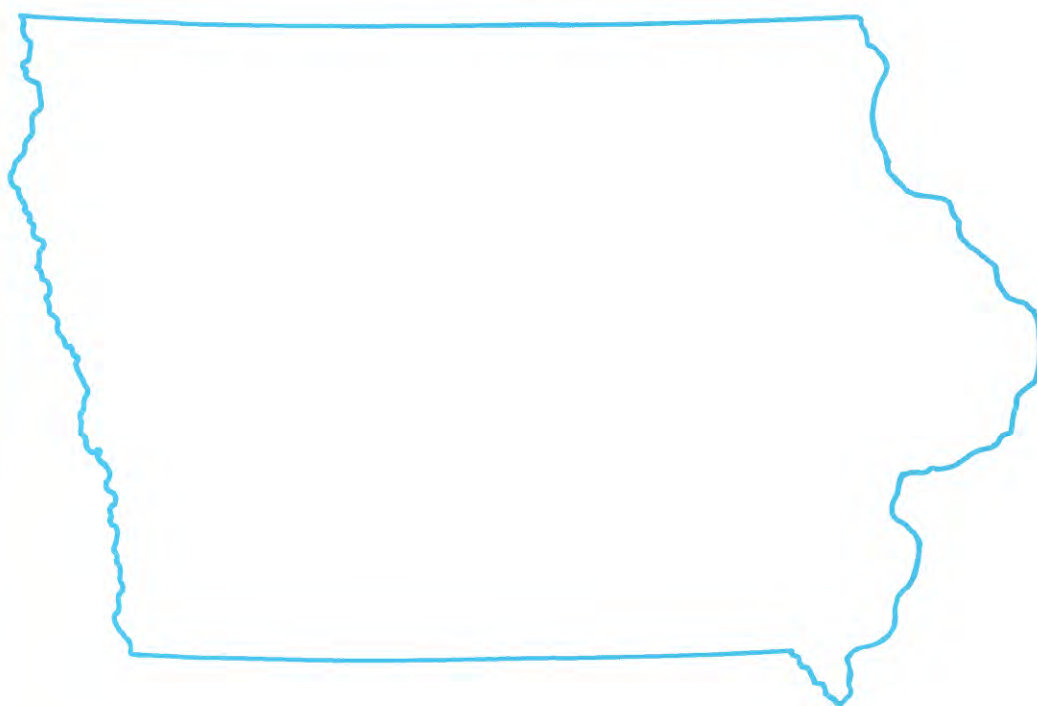




# Water Resources Data Iowa Water Year 1988



U.S. GEOLOGICAL SURVEY WATER DATA REPORT IA-88-1  
Prepared in cooperation with the Iowa Department of Natural  
Resources (Geological Survey Bureau), Iowa Department of  
Transportation and with Federal agencies

# CALENDAR FOR WATER YEAR 1988

1987

## OCTOBER

S	M	T	W	T	F	S
				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

## NOVEMBER

S	M	T	W	T	F	S
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					

## DECEMBER

S	M	T	W	T	F	S
		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		

1988

## JANUARY

S	M	T	W	T	F	S
					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						

## FEBRUARY

S	M	T	W	T	F	S
	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					

## MARCH

S	M	T	W	T	F	S
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6	7	8	9	10	11	12
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27	28	29	30	31		

## APRIL

S	M	T	W	T	F	S
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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

## MAY

S	M	T	W	T	F	S
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8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

## JUNE

S	M	T	W	T	F	S
			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		

## JULY

S	M	T	W	T	F	S
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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						

## AUGUST

S	M	T	W	T	F	S
	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			

## SEPTEMBER

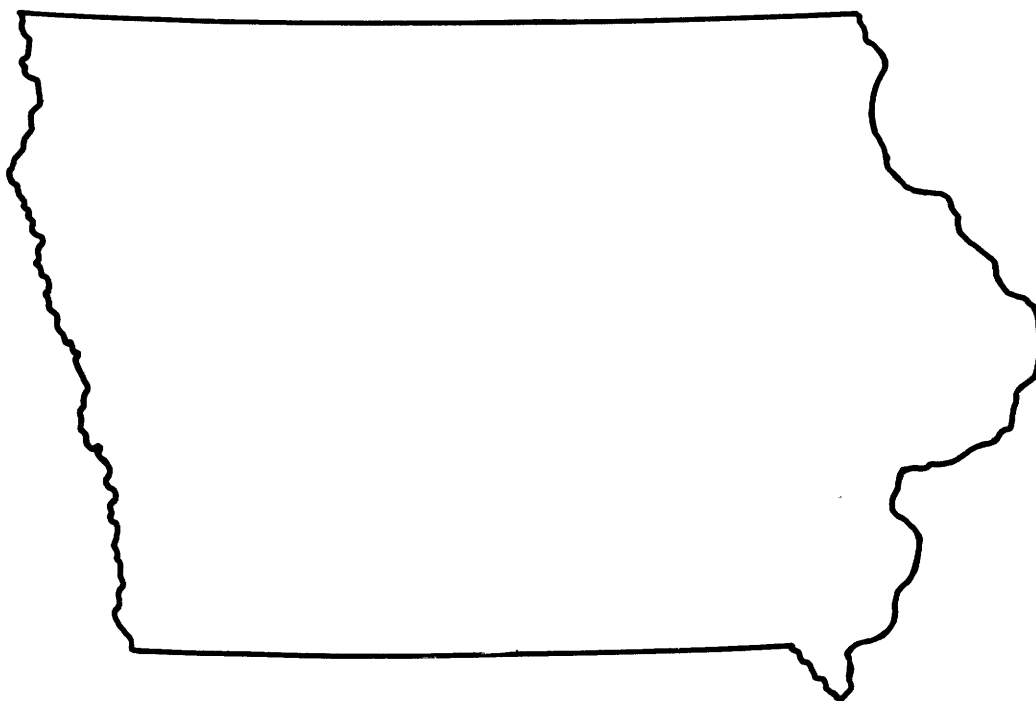
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25	26	27	28	29	30	



# Water Resources Data Iowa

## Water Year 1988

by N.B. Melcher, M.G. Detroy, R.A. Karsten, and W.J. Matthes



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT IA-88-1  
Prepared in cooperation with the Iowa Department of Natural  
Resources (Geological Survey Bureau), Iowa Department of  
Transportation and with Federal agencies

DEPARTMENT OF THE INTERIOR  
DONALD PAUL HODEL, Secretary

U.S. GEOLOGICAL SURVEY  
Dallas L. Peck, Director

For information on the water program in Iowa write to:

District Chief, Water Resources Division  
U.S. Geological Survey  
P.O. Box 1230  
Iowa City, Iowa 52244

1989

## PREFACE

This report of Iowa is one of a series of annual reports that document hydrologic data gathered from the U.S. Geological Survey's surface-water and ground-water data-collection networks in each State, Puerto Rico and, the Trust Territories. These records of streamflow, ground-water levels, and quality of water provide the hydrologic information needed by State, local, and Federal agencies, and the private sector for developing and managing our Nation's land and water resources.

This report is the culmination of a concerted effort by dedicated personnel of the U.S. Geological Survey who collected, compiled, analyzed, verified, and organized the data, and who typed, edited, and assembled the report. The authors had primary responsibility for assuring that the information contained herein is accurate, complete, and adheres to Geological Survey policy and established guidelines. Most of the data were collected, computed, and processed from area field offices. Personnel in charge of the field offices are:

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This report was prepared in cooperation with the State of Iowa and with other agencies under the general supervision of R.A. Engberg, District Chief, Iowa.

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<b>16. Abstract (Limit: 200 words)</b> Water resources data for the 1988 water year for Iowa consist of records of stage, discharge, and water quality of streams; stage, contents, and water quality of lakes and reservoirs; ground water levels and water quality of ground-water wells. This report contains records of water discharge for 117 stream-gaging stations; stage or contents for 7 lakes and reservoirs; water quality for 9 stream-gaging stations; sediment records for 8 stream-gaging stations; water levels for 108 observation wells; and chemical analyses for 153 municipal wells. Also included are 113 crest-stage partial-record stations. Additional water data were collected at various sites, not part of the systematic data-collection program, and are published as miscellaneous discharge measurements and miscellaneous water-quality analyses.			
<b>17. Document Analysis a. Descriptors</b>  *Iowa, *Hydrologic data, *Surface water, *Ground water, *Water quality, Flow rates, Streamflow, Stream-gaging stations, Lakes, Reservoirs, Chemical analyses, Sediment, Water, Temperature, Sampling sites, Water levels, Water analyses, Data collections, Ground water levels. <b>b. Identifiers/Open-Ended Terms</b>    <b>c. COSATI Field/Group</b>			
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ix

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(c) chemical, (m) microbiological, (t) water temperature,  
(s) sediment]

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EMMET COUNTY

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Well 415808091160501	Local number	83-04-25	CBBB1.....	300
<u>LEE COUNTY</u>				
Well 403630091240801	Local number	67-05-14	BAAD1.....	301
<u>LINN COUNTY</u>				
Well 415534091251502	Local number	82-05-10	CBAA2.....	301
Well 415422091422601	Local number	82-07-18	CDCD1.....	302
Well 415509091461801	Local number	82-08-20	ACBB1.....	302
Well 415834091351601	Local number	83-06-30	ABBA1.....	302
Well 415816091393401	Local number	83-07-28	ADDA1.....	303
Well 415725091410101	Local number	83-07-32	ACDC1.....	303
Well 420526091370701	Local number	84-07-13	BCBB1.....	304
Well 421149091403301	Local number	85-07-04	CCCC1.....	304
<u>LYON COUNTY</u>				
Well 431812096302701	Local number	98-48-16	DDAD1.....	305
Well 432140095595301	Local number	99-44-26	DDDD1.....	305
Well 432553096105701	Local number	99-45-05	ABAC1.....	306
Well 432601096335511	Local number	100-48-31	CCCC1.....	306
<u>MADISON COUNTY</u>				
Well 411727093483001	Local number	75-26-23	AAAC1.....	307
<u>MARION COUNTY</u>				
Well 411323093142601	Local number	74-21-11	DBCC1.....	307
Well 411329093142902	Local number	74-21-11	DBBB2.....	308
Well 411328093143503	Local number	74-21-11	CAAD3.....	308
<u>MARSHALL COUNTY</u>				
Well 420355092534701	Local number	84-18-24	CDCA1.....	309
<u>MONTGOMERY COUNTY</u>				
Well 405841095012701	Local number	71-36-06	DADA1.....	309
Well 410057095075101	Local number	72-37-29	BABA1.....	310



MUSCATINE COUNTY

Well 412120091080401	Local number	76-02-30 CBAA1.....	310
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O'BRIEN COUNTY

Well 425610095250611	Local number	94-39-26 BADB11.....	311
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Well 425808095480311	Local number	94-42-09 DDDD11.....	312
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Well 430930095350401	Local number	96-40-05 DDDA1.....	313
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OSCEOLA COUNTY

Well 431620095250501	Local number	98-39-26 CDAD1.....	313
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Well 431620095250511	Local number	98-39-26 CDAD11.....	313
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Well 431613095251801	Local number	98-39-26 CDCC1.....	314
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Well 431620095482402	Local number	98-42-33 AAB2.....	314
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Well 432828095283611	Local number	100-39-17 DCCB11.....	315
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PAGE COUNTY

Well 404257095150801	Local number	68-38-07 CCAA1.....	315
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PLYMOUTH COUNTY

Well 424850096074801	Local number	92-45-02 CBCB1.....	316
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Well 424833096324701	Local number	92-48-06 DDDA1.....	316
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Well 425249096125001	Local number	93-46-12 DDDD1.....	317
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POTTAWATTAMIE COUNTY

Well 411246095502001	Local number	74-43-18 BCCC1.....	317
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SAC COUNTY

Well 422500095084801	Local number	88-37-22 CCCC1.....	318
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Well 423013095175301	Local number	89-38-26 ABAA1.....	318
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Well 422850095171501	Local number	89-38-36 CBCC1.....	318
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SCOTT COUNTY

Well 413544090212901	Local number	78-5E-3 AADA1.....	319
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SIOUX COUNTY

Well 430140095573101	Local number	95-43-07 AAAA1.....	319
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Well 430913096033201	Local number	96-44-08 ADA1.....	320
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WASHINGTON COUNTY

Well 411300091320701	Local number	74-06-15 BDAC1.....	320
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Well 411244091323501	Local number	74-06-15 CBDD1.....	321
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Well 421829091304701	Local number	75-06-14 ABBB1.....	321
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Well 412037091564701	Local number	76-09-31 CBBC1.....	322
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Well 412750091495201	Local number	77-09-24 AADA1.....	323
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WEBSTER COUNTY

Well 421550094041001	Local number	86-28-14 ADAB1.....	323
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Well 421837094083601	Local number	87-28-29 CCCD1.....	324
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Well 423018094214701	Local number	89-30-23 CCBB1.....	325
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WOODBURY COUNTY

Well 422058095573701	Local number	87-44-15 CBBB1.....	325
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Well 422830096000511	Local number	88-44-06 BAAB11.....	325
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Well 423015096034601	Local number	89-44-20 DCDC1.....	326
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Well 422910096135811	Local number	89-46-36 BBDC11.....	326
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## WATER RESOURCES DATA - IOWA, 1988

### INTRODUCTION

The Water Resources Division of the U.S. Geological Survey, in cooperation with State agencies, obtains a large amount of data pertaining to the water resources of Iowa each water year. These data, accumulated during many water years, constitute a valuable data base for developing an improved understanding of the water resources of the State. To make these data readily available to interested parties outside of the Geological Survey, the data are published annually in this report series entitled "Water Resources Data - Iowa."

This report contains records for water discharge at 117 gaging stations, stage or contents for 8 lakes and reservoirs, water quality records for 8 gaging stations, sediment records for 10 gaging stations, and water levels for 108 observation wells. Also included are data for 113 crest-stage partial-record stations and water-quality data from 197 municipal wells. Additional water data were collected at various sites not involved in the systematic data-collection program and are published as miscellaneous measurements and analyses. These data represent that part of the National Water Data System operated by the U.S. Geological Survey and cooperating State, local, and Federal agencies in Iowa.

Records of discharge and stage of streams, and contents or stage of lakes and reservoirs were first published in a series of U.S. Geological Survey water-supply papers entitled, "Surface Water Supply of the United States." Through September 30, 1960, these water-supply papers were in an annual series and then in a 5-year series for 1961-65 and 1966-70. Records of chemical quality, water temperatures, and suspended sediment were published from 1941 to 1970 in an annual series of water-supply papers entitled, "Quality of Surface Waters of the United States." Records of ground-water levels were published from 1935 to 1974 in a series of water-supply papers entitled, "Ground-Water Levels in the United States." Water-supply papers may be consulted in the libraries of the principal cities in the United States or may be purchased from Branch of Distribution, U.S. Geological Survey, 604 South Pickett Street, Alexandria, Virginia, 22304.

For water years 1961 through 1970, streamflow data were released by the Geological Survey in annual reports on a State-boundary basis. Water-quality records for water years 1964 through 1970 were similarly released either in separate reports or in conjunction with streamflow records.

Beginning with the 1971 water year, water data for streamflow, water quality, and ground water are published in official Survey reports on a State-boundary basis. These official Survey reports carry an identification number consisting of the two-letter State abbreviation, the last two digits of the water year, and the volume number. For example, this report is identified as "U.S. Geological Survey Water-Data Report IA-87-1." These water-data reports are for sale, in paper copy or in microfiche, by the National Technical Information Service, U.S. Department of Commerce, Springfield, Virginia 22161.

Additional information, including current prices, for ordering specific reports may be obtained from the District Chief at the address given on the back of the title page or by telephone, (319) 337-4191.

## COOPERATION

The U.S. Geological Survey and organizations in the State of Iowa have had cooperative agreements for the systematic collection of streamflow records since 1914, for ground water levels since 1935, and for water-quality records since 1943. Organizations that assisted in collecting data through cooperative agreement with the Survey in water year 1988 are:

Iowa Department of Natural Resources (Geological Survey Bureau),  
Donald L. Koch, Bureau Chief and State Geologist

University of Iowa, Institute of Hydraulic Research, Robert  
G. Hering, Dean of College of Engineering and John F. Kennedy,  
Director

University of Iowa, Hygienics Laboratory, W.J. Hausler, Jr.,  
Director

Iowa Department of Transportation, Highway Division, Robert  
Humphrey, Director, and Vernon J. Marks, Research Engineer

Iowa State University, Richard E. Hasbrook, Contracts and Grants  
Officer, and Iowa State Water Resources Research Institute,  
T. Al Austin, Director

City of Cedar Rapids, Donald Canney, Mayor

City of Des Moines, John Dorrian, Mayor

City of Fort Dodge, Micheal D. McCarville, Mayor

Assistance in the form of funds or services was given by the Corps of Engineers, U.S. Army, in collecting flow records for 77 gaging stations. Assistance was also furnished by NOAA-National Weather Service, U.S. Department of Commerce.

The following organizations aided in collecting records:

Union Electric Co; Des Moines Water Works; Waterloo Sewage Treatment Plant; University of Iowa; West Central Iowa Rural Water Association; and cities of, Charles City, Clear Lake, Denison, Iowa City, Marshalltown, Sioux City and Waterloo.

Organizations that supplied data are acknowledged in station descriptions.

## SUMMARY OF HYDROLOGIC CONDITIONS

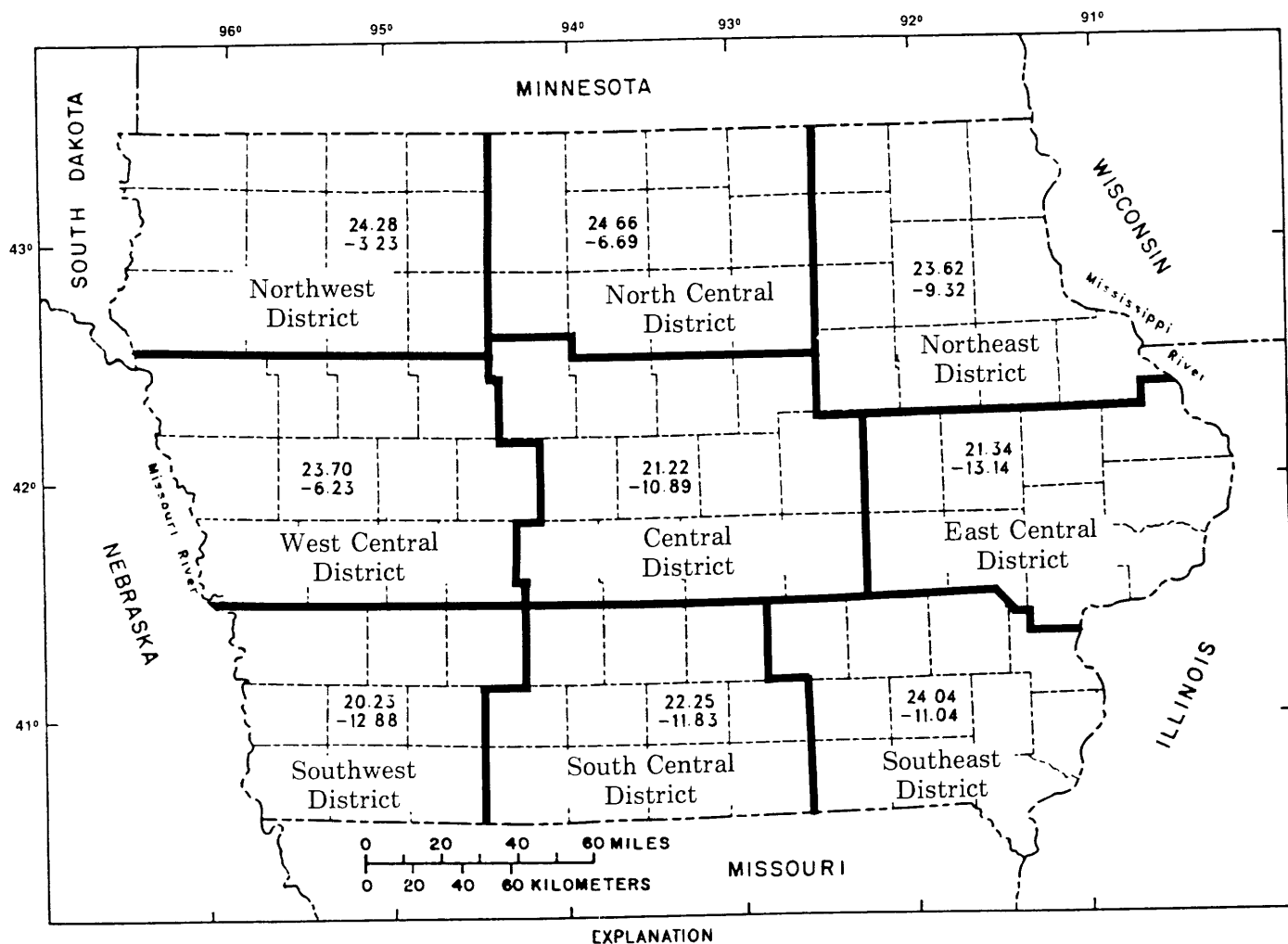
Surface Water

Less than average precipitation and streamflow were prevalent in Iowa during water year 1988 (October 1, 1987, to September 30, 1988). Recorded precipitation for the year (fig. 1) varied from 13.14 inches less than average in the East Central Climatological District to 3.23 inches less than average in the Northwest Climatological District. Precipitation during water year 1988 ranged from 20.23 inches in the Southwest Climatological District to 24.66 inches in the North Central Climatological District. The statewide average precipitation during the water year was 22.85 inches or 71 percent of the 1951-80 average (table 1). Total statewide precipitation from January to July was 50 percent of average. This was the driest January to July period for Iowa on record (1873-1988). Streamflow during water year 1988 generally was less than average at gaging stations on unregulated streams.

Table 1.--Monthly and annual precipitation during water year 1988 as a percentage of average precipitation. [Source: Harry Hillaker, State Climatologist, written commun., 1988]

Climatological district	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Year
Northwest	27	110	113	161	45	36	131	54	60	50	156	144	88
North Central	40	165	162	98	53	40	105	42	63	53	100	119	79
Northeast	26	178	208	109	54	63	61	30	29	53	97	112	72
West Central	35	118	118	95	38	12	71	49	44	115	105	160	79
Central	35	204	202	70	41	33	46	37	30	58	92	100	66
East Central	29	161	189	99	54	53	41	37	26	23	109	56	62
Southwest	44	180	111	39	41	7	57	60	26	74	46	106	61
South Central	36	238	183	26	54	26	30	52	26	48	100	83	65
Southeast	29	216	198	86	66	54	33	48	38	32	115	59	69
Statewide	33	177	172	86	49	37	62	45	38	56	102	104	71

Less than average precipitation fell throughout Iowa during October. Flow in rivers and streams in the State generally decreased steadily during the month. The mean monthly discharge at the index stations on the Cedar River at Cedar Rapids and on the Des Moines River at Fort Dodge was in the normal range (25- to 75-percent quartile of median daily discharges during water years 1951-80 for the specified month) during the month. Residual flow from greater than average precipitation in western Iowa during August and September of 1987 caused the Nishnabotna River at Hamburg to be in the excess flow range (75-percent quartile of median daily discharges during water years 1951-80 for the specified month) during October (fig. 2).



EXPLANATION  
 22.25 Precipitation, in inches, during water year 1988  
 -11.83 Deviation from long-term average (1951-80), in inches  
 Figure 1.—Precipitation record in the National Weather Service's designated climatological districts for water year 1988 (Source: Harry Hillaker, State Climatologist, written commun., 1988)

Greater than average precipitation fell in the State during November and December. Statewide, precipitation was 177 percent of average during November and 172 percent of average during December (table 1). During these months, discharge at the index stations on the Cedar River at Cedar Rapids and on the Des Moines River at Fort Dodge were in the normal range. The discharge at the index station on the Nishnabotna River at Hamburg remained in the excess flow range during October and November (fig. 2).

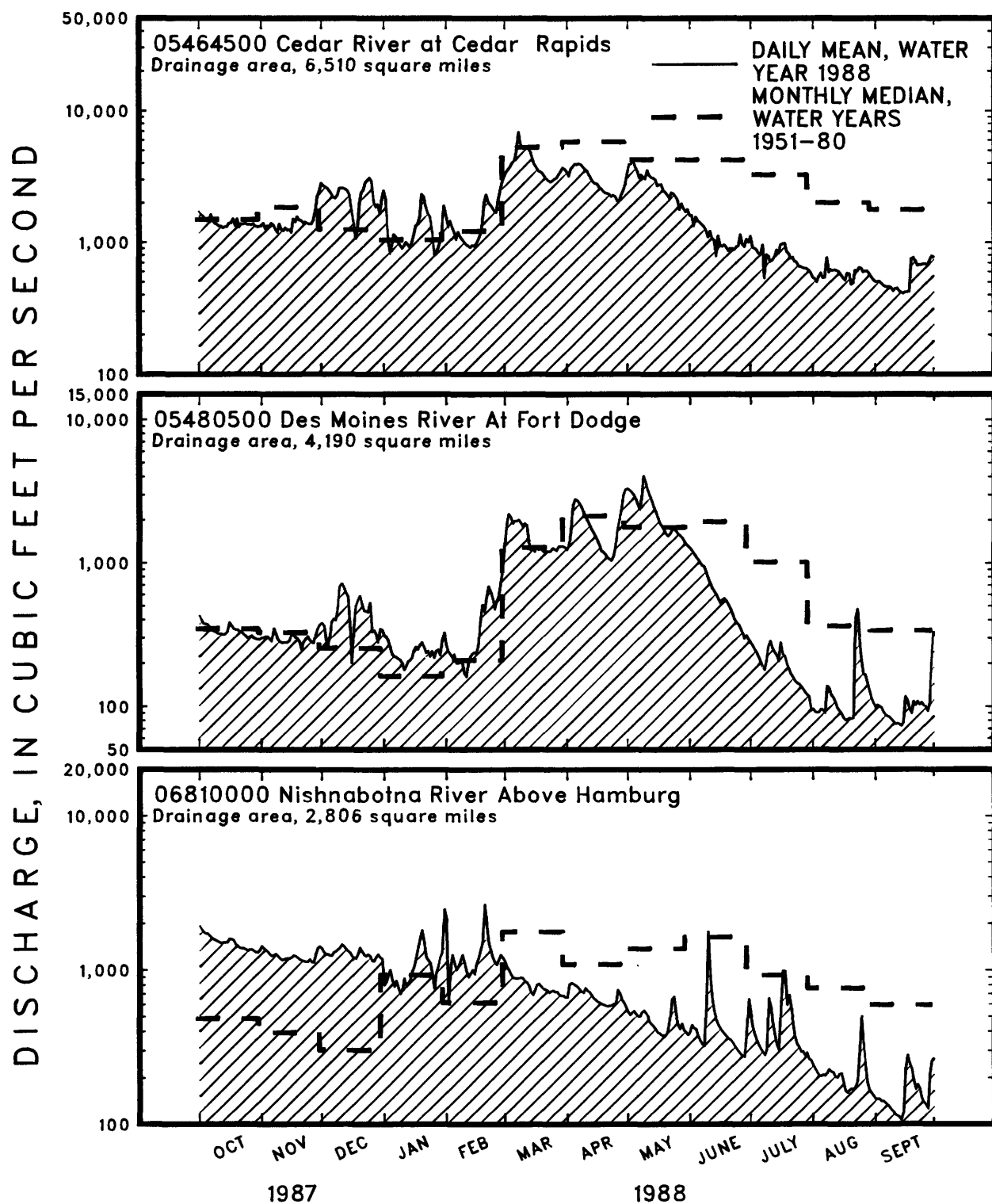


Figure 2.--Daily mean discharge for water year 1988 compared with monthly median discharges for water years 1951-80 for three index stations.

During January, variable precipitation fell throughout the State. Recorded precipitation ranged from 26 percent of average in the South Central Climatological District to 161 percent of average in the Northwest Climatological District (table 1). Most of the precipitation in the northern part of the State fell as snow. Higher than normal temperatures occurred on January 18-19, and rain fell in some locations in the southern part of the State. Discharge increased during this period in many streams in the southern part of the State causing ice jamming and some minor lowland flooding. Discharge at the index stations on the Cedar River at Cedar Rapids and on the Des Moines River at Fort Dodge remained in the normal range during the month. Discharge at the index station on the Nishnabotna River at Hamburg remained in the excess flow range during January (fig. 2).

Precipitation during February through July in Iowa generally was substantially less than average. Statewide, precipitation during this period ranged from 37 percent of average for March to 62 percent of average for April (table 1). Only a thin snow cover was present throughout the State by late February and rivers and streams generally had only minor increases in flow resulting from snowmelt during late February and early March. Flow in rivers and streams throughout the State generally receded during February, March, and April; however, the discharge at the index stations on the Des Moines River at Fort Dodge and on the Cedar River at Cedar Rapids remained in the normal range during this period. The discharge at the index station on the Nishnabotna River at Hamburg was in the excess flow range during February, but receded into the normal range during March and April (fig. 2).

Extremely dry weather during May, June, and July produced low flows in rivers and streams throughout the State. The discharge in the Cedar River at Cedar Rapids and in the Des Moines River at Fort Dodge was in the normal range during May, but the discharge at both index stations receded into the deficient range (25-percent quartile of median daily discharges during water years 1951-80 for the specified month) during June and July. The discharge in the Nishnabotna River above Hamburg was in the deficient range during May, June, and July.

Precipitation in Iowa during August and September was near average. Statewide precipitation was 102 percent of average during August and 104 percent of average during September (table 1). Because of dry antecedent conditions throughout the State, most of this precipitation was absorbed by surficial soil layers, and there was no substantial runoff during these months. The flow of most rivers and streams throughout the State continued to recede during August and September, and most of the annual low-flows were recorded during this period. A comparison of the minimum discharge for water year 1988 with the 7-day, 2-year low-flow discharge; the 7-day, 10-year low-flow discharge; and the minimum discharge for period of record for unregulated gaging stations in Iowa with more than 20 years of record is presented in table 2. Discharge at all three index stations was in the deficient flow range during August and September.



Table 2.--Minimum discharge for water year 1988 compared with the 7-day, 2-year low flow discharge; the 7-day, 10-year low flow discharge; and the minimum discharge for period of record for unregulated gaging stations in Iowa with more than 20 years of record. [ft<sup>3</sup>/s, cubic feet per second]

Station number and name	Minimum discharge for Water Year 1988 (ft <sup>3</sup> /s)	Date	7-day, 2-year low- flow <sup>1</sup> (ft <sup>3</sup> /s)	7-day, 10-year low- flow <sup>1</sup> (ft <sup>3</sup> /s)	Minimum for period of record (ft <sup>3</sup> /s)	Water year
05411600 Turkey R at Spillville	8.9	Sept 15,18	17	7.4	4.4 (2)	1959
05412500 Turkey R at Garber	117	Sept 15,16	161	80	49 (2)	1940
05418500 Maquoketa R nr Maquoketa	290	Sept 2	287	158	105 (2)	1936
05420560 Wapsipinicon R nr Elma	3.6	Sept 15	7.4	4.6	1.9 (2)	1959
05421000 Wapsipinicon R at Independence	18	Sept 15	48	17	7.0 (2)	(3)
05422000 Wapsipinicon R nr De Witt	116	Sept 18	214	103	46 (2)	1977
05449000 East Branch Iowa R nr Klemme	.34	Jan 27	3.1	.75	.2 (2)	1959
05449500 Iowa R nr Rowan	13	Sept 27,28	14	5.5	2.9 (2)	1959
05451500 Iowa R nr Marshalltown	25	Sept 17,18	65	23	4.7 (2)	1977
05451700 Timber Cr at Marshalltown	1.0	Aug 1	3.7	.40	No flow	(3)
05451900 Richland Cr nr Haven	.33	Sept 16	1.4	.23	No flow	1977
05452000 Salt Cr nr Elberon	3.5	Sept 15	8.7	3.1	.85 (2)	1977
05452200 Walnut Cr nr Hartwick	.47(2)	Aug 18	1.4	No flow	No flow	(3)
05453000 Big Bear Cr at Ladora	1.3	Aug 17	5.3	.56	No flow	(3)
05453100 Iowa R at Marengo	81 (2)	Sept 18	192	93	24 (2)	1977
05454000 Rapid Cr nr Iowa City	No flow	(4)	.04	No flow	No flow	(3)
05454300 Clear Cr nr Coralville	.90	Sept 18	2.6	.44	No flow	1977
05455010 South Branch Ralston Cr at Iowa City	No flow	(4)	.04	No flow	No flow	(3)
05455500 English R at Kalona	.80	Sept 12	11	2.7	.66 (2)	1977
05457700 Cedar R at Charles City	78	Aug 3	169	113	60 (2)	(3)
05458000 Little Cedar R nr Ionia	6.0	Sept (5)	18	6.3	3.0 (2)	1959
05458500 Cedar R at Janesville	119	Sept (5)	136	68	28 (2)	1922
05458900 West Fork Cedar R at Finchford	17 (2)	Sept (5)	44	14	5.9 (2)	1959
05459500 Winnebago R at Mason City	.86	Aug 18,19	20	7.1	.86	1988
05462000 Shell Rock R at Shell Rock	37 (2)	Sept 10	151	69	38 (2)	1977
05463000 Beaver Cr at New Hartford	4.0	Sept 17,18	15	4.9	2.3 (2)	(3)
05463500 Black Hawk Cr at Hudson	3.8	Sept (5)	14	4.0	.12 (2)	1977
05464000 Cedar R at Waterloo	384	Sept 8	535	278	152 (2)	1959
05470000 South Skunk R nr Ames	.03	Sept 15	2.1	.10	No flow	(3)
05470500 Squaw Cr at Ames	No flow	(4)	2.1	.08	No flow	(3)
05471200 Indian Cr nr Mingo	.16	Sept 8	5.0	.73	.14 (2)	1968
05471500 South Skunk R nr Oskaloosa	14	Sept 15	58	10	1.8 (2)	1956
05472500 North Skunk R nr Sigourney	6.7	Sept 15	22	2.1	.1 (2)	1956
05474000 Skunk R at Augusta	54	Sept 15,16	135	30	7 (2)	1934
05476500 Des Moines R at Estherville	2.7	Sept 13	8.7	1.4	No flow	1977
05479000 East Fork Des Moines R at Dakota City	14 (2)	Sept 11,14	23	10	4.8 (2)	1977
05481000 Boone R nr Webster City	2.1	Sept 14	12	4.3	No flow	1977
05481950 Beaver Cr nr Grimes	.01(2)	Aug 9,10	1.8	.07	No flow	(3)
05482170 Big Cedar Cr nr Varina	.04	Aug (5)	.43	No flow	No flow	(3)
05482300 North Raccoon R nr Sac City	10	Aug (5)	12	4.5	No flow	1977
05482500 North Raccoon R nr Jefferson	37	Aug 21	39	8.9	.6 (2)	1956
05483000 East Fork Hardin Cr nr Churdan	No flow	(4)	No flow	No flow	No flow	(3)
05484000 South Raccoon R at Redfield	65	Sept (5)	44	25	17 (2)	1977
05484500 Raccoon River at Van Meter	105	Aug 21,22	90	33	10 (2)	1940
05486000 North R nr Norwalk	.30	(4)	1.7	No flow	No flow	(3)
05486490 Middle R nr Indianola	1.5	Sept 8	7.8	1.6	.11 (2)	1977
05487470 South R nr Ackworth	.89	Sept 9,10	3.2	.89	No flow	1956
05487980 White Breast Cr nr Dallas	.52(2)	Sept 14	1.4	.24	.07 (2)	1968
05489000 Cedar Cr nr Bussey	.50	Sept (5)	1.9	.25	No flow	(3)
06483500 Rock R nr Rock Valley	11	Aug (5)	11	1.7	No flow	(3)
06600000 Perry Cr at 38th St, Sioux City	1.3	Aug (5)	.41	.03	No flow	(3)
06600100 Floyd R at Alton	2.2	Aug 3,4	.52	No flow	No flow	(3)
06600300 West Branch Floyd R nr Struble	1.3	Aug (5)	.16	No flow	No flow	(3)
06600500 Floyd River at James	31	Aug 17,18	10	3.2	.90 (2)	1977
06602400 Monona-Harrison Ditch nr Turin	43	Aug (5)	33	16	8.5 (2)	1959
06607500 Little Sioux R nr Turin	148	Aug 18	118	40	17 (2)	1977
06608500 Soldier R at Pisgah	32	Aug (5)	14	3.9	2.0 (2)	1945
06609500 Boyer R at Logan	63	Sept (5)	29	6.8	1.5 (2)	1938
06807410 West Nishnabotna R at Hancock	37	Aug 19	28	6.4	2.2 (2)	1971
06808500 West Nishnabotna R at Randolph	74	Sept (5)	75	23	10 (2)	1955
06809210 East Nishnabotna R nr Atlantic	15	Sept 13,14	21	7.4	2.5 (2)	1977
06809500 East Nishnabotna R at Red Oak	42	(4)	35	14	6 (2)	1936
06810000 Nishnabotna R above Hamburg	104	Sept 14	111	26	4.5 (2)	1934
06811840 Tarkio R at Stanton	No flow	(4)	.50	No flow	No flow	(3)
06817000 Nodaway R at Clarinda	16	Aug 18	16	5.3	1.0 (2)	(3)
06897950 Elk Cr nr Decatur City	No flow	(4)	.20	No flow	No flow	(3)
06898000 Thompson R at Davis City	1.8	Aug 18	9.9	1.8	.1 (2)	1956
06898400 Weldon R nr Leon	No flow	(4)	.26	No flow	No flow	(3)
06903400 Chariton R nr Chariton	No flow	(4)	.55	.18	No flow	(3)
06903700 South Fork Chariton R nr Promise City	.09(2)	Sept 13	.3	-	No flow	1977

1 Lara, O.G., 1979, Annual and seasonal low-flow characteristics of Iowa streams, U.S. Geological Survey, Open-file Report 79-555, 506 p.

2 Minimum daily discharge.

3 Occurred in more than one year.

4 Occurred in more than one month.

5 Occurred more than twice during month.

### Suspended-Sediment

Suspended-sediment discharge at all five daily sediment stations in Iowa was less than average during water year 1988 (fig. 3). At four of the daily sediment stations, suspended-sediment discharge was the lowest for the period of record. The suspended-sediment discharge in the Des Moines River near Saylorville was the second lowest for the period of record. Streamflow at this station is regulated by the Saylorville Reservoir. The minimum suspended-sediment discharge at the five daily suspended-sediment stations generally was measured during August or September.

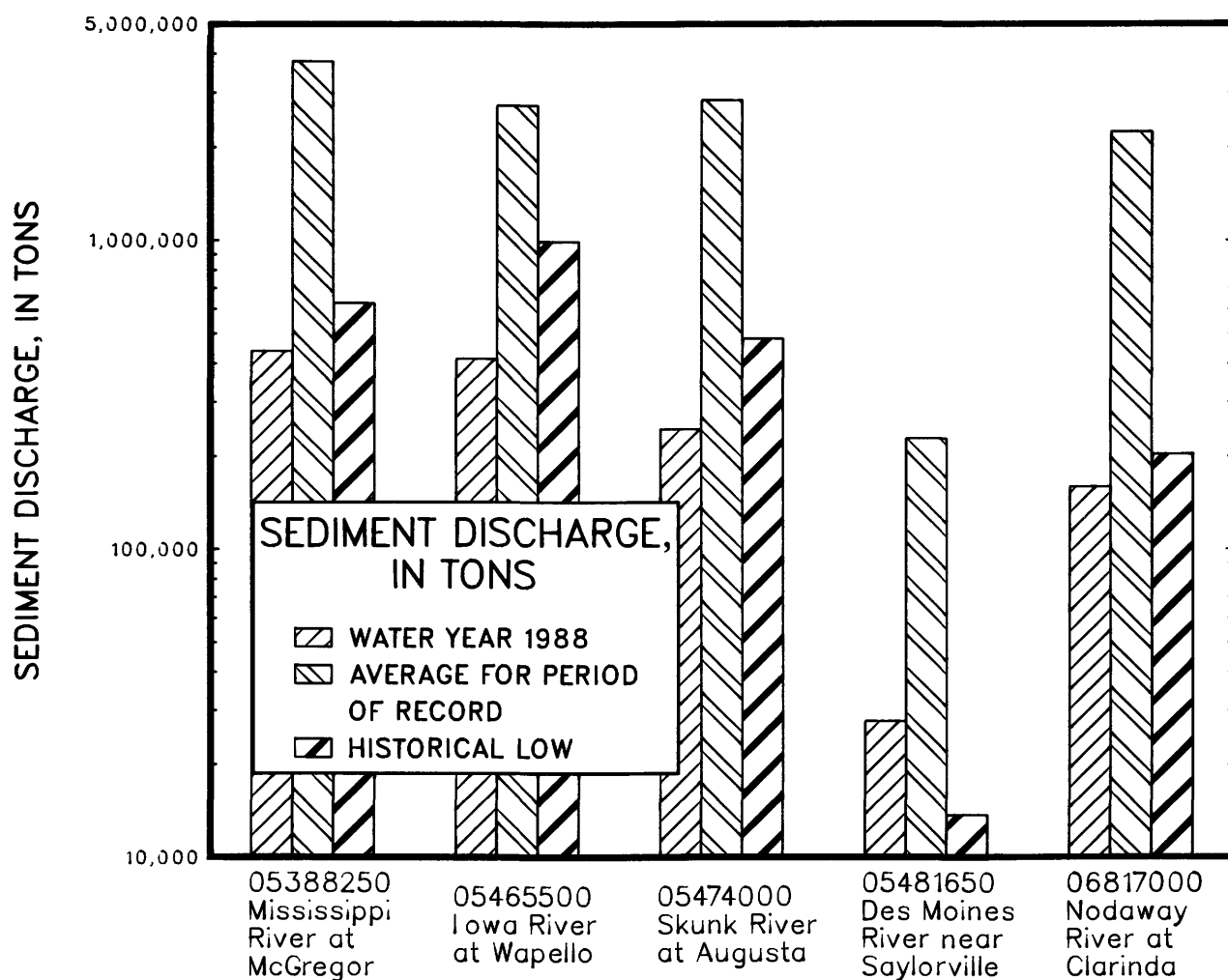


Figure 3.--Comparison of total annual sediment discharge for water year 1988 with average annual sediment discharge and the lowest annual sediment discharge for period of record, for the five daily sediment stations in Iowa.

The maximum daily suspend-sediment discharge for the year in the Mississippi River at McGregor, located in the the Northeast Climatological District, was measured on April 12. This maximum was due to increased streamflow caused by snowmelt in the Upper Mississippi River basin. The minimum daily suspended-sediment discharge at this station was measured on December 11. The total sediment discharge for the year was a record low and reflected the drought conditions in the Mississippi River basin.

The maximum daily suspend-sediment discharge for the year in the Iowa River at Wapello, located in the Southeast Climatological District, was measured on January 31 and the minimum was measured on September 20. The maximum discharge was due to rainfall during January. For Skunk River at Augusta, located in the same climatological district, the maximum daily suspended-sediment discharge for the year was measured on November 30 and the minimum was measured on September 15.

The maximum daily suspended-sediment discharge for the year in the Des Moines River near Saylorville, located in the Central Climatological District, was measured on May 1 and the minimum was measured on August 22.

The maximum daily suspended-sediment discharge for the year in the Nodaway River at Clarinda, located in the Southwest Climatological District, was measured on February 19. This would normally be a period of minimum sediment discharge. The minimum daily sediment discharge was measured on September 23.

### Surface-Water Quality

The chemical quality of surface water in Iowa, as indicated by samples collected at five stations on major rivers, was not significantly different than that for previous years; however, the drought conditions during water year 1988 did affect the concentration of some constituents. Samples collected at these stations indicate that water in the major streams generally is suitable for public water supply and most industrial uses when properly treated. For the constituents analyzed, none of the samples had concentrations that were in excess of environmental standards. Dissolved-oxygen concentrations were slightly less than, or greater than saturation at all stations. This generally indicates, with respect to dissolved oxygen, that stream quality has not been significantly affected by oxygen-demanding substances, such as nutrients or organic matter.

A comparison between selected water-quality data for water year 1988 and data for the period of record are shown for three stations in figures 4, 5 and 6. Boxplots are used to compare the observed nitrate and dissolved solids concentrations for water year 1988 to historical statistics. Daily mean discharge for water year 1988 is shown so that a general relation can be seen between flow conditions and water-quality data. Dissolved-solids and nitrate data, collected at selected National Stream-Quality Accounting Network (NASQAN) stations, were used to demonstrate temporal variability of water quality for the Iowa, Skunk and Nishnabotna Rivers.

## WATER RESOURCES DATA - IOWA, 1988

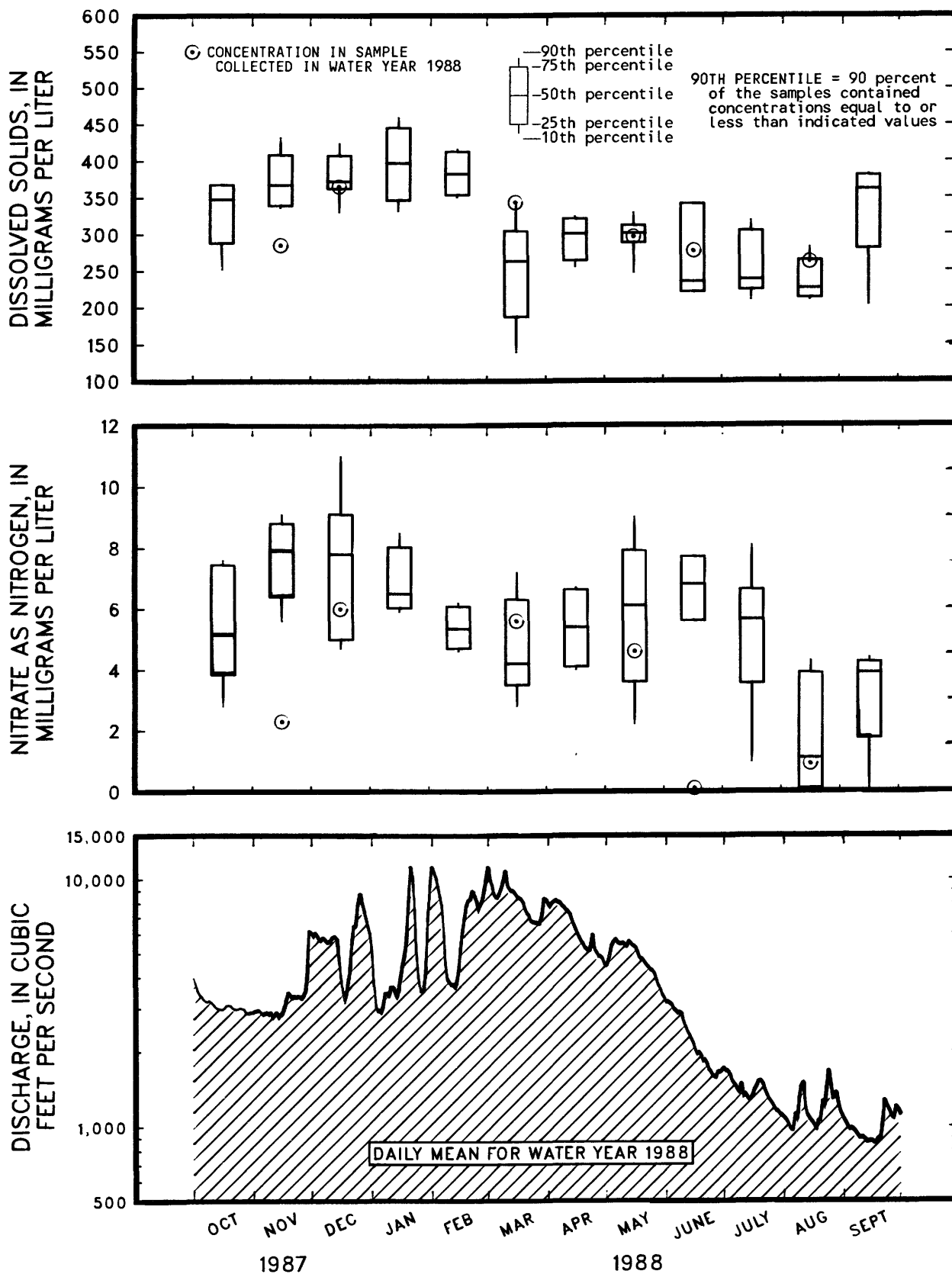


Figure 4.--Comparison of dissolved-solids and nitrate concentrations for water year 1988 with historical data summarized by monthly boxplots at the NASQAN station on the Iowa River at Wapello (station 05465500; period of record, water years 1978-88).

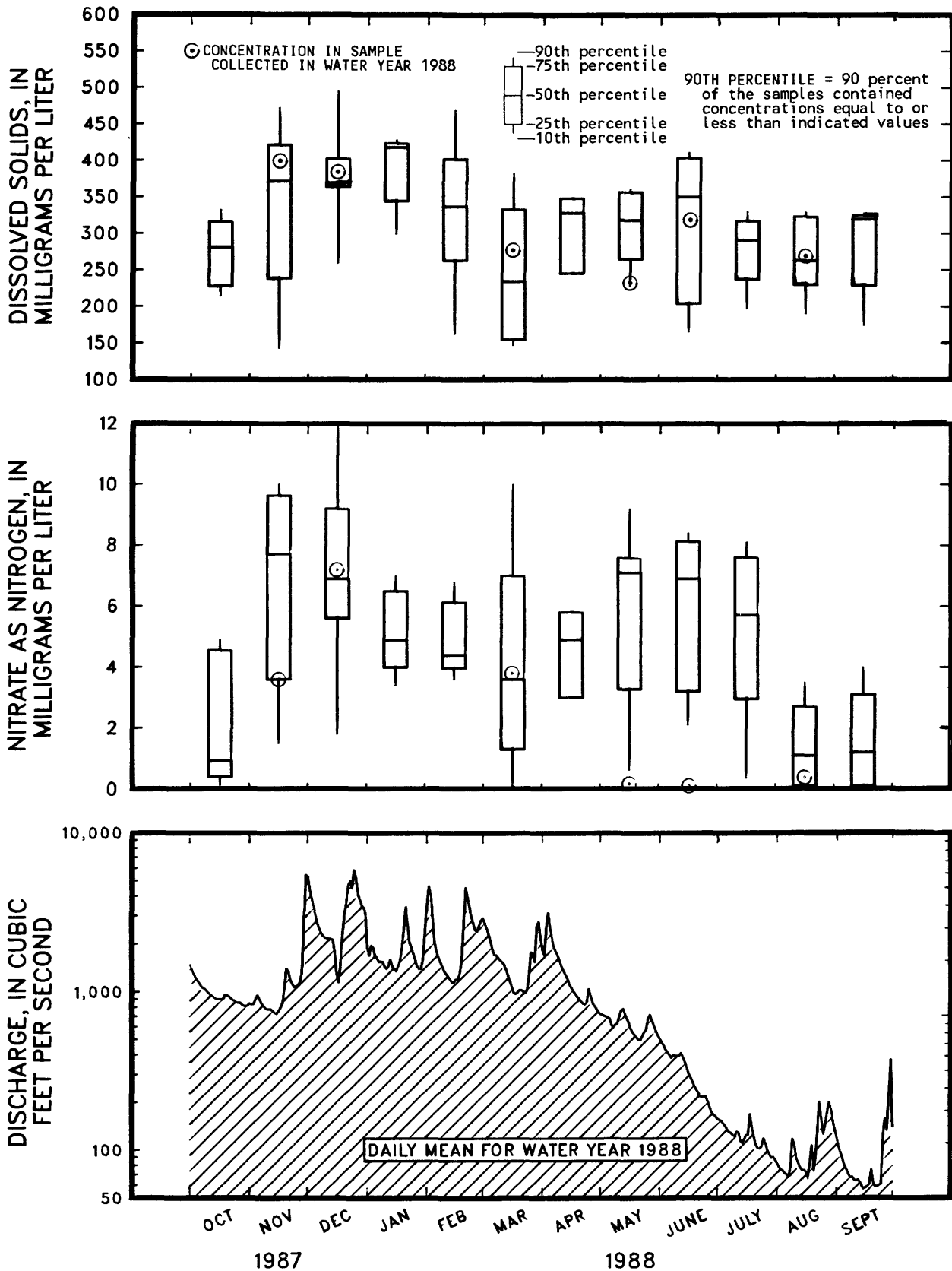


Figure 5.--Comparison of dissolved-solids and nitrate concentrations for water year 1988 with historical data summarized by monthly boxplots at the NASQAN station on the Skunk River at Augusta (station 05474000; period of record, water years 1978-88).

## WATER RESOURCES DATA - IOWA, 1988

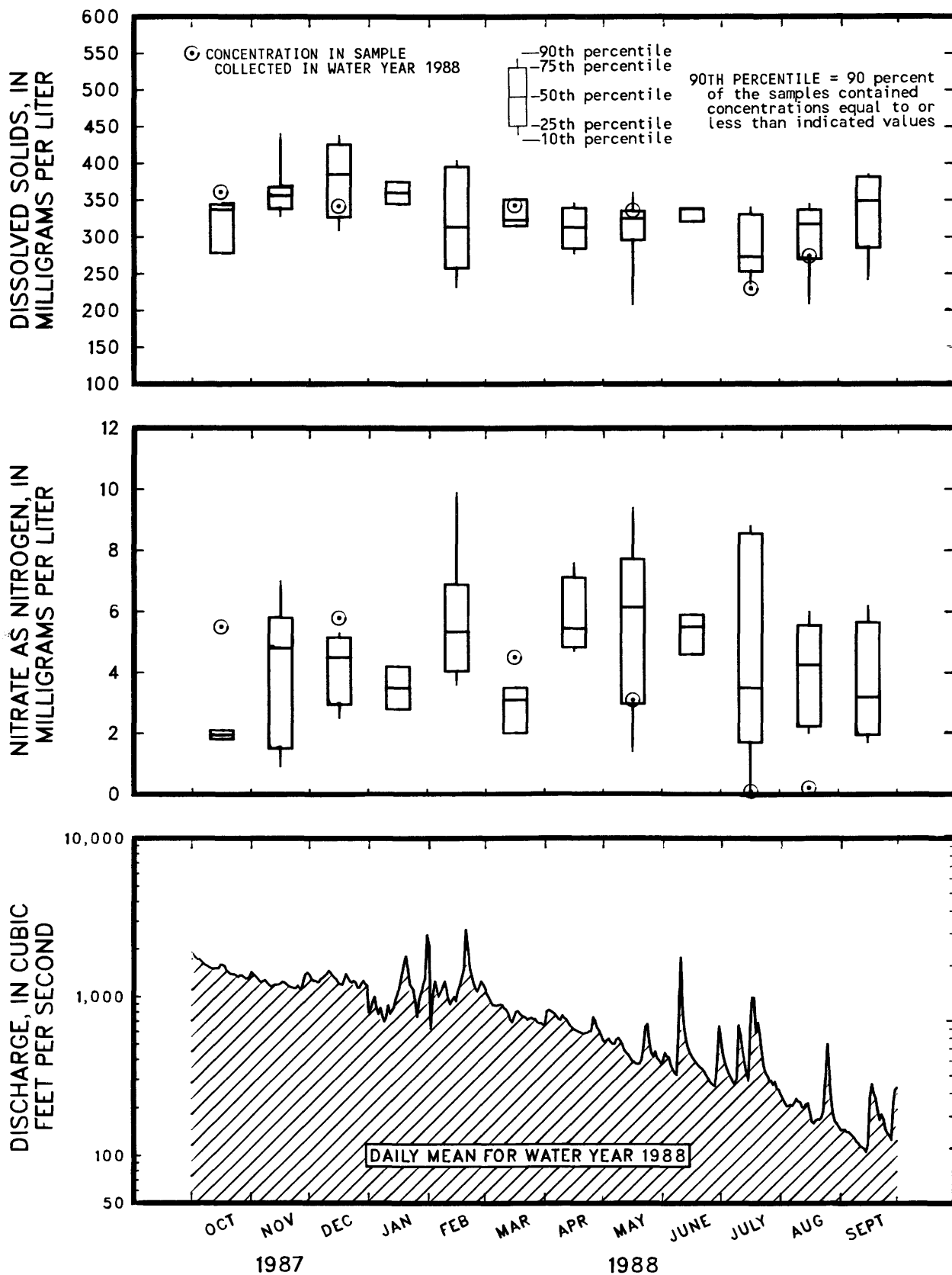


Figure 6.--Comparison of dissolved-solids and nitrate concentrations for water year 1988 with historical data summarized by monthly boxplots at the NASQAN station on the Nishnabotna River above Hamburg (station 06810000; period of record, water years 1980-88).

Concentrations of dissolved-solids for the stations on the Iowa River at Wapello (fig. 4), on the Skunk River at Augusta (fig. 5), and on the Nishnabotna River above Hamburg (fig. 6), for water year 1988, were variable when compared to historical monthly means for the period of record. For four of six samples analyzed, dissolved-solids concentrations in the Iowa River at Wapello (fig. 4) were within the interquartile range (25th to 75th percentile). The sample collected in November had a concentration less than the 25th percentile, the sample collected in March had a concentration greater than the 75th percentile. Samples collected in December and May had dissolved solids concentrations about equal to the historical monthly median (50th percentile).

For five of six samples analyzed, dissolved-solids concentrations in the Skunk River at Augusta (fig. 5) were within the interquartile range; concentrations in four of these samples exceeded the historical monthly median. The sample collected in May had a concentration less than the 25th percentile. For only three of six samples analyzed, dissolved-solids concentrations in the Nishnabotna River above Hamburg (fig. 6) were within the interquartile range. The sample collected in November and May had a concentration greater than the 75th percentile, and the sample collected in July had a concentration less than the 25th percentile.

Nitrate concentrations reported as nitrogen (analysis for nitrite plus nitrate as nitrogen, but nitrite concentration assumed to be negligible) in the Iowa River at Wapello (fig. 4) were less than the historical monthly median for five of six samples analyzed. Concentrations in two of these samples, collected in November and June, were less than the 25th percentile. Nitrate was not detectable in the June sample; however, the historical median for this month is 6.8 mg/L. Nitrate concentrations at the station on the Skunk River at Augusta (fig. 5) were about equal to the historical monthly median in two samples, and were substantially less than the historical median in four of six samples analyzed. Concentrations in the samples collected in May, June, and August were all less than 1.0 mg/L. Nitrate concentrations in the Nishnabotna River above Hamburg (fig. 6) exceeded the 75th percentile in the first three samples collected during the water year. Concentrations in the remaining three samples were less than the historical monthly median. The samples collected in July and August had nitrate concentrations less than the 25th percentile. Except for the sample collected in May, all nitrate concentrations were outside of the interquartile range.

At all three stations, nitrate concentrations generally were less than the historical monthly median for the summer months, and many concentrations were less than the 25th percentile. Drought conditions in the summer months of water year 1988 were the probable cause of the decreased nitrate concentrations because nitrate derived from overland runoff and from nitrate-enriched ground-water seepage into streams was less than normal during the drought.

Ground Water

Water levels in surficial, water-table aquifers in Iowa typically have a moderate autumn rise, a steady or slightly declining water level in winter, and a rapid spring rise followed by a gradual decline throughout the growing season. This pattern generally did not occur during water year 1988 because of a statewide precipitation deficiency during October and during January through July (figs. 7 and 8; table 1). Rises in water levels in these aquifers are partly a result of recharge by infiltration of excess precipitation. Because infiltration rates are decreased by evapotranspiration during the growing season recharge to the aquifers decreases. The deficient precipitation during water year 1988 resulted in less than normal recharge to the aquifers.

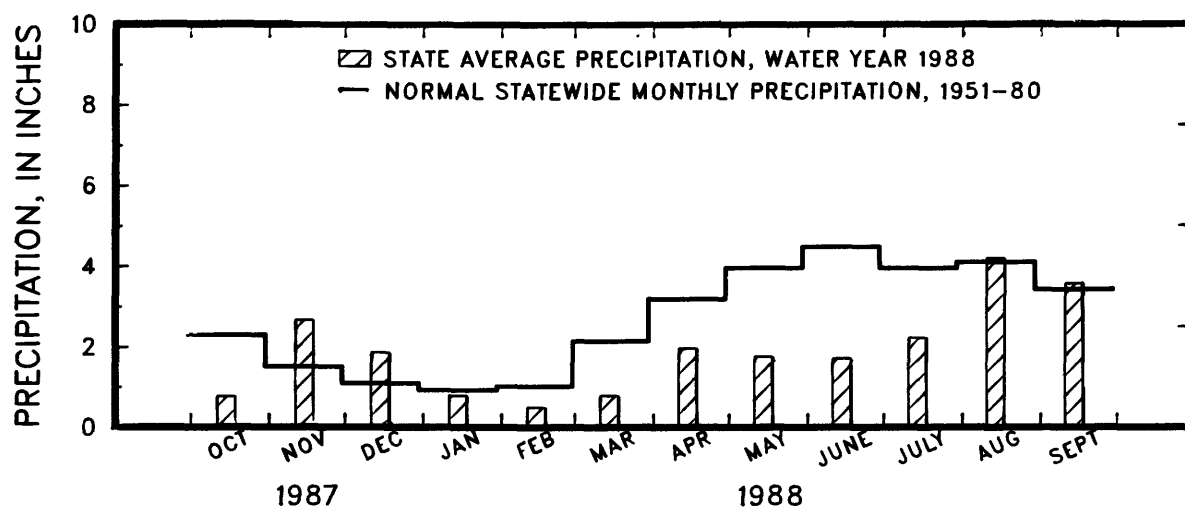


Figure 7.--Statewide average precipitation, during water year 1988 compared to normal statewide monthly precipitation, 1951-80 (Source: P.J. Waite, State climatologist, oral commun., 1987)

The water level records shown in figure 8 are from three shallow, water-table wells completed in glacial drift of Pleistocene age in Linn, Webster, and Marion Counties. The water levels reflect the precipitation pattern for water year 1988 shown in figure 7. Because precipitation during May through September differs between counties, the yearly hydrographs of water levels in observation wells are not always similar. However, the long-term average hydrographs display similar trends.



WATER LEVEL, IN FEET, BELOW LAND-SURFACE DATUM

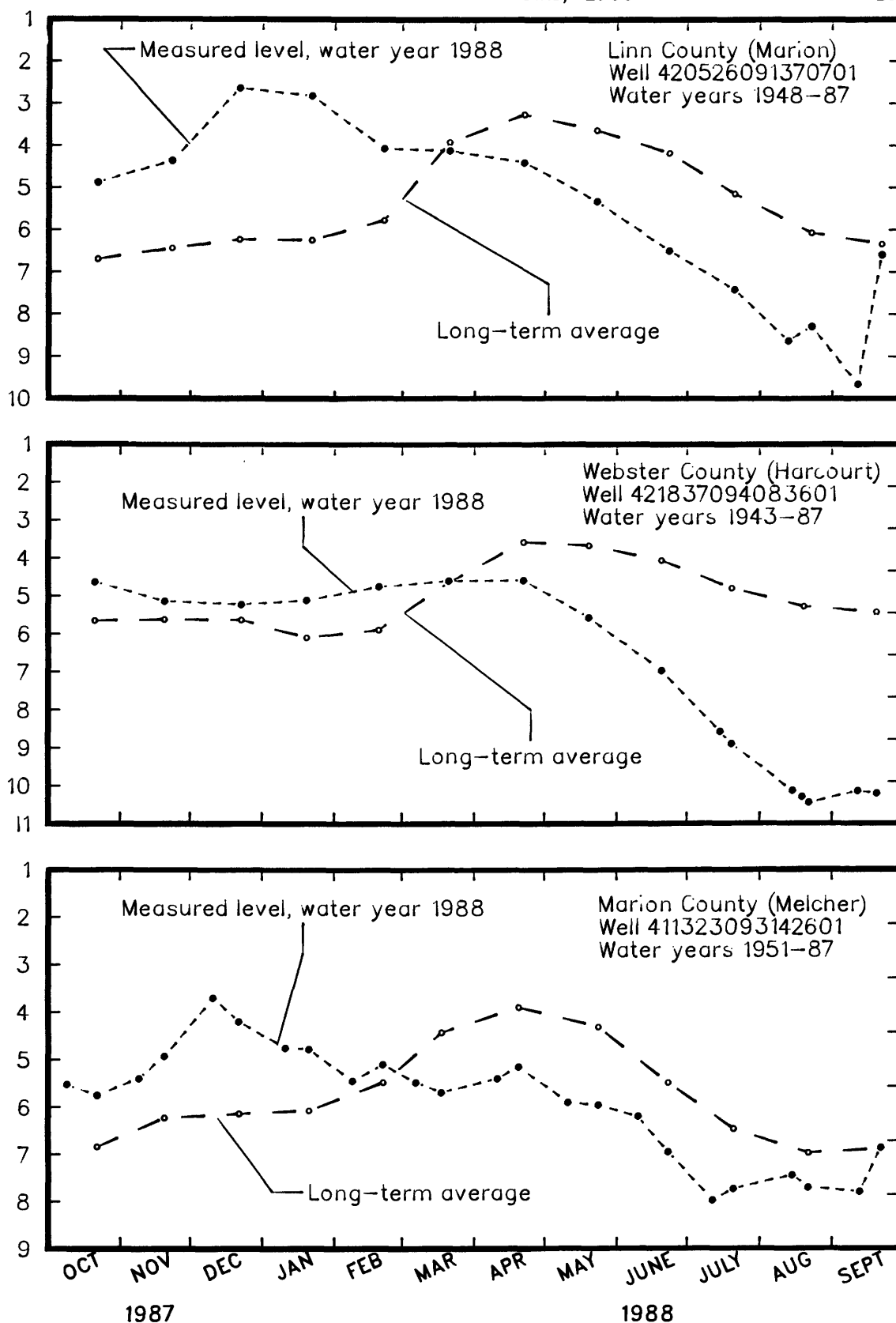


Figure 8.--Monthly water levels during water year 1988 compared to the average monthly levels for the period of record.

The well in Linn County, in east-central Iowa, had water levels lower than the average monthly levels during March through September. A well in Johnson County completed in the same aquifer, in east-central Iowa also had water levels lower than the average monthly levels during March through September; however, water levels also were lower than average water level in October. A well in Washington County completed in the glacial drift aquifer, in southeast Iowa, had a record low water level in September. The well in Webster County, in central Iowa, had water levels lower than the average monthly levels during April through September, and the water level in this well was only slightly higher average in March. The well in Marion County, in south-central Iowa, had water levels lower than the average monthly levels during March through mid-September; the water level in this well was average in late September.

A shallow, water-table well completed in alluvium of Holocene age in Pottawattamie County in southwest Iowa had water levels lower than the average monthly levels during April through September. The water level in this well was only slightly higher than average in March. Nine shallow, water-table wells completed in alluvial aquifers that had record low water levels measured during the water year are listed in table 3.

Table 3.--Water-table wells completed in alluvial aquifers that had record low water levels measured during water year 1988.

County	Well number	Month of record low
Benton	415211092164101	August
Benton	415211092164102	August
Cass	411117095091902	September
Iowa	414816092053401	August
Iowa	414930092093801	August
Iowa	415125092164201	August
Iowa	414709091155801	August
Muscatine	412120091080401	August
Pottawattamie	411024095095502	September

Twenty-three artesian wells in Iowa that had record low water levels measured during the water year are listed in table 4 and six artesian wells that had record high

water levels measured are listed in table 5. These differing water levels were due to the variability of precipitation throughout the state.

Table 4.--Artesian wells that had record low water levels measured in water year 1988.

County	Well number	Aquifer	Month of record low
Benton	421326091522701	Devonian-Ordovician	August
Buena Vista	424023095571401	Dakota	September
Cerro Gordo	430658093281001	Pleistocene	August
Delaware	422029091144302	Silurian	September
Jackson	420842090165704	Galena	September
Johnson	414107091322901	Silurian	July
Johnson	413925091324001	Silurian	August
Johnson	413940091345701	Silurian	September
Johnson	413844091323201	Silurian-Devonian	July
Johnson	414853091425101	Silurian-Devonian	September
Johnson	415214091453901	Silurian-Devonian	September
Jones	415808091160501	Silurian	September
Linn	415534091251502	Jordan	August
Linn	421256091401301	Silurian-Devonian	September
Linn	420237091560701	Silurian	September
Linn	420145091340901	Silurian	September
Osceola	431620095482402	Dakota	July
Osceola	432828095283611	Dakota	May
Sioux	430140095573101	Dakota	October
Sioux	430913096033201	Dakota	July
Washington	412037091564701	Mississippian	September
Washington	411300091320701	Mississippian	September
Washington	411244091323501	Mississippian	September

Table 5.--Artesian wells that had record high water levels measured during water year 1988.

County	Well number	Aquifer	Month of record high
Buena Vista	423618095194511	Dakota	August
Cherokee	424348095231602	Dakota	April
Jackson	420842090165701	Mt. Simon	May
Linn	415534091251502	Jordan	October
Plymouth	424850096074801	Dakota	October
Woodbury	422058095573701	Dakota	January

### Ground-Water Quality

Since 1985 the ground-water quality monitoring program operated by the U.S. Geological Survey in cooperation with the University of Iowa Hygienic Laboratory and the Iowa Geological Survey Bureau has emphasized the analysis of water samples for nitrogen and pesticide constituents collected primarily from municipal wells with depths less than 200 feet. In prior years, only one sample per well was collected during each sampling season; however, in 1988 a group of wells that have consistently yielded water which have a history of containing nitrate concentrations near 10 mg/L or detectable herbicides, or both, were sampled three times during the eight months from April through November. The purpose of this specific sampling was to characterize the seasonal variability of nitrate and herbicide concentrations in shallow ground water throughout the State.

During water year 1988, 255 raw-water samples (untreated, obtained directly from the aquifer or aquifers) were collected from 153 municipal wells (fig.9) throughout the State; these samples were analyzed by the University of Iowa Hygienic Laboratory, and the analyses are published in this report. Single samples were collected from 101 of these wells during August and September. These samples were analyzed for common constituents, nutrients, and common herbicides. Samples from the other 52 municipal wells were collected in April, July, and September, and analyzed for nutrients and common herbicides. The April samples also were analyzed for common constituents. Of the 101 wells that were sampled once during the water year, 84 percent were less than 200 feet deep; 43 percent were completed in alluvial aquifers and the remaining 57 percent were completed in bedrock aquifers.

Madison and Brunett (1984) evaluated nitrate concentrations nationwide and determined that concentrations of nitrate as nitrogen greater than 3 mg/L may indicate effects from human activities, whereas concentrations less than 3 mg/L may indicate natural or ambient concentrations from naturally occurring soil nitrogen or geologic deposits. Of the 101 samples collected from wells that were sampled once during water year 1988, 20 contained nitrate concentrations greater than 3 mg/L, and 3 contained nitrate concentrations greater than 10 mg/L, which is the maximum contaminant limit for public drinking water. For this group of 101 wells that were sampled once, the median nitrate concentration was the detection limit, 0.1 mg/L, and the mean concentration was 1.7 mg/L. The largest nitrate concentration was 14 mg/L. For this group, median ammonia concentration was 0.3 mg/L, and the mean concentration was 0.9 mg/L. The largest ammonia concentration was 1.2 mg/L.

Only five samples collected from the 101 wells that were sampled once contained detectable concentrations of any herbicide, and all five samples were collected from wells less than 200 feet deep. Six percent (5 of 85) of the samples collected from wells less than 200 feet contained detectable herbicide concentrations. All five of the samples contained atrazine and one sample also contained alachlor and metolachlor. The largest concentration was 1.6 ug/L of atrazine. Results from past monitoring indicate that a detection rate of 22 percent is typical for wells less than 200 feet in depth (Detroy, 1988). Drought conditions likely are responsible for this decrease in detection rate. Agricultural chemicals applied in 1988 were not leached into ground water because of the less than normal precipitation during the growing season.

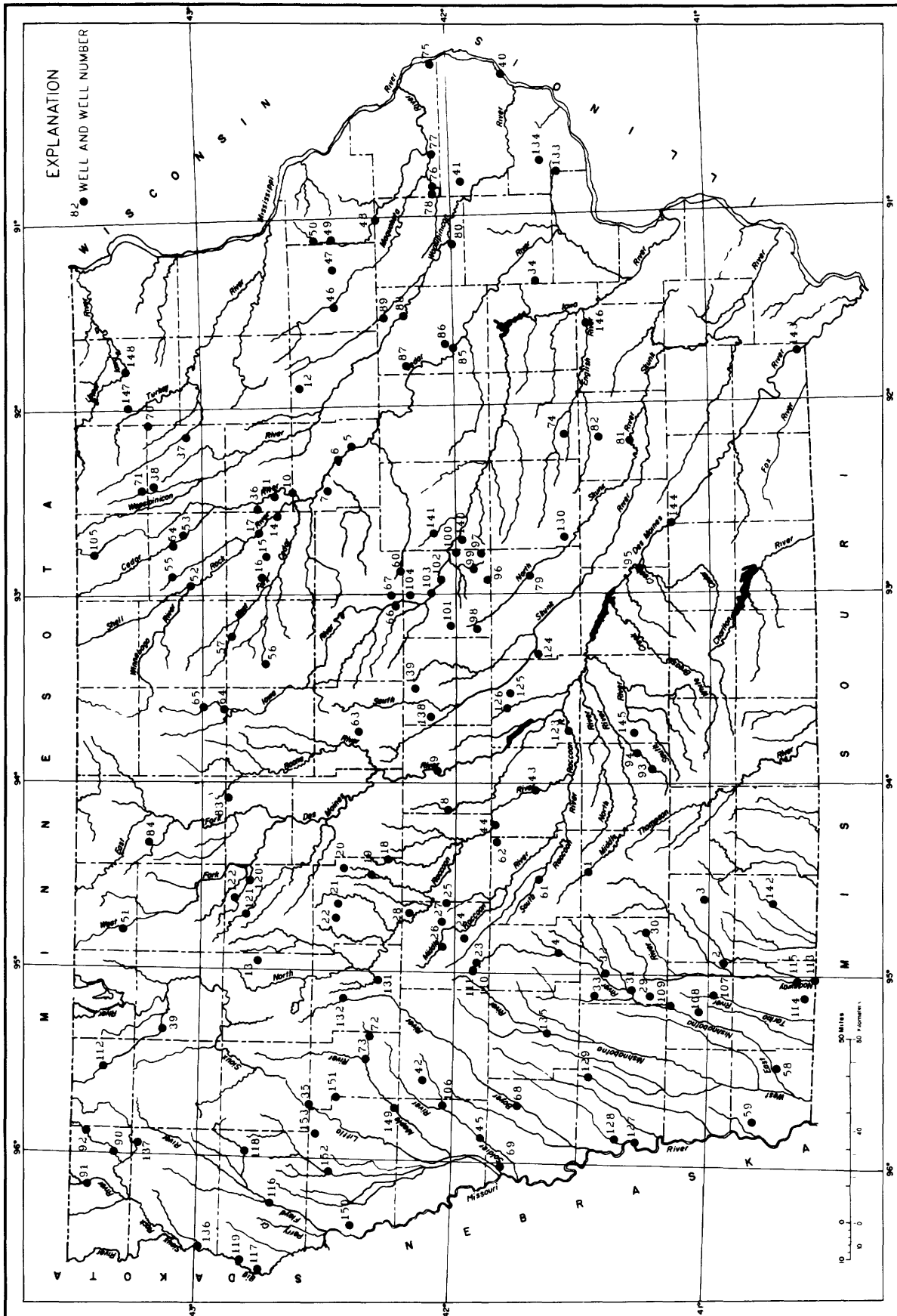


Figure 9.—Location of wells where water samples were collected during water year 1988.

Of the 52 wells that were sampled more than once, all were less than 200 feet deep; 39 were completed in Quaternary aquifers, and 13 were completed in bedrock aquifers. For these samples the median nitrate concentration was the 6.7 mg/L, and the mean concentration was 7.9 mg/L. The largest concentration was 27 mg/L. Statistically, nitrate concentrations did not vary between sampling periods. The median concentration for each sampling period was about the same: sampling period 1--6.7 mg/L; sampling period 2--6.4 mg/L; and sampling period 3--6.7 mg/L. The median ammonia concentration was at the detection limit of 0.1 mg/L. The mean concentration was 0.1 mg/L and the largest concentration was 1.9 mg/L.

Of the 154 samples collected in this group, 63 samples contained detectable concentrations of at least one herbicide. Atrazine was detected in all of these 63 samples, which represent 29 of the 52 municipal wells. The largest concentration of atrazine was 14 ug/L, and the median concentration of the 63 samples was 0.35 ug/L. Cyanazine was detectable in water from six wells, metribuzin was detectable in water from two wells, alachlor was detectable in water from three wells, and metolachlor was detectable in water from two wells.

## SPECIAL NETWORKS AND PROGRAMS

Hydrologic Bench-Mark Network is a network of 57 sites in small drainage basins around the country whose purpose is to provide consistent data on the hydrology, including water quality, and related factors in representative undeveloped watersheds nationwide, and to provide analyses on a continuing basis to compare and contrast conditions observed in basins more obviously affected by the activities of man.

National Stream Quality Accounting Network (NASQAN) is a nationwide data-collection network designed by the U.S. Geological Survey to meet many of the information needs of government agencies and other groups involved in natural or regional water-quality planning and management. The 500 or so sites in NASQAN are generally located at the downstream ends of hydrologic accounting units designated by the U.S. Geological Survey Office of Water Data Coordination in consultation with the Water Resources Council. The objectives of NASQAN are (1) to obtain information on the quality and quantity of water moving within and from the United States through a systematic and uniform process of data collection, summarization, analysis, and reporting such that the data may be used for, (2) description of the areal variability of water quality in the Nation's rivers through analysis of data from this and other programs, (3) detection of changes or trends with time in the pattern of occurrence of water-quality characteristics, and (4) providing a nationally consistent data base useful for water-quality assessment and hydrologic research.

The National Trends Network (NTN) is a 150-station network for sampling atmospheric deposition in the United States. The purpose of the network is to determine the variability, both in location and in time, of the composition of atmospheric deposition, which includes snow, rain, dust particles, aerosols, and gases. The core from which the NTN was built was the already-existing deposition-monitoring network of the National Atmospheric Deposition Program (NADP).

Radiochemical Program is a network of regularly sampled water-quality stations where samples are collected to be analyzed for radioisotopes. The streams that are sampled represent major drainage basins in the conterminous United States.

Tritium Network is a network of stations which has been established to provide baseline information on the occurrence of tritium in the Nation's surface waters. In addition to the surface-water stations in the network, tritium data are also obtained at a number of precipitation stations. The purpose of the precipitation stations is to provide an estimate sufficient for hydrologic studies of the tritium input to the United States.

### EXPLANATION OF THE RECORDS

The surface-water and ground-water records published in this report are for the 1988 water year that began October 1, 1987, and ended September 30, 1988. A calendar of the water year is provided on the inside of the front cover. The records contain streamflow data, stage and content data for lakes and reservoirs, water-quality data for surface and ground water, and ground-water-level data. The locations of the stations and wells where the data were collected are shown in figures 10-13. The following sections of the introductory text are presented to provide users with a more detailed explanation of how the hydrologic data published in this report were collected, analyzed, computed, and arranged for presentation.

#### Station Identification Numbers

Each data station, whether streamsite or well, in this report is assigned a unique identification number. This number is unique in that it applies specifically to a given station and to no other. The number usually is assigned when a station is first established and is retained for that station indefinitely. The systems used by the U.S. Geological Survey to assign identification numbers for surface-water stations and for ground-water well sites differ, but both are based on geographic location. The "downstream order" system is used for regular surface-water stations and the "latitude-longitude" system is used for wells.

#### Downstream Order System

Since October 1, 1950, the order of listing hydrologic-station records in Survey reports is in a downstream direction along the main stream. All stations on a tributary entering upstream from a mainstream station are listed before that station. A station on a tributary that enters between two mainstream stations is listed between them. A similar order is followed in listing stations on first rank, second rank, and other ranks of tributaries. The rank of any tributary with respect to the stream to which it is immediately tributary is indicated by an indentation in the "List of Stations" in the front of this report. Each indentation represents one rank. This downstream order and system of indentation shows which stations are on tributaries between any two stations and the rank of the tributary on which each station is situated.



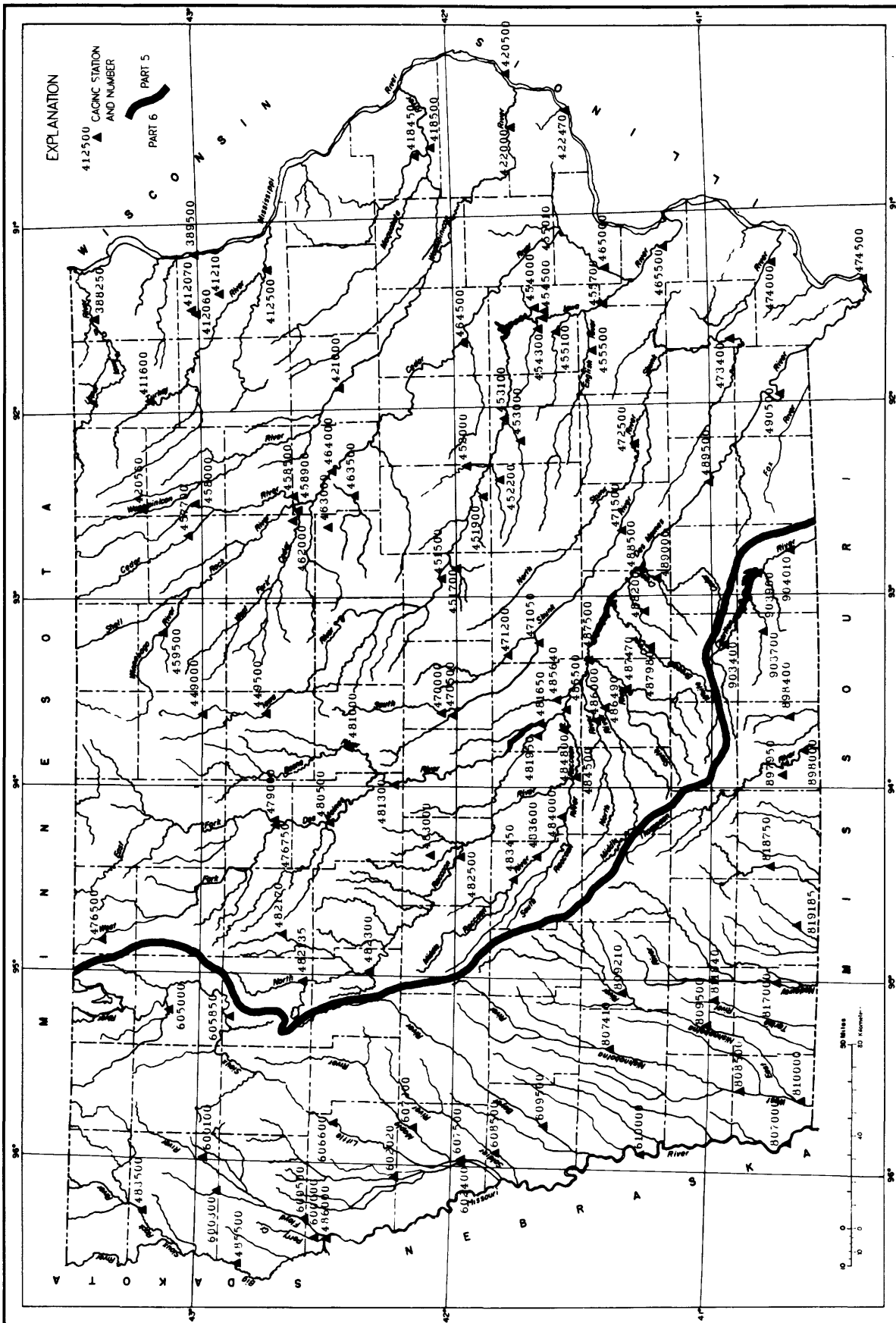


Figure 10.—Location of active, continuous-record gaging stations.

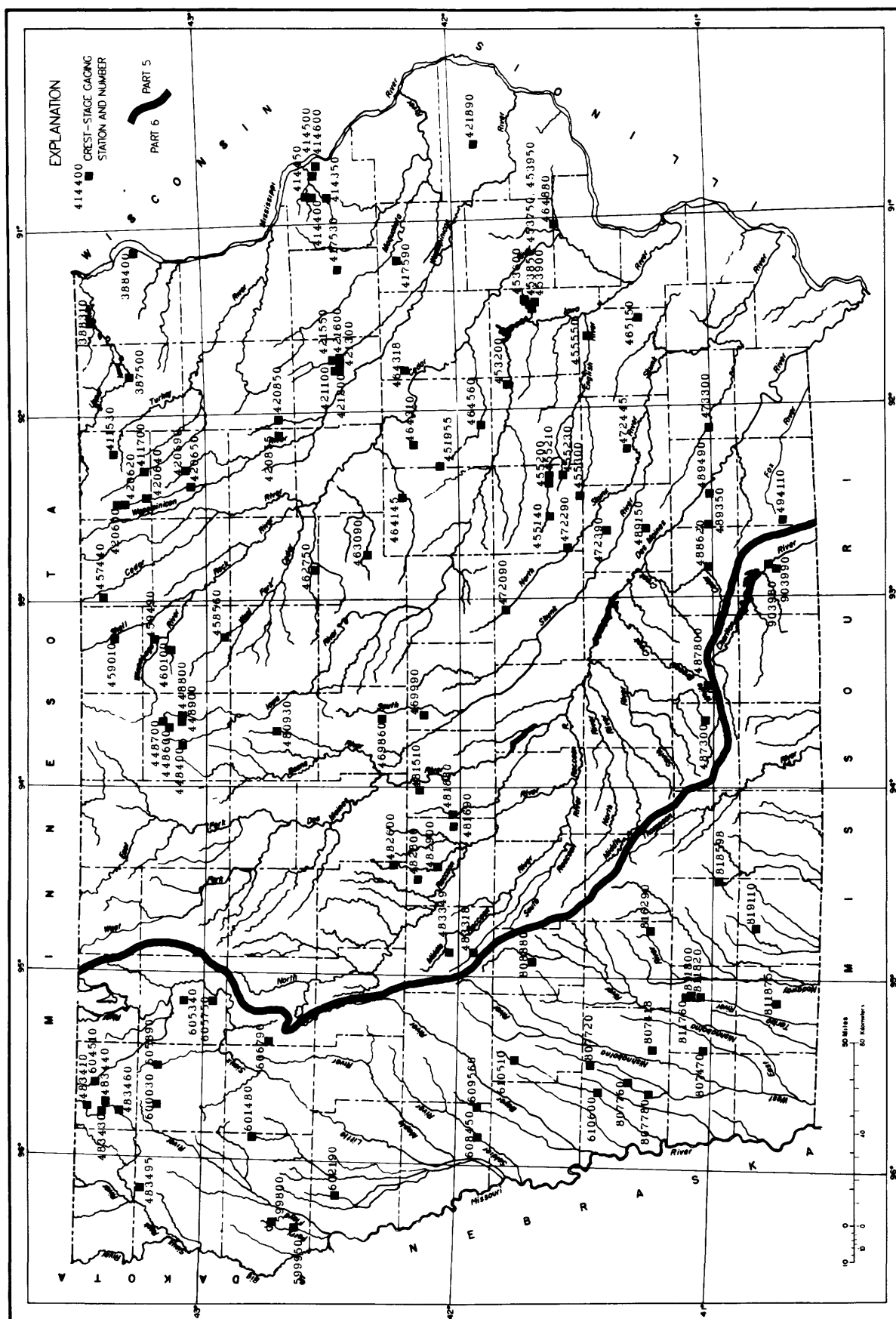


Figure 11.--Location of active, crest-stage gaging stations.

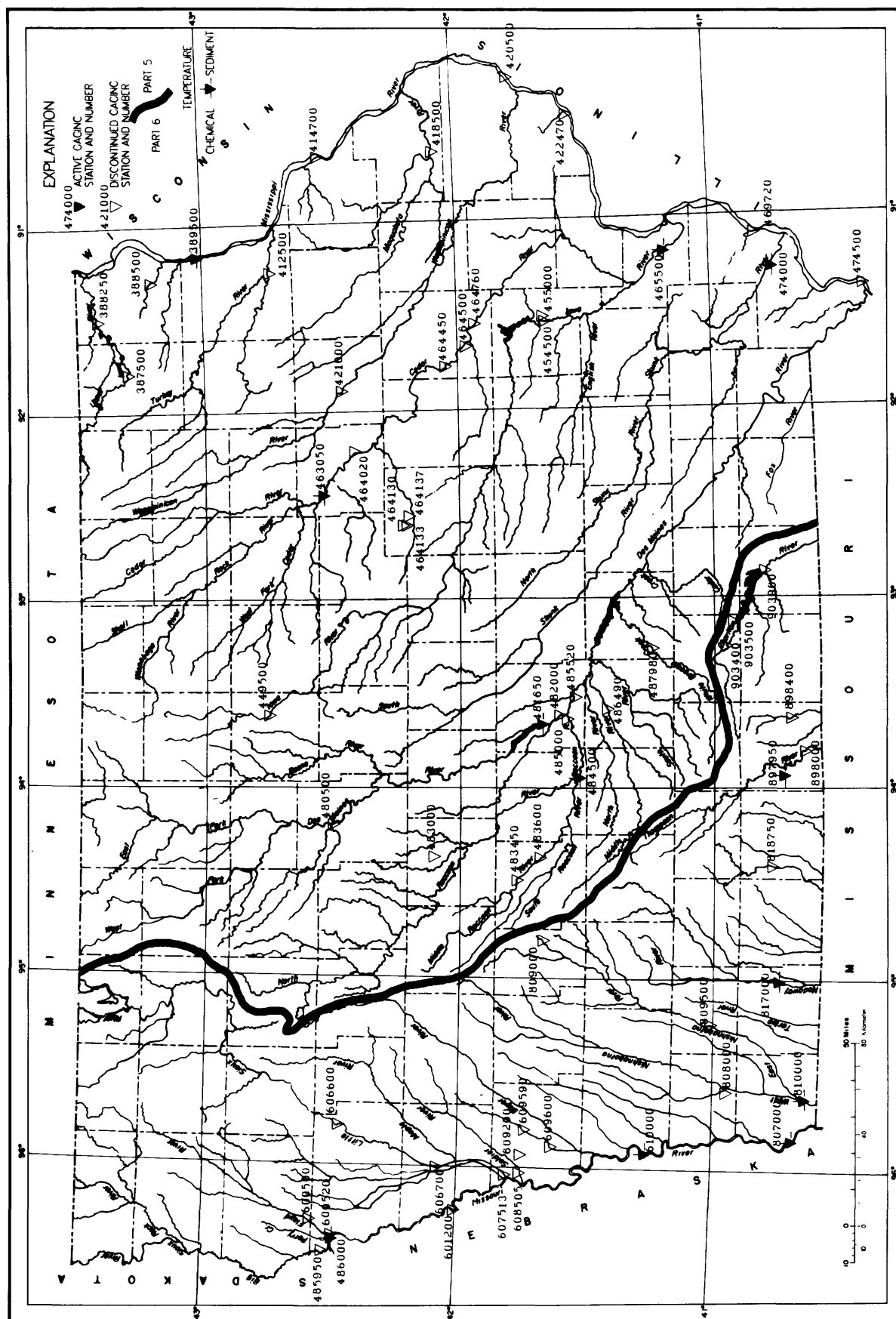


Figure 12.—Location of active and discontinued water-quality stations.

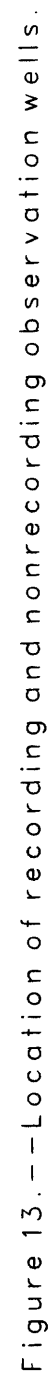


Figure 13. --Location of recording and nonrecording observation wells.

The station-identification number is assigned according to downstream order. In assigning station numbers, no distinction is made between partial-record stations and other stations; therefore, the station number for a partial-record station indicates downstream-order position in a list made up of both types of stations. Gaps are left in the series of numbers to allow for new stations that may be established; hence, the numbers are not consecutive. The complete eight-digit number for each station, such as 05388250, which appears just to the left of the station name, includes the two-digit Part number "05" plus the six-digit downstream-order number "388250." The Part number designates the major river basin; for example, Part "05" is the Mississippi River Basin.

### Latitude-Longitude System

The identification numbers for wells and miscellaneous surface-water sites are assigned according to the grid system of latitude and longitude. The number consists of 15 digits. The first six digits denote the degrees, minutes, and seconds of latitude, the next seven digits denote degrees, minutes, and seconds of longitude, and the last two digits (assigned sequentially) identify the wells or other sites within a 1-second grid. This site-identification number, once assigned, is a pure number and has no locational significance. In the rare instance where the initial determination of latitude and longitude are found to be in error, the station will retain its initial identification number; however, its true latitude and longitude will be listed in the LOCATION paragraph of the station description. (See figure below.)

Latitude and longitude coordinates for wells:  
1. 414315N 091252001.  
2. 414315N 091252002.  
3. 414316N 091251901.

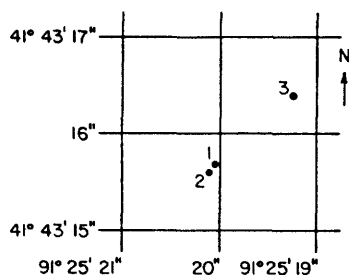


Figure 14.--Latitude-longitude well number.

### Numbering System For Wells

Each well is identified by means of (1) a 15-digit number that is based on the grid system of latitude and longitude, and (2) a local number that is provided for continuity with older reports and for other use as dictated by local needs. The former number serves not only to identify the well but also to locate it as a point on a map (fig. 9). For maximum utility, latitude and longitude code numbers are determined to seconds in order that each well may have a unique number. The first six digits denote degrees, minutes, and seconds of north latitude; the next seven digits are degrees, minutes, and seconds of west longitude; and the last two numbers are a sequential number assigned in the order in which the wells are located in a 1-second quadrangle.

The local well numbers are in accordance with the Bureau of Land Management's system of land subdivision. Each well number is made up of three segments. The first segment indicates the township, the second the range, and the third the section in which the well is located (fig. 15). The letters after the section number which are assigned in a counter-clockwise direction (beginning with "A" in the northeast quarter), represent subdivisions of the section. The first letter denotes a 160-acre tract, the second a 40-acre tract, the third a 10-acre tract, and the fourth a 2.5 acre tract. Numbers are added as suffixes to distinguish wells in the same tract. Thus, the number 96-20-3CDBD1 designates the well in the SE 1/4 NW 1/4 SE 1/4 SW 1/4 sec.3, T.96 N., R.20 W.

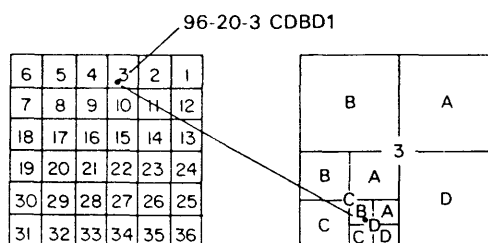


Figure 15.--Local well-numbering system for well 96-20-3CDBD1.

### Records of Stage and Water Discharge

Records of stage and water discharge may be complete or partial. Complete records of discharge are those obtained using a continuous stage-recording device through which either instantaneous or mean daily discharges may be computed for any time, or any period of time, during the period of record. Complete records of lake or reservoir content, similarly, are those for which stage or content may be computed or estimated with reasonable accuracy for any time, or period of time. They may be obtained using a continuous stage-recording device, but need not be. Because daily mean discharges and end-of-day contents commonly are published for such stations, they are referred to as "daily stations." Location of all complete-record surface water stations which are given in this report are shown in figure 10.

Partial records are obtained through discrete measurements without using a continuous stage-recording device and generally pertain only to a characteristic of either high, medium or low flow. The location of all active, crest-stage gaging stations are shown in figure 11.

### Data Collection and Computation

The data obtained at a complete-record gaging station on a stream or canal consist of a continuous record of stage, individual measurements of discharge throughout a range of stages, and notations regarding factors that may affect the relationships between stage and discharge. These data, together with supplemental information, such as weather records, are used to compute daily discharges. The data obtained at a complete-record gaging station on a lake or reservoir consist of a record of stage and of notations regarding factors that may affect the relationship between stage and lake content. These data are used with stage-capacity curves or tables to compute lake storage.

Continuous records of stage are obtained with analog recorders that trace continuous graphs of stage or with digital recorders that punch stage values on paper tapes at selected time intervals. Measurements of discharge are made with current meters using methods adopted by the Geological Survey as a result of experience accumulated since 1880. These methods are described in standard textbooks, in Water-Supply Paper 2175, and in U.S. Geological Survey Techniques of Water-Resources Investigations, Book 3, Chapter A6.

In computing discharge records, results of individual measurements are plotted against the corresponding stages, and stage-discharge relation curves are then constructed. From these curves, rating tables indicating the approximate discharge for any stage within the range of the measurements are prepared. If it is necessary to define extremes of discharge outside the range of the current-meter measurements, the curves are extended using: (1) logarithmic plotting; (2) velocity-area studies; (3) results of indirect measurements of peak discharge, such as slope-area or contracted-opening measurements, and computations of flow over dams or weirs; or (4) step-backwater techniques.

Daily mean discharges are computed by applying the daily mean stages (gage heights) to the stage-discharge curves or tables. If the stage-discharge relation is subject to change because of frequent or continual change in the physical features that form the control, the daily mean discharge is determined by the shifting-control method, in which correction factors based on the individual discharge measurements and notes of the personnel making the measurements are applied to the gage heights before the discharges are determined from the curves or tables. This shifting-control method also is used if the stage-discharge relation is changed temporarily because of aquatic growth or debris on the control. For some stations, formation of ice in the winter may so obscure the stage-discharge relations that daily mean discharges must be estimated from other information such as temperature and precipitation records, notes of observations, and records for other stations in the same or nearby basins for comparable periods.

At some stream-gaging stations, the stage-discharge relation is affected by the backwater from reservoirs, tributary streams, or other sources. This necessitates the use of the slope method in which the slope or fall in a reach of the stream is a factor in computing discharge. The slope or fall is obtained by means of an auxiliary gage set at some distance from the base gage. At some stations the stage-discharge relation is affected by changing stage; at these stations the rate of change in stage is used as a factor in computing discharge.

In computing records of lake or reservoir contents, it is necessary to have available from surveys, curves or tables defining the relationship of stage and content. The application of stage to the stage-content curves or tables gives the contents from which daily, monthly, or yearly changes then are determined. If the stage-content relation changes because of deposition of sediment in a lake or reservoir, periodic resurveys may be necessary to redefine the relation. Even when this is done, the contents computed may become increasingly in error as the lapsed time since the last survey increases. Discharges over lake or reservoir spillways are computed using stage-discharge relations.

For some gaging stations, there are periods when no gage-height record is obtained, or the recorded gage height is so faulty that it cannot be used to compute daily discharge or contents. This happens when the recorder stops or otherwise fails to operate properly, intakes are plugged, the float is frozen in the well, or for various other reasons. For these periods, the daily discharges are estimated from the recorded range in stage, discharge computed before and after the missing record, discharge measurements, weather records, and comparison with other station records from the same or nearby basins. Likewise, daily contents may be estimated from operator's logs, previous or following record, inflow-outflow studies, and other information. Information explaining how estimated daily-discharge values are identified in station records is included in the next two sections, "Data Presentation" (REMARKS paragraph) and "Identifying Estimated Daily Discharge."



## Data Presentation

The records published for each gaging station consist of two parts, the manuscript or station description and the data table for the current water year. The manuscript provides, under various headings, descriptive information, such as station location; period of record; average discharge; historical extremes; record accuracy; and other remarks pertinent to station operation and regulation. The following information, as appropriate, is provided with each continuous record of discharge or lake content. Comments to follow clarify information presented under the various headings of the station description.

LOCATION.--Information on locations is obtained from the most accurate maps available. The location of the gage with respect to the cultural and physical features in the vicinity and with respect to the reference place mentioned in the station name is given. River mileages were determined by methods given in "River Mileage Measurement," Bulletin 14, Revision of October 1968, prepared by the Water Resources Council or were provided by the U.S. Army Corps of Engineers.

DRAINAGE AREA.--Drainage areas are measured using the most accurate maps available. Because the type of maps available varies from one drainage basin to another, the accuracy of drainage areas likewise varies. Drainage areas are updated as better maps become available.

PERIOD OF RECORD.--This indicates the period for which there are published records for the station or for an equivalent station. An equivalent station is one that was in operation at a time that the present station was not, and whose location was such that records from it can reasonably be considered equivalent with records from the present station.

REVISED RECORDS.--Published records, because of new information, occasionally are found to be incorrect, and revisions are printed in later reports. Listed under this heading are all the reports in which revisions have been published for the station and the water years to which the revisions apply. If a revision did not include daily, monthly, or annual figures of discharge, that fact is noted after the year dates as follows: "(M)" means that only the instantaneous maximum discharge was revised; "(m)" that only the instantaneous minimum was revised; and "(P)" that only peak discharges were revised. If the drainage area has been revised, the report in which the most recently revised figure was first published is given.

GAGE.--The type of gage in current use, the datum of the current gage referred to National Geodetic Vertical Datum of 1929 (see glossary), and a condensed history of the types, locations, and datums of previous gages are given under this heading.

REMARKS.--All periods of estimated daily-discharge record will either be identified by date in this paragraph of the station description for water-discharge stations or flagged in the daily-discharge table. (See next section, "Identifying Estimated Daily Discharge.") If a remarks statement is used to identify estimated record, the paragraph will begin with this information presented as the first entry. The paragraph is also used to present information relative to the accuracy of the records, to special methods of computation, to conditions that affect natural flow at the station and, possibly, to other pertinent items. For reservoir stations, information is given on the dam forming the reservoir, the capacity, outlet works and spillway, and purpose and use of the reservoir.

COOPERATION.--Records provided by a cooperating organization or obtained for the Geological Survey by a cooperating organization are identified here.

AVERAGE DISCHARGE.--The discharge value given is the arithmetic mean of the water-year mean discharges. It is computed only for stations having at least 5 water years of complete record, and only water years of complete record are included in the computation. It is not computed for stations where diversions, storage, or other water-use practices cause the value to be meaningless. If water developments significantly altering flow at a station are put into use after the station has been in operation for a period of years, a new average is computed as soon as 5 water years of record have accumulated following the development. The median of yearly mean discharges also is given under this heading for stations having 10 or more water years of record, if the median differs from the average given by more than 10 percent.

EXTREMES FOR PERIOD OF RECORD.--Extremes may include maximum and minimum stages and maximum and minimum discharges or content. Unless otherwise qualified, the maximum discharge or content is the instantaneous maximum corresponding to the highest stage that occurred. The highest stage may have been obtained from a graphic or digital recorder, a crest-stage gage, or by direct observation of a nonrecording gage. If the maximum stage did not occur on the same day as the maximum discharge or content, it is given separately. Similarly, the minimum is the instantaneous minimum discharge, unless otherwise qualified, and was determined and is reported in the same manner as the maximum.

EXTREMES OUTSIDE PERIOD OF RECORD.--Included here is information concerning major floods or unusually low flows that occurred outside the stated period of record. The information may or may not have been obtained by the U.S. Geological Survey.

EXTREMES FOR CURRENT YEAR.--Extremes given here are similar to those for the period of record, except the peak discharge listing may include secondary peaks. For stations meeting certain criteria, all peak discharges and stages occurring during the water year and greater than a selected base discharge are presented under this heading. The peaks greater than the base discharge, excluding the highest one, are referred to as secondary peaks. Peak discharges are not published for canals, ditches, drains, or streams for which the peaks are subject to substantial control by man. The time of occurrence for peaks is expressed in 24-hour local standard time. For example, 12:30 a.m. is 0030, and 1:30 p.m. is 1330. The minimum for the current water year appears below the table of peak data.

REVISIONS.--If a critical error in published records is discovered, a revision is included in the first report published following discovery of the error.

Although rare, occasionally the records of a discontinued gaging station may need revision. Because, for these stations, there would be no current or, possibly, future station manuscript published to document the revision in a "Revised Records" entry, users of data for these stations who obtained the record from previously published data reports may wish to contact the offices whose addresses are given on the back of the title page of this report to determine if the published records were ever revised after the station was discontinued. Of course, if the data were obtained by computer retrieval, the data would be current and there would be no need to check because any published revision of data is always accompanied by revision of the corresponding data in computer storage.

Manuscript information for lake or reservoir stations differs from that for stream stations in the nature of the "Remarks" and in the inclusion of a skeleton stage-capacity table when daily contents are given.

The daily table for stream-gaging stations gives mean discharge for each day and is followed by monthly and yearly summaries. In the monthly summary below the daily table, the line headed "TOTAL" gives the sum of the daily figures. The line headed "MEAN" gives the average flow in cubic feet per second during the month. The lines headed "MAX" and "MIN" give the maximum and minimum daily discharges, respectively, for the month. Discharge for the month also is usually expressed in cubic feet per second per square mile (line headed "CFSM"), or in inches (line headed "IN."), or in acre-feet (line headed "AC-FT"). Figures for cubic feet per second per square mile and runoff in inches are omitted if there is extensive regulation or diversion or if the drainage area includes large noncontributing areas. In the yearly summary below the monthly summary, the figures shown are the appropriate discharges for the calendar and water years. At some stations monthly and (or) yearly observed discharges are adjusted for reservoir storage or diversion, or diversions or reservoir contents are given. These figures are identified by a symbol and corresponding footnote.

Data collected at partial-record stations follow the information for continuous-record sites. This section consists of a table of annual maximum stage and discharge for crest-stage stations.

#### Identifying Estimated Daily Discharge

Estimated daily-discharge values published in the water-discharge tables of annual State data reports are identified by listing the dates of the estimated record in the REMARKS paragraph of the station description.

#### Accuracy of the Records

The accuracy of streamflow records depends primarily on: (1) The stability of the stage-discharge relation or, if the control is unstable, the frequency of discharge measurements; and (2) the accuracy of measurements of stage, measurements of discharge, and interpretation of records.

The accuracy attributed to the records is indicated under "REMARKS." "Excellent" means that about 95 percent of the daily discharges are within 5 percent of their true values; "good," within 10 percent; and "fair," within 15 percent. Records that do not meet the criteria mentioned are rated "poor." Different accuracies may be attributed to different parts of a given record.

Daily mean discharges in this report are given to the nearest hundredth of a cubic foot per second for values less than 1 ft<sup>3</sup>/s the nearest tenth between 1.0 and 10 ft<sup>3</sup>/s; to whole numbers between 10 and 1,000 ft<sup>3</sup>/s; and to 3 significant figures for more than 1,000 ft<sup>3</sup>/s. The number of significant figures used is based solely on the magnitude of the discharge value. The same rounding rules apply to discharges listed for partial-record stations and miscellaneous sites.

Discharge at many stations, as indicated by the monthly mean, may not reflect natural runoff due to the effects of diversion, consumption, regulation by storage, increase or decrease in evaporation due to artificial causes, or to other factors. For such stations, figures of cubic feet per second per square mile and of runoff, in inches, are not published.

#### Other Records Available

Information used in the preparation of the records in this publication, such as discharge-measurement notes, gage-height records, temperature measurements, and rating tables is on file in various field offices of the Iowa District. Also, most of the daily mean discharges are in computer-readable form and have been analyzed statistically. Information on the availability of the unpublished information or on the results of statistical analyses of the published records may be obtained from the offices whose addresses are given on the back of the title page of this report.

#### Records of Surface-Water Quality

Records of surface-water quality ordinarily are obtained at or near stream-gaging stations because interpretation of records of surface-water quality nearly always requires corresponding discharge data. Records of surface-water quality in this report may involve a variety of types of data and measurement frequencies.

#### Classification of records

Water-quality data for surface-water sites are grouped into one of three classifications. A continuing-record station is a site where data are collected on a regularly scheduled basis. Frequency may be once or more times daily, weekly, monthly, or quarterly. A partial-record station is a site where limited water-quality data are collected systematically over a period of years. Frequency of sampling is usually less than quarterly. A miscellaneous sampling site is a location other than a continuing or partial-record station, where random samples are collected to give better areal coverage to define water-quality conditions in the river basin.

A careful distinction needs to be made between "continuing records" as used in this report and "continuous recordings," which refers to a continuous graph or a series of discrete values punched at short intervals on a paper tape. Some records of water quality, such as temperature and specific conductance, may be obtained through continuous recordings; however, because of costs, most data are obtained only monthly or less frequently. Locations of stations for which records on the quality of surface water appear in this report are shown in figure 12.

#### Arrangement of Records

Water-quality records collected at a surface-water daily record station are published immediately following that record, regardless of the frequency of sample collection. Station number and name are the same for both records. Where a surface-water daily record station is not available or where the water quality differs significantly from that at the nearby surface-water station, the continuing water-quality record is published with its own station number and name in the regular downstream-order sequence. Water-quality data for partial-record stations and for miscellaneous sampling sites appear in separate tables following the table of discharge measurements at miscellaneous sites.

#### On-site measurements and sample collection

In obtaining water-quality data, a major concern needs to be assuring that the data obtained represent the in-situ quality of the water. To assure this, certain measurements, such as water temperature, pH, alkalinity and dissolved oxygen, are made onsite when the samples are taken. To assure that measurements made in the laboratory also represent the in situ water, carefully prescribed procedures are followed in collecting the samples, in treating the samples to prevent changes in quality pending analysis, and in shipping the samples to the laboratory. Procedures of onsite measurements and for collecting, treating, and shipping samples are given in publications on "Techniques of Water-Resources Investigations," Book 1, Chap. C2; Book 3, Chap. C2; Book 5, Chap. A1, A3, and A4. All of these references are listed on p. 52-53 of this report. Also, detailed information on collecting, treating, and shipping samples may be obtained from the Geological Survey District office.

One sample can define adequately the water quality at a given time if the mixture of solutes throughout the stream cross section is homogeneous. However, the concentration of solutes at different locations in the cross section may vary widely with different rates of water discharge, depending on the source of material and the turbulence and mixing of the stream. Some streams must be sampled through several vertical sections to obtain the representative sample needed for an accurate mean concentration and for use in calculating load. All samples obtained for the National Stream Quality Accounting Network are obtained from at least several verticals. Whether samples are obtained from the centroid of flow or from several verticals, depends on flow conditions and other factors which must be evaluated by the collector.

Chemical-quality data published in this report are considered to be the most representative values available for stations listed. The values reported represent water-quality conditions at the time of sampling as much as possible, consistent with available sampling techniques and methods of analysis.

### Water temperature and specific conductance

Water temperatures are measured at most of the water-quality stations. The measurement of temperature and specific conductance is performed during each regular site visit (usually at a six week interval) to stream-gaging stations. Records of stream temperature indicate significant thermal characteristics of the stream when analysed over a long period of record. Large streams have small daily temperature variations while shallow streams may have a daily range of several degrees and may closely follow the changes in air temperature. Furthermore, some streams may be affected by waste-heat discharge.

Specific conductance can be used as a general indicator of stream quality. This determination is easily made in the field with a portable meter, and the results are very useful as general indicators of dissolved-solids concentration or as a base for extrapolating other analytical data. Records for temperature and specific conductance appear in the section "Analyses of samples collected at miscellaneous sites".

### Sediment

Suspended-sediment concentrations are determined from samples collected by using depth-integrating samples. Samples usually are obtained at several verticals in the cross section, or a single sample may be obtained at a fixed point and a coefficient applied to determine the mean concentration in the cross sections.

During periods of rapidly changing flow or rapidly changing concentration, samples may have been collected more frequently (twice daily or, in some instances, hourly). The published sediment discharges for days of rapidly changing flow or concentration were computed by the subdivided-day method (time-discharge weighted average). Therefore, for those days when the published sediment discharge value differs from the value computed as the product of discharge times mean concentration times 0.0027, the reader can assume that the sediment discharge for that day was computed by the subdivided-day method. For periods when no samples were collected, daily discharges of suspended sediment were estimated on the basis of water discharge, sediment concentrations observed immediately before and after the periods, and suspended-sediment loads for other periods of similar discharge.

At other stations, suspended-sediment samples were collected periodically at many verticals in the stream cross section. Although data collected periodically may represent conditions only at the time of observations, such data are useful in establishing seasonal relations between quality and streamflow and in predicting long-term sediment-discharge characteristics of the stream.

In addition to the records of the quantities of suspended-sediment, records of the periodic measurements of the particle-size distribution of the suspended-sediment and bed material are included. Miscellaneous suspended-sediment samples were collected during flood events have been included with the station's water quality data or in the section "Analyses of samples at miscellaneous sites".

#### Laboratory measurements

Sediment samples, samples for indicator bacteria, and daily samples for specific conductance are analyzed locally. All other samples are analyzed in the U.S. Geological Survey laboratory in Arvada, Colorado and the University of Iowa Hygienic Laboratory. Methods used in analyzing sediment samples and computing sediment records are given in TWRI, Book 5, Chap. C1. Methods used by the U.S. Geological Survey laboratories are given in TWRI, Book 1, Chap. D2, Book 3, Chap. C2; Book 5, Chap. A1, A3, and A4.

#### Data Presentation

For continuing-record stations, information pertinent to the history of station operation is provided in descriptive headings preceding the tabular data. These descriptive headings give details regarding location, drainage area, period of record, type of data available, instrumentation, general remarks, cooperation, and extremes for parameters currently measured daily. Tables of chemical, physical, biological, radiochemical data, and so forth, obtained at a frequency less than daily are presented first. Tables of "daily values" of specific conductance, pH, water temperature, dissolved oxygen, and suspended sediment then follow in sequence.

In the descriptive headings, if the location is identical to that of the discharge gaging station, neither the LOCATION nor the DRAINAGE AREA statements are repeated. The following information, as appropriate, is provided with each continuous-record station. Comments that follow clarify information presented under the various headings of the station description.

LOCATION.--See Data Presentation under "Records of Stage and Water Discharge;" same comments apply.

DRAINAGE AREA.--See Data Presentation under "Records of Stage and Water Discharge;" same comments apply.

PERIOD OF RECORD.--This indicates the periods for which there are published water-quality records for the station. The periods are shown separately for records of parameters measured daily or continuously and those measured less than daily. For those measured daily or continuously, periods of record are given for the parameters individually.

INSTRUMENTATION.--Information on instrumentation is given only if a water-quality monitor temperature record, sediment pumping sampler, or other sampling device is in operation at a station.

REMARKS.--Remarks provide added information pertinent to the collection, analysis, or computation of the records.

COOPERATION.--Records provided by a cooperating organization or obtained for the Geological Survey by a cooperating organization are identified here.

EXTREMES.--Maximums and minimums are given only for parameters measured daily or more frequently. None are given for parameters measured weekly or less frequently, because the true maximums or minimums may not have been sampled. Extremes, when given, are provided for both the period of record and for the current water year.

REVISIONS.--If errors in published water-quality records are discovered after publication, appropriate updates are made to the Water-Quality File in the U.S. Geological Survey's computerized data system, WATSTORE, and subsequently by monthly transfer of update transactions to the U.S. Environmental Protection Agency's STORET system. Because the usual volume of updates makes it impractical to document individual changes in the State data-report series or elsewhere, potential users of U.S. Geological Survey water-quality data are encouraged to obtain all required data from the appropriate computer file to insure the most recent updates.

The surface-water-quality records for partial-record stations and miscellaneous sampling sites are published in separate tables following the table of discharge measurements at miscellaneous sites. No descriptive statements are given for these records. Each station is published with its own station number and name in the regular downstream-order sequence.



## Remark Codes

The following remark codes may appear with the water-quality data in this report:

<u>PRINTED OUTPUT</u>	<u>REMARK</u>
E	Estimated value
>	Actual value is known to be greater than the value shown
<	Actual value is known to be less than the value shown
K	Results based on colony count outside the acceptance range (non-ideal colony count)
L	Biological organism count less than 0.5 percent (organism may be observed rather than counted)
D	Biological organism count equal to or greater than 15 percent (dominant)
&	Biological organism estimated as dominant

### Records of Ground-Water Levels

Ground-water level data from a network of observation wells in Iowa are published in this report. These data provide a limited historical record of water-level changes in the State's most important aquifers. Locations of the observation wells in this network in Iowa are shown in figure 13. Information about the availability of the data in the water-level files and reports of the U.S. Geological Survey may be obtained from the Iowa District Office (see address on back of title page).

#### Data Collection and Computation

Measurements of water levels are made in many types of wells under varying conditions, but the methods of measurement are standardized to the extent possible. The equipment and measuring techniques used at each observation well ensures that measurements at each well are of consistent accuracy and reliability.

Tables of water-level data are arranged alphabetically by counties. The site identification number, based on latitude and longitude, for a given well is the 15-digit numeric value that appears in the upper left corner of the station description. The secondary identification number is the local well number, an alphanumeric value, derived from the township, range, and section location of the well (fig. 15).

Water-level records are obtained from direct measurements with a chalked steel tape, electric line, airline, or from the graph of a water-level recorder. The water-level measurements in this report are in feet with reference to land-surface datum. Land-surface datum is a plane that is approximately at land surface at each well. The elevation of the land-surface datum is given in the well description. The height of the measuring point above or below land-surface datum is given in each well description. Water levels in wells equipped with recording gages are reported for every fifth day and the end of each month (EOM).

Water-level measurements are reported to the nearest hundredth of a foot. Estimates, indicated by an "e" may be reported in tenths of a foot. Adjustments to the water level recorder char are indicated by an "a". The error of water-level measurements may be, at most, a few hundredths of a foot.

#### Data Presentation

Each well record consists of two parts, the station description and the table of water levels observed during the water year. The description of the well is presented by headings preceding the tabular data. The following explains the information presented under each heading.

LOCATION.--This paragraph follows the well identification number and includes the latitude and longitude (given in degrees, minutes, and seconds), the hydrologic unit number, the distance and direction from a geographic point of reference, and the well owner's name.

AQUIFER.--This entry is the aquifer(s) name (if one exists) and geologic age of the strata open to the well.

WELL CHARACTERISTICS.--This entry describes the well depth, casing diameter, casing depth, opening or screened interval(s), method of construction, and use of water from the well.

INSTRUMENTATION.--This paragraph provides information on the frequency of measurement and the collection method used.

DATUM.--This entry includes the measuring point and the land-surface elevation at the well. The measuring point is described physically and in relation to land surface. The elevation of the land-surface datum is in feet above National Geodetic Vertical Datum of 1929 and its precision is dependent on the method of determination.

REMARKS.--This entry describes factors that may influence the water level in a well or the measurement of the water level and any information not presented in the other parts of the station description but considered useful.

PERIOD OF RECORD.--This entry indicates the period for which there are published records for the well. It reports the month and year of the beginning of publication of water-level records by the U.S. Geological Survey.

REVISED RECORDS.--If any revisions of previously published data were made for water-levels, the Water Data Report in which they appeared and year published would appear here.

EXTREMES FOR PERIOD OF RECORD.--This entry contains the highest and lowest water levels for the period of record, below land-surface datum, and the dates of their occurrence.

A table of water levels follows the station description for each well. Water levels are reported in feet below land-surface datum. For wells equipped with recorders, only abbreviated tables are published. The highest and lowest water levels of the water year and the dates of occurrence are shown on a line below the abbreviated table. Because all values are not published for wells with recorders, the extremes may be values that are not listed in the table. Missing records are indicated by dashes in place of the water level.

Hydrographs are included for nine wells which are representative of hydrologic conditions in the important aquifers in Iowa.

Only water-level data from a national network of observation wells are given in this report. These data are intended to provide a sampling and historical record of water-level changes in the Nation's most important aquifers. Locations of the observation wells in this network in Iowa are shown in figure 13.

### Records of Ground-Water Quality

Records of ground-water quality in this report differ from other types of records in that for most sampling sites they consist of only one set of measurements for the water year. The quality of ground water ordinarily changes only slowly; therefore, for most general purposes one annual sampling, or only a few samples taken at infrequent intervals during the year, is sufficient. Frequent measurement of the same constituents is not necessary unless one is concerned with a particular problem, such as monitoring for trends in nitrate concentration. In the special cases where the quality of ground water may change more rapidly, more frequent measurements are made to identify the nature of the changes.

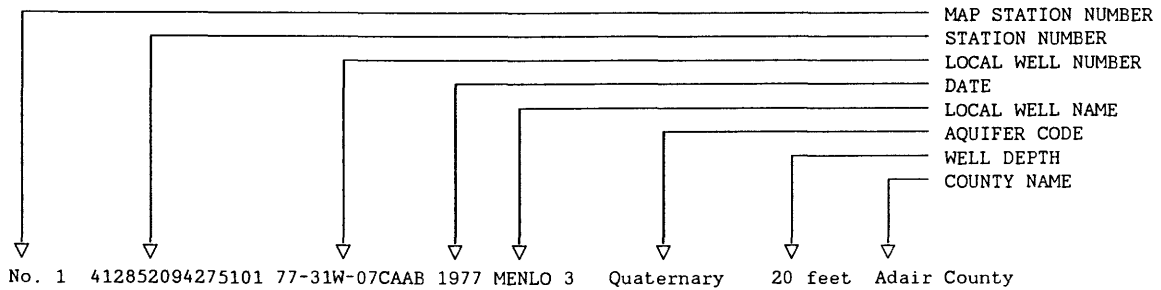
The records of ground-water quality in this report were obtained as a part of a statewide ground-water quality monitoring network operated by the Iowa District. All samples were obtained from municipal wells throughout Iowa. This program is conducted in cooperation with the University of Iowa Hygienic Laboratory (UHL) and the Iowa Geological Survey. All samples are collected by USGS personnel, field-preserved and submitted to UHL for analysis. Chemical analyses include common constituents (major ions), nutrients, trace metals, radionuclides and pesticides. Approximately 10 percent of the samples receive additional analyses for about 90 organic priority pollutants, however these analyses are not presented in this report but are on file in the District office.

Most methods for collecting and analyzing water samples are described in the "U.S. Geological Survey Techniques of Water-Resources Investigations" manuals listed on a following page. The values reported in this report represent water-quality conditions at the time of sampling as much as possible, consistent with available sampling techniques and methods of analysis. All samples were obtained by trained personnel. The wells sampled were pumped long enough to assure that the water collected came directly from the aquifer and had not stood for a long time in the well casing where it would have been exposed to the atmosphere and to the material, possibly metal, comprising the casings. The samples collected represent raw water.

### Data Presentation

The records of ground-water quality are published in a section titled GROUND-WATER QUALITY DATA immediately following the ground-water-level records. Data for quality of ground water are listed alphabetically by County, and are identified by station number. The prime identification number for wells sampled is the 15-digit station number derived from the latitude-longitude locations. No descriptive statements are given for ground-water-quality records; however, the station number, date and time of sampling, depth of well, and other pertinent data are given in the table containing the chemical analyses of the ground water. The REMARK codes listed for surface-water-quality records are also applicable to ground-water-quality records.

## Explanation of ground-water-quality data tables--descriptive headings.



MAP STATION: Reference to illustrations found in "SUMMARY OF  
NUMBER HYDROLOGIC CONDITIONS".

STATION: 15-digit number based on grid system of latitude and  
NUMBER longitude

LOCAL WELL: Refers to the Bureau of Land Management System of land  
NUMBER subdivision

DATE: Date of well construction.

LOCAL WELL NAME: Name used by community to identify well.

AQUIFER: Refers to the lithologic unit in which the well is  
CODE completed. Derived from first two digits of the  
GEOLOGIC UNIT, the principal unit which is providing  
the majority of water to the well.

11 = Quaternary	34 = Devonian
21 = Cretaceous	35 = Silurian
32 = Pennsylvanian	36 = Ordovician
33 = Mississippian	37 = Cambrian

Third digit and remaining alphabetic characters refer to the more specific lithologic unit which the well is tapping. The following examples are commonly used units:

<u>CODE</u>	<u>General</u>	<u>Specific</u>
111ALVM	Quaternary	(alluvium)
217DKOT	Cretaceous	(Dakota sandstone)
344CDVL	Devonian	(Cedar Valley limestone)

## ACCESS TO WATSTORE DATA

The National WATER Data STORAGE and RETRIEVAL System (WATSTORE) was established for handling water data collected through the activities of the U.S. Geological Survey and to provide for more effective and efficient means of releasing the data to the public. The system is operated and maintained on the central computer facilities of the Survey at its National Center in Reston, Virginia.

WATSTORE can provide a variety of useful products ranging from simple data tables to complex statistical analyses. A minimal fee, plus the actual computer cost incurred in producing a desired product, is charged to the requester. Information about the availability of specific types of data, the acquisition of data or products, and user charges can be obtained locally from the offices whose addresses are given on the back of the title page.

General inquiries about WATSTORE may be directed to:

Chief Hydrologist  
U.S. Geological Survey  
437 National Center  
Reston, Virginia 22092

## DEFINITION OF TERMS

Terms related to streamflow, water-quality, and other hydrologic data, as used in this report, are defined below. See also table for converting English units to International System (SI) Units on the inside of the back cover.

Acre-foot (AC-FT, acre-ft) is the quantity of water required to cover 1 acre to a depth of 1 foot and is equivalent to 43,560 cubic feet or about 326,000 gallons or 1,233 cubic meters.

Aquifer is a geologic formation, group of formations, or part of a formation that contains sufficient saturated permeable material to yield significant quantities of water to wells and springs.

Artesian means confined and is used to describe a well in which the water level stands above the top of the aquifer tapped by the well. A flowing artesian well is one in which the water level is above the land surface.

Bacteria are microscopic unicellular organisms, typically spherical, rodlike, or spiral and threadlike in shape, often clumped into colonies. Some bacteria cause disease, while others perform an essential role in nature in the recycling of materials; for example, by decomposing organic matter into a form available for reuse by plants.

Fecal coliform bacteria are bacteria that are present in the intestine or feces of warm-blooded animals. They are often used as indicators of the sanitary quality of the water. In the laboratory they are defined as all organisms that produce blue colonies within 24 hours when incubated at 44.5°C plus or minus 0.2°C on M-FC medium (nutrient medium for bacterial growth). Their concentrations are expressed as number of colonies per 100 mL of sample.

Fecal streptococcal bacteria are bacteria found also in the intestine of warm-blooded animals. Their presence in water is considered to verify fecal pollution. They are characterized as Gram-positive, cocci bacteria which are capable of growth in brain-heart infusion broth. In the laboratory they are defined as all the organisms which produce red or pink colonies within 48 hours at 35°C plus or minus 1.0°C on KF-streptococcus medium (nutrient medium for bacterial growth). Their concentrations are expressed as number of colonies per 100 mL of sample.

Bed material is the sediment mixture of which a streambed, lake, pond, reservoir, or estuary bottom is composed.

Bottom material: See Bed material.

Cubic-foot-per-second day is the volume of water represented by a flow of 1 cubic foot per second for 24 hours. It is equivalent to 86,400 cubic feet, approximately 1.9835 acre-feet, about 646,000 gallons, or 2,445 cubic meters.

Contents is the volume of water in a reservoir or lake. Unless otherwise indicated, volume is computed on the basis of a level pool and does not include bank storage.

Control designates a feature downstream from the gage that determines the stage-discharge relation at the gage. This feature may be a natural constriction of the channel, an artificial structure, or a uniform cross section over a long reach of the channel.

Control structure as used in this report is a structure on a stream or canal that is used to regulate the flow or stage of the stream or to prevent the intrusion of salt water.

Cubic foot per second ( $\text{ft}^3/\text{s}$ ) is the rate of discharge representing a volume of 1 cubic foot passing a given point during 1 second and is equivalent to 7.48 gallons per second or 448.8 gallons per minute or 0.02832 cubic meters per second.

Cubic feet per second per square mile (CFSM) is the average number of cubic feet of water flowing per second from each square mile of area drained, assuming that the runoff is distributed uniformly in time and area.

Discharge is the volume of water (or more broadly, volume of fluid plus suspended sediment) that passes a given point within a given period of time.

Mean discharge (MEAN) is the arithmetic mean of individual daily mean discharges during a specific period.

Instantaneous discharge is the discharge at a particular instant of time.

Dissolved refers to that material in a representative water sample which passes through a 0.45  $\mu\text{m}$  membrane filter. This is a convenient operational definition used by Federal agencies that collect water data. Determinations of "dissolved" constituents are made on subsamples of the filtrate.

Dissolved-solids concentration of water is determined either analytically by the "residue-on-evaporation" method, or mathematically by totaling the concentrations of individual constituents reported in a comprehensive chemical analysis. During the analytical determination of dissolved solids, the bicarbonate (generally a major dissolved component of water) is converted to carbonate. Therefore, in the mathematical calculation of dissolved-solids concentration, the bicarbonate value, in milligrams per liter, is multiplied by 0.492 to reflect the change.

Drainage area of a stream at a specified location is that area, measured in a horizontal plane, enclosed by a topographic divide from which direct surface runoff from precipitation normally drains by gravity into the stream above the specified point. Figures of drainage area given herein include all closed basins, or noncontributing areas, within the area unless otherwise specified.



Drainage basin is a part of the surface of the earth that is occupied by a drainage system, which consists of a surface stream or a body of impounded surface water together with all tributary surface streams and bodies of impounded surface water.

Gage height (G.H.) is the water-surface elevation referred to some arbitrary gage datum. Gage height is often used interchangeably with the more general term "stage," although gage height is more appropriate when used with a reading on a gage.

Gaging station is a particular site on a stream, canal, lake, or reservoir where systematic observations of hydrologic data are obtained.

Hardness of water is a physical-chemical characteristic that is commonly recognized by the increased quantity of soap required to produce lather. It is computed as the sum of equivalents of polyvalent cations and is expressed as the equivalent concentration of calcium carbonate ( $\text{CaCO}_3$ ).

Hydrologic Bench-Mark Network is a network of 57 sites in small drainage basins around the country whose purpose is to provide consistent data on the hydrology, including water quality, and related factors in representative undeveloped watersheds nationwide, and to provide analyses on a continuing basis to compare and contrast conditions observed in basins more obviously affected by the activities of man.

Hydrologic unit is a geographic area representing part or all of a surface drainage basin or distinct hydrologic feature as delineated by the Office of Water Data Coordination on the State Hydrologic Unit Maps; each hydrologic unit is identified by an eight-digit number.

Land-surface datum (lsd) is a datum plane that is approximately at land surface at each ground-water observation well.

Measuring point (MP) is an arbitrary permanent reference point from which the distance to the water surface in a well is measured to obtain the water level.

Micrograms per gram ( $\mu\text{g/g}$ ) is a unit expressing the concentration of a chemical constituent as the mass (micrograms) of the element per unit mass (gram) of material analyzed.

Micrograms per liter ( $\mu\text{g/L}$ ,  $\mu\text{g/L}$ ) is a unit expressing the concentration of chemical constituents in solution as mass (micrograms) of solute per unit volume (liter) of water. One thousand micrograms per liter is equivalent to one milligram per liter.

Milligrams per liter ( $\text{mg/L}$ ,  $\text{mg/L}$ ) is a unit for expressing the concentration of chemical constituents in solution. Milligrams per liter represents the mass of solute per unit volume (liter) of water. Concentration of suspended sediment also is expressed in  $\text{mg/L}$  and is based on the mass of dry sediment per liter of water-sediment mixture.

National Geodetic Vertical Datum of 1929 (NGVD of 1929) is a geodetic datum derived from a general adjustment of the first order level nets of both the United States and Canada. It was formerly called "Sea Level Datum of 1929" or "mean sea level" in this series of reports. Although the datum was derived from the average sea level over a period of many years at 26 tide stations along the Atlantic, Gulf of Mexico, and Pacific Coasts, it does not necessarily represent local mean sea level at any particular place.

National Stream Quality Accounting Network (NASQAN) is a nationwide data-collection network designed by the U.S. Geological Survey to meet many of the information needs of government agencies and other groups involved in natural or regional water-quality planning and management. The 500 or so sites in NASQAN are generally located at the downstream ends of hydrologic accounting units designated by the U.S. Geological Survey Office of Water Data Coordination in consultation with the Water Resources Council. The objectives of NASQAN are (1) to obtain information on the quality and quantity of water moving within and from the United States through a systematic and uniform process of data collection, summarization, analysis, and reporting such that the data may be used for, (2) description of the areal variability of water quality in the Nation's rivers through analysis of data from this and other programs, (3) detection of changes or trends with time in the pattern of occurrence of water-quality characteristics, and (4) providing a nationally consistent data base useful for water-quality assessment and hydrologic research.

The National Trends Network (NTN) is a 150-station network for sampling atmospheric deposition in the United States. The purpose of the network is to determine the variability, both in location and in time, of the composition of atmospheric deposition, which includes snow, rain, dust particles, aerosols, and gases. The core from which the NTN was built was the already-existing deposition-monitoring network of the National Atmospheric Deposition Program (NADP).

Parameter Code is a 5-digit number used in the U.S. Geological Survey computerized data system, WATSTORE, to uniquely identify a specific constituent. The codes used in WATSTORE are the same as those used in the U.S. Environmental Protection Agency data system, STORET. The Environmental Protection Agency assigns and approves all requests for new codes.

Partial-record station is a particular site where limited streamflow and/or water-quality data are collected systematically over a period of years for use in hydrologic analyses.

Particle size is the diameter, in millimeters (mm), of a particle determined by either sieve or sedimentation methods. Sedimentation methods (pipet, bottom-withdrawal tube, visual-accumulation tube) determine fall diameter of particles in either distilled water (chemically dispersed) or in native water (the river water at the time and point of sampling).

Particle-size classification used in this report agrees with the recommendation made by the American Geophysical Union Subcommittee on Sediment Terminology. The classification is as follows:

<u>Classification</u>	<u>Size (mm)</u>	<u>Method of analysis</u>
Clay.....	0.00024 - 0.004	Sedimentation
Silt.....	.004 - .062	Sedimentation
Sand.....	.062 - 2.0	Sedimentation or sieve
Gravel.....	2.0 - 64.0	Sieve

The particle-size distributions given in this report are not necessarily representative of all particles in transport in the stream. Most of the organic matter is removed, and the sample is subjected to mechanical and chemical dispersion before analysis in distilled water. Chemical dispersion is not used for native-water analysis.

Pesticides are chemical compounds used to control undesirable organisms. Major categories of pesticides include insecticides, miticides, fungicides, herbicides, and rodenticides.

Picocurie (PC, pCi) is one trillionth ( $1 \times 10^{-12}$ ) of the amount of radioactivity represented by a curie (Ci). A curie is the amount of radioactivity that yields  $3.7 \times 10^{10}$  radioactive disintegrations per second. A picocurie yields 2.22 dpm (disintegrations per minute).

Radiochemical program is a network of regularly sampled water-quality stations where samples are collected to be analyzed for radioisotopes. The streams that are sampled represent major drainage basins in the conterminous United States.

Recoverable from bottom material is the amount of a given constituent that is in solution after a representative sample of bottom material has been digested by a method (usually using an acid or mixture of acids) that results in dissolution of readily soluble substances. Complete dissolution of all bottom material is not achieved by the digestion treatment and thus the determination represents less than the total amount (that is, less than 95 percent) of the constituent in the sample. To achieve comparability of analytical data, equivalent digestion procedures would be required of all laboratories performing such analyses because different digestion procedures are likely to produce different analytical results.

Return period is the average time interval between occurrences of a hydrological event of a given or greater magnitude, usually expressed in years. May also be called recurrence interval.

Runoff in inches (IN., in.) shows the depth to which the drainage area would be covered if all the runoff for a given time period were uniformly distributed on it.

Sediment is solid material that originates mostly from disintegrated rocks and is transported by, suspended in, or deposited from water; it includes chemical and biochemical precipitates and decomposed organic material, such as humus. The quantity, characteristics, and cause of the occurrence of sediment in streams are influenced by environmental factors. Some major factors are degree of slope, length of slope, soil characteristics, land usage, and quantity and intensity of precipitation.

Bed load is the sediment that is transported in a stream by rolling, sliding, or skipping along the bed and very close to it. In this report, bed load is considered to consist of particles in transit within 0.25 ft of the streambed.

Bed load discharge (tons per day) is the quantity of bed load measured by dry weight that moves past a section as bed load in a given time.

Suspended sediment is the sediment that at any given time is maintained in suspension by the upward components of turbulent currents or that exists in suspension as a colloid.

Suspended-sediment concentration is the velocity-weighted concentration of suspended sediment in the sampled zone (from the water surface to a point approximately 0.3 ft above the bed) expressed as milligrams of dry sediment per liter of water-sediment mixture (mg/L).

Mean concentration is the time-weighted concentration of suspended sediment passing a stream section during a 24-hour day.

Suspended-sediment discharge (tons/day) is the rate at which dry mass of sediment passes a section of a stream or is the quantity of sediment, as measured by dry mass or volume, that passes a section in a given time. It is calculated in units of tons per day as follows: concentration (mg/L) x discharge  $\text{ft}^3/\text{s}$  x 0.0027.

Suspended-sediment load is a general term that refers to material in suspension. It is not synonymous with either discharge or concentration.

Total sediment discharge (tons/day) is the sum of the suspended-sediment discharge and the bed-load discharge. It is the total quantity of sediment, as measured by dry mass or volume, that passes a section during a given time.

Total-sediment load or total load is a term which refers to the total sediment (bed load plus suspended-sediment load) that is in transport. It is not synonymous with total-sediment discharge.

7-day 10-year low flow (7 Q ) is the discharge at the 10-year recurrence interval taken from a frequency curve of annual values of the lowest mean discharge for 7 consecutive days (the 7-day low flow).

Sodium-adsorption-ratio (SAR) is the expression of relative activity of sodium ions in exchange reactions within soil and is an index of sodium or alkali hazard to the soil. Waters range in respect to sodium hazard from those which can be used for irrigation on almost all soils to those which are generally unsatisfactory for irrigation.

Solute is any substance that is dissolved in water.

Specific conductance is a measure of the ability of a water to conduct an electrical current. It is expressed in microsiemens per centimeter at 25° C. Specific conductance is related to the type and concentration of ions in solution and can be used for approximating the dissolved-solids content of the water. Commonly, the concentration of dissolved solids (in milligrams per liter) is about 65-percent of the specific conductance (in microsiemens). This relation is not constant from stream to stream, and it may vary in the same source with changes in the composition of the water.

Stage-discharge relation is the relation between gage height (stage) and volume of water, per unit of time, flowing in a channel.

Streamflow is the discharge that occurs in a natural channel. Although the term "discharge" can be applied to the flow of a canal, the word "streamflow" uniquely describes the discharge in a surface stream course. The term "streamflow" is more general than "runoff" as streamflow may be applied to discharge whether or not it is affected by diversion or regulation.

Surface area of a lake is that area outlined on the latest U.S.G.S. topographic map as the boundary of the lake and measured by a planimeter in acres. In localities not covered by topographic maps, the areas are computed from the best maps available at the time planimetered. All areas shown are those for the stage when the planimetered map was made.

Surficial bed material is the part (0.1 to 0.2 ft) of the bed material that is sampled using U.S. Series Bed-Material Samplers.

Suspended (as used in tables of chemical analyses) refers to the amount (concentration) of undissolved material in a water-sediment mixture. It is associated with the material retained on a 0.45-micrometer filter.

Suspended, recoverable is the amount of a given constituent that is in solution after the part of a representative water-suspended sediment sample that is retained on a 0.45 um membrane filter has been digested by a method (usually using a dilute acid solution) that results in dissolution of only readily soluble substances. Complete dissolution of all the particulate matter is not achieved by the digestion treatment and thus the determination represents something less than the "total" amount (that is, less than 95-percent) of the constituent present in the sample. To achieve comparability of analytical data, equivalent digestion procedures are required of all laboratories performing such analyses because different digestion procedures are likely to produce different analytical results.

Determinations of "suspended, recoverable" constituents are made either by analyzing portions of the material collected on the filter or, more commonly, by difference, based on determinations of (1) dissolved and (2) total recoverable concentrations of the constituent.

Suspended, total is the total amount of a given constituent in the part of a representative water-suspended sediment sample that is retained on a 0.45 um membrane filter. This term is used only when the analytical procedure assures measurement of at least 95-percent of the constituent determined. A knowledge of the expected form of the constituent in the sample, as well as the analytical methodology used, is required to determine when the results should be reported as "suspended, total."

Determinations of "suspended, total" constituents are made either by analyzing portions of the material collected on the filter or, more commonly, by difference, based on determinations of (1) dissolved and (2) total concentrations of the constituent.

Thermograph is an instrument that continuously records variations of temperature on a chart. The more general term "temperature recorder" is used in the table headings and refers to any instrument that records temperature whether on a chart, a tape, or any other medium.

Time-weighted average is computed by multiplying the number of days in the sampling period by the concentrations of individual constituents for the corresponding period and dividing the sum of the products by the total number of days. A time-weighted average represents the composition of water that would be contained in a vessel or reservoir that had received equal quantities of water from the stream each day for the year.

Tons per acre-foot indicates the dry mass of dissolved solids in 1 acre-foot of water. It is computed by multiplying the concentration of the constituent, in milligrams per liter, by 0.00136.

Tons per day (T/DAY) is the quantity of a substance in solution or suspension that passes a stream section during a 24-hour period.

Total is the total amount of a given constituent in a representative water-suspended sediment sample, regardless of the constituent's physical or chemical form. This term is used only when the analytical procedure assures measurement of at least 95-percent of the constituent present in both the dissolved and suspended phases of the sample. A knowledge of the expected form of the constituent in the sample, as well as the analytical methodology used, is required to judge when the results should be reported as "total." (Note that the word "total" does double duty here, indicating both that the sample consists of a water-suspended sediment mixture and that the analytical method determined all of the constituent in the sample.)

Total discharge is the total quantity of any individual constituent, as measured by dry mass or volume, that passes through a stream cross-section per unit of time. This term needs to be qualified, such as "total sediment discharge," "total chloride discharge," and so on.

Total, recoverable is the amount of a given constituent that is in solution after a representative water-suspended sediment sample has been digested by a method (usually using a dilute acid solution) that results in dissolution of only readily soluble substances. Complete dissolution of all particulate matter is not achieved by the digestion treatment, and thus the determination represents something less than the "total" amount (that is, less than 95-percent) of the constituent present in the dissolved and suspended phases of the sample. To achieve comparability of analytical data, equivalent digestion procedures are required of all laboratories performing such analyses because different digestion procedures are likely to produce different analytical results.

Tritium Network is a network of stations which has been established to provide baseline information on the occurrence of tritium in the Nation's surface waters. In addition to the surface-water stations in the network, tritium data are also obtained at a number of precipitation stations. The purpose of the precipitation stations is to provide an estimate sufficient for hydrologic studies of the tritium input to the United States.

Water year in U.S. Geological Survey reports dealing with surface-water supply is the 12-month period October 1 through September 30. The water year is designated by the calendar year in which it ends and which includes 9 of the 12 months. Thus, the year ending September 30, 1987, is called the "1987 water year."

WDR is used as an abbreviation for "Water-Data Report" in the REVISED RECORDS paragraph to refer to State annual hydrologic-data reports (WRD was used as an abbreviation for "Water-Resources Data" in reports published prior to 1976).

Weighted average is used in this report to indicate discharge-weighted average. It is computed by multiplying the discharge for a sampling period by the concentrations of individual constituents for the corresponding period and dividing the sum of the products by the sum of the discharges. A discharge-weighted average approximates the composition of water that would be found in a reservoir containing all the water passing a given location during the water year after thorough mixing in the reservoir.

WSP is used as an abbreviation for "Water-Supply Paper" in reference to previously published reports.

## PUBLICATIONS ON TECHNIQUES OF WATER-RESOURCES INVESTIGATIONS

The U.S. Geological Survey publishes a series of manuals describing procedures for planning and conducting specialized work in water-resources investigations. The material is grouped under major subject headings called books and is further divided into sections and chapters. For example, Section A of Book 3 (Applications of Hydraulics) pertains to surface water. The chapter, the unit of publication, is limited to a narrow field of subject matter. This format permits flexibility in revision and publication as the need arises.

The reports listed below are for sale by the U.S. Geological Survey, Books and Open-File Reports Section, Federal Center, Box 25425, Denver, Colorado 80225 (authorized agent of the Superintendent of Documents, Government Printing Office). Prepayment is required. Remittance should be sent by check or money order payable to the U.S. Geological Survey. Prices are not included because they are subject to change. Current prices can be obtained by writing to the above address. When ordering or inquiring about prices for any of these publications, please give the title, book number, chapter number, and "U.S. Geological Survey Techniques of Water-Resources Investigations."

- 1-D1. Water temperature--influential factors, field measurement, and data presentation, by H. H. Stevens, Jr., J. F. Ficke, and G. F. Smoot: USGS--TWRI Book 1, Chapter D1. 1975. 65 pages.
- 1-D2. Guidelines for collection and field analysis of ground-water samples for selected unstable constituents, by W. W. Wood: USGS--TWRI Book 1, Chapter D2. 1976. 24 pages.
- 2-D1. Application of surface geophysics to ground-water investigations, by A. A. R. Zohdy, G. P. Eaton, and D. R. Mabey: USGS--TWRI Book 2, Chapter D1. 1974. 116 pages.
- 2-E1. Application of borehole geophysics to water-resources investigations, by W. S. Keys and L. M. MacCary: USGS--TWRI Book 2, Chapter E1. 1971. 126 pages.
- 3-A1. General field and office procedures for indirect discharge measurements, by M. A. Benson and Tate Dalrymple: USGS--TWRI Book 3, Chapter A1. 1967. 30 pages.
- 3-A2. Measurement of peak discharge by the slope-area method, by Tate Dalrymple and M. A. Benson: USGS--TWRI Book 3, Chapter A2. 1967. 12 pages.
- 3-A3. Measurement of peak discharge at culverts by indirect methods, by G. L. Bodhaine: USGS--TWRI Book 3, Chapter A3. 1968. 60 pages.
- 3-A4. Measurement of peak discharge at width contractions by indirect methods, by H. J. Matthai: USGS--TWRI Book 3, Chapter A4. 1967. 44 pages.
- 3-A5. Measurement of peak discharge at dams by indirect methods, by Harry Hulsing: USGS--TWRI Book 3, Chapter A5. 1967. 29 pages.
- 3-A6. General procedure for gaging streams, by R. W. Carter and Jacob Davidian: USGS--TWRI Book 3, Chapter A6. 1968. 13 pages.
- 3-A7. Stage measurements at gaging stations, by T. J. Buchanan and W. P. Somers: USGS--TWRI Book 3, Chapter A7. 1968. 28 pages.
- 3-A8. Discharge measurements at gaging stations, by T. J. Buchanan and W. P. Somers: USGS--TWRI Book 3, Chapter A8. 1969. 65 pages.
- 3-A9. Measurement of time of travel and dispersion in streams by dye tracing, by E. F. Hubbard, F. A. Kilpatrick, L. A. Martens, and J. F. Wilson, Jr.: USGS--TWRI Book 3, Chapter A9. 1982. 44 pages.
- 3-A10. Discharge ratings at gaging stations, by E. J. Kennedy: USGS--TWRI Book 3, Chapter A10. 1984. 59 pages.
- 3-A11. Measurement of discharge by moving-boat method, by G. F. Smoot and C. E. Novak: USGS--TWRI Book 3, Chapter A11. 1969. 22 pages.
- 3-A12. Fluorometric procedures for dye tracing, by J. F. Wilson, Jr., E. D. Cobb, and F. A. Kilpatrick: USGS--TWRI Book 3, Chapter A12. 1986. 41 pages.
- 3-A13. Computation of continuous records of streamflow, by E. J. Kennedy: USGS--TWRI Book 3, Chapter A13. 1983. 53 pages.
- 3-A14. Use of flumes in measuring discharge, by F. A. Kilpatrick and V. R. Schneider: USGS--TWRI Book 3, Chapter A14. 1983. 46 pages.
- 3-A15. Computation of water-surface profiles in open channels, by Jacob Davidian: USGS--TWRI Book 3, Chapter A15. 1984. 48 pages.
- 3-A16. Measurement of discharge using tracers, by F. A. Kilpatrick and E. D. Cobb: USGS--TWRI Book 3, Chapter A16. 1985. 52 pages.
- 3-A17. Acoustic velocity meter systems, by Antonius Laenen: USGS--TWRI Book 3, Chapter A17. 1985. 38 pages.
- 3-B1. Aquifer-test design, observation, and data analysis, by R. W. Stallman: USGS--TWRI Book 3, Chapter B1. 1971. 26 pages.



## PUBLICATIONS ON TECHNIQUES OF WATER-RESOURCES INVESTIGATIONS--Continued

- 3-B2. Introduction to ground-water hydraulics, a programed test for self-instruction, by G. D. Bennett: USGS--TWRI Book 3, Chapter B2. 1976. 172 pages.
- 3-B3. Type curves for selected problems of flow to wells in confined aquifers, by J. E. Reed: USGS--TWRI Book 3, Chapter B3. 1980. 106 pages.
- 3-B5. Definition of boundary and initial conditions in the analysis of saturated ground-water flow systems--An introduction, by O. L. Franke, T. E. Reilly, and G. D. Bennett: USGS--TWRI Book 3, Chapter B5. 1987. 15 pages.
- 3-B6. The principle of superposition and its application in ground-water hydraulics, by T. E. Reilly, O. L. Franke, and G. D. Bennett: USGS--TWRI Book 3, Chapter B6. 1987. 28 pages.
- 3-C1. Fluvial sediment concepts, by H. P. Guy: USGS--TWRI Book 3, Chapter C1. 1970. 55 pages.
- 3-C2. Field methods for measurement of fluvial sediment, by H. P. Guy and V. W. Norman: USGS--TWRI Book 3, Chapter C2. 1970. 59 pages.
- 3-C3. Computation of fluvial-sediment discharge, by George Porterfield: USGS--TWRI Book 3, Chapter C3. 1972. 66 pages.
- 4-A1. Some statistical tools in hydrology, by H. C. Riggs: USGS--TWRI Book 4, Chapter A1. 1968. 39 pages.
- 4-A2. Frequency curves, by H. C. Riggs: USGS--TWRI Book 4, Chapter A2. 1968. 15 pages.
- 4-B1. Low-flow investigations, by H. C. Riggs: USGS--TWRI Book 4, Chapter B1. 1972. 18 pages.
- 4-B2. Storage analyses for water supply, by H. C. Riggs and C. H. Hardison: USGS--TWRI Book 4, Chapter B2. 1973. 20 pages.
- 4-B3. Regional analyses of streamflow characteristics, by H. C. Riggs: USGS--TWRI Book 4, Chapter B3. 1973. 15 pages.
- 4-D1. Computation of rate and volume of stream depletion by wells, by C. T. Jenkins: USGS--TWRI Book 4, Chapter D1. 1970. 17 pages.
- 5-A1. Methods for determination of inorganic substances in water and fluvial sediments, by M. W. Skougstad and others, editors: USGS--TWRI Book 5, Chapter A1. 1979. 626 pages.
- 5-A2. Determination of minor elements in water by emission spectroscopy, by P. R. Barnett and E. C. Mallory, Jr.: USGS--TWRI Book 5, Chapter A2. 1971. 31 pages.
- 5-A3. Methods for analysis of organic substances in water, by D. F. Goerlitz and Eugene Brown: USGS--TWRI Book 5, Chapter A3. 1972. 40 pages.
- 5-A4. Methods for collection and analysis of aquatic biological and microbiological samples, edited by P. E. Greeson, T. A. Ehlike, G. A. Irwin, B. W. Lium, and K. V. Slack: USGS--TWRI Book 5, Chapter A4. 1977. 332 pages.
- 5-A5. Methods for determination of radioactive substances in water and fluvial sediments, by L. L. Thatcher, V. J. Janzer, and K. W. Edwards: USGS--TWRI Book 5, Chapter A5. 1977. 95 pages.
- 5-A6. Quality assurance practices for the chemical and biological analyses of water and fluvial sediments, by L. C. Friedman and D. E. Erdmann: USGS--TWRI Book 5, Chapter A6. 1982. 181 pages.
- 5-C1. Laboratory theory and methods for sediment analysis, by H. P. Guy: USGS--TWRI Book 5, Chapter C1. 1969. 58 pages.
- 6-A1. A modular three-dimensional finite-difference ground-water flow model, by M. G. McDonald and A. W. Harbaugh: USGS--TWRI Book 6, Chapter A1. 1988. 586 pages.
- 7-C1. Finite difference model for aquifer simulation in two dimensions with results of numerical experiments, by P. C. Trescott, G. F. Pinder, and S. P. Larson: USGS--TWRI Book 7, Chapter C1. 1976. 116 pages.
- 7-C2. Computer model of two-dimensional solute transport and dispersion in ground water, by L. F. Konikow and J. D. Bredehoeft: USGS--TWRI Book 7, Chapter C2. 1978. 90 pages.
- 7-C3. A model for simulation of flow in singular and interconnected channels, by R. W. Schaffranek, R. A. Baltzer, and D. E. Goldberg: USGS--TWRI Book 7, Chapter C3. 1981. 110 pages.
- 8-A1. Methods of measuring water levels in deep wells, by M. S. Garber and F. C. Koopman: USGS--TWRI Book 8, Chapter A1. 1968. 23 pages.
- 8-A2. Installation and service manual for U.S. Geological Survey manometers, by J. D. Craig: USGS--TWRI Book 8, Chapter A2. 1983. 57 pages.
- 8-B2. Calibration and maintenance of vertical-axis type current meters, by G. F. Smoot and C. E. Novak: USGS--TWRI Book 8, Chapter B2. 1968. 15 pages.

## DISCONTINUED GAGING STATIONS

The following stream-gaging stations have been discontinued in Iowa. Continuous daily streamflow records were collected and published for the period of record shown for each station.

## Discontinued gaging stations

Station name	Station number	Drainage area (sq mi)	Period of record
Upper Iowa River at Decorah, Iowa	05387500	511	1952-83
Upper Iowa River near Decorah, Iowa	05388000	568	1913-14; 1919-27
Paint Creek at Waterville, Iowa	05388500	42.8	1952-73
Yellow River at Ion, Iowa	05389000	221	1934-51
Mississippi River at Clayton, Iowa	05411500	9,200	1930-36
Turkey River at Elkader, Iowa	05412000	891	1932-42
Little Maquoketa River near Durango, Iowa	05414500	130	1934-82
Maquoketa River near Manchester, Iowa	05417000	305	1933-73
Maquoketa River near Delhi, Iowa	05417500	347	1933-40
Bear Creek near Monmouth, Iowa	05417700	61.3	1957-76
Maquoketa River above North Fork Maquoketa River near Maquoketa, Iowa	05418000	938	1913-14
Wapsipinicon River at Stone City, Iowa	05421500	1,324	1903-14
Crow Creek at Eldridge, Iowa	05422420	2.20	1977-82
Crow Creek at Mt. Joy, Iowa	05422450	6.90	1977-82
Pine Creek at Muscatine, Iowa	05448150	38.9	1975-82
Eagle Lake inlet near Britt, Iowa	05448285	3.83	1975-80
Eagle Lake outlet near Britt, Iowa	05448290	11.3	1975-80
West Branch (West Fork) Iowa River near Klemme, Iowa	05448500	112	1948-58
Iowa River near Iowa Falls, Iowa	05450000	665	1911-14
Upper Pine Lake at Eldora, Iowa	05450500	14.9	1936-70
Lower Pine Lake at Eldora, Iowa	05451000	15.9	1936-70
Iowa River near Belle Plaine, Iowa	05452500	2,455	1939-59
Lake Macbride near Solon, Iowa	05453500	27.0	1936-71
Ralston Creek at Iowa City, Iowa	05455000	3.01	1924-87
Cedar River at Mitchell, Iowa	05457500	826	1933-42
Shell Rock River near Northwood, Iowa	05459000	300	1945-86
Shell Rock River at Marble Rock (Greene), Iowa	05460500	1,318	1933-53
Shell Rock River at Greene, Iowa	05461000	1,357	1933-42
Shell Rock River near Clarksville, Iowa	05461500	1,626	1915-27; 1932-34
Fourmile Creek near Lincoln, Iowa	05464130	13.78	1962-67; 1969-74
Half Mile Creek near Gladbrook, Iowa	05464133	1.33	1962-67; 1969-74
Fourmile Creek near Traer, Iowa	05464137	19.51	1962-74; 1975-80
Prairie Creek at Fairfax, Iowa	05464640	178	1966-82
South Skunk River below Squaw Creek near Ames, Iowa	05471000	556	1952-79
Lake Keomah near Oskaloosa, Iowa	05472000	3.06	1936-71
Skunk River at Coppock, Iowa	05473000	2,916	1913-44
Big Creek near Mount Pleasant, Iowa	05473500	106	1955-79
East Fork Des Moines River near Burt, Iowa	05478000	462	1971-74
East Fork Des Moines River near Hardy, Iowa	05478500	1,268	1940-54
Des Moines River near Fort Dodge, Iowa	05479500	3,753	1911-13
Lizard Creek near Clare, Iowa	05480000	257	1940-82
Des Moines River near Boone, Iowa	05481500	5,511	1920-68
Des Moines River at Des Moines, Iowa	05482000	6,245	1905-06; 1915-61
Storm Lake at Storm Lake, Iowa	05482140	28.3	1970-75
Springbrook Lake near Guthrie Center, Iowa	05483500	5.18	1936-71
Raccoon River at Des Moines, Iowa	05485000	3,590	1902-03
Lake Ahquabi near Indianola, Iowa	05487000	4.93	1936-71
White Breast Creek near Knoxville, Iowa	05488000	380	1945-62
Muchakinock Creek near Eddyville, Iowa	05489190	70.2	1975-79
Lake Wapello near Drakesville, Iowa	05490000	7.75	1936-71
Sugar Creek near Keokuk, Iowa	05491000	105	1922-31; 1958-73
Fox River at Bloomfield, Iowa	05494300	87.7	1957-73
Fox River at Cantril, Iowa	05494500	161	1940-51
Rock River at Rock Rapids, Iowa	06483270	788	1959-74
Dry Creek at Hawarden, Iowa	06484000	48.4	1948-69
West Fork ditch at Holly Springs, Iowa	06602000	399	1939-69
Loon Creek near Orleans, Iowa	06603920	31	1971-74
Spirit Lake outlet at Orleans, Iowa	06604100	75.6	1971-74
Milford Creek at Milford, Iowa	06604400	146	1971-74
Little Sioux River at Spencer, Iowa	06605100	990	1936-42
Little Sioux River at Gillett Grove, Iowa	06605600	1,334	1958-73
Little Sioux River near Kennebeck, Iowa	06606700	2,738	1939-69
Odebolt Creek near Arthur, Iowa	06607000	39.3	1957-75
Maple River at Turin, Iowa	06607300	725	1939-41
Little Sioux River near Blencoe (Turin), Iowa	06607510	4,470	1939-42
Steer Creek near Magnolia, Iowa	06609200	9.26	1963-69
Thompson Creek near Woodbine, Iowa	06609590	6.97	1963-69
Willow Creek near Logan, Iowa	06609600	129	1972-75
Indian Creek at Council Bluffs, Iowa	06610500	7.99	1954-76
Mosquito Creek near Earling, Iowa	06610520	33.0	1965-79
Waubonsie Creek near Bartlett, Iowa	06806000	30.4	1946-69
West Nishnabotna River at Harlan, Iowa	06807320	316	1977-82
West Nishnabotna River at (near) White Cloud, Iowa	06807500	967	1918-24
Mule Creek near Malvern, Iowa	06808000	10.6	1954-69
Spring Valley Creek near Tabor, Iowa	06808200	7.6	1955-64
Dauids Creek near Hamlin, Iowa	06809000	26.0	1952-73
West Nodaway River at Villisca, Iowa	06816500	342	1918-25
Honey Creek near Russell, Iowa	06903500	13.2	1952-62
Chariton River near Centerville, Iowa	06904000	708	1938-59

## DISCONTINUED WATER-QUALITY STATIONS

The following water-quality stations have been discontinued in Iowa. Continuous daily records of water temperature or sediment and monthly or periodic samples of chemical quality were collected and published for the period of record shown for each station. An asterisk (\*) in the type of record column indicates that periodic data is available for that parameter subsequent to the period of daily record.

## Discontinued water-quality stations

Station name	Station number	Drainage area (sq mi)	Type of Record	Period of record
Upper Iowa River at Decorah, Iowa	05387500	511	Sed., Temp.	1963-1983
Upper Iowa River near Dorchester, Iowa	05388250	770	Sed., Temp.	1975-81
Paint Creek at Waterville, Iowa	05388500	42.8	Temp.	1952-56
			Sed.	1952-57
Turkey River at Garber, Iowa	05412500	1,545	Temp., Sed.*	1957-62
Mississippi River at Dubuque, Iowa	05414700	1,600	Chem.	1969-73
Maquoketa River near Maquoketa, Iowa	05418500	1,553	Chem., Temp., Sed.	1978-82
Mississippi River at Clinton, Iowa	05420500	85,600	Chem.	1973-87
Wapsipinicon River at Independence, Iowa	05421000	1,048	Chem.*	1968-70
			Temp.*, Sed.*	1967-70
Crow Creek at Bettendorf, Iowa	05422470	17.8	Chem., Temp., Sed.	1978-82
Iowa River near Rowan, Iowa	05449500	429	Temp.*, Sed.*	1957-62
Cedar River near Gilbertville, Iowa	05464020	5,234	Chem.	1971; 1975-81
Iowa River at Iowa City, Iowa	05454500	3,271	Chem., Temp., Sed.	1952-1987
Ralston Creek at Iowa City, Iowa	05455000	3.01	Chem., Temp., Sed.	1906-1907; 1944-88
Fourmile Creek near Lincoln, Iowa	05464130	13.78	Chem., Temp., Sed.	1969-74
Half Mile Creek near Gladbrook, Iowa	05464133	1.33	Chem., Temp., Sed.	1969-74
Fourmile Creek near Traer, Iowa	05464137	19.51	Chem., Temp., Sed.	1969-74
Cedar River near Palo, Iowa	05464450	6,380	Chem.	1975-79
Cedar River at Cedar Rapids, Iowa	05464500	6,640	Chem.*	1906-07; 1944-54
			Temp.*	1944-54
			Sed.	1943-54
Cedar River near Bertram, Iowa	05464760	6,955	Chem.	1975-81
Mississippi River at Burlington, Iowa	05469720	4,000	Chem.	1969-73
Mississippi River at Keokuk, Iowa	05474500	119,000	Chem.	1974-87
Des Moines River at Fort Dodge, Iowa	05480500	4,190	Chem.	1972-73
Des Moines River at Des Moines, Iowa	05482000	6,245	Chem.	1954-55
			Temp., Sed.	1954-61
E. Fork Hardin Creek near Churdan, Iowa	05483000	24.0	Temp.*, Sed.*	1952-57
M. Fork Raccoon River near Bayard, Iowa	05483450	375	Chem., Temp., Sed.	1979-85
M. Fork Raccoon River at Panora, Iowa	05483600	440	Chem., Temp., Sed.	1979-85
Raccoon River at Des Moines, Iowa	05485000	3,590	Chem., Temp.	1945-47
Des Moines River below Raccoon River at Des Moines, Iowa	05485500	9,770	Chem.*	1944-45
			Temp.*, Sed.	1944-47
Des Moines River below Des Moines, Iowa	05485520	9,901	Chem.	1971; 1975-81
Middle River near Indianola, Iowa	05486490	503	Temp.*, Sed.	1962-67
White Breast Creek near Dallas, Iowa	05487980	342	Chem.	1968-73
			Temp., Sed.	1967-73
Big Sioux River at Sioux City, Iowa	06485950	9,410	Chem.	1969-73
Missouri River at Sioux City, Iowa	06486000	314,600	Chem.	1972-86
Floyd River at James, Iowa	06600500	882	Temp., Sed.	1968-73
Floyd River at Sioux City, Iowa	06600520	921	Chem.	1969-73
Missouri River at Decatur, Nebr.	06601200	316,160	Chem.	1974-81
Little Sioux River at Correctionville, Iowa	06606600	2,500	Chem.*	1954-55
			Temp.*	1951-62
			Sed.	1950-62
Little Sioux River near Kennebec, Iowa	06606700	2,738	Temp.	1950-55
			Sed.	1950-57
Little Sioux River at River Sioux, Iowa	06607513	3,600	Chem.	1969-73
Soldier River near Mondamin, Iowa	06608505	440	Chem.	1970-73
Steer Creek near Magnolia, Iowa	06609200	9.26	Temp., Sed.	1963-69
Thompson Creek near Woodbine, Iowa	06609590	6.97	Temp., Sed.	1963-69
Willow Creek near Logan, Iowa	06609600	129	Chem., Temp.	1972-75
			Sed.	1971-75
Missouri River at Omaha, Nebr.	06610000	322,800	Chem.	1969-86
Mule Creek near Malvern, Iowa	06808000	10.6	Temp.	1958-69
			Sed.	1954-69
Davids Creek near Hamlin, Iowa	06809000	26.0	Temp.*	1952-53; 1965-68
East Nishnabotna River at Red Oak, Iowa	06809500	894	Temp., Sed.	1962-73
Platte River near Diagonal, Iowa	06818750	217	Chem.	1969-73
Thompson River at Davis City, Iowa	06898000	701	Chem.	1967-73
			Temp., Sed.	1968-73
Weldon River near Leon, Iowa	06898400	104	Chem.	1968-73
Chariton River near Chariton, Iowa	06903400	182	Temp., Sed.	1969-73
Honey Creek near Russell, Iowa	06903500	13.2	Sed.	1952-62
Chariton River near Rathbun, Iowa	06903900	551	Temp.*, Sed.*	1962-69

Type of record: Chem. (chemical quality); Temp. (water temperature); Sed. (sediment).

## MISSISSIPPI RIVER BASIN

## UPPER IOWA RIVER BASIN

## 05388250 UPPER IOWA RIVER NEAR DORCHESTER, IA

LOCATION.--Lat 43°25'16", long 91°30'31", in SW1/4 NW1/4 sec.1, T.99 N., R.6 W., Allamakee County, Hydrologic Unit 07060002, on right bank at upstream side of bridge on State Highway 76, 650 ft upstream from Mineral Creek, 0.5 mi upstream from Bear Creek, 3.5 mi south of Dorchester, and 18.1 mi upstream from mouth.

DRAINAGE AREA.--770 mi<sup>2</sup>.

PERIOD OF RECORD.--September 1936 to June 1975 (gage heights and discharge measurements only), July 1975 to current year.

GAGE.--Water-stage recorder. Datum of gage is 660.00 ft above NGVD. Prior to Jan. 6, 1938, nonrecording gage on old bridge at site 0.2 mi upstream at datum 5.91 ft higher. Jan. 6, 1938, to Apr. 26, 1948, nonrecording gage at datum 60.00 ft lower. Apr. 27, 1948 to August 1963, nonrecording gage on old bridge and August 1963 to June 1975 nonrecording gage on new bridge at same datum.

REMARKS.--Estimated daily discharges: Oct. 2, 4-5, 24-27, Oct. 29 to Nov. 2, Nov. 5-6, Dec. 15 to Mar. 10, Mar. 25-30, Apr. 1-27, June 11 to July 20, July 27 to Aug. 31, Sept. 11, and 17-20. Records poor. U.S. Geological Survey gage-height telemeter and U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--13 years, (water years 1976-88) 577 ft<sup>3</sup>/s, 10.18 in/yr, 418,000 acre-ft/yr; median of yearly mean discharges, 530 ft<sup>3</sup>/s, 9.4 in/yr, 384,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 14,000 ft<sup>3</sup>/s Mar. 12, 1976, gage height, 17.67 ft; minimum daily discharge, 79 ft<sup>3</sup>/s Dec. 31, 1976.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of May 30, 1941, reached a stage of 21.8 ft, from flood profile, discharge, 30,400 ft<sup>3</sup>/s on basis of slope-area determination of peak flow.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 10	----	*3,000	(a) *10.50				

(a) Ice jam

Minimum daily discharge, 109 ft<sup>3</sup>/s Aug. 7.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	199	184	220	160	250	280	617	473	273	190	136	126
2	210	180	215	150	240	290	610	471	265	184	138	119
3	212	172	219	160	260	280	600	452	254	177	131	128
4	203	169	213	170	250	270	620	437	243	174	127	135
5	203	168	208	130	240	400	640	431	244	174	124	132
6	203	174	204	140	250	580	580	419	242	187	115	130
7	201	184	207	160	270	860	540	404	239	184	109	136
8	197	211	207	180	260	1300	500	404	240	187	182	133
9	195	203	220	160	250	1500	460	483	234	203	241	128
10	191	197	235	150	260	1600	440	474	261	217	183	133
11	191	195	248	170	260	1350	430	433	246	231	166	125
12	190	195	254	190	270	1180	420	410	235	196	160	118
13	189	196	267	170	290	1050	400	389	235	200	153	117
14	187	193	263	160	300	919	380	390	231	203	136	117
15	186	192	230	200	290	803	370	394	220	190	133	118
16	187	194	190	240	290	719	350	388	217	174	124	125
17	190	213	150	230	300	655	330	383	213	166	133	138
18	185	221	180	220	330	610	310	376	213	165	132	133
19	179	212	210	230	320	568	300	361	213	156	138	152
20	176	198	230	230	300	532	290	361	213	159	146	168
21	174	188	200	210	280	511	285	358	206	160	148	160
22	175	181	190	180	310	484	285	346	196	167	156	181
23	178	188	170	190	290	474	290	313	187	173	189	275
24	180	188	160	200	270	457	300	299	193	170	168	220
25	177	187	170	190	250	560	280	289	180	169	160	170
26	177	183	160	170	260	640	260	297	177	161	149	170
27	180	179	150	160	280	740	340	300	187	138	142	160
28	178	192	160	180	270	580	450	303	184	144	135	156
29	177	215	150	200	270	600	418	296	187	143	125	151
30	177	226	170	280	---	700	442	288	187	163	119	148
31	184	---	180	260	---	650	---	278	---	151	119	---
TOTAL	5831	5778	6230	5820	7960	22142	12537	11700	6615	5456	4517	4402
MEAN	188	193	201	188	274	714	418	377	220	176	146	147
MAX	212	226	267	280	330	1600	640	483	273	231	241	275
MIN	174	168	150	130	240	270	260	278	177	138	109	117
AC-FT	11570	11460	12360	11540	15790	43920	24870	23210	13120	10820	8960	8730
CFSM	.24	.25	.26	.24	.36	.93	.54	.49	.29	.23	.19	.19
IN.	.28	.28	.30	.28	.38	1.07	.61	.57	.32	.26	.22	.21

CAL YR 1987	TOTAL 125061	MEAN 343	MAX 1120	MIN 150	AC-FT 248100	CFSM .44	IN. 6.04
WTR YR 1988	TOTAL 98988	MEAN 270	MAX 1600	MIN 109	AC-FT 196300	CFSM .35	IN. 4.78

## MISSISSIPPI RIVER MAIN STEM

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## 05389500 MISSISSIPPI RIVER AT MCGREGOR, IA

LOCATION.--Lat 43°01'29", long 91°10'21", in SE1/4 SE1/4 sec.22, T.95 N., R.3 W., Clayton County, Hydrologic Unit 07060001, on right bank in city park at east end of Main Street in McGregor, 2.6 mi upstream from Wisconsin River, 4.3 mi downstream from Yellow River, and at mile 633.4 upstream from Ohio River.

DRAINAGE AREA.--67,500 mi<sup>2</sup>, approximately.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--August 1936 to current year.

REVISED RECORDS.--WDR IA-75-1: 1974.

GAGE.--Water-stage recorder. Datum of gage is 604.84 ft above NGVD. Prior to June 1, 1937, and since June 2, 1939, auxiliary water-stage recorder; June 1, 1937 to June 1, 1939, auxiliary nonrecording gage 14.1 mi upstream in tailwater of dam 9, at datum 5.30 ft lower.

REMARKS.--Estimated daily discharges: Dec. 26 to Mar. 13, May 14 to June 8, and July 25 to Aug. 8. Records good except those for estimated daily discharges and for discharges less than 10,000 ft<sup>3</sup>/s, which are fair. Stage-discharge relation affected by backwater from Wisconsin River and Lock and Dam No. 10. Minor flow regulation caused by navigation dams. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--52 years, 35,470 ft<sup>3</sup>/s, 7.14 in/yr, 25,700,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 276,000 ft<sup>3</sup>/s Apr. 24, 1965; maximum gage height, 25.38 ft Apr. 24, 1965; minimum daily discharge, 6,200 ft<sup>3</sup>/s Dec. 9, 1936; minimum gage height, -0.86 ft Aug. 18, 1936.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since at least 1828, that of Apr. 24, 1965.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 57,200 ft<sup>3</sup>/s Apr. 2; maximum gage height, 9.84 ft Apr. 1; minimum daily discharge, 8,990 ft<sup>3</sup>/s Sept. 15; minimum gage height, 5.95 ft Sept. 17.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	19100	22600	29000	19000	18000	18000	56800	30300	20000	11200	10000	14900
2	17500	23700	28800	18000	18000	19000	57200	31700	19000	11400	10000	14000
3	17900	24400	28400	18000	17000	21000	56900	33800	17000	11500	9000	14800
4	17000	24400	28800	17000	17000	23000	55500	34300	16000	10900	9000	14700
5	16100	24000	28500	16000	17000	25000	52500	32800	16000	9730	9000	16200
6	16700	22800	27000	15500	17000	27000	51200	29700	16000	10200	9000	16300
7	16400	21300	27100	15500	17000	29000	49700	26400	16000	10200	9500	15800
8	17100	21000	26600	16000	17000	30000	49700	24800	15100	10300	11000	13900
9	16900	21100	26200	16000	17000	32000	50300	25800	14400	9940	13800	12100
10	16800	21500	25500	16000	16500	34000	52000	27000	13800	11000	15200	11500
11	16900	21500	23800	16000	16500	37000	53100	28100	12800	12200	15200	11700
12	15900	21300	24100	16000	16500	40000	53400	29900	12400	12300	15500	10100
13	16200	21200	25100	16000	16500	43000	52800	31100	11600	13100	16100	10400
14	16000	21400	27100	16000	16500	43800	52100	32000	11900	11700	15600	10200
15	16900	20900	30400	16000	16500	44500	49700	33000	9760	13100	15600	8990
16	20200	20500	31700	16000	16000	43700	47100	35000	9850	11800	15500	10100
17	25600	21100	28200	16500	16000	41400	45000	36000	10500	12100	15000	11100
18	26400	22800	27000	17000	16000	39000	42600	36000	11700	11600	13000	13600
19	25400	23600	24400	17000	16000	37400	39500	35000	11000	10900	12500	18100
20	23700	24000	24500	17000	16500	35700	37300	32000	10600	11000	12200	21600
21	22100	23900	22900	18000	17000	32900	35800	30000	12600	10800	13000	23800
22	21600	23600	20400	18500	17000	30200	34700	28000	12600	11100	13000	25900
23	21600	24800	19500	18500	17000	28600	35000	25000	13000	11700	15700	28100
24	21500	26300	21200	18500	17000	27600	35200	21000	13900	11900	18300	26700
25	21600	26400	24200	18500	17000	28300	34200	18000	12900	12000	18500	23400
26	21800	26300	25000	18500	17000	29300	31500	15000	12900	12500	18600	19700
27	21600	24700	25000	18000	17000	33100	31300	14000	13600	11500	18200	17300
28	21800	24200	24000	18000	17000	37700	30300	15000	12500	10500	16600	17800
29	21900	25900	23000	18000	17500	46200	29400	17000	11500	10000	15100	18500
30	21800	28300	21000	18000	---	49900	29400	18000	11700	9500	15300	18900
31	21900	---	19000	18000	---	54100	---	20000	---	10000	15300	---
TOTAL	613900	699500	787400	531000	488000	1061400	1331200	845700	402610	347670	429300	490190
MEAN	19800	23320	25400	17130	16830	34240	44370	27280	13420	11220	13850	16340
MAX	26400	28300	31700	19000	18000	54100	57200	36000	20000	13100	18600	28100
MIN	15900	20500	19000	15500	16000	18000	29400	14000	9760	9500	9000	8990
AC-FT	1218000	1387000	1562000	1053000	967900	2105000	2640000	1677000	798600	689600	851500	972300
CFSM	.29	.35	.38	.25	.25	.51	.66	.40	.20	.17	.21	.24
IN.	.34	.39	.43	.29	.27	.58	.73	.47	.22	.19	.24	.27
CAL YR 1987	TOTAL 10052500	MEAN 27540	MAX 51400	MIN 10100	AC-FT 19940000	CFSM .41	IN. 5.54					
WTR YR 1988	TOTAL 8027870	MEAN 21930	MAX 57200	MIN 8990	AC-FT 15920000	CFSM .32	IN. 4.42					

## MISSISSIPPI RIVER MAIN STEM

05389500 MISSISSIPPI RIVER AT MCGREGOR, IA--Continued

## WATER-QUALITY RECORDS

LOCATION.--Samples collected by boat 1.5 mi downstream from discharge station. Prior to April 1981, at bridge on U.S. Highway 18, 1.2 mi upstream from gage.

PERIOD OF RECORD.--Water years 1975 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: July 1975 to current year.

WATER TEMPERATURES: July 1975 to current year.

SUSPENDED-SEDIMENT DISCHARGE: July 1975 to current year.

REMARKS.--Records of specific conductance are obtained from suspended-sediment samples at time of analysis.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SEDIMENT CONCENTRATIONS: Maximum daily mean, 2350 mg/L Mar. 19, 1986; minimum daily mean, 1 mg/L Dec. 23-25, 1976, Dec. 20, 28, 1977, Feb. 13-17, 23, Mar. 5-9, 1986 and Dec. 2, 6, 8-11, 1987.

SEDIMENT LOADS: Maximum daily, 363,000 tons Mar. 19, 1986; minimum daily, 31 tons Dec. 25, 1976.

EXTREMES FOR CURRENT YEAR.--

SEDIMENT CONCENTRATIONS: Maximum daily mean, 108 mg/L May 11; minimum daily mean, 1 mg/L Dec. 2, 6, 8-11.

SEDIMENT LOADS: Maximum daily, 11,100 tons Apr. 12; minimum daily, 64 tons Dec. 11.

SPECIFIC CONDUCTANCE MICROSIEMENS/CM AT 25 DEG C, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	375	---	410	---	---	---	---	400	---	---
2	---	---	---	---	---	---	---	320	380	---	340	380
3	---	400	---	---	---	---	340	---	---	---	---	---
4	420	---	---	380	---	420	---	---	---	400	---	---
5	---	---	---	---	430	---	---	300	400	---	340	370
6	410	---	380	---	---	---	345	---	---	---	---	---
7	---	---	---	---	---	410	---	---	---	---	---	---
8	---	400	---	420	450	---	---	---	395	385	340	380
9	---	---	---	---	---	---	---	320	---	---	---	---
10	---	---	---	---	---	---	---	---	---	---	---	---
11	420	---	375	430	---	360	---	320	---	---	---	---
12	---	390	---	---	445	---	350	---	430	380	---	---
13	---	---	---	---	---	---	---	---	---	---	340	380
14	420	---	---	---	---	375	370	---	---	---	---	---
15	---	400	365	450	450	---	---	---	---	---	---	---
16	---	---	---	---	---	---	---	350	---	380	345	380
17	---	---	---	---	---	---	---	---	420	---	---	---
18	---	390	370	445	---	350	335	345	---	---	---	---
19	420	---	---	---	435	---	---	---	---	---	350	400
20	---	---	---	---	---	---	350	---	---	355	---	---
21	---	---	380	---	---	365	---	---	420	---	---	---
22	430	390	---	420	440	---	---	---	---	---	380	400
23	---	---	---	---	---	---	---	---	---	340	---	---
24	---	---	360	---	---	---	---	360	405	---	---	---
25	420	390	---	420	---	350	---	---	---	---	375	390
26	---	---	---	---	440	---	334	---	---	350	---	---
27	---	---	---	---	---	---	340	---	---	---	---	360
28	420	---	---	---	430	350	---	365	400	---	375	---
29	---	---	380	420	---	---	---	---	---	340	---	---
30	395	380	---	---	---	---	---	---	---	---	---	360
31	---	---	---	---	---	375	---	380	---	---	---	---

05389500 MISSISSIPPI RIVER AT MCGREGOR, IA--Continued

## WATER-QUALITY RECORDS

WATER TEMPERATURE, DEGREES CENTIGRADE, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	.0	---	.0	---	---	---	---	26.0	---	---
2	---	---	---	---	---	---	---	15.0	26.0	---	26.0	22.0
3	---	6.0	---	---	---	---	9.0	---	---	---	---	---
4	13.0	---	---	.0	---	1.5	---	---	---	26.5	---	---
5	---	---	---	---	.0	---	---	16.0	26.0	---	23.0	22.0
6	13.0	---	3.0	---	---	---	10.0	---	---	---	---	---
7	---	---	---	---	---	2.0	---	---	---	---	---	---
8	---	6.0	---	.0	.0	---	---	---	26.0	24.0	26.0	22.0
9	---	---	---	---	---	---	---	17.0	---	---	---	---
10	---	---	---	---	---	---	---	---	---	---	---	---
11	9.0	---	3.0	.0	---	2.0	---	18.0	---	---	---	---
12	---	5.0	---	---	.0	---	11.0	---	---	25.0	---	---
13	---	---	---	---	---	---	---	---	26.0	---	27.0	19.5
14	10.0	---	---	---	---	2.0	11.0	---	---	---	---	---
15	---	4.5	.0	.0	.0	---	---	---	---	---	---	---
16	---	---	---	---	---	---	---	18.0	---	25.0	28.0	20.0
17	---	---	---	---	---	---	---	---	26.0	---	---	---
18	---	5.0	.0	.0	---	2.0	11.0	18.0	---	---	---	---
19	9.0	---	---	---	.0	---	---	---	---	---	27.0	21.0
20	---	---	---	---	---	---	8.0	---	---	27.0	---	---
21	---	---	.0	---	---	3.0	---	---	26.0	---	---	---
22	8.0	5.0	---	.0	.0	---	---	---	---	---	26.0	21.0
23	---	---	---	---	---	---	---	---	---	26.5	---	---
24	---	---	.0	---	---	---	---	20.0	25.5	---	---	---
25	6.0	4.0	---	.0	---	6.0	---	---	---	---	26.5	21.0
26	---	---	---	---	.0	---	9.0	---	---	26.0	---	---
27	---	---	---	---	---	---	9.0	---	---	---	---	21.0
28	6.0	---	---	---	1.0	8.0	---	18.0	27.0	---	27.0	---
29	---	---	.0	.0	---	---	---	---	---	27.5	---	---
30	6.0	4.0	---	---	---	---	---	---	---	---	---	18.0
31	---	---	---	---	---	7.5	---	26.0	---	---	---	---

## SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DAY	MEAN CONCENTRATION (MG/L)	LOADS (T/DAY)	MEAN CONCENTRATION (MG/L)	LOADS (T/DAY)	MEAN CONCENTRATION (MG/L)	LOADS (T/DAY)	MEAN CONCENTRATION (MG/L)	LOADS (T/DAY)	MEAN CONCENTRATION (MG/L)	LOADS (T/DAY)	MEAN CONCENTRATION (MG/L)	LOADS (T/DAY)
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	10	516	14	854	2	157	3	154	3	146	6	292
2	10	472	16	1020	1	78	3	146	3	146	7	359
3	9	435	18	1190	2	153	3	146	3	138	7	397
4	9	413	16	1050	3	233	3	138	4	184	7	435
5	8	348	14	907	2	154	3	130	4	184	7	472
6	21	947	15	923	1	73	3	126	3	138	7	510
7	38	1680	12	690	2	146	4	167	3	138	6	470
8	20	923	7	397	1	72	4	173	3	138	6	486
9	21	958	8	456	1	71	5	216	3	138	6	518
10	19	862	12	697	1	69	6	259	2	89	6	551
11	14	639	11	639	1	64	7	302	3	134	6	599
12	13	558	10	575	2	130	6	259	3	134	8	864
13	15	656	10	572	2	136	5	216	3	134	11	1280
14	17	734	10	578	8	585	5	216	3	134	25	2960
15	16	730	10	564	16	1310	4	173	2	89	32	3840
16	17	927	10	553	21	1800	4	173	2	86	31	3660
17	41	2830	9	513	12	914	4	178	2	86	20	2240
18	42	2990	9	554	5	364	4	184	2	86	11	1160
19	17	1170	18	1150	14	922	3	138	2	86	10	1010
20	13	832	10	648	17	1120	3	138	2	89	10	964
21	12	716	7	452	7	433	2	97	2	92	10	888
22	19	1110	9	573	4	220	2	100	2	92	10	815
23	15	875	11	737	4	211	2	100	3	138	10	772
24	8	464	11	781	2	114	2	100	3	138	12	894
25	7	408	10	713	2	131	2	100	4	184	23	1760
26	7	412	9	639	2	135	3	150	4	184	28	2220
27	7	408	8	534	3	202	3	146	4	184	38	3400
28	8	471	6	392	3	194	3	146	5	229	51	5190
29	8	473	4	280	3	186	3	146	5	236	64	7980
30	11	647	3	229	3	170	3	146	---	---	50	6740
31	13	769	---	---	3	154	3	146	---	---	30	4380
TOTAL	---	26373	---	19860	---	10701	---	5009	---	3974	---	58106

## MISSISSIPPI RIVER MAIN STEM

05389500 MISSISSIPPI RIVER AT MCGREGOR, IA--Continued

## WATER-QUALITY RECORDS

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DAY	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	27	4140	18	1470	30	1620	22	665	15	405	28	1130
2	26	4020	20	1710	23	1180	21	646	21	567	30	1130
3	24	3690	28	2560	20	918	18	559	25	607	30	1200
4	24	3600	26	2410	19	821	12	353	27	656	30	1190
5	33	4680	20	1770	17	734	12	315	31	753	29	1270
6	43	5940	18	1440	16	691	11	303	28	680	34	1500
7	42	5640	15	1070	16	691	11	303	20	513	38	1620
8	39	5230	15	1000	15	612	11	306	19	564	27	1010
9	42	5700	20	1390	15	583	10	268	35	1300	24	784
10	52	7300	57	4160	15	559	11	327	46	1890	22	683
11	65	9320	108	8190	14	484	16	527	38	1560	24	758
12	77	11100	89	7180	13	435	21	697	25	1050	43	1170
13	73	10400	46	3860	50	1570	25	884	19	826	33	927
14	74	10400	30	2590	49	1570	24	758	26	1100	23	633
15	50	6710	25	2230	37	975	21	743	27	1140	15	364
16	37	4710	21	1980	30	798	17	542	24	1000	8	218
17	28	3400	21	2040	24	680	18	588	22	891	6	180
18	24	2760	21	2040	23	727	32	1000	18	632	12	441
19	24	2560	20	1890	23	683	30	883	17	574	19	929
20	23	2320	20	1730	22	630	25	742	16	527	27	1570
21	23	2220	19	1540	22	748	17	436	28	983	25	1610
22	23	2150	18	1360	21	714	16	480	60	2110	18	1260
23	22	2080	17	1150	20	702	20	652	72	3050	16	1210
24	22	2090	16	907	20	751	30	964	37	1830	26	1870
25	22	2030	16	778	20	697	26	842	19	949	94	5940
26	21	1790	16	648	21	731	25	844	19	954	77	4100
27	21	1770	23	869	23	845	33	1020	24	1180	30	1400
28	20	1640	47	1900	23	776	29	822	31	1390	20	961
29	20	1590	53	2430	22	683	23	621	36	1470	12	599
30	19	1510	45	2190	22	695	21	539	35	1450	18	919
31	---	---	38	2050	---	---	16	432	32	1320	---	---
TOTAL	---	132490	---	68532	---	24303	---	19101	---	33921	---	38576
TOTAL LOAD FOR YEAR:		440946	TONS.									

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	TEMPER- ATURE WATER (DEG C) (00010)	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT 1987						
07...	1230	13.0	13100	43	1520	94
APR 1988						
08...	1305	12.5	48900	40	5280	96
JUN						
08...	1200	27.0	13500	19	693	92
JUL						
20...	1110	28.0	11200	30	907	86
SEP						
01...	1035	22.0	13100	27	955	98



05389500 MISSISSIPPI RIVER AT MCGREGOR, IA--Continued

## WATER-QUALITY RECORDS

## PARTICLE-SIZE DISTRIBUTION OF SURFACE BED MATERIAL, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	NUMBER OF SAM- PLING POINTS (COUNT) (00063)	BED MAT. SIEVE DIAM. % FINER THAN .062 MM (80164)	BED MAT. SIEVE DIAM. % FINER THAN .125 MM (80165)	BED MAT. SIEVE DIAM. % FINER THAN .250 MM (80166)	BED MAT. SIEVE DIAM. % FINER THAN .500 MM (80167)	BED MAT. SIEVE DIAM. % FINER THAN 1.00 MM (80168)	BED MAT. SIEVE DIAM. % FINER THAN 2.00 MM (80169)	BED MAT. SIEVE DIAM. % FINER THAN 4.00 MM (80170)	BED MAT. SIEVE DIAM. % FINER THAN 8.00 MM (80171)	BED MAT. SIEVE DIAM. % FINER THAN 16.0 MM (80172)
OCT 1987												
07...	1230	13100	6	5	9	29	71	82	86	91	99	100
APR 1988												
08...	1305	48900	5	5	13	48	76	86	89	92	95	100
SEP												
01...	1035	13100	6	1	3	21	82	97	99	99	100	

## TURKEY RIVER BASIN

05411600 TURKEY RIVER AT SPILLVILLE, IA

LOCATION.--Lat 43°12'28", long 91°56'56", in SW1/4 NE1/4 sec.19, T.97 N., R.9 W., Winneshiek County, Hydrologic Unit 07060004, on right bank 60 ft downstream from bridge on county highway W14 at north edge of Spillville, 150 ft downstream from old mill dam, 0.6 mi upstream from Wonder Creek and at mile 98.5.

DRAINAGE AREA.--177 mi<sup>2</sup>.

PERIOD OF RECORD.--June 1956 to September 1973, October 1977 to current year. Monthly discharge only for some periods, published in WSP 1728.

REVISED RECORDS.--WDR IA-75-1: 1974.

GAGE.--Water-stage recorder. Datum of gage is 1,034.92 ft above NGVD.

REMARKS.--Estimated daily discharges: Nov. 20-22, Dec. 4-7, Dec. 15 to Mar. 10. Records good except those for estimated daily discharges, which are poor.

AVERAGE DISCHARGE.--28 years, 125 ft<sup>3</sup>/s, 9.59 in/yr, 90,560 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,600 ft<sup>3</sup>/s July 12, 1972, gage height, 16.73 ft; minimum daily discharge, 4.4 ft<sup>3</sup>/s Feb. 1-3, 1959.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1947 reached a stage of 18.4 ft, from floodmark, discharge, about 10,000 ft<sup>3</sup>/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,200 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 8	1415	ice jam	*8.83	Mar. 10	----	*720	ice jam

Minimum discharge, 8.9 ft<sup>3</sup>/s Sept. 15, 18.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	21	25	38	20	29	130	138	94	40	20	12	13
2	20	23	37	22	28	100	133	88	39	19	11	12
3	22	22	37	18	29	90	144	84	38	19	11	12
4	21	21	34	16	29	84	147	80	38	18	11	13
5	23	21	36	15	27	120	136	76	37	18	12	12
6	25	22	37	17	28	200	131	72	35	18	11	12
7	25	22	38	19	30	170	125	69	35	17	11	11
8	26	23	36	17	28	250	116	75	34	16	37	11
9	25	22	42	16	27	350	106	91	34	18	27	11
10	21	23	48	15	28	430	101	96	33	29	23	10
11	22	23	51	17	27	399	97	87	32	23	19	10
12	23	23	49	25	25	272	93	83	30	21	17	9.8
13	21	23	47	22	27	214	88	82	29	20	17	10
14	20	23	46	30	28	178	85	79	27	19	16	9.7
15	20	22	35	35	26	159	79	76	27	18	15	9.4
16	20	23	30	38	27	143	76	73	27	17	14	10
17	21	31	28	36	28	130	71	71	26	17	13	10
18	21	30	32	38	30	120	68	68	27	16	13	9.3
19	22	29	37	39	29	113	65	64	27	16	13	17
20	20	27	39	37	28	105	64	61	25	17	13	18
21	21	29	36	34	27	97	63	58	24	18	13	17
22	21	31	34	30	30	90	63	56	23	17	17	23
23	21	30	33	23	28	89	66	54	22	16	19	30
24	21	28	31	25	25	96	62	53	23	16	17	27
25	21	28	32	23	28	169	57	52	22	15	16	23
26	21	27	35	22	31	170	61	50	21	16	15	19
27	22	27	33	20	40	133	90	49	21	15	15	16
28	21	30	32	22	70	134	101	47	20	14	15	16
29	21	36	29	26	100	187	107	45	21	13	14	17
30	21	37	35	32	---	189	100	43	21	13	14	16
31	21	---	27	30	---	152	---	41	---	13	13	---
TOTAL	671	781	1134	779	937	5263	2833	2117	858	542	484	434.2
MEAN	21.6	26.0	36.6	25.1	32.3	170	94.4	68.3	28.6	17.5	15.6	14.5
MAX	26	37	51	39	100	430	147	96	40	29	37	30
MIN	20	21	27	15	25	84	57	41	20	13	11	9.3
AC-FT	1330	1550	2250	1550	1860	10440	5620	4200	1700	1080	960	861
CFSM	.12	.15	.21	.14	.18	.96	.53	.39	.16	.10	.09	.08
IN.	.14	.16	.24	.16	.20	1.11	.60	.44	.18	.11	.10	.09

CAL YR 1987 TOTAL 24388 MEAN 66.8 MAX 320 MIN 20 AC-FT 48370 CFSM .38 IN. 5.13  
WTR YR 1988 TOTAL 16833.2 MEAN 46.0 MAX 430 MIN 9.3 AC-FT 33390 CFSM .26 IN. 3.54

## TURKEY RIVER BASIN

65

05412060 SILVER CREEK NEAR LUANA, IA

LOCATION.--Lat 43°01'19", long 91°29'21", in NE1/4 SEC.25, T.9S N., R.6 W., Clayton County, Hydrologic Unit 07060004, on right upstream bank of bridge on county road W70, 2.3 miles south of Highway 52 and 18, and 3.2 miles south of Luana.

DRAINAGE AREA.--4.39 mi<sup>2</sup>.

PERIOD OF RECORD.--May 1986 to current year.

GAGE.--Water-stage recorder.

REMARKS.--Estimated daily discharges: Oct. 1-7, 9-26, Oct. 28 to Nov. 15, Nov. 29 to Dec. 1, Dec. 4-6, 14, 15, Dec. 21 to Feb. 2, Feb. 4-28, Apr. 29 to June 11, Aug. 25-26, 28-30, Sept. 1-18, and 26-30. Records fair except those for estimated daily discharges, which are poor.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 137 ft<sup>3</sup>/s Sept. 21, 1986, gage height, 6.82 ft; minimum daily discharge, 0.05 ft<sup>3</sup>/s Sept. 14, 15, 1988.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 50 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 1	1815	*63	*6.45	No other peak greater than base discharge.			

Minimum daily discharge, 0.05 ft<sup>3</sup>/s Sept. 14, 15.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.6	1.1	.88	.72	2.4	26	3.5	1.2	1.0	.58	.24	.12
2	1.5	1.4	.96	.70	2.0	17	5.5	1.1	1.0	.66	.22	.11
3	1.5	1.3	1.0	.68	2.0	7.4	7.3	1.0	.89	.66	.25	.20
4	1.4	1.1	.70	.58	1.2	6.0	5.8	.97	1.1	.58	.31	.16
5	1.4	1.1	.64	.49	.90	7.1	5.5	.94	1.0	.60	.31	.12
6	1.3	1.0	.78	.43	.76	17	5.1	.90	.95	.60	.24	.10
7	1.3	1.0	.97	.48	.68	13	4.4	.88	.99	.59	.21	.09
8	1.3	1.8	1.2	.52	.63	19	3.9	2.5	.98	.57	.33	.08
9	1.2	1.6	1.9	.49	.58	9.1	3.4	5.3	.95	.59	.26	.08
10	1.2	1.4	1.6	.45	.56	7.6	3.2	4.3	.97	.65	.21	.07
11	1.2	1.3	1.6	.47	.55	6.9	2.7	3.5	.95	.52	.22	.07
12	1.1	1.8	1.4	.58	.54	6.1	2.7	3.1	.97	.53	.17	.06
13	1.2	1.6	1.0	.52	.53	5.1	2.5	2.3	.96	.52	.15	.06
14	1.1	1.4	.80	.48	.58	4.9	2.1	2.2	.88	.55	.13	.05
15	1.1	1.3	.72	.54	.56	4.7	1.9	2.0	.88	.58	.13	.05
16	1.3	1.2	1.6	.68	.56	3.8	1.8	1.7	.85	.58	.12	.10
17	1.5	2.0	1.4	.64	.64	3.6	2.0	1.5	.91	.52	.13	.09
18	1.3	1.2	1.2	.56	.62	3.6	1.8	1.7	.86	.53	.10	.20
19	1.2	1.2	1.3	.51	.60	3.3	1.8	1.5	.89	.48	.09	.99
20	1.1	1.1	1.5	.48	.56	2.6	1.9	1.3	.88	.44	.10	.56
21	1.1	1.0	.90	.45	.54	2.5	1.5	1.2	.72	.41	.13	.32
22	1.0	1.1	1.0	.44	.58	2.8	1.4	1.1	.73	.40	.27	1.7
23	.96	.93	.95	.44	.58	2.9	1.6	1.0	.69	.40	.23	.56
24	.94	.76	.84	.45	.55	3.5	1.4	.96	.78	.38	.11	.33
25	.89	.76	.75	.44	.53	5.4	1.5	.94	.70	.37	.10	.31
26	.88	.75	.70	.43	.68	4.2	1.8	.94	.59	.35	.09	.28
27	3.0	.73	.68	.42	1.2	3.3	2.2	1.2	.58	.36	.18	.22
28	2.0	1.2	.79	.54	3.0	5.0	1.7	1.1	.57	.31	.15	.17
29	1.2	1.2	.76	.68	14	5.6	1.5	1.1	.57	.33	.13	.19
30	1.0	1.1	.80	2.0	---	5.1	1.3	1.0	.57	.28	.15	.21
31	.93	---	.80	6.0	---	4.0	---	1.0	---	.28	.14	---
TOTAL	39.70	36.43	32.12	23.29	39.11	218.1	84.7	51.43	25.36	15.20	5.60	7.65
MEAN	1.28	1.21	1.04	.75	1.35	7.04	2.82	1.66	.85	.49	.18	.25
MAX	3.0	2.0	1.9	6.0	14	26	7.3	5.3	1.1	.66	.33	1.7
MIN	.88	.73	.64	.42	.53	2.5	1.3	.88	.57	.28	.09	.05
AC-FT	79	72	64	46	78	433	168	102	50	30	11	.15
CFSM	.29	.28	.24	.17	.31	1.60	.64	.38	.19	.11	.04	.06
IN.	.34	.31	.27	.20	.33	1.85	.72	.44	.21	.13	.05	.06

CAL YR 1987	TOTAL 628.02	MEAN 1.72	MAX 25	MIN .35	AC-FT 1250	CFSM .39	IN. 5.32
WTR YR 1988	TOTAL 578.69	MEAN 1.58	MAX 26	MIN .05	AC-FT 1150	CFSM .36	IN. 4.90

## TURKEY RIVER BASIN

05412070 UNNAMED CREEK NEAR LUANA, IA

LOCATION.--Lat 43°02'24", long 91°28'07", in SE 1/4 sec.18, T.95 N., R.5 W., Clayton County, Hydrologic Unit 07060004, on right upstream bank at culvert on the north-south gravel road between county road W70 and county road X16, 0.8 mile south of State Highway 52 and 18 and approximately 1.6 miles south of Luana.

DRAINAGE AREA.--1.15 mi<sup>2</sup>.

PERIOD OF RECORD.--May 1986 to current year.

GAGE.--Water-stage recorder.

REMARKS.--Estimated daily discharges: Oct. 1-7, Oct. 9 to Nov. 15, Dec. 3-7, 14, 19-24, 26-30, Jan. 1-21, 23-27, 29, 30, Feb. 4 to Mar. 8, and Apr. 3. Records good except those for estimated daily discharges, which are poor.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 96 ft<sup>3</sup>/s Aug. 13, 1987, gage height, 11.81 ft; maximum gage height, 11.84 ft, Mar. 1, 1988, (backwater from ice); no flow at times each year.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 25 ft<sup>3</sup>/s and maximum (\*);

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Feb. 29	----	55	ice jam	Mar. 1	1745	*65	(a) *11.84

(a) Ice jam

No flow for many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.19	.04	.04	.00	.11	7.0	.66	.14	.07	.00	.00	.00
2	.17	.03	.03	.00	.45	3.5	.93	.18	.06	.00	.00	.00
3	.16	.03	.02	.00	.53	.80	2.6	.16	.06	.00	.00	.00
4	.15	.02	.01	.00	.21	.40	2.3	.15	.05	.00	.00	.00
5	.14	.02	.01	.00	.10	1.0	1.8	.15	.05	.00	.00	.00
6	.13	.02	.01	.00	.05	2.5	1.3	.14	.05	.00	.00	.00
7	.12	.02	.02	.00	.03	6.0	1.1	.13	.06	.00	.00	.00
8	.11	.04	.04	.01	.02	4.0	.85	.35	.06	.00	.00	.00
9	.10	.03	.06	.01	.02	2.8	1.1	.20	.06	.00	.00	.00
10	.09	.02	.03	.01	.01	2.5	.95	.13	.06	.00	.00	.00
11	.09	.02	.04	.00	.01	2.1	.75	.10	.06	.00	.00	.00
12	.09	.03	.04	.00	.01	1.9	.81	.12	.05	.00	.00	.00
13	.08	.03	.03	.00	.01	1.2	.78	.12	.05	.00	.00	.00
14	.08	.02	.02	.01	.01	.98	.65	.13	.06	.00	.00	.00
15	.07	.02	.01	.01	.01	.78	.54	.12	.06	.00	.00	.00
16	.15	.02	.01	.00	.01	.67	.51	.13	.06	.00	.00	.00
17	.13	.06	.01	.00	.01	.60	.53	.11	.06	.00	.00	.00
18	.10	.02	.01	.00	.02	.46	.51	.12	.05	.00	.00	.00
19	.08	.01	.01	.00	.01	.42	.40	.22	.05	.00	.00	.00
20	.06	.02	.01	.00	.01	.29	.40	.21	.04	.00	.00	.00
21	.05	.01	.01	.00	.01	.25	.30	.21	.04	.00	.00	.00
22	.05	.02	.01	.00	.02	.31	.29	.20	.04	.00	.00	.00
23	.04	.02	.01	.00	.02	.32	.26	.14	.04	.00	.00	.00
24	.04	.02	.01	.00	.01	.91	.25	.08	.04	.00	.00	.00
25	.03	.03	.01	.00	.01	.77	.24	.07	.02	.00	.00	.00
26	.03	.04	.00	.00	.04	.54	.30	.07	.00	.00	.00	.00
27	.04	.04	.00	.01	.10	.47	.32	.11	.01	.00	.00	.00
28	.04	.10	.00	.01	.50	.99	.21	.13	.00	.00	.00	.00
29	.03	.07	.00	.02	6.0	.91	.14	.09	.00	.00	.00	.00
30	.03	.05	.00	.04	---	.65	.13	.07	.00	.00	.00	.00
31	.02	---	.00	.08	---	.71	---	.08	---	.00	.00	---
TOTAL	2.69	0.92	0.51	0.21	8.35	46.73	21.91	4.36	1.31	0.00	0.00	0.00
MEAN	.087	.031	.016	.007	.29	1.51	.73	.14	.044	.00	.00	.00
MAX	.19	.10	.06	.08	6.0	7.0	2.6	.35	.07	.00	.00	.00
MIN	.02	.01	.00	.00	.01	.25	.13	.07	.00	.00	.00	.00
AC-FT	5.3	1.8	1.0	.4	.17	.93	.43	8.6	2.6	.0	.0	.0
CFSM	.08	.03	.01	.01	.25	1.31	.64	.12	.04	.00	.00	.00
IN.	.09	.03	.02	.01	.27	1.51	.71	.14	.04	.00	.00	.00

CAL YR 1987	TOTAL	112.41	MEAN	.31	MAX	9.8	MIN	.00	AC-FT	223	CFSM	.27	IN.	3.64
WTR YR 1988	TOTAL	86.99	MEAN	.24	MAX	7.0	MIN	.00	AC-FT	173	CFSM	.21	IN.	2.81

05412100 ROBERTS CREEK ABOVE SAINT OLAF, IA

LOCATION.--Lat 42°55'49", long 91°23'03", in NW1/4 sec.25, T.94 N., R.5 W., Clayton County, Hydrologic Unit 07060004, on left downstream bank at bridge on road X28, 0.1 mi north of county road B65, on north edge of St. Olaf.

DRAINAGE AREA.--70.7 mi<sup>2</sup>.

PERIOD OF RECORD.--September 1957 to July 1977 (operated as a low-flow station only), March 1986 to current year.

GAGE.--Water-stage recorder. Datum of gage is 826.73 ft above NGVD.

REMARKS.--Estimated daily discharges: Dec. 4-6, Dec. 14 to Mar. 10, Aug. 28-30, and Sept. 7-18. Records good except those for estimated daily discharges, which are poor.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 513 ft<sup>3</sup>/s Sept. 17, 1987, gage height, 13.02 ft; minimum discharge, 0.01 ft<sup>3</sup>/s Aug. 11, 1964.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s) *270	Gage height (ft) (a) *12.68	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 2	1545						

(a) Ice jam

Minimum daily discharge, 0.03 ft<sup>3</sup>/s Sept. 3, 14, 15.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	13	8.5	15	5.7	50	160	45	17	6.0	2.7	.94	.11
2	12	9.1	14	6.0	37	190	42	16	6.4	2.7	.64	.05
3	11	8.6	13	6.2	44	70	99	16	6.0	2.6	.54	.03
4	11	7.9	9.0	6.3	24	30	79	15	5.6	2.4	.56	.05
5	11	6.8	9.7	5.2	16	25	65	14	5.2	2.1	1.4	.08
6	11	6.4	11	4.8	13	33	56	13	4.9	1.9	1.6	.10
7	10	7.2	12	6.3	9.9	100	46	13	4.7	1.8	.98	.08
8	10	9.3	12	7.4	9.6	130	41	16	4.6	1.8	2.4	.07
9	10	8.2	20	6.6	9.4	98	37	45	4.1	1.9	3.5	.06
10	9.7	7.1	21	5.8	7.4	54	35	27	4.0	3.4	2.3	.06
11	9.3	7.0	18	6.0	6.8	45	33	20	4.0	4.8	1.4	.05
12	9.4	7.3	17	7.0	6.4	36	32	19	3.9	3.1	1.1	.04
13	9.8	7.7	15	6.6	6.2	32	30	17	3.6	2.6	.83	.04
14	9.4	7.4	10	6.2	6.4	27	28	15	2.9	2.5	.73	.03
15	9.5	7.1	7.3	7.0	6.2	35	26	15	3.0	2.6	.80	.03
16	9.7	8.1	9.0	7.2	6.2	33	25	14	2.9	2.2	.65	.04
17	12	12	12	7.0	6.4	37	23	13	3.0	2.5	.55	.04
18	11	18	11	6.8	6.4	36	22	12	3.3	2.6	.39	.10
19	9.3	11	12	6.7	6.2	35	20	11	3.7	1.9	.34	6.1
20	8.6	9.1	15	6.6	6.0	34	21	11	3.7	1.9	.31	15
21	8.8	8.1	13	6.4	5.6	30	20	11	3.3	2.2	.26	5.6
22	8.7	9.1	12	6.4	5.8	30	21	9.9	2.9	2.0	.46	25
23	8.7	9.5	11	6.0	5.8	30	22	9.0	2.5	1.8	.86	23
24	8.4	9.0	9.6	6.0	5.4	30	22	8.3	2.4	1.7	1.2	6.9
25	8.1	8.5	8.6	6.3	5.5	75	19	7.9	2.6	1.8	.72	3.2
26	8.2	8.2	7.8	5.5	5.6	53	18	7.8	2.4	1.8	.32	2.0
27	8.1	7.9	8.6	5.8	6.2	40	31	7.8	2.1	1.4	.20	1.1
28	8.1	10	7.6	6.2	8.4	45	25	7.8	2.1	1.4	.18	.57
29	7.9	30	7.0	6.2	82	77	20	7.1	2.3	1.4	.15	.78
30	7.8	19	9.6	10	---	60	18	6.5	2.8	1.3	.12	.83
31	7.6	---	7.3	72	---	50	---	6.3	---	1.2	.11	---
TOTAL	297.1	293.1	365.1	264.2	413.8	1760	1021	428.4	110.9	68.0	26.54	91.14
MEAN	9.58	9.77	11.8	8.52	14.3	56.8	34.0	13.8	3.70	2.19	.86	3.04
MAX	13	30	21	72	82	190	99	45	6.4	4.8	3.5	25
MIN	7.6	6.4	7.0	4.8	5.4	25	18	6.3	2.1	1.2	.11	.03
AC-FT	589	581	724	524	821	3490	2030	850	220	135	.53	181
CFSM	.14	.14	.17	.12	.20	.80	.48	.20	.05	.03	.01	.04
IN.	.16	.15	.19	.14	.22	.93	.54	.23	.06	.04	.01	.05

CAL YR 1987	TOTAL 5890.5	MEAN 16.1	MAX 252	MIN 2.8	AC-FT 11680	CFSM .23	IN. 3.10
WTR YR 1988	TOTAL 5139.28	MEAN 14.0	MAX 190	MIN .03	AC-FT 10190	CFSM .20	IN. 2.70

## TURKEY RIVER BASIN

05412500 TURKEY RIVER AT GARBER, IA

LOCATION.--Lat 42°44'24", long 91°15'42", in SE1/4 NW1/4 sec.36, T.92 N., R.4 W., Clayton County, Hydrologic Unit 07060004, on left bank 10 ft downstream from bridge on county highway C43, 800 ft upstream from Wayman Creek, 1,000 ft southeast of Garber, 2,000 ft downstream from Elk Creek, 1 mi downstream from Volga River, and 19.8 mi upstream from mouth.

DRAINAGE AREA.--1,545 mi<sup>2</sup>.

PERIOD OF RECORD.--August 1913 to November 1916, May 1919 to September 1927, April 1929 to September 1930, October 1932 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 1308: 1922-25 (M), 1927 (M). WSP 1438: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 634.46 ft above NGVD. Prior to Feb. 7, 1935, nonrecording gage at same site and datum.

REMARKS.--Estimated daily discharges: Dec. 31 to Mar. 10, Apr. 12-21, May 11, 12, 14-16, Aug. 15, 16, and Sept. 19. Records fair except those for estimated daily discharges, which are poor. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--68 years (water years 1914-16, 1920-27, 1930, 1933-88), 953 ft<sup>3</sup>/s, 8.38 in/yr, 690,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 32,300 ft<sup>3</sup>/s Feb. 23, 1922, gage height, 28.06 ft, from flood-mark; minimum daily discharge, 49 ft<sup>3</sup>/s Jan. 28, 29, 1940.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since at least 1890, that of Feb. 23, 1922.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 8,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 9	0415	*3,400	(a) *12.83				

(a) Ice jam

Minimum discharge, 117 ft<sup>3</sup>/s Sept. 15, 16.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	550	421	703	540	1100	1500	1480	955	424	265	155	153
2	529	435	671	580	1050	2500	1400	914	413	267	152	150
3	503	451	640	500	1100	1300	1570	865	406	263	156	148
4	483	427	619	450	1000	1100	1850	831	385	258	172	146
5	480	405	575	400	900	1000	1730	802	381	251	204	145
6	473	390	551	420	940	1100	1600	776	374	245	187	143
7	473	391	536	440	1000	1200	1490	757	372	240	173	139
8	468	412	573	410	940	1600	1400	768	373	221	183	136
9	460	407	640	430	900	2700	1310	1000	358	212	196	136
10	441	399	713	450	940	2400	1250	1040	350	247	207	132
11	435	396	771	490	880	2380	1170	972	347	270	229	129
12	440	398	773	560	800	2150	1110	922	340	265	209	129
13	430	399	734	500	840	1940	1050	832	329	269	199	127
14	423	398	694	540	900	1620	1010	830	317	261	197	122
15	444	397	658	640	880	1360	961	780	304	249	190	122
16	434	392	598	760	880	1290	904	740	294	238	185	120
17	449	456	526	720	880	1180	876	694	282	243	183	123
18	441	492	534	740	940	1090	849	644	273	237	175	125
19	427	496	657	760	900	1040	814	639	271	226	172	187
20	413	477	748	720	940	995	820	615	284	218	164	336
21	411	459	695	660	840	948	800	594	281	214	162	265
22	428	451	701	620	800	925	731	558	270	204	173	259
23	413	453	682	600	760	929	767	542	262	197	199	378
24	420	459	676	620	720	941	778	519	260	201	198	302
25	410	447	697	580	700	1220	763	476	264	205	190	256
26	414	432	621	540	720	1470	760	476	254	216	180	231
27	414	420	550	500	760	1500	824	476	247	203	173	210
28	414	487	628	540	960	1400	934	473	256	189	170	193
29	415	623	573	600	1250	1490	1020	465	277	178	164	188
30	417	689	661	1000	---	1660	1000	454	265	171	162	185
31	400	---	580	1200	---	1650	---	432	---	161	154	---
TOTAL	13752	13359	19978	18510	26220	45578	33021	21841	9513	7084	5613	5415
MEAN	444	445	644	597	904	1470	1101	705	317	229	181	180
MAX	550	689	773	1200	1250	2700	1850	1040	424	270	229	378
MIN	400	390	526	400	700	925	731	432	247	161	152	120
AC-FT	27280	26500	39630	36710	52010	90400	65500	43320	18870	14050	11130	10740
CFSM	.29	.29	.42	.39	.59	.95	.71	.46	.21	.15	.12	.12
IN.	.33	.32	.48	.45	.63	1.10	.80	.53	.23	.17	.14	.13

CAL YR 1987	TOTAL 272311	MEAN 746	MAX 1930	MIN 324	AC-FT 540100	CFSM .48	IN. 6.56
WTR YR 1988	TOTAL 219884	MEAN 601	MAX 2700	MIN 120	AC-FT 436100	CFSM .39	IN. 5.29

## MAQUOKETA RIVER BASIN

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05418450 NORTH FORK MAQUOKETA RIVER AT FULTON, IA

LOCATION.--Lat 42°08'48", long 90°40'33" in SW1/4 NE1/4 sec.25, T.85 N., R.2 E, Jackson County, Hydrologic Unit 07060006, on right downstream bank at bridge on State Highway 61, 7.8 mi upstream from mouth, and 5.5 mi north of junction of State Highway 64 and 61 and 0.5 mi south of Fulton.

DRAINAGE AREA.--516 mi<sup>2</sup>.

PERIOD OF RECORD.--July 1977 to current year.

GAGE.--Water-stage recorder. Datum of gage is 666.19 ft above NGVD. Nonrecording gage July 7 to September 22, 1977.

REMARKS.--Estimated daily discharges: Dec. 16-19, Dec. 25 to Mar. 2, May 25 to June 6, June 8-15, 17-27, 30, July 9-13, Aug. 24, and Sept. 27. Records fair except those for estimated daily discharges, which are poor. U.S. National Weather Service gage-height telemeter at station.

AVERAGE DISCHARGE.--11 years, 367 ft<sup>3</sup>/s, 9.66 in/yr, 265,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 10,700 ft<sup>3</sup>/s Aug. 31, 1981, gage height, 17.26 ft; minimum discharge, 63 ft<sup>3</sup>/s Jan. 2, 1988 (result of freezeup).

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of May 18, 1974 reached a stage of 16.0 ft., from floodmark, discharge 10,000 ft<sup>3</sup>/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan. 31	----	*1,300	unknown				

Minimum discharge, 63 ft<sup>3</sup>/s Jan. 2, result of freezeup.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	217	223	492	140	800	640	344	243	200	168	127	115
2	211	246	441	145	640	580	341	243	198	154	125	113
3	196	226	417	230	500	539	401	243	196	152	124	113
4	193	217	390	300	400	438	371	241	194	144	128	122
5	197	204	365	290	350	387	349	242	192	147	133	122
6	193	197	355	280	320	363	346	242	192	148	143	119
7	185	199	358	280	300	364	316	240	191	144	139	117
8	178	212	358	290	280	393	306	243	186	144	141	122
9	176	206	402	280	270	410	298	272	182	160	224	123
10	176	192	476	270	260	387	285	293	179	175	211	131
11	172	190	473	270	250	335	277	262	172	160	159	137
12	175	194	457	280	240	325	280	254	167	152	147	142
13	181	201	428	270	230	311	281	249	165	150	143	149
14	199	203	400	270	235	284	275	227	164	146	143	145
15	203	200	386	280	240	274	265	229	161	138	146	156
16	210	220	305	280	250	273	261	217	161	134	144	157
17	223	313	280	300	270	267	263	208	159	135	141	154
18	219	508	280	340	290	264	260	206	162	153	137	169
19	212	436	328	440	310	261	253	204	163	150	137	197
20	206	360	463	600	350	262	256	207	160	134	142	208
21	203	324	475	450	320	256	261	210	159	129	145	197
22	204	310	451	380	300	256	261	205	156	128	154	182
23	203	306	422	340	310	262	269	197	149	128	182	160
24	209	294	409	300	320	264	260	193	155	128	188	115
25	204	288	395	270	330	314	256	215	167	129	138	107
26	207	281	380	260	380	320	251	208	159	125	108	126
27	210	275	370	260	500	296	259	204	150	125	110	115
28	210	342	350	270	700	294	260	203	147	124	111	131
29	209	533	290	350	670	514	249	202	168	123	115	135
30	193	564	230	540	---	432	243	201	175	127	118	149
31	193	---	150	900	---	373	---	200	---	127	120	---
TOTAL	6167	8464	11776	10155	10615	10938	8597	7003	5129	4381	4423	4228
MEAN	199	282	380	328	366	353	287	226	171	141	143	141
MAX	223	564	492	900	800	640	401	293	200	175	224	208
MIN	172	190	150	140	230	256	243	193	147	123	108	107
AC-FT	12230	16790	23360	20140	21050	21700	17050	13890	10170	8690	8770	8390
CFSM	.39	.55	.74	.63	.71	.68	.56	.44	.33	.27	.28	.27
IN.	.44	.61	.85	.73	.77	.79	.62	.50	.37	.32	.32	.30

CAL YR 1987 TOTAL 110062 MEAN 302 MAX 1220 MIN 150 AC-FT 218300 CFSM .58 IN. 7.93  
WTR YR 1988 TOTAL 91876 MEAN 251 MAX 900 MIN 107 AC-FT 182200 CFSM .49 IN. 6.62

## MAQUOKETA RIVER BASIN

05418500 MAQUOKETA RIVER NEAR MAQUOKETA, IA

LOCATION.--Lat 42°05'05", long 90°38'04", in SW1/4 NE1/4 sec.17, T.84 N., R.3 E., Jackson County, Hydrologic Unit 07060006, on right bank 300 ft upstream from bridge on State Highway 62, 1,200 ft upstream from Prairie Creek, 2.0 mi northeast of Maquoketa, 2.2 mi downstream from North Fork, and 26.7 mi upstream from mouth.

DRAINAGE AREA.--1,553 mi<sup>2</sup>.

PERIOD OF RECORD.--September 1913 to current year. Prior to October 1939, published as "below North Fork near Maquoketa". Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 405: 1914. WSP 1438: Drainage area. WSP 1508: 1914-17, 1919-25, 1926 (M), 1929, 1933-34 (M), 1943.

GAGE.--Water-stage recorder. Datum of gage is 625.96 ft above NGVD. Prior to July 14, 1924, nonrecording gage, and July 15, 1924 to Sept. 30, 1972, recording gage at same site at datum 10.00 ft higher.

REMARKS.--Estimated daily discharges: Dec. 16-17 and Dec. 26 to Mar. 4. Records good except those for estimated daily discharges, which are poor. Diurnal fluctuation caused by powerplant 4 mi upstream of station. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--75 years, 1,030 ft<sup>3</sup>/s, 9.01 in/yr, 746,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 48,000 ft<sup>3</sup>/s June 27, 1944, gage height, 24.70 ft, at datum then in use; minimum daily discharge, 105 ft<sup>3</sup>/s Feb. 11-20, 1936.

EXTREMES OUTSIDE PERIOD OF RECORD.--A flood, probably in 1903, reached a stage of 23.5 ft, discharge, 43,000 ft<sup>3</sup>/s, at datum in use prior to Oct. 1, 1972.

EXTREMES FOR CURRENT YEAR.-- Peak discharges greater than base discharge of 7,500 ft<sup>3</sup>/s and maximum (\*)

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan. 31	2400	*4,470	(a) *18.92				

(a) Ice jam

Minimum daily discharge, 290 ft<sup>3</sup>/s Sept. 2.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	881	646	1510	600	3500	1300	1160	674	510	403	377	320
2	868	675	1360	620	2300	1500	1190	667	524	392	375	290
3	755	623	1200	720	1750	1400	1430	667	473	387	376	316
4	753	647	1180	900	1500	1300	1210	675	471	388	365	312
5	748	580	989	840	1200	1150	1280	618	463	377	417	323
6	727	594	1010	800	1100	1010	1170	618	470	373	402	321
7	673	550	974	820	1000	1150	1180	656	470	373	405	303
8	692	619	950	840	980	990	1050	634	450	363	396	323
9	655	542	1010	820	960	1110	1010	677	423	375	451	325
10	634	530	1150	800	920	1080	979	726	453	415	514	325
11	615	544	1240	820	880	1030	936	716	403	399	439	313
12	655	542	1250	840	840	1020	916	689	429	366	395	331
13	658	546	1190	820	820	1010	892	696	439	369	384	337
14	610	540	1090	800	840	909	856	653	419	372	378	300
15	614	571	952	780	860	878	803	644	411	372	382	340
16	613	603	850	800	860	857	814	579	442	375	369	334
17	669	748	780	860	880	785	780	668	394	367	353	337
18	656	1280	812	1000	960	818	735	566	398	385	348	368
19	644	1150	925	1500	1000	856	762	564	412	394	338	404
20	587	776	1190	2500	1400	806	715	563	409	386	326	448
21	589	873	1360	1900	1200	782	745	571	400	367	348	423
22	584	842	1350	1500	1100	831	756	572	402	367	349	435
23	577	846	1220	1200	1000	726	780	572	397	365	382	393
24	574	814	1270	1100	960	823	721	574	395	367	391	371
25	605	801	1200	1000	900	826	709	566	403	375	375	347
26	582	723	1170	960	880	936	704	554	410	375	339	342
27	581	756	1100	940	1000	930	723	547	386	373	316	351
28	583	890	1000	1000	1200	1050	699	549	382	357	323	355
29	580	1210	940	1200	1250	1250	737	545	409	363	314	306
30	570	1510	860	2000	---	1280	646	537	415	358	303	312
31	566	---	740	3900	---	1250	---	535	---	380	299	---
TOTAL	20098	22571	33822	35180	34040	31643	27088	19072	12862	11678	11529	10305
MEAN	648	752	1091	1135	1174	1021	903	615	429	377	372	343
MAX	881	1510	1510	3900	3500	1500	1430	726	524	415	514	448
MIN	566	530	740	600	820	726	646	535	382	357	299	290
AC-FT	39860	44770	67090	69780	67520	62760	53730	37830	25510	23160	22870	20440
CFSM	.42	.48	.70	.73	.76	.66	.58	.40	.28	.24	.24	.22
IN.	.48	.54	.81	.84	.82	.76	.65	.46	.31	.28	.28	.25

CAL YR 1987	TOTAL 325302	MEAN 891	MAX 4570	MIN 394	AC-FT 645200	CFSM .57	IN. 7.79
WTR YR 1988	TOTAL 269888	MEAN 737	MAX 3900	MIN 290	AC-FT 535300	CFSM .47	IN. 6.46



## MISSISSIPPI RIVER MAIN STEM

71

## 05420500 MISSISSIPPI RIVER AT CLINTON, IA

LOCATION.--Lat 41°46'53", long 90°15'04", in NW1/4 sec.34, T.81 N., R.6 E., Clinton County, Hydrologic Unit 07080101, on right bank at foot of Seventh Avenue in Camanche, 5.0 mi upstream from Wapsipinicon River, 6.4 mi downstream from Clinton, 10.6 mi downstream from Lock and Dam 13, and at mile 511.8 upstream from Ohio River. Prior to June 6, 1969, at site 400 ft downstream.

DRAINAGE AREA.--85,600 mi<sup>2</sup>, approximately, at Fulton-Lyons Bridge at Clinton.

PERIOD OF RECORD.--June to August 1873 (fragmentary), October 1873 to current year (October 1932 to September 1939, published as "at Le Claire").

REVISED RECORDS.--WDR IA-75-1: 1974.

GAGE.--Water-stage recorder. Datum of gage is 562.68 ft above NGVD. Oct. 1, 1955, to June 5, 1969, water-stage recorder at site 400 ft downstream at same datum. Auxiliary water-stage recorder at Lock and Dam 13 since Oct. 1, 1958. See WSP 1728 for history of changes prior to Oct. 1, 1955.

REMARKS.--Estimated daily discharges: Dec. 14 to Mar. 2, July 18 to Aug. 10, and Aug. 30 to Sept. 30. Records good except those for estimated daily discharges or discharges below 10,000 ft<sup>3</sup>/s, which are poor. Minor flow regulation caused by navigation dams. U.S. Army Corps of Engineers data collection platform and gage-height telemeter at station.

AVERAGE DISCHARGE.--115 years, 47,700 ft<sup>3</sup>/s, 7.57 in/yr, 34,560,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 307,000 ft<sup>3</sup>/s Apr. 28, 1965; maximum gage height, 24.65 ft Apr. 28, 1965; minimum daily discharge, 6,500 ft<sup>3</sup>/s Dec. 25-27, 1933.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage known since at least 1828, that of Apr. 28, 1965.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 65,800 ft<sup>3</sup>/s Apr. 6; maximum gage height, 11.71 ft Apr. 6, minimum daily discharge, 10,700 ft<sup>3</sup>/s July 5; minimum gage height, 8.47 ft Dec. 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	23800	27400	35500	21000	38000	25000	63500	34900	25200	11500	14000	16000
2	19600	28600	36900	20000	39000	30000	64200	38200	24500	11700	13500	15000
3	18600	30100	34300	20000	34000	31200	64600	39700	23400	11000	13500	15000
4	18500	29500	35600	20000	30000	33000	65000	40200	21700	11100	13000	15000
5	17800	29700	36100	19000	27000	34900	65300	40300	21300	10700	13000	15000
6	16700	29400	33300	19000	26000	37400	65800	40600	20600	11000	12500	16000
7	15600	27400	32600	19000	26000	39000	64000	38900	18300	11300	12000	15000
8	16700	24300	32900	19000	25000	41000	62100	34300	15500	11800	12000	14000
9	16600	22900	34000	19000	25000	43300	59300	34400	12500	11800	14000	13500
10	17700	23400	30300	19000	25000	45900	58700	34400	14400	12500	15000	13000
11	18700	25500	32400	20000	24000	48200	57900	36300	15600	14400	15300	12500
12	20300	26200	35300	21000	24000	53200	57700	36800	16200	16900	15900	12000
13	21800	25700	35100	21000	25000	57700	58200	37600	14400	19400	18100	12000
14	20300	25000	34600	21000	25000	57200	60600	37900	12600	19700	16200	12500
15	19400	24800	33000	21000	28000	54000	62700	36000	12000	20600	14200	13000
16	19200	23700	31000	22000	25000	52900	63100	36600	11800	20100	14900	13000
17	18900	26400	29000	22000	25000	54500	60900	39400	11300	20300	15900	13000
18	21900	27800	27000	22000	24000	55300	58400	40200	12200	17000	15000	14000
19	29900	28900	25000	23000	24000	52200	55700	40100	12700	16000	13900	17000
20	32300	30200	26000	25000	25000	48900	50100	40500	13400	15500	12900	23000
21	32100	32400	27000	28000	25000	44800	47400	40000	14200	16000	13000	27000
22	28200	32000	27000	30000	25000	43900	44600	39100	14700	16000	12600	30000
23	26000	31700	28000	30000	25000	41700	44300	35700	12700	16000	13400	36000
24	25000	32800	28000	28000	24000	41800	45600	32200	13400	15000	15800	35000
25	25100	32700	28000	28000	23000	42500	43300	29100	14200	14500	19100	35000
26	23900	33100	28000	27000	23000	42500	42300	22600	13400	14000	20200	34000
27	24200	33100	27000	27000	23000	43300	41800	18400	14600	14000	20200	32000
28	24600	32100	26000	27000	24000	42100	42400	17700	13500	14000	19300	29000
29	24800	32800	25000	28000	24000	47200	39000	18000	11300	14000	17900	26000
30	25300	33800	24000	29000	---	54600	34900	20100	11000	13500	17000	24000
31	25600	---	22000	33000	---	59700	---	22900	---	14000	16500	---
TOTAL	689100	863400	939900	728000	760000	1398900	1643400	1053100	462600	455300	469800	597500
MEAN	22230	28780	30320	23480	26210	45130	54780	33970	15420	14690	15150	19920
MAX	32300	33800	36900	33000	39000	59700	65800	40600	25200	20600	20200	36000
MIN	15600	22900	22000	19000	23000	25000	34900	17700	11000	10700	12000	12000
AC-FT	1367000	1713000	1864000	1444000	1507000	2775000	3260000	2089000	917600	903100	931800	1185000
CFSM	.26	.34	.35	.27	.31	.53	.64	.40	.18	.17	.18	.23
IN.	.30	.38	.41	.32	.33	.61	.71	.46	.20	.20	.20	.26
CAL YR 1987	TOTAL 13360900	MEAN 36610	MAX 66000	MIN 15600	AC-FT 26500000	CFSM .43	IN. 5.81					
WTR YR 1988	TOTAL 10061000	MEAN 27490	MAX 65800	MIN 10700	AC-FT 19960000	CFSM .32	IN. 4.37					

## WAPSIPINICON RIVER BASIN

05420560 WAPSIPINICON RIVER NEAR ELMA, IA

LOCATION.--Lat 43°14'34", long 92°31'48", in NW1/4 NW1/4 sec.8, T.97 N., R.14 W., Howard County, Hydrologic Unit 07080102, on right bank 10 ft downstream from bridge on county highway B17, 0.2 mi downstream from small left-bank tributary, 4.8 mi west of Elma, and at mile 217.9.

DRAINAGE AREA.--95.2 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1958 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,130.05 ft above NGVD.

REMARKS.--Estimated daily discharges: Nov. 21-24, Nov. 30 to Dec. 7, and Dec. 14 to Mar. 23. Records good except those for June 1 to Sept. 30, which are fair, and those for estimated daily discharges, which are poor.

AVERAGE DISCHARGE.--30 years, 66.9 ft<sup>3</sup>/s, 9.54 in/yr, 48,470 acre-ft/yr; median of yearly mean discharges, 56 ft<sup>3</sup>/s, 8.0 in/yr, 40,600 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 10,100 ft<sup>3</sup>/s June 4, 1974, gage height, 14.94 ft, from high-water mark in well; maximum gage height, 15.38 ft, from high-water mark in well, probably occurred Aug. 22, 1979 (backwater from vegetation); minimum daily discharge, 1.9 ft<sup>3</sup>/s Feb. 4-8, 1959.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 600 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 6	2400	239	ice jam	Mar. 8	1035	icejam	9.88

Minimum daily discharge, 3.6 ft<sup>3</sup>/s Sept. 15.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	11	9.2	14	16	6.2	43	37	44	7.4	6.7	5.3	6.1
2	12	9.5	12	18	6.6	39	35	38	7.3	6.8	5.1	5.8
3	8.5	9.4	11	12	7.0	35	44	33	7.2	7.0	4.8	5.6
4	11	9.1	11	7.4	6.5	47	46	29	7.1	7.6	5.4	5.7
5	9.6	8.9	12	4.8	6.2	75	42	27	7.1	8.9	6.4	5.9
6	9.8	8.8	11	6.4	7.0	175	43	25	7.0	9.7	6.2	5.6
7	9.8	8.7	11	7.1	7.8	152	38	23	6.8	9.0	6.0	5.4
8	9.8	10	12	6.5	9.0	200	33	24	6.9	8.2	7.7	4.6
9	9.5	10	19	5.7	8.0	172	30	30	6.8	8.4	11	4.2
10	9.2	11	24	6.4	7.4	144	28	30	6.7	9.4	7.5	4.0
11	9.3	9.3	23	6.7	8.2	145	26	25	6.5	8.3	6.6	4.0
12	9.4	9.0	20	6.6	8.7	139	25	24	6.5	9.5	6.4	3.8
13	9.8	8.9	15	5.9	9.2	94	24	22	6.4	9.8	6.2	3.7
14	11	8.9	13	9.8	9.7	84	23	20	6.8	8.1	6.4	3.7
15	11	8.6	12	10	9.4	76	21	18	6.8	8.2	6.5	3.6
16	12	9.3	10	11	12	50	20	17	6.7	8.0	5.8	3.7
17	13	14	10	11	12	39	20	16	7.1	7.9	5.4	3.7
18	13	14	12	10	13	35	19	15	7.3	6.9	5.6	3.7
19	12	12	14	9.4	12	38	18	15	7.8	6.9	5.5	4.6
20	11	9.3	15	10	11	30	18	16	7.3	7.4	5.7	6.2
21	10	10	15	9.9	10	28	18	15	6.9	7.6	5.2	6.2
22	10	9.8	15	9.1	12	31	18	14	6.8	7.5	6.6	7.8
23	9.8	9.5	15	10	9.5	35	20	12	6.4	6.7	8.6	8.2
24	10	9.1	15	8.3	9.6	42	20	12	7.4	6.2	7.8	6.0
25	11	8.5	14	6.9	11	132	18	11	8.8	7.0	6.2	5.2
26	10	8.4	13	7.2	13	78	19	10	7.1	10	5.8	4.5
27	9.9	8.4	13	7.8	17	51	53	9.7	7.1	7.1	6.2	3.8
28	8.9	11	11	8.0	29	47	72	9.9	6.4	6.7	6.4	4.4
29	9.3	18	15	8.5	47	60	66	9.5	7.0	7.0	6.5	5.8
30	8.5	16	19	8.3	---	51	54	8.4	7.1	6.9	5.9	6.2
31	8.6	---	23	7.7	---	41	---	7.6	---	5.5	6.1	---
TOTAL	317.7	306.6	449	272.4	335.0	2408	948	610.1	210.5	240.9	196.8	151.7
MEAN	10.2	10.2	14.5	8.79	11.6	77.7	31.6	19.7	7.02	7.77	6.35	5.06
MAX	13	18	24	18	47	200	72	44	8.8	10	11	8.2
MIN	8.5	8.4	10	4.8	6.2	28	18	7.6	6.4	5.5	4.8	3.6
AC-FT	630	608	891	540	664	4780	1880	1210	418	478	390	301
CFSM	.11	.11	.15	.09	.12	.82	.33	.21	.07	.08	.07	.05
IN.	.12	.12	.18	.11	.13	.94	.37	.24	.08	.09	.08	.06

CAL YR 1987	TOTAL 7900.1	MEAN 21.6	MAX 107	MIN 7.3	AC-FT 15670	CFSM .23	IN. 3.09
WTR YR 1988	TOTAL 6446.7	MEAN 17.6	MAX 200	MIN 3.6	AC-FT 12790	CFSM .19	IN. 2.52

## WAPSIPINICON RIVER BASIN

73

## 05421000 WAPSIPINICON RIVER AT INDEPENDENCE, IA

LOCATION.--Lat 42°27'49", long 91°53'42", in SE1/4 sec.4, T.88 N., R.9 W., Buchanan County, Hydrologic Unit 07080102, on right bank at Sixth Street in Independence, 1,800 ft downstream from dam at abandoned hydroelectric plant, 4.9 mi downstream from Otter Creek, 9.7 mi upstream from Pine Creek, and at mile 142.5.

DRAINAGE AREA.--1,048 mi<sup>2</sup>.

PERIOD OF RECORD.--July 1933 to current year.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1508: 1938-39, 1940 (M), 1947.

GAGE.--Water-stage recorder and concrete control. Datum of gage is 882.85 ft above NGVD. Prior to May 24, 1941 nonrecording gage in tailrace of powerplant 1,800 ft upstream at datum 80.00 ft lower.

REMARKS.-- No estimated daily discharges. Records good. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--55 years, 619 ft<sup>3</sup>/s, 8.02 in/yr, 448,500 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 26,800 ft<sup>3</sup>/s July 18, 1968, gage height, 21.11 ft; minimum daily discharge, 7.0 ft<sup>3</sup>/s for several days in 1934 and 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since at least 1901, that of July 18, 1968.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 12	2330	*1,820	*6.60				

Minimum discharge, 15 ft<sup>3</sup>/s Sept. 18.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	259	136	799	237	645	964	1090	635	144	60	29	26
2	235	141	701	271	443	1070	1030	600	137	60	28	26
3	215	150	633	291	459	1090	1300	551	128	55	27	26
4	205	156	546	249	409	1130	1460	512	124	55	27	25
5	212	140	474	201	342	1110	1260	473	113	51	25	24
6	190	131	455	179	295	1060	1110	431	104	48	25	23
7	176	146	435	171	264	1110	1010	394	98	46	26	23
8	160	162	421	158	227	1220	925	401	94	45	32	23
9	164	155	530	143	198	1400	858	465	88	46	31	22
10	146	148	627	138	185	1490	763	576	84	49	31	21
11	141	146	686	121	172	1680	694	621	82	46	29	21
12	139	152	675	121	172	1700	634	596	76	45	29	20
13	137	153	604	120	187	1640	592	549	72	46	29	17
14	140	145	539	119	177	1330	550	487	71	46	30	17
15	137	143	425	127	150	1070	510	450	71	44	29	19
16	149	152	325	126	148	890	472	398	65	57	29	18
17	151	195	290	131	144	782	447	364	59	49	27	17
18	150	248	346	142	143	705	413	340	58	46	27	17
19	141	299	438	163	158	638	385	319	59	41	28	28
20	145	290	470	174	168	579	390	305	65	40	27	38
21	131	262	447	188	159	540	382	280	64	39	27	43
22	133	264	465	197	155	519	370	266	73	37	30	51
23	125	284	437	193	158	511	391	248	61	36	30	45
24	128	262	434	187	158	512	387	232	68	34	32	39
25	119	296	473	181	149	676	400	209	68	34	32	39
26	122	303	393	160	155	835	411	195	56	33	31	37
27	125	282	361	183	311	846	446	167	52	33	31	38
28	118	330	369	175	527	920	483	170	50	33	30	33
29	120	615	362	169	769	1050	555	170	60	32	27	34
30	123	837	387	239	---	1190	623	160	62	31	28	34
31	122	---	383	670	---	1170	---	153	---	29	27	---
TOTAL	4758	7123	14930	5924	7627	31427	20341	11717	2406	1346	890	844
MEAN	153	237	482	191	263	1014	678	378	80.2	43.4	28.7	28.1
MAX	259	837	799	670	769	1700	1460	635	144	60	32	51
MIN	118	131	290	119	143	511	370	153	50	29	25	17
AC-FT	9440	14130	29610	11750	15130	62340	40350	23240	4770	2670	1770	1670
CFSM	.15	.23	.46	.18	.25	.97	.65	.36	.08	.04	.03	.03
IN.	.17	.25	.53	.21	.27	1.12	.72	.42	.09	.05	.03	.03

CAL YR 1987	TOTAL 159638	MEAN 437	MAX 1660	MIN 40	AC-FT 316600	CFSM .42	IN. 5.67
WTR YR 1988	TOTAL 109333	MEAN 299	MAX 1700	MIN 17	AC-FT 216900	CFSM .29	IN. 3.88

## WAPSIPINICON RIVER BASIN

05422000 WAPSIPINICON RIVER NEAR DE WITT, IA

LOCATION.--Lat 41°46'01", long 90°32'05", in SW1/4 NE1/4 sec.6, T.80 N., R.4 E., Clinton County, Hydrologic Unit 07080103, on left bank 5 ft upstream from bridge on U.S. Highway 61, 0.9 mi downstream from Silver Creek, 4.0 mi south of water tower in De Witt, 6.2 mi upstream from Brophy Creek, and 18.2 mi upstream from mouth.

DRAINAGE AREA.--2,330 mi<sup>2</sup>.

PERIOD OF RECORD.--June 1934 to current year.

REVISED RECORDS.--WSP 1308: 1937 (M). WSP 1438: Drainage area. WSP 1708: 1951.

GAGE.--Water-stage recorder. Datum of gage is 598.81 ft above NGVD.

REMARKS.--Estimated daily discharges: Jan. 2 to Feb. 28 and Aug. 22. Records good except those for estimated daily discharges, which are poor. U. S. Army Corps of Engineers gage-height telemeter and data collection platform at station.

AVERAGE DISCHARGE.--54 years, 1,550 ft<sup>3</sup>/s, 9.03 in/yr, 1,123,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 29,900 ft<sup>3</sup>/s May 17, 1974, gage height, 13.07 ft; minimum daily discharge, 46 ft<sup>3</sup>/s Jan. 22, 23, 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 6,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan. 31	1445	*6,830	(a) *11.69	No other peak greater than base discharge.			

(a) Ice jam

Minimum discharge, 116 ft<sup>3</sup>/s Sept. 18.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	963	556	1570	1380	5000	1760	2330	1140	581	290	165	149
2	904	565	1600	1350	4000	1850	2370	1160	561	287	162	146
3	848	575	1710	1260	2700	1810	2590	1190	534	281	158	145
4	813	575	1690	1100	1900	1870	2760	1190	521	273	154	148
5	804	575	1590	1000	1600	1940	2610	1180	504	267	169	145
6	789	574	1490	940	1300	2050	2690	1170	494	265	165	147
7	764	568	1430	900	1200	2070	2760	1130	490	256	160	142
8	740	567	1370	880	1100	2110	2560	1090	474	250	189	141
9	718	563	1360	860	1050	2140	2360	1090	472	244	249	139
10	701	549	1370	840	1000	2170	2170	1090	455	237	194	137
11	684	546	1410	820	940	2140	2030	1060	433	246	192	134
12	666	545	1500	800	900	2160	1940	1050	411	245	185	129
13	658	546	1560	780	880	2200	1810	1090	403	229	176	128
14	648	546	1570	760	860	2240	1720	1120	388	227	163	127
15	641	546	1520	780	860	2220	1620	1140	376	226	165	125
16	631	551	1400	800	840	2170	1540	1110	374	221	169	126
17	627	633	1360	840	840	2020	1460	1050	362	230	168	123
18	630	802	1110	1250	860	1870	1410	1000	358	235	181	120
19	631	886	953	1800	1100	1690	1340	958	347	228	209	142
20	625	836	1470	2500	1060	1570	1290	917	333	222	218	141
21	611	809	2010	3800	1000	1480	1250	878	327	219	203	140
22	605	798	2000	2700	980	1420	1210	839	331	214	200	151
23	599	798	1950	2000	960	1370	1320	835	327	209	258	173
24	597	794	1900	1500	930	1330	1340	860	328	206	204	174
25	591	793	2130	1300	900	1350	1230	833	341	198	192	173
26	579	793	2130	1200	1100	1420	1200	789	319	193	175	166
27	578	783	1890	1150	1460	1430	1190	758	311	187	165	162
28	572	837	1840	1150	1800	1530	1170	707	304	182	170	158
29	565	1290	1740	1200	1800	2200	1150	655	301	176	164	155
30	555	1550	1580	2500	---	2550	1140	628	301	174	157	150
31	554	---	1520	5800	---	2390	---	611	---	172	154	---
TOTAL	20891	21349	49723	45940	40920	58520	53560	30318	12061	7089	5633	4336
MEAN	674	712	1604	1482	1411	1888	1785	978	402	229	182	145
MAX	963	1550	2130	5800	5000	2550	2760	1190	581	290	258	174
MIN	554	545	953	760	840	1330	1140	611	301	172	154	120
AC-FT	41440	42350	98630	91120	81160	116100	106200	60140	23920	14060	11170	8600
CFSM	.29	.31	.69	.64	.61	.81	.77	.42	.17	.10	.08	.06
IN.	.33	.34	.79	.73	.65	.93	.86	.48	.19	.11	.09	.07

CAL YR 1987	TOTAL 439385	MEAN 1204	MAX 7400	MIN 301	AC-FT 871500	CFSM .52	IN. 7.02
WTR YR 1988	TOTAL 350340	MEAN 957	MAX 5800	MIN 120	AC-FT 694900	CFSM .41	IN. 5.59

## CROW CREEK BASIN

75

05422470 CROW CREEK AT BETTENDORF, IA

LOCATION.--Lat 41°33'03", long 90°27'15", in NW1/4 NW1/4 sec.24, T.78 N., R.4 E., Scott County, Hydrologic Unit 07080101, on left bank 200 ft upstream from bridge on Valley Road (old U.S. Highway 67), 3.5 mi east of U.S. Highway 6, and 0.7 mi upstream from mouth.

DRAINAGE AREA.--17.8 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1977 to current year.

GAGE.--Water-stage recorder. Datum of gage is 576.23 ft above NGVD.

REMARKS.--Estimated daily discharges: Dec. 15-22, Dec. 30 to Jan. 18, Jan. 22-31, and Feb. 2-26. Records good except those for estimated daily discharges, which are poor.

AVERAGE DISCHARGE.--11 years, 15.3 ft<sup>3</sup>/s, 11.7 in/yr, 11,080 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,490 ft<sup>3</sup>/s June 15, 1982, gage height, 10.24 ft; minimum discharge, 0.06 ft<sup>3</sup>/s Aug. 18, 1988.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 250 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan. 19	2045	*472	*5.60	No other peak greater than base discharge.			

Minimum discharge, 0.06 ft<sup>3</sup>/s Aug. 18.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.8	5.4	8.5	6.0	37	11	16	8.0	4.5	1.6	.26	.50
2	3.4	5.7	7.6	7.6	14	10	16	8.2	4.4	1.5	.22	.51
3	3.3	4.2	7.5	11	16	8.7	20	7.9	4.3	1.3	.22	.61
4	3.7	3.1	6.7	13	13	8.8	20	7.6	4.2	1.3	.47	.76
5	3.8	3.2	6.4	12	11	7.7	19	7.5	4.2	1.2	2.0	.71
6	3.3	2.3	5.8	10	10	7.5	18	6.9	4.4	.96	.90	.59
7	3.6	2.5	7.4	10	13	7.5	17	6.2	4.1	.87	.55	.57
8	3.5	3.2	6.3	12	12	8.0	15	7.0	5.2	.69	.51	.57
9	3.7	2.9	16	11	10	8.3	14	9.3	4.7	.55	2.2	.60
10	3.2	2.9	11	10	8.6	7.7	13	5.8	3.6	.62	.87	.57
11	3.1	2.7	10	10	8.0	7.9	12	5.1	3.5	.58	.54	.52
12	3.2	2.8	9.6	11	7.6	8.3	11	7.3	3.3	.72	.47	.45
13	3.3	2.8	8.3	9.0	7.4	7.3	11	5.9	3.0	.69	.25	.44
14	3.0	2.6	8.2	8.2	7.4	7.3	11	5.2	2.9	.98	.14	.43
15	3.2	2.6	7.2	8.4	7.6	11	11	5.1	2.9	.92	.19	.38
16	3.5	3.5	6.2	8.6	8.0	6.6	9.9	5.0	2.7	.41	.13	.54
17	3.3	11	11	11	8.6	6.2	9.9	4.8	2.6	.27	.16	.51
18	3.2	4.5	10	45	9.8	6.3	9.9	4.7	2.8	1.2	.21	.58
19	3.3	3.3	12	164	23	6.3	9.7	4.7	2.5	1.3	.36	1.8
20	3.2	3.0	19	94	25	6.3	9.5	4.6	2.3	.62	.32	.64
21	3.0	2.5	28	50	15	6.0	9.5	4.1	2.2	.55	.34	.39
22	3.0	2.4	27	18	27	6.0	10	4.2	2.0	.59	5.2	.27
23	3.0	2.4	28	11	22	6.6	9.9	13	2.0	.43	8.4	.22
24	6.5	2.3	39	9.0	26	13	9.1	14	2.8	.33	1.3	.19
25	3.2	3.4	40	10	20	18	9.3	9.3	2.5	.30	.76	.19
26	2.8	2.5	36	7.2	22	12	9.6	6.9	1.7	.45	.46	.18
27	3.1	2.3	35	8.2	16	10	9.4	5.9	1.5	.39	2.6	.27
28	2.8	14	37	7.6	13	15	8.3	4.8	1.5	.46	3.3	.35
29	3.0	13	34	17	12	24	8.2	4.2	4.4	.46	.97	.20
30	3.1	9.7	30	81	---	20	7.8	3.9	2.4	.33	.75	.19
31	3.1	---	20	84	---	17	---	4.4	---	.28	.55	---
TOTAL	104.2	128.7	538.7	774.8	430.0	306.3	364.0	201.5	95.1	22.85	35.60	14.73
MEAN	3.36	4.29	17.4	25.0	14.8	9.88	12.1	6.50	3.17	.74	1.15	.49
MAX	6.5	14	40	164	37	24	20	14	5.2	1.6	8.4	1.8
MIN	2.8	2.3	5.8	6.0	7.4	6.0	7.8	3.9	1.5	.27	.13	.18
AC-FT	207	255	1070	1540	853	608	722	400	189	45	71	29
CFSM	.19	.24	.98	1.40	.83	.56	.68	.37	.18	.04	.06	.03
IN.	.22	.27	1.13	1.62	.90	.64	.76	.42	.20	.05	.07	.03

CAL YR 1987	TOTAL	4217.9	MEAN	11.6	MAX	569	MIN	1.1	AC-FT	8370	CFSM	.65	IN.	8.81
WTR YR 1988	TOTAL	3016.48	MEAN	8.24	MAX	164	MIN	.13	AC-FT	5980	CFSM	.46	IN.	6.30

## IOWA RIVER BASIN

## 05449000 EAST BRANCH IOWA RIVER NEAR KLEMME, IA

LOCATION.--Lat 43°00'31", long 93°37'42", in NE1/4 NW1/4 sec.36, T.95 N., R.24 W., Hancock County, Hydrologic Unit 07080207, on left bank 15 ft upstream from bridge on county highway B55, 1.2 mi west of Chicago, Rock Island and Pacific Railroad crossing in Klemme, 1.5 mi upstream from Drainage ditch 9, 18.2 mi upstream from confluence with West Branch Iowa River, and at mile 341.0.

DRAINAGE AREA.--133 mi<sup>2</sup>.

PERIOD OF RECORD.--April 1948 to September 1976, June 1977 to current year. Prior to October 1958, published as East Fork Iowa River near Klemme.

REVISED RECORDS.--WSP 1438: Drainage area. WDR IA-80-1: 1978.

GAGE.--Water-stage recorder. Datum of gage is 1,179.33 ft above NGVD. Apr. 1, 1948, to Sept. 30, 1955, nonrecording gage at site 0.6 mi upstream at datum 0.80 ft higher. Oct. 1, 1955, to Sept. 30, 1969, at present site at datum 0.31 ft lower.

REMARKS.--Estimated daily discharges: Dec. 1-6, 13-31, and Jan. 1 to Mar. 16. Records good except those for estimated daily discharges, which are poor.

AVERAGE DISCHARGE.--39 years (water years 1948-76, 1978-88), 66.0 ft<sup>3</sup>/s, 6.74 in/yr, 47,820 acre-ft/yr; median of yearly mean discharges, 54 ft<sup>3</sup>/s, 5.5 in/yr, 39,100 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,960 ft<sup>3</sup>/s June 19, 1954, gage height, 11.2 ft, from floodmark, site and datum then in use; maximum gage height, 10.67 ft Apr. 6, 1965 (corrected), backwater from ice; minimum daily discharge, 0.2 ft<sup>3</sup>/s Feb. 22-26, 1959.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1944 reached a stage of about 10 ft, from information by local residents, former site and datum.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 700 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s) ice jam	Gage height (ft) *6.22	Date	Time	Discharge (ft <sup>3</sup> /s) *292	Gage height (ft) 5.26
Mar. 2	0945			Apr. 28	1130		

Minimum daily discharge, 0.34 ft<sup>3</sup>/s Jan. 27.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	7.9	7.0	11	4.2	1.9	35	22	121	19	13	5.8	5.6
2	7.5	6.8	11	4.4	1.8	40	32	105	20	10	5.7	5.7
3	7.5	6.8	10	3.2	1.7	41	43	91	20	8.8	7.4	5.5
4	7.6	6.7	9.1	2.3	1.6	48	48	81	19	8.0	7.3	5.6
5	7.5	6.6	8.4	1.6	1.3	61	46	75	17	7.4	6.2	5.3
6	7.1	6.7	8.7	1.8	1.5	102	43	70	16	7.0	5.9	5.1
7	7.2	7.0	8.5	1.8	1.7	93	42	71	16	6.7	5.8	5.2
8	7.3	7.0	8.5	1.7	1.8	82	43	73	15	6.6	8.0	5.1
9	7.2	6.6	11	1.5	1.8	89	36	71	14	7.2	6.7	4.9
10	7.0	6.6	11	1.5	1.6	84	31	62	13	7.7	6.1	4.9
11	7.0	6.8	11	1.4	1.1	78	28	58	13	7.1	5.9	4.8
12	7.1	6.9	10	1.3	1.2	73	27	57	13	6.9	5.9	4.7
13	7.1	6.8	8.0	1.2	1.3	67	27	54	12	7.0	5.8	4.6
14	7.1	6.8	7.1	1.6	1.5	59	23	52	12	6.7	5.8	4.6
15	7.1	6.9	6.2	1.6	1.6	53	20	49	11	6.4	5.8	4.7
16	8.2	7.3	4.0	1.6	1.8	47	24	44	11	6.6	5.6	4.7
17	7.4	6.9	7.6	1.5	2.0	46	26	42	14	6.3	5.6	4.5
18	7.0	7.1	8.2	1.3	2.6	50	21	41	12	6.3	5.6	4.3
19	6.8	6.7	9.0	1.2	4.0	43	20	39	11	6.2	5.8	5.1
20	6.8	6.8	8.5	1.2	3.7	39	25	39	10	6.2	5.8	4.9
21	6.7	7.8	9.8	1.0	3.5	34	28	37	9.3	6.1	5.8	4.5
22	6.8	9.1	7.8	.86	5.2	38	34	42	9.2	6.1	11	4.9
23	6.6	6.9	7.5	.82	4.2	45	46	38	8.6	6.1	8.5	4.5
24	6.6	7.2	6.8	.61	6.8	47	55	34	9.0	6.1	6.4	4.3
25	6.4	6.6	7.4	.49	9.2	50	54	31	8.3	6.1	5.8	4.2
26	6.6	6.4	7.0	.39	11	43	58	31	8.0	6.0	5.5	4.0
27	6.3	6.5	7.9	.34	13	35	111	35	7.7	5.9	6.1	4.0
28	6.3	8.2	5.6	1.4	20	37	273	32	7.5	5.9	6.0	4.3
29	6.5	11	7.0	2.4	30	30	210	28	13	5.9	5.8	6.0
30	6.4	11	7.7	2.8	---	27	150	26	18	5.9	5.8	4.5
31	6.6	---	5.6	3.0	---	25	---	21	---	5.8	5.7	---
TOTAL	217.2	217.5	256.9	52.01	140.4	1641	1646	1650	386.6	214.0	194.9	145.0
MEAN	7.01	7.25	8.29	1.68	4.84	52.9	54.9	53.2	12.9	6.90	6.29	4.83
MAX	8.2	11	11	4.4	30	102	273	121	20	13	11	6.0
MIN	6.3	6.4	4.0	.34	1.1	25	20	21	7.5	5.8	5.5	4.0
AC-FT	431	431	510	103	278	3250	3260	3270	767	424	387	288
CFSM	.05	.05	.06	.01	.04	.40	.41	.40	.10	.05	.05	.04
IN.	.06	.06	.07	.01	.04	.46	.46	.46	.11	.06	.05	.04

CAL YR 1987	TOTAL	9817.7	MEAN	26.9	MAX	166	MIN	4.0	AC-FT	19470	CFSM	.20	IN.	2.75
WTR YR 1988	TOTAL	6761.51	MEAN	18.5	MAX	273	MIN	.34	AC-FT	13410	CFSM	.14	IN.	1.89

## IOWA RIVER BASIN

77

05449500 IOWA RIVER NEAR ROWAN, IA

LOCATION.--Lat 42°45'36", long 93°37'23", in NW1/4 NE1/4 sec.25, T.92 N., R.24 W., Wright County, Hydrologic Unit 07080207, on left bank 10 ft downstream from bridge on county highway C38, 0.9 mi downstream from drainage ditch 123, 3.8 mi northwest of Rowan, 10.7 mi downstream from confluence of East and West Branches, and at mile 316.4.

DRAINAGE AREA.--429 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1940 to September 1976, June 1977 to current year.

REVISED RECORDS.--WSP 1308: 1942-43 (M). WSP 1438: Drainage area. WDR IA-80-1: 1978.

GAGE.--Water-stage recorder. Datum of gage is 1,143.35 ft above NGVD. Prior to Oct. 14, 1948, nonrecording gage at same site and datum.

REMARKS.--Estimated daily discharges: Nov. 30, Dec. 1-6, 12-31, Jan. 1 to Mar. 17, and Sept. 30. Records good except those for estimated daily discharges, which are poor.

AVERAGE DISCHARGE.--47 years (water years 1941-76, 1978-88), 215 ft<sup>3</sup>/s, 6.81 in/yr, 155,800 acre-ft/yr; median of yearly mean discharges, 200 ft<sup>3</sup>/s, 6.3 in/yr, 145,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,460 ft<sup>3</sup>/s June 21, 1954, gage height, 14.88 ft; minimum daily discharge, 2.9 ft<sup>3</sup>/s Jan. 21-23, 1959.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,200 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s) ice jam	Gage height (ft) *7.80	Date	Time	Discharge (ft <sup>3</sup> /s) *544	Gage height (ft) 6.84
Mar. 2	0800			Apr. 29	1500		

Minimum discharge, 13 ft<sup>3</sup>/s Sept. 27, 28.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	33	34	57	28	23	105	97	366	67	47	18	16
2	31	35	54	27	21	142	101	297	65	41	18	16
3	33	34	46	26	20	164	120	254	66	33	17	16
4	30	32	40	24	20	157	147	222	64	29	17	17
5	30	33	43	21	20	146	157	198	61	26	17	17
6	32	32	51	20	18	152	153	180	57	24	20	15
7	32	32	51	20	18	144	148	167	53	23	22	15
8	31	34	50	20	19	156	138	166	52	22	20	15
9	29	35	62	19	19	150	123	188	48	22	25	14
10	30	33	78	18	16	144	121	208	45	23	31	15
11	31	32	82	17	16	150	109	175	43	26	23	14
12	30	32	70	17	19	148	103	155	41	26	21	15
13	31	33	58	18	21	118	99	145	41	29	20	14
14	31	32	50	19	22	106	95	134	39	27	19	14
15	32	31	33	19	22	112	91	124	37	25	18	14
16	38	35	20	21	22	105	86	122	36	25	18	15
17	38	37	33	22	25	114	85	115	41	28	18	15
18	38	39	44	21	36	109	83	107	45	24	18	15
19	34	35	46	23	44	100	79	101	44	23	17	24
20	32	31	49	23	40	109	80	99	38	22	17	19
21	31	34	43	22	49	97	81	95	36	21	17	18
22	32	34	39	20	57	95	83	95	34	21	18	19
23	31	36	40	20	54	106	91	97	32	21	23	16
24	31	36	39	19	49	121	104	92	34	21	30	16
25	30	33	44	20	43	131	118	86	30	20	22	15
26	31	34	29	18	48	132	129	83	29	20	19	14
27	32	33	30	20	51	128	218	83	27	20	19	14
28	31	41	28	21	62	112	384	85	26	20	18	15
29	30	56	26	19	73	119	531	80	27	19	17	19
30	29	57	31	24	---	112	476	74	34	18	18	18
31	30	---	30	26	---	101	---	71	---	18	17	---
TOTAL	984	1065	1396	652	947	3885	4430	4464	1292	764	612	479
MEAN	31.7	35.5	45.0	21.0	32.7	125	148	144	43.1	24.6	19.7	16.0
MAX	38	57	82	28	73	164	531	366	67	47	31	24
MIN	29	31	20	17	16	95	79	71	26	18	17	14
AC-FT	1950	2110	2770	1290	1880	7710	8790	8850	2560	1520	1210	950
CFSM	.07	.08	.10	.05	.08	.29	.34	.34	.10	.06	.05	.04
IN.	.09	.09	.12	.06	.08	.34	.38	.39	.11	.07	.05	.04

CAL YR 1987	TOTAL 32029	MEAN 87.8	MAX 585	MIN 20	AC-FT 63530	CFSM .20	IN. 2.78
WTR YR 1988	TOTAL 20970	MEAN 57.3	MAX 531	MIN 14	AC-FT 41590	CFSM .13	IN. 1.82

## IOWA RIVER BASIN

05451500 IOWA RIVER AT MARSHALLTOWN, IA

LOCATION.--Lat 42°03'57", long 92°54'27", in SE1/4 SE1/4 sec.23, T.84 N., R.18 W., Marshall County, Hydrologic Unit 07080208, on right bank 10 ft downstream from bridge on State Highway 14, 1,500 ft upstream from Burnett Creek, 2.2 mi upstream from Linn Creek, and at mile 222.8.

DRAINAGE AREA.--1,564 mi<sup>2</sup>, including that of Burnett Creek.

PERIOD OF RECORD.--October 1902 to September 1903, October 1914 to September 1927, October 1932 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1558: 1915-18, 1919 (M), 1920, 1921-23 (M), 1924-27, 1933, 1934 (M), 1936, 1938, 1947 (M).

GAGE.--Water-stage recorder. Datum of gage is 853.10 ft above NGVD. See WSP 1728 for history of changes prior to Sept. 21, 1934.

REMARKS.--Estimated daily discharges: Dec. 14 to Mar. 8. Records good except those for estimated daily discharges, which are poor. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--70 years (water years 1903, 1915-27, 1933-88), 819 ft<sup>3</sup>/s, 7.11 in/yr, 93,400 acre-ft/yr; median of yearly mean discharges, 710 ft<sup>3</sup>/s, 6.2 in/yr, 514,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 42,000 ft<sup>3</sup>/s June 4, 1918, gage height, 17.74 ft, from flood-mark, from rating curve extended above 19,000 ft<sup>3</sup>/s on basis of velocity-area study; maximum gage height, 19.77 ft March 19, 1979; minimum daily discharge, 4.7 ft<sup>3</sup>/s Jan. 25, 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 5,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 8	0100	*2,980	(a) *13.94				

(a) Ice jam

Minimum discharge, 25 ft<sup>3</sup>/s Sept. 17, 18.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	359	254	906	500	1200	1050	542	732	261	102	48	45
2	349	258	836	490	1000	1100	561	771	258	100	43	43
3	332	258	786	480	940	1120	676	732	256	95	40	42
4	324	253	729	470	870	1220	735	640	242	93	40	48
5	319	249	653	460	720	1400	799	586	226	94	42	43
6	312	248	642	450	620	1100	825	537	215	92	38	39
7	307	245	609	460	550	1020	813	498	204	87	37	36
8	297	247	600	450	500	1020	793	502	203	85	37	36
9	296	247	631	440	480	950	763	622	191	81	40	35
10	288	247	639	430	450	934	723	599	183	96	40	34
11	283	238	701	440	420	974	678	578	183	84	41	34
12	277	238	737	450	400	991	657	564	180	93	41	33
13	275	238	701	410	380	764	622	546	173	97	46	33
14	267	239	600	420	360	695	582	504	163	80	41	32
15	251	241	540	360	360	663	552	472	161	89	38	32
16	268	273	580	360	350	631	524	444	155	93	37	31
17	299	323	370	400	340	614	507	423	152	95	34	26
18	293	347	560	400	400	606	488	398	167	108	33	27
19	285	361	780	470	800	575	465	379	154	112	36	50
20	277	364	990	490	940	524	457	383	150	122	35	45
21	278	345	520	490	850	500	454	364	139	106	33	53
22	277	361	500	490	740	481	446	359	137	99	69	67
23	268	349	500	480	660	482	440	348	130	94	69	56
24	266	339	510	480	620	493	429	332	122	91	67	57
25	252	329	500	480	600	633	422	310	118	80	68	51
26	255	317	560	490	580	727	422	299	116	58	63	49
27	256	315	800	450	660	649	466	287	117	55	60	47
28	255	394	900	400	860	636	473	276	114	54	59	43
29	254	779	820	370	940	593	535	287	111	52	57	45
30	253	932	620	1100	---	561	625	275	108	52	50	45
31	251	---	450	2000	---	552	---	265	---	50	47	---
TOTAL	8823	9828	20270	16060	18590	24258	17474	14312	5089	2689	1429	1257
MEAN	285	328	654	518	641	783	582	462	170	86.7	46.1	41.9
MAX	359	932	990	2000	1200	1400	825	771	261	122	69	67
MIN	251	238	370	360	340	481	422	265	108	50	33	26
AC-FT	17500	19490	40210	31860	36870	48120	34660	28390	10090	5330	2830	2490
CFSM	.18	.21	.42	.33	.41	.50	.37	.30	.11	.06	.03	.03
IN.	.21	.23	.48	.38	.44	.58	.42	.34	.12	.06	.03	.03

CAL YR 1987	TOTAL 246387	MEAN 675	MAX 4560	MIN 165	AC-FT 488700	CFSM .43	IN. 5.86
WTR YR 1988	TOTAL 140079	MEAN 383	MAX 2000	MIN 26	AC-FT 277800	CFSM .24	IN. 3.33



## IOWA RIVER BASIN

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05451700 TIMBER CREEK NEAR MARSHALLTOWN, IA

LOCATION.--Lat 42°00'25", long 92°51'15", in SE1/4 SW1/4 sec.8, T.83 N., R.17 W., Marshall County, Hydrologic Unit 07080208, on left bank 20 ft downstream from bridge on U.S. Highway 30, 3.5 mi upstream from mouth, and 4.1 mi southeast of court house in Marshalltown.

DRAINAGE AREA.--118 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1949 to current year.

REVISED RECORDS.--WSP 1708: 1950-55, 1957-59.

GAGE.--Water-stage recorder. Datum of gage is 849.44 ft above NGVD.

REMARKS.--Estimated daily discharges: Dec. 15 to Mar. 7 and May 20. Records good except those for estimated daily discharges, which are poor. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--39 years, 74.2 ft<sup>3</sup>/s, 8.54 in/yr, 53,760 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 12,000 ft<sup>3</sup>/s Aug. 16, 1977, gage height, 17.69 ft; no flow for a few days in 1956 and 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1947 reached a stage of 16.8 ft, discharge, 5,700 ft<sup>3</sup>/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan. 30	1430	ice jam	*11.25	Jan. 31	1415	*803	ice jam

Minimum discharge, 1.0 ft<sup>3</sup>/s Aug. 1.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	57	46	74	29	250	59	41	30	13	7.7	1.1	1.8
2	56	44	66	37	200	56	42	29	13	7.0	1.3	1.8
3	53	43	63	35	155	57	62	28	14	6.6	1.3	2.6
4	52	39	56	34	108	54	63	27	13	6.3	3.7	2.5
5	52	36	56	35	81	51	58	26	13	6.1	12	1.9
6	51	36	53	34	70	48	56	25	14	5.6	4.0	1.7
7	49	39	52	34	59	43	52	24	13	5.2	1.9	1.7
8	48	39	51	34	53	45	50	25	14	4.9	2.0	1.6
9	47	35	59	33	50	43	46	34	14	4.5	4.0	1.5
10	44	34	53	32	49	40	45	30	13	5.6	2.4	1.6
11	44	34	53	34	46	40	43	28	11	6.6	1.7	1.5
12	42	35	50	35	39	40	43	28	12	6.4	1.4	1.3
13	41	35	47	32	36	37	41	26	12	4.6	1.3	1.5
14	39	35	47	31	34	49	39	24	12	4.1	1.1	1.5
15	40	37	46	30	33	57	37	23	13	3.3	1.1	1.4
16	42	45	44	29	32	43	38	21	12	3.4	1.3	1.6
17	42	48	32	32	29	37	37	21	13	3.2	1.2	1.4
18	40	43	32	38	28	34	36	20	15	3.4	1.5	1.3
19	39	38	34	58	70	35	35	19	13	2.9	1.8	36
20	40	37	39	82	92	35	35	18	10	4.4	1.7	29
21	40	36	36	72	70	32	34	17	9.8	3.6	1.2	6.8
22	41	36	40	62	55	31	33	18	8.9	3.2	90	7.0
23	40	35	47	55	55	32	34	19	9.7	2.7	33	5.3
24	42	37	54	47	52	32	34	19	9.3	2.5	12	4.0
25	42	35	61	39	47	49	33	16	8.5	2.2	5.4	2.7
26	47	34	73	36	42	44	32	16	7.0	2.5	4.0	1.8
27	45	34	69	32	49	38	33	16	6.7	3.6	4.8	1.8
28	44	73	78	31	56	38	32	15	6.9	2.3	4.2	2.0
29	44	124	72	33	60	46	31	14	6.9	1.8	3.6	2.6
30	44	89	56	186	---	44	31	14	7.8	2.1	2.5	2.7
31	43	---	33	330	---	42	---	13	---	1.4	2.0	---
TOTAL	1390	1311	1626	1661	2000	1331	1226	683	338.5	129.7	210.5	131.9
MEAN	44.8	43.7	52.5	53.6	69.0	42.9	40.9	22.0	11.3	4.18	6.79	4.40
MAX	57	124	78	330	250	59	63	34	15	7.7	90	36
MIN	39	34	32	29	28	31	31	13	6.7	1.4	1.1	1.3
AC-FT	2760	2600	3230	3290	3970	2640	2430	1350	671	257	418	262
CFSM	.38	.37	.44	.45	.58	.36	.35	.19	.10	.04	.06	.04
IN.	.44	.41	.51	.52	.63	.42	.39	.22	.11	.04	.07	.04

CAL YR 1987	TOTAL	25609	MEAN	70.2	MAX	488	MIN	21	AC-FT	50800	CFSM	.59	IN.	8.07
WTR YR 1988	TOTAL	12038.6	MEAN	32.9	MAX	330	MIN	1.1	AC-FT	23880	CFSM	.28	IN.	3.80

## IOWA RIVER BASIN

05451900 RICHLAND CREEK NEAR HAVEN, IA

LOCATION.--Lat 41°53'58", long 92°28'27", in SE1/4 NE1/4 sec.21, T.82 N., R.14 W., Tama County, Hydrologic Unit 07080208, on right bank 5 ft upstream from bridge on county highway, 0.6 mi northeast of Haven, and 2.8 mi upstream from mouth.

DRAINAGE AREA.--56.1 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1949 to current year.

REVISED RECORDS.--WSP 1708: 1950-55, 1956 (M), 1957, 1958 (M), 1959.

GAGE.--Water-stage recorder. Datum of gage is 788.69 ft above NGVD. Prior to Oct. 1, 1971, at datum 10.00 ft higher.

REMARKS.--Estimated daily discharges: Dec. 15-21, Dec. 31 to Jan. 19, Jan. 22-30, Feb. 2-27, and Mar. 14, 15. Records good except those for estimated daily discharges, which are poor. U.S. Army Corp of Engineers data collection platform at station.

AVERAGE DISCHARGE.--39 years, 36.2 ft<sup>3</sup>/s, 8.76 in/yr, 26,230 acre-ft/yr; median of yearly mean discharges, 31 ft<sup>3</sup>/s, 7.5 in/yr, 22,460 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 7,000 ft<sup>3</sup>/s May 28, 1974, gage height, 24.00 ft; no flow Jan. 22 to Feb. 2, 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1918 reached a stage of 24.3 ft, discharge not determined.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s) *917	Gage height (ft) (a) *18.14	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan. 30	1930						

(a) Ice jam

Minimum discharge, .33 ft<sup>3</sup>/s, Sept. 16.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	13	9.1	26	22	75	29	16	14	7.3	3.6	.87	.70
2	12	8.3	24	22	40	22	19	13	8.1	3.4	.79	.72
3	12	8.0	22	20	25	19	19	13	8.7	3.2	.77	.85
4	12	7.5	20	18	18	17	18	13	7.8	3.0	.92	.93
5	11	7.2	21	18	17	16	17	13	7.4	2.7	3.1	.93
6	8.1	7.5	19	15	16	17	16	12	7.2	2.5	1.7	.84
7	7.4	8.5	18	21	17	17	16	12	7.0	2.2	1.1	.79
8	12	8.9	18	25	17	17	15	22	7.9	2.1	1.1	.65
9	17	8.0	27	22	16	16	14	28	7.0	3.3	1.1	.67
10	15	7.6	24	19	15	15	14	15	6.5	3.9	1.1	.60
11	8.9	8.0	23	23	14	15	14	13	6.2	3.0	.88	.65
12	9.0	8.9	21	24	13	14	14	13	5.9	2.3	.81	.59
13	6.1	8.4	20	17	13	11	14	11	5.6	2.1	1.2	.49
14	6.3	8.3	19	20	15	10	13	12	5.4	2.2	1.1	.52
15	7.1	8.9	10	27	16	11	12	11	5.3	2.1	.93	.54
16	10	9.6	12	30	16	12	13	11	5.2	1.8	.76	.59
17	10	13	19	40	20	11	13	12	5.5	1.4	.67	.53
18	9.3	8.3	16	38	35	11	12	11	7.1	1.5	.70	.57
19	9.5	7.7	18	120	60	10	14	10	5.5	1.5	1.6	17
20	9.7	8.1	40	350	40	10	14	10	4.9	1.7	1.2	2.5
21	10	11	38	140	35	9.7	14	9.4	4.5	1.5	.88	1.8
22	11	9.2	34	70	45	9.8	15	10	4.3	1.4	19	1.2
23	9.1	9.1	27	50	50	9.6	15	9.8	4.3	1.3	19	.82
24	8.8	8.2	31	45	30	13	15	10	4.1	1.3	3.3	.68
25	8.5	9.5	35	35	25	16	15	9.1	4.1	1.3	1.0	.60
26	9.3	9.1	42	15	40	12	16	8.7	3.6	1.1	.84	.57
27	8.4	10	35	16	45	12	16	8.6	3.5	1.2	1.1	.58
28	7.8	30	33	19	36	16	14	8.5	3.8	.99	1.0	.93
29	7.9	48	33	25	32	19	14	7.7	3.7	1.0	.83	.64
30	7.7	31	29	570	---	17	14	7.3	4.1	1.0	.80	.69
31	7.5	---	12	220	---	16	---	7.2	---	.95	.71	---
TOTAL	301.4	344.9	766	2096	836	450.1	445	365.3	171.5	62.54	70.86	40.17
MEAN	9.72	11.5	24.7	67.6	28.8	14.5	14.8	11.8	5.72	2.02	2.29	1.34
MAX	17	48	42	570	75	29	19	28	8.7	3.9	19	17
MIN	6.1	7.2	10	15	13	9.6	12	7.2	3.5	.95	.67	.49
AC-FT	598	684	1520	4160	1660	893	883	725	340	124	141	80
CFSM	.17	.20	.44	1.21	.51	.26	.26	.21	.10	.04	.04	.02
IN.	.20	.23	.51	1.39	.55	.30	.30	.24	.11	.04	.05	.03

CAL YR 1987	TOTAL 11159.3	MEAN 30.6	MAX 457	MIN 4.9	AC-FT 22130	CFSM .54	IN. 7.40
WTR YR 1988	TOTAL 5949.77	MEAN 16.3	MAX 570	MIN .49	AC-FT 11800	CFSM .29	IN. 3.95

## 05452000 SALT CREEK NEAR ELBERON, IA

LOCATION.--Lat 41°57'51", long 92°18'47", in NW1/4 NW1/4 sec.36, T.83 N., R.13 W., Tama County, Hydrologic Unit 07080208, at left downstream end of bridge on U.S. Highway 30, 2.0 mi upstream from Hog Run, 3.0 mi south of Elberon, and 9.0 mi upstream from mouth.

DRAINAGE AREA.--201 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1945 to current year.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1558: 1946.

GAGE.--Water-stage recorder. Datum of gage is 781.58 ft above NGVD (Iowa Highway Commission bench mark). Prior to Oct. 15, 1945 and June 14, 1947 to Feb. 10, 1949, nonrecording gage on upstream side of bridge at present datum.

REMARKS.--Estimated daily discharges: Dec. 15-18, Jan. 1-19, Jan. 22-31, and Feb. 2 to Mar. 3. Records good except those for periods of estimated discharge, which are poor. U.S. Army Corps of Engineers rain-gage and data collection platform at station.

AVERAGE DISCHARGE.--43 years, 133 ft<sup>3</sup>/s, 8.99 in/yr, 96,360 acre-ft/yr; median of yearly mean discharges, 120 ft<sup>3</sup>/s, 8.1 in/yr, 86,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge observed, 35,000 ft<sup>3</sup>/s June 13, 1947, gage height, 17.6 ft from rating curve extended above 17,000 ft<sup>3</sup>/s; maximum gage height, 20.00 ft June 15, 1982; minimum daily discharge, 0.85 ft<sup>3</sup>/s Jan. 31, 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 16, 1944 reached a stage of 19.9 ft, from floodmark at downstream side of bridge, discharge, about 30,000 ft<sup>3</sup>/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan. 31	0530	*1,400	(a) *14.90				

(a) Ice jam

Minimum discharge, 3.5 ft<sup>3</sup>/s Sept. 15.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	62	46	101	50	323	130	75	45	28	16	7.8	5.4
2	61	44	90	80	150	100	81	44	29	15	7.2	5.3
3	59	43	84	90	90	80	92	42	30	15	7.0	6.0
4	61	41	73	70	82	71	90	41	28	13	7.2	8.2
5	60	39	74	60	78	77	85	42	27	12	9.1	8.0
6	56	39	74	58	76	78	80	40	26	12	7.6	6.2
7	55	41	72	62	80	79	76	39	25	11	7.1	5.5
8	55	44	71	64	80	84	73	53	25	11	6.9	5.3
9	55	38	116	60	78	79	69	189	23	11	13	5.2
10	52	38	109	58	80	73	67	76	23	14	9.4	4.9
11	53	38	100	62	70	71	67	63	23	12	7.9	5.0
12	56	40	91	68	65	72	65	58	22	11	7.1	5.1
13	54	40	84	60	64	53	64	54	22	11	6.8	5.0
14	52	38	78	64	62	63	61	51	21	175	7.1	5.2
15	52	38	40	68	62	71	59	49	20	35	6.7	3.9
16	54	40	45	72	64	64	59	45	19	18	5.9	4.0
17	57	56	70	82	66	63	58	46	19	15	5.4	4.5
18	52	55	80	95	90	59	56	45	23	14	5.1	4.4
19	49	45	96	150	160	61	55	44	21	13	5.9	85
20	49	40	143	559	120	60	57	44	20	13	6.5	27
21	48	45	137	328	80	57	56	41	18	12	6.1	12
22	49	49	118	150	120	57	54	39	17	12	8.9	9.3
23	48	45	106	100	180	58	54	38	17	11	14	7.7
24	47	40	109	80	140	61	54	39	17	10	9.1	6.6
25	44	41	123	70	90	81	51	35	17	10	6.8	5.9
26	46	42	116	65	110	70	50	35	15	9.3	5.9	5.5
27	47	41	123	60	160	64	57	33	15	9.2	6.9	4.5
28	43	79	119	65	170	67	49	33	15	8.9	7.3	4.7
29	45	189	107	70	180	88	48	31	16	8.8	6.4	4.8
30	44	124	113	450	---	88	47	30	18	8.5	6.2	4.8
31	42	---	102	500	---	79	---	29	---	8.2	6.0	---
TOTAL	1607	1538	2964	3870	3170	2258	1909	1493	639	554.9	230.3	274.9
MEAN	51.8	51.3	95.6	125	109	72.8	63.6	48.2	21.3	17.9	7.43	9.16
MAX	62	189	143	559	323	130	92	189	30	175	14	85
MIN	42	38	40	50	62	53	47	29	15	8.2	5.1	3.9
AC-FT	3190	3050	5880	7680	6290	4480	3790	2960	1270	1100	457	545
CFSM	.26	.26	.48	.62	.54	.36	.32	.24	.11	.09	.04	.05
IN.	.30	.28	.55	.72	.59	.42	.35	.28	.12	.10	.04	.05

CAL YR 1987	TOTAL	45681	MEAN	125	MAX	2910	MIN	23	AC-FT	90610	CFSM	.62	IN.	8.45
WTR YR 1988	TOTAL	20508.1	MEAN	56.0	MAX	559	MIN	3.9	AC-FT	40680	CFSM	.28	IN.	3.80

## IOWA RIVER BASIN

05452200 WALNUT CREEK NEAR HARTWICK, IA

LOCATION.--Lat 41°50'06", long 92°23'10", in SE1/4 SW1/4 sec.8, T.81 N, R.13 W., Poweshiek County, Hydrologic Unit 07080208, on right bank 5 ft downstream from bridge on county highway V21, 1.2 mi downstream from North Walnut Creek, 4.0 mi northwest of Hartwick, and 6.5 mi upstream from mouth.

DRAINAGE AREA.--70.9 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1949 to current year.

REVISED RECORDS.--WSP 1558: 1950 (P), 1951-57.

GAGE.--Water-stage recorder. Datum of gage is 786.59 ft above NGVD.

REMARKS.--Estimated daily discharges: Dec. 15-21, Dec. 29 to Jan. 19, Jan. 22 to Feb. 27, Mar. 13-15, May 19 to June 2, June 10, 13-15, July 26 to Aug. 8, Aug. 17, and Sept. 6-15, 21-30. Records good except those for estimated daily discharges, which are poor. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--39 years, 45.0 ft<sup>3</sup>/s, 8.62 in/yr, 32,600 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 7,100 ft<sup>3</sup>/s July 2, 1983, gage height, 16.65 ft, from rating curve extended above 2,600 ft<sup>3</sup>/s on basis of contracted-opening and flow-over-embankment measurement of peak flow; no flow at times most years.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1947 reached a stage of 17.7 ft, from information by local residents, discharge not determined.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s) *471	Gage height (ft) *7.54	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Sept. 19	0815						

Minimum daily discharge, 0.47 ft<sup>3</sup>/s Aug. 18.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	12	10	36	21	150	36	19	11	4.8	1.8	.58	.77
2	11	8.4	31	29	110	30	22	11	4.6	1.7	.57	.77
3	11	7.7	27	30	90	26	22	11	4.7	1.7	.56	.92
4	12	7.3	25	28	70	23	22	11	4.9	1.6	.60	.92
5	11	8.4	24	25	40	22	22	11	4.0	1.5	1.0	.83
6	10	8.1	22	24	28	22	21	11	3.8	1.4	.80	.76
7	11	9.8	21	26	31	22	20	13	4.3	1.3	.70	.72
8	11	9.1	21	27	29	23	18	19	5.9	1.2	.65	.68
9	11	7.9	39	26	26	21	17	20	5.8	3.8	.62	.66
10	11	7.8	32	24	25	19	17	14	4.3	4.6	.61	.65
11	11	7.4	31	27	24	19	17	12	3.4	1.5	.61	.64
12	11	7.4	28	32	22	18	17	11	3.3	1.2	.56	.63
13	11	7.0	25	29	22	15	16	11	3.2	1.2	.57	.62
14	9.6	6.5	23	26	25	17	16	10	3.1	2.4	.61	.61
15	9.7	5.9	18	27	24	19	15	9.2	3.0	1.4	.58	.70
16	11	6.8	23	32	25	20	14	8.1	2.9	.99	.51	.84
17	10	18	35	42	41	16	15	8.6	3.5	.91	.50	.89
18	9.6	12	31	70	70	15	15	8.8	5.3	.87	.47	.72
19	8.6	9.4	34	140	110	14	14	8.0	4.1	.83	1.4	118
20	8.6	6.9	42	176	56	13	15	7.6	2.9	.77	1.2	12
21	8.4	7.8	90	79	42	13	15	7.2	2.6	.77	.61	1.9
22	9.1	9.6	56	35	70	14	15	7.6	2.3	.75	42	1.4
23	9.6	7.5	44	30	120	13	16	7.6	2.1	.75	17	.99
24	10	5.1	60	26	70	16	15	7.4	1.9	.68	1.8	.92
25	9.6	6.6	73	24	49	27	14	7.1	1.9	.66	1.0	.87
26	11	6.1	63	21	82	20	14	6.6	1.7	.64	.81	.82
27	9.9	5.9	57	24	110	18	15	6.4	1.6	.63	.98	.82
28	8.9	60	59	28	101	18	12	6.0	1.6	.62	.94	1.2
29	9.2	80	41	70	44	20	12	5.6	1.7	.61	.81	1.2
30	8.5	45	40	110	---	19	12	5.2	1.8	.60	.77	1.0
31	8.0	---	28	140	---	18	---	4.9	---	.59	.80	---
TOTAL	313.3	405.4	1179	1448	1706	606	494	297.9	101.0	39.97	81.22	154.45
MEAN	10.1	13.5	38.0	46.7	58.8	19.5	16.5	9.61	3.37	1.29	2.62	5.15
MAX	12	80	90	176	150	36	22	20	5.9	4.6	42	118
MIN	8.0	5.1	18	21	22	13	12	4.9	1.6	.59	.47	.61
AC-FT	621	804	2340	2870	3380	1200	980	591	200	.79	161	306
CFSM	.14	.19	.54	.66	.83	.28	.23	.14	.05	.02	.04	.07
IN.	.16	.21	.62	.76	.90	.32	.26	.16	.05	.02	.04	.08

CAL YR 1987	TOTAL 13237.7	MEAN 36.3	MAX 400	MIN 5.1	AC-FT 26260	CFSM .51	IN. 6.95
WTR YR 1988	TOTAL 6826.24	MEAN 18.7	MAX 176	MIN .47	AC-FT 13540	CFSM .26	IN. 3.58

## 05453000 BIG BEAR CREEK AT LADORA, IA

LOCATION.--Lat 41°44'58", long 92°10'55", in SW1/4 SW1/4 sec.7, T.80 N., R.11 W., Iowa County, Hydrologic Unit 07080208, on left bank 10 ft downstream from bridge on county highway V52, 0.4 mi south of Ladora, 1.2 mi downstream from Coats Creek, 2.8 mi upstream from Little Bear Creek, and 8.1 mi upstream from mouth.

DRAINAGE AREA.--189 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1945 to current year. Prior to October 1966, published as Bear Creek at Ladora.

REVISED RECORDS.--WSP 1308: 1947 (M). WSP 1438: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 744.94 ft above NGVD. Oct. 1945 to June 26, 1946, non-recording gage and June 27, 1946 to Sept. 30, 1980, water-stage recorder at datum 10.00 ft higher.

REMARKS.--Estimated daily discharges: Dec. 15-17, Jan. 1 to Feb. 29, Mar. 13-16, and Aug. 22, 23. Records good except those for estimated daily discharges, which are poor. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--43 years, 124 ft<sup>3</sup>/s, 8.91 in/yr, 89,840 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 10,500 ft<sup>3</sup>/s Mar. 30, 1960, gage height, 14.60 ft, datum then in use; maximum gage height, 15.32 ft, datum then in use, Sept. 18, 1977; no flow for several days in 1956 and 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan. 30	unknown	*2,050	(a) *22.43	No other peak greater than base discharge.			

(a) Ice jam

Minimum discharge, 1.3 ft<sup>3</sup>/s Aug. 17.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	40	31	127	40	250	125	48	29	15	7.8	2.7	4.8
2	37	31	106	60	90	99	53	28	15	7.2	2.5	4.7
3	35	27	97	50	100	69	60	27	16	6.8	1.9	4.5
4	37	27	83	47	80	63	54	27	16	6.3	2.3	4.6
5	37	26	79	45	70	65	51	27	16	6.0	2.3	5.0
6	35	26	79	43	64	64	48	26	15	5.9	2.3	4.4
7	33	28	73	43	60	62	45	25	13	5.5	2.6	4.0
8	33	29	71	45	58	65	45	32	14	5.3	2.9	3.8
9	33	27	89	43	56	59	43	55	15	5.2	3.0	3.7
10	33	26	87	41	58	53	43	37	13	6.1	2.9	3.4
11	33	27	85	42	56	54	47	29	12	9.1	2.6	3.3
12	33	28	77	45	54	54	45	27	12	6.2	2.1	3.3
13	33	28	70	43	58	47	42	25	11	5.4	2.1	3.1
14	31	27	67	44	60	52	40	24	11	4.9	2.6	3.1
15	30	27	45	45	58	54	39	23	11	4.7	2.1	2.9
16	34	27	60	50	62	52	39	22	11	4.6	1.9	2.9
17	35	39	80	60	70	51	39	22	11	4.7	1.7	2.8
18	31	46	130	70	85	45	37	22	13	4.7	1.6	2.4
19	30	35	132	90	150	48	37	21	12	4.4	1.8	2.0
20	30	31	268	150	100	47	38	20	9.8	4.6	3.4	128
21	30	34	300	200	70	43	37	20	8.8	4.6	3.3	19
22	30	37	247	100	90	44	39	20	8.4	4.4	2.3	9.9
23	29	36	212	80	120	43	39	20	8.6	4.3	57	7.2
24	29	31	253	60	90	44	37	19	8.3	4.0	17	6.0
25	28	32	222	50	80	63	35	19	7.9	3.9	9.9	5.1
26	29	31	189	45	85	51	34	19	7.5	3.4	7.3	4.7
27	30	31	193	48	110	45	37	19	7.1	3.2	6.6	4.0
28	28	105	170	52	150	49	33	18	7.0	3.0	6.5	4.0
29	28	276	141	150	135	53	32	17	7.7	2.9	6.1	4.7
30	27	170	136	600	---	51	30	17	7.9	3.0	5.7	4.2
31	27	---	127	1000	---	48	---	16	---	3.0	5.2	---
TOTAL	988	1376	4095	3481	2569	1762	1246	752	341.0	155.1	194.9	283.5
MEAN	31.9	45.9	132	112	88.6	56.8	41.5	24.3	11.4	5.00	6.29	9.45
MAX	40	276	300	1000	250	125	60	55	16	9.1	57	128
MIN	27	26	45	40	54	43	30	16	7.0	2.9	1.6	2.4
AC-FT	1960	2730	8120	6900	5100	3490	2470	1490	676	308	387	562
CFSM	.17	.24	.70	.59	.47	.30	.22	.13	.06	.03	.03	.05
IN.	.19	.27	.81	.69	.51	.35	.25	.15	.07	.03	.04	.06

CAL YR 1987	TOTAL	34981	MEAN	95.8	MAX	1590	MIN	15	AC-FT	69380	CFSM	.51	IN.	6.89
WTR YR 1988	TOTAL	17243.5	MEAN	47.1	MAX	1000	MIN	1.6	AC-FT	34200	CFSM	.25	IN.	3.39

## IOWA RIVER BASIN

05453100 IOWA RIVER AT MARENGO, IA

LOCATION.-- Lat 41°48'48" long 92°03'51", in SE1/4 NE1/4 sec.24, T.81 N., R.11 W., Iowa County, Hydrologic Unit 07080208, on left bank 5 ft upstream from bridge on State Highway 411, 1.0 mi downstream from Big Bear Creek, 0.8 mi north of Marengo, 4.6 mi upstream from Hilton Creek, and at mile 139.1.

DRAINAGE AREA.--2,794 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1956 to current year. Monthly discharge only for some periods, published in WSP 1728.

REVISED RECORDS.--WSP 1558: 1957.

GAGE.--Water-stage recorder. Datum of gage is 720.52 ft above NGVD.

REMARKS.--Estimated daily discharges: Dec. 15-22, Dec. 28 to Mar. 6, and Aug. 23-28. Records good except those for periods of estimated daily discharges Dec. 15-22, Dec. 20 to Mar. 6, which are fair, and period of estimated daily discharges, Aug. 23-28, which are poor. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--32 years, 1,825 ft<sup>3</sup>/s, 8.87 in/yr, 1,322,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 30,800 ft<sup>3</sup>/s Mar. 31, 1960, gage height, 19.21 ft; maximum gage height, 19.79 ft July 12, 1969; minimum daily discharge, 24 ft<sup>3</sup>/s Jan. 29 to Feb. 1, 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 6,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan. 31	1015	*4,500	(a) *13.73				

(a) Ice jam

Minimum daily discharge, 81 ft<sup>3</sup>/s Sept. 18.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	945	614	1600	800	4020	1980	1160	841	511	214	136	125
2	883	604	1620	950	3610	2130	1150	934	496	210	132	119
3	841	599	1550	900	2430	2240	1180	1020	490	207	129	118
4	820	594	1440	850	1810	2410	1230	1050	475	198	126	114
5	805	579	1340	840	1500	2640	1320	1030	461	191	124	113
6	789	559	1270	822	1310	2100	1350	971	446	182	125	112
7	774	559	1200	806	1160	1880	1370	919	423	174	132	107
8	759	574	1170	806	1080	1860	1370	899	414	170	130	103
9	740	564	1180	786	1030	1820	1330	1050	404	169	123	100
10	725	564	1260	768	972	1730	1290	1200	391	179	119	98
11	714	559	1260	773	921	1610	1240	1080	373	184	117	98
12	703	559	1240	792	878	1550	1190	1030	353	177	112	93
13	706	559	1240	772	845	1470	1130	977	339	174	110	90
14	691	559	1230	747	829	1320	1090	931	324	171	108	88
15	686	554	1100	747	811	1120	1050	899	312	282	109	85
16	692	549	950	758	786	1120	976	848	299	237	108	85
17	699	594	890	813	770	1130	951	806	291	182	107	85
18	691	687	1500	915	848	1080	914	781	294	174	104	81
19	703	715	2600	1250	1700	1080	879	761	297	169	102	111
20	682	693	3200	2750	1980	1060	867	740	295	168	117	370
21	665	677	3400	1950	1770	1030	848	725	284	172	119	205
22	670	666	3400	1430	1580	990	833	716	267	173	129	174
23	655	693	2990	1170	1540	974	829	698	267	174	400	147
24	661	698	2030	1020	1420	966	819	689	258	166	250	133
25	650	687	1710	915	1270	1050	816	676	248	161	200	138
26	640	671	1490	841	1220	1150	798	646	233	154	180	127
27	629	645	1460	806	1380	1200	792	620	225	151	200	123
28	634	709	1570	787	1610	1230	791	599	217	145	170	115
29	619	980	1460	804	1790	1200	800	579	214	143	147	115
30	604	1450	1300	2830	---	1210	802	553	215	142	137	110
31	594	---	900	4360	---	1200	---	533	---	141	129	---
TOTAL	22069	19714	50550	35558	42870	45530	31165	25801	10116	5534	4431	3682
MEAN	712	657	1631	1147	1478	1469	1039	832	337	179	143	123
MAX	945	1450	3400	4360	4020	2640	1370	1200	511	282	400	370
MIN	594	549	890	747	770	966	791	533	214	141	102	81
AC-FT	43770	39100	100300	70530	85030	90310	61820	51180	20070	10980	8790	7300
CFSM	.25	.24	.58	.41	.53	.53	.37	.30	.12	.06	.05	.04
IN.	.29	.26	.67	.47	.57	.61	.41	.34	.13	.07	.06	.05

CAL YR 1987 TOTAL 544250 MEAN 1491 MAX 6770 MIN 349 AC-FT 1080000 CFSM .53 IN. 7.25  
WTR YR 1988 TOTAL 297020 MEAN 812 MAX 4360 MIN 81 AC-FT 589100 CFSM .29 IN. 3.95

## 05453510 CORALVILLE LAKE NEAR CORALVILLE, IA

LOCATION.--Lat 41°43'29", long 91°31'40", in SW1/4 NE1/4 sec.22, T.80 N., R.6 W., Johnson County, Hydrologic Unit 07080208, at outlet works at left end of Coralville Dam on Iowa River, 2.3 mi upstream from Rapid Creek, 4.3 mi northeast of Coralville Post Office and at mile 83.3.

DRAINAGE AREA.--3,115 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1958 to current year.

GAGE.--Water-stage recorder. Datum of gage is at NGVD (levels by U.S. Army Corps of Engineers).

REMARKS.--Reservoir is formed by earthfill dam completed in 1957. Storage began in September 1958. Releases controlled by three gates, 8.33 ft wide and 20 ft high, into forechamber of 23-ft diameter concrete conduit through dam. Inlet invert elevation at 646.0 ft. No dead storage. Maximum design discharge through gates is 20,000 ft<sup>3</sup>/s. Ungated spillway is concrete overflow section 500 ft in length at elevation 712 ft above NGVD, contents, 469,000 acre-ft, surface area, 24,800 acres. Reservoir is used for flood control, low-flow augmentation, conservation and recreation. Normal operation will maintain an elevation of 670 ft Feb. 15 to June 15, surface area, 1,820 acres, 680 ft June 15 to Sept. 25, surface area, 4,900 acres, 683 ft Sep. 25 to Dec. 15, and 680 ft December 15 to Feb. 1 with a minimum release of 150 ft<sup>3</sup>/s and maximum release of 10,000 ft<sup>3</sup>/s Dec. 15 to May 1 and 6,000 ft<sup>3</sup>/s May 1 to Dec. 15. Storage tables for water years 1985-1986 published as day second-feet instead of acre-feet storage.

COOPERATION.--Records provided by U.S. Army Corps of Engineers.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 472,000 acre-ft July 21, 1969, elevation, 711.85 ft; minimum daily contents, 456 acre-ft Jan. 15, 1975; minimum elevation, 658.77 ft Mar. 10, 1959.

EXTREMES FOR CURRENT YEAR.--Maximum daily contents, 52,900 acre-ft Dec. 3; maximum elevation, 683.88 ft Dec. 3; minimum daily contents, 14,700 acre-ft Apr. 15-16; minimum elevation, 675.0 ft Apr. 16.

Capacity table (elevation, in feet, and contents, in acre-ft)

655	5,000	683	55,000	700	232,000
670	10,600	685	69,000	705	327,000
675	21,000	690	108,000	710	427,000
680	40,300	695	162,000	712	469,000

RESERVOIR STORAGE (ACRE-FEET), WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
OBSERVATION AT 24:00 VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	50200	50100	52600	30800	31800	16700	15900	18000	32300	32500	30500	28000
2	49500	50200	52500	30300	33000	16600	15800	19200	32400	32600	30400	27800
3	49700	50400	52900	30600	33300	15900	15800	20500	32500	32700	30200	27900
4	49800	50600	52500	31100	31200	16300	15700	21800	32400	32900	30400	27700
5	50200	50300	51300	31300	29200	16800	16100	23200	32300	33000	30200	27600
6	50200	50200	49800	31100	29000	16100	15800	24200	32200	32800	30100	27400
7	50200	50300	48200	31000	29600	15400	15700	24700	31800	32700	29800	27200
8	50100	50600	46600	30900	29800	16200	15800	25400	31900	32700	30000	27200
9	50400	50400	45400	30700	29600	15700	16200	26000	31900	32700	29800	27000
10	50300	50200	43600	30600	29400	15600	15500	26700	31900	32800	29700	26800
11	50200	50200	42900	30600	28800	15100	15300	27500	31800	32800	29400	26700
12	50200	50100	40900	30600	28300	15400	15400	27900	31700	32700	29100	26600
13	50100	50100	39100	30700	27500	14900	15500	28300	31500	32700	29000	26300
14	49900	49800	38300	30700	26600	15300	15100	28500	31400	32700	28900	26100
15	49900	49900	37400	30600	25500	15700	14700	28900	31600	32500	28600	25900
16	50500	50800	35800	30600	24400	15600	14700	29000	31500	32600	28300	25700
17	50200	51500	35800	30700	23200	15600	15000	29100	31400	32700	28200	25600
18	50300	51400	34000	31100	22000	15600	15200	29100	31300	32900	28100	25400
19	50100	52500	35700	34600	20900	15500	15300	29100	31400	32700	27900	26000
20	50200	51700	36200	35100	20800	15100	15400	29000	31400	32600	27800	25700
21	49700	51300	36400	33600	20200	15100	15400	28900	31300	32400	27500	25800
22	49700	51300	37300	32000	19100	15300	15500	28600	31600	32300	28100	26500
23	49500	51300	38500	30100	17700	15400	15500	28900	31700	32300	28200	26400
24	49400	51300	39100	29700	16700	15800	15300	29000	31900	32500	28200	26300
25	49100	51100	39300	29500	16400	16500	15300	29300	31900	32200	28300	26100
26	49500	50800	39300	29700	16300	16600	15600	29800	31900	31900	28300	26000
27	49500	50500	39300	30300	16000	16600	15000	30200	32000	31600	28500	26100
28	49500	50900	38500	30800	15700	17500	15300	30800	32300	31500	28400	26100
29	49500	51700	37400	31200	16000	16900	16000	31300	32400	31500	28300	26200
30	49500	52300	37200	32700	---	16400	17000	31800	32400	31100	28300	26100
31	49700	---	37300	31500	---	16200	---	32100	---	30800	28100	---
MEAN	49900	50800	41600	31100	24400	15900	15500	27300	31900	32400	28900	26500
MAX	50500	52500	52900	35100	33300	17500	17000	32100	32500	33000	30500	28000
MIN	49100	49800	34000	29500	15700	14900	14700	18000	31300	30800	27500	25400

CAL YR 1987 MEAN 37900 MAX 73700 MIN 17900  
WTR YR 1988 MEAN 31400 MAX 52900 MIN 14700

## IOWA RIVER BASIN

05454000 RAPID CREEK NEAR IOWA CITY, IA

LOCATION.--Lat 41°41'19", long 91°29'15", in NE1/4 NE1/4 sec.36. T.80 N., R.6 W., Johnson County, Hydrologic Unit 07080209, on left bank 80 ft upstream from bridge on State Highway 1, 3.5 mi northeast of Iowa City, and 4.7 mi upstream from mouth.

DRAINAGE AREA.--25.3 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1937 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 1558: 1941 (M), 1943 (P), 1944 (M), 1946. WSP 1708: 1951 (P), 1952. WDR IOWA 1967: Drainage area.

GAGE.--Water-stage recorder and concrete control with sharp-crested weir. Datum of gage is 673.72 ft above NGVD.

REMARKS.--Estimated daily discharges: Dec. 15-21, Dec. 31 to Jan. 20, Jan. 22 to Feb. 7, and Feb. 9 to Mar. 2. Records good except those for estimated daily discharges, which are poor.

AVERAGE DISCHARGE.--51 years, 16.2 ft<sup>3</sup>/s, 8.70 in/yr, 11,740 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,100 ft<sup>3</sup>/s May 23, 1965, gage height, 14.10 ft, from contracted-opening measurement of peak flow; maximum gage height, 14.93 ft July 17, 1972; no flow at times most years.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 600 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan. 19	1905	*1,180	(a) *10.54	No other peak greater than base discharge.			

(a) Ice jam.

No flow at times July through September.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.8	3.9	20	14	20	11	22	7.3	1.9	.51	.00	.00
2	2.4	3.3	17	8.6	12	9.6	22	6.8	3.6	.37	.00	.00
3	2.4	2.8	15	10	9.4	8.6	27	6.4	3.4	.29	.00	.00
4	2.6	2.5	12	12	8.4	8.2	25	6.0	2.0	.26	.00	.00
5	2.8	2.1	12	11	8.0	7.6	23	5.8	1.9	.19	.00	.00
6	2.5	1.9	11	9.1	7.8	7.6	21	5.3	1.8	.13	.00	.00
7	2.3	2.2	11	9.0	9.0	7.7	18	5.1	1.7	.09	.00	.00
8	2.2	2.5	11	9.4	8.0	9.4	16	6.0	2.1	.02	1.7	.00
9	2.1	2.1	15	9.6	7.2	8.9	15	7.3	2.0	.01	.39	.00
10	2.2	1.8	13	9.0	7.0	7.4	14	5.6	1.4	.04	.00	.00
11	2.0	1.8	13	9.6	6.8	7.6	13	4.9	1.3	.03	.00	.00
12	2.1	2.0	12	10	6.6	8.0	12	5.6	1.3	.21	.00	.00
13	2.3	2.3	11	8.8	6.6	5.7	12	4.8	1.2	.18	.00	.00
14	2.1	2.1	9.9	7.6	6.8	5.4	11	4.4	1.0	.11	.00	.00
15	2.2	2.0	4.8	8.0	7.2	5.7	9.8	4.3	.91	.01	.00	.00
16	3.1	3.3	6.4	8.6	7.0	5.9	9.4	4.0	.90	.00	.00	.00
17	3.7	18	10	10	7.6	6.4	9.5	4.0	.89	.00	.00	.00
18	2.9	12	9.4	15	11	6.7	8.7	3.9	.94	.00	.00	.00
19	2.9	8.9	13	250	20	7.4	8.2	3.8	.89	.00	.00	.00
20	2.6	7.2	30	160	11	9.1	8.4	3.7	.77	.00	.00	.00
21	2.1	6.3	27	39	7.0	8.4	8.1	3.4	.66	.00	.00	.00
22	2.6	6.2	25	20	15	9.3	9.5	3.3	.52	.00	.57	.00
23	2.8	6.3	22	16	30	11	16	3.9	.49	.00	.49	.00
24	2.8	5.2	34	12	8.2	13	10	4.7	.47	.00	.00	.00
25	2.1	6.8	37	9.0	7.0	19	9.6	3.2	.43	.00	.00	.00
26	2.0	6.3	29	8.0	34	15	9.8	3.0	.41	.00	.00	.00
27	2.2	6.4	29	9.0	24	13	9.6	2.9	.29	.00	.00	.00
28	2.1	24	34	11	15	19	8.3	2.8	.25	.00	.00	.00
29	2.2	32	26	17	13	40	7.9	2.6	.40	.00	.00	.00
30	2.4	24	25	110	---	30	7.6	2.3	.74	.00	.00	.00
31	2.6	---	20	30	---	25	---	2.1	---	.00	.00	---
TOTAL	76.1	208.2	564.5	870.3	340.6	356.6	401.4	139.2	36.56	2.45	3.15	0.00
MEAN	2.45	6.94	18.2	28.1	11.7	11.5	13.4	4.49	1.22	.079	.10	.00
MAX	3.7	32	37	250	34	40	27	7.3	3.6	.51	1.7	.00
MIN	2.0	1.8	4.8	7.6	6.6	5.4	7.6	2.1	.25	.00	.00	.00
AC-FT	151	413	1120	1730	676	707	796	276	73	4.9	6.2	.0
CFSM	.10	.27	.72	1.11	.46	.45	.53	.18	.05	.00	.00	.00
IN.	.11	.31	.83	1.28	.50	.52	.59	.20	.05	.00	.00	.00

CAL YR 1987	TOTAL 5165.72	MEAN 14.2	MAX 591	MIN .30	AC-FT 10250	CFSM .56	IN. 7.60
WTR YR 1988	TOTAL 2999.06	MEAN 8.19	MAX 250	MIN .00	AC-FT 5950	CFSM .32	IN. 4.41



## IOWA RIVER BASIN

87

05454300 CLEAR CREEK NEAR CORALVILLE, IA

LOCATION.--Lat 41°40'36", long 91°35'55", in NE1/4 SE1/4 sec.1, T.79 N., R.7 W., Johnson County, Hydrologic Unit 07080209, on left bank about 150 ft upstream from bridge on county highway, 1.1 mi west of post office in Coralville, 1.5 mi downstream from Deer Creek and 2.7 mi upstream from mouth.

DRAINAGE AREA.--98.1 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1952 to current year. Monthly discharge only for some periods, published in WSP 1728.

GAGE.--Water-stage recorder. Datum of gage is 647.48 ft above NGVD (levels by U.S. Army Corps of Engineers). Prior to Jan. 7, 1957, nonrecording gage at same site and datum.

REMARKS.--Estimated daily discharges: Dec. 15-22, Dec. 31 to Jan. 19, Jan. 22-31, Feb. 2-29, Mar. 14-16, May 14 to June 3, June 8-23, and July 1-7. Records good except those for periods of no gage-height record, May 14 to June 3, June 8-23, and July 1-7, which are poor. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--36 years, 66.8 ft<sup>3</sup>/s, 9.25 in/yr, 48,400 acre-ft/yr; median of yearly mean discharges, 56 ft<sup>3</sup>/s, 7.8 in/yr, 40,600 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,900 ft<sup>3</sup>/s June 15, 1982, gage height, 14.61 ft; no flow Jan. 18 to Feb. 4, 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan. 19	2200	*1,660	*10.25	No other peak greater than base discharge.			

Minimum discharge, 0.90 ft<sup>3</sup>/s Sept. 18.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	16	16	75	25	111	54	39	20	7.9	3.7	1.2	1.4
2	15	20	65	35	38	45	41	20	7.6	3.3	1.2	1.3
3	14	14	60	42	35	36	67	19	9.0	3.0	1.2	1.3
4	14	13	54	50	32	32	55	19	10	2.8	1.6	1.4
5	15	12	51	46	32	32	49	18	8.8	2.7	2.0	1.4
6	14	12	49	42	37	32	47	18	8.8	2.6	1.7	1.4
7	14	12	48	44	36	32	41	17	8.6	2.5	1.4	1.3
8	13	13	46	45	32	33	39	19	12	2.5	1.8	1.1
9	13	13	47	42	29	31	36	27	9.0	2.7	1.8	1.2
10	13	12	42	40	28	28	36	21	7.2	3.6	1.7	1.1
11	12	11	41	42	27	28	36	19	6.2	2.9	1.6	1.1
12	13	11	37	44	25	28	34	19	5.4	2.7	1.6	1.1
13	14	12	33	35	24	22	33	18	5.0	2.6	1.5	1.1
14	13	11	31	28	28	20	32	17	4.7	2.5	1.6	1.0
15	12	11	18	29	26	21	30	16	4.4	2.3	1.3	.98
16	15	16	24	33	29	22	29	15	4.2	2.1	1.2	.99
17	19	52	45	45	31	23	28	14	4.0	2.0	1.1	1.2
18	14	44	43	66	41	21	28	14	3.8	2.2	1.0	1.0
19	13	34	48	630	110	22	26	13	4.0	2.0	1.4	2.3
20	13	30	97	816	93	22	26	13	3.8	1.8	1.4	14
21	12	28	116	166	43	21	26	12	3.6	1.8	1.2	4.7
22	13	27	111	70	80	21	27	13	3.5	1.8	1.3	1.9
23	13	26	89	42	150	23	29	15	3.4	1.7	1.8	1.4
24	13	24	113	35	52	28	26	18	3.4	1.6	8.5	1.3
25	13	27	143	41	37	37	24	14	3.7	1.5	2.6	1.2
26	13	25	113	29	55	31	25	11	3.7	1.6	1.8	1.2
27	14	25	105	33	130	26	27	10	3.3	1.4	2.0	1.2
28	12	75	118	30	72	40	23	9.4	3.1	1.4	1.8	1.3
29	12	153	99	65	66	63	22	8.8	4.6	1.4	1.6	1.1
30	12	95	95	440	---	49	21	8.4	4.6	1.3	1.5	1.2
31	12	---	70	330	---	42	---	8.2	---	1.4	1.4	---
TOTAL	418	874	2126	3460	1529	965	1002	483.8	171.3	69.4	82.7	54.17
MEAN	13.5	29.1	68.6	112	52.7	31.1	33.4	15.6	5.71	2.24	2.67	1.81
MAX	19	153	143	816	150	63	67	27	12	3.7	1.8	14
MIN	12	11	18	25	24	20	21	8.2	3.1	1.3	1.0	.98
AC-FT	829	1730	4220	6860	3030	1910	1990	960	340	138	164	107
CFSM	.14	.30	.70	1.14	.54	.32	.34	.16	.06	.02	.03	.02
IN.	.16	.33	.81	1.31	.58	.37	.38	.18	.06	.03	.03	.02

CAL YR 1987 TOTAL 16057.6 MEAN 44.0 MAX 643 MIN 2.6 AC-FT 31850 CFSM .45 IN. 6.09  
WTR YR 1988 TOTAL 11235.37 MEAN 30.7 MAX 816 MIN .98 AC-FT 22290 CFSM .31 IN. 4.26

05454500 IOWA RIVER AT IOWA CITY, IA

LOCATION.--Lat 41°39'24", long 91°32'27", in SE1/4 SE1/4 sec.9, T.79 N., R.6 W., Johnson County, Hydrologic Unit 07080209, on right bank 25 ft downstream from Hydraulics Laboratory of University of Iowa in Iowa City, 175 ft downstream from University Dam, 0.8 mi upstream from Ralston Creek, 3.6 mi downstream from Clear Creek, and at mile 74.2.

DRAINAGE AREA.--3,271 mi<sup>2</sup>.

PERIOD OF RECORD.--June 1903 to current year. Monthly discharge only for some periods, published in WSP 1308.

GAGE.--Water-stage recorder. Datum of gage is 29.00 ft above Iowa City datum, and 617.27 ft above NGVD. Oct. 1, 1934 to Sept. 30, 1972, at datum 10.00 ft higher. See WSP 1708 for history of changes prior to Oct. 1, 1984.

REMARKS.--No estimated daily discharges. Records excellent. Slight fluctuation at low stages caused by powerplant above station. Flow regulated by Coralville Lake (station 05453510), 9.1 mi upstream, since Sept. 17, 1958. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--85 years, 1,729 ft<sup>3</sup>/s, 7.18 in/yr, 1,253,000 acre-ft/yr; median of yearly mean discharges, 1,470 ft<sup>3</sup>/s, 6.1 in/yr, 1,060,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 42,500 ft<sup>3</sup>/s June 8, 1918, gage height, 19.6 ft, from graph based on gage readings, site and datum then in use; minimum daily discharge, 29 ft<sup>3</sup>/s Oct. 21, 22, 1916, regulated.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of July 17, 1881, reached a stage of 21.1 ft, from floodmarks at site and datum in use 1913-21, from information by local resident, discharge, 51,000 ft<sup>3</sup>/s. Maximum stage known since at least 1850, about 3 ft higher than that of July 17, 1881, occurred in June 1851, discharge, 70,000 ft<sup>3</sup>/s. estimated.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 4,450 ft<sup>3</sup>/s Jan. 31, gage height, 15.33 ft; minimum daily discharge, 154 ft<sup>3</sup>/s Sept. 26, 29.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1010	675	1520	1350	3620	1710	1520	434	494	174	179	166
2	832	668	1750	1220	3060	1960	1530	434	494	174	179	167
3	819	656	1740	922	3480	2180	1570	433	493	175	180	169
4	820	647	1730	796	3520	2000	1540	435	552	174	184	168
5	819	643	1920	928	2950	2010	1530	442	560	171	186	162
6	804	641	2130	1030	2000	2370	1520	539	556	170	185	159
7	797	644	2120	1020	1490	2690	1500	740	553	168	178	159
8	794	641	2120	1010	1380	2500	1500	764	519	168	215	156
9	794	634	2120	1010	1300	2220	1500	766	408	174	184	156
10	787	634	2100	1000	1280	2020	1590	827	405	180	174	158
11	786	634	2090	980	1340	2080	1560	895	404	169	173	160
12	782	632	2080	899	1320	1800	1360	904	404	170	171	164
13	783	628	2060	893	1380	1780	1360	899	401	170	170	164
14	786	628	1860	890	1470	1520	1360	899	361	173	173	162
15	785	633	1680	893	1440	1310	1350	904	310	177	171	159
16	801	651	1540	888	1420	1310	1240	902	308	184	167	161
17	794	753	1400	905	1400	1320	1080	895	307	181	171	164
18	785	707	1000	940	1390	1310	1030	897	308	183	169	165
19	780	678	534	1920	1600	1310	1020	899	306	181	176	177
20	776	743	1090	3630	1830	1310	1030	899	299	180	172	173
21	762	842	1520	3480	2100	1210	1030	897	285	179	171	167
22	768	847	1490	3150	2280	1120	1050	882	218	180	242	162
23	768	846	1550	2460	2370	1130	1050	800	187	181	205	157
24	773	844	1810	1760	2080	1080	1030	729	188	181	182	157
25	768	927	1980	1260	1590	1050	1030	684	189	179	171	157
26	712	1000	1930	1140	1590	1150	1040	541	184	177	170	154
27	628	1000	1940	826	1740	1260	1040	482	181	177	180	157
28	635	1110	1960	805	1750	1300	904	431	179	179	172	157
29	648	1210	1910	903	1730	1750	703	428	196	178	167	154
30	644	1240	1670	2090	---	1770	562	415	176	180	167	156
31	657	---	1400	3590	---	1530	---	426	---	181	166	---
TOTAL	23897	23036	53744	44588	55900	51060	37129	21522	10425	5468	5550	4847
MEAN	771	768	1734	1438	1928	1647	1238	694	347	176	179	162
MAX	1010	1240	2130	3630	3620	2690	1590	904	560	184	242	177
MIN	628	628	534	796	1280	1050	562	415	176	168	166	154
AC-FT	47400	45690	106600	88440	110900	101300	73650	42690	20680	10850	11010	9610
CAL YR 1987	TOTAL 603792											
WTR YR 1988	TOTAL 337166											
	MEAN	1654	MEAN	1654	MAX 4890	MIN 205	AC-FT 1198000					
	MEAN	921	MAX 3630	MIN 154	AC-FT 668800							

## 05455010 SOUTH BRANCH RALSTON CREEK AT IOWA CITY, IA

LOCATION.--Lat 41°39'05", long 91°30'27", in SW1/4 NE1/4 sec.14, T.79 N., R.6 W., Johnson County, Hydrologic Unit 07080209, on right bank 60 ft downstream from bridge on Muscatine Avenue in Iowa City, and 1.2 mi upstream from mouth.

DRAINAGE AREA.--2.94 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1963 to current year.

REVISED RECORDS.--WDR IOWA 1966: Drainage area.

GAGE.--Water-stage recorder and V-notch sharp-crested weir. Datum of gage is 678.03 ft above NGVD.

REMARKS.--Estimated daily discharges: Dec. 15-20, Dec. 31 to Jan. 19, and Jan. 22 to Feb. 26. Records good except those for estimated daily discharges, which are poor.

AVERAGE DISCHARGE.--25 years, 2.43 ft<sup>3</sup>/s, 11.22 in/yr, 1,761 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,070 ft<sup>3</sup>/s July 17, 1972, gage height, 9.47 ft; no flow at times most years.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of July 14, 1962, reached a stage of 10.5 ft, from flood profile, discharge not determined.

EXTREMES FOR CURRENT YEAR.-- Peak discharges greater than base discharge of 200 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Aug. 8	1630	*378	*6.54	No other peak greater than base discharge.			

No flow at times June through September.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.10	1.7	1.1	.50	.84	.98	1.9	1.0	.07	.00	.00	.00
2	.06	.34	1.1	.80	.76	.83	2.9	.91	6.0	.00	.00	.00
3	.06	.21	1.4	1.0	.74	.68	3.4	.83	.25	.00	.00	.00
4	.19	.20	.74	1.3	.72	.60	2.3	.64	.13	.00	.19	.00
5	.06	.23	.66	.80	.72	.60	1.8	.57	.10	.00	.00	.00
6	.04	.16	.79	.65	1.3	.69	2.3	.55	.09	.00	.00	.00
7	.05	.19	.67	.86	1.2	.84	1.3	.52	.08	.00	.00	.00
8	.05	.22	1.5	1.2	1.0	1.0	1.3	2.2	.68	.00	20	.00
9	.06	.15	1.1	1.0	.92	1.5	1.1	.62	.08	.76	.24	.00
10	.06	.16	.77	.90	.62	1.4	.93	.45	.06	.26	.00	.00
11	.06	.16	.74	1.2	.58	1.0	.89	.42	.06	.00	.00	.00
12	.08	.15	.67	.90	.56	.95	.82	.55	.05	.00	.00	.00
13	.08	.18	.61	.60	.60	.70	.77	.36	.04	.00	.00	.00
14	.13	.15	.60	1.9	.70	.71	.71	.35	.03	.00	.00	.00
15	.10	.86	.45	7.2	.64	.72	.67	.30	.02	.00	.00	.00
16	1.7	2.9	.40	8.6	1.0	.73	.67	.30	.02	.00	.00	.00
17	.14	5.7	.50	9.6	1.5	.76	.65	.31	.02	.00	.00	.00
18	.10	.95	.60	6.0	2.3	.83	.63	.28	.12	.02	3.1	.05
19	.10	.70	5.0	42	3.5	.75	.79	.26	.01	.00	3.1	.90
20	.09	.61	4.5	11	1.2	.84	.92	.23	.01	.00	.01	.03
21	.23	.55	2.5	5.1	.68	.83	1.2	.21	.00	.00	.02	.00
22	.08	.73	2.1	2.0	4.0	.87	10	.18	.00	.00	8.6	.00
23	.13	.60	2.0	1.3	1.5	.81	3.4	1.9	.00	.00	.62	.00
24	.67	1.2	4.9	1.0	.64	3.7	1.9	.30	.00	.00	.08	.00
25	.13	1.4	3.1	.86	.72	2.1	2.4	.18	.00	.00	.02	.00
26	.20	.59	2.2	.70	3.0	1.4	2.4	.19	.00	.00	.00	.00
27	.17	1.0	4.5	1.3	2.1	1.0	1.6	.16	.00	.00	1.3	.00
28	.11	6.8	3.0	2.1	1.6	5.9	1.8	.14	.00	.00	.28	.04
29	.19	2.4	2.1	8.2	1.1	4.3	1.6	.12	3.2	.00	.03	.01
30	.17	1.5	2.1	7.4	---	2.6	1.2	.10	.01	.00	.01	.00
31	1.7	---	1.4	1.9	---	2.1	---	.09	---	.00	.00	---
TOTAL	7.09	32.69	53.80	129.87	36.74	42.72	54.25	15.22	11.13	1.04	37.60	1.03
MEAN	.23	1.09	1.74	4.19	1.27	1.38	1.81	.49	.37	.034	1.21	.034
MAX	1.7	6.8	5.0	42	4.0	5.9	10	2.2	6.0	.76	20	.90
MIN	.04	.15	.40	.50	.56	.60	.63	.09	.00	.00	.00	.00
AC-FT	.14	.65	107	258	.73	.85	108	.30	.22	2.1	.75	2.0
CFSM	.08	.37	.59	1.42	.43	.47	.62	.17	.13	.01	.41	.01
IN.	.09	.41	.68	1.64	.46	.54	.69	.19	.14	.01	.48	.01

CAL YR 1987 TOTAL 462.86 MEAN 1.27 MAX 27 MIN .00 AC-FT 918 CFSM .43 IN. 5.86  
WTR YR 1988 TOTAL 423.18 MEAN 1.16 MAX 42 MIN .00 AC-FT 839 CFSM .39 IN. 5.35

## IOWA RIVER BASIN

## 05455100 OLD MANS CREEK NEAR IOWA CITY, IA

LOCATION.--Lat. 41°36'23", long. 91°36'56", in SE1/4 SW1/4 NW1/4 sec. 36, T.79 N., R.7 W., Johnson County, Hydrologic Unit 07080209, on left bank 10 ft downstream from bridge on county highway W62, 5 miles southwest of Iowa City, 5.9 miles upstream of Dirty Face Creek, and 8.6 miles upstream from mouth.

DRAINAGE AREA.--201 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1950 to September 1964, published in WSP 1914. Annual maximum, water years 1965-84. Occasional low-flow measurements, water years 1964-77, October 1984 to current year.

GAGE.--Water-stage recorder. Datum of gage is 637.49 ft above NGVD. Prior to Nov. 16, 1984, nonrecording gage at same site at datum 2.00 ft higher. Prior to Oct. 1, 1987, at datum 2.00 ft higher.

REMARKS.--Estimated daily discharges: Nov. 5-12, Dec. 15-21, Dec. 23 to Jan. 20, Jan. 22-30, and Feb. 2-29. Records good except those for estimated daily discharges, which are poor. U.S. Army Corps of Engineers data collection platform at station.

COOPERATION.--Gage height record and discharge measurements for water years 1951-64 were collected by the U.S. Army Corps of Engineers and computed by the U.S. Geological Survey.

AVERAGE DISCHARGE.--18 years (1951-64, 1985-88), 103 ft<sup>3</sup>/s, 6.96 in/yr, 74,620 acre-ft/yr; median of yearly mean discharges, 96 ft<sup>3</sup>/s, 6.5 in/yr, 69,600 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 12,000 ft<sup>3</sup>/s (corrected) May 29, 1962, gage height, 16.52 ft, present datum; minimum daily discharge, 0.1 ft<sup>3</sup>/s for several days in 1957, 1958 and 1964.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum discharge, 13,500 ft<sup>3</sup>/s, on the basis of contracted-opening of peak flow, June 15, 1982, gage height, 17.25 ft, present datum.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan. 20	----	ice jam	unknown				

Minimum discharge, 1.1 ft<sup>3</sup>/s Sept. 7

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	31	27	195	60	279	143	81	36	16	4.7	2.3	1.7
2	29	24	163	80	110	119	85	34	16	4.7	2.1	1.7
3	28	25	147	96	80	95	138	34	17	4.6	2.2	1.6
4	28	26	129	120	74	82	122	33	17	4.2	2.0	1.5
5	28	27	121	98	74	78	105	34	15	4.0	2.2	1.4
6	27	27	116	80	100	76	95	33	14	4.4	2.0	1.6
7	27	28	110	88	88	77	83	32	14	4.2	2.1	1.3
8	28	28	101	95	80	71	76	35	14	3.8	2.3	1.4
9	27	26	99	90	73	70	66	50	16	3.7	2.3	1.4
10	27	24	91	85	68	63	63	43	15	4.5	2.0	1.3
11	27	24	87	94	64	61	63	34	13	3.6	1.8	1.5
12	27	25	82	100	60	61	60	33	12	3.8	1.9	1.2
13	28	26	73	75	55	50	57	31	11	3.6	1.8	1.2
14	26	25	71	60	64	41	53	30	10	3.3	1.8	1.2
15	26	24	45	65	62	47	50	29	10	3.1	1.6	1.2
16	26	27	55	75	66	50	50	28	9.1	3.1	1.7	1.3
17	38	104	80	100	70	50	49	29	8.3	3.0	1.6	1.3
18	31	114	75	150	80	47	47	30	8.8	3.0	1.5	1.3
19	27	75	90	500	100	46	46	28	9.8	2.9	1.6	1.8
20	25	63	165	1100	190	47	46	28	9.5	2.8	1.5	5.2
21	24	57	230	513	70	44	46	26	7.2	2.7	1.5	6.6
22	26	56	195	150	100	44	52	25	5.8	2.7	4.3	2.7
23	25	54	180	80	210	44	57	27	5.5	2.7	4.3	1.6
24	26	48	150	75	80	51	48	32	5.2	2.7	25	1.6
25	30	57	250	80	65	80	45	28	5.1	2.6	6.5	1.3
26	25	58	170	55	85	67	45	25	4.9	2.5	2.4	1.3
27	24	54	130	65	230	58	45	24	4.6	2.5	2.2	1.3
28	24	192	140	60	180	64	42	23	4.5	2.5	2.0	1.4
29	22	493	170	150	160	113	37	22	4.9	2.4	1.9	1.4
30	22	264	140	600	---	98	36	20	4.8	2.3	1.9	1.3
31	22	---	100	723	---	87	---	17	---	2.3	1.8	---
TOTAL	831	2102	3950	5762	3017	2124	1888	933	308.0	102.9	92.1	52.6
MEAN	26.8	70.1	127	186	104	68.5	62.9	30.1	10.3	3.32	2.97	1.75
MAX	38	493	250	1100	279	143	138	50	17	4.7	25	6.6
MIN	22	24	45	55	55	41	36	17	4.5	2.3	1.5	1.2
AC-FT	1650	4170	7830	11430	5980	4210	3740	1850	611	204	183	104
CFSM	.13	.35	.63	.92	.52	.34	.31	.15	.05	.02	.01	.01
IN.	.15	.39	.73	1.07	.56	.39	.35	.17	.06	.02	.02	.01

CAL YR 1987	TOTAL 37086.8	MEAN 102	MAX 1450	MIN 3.8	AC-FT 73560	CFSM .51	IN. 6.86
WTR YR 1988	TOTAL 21162.6	MEAN 57.8	MAX 1100	MIN 1.2	AC-FT 41980	CFSM .29	IN. 3.92

## IOWA RIVER BASIN

91

05455500 ENGLISH RIVER AT KALONA, IA

LOCATION.--Lat 41°27'59", long 91°42'56", in SE1/4 SE1/4 sec.13, T.77 N., R.8 W., Washington County, Hydrologic Unit 07080209, on right bank 30 ft upstream from bridge on State Highway 1, 0.8 mi south of Kalona, 1.1 mi upstream from Camp Creek, 4.5 mi downstream from Smith Creek, and 14.5 mi upstream from mouth.

DRAINAGE AREA.--573 mi<sup>2</sup>.

PERIOD OF RECORD.--September 1939 to current year.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1558: 1940 (M), 1941. WSP 1708: 1956, 1957 (P), 1958 (P).

GAGE.--Water-stage recorder. Datum of gage is 633.45 ft above NGVD (levels by U.S. Army Corps of Engineers). Prior to Dec. 27, 1939, nonrecording gage 30 ft downstream at same datum.

REMARKS.--Estimated daily discharges: Dec. 15-22 and Dec. 31 to Mar. 5. Records good except those for estimated daily discharges, which are poor. U.S. Army Corps of Engineers gage-height telemeter and data collection platform at station.

AVERAGE DISCHARGE.--49 years, 372 ft<sup>3</sup>/s, 8.82 in/yr, 269,500 acre-ft/yr; median of yearly mean discharges, 330 ft<sup>3</sup>/s, 7.8 in/yr, 239,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 20,000 ft<sup>3</sup>/s Sept. 21, 1965, gage height, 21.45 ft; minimum daily discharge, 0.66 ft<sup>3</sup>/s Feb. 5-7, 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1930 reached a stage of 19.9 ft, from floodmark, from information by local residents, discharge, 18,500 ft<sup>3</sup>/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 29	0830	*2,080	9.18	Jan. 20	0600	ice jam	*13.29

Minimum discharge, 0.80 ft<sup>3</sup>/s Sept. 12.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	95	70	705	150	820	350	200	90	37	14	4.6	2.4
2	87	92	532	170	600	430	199	85	38	11	4.7	2.0
3	80	99	452	210	300	360	255	81	40	12	5.3	1.8
4	77	82	387	250	180	320	259	77	39	11	7.6	2.1
5	76	71	335	230	180	370	232	75	36	12	5.8	2.5
6	77	63	317	210	210	423	213	75	34	11	4.3	3.1
7	73	60	306	220	210	365	196	73	32	9.5	3.9	2.6
8	69	63	294	230	185	263	177	75	33	8.7	29	2.3
9	65	69	292	210	170	242	165	102	35	8.9	55	3.3
10	65	63	293	210	160	186	155	138	32	14	14	3.2
11	63	59	289	180	160	162	154	121	31	9.0	10	4.7
12	62	56	281	190	145	162	149	93	29	11	8.7	2.0
13	64	58	254	175	140	151	140	84	26	8.9	7.5	2.4
14	64	61	233	160	170	112	131	78	25	9.0	7.0	3.4
15	63	58	160	165	160	100	119	74	24	8.8	6.5	3.1
16	64	63	140	185	180	128	112	72	24	8.7	5.9	4.1
17	94	140	130	240	190	132	110	64	21	8.9	5.1	5.0
18	115	238	190	540	270	128	107	63	22	8.9	4.4	5.7
19	86	179	300	880	380	128	100	65	25	8.0	5.9	8.3
20	71	140	500	1250	390	131	96	62	24	8.4	6.7	19
21	64	112	1000	1000	250	125	95	64	22	7.9	8.7	58
22	63	102	860	660	400	116	126	61	20	7.5	26	56
23	64	110	691	270	620	116	313	61	17	7.4	88	62
24	67	110	907	180	450	127	154	67	16	7.1	247	38
25	70	124	1410	190	280	199	130	65	15	6.9	145	24
26	67	160	951	180	400	257	121	59	16	6.3	43	17
27	66	146	687	170	540	204	117	52	16	5.9	21	11
28	65	517	651	185	450	183	109	50	17	5.2	14	18
29	64	1920	577	250	380	228	102	47	19	5.2	7.5	12
30	58	1180	513	560	---	245	94	44	12	5.5	4.8	8.8
31	58	---	360	680	---	219	---	40	---	5.3	3.0	---
TOTAL	2216	6265	14997	10380	8970	6662	4630	2257	777	271.9	809.9	387.8
MEAN	71.5	209	484	335	309	215	154	72.8	25.9	8.77	26.1	12.9
MAX	115	1920	1410	1250	820	430	313	138	40	14	247	62
MIN	58	56	130	150	140	100	94	40	12	5.2	3.0	1.8
AC-FT	4400	12430	29750	20590	17790	13210	9180	4480	1540	539	1610	769
CFSM	.12	.36	.84	.58	.54	.38	.27	.13	.05	.02	.05	.02
IN.	.14	.41	.97	.67	.58	.43	.30	.15	.05	.02	.05	.03

CAL YR 1987	TOTAL 103243.5	MEAN 283	MAX 3810	MIN 1.4	AC-FT 204800	CFSM .49	IN. 6.70
WTR YR 1988	TOTAL 58623.6	MEAN 160	MAX 1920	MIN 1.8	AC-FT 116300	CFSM .28	IN. 3.81

## IOWA RIVER BASIN

05455700 IOWA RIVER NEAR LONE TREE, IA

LOCATION.--Lat 41°25'15", long 91°28'25", in NW1/4 NE1/4 sec.6, T.76 N., R.5 W., Louisa County, Hydrologic Unit 07080209, on left bank 2,000 ft downstream from tri-county bridge on county highway W66, 5 mi southwest of Lone Tree, 6.2 mi downstream from English River, and at mile 47.2.

DRAINAGE AREA.--4,293 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1956 to current year.

GAGE.--Water-stage recorder. Datum of gage is 588.16 ft above NGVD. Prior to Dec. 28, 1956, nonrecording gage at same site and datum.

REMARKS.--Estimated daily discharges: Dec. 16-21, Jan. 1 to Mar. 1, May 20-28, and Aug. 22-23. Records good except those for estimated daily discharges, which are poor. Flow regulated by Coralville Lake (station 05453510), 36.1 mi upstream, since Sept. 17, 1958. U.S. Army Corps of Engineers gage-height telemeter and data collection platform at station.

AVERAGE DISCHARGE.--32 years, 2,865 ft<sup>3</sup>/s, 9.06 in/yr, 2,076,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 35,700 ft<sup>3</sup>/s May 19, 1974, gage height, 18.97 ft; maximum gage height, 20.27 ft Sept. 22, 1965; minimum daily discharge, 69 ft<sup>3</sup>/s Aug. 4, 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of May 25, 1944, reached a stage of 19.94 ft, discharge not determined, from information by U.S. Army Corps of Engineers.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 6,670 ft<sup>3</sup>/s Jan. 21, gage height, 14.3 ft, backwater from ice; minimum daily discharge, 186 ft<sup>3</sup>/s Sept. 16, 17.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1400	921	2470	1600	5200	2600	2190	906	602	280	243	253
2	1150	925	2540	1400	5400	2940	2170	773	611	279	238	247
3	1060	922	2470	1200	4500	3140	2310	718	625	274	240	244
4	1050	909	2370	1200	4300	3010	2360	681	638	274	240	241
5	1040	891	2300	1150	3900	2670	2280	644	654	270	256	234
6	1040	881	2600	1400	3400	2930	2230	628	660	263	250	225
7	1020	878	2630	1550	2600	3290	2160	873	666	260	250	221
8	1010	879	2610	1550	2050	3460	2100	1010	666	261	269	206
9	1010	880	2650	1550	1900	3040	2070	1090	664	259	508	200
10	998	884	2610	1500	1700	2890	2050	1080	622	259	347	195
11	991	874	2590	1500	1700	2790	2180	1160	607	261	267	194
12	986	873	2570	1450	1800	2580	1970	1170	590	263	233	194
13	986	871	2520	1350	1700	2450	1870	1140	580	263	226	194
14	986	870	2450	1350	1800	2350	1850	1120	572	263	224	193
15	986	868	2140	1300	1950	1930	1820	1120	545	263	222	189
16	987	897	1800	1300	1900	1910	1790	1120	465	263	222	186
17	1020	1060	1500	1350	1900	1910	1610	1110	449	263	219	186
18	1040	1230	1600	1450	1900	1900	1480	1110	441	263	218	189
19	1030	1140	1200	1750	2050	1890	1440	1100	434	267	218	204
20	999	1060	1300	3400	2450	1890	1430	1090	428	267	218	222
21	985	1140	2300	6000	2700	1860	1430	1060	423	259	215	209
22	980	1140	2910	5500	2800	1690	1430	1020	414	251	265	224
23	984	1150	2600	4700	3300	1670	1960	980	376	253	680	216
24	1000	1150	2820	3200	3700	1690	1600	932	290	247	387	214
25	993	1170	3770	2300	3100	1720	1450	859	272	247	320	206
26	990	1310	3550	1750	2300	1750	1420	786	274	247	330	200
27	917	1340	3070	1600	2450	1890	1390	724	276	246	317	194
28	870	1450	3070	1250	2800	1900	1330	655	276	245	313	214
29	891	3050	2940	1250	2700	2200	1190	631	276	245	292	205
30	889	3100	2740	1450	---	2740	1050	623	280	250	280	200
31	887	---	2350	3300	---	2300	---	610	---	248	264	---
TOTAL	31175	34713	77040	62600	79950	72980	53610	28523	14676	8053	8771	6299
MEAN	1006	1157	2485	2019	2757	2354	1787	920	489	260	283	210
MAX	1400	3100	3770	6000	5400	3460	2360	1170	666	280	680	253
MIN	870	868	1200	1150	1700	1670	1050	610	272	245	215	186
AC-FT	61840	68850	152800	124200	158600	144800	106300	56580	29110	15970	17400	12490

CAL YR 1987 TOTAL 815647 MEAN 2235 MAX 7200 MIN 311 AC-FT 1618000  
WTR YR 1988 TOTAL 478390 MEAN 1307 MAX 6000 MIN 186 AC-FT 948900

## IOWA RIVER BASIN

93

## 05457700 CEDAR RIVER AT CHARLES CITY, IA

LOCATION.--Lat 43°03'45", long 92°40'23", in SE1/4 NE1/4, sec.12, T.95 N., R.16 W., Floyd County, Hydrologic Unit 07080201, on right bank 800 ft downstream from bridge on U.S. Highway 18 (Brantingham Street) in Charles City, 10.6 mi upstream from Gizzard Creek, and at mile 252.9 upstream from mouth of Iowa River.

DRAINAGE AREA.--1,054 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1964 to current year.

GAGE.--Water-stage recorder. Datum of gage is 973.02 ft above NGVD.

REMARKS.--Estimated daily discharges: Dec. 31 to Mar. 12. Records excellent except those for estimated daily discharges, which are poor. Occasional minor regulation by dam 0.2 mi upstream from gage. Daily wire-weight gage readings available in district office for period Sept. 13, 1945 to June 30, 1954, at same site and datum. Discharge not published for this period because of extreme regulation of streamflow by power dam 0.2 mi upstream. U.S. National Weather Service gage-height telemeter at station.

AVERAGE DISCHARGE.--24 years, 713 ft<sup>3</sup>/s, 9.19 in/yr, 516,600 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 21,000 ft<sup>3</sup>/s Apr. 7, 1965, gage height, 19.14 ft; maximum gage height, 21.64 ft Mar. 2, 1965, backwater from ice; minimum daily discharge, 60 ft<sup>3</sup>/s Nov. 23, 1977, Jan. 7, 1978.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Mar. 27, 1961, reached a stage of 21.6 ft, from floodmarks, discharge, 29,200 ft<sup>3</sup>/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,600 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 4	0445	*1,440	(a) *5.71				

(a) Ice jam

Minimum discharge, 78 ft<sup>3</sup>/s Aug. 3.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	211	212	338	257	138	500	470	1330	291	141	88	97
2	198	209	366	286	144	760	469	1160	281	139	84	96
3	196	203	354	202	149	1150	520	971	273	133	81	97
4	191	202	289	143	138	1240	684	833	276	127	94	111
5	188	199	241	104	132	1180	763	742	263	119	143	103
6	181	198	275	130	144	1100	738	674	247	114	145	100
7	180	193	305	141	155	1020	700	626	234	110	133	93
8	181	193	284	132	172	1100	656	617	224	108	176	92
9	182	194	280	121	155	1120	621	654	214	114	142	89
10	179	194	306	132	144	1030	576	784	205	156	130	90
11	179	191	400	138	155	900	537	806	195	311	125	87
12	176	189	472	138	161	940	507	746	189	369	112	86
13	170	189	452	127	166	932	485	673	183	335	108	83
14	167	185	391	188	171	785	460	614	175	284	101	85
15	173	186	221	199	166	713	432	560	162	234	99	82
16	187	191	205	210	194	643	415	522	154	205	93	83
17	223	201	229	205	199	600	396	499	157	183	87	86
18	255	201	230	197	210	548	395	467	161	162	83	88
19	273	204	324	188	199	536	361	499	171	146	81	130
20	272	198	361	204	177	516	358	727	181	141	113	158
21	260	182	331	199	166	487	359	840	167	136	129	218
22	255	184	332	188	194	438	362	652	164	136	145	216
23	244	195	303	205	155	441	361	540	158	138	151	325
24	238	194	302	177	155	483	361	477	195	129	147	421
25	230	194	271	155	172	531	361	429	183	125	135	326
26	226	191	257	161	194	546	381	393	183	120	112	251
27	217	189	180	171	250	532	441	378	165	114	107	209
28	213	210	207	190	390	510	589	364	149	107	104	186
29	212	218	246	183	420	488	1100	353	164	104	100	175
30	209	260	233	177	---	500	1340	331	147	102	101	173
31	204	---	248	166	---	494	---	306	---	93	100	---
TOTAL	6470	5949	9233	5414	5365	22763	16198	19567	5911	4935	3549	4436
MEAN	209	198	298	175	185	734	540	631	197	159	114	148
MAX	273	260	472	286	420	1240	1340	1330	291	369	176	421
MIN	167	182	180	104	132	438	358	306	147	93	81	82
AC-FT	12830	11800	18310	10740	10640	45150	32130	38810	11720	9790	7040	8800
CFSM	.20	.19	.28	.17	.18	.70	.51	.60	.19	.15	.11	.14
IN.	.23	.21	.33	.19	.19	.80	.57	.69	.21	.17	.13	.16

CAL YR 1987	TOTAL 109574	MEAN 300	MAX 930	MIN 154	AC-FT 217300	CFSM .28	IN. 3.87
WTR YR 1988	TOTAL 109790	MEAN 300	MAX 1340	MIN 81	AC-FT 217800	CFSM .28	IN. 3.87

## IOWA RIVER BASIN

05458000 LITTLE CEDAR RIVER NEAR IONIA, IA

LOCATION.--Lat 43°02'05", long 92°30'05", in SW1/4 NE1/4 sec.21, T.95 N., R.14 W., Chickasaw County, Hydrologic Unit 07080201, on left bank 12 ft downstream from bridge on county highway B57, 2.4 mi west of Ionia, 6.4 mi upstream from mouth, and 7.6 mi downstream from Beaver Creek.

DRAINAGE AREA.--306 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1954 to current year.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1708: 1959.

GAGE.--Water-stage recorder. Datum of gage is 973.35 ft above NGVD.

REMARKS.--Estimated daily discharges: Dec. 2-17, and Jan. 18 to Mar. 13. Records good except those for estimated daily discharges, which are poor. U.S. National Weather Service gage-height telemeter at station.

AVERAGE DISCHARGE.--34 years, 176 ft<sup>3</sup>/s, 7.81 in/yr, 127,500 acre-ft/yr; median of yearly mean discharges, 150 ft<sup>3</sup>/s, 6.7 in/yr, 109,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 10,800 ft<sup>3</sup>/s Mar. 27, 1961, gage height, 15.58 ft; minimum daily discharge, 3.0 ft<sup>3</sup>/s Feb. 4-9, 1959.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 22, 1954, reached a stage of 11.37 ft, discharge, 4,600 ft<sup>3</sup>/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,200 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 9	1430	*390	(a) *5.79				

(a) Ice jam

Minimum discharge, 6.0 ft<sup>3</sup>/s Sept. 17, 18, 19.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	26	28	42	29	12	30	122	166	37	20	11	8.5
2	24	28	42	27	12	64	116	148	35	20	9.5	8.3
3	24	29	43	25	13	58	123	135	33	19	9.0	7.9
4	24	28	49	23	12	80	131	123	32	18	9.4	9.1
5	24	26	44	19	11	150	131	115	31	17	9.8	9.0
6	24	26	40	16	12	320	132	109	29	17	9.8	9.1
7	24	27	43	13	14	220	129	102	28	16	9.4	8.7
8	24	27	45	12	16	250	123	103	27	15	22	7.9
9	24	26	46	11	14	370	118	108	25	16	17	7.5
10	24	26	47	10	12	330	112	106	24	22	17	7.1
11	23	26	49	9.3	14	300	107	107	24	22	15	6.8
12	24	26	56	9.9	14	250	103	103	23	23	13	6.7
13	24	26	40	10	15	200	100	95	22	29	13	6.6
14	24	26	30	10	16	181	96	88	21	25	12	6.6
15	25	26	25	10	15	162	93	83	20	22	11	6.4
16	25	27	26	11	18	166	89	78	20	20	10	6.7
17	26	30	34	12	19	163	87	73	20	18	9.3	6.2
18	26	30	47	12	20	140	84	70	21	17	8.9	6.1
19	26	30	51	12	19	118	81	67	21	16	8.6	9.7
20	26	36	47	14	16	113	80	65	21	17	8.6	11
21	26	28	45	14	15	113	79	66	20	16	8.5	15
22	26	45	44	14	18	116	78	64	19	15	12	21
23	26	36	44	16	14	117	80	60	17	15	14	22
24	26	33	44	14	14	118	78	56	19	15	14	26
25	26	30	42	12	16	120	76	53	22	14	15	26
26	26	29	36	13	18	122	79	50	26	13	14	28
27	27	29	32	15	19	124	116	47	25	13	13	26
28	26	34	27	17	22	129	145	47	23	13	12	22
29	26	38	27	17	26	138	160	46	27	12	10	21
30	26	41	26	17	---	137	174	43	22	12	10	19
31	26	---	28	16	---	130	---	40	---	11	9.3	---
TOTAL	778	897	1241	460.2	456	5029	3222	2616	734	538	365.1	381.9
MEAN	25.1	29.9	40.0	14.8	15.7	162	107	84.4	24.5	17.4	11.8	12.7
MAX	27	45	56	29	26	370	174	166	37	29	22	28
MIN	23	26	25	9.3	11	30	76	40	17	11	8.5	6.1
AC-FT	1540	1780	2460	913	904	9980	6390	5190	1460	1070	724	757
CFMS	.08	.10	.13	.05	.05	.53	.35	.28	.08	.06	.04	.04
IN.	.09	.11	.15	.06	.06	.61	.39	.32	.09	.07	.04	.05

CAL YR 1987	TOTAL	25019	MEAN	68.5	MAX	247	MIN	22	AC-FT	49630	CFMS	.22	IN.	3.04
WTR YR 1988	TOTAL	16718.2	MEAN	45.7	MAX	370	MIN	6.1	AC-FT	33160	CFMS	.15	IN.	2.03



## 05458500 CEDAR RIVER AT JANESVILLE, IA

LOCATION.--Lat 42°38'54", long 92°27'54", in NE1/4 SW1/4 sec.35, T.91 N., R.14 W., Bremer County, Hydrologic Unit 07080201, on left bank 300 ft downstream from bridge on county highway at Janesville, 3.6 mi upstream from West Fork Cedar River, and at mile 207.7 upstream from mouth of Iowa River.

DRAINAGE AREA.--1,661 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1904 to Sept. 1906, October 1914 to September 1927, October 1932 to September 1942, October 1945 to current year. Monthly discharge only for some periods, published in WSP 1308. Published as Red Cedar River at Janesville, 1905-06.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1558: 1906 (M), 1915-16 (M), 1917, 1918-19 (M), 1920-27, 1933-37 (M), 1940-42 (M).

GAGE.--Water-stage recorder. Datum of gage is 868.26 ft above NGVD. Prior to July 26, 1919, nonrecording gage at site 1,000 ft downstream at datum 4.0 ft lower. July 26, 1919, to Sept. 30, 1927, Nov. 14, 1932, to Sept 30, 1942, and Apr. 26, 1946, to Nov. 10, 1949, nonrecording gage at county bridge 300 ft upstream at same datum.

REMARKS.--Estimated daily discharges: Dec. 17, 25-31, and Jan. 1 to Mar. 7. Records good except those for estimated daily discharges, which are poor. Diurnal fluctuation during low water caused by powerplant at Waverly, 10 mi upstream. U.S. National Weather Service gage-height telemeter at station.

AVERAGE DISCHARGE.--68 years (water years 1905-06, 1915-27, 1933-42, 1946-88), 864 ft<sup>3</sup>/s, 7.06 in/yr, 626,000 acre-ft/yr; median of yearly mean discharges, 760 ft<sup>3</sup>/s, 6.2 in/yr, 551,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 37,000 ft<sup>3</sup>/s Mar. 28, 1961, gage height, 16.33 ft; minimum daily discharge, 28 ft<sup>3</sup>/s Oct. 21, 1922.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Mar. 17, 1945, reached a stage of 16.2 ft, from floodmark at site 300 ft upstream, discharge, 34,300 ft<sup>3</sup>/s. Flood of Mar. 16, 1929, reached a stage of about 16 ft, from information by City of Waterloo, discharge not determined.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 6	2030	*3,080	(a) *4.15				

(a) Ice jam

Minimum discharge, 119 ft<sup>3</sup>/s Sept. 11, 12, 13, 14, 15.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	314	292	405	445	230	850	841	1500	397	231	176	141
2	292	290	441	500	240	780	814	1610	402	226	159	144
3	289	291	497	345	250	710	827	1470	394	222	165	142
4	303	286	485	240	230	900	857	1300	352	213	161	149
5	272	270	423	170	220	1300	996	1140	354	207	157	145
6	294	269	414	215	240	2600	1100	1010	345	195	185	143
7	277	274	424	235	260	2300	1080	912	329	193	184	137
8	271	280	445	220	290	1840	1020	873	316	160	228	135
9	271	262	475	200	260	2060	976	923	285	175	257	133
10	270	262	465	220	240	2220	915	884	284	228	238	136
11	261	261	477	230	260	2210	851	926	268	237	215	129
12	261	264	529	230	270	2120	797	928	258	249	194	131
13	261	265	591	210	280	1530	756	955	251	366	177	129
14	263	262	602	320	290	1390	711	871	250	369	181	128
15	395	260	386	340	280	1420	697	809	255	352	186	126
16	274	261	354	360	330	1250	656	747	245	302	167	133
17	288	287	295	350	340	1140	628	703	242	275	156	132
18	281	295	874	335	360	1070	588	667	240	248	147	137
19	309	287	559	320	340	1000	589	622	244	225	148	162
20	336	289	510	350	300	957	571	617	252	221	155	165
21	343	278	703	340	280	931	559	732	246	213	137	178
22	351	273	562	320	330	848	558	929	237	202	232	221
23	334	281	552	350	260	786	561	812	231	194	210	253
24	320	284	508	300	260	765	551	695	244	198	191	251
25	307	282	460	260	290	839	550	606	240	200	186	381
26	307	283	400	270	330	931	560	558	243	191	182	351
27	306	278	340	290	410	941	615	519	233	187	176	313
28	276	317	310	300	620	939	670	504	235	181	158	263
29	283	386	330	310	920	926	784	469	259	178	149	243
30	284	393	360	300	---	886	1160	454	244	183	149	232
31	280	---	400	280	---	869	---	430	---	168	147	---
TOTAL	9173	8562	14576	9155	9210	39308	22838	26175	8375	6989	5553	5463
MEAN	296	285	470	295	318	1268	761	844	279	225	179	182
MAX	395	393	874	500	920	2600	1160	1610	402	369	257	381
MIN	261	260	295	170	220	710	550	430	231	160	137	126
AC-FT	18190	16980	28910	18160	18270	77970	45300	51920	16610	13860	11010	10840
CFSM	.18	.17	.28	.18	.19	.76	.46	.51	.17	.14	.11	.11
IN.	.21	.19	.33	.21	.21	.88	.51	.59	.19	.16	.12	.12

CAL YR 1987	TOTAL 189380	MEAN 519	MAX 1400	MIN 260	AC-FT 375600	CFSM .31	IN. 4.24
WTR YR 1988	TOTAL 165377	MEAN 452	MAX 2600	MIN 126	AC-FT 328000	CFSM .27	IN. 3.70

## IOWA RIVER BASIN

05458900 WEST FORK CEDAR RIVER AT FINCHFORD, IA

LOCATION.--Lat 42°37'50", long 92°32'24", in SW1/4 SE1/4 sec.6, T.90 N., R.14 W., Black Hawk County, Hydrologic Unit 07080204, on left bank 100 ft downstream from bridge on county highway C55 at Finchford, 3.2 mi upstream upstream from Shell Rock River, and 5.0 mi upstream from mouth.

DRAINAGE AREA.--846 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1945 to current year. Prior to October 1955, published as West Fork Shell Rock River at Finchford.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1558: 1946 (M), 1947.

GAGE.--Water-stage recorder. Datum of gage is 867.54 ft above NGVD. Prior to June 10, 1955, nonrecording gage at same site and datum.

REMARKS.--Estimated daily discharges: Dec. 15 to Mar. 5 and Aug. 9. Records good except 'hose for estimated daily discharges, which are poor. An authorized diversion of 2,100 acre-ft is made into Big Marsh, 16 mi upstream from gage, each year between September 1 and November 15. Net effect on daily flows at gage is unknown. U.S. National Weather Service gage-height telemeter at station.

AVERAGE DISCHARGE.--43 years, 509 ft<sup>3</sup>/s, 8.17 in/yr, 368,800 acre-ft/yr; median of yearly mean discharges, 430 ft<sup>3</sup>/s, 6.9 in/yr, 312,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 31,900 ft<sup>3</sup>/s June 27, 1951, gage height, 17.28 ft, from floodmarks; minimum daily discharge, 5.9 ft<sup>3</sup>/s Feb. 26, 27, 1959.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in March 1929 reached a stage of about 14 ft, from information by local resident, discharge, about 12,800 ft<sup>3</sup>/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 6	0715	*1,390	*8.94				

Minimum daily discharge, 17 ft<sup>3</sup>/s Sept. 14, 15, 18.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	175	129	445	236	72	379	409	607	170	110	42	34
2	169	130	420	230	76	347	404	540	165	116	41	29
3	156	130	376	174	81	316	443	484	163	114	41	27
4	148	128	342	116	74	411	558	439	159	104	40	32
5	144	127	302	79	72	617	599	407	155	95	40	27
6	143	125	303	100	79	1290	586	379	153	89	37	27
7	142	132	296	108	87	1150	560	353	145	83	36	26
8	140	137	283	99	99	1160	533	345	142	79	38	25
9	139	142	285	88	89	1040	504	370	136	78	48	23
10	139	142	315	96	82	1040	467	414	131	91	52	23
11	141	141	340	98	90	845	434	403	126	123	53	19
12	142	141	345	97	95	732	406	373	118	141	50	19
13	137	140	331	86	100	649	390	351	112	120	44	19
14	134	141	307	134	104	530	372	330	110	106	41	17
15	134	139	170	140	101	454	356	312	107	96	38	17
16	140	143	130	146	122	434	338	295	103	91	34	19
17	144	161	240	139	127	437	323	284	101	82	33	19
18	148	180	242	130	136	412	312	269	102	82	31	17
19	146	192	252	122	129	393	303	261	106	79	30	21
20	143	196	228	131	114	380	299	277	104	76	29	27
21	143	187	242	125	106	366	298	283	99	70	25	20
22	141	179	254	114	128	353	296	264	96	67	45	24
23	141	194	249	123	100	348	293	253	90	64	43	26
24	139	204	227	102	101	352	296	243	112	63	53	26
25	139	329	237	85	114	388	301	227	111	60	60	26
26	139	315	250	87	132	444	309	215	124	61	52	24
27	140	283	258	92	168	456	337	205	109	56	47	20
28	139	277	259	93	265	434	410	199	98	53	42	22
29	137	305	250	97	410	453	570	195	108	51	38	24
30	135	376	258	95	---	454	668	186	102	49	38	22
31	128	---	276	89	---	431	---	176	---	47	36	---
TOTAL	4425	5545	8712	3651	3453	17495	12374	9939	3657	2596	1277	701
MEAN	143	185	281	118	119	564	412	321	122	83.7	41.2	23.4
MAX	175	376	445	236	410	1290	668	607	170	141	60	34
MIN	128	125	130	79	72	316	293	176	90	47	25	17
AC-FT	8780	11000	17280	7240	6850	34700	24540	19710	7250	5150	2530	1390
CFSM	.17	.22	.33	.14	.14	.67	.49	.38	.14	.10	.05	.03
IN.	.19	.24	.38	.16	.15	.77	.54	.44	.16	.11	.06	.03

CAL YR 1987	TOTAL 103458	MEAN 283	MAX 960	MIN 115	AC-FT 205200	CFSM .34	IN. 4.55
WTR YR 1988	TOTAL 73825	MEAN 202	MAX 1290	MIN 17	AC-FT 146400	CFSM .24	IN. 3.25

## 05459500 WINNEBAGO RIVER AT MASON CITY, IA

LOCATION.--Lat 43°09'54", long 93°11'33", in NE1/4 NW1/4 sec.3, T.96 N., R.20 W., Cerro Gordo County, Hydrologic Unit 07080203, on right bank 650 ft upstream from Thirteenth Street Bridge in Mason City, 0.1 mi downstream from Calmus Creek, and 1.0 mi upstream from Willow Creek, and at mile 275.8 upstream from mouth of Iowa River.

DRAINAGE AREA.--526 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1932 to current year. Prior to December 1932, monthly discharge only, published in WSP 1308. Prior to October 1959, published as Lime Creek at Mason City.

REVISED RECORDS.--WSP 825: 1935-36. WSP 1438: Drainage area. WSP 1558: 1933-37, 1943 (M), 1945, 1948.

GAGE.--Water-stage recorder and concrete control. Datum of gage is 1,069.59 ft above NGVD. Prior to Oct. 15, 1934, nonrecording gage at datum 6.47 ft lower. Oct. 15 to Nov. 6, 1934, nonrecording gage at different datum, and Nov. 7, 1934, to Mar. 22, 1935, nonrecording gage at present datum.

REMARKS.--Estimated daily discharges: Dec. 15-18, Jan. 4-7, 25-28, Feb. 2-13, 21, 29, and Mar. 1-18. Records good except those for estimated daily discharges, which are poor.

AVERAGE DISCHARGE.--56 years, 262 ft<sup>3</sup>/s, 6.76 in/yr, 189,800 acre-ft/yr; median of yearly mean discharges, 210 ft<sup>3</sup>/s, 5.4 in/yr, 152,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 10,800 ft<sup>3</sup>/s Mar. 30, 1933, gage height, 15.7 ft; minimum discharge, 0.86 ft<sup>3</sup>/s Aug. 18, 19, 1988.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s) *607	Gage height (ft) *4.67	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Apr. 29	2000						

Minimum discharge, 0.86 ft<sup>3</sup>/s Aug. 18, 19.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	25	33	84	31	21	107	173	442	87	35	4.3	11
2	24	33	64	32	22	156	175	365	85	27	3.0	11
3	23	33	60	32	23	191	212	320	85	26	12	13
4	25	35	35	30	24	194	229	292	85	25	23	13
5	26	33	55	28	28	190	228	270	76	23	29	12
6	25	33	60	28	26	208	221	253	69	20	20	9.9
7	24	33	57	29	29	208	204	238	62	19	16	11
8	23	34	57	29	31	236	189	235	60	18	19	9.4
9	26	36	68	25	33	236	174	280	56	20	18	8.0
10	28	36	74	21	30	236	156	345	55	14	23	9.6
11	27	34	77	19	31	257	141	353	51	19	17	9.5
12	24	33	77	19	39	262	139	342	46	29	15	6.3
13	25	33	64	19	45	217	132	321	40	27	16	6.7
14	26	33	27	18	48	200	125	302	40	24	14	9.0
15	28	35	44	15	46	220	118	285	39	24	13	7.7
16	42	40	43	15	43	211	114	260	36	24	8.8	10
17	48	44	50	16	33	236	112	241	37	22	6.1	12
18	46	47	52	18	27	227	104	229	44	18	4.8	9.9
19	40	45	52	19	21	232	95	215	45	16	5.9	35
20	39	32	52	19	21	200	102	177	38	17	7.0	35
21	38	32	51	19	22	195	107	153	31	17	7.4	34
22	36	41	50	19	22	190	109	152	27	16	22	49
23	33	41	52	19	20	194	127	151	24	16	24	55
24	31	37	52	19	21	196	146	141	46	14	32	48
25	30	36	47	22	23	230	145	130	38	12	20	34
26	31	37	40	22	23	231	159	123	29	15	15	24
27	32	37	42	25	26	209	231	125	28	15	16	20
28	32	46	37	27	54	206	538	121	24	11	13	20
29	32	64	35	27	69	205	586	111	48	7.9	11	28
30	32	84	35	22	---	193	539	102	41	7.3	12	40
31	32	---	35	20	---	180	---	92	---	5.4	11	---
TOTAL	953	1170	1628	703	901	6453	5830	7166	1472	583.6	458.3	601.0
MEAN	30.7	39.0	52.5	22.7	31.1	208	194	231	49.1	18.8	14.8	20.0
MAX	48	84	84	32	69	262	586	442	87	35	32	55
MIN	23	32	27	15	20	107	95	92	24	5.4	3.0	6.3
AC-FT	1890	2320	3230	1390	1790	12800	11560	14210	2920	1160	909	1190
CFSM	.06	.07	.10	.04	.06	.40	.37	.44	.09	.04	.03	.04
IN.	.07	.08	.12	.05	.06	.46	.41	.51	.10	.04	.03	.04

CAL YR 1987 TOTAL 33958 MEAN 93.0 MAX 418 MIN 20 AC-FT 67360 CFSM .18 IN. 2.40  
WTR YR 1988 TOTAL 27918.9 MEAN 76.3 MAX 586 MIN 3.0 AC-FT 55380 CFSM .15 IN. 1.97

## IOWA RIVER BASIN

## 05460000 CLEAR LAKE AT CLEAR LAKE, IA

LOCATION.--Lat 43°08'01", long 93°22'57", in SE1/4 NE1/4 sec.13, T.96 N., R.22 W., Cerro Gordo County, Hydrologic Unit 07080203, at the public bathing beach in the town of Clear Lake near dam across Clear Creek.

DRAINAGE AREA.--22.6 mi<sup>2</sup>.

PERIOD OF RECORD.--May 1933 to current year. No winter records 1933-52. Record fragmentary November 1952 to June 1959.

GAGE.--Water-stage recorder. Datum of gage is 1,222.24 ft above NGVD, and 4.60 ft below crest of spillway of dam at outlet. See WSP 1708 for history of changes prior to June 25, 1959.

REMARKS.--Lake is formed by concrete dam on Clear Creek with ungated overflow spillway 50 ft long at elevation 1,226.84 ft above NGVD. Dam constructed in 1903. A previous outlet works had been constructed in 1887. Lake is used for conservation and recreation. Area of lake is approximately 3,600 acres.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height observed, 5.94 ft July 3, 1951; minimum observed, 1.16 ft Dec. 20, 22-24, 1958.

EXTREMES FOR CURRENT YEAR.--Maximum gage height, 3.69 ft May 9; minimum, 2.21 ft Sept. 15.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.47	3.21	3.28	3.39	3.46	3.50	3.50	3.60	3.28	2.97	2.57	2.45
2	3.40	3.22	3.27	3.39	3.46	3.50	3.52	3.57	3.27	2.96	2.55	2.44
3	3.39	3.25	3.28	3.39	3.46	3.50	3.57	3.56	3.26	2.95	2.53	2.43
4	3.38	3.25	3.27	3.39	3.46	3.50	3.58	3.57	3.25	2.93	2.53	2.41
5	3.40	3.22	3.26	3.38	3.46	3.50	3.57	3.56	3.23	2.92	2.53	2.39
6	3.35	3.20	3.26	3.38	3.45	3.50	3.58	3.55	3.21	2.90	2.54	2.39
7	3.32	3.21	3.26	3.38	3.45	3.50	3.56	3.54	3.19	2.89	2.55	2.39
8	3.31	3.22	3.28	3.38	3.45	3.52	3.55	3.55	3.14	2.90	2.55	2.38
9	3.30	3.22	3.32	3.38	3.46	3.51	3.54	3.60	3.11	2.89	2.55	2.35
10	3.27	3.21	3.31	3.38	3.48	3.51	3.52	3.55	3.10	2.89	2.55	2.31
11	3.27	3.22	3.34	3.38	3.48	3.51	3.51	3.55	3.09	2.86	2.55	2.30
12	3.26	3.20	3.36	3.39	3.47	3.54	3.51	3.55	3.06	2.84	2.55	2.29
13	3.25	3.20	3.32	3.38	3.47	3.54	3.51	3.51	3.03	2.85	2.56	2.28
14	3.24	3.18	3.30	3.38	3.48	3.54	3.50	3.50	3.02	2.83	2.57	2.26
15	3.26	3.19	3.32	3.38	3.47	3.53	3.47	3.50	2.98	2.84	2.57	2.24
16	3.31	3.24	3.31	3.38	3.49	3.53	3.47	3.45	2.96	2.83	2.57	2.28
17	3.31	3.27	3.31	3.38	3.50	3.52	3.46	3.43	2.98	2.82	2.57	2.28
18	3.29	3.27	3.30	3.38	3.49	3.52	3.42	3.41	3.00	2.80	2.57	2.29
19	3.28	3.26	3.31	3.41	3.50	3.52	3.40	3.40	3.00	2.77	2.57	2.48
20	3.29	3.23	3.31	3.44	3.50	3.51	3.41	3.39	2.99	2.76	2.57	2.43
21	3.26	3.21	3.31	3.44	3.49	3.51	3.43	3.39	2.99	2.72	2.58	2.38
22	3.25	3.21	3.31	3.44	3.50	3.51	3.42	3.41	2.96	2.71	2.58	2.42
23	3.24	3.22	3.31	3.45	3.49	3.52	3.48	3.39	2.92	2.69	2.58	2.42
24	3.23	3.19	3.32	3.47	3.48	3.52	3.48	3.38	2.99	2.69	2.57	2.41
25	3.22	3.19	3.31	3.46	3.48	3.56	3.47	3.37	2.97	2.67	2.54	2.39
26	3.23	3.19	3.31	3.46	3.48	3.57	3.52	3.37	2.93	2.66	2.52	2.39
27	3.23	3.18	3.32	3.45	3.48	3.49	3.64	3.36	2.92	2.65	2.53	2.36
28	3.20	3.24	3.39	3.45	3.48	3.53	3.62	3.36	2.90	2.63	2.51	2.34
29	3.19	3.29	3.39	3.45	3.49	3.55	3.61	3.34	2.98	2.62	2.49	2.41
30	3.19	3.28	3.39	3.46	---	3.53	3.61	3.32	2.98	2.59	2.48	2.42
31	3.17	---	3.39	3.46	---	3.51	---	3.30	---	2.58	2.48	---
MEAN	3.28	3.22	3.31	3.41	3.48	3.52	3.51	3.46	3.06	2.79	2.55	2.37
MAX	3.47	3.29	3.39	3.47	3.50	3.57	3.64	3.60	3.28	2.97	2.58	2.48
MIN	3.17	3.18	3.26	3.38	3.45	3.49	3.40	3.30	2.90	2.58	2.48	2.24

## 05462000 SHELL ROCK RIVER AT SHELL ROCK, IA

LOCATION.--Lat 42°39'10", long 92°35'45", in NE1/4 NW1/4 sec.11, T.91 N., R.15 W., Butler County, Hydrologic Unit 07080202 on right bank 400 ft upstream from bridge on county highway C45 in Shell Rock, 2.2 mi downstream from Curry Creek, and 10.4 mi upstream from mouth.

DRAINAGE AREA.--1,746 mi<sup>2</sup>.

PERIOD OF RECORD.--June 1953 to current year. Prior to July 1953, monthly discharge only, published in WSP 1728.

REVISED RECORDS.--WSP 1438: Drainage area.

GAGE.--Water-stage recorder. Rockfill dam since Oct. 19, 1957. Datum of gage is 885.34 ft above NGVD.

REMARKS.--Estimated daily discharges: Dec. 16, 17, Feb. 2-5, 24, Mar. 9-13, Apr. 29 to May 1. Records fair except those for estimated daily discharges, which are poor. Diurnal fluctuation at low stages caused by power plant upstream at Greene. U.S. National Weather Service gage-height telemeter at station.

AVERAGE DISCHARGE.--35 years, 980 ft<sup>3</sup>/s, 7.62 in/yr, 710,000 acre-ft/yr; median of yearly mean discharges, 800 ft<sup>3</sup>/s, 6.2 in/yr, 580,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 33,500 ft<sup>3</sup>/s Mar. 28, 1961, gage height, 16.26 ft; minimum daily discharge, 37 ft<sup>3</sup>/s Sept. 10, 1988 result of dam construction.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in 1856 reached a stage of 17.7 ft at bridge 400 ft downstream, from information provided by U.S. Army Corps of Engineers, discharge, about 45,000 ft<sup>3</sup>/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s) *1600	Gage height (ft) unknown	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Apr. 29	----						

Minimum discharge, 37 ft<sup>3</sup>/s Sept. 10, result of dam construction.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	166	202	358	161	141	628	637	1490	389	282	103	84
2	171	205	363	215	148	1120	632	1320	382	235	95	90
3	162	208	339	235	155	1160	723	1170	413	217	88	94
4	167	208	309	208	151	1160	864	1060	456	196	88	111
5	166	199	265	182	147	1110	917	969	383	185	106	121
6	172	184	265	158	142	1070	899	893	361	180	148	120
7	164	196	305	146	140	1060	876	832	336	174	154	115
8	155	205	326	139	138	1150	831	819	313	169	216	118
9	153	208	344	126	136	1120	788	843	293	173	280	136
10	160	202	349	112	135	1100	713	875	285	220	285	57
11	160	202	382	106	135	1070	666	976	271	207	128	98
12	166	202	402	118	134	1040	642	1000	258	215	92	102
13	167	202	377	122	135	1020	608	976	248	221	82	106
14	164	202	358	114	136	992	581	930	246	205	117	96
15	175	202	239	117	137	940	544	902	238	187	128	84
16	194	215	160	134	139	925	523	834	230	170	130	84
17	194	239	180	157	142	977	511	776	222	180	111	153
18	206	253	265	170	148	953	482	736	218	168	97	191
19	221	239	353	179	157	887	455	704	232	148	108	123
20	219	242	353	190	140	852	456	688	242	139	165	139
21	215	232	322	189	151	763	452	631	227	154	118	171
22	208	208	335	182	174	717	461	596	213	156	141	174
23	206	199	330	161	165	689	478	570	201	147	147	163
24	203	235	330	147	145	684	486	550	261	144	170	159
25	202	253	305	149	173	750	509	522	245	150	171	162
26	197	232	242	155	188	801	530	497	237	136	134	154
27	197	222	257	171	254	748	605	475	206	125	101	146
28	191	261	228	164	305	723	869	481	186	121	94	139
29	186	288	265	175	399	706	1500	467	221	123	86	140
30	188	335	268	187	---	684	1570	441	265	127	86	138
31	195	---	228	192	---	666	---	413	---	122	85	---
TOTAL	5690	6680	9402	4961	4790	28265	20808	24436	8278	5376	4054	3768
MEAN	184	223	303	160	165	912	694	788	276	173	131	126
MAX	221	335	402	235	399	1160	1570	1490	456	282	285	191
MIN	153	184	160	106	134	628	452	413	186	121	82	57
AC-FT	11290	13250	18650	9840	9500	56060	41270	48470	16420	10660	8040	7470
CFSM	.11	.13	.17	.09	.09	.52	.40	.45	.16	.10	.07	.07
IN.	.12	.14	.20	.11	.10	.60	.44	.52	.18	.11	.09	.08

CAL YR 1987	TOTAL 148338	MEAN 406	MAX 1210	MIN 153	AC-FT 294200	CFSM .23	IN. 3.16
WTR YR 1988	TOTAL 126508	MEAN 346	MAX 1570	MIN 57	AC-FT 250900	CFSM .20	IN. 2.70

## IOWA RIVER BASIN

05463000 BEAVER CREEK AT NEW HARTFORD, IA

LOCATION.--Lat 42°30'50", long 92°37'55", in SE1/4 SE1/4 sec.28, T.90 N., R.15 W., Butler County, Hydrologic Unit 07080205, on right bank 5 ft from right end of bridge on county highway T55, 0.2 mi north of New Hartford, and 8 mi upstream from mouth.

DRAINAGE AREA.--347 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1945 to current year. Prior to April 1948, monthly discharge only, published in WSP 1308.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1558: 1948-49. WSP 1708: 1947 (M).

GAGE.--Water-stage recorder. Datum of gage is 882.44 ft above NGVD. Prior to July 14, 1959, nonrecording gage at same site and datum.

REMARKS.--Estimated daily discharges: Oct. 1, Dec. 12 to Mar. 9, and Mar. 14, 16. Records good except those for estimated daily discharges, which are poor. U.S. National Weather Service gage-height telemeter at station.

AVERAGE DISCHARGE.--43 years, 200 ft<sup>3</sup>/s, 7.83 in/yr, 144,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 18,000 ft<sup>3</sup>/s June 13, 1947, gage height, 13.5 ft, from graph based on gage readings, from rating curve extended above 14,000 ft<sup>3</sup>/s; minimum daily discharge, 2.3 ft<sup>3</sup>/s Jan. 20-24, 1956, Jan. 24, 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,400 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 1	1330	ice jam	*6.72	Mar. 6	----	*290	ice jam

Minimum daily discharge, 4.0 ft<sup>3</sup>/s Sept. 17, 18.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	41	39	118	51	69	142	130	103	46	36	13	5.1
2	35	40	105	59	68	145	130	95	46	33	13	5.0
3	33	40	99	47	54	146	168	90	46	30	13	5.2
4	33	38	81	37	44	174	205	87	45	28	13	5.4
5	35	37	80	31	39	225	198	83	44	25	12	5.1
6	34	37	92	34	38	274	186	80	43	23	11	4.8
7	33	38	83	34	37	243	173	79	41	21	11	4.8
8	33	42	79	32	38	214	160	85	40	20	12	4.7
9	33	41	84	30	36	226	147	117	38	19	11	4.7
10	33	40	91	30	34	230	134	125	38	24	11	4.7
11	34	39	96	31	34	212	126	114	38	29	10	4.9
12	34	40	90	31	35	202	122	107	35	25	8.8	4.7
13	34	40	80	28	35	250	117	99	34	22	8.2	4.5
14	34	40	69	33	36	185	111	91	34	21	7.8	4.5
15	35	40	62	34	36	162	105	85	34	19	8.2	4.2
16	38	41	57	34	38	150	101	79	33	20	7.2	4.2
17	39	47	66	35	39	138	99	76	33	18	6.8	4.0
18	39	52	74	36	44	132	93	74	37	26	6.1	4.0
19	36	54	87	43	59	132	90	71	38	41	6.1	8.1
20	37	50	110	74	63	131	92	79	33	30	5.7	9.8
21	37	43	120	57	57	123	94	71	29	24	5.6	9.1
22	36	50	116	44	58	122	91	68	28	21	9.5	11
23	37	58	114	40	50	121	91	66	28	18	12	11
24	37	52	111	33	58	118	89	64	40	17	11	8.5
25	37	49	95	28	58	142	86	61	82	16	11	7.3
26	37	48	81	26	61	166	86	58	56	15	8.7	6.6
27	38	47	72	26	75	143	109	56	44	15	7.7	6.2
28	35	56	71	25	103	137	116	55	38	14	7.6	5.7
29	34	100	68	25	136	146	113	53	46	14	7.6	6.4
30	35	133	65	59	---	150	109	50	43	13	7.6	6.4
31	35	---	53	79	---	138	---	48	---	13	5.5	---
TOTAL	1101	1471	2669	1206	1532	5219	3671	2469	1210	690	288.7	180.6
MEAN	35.5	49.0	86.1	38.9	52.8	168	122	79.6	40.3	22.3	9.31	6.02
MAX	41	133	120	79	136	274	205	125	82	41	13	11
MIN	33	37	53	25	34	118	86	48	28	13	5.5	4.0
AC-FT	2180	2920	5290	2390	3040	10350	7280	4900	2400	1370	573	358
CFSM	.10	.14	.25	.11	.15	.49	.35	.23	.12	.06	.03	.02
IN.	.12	.16	.29	.13	.16	.56	.39	.26	.13	.07	.03	.02

CAL YR 1987	TOTAL	50615	MEAN	139	MAX	652	MIN	32	AC-FT	100400	CFSM	.40	IN.	5.43
WTR YR 1988	TOTAL	21707.3	MEAN	59.3	MAX	274	MIN	4.0	AC-FT	43060	CFSM	.17	IN.	2.33

## IOWA RIVER BASIN

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05463050 CEDAR RIVER AT CEDAR FALLS, IA

## WATER-QUALITY RECORDS

LOCATION.--Lat 42°32'20", Long 92°26'58", in NW1/4 NE1/4 sec.12, T.89 N, R.14W., Black Hawk County, Hydrologic Unit 07080205, at bridge on U.S. Highway 20 at Cedar Falls, 1.1 mi upstream from Dry Run, and at mile 196.0 upstream from mouth of Iowa River.

DRAINAGE AREA.--4,734 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1975 to September 1979, May 1984 to September 1985, October 1986 to current year.

REMARKS.--Water discharge estimated on basis of records at gaging station 8.1 mi downstream at Waterloo. No significant inflow between gaging station and sampling site.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	TEMPER- ATURE AIR (DEG C) (00020)	TUR- BID- ITY (FTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	BARO- METRIC PRES- SURE OF HG) (00025)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)
OCT 26...	1045	1100	600	8.40	6.5	10.0	4.7	11.9	99	743	K500
DEC 14...	1100	1770	650	8.40	0.5	-3.0	3.4	14.5	103	749	320
MAR 22...	1015	2330	520	8.20	4.0	12.0	8.8	12.7	100	742	K70
MAY 02...	1030	3860	592	8.40	15.0	21.0	14	10.4	106	744	K60
JUN 22...	1405	790	420	9.00	29.0	35.0	12	11.2	150	740	580
AUG 17...	1100	491	405	8.80	30.0	36.0	8.4	11.4	155	742	170

DATE	STREP- TOCOC- FECAL, KF AGAR (COLS. PER 100 ML) (31673)	HARD- NESS NONCARB WH WAT TOT FLD MG/L AS CACO3 (00902)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	SODIUM AD- SORP- TION RATIO (00932)	SODIUM AD- SORP- TION RATIO (00931)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	CAR- BONATE WATER DIS IT FIELD MG/L AS CO3 (00452)
OCT 26...	87	50	280	74	24	17	11	0.5	6.7	230	7
DEC 14...	310	74	320	86	26	14	9	0.4	4.5	245	7
MAR 22...	K140	78	300	80	24	11	7	0.3	4.5	219	4
MAY 02...	K40	120	300	77	25	11	7	0.3	3.2	203	0
JUN 22...	--	44	190	39	23	14	13	0.5	2.6	145	14
AUG 17...	100	33	160	27	22	19	20	0.7	9.1	118	3

DATE	BICAR- BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SiO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	NITRO- GEN, ORGANIC TOTAL (MG/L AS N) (00605)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)
OCT 26...	267	46	27	0.40	5.9	355	354	0.48	1050	0.59	2.80
DEC 14...	286	45	27	0.30	14	387	391	0.53	1850	0.64	5.60
MAR 22...	259	47	20	0.20	14	351	355	0.48	2210	0.80	4.90
MAY 02...	247	43	26	0.30	7.2	354	333	0.48	3690	0.76	8.10
JUN 22...	148	45	24	0.30	6.1	257	244	0.35	548	--	0.280
AUG 17...	138	42	38	0.20	15	232	248	0.32	308	2.2	<0.100

IOWA RIVER BASIN  
05463050 CEDAR RIVER AT CEDAR FALLS, IA  
WATER-QUALITY RECORDS

WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO- GEN, AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHOROUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	PHOS- PHOROUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHOROUS TOTAL (MG/L AS P) (00665)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. THAN .062 MM (70331)		
OCT 26...	0.010	0.020	0.010	0.60	0.080	0.080	0.150	36	107	96		
DEC 14...	0.040	0.070	0.060	0.70	0.170	0.200	0.290	83	397	52		
MAR 22...	0.020	0.110	0.100	0.90	0.100	0.130	0.210	42	264	95		
MAY 02...	0.030	0.050	0.040	0.80	0.050	0.050	0.100	81	844	77		
JUN 22...	0.030	<0.010	<0.010	1.7	0.010	0.020	0.170	--	--	--		
AUG 17...	<0.010	<0.010	0.010	2.2	0.010	0.040	0.160	--	--	--		
DATE	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)		
OCT 26...	4	<10	89	<0.5	<1	<1	<3	<1	11	8		
DEC 14...	--	--	--	--	--	--	--	--	--	--		
MAR 22...	4	<10	87	<0.5	<1	<1	<3	2	5	<5		
MAY 02...	2	<10	93	<0.5	<1	<1	<3	4	<3	<5		
JUN 22...	--	--	--	--	--	--	--	--	--	--		
AUG 17...	7	<10	100	<0.5	<1	<1	<3	2	42	<5		
DATE	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	NICKEL, DIS- SOLVED (UG/L AS NI) (01065)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	SILVER, DIS- SOLVED (UG/L AS AG) (01075)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)		
OCT 26...	9	24	<0.1	<10	1	<1	<1.0	180	<6	<3		
DEC 14...	--	--	--	--	--	--	--	--	--	--		
MAR 22...	13	9	0.3	<10	1	1	<1.0	160	<6	4		
MAY 02...	13	1	<0.1	<10	4	2	<1.0	150	<6	<3		
JUN 22...	--	--	--	--	--	--	--	--	--	--		
AUG 17...	<4	9	0.3	<10	3	1	<1.0	47	<6	12		
DATE	ATRA- ZINE (UG/L) (39630)	CYAN- AZINE (UG/L) (81757)	METRI- BUZIN (UG/L) [ Pesticide concentrations (81408) (77825) (39356)	ALA- CHLOR (UG/L) (77825)	METOLA- CHLOR (UG/L) (39356)	TRIFLU- RALIN (UG/L) (39030)	BUTY- LATE (UG/L) (99901)	CHLOR- PYRIFOS (UG/L) (81403)	ETHO- PROP (UG/L) (81758)	D. FO- NATE (UG/L) (81294)	PHORATE (UG/L) (39023)	TERBU- FOS (UG/L) (82088)
OCT 26...	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	--	--	--	--	--
DEC 14...	--	--	--	--	--	--	--	--	--	--	--	--
MAR 22...	0.11	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	--	--	--	--	--
MAY 02...	0.19	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	--	--	--	--	--
JUN 22...	0.30	1.0	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
AUG 17...	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	--	--	--	--	--



## IOWA RIVER BASIN

103

05463500 BLACK HAWK CREEK AT HUDSON, IA

LOCATION.--Lat 42°24'28", long 92°27'47", in SW1/4 NE1/4 sec.27, T.88 N., R.14 W., Black Hawk County, Hydrologic Unit 07080205, on left bank 35 ft downstream from bridge on State Highway 58, 0.2 mi northwest of Chicago and Great Western Railway tracks at the west edge of Hudson, 4.5 mi upstream from Prescotts Creek, and 9.6 mi upstream from mouth.

DRAINAGE AREA.--303 mi<sup>2</sup>.

PERIOD OF RECORD.--April 1952 to current year.

REVISED RECORDS.--WSP 1438: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 865.03 ft above NGVD.

REMARKS.--Estimated daily discharges: Dec. 27-31, and Jan. 1 to Mar. 9. Records good except those for estimated daily discharges, which are poor. U.S. National Weather Service gage-height telemeter at station.

AVERAGE DISCHARGE.--36 years, 172 ft<sup>3</sup>/s, 7.71 in/yr, 124,600 acre-ft/yr; median of yearly mean discharges, 160 ft<sup>3</sup>/s, 7.2 in/yr, 116,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 19,300 ft<sup>3</sup>/s July 9, 1969, gage height, 18.23 ft; minimum daily discharge, 0.12 ft<sup>3</sup>/s Jan. 26, 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,200 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Feb. 19	2400	*567	*10.46				

Minimum discharge, 3.8 ft<sup>3</sup>/s Sept. 10, 11, 12, 13, 14, 15.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	111	75	201	83	358	380	135	87	45	33	10	5.2
2	107	76	192	99	318	330	136	83	46	30	9.2	5.0
3	103	75	184	93	208	290	179	80	48	29	8.5	6.5
4	101	74	175	86	152	260	207	78	45	26	8.6	6.9
5	101	73	168	84	124	238	197	76	44	24	11	7.6
6	98	73	163	82	107	186	182	72	42	22	10	6.5
7	95	74	160	79	94	165	171	71	41	20	8.7	5.7
8	93	77	156	78	87	162	159	83	39	19	9.5	5.7
9	91	78	155	76	83	158	149	142	37	19	11	5.0
10	89	77	156	73	78	141	138	109	36	20	10	4.9
11	88	76	159	73	74	145	132	98	35	23	8.7	4.3
12	89	77	160	74	70	145	126	92	35	22	7.9	4.1
13	89	77	158	71	67	135	121	86	34	20	7.2	4.0
14	86	77	157	68	66	119	115	82	32	20	7.1	4.2
15	84	76	148	67	65	117	110	79	32	19	6.5	4.1
16	84	77	123	68	62	115	107	75	31	22	5.8	4.5
17	86	80	130	72	61	111	104	74	32	23	5.0	5.0
18	87	88	194	81	100	108	100	72	35	20	4.7	4.6
19	85	94	201	113	410	106	98	69	33	19	4.8	11
20	83	96	198	105	390	104	97	69	32	19	5.4	16
21	82	95	197	98	310	99	96	65	29	18	5.4	15
22	81	96	195	94	240	98	94	63	28	17	8.0	16
23	81	97	191	90	250	99	96	62	27	16	15	13
24	79	94	182	86	220	98	92	60	38	15	13	9.6
25	77	92	179	75	195	126	87	58	40	15	9.8	8.5
26	77	90	174	68	190	135	87	56	34	13	6.7	9.9
27	78	89	170	64	245	121	98	55	31	12	7.4	6.0
28	77	91	179	62	300	119	98	53	29	12	8.2	6.0
29	76	205	164	62	390	148	95	50	35	11	7.2	8.1
30	76	236	143	68	---	158	91	48	38	11	6.5	8.6
31	74	---	95	160	---	144	---	46	---	11	5.8	---
TOTAL	2708	2755	5207	2552	5314	4860	3697	2293	1083	600	252.6	221.5
MEAN	87.4	91.8	168	82.3	183	157	123	74.0	36.1	19.4	8.15	7.38
MAX	111	236	201	160	410	380	207	142	48	33	15	16
MIN	74	73	95	62	61	98	87	46	27	11	4.7	4.0
AC-FT	5370	5460	10330	5060	10540	9640	7330	4550	2150	1190	501	439
CFSM	.29	.30	.55	.27	.60	.52	.41	.24	.12	.06	.03	.02
IN.	.33	.34	.64	.31	.65	.60	.45	.28	.13	.07	.03	.03

CAL YR 1987	TOTAL	61531	MEAN	169	MAX	701	MIN	43	AC-FT	122000	CFSM	.56	IN.	7.55
WTR YR 1988	TOTAL	31543.1	MEAN	86.2	MAX	410	MIN	4.0	AC-FT	62570	CFSM	.28	IN.	3.87

## IOWA RIVER BASIN

05464000 CEDAR RIVER AT WATERLOO, IA

LOCATION.--Lat 42°29'44", long 92°20'03", in NW1/4 NW1/4 sec.25, T.89 N., R.13 W., Black Hawk County, Hydrologic Unit 07080205, on left bank at foot of East Seventh Street, 0.3 mi upstream from Eleventh Avenue bridge in Waterloo, 1.1 mi downstream from Black Hawk Creek, and at mile 187.9 upstream from mouth of Iowa River.

DRAINAGE AREA.--5,146 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1940 to current year. Prior to April 1941, monthly discharge only, published in WSP 1308.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1558: 1950.

GAGE.--Water-stage recorder. Datum of gage is 824.14 ft above NGVD.

REMARKS.--Estimated daily discharges: Jan. 2-14, 25-27 and Feb. 1-9. Records excellent except those for estimated daily discharges, which are poor. Slight diurnal fluctuation during low flow caused by powerplant upstream from station. U.S. National Weather Service gage-height telemeter and U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--48 years, 3,030 ft<sup>3</sup>/s, 8.00 in/yr, 2,195,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 76,700 ft<sup>3</sup>/s Mar. 29, 1961, gage height, 21.86 ft; minimum daily discharge, 152 ft<sup>3</sup>/s Jan. 28, 1959.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Mar. 16, 1929, reached a stage of about 20 ft, determined by U. S. Army Corps of Engineers, from information by City of Waterloo, discharge, 65,000 ft<sup>3</sup>/s. Flood of Apr. 2, 1933, reached a stage of about 19.5 ft from information by City of Waterloo, discharge, 61,000 ft<sup>3</sup>/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 13,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 11	0300	*5,150	*6.94				

Minimum discharge, 384 ft<sup>3</sup>/s Sept. 8.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1100	983	1850	1470	1000	2620	2530	3960	1290	881	510	484
2	1040	989	1880	1000	860	3120	2530	3880	1230	846	513	480
3	987	996	1850	740	940	3510	2600	3630	1270	791	489	469
4	989	1050	1720	640	880	3670	2940	3290	1250	752	500	465
5	1240	959	1540	800	830	4070	3280	3010	1210	725	516	466
6	1010	935	1500	880	880	4460	3400	2720	1160	705	484	464
7	979	980	1520	800	940	4650	3340	2490	1130	684	496	450
8	945	984	1580	750	900	4680	3200	2560	1070	671	610	407
9	927	977	1650	700	870	4830	3010	2750	1010	640	611	470
10	928	950	1650	680	795	5120	2820	2670	963	715	637	443
11	928	939	1740	680	774	5080	2630	2700	951	757	625	439
12	929	948	1790	740	762	4970	2470	2660	885	811	591	439
13	931	950	1810	700	750	4490	2330	2690	868	869	549	438
14	929	941	1780	760	797	3670	2220	2520	854	938	521	432
15	925	934	1440	774	755	3330	2110	2390	836	896	516	428
16	1090	961	994	785	743	3180	2020	2240	819	884	517	439
17	1020	1150	865	793	750	3120	1940	2090	800	778	498	440
18	995	1090	1040	810	783	3020	1870	2010	801	768	480	431
19	997	1120	1430	906	948	2880	1780	1960	865	741	473	589
20	1040	1090	1540	896	1290	2720	1780	1800	843	749	458	534
21	1040	1050	1530	893	1380	2570	1640	1900	826	705	446	555
22	1060	1040	1610	890	1050	2440	1720	2050	803	667	629	626
23	1050	1050	1610	896	1070	2310	1710	2020	754	618	648	661
24	1050	1070	1690	952	1090	2300	1690	1880	1100	603	592	654
25	1050	1150	1540	860	1200	2420	1710	1730	906	602	593	657
26	1070	1230	1200	760	1130	2690	1790	1620	885	599	583	809
27	1040	1200	1050	840	1360	2760	1830	1560	852	581	573	804
28	1010	1420	1100	851	1740	2860	2110	1510	815	571	535	695
29	963	1500	1120	824	2200	2820	2740	1470	970	565	509	663
30	949	1790	1210	896	---	2790	3650	1400	884	549	507	648
31	951	---	1320	1140	---	2550	---	1350	---	529	497	---
TOTAL	31162	32426	46149	26106	29467	105700	71390	72510	28900	22170	16706	15979
MEAN	1005	1081	1489	842	1016	3410	2380	2339	963	715	539	533
MAX	1240	1790	1880	1470	2200	5120	3650	3960	1290	938	648	809
MIN	925	934	865	640	743	2300	1640	1350	754	529	446	407
AC-FT	61810	64320	91540	51780	58450	209700	141600	143800	57320	43970	33140	31690
CFSM	.20	.21	.29	.16	.20	.66	.46	.45	.19	.14	.10	.10
IN.	.23	.23	.33	.19	.21	.76	.52	.52	.21	.16	.12	.12

CAL YR 1987 TOTAL 697484 MEAN 1911 MAX 5060 MIN 829 AC-FT 1383000 CFSM .37 IN. 5.04  
WTR YR 1988 TOTAL 498665 MEAN 1362 MAX 5120 MIN 407 AC-FT 989100 CFSM .26 IN. 3.60

## 05464500 CEDAR RIVER AT CEDAR RAPIDS, IA

LOCATION.--Lat 41°58'14", long 91°40'01", in SE1/4 NW1/4 sec.28, T.83 N., R.7 W., Linn County, Hydrologic Unit 07080205, on right bank 400 ft upstream from bridge on Eighth Avenue in Cedar Rapids, 2.7 mi upstream from Prairie Creek, and at mile 112.7 upstream from mouth of Iowa River.

DRAINAGE AREA.--6,510 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1902 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 955: 1924. WSP 1308: 1904, 1906-13, 1915, 1917, 1919-24, 1928, 1930,. WSP 1438: Drainage area. WSP 1558: 1915-18 (M), 1920 (M), 1922 (M), 1929, 1933, 1943.

GAGE.--Water-stage recorder. Datum of gage is 700.47 ft above NGVD. Prior to Aug. 20, 1920, nonrecording gage at same site and datum.

REMARKS.--Estimated daily discharges: Jan. 3-16, and Jan. 25 to Feb. 17. Records excellent except those for estimated daily discharges, which are fair. Flow regulated by city hydroelectric dam 1/2 mile upstream since June 1979. U.S. Geological Survey gage-height telemeter and U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--86 years, 3,476 ft<sup>3</sup>/s, 7.25 in/yr, 2,518,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 73,000 ft<sup>3</sup>/s Mar. 31, 1961, gage height, 19.66 ft; maximum gage height, 20.0 ft Mar. 18, 1929; minimum discharge 53 ft<sup>3</sup>/s Jan. 6, 1950, caused by construction operations upstream; minimum daily, 212 ft<sup>3</sup>/s Dec. 10, 1949.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1851 reached a stage of about 20 ft, discharge, 65,000 ft<sup>3</sup>/s, estimated.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 12,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 8	2045	*9,760	*5.92				

Minimum daily discharge, 410 ft<sup>3</sup>/s Sept. 15.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1730	1340	2830	2480	1600	3220	3450	3350	1610	1110	541	505
2	1630	1400	2710	2140	1300	3470	3210	3920	1610	914	529	502
3	1590	1270	2650	1000	1450	3610	3620	3940	1330	906	501	506
4	1520	1340	2590	820	1300	3790	3800	4190	1560	880	550	491
5	1500	1330	2470	960	1200	4060	3950	3730	1470	821	584	472
6	1470	1400	2340	1150	1050	4240	3930	3470	1420	809	538	463
7	1630	1360	2200	1100	1200	5070	3990	3100	1370	958	541	459
8	1450	1250	2170	1000	1100	6890	3930	3270	1320	537	762	462
9	1390	1190	2280	950	1050	5510	3780	3160	1240	807	591	454
10	1370	1380	2590	900	1000	5210	3610	3050	1100	784	619	428
11	1330	1250	2600	940	960	5280	3520	3540	1220	718	615	446
12	1330	1230	2590	1000	940	5350	3270	3240	1070	733	619	449
13	1290	1290	2550	960	920	5190	3070	3130	1040	777	611	427
14	1320	1240	2480	910	950	4840	2900	3100	786	876	596	417
15	1320	1250	2300	1000	940	4220	2810	3010	1120	829	566	410
16	1400	1190	1710	1150	980	3920	2800	2700	944	969	537	420
17	1410	1510	1380	1340	1050	3720	2650	2760	933	980	518	421
18	1510	1440	1070	1390	1150	3490	2570	2770	957	986	583	423
19	1340	1570	1260	1560	1370	3450	2460	2480	921	848	580	752
20	1510	1480	1970	2330	2020	3360	2390	2410	862	819	480	765
21	1310	1470	2420	2230	2310	3160	2370	2300	900	757	493	724
22	1380	1410	2520	1850	2030	3050	2340	2170	897	770	614	667
23	1380	1430	2880	1660	1940	2960	2240	2400	883	717	605	673
24	1400	1400	2970	1570	1840	2890	2290	2360	924	711	645	677
25	1370	1380	3100	1200	1730	2960	2250	2250	947	660	638	685
26	1370	1380	2940	800	1690	3050	2070	2110	1150	655	597	685
27	1360	1480	2000	840	2150	3110	2070	1790	966	644	606	676
28	1380	1750	1860	900	2520	3290	2310	1980	932	637	607	730
29	1330	2240	1950	1000	2950	3490	2500	1810	1060	633	582	790
30	1310	2450	1650	1200	---	3710	2790	1710	1010	614	548	768
31	1320	---	2110	1900	---	3620	---	1790	---	592	520	---
TOTAL	43950	43100	71140	40230	42690	123180	88940	86990	33552	24451	17916	16747
MEAN	1418	1437	2295	1298	1472	3974	2965	2806	1118	789	578	538
MAX	1730	2450	3100	2480	2950	6890	3990	4190	1610	1110	762	790
MIN	1290	1190	1070	800	920	2890	2070	1710	786	537	480	410
AC-FT	87170	85490	141100	79800	84680	244300	176400	172500	66550	48500	35540	33220
CFSM	.22	.22	.35	.20	.23	.61	.46	.43	.17	.12	.09	.09
IN.	.25	.25	.41	.23	.24	.70	.51	.50	.19	.14	.10	.10

CAL YR 1987	TOTAL 959610	MEAN 2629	MAX 9010	MIN 1020	MED 2340	AC-FT 1903000	CFSM .40	IN. 5.48
WTR YR 1988	TOTAL 632886	MEAN 1729	MAX 6890	MIN 410	MED 1370	AC-FT 1255000	CFSM .27	IN. 3.62

## IOWA RIVER BASIN

05465000 CEDAR RIVER NEAR CONESVILLE, IA

LOCATION.--Lat 41°24'36", long 91°17'06", in SW1/4 SW1/4 sec.2, T.76 N., R.4 W., Muscatine County, Hydrologic Unit 07080206, on right bank 10 ft downstream from bridge on county highway G28, 3.4 mi northeast of Conesville, 5.2 mi downstream from Wapsinonoc Creek, 10.7 mi upstream from mouth, and at mile 39.8 upstream from mouth of Iowa River.

DRAINAGE AREA.--7,785 mi<sup>2</sup>.

PERIOD OF RECORD.--September 1939 to current year.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1708: 1956.

GAGE.--Water-stage recorder. Datum of gage is 581.95 ft above NGVD. Prior to Feb. 2, 1940, and Apr. 11, 1952, to July 1, 1954, nonrecording gage, Feb. 2, 1940, to Apr. 10, 1952, and July 2, 1954, to Sept. 16, 1963, water-stage recorder, at site 150 ft downstream on left bank at same datum.

REMARKS.-- Estimated daily discharges: Dec. 15-20 and Jan. 2 to Feb. 28. Records fair except those for estimated daily discharges, which are poor. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--49 years, 4,749 ft<sup>3</sup>/s, 8.28 in/yr, 3,441,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 70,800 ft<sup>3</sup>/s Apr. 2, 1961, gage height, 16.62 ft; maximum gage height, 16.85 ft Apr. 12, 1965; minimum daily discharge, 250 ft<sup>3</sup>/s Nov. 28, 1955, result of freezeup.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in March 1929 reached a stage of 15.8 ft, from information by local residents to U.S. Army Corps of Engineers.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 12,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan. 20	----	(a)	*11.02	Mar. 10	0230	*8,460	9.47

(a) Backwater from ice

Minimum discharge, 705 ft<sup>3</sup>/s Sept. 17.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2610	1910	3520	2850	2400	5570	5100	3380	2310	1410	936	895
2	2510	1960	3650	1900	2000	5690	4940	3640	2290	1390	917	875
3	2450	1970	3580	1400	2200	5740	5030	4200	2280	1390	892	857
4	2390	1970	3450	1250	2050	5170	5120	4510	2260	1360	853	851
5	2330	1900	3370	1500	1900	5180	5310	4530	2040	1350	840	844
6	2260	1910	3290	1900	1800	5320	5410	4470	2070	1300	917	833
7	2210	1900	3170	1750	2000	5350	5270	4170	2060	1260	969	820
8	2200	1910	3090	1700	1900	5810	5230	3960	2060	1220	925	786
9	2240	1920	3140	1650	1850	7080	5120	3910	1950	1260	1110	763
10	2160	1830	3210	1600	1850	7360	5000	3990	1870	1150	1210	758
11	2100	1800	3270	1800	1800	6230	4840	3820	1800	1200	1120	763
12	2060	1900	3630	1900	1750	6310	4640	3880	1760	1190	1010	741
13	2030	1840	3690	1750	1750	6410	4450	4030	1720	1120	987	741
14	2030	1830	3940	1650	1800	6200	4290	3780	1660	1140	974	735
15	2020	1890	3200	1900	2000	5870	4080	3710	1590	1160	953	725
16	2010	1900	2500	2200	2200	5400	3860	3710	1460	1210	945	711
17	2010	2060	2100	2600	2700	4990	3850	3550	1530	1190	915	709
18	2010	2160	1800	2900	3100	4820	3740	3310	1540	1250	899	716
19	2010	2310	2400	3150	3500	4550	3570	3310	1570	1270	904	720
20	2000	2210	2900	3300	3800	4450	3450	3200	1500	1240	1040	742
21	1920	2160	3280	3100	3900	4370	3410	3100	1450	1160	1010	981
22	1970	2200	3680	2700	3700	4230	3380	3000	1400	1120	947	974
23	1900	2280	3690	2300	3300	4090	3750	2940	1390	1070	1110	937
24	1960	2200	3970	2050	3000	4080	3520	2910	1390	1050	1120	888
25	1930	2160	4480	1800	2900	4100	3340	2910	1380	1030	1040	863
26	1950	2150	4590	1650	3700	4170	3280	2900	1380	1000	994	860
27	1920	2160	4370	1750	4600	4150	3250	2820	1360	969	1030	849
28	1910	2210	4060	1900	5200	4170	3230	2820	1490	956	1010	877
29	1900	2800	3650	2100	5530	4860	3210	2480	1420	956	975	854
30	1910	3370	3360	2500	---	5260	3220	2410	1460	936	958	865
31	1900	---	3120	3000	---	5230	---	2370	---	930	934	---
TOTAL	64810	62770	105150	65500	80180	162210	125890	107720	51440	36237	30444	24533
MEAN	2091	2092	3392	2113	2765	5233	4196	3475	1715	1169	982	818
MAX	2610	3370	4590	3300	5530	7360	5410	4530	2310	1410	1210	981
MIN	1900	1800	1800	1250	1750	4080	3210	2370	1360	930	840	709
AC-FT	128600	124500	208600	129900	159000	321700	249700	213700	102000	71880	60390	48660
CFSM	.27	.27	.44	.27	.36	.67	.54	.45	.22	.15	.13	.11
IN.	.31	.30	.50	.31	.38	.78	.60	.51	.25	.17	.15	.12

CAL YR 1987	TOTAL	1306490	MEAN	3579	MAX	15600	MIN	1600	AC-FT	2591000	CFSM	.46	IN.	6.24
WTR YR 1988	TOTAL	916884	MEAN	2505	MAX	7360	MIN	709	AC-FT	1819000	CFSM	.32	IN.	4.38

## IOWA RIVER BASIN

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05465500 IOWA RIVER AT WAPELLO, IA  
(National stream-quality accounting network station)

LOCATION.--Lat 41°10'48", long 91°10'57", in NW1/4 SE1/4 sec.27, T.74 N., R.3 W., Louisa County, Hydrologic Unit 07080209, on right bank 30 ft downstream from bridge on State Highway 99 at east edge of Wapello, 13.0 mi downstream from Cedar River, and at mile 16.0.

DRAINAGE AREA.--12,499 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1914 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 1308: 1917, 1923-30, 1932. WSP 1438: Drainage area. WSP 1558: 1918, 1923-25 (M), 1929. WSP 1708: 1955(P), 1956.

GAGE.--Water-stage recorder. Datum of gage is 538.17 ft above NGVD; Oct. 1, 1914 to Apr. 15, 1934, nonrecording gage and Apr. 16, 1934 to Sept. 30, 1972, water-stage recorder at datum 10.00 ft higher.

REMARKS.--Estimated daily discharges: Dec. 15-22 and Jan. 1 to Mar. 1. Records good except those for estimated daily discharges, which are poor. Flow regulated by Coralville Lake (station 05453510) 67.3 mi upstream, since Sept. 17, 1958. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--74 years, 7,033 ft<sup>3</sup>/s, 7.64 in/yr, 5,095,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 94,000 ft<sup>3</sup>/s June 18, 1947, gage height, 16.14 ft, datum then in use; maximum gage height, 28.63 ft Apr. 22, 1973; minimum daily discharge, 300 ft<sup>3</sup>/s Nov. 28, 1955, result of freezeup.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 12,200 ft<sup>3</sup>/s, Jan. 21, gage height, 19.32 ft, from floodmark (backwater from ice); minimum daily discharge, 844 ft<sup>3</sup>/s Sept. 17.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3970	2870	5950	5100	11000	11000	7780	4380	3130	1690	1070	1050
2	3790	2900	5780	3800	10500	9750	7620	4460	3140	1650	1050	1020
3	3520	2910	5960	3050	10000	9300	7910	4800	3100	1640	1020	983
4	3410	2920	5790	2900	9200	8620	8030	5290	3060	1590	973	962
5	3350	2860	5590	2900	8400	8370	8110	5480	2930	1500	952	968
6	3260	2800	5570	2850	7700	8340	8000	5610	2890	1470	956	959
7	3210	2830	5700	3000	6000	8570	7950	5440	2830	1430	1100	937
8	3190	2850	5590	3400	4500	9030	7730	5390	2840	1380	1030	910
9	3220	2810	5470	3400	3900	9640	7620	5400	2810	1350	1270	886
10	3180	2840	5500	3300	3800	10600	7430	5420	2600	1460	1420	889
11	3120	2720	5550	3600	3700	9260	7330	5300	2480	1290	1470	888
12	3050	2780	5730	3600	3700	9030	7160	5230	2370	1330	1180	874
13	3000	2840	5780	3400	3600	8850	6780	5510	2300	1290	1100	852
14	2990	2720	5640	3250	3750	8860	6460	5380	2210	1260	1070	858
15	2970	2790	4800	3500	4100	8630	6220	5280	2130	1280	1040	862
16	2970	2820	4000	3900	5000	8380	5970	5240	2000	1310	1020	858
17	3010	2940	3500	4400	6000	8290	5750	5020	1920	1390	988	844
18	3080	3180	3150	4800	6800	8210	5540	4760	1950	1430	962	853
19	3090	3410	3400	5400	7700	7960	5400	4680	1910	1500	1040	880
20	3080	3330	3700	7300	8100	7480	5200	4660	1800	1500	1050	870
21	3010	3250	4200	11000	8200	7190	5120	4530	1820	1460	1240	1000
22	2980	3310	5400	10000	8800	7050	5050	4410	1760	1370	1170	1250
23	2970	3290	6370	7400	8400	6690	5100	4330	1670	1320	1370	1190
24	2980	3310	6370	5000	8000	6610	5850	4230	1640	1270	1640	1150
25	3010	3290	7780	4000	7300	6590	5100	4190	1580	1240	1440	1100
26	2990	3250	8590	3500	7700	6560	4980	4100	1560	1210	1280	1070
27	2970	3340	7840	3500	8000	6520	4810	3870	1550	1170	1290	1060
28	2870	3470	7370	3500	8800	6520	4780	3660	1630	1140	1340	1180
29	2850	3960	6840	4000	9700	7040	4710	3510	1630	1130	1210	1150
30	2850	6060	6350	6600	---	8220	4470	3340	1650	1100	1130	1100
31	2870	---	5920	9000	---	8150	---	3250	---	1090	1090	---
TOTAL	96810	94650	175180	144350	202350	255310	189960	146150	66890	42240	35961	29453
MEAN	3123	3155	5651	4656	6978	8236	6332	4715	2230	1363	1160	982
MAX	3970	6060	8590	11000	11000	11000	8110	5610	3140	1690	1640	1250
MIN	2850	2720	3150	2850	3600	6520	4470	3250	1550	1090	952	844
AC-FT	192000	187700	347500	286300	401400	506400	376800	289900	132700	83780	71330	58420
CAL YR 1987	TOTAL 2062970	MEAN 5652	MAX 19000	MIN 2270	MED 5160	AC-FT 4092000	CFSM .45	IN. 6.14				
WTR YR 1988	TOTAL 1479304	MEAN 4042	MAX 11000	MIN 844	MED 3340	AC-FT 2934000	CFSM .32	IN. 4.40				

## IOWA RIVER BASIN

05465500 IOWA RIVER AT WAPELLO, IA--Continued  
(National stream-accounting network station)

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1978 to current year.

## PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: January 1978 to current year.

WATER TEMPERATURES: January 1978 to current year.

SUSPENDED-SEDIMENT DISCHARGE: April 1978 to current year.

REMARKS.--During periods of ice effect samples are collected in open water channel or through ice cover. Records of specific conductance are obtained from suspended-sediment samples at time of analysis.

## EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum daily, 810 microsiemens Jan. 23, 1978-Jan. 20, 1981; minimum daily, 250 microsiemens Sept. 18, 1978, July 20, 1982.

WATER TEMPERATURES: Maximum daily, 33.0°C July 25, 1987; minimum daily, 0.0°C on many days during winter period.

SEDIMENT CONCENTRATIONS: Maximum daily mean, 4,970 mg/L June 25, 1981; minimum daily mean, 1 mg/L Jan. 21, 22, 1981.

SEDIMENT LOADS: Maximum daily, 413,000 tons July 19, 1982; minimum daily, 5.4 tons Jan. 21, 1981.

## EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum daily, 640 microsiemens Jan. 14, 16; minimum daily, 300 microsiemens Jan. 20, 21.

WATER TEMPERATURES: Maximum daily, 32.0°C Aug. 4.

SEDIMENT CONCENTRATIONS: Maximum daily mean, 617 mg/L Jan. 20; minimum daily mean, 11 mg/L Feb. 10.

SEDIMENT LOADS: Maximum daily, 14,500 tons Jan 31; minimum daily, 61 tons Sep. 20.

SPECIFIC CONDUCTANCE MICROSIEMENS/CM AT 25 DEG C, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	525	---	---	370	530	---	410	500	510	580
2	480	495	540	---	370	---	520	440	435	500	---	560
3	465	470	560	---	390	---	510	430	---	500	---	580
4	480	495	540	---	---	---	510	---	460	490	550	580
5	480	---	580	---	---	410	530	470	470	500	520	580
6	480	495	560	---	---	410	530	480	450	---	510	600
7	520	490	580	---	440	410	540	480	---	500	510	580
8	485	---	---	---	470	410	---	---	440	500	---	580
9	---	500	560	---	500	380	---	500	---	---	---	---
10	---	500	560	620	440	400	---	515	470	510	470	600
11	---	---	540	560	480	---	540	500	---	---	---	---
12	---	525	---	---	460	---	540	---	---	---	510	600
13	510	535	---	540	---	---	490	470	480	520	520	---
14	510	540	---	640	420	---	480	470	460	520	450	---
15	---	540	580	540	460	---	---	---	460	---	---	600
16	535	535	---	640	510	---	480	450	470	540	---	---
17	540	---	---	580	500	---	---	460	480	540	---	600
18	---	---	---	580	---	---	---	450	480	500	---	600
19	---	560	560	585	---	---	490	450	480	---	---	600
20	525	560	550	300	440	510	490	---	495	---	---	---
21	545	560	570	300	---	510	480	440	---	500	---	600
22	550	560	545	---	420	490	---	440	500	520	440	520
23	530	560	565	500	420	540	---	450	510	---	450	540
24	535	---	---	510	420	550	500	---	520	470	435	540
25	530	580	---	---	420	---	500	425	500	465	---	---
26	---	565	565	---	400	510	---	440	---	480	---	540
27	500	560	575	465	360	---	---	450	485	---	520	---
28	510	575	---	380	---	---	480	---	---	470	520	540
29	---	---	570	460	380	530	470	---	---	---	---	540
30	---	535	---	---	---	540	---	410	480	---	---	560
31	500	---	---	370	---	545	---	420	---	---	560	---

05465500 IOWA RIVER AT WAPELLO, IA--Continued

## WATER-QUALITY RECORDS

WATER TEMPERATURE, DEGREES CENTIGRADE, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	1.0	13.0	---	23.5	25.5	31.5	24.0
2	17.5	10.0	4.0	---	2.5	---	13.0	16.0	23.0	24.5	---	24.0
3	17.0	10.5	4.0	---	2.0	---	14.5	16.5	---	25.0	---	24.0
4	16.0	10.5	4.0	---	---	---	19.5	---	23.0	26.0	32.0	23.5
5	16.0	---	4.0	---	---	2.5	15.0	19.0	24.0	26.5	30.0	22.0
6	15.0	10.0	4.0	---	---	3.0	15.0	17.5	24.0	---	30.0	20.0
7	13.5	10.0	4.0	---	1.5	3.0	15.0	20.0	---	27.5	30.5	21.0
8	12.0	---	---	---	1.0	2.5	---	---	---	28.0	---	21.0
9	---	9.0	4.0	---	1.0	3.5	---	17.0	---	---	---	---
10	---	7.5	4.0	1.0	1.0	4.5	---	16.5	23.0	29.0	29.0	23.0
11	---	---	4.0	1.0	1.0	---	15.0	17.0	---	---	---	---
12	---	10.0	---	---	1.0	---	15.0	---	---	---	29.5	22.0
13	14.5	10.0	---	1.0	---	---	15.0	17.0	26.0	29.0	30.0	---
14	14.0	10.5	---	1.0	1.5	---	15.0	17.5	26.0	28.5	31.0	---
15	---	11.0	3.0	1.0	1.0	---	---	---	26.0	---	---	22.0
16	13.5	11.0	---	1.0	1.0	---	15.5	16.0	26.0	28.0	---	---
17	13.0	---	---	1.0	1.5	---	---	15.0	26.0	28.0	---	22.5
18	---	---	---	1.0	---	---	---	15.5	27.5	27.0	---	23.0
19	---	9.0	3.0	1.0	---	---	15.0	17.0	27.0	---	---	24.0
20	12.5	8.5	2.0	3.0	---	7.5	14.0	---	27.0	---	---	---
21	12.0	7.0	2.0	2.0	---	9.0	14.5	18.0	---	25.5	---	23.0
22	12.5	6.0	2.0	---	1.0	9.0	---	18.5	27.5	25.0	24.0	23.0
23	10.5	6.0	2.0	1.0	1.0	9.5	---	20.0	26.0	---	23.5	21.0
24	10.5	---	---	1.0	1.5	12.0	14.0	---	25.0	25.0	24.5	21.5
25	10.0	5.0	---	---	1.5	---	14.0	22.0	26.5	27.0	---	---
26	---	5.0	2.0	---	1.5	11.0	---	21.0	---	27.0	---	22.0
27	10.0	5.0	2.0	2.0	2.0	---	---	22.0	25.0	---	26.0	---
28	10.0	5.0	---	2.0	---	---	15.0	---	---	28.0	26.0	21.5
29	---	---	2.5	2.5	1.5	11.0	15.5	---	---	---	---	21.0
30	---	---	---	---	---	11.0	---	23.0	26.0	---	---	21.0
31	10.0	---	---	3.5	---	10.0	---	25.0	---	---	24.0	---

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DAY	MEAN CONCENTRATION (MG/L)	LOADS (T/DAY)	MEAN CONCENTRATION (MG/L)	LOADS (T/DAY)	MEAN CONCENTRATION (MG/L)	LOADS (T/DAY)	MEAN CONCENTRATION (MG/L)	LOADS (T/DAY)	MEAN CONCENTRATION (MG/L)	LOADS (T/DAY)	MEAN CONCENTRATION (MG/L)	LOADS (T/DAY)
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	60	643	65	504	166	2670	30	413	336	9980	87	2580
2	55	563	67	525	90	1400	24	246	207	5870	100	2630
3	57	542	79	621	51	821	18	148	161	4350	104	2610
4	51	470	60	473	68	1060	13	102	33	820	99	2300
5	50	452	40	309	60	906	14	110	26	590	103	2330
6	44	387	33	249	49	737	16	123	18	374	142	3200
7	45	390	32	245	57	877	18	146	13	211	105	2430
8	49	422	32	246	54	815	20	184	21	255	177	4320
9	53	461	31	235	49	724	23	211	13	137	228	5930
10	56	481	30	230	57	846	24	214	11	113	298	8530
11	55	463	25	184	57	854	32	311	17	170	190	4750
12	52	428	48	360	54	835	33	321	12	120	107	2610
13	49	397	43	330	53	827	33	303	19	185	93	2220
14	45	363	43	316	52	792	28	246	30	304	89	2130
15	45	361	54	407	51	661	23	217	35	387	86	2000
16	48	385	61	464	47	508	16	168	22	297	83	1880
17	53	431	48	381	46	435	25	297	13	211	82	1840
18	58	482	37	318	44	374	26	337	30	551	82	1820
19	40	334	27	249	60	551	98	1430	53	1100	81	1740
20	33	274	23	207	50	499	617	12200	52	1140	81	1640
21	34	276	23	202	83	941	453	13500	73	1620	80	1550
22	33	266	22	197	218	3180	172	4640	82	1950	75	1430
23	35	281	23	204	76	1310	65	1300	67	1520	113	2040
24	33	266	24	214	69	1190	47	634	76	1640	129	2300
25	32	260	25	222	110	2310	38	410	72	1420	140	2490
26	32	258	23	202	92	2130	30	283	53	1100	287	5080
27	46	369	37	334	87	1840	20	189	92	1990	390	6870
28	48	372	30	281	94	1870	18	170	160	3800	265	4670
29	52	400	155	1660	76	1400	18	194	107	2800	131	2490
30	58	446	350	5730	60	1030	32	570	---	---	78	1730
31	63	488	---	---	40	639	598	14500	---	---	201	4420
TOTAL	---	12411	---	16099	---	35032	---	54117	---	45005	---	94560

IOWA RIVER BASIN  
05465500 IOWA RIVER AT WAPELLO, IA--Continued

WATER-QUALITY RECORDS

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DAY	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	135	2840	57	674	113	955	69	315	48	139	53	150
2	308	6340	88	1060	103	873	76	339	47	133	55	151
3	259	5530	173	2240	118	988	94	416	53	146	55	146
4	213	4620	196	2800	107	884	95	408	61	160	46	119
5	276	6040	77	1140	92	728	74	300	45	116	52	136
6	193	4170	142	2150	113	882	74	294	44	114	50	129
7	197	4230	107	1570	118	902	86	332	46	137	52	132
8	203	4240	93	1350	108	828	85	317	40	111	48	118
9	183	3770	123	1790	100	759	78	284	62	213	46	110
10	156	3130	157	2300	94	660	84	331	75	288	48	115
11	109	2160	125	1790	88	589	74	258	85	337	40	96
12	104	2010	75	1060	82	525	67	241	70	223	38	90
13	66	1210	94	1400	99	615	60	209	82	244	35	81
14	73	1270	116	1690	77	459	59	201	97	280	41	95
15	47	789	88	1250	79	454	103	356	85	239	51	119
16	19	306	115	1630	84	454	209	739	76	209	45	104
17	19	295	120	1630	99	513	268	1010	77	205	43	98
18	33	494	107	1380	118	621	78	301	67	174	39	90
19	53	773	61	771	85	438	56	227	87	244	30	71
20	62	870	63	793	118	573	62	251	80	227	26	61
21	80	1110	117	1430	156	767	64	252	108	362	34	92
22	86	1170	121	1440	165	784	53	196	118	373	58	196
23	109	1500	134	1570	149	672	48	171	141	522	58	186
24	270	4260	144	1640	109	483	44	151	134	593	64	199
25	187	2570	140	1580	89	380	45	151	93	362	62	184
26	165	2220	111	1230	87	366	44	144	76	263	57	165
27	142	1840	96	1000	88	368	45	142	70	244	48	137
28	118	1520	97	959	100	440	75	231	70	253	58	185
29	95	1210	100	948	106	467	70	214	63	206	72	224
30	121	1460	93	839	95	423	60	178	61	186	66	196
31	---	---	112	983	---	---	53	156	60	177	---	---
TOTAL	---	73947	---	44087	---	18850	---	9115	---	7480	---	3975
TOTAL LOAD FOR YEAR: 414678 TONS.												

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	TEMPER- ATURE WATER (DEG C) (00010)	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDED (T/DAY) (80155)	SED. SUSP. FALL DIAM. % FINER THAN (70337)	SED. SUSP. FALL DIAM. % FINER THAN (70338)	SED. SUSP. FALL DIAM. % FINER THAN (70339)
NOV 1987								
03...	1100	11.0	2790	94	708	--	--	--
MAR 1988								
31...	1230	10.0	8160	278	6120	25	31	37
MAY								
10...	1200	16.5	5400	167	2430	--	--	--
JUN								
27...	1130	26.0	1560	88	371	--	--	--
AUG								
24...	1200	25.0	1710	134	619	--	--	--



05465500 IOWA RIVER AT WAPELLO, IA--Continued

## WATER-QUALITY RECORDS

## PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	SED. SUSP. FALL DIAM. % FINER THAN .016 MM (70340)	SED. SUSP. FALL DIAM. % FINER THAN .062 MM (70342)	SED. SUSP. FALL DIAM. % FINER THAN .125 MM (70343)	SED. SUSP. FALL DIAM. % FINER THAN .250 MM (70344)	SED. SUSP. FALL DIAM. % FINER THAN .500 MM (70345)	SED. SUSP. FALL DIAM. % FINER THAN 1.00 MM (70346)	SED. SUSP. FALL DIAM. % FINER THAN .062 MM (70331)
NOV 1987 03...	--	--	--	--	--	--	97
MAR 1988 31...	50	69	70	73	82	100	--
MAY 10...	--	--	--	--	--	--	97
JUN 27...	--	--	--	--	--	--	99
AUG 24...	--	--	--	--	--	--	97

## PARTICLE-SIZE DISTRIBUTION OF SURFACE BED MATERIAL, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	NUMBER OF SAM- PLING POINTS (COUNT) (00063)	BED MAT. SIEVE DIAM. % FINER THAN .062 MM (80164)	BED MAT. SIEVE DIAM. % FINER THAN .125 MM (80165)	BED MAT. SIEVE DIAM. % FINER THAN .250 MM (80166)	BED MAT. SIEVE DIAM. % FINER THAN .500 MM (80167)	BED MAT. SIEVE DIAM. % FINER THAN 1.00 MM (80168)	BED MAT. SIEVE DIAM. % FINER THAN 2.00 MM (80169)	BED MAT. SIEVE DIAM. % FINER THAN 4.00 MM (80170)	BED MAT. SIEVE DIAM. % FINER THAN 8.00 MM (80171)
NOV 1987 03...	1100	2790	6	1	2	11	45	79	94	100	--
MAR 1988 31...	1300	8160	8	0	1	7	48	87	96	99	100
MAY 10...	1200	5400	7	1	2	10	54	84	95	98	100
JUN 27...	1130	1560	8	1	1	7	50	87	97	99	100

IOWA RIVER BASIN  
05465500 IOWA RIVER AT WAPELLO, IA--Continued  
WATER QUALITY RECORDS

WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	STREAM- FLOW- INSTAN- TANEOUS (CFS) (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	TEMPER- ATURE AIR (DEG C) (00020)	TUR- BID- ITY (FTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)
NOV 03...	1100	2790	530	8.80	11.0	24.0	15	16.2	149	750	110
DEC 11...	1530	5830	625	8.50	5.0	10.5	6.2	12.9	104	739	190
MAR 31...	1230	8160	575	8.40	10.0	8.5	45	11.7	105	755	K190
MAY 10...	1200	5400	508	8.90	16.5	11.5	2.6	11.0	115	750	110
JUN 27...	1130	1560	485	9.30	26.0	19.5	26	10.8	135	753	--
AUG 24...	1200	1710	468	8.60	25.0	20.5	45	8.9	110	749	K9300

DATE	STREP- TOCOCCEI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	HARD- NESS NONCARB WH WAT TOT FLD MG/L AS CACO3 (00902)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	SODIUM AD- SORP- TION RATIO (00932)	SODIUM AD- SORP- TION RATIO (00931)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	CAR- BONATE WATER DIS IT FIELD MG/L AS CO3 (00452)
NOV 03...	K27	79	240	54	25	19	15	0.6	3.4	182	18
DEC 11...	1400	73	300	78	25	17	11	0.4	3.2	225	9
MAR 31...	430	69	270	72	23	14	10	0.4	4.0	206	4
MAY 10...	210	79	230	52	25	16	13	0.5	3.3	158	14
JUN 27...	K30	47	200	39	24	28	23	0.9	3.2	147	27
AUG 24...	K5200	46	180	39	20	26	23	0.9	5.0	135	3

DATE	BICAR- BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SiO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	NITRO- GEN, ORGANIC TOTAL (MG/L AS N) (00605)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)
NOV 03...	185	43	29	0.30	0.04	285	279	0.39	2150	2.1	2.30
DEC 11...	257	43	27	0.30	11	365	366	0.50	5750	1.1	6.00
MAR 31...	242	43	24	0.30	11	343	340	0.47	7560	0.53	5.60
MAY 10...	163	45	31	0.30	0.19	296	286	0.40	4320	0.98	4.60
JUN 27...	124	52	41	0.30	0.24	277	277	0.38	1170	--	<0.100
AUG 24...	159	43	41	0.20	6.2	262	266	0.36	1210	1.9	0.910

05465500 IOWA RIVER AT WAPELLO, IA--Continued

## WATER QUALITY RECORDS

WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHOROUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	PHOS- PHOROUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHOROUS TOTAL (MG/L AS P) (00665)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)	SED. SUSP. FALL DIAM. % FINER THAN .062 MM (70342)
NOV 03...	0.010	<0.010	0.030	2.1	<0.010	<0.010	0.070	94	708	97	--
DEC 11...	0.030	0.070	0.060	1.2	0.120	0.140	0.270	--	--	--	--
MAR 31...	0.030	0.070	0.070	0.60	0.120	0.150	0.240	278	6120	--	69
MAY 10...	0.050	0.030	0.020	1.0	0.020	0.040	0.120	167	2430	97	--
JUN 27...	<0.010	0.020	<0.010	1.5	0.120	0.140	0.510	88	371	99	--
AUG 24...	0.070	0.180	0.150	2.1	0.290	0.390	0.720	134	619	97	--

DATE	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)
NOV 03...	2	<10	88	<0.5	<1	1	<3	2	3	<5
DEC 11...	--	--	--	--	--	--	--	--	--	--
MAR 31...	2	<10	130	<0.5	<1	<1	<3	3	3	<5
MAY 10...	1	<10	85	<0.5	<1	<1	<3	4	4	<5
JUN 27...	--	--	--	--	--	--	--	--	--	--
AUG 24...	4	<10	130	<0.5	<1	9	<3	5	15	<5

DATE	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	NICKEL, DIS- SOLVED (UG/L AS NI) (01065)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	SILVER, DIS- SOLVED (UG/L AS AG) (01075)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)
NOV 03...	12	3	0.2	<10	2	<1	1.0	170	<6	<3
DEC 11...	--	--	--	--	--	--	--	--	--	--
MAR 31...	7	5	0.3	<10	<1	<1	<1.0	160	<6	7
MAY 10...	13	2	0.3	<10	5	1	<1.0	150	<6	<3
JUN 27...	--	--	--	--	--	--	--	--	--	--
AUG 24...	7	1	<0.1	<10	3	<1	<1.0	150	<6	<3

DATE	ATRA- ZINE (UG/L) (39630)	CYAN- AZINE (UG/L) (81757)	METRI- BUZIN (UG/L) [ Pesticide concentrations (81408)	ALA- CHLOR (UG/L) (77825)	METOLA- CHLOR (UG/L) (39356)	TRIFLU- RALIN (UG/L) (39030)	BUTY- LATE (UG/L) (99901)	CHLOR- PYRIFOS (UG/L) (81403)	ETHO- PROP (UG/L) (81758)	DYFO- NATE (UG/L) (81294)	PHORATE (UG/L) (39023)	TERBU- FOS (UG/L) (82088)
NOV 03...	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	--	--	--	--	--
DEC 11...	--	--	--	--	--	--	--	--	--	--	--	--
MAR 31...	0.19	0.20	<0.10	<0.10	<0.10	<0.10	<0.10	--	--	--	--	--
MAY 10...	0.99	1.3	<0.10	0.30	<0.10	<0.10	<0.10	--	--	--	--	--
JUN 27...	0.22	0.34	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
AUG 24...	0.66	0.39	<0.10	<0.10	0.42	<0.10	<0.10	--	--	--	--	--

## SKUNK RIVER BASIN

05470000 SOUTH SKUNK RIVER NEAR AMES, IA

LOCATION.--Lat 42°04'05", long 93°37'02", in NW1/4 SW1/4 sec.23, T.84 N., R.24 W., Story County, Hydrologic Unit 07080105, on left bank 2.5 mi north of Ames, 3.5 mi downstream from Keigley Branch, 5.2 mi upstream from Squaw Creek, and at mile 228.1 upstream from mouth of Skunk River.

DRAINAGE AREA.--315 mi<sup>2</sup>.

PERIOD OF RECORD.--July 1920 to September 1927, October 1932 to current year. Monthly discharge only for some periods, published in WSP 1308. Prior to October 1966, published as Skunk River near Ames.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1308: 1921, 1925-26, 1934-35 (M), 1937 (M), 1939 (M), 1947-50 (M). WDR Iowa 1967: 1965. WDR IA-74-1: 1973 (P).

GAGE.--Water-stage recorder. Concrete control since July 21, 1934. Datum of gage is 893.61 ft above NGVD (Iowa Highway Commission benchmark). Prior to Aug. 25, 1921, nonrecording gage at same site and datum.

REMARKS.--Estimated daily discharges: Aug. 28-29. Records good except those for Aug. 2 to Sept. 30, which are poor, U.S. National Weather Service gage-height telemeter at station.

AVERAGE DISCHARGE.--63 years (water years 1921-27, 1933-88), 163 ft<sup>3</sup>/s, 7.03 in/yr, 118,100 acre-ft/yr; median of yearly mean discharges, 130 ft<sup>3</sup>/s, 5.6 in/yr, 94,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,630 ft<sup>3</sup>/s June 10, 1954, gage height, 13.66 ft; maximum gage height, 13.90 ft May 20, 1944; no flow at times in 1934, 1937, 1953-57, 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 29	1800	*565	*3.98				

Minimum discharge, 0.03 ft<sup>3</sup>/s Sept. 15.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	105	71	396	83	179	260	82	77	60	7.2	.97	.04
2	99	71	328	135	145	237	94	73	55	6.5	.70	.04
3	92	69	294	140	156	195	155	70	54	5.8	.94	.10
4	93	67	255	104	145	165	207	68	50	5.0	.92	.32
5	93	63	228	97	121	154	205	65	46	4.1	1.1	.35
6	89	61	218	85	107	151	202	62	42	3.6	1.1	.34
7	82	66	201	83	102	165	198	59	41	3.0	.81	.39
8	80	67	194	85	104	171	187	67	44	2.2	.63	.50
9	79	63	232	79	102	159	174	108	41	2.3	.54	.52
10	76	57	309	74	100	140	160	114	35	2.7	.36	.59
11	74	57	302	78	91	127	150	97	33	3.1	.43	1.0
12	75	59	271	85	87	123	143	89	31	3.0	.22	.10
13	75	61	232	72	87	79	137	81	29	2.9	.37	.08
14	74	59	207	67	85	68	127	74	27	3.3	.19	.09
15	75	61	223	69	81	77	119	70	25	3.3	.26	.05
16	93	78	265	74	79	88	110	65	23	7.3	.11	.14
17	102	102	207	78	89	85	107	63	28	6.2	.43	.87
18	104	114	204	79	293	78	103	58	32	3.6	.66	.50
19	97	116	194	81	468	82	96	57	28	3.5	.74	1.5
20	93	111	176	89	327	81	92	55	24	3.4	.75	2.7
21	87	100	167	89	198	73	91	58	21	2.8	.72	3.3
22	87	104	156	83	184	71	87	88	17	2.4	7.6	4.5
23	83	102	151	81	176	73	87	118	14	2.3	3.9	2.1
24	81	91	164	78	145	76	84	116	13	2.2	2.2	.67
25	74	87	161	78	124	86	78	97	12	2.2	.85	.19
26	76	83	151	78	118	84	80	89	10	2.0	.37	.19
27	76	84	167	78	148	78	88	85	9.0	1.6	.42	.68
28	72	166	143	78	193	80	84	81	8.1	1.6	.15	1.2
29	72	501	156	89	228	85	80	74	7.8	1.4	.09	1.8
30	71	522	156	263	---	84	79	67	7.6	.87	.06	1.3
31	67	---	156	379	---	83	---	64	---	.94	.06	---
TOTAL	2596	3313	6664	3111	4462	3558	3686	2409	867.5	102.31	28.65	26.15
MEAN	83.7	110	215	100	154	115	123	77.7	28.9	3.30	.92	.87
MAX	105	522	396	379	468	260	207	118	60	7.3	7.6	4.5
MIN	67	57	143	67	79	68	78	55	7.6	.87	.06	.04
AC-FT	5150	6570	13220	6170	8850	7060	7310	4780	1720	203	57	52
CFSM	.27	.35	.68	.32	.49	.36	.39	.25	.09	.01	.00	.00
IN.	.31	.39	.79	.37	.53	.42	.44	.28	.10	.01	.00	.00

CAL YR 1987	TOTAL	81268	MEAN	223	MAX	2810	MIN	43	AC-FT	161200	CFSM	.71	IN.	9.60
WTR YR 1988	TOTAL	30823.61	MEAN	84.2	MAX	522	MIN	.04	AC-FT	61140	CFSM	.27	IN.	3.64

## SKUNK RIVER BASIN

115

05470500 SQUAW CREEK AT AMES, IA

LOCATION.--Lat 42°01'21", long 93°37'45", in NE1/4 NW1/4 sec.10, T.83 N., R.24 W., Story County, Hydrological Unit 07080105, on left bank 65 ft downstream from Lincoln Way Bridge in Ames, 0.2 mi, downstream from College Creek, and 2.4 mi, upstream from mouth.

DRAINAGE AREA.--204 mi<sup>2</sup>.

PERIOD OF RECORD.--May 1919 to September 1927, May 1965 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 1308: Drainage area, 1920-22 (M), 1923, 1924-25 (M), 1926, 1927 (M), WDR Iowa. 1966: 1965, WDR IA-71-1: 1970 (M).

GAGE.--Water-stage recorder and concrete control. Datum of gage is 881.00 ft above NGVD (levels by Iowa State University). Prior to Mar. 11, 1925, nonrecording gage at site 0.6 mi upstream at different datum. Mar. 11, 1925 to Apr. 30, 1927, nonrecording gage at site 65 ft upstream at datum about 4 ft higher.

REMARKS.-- Estimated daily discharges: Dec. 16-31, Jan. 2-13, and 24-27. Records good. U.S. National Weather Service gage-height telemeter at station.

AVERAGE DISCHARGE.--31 years (water years 1920-27, 1966-88), 130 ft<sup>3</sup>/s, 8.65 in/yr, 94,180 acre-ft/yr; median of yearly mean discharges, 100 ft<sup>3</sup>/s, 6.7 in/yr, 72,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 11,300 ft<sup>3</sup>/s June 27, 1975, gage height, 14.00 ft, on basis of contracted-opening measurement; no flow at times most years.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 4, 1918, reached a stage of 14.5 ft, from floodmarks, site and datum used 1919-25, discharge, 6,900 ft<sup>3</sup>/s. Flood of Mar. 1, 1965, reached a stage of 10.7 ft, from graph based on gage readings, at present site and datum, discharge, 4,200 ft<sup>3</sup>/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,600 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Feb. 19	0045	*656	*3.22				

No flow for many days July through September.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	70	40	221	55	161	106	53	45	37	1.9	.00	.00
2	74	38	188	117	116	103	77	43	36	1.7	.00	.00
3	67	39	169	108	94	82	115	42	35	1.1	.00	.08
4	68	38	149	90	75	77	128	42	31	.71	.00	.00
5	70	36	144	108	62	82	124	41	29	.22	.00	.00
6	64	35	138	117	71	81	119	40	26	.14	.00	.00
7	60	43	129	121	70	80	109	40	23	.10	.00	.00
8	55	39	132	103	63	77	99	56	38	.00	.02	.00
9	53	35	157	82	53	68	93	76	29	2.6	.00	.00
10	49	32	169	67	48	64	87	53	21	3.9	.00	.00
11	48	33	168	71	44	63	83	45	19	.32	.00	.00
12	51	35	150	67	43	62	81	42	17	.13	.00	.00
13	52	36	134	56	37	37	78	38	16	.21	.00	.00
14	48	33	125	52	36	40	75	37	15	.01	.00	.00
15	52	47	128	50	34	50	70	36	13	.00	.00	.01
16	63	57	111	53	35	56	67	33	12	64	.00	.0
17	55	82	109	54	56	51	67	32	32	26	.00	.00
18	51	73	126	53	307	45	61	31	26	9.5	.00	.00
19	50	68	120	74	384	51	57	31	18	4.3	.48	40
20	47	62	111	71	209	48	57	31	13	2.3	.00	2.9
21	45	59	98	63	112	44	53	34	11	1.4	.00	14
22	46	63	104	57	93	45	53	60	9.0	.86	142	.22
23	43	57	99	56	91	47	55	69	5.8	.28	32	.00
24	41	51	124	51	73	51	49	69	5.0	.14	6.0	.00
25	39	50	122	53	63	56	47	60	4.3	.19	.92	.00
26	42	49	115	64	71	53	55	54	3.3	.00	1.1	.00
27	40	54	135	59	88	50	54	53	2.7	.0	.53	.00
28	38	124	129	51	98	53	48	49	2.4	.00	.00	.03
29	40	303	102	69	102	55	46	44	2.7	.00	.00	.07
30	38	288	115	432	---	52	47	41	2.1	.00	.00	.00
31	37	---	97	364	---	52	---	38	---	.00	.00	---
TOTAL	1596	1999	4118	2888	2789	1881	2207	1405	534.3	122.01	183.05	57.31
MEAN	51.5	66.6	133	93.2	96.2	60.7	73.6	45.3	17.8	3.94	5.90	1.91
MAX	74	303	221	432	384	106	128	76	38	64	142	40
MIN	37	32	97	50	34	37	46	31	2.1	.00	.00	.00
AC-FT	3170	3970	8170	5730	5530	3730	4380	2790	1060	242	363	114
CFSM	.25	.33	.65	.46	.47	.30	.36	.22	.09	.02	.03	.01
IN.	.29	.36	.75	.53	.51	.34	.40	.26	.10	.02	.03	.01

CAL YR 1987	TOTAL	49602	MEAN	136	MAX	2300	MIN	16	AC-FT	98390	CFSM	.67	IN.	9.05
WTR YR 1988	TOTAL	19779.67	MEAN	54.0	MAX	432	MIN	.00	AC-FT	39230	CFSM	.26	IN.	3.61

## SKUNK RIVER BASIN

05471050 SOUTH SKUNK RIVER AT COLFAX, IA

LOCATION.--Lat 41°40'55", long 93°14'47", in NE1/4 NE1/4 SW1/4 sec.1, T.79 N., R.21 W., Jasper County, Hydrologic Unit 07080105, on left bank 15 ft downstream of bridge on State Highway 117 at north edge of Colfax, 1 mi downstream from Sugar Creek, 2.8 mi upstream from Indian Creek, and at mile 191 upstream from mouth of Skunk River.

DRAINAGE AREA.--803 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1985 to current year.

GAGE.--Water-stage recorder. Datum of gage is 770.00 ft above NGVD.

REMARKS.--Estimated daily discharges: Nov. 10-17, Dec. 18-20, Dec. 28 to Feb. 29, and Mar. 2. Records good except those for estimated daily discharges, which are poor. U.S. National Weather Service gage-height telemeter at station.

EXTREMES FOR PERIOD OF RECORD.-- Maximum discharge, 6,850 ft<sup>3</sup>/s Aug. 27, 1987, gage height, 17.35 ft; minimum discharge, 1.2 ft<sup>3</sup>/s Aug. 18, 19, 1988.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood occurred in late June, 1975, discharge and gage height not determined.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s) *1,130	Gage height (ft) *10.27	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 30	1310						

Minimum discharge, 1.2 ft<sup>3</sup>/s Aug. 18, 19.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	430	269	963	310	500	464	248	219	154	42	12	5.2
2	417	268	836	280	440	460	264	212	150	40	12	4.4
3	393	263	759	260	370	423	306	209	141	39	11	4.8
4	394	260	686	245	330	377	368	208	137	36	11	6.2
5	381	250	635	235	300	354	411	202	131	34	13	5.6
6	365	247	609	225	285	347	412	197	124	32	9.8	4.3
7	358	247	582	220	270	351	397	195	122	30	9.1	4.0
8	347	257	565	215	260	358	383	209	138	29	8.6	3.6
9	340	244	595	215	255	350	361	261	132	30	8.6	3.5
10	327	220	620	210	245	332	336	264	116	42	8.4	3.3
11	318	225	670	210	240	318	322	254	110	33	7.7	3.1
12	314	230	641	210	235	306	311	233	105	29	6.8	3.2
13	314	235	583	210	225	291	303	217	101	27	6.3	2.9
14	308	230	541	210	220	267	292	207	97	25	6.0	3.0
15	299	225	518	210	215	256	283	197	93	25	5.2	4.1
16	309	260	500	210	210	253	271	183	90	27	3.4	5.9
17	351	300	468	215	210	261	263	176	88	68	2.3	6.2
18	334	328	490	220	210	255	260	172	102	80	1.4	5.7
19	322	318	510	300	330	246	253	168	107	55	3.4	8.5
20	313	309	520	450	700	254	247	164	92	42	5.7	12
21	300	300	478	400	620	246	242	161	82	31	4.0	14
22	295	299	461	340	510	240	238	194	72	27	7.9	14
23	291	296	460	300	440	232	238	247	64	24	57	14
24	287	282	485	275	380	231	235	257	60	22	76	9.3
25	276	270	522	255	340	254	229	249	56	21	28	8.1
26	277	259	481	245	370	252	221	223	52	19	16	7.2
27	277	254	473	230	440	248	234	210	48	17	14	6.9
28	272	346	470	225	520	250	232	201	46	16	12	8.8
29	268	734	440	220	510	254	226	190	45	15	8.9	9.8
30	264	1070	400	350	---	253	223	175	45	15	7.6	11
31	263	---	350	580	---	250	---	163	---	14	6.4	---
TOTAL	10004	9295	17311	8280	10180	9233	8609	6417	2900	986	389.5	202.6
MEAN	323	310	558	267	351	298	287	207	96.7	31.8	12.6	6.75
MAX	430	1070	963	580	700	464	412	264	154	80	76	14
MIN	263	220	350	210	210	231	221	161	45	14	1.4	2.9
AC-FT	19840	18440	34340	16420	20190	18310	17080	12730	5750	1960	773	402
CFSM	.40	.39	.70	.33	.44	.37	.36	.26	.12	.04	.02	.01
IN.	.46	.43	.80	.38	.47	.43	.40	.30	.13	.05	.02	.01

CAL YR 1987	TOTAL	214963	MEAN	589	MAX	6560	MIN	141	AC-FT	426400	CFSM	.73	IN.	9.96
WTR YR 1988	TOTAL	83807.1	MEAN	229	MAX	1070	MIN	1.4	AC-FT	166200	CFSM	.29	IN.	3.88

## SKUNK RIVER BASIN

117

05471200 INDIAN CREEK NEAR MINGO, IA

LOCATION.--Lat 41°48'17", long 93°18'36", near corner common to secs. 20, 21, 28, and 29, T.81 N., R.21, W., Hydrologic Unit 07080105, Jasper County, on right bank 30 ft downstream from bridge on State Highway 117, 0.7 mi downstream from Wolf Creek, 2.2 mi upstream from Byers Branch, 2.9 mi northwest of Mingo, and 11.3 mi upstream from S. Skunk River.

DRAINAGE AREA.--276 mi<sup>2</sup>.

PERIOD OF RECORD.--May 1958 to September 1975; October 1985 to current year.

REVISED RECORDS.--WSP 1728: 1958 (M), 1959 (M).

GAGE.--Water-stage recorder. Datum of gage is 810.47 ft above NGVD.

REMARKS.--Estimated daily discharges: Dec. 15-20, Dec. 31 to Mar. 3, Mar. 12, 16, 18-22. Records good except those for estimated daily discharges, which are poor. U.S. National Weather Service gage-height telemeter at station.

AVERAGE DISCHARGE.--20 years (water years 1959-75, 1986-88) 190 ft<sup>3</sup>/s, 9.35 in/yr, 137,700 acre-ft/yr; median of yearly mean discharges, 170 ft<sup>3</sup>/s, 8.4 in/yr, 123,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 7,380 ft<sup>3</sup>/s June 12, 1966, gage height, 16.41 ft; minimum daily discharge, 0.14 ft<sup>3</sup>/s Jan. 11-12, 1968.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of May 20, 1944, reached a stage of 21.4 ft, from information by local resident, discharge not determined.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s) *766	Gage height (ft) 7.39	Date	Time	Discharge (ft <sup>3</sup> /s) (a)	Gage height (ft) *8.15
Nov. 29	1355			Jan. 31	0745		

(a) Backwater from ice.

Minimum discharge, 0.16 ft<sup>3</sup>/s Sept. 8.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	162	95	439	90	250	130	95	66	44	4.5	1.5	.60
2	155	95	366	100	210	110	106	64	43	4.1	1.4	.47
3	142	95	329	92	180	100	126	64	42	3.9	1.4	1.1
4	144	93	283	88	155	97	142	62	39	3.3	1.5	.62
5	147	85	258	84	135	97	147	61	37	3.3	2.6	.60
6	140	83	246	82	120	99	141	57	35	2.8	1.3	.42
7	129	86	228	80	110	104	135	58	33	3.2	1.2	.58
8	125	91	223	78	100	100	130	70	38	3.1	1.3	.22
9	123	83	251	77	94	91	121	104	35	3.3	1.2	.30
10	118	78	251	76	90	81	113	92	29	6.0	1.1	.30
11	113	79	255	76	86	77	106	87	27	5.9	1.1	.23
12	115	81	235	76	83	70	103	84	25	5.7	.90	.27
13	115	82	211	75	81	65	99	81	22	4.4	.96	.22
14	111	80	197	76	79	61	96	76	20	3.7	1.0	.24
15	110	80	150	78	77	63	90	74	19	3.6	.93	.41
16	117	102	130	82	76	66	87	69	18	3.5	.78	1.0
17	124	117	150	86	75	64	87	65	18	4.1	.58	.66
18	124	135	165	94	74	68	84	62	23	6.7	.97	.46
19	122	140	180	120	170	66	79	60	20	4.2	1.7	1.9
20	119	134	190	170	240	64	79	58	17	4.1	1.2	1.1
21	112	127	180	150	210	66	77	56	15	3.4	.81	.89
22	109	129	182	130	180	70	74	69	14	2.9	3.0	2.0
23	108	126	175	115	155	68	75	82	12	2.6	5.2	3.4
24	105	115	201	105	130	71	71	75	11	2.4	3.8	1.6
25	98	110	231	96	120	110	69	70	9.6	2.2	1.6	1.9
26	101	107	214	90	145	108	70	65	8.4	2.1	.87	.79
27	102	106	226	86	180	94	74	63	6.7	2.0	1.8	.53
28	95	191	228	83	150	97	68	61	6.2	1.9	1.0	1.5
29	94	675	195	82	140	97	67	57	5.8	1.8	.69	1.5
30	94	578	191	170	---	95	67	52	4.8	1.8	.79	1.4
31	91	---	120	350	---	96	---	48	---	1.7	.48	---
TOTAL	3664	4178	6880	3237	3895	2645	2878	2112	677.5	108.2	44.66	27.21
MEAN	118	139	222	104	134	85.3	95.9	68.1	22.6	3.49	1.44	.91
MAX	162	675	439	350	250	130	147	104	44	6.7	5.2	3.4
MIN	91	78	120	75	74	61	67	48	4.8	1.7	.48	.22
AC-FT	7270	8290	13650	6420	7730	5250	5710	4190	1340	215	89	54
CFSM	.43	.50	.80	.38	.49	.31	.35	.25	.08	.01	.01	.00
IN.	.49	.56	.93	.44	.52	.36	.39	.28	.09	.01	.01	.00

CAL YR 1987	TOTAL	83855	MEAN 230	MAX 4600	MIN 29	AC-FT 166300	CFSM .83	IN. 11.30
WTR YR 1988	TOTAL	30346.57	MEAN 82.9	MAX 675	MIN .22	AC-FT 60190	CFSM .30	IN. 4.09

## SKUNK RIVER BASIN

05471500 SOUTH SKUNK RIVER NEAR OSKALOOSA, IA

LOCATION.--Lat 41°21'19", long 92°39'31", in NW1/4 SW1/4 sec.25, T.76 N., R.16 W., Mahaska County, Hydrologic Unit 07080105, on right bank 400 ft upstream from bridge on U.S. Highway 63, 0.3 mi downstream from Painter Creek, 4.0 mi north of Oskaloosa, 52.0 mi upstream from confluence with North Skunk River, and at mile 147.3 upstream from mouth of Skunk River.

DRAINAGE AREA.--1,635 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1945 to current year. Prior to October 1966, published as Skunk River near Oskaloosa. Prior to October 1948, monthly discharge only, published in WSP 1308.

REVISED RECORDS.--WSP 1438: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 685.50 ft above NGVD. Prior to Nov. 21, 1947, nonrecording gage at site 400 ft downstream at same datum.

REMARKS.--Estimated daily discharges: Oct. 1-4, 17-19, Nov. 29, Dec. 10-12, 14-24, Dec. 26 to Feb. 29, Apr. 3-7, June 6-8, Aug. 4-8, 10-13, 16-21, and Sept. 3-8. Records fair except those for estimated daily discharges, which are poor. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--43 years, 966 ft<sup>3</sup>/s, 8.0 in/yr, 699,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 20,000 ft<sup>3</sup>/s June 15, 1947, gage height, 21.26 ft, from floodmarks; maximum gage height, 22.52 ft Feb. 3, 1973, backwater from ice; minimum daily discharge, 1.8 ft<sup>3</sup>/s Oct. 11-13, 1956.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in May 1944 reached a stage of 25.8 ft, from floodmarks, discharge, 37,000 ft<sup>3</sup>/s, from rating curve extended above 18,000 ft<sup>3</sup>/s on basis of velocity-area study.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 5,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s) *2,220	Gage height (ft) *12.09	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 30	2200						

Minimum discharge, 14 ft<sup>3</sup>/s Sept. 15.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	960	531	2140	560	1500	1090	527	397	309	81	38	26
2	880	522	1860	690	1400	1010	540	387	296	82	36	26
3	820	500	1680	640	1150	955	600	378	290	80	36	29
4	760	487	1480	600	970	867	680	374	280	78	38	32
5	731	478	1330	580	850	806	760	369	260	74	47	28
6	726	466	1220	570	770	756	800	360	245	73	57	24
7	704	467	1160	550	700	730	760	352	240	71	43	22
8	674	476	1110	550	660	712	712	377	280	65	39	21
9	653	477	1140	530	620	700	687	450	274	57	44	20
10	636	459	1250	510	570	688	672	468	240	82	40	19
11	620	451	1300	510	530	666	632	460	212	88	31	20
12	609	451	1250	530	490	646	604	442	210	81	31	20
13	599	447	1170	510	460	609	592	419	199	70	31	18
14	590	440	1100	490	450	551	582	400	188	67	27	16
15	587	436	1000	480	430	545	571	386	174	63	27	15
16	582	497	780	490	410	536	535	369	155	63	26	22
17	660	726	720	560	400	532	519	354	152	61	24	19
18	620	730	900	600	450	527	502	347	153	64	23	24
19	600	705	1300	680	1050	511	496	339	161	97	24	139
20	557	690	1200	930	1300	490	488	333	174	97	41	168
21	552	668	1100	880	1100	471	479	325	152	84	38	72
22	545	656	1050	770	940	461	482	353	132	71	52	35
23	540	656	1050	640	900	454	478	416	120	62	180	29
24	535	638	1100	620	810	452	468	426	113	59	79	24
25	527	617	1150	600	700	505	456	420	106	56	51	23
26	520	593	1100	530	660	534	445	406	97	51	64	22
27	518	582	1050	500	760	533	435	383	89	48	51	22
28	515	979	1000	480	910	514	438	369	86	45	38	24
29	506	1720	960	490	1050	543	427	356	90	43	32	24
30	496	2090	900	770	---	541	410	341	85	40	28	25
31	494	---	650	1000	---	532	---	324	---	39	26	---
TOTAL	19316	19635	36200	18840	22990	19467	16777	11880	5562	2092	1342	1008
MEAN	623	654	1168	608	793	628	559	383	185	67.5	43.3	33.6
MAX	960	2090	2140	1000	1500	1090	800	468	309	97	180	168
MIN	494	436	650	480	400	452	410	324	85	39	23	15
AC-FT	38310	38950	71800	37370	45600	38610	33280	23560	11030	4150	2660	2000
CFSM	.38	.40	.71	.37	.48	.38	.34	.23	.11	.04	.03	.02
IN.	.44	.45	.82	.43	.52	.44	.38	.27	.13	.05	.03	.02

CAL YR 1987	TOTAL 445469	MEAN 1220	MAX 12000	MIN 282	AC-FT 883600	CFSM .75	IN. 10.14
WTR YR 1988	TOTAL 175109	MEAN 478	MAX 2140	MIN 15	AC-FT 347300	CFSM .29	IN. 3.98



## SKUNK RIVER BASIN

119

05472500 NORTH SKUNK RIVER NEAR SIGOURNEY, IA

LOCATION.--Lat 41°18'03", long 92°12'16", in NE1/4 SE1/4 sec.14, T.75 N., R.12 W., Keokuk County, Hydrologic Unit 07080106, on right bank 20 ft downstream from bridge on State Highway 149, 1.2 mi downstream from Cedar Creek, 2.2 mi south of Sigourney, 4.0 mi upstream from Bridge Creek, and 16.2 mi upstream from confluence with South Skunk River.

DRAINAGE AREA.--730 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1945 to current year.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1558: 1946-47 (M).

GAGE.--Water-stage recorder. Datum of gage is 651.53 ft above NGVD. Prior to June 10, 1953, nonrecording gage at same site and datum.

REMARKS.--Estimated daily discharges: Nov. 26 to Dec. 5, Dec. 19 to Jan. 1, Jan. 5-15, 17-25, Jan. 31 to Feb. 5, Feb. 21-26, May 28-30, and June 4-5, 11-12, June 18-19. Records good except those for periods of estimated daily discharge, which are poor. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--43 years, 448 ft<sup>3</sup>/s, 8.33 in/yr, 324,600 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 27,500 ft<sup>3</sup>/s Mar. 31, 1960, gage height, 25.33 ft; minimum daily discharge, 0.1 ft<sup>3</sup>/s Oct. 7 to Nov. 15, 1956.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in May 1944 reached a stage of 22.8 ft, from floodmark, discharge, 14,500 ft<sup>3</sup>/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,800 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 30	0700	*1,690	(a) 10.88	Jan. 31	1500	ice jam	*11.62

(a) Maximum observed

Minimum discharge, 6.7 ft<sup>3</sup>/s Sept. 15.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	274	186	1010	240	640	400	263	148	77	25	9.7	11
2	257	237	812	275	520	430	262	145	69	25	9.2	11
3	243	240	701	330	460	450	281	139	67	25	8.8	10
4	226	214	621	300	420	470	323	135	65	25	9.0	9.5
5	223	193	552	280	390	439	328	131	63	25	9.8	10
6	225	178	513	260	370	426	311	128	62	23	10	10
7	215	174	499	275	340	401	286	126	62	24	9.4	10
8	200	179	484	270	320	322	266	129	60	22	8.7	9.4
9	190	181	487	260	300	307	248	152	60	20	20	9.0
10	187	175	509	255	290	288	238	230	58	19	20	8.7
11	183	162	505	250	285	265	228	212	57	18	15	8.5
12	178	158	478	280	280	261	222	169	56	21	11	9.6
13	180	164	441	290	270	252	216	154	54	27	11	8.5
14	183	167	406	275	270	209	207	132	51	25	10	7.4
15	180	168	300	260	290	160	196	123	49	20	8.4	7.2
16	189	170	250	250	280	179	187	118	46	18	8.4	7.2
17	256	249	260	240	270	207	182	112	45	17	8.3	7.2
18	228	388	350	265	280	218	179	106	44	19	7.6	7.6
19	197	408	700	310	300	216	173	103	43	20	8.9	17
20	181	305	1150	500	375	214	166	103	42	18	9.0	23
21	172	262	1410	400	350	208	163	103	39	16	9.1	39
22	168	238	1080	350	310	200	170	102	38	15	13	112
23	168	242	890	320	290	194	177	123	36	14	24	75
24	175	248	1130	290	275	215	174	144	34	13	48	37
25	176	271	1050	275	260	267	181	134	31	13	53	23
26	174	267	1040	265	250	309	173	112	30	12	69	18
27	171	430	914	255	270	303	167	99	29	11	44	15
28	175	879	856	260	320	267	160	90	27	11	25	14
29	168	1100	789	310	360	272	159	85	27	11	18	18
30	163	1510	706	660	---	284	153	80	26	12	14	15
31	165	---	671	720	---	285	---	75	---	11	12	---
TOTAL	6070	9743	21564	9770	9635	8918	6439	3942	1447	575	541.3	567.8
MEAN	196	325	696	315	332	288	215	127	48.2	18.5	17.5	18.9
MAX	274	1510	1410	720	640	470	328	230	77	27	69	112
MIN	163	158	250	240	250	160	153	75	26	11	7.6	7.2
AC-FT	12040	19330	42770	19380	19110	17690	12770	7820	2870	1140	1070	1130
CFSM	.27	.44	.95	.43	.46	.39	.29	.17	.07	.03	.02	.03
IN.	.31	.50	1.10	.50	.49	.45	.33	.20	.07	.03	.03	.03

CAL YR 1987 TOTAL 181053 MEAN 496 MAX 5310 MIN 120 AC-FT 359100 CFSM .68 IN. 9.23  
WTR YR 1988 TOTAL 79212.1 MEAN 216 MAX 1510 MIN 7.2 AC-FT 157100 CFSM .30 IN. 4.04

## SKUNK RIVER BASIN

05473400 CEDAR CREEK NEAR OAKLAND MILLS, IA

LOCATION.--Lat. 40°55'20", long 91°40'10", in SE1/4 NW1/4 sec.28, T.71 N., R.7 W., Henry County, Hydrologic Unit 07080107, on left bank 30 ft upstream from bridge on county highway H46, 3.0 mi west of Oakland Mills, 2.9 mi upstream from Wolf Creek, and 4.3 mi upstream from mouth.

DRAINAGE AREA.--530 mi<sup>2</sup>.

PERIOD OF RECORD.--Occasional low-flow measurements, water years 1957 to 1977. July 1977 to current year.

GAGE.--Water-stage recorder. Datum of gage is 565.07 ft above NGVD.

REMARKS.--Estimated daily discharges: Dec. 15-20 and Jan. 1 to Mar. 6. Records good except those for estimated daily discharges, which are poor. Occasional high-water measurements were made by U.S. Army Corps of Engineers in 1965, 1966, 1970 and 1974 and by U.S. Geological Survey in 1966 and 1967.

AVERAGE DISCHARGE.--11 years, 376 ft<sup>3</sup>/s, 9.63 in/yr, 272,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,560 ft<sup>3</sup>/s Apr. 3, 1983, gage height, 19.68 ft; minimum daily discharge, 0.42 ft<sup>3</sup>/s Sept. 17, 1988.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of April 22, 1973 reached a stage of 24.09 ft, discharge not determined. Flood of June 1905 reached a stage approximately 2 feet higher from information by local resident.

EXTREMES FOR CURRENT PERIOD.--Peak discharges greater than base discharge of 3,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Dec. 21	0830	*3,780	*13.76	No other peak greater than base discharge.			

Minimum daily discharge, 0.42 ft<sup>3</sup>/s Sept. 17.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	18	15	681	200	480	190	166	33	24	4.7	.84	2.9
2	14	15	375	160	390	150	156	31	22	4.6	.70	2.2
3	10	14	243	130	200	120	481	29	20	5.9	.59	1.8
4	9.5	43	189	110	93	110	480	28	19	4.5	.71	1.8
5	8.7	35	147	105	77	110	236	27	19	3.8	.75	1.5
6	8.1	26	117	100	69	100	175	27	18	3.6	.74	1.4
7	8.0	21	113	95	64	102	149	26	17	3.5	.65	1.2
8	7.5	18	106	95	60	91	122	26	18	3.3	.56	.99
9	6.0	16	100	91	57	91	102	32	19	3.0	1.2	.97
10	8.1	15	114	91	52	92	93	46	27	3.1	2.3	.96
11	9.7	15	104	95	50	83	86	74	35	3.3	4.8	.79
12	8.6	15	92	110	50	78	82	46	22	3.3	3.7	.75
13	8.3	14	91	82	51	78	78	33	18	5.1	2.1	.75
14	7.5	13	79	78	53	69	72	27	16	5.0	2.5	.66
15	5.6	13	58	81	55	49	66	25	15	3.7	1.3	.47
16	6.0	13	38	97	58	43	61	23	14	2.6	4.0	.47
17	6.3	18	42	110	85	48	56	21	13	2.0	3.5	.42
18	8.3	41	54	145	120	46	53	19	12	5.1	2.4	.47
19	8.2	137	96	280	230	47	53	18	11	6.2	2.6	.67
20	11	80	500	375	825	48	52	18	10	4.8	2.9	.67
21	16	54	3560	230	700	50	48	17	9.6	6.1	2.6	1.7
22	13	44	2550	135	600	49	47	17	8.8	4.7	5.8	1.3
23	12	39	2140	140	430	46	47	24	8.2	3.5	15	.84
24	11	40	1340	120	375	58	47	31	7.6	2.9	36	3.6
25	10	52	1540	95	340	223	49	52	7.3	2.2	37	6.4
26	9.1	64	786	88	350	339	52	86	6.2	2.0	16	3.9
27	9.1	70	413	83	360	194	48	59	5.4	1.7	15	2.4
28	9.5	130	493	88	325	141	44	42	5.3	1.5	14	14
29	10	1500	553	115	280	557	42	35	4.9	1.3	9.9	89
30	11	1180	359	130	---	395	37	31	4.8	1.2	6.0	218
31	12	---	323	300	---	236	---	28	---	.88	4.3	---
TOTAL	300.1	3750	17396	4154	6879	4033	3280	1031	437.1	109.08	200.44	362.98
MEAN	9.68	125	561	134	237	130	109	33.3	14.6	3.52	6.47	12.1
MAX	18	1500	3560	375	825	557	481	86	35	6.2	37	218
MIN	5.6	13	38	78	50	43	37	17	4.8	.88	.56	.42
AC-FT	595	7440	34500	8240	13640	8000	6510	2040	867	216	398	720
CFSM	.02	.24	1.06	.25	.45	.25	.21	.06	.03	.01	.01	.02
IN.	.02	.26	1.22	.29	.48	.28	.23	.07	.03	.01	.01	.03

CAL YR 1987 TOTAL 62563.4 MEAN 171 MAX 3560 MIN 2.7 AC-FT 124100 CFSM .32 IN. 4.39  
WTR YR 1988 TOTAL 41932.70 MEAN 115 MAX 3560 MIN .42 AC-FT 83170 CFSM .22 IN. 2.94

## SKUNK RIVER BASIN

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05474000 SKUNK RIVER AT AUGUSTA, IA  
(National stream-quality accounting network station)

LOCATION.--Lat 40°45'13", long 91°16'40", in NE1/4 NE1/4 sec.26, T.69 N., R.4 W., Des Moines County, Hydrologic Unit 07080107, on left bank 300 ft upstream from bridge on State Highway 394 at Augusta, 2.0 mi upstream from Long Creek, and at mile 12.5.

DRAINAGE AREA.--4,303 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--September to November 1913, October 1914 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 1308: 1915 (M), 1919-27 (M), 1932-34 (M), 1936, 1937-38 (M), 1942 (M). WSP 1438: Drainage area. WDR IA-71-1: 1966 (M).

GAGE.--Water-stage recorder. Datum of gage is 521.24 ft above NGVD. Prior to Nov. 15, 1913, nonrecording gage at site 400 ft upstream at datum about 0.7 ft higher. May 27, 1915, to Jan. 14, 1935, nonrecording gage at site 400 ft upstream at present datum.

REMARKS.--Estimated daily discharges: Dec. 15-20 and Jan. 1 to Mar. 4. Records good except those for estimated daily discharges, which are poor. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--74 years (water years 1915-88), 2,455 ft<sup>3</sup>/s, 7.75 in/yr, 1,779,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 66,800 ft<sup>3</sup>/s Apr. 23, 1973, gage height, 27.05 ft; minimum daily discharge, 7 ft<sup>3</sup>/s Aug. 27 to Sept. 1, 1934.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 1, 1903, reached a stage of about 21 ft, discharge, about 45,000 ft<sup>3</sup>/s. Stage and discharge for flood of April 1973 are believed to be the greatest since 1851.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 15,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Dec. 25	----	*6,000	unknown	Jan. 21	0345	ice jam	*11.78

Minimum discharge, 54 ft<sup>3</sup>/s Sept. 15, 16.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1480	843	5310	1900	3500	2900	1840	723	505	158	82	119
2	1380	831	4360	1700	4600	2700	1700	716	481	155	78	105
3	1290	835	3840	1950	4000	2500	2520	706	461	153	75	96
4	1220	903	3390	1900	2900	2300	3130	698	431	147	74	88
5	1170	949	3010	1700	2050	2070	2480	694	415	142	71	80
6	1120	893	2700	1650	1800	1840	2120	679	399	135	70	76
7	1070	849	2490	1550	1650	1710	1880	616	383	130	67	71
8	1050	819	2330	1550	1550	1700	1780	598	397	128	78	67
9	1030	790	2250	1550	1450	1640	1680	623	395	124	117	68
10	995	775	2190	1450	1350	1580	1560	630	394	122	109	65
11	970	773	2170	1400	1300	1540	1440	697	393	130	88	64
12	947	773	2160	1450	1250	1490	1350	764	410	129	82	65
13	926	756	2150	1600	1200	1390	1280	781	388	114	77	63
14	906	735	2130	1450	1150	1280	1210	727	360	111	74	60
15	893	725	1800	1400	1150	1170	1110	678	333	116	75	57
16	897	754	1300	1350	1200	1080	1060	635	304	124	73	58
17	893	789	1150	1450	1200	990	1010	583	289	124	67	59
18	888	841	1450	1550	1300	973	971	553	270	168	82	61
19	950	1050	2200	1800	1550	996	929	533	253	138	107	75
20	955	1400	3000	2400	2600	1030	905	514	240	122	74	62
21	937	1350	3650	3400	4500	1030	868	498	229	108	91	59
22	909	1190	4630	2650	3900	1010	846	493	218	103	131	59
23	887	1120	4980	2050	3400	989	832	524	216	102	201	60
24	877	1070	4480	1900	3000	1020	848	557	217	105	157	61
25	855	1080	5810	1750	2700	1280	1040	573	218	118	126	121
26	851	1100	5200	1600	2450	1780	937	680	203	110	143	157
27	854	1150	4080	1450	2400	1740	853	713	186	100	169	133
28	829	1300	3760	1400	2600	1550	818	661	173	94	200	222
29	814	2470	3460	1400	2800	2580	786	610	168	89	181	371
30	811	5420	3350	1600	---	2750	751	568	164	90	153	139
31	817	---	3130	2400	---	2160	---	531	---	87	135	---
TOTAL	30471	34333	97910	54350	66500	50768	40534	19556	9493	3776	3307	2841
MEAN	983	1144	3158	1753	2293	1638	1351	631	316	122	107	94.7
MAX	1480	5420	5810	3400	4600	2900	3130	781	505	168	201	371
MIN	811	725	1150	1350	1150	973	751	493	164	87	67	57
AC-FT	60440	68100	194200	107800	131900	100700	80400	38790	18830	7490	6560	5640
CFSM	.23	.27	.73	.41	.53	.38	.31	.15	.07	.03	.02	.02
IN.	.26	.30	.85	.47	.57	.44	.35	.17	.08	.03	.03	.02

CAL YR 1987	TOTAL 814614	MEAN 2232	MAX 10100	MIN 565	AC-FT 1616000	CFSM .52	IN. 7.04
WTR YR 1988	TOTAL 413839	MEAN 1131	MAX 5810	MIN 57	AC-FT 820800	CFSM .26	IN. 3.58

## SKUNK RIVER BASIN

05474000 SKUNK RIVER AT AUGUSTA, IA--Continued  
(National stream-quality accounting network station)

## WATER-QUALITY RECORDS

LOCATION.--Samples collected at bridge on State Highway 394, 300 ft downstream from gage.

PERIOD OF RECORD.--Water years 1975 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: October 1975 to current year.

WATER TEMPERATURES: October 1975 to current year.

SUSPENDED-SEDIMENT DISCHARGE: October 1975 to current year.

REMARKS.--During periods of ice effect, sediment samples are collected in open water channel. Records of specific conductance are obtained from suspended sediment samples at time of analysis.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum daily, 950 microsiemens Dec. 20, 1979, Feb. 12, 1980; minimum daily, 180 microsiemens Aug. 17, 1986.

WATER TEMPERATURES: Maximum daily, 34.0°C July 20, 1980, Aug. 15-17, 1988; minimum daily, 0.0°C on many days during winter periods.

SEDIMENT CONCENTRATIONS: Maximum daily mean, 8,550 mg/L June 25, 1981; minimum daily mean, 1 mg/L Mar. 8, 9, 12, 1978, Jan. 5, 6, 1984.

SEDIMENT LOADS: Maximum daily, 499,000 tons Mar. 21, 1978; minimum daily, 1.5 tons Feb. 8, 1977.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum daily, 680 microsiemens Aug. 25; minimum daily, 290 microsiemens Feb. 27.

TEMPERATURES: Maximum daily, 34.0°C Aug. 15-17; minimum daily, 0.0°C on many days during winter periods.

SEDIMENT CONCENTRATIONS: Maximum daily mean, 1,600 mg/L Mar. 2; minimum daily mean, 12 mg/L Oct. 30, 31.

SEDIMENT LOADS: Maximum daily, 18,400 tons Nov. 30; minimum daily, 7.1 tons Sep. 15.

SPECIFIC CONDUCTANCE MICROSIEMENS/CM AT 25 DEG C, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	600	595	420	545	420	330	540	430	480	560	480	560
2	585	595	440	570	390	360	550	420	530	570	475	540
3	480	530	500	565	390	390	510	430	520	550	500	520
4	475	530	560	580	400	420	460	420	490	580	560	520
5	540	510	590	610	390	420	500	420	490	560	540	520
6	520	540	600	510	380	430	530	410	490	550	530	500
7	535	480	620	560	380	440	540	410	465	550	530	490
8	465	585	600	595	380	470	540	460	485	560	520	500
9	465	550	600	590	380	500	550	420	470	560	400	480
10	525	540	580	510	380	510	520	420	470	550	390	490
11	520	545	580	520	380	520	450	430	470	560	450	490
12	460	570	580	565	400	560	470	440	510	540	610	500
13	540	560	610	590	520	550	500	460	520	550	540	500
14	460	500	620	585	410	550	510	460	530	540	540	---
15	440	545	600	660	540	560	470	500	520	540	540	---
16	520	560	490	665	560	560	460	470	520	520	540	530
17	480	615	570	585	570	560	460	480	510	520	540	540
18	640	590	640	645	560	560	450	460	540	440	540	540
19	510	570	640	520	580	510	430	460	540	460	440	500
20	485	620	600	420	540	400	420	450	525	550	540	500
21	605	585	540	300	470	440	440	460	520	540	570	520
22	585	570	480	310	470	450	430	440	520	530	560	540
23	580	560	470	340	430	520	440	460	540	520	445	530
24	480	550	480	370	390	500	440	460	540	500	660	550
25	565	590	460	370	380	510	440	470	540	500	680	550
26	460	610	410	370	390	460	530	540	540	520	560	550
27	550	630	440	460	290	520	460	540	560	520	540	540
28	520	620	480	450	320	560	460	520	570	510	500	510
29	500	600	530	380	320	530	480	520	560	540	500	580
30	620	440	540	460	---	440	440	490	560	500	580	420
31	585	---	540	520	---	510	---	490	---	490	580	---

## SKUNK RIVER BASIN

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05474000 SKUNK RIVER AT AUGUSTA, IA--Continued

## WATER-QUALITY RECORDS

WATER TEMPERATURE, DEGREES CENTIGRADE, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	19.0	13.0	4.0	.0	1.0	1.0	10.0	18.0	29.0	26.0	33.0	26.0
2	15.0	15.0	5.0	.0	.0	2.0	14.0	21.0	27.0	25.0	33.0	26.0
3	15.0	15.0	5.0	.0	.0	2.0	12.0	19.0	27.0	28.0	33.0	25.0
4	16.0	15.0	5.0	.0	.0	3.0	14.0	19.0	26.0	30.0	32.0	22.0
5	16.0	14.0	5.0	.0	.0	4.0	14.0	19.0	27.0	30.0	32.0	22.0
6	15.0	12.0	5.0	.0	.0	4.0	---	22.0	28.0	31.0	32.0	21.0
7	15.0	12.0	3.0	.0	.0	6.0	15.0	23.0	29.0	31.0	32.0	21.0
8	15.0	12.0	3.0	.0	.0	6.0	17.0	19.0	28.0	31.0	28.0	21.0
9	13.0	12.0	3.0	.0	.0	6.0	19.0	20.0	28.0	31.0	30.0	21.0
10	13.0	8.0	5.0	.0	.0	8.0	12.0	21.0	26.0	31.0	30.0	24.0
11	12.0	8.0	5.0	.0	.0	7.0	15.0	23.0	27.0	30.0	30.0	24.0
12	12.0	8.0	5.0	.0	.0	6.0	16.0	23.0	27.0	32.0	30.0	24.0
13	13.0	9.0	5.0	.0	.0	4.0	16.0	24.0	29.0	32.0	30.0	---
14	13.0	9.0	3.0	.0	.0	4.0	15.0	24.0	30.0	30.0	31.0	25.0
15	16.0	10.0	3.0	.0	.0	2.0	15.0	25.0	30.0	32.0	34.0	25.0
16	16.0	11.0	2.0	.0	.0	2.0	15.0	23.0	29.0	31.0	34.0	25.0
17	16.0	9.0	---	.0	.0	3.0	17.0	23.0	29.0	33.0	34.0	26.0
18	16.0	9.0	---	1.0	.0	5.0	15.0	24.0	30.0	30.0	32.0	25.0
19	12.0	7.0	---	1.0	.0	5.0	15.0	24.0	30.0	30.0	29.0	23.0
20	12.0	7.0	1.0	1.0	.0	8.0	16.0	24.0	30.0	29.0	29.0	23.0
21	10.0	4.0	1.0	1.0	.0	8.0	16.0	26.0	33.0	28.0	29.0	22.0
22	10.0	5.0	1.0	1.0	1.0	12.0	13.0	24.0	31.0	28.0	29.0	22.0
23	10.0	6.0	2.0	1.0	1.0	12.0	11.0	20.0	31.0	28.0	27.0	---
24	10.0	6.0	2.0	1.0	1.0	15.0	11.0	24.0	32.0	30.0	29.0	22.0
25	10.0	5.0	---	1.0	1.0	15.0	12.0	23.0	33.0	30.0	28.0	22.0
26	10.0	5.0	---	.0	1.0	10.0	14.0	24.0	32.0	30.0	27.0	22.0
27	10.0	5.0	2.0	.0	1.0	12.0	14.0	24.0	28.0	30.0	23.0	23.0
28	10.0	5.0	2.0	---	1.0	12.0	15.0	26.0	30.0	30.0	25.0	23.0
29	10.0	5.0	1.0	.0	1.0	9.0	15.0	27.0	25.0	30.0	25.0	23.0
30	11.0	4.0	2.0	1.0	---	11.0	16.0	27.0	25.0	30.0	25.0	22.0
31	11.0	---	.0	1.0	---	12.0	---	29.0	---	33.0	25.0	---

## SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DAY	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY) OCTOBER	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY) NOVEMBER	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY) DECEMBER	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY) JANUARY	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY) FEBRUARY	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY) MARCH
1	86	344	22	50	900	12900	79	405	238	2250	750	5870
2	73	272	28	63	635	7480	67	308	200	2480	1600	11700
3	90	313	32	72	485	5030	58	305	250	2700	1160	7830
4	81	267	46	112	360	3300	38	195	293	2290	388	2410
5	52	164	70	179	240	1950	148	679	284	1570	170	950
6	44	133	56	135	152	1110	72	321	77	374	153	760
7	43	124	25	57	115	773	34	142	43	192	142	656
8	34	96	14	31	97	610	24	100	51	213	132	606
9	36	100	28	60	90	547	31	130	58	227	130	576
10	33	89	28	59	84	497	50	196	57	208	128	546
11	28	73	25	52	81	475	24	91	56	197	123	511
12	33	84	27	56	93	542	18	70	74	250	121	487
13	34	85	27	55	75	435	22	95	49	159	102	383
14	29	71	28	56	68	391	24	94	68	211	82	283
15	40	96	29	57	80	389	26	98	50	155	59	186
16	31	75	30	61	134	470	32	117	29	94	37	108
17	34	82	24	51	66	205	35	137	28	91	25	67
18	29	70	19	43	18	70	33	138	27	95	27	71
19	27	69	30	85	23	137	141	685	28	117	44	118
20	34	88	48	181	147	1190	820	5310	53	372	159	442
21	28	71	34	124	395	3890	475	4360	76	923	145	403
22	23	56	24	77	495	6190	425	3040	78	821	131	357
23	19	46	26	79	463	6230	422	2340	92	845	130	347
24	21	50	28	81	413	5000	143	734	103	834	156	430
25	22	51	15	44	462	7250	85	402	110	802	335	1160
26	19	44	14	42	614	8620	84	363	116	767	378	1820
27	15	35	42	130	372	4100	35	137	153	991	278	1310
28	15	34	38	133	245	2490	27	102	167	1170	103	431
29	14	31	464	3090	146	1360	69	261	250	1890	538	3750
30	12	26	1260	18400	130	1180	42	181	---	---	755	5610
31	12	26	---	---	131	1110	87	564	---	---	385	2250
TOTAL	---	3165	---	23715	---	85921	---	22100	---	23288	---	52428

## SKUNK RIVER BASIN

05474000 SKUNK RIVER AT AUGUSTA, IA-Continued

## WATER-QUALITY RECORDS

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DAY	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	218	1080	124	242	108	147	211	90	39	8.6	71	23
2	138	633	98	189	88	114	99	41	55	12	68	19
3	484	3290	85	162	102	127	50	21	58	12	64	17
4	830	7010	61	115	97	113	41	16	99	20	63	15
5	492	3290	41	77	80	90	40	15	100	19	62	13
6	280	1600	34	62	72	78	37	13	58	11	83	17
7	173	878	40	67	62	64	34	12	47	8.5	80	15
8	136	654	48	78	55	59	34	12	58	12	74	13
9	126	572	66	111	50	53	36	12	121	38	69	13
10	130	548	39	66	48	51	42	14	106	31	65	11
11	103	400	52	98	88	93	45	16	78	19	60	10
12	118	430	50	103	105	116	41	14	82	18	58	10
13	131	453	57	120	60	63	38	12	82	17	55	9.4
14	149	487	65	128	50	49	43	13	64	13	51	8.3
15	137	411	77	141	55	49	45	14	56	11	46	7.1
16	113	323	94	161	54	44	45	15	88	17	62	9.7
17	104	284	79	124	56	44	51	17	99	18	54	8.6
18	118	309	70	105	63	46	105	48	110	24	59	9.7
19	106	266	76	109	67	46	80	30	163	47	108	22
20	110	269	65	90	68	44	47	15	126	25	67	11
21	98	230	62	83	62	38	40	12	160	39	62	9.9
22	99	226	98	130	68	40	38	11	113	40	64	10
23	94	211	83	117	75	44	37	10	155	84	75	12
24	89	204	89	134	91	53	38	11	121	51	52	8.6
25	72	202	158	244	72	42	38	12	90	31	55	18
26	114	288	203	373	57	31	36	11	85	33	58	25
27	98	226	330	635	57	29	32	8.6	96	44	47	17
28	95	210	158	282	57	27	29	7.4	100	54	74	44
29	79	168	115	189	88	40	30	7.2	83	41	113	113
30	98	199	121	186	253	112	47	11	78	32	90	34
31	---	---	117	168	---	---	43	10	75	27	---	---
TOTAL	---	25351	---	4889	---	1946	---	551.2	---	857.1	---	553.3

TOTAL LOAD FOR YEAR: 244764.6 TONS.

## PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	TEMPER- ATURE WATER (DEG C) (00010)	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDED (T/DAY) (80155)	SED. SUSP. FALL DIAM. % FINER THAN .002 MM (70337)	SED. SUSP. FALL DIAM. % FINER THAN .004 MM (70338)	SED. SUSP. FALL DIAM. % FINER THAN .008 MM (70339)	SED. SUSP. FALL DIAM. % FINER THAN .016 MM (70340)	SED. SUSP. FALL DIAM. % FINER THAN .062 MM (70331)
NOV 1987										
02...	1100	13.5	825	31	69	--	--	--	--	65
MAR 1988										
30...	1200	10.0	2690	904	6570	49	62	76	90	99
MAY										
09...	1200	17.0	626	72	122	--	--	--	--	99
JUN										
20...	1230	30.5	240	69	45	--	--	--	--	99
AUG										
23...	1200	25.0	187	139	70	--	--	--	--	100

## PARTICLE-SIZE DISTRIBUTION OF SURFACE BED MATERIAL, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	NUMBER OF SAM- PLING POINTS (COUNT) (00063)	BED MAT. SIEVE DIAM. % FINER THAN .062 MM (80164)	BED MAT. SIEVE DIAM. % FINER THAN .125 MM (80165)	BED MAT. SIEVE DIAM. % FINER THAN .250 MM (80166)	BED MAT. SIEVE DIAM. % FINER THAN .500 MM (80167)	BED MAT. SIEVE DIAM. % FINER THAN 1.00 MM (80168)	BED MAT. SIEVE DIAM. % FINER THAN 2.00 MM (80169)	BED MAT. SIEVE DIAM. % FINER THAN 4.00 MM (80170)	BED MAT. SIEVE DIAM. % FINER THAN 8.00 MM (80171)	BED MAT. SIEVE DIAM. % FINER THAN 16.0 MM (80172)
MAR 1988												
30...	1200	2690	2	6	11	21	78	86	87	87	88	100

## SKUNK RIVER BASIN

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05474000 SKUNK RIVER AT AUGUSTA, IA--Continued

## WATER-QUALITY RECORDS

WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	TEMPER- ATURE AIR (DEG C) (00020)	TUR- BID- ITY (FTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED	BARO- METRIC PRES- SURE (MM OF HG) (00025)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	
									(PER- CENT SATUR- ATION) (00301)			
NOV 02...	1100	825	655	8.50	13.5	12.0	3.7	11.0	107	756	K53	
DEC 11...	1100	2010	635	8.50	5.0	7.0	16	12.8	104	739	270	
MAR 30...	1200	2690	472	8.10	10.0	9.5	190	10.6	95	756	3800	
MAY 09...	1200	626	415	9.30	17.0	14.5	22	12.3	131	742	K20	
JUN 20...	1230	240	528	8.70	30.5	29.0	23	8.2	110	757	120	
AUG 23...	1200	187	455	8.20	25.0	22.0	73	6.9	85	750	K40000	
DATE		STREP- TOCOCCEI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	HARD- NESS NONCARB WH WAT TOT FLD MG/L AS CACO3 (00902)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	SODIUM AD- SORP- TION RATIO (00931)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	CAR- BONATE WATER DIS IT FIELD MG/L AS CO3 (00452)	
								SODIUM PERCENT (00932)				
NOV 02...	67	98	330	85	28	18	11	0.4	2.7	264	7	
DEC 11...	2700	75	320	84	27	11	7	0.3	2.2	247	10	
MAR 30...	6900	59	210	55	17	12	11	0.4	5.1	147	0	
MAY 09...	K50	50	180	31	25	16	16	0.5	2.1	125	10	
JUN 20...	96	53	260	58	27	18	13	0.5	3.0	200	18	
AUG 23...	K24000	45	200	47	20	18	16	0.6	3.9	158	0	
DATE		BICAR- BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	NITRO- GEN, ORGANIC TOTAL (MG/L AS N) (00605)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)
NOV 02...	308	51	22	0.30	14	399	375	0.54	889	0.66	3.60	
DEC 11...	282	44	18	0.30	18	384	384	0.52	2080	0.84	7.20	
MAR 30...	179	56	14	0.30	10	277	276	0.38	2010	0.83	3.80	
MAY 09...	132	56	22	0.30	0.14	232	232	0.32	392	0.68	0.170	
JUN 20...	208	54	22	0.40	9.6	318	314	0.43	206	1.2	<0.100	
AUG 23...	193	51	17	0.30	6.9	269	259	0.37	136	0.81	0.380	

## SKUNK RIVER BASIN

05474000 SKUNK RIVER AT AUGUSTA, IA--Continued

## WATER-QUALITY RECORDS

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

		NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHOROUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	PHOS- PHOROUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHOROUS TOTAL (MG/L AS P) (00665)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)	
	DATE											
	NOV 02...	<0.010	0.010	0.040	0.70	0.090	0.100	0.090	31	69	65	
	DEC 11...	0.020	0.070	0.060	0.90	0.110	0.150	0.230	--	--	--	
	MAR 30...	0.040	0.150	0.170	1.0	0.100	0.120	0.230	904	6570	99	
	MAY 09...	0.010	0.030	0.020	0.70	<0.010	0.020	0.090	72	122	99	
	JUN 20...	<0.010	0.010	0.010	1.2	0.060	0.110	0.280	69	45	99	
	AUG 23...	0.020	0.170	0.190	1.0	0.040	0.090	0.230	139	70	100	
	DATE	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	
	NOV 02...	2	<10	110	<0.5	<1	<1	<3	2	4	<5	
	DEC 11...	--	--	--	--	--	--	--	--	--	--	
	MAR 30...	1	20	200	<0.5	<1	<1	<3	5	24	<5	
	MAY 09...	1	<10	85	<0.5	<1	<1	<3	2	11	<5	
	JUN 20...	--	--	--	--	--	--	--	--	--	--	
	AUG 23...	3	<10	170	<0.5	<1	<1	<3	6	80	<5	
	DATE	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	NICKEL, DIS- SOLVED (UG/L AS NI) (01065)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	SILVER, DIS- SOLVED (UG/L AS AG) (01075)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	
	NOV 02...	17	16	0.2	<10	1	<1	<1.0	220	<6	<3	
	DEC 11...	--	--	--	--	--	--	--	--	--	--	
	MAR 30...	8	6	0.3	<10	<1	<1	<1.0	160	<6	40	
	MAY 09...	13	9	<0.1	<10	4	<1	<1.0	140	<6	<3	
	JUN 20...	--	--	--	--	--	--	--	--	--	--	
	AUG 23...	8	11	2.2	<10	3	<1	<1.0	160	<6	7	
DATE	ATRA- ZINE (UG/L) (39630)	CYAN- AZINE (UG/L) (81757)	METRI- BUZIN (UG/L) [ Pesticide concentrations (81408)	ALA- CHLOR (UG/L) (77825)	METOLA- CHLOR (UG/L) (39356)	TRIFLU- RALIN (UG/L) (39030)	BUTY- LATE (UG/L) (99901)	CHLOR- PYRIFOS (UG/L) (81403)	ETHO- PROP (UG/L) (81758)	DYFO- NATE (UG/L) (81294)	PHORATE (UG/L) (39023)	TERBU- FOS (UG/L) (82088)
NOV 02...	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	--	--	--	--	--
DEC 11...	--	--	--	--	--	--	--	--	--	--	--	--
MAR 30...	0.46	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	--	--	--	--	--
MAY 09...	0.64	0.80	<0.10	<0.10	<0.10	<0.10	<0.10	--	--	--	--	--
JUN 20...	0.61	1.4	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
AUG 23...	0.25	0.23	<0.10	<0.10	0.37	<0.10	<0.10	--	--	--	--	--



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LOCATION.--Lat 40°23'37", long 91°22'27", in SE1/4 SW1/4 sec.30, T.65 N., R.4 W., Lee County, Hydrologic Unit 07080104, near right bank in tailwater of dam and powerplant of Union Electric Co. at Keokuk, 0.2 mi upstream from bridge on U.S. Highway 136, 2.7 mi upstream from Des Moines River, and at mile 364.2 upstream from Ohio River.

PERIOD OF RECORD.--January 1878 to current year.

GAGE.--Water-stage recorder. Datum of gage is 477.41 ft above NGVD (levels by U.S. Army Corps of Engineers). May 1913 to Jan. 1, 1978, nonrecording gage at Galland (formerly Nashville), 8 mi upstream; zero of gage was set to low-water mark of 1864, or 496.52 ft above NGVD.

REMARKS.--Discharge computed from records of operation of turbines in powerplant and spillway gates in dam. Minor flow regulation caused by powerplant since 1913 and navigation dams. Records for May 1913 to September 1937 adjusted for change in contents in Keokuk Reservoir, those after September 1937 unadjusted.

AVERAGE DISCHARGE.--110 years, 64,120 ft<sup>3</sup>/s, 7.32 in/yr, 46,450,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 344,000 ft<sup>3</sup>/s Apr. 24, 1973; maximum gage height, 23.35 ft Apr. 24, 1973; minimum daily discharge, 5,000 ft<sup>3</sup>/s Dec. 27, 1933.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 6, 1851, reached a stage of 21.0 ft, present site and datum, estimated as 13.5 ft at Galland, discharge, 360,000 ft<sup>3</sup>/s.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 107,000 ft<sup>3</sup>/s Apr. 8; minimum daily discharge, 11,900 ft<sup>3</sup>/s Sept. 13.

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	39400	38000	60200	38200	72900	52200	98300	54200	34000	16600	15300	17200
2	35600	41000	59900	37900	73300	58700	99900	49900	37000	16000	14500	16600
3	34000	41000	60300	37100	85300	64500	103000	55400	35100	13800	13600	17200
4	31000	42500	60700	37500	79500	63500	106000	58700	34100	13700	12500	17700
5	26300	41600	60500	36600	67800	61100	104000	60100	30700	13600	12700	18700
6	26600	40600	60200	35800	56200	62900	104000	59800	28500	13700	12400	18400
7	29500	40100	58200	35100	53300	64900	104000	58600	26500	13000	12500	18600
8	28300	39500	54800	34800	53200	63200	107000	55500	23800	12200	12400	18000
9	28000	36800	57200	34500	53400	68000	105000	54500	22000	12000	15300	16800
10	31200	33500	59100	34300	53400	73600	102000	51100	19900	13000	18700	14500
11	31300	31800	57700	36900	46800	77300	100000	52200	18900	14300	21500	13700
12	33800	34300	58800	39100	46000	75500	94900	53700	18200	19700	20500	12500
13	35300	37700	58500	41200	45100	83300	93300	54800	18100	21900	20900	11900
14	31600	36200	61500	40400	46400	88200	89900	55900	18500	21800	20700	12300
15	31000	37400	59700	40600	46600	88100	88200	55100	19300	22100	19400	13700
16	28100	36600	59300	41200	46800	84600	92700	52900	19300	19900	20400	13700
17	25800	36800	56500	40400	47600	79400	91500	51500	18200	18900	20000	14700
18	28100	37900	48100	39600	49000	78700	90100	54300	16600	18100	20000	14600
19	38500	38500	48700	41400	51100	80200	83600	55500	15400	17700	17200	16900
20	42200	42900	50700	54100	51000	81900	82000	55500	15400	17900	18300	17100
21	41800	44600	50600	72100	54700	75600	74500	54400	15900	18100	17700	23300
22	45200	47100	65600	75700	50300	66900	68500	55000	16300	18100	16700	40800
23	41700	48400	71300	77400	52600	63700	64500	55100	19100	17300	20000	40600
24	37800	45600	65500	72000	58700	63200	62300	55600	20800	16100	21400	35200
25	37200	46200	66900	63000	56400	60800	65800	52500	20900	15600	21700	35800
26	36500	46700	74900	52400	50800	63300	67500	41400	21300	15200	26900	35400
27	34100	48600	73400	47300	52600	64300	60000	33500	20400	15000	29100	32500
28	33500	50200	70000	51400	53500	66700	57100	25700	18000	14900	26600	30900
29	34500	53100	70500	51000	54700	69200	59700	21600	17300	14400	23800	26300
30	34600	53200	61900	49800	---	79500	59400	21500	16400	14500	20400	22300
31	36600	---	53400	64000	---	92000	---	25600	---	1560		

## DES MOINES RIVER BASIN

05476500 DES MOINES RIVER AT ESTHERVILLE, IA

LOCATION.--Lat 43°23'51", long 94°50'38", in SW1/4 SE1/4 sec.10, T.99 N., R.34 W., Emmet County, Hydrologic Unit 07100002, on right bank in city park, 1,200 ft downstream from bridge on State Highway 9 at Estherville, 0.1 mi upstream from School Creek, 2.3 mi upstream from Brown Creek, and at mile 404.2.

DRAINAGE AREA.--1,372 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1951 to current year. Prior to November 1951, monthly discharge only, published in WSP 1728.

REVISED RECORDS.--WSP 1438: Drainage area.

GAGE.--Water-stage recorder and concrete control. Datum of gage is 1,247.55 ft above NGVD.

REMARKS.--Estimated daily discharges: Dec. 28 to Jan. 6, Jan. 25-30, and Feb. 2-6. Records good except those for estimated daily discharges, which are poor. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--37 years, 391 ft<sup>3</sup>/s, 3.87 in/yr, 283,300 acre-ft/yr; median of yearly mean discharges, 250 ft<sup>3</sup>/s, 2.5 in/yr, 181,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 16,000 ft<sup>3</sup>/s Apr. 12, 1969, gage height, 17.68 ft, from flood-mark; no flow Jan. 16-18, 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Apr. 28	2045	*1,020	*4.72				

Minimum discharge, 2.7 ft<sup>3</sup>/s Sept. 13.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	49	36	36	25	15	132	506	904	394	61	5.4	3.2
2	42	35	32	28	14	176	523	875	386	56	4.9	3.1
3	42	36	43	27	14	173	666	830	392	45	5.0	3.1
4	45	37	25	29	13	189	757	783	383	33	6.7	3.3
5	38	34	40	25	14	199	763	737	367	25	8.8	3.3
6	35	33	48	22	13	197	748	694	344	19	12	3.4
7	37	35	43	17	14	234	728	659	323	15	9.0	3.3
8	41	37	45	12	13	287	703	654	301	19	13	3.1
9	38	29	50	9.2	11	284	671	646	274	24	15	3.0
10	37	33	49	7.4	11	303	638	606	249	25	9.4	2.8
11	36	40	58	6.8	10	373	572	565	228	19	6.0	2.8
12	37	35	61	7.0	10	504	551	536	216	25	5.5	2.8
13	33	34	40	7.6	10	522	537	523	202	32	5.3	2.8
14	30	32	39	7.2	9.3	471	508	512	189	21	4.8	2.8
15	33	34	38	7.2	9.3	523	471	480	176	16	4.4	3.9
16	39	37	42	7.5	9.5	463	437	453	164	13	4.2	3.9
17	42	37	49	8.1	11	487	415	433	159	15	4.0	6.9
18	39	35	45	8.1	14	503	400	382	151	15	4.1	5.6
19	37	38	47	8.4	15	509	352	369	142	14	3.8	9.7
20	35	31	43	8.7	16	537	327	357	138	13	4.1	8.3
21	33	25	40	8.7	17	512	340	349	130	13	4.7	11
22	32	42	43	9.0	20	471	334	372	117	11	7.7	11
23	36	38	41	11	22	499	361	395	110	11	18	8.8
24	37	33	41	12	26	521	532	409	115	11	7.8	7.2
25	35	43	35	11	25	545	589	408	98	9.4	5.6	5.6
26	32	35	32	10	27	562	608	397	90	8.1	4.7	4.7
27	30	33	27	11	35	556	691	418	82	7.9	4.8	4.3
28	32	38	26	11	54	547	922	425	72	7.1	4.1	6.2
29	35	42	25	12	88	581	978	430	69	6.6	3.8	6.6
30	33	41	24	12	---	576	925	434	68	6.3	3.6	9.0
31	37	---	24	14	---	540	---	410	---	5.7	3.4	---
TOTAL	1137	1068	1231	399.9	560.1	12976	17553	16445	6129	602.1	203.6	155.5
MEAN	36.7	35.6	39.7	12.9	19.3	419	585	530	204	19.4	6.57	5.18
MAX	49	43	61	29	88	581	978	904	394	61	18	11
MIN	30	25	24	6.8	9.3	132	327	349	68	5.7	3.4	2.8
AC-FT	2260	2120	2440	793	1110	25740	34820	32620	12160	1190	404	308
CFSM	.03	.03	.03	.01	.01	.31	.43	.39	.15	.01	.00	.00
IN.	.03	.03	.03	.01	.02	.35	.48	.45	.17	.02	.01	.00

CAL YR 1987 TOTAL 118843 MEAN 326 MAX 2330 MIN 24 AC-FT 235700 CFSM .24 IN. 3.22  
WTR YR 1988 TOTAL 58460.2 MEAN 160 MAX 978 MIN 2.8 AC-FT 116000 CFSM .12 IN. 1.59

## DES MOINES RIVER BASIN

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## 05476750 DES MOINES RIVER AT HUMBOLDT, IA

LOCATION.--Lat 42°43'12", long 94°13'06", in SE1/4 SW1/4 sec.1, T.91 N., R.29 W., Humboldt County, Hydrologic Unit 07100002 on left bank 5 ft downstream from First Avenue in city of Humboldt, about 700 ft downstream from City of Humboldt water plant, 3.2 mi downstream from dam, 3.2 mi upstream from Indian Creek, 3.9 mi upstream from East Fork Des Moines River, and at mile 334.3 upstream from mouth of Des Moines River.

DRAINAGE AREA.--2,256 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1964 to current year. Prior to October 1970, published as West Fork Des Moines River at Humboldt.

GAGE.--Water-stage recorder. Datum of gage is 1,053.54 ft above NGVD. Prior to Oct. 3, 1966, nonrecording gage at same site and datum.

REMARKS.--Estimated daily discharges: Dec. 31, Jan. 1-5, 24-27, and Feb. 1-2. Records good except those for estimated daily discharges, which are poor. Daily nonrecording gage readings available in Iowa City district office for period Mar. 7, 1940, to Sept. 30, 1964. Discharge not published for this period because of extreme regulation at dam 3.2 mi upstream from gage. Power generation and streamflow regulation discontinued August 1964. Low-flow discharges occasionally affected by minor regulation. U.S. Army Corp of Engineers data collection platform at station.

AVERAGE DISCHARGE.--24 years, 951 ft<sup>3</sup>/s, 5.72 in/yr, 689,000 acre-ft/yr; median of yearly mean discharges, 820 ft<sup>3</sup>/s, 4.9 in/yr, 594,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 18,000 ft<sup>3</sup>/s Apr. 14, 1969, gage height, 15.40 ft; minimum daily discharge, 13 ft<sup>3</sup>/s Nov. 12, 1976, Jan. 12 to Feb. 2, 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 23, 1947, reached a stage of 12.2 ft, discharge, 11,000 ft<sup>3</sup>/s at present site and datum.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,800 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Apr. 30	1000	*2,110	*5.97				

Minimum daily discharge, 36 ft<sup>3</sup>/s Sept. 21.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	220	157	167	136	68	526	769	1940	728	197	68	56
2	192	161	154	122	72	748	810	1770	695	188	66	58
3	187	165	168	120	72	835	1150	1670	674	187	57	61
4	187	160	113	118	66	784	1600	1560	661	177	57	60
5	189	151	121	116	66	785	1730	1460	636	165	66	56
6	177	151	175	109	69	760	1650	1360	604	155	63	56
7	173	245	189	85	70	791	1520	1300	567	144	61	56
8	172	172	192	74	66	827	1400	1700	550	139	97	56
9	166	160	209	67	62	783	1290	1720	511	153	80	54
10	161	156	229	62	59	799	1200	1560	472	169	70	54
11	161	158	256	61	57	902	1120	1410	444	161	67	54
12	164	156	246	64	66	878	1040	1280	419	149	62	53
13	158	155	245	62	65	611	961	1190	397	123	61	48
14	164	154	232	57	62	683	917	1140	362	119	57	47
15	192	161	131	56	60	645	866	1080	357	108	54	48
16	199	173	126	59	61	660	814	960	333	112	50	81
17	178	164	130	66	66	713	764	906	350	120	48	67
18	175	158	189	66	88	709	722	840	353	113	48	59
19	172	158	214	73	112	742	688	780	328	105	48	79
20	171	143	215	75	162	694	663	724	311	99	49	70
21	162	134	196	73	108	708	627	704	286	101	53	36
22	165	161	195	72	114	740	652	742	268	92	193	53
23	152	152	203	72	128	754	616	880	255	89	132	61
24	154	145	197	69	136	720	719	936	247	92	96	61
25	152	154	160	73	132	747	907	916	239	89	87	65
26	156	147	125	68	145	755	1130	875	238	88	80	66
27	154	146	151	70	176	764	1200	836	224	85	83	62
28	151	173	130	67	231	815	1470	819	218	81	70	79
29	151	176	126	64	331	803	1900	788	223	81	65	125
30	151	174	158	70	---	811	2080	755	213	74	63	112
31	153	---	148	77	---	806	---	741	---	48	61	---
TOTAL	5259	4820	5490	2423	2970	23298	32975	35342	12163	3803	2212	1893
MEAN	170	161	177	78.2	102	752	1099	1140	405	123	71.4	63.1
MAX	220	245	256	136	331	902	2080	1940	728	197	193	125
MIN	151	134	113	56	57	526	616	704	213	48	48	36
AC-FT	10430	9560	10890	4810	5890	46210	65410	70100	24130	7540	4390	3750
CFSM	.08	.07	.08	.03	.05	.33	.49	.51	.18	.05	.03	.03
IN.	.09	.08	.09	.04	.05	.38	.54	.58	.20	.06	.04	.03

CAL YR 1987	TOTAL 245619	MEAN 673	MAX 3080	MIN 113	AC-FT 487200	CFSM .30	IN. 4.05
WTR YR 1988	TOTAL 132648	MEAN 362	MAX 2080	MIN 36	AC-FT 263100	CFSM .16	IN. 2.19

## DES MOINES RIVER BASIN

05479000 EAST FORK DES MOINES RIVER AT DAKOTA CITY, IA

LOCATION.--Lat 42°43'26", long 94°11'30", in NW1/4 SE1/4 sec.6, T.91 N., R.28 W., Humboldt County, Hydrologic Unit 07100003, on right bank 50 ft upstream from old mill dam, in city park at east edge of Dakota City, 500 ft upstream from bridge on county highway P56, 0.6 mi downstream from bridge on State Highway 3, 3.4 mi upstream from confluence with Des Moines River, and at mile 333.8 upstream from mouth of Des Moines River.

DRAINAGE AREA.--1,308 mi<sup>2</sup>.

PERIOD OF RECORD.--March 1940 to current year. Prior to October 1954, published as "near Hardy".

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1508: 1944, 1945-47 (M).

GAGE.--Water-stage recorder. Datum of gage is 1,038.71 ft above NGVD. Prior to Oct. 1, 1954, nonrecording gage at site 8 mi upstream at different datum.

REMARKS.--Estimated daily discharges: Nov. 21 to Mar. 14. Records good except those for estimated daily discharges, which are poor. U. S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--48 years, 551 ft<sup>3</sup>/s, 5.72 in/yr, 399,200 acre-ft/yr; median of yearly mean discharges, 490 ft<sup>3</sup>/s, 5.1 in/yr, 355,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 18,800 ft<sup>3</sup>/s June 21, 1954, gage height, 16.95 ft, from flood-mark, site and datum then in use; minimum daily discharge, 4.8 ft<sup>3</sup>/s Jan. 11-14, 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 21, 1954, reached a stage of 24.02 ft, discharge, 17,400 ft<sup>3</sup>/s at present site. Flood of September 1938 reached a stage of 17.4 ft, discharge, about 22,000 ft<sup>3</sup>/s, site and datum in use during the period 1940-54.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,700 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 8	0630	ice jam	*11.08	May 9	0915	*1,640	10.94

Minimum daily discharge, 14 ft<sup>3</sup>/s Sept. 11, 14.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	90	66	88	75	46	195	330	1300	395	70	24	20
2	85	67	92	70	44	240	351	1340	382	64	22	20
3	80	67	84	68	43	300	473	1320	370	60	22	18
4	75	68	70	64	45	380	656	1240	353	55	23	18
5	72	66	78	60	46	440	779	1100	338	50	22	18
6	71	63	90	58	46	480	869	945	322	46	22	19
7	65	65	100	58	47	520	890	844	306	45	21	18
8	66	70	110	58	46	510	845	1090	295	41	35	16
9	69	68	115	56	43	500	758	1630	267	48	33	15
10	64	65	120	50	40	500	677	1500	232	90	33	15
11	59	63	125	46	44	480	624	1380	212	100	31	14
12	58	63	125	46	48	470	555	1300	197	88	25	15
13	57	60	125	47	50	450	513	1170	185	99	23	15
14	56	59	120	48	52	450	474	1050	171	81	22	14
15	63	59	86	49	53	437	433	941	157	73	21	16
16	80	69	62	49	56	624	396	838	145	70	19	23
17	85	77	76	48	60	549	371	766	148	65	20	22
18	86	82	90	47	70	478	348	696	162	58	21	18
19	88	77	110	50	80	448	323	640	159	51	21	20
20	84	74	100	52	105	444	307	601	154	44	19	21
21	80	52	92	49	98	414	300	559	143	41	18	19
22	75	58	94	46	90	411	292	562	127	38	49	24
23	70	62	92	45	98	404	298	564	113	36	35	23
24	70	66	92	45	100	425	319	554	111	35	37	20
25	66	70	90	40	105	457	406	525	109	35	36	18
26	66	68	84	45	110	425	545	500	94	34	29	19
27	70	66	72	50	120	389	671	481	85	32	30	19
28	63	70	62	50	135	411	844	469	78	28	27	20
29	60	76	74	50	140	392	1080	448	80	27	26	39
30	63	84	76	49	---	373	1210	431	73	27	24	38
31	65	---	76	48	---	356	---	412	---	26	22	---
TOTAL	2201	2020	2870	1616	2060	13352	16937	27196	5963	1657	812	594
MEAN	71.0	67.3	92.6	52.1	71.0	431	565	877	199	53.5	26.2	19.8
MAX	90	84	125	75	140	624	1210	1630	395	100	49	39
MIN	56	52	62	40	40	195	292	412	73	26	18	14
AC-FT	4370	4010	5690	3210	4090	26480	33590	53940	11830	3290	1610	1180
CFSM	.05	.05	.07	.04	.05	.33	.43	.67	.15	.04	.02	.02
IN.	.06	.06	.08	.05	.06	.38	.48	.77	.17	.05	.02	.02

CAL YR 1987	TOTAL	112881	MEAN	309	MAX	2050	MIN	50	AC-FT	223900	CFSM	.24	IN.	3.21
WTR YR 1988	TOTAL	77278	MEAN	211	MAX	1630	MIN	14	AC-FT	153300	CFSM	.16	IN.	2.20

## DES MOINES RIVER BASIN

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05480500 DES MOINES RIVER AT FORT DODGE, IA

LOCATION.--Lat 42°30'22", long 94°12'04", in NW1/4 SW1/4 sec.19, T.89 N., R.28 W., Webster County, Hydrologic Unit 07100004, on right bank 400 ft upstream from Soldier Creek, 1,800 ft downstream from Illinois Central Railroad bridge in Fort Dodge, 2,000 ft downstream from Lizard Creek, and at mile 314.6.

DRAINAGE AREA.--4,190 mi<sup>2</sup>.

PERIOD OF RECORD.--April 1905 to July 1906 (no winter records), October 1913 to September 1927 (published as "at Kalo"), October 1946 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1308: 1924, 1925 (M).

GAGE.--Water-stage recorder. Datum of gage is 969.38 ft above NGVD. See WSP 1728 for history of changes prior to Dec. 8, 1949.

REMARKS.--Estimated daily discharges: Dec. 3, 4, 15-18, Dec. 29 to Feb. 27. Records good. Occasional minor regulation caused by dam 0.8 mi upstream from gage. U.S. Army Corps of Engineers rain-gage and data collection platform and City of Fort Dodge gage-height telemeter at station.

AVERAGE DISCHARGE.--56 years (water years 1914-27, 1947-88), 1,566 ft<sup>3</sup>/s, 5.08 in/yr, 1,134,600 acre-ft/yr; median of yearly mean discharges, 1,270 ft<sup>3</sup>/s, 4.1 in/yr, 920,100 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 35,600 ft<sup>3</sup>/s Apr. 8, 1965, gage height, 17.79 ft; maximum gage height, 19.62 ft, from floodmark, June 23, 1947, present site and datum; minimum daily discharge, 14 ft<sup>3</sup>/s Nov. 3, 1955.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 6,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
May 9	1030	*4,130	*5.65				

Minimum discharge, 71 ft<sup>3</sup>/s for part of each day Sept. 14-15.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	430	300	365	310	268	1320	1240	3300	1280	280	96	97
2	398	302	349	305	240	1870	1320	3220	1230	265	91	102
3	376	307	300	290	230	2200	1760	3120	1170	2.0	90	100
4	373	305	260	260	220	2080	2550	3010	1110	237	91	98
5	371	295	296	230	230	1890	2790	2800	1060	221	96	91
6	354	285	374	223	200	1970	2750	2580	1010	203	94	87
7	341	344	391	220	200	1970	2640	2380	961	189	90	85
8	332	313	382	215	205	2010	2480	2890	944	180	138	84
9	329	288	464	210	200	1900	2300	4050	864	208	135	81
10	321	273	663	200	169	1800	2110	3640	780	259	120	78
11	318	267	693	180	161	1890	1980	3210	715	285	115	75
12	318	267	647	190	199	1840	1850	2960	665	252	107	76
13	314	263	595	205	223	1410	1720	2730	631	238	97	75
14	318	264	564	210	233	1230	1630	2470	600	227	93	73
15	330	271	350	218	238	1310	1530	2280	556	207	89	77
16	382	297	200	248	233	1200	1430	2070	523	278	83	117
17	363	295	360	260	268	1310	1340	1890	551	228	80	109
18	345	285	500	250	405	1240	1210	1810	565	224	81	95
19	340	279	529	268	510	1260	1190	1700	544	195	83	90
20	341	267	568	279	449	1220	1150	1600	511	182	82	108
21	331	236	497	258	575	1180	1090	1540	478	167	83	102
22	329	271	447	236	685	1210	1060	1590	439	159	411	108
23	314	281	451	243	628	1200	1040	1680	401	150	475	103
24	308	295	444	223	558	1210	1110	1750	382	145	293	106
25	298	279	517	242	475	1270	1280	1690	370	143	210	101
26	305	269	323	218	542	1250	1710	1600	346	138	167	100
27	310	266	331	243	580	1220	1980	1560	321	132	166	93
28	299	304	310	248	718	1310	2390	1510	298	125	145	104
29	295	334	280	228	868	1310	3000	1430	312	120	127	191
30	292	354	345	285	---	1310	3260	1360	295	117	112	330
31	293	---	340	325	---	1290	---	1320	---	93	104	---
TOTAL	10368	8656	13135	7520	10710	46680	54890	70740	19912	6097	4244	3136
MEAN	334	289	424	243	369	1506	1830	2282	664	197	137	105
MAX	430	354	693	325	868	2200	3260	4050	1280	2.5	475	330
MIN	292	236	200	180	161	1180	1040	1320	295	93	80	73
AC-FT	20560	17170	26050	14920	21240	92590	108900	140300	39500	12090	8420	6220
CFSM	.08	.07	.10	.06	.09	.36	.44	.54	.16	.05	.03	.02
IN.	.09	.08	.12	.07	.10	.41	.49	.63	.18	.05	.04	.03

CAL YR 1987	TOTAL 452884	MEAN 1241	MAX 7480	MIN 200	AC-FT 898300	CFSM .30	IN. 4.02
WTR YR 1988	TOTAL 256088	MEAN 700	MAX 4050	MIN 73	AC-FT 508000	CFSM .17	IN. 2.27

## DES MOINES RIVER BASIN

05481000 BOONE RIVER NEAR WEBSTER CITY, IA

LOCATION.--Lat 42°26'01", Long 93°48'12", in NW1/4 SE1/4 sec. 18, T.88 N., R.25 W., Hamilton County, Hydrologic Unit 07100005, on right bank 100 ft upstream from bridge on State Highway 17, 2.5 mi south of Webster City, and 3.2 mi downstream from Brewers Creek.

DRAINAGE AREA.--844 mi<sup>2</sup>.

PERIOD OF RECORD.--March 1940 to current year.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1308: 1940 (M), WSP 1708: 1956.

GAGE.--Water-stage recorder. Datum of gage is 989.57 ft above NGVD. Prior to June 26, 1940, nonrecording gage at same site and datum.

REMARKS.--Estimated daily discharges: Nov. 28 to Mar. 6. Records good except those for estimated daily discharges, which are poor. U.S. Army Corps of Engineers rain-gage and gage-height satellite data collection platform at station.

AVERAGE DISCHARGE.--48 years, 415 ft<sup>3</sup>/s, 6.68 in/yr, 300,700 acre-ft/yr; median of yearly mean discharges, 360 ft<sup>3</sup>/s, 5.8 in/yr, 261,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 20,300 ft<sup>3</sup>/s June 22, 1954, gage height, 18.55 ft; no flow Feb. 7, 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since 1896, 19.1 ft about June 10, 1918, from floodmarks, from information by local resident, discharge, 21,500 ft<sup>3</sup>/s. Flood of June 18, 1932, reached a stage of 16.0 ft, discharge, 15,000 ft<sup>3</sup>/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,200 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 3	1315	ice jam	*4.82	Mar. 4	0100	*980	ice jam

Minimum discharge, 2.1 ft<sup>3</sup>/s Sept. 14.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	163	105	145	128	115	330	295	774	156	42	11	8.6
2	159	106	138	126	103	510	346	670	151	41	9.9	8.3
3	144	102	117	119	98	710	551	594	146	46	8.6	7.4
4	139	100	100	106	94	840	733	537	138	40	8.4	8.1
5	141	96	116	93	98	760	772	479	130	35	8.2	8.3
6	131	93	150	90	85	670	723	438	122	32	7.4	7.5
7	124	97	157	89	85	666	657	420	115	29	7.3	6.2
8	119	97	154	87	87	673	604	415	115	27	12	6.2
9	115	93	190	85	85	674	550	410	102	27	15	5.6
10	110	86	281	81	71	707	495	489	96	29	22	4.1
11	102	84	350	72	67	686	460	551	88	29	16	3.5
12	103	84	330	77	85	663	431	482	81	33	11	3.4
13	104	85	310	83	96	452	395	428	77	51	9.1	3.3
14	103	86	290	86	101	271	362	389	74	43	12	2.9
15	107	88	140	89	104	329	332	358	68	35	9.8	3.4
16	131	109	77	103	102	429	309	334	63	34	7.8	9.5
17	125	121	147	109	119	387	290	309	79	56	6.3	7.0
18	116	121	210	104	186	353	276	284	93	51	5.7	12
19	119	124	223	113	240	340	263	267	88	51	5.4	24
20	121	120	242	118	204	281	254	254	87	36	5.3	16
21	118	105	210	109	261	279	250	252	75	29	5.2	17
22	117	122	187	99	308	271	245	284	64	24	28	18
23	115	126	189	102	274	287	245	275	57	22	26	24
24	113	117	186	93	235	293	241	260	52	20	28	21
25	107	115	220	102	193	315	245	243	58	19	21	14
26	106	103	132	91	217	327	299	226	57	17	22	9.7
27	108	100	136	103	227	303	447	220	49	17	26	7.9
28	100	118	127	105	279	305	709	214	43	15	20	8.7
29	103	130	114	96	334	320	861	206	40	15	16	24
30	100	140	143	123	---	333	887	188	40	14	13	25
31	96	---	141	142	---	317	---	168	---	12	9.9	---
TOTAL	3659	3173	5652	3123	4553	14081	13527	11418	2604	971	413.3	324.6
MEAN	118	106	182	101	157	454	451	368	86.8	31.3	13.3	10.8
MAX	163	140	350	142	334	840	887	774	156	56	28	25
MIN	96	84	77	72	67	271	241	168	40	12	5.2	2.9
AC-FT	7260	6290	11210	6190	9030	27930	26830	22650	5170	1930	820	644
CFSM	.14	.13	.22	.12	.19	.54	.53	.44	.10	.04	.02	.01
IN.	.16	.14	.25	.14	.20	.62	.60	.50	.11	.04	.02	.01

CAL YR 1987 TOTAL 98344 MEAN 269 MAX 2480 MIN 41 AC-FT 195100 CFSM .32 IN. 4.33  
WTR YR 1988 TOTAL 63498.9 MEAN 173 MAX 887 MIN 2.9 AC-FT 126000 CFSM .21 IN. 2.80

## 05481300 DES MOINES RIVER NEAR STRATFORD, IA

LOCATION.--Lat 42°15'04", long 93°59'52", in NW1/4 NE1/4 sec.21, T.86 N., R.27 W., Webster County, Hydrologic Unit 07100004, on right bank 6 ft downstream from bridge on State Highway 175, 0.1 mi downstream from Skillet Creek, 4.0 mi southwest of Stratford, 7.3 mi downstream from Boone River and at mile 276.7.

DRAINAGE AREA.--5,452 mi<sup>2</sup>.

PERIOD OF RECORD.--April 1920 to current year in reports of U.S. Geological Survey. Published as "near Boone" 1920-67. Monthly discharge only for some periods, published in WSP 1308. December 1904 to April 1920 (fragmentary gage heights during high-water periods only) in reports of U.S. Weather Bureau.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1508: 1925-27, 1934. WSP 1708: 1955.

GAGE.--Water-stage recorder. Datum of gage is 894.00 ft above NGVD. Prior to May 1, 1920, nonrecording gage 16.6 mi downstream at datum 23.49 ft lower. Oct. 9, 1924, to Jan. 10, 1933, nonrecording gage 17.6 mi downstream at datum 28.53 ft lower. Jan. 11, 1933, to Sept. 30, 1934, nonrecording gage 17.9 mi downstream at datum 22.25 ft lower. Oct. 1, 1934 to Feb. 6, 1935, nonrecording gage and Feb. 7, 1935 to Sept. 30, 1967, water-stage recorder 17.9 mi downstream at datum 21.84 ft lower.

REMARKS.--Estimated daily discharges: Dec. 15 to Mar. 14. Records good except those for estimated daily discharges, which are poor. Occasional minor regulation caused by dam at Fort Dodge. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--68 years, 1,986 ft<sup>3</sup>/s, 4.95 in/yr, 1,439,000 acre-ft/yr; median of yearly mean discharges, 1,680 ft<sup>3</sup>/s, 4.2 in/yr, 1,220,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 57,400 ft<sup>3</sup>/s June 22, 1954, gage height, 25.35 ft, from graph based on hourly gage readings, site and datum then in use; no flow for a short time on Jan. 9, 25, 1938, caused by manipulation of gates in control dam, site then in use; minimum unregulated daily discharge, 13 ft<sup>3</sup>/s Jan. 23, 24, 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of May 30, 1903, reached a stage of 25.4 ft, from high-water mark, site and datum then in use, discharge, 43,600 ft<sup>3</sup>/s. Flood of June 22, 1954, reached a stage of 29.7 ft, from floodmark, present site and datum, discharge, 54,200 ft<sup>3</sup>/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 7,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 7	----	ice jam	*9.68	May 9	2400	*5,010	9.60

Minimum discharge, 81 ft<sup>3</sup>/s Sept. 14, 15.

## DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

## MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	769	455	926	680	430	1250	1740	4570	1600	362	126	126
2	719	447	960	610	380	1650	1780	4340	1560	339	111	128
3	673	446	923	530	360	2300	2090	4080	1490	319	117	119
4	628	442	868	460	330	2700	2860	3880	1430	307	112	120
5	603	438	763	440	340	2600	3620	3620	1370	288	110	112
6	576	430	770	430	300	2250	3800	3300	1310	271	110	104
7	556	426	806	420	290	2200	3650	3050	1250	251	110	102
8	534	472	803	415	290	2280	3470	2950	1280	233	115	98
9	519	474	853	400	290	2300	3260	4220	1180	226	143	95
10	517	439	1100	390	260	2300	3030	4810	1080	249	143	95
11	510	427	1420	360	240	2200	2790	4250	985	282	136	93
12	498	418	1440	380	280	2350	2630	3830	907	297	133	87
13	498	416	1320	400	300	2000	2480	3480	849	273	128	84
14	486	413	1200	415	310	1700	2320	3160	802	275	116	83
15	493	416	810	460	310	1580	2160	2910	749	265	110	85
16	551	466	500	450	290	1620	2030	2710	689	247	108	107
17	571	498	460	460	350	1760	1920	2480	695	293	101	134
18	542	502	1030	450	520	1730	1820	2300	775	299	93	130
19	520	485	1100	480	640	1680	1700	2190	725	299	91	134
20	518	477	940	480	580	1710	1670	2070	685	274	95	129
21	523	467	820	450	720	1640	1620	1960	640	252	95	123
22	511	439	740	400	840	1610	1560	2040	579	234	182	146
23	506	463	730	410	760	1630	1560	2020	526	217	476	171
24	491	480	730	370	720	1640	1500	2100	484	201	469	125
25	487	485	620	400	620	1700	1580	2110	450	186	323	128
26	479	467	660	350	720	1730	1850	2010	439	175	235	125
27	477	445	580	390	780	1700	2330	1930	416	161	203	118
28	479	499	550	380	980	1680	2810	1880	386	153	195	127
29	466	701	650	360	1100	1770	3580	1810	364	143	165	174
30	455	876	630	460	---	1770	4340	1730	379	136	147	231
31	447	---	670	500	---	1770	---	1650	---	133	138	---
TOTAL	16602	14309	26372	13580	14330	58800	73550	89440	26074	7640	4936	3633
MEAN	536	477	851	438	494	1897	2452	2885	869	246	159	121
MAX	769	876	1440	680	1100	2700	4340	4810	1600	362	476	231
MIN	447	413	460	350	240	1250	1500	1650	364	133	91	83
AC-FT	32930	28380	52310	26940	28420	116600	145900	177400	51720	15150	9790	7210
CFSM	.10	.09	.16	.08	.09	.35	.45	.53	.16	.05	.03	.02
IN.	.11	.10	.18	.09	.10	.40	.50	.61	.18	.05	.03	.02

CAL YR 1987	TOTAL 639732	MEAN 1753	MAX 12000	MIN 413	AC-FT 1269000	CFSM .32	IN. 4.37
WTR YR 1988	TOTAL 349266	MEAN 954	MAX 4810	MIN 83	AC-FT 692800	CFSM .18	IN. 2.38





## 05481650 DES MOINES RIVER NEAR SAYLORVILLE, IA

LOCATION.--Lat 41°40'50", long 93°40'05", near center of sec.5, T.79 N., R.24 W., Polk County, Hydrologic Unit 07100004, on left bank 5 ft upstream of Fisher Bridge on county highway R6F, 2.0 mi west of Saylorville, 2.1 mi downstream from Rock Creek, 2.3 mi downstream from Saylorville Dam, 2.3 mi upstream from Beaver Creek, and at mile 211.4.

DRAINAGE AREA.--5,841 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1961 to current year.

GAGE.--Water-stage recorder. Datum of gage is 787.42 ft above NGVD (levels by U. S. Army Corps of Engineers). Prior to Aug. 6, 1970, nonrecording gage at same site and datum.

REMARKS.--Estimated daily discharge: March 12. Records good. Flow regulated by Saylorville Lake (Station 05481630) 2.3 mi upstream since Apr. 12, 1977. U.S. Army Corps of Engineers satellite data collection platform at station.

AVERAGE DISCHARGE.--27 years, 2,878 ft<sup>3</sup>/s, 6.69 in/yr, 2,085,000 acre-ft/yr; median of yearly mean discharges, 2,410 ft<sup>3</sup>/s, 5.6 in/yr, 1,700,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 47,400 ft<sup>3</sup>/s Apr. 10, 1965, gage height, 24.02 ft; minimum daily discharge, 13 ft<sup>3</sup>/s Jan. 25, 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since at least 1893, 24.5 ft June 24, 1954, from floodmarks, discharge, 60,000 ft<sup>3</sup>/s.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 4,590 ft<sup>3</sup>/s May 12, gage height, 8.52 ft; minimum daily discharge, 172 ft<sup>3</sup>/s July 4.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	809	662	1180	568	1730	1320	1580	3770	1640	293	278	209
2	693	656	1270	566	443	1670	1700	4120	1550	214	275	207
3	691	661	1260	547	354	2070	2160	4130	1450	185	282	211
4	682	661	1250	604	345	2190	2530	4120	1370	172	258	216
5	702	658	1560	928	342	2440	2530	4110	1370	198	222	217
6	681	656	1850	863	342	2690	2910	3850	1370	247	224	217
7	661	661	1840	821	341	2970	3690	3290	1370	251	229	214
8	666	658	1840	651	342	3160	3840	2960	1390	251	234	217
9	661	653	1950	523	342	3140	3820	2830	978	254	235	217
10	655	655	2030	523	342	3150	3820	2980	1310	253	244	218
11	658	659	2040	363	344	3160	3400	3940	1330	251	247	225
12	660	536	2040	253	348	3130	3050	4580	1070	246	221	246
13	659	440	1770	270	348	3100	2770	4550	737	253	207	202
14	655	440	1560	247	339	2510	2530	3840	643	262	211	220
15	658	442	1550	246	336	1830	2350	3070	647	260	211	227
16	658	443	1550	243	342	1650	2220	2920	645	256	207	230
17	655	437	1250	421	342	1650	2210	2910	635	258	208	235
18	655	440	1020	543	347	1650	2050	2530	638	261	211	240
19	655	440	773	546	477	1660	1800	2110	641	265	211	237
20	655	440	498	549	602	1670	1670	1990	636	275	211	228
21	656	450	989	553	607	1670	1660	1980	638	271	201	230
22	659	569	1520	556	768	1680	1680	1970	641	262	211	234
23	658	652	1310	547	1000	1660	1670	1960	635	268	211	234
24	661	718	1150	457	1100	1670	1670	1960	567	271	203	234
25	665	777	1150	417	1100	1670	1680	1960	517	272	205	231
26	665	777	1150	345	995	1660	1670	1970	514	271	208	230
27	659	780	1150	300	905	1680	1830	1980	418	269	211	236
28	661	806	918	300	903	1730	1980	1990	330	270	210	234
29	663	840	729	302	1130	1940	2410	1980	322	272	211	234
30	668	973	736	318	---	2330	3170	1970	312	271	211	234
31	668	---	634	2090	---	2050	---	1850	---	274	213	---
TOTAL	20752	18640	41517	16460	17256	66550	72050	90170	26314	7876	6921	6764
MEAN	669	621	1339	531	595	2147	2402	2909	877	254	223	225
MAX	809	973	2040	2090	1730	3160	3840	4580	1640	293	282	246
MIN	655	437	498	243	336	1320	1580	1850	312	172	201	202
AC-FT	41160	36970	82350	32650	34230	132000	142900	178900	52190	15620	13730	13420
CFSM	.11	.11	.23	.09	.10	.37	.41	.50	.15	.04	.04	.04
IN.	.13	.12	.26	.10	.11	.42	.46	.57	.17	.05	.04	.04

CAL YR 1987 TOTAL 730741 MEAN 2002 MAX 11700 MIN 240 AC-FT 1449000 CFSM .34 IN. 4.65  
WTR YR 1988 TOTAL 391270 MEAN 1069 MAX 4580 MIN 172 AC-FT 776100 CFSM .18 IN. 2.49

## DES MOINES RIVER BASIN

05481650 DES MOINES RIVER NEAR SAYLORVILLE, IA--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD: Water years 1962 to current year.

## PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: December 1967 to September 1971, October 1971 to September 1980 (partial record station), October 1980 to current year.

WATER TEMPERATURES: October 1961 to September 1971, October 1971 to September 1980 (partial record station), October 1980 to current year.

SUSPENDED-SEDIMENT DISCHARGE: October 1961 to current year.

REMARKS.--Records of specific conductance are obtained from suspended-sediment samples at time of analysis. During periods of partial ice cover, sediment samples are collected in open water channel.

## EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum daily, 1,400 microsiemens Feb. 18, 1977; minimum daily, 90 microsiemens Feb. 19, 1971.

WATER TEMPERATURES: Maximum daily, 36.0°C June 29, 1971; minimum daily, 0.0°C on many days during winter periods.

SEDIMENT CONCENTRATIONS: Maximum daily mean, 5,400 mg/L May 14, 1970; minimum daily mean, 1 mg/L Jan. 8, 1965, Sept. 1, 1988.

SEDIMENT LOADS: Maximum daily, 148,000 tons June 12, 1966; minimum daily, 0.56 ton Sept. 1, 1988.

## EXTREMES FOR CURRENT YEAR:

SPECIFIC CONDUCTANCE: Maximum daily, 800 microsiemens Aug. 22; minimum daily, 440 microsiemens May 9.

WATER TEMPERATURES: Maximum daily, 31.0°C Aug. 14-16.

SEDIMENT CONCENTRATIONS: Maximum daily mean, 200 mg/L May 1; minimum daily mean, 1 mg/L Sept. 1.

SEDIMENT LOADS: Maximum daily, 2,040 tons May 1; minimum daily, 0.56 tons Sept. 1.

SPECIFIC CONDUCTANCE MICROSIEMENS/CM AT 25 DEG C, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	600	605	560	510	620	---	500	530	580	720	640	800
2	560	590	---	---	---	---	---	---	580	720	640	---
3	595	560	---	500	---	520	---	540	640	720	620	800
4	590	605	---	520	570	---	510	520	620	720	630	780
5	540	500	490	---	---	---	---	---	570	620	740	790
6	565	605	---	---	560	580	480	570	560	740	740	790
7	530	560	500	500	---	580	---	540	560	720	---	500
8	585	565	---	---	560	---	---	500	---	720	740	740
9	560	513	500	---	---	540	---	440	620	720	720	530
10	540	510	---	490	560	---	490	610	600	720	500	530
11	510	540	---	---	---	---	570	560	560	680	480	520
12	520	520	---	---	---	510	560	520	570	670	480	780
13	560	720	---	---	590	600	---	520	630	680	480	580
14	520	540	500	520	---	560	460	510	620	530	720	540
15	600	515	---	---	650	---	---	560	630	520	740	---
16	585	540	---	520	---	540	---	635	620	530	720	780
17	500	535	550	510	---	540	560	535	---	710	740	---
18	510	560	---	540	730	540	500	560	---	620	740	500
19	550	560	510	---	---	---	460	530	620	620	745	---
20	520	---	---	510	550	510	480	560	610	610	780	605
21	480	625	490	---	---	525	---	520	620	---	780	650
22	600	---	---	510	---	---	500	580	620	625	800	650
23	620	---	530	---	540	520	560	540	620	620	790	650
24	535	525	---	520	---	---	580	720	630	640	790	650
25	545	---	---	520	540	---	485	570	680	620	790	670
26	545	540	490	---	---	---	---	---	690	630	780	660
27	520	---	---	530	560	---	540	---	740	600	780	650
28	540	---	---	580	---	520	530	---	670	---	790	720
29	540	570	500	---	530	---	---	---	---	590	785	760
30	590	---	---	---	---	520	595	600	740	640	790	670
31	560	---	---	---	---	---	---	580	---	640	790	---

## DES MOINES RIVER BASIN

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05481650 DES MOINES RIVER NEAR SAYLORVILLE, IA-Continued

## WATER-QUALITY RECORDS

WATER TEMPERATURE, DEGREES CENTIGRADE, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	20.0	10.0	4.0	2.0	3.0	---	6.0	14.0	20.0	28.0	30.0	25.0
2	20.0	10.0	---	---	---	---	---	14.0	25.0	28.0	30.0	---
3	20.0	10.0	---	2.0	---	6.0	---	14.0	23.0	28.0	30.0	24.0
4	20.0	9.0	---	2.0	3.0	---	6.0	14.0	24.0	28.0	29.0	24.0
5	19.0	9.0	3.0	---	---	---	---	14.0	25.0	29.0	29.0	23.0
6	16.0	9.0	---	---	4.0	6.0	6.0	14.0	26.0	29.0	29.0	23.0
7	16.0	9.0	3.0	3.0	---	5.0	---	14.0	26.0	29.0	---	23.0
8	15.0	9.0	---	---	4.0	---	---	14.0	---	29.0	28.0	23.0
9	15.0	9.0	3.0	---	---	6.0	---	14.0	25.0	29.0	29.0	23.0
10	15.0	9.0	---	3.0	4.0	---	10.0	18.0	25.0	29.0	29.0	24.0
11	15.0	9.0	---	---	---	---	---	17.0	25.0	29.0	30.0	24.0
12	15.0	9.0	---	---	---	5.0	12.0	16.0	25.0	29.0	30.0	23.0
13	12.0	---	---	1.0	4.0	5.0	---	16.0	26.0	29.0	30.0	23.0
14	12.0	9.0	3.0	4.0	---	4.0	14.0	17.0	27.0	29.0	31.0	23.0
15	10.0	8.0	---	---	4.0	---	---	18.0	27.0	29.0	31.0	23.0
16	10.0	8.0	---	5.0	---	4.0	---	16.0	27.0	29.0	31.0	23.0
17	10.0	8.0	3.0	5.0	---	4.0	10.0	18.0	---	29.0	---	23.0
18	10.0	9.0	---	5.0	4.0	---	11.0	19.0	---	28.0	---	22.0
19	10.0	8.0	3.0	---	---	---	11.0	19.0	27.0	28.0	29.0	23.0
20	10.0	---	---	5.0	5.0	5.0	12.0	18.0	29.0	28.0	29.0	21.0
21	10.0	7.0	3.0	---	---	5.0	---	18.0	28.0	---	29.0	23.0
22	10.0	---	---	4.0	---	---	13.0	18.0	28.0	28.0	28.0	23.0
23	10.0	---	3.0	---	5.0	6.0	13.0	19.0	26.0	28.0	28.0	---
24	10.0	5.0	---	4.0	---	---	13.0	19.0	28.0	28.0	28.0	23.0
25	10.0	---	---	3.0	5.0	---	13.0	---	28.0	28.0	28.0	23.0
26	10.0	5.0	2.0	---	---	---	---	---	28.0	28.0	28.0	23.0
27	10.0	---	---	3.0	5.0	---	12.0	---	25.0	28.0	27.0	23.0
28	10.0	---	---	4.0	---	6.0	13.0	---	28.0	---	27.0	25.0
29	9.0	5.0	2.0	---	6.0	---	---	20.0	29.0	29.0	27.0	22.0
30	10.0	---	---	---	---	6.0	14.0	20.0	---	29.0	26.0	23.0
31	---	---	---	---	---	---	---	20.0	---	30.0	25.0	---

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DAY	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	24	52	12	21	19	61	3	4.6	45	210	3	11
2	31	58	15	27	12	41	2	3.1	22	26	3	14
3	28	52	19	34	11	37	2	3.0	18	17	3	17
4	29	53	11	20	10	34	30	49	18	17	5	30
5	32	61	13	23	24	101	68	170	18	17	8	53
6	25	46	14	25	60	300	63	147	13	12	9	65
7	27	48	10	18	51	253	59	131	15	1	5	40
8	12	22	6	11	34	169	57	100	26	24	3	26
9	41	73	11	19	39	205	55	78	44	41	4	34
10	39	69	11	19	46	252	55	78	49	45	4	34
11	15	27	10	18	45	248	49	48	47	44	6	51
12	6	11	11	16	44	242	21	14	41	39	12	101
13	11	20	11	13	29	139	17	12	33	31	12	100
14	44	78	11	13	18	76	6	4.0	28	26	13	88
15	43	76	12	14	17	71	6	4.0	29	26	13	64
16	17	30	21	25	17	71	7	4.6	32	30	14	62
17	5	8.8	32	38	33	111	7	8.0	24	22	17	76
18	40	71	22	26	47	129	4	5.9	18	17	17	76
19	42	74	34	40	27	56	10	15	17	22	44	197
20	12	21	45	53	12	16	72	107	17	28	115	519
21	12	21	27	33	20	53	101	151	17	28	113	510
22	50	89	37	57	27	111	96	144	33	68	110	499
23	24	43	19	33	34	120	92	136	46	124	110	493
24	21	37	18	35	14	43	87	107	45	134	108	487
25	19	34	13	27	6	19	90	101	42	125	105	473
26	25	45	13	27	5	16	74	69	28	75	101	453
27	20	36	11	23	5	16	45	36	18	44	105	476
28	25	45	13	28	5	12	24	19	18	44	124	579
29	21	38	32	73	3	5.9	14	11	8	24	155	812
30	22	40	37	97	3	6.0	18	15	---	---	124	780
31	24	43	---	---	3	5.1	60	339	---	---	64	354
TOTAL	---	1421.8	---	906	---	3019.0	---	2114.2	---	1374	---	7574

## DES MOINES RIVER BASIN

05481650 DES MOINES RIVER NEAR SAYLORVILLE, IA--Continued

## WATER-QUALITY RECORDS

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DAY	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	20	85	200	2040	44	195	56	44	13	9.8	1	.56
2	14	64	63	701	18	75	85	49	12	8.9	4	2.2
3	14	82	39	435	23	90	78	39	11	8.4	15	8.5
4	13	89	35	389	21	78	76	35	20	14	20	12
5	12	82	30	333	22	81	65	35	10	6.0	6	3.5
6	21	165	25	260	43	159	114	76	19	11	4	2.3
7	27	269	25	222	42	155	110	75	22	14	35	20
8	27	280	27	216	21	79	130	88	4	2.5	10	5.9
9	21	217	60	458	15	40	110	75	3	1.9	45	26
10	13	134	46	370	18	64	107	73	19	13	31	18
11	15	138	30	319	39	140	80	54	37	25	26	16
12	17	140	31	383	32	92	55	37	51	30	20	13
13	10	75	42	516	17	34	35	24	31	17	30	16
14	8	55	44	456	10	17	35	25	6	3.4	30	18
15	8	51	37	307	14	24	49	34	3	1.7	31	19
16	8	48	30	237	14	24	48	33	5	2.8	20	12
17	7	42	54	424	14	24	92	64	21	12	40	25
18	12	66	78	533	14	24	29	20	39	22	55	36
19	20	97	56	319	14	24	5	3.6	11	6.3	51	33
20	24	108	43	231	12	21	5	3.7	2	1.1	14	8.6
21	35	157	54	289	16	28	5	3.7	3	1.6	11	6.8
22	50	227	39	207	18	31	6	4.2	2	1.1	11	6.9
23	37	167	40	212	23	39	10	7.2	9	5.1	11	6.9
24	21	95	115	609	12	18	6	4.4	8	4.4	16	10
25	59	268	184	974	15	21	4	2.9	11	6.1	14	8.7
26	52	234	154	819	19	26	9	6.6	17	9.5	18	11
27	33	163	106	567	25	28	11	8.0	17	9.7	21	13
28	60	321	75	403	31	28	11	8.0	26	15	24	15
29	78	508	49	262	35	30	10	7.3	34	19	6	3.8
30	125	1070	35	186	40	34	11	8.0	26	15	1	.63
31	---	---	44	220	---	---	12	8.9	9	5.2	---	---
TOTAL	---	5497	---	13897	---	1723	---	956.5	---	302.5	---	378.29
TOTAL LOAD FOR YEAR: 39163.29 TONS.												

## PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	TEMPER- ATURE WATER (DEG C) (00010)	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDED (T/DAY) (80155)	SED. . SUSP. SIEVE DIAM. THAN .062 MM (70331)
OCT 1987						
14...	0920	13.0	675	49	89	78
NOV						
18...	1425	--	437	17	20	85
APR 1988						
12...	1700	11.0	4950	19	254	89
MAY						
17...	1215	19.0	2950	27	215	88
JUN						
23...	1400	23.0	624	41	69	93
AUG						
04...	0920	28.0	281	14	11	99
SEP						
20...	1205	--	229	12	7.4	93

05481650 DES MOINES RIVER BASIN NEAR SAYLORVILLE, IA--Continued

## WATER-QUALITY RECORDS

PARTICLE-SIZE DISTRIBUTION OF SURFACE BED MATERIAL, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	NUMBER OF SAM- PLING POINTS (COUNT) (00063)	BED MAT. SIEVE DIAM. FINER THAN (80164)	BED MAT. SIEVE DIAM. FINER THAN (80165)	BED MAT. SIEVE DIAM. FINER THAN (80166)	BED MAT. SIEVE DIAM. FINER THAN (80167)	BED MAT. SIEVE DIAM. FINER THAN (80168)	BED MAT. SIEVE DIAM. FINER THAN (80169)	BED MAT. SIEVE DIAM. FINER THAN (80170)	BED MAT. SIEVE DIAM. FINER THAN (80171)	BED MAT. SIEVE DIAM. FINER THAN (80172)	BED MAT. SIEVE DIAM. FINER THAN (80173)
NOV 1987												
18...	1410	5	0	1	4	20	34	46	61	78	91	100
MAY 1988												
17...	1250	3	0	1	18	66	90	97	100	--	--	--
JUN												
23...	1335	5	--	0	3	18	37	52	69	84	96	1

## DES MOINES RIVER BASIN

05481950 BEAVER CREEK NEAR GRIMES, IA

LOCATION.--Lat 41°41'18", long 93°44'08", in SW1/4 SW1/4 sec.35, T.80 N., R.25 W., Polk County, Hydrologic Unit 07100004, on right bank 6 ft upstream from bridge on Northwest 70th Avenue, 0.5 mi downstream from Little Beaver Creek, 2.5 mi east of Grimes and 6 mi upstream from mouth.

DRAINAGE AREA.--358 mi<sup>2</sup>.

PERIOD OF RECORD.--April 1960 to current year.

REVISED RECORDS.--WDR IA-77-1: 1974 (P).

GAGE.--Water-stage recorder and concrete and steel sheeting broad-crested control. Datum of gage is 806.98 ft above NGVD. Prior to Aug. 31, 1966, nonrecording gage at same site and datum.

REMARKS.--Estimated daily discharges: Dec. 16 to Mar. 6, Mar. 13-15, July 2-4, 19-28. Records good except those for estimated daily discharges, which are poor. U.S. Army Corps of Engineers satellite data collection platform at station.

AVERAGE DISCHARGE.--28 years, 212 ft<sup>3</sup>/s, 8.04 in/yr, 153,600 acre-ft/yr; median of yearly mean discharges, 200 ft<sup>3</sup>/s, 7.6 in/yr, 145,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 7,980 ft<sup>3</sup>/s June 30, 1986, gage height, 14.73 ft; no flow for several days in 1970 and 1971 and many days in 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 30	1015	*544	6.34	Feb. 1	0015	ice jam	*6.91

Minimum daily discharge, 0.01 ft<sup>3</sup>/s Aug. 9, 10.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	198	117	471	92	348	126	90	66	25	.85	.04	.03
2	187	120	396	118	262	125	104	65	26	.96	.04	.05
3	173	122	352	112	193	115	123	62	24	1.2	.04	.05
4	169	120	316	108	170	128	138	62	23	.90	.19	.06
5	170	114	292	99	147	132	146	62	21	.48	.06	.07
6	162	110	281	94	133	141	146	59	19	.47	.04	.09
7	153	113	268	92	120	124	137	56	18	.33	1.5	.11
8	144	121	260	99	132	115	132	62	39	.31	1.7	.07
9	141	114	261	98	115	104	127	71	99	1.1	.01	.08
10	132	105	257	86	105	96	119	66	72	2.1	.01	.04
11	120	105	264	84	93	94	113	61	53	1.4	.03	.04
12	124	108	257	84	82	93	122	57	45	.68	2.5	.06
13	125	113	237	93	79	70	118	50	37	.36	11	.04
14	124	112	223	82	72	68	112	49	27	.24	2.1	.03
15	121	112	224	96	66	64	105	46	21	.22	.02	.09
16	138	145	161	105	66	102	100	45	18	.42	.02	.14
17	160	176	123	92	71	95	98	44	17	.73	.02	.18
18	160	178	115	88	85	80	93	43	17	23	.02	.15
19	159	176	117	90	105	77	87	42	17	14	.02	.82
20	154	174	145	85	146	80	83	41	16	9.1	.02	.35
21	143	169	115	82	225	75	82	39	13	4.0	.02	.44
22	136	168	135	78	210	73	81	45	9.6	3.5	2.1	1.8
23	135	170	152	82	170	73	79	48	7.1	3.2	.86	.34
24	129	159	163	85	162	78	79	47	5.9	3.0	.08	.24
25	123	151	140	78	148	88	74	39	4.3	2.6	.07	.21
26	124	147	107	74	125	87	73	35	3.2	2.0	.03	.19
27	128	147	96	76	120	85	75	33	2.7	1.1	.03	.28
28	122	212	99	82	123	88	73	34	2.1	.42	.03	.38
29	119	425	106	98	124	92	70	32	1.8	.10	.06	.53
30	118	532	105	130	---	90	68	30	1.2	.13	.04	.75
31	114	---	98	430	---	89	---	27	---	.10	.03	---
TOTAL	4405	4835	6336	3192	3997	2947	3047	1518	684.9	79.00	22.73	7.71
MEAN	142	161	204	103	138	95.1	102	49.0	22.8	2.55	.73	.26
MAX	198	532	471	430	348	141	146	71	99	23	11	1.8
MIN	114	105	96	74	66	64	68	27	1.2	.10	.01	.03
AC-FT	8740	9590	12570	6330	7930	5850	6040	3010	1360	157	45	15
CFSM	.40	.45	.57	.29	.38	.27	.28	.14	.06	.01	.00	.00
IN.	.46	.50	.66	.33	.42	.31	.32	.16	.07	.01	.00	.00

CAL YR 1987	TOTAL	82687	MEAN	227	MAX	2520	MIN	31	AC-FT	164000	CFSM	.63	IN.	8.59
WTR YR 1988	TOTAL	31071.34	MEAN	84.9	MAX	532	MIN	.01	AC-FT	61630	CFSM	.24	IN.	3.23

## DES MOINES RIVER BASIN

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05482135 NORTH RACCOON RIVER NEAR NEWELL, IA

LOCATION.--Lat 42°36'16", long 95°02'42", in NE1/4 NW1/4 sec.24, T.90 N., R.36 W., Buena Vista County, Hydrologic Unit 07100005, on left bank 40 ft downstream from bridge on State Highway 7, 0.8 mi upstream from Outlet Creek, 2.2 mi west of Newell, and at mile 398.6 upstream from mouth of Des Moines River.

DRAINAGE AREA.--233 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1982 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1235.50 ft above NGVD.

REMARKS.--Estimated daily discharges: Nov. 28 to Dec. 6, Dec. 14-18, and Dec. 22 to Mar. 17. Records good except those for estimated daily discharges, which are poor. U.S. Geological Survey gage-height telemeter at station.

AVERAGE DISCHARGE.--6 years, 198 ft<sup>3</sup>/s, 11.5 in/yr, 143,500 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,850 ft<sup>3</sup>/s June 17, 1984, gage height, 16.73 ft, from flood-mark; minimum discharge 2.1 ft<sup>3</sup>/s Aug. 17, 18, 1988.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 750 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Aug. 22	2130	*649	*12.20				

Minimum discharge, 2.1 ft<sup>3</sup>/s Aug. 17, 18.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	88	43	25	28	20	117	68	143	75	18	3.4	33
2	79	43	26	27	17	103	93	132	135	16	3.1	29
3	73	44	27	26	16	118	287	122	105	15	2.9	26
4	75	41	26	24	15	115	289	113	83	14	3.9	24
5	74	38	35	21	14	110	240	106	69	13	4.3	22
6	68	39	40	20	15	116	211	99	61	11	3.4	20
7	65	41	33	20	16	107	190	102	55	10	2.8	19
8	65	39	36	19	16	107	177	114	365	9.8	10	17
9	65	45	83	18	15	97	158	124	318	64	7.3	15
10	59	39	100	17	14	90	141	115	203	114	3.8	15
11	57	42	95	17	13	91	133	107	164	39	3.2	14
12	58	41	84	18	15	87	125	106	136	26	2.8	13
13	58	40	74	18	18	71	117	97	116	20	2.7	13
14	54	38	54	19	17	61	109	95	98	16	2.6	12
15	55	38	38	20	16	62	102	90	82	13	2.6	17
16	60	40	24	22	17	59	96	82	71	13	2.4	22
17	61	40	32	22	19	80	95	76	71	10	2.2	19
18	57	37	39	21	26	111	86	75	66	11	2.8	17
19	56	36	31	22	33	106	85	73	57	8.9	5.5	17
20	56	36	33	22	30	100	84	69	48	8.7	3.1	18
21	55	40	35	21	36	98	76	66	42	7.9	2.8	17
22	56	41	43	19	38	94	78	68	37	7.4	285	19
23	52	36	45	18	35	90	87	68	31	6.9	484	17
24	49	31	45	16	40	86	90	66	30	6.4	240	16
25	48	31	42	14	55	83	91	61	27	6.2	147	15
26	52	31	36	13	59	79	92	57	23	5.3	101	15
27	48	30	35	16	62	77	152	57	22	4.9	83	14
28	44	28	34	20	74	71	181	53	21	4.5	69	17
29	46	27	32	23	88	68	169	49	21	4.3	55	106
30	44	26	36	32	---	71	154	47	22	4.2	46	136
31	41	---	31	25	---	71	---	43	---	3.9	38	---
TOTAL	1818	1121	1349	638	849	2796	4056	2675	2654	512.3	1625.6	754
MEAN	58.6	37.4	43.5	20.6	29.3	90.2	135	86.3	88.5	16.5	52.4	25.1
MAX	88	45	100	32	88	118	289	143	365	114	484	136
MIN	41	26	24	13	13	59	68	43	21	3.9	2.2	12
AC-FT	3610	2220	2680	1270	1680	5550	8050	5310	5260	1020	3220	1500
CFSM	.25	.16	.19	.09	.13	.39	.58	.37	.38	.07	.22	.11
IN.	.29	.18	.22	.10	.14	.45	.65	.43	.42	.08	.26	.12

CAL YR 1987	TOTAL	40491	MEAN	111	MAX	1070	MIN	21	AC-FT	80310	CFSM	.48	IN.	6.45
WTR YR 1988	TOTAL	20847.9	MEAN	57.0	MAX	484	MIN	2.2	AC-FT	41350	CFSM	.24	IN.	3.32

## DES MOINES RIVER BASIN

05482170 BIG CEDAR CREEK NEAR VARINA, IA

LOCATION.--Lat 42°41'16", long 94°47'52", in NE1/4 NE1/4 sec.24, T.91 N., R.34 W., Pocahontas County, Hydrologic Unit 07100006, on left bank 2 ft downstream from bridge on county highway N33, 2.0 mi downstream from Drainage ditch 21, 3.5 mi upstream from Drainage ditch 74, and 5.5 mi northeast of Varina.

DRAINAGE AREA.--80.0 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1959 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,225.12 ft above NGVD.

REMARKS.--Estimated daily discharges: Nov. 27 to Dec. 6, Dec. 15-21, Dec. 26 to Mar. 7, and Mar. 13-18. Records good except those for estimated daily discharges, which are poor.

AVERAGE DISCHARGE.--29 years, 42.7 ft<sup>3</sup>/s, 7.25 in/yr, 30,940 acre-ft/yr; median of yearly mean discharges, 35 ft<sup>3</sup>/s, 5.9 in/yr, 25,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,080 ft<sup>3</sup>/s Aug. 31, 1962, gage height, 13.68 ft; maximum gage height, 16.29 ft Mar. 24, 1979, backwater from ice; no flow at times most years.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 400 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 1	0145	ice jam	*5.78	Aug. 22	1330	*316	5.74

Minimum discharge, 0.04 ft<sup>3</sup>/s Aug. 16, 17, 18.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	32	12	6.2	13	7.8	26	24	60	24	4.4	.33	5.5
2	27	12	5.9	13	6.8	38	62	55	22	4.2	.25	5.1
3	26	12	5.0	12	6.3	44	152	51	20	3.7	.23	4.6
4	27	11	4.2	11	5.9	40	114	47	19	3.4	.68	4.1
5	25	10	4.9	9.1	6.2	35	93	45	18	2.9	.64	3.2
6	23	10	8.0	8.7	5.2	35	82	43	17	2.7	.22	2.6
7	22	11	9.1	8.5	5.1	32	74	43	16	2.2	.16	2.3
8	22	11	13	8.2	5.2	26	67	99	19	2.0	2.4	2.3
9	20	9.4	71	7.9	4.9	21	62	95	15	26	.90	3.7
10	18	9.3	55	7.4	4.0	23	55	71	14	18	.29	2.2
11	19	9.7	45	6.5	3.7	22	53	62	13	7.5	.22	2.1
12	20	10	37	6.8	4.6	15	48	58	13	5.6	.16	2.2
13	18	10	32	7.3	5.2	18	44	52	12	4.4	.11	2.1
14	18	9.3	29	7.4	5.3	15	39	49	11	3.6	.11	2.2
15	19	9.3	18	7.7	5.4	16	37	46	13	3.2	.11	2.4
16	19	9.7	9.4	8.8	5.1	13	35	41	11	4.0	.06	4.5
17	18	9.5	10	9.2	5.9	14	35	39	16	2.6	.06	2.5
18	17	8.2	16	8.7	9.2	12	31	38	13	2.6	.08	2.1
19	16	8.3	18	9.2	12	11	30	36	10	1.9	.18	2.1
20	16	7.4	19	9.6	9.9	10	30	35	11	1.9	.13	2.5
21	15	7.8	20	8.6	13	9.7	28	33	8.9	1.8	.10	1.8
22	16	9.1	19	7.7	15	11	30	35	7.5	1.3	180	3.5
23	14	8.2	17	7.9	14	11	34	33	6.1	1.1	120	2.5
24	13	7.4	17	7.0	11	12	38	32	6.1	1.0	54	2.1
25	13	7.5	16	7.6	9.4	12	38	29	5.9	.99	30	2.0
26	14	7.1	15	6.7	11	11	43	29	5.1	.80	17	1.8
27	13	4.3	15	7.5	11	10	79	28	4.8	.61	15	1.7
28	12	5.0	14	7.5	14	31	90	27	4.6	.50	12	3.3
29	13	5.6	12	6.8	17	36	76	25	5.3	.47	8.9	61
30	12	6.0	15	8.6	---	29	67	24	5.2	.46	8.0	52
31	11	---	15	9.8	---	26	---	24	---	.39	6.4	---
TOTAL	568	267.1	590.7	265.7	239.1	664.7	1690	1384	366.5	116.22	458.72	192.0
MEAN	18.3	8.90	19.1	8.57	8.24	21.4	56.3	44.6	12.2	3.75	14.8	6.40
MAX	32	12	71	13	17	44	152	99	24	26	180	61
MIN	11	4.3	4.2	6.5	3.7	9.7	24	24	4.6	.39	.06	1.7
AC-FT	1130	530	1170	527	474	1320	3350	2750	727	231	910	381
CFSM	.23	.11	.24	.11	.10	.27	.70	.56	.15	.05	.18	.08
IN.	.26	.12	.27	.12	.11	.31	.79	.64	.17	.05	.21	.09

CAL YR 1987	TOTAL 13682.9	MEAN 37.5	MAX 480	MIN 3.0	AC-FT 27140	CFSM .47	IN. 6.36
WTR YR 1988	TOTAL 6802.74	MEAN 18.6	MAX 180	MIN .06	AC-FT 13490	CFSM .23	IN. 3.16



## 05482300 NORTH RACCOON RIVER NEAR SAC CITY, IA

LOCATION.--Lat 42°21'16", long 94°59'26", in NW1/4 NW1/4 sec.24, T.87 N., R.36 W., Sac County, Hydrologic Unit 07100006, on right bank 5 ft downstream from bridge on county highway, 1.2 mi upstream from Indian Creek, 0.1 mi upstream from Drainage ditch 73, 4.6 mi south of Sac City, and at mile 366.9 upstream from mouth of Des Moines River.

DRAINAGE AREA.--700 mi<sup>2</sup>.

PERIOD OF RECORD.--June 1958 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,132.33 ft above NGVD (levels by Iowa Natural Resources Council).

REMARKS.--Estimated daily discharges: Dec. 15 to Mar. 4 and Mar. 13-16. Records good except those for estimated daily discharges, which are poor. U.S. National Weather Service gage-height telemeter at station.

AVERAGE DISCHARGE.--30 years, 364 ft<sup>3</sup>/s, 6.93 in/yr, 263,700 acre-ft/yr; median of yearly mean discharges, 280 ft<sup>3</sup>/s, 5.3 in/yr, 203,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 13,100 ft<sup>3</sup>/s Mar. 23, 1979, gage height, 18.02 ft; maximum gage height, 18.12 ft Sept. 1, 1962; no flow Jan. 30 to Feb. 4, 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 21, 1954, reached a stage of 15.61 ft, from floodmark, discharge, 7,000 ft<sup>3</sup>/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Feb. 20	0530	ice jam	*10.63	Aug. 23	1315	*1,040	10.12

Minimum discharge, 10 ft<sup>3</sup>/s Aug. 16, 17, 18.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	402	161	139	141	125	321	168	404	162	56	18	53
2	366	170	125	139	113	434	201	374	204	50	17	51
3	324	166	134	132	108	491	529	347	252	44	17	48
4	303	164	120	119	104	450	762	325	205	38	18	45
5	289	153	112	106	107	398	664	303	177	35	19	40
6	272	150	164	103	92	315	589	284	158	36	16	36
7	258	153	146	102	90	290	538	284	148	33	22	34
8	244	152	143	100	91	291	499	575	285	33	26	31
9	233	143	286	98	87	238	463	747	650	40	25	30
10	226	136	420	93	73	221	416	578	458	130	25	28
11	215	135	391	85	68	223	384	485	355	151	17	26
12	216	140	348	89	82	212	362	448	296	80	15	23
13	215	142	312	96	89	112	338	415	258	53	13	22
14	210	140	280	98	91	102	309	376	216	45	12	21
15	216	133	156	102	91	115	287	358	186	39	12	25
16	225	135	140	115	88	160	268	345	163	62	12	33
17	225	136	150	120	98	172	262	301	163	49	11	36
18	219	135	220	116	142	158	246	282	165	45	11	33
19	209	128	232	124	173	151	230	271	139	42	13	29
20	203	124	248	129	150	141	227	254	124	39	16	31
21	202	121	219	120	185	135	215	240	110	35	16	31
22	201	134	198	110	213	126	207	246	96	32	153	51
23	195	134	200	113	192	130	221	247	88	29	821	43
24	184	125	197	105	167	129	227	234	81	25	675	36
25	177	126	180	96	140	128	235	218	76	25	396	31
26	181	128	146	102	154	127	245	202	74	22	253	30
27	183	123	149	114	160	128	324	202	64	21	147	28
28	176	133	140	116	191	119	481	193	57	22	113	35
29	170	145	128	107	222	164	478	177	58	21	91	123
30	167	148	156	132	---	189	439	169	62	20	72	395
31	162	---	154	150	---	180	---	157	---	18	61	---
TOTAL	7068	4213	6133	3472	3686	6550	10814	10041	5530	1370	3133	1478
MEAN	228	140	198	112	127	211	360	324	184	44.2	101	49.3
MAX	402	170	420	150	222	491	762	747	650	151	821	395
MIN	162	121	112	85	68	102	168	157	57	18	11	21
AC-FT	14020	8360	12160	6890	7310	12990	21450	19920	10970	2720	6210	2930
CFSM	.32	.20	.28	.16	.18	.30	.51	.45	.26	.06	.14	.07
IN.	.37	.22	.32	.18	.19	.34	.56	.52	.29	.07	.16	.08

CAL YR 1987	TOTAL 180012	MEAN 493	MAX 4050	MIN 112	AC-FT 357100	CFSM .69	IN. 9.39
WTR YR 1988	TOTAL 63488	MEAN 173	MAX 821	MIN 11	AC-FT 125900	CFSM .24	IN. 3.31



## 05482500 NORTH RACCOON RIVER NEAR JEFFERSON, IA

LOCATION.--Lat 41°59'17", long 94°22'36", in SW1/4 NW1/4 sec. 20, T.83 N., R.30 W., Greene County, Hydrologic Unit 07100006, on right bank 5 ft downstream from bridge on State Highway 4, 0.1 mi downstream from Drainage ditch 33 and 40, 1.9 mi south of Jefferson, 4.2 mi upstream from Hardin Creek, and at mile 292.5 upstream from mouth of Des Moines River.

DRAINAGE AREA.--1,619 mi<sup>2</sup>.

PERIOD OF RECORD.--March 1940 to current year. Prior to April 1940, monthly discharge only, published in WSP 1308. Prior to October 1955, published as Raccoon River near Jefferson.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1508: 1940 (M), 1950-51.

GAGE.--Water-stage recorder. Datum of gage is 967.09 ft above NGVD. Prior to Apr. 22, 1946, nonrecording gage at site 4 mi upstream at different datum. Apr. 22 to June 25, 1946, nonrecording gage, June 26, 1946 to Sept. 30, 1955, water-stage recorder, Oct. 1, 1955 to Apr. 30, 1958, nonrecording gage, at present site and datum.

REMARKS.--Estimated daily discharges: Dec. 1-6, Dec. 16 to Mar. 5, Mar. 13, 14, and June 11-17. Records good except those for estimated daily discharges, which are poor. U.S. National Weather Service gage-height telemeter and U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--48 years, 745 ft<sup>3</sup>/s, 6.25 in/yr, 539,800 acre-ft/yr; median of yearly mean discharges, 600 ft<sup>3</sup>/s, 5.0 in/yr, 435,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 29,100 ft<sup>3</sup>/s June 23, 1947, gage height, 22.3 ft; minimum daily discharge, 0.6 ft<sup>3</sup>/s Oct. 5, 1956.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Feb. 20	1630	ice jam	*7.08	May 10	0615	*1,470	6.78

Minimum daily discharge, 37 ft<sup>3</sup>/s Aug. 21.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	765	405	428	265	597	728	387	712	379	158	146	142
2	717	404	414	288	511	796	404	671	382	154	130	125
3	677	405	373	274	439	869	425	629	389	151	117	120
4	641	405	346	256	409	847	521	600	390	142	106	111
5	620	395	362	235	382	812	916	577	399	130	95	100
6	600	384	395	228	349	782	996	551	362	119	90	91
7	576	381	404	225	327	737	905	533	340	100	89	83
8	557	384	424	224	339	675	834	527	372	85	89	77
9	540	380	481	219	312	612	781	962	404	88	87	80
10	529	367	642	207	274	562	728	1400	402	106	84	72
11	512	356	899	240	250	530	678	1130	401	108	81	62
12	510	352	912	270	260	507	626	939	425	112	72	56
13	502	353	834	250	262	436	596	818	444	193	73	48
14	495	354	766	300	253	372	565	747	450	154	68	48
15	497	359	707	353	244	358	538	687	420	124	57	43
16	522	368	292	380	238	354	509	642	391	807	53	71
17	517	365	334	374	252	399	488	601	361	1020	51	60
18	506	365	374	359	316	415	471	563	345	917	51	53
19	498	359	500	369	385	395	461	533	339	510	44	51
20	484	352	560	366	406	391	447	513	324	369	38	49
21	473	346	540	346	481	386	429	502	300	301	37	53
22	469	339	520	327	536	373	424	506	276	255	100	50
23	464	345	480	336	557	361	422	504	258	217	131	54
24	454	347	440	321	554	357	422	495	241	187	235	50
25	444	344	400	327	519	368	419	491	224	174	570	63
26	435	332	356	304	519	366	425	474	209	266	472	63
27	428	330	343	321	514	359	441	456	187	292	341	55
28	428	360	338	332	563	357	477	450	173	236	266	68
29	423	389	333	418	622	349	628	442	170	203	232	96
30	411	417	362	573	---	346	733	417	173	184	200	334
31	408	---	310	710	---	365	---	395	---	165	167	---
TOTAL	16102	11042	14869	9997	11670	15564	17096	19467	9930	8027	4372	2428
MEAN	519	368	480	322	402	502	570	628	331	259	141	80.9
MAX	765	417	912	710	622	869	996	1400	450	1020	570	334
MIN	408	330	292	207	238	346	387	395	170	85	37	43
AC-FT	31940	21900	29490	19830	23150	30870	33910	38610	19700	15920	8670	4820
CFSM	.32	.23	.30	.20	.25	.31	.35	.39	.20	.16	.09	.05
IN.	.37	.25	.34	.23	.27	.36	.39	.45	.23	.18	.10	.06

CAL YR 1987	TOTAL 333580	MEAN 914	MAX 5240	MIN 280	AC-FT 661700	CFSM .56	IN. 7.66
WTR YR 1988	TOTAL 140564	MEAN 384	MAX 1400	MIN 37	AC-FT 278800	CFSM .24	IN. 3.23

## DES MOINES RIVER BASIN

05483000 EAST FORK HARDIN CREEK NEAR CHURDAN, IA

LOCATION.--Lat 42°06'27", long 94°22'12", in SE1/4 SW1/4 sec. 5, T.84 N., R.30 W., Greene County, Hydrologic Unit 07100006, on left bank 35 ft upstream from bridge on county highway E26, 1.6 mi upstream from small left-bank tributary, 4.4 mi upstream from mouth, and 6.5 mi southeast of Churdan.

DRAINAGE AREA.--24.0 mi<sup>2</sup>.

PERIOD OF RECORD.--July 1952 to current year.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1708: 1954-55, 1957 (M).

GAGE.--Water-stage recorder. Datum of gage is 1,050.90 ft above NGVD.

REMARKS.--Estimated daily discharges: Dec. 31 to Jan. 1, Jan. 4-13, Jan. 20 to Feb. 9, Feb. 16 to Mar. 1, Mar. 13-15, and June 30 to July 6. Records good except those for estimated daily discharges, which are poor. Small diversion for irrigation upstream from station.

AVERAGE DISCHARGE.--36 years, 10.6 ft<sup>3</sup>/s, 6.00 in/yr, 7,680 acre-ft/yr; median of yearly mean discharges, 8.3 ft<sup>3</sup>/s, 4.7 in/yr, 6,010 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 870 ft<sup>3</sup>/s June 30, 1986 gage height, 10.78 ft, from flood mark; no flow at times most years.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 150 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan. 27	0915	ice jam	*3.29	Dec. 9	0415	*37	2.64

No flow July 12-15 and July 21 to Sept. 29.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	16	5.4	21	5.2	6.1	9.0	4.2	4.8	3.5	.80	.00	.00
2	13	5.5	19	6.7	4.6	7.3	5.8	4.6	3.4	.64	.00	.00
3	12	5.6	15	6.6	3.3	5.9	8.1	4.8	3.2	.54	.00	.00
4	14	5.3	13	4.8	2.8	5.2	8.4	4.6	2.8	.47	.00	.00
5	12	5.0	13	4.5	2.2	4.8	7.9	4.5	2.8	.43	.00	.00
6	11	5.3	12	4.4	2.4	5.0	7.6	4.7	2.7	.40	.00	.00
7	10	5.7	11	4.3	2.4	4.9	7.8	5.1	2.9	.35	.00	.00
8	10	5.2	14	4.3	2.9	4.9	7.4	5.0	3.4	.04	.00	.00
9	9.0	4.7	34	4.2	2.8	4.5	6.5	4.0	2.5	.17	.00	.00
10	8.1	4.8	29	4.0	2.4	4.3	6.2	3.4	2.4	.19	.00	.00
11	8.4	5.0	24	3.9	2.7	4.4	6.2	3.4	2.5	.01	.00	.00
12	8.7	5.2	20	4.1	3.1	4.3	6.0	4.1	2.4	.00	.00	.00
13	8.2	5.0	17	3.7	2.9	5.0	5.9	4.3	2.3	.00	.00	.00
14	7.7	4.8	16	4.9	2.4	4.3	5.3	4.5	2.1	.00	.00	.00
15	7.8	4.8	16	4.6	2.1	4.0	5.2	4.3	2.1	.00	.00	.00
16	7.9	5.5	13	4.4	2.6	3.1	5.3	3.9	2.0	.60	.00	.00
17	7.4	5.8	13	3.8	2.6	3.1	5.5	3.6	2.2	.32	.00	.00
18	7.4	6.0	13	3.7	3.0	3.4	4.9	3.6	2.1	1.3	.00	.00
19	7.2	6.4	12	4.3	3.3	3.7	4.8	4.1	1.9	.62	.00	.00
20	7.0	6.0	10	4.0	4.3	3.6	4.9	4.0	1.8	.06	.00	.00
21	6.8	6.4	11	3.6	5.1	3.3	4.6	3.9	1.8	.00	.00	.00
22	7.1	6.5	9.7	3.4	5.3	3.5	4.6	3.8	1.6	.00	.00	.00
23	6.5	5.8	9.6	3.4	5.6	3.3	4.2	3.3	1.4	.00	.00	.00
24	6.2	5.4	8.9	3.2	7.0	3.6	3.9	3.2	1.2	.00	.00	.00
25	6.2	5.4	8.2	3.0	6.6	4.1	4.0	2.9	1.0	.00	.00	.00
26	6.8	5.2	8.1	2.7	5.4	3.8	4.2	3.0	.90	.00	.00	.00
27	5.9	5.5	8.5	3.2	6.4	3.7	4.2	3.5	.80	.00	.00	.00
28	5.8	11	7.7	3.4	8.0	4.1	4.4	3.8	.70	.00	.00	.00
29	6.0	25	7.2	5.6	8.6	3.7	4.5	4.2	.85	.00	.00	.00
30	5.6	27	8.2	8.6	---	4.1	4.7	3.9	.94	.00	.00	.21
31	5.3	---	6.2	7.7	---	3.9	---	3.8	---	.00	.00	---
TOTAL	261.0	210.2	428.3	138.2	118.9	135.8	167.2	124.6	62.19	6.94	0.00	0.21
MEAN	8.42	7.01	13.8	4.46	4.10	4.38	5.57	4.02	2.07	.22	.00	.007
MAX	16	27	34	8.6	8.6	9.0	8.4	5.1	3.5	1.3	.00	.21
MIN	5.3	4.7	6.2	2.7	2.1	3.1	3.9	2.9	.70	.00	.00	.00
AC-FT	518	417	850	274	236	269	332	247	123	.14	.0	.4
CFSM	.35	.29	.58	.19	.17	.18	.23	.17	.09	.01	.00	.00
IN.	.40	.33	.66	.21	.18	.21	.26	.19	.10	.01	.00	.00

CAL YR 1987 TOTAL 5038.17 MEAN 13.8 MAX 159 MIN .97 AC-FT 9990 CFSM .58 IN. 7.81  
WTR YR 1988 TOTAL 1653.54 MEAN 4.52 MAX 34 MIN .00 AC-FT 3280 CFSM .19 IN. 2.56

## 05483450 MIDDLE RACCOON RIVER NEAR BAYARD, IA

LOCATION.--Lat 41°46'43", long 94°29'33", in SW1/4 SW1/4 sec. 32, T.81 N., R.31 W., Guthrie County, Hydrologic Unit 07100007, on left bank 15 ft, downstream from bridge on State Highway 25, 0.2 mi downstream from Battle Run Creek, 1.8 mi upstream from Springbrook Creek, 5.8 mi southeast of Bayard, 10.4 mi upstream from dam at Lake Panorama, and at mile 279.2 upstream from mouth of Des Moines River.

DRAINAGE AREA.--375 mi<sup>2</sup>.

PERIOD OF RECORD.--March 1979 to current year. Occasional low-flow measurements, water years 1976,77. Contracted-opening measurement of July 3, 1973 flood.

GAGE.--Water-stage recorder. Datum of gage is 1,040.00 ft above NGVD. Prior to June 23, 1979, nonrecording gage on downstream side of State Highway 25 bridge.

REMARKS.--Estimated daily discharges: Dec. 14 to Mar. 4, Apr. 8-12, May 12-15, and June 18, 19. Records good except those for estimated daily discharges, which are poor. Gage-height telemeter at station.

AVERAGE DISCHARGE.--9 years, 234 ft<sup>3</sup>/s, 8.47 in/yr 169,500 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 12,300 ft<sup>3</sup>/s June 30, 1986, gage height, 24.70 ft; minimum daily discharge, 5.5 ft<sup>3</sup>/s, June 13, 14, 1981.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of July 3, 1973 reached a stage of 21.63 ft, from contracted-opening measurement, discharge, 14,600 ft<sup>3</sup>/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,200 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
June 8	1500	*2,230	*16.63	July 18	1245	1,390	14.52

Minimum discharge, 22 ft<sup>3</sup>/s Sept. 14, 15.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	223	136	158	130	283	192	114	79	56	57	64	36
2	217	136	153	141	228	166	120	77	53	55	55	34
3	201	134	153	131	185	160	128	77	54	53	51	41
4	203	132	145	125	167	136	122	76	52	51	47	38
5	205	124	140	119	149	134	119	79	49	49	44	34
6	195	123	145	116	143	123	119	76	48	46	46	31
7	191	129	141	114	132	122	118	73	48	43	43	30
8	187	130	148	116	138	122	115	77	1430	41	42	29
9	185	123	249	114	127	117	111	81	726	46	46	28
10	178	121	289	110	118	112	108	87	335	57	43	28
11	174	122	258	111	110	112	105	82	247	51	38	26
12	178	125	230	119	105	113	104	82	207	42	36	25
13	176	125	209	106	103	109	101	79	173	43	33	25
14	171	121	160	107	99	109	93	78	151	37	32	24
15	170	121	126	114	97	108	89	75	136	35	31	27
16	183	129	109	124	98	108	88	75	123	196	29	62
17	175	131	95	124	109	108	87	66	106	532	27	52
18	166	128	135	127	126	106	84	67	100	821	25	34
19	161	123	153	133	163	101	84	67	98	402	25	29
20	156	128	171	136	221	99	83	67	93	222	27	29
21	152	122	160	120	231	96	82	67	87	160	27	32
22	155	125	165	113	231	94	85	71	82	120	110	29
23	156	123	155	122	246	95	87	71	76	99	284	32
24	153	115	150	118	249	98	84	65	73	84	92	28
25	147	114	140	110	242	105	80	60	71	441	64	27
26	152	116	150	105	223	100	83	58	65	378	54	27
27	148	119	204	106	211	94	89	58	62	154	51	26
28	141	139	231	112	306	97	87	60	60	116	49	38
29	144	157	221	165	206	97	83	59	59	95	44	206
30	144	169	207	180	---	95	82	58	58	81	41	407
31	138	---	159	300	---	95	---	56	---	72	39	---
TOTAL	5325	3840	5309	3968	5046	3523	2934	2203	4978	4679	1639	1514
MEAN	172	128	171	128	174	114	97.8	71.1	166	151	52.9	50.5
MAX	223	169	289	300	306	192	128	87	1430	821	284	407
MIN	138	114	95	105	97	94	80	56	48	35	25	24
AC-FT	10560	7620	10530	7870	10010	6990	5820	4370	9870	9280	3250	3000
CFSM	.46	.34	.46	.34	.46	.30	.26	.19	.44	.40	.14	.13
IN.	.53	.38	.53	.39	.50	.35	.29	.22	.49	.46	.16	.15
CAL YR 1987	TOTAL 87983	MEAN 241	MAX 1890	MIN 95	AC-FT 174500	CFSM .64	IN. 8.73					
WTR YR 1988	TOTAL 44958	MEAN 123	MAX 1430	MIN 24	AC-FT 89170	CFSM .33	IN. 4.46					

05483470 LAKE PANORAMA AT PANORA, IOWA

LOCATION.--Lat 41°41'44", long 94°22'53", in SW1/4 NE1/4 sec.31, T.80 N., R.30 W., Guthrie County, Hydrologic Unit 07100007, in gate control building of dam on Middle Raccoon River, 0.5 mi upstream from State Highway 44, 1.0 mi west of Panora, 4.4 mi upstream from Bay Branch, and at mile 268.8 upstream from mouth of Des Moines River.

DRAINAGE AREA.--433 mi<sup>2</sup>.

PERIOD OF RECORD.--May 1979 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,000.00 ft above NGVD.

REMARKS.--Lake is formed by earthfill dam with 100 ft bascule gate and concrete chute spillway, and 300 ft earthen emergency spillway. Low-flow outlet is 30-inch conduit and gate valve through dam. Dam was completed in August, 1970 and began filling April 27, 1971. Total storage, 60,000 acre-ft, surface area, 2,900 acres, at top of dam, elevation 1,068 ft. Storage unknown at top of spillway, elevation 1,048 ft. Normal storage, 19,700 acre-ft, surface area, 1,270 acres with bascule gate closed, elevation 1,045 ft. Dead storage unknown with bascule gate open, elevation 1,036 ft. Present lake classification is utility (industrial) but is also used for recreation. Gage-height telemeter at station.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height, 50.10 ft June 30, 1986; minimum, 43.96 ft July 22, 1986.

EXTREMES FOR CURRENT YEAR.--Maximum gage height, 47.76 ft Mar. 13; minimum recorded, 44.71 ft Mar. 7.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	45.52	45.40	45.43	45.37	45.92	45.09	44.79	45.01	45.02	45.07	45.54	45.24
2	45.58	45.34	45.39	45.34	45.34	45.05	44.97	44.95	45.06	45.01	45.49	45.25
3	45.56	45.34	45.44	45.36	45.17	44.97	45.11	44.93	45.08	45.00	45.45	45.28
4	45.46	45.47	45.41	45.32	45.28	44.88	45.17	44.90	45.04	45.03	45.44	45.28
5	45.52	45.50	45.55	45.25	45.29	44.82	45.19	44.96	45.05	45.05	45.41	45.25
6	45.48	45.48	45.31	45.19	45.23	44.77	45.15	44.97	45.06	45.02	45.38	45.23
7	45.53	45.46	45.28	45.16	45.16	44.74	45.16	44.94	45.07	45.01	45.35	45.20
8	45.59	45.44	45.28	45.23	45.09	44.77	45.14	44.93	45.37	45.01	45.35	45.21
9	45.60	45.36	45.49	45.26	45.04	44.88	45.13	44.91	45.36	45.12	45.36	45.19
10	45.46	45.30	45.72	45.27	45.01	44.91	45.06	44.86	45.54	45.25	45.35	45.16
11	45.37	45.39	45.83	45.25	44.95	44.93	45.00	44.92	45.60	45.29	45.33	45.15
12	45.45	45.46	45.78	45.25	44.91	45.07	45.05	44.99	45.51	45.30	45.31	45.17
13	45.49	45.48	45.67	45.22	44.87	46.06	45.11	45.02	45.49	45.31	45.30	45.13
14	45.58	45.46	45.59	45.18	44.88	44.96	45.11	45.05	45.54	45.31	45.29	45.11
15	45.59	45.43	45.70	45.16	44.95	44.92	45.07	45.09	45.57	45.31	45.27	45.13
16	45.69	45.44	45.71	45.13	45.00	44.93	45.01	45.09	45.54	45.56	45.25	45.29
17	45.71	45.41	45.64	45.14	45.05	44.94	44.98	45.11	45.47	45.93	45.22	45.34
18	45.64	45.33	45.62	45.13	45.17	44.95	44.92	45.14	45.47	45.80	45.21	45.36
19	45.66	45.28	45.69	45.15	45.42	44.92	44.86	45.15	45.42	45.48	45.18	45.39
20	45.70	45.24	45.70	45.14	45.47	44.89	44.84	45.18	45.38	45.57	45.17	45.33
21	45.66	45.18	45.62	45.12	45.29	44.85	44.91	45.18	45.30	45.56	45.15	45.32
22	45.60	45.15	45.56	45.06	45.14	44.82	44.99	45.15	45.27	45.57	45.43	45.36
23	45.63	45.14	45.51	45.03	45.11	44.79	45.07	45.06	45.26	45.59	45.68	45.33
24	45.55	45.12	45.49	44.99	45.07	44.78	45.07	44.99	45.23	45.58	45.63	45.30
25	45.35	45.23	46.22	44.94	45.02	44.80	45.08	44.97	45.25	45.68	45.47	45.28
26	45.26	45.31	46.31	44.89	45.00	44.89	45.07	44.95	45.23	46.19	45.37	45.25
27	45.37	45.39	45.71	44.85	45.09	44.86	45.05	44.97	45.22	46.06	45.37	45.25
28	45.45	45.46	45.62	44.82	45.13	44.88	45.08	44.99	45.20	45.89	45.35	45.30
29	45.47	45.49	45.60	44.88	45.12	44.87	45.09	45.03	45.18	45.77	45.32	45.46
30	45.46	45.48	45.55	45.61	---	44.81	45.06	45.02	45.08	45.69	45.30	45.92
31	45.43	---	45.49	46.18	---	44.78	---	44.98	---	45.61	45.27	---
MEAN	45.53	45.37	45.61	45.19	45.14	44.92	45.04	45.01	45.30	45.44	45.35	45.28
MAX	45.71	45.50	46.31	46.18	45.92	46.06	45.19	45.18	45.60	46.19	45.68	45.92
MIN	45.26	45.12	45.28	44.82	44.87	44.74	44.79	44.86	45.02	45.00	45.15	45.11
CAL YR 1987	MEAN 45.31	MAX 46.31	MIN 44.10									
WTR YR 1988	MEAN 45.27	MAX 46.31	MIN 44.74									

## 05483600 MIDDLE RACCOON RIVER AT PANORA, IA

LOCATION.--Lat 41°41'14", long 94°22'15", in NE1/4 NW1/4 sec.5, T.79 N., R.30 W., Guthrie County, Hydrologic Unit 07100007, on left bank 15 ft downstream from bridge on county highway, 0.2 mi southwest of Panora, 1.5 mi upstream from Andy's Branch, 1.6 mi downstream from Lake Panorama, 18.2 mi upstream from mouth, and at mile 267.2 upstream from mouth of Des Moines River.

DRAINAGE AREA.--440 mi<sup>2</sup>.

PERIOD OF RECORD.--June 1958 to current year.

REVISED RECORDS.--WDR IOWA 1974: 1973 (P).

GAGE.--Water-stage recorder and concrete control. Datum of gage is 991.20 ft above NGVD.

REMARKS.--No estimated daily discharges. Records good. City of Panora diverts approximately 100 acre-ft/yr upstream of station. Flow regulated by dam on Lake Panorama since August 1970.

AVERAGE DISCHARGE.--30 years, 223 ft<sup>3</sup>/s, 6.88 in/yr 161,600 acre-ft/yr; median of yearly mean discharges, 170 ft<sup>3</sup>/s, 5.2 in/yr, 123,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 15,300 ft<sup>3</sup>/s June 30, 1986, gage height, 15.50 ft; no flow June 9, 10, 1977, result of gate operation at Lake Panorama; minimum daily discharge, excluding regulation at Lake Panorama, 3.0 ft<sup>3</sup>/s July 9, 14, 22-23, 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 10, 1953, reached a stage of 14.3 ft, from floodmark, discharge, about 14,000 ft<sup>3</sup>/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
June 8	1700	*2,300	*7.40				

Minimum daily discharge, 27 ft<sup>3</sup>/s Sept.9.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	264	181	232	142	673	193	84	108	40	58	88	32
2	154	189	186	137	357	198	61	106	37	89	77	30
3	263	120	198	152	162	183	101	111	62	32	69	34
4	200	105	205	154	141	163	131	74	62	31	65	37
5	234	143	202	143	160	152	155	58	39	37	58	34
6	158	161	203	132	159	146	128	78	38	62	52	31
7	162	175	203	88	151	144	115	94	43	37	49	29
8	165	192	141	76	142	84	133	112	1150	31	47	28
9	235	185	143	93	135	86	147	132	844	33	51	27
10	252	137	259	105	136	108	143	107	219	35	49	28
11	136	81	296	112	125	87	114	41	268	38	47	28
12	156	124	298	116	118	94	61	59	193	38	45	30
13	122	151	271	118	115	107	92	51	151	39	42	30
14	168	162	223	118	80	97	110	49	112	40	40	31
15	150	171	141	118	63	96	114	74	120	40	39	29
16	181	183	169	123	86	105	114	53	119	84	38	34
17	206	197	164	128	115	115	121	43	130	564	36	39
18	182	189	177	134	160	122	116	49	103	659	35	41
19	150	186	213	147	303	124	110	57	108	617	34	46
20	155	179	233	155	378	120	71	60	110	168	33	40
21	199	172	219	155	312	116	40	86	109	141	32	41
22	156	172	206	147	241	119	50	119	86	95	51	43
23	169	174	204	142	197	118	72	123	62	95	154	40
24	236	122	207	135	175	122	85	83	65	90	148	39
25	257	66	125	128	170	87	99	58	55	114	107	36
26	153	102	99	120	127	87	114	64	59	301	54	34
27	94	142	132	113	142	94	87	39	58	250	41	32
28	115	191	166	112	176	114	76	40	68	190	40	36
29	151	220	174	129	180	121	95	50	61	149	39	57
30	167	237	175	360	---	117	106	76	75	122	37	174
31	171	---	171	788	---	118	---	56	---	103	32	---
TOTAL	5561	4809	6035	4820	5479	3737	3045	2310	4646	4382	1729	1190
MEAN	179	160	195	155	189	121	101	74.5	155	141	55.8	39.7
MAX	264	237	298	788	673	198	155	132	1150	659	154	174
MIN	94	66	99	76	63	84	40	39	37	31	32	27
AC-FT	11030	9540	11970	9560	10870	7410	6040	4580	9220	8690	3430	2360

CAL YR 1987	TOTAL 95155	MEAN 261	MAX 2100	MIN 38	AC-FT 188700
WTR YR 1988	TOTAL 47743	MEAN 130	MAX 1150	MIN 27	AC-FT 94700

## DES MOINES RIVER BASIN

## 05484000 SOUTH RACCOON RIVER AT REDFIELD, IA

LOCATION.--Lat 41°35'22", long 94°09'33", in NE1/4 NE1/4 sec. 2, T.78 N., R.28 W., Dallas County, Hydrologic Unit 07100007, on right bank 20 ft upstream from bridge on county highway at Redfield, 3.2 mi downstream from bridge on U.S. Highway 6, 3.4 mi downstream from Middle Raccoon River, 14.0 mi upstream from mouth, and at mile 245.6 upstream from mouth of Des Moines River.

DRAINAGE AREA.--994 mi<sup>2</sup>.

PERIOD OF RECORD.--March 1940 to current year.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1508: 1940.

GAGE.--Water-stage recorder. Datum of gage is 876.43 ft above NGVD. Prior to June 12, 1946, nonrecording gage, June 12, 1946 to Sept. 30, 1966, water-stage recorder at site 20 ft upstream at same datum. Sept. 30, 1966, to Sept. 30, 1986 water-stage recorder at site 1.5 mi upstream at datum 20.0 ft higher.

REMARKS.--Estimated daily discharges: Dec. 16 to Jan. 30, Feb. 3-29, and Mar. 14, 15. Records excellent except those for estimated daily discharges, which are poor. U.S. National Weather Service gage-height telemeter at station.

AVERAGE DISCHARGE.--48 years, 469 ft<sup>3</sup>/s, 6.41 in/yr, 339,800 acre-ft/yr; median of yearly mean discharges, 410 ft<sup>3</sup>/s, 5.6 in/yr, 297,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 35,000 ft<sup>3</sup>/s July 2, 1958, gage height, 29.04 ft, from flood-mark; minimum daily discharge, 17 ft<sup>3</sup>/s Aug. 4, 1977 at site 1.5 mi upstream from present site.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 5,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan. 30	0530	*8,400	(a) *14.31				

(a) Release from ice jam upstream.

Minimum discharge, 65.0 ft<sup>3</sup>/s Sept. 12, 14, 15.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	496	397	479	301	1110	351	246	215	99	156	161	76
2	431	389	440	344	807	362	236	213	94	193	142	72
3	419	379	406	334	519	329	269	216	92	163	129	76
4	485	310	413	328	489	302	281	230	125	127	120	86
5	401	326	404	318	446	289	294	163	93	115	107	82
6	438	339	414	313	439	285	309	161	81	139	96	75
7	372	359	406	313	412	290	262	180	76	119	89	69
8	368	372	403	319	440	295	272	206	1550	103	89	69
9	401	375	422	317	410	227	274	230	1950	149	95	70
10	434	359	474	305	387	232	265	236	639	215	95	70
11	423	301	519	306	361	252	259	162	508	146	89	70
12	349	307	522	321	348	231	207	129	463	122	82	69
13	381	332	485	303	338	221	199	150	347	121	81	69
14	351	340	467	312	323	190	219	118	286	121	81	68
15	397	365	374	327	313	210	226	130	278	115	81	72
16	418	401	359	340	315	245	224	153	266	145	79	111
17	418	401	307	327	322	252	226	109	285	552	77	125
18	430	388	312	321	338	239	226	114	250	750	73	96
19	369	374	320	324	378	261	215	126	253	1070	74	113
20	366	369	345	317	424	255	214	127	230	265	77	95
21	376	360	385	310	450	245	152	142	264	269	77	157
22	404	360	380	306	457	235	142	187	205	218	146	168
23	353	362	410	316	489	240	162	224	178	199	357	107
24	401	351	430	316	500	244	183	206	186	197	295	83
25	428	289	440	311	482	272	198	148	151	193	207	81
26	428	283	340	303	429	214	209	134	153	359	161	78
27	326	313	319	310	345	218	235	128	143	342	110	75
28	312	435	325	323	355	233	180	107	150	274	100	103
29	344	518	340	465	360	259	191	111	145	231	89	189
30	365	515	338	2000	---	252	206	122	187	199	84	302
31	373	---	349	1520	---	246	---	141	---	179	81	---
TOTAL	12257	10969	12327	12870	12786	7976	6781	5018	9727	7546	3624	2976
MEAN	395	366	398	415	441	257	226	162	324	243	117	99.2
MAX	496	518	522	2000	1110	362	309	236	1950	1070	357	302
MIN	312	283	307	301	313	190	142	107	76	103	73	68
AC-FT	24310	21760	24450	25530	25360	15820	13450	9950	19290	14970	7190	5900
CFSM	.40	.37	.40	.42	.45	.26	.23	.16	.33	.25	.12	.10
IN.	.46	.41	.46	.48	.48	.30	.26	.19	.37	.28	.14	.11

CAL YR 1987 TOTAL 219622 MEAN 602 MAX 8210 MIN 231 AC-FT 435600 CFSM .61 IN. 8.27  
WTR YR 1988 TOTAL 104857 MEAN 286 MAX 2000 MIN 68 AC-FT 208000 CFSM .29 IN. 3.95



## DES MOINES RIVER BASIN

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## 05484500 RACCOON RIVER AT VAN METER, IA

LOCATION.--Lat 41°32'02", long 93°56'59", in SW1/4 SW1/4 sec.22, T.78 N., R.27 W., Dallas County, Hydrologic Unit 07100007, on right bank 10 ft downstream from bridge on county highway R16, 0.3 mi northeast of Van Meter, 0.7 mi upstream from small left bank tributary, 1.1 mi downstream from confluence of North and South Raccoon Rivers, 29.0 mi upstream from mouth, and at mile 230.5 upstream from mouth of Des Moines River.

DRAINAGE AREA.--3,441 mi<sup>2</sup>.

PERIOD OF RECORD.--April 1915 to current year. Prior to October 1934, monthly discharge only, published in WSP 1308.

REVISED RECORDS.--WSP 1308: 1927 (M), WSP 1438: Drainage area, WSP 1508: 1915 (M), 1925 (M), 1926, 1933 (M), 1939 (M), 1947 (M), 1949 (M).

GAGE.--Water-stage recorder. Datum of gage is 841.16 ft above NGVD. See WSP 1308 for history of changes prior to Aug. 8, 1934.

REMARKS.--Estimated daily discharges: Dec. 16-22 and Dec. 31 to Mar. 6. Records good except those for estimated daily discharges, which are poor. U.S. Army Corps of Engineers rain-gage, gage-height telemeter and data collection platform at station.

AVERAGE DISCHARGE.--73 years, 1,423 ft<sup>3</sup>/s, 5.62 in/yr, 1,031,000 acre-ft/yr; median of yearly mean discharges, 1,120 ft<sup>3</sup>/s, 4.4 in/yr, 811,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 41,200 ft<sup>3</sup>/s June 13, 1947, gage height, 21.37 ft, from flood-mark; maximum gage height, 22.69 ft July 1, 1986; minimum daily discharge, 10 ft<sup>3</sup>/s Jan. 22-31, 1940.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 8,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Feb. 21	1430	ice jam	*11.69	June 9	0030	*3,920	7.16

Minimum discharge, 105 ft<sup>3</sup>/s Aug. 21, 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2210	1120	1700	900	1800	1600	859	1150	648	317	357	262
2	2090	1100	1640	1050	1500	1500	937	1180	599	287	330	235
3	1930	1070	1550	1000	1200	1600	1010	1150	585	330	289	228
4	1990	979	1500	960	1100	1650	1080	1120	592	254	253	233
5	1830	970	1420	910	970	1700	1180	1060	607	225	234	232
6	1820	999	1380	880	940	1800	1500	995	572	226	200	212
7	1650	1040	1370	870	860	1520	1690	978	565	246	200	170
8	1610	1090	1370	880	920	1470	1620	993	1240	227	230	156
9	1590	1090	1390	860	830	1290	1540	1020	3040	235	205	147
10	1600	1060	1540	810	770	1170	1480	1190	1450	355	205	139
11	1560	992	1800	800	700	1130	1410	1800	1200	279	205	129
12	1400	949	2060	840	660	1060	1300	1640	1340	230	181	124
13	1430	994	2100	770	630	988	1190	1420	1130	230	181	119
14	1380	1000	1980	790	590	869	1170	1280	970	230	163	114
15	1410	1010	1800	830	560	811	1130	1170	854	270	162	118
16	1450	1160	1450	860	560	837	1090	1110	787	259	155	154
17	1500	1160	1200	810	570	854	1050	1020	728	619	136	199
18	1470	1150	1150	780	640	884	1020	955	703	2030	120	193
19	1370	1090	1150	780	780	903	978	910	634	2130	120	247
20	1340	1040	1300	750	960	888	959	877	606	1180	118	203
21	1310	1020	1450	720	1100	854	908	828	590	809	114	175
22	1350	1030	1650	700	1200	842	846	851	552	620	286	436
23	1260	1030	1770	720	1400	847	848	902	492	498	406	231
24	1290	987	1860	710	1550	851	870	891	428	433	564	168
25	1340	927	1690	690	1600	884	877	823	417	389	410	151
26	1320	878	1420	660	1500	842	876	755	366	446	453	143
27	1130	895	1310	670	1450	818	915	750	360	597	671	139
28	1000	1130	1340	700	1500	834	900	708	343	602	579	173
29	1030	1480	1420	1100	1600	861	890	693	329	547	461	304
30	1030	1680	1410	1600	---	857	998	674	288	458	376	406
31	1060	---	1100	2100	---	847	---	676	---	395	314	---
TOTAL	45750	32120	47270	27500	30440	33861	33121	31569	23015	15953	8678	5940
MEAN	1476	1071	1525	887	1050	1092	1104	1018	767	515	280	198
MAX	2210	1680	2100	2100	1800	1800	1690	1800	3040	2130	671	436
MIN	1000	878	1100	660	560	811	846	674	288	225	114	114
AC-FT	90750	63710	93760	54550	60380	67160	65700	62620	45650	31640	17210	11780
CFSM	.43	.31	.44	.26	.31	.32	.32	.30	.22	.15	.08	.06
IN.	.49	.35	.51	.30	.33	.37	.36	.34	.25	.17	.09	.06

CAL YR 1987	TOTAL 802109	MEAN 2198	MAX 11600	MIN 690	AC-FT 1591000	CFSM .64	IN. 8.67
WTR YR 1988	TOTAL 335217	MEAN 916	MAX 3040	MIN 114	AC-FT 664900	CFSM .27	IN. 3.62

## DES MOINES RIVER BASIN

05484500 RACCOON RIVER AT VAN METER, IA--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD: Chemical analyses: Partial record station September 1968 to September 1973, February 1974 to September 1979 and October 1986 to current year.  
 Water temperatures: Partial record station September 1968 to September 1973 and February 1974 to September 1979.  
 Biological analyses: February 1974 to September 1979.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	TEMPER- ATURE AIR (DEG C) (00020)	TUR- BID- ITY (FTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)
OCT 27...	0830	1070	695	8.50	8.0	7.5	3.8	12.0	104	742	130
DEC 09...	1130	1360	722	8.50	5.0	6.5	4.0	12.6	102	742	180
MAR 23...	1100	853	686	8.50	11.0	8.0	16	11.2	105	742	130
MAY 03...	1045	1140	620	8.40	16.5	14.5	25	10.0	106	740	K90
JUN 24...	1130	425	458	9.00	28.0	29.0	15	8.4	111	742	380
AUG 16...	1330	157	472	8.60	31.5	36.0	20	7.8	109	742	270
DATE	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	HARD- NESS NONCARB WH WAT TOT FLD MG/L AS CACO3 (00902)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	SODIUM AD- SORP- TION RATIO (00932)	SODIUM AD- SORP- TION RATIO (00931)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	CAR- BONATE WATER DIS IT FIELD MG/L AS CO3 (00452)
OCT 27...	190	75	370	92	33	12	7	0.3	2.4	295	2
DEC 09...	4000	140	380	96	33	11	6	0.3	1.9	295	7
MAR 23...	160	75	360	96	30	13	7	0.3	3.3	285	13
MAY 03...	K70	84	310	66	34	12	8	0.3	2.5	224	3
JUN 24...	93	63	210	41	27	15	13	0.5	2.6	152	18
AUG 16...	210	0	45	5.8	7.5	55	70	4	3.9	172	5
DATE	BICAR- BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	NITRO- GEN, ORGANIC TOTAL (MG/L AS N) (00605)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)
OCT 27...	357	45	20	0.40	18	428	432	0.58	1240	0.88	7.80
DEC 09...	346	41	20	0.40	18	429	397	0.58	1580	0.97	7.60
MAR 23...	321	50	19	0.40	18	425	430	0.58	979	0.81	5.80
MAY 03...	267	50	23	0.50	11	361	361	0.49	1110	0.67	6.60
JUN 24...	150	53	21	0.40	17	277	276	0.38	318	1.8	1.80
AUG 16...	200	47	20	0.30	15	--	260	0.35	110	0.47	<0.100

## DES MOINES RIVER BASIN

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05484500 RACCOON RIVER AT VAN METER, IA--Continued

## WATER-QUALITY RECORDS

WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

		NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHOROUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	PHOS- PHOROUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHOROUS TOTAL (MG/L AS P) (00665)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)	
DATE												
OCT 27...		0.020	0.030	0.020	0.90	0.070	0.070	0.090	127	367	20	
DEC 09...		0.030	0.040	0.030	1.0	0.050	0.060	0.110	78	286	51	
MAR 23...		0.130	0.110	0.090	0.90	0.170	0.210	0.270	141	325	87	
MAY 03...		0.020	0.040	0.030	0.70	<0.010	0.010	0.050	128	394	92	
JUN 24...		0.040	0.020	0.010	1.8	0.010	0.020	0.280	--	--	--	
AUG 16...		<0.010	0.020	0.030	0.50	0.050	0.060	0.210	--	--	--	
DATE		ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	
OCT 27...		2	<10	110	<0.5	2	<1	<3	<1	10	5	
DEC 09...		--	--	--	--	--	--	--	--	--	--	
MAR 23...		2	<10	100	<0.5	<1	<1	<3	2	4	<5	
MAY 03...		1	<10	91	<0.5	<1	<1	<3	4	6	<5	
JUN 24...		--	--	--	--	--	--	--	--	--	--	
AUG 16...		3	<10	28	<0.5	<1	<1	<3	5	10	<5	
DATE		LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	NICKEL, DIS- SOLVED (UG/L AS NI) (01065)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	SILVER, DIS- SOLVED (UG/L AS AG) (01075)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	
OCT 27...		30	13	0.2	<10	<1	2	<1.0	260	<6	24	
DEC 09...		--	--	--	--	--	--	--	--	--	--	
MAR 23...		25	18	0.2	<10	<1	2	<1.0	260	<6	<3	
MAY 03...		27	5	0.1	<10	6	3	<1.0	260	<6	19	
JUN 24...		--	--	--	--	--	--	--	--	--	--	
AUG 16...		<4	95	0.3	<10	3	<1	<1.0	88	<6	1600	
DATE	ATRA- ZINE (UG/L) (39630)	CYAN- AZINE (UG/L) (81757)	METRI- BUZIN (UG/L) (81408)	ALA- CHLOR (UG/L) (77825)	METOLA- CHLOR (UG/L) (39356)	TRIFLU- RALIN (UG/L) (39030)	BUTY- LATE (UG/L) (99901)	CHLOR- PYRIFOS (UG/L) (81403)	ETHO- PROP (UG/L) (81758)	DYFO- NATE (UG/L) (81294)	PHORATE (UG/L) (39023)	TERBU- FOS (UG/L) (82088)
[ Pesticide concentrations expressed as total recoverable ]												
OCT 27...	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	--	--	--	--	--
DEC 09...	--	--	--	--	--	--	--	--	--	--	--	--
MAR 23...	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	--	--	--	--	--
MAY 03...	0.12	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	--	--	--	--	--
JUN 24...	0.18	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
AUG 16...	0.31	0.13	<0.10	<0.10	0.37	<0.10	<0.10	--	--	--	--	--

## DES MOINES RIVER BASIN

05484800 WALNUT CREEK AT DES MOINES, IA

LOCATION.--Lat 41°35'14", long 93°42'11", in SW1/4 SE1/4 sec.2, T.78 N., R.25 W., Polk County, Hydrologic Unit 07100006, on left bank, 25 ft downstream from bridge on 63rd Street in Des Moines, and 2.2 mi upstream from Raccoon River.

DRAINAGE AREA.--78.4 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1971 to current year.

REVISED RECORDS.--WDR Iowa 1973: 1972. WDR IA-75-1: 1973-74.

GAGE.--Water-stage recorder. Datum of gage is 801.04 ft above NGVD (levels by Iowa Natural Resources Council).

REMARKS.--Estimated daily discharges: Oct. 2-18, Dec. 15-21, Jan. 1 to Feb. 29, Mar. 7-17. Records good except those for estimated daily discharges, which are poor. U.S. National Weather Service gage-height telemeter at station.

AVERAGE DISCHARGE.--17 years, 62.40 ft<sup>3</sup>/s, 10.8 in/yr, 45,210 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 12,500 ft<sup>3</sup>/s May 10, 1986, gage height, 18.32 ft, from rating curve extended above 3,500 ft<sup>3</sup>/s on basis of contracted-opening measurement of peak flow; no flow for many days in 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 600 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
June 8	0715	613	7.58	Aug. 22	1015	*704	*7.95

Minimum daily discharge, 0.08 ft<sup>3</sup>/s Aug. 17.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	30	37	78	41	52	34	16	11	9.7	1.1	.59	.45
2	30	26	67	47	43	28	41	11	12	1.1	.27	.46
3	29	23	61	28	34	23	25	10	6.6	.90	.22	1.3
4	28	22	54	33	31	22	23	11	5.9	.83	3.2	1.4
5	30	20	51	37	27	22	27	10	5.5	.70	4.7	.48
6	31	20	50	38	26	22	28	10	5.3	.61	1.1	.36
7	29	26	49	37	23	19	21	10	5.2	.71	.69	.34
8	28	23	58	36	25	20	19	57	127	1.2	.51	.30
9	27	21	55	35	22	19	19	24	33	.58	.63	.34
10	26	19	48	33	20	18	19	14	20	.18	.54	.26
11	25	20	50	32	18	19	18	12	16	2.3	.77	.11
12	26	20	46	33	17	18	17	10	13	2.1	.57	.09
13	25	20	43	30	16	17	17	9.2	12	1.3	.50	.11
14	24	20	42	30	15	19	16	8.4	9.9	1.0	.45	.13
15	23	37	32	31	14	23	16	8.4	8.6	.87	.34	18
16	24	35	28	31	14	20	16	8.2	8.4	6.4	.18	11
17	23	40	25	29	14	16	15	7.8	7.5	.81	.08	2.1
18	23	29	28	28	15	15	15	7.9	8.4	37	.14	1.3
19	22	27	35	27	19	19	15	7.3	7.2	9.9	.90	57
20	22	26	39	26	23	18	15	6.9	5.3	12	.68	4.5
21	23	25	43	24	26	16	15	7.7	4.6	3.5	.13	4.1
22	23	27	53	23	28	16	15	14	9.6	2.8	131	3.3
23	23	26	53	23	32	16	16	13	4.0	2.0	8.8	16
24	24	24	68	22	35	29	14	9.1	3.1	1.3	2.9	8.0
25	22	24	64	21	36	25	13	6.8	2.2	.97	2.2	4.1
26	25	24	64	20	33	20	20	6.4	1.7	.77	1.1	2.4
27	24	43	74	20	32	18	16	9.8	1.8	.62	14	9.5
28	23	129	59	25	33	22	13	7.1	1.7	.49	2.2	15
29	23	127	53	28	34	19	12	6.3	2.5	.51	.87	23
30	23	98	59	43	---	16	12	6.0	1.4	.55	.63	12
31	28	---	51	48	---	16	---	5.8	---	.58	.52	---
TOTAL	786	1058	1580	959	757	624	544	346.1	359.1	251.11	181.41	197.43
MEAN	25.4	35.3	51.0	30.9	26.1	20.1	18.1	11.2	12.0	8.10	5.85	6.58
MAX	31	129	78	48	52	34	41	57	127	81	131	57
MIN	22	19	25	20	14	15	12	5.8	1.4	.49	.08	.09
AC-FT	1560	2100	3130	1900	1500	1240	1080	686	712	498	360	392
CFSM	.32	.45	.65	.39	.33	.26	.23	.14	.15	.10	.07	.08
IN.	.37	.50	.75	.46	.36	.30	.26	.16	.17	.12	.09	.09

CAL YR 1987	TOTAL 23245.8	MEAN 63.7	MAX 1050	MIN 8.4	AC-FT 46110	CFSM .81	IN. 11.03
WTR YR 1988	TOTAL 7643.15	MEAN 20.9	MAX 131	MIN .08	AC-FT 15160	CFSM .27	IN. 3.63

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LOCATION.--Lat 41°34'30", long 93°35'48", in NE1/4 SE1/4 sec.10, T.78 N., R.24 W., Polk County, Hydrologic Unit 07100008, on right bank 10 ft downstream from bridge on Southeast 14th Street at Des Moines, 0.8 mi downstream from Raccoon River and Scott Street Dam, and at mile 200.7.

PERIOD OF RECORD.--April 1940 to current year.

GAGE.--Water-stage recorder. Datum of gage is 762.52 ft above NGVD. Prior to Oct. 1, 1951, and Oct. 1, 1953, to Sept. 30, 1959, water-stage recorder upstream of Scott Street Dam, 0.8 mi upstream at datum 11.16 ft higher. Oct. 1, 1951, to Sept. 30, 1953, and Oct. 1, 1959 to Sept. 30, 1961, nonrecording gage at present site and datum.

COOPERATION.--Average monthly pumpage from galleries provided by Des Moines Water Works.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 77,000 ft<sup>3</sup>/s June 26, 1947, gage height, 20.8 ft in gage well, 21.6 ft from outside floodmark, site and datum then in use; minimum daily discharge, 26 ft<sup>3</sup>/s Jan. 16-29, 1977.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 6,370 ft<sup>3</sup>/s May 12; maximum gage height, 13.95 ft Jan. 31, backwater from ice; minimum daily discharge, 295 ft<sup>3</sup>/s Aug. 21.

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3380	2190	3370	1700	5000	3080	2760	4670	2400	699	497	473
2	3150	2160	3410	1900	4000	3430	2970	5240	2280	643	470	447
3	2960	2130	3290	1900	3500	3900	3430	5260	2170	604	452	444
4	2900	2090	3160	2100	3100	4020	3870	5220	2030	598	433	437
5	2880	1980	3210	2300	2800	4280	3950	5200	2030	548	415	424
6	2750	1960	3550	2200	2500	4470	4320	4920	2010	561	393	408
7	2730	1980	3500	2200	2300	4640	5450	4350	1990	557	383	395
8	2610	2000	3490	2000	2400	4830	5660	4140	2610	560	371	399
9	2530	1840	3560	1700	2200	4730	5610	3940	3480	709	359	387
10	2540	1950	3680	1700	2000	4560	5530	3980	3210	719	352	377
11	2520	1920	3860	1650	1800	4500	5190	5130	2600	620	350	365
12	2450	1810	4070	1600	1570	4440	4680	6280	2470	554	348	375
13	2350	1690	4090	1600	1610	4290	4390	6030	2130	521	351	349
14	2370	1700	3740	1550	1570	3790	3980	5340	1790	498	344	358
15	2320	1780	3620	1550	1500	2960	3810	4320	1620	507	328	389
16	2410	1880	3320	1600	1440	2860	3580	4040	1530	550	320	435
17	2450	1990	2870	1700	1360	2890	3520	3970	1460	850	317	414
18	2440	1950	2400	1700	1330	2860	3370	3620	1420	1600	309	435
19	2410	1910	2550	1800	1770	2890	3080	3120	1350	1860	319	541
20	2310	1860	2530	1900	2180	2940	2840	2940	1290	1770	321	475
21	2260	1830	2590	1800	2440	2910	2820	2900	1240	1010	295	437
22	2250	1860	3410	1700	2580	2880	2740	2930	1260	838	612	472
23	2250	1960	3320	1600	2750	2850	2700	2970	1160	701	538	550
24	2180	1990	3110	1500	2820	2930	2680	2960	1070	631	572	456
25	2200	2210	3140	1400	2760	2930	2690	2910	954	590	594	423
26	2230	2010	3000	1400	2580	2900	2720	2830	917	548	529	413
27	2190	2020	2830	1400	2470	2840	2810	2800	832	602	667	428
28	2430	2400	2670	1450	2450	2870	3040	2780	734	655	727	463
29	2110	2800	2580	1500	2680	3110	3240	2730	729	654	633	507
30	2070	3140	2200	1700	---	3420	4040	2710	711	600	566	540
31	2110	---	2000	3200	---	3370	---	2620	---	543	508	---
TOTAL	76740	60990	98120	55000	69460	109370	111470	122850	51477	22900	13673	13016
MEAN	2475	2033	3165	1774	2395	3528	3716	3963	1716	739	441	434
MAX	3380	3140	4090	3200	5000	4830	5660	6280	3480	1860	727	550
MIN	2070	1690	2000	1400	1330	2840	2680	2620	7			

## DES MOINES RIVER BASIN

05485640 FOURMILE CREEK AT DES MOINES, IA

LOCATION.--Lat 41°36'50", long 93°32'43", in NE1/4 NE1/4 sec.32, T.79 N., R.23 W., Polk County, Hydrologic Unit 07100008, on right bank 20 ft downstream from bridge on Easton Blvd., 4.4 mi downstream from Muchikino Creek and 5.0 mi upstream from Des Moines River.

DRAINAGE AREA.--92.7 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1971 to current year.

REVISED RECORDS.--WDR IA-75-1: 1974 (P).

GAGE.--Water-stage recorder. Datum of gage is 795.87 ft above NGVD.

REMARKS.--Estimated daily discharges: Oct. 5-12, Nov. 11-14, 17-27, Nov. 29 to Dec. 8, Dec. 15-21, Jan. 2 to Mar. 2, May 20-21, Aug. 16-17, Aug. 30 to Sept. 2, and Sept. 8-12. Records fair except those for estimated daily discharges, which are poor. U.S. National Weather Service gage-height telemeter at station.

AVERAGE DISCHARGE.--17 years, 75.0 ft<sup>3</sup>/s, 11.0 in/yr, 54,340 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,340 ft<sup>3</sup>/s June 9, 1974, gage height, 14.84 ft; no flow for many days in 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s) *250	Gage height (ft) 5.58	Date	Time	Discharge (ft <sup>3</sup> /s) ice jam	Gage height (ft) *5.83
Nov. 28	2300			Jan. 30	1000		

Minimum daily discharge, 0.05 ft<sup>3</sup>/s Aug. 18.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	55	33	101	52	64	33	25	18	8.2	3.8	1.5	.68
2	56	27	84	60	54	28	36	18	8.4	3.7	1.4	.60
3	49	25	81	40	43	22	38	16	8.0	3.4	1.2	1.2
4	49	26	70	45	38	23	36	15	6.9	3.3	1.1	2.5
5	58	28	66	47	34	21	36	15	5.9	2.4	2.5	1.9
6	60	29	64	50	32	21	35	15	5.7	2.5	2.6	1.4
7	52	33	60	47	29	22	32	15	5.7	2.5	2.0	.87
8	39	33	57	44	31	24	31	25	36	2.2	2.1	.70
9	38	32	66	43	28	23	30	29	23	7.4	1.7	.80
10	35	32	64	41	25	22	28	22	16	9.4	1.2	.64
11	33	32	67	39	23	23	27	19	15	3.9	.59	.57
12	34	29	59	40	21	22	27	19	13	2.0	.24	.50
13	33	28	53	37	20	20	26	17	12	1.0	.32	.40
14	33	28	49	36	19	25	25	16	9.7	.99	.41	.27
15	31	34	40	37	18	29	25	15	7.7	.87	.23	.96
16	33	43	35	38	17	28	26	15	7.2	2.3	.17	.98
17	32	60	31	36	17	20	25	13	7.1	21	.09	.92
18	29	45	35	34	19	20	23	15	9.2	26	.05	.71
19	30	42	42	33	25	21	23	13	7.5	7.5	.13	4.6
20	35	37	48	31	30	20	22	12	6.2	5.5	2.7	2.9
21	34	35	54	29	33	19	20	13	5.8	3.0	1.4	1.3
22	34	40	55	28	37	20	21	16	6.9	2.0	11	2.6
23	33	37	55	28	40	20	21	18	6.3	1.6	5.0	1.3
24	32	35	76	27	43	24	20	16	5.4	1.6	1.7	.94
25	32	34	84	26	45	27	20	12	4.9	1.5	1.2	.84
26	34	33	82	25	41	25	22	11	4.9	1.4	.70	.89
27	34	60	80	25	39	23	21	11	4.3	1.1	2.6	2.4
28	32	134	80	29	41	24	19	11	4.7	.99	2.2	1.9
29	32	182	67	35	37	27	19	10	4.2	1.2	1.5	2.3
30	33	127	68	50	---	26	19	9.1	3.9	1.3	1.2	2.4
31	33	---	64	60	---	25	---	8.6	---	1.7	.88	---
TOTAL	1177	1393	1937	1192	943	727	778	477.7	269.7	129.05	51.61	40.97
MEAN	38.0	46.4	62.5	38.5	32.5	23.5	25.9	15.4	8.99	4.16	1.66	1.37
MAX	60	182	101	60	64	33	38	29	36	26	11	4.6
MIN	29	25	31	25	17	19	19	8.6	3.9	.87	.05	.27
AC-FT	2330	2760	3840	2360	1870	1440	1540	948	535	256	102	81
CFSM	.41	.50	.67	.41	.35	.25	.28	.17	.10	.04	.02	.01
IN.	.47	.56	.78	.48	.38	.29	.31	.19	.11	.05	.02	.02

CAL YR 1987	TOTAL 31884.6	MEAN 87.4	MAX 1990	MIN 8.0	AC-FT 63240	CFSM .94	IN. 12.80
WTR YR 1988	TOTAL 9116.03	MEAN 24.9	MAX 182	MIN .05	AC-FT 18080	CFSM .27	IN. 3.66

## 05486000 NORTH RIVER NEAR NORWALK, IA

LOCATION.--Lat 41°27'25", long 93°39'10", in NW1/4 SW1/4 sec.20, T.77 N., R.24 W., Warren County, Hydrologic Unit 07100008, on left bank 10 ft downstream from bridge on county highway R57, 1.7 mi southeast of Norwalk, 5.2 mi upstream from Middle Creek, and 6.2 mi downstream from Badger Creek.

DRAINAGE AREA.--349 mi<sup>2</sup>.

PERIOD OF RECORD.--February 1940 to current year.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1508: 1946. WDR IA-76-1: 1975 (P).

GAGE.--Water-stage recorder. Datum of gage is 788.45 ft above NGVD (levels by U.S. Army Corps of Engineers). Prior to June 12, 1946, nonrecording gage at same site and datum. Jan. 7 to Oct. 11, 1960, nonrecording gage at site 2.1 mi upstream at different datum.

REMARKS.--Estimated daily discharges: Dec. 15-19, Dec. 26 to Feb. 25, and Mar. 2-8. Records good except those for estimated daily discharges, which are poor. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--48 years, 185 ft<sup>3</sup>/s, 7.20 in/yr, 134,000 acre-ft/yr; median of yearly mean discharges, 160 ft<sup>3</sup>/s, 6.2 in/yr, 116,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 32,000 ft<sup>3</sup>/s June 13, 1947, gage height, 25.3 ft, from floodmark, from rating curve extended above 9,100 ft<sup>3</sup>/s on basis of velocity-area studies; no flow at times during period 1954-58.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,700 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan. 31	1545	ice jam	*15.49	Feb. 20	----	*430	ice jam

Minimum discharge, 0.30 ft<sup>3</sup>/s Aug. 19, 22, Sept. 6, 7.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	76	66	301	105	170	201	70	39	12	3.2	1.4	.58
2	69	91	240	80	120	170	88	37	14	3.1	1.4	.61
3	67	98	192	64	90	140	131	34	12	2.9	1.2	.53
4	65	80	171	52	68	120	140	33	10	2.7	1.0	.43
5	61	66	151	43	56	100	126	32	9.3	2.7	1.3	.41
6	61	58	141	38	45	110	112	32	9.0	2.7	1.1	.33
7	61	54	143	36	38	120	103	32	8.7	2.6	1.0	.32
8	59	52	139	38	34	130	95	36	21	2.5	.87	.37
9	56	51	157	36	30	115	83	53	12	3.8	.67	.44
10	55	50	182	35	27	99	76	64	9.5	2.1	.57	.49
11	55	47	193	38	26	90	74	51	8.3	10	.52	.45
12	55	44	170	46	25	90	69	40	7.9	7.0	.41	.41
13	56	43	154	42	25	81	65	33	7.1	5.3	.47	.44
14	57	44	136	36	29	55	62	28	6.4	4.4	.69	.42
15	59	48	100	33	32	64	58	24	5.9	3.8	.67	.47
16	59	62	80	42	37	66	56	22	5.5	3.8	.54	.87
17	63	88	88	70	60	67	52	19	5.2	5.6	.44	.71
18	75	125	115	100	100	66	51	18	5.1	7.9	.35	.66
19	70	106	130	130	230	70	48	17	4.7	5.3	.34	1.3
20	60	91	209	170	400	67	46	16	4.5	5.0	.39	1.5
21	55	76	255	120	330	68	44	16	4.5	4.7	.36	1.4
22	53	69	224	84	260	66	43	17	4.3	5.8	1.9	2.2
23	52	66	215	96	210	66	44	26	4.0	6.1	2.5	2.4
24	50	65	226	88	190	72	44	33	4.0	4.6	9.1	1.6
25	51	62	214	84	175	100	45	34	3.9	3.6	4.5	1.1
26	54	58	200	82	186	111	45	29	3.5	2.9	5.0	1.2
27	54	59	220	80	207	94	46	22	3.2	2.5	5.7	1.6
28	60	131	240	80	222	81	48	18	3.1	2.2	3.0	1.6
29	56	318	220	90	225	78	47	15	4.0	2.0	1.8	1.7
30	53	341	200	140	---	79	43	14	3.5	1.7	1.1	2.1
31	53	---	150	250	---	75	---	13	---	1.5	.90	---
TOTAL	1830	2609	5556	2428	3647	2911	2054	897	216.1	142.9	51.19	28.64
MEAN	59.0	87.0	179	78.3	126	93.9	68.5	28.9	7.20	4.61	1.65	.95
MAX	76	341	301	250	400	201	140	64	21	21	9.1	2.4
MIN	50	43	80	33	25	55	43	13	3.1	1.5	.34	.32
AC-FT	3630	5170	11020	4820	7230	5770	4070	1780	429	283	102	.57
CFSM	.17	.25	.51	.22	.36	.27	.20	.08	.02	.01	.00	.00
IN.	.20	.28	.59	.26	.39	.31	.22	.10	.02	.02	.01	.00

CAL YR 1987	TOTAL	85687	MEAN	235	MAX	6210	MIN	23	AC-FT	170000	CFSM	.67	IN.	9.13
WTR YR 1988	TOTAL	22370.83	MEAN	61.1	MAX	400	MIN	.32	AC-FT	44370	CFSM	.18	IN.	2.38

## DES MOINES RIVER BASIN

05486490 MIDDLE RIVER NEAR INDIANOLA, IA

LOCATION.--Lat 41°25'27", long 93°35'09", in SW1/4 SE1/4 sec.35, T.77 N., R.24 W., Warren County, Hydrologic Unit 07100008, on right bank 10 ft downstream from bridge on county highway, 0.4 mi upstream from Cavitt Creek, 1.5 mi upstream from bridge on U.S. Highway 69, and 4.6 mi northwest of Indianola.

DRAINAGE AREA.--503 mi<sup>2</sup>.

PERIOD OF RECORD.--March 1940 to current year.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1508: 1940 (M), 1941, 1944, 1946, 1949 (M).

GAGE.--Water-stage recorder. Datum of gage is 776.15 ft above NGVD (U.S. Army Corps of Engineers bench mark). Prior to June 11, 1946, June 9, 1947, to Nov. 23, 1948, and Sept. 8, 1951, to Oct. 30, 1952, nonrecording gage and June 11, 1946, to June 8, 1947 (destroyed by flood), Nov. 24, 1948, to Sept. 7, 1951, Sept. 1, 1952, to Sept. 30, 1962, water-stage recorder at site 1.6 mi downstream at datum 2.81 ft lower.

REMARKS.--Estimated daily discharges: Nov. 29, 30, Dec. 2-20, Dec. 29 to Mar. 6, 13-16, Apr. 2, 7-8, 14-18, May 12, 13, 15, 23 and June 17-20. Records good except those for estimated daily discharges, which are poor. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--48 years, 263 ft<sup>3</sup>/s, 7.10 in/yr, 190,500 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 34,000 ft<sup>3</sup>/s June 13, 1947, gage height, 26.40 ft, from floodmark, former site and datum; 28.27 ft, from floodmark, present site and datum; minimum daily discharge, 0.11 ft<sup>3</sup>/s July 2, 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 29	0600	*874	*9.00				

Minimum discharge, 1.5 ft<sup>3</sup>/s Sept. 8.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	101	108	407	150	240	300	101	59	30	6.5	7.0	5.1
2	93	151	298	110	170	240	139	55	32	6.7	6.0	4.5
3	88	130	248	90	120	190	184	53	28	6.0	5.4	4.4
4	85	104	235	74	90	150	187	53	27	6.3	8.5	4.4
5	83	87	202	62	76	130	162	52	26	6.4	6.5	3.8
6	81	78	191	54	60	140	141	50	24	6.5	6.0	2.4
7	80	73	195	52	54	172	131	49	23	6.0	5.4	1.9
8	76	73	202	54	49	204	130	60	39	5.7	5.1	1.6
9	74	72	235	52	43	213	110	117	25	11	4.6	1.8
10	73	71	264	50	39	163	99	102	22	20	4.4	2.0
11	74	71	284	54	37	141	99	74	21	11	4.2	2.3
12	75	68	245	66	36	135	97	62	22	7.4	3.9	2.6
13	77	66	218	60	36	125	95	65	22	6.1	4.3	2.6
14	80	66	193	52	42	110	94	59	24	5.9	3.8	2.8
15	80	71	140	47	46	105	88	59	20	11	3.7	5.4
16	81	96	115	66	54	100	84	52	18	9.5	3.6	6.3
17	82	114	130	100	86	95	80	47	17	12	3.3	4.4
18	94	135	150	150	140	96	78	44	16	19	3.4	5.9
19	92	126	220	190	310	98	78	44	14	11	4.2	6.2
20	81	106	500	240	800	91	72	43	14	81	5.5	7.4
21	79	93	767	170	700	90	69	47	13	123	4.6	11
22	76	90	691	120	600	89	69	46	12	58	12	20
23	75	84	525	130	500	87	71	54	11	35	20	12
24	80	80	529	120	420	90	70	64	10	25	27	7.8
25	79	79	495	110	360	127	66	62	9.6	19	56	6.1
26	81	77	308	105	330	163	67	52	8.9	15	45	11
27	84	79	328	105	400	126	73	45	7.8	13	33	14
28	83	294	388	110	350	111	75	39	7.8	11	19	15
29	84	783	350	130	320	103	69	36	12	9.7	12	33
30	80	614	280	200	---	102	63	33	8.6	8.7	8.4	25
31	80	---	200	350	---	98	---	31	---	8.0	6.4	---
TOTAL	2531	4139	9533	3423	6508	4184	2941	1708	564.7	580.4	342.2	232.7
MEAN	81.6	138	308	110	224	135	98.0	55.1	18.8	18.7	11.0	7.76
MAX	101	783	767	350	800	300	187	117	39	123	56	33
MIN	73	66	115	47	36	87	63	31	7.8	5.7	3.3	1.6
AC-FT	5020	8210	18910	6790	12910	8300	5830	3390	1120	1150	679	462
CFSM	.16	.27	.61	.22	.45	.27	.19	.11	.04	.04	.02	.02
IN.	.19	.31	.71	.25	.48	.31	.22	.13	.04	.04	.03	.02

CAL YR 1987	TOTAL	146434	MEAN	401	MAX	13500	MIN	50	AC-FT	290500	CFSM	.80	IN.	10.83
WTR YR 1988	TOTAL	36687.0	MEAN	100	MAX	800	MIN	1.6	AC-FT	72770	CFSM	.20	IN.	2.71



## DES MOINES RIVER BASIN

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05487470 SOUTH RIVER NEAR ACKWORTH, IA

LOCATION.--Lat 41°20'14", long 93°29'10", in SE1/4 SE1/4 sec.34, T.76 N., R.23 W., Warren County, Hydrologic Unit 07100008, on right bank 15 ft downstream from bridge on county highway, 0.5 mi downstream from Otter Creek, and 2.2 mi southwest of Ackworth.

DRAINAGE AREA.--460 mi<sup>2</sup>.

PERIOD OF RECORD.--February 1940 to current year.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1508: 1941, 1945 (M), 1946.

GAGE.--Water-stage recorder. Datum of gage is 769.97 ft above NGVD. Prior to June 12, 1946, nonrecording gage, June 13, 1946, to Apr. 13, 1960, water-stage recorder, and Apr. 14, 1960 to Sept. 30, 1961, nonrecording gage, all at site 4.0 mi downstream at datum 8.06 ft lower.

REMARKS.--Estimated daily discharges: Dec. 15-18, Dec. 29 to Feb. 28, Mar. 2-4, 15, 16 and June 11-19. Records good except those for estimated daily discharges, which are poor. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--48 years, 249 ft<sup>3</sup>/s, 7.35 in/yr, 180,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 34,000 ft<sup>3</sup>/s June 5, 1947, gage height, 24.60 ft, site and datum then in use; maximum gage height, 32.85 ft July 5, 1981; no flow Sept. 19 to Oct. 13, 1956.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1930 reached a stage of 24.5 ft, from information by local residents, discharge, about 30,000 ft<sup>3</sup>/s, at site 4.0 mi downstream.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 5,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 28	unknown	*3,670	*15.50				
Minimum discharge, 0.89 ft <sup>3</sup> /s Sept. 9, 10.							

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	118	204	442	120	200	212	91	36	16	6.6	2.2	1.7
2	106	260	307	90	120	170	145	35	30	5.7	2.0	1.6
3	100	114	256	70	90	115	240	32	23	5.6	2.0	1.9
4	95	76	212	60	70	100	166	35	23	5.2	2.8	1.8
5	93	61	173	52	60	91	128	35	20	4.4	5.1	1.5
6	87	55	178	47	50	95	110	33	16	4.3	3.0	1.4
7	84	56	169	46	45	113	95	32	13	4.6	2.7	1.4
8	81	59	160	48	40	128	84	49	24	4.4	2.7	1.4
9	79	56	239	46	37	121	70	239	17	5.2	2.5	1.3
10	75	56	225	45	34	98	66	115	12	9.2	2.3	1.3
11	71	56	178	48	32	96	67	69	9.9	6.1	2.3	1.9
12	68	57	152	58	32	99	64	63	9.4	4.3	2.2	1.5
13	68	61	125	50	34	87	61	54	9.9	3.7	2.1	1.7
14	67	62	108	42	36	72	57	43	9.2	3.7	2.4	1.6
15	66	69	80	45	38	70	53	41	8.6	3.7	2.0	1.9
16	67	218	70	60	42	76	52	36	8.2	3.5	2.4	3.6
17	70	419	84	80	70	82	53	29	7.6	4.8	1.8	3.6
18	72	372	100	110	120	79	51	27	7.0	13	1.8	2.1
19	57	171	170	150	270	79	48	25	6.3	6.4	2.5	6.7
20	48	125	1090	200	800	85	48	23	5.8	5.9	2.9	5.2
21	46	115	695	120	640	82	47	22	5.4	4.6	2.2	3.4
22	44	103	536	90	480	78	47	27	5.5	4.1	8.8	2.9
23	41	88	529	110	420	80	48	41	4.9	3.3	17	2.1
24	42	98	1170	100	350	106	49	64	5.2	3.1	3.6	2.1
25	40	105	765	90	300	349	45	52	4.8	2.9	2.4	2.3
26	40	112	300	82	280	206	48	38	3.5	2.6	2.2	2.5
27	40	1250	340	80	340	131	67	31	3.7	2.6	3.1	3.1
28	47	2610	638	86	310	113	56	27	4.4	2.5	2.6	9.1
29	43	930	350	100	285	122	45	24	11	2.6	1.9	12
30	35	633	250	150	---	118	39	21	11	2.5	1.8	6.6
31	47	---	150	300	---	96	---	19	---	2.2	1.8	---
TOTAL	2037	8651	10241	2775	5625	3549	2240	1417	335.3	143.3	97.1	91.2
MEAN	65.7	288	330	89.5	194	114	74.7	45.7	11.2	4.62	3.13	3.04
MAX	118	2610	1170	300	800	349	240	239	30	13	17	12
MIN	35	55	70	42	32	70	39	19	3.5	2.2	1.8	1.3
AC-FT	4040	17160	20310	5500	11160	7040	4440	2810	665	284	193	181
CFSM	.14	.63	.72	.19	.42	.25	.16	.10	.02	.01	.01	.01
IN.	.16	.70	.83	.22	.45	.29	.18	.11	.03	.01	.01	.01

CAL YR 1987	TOTAL	155781	MEAN	427	MAX	14700	MIN	24	AC-FT	309000	CFSM	.93	IN.	12.60
WTR YR 1988	TOTAL	37201.9	MEAN	102	MAX	2610	MIN	1.3	AC-FT	73790	CFSM	.22	IN.	3.01

LOCATION.--Lat 41°29'19", long 93°20'17", in SE1/4 NW1/4 sec.12, T.77 N., R.22 W., Polk County, Hydrologic Unit 07100008, on left bank 10 ft downstream from bridge on State Highway 316, 0.2 mi downstream from South River, 0.5 mi upstream from Camp Creek, 2.2 mi southeast of Runnells, 37.2 mi upstream from Red Rock Dam and at mi 179.5.

PERIOD OF RECORD.--October 1985 to current year.

REMARKS.--Estimated daily discharges: Dec. 31 to Feb. 29, June 27 to July 6, and Aug. 2-17. Records good except those for estimated daily discharges, which are poor. Flow regulated by Saylorville Lake (station 05481630) 34.2 mi upstream. U.S. Army Corps of Engineers data collection platform at station. Stage-discharge relation is affected at times by backwater from Lake Red Rock (05488100).

EXTREMES OUTSIDE PERIOD OF RECORD.--Floods occurred on May 31, 1903; June 14, 1947; June 26, 1947; and June 24, 1954. No gage height or discharge was determined for this site.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 9,860 ft<sup>3</sup>/s Feb. 1, gage height, 50.06 ft (backwater from ice); maximum gage height, 57.65 ft Oct. 28, (backwater from Lake Red Rock); minimum daily discharge, 408 ft<sup>3</sup>/s Aug. 19.

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3720	2330	5060	2400	6600	3820	3030	4230	2650	740	679	535
2	3330	2510	4710	2200	5800	4080	3000	5190	2480	710	640	506
3	3160	2380	4400	2400	5000	4470	3480	5410	2360	660	590	493
4	2990	2260	4080	2300	4300	4530	4120	5420	2180	610	560	498
5	2990	2130	3870	2250	3800	4820	4210	5420	2120	570	540	492
6	2820	2070	4190	2200	3300	5000	4280	5360	2110	550	520	475
7	2770	2060	4250	2150	2800	5190	5230	4770	2070	558	500	453
8	2650	2090	4210	2100	3100	5500	5960	4310	2730	563	480	447
9	2600	2050	4440	2050	2900	5550	5920	4440	3070	559	470	445
10	2560	1910	4600	2000	2700	5310	5830	4280	3630	872	460	437
11	2550	1990	4730	1950	2500	5110	5690	4570	2840	755	450	432
12	2510	1950	4920	1900	2300	5020	4950	6520	2450	720	440	428
13	2390	1790	5020	1850	2100	4790	4700	6760	2210	686	460	441
14	2380	1770	4610	1850	2000	4450	4110	6490	1820	666	440	445
15	2350	1800	4280	1800	1900	3420	3930	5050	1630	657	430	456
16	2410	2070	3930	1800	1800	3050	3640	4390	1490	676	420	511
17	2460	2410	3640	1800	1750	3000	3530	4240	1420	703	415	512
18	2490	2550	3190	1900	1700	2970	3440	4140	1380	1180	411	502
19	2460	2270	3220	2000	2300	2980	3190	3510	1340	1900	408	540
20	2350	2110	4220	2100	2700	3020	2900	3190	1280	2050	431	623
21	2260	2010	4450	2200	3000	3010	2780	3090	1240	1540	424	541
22	2230	1980	4700	2100	3200	2970	2720	3080	1180	1120	495	517
23	2230	2070	4940	1900	3400	2930	2650	3200	1180	962	788	586
24	2210	2080	5620	1800	3500	2960	2620	3230	1120	839	593	592
25	2180	2190	5780	1700	3400	3310	2620	3200	1040	769	648	529
26	2210	2230	4280	1650	3300	3260	2640	3100	970	718	606	507
27	2200	2080	3920	1650	3100	3090	2680	3000	910	693	611	500
28	2150	3440	4180	1700	3000	3010	2910	3000	850	758	734	541
29	2390	8260	3770	1800	3250	3110	2970	2910	790	777	710	557
30	2100	5610	3360	2200	---	3330	3600	2860	760	764	630	648
31	2120	---	2800	3400	---	3690	---	2820	---	714	576	---
TOTAL	78220	74450	133370	63100	90500	120750	113330	131180	53300	26039	16559	15189
MEAN	2523	2482	4302	2035	3121	3895	3778	4232	1777	840	534	506
MAX	3720	8260	5780	3400	6600	5550	5960	6760	3630	2050	788	648
MIN	2100	1770	2800	1650	1700	2930	2620	2820				

CAL YR 1987	TOTAL	2214780	MEAN	6068	MAX	40300	MIN	1770	AC-FT	4393000
WTR YR 1988	TOTAL	915987	MEAN	2503	MAX	8260	MIN	408	AC-FT	1817000

## DES MOINES RIVER BASIN

161

05487980 WHITE BREAST CREEK NEAR DALLAS, IA

LOCATION.--Lat 41°14'41", long 93°16'08", in NW1/4 NW1/4 sec.3, T.74 N., R.21 W., Marion County, Hydrologic Unit 07100008, on left bank 15 ft downstream from bridge on county highway, 0.5 mi downstream from Kirk Branch, and 1.7 mi northwest of Dallas.

DRAINAGE AREA.--342 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1962 to current year.

GAGE.--Water-stage recorder. Datum of gage is 759.21 ft above NGVD.

REMARKS.--Estimated daily discharges: Nov. 28-29, Dec. 15-22, 24, 26-27, Dec. 29 to Mar. 3, Mar. 6-7, July 18-28, July 31 to Aug. 3, Aug. 6-16, 20-21, Aug. 28 to Sept. 5, Sept. 7-11, 22-24, and Sept. 29-30. Records good except those for estimated daily discharges, which are poor. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--26 years, 205 ft<sup>3</sup>/s, 8.14 in/yr, 148,500 acre-ft/yr; median of yearly mean discharges, 160 ft<sup>3</sup>/s, 6.4 in/yr, 116,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 37,300 ft<sup>3</sup>/s July 16, 1982, gage height, 33.45 ft; minimum daily discharge, 0.07 ft<sup>3</sup>/s Sept. 29, 1968.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 11, 1962, reached a stage of 28.87 ft, from floodmark, discharge, about 12,000 ft<sup>3</sup>/s. Flood of June 6, 1947, may have been slightly higher.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 29	unknown	*3,260	*16.50	No other peak greater than base discharge.			

Minimum daily discharge, 0.52 ft<sup>3</sup>/s Sept. 14.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	22	124	382	73	110	155	63	25	9.4	3.5	.70	.80		
2	19	246	241	55	68	115	96	23	13	2.9	.62	.70		
3	17	103	194	43	53	88	172	23	14	2.4	.58	.75		
4	17	57	159	37	41	78	142	24	13	2.1	4.2	.82		
5	19	41	136	34	36	74	101	22	10	1.7	10	.88		
6	19	35	131	33	31	70	81	21	8.3	1.5	6.0	.93		
7	19	38	127	31	29	73	65	19	8.0	1.2	2.5	.82		
8	19	38	120	32	26	93	57	27	21	1.1	3.0	.78		
9	18	35	157	31	25	96	52	68	17	1.0	6.0	.74		
10	18	30	151	31	22	87	48	46	10	1.3	4.0	.68		
11	17	26	139	33	21	79	44	35	7.5	1.2	2.9	.64		
12	18	28	117	40	21	79	42	25	6.5	1.1	2.4	.60		
13	20	29	100	29	22	67	41	20	6.1	.83	1.8	.68		
14	22	30	87	27	23	65	39	18	5.7	1.3	1.5	.52		
15	22	30	60	29	25	65	36	15	5.3	1.1	1.3	.55		
16	23	54	70	40	27	56	35	15	5.7	.88	1.2	1.2		
17	28	340	74	54	46	52	34	13	5.1	1.1	1.0	1.3		
18	27	341	74	72	75	52	32	13	4.6	2.6	1.7	1.8		
19	25	149	150	94	175	52	31	14	4.3	2.1	3.2	8.9		
20	23	92	2000	130	520	53	31	14	4.0	3.5	4.0	12		
21	21	70	900	68	425	53	30	14	3.5	1.8	2.7	4.4		
22	20	68	550	53	335	52	31	16	3.3	1.4	8.2	2.5		
23	19	66	513	70	280	52	33	35	3.4	1.2	21	1.5		
24	22	58	1200	59	230	56	31	50	3.3	1.1	76	1.3		
25	24	62	729	43	205	102	29	40	2.9	.96	21	1.1		
26	22	67	320	39	210	120	35	27	2.7	.86	8.5	1.3		
27	24	82	280	37	220	81	38	19	2.8	.78	4.3	21		
28	25	1260	440	39	205	71	34	16	2.5	.76	2.0	67		
29	22	2840	240	47	190	101	32	14	4.1	.79	1.5	6.0		
30	23	1100	160	91	---	93	28	12	4.1	.88	1.1	4.0		
31	29	---	100	195	---	72	---	11	---	.78	.90	---		
TOTAL	663	7539	10101	1689	3696	2402	1563	734	211.1	45.72	205.80	146.19		
MEAN	21.4	251	326	54.5	127	77.5	52.1	23.7	7.04	1.47	6.64	4.87		
MAX	29	2840	2000	195	520	155	172	68	21	3.5	76	67		
MIN	17	26	60	27	21	52	28	11	2.5	.76	.58	.52		
AC-FT	1320	14950	20040	3350	7330	4760	3100	1460	419	91	408	290		
CFSM	.06	.73	.95	.16	.37	.23	.15	.07	.02	.00	.02	.01		
IN.	.07	.82	1.10	.18	.40	.26	.17	.08	.02	.00	.02	.02		
CAL YR 1987	TOTAL	102226	MEAN	280	MAX	8880	MIN	12	AC-FT	202800	CFSM	.82	IN.	11.12
WTR YR 1988	TOTAL	28995.81	MEAN	79.2	MAX	2840	MIN	.52	AC-FT	57510	CFSM	.23	IN.	3.15

## DES MOINES RIVER BASIN

05488100 LAKE RED ROCK NEAR PELLA, IA

LOCATION.--Lat 41°22'11", long 92°58'48", in NE1/4 NW1/4 sec.19, T.76 N., R.18 W., Marion County, Hydrologic Unit 07100008, at outlet works near right end of Red Rock Dam on Des Moines River, 1.4 mi upstream from Lake Creek, 4.5 mi southwest of Pella and at mile 142.3.

DRAINAGE AREA.--12,323 mi<sup>2</sup>.

PERIOD OF RECORD.--March 1969 to current year.

GAGE.--Water-stage recorder. Datum of gage is at NGVD (levels by U.S. Army Corps of Engineers).

REMARKS.--Reservoir is formed by earthfill dam completed in 1969. Storage began in March 1969. Releases controlled through 14 concrete conduits extending through the concrete ogee spillway section into the stilling basin. Inlet invert elevation at 690 ft above NGVD. Maximum design discharge through the conduits is 37,500 ft<sup>3</sup>/s but normal flood control operation limits maximum outflow to 30,000 ft<sup>3</sup>/s. Spillway section consists of 5 tainter gates, 41 ft wide and 46 ft high, on concrete ogee crest at elevation 736 ft. The storage capacity of the reservoir at full flood-control pool level, 780 ft, is 1,790,000 acre-ft, surface area, 65,500 acres and that of conservation pool level, 728 feet, is 89,000 acre-feet, surface area, 9,980 acres. Reservoir is used for flood control, low-flow augmentation, conservation and recreation. Normal operation will maintain an elevation of 728 ft with minimum release of 300 ft<sup>3</sup>/s and maximum release of 30,000 ft<sup>3</sup>/s during the non-growing season, providing discharges at Ottumwa and Keosauqua do not exceed 30,000 ft<sup>3</sup>/s and 35,000 ft<sup>3</sup>/s respectively. Storage tables for water years 1985-1986 published as day second-feet instead of acre-feet storage.

COOPERATION.--Records provided by U.S. Army Corps of Engineers.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily contents, 1,765,000 acre-ft June 25, 1984; maximum elevation, 779.61 ft June 25, 1984; minimum daily contents, 43,900 acre-ft May 24, 1985, minimum elevation, 719.68 ft Feb. 17, 1977.

EXTREMES FOR CURRENT YEAR.--Maximum daily contents, 135,000 acre-ft Dec. 2; maximum elevation, 733.80 ft Dec. 2; minimum daily contents, 72,100 acre-ft Feb. 22; minimum elevation, 727.76 ft Feb. 23.

Capacity table (elevation, in feet, and contents, in acre-feet)

722	45,600	740	256,000	760	789,000
725	63,400	745	357,000	765	983,000
730	110,000	750	479,000	770	1,213,000
735	174,000	755	623,000		

RESERVOIR STORAGE (ACRE-FEET), WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
OBSERVATION AT 24:00 VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	95800	95700	133000	75500	78700	73500	79400	77100	75000	78900	90700	97600
2	93300	97000	135000	75500	78200	73900	79000	75700	75600	79500	90400	97500
3	92500	96900	131000	78300	76400	72900	77900	74800	75600	80100	90500	97800
4	92700	95800	125000	79000	76200	73100	77500	74200	75500	80600	91900	97300
5	95200	93600	119000	77100	77000	74600	78500	74500	75500	81000	92500	97000
6	95400	92800	114000	76900	76500	75400	78300	74800	75300	81400	92500	96500
7	94200	93200	110000	78200	76900	75400	78500	75700	74800	81800	92900	95900
8	95600	93600	105000	78700	78400	76300	78500	77600	77400	82200	94500	96500
9	95600	93300	100000	78200	76400	75400	79000	75500	81000	82900	94600	96400
10	96100	92600	95400	77300	74100	74200	77700	74200	84400	84000	94700	96100
11	96100	92300	90300	77200	74100	74400	77100	74800	84900	84800	94900	96400
12	95700	92000	86700	77800	74500	77000	77500	75400	84300	85200	94800	96600
13	95100	92300	82800	77200	74500	76200	78200	76700	83300	85800	94900	96500
14	94400	92700	80400	76700	74900	76700	77800	77900	81600	86000	94900	96400
15	93800	93900	76900	77200	74600	76600	76200	76800	79600	86300	94900	96900
16	94000	97800	75500	78400	75000	75000	75500	75800	78100	87000	94900	97200
17	93200	102000	75200	78200	74800	75200	75400	75300	76700	87600	94800	97700
18	93300	103000	77100	77200	74800	76500	74700	75600	76700	89400	94700	98800
19	93000	102000	80100	77100	75500	77700	74900	75500	76800	93000	94700	104000
20	92800	98000	81500	79000	75600	76800	75400	74200	76600	96600	94500	102000
21	90900	96600	85800	79300	73900	76000	74900	74800	76600	97900	93500	101000
22	90800	97700	92400	78500	72100	77500	74900	76400	76800	97800	98500	103000
23	89900	98300	90800	78100	74100	77800	75900	76000	76800	97800	99800	102000
24	90500	98100	89200	76500	75500	79200	76200	75200	77400	96500	100000	103000
25	90500	97500	87000	76200	74300	78400	76600	75400	77500	95900	99700	103000
26	92100	97500	79400	76300	73600	77300	78700	75300	77200	95100	98900	103000
27	92300	97700	77100	77800	73800	76600	77800	74800	77500	94000	98900	104000
28	92200	104000	77400	77900	73800	77900	78300	74400	77800	92900	98400	104000
29	93500	120000	76700	77300	72500	76600	77700	74300	77500	93000	98300	104000
30	93500	127000	78800	78800	---	76600	77200	74400	77900	92700	98200	105000
31	94400	---	79200	79400	---	78300	---	74500	---	91300	97700	---
MEAN	93500	98200	93200	77600	75200	76100	77200	75400	78100	88400	95300	99400
MAX	96100	127000	135000	79400	78700	79200	79400	77900	84900	97900	100000	105000
MIN	89900	92000	75200	75500	72100	72900	74700	74200	74800	78900	90400	95900

CAL YR 1987 MEAN 92800 MAX 367000 MIN 72800  
WTR YR 1988 MEAN 85700 MAX 135000 MIN 72100

## DES MOINES RIVER BASIN

163

05488200 ENGLISH CREEK NEAR KNOXVILLE, IA

LOCATION.--Lat 41°16'00", long 93°05'00", in NE1/4 NE1/4 SE1/4 sec.16, T.75 N., R.19 W., Marion County, Hydrologic Unit 07100009, on left bank 30 ft from left upstream abutment of bridge on State Highway 92, 3 mi east of Knoxville, and 11.4 mi upstream from mouth at Des Moines River.

DRAINAGE AREA.--90.1 mi<sup>2</sup>.

PERIOD OF RECORD.--July 1985 to current year.

GAGE.--Water-stage recorder. Datum of gage is 721.79 ft above NGVD.

REMARKS.--Estimated daily discharges: Dec. 15-19, Dec. 27 to Mar. 1, July 18 to Aug. 14, Aug. 16-21, Aug. 24 to Sept. 4, Sept. 10-12, 24-26, and 28-29. Records good except those for estimated daily discharges, which are poor. U.S. Army Corps of Engineers satellite data collection platform at station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,270 ft<sup>3</sup>/s May 17, 1986, gage height, 21.76 ft; no flow Sept. 12-17, 1988.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of July 16, 1982 reached a stage of 30.28 ft, gage datum, discharge 28,000 ft<sup>3</sup>/s, from contracted-opening indirect computations.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 600 ft<sup>3</sup>/s and maximum (\*);

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 29	0700	*986	*16.86	Dec. 24	1800	675	15.12
Dec. 20	1230	896	16.38				

No flow Sept. 12-17.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.9	43	77	50	15	26	14	6.3	1.3	.75	.04	.03
2	2.4	31	54	37	12	23	18	6.0	1.2	.58	.04	.02
3	2.0	11	46	30	10	23	31	5.6	1.4	.44	.03	.03
4	3.0	7.3	38	23	9.0	24	22	4.9	1.3	.38	.10	.02
5	2.6	3.7	30	16	8.4	28	19	5.2	1.1	.33	.50	.02
6	2.5	2.5	32	12	8.0	31	16	5.0	1.0	.27	.20	.03
7	2.7	2.1	31	11	8.6	30	13	5.0	1.1	.15	.07	.04
8	3.8	2.9	31	12	9.4	25	12	9.1	18	.09	.15	.05
9	3.6	2.9	62	13	8.6	22	11	37	42	.08	.30	.03
10	3.2	2.5	50	12	7.6	17	10	18	9.8	.10	.13	.02
11	3.5	2.2	39	13	7.2	16	9.7	9.3	5.2	.09	.09	.01
12	4.1	2.1	33	14	6.8	18	9.3	7.2	3.7	.08	.07	.00
13	4.7	2.1	26	12	7.6	13	9.0	5.8	2.4	.06	.06	.00
14	5.1	2.6	23	11	8.6	10	8.6	5.0	2.1	.07	.04	.00
15	6.1	2.9	15	10	9.4	10	8.2	4.6	1.7	.09	.03	.00
16	7.8	8.9	13	14	9.0	9.9	8.3	3.7	1.6	.14	.03	.00
17	3.5	110	16	21	10	11	8.3	3.1	1.3	.21	.02	.00
18	3.0	69	20	32	18	12	7.9	3.0	1.4	.27	.02	1.3
19	4.0	24	35	40	45	14	7.7	2.9	1.3	.35	.10	40
20	3.2	15	685	30	100	13	7.4	2.8	1.1	.20	.06	5.3
21	2.2	10	360	20	74	13	7.4	2.6	1.2	.11	.08	.37
22	2.1	10	257	16	56	13	7.3	4.1	1.1	.12	.65	.23
23	2.8	11	185	19	50	13	7.3	7.9	.72	.10	1.2	.21
24	3.8	8.1	509	14	45	15	7.5	10	.58	.08	.50	.18
25	3.6	7.4	282	11	52	35	6.9	7.1	.64	.07	.30	.15
26	4.2	12	85	10	45	27	6.9	4.4	.56	.06	.20	.20
27	7.2	11	80	10	35	18	9.1	3.2	.45	.07	.10	.30
28	2.5	566	86	11	28	16	8.2	2.5	.37	.07	.07	10
29	1.5	676	74	12	27	20	7.0	2.2	.63	.06	.05	8.0
30	1.3	148	66	40	---	18	6.5	2.3	.89	.05	.04	4.0
31	1.8	---	58	20	---	15	---	1.9	---	.05	.03	---
TOTAL	106.7	1807.2	3398	596	730.2	578.9	324.5	197.7	107.14	5.57	5.30	70.54
MEAN	3.44	60.2	110	19.2	25.2	18.7	10.8	6.38	3.57	.18	.17	2.35
MAX	7.8	676	685	50	100	35	31	37	42	.75	1.2	40
MIN	1.3	2.1	13	10	6.8	9.9	6.5	1.9	.37	.05	.02	.00
AC-FT	212	3580	6740	1180	1450	1150	644	392	213	11	11	140
CFSM	.04	.67	1.22	.21	.28	.21	.12	.07	.04	.00	.00	.03
IN.	.04	.75	1.40	.25	.30	.24	.13	.08	.04	.00	.00	.03

CAL YR 1987	TOTAL 17038.56	MEAN 46.7	MAX 1320	MIN .04	AC-FT 33800	CFSM .52	IN. 7.03
WTR YR 1988	TOTAL 7927.75	MEAN 21.7	MAX 685	MIN .00	AC-FT 15720	CFSM .24	IN. 3.27

## DES MOINES RIVER BASIN

05488500 DES MOINES RIVER NEAR TRACY, IA

LOCATION.--Lat 41°16'53", long 92°51'34", in NW1/4 SE1/4 sec.19, T.75 N., R.17 W., Mahaska County, Hydrologic Unit 07100009, on right bank 250 ft upstream from abandoned Bellefontaine Bridge, 0.8 mi east of Tracy, 3.1 mi upstream from Cedar Creek, 3.8 mi downstream from bridge on newly located State Highway 92, 6.4 mi downstream from English Creek, and at mile 130.4.

DRAINAGE AREA.--12,479 mi<sup>2</sup>.

PERIOD OF RECORD.--March, 1920 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1508: 1920 (M), 1922 (M), 1933.

GAGE.--Water-stage recorder. Datum of gage is 670.91 ft above NGVD. Prior to June 26, 1940, and June 30, 1952, to Nov. 4, 1960, nonrecording gage, and June 27, 1940, to June 29, 1952, water-stage recorder, at site 250 ft downstream at same datum.

REMARKS.--Estimated daily discharges: Dec. 21, 29, Jan. 1-2, 5-16, 18-20, 24, 26-27, Feb. 6-8, and 10-16. Records good, except those for periods of estimated discharges, which are fair. Flow regulated by Lake Red Rock (station 05488100) 11.9 mi upstream, since March 12, 1969. U.S. Army Corps of Engineers gage-height telemeter and data collection platform at station.

AVERAGE DISCHARGE.--68 years, 5,100 ft<sup>3</sup>/s, 5.55 in/yr, 3,695,000 acre-ft/yr; median of yearly mean discharges, 4,170 ft<sup>3</sup>/s, 4.5 in/yr, 3,020,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 155,000 ft<sup>3</sup>/s, June 14, 1947, gage height, 26.5 ft; minimum daily discharge, 40 ft<sup>3</sup>/s Jan. 29 to Feb. 1, 1940.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since 1851, that of June 14, 1947. Flood of May 31, 1903, reached a stage of about 25 ft, discharge, about 130,000 ft<sup>3</sup>/s. Minimum daily discharge since at least 1910, that of Jan. 29 to Feb. 1, 1940.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 8,670 ft<sup>3</sup>/s Dec. 24, gage height, 7.18 ft; minimum daily discharge, 336 ft<sup>3</sup>/s Sept. 14.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3980	2190	2620	3200	4450	3700	3150	4020	2720	685	1020	832
2	3560	2330	3580	2400	5420	3550	3470	4850	2460	432	956	723
3	3510	2620	6290	1570	4400	4480	4130	5630	2460	402	820	720
4	3200	2920	6300	2100	3520	4430	4370	5620	2450	399	411	714
5	2660	2800	6280	2500	2220	4050	4360	5380	2300	396	401	717
6	2310	2440	6250	2100	2100	4360	4350	5050	2300	391	393	717
7	2950	2160	6220	1700	1800	4900	4510	4850	2300	392	388	631
8	2700	2150	6210	2100	1600	5000	5330	4310	2140	388	390	398
9	2340	2140	6200	2200	2120	5600	5930	4900	1770	383	388	387
10	2340	2140	6300	2200	2500	5620	6050	5250	2110	388	381	384
11	2440	2150	6440	1900	1800	5230	6090	4240	2850	381	386	382
12	2630	2150	6390	1800	1600	4710	5370	4830	3100	379	382	386
13	2620	1970	6340	1800	1700	4720	4700	5660	3090	381	395	377
14	2620	1590	6000	1800	1600	4470	4700	5690	3090	381	391	336
15	2620	1600	5520	1600	1600	3830	4700	5690	2960	382	387	357
16	2630	1600	4800	1500	1500	3820	4420	5100	2660	396	386	399
17	2620	1740	3190	1900	1770	3400	3960	4250	2360	387	379	383
18	2620	2180	2730	2200	2010	2750	3950	4080	2000	390	381	392
19	2610	3300	2630	2150	2840	2750	3680	3800	1740	512	384	638
20	2610	3280	4160	2200	4020	3090	3200	3790	1730	1090	405	508
21	2610	2840	4100	2980	4610	3570	3190	3440	1640	1200	383	428
22	2560	1980	3650	3790	4720	2930	3160	2950	1510	1510	451	413
23	2450	1980	5650	3010	3690	2930	2880	3310	1430	1390	447	391
24	2330	2140	7360	2800	3500	2950	2880	3690	1300	1670	473	394
25	2170	2450	8480	2390	4210	3420	2890	3200	1300	1220	1080	394
26	2160	2450	8050	1900	4250	4030	2890	3190	1290	1190	1100	391
27	2150	2460	6220	1300	4070	3670	2870	3190	1170	1280	1110	397
28	2150	2860	4190	1790	4080	3130	2880	3210	893	1210	1100	405
29	2150	4790	4100	2060	4060	3560	3210	3090	896	1180	1030	400
30	2150	5240	3260	2090	---	3720	3780	2880	851	1080	891	419
31	2180	---	3140	2910	---	3140	---	2870	---	1480	892	---
TOTAL	80630	74640	162650	67940	87760	121510	121050	132010	60870	23345	18381	14413
MEAN	2601	2488	5247	2192	3026	3920	4035	4258	2029	753	593	480
MAX	3980	5240	8480	3790	5420	5620	6090	5690	3100	1670	1110	832
MIN	2150	1590	2620	1300	1500	2750	2870	2870	851	379	379	336
AC-FT	159900	148000	322600	134800	174100	241000	240100	261800	120700	46300	36460	28590

CAL YR 1987 TOTAL 2329600 MEAN 6382 MAX 25400 MIN 1590 AC-FT 4621000  
WTR YR 1988 TOTAL 965199 MEAN 2637 MAX 8480 MIN 336 AC-FT 1914000

## 05489000 CEDAR CREEK NEAR BUSSEY, IA

LOCATION.--Lat 41°13'09", long 92°54'38", at SW corner sec.11, T.74 N., R.18 W., Marion County, Hydrologic Unit 07100009, on left bank 10 ft downstream from bridge on State Highway 156, 0.8 mi downstream from North Cedar Creek, 1.6 mi northwest of Bussey, 3.0 mi upstream from Honey Creek, and 8.9 mi upstream from mouth.

DRAINAGE AREA.--374 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1947 to current year.

REVISED RECORDS.--WSP 1438: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 682.15 ft above NGVD (levels by U.S. Army Corps of Engineers). Prior to Feb. 21, 1949, nonrecording gage at same site and datum.

REMARKS.--Estimated daily discharges: Oct. 6-13, Dec. 3, 4, 15-17, and Dec. 30 to Feb. 29. Records good except those for estimated daily discharges, which are poor. U.S. Army Corps of Engineers satellite data collection platform and gage-height telemeter at station.

AVERAGE DISCHARGE.--41 years, 218 ft<sup>3</sup>/s, 7.92 in/yr, 157,900 acre-ft/yr; median of yearly mean discharges, 180 ft<sup>3</sup>/s, 6.5 in/yr, 130,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 96,000 ft<sup>3</sup>/s July 3, 1982, gage height, 34.61 ft; no flow Sept. 6-20, 1955, Oct. 11, 12, 1956.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1946 reached a stage of 28.45 ft on upstream side and 28.05 ft on downstream side of bridge, levels to floodmarks by U.S. Army Corps of Engineers, discharge, 31,500 ft<sup>3</sup>/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 29	0415	*4,710	*17.86	No other peak greater than base discharge.			

Minimum discharge, 0.50 ft<sup>3</sup>/s Sept. 10, 11, 12, 13.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	28	123	313	130	135	234	74	31	9.9	3.3	.99	.85
2	25	235	227	98	110	207	78	29	8.0	3.2	.87	.71
3	23	119	192	77	87	161	131	27	6.7	3.1	.81	.82
4	21	70	161	67	68	127	115	25	6.5	2.7	4.3	.81
5	19	44	133	62	61	117	96	26	6.2	2.5	21	.81
6	18	33	130	59	53	123	80	25	25	2.3	7.0	.87
7	17	38	122	57	49	132	69	24	8.8	4.5	2.0	.81
8	15	45	121	58	45	152	61	26	65	2.3	5.8	.65
9	14	40	151	55	43	164	55	79	108	1.7	9.2	.56
10	13	32	142	56	39	150	50	57	41	1.8	3.2	.54
11	13	29	125	60	37	140	50	35	19	2.1	2.3	.52
12	14	28	115	70	38	144	49	26	12	2.0	1.5	.51
13	15	30	99	51	39	121	56	21	7.8	1.8	1.2	.57
14	17	33	89	49	41	84	49	19	6.1	1.9	1.1	.62
15	19	34	64	53	44	99	43	17	5.5	1.8	1.0	.62
16	25	48	60	70	47	91	41	15	5.1	3.3	1.1	1.2
17	51	467	70	91	76	91	40	13	5.5	1.9	.98	1.4
18	56	408	82	120	120	99	39	16	4.9	3.6	.97	2.2
19	35	156	136	150	260	99	36	14	4.3	5.7	3.2	72
20	24	106	2630	200	720	85	35	13	4.3	2.4	1.7	59
21	20	79	1150	110	450	70	36	13	4.0	2.2	23	17
22	20	75	613	89	300	64	36	20	4.6	2.3	20	6.5
23	19	80	560	115	200	67	36	38	3.7	1.8	19	3.1
24	19	75	1510	98	190	75	37	74	3.2	1.4	9.3	2.3
25	19	114	1020	73	220	136	35	58	3.3	1.3	22	2.0
26	22	127	318	66	250	130	45	30	3.2	1.3	7.2	1.6
27	23	103	289	63	320	88	55	18	2.7	1.1	5.2	1.9
28	27	2340	638	60	300	76	44	14	2.7	1.2	4.2	104
29	24	4130	389	70	280	93	35	12	3.7	1.2	2.3	94
30	21	936	260	93	---	104	31	11	3.7	1.2	1.4	32
31	27	---	170	190	---	86	---	12	---	1.1	1.1	---
TOTAL	703	10177	12079	2660	4622	3609	1637	838	394.4	70.0	184.92	410.47
MEAN	22.7	339	390	85.8	159	116	54.6	27.0	13.1	2.26	5.97	13.7
MAX	56	4130	2630	200	720	234	131	79	108	5.7	23	104
MIN	13	28	60	49	37	64	31	11	2.7	1.1	.81	.51
AC-FT	1390	20190	23960	5280	9170	7160	3250	1660	782	139	367	814
CFSM	.06	.91	1.04	.23	.43	.31	.15	.07	.04	.01	.02	.04
IN.	.07	1.01	1.20	.26	.46	.36	.16	.08	.04	.01	.02	.04

CAL YR 1987	TOTAL	72678.5	MEAN	199	MAX	6000	MIN	3.4	AC-FT	144200	CFSM	.53	IN.	7.23
WTR YR 1988	TOTAL	37384.79	MEAN	102	MAX	4130	MIN	.51	AC-FT	74150	CFSM	.27	IN.	3.72

## 05489500 DES MOINES RIVER AT OTTUMWA, IA

LOCATION.--Lat 41°00'39", long 92°24'40", in SE1/4 NE1/4 sec.25, T.72 N., R.14 W., Wapello County, Hydrologic Unit 07100009, on right bank 15 ft downstream from Wabash Railroad Bridge at Ottumwa, 0.4 mi downstream from Ottumwa powerplant, 6.5 mi upstream from Village Creek, 9.5 mi downstream from South Avery Creek, and at mile 94.1.

DRAINAGE AREA.--13,374 mi<sup>2</sup>.

PERIOD OF RECORD.--March 1917 to current year (published as "at Eldon" October 1930 to March 1935). Monthly dis-charge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 525: 1917-20. WSP 1308: 1917-23 (M), 1925-27 (M), 1931. WSP 1438: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 622.00 ft above NGVD. Prior to Sept. 30, 1930, nonrecording gage at Market Street Bridge 1,700 ft upstream at datum 0.83 ft higher. Oct. 1, 1930, to Mar. 31, 1935, nonrecording gage at Eldon 15 mi downstream at different datum. Apr. 1, 1935, to Oct. 25, 1963, water-stage recorder at site 1,100 ft downstream at Vine Street Bridge at datum 0.77 ft higher.

REMARKS.--Estimated daily discharges: Dec. 16-21 and Jan. 3 to Feb. 26. Records good except those for estimated daily discharges, which are poor. Prior to Dec. 12, 1958, and since Nov. 30, 1960, diurnal fluctuation at low and medium stages are caused by powerplant upstream of station about 1/2 mile. Flow regulated by Lake Red Rock (station 05488100) 48.2 mi upstream, since March 12, 1969. U.S. Army Corps of Engineers satellite data collection platform at station.

AVERAGE DISCHARGE.--71 years, 5,524 ft<sup>3</sup>/s, 5.61 in/yr, 4,002,000 acre-ft/yr; median of yearly mean discharges, 4,690 ft<sup>3</sup>/s, 4.8 in/yr, 3,400,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 135,000 ft<sup>3</sup>/s June 7, 1947, gage height, 20.2 ft, site and datum then in use; minimum daily discharge, 30 ft<sup>3</sup>/s Jan. 27-29, 31, Feb. 2, 3, 5-7, 1940.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since at least 1850, that of June 7, 1947. Flood of May 31, 1903, reached a stage of 19.4 ft. former site and datum at Vine Street Bridge or about 22 ft. at Market Street Bridge, from information by U.S. Army Corps of Engineers and U.S. National Weather Service, discharge, about 140,000 ft<sup>3</sup>/s.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 13,100 ft<sup>3</sup>/s Dec. 25, gage height, 5.76 ft; minimum daily discharge 203 ft<sup>3</sup>/s Aug. 21.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4530	2730	5530	4290	4500	5190	3730	4250	3200	855	1120	788
2	3910	2980	3910	4300	6000	4200	3860	4860	2690	737	989	777
3	3800	3110	6610	1900	4900	5120	4540	5950	2820	445	623	719
4	3800	3390	7730	2450	4000	5350	5120	6230	2640	478	711	724
5	3250	3480	7620	2200	2600	5080	5140	6230	2490	660	509	710
6	2700	3290	7590	2400	2400	4870	5040	5710	2640	412	364	661
7	2910	2890	7540	2000	2100	5700	5080	5630	2460	545	439	709
8	3140	2540	7470	2400	1850	5870	5440	5180	2680	434	449	558
9	2800	2520	7540	2500	2500	6320	6550	4830	2450	354	438	429
10	2580	2620	7520	2500	2850	6610	6700	6330	1990	496	411	515
11	2610	2630	7730	2200	2100	6610	6910	5050	2400	456	420	486
12	2800	2580	7660	2100	1850	5790	6520	4830	3510	488	404	469
13	2890	2590	7610	2100	1950	5560	5660	6020	3360	428	452	490
14	2950	2140	7500	2100	1850	5520	5310	6330	3470	470	400	437
15	2950	2080	6810	1850	1850	4790	5290	6300	3560	402	405	439
16	3000	2170	5300	1750	1750	4580	5270	6260	3200	410	381	457
17	3040	2330	3600	2000	2100	4550	4630	5030	2730	436	455	553
18	2930	3210	3100	2500	2350	3580	4480	4780	2360	459	392	486
19	2980	3850	3000	2450	3250	3340	4450	4340	2120	417	513	665
20	2930	4180	4700	2500	4500	3320	3830	4310	1750	578	450	759
21	2940	4150	6800	3400	5100	4140	3570	4250	1600	904	203	587
22	2940	3110	6490	4300	5200	3950	3690	3770	1840	1060	478	537
23	2870	2660	6750	3450	4200	3530	3400	3760	1410	1460	1200	440
24	2750	2590	10400	3200	4000	3590	3230	4510	1420	1220	448	450
25	2650	2980	12300	2800	4700	3770	3290	4300	1360	1500	626	450
26	2520	3290	10500	2200	5200	4690	3230	3580	1260	1070	694	435
27	2500	3350	9780	1550	5530	4830	3270	3730	1220	1050	974	440
28	2390	6900	6370	2100	5340	4020	3200	3580	1200	1050	1070	705
29	2440	10500	7460	2400	5270	3770	3250	3600	884	1060	1300	519
30	2530	9290	5340	2450	---	4760	3950	3410	855	1080	811	654
31	2510	---	4720	3350	---	3970	---	3150	---	919	789	---
TOTAL	91540	106130	212980	79690	101790	146970	137630	150090	67569	22333	18918	17048
MEAN	2953	3538	6870	2571	3510	4741	4588	4842	2252	720	610	568
MAX	4530	10500	12300	4300	6000	6610	6910	6330	3560	1500	1300	788
MIN	2390	2080	3000	1550	1750	3320	3200	3150	855	354	203	429
AC-FT	181600	210500	422400	158100	201900	291500	273000	297700	134000	44300	37520	33810
CAL YR 1987	TOTAL 2585250		MEAN 7083	MAX 25400	MIN 1670	AC-FT 5128000						
WTR YR 1988	TOTAL 1152688		MEAN 3149	MAX 12300	MIN 203	AC-FT 2286000						



## 167

LOCATION.--Lat. 40°43'40", long 91°57'34", in SE1/4 SW1/4 sec.36, T.69 N., R.10 W., Van Buren County, Hydrologic Unit 07100009, on right bank 10 ft upstream from bridge on State Highway 1 at Keosauqua, 4.0 mi downstream from Chequest Creek, and at mile 51.3.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 12,500 ft<sup>3</sup>/s Dec. 25, maximum gage height, 18.06 ft Feb. 23, backwater from ice; minimum daily discharge, 316 ft<sup>3</sup>/s July 8.

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4900	2610	7670	4540	3600	5300	3790	3980	2890	706	1010	785
2	4500	2710	4450	3480	4800	4980	3730	4180	2950	715	1150	496
3	3900	2870	4160	2100	6400	4270	4160	4940	2460	649	1110	740
4	3850	3000	6900	2650	5200	5250	4830	5870	2520	470	826	615
5	3780	3230	7040	2400	4300	5230	5090	5950	2390	404	791	666
6	3270	3290	6970	2600	2800	4860	5070	5810	2230	334	545	616
7	2700	3000	6960	2200	2600	5000	4960	5350	2290	489	439	570
8	3050	2630	6910	2600	2300	5680	4970	5330	2950	316	397	572
9	3140	2340	6930	2700	2050	5810	5570	4930	4190	410	431	584
10	2750	2360	6950	2700	2700	6320	6360	5030	2320	425	463	431
11	2650	2400	7000	2400	3100	6350	6450	5840	1820	415	376	352
12	2660	2380	7110	2300	2300	6120	6550	4700	2340	362	371	385
13	2850	2340	7020	2300	2000	5500	5930	4860	3180	319	377	384
14	2910	2340	6980	2300	2150	5370	5260	5850	3160	383	372	369
15	2930	1880	6850	2050	2050	5210	5080	5950	3030	405	409	374
16	2930	1800	5600	2000	2050	4500	5090	5910	3220	425	382	366
17	3040	2260	3900	1900	1900	4430	4950	5630	2900	380	378	390
18	3020	2520	3350	2200	2300	4230	4340	4600	2390	507	362	388
19	3000	2920	3250	2700	2550	3330	4260	4440	2020	607	450	401
20	2930	3790	5000	2650	3500	3210	4150	4040	1850	326	416	535
21	2890	3790	7400	2700	4800	3290	3530	4040	1470	432	494	669
22	2880	3610	7600	3650	5400	4090	3410	4210	1320	893	478	615
23	2900	2670	6250	4600	5500	3600	3460	3750	1530	1090	553	435
24	2810	2480	8540	3700	4500	3500	3190	4050	1150	1490	1180	434
25	2740	2430	11900	3450	4300	3880	3100	4500	1170	1280	635	372
26	2580	2880	10900	3050	5000	4120	3160	3780	1130	1520	383	377
27	2460	3100	9470	2400	5500	4730	3150	3500	1050	1160	851	385
28	2450	4960	9420	1700	5800	4570	3120	3370	997	1100	753	471
29	2340	10200	6680	2300	5700	4230	3100	3420	1030	1080	1030	652
30	2370	10100	6910	2600	---	4150	3170	3320	759	1130	1250	518
31	2470	---	5140	2650	---	4670	---	3010	---	1190	889	---
TOTAL	93650	98890	211210	83570	107150	145780	132980	144140	64706	21412	19551	14947
MEAN	3021	3296	6813	2696	3695	4703	4433	4650	2157	691	631	498
MAX	4900	10200	11900	4600	6400	6350	6550	5950	4190	1520	1250	785
MIN	2340	1800	3250	1700	1900	3210	3100	3010	759	316	362	352
AC-FT	185800	196100	418900	165800	212500	289200	263800	285900	128300	42470	38780	29650
CAL YR	1987	TOTAL 2634600		MEAN 7218	MAX 25900	MIN 1800	AC-FT 5226000					
WTR YR	1988	TOTAL 1137986		MEAN 3109	MAX 11900	MIN 316	AC-FT 2257000					

## MISSOURI RIVER BASIN

## BIG SIOUX RIVER BASIN

06483500 ROCK RIVER NEAR ROCK VALLEY, IA

LOCATION.--Lat 43°12'52", long 96°17'39", in SW1/4 SW1/4 sec.16, T.97 N., R.46 W., Sioux County, Hydrologic Unit 10170204, on left bank 3 ft upstream from bridge on county highway K30, 0.3 mi north of Rock Valley and at mile 19.1.

DRAINAGE AREA.--1,592 mi<sup>2</sup>.

PERIOD OF RECORD.--June 1948 to current year.

REVISED RECORDS.--WSP 1439: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,222.54 ft above NGVD. Prior to Aug. 13, 1952, nonrecording gage with supplementary water-stage recorder operating above 6.2 ft gage height. June 4, 1949 to Aug. 12, 1952 and Aug. 13, 1952 to May 4, 1976, water-stage recorder, at site 3.2 mi downstream at datum 10.73 ft lower.

REMARKS.--Estimated daily discharges: Dec. 15 to Mar. 5. Records good except those for estimated daily discharges, which are poor. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--40 years, 419 ft<sup>3</sup>/s, 3.57 in/yr, 303,600 acre-ft/yr; median of yearly mean discharges, 320 ft<sup>3</sup>/s, 2.7 in/yr, 232,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 40,400 ft<sup>3</sup>/s Apr. 7, 1969, gage height, 17.32 ft, site and datum then in use; no flow for many days during winter period in 1959 and 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in 1897 reached a stage of 17.0 ft, former site and datum, discharge not determined, from information by State Highway Commission.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 12	0745	*1,810	*8.62				

Minimum daily discharge, 11 ft<sup>3</sup>/s Aug. 18-20.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	207	135	125	74	50	700	527	1100	300	112	20	27
2	190	136	127	79	40	900	561	975	296	105	17	26
3	182	136	139	67	37	1110	769	877	332	91	16	24
4	174	133	130	60	34	1150	1060	800	341	80	37	23
5	168	128	117	48	33	1200	1050	729	315	73	48	21
6	163	126	144	40	33	1270	965	673	292	66	46	21
7	158	126	170	40	34	1110	905	646	274	62	39	20
8	154	128	172	37	36	1090	835	614	255	62	44	19
9	147	128	186	33	34	1030	781	582	228	57	42	18
10	144	125	207	34	32	1150	739	550	212	65	34	18
11	143	125	260	35	29	1480	724	526	192	61	29	17
12	143	126	277	39	31	1750	690	496	180	60	23	17
13	145	127	257	35	33	1430	635	469	174	56	18	18
14	144	126	202	37	30	893	580	445	168	54	16	16
15	146	127	155	39	33	766	531	421	162	50	15	30
16	145	141	105	51	34	853	492	391	155	44	14	68
17	147	144	91	51	36	917	457	365	147	42	12	77
18	146	142	210	46	58	825	428	351	142	42	11	76
19	141	143	277	44	125	739	404	348	138	46	11	71
20	138	140	205	42	106	710	395	344	129	49	11	65
21	137	129	136	37	91	697	390	371	124	44	16	57
22	136	139	177	40	152	686	414	538	114	39	212	52
23	135	148	164	46	236	713	474	483	103	34	113	49
24	133	140	130	41	265	728	567	464	99	32	100	41
25	134	137	69	32	220	760	876	429	96	30	78	34
26	137	133	65	33	180	824	1080	394	92	30	58	30
27	136	132	114	31	267	779	1180	371	85	26	51	26
28	136	135	103	36	300	701	1350	350	81	24	42	41
29	137	140	92	36	450	645	1370	327	88	23	38	66
30	134	126	128	44	---	625	1240	312	100	22	31	72
31	131	---	103	57	---	579	---	300	---	21	29	---
TOTAL	4611	4001	4837	1364	3039	28810	22469	16041	5414	1602	1271	1140
MEAN	149	133	156	44.0	105	929	749	517	180	51.7	41.0	38.0
MAX	207	148	277	79	450	1750	1370	1100	341	112	212	77
MIN	131	125	65	31	29	579	390	300	81	21	11	16
AC-FT	9150	7940	9590	2710	6030	57140	44570	31820	10740	3180	2520	2260
CFSM	.09	.08	.10	.03	.07	.58	.47	.33	.11	.03	.03	.02
IN.	.11	.09	.11	.03	.07	.67	.53	.37	.13	.04	.03	.03
CAL YR 1987	TOTAL 154564	MEAN 423	MAX 4860	MIN 65	AC-FT 306600	CFSM .27	IN. 3.61					
WTR YR 1988	TOTAL 94599	MEAN 258	MAX 1750	MIN 11	AC-FT 187600	CFSM .16	IN. 2.21					

06485500 BIG SIOUX RIVER AT AKRON, IA  
(National stream-quality accounting network station)

LOCATION.--Lat 42°50'14", long 96°33'41", in SW1/4SE1/4SW1/4 sec.30, T.93 N., R.48 W., Plymouth County, on left bank 15 ft downstream from Iowa Highway 403 bridge, 0.5 mi northwest of Akron, and 2.9 mi upstream from Union Creek.

DRAINAGE AREA.--8,424 mi<sup>2</sup>, approximately, of which about 1,487 mi<sup>2</sup> is probably noncontributing.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1928 to current year.

REVISED RECORDS.--WSP 1309: 1929(M), 1931-33(M), 1936(M), 1938(M), 1940(M). WSP 1389: Drainage area. WDR SD-84-1: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,118.90 ft above National Geodetic Vertical Datum of 1929. Prior to Dec. 3, 1934, nonrecording gage at bridge 0.5 mi downstream at same datum. From Dec. 3, 1934, to Oct. 31, 1985, water-stage recorder at site 0.6 mi downstream at same datum.

REMARKS.--Records good except those for estimated daily discharges, which are poor. U.S. Army Corps of Engineers satellite data-collection platform at station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--60 years, 1,040 ft<sup>3</sup>/s, 753,500 acre-ft/yr; median of yearly mean discharges, 770 ft<sup>3</sup>/s, 558,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 80,800 ft<sup>3</sup>/s, Apr. 9, 1969, gage height, 22.99 ft; minimum daily, 4.0 ft<sup>3</sup>/s, Jan. 17, 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 12	1330	*3,110	10.82	Mar. 16	1430	ice jam	*11.82

Minimum daily discharge, 98 ft<sup>3</sup>/s, Aug. 2, 21.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	537	420	477	e250	e200	e1000	1850	2400	1050	246	102	214
2	506	418	467	e250	e190	e1500	1780	2180	897	284	98	197
3	488	423	e450	e250	e190	e2000	1830	1980	823	277	360	179
4	482	423	443	e250	e190	e1900	2080	1820	825	241	156	170
5	466	414	431	e240	e190	e1700	2310	1690	802	225	156	163
6	444	411	409	e220	e190	e1500	2300	1580	765	211	153	158
7	437	407	450	e200	e190	e1800	2220	1500	722	196	154	154
8	434	407	511	e200	e190	e2000	2150	1420	681	194	160	150
9	420	405	550	e200	e180	e2000	2090	1350	623	210	152	143
10	411	410	587	e200	e180	2020	2030	1280	578	201	144	143
11	407	411	631	e200	e180	2290	1960	1230	536	203	134	141
12	409	410	662	e200	e180	2990	1890	1170	498	194	124	135
13	409	414	672	e200	e180	3010	1810	1110	476	194	117	133
14	413	414	654	e200	e180	2790	1700	1060	450	197	110	134
15	418	423	e350	e200	e180	e2400	1610	1000	425	181	107	167
16	415	434	e250	e200	e180	e2600	1520	946	409	172	104	290
17	412	444	e300	e200	e190	e2300	1450	904	404	161	111	298
18	412	472	e350	e200	e200	2120	1360	868	390	160	115	278
19	412	504	e400	e200	e250	2090	1300	856	367	152	102	296
20	409	478	e400	e200	e300	2010	1250	851	345	150	100	262
21	409	466	e350	e200	e350	1960	1220	848	329	153	98	245
22	416	459	e350	e200	e400	1920	1200	1140	305	158	811	232
23	416	453	e350	e200	e400	1870	1270	1090	281	137	1380	219
24	407	463	e300	e200	e400	1960	1340	1080	267	133	515	207
25	404	457	e250	e200	e350	2050	1470	993	250	127	570	199
26	414	451	e250	e200	e350	2110	1800	938	244	124	421	190
27	410	446	e250	e200	e400	2090	2090	892	244	121	332	180
28	420	457	e250	e200	e500	2110	2290	852	236	115	279	211
29	425	475	e250	e200	e700	2080	2520	822	232	111	246	252
30	418	480	e250	e200	---	2020	2570	811	240	110	225	265
31	416	---	e250	e200	---	1950	---	829	---	108	208	---
TOTAL	13296	13149	12544	6460	7760	64140	54260	37490	14694	5446	7844	6005
MEAN	429	438	405	208	268	2069	1809	1209	490	176	253	200
MAX	537	504	672	250	700	3010	2570	2400	1050	284	1380	298
MIN	404	405	250	200	180	1000	1200	811	232	108	98	133
AC-FT	26370	26080	24880	12810	15390	127200	107600	74360	29150	10800	15560	11910

CAL YR 1987 TOTAL 458839 MEAN 1257 MAX 11900 MIN 250 AC-FT 910100  
WTR YR 1988 TOTAL 243088 MEAN 664 MAX 3010 MIN 98 AC-FT 482200

e Estimated

LOCATION.--Lat. 42°29'09", long 96°24'49", in NW1/4 SE1/4 sec.16 T.29 N., R.9 E., sixth principal meridian, Dakota County, Nebraska, Hydrologic Unit 10230001, on right bank of Big Sioux River, on upstream side of bridge on U.S. Highway 20 and 77 at South Sioux City, Nebraska. 1.9 mi downstream from Big Sioux River, and at mile 732.2.

WATER-DISCHARGE RECORDS

REVISED RECORDS.--WSP 716: 1929-30. WSP 876: Drainage area.

REMARKS.--Estimated daily discharges: Jan. 1-22, 27, 28, Feb. 7-17, Feb. 22, 23, Mar. 3-5, and Mar. 8. Records good except those for estimated daily discharges, which are poor. Flow regulated by upstream main-stem reservoirs. U.S. National Weather Service gage-height telemeter and U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 441,000 ft<sup>3</sup>/s Apr. 14, 1952, gage height, 24.28 ft, datum then in use; minimum, 2,500 ft<sup>3</sup>/s Dec. 29, 1941; minimum gage height, 9.00 ft Jan. 8, 1980, based on gage readings at site 14 mi downstream.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 40,200 ft<sup>3</sup>/s Sept. 15, gage height, 19.96 ft; minimum daily discharge, 11,100 ft<sup>3</sup>/s Jan. 5; minimum gage height, 10.39 ft, Jan. 5.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	31100	33800	19600	15900	18900	23000	31700	31800	32200	30600	31100	36100
2	30900	33500	19400	16100	17700	23700	31200	31500	32600	30400	31400	37700
3	30700	33400	19500	17700	18200	23400	30800	31600	32400	31600	31700	37200
4	30800	33900	19400	16500	19100	23200	30500	31500	32800	31800	32700	37200
5	31000	34100	19500	11100	19000	23700	30700	30900	32400	31800	31700	36900
6	31000	34600	19600	12400	18300	23900	31200	31200	32400	31600	31300	36400
7	30900	34500	19700	15300	17600	22400	30600	32200	32100	31400	31300	36700
8	31100	34500	19900	15700	17500	22600	30200	32700	31700	31900	31700	37400
9	31200	34500	20500	16200	19000	21700	30900	32600	31100	31600	31400	37500
10	31200	34300	20200	17000	18700	21600	30900	32000	31400	31000	31100	37500
11	31400	34300	20400	17800	18200	21800	30900	32000	31500	31100	31000	37700
12	31800	34000	20300	18800	17800	22500	31100	32200	31600	31000	30900	37600
13	31600	33800	20200	16500	17500	22000	31600	32000	31700	31000	31200	37400
14	31500	33700	20100	17000	18500	21400	31500	32300	32200	31100	31400	37100
15	31600	33500	20100	19000	19000	21100	31200	32300	32500	31200	31700	38300
16	31700	33900	19700	20000	18500	20600	31200	32100	32500	31200	31800	38400
17	31900	33400	19500	19800	19000	20600	31100	32200	32700	30900	31500	35700
18	32000	33500	19800	19500	19900	21600	30900	32100	32900	31100	31700	32900
19	32400	34200	20000	18000	21000	22900	30800	32100	32700	31500	31600	33600
20	32600	34800	20000	17500	20800	25400	31100	31700	32600	31900	30700	33600
21	32400	34600	19900	17100	20400	27900	31000	33000	32500	31400	30700	32200
22	32300	34500	20200	18100	20800	29100	31200	32400	32400	31400	32700	32600
23	32300	34200	20200	19800	21300	29900	31300	32000	31900	31400	34100	33100
24	32300	34000	20200	19800	21300	31200	30700	31300	31700	31400	33900	32900
25	32600	31900	19100	19200	20200	33500	30700	32800	31500	31500	33100	33200
26	33100	29300	19200	17700	20500	33200	31500	33600	31300	31200	33900	33300
27	33100	26800	20000	18900	20800	32900	32200	32400	31000	30700	33900	33500
28	33600	24200	19800	19500	21800	33300	31600	31900	31000	30800	33500	34800
29	34000	21600	19700	19600	22400	33600	31700	31500	30800	30800	33100	34400
30	33800	20000	20000	19500	---	33400	31900	31400	30500	31000	32500	32000
31	33700	---	19500	19300	---	32800	---	31400	---	31000	33400	---
TOTAL	991600	971300	615200	546300	563700	799900	933900	992700	958600	968300	993700	1064900
MEAN	31190	32380	19850	17620	19440	25800	31130	32020	31950	31240	32050	35500
MAX	34000	34800	20500	20000	22400	33600	32200	33600	32900	31900	34100	38400
MIN	30700	20000	19100	11100	17500	20600	30200	30900	30500	30400	30700	32000
AC-FT	1967000	1927000	1220000	1084000	1118000	1587000	1852000	1969000	1901000	1921000	1971000	2112000
CAL YR 1987	TOTAL 10941500		MEAN 29980		MAX 46600		MIN 19100		AC-FT 217000000			
WTR YR 1988	TOTAL 10400100		MEAN 28420		MAX 38400		MIN 11100		AC-FT 206300000			

06486000 MISSOURI RIVER AT SIOUX CITY, IA--Continued

## WATER-QUALITY RECORDS

LOCATION.--Samples for particle-size distribution were collected from boat cross-section 0.2 mile downstream from gage.

PERIOD OF RECORD.--Water years 1972 to current year. Daily sediment loads October 1954 to September 1971 in reports of U.S. Army Corps of Engineers.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: October 1972 to September 1976, November 1977 to September 1981.

WATER TEMPERATURES: October 1971 to September 1976, November 1977 to September 1981.

SUSPENDED-SEDIMENT DISCHARGE: October 1971 to September 1976.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum daily, 950 microsiemens June 17, 19, 1981; minimum daily, 410 microsiemens Mar. 22, 1978.

WATER TEMPERATURES: Maximum daily, 28.0°C July 30, 1976 and Aug. 7, 1979; minimum daily, 0.0°C on many days during the winter periods.

SEDIMENT CONCENTRATIONS: Maximum daily mean, 1,620 mg/L Nov. 20, 1972; minimum daily mean, 42 mg/L Dec. 29, 1975.

SEDIMENT LOADS: Maximum daily, 222,000 tons Nov. 20, 1972; minimum daily, 2,970 tons Dec. 29, 1975.

## PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	SAMPLE LOC- ATION, CROSS SECTION (FT FM L BANK) (000009)	DEPTH AT SAMPLE LOC- ATION, TOTAL (FEET) (81903)	SAM- PLING DEPTH (FEET) (000003)	STREAM VELOC- ITY, POINT (FPS) (81904)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	SED. SUSP. FALL DIAM. % FINER THAN .004 MM (70338)	SED. SUSP. FALL DIAM. % FINER THAN .062 MM (70342)	SED. SUSP. FALL DIAM. % FINER THAN .125 MM (70343)	SED. SUSP. FALL DIAM. % FINER THAN .250 MM (70344)	SED. SUSP. FALL DIAM. % FINER THAN .500 MM (70345)
OCT											
15...	0845	40.0	19.2	4.40	4.61	110	--	76	87	95	100
15...	0850	40.0	--	9.60	4.15	133	--	56	70	95	100
15...	0855	40.0	--	13.7	3.44	242	--	30	39	66	100
15...	0900	40.0	--	16.0	3.09	332	--	23	32	64	100
15...	0905	40.0	--	17.3	2.31	449	--	18	25	55	100
15...	0910	40.0	--	18.1	1.85	493	--	13	19	51	100
15...	0913	40.0	--	--	--	120	--	53	66	92	100
15...	0925	125	18.2	4.20	4.80	160	--	43	59	93	100
15...	0930	125	--	9.10	4.09	202	--	40	53	96	100
15...	0935	125	--	13.0	3.83	335	--	25	41	97	100
15...	0940	125	--	15.2	3.39	306	--	26	40	95	100
15...	0945	125	--	16.4	3.37	371	--	30	44	96	100
15...	0950	125	--	17.1	3.20	449	--	21	31	91	100
15...	0953	125	--	--	--	143	--	41	55	99	100
15...	1000	210	14.4	3.30	4.59	--	--	--	--	--	--
15...	1005	210	--	7.20	4.37	--	--	--	--	--	--
15...	1010	210	--	10.3	3.63	--	--	--	--	--	--
15...	1015	210	--	12.0	3.53	--	--	--	--	--	--
15...	1020	210	--	13.0	3.68	--	--	--	--	--	--
15...	1025	210	--	13.6	3.70	--	--	--	--	--	--
15...	1028	210	--	--	--	332	--	21	36	91	100
15...	1035	210	--	--	--	463	5	8	--	--	--
15...	1040	330	15.2	3.50	4.63	211	--	36	54	96	100
15...	1044	330	--	7.60	4.48	237	--	30	53	97	100
15...	1048	330	--	10.9	3.96	391	--	18	36	89	100
15...	1052	330	--	12.7	3.72	353	--	17	37	92	100
15...	1056	330	--	13.7	3.65	396	--	17	31	91	100
15...	1100	330	--	14.3	3.52	611	--	14	32	90	100
15...	1103	330	--	--	--	319	--	27	41	89	100
15...	1115	425	15.0	3.50	4.33	144	--	47	64	96	100
15...	1121	425	--	7.50	3.87	163	--	47	68	96	100
15...	1127	425	--	10.7	3.39	228	--	37	47	86	100
15...	1133	425	--	12.5	2.87	275	--	24	39	79	100
15...	1139	425	--	13.5	2.70	418	--	21	29	60	100
15...	1145	425	--	14.1	2.48	464	--	22	32	78	100
15...	1148	425	--	--	--	165	--	46	65	93	100

## MISSOURI RIVER MAIN STEM

06486000 MISSOURI RIVER AT SIOUX CITY, IA--Continued

## WATER-QUALITY RECORDS

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988												
DATE	TIME	SAMPLE	DEPTH	SAMPLING	STREAM	SEDI-	SED.	SED.	SED.	SED.	SED.	SED.
		LOC-	AT		VELOC-	MENT,	SUSP.	SUSP.	SUSP.	SUSP.	SUSP.	SUSP.
		ATION, CROSS SECTION (FT FM L BANK) (00009)	SAMPLE ATION, TOTAL (FEET) (81903)		ITY, POINT (FPS) (81904)	FALL DIAM. % FINER THAN .004 MM (70338)	FALL DIAM. % FINER THAN .062 MM (70342)	FALL DIAM. % FINER THAN .125 MM (70343)	FALL DIAM. % FINER THAN .250 MM (70344)	FALL DIAM. % FINER THAN .500 MM (70345)		
APR												
21...		WATER TEMPERATURE, 12.0° C (0830-1145 HOURS); DISCHARGE, 31,100 ft <sup>3</sup> /s.										
21...	0840	150	18.8	4.30	4.59	76	--	51	69	91	100	
21...	0845	150	--	9.40	4.15	121	--	37	50	86	100	
21...	0850	150	--	13.4	3.83	173	--	28	36	66	100	
21...	0855	150	--	15.7	3.18	291	--	13	22	47	100	
21...	0900	150	--	16.9	1.11	1270	--	4	7	33	100	
21...	0905	150	--	17.7	1.11	587	--	13	19	31	100	
21...	0910	150	--	--	--	272	--	16	24	55	100	
21...	0930	230	17.2	4.00	4.59	130	--	30	47	92	100	
21...	0933	230	--	8.60	4.37	102	--	36	56	94	100	
21...	0936	230	--	12.3	3.72	256	--	14	29	82	100	
21...	0939	230	--	14.3	3.55	348	--	11	21	58	100	
21...	0942	230	--	15.5	3.18	350	--	10	23	68	100	
21...	0945	230	--	16.2	2.74	493	--	8	19	58	100	
21...	0948	230	--	--	--	142	--	26	46	95	100	
21...	1005	325	14.2	3.30	4.37	--	--	--	--	--	--	
21...	1008	325	--	7.10	4.15	--	--	--	--	--	--	
21...	1011	325	--	10.1	3.83	--	--	--	--	--	--	
21...	1014	325	--	11.8	3.61	--	--	--	--	--	--	
21...	1017	325	--	12.8	3.07	--	--	--	--	--	--	
21...	1020	325	--	13.4	3.39	--	--	--	--	--	--	
21...	1025	325	--	--	--	285	--	16	29	73	100	
21...	1030	325	--	--	--	225	3	8	--	--	--	
21...	1040	450	15.6	3.60	4.37	167	--	26	53	100	--	
21...	1043	450	--	7.80	3.83	197	--	23	41	98	100	
21...	1046	450	--	11.1	3.50	289	--	14	37	97	100	
21...	1049	450	--	13.0	3.07	399	--	12	30	92	100	
21...	1052	450	--	14.0	2.85	494	--	9	26	89	100	
21...	1055	450	--	14.7	3.18	515	--	10	25	85	100	
21...	1058	450	--	--	--	244	--	18	42	98	100	
21...	1115	540	15.8	3.70	4.59	114	--	49	69	100	--	
21...	1118	540	--	7.90	3.94	121	--	39	65	100	--	
21...	1121	540	--	11.3	3.72	155	--	34	46	100	--	
21...	1124	540	--	13.2	3.50	233	--	22	36	94	100	
21...	1127	540	--	14.2	3.07	281	--	21	35	93	100	
21...	1130	540	--	14.9	2.96	334	--	19	33	93	100	
21...	1133	540	--	--	--	173	--	29	43	98	100	
DATE	TIME	SAMPLE LOC-ATION, CROSS SECTION (FT FM L BANK) (00009)	DEPTH AT SAMPLE ATION, TOTAL (FEET) (81903)	SAMPLING DEPTH (FEET) (00003)	STREAM VELOC-ITY, POINT (FPS) (81904)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SED. SUSP. FALL DIAM. % FINER THAN .004 MM (70338)	SED. SUSP. FALL DIAM. % FINER THAN .062 MM (70342)	SED. SUSP. FALL DIAM. % FINER THAN .125 MM (70343)	SED. SUSP. FALL DIAM. % FINER THAN .250 MM (70344)	SED. SUSP. FALL DIAM. % FINER THAN .500 MM (70345)	SED. SUSP. FALL DIAM. % FINER THAN 1.00 MM (70346)
JUN												
02...		WATER TEMPERATURE, 21.5° C (0745-1115 HOURS); DISCHARGE, 32,500ft <sup>3</sup> /s.										
02...	0755	580	17.0	3.90	4.15	92	--	80	88	98	100	--
02...	0758	580	--	8.50	3.83	117	--	71	82	97	100	--
02...	0800	580	--	12.1	3.28	124	--	71	83	97	100	--
02...	0805	580	--	14.2	2.96	146	--	59	70	96	100	--
02...	0810	580	--	15.3	2.74	192	--	42	48	80	100	--
02...	0812	580	--	16.0	2.20	168	--	52	59	83	100	--
02...	0815	580	--	--	--	128	--	64	72	91	100	--
02...	0830	480	15.4	3.60	4.48	139	--	56	68	99	100	--
02...	0835	480	--	7.70	4.26	194	--	38	50	99	100	--
02...	0838	480	--	11.0	3.72	295	--	24	38	92	100	--
02...	0840	480	--	12.8	3.39	367	--	22	33	88	100	--
02...	0845	480	--	13.9	3.18	361	--	24	36	92	100	--
02...	0850	480	--	14.5	3.18	384	--	21	33	87	100	--
02...	0855	480	--	--	--	168	--	45	57	98	100	--
02...	0905	390	16.6	3.80	4.26	--	--	--	--	--	--	--
02...	0910	390	--	8.30	4.04	--	--	--	--	--	--	--
02...	0912	390	--	11.9	2.96	--	--	--	--	--	--	--
02...	0915	390	--	13.8	2.53	--	--	--	--	--	--	--
02...	0920	390	--	14.9	2.31	--	--	--	--	--	--	--
02...	0925	390	--	15.6	1.98	--	--	--	--	--	--	--
02...	0930	390	--	--	--	257	--	30	43	83	100	--
02...	0935	390	--	--	--	340	9	14	--	--	--	--
02...	0945	300	17.4	4.00	4.70	110	--	57	73	99	--	--
02...	0948	300	--	8.70	4.26	142	--	47	60	100	--	--
02...	0950	300	--	12.4	3.94	199	--	34	46	98	100	--
02...	0955	300	--	14.5	3.61	236	--	34	46	96	100	--
02...	0958	300	--	15.7	3.39	427	--	18	31	84	100	--
02...	1000	300	--	16.4	2.09	1860	--	4	7	48	98	100
02...	1005	300	--	--	--	243	--	32	41	80	100	--
02...	1030	205	16.4	3.80	4.59	106	--	60	70	90	100	--
02...	1035	205	--	8.20	4.04	162	--	38	48	600	--	--
02...	1040	205	--	11.7	3.61	163	--	40	48	94	100	--
02...	1045	205	--	13.7	3.39	246	--	26	35	82	100	--
02...	1047	205	--	14.8	3.18	267	--	26	34	82	100	--
02...	1050	205	--	15.4	3.50	326	--	20	30	82	100	--
02...	1055	205	--	--	--	166	--	46	55	94	100	--

06486000 MISSOURI RIVER AT SIOUX CITY, IA--Continued

## WATER-QUALITY RECORDS

## PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT

		SAMPLE LOC- ATION, CROSS SECTION (FT FM L BANK) (00009)	DEPTH AT SAMPLE LOC- ATION, TOTAL (FEET) (81903)	SAM- PLING DEPTH (FEET) (00003)	STREAM VELOC- ITY, POINT (FPS) (81904)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	SED. SUSP. FALL DIAM. % FINER THAN .004 MM (70338)	SED. SUSP. FALL DIAM. % FINER THAN .062 MM (70342)	SED. SUSP. FALL DIAM. % FINER THAN .125 MM (70343)	SED. SUSP. FALL DIAM. % FINER THAN .250 MM (70344)	SED. SUSP. FALL DIAM. % FINER THAN .500 MM (70345)	
JUL												
14...		WATER TEMPERATURE, 27.0° C (0745-1030 HOURS); DISCHARGE, 31,100ft <sup>3</sup> /s.										
14...	0755	160	12.6	2.90	5.02	86	--	72	82	96	100	
14...	0758	160	--	6.30	4.04	122	--	46	56	91	100	
14...	0800	160	--	9.00	3.83	175	--	36	46	87	100	
14...	0805	160	--	10.5	2.96	254	--	25	31	70	100	
14...	0807	160	--	11.3	2.74	404	--	16	21	59	100	
14...	0815	160	--	--	--	119	--	45	55	89	100	
14...	0830	280	14.0	3.20	4.80	102	--	57	75	97	100	
14...	0833	280	--	7.00	3.83	147	--	42	58	98	100	
14...	0836	280	--	10.0	3.72	216	--	29	46	94	100	
14...	0840	280	--	11.7	3.18	260	--	25	39	89	100	
14...	0845	280	--	12.6	3.07	325	--	20	36	90	100	
14...	0847	280	--	13.2	2.96	304	--	23	37	89	100	
14...	0850	280	--	--	--	145	--	42	57	94	100	
14...	0900	380	16.4	3.80	4.59	--	--	--	--	--	--	
14...	0904	380	--	8.20	4.15	--	--	--	--	--	--	
14...	0908	380	--	11.7	3.83	--	--	--	--	--	--	
14...	0910	380	--	13.7	3.18	--	--	--	--	--	--	
14...	0915	380	--	14.8	3.28	--	--	--	--	--	--	
14...	0917	380	--	15.4	3.28	--	--	--	--	--	--	
14...	0918	380	--	--	--	190	11	18	--	--	--	
14...	0920	380	--	--	--	178	--	40	54	97	100	
14...	0930	485	17.2	4.00	4.59	95	--	71	88	100	--	
14...	0933	485	--	8.60	4.26	164	--	43	66	100	--	
14...	0935	485	--	12.3	3.61	213	--	33	50	99	100	
14...	0940	485	--	14.3	3.18	258	--	27	47	98	100	
14...	0943	485	--	15.5	2.85	311	--	22	40	97	100	
14...	0948	485	--	16.2	2.63	379	--	17	35	97	100	
14...	0950	485	--	--	--	156	--	42	56	98	100	
14...	1010	565	18.4	4.30	4.48	83	--	78	89	100	--	
14...	1013	565	--	9.20	4.04	86	--	75	89	100	--	
14...	1015	565	--	13.1	3.61	114	--	57	73	100	--	
14...	1020	565	--	15.3	3.07	145	--	39	50	93	100	
14...	1025	565	--	16.6	2.74	182	--	35	48	92	100	
14...	1028	565	--	17.3	2.53	194	--	30	40	89	100	
14...	1030	565	--	--	--	114	--	59	73	96	100	
DATE	TIME	SAMPLE LOC- ATION, CROSS SECTION (FT FM L BANK) (00009)	DEPTH AT SAMPLE LOC- ATION, TOTAL (FEET) (81903)	SAM- PLING DEPTH (FEET) (00003)	STREAM VELOC- ITY, POINT (FPS) (81904)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	SED. SUSP. FALL DIAM. % FINER THAN .004 MM (70338)	SED. SUSP. FALL DIAM. % FINER THAN .062 MM (70342)	SED. SUSP. FALL DIAM. % FINER THAN .125 MM (70343)	SED. SUSP. FALL DIAM. % FINER THAN .250 MM (70344)	SED. SUSP. FALL DIAM. % FINER THAN .500 MM (70345)	SED. SUSP. FALL DIAM. % FINER THAN 1.00 MM (70346)
AUG												
26...		WATER TEMPERATURE, 23.5° C (0800-1030 HOURS); DISCHARGE, 34,100 ft <sup>3</sup> /s.										
26...	0800	500	19.4	4.50	3.61	94	--	81	93	100	--	--
26...	0805	500	--	9.70	3.50	105	--	74	89	100	--	--
26...	0807	500	--	13.9	3.50	93	--	79	88	100	--	--
26...	0810	500	--	16.2	2.85	102	--	69	82	98	100	--
26...	0813	500	--	17.5	2.85	127	--	61	71	95	100	--
26...	0815	500	--	18.3	2.53	143	--	56	64	96	100	--
26...	0818	500	--	--	--	94	--	70	84	99	100	--
26...	0830	415	18.0	4.20	4.48	139	--	65	79	100	--	--
26...	0832	415	--	9.00	3.94	165	--	49	64	99	100	--
26...	0835	415	--	12.9	3.72	210	--	34	46	98	100	--
26...	0838	415	--	15.0	3.07	249	--	31	47	99	100	--
26...	0840	415	--	16.2	3.07	250	--	30	44	99	100	--
26...	0845	415	--	17.0	2.74	280	--	22	37	97	100	--
26...	0850	415	--	--	--	179	--	44	58	99	100	--
26...	0905	315	16.6	3.80	4.48	--	--	--	--	--	--	--
26...	0908	315	--	8.30	3.83	--	--	--	--	--	--	--
26...	0910	315	--	11.9	3.28	--	--	--	--	--	--	--
26...	0912	315	--	13.8	3.07	--	--	--	--	--	--	--
26...	0915	315	--	14.9	2.63	--	--	--	--	--	--	--
26...	0920	315	--	15.6	2.31	--	--	--	--	--	--	--
26...	0923	315	--	--	--	231	--	36	54	96	100	--
26...	0925	315	--	--	--	395	7	10	--	--	--	--
26...	0940	225	15.2	3.50	4.70	176	--	42	56	99	100	--
26...	0943	225	--	7.60	4.04	309	--	29	46	96	100	--
26...	0945	225	--	10.9	3.72	361	--	21	35	85	100	--
26...	0948	225	--	12.7	3.18	339	--	21	37	89	100	--
26...	0950	225	--	13.7	2.85	502	--	15	29	82	100	--
26...	0955	225	--	14.3	1.87	9200	--	2	5	18	68	100
26...	0958	225	--	--	--	230	--	35	47	85	100	--
26...	1015	130	14.0	3.20	4.48	176	--	41	48	72	100	--
26...	1018	130	--	7.00	4.59	148	--	44	57	97	100	--
26...	1020	130	--	10.0	4.04	233	--	32	44	93	100	--
26...	1023	130	--	11.7	4.15	258	--	28	37	90	100	--
26...	1025	130	--	12.6	3.61	237	--	31	42	93	100	--
26...	1030	130	--	13.2	3.50	420	--	16	25	72	100	--
26...	1033	130	--	--	--	170	--	36	46	89	100	--

MISSOURI RIVER MAIN STEM  
06486000 MISSOURI RIVER AT SIOUX CITY, IA--Continued  
WATER-QUALITY RECORDS

PARTICLE-SIZE DISTRIBUTION OF SURFACE BED MATERIAL, WATER YEAR OCTOBER 1987 TO SEPTEMBER

DATE	TIME	NUMBER OF SAM- PLING POINTS (COUNT) (00063)	BED MAT. SIEVE DIAM. % FINER THAN .125 MM (80165)	BED MAT. SIEVE DIAM. % FINER THAN .250 MM (80166)	BED MAT. SIEVE DIAM. % FINER THAN .500 MM (80167)	BED MAT. SIEVE DIAM. % FINER THAN 1.00 MM (80168)	BED MAT. SIEVE DIAM. % FINER THAN 2.00 MM (80169)	BED MAT. SIEVE DIAM. % FINER THAN 4.00 MM (80170)	BED MAT. SIEVE DIAM. % FINER THAN 8.00 MM (80171)	BED MAT. SIEVE DIAM. % FINER THAN 16.0 MM (80172)
OCT 1987										
15...	0915	5	0	14	91	99	100	--	--	--
APR 1988										
21...	0920	5	0	12	79	95	97	98	98	100
JUN										
02...	1100	5	0	13	84	99	100	--	--	--
JUL										
14...	1036	5	0	12	73	95	98	99	100	--
AUG										
26...	0825	5	0	14	67	83	92	97	99	100



## 06600000 PERRY CREEK AT 38th STREET, SIOUX CITY, IA

LOCATION.--Lat 42°32'08", long 96°24'39", in SE1/4 SE1/4 sec.8, T.89 N., R. 47 W., Woodbury County, Hydrologic Unit 10230001, on left bank at downstream side of bridge on 38th Street in Sioux City, 1.9 mi downstream from West Branch, and 3.6 mi upstream from mouth.

DRAINAGE AREA.--65.1 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1945 to September 1969, June 1981 to current year.

REVISED RECORDS.--WSP 1440: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,112.04 ft above NGVD (City of Sioux City benchmark). Prior to May 20, 1954, nonrecording gage with supplementary water-stage recorder in operation above 5.0 ft gage height and May 20, 1954 to Sept. 30, 1969, water-stage recorder at present site at datum 5.0 ft higher.

REMARKS.--Estimated daily discharges: Oct. 17-19, Dec. 15-16, 20-21, 24-25, 29, Jan. 1 to Feb. 24, and Mar. 2-4, 13-16. Records good except those for estimated daily discharges, which are poor. U.S. National Weather Service gage-height telemeter at station.

AVERAGE DISCHARGE.--31 years (water years 1946-69, 1982-88), 17.3 ft<sup>3</sup>/s, 3.61 in/yr, 12,530 acre-ft/yr; median of yearly mean discharges, 14 ft<sup>3</sup>/s, 2.9 in/yr, 10,100 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 7,780 ft<sup>3</sup>/s Sept. 10, 1949, gage height, 26.80 ft, present datum, from rating curve extended above 1,700 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow; no flow at times in 1946, 1958-60.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of July 7, 1944, reached a stage of about 30.5 ft, from floodmarks, present datum, discharge, 9,600 ft<sup>3</sup>/s, on basis of contracted-opening measurement of peak flow by U.S. Army Corps of Engineers.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 800 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Feb. 18	2015	*351	(a) *10.41				

(a) Ice jam

Minimum discharge 1.3 ft<sup>3</sup>/s Aug. 15-17

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	8.2	15	13	8.2	14	37	12	15	10	6.0	2.0	2.4
2	8.1	13	13	11	12	30	25	14	8.2	5.2	2.0	2.5
3	8.1	12	14	9.0	13	24	23	15	7.7	5.0	2.2	2.4
4	9.4	12	12	8.0	12	21	19	16	12	4.7	2.5	2.4
5	9.2	10	15	7.0	11	19	18	15	8.7	4.4	2.3	2.6
6	9.6	11	14	6.4	15	21	18	14	7.2	4.1	2.1	2.2
7	11	11	14	7.6	20	22	16	16	6.5	4.0	2.1	2.3
8	9.3	11	17	6.6	25	20	15	15	6.6	13	3.2	2.3
9	8.9	11	19	5.8	17	16	20	15	5.8	6.7	2.1	2.3
10	8.7	11	15	7.5	13	17	20	14	5.5	5.3	1.9	2.3
11	8.8	11	15	8.6	11	20	17	14	5.4	8.1	1.9	2.3
12	10	11	14	11	13	16	16	15	5.3	5.7	1.8	2.3
13	10	11	14	7.9	22	11	15	13	6.5	4.8	1.7	2.5
14	11	11	13	9.0	25	12	14	13	5.6	4.4	1.9	2.6
15	10	12	12	12	19	17	13	12	4.8	4.0	1.8	35
16	9.6	14	11	17	30	20	12	11	5.5	3.9	1.6	34
17	10	12	12	16	50	14	12	11	9.2	3.5	1.4	6.3
18	10	11	14	15	100	13	11	11	7.4	3.5	13	3.8
19	10	11	14	16	180	13	12	11	5.0	3.4	2.4	4.9
20	10	12	13	13	130	13	12	16	4.8	3.5	1.9	4.0
21	10	12	12	11	110	12	11	19	4.5	3.1	1.8	3.5
22	12	13	13	13	180	13	14	27	4.2	3.0	62	3.5
23	11	13	12	15	140	13	17	14	4.1	2.7	9.4	3.2
24	11	12	11	12	100	24	14	11	4.0	2.5	3.7	3.1
25	11	12	9.0	9.2	92	22	15	9.2	3.9	2.5	3.0	3.0
26	12	12	10	8.6	94	15	24	8.6	3.8	2.4	2.8	3.1
27	12	12	12	8.4	116	14	25	8.0	3.9	2.3	2.9	3.0
28	12	14	13	10	64	15	20	7.2	3.8	2.2	2.6	14
29	13	15	12	14	54	13	17	6.9	5.0	2.3	2.5	7.6
30	12	14	14	20	---	13	16	6.8	12	2.3	2.5	5.0
31	14	---	10	25	---	13	---	8.4	---	2.2	2.4	---
TOTAL	319.9	362	406.0	348.8	1682	543	493	402.1	186.9	130.7	147.4	170.4
MEAN	10.3	12.1	13.1	11.3	58.0	17.5	16.4	13.0	6.23	4.22	4.75	5.68
MAX	14	15	19	25	180	37	25	27	12	13	62	35
MIN	8.1	10	9.0	5.8	11	11	11	6.8	3.8	2.2	1.4	2.2
AC-FT	635	718	805	692	3340	1080	978	798	371	259	292	338
CFSM	.16	.19	.20	.17	.89	.27	.25	.20	.10	.06	.07	.09
IN.	.18	.21	.23	.20	.96	.31	.28	.23	.11	.07	.08	.10

CAL YR 1987 TOTAL 7689.2 MEAN 21.1 MAX 283 MIN 7.9 AC-FT 15250 CFSM .32 IN. 4.39  
WTR YR 1988 TOTAL 5192.2 MEAN 14.2 MAX 180 MIN 1.4 AC-FT 10300 CFSM .22 IN. 2.97

## FLOYD RIVER BASIN

06600100 FLOYD RIVER AT ALTON, IA

LOCATION.--Lat 42°58'55", long 96°00'03", in NE1/4 NE1/4 sec.11, T.94 N., R.44 W., Sioux County, Hydrologic Unit 10230002, on left bank 270 ft downstream from South County Road at east edge of Alton, 34.3 mi upstream from West Branch Floyd River, and at mile 58.1.

DRAINAGE AREA.--268 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1955 to current year. Prior to December 1955, monthly discharge only, published in WSP 1730.

REVISED RECORDS.--WDR IA-82-1: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,269.55 ft above NGVD.

REMARKS.--Estimated daily discharges: Dec. 3, 4, Dec. 15 to Mar. 9, and Mar. 13-17. Records good except those for estimated daily discharges, which are poor. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--33 years, 72.3 ft<sup>3</sup>/s, 3.66 in/yr, 52,380 acre-ft/yr; median of yearly mean discharges, 58 ft<sup>3</sup>/s, 2.9 in/yr, 42,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 16,300 ft<sup>3</sup>/s June 20, 1983, gage height 18.54 ft, from flood-mark, from rating curve extended above 8,500 ft<sup>3</sup>/s; no flow at times in 1956, 1958-59, 1965, 1968, 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1953 reached a discharge of about 45,500 ft<sup>3</sup>/s, from information by U. S. Army Corps of Engineers.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 800 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 2	0700	ice jam	*10.46	Aug. 22	1515	*775	9.48

Minimum discharge, 2.2 ft<sup>3</sup>/s Aug. 3-4.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	78	47	40	23	23	431	70	159	77	54	6.4	15
2	73	46	33	25	18	499	83	146	78	41	5.7	14
3	69	47	29	21	17	378	157	136	100	35	3.9	12
4	68	45	24	19	15	273	190	128	88	31	3.9	11
5	67	42	29	14	14	199	176	121	68	27	7.5	11
6	65	41	44	12	14	160	164	117	61	24	3.8	10
7	63	42	42	12	16	177	154	117	63	21	4.5	9.9
8	62	45	37	11	16	166	143	134	311	19	6.3	9.9
9	60	42	49	9.6	16	152	140	117	152	21	7.2	9.6
10	58	40	67	10	15	158	137	109	113	21	7.2	9.8
11	57	40	70	11	13	150	131	103	99	20	6.7	9.5
12	58	42	69	12	14	126	124	101	88	19	6.4	8.7
13	58	42	66	11	16	70	118	98	88	17	5.8	8.1
14	58	40	61	12	14	72	111	94	77	16	5.3	8.2
15	58	41	54	13	16	90	104	94	67	14	5.0	13
16	60	44	48	19	17	120	99	89	62	13	4.5	22
17	58	42	39	19	17	99	97	88	62	12	3.8	23
18	55	38	45	17	32	86	90	87	60	13	5.2	19
19	54	40	50	17	80	84	87	88	56	16	6.9	16
20	52	37	52	16	67	80	86	94	50	15	7.4	15
21	51	34	45	14	56	71	85	197	45	13	7.1	15
22	52	42	40	16	104	68	89	159	41	12	557	14
23	51	37	45	19	179	67	103	155	37	11	209	13
24	48	32	40	17	208	74	112	139	36	10	75	12
25	48	34	32	13	168	96	134	121	32	9.9	45	11
26	50	34	31	14	152	94	138	110	28	9.2	34	11
27	48	35	36	13	231	81	178	103	26	8.2	31	11
28	46	36	32	15	365	82	210	94	24	7.8	25	21
29	45	38	28	15	414	81	196	94	37	8.5	21	32
30	45	38	43	20	---	77	175	82	56	7.4	18	35
31	44	---	33	27	---	74	---	86	---	6.7	17	---
TOTAL	1759	1203	1353	486.6	2327	4435	3881	3560	2182	552.7	1152.5	429.7
MEAN	56.7	40.1	43.6	15.7	80.2	143	129	115	72.7	17.8	37.2	14.3
MAX	78	47	70	27	414	499	210	197	311	54	557	35
MIN	44	32	24	9.6	13	67	70	82	24	6.7	3.8	8.1
AC-FT	3490	2390	2680	965	4620	8800	7700	7060	4330	1100	2290	852
CFSM	.21	.15	.16	.06	.30	.53	.48	.43	.27	.07	.14	.05
IN.	.24	.17	.19	.07	.32	.62	.54	.49	.30	.08	.16	.06

CAL YR 1987 TOTAL 35859 MEAN 98.2 MAX 1470 MIN 20 AC-FT 71130 CFSM .37 IN. 4.98  
WTR YR 1988 TOTAL 23321.5 MEAN 63.7 MAX 557 MIN 3.8 AC-FT 46260 CFSM .24 IN. 3.24

## 06600300 WEST BRANCH FLOYD RIVER NEAR STRUBLE, IA

LOCATION.--Lat 42°55'25", long 96°10'34", in NE1/4 NE1/4 sec. 32, T.94 N., R.45 W., Sioux County, Hydrologic Unit 10230002, on left bank near wingwall at downstream side of bridge on county highway B62, 0.1 mi west of U.S. Highway 75, 0.8 mi downstream from Orange City slough, 2.2 mi northeast of Struble, 21.4 mi upstream from Floyd River, and at mile 45.2 upstream from mouth of Floyd River.

DRAINAGE AREA.--180 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1955 to current year. Prior to December 1955, monthly discharge only, published in WSP 1730.

REVISED RECORDS.--WDR IA-82-1: Drainage area, 1978-81 (P).

GAGE.--Water-stage recorder. Datum of gage is 1,239.40 ft above NGVD (State Highway Commission bench mark). Prior to Jan. 5, 1978, at site 721 ft right at old channel at same datum.

REMARKS.--Estimated daily discharges: Dec. 1-4, Dec. 14 to Mar. 10, Mar. 13-16, and Aug. 22. Records good except those for estimated daily discharges, which are poor. U.S. National Weather Service gage-height telemeter at station.

AVERAGE DISCHARGE.--33 years, 46.7 ft<sup>3</sup>/s, 3.52 in/yr, 33,830 acre-ft/yr; median of yearly mean discharges, 37 ft<sup>3</sup>/yr, 2.8 in/yr, 26,800 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,060 ft<sup>3</sup>/s Mar. 28, 1962, gage height, 15.63 ft; maximum gage height, 15.86 ft June 20, 1983; no flow at times most years.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 400 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Aug. 22	unknown	*3,240	*13.52	No other peak greater than base discharge.			

Minimum discharge, 1.3 ft<sup>3</sup>/s Aug. 15-18.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	26	22	19	17	13	220	47	68	34	15	3.8	17
2	23	21	18	18	9.9	254	64	63	35	13	3.8	17
3	24	20	16	15	9.2	190	78	60	32	13	5.4	14
4	26	18	15	14	8.3	135	77	57	32	13	12	13
5	23	17	24	10	7.8	97	74	55	33	12	7.8	12
6	22	18	26	8.4	7.8	77	70	54	29	12	4.3	11
7	24	19	27	8.5	8.3	85	68	57	25	12	4.5	12
8	25	18	33	7.5	8.8	79	64	52	26	13	5.5	10
9	24	17	36	6.7	8.4	73	69	48	33	16	4.6	9.4
10	22	18	36	7.0	7.7	79	67	45	27	13	3.3	9.4
11	23	18	37	7.2	6.8	89	65	43	27	12	2.8	8.4
12	23	19	36	8.5	7.4	69	62	42	25	11	2.3	6.9
13	23	19	36	7.6	8.0	60	60	39	26	11	2.0	7.0
14	23	18	34	8.4	7.3	54	56	38	22	11	1.6	7.5
15	25	20	30	8.9	7.9	74	53	37	20	10	1.4	20
16	23	20	24	12	8.5	88	51	35	18	9.6	1.4	148
17	23	18	20	13	8.8	74	49	35	24	9.2	1.3	85
18	21	18	31	11	16	67	46	34	20	9.5	4.0	58
19	21	16	36	11	42	68	45	35	18	9.1	6.0	47
20	21	15	29	10	35	64	44	35	16	9.5	2.1	42
21	21	16	25	8.8	28	61	44	35	15	8.4	1.6	36
22	21	16	27	10	54	61	52	44	14	7.6	1590	33
23	21	14	23	12	93	56	55	38	13	7.0	236	29
24	20	14	18	10	108	67	52	35	14	6.6	83	28
25	21	15	14	7.8	86	70	51	33	13	6.4	53	26
26	22	16	9.7	8.0	77	61	65	32	12	7.8	36	23
27	20	17	28	7.5	118	59	78	31	11	5.9	34	21
28	20	19	25	8.6	188	58	83	29	12	5.9	26	53
29	21	19	22	8.6	213	52	78	28	27	5.4	21	70
30	20	20	33	11	---	50	74	28	20	5.2	19	87
31	23	---	25	15	---	47	---	28	---	5.0	18	---
TOTAL	695	535	812.7	317.0	1201.9	2638	1841	1293	673	305.1	2197.5	960.6
MEAN	22.4	17.8	26.2	10.2	41.4	85.1	61.4	41.7	22.4	9.84	70.9	32.0
MAX	26	22	37	18	213	254	83	68	35	16	1590	148
MIN	20	14	9.7	6.7	6.8	47	44	28	11	5.0	1.3	6.9
AC-FT	1380	1060	1610	629	2380	5230	3650	2560	1330	605	4360	1910
CFSM	.12	.10	.15	.06	.23	.47	.34	.23	.12	.05	.39	.18
IN.	.14	.11	.17	.07	.25	.55	.38	.27	.14	.06	.45	.20

CAL YR 1987	TOTAL 18523.7	MEAN 50.7	MAX 405	MIN 9.7	AC-FT 36740	CFSM .28	IN. 3.83
WTR YR 1988	TOTAL 13469.8	MEAN 36.8	MAX 1590	MIN 1.3	AC-FT 26720	CFSM .20	IN. 2.78

## FLOYD RIVER BASIN

## 06600500 FLOYD RIVER AT JAMES, IA

LOCATION.--Lat 42°34'36", long 96°18'43", in SE1/4 SE1/4 sec.30, T.90 N., R.46 W., Plymouth County, Hydrologic Unit 10230002, on right bank at downstream side of bridge on county highway C70, 0.2 mi east of James, 14.3 mi downstream from West Branch Floyd River, and at mile 7.5.

DRAINAGE AREA.--886 mi<sup>2</sup>.

PERIOD OF RECORD.--December 1934 to current year.

REVISED RECORDS.--WSP 1240: 1935 (M), 1936, 1937-38 (M), 1942, 1945. WSP 1440: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,092.59 ft above NGVD. Prior to Sept. 11, 1938, June 9 to Nov. 5, 1953, and Oct. 1, 1955, to May 22, 1957, nonrecording gage and May 23, 1957, to Sept. 30, 1970, water-stage recorder at same site at datum 10.0 ft higher.

REMARKS.--Estimated daily discharges: Dec. 15 to Mar. 2. Records good. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--53 years (water years 1936-88), 224 ft<sup>3</sup>/s, 3.43 in/yr, 162,300 acre-ft/yr; median of yearly mean discharges, 160 ft<sup>3</sup>/s, 2.4 in/yr, 116,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 71,500 ft<sup>3</sup>/s June 8, 1953, gage height, 25.3 ft, from flood-marks, datum then in use, from rating curve extended above 16,000 ft<sup>3</sup>/s on basis of contracted-opening and flow-over-embankment measurement of peak flow; minimum daily discharge, 0.90 ft<sup>3</sup>/s Jan. 10-22, 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage and discharge since 1892, that of June 8, 1953, from information by U. S. Army Corps of Engineers.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Aug. 22	2200	*3,100	*15.85	No other peak greater than base discharge.			

Minimum discharge, 31 ft<sup>3</sup>/s Aug. 17-18.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	201	171	146	86	98	980	217	366	255	137	48	83
2	193	160	140	92	79	1100	235	335	214	144	46	78
3	185	155	140	80	75	884	273	312	204	134	45	74
4	181	146	134	74	70	684	347	297	239	123	50	66
5	181	142	138	60	67	534	387	282	287	111	51	62
6	179	145	139	52	67	450	373	273	201	95	49	61
7	173	145	153	53	71	488	353	276	181	90	45	59
8	173	143	158	49	74	463	333	284	218	86	69	56
9	171	143	166	45	72	385	334	290	606	94	62	55
10	169	142	167	47	68	382	330	253	377	93	53	53
11	167	141	182	49	62	414	315	239	297	95	49	52
12	166	141	184	56	66	386	307	231	254	92	45	50
13	165	139	183	52	71	259	294	219	230	86	42	51
14	166	141	174	56	66	190	283	213	224	82	39	52
15	177	142	137	60	71	227	263	206	201	80	37	78
16	180	143	96	78	75	284	254	197	183	77	35	159
17	174	143	85	80	78	324	239	196	188	75	33	187
18	169	142	190	74	125	277	229	189	181	80	39	135
19	167	141	250	72	260	262	222	186	161	76	40	118
20	165	140	190	70	225	254	216	188	150	74	41	106
21	163	139	130	64	195	244	212	199	143	73	39	95
22	162	142	170	71	320	234	217	337	136	69	1100	89
23	163	143	160	82	490	227	240	311	134	67	1670	84
24	161	141	130	76	550	232	247	289	131	62	559	79
25	160	140	72	62	465	268	247	271	122	62	300	75
26	164	139	69	64	430	262	293	250	119	60	209	70
27	162	139	120	61	600	260	334	232	118	58	173	67
28	159	145	110	69	860	248	382	223	113	56	144	98
29	159	144	100	70	950	240	417	210	115	55	122	134
30	158	152	140	86	---	227	396	203	151	55	103	148
31	157	---	115	110	---	220	---	195	---	52	91	---
TOTAL	5270	4329	4468	2100	6700	11889	8789	7752	6133	2593	5428	2574
MEAN	170	144	144	67.7	231	384	293	250	204	83.6	175	85.8
MAX	201	171	250	110	950	1100	417	366	606	144	1670	187
MIN	157	139	69	45	62	190	212	186	113	52	33	50
AC-FT	10450	8590	8860	4170	13290	23580	17430	15380	12160	5140	10770	5110
CFSM	.19	.16	.16	.08	.26	.43	.33	.28	.23	.09	.20	.10
IN.	.22	.18	.19	.09	.28	.50	.37	.33	.26	.11	.23	.11

CAL YR 1987	TOTAL	118158	MEAN	324	MAX	2630	MIN	69	AC-FT	234400	CFSM	.37	IN.	4.96
WTR YR 1988	TOTAL	68025	MEAN	186	MAX	1670	MIN	33	AC-FT	134900	CFSM	.21	IN.	2.86

## 06601200 MISSOURI RIVER AT DECATUR, NE

LOCATION.--Lat 42°00'26", long 96°14'29", in NE1/4 SW1/4 sec.36, T.24 N., R.10 E., Burt County, Hydrologic Unit 10230001, on right bank 0.1 mi upstream from Iowa Highway 175 bridge at Decatur, and at mile 691.0.

DRAINAGE AREA.--316,200 mi<sup>2</sup>, approximately. The 3,959 mi<sup>2</sup> in Great Divide basin are not included.

PERIOD OF RECORD.--October 1987 to September 1988.

GAGE.--Water-stage recorder. Datum of gage is 1,010.00 ft above NGVD, supplementary adjustment of 1954.

REMARKS.--Estimated daily discharges: Oct. 1, 2, 16, Nov. 1, 6, 8, 18, 28, 29, Dec. 1-14, Dec. 18 to Jan. 5, and Apr. 16, 17, 26. Records good except those for estimated daily discharges, which are poor. Flow regulated by upstream main-stem reservoirs. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

COOPERATION.--Gage-height record from October 1 to March 29 was provided by U.S. National Weather Service.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 40,600 ft<sup>3</sup>/s Sept. 16, 1988, gage height, 25.59 ft; minimum daily discharge, 13,600 ft<sup>3</sup>/s Jan. 6, 1988.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 40,600 ft<sup>3</sup>/s Sept. 16, gage height, 25.59 ft; minimum daily discharge, 13,600 ft<sup>3</sup>/s Jan. 6.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	33000	33800	21100	19700	19600	23500	32900	32400	32800	33500	31600	35100
2	32500	33900	20400	16800	19200	23500	32400	32000	33100	32500	31500	37800
3	32000	33900	20200	17300	18300	24500	31900	32300	33200	32500	31800	37900
4	32100	34400	20000	18000	19400	23900	31500	32300	33100	32400	33100	37600
5	32100	34300	20000	17000	19200	24000	31200	31500	33500	32400	33300	37500
6	32200	34600	20100	13600	19200	24000	31700	31100	32900	32300	32400	36800
7	32000	34700	20400	15900	19100	23800	31800	32000	33000	31900	32100	36600
8	31900	34800	20700	16000	19200	22600	31300	33400	32800	32000	32800	36900
9	31800	34900	21000	17100	19700	23000	31500	33300	32800	33000	33100	37000
10	31600	35000	21500	17800	19500	22400	32100	33000	32900	31400	32800	37000
11	31800	34700	21100	17900	19200	22300	31700	32600	32900	31300	32700	37400
12	32100	34500	21000	18100	18600	22300	31400	32700	32400	31500	32400	37600
13	31800	34300	20800	17800	19400	23000	31900	32900	32500	31100	32100	37700
14	31800	34100	20700	18200	19400	22200	32400	32700	32900	31300	32000	37700
15	32100	34000	20400	18400	19300	22000	32400	32900	33300	31600	31900	38200
16	32500	34000	20300	20700	19300	21600	32000	32600	33300	33100	31800	40100
17	32900	34000	19900	21200	19700	21000	32000	32200	33100	32200	31600	37600
18	32800	34000	20000	20900	20100	21400	32000	31900	33300	33200	31800	34200
19	32800	34000	20700	20700	21600	21300	31400	31900	33000	32200	32400	33700
20	33100	33700	20300	20700	21600	24200	31700	31900	32800	32000	31700	34800
21	33100	33400	20400	18500	21500	27200	31700	33400	32800	31800	31400	33700
22	32800	33800	20400	18900	21400	29800	31600	34000	32800	31500	32800	33100
23	32400	33500	20700	18600	22200	30600	32300	33500	32800	31500	35300	33600
24	32300	33800	20500	20000	22400	31300	31900	32900	32200	31400	34100	33600
25	32400	33500	20000	19600	21500	33800	31400	32700	32400	31400	32700	33500
26	32700	30800	19400	19200	21000	34600	32000	34200	31900	31200	32600	33300
27	32800	29000	19600	17500	21400	34800	33300	32500	31600	31300	33000	33300
28	32700	26400	20000	19600	21500	34400	32600	32100	31700	31300	32800	34300
29	33900	23800	19900	20200	22900	35100	31800	31900	32400	31400	32300	35300
30	34000	22600	20500	20200	---	35000	32200	31900	33100	31500	32400	32300
31	33400	---	20000	20300	---	33900	---	32100	---	31600	32300	---
TOTAL	1007400	986200	632000	576400	586400	817000	958000	1008800	983300	989300	1006600	1075200
MEAN	32500	32870	20390	18590	20220	26350	31930	32540	32780	31910	32470	35840
MAX	34000	35000	21500	21200	22900	35100	33300	34200	33500	33500	35300	40100
MIN	31600	22600	19400	13600	18300	21000	31200	31100	31600	31100	31400	32300
AC-FT	1998000	1956000	1254000	1143000	1163000	1621000	1900000	2001000	1950000	1962000	1997000	2133000

WTR YR 1988 TOTAL 10626600 MEAN 29030 MAX 40100 MIN 13600 AC-FT 21080000

## MONONA-HARRISON DITCH BASIN

06602020 WEST FORK DITCH AT HORNICK, IA

LOCATION.--Lat 42°13'37", long 96°04'40", in SW1/4 sec.27, T.86 N., R.45 W., Woodbury County, Hydrologic Unit 10230004, on left bank at upstream side of State Highway 141 bridge, 1.0 mi east of Hornick, 9.2 mi upstream from Wolf Creek, and 13.5 mi north of Onawa.

DRAINAGE AREA.--403 mi<sup>2</sup>.

PERIOD OF RECORD.--April 1939 to September 1969 (published as "at Holly Springs"), July 1974 to current year.

REVISED RECORDS.--WSP 1240: 1943, 1945 (M). WSP 1310: 1941 (M) 1944-46 (M). WSP 1440: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,045.82 ft above NGVD. Prior to June 16, 1959, nonrecording gage at site 3.0 mi upstream and June 16, 1959 to Sept. 30, 1969, recording gage at site 2.2 mi upstream at datum 7.0 ft higher.

REMARKS.--Estimated daily discharges: Dec. 15-19, 21, Dec. 24 to Mar. 6, and Mar. 13-17. Records good except those for estimated daily discharges, which are poor. West Fork ditch is a dredged channel which diverts flow of West Fork Little Sioux River at Holly Springs 5.5 mi south, then southeast 6.5 mi to a point 1.2 mi west of Kennebec, where Wolf Creek enters from left. From this point, ditch roughly parallels the Little Sioux River and is known as Monona-Harrison ditch. U.S. National Weather Service gage-height telemeter at station.

AVERAGE DISCHARGE.--44 years (water years 1940-69, 1975-88), 110 ft<sup>3</sup>/s, 3.71 in/yr, 79,700 acre-ft/yr; median of yearly mean discharges, 91 ft<sup>3</sup>/s, 3.1 in/yr, 65,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 12,400 ft<sup>3</sup>/s Mar. 28, 1962, gage height, 22.46 ft, site and datum then in use; maximum gage height, 25.2 ft Mar. 30, 1960, from floodmark, site and datum then in use; minimum daily discharge, 0.2 ft<sup>3</sup>/s July 30, Aug. 17, 1956.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,800 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s) *944	Gage height (ft) *11.40	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Aug. 23	1230						

Minimum discharge, 25 ft<sup>3</sup>/s, Aug. 16-18.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	81	76	67	41	58	190	71	90	66	68	33	38
2	79	78	64	42	53	155	76	85	89	59	32	39
3	78	74	66	36	49	135	91	81	82	55	31	37
4	80	72	64	33	47	122	101	81	68	54	31	35
5	80	70	60	31	45	120	99	80	68	52	32	34
6	79	70	69	29	45	116	97	78	69	50	32	33
7	78	70	69	30	46	130	95	83	63	48	31	33
8	79	70	68	29	47	126	93	86	85	47	31	32
9	78	68	77	27	45	106	88	80	212	72	37	32
10	77	67	88	28	41	108	90	76	119	71	34	32
11	78	69	92	29	37	120	89	73	90	62	31	32
12	80	70	86	31	39	110	87	72	80	58	29	30
13	81	71	83	30	43	80	84	71	75	52	28	30
14	78	69	79	32	40	60	84	70	73	49	28	31
15	79	70	68	34	42	90	82	67	69	46	27	34
16	81	72	48	38	44	100	81	65	66	46	26	43
17	80	71	51	42	46	95	78	65	66	45	25	46
18	78	68	64	43	60	91	76	66	69	45	26	42
19	76	67	75	42	112	87	75	64	64	58	32	38
20	76	68	68	38	95	87	78	65	59	46	36	38
21	76	65	60	33	84	85	76	83	58	42	30	39
22	77	69	67	38	300	82	76	96	55	41	132	50
23	76	69	63	43	240	80	82	92	55	39	687	46
24	74	64	60	40	190	78	83	80	54	38	227	42
25	74	64	46	37	170	84	78	74	52	40	90	40
26	77	65	43	38	160	81	82	72	51	37	62	39
27	76	64	64	36	180	79	96	70	51	36	54	39
28	74	66	56	40	200	75	99	68	51	35	49	47
29	73	69	52	41	220	75	97	68	50	34	44	62
30	73	73	59	47	---	74	93	66	59	34	41	63
31	72	---	48	60	---	72	---	65	---	33	39	---
TOTAL	2398	2078	2024	1138	2778	3093	2577	2332	2168	1492	2067	1176
MEAN	77.4	69.3	65.3	36.7	95.8	99.8	85.9	75.2	72.3	48.1	66.7	39.2
MAX	81	78	92	60	300	190	101	96	212	72	687	63
MIN	72	64	43	27	37	60	71	64	50	33	25	30
AC-FT	4760	4120	4010	2260	5510	6130	5110	4630	4300	2960	4100	2330
CFSM	.19	.17	.16	.09	.24	.25	.21	.19	.18	.12	.17	.10
IN.	.22	.19	.19	.11	.26	.29	.24	.22	.20	.14	.19	.11

CAL YR 1987	TOTAL 51264	MEAN 140	MAX 1240	MIN 43	AC-FT 101700	CFSM .35	IN. 4.73
WTR YR 1988	TOTAL 25321	MEAN 69.2	MAX 687	MIN 25	AC-FT 50220	CFSM .17	IN. 2.34

## MONONA-HARRISON DITCH BASIN

181

06602400 MONONA-HARRISON DITCH NEAR TURIN, IA

LOCATION.--Lat 41°57'52", long 95°59'30", in NW1/4 NE1/4 sec.32, T.83 N., R.44 W., Monona County, Hydrologic Unit 10230004, on left pier at downstream side of bridge on county highway E54, 1.0 mi west of gaging station on Little Sioux River near Turin, 4 mi southwest of Turin, 5.2 mi northeast of Blencoe, and 12.5 mi upstream from mouth.

DRAINAGE AREA.--900 mi<sup>2</sup>.

PERIOD OF RECORD.--April 1939 to current year. Records for April 1939 to January 1958 not equivalent owing to diversion from Little Sioux River through equalizer ditch 1.5 mi upstream. Prior to May 1942, published as "near Blencoe".

GAGE.--Water-stage recorder. Datum of gage is 1,015.00 ft above NGVD (U.S. Army Corps of Engineers bench mark). Prior to May 7, 1942, nonrecording gage at site 4.8 mi downstream at datum 5.40 ft lower. May 7, 1942 to Oct. 13, 1953, nonrecording gage and Oct. 14, 1953 to Sept. 30, 1975, recording gage at same site at datum 5.00 ft higher.

REMARKS.--Estimated daily discharges: Nov. 10-18, Dec. 25, 26, Dec. 31 to Mar. 3, and Mar. 13-16. Records good except those for estimated daily discharges, which are poor. Monona-Harrison ditch is a dug channel and is a continuation of West Fork ditch, paralleling the Little Sioux River, and discharging into the Missouri River 1.5 mi upstream from the mouth of the Little Sioux River. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--30 years (water years 1959-88), 250 ft<sup>3</sup>/s, 3.77 in/yr, 181,100 acre-ft/yr; median of yearly mean discharges, 200 ft<sup>3</sup>/s, 3.0 in/yr, 145,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 19,900 ft<sup>3</sup>/s Feb. 19, 1971, gage height, 28.03 ft, present datum; minimum daily discharge, 8.5 ft<sup>3</sup>/s Jan. 3-11, 1959.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Feb. 19	1815	ice jam	*8.82	Aug. 23	2315	*901	8.21

Minimum discharge, 43 ft<sup>3</sup>/s Aug. 17, 18 and 19.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	145	149	158	88	145	270	137	165	159	97	60	68
2	141	165	147	93	130	235	147	161	202	90	57	93
3	139	157	147	80	118	230	191	156	198	80	55	75
4	144	153	152	75	109	223	191	154	162	79	55	66
5	146	148	139	72	100	217	180	156	156	76	54	61
6	143	149	156	70	105	212	175	153	158	71	55	59
7	142	155	162	68	110	234	174	154	149	68	54	59
8	146	154	160	68	120	240	175	167	146	68	55	58
9	146	154	172	70	114	204	157	161	249	69	60	55
10	144	151	184	73	105	197	158	147	227	137	67	55
11	146	152	176	76	90	230	158	145	161	103	60	56
12	149	156	171	80	100	206	153	145	148	95	55	54
13	155	154	161	79	110	120	150	142	141	87	53	51
14	153	151	154	85	100	110	147	142	136	78	52	52
15	149	153	139	90	105	140	145	139	133	74	51	59
16	152	158	106	100	110	150	141	134	125	84	49	77
17	153	153	109	110	115	183	141	133	125	81	45	102
18	151	149	149	100	150	168	138	137	129	96	43	91
19	145	150	161	96	250	161	141	140	125	98	46	74
20	142	153	148	92	215	157	143	139	112	87	65	66
21	140	149	133	80	180	155	141	173	104	76	58	67
22	144	156	141	90	500	152	142	285	102	72	128	99
23	143	158	161	110	400	149	153	235	94	71	621	98
24	142	151	151	105	320	147	160	187	93	69	571	77
25	141	147	105	90	270	156	153	168	89	78	177	68
26	148	147	96	92	250	152	153	160	82	71	111	66
27	151	147	113	90	280	146	186	157	80	65	92	63
28	144	151	135	96	300	148	191	154	75	64	85	82
29	145	153	133	105	320	142	183	151	69	63	78	170
30	133	166	135	115	---	141	173	149	74	62	74	141
31	159	---	110	170	---	141	---	149	---	62	70	---
TOTAL	4521	4589	4464	2808	5321	5516	4777	4938	4003	2471	3156	2262
MEAN	146	153	144	90.6	183	178	159	159	133	79.7	102	75.4
MAX	159	166	184	170	500	270	191	285	249	137	621	170
MIN	133	147	96	68	90	110	137	133	69	62	43	51
AC-FT	8970	9100	8850	5570	10550	10940	9480	9790	7940	4900	6260	4490
CFSM	.16	.17	.16	.10	.20	.20	.18	.18	.15	.09	.11	.08
IN.	.19	.19	.18	.12	.22	.23	.20	.20	.17	.10	.13	.09

CAL YR	TOTAL	MEAN	MAX	MIN	AC-FT	CFSM	IN.
1987	118156	324	4490	91	234400	.36	4.88
1988	48826	133	621	43	96850	.15	2.02

## LITTLE SIOUX RIVER BASIN

06604200 WEST OKOBOJI LAKE AT LAKESIDE LABORATORY NEAR MILFORD, IA

LOCATION.--Lat 43°22'43", long 95°10'52", in NE1/4 SW1/4 sec.23, T.99N., R.37W., Dickinson County, Hydrologic Unit 10230003, at pumping station of Lakeside Laboratory on west shore, 2.3 mi upstream from lake outlet and 3.8 mi northwest of Milford.

DRAINAGE AREA.--125 mi<sup>2</sup>.

PERIOD OF RECORD.--May 1933 to current year. Published as "Okoboji Lake at Arnold's Park" 1933-37 and as "Okoboji Lake at Lakeside Laboratory near Milford" 1937-66.

GAGE.--Water-stage recorder. Datum of gage is 1,391.76 ft above NGVD, 94.51 ft above Iowa Lake Survey datum, and about 4.0 ft below crest of spillway. Prior to June 17, 1938, nonrecording gage at State Pier at Arnolds Park at same datum.

REMARKS.--Lake formed by concrete dam with ungated spillway at elevation 1,395.8 ft above NGVD. Lake is used for conservation and recreation. Area of lake is approximately 3,900 acres.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height, 6.28 ft June 22, 1984; minimum observed, 0.20 ft Sept. 20, 1959.

EXTREMES FOR CURRENT YEAR.--Maximum gage height, 4.54 ft Apr. 29, 30; minimum, 3.14 ft Sept. 15.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4.27	4.02	3.99	4.13	4.18	4.24	4.27	4.53	4.39	3.99	3.64	3.40
2	4.24	4.02	4.00	4.13	4.18	4.26	4.34	4.53	4.39	3.98	3.62	3.39
3	4.20	4.03	4.00	4.13	4.17	4.27	4.42	4.52	4.38	3.96	3.61	3.37
4	4.18	4.03	4.01	4.13	4.17	4.27	4.44	4.52	4.37	3.95	3.62	3.35
5	4.16	4.02	4.01	4.13	4.17	4.27	4.45	4.51	4.35	3.93	3.61	3.32
6	4.15	4.02	4.02	4.13	4.17	4.27	4.45	4.50	4.33	3.92	3.59	3.30
7	4.13	4.02	4.02	4.13	4.17	4.28	4.45	4.50	4.31	3.90	3.58	3.27
8	4.10	4.03	4.03	4.13	4.17	4.29	4.45	4.51	4.31	3.89	3.65	3.25
9	4.09	4.02	4.05	4.13	4.17	4.29	4.46	4.51	4.28	3.90	3.64	3.23
10	4.08	4.01	4.05	4.13	4.18	4.29	4.45	4.51	4.25	3.90	3.63	3.22
11	4.06	4.00	4.05	4.12	4.18	4.29	4.44	4.51	4.21	3.90	3.62	3.20
12	4.06	4.00	4.05	4.13	4.18	4.30	4.44	4.50	4.18	3.89	3.61	3.19
13	4.05	4.00	4.05	4.13	4.18	4.30	4.43	4.49	4.17	3.88	3.60	3.16
14	4.06	4.00	4.06	4.12	4.18	4.29	4.41	4.46	4.16	3.88	3.59	3.16
15	4.07	4.00	4.05	4.13	4.17	4.29	4.40	4.43	4.15	3.87	3.58	3.16
16	4.08	4.02	4.05	4.13	4.17	4.28	4.38	4.42	4.14	3.85	3.56	3.22
17	4.08	4.02	4.05	4.12	4.17	4.28	4.37	4.40	4.14	3.85	3.52	3.21
18	4.08	4.00	4.06	4.12	4.17	4.27	4.36	4.38	4.14	3.87	3.53	3.20
19	4.07	3.99	4.06	4.15	4.17	4.27	4.33	4.37	4.14	3.85	3.52	3.20
20	4.06	3.99	4.06	4.20	4.17	4.27	4.34	4.36	4.14	3.83	3.51	3.20
21	4.06	3.97	4.06	4.19	4.17	4.26	4.36	4.36	4.13	3.81	3.49	3.19
22	4.05	3.97	4.06	4.19	4.17	4.26	4.41	4.45	4.12	3.79	3.62	3.22
23	4.04	3.97	4.06	4.20	4.17	4.27	4.43	4.46	4.11	3.78	3.60	3.22
24	4.04	3.97	4.07	4.20	4.17	4.27	4.43	4.44	4.10	3.76	3.58	3.20
25	4.02	3.97	4.07	4.20	4.17	4.29	4.44	4.42	4.09	3.76	3.55	3.19
26	4.02	3.97	4.07	4.19	4.17	4.29	4.47	4.42	4.06	3.74	3.53	3.18
27	4.01	3.94	4.08	4.19	4.18	4.28	4.52	4.43	4.04	3.71	3.52	3.17
28	4.01	3.97	4.13	4.18	4.19	4.29	4.53	4.42	4.01	3.69	3.49	3.19
29	4.01	3.99	4.13	4.18	4.21	4.29	4.54	4.41	4.01	3.67	3.47	3.22
30	4.01	3.99	4.14	4.18	---	4.28	4.54	4.40	4.01	3.66	3.45	3.23
31	4.01	---	4.14	4.18	---	4.28	---	4.39	---	3.66	3.42	---
MEAN	4.08	4.00	4.06	4.15	4.17	4.28	4.42	4.45	4.19	3.84	3.57	3.23
MAX	4.27	4.03	4.14	4.20	4.21	4.30	4.54	4.53	4.39	3.99	3.65	3.40
MIN	4.01	3.94	3.99	4.12	4.17	4.24	4.27	4.36	4.01	3.66	3.42	3.16

CAL YR 1987 TOTAL 1573.63 MEAN 4.31 MAX 5.09 MIN 3.94  
WTR YR 1988 TOTAL 1477.66 MEAN 4.04 MAX 4.54 MIN 3.16



## LITTLE SIOUX RIVER BASIN

183

06605000 OCHEYEDAN RIVER NEAR SPENCER, IA

LOCATION.--Lat 43°07'44", long 95°12'37", in SW1/4SW1/4 sec.15, T.96N., R.37W., Clay County, Hydrologic Unit 10230003, on left bank 3 ft upstream from bridge on county highway M38, 3.4 mi west by southwest of Spencer, and at mile 4.1.

DRAINAGE AREA.--426 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1977 to current year. Occasional low-flow measurements, water years 1957-61, 1964, 1966-68, 1970, 1971, 1974-77.

GAGE.--Water-stage recorder. Datum of gage is 1,311.66 ft above NGVD.

REMARKS.--Estimated daily discharges: Dec. 4-6, and Dec. 14 to Mar. 18. Records good except those for estimated daily discharges, which are poor.

AVERAGE DISCHARGE.--11 years, 251 ft<sup>3</sup>/s, 8.00 in/yr, 181,800 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,450 ft<sup>3</sup>/s June 21, 1983, gage height, 10.49 ft; no flow Jan. 24 to Mar. 9, 1979.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 8, 1953 reached a stage of 12.89 ft, discharge, 26,000 ft<sup>3</sup>/s on basis of contracted-opening measurement of peak flow.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,700 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 2	2030	*679	(a) *6.27				

(a) Ice jam

Minimum discharge, 8.3 ft<sup>3</sup>/s Sept. 11, 12.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	301	133	104	51	39	583	186	414	172	47	16	14
2	280	131	105	54	31	662	230	382	170	44	14	15
3	259	132	102	46	30	520	534	357	167	41	17	14
4	252	131	95	42	28	391	605	336	168	37	19	14
5	246	125	96	32	27	297	521	318	158	35	19	12
6	232	123	95	27	27	245	466	303	147	33	16	12
7	218	123	105	28	30	269	430	297	140	32	14	11
8	210	122	105	25	31	253	399	295	144	33	30	10
9	205	118	122	22	31	206	369	285	131	38	22	9.9
10	192	115	134	23	29	205	345	265	119	35	18	9.8
11	188	115	147	24	27	224	331	251	113	32	16	8.7
12	189	116	149	28	29	207	315	248	109	31	15	8.8
13	186	116	143	25	32	133	302	239	109	29	15	9.4
14	184	114	133	27	30	94	284	227	103	28	14	9.7
15	185	114	101	29	33	115	266	222	94	26	13	12
16	184	117	67	38	36	147	251	205	90	25	12	23
17	178	118	58	38	38	170	244	194	91	38	11	21
18	174	111	141	35	59	185	225	188	90	108	11	16
19	168	109	190	33	133	200	216	187	83	49	15	14
20	166	108	138	32	114	192	217	203	79	40	14	14
21	162	111	90	28	97	183	210	246	72	34	13	14
22	161	109	120	32	168	182	216	282	66	30	62	16
23	156	108	111	36	269	187	244	315	63	27	42	15
24	152	106	87	33	307	187	343	287	65	25	26	14
25	143	104	45	26	254	212	400	261	59	24	20	13
26	145	103	42	26	233	225	373	246	54	22	17	12
27	141	102	78	25	338	201	435	230	51	21	19	12
28	136	106	70	28	504	207	544	212	49	20	17	16
29	135	111	62	28	563	206	518	197	52	19	15	27
30	134	108	89	34	---	199	456	186	54	19	15	28
31	133	---	71	45	---	190	---	176	---	17	14	---
TOTAL	5795	3459	3195	1000	3567	7477	10475	8054	3062	1039	581	425.3
MEAN	187	115	103	32.3	123	241	349	260	102	33.5	18.7	14.2
MAX	301	133	190	54	563	662	605	414	172	108	62	28
MIN	133	102	42	22	27	94	186	176	49	17	11	8.7
AC-FT	11490	6860	6340	1980	7080	14830	20780	15980	6070	2060	1150	844
CFSM	.44	.27	.24	.08	.29	.57	.82	.61	.24	.08	.04	.03
IN.	.51	.30	.28	.09	.31	.65	.91	.70	.27	.09	.05	.04

CAL YR 1987 TOTAL 81414 MEAN 223 MAX 2920 MIN 42 AC-FT 161500 CFSM .52 IN. 7.11  
WTR YR 1988 TOTAL 48129.3 MEAN 132 MAX 662 MIN 8.7 AC-FT 95460 CFSM .31 IN. 4.20

## LITTLE SIOUX RIVER BASIN

06605850 LITTLE SIOUX RIVER AT LINN GROVE, IA

LOCATION.--Lat 42°53'24", long 95°14'30", in SW1/4 SW1/4 sec.5, T.93 N., R.37 W., Buena Vista County, Hydrologic Unit 10230003, on right bank at downstream side of bridge on State Highway 264, in Linn Grove, and at mile 123.7.

DRAINAGE AREA.--1,548 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1972 to current year.

REVISED RECORDS.--WDR IA-80-1: 1978-79.

GAGE.--Water-stage recorder. Datum of gage is 1,223.60 ft above NGVD.

REMARKS.--Estimated daily discharges: Dec. 12 to Mar. 19. Records good except those for estimated daily discharges, which are poor. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--16 years, 729 ft<sup>3</sup>/s, 6.40 in/yr, 528,200 acre-ft/yr; median of yearly mean discharges, 690 ft<sup>3</sup>/s, 6.1 in/yr, 500,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 13,100 ft<sup>3</sup>/s June 17, 1984, gage height, 19.58 ft; maximum gage height, 19.58 ft June 17, 1984; minimum daily discharge, 0.70 ft<sup>3</sup>/s Feb. 4, 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Apr. 6	1045	*1,720	*9.86	Apr. 30	1745	1,650	9.56

Minimum discharge, 24 ft<sup>3</sup>/s Sept. 13.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	695	300	243	170	171	640	604	1620	522	119	47	41
2	655	299	228	167	153	623	620	1510	524	116	42	39
3	612	299	212	160	146	742	860	1380	500	109	39	38
4	586	298	183	142	140	699	1290	1270	475	105	39	38
5	551	295	174	126	147	631	1590	1170	446	99	42	37
6	523	287	200	122	127	659	1710	1090	414	93	46	34
7	499	284	241	121	127	659	1650	1030	385	88	43	32
8	481	281	266	119	130	674	1520	993	371	84	46	31
9	459	276	269	117	127	635	1390	948	350	98	51	31
10	437	268	312	111	106	600	1260	912	326	125	61	31
11	421	267	349	100	101	630	1180	870	301	114	61	28
12	413	269	326	107	127	635	1110	827	276	101	52	28
13	405	271	300	116	144	461	1030	782	259	91	44	28
14	399	269	285	120	151	400	969	749	250	87	41	28
15	396	265	173	126	154	425	907	719	234	81	40	29
16	404	268	140	145	151	390	847	670	217	76	38	36
17	405	270	180	153	176	600	796	635	212	71	38	51
18	393	268	258	148	274	850	747	607	216	73	34	53
19	384	262	276	160	350	870	713	569	206	135	34	43
20	376	258	300	168	307	749	686	538	193	129	34	39
21	368	240	260	155	400	688	657	526	178	98	33	36
22	364	242	235	142	480	643	644	557	167	87	140	42
23	357	256	240	147	440	618	668	670	156	78	147	43
24	349	255	236	135	390	614	739	814	151	72	129	42
25	338	244	190	148	330	630	865	818	147	66	95	41
26	335	241	170	133	380	637	1060	764	141	62	72	37
27	327	239	175	150	410	660	1170	712	130	59	65	33
28	319	241	165	154	510	690	1320	670	127	56	58	34
29	314	249	150	142	630	679	1510	625	124	54	55	48
30	309	257	190	181	---	668	1630	576	121	50	50	69
31	302	---	185	209	---	642	---	535	---	48	45	---
TOTAL	13176	8018	7111	4394	7279	19741	31742	26156	8119	2724	1761	1140
MEAN	425	267	229	142	251	637	1058	844	271	87.9	56.8	38.0
MAX	695	300	349	209	630	870	1710	1620	524	135	147	69
MIN	302	239	140	100	101	390	604	526	121	48	33	28
AC-FT	26130	15900	14100	8720	14440	39160	62960	51880	16100	5400	3490	2260
CFSM	.27	.17	.15	.09	.16	.41	.68	.55	.17	.06	.04	.02
IN.	.32	.19	.17	.11	.17	.47	.76	.63	.20	.07	.04	.03

CAL YR 1987 TOTAL 237585 MEAN 651 MAX 3610 MIN 140 AC-FT 471200 CFSM .42 IN. 5.71  
WTR YR 1988 TOTAL 131361 MEAN 359 MAX 1710 MIN 28 AC-FT 260600 CFSM .23 IN. 3.16

## 06606600 LITTLE SIOUX RIVER AT CORRECTIONVILLE, IA

LOCATION.--Lat 42°28'20", long 95°47'49", in NE1/4 NW1/4 sec.1, T.88 N., R.43 W., Woodbury County, Hydrologic Unit 10230003 on right bank 50 ft upstream from bridge on State Highway 31, 0.3 mi upstream from Bacon Creek, 0.5 mi west of Correctionville, 0.8 mi downstream from Pierson Creek, and at mile 56.0.

DRAINAGE AREA.--2,500 mi<sup>2</sup>.

PERIOD OF RECORD.--May 1918 to July 1925, October 1928 to July 1932, June 1936 to current year. Monthly discharge only for some periods, published in WSP 1310.

REVISED RECORDS.--WSP 856: 1919. WSP 1240: 1924-25, 1931, 1932 (M), 1937, 1945 (M), 1947 (M), 1949 (M). WSP 1440: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,096.49 ft above NGVD. May 28, 1918, to July 1, 1925 and Oct. 29, 1928 to July 15, 1929, nonrecording gage 0.2 mi downstream at datum 1.25 ft lower. July 16, 1929, to July 2, 1932, and June 15, 1936, to Nov. 7, 1938, nonrecording gage at present site and datum.

REMARKS.--Estimated daily discharges: Dec. 24-26, 29, Dec. 31 to Feb. 16, and Feb. 29 to Mar. 7. Records good except those for estimated daily discharges, which are poor. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--61 years (water years 1919-24, 1929-31, 1937-88), 831 ft<sup>3</sup>/s, 4.51 in/yr, 602,100 acre-ft/yr; median of yearly mean discharges, 650 ft<sup>3</sup>/s, 3.5 in/yr, 471,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 29,800 ft<sup>3</sup>/s Apr. 7, 1965, gage height, 25.86 ft; minimum daily discharge, 2.6 ft<sup>3</sup>/s July 17, 25, 1936, caused by construction dam above gage; minimum daily discharge excluding regulation, 4.0 ft<sup>3</sup>/s Oct. 9, 12, 1956.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 23 or 24, 1891, reached a stage of 29.34 ft, present datum, from levels to floodmark by U.S. Soil Conservation Service (discharge not determined).

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 3	1645	ice jam	*10.29	Apr. 7	2400	*2,090	9.28

Minimum discharge, 61 ft<sup>3</sup>/s Aug. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1170	627	475	380	420	1550	921	1930	839	353	113	137
2	1100	617	465	390	360	1500	942	1960	808	332	102	129
3	1040	602	438	390	320	1530	1010	1870	771	311	98	122
4	1010	593	395	350	300	1480	1200	1750	749	297	103	114
5	963	580	421	260	290	1450	1580	1630	703	283	99	107
6	924	571	460	210	310	1570	1900	1520	663	268	95	101
7	884	568	465	210	320	1680	2070	1440	646	254	89	97
8	852	563	534	200	310	1810	2070	1390	1460	240	109	93
9	827	553	573	180	300	1570	1970	1330	966	415	130	88
10	801	545	556	180	290	1610	1830	1260	875	375	118	84
11	777	540	542	190	300	1690	1690	1210	742	314	104	81
12	760	535	573	200	310	1890	1580	1160	664	297	100	77
13	743	533	592	190	300	1630	1500	1110	609	267	103	73
14	736	529	601	200	310	1510	1410	1050	572	232	96	72
15	736	530	547	205	320	1320	1330	1000	530	211	87	85
16	758	549	393	220	330	1160	1260	959	494	201	78	139
17	751	545	361	250	379	1160	1190	912	486	201	73	140
18	741	510	360	260	758	1240	1120	865	474	222	72	133
19	724	496	446	250	1510	1320	1070	827	449	180	72	126
20	705	488	544	240	1460	1240	1020	836	429	220	68	130
21	695	474	633	230	1280	1170	988	1150	407	250	63	131
22	686	477	602	240	1560	1060	969	1370	384	256	426	158
23	672	473	577	270	1690	1010	965	1010	362	216	673	151
24	663	468	500	260	1590	964	965	954	344	190	480	130
25	654	469	330	230	1420	944	989	1020	333	174	376	125
26	644	467	320	240	1360	930	1110	1090	318	161	295	120
27	623	463	415	230	1510	919	1340	1070	308	151	245	114
28	616	477	410	245	1600	937	1500	1000	302	141	206	143
29	621	483	380	260	1580	981	1650	940	314	133	178	198
30	612	479	430	300	---	966	1820	885	355	127	158	236
31	604	---	410	440	---	940	---	834	---	122	146	---
TOTAL	24092	15804	14748	7900	22787	40731	40959	37332	17356	7394	5155	3634
MEAN	777	527	476	255	786	1314	1365	1204	579	239	166	121
MAX	1170	627	633	440	1690	1890	2070	1960	1460	415	673	236
MIN	604	463	320	180	290	919	921	827	302	122	63	72
AC-FT	47790	31350	29250	15670	45200	80790	81240	74050	34430	14670	10220	7210
CFSM	.31	.21	.19	.10	.31	.53	.55	.48	.23	.10	.07	.05
IN.	.36	.24	.22	.12	.34	.61	.61	.56	.26	.11	.08	.05
CAL YR 1987	TOTAL 422305	MEAN 1157	MAX 5140	MIN 320	AC-FT 837600	CFSM .46	IN. 6.28					
WTR YR 1988	TOTAL 237892	MEAN 650	MAX 2070	MIN 63	AC-FT 471900	CFSM .26	IN. 3.54					

## LITTLE SIOUX RIVER BASIN

06607200 MAPLE RIVER AT MAPLETON, IA

LOCATION.--Lat 42°09'25", long 95°48'35", in SE1/4 SE1/4 sec.23, T.85 N., R.43 W., Monona County, Hydrologic Unit 10230005, on right bank at downstream side of bridge on State Highway 175, 1.0 mi downstream from Simmons Creek, 1.1 mi southwest of intersection of State Highways 175 and 141 in Mapleton, 2.1 mi upstream from McCleery Creek, and 16.0 mi upstream from mouth.

DRAINAGE AREA.--669 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1941 to current year.

REVISED RECORDS.--WSP 1310: 1942 (M), 1946 (M), 1948 (M). WSP 1440: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,085.86 ft above NGVD. See WSP 1730 for history of changes prior to Sept. 20, 1956.

REMARKS.--Estimated daily discharges: Dec. 28 to Feb. 24 and Mar. 1-6. Records good except those for estimated daily discharges, which are poor. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--47 years, 269 ft<sup>3</sup>/s, 5.46 in/yr, 194,900 acre-ft/yr; median of yearly mean discharges, 240 ft<sup>3</sup>/s, 4.9 in/yr, 174,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 20,800 ft<sup>3</sup>/s Sept. 12, 1978, gage height, 16.74 ft; maximum gage height, 22.1 ft June 12, 1950; no flow Sept. 21, 22, 1945 caused by temporary dam above gage; minimum daily discharge excluding regulation, 2.5 ft<sup>3</sup>/s Feb. 17-20, 1959.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
June 8	1215	4,400	7.22	Aug. 22	0945	*4,480	*7.29

Minimum discharge, 80 ft<sup>3</sup>/s, Sept. 11-13.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	416	296	252	140	230	636	201	229	196	175	99	92
2	405	305	243	173	139	493	235	217	214	152	95	107
3	391	306	239	180	148	391	268	214	176	148	93	99
4	384	298	233	160	186	324	274	220	169	143	94	92
5	387	291	229	136	170	302	282	214	159	139	99	89
6	381	288	239	113	157	295	278	212	152	134	96	87
7	368	291	247	121	166	309	266	212	150	127	93	83
8	361	294	254	113	177	310	254	252	2350	125	98	82
9	354	288	330	101	181	291	248	336	765	138	104	83
10	350	277	362	106	167	275	248	253	409	197	99	82
11	346	278	346	112	152	277	243	228	319	214	93	81
12	349	282	320	129	158	267	233	213	273	208	90	80
13	355	281	300	118	173	224	219	202	250	168	88	80
14	352	278	289	126	178	172	213	192	233	148	88	81
15	355	275	267	138	185	210	210	185	216	140	86	87
16	375	288	243	171	194	241	216	184	205	144	84	118
17	381	293	208	187	213	250	215	177	210	162	81	110
18	366	284	246	188	336	238	209	174	221	658	93	94
19	355	275	299	180	1410	225	205	172	194	269	101	88
20	348	270	275	175	1110	216	205	173	180	189	93	87
21	346	266	252	160	860	215	202	186	173	159	88	88
22	344	269	255	173	1050	209	206	350	163	141	1980	98
23	340	268	265	206	988	210	223	246	156	130	699	99
24	333	258	260	180	910	209	221	207	151	122	314	94
25	326	253	215	149	792	207	212	188	146	118	184	89
26	328	251	190	145	747	198	229	177	141	117	130	87
27	319	250	233	144	952	196	253	172	138	113	118	85
28	305	267	190	161	1060	194	250	169	136	109	109	122
29	299	276	170	166	731	201	247	164	140	106	103	247
30	297	266	190	235	---	200	241	156	191	105	99	237
31	297	---	170	350	---	199	---	161	---	102	95	---
TOTAL	10913	8362	7811	4936	13920	8184	7006	6435	8576	5100	5786	3048
MEAN	352	279	252	159	480	264	234	208	286	165	187	102
MAX	416	306	362	350	1410	636	282	350	2350	658	1980	247
MIN	297	250	170	101	139	172	201	156	136	102	81	80
AC-FT	21650	16590	15490	9790	27610	16230	13900	12760	17010	10120	11480	6050
CFSM	.53	.42	.38	.24	.72	.39	.35	.31	.43	.25	.28	.15
IN.	.61	.46	.43	.27	.77	.46	.39	.36	.48	.28	.32	.17

CAL YR 1987	TOTAL	165676	MEAN	454	MAX	2870	MIN	120	AC-FT	328600	CFSM	.68	IN.	9.21
WTR YR 1988	TOTAL	90077	MEAN	246	MAX	2350	MIN	80	AC-FT	178700	CFSM	.37	IN.	5.01

## LITTLE SIOUX RIVER BASIN

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06607500 LITTLE SIOUX RIVER NEAR TURIN, IA

LOCATION.--Lat 41°57'52", long 95°58'21", in NW1/4 NE1/4 sec.33, T.83 N., R.44 W., Monona County, Hydrologic Unit 10230003, on left bank on downstream side of bridge on county highway E54, 1.0 mi east of gaging station on Monona-Harrison ditch near Turin, 2.5 mi downstream from Maple River, 3.8 mi south of Turin, 6.2 mi northeast of Blencoe, and at mile 13.5.

DRAINAGE AREA.--3,526 mi<sup>2</sup>. Prior to Jan. 15, 1958, 4,426 mi<sup>2</sup>, combined area above this station and Monona-Harrison ditch station 1.0 mi west.

PERIOD OF RECORD.--January 1958 to current year. April 1939 to May 1942 at site 4.7 mi downstream, published as "near Blencoe" June 1942 to January 1958 at site 1,200 ft east on old river channel; records not equivalent owing to diversion into Monona-Harrison ditch through equalizer ditch 1.5 mi upstream.

GAGE.--Water-stage recorder. Datum of gage is 1,019.85 ft above NGVD (U.S. Army Corps of Engineers bench mark). Prior to July 15, 1958, nonrecording gages near present site at different datums. July 15 to Sept. 3, 1958, nonrecording gage at present site and datum.

REMARKS.--Estimated daily discharges: Dec. 17 to Mar. 1 and June 25-27. Records good except those for estimated daily discharges, which are poor. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--30 years (water years 1959-88), 1,430 ft<sup>3</sup>/s, 5.50 in/yr, 1,033,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 31,200 ft<sup>3</sup>/s June 21, 1983, gage height, 26.54 ft; maximum gage height, 27.44 ft Feb. 19, 1971, backwater from ice; minimum daily discharge, 17 ft<sup>3</sup>/s Jan. 18-20, Jan. 28 to Feb. 1, 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 5,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Dec. 20	0730	ice jam	*15.29	June 8	1945	*4,950	12.05

Minimum discharge, 148 ft<sup>3</sup>/s Aug. 18.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1820	946	901	700	840	2100	1120	2120	1170	603	254	337
2	1690	973	898	710	700	2030	1160	2210	1240	567	258	560
3	1580	966	886	730	600	2030	1220	2220	1110	530	236	350
4	1510	938	862	740	540	1990	1310	2150	1050	500	221	301
5	1450	932	793	620	510	1930	1580	2050	986	467	220	282
6	1380	928	783	470	500	1990	2010	1950	924	440	214	262
7	1310	917	846	390	510	2030	2250	1840	880	415	217	272
8	1270	902	877	360	510	2090	2350	1800	2680	400	205	245
9	1220	910	966	340	500	2010	2330	1810	2620	384	211	222
10	1190	903	1110	340	490	1850	2230	1720	1630	636	242	216
11	1160	909	1080	360	500	1920	2110	1630	1390	703	237	212
12	1130	905	1040	370	520	2030	1990	1570	1190	639	219	199
13	1110	900	1050	350	520	2020	1900	1500	1100	555	204	191
14	1080	895	1050	370	540	1710	1820	1410	1020	494	200	189
15	1080	893	1040	380	570	1660	1730	1330	967	438	201	214
16	1110	899	928	380	620	1460	1640	1270	904	432	194	280
17	1150	922	800	430	700	1430	1560	1220	854	403	173	350
18	1120	930	740	440	1250	1420	1470	1160	866	805	150	328
19	1090	910	800	440	2000	1520	1400	1130	823	725	180	307
20	1060	891	900	410	2500	1530	1340	1100	779	485	186	289
21	1060	900	1000	400	2400	1440	1290	1240	720	451	174	283
22	1040	890	980	440	2000	1310	1280	1790	692	470	1820	313
23	1030	878	930	490	3000	1190	1280	1760	640	471	2000	360
24	1010	876	880	480	2800	1200	1280	1370	604	422	1200	321
25	1020	862	740	430	2500	1180	1260	1280	575	382	847	292
26	1010	866	700	450	2350	1120	1320	1340	540	343	661	272
27	998	867	720	440	2300	1140	1510	1390	510	320	554	261
28	989	896	760	510	2350	1110	1720	1350	473	303	482	348
29	971	928	740	600	2250	1120	1850	1270	473	280	425	569
30	959	926	800	740	---	1170	1990	1190	518	261	389	568
31	943	---	740	820	---	1140	---	1130	---	246	366	---
TOTAL	36540	27258	27340	15130	37370	49870	49300	48300	29928	14570	13140	9193
MEAN	1179	909	882	488	1289	1609	1643	1558	998	470	424	306
MAX	1820	973	1110	820	3000	2100	2350	2220	2680	805	2000	569
MIN	943	862	700	340	490	1110	1120	1100	473	246	150	189
AC-FT	72480	54070	54230	30010	74120	98920	97790	95800	59360	28900	26060	18230
CFSM	.33	.26	.25	.14	.37	.46	.47	.44	.28	.13	.12	.09
IN.	.39	.29	.29	.16	.39	.53	.52	.51	.32	.15	.14	.10

CAL YR 1987	TOTAL 692632	MEAN 1898	MAX 11200	MIN 620	AC-FT 1374000	CFSM .54	IN. 7.31
WTR YR 1988	TOTAL 357939	MEAN 978	MAX 3000	MIN 150	AC-FT 710000	CFSM .28	IN. 3.78

## SOLDIER RIVER BASIN

06608500 SOLDIER RIVER AT PISGAH, IA

LOCATION.--Lat 41°49'50", long 95°55'54", in NW1/4 NE1/4 sec.14, T.81 N., R.44 W., Harrison County, Hydrologic Unit 10230001, on right bank at downstream side of bridge on county highway F20, at west edge of Pisgah, 0.4 mi downstream from Cobb Creek, 0.5 mi upstream from Mogger Ditch, and 13.1 mi upstream from mouth.

DRAINAGE AREA.--407 mi<sup>2</sup>.

PERIOD OF RECORD.--March 1940 to current year.

REVISED RECORDS.--WSP 956: 1940 (M). WSP 1240: 1940, 1941 (M), 1947. WSP 1440: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,036.53 ft above NGVD. Prior to Oct. 11, 1954, nonrecording gage at same site and datum with supplementary water-stage recorder operating above 8.2 ft gage height Mar. 2, 1946 to Sept. 24, 1953. Prior to Feb. 1954, on left bank at downstream side of bridge.

REMARKS.--Estimated daily discharges: Oct. 31 to Nov. 2 and Dec. 17 to Mar. 2. Records good except those for estimated daily discharges, which are poor. U.S. Army Corps of Engineers rain-gage and satellite data data collection platform at station.

AVERAGE DISCHARGE.--48 years, 135 ft<sup>3</sup>/s, 4.50 in/yr, 97,810 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 22,500 ft<sup>3</sup>/s June 12, 1950, gage height, 28.17 ft; minimum daily discharge, 2.0 ft<sup>3</sup>/s Jan. 2-10, 1945.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 5,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan. 31	0230	ice jam	*13.39	Aug. 22	1615	*2,150	10.08

Minimum discharge, 32 ft<sup>3</sup>/s Aug. 17, 18 and 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	192	180	172	115	125	283	117	110	144	71	50	48
2	186	180	171	117	72	189	154	105	122	65	46	46
3	181	176	173	134	81	170	171	104	94	62	47	74
4	187	170	177	116	116	151	145	106	96	62	54	54
5	191	164	174	102	104	161	136	103	76	61	56	48
6	183	164	183	84	92	151	135	103	72	57	51	44
7	177	166	176	91	95	161	127	108	69	54	50	42
8	174	168	186	85	101	156	121	112	465	54	51	40
9	173	162	269	76	105	142	120	120	187	74	51	38
10	172	164	209	78	92	146	126	101	104	85	49	38
11	173	170	191	82	81	148	120	97	92	82	46	37
12	177	173	180	93	79	139	116	99	86	102	43	35
13	180	173	171	84	83	119	115	96	82	73	41	36
14	177	171	166	88	86	127	113	90	80	65	41	37
15	182	170	161	96	84	139	112	89	75	62	41	42
16	190	183	156	113	88	133	110	83	74	101	39	68
17	178	185	115	127	93	133	110	83	76	98	37	61
18	176	175	90	132	123	129	105	86	83	225	35	45
19	174	170	115	145	344	130	105	84	78	103	35	45
20	171	161	135	157	417	129	106	80	73	79	36	44
21	169	169	125	192	350	127	105	113	70	69	36	42
22	175	169	120	169	283	128	115	223	66	67	769	40
23	173	163	115	138	250	129	127	127	62	64	383	42
24	173	159	120	116	217	128	117	104	62	63	117	39
25	170	162	110	97	185	129	111	91	59	81	80	37
26	189	161	97	91	275	120	127	85	57	64	68	36
27	187	163	82	93	400	117	145	83	59	59	64	35
28	180	181	93	101	400	125	121	82	59	56	61	84
29	182	187	115	104	520	127	117	78	60	53	57	234
30	176	179	135	113	---	118	113	74	65	54	54	116
31	175	---	145	151	---	118	---	70	---	52	52	---
TOTAL	5543	5118	4627	3480	5341	4402	3662	3089	2847	2317	2640	1627
MEAN	179	171	149	112	184	142	122	99.6	94.9	74.7	85.2	54.2
MAX	192	187	269	192	520	283	171	223	465	225	769	234
MIN	169	159	82	76	72	117	105	70	57	52	35	35
AC-FT	10990	10150	9180	6900	10590	8730	7260	6130	5650	4600	5240	3230
CFSM	.44	.42	.37	.28	.45	.35	.30	.24	.23	.18	.21	.13
IN.	.51	.47	.42	.32	.49	.40	.33	.28	.26	.21	.24	.15

CAL YR 1987	TOTAL 88571	MEAN 243	MAX 3430	MIN 80	AC-FT 175700	CFSM .60	IN. 8.10
WTR YR 1988	TOTAL 44693	MEAN 122	MAX 769	MIN 35	AC-FT 88650	CFSM .30	IN. 4.08

## 06609500 BOYER RIVER AT LOGAN, IA

LOCATION.--Lat. 41°38'33", long. 95°46'57", in SE1/4 NW1/4 sec.19, T.79 N., R.42 W., Harrison County, Hydrologic Unit 10230007, on left bank 9 ft downstream from Chicago Central and Pacific Railroad bridge at Logan, 0.4 mi downstream from Elk Grove Creek, 10.5 mi upstream from Willow Creek, and 15.8 mi upstream from mouth.

DRAINAGE AREA.--871 mi<sup>2</sup>.

PERIOD OF RECORD.--May 1918 to July 1925, November 1937 to current year. Monthly discharge only for some periods, published in WSP 1310.

REVISED RECORDS.--WSP 956: 1938-39. WSP 1240: 1918-19, 1920 (M), 1921, 1922 (M), 1924-25, 1938 (M), 1945. WSP 1440: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,009.38 ft above NGVD (Chicago and Northwestern Railway Company bench mark). See WSP 1918 for history of changes prior to Oct. 18, 1960.

REMARKS.--Estimated daily discharges: Dec. 15-18 and Dec. 24 to Feb. 28. Records good except those for estimated daily discharges, which are poor. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--56 years (water years 1919-24, 1939-88), 333 ft<sup>3</sup>/s, 5.19 in/yr, 241,300 acre-ft/yr; median of yearly mean discharges, 280 ft<sup>3</sup>/s, 4.4 in/yr, 203,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 25,000 ft<sup>3</sup>/s Feb. 19, 1971, gage height, 22.65 ft, from floodmark; maximum gage height, 25.22 ft Mar. 1, 1965, backwater from ice; minimum daily discharge, 1.5 ft<sup>3</sup>/s July 16, 1938.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 6,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
June 8	1200	*13,200	*16.01	No other peak greater than base discharge.			

Minimum discharge, 63 ft<sup>3</sup>/s Sept. 12-14.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	430	345	328	167	180	501	219	221	204	197	134	85
2	414	350	316	202	150	493	258	205	197	158	128	82
3	398	352	316	235	171	419	308	202	171	147	121	104
4	400	343	313	202	257	372	291	207	150	141	121	88
5	413	328	304	176	228	363	281	208	142	136	122	80
6	409	319	316	143	201	364	272	195	135	129	119	78
7	405	322	327	157	212	382	256	195	130	122	110	73
8	394	331	336	147	229	394	238	503	4400	364	107	72
9	394	323	460	130	240	349	233	668	1770	216	109	67
10	389	311	470	135	209	321	239	351	749	163	110	68
11	384	315	423	144	183	327	233	286	501	151	103	66
12	388	320	394	167	180	327	219	264	367	141	99	65
13	395	324	363	150	192	276	217	243	305	136	96	63
14	387	320	347	160	201	233	211	218	285	121	94	65
15	404	322	300	178	199	254	210	206	254	136	91	74
16	459	346	233	215	210	293	199	194	238	1940	88	95
17	428	351	175	244	226	296	195	183	227	871	87	111
18	398	333	274	258	309	282	192	181	231	579	84	84
19	380	317	367	287	957	269	186	177	230	505	80	77
20	365	312	354	315	654	267	187	170	204	296	79	77
21	361	305	319	394	465	261	188	189	189	243	79	74
22	368	312	335	346	522	253	191	300	178	211	718	72
23	371	316	346	281	557	256	224	237	165	189	1070	74
24	368	304	330	235	525	256	228	203	158	179	278	73
25	360	298	261	194	478	255	219	179	151	248	177	72
26	378	294	206	183	434	244	227	166	149	599	130	70
27	373	299	282	187	539	227	288	157	143	261	117	66
28	357	333	274	208	594	233	271	165	141	189	111	177
29	352	362	280	216	592	233	248	155	147	164	105	418
30	352	358	330	238	---	227	235	145	222	153	98	382
31	347	---	240	270	---	223	---	143	---	144	90	---
TOTAL	12021	9765	9919	6564	10094	9450	6963	7116	12533	9229	5055	3052
MEAN	388	325	320	212	348	305	232	230	418	298	163	102
MAX	459	362	470	394	957	501	308	668	4400	1940	1070	418
MIN	347	294	175	130	150	223	186	143	130	121	79	63
AC-FT	23840	19370	19670	13020	20020	18740	13810	14110	24860	18310	10030	6050
CFSM	.45	.37	.37	.24	.40	.35	.27	.26	.48	.34	.19	.12
IN.	.51	.42	.42	.28	.43	.40	.30	.30	.54	.39	.22	.13

CAL YR 1987	TOTAL 213277	MEAN 584	MAX 4770	MIN 175	AC-FT 423000	CFSM .67	IN. 9.11
WTR YR 1988	TOTAL 101761	MEAN 278	MAX 4400	MIN 63	AC-FT 201800	CFSM .32	IN. 4.35

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LOCATION.--Lat 41°15'32", long 95°55'20", in SE1/4 NW1/4 sec.23, T.15 N., R.13 E., Douglas County, Hydrologic Unit 10230006, on right bank on left side of concrete floodwall, at foot of Douglas Street, 275 ft downstream from Interstate 480 Highway bridge in Omaha, and at mile 615.9.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--September 1928 to current year. April 1872 to December 1899 (gage heights only) in reports of the Missouri River Commission and since January 1875, (gage heights only) in reports of the U.S. Weather Bureau.

GAGE.--Water-stage recorder. Datum of gage is 948.24 ft above NGVD. See WSP 1730 for history of changes prior to Sept. 30, 1936. Oct. 1, 1936 to Sept. 30, 1982 at datum 10.00 ft higher.

REMARKS.--No estimated daily discharges. Records good. Flow regulated by upstream main-stem reservoirs. U.S. National Weather Service gage-height telemeter and U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 396,000 ft<sup>3</sup>/s Apr. 18, 1952, gage height, 40.20 ft, present datum; minimum, about 2,200 ft<sup>3</sup>/s Jan. 6, 1937; minimum gage height observed, 7.23 ft, present datum, Jan. 10, 1957, result of freezeup.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 43,600 ft<sup>3</sup>/s Aug. 23; maximum gage height, 19.23 ft June 8; minimum daily discharge, 12,900 ft<sup>3</sup>/s Jan. 7; minimum gage height, 10.89 ft Jan. 7.

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	36000	36100	24900	20300	26600	26600	37000	34600	34400	33900	33300	34500
2	35400	36200	23200	18200	22500	28300	36600	35600	34900	34600	32800	36900
3	35100	36000	22700	17000	20900	29000	36000	36400	35000	33900	32600	39100
4	34900	36200	22600	18900	19800	28900	35600	37300	34500	33200	33100	38600
5	35300	36600	22500	20200	20800	27900	35400	37400	34200	33600	34500	38000
6	35200	36900	22100	16900	21200	27500	35600	36000	34200	34200	34300	38400
7	34500	37600	22400	12900	20400	28000	36200	34500	33000	34100	32700	37500
8	34700	37800	22700	14700	19700	27200	36400	35200	36200	33900	32400	37200
9	35000	38000	23000	17000	20700	26100	35400	37200	39100	34700	33300	37700
10	34900	38100	23900	17600	21600	26200	35400	36900	36200	35200	33600	37900
11	34500	38100	24100	18000	20900	25700	35800	36700	34600	33600	33300	38000
12	34300	38700	23600	19000	19900	25800	35600	36600	35200	33500	33300	38500
13	34200	38300	23400	21100	19400	26700	35400	36200	34900	32700	33500	38800
14	33800	37900	23000	21900	20300	27500	35800	36200	34400	32400	33400	38900
15	34100	37800	22800	19600	20600	25500	36000	35700	34300	32800	33500	39600
16	34800	38200	22500	20300	20300	24900	35700	35700	34300	34900	33600	40300
17	35600	39700	21600	23500	20600	23900	34800	35000	34500	38600	33600	42200
18	35900	40100	20600	24300	22100	22700	34400	33800	34700	35500	33500	39600
19	35700	39800	20800	24100	24400	23200	33800	33400	34900	37500	34100	36100
20	35200	39700	21800	23900	28600	25200	33300	33200	34700	34600	34900	36000
21	35000	39600	22000	22900	28200	28500	33600	32700	34300	34400	33900	37300
22	35200	39100	21800	20600	25600	32100	33500	36000	34200	34700	33800	36200
23	35000	38600	22300	20000	25300	34500	33900	37400	34300	34200	40800	35300
24	34700	38300	22900	21100	25900	34900	35000	36600	33800	33900	38700	35900
25	34700	37900	22400	22200	25200	35600	34900	36300	33200	33900	35700	36000
26	35500	36300	21100	21600	23300	38800	33500	36900	33700	34500	34400	35700
27	36700	34400	19500	19800	22600	39300	34100	38900	33300	33800	34500	35100
28	36900	32800	20500	18900	23700	37700	35700	36700	32800	33500	35000	36000
29	37600	30900	21700	21500	25000	37600	35100	35500	33700	33200	34600	37300
30	37600	27800	21100	24500	---	38300	34100	34500	33500	33100	34100	38700
31	37000	---	20500	29700	---	38200	---	34200	---	33300	34100	---
TOTAL	1095000	1113500	690000	632200	656100	922300	1053600	1109300	1035000	1059900	1058900	1127300
MEAN	35320	37120	22260	20390	22620	29750	35120	35780	34500	34190	34160	37580
MAX	37600	40100	24900	29700	28600	39300	37000	38900	39100	38600	40800	42200
MIN	33800	27800	19500	12900	19400	22700	33300	32700	32800	32400	32400	34500
AC-FT	2172000	2209000	1369000	1254000	1301000	1829000	2090000	2200000	2053000	2102000	2100000	2236000
CAL YR 1987	TOTAL 13088000		MEAN 35860		MAX 58800		MIN 19500		AC-FT 25960000			
WTR YR 1988	TOTAL 11553100		MEAN 31570		MAX 42200		MIN 12900		AC-FT 22920000			



## MISSOURI RIVER MAIN STEM

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06610000 MISSOURI RIVER AT OMAHA, NE--Continued

## WATER-QUALITY RECORDS

LOCATION.--Water quality samples were collected from Interstate 80 highway bridge 2.0 mi downstream from gaging station. Samples for particle-size distribution were collected from boat cross-section 3.6 mi downstream from gaging station.

PERIOD OF RECORD.--Water years 1969-76, 1978 to current year. Daily sediment loads for April 1939 to September 1971 are in reports of U.S. Army Corps of Engineers.

## PERIOD OF DAILY RECORD.--

CHEMICAL ANALYSES: July 1969 to June 1972.

SPECIFIC CONDUCTANCE: October 1972 to September 1976, January 1978 to September 1981.

WATER TEMPERATURES: October 1971 to September 1976, January 1978 to September 1981.

SUSPENDED-SEDIMENT DISCHARGE: October 1971 to September 1976.

## EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum daily, 950 microsiemens Dec. 4,5, 1980; minimum daily, 335 microsiemens Mar. 22, 1978.

WATER TEMPERATURES: Maximum daily, 32.0°C July 24, 1972; minimum daily, 0.0°C on many days during winter period.

SEDIMENT CONCENTRATIONS: Maximum daily mean, 8,180 mg/L May 19, 1974; minimum daily mean, 165 mg/L Sept. 13, 1976.

SEDIMENT LOADS: Maximum daily, 1,060,000 tons May 19, 1974; minimum daily, 3,990 tons Jan. 14, 1975.

## PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	SAMPLE LOC- ATION, CROSS SECTION (FT FM L BANK) (00009)	DEPTH AT SAMPLE LOC- ATION, TOTAL (FEET) (81903)	SAM- PLING DEPTH (FEET) (00003)	STREAM VELOC- ITY, POINT (FPS) (81904)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	SED. SUSP. FALL DIAM. % FINER THAN .004 MM (70338)	SED. SUSP. FALL DIAM. % FINER THAN .062 MM (70342)	SED. SUSP. FALL DIAM. % FINER THAN .125 MM (70343)	SED. SUSP. FALL DIAM. % FINER THAN .250 MM (70344)	SED. SUSP. FALL DIAM. % FINER THAN .500 MM (70345)
OCT											
14...	0950	150	11.0	2.50	3.50	198	--	48	60	96	100
14...	0955	150	--	5.50	3.22	270	--	36	52	90	100
14...	1000	150	--	7.90	3.11	297	--	40	53	90	100
14...	1005	150	--	9.20	3.02	294	--	32	47	92	100
14...	1010	150	--	9.90	2.76	317	--	29	46	90	100
14...	1018	150	--	--	--	200	--	41	54	91	100
14...	1020	285	10.0	2.30	5.13	251	--	38	60	99	100
14...	1025	285	--	5.00	4.61	433	--	23	38	94	100
14...	1030	285	--	7.10	4.30	499	--	17	31	92	100
14...	1035	285	--	8.30	4.26	640	--	13	24	80	100
14...	1040	285	--	9.00	4.15	707	--	13	24	86	100
14...	1050	285	--	--	--	514	--	20	33	89	100
14...	1055	420	17.0	3.90	4.72	--	--	--	--	--	--
14...	1059	420	--	8.50	4.59	--	--	--	--	--	--
14...	1103	420	--	12.1	4.33	--	--	--	--	--	--
14...	1107	420	--	14.2	4.15	--	--	--	--	--	--
14...	1111	420	--	15.3	3.81	--	--	--	--	--	--
14...	1115	420	--	16.0	3.72	--	--	--	--	--	--
14...	1118	420	--	--	--	383	--	25	44	98	100
14...	1125	420	--	--	--	405	7	14	--	--	--
14...	1130	505	16.4	3.80	5.24	197	--	47	63	100	--
14...	1134	505	--	8.20	4.91	256	--	41	59	100	--
14...	1138	505	--	11.7	4.70	252	--	41	61	100	--
14...	1142	505	--	13.7	4.09	383	--	30	45	99	100
14...	1146	505	--	14.8	3.70	424	--	25	44	98	100
14...	1150	505	--	15.4	3.50	522	--	20	37	98	100
14...	1153	505	--	--	--	314	--	36	54	99	100
14...	1200	605	19.4	4.50	4.54	177	--	62	81	100	--
14...	1206	605	--	9.70	3.94	198	--	61	80	100	--
14...	1212	605	--	13.9	3.07	198	--	58	75	99	100
14...	1218	605	--	16.2	2.94	179	--	55	78	100	--
14...	1224	605	--	17.5	2.53	200	--	56	74	98	100
14...	1230	605	--	18.3	1.96	206	--	54	77	99	100
14...	1235	605	--	--	--	201	--	56	69	98	100

## MISSOURI RIVER MAIN STEM

06610000 MISSOURI RIVER AT OMAHA, NE--Continued

## WATER-QUALITY RECORDS

## PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	SAMPLE LOC- ATION, CROSS SECTION (FT FM L BANK) (000009)	DEPTH AT SAMPLE LOC- ATION, TOTAL (FEET) (81903)	SAM- PLING DEPTH (FEET) (000003)	STREAM VELOC- ITY, POINT (FPS) (81904)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	SED. SUSP. FALL DIAM. % FINER THAN .004 MM (70338)	SED. SUSP. FALL DIAM. % FINER THAN .062 MM (70342)	SED. SUSP. FALL DIAM. % FINER THAN .125 MM (70343)	SED. SUSP. FALL DIAM. % FINER THAN .250 MM (70344)	SED. SUSP. FALL DIAM. % FINER THAN .500 MM (70345)
APR											
20...		WATER TEMPERATURE, 12.0° C (1030-1330 HOURS); DISCHARGE, 33,300 ft <sup>3</sup> /s.									
20...	1040	150	10.8	2.50	3.28	171	--	59	73	100	--
20...	1043	150	--	5.40	3.28	198	--	49	65	97	100
20...	1046	150	--	7.70	2.96	241	--	41	51	88	100
20...	1049	150	--	9.00	2.63	332	--	28	40	88	100
20...	1052	150	--	9.70	2.31	400	--	31	39	84	100
20...	1055	150	--	--	--	224	--	49	65	96	100
20...	1115	320	13.2	3.10	5.26	318	--	46	59	98	100
20...	1118	320	--	6.60	4.26	318	--	37	54	99	100
20...	1121	320	--	9.40	3.83	558	--	31	44	96	100
20...	1124	320	--	11.0	3.07	526	--	18	32	95	100
20...	1127	320	--	11.9	2.63	420	--	30	38	94	100
20...	1130	320	--	12.4	2.85	697	--	17	28	94	100
20...	1133	320	--	--	--	359	--	25	40	96	100
20...	1145	440	15.4	3.60	4.37	--	--	--	--	--	--
20...	1148	440	--	7.70	4.15	--	--	--	--	--	--
20...	1152	440	--	11.0	3.72	--	--	--	--	--	--
20...	1156	440	--	12.8	3.28	--	--	--	--	--	--
20...	1200	440	--	13.9	2.42	--	--	--	--	--	--
20...	1204	440	--	14.5	2.63	--	--	--	--	--	--
20...	1208	440	--	--	--	353	--	27	42	93	100
20...	1215	440	--	--	--	543	3	9	--	--	--
20...	1220	520	16.4	3.80	4.48	187	--	48	65	98	100
20...	1223	520	--	8.20	3.94	233	--	47	70	100	--
20...	1226	520	--	11.7	3.72	245	--	28	44	98	100
20...	1229	520	--	13.7	2.85	351	--	22	39	97	100
20...	1232	520	--	14.8	2.96	411	--	22	36	94	100
20...	1235	520	--	15.4	2.96	466	--	21	36	93	100
20...	1238	520	--	--	--	207	--	34	50	95	100
20...	1255	615	20.0	4.60	4.48	131	--	69	91	100	--
20...	1258	615	--	10.0	4.37	167	--	57	74	100	--
20...	1301	615	--	14.3	3.50	224	--	39	55	97	100
20...	1304	615	--	16.7	3.28	234	--	32	45	88	100
20...	1307	615	--	18.0	2.74	220	--	39	54	97	100
20...	1310	615	--	18.8	2.63	344	--	26	37	74	100
20...	1315	615	--	--	--	156	--	50	72	100	--

JUN

01...		WATER TEMPERATURE, 22.0° C (0930-1245 HOURS); DISCHARGE, 34,200 ft <sup>3</sup> /s.									
01...	0945	150	10.8	2.50	3.50	223	--	63	71	97	100
01...	0950	150	--	5.40	3.50	224	--	69	76	98	100
01...	1000	150	--	7.70	2.85	254	--	56	62	94	100
01...	1010	150	--	9.00	2.85	322	--	47	52	90	100
01...	1020	150	--	9.70	2.42	400	--	38	43	83	100
01...	1025	150	--	--	--	214	--	65	72	97	100
01...	1040	310	12.4	2.90	4.26	251	--	60	68	100	--
01...	1045	310	--	6.20	4.15	289	--	53	60	99	100
01...	1048	310	--	8.90	3.83	363	--	41	52	98	100
01...	1051	310	--	10.3	3.50	443	--	38	48	96	100
01...	1056	310	--	11.2	3.61	475	--	32	42	98	100
01...	1100	310	--	--	--	321	--	44	56	99	100
01...	1110	420	16.2	3.70	4.37	--	--	--	--	--	--
01...	1114	420	--	8.10	3.94	--	--	--	--	--	--
01...	1117	420	--	11.6	3.28	--	--	--	--	--	--
01...	1120	420	--	13.5	3.18	--	--	--	--	--	--
01...	1123	420	--	14.6	2.85	--	--	--	--	--	--
01...	1126	420	--	15.2	2.53	--	--	--	--	--	--
01...	1130	420	--	--	--	325	--	44	54	98	100
01...	1135	420	--	--	--	494	11	25	--	--	--
01...	1145	510	18.0	4.20	4.48	204	--	68	80	100	--
01...	1148	510	--	9.00	4.15	243	--	65	75	99	100
01...	1152	510	--	12.9	3.72	294	--	49	58	98	100
01...	1155	510	--	15.0	3.50	352	--	44	55	98	100
01...	1158	510	--	16.2	3.07	426	--	36	48	94	100
01...	1200	510	--	17.0	3.07	798	--	19	27	79	100
01...	1205	510	--	--	--	297	--	46	56	94	100
01...	1220	620	20.0	4.60	4.37	161	--	88	96	100	--
01...	1223	620	--	10.0	4.15	184	--	78	89	100	--
01...	1227	620	--	14.3	4.04	198	--	75	86	100	--
01...	1230	620	--	16.7	3.72	209	--	70	81	100	--
01...	1233	620	--	18.0	3.18	217	--	65	73	98	100
01...	1237	620	--	18.8	3.18	336	--	47	54	94	100
01...	1240	620	--	--	--	182	--	79	89	99	100

06610000 MISSOURI RIVER AT OMAHA, NE--Continued

## WATER-QUALITY RECORDS

## PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	SAMPLE LOC- ATION, CROSS SECTION (FT FM L BANK) (000009)	DEPTH AT SAMPLE LOC- ATION, TOTAL (FEET) (81903)	SAM- PLING DEPTH (FEET) (000003)	STREAM VELOC- ITY, POINT (FPS) (81904)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	SED. SUSP. FALL DIAM. % FINER THAN .004 MM (70338)	SED. SUSP. FALL DIAM. % FINER THAN .062 MM (70342)	SED. SUSP. FALL DIAM. % FINER THAN .125 MM (70343)	SED. SUSP. FALL DIAM. % FINER THAN .250 MM (70344)	SED. SUSP. FALL DIAM. % FINER THAN .500 MM (70345)
JUL											
13...		WATER TEMPERATURE, 26.5 ° C (1000-1330 HOURS); DISCHARGE, 32,600 ft <sup>3</sup> /s.									
13...	1015	175	11.6	2.70	3.83	142	--	61	74	99	100
13...	1018	175	--	5.80	3.39	150	--	65	76	98	100
13...	1021	175	--	8.30	3.07	176	--	52	62	99	100
13...	1024	175	--	9.70	2.74	248	--	39	47	96	100
13...	1030	175	--	10.4	2.42	286	--	31	41	93	100
13...	1035	175	--	--	--	160	--	51	62	94	100
13...	1045	305	12.4	2.90	3.94	158	--	57	70	99	100
13...	1048	305	--	6.20	3.72	195	--	44	54	98	100
13...	1051	305	--	8.90	2.96	249	--	36	51	98	100
13...	1055	305	--	10.3	2.96	340	--	28	39	95	100
13...	1057	305	--	11.2	2.85	387	--	23	35	97	100
13...	1100	305	--	--	--	259	--	34	45	86	100
13...	1150	425	15.6	3.60	4.59	--	--	--	--	--	--
13...	1152	425	--	7.80	4.26	--	--	--	--	--	--
13...	1155	425	--	11.1	3.94	--	--	--	--	--	--
13...	1158	425	--	13.0	3.61	--	--	--	--	--	--
13...	1200	425	--	14.0	3.61	--	--	--	--	--	--
13...	1202	425	--	14.7	3.62	--	--	--	--	--	--
13...	1203	425	--	--	--	274	11	23	--	--	--
13...	1206	425	--	--	--	304	--	31	42	96	100
13...	1220	520	17.0	3.90	4.37	137	--	72	90	100	--
13...	1223	520	--	8.50	4.15	184	--	52	66	100	--
13...	1226	520	--	12.1	3.50	239	--	40	59	98	100
13...	1230	520	--	14.2	3.18	269	--	38	54	98	100
13...	1238	520	--	15.3	2.42	363	--	26	42	97	100
13...	1240	520	--	16.0	2.31	426	--	26	42	96	100
13...	1245	520	--	--	--	204	--	49	67	99	100
13...	1255	610	20.2	4.70	4.48	111	--	84	96	100	--
13...	1258	610	--	10.1	4.04	163	--	66	81	99	100
13...	1305	610	--	14.4	3.72	154	--	68	81	98	100
13...	1310	610	--	16.8	3.28	185	--	56	71	98	100
13...	1312	610	--	18.2	3.07	218	--	47	57	95	100
13...	1314	610	--	19.0	2.42	330	--	31	42	90	100
13...	1315	610	--	--	--	167	--	59	73	98	100
AUG											
24...											
24...		WATER TEMPERATURE, 25.0 ° C (1015-1300 HOURS); DISCHARGE, 38,100 ft <sup>3</sup> /s.									
24...	1020	150	11.8	2.70	3.94	482	--	92	96	100	--
24...	1023	150	--	5.90	3.50	514	--	88	92	99	100
24...	1025	150	--	8.40	3.18	545	--	82	86	98	100
24...	1030	150	--	9.80	3.07	604	--	78	81	98	100
24...	1033	150	--	10.6	2.96	607	--	74	77	92	100
24...	1038	150	--	--	--	503	--	89	93	99	100
24...	1050	295	12.6	2.90	5.24	545	--	84	89	100	--
24...	1053	295	--	6.30	4.26	638	--	72	77	99	100
24...	1055	295	--	9.00	4.15	778	--	60	67	96	100
24...	1058	295	--	10.5	4.04	858	--	53	60	96	100
24...	1100	295	--	11.3	3.94	709	--	64	70	97	100
24...	1108	295	--	--	--	599	--	74	80	99	100
24...	1120	440	16.2	3.70	4.70	--	--	--	--	--	--
24...	1122	440	--	8.10	4.59	--	--	--	--	--	--
24...	1125	440	--	11.6	4.48	--	--	--	--	--	--
24...	1127	440	--	13.5	4.26	--	--	--	--	--	--
24...	1130	440	--	14.6	4.04	--	--	--	--	--	--
24...	1133	440	--	15.2	3.94	--	--	--	--	--	--
24...	1135	440	--	--	--	552	--	78	83	99	100
24...	1140	440	--	--	--	757	30	55	--	--	--
24...	1155	535	18.2	4.20	4.59	493	--	84	92	100	--
24...	1157	535	--	9.10	4.15	533	--	79	85	100	--
24...	1200	535	--	13.0	4.26	649	--	67	78	99	100
24...	1205	535	--	15.2	3.72	735	--	62	72	98	100
24...	1210	535	--	16.4	3.72	731	--	59	68	95	100
24...	1215	535	--	17.1	3.50	879	--	51	60	94	100
24...	1218	535	--	--	--	655	--	66	76	98	100
24...	1230	630	20.2	4.70	4.37	444	--	91	98	100	--
24...	1232	630	--	10.0	4.15	464	--	89	96	99	100
24...	1235	630	--	14.4	3.18	473	--	87	95	100	--
24...	1238	630	--	16.8	3.18	476	--	89	95	100	--
24...	1240	630	--	18.2	2.96	490	--	85	92	100	--
24...	1245	630	--	19.0	2.42	483	--	84	91	99	100
24...	1247	630	--	--	--	462	--	90	97	99	100

MISSOURI RIVER MAIN STEM  
06610000 MISSOURI RIVER AT OMAHA, NE--Continued  
WATER-QUALITY RECORDS

PARTICLE-SIZE DISTRIBUTION OF SURFACE BED MATERIAL, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	NUMBER OF SAM- PLING POINTS (COUNT) (00063)	BED MAT. SIEVE DIAM. % FINER THAN .062 MM (80164)	BED MAT. SIEVE DIAM. % FINER THAN .125 MM (80165)	BED MAT. SIEVE DIAM. % FINER THAN .250 MM (80166)	BED MAT. SIEVE DIAM. % FINER THAN .500 MM (80167)	BED MAT. SIEVE DIAM. % FINER THAN 1.00 MM (80168)	BED MAT. SIEVE DIAM. % FINER THAN 2.00 MM (80169)	BED MAT. SIEVE DIAM. % FINER THAN 4.00 MM (80170)
OCT									
14...	1013	4	0	1	44	99	100	--	--
APR									
20...	1110	4	0	1	27	90	98	99	100
JUN									
01...	1030	5	0	1	29	90	98	99	100
JUL									
13...	1212	5	0	1	38	97	100	--	--
AUG									
24...	1255	5	0	1	23	97	100	--	--

## 195

LOCATION.--Lat 40°40'55", long 95°50'48", in NW1/4 NE1/4 sec.9, T.8 N., R.14 E., Otoe County, Hydrologic Unit 10240001, on right bank 0.7 mi upstream from Waubonsie Highway Bridge at Nebraska City, and at mile 562.6.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--August 1929 to current year. Gage-height records collected in this vicinity from August 1878 to December 1899 are contained in reports of Missouri River Commission.

REVISID RECORDS.--WSP 761: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 905.36 ft. above NGVD, supplementary adjustment of 1954. See WSP 1918 or 1919 for history of changes prior to Apr. 1, 1963.

REMARKS.--No estimated daily discharges. Records good. Flow regulated by upstream main-stem reservoirs. U.S. Army Corps of Engineers rain-gage and satellite data collection platform and U.S. National Weather Service gage-height telemeter at station.

AVERAGE DISCHARGE.--59 years, 37,110 ft<sup>3</sup>/s, 26,890,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 414,000 ft<sup>3</sup>/s Apr. 19, 1952; maximum gage height, 27.66 ft Apr. 18, 1952; minimum discharge, 1,600 ft<sup>3</sup>/s Dec. 31, 1946 (discharge measurement); minimum gage height observed, -0.28 ft Dec. 24, 1960, result of freezeup.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 49,000 ft<sup>3</sup>/s May 23, gage height, 11.84 ft; minimum daily discharge, 17,700 ft<sup>3</sup>/s Jan. 8, gage height, 4.17 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	39800	40600	32000	23900	30900	40300	42000	38700	42500	34100	34100	33900
2	39600	40500	30300	22400	28200	40000	41100	38900	41300	34300	33900	35000
3	38900	41400	29800	21000	26900	41000	40500	38500	41400	34400	33700	37600
4	38600	41600	29200	21200	25800	39800	40600	39200	41100	34100	34000	38900
5	38300	41500	29100	22400	25700	39000	40300	39600	40100	34400	34200	38600
6	38400	41600	29100	22200	26000	37800	41300	40600	39700	35900	34900	38000
7	37800	41200	29100	19000	25800	37600	40600	41600	38700	34800	34100	38200
8	37700	40500	29000	17700	25200	38000	41800	41400	38100	35000	33500	37700
9	38600	40100	29200	19600	25000	37400	41900	42000	41100	37300	33700	38000
10	39100	39900	29900	21300	26000	36900	41300	42200	40000	36700	34400	38500
11	39600	39900	29900	21800	25900	36300	41900	41100	37600	36400	34300	38700
12	39900	40500	29900	22100	25200	35700	41500	41200	37000	35600	34100	39000
13	40500	41200	29700	22200	24700	35400	41300	39700	36900	35400	34500	39500
14	40100	41300	29500	23000	25200	35600	40700	39500	36200	35200	34400	39500
15	39200	41600	29400	23000	25600	35000	41000	38800	35600	34800	34000	40200
16	39000	42200	28700	22100	25900	31700	40700	37900	36000	37300	34000	40900
17	39200	42600	28800	23500	26400	30600	40700	37900	35500	37500	34300	42300
18	39100	43400	28400	25400	27200	30800	40500	37500	35000	36800	34200	41900
19	39100	43300	27300	26400	29600	30900	40200	37700	34900	36900	34600	39800
20	38600	43800	27600	26600	32400	31700	39800	38000	35400	36800	36000	37800
21	38400	42700	28300	26000	34800	32800	39000	39900	34900	35800	35700	38300
22	38400	42400	28300	24800	37900	36200	38900	45200	34900	35800	35300	38300
23	38800	42600	28600	23900	37400	37200	38600	48100	34800	35900	37200	37600
24	38600	42700	29100	25100	37600	38500	38700	46100	34900	35100	41500	37600
25	38300	42400	29300	24900	37600	39600	38700	44500	34300	35900	39100	38200
26	38200	41400	28400	24700	37100	41300	38800	42400	33600	36900	37000	38400
27	38500	38800	27500	24500	37900	43100	39600	42100	33900	37300	35400	37900
28	38200	37600	26800	23800	38800	43200	40700	42200	33400	36200	35400	38800
29	37900	36100	25800	23700	42300	43200	40600	41900	34400	35300	35200	41200
30	39100	34000	25000	26600	---	43200	39900	41200	34500	34700	34600	44700
31	39800	---	24600	29900	---	42000	---	41500	---	34300	34100	---
TOTAL	1205300	1229400	887600	724700	875000	1161800	1213200	1267100	1107700	1107000	1085400	1165600
MEAN	38880	40980	28630	23380	30170	37480	40440	40870	36920	35710	35010	38850
MAX	40500	43800	32000	29900	42300	43200	42000	48100	42500	37500	41500	44700
MIN	37700	34000	24600	17700	24700	30600	38600	37500	33400	34100	33500	33900
AC-FT	2391000	2439000	1761000	1437000	1736000	2304000	2406000	2513000	2197000	2196000	2153000	2312000
CAL YR 1987	TOTAL 16362700		MEAN 44830	MAX 119000		MIN 24600	AC-FT 32460000					
WTR YR 1988	TOTAL 13029800		MEAN 35600	MAX 48100		MIN 17700	AC-FT 25840000					

## MISSOURI RIVER MAIN STEM

06807000 MISSOURI RIVER AT NEBRASKA CITY, NE--Continued

## WATER-QUALITY RECORDS

LOCATION.--Samples for particle size distribution were collected from boat cross-section 0.7 mi upstream from gage.

PERIOD OF RECORD.--May 1951 to current year. Daily sediment loads August 1957 to September 1971 in reports of U.S. Army Corps of Engineers.

## PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: May 1951 to September 1976.

WATER TEMPERATURES: May 1951 to September 1976.

SEDIMENT DISCHARGE: October 1971 to September 1976.

## EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum daily, 994 microsiemens Dec. 17, 1962; minimum daily, 273 microsiemens June 17, 1964.

WATER TEMPERATURES: Maximum daily, 31°C July 26, 1977; minimum, 0.0°C on many days during winter periods.

SEDIMENT CONCENTRATIONS: Maximum daily mean, 8,220 mg/L May 19, 1974; minimum daily mean, 137 mg/L Jan. 14, 1975.

SEDIMENT LOADS: Maximum daily, 1,590,000 tons May 19, 1974; minimum daily, 4,050 tons Jan. 17, 1972.

## PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	SAMPLE LOC- ATION, CROSS SECTION (FT FM L BANK) (000009)	DEPTH AT SAMPLE LOC- ATION, TOTAL (FEET) (81903)	SAM- PLING DEPTH (FEET) (000003)	STREAM VELOC- ITY, POINT (FPS) (81904)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	SED. SUSP. FALL DIAM. % FINER THAN .004 MM (70338)	SED. SUSP. FALL DIAM. % FINER THAN .062 MM (70342)	SED. SUSP. FALL DIAM. % FINER THAN .125 MM (70343)	SED. SUSP. FALL DIAM. % FINER THAN .250 MM (70344)	SED. SUSP. FALL DIAM. % FINER THAN .500 MM (70345)	SED. SUSP. FALL DIAM. % FINER THAN 1.00 MM (70346)
OCT												
13...	13...	WATER TEMPERATURE, 11.0° C (1000-1315 HOURS);					DISCHARGE, 40,500 ft <sup>3</sup> /s.					
13...	1015	50.0	17.8	4.10	5.15	161	--	62	73	100	--	--
13...	1020	50.0	--	8.90	4.61	236	--	47	63	96	100	--
13...	1025	50.0	--	12.7	4.02	302	--	44	56	94	100	--
13...	1030	50.0	--	14.8	3.24	306	--	35	49	89	100	--
13...	1035	50.0	--	16.0	2.59	410	--	25	39	82	99	100
13...	1045	50.0	--	16.8	2.33	604	--	19	33	67	98	100
13...	1053	50.0	--	--	--	247	--	49	59	93	100	--
13...	1055	140	14.2	3.30	6.11	284	--	38	52	97	99	100
13...	1100	140	--	7.10	5.87	365	--	29	44	99	100	--
13...	1105	140	--	10.1	5.59	759	--	13	23	88	100	--
13...	1110	140	--	11.8	4.70	1120	--	10	16	77	100	--
13...	1115	140	--	12.8	4.28	1590	--	6	12	74	100	--
13...	1120	140	--	13.4	4.37	1690	--	6	11	72	99	100
13...	1130	140	--	--	--	661	--	23	34	91	100	--
13...	1135	250	15.0	3.50	6.02	--	--	--	--	--	--	--
13...	1140	250	--	7.50	5.59	--	--	--	--	--	--	--
13...	1145	250	--	10.7	4.96	--	--	--	--	--	--	--
13...	1150	250	--	12.5	4.80	--	--	--	--	--	--	--
13...	1155	250	--	13.5	4.83	--	--	--	--	--	--	--
13...	1200	250	--	14.1	4.46	--	--	--	--	--	--	--
13...	1203	250	--	--	--	845	--	15	25	96	100	--
13...	1210	250	--	--	--	1030	3	6	--	--	--	--
13...	1215	330	13.6	3.10	6.11	307	--	33	51	100	--	--
13...	1218	330	--	6.80	6.02	289	--	33	52	98	100	--
13...	1221	330	--	9.70	5.67	424	--	26	45	98	100	--
13...	1224	330	--	11.3	5.15	672	--	15	31	90	100	--
13...	1227	330	--	12.2	4.37	1820	--	6	11	54	88	100
13...	1230	330	--	12.8	3.81	7930	--	1	3	26	53	88
13...	1233	330	--	--	--	455	--	25	40	87	98	100
13...	1240	450	13.0	3.00	5.19	165	--	68	84	100	--	--
13...	1244	450	--	6.50	4.67	177	--	63	78	97	100	--
13...	1248	450	--	9.30	4.11	221	--	49	63	95	100	--
13...	1252	450	--	10.8	3.20	202	--	48	64	92	100	--
13...	1256	450	--	11.7	2.85	296	--	39	50	78	99	100
13...	1300	450	--	12.2	2.98	340	--	35	44	72	97	100
13...	1305	450	--	--	--	173	--	54	73	95	100	--

## MISSOURI RIVER MAIN STEM

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06807000 MISSOURI RIVER AT NEBRASKA CITY, NE--Continued

## WATER-QUALITY RECORDS

## PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	SAMPLE LOC- ATION, CROSS SECTION (FT FM L BANK) (000009)	DEPTH AT SAMPLE LOC- ATION, TOTAL (FEET) (81903)	SAM- PLING DEPTH (FEET) (00003)	STREAM VELOC- ITY, POINT (FPS) (81904)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	SED. SUSP. FALL DIAM. % FINER THAN .004 MM (70338)	SED. SUSP. FALL DIAM. % FINER THAN .062 MM (70342)	SED. SUSP. FALL DIAM. % FINER THAN .125 MM (70343)	SED. SUSP. FALL DIAM. % FINER THAN .250 MM (70344)	SED. SUSP. FALL DIAM. % FINER THAN .500 MM (70345)
APR											
WATER TEMPERATURE, 12.0° C (1030-1345 HOURS); DISCHARGE, 40,400 ft <sup>3</sup> /s.											
19...	1040	60.0	17.2	4.00	5.24	171	--	65	77	97	100
19...	1045	60.0	--	8.60	5.24	218	--	52	60	93	100
19...	1050	60.0	--	12.3	4.48	317	--	34	40	78	100
19...	1055	60.0	--	14.3	4.26	312	--	35	43	79	100
19...	1100	60.0	--	15.5	4.15	392	--	25	33	66	100
19...	1105	60.0	--	16.2	4.04	449	--	25	33	68	100
19...	1110	60.0	--	--	--	196	--	50	58	92	100
19...	1130	165	14.4	3.30	6.11	284	--	40	50	97	100
19...	1133	165	--	7.20	5.45	398	--	29	40	95	100
19...	1136	165	--	10.3	5.13	519	--	20	27	91	100
19...	1139	165	--	12.0	4.80	737	--	14	23	87	100
19...	1142	165	--	13.0	4.70	858	--	13	21	88	100
19...	1145	165	--	13.6	4.80	1000	--	10	17	85	100
19...	1147	165	--	--	--	456	--	25	34	95	100
19...	1200	255	13.2	3.10	5.67	--	--	--	--	--	--
19...	1203	255	--	6.60	5.35	--	--	--	--	--	--
19...	1206	255	--	9.40	5.02	--	--	--	--	--	--
19...	1209	255	--	11.0	4.80	--	--	--	--	--	--
19...	1212	255	--	11.9	4.70	--	--	--	--	--	--
19...	1215	255	--	12.4	4.37	--	--	--	--	--	--
19...	1218	255	--	--	4.37	516	--	19	30	91	100
19...	1225	255	--	--	--	651	4	11	--	--	--
19...	1235	375	13.4	3.10	5.13	283	--	40	51	97	100
19...	1238	375	--	6.70	4.70	334	--	33	48	94	100
19...	1241	375	--	9.60	4.37	396	--	29	40	87	100
19...	1244	375	--	11.2	4.15	401	--	28	41	88	100
19...	1247	375	--	12.1	3.83	615	--	19	30	85	100
19...	1250	375	--	12.6	3.28	607	--	17	29	87	100
19...	1253	375	--	--	--	340	--	31	42	86	100
19...	1310	510	17.2	4.00	4.48	150	--	73	87	100	--
19...	1315	510	--	8.60	4.04	151	--	74	87	96	100
19...	1320	510	--	12.3	3.28	150	--	75	92	100	--
19...	1325	510	--	14.3	3.28	138	--	73	86	95	100
19...	1330	510	--	15.5	2.85	155	--	70	84	95	100
19...	1335	510	--	16.2	2.74	158	--	69	81	95	100
19...	1340	510	--	--	--	138	--	75	92	96	100
MAY											
WATER TEMPERATURE, 22.0° C (1015-1330 HOURS); DISCHARGE, 41,500 ft <sup>3</sup> /s.											
31...	1025	60.0	17.4	4.00	5.24	260	--	82	88	98	100
31...	1029	60.0	--	8.70	5.13	235	--	80	88	98	100
31...	1035	60.0	--	12.4	4.70	300	--	65	71	94	100
31...	1040	60.0	--	14.5	4.04	319	--	55	59	92	100
31...	1045	60.0	--	15.7	4.04	416	--	47	50	82	100
31...	1050	60.0	--	16.4	2.63	423	--	44	50	81	100
31...	1055	60.0	--	--	--	196	--	82	90	100	--
31...	1100	170	18.0	4.20	5.45	273	--	67	75	100	--
31...	1103	170	--	9.00	5.24	429	--	43	51	98	100
31...	1106	170	--	12.9	4.37	742	--	40	46	98	100
31...	1110	170	--	15.0	3.50	926	--	21	26	92	100
31...	1115	170	--	16.7	2.20	2040	--	10	14	81	100
31...	1125	170	--	--	--	539	--	35	44	95	100
31...	1140	270	15.4	3.60	5.67	--	--	--	--	--	--
31...	1143	270	--	7.70	5.67	--	--	--	--	--	--
31...	1147	270	--	11.0	4.70	--	--	--	--	--	--
31...	1150	270	--	12.8	4.91	--	--	--	--	--	--
31...	1153	270	--	13.9	4.04	--	--	--	--	--	--
31...	1155	270	--	14.5	3.72	--	--	--	--	--	--
31...	1205	270	--	--	--	780	--	25	31	92	100
31...	1210	270	--	--	--	1160	6	14	--	--	--
31...	1215	375	14.6	2.90	4.91	212	--	72	86	99	100
31...	1220	375	14.6	3.40	4.80	305	--	68	75	99	100
31...	1225	375	--	7.30	4.59	330	--	65	72	98	100
31...	1230	375	--	10.4	3.94	439	--	46	53	85	100
31...	1238	375	--	12.2	3.39	482	--	35	41	74	591
31...	1240	375	--	13.1	3.61	591	--	35	41	74	100
31...	1245	375	--	13.7	3.28	547	--	36	41	75	100
31...	1250	375	--	--	--	313	--	61	66	89	100
31...	1305	500	16.2	3.70	4.37	207	--	91	97	100	--
31...	1308	500	--	8.10	4.37	209	--	90	97	100	--
31...	1310	500	--	11.6	3.61	228	--	84	93	100	--
31...	1312	500	--	13.5	3.28	245	--	82	90	98	100
31...	1317	500	--	14.6	2.85	252	--	83	91	98	100
31...	1320	500	--	15.2	2.63	264	--	77	84	94	100
31...	1325	500	--	--	--	212	--	90	95	99	100

## MISSOURI RIVER MAIN STEM

06807000 MISSOURI RIVER AT NEBRASKA CITY, NE--Continued

## WATER-QUALITY RECORDS

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

		SAMPLE LOC- ATION, CROSS SECTION (FT FM L BANK) (00009)	DEPTH AT SAMPLE LOC- ATION, TOTAL (FEET) (81903)	SAM- PLING DEPTH (FEET) (00003)	STREAM VELOC- ITY, POINT (FPS) (81904)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SED. SUSP. FALL DIAM. % FINER THAN .004 MM (70338)	SED. SUSP. FALL DIAM. % FINER THAN .062 MM (70342)	SED. SUSP. FALL DIAM. % FINER THAN .125 MM (70343)	SED. SUSP. FALL DIAM. % FINER THAN .250 MM (70344)	SED. SUSP. FALL DIAM. % FINER THAN .500 MM (70345)	
DATE	TIME											
JUL												
12...	1010	60.0	16.6	3.80	4.91	164	--	84	92	100	--	
12...	1015	60.0	--	8.30	4.37	164	--	81	88	99	100	
12...	1020	60.0	--	11.9	3.72	192	--	68	76	97	100	
12...	1025	60.0	--	13.8	3.61	282	--	49	57	87	100	
12...	1030	60.0	--	14.9	2.42	359	--	36	44	71	100	
12...	1040	60.0	--	15.6	1.11	864	--	17	21	56	100	
12...	1050	60.0	--	--	--	163	--	80	88	97	100	
12...	1105	190	15.6	3.60	4.91	258	--	56	69	99	100	
12...	1110	190	--	7.80	4.26	372	--	39	53	99	100	
12...	1115	190	--	11.1	4.48	310	--	47	61	100	--	
12...	1120	190	--	13.0	4.15	493	--	29	43	97	100	
12...	1123	190	--	14.0	4.15	614	--	27	32	99	100	
12...	1127	190	--	14.7	4.04	565	--	28	41	99	100	
12...	1130	190	--	--	--	331	--	43	56	98	100	
12...	1140	255	14.4	3.30	5.02	--	--	--	--	--	--	
12...	1143	255	--	7.20	4.59	--	--	--	--	--	--	
12...	1147	255	--	10.3	4.15	--	--	--	--	--	--	
12...	1150	255	--	12.0	3.28	--	--	--	--	--	--	
12...	1153	255	--	13.0	2.74	--	--	--	--	--	--	
12...	1157	255	--	13.6	2.31	--	--	--	--	--	--	
12...	1158	255	--	--	--	590	10	21	--	--	--	
12...	1200	255	--	--	--	433	--	38	52	97	100	
12...	1215	365	12.6	2.90	4.91	212	--	72	86	99	100	
12...	1218	365	--	6.30	4.37	218	--	70	83	98	100	
12...	1221	365	--	9.00	3.94	249	--	58	72	97	100	
12...	1224	365	--	10.5	3.72	284	--	54	64	95	100	
12...	1227	365	--	11.3	3.39	316	--	49	61	96	100	
12...	1235	365	--	--	--	275	--	57	66	89	100	
12...	1250	515	15.6	3.60	5.35	159	--	95	98	100	--	
12...	1253	515	--	7.80	3.72	166	--	93	99	100	--	
12...	1256	515	--	11.1	3.18	172	--	88	97	100	--	
12...	1300	515	--	13.0	3.18	165	--	91	99	100	--	
12...	1303	515	--	14.0	3.07	166	--	90	98	100	--	
12...	1306	515	--	14.7	2.74	177	--	88	96	99	100	
12...	1310	515	--	--	--	173	--	92	98	100	--	
DATE	TIME	SAMPLE LOC- ATION, CROSS SECTION (FT FM L BANK) (00009)	DEPTH AT SAMPLE LOC- ATION, TOTAL (FEET) (81903)	SAM- PLING DEPTH (FEET) (00003)	STREAM VELOC- ITY, POINT (FPS) (81904)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SED. SUSP. FALL DIAM. % FINER THAN .004 MM (70338)	SED. SUSP. FALL DIAM. % FINER THAN .062 MM (70342)	SED. SUSP. FALL DIAM. % FINER THAN .125 MM (70343)	SED. SUSP. FALL DIAM. % FINER THAN .250 MM (70344)	SED. SUSP. FALL DIAM. % FINER THAN .500 MM (70345)	SED. SUSP. FALL DIAM. % FINER THAN 1.00 MM (70346)
AUG												
23...	1110	70.0	16.8	3.90	4.70	137	--	85	97	100	--	--
23...	1112	70.0	--	8.40	4.48	162	--	80	89	100	--	--
23...	1115	70.0	--	12.0	4.04	169	--	78	89	100	--	--
23...	1118	70.0	--	14.0	3.18	179	--	65	76	96	100	--
23...	1120	70.0	--	15.1	3.18	217	--	58	69	94	100	--
23...	1125	70.0	--	15.8	2.85	246	--	51	62	88	100	--
23...	1130	70.0	--	--	--	185	--	62	74	88	98	100
23...	1145	150	14.2	3.30	5.56	278	--	49	64	100	--	--
23...	1147	150	--	7.10	5.35	253	--	49	61	99	100	--
23...	1150	150	--	10.1	5.35	255	--	48	64	100	--	--
23...	1153	150	--	11.8	5.24	488	--	29	43	97	100	--
23...	1155	150	--	12.8	5.24	499	--	28	42	98	100	--
23...	1200	150	--	13.4	4.80	472	--	26	41	98	100	--
23...	1205	150	--	--	--	242	--	46	64	99	100	--
23...	1220	240	13.8	3.20	5.45	--	--	--	--	--	--	--
23...	1223	240	--	6.90	4.80	--	--	--	--	--	--	--
23...	1225	240	--	9.90	4.80	--	--	--	--	--	--	--
23...	1227	240	--	11.5	4.48	--	--	--	--	--	--	--
23...	1230	240	--	12.4	4.15	--	--	--	--	--	--	--
23...	1233	240	--	13.0	4.26	--	--	--	--	--	--	--
23...	1235	240	--	--	--	419	--	31	48	98	100	--
23...	1238	240	--	--	--	483	9	20	--	--	--	--
23...	1255	330	13.6	3.10	4.91	191	--	64	80	99	100	--
23...	1258	330	--	6.80	4.48	232	--	55	68	99	100	--
23...	1300	330	--	9.70	4.26	318	--	41	58	98	100	--
23...	1305	330	--	11.3	4.26	317	--	45	58	98	100	--
23...	1310	330	--	12.2	4.37	392	--	33	48	96	100	--
23...	1315	330	--	12.8	3.61	359	--	36	51	97	100	--
23...	1318	330	--	--	--	248	--	50	66	98	100	--
23...	1335	485	14.6	3.40	4.26	122	--	90	98	100	--	--
23...	1340	485	--	7.30	4.15	147	--	81	94	100	--	--
23...	1343	485	--	10.4	3.28	142	--	83	94	99	100	--
23...	1345	485	--	12.2	3.07	159	--	81	92	98	100	--
23...	1348	485	--	13.1	2.53	176	--	73	85	96	100	--
23...	1350	485	--	13.7	2.42	180	--	64	76	93	100	--
23...	1355	485	--	--	--	146	--	81	93	99	100	--



06807000 MISSOURI RIVER AT NEBRASKA CITY, NE--Continued

## WATER-QUALITY RECORDS

PARTICLE-SIZE DISTRIBUTION OF SURFACE BED MATERIAL, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	NUMBER OF SAM- PLING POINTS (COUNT)	BED MAT. SIEVE DIAM.	BED MAT. SIEVE DIAM.	BED MAT. SIEVE DIAM.	BED MAT. SIEVE DIAM.	BED MAT. SIEVE DIAM.	BED MAT. SIEVE DIAM.	BED MAT. SIEVE DIAM.	BED MAT. SIEVE DIAM.	BED MAT. SIEVE DIAM.	
			% FINER THAN (00063) (80164)	% FINER THAN (80165) (80166)	% FINER THAN (80167) (80168)	% FINER THAN (80169) (80170)	% FINER THAN (80171) (80172)	% FINER THAN (80173)				
OCT 13...	1048	5	--	0	9	43	72	91	97	99	100	--
APR 19...	1120	5	--	0	17	68	78	89	99	100	--	--
MAY 31...	1400	5	--	0	17	57	76	89	96	98	99	100
JUL 12...	1053	5	--	0	18	51	73	88	96	99	100	--
AUG 23...	1405	5	0	1	18	64	88	96	99	100	--	--

## NISHNABOTNA RIVER BASIN

06807410 WEST NISHNABOTNA RIVER AT HANCOCK, IA

LOCATION.--Lat 41°23'24", long 95°22'17", in NW1/4 NE1/4 sec.18, T.76 N., R.39 W., Pottawattamie County, Hydrologic Unit 10240002, on right bank at upstream side of bridge on county highway G30, 0.6 mi west of Hancock school, 3.0 mi downstream from Jim Creek, 59.6 mi upstream from confluence with East Nishnabotna River, and at mile 75.1 mi upstream from mouth of Nishnabotna River.

DRAINAGE AREA.--609 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1959 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,085.83 ft above NGVD. Prior to Sept. 15, 1980, on downstream end of right pier at same datum.

REMARKS.--Estimated daily discharges: Dec. 16 to Feb. 19 and Mar. 14. Records good except those for estimated daily discharges, which are poor. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--29 years, 299 ft<sup>3</sup>/s, 6.67 in/yr, 216,600 acre-ft/yr; median of yearly mean discharges, 240 ft<sup>3</sup>/s, 5.4 in/yr, 174,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 26,400 ft<sup>3</sup>/s Sept. 13, 1972, gage height, 22.12 ft; minimum daily discharge, 2.2 ft<sup>3</sup>/s Feb. 8, 9, 1971.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan. 30	1500	ice jam	*10.63	June 8	2100	*2,730	7.45

Minimum discharge, 37 ft<sup>3</sup>/s Aug. 19.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	380	269	240	150	221	257	147	135	139	108	72	49
2	363	267	232	157	115	252	168	131	188	98	69	46
3	348	267	232	191	135	220	182	133	168	93	61	49
4	350	263	229	163	218	210	172	135	159	90	57	47
5	349	253	226	143	190	212	166	134	145	86	56	46
6	336	248	233	114	164	204	169	130	137	83	57	46
7	328	255	235	127	174	208	167	135	128	77	56	43
8	326	256	246	119	189	211	160	146	1120	75	53	43
9	321	245	298	104	201	198	162	184	920	87	54	42
10	316	238	319	109	173	192	167	138	334	180	50	42
11	312	241	295	116	150	193	163	132	247	111	49	41
12	314	245	282	135	145	189	157	132	204	86	48	40
13	316	242	268	121	155	162	154	127	175	82	48	41
14	312	240	261	129	166	140	151	121	157	75	46	42
15	318	244	246	144	162	173	148	118	144	74	45	53
16	351	257	196	173	171	198	148	114	136	199	43	81
17	338	254	155	201	186	182	146	113	131	364	43	65
18	314	246	180	217	253	173	141	116	128	165	40	52
19	312	237	195	246	857	170	139	117	123	222	38	46
20	300	233	225	275	545	168	141	119	115	134	39	45
21	290	233	208	362	390	163	140	122	110	118	39	46
22	288	239	195	307	360	160	142	146	103	111	47	48
23	286	236	208	236	319	161	149	144	98	101	574	44
24	281	230	217	194	277	161	149	129	96	93	167	42
25	278	230	195	160	270	165	147	119	93	87	91	41
26	284	229	170	148	308	158	148	114	89	84	73	42
27	278	231	150	153	362	150	159	118	87	81	67	42
28	268	257	165	171	306	152	155	123	89	78	63	69
29	268	272	180	178	272	164	145	119	99	76	58	253
30	267	256	190	194	---	148	141	112	100	75	55	388
31	266	---	180	275	---	145	---	113	---	73	52	---
TOTAL	9658	7413	6851	5512	7434	5639	4623	3969	5962	3466	2310	1974
MEAN	312	247	221	178	256	182	154	128	199	112	74.5	65.8
MAX	380	272	319	362	857	257	182	184	1120	364	574	388
MIN	266	229	150	104	115	140	139	112	87	73	38	40
AC-FT	19160	14700	13590	10930	14750	11180	9170	7870	11830	6870	4580	3920
CFSM	.51	.41	.36	.29	.42	.30	.25	.21	.33	.18	.12	.11
IN.	.59	.45	.42	.34	.45	.34	.28	.24	.36	.21	.14	.12

CAL YR 1987	TOTAL	145143	MEAN	398	MAX	3330	MIN	150	AC-FT	287900	CFSM	.65	IN.	8.87
WTR YR 1988	TOTAL	64811	MEAN	177	MAX	1120	MIN	38	AC-FT	128600	CFSM	.29	IN.	3.96

## NISHNABOTNA RIVER BASIN

201

06808500 WEST NISHNABOTNA RIVER AT RANDOLPH, IA

LOCATION.--Lat 40°52'23", long 95°34'48", in NE1/4 NE1/4 sec.17, T.70 N., R.41 W., Fremont County, Hydrologic Unit 10240002, on right bank at upstream side of bridge on State Highway 184, 0.3 mi downstream from Deer Creek, 0.5 mi west of Randolph, and 16.0 mi upstream from confluence with East Nishnabotna River, and at mile 31.5 upstream from mouth of Nishnabotna River.

DRAINAGE AREA.--1,326 mi<sup>2</sup>.

PERIOD OF RECORD.--June 1948 to current year.

REVISED RECORDS.--WSP 1440: Drainage area. WDR IA-74-1: 1973 (M). WDR IA-76-1: 1975 (P).

GAGE.--Water-stage recorder. Datum of gage is 932.99 ft above NGVD, unadjusted. Prior to Aug. 26, 1955, non-recording gage with supplementary water-stage recorder operating above 8.4 ft June 30, 1949 to Aug. 25, 1955 at same site and datum.

REMARKS.--Estimated daily discharges: Jan. 1 to Feb. 18, Feb. 21, 22, Mar. 13-15, and May 16-18. Records good except those for estimated daily discharges, which are poor. U.S. National Weather Service gage-height telemeter at station.

AVERAGE DISCHARGE.--40 years, 595 ft<sup>3</sup>/s, 6.09 in/yr, 431,100 acre-ft/yr; median of yearly mean discharges, 520 ft<sup>3</sup>/s, 5.3 in/yr, 377,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 40,800 ft<sup>3</sup>/s May 26, 1987, gage height, 24.50 ft, from rating curve extended above 35,800 ft<sup>3</sup>/s; maximum gage height, 24.8 ft Mar. 5, 1949, from graph based on gage readings, backwater from ice; minimum daily discharge, 10 ft<sup>3</sup>/s Dec. 17-21, 1955.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1947 reached a stage of about 24 ft, discharge not determined, from information by local residents.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 6,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan. 31	0900	ice jam	*15.91	June 9	1530	*2,080	10.59

Minimum discharge, 74 ft<sup>3</sup>/s Sept. 26-28.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	954	704	599	370	609	492	322	283	265	225	161	92
2	909	677	566	410	402	477	392	272	306	226	145	87
3	881	666	562	440	440	465	412	285	293	203	138	88
4	871	656	572	480	620	428	407	291	268	185	137	89
5	862	637	560	410	530	417	390	285	236	174	132	90
6	833	623	567	370	480	422	380	279	218	162	132	86
7	806	629	607	410	500	426	366	287	211	153	128	86
8	800	630	632	370	550	431	355	342	202	148	123	83
9	786	605	662	330	600	429	352	301	1190	232	122	81
10	770	588	711	350	510	411	370	337	832	337	118	79
11	766	589	735	420	460	404	354	292	445	298	115	78
12	771	600	687	370	410	404	344	282	348	224	109	77
13	782	610	645	380	440	360	335	276	302	177	113	76
14	775	600	609	400	470	310	321	270	271	160	123	77
15	780	598	586	440	450	330	314	264	255	151	110	94
16	829	627	540	500	515	391	310	235	244	749	98	149
17	809	640	551	570	665	422	307	230	234	481	92	165
18	775	620	563	650	930	402	297	235	226	714	88	131
19	736	593	569	782	1350	389	290	236	220	330	98	108
20	718	576	610	887	1460	384	287	240	216	359	97	98
21	701	572	571	877	800	382	285	255	203	270	89	92
22	695	575	565	595	720	373	283	304	189	232	95	93
23	688	580	593	573	641	369	286	437	184	216	123	90
24	688	570	611	559	520	373	295	342	173	207	462	86
25	685	570	578	509	481	375	304	284	166	203	293	83
26	712	564	549	487	519	362	349	257	158	193	167	77
27	700	572	581	510	559	349	329	281	155	189	128	75
28	684	628	599	514	623	337	314	277	152	178	115	93
29	678	669	592	544	541	341	309	253	445	168	110	141
30	667	644	564	630	---	340	291	247	348	166	104	209
31	678	---	556	740	---	325	---	239	---	165	98	---
TOTAL	23789	18412	18492	15877	17795	12120	9950	8698	8955	7875	4163	2953
MEAN	767	614	597	512	614	391	332	281	298	254	134	98.4
MAX	954	704	735	887	1460	492	412	437	1190	749	462	209
MIN	667	564	540	330	402	310	283	230	152	148	88	75
AC-FT	47190	36520	36680	31490	35300	24040	19740	17250	17760	15620	8260	5860
CFSM	.58	.46	.45	.39	.46	.29	.25	.21	.23	.19	.10	.07
IN.	.67	.52	.52	.45	.50	.34	.28	.24	.25	.22	.12	.08

CAL YR 1987	TOTAL 423735	MEAN 1161	MAX 22500	MIN 380	AC-FT 840500	CFSM .88	IN. 11.89
WTR YR 1988	TOTAL 149079	MEAN 407	MAX 1460	MIN 75	AC-FT 295700	CFSM .31	IN. 4.18

## NISHNABOTNA RIVER BASIN

06809210 EAST NISHNABOTNA RIVER NEAR ATLANTIC, IA

LOCATION.--Lat 41°20'46", long 95°04'36", in NW1/4 NW1/4 sec.35, T.76 N., R.37 W., Cass County, Hydrologic Unit 10240003, on left bank at downstream side of bridge on county highway, 1.6 mi upstream from Turkey Creek, 5.2 mi southwest of junction of U.S. Highway 6 and State Highway 83 in Atlantic, 69.1 mi upstream from confluence with West Nishnabotna River, and at mile 84.6 upstream from mouth of Nishnabotna River.

DRAINAGE AREA.--436 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1960 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,105.83 ft above NGVD. Prior to Oct. 1, 1970, at site 2.2 mi upstream at datum 5.00 ft higher.

REMARKS.--Estimated daily discharges: Dec. 15-19, Dec. 26 to Feb. 27, and Mar. 12-14. Records good except those for estimated daily discharges, which are poor. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--28 years, 226 ft<sup>3</sup>/s, 7.04 in/yr, 163,700 acre-ft/yr; median of yearly mean discharges, 220 ft<sup>3</sup>/s, 6.9 in/yr, 159,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 26,700 ft<sup>3</sup>/s Sept. 12, 1972, gage height, 22.81 ft; minimum daily discharge, 2.5 ft<sup>3</sup>/s July 10, 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of July 2, 1958 reached a stage of 22.49 ft, from floodmark, discharge, 34,200 ft<sup>3</sup>/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan. 30	0415	ice jam	*9.73	June 8	1515	*2,040	6.94

Minimum discharge, 15 ft<sup>3</sup>/s Sept. 13, 14.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	212	166	157	71	139	177	78	69	43	47	23	18
2	199	160	151	90	65	176	100	67	41	41	23	17
3	190	153	140	121	81	148	111	67	40	37	22	18
4	193	142	135	101	151	146	105	69	39	33	24	23
5	193	128	138	91	129	143	99	66	38	29	25	21
6	184	124	136	72	108	141	104	63	37	28	24	22
7	178	135	133	82	113	148	98	76	36	27	24	22
8	183	137	132	77	124	152	92	76	752	26	25	24
9	180	130	150	67	136	143	84	68	417	55	30	25
10	176	129	185	70	114	138	92	60	177	112	27	25
11	175	130	175	75	98	137	90	54	137	74	26	21
12	180	132	167	87	93	136	84	50	107	44	23	21
13	180	127	153	78	99	111	82	47	95	36	24	17
14	174	125	146	83	110	90	82	47	76	33	22	17
15	171	127	139	93	104	96	79	42	72	39	21	45
16	193	136	116	109	110	116	76	40	70	59	20	88
17	177	138	83	129	121	117	77	40	70	50	20	77
18	164	135	112	145	155	104	73	42	70	143	19	46
19	156	127	167	172	574	106	71	41	65	124	22	35
20	159	124	160	200	357	102	73	39	57	62	21	29
21	159	124	146	289	235	97	72	44	53	46	21	36
22	164	130	147	228	222	95	74	59	47	39	100	42
23	162	124	141	158	203	95	81	63	42	37	156	32
24	161	119	151	126	178	98	80	51	37	31	118	29
25	158	119	130	105	170	107	76	43	35	28	50	25
26	172	118	106	95	154	96	78	40	32	30	40	27
27	168	122	129	101	183	89	92	43	33	30	39	27
28	161	159	129	111	180	83	85	47	32	29	36	73
29	163	188	139	117	174	81	74	47	40	28	33	87
30	158	172	150	122	---	83	69	43	41	25	28	104
31	161	---	105	177	---	79	---	42	---	25	24	---
TOTAL	5404	4080	4348	3642	4680	3630	2531	1645	2831	1447	1110	1093
MEAN	174	136	140	117	161	117	84.4	53.1	94.4	46.7	35.8	36.4
MAX	212	188	185	289	574	177	111	76	752	143	156	104
MIN	156	118	83	67	65	79	69	39	32	25	19	17
AC-FT	10720	8090	8620	7220	9280	7200	5020	3260	5620	2870	2200	2170
CFSM	.40	.31	.32	.27	.37	.27	.19	.12	.22	.11	.08	.08
IN.	.46	.35	.37	.31	.40	.31	.22	.14	.24	.12	.09	.09

CAL YR 1987 TOTAL 96135 MEAN 263 MAX 2990 MIN 83 AC-FT 190700 CFSM .60 IN. 8.20  
WTR YR 1988 TOTAL 36441 MEAN 99.6 MAX 752 MIN 17 AC-FT 72280 CFSM .23 IN. 3.11

## NISHNABOTNA RIVER BASIN

203

06809500 EAST NISHNABOTNA RIVER AT RED OAK, IA

LOCATION.--Lat 41°00'31", long 95°14'29", in NW1/4 SE1/4 sec.29, T.72 N., R.38 W., Montgomery County, Hydrologic Unit 10240003, on left bank on downstream side of Coolbaugh Street bridge in Red Oak, and 0.2 mi upstream from Red Oak Creek, 38.0 mi upstream from confluence with West Nishnabotna River, and at mile 53.6 upstream from mouth of Nishnabotna River. Gage shelter relocated July 28, 1988 to upstream side of Coolbaugh Street and 200 ft left of left end of Coolbaugh Street bridge in Red Oak.

DRAINAGE AREA.--894 mi<sup>2</sup>.

PERIOD OF RECORD.--May 1918 to July 1925, May 1936 to current year. Monthly discharge only for some periods, published in WSP 1310.

REVISED RECORDS.--WSP 1240: 1921, 1922-23 (M), 1924, 1942 (M), 1944 (M), 1946. WSP 1440: Drainage area. WSP 1710: 1957.

GAGE.--Water-stage recorder. Datum of gage is 1,005.45 ft above NGVD. Prior to July 5, 1925, nonrecording gage at present site at datum 4.60 ft higher. May 29, 1936, to Nov. 13, 1952, nonrecording gage with supplementary water-stage recorder in operation above 3.2 ft gage height July 30, 1939, to Nov. 13, 1952, and Nov. 14, 1952, to June 13, 1966, water-stage recorder, all at site 0.5 mi upstream at datum 5.00 ft higher. June 14, 1966, to Sept. 30, 1969, at present site at datum 5.00 ft higher.

REMARKS.--Estimated daily discharges: Dec. 16-18 and Dec. 28 to Feb. 19. Records good except those for estimated daily discharges, which are poor. U.S. National Weather Service gage-height telemeter at station.

AVERAGE DISCHARGE.--58 years (water years 1919-24, 1937-88), 397 ft<sup>3</sup>/s, 6.03 in/yr, 287,600 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 38,000 ft<sup>3</sup>/s Sept. 13, 1972, gage height, 27.43 ft; maximum gage height, 28.23 ft June 13, 1947, present datum; minimum daily discharge, 6 ft<sup>3</sup>/s Aug. 18, 1936.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan. 30	1920	ice jam	*13.90	June 9	0715	*1,170	7.84

Minimum discharge, 42 ft<sup>3</sup>/s Aug. 18, 19 and Sept. 13.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	492	343	325	160	280	284	152	143	107	99	64	47
2	475	340	298	200	140	272	167	139	110	97	62	47
3	449	326	293	260	170	258	197	139	105	91	59	48
4	441	314	294	220	300	220	201	142	102	83	57	47
5	442	296	286	200	260	221	189	141	99	81	58	47
6	427	285	291	160	220	220	184	138	95	76	57	46
7	412	301	307	180	230	216	186	140	92	70	55	45
8	406	309	311	170	250	233	176	149	92	67	54	45
9	407	291	335	150	270	233	175	152	775	87	56	45
10	396	282	377	155	230	210	177	139	287	171	56	44
11	388	280	370	165	200	203	183	131	184	130	53	43
12	388	287	358	190	190	203	174	128	148	111	50	43
13	393	293	341	170	200	188	168	122	131	87	53	43
14	388	296	326	180	220	153	164	116	120	82	54	44
15	384	294	308	200	210	190	158	112	114	83	49	56
16	410	315	260	230	220	184	156	110	107	278	46	107
17	417	323	190	270	240	190	156	107	103	144	44	97
18	387	310	250	300	300	189	155	106	101	110	42	88
19	368	298	362	350	1000	172	149	106	97	203	47	68
20	357	283	366	400	644	179	147	106	92	154	47	58
21	350	277	321	560	438	172	147	108	87	102	45	59
22	353	281	322	450	416	164	146	120	84	89	48	63
23	356	283	333	320	381	162	148	157	82	83	93	61
24	354	266	336	260	338	167	152	142	79	82	136	57
25	342	261	316	220	323	174	153	122	76	77	105	53
26	348	256	234	200	295	182	166	107	74	73	65	49
27	350	256	281	210	345	161	161	109	73	73	57	49
28	336	290	280	230	339	153	170	108	75	72	54	59
29	332	360	300	240	304	155	158	116	111	69	52	95
30	332	352	320	565	---	155	148	111	102	70	51	100
31	332	---	230	800	---	153	---	105	---	66	48	---
TOTAL	12012	8948	9521	8365	8953	6016	4963	3871	3904	3160	1817	1753
MEAN	387	298	307	270	309	194	165	125	130	102	58.6	58.4
MAX	492	360	377	800	1000	284	201	157	775	278	136	107
MIN	332	256	190	150	140	153	146	105	73	66	42	43
AC-FT	23830	17750	18880	16590	17760	11930	9840	7680	7740	6270	3600	3480
CFSM	.43	.33	.34	.30	.35	.22	.19	.14	.15	.11	.07	.07
IN.	.50	.37	.40	.35	.37	.25	.21	.16	.16	.13	.08	.07

CAL YR 1987	TOTAL	218566	MEAN	599	MAX	5270	MIN	190	AC-FT	433500	CFSM	.67	IN.	9.09
WTR YR 1988	TOTAL	73283	MEAN	200	MAX	1000	MIN	42	AC-FT	145400	CFSM	.22	IN.	3.05

## NISHNABOTNA RIVER BASIN

06810000 NISHNABOTNA RIVER ABOVE HAMBURG, IA  
(National stream-quality accounting network station)

LOCATION.--Lat 40°37'57", long 95°37'32", in SW1/4 SE1/4 sec.11, T.67 N., R.42 W., Fremont County, Hydrologic Unit 10240004, on left bank 1.7 mi downstream from confluence of East Nishnabotna and West Nishnabotna Rivers, 2 mi northeast of Hamburg, and at mile 13.8.

DRAINAGE AREA.--2,806 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March 1922 to September 1923, October 1928 to current year. Monthly discharge only for some periods published in WSP 1310.

REVISED RECORDS.--WSP 1240: 1923, 1929-37, 1938-40 (M), 1943 (M). WSP 1440: Drainage area. WDR IA-74-1: 1973.

GAGE.--Water-stage recorder. Datum of gage is 894.17 ft above NGVD. See WSP 1730 for history of changes prior to Nov. 16, 1950.

REMARKS.--Estimated daily discharges: Jan. 1 to Feb. 24 and Feb. 29 to Mar. 2. Records good except those for estimated daily discharges, which are poor. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--61 years (water years 1923, 1929-88), 1,124 ft<sup>3</sup>/s, 5.44 in/yr, 814,300 acre-ft/yr; median of yearly mean discharges, 950 ft<sup>3</sup>/s, 4.6 in/yr, 688,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 55,500 ft<sup>3</sup>/s June 24, 1947, gage height, 26.03 ft, from flood-mark, present site and datum; maximum gage height, 28.14 ft May 27, 1987; minimum daily discharge, 4.5 ft<sup>3</sup>/s Aug. 30, 1934.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 9,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan. 31	2300	*4,580	(a) *17.93				

(a) Ice jam

Minimum discharge, 104 ft<sup>3</sup>/s Sept. 14.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1920	1430	1380	800	2120	1140	665	533	396	514	241	145
2	1840	1380	1300	840	630	1040	811	512	442	426	228	146
3	1760	1350	1260	920	1000	998	826	530	420	381	216	146
4	1720	1310	1260	1000	1250	937	814	543	415	350	205	141
5	1720	1260	1240	850	1100	888	797	517	370	326	205	141
6	1670	1230	1240	780	1000	885	782	502	348	308	209	137
7	1620	1250	1300	850	1050	879	751	504	331	294	206	133
8	1580	1270	1320	760	1150	886	723	538	322	281	215	129
9	1560	1230	1360	700	1250	894	713	549	630	305	228	123
10	1530	1190	1390	740	1100	886	763	527	1770	659	219	120
11	1510	1160	1460	880	970	847	733	502	858	573	217	115
12	1490	1170	1420	780	900	830	719	458	618	449	202	113
13	1510	1190	1360	820	950	791	686	444	523	379	200	111
14	1510	1190	1320	860	1000	716	656	431	470	327	211	106
15	1510	1190	1290	980	940	692	640	412	438	301	214	119
16	1590	1210	1220	1050	1100	740	622	393	416	620	188	230
17	1580	1240	1200	1200	1200	804	614	388	398	994	164	281
18	1560	1230	1190	1400	1350	814	603	378	384	988	160	244
19	1460	1200	1270	1600	1500	782	596	376	370	598	167	228
20	1430	1170	1390	1800	2650	758	588	378	359	688	170	190
21	1390	1150	1320	1500	2000	749	583	401	352	571	169	169
22	1380	1140	1250	1200	1500	738	590	490	340	442	174	181
23	1380	1130	1230	1150	1350	714	592	649	323	365	191	170
24	1360	1130	1260	1100	1200	728	605	673	308	329	297	146
25	1330	1170	1230	930	1120	737	606	514	296	317	502	138
26	1360	1120	1140	750	1080	721	743	442	285	295	315	134
27	1360	1120	1140	960	1160	722	707	416	278	295	228	127
28	1330	1270	1210	1050	1250	689	639	450	274	279	182	211
29	1300	1390	1260	1200	1200	680	613	407	408	291	164	258
30	1300	1420	1200	1300	---	683	575	396	651	263	159	267
31	1340	---	1180	2460	---	665	---	380	---	260	152	---
TOTAL	46900	36890	39590	33210	36070	25033	20355	14633	13793	13468	6598	4899
MEAN	1513	1230	1277	1071	1244	808	678	472	460	434	213	163
MAX	1920	1430	1460	2460	2650	1140	826	673	1770	994	502	281
MIN	1300	1120	1140	700	630	665	575	376	274	260	152	106
AC-FT	93030	73170	78530	65870	71540	49650	40370	29020	27360	26710	13090	9720
CFSM	.54	.44	.46	.38	.44	.29	.24	.17	.16	.15	.08	.06
IN.	.62	.49	.52	.44	.48	.33	.27	.19	.18	.18	.09	.06
CAL YR 1987	TOTAL 948160	MEAN 2598	MAX 28700	MIN 1000	AC-FT 1881000	CFSM .93	IN. 12.57					
WTR YR 1988	TOTAL 291439	MEAN 796	MAX 2650	MIN 106	AC-FT 578100	CFSM .28	IN. 3.86					

## NISHNABOTNA RIVER BASIN

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06810000 NISHNABOTNA RIVER ABOVE HAMBURG, IA--Continued  
(National stream-quality accounting network station)

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--April 1979 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: April 1979 to September 1981.

WATER TEMPERATURES: April 1979 to September 1981.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum daily, 815 microsiemens Sept. 16,18, 19, 28,30, 1979; minimum daily, 155 microsiemens, July 20, 1981.

WATER TEMPERATURES: Maximum daily, 32.0°C July 14, 1980; minimum daily 0.0°C, on many days during winter period.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	TEMPER- ATURE AIR (DEG C) (00020)	TUR- BID- ITY (FTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)
OCT 27...	1045	1400	615	7.49	9.5	12.5	25	10.3	109	743	340
DEC 14...	1130	1320	565	7.82	1.5	0.0	23	13.2	97	740	1300
MAR 24...	1130	728	558	7.60	13.5	18.0	45	9.6	97	724	2200
MAY 02...	1130	516	550	7.49	17.5	20.0	9.7	10.5	115	732	140
JUL 07...	1300	307	435	8.48	27.5	26.5	7.8	12.1	158	740	560
AUG 30...	1430	158	495	9.00	21.5	26.5	4.0	11.4	134	737	240

DATE	STREP- TOCOC- FECAL, KF AGAR (COLS. PER 100 ML) (31673)	HARD- NESS NONCARB WH WAT TOT FLD MG/L AS CACO3 (00902)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	SODIUM AD- SORP- TION RATIO (00932)	SODIUM AD- SORP- TION RATIO (00931)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	CAR- BONATE WATER DIS IT FIELD MG/L AS CO3 (00452)
OCT 27...	1200	54	300	81	24	11	7	0.3	2.2	250	0
DEC 14...	8000	46	290	77	23	11	8	0.3	2.3	247	0
MAR 24...	1400	53	300	79	24	12	8	0.3	2.8	238	0
MAY 02...	93	43	280	74	24	13	9	0.3	2.8	241	0
JUL 07...	260	34	200	43	22	13	12	0.4	2.9	171	24
AUG 30...	150	61	250	62	22	14	11	0.4	7.3	208	22

DATE	BICAR- BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	NITRO- GEN, ORGANIC TOTAL (MG/L AS N) (00605)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)
OCT 27...	305	34	11	0.30	19	361	356	0.49	1360	--	5.50
DEC 14...	301	33	14	0.40	18	342	349	0.47	1220	0.62	5.80
MAR 24...	290	40	12	0.30	17	343	354	0.47	672	0.27	4.50
MAY 02...	300	45	14	0.40	12	336	344	0.46	468	--	3.10
JUL 07...	160	41	13	0.30	8.6	230	242	0.31	191	1.9	<0.100
AUG 30...	210	48	15	0.30	8.2	274	289	0.37	117	0.39	0.210

06810000 NISHNABOTNA RIVER ABOVE HAMBURG, IA--Continued

## WATER-QUALITY RECORDS

WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO- GEN, AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHOROUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	PHOS- PHOROUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHOROUS TOTAL (MG/L AS P) (00665)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT 27...	<0.010	0.020	0.040	--	0.110	0.140	0.200	--	--	--
DEC 14...	<0.010	0.070	0.080	0.70	0.060	0.110	0.130	136	485	66
MAR 24...	0.020	0.030	0.030	0.30	0.100	0.140	0.210	206	404	98
MAY 02...	0.020	<0.010	<0.010	0.40	0.060	0.100	0.130	132	184	97
JUL 07...	0.020	<0.010	0.020	1.9	<0.010	0.030	0.260	--	--	--
AUG 30...	0.010	<0.010	0.010	0.40	0.070	0.080	0.120	58	25	100

DATE	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)
OCT 27...	2	<10	160	<0.5	<1	<1	<3	2	11	<5
DEC 14...	--	--	--	--	--	--	--	--	--	--
MAR 24...	2	<10	150	<0.5	<1	<1	<3	2	4	<5
MAY 02...	3	20	130	<0.5	<1	<1	<3	2	<3	<5
JUL 07...	--	--	--	--	--	--	--	--	--	--
AUG 30...	3	<10	170	<0.5	2	<1	<3	<1	4	<5

DATE	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	NICKEL, DIS- SOLVED (UG/L AS NI) (01065)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	SILVER, DIS- SOLVED (UG/L AS AG) (01075)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)
OCT 27...	16	31	<0.1	<10	<1	3	1.0	270	<6	28
DEC 14...	--	--	--	--	--	--	--	--	--	--
MAR 24...	16	38	<0.1	<10	1	4	<1.0	270	<6	7
MAY 02...	17	23	<0.1	<10	5	3	<1.0	270	<6	4
JUL 07...	--	--	--	--	--	--	--	--	--	--
AUG 30...	12	23	<0.1	<10	<1	2	1.0	250	<6	<3

[illegible]



## TARKIO RIVER BASIN

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06811840 TARKIO RIVER AT STANTON, IA

LOCATION.--Lat 40°58'52", long 95°06'32", in NW1/4 SW1/4 sec.4, T.71 N., R.37 W., Montgomery County, Hydrologic Unit 10240005, on right bank 10 ft downstream from bridge on county highway H42, 0.1 mi downstream from Little Tarkio Creek, and 0.5 mi west of Stanton.

DRAINAGE AREA.--49.3 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1957 to current year. Annual maximum, water years 1952-57.

REVISED RECORDS.--WSP 1919: 1960 (M).

GAGE.--Water-stage recorder and concrete control. Datum of gage is 1,104.67 ft above NGVD.

REMARKS.--Estimated daily discharges: Dec. 16-17, Dec. 25 to Jan. 14, Jan. 26, 27, Feb. 2-13, June 21-28, July 2-5, 12-15, July 21 to Aug. 3, Aug. 6-8, 11, 13-15, 17-28, Aug. 30 to Sept. 15, Sept. 17-19, 21-25, 27, 28, and Sept. 30. Records good except those for estimated daily discharges, which are poor.

AVERAGE DISCHARGE.--31 years, 29.3 ft<sup>3</sup>/s, 8.07 in/yr, 21,230 acre-ft/yr; median of yearly mean discharges, 25 ft<sup>3</sup>/s, 6.9 in/yr, 18,100 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 22,500 ft<sup>3</sup>/s June 9, 1967, gage height, 28.56 ft, from rating curve extended above 1,600 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow; no flow at times most years.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Dec. 8	2200	----	*9.93	Feb. 16	1715	*83	9.91

No flow Aug. 30 to Sept. 2, Sept. 6-14, and 23-27.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	34	30	17	13	7.5	11	8.3	6.4	5.6	1.1	.29	.00
2	29	27	16	15	6.0	11	14	6.2	5.9	.35	.26	.00
3	30	25	18	17	5.7	10	12	6.3	5.8	.23	.24	.08
4	30	22	19	12	5.5	10	10	6.8	5.8	.18	.25	.03
5	27	20	18	11	5.4	11	9.4	6.2	5.4	.15	.08	.01
6	26	19	32	10	5.3	11	12	5.6	4.9	.13	.03	.00
7	25	22	41	12	5.6	11	9.2	5.6	4.7	.12	.01	.00
8	25	21	46	10	6.4	12	7.9	6.3	4.4	.11	.10	.00
9	23	18	51	9.0	6.0	11	7.8	6.0	3.9	.20	.07	.00
10	23	18	39	10	5.4	11	11	4.9	3.5	2.7	.06	.00
11	22	18	36	11	5.0	12	9.0	3.9	3.2	1.4	.05	.00
12	23	17	30	12	4.5	11	8.1	3.7	2.9	.30	.05	.00
13	23	16	28	9.0	8.0	7.6	7.7	3.9	2.8	.20	.07	.00
14	23	14	27	10	9.9	8.6	7.2	3.9	2.4	.15	.05	.00
15	25	14	26	13	8.9	9.6	6.9	3.5	2.2	1.0	.03	5.0
16	26	14	21	15	36	9.1	6.8	3.2	1.9	12	.02	1.1
17	21	16	20	15	52	9.2	6.8	3.1	2.1	4.7	.01	.30
18	20	14	22	15	35	8.3	6.8	3.0	2.3	5.9	.01	.10
19	20	13	27	27	25	8.6	6.7	2.9	2.4	3.5	.05	.03
20	20	12	31	22	15	8.7	6.6	2.9	2.2	2.7	.04	.01
21	21	13	26	13	16	8.3	6.3	4.0	1.6	1.4	.03	.04
22	21	13	25	14	18	8.3	6.5	5.5	1.3	1.0	.20	.01
23	23	12	25	14	11	8.4	6.7	11	1.1	.86	.15	.00
24	23	11	27	11	9.9	10	6.6	7.2	.90	.76	.10	.00
25	20	12	20	9.4	11	11	6.6	6.5	.80	.68	.06	.00
26	21	12	18	8.0	13	8.7	10	6.2	.70	.60	.04	.00
27	21	13	23	9.0	12	7.7	7.9	7.1	.67	.53	.03	.00
28	22	18	21	12	11	8.7	6.8	6.5	.64	.47	.02	4.0
29	23	20	19	15	11	9.5	6.6	6.2	8.9	.42	.01	2.0
30	23	18	21	23	---	8.1	6.6	5.9	3.8	.37	.00	1.0
31	31	---	15	16	---	8.0	---	5.4	---	.32	.00	---
TOTAL	744	512	805	412.4	371.0	298.4	244.8	165.8	94.71	44.53	2.41	13.71
MEAN	24.0	17.1	26.0	13.3	12.8	9.63	8.16	5.35	3.16	1.44	.078	.46
MAX	34	30	51	27	52	12	14	11	8.9	12	.29	5.0
MIN	20	11	15	8.0	4.5	7.6	6.3	2.9	.64	.11	.00	.00
AC-FT	1480	1020	1600	818	736	592	486	329	188	88	4.8	27
CFSM	.49	.35	.53	.27	.26	.20	.17	.11	.06	.03	.00	.01
IN.	.56	.39	.61	.31	.28	.23	.18	.13	.07	.03	.00	.01
CAL YR 1987	TOTAL 23402.5	MEAN 64.1	MAX 3640	MIN 8.8	AC-FT 46420	CFSM 1.30	IN. 17.66					
WTR YR 1988	TOTAL 3708.76	MEAN 10.1	MAX 52	MIN .00	AC-FT 7360	CFSM .21	IN. 2.80					



## 06817000 NODAWAY RIVER AT CLARINDA, IA

LOCATION.--Lat 40°44'19", long 95°00'47", in SW1/4 NE1/4 sec.32, T.69 N., R.36 W., Page County, Hydrologic Unit 10240009, near left abutment on downstream side of bridge on State Highway 2 (city route), 0.5 mi downstream from North Branch, 1.2 mi east of city square of Clarinda, and 7.5 mi upstream from East Nodaway River.

DRAINAGE AREA.--762 mi<sup>2</sup>.

## WATER DISCHARGE RECORDS

PERIOD OF RECORD.--May 1918 to July 1925, May 1936 to current year. Monthly discharge only for some periods, published in WSP 1310.

REVISED RECORDS.--WSP 1240: 1918-20 (M), 1921, 1922-25 (M), 1936-38, 1942, 1943-45 (M), 1948. WSP 1440: Drainage area. WSP 1710: 1958, 1959 (P).

GAGE.--Water-stage recorder. Datum of gage is 955.36 ft above NGVD. Prior to July 5, 1925, and May 28, 1936, to Mar. 26, 1957 nonrecording gage at same site, and prior to Oct. 1, 1987, at datum 5.00 ft. higher.

REMARKS.--Estimated daily discharges: Dec. 15-17, 26, 27, 31, Jan. 1 to Feb. 26 and May 10. Records good except those for estimated daily discharges, which are poor. Clarinda municipal water supply is taken from Nodaway River, 500 ft upstream from station. Average daily pumpage was 1.60 ft<sup>3</sup>/s. U.S. National Weather Service gage-height telemeter at station.

COOPERATION.--Average pumpage provided by City of Clarinda water works.

AVERAGE DISCHARGE.--58 years (1918-24, 1936-88), 352 ft<sup>3</sup>/s, 6.27 in/yr, 255,000 acre-ft/yr; median of yearly mean discharges, 270 ft<sup>3</sup>, 4.8 in/yr, 196,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 31,100 ft<sup>3</sup>/s June 13, 1947, gage-height, 25.3 ft, from floodmark, from rating curve extended above 15,000 ft<sup>3</sup>/s on basis of an overflow profile and extended channel rating; minimum daily discharge, 1.0 ft<sup>3</sup>/s Sept. 5, 9, 12, 14, 1918, Dec. 9, 27-31, 1923.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in August 1903 reached a stage of 25.4 ft, from floodmarks, discharge not determined.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 5,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Feb. 19	0215	*934	(a) *8.26				

(a) Ice jam

Minimum discharge, 16 ft<sup>3</sup>/s Aug. 18.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	333	249	334	170	262	208	131	90	52	50	22	26
2	311	269	293	220	122	201	148	83	52	39	20	23
3	289	242	292	290	150	177	168	82	50	38	20	21
4	281	224	311	240	278	153	171	85	49	34	22	24
5	280	209	293	213	236	154	154	86	46	32	21	24
6	268	198	306	165	195	159	152	82	41	26	21	24
7	257	201	355	186	204	159	153	81	39	23	21	23
8	255	211	375	174	222	172	144	81	43	26	20	21
9	253	205	421	151	240	175	134	80	40	35	20	19
10	245	193	464	156	200	160	135	75	35	38	20	22
11	242	194	396	166	171	153	137	68	37	38	19	22
12	240	196	370	192	160	154	128	64	38	33	19	22
13	241	198	335	169	168	142	122	66	38	27	20	19
14	241	192	310	179	186	118	120	63	35	26	21	19
15	239	190	305	200	175	138	115	61	36	26	20	29
16	262	204	280	232	183	139	111	58	37	51	19	45
17	280	251	255	274	200	140	107	54	37	131	17	47
18	251	248	310	306	254	142	99	52	34	107	17	39
19	233	233	355	360	800	136	101	53	32	176	19	32
20	226	218	424	415	540	141	102	57	34	109	20	25
21	221	213	448	595	470	139	101	57	31	55	19	25
22	219	214	389	395	460	136	99	63	30	38	29	28
23	219	214	351	320	430	134	101	84	30	31	27	32
24	216	203	344	253	350	138	99	93	28	28	36	38
25	212	204	330	210	310	150	103	77	30	27	55	30
26	215	200	270	188	260	153	125	64	28	26	36	25
27	216	199	300	197	261	135	127	61	25	25	30	22
28	212	245	355	216	265	130	127	67	23	24	26	32
29	208	359	311	225	226	131	113	61	34	22	24	36
30	206	374	300	234	---	134	103	57	50	22	26	44
31	220	---	260	336	---	132	---	51	---	23	27	---
TOTAL	7591	6750	10442	7627	7978	4633	3730	2156	1114	1386	733	838
MEAN	245	225	337	246	275	149	124	69.5	37.1	44.7	23.6	27.9
MAX	333	374	464	595	800	208	171	93	52	176	55	47
MIN	206	190	255	151	122	118	99	51	23	22	17	19
AC-FT	15060	13390	20710	15130	15820	9190	7400	4280	2210	2750	1450	1660
CFSM	.32	.30	.44	.32	.36	.20	.16	.09	.05	.06	.03	.04
IN.	.37	.33	.51	.37	.39	.23	.18	.11	.05	.07	.04	.04

CAL YR 1987	TOTAL 255378	MEAN 700	MAX 22200	MIN 130	AC-FT 506500	CFSM .92	IN. 12.47
WTR YR 1988	TOTAL 54978	MEAN 150	MAX 800	MIN 17	AC-FT 109000	CFSM .20	IN. 2.68

## NODAWAY RIVER BASIN

06817000 NODAWAY RIVER AT CLARINDA, IA--Continued

## WATER-QUALITY RECORDS

LOCATION.--Suspended-sediment samples at normal flows and during winter periods are collected downstream from the dam, 300 ft upstream from gage. Samples at higher stages are collected from the bridge at gage.

PERIOD OF RECORD.--October 1976 to current year.

## PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: October 1975 to current year.

WATER TEMPERATURES: October 1975 to September 1978, October 1979 to current year.

SUSPENDED-SEDIMENT DISCHARGE: October 1975 to current year.

REMARKS.--Records of specific conductance are obtained from suspended-sediment samples at time of analysis. Random water temperatures are on file for the 1979 water year.

## EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum daily, 600 microsiemens Aug. 22, 1982; minimum daily, 130 microsiemens June 15, 1976.

WATER TEMPERATURES: Maximum daily, 31.0°C Aug. 8, 1988; minimum daily, 0.0°C on many days during winter period.

SEDIMENT CONCENTRATIONS: Maximum daily mean, 23,800 mg/L Apr. 17, 1978; minimum daily mean, 3 mg/L Dec. 1, 1986.

SEDIMENT LOADS: Maximum daily, 1,500,000 tons June 16, 1982; minimum daily, 0.23 ton Dec. 14, 1977.

## EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum daily, 460 microsiemens Feb. 8, 11; minimum daily, 240 microsiemens Feb. 20, July 17.

WATER TEMPERATURE: Maximum daily, 31.0°C Aug. 8.

SEDIMENT CONCENTRATIONS: Maximum daily mean, 500 mg/L Dec. 10; minimum daily mean, 12 mg/L Sept. 23.

SEDIMENT LOADS: Maximum daily, 855 tons Feb. 19; minimum daily, 1.0 ton Sept. 23.

SPECIFIC CONDUCTANCE MICROSIEMENS/CM AT 25 DEG C, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	400	390	440	280	330	400	390	400	340	360	340
2	385	400	400	430	320	---	390	380	380	380	360	320
3	420	400	410	400	350	350	400	380	380	360	380	340
4	420	420	400	420	370	370	390	390	380	360	370	340
5	420	420	430	450	390	370	400	400	400	350	350	350
6	430	430	430	---	430	390	400	400	380	360	345	330
7	430	420	410	410	450	400	380	400	380	370	---	320
8	430	420	---	330	460	390	390	400	380	380	350	320
9	430	420	---	360	440	390	390	400	380	360	340	320
10	430	430	380	370	430	390	380	400	400	---	350	310
11	430	430	400	400	460	400	380	400	390	340	340	320
12	430	430	380	370	430	400	380	400	---	340	370	320
13	440	420	400	420	420	400	380	400	380	340	370	350
14	440	420	400	320	420	420	380	400	380	340	380	330
15	430	430	410	---	420	420	380	400	380	340	360	340
16	420	420	420	---	420	430	380	380	380	340	360	330
17	420	420	430	380	380	420	380	400	380	240	370	360
18	430	400	430	400	310	420	---	390	400	280	370	---
19	440	400	410	380	260	400	380	380	380	260	340	370
20	430	420	390	340	240	410	380	380	380	250	360	380
21	440	410	380	300	250	420	380	400	380	610	365	400
22	440	400	380	300	260	410	380	380	390	350	360	380
23	430	390	390	320	280	400	390	380	400	360	390	360
24	420	400	400	360	310	400	380	380	380	370	370	380
25	420	400	400	380	310	400	380	400	380	340	370	400
26	420	400	410	410	350	400	360	400	---	350	360	375
27	420	---	---	440	330	400	380	420	380	370	365	370
28	420	400	410	440	340	400	380	400	410	360	390	360
29	420	400	400	420	330	410	380	420	380	350	380	360
30	420	380	400	380	---	400	380	400	350	360	380	360
31	400	---	420	340	---	400	---	400	---	350	360	---

## NODAWAY RIVER BASIN

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06817000 NODAWAY RIVER AT CLARINDA, IA--Continued

## WATER-QUALITY RECORDS

WATER TEMPERATURE, DEGREES CENTIGRADE, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	11.0	---	---	---	---	8.0	14.0	22.0	18.0	28.0	20.0
2	12.5	11.0	---	---	---	---	10.0	14.0	21.0	20.0	26.0	22.0
3	14.0	13.0	---	---	---	---	10.0	15.0	22.0	22.0	27.0	21.0
4	15.0	13.0	---	---	---	1.0	10.0	15.0	22.0	23.0	27.0	20.0
5	14.0	11.0	---	---	---	---	15.0	9.0	20.0	25.0	25.0	19.0
6	14.0	11.0	---	---	---	5.0	14.0	15.0	19.0	26.0	24.0	16.0
7	12.0	11.0	---	0.0	---	6.0	14.0	16.0	22.0	26.0	---	17.0
8	11.0	11.0	---	---	---	6.0	15.0	18.0	23.0	26.0	31.0	19.0
9	11.0	11.0	---	---	---	6.0	13.0	16.0	23.0	26.0	26.0	19.0
10	9.0	6.0	---	---	---	6.0	9.0	16.0	19.0	---	26.0	19.0
11	7.0	7.0	---	---	---	4.0	9.0	23.0	20.0	25.0	28.0	21.0
12	9.0	6.0	---	---	---	4.0	---	17.0	---	24.0	26.0	22.0
13	---	8.0	---	---	---	---	12.0	21.0	22.0	26.0	26.0	20.0
14	14.0	5.0	---	---	---	4.0	11.0	19.0	22.0	28.0	26.0	20.0
15	14.0	9.0	---	---	---	6.0	11.0	19.0	23.0	27.0	28.0	22.0
16	14.0	---	---	---	---	---	11.0	20.0	22.0	25.0	28.0	20.0
17	15.0	---	---	---	---	6.0	12.0	19.0	27.0	27.0	27.0	22.0
18	15.0	---	---	---	---	6.0	---	19.0	23.0	25.0	27.0	---
19	11.0	2.5	---	---	---	6.0	12.0	19.0	25.0	25.0	26.0	22.0
20	9.0	---	---	---	---	6.0	12.0	20.0	25.0	23.5	---	16.0
21	8.0	---	---	---	---	6.0	12.0	21.0	27.0	21.0	28.0	21.0
22	8.0	---	---	---	---	7.0	13.0	22.0	---	23.0	25.0	22.0
23	10.0	---	---	---	---	7.0	10.0	---	26.0	24.0	22.0	21.0
24	9.0	---	---	---	---	7.0	10.0	18.0	28.0	25.0	22.0	16.0
25	7.0	---	---	---	2.0	7.0	14.0	19.0	26.0	25.0	22.0	17.0
26	13.0	---	---	---	---	8.0	15.0	20.0	---	23.0	21.0	18.0
27	8.0	---	---	---	---	10.0	9.0	20.0	24.0	24.0	21.0	20.0
28	6.0	---	---	---	---	13.0	10.0	20.0	23.0	25.0	17.0	20.0
29	10.0	---	---	---	---	9.0	10.0	20.0	26.0	25.0	18.0	19.0
30	11.0	---	---	---	---	8.0	12.0	22.0	24.0	27.0	19.0	16.0
31	12.0	---	---	---	---	7.0	---	21.0	---	27.0	20.0	---

## SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DAY	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	160	144	50	34	169	152	41	19	250	177	334	188
2	140	118	66	48	100	79	48	29	60	20	278	151
3	101	79	48	31	87	69	72	56	55	22	201	96
4	93	71	39	24	101	85	49	32	50	38	182	75
5	102	77	26	15	102	81	38	22	35	22	175	73
6	83	60	28	15	107	88	47	21	20	11	154	66
7	75	52	29	16	153	147	41	21	21	12	175	75
8	70	48	29	17	196	198	45	21	19	11	184	85
9	64	44	23	13	330	375	45	18	19	12	174	82
10	51	34	18	9.4	500	626	45	19	21	11	154	67
11	44	29	19	10	222	237	28	13	18	8.3	143	59
12	43	28	19	10	160	160	30	16	19	8.2	138	57
13	46	30	18	9.6	124	112	27	12	20	9.1	115	44
14	45	29	16	8.3	107	90	28	14	18	9.0	92	29
15	34	22	23	12	100	82	21	11	18	8.5	89	33
16	40	28	32	18	36	27	19	12	22	11	124	47
17	49	37	48	33	32	22	21	16	124	67	134	51
18	36	24	57	38	57	48	24	20	285	195	115	44
19	29	18	45	28	134	128	30	29	396	855	102	37
20	26	16	30	18	158	181	451	505	278	405	113	43
21	27	16	23	13	203	246	363	583	216	274	107	40
22	32	19	25	14	244	256	118	126	168	209	105	39
23	34	20	32	18	275	261	82	71	140	163	103	37
24	31	18	26	14	201	187	50	34	85	80	87	32
25	22	13	28	15	160	143	33	19	70	59	85	34
26	25	15	30	16	90	66	26	13	125	88	82	34
27	26	15	25	13	124	100	22	12	243	171	50	18
28	24	14	48	32	190	182	18	10	332	238	36	13
29	22	12	168	163	110	92	20	12	345	211	28	9.9
30	21	12	231	233	64	52	58	37	---	---	21	7.6
31	38	23	---	---	105	74	482	437	---	---	20	7.1
TOTAL	---	1165	---	938.3	---	4646	---	2260	---	3405.1	---	1673.6

NODAWAY RIVER BASIN  
06817000 NODAWAY RIVER AT CLARINDA, IA--Continued  
WATER-QUALITY RECORDS

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DAY	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	29	10	90	22	52	7.3	31	4.2	79	4.7	42	2.9
2	34	14	78	17	54	7.6	30	3.2	72	3.9	29	1.8
3	46	21	63	14	53	7.2	39	4.0	66	3.6	29	1.6
4	60	28	132	30	75	9.9	45	4.1	68	4.0	30	1.9
5	49	20	95	22	78	9.7	43	3.7	57	3.2	20	1.3
6	39	16	62	14	86	9.5	62	4.4	64	3.6	35	2.3
7	45	19	338	74	45	4.7	57	3.5	60	3.4	32	2.0
8	44	17	37	8.1	56	6.5	78	5.5	32	1.7	35	2.0
9	40	14	47	10	65	7.0	95	9.0	56	3.0	38	1.9
10	27	9.8	50	10	56	5.3	76	7.8	56	3.0	34	2.0
11	26	9.6	51	9.4	64	6.4	39	4.0	30	1.5	48	2.9
12	28	9.7	49	8.5	64	6.6	40	3.6	57	2.9	38	2.3
13	34	11	59	11	60	6.2	34	2.5	52	2.8	37	1.9
14	32	10	55	9.4	71	6.7	44	3.1	41	2.3	36	1.8
15	21	6.5	73	12	65	6.3	47	3.3	46	2.5	30	2.3
16	19	5.7	77	12	83	8.3	118	16	37	1.9	38	4.6
17	26	7.5	70	10	66	6.6	499	176	59	2.1	26	3.3
18	24	6.4	50	7.0	59	5.4	230	66	45	2.1	35	3.7
19	21	5.7	45	6.4	56	4.8	478	227	33	1.7	34	2.9
20	22	6.1	47	7.2	63	5.8	320	94	36	1.9	24	1.6
21	24	6.5	49	7.5	44	3.7	160	24	55	2.8	20	1.4
22	16	4.3	35	6.0	59	4.8	84	8.6	52	4.1	26	2.0
23	15	4.1	58	13	38	3.1	63	5.3	45	3.3	12	1.0
24	16	4.3	55	14	45	3.4	50	3.8	52	5.1	29	3.0
25	28	7.8	55	11	35	2.8	70	5.1	53	7.9	23	1.9
26	32	11	52	9.0	35	2.6	74	5.2	50	4.9	37	2.5
27	27	9.3	66	11	49	3.3	72	4.9	45	3.6	35	2.1
28	52	18	67	12	26	1.6	70	4.5	27	1.9	40	3.5
29	67	20	72	12	34	3.1	69	4.1	25	1.6	28	2.7
30	84	23	65	10	51	6.9	69	4.1	41	2.9	32	3.8
31	---	---	56	7.7	---	---	70	4.3	51	3.7	---	---
TOTAL	---	355.3	---	427.2	---	173.1	---	718.8	---	98.2	---	70.9
TOTAL LOAD FOR YEAR: 15931.5 TONS.												

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	TEMPER- ATURE WATER (DEG C) (00010)	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT 1987						
02...	0915	12.5	315	216	184	65
NOV						
19...	0815	2.5	236	50	32	99
JAN 1988						
07...	1015	1.0	186	40	20	83
MAR						
04...	1100	1.0	157	150	64	99
APR						
05...	1625	12.0	155	58	24	94
MAY						
19...	0915	19.0	52	40	5.6	99
JUN						
28...	1415	25.5	23	19	1.2	100
AUG						
11...	1745	28.0	19	28	1.4	100
SEP						
21...	1840	23.0	28	19	1.4	99

06817000 NODAWAY RIVER AT CLARINDA, IA--Continued

## WATER-QUALITY RECORDS

## PARTICLE-SIZE DISTRIBUTION OF SURFACE BED MATERIAL, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	NUMBER OF SAM- PLING POINTS (COUNT) (00063)	BED MAT. FALL DIAM. % FINER THAN .004 MM (80157)	BED MAT. SIEVE DIAM. % FINER THAN .062 MM (80164)	BED MAT. SIEVE DIAM. % FINER THAN .125 MM (80165)	BED MAT. SIEVE DIAM. % FINER THAN .250 MM (80166)
OCT 1987							
02...	0900	315	3	--	0	1	8
NOV							
19...	0800	236	3	--	1	2	13
JAN 1988							
07...	1030	186	3	7	48	64	87
MAR							
04...	1015	157	3	--	1	2	13
APR							
05...	1600	155	3	--	2	4	19
MAY							
19...	0850	52	3	--	3	6	22
JUN							
28...	1415	23	3	--	1	2	15
AUG							
11...	1715	19	3	--	1	2	17
SEP							
21...	1800	28	3	--	1	2	14

DATE	BED MAT. SIEVE DIAM. % FINER THAN .500 MM (80167)	BED MAT. SIEVE DIAM. % FINER THAN 1.00 MM (80168)	BED MAT. SIEVE DIAM. % FINER THAN 2.00 MM (80169)	BED MAT. SIEVE DIAM. % FINER THAN 4.00 MM (80170)	BED MAT. SIEVE DIAM. % FINER THAN 8.00 MM (80171)	BED MAT. SIEVE DIAM. % FINER THAN 16.0 MM (80172)
OCT 1987						
02...	61	90	95	97	99	100
NOV						
19...	39	70	84	91	95	100
JAN 1988						
07...	96	99	100	--	--	--
MAR						
04...	39	67	80	89	95	100
APR						
05...	44	68	80	89	96	100
MAY						
19...	52	79	90	96	99	100
JUN						
28...	70	91	96	98	100	--
AUG						
11...	73	93	96	97	99	100
SEP						
21...	69	90	94	96	98	100

## PLATTE RIVER BASIN

06818750 PLATTE RIVER NEAR DIAGONAL, IA

LOCATION.--Lat 40°46'02", long 94°24'46", in NE1/4 NW1/4 sec.22, T.69 N., R.31 W., Ringgold County, Hydrologic Unit 10240012, on left bank at downstream side of bridge on county highway, 2.2 mi upstream from Turkey Creek, 4.6 mi southwest of Diagonal, and 4.9 mi downstream from Gard Creek.

DRAINAGE AREA.--217 mi<sup>2</sup>.

PERIOD OF RECORD.--April 1968 to current year.

REVISED RECORDS.--WSP 2119: 1969 (P).

GAGE.--Water-stage recorder. Datum of gage is 1,095.27 ft above NGVD.

REMARKS.--Estimated daily discharges: Dec. 16-18, 27, Dec. 31 to Mar. 2 and Mar. 13-15. Records good except those for estimated daily discharges, which are poor.

AVERAGE DISCHARGE.--20 years, 135 ft<sup>3</sup>/s, 8.45 in/yr, 97,810 acre-ft/yr; median of yearly mean discharges, 120 ft<sup>3</sup>/s, 7.5 in/yr, 86,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,580 ft<sup>3</sup>/s Aug. 27, 1987, gage height, 23.67 ft; minimum daily discharge, 0.21 ft<sup>3</sup>/s Jan. 14, 15, 1969.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 1967 reached a stage of 23.16 ft, from floodmark by local resident, discharge, 6,360 ft<sup>3</sup>/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 1	1300	*602	7.81	Jan. 20	0745	ice jam	*9.01
Dec. 20	1115	*602	7.81				

Minimum discharge, 1.2 ft<sup>3</sup>/s Sept. 23, 24.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	34	319	234	58	91	40	38	28	13	6.7	2.7	1.5
2	24	138	153	60	41	38	91	27	13	6.9	2.5	1.6
3	26	72	202	66	38	36	96	25	12	5.4	2.4	1.8
4	22	52	315	56	48	33	68	25	12	4.2	3.2	1.6
5	23	37	169	53	40	32	59	25	10	3.7	3.4	2.6
6	21	31	217	46	33	31	65	24	9.7	3.4	2.1	1.8
7	18	31	254	48	33	34	53	23	9.2	3.2	2.0	1.5
8	17	29	235	46	33	41	43	59	8.9	3.1	2.3	1.5
9	15	24	447	41	34	42	39	84	8.4	3.2	2.9	1.4
10	13	18	245	42	28	38	46	42	7.6	3.5	2.2	1.7
11	11	18	203	45	25	37	44	32	7.4	3.3	2.1	1.4
12	13	19	161	54	24	37	39	26	7.1	2.9	2.3	1.4
13	16	19	121	42	26	32	36	22	6.5	2.7	3.3	1.4
14	17	19	104	39	29	28	33	20	6.0	2.9	2.1	1.4
15	18	26	87	42	28	32	33	17	6.0	3.0	2.0	2.3
16	22	111	84	50	30	34	32	15	6.3	2.7	1.8	4.8
17	22	133	67	56	56	36	30	14	6.0	8.5	1.5	5.0
18	15	131	76	60	84	31	29	14	5.6	34	1.9	4.6
19	12	78	135	64	400	34	29	14	5.3	12	3.7	9.5
20	8.1	69	502	155	200	34	28	13	4.8	5.7	2.2	35
21	7.9	59	294	135	100	34	28	13	4.6	4.3	2.3	13
22	9.4	56	255	102	60	33	27	14	4.2	3.6	5.3	4.4
23	11	53	290	84	42	33	28	36	4.0	2.8	7.6	2.0
24	9.2	48	440	64	33	40	28	50	3.8	2.7	7.5	1.7
25	6.5	47	242	44	30	76	27	33	3.8	3.4	4.9	1.8
26	7.8	48	138	38	66	50	58	25	3.6	2.8	2.7	2.5
27	10	53	119	37	54	46	59	21	3.3	2.1	1.9	2.1
28	9.5	351	163	40	50	39	41	21	3.0	2.4	1.6	4.4
29	11	462	122	46	45	44	34	18	3.2	2.3	1.7	11
30	12	421	110	81	---	42	30	15	4.4	2.5	1.9	14
31	17	---	83	156	---	37	---	14	---	2.7	1.8	---
TOTAL	478.4	2972	6267	1950	1801	1174	1291	809	202.7	152.6	87.8	140.7
MEAN	15.4	99.1	202	62.9	62.1	37.9	43.0	26.1	6.76	4.92	2.83	4.69
MAX	34	462	502	156	400	76	96	84	13	34	7.6	35
MIN	6.5	18	67	37	24	28	27	13	3.0	2.1	1.5	1.4
AC-FT	949	5890	12430	3870	3570	2330	2560	1600	402	303	174	279
CFSM	.07	.46	.93	.29	.29	.17	.20	.12	.03	.02	.01	.02
IN.	.08	.51	1.07	.33	.31	.20	.22	.14	.03	.03	.02	.02
CAL YR 1987	TOTAL 73355.4	MEAN 201	MAX 7830	MIN 5.2	AC-FT 145500	CFSM .93	IN. 12.58					
WTR YR 1988	TOTAL 17326.2	MEAN 47.3	MAX 502	MIN 1.4	AC-FT 34370	CFSM .22	IN. 2.97					



## 06819185 EAST FORK ONE HUNDRED AND TWO RIVER AT BEDFORD, IA

LOCATION.--Lat 40°39'38", long 94°42'59", in NE1/4 sec.35, T.68 N., R.34 W., Taylor County, Hydrologic Unit 10240013, on left bank at downstream side of bridge of county highway N44, 0.1 mi south of Bedford, 0.4 mi upstream from concrete stabilization dam, and 3.0 mi upstream from Daugherty creek.

DRAINAGE AREA.--85.4 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1983 to current year. September 1959 to September 1983, at site 2 mi upstream published as "near Bedford" (station 06819190) not equivalent because of difference in drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,069.16 ft above NGVD.

REMARKS.--Estimated daily discharges: Dec. 15-24, 26-29, 31, Jan. 1, 3-29, Feb. 2-18, 25, and May 10-16. Records good except those for estimated daily discharges, which are poor. Slight regulation at low flow by low dam used for water supply in Bedford. U.S. National Weather Service gage-height telemeter at station.

AVERAGE DISCHARGE.--5 years, 66.6 ft<sup>3</sup>/s, 10.6 in/yr, 48,250 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,570 ft<sup>3</sup>/s July 14, 1986, gage height 23.47 ft.; minimum daily discharge, 0.04 ft<sup>3</sup>/s Sept. 2, 1988.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s) *328	Gage height (ft) *12.50	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Dec. 8	2215						

Minimum daily discharge, 0.04 ft<sup>3</sup>/s Sept. 2.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.8	145	88	14	24	15	10	13	3.5	1.1	1.3	.13
2	3.1	43	68	40	12	15	60	17	3.7	.22	1.2	.04
3	2.8	25	124	25	6.9	9.3	46	20	3.6	.22	1.2	.13
4	3.1	15	130	12	8.0	9.5	28	22	3.2	.35	1.2	.09
5	4.1	8.0	81	11	6.5	11	19	22	2.9	.22	1.2	1.0
6	4.5	7.5	120	9.3	5.2	11	15	14	2.8	.39	.74	1.5
7	4.0	7.7	97	9.5	5.8	11	7.8	14	2.3	.89	.22	1.7
8	3.7	8.2	127	9.0	11	17	6.8	80	1.9	1.2	1.1	1.7
9	4.1	6.6	158	7.9	7.0	14	6.9	85	1.7	2.1	.64	2.0
10	5.6	5.1	85	7.9	3.8	13	8.5	60	1.7	1.1	.22	2.8
11	4.6	4.5	78	8.5	3.3	13	7.0	42	1.6	1.2	.53	2.8
12	4.6	5.0	61	10	3.1	15	6.1	27	1.5	.36	.67	2.4
13	4.2	5.4	51	7.3	3.5	7.0	6.0	18	1.5	1.0	.29	2.0
14	4.8	5.3	47	7.1	7.0	5.0	5.6	13	1.4	.64	1.2	2.4
15	5.5	14	37	7.9	5.8	6.3	5.4	9.0	1.4	1.1	.64	4.4
16	8.0	53	34	18	15	7.8	5.7	7.0	1.4	1.2	.88	.19
17	5.0	67	26	35	30	8.7	6.0	5.0	1.3	1.1	1.2	.22
18	3.5	42	28	30	66	7.2	6.3	4.8	1.3	28	1.0	.20
19	3.3	28	40	50	103	8.1	6.3	5.0	1.3	2.5	.99	1.4
20	3.4	21	95	60	68	8.0	7.3	4.5	1.3	1.5	1.2	.22
21	3.2	14	130	24	36	8.2	7.7	4.9	2.4	1.4	.35	.22
22	3.6	15	90	14	58	7.5	8.9	5.9	4.4	1.3	.80	.10
23	3.8	14	70	30	36	8.6	11	13	1.4	1.3	.21	.60
24	3.9	8.5	125	20	17	13	11	15	1.2	1.3	.51	.35
25	3.7	36	69	8.6	8.9	37	12	9.1	1.2	1.3	.42	.53
26	5.3	24	27	7.3	19	16	27	6.5	1.2	1.3	.68	.14
27	5.9	27	32	11	30	8.2	31	5.7	1.0	1.3	.25	.22
28	4.5	204	36	18	21	8.0	24	5.6	.77	1.3	.46	1.0
29	3.9	182	30	29	19	11	21	4.6	.22	1.3	.70	.21
30	4.8	144	56	58	---	8.3	21	3.7	1.8	1.3	.22	.22
31	17	---	30	54	---	7.6	---	3.5	---	1.5	.14	---
TOTAL	145.3	1184.8	2270	653.3	639.8	345.3	444.3	559.8	56.89	60.99	22.36	30.91
MEAN	4.69	39.5	73.2	21.1	22.1	11.1	14.8	18.1	1.90	1.97	.72	1.03
MAX	17	204	158	60	103	37	60	85	4.4	28	1.3	4.4
MIN	2.8	4.5	26	7.1	3.1	5.0	5.4	3.5	.22	.22	.14	.04
AC-FT	288	2350	4500	1300	1270	685	881	1110	113	121	.44	.61
CFSM	.05	.46	.86	.25	.26	.13	.17	.21	.02	.02	.01	.01
IN.	.06	.52	.99	.28	.28	.15	.19	.24	.02	.03	.01	.01

CAL YR 1987	TOTAL 28861.8	MEAN 79.1	MAX 2320	MIN 1.8	AC-FT 57250	CFSM .93	IN. 12.57
WTR YR 1988	TOTAL 6413.75	MEAN 17.5	MAX 204	MIN .04	AC-FT 12720	CFSM .21	IN. 2.79

## GRAND RIVER BASIN

06897950 ELK CREEK NEAR DECATUR CITY, IA  
(Hydrologic bench-mark station)

LOCATION.--Lat 40°43'18", long 93°56'12", near SE corner sec.34, T.69 N., R.27 W., Decatur County, Hydrologic Unit 10280102, at right downstream corner of bridge on county highway, 1,000 ft downstream from West Elk Creek, 5.2 mi upstream from mouth, and 5.7 mi southwest of Decatur City.

DRAINAGE AREA.--52.5 mi<sup>2</sup>.

## WATER DISCHARGE RECORDS

PERIOD OF RECORD.--October 1967 to current year.

GAGE.--Water-stage recorder. Datum of gage is 924.70 ft above NGVD. Oct. 1, 1967, to Sept. 30, 1974, at datum 10.00 ft higher.

REMARKS.--Estimated daily discharges: Oct. 2-31, Nov. 19, Dec. 15 to Feb. 28. Records good except those for estimated daily discharges, which are poor.

AVERAGE DISCHARGE.--21 years, 31.3 ft<sup>3</sup>/s, 8.10 in/yr, 22,680 acre-ft/yr; median of yearly mean discharges, 26 ft<sup>3</sup>/s, 6.7 in/yr, 18,800 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 16,400 ft<sup>3</sup>/s June 2, 1980, gage height, 28.22 ft, from rating curve extended above 5,300 ft<sup>3</sup>/s on basis of step-backwater computation; no flow at times most years.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 14, 1967, reached a stage of 18.35 ft, datum in use prior to Oct. 1, 1974, discharge, 17,800 ft<sup>3</sup>/s, estimated from rating curve extended above 5,300 ft<sup>3</sup>/s on basis of step-backwater computation. Flood of Aug. 6, 1959, reached a stage between 20.5 and 22.5 ft, datum in use prior to Oct. 1, 1974, 300 ft downstream, from information by assistant county engineer, discharge not determined.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 28	1415	*593	13.08	Dec. 19	2245	ice jam	*13.38

No flow many days June through September.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.8	158	30	8.8	11	16	15	3.3	.30	.01	.00	.00
2	1.7	34	21	6.4	6.0	13	49	2.9	.34	.02	.00	.00
3	1.7	19	19	5.6	4.5	9.7	34	2.7	.30	.03	.00	.00
4	1.7	13	14	4.8	3.3	8.6	25	3.0	.30	.02	.00	.00
5	1.7	9.6	11	4.2	2.9	8.5	19	2.7	.26	.01	.00	.00
6	1.6	8.3	10	3.8	2.4	8.9	15	2.3	.24	.00	.00	.00
7	1.5	8.8	8.1	3.6	2.2	11	12	2.5	.23	.00	.00	.00
8	1.6	8.6	11	3.6	2.0	13	11	3.7	.20	.02	.00	.00
9	2.0	7.4	21	3.4	1.8	11	9.1	5.1	.17	.09	.00	.00
10	1.7	6.4	11	3.4	1.6	9.3	10	2.5	.17	.08	.00	.00
11	1.9	6.0	9.8	3.6	1.5	11	8.8	2.0	.16	.02	.00	.00
12	1.9	6.9	7.2	4.3	1.5	9.5	8.0	1.8	.13	.00	.00	.00
13	2.0	6.9	5.4	2.9	1.6	5.9	7.5	1.6	.13	.01	.00	.00
14	2.1	6.5	5.1	2.7	1.7	5.2	6.7	1.5	.13	.08	.00	.00
15	2.1	10	4.9	2.9	1.8	6.7	6.1	1.3	.12	.04	.00	.04
16	3.6	21	6.0	4.1	2.0	6.8	5.8	1.0	.10	.02	.00	.00
17	3.2	45	6.8	5.5	3.6	6.8	5.9	.89	.07	.04	.00	.00
18	2.6	21	7.0	7.5	6.2	6.7	5.0	.93	.07	.08	.00	.00
19	2.3	15	14	10	80	7.1	4.8	.78	.07	.05	.00	.12
20	2.1	10	29	14	55	7.4	5.0	.69	.05	.05	.00	.03
21	1.9	8.8	48	6.7	33	6.8	4.3	.64	.00	.01	.00	.00
22	1.9	9.9	36	5.0	27	7.1	4.4	1.2	.02	.01	.22	.00
23	1.9	8.9	24	6.7	23	6.9	4.5	3.8	.03	.01	.05	.00
24	2.0	8.4	45	5.5	20	24	4.1	3.0	.01	.02	.00	.00
25	1.8	12	38	3.8	22	30	4.3	1.4	.00	.03	.00	.00
26	2.4	9.7	28	3.3	24	15	8.4	.82	.00	.02	.00	.00
27	2.2	14	22	3.1	22	12	5.9	.58	.00	.03	.00	.00
28	2.7	300	19	3.3	21	12	4.1	.64	.00	.01	.00	.07
29	2.5	218	16	4.1	20	15	3.7	.56	.00	.01	.00	.00
30	2.5	73	14	8.5	---	10	3.5	.42	.05	.00	.00	.00
31	6.0	---	12	20	---	9.5	---	.32	---	.00	.00	---
TOTAL	68.6	1084.1	553.3	175.1	404.6	330.4	309.9	56.57	3.65	0.82	0.27	0.26
MEAN	2.21	36.1	17.8	5.65	14.0	10.7	10.3	1.82	.12	.026	.009	.009
MAX	6.0	300	48	20	80	30	49	5.1	.34	.09	.22	.12
MIN	1.5	6.0	4.9	2.7	1.5	5.2	3.5	.32	.00	.00	.00	.00
AC-FT	136	2150	1100	347	803	655	615	112	7.2	1.6	.5	.5
CFSM	.04	.69	.34	.11	.27	.20	.20	.03	.00	.00	.00	.00
IN.	.05	.77	.39	.12	.29	.23	.22	.04	.00	.00	.00	.00

CAL YR 1987	TOTAL	19185.07	MEAN	52.6	MAX	2150	MIN	.11	AC-FT	38050	CFSM	1.00	IN.	13.59
WTR YR 1988	TOTAL	2987.57	MEAN	8.16	MAX	300	MIN	.00	AC-FT	5930	CFSM	.16	IN.	2.12

## GRAND RIVER BASIN

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06897950 ELK CREEK NEAR DECATUR CITY, IA--Continued  
(Hydrologic bench-mark station)

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1968 to current year.

REMARKS.--Miscellaneous biological data collected September 1970 to September 1972 are available in the Iowa City district office.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	TEMPER- ATURE AIR (DEG C) (00020)	TUR- BID- ITY (FTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)
NOV 13...	1230	6.7	562	7.75	5.5	10.5	2.7	12.1	100	734	220	1600
FEB 24...	1245	24	380	7.44	0.0	0.0	30	12.6	88	745	140	2500
MAY 18...	0945	0.88	572	7.70	16.5	20.0	4.4	7.5	80	737	360	450
DATE	HARD- NESS NONCARB WH WAT TOT FLD MG/L AS CACO3 (00902)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	SODIUM PERCENT (00932)	SODIUM AD- SORP- TION RATIO (00931)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	CAR- BONATE WATER DIS IT FIELD MG/L AS CO3 (00452)	BICAR- BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)
NOV 13...	33	290	87	18	11	7	0.3	3.7	262	0	319	51
FEB 24...	34	190	56	12	7.7	8	0.3	5.2	151	0	184	41
MAY 18...	35	280	82	19	14	10	0.4	2.7	250	0	305	51
DATE	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	NITRO- GEN, ORGANIC TOTAL (MG/L AS N) (00605)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610)
NOV 13...	8.0	0.20	13	354	349	0.48	6.44	0.38	0.150	<0.010	0.030	0.020
FEB 24...	6.9	0.20	11	245	237	0.33	15.6	0.87	0.560	0.010	0.300	0.330
MAY 18...	9.0	0.30	8.3	336	337	0.46	0.80	0.20	<0.100	<0.010	0.070	0.100
DATE	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHOROUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	PHOS- PHOROUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHOROUS TOTAL (MG/L AS P) (00665)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)
NOV 13...	0.40	0.020	0.040	0.050	59	1.1	45	1	<10	120	<0.5	<1
FEB 24...	1.2	0.020	0.060	0.170	84	5.4	98	1	20	100	<0.5	<1
MAY 18...	0.30	0.020	0.040	0.050	35	0.08	73	1	<10	120	<0.5	<1

GRAND RIVER BASIN  
06897950 ELK CREEK NEAR DECATUR CITY, IA--Continued  
WATER-QUALITY RECORDS

WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	CHROMIUM, DIS-SOLVED (UG/L AS CR) (01030)	COBALT, DIS-SOLVED (UG/L AS CO) (01035)	COPPER, DIS-SOLVED (UG/L AS CU) (01040)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)	LITHIUM DIS-SOLVED (UG/L AS LI) (01130)	MANGANESE, DIS-SOLVED (UG/L AS MN) (01056)	MERCURY DIS-SOLVED (UG/L AS HG) (71890)	MOLYBDENUM, DIS-SOLVED (UG/L AS MO) (01060)	NICKEL, DIS-SOLVED (UG/L AS NI) (01065)	SELENIUM, DIS-SOLVED (UG/L AS SE) (01145)
NOV 13...	1	<3	1	5	<5	11	470	<0.1	<10	1	<1
FEB 24...	<1	<3	2	61	<5	9	230	<0.1	<10	<1	1
MAY 18...	<1	<3	1	7	<5	12	570	<0.1	<10	<1	<1
DATE	SILVER, DIS-SOLVED (UG/L AS AG) (01075)	STRONTIUM, DIS-SOLVED (UG/L AS SR) (01080)	VANADIUM, DIS-SOLVED (UG/L AS V) (01085)	ZINC, DIS-SOLVED (UG/L AS ZN) (01090)	GROSS ALPHA, DIS-SOLVED (UG/L AS U-NAT) (80030)	GROSS ALPHA, SUSP. TOTAL (UG/L AS U-NAT) (80040)	GROSS BETA, DIS-SOLVED (PCI/L AS CS-137) (03515)	GROSS BETA, DIS-SOLVED (PCI/L AS YT-90) (80050)	GROSS BETA, SUSP. TOTAL (PCI/L AS CS-137) (03516)	GROSS BETA, SUSP. TOTAL (PCI/L AS YT-90) (80060)	RADIUM 226, DIS-SOLVED, RADON METHOD (PCI/L) (09511)
NOV 13...	<1.0	280	<6	<3	--	--	--	--	--	--	--
FEB 24...	<1.0	180	<6	10	--	--	--	--	--	--	--
MAY 18...	1.0	330	<6	4	2.0	<0.4	6.1	4.6	0.7	0.7	0.06

## 06898000 THOMPSON RIVER AT DAVIS CITY, IA

LOCATION.--Lat 40°38'25", long 93°48'29", in SE1/4 SE1/4 sec.35, T.68 N., R.26 W., Decatur County, Hydrologic Unit 10280102, on right bank 15 ft downstream from bridge on U.S. Highway 69 at Davis City, 2.6 mi upstream from Dickersons Branch, and 5.2 mi upstream from Iowa-Missouri State line.

DRAINAGE AREA.--701 mi<sup>2</sup>.

PERIOD OF RECORD.--May 1918 to July 1925, July 1941 to current year. Monthly discharge only for some periods, published in WSP 1310. Prior to October 1918, published as "Grand River".

REVISED RECORDS.--WSP 1240: 1918, 1920-21 (M), 1922-24, 1925 (M), 1946-47 (M). WSP 1440: Drainage area. WSP 1710: 1957.

GAGE.--Water-stage recorder. Datum of gage is 874.04 ft above NGVD. May 14, 1918, to July 2, 1925, July 14, 1941, to Feb. 24, 1942, nonrecording gage, and Feb. 25, 1942, to Feb. 8, 1967, water-stage recorder at same site at datum 2.00 ft higher.

REMARKS.--Estimated daily discharges: Dec. 16-18, Dec. 31 to Jan. 10, Jan. 13-15, 24-29, Feb. 1-21 and 24-28. Records good except those for estimated daily discharges, which are poor. U.S. National Weather Service gage-height telemeter at station.

AVERAGE DISCHARGE.--53 years (water years 1919-24, 1942-88), 379 ft<sup>3</sup>/s, 7.34 in/yr, 274,600 acre-ft/yr; median of yearly mean discharges, 340 ft<sup>3</sup>/s, 6.6 in/yr 246,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 24,300 ft<sup>3</sup>/s June 10, 1974, gage height, 19.43 ft, from rating curve extended above 17,000 ft<sup>3</sup>/s on basis of velocity-area study; minimum daily discharge, 0.1 ft<sup>3</sup>/s June 25, 1956.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Aug. 8, 1885, reached a stage of 22.8 ft, datum in use prior to Feb. 9, 1967, from floodmark, discharge, 30,000 ft<sup>3</sup>/s, from rating curve extended as explained above.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 29	0315	*2,640	5.37	Feb. 20	0600	ice jam	*5.45

Minimum discharge, 1.8 ft<sup>3</sup>/s Aug. 18.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	114	783	811	232	303	296	127	94	34	9.3	9.4	6.8
2	113	543	506	220	151	292	210	85	35	8.7	8.9	6.1
3	102	274	377	216	138	244	344	79	30	8.9	7.8	5.8
4	96	220	333	185	149	195	295	73	27	9.7	6.6	6.4
5	93	156	298	172	125	170	251	71	24	10	7.4	7.8
6	88	126	274	155	103	175	199	67	20	10	6.0	6.2
7	87	113	263	157	110	172	169	63	19	9.8	4.5	5.5
8	87	107	255	151	160	184	154	69	19	9.4	4.5	5.8
9	81	99	393	135	93	197	141	120	16	9.4	6.9	5.2
10	79	93	396	120	79	188	125	323	15	10	7.6	4.4
11	79	89	390	128	70	171	119	173	14	11	5.3	4.4
12	80	90	325	120	68	161	117	115	14	8.9	4.5	3.9
13	87	89	282	105	70	146	114	86	14	7.2	3.9	4.0
14	89	85	249	110	88	115	110	67	13	6.9	4.2	2.9
15	92	103	203	120	76	88	103	57	12	9.4	3.9	4.1
16	103	240	200	127	81	90	95	50	12	11	2.7	7.4
17	107	351	185	130	120	101	91	42	12	15	2.2	6.5
18	119	348	206	146	187	114	88	43	12	16	1.9	6.6
19	122	225	383	173	599	112	84	36	11	11	2.7	9.6
20	117	189	1850	424	1030	112	81	35	11	9.6	3.3	9.5
21	100	147	1170	1240	720	115	81	37	10	8.4	3.3	6.3
22	95	133	969	1000	557	114	79	38	10	8.5	10	6.1
23	95	129	911	392	540	116	79	49	10	11	200	5.9
24	97	119	1480	211	480	121	79	93	10	9.8	181	6.2
25	98	120	1130	153	350	290	82	116	9.8	8.6	70	4.6
26	104	124	530	134	270	321	111	104	10	8.6	20	4.6
27	106	135	535	130	285	233	116	73	9.5	8.3	11	5.1
28	104	1340	876	140	315	180	121	55	8.7	7.5	17	5.8
29	112	2300	665	160	311	153	115	43	8.7	7.1	16	7.8
30	121	1580	492	195	---	147	106	38	11	7.4	11	7.1
31	132	---	331	467	---	131	---	34	---	9.5	8.5	---
TOTAL	3099	10450	17268	7548	7628	5244	3986	2428	461.7	295.9	652.0	178.4
MEAN	100	348	557	243	263	169	133	78.3	15.4	9.55	21.0	5.95
MAX	132	2300	1850	1240	1030	321	344	323	35	16	200	9.6
MIN	79	85	185	105	68	88	79	34	8.7	6.9	1.9	2.9
AC-FT	6150	20730	34250	14970	15130	10400	7910	4820	916	587	1290	354
CFSM	.14	.50	.79	.35	.38	.24	.19	.11	.02	.01	.03	.01
IN.	.16	.55	.92	.40	.40	.28	.21	.13	.02	.02	.03	.01

CAL YR 1987	TOTAL 276953	MEAN 759	MAX 14000	MIN 62	AC-FT 549300	CFSM 1.08	IN. 14.70
WTR YR 1988	TOTAL 59239.0	MEAN 162	MAX 2300	MIN 1.9	AC-FT 117500	CFSM .23	IN. 3.14

## GRAND RIVER BASIN

06898400 WELDON RIVER NEAR LEON, IA

LOCATION--Lat 40°41'45, long 93°38'07", in NE1/4 NE1/4 sec.17, T.68 N., R.24 W., Decatur County, Hydrologic Unit 10280102, on left bank 10 ft downstream from bridge on county highway A, 200 ft upstream from Unnamed Creek, 1.3 mi downstream from Brush Creek, and 6.5 mi southeast of post office at Leon.

DRAINAGE AREA.--104 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1958 to current year.

GAGE.--Water-stage recorder. Datum of gage is 906.26 ft above NGVD.

REMARKS.--Estimated daily discharges: Dec. 14-25, Dec. 27 to Mar. 9, Mar. 13-16, and 18. Records good except those for estimated daily discharges, which are poor.

AVERAGE DISCHARGE.--30 years, 70.1 ft<sup>3</sup>/s, 9.15 in/yr, 50,790 acre-ft/yr; median of yearly mean discharges, 61 ft<sup>3</sup>/s, 8.0 in/yr, 44,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 48,600 ft<sup>3</sup>/s Aug. 6, 1959, gage height, 25.27 ft, from rating curve extended above 5,600 ft<sup>3</sup>/s on basis of contracted-opening and flow-over-embankment measurement; no flow some years.

EXTREMES OUTSIDE PERIOD OF RECORD.--Stage and discharge of the flood of Aug. 6, 1959 are the greatest since at least 1919.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 28	1600	*2,100	*10.90				

No flow many days July to September.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.9	517	34	13	19	14	22	5.4	2.0	.67	.00	.03
2	2.8	69	25	11	12	10	83	5.1	5.6	.85	.00	.05
3	2.8	28	23	11	9.6	6.3	66	5.6	3.1	.73	.00	.08
4	2.8	21	17	9.2	7.5	5.6	41	5.0	1.8	.95	.33	.16
5	2.8	15	15	8.2	6.6	5.6	29	4.4	1.6	.41	.27	.10
6	2.7	12	14	7.9	5.8	5.2	23	4.0	1.4	.28	.00	.0
7	2.6	11	13	7.5	5.3	5.5	19	3.7	1.2	.27	.00	.03
8	2.7	10	12	7.5	4.9	24	16	6.1	1.0	.26	.21	.00
9	3.1	9.4	17	7.1	4.6	20	13	9.2	.91	.33	.32	.00
10	2.8	8.7	13	7.1	4.2	16	13	5.7	.91	.48	.06	.00
11	3.0	8.5	11	7.5	4.0	18	12	3.8	.93	.28	.15	.00
12	3.0	8.5	9.6	8.8	4.0	18	11	3.3	1.2	.16	.04	.00
13	3.1	8.5	7.8	6.3	4.2	14	11	3.4	.85	.32	.17	.00
14	3.2	8.3	6.0	5.9	4.4	8.2	9.6	2.3	.77	1.1	.25	.08
15	3.2	19	5.8	6.4	4.6	9.1	8.8	2.0	.74	.68	.21	.41
16	4.7	171	7.2	8.4	5.0	7.5	8.5	1.7	.79	.25	.24	1.9
17	4.3	213	7.6	11	8.1	6.5	8.3	1.5	.76	.38	.44	.94
18	3.7	44	8.0	14	13	6.8	7.9	1.5	.78	1.0	.38	1.5
19	3.4	23	25	18	120	7.0	7.5	1.6	.79	.52	.95	4.2
20	3.2	19	47	24	78	8.0	7.1	1.6	.73	.23	.74	.90
21	3.0	16	78	13	63	7.2	7.0	1.9	.68	.03	.60	.16
22	3.0	16	65	10	51	7.4	7.1	2.0	.64	.03	53	.06
23	3.0	14	54	13	43	8.1	7.0	3.3	.63	.03	304	.01
24	3.1	12	79	11	35	44	6.7	3.1	.55	.00	21	.0
25	2.9	14	84	8.2	31	102	7.0	2.2	.53	.00	3.4	.0
26	3.5	13	39	7.3	31	40	11	1.6	.48	.00	1.3	.00
27	3.3	23	37	6.9	31	26	9.7	1.6	.44	.00	.83	.00
28	3.8	1280	56	7.4	23	26	7.3	1.5	.46	.00	.44	.12
29	3.6	557	36	8.6	21	38	6.1	1.5	.55	.02	.21	.17
30	3.6	83	25	16	---	25	5.8	1.4	.67	.00	.14	1.2
31	7.7	---	16	32	---	19	---	1.3	---	.01	.11	---
TOTAL	103.3	3251.9	887.0	333.2	653.8	558.0	491.4	98.3	33.49	10.27	389.79	12.10
MEAN	3.33	108	28.6	10.7	22.5	18.0	16.4	3.17	1.12	.33	12.6	.40
MAX	7.7	1280	84	32	120	102	83	9.2	5.6	1.1	304	4.2
MIN	2.6	8.3	5.8	5.9	4.0	5.2	5.8	1.3	.44	.00	.00	.00
AC-FT	205	6450	1760	661	1300	1110	975	195	66	20	773	24
CFSM	.03	1.04	.28	.10	.22	.17	.16	.03	.01	.00	.12	.00
IN.	.04	1.16	.32	.12	.23	.20	.18	.04	.01	.00	.14	.00

CAL YR 1987	TOTAL 26580.21	MEAN 72.8	MAX 3290	MIN .30	AC-FT 52720	CFSM .70	IN. 9.51
WTR YR 1988	TOTAL 6822.55	MEAN 18.6	MAX 1280	MIN .00	AC-FT 13530	CFSM .18	IN. 2.44

## CHARITON RIVER BASIN

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## 06903400 CHARITON RIVER NEAR CHARITON, IA

LOCATION.--Lat 40°57'12", long 93°15'37", in SW1/4 NE1/4 sec.15, T.71 N., R.21 W., Lucas County, Hydrologic Unit 10280201, on right bank 15 ft downstream from bridge on county highway S43, 0.4 mi downstream from Wolf Creek and 5.0 mi southeast of Chariton.

DRAINAGE AREA.--182 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1965 to current year. Occasional low-flow measurements, water years 1958-60, 1962, 1964.

GAGE.--Water-stage recorder. Datum of gage is 917.90 ft above NGVD ( U.S. Army Corps of Engineers bench mark ).

REMARKS.--Estimated daily discharges: Dec. 14-16, Dec. 29 to Jan. 8, Jan. 13 to Feb. 25, Mar. 1-7, July 20-22 and July 24. Records good except those for estimated daily discharges, which are poor. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--23 years, 118 ft<sup>3</sup>/s, 8.80 in/yr, 85,490 acre-ft/yr; median of yearly mean discharges, 98.0 ft<sup>3</sup>/s, 7.3 in/yr, 71,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 16,600 ft<sup>3</sup>/s July 4, 1981, gage height, 23.14 ft; no flow at times during some years.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in March 1960 reached a stage of about 23 ft, discharge, about 15,000 ft<sup>3</sup>/s and flood of June 5, 1947 reached a stage of 21.65 ft, from floodmark, discharge, 11,000 ft<sup>3</sup>/s. A discharge of 0.08 ft<sup>3</sup>/s was measured on Oct. 30, 1963.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,600 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 29	0500	*1,840	*16.40	No other peak greater than base discharge.			

No flow at times June through September.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	12	175	987	45	45	56	36	8.3	.96	.00	.00	.88
2	11	336	185	33	27	41	68	7.3	2.5	.00	.00	1.0
3	10	249	94	25	21	31	100	6.2	1.6	.00	.00	.97
4	8.9	83	76	21	16	27	83	5.7	.86	.00	.11	.61
5	8.1	48	60	19	14	26	66	5.2	.62	.00	.14	.58
6	6.9	34	51	18	12	24	51	4.5	.48	.00	.00	.52
7	6.4	27	49	17	11	25	41	4.2	.46	.00	.00	.30
8	6.2	24	48	17	10	32	34	6.4	.51	.00	.05	.21
9	5.4	22	81	16	9.4	34	28	61	.64	.00	.16	.10
10	4.9	19	73	16	8.4	32	24	27	.60	.00	.42	.05
11	4.7	17	72	17	8.0	31	22	14	.50	.00	.52	.01
12	4.5	17	60	20	8.0	32	20	8.8	.38	.00	.38	.04
13	4.0	17	47	14	8.3	28	18	6.2	.34	.00	.26	.03
14	4.1	17	37	13	8.7	23	16	5.0	.29	.00	.20	.00
15	6.8	17	30	14	9.3	20	14	3.8	.24	.00	.15	.00
16	20	42	35	19	10	19	13	2.8	.17	.00	.11	.28
17	25	467	37	25	17	19	12	2.3	.08	.00	.07	.18
18	18	400	37	33	28	19	11	2.1	.00	.00	.03	.09
19	14	182	77	43	66	20	9.4	1.7	.02	.00	.08	4.0
20	11	77	1100	59	200	21	8.8	1.5	.02	.00	.04	7.8
21	11	50	740	30	160	24	8.0	1.4	.00	.00	.00	2.8
22	11	40	498	23	125	25	7.6	1.3	.00	.00	.17	1.8
23	12	36	322	30	105	25	7.7	3.4	.00	.00	1.9	1.5
24	12	33	996	25	85	27	7.6	8.6	.00	.00	1.2	.66
25	13	44	737	18	75	73	7.4	6.3	.00	.00	.54	.40
26	14	42	441	16	77	72	11	3.6	.00	.00	9.6	.32
27	15	48	162	15	81	61	13	2.2	.00	.00	11	.30
28	14	924	301	16	74	43	12	1.6	.00	.00	6.0	.34
29	14	1560	160	19	68	49	12	1.4	.00	.00	3.3	1.2
30	14	910	102	37	---	44	10	1.1	.00	.00	2.0	2.1
31	18	---	63	80	---	37	---	.92	---	.00	1.1	---
TOTAL	339.9	5957	7758	793	1387.1	1040	771.5	215.82	11.27	0.00	39.53	29.07
MEAN	11.0	199	250	25.6	47.8	33.5	25.7	6.96	.38	.00	1.28	.97
MAX	25	1560	1100	80	200	73	100	61	2.5	.00	11	7.8
MIN	4.0	17	30	13	8.0	19	7.4	.92	.00	.00	.00	.00
AC-FT	674	11820	15390	1570	2750	2060	1530	428	22	.0	78	58
CFSM	.06	1.09	1.38	.14	.26	.18	.14	.04	.00	.00	.01	.01
IN.	.07	1.22	1.59	.16	.28	.21	.16	.04	.00	.00	.01	.01

CAL YR 1987	TOTAL	64208.9	MEAN	176	MAX	4890	MIN	1.1	AC-FT	127400	CFSM	.97	IN.	13.12
WTR YR 1988	TOTAL	18342.19	MEAN	50.1	MAX	1560	MIN	.00	AC-FT	36380	CFSM	.28	IN.	3.75

## CHARITON RIVER BASIN

06903700 SOUTH FORK CHARITON RIVER NEAR PROMISE CITY, IA

LOCATION.--Lat 40°48'02", long 93°11'32", in SW1/4 SW1/4 sec.5, T.69 N., R.20 W., Wayne County, Hydrologic Unit 10280201, on right bank 20 ft downstream from bridge on county highway S50, 1.3 mi downstream from Jordan Creek and 4.3 mi northwest of Promise City.

DRAINAGE AREA.--168 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1967 to current year. Occasional low-flow measurements, water years 1958-66, published as "near Bethlehem". Monthly discharge measurements for March 1965 to September 1967 available in files of Iowa City district office.

GAGE.--Water-stage recorder. Datum of gage is 913.70 ft above NGVD (U.S. Army Corps of Engineers bench mark).

REMARKS.--Estimated daily discharges: Oct. 23-29, Nov. 5-15, 20-26, Dec. 15-21, Dec. 29 to Feb. 29, May 14-22, June 23 to July 1, 7-9, and July 11 to Sept. 30. Records good except those for estimated daily discharges, which are poor. U.S. Army Corps of Engineers satellite data collection platform at station.

AVERAGE DISCHARGE.--21 years, 116 ft<sup>3</sup>/s, 9.38 in/yr, 84,040 acre-ft/yr; median of yearly mean discharges, 110 ft<sup>3</sup>/s, 8.9 in/yr, 79,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 28,000 ft<sup>3</sup>/s July 4, 1981, gage height, 29.95 ft; no flow July 6, 7, 21-24, 28-31, and Aug. 1, 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Sept. 21, 1965, reached a stage of 25.5 ft, from floodmarks, discharge, about 18,000 ft<sup>3</sup>/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 28	2030	*2,770	*15.71	No other peak greater than base discharge.			

Minimum daily discharge, 0.09 ft<sup>3</sup>/s Sept. 13.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	11	470	153	66	31	42	28	9.6	1.1	.42	.12	1.5		
2	10	256	109	48	20	36	101	8.1	2.1	1.4	.12	1.8		
3	8.8	112	92	39	16	29	120	7.1	4.3	1.3	.11	1.5		
4	8.3	82	75	32	12	25	69	8.2	4.1	1.3	.35	1.3		
5	8.0	60	67	28	11	25	51	7.7	2.2	1.0	1.0	1.1		
6	7.0	46	60	26	9.5	26	44	6.4	1.6	.30	.40	.90		
7	6.3	34	57	24	10	26	36	6.2	1.5	.23	.15	.76		
8	6.2	34	57	23	11	32	27	12	1.9	.21	.37	.64		
9	5.9	25	104	21	10	33	23	49	1.8	.19	.60	.52		
10	5.4	22	80	21	9.5	28	22	24	1.6	.97	.56	.52		
11	5.2	20	66	21	9.0	27	19	13	1.3	.35	.70	.49		
12	6.0	19	58	24	8.8	29	18	8.6	1.1	.21	.52	.12		
13	6.3	18	46	17	9.0	22	17	6.7	.96	.18	.38	.09		
14	5.7	17	40	15	10	25	15	5.8	.85	.16	.30	.10		
15	6.1	17	32	16	9.7	25	13	4.6	.87	.15	.24	.13		
16	10	105	29	20	11	21	12	3.6	.86	.14	.20	.29		
17	19	550	28	25	14	17	11	2.9	.76	.14	.17	.15		
18	15	191	32	31	23	17	10	2.4	.69	.50	.14	.70		
19	11	99	62	38	51	19	8.8	2.1	.64	.45	.20	4.0		
20	11	70	690	48	145	18	8.6	1.8	.64	.60	.25	15		
21	13	49	450	25	120	17	8.2	1.7	.57	.19	.17	6.6		
22	14	37	294	18	95	17	8.7	1.6	.54	.15	.74	2.3		
23	14	31	331	22	81	19	9.0	12	.53	.13	2.5	1.7		
24	15	30	1160	18	66	23	8.6	17	.50	.12	1.0	.90		
25	16	47	399	13	60	70	9.3	12	.45	.13	3.6	.52		
26	17	40	173	11	62	41	29	8.0	.42	.12	15	.35		
27	18	91	266	11	66	27	29	4.4	.40	.12	11	.32		
28	17	1760	442	12	61	24	19	4.0	.36	.12	8.0	.64		
29	17	1290	84	14	57	43	14	2.9	.39	.12	5.0	1.2		
30	100	290	74	26	---	44	12	1.3	.42	.14	3.4	2.2		
31	110	---	73	52	---	30	---	1.1	---	.13	2.3	---		
TOTAL	523.2	5912	5683	805	1098.5	877	800.2	255.8	35.45	11.67	59.59	48.34		
MEAN	16.9	197	183	26.0	37.9	28.3	26.7	8.25	1.18	.38	1.92	1.61		
MAX	110	1760	1160	66	145	70	120	49	4.3	1.4	15	15		
MIN	5.2	17	28	11	8.8	17	8.2	1.1	.36	.12	.11	.09		
AC-FT	1040	11730	11270	1600	2180	1740	1590	507	70	23	118	96		
CFSM	.10	1.17	1.09	.15	.23	.17	.16	.05	.01	.00	.01	.01		
IN.	.12	1.31	1.26	.18	.24	.19	.18	.06	.01	.00	.01	.01		
CAL YR 1987	TOTAL	45694.9	MEAN	125	MAX	3340	MIN	3.5	AC-FT	90640	CFSM	.75	IN.	10.12
WTR YR 1988	TOTAL	16109.75	MEAN	44.0	MAX	1760	MIN	.09	AC-FT	31950	CFSM	.26	IN.	3.57



## 223

LOCATION.--Lat 40°49'30", long 92°53'33", in NW1/4 NE1/4 sec.35, T.70 N., R.18 W., Appanoose County, Hydrologic Unit 10280201, at control tower of Rathbun Dam, 1.8 mi north of Rathbun and 3.9 mi upstream from Walnut Creek and at mile 142.3.

GAGE.--Water-stage recorder. Datum of gage is at NGVD.

COOPERATION.--Records provided by U.S. Army Corps of Engineers.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily contents, 514,000 acre-ft July 22, 23, 1982; maximum elevation, 924.46 ft July 22, 1982; minimum daily contents, 100 acre-ft Oct. 1-15, Nov. 17-21, 1969; minimum elevation, 855.40 ft Oct. 6-10, 1969.

EXTREMES FOR CURRENT YEAR.--Maximum daily contents, 235,000 acre-ft Oct. 1; maximum elevation 907.05 ft Oct. 1; minimum daily contents, 176,000 acre-ft Sept. 14-18; minimum elevation, 901.78 ft Sept. 16-18.

860	150	880	31,900	905	211,000
862	226	885	52,700	910	272,600
865	950	890	80,300	915	345,000
870	5,870	895	115,600	920	428,900
875	17,000	900	158,800	925	524,900

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	235000	201000	225000	218000	202000	213000	201000	199000	195000	190000	185000	180000
2	234000	202000	227000	217000	203000	213000	200000	198000	195000	189000	184000	180000
3	231000	203000	228000	215000	203000	213000	201000	198000	195000	189000	184000	180000
4	229000	204000	227000	214000	203000	212000	201000	198000	195000	189000	184000	180000
5	228000	204000	225000	212000	203000	212000	201000	198000	194000	189000	184000	180000
6	227000	204000	223000	209000	203000	212000	202000	198000	194000	189000	184000	179000
7	224000	204000	222000	207000	203000	211000	201000	198000	194000	189000	184000	179000
8	222000	203000	220000	206000	203000	211000	201000	198000	194000	189000	184000	179000
9	221000	203000	218000	204000	203000	211000	200000	199000	195000	188000	183000	178000
10	219000	202000	216000	202000	204000	211000	201000	198000	195000	188000	183000	178000
11	217000	202000	214000	200000	204000	210000	201000	198000	195000	188000	183000	178000
12	215000	201000	213000	200000	204000	210000	200000	198000	194000	188000	183000	178000
13	214000	201000	210000	200000	204000	209000	200000	198000	194000	188000	183000	177000
14	212000	201000	208000	200000	204000	209000	200000	198000	194000	188000	183000	176000
15	211000	200000	208000	199000	204000	209000	200000	198000	194000	187000	183000	176000
16	209000	201000	205000	199000	204000	209000	200000	198000	193000	187000	182000	176000
17	207000	202000	202000	200000	204000	208000	200000	197000	193000	187000	182000	176000
18	207000	203000	200000	199000	204000	207000	200000	197000	193000	187000	182000	176000
19	205000	204000	200000	200000	205000	206000	199000	197000	193000	187000	182000	177000
20	204000	205000	203000	200000	207000	205000	199000	197000	193000	187000	182000	177000
21	203000	205000	207000	200000	209000	204000	199000	197000	193000	187000	181000	177000
22	202000	205000	212000	200000	210000	203000	198000	197000	192000	187000	181000	177000
23	202000	205000	213000	200000	211000	202000	199000	197000	192000	187000	182000	177000
24	202000	205000	215000	201000	211000	201000	199000	198000	192000	186000	182000	177000
25	201000	205000	218000	201000	212000	202000	198000	198000	192000	186000	182000	177000
26	201000	205000	219000	201000	212000	202000	199000	197000	191000	186000	182000	177000
27	201000	205000	219000	201000	212000	201000	199000	197000	191000	186000	181000	177000
28	201000	208000	220000	201000	212000	201000	199000	196000	191000	186000	181000	177000
29	2000											

## CHARITON RIVER BASIN

06903900 CHARITON RIVER NEAR RATHBUN, IA

LOCATION.--Lat 40°49'22", long 92°53'22", in SE1/4 NE1/4 sec.35, T.70 N., R.18 W., Appanoose County, Hydrologic Unit 10280201, on left bank 600 ft downstream from outlet of Rathbun Dam, 1.8 mi north of Rathbun and 3.7 mi upstream from Walnut Creek and at mile 142.1.

DRAINAGE AREA.--549 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1956 to current year. Monthly discharge only for some periods, published in WSP 1730.

REVISED RECORDS.--WSP 1560: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 847.92 ft above NGVD. Prior to Nov. 16, 1960, nonrecording gage and Nov. 17, 1960, to Sept. 30, 1969, recording gage, at site 3.1 mi downstream at datum 4.65 ft lower.

REMARKS.--Estimated daily discharges: Nov. 28, 29, Jan. 25, May 11-15, and July 8-24. Records good except those for estimated daily discharges, which are fair. U.S. Army Corps of Engineers gage-height telemeter at station. Flow regulated by Rathbun Reservoir (station 06903880) since Nov. 21, 1969. Records of discharge include diversion of:

Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)
Oct. 1 - Jan. 11	11	May 25, 26	12
Jan. 12	17	May 27	23
Jan. 13 to Feb. 5	18	May 28-31	12
Feb. 6 to May 22	12	June 1 to Aug. 31	5
May 23-24	23	Sept. 1-30	9

The diversion goes from the reservoir through fish ponds on left bank downstream from dam. Diverted flow returns to stream 0.1 mi downstream from gage. Rathbun Regional Water Association permit No. 3663 allows withdrawal from Rathbun Dam discharge immediately downstream from gage for maximum rate of 4,200 gpm (9.36 ft<sup>3</sup>/s) and maximum quantity of 638 million gallons per year (1,955 acre-ft).

AVERAGE DISCHARGE.--32 years, 346 ft<sup>3</sup>/s, 8.56 in/yr, (unadjusted) 250,700 acre-ft/yr; median of yearly mean discharges, 270 ft<sup>3</sup>/s, 6.7 in/yr, 196,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 21,800 ft<sup>3</sup>/s Mar. 31, 1960, gage height, 25.3 ft from flood-mark, site and datum then in use; no flow Oct. 26, 1977.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,130 ft<sup>3</sup>/s Dec. 8-9, gage height, 11.09 ft; minimum daily discharge, 16 ft<sup>3</sup>/s June 1, 2, 11-17, 20, 24-28 and July 6, 7.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	815	33	269	956	18	154	219	22	16	17	18	21
2	818	67	501	933	18	212	219	23	16	17	18	20
3	815	166	602	927	18	214	219	23	17	17	17	21
4	809	217	794	925	21	214	166	23	17	17	18	21
5	805	215	956	926	28	215	123	23	17	17	18	21
6	803	215	950	924	23	215	124	23	17	16	18	21
7	798	215	947	921	23	215	124	23	18	16	18	21
8	793	215	1040	919	24	213	125	23	18	27	18	23
9	789	214	1130	916	24	214	124	22	18	26	18	23
10	786	214	1120	914	25	214	124	22	18	25	18	22
11	780	214	1120	417	25	214	124	23	16	24	18	22
12	778	214	1120	41	25	214	93	23	16	23	19	21
13	776	168	1110	94	25	214	65	23	16	23	18	21
14	781	122	1110	83	25	215	52	23	16	23	18	21
15	787	122	1110	78	25	215	61	22	16	24	18	20
16	808	122	1110	80	26	352	61	22	16	24	18	22
17	808	122	1100	80	49	480	61	23	16	24	18	22
18	805	121	567	45	65	480	38	23	17	24	18	23
19	808	121	73	23	64	480	23	23	17	24	18	22
20	441	121	82	18	63	480	23	23	16	25	18	22
21	130	121	71	18	63	480	23	23	17	25	18	21
22	101	123	167	18	62	480	23	23	17	25	19	21
23	119	122	679	18	61	481	22	34	17	25	18	20
24	120	123	972	18	63	417	23	34	16	21	19	22
25	121	123	962	18	63	216	23	24	16	18	19	21
26	121	123	945	18	63	215	22	24	16	17	19	21
27	121	124	950	18	63	217	22	245	16	17	20	21
28	121	124	734	18	63	218	22	282	16	17	20	21
29	121	124	714	18	61	218	22	146	17	17	19	22
30	76	124	937	18	---	218	22	107	17	18	18	22
31	33	---	937	18	---	218	---	55	---	18	18	---
TOTAL	16787	4449	24879	10418	1176	8802	2392	1452	499	651	567	642
MEAN	542	148	803	336	40.6	284	79.7	46.8	16.6	21.0	18.3	21.4
MAX	818	217	1130	956	65	481	219	282	18	27	20	23
MIN	33	33	71	18	18	154	22	22	16	16	17	20
AC-FT	33300	8820	49350	20660	2330	17460	4740	2880	990	1290	1120	1270

CAL YR 1987 TOTAL 143994 MEAN 395 MAX 1220 MIN 23 AC-FT 285600  
WTR YR 1988 TOTAL 72714 MEAN 199 MAX 1130 MIN 16 AC-FT 144200

## 06904010 CHARITON RIVER NEAR MOULTON, IA

LOCATION.--Lat 40°41'30", long 92°46'15", in SE1/4 NE1/4 sec.14, T.68N., R.17W., Appanoose County, Hydrologic Unit 10280201, on right bank 6 ft downstream from bridge on county highway J45, 0.7 mi downstream from Hickory Creek, 5.0 mi west of Moulton, 8.0 mi upstream from Iowa-Missouri border, 20.8 mi downstream from Rathbun Dam, and at mile 121.5.

DRAINAGE AREA.--740 mi<sup>2</sup>.

PERIOD OF RECORD--August 1979 to current year.

GAGE--Water stage recorder. Datum of gage is 800.00 ft above NGVD (U.S. Army Corps of Engineers bench mark).

REMARKS.--Estimated daily discharges: Oct. 10-13, Dec. 31 to Mar. 1, June. 3-20, July 19-21, and Aug. 23-24. Records good except those for estimated daily discharges, which are poor. Flow regulated by Rathbun Reservoir (station 06903880) 20.8 mi upstream. U.S. Army Corps of Engineers rain-gage, gage-height telemeters and satellite data collection platform at station.

AVERAGE DISCHARGE.--9 years, 610 ft<sup>3</sup>/s, 11.2 in/yr, 441,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 11,200 ft<sup>3</sup>/s July 16, 1982, gage height, 36.83 ft; minimum daily discharge, 14 ft<sup>3</sup>/s June 22-23, 27, and July 9, 1988.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1947 reached a stage of about 45 ft, discharge unknown, from information by U.S. Army Corps of Engineers.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 2,270 ft<sup>3</sup>/s Nov. 28, gage height, 27.07 ft; minimum daily discharge, 14 ft<sup>3</sup>/s June 22-23, 27, and July 9.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	782	124	316	1200	39	80	250	26	49	16	17	21
2	779	212	480	1160	37	247	256	24	26	17	17	21
3	776	203	644	1150	40	253	258	24	22	18	17	21
4	774	233	680	1150	38	249	258	24	21	17	17	21
5	776	238	994	1100	38	247	172	24	20	16	21	21
6	772	234	1020	1100	37	248	151	22	19	16	19	21
7	771	232	1020	1100	35	251	146	22	19	15	18	21
8	769	229	1040	1100	35	256	141	28	62	16	19	21
9	769	226	1230	1100	36	256	137	43	35	14	22	22
10	770	226	1240	1100	36	253	135	37	22	19	21	24
11	770	227	1240	1100	36	250	134	33	18	22	20	25
12	775	227	1230	270	35	248	130	30	17	18	19	25
13	780	227	1220	100	36	244	94	27	17	17	19	25
14	789	163	1210	120	37	236	79	23	17	18	18	25
15	773	146	1210	92	37	235	66	23	16	18	17	25
16	803	154	1200	80	37	245	73	21	16	17	17	33
17	810	331	1200	80	40	476	70	21	16	18	16	32
18	804	269	1110	70	60	496	68	22	16	25	18	30
19	805	210	306	58	90	496	51	22	16	21	20	40
20	757	170	1590	58	100	498	38	22	16	20	20	40
21	223	158	881	50	90	497	36	20	16	19	20	31
22	154	154	497	51	86	499	36	24	14	19	28	29
23	125	154	684	45	90	496	35	33	14	18	50	28
24	141	153	1570	38	84	504	33	43	15	18	30	28
25	140	168	1630	41	85	350	33	34	15	17	22	26
26	141	167	1220	35	84	271	44	33	15	17	21	27
27	140	182	1190	34	83	266	40	30	14	18	22	27
28	141	1470	1680	33	84	255	36	325	15	18	22	29
29	140	1710	913	35	84	262	32	198	15	17	22	30
30	140	623	1110	35	---	262	29	112	16	18	21	28
31	93	---	1150	46	---	254	---	98	---	18	21	---
TOTAL	17182	9220	32705	13731	1649	9680	3061	1468	609	555	651	797
MEAN	554	307	1055	443	56.9	312	102	47.4	20.3	17.9	21.0	26.6
MAX	810	1710	1680	1200	100	504	258	325	62	25	50	40
MIN	93	124	306	33	35	80	29	20	14	14	16	21
AC-FT	34080	18290	64870	27240	3270	19200	6070	2910	1210	1100	1290	1580
CAL YR 1987	TOTAL 181499	MEAN 497	MAX 2850	MIN 31	AC-FT 360000							
WTR YR 1988	TOTAL 91308	MEAN 249	MAX 1710	MIN 14	AC-FT 181100							

## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

## Crest-stage partial-record stations

The following table contains annual maximum discharge for crest-stage stations. A crest-stage is a device which will register the peak stage occurring between inspections of the gage. A stage-discharge relation for each gage is developed from discharge measurements made by indirect measurements of peak flow or by current meter. The date of the maximum discharge is not always certain but is usually determined by comparison with nearby continuous-record stations, weather records, or local inquiry. Only the maximum discharge for each water year is given. Information on some lower floods may have been obtained, but is not published herein. The years given in the period of record represent water years up to the current year for which the annual maximum has been determined.

## Annual maximum discharge at crest-stage partial-record stations during water year 1988

Station no.	Station name	Location	Drainage area (mi <sup>2</sup> )	Period of record	Date	Annual maximum Gage height (feet)	Dis-charge (ft <sup>3</sup> /s)
Upper Iowa River Basin							
05387500	Upper Iowa River at Decorah, Ia.	Lat 43°18'19", long 91°47'48", in NE1/4 sec. 16, T.98N., R.8 W., Winneshiek County, on right bank 1,200 ft upstream from bridge on U.S. Highway 52 (city route) in Decorah.	511	1951-	c06-21-87 03-08-88	4.56 4.66	375 430
05388310	Waterloo Creek near Dorchester, Ia.	Lat 43°27'04", long 91°30'18", in NW1/4 sec. 25, T.100 N., R.6 W., Allamakee County, on State Highway 76, 1.4 mi south of Dorchester.	43.6	1966-	1988	(a)	(+)
Wexford Creek Basin							
05388400	Wexford Creek near Harpers Ferry, Ia.	Lat 43°16'22", long 91°08'00", in SE1/4 sec. 25, T.98 N., R.3 W., Allamakee County, at bridge, 5 mi north of Harpers Ferry on county highway X52.	11.9	1953-	1988	(a)	(+)
Turkey River Basin							
05411530	North Branch Turkey River near Cresco, Ia.	Lat 43°22'15", long 92°12'49", in NW1/4 sec. 25, T.99 N., R.12 W., Howard County, at bridge on state highway 9, 5 mi west of Cresco.	19.5	1966-	1988	(a)	(+)
05411700	Crane Creek near Lourdes, Ia.	Lat 43°14'57", long 92°18'32", in SE1/4 NW1/4 sec. 6, T.97 N., R.12 W., Howard County, at bridge on State Highway 272, 1 mi southwest of Lourdes.	75.8	1951-	1988	(a)	<210
Little Maquoketa River Basin							
05414350	Little Maquoketa River near Graf, Ia.	Lat 42°30'09", long 90°51'50", in SE1/4 sec. 20, T.89 N., R.1 E., Dubuque County, at bridge on county highway, 300 ft downstream from Illinois Central railroad bridge, 0.5 mi northeast of Graf.	39.6	1951-	c08-26-87 1988	8.75 (a)	1,800 <1,150
05414400	Middle Fork Little Maquoketa River near Rickardsville, Ia.	Lat 42°33'38", long 90°51'35", in SE1/4 sec. 32, T.90 N., R.1 E., Dubuque County, at bridge on county highway, 2 mi southeast of Rickardsville.	30.2	1951-	c08-26-87 1988	14.96 (a)	650 <180
05414450	North Fork Little Maquoketa River near Rickardsville, Ia.	Lat 42°35'09", long 90°51'20", near NW corner sec. 28, T.90 N., R.1 E., Dubuque County, at bridge on county highway, 1 mi northeast of Rickardsville.	21.6	1951-	1988	(a)	<290
05414500	Little Maquoketa River near Durango, Ia.	Lat 42°33'18", long 90°44'46", in NW1/4 NE1/4 sec. 5, T.89 N., R.2 E., Dubuque County, on left bank 10 ft upstream from bridge on county highway, 300 ft upstream from Cloie Branch, 1.7 mi east of Durango, 5.6 mi northwest of court house at Dubuque and 6.4 mi upstream from mouth.	130	1934-	c09-21-86 c1987 1988	16.11 (a) (a)	8,400 <3,140 <3,140
05414600	Little Maquoketa River tributary at Dubuque, Ia.	Lat 42°32'33", long 90°41'38", near NW corner sec. 11, T.89 N., R.2 E., Dubuque County at bridge on State Highway 386, near north city limits of Dubuque.	1.54	1951-	c03-01-87 1988	12.45 (a)	370 <90

## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

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Annual maximum discharge at crest-stage partial-record stations during water year 1988--Continued

Station no.	Station name	Location	Drainage area (mi <sup>2</sup> )	Period of record	Date	Annual maximum Gage height (feet)	Dis-charge (ft <sup>3</sup> /s)
Maquoketa River Basin							
05417530	Plum Creek at Earlville, Ia.	Lat 42°28'13", long 91°14'53", in NE1/4 sec.1, T.88 N., R.4 W., Delaware County, at bridge on U.S. Highway 20, 1.5 mi southeast of Earlville.	41.1	1966-	c08-08-87 1988	83.12 (a)	800 <490
05417590	Kitty Creek near Langworthy, Ia.	Lat 42°12'04", long 91°12'27", in NW1/4 sec.4, T.85 N., R.3 W., Jones County, at bridge on U.S. Highway 151, 1 mi north-east of Langworthy.	14.4	1966-	c08-08-87 1988	85.87 (a)	560 <430
Wapsipinicon River Basin							
05420600	Little Wapsipinicon River tributary near Riceville, Ia.	Lat 43°21'31", long 92°29'08", near S1/4 corner sec.27, T.99 N., R.14 W., Howard County, at culvert on county highway, 3.5 mi east of Riceville.	0.90	1953-	1988	(a)	(+)
05420620	Little Wapsipinicon River near Acme, Ia.	Lat 43°19'37", long 92°29'07", near N1/4 corner sec.10, T.98 N., R.14 W., Howard County, at bridge on county highway, 1 mi north of Acme.	7.76	1953-	1988	(a)	<92
05420640	Little Wapsipinicon River at Elma, Ia.	Lat 43°14'30", long 92°27'04", in NW1/4 sec.12, T.97 N., R.14 W., Howard County, at bridge on county highway B17, near west city limits of Elma.	37.3	1953-	1988	(a)	<430
05420650	Little Wapsipinicon River near New Hampton, Ia.	Lat 43°03'58", long 92°23'38", in NW1/4 sec.9, T.95 N., R.13 W., Chickasaw County, at bridge on U.S. Highway 18, 4 mi west of New Hampton.	95.0	1966-	1988	(a)	<420
05420690	East Fork Wapsipinicon River near New Hampton, Ia.	Lat 43°05'11", long 92°18'22", in SE1/4 sec.31, T.96 N., R.12 W., Chickasaw County, at bridge on U.S. Highway 63, 2 mi north of New Hampton.	30.3	1966-	1988	(a)	<480
05420850	Little Wapsipinicon River near Oran, Ia.	Lat 42°42'53", long 92°02'29", near NW corner sec.9, T.91 N., R.10 W., Fayette County at bridge on State Highway 3, 2 mi northeast of Oran.	94.1	1966-	03-12-88	86.00(b)	(+)
05420855	Buck Creek near Oran, Ia.	Lat 42°42'53", long 92°07'33", in NE1/4 sec.10, T.91 N., R.11 W., Bremer County, at bridge on State Highway 3, 2.5 mi northwest of Oran.	37.9	1966-	03-12-88	87.17(b)	(+)
05421100	Pine Creek tributary near Winthrop, Ia.	Lat 42°29'17", long 91°47'10", in SW1/4 sec.27, T.89 N., R.8 W., Buchanan County, at culvert on county highway, 2.5 mi northwest of Winthrop.	0.334	1953-	1988	(a)	(+)
05421200	Pine Creek near Winthrop, Ia.	Lat 42°28'11", long 91°47'01", in SW/4 sec.34, T.89 N., R.8 W., Buchanan County, at railroad bridge, 500 ft upstream from U.S. Highway 20, and 2.5 mi north-west of Winthrop.	28.3	1950-	1988	(a)	(+)
05421300	Pine Creek tributary No. 2 at Winthrop, Ia.	Lat 42°28'06", long 91°44'33", at N1/4 corner sec.2, T.88 N., R.8 W., Buchanan County, at culvert on U.S. Highway 20, near west city limits of Winthrop.	0.704	1953-	1988	(a)	(+)
05421550	Buffalo Creek above Winthrop, Ia.	Lat 42°29'51", long 91°43'42", near NE corner sec.25, T.89 N., R.8 W., Buchanan County, at bridge on county highway W45, 1.5 mi northeast of Winthrop.	68.2	1957-	1988	(a)	(+)
05421600	Buffalo Creek near Winthrop, Ia.	Lat 42°28'07", long 91°43'04", in NE1/4 sec.1, T.88 N., R.8 W., Buchanan County, at bridge on U.S. Highway 20, 1 mi east of Winthrop.	71.4	1953-	03-12-88	85.21(b)	(+)
05421890	Silver Creek at Welton, Ia.	Lat 41°54'54", long 90°36'00", in NW1/4 sec.15, T.82 N., R.3 E., Clinton County, at bridge on U.S. Highway 61, at north edge of Welton.	9.03	1966-	c05-19-87 11-30-87	85.91 87.20	385 584

## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Annual maximum discharge at crest-stage partial-record stations during water year 1988--Continued

Station no.	Station name	Location	Drainage area (mi <sup>2</sup> )	Period of record	Date	Annual maximum Gage height (feet)	Dis-charge (ft <sup>3</sup> /s)
Iowa River Basin							
05448400	Westmain drainage ditch 1 & 2 near Britt, Ia.	Lat 43°06'09", long 93°47'04", in SW1/4 sec.27, T.96 N., R.25 W., Hancock County, at bridge on U.S. Highway 18, near east city limits of Britt.	21.2	1966-	1988	(a)	<53
05448600	East Branch Iowa River above Hayfield, Ia.	Lat 43°09'21", long 93°41'21", near S1/4 corner sec.4, T.96 N., R.24 W., Hancock County, at bridge on county highway, 1.5 mi southeast of Hayfield.	2.23	1953-	c03-31-87 03-02-88	2.6 5.24(b)	(+) (+)
05448700	East Branch Iowa River near Hayfield, Ia.	Lat 43°10'50", long 93°39'20", in NW1/4 sec.35, T.97 N., R.24 W., Hancock County, at bridge on county highway B20, 2 mi east of Hayfield.	7.94	1952-	1988	(a)	(+)
05448800	East Branch Iowa River near Garner, Ia.	Lat 43°06'17", long 93°37'20", near center sec.25, T.96 N., R.24 W., Hancock County, at bridge on U.S. Highway 18, 1.2 mi west of Garner.	45.1	1952-	1988	(a)	(+)
05448900	East Branch Iowa River tributary near Garner, Ia.	Lat 43°06'18", long 93°39'29", near E1/4 corner sec.27, T.96 N., R.24 W., Hancock County, at culvert on U.S. Highway 18, 2.1 mi west of Garner.	5.98	1952-	1988	(a)	(+)
05451955	Stein Creek near Clutier, Ia.	Lat 42°04'46", long 92°18'00", in NE1/4 sec.24, T.84 N., R.13 W., Tama County, at bridge on State Highway 318, 5 mi east of Clutier.	23.4	1971-	1988	(a)	(+)
05453200	Price Creek at Amana, Ia.	Lat 41°48'18", long 91°52'23", in SE1/4 sec.22, T.81 N., R.9 W., Iowa County, at bridge on State Highway 149, near north edge of Amana.	29.1	1966-	1988	(a)	(+)
05453600	Rapid Creek below Morse, Ia.	Lat 41°43'45", long 91°25'38", near NE corner sec.21, T.80 N., R.5 W., Johnson County, at bridge on county highway, 1.5 mi southeast of Morse.	8.12	1951-	01-19-88	19.20(b)	(+)
05453750	Rapid Creek south-west of Morse, Ia.	Lat 41°43'23", long 91°26'16", in W1/2 sec. 21, T.80 N., R.5 W., Johnson County, at bridge on county highway, 2 mi southwest of Morse.	15.2	1951-	1988	(a)	(+)
05453850	Rapid Creek tributary No. 3 near Oasis, Ia.	Lat 41°42'33", long 91°27'14", near center sec. 29, T.80 N., R.5 W., Johnson County, at bridge on county highway, 3.5 mi west of Oasis.	1.62	1951-	1988	(a)	(+)
05453900	Rapid Creek tributary near Oasis, Ia.	Lat 41°41'14", long 91°26'37", near SW corner sec.33, T.80 N., R.5 W., Johnson County, at bridge on county highway X16, 3 mi southwest of Oasis.	0.97	1951-	1988	(a)	(+)
05453950	Rapid Creek tributary near Iowa City, Ia.	Lat 41°41'56", long 91°28'39", in NW1/4 sec.31, T.80 N., R.5 W., Johnson County, at bridge on county highway, 4 mi north-east of Iowa City.	3.43	1951-	01-19-88	23.15(b)	(+)
05455140	North English River near Montezuma, Ia.	Lat 41°38'45", long 92°34'20", in SW1/4 sec.14, T.79 N., R.15 W., Poweshiek County, at bridge on county highway, 5.0 mi northwest of Montezuma.	31.0	1972-	1988	(a)	(+)
05455200	North English River near Guernsey, Ia.	Lat 41°38'47", long 92°23'47", near SW corner sec.17, T.79 N., R.13 W., Poweshiek County, at bridge on county highway V21, 2.2 mi west of Guernsey.	68.7	1953-	1988	(a)	(+)
05455210	North English River at Guernsey, Ia.	Lat 41°38'42", long 92°21'28", at NW corner sec.22, T.79 N., R.13 W., Poweshiek County at bridge on State Highway 21, 1 mi southwest of Guernsey.	81.5	1960, 1966-	1988	(a)	(+)

## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

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Annual maximum discharge at crest-stage partial-record stations during water year 1988--Continued

Station no.	Station name	Location	Drainage area (mi <sup>2</sup> )	Period of record	Date	Annual maximum Gage height (feet)	Dis-charge (ft <sup>3</sup> /s)
Iowa River Basin--Continued							
05455230	Deep River at Deep River, Ia.	Lat 41°35'29", long 92°21'18", in SW1/4 sec.3, T.78 N., R.13 W., Poweshiek County, at bridge on State Highway 21, 1 mi northeast of Deep River.	30.5	1960, 1966-	1988	(a)	(+)
05455300	South English River near Barnes City, Ia.	Lat 41°31'26", long 92°27'56", near NW corner sec.34, T.78 N., R.14 W., Poweshiek County, at bridge on county highway, 1 mi north of Barnes City.	11.5	1953-	1988	(a)	(+)
05455550	Bulgiers run near Riverside, Ia.	Lat 41°29'02", long 91°37'36", in SE1/4 sec.11, T.77 N., R.7 W., Washington County, at bridge on State Highway 22, 2.5 mi west of Riverside.	6.31	1965-	1988	(a)	(+)
05457440	Deer Creek near Carpenter, Ia.	Lat 43°24'54", long 92°59'05", at NW corner sec.9, T.99 N., R.18 W., Mitchell County, at bridge on State Highway 105, 1.5 mi east of Carpenter.	91.6	1966-	1988	(a)	(+)
05458560	Beaverdam Creek near Sheffield, Ia.	Lat 42°56'11", long 93°12'09", at NW corner sec.27, T.94 N., R.20 W., Cerro Gordo County, at bridge on U.S. Highway 65, 3 mi north of Sheffield.	123	1966-	1988	(a)	<650
05459010	Elk Creek at Kensett, Ia.	Lat 43°22'18", long 93°12'37", in NE1/4 sec.28, T.99 N., R.20 W., Worth County, at bridge on U.S. Highway 65, 1 mi north of Kensett.	58.1	1966-	1988	(a)	<180
05459490	Spring Creek near Mason City, Ia.	Lat 43°12'48", long 93°12'38", in SE1/4 sec.16, T.97 N., R.20 W., Cerro Gordo County, at bridge on U.S. Highway 65, 4 mi north of Mason City.	29.3	1966-	1988	(a)	<115
05460100	Willow Creek near Mason City, Ia.	Lat 43°08'55", long 93°16'07", near center sec.12, T.96 N., R.21 W., Cerro Gordo County, at bridge on U.S. Highway 18, 3.5 mi west of Mason City.	78.6	1966-	1988	(a)	<145
05462750	Beaver Creek tributary near Aplington, Ia.	Lat 42°34'40", long 92°50'49", in NW1/4 sec.27, T.90 N., R.17 W., Butler County, at bridge on U.S. Highway 20, 2 mi east of Aplington.	11.6	1966-	1988	(a)	(+)
05463090	Black Hawk Creek at Grundy Center, Ia.	Lat 42°22'10", long 92°46'05", in NW1/4 sec.7, T.87 N., R.16 W., Grundy County, at bridge on State Highway 14, at north edge of Grundy Center.	56.9	1966-	1988	(a)	<78
05464145	Twelve Mile Creek near Traer, Ia.	Lat 42°13'50", long 92°27'56", in SE1/4 sec.27, T.86 N., R.14 W., Tama County, at bridge on U.S. Highway 63, 2.5 mi north of Traer.	43.8	1966-	1988	(a)	(+)
05464310	Pratt Creek near Garrison, Ia.	Lat 42°10'53", long 92°11'10", in SE1/4 sec.12, T.85 N., R.12 W., Benton County, at bridge on U.S. Highway 218, 3.5 mi northwest of Garrison.	23.4	1966-	1988	(a)	740
05464318	East Blue Creek at Center Point, Ia.	Lat 42°12'44", long 91°47'21", in SW1/4 sec.33, T.86 N., R.8 W., Linn County, at bridge on State Highway 150, 1.5 mi north of Center Point.	17.6	1966-	c08-26-87 1988	78.61 (a)	(+) (+)
05464560	Prairie Creek at Blairstown, Ia. (discontinued)	Lat 41°54'42", long 92°05'03", in SW1/4 sec.13, T.82 N., R.11 W., Benton County, at bridge on State Highway 82, at north edge of Blairstown.	87.0	1966-	1988	(a)	(+)
05464880	Otter Creek at Wilton, Ia.	Lat 41°36'17", long 91°02'08", in NE1/4 sec.35, T.79 N., R.2 W., Cedar County, at bridge on State Highway 38, 1.5 mi northwest of Wilton.	10.7	1966-	c08-26-87 08-23-88	86.92 82.27	1,300 260
05465150	North Fork Long Creek at Ainsworth, Ia.	Lat 41°16'51", long 91°32'16", in SW1/4 sec.22, T.75 N., R.6 W., Washington County, at bridge on U.S. Highway 218, 1 mi southeast of Ainsworth.	30.2	1951, 1965-	01-31-88	87.78(b)	(+)

## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Annual maximum discharge at crest-stage partial-record stations during water year 1988--Continued

Station no.	Station name	Location	Drainage area (mi <sup>2</sup> )	Period of record	Date	Annual maximum Gage height (feet)	Dis-charge (ft <sup>3</sup> /s)
Skunk River Basin							
05469860	Mud Lake drainage ditch 71 in Jewell, Ia.	Lat 42°18'52", long 93°38'23", in SW1/4 sec.27, T.87 N., R.24 W., Hamilton County, at bridge on U.S. Highway 69, in Jewell.	65.4	1966-	1988	(a)	<270
05469990	Keigley Branch near Story City, Ia.	Lat 42°09'01", long 93°37'13", in NW1/4 sec.26, T.85 N., R.24 W., Story County, at bridge on U.S. Highway 69, 3 mi south of Story City.	31.0	1966-	1988	(a)	<245
05472090	North Skunk River near Baxter, Ia.	Lat 41°49'13", long 93°03'41", in NE1/4 sec.21, T.81 N., R.19 W., Jasper County, at bridge on State Highway 223, 4.5 mi east of Baxter.	52.2	1966-	1988	(a)	(+)
05472290	Sugar Creek near Searsboro, Ia.	Lat 41°34'26", long 92°44'20", at E1/4 corner sec.7, T.78 N., R.16 W., Poweshiek County, at bridge on State Highway 225, 1.8 mi west of Searsboro.	52.7	1966-	11-29-87	87.49	520
05472390	Middle Creek near Lacey, Ia.	Lat 41°25'17", long 92°39'04", near N1/4 corner sec.1, T.76 N., R.16 W., Mahaska County, at bridge on U.S. Highway 63, 1.5 mi northwest of Lacey.	23.0	1966-	1988	(a)	(+)
05472445	Rock Creek at Sigourney, Ia.	Lat 41°20'12", long 92°13'20", in NE1/4 sec.3, T.75 N., R.12 W., Keokuk County, at bridge on State Highway 92, near west edge of Sigourney.	26.3	1966-	01-31-88	86.81(b)	(+)
05473300	Cedar Creek near Batavia, Ia.	Lat 41°00'34", long 92°07'06", in SW1/4 sec.27, T.72 N., R.11 W., Jefferson County, at bridge on U.S. Highway 34, 2.5 mi northeast of Batavia.	252	1966-	1988	(a)	(+)
Des Moines River Basin							
05480930	White Fox Creek at Clarion, Ia.	Lat 42°43'55", long 93°42'26", in NW1/4 sec.5, T.91 N., R.24 W., Wright County, at bridge on State Highway 3, 1.5 mi east of Clarion.	13.3	1966-	1988	(a)	<68
05481510	Bluff Creek at Pilot Mound, Ia.	Lat 42°09'59", long 94°01'15", in NW 1/4 sec.20, T.85 N., R.27 W., Boone County, at bridge on State Highway 329, at northwest edge of Pilot Mound.	23.5	1966-	1988	(a)	(+)
05481680	Beaver Creek at Beaver, Ia.	Lat 42°02'04", long 94°08'46", in NE1/4 sec.6, T.83 N., R.28 W., Boone County, at bridge on U.S. Highway 30, at southwest edge of Beaver.	38.5	1966-	1988	(a)	(+)
05481690	West Beaver Creek at Grand Junction, Ia.	Lat 42°01'56", long 94°12'38", in NE1/4 sec.3, T.83 N., R.29 W., Greene County, at bridge on U.S. Highway 30, near east edge of Grand Junction.	12.6	1966-	c08-26-87 1988	85.71 (a)	118 (+)
05482600	Hardin Creek at Farnhamville, Ia.	Lat 42°16'01", long 94°25'10", near NE corner sec.14, T.86 N., R.31 W., Calhoun County, at bridge on State Highway 175, near west city limits of Farnhamville.	43.7	1952-	1988	(a)	(+)
05482800	Happy Run at Churdan, Ia.	Lat 42°10'16", long 94°29'39", in SW1/4 sec.17, T.85 N., R.31 W., Greene County, at bridge on county highway, 1 mi northwest of Churdan.	7.58	1952-	1988	(a)	(+)
05482900	Hardin Creek near Farlin, Ia.	Lat 42°05'34", long 94°25'39", near N1/4 corner sec.14, T.84 N., R.31 W., Greene County, at bridge on county highway, 1.5 mi northeast of Farlin.	101	1951-	1988	(a)	(+)
05483318	Brushy Fork Creek near Templeton, Ia.	Lat 41°56'45", long 94°52'45", in NW1/4 sec.1, T.82 N., R.35 W., Carroll County, at bridge on U.S. Highway 71, 4 mi northeast of Templeton.	45.0	1966-	06-07-88	87.82	(+)
05483349	Middle Raccoon River tributary at Carroll, Ia.	Lat 42°02'30", long 94°52'43", in NW1/4 sec.36, T.84 N., R.35 W., Carroll County, at bridge on U.S. Highway 71, 1.5 mi south of Carroll.	6.58	1966-	c08-12-87 06-08-88	24.68 22.07	(+) (+)



## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

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Annual maximum discharge at crest-stage partial-record stations during water year 1988--Continued

Station no.	Station name	Location	Drainage area (mi <sup>2</sup> )	Period of record	Date	Annual maximum Gage height (feet)	Dis-charge (ft <sup>3</sup> /s)
Des Moines River Basin--Continued							
05487350	South Otter Creek tributary near Woodburn, Ia.	Lat 41°02'48", long 93°35'26", near SW corner sec.11, T.72 N., R.24 W., Clarke County, at bridge on county highway, 2 mi north of Wood.	0.71	1955-	1988	(a)	(+)
05487800	White Breast Creek at Lucas, Ia.	Lat 41°01'24", long 93°27'56", in NE1/4 sec.23, T.72 N., R.23 W., Lucas County, at bridge on U.S. Highway 65, near south city limits of Lucas.	128	1953-	11-29-87	15.48	4,500
05488620	Coal Creek near Albia, Ia.	Lat 41°01'02", long 92°50'46", in SW1/4 sec.20, T.72 N., R.17 W., Monroe County, at bridge on U.S. Highway 34, 2 mi southwest of Albia.	13.5	1966-	1988	(a)	(+)
05489150	Little Muchakinock Creek at Oskaloosa, Ia.	Lat 41°15'58", long 92°38'33", in SE1/4 sec.25, T.75 N., R.16 W., Mahaska County, at bridge on State Highway 137, at south edge of Oskaloosa.	9.12	1966-	1988	(a)	(+)
05489350	South Avery Creek near Blakesburg, Ia.	Lat 41°00'59", long 92°37'32", in SE1/4 sec.19, T.72 N., R.15 W., Wapello County, at bridge on U.S. Highway 34, 3.5 mi north of Blakesburg.	33.1	1965-	02-20-88	77.91(b)	(+)
05489490	Bear Creek at Ottumwa, Ia.	Lat 41°00'43", long 92°27'54", in NW1/4 sec.27, T.72 N., R.14 W., Wapello County, at bridge on U.S. Highway 34, near west edge of Ottumwa.	22.9	1965-	02-20-88	84.43(b)	(+)
Fox River Basin							
05494110	South Fox Creek near West Grove, Ia.	Lat 40°43'31", long 92°36'16", in SE1/4 sec.32, T.69 N., R.15 W., Davis County, at bridge on State Highway 2, 2.4 mi west of West Grove.	12.2	1965-	1988	(a)	(+)
Big Sioux River Basin							
06483410	Otter Creek north of Sibley, Ia.	Lat 43°27'41", long 95°44'29", at NE corner sec.25, T.100 N., R.42 W., Osceola County, at bridge on county highway L40, 4 mi north of Sibley.	11.9	1952-	1988	(a)	<68
06483430	Otter Creek at Sibley, Ia.	Lat 43°24'14", long 95°46'10", near N1/4 corner sec.14, T.99 N., R.42 W., Osceola County, at bridge on county highway A22, 1 mi northwest of Sibley.	29.9	1952-	03-08-88	6.31(b)	(+)
06483440	Dawson Creek near Sibley, Ia.	Lat 43°23'23", long 95°42'53", near NW corner sec.20, T.99 N., R.41 W., Osceola County, at culvert on county highway A30, 2 mi southeast of Sibley.	4.35	1952-	03-08-88	4.15(b)	(+)
06483460	Otter Creek near Ashton, Ia.	Lat 43°20'07", long 95°45'43", in SE1/4 sec.2, T.98 N., R.42 W., Osceola County, at bridge on county highway L36, 2 mi northeast of Ashton.	88.0	1952-	03-08-88	7.13(b)	(+)
06483495	Burr Oak Creek near Perkins, Ia.	Lat 43°14'43", long 96°10'38", in SE1/4 sec.5, T.97 N., R.45 W., Sioux County, at bridge on U.S. Highway 75, 4 mi north of Perkins.	30.9	1966-	1988	(a)	(+)
Perry Creek Basin							
06599800	Perry Creek near Merrill, Ia.	Lat 42°43'16", long 96°20'33", in NW1/4 sec.12, T.91 N., R.47 W., Plymouth County, at bridge on county highway C44, 5 mi west of Merrill.	8.17	1953-	1988	(+)	(+)
06599950	Perry Creek near Hinton, Ia.	Lat 42°37'57", long 96°22'13", in NE1/4 sec.15, T.90 N., R.47 W., Plymouth County, at bridge on county highway, 4 mi west of Hinton.	30.8	1953-	1988	(a)	(+)

## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Annual maximum discharge at crest-stage partial-record stations during water year 1988--Continued

Station no.	Station name	Location	Drainage area (mi <sup>2</sup> )	Period of record	Date	Annual maximum Gage height (feet)	Dis-charge (ft <sup>3</sup> /s)
Floyd River Basin							
06600030	Little Floyd River near Sanborn, Ia.	Lat 43°11'10", long 95°43'30", in NE1/4 sec.31, T.97 N., R.41 W., O'Brien County, at bridge on U.S. Highway 18, 3.5 mi west of Sanborn.	8.44	1966-	1988	(a)	(+)
Monona-Harrison Ditch Basin							
06601480	Big Whiskey Slough near Remsen, Ia.	Lat 42°48'28", long 95°53'21", in NW1/4 sec.11, T.92 N., R.43 W., Plymouth County, at bridge on State Highway 3, 4.2 mi east of Remsen.	12.9	1966-	03-08-88	92.41(b)	(+)
06602190	Elliott Creek at Lawton, Ia.	Lat 42°28'30", long 96°11'22", in NW1/4 sec.3, T.88 N., R.46 W., Woodbury County, at bridge on U.S. Highway 20, at west edge of Lawton.	34.8	1966-	c1987 1988	(a) (a)	<1,300 <1,300
Little Sioux River Basin							
06604510	Ocheyedan River near Ocheyedan, Ia.	Lat 43°25'58", long 95°36'41", in NE1/4 sec.6, T.99 N., R.40 W., Osceola County, at bridge on State Highway 9, 4 mi northwest of Ocheyedan.	73.5	1966-	1988	(a)	(+)
06605340	Prarie Creek near Spencer, Ia.	Lat 43°05'16", long 95°09'40", in SE1/4 sec. 36, T.96 N., R.37 W., Clay County, at bridge on U.S. Highway 71, 4 mi south of Spencer.	22.3	1966-	1988	(a)	<160
06605750	Willow Creek near Cornell, Ia.	Lat 42°58'21", long 95°09'40", in SE1/4 sec. 12, T.94 N., R.37 W., Clay County, at bridge on U.S. Highway 71, 2 mi northwest of Spencer.	78.6	1966-	1988	(a)	<340
06605890	Waterman Creek at Hartley, Ia.	Lat 43°11'06", long 95°30'43", in NE1/4 sec.36, T.97 N., R.40 W., O'Brien County, at bridge on U.S. Highway 18, 1.8 mi west of Hartley.	28.7	1966-	03-08-88	85.29(b)	(+)
06606790	Maple Creek near Alta, Ia.	Lat 42°44'56", long 95°22'16", in NE1/4 sec. 31, T. 92 N., R.38 W., Buena Vista County, at bridge on State Highway 3, 6 mi northwest of Alta.	15.5	1966-	1988	(a)	<32
Soldier River Basin							
06608450	Jordan Creek at Moorhead, Ia.	Lat 41°54'59", long 95°51'33", in NW1/4 sec.16, T.82 N., R.43 W., Monona County, at bridge on State Highway 183, at southwest corner of Moorhead.	30.1	1966-	1988	(a)	(+)
Boyer River Basin							
06609560	Willow Creek near Soldier, Ia.	Lat 41°55'17", long 95°42'05", near S1/4 corner sec.11, T.82 N., R.42 W., Monona County, at bridge on State Highway 37, 6 mi southeast of Soldier.	29.1	1966-	1988	(a)	(+)
Mosquito Creek Basin							
06610510	Moser Creek near Earling, Ia.	Lat 41°46'35", long 95°26'55", in NE1/4 sec.1, T.80 N., R.40 W., Shelby County, at bridge on State Highway 37, 1.5 mi west of Earling.	21.6	1966-	1988	(a)	(+)
06610600	Mosquito Creek at Neola, Ia.	Lat 41°26'36", long 95°36'42", in NE1/4 sec.25, T.77 N., R.42 W., Pottawattamie County, at bridge on county highway, 0.5 mi south of Neola. Prior to 04-19-63, gage located 0.9 miles upstream D.A. 128 mi <sup>2</sup> .	131	1952-	1988	(a)	(+)
Nishnabotna River Basin							
06807418	Graybill Creek near Carson, Ia.	Lat 41°13'57", long 95°22'51", in NW1/4 sec.7, T.74 N., R.39 W., Pottawattamie County, at bridge on State Highway 92, 2 mi east of Carson.	45.9	1966-	1988	(a)	(+)
06807470	Indian Creek near Emerson, Ia.	Lat 41°01'50", long 95°22'51", in NW1/4 sec.19, T.72 N., R.39 W., Montgomery County, at bridge on U.S. Highway 34, 1 mi east of Emerson.	37.3	1966-	1988	(a)	(+)

Annual maximum discharge at crest-stage partial-record stations during water year 1988--Continued

Station no.	Station name	Location	Drainage area (mi <sup>2</sup> )	Period of record	Annual maximum Date	Gage height (feet)	Dis-charge (ft <sup>3</sup> /s)
Nishnabotna River Basin--Continued							
06807720	Middle Silver Creek near Avoca, Ia.	Lat 41°28'33", long 95°28'06", near N1/4 corner sec.17, T.77 N., R.40 W., Pottawattamie County, at bridge on State Highway 83, 7 mi west of Avoca.	3.21	1955-	1988	(a)	(+)
06807760	Middle Silver Creek near Oakland, Ia.	Lat 41°19'28", long 95°33'19", near E1/4 corner sec. 4, T.75., R.41 W., Pottawattamie County, at bridge on county highway, 8.5 mi northwest of Oakland.	25.7	1953-	1988	(a)	(+)
06807780	Middle Silver Creek at Treynor, Ia.	Lat 41°14'37", long 95°36'53", near NE corner sec. 1, T.74 N., R.42 W., Pottawattamie County, at bridge on county highway L55, 1 mi north of Treynor.	42.7	1953-	1988	(a)	(+)
06808880	Bluegrass Creek at Audubon, Ia.	Lat 41°42'46", long 94°55'43", in NW1/4 sec.28, T.80 N., R.35 W., Audubon County, at bridge on U.S. Highway 71, near south edge of Audubon.	15.4	1966-	1988	(a)	(+)
Tarkio River Basin							
06811760	Tarkio River near Elliot, Ia.	Lat 41°06'06", long 95°06'09", near NE corner sec.28, T.73 N., R.37 W., Montgomery County, at bridge on county highway, 4.5 mi southeast of Elliot.	10.7	1952-	1988	(a)	(+)
06811800	East Tarkio Creek near Stanton, Ia.	Lat 41°04'48", long 95°05'34", in W1/2 sec. 34, T.73 N., R.37 W., Montgomery County, at bridge on county highway H24, 7 mi north of Stanton.	4.66	1952-	1988	(a)	(+)
06811820	Tarkio River tributary near Stanton, Ia.	Lat 41°02'38", long 95°05'55", near NE corner sec.16, T.72 N., R.37 W., Montgomery County, at box culvert on county highway H63, 4 mi north of Stanton.	0.67	1952-	1988	(a)	(+)
06811875	Snake Creek near Yorktown, Ia.	Lat 40°44'33", long 95°07'46", in NW1/4 sec.32, T.69 N., R.37 W., Page County, at bridge on State Highway 2, 1.5 mi northeast of Yorktown.	9.10	1966-	1988	(a)	<760
Nodaway River Basin							
06816290	West Nodaway River at Massena, Ia.	Lat 41°14'44", long 94°45'27", in E1/2 sec.33, T.75 N., R.34 W., Cass County, at bridge on State Highway 148, at southeast corner of Massena.	23.4	1966-	1988	(a)	(+)
Platte River Basin							
06818598	Platte River near Stringtown, Ia.	Lat 40°58'44", long 94°29'39", in SE1/4 sec.2, T.71 N., R.32 W., Adams County, at bridge on U.S. Highway 34, 3.8 mi east of Stringtown.	51.7	1966-	1988	(a)	(+)
06819110	Middle Branch 102 River near Gravity, Ia.	Lat 40°49'40", long 94°44'18", in SE1/4 sec.27, T.70 N., R.34 W., Taylor County, at bridge on State Highway 148, 4.8 mi north of Gravity.	33.5	1966-	1988	(a)	(+)
Chariton River Basin							
06903980	Chariton River near Udell, Ia	Lat 40°46'53", long 92°50'12", in NE1/4 sec. 17, T.69 N., R.17 W., Appanoose County, at bridge on county highway 5.0 mi west of Udell.	631	1972-	1988	(a)	(+)
06903990	Cooper Creek at Centerville, Ia.	Lat 40°45'02", long 92°51'36", in NW1/4 sec. 30, T.69 N., R.17 W., Appanoose County, at bridge on State Highway 5, at north edge of Centerville.	47.8	1966-	1988	(a)	<370

+ Not determined.

a Peak stage did not reach bottom of gage.

b Ice affected.

c Revised.

d Gage destroyed.

&lt; Less than.

Discharge measurements in the following table were made at special study and miscellaneous sites throughout the Roberts Creek Basin (tributary to the Turkey River Basin).

Stream	Location	Drainage area (mi <sup>2</sup> )	Date	Measurements Discharge (ft <sup>3</sup> /s)
Roberts Creek Basin				
Hatchery Creek	Lat 42°57'34", long 91°30'12", in SW1/4 NW1/4 sec. 13, T.94 N., R.6 W., Clayton County, Hydrologic Unit 07060004, at bridge on township road 0.8 mi S of county road B60, 1.0 mi SE of Gunder	1.28	06-29-88	0.198
Hatchery Creek	Lat 42°56'47", long 91°28'59", in NW1/4 NW1/4 sec. 19, T.94 N., R.5 W., Clayton County, Hydrologic Unit 07060006, at bridge on farm road 0.9 mi SW of county road B60, approximately 2.5 mi SE of Gunder.	2.84	06-29-88	0.290
Hatchery Creek	Lat 42°56'29", long 91°27'37", in NE1/4, SW1/4 sec. 20, T.94 N., R.5 W., Clayton County, Hydrologic Unit 07060004, at bridge on township road 0.6 mi S of county road B60, approximately 2 mi N of Big Spring.	1.36	06-29-88	0.357
Hatchery Creek	Lat 42°56'06", long 91°28'06", in NW1/4 NW1/4 sec. 29, T.94 N., R.5 W., Clayton County, Hydrologic Unit 070600004, at culvert under towship road 1.3 mi S of county road B60, 1.7 mi N of Big Spring.	1.85	06-29-88	0.269
Hatchery Creek	Lat 42°55'36", long 91°28'06", in NE1/4 SE1/4 sec. 30, T.94 N., R.5 W., Clayton County, Hydrologic Unit 07060004, at bridge on township road 2.25 mi W of county road X16, 1.2 mi N of Big Spring.	7.02	06-29-88	0.710
Hatchery Creek	Lat 42°54'46", long 91°28'53", in NE1/4 SW1/4 sec. 31, T.94 N., R.5 W., Clayton County, Hydrologic Unit 07060004, at bridge on Dept. of Natural Resources hatchery road 0.25 mi SE of township road, 0.6 mi W of Big Spring.	8.80	06-29-88	0.300
Roberts Creek	Lat 43°03'27", long 91°34'40", in NE1/4 SE1/4 sec. 8, T.95 N., R.6 W., Clayton County, Hydrologic Unit 07060004, at bridge on county road W62, 1.75 mi S of Postville.	2.28	06-29-88	0.101
West Branch Roberts Creek	Lat 43°02'44", long 91°33'00", in SE1/4 NE1/4 sec. 16, T.95 N., R.6 W., Clayton County, Hydrologic Unit 07060004, at mouth 0.1 mi upstream of county road W64, 3.0 mi SE of Postville	4.14	06-29-88	0.824
Roberts Creek	Lat 43°02'40", long 91°32'53", in SE1/4 NE1/4 sec. 16, T.95 N., R.6 W., Clayton County, Hydrologic Unit 07060004, at bridge on county road W64 1.5 mi S of State Highway 52, 3.0 mi SE of Postville.	11.1	06-29-88	2.54
Roberts Creek	Lat 43°02'11", long 91°32'16", in SW1/4 SE1/4 sec. 15, T.95 N., R.6 W., Clayton County, Hydrologic Unit 07060004, at bridge on county road 0.5 mi E of county W64, approximately 3.75 mi SE of Postville.	13.2	06-29-88	2.79
Roberts Creek	Lat 43°00'57", long 91°30'42", in SE1/4 NW1/4 sec. 25, T.95 N., R.6 W., Clayton County, Hydrologic Unit 07060004, at bridge on county road 2.0 mi E of county road W64, 4.4 mi SW of Luana.	15.9	06-29-88	3.59
Roberts Creek	Lat 42°59'08", long 91°30'02", in SE1/4 NW1/4 sec. 1, T.94 N., R.6 W., Clayton County, Hydrologic Unit 07060004, at bridge on county road B58, 1.0 mi NE of Gunder.	18.2	06-28-88	3.44
Deer Creek	Lat 42°59'42", long 91°31'07", in SE1/4 SW1/4 sec. 35, T.95 N., R.6 W., Clayton County, Hydrologic Unit 07060004, at bridge on township road, 1.5 mi S of county road B58, 1.75 mi N of Gunder.	4.37	06-28-88	0.424

## Roberts Creek Basin--Continued

Deer Creek	Lat 42°59'08", long 91°30'25", in SW1/4 NW1/4 sec. 1, T.94 N., R.6 W., Clayton County, Hydrologic Unit 07060004, at bridge on county road B58, 0.3 mi upstream of mouth, 1.0 mi N of Gunder.	5.56	06-28-88	0.766
Roberts Creek	Lat 42°58'30", long 91°28'58", in NE1/4 NW1/4 sec. 7, T.94 N., R.5 W., Clayton County, Hydrologic Unit 07060004, at bridge on township road, 0.8 mi NE from county road B60, approximately 1.5 mi E of Gunder	26.0	06-28-88	4.37
Roberts Creek	Lat 42°58'06", long 91°28'05", in SW1/4 SW1/4 sec. 8, T.94 N., R.5 W., Clayton County, Hydrologic Unit 07060004, at bridge on dead end township road 4.0 mi N of Big Spring.	28.8	06-28-88 10-04-88	4.86 2.53
Roberts Creek	Lat 42°57'35", long 91°27'22", in SW1/4 NE1/4 sec. 17, T.94 N., R.5 W., Clayton County, Hydrologic Unit 07060004, at bridge on township road 0.7 mi N of county road B60, 3.0 mi NE of Big Spring.	30.4	06-28-88 10-04-88	4.67 2.09
East Fork Silver Creek	Lat 43°02'40", long 91°26'20", in NW1/4 SE1/4 sec. 16, T.95 N., R.5 W., Clayton County, Hydrologic Unit 07060004, at box culvert on township road 2.0 mi W of State Highway 52 and 18, approximately 2.5 mi W of Monona.	3.05	06-29-88	0.119
East Fork Silver Creek	Lat 43°02'40", long 91°26'06", in NE1/4 SW1/4 sec. 16, T.95 N., R.5 W., Clayton County, Hydrologic Unit 07060004, at steel culvert on township road 2.2 mi W of State Highway 52 and 18, 2.7 mi W of Monona.	0.283	06-29-88	1.19
East Fork Silver Creek	Lat 43°02'03", long 91°27'30", in NW1/4 NE1/4 sec. 20, T.95 N., R.5 W., Clayton County, Hydrologic Unit 07060004, at bridge on county road X16, 1.4 mi N of county road, 1.8 mi S of Luana.	4.28	06-29-88	1.24
Unnamed Creek (05412070)	Lat 43°02'24", long 91°28'07", in SE1/4 sec. 18, T.95 N., R.5 W., Clayton County, Hydrologic Unit 07060004, on right upstream bank at culvert on the north-south gravel road between county road W70 and county road X16, 0.8 mi S of State Highway 52 and 18 and approximately 1.6 mi S of Luana.	1.15	06-28-88	0.0
East Fork Silver Creek	Lat 43°00'54", long 91°27'30", in NE1/4 SW1/4 sec. 29, T.95 N., R.5 W., Clayton County, Hydrologic Unit 07060004, at box culvert on county road B56 0.56 mi upstream from mouth, 3.1 mi S of Luana.	9.5	06-29-88	1.43
Silver Creek	Lat 43°02'10", long 91°30'33", in SE1/4 SE1/4 sec. 14, T.95 N., R.5 W., Clayton County, Hydrologic Unit 07060004, at bridge on township road 2.0 mi E of county road W64, 3.3 mi SW of Luana.	1.36	06-28-88	0.119
Silver Creek	Lat 43°02'01", long 91°29'49", in SW1/4 SE1/4 sec. 13, T.95 N., R.6 W., Clayton County, Hydrologic Unit 07060004, at bridge on township road 0.5 mi W of county road W70, 2.75 mi SW of Luana.	0.703	06-28-88	0.0
Silver Creek (05412060)	Lat 43°01'19", long 91°29'21", in NE1/4 sec. 25, T.95 N., R.6 W., Clayton County, Hydrologic Unit 07060004, on right upstream bank of bridge on county road W70, 2.3 mi S of State Highway 52 and 18, 3.2 mi S of Luana.	4.39	06-28-88	0.521
Silver Creek	Lat 43°00'49", long 91°27'44", in NE1/4 SW1/4 sec. 29, T.95 N., R.5 W., Clayton County, Hydrologic Unit 07060004, at concrete box culvert on county road B56, 3.2 mi S of Luana.	5.59	06-28-88	0.686

## Roberts Creek Basin--Continued

Silver Creek	Lat 43°00'02", long 91°26'53", in SW1/4 NW1/4 sec. 33, T.95 N., R.5 W., Clayton County, Hydrologic Unit 07060004, at bridge on township road 0.5 mi W of county road X16, 3.8 mi NE of Gunder.	17.3	06-29-88	0.811
Silver Creek	Lat 43°01'40", long 91°25'10", in NW1/4 SE1/4 sec. 22, T.95 N., R.5 W., Clayton County, Hydrologic Unit 07060004, at steel culvert on township road 2.1 mi SE of Monona, 2.9 mi N of county road B58.	1.13	06-29-88	0.153
Silver Creek	Lat 42°59'16", long 91°27'12", in SW1/4 NE1/4 sec. 5, T.94 N., R.5 W., Clayton County, Hydrologic Unit 07060004, at bridge on township road 0.75 mi W of county road X16, 3.2 mi NE of Gunder.	25.2	06-28-88	0.246
Silver Creek	Lat 42°58'24", long 91°26'30", in SE1/4 NW1/4 sec. 9, T.94 N., R.5 W., Clayton County, Hydrologic Unit 07060004, at bridge on township road 0.15 mi W of county road X16, 3.0 mi E of Gunder.	28.8	06-28-88 08-09-88 09-09-88	0.362 6.28 1.50
Roberts Creek	Lat 42°57'36", long 91°26'03", in SE1/4 NW1/4 sec. 16, T.94 N., R.5 W., Clayton County, Hydrologic Unit 07060004, at bridge on county road X16, 0.8 mi N of county road B60, 3.8 mi NE of Big Spring.	61.8	06-28-88	5.17
Roberts Creek	Lat 42°57'33", long 91°25'10", in SW1/4 NE1/4 sec. 15, T.94 N., R.5 W., Clayton County, Hydrologic Unit 07060004, at bridge on township road 0.9 mi N of county road B60, 2.7 mi NW of St. Olaf.	63.6	06-28-88 06-29-88	3.38 4.24
Roberts Creek	Lat 42°57'06", long 91°24'34", in SW1/4 SW1/4 sec. 14, T.94 N., R.5 W., Clayton County, Hydrologic Unit 07060004, at bridge on county road B60, 2.6 mi W of Farmersburg.	64.3	06-28-88	4.02
Roberts Creek	Lat 42°57'24", long 91°23'58", in NE1/4 SW1/4 sec. 14, T.94 N., R.5 W., Clayton County, Hydrologic Unit 07060004, at bridge on farm road 1000 ft S of county road B60, 1.8 mi W of Farmersburg.	65.2	06-29-88	3.84
Roberts Creek	Lat 42°56'41", long 91°22'26", in SE1/4 NW1/4 sec. 24, T.94 N., R.5 W., Clayton County, Hydrologic Unit 07060004, under high voltage power line 1000 ft W of township road, 1.0 mi SW of Farmersburg.	66.6	06-28-88	2.63
Roberts Creek	Lat 42°57'10", long 91°23'28", in SE1/4 SE1/4 sec. 14, T.94 N., R.5 W., Clayton County, Hydrologic Unit 07060004, on private property 1.7 mi N of St. Olaf.	66.0	06-29-88	3.49
Roberts Creek (05412100)	Lat 42°55'49", long 91°23'03", in NW1/4 sec. 25, T.94 N., R.5 W., Clayton County, Hydrologic Unit 07060004, on left downstream bank at bridge on road X28, 0.1 mi N of county road B65, on north edge of St. Olaf.	70.7	06-28-88 07-19-88 09-09-88	2.11 1.34 0.017
Howard Creek	Lat 42°57'44", long 91°22'09", in NW1/4 NW1/4 sec. 18, T.94 N., R.4 W., Clayton County, Hydrologic Unit 07060004, at bridge on county road X28 in Farmersburg, downstream of the mouth of an unnamed creek.	13.8	06-28-88	0.588
Howard Creek	Lat 42°56'48", long 91°22'23", in NE1/4 NE1/4 sec. 24, T.94 N., R.5 W., Clayton County, Hydrologic Unit 07060004, at bridge on county road X28, 0.9 mi S of Farmersburg.	17.8	06-28-88 10-04-88	0.523 0.334

Discharge measurements in the following table were made at special study and miscellaneous sites throughout the Cedar River Basin.

Stream	Location	Drainage area (mi <sup>2</sup> )	Measurements Date	Discharge (ft <sup>3</sup> /s)
Cedar River Basin				
Cedar River (05455950)	Lat 43°42'25", long 92°57'42", in SE1/4 SW1/4 sec. 23, T.103 N., R.18 W., Mower County, Hydrologic Unit 07080201, at bridge on County Highway 25, 2.8 mi north of Highway 25, 2.8 mi north of Austin, MN.	183	07-23-88	16.3
Turtle Creek (05456500)	Lat 43°41'05", long 93°02'15", in NE1/4 NW1/4 sec. 31, T.103 N., R.18 W., Mower County, Hydrologic Unit 07080201, at bridge on county road, 3 miles west of Austin, MN.	144	07-23-88	12.6
Cedar River (05457000)	Lat 43°38'11", long 92°58'26", in NE1/4 SE1/4 sec. 15, T.102 N., R.18 W., Mower County, Hydrologic Unit 07080201, on left bank 200 ft upstream from abandoned powerhouse, 500 ft downstream from highway bridge, 1.1 mi downstream from Turtle Creek, and 1.1 mi south of Austin, MN.	425	07-23-88	51.3
Rose Creek (05457160)	Lat 43°36'48", long 92°58'10", on line between sec. 26 and 27, T.102 N., R.18 W., Mower County, Hydrologic Unit 07080201, at bridge on County Highway 29, 0.3 mi upstream from mouth, 3.8 mi south of Austin, MN.	65.8	07-23-88	5.96
Otter Creek (05457300)	Lat 43°28'10", long 92°57'38", in NW1/4 sec. 22, T.100 N., R.18 W., Mitchell County, Hydrologic Unit 07080201, at bridge, 1.5 mi NE of Otranto.	60.3	07-23-88	7.55
Deer Creek (05457450)	Lat 42°23'36", long 92°57'52", in SW1/4 sec. 15, T.99 N., R.18 W., Mitchell County, Hydrologic Unit 07080201, at bridge, 2.5 mi NW of St. Ansgar.	97.5	07-23-88	2.76
Cedar River (05457500)	Lat 43°19'03", long 92°52'45", in NW1/4 SE1/4 sec. 8, T.98 N., R.17 W., Mitchell County, Hydrologic Unit 07080201, at bridge, SE of Mitchell.	826	07-23-88	106
Cedar River (05457700)	Lat 43°03'45", long 92°40'23", in SE1/4, NE1/4 sec. 12, T.95 N., R.16 W., Floyd County, Hydrologic Unit 07080201, on right bank 800 ft downstream from bridge on U.S. Highway 18 (Brantingham Street) in Charles City, 10.6 mi upstream from Gizzard Creek, and at mi 252.9 upstream from mouth of Iowa River.	1,054	07-23-88	171
Little Cedar River (05457800)	Lat 43°28'21", long 92°46'29", in NE1/4 sec. 19, T.100 N., R.16 W., Mitchell County, Hydrologic Unit 07080201, at bridge, 2 mi N of Staceyville.	77.3	07-23-88	3.77
Little Cedar River (05458000)	Lat 43°02'05", long 92°30'05", in SW1/4 NE1/4 sec. 21, T.95 N., R.14 W., Chickasaw County, Hydrologic Unit 07080201, on left bank 12 ft downstream from bridge on county highway B57, 2.4 mi W of Ionia, 6.4 mi upstream from mouth, and 7.6 mi downstream from Beaver Creek.	306	07-23-88	16.5
Cedar River (05458500)	Lat 42°38'54", long 92°27'54", in NE1/4 SW1/4 sec. 35, T.91 N., R.14 W., Bremer County, Hydrologic Unit 07080201, on left bank 300 ft downstream from bridge on county highway at Janesville, 3.6 mi upstream from West Fork Cedar River, and at mi 207.7 upstream from mouth of Iowa River.	1,661	07-23-88	253
Hartgrave Creek (05458780)	Lat 42°44'30", long 93°05'06", in NW1/4 sec. 34, T.92 N., R.19 W., Franklin County, Hydrologic Unit 07080204, at bridge, 1.5 mi SE of Hansell.	161	07-24-88	14.6

## Cedar River Basin--Continued

Maynes Creek (05458850)	Lat 42°41'41", long 92°58'01", in SW1/4 sec. 15, T.91 N., R.18 W., Butler County, Hydrologic Unit 07080204, at bridge, 4 mi S of Dumont.	121	07-24-88	9.92
West Fork Cedar River (05458900)	Lat 42°37'50", long 92°32'24", in SW1/4 SE1/4 sec. 6, T.90 N., R.14 W., Black Hawk County, Hydrologic Unit 07080204, on left bank 100 ft downstream from bridge on county highway C55 at Finchford, 3.2 mi upstream from Shell Rock River, and 5.0 mi upstream from mouth.	846	07-23-88	65.4
Shell Rock River (05458966)	Lat 43°36'47", long 93°17'38", in NE1/4 NE1/4 sec. 25, T.102 N., R.21 W., Freeborn County, Hydrologic Unit 07080201, at outlet of Albert Lea Lake, county highway 19, 2.8 mi N of Glenville, MN.	147	07-23-88	No flow
Shell Rock River (05458970)	Lat 43°30'51", long 93°16'06", on line between secs. 29 and 32, T.101 N., R.20 W., Freeborn County, Hydrologic Unit 07080202, at bridge on county highway 1, 0.8 mi W of Gordonsville, MN.	191	07-23-88	6.51
Goose Creek (05458975)	Lat 43°30'13", long 93°16'24", in NE1/4 SE1/4 sec. 31, T.101 N., R.20 W., Freeborn County, Hydrologic Unit 07080202, at bridge on county highway 1, 0.2 mi upstream from mouth, 1.1 mi SW of Gordonsville, MN.	53.8	07-23-88	No flow
Shell Rock River (05459000)	Lat 43°24'51", long 93°13'14", in NW1/4 NW1/4 sec. 9, T.99 N., R.20 W., Worth County, Hydrologic Unit 07080202, on right bank 50 ft downstream from bridge on county highway A27, 1.3 mi downstream from drainage ditch 2, 2.0 mi S of Northwood, 3.7 mi upstream from Elk Creek, and 84.5 mi upstream from mouth.	300	07-23-88	10.9
Lime Creek (05459050)	Lat 43°26'49", long 93°34'36", in SW1/4 sec. 28, T.100 N., R.23 W., Winnebago County, Hydrologic Unit 07080203, at bridge, 3.5 mi SE of Scarville.	113	07-23-88	2.25
Winnebago River (05459300)	Lat 43°14'49", long 93°26'15", near W1/4 corner sec. 3, T.97 N., R.22 W., Cerro Gordo County, Hydrologic Unit 07080203, at bridge, 1.5 mi SW of Fertile.	303	07-24-88	8.17
Beaver Creek (05459400)	Lat 43°16'13", long 93°27'28", in SW1/4 sec. 28, T.98 N., R.22 W., Worth County, Hydrologic Unit 07080203, at bridge, 2.0 mi NW of Fertile.	54.9	07-24-88	1.88
Winnebago River (05459500)	Lat 43°09'54", long 93°11'33", in NE1/4 NW1/4 sec. 3, T.96 N., R.20 W., Cerro Gordo County, Hydrologic Unit 07080203, on right bank 650 ft upstream from Thirteenth Street Bridge in Mason City, 0.1 mi downstream from Calmus Creek, and 1.0 mi upstream from Willow Creek, and at mi 275.8 upstream from mouth of Iowa River.	526	07-24-88	20.4
Willow Creek (05460200)	Lat 43°09'46", long 93°14'20", near W1/4 corner sec. 5, T.96 N., R.20 W., Cerro Gordo County, Hydrologic Unit 07080203, at bridge near W city limits of Mason City.	86.0	07-24-88	3.29
Shell Rock River (05460500)	Lat 42°58'00", long 92°52'15", in SE1/4 SE1/4 sec. 8, T.94 N., R.17 W., Floyd County, Hydrologic Unit 07080202, on left bank 20 ft above dam at Marble Rock, 1.1 mi upstream from Ackley Creek, 9.5 mi downstream from Winnebago River, and at mi 247.1 above mouth of Iowa River.	1,318	07-24-88	91.7
Cold Water Creek (05461100)	Lat 42°52'50", long 92°50'58", in SW1/4 sec. 10, T.93 N., R.17 W., Butler County, Hydrologic Unit 07080202, at bridge, 2.5 mi SW of Greene.	56.8	07-24-88	.035



## Cedar River Basin--Continued

Flood Creek (05461300)	Lat 43°03'09", long 92°50'37", in NW1/4 sec. 15, T.95 N., R.17 W., Floyd County, Hydrologic Unit 07080202, at bridge, 5 mi E of Rockford.	59.3	0.-24-88	Dry bed
Flood Creek (05461400)	Lat 42°51'43", long 92°41'55", in NE1/4 sec. 10, T.93 N., R.16 W., Butler County, Hydrologic Unit 07080202, at bridge, 2 mi NE of Packard.	145	07-24-88	Dry bed
Shell Rock River (05462000)	Lat 42°39'10", long 92°35'45", in NE1/4 NW1/4 sec. 11, T.91 N., R.15 W., Butler County, Hydrologic Unit 07080202, on right bank 400 ft upstream from bridge on county highway C45 in Shell Rock, 2.2 mi downstream from Curry Creek, and 10.4 mi upstream from mouth.	1,746	07-23-88	145
Beaver Creek (05462700)	Lat 42°33'49", long 92°01'37", in SW1/4 sec. 36, T.90 N., R.19 W., Franklin County, Hydrologic Unit 07080205, at bridge near E city limits of Ackley.	55.5	07-23-88	1.87
South Beaver Creek (05462800)	Lat 42°33'21", long 92°49'01", in SE1/4 sec. 35, T.90 N., R.17 W., Butler County, Hydrologic Unit 07080205, at culvert, 2.0 mi SW of Parkersburg.	114	07-24-88	6.22
Beaver Creek (05463000)	Lat 42°30'50", long 92°37'55", in SE1/4 SE1/4 sec. 28, T.90 N., R.15 W., Butler County, Hydrologic Unit 07080205, on right bank 5 ft from right end of bridge on county highway T55, 0.2 mi N of New Hartford, and 8.0 mi upstream from mouth.	347	07-24-88	19.8
Black Hawk Creek (05463500)	Lat 42°24'28", long 92°27'47", in SW1/4 NE1/4 sec. 27, T.88 N., R.14 W., Black Hawk County, Hydrologic Unit 07080205, on left bank 35 ft downstream from bridge on State Highway 58, 0.2 mi NW of Chicago and Great Western Railway tracks at the W edge of Hudson, 4.5 mi upstream from Prescotts Creek, and 9.6 mi upstream from mouth.	303	07-24-88	15.2
Wolf Creek (05464100)	Lat 42°12'47", long 92°47'12", in SW1/4 sec. 36, T.86 N., R.17 W., Grundy County, Hydrologic Unit, 07080205, at bridge, 2.0 mi SE of Beaman.	63.2	07-23-88	2.55
Cedar River	Lat 42°10'14", long 92°01'26", Benton County, Hydrologic Unit 07080205, at Vinton.	6,034	07-23-88	744
Twelve Mile Creek (05464150)	Lat 42°14'26", long 92°26'10", in SE1/4 sec. 24, T.86 N., R.14 W., Tama County, Hydrologic Unit 07080205, at bridge, 1.5 mi S of Buckingham.	76.8	07-23-88	7.29
Wolf Creek (05464250)	Lat 42°19'01", long 92°11'31", in SW 1/4 sec. 25, T.87 N., R.12 W., Black Hawk County, Hydrologic Unit 07080205, at bridge on U.S. Highway 218 in Laporte City.	327	07-23-88	33.4
Bear Creek (05464400)	Lat 42°04'55", long 91°47'40", in SE1/4 sec. 17, T.84 N., R.8 W., Linn County, Hydrologic Unit 07080205, at bridge, 1.0 mi N of Palo.	95.9	07-24-88	2.66
Otter Creek (05464460)	Lat 42°03'57", long 91°44'27", in SE1/4 sec. 24, T.84 N., R.8 W., Linn County, Hydrologic Unit 07080205, at bridge, 7.0 mi NW of Cedar Rapids.	65.1	07-24-88	1.83
Prairie Creek (05464600)	Lat 41°53'35", long 91°55'43", near SW corner sec. 19, T.82 N., R.9 W., Benton County, Hydrologic Unit 07080205, at bridge, 1.0 mi SW of Norway.	126	07-23-88	4.29
Prairie Creek (05464650)	Lat 41°55'49", long 91°40'34", in NW1/4 sec. 9, T.82 N., R.7 W., Linn County, Hydrologic Unit 07080205, at bridge, 3.0 mi S of Cedar Rapids.	208	07-23-88	12.7
Big Creek (05464750)	Lat 41°57'23", long 91°31'35", near E1/4 corner sec. 34, T.83 N., R.6 W., Linn County, Hydrologic Unit 07080206, at bridge near E city limits of Bertram.	81.2	07-23-88	8.96

Cedar River Basin--Continued				
Cedar River	Lat 41°43'43", long 91°14'22", Cedar County, Hydrologic Unit 07080206, at Cedar Valley.	7,116	07-24-88	877
Rock Creek (05464800)	Lat 41°40'40", long 91°09'52", in NW1/4 sec. 2, T.79 N., R.3 W., Cedar County, Hydrologic Unit 07080206, at bridge, 0.5 mi NW of Rochester.	63.4	07-23-88	3.64
Sugar Creek (05464850)	Lat 41°41'56", long 91°02'43", near S1/4 corner of sec. 26, T.80 N., R.2 W., Cedar County, Hydrologic Unit 07080206, at bridge, 4.5 mi SW of Bennett.	80.7	07-23-88	0.658
Mud Creek (05464900)	Lat 41°34'45", long 91°02'17", in NW1/4 sec. 12, T.78 N., R.2 W., Muscatine County, Hydrologic Unit 07080206, at bridge, 1.0 mi SW of Wilton.	102	07-24-88	3.60
Sugar Creek (05464920)	Lat 41°34'00", long 91°04'09", near N1/4 corner of sec. 15, T.78 N., R.2 W., Muscatine County, Hydrologic Unit 07080206, at bridge, 1.0 mi SE of Moscow.	218	07-24-88	9.58
Wapsinonoc Creek (05464940)	Lat 41°33'26", long 91°15'19", in SE1/4 sec. 13, T.78 N., R.4 W., Muscatine County, Hydrologic Unit 07080206, at bridge on State Highway 76, 0.5 mi SE of West Liberty.	51.7	07-23-88	1.28
Wapsinonoc Creek	Lat 41°28'53", long 91°16'32", Muscatine County, Hydrologic Unit 07080206, near Nichols.	163	07-24-88	5.35
Cedar River (05465000)	Lat 41°24'36", long 91°17'06", in SW1/4 SW1/4 sec. 2, T.76 N., R.4 W., Muscatine County, Hydrologic Unit 07080206, on right bank 10 ft downstream from bridge on county highway G28, 3.4 mi NE of Conesville, 5.2 mi downstream from Wapsinonoc Creek, 10.7 mi upstream from mouth, and at mi 39.8 upstream from mouth of Iowa River.	7,785	07-24-88	1,040

## MISCELLANEOUS WATER-QUALITY DATA

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DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)
05388250 UPPER IOWA RIVER NEAR DORCHESTER, IOWA (LAT 43 25 16N LONG 091 30 31W)									
OCT 1987					APR 1988				
08...	1645	189	9.5	520	28...	1210	443	9.5	505
NOV					JUN				
17...	1425	215	8.0	500	09...	0935	229	20.0	485
DEC					JUL				
18...	0930	181	0.0	575	21...	1455	155	25.0	263
FEB 1988					SEP				
04...	1350	250	0.5	525	01...	1630	121	23.0	300
MAR									
24...	0920	462	7.0	545					
05411600 TURKEY RIVER AT SPILLVILLE, IOWA (LAT 43 12 28N LONG 091 56 56W)									
OCT 1987					MAR 1988				
13...	1120	20	8.0	540	24...	1210	90	7.0	500
NOV					JUN				
18...	1630	30	5.5	505	09...	1205	35	21.0	510
DEC					JUL				
18...	1210	32	0.0	575	22...	0840	18	19.5	548
FEB 1988					SEP				
04...	1650	29	0.0	460	02...	0910	12	18.5	527
05412060 SILVER CREEK AT LUANA, IOWA (LAT 43 01 19N LONG 091 29 21W)									
OCT 1987					APR 1988				
08...	1405	1.3	12.5	750	17...	1510	4.5	17.0	640
NOV					27...	1450	2.5	10.0	630
17...	1040	2.1	7.0	745	MAY				
DEC					17...	1655	1.6	25.0	640
17...	1255	1.7	0.0	653	31...	1530	1.1	29.0	670
FEB 1988					JUN				
03...	1315	2.8	1.0	625	28...	0910	0.60	19.0	665
MAR					JUL				
01...	1440	15	2.0	360	21...	1200	0.41	25.0	558
02...	1120	12	1.0	395	AUG				
02...	1800	16	1.0	365	09...	1135	0.26	24.5	650
07...	1400	9.6	5.0	490					
24...	1350	2.6	8.0	720					
05412070 UNNAMED CREEK NEAR LUANA, IOWA (LAT 43 02 24N LONG 091 28 07W)									
MAR 1988					MAY 1988				
08...	1130	4.0	4.5	410	04...	1330	0.84	19.5	524
APR					JUN				
05...	1200	1.8	13.0	730	01...	1015	0.07	22.0	775
05412100 ROBERTS CREEK ABOVE ST. OLAF, IOWA (LAT 42 55 49N LONG 091 23 03W)									
OCT 1987					JUN 1988				
08...	1110	10	8.0	595	23...	0900	2.4	23.5	590
NOV					23...	1200	2.5	--	560
16...	1400	8.2	9.0	645	23...	1500	2.4	30.0	550
DEC					23...	2100	2.4	27.0	555
17...	1010	12	0.0	705	24...	0300	2.1	22.5	600
FEB 1988					24...	0600	2.1	21.0	580
03...	1025	44	0.0	535	27...	1320	2.5	27.0	485
MAR					28...	1535	2.1	30.0	530
01...	1800	163	1.0	354	JUL				
02...	0925	176	1.0	330	01...	1100	2.9	27.0	570
07...	1135	173	1.0	435	21...	0705	2.4	21.0	519
08...	0955	169	1.0	490	AUG				
08...	1330	173	2.0	480	05...	0810	0.97	23.0	590
23...	0905	30	6.0	635	09...	0830	4.3	25.0	400
APR					SEP				
05...	0900	80	13.0	650	06...	1000	0.04	12.5	540
07...	0905	46	13.0	644	20...	0950	22	16.0	465
27...	1145	37	7.0	610	22...	1340	78	17.5	504
MAY									
04...	1455	15	20.5	617					
17...	1510	14	20.5	630					
31...	1300	6.5	22.0	725					
05412500 TURKEY RIVER AT GARBER, IOWA (LAT 42 44 24N LONG 091 15 42W)									
OCT 1987					APR 1988				
06...	1705	481	11.0	580	27...	1000	824	7.5	497
NOV					JUN				
16...	1040	408	9.0	560	07...	1845	372	28.0	560
FEB 1988					JUL				
02...	1720	1050	0.0	475	19...	1535	224	29.5	520
MAR					AUG				
22...	1815	922	9.0	565	08...	1530	185	30.0	380

## MISCELLANEOUS WATER-QUALITY DATA

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05418450 NORTH FORK MAQUOKETA RIVER AT FULTON, IOWA (LAT 42 08 42N LONG 090 40 55W)									
OCT 1987					APR 1988				
28...	1600	869	13.0	570	18...	1045	347	11.0	625
DEC					JUN				
09...	1457	485	3.0	485	01...	1555	427	24.5	535
JAN 1988					JUL				
21...	0930	--	0.0	690	07...	1217	257	23.5	605
MAR					AUG				
20...	1000	285	7.0	610	18...	1324	223	24.0	580
05418500 MAQUOKETA RIVER NEAR MAQUOKETA, IOWA (LAT 42 05 05N LONG 090 38 04W)									
OCT 1987					APR 1988				
06...	1000	696	13.0	550	26...	0935	600	12.0	550
NOV					JUN				
10...	1120	528	6.0	575	07...	0935	365	22.0	555
DEC					JUL				
16...	1125	849	0.0	560	19...	0905	287	25.0	558
MAR 1988					AUG				
22...	0955	824	6.0	550	08...	1150	391	27.0	425
05420560 WAPSIPINICON RIVER NEAR ELMA, IOWA (LAT 43 14 34N LONG 092 31 46W)									
NOV 1987					JUN 1988				
02...	1250	9.5	10.0	560	01...	1015	7.2	24.0	430
JAN 1988					JUL				
28...	1200	8.0	0.0	480	12...	1500	10	26.5	400
APR					AUG				
19...	1450	18	9.0	610	24...	1025	7.9	21.0	360
05421000 WAPSIPINICON RIVER AT INDEPENDENCE, IOWA (LAT 42 27 49N LONG 091 53 42W)									
NOV 1987					APR 1988				
12...	1030	153	6.0	425	29...	1315	562	15.0	430
DEC					JUN				
21...	1020	442	0.0	505	09...	1537	87	25.0	365
FEB 1988					JUL				
05...	1303	314	1.0	475	22...	1145	38	29.0	346
MAR					SEP				
24...	1545	498	10.0	420	02...	1215	27	25.5	380
05422000 WAPSIPINICON RIVER NEAR DE WITT, IOWA (LAT 41 46 01N LONG 090 32 05W)									
OCT 1987					APR 1988				
05...	1445	801	15.0	455	25...	1350	1200	14.5	405
NOV					JUN				
09...	1555	577	9.0	405	06...	1640	489	28.0	360
DEC					JUL				
14...	1510	1560	2.0	540	18...	1225	228	28.0	311
MAR 1988									
21...	1605	1410	7.0	420					
05422470 CROW CREEK AT BETTENDORF, IOWA (LAT 41 33 03N LONG 090 27 15W)									
OCT 1987					MAR 1988				
05...	1050	4.3	13.0	570	21...	1005	5.9	3.5	600
NOV					APR				
09...	1000	2.9	7.0	665	25...	1005	9.0	11.5	595
DEC					MAY				
14...	0950	8.3	2.0	675	06...	1035	4.5	20.0	650
FEB 1988					JUL				
01...	0910	35	2.5	525	18...	0830	0.43	24.0	633
05449000 EAST BRANCH IOWA RIVER NEAR KLEMME, IOWA (LAT 43 00 31N LONG 093 37 42W)									
OCT 1987					MAY 1988				
28...	1040	6030	6.0	835	31...	1140	21	22.0	710
JAN 1988					JUL				
27...	1130	0.34	0.0	875	07...	1225	6070	32.0	560
APR					AUG				
18...	1135	22	8.0	700	23...	1030	8.1	21.0	530
05449500 IOWA RIVER NEAR ROWAN, IOWA (LAT 42 45 36N LONG 093 37 23W)									
OCT 1987					MAY 1988				
28...	0855	31	5.5	660	31...	0940	71	22.0	670
DEC					JUL				
14...	1005	49	0.0	490	07...	0905	23	25.0	590
JAN 1988					AUG				
27...	1015	20	0.0	770	23...	0850	25	20.5	400
APR									
18...	0920	84	8.0	690					

## MISCELLANEOUS WATER-QUALITY DATA

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05451500 IOWA RIVER AT MARSHALLTOWN, IOWA (LAT 42 03 57N LONG 092 54 27W)									
OCT 1987					JUL 1988				
14...	1310	284	14.0	590	08...	1735	85	31.0	430
FEB 1988					26...	1300	60	27.0	400
18...	1320	381	0.0	510	AUG				
MAY					02...	1150	46	28.0	470
11...	0845	579	19.0	1040	SEP				
JUN					14...	1135	33	21.0	490
23...	1025	129	23.0	460					
05451700 TIMBER CREEK NEAR MARSHALLTOWN, IOWA (LAT 42 00 25N LONG 092 51 15W)									
OCT 1987					JUL 1988				
14...	1605	38	13.0	510	08...	1630	4.3	29.0	400
DEC					26...	1110	2.2	21.0	620
03...	1210	60	3.0	605	AUG				
MAR 1988					02...	0905	1.6	25.0	650
22...	1000	31	5.0	600	SEP				
MAY					14...	0925	1.7	16.0	620
10...	1935	27	19.5	520					
JUN									
23...	0855	11	21.5	590					
05451900 RICHLAND CREEK NEAR HAVEN, IOWA (LAT 41 53 58N LONG 092 28 27W)									
OCT 1987					APR 1988				
29...	1315	8.1	10.0	532	12...	1335	14	14.5	476
DEC					MAY				
07...	1230	18	3.5	510	24...	1455	11	23.0	530
JAN 1988					JUL				
29...	1425	20	0.0	525	07...	1020	2.3	24.0	453
MAR					AUG				
09...	1235	16	6.0	435	16...	1135	0.86	30.0	460
05452000 SALT CREEK NEAR ELBERON, IOWA (LAT 41 57 51N LONG 092 18 47W)									
OCT 1987					APR 1988				
28...	1345	43	7.0	648	12...	0950	65	9.5	562
DEC					MAY				
07...	1020	74	3.5	505	24...	1055	39	16.0	570
JAN 1988					JUL				
29...	1115	70	0.0	550	06...	1305	12	28.0	523
MAR					AUG				
04...	1140	67	2.0	563	16...	0945	5.9	26.0	540
05452200 WALNUT CREEK NEAR HARTWICK, IOWA (LAT 41 50 06N LONG 092 23 10W)									
OCT 1987					MAY 1988				
29...	1500	9.0	12.0	535	25...	0940	7.2	16.0	480
DEC					JUL				
07...	1430	20	3.5	505	07...	1245	1.3	31.0	416
MAR 1988					AUG				
09...	1415	20	7.5	485	16...	1350	0.49	36.0	353
APR									
12...	1540	19	20.0	451					
05453000 BIG BEAR CREEK AT LADORA, IOWA (LAT 41 44 58N LONG 092 10 55W)									
OCT 1987					JUL 1988				
29...	1625	26	9.5	635	07...	1420	5.4	32.0	682
DEC					AUG				
08...	1015	69	4.5	488	01...	1115	2.8	31.0	705
MAR 1988					18...	1000	1.6	27.0	825
09...	1547	58	8.0	585	SEP				
APR					16...	1230	2.8	18.0	840
13...	1027	40	12.5	513					
MAY									
25...	1150	19	19.0	638					
05453100 IOWA RIVER NEAR MARENGO, IOWA (LAT 41 48 41N LONG 092 03 42W)									
DEC 1987					MAR 1988				
01...	1135	1610	3.5	587	10...	1000	1720	4.0	500
17...	1300	885	0.0	560	APR				
24...	0840	0.0	0.0	640	13...	1245	1130	14.0	625
JAN 1988					MAY				
06...	1325	807	0.0	759	26...	1010	651	19.0	490
12...	1110	792	0.0	784	JUL				
24...	0955	1040	0.0	660	11...	0950	188	25.0	522
29...	1250	783	0.0	621	AUG				
FEB					01...	0930	136	29.0	590
04...	1220	1810	0.0	445	18...	1205	106	27.0	590
12...	1135	882	0.0	658	SEP				
18...	1140	827	0.0	640	16...	1025	83	18.0	600
23...	1255	1540	0.0	395					

## MISCELLANEOUS WATER-QUALITY DATA

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05454000 RAPID CREEK NEAR IOWA CITY, IOWA (LAT 41 41 19N LONG 091 29 15W)									
DEC 1987					APR 1988				
01...	0915	20	3.0	595	05...	0855	23	10.0	405
JAN 1988					MAY				
06...	1025	9.1	0.0	645	03...	0930	6.4	14.0	552
FEB					JUN				
09...	0945	9.9	0.0	625	02...	0935	2.2	25.5	550
MAR					JUL				
03...	1235	8.4	2.0	495	01...	0940	0.51	18.5	495
05454300 CLEAR CREEK NEAR CORALVILLE, IOWA (LAT 41 40 36N LONG 091 35 55W)									
NOV 1987					FEB 1988				
24...	0945	23	4.0	647	18...	1300	36	0.0	730
DEC					19...	1520	151	0.0	410
15...	1415	18	0.0	644	21...	1100	34	0.0	375
17...	1030	36	0.0	640	23...	1035	178	0.0	335
21...	1055	97	0.0	560	26...	1000	31	0.0	610
24...	1015	107	4.0	581	28...	1130	87	0.0	383
JAN 1988					MAR				
01...	1105	23	0.0	695	01...	1050	56	1.5	475
04...	1040	50	0.0	655	14...	1305	20	0.5	665
06...	0955	42	0.0	700	APR				
08...	0955	45	0.0	675	14...	1140	32	12.0	395
13...	0940	35	0.0	697	MAY				
15...	1425	29	0.0	694	26...	1325	11	22.0	606
30...	1030	540	0.5	246	JUL				
FEB					11...	1230	2.9	30.0	715
02...	1040	31	0.0	605	AUG				
04...	0930	26	0.0	580	01...	1340	1.2	35.0	620
09...	1400	29	0.0	590	23...	1450	18	26.0	422
12...	0905	25	0.0	618	SEP				
15...	0925	28	0.0	602	16...	1430	1.0	21.0	680
05454500 IOWA RIVER AT IOWA CITY, IOWA (LAT 41 39 24N LONG 091 32 27W)									
NOV 1987					APR 1988				
23...	1210	855	7.0	545	29...	1320	710	14.0	445
FEB 1988					MAY				
10...	1005	1260	0.0	775	27...	0905	530	20.0	534
MAR					JUL				
22...	1200	1150	5.0	572	08...	1020	169	28.0	498
05455000 RALSTON CREEK AT IOWA CITY, IOWA (LAT 41 39 50N LONG 091 30 48W)									
NOV 1987					JAN 1988				
02...	1255	0.32	11.5	445	06...	1240	0.42	0.0	865
DEC									
01...	1015	1.1	3.0	700					
05455010 SOUTH BRANCH RALSTON CREEK AT IOWA CITY, IOWA (LAT 41 39 05N LONG 091 30 27W)									
OCT 1987					MAR 1988				
01...	1100	0.10	12.0	660	03...	1450	0.75	4.0	660
NOV					APR				
02...	1515	0.56	11.0	440	05...	1045	1.8	10.5	645
DEC					MAY				
01...	1200	1.2	3.0	655	03...	1115	1.0	15.0	650
JAN 1988					JUN				
06...	1550	0.65	0.0	725	02...	1035	0.10	21.0	650
FEB									
09...	1130	0.92	0.0	650					
05455100 OLD MANS CREEK NEAR IOWA CITY, IOWA (LAT 41 36 25N LONG 091 36 40W)									
OCT 1987					APR 1988				
14...	0915	26	9.0	500	29...	1015	40	11.5	496
NOV					MAY				
23...	0910	56	4.0	495	26...	1525	24	22.0	505
DEC					JUL				
22...	0835	193	1.0	450	08...	1255	3.9	29.0	492
FEB 1988					AUG				
09...	1415	73	0.5	475	24...	0950	32	21.0	405
MAR									
22...	0900	45	4.0	525					

## MISCELLANEOUS WATER-QUALITY DATA

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DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)
05455500 ENGLISH RIVER AT KALONA, IOWA (LAT 41 27 59N LONG 091 42 56W)									
OCT 1987					JUN 1988				
16...	1030	63	13.5	450	24...	0955	15	23.5	510
NOV					AUG				
17...	1255	115	9.5	460	04...	1310	5.2	33.5	450
MAR 1988					26...	1210	38	22.5	340
10...	1325	181	4.0	440	SEP				
APR					14...	1210	3.6	22.0	475
07...	1355	194	15.0	460					
MAY									
05...	0950	77	16.0	478					
05455700 IOWA RIVER NEAR LONE TREE, IOWA (LAT 41 25 15N LONG 091 28 25W)									
NOV 1987					JUN 1988				
19...	0945	1150	7.0	500	24...	1200	278	24.5	525
MAR 1988					AUG				
09...	0905	2980	3.0	450	08...	1320	248	31.0	510
APR					SEP				
08...	0945	2060	13.0	590	15...	0930	190	20.0	575
MAY									
05...	1315	631	19.0	473					
05456500 TURTLE CREEK NEAR AUSTIN, MN (LAT 43 41 05N LONG 093 02 15W)									
JUL 1988									
23...	1710	14	27.0	390					
05457000 CEDAR RIVER NEAR AUSTIN, MN (LAT 43 38 11N LONG 092 58 26W)									
JUL 1988									
23...	1110	51	21.0	630					
05457160 ROSE CREEK NEAR AUSTIN, MN (LAT 43 36 48N LONG 092 58 10W)									
JUL 1988									
23...	1330	5.9	22.0	470					
05457300 OTTER CREEK NEAR OTRANTO, IOWA (LAT 43 28 00N LONG 092 58 00W)									
JUL 1988									
23...	1055	--	--	460					
05457450 DEER CREEK AT ST ANSGAR, IOWA (LAT 43 23 00N LONG 092 58 00W)									
JUL 1988									
23...	1400	--	28.0	420					
05457700 CEDAR RIVER AT CHARLES CITY, IOWA (LAT 43 03 45N LONG 092 40 23W)									
NOV 1987					JUN 1988				
02...	1605	199	10.0	500	02...	1315	283	26.0	490
DEC					06...	1430	231	26.0	550
16...	1540	206	0.0	600	12...	1000	--	23.0	580
JAN 1988					21...	1045	--	29.0	558
28...	0720	193	0.0	710	30...	1130	--	21.0	540
APR					JUL				
19...	1830	352	10.0	580	06...	1130	--	27.0	385
26...	1445	1600	9.5	495	13...	0745	350	25.0	425
MAY					13...	1300	--	26.0	445
05...	1145	743	16.0	585	23...	1200	171	26.0	305
12...	1150	750	17.0	555	AUG				
19...	115	492	17.0	555	08...	1045	156	27.0	540
25...	1145	414	19.0	525					
31...	1650	293	23.5	550					
05457800 LITTLE CEDAR RIVER NEAR STACEYVILLE, IOWA (LAT 43 28 00N LONG 092 47 00W)									
JUL 1988									
23...	1245	--	--	440					
05458000 LITTLE CEDAR RIVER NEAR IONIA, IOWA (LAT 43 02 05N LONG 092 30 05W)									
NOV 1987					JUL 1988				
02...	1425	27	10.0	550	12...	1800	25	29.0	380
JAN 1988					SEP				
28...	1000	17	0.0	570	01...	1035	8.4	23.5	400
APR					JUL				
19...	1645	81	10.0	480	23...	1700	16	30.0	405
JUN									
01...	0810	37	22.0	480					

## MISCELLANEOUS WATER-QUALITY DATA

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)
05458500 CEDAR RIVER AT JANESVILLE, IOWA (LAT 42 38 54N LONG 092 27 54W)									
FEB 1988					JUN 1988				
05...	1000	224	0.0	560	03...	0745	328	21.0	440
12...	1115	276	0.0	700	07...	0945	266	22.5	455
25...	1045	283	1.0	670	12...	1600	--	26.0	470
MAR					22...	1245	--	29.0	490
18...	1225	1030	2.0	520	30...	0930	--	19.5	510
APR					JUL				
20...	1210	620	10.0	540	06...	0945	--	36.0	490
27...	1030	515	8.5	445	13...	1200	423	27.5	450
MAY					14...	0800	--	26.0	460
05...	0945	1030	16.5	555	23...	1715	234	29.0	3350
12...	0945	842	18.0	540	AUG				
19...	0915	545	18.0	525	10...	1235	234	27.0	400
25...	1000	523	19.0	470	22...	1130	--	22.5	385
JUN					24...	1705	194	23.0	550
01...	1645	405	24.0	430	SEP				
					12...	1210	126	23.0	410
05458780 HARTGRAVE CREEK NEAR HANSELL, IOWA (LAT 42 44 00N LONG 093 05 00W)									
JUL 1988					JUL 1988				
24...	1815	15	28.0	560					
05458900 WEST FORK CEDAR RIVER AT FINCHFORD, IOWA (LAT 42 37 50N LONG 092 32 24W)									
NOV 1987					JUN 1988				
03...	0940	130	11.5	610	02...	1530	176	24.5	585
JAN 1988					07...	0830	162	21.0	600
28...	1635	93	0.0	760	12...	1515	--	26.5	590
APR					21...	1715	--	32.0	485
20...	1035	304	9.5	590	30...	1545	101	22.0	550
27...	0900	310	6.5	560	JUL				
MAY					07...	0745	--	25.0	495
06...	0915	370	16.0	615	13...	1445	--	29.0	530
13...	0930	350	16.5	600	23...	1305	65	29.0	450
20...	0915	278	17.0	595	AUG				
JUN					10...	1110	50	27.0	430
01...	1450	170	26.0	600	24...	1540	57	23.0	510
MAY					SEP				
26...	0930	218	17.0	605	07...	1150	26	18	500
05458970 SHELL ROCK RIVER AT GORDONVILLE, MN (LAT 43 30 51N LONG 093 16 06W)									
JUL 1988									
23...	0945	6.5	22.0	1300					
05458975 GOOSE CREEK NEAR GORDONVILLE, MN (LAT 43 30 13N LONG 093 16 24W)									
JUL 1988									
23...	0800	--	22.0	650					
05459000 SHELL ROCK RIVER NEAR NORTHWOOD, IOWA (LAT 43 24 51N LONG 093 13 14W)									
APR 1988					JUN 1988				
26...	1130	85	9.0	590	02...	1115	60	25.0	690
26...	1135	85	9.0	590	06...	1200	45	26.0	690
MAY					12...	1130	--	23.5	775
05...	1400	226	19.0	530	21...	1300	--	31.0	785
12...	1400	257	20.0	505	30...	1300	--	23.0	805
19...	1330	150	16.0	590	JUL				
25...	1400	100	20.5	600	06...	1300	--	30.0	665
					13...	1100	--	28.0	810
					23...	0900	--	21.0	980
05459050 LIME CREEK NEAR SCARVILLE, IOWA (LAT 43 27 00N LONG 093 35 00W)									
JUL 1988					JUL 1988				
23...	1955	2.2	28.0	810					



## MISCELLANEOUS WATER-QUALITY DATA

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DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)
05459400 BEAVER CREEK NEAR FERTILE, IOWA (LAT 43 16 00N LONG 093 27 00W)									
JUL 1988 24...	1050	--	23.0	750					
05459500 WINNEBAGO RIVER AT MASON CITY, IOWA (LAT 43 09 54N LONG 093 11 33W)									
OCT 1987 28...	1345	32	6.0	610	MAY 1988 31...	1415	91	23.0	830
DEC 16...	1015	43	0.0	520	JUL 12...	1115	29	24.0	880
JAN 1988 27...	1500	20	0.0	500	24...	0700	--	25.0	1000
APR 19...	1145	94	8.5	750	AUG 23...	1355	21	22.0	960
05460200 WILLOW CREEK AT MASON CITY, IOWA (LAT 43 09 46N LONG 093 14 20W)									
JUL 1988 24...	0850	--	--	700	JUL 1988				
05461100 COLD WATER CREEK NEAR GREENE, IOWA (LAT 42 53 00N LONG 092 51 00W)									
JUL 1988 24...	0845	0.03	22.0	415					
05462000 SHELL ROCK RIVER AT SHELL ROCK, IOWA (LAT 42 39 10N LONG 092 35 46W)									
NOV 1987 03...	0810	206	12.5	700	JUN 1988 02...	1415	344	24.0	575
DEC 17...	0840	180	0.0	620	06...	1600	322	26.0	455
JAN 1988 28...	1450	164	3.0	740	12...	1415	--	23.0	455
MAR 17...	1240	999	2.0	750	21...	1530	--	29.0	478
APR 20...	0845	462	9.5	480	30...	1500	--	29.0	490
27...	0730	531	6.5	475	JUL 06...	1545	--	28.0	365
MAY 06...	0745	830	16.0	540	08...	0945	168	27.0	440
13...	0815	908	16.5	605	13...	1400	--	26.0	540
20...	0815	637	16.0	570	23...	1520	145	27.0	545
JUN 01...	1310	388	24.0	550	AUG 16...	1015	133	28.0	565
MAY 26...	0830	461	18.0	535	24...	1400	180	22.5	580
05462700 BEAVER CREEK NEAR ACKLEY, IOWA (LAT 42 34 00N LONG 093 02 00W)									
JUL 1988 23...	1000	1.9	23.5	660	SEP 07...	1010	116	17.0	560
05462800 SOUTH BEAVER CREEK NEAR PARKERSBURG, IOWA (LAT 42 34 00N LONG 092 49 00W)									
JUL 1988 24...	1015	6.4	25.0	540	12...	1020	102	22.0	500
05463000 BEAVER CREEK AT NEW HARTFORD, IOWA (LAT 42 30 50N LONG 092 37 55W)									
JUL 1988 24...	1210	20	26.5	555	19...	1045	120	22.0	560
05463050 CEDAR RIVER AT CEDAR FALLS, IOWA (LAT 42 32 20N LONG 092 26 58W)									
OCT 1987 26...	1045	1100	6.5	600	JUN 1988 03...	0900	1740	22.0	475
DEC 14...	1100	1770	0.5	650	07...	1100	1490	25.0	460
MAR 1988 22...	1015	2330	4.0	520	13...	0830	--	24.0	435
APR 27...	1145	2600	8.0	510	22...	1405	790	29.0	420
MAY 02...	1030	3860	15.0	592	JUL 01...	0715	--	21.0	490
06...	1045	3550	17.5	545	07...	0900	--	28.0	425
13...	1045	3520	17.5	555	14...	0845	--	29.0	430
20...	1015	2570	17.0	540	24...	1350	--	29.0	365
26...	1030	2210	19.5	490	AUG 17...	1100	491	30.0	405

## MISCELLANEOUS WATER-QUALITY DATA

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05463500 BLACK HAWK CREEK AT HUDSON, IOWA (LAT 42 24 28N LONG 092 27 47W)									
OCT 1987					JUN 1988				
27...	1355	78	9.0	660	02...	0800	45	23.0	610
DEC 17...	1410	130	0.0	520	30...	1445	37	23.0	580
JAN 1988					JUL 24...	0815	15	22.0	540
29...	0815	62	0.0	650	AUG 10...	1415	9.5	28.0	530
MAR 18...	0900	108	1.0	620					
APR 20...	1615	97	11.0	610					
05464000 CEDAR RIVER AT WATERLOO, IOWA (LAT 42 29 44N LONG 092 20 03W)									
JAN 1988									
28...	1105	875	0.0	780					
05464100 WOLF CREEK NEAR BEAMAN, IOWA (LAT 42 12 47N LONG 092 47 12W)									
JUL 1988									
23...	1800	2.4	29.0	575					
05464150 TWELVE MILE CREEK NEAR BUCKINGHAM, IOWA (LAT 42 14 00N LONG 092 26 00W)									
JUL 1988									
23...	1535	7.3	28.0	527					
05464250 WOLF CREEK AT LAPORTE CITY, IOWA (LAT 42 19 00N LONG 092 12 00W)									
JUL 1988									
23...	1330	33	25.0	526					
05464400 BEAR CREEK NEAR PALO, IOWA (LAT 42 04 55N LONG 091 47 40W)									
JUL 1988									
24...	0700	2.7	23.0	495					
05464460 OTTER CREEK NEAR CEDAR RAPIDS, IOWA (LAT 42 03 57N LONG 091 44 27W)									
JUL 1988					AUG 1988				
24...	0845	--	23.0	422	22...	1345	--	21.5	400
05464500 CEDAR RIVER AT CEDAR RAPIDS, IOWA (LAT 41 58 14N LONG 091 40 01W)									
OCT 1987					JUN 1988				
28...	1045	447	10.0	605	03...	1100	902	25.0	350
JAN 1988					07...	1330	1450	26.0	355
28...	1500	904	0.0	800	13...	1100	--	25.0	360
FEB 29...	1130	2750	1.5	441	23...	1030	--	28.0	365
APR 25...	1200	2320	14.0	482	29...	1335	1190	23.0	367
28...	1000	2650	10.0	385	JUL 01...	0930	--	21.0	365
MAY 06...	1300	3580	19.0	530	07...	1100	--	28.0	370
06...	1305	3580	19.0	530	14...	1030	--	28.0	390
13...	1330	3180	20.0	500	24...	0945	--	25.0	340
20...	1300	2400	20.0	425	AUG 22...	1430	--	22.5	265
26...	1130	2780	22.0	405	25...	1400	652	26.0	435
05464600 PRAIRIE CREEK AT NORWAY, IOWA (LAT 41 53 35N LONG 091 55 43W)									
JUL 1988									
23...	1030	4.0	25.0	635					
05464650 PRAIRIE CREEK AT CEDAR RAPIDS, IOWA (LAT 41 55 49N LONG 091 40 34W)									
JUL 1988									
23...	0830	13	23.0	780					
05464750 BIG CREEK AT BERTRAM, IOWA (LAT 41 57 23N LONG 091 31 35W)									
JUL 1988									
23...	1300	9.0	27.0	525					

## MISCELLANEOUS WATER-QUALITY DATA

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DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)
05464800 ROCK CREEK AT ROCHESTER, IOWA (LAT 41 40 40N LONG 091 09 52W)									
JUL 1988 23...	1740	3.3	27.0	500					
05464850 SUGAR CREEK NEAR BENNETT, IOWA (LAT 41 41 56N LONG 091 02 43W)									
JUL 1988 23...	1600	0.66	33.0	360					
05464900 MUD CREEK NEAR WILTON, IOWA (LAT 41 34 45N LONG 091 02 17W)									
JUL 1988 24...	0900	3.6	22.0	770					
05464920 SUGAR CREEK NEAR MOSCOW, IOWA (LAT 41 34 00N LONG 091 04 09W)									
JUL 1988 24...	--	9.6	27.0	645					
05464940 EAST BRANCH WAPSINONOC CREEK AT WEST LIBERTY, IOWA (LAT 41 33 26N LONG 091 15 19W)									
JUL 1988 23...	1900	1.3	28.5	1410					
05465000 CEDAR RIVER NEAR CONESVILLE, IOWA (LAT 41 24 36N LONG 091 17 06W)									
NOV 1987 20...	1030	2250	4.0	575	JUN 1988 27...	1050	1360	25.5	490
MAR 1988 09...	1255	6860	4.0	450	JUL 24...	1530	1040	29.0	485
APR 08...	1345	5230	15.0	575	SEP 15...	1235	723	21.5	600
MAY 06...	1430	4400	20.0	515					
05465500 IOWA RIVER AT WAPELLO, IOWA (LAT 41 10 48N LONG 091 10 57W)									
NOV 1987 03...	1100	2790	11.0	530	MAY 1988 10...	1200	5400	16.5	508
DEC 11...	1530	5830	5.0	625	JUN 27...	1130	1560	26.0	485
MAR 1988 31...	1230	8160	10.0	575	AUG 24...	1200	1710	25.0	468
05470000 SOUTH SKUNK RIVER NEAR AMES, IOWA (LAT 42 04 05N LONG 093 37 02W)									
OCT 1987 15...	0925	74	12.0	740	JUN 1988 22...	1340	16	29.0	750
FEB 1988 22...	1100	168	2.0	490	JUL 06...	1350	3.6	31.0	640
APR 14...	1055	131	10.0	640	AUG 02...	1445	124	0.0	670
MAY 05...	1130	66	18.0	620					
05470500 SQUAW CREEK AT AMES, IOWA (LAT 42 01 21N LONG 093 37 45W)									
OCT 1987 15...	0800	45	11.0	690	MAY 1988 17...	0950	32	15.0	700
FEB 1988 22...	0955	79	2.0	550	JUN 22...	1215	8.2	27.0	710
MAR 22...	1310	43	5.0	950					
05471050 SOUTH SKUNK RIVER AT COLFAX, IOWA (LAT 41 40 55N LONG 093 14 47W)									
OCT 1987 21...	1105	301	7.0	670	APR 1988 21...	1340	234	11.5	660
DEC 10...	0935	613	4.5	670	JUL 05...	1530	34	33.0	670
JAN 1988 28...	1330	221	0.0	710	AUG 17...	1155	2.6	30.0	915
MAR 23...	1555	229	14.0	670					

## MISCELLANEOUS WATER-QUALITY DATA

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05471200 INDIAN CREEK NEAR MINGO, IOWA (LAT 41 48 17N LONG 093 18 26W)									
OCT 1987					MAR 1988				
12...	1250	110	8.0	670	23...	1350	68	14.0	750
DEC					AUG				
10...	1125	250	4.0	670	17...	1405	0.60	31.0	525
JAN 1988									
28...	1610	83	0.0	710					
05471500 SOUTH SKUNK RIVER NEAR OSKALOOSA, IOWA (LAT 41 21 19N LONG 092 39 31W)									
OCT 1987					APR 1988				
26...	1000	521	9.0	580	18...	1015	495	12.5	570
DEC					MAY				
07...	1000	1140	3.5	570	23...	1150	439	19.5	630
JAN 1988					AUG				
25...	1220	599	0.0	370	15...	1145	28	32.0	700
MAR					SEP				
21...	0940	482	6.0	580	09...	0930	20	21.0	570
05473400 CEDAR CREEK NEAR OAKLAND MILLS, IOWA (LAT 40 55 00N LONG 091 40 00W)									
NOV 1987					JUN 1988				
25...	1210	52	3.0	540	22...	0935	8.5	27.0	600
MAR 1988					AUG				
08...	1505	90	8.0	510	03...	1510	0.57	35.0	700
APR					SEP				
06...	1240	173	15.0	525	13...	1335	0.78	27.0	600
MAY									
05...	1330	26	20.5	605					
05474000 SKUNK RIVER AT AUGUSTA, IOWA (LAT 40 45 13N LONG 091 16 40W)									
NOV 1987					MAY 1988				
02...	1100	825	13.5	655	09...	1200	626	17.0	415
DEC					JUN				
11...	1100	2010	5.0	635	20...	1230	240	30.5	528
MAR 1988					AUG				
30...	1200	2690	10.0	472	23...	1200	187	25.0	455
05482135 NORTH RACCOON RIVER NEAR NEWELL, IOWA (LAT 42 36 16N LONG 095 02 42W)									
OCT 1987					MAY 1988				
27...	1050	48	9.0	700	25...	1730	64	23.0	750
DEC					JUL				
09...	1550	99	3.0	790	05...	1130	12	29.0	740
FEB 1988					AUG				
02...	1500	17	0.0	760	18...	1030	3.2	22.0	600
MAR					23...	1204	466	27.0	820
30...	1255	78	11.0	800					
APR									
20...	1630	84	15.5	880					
05482300 NORTH RACCOON RIVER NEAR SAC CITY, IOWA (LAT 42 20 28N LONG 094 59 05W)									
OCT 1987					APR 1988				
05...	1130	282	18.0	760	20...	1430	225	14.5	890
27...	1400	181	9.0	760	MAY				
DEC					26...	1030	203	23.0	690
03...	1513	120	1.5	575	JUN				
FEB 1988					23...	1330	86	31.0	630
04...	1020	104	0.0	850	AUG				
MAR					16...	0805	10	27.0	700
30...	1530	190	11.0	750					
05482500 NORTH RACCOON RIVER NEAR JEFFERSON, IOWA (LAT 41 59 17N LONG 094 22 36W)									
OCT 1987					MAY 1988				
29...	1200	421	11.0	725	26...	1545	471	22.0	670
DEC					JUL				
07...	1330	407	3.0	750	07...	0915	91	28.0	500
FEB 1988					AUG				
04...	1350	409	0.0	680	02...	0900	131	31.0	410
MAR					16...	1125	54	31.0	540
28...	1340	356	8.5	710					
APR									
21...	1200	433	11.0	690					
05483000 EAST FORK HARDIN CREEK NEAR CHURDAN, IOWA (LAT 42 06 27N LONG 094 22 12W)									
OCT 1987					NOV 1987				
16...	1510	50	11.0	890	26...	1420	164	5.0	900

## MISCELLANEOUS WATER-QUALITY DATA

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DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)
05483450 MIDDLE RACCOON RIVER NEAR BAYARD, IOWA (LAT 41 47 00N LONG 094 30 00W)									
OCT 1987					JUL 1988				
13...	1030	177	11.0	740	08...	0950	42	27.0	520
MAR 1988					AUG				
30...	1140	96	7.0	790	03...	0915	52	27.0	670
JUN					SEP				
01...	1100	57	25.0	690	14...	1100	25	20.0	640
21...	0710	88	26.0	650					
05483600 MIDDLE RACCOON RIVER AT PANORA, IOWA (LAT 41 41 14N LONG 094 22 15W)									
OCT 1987					JUL 1988				
13...	1235	79	15.0	690	08...	1125	33	26.5	550
FEB 1988					AUG				
17...	1120	104	3.5	580	03...	1210	68	27.5	480
MAY					SEP				
06...	1020	7410	17.0	530	13...	1135	32	20.0	420
05484000 SOUTH RACCOON RIVER AT REDFIELD, IOWA (LAT 41 34 48N LONG 094 10 58W)									
OCT 1987					JUN 1988				
13...	1415	418	13.5	610	21...	1025	285	26.0	620
FEB 1988					JUL				
17...	1320	322	0.0	510	08...	1300	91	30.5	440
APR					AUG				
13...	1250	200	15.0	520	03...	1500	120	30.0	430
MAY									
09...	1245	225	18.5	510					
05484500 RACCOON RIVER AT VAN METER, IOWA (LAT 41 32 02N LONG 093 56 59W)									
OCT 1987					MAR 1988				
27...	0830	1070	8.0	695	23...	1100	853	11.0	686
DEC					MAY				
09...	1130	1360	5.0	722	03...	1045	1140	16.5	620
JAN 1988					JUN				
07...	1505	880	0.0	450	24...	1130	425	28.0	458
13...	1430	768	0.0	880	AUG				
26...	1145	658	0.0	780	16...	1330	157	31.5	472
FEB									
17...	1550	571	1.0	680					
29...	1110	1580	1.0	540					
05484800 WALNUT CREEK AT DES MOINES, IOWA (LAT 41 35 14N LONG 093 42 11W)									
OCT 1987					APR 1988				
19...	1000	22	10.0	640	20...	1405	14	19.5	600
DEC					MAY				
09...	0825	56	5.5	630	25...	0915	6.7	16.0	730
JAN 1988					AUG				
27...	1355	20	0.0	480	17...	1545	0.06	37.0	935
MAR									
18...	0815	8.1	1.0	640					
18...	1200	14	4.5	660					
05485500 DES MOINES RIVER BELOW RACCOON RIVER AT DES MOINES, IOWA (LAT 41 34 30N LONG 093 35 48)									
MAR 1988					JUL 1988				
22...	1515	2880	9.5	510	13...	0845	511	27.0	600
APR					AUG				
20...	0925	2840	12.0	670	18...	0955	314	30.0	605
05485640 FOURMILE CREEK AT DES MOINES, IOWA (LAT 41 36 50N LONG 093 32 43W)									
OCT 1987					APR 1988				
19...	1330	29	11.0	780	20...	1145	22	15.5	780
DEC					JUL				
09...	1200	67	7.5	710	13...	1150	0.88	29.0	1130
JAN 1988					AUG				
27...	1650	24	0.0	810	18...	1150	0.07	30.0	1000
MAR									
23...	0830	20	9.0	770					
05486000 NORTH RIVER NEAR NORWALK, IOWA (LAT 41 27 25N LONG 093 39 10W)									
OCT 1987					APR 1988				
27...	1610	54	10.0	440	19...	1605	47	15.5	425
DEC					JUL				
08...	1515	135	6.0	450	12...	1345	6.9	25.0	375
JAN 1988					AUG				
27...	1125	79	0.0	460	16...	1400	0.52	29.0	780
MAR									
22...	1310	66	9.0	475					

## MISCELLANEOUS WATER-QUALITY DATA

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)
05486490 MIDDLE RIVER NEAR INDIANOLA, IOWA (LAT 41 25 27N LONG 093 35 09W)									
OCT 1987					APR 1988				
27...	1430	86	10.0	480	19...	1415	75	16.0	490
JAN 1988					JUL				
27...	0915	104	0.0	430	06...	1320	6.4	34.0	550
MAR					AUG				
17...	1335	94	3.5	480	16...	1235	3.7	34.0	535
05487470 SOUTH RIVER NEAR ACKWORTH, IOWA (LAT 41 20 14N LONG 093 29 10W)									
OCT 1987					APR 1988				
27...	1120	40	11.0	480	19...	1220	46	14.5	460
DEC					MAY				
08...	1155	157	6.0	470	24...	1125	73	22.0	493
JAN 1988					JUL				
26...	1455	82	0.0	480	06...	1555	4.0	35.0	490
MAR					AUG				
22...	1025	74	13.0	430	16...	1035	2.8	31.5	585
05487500 DES MOINES RIVER NR RUNNELLS, IOWA (LAT 41 29 19N LONG 093 20 17W)									
DEC 1987					JUL 1988				
09...	1505	4460	8.0	550	06...	1010	544	28.0	640
MAR 1988					AUG				
24...	1020	2960	9.5	550	17...	0855	416	28.5	705
APR									
21...	1050	2870	10.0	670					
05487980 WHITE BREAST CREEK NEAR DALLAS, IOWA (LAT 41 14 41N LONG 093 16 08W)									
OCT 1987					MAY 1988				
27...	0900	24	8.5	540	24...	0840	54	18.0	570
DEC					JUL				
08...	0900	119	6.0	480	07...	1005	1.5	30.0	555
MAR 1988					AUG				
22...	0835	50	6.0	530	16...	0840	1.2	29.0	490
APR									
19...	1015	31	10.5	480					
05488200 ENGLISH CREEK NEAR KNOXVILLE, IOWA (LAT 41 16 00N LONG 093 05 00W)									
DEC 1987					APR 1988				
07...	1450	32	3.0	480	18...	1705	7.6	13.5	580
JAN 1988					JUL				
26...	0910	10	0.0	420	07...	0750	0.16	24.0	1050
MAR									
21...	1620	12	8.0	540					
05488500 DES MOINES RIVER NEAR TRACY, IOWA (LAT 41 16 53N LONG 092 51 34W)									
OCT 1987					APR 1988				
26...	1320	2130	11.0	630	18...	1400	3960	31.0	600
DEC					JUL				
07...	1140	6280	3.0	470	08...	1520	376	31.0	665
MAR 1988					AUG				
21...	1305	3690	4.5	550	15...	1515	394	33.5	585
05489000 CEDAR CREEK NEAR BUSSEY, IOWA (LAT 41 13 09N LONG 092 54 38W)									
OCT 1987					JUL 1988				
26...	1440	23	10.0	670	07...	1330	6.1	29.0	830
DEC					AUG				
07...	1300	123	4.5	530	15...	1610	0.88	36.0	850
MAR 1988					SEP				
21...	1420	69	9.0	520	09...	1200	0.56	22.0	650
APR									
18...	1515	39	14.5	620					
05489500 DES MOINES RIVER AT OTTUMWA, IOWA (LAT 41 00 39N LONG 092 24 40W)									
NOV 1987					JUN 1988				
23...	0945	2430	7.0	675	20...	1100	1740	28.5	625
MAR 1988					AUG				
07...	1035	5580	5.0	560	01...	1110	1230	32.5	600
APR					SEP				
04...	1030	5160	11.5	625	12...	0955	277	22.5	650
MAY									
04...	1045	6340	16.0	625					

## MISCELLANEOUS WATER-QUALITY DATA

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DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)
05490500 DES MOINES RIVER AT KEOSAUQUA, IOWA (LAT 40 43 40N LONG 091 57 34W)									
OCT 1987					MAY 1988				
15...	0915	3020	12.0	656	05...	1105	5910	12.0	690
NOV					JUN				
25...	1145	2290	3.5	630	22...	0715	1410	26.5	500
MAR 1988					AUG				
08...	1145	5770	7.0	575	03...	1250	1040	30.0	525
APR					SEP				
06...	0940	5180	13.0	460	13...	1135	385	23.5	590
06483500 ROCK RIVER NEAR ROCK VALLEY, IOWA (LAT 43 12 52N LONG 096 17 39W)									
NOV 1987					JUN 1988				
04...	1415	135	12.0	735	06...	1200	281	23.0	810
DEC					JUL				
15...	1215	175	0.0	870	13...	1030	61	25.0	630
JAN 1988					AUG				
25...	1315	32	0.0	930	02...	1145	17	27.5	700
MAR					23...	1345	106	25.0	680
08...	1610	1060	0.0	540	SEP				
APR					14...	1250	16	17.0	700
21...	0910	389	9.5	790					
06486000 MISSOURI RIVER AT SIOUX CITY, IOWA (LAT 42 29 10N LONG 096 24 47W)									
OCT 1987					MAY 1988				
02...	1150	30700	16.0	790	02...	1745	31500	14.5	780
06...	1010	30700	14.0	750	06...	0715	31100	16.0	750
09...	0920	31000	13.0	800	09...	1245	32700	14.0	740
13...	1145	31600	12.0	800	12...	0820	32300	17.0	730
15...	1130	31600	11.0	790	17...	0730	32300	17.0	760
20...	0915	32900	10.0	650	19...	0715	32200	17.5	760
23...	1000	32200	9.0	760	24...	1015	31200	19.5	700
27...	1045	32900	8.5	810	26...	0920	33700	19.5	780
30...	1130	33800	10.5	780	31...	1550	31200	22.0	750
NOV					JUN				
03...	0925	33400	11.5	830	02...	0800	32500	21.5	715
06...	0845	34400	10.0	810	07...	1100	32300	22.0	740
10...	0710	34400	8.5	810	09...	1345	31000	20.0	750
13...	1200	33900	6.5	790	14...	0740	32100	23.5	700
17...	1300	33500	7.0	800	17...	1600	32700	24.0	770
20...	1015	35000	5.5	780	21...	0745	32500	26.0	700
23...	1250	34300	5.0	750	24...	1230	31600	25.0	770
DEC					28...	1145	31100	25.0	770
03...	1200	19400	2.0	760	JUL				
10...	0920	20200	2.0	820	01...	1230	30900	20.5	720
21...	1700	19900	0.0	775	05...	1025	30900	20.5	720
JAN 1988					08...	1145	31600	25.0	775
16...	1600	20300	0.0	860	11...	1400	31000	25.0	700
19...	1715	18100	0.0	790	14...	1200	31000	27.0	745
29...	1500	19900	0.5	840	18...	1330	30800	27.0	740
FEB					21...	1215	31300	23.0	800
09...	1700	18300	0.0	740	26...	0630	31200	25.5	725
19...	1200	21100	0.0	760	29...	1145	30800	25.0	750
26...	0900	20500	0.0	750	AUG				
MAR					02...	0705	31300	27.0	760
02...	0700	20500	0.0	650	05...	1230	31700	25.0	750
07...	1335	22000	3.5	690	08...	1330	31500	26.0	760
17...	1230	20500	2.0	660	12...	1315	30900	26.0	770
22...	1040	28900	5.5	700	16...	0955	31800	28.0	750
28...	1415	33400	8.5	745	18...	1315	31500	26.0	725
31...	0700	33000	6.0	745	22...	1315	32400	25.0	675
APR					26...	0800	34100	23.5	700
04...	1700	30500	9.0	760	30...	1215	32400	21.0	700
08...	1245	30300	11.5	780	SEP				
12...	0745	31000	10.5	780	02...	1315	37700	21.0	750
14...	0935	31400	10.5	720	06...	1330	36500	20.0	750
18...	1415	31000	10.0	730	09...	0940	37900	19.0	725
21...	0745	31100	12.0	690	13...	1000	37700	16.0	750
26...	1130	31500	10.5	700	16...	0725	38900	17.0	700
28...	0910	31700	9.0	760	20...	1215	33800	16.0	730
					23...	0700	33200	18.5	725
					27...	1045	33300	18.5	730
					30...	1315	31900	18.0	730

## MISCELLANEOUS WATER-QUALITY DATA

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06600000 PERRY CREEK AT 38TH STREET, SIOUX CITY, IOWA (LAT 42 32 05N LONG 096 24 35W)									
NOV 1987					JUN 1988				
03...	1420	12	15.0	770	07...	0800	6.6	19.0	760
DEC					JUL				
16...	1455	11	0.0	830	14...	0810	4.2	23.5	740
JAN 1988					AUG				
28...	1720	10	0.0	1200	01...	1630	2.0	30.0	700
MAR					22...	1145	138	21.5	330
09...	1545	14	5.5	730	24...	0820	3.7	18.0	610
APR					SEP				
20...	1635	12	16.5	690	15...	1530	19	16.0	325
06600100 FLOYD RIVER AT ALTON, IOWA (LAT 42 58 55N LONG 096 00 03W)									
OCT 1987					JUN 1988				
01...	1220	76	14.0	880	01...	1230	77	21.0	850
NOV					JUL				
04...	1115	45	11.5	880	13...	1315	18	29.0	800
DEC					AUG				
14...	1500	70	0.0	900	03...	1000	5.2	26.0	860
JAN 1988					22...	1600	761	21.0	240
26...	1055	14	0.0	1060	30...	1110	18	20.0	910
MAR					SEP				
08...	1015	166	0.0	670	15...	1110	11	15.0	1400
APR									
20...	1245	88	10.5	800					
06600300 WEST BRANCH FLOYD RIVER NEAR STRUBLE, IOWA (LAT 42 55 15N LONG 096 10 30W)									
NOV 1987					JUN 1988				
04...	0930	19	14.0	1100	01...	0930	34	20.0	1060
DEC					JUL				
16...	1200	24	0.0	1230	13...	1515	11	34.0	1230
JAN 1988					AUG				
29...	1015	8.6	0.0	1140	03...	0820	4.9	23.0	1080
MAR					22...	1530	1220	21.5	300
08...	0920	79	0.0	840	29...	1605	21	22.5	1160
APR					SEP				
20...	1035	44	10.0	990	15...	0905	11	14.0	1200
06600500 FLOYD RIVER AT JAMES, IOWA (LAT 42 34 36N LONG 096 18 43W)									
NOV 1987					FEB 1988				
24...	1245	140	4.0	1000	03...	1400	75	0.0	940
DEC					05...	1330	67	0.0	950
15...	0920	146	0.0	980	08...	1645	74	0.0	1000
16...	1000	93	0.0	1040	10...	1015	68	0.0	900
16...	1635	92	0.0	1020	13...	1400	69	0.0	1000
17...	1300	82	0.0	1060	16...	0945	77	0.0	960
17...	1550	101	0.0	1060	19...	1530	277	0.0	530
18...	1015	171	0.0	1060	20...	1300	222	0.0	510
21...	1335	129	0.0	950	23...	1015	519	0.0	380
23...	1100	165	0.0	875	24...	1200	551	0.0	390
28...	1300	116	0.0	960	25...	1145	464	0.0	420
31...	1100	122	0.0	1000	26...	1315	428	0.0	530
JAN 1988					29...	1445	957	0.5	500
04...	1700	74	0.0	990	MAR				
12...	1245	55	0.0	960	01...	1300	990	2.5	440
15...	1340	60	0.0	980	02...	0945	1050	0.0	420
19...	1230	71	0.0	950	04...	1300	646	1.5	580
20...	0900	72	0.0	960	09...	1320	370	3.0	710
22...	1315	73	0.0	980	APR				
24...	1655	78	0.0	980	13...	1640	289	13.0	900
25...	0805	67	0.0	960	JUN				
26...	1500	64	0.0	970	02...	0830	212	21.0	850
27...	0745	60	0.0	950	JUL				
28...	1325	69	0.0	1030	14...	1030	83	27.5	710
29...	1100	70	0.0	1050	AUG				
30...	0950	74	0.0	1000	03...	1210	46	25.0	810
FEB					30...	1400	103	22.0	930
01...	1500	99	0.0	825	SEP				
					15...	1340	73	16.5	810



## MISCELLANEOUS WATER-QUALITY DATA

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DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)
06601200 MISSOURI RIVER AT DECATUR, NEBRASKA (LAT 42 00 26N LONG 096 14 29W)									
OCT 1987					JUN 1988				
06...	1415	32200	15.0	675	07...	1500	33100	22.5	740
13...	1415	31800	13.0	760	13...	1615	32000	23.0	750
20...	1420	33100	9.0	760	20...	1630	31200	27.0	750
27...	1400	32800	9.5	800	28...	1730	30900	26.0	820
NOV					JUL				
02...	1535	33900	10.5	820	06...	1400	32200	25.0	800
09...	1230	34900	10.0	810	12...	1330	31500	25.0	750
17...	1345	34000	8.0	880	19...	1345	32100	26.0	725
23...	1200	33500	5.0	845	26...	1255	31100	26.5	755
MAR 1988					AUG				
21...	1600	27200	5.5	710	02...	1300	31500	28.0	750
28...	1300	34400	8.0	750	11...	1340	32700	28.0	745
APR					15...	1900	31900	28.0	750
05...	1315	31200	9.5	750	24...	1215	34200	25.0	720
11...	1445	31600	10.5	790	31...	1230	32100	21.0	725
18...	1150	31800	11.0	680	SEP				
25...	1630	31500	12.5	750	08...	1230	36800	18.0	790
MAY					13...	1300	37700	20.0	710
02...	1335	31100	15.5	790	19...	1630	33900	22.0	725
12...	1130	31800	17.5	725	27...	1200	33300	19.0	730
16...	1315	32000	17.5	770					
24...	1615	32700	20.0	760					
31...	1130	32100	22.0	740					
06602020 WEST FORK DITCH AT HORNICK, IOWA (LAT 42 13 37N LONG 096 04 40W)									
OCT 1987					MAY 1988				
13...	1730	81	12.5	650	03...	1015	80	15.0	690
NOV					JUN				
24...	1015	64	2.5	700	14...	1245	74	25.0	725
FEB 1988					JUL				
08...	1300	47	0.0	760	25...	1735	40	31.0	550
MAR					SEP				
23...	1730	79	13.0	760	08...	1930	33	19.0	590
06602400 MONONA-HARRISON DITCH NEAR TURIN, IOWA (LAT 41 57 52N LONG 095 59 30W)									
OCT 1987					JUN 1988				
14...	1700	147	13.0	800	14...	1430	133	23.5	725
NOV					28...	1200	73	24.0	700
25...	1500	144	5.0	750	JUL				
FEB 1988					29...	1430	65	26.0	660
09...	1215	113	0.0	775	AUG				
MAR					15...	1810	48	31.0	540
25...	0830	150	8.5	750	SEP				
MAY					08...	0930	61	17.0	700
04...	1145	152	15.5	680					
06605000 OCHEYEDAN RIVER NEAR SPENCER, IOWA (LAT 43 07 44N LONG 095 12 37W)									
OCT 1987					APR 1988				
26...	1630	147	9.5	800	19...	1930	216	9.5	775
DEC					MAY				
09...	0900	122	1.0	750	25...	0815	260	16.0	880
FEB 1988					JUL				
01...	1510	39	0.0	860	05...	1745	34	29.5	650
MAR					AUG				
29...	1700	207	8.0	740	17...	0945	10	31.0	550
06605850 LITTLE SIOUX RIVER AT LINN GROVE, IOWA (LAT 42 53 24N LONG 095 14 30W)									
DEC 1987					MAY 1988				
09...	1210	273	2.5	690	25...	1130	820	21.0	750
FEB 1988					JUL				
02...	1250	153	0.0	750	05...	1415	96	29.0	540
MAR					AUG				
30...	0930	668	8.0	760	18...	0750	33	27.0	640

## MISCELLANEOUS WATER-QUALITY DATA

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)
06606600 LITTLE SIOUX RIVER AT CORRECTIONVILLE, IOWA (LAT 42 28 20N LONG 095 47 49W)									
NOV 1987					JUN 1988				
05...	1440	576	10.0	740	02...	1340	808	24.0	730
DEC 14...	1245	598	1.0	820	JUL 12...	1130	299	24.0	470
JAN 1988					AUG 01...	1320	113	29.0	670
28...	1215	246	0.0	880	29...	1225	179	19.0	620
MAR 10...	0955	1650	2.0	600	SEP 14...	1100	72	18.0	730
APR 13...	1345	1560	12.0	770					
06607200 MAPLE RIVER AT MAPLETON, IOWA (LAT 42 09 28N LONG 095 48 27W)									
OCT 1987					JUN 1988				
14...	1015	346	12.0	750	08...	1430	4240	20.5	215
NOV 24...	1515	254	4.5	750	13...	1645	240	27.0	700
FEB 1988					JUL 25...	1440	118	30.0	620
09...	1430	181	0.0	720	SEP 08...	1700	81	21.0	670
MAR 24...	1200	211	11.5	750					
MAY 03...	1430	214	15.5	630					
06607500 LITTLE SIOUX RIVER NEAR TURIN, IOWA (LAT 41 57 52N LONG 095 58 21W)									
OCT 1987					JUN 1988				
14...	1415	1040	12.0	770	14...	1130	967	23.5	700
NOV 25...	1215	835	3.5	750	JUL 29...	1230	285	27.0	500
FEB 1988					AUG 16...	1600	200	31.0	600
09...	1215	528	0.0	800	SEP 08...	1300	229	20.0	650
MAR 24...	1800	1190	10.5	750					
MAY 03...	1930	2150	16.5	670					
06608500 SOLDIER RIVER AT PISGAH, IOWA (LAT 41 49 52N LONG 095 55 50W)									
OCT 1987					MAY 1988				
15...	1215	182	12.0	750	04...	1550	105	20.5	650
NOV 23...	1800	157	5.5	750	JUN 13...	1445	82	26.5	690
FEB 1988					JUL 28...	1140	55	26.0	660
10...	1615	111	0.0	720	SEP 07...	1445	42	20.0	680
MAR 28...	1345	119	10.0	740					
06609400 BOYER RIVER NEAR DENISON, IOWA (LAT 42 00 00N LONG 095 23 00W)									
JUN 1988					SEP 1988				
20...	1330	153	29.0	1000	09...	1015	43	13.0	580
AUG 01...	1110	93	26.0	640					
06609500 BOYER RIVER AT LOGAN, IOWA (LAT 41 38 33N LONG 095 46 57W)									
OCT 1987					JUN 1988				
16...	1230	464	12.0	710	08...	1350	12800	20.5	220
NOV 23...	1200	320	5.0	770	13...	1145	280	24.0	650
FEB 1988					23...	1115	170	25.0	720
16...	1330	210	0.0	760	28...	1745	136	30.0	580
MAR 28...	1700	227	10.0	770	JUL 28...	1605	187	29.0	580
MAY 04...	1845	218	21.5	660	AUG 17...	1240	86	28.0	600
					SEP 07...	1100	74	15.0	660

## MISCELLANEOUS WATER-QUALITY DATA

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DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)
06610000 MISSOURI RIVER AT OMAHA, NEBRASKA (LAT 41 15 32N LONG 095 55 20W)									
OCT 1987					MAY 1988				
05...	1415	35000	15.5	760	09...	1050	37500	17.0	750
09...	1445	35300	12.0	795	12...	1150	36600	17.0	750
14...	0815	34500	12.0	800	16...	1320	35800	19.0	710
19...	1415	35700	11.0	760	19...	1145	33300	20.0	750
22...	1230	35100	10.0	800	23...	1200	37300	20.5	680
26...	1130	35100	10.0	800	26...	1430	36800	21.5	780
29...	1100	37500	9.5	790	JUN				
NOV					01...	0945	34200	22.0	700
02...	1100	36300	12.0	800	06...	1300	34600	24.0	725
06...	1130	36800	12.0	750	09...	1150	38700	23.0	675
12...	1105	38900	9.0	800	13...	1115	35000	23.0	740
16...	1200	37900	9.5	800	16...	1400	34200	23.0	760
19...	1230	39800	6.0	790	20...	1145	35400	26.0	740
DEC					27...	1315	33300	21.5	720
01...	1300	25200	3.5	810	30...	1215	33200	25.0	750
09...	1200	23000	5.0	780	JUL				
14...	1320	23000	4.5	840	05...	1200	33500	25.0	800
24...	1115	22900	2.0	780	07...	1145	34100	27.0	745
JAN 1988					13...	0840	32600	26.5	740
16...	1400	20900	0.5	860	18...	1315	35000	27.0	710
29...	1215	21400	1.0	850	22...	1045	34700	25.0	720
FEB					25...	1230	33800	26.0	775
18...	1145	22800	2.0	750	28...	1100	33400	27.0	775
22...	1200	25600	3.5	700	AUG				
MAR					01...	1125	33300	27.5	740
01...	1045	26300	2.5	700	04...	1115	32900	28.0	775
07...	1055	28600	3.0	680	08...	1100	32200	27.0	750
15...	1255	26000	0.5	700	11...	1130	33400	28.0	750
21...	1100	27400	6.0	700	15...	1130	33300	28.0	725
25...	1540	35000	7.0	710	19...	1045	33800	23.0	750
28...	1145	38000	7.5	750	24...	1020	38100	25.0	700
31...	1055	38200	8.0	740	29...	1200	34600	23.0	710
APR					SEP				
08...	1200	36300	11.0	800	06...	1225	40200	23.0	720
11...	1145	35800	12.0	750	09...	1145	39700	21.0	710
14...	1140	35800	11.5	750	12...	1240	39700	20.0	740
20...	1045	33300	12.0	780	15...	1130	40200	20.0	680
25...	1130	34900	11.5	750	19...	1130	36200	23.0	680
28...	1245	36000	10.5	750	22...	1130	36300	19.0	690
MAY					26...	1220	35800	19.0	700
05...	1115	37700	16.0	790	29...	1040	36700	18.0	715

06807000 MISSOURI RIVER AT NEBRASKA CITY, NE (LAT 40 40 55N LONG 095 50 48W)									
OCT 1987					MAY 1988				
13...	1230	40500	11.0	800	03...	1030	38300	16.0	760
16...	0900	39100	13.5	795	09...	1410	41900	17.5	730
21...	1310	38400	10.5	780	12...	1330	41300	19.0	750
26...	1415	38400	11.0	780	18...	1345	37400	20.5	775
29...	1530	37500	10.5	800	23...	1320	48600	20.0	680
NOV					27...	1315	41700	22.0	750
04...	1130	41600	13.0	750	31...	1030	41500	22.0	715
09...	1500	40000	10.5	800	JUN				
12...	1300	40600	8.5	780	07...	1300	39000	25.5	750
18...	0900	43800	7.5	750	10...	1600	40200	22.0	725
25...	1315	42500	6.5	800	14...	1430	36400	24.0	785
DEC					20...	1500	35400	26.5	810
03...	1615	29800	3.5	770	23...	1120	34700	28.0	700
10...	1315	30000	5.0	830	29...	1800	34500	27.0	770
18...	1445	28200	0.0	760	JUL				
22...	1210	28300	2.0	790	05...	1115	33900	26.0	790
30...	1330	25000	0.5	830	08...	1015	35400	27.5	720
JAN 1988					12...	0950	35500	26.0	740
17...	0915	23300	0.5	845	18...	1345	36300	28.0	725
29...	1245	23600	1.5	830	22...	1330	35600	26.0	750
FEB					27...	1315	37900	28.0	700
19...	1530	29800	2.0	775	AUG				
25...	1300	37700	2.0	770	01...	1345	33900	28.5	785
MAR					10...	1300	33800	27.5	750
02...	1545	40500	3.5	660	14...	1200	32400	29.0	750
10...	1000	36800	5.0	675	16...	1245	33400	28.0	775
16...	1050	31800	0.5	725	19...	1400	34200	29.0	750
24...	0915	38400	9.5	675	23...	1115	36800	26.0	700
28...	1045	42900	8.0	725	29...	1430	34700	24.0	750
APR					SEP				
06...	1400	41300	11.5	760	01...	1400	33800	22.0	775
11...	1410	42100	12.0	760	07...	1400	38200	19.0	765
19...	1050	40400	12.0	750	12...	1400	38600	21.0	750
25...	0855	38900	11.0	750	16...	1345	40800	22.0	740
28...	1530	40800	13.0	775	23...	1330	37200	19.0	700
					26...	1315	38500	20.0	710
					30...	1430	45600	19.0	700

## MISCELLANEOUS WATER-QUALITY DATA

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)
06807410 WEST NISHNABOTNA RIVER AT HANCOCK, IOWA (LAT 41 23 24N LONG 095 22 17W)									
OCT 1987					MAY 1988				
01...	1230	380	15.0	650	05...	1400	129	22.0	580
NOV					JUN				
12...	1145	249	5.0	675	15...	1040	141	22.0	580
DEC					JUL				
16...	1715	259	0.0	650	26...	1425	86	28.0	620
FEB 1988					AUG				
12...	1230	148	0.0	610	18...	1500	40	31.0	570
MAR					SEP				
29...	1300	149	10.0	650	06...	1600	48	18.0	625
06808500 WEST NISHNABOTNA RIVER AT RANDOLPH, IOWA (LAT 40 52 23N LONG 095 3' 48W)									
OCT 1987					MAY 1988				
07...	1130	788	10.0	625	19...	1430	235	26.0	625
NOV					JUN				
13...	1520	586	8.0	640	30...	1110	346	21.0	445
DEC					JUL				
17...	1300	564	0.0	625	21...	0925	277	21.0	440
FEB 1988					AUG				
12...	1505	428	0.0	640	08...	1030	123	26.0	500
25...	1300	443	1.0	550	29...	1615	108	21.0	560
APR					SEP				
06...	1210	373	11.0	625	19...	1215	105	19.0	525
06809210 EAST NISHNABOTNA RIVER NEAR ATLANTIC, IOWA (LAT 41 20 47N LONG 095 04 31W)									
OCT 1987					JUN 1988				
01...	1530	209	18.0	600	08...	1540	1980	21.0	220
NOV					15...	0815	70	20.0	525
12...	1510	132	8.0	580	JUL				
DEC					26...	1100	30	24.0	518
16...	1315	116	0.0	590	AUG				
FEB 1988					18...	1145	20	28.0	500
12...	1615	93	0.0	590	SEP				
MAR					06...	1200	21	12.0	520
29...	1000	81	7.5	570					
MAY									
05...	1045	68	15.5	525					
06809500 EAST NISHNABOTNA RIVER NEAR RED OAK, IOWA (LAT 41 00 41N LONG 095 14 07W)									
OCT 1987					FEB 1988				
07...	1410	397	12.5	545	12...	1150	193	0.0	540
NOV					17...	1100	236	0.0	500
13...	1245	289	7.5	550	19...	1100	846	0.5	330
DEC					20...	1215	653	0.5	425
16...	1545	263	0.0	580	22...	1240	421	1.5	340
17...	1030	181	0.0	540	APR				
18...	1045	275	0.0	550	04...	1045	204	11.0	500
JAN 1988					MAY				
01...	1045	108	0.0	580	16...	1610	109	24.0	535
03...	1145	274	0.0	585	JUN				
05...	1030	191	0.0	575	27...	1145	75	23.0	470
07...	1430	176	0.0	645	JUL				
12...	1330	181	0.0	560	20...	1715	131	29.0	385
17...	1500	216	0.0	545	28...	1620	71	32.0	460
21...	1415	586	0.0	420	AUG				
26...	1100	196	0.0	580	09...	1030	56	25.0	440
FEB					29...	1345	51	21.0	500
02...	1300	66	0.0	420	SEP				
04...	1320	295	0.0	440	20...	1140	57	16.0	500
06810000 NISHNABOTNA RIVER ABOVE HAMBURG, IOWA (LAT 40 37 57N LONG 095 37 32W)									
OCT 1987					MAY 1988				
27...	1045	1400	9.5	615	02...	1130	516	17.5	550
27...	1300	1400	9.5	615	02...	1145	516	17.5	550
DEC					JUN				
14...	1130	1320	1.5	565	23...	1015	329	26.5	400
JAN 1988					JUL				
26...	1535	758	0.0	560	07...	1115	307	27.5	435
FEB					07...	1300	307	27.5	435
02...	1610	786	0.0	240	19...	1130	547	24.0	350
25...	1315	1110	1.0	400	AUG				
MAR					08...	0820	198	26.0	420
24...	1130	726	13.5	558	30...	1255	158	21.5	495
24...	1200	728	13.5	492	30...	1430	158	21.5	495
					SEP				
					27...	1330	125	21.0	480

## MISCELLANEOUS WATER-QUALITY DATA

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DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)
06811840 TARKIO RIVER AT STANTON, IOWA (LAT 40 58 52N LONG 095 06 32W)									
OCT 1987					JUL 1988				
01...	1100	33	18.0	445	06...	1310	0.13	29.5	450
NOV					15...	1010	0.14	28.5	450
13...	1100	19	6.0	440	20...	1530	2.6	25.0	390
DEC					29...	1105	0.42	27.0	520
16...	1215	21	0.0	440	AUG				
JAN 1988					04...	0950	0.25	21.5	640
05...	1220	11	0.0	450	05...	1200	0.08	22.0	650
FEB					09...	1300	0.07	22.0	640
22...	1700	17	0.0	360	12...	0915	0.05	24.0	655
APR					16...	1050	0.02	27.5	630
04...	1250	9.8	12.0	485	29...	1145	0.01	17.0	940
MAY					SEP				
16...	1230	3.3	20.5	460	20...	1325	0.01	19.0	540
JUN					29...	1410	2.0	18.0	450
16...	1040	1.7	23.0	505					
27...	1400	0.67	26.5	480					
06813500 MISSOURI RIVER AT RULO, NEBRASKA (LAT 40 03 14N LONG 095 25 12W)									
OCT 1987					APR 1988				
02...	1545	40700	18.5	760	13...	1300	44500	13.0	740
09...	1530	40200	15.0	750	18...	1600	41600	12.5	750
16...	1000	41500	14.5	760	26...	1050	40000	11.5	750
21...	1500	43300	10.5	750	MAY				
28...	1315	40600	10.5	790	04...	1145	42100	16.5	770
NOV					10...	1315	47500	18.0	750
05...	0800	45100	13.0	750	17...	1315	41300	20.0	710
12...	1230	44100	9.0	755	25...	1545	46500	21.0	675
18...	1300	44300	9.0	780	JUN				
DEC					08...	1415	40300	24.5	725
02...	1315	35500	4.0	800	13...	1530	38800	24.0	780
08...	1300	32300	5.5	780	22...	1515	36400	28.0	750
17...	1330	30500	3.5	790	29...	1230	34800	27.0	750
22...	1230	32500	3.5	830	JUL				
30...	1000	29100	0.5	800	07...	1430	35800	27.0	750
JAN 1988					13...	1345	37700	28.0	650
16...	1500	24800	1.5	850	20...	1330	41300	26.0	725
21...	1515	29900	1.5	850	26...	1245	37300	28.0	750
FEB					AUG				
18...	1630	29800	3.0	790	03...	1400	35900	29.0	800
23...	1230	42200	2.0	600	09...	1330	34600	28.0	775
MAR					17...	1500	35400	28.0	750
01...	1745	46000	3.5	740	23...	1330	36300	27.0	725
09...	1240	40700	5.0	650	30...	1430	35700	23.0	750
15...	1745	39900	2.0	740	SEP				
24...	1145	38900	10.0	680	08...	1345	39900	22.0	780
30...	1415	45800	9.0	770	14...	1315	41400	22.0	750
APR					21...	1520	38200	21.0	725
07...	1400	43900	12.0	760	28...	1600	39600	21.0	750
06817000 NODAWAY RIVER AT CLARINDA, IOWA (LAT 40 44 19N LONG 095 00 47W)									
OCT 1987					JUN 1988				
02...	0845	315	12.5	420	28...	1400	23	25.5	410
NOV					JUL				
19...	0800	236	2.5	425	20...	1300	117	25.0	295
MAR 1988					AUG				
04...	1010	157	1.0	400	11...	1550	19	28.0	390
APR					31...	1725	32	21.5	365
05...	1600	155	12.0	475	SEP				
MAY					01...	0755	25	19.0	335
11...	1215	68	20.0	455	21...	1710	28	23.0	380
19...	0740	52	19.0	415					
06818750 PLATTE RIVER NEAR DIAGONAL, IOWA (LAT 40 46 02N LONG 094 24 46W)									
OCT 1987					MAY 1988				
01...	1735	40	17.5	400	17...	1405	13	17.0	475
NOV					JUN				
19...	1325	75	4.5	395	29...	1455	3.3	25.0	505
JAN 1988					JUL				
06...	1310	46	0.0	420	20...	0845	6.2	20.0	420
FEB					AUG				
24...	0945	33	0.0	250	10...	1745	2.2	28.0	530
MAR					31...	0745	1.7	17.5	505
03...	1730	36	4.0	380	SEP				
APR					20...	1755	23	19.0	345
04...	1715	64	17.0	440					

## MISCELLANEOUS WATER-QUALITY DATA

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06819185 EAST FORK ONE HUNDRED TWO RIVER AT BEDFORD, IOWA (LAT 40 39 40N LONG 094 42 58W)									
NOV 1987					JUN 1988				
19...	1200	23	4.0	365	28...	1715	0.28	30.0	440
JAN 1988					JUL				
06...	1440	9.3	0.0	460	20...	1045	1.5	25.0	225
FEB					AUG				
24...	1245	14	0.0	250	10...	1600	0.14	30.0	420
APR					31...	1530	0.04	23.5	500
04...	1535	27	15.0	430	SEP				
MAY					20...	1530	0.20	21.0	420
17...	1125	4.2	20.5	445	21...	1515	0.49	24.0	430
06897950 ELK CREEK NEAR DECATUR CITY, IOWA (LAT 40 43 18N LONG 093 56 19W)									
NOV 1987					APR 1988				
13...	1230	6.7	5.5	562	05...	1305	19	17.0	490
JAN 1988					MAY				
06...	1045	3.8	0.0	675	18...	0945	0.88	16.5	572
FEB									
23...	1500	27	0.0	295					
24...	1245	24	0.0	380					
06898000 THOMPSON RIVER AT DAVIS CITY, IOWA (LAT 40 38 25N LONG 093 48 29W)									
OCT 1987					JUN 1988				
01...	0810	113	15.0	495	29...	1100	8.4	26.5	500
NOV					JUL				
17...	1650	393	7.5	410	19...	1810	9.7	27.0	380
JAN 1988					AUG				
06...	0845	155	0.0	545	11...	1145	5.2	27.0	460
FEB					17...	0945	2.0	28.0	440
23...	1120	549	0.0	260	31...	1125	8.7	21.0	335
APR					SEP				
05...	1050	259	14.0	480	21...	1130	5.9	18.0	460
MAY									
17...	1845	39	24.5	500					
06898400 WELDON RIVER NEAR LEON, IOWA (LAT 40 41 45N LONG 093 38 07W)									
NOV 1987					JUN 1988				
17...	1410	424	7.0	365	29...	0800	0.14	24.0	510
JAN 1988					JUL				
05...	1625	8.2	0.0	600	19...	1610	0.28	26.0	480
FEB					AUG				
23...	0950	43	0.0	290	11...	0915	0.29	24.0	500
MAR					17...	1530	0.02	32.0	510
03...	1420	12	5.0	440	31...	1235	0.10	23.0	505
APR					SEP				
05...	0850	31	11.0	500	21...	0845	0.14	13.0	495
MAY									
17...	1650	1.3	26.0	500					
18...	0830	1.5	16.0	530					
06903400 CHARITON RIVER NEAR CHARITON, IOWA (LAT 40 57 12N LONG 093 15 37W)									
OCT 1987					MAR 1988				
13...	1150	3.8	9.0	532	04...	1110	27	1.0	325
NOV					APR				
23...	1440	35	5.0	395	04...	1545	85	15.0	450
DEC					MAY				
17...	1330	36	0.0	420	04...	1415	5.6	17.0	575
25...	1300	72	1.0	190	AUG				
JAN 1988					25...	1010	0.61	19.5	475
05...	1255	19	0.0	480	SEP				
11...	1220	18	0.0	570	12...	1205	0.03	21.0	490
25...	1315	19	0.0	340					
FEB									
08...	1205	10	0.0	425					
16...	1235	10	1.0	505					
24...	1230	85	0.0	210					
06903700 SOUTH FORK CHARITON RIVER NEAR PROMISE CITY, IOWA (LAT 40 48 02N LONG 093 11 32)									
OCT 1987					JUN 1988				
13...	1430	6.5	10.5	465	21...	0620	0.66	24.5	550
NOV					AUG				
23...	1530	30	6.0	490	03...	0655	0.11	27.0	475
MAR 1988					25...	1145	3.6	22.0	340
04...	1230	23	1.5	450	SEP				
APR					12...	1315	0.12	22.5	425
05...	0900	50	14.5	480					
MAY									
04...	1545	9.0	26.5	560					

## MISCELLANEOUS WATER-QUALITY DATA

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DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)
06903900 CHARITON RIVER NEAR RATHBUN, IOWA (LAT 40 49 22N LONG 092 53 22W)									
OCT 1987					MAY 1988				
14...	0935	772	14.5	240	05...	0830	10	12.0	275
NOV					JUN				
24...	0930	110	5.5	240	21...	1100	12	21.0	280
MAR 1988					AUG				
07...	1545	200	6.0	270	02...	1215	13	28.0	320
APR					SEP				
05...	1225	106	12.0	270	12...	1535	12	22.5	270
06904010 CHARITON RIVER NEAR MOULTON, IOWA (LAT 40 41 30N LONG 092 46 15W)									
OCT 1987					MAY 1988				
14...	1250	789	14.5	248	04...	1815	23	26.0	610
NOV					JUN				
24...	1300	152	4.5	320	21...	0855	16	26.0	415
JAN 1988					21...	0910	16	26.0	415
26...	1455	35	0.0	580	AUG				
MAR					02...	1350	16	29.5	510
08...	0935	260	5.0	270	25...	1400	22	22.0	540
APR					SEP				
05...	1510	159	16.0	410	13...	0900	25	20.0	340

## MISCELLANEOUS WATER-QUALITY DATA

Water-quality data in the following tables were collected during the 1988 water year in the Big Spring Groundwater Basin in northeast Iowa .

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	ALKA- LITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	CAR- BONATE WATER DIS IT FIELD MG/L AS CO3 (00452)	BICAR- BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)
05412070 UNNAMED CREEK NEAR LUANA (LAT 43 02 24N LONG 091 28 07W)											
MAR 1988											
08...	1130	4.0	4.5	410	7.31	740	10.6	84	149	0	182
APR											
05...	1200	1.8	13.0	730	7.84	735	10.1	100	250	0	305
MAY											
04...	1330	0.84	19.5	524	8.31	--	--	--	--	--	--
JUN											
01...	1015	0.07	22.0	775	8.04	735	5.7	68	300	0	366
05412100 ROBERTS CREEK ABOVE ST. OLAF, IOWA (LAT 42 55 49N LONG 091 23 03W)											
MAR 1988											
08...	1330	173	2.0	480	7.72	739	12.0	90	180	0	220
APR											
05...	0900	80	13.0	650	8.30	740	9.8	96	254	36	237
MAY											
04...	1455	15	20.5	617	8.85	--	--	--	--	--	--
JUN											
01...	1510	5.7	28.0	700	8.60	745	14.2	186	--	--	--
23...	0900	2.4	23.5	590	8.10	745	6.0	72	--	--	--
23...	1200	2.5	--	560	8.40	745	11.5	--	--	--	--
23...	1500	2.4	30.0	550	--	745	14.0	190	--	--	--
23...	1800	2.4	29.0	--	8.80	745	12.6	168	--	--	--
23...	2100	2.4	27.0	555	8.50	745	7.8	100	--	--	--
23...	2400	2.4	24.0	580	8.10	745	4.4	54	--	--	--
24...	0300	2.1	22.5	600	7.80	745	4.0	47	--	--	--
24...	0600	2.1	21.0	580	7.70	745	4.2	48	--	--	--
28...	1530	2.1	30.0	533	9.00	--	--	--	--	--	--
JUL											
01...	1100	2.9	27.0	570	8.92	745	10.6	137	256	30	251
AUG											
05...	0810	0.97	23.0	590	7.74	745	7.5	90	--	--	--
SEP											
06...	1000	0.08	12.5	540	8.20	745	18.2	175	290	0	354
12...	1350	0.04	26.0	365	9.40	750	>20.0	--	138	42	82
20...	0950	22	16.0	465	8.10	--	--	--	--	--	--
22...	1340	78	17.5	504	7.64	--	--	--	--	--	--
425433091280101 BIG SPRING AT HATCHERY (LAT 42 54 33N LONG 091 28 01W)											
MAR 1988											
08...	0930	--	8.0	550	7.20	740	9.3	81	216	0	264
APR											
04...	1300	--	9.0	730	7.24	735	9.2	83	315	0	384
MAY											
04...	1055	--	--	--	--	--	--	--	--	--	--
JUN											
01...	1230	--	--	--	--	--	--	--	--	--	--
JUL											
01...	1330	--	12.0	750	7.10	--	--	--	315	0	384
AUG											
04...	1545	--	11.0	750	7.22	740	10.2	95	--	--	--
SEP											
06...	1200	--	10.5	690	7.21	750	9.6	88	320	0	390
20...	1230	--	10.0	620	7.20	--	--	--	--	--	--



## MISCELLANEOUS WATER-QUALITY DATA

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DATE	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)
05412070 UNNAMED CREEK NEAR LUANA (LAT 43 02 24N LONG 091 28 07W)											
MAR 1988											
08...	44	19	5.4	5.1	12	22	--	10	--	--	--
APR											
05...	78	29	9.8	4.4	26	31	--	13	<20	--	388
MAY											
04...	--	--	--	--	--	--	--	--	--	--	320
JUN											
01...	79	33	8.4	2.2	24	32	0.15	18	<20	320	434
05412100 ROBERTS CREEK ABOVE ST. OLAF, IOWA (LAT 42 55 49N LONG 091 23 03W)											
MAR 1988											
08...	53	22	7.5	5.1	16	26	--	11	30	--	282
APR											
05...	76	33	7.2	3.6	22	26	--	15	<20	--	376
MAY											
04...	--	--	--	--	--	--	--	--	--	--	326
JUN											
01...	--	--	--	--	--	--	--	--	--	--	380
23...	--	--	--	--	--	--	--	--	--	--	322
23...	--	--	--	--	--	--	--	--	--	--	316
23...	--	--	--	--	--	--	--	--	--	--	294
23...	52	34	10	3.8	23	37	--	--	<20	--	308
23...	--	--	--	--	--	--	--	--	--	--	308
23...	--	--	--	--	--	--	--	--	--	--	314
24...	--	--	--	--	--	--	--	--	--	--	316
24...	54	33	9.5	3.5	22	33	--	--	<20	--	308
28...	--	--	--	--	23	--	--	--	--	--	328
JUL											
01...	51	36	10	4.0	26	38	--	7.5	<20	--	288
AUG											
05...	57	29	10	5.0	24	30	--	8.3	<20	--	308
SEP											
06...	85	30	8.2	4.8	23	24	--	--	<20	--	250
12...	--	--	--	--	--	--	--	--	--	--	--
20...	--	--	--	--	--	40	--	--	--	--	--
22...	--	--	--	--	--	--	--	--	--	--	--
425433091280101 BIG SPRING AT HATCHERY (LAT 42 54 33N LONG 091 28 01W)											
MAR 1988											
08...	64	25	6.5	4.7	14	23	--	13	<20	--	328
APR											
04...	84	34	7.1	3.0	19	24	--	--	<20	--	404
MAY											
04...	--	--	--	--	--	--	--	17	--	--	352
JUN											
01...	--	--	--	--	--	--	--	--	--	--	480
JUL											
01...	83	37	13	2.6	24	35	--	5.8	<20	--	--
AUG											
04...	--	--	--	--	--	--	--	--	--	--	--
SEP											
06...	96	39	12	3.9	24	32	--	--	--	--	--
20...	--	--	--	--	23	37	--	--	--	--	--

## MISCELLANEOUS WATER-QUALITY DATA

DATE	NITRO- GEN, ORGANIC DIS- SOLVED (MG/L AS N) (00607)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	PHOS- PHOROUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	ATRA- ZINE (concentrations expressed as total recoverable) (UG/L) (39630)	CYAN- AZINE (UG/L) (81757)	METRI- BUZIN (UG/L) (81408)	ALA- CHLOR (UG/L) (77825)	METOLA- CHLOR (UG/L) (39356)	PROPA- CHLOR (UG/L) (77729)
05412070 UNNAMED CREEK NEAR LUANA (LAT 43 02 24N LONG 091 28 07W)											
MAR 1988											
08...	0.80	0.200	7.60	--	3.4	--	--	--	--	--	--
APR											
05...	0.70	0.100	11.0	--	2.8	0.27	<0.10	<0.10	<0.10	<0.10	<0.10
MAY											
04...	0.10	<0.100	14.0	<0.100	--	0.16	<0.10	<0.10	<0.10	<0.10	--
JUN											
01...	0.50	0.500	13.0	0.100	3.5	0.22	<0.10	<0.10	0.11	<0.10	--
05412100 ROBERTS CREEK ABOVE ST. OLAF, IOWA (LAT 42 55 49N LONG 091 23 03W)											
MAR 1988											
08...	1.1	0.400	7.20	--	3.1	0.24	<0.10	<0.10	<0.10	<0.10	<0.10
APR											
05...	0.30	<0.100	0.150	--	1.7	0.11	<0.10	<0.10	<0.10	<0.10	<0.10
MAY											
04...	0.40	<0.100	6.10	0.200	--	0.40	<0.10	<0.10	<0.10	<0.10	--
JUN											
01...	<0.10	<0.100	3.30	--	--	0.72	0.23	<0.10	<0.10	<0.10	--
23...	1.1	<0.100	0.600	0.300	4.5	--	--	--	--	--	--
23...	0.60	<0.100	0.600	0.300	5.0	0.26	<0.10	<0.10	<0.10	<0.10	--
23...	0.70	<0.100	0.500	0.300	5.3	--	--	--	--	--	--
23...	0.50	<0.100	0.500	0.300	4.9	0.26	0.12	<0.10	<0.10	<0.10	--
23...	0.70	<0.100	0.500	0.300	4.4	--	--	--	--	--	--
23...	0.80	<0.100	0.500	0.300	4.5	0.25	<0.10	<0.10	<0.10	<0.10	--
24...	0.90	<0.100	0.500	0.300	5.1	--	--	--	--	--	--
24...	0.70	0.200	0.500	0.300	4.3	0.26	<0.10	<0.10	<0.10	<0.10	--
28...	0.70	<0.100	0.200	0.200	--	--	--	--	--	--	--
JUL											
01...	0.50	0.200	0.200	--	--	0.41	0.72	<0.10	<0.10	<0.10	--
AUG											
05...	0.40	<0.100	1.50	--	--	0.42	0.51	<0.10	0.55	<0.10	--
SEP											
06...	<0.10	<0.100	2.20	<0.100	--	0.19	<0.10	<0.10	<0.10	<0.10	--
12...	--	--	--	--	--	--	--	--	--	--	--
20...	0.70	0.200	0.500	0.200	--	<0.10	<0.10	<0.10	<0.10	<0.10	--
22...	--	--	--	--	--	0.50	0.12	<0.10	<0.10	0.11	--
425433091280101 BIG SPRING AT HATCHERY (LAT 42 54 33N LONG 091 28 01W)											
MAR 1988											
08...	0.60	0.100	8.60	--	2.6	0.19	<0.10	<0.10	<0.10	<0.10	<0.10
APR											
04...	0.30	0.300	11.0	--	1.2	0.11	<0.10	<0.10	<0.10	<0.10	--
MAY											
04...	<0.10	<0.100	10.0	<0.100	--	0.26	--	<0.10	--	<0.10	--
JUN											
01...	0.20	<0.100	9.70	--	--	0.24	<0.10	<0.10	<0.10	<0.10	--
JUL											
01...	0.20	<0.100	9.00	--	1.2	0.12	<0.10	<0.10	<0.10	<0.10	--
AUG											
04...	<0.10	<0.100	8.50	--	1.1	<0.12	<0.10	<0.10	<0.10	<0.10	--
SEP											
06...	<0.10	<0.100	8.10	0.200	--	0.12	<0.10	<0.10	<0.10	<0.10	--
20...	0.20	<0.100	7.50	0.200	--	--	--	--	--	--	--

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## MISCELLANEOUS WATER-QUALITY DATA

DATE	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SOLIDS, RESIDUE AT 180 DEG. C SOLVED (MG/L) (70300)	NITRO- GEN, ORGANIC DIS- SOLVED (MG/L AS N) (00607)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	PHOS- PHOROUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)
	425446091285301 HS-1 HATCHERY CR AT BIG SPRING (LAT 42 54 46N LONG 091 28 53W)										
JUN 1988 29...	0.30	600	8.30	20.0	16	328	0.80	<0.100	4.70	0.200	3.7
	425536091280601 HS-3 HATCHERY CREEK NEAR BIG SPRING (LAT 42 55 36N LONG 091 28 06W)										
JUN 1988 29...	0.71	625	8.30	18.0	18	384	0.40	<0.100	5.70	0.100	2.6
	425606091280601 HS-2 HATCHERY CREEK TRIBUTARY NEAR BIG SPRING (LAT 42 56 06N LONG 091 28 06W)										
JUN 1988 29...	0.27	690	--	16.5	18	390	0.60	0.300	8.00	0.300	7.5
	425629091273701 HS-4 HATCHERY CREEK TRIBUTARY NORTH OF BIG SPRING (LAT 42 56 29N LONG 091 27 37W)										
JUN 1988 29...	0.36	695	7.90	15.0	17	390	0.60	<0.100	9.00	<0.100	1.8
	425641091222601 RC-22 ROBERTS CREEK SOUTHWEST OF FARMERSBURG (LAT 42 56 41N LONG 091 22 26W)										
JUN 1988 28...	2.6	580	8.90	27.0	24	328	0.60	<0.100	<0.100	0.300	6.6
	425647091285901 HS-6 HATCHERY CREEK SOUTHEAST OF GUNDER (LAT 42 56 47N LONG 091 28 59W)										
JUN 1988 29...	0.29	700	8.10	17.0	19	406	0.40	<0.100	5.70	0.200	3.3
	425648091222301 HC-2 HOWARD CR NR FARMERSBURG (LAT 42 56 48N LONG 091 22 23W)										
JUN 1988 28...	0.52	710	8.10	26.0	18	396	0.40	<0.100	4.40	<0.100	2.3
	425706091243401 F-47 ROBERTS CREEK WEST OF FARMERSBURG (LAT 42 57 06N LONG 091 24 34W)										
JUN 1988 28...	4.0	670	8.30	23.0	26	360	0.90	<0.100	0.800	0.300	7.1
	425710091232801 RC-23 ROBERTS CREEK NORTH OF ST. OLAF (LAT 42 57 10N LONG 091 23 28W)										
JUN 1988 28...	3.5	590	8.40	21.0	24	328	0.50	<0.100	0.200	0.300	4.9
	425724091235801 RC-24 ROBERTS CR NR FARMERSBURG (LAT 42 57 24N LONG 091 23 58W)										
JUN 1988 29...	3.8	630	8.00	21.0	32	342	1.1	<0.100	0.500	0.300	5.0
	425733091251001 RC-19 ROBERTS CREEK NORTHWEST OF ST. OLAF (LAT 42 57 33N LONG 091 25 10W)										
JUN 1988 28...	3.4	630	8.40	24.0	24	366	0.70	<0.100	0.700	0.300	5.6
	425734091301201 HS-5 HATCHERY CREEK NEAR GUNDER (LAT 42 57 34N LONG 091 30 12W)										
JUN 1988 29...	0.20	750	8.00	17.0	29	432	0.70	<0.100	0.200	0.300	2.4
	425736091260301 RC-18 ROBERTS CREEK (LAT 42 57 36N LONG 091 26 03W)										
JUN 1988 28...	5.2	600	--	24.0	23	340	1.2	3.90	2.50	3.20	8.7
AUG 05...	--	590	8.01	24.0	--	--	--	--	--	--	--

## MISCELLANEOUS WATER-QUALITY DATA

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DATE	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	NITRO- GEN, ORGANIC DIS- SOLVED (MG/L AS N) (00607)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	PHOS- PHOROUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)
425744091220901 HC-1 HOWARD CREEK AT FARMERSBURG (LAT 42 57 44N LONG 091 22 09W)											
JUN 1988 28...	0.59	700	8.40	24.0	18	408	1.5	<0.100	5.20	<0.100	5.0
425806091280501 RC-16 ROBERTS CREEK (LAT 42 58 06N LONG 091 28 05W)											
JUN 1988 28...	4.9	574	8.70	28.5	21	342	0.40	<0.100	1.20	0.100	4.1
425824091263001 SC-4 SILVER CREEK EAST OF GUNDER (LAT 42 58 24N LONG 091 26 30W)											
JUN 1988 28...	0.36	1490	--	22.0	250	864	0.80	1.20	3.00	2.20	5.5
425830091285801 F-45 ROBERTS CREEK EAST OF GUNDER (LAT 42 58 30N LONG 091 28 58W)											
JUN 1988 28...	4.4	598	8.60	22.0	20	364	0.60	<0.100	2.20	0.100	4.1
425908091300201 RC-15 ROBERTS CREEK AT GUNDER (LAT 42 59 08N LONG 091 30 02W)											
JUN 1988 28...	3.4	615	8.10	22.5	20	366	1.0	<0.100	1.50	0.200	11
425908091302501 DC-2 DEER CREEK AT GUNDER (LAT 42 59 08N LONG 091 30 25W)											
JUN 1988 28...	0.77	680	8.30	22.0	16	420	1.6	<0.100	5.40	0.100	2.2
425916091271201 SC-2 SILVER CREEK NEAR GUNDER (LAT 42 59 16N LONG 091 27 12W)											
JUN 1988 28...	0.25	1310	--	29.0	160	768	0.50	<0.100	1.00	0.200	4.2
425942091310701 DC-4 DEER CREEK NEAR GUNDER (LAT 42 59 42N LONG 091 31 07W)											
JUN 1988 28...	0.42	561	8.40	26.5	15	318	0.50	<0.100	4.40	<0.100	2.4
430002091265301 SC-1 SILVER CREEK NORTHWEST OF GUNDER (LAT 43 00 02N LONG 091 26 53W)											
JUN 1988 29...	0.81	710	--	19.5	100	632	0.50	9.50	0.500	4.90	6.5
430049091274401 SC-5 SILVER CREEK SOUTH OF LUANA (LAT 43 00 49N LONG 091 27 44W)											
JUN 1988 28...	0.69	665	--	25.5	23	370	0.50	<0.100	8.20	<0.100	2.8
430054091273001 SC-6 EAST FORK SILVER CREEK SOUTH OF LUANA (LAT 43 00 54N LONG 091 27 30W)											
JUN 1988 29...	1.4	1090	--	19.0	90	590	3.0	7.80	0.400	4.30	1.7
430057091304201 RC-10 ROBERTS CREEK NEAR LUANA (LAT 43 00 57N LONG 091 30 42W)											
JUN 1988 29...	3.6	630	8.20	19.0	21	370	0.30	<0.100	3.40	0.100	3.7
430119091292101 L-23 SILVER CREEK NEAR LUANA (05412060-USGS) (LAT 43 01 19N LONG 091 29 21W)											
JUN 1988 28...	0.52	680	--	27.5	24	398	2.8	0.800	7.60	0.200	6.2

## MISCELLANEOUS WATER-QUALITY DATA

DATE	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	NITRO- GEN, ORGANIC DIS- SOLVED (MG/L AS N) (00607)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	PHOS- PHOROUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)
430140091251001 SC-14 SILVER CREEK TRIBUTARY NEAR MONONA (LAT 43 01 40N LONG 091 25 10W)											
JUN 1988 29...	0.15	710	--	15.5	34	422	0.20	<0.100	6.70	0.100	2.1
430201091294901 SCU-2 SILVER CREEK TRIBUTARY SOUTHWEST OF LUANA (LAT 43 02 01N LONG 091 29 49W)											
JUN 1988 28...	--	710	--	18.5	20	420	0.30	<0.100	15.0	<0.100	1.3
430203091273001 SC-3 EAST FORK SILVER CREEK NEAR LUANA (LAT 43 02 03N LONG 091 27 30W)											
JUN 1988 29...	1.2	1130	--	22.0	80	568	2.0	4.90	1.40	4.40	1.6
AUG 05...	--	1220	8.00	29.0	--	--	--	--	--	--	--
430210091303301 SCU-1 SILVER CREEK SOUTHWEST OF LUANA (LAT 43 02 10N LONG 091 30 33W)											
JUN 1988 28...	0.12	630	--	26.5	18	370	1.9	0.200	4.60	0.100	5.1
430211091321601 RC-11 ROBERTS CREEK EAST OF POSTVILLE (LAT 43 02 11N LONG 091 32 16W)											
JUN 1988 29...	2.8	640	8.70	18.5	18	368	0.50	<0.100	4.70	0.200	2.8
430240091260601 SC-13 EAST FORK SILVER CREEK TRIBUTARY NEAR MONONA (LAT 43 02 40N LONG 091 26 06W)											
JUN 1988 29...	1.2	1000	--	30.0	64	512	5.2	3.10	<0.100	3.80	2.4
430240091262001 SC-10 EAST FORK SILVER CREEK NEAR MONONA (LAT 43 02 40N LONG 091 26 20W)											
JUN 1988 29...	0.12	1280	--	12.0	200	758	1.2	<0.100	27.0	6.20	6.1
430240091325301 RC-20 ROBERTS CREEK NEAR POSTVILLE (LAT 43 02 40N LONG 091 32 53W)											
JUN 1988 29...	2.5	621	8.40	19.0	18	380	0.30	0.100	4.90	0.300	2.8
430244091330001 RC-21 WEST BRANCH ROBERTS CREEK AT MOUTH (LAT 43 02 44N LONG 091 33 00W)											
JUN 1988 29...	0.82	614	8.50	18.5	22	390	0.30	0.100	7.30	<0.100	2.2
430327091344001 RC-13 ROBERTS CREEK TRIBUTARY NEAR POSTVILLE (LAT 43 03 27N LONG 091 34 40W)											
JUN 1988 29...	0.10	680	8.30	18.0	23	396	1.0	0.300	4.30	0.700	4.5

## BENTON COUNTY

415211092164101. Local number, 82-12-31 DAAD1.

LOCATION.--Lat 41°52'11", long 92°16'41", Hydrologic Unit 07080208, approximately 0.6 mi north of the Iowa River, west side of Iowa Highways 21 and 212, approximately 1.2 mi south of the Town of Belle Plaine. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Iowa River Alluvial Aquifer: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 26 ft, cased to 23 ft, screen 23 to 26 ft.

INSTRUMENTATION.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 770 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3 ft above land-surface datum.

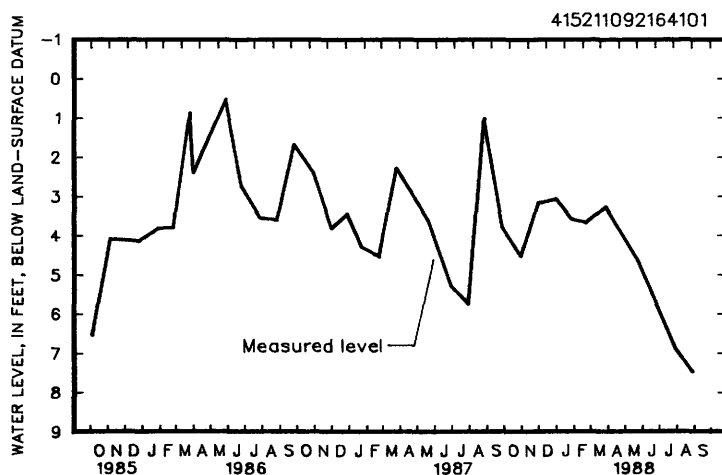
REMARKS.--Well IRA-16A.

PERIOD OF RECORD.--October 1984 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 0.52 ft below land-surface datum, May 28, 1986; lowest measured, 7.49 ft below land-surface datum, Aug. 29, 1988.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 30	4.53	JAN 28	3.58	MAR 28	3.26	JUL 29	6.88
NOV 30	3.15	FEB 22	3.67	MAY 24	4.64	AUG 29	7.49
DEC 31	3.05						



415211092164102. Local number, 82-12-31 DAAD2.

LOCATION.--Lat 41°52'11", long 92°16'41", Hydrologic Unit 07080208, approximately 0.6 mi north of the Iowa River, west side of Iowa Highways 21 and 212, approximately 1.2 mi south of the Town of Belle Plaine. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Iowa River Alluvial Aquifer: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 15 ft, cased to 12 ft, slotted 12 to 15 ft.

INSTRUMENTATION.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 770 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.92 ft above land-surface datum.

REMARKS.--Well IRA-16B.

PERIOD OF RECORD.--October 1984 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 0.48 ft below land-surface datum, May 28, 1986; lowest measured, 7.54 ft below land-surface datum, Aug. 29, 1988.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 30	4.56	JAN 28	3.60	MAR 28	3.32	JUL 29	6.92
NOV 30	3.13	FEB 22	3.73	MAY 24	4.70	AUG 29	7.54
DEC 31	3.06						

## GROUND-WATER LEVELS

## BENTON COUNTY

420319091540102. Local number, 84-9-28 DBCC2.

LOCATION.--Lat 42°03'19", long 91°54'01", Hydrologic Unit 07080205, approximately 3 mi south and 1.5 mi west of the Town of Shellsburg. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Silurian-Devonian: in limestone of Devonian age and dolomite of Silurian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 7 in., to 173 ft, 5 in. to 590 ft, depth 590 ft, cased to 260 ft, open hole 265 to 590 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 915 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.28 ft above land-surface datum.

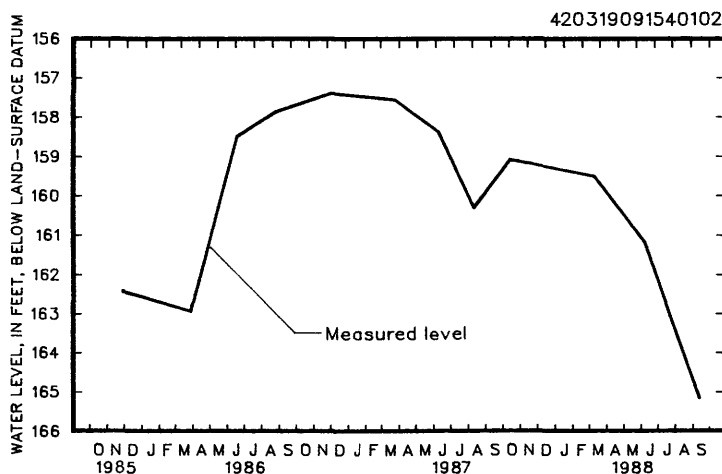
REMARKS.--Parker's Grove Cemetery well. Cement plug 260 to 265 ft. 59.7 ft of open Devonian rock reported to yield little, if any, water.

PERIOD OF RECORD.--April 1975 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 150.73 ft below land-surface datum, Apr. 14, 1975; lowest measured, 166.92 ft below land-surface datum, Aug. 9, 1977.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 13	159.08	MAR 10	159.52	JUN 7	161.20	SEP 12	165.17



420731092083801. Local number, 85-11-33 CCBC1.

LOCATION.--Lat 42°07'31", long 92°08'38", Hydrologic Unit 07080205, approximately 1 mi south of the Town of Garrison, just east of County Road V-56. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Cedar Valley: in limestone of Devonian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 0.75 in., depth 237 ft, cased 170 ft, slotted below cement plug, open hole 170 to 237 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 905 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of 6 in. casing, 2.20 ft above land-surface datum.

REMARKS.--Garrison 170 well. 3 ft cement plugs from 97 to 100 ft and 237 to 240 ft.

PERIOD OF RECORD.--June 1977 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 60.18 ft below land-surface datum, Apr. 19, 1983; lowest measured, 64.80 ft below land-surface datum, June 29, 1977.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 29	61.87	MAR 9	62.32	JUN 7	63.23	SEP 12	64.38



## BENTON COUNTY

420731092083802. Local number, 85-11-33 CCBC2.

LOCATION.--Lat 42°07'31", long 92°08'38", Hydrologic Unit 07080205, approximately 1 mi south of the Town of Garrison, just east of County Road V-56. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Silurian-Devonian: in limestone of Devonian age and dolomite of Silurian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 0.75 in., depth 538 ft, cased to 340 ft, open hole 340 to 538 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 905 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of 6 in. casing, 2.20 ft above land-surface datum.

REMARKS.--Garrison 340 well. 106 ft of open Devonian rock reported to yield little, if any, water. 3 ft cement plug 237 to 240 ft.

PERIOD OF RECORD.--October 1975, June 1977 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, e88.00 ft below land-surface datum, Oct. 17, 1975; lowest measured, 104.94 ft below land-surface datum, Aug. 21, 1985.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 29	91.19	MAR 9	90.17	JUN 7	91.77

e Estimated.

420731092083803. Local number, 85-11-33 CCBC3.

LOCATION.--Lat 42°07'31", long 92°08'38", Hydrologic Unit 07080205, approximately 1 mi south of the Town of Garrison, just east of County Road V-56. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Cedar Valley: in limestone of Devonian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 6 in., depth 97 ft, cased to 90 ft, open hole 90 to 97 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 905 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of 6 in. casing, 2.20 ft above land-surface datum.

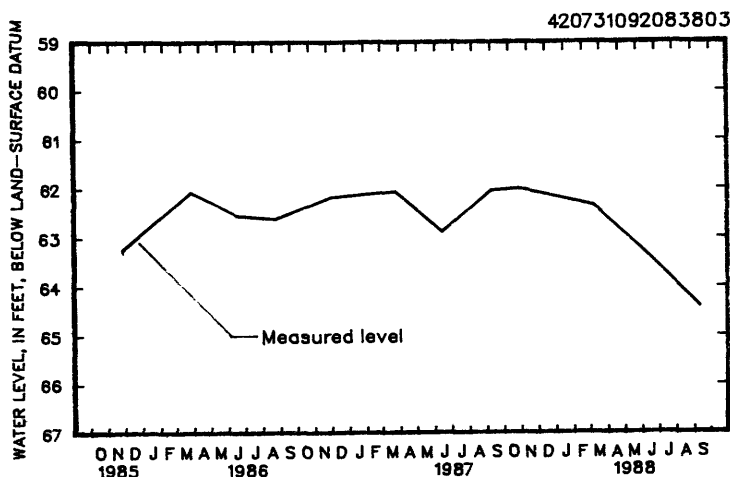
REMARKS.--Garrison 109 well. 3 ft cement plug 97 to 100 ft.

PERIOD OF RECORD.--June 1977 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 60.63 ft below land-surface datum, Mar. 23, 1979; lowest measured, 64.86 ft below land-surface datum, June 29, 1977.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 29	61.98	MAR 9	62.34	JUN 7	63.30	SEP 12	64.41



## GROUND-WATER LEVELS

## BENTON COUNTY

421326091522701. Local number, 86-9-34 AAAD1.

LOCATION.--Lat 42°13'29", long 91°52'19", Hydrologic Unit 07080205, next to the water tower in the Town of Urbana. Owner: Town of Urbana.

AQUIFER.--Silurian-Devonian and Ordovician: open from limestone of Devonian age into limestone and dolomite of the Platteville formation of Ordovician age.

WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 8 in., depth 1,033 ft, cased to 142 ft, open hole 142 to 1,033 ft.

INSTRUMENTATION.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 940 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple on plate welded to casing, 3.15 ft above land-surface datum.

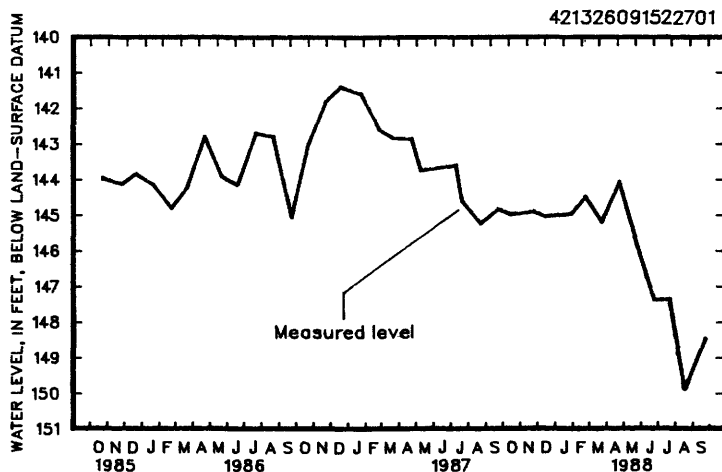
REMARKS.--None.

PERIOD OF RECORD.--September 1984 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 141.37 ft below land-surface datum, Dec. 17, 1986; lowest measured, 149.86 ft below land-surface datum, Aug. 17, 1988.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 13	144.97	JAN 28	144.94	APR 22	144.05	JUL 21	147.33
NOV 23	144.87	FEB 22	144.46	MAY 23	145.78	AUG 17	149.86
DEC 14	145.03	MAR 22	145.18	JUN 23	147.36	SEP 22	148.43



## BUENA VISTA COUNTY

423618095194511. Local number, 90-38-16 DDDD11.

LOCATION.--Lat 42°36'18", long 95°19'45", Hydrologic Unit 10230005, north of County Highway C-65, 2 mi east of the Village of Hanover. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Early Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 497 ft, cased to 497 ft, perforated 346.5 to 349.5 ft.

INSTRUMENTATION.--Quarterly measurement with electric line by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,365 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.50 ft above land-surface datum.

REMARKS.--Well D-25.

PERIOD OF RECORD.--April 1980 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 187.17 ft below land-surface datum, Aug. 12, 1988; lowest measured, 189.53 ft below land-surface datum, Dec. 6, 1983.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 10	187.63	APR 20	187.80	MAY 25	187.90	AUG 12	187.17

## BUENA VISTA COUNTY

424023095571401. Local number, 91-35-26 BCCC1.

LOCATION.--Lat 42°40'23", long 94°57'14", Hydrologic Unit 07100006, approximately 2.7 mi west and 0.5 mi north of the Village of Varina. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Early Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 357 ft, cased to 357 ft, perforated 338 to 347 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape or electric line by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,291 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.00 ft above land-surface datum.

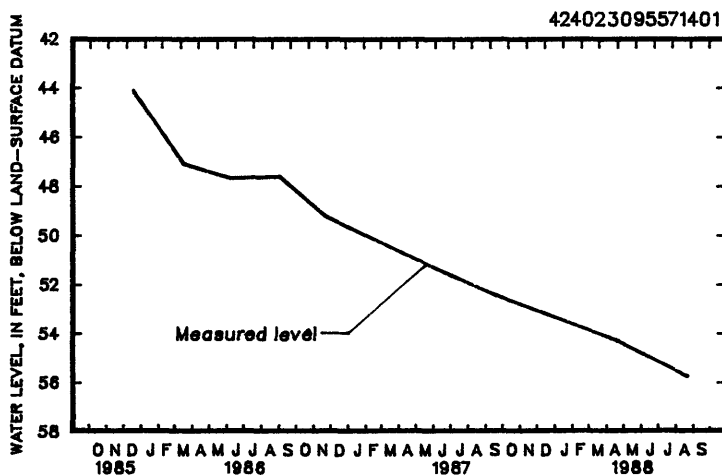
REMARKS.--Well D-24. Paleozoic rock at 347 ft.

PERIOD OF RECORD.--December 1979 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 18.40 ft below land-surface datum, Jan. 7, 1980; lowest measured, 55.81 ft below land-surface datum, Aug. 23, 1988.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 10	53.19	APR 19	54.33	MAY 24	54.75	AUG 23	55.81



425233094545001. Local number, 93-35-13 ADAA1.

LOCATION.--Lat 42°52'33", long 94°54'50", Hydrologic Unit 07100006, south of the Chicago, Rock Island and Pacific Railroad track, approximately 3.5 mi east and 0.75 mi north of the Town of Marathon. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Early Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 1.50 in., depth 381 ft, cased to 381 ft, perforated 350 to 360 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape or electric line by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,330 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.00 ft above land-surface datum.

REMARKS.--Well D-36.

PERIOD OF RECORD.--February 1980 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 131.65 ft below land-surface datum, May 6, 1985; lowest measured, 133.67 ft below land-surface datum, Sept. 11, 1981.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 8	132.30	APR 19	132.08	MAY 24	132.02	AUG 23	132.81

## GROUND-WATER LEVELS

## CARROLL COUNTY

420335094521501. Local number, 84-35-25 BDAD1.

LOCATION.--Lat 42°03'35", long 94°52'15", Hydrologic Unit 07100007, near the city water plant, Carroll.

Owner: City of Carroll.

AQUIFER.--Dakota: in sandstone of Early Cretaceous age.

WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 8 in., depth 120 ft, cased to 100 ft, open hole 100 to 120 ft.

INSTRUMENTATION.--Intermittent measurement reported by personnel from the City of Carroll.

DATUM.--Elevation of land-surface datum is 1,275 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 4.00 ft above land-surface datum.

REMARKS.--City test No. 1. Water levels affected by pumping of nearby wells.

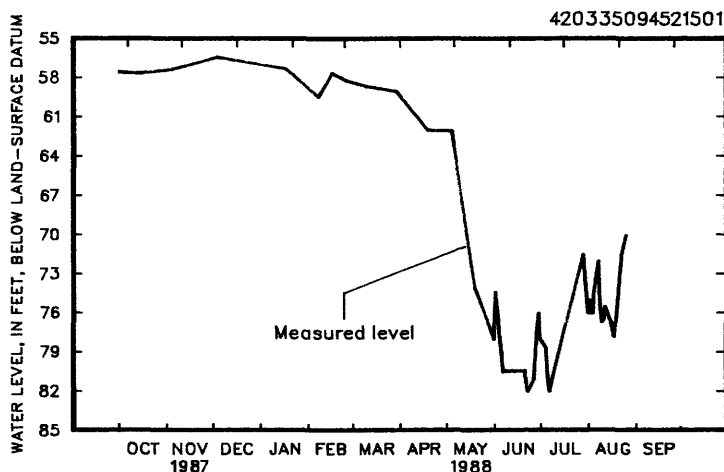
PERIOD OF RECORD.--September 1939 to December 1949, May 1952 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 34.55 ft below land-surface datum, Sep. 8, 1945; lowest measured, 87.50 ft below land-surface datum, Jun. 13, 1981.

REVISION.--Lowest water level measured, 87.50 ft below land-surface datum, Jun. 13, 1981.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 1	57.55	MAY 5	62.11	JUL 5	78.70	AUG 10	76.70
13	57.69	20	74.20	6	81.00	11	76.50
NOV 5	57.32	JUN 1	78.00	7	82.00	12	75.50
DEC 4	56.39	2	74.40	29	71.50	15	76.50
JAN 18	57.35	6	79.00	AUG 1	76.00	16	76.70
FEB 8	59.47	7	80.50	2	75.00	17	77.50
17	57.63	21	80.40	3	76.00	18	77.80
26	58.22	23	82.00	4	76.00	19	76.90
MAR 10	58.65	27	81.00	5	74.30	23	71.50
30	59.07	30	76.00	8	72.00	26	70.00
APR 19	62.04	JUL 1	78.00	9	75.50		



421058094582701. Local number, 85-35-7 CCCC1.

LOCATION.--Lat 42°10'58", long 94°58'27", Hydrologic Unit 07100006, approximately 1 block north of Iowa Highway 217, next to the town maintenance building, Breda. Owner: Town of Breda.

AQUIFER.--Dakota: in sandstone of Early Cretaceous age.

WELL CHARACTERISTICS.--Drilled municipal artesian water well, diameter 10 in., depth 340 ft, cased to 320 ft, screen 320 to 340 ft.

INSTRUMENTATION.--Quarterly measurement with chalked taped by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,362 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Vent pipe, 1.60 ft above land-surface datum.

REMARKS.--Town well No. 3. Water levels affected by pumping. Original depth 349 ft. 1942 to 1955 records published in Geological Survey Water-Supply Papers.

PERIOD OF RECORD.--March 1942 to August 1966, March 1968 to November 1971, June 1975 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 187.70 ft below land-surface datum, Mar. 25, 1948; lowest measured, 250.40 ft below land-surface datum, May 24, 1977.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 10	200.19	AUG 8	212.43

## CERRO GORDO COUNTY

430806093164501. Local number, 96-21-13 BCCB1.

LOCATION.--Lat 43°08'06", long 93°16'45", Hydrologic Unit 07080203, south of the County Home, just north of Iowa Highway 106, east of the City of Clear Lake. Owner: Mason City and Clear Lake Railroad.

AQUIFER.--Cedar Valley: in limestone of Devonian age.

WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 5 in., depth 198 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape or electric line by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,165 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of well curb, 1.30 ft above land-surface datum.

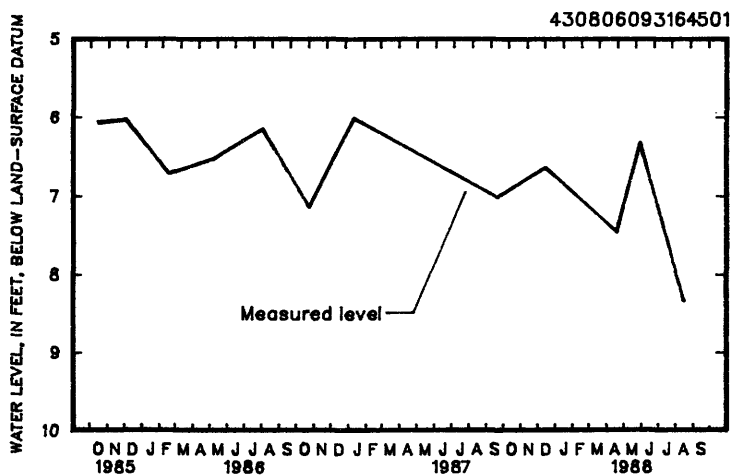
REMARKS.--Casing information not available.

PERIOD OF RECORD.--November 1940 to August 1971, March 1973 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 1.73 ft below land-surface datum, Jan. 28, 1951; lowest measured, 17.26 ft below land-surface datum, Nov. 18, 1955.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 16	6.66	APR 19	7.48	MAY 31	6.35	AUG 17	8.37



## GROUND-WATER LEVELS

## CERRO GORDO COUNTY

430658093281001. Local number, 96-22-20 CADCl.

LOCATION.--Lat 43°06'58", long 93°28'10", Hydrologic Unit 07080203, east of County Road S-14 in Ventura Heights. Owner: W. Baine and H. Elder.

AQUIFER.--Glacial drift: in material of Pleistocene age.

WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 5 in., depth 126 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,249 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Hole in side of casing, 0.87 ft above land-surface datum.

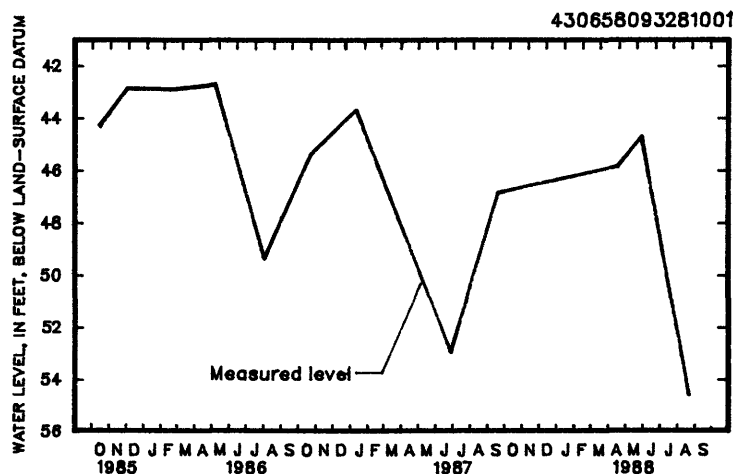
REMARKS.--Casing information not available. Formerly Boy Scouts of America.

PERIOD OF RECORD.--July 1940 to August 1971, March 1973 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 29.65 ft below land-surface datum, Mar. 25, 1942; lowest measured, 54.67 ft below land-surface datum, Aug. 23, 1988.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
APR 19	45.86	MAY 31	44.74	AUG 23	54.67



## CHEROKEE COUNTY

423833095365701. Local number, 90-40-6 BDCD1.

LOCATION.--Lat 42°38'33", long 95°36'57", Hydrologic Unit 10230003, approximately 3.1 mi west of U.S. Highway 59 and 0.55 mi north of Iowa Highway 31 along the Illinois Central Railroad track. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Early Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 1.25 in., depth 253 ft, cased to 252 ft, sandpoint 252 to 253 ft.

INSTRUMENTATION.--Quarterly measurements with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,182 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.93 ft above land-surface datum.

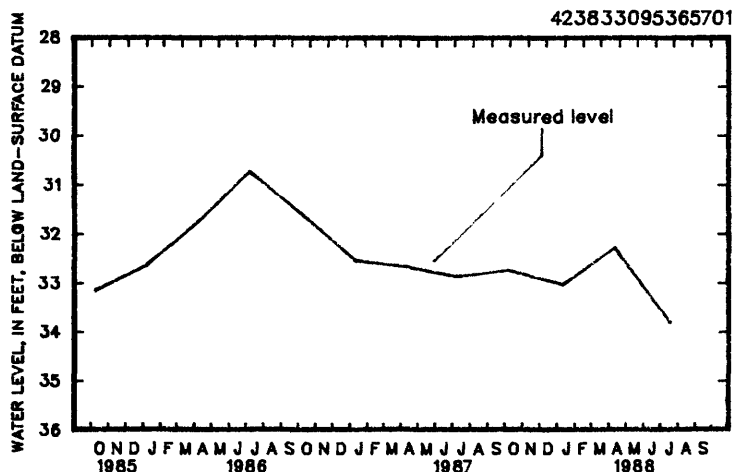
REMARKS.--Well D-6.

PERIOD OF RECORD.--December 1978 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 28.38 ft below land-surface datum, Aug. 27, 1983; lowest measured, 37.22 ft below land-surface datum, Sept. 10, 1981.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 8	32.72	JAN 13	33.02	APR 12	32.27	JUL 20	33.81



424348095231601. Local number, 91-39-1 ADAD1.

LOCATION.--Lat 42°43'48", long 95°23'16", Hydrologic Unit 10230005, approximately 2 mi east and 0.5 mi north of the Town of Aurelia at the Larson Lake County Park. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Cambrian-Ordovician: in dolomite of Ordovician age and sandstone of Cambrian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 6 in. to 236 ft, 5 in. to 486 ft, 2 in. to 1,545 ft, depth 1,545 ft, cased to 1,126 ft, open hole 1,126 to 1,545 ft.

INSTRUMENTATION.--Quarterly measurement with electric line by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,370 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.20 ft above land-surface datum.

REMARKS.--Well D-28.

PERIOD OF RECORD.--September 1979 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 189.65 ft below land-surface datum, Dec. 19, 1984; lowest measured, 194.47 ft below land-surface datum, May 5, 1982.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 9	191.96	APR 20	192.05	MAY 25	191.40	AUG 12	192.01

## CHEROKEE COUNTY

424348095231602. Local number, 91-39-1 ADAD2.

LOCATION.--Lat 42°43'48", long 95°23'16", Hydrologic Unit 10230005, approximately 2 mi east and 0.5 mi north of the Town of Aurelia at the Larson Lake County Park. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Early Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 4 in., depth 340 ft, cased to 340 ft, perforated 235 to 240 ft.

INSTRUMENTATION.--Quarterly measurement with electric line by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,370 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.75 ft above land-surface datum.

REMARKS.--Well D-29.

PERIOD OF RECORD.--September 1979 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 188.65 ft below land-surface datum, Apr. 20, 1988; lowest measured, 194.15 ft below land-surface datum, Aug. 24, 1982.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 9	189.02	APR 20	188.65	MAY 25	189.50	AUG 12	188.83

424132095480211. Local number, 91-42-16 DDDD11.

LOCATION.--Lat 42°41'32", long 95°48'02", Hydrologic Unit 10230004, approximately 2 mi north of the Village of Fielding at the junction of County Roads L-36 and C-44. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Early Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 390 ft, cased to 390 ft, perforated 386 to 390 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,320 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.50 ft above land-surface datum.

REMARKS.--Well D-11.

PERIOD OF RECORD.--March 1980 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 152.75 ft below land-surface datum, June 27, 1984; lowest measured, 155.50 ft below land-surface datum, Dec. 15, 1980.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 8	153.82	JAN 13	153.90	APR 12	153.64	JUL 20	154.29

424802095331201. Local number, 92-40-10 BDDD1.

LOCATION.--Lat 42°48'02", long 95°33'12", Hydrologic Unit 10230003, west of U.S. Highway 59, approximately 2.5 mi north of the City of Cherokee. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Early Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2.50 in., depth 300 ft, cased to 300 ft, perforated 114 to 118 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,210 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 0.30 ft above land-surface datum.

REMARKS.--Well D-5.

PERIOD OF RECORD.--April 1980 to October 1980, May 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 26.05 ft below land-surface datum, Jun. 27, 1984; lowest measured, 29.19 ft below land-surface datum, May 5, 1982.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 8	27.15	JAN 13	27.49	APR 12	26.87	JUL 20	27.44



## CLAYTON COUNTY

424023091291201. Local number, 91-5-30 BBBB1.

LOCATION.--Lat 42°40'23", long 91°29'12", Hydrologic Unit 07060006, 5 mi northwest of the City of Edgewood, or 2 mi northwest of the junction of Iowa Highways 3 and 13 east of Strawberry Point.

Owner: Harold Knight.

AQUIFER.--Glacial drift: in material of Pleistocene age.

WELL CHARACTERISTICS.--Dug unused water-table well, diameter 36 in., depth 36 ft.

INSTRUMENTATION.--Intermittent measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,233 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Hole in pump base at land-surface datum.

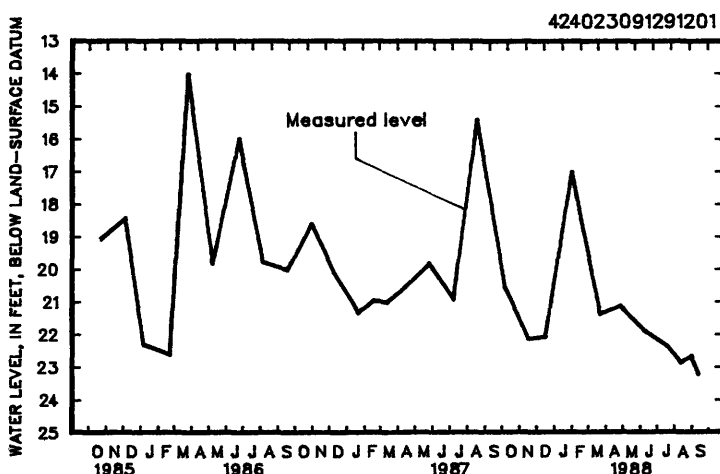
REMARKS.--Casing information not available.

PERIOD OF RECORD.--June 1957 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 14.06 ft below land-surface datum, Mar. 26, 1986; lowest measured, 30.68 ft below land-surface datum, Jan. 12, 1959.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 6	20.62	FEB 1	17.05	JUN 7	21.92	AUG 30	22.70
NOV 16	22.18	MAR 22	21.42	JUL 19	22.43	SEP 12	23.28
DEC 16	21.10	APR 26	21.16	AUG 12	22.91		



424057091320001. Local number, 91-6-22 ACAC1.

LOCATION.--Lat 42°40'57", long 91°32'00", Hydrologic Unit 07060006, southeast corner of the junction of Iowa Highways 3 and 13, Strawberry Point. Owner: City of Strawberry Point.

AQUIFER.--Silurian and Ordovician: in dolomite of Silurian age and Upper Ordovician age.

WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 16 in., 0-130 ft, 12 in. 130-161 ft, depth 492 ft, cased to 161 ft with a 10 in. liner 229-370 ft, open hole 161 to 229 ft and 370 to 492 ft.

INSTRUMENTATION.--Intermittent measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,219 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of recorder platform, 2.10 ft above land-surface datum.

REMARKS.--City well No. 2. Recorder removed October 1987.

PERIOD OF RECORD.--March 1963 to current year.

REVISED RECORDS.--WDR IA-84-1.

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 114.38 ft below land-surface datum, May 9, 1973; lowest recorded, 133.18 ft below land-surface datum, Feb. 4, 1968.

WATER LEVEL, IN FEET, BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 6	126.87	MAR 22	123.36	JUN 7	126.51	AUG 30	128.56
DEC 16	127.06						

## GROUND-WATER LEVELS

## CLAYTON COUNTY

430156091182901. Local number, 95-4-22 BCBD1.

LOCATION.--Lat 43°01'56", long 91°18'29", Hydrologic Unit 07060001, approximately 2 mi north of the junction of U.S. Highway 18 and U.S. Highway 52-Iowa Highway 13, near Spook Cave. Owner: Gerald Mielke.

AQUIFER.--St. Peter: in sandstone of Middle Ordovician age.

WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 6 in., depth 49 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 940 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.00 ft above land-surface datum.

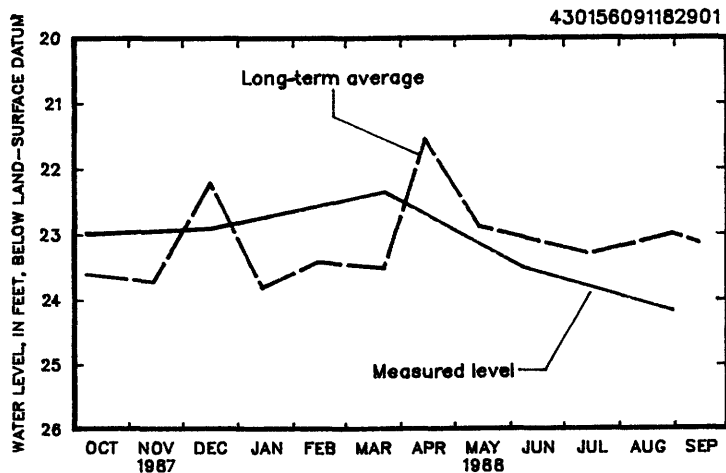
REMARKS.--Casing information not available.

PERIOD OF RECORD.--October 1957 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 13.98 ft below land-surface datum, Dec. 7, 1983; lowest measured, 27.88 ft below land-surface datum, Mar. 4, 1968.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 8	23.01	MAR 23	22.37	JUN 8	23.53	AUG 31	24.20
DEC 17	22.92						



## CLAYTON COUNTY

425940091194701. Local number, 95-4-32 DDDD1.

LOCATION.--Lat 42°59'40", long 91°19'47", Hydrologic Unit 07060004, 1 mi west of the junction of U.S. Highway 52 and Iowa Highway 13, or northeast of the Town of Farmersburg. Owner: Milton and Willis Meier.

AQUIFER.--St. Peter: in sandstone of Middle Ordovician age.

WELL CHARACTERISTICS.--Drilled stock artesian water well, diameter 6 in., depth 380 ft (reported).

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,090 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Plug in pump base, 1.00 ft above land-surface datum.

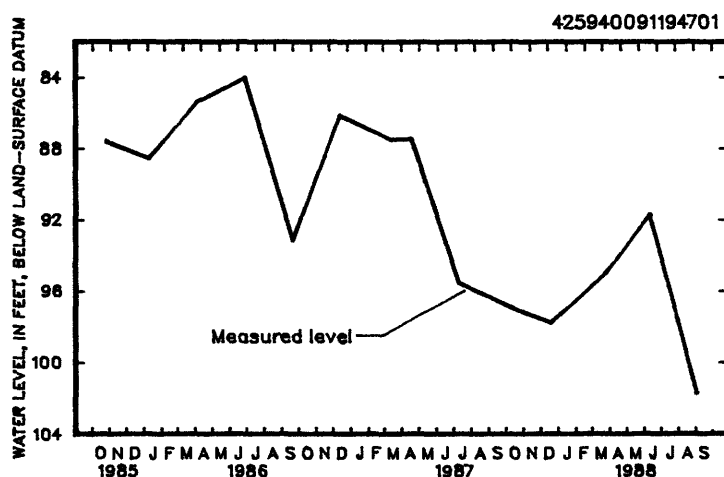
REMARKS.--Casing information not available.

PERIOD OF RECORD.--October 1957 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 74.08 ft below land-surface datum, July 10, 1984; lowest measured, 126.56 ft below land-surface datum, Jan. 13, 1969.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 8	97.00	MAR 22	95.05	JUN 8	91.76	AUG 31	101.80
DEC 17	97.85						



## CRAWFORD COUNTY

421031095225611. Local number, 85-39-16 ADDED11.

LOCATION.--Lat 42°10'31", long 95°22'56", Hydrologic Unit 10230007, approximately 2.5 mi east and 0.5 mi north of the Town of Schleswig. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Mississippian: in limestone of Mississippian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 561 ft, cased to 561 ft, perforated 543 to 561 ft.

INSTRUMENTATION.--Quarterly measurement with electric line by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,370 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.14 ft above land-surface datum.

REMARKS.--Well WC-7B. Water level for Jan. 8, 1985, 307.26 ft.

PERIOD OF RECORD.--June 1981 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 305.58 ft below land-surface datum, Feb. 8, 1983; lowest measured, 307.64 ft below land-surface datum, Oct. 4, 1983.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 5	307.18	JAN 13	307.46	APR 12	307.14	JUL 17	307.16

## GROUND-WATER LEVELS

## DELAWARE COUNTY

422029091144302. Local number, 87-3-18 CBCD2.

LOCATION.--Lat 42°20'37", long 91°14'47", Hydrologic Unit 07060006, behind the municipal utilities building in downtown Hopkinton. Owner: Town of Hopkinton.

AQUIFER.--Silurian: in dolomite of Silurian age.

WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 8 in., depth 86 ft.

INSTRUMENTATION.--Intermittent measurement with chalked tape by observer.

DATUM.--Elevation of land-surface datum is 863 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple welded to plate on top of casing, 2.46 ft above land-surface datum.

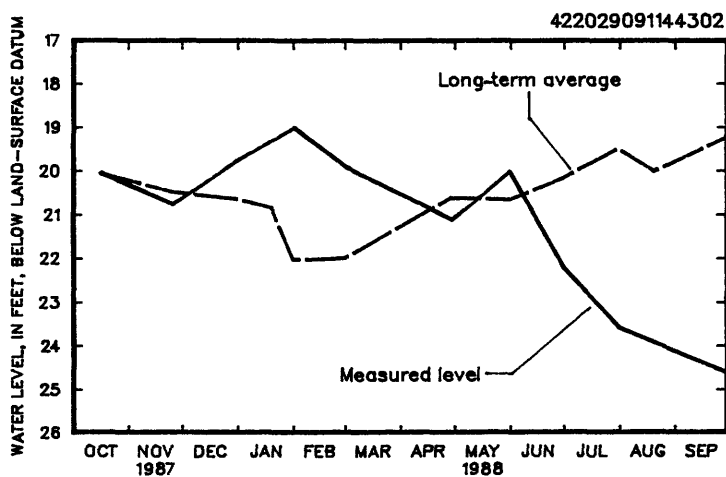
REMARKS.--Casing information not available. Water levels affected by pumping of a nearby well.

PERIOD OF RECORD.--December 1984 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 16.65 ft below land-surface datum, Nov. 6, 1986; lowest measured, 24.37 ft below land-surface datum, Sep. 30, 1988.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 16	20.08	FEB 1	19.04	MAY 31	20.04	SEP 30	24.37
NOV 25	20.80	MAR 1	19.95	JUN 30	22.25		
DEC 31	19.79	APR 29	21.15	JUL 31	23.62		



## DES MOINES COUNTY

404844091142701. Local number, 69-3-6 AABA1.

LOCATION.--Lat 40°48'44", long 91°14'27", Hydrologic Unit 07080104, at the Iowa Army Ammunition Plant, near the Town of Middleton. Owner: Iowa Ordnance Plant.

AQUIFER.--St. Peter: in sandstone of Middle Ordovician age.

WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 16 in., depth 1,209 ft, cased to 855 ft, open hole 855 to 1,209 ft.

INSTRUMENTATION.--Intermittent measurement with chalked tape by observer.

DATUM.--Elevation of land-surface datum is 717 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of platform, 1.61 ft above land-surface datum.

REMARKS.--Plant well No. 3.

PERIOD OF RECORD.--March 1950 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 105.97 ft below land-surface datum, May 11, 1987; lowest measured, 201.75 ft below land-surface datum, Aug. 15, 1978.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 2	108.56	MAR 6	107.49	MAY 16	106.79	JUL 14	107.94
JAN 3	107.44	APR 9	106.64	JUN 11	107.23	SEP 6	107.17

## DES MOINES COUNTY

404753091142501. Local number, 69-3-6 DDCD1.

LOCATION.--Lat 40°47'53", long 91°14'25", Hydrologic Unit 07080104, at the Iowa Army Ammunition Plant, near the Town of Middleton. Owner: Iowa Ordnance Plant.

AQUIFER.--Cedar Valley and Mississippian: in limestone of Devonian and Mississippian age.

WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 19 in., depth 675 ft, cased to 75 ft, open hole 75 to 675 ft.

INSTRUMENTATION.--Intermittent measurement with chalked tape by observer.

DATUM.--Elevation of land-surface datum is 699 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of platform, 1.91 ft above land-surface datum.

REMARKS.--Plant well No. 2.

PERIOD OF RECORD.--March 1950 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 74.46 ft below land-surface datum, Apr. 18, 1975; lowest measured, 83.19 ft below land-surface datum, Apr. 26, 1950.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 2	79.99	MAR 6	80.46	MAY 16	80.41	JUL 14	80.99
JAN 3	80.44	APR 9	80.37	JUN 11	80.75	SEP 6	80.73

## EMMET COUNTY

432927094345501. Local number, 100-32-11 DDDD1.

LOCATION.--Lat 43°29'27", long 94°34'55", Hydrologic Unit 07100003, at Okamanpedan Lake Reserve State Park, north of the Town of Dolliver. Owner: State of Iowa.

AQUIFER.--Dakota: in sandstone of Early Cretaceous age.

WELL CHARACTERISTICS.--Drilled public-supply artesian water well, diameter 6 in., depth 277 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,233 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Plug in pump base, 0.61 ft above land-surface datum.

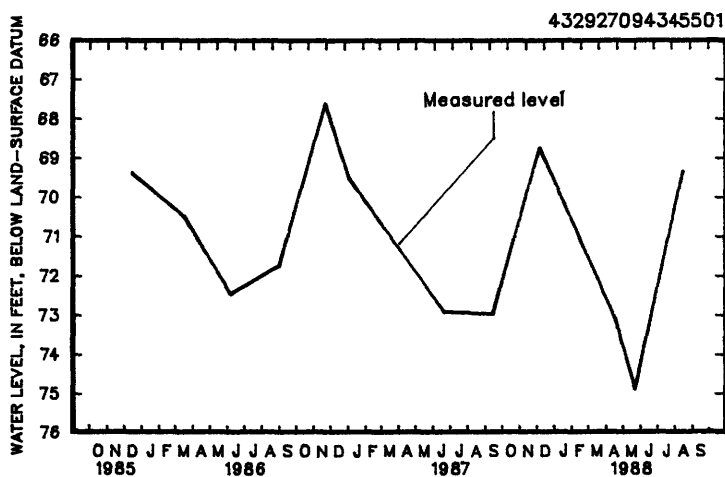
REMARKS.--Casing information not available.

PERIOD OF RECORD.--November 1939 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 59.60 ft below land-surface datum, Dec. 19, 1946; lowest measured, 77.86 ft below land-surface datum, Aug. 27, 1979.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 8	68.78	APR 19	73.13	MAY 24	74.91	AUG 17	69.37



## GROUND-WATER LEVELS

## GREENE COUNTY

415449094161501. Local number, 82-29-18 CAAA1.

LOCATION.--Lat 41°54'49", long 94°16'15", Hydrologic Unit 07100006, approximately 0.5 mi south and 4 mi east of the Village of Cooper and just south of County Road E-57. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Pennsylvanian: in sandstone of Pennsylvanian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 101 ft, cased to 100 ft, perforated 89 to 100 ft, open hole 100 to 101 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 960 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.00 ft above land-surface datum.

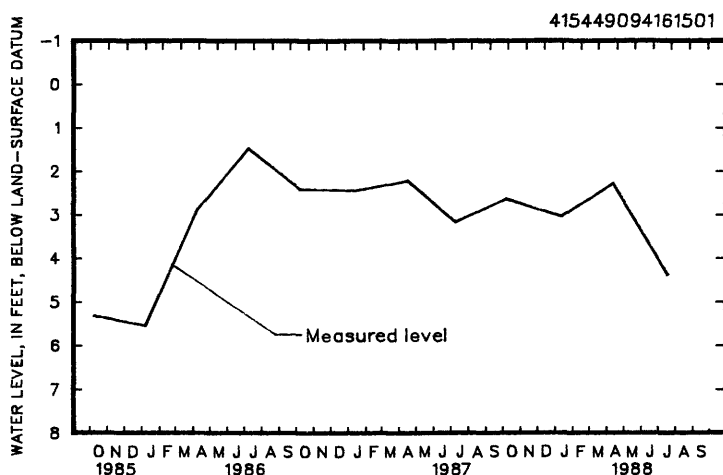
REMARKS.--Well WC-116.

PERIOD OF RECORD.--September 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 0.41 ft above land-surface datum, Jul. 5, 1983; lowest measured, 5.57 ft below land-surface datum, Jan. 7, 1986.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 6	2.64	JAN 12	3.06	APR 12	2.29	JUL 18	4.42



415449094173201. Local number, 82-30-13 CABA1.

LOCATION.--Lat 41°54'49", long 94°17'32", Hydrologic Unit 07100006, approximately 0.5 mi south and 3 mi east of the Village of Cooper and just south of County Road E-57. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Pennsylvanian and Mississippian: in sandstone of Pennsylvanian age and limestone of Mississippian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 230 ft, cased to 230 ft, perforated 209 to 230 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,035 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.45 ft above land-surface datum.

REMARKS.--Well WC-118. Original depth 245 ft, casing plugged at 230 ft. Water level for Jan. 8, 1985, 70.61 ft.

PERIOD OF RECORD.--September 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 66.79 ft below land-surface datum, Jul. 5, 1983; lowest measured, 72.59 ft below land-surface datum, Jan. 7, 1986.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 6	70.10	JAN 12	69.92	APR 12	70.63	JUL 18	71.62

## GRUNDY COUNTY

422605092560001. Local number, 88-18-15 DBBB1.

LOCATION.--Lat 42°26'05", long 92°56'00", Hydrologic Unit 07080205, west of the corner of Monroe and 4th Streets and west of the high school, Wellsburg. Owner: City of Wellsburg.

AQUIFER.--Devonian; in limestone and dolomite of Upper Devonian age.

WELL CHARACTERISTICS.--Drilled public-emergency-supply artesian water well, diameter 12 in., depth 280 ft, cased to 128 ft, open hole 128 to 280 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,060 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Edge of vent pipe, 1.25 ft above land-surface datum.

REMARKS.--None.

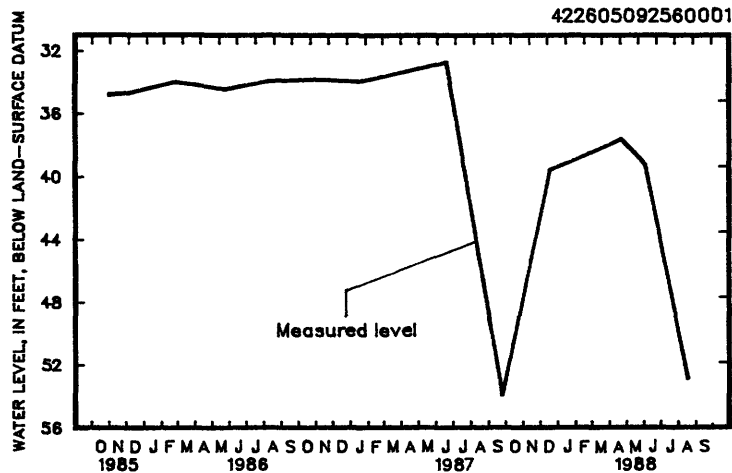
PERIOD OF RECORD.--September 1960 to August 1971, May 1973 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 32.78 ft below land-surface datum, Jun. 18, 1987; lowest measured, 96.81 ft below land-surface datum, Sep. 27, 1960.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 17	39.60	APR 20	37.66	JUN 2	39.33	AUG 16	p52.97

p Well recently pumped.



## GROUND-WATER LEVELS

## HARRISON COUNTY

413838095462001. Local number, 79-42-19 AADB1.

LOCATION.--Lat 41°38'38", long 95°46'20", Hydrologic Unit 10230007, approximately 0.5 mi east of the Town of Logan, north of U.S. Highway 30. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Mississippian: in dolomite of Mississippian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 628 ft, cased to 628 ft, perforated 588 to 628 ft.

INSTRUMENTATION.--Intermittent measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,045 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 4.40 ft above land-surface datum.

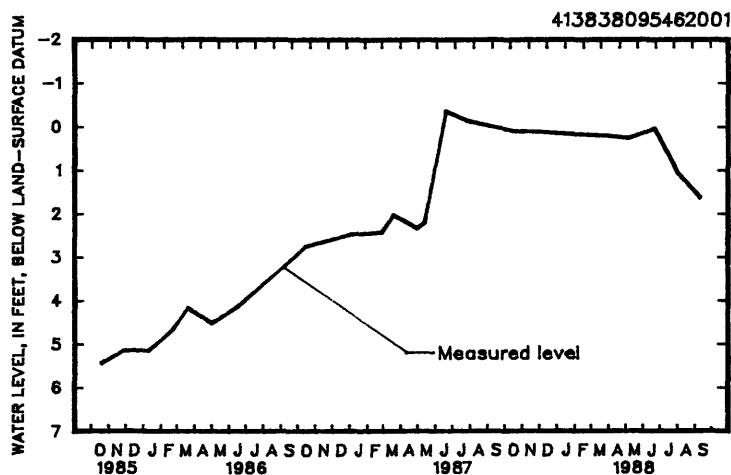
REMARKS.--Well WC-22.

PERIOD OF RECORD.--November 1981 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 0.33 ft above land-surface datum, Jun. 9, 1987; lowest measured, 16.37 ft below land-surface datum, Jun. 3, 1982.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 16	0.14	JAN 14	0.20	MAY 6	0.30	AUG 1	1.10
NOV 27	0.15	MAR 30	0.25	JUN 20	0.69	SEP 9	1.67





## HARRISON COUNTY

414955096000601. Local number, 81-44-18 AADA1.

LOCATION.--Lat 41°49'55", long 96°00'06", Hydrologic Unit 10230003, approximately 1.8 mi northeast of the Town of Little Sioux, just west of Iowa Highway 301. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Pennsylvanian: in sandstone of Pennsylvanian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 126 ft, cased to 126 ft, perforated 108 to 126 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,075 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.80 ft above land-surface datum.

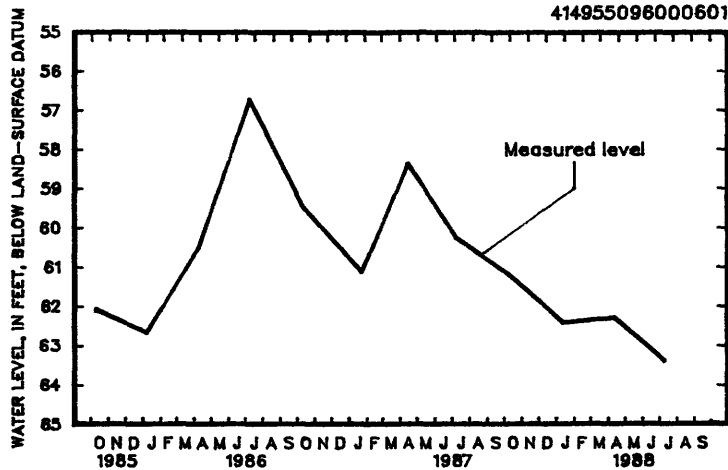
REMARKS.--Well WC-23. Original depth 209 ft, casing plugged at 126 ft.

PERIOD OF RECORD.--January 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 52.33 ft below land-surface datum, Jul. 12, 1984; lowest measured, 64.07 ft below land-surface datum, Jan. 15, 1982.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 7	61.23	JAN 11	62.46	APR 11	62.32	JUL 8	63.44



## GROUND-WATER LEVELS

## HENRY COUNTY

405741091334501. Local number, 71-6-9 CBA1.

LOCATION.--Lat 40°57'41", long 91°33'45", Hydrologic Unit 07080107, at Saunders Park in the southwest part of Mount Pleasant. Owner: City of Mount Pleasant.

AQUIFER.--Jordan: in strata of Cambrian and Ordovician age.

WELL CHARACTERISTICS.--Drilled municipal artesian water well, diameter 16 to 6 in., depth 1,896 ft, cased to 1,689 ft, open hole 1,689 to 1,896 ft.

INSTRUMENTATION.--Quarterly measurement with airline by USGS personnel.

DATUM.--Elevation of land-surface datum is 670 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.32 ft below land-surface datum.

REMARKS.--City well No. 3. Water levels affected by pumping. Well deepened from 1,802 to 1,896 ft in 1955. Records for 1945 to 1958, and 1961 to September 1985 are available in the files of the Iowa District Office.

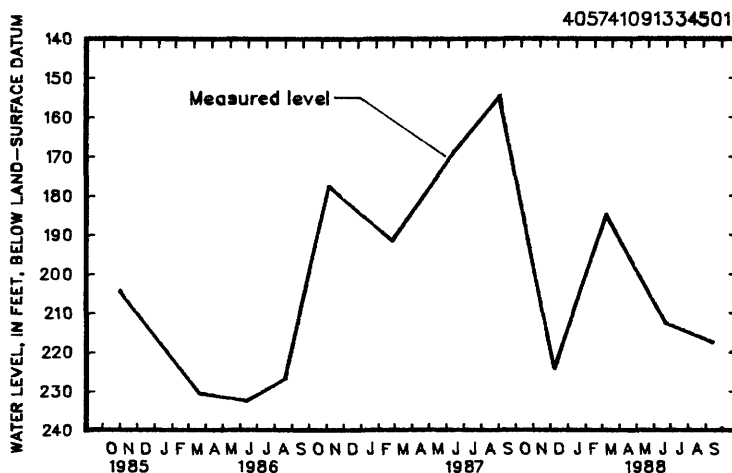
PERIOD OF RECORD.--September 1945 to February 1958 and November 1961 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 71.60 ft below land-surface datum, Dec. 31, 1945; lowest measured (pumping), 259.32 ft below land-surface datum, Jan. 1981.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 8	p223.84	MAR 8	184.57	JUN 21	p212.29	SEP 13	p217.32

p Well being pumped.



405810091330502. Local number, 71-6-9 ABAC2.

LOCATION.--Lat 40°58'10", long 91°33'05", Hydrologic Unit 07080107, in the city water plant on Adams Street, Mount Pleasant. Owner: City of Mount Pleasant.

AQUIFER.--Jordan: in strata of Cambrian and Ordovician age.

WELL CHARACTERISTICS.--Drilled municipal artesian water well, diameter 20 to 19 in., depth 1,860 ft, cased to 623 ft, open hole 623 to 1,860 ft.

INSTRUMENTATION.--Quarterly measurement with airline by USGS personnel.

DATUM.--Elevation of land-surface datum is 725 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Hole in pump base, 2.25 ft above land-surface datum.

REMARKS.--City well No. 4. Water levels affected by pumping. Open from the Cedar Valley Aquifer of Devonian age into the St. Lawrence Formation of Cambrian age.

PERIOD OF RECORD.--April 1946 to December 1950, January 1953 to March 1957 and May 1959 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 132.00 ft below land-surface datum, May 5, 1946; lowest measured, nonpumping, 208.25 ft below land-surface datum, Feb. 25, 1987.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 8	p223.43	MAR 8	p223.43	JUN 21	p230.36	SEP 13	p232.25

p Well being pumped.

## HENRY COUNTY

410852091394301. Local number, 73-7-9 AABD1.

LOCATION.--Lat 41°08'52", long 91°39'43", Hydrologic Unit 07080107, north of Main Street near the water tower, Wayland. Owner: Town of Wayland.

AQUIFER.--Glacial drift: in material of Pleistocene age.

WELL CHARACTERISTICS.--Dug unused water-table well, diameter 4 ft, depth 52 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 735 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of cement cover, 0.21 ft above land-surface datum.

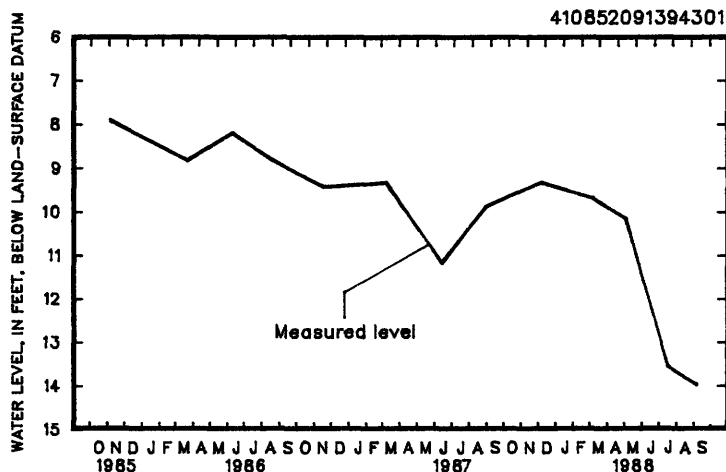
REMARKS.--Casing information not available.

PERIOD OF RECORD.--September 1960 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 2.30 ft below land-surface datum, Sep. 1, 1965; lowest measured, 14.69 ft below land-surface datum, Feb. 15, 1977.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 8	9.34	MAY 5	10.17	JUL 19	13.59	SEP 8	14.01
MAR 8	9.71						



## IDA COUNTY

422215095390811. Local number, 87-41-5 CCCC11.

LOCATION.--Lat 42°22'15", long 95°39'08", Hydrologic Unit 10230005, approximately 0.75 mi east and 6.5 mi south of the Village of Cushing. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Early Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 490 ft, cased to 490 ft, perforated 301 to 305 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,344 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.72 ft above land-surface datum.

REMARKS.--Well D-10. Original depth, 510 ft, cemented back to 490 ft.

PERIOD OF RECORD.--June 1980 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 202.55 ft below land-surface datum, Jun. 4, 1980; lowest measured, 206.50 ft below land-surface datum, May 7, 1982.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 8	204.18	JAN 13	203.77	APR 12	204.44	JUL 19	205.13

## GROUND-WATER LEVELS

## IDA COUNTY

423107095383201. Local number, 89-41-13 CCCC1.

LOCATION.--Lat 42°31'07", long 95°38'32", Hydrologic Unit 10230003, at a roadside park on County Road D-15, approximately 1.5 mi east and 3.5 mi north of the Village of Cushing. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Mississippian: in limestone of Mississippian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 469 ft, cased to 465 ft, sand point 465 to 468 ft, open hole 468 to 469 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,320 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.11 ft above land-surface datum.

REMARKS.--Well D-9.

PERIOD OF RECORD.--December 1978 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 186.45 ft below land-surface datum, Jul. 27, 1983; lowest measured, 244.55 ft below land-surface datum, Jul. 9, 1980.

REVISION.--Lowest water level measured, 244.55 ft below land-surface datum, Jul. 9, 1980.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 8	189.13	JAN 13	188.53	APR 12	189.59	JUL 19	189.80

## IOWA COUNTY

414709091515801. Local number, 81-9-35 BCAA1.

LOCATION.--Lat 41°47'09", long 91°51'58", Hydrologic Unit 07080208, approximately 400 ft northwest of the Iowa River, east of Iowa Highway 149, and approximately 1.1 mi south of the Village of Amana. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Iowa River Alluvial Aquifer: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 10 in, depth 27 ft, cased to 18 ft, screen 18 to 27 ft.

INSTRUMENTATION.--Water-level recorder.

DATUM.--Elevation of land-surface datum is 710 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 4.0 ft above land-surface datum.

REMARKS.--Well IRA-24.

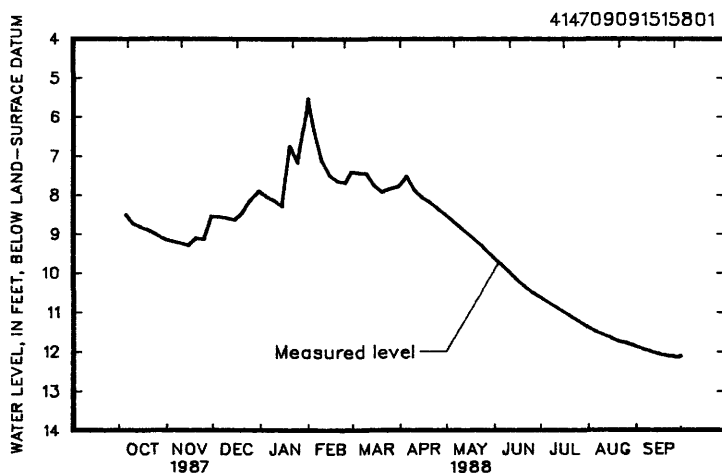
PERIOD OF RECORD.--December 1984 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 2.90 ft below land-surface datum, Feb. 24, 1985; lowest recorded, 12.15 ft below land-surface datum, Sep. 27 and 28, 1988.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
NOON VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	8.50	9.20	8.57	8.05	6.36	7.45	7.52	----	9.78	----	11.49	11.94
10	8.74	9.25	8.60	8.15	7.15	7.46	7.88	----	9.97	----	11.57	12.00
15	8.83	9.30	8.65	8.30	7.51	7.77	8.07	----	10.16	----	11.65	12.06
20	8.90	9.10	8.45	6.75	7.66	7.93	8.19	----	10.33	----	11.75	12.11
25	9.02	9.15	8.14	7.17	7.70	7.84	8.35	9.37	10.50	----	11.79	12.13
EOY	9.15	8.54	7.89	5.90	7.40	7.77	8.51	9.60	----	11.38	11.87	12.10

WTR YEAR 1988 HIGHEST 5.53 FEB 1, 1988 LOWEST 12.15 SEP 27 and 28, 1988



## IOWA COUNTY

414930092093801. Local number, 81-11-17 CBBCL.

LOCATION.--Lat 41°49'30", long 92°09'38", Hydrologic Unit 07080208, approximately 2.2 mi east of the Village of Koszta and 0.5 mi south of the Iowa River. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Iowa River Alluvial Aquifer: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 30 ft, cased to 27 ft, screen 27 to 30 ft.

INSTRUMENTATION.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 745 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.60 ft above land-surface datum.

REMARKS.--Well IRA-6. Replaces well IRA 10-B. Records for 1984 to July 1986 are available in the files of the Iowa District Office.

PERIOD OF RECORD.--October 1984 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 3.64 ft below land-surface datum, May 28, 1986; lowest measured, 9.91 ft below land-surface datum, Aug. 29, 1988.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 30	7.24	JAN 28	6.15	MAR 28	5.88	JUL 29	9.07
NOV 30	6.65	FEB 22	6.06	MAY 24	6.96	AUG 29	9.91
DEC 31	5.88						

414816092053401. Local number, 81-11-23 DCCC1.

LOCATION.--Lat 41°48'16", long 92°05'34", Hydrologic Unit 07080208, approximately 0.75 mi west of the Town of Marengo, 0.5 mi north of Iowa Highway 212 and 0.5 mi south of the Iowa River. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Iowa River Alluvial Aquifer: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 31 ft, cased to 28 ft, screen 28 to 31 ft.

INSTRUMENTATION.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 745 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.30 ft above land-surface datum.

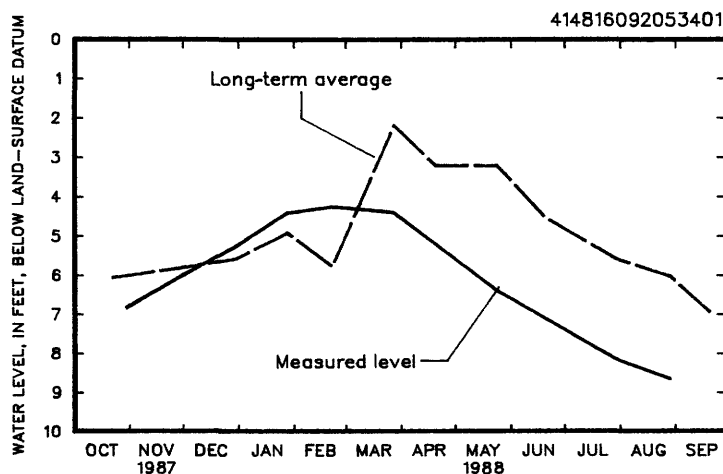
REMARKS.--Well IRA-4A. Replaces well IRA-10A. Records for 1984 to July 1986 are available in the files of the Iowa District Office.

PERIOD OF RECORD.--October 1984 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 1.65 ft below land-surface datum, May 28, 1986; lowest measured, 8.67 ft below land-surface datum, Aug. 29, 1988.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 30	6.84	JAN 28	4.42	MAR 28	4.42	JUL 29	8.15
NOV 30	6.02	FEB 22	4.25	MAY 24	6.40	AUG 29	8.67
DEC 31	5.25						



## GROUND-WATER LEVELS

## IOWA COUNTY

415125092164201. Local number, 81-12-6 ADDA1.

LOCATION.--Lat 41°51'25", long 92°16'42", Hydrologic Unit 07080208, approximately 800 ft south of the Iowa River, west side of Iowa Highways 21 and 212, approximately 2 mi south of the Town of Belle Plaine. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Iowa River Alluvial Aquifer: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in, depth 36 ft, cased to 33 ft, screen 33 to 36 ft.

INSTRUMENTATION.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 765 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.60 ft above land-surface datum.

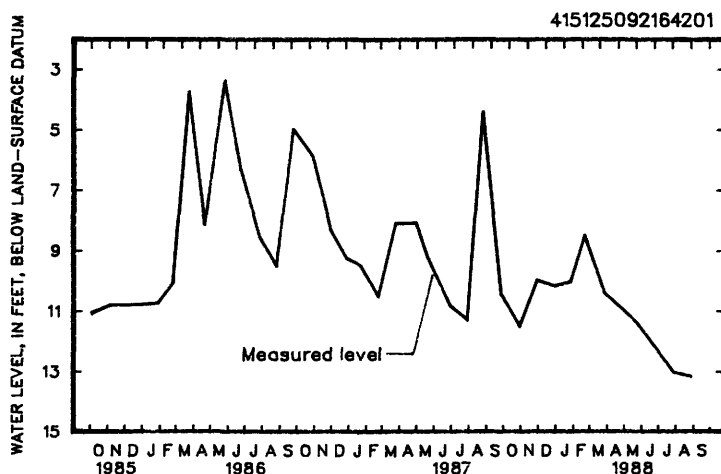
REMARKS.--Well IRA-14.

PERIOD OF RECORD.--October 1984 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 3.35 ft below land-surface datum, May 28, 1986; lowest measured, 13.16 ft below land-surface datum, Aug. 29, 1988.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 30	11.48	JAN 28	10.00	MAR 28	10.39	JUL 29	13.02
NOV 30	9.94	FEB 22	8.47	MAY 24	11.37	AUG 29	13.16
DEC 31	10.16						



## JACKSON COUNTY

420842090165701. Local number, 85-6E-29 ACAD1.

LOCATION.--Lat 42°08'42", long 90°16'57", Hydrologic Unit 07060005, 1 mi east of U.S. Highway 52, 2 mi southeast of the Village of Green Island beside the Chicago, Milwaukee, St. Paul and Pacific Railroad tracks in the Upper Mississippi River Wildlife and Fish Refuge. Owner: U.S. Geological Survey.

AQUIFER.--Mt. Simon: in sandstone of Early Cambrian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in. depth 1,804 ft, cased to 1,705 ft, screened 1,705 to 1,725 ft, open hole 1,725 to 1,804 ft.

INSTRUMENTATION.--Monthly measurement with engineers rule by USGS personnel.

DATUM.--Elevation of land-surface datum is 610 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Mark on angle iron attached to well house, 6.05 ft above land-surface datum.

REMARKS.--Flowing well.

PERIOD OF RECORD.--May 1983 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 11.81 ft above land-surface datum, May 16, 1988; lowest measured, 7.67 ft above land-surface datum, Sep. 6, 1984.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 5	+10.49	FEB 1	+10.46	MAY 16	+11.81	AUG 29	+10.51
NOV 10	+9.89	MAR 10	+10.78	JUN 6	+10.68	SEP 20	+10.79
DEC 16	+10.40	APR 25	+10.99	JUL 18	+10.67		

## JACKSON COUNTY

420842090165703. Local number, 85-6E-29 ACAD3.

LOCATION.--Lat 42°08'42", long 90°16'57", Hydrologic Unit 07060005, 1 mi east of U.S. Highway 52, 2 mi southeast of the Village of Green Island beside the Chicago, Milwaukee, St. Paul and Pacific Railroad tracks in the Upper Mississippi River Wildlife and Fish Refuge. Owner: U.S. Geological Survey.

AQUIFER.--St. Peter and Prairie du Chien: in sandstone and dolomite of Middle and Early Ordovician age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 910 ft, cased to 604.2 ft, screened 604.2 to 624.2 ft, open hole 624.2 to 910 ft.

INSTRUMENTATION.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 610 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.00 ft above land-surface datum.

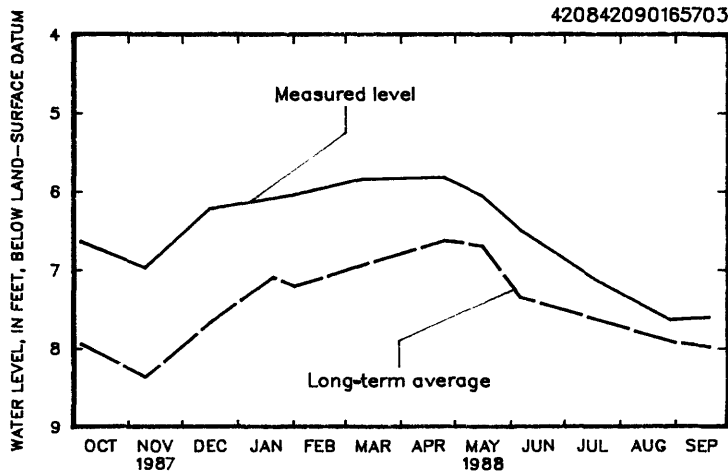
REMARKS.--None.

PERIOD OF RECORD.--May 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 5.19 ft below land-surface datum, Jan. 8, 1986; lowest measured 9.90 ft below land-surface datum, Aug. 31, 1983.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 5	6.63	FEB 1	6.03	MAY 16	6.05	AUG 29	7.64
NOV 10	6.97	MAR 10	5.83	JUN 6	6.48	SEP 20	7.60
DEC 16	6.21	APR 25	5.81	JUL 18	7.12		



## GROUND-WATER LEVELS

## JACKSON COUNTY

420842090165704. Local number, 85-6E-29 ACAD4.

LOCATION.--Lat 42°08'42", long 90°16'57", Hydrologic Unit 07060005, 1 mi east of U.S. Highway 52, 2 mi southeast of the Village of Green Island beside the Chicago, Milwaukee, St. Paul and Pacific Railroad tracks in the Upper Mississippi River Wildlife and Fish Refuge. Owner: U.S. Geological Survey.

AQUIFER.--Galena: in dolomite of Ordovician age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 400 ft, cased to 299.6 ft, screened 299.6 to 319.6 ft, open hole 319.6 to 400 ft.

INSTRUMENTATION.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 610 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.00 ft above land-surface datum.

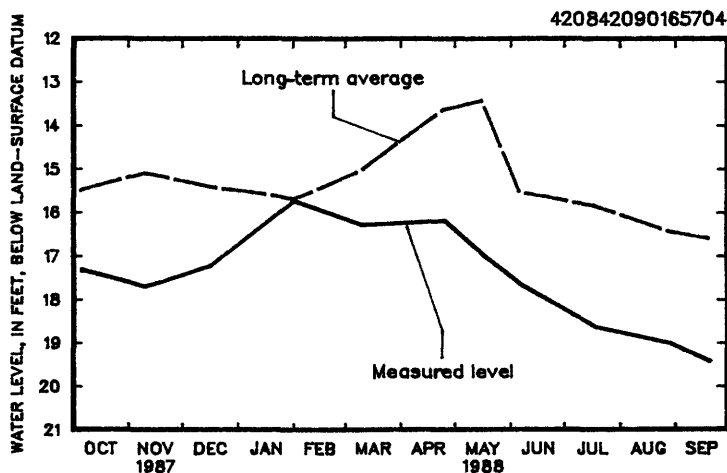
REMARKS.--None.

PERIOD OF RECORD.--May 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 11.40 ft below land-surface datum May 15, 1986; lowest measured, 19.46 ft below land-surface datum, Sep. 20, 1988.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 5	17.34	FEB 1	15.75	MAY 16	17.00	AUG 29	19.05
NOV 10	17.74	MAR 10	16.32	JUN 6	17.68	SEP 20	19.46
DEC 16	17.25	APR 25	16.21	JUL 18	18.67		





## JASPER COUNTY

414210092592001. Local number, 80-18-31 ABBB1.

LOCATION.--Lat 41°42'10", long 92°59'20", Hydrologic Unit 07080105, approximately 3 mi east of the City of Newton just south of U.S. Highway 6. Owner: P.W. Beukema.

AQUIFER.--Glacial drift: in material of Pleistocene age.

WELL CHARACTERISTICS.--Dug stock water-table well, diameter 36 in., depth 37 ft, cribbed with brick.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 940 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of cement platform, 0.70 ft above land-surface datum.

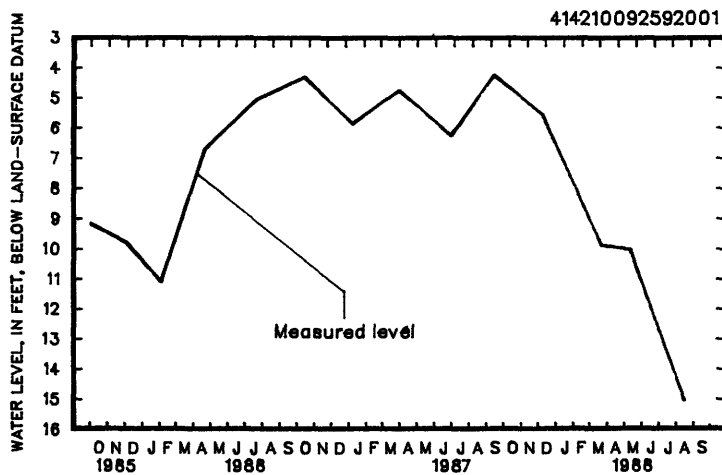
REMARKS.--None.

PERIOD OF RECORD.--February 1940 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 2.67 ft below land-surface datum, Jun. 10, 1947; lowest measured, 27.15 ft below land-surface datum, Dec. 18, 1948.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 10	5.62	MAR 24	9.96	MAY 13	10.10	AUG 18	15.11



## GROUND-WATER LEVELS

## JASPER COUNTY

414147093035401. Local number, 80-19-33 ACAC1.

LOCATION.--Lat 41°41'50", long 93°03'53", Hydrologic Unit 07080105, 231 West 10th Street, Newton.

Owner: John Coppess.

AQUIFER.--Jordan: in strata of Cambrian and Ordovician age.

WELL CHARACTERISTICS.--Drilled unused private artesian water well, diameter 12 to 6 in., depth 2,567 ft, cased to 1,750 ft, open hole 1,750 to 2,567 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 915 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Plug in cement well cover, 0.50 ft above land-surface datum.

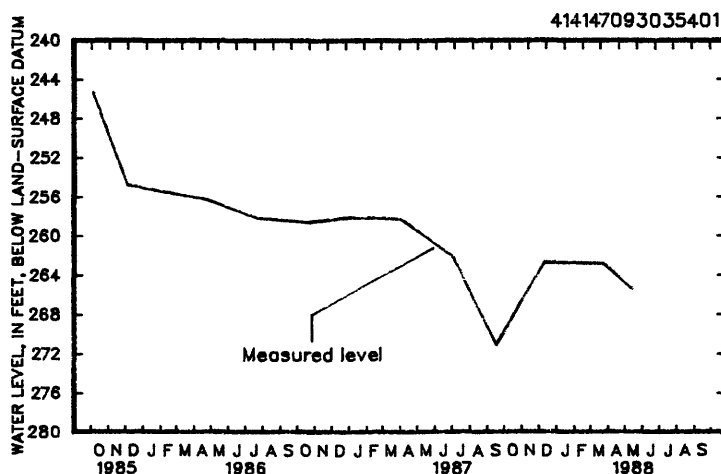
REMARKS.--461 ft of the Prairie du Chien formation of Ordovician age, 262 ft of the St. Lawrence formation of Cambrian age, and 94 ft of Franconia sandstone of Cambrian age open.

PERIOD OF RECORD.--September 1963 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 98.43 ft below land-surface datum, Jun. 14, 1966; lowest measured, 271.19 ft below land-surface datum, Sep. 16, 1987.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 10	262.75	MAR 24	262.97	MAY 13	265.53



## JOHNSON COUNTY

414107091322901. Local number, 79-6-4 AAAA1.

LOCATION.--Lat 41°41'07", long 91°32'29", Hydrologic Unit 07080209, at Forest View Trailer Court, northern edge of Iowa City. Owner: Forest View Trailer Court.

AQUIFER.--Silurian: in limestone of Silurian age.

WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 6 in., depth 280 ft, cased to 96 ft, open hole 96 to 280 ft.

INSTRUMENTATION.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 735 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple on plate welded to top of casing, 1.62 ft above land-surface datum.

REMARKS.--Water levels affected by wells in the area pumping in late spring, summer, and early fall.

Water-level recorder removed October 1986.

PERIOD OF RECORD.--May 1971 to current year.

REVISED RECORDS.--WDR IA-84-1.

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 96.93 ft below land-surface datum, Mar. 23, 1979; lowest recorded, 146.90 ft below land-surface datum, Jul. 1, 1988.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 5	128.91	JAN 4	110.23	APR 11	108.67	JUL 1	146.90
NOV 5	121.23	FEB 5	110.26	MAY 2	113.45	AUG 2	144.18
DEC 4	112.71	MAR 7	109.38	JUN 2	139.11	SEP 2	140.83

## JOHNSON COUNTY

413925091324001. Local number, 79-6-9 DDBC1.

LOCATION.--Lat 41°39'34", long 91°32'42", Hydrologic Unit 07080209, at the Quadrangle Dormitory, University of Iowa, Iowa City. Owner: University of Iowa.

AQUIFER.--Silurian: in dolomite of Silurian age.

WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 12 in., depth 430.5 ft, cased to 225 ft, open hole 225 to 430.5 ft.

INSTRUMENTATION.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 714 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple welded to plate on top of casing, 1.81 ft above land-surface datum.

REMARKS.--Water levels affected by nearby wells pumping in late spring, summer, and early fall.

PERIOD OF RECORD.--April 1975 to current year.

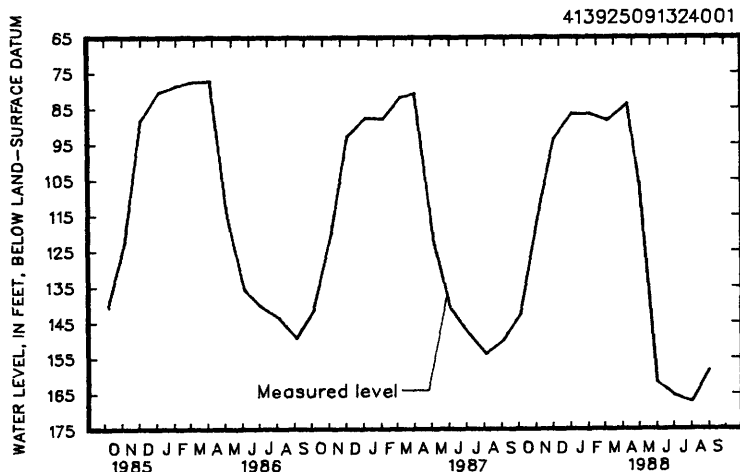
REVISED RECORDS.--WDR IA-84-1.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 74.63 ft below land-surface datum, Mar. 21, 1979; lowest measured, 167.63 ft below land-surface datum, Aug. 2, 1988.

REVISION.--Highest water level measured, 74.63 ft below land-surface datum, Mar. 21, 1979.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 5	142.72	JAN 4	86.71	APR 11	83.91	JUL 1	165.81
NOV 5	115.58	FEB 5	86.96	MAY 2	106.21	AUG 2	167.63
DEC 4	93.55	MAR 7	88.78	JUN 2	162.06	SEP 2	158.57



413955091320303. Local number, 79-6-10 BDBC3.

LOCATION.--Lat 41°39'58", long 91°32'06", Hydrologic Unit 07080209, at the Currier Hall Dormitory, University of Iowa, Iowa City. Owner: University of Iowa.

AQUIFER.--Silurian-Devonian: in dolomite of Devonian age and Silurian age.

WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 12 in., depth 425 ft, cased to 160 ft, open hole 160 to 425 ft.

INSTRUMENTATION.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 707 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple welded to plate on top of casing, 7.76 ft below land-surface datum.

REMARKS.--Water levels affected by nearby wells pumping in late spring, summer, and early fall.

PERIOD OF RECORD.--October 1971 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 62.12 ft below land-surface datum, Apr. 23, 1973; lowest measured, 168.40 ft below land-surface datum, Jul. 27, 1978.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 5	153.99	JAN 4	75.64	APR 11	73.85	JUL 1	165.83
NOV 5	93.88	FEB 5	75.89	MAY 2	112.06	AUG 2	165.48
DEC 4	80.64	MAR 7	75.51	JUN 2	159.23	SEP 2	165.78

## GROUND-WATER LEVELS

## JOHNSON COUNTY

413844091323201. Local number, 79-6-16 DDAD1.

LOCATION.--Lat 41°38'44", long 91°32'32", Hydrologic Unit 07080209, 1223 South Riverside Drive, Iowa City. Owner: Iowa City Community School District.

AQUIFER.--Silurian-Devonian: in limestone and dolomite of Devonian age and dolomite of Silurian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 6 in., depth 363 ft, cased to 66.5 ft, open hole 66.5 to 363 ft.

INSTRUMENTATION.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 652 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple welded to plate on top of casing, 2.12 ft above land-surface datum.

REMARKS.--Warehouse well. Water levels affected by wells in the area pumping in late spring, summer, and early fall. Main water, 214 to 215 ft, in the Silurian.

PERIOD OF RECORD.--April 1974 to current year.

REVISED RECORDS.--WDR IA-84-1.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 9.96 ft below land-surface datum, Apr. 11, 1979; lowest measured, 41.50 ft below land-surface datum, Jul. 1, 1988.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 5	27.08	JAN 4	14.81	APR 11	13.45	JUL 1	41.50
NOV 5	24.76	FEB 5	14.90	MAY 2	14.71	AUG 2	36.61
DEC 4	18.55	MAR 7	13.57	JUN 2	32.35	SEP 2	36.63

414458091260201. Local number, 80-5-9 DBBC1.

LOCATION.--Lat 41°44'58", long 91°26'02", Hydrologic Unit 07080209, in the southeast corner of the T junction of County Roads F8W and F36 in the Village of Morse. Owner: Mrs. Frank Miller.

AQUIFER.--Glacial drift: in material of Pleistocene age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1.25 in., depth 15 ft, cased to 13 ft, sand point 13 to 15 ft.

INSTRUMENTATION.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 762 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple welded to casing, 2.72 ft above land-surface datum.

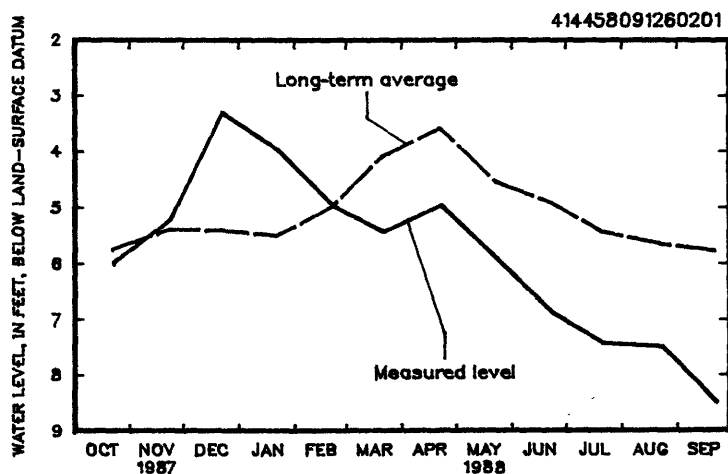
REMARKS.--Records for 1950 to September 1985 are available in the files of the Iowa District Office.

PERIOD OF RECORD.--August 1950 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 0.60 ft above land-surface datum, Mar. 14, 1953; lowest measured, 9.22 ft below land-surface datum, Sep. 8, 1955.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 22	6.00	JAN 22	4.00	APR 22	4.98	JUL 21	7.46
NOV 23	5.23	FEB 22	5.00	MAY 23	5.94	AUG 23	7.52
DEC 22	3.33	MAR 21	5.46	JUN 23	6.92	SEP 22	8.52



## JOHNSON COUNTY

414315091252001. Local number, 80-5-22 CBCB1.

LOCATION.--Lat 41°43'15", long 91°25'20", Hydrologic Unit 07080209, along the Chicago, Rock Island and Pacific Railroad track, southeast of the overpass on Rapid Creek Road over the track, approximately 5.5 mi northeast of the junction of Interstate 80 and Iowa Highway 1. Owner: Chicago, Rock Island and Pacific Railroad Co.

AQUIFER.--Glacial drift: in material of Pleistocene age.

WELL CHARACTERISTICS.--Drilled unused water-table well, diameter 2.25 in., depth 20 ft, cased to 18 ft, screened 18 to 20 ft.

INSTRUMENTATION.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 753 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple welded to casing, 4.47 ft above land-surface datum.

REMARKS.--At the site of the former Elmira depot.

PERIOD OF RECORD.--October 1941 to September 1956, January 1958 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 5.78 ft below land-surface datum, Sep. 20, 1977; lowest measured, dry, Dec. 2-31, 1955.

REVISIONS.--Lowest water level measured, dry, Nov. 10, 15, 20, 25, and 30, 1964, Dec. 5, 10, 15, 20, 25, and 31, 1964, Dec. 1 and 10, 1975, Oct. 21, 1976, Nov. 23, 1976, Dec. 17, 1976, Jan. 20, 1977, and Feb. 18, 1977.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 22	13.89	JAN 22	13.50	APR 22	12.78	JUL 21	13.20
NOV 23	14.17	FEB 22	13.18	MAY 23	12.72	AUG 23	13.72
DEC 22	13.98	MAR 21	13.13	JUN 23	12.91	SEP 22	14.22

414315091252002. Local number, 80-5-22 CBCB2.

LOCATION.--Lat 41°43'15", long 91°25'20", Hydrologic Unit 07080209, along the Chicago, Rock Island and Pacific Railroad track, southeast of the overpass on Rapid Creek Road over the track, approximately 5.5 mi northeast of the junction of Interstate 80 and Iowa Highway 1. Owner: Chicago, Rock Island and Pacific Railroad Co.

AQUIFER.--Cedar Valley: in limestone of Devonian age.

WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 5 in., depth 82 ft.

INSTRUMENTATION.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 753 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple welded to plate on top of casing, 4.01 ft above land-surface datum.

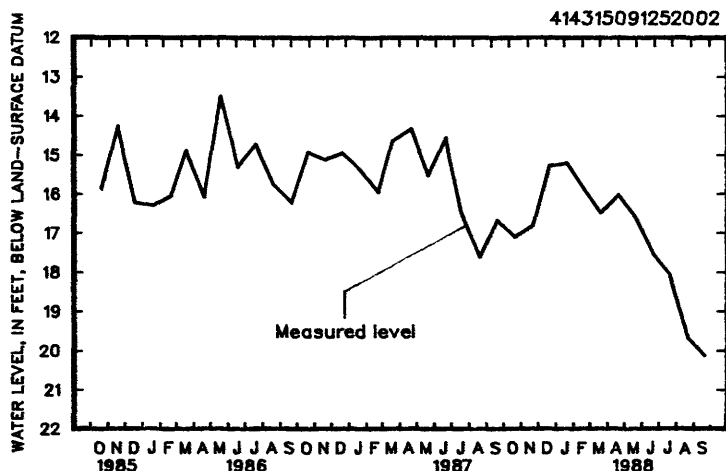
REMARKS.--Casing information not available. At the site of the former Elmira depot.

PERIOD OF RECORD.--December 1941 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 8.15 ft below land-surface datum, Apr. 21, 1952; lowest measured, 21.05 ft below land-surface datum, Sep. 26, 1957.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 22	17.09	JAN 22	15.18	APR 22	16.01	JUL 21	18.65
NOV 23	16.79	FEB 22	15.89	MAY 23	16.62	AUG 23	19.68
DEC 22	15.26	MAR 21	16.48	JUN 23	17.54	SEP 22	20.13



## GROUND-WATER LEVELS

## JOHNSON COUNTY

414853091425101. Local number, 81-7-19 BCBB1.

LOCATION.--Lat 41°48'53", long 91°42'51", Hydrologic Unit 07080208, approximately 0.75 mi west and 2.25 mi south of the Town of Swisher. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Silurian-Devonian: in dolomite of Silurian age and limestone of Devonian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 6 in., depth 535 ft, cased to 130 ft, open hole 130 to 535 ft.

INSTRUMENTATION.--Water-level recorder.

DATUM.--Elevation of land-surface datum is 745 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.50 ft above land-surface datum.

REMARKS.--Plum Creek well.

PERIOD OF RECORD.--November 1976 to current year.

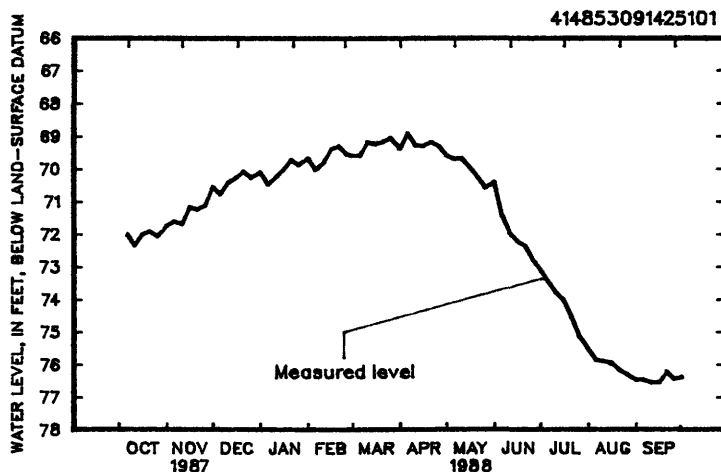
EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 64.46 ft below land-surface datum, May 31, 1983; lowest recorded, 76.64 ft below land-surface datum, Sep. 6, 1988.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
NOON VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	72.03	71.62	70.81	70.51	70.06	69.56	68.94	69.74	71.46	a73.50	a75.90	76.49
10	72.38	71.73	70.44	70.28	69.83	69.20	69.32	69.71	72.02	73.83	75.94	a76.60
15	72.03	71.19	70.30	70.05	69.42	69.28	69.34	69.99	72.26	74.06	75.98	76.59
20	71.93	71.28	70.10	69.74	69.32	69.19	69.20	70.29	a72.40	74.57	a76.20	76.26
25	72.10	71.14	70.30	69.91	69.58	69.08	69.34	70.61	72.83	75.16	76.34	76.48
EOB	71.77	70.57	70.13	69.69	69.63	69.41	69.63	70.94	73.14	75.56	76.51	76.41

WTR YEAR 1988 HIGHEST 68.88 MAR 12, 1988 LOWEST 76.64 SEP 6, 1988

a Recorded water level has been adjusted.



## JONES COUNTY

415808091160501. Local number, 83-4-25 CBBB1.

LOCATION.--Lat 41°58'08", long 91°16'05", Hydrologic Unit 07080103, 4 mi north of the Town of Mechanicsville and 1 mi west of County Road X-40. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Silurian: in dolomite of Silurian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 6 in. to 41 ft, 5 in. to 517 ft, depth 517 ft, cased to 41 ft, open hole 41 to 517 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 811 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple welded to plate on top of casing, 2.16 ft above land-surface datum.

REMARKS.--White Oak Creek well.

PERIOD OF RECORD.--July 1976 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 1.24 ft below land-surface datum, Apr. 3, 1979; lowest measured, 5.68 ft below land-surface datum, Sep. 12, 1988.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 13	2.86	MAR 10	3.14	JUN 7	3.74	SEP 12	5.68

## LEE COUNTY

403630091240801. Local number, 67-5-14 BAAD1.

LOCATION.--Lat 40°36'30", long 91°24'08", Hydrologic Unit 07080104, approximately 1 mi east of U.S. Highway 61 and 0.5 mi north of the Atchison, Topeka, and Santa Fe railroad tracks, approximately 1.4 mi west and 1.1 mi south of the City of Fort Madison. Owner: U.S. Geological Survey.

AQUIFER.--Alluvial: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Driven observation water-table well, diameter 1.25 in., depth 12 ft, cased to 10 ft, sand point 10 to 12 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 530 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple welded to casing, 3.55 ft above land-surface datum.

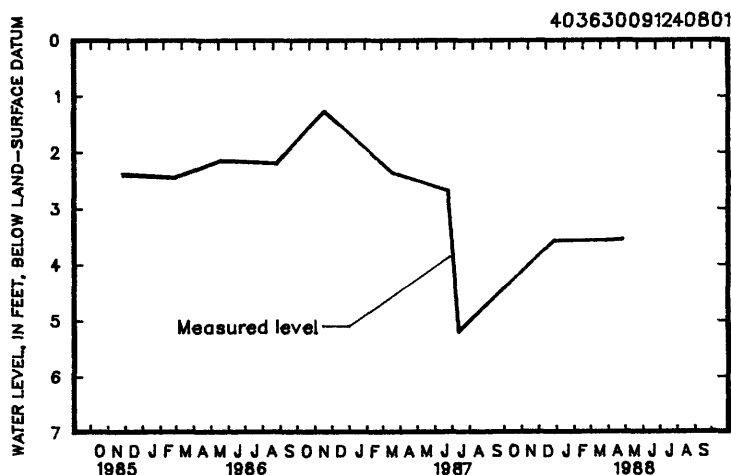
REMARKS.--Records for 1950 to 1981 and September 1985 are available in the files of the Iowa District Office.

PERIOD OF RECORD.--June 1950 to September 1981, September 1985 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 1.29 ft below land-surface datum, Nov. 19, 1986; lowest measured, 9.70 ft below land-surface datum, Jan. 29, 1953.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 30	3.59	MAR 30	3.58	APR 28	3.56



## LINN COUNTY

415534091251502. Local number, 82-5-10 CBAA2.

LOCATION.--Lat 41°55'26", long 91°25'11", Hydrologic Unit 07080206, next to the water tower, north of Main Street, 3 blocks west of Iowa Highway 1 in Mt. Vernon. Owner: City of Mt. Vernon.

AQUIFER.--Jordan: in strata of Cambrian and Ordovician age.

WELL CHARACTERISTICS.--Drilled unused municipal artesian water well, diameter 12 to 8 in., depth 1,557 ft, cased to 1,054 ft, open hole 1,054 to 1,557 ft.

INSTRUMENTATION.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 895 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple on plate welded to casing, 1.59 ft above land-surface datum.

REMARKS.--None.

PERIOD OF RECORD.--March 1987 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 329.96 ft below land-surface datum, Oct. 22, 1987; lowest measured, 336.61 ft below land-surface datum, Aug. 23, 1988.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 22	329.96	JAN 22	334.13	APR 22	334.58	JUL 21	335.80
NOV 23	333.82	FEB 22	333.61	MAY 23	334.84	AUG 23	336.61
DEC 22	334.09	MAR 21	334.74	JUN 23	335.38	SEP 22	335.63

## GROUND-WATER LEVELS

## LINN COUNTY

415422091422601. Local number, 82-7-18 CDCD1.

LOCATION.--Lat 41°54'22", long 91°42'26", Hydrologic Unit 07080205, on 76th Avenue SW, approximately 1.5 mi west of U.S. Highway 218, Cedar Rapids. Owner: Lester Petrak.

AQUIFER.--Glacial drift: in material of Pleistocene age.

WELL CHARACTERISTICS.--Dug unused water-table well, diameter 4 ft, depth 14 ft, cribbed with brick.

INSTRUMENTATION.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 835 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Base of recorder shelter, 0.25 ft above land-surface datum.

REMARKS.--Water-level recorder removed October 1987.

PERIOD OF RECORD.--July 1959 to current year.

REVISED RECORDS.--WDR IA-84-1.

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 1.09 ft below land-surface datum, Aug. 4, 1968; lowest recorded, 11.75 ft below land-surface datum, Feb. 8, 1977.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 22	8.49	JAN 22	4.89	APR 22	5.93	JUL 21	9.57
NOV 23	8.62	FEB 22	5.45	MAY 23	7.37	AUG 23	9.99
DEC 22	5.72	MAR 21	6.24	JUN 23	8.79	SEP 22	9.94

e Estimated.

415509091461801. Local number, 82-8-20 ACBB1.

LOCATION.--Lat 41°55'09", long 91°46'18", Hydrologic Unit 070802005, approximately 1.5 mi southwest of the Town of Fairfax, just northwest of Iowa Highway 149. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Silurian-Devonian: in limestone of Devonian age and dolomite of Silurian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 5 in., depth 569 ft, cased to 100.5 ft, open hole 100.5 to 569 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 842 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple welded to plate on top of casing, 2.39 ft above land-surface datum.

REMARKS.--Rock Pile well.

PERIOD OF RECORD.--March 1973 to current year.

REVISED RECORDS.--WDR IA-84-1.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 96.70 ft below land-surface datum, Jun. 21, 1974; lowest measured, 108.37 ft below land-surface datum, Jul. 22 and 23, 1977.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 13	104.02	MAR 10	102.44	JUN 7	106.05	SEP 12	107.86

415834091351601. Local number, 83-6-30 ABBA1.

LOCATION.--Lat 41°58'34", long 91°35'16", Hydrologic Unit 07080206, approximately 200 ft west of 5201 Mount Vernon Road SE, Cedar Rapids. Owner: B.L. Anderson.

AQUIFER.--Silurian-Devonian: in limestone of Devonian age and dolomite of Silurian age.

WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 6 in., depth 76.5 ft.

INSTRUMENTATION.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 755 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Hole in pump base, 0.50 ft above land-surface datum.

REMARKS.--Katz well. Casing information not available. Devonian rock reported to yield little, if any, water. Records for 1940 to September 1985 are available in the files of the Iowa District Office.

PERIOD OF RECORD.--May 1940 to current year.

EXTREMES OF PERIOD OF RECORD.--Highest water level measured, 41.93 ft below land-surface datum, Apr. 25, 1973; lowest measured, 53.90 ft below land-surface datum, Dec. 21, 1970.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 22	49.53	JAN 22	49.35	APR 22	49.63	JUL 21	49.82
NOV 23	49.79	FEB 22	49.23	MAY 23	49.95	AUG 23	51.14
DEC 22	49.57	MAR 21	49.65	JUN 23	50.45	SEP 22	51.23



## GROUND-WATER LEVELS

303

## LINN COUNTY

415816091393401. Local number, 83-7-28 ADDA1.

LOCATION.--Lat 41°58'16", long 91°39'34", Hydrologic Unit 07080205, 320 11th Avenue SE, Cedar Rapids.

Owner: Robert Chadima.

AQUIFER.--Silurian: in limestone of Silurian age.

WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 10 in., depth 420 ft, cased to 75 ft, open hole 75 to 420 ft.

INSTRUMENTATION.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 735 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of recorder platform, 2.95 ft below land-surface datum.

REMARKS.--Formerly The Kacena Co., Inc. Water-level recorder removed October 1987.

PERIOD OF RECORD.--January 1962 to current year.

REVISED RECORDS.--WDR IA-84-1.

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 51.10 ft below land-surface datum, Feb. 25, 1963; lowest recorded, 101.40 ft below land-surface datum, Jul. 27, 1981.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 22	91.13	JAN 22	85.30	MAY 23	84.88	AUG 23	89.86
NOV 23	89.45	FEB 22	83.72	JUN 23	86.35	SEP 22	91.65
DEC 22	86.99	APR 22	83.44	JUL 21	87.35		

415725091410101. Local number, 83-7-32 ACDC1.

LOCATION.--Lat 41°57'25", long 91°41'01", Hydrologic Unit 07080205, northwest corner of 22nd Avenue SW and 11th Street SW, Cedar Rapids. Owner: Floyd Fetter.

AQUIFER.--Silurian: in limestone of Silurian age.

WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 5 in., depth 282 ft.

INSTRUMENTATION.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 805 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Plug in well cover at land-surface datum.

REMARKS.--Casing information not available.

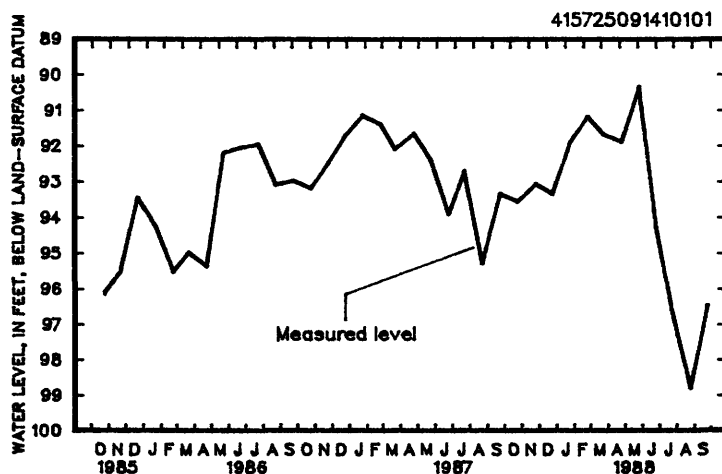
PERIOD OF RECORD.--July 1940 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 75.88 ft below land-surface datum, Jan. 26, 1942; lowest measured, 107.00 ft below land-surface datum, Sept. 16, 1976.

REVISION.--Highest water level measured, 75.88 ft below land-surface datum, Jan. 26, 1942.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 22	93.60	JAN 22	91.94	APR 22	91.93	JUL 21	96.66
NOV 23	93.09	FEB 22	91.21	MAY 23	90.38	AUG 23	98.83
DEC 22	93.38	MAR 21	91.72	JUN 23	94.34	SEP 22	96.49



## GROUND-WATER LEVELS

## LINN COUNTY

420526091370701. Local number, 84-7-13 BCBB1.

LOCATION.--Lat 42°05'26", long 91°37'07", Hydrologic Unit 07080206, approximately 0.25 mi south of the junction of County Roads W-58 and E-34, on the east side of the road, or approximately 3.75 mi north of the City of Marion. Owner: U.S. Geological Survey.

AQUIFER.--Glacial drift: in material of Pleistocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 1.25 in., depth 17 ft, cased to 15 ft, screened 15 to 17 ft.

INSTRUMENTATION.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 882 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple welded to casing, 1.24 ft above land-surface datum.

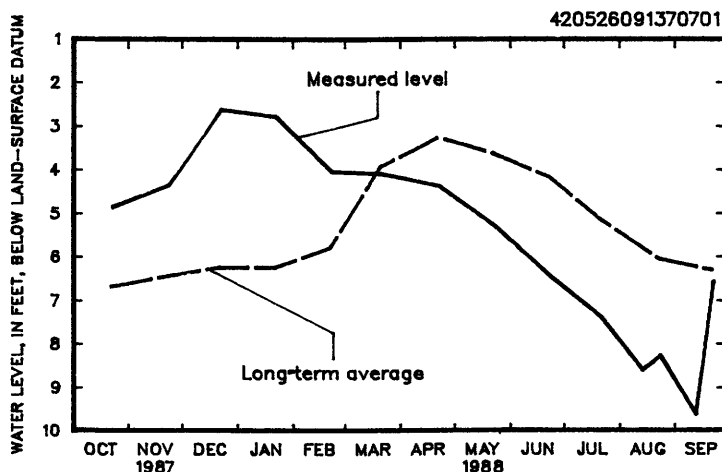
REMARKS.--None.

PERIOD OF RECORD.--September 1948 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 0.93 ft below land-surface datum, May 18, 1982; lowest measured, 15.19 ft below land-surface datum, Jan. 20, 1977.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 22	4.88	FEB 22	4.08	JUN 23	6.50	SEP 12	9.65
NOV 23	4.37	MAR 21	4.13	JUL 21	7.42	22	6.59
DEC 22	2.65	APR 22	4.41	AUG 13	8.63		
JAN 22	2.83	MAY 23	5.34	23	8.29		



421149091403301. Local number, 85-7-4 CCCC1.

LOCATION.--Lat 42°11'49", long 91°40'33", Hydrologic Unit 07080205, approximately 5 mi east of the Town of Center Point, north side of County Road E-16. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Silurian-Devonian: in dolomite of Silurian age and limestone of Devonian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 6 in., depth 435 ft, cased to 41 ft, 5 in. liner 129 to 147 ft, open hole 41 to 129 ft and 147 to 435 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 912 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple welded to plate on top of casing, 1.21 ft above land-surface datum.

REMARKS.--Alice well.

PERIOD OF RECORD.--July 1973 to current year.

REVISED RECORDS.--WDR IA-84-1.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 17.06 ft below land-surface datum, Jun. 10, 1974; lowest measured, 32.87 ft below land-surface datum, Mar. 23, 1977.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 13	26.79	MAR 10	27.03	JUN 7	28.92	SEP 12	31.59

## LYON COUNTY

431812096302701. Local number, 98-48-16 DDAD1.

LOCATION.--Lat 43°18'12", long 96°30'27", Hydrologic Unit 10170203, approximately 3.5 mi east of the City of Canton, S.D., south of U.S. Highway 18. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Early Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 358 ft, cased to 358 ft, perforated 335 to 355 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,268 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.00 ft above land-surface datum.

REMARKS.--Well D-20, Sioux quartzite from 353 to 358 ft.

PERIOD OF RECORD.--December 1978 to December 1980, May 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 91.89 ft below land-surface datum, Jul. 8, 1986; lowest measured, 97.56 ft below land-surface datum, Dec. 9, 1982.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 8	95.77	JAN 13	96.08	APR 12	95.58	JUL 19	96.26

432140095595301. Local number, 99-44-26 DDDD1.

LOCATION.--Lat 43°21'40", long 95°59'53", Hydrologic Unit 10170204, 1 mi north of the City of George, west of Iowa Highway 339. Owner: State of Iowa.

AQUIFER.--Glacial drift: in material of Pleistocene age.

WELL CHARACTERISTICS.--Drilled unused water-table well, diameter 20 in., depth 38 ft, lined with tile.

INSTRUMENTATION.--Intermittent measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,400 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Plug in well cover, 2.01 ft above land-surface datum.

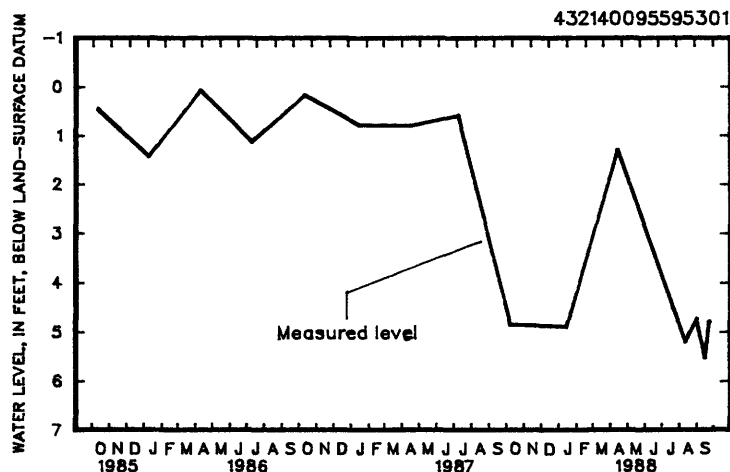
REMARKS.--None.

PERIOD OF RECORD.--October 1940 to June 1943, May 1947 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 0.41 ft above land-surface datum, May 9, 1979; lowest measured, 9.74 ft below land-surface datum, Oct. 24, 1940.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	
OCT 7	4.88	APR 12	1.32	AUG 10	5.22	SEP 14	5.55	
JAN 13	4.92	JUL 19	4.55		30	4.75	22	4.80



## GROUND-WATER LEVELS

## LYON COUNTY

432553096105701. Local number, 99-45-5 ABAC1.

LOCATION.--Lat 43°25'53", long 96°10'55", Hydrologic Unit 10170204, 0.05 mi south of Iowa Highway 9 on 2nd Street, Rock Rapids. Owner: City of Rock Rapids.

AQUIFER.--Dakota: in sandstone of Early Cretaceous age.

WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 10 in., depth 375 ft, cased to 296 ft, open hole 296 to 375 ft.

INSTRUMENTATION.--Intermittent measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,368 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Plug in cover over casing, 1.00 ft above land-surface datum.

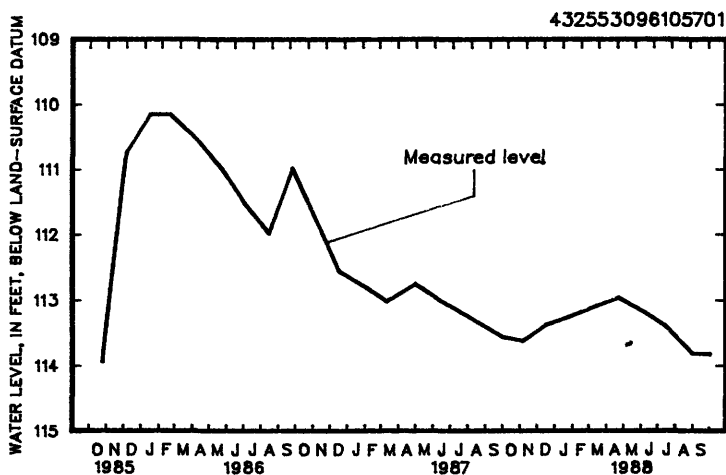
REMARKS.--City test well No. 3.

PERIOD OF RECORD.--August 1960 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 100.08 ft below land-surface datum, Jul. 27, 1964; lowest measured, 114.60 ft below land-surface datum, May 7, 1985.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 4	113.65	MAR 9	113.12	JUN 6	113.21	AUG 30	113.84
DEC 15	113.39	APR 21	112.98	JUL 12	113.41	SEP 30	113.85
JAN 25	113.27						



432601096335511. Local number, 100-48-31 CCCC11.

LOCATION.--Lat 43°26'01", long 96°33'55", Hydrologic Unit 10170203, 0.5 mi west and 2.5 mi south of the Village of Granite. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Early Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 657 ft, cased to 657 ft, perforated 450 to 455 ft and 630 to 650 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,417 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing at land-surface datum.

REMARKS.--Well D-19.

PERIOD OF RECORD.--December 1978 to December 1980, May 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 152.17 ft below land-surface datum, Oct. 9, 1986; lowest measured, 157.53 ft below land-surface datum, Aug. 12, 1982.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 8	154.76	JAN 13	155.17	APR 12	154.78	JUL 19	155.63

## MADISON COUNTY

411727093483001. Local number, 75-26-23 AAAC1.

LOCATION.--Lat 41°17'27", long 93°48'30", Hydrologic Unit 07100008, near the shelter house in the city park, St. Charles. Owner: City of St. Charles

AQUIFER.--Mississippian: in limestone of Mississippian age.

WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 8 in., depth 867 ft, cased to 657 ft, open hole 657 to 867 ft.

INSTRUMENTATION.--Intermittent measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,067 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Plug in well cover, 1.20 ft above land-surface datum.

REMARKS.--City well No. 1.

PERIOD OF RECORD.--November 1962 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 261.62 ft below land-surface datum, Nov. 20, 1962; lowest measured, 275.80 ft below land-surface datum, Mar. 31, 1987.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 27	273.56	MAR 17	273.85	JUL 6	274.13

## MARION COUNTY

411323093142601. Local number, 74-21-11 DBCC1.

LOCATION.--Lat 41°13'23", long 93°14'26", Hydrologic Unit 07100008, north of the water tower in the town square, Melcher. Owner: Town of Melcher.

AQUIFER.--Glacial drift: in material of Pleistocene age.

WELL CHARACTERISTICS.--Drilled unused water-table well, diameter 18 in., depth 12.2 ft, lined with tile.

INSTRUMENTATION.--Twice a month measurement with chalked tape by observer.

DATUM.--Elevation of land-surface datum is 948 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of tile casing at land-surface datum.

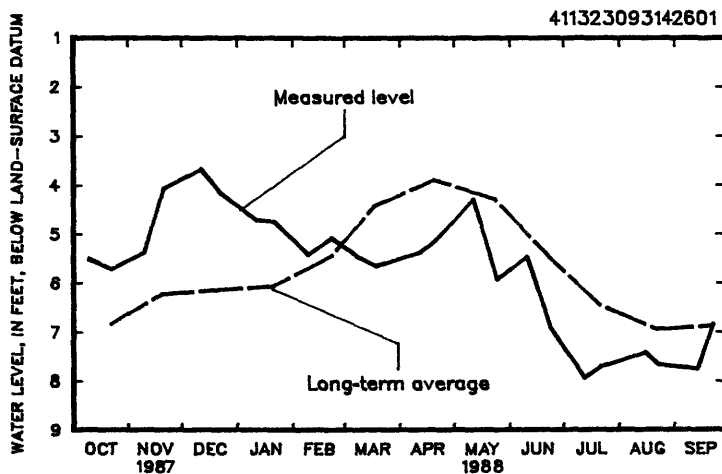
REMARKS.--Town well No. 2. Depth formerly 25 ft, re-measured in 1981.

PERIOD OF RECORD.--March 1950 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 0.30 ft below land-surface datum, May 23, 1966; lowest measured, 16.27 ft below land-surface datum, Oct. 22, 1953.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 9	5.53	JAN 11	4.75	APR 11	5.40	JUL 12	7.97
22	5.75	21	4.78	20	5.15	21	7.73
NOV 9	5.40	FEB 9	5.45	MAY 11	5.90	AUG 15	7.44
20	4.93	22	5.10	24	5.96	22	7.70
DEC 11	3.70	MAR 7	5.48	JUN 10	6.20	SEP 13	7.79
22	4.20	18	5.69	23	6.95	22	6.86



## GROUND-WATER LEVELS

## MARION COUNTY

411329093142902. Local number, 74-21-11 DBBB2.

LOCATION.--Lat 41°13'29", long 93°14'29", Hydrologic Unit 07100008, southeast corner of the T junction of North B Street and Main Street, Melcher. Owner: Town of Melcher.

AQUIFER.--Glacial drift: in sand and gravel of Pleistocene age.

WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 6 in., depth 119 ft, cased to 76 ft, open hole 76 to 119 ft.

INSTRUMENTATION.--Twice a month measurement with chalked tape by observer.

DATUM.--Elevation of land-surface datum is 943 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple welded to plate on top of casing, 1.82 ft above land-surface datum.

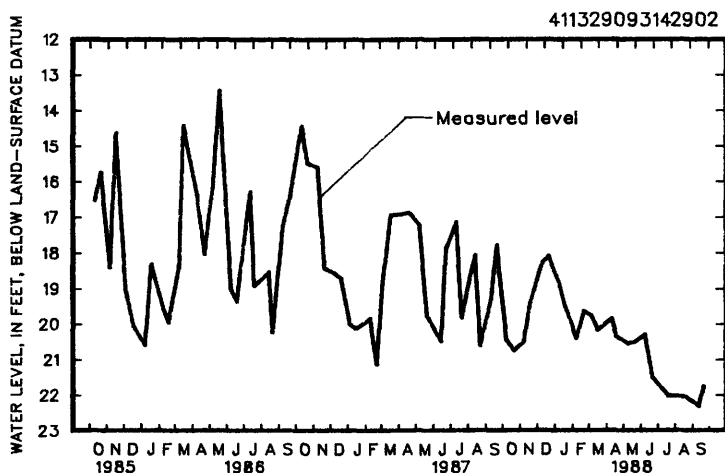
REMARKS.--Sand and gravel 103 to 117 ft. Pennsylvanian shale 117 to 119 ft. Records for 1945 to 1955 and 1976 to September 1985 are available in the files of the Iowa District Office. Town well No. 3, well 11K1.

PERIOD OF RECORD.--July 1945 to December 1955, October 1976 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 13.43 ft below land-surface datum, May 21, 1986; lowest measured (nearby well pumping), 108.85 ft below land-surface datum, Dec. 4, 6-7, 1949.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 9	20.45	JAN 11	18.90	APR 11	19.83	JUL 12	21.88
22	20.75	21	19.53	20	20.36	21	22.03
NOV 9	20.48	FEB 9	20.41	MAY 11	20.56	AUG 15	22.04
20	19.38	22	19.63	24	20.48	22	22.06
DEC 11	18.26	MAR 7	19.78	JUN 10	20.28	SEP 13	22.32
22	18.08	18	20.18	23	21.52	22	21.73



411328093143503. Local number, 74-21-11 CAAD3.

LOCATION.--Lat 41°13'28", long 93°14'35", Hydrologic Unit 07100008, northeast corner of the junction of West 1st Street and North A Street, Melcher. Owner: Town of Melcher.

AQUIFER.--Glacial drift: in sand of Pleistocene age.

WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 1.25 in., depth 96.5 ft, cased to 80 ft, screen 80 to 82 ft, open hole 82 to 96.5 ft.

INSTRUMENTATION.--Twice a month measurement with chalked tape by observer.

DATUM.--Elevation of land-surface datum is 944 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple welded to casing, 0.51 ft above land-surface datum.

REMARKS.--Town well No. 5, well 11L1. Records for 1956 to September 1985 are available in the files of the Iowa District Office.

PERIOD OF RECORD.--January 1956 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 10.55 ft below land-surface datum, May 21, 1986; lowest measured (nearby well pumping), 55.22 ft below land-surface datum, Jan. 26, 1956.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 9	11.46	JAN 11	11.02	APR 11	11.65	JUL 12	12.44
22	11.64	21	11.06	20	11.65	21	13.09
NOV 9	11.79	FEB 9	11.46	MAY 11	11.95	AUG 15	13.37
20	11.69	22	11.41	24	12.05	22	13.35
DEC 11	11.54	MAR 7	11.51	JUN 10	12.29	SEP 13	13.35
22	11.59	18	11.67	23	12.52	22	13.35

## MARSHALL COUNTY

420355092534701. Local number, 84-18-24 CDCA1.

LOCATION.--Lat 42°03'55", long 92°53'47", Hydrologic Unit 07080208, east of Riverview Park and south of the sewage treatment plant, Marshalltown. Owner: City of Marshalltown.

AQUIFER.--Glacial drift: in sand and gravel of Pleistocene age.

WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 8 in., depth 200 ft, cased to 190 ft, screened 190 to 200 ft.

INSTRUMENTATION.--Quarterly measurement with electric line by USGS personnel.

DATUM.--Elevation of land-surface datum is 871 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing at land-surface datum.

REMARKS.--None.

PERIOD OF RECORD.--May 1949 to August 1971, March 1973 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 4.92 ft below land-surface datum, Jul. 13, 1951; lowest measured, 54.95 ft below land-surface datum, May 8, 1981.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
MAR 22	34.71	JUN 23	41.76	SEP 14	28.12

## MONTGOMERY COUNTY

405841095012701. Local number, 71-36-6 DADA1.

LOCATION.--Lat 40°58'41", long 95°01'27", Hydrologic Unit 10240009, east of Viking Lake in Viking Lake State Park, or approximately 4 mi east of the town of Stanton and 0.25 mi south of U.S. Highway 34, Owner: State of Iowa.

AQUIFER.--Glacial drift: in material of Pleistocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 1.25 in., depth 38 ft, cased to 36 ft, screened 36 to 38 ft.

INSTRUMENTATION.--Intermittent measurement with chalked tape by USGS personnel or observer.

DATUM.--Elevation of land-surface datum is 1,081 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.95 ft above land-surface datum.

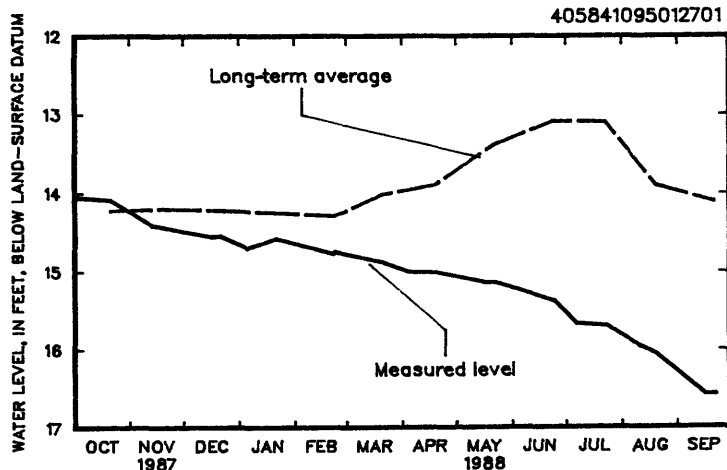
REMARKS.--Formerly the Templeton well.

PERIOD OF RECORD.--April 1950 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 2.52 ft below land-surface datum, May 31, 1951; lowest measured (pumping), 30.99 ft below land-surface datum, Apr. 26, 1950.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 1	14.07	JAN 5	14.72	APR 20	15.03	AUG 10	15.98
21	14.11	21	14.59	16	15.16	16	16.04
NOV 13	14.43	FEB 22	14.79	22	15.16	20	16.09
20	14.46	23	14.76	JUN 24	15.40	16	16.60
DEC 16	14.58	MAR 21	14.90	JUL 6	15.69	20	16.60
21	14.56	APR 4	15.02	23	15.72		



## GROUND-WATER LEVELS

## MONTGOMERY COUNTY

410057095075101. Local number, 72-37-29 BABA1.

LOCATION.--Lat 41°00'57", long 95°07'51", Hydrologic Unit 10240005, approximately 4.35 mi east of the City of Red Oak, just south of County Road H-34. Owner: John Ogden.

AQUIFER.--Glacial drift: in material of Pleistocene age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 3 in., depth 40 ft, cased to 40 ft, perforated.

INSTRUMENTATION.--Intermittent measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,275 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.00 ft above land-surface datum.

REMARKS.--Interval of perforation not available. Records for 1937 to September 1985 are available in the files of the Iowa District Office.

PERIOD OF RECORD.--June 1937 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 2.94 ft below land-surface datum, Jun. 20, 1984; lowest measured, dry, Jul. 8, 1963 and Feb. 3, 1964.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 1	7.10	JAN 5	15.07	MAY 16	18.13	SEP 20	21.07
NOV 13	13.03	FEB 22	16.41	JUL 6	19.03		
DEC 16	14.60	APR 4	17.51	AUG 10	19.80		

## MUSCATINE COUNTY

412120091080401. Local number, 76-2-30 CBAA1.

LOCATION.--Lat 41°21'20", long 91°08'04", Hydrologic Unit 07080101, west of the Town of Fruitland on an Iowa State University Agricultural Experiment Farm. Owner: U.S. Geological Survey.

AQUIFER.--Alluvial: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 6 in., depth 27 ft, cased to 24 ft, screened 24 to 27 ft.

INSTRUMENTATION.--Intermittent measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 546 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Base of recorder shelter, 3.70 ft above land-surface datum.

REMARKS.--Water-level recorder removed October 1987.

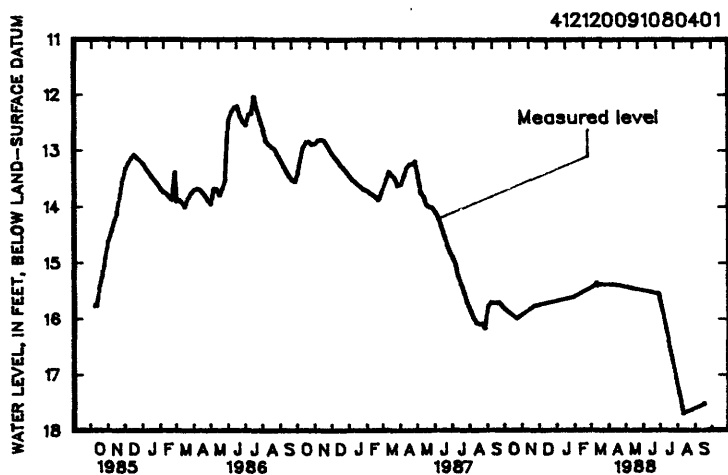
PERIOD OF RECORD.--May 1966 to current year.

REVISED RECORDS.--WDR IA-84-1.

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 8.51 ft below land-surface datum, May 16, 1973; lowest measured, 17.72 ft below land-surface datum, Aug. 9, 1988.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 20	16.02	MAR 9	15.40	MAY 10	15.48	AUG 9	17.72
NOV 20	15.78	APR 8	15.40	JUN 27	15.58	SEP 15	17.54
JAN 29	15.62						





## O'BRIEN COUNTY

425610095250611. Local number, 94-39-26 BADB11.

LOCATION.--Lat 42°56'10", long 95°25'06", Hydrologic Unit 10230003, near a dead-end road just south of the Little Sioux River, 0.9 mi north of Iowa Highway 10, approximately 5 mi southeast of the Town of Sutherland. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Early Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2.50 in., depth 329 ft, cased to 329 ft, perforated 291 to 295 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape or electric line by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,212 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing at land-surface datum.

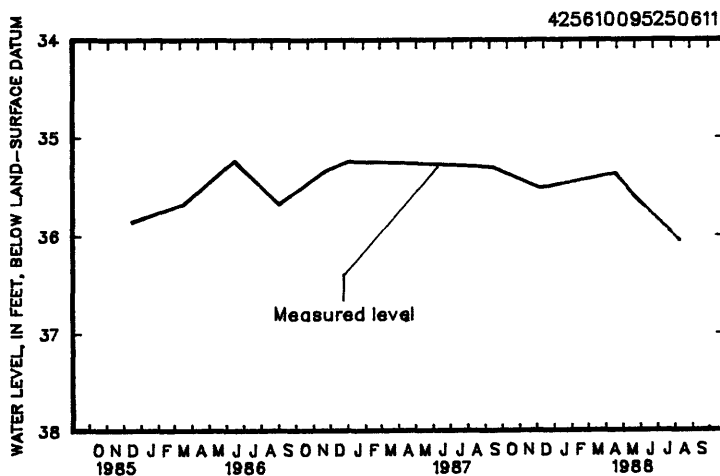
REMARKS.--Well D-3.

PERIOD OF RECORD.--April 1980 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 35.25 ft below land-surface datum, Jun. 8, 1986 and Jan. 6, 1987; lowest measured, 36.85 ft below land-surface datum, Dec. 15, 1980.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 9	35.53	APR 20	35.38	MAY 25	35.63	AUG 12	36.07



## O'BRIEN COUNTY

425808095480311. Local number, 94-42-9 DDDD11.

LOCATION.--Lat 42°58'08", long 95°48'03", Hydrologic Unit 10230003, west of Iowa Highway 143, 1 mi west and 1 mi north of the Village of Germantown. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Early Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 638 ft, cased to 638 ft, perforated 516 to 536 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,440 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 4.00 ft above land-surface datum.

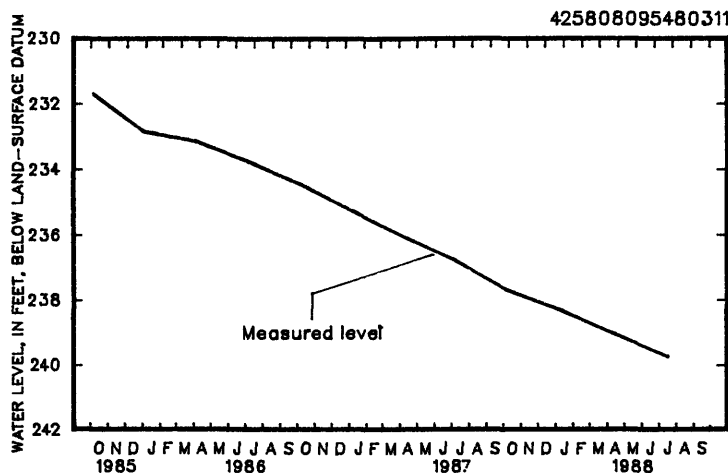
REMARKS.--Well D-42.

PERIOD OF RECORD.--July 1980 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 215.09 ft below land-surface datum, May 6, 1982; lowest measured, 260.64 ft below land-surface datum, July 10, 1980.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 8	237.72	JAN 13	238.35	APR 12	239.05	JUL 20	239.78



## O'BRIEN COUNTY

430930095350401. Local number, 96-40-5 DDDA1.

LOCATION.--Lat 43°09'30", long 95°35'04", Hydrologic Unit 10230003, approximately 3 mi east of the Town of Sanborn and 2 mi south of U.S. Highway 18. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota and Ordovician: in sandstone of Early Cretaceous age and sandy shale of Ordovician age. WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 701 ft, cased to 701 ft, perforated 661 to 701 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,560 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 4.00 ft above land-surface datum.

REMARKS.--Well D-41.

PERIOD OF RECORD.--June 1980 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 358.39 ft below land-surface datum, Jul. 8, 1986; lowest measured, 361.40 ft below land-surface datum, Jul. 16, 1980.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
JAN 13	359.90	APR 12	359.69	JUL 20	360.00

## OSCEOLA COUNTY

431620095250501. Local number, 98-39-26 CDAD1.

LOCATION.--Lat 43°16'20", long 95°25'05", Hydrologic Unit 10230003, 3.5 mi south and 2.5 mi east of the Village of May City. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--St. Peter: in sandstone of Middle Ordovician age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 662 ft, cased to 662 ft, perforated 622 to 662 ft.

INSTRUMENTATION.--Intermittent measurement with chalked tape by observer or electric line by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,402 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of low pipe, 1.47 ft above land-surface datum.

REMARKS.--Well D-38 Deep Hibbing.

PERIOD OF RECORD.--June 1980 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 197.68 ft below land-surface datum, May 8, 1984; lowest measured, 199.52 ft below land-surface datum, Aug. 5, 1980.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 23	197.91	MAY 24	198.23	AUG 26	198.72	AUG 29	199.01
APR 10	198.11	JUN 15	198.13				

431620095250511. Local number, 98-39-26 CDAD11.

LOCATION.--Lat 43°16'20", long 95°25'05", Hydrologic Unit 10230003, 3.5 mi south and 2.5 mi east of the Village of May City. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Early Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 345 ft, cased to 345 ft, perforated 335 to 345 ft.

INSTRUMENTATION.--Intermittent measurement with chalked tape by observer or electric line by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,402 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of high pipe, 2.60 ft above land-surface datum.

REMARKS.--Well D-38 Shallow Hibbing.

PERIOD OF RECORD.--June 1980 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 192.20 ft below land-surface datum, Sep. 10, 1981; lowest measured, 194.11 ft below land-surface datum, Jul. 25, 1982.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 23	193.75	JUN 15	194.00	AUG 26	193.85	AUG 29	193.86
MAY 24	193.80						

## GROUND-WATER LEVELS

## OSCEOLA COUNTY

431613095251801. Local number, 98-39-26 CDCC1.

LOCATION.--Lat 43°16'13", long 95°25'18", Hydrologic Unit 10230003, 3.5 mi south and 2.5 mi east of the Village of May City. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Early Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 500 ft, cased to 500 ft, perforated 490 to 500 ft.

INSTRUMENTATION.--Intermittent measurement with chalked tape by observer or electric line by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,398 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.70 ft above land-surface datum.

REMARKS.--Well D-39.

PERIOD OF RECORD.--June 1980 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 189.99 ft below land-surface datum, Jun. 17, 1980; lowest measured, 196.85 ft (nearby well pumping) below land-surface datum, Sep. 6, 1984.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 23	191.22	MAY 24	191.10	AUG 26	191.88	AUG 29	192.14
APR 19	191.14	JUN 15	191.44				

431620095482402. Local number, 98-42-33 AAB2.

LOCATION.--Lat 43°16'20", long 95°48'24", Hydrologic Unit 10170204, approximately 2.75 mi south of the Town of Ashton, west of Iowa Highway 60, near the Chicago and Northwestern Railroad tracks. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Early Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 400 ft, cased to 400 ft, perforated 385 to 395 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,440 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.80 ft above land-surface datum.

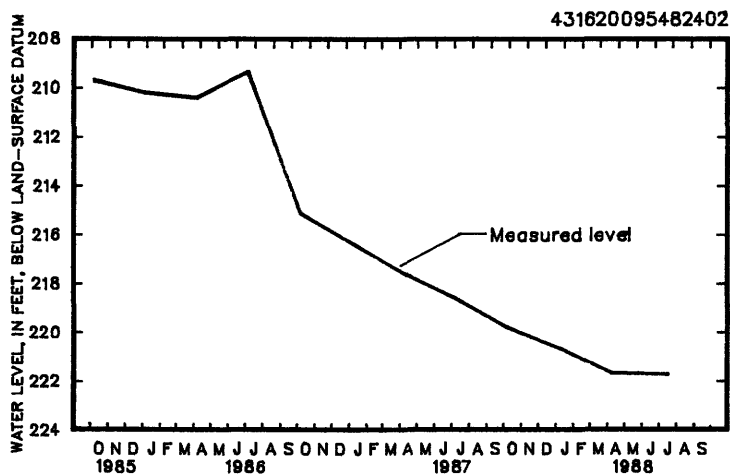
REMARKS.--Well D-40.

PERIOD OF RECORD.--May 1980 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 195.87 ft below land-surface datum, June 1, 1983; lowest measured, 221.78 ft below land-surface datum, Jul. 20, 1988.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 8	219.84	JAN 13	220.75	APR 12	221.73	JUL 20	221.78



## OSCEOLA COUNTY

432828095283611. Local number, 100-39-17 DCCB11.

LOCATION.--Lat 43°28'28", long 95°28'36", Hydrologic Unit 10230003, approximately 2 mi west and 2 mi north of the Town of Harris, east of County Road M-12. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Early Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 5 in. to 461 ft, 4 in. to 760 ft, depth 760 ft, cased to 760 ft, perforated 680 to 700 ft.

INSTRUMENTATION.--Quarterly measurement with electric line by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,560 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.00 ft above land-surface datum.

REMARKS.--Well D-13.

PERIOD OF RECORD.--July 1980 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 341.80 ft below land-surface datum, Aug. 5, 1980; lowest measured, 344.54 ft below land-surface datum, May 24, 1988.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 8	344.37	APR 19	344.48	MAY 24	344.54	AUG 17	344.12

## PAGE COUNTY

404257095150801. Local number, 68-38-7 CCAA1.

LOCATION.--Lat 40°42'57", long 95°15'08", Hydrologic Unit 10240005, approximately 2 mi south of the Village of Norwich and 1.5 mi west of County Road M-48. Owner: William Brayman.

AQUIFER.--Glacial drift: in material of Pleistocene age.

WELL CHARACTERISTICS.--Drilled unused water-table well, diameter 12 in., depth 44 ft, lined with tile.

INSTRUMENTATION.--Intermittent measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,087 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of pipe inserted through board cover, 1.00 ft above land-surface datum.

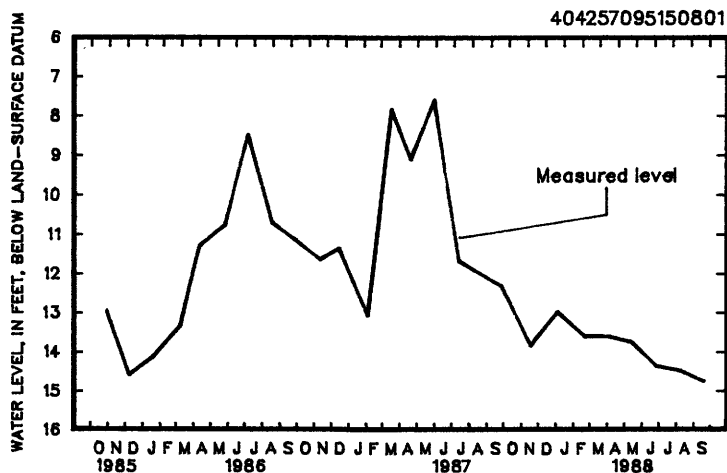
REMARKS.--None.

PERIOD OF RECORD.--May 1934 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 2.09 ft below land-surface datum, Mar. 26, 1946; lowest measured, 22.76 ft below land-surface datum, Jun. 23, 1947.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 20	13.86	FEB 24	13.63	MAY 17	13.79	AUG 12	14.52
JAN 7	13.00	APR 6	13.64	JUN 30	14.40	SEP 22	14.78



## GROUND-WATER LEVELS

## PLYMOUTH COUNTY

424850096074801. Local number, 92-45-2 CBCB1.

LOCATION.--Lat 42°48'50", long 96°07'48", Hydrologic Unit 10230002, approximately 3.8 mi west and 0.6 mi south of the Village of Oyens. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Cambrian-Ordovician: in dolomite of Cambrian and Ordovician age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 5 in. to 161 ft, 4 in. to 598 2 in. to 1,340 ft, depth 1,340 ft, cased to 598 ft, open hole 598 to 1,340 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,245 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.80 ft above land-surface datum.

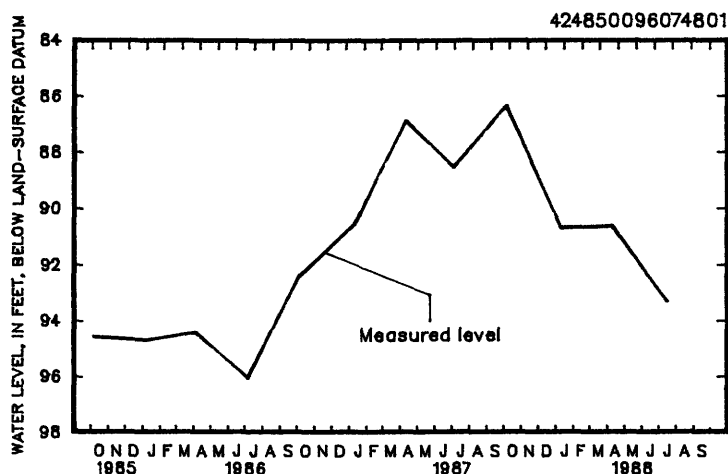
REMARKS.--Well D-21. Well deepened from 1,089 to 1,340 ft, May 1984. Penetrates the Precambrian.

PERIOD OF RECORD.--May 1979 to January 1981, May 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 86.38 ft below land-surface datum, Oct. 8, 1987; lowest measured, 102.10 ft below land-surface datum, Aug. 6, 1980.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 8	86.38	JAN 13	90.73	APR 12	90.65	JUL 19	93.35



424833096324701. Local number, 92-48-6 DDDA1.

LOCATION.--Lat 42°48'33", long 96°32'47", Hydrologic Unit 10170203, just south of the curve on Iowa Highway 3, 1 mi south of the Town of Akron. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Early Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 4 in. to 184 ft, 2 in. to 581 ft, depth 581 ft, cased to 576 ft, perforated 430 to 434 ft and 510 to 515 ft, open hole 576 to 581 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,282 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 4.80 ft above land-surface datum.

REMARKS.--Well D-35. 5 feet of Paleozoic rock open 576 to 581 ft.

PERIOD OF RECORD.--December 1979 to December 1980, May 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 137.35 ft below land-surface datum, Apr. 22, 1987; lowest measured, 159.82 ft below land-surface datum, Aug. 6, 1980.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 1	138.09	FEB 17	138.35	APR 27	138.26	JUL 21	138.63

## PLYMOUTH COUNTY

425249096125001. Local number, 93-46-12 DDDD1.

LOCATION.--Lat 42°52'49", long 96°12'50", Hydrologic Unit 10230002, 1 mi west and 1 mi south of the Village of Struble. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Early Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2.50 in., depth 570 ft, cased to 570 ft, perforated 356 to 360 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,280 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of coupling, 4.80 ft above land-surface datum.

REMARKS.--Well D-2.

PERIOD OF RECORD.--March 1980 to December 1980, May 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 117.78 ft below land-surface datum, Apr. 9, 1980; lowest measured, 122.00 ft below land-surface datum, Mar. 27, 1980.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 8	120.55	JAN 13	119.78	APR 12	119.75	JUL 19	121.78

## POTTAWATTAMIE COUNTY

411246095502001. Local number, 74-43-18 BCCC1.

LOCATION.--Lat 41°12'46", long 95°50'20", Hydrologic Unit 10230006, approximately 0.4 mi east of Lake Manawa in Manawa State Park, 1.4 mi south of Interstate 80, south of the City of Council Bluffs. Owner: U.S. Geological Survey.

AQUIFER.--Alluvial: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1.25 in., depth 16 ft, cased to 14 ft, sand point 14 to 16 ft.

INSTRUMENTATION.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 975 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 0.25 ft above land-surface datum.

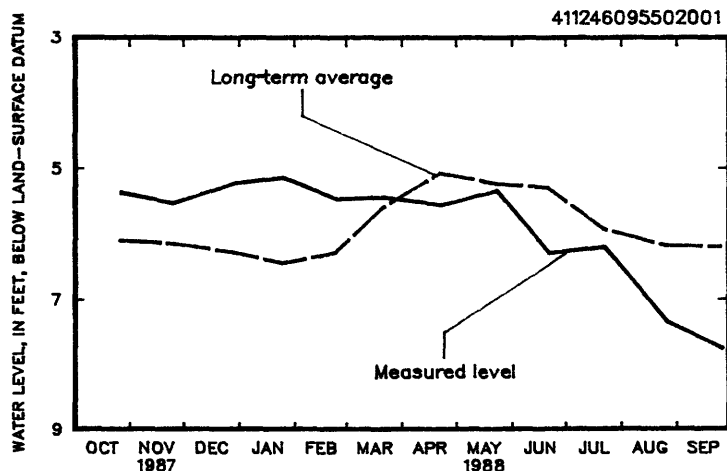
REMARKS.--Records from 1950 to September 1985 are available in the files of the Iowa District Office.

PERIOD OF RECORD.--November 1950 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 0.45 ft below land-surface datum, May 2, 1951; lowest measured, 11.86 ft below land-surface datum, Jun. 26, 1956.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 26	5.39	JAN 25	5.16	APR 22	5.59	JUL 22	6.22
NOV 24	5.56	FEB 24	5.50	MAY 23	5.36	AUG 26	7.37
DEC 29	5.24	MAR 21	5.46	JUN 21	6.32	SEP 26	7.78



## GROUND-WATER LEVELS

## SAC COUNTY

422500095084801. Local number, 88-37-22 CCCC1.

LOCATION.--Lat 42°25'00", long 95°08'48", Hydrologic Unit 10230007, approximately 3 mi south of the Town of Early or 0.5 mi south of the junction of U.S. Highways 20 and 71. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota and Pennsylvanian: in sandstone of Early Cretaceous age and limestone of Pennsylvanian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 435 ft, cased to 435 ft, perforated 417 to 435 ft.

INSTRUMENTATION.--Quarterly measurement with electric line or chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,320 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.50 ft above land-surface datum.

REMARKS.--Well D-16.

PERIOD OF RECORD.--December 1978 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 163.93 ft below land-surface datum, May 12, 1984; lowest measured, 165.40 ft below land-surface datum, Dec. 16, 1980.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 10	164.37	APR 20	164.17	MAY 26	164.50	SEP 13	164.81

423013095175301. Local number, 89-38-26 ABAA1.

LOCATION.--Lat 42°30'13", long 95°17'53", Hydrologic Unit 10230005, northern part of the Town of Schaller. Owner: Town of Schaller.

AQUIFER.--Dakota: in sandstone of Early Cretaceous age.

WELL CHARACTERISTICS.--Drilled public-emergency-supply artesian water well, diameter 10 to 8 in., depth 352 ft, cased to 352 ft, perforated 304 to 352 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,376 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Edge of pump breather pipe, 1.80 ft above land-surface datum.

REMARKS.--None.

PERIOD OF RECORD.--October 1940 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 210.04 ft below land-surface datum, Mar. 25, 1948; lowest non-pumping measured, 240.10 ft below land-surface datum, May 24, 1977.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 10	232.57	APR 20	232.09	MAY 25	230.62

422850095171501. Local number, 89-38-36 CBCC1.

LOCATION.--Lat 42°28'50", long 95°17'15", Hydrologic Unit 10230005, just east of Iowa Highway 110, 0.75 mi south of the Town of Schaller and 0.25 mi north of U.S. Highway 20. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Early Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 521 ft, cased to 512 ft, perforated 410 to 430 ft, open hole 512 to 521 ft.

INSTRUMENTATION.--Quarterly measurement with electric line by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,445 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 4.00 ft above land-surface datum.

REMARKS.--Well D-17. 9 ft of Paleozoic rock open.

PERIOD OF RECORD.--December 1978 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 288.05 ft below land-surface datum, Jun. 2, 1980; lowest measured, 291.90 ft below land-surface datum, Sep. 18, 1987 and May 26, 1988.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 10	291.65	APR 20	291.32	MAY 26	291.90	SEP 13	291.66



## SCOTT COUNTY

413544090212901. Local number, 78-5E-3 AADA1.

LOCATION.--Lat 41°35'44", long 90°21'29", Hydrologic Unit 07080101, at the Bridgeview Elementary School, corner of 12th and Davenport Streets, Le Claire. Owner: City of Le Claire.

AQUIFER.--Jordan: in strata of Cambrian and Ordovician age.

WELL CHARACTERISTICS.--Drilled unused municipal artesian water well, diameter 16 to 12 in., depth 1,607 ft, cased to 1,128 ft, open hole 1,128 to 1,607 ft.

INSTRUMENTATION.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 703 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple on plate welded to casing, 2.11 ft above land-surface datum.

REMARKS.--Water-level recorder removed December 4, 1984. Well no. 3.

PERIOD OF RECORD.--July 1975 to current year.

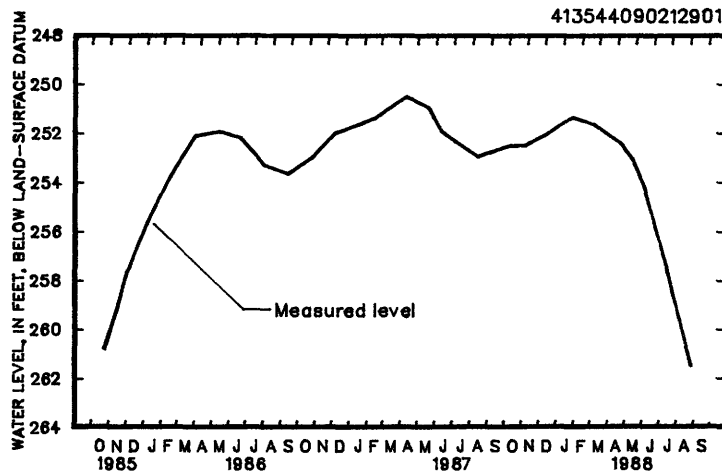
REVISED RECORDS.--WRD 1A-84-1.

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 247.46 ft below land-surface datum, Jul. 8, 1975; lowest recorded, 275.26 ft below land-surface datum, Oct. 7 and 11, 1981.

REVISION.--Lowest water level recorded, 275.26 ft below land-surface datum, Oct. 7 and 11, 1981.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 15	252.52	FEB 1	251.39	MAY 16	253.11	AUG 29	261.56
NOV 9	252.54	MAR 10	251.71	JUN 6	254.25		
DEC 14	252.12	APR 25	252.46	JUL 18	257.70		



## SIOUX COUNTY

430140095573101. Local number, 95-43-7 AAAA1.

LOCATION.--Lat 43°04'10", long 95°57'32", Hydrologic Unit 10230002, just south of County Road B-40, 1 mi east of the Village of Newkirk. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Early Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 681 ft, cased to 681 ft, perforated 641 to 681 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,390 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.70 ft above land-surface datum.

REMARKS.--Well D-43. Paleozoic rock from 674 to 681 ft.

PERIOD OF RECORD.--July 1980 to December 1980, May 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 213.66 ft below land-surface datum, Mar. 13, 1984; lowest measured, 218.24 ft below land-surface datum, Oct. 8, 1987.

REVISION.--Highest water level measured, 213.66 ft below land-surface datum, Mar. 13, 1984.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 8	218.24	JAN 13	216.17	APR 12	215.20	JUL 20	216.92

## GROUND-WATER LEVELS

## SIOUX COUNTY

430913096033201. Local number, 96-44-8 ADAA1.

LOCATION.--Lat 43°09'13", long 96°03'32", Hydrologic Unit 10230002, west side of County Road K-64, approximately 2.5 mi west of the Town of Boyden and approximately 2.2 mi south of U.S. Highway 18.  
 Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Early Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 682 ft, cased to 682 ft, perforated 647 to 667 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,373 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.70 ft above land-surface datum.

REMARKS.--Well D-44. One ft of Paleozoic rock penetrated.

PERIOD OF RECORD.--August 1980 to December 1980, May 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 187.85 ft below land-surface datum, Oct. 16, 1984; lowest measured, 194.88 ft below land-surface datum, Jul. 20, 1988.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 8	194.08	JAN 13	189.22	APR 12	193.67	JUL 20	194.88

## WASHINGTON COUNTY

411300091320701. Local number, 74-6-15 BDAC1.

LOCATION.--Lat 41°13'00", long 91°32'07", Hydrologic Unit 07080107, in the water treatment plant, beneath the water tower in Crawfordsville. Owner: Town of Crawfordsville.

AQUIFER.--Mississippian: in dolomite of Mississippian age.

WELL CHARACTERISTICS.--Drilled unused municipal artesian water well, diameter 6.5 in., depth 215 ft, cased to 132 ft, open hole 132 to 215 ft.

INSTRUMENTATION.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 725 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple on plate welded to casing, 1.10 ft above land-surface datum.

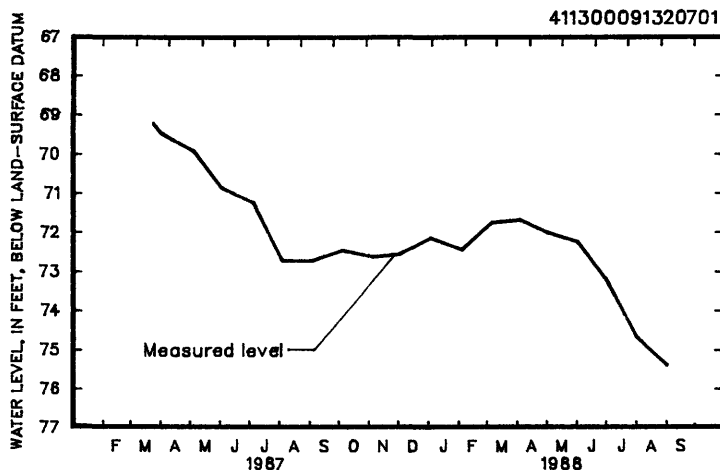
REMARKS.--Water level for Sep. 13, 1983, 72.69 ft below land-surface datum.

PERIOD OF RECORD.--September 1983, March 1987 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 69.23 ft below land-surface datum, Mar. 25, 1987; lowest measured, 75.40 ft below land-surface datum, Sep. 2, 1988.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 5	72.45	JAN 4	72.14	APR 4	71.66	JUL 1	73.19
NOV 5	72.62	FEB 5	72.44	MAY 2	72.00	AUG 2	74.69
DEC 4	72.54	MAR 7	71.73	JUN 2	72.24	SEP 2	75.40



## WASHINGTON COUNTY

411244091323501. Local number, 74-6-15 CBDD1.

LOCATION.--Lat 41°12'41", long 91°32'19", Hydrologic Unit 07080107, just west of U.S. Highway 218, approximately 0.4 mi southeast of the water tower in Crawfordsville. Owner: Town of Crawfordsville.

AQUIFER.--Mississippian: in dolomite of Mississippian age.

WELL CHARACTERISTICS.--Drilled unused municipal artesian water well, diameter 8 in., depth 217 ft, cased to 142 ft, open hole 142 to 217 ft.

INSTRUMENTATION.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 725 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple on plate welded to casing, 1.67 ft above land-surface datum.

REMARKS.--Water level for Sep. 13, 1983, 75.46 ft below land-surface datum.

PERIOD OF RECORD.--September 1983, March 1987 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 71.62 ft below land-surface datum, Mar. 25, 1987; lowest measured, 77.98 ft below land-surface datum, Sep. 2, 1988.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 5	74.80	JAN 4	74.57	APR 4	73.87	JUL 1	75.91
NOV 5	75.03	FEB 5	74.62	MAY 2	74.26	AUG 2	77.49
DEC 4	74.93	MAR 7	73.98	JUN 2	74.65	SEP 2	77.98

421829091304701. Local number, 75-6-14 ABBB1.

LOCATION.--Lat 41°18'27", long 91°30'47", Hydrologic Unit 07080209, 1 mi north and 1.5 mi east of the junction of U.S. Highway 218 and Iowa Highway 92. Owner: Mrs. David Armstrong.

AQUIFER.--Glacial drift: in material of Pleistocene age.

WELL CHARACTERISTICS.--Bored unused water-table well, diameter 12 in., depth 45 ft, lined with tile.

INSTRUMENTATION.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 745 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple welded to barrel, 4.08 ft above land-surface datum.

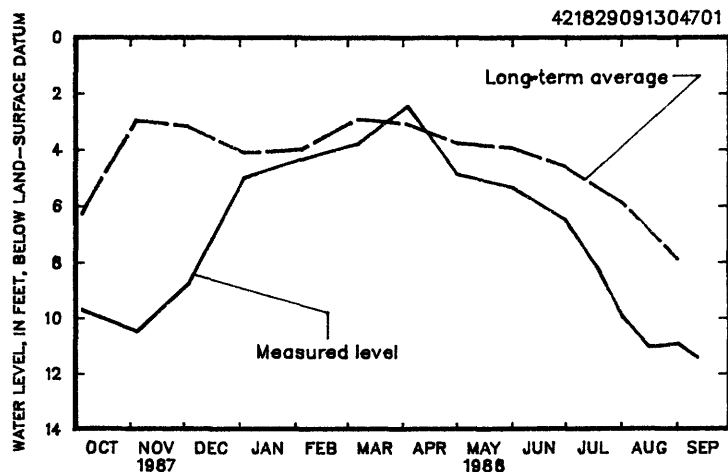
REMARKS.--None.

PERIOD OF RECORD.--December 1983 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 1.53 ft below land-surface datum, May 23, 1984; lowest measured, 11.49 ft below land-surface datum, Sep. 13, 1988.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 5	9.76	FEB 5	4.37	JUN 2	5.41	AUG 17	11.09
NOV 5	10.52	MAR 7	3.82	JUL 1	6.54	SEP 2	10.97
DEC 4	8.77	APR 4	2.49	19	8.23	13	11.49
JAN 4	5.02	MAY 2	4.94	AUG 2	10.02		



## WASHINGTON COUNTY

412037091564701. Local number, 76-9-31 CBBC1.

LOCATION.--Lat 41°20'37", long 91°56'47", Hydrologic Unit 07080107, at Pepper Quarry on County Road V-15, 1 mi south of the City of Keota. Owner: River Products Co.

AQUIFER.--Mississippian: in limestone of Mississippian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 5 in., depth 136 ft, cased to 19 ft, open hole 19 to 136 ft.

INSTRUMENTATION.--Water-level recorder.

DATUM.--Elevation of land-surface datum is 745 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.88 ft above land-surface datum.

REMARKS.--Water levels affected by quarrying operations.

PERIOD OF RECORD.--August 1979 to current year.

REVISED RECORDS.--WDR IA-84-1.

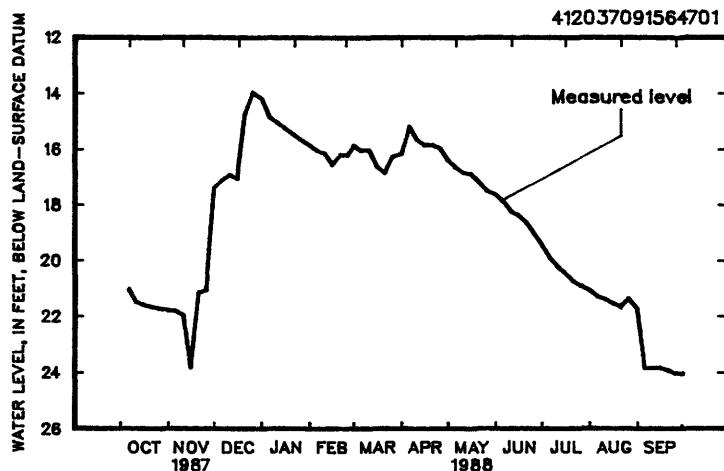
EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 9.38 ft below land-surface datum, Mar. 4, 1985; lowest recorded, 24.11 ft below land-surface datum, Sep. 26 and 27, 1988.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
NOON VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	21.07	21.86	17.14	a14.90	a16.10	16.10	15.23	a16.70	a17.95	19.94	a21.35	a23.90
10	21.54	22.02	16.95	a15.10	a16.20	16.06	15.72	a16.90	a18.30	20.26	a21.45	a23.90
15	21.65	23.87	17.10	a15.30	a16.60	16.66	15.91	a16.95	a18.45	20.51	a21.60	23.87
20	21.72	21.20	a14.75	a15.50	16.22	16.90	15.88	a17.25	a18.70	20.79	a21.70	23.98
25	21.78	21.10	14.00	a15.70	16.27	16.31	16.02	a17.55	a19.10	20.96	a21.40	24.09
EOM	21.85	17.40	14.25	a15.90	15.90	16.19	16.44	a17.70	a19.50	21.13	a21.80	a24.10

WTR YEAR 1988 HIGHEST 13.35 DEC 24, 1987 LOWEST 24.11 SEP 26 AND 27, 1988

a Recorded water level has been adjusted.



## WASHINGTON COUNTY

412750091495201. Local number, 77-9-24 AADA1.

LOCATION.--Lat 41°27'54", long 91°49'47", Hydrologic Unit 07080209, north of the city sewage treatment plant and west of First Avenue SE, Wellman. Owner: City of Wellman.

AQUIFER.--Mississippian: in dolomite of Mississippian age.

WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 8 in., depth 110 ft, cased to 47 ft, open hole 47 to 110 ft.

INSTRUMENTATION.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 695 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple on plate welded to casing, 1.87 ft above land-surface datum.

REMARKS.--City test well No. 1.

PERIOD OF RECORD.--May 1963 to October 1971, May 1973 to current year.

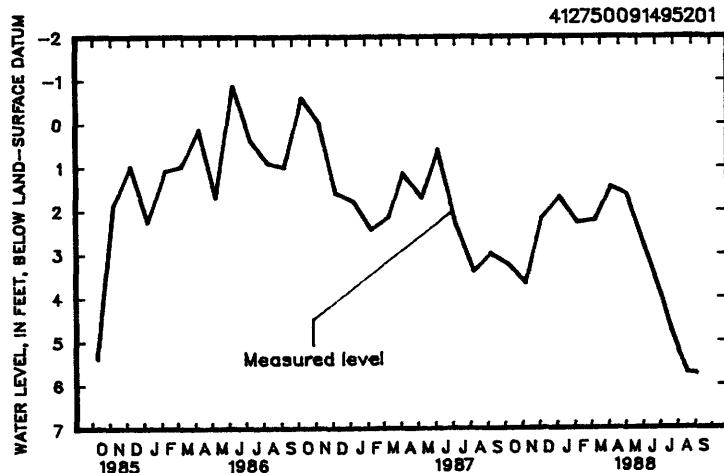
REVISED RECORDS.--WDR IA-84-1.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 1.35 ft above land-surface datum, Nov. 3, 1977, Mar. 28, 1979, and Apr. 13, 1983; lowest measured, 6.80 ft below land-surface datum, Oct. 20, 1964.

REVISION.--Lowest water level measured, 6.80 ft below land-surface datum, Oct. 20, 1964.

## WATER LEVEL, IN FEET BELOW LAND SURFACE-DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 5	3.28	FEB 5	2.31	JUN 2	2.87	AUG 17	5.77
NOV 5	3.70	MAR 7	2.25	JUL 1	3.98	SEP 2	5.80
DEC 4	2.20	APR 4	1.48	19	4.79		
JAN 4	1.71	MAY 2	1.67	AUG 2	5.30		



## WEBSTER COUNTY

421550094041001. Local number, 86-28-14 ADAB1.

LOCATION.--Lat 42°15'50", long 94°04'10", Hydrologic Unit 07100004, in the town water plant, next to the water tower, Dayton. Owner: Town of Dayton.

AQUIFER.--Devonian and Mississippian: in limestone of Devonian and Mississippian age.

WELL CHARACTERISTICS.--Drilled municipal artesian water well, diameter 13 to 10 in., depth 1,240 ft, cased to 505 ft, 8 in. liner 770 to 966 ft, open hole 505 to 770 ft and 966 to 1,240 ft.

INSTRUMENTATION.--Intermittent measurement with airline by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,121 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Pump base, 0.80 ft above land-surface datum.

REMARKS.--Town well No. 2. Water levels affected by pumping.

PERIOD OF RECORD.--September 1942 to December 1948, January 1952 to November 1971, March 1974 to current year.

REVISIONS.--WRD IA-85-1.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 69.93 ft below land-surface datum, Nov. 17, 1942; lowest measured, 153.20 ft below land-surface datum, Feb. 10, 1987.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL
JUL 6	125.20	SEP 20	128.20

## GROUND-WATER LEVELS

## WEBSTER COUNTY

421837094083601. Local number, 87-28-29 CCCD1.

LOCATION.--Lat 42°18'37", long 94°08'36", Hydrologic Unit 07100006, 3 mi north and 2 mi east of the Town of Harcourt. Owner: Ransom Helms.

AQUIFER.--Glacial drift: in material of Pleistocene age.

WELL CHARACTERISTICS.--Drilled unused water-table well, diameter 12 in., depth 42 ft, lined with tile.

INSTRUMENTATION.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,165 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 0.75 ft above land-surface datum.

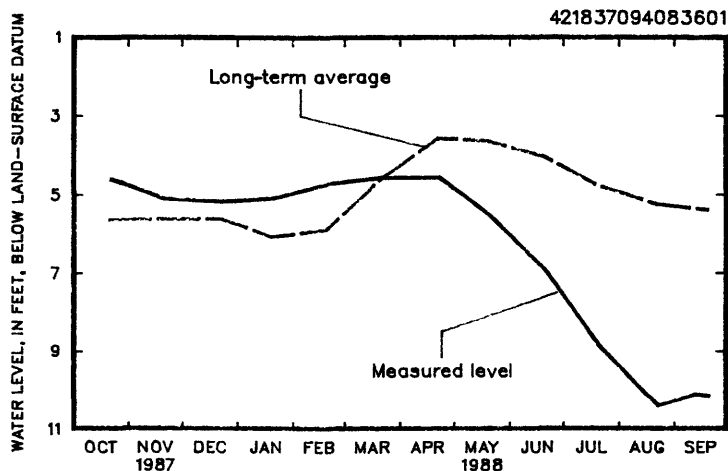
REMARKS.--None.

PERIOD OF RECORD.--October 1942 to June 1956, March 1958 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 0.05 ft below land-surface datum, Aug. 1, 1972; lowest measured, 13.62 ft below land-surface datum, Mar. 12, 1956.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 21	4.63	FEB 20	4.75	JUN 20	6.97	AUG 19	10.29
NOV 20	5.14	MAR 21	4.60	JUL 15	8.57	22	10.44
DEC 23	5.22	APR 22	4.59	20	8.89	SEP 12	10.14
JAN 20	5.11	MAY 20	5.57	AUG 15	10.13	20	10.20



## WEBSTER COUNTY

423018094214701. Local number, 89-30-23 CCBB1.

LOCATION.--Lat 42°30'18", long 94°21'47", Hydrologic Unit 07100004, 75 ft west of the new school addition, Barnum. Owner: Johnson Township Consolidated School.

AQUIFER.--Dakota: in sandstone of Early Cretaceous age.

WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 4 in., reported depth 208 ft, cased to 208 ft, perforated 203-208 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,174 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing at land-surface datum.

REMARKS.--None.

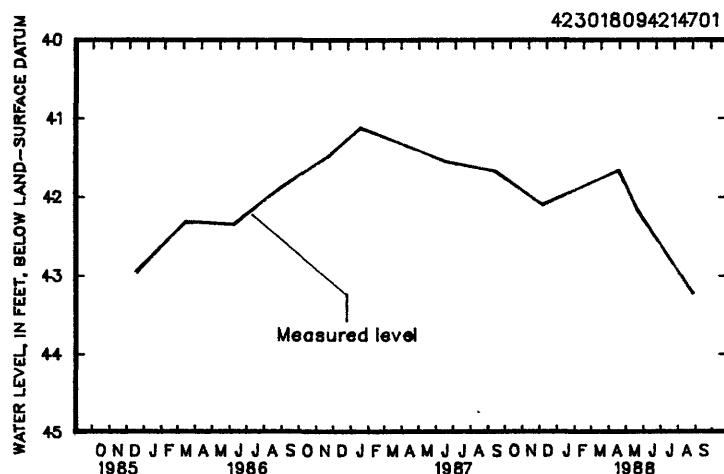
PERIOD OF RECORD.--October 1942 to September 1945, May 1947 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 30.36 ft below land-surface datum, Oct. 21, 1942; lowest measured, 45.85 ft below land-surface datum, Jul. 28, 1980.

REVISIONS.--Highest water level measured, 30.36 ft below land-surface datum, Oct. 21, 1942; lowest measured, 45.85 ft below land-surface datum, Jul. 28, 1980.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 8	42.11	APR 20	41.67	MAY 24	42.19	AUG 29	43.24



## WOODBURY COUNTY

422058095573701. Local number, 87-44-15 CBBB1.

LOCATION.--Lat 42°20'58", long 95°57'37", Hydrologic Unit 10230003, approximately 3.5 mi west and 5.5 mi north of the Village of Oto. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Early Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 197 ft, cased to 197 ft, perforated 185 to 189 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,165 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.50 ft above land-surface datum.

REMARKS.--Well D-34.

PERIOD OF RECORD.--April 1980 to December 1980, May 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 54.21 ft below land-surface datum, Jan. 11, 1988; lowest measured, 63.56 ft below land-surface datum, Nov. 2, 1982.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 7	55.46	JAN 11	54.21	APR 11	55.79	JUL 18	56.46

422830096000511. Local number, 88-44-6 BAAB11.

LOCATION.--Lat 42°28'30", long 96°00'05", Hydrologic Unit 10230004, approximately 3 mi east and 0.5 mi south of the Town of Merville. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Early Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 337 ft, cased to 337 ft, perforated 332 to 337 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,340 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.50 ft above land-surface datum.

REMARKS.--Well D-33.

PERIOD OF RECORD.--October 1979 to December 1980, May 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 199.09 ft below land-surface datum, Apr. 13, 1987; lowest measured, 202.90 ft below land-surface datum, Oct. 17, 1979.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

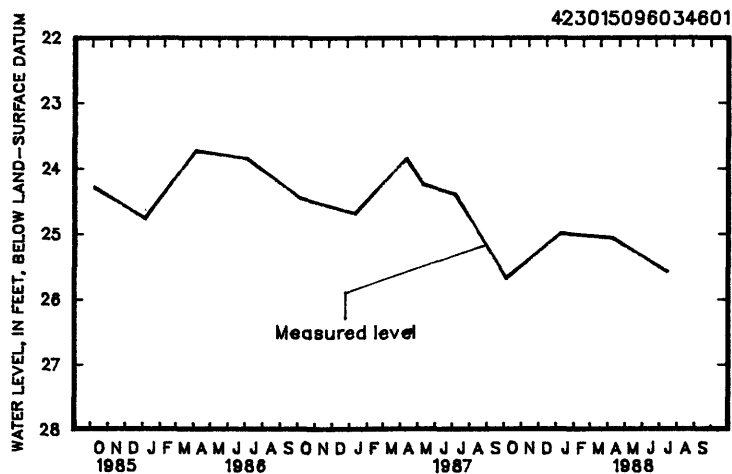
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 7	199.89	JAN 11	199.31	APR 11	199.69	JUL 18	199.70

WOODBURY COUNTY

423015096034601. Local number, 89-44-20 DCDC1.  
LOCATION.--Lat 42°30'15", long 96°03'46", Hydrologic Unit 10230004, east of Iowa Highway 140, approximately 1 mi north of the Town of Merville. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.  
AQUIFER.--Dakota: in sandstone of Early Cretaceous age.  
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 221 ft, cased to 221 ft, perforated 206 to 221 ft.  
INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.  
DATUM.--Elevation of land-surface datum is 1,168 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 4.00 ft above land-surface datum.  
REMARKS.--Well D-32.  
PERIOD OF RECORD.--October 1979 to December 1980, May 1982 to current year.  
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 22.64 ft below land-surface datum, Aug. 8, 1984; lowest measured, 26.65 ft below land-surface datum, Dec. 11, 1980.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE		WATER LEVEL	DATE		WATER LEVEL	DATE		WATER LEVEL	DATE		WATER LEVEL
OCT	7	25.69	JAN	11	25.00	APR	11	25.08	JUL	18	25.60



422910096135811. Local number, 89-46-36 BBDC11.  
LOCATION.--Lat 42°29'10", long 96°13'58", Hydrologic Unit 10230004, approximately 0.75 mi northeast of the Eberly Cemetery or 2.5 mi west and 0.75 mi north of the Village of Lawton. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.  
AQUIFER.--Dakota: in sandstone of Early Cretaceous age.  
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 500 ft, cased to 500 ft, perforated 358 to 362 ft.  
INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.  
DATUM.--Elevation of land-surface datum is 1,268 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.00 ft above land-surface datum.  
REMARKS.--Well D-30.  
PERIOD OF RECORD.--April 1980 to December 1980, May 1982 to current year.  
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 128.32 ft below land-surface datum, Jul. 8, 1987; lowest measured, 135.35 ft below land-surface datum, Nov. 2, 1982.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE		WATER LEVEL	DATE		WATER LEVEL	DATE		WATER LEVEL	DATE		WATER LEVEL
OCT	7	128.97	JAN	11	129.28	APR	11	129.40	JUL	18	130.00



## GROUND-WATER-QUALITY DATA

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DATE	TIME	GEOLOGIC UNIT	FLOW RATE (G/M) (00058)	PUMPING PERIOD PRIOR TO SAM- PLING (MIN) (72004)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)
No. 1	412852094275101	77-31W-07CAAB	1977	MENLO 3		Quaternary		20 feet	Adair County		
APR 1988											
13...	1330	111ALVM	6.0	300	14.0	475	7.47	200	65	9.4	16
JUL											
19...	1315	111ALVM	--	30	12.5	400	7.60	--	--	--	--
SEP											
27...	0900	111ALVM	9.0	60	13.0	480	7.52	--	--	--	--
No. 2	405631094560802	71-35W-20AACA	1978	NODAWAY 3		Quaternary		36 feet	Adams County		
OCT 1987											
20...	1115	112PLSC	--	--	12.0	585	6.80	280	76	23	11
No. 3	410115094362201	72-33W-23DBAA	1981	PRESCOTT 2		Quaternary		40 feet	Adams County		
OCT 1987											
20...	1400	111ALVM	--	--	13.0	750	6.90	290	80	21	28
No. 4	413537094532701	78-35W-04BCBD	1969	EXIRA 11		Quaternary		60 feet	Audubon County		
APR 1988											
12...	1530	111ENRV	140	20	9.0	690	7.35	310	88	21	12
JUL											
19...	1430	111ENRV	--	20	18.0	728	7.30	--	--	--	--
SEP											
26...	1600	111ENRV	150	20	17.0	620	6.97	--	--	--	--
No. 5	422457092125101	88-12W-23CDB	1951	GILBERTVILLE 1		Devonian		200 feet	Black Hawk County		
AUG 1988											
08...	1200	340DVNN	35	20	12.0	410	7.79	200	57	15	4.4
No. 6	422805092165901	88-12W-06ACAA	1958	EVANS DALE 3		Devonian		145 feet	Black Hawk County		
AUG 1988											
08...	1400	344WPPC	475	15	12.0	680	7.28	300	87	20	16
No. 7	423042092265801	89-14W-24BBAA	1961	CEDAR FALLS 5		Devonian		125 feet	Black Hawk County		
JUN 1988											
01...	0800	344CDVL	2400	120	12.0	560	7.45	280	81	19	12
JUL											
13...	1440	344CDVL	2300	15	17.0	595	7.52	--	--	--	--
SEP											
26...	1015	344CDVL	2400	25	12.5	590	7.58	--	--	--	--
No. 8	420215094083201	84-28W-32CCAC	1954	BEAVER 1		Quaternary		100 feet	Boone County		
AUG 1988											
16...	1130	112PLSC	25	15	18.0	945	7.50	330	80	31	77
No. 9	420447093560701	84-27W-13DDBC	1979	BOONE 23		Quaternary		54 feet	Boone County		
AUG 1988											
16...	1330	111ALVM	415	150	21.0	765	7.50	320	82	28	31
No. 10	423902092272502	91-14W-35DA	1984	JANESVILLE 3		Silurian		150 feet	Bremer County		
JUN 1988											
01...	0930	350SLRN	--	60	12.0	440	7.62	240	66	19	3.7
JUL											
13...	1320	350SLRN	100	960	21.0	500	7.61	--	--	--	--
SEP											
26...	1345	350SLRN	95	30	12.0	520	7.28	--	--	--	--

## GROUND-WATER-QUALITY DATA

DATE	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY LAB (MG/L AS CAC03) (90410)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	PHOS- PHOROUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)
No. 1 412852094275101 77-31W-07CAAB 1977 MENLO 3							Quaternary	20 feet	Adair County	
APR 1988										
13...	0.70	185	12	30	0.25	24	274	4.40	<0.100	0.200
JUL 19...	--	--	--	--	--	--	--	3.30	<0.100	<0.100
SEP 27...	--	--	--	--	--	--	--	2.70	<0.100	0.200
No. 2 405631094560802 71-35W-20AACA 1978 NODAWAY 3							Quaternary	36 feet	Adams County	
OCT 1987										
20...	2.0	156	18	110	0.25	--	354	0.800	<0.100	0.400
No. 3 410115094362201 72-33W-23DBAA 1981 PRESCOTT 2							Quaternary	40 feet	Adams County	
OCT 1987										
20...	3.7	152	49	150	0.30	--	482	<0.100	0.800	0.700
No. 4 413537094532701 78-35W-04BCBD 1969 EXIRA 11							Quaternary	60 feet	Audubon County	
APR 1988										
12...	4.2	225	24	86	0.25	17	406	4.90	<0.100	<0.100
JUL 19...	--	--	--	--	--	--	--	1.60	<0.100	<0.100
SEP 26...	--	--	--	--	--	--	--	1.30	<0.100	<0.100
No. 5 422457092125101 88-12W-23CDB 1951 GILBERTVILLE 1							Devonian	200 feet	Black Hawk County	
AUG 1988										
08...	0.90	153	9.5	40	0.40	16	250	3.20	<0.100	0.300
No. 6 422805092165901 88-12W-06ACAA 1958 EVANS DALE 3							Devonian	145 feet	Black Hawk County	
AUG 1988										
08...	2.6	226	30	76	0.40	12	398	<0.100	0.100	0.200
No. 7 423042092265801 89-14W-24BBAA 1961 CEDAR FALLS 5							Devonian	125 feet	Black Hawk County	
JUN 1988										
01...	2.2	222	25	38	0.20	9.6	338	4.70	<0.100	<0.100
JUL 13...	--	--	--	--	--	--	--	5.00	<0.100	<0.100
SEP 26...	--	--	--	--	--	--	--	4.20	<0.100	<0.100
No. 8 420215094083201 84-28W-32CCAC 1954 BEAVER 1							Quaternary	100 feet	Boone County	
AUG 1988										
16...	4.9	502	7.5	12	0.30	39	556	<0.100	2.30	0.200
No. 9 420447093560701 84-27W-13DDBC 1979 BOONE 23							Quaternary	54 feet	Boone County	
AUG 1988										
16...	4.7	226	37	93	0.45	24	438	0.600	<0.100	0.200
No. 10 423902092272502 91-14W-35DA 1984 JANESVILLE 3							Silurian	150 feet	Bremer County	
JUN 1988										
01...	0.90	193	8.5	20	0.15	7.6	262	8.50	<0.100	<0.100
JUL 13...	--	--	--	--	--	--	--	8.60	<0.100	<0.100
SEP 26...	--	--	--	--	--	--	--	8.50	<0.100	<0.100

## 329

[illegible]

## GROUND-WATER-QUALITY DATA

DATE	TIME	GEOLOGIC UNIT	FLOW RATE (G/M) (00058)	PUMPING PERIOD PRIOR TO SAM- PLING (MIN) (72004)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)
No. 11	424319092283401	91-14W-03CABB	1967	WAVERLY	5		Devonian	170 feet	Bremer County		
MAY 1988											
31...	1500	340DVSL	1540	60	11.0	540	7.40	290	79	22	8.6
JUL											
13...	1200	340DVSL	1600	15	16.0	560	7.33	--	--	--	--
SEP											
26...	1135	340DVSL	1500	60	17.0	626	7.47	--	--	--	--
No. 12	423710091540001	90-09W-10CBA	1953	HAZLETON	1		Silurian	65 feet	Buchanan County		
JUN 1988											
01...	1430	350SLRN	145	20	12.0	500	7.41	260	66	24	3.9
JUL											
07...	1320	350SLRN	150	15	15.0	530	7.28	--	--	--	--
SEP											
27...	0835	350SLRN	150	20	11.0	498	7.40	--	--	--	--
No. 13	424708094570801	92-35W-14BCCC	1949	ALBERT CITY	1		Quaternary	190 feet	Buena Vista County		
AUG 1988											
10...	1030	112PLSC	150	30	11.5	1340	7.35	630	170	49	60
No. 14	424239092350001	91-15W-11ACBB	1939	SHELL ROCK	1		Devonian	160 feet	Butler County		
AUG 1988											
12...	1300	344CDVL	200	15	10.0	425	7.60	240	67	18	3.9
No. 15	424524092474601	92-17W-25ABDA	1897	ALLISON	2		Devonian	200 feet	Butler County		
AUG 1988											
12...	1200	344CDVL	165	20	10.0	395	7.65	220	58	19	7.1
No. 16	424627092542302	92-17W-18CCCC	1967	BRISTOW	2		Devonian	180 feet	Butler County		
AUG 1988											
16...	1200	344CDVL	80	20	--	467	7.35	250	69	19	5.7
No. 17	424704092400803	92-15W-18BCAA	1981	CLARKSVILLE	3		Devonian	220 feet	Butler County		
AUG 1988											
12...	1100	340DVNN	400	60	11.0	425	7.69	240	68	18	3.4
No. 18	421626094242201	86-31W-12ACC	1947	FARNHAMVILLE	3		Cretaceous	850 feet	Calhoun County		
AUG 1988											
09...	1155	210CRCS	110	240	12.5	1140	7.23	460	110	46	65
No. 19	422023094291601	87-31W-17CDD	1968	RINARD	2		Cretaceous	317 feet	Calhoun County		
AUG 1988											
09...	1340	210CRCS	25	30	12.0	1220	7.15	560	140	50	55
No. 20	422656094271901	88-31W-10CBBB	1977	KNIERIM	1		Cretaceous	175 feet	Calhoun County		
AUG 1988											
09...	1510	210CRCS	70	30	10.0	1430	7.57	640	150	65	110
No. 21	422814094384201	88-33W-01BBDD	1976	TWIN LAKES	1		Quaternary	139 feet	Calhoun County		
AUG 1988											
09...	1515	112PLSC	55	45	12.0	1340	7.50	530	140	44	120
No. 22	422844094431301	89-33W-34DACA	1983	JOLLEY	1		Cretaceous	350 feet	Calhoun County		
AUG 1988											
09...	1345	217DKOT	27	30	12.0	1590	7.00	810	190	81	66

## GROUND-WATER-QUALITY DATA

331

DATE	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L (MG/L) (70300)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	PHOS- PHOROUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)
No. 11 424319092283401	91-14W-03CABB	1967	WAVERLY 5	Devonian	170 feet	Bremer County				
MAY 1988										
31...	1.2	237	16	24	0.15	21	320	6.70	<0.100	<0.100
JUL 13...	--	--	--	--	--	--	--	7.00	<0.100	<0.100
SEP 26...	--	--	--	--	--	--	--	7.20	<0.100	<0.100
No. 12 423710091540001	90-09W-10CBA	1953	HAZLETON 1	Silurian	65 feet	Buchanan County				
JUN 1988										
01...	1.2	205	13	22	0.10	14	274	10.0	<0.100	<0.100
JUL 07...	--	--	--	--	--	--	--	10.0	0.200	<0.100
SEP 27...	--	--	--	--	--	--	--	9.90	<0.100	<0.100
No. 13 424708094570801	92-35W-14BCCC	1949	ALBERT CITY 1	Quaternary	190 feet	Buena Vista County				
AUG 1988										
10...	9.8	394	<0.50	360	0.30	31	984	<0.100	1.40	0.100
No. 14 424239092350001	91-15W-11ACBB	1939	SHELL ROCK 1	Devonian	160 feet	Butler County				
AUG 1988										
12...	2.3	202	6.5	22	0.30	13	268	2.90	<0.100	<0.100
No. 15 424524092474601	92-17W-25ABDA	1897	ALLISON 2	Devonian	200 feet	Butler County				
AUG 1988										
12...	1.8	226	<0.50	7.2	0.30	12	236	<0.100	0.200	<0.100
No. 16 424627092542302	92-17W-18CCCC	1967	BRISTOW 2	Devonian	180 feet	Butler County				
AUG 1988										
16...	2.0	222	8.0	22	0.15	12	272	3.20	<0.100	<0.100
No. 17 424704092400803	92-15W-18BCAA	1981	CLARKSVILLE 3	Devonian	220 feet	Butler County				
AUG 1988										
12...	1.9	189	9.0	32	0.40	12	284	3.20	<0.100	<0.100
No. 18 421626094242201	86-31W-12ACC	1947	FARNHAMVILLE 3	Cretaceous	850 feet	Calhoun County				
AUG 1988										
09...	18	330	11	280	2.0	9.5	724	<0.100	1.20	<0.100
No. 19 422023094291601	87-31W-17CDCD	1968	RINARD 2	Cretaceous	317 feet	Calhoun County				
AUG 1988										
09...	10	361	7.5	320	1.1	10	830	<0.100	0.900	<0.100
No. 20 422656094271901	88-31W-10CBBB	1977	KNIERIM 1	Cretaceous	175 feet	Calhoun County				
AUG 1988										
09...	8.2	473	4.0	330	0.35	30	982	<0.100	3.90	0.200
No. 21 422814094384201	88-33W-01BBDD	1976	TWIN LAKES 1	Quaternary	139 feet	Calhoun County				
AUG 1988										
09...	11	604	4.0	150	0.40	36	864	<0.100	3.50	0.200
No. 22 422844094431301	89-33W-34DACA	1983	JOLLEY 1	Cretaceous	350 feet	Calhoun County				
AUG 1988										
09...	5.1	389	0.50	520	1.1	13	1140	<0.100	0.600	<0.100

## GROUND-WATER-QUALITY DATA

		CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	ATRA- ZINE, Pesticide (UG/L) (39630)	CYAN- AZINE (UG/L) (81757)	METRI- BUZIN (UG/L) (81408)	ALA- CHLOR (UG/L) (77825)	METOL- ACHLOR (UG/L) (39356)	BUTY- LATE (UG/L) (99901)	TRIFLU- RALIN (UG/L) (39030)
No. 11	424319092283401		91-14W-03CABB	1967	WAVERLY	5		Devonian	170 feet		Bremer County
	MAY 1988										
	31...	0.6	<20	<20	0.25	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
	JUL 13...	--	--	--	0.29	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
	SEP 26...	--	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
No. 12	423710091540001		90-09W-10CBA	1953	HAZLETON	1		Silurian	65 feet		Buchanan County
	JUN 1988										
	01...	1.0	<20	<20	0.28	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
	JUL 07...	--	--	--	0.37	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
	SEP 27...	--	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
No. 13	424708094570801		92-35W-14BCCC	1949	ALBERT CITY	1		Quaternary	190 feet		Buena Vista County
	AUG 1988										
	10...	2.6	3900	110	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
No. 14	424239092350001		91-15W-11ACBB	1939	SHELL ROCK	1		Devonian	160 feet		Butler County
	AUG 1988										
	12...	--	<20	<20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
No. 15	424524092474601		92-17W-25ABDA	1897	ALLISON	2		Devonian	200 feet		Butler County
	AUG 1988										
	12...	--	370	<20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
No. 16	424627092542302		92-17W-18CCCC	1967	BRISTOW	2		Devonian	180 feet		Butler County
	AUG 1988										
	16...	--	<20	<20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
No. 17	424704092400803		92-15W-18BCAA	1981	CLARKSVILLE	3		Devonian	220 feet		Butler County
	AUG 1988										
	12...	--	<20	<20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
No. 18	421626094242201		86-31W-12ACC	1947	FARNHAMVILLE	3		Cretaceous	850 feet		Calhoun County
	AUG 1988										
	09...	<1.0	1100	<20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
No. 19	422023094291601		87-31W-17CDD	1968	RINARD	2		Cretaceous	317 feet		Calhoun County
	AUG 1988										
	09...	1.1	370	70	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
No. 20	422656094271901		88-31W-10CBBB	1977	KNIERIM	1		Cretaceous	175 feet		Calhoun County
	AUG 1988										
	09...	--	2200	80	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
No. 21	422814094384201		88-33W-01BBDD	1976	TWIN LAKES	1		Quaternary	139 feet		Calhoun County
	AUG 1988										
	09...	8.4	--	60	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
No. 22	422844094431301		89-33W-34DACA	1983	JOLLEY	1		Cretaceous	350 feet		Calhoun County
	AUG 1988										
	09...	1.6	1300	40	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10

## GROUND-WATER-QUALITY DATA

333

DATE	TIME	GEOLOGIC UNIT	FLOW RATE (G/M) (00058)	PUMPING PERIOD PRIOR TO SAM- PLING (MIN) (72004)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)
No. 23	415512094565201	82-35W-17BAAA	1925	TEMPLETON	1		Quaternary	171 feet	Carroll County		
AUG 1988											
12...	0830	111ALVM	18	15	18.0	688	7.24	330	90	26	8.3
No. 24	415808094491801	83-34W-28CBCC	1961	WILLEY			Quaternary	43 feet	Carroll County		
AUG 1988											
15...	1330	112PLSC	--	240	18.0	650	7.20	300	82	23	21
No. 25	420230094380601	84-33W-36DBAB	1971	RALSTON	1		Quaternary	170 feet	Carroll County		
AUG 1988											
16...	0945	112RLCL	--	15	13.0	705	7.49	310	84	24	22
No. 26	420316094515801	84-35W-25DACB	1957	CARROLL	11		Cretaceous	189 feet	Carroll County		
AUG 1988											
15...	1515	217DKOT	450	480	16.0	695	7.24	320	87	25	14
No. 27	420331094440101	84-33W-30ACBB	1978	GLIDDEN	6		Cretaceous	183 feet	Carroll County		
AUG 1988											
16...	0830	217DKOT	150	640	16.0	865	7.26	400	110	30	35
No. 28	421114094412501	85-33W-09DAC	1941	LANESBORO	1		Cretaceous	148 feet	Carroll County		
AUG 1988											
09...	1130	217DKOT	60	30	11.0	630	7.40	320	87	26	8.2
No. 29	411355095065201	74-37W-09BBAA	1956	GRISWOLD	3		Cretaceous	99 feet	Cass County		
AUG 1988											
11...	1530	217DKOT	390	30	12.0	470	6.80	230	61	18	7.0
No. 30	411503094465401	75-34W-32DBAA	1979	MASSENA	79-1		Quaternary	35 feet	Cass County		
OCT 1987											
19...	1315	111ALVM	--	--	13.0	475	7.10	210	62	14	9.9
No. 31	411818095045801	75-37W-10DDBD	1916	LEWIS	1		Quaternary	60 feet	Cass County		
APR 1988											
12...	1330	112PLSC	120	60	12.0	765	7.29	330	80	31	12
JUL 19...	1615	112PLSC	--	10	13.5	885	6.90	--	--	--	--
SEP 19...	0945	112PLSC	--	30	13.0	740	6.80	--	--	--	--
No. 32	412429094594301	76-36W-04CAD	1927	ATLANTIC	2		Cretaceous	81 feet	Cass County		
AUG 1988											
11...	1345	217DKOT	120	60	12.0	545	6.60	240	65	19	13
No. 33	412706095065501	77-37W-21CBDB	1959	MARNE	3		Quaternary	48 feet	Cass County		
APR 1988											
13...	0800	111HLCN	3.0	60	11.0	1090	6.59	580	140	56	14
JUL 20...	0715	111HLCN	--	20	12.0	1240	6.70	--	--	--	--
SEP 23...	1430	111HLCN	38	30	11.5	1250	6.70	--	--	--	--
No. 34	414032091210001	79-04W-06DADC	1979	WEST BRANCH	4		Silurian	440 feet	Cedar County		
AUG 1988											
09...	1430	358ALXD	250	30	13.0	790	7.30	390	110	29	25

## GROUND-WATER-QUALITY DATA

DATE	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LITY LAB (MG/L AS CACO3) (90410)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	PHOS- PHOROUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)
No. 23 415512094565201	82-35W-17BAAA	1925	TEMPLETON	1	Quaternary	171 feet	Carroll County			
AUG 1988 12...	<0.10	254	14	27	0.50	19	382	14.0	<0.100	0.100
No. 24 415808094491801	83-34W-28CBCC	1961	WILLEY		Quaternary	43 feet	Carroll County			
AUG 1988 15...	2.8	272	5.0	68	0.35	25	378	<0.100	1.40	<0.100
No. 25 420230094380601	84-33W-36DBAB	1971	RALSTON	1	Quaternary	170 feet	Carroll County			
AUG 1988 16...	4.6	332	1.0	16	0.35	32	378	<0.100	0.800	<0.100
No. 26 420316094515801	84-35W-25DACB	1957	CARROLL	11	Cretaceous	189 feet	Carroll County			
AUG 1988 15...	3.3	296	3.5	60	0.35	22	384	<0.100	0.400	<0.100
No. 27 420331094440101	84-33W-30ACBB	1978	GLIDDEN	6	Cretaceous	183 feet	Carroll County			
AUG 1988 16...	4.6	408	1.5	48	0.40	18	478	0.700	0.900	<0.100
No. 28 421114094412501	85-33W-09DAC	1941	LANESBORO	1	Cretaceous	148 feet	Carroll County			
AUG 1988 09...	4.8	350	<0.50	28	0.35	29	344	<0.100	1.00	<0.100
No. 29 411355095065201	74-37W-09BBAA	1956	GRISWOLD	3	Cretaceous	99 feet	Cass County			
AUG 1988 11...	1.1	162	12	20	0.30	21	268	9.70	<0.100	<0.100
No. 30 411503094465401	75-34W-32DBAA	1979	MASSENA	79-1	Quaternary	35 feet	Cass County			
OCT 1987 19...	1.8	220	5.0	20	0.35	--	296	<0.100	0.400	0.800
No. 31 411818095045801	75-37W-10DDBD	1916	LEWIS	1	Quaternary	60 feet	Cass County			
APR 1988 12...	2.3	190	42	58	0.25	22	422	20.0	<0.100	<0.100
JUL 19...	--	--	--	--	--	--	--	26.0	<0.100	0.400
SEP 19...	--	--	--	--	--	--	--	19.0	<0.100	<0.100
No. 32 412429094594301	76-36W-04CAD	1927	ATLANTIC	2	Cretaceous	81 feet	Cass County			
AUG 1988 11...	2.7	135	35	65	0.25	22	332	4.80	<0.100	<0.100
No. 33 412706095065501	77-37W-21CBDB	1959	MARNE	3	Quaternary	48 feet	Cass County			
APR 1988 13...	3.0	224	79	190	0.25	29	746	27.0	<0.100	<0.100
JUL 20...	--	--	--	--	--	--	--	26.0	<0.100	0.300
SEP 23...	--	--	--	--	--	--	--	26.0	<0.100	<0.100
No. 34 414032091210001	79-04W-06DACD	1979	WEST BRANCH	4	Silurian	440 feet	Cedar County			
AUG 1988 09...	2.2	348	14	41	0.30	18	430	<0.100	0.900	0.100



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[illegible]

## GROUND-WATER-QUALITY DATA

DATE	TIME	GEOLOGIC UNIT	FLOW RATE (G/M) (00058)	PUMPING PERIOD PRIOR TO SAM- PLING (MIN) (72004)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)
No. 35 423422095425201 90-41W-32BACB 1982 WASHTA 3 Quaternary 112 feet Cherokee County											
AUG 1988											
10...	1030	110QRNR	100	30	11.0	1320	7.36	690	200	4.7	49
No. 36 424725092322801 94-14W-18CAAD 1979 NASHUA 4 Devonian 153 feet Chickasaw County											
JUN 1988											
01...	1100	340DVNN	--	60	11.0	600	7.37	320	89	24	15
JUL 13...	0745	340DVNN	500	15	13.0	650	7.36	--	--	--	--
SEP 22...	1350	340DVNN	460	20	12.0	625	7.40	--	--	--	--
No. 37 430408092091001 95-11W-04CDAC 1940 LAWLER 1 Devonian 209 feet Chickasaw County											
AUG 1988											
11...	1200	347DVSL	160	15	11.0	610	7.61	280	61	30	35
No. 38 431155092245801 97-13W-20CCCC 1911 ALTA VISTA 1 Devonian 150 feet Chickasaw County											
AUG 1988											
10...	1500	344CDVL	258	60	11.0	350	7.68	210	61	14	4.0
No. 39 430922095193501 96-38W-03CCDD 1976 EVERLY 3 Quaternary 20 feet Clay County											
APR 1988											
14...	1315	111ALVM	230	30	8.0	870	7.06	430	120	32	14
JUL 20...	0920	111ALVM	230	30	13.0	940	6.77	--	--	--	--
SEP 22...	0900	111ALVM	230	30	16.0	900	7.20	--	--	--	--
No. 40 414729090151801 81-06E-27CBC 1971 CAMANCHE 3 Quaternary 75 feet Clinton County											
APR 1988											
06...	1500	112PLSC	125	60	14.0	380	7.60	150	38	14	8.3
JUL 11...	1300	112PLSC	240	180	17.0	1500	7.30	810	190	81	66
SEP 15...	1430	112PLSC	240	60	14.0	355	7.19	--	--	--	--
No. 41 415753090490411 83-01E-26CBDC 1963 LOST NATION 2 Silurian 205 feet Clinton County											
JUN 1988											
02...	1200	350SLRN	--	20	13.0	840	7.18	370	92	35	17
JUL 11...	1100	350SLRN	--	15	15.0	795	6.94	--	--	--	--
SEP 28...	1130	350SLRN	300	15	12.0	813	7.36	--	--	--	--
No. 42 420736095342401 85-41W-36CCBC 1931 RICKETTS 2 Quaternary 32 feet Crawford County											
APR 1988											
11...	1500	111SDRV	--	20	11.5	935	7.22	450	120	36	12
JUL 20...	1400	111SDRV	--	3	12.0	770	7.30	--	--	--	--
SEP 20...	0800	111SDRV	84	45	12.0	850	7.20	--	--	--	--
No. 43 414130094021501 80-27W-31CDAA 1976 DALLAS CENTER 4 Quaternary 50 feet Dallas County											
APR 1988											
13...	1530	111ALVM	125	60	13.0	730	7.13	340	93	27	4.9
JUL 19...	0930	111ALVM	--	120	12.5	750	7.20	--	--	--	--
SEP 28...	0800	111ALVM	110	20	12.0	695	6.92	--	--	--	--

## GROUND-WATER-QUALITY DATA

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DATE	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED AS (MG/L) (70300)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	PHOS- PHOROUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)
No. 35 423422095425201	90-41W-32BACB	1982 WASHTA	3	Quaternary	112 feet	Cherokee County				
AUG 1988										
10...	10	324	3.0	470	0.75	27	1030	<0.100	0.600	<0.100
No. 36 424725092322801	94-14W-18CAAD	1979 NASHUA	4	Devonian	153 feet	Chickasaw County				
JUN 1988										
01...	2.2	282	28	30	0.15	15	360	2.30	<0.100	<0.100
JUL 13...	--	--	--	--	--	--	--	2.00	<0.100	<0.100
SEP 22...	--	--	--	--	--	--	--	2.00	0.100	<0.100
No. 37 430408092091001	95-11W-04CDAC	1940 LAWLER	1	Devonian	209 feet	Chickasaw County				
AUG 1988										
11...	4.7	270	0.50	66	0.75	13	390	<0.100	4.80	0.100
No. 38 431155092245801	97-13W-20CCCC	1911 ALTA VISTA	1	Devonian	150 feet	Chickasaw County				
AUG 1988										
10...	1.1	169	5.0	39	0.25	14	242	<0.100	<0.100	0.100
No. 39 430922095193501	96-38W-03CCDD	1976 EVERLY	3	Quaternary	20 feet	Clay County				
APR 1988										
14...	5.3	297	65	52	0.20	23	502	11.0	0.200	<0.100
JUL 20...	--	--	--	--	--	--	--	10.0	0.200	<0.100
SEP 22...	--	--	--	--	--	--	--	9.80	0.200	<0.100
No. 40 414729090151801	81-06E-27CBC	1971 CAMANCHE	3	Quaternary	75 feet	Clinton County				
APR 1988										
06...	1.7	88	22	24	0.10	23	206	8.80	<0.100	<0.100
JUL 11...	5.1	389	0.50	520	1.1	13	1140	8.90	<0.600	<0.100
SEP 15...	--	--	--	--	--	--	--	8.80	<0.100	<0.100
No. 41 415753090490411	83-01E-26CBDC	1963 LOST NATION	2	Silurian	205 feet	Clinton County				
JUN 1988										
02...	2.3	315	41	43	0.25	15	440	2.80	<0.100	<0.100
JUL 11...	--	--	--	--	--	--	--	3.50	<0.100	<0.100
SEP 28...	--	--	--	--	--	--	--	5.00	<0.100	<0.100
No. 42 420736095342401	85-41W-36CCBC	1931 RICKETTS	2	Quaternary	32 feet	Crawford County				
APR 1988										
11...	4.4	353	44	88	0.35	22	570	0.500	0.100	<0.100
JUL 20...	--	--	--	--	--	--	--	2.10	<0.100	0.200
SEP 20...	--	--	--	--	--	--	--	0.900	<0.100	<0.100
No. 43 414130094021501	80-27W-31CDAA	1976 DALLAS CENTER	4	Quaternary	50 feet	Dallas County				
APR 1988										
13...	2.8	316	11	36	0.20	24	412	6.60	<0.100	<0.100
JUL 19...	--	--	--	--	--	--	--	5.40	<0.100	<0.100
SEP 28...	--	--	--	--	--	--	--	5.00	<0.100	<0.100

## GROUND-WATER-QUALITY DATA

[illegible]

## GROUND-WATER-QUALITY DATA

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DATE	TIME	GEOLOGIC UNIT	FLOW RATE (G/M) (00058)	PUMPING PERIOD PRIOR TO SAM- PLING (MIN) (72004)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)
No. 44	415055094131202	81-29W-10BBBA	1969	DAWSON 2		Quaternary	22 feet	Dallas County			
APR 1988											
14...	0900	111ALVM	40	20	10.0	730	7.20	330	88	26	15
JUL 19...	1030	111ALVM	--	--	12.5	720	7.40	--	--	--	--
SEP 27...	1100	111ALVM	45	20	13.0	665	7.20	--	--	--	--
No. 45	414915093561001	81-27W-13DDDD	----	WOODWARD SOUTH		Quaternary	104 feet	Dallas County			
AUG 1988											
12...	1045	112PLSC	450	15	17.5	703	7.83	290	68	29	50
No. 46	422834091281601	89-05W-31DAAB	1970	MANCHESTER 6		Silurian	150 feet	Delaware County			
JUN 1988											
02...	0800	350SLRN	650	20	11.0	530	7.55	270	70	23	6.2
JUL 07...	1000	350SLRN	600	15	20.0	505	7.44	--	--	--	--
SEP 27...	1000	350SLRN	800	120	11.0	563	7.59	--	--	--	--
No. 47	422852091161701	88-04W-36BCBB	1960	EARLVILLE 2		Silurian	200 feet	Delaware County			
AUG 1988											
15...	1330	350SLRN	210	15	13.0	675	7.50	350	83	34	10
No. 48	421812091004001	87-01W-31CBA	1958	CASCADE 2		Silurian	180 feet	Dubuque County			
AUG 1988											
15...	1130	358ALXD	210	10	12.0	680	7.40	340	84	32	13
No. 49	422852091064301	89-02W-32BCD	1970	DYERSVILLE 2		Silurian	195 feet	Dubuque County			
JUN 1988											
01...	1630	358KNKK	250	60	12.0	780	7.29	350	79	38	16
JUL 12...	1015	358KNKK	260	15	14.0	800	7.06	--	--	--	--
SEP 27...	1335	358KNKK	250	20	13.0	826	7.27	--	--	--	--
No. 50	423305091064901	89-02W-05CBBB	1898	NEW VIENNA 1		Silurian	170 feet	Dubuque County			
JUN 1988											
02...	1600	350SLRN	50	60	11.0	660	7.25	340	82	32	8.8
JUL 12...	1120	350SLRN	50	240	12.0	680	7.10	--	--	--	--
SEP 27...	1415	350SLRN	100	15	11.5	660	7.34	--	--	--	--
No. 51	431910094473601	98-33W-07CBAB	1981	WALLINGFORD 4		Quaternary	161 feet	Emmet County			
AUG 1988											
10...	1315	112PLSC	62	30	9.0	1350	7.18	710	200	51	56
No. 52	430319092565801	95-18W-10DDBB	1914	ROCKFORD 1		Devonian	185 feet	Floyd County			
AUG 1988											
10...	1200	344CDVL	250	60	12.0	515	7.37	310	80	26	3.2
No. 53	430458092403701	95-16W-01AAB	1950	CHARLES CITY 5		Devonian	187 feet	Floyd County			
AUG 1988											
10...	1300	344CDVL	3040	20	10.0	420	7.50	230	65	17	4.4

## GROUND-WATER-QUALITY DATA

DATE	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	PHOS- PHOROUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)
No. 44 415055094131202	81-29W-10BBBA	1969	DAWSON 2	Quaternary	22 feet	Dallas County				
APR 1988										
14...	2.4	267	20	53	0.15	26	424	11.0	<0.100	<0.100
JUL										
19...	--	--	--	--	--	--	--	11.0	<0.100	<0.100
SEP										
27...	--	--	--	--	--	--	--	11.0	<0.100	<0.100
No. 45 414915093561001	81-27W-13DDDD	----	WOODWARD SOUTH	Quaternary	104 feet	Dallas County				
AUG 1988										
12...	5.1	420	1.5	6.4	0.40	23	406	<0.100	2.90	0.400
No. 46 422834091281601	89-05W-31DAAB	1970	MANCHESTER 6	Silurian	150 feet	Delaware County				
JUN 1988										
02...	0.70	187	14	38	0.10	13	294	13.0	<0.100	<0.100
JUL										
07...	--	--	--	--	--	--	--	13.0	<0.100	<0.100
SEP										
27...	--	--	--	--	--	--	--	14.0	<0.100	<0.100
No. 47 422852091161701	88-04W-36BCBB	1960	EARLVILLE 2	Silurian	200 feet	Delaware County				
AUG 1988										
15...	3.1	268	14	52	0.10	9.5	386	6.40	<0.100	<0.100
No. 48 421812091004001	87-01W-31CBA	1958	CASCADE 2	Silurian	180 feet	Dubuque County				
AUG 1988										
15...	3.4	272	18	54	0.25	12	384	2.70	<0.100	<0.100
No. 49 422852091064301	89-02W-32BCD	1970	DYERSVILLE 2	Silurian	195 feet	Dubuque County				
JUN 1988										
01...	2.5	267	38	32	0.10	12	390	12.0	<0.100	<0.100
JUL										
12...	--	--	--	--	--	--	--	10.0	0.200	<0.100
SEP										
27...	--	--	--	--	--	--	--	9.20	<0.100	<0.100
No. 50 423305091064901	89-02W-05CBBB	1898	NEW VIENNA 1	Silurian	170 feet	Dubuque County				
JUN 1988										
02...	0.40	288	22	24	0.20	26	372	6.10	<0.100	<0.100
JUL										
12...	--	--	--	--	--	--	--	6.40	<0.100	<0.100
SEP										
27...	--	--	--	--	--	--	--	6.10	<0.100	0.100
No. 51 431910094473601	98-33W-07CBAB	1981	WALLINGFORD 4	Quaternary	161 feet	Emmet County				
AUG 1988										
10...	6.8	352	1.5	440	0.50	14	1030	<0.100	0.600	0.100
No. 52 430319092565801	95-18W-10DDBB	1914	ROCKFORD 1	Devonian	185 feet	Floyd County				
AUG 1988										
10...	1.2	247	3.5	48	0.60	14	356	<0.100	0.100	<0.100
No. 53 430458092403701	95-16W-01AAB	1950	CHARLES CITY 5	Devonian	187 feet	Floyd County				
AUG 1988										
10...	2.1	219	5.0	18	0.70	12	250	<0.100	0.300	0.200

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[illegible]

## GROUND-WATER-QUALITY DATA

DATE	TIME	GEOLOGIC UNIT	FLOW RATE (G/M) (00058)	PUMPING PERIOD PRIOR TO SAM- PLING (MIN) (72004)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)
No. 54	430726092441501	96-16W-21ABDD	1948	FLOYD 1		Devonian	193 feet	Floyd County			
AUG 1988	10...	1000 344RPID	90	30	10.0	490	7.44	260	76	17	4.2
No. 55	430741092540601	96-17W-18CCAD	1916	RUDD 1		Devonian	200 feet	Floyd County			
AUG 1988	10...	0900 344CDVL	52	60	11.0	560	7.65	290	73	25	6.1
No. 56	424537093220501	92-21W-19CCD	1900	LATIMER 1		Mississippian	150 feet	Franklin County			
AUG 1988	16...	1600 330MSSP	120	20	11.0	670	7.16	320	86	25	21
No. 57	425341093132501	93-20W-05DDD	1956	SHEFFIELD 2		Quaternary	27 feet	Franklin County			
APR 1988	26...	1100 110QRNR	80	10	9.0	417	7.70	200	53	17	6.2
JUL 13...	0945	110QRNR	40	60	13.0	560	7.48	--	--	--	--
SEP 22...	0800	110QRNR	60	15	13.0	550	7.56	--	--	--	--
No. 58	404331095285501	68-40W-07CBDA	1980	FARRAGUT 79 1		Quaternary	62 feet	Fremont County			
SEP 1988	01...	1130 112PLSC	145	120	13.0	669	7.18	300	82	24	16
No. 59	404918095454801	70-43W-35CBBA	1973	THURMAN 1		Quaternary	105 feet	Fremont County			
SEP 1988	24...	0830 111ALVM	140	30	12.5	840	7.25	460	120	39	14
No. 60	421336092524401	86-17W-30CDDB	1966	CONRAD 4		Mississippian	130 feet	Grundy County			
JUN 1988	03...	1130 339HMPN	165	20	12.0	590	7.40	310	83	24	7.9
JUL 14...	0915	339HMPN	163	15	16.0	605	7.40	--	--	--	--
SEP 21...	1315	339HMPN	160	15	12.0	577	7.12	--	--	--	--
No. 61	414035094302502	79-31W-06CDBC	1941	GUTHRIE CENTER 2		Quaternary	60 feet	Guthrie County			
APR 1988	13...	1630 110QRCU	300	20	9.0	405	6.71	170	48	13	8.3
JUL 19...	1130	110QRCU	50	60	13.0	300	6.80	--	--	--	--
SEP 26...	1400	110QRCU	300	20	14.0	230	6.40	--	--	--	--
No. 62	415034094183601	81-30W-11BDD	1979	JAMAICA 1		Quaternary	197 feet	Guthrie County			
AUG 1988	11...	1230 112PLSC	28	15	15.0	636	7.53	280	74	24	23
No. 63	422334093435101	88-25W-35BDED	1913	KAMRAR 1		Mississippian	283 feet	Hamilton County			
AUG 1988	18...	1600 330MSSP	85	60	12.0	704	7.71	290	64	31	50
No. 64	425528093364501	94-23W-30CCDA	1964	GOODELL 1		Mississippian	170 feet	Hancock County			
AUG 1988	18...	1400 339HMPN	--	20	11.0	680	7.85	290	79	23	16



## GROUND-WATER-QUALITY DATA

343

DATE	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	PHOS- PHOROUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)
No. 54 430726092441501	96-16W-21ABDD	1948 FLOYD 1	Devonian	193 feet	Floyd County					
AUG 1988 10...	1.4	213	8.0	40	0.35	12	294	<0.100	<0.100	<0.100
No. 55 430741092540601	96-17W-18CCAD	1916 RUDD 1	Devonian	200 feet	Floyd County					
AUG 1988 10...	1.9	241	9.5	52	0.30	12	328	<0.100	<0.100	0.100
No. 56 424537093220501	92-21W-19CCD	1900 LATIMER 1	Mississippian	150 feet	Franklin County					
AUG 1988 16...	2.3	364	0.50	8.0	0.40	22	368	<0.100	0.600	0.100
No. 57 425341093132501	93-20W-05DDD	1956 SHEFFIELD 2	Quaternary	27 feet	Franklin County					
APR 1988 26...	2.5	186	12	20	0.16	20	230	0.800	0.100	<0.100
JUL 13...	--	--	--	--	--	--	--	13.0	<0.100	<0.100
SEP 22...	--	--	--	--	--	--	--	12.0	<0.100	<0.100
No. 58 404331095285501	68-40W-07CBDA	1980 FARRAGUT 79 1	Quaternary	62 feet	Fremont County					
SEP 1988 01...	3.9	280	14	65	0.30	21	364	0.300	0.300	<0.100
No. 59 404918095454801	70-43W-35CBBA	1973 THURMAN 1	Quaternary	105 feet	Fremont County					
SEP 1988 24...	4.8	402	10	65	0.40	27	490	0.200	0.200	<0.100
No. 60 421336092524401	86-17W-30CDDDB	1966 CONRAD 4	Mississippian	130 feet	Grundy County					
JUN 1988 03...	1.0	259	8.0	29	0.30	17	346	6.40	<0.100	<0.100
JUL 14...	--	--	--	--	--	--	--	6.30	<0.100	<0.100
SEP 21...	--	--	--	--	--	--	--	4.10	<0.100	<0.100
No. 61 414035094302502	79-31W-06CDBC	1941 GUTHRIE CENTER 2	Quaternary	60 feet	Guthrie County					
APR 1988 13...	1.2	113	11	37	0.20	21	242	3.90	<0.100	<0.100
JUL 19...	--	--	--	--	--	--	--	7.30	<0.100	<0.100
SEP 26...	--	--	--	--	--	--	--	5.30	<0.100	<0.100
No. 62 415034094183601	81-30W-11BDD	1979 JAMAICA 1	Quaternary	197 feet	Guthrie County					
AUG 1988 11...	10	328	0.50	1.6	0.20	20	344	0.500	3.20	0.100
No. 63 422334093435101	88-25W-35BDBD	1913 KAMRAR 1	Mississippian	283 feet	Hamilton County					
AUG 1988 18...	5.0	414	<0.50	44	0.85	25	454	<0.100	2.60	0.100
No. 64 425528093364501	94-23W-30CCDA	1964 GOODELL 1	Mississippian	170 feet	Hancock County					
AUG 1988 18...	2.6	348	4.0	32	0.30	29	376	<0.100	1.40	<0.100

## GROUND-WATER-QUALITY DATA

[illegible]

## GROUND-WATER-QUALITY DATA

345

DATE	TIME	GEOLOGIC UNIT	FLOW RATE (G/M) (00058)	PUMPING PERIOD PRIOR TO SAM- PLING (MIN) (72004)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)
No. 65	430015093360501	95-23W-31ACA	1959	KLEMME 2		Devonian	185 feet	Hancock County			
AUG 1988											
16...	1430	341LMCK	100	20	12.0	680	6.99	350	84	34	29
No. 66	421443093034701	86-19W-21DAB	1946	UNION 1		Mississippian	195 feet	Hardin County			
AUG 1988											
17...	0930	339HMPN	180	20	12.0	680	7.31	300	82	23	12
No. 67	421544093002201	86-19W-13ACAA	1955	WHITTEN 1		Mississippian	188 feet	Hardin County			
SEP 1988											
21...	1855	330MSSP	85	60	10.0	680	7.25	310	79	28	18
No. 68	414500095420002	80-42W-14AACC	1936	WOODBINE 1		Cretaceous	91 feet	Harrison County			
SEP 1988											
06...	1015	217DKOT	200	30	10.5	840	7.20	380	100	32	13
No. 69	414842096012501	81-45W-24DABD	1972	LITTLE SIOUX 1		Quaternary	108 feet	Harrison County			
SEP 1988											
07...	1030	111ALVM	45	30	13.0	1180	7.15	590	150	53	28
No. 70	431303092052002	97-11W-13DBCB	1906	PROTIVIN 1		Devonian	72 feet	Howard County			
SEP 1988											
22...	1220	340DVNN	80	15	11.0	645	7.37	300	86	20	6.8
No. 71	431443092261401	97-14W-01DDAB	1914	ELMA 1		Quaternary	143 feet	Howard County			
APR 1988											
28...	1430	112PLSC	0	15	10.5	590	7.50	270	76	19	9.3
JUL 12...	1445	112PLSC	180	20	12.0	590	7.31	--	--	--	--
SEP 22...	1010	112PLSC	160	60	11.0	583	7.43	--	--	--	--
No. 72	422018095205101	87-39W-23ABDD	1923	ARTHUR 1		Quaternary	24 feet	Ida County			
APR 1988											
13...	1915	112PLSC	100	30	8.5	650	6.95	320	91	23	10
JUL 19...	1300	112PLSC	100	45	9.0	680	7.03	--	--	--	--
SEP 20...	1215	112PLSC	100	20	13.5	695	7.25	--	--	--	--
No. 73	422106095280201	87-40W-14ACBB	1965	IDA GROVE 3		Quaternary	65 feet	Ida County			
APR 1988											
13...	1130	112PLSC	550	35	13.5	975	7.42	430	130	26	38
JUL 19...	1430	112PLSC	450	180	11.5	970	7.02	--	--	--	--
SEP 19...	1615	112PLSC	400	30	14.5	960	7.25	--	--	--	--
No. 74	413422092093601	78-11W-08CBCA	1968	MILLERSBURG 1		Quaternary	175 feet	Iowa County			
AUG 1988											
11...	0945	112PLSC	--	60	13.5	1410	7.80	570	150	47	120
No. 75	420414090113202	84-07E-19BD	1920	SABULA 2		Silurian	112 feet	Jackson County			
JUN 1988											
02...	1400	350SLRN	165	60	13.0	560	7.40	310	78	7	8.9
JUL 11...	1430	350SLRN	165	480	13.0	590	7.42	--	--	--	--
SEP 28...	0825	350SLRN	145	60	13.0	570	7.58	--	--	--	--

## GROUND-WATER-QUALITY DATA

DATE	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	PHOS- PHOROUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)
No. 65 430015093360501	95-23W-31ACA	1959 KLEMME 2	Devonian	185 feet	Hancock County					
AUG 1988 16...	6.3	388	1.5	44	0.85	11	434	<0.100	0.200	<0.100
No. 66 421443093034701	86-19W-21DAB	1946 UNION 1	Mississippian	195 feet	Hardin County					
AUG 1988 17...	4.4	248	17	45	0.15	18	386	7.30	0.200	<0.100
No. 67 421544093002201	86-19W-13ACAA	1955 WHITTEN 1	Mississippian	188 feet	Hardin County					
SEP 1988 21...	3.8	334	2.0	29	0.40	13	388	0.100	0.500	<0.100
No. 68 414500095420002	80-42W-14AACC	1936 WOODBINE 1	Cretaceous	91 feet	Harrison County					
SEP 1988 06...	4.7	330	14	85	0.30	26	478	6.60	<0.100	<0.100
No. 69 414842096012501	81-45W-24DABD	1972 LITTLE SIOUX 1	Quaternary	108 feet	Harrison County					
SEP 1988 07...	8.6	477	14	220	0.30	32	744	0.100	0.900	<0.100
No. 70 431303092052002	97-11W-13DBCB	1906 PROTIVIN 1	Devonian	72 feet	Howard County					
SEP 1988 22...	3.7	204	28	38	0.15	12	384	9.80	<0.100	<0.100
No. 71 431443092261401	97-14W-01DDAB	1914 ELMA 1	Quaternary	143 feet	Howard County					
APR 1988 28...	1.1	198	23	58	0.80	14	360	5.60	<0.100	<0.100
JUL 12...	--	--	--	--	--	--	--	5.60	<0.100	<0.100
SEP 22...	--	--	--	--	--	--	--	5.60	<0.100	<0.100
No. 72 422018095205101	87-39W-23ABDD	1923 ARTHUR 1	Quaternary	24 feet	Ida County					
APR 1988 13...	<0.10	271	14	45	0.40	16	349	8.50	<0.100	<0.100
JUL 19...	--	--	--	--	--	--	--	8.00	<0.100	0.100
SEP 20...	--	--	--	--	--	--	--	7.30	<0.100	<0.100
No. 73 422106095280201	87-40W-14ACBB	1965 IDA GROVE 3	Quaternary	65 feet	Ida County					
APR 1988 13...	4.2	309	88	96	0.25	23	604	3.50	<0.100	0.100
JUL 19...	--	--	--	--	--	--	--	3.60	<0.100	0.200
SEP 19...	--	--	--	--	--	--	--	5.80	<0.100	<0.100
No. 74 413422092093601	78-11W-08CBCA	1968 MILLERSBURG 1	Quaternary	175 feet	Iowa County					
AUG 1988 11...	4.9	320	4.5	540	0.50	12	994	<0.100	4.70	<0.100
No. 75 420414090113202	84-07E-19BD	1920 SABULA 2	Silurian	112 feet	Jackson County					
JUN 1988 02...	2.1	273	8.5	29	0.20	25	310	4.20	<0.100	<0.100
JUL 11...	--	--	--	--	--	--	--	4.40	<0.100	<0.100
SEP 28...	--	--	--	--	--	--	--	4.50	<0.100	0.100

## 347

[illegible]

## GROUND-WATER-QUALITY DATA

DATE	TIME	GEOLOGIC UNIT	FLOW RATE (G/M) (00058)	PUMPING PERIOD PRIOR TO SAM- PLING (MIN) (72004)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)
No. 76	420428090501901	84-01E-22BB		1912	BALDWIN 1		Silurian	160 feet	Jackson County		
AUG 1988											
12...	1430	355HPKN	70	20	13.0	675	7.30	350	82	36	6.8
No. 77	420432090401201	84-02E-24AAB		1953	MAQUOKETA 3		Quaternary	90 feet	Jackson County		
APR 1988											
06...	1400	112PLSC	550	60	14.0	800	7.17	380	94	35	17
JUL											
12...	0800	112PLSC	500	15	14.0	705	6.92	--	--	--	--
No. 78	420435090524501	84-01E-19AAAA		1982	MONMOUTH 1		Silurian	160 feet	Jackson County		
AUG 1988											
12...	1330	350SLRN	--	10	12.5	640	7.60	320	73	34	14
No. 79	414251092541701	80-18W-26AADC		1939	KELLOGG 1		Quaternary	36 feet	Jasper County		
APR 1988											
15...	0900	111ALVM	50	20	12.0	850	6.69	350	100	25	30
JUL											
18...	1000	111ALVM	--	--	12.5	835	6.80	--	--	--	--
SEP											
28...	1300	111ALVM	50	60	12.0	846	6.52	--	--	--	--
No. 80	420009091084902	83-03W-13BA		1910	OLIN 1		Silurian	180 feet	Jones County		
AUG 1988											
15...	1000	350SLRN	250	120	13.0	546	7.60	270	58	30	12
No. 81	411849092115401	75-12W-12CBCA		1958	SIGOURNEY 5		Quaternary	35 feet	Keokuk County		
APR 1988											
07...	1030	111ALVM	80	1440	12.0	600	7.08	270	79	18	13
AUG											
02...	1030	111ALVM	--	30	14.0	600	7.30	--	--	--	--
SEP											
29...	1200	111ALVM	60	20	12.0	595	7.10	--	--	--	--
No. 82	412614092104501	77-11W-31BBB		1954	WEBSTER 1		Mississippian	170 feet	Keokuk County		
AUG 1988											
10...	1100	338OSGE	30	15	13.0	955	7.30	480	130	38	34
No. 83	425426094050301	93-27W-06BABB		1967	LU VERNE 2		Mississippian	164 feet	Kossuth County		
AUG 1988											
09...	1000	330MSSP	160	20	10.0	727	7.40	360	93	30	15
No. 84	431306094192801	97-29W-18BCC		1946	LONE ROCK 1		Devonian	167 feet	Kossuth County		
AUG 1988											
09...	1230	344CDVL	500	15	11.0	1480	7.38	460	120	39	170
No. 85	420025091414601	83-07W-17BBBB		1964	CEDAR RAPIDS W3		Quaternary	58 feet	Linn County		
APR 1988											
08...	1400	111ALVM	1200	30	9.0	580	7.63	260	68	21	12
JUL											
14...	1300	111ALVM	1500	15	17.0	455	7.39	--	--	--	--
SEP											
15...	0945	111ALVM	700	120	16.0	525	7.25	--	--	--	--
No. 86	420219091402802	84-07W-33CCDB		1953	HIAWATHA 2		Silurian	230 feet	Linn County		
AUG 1988											
09...	1300	350SLRN	200	360	12.5	678	7.50	320	99	17	20

## GROUND-WATER-QUALITY DATA

349

DATE	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	PHOS- PHOROUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)
No. 76 420428090501901	84-01E-22BB	1912 BALDWIN 1	Silurian	160 feet	Jackson County					
AUG 1988 12...	1.1	322	5.5	20	0.15	16	360	2.70	<0.100	<0.100
No. 77 420432090401201	84-02E-24AAB	1953 MAQUOKETA 3	Quaternary	90 feet	Jackson County					
APR 1988 06...	3.1	302	36	51	0.20	23	462	5.80	<0.100	<0.100
JUL 12...	--	--	--	--	--	--	--	5.50	<0.100	<0.100
No. 78 420435090524501	84-01E-19AAAA	1982 MONMOUTH 1	Silurian	160 feet	Jackson County					
AUG 1988 12...	3.4	296	7.5	39	0.20	12	338	3.00	<0.100	<0.100
No. 79 414251092541701	80-18W-26AADC	1939 KELLOGG 1	Quaternary	36 feet	Jasper County					
APR 1988 15...	4.0	202	50	160	0.15	23	538	6.70	<0.100	<0.100
JUL 18...	--	--	--	--	--	--	--	6.40	<0.100	<0.100
SEP 28...	--	--	--	--	--	--	--	6.40	<0.100	<0.100
No. 80 420009091084902	83-03W-13BA	1910 OLIN 1	Silurian	180 feet	Jones County					
AUG 1988 15...	1.9	280	1.0	15	0.20	12	290	<0.100	0.300	<0.100
No. 81 411849092115401	75-12W-12CBCA	1958 SIGOURNEY 5	Quaternary	35 feet	Keokuk County					
APR 1988 07...	1.4	212	18	73	0.25	21	352	<0.100	<0.100	--
AUG 02...	--	--	--	--	--	--	--	<0.100	<0.100	<0.100
SEP 29...	--	--	--	--	--	--	--	<0.100	<0.100	<0.100
No. 82 412614092104501	77-11W-31BBB	1954 WEBSTER 1	Mississippian	170 feet	Keokuk County					
AUG 1988 10...	4.4	516	5.0	21	0.15	18	528	<0.100	<0.100	0.300
No. 83 425426094050301	93-27W-06BABB	1967 LU VERNE 2	Mississippian	164 feet	Kossuth County					
AUG 1988 09...	4.6	363	5.5	48	0.35	22	414	<0.100	0.400	0.100
No. 84 431306094192801	97-29W-18BCC	1946 LONE ROCK 1	Devonian	167 feet	Kossuth County					
AUG 1988 09...	12	377	8.5	440	0.45	19	1080	<0.100	0.800	0.100
No. 85 420025091414601	83-07W-17BBBB	1964 CEDAR RAPIDS W3	Quaternary	58 feet	Linn County					
APR 1988 08...	3.7	224	24	40	0.20	15	314	0.600	1.00	0.200
JUL 14...	--	--	--	--	--	--	--	0.200	1.60	0.200
SEP 15...	--	--	--	--	--	--	--	<0.100	1.90	<0.100
No. 86 420219091402802	84-07W-33CCDB	1953 HIAWATHA 2	Silurian	230 feet	Linn County					
AUG 1988 09...	3.0	232	32	44	0.10	14	376	4.70	<0.100	<0.100

## GROUND-WATER-QUALITY DATA

[illegible]



## GROUND-WATER-QUALITY DATA

351

DATE	TIME	GEOLOGIC UNIT	FLOW RATE (G/M) (00058)	PUMPING PERIOD PRIOR TO SAM- PLING (MIN) (72004)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)
No. 87	421138091471801	85-08W-09BAB	1966	CENTER POINT 1		Devonian		49 feet		Linn County	
JUN 1988											
03...	0900	344SOLN	100	20	12.0	660	7.18	320	110	12	20
JUL 07...	1130	344SOLN	100	240	15.0	750	7.08	--	--	--	--
SEP 15...	1100	344SOLN	100	60	13.0	720	6.98	--	--	--	--
No. 88	421205091312401	85-06W-03DABC	1963	CENTRAL CITY 2		Silurian		104 feet		Linn County	
AUG 1988											
09...	1130	355NIGR	200	15	13.5	638	7.40	300	83	22	14
No. 89	421646091315101	86-06W-10BADB	1910	COGGON 1		Silurian		247 feet		Linn County	
AUG 1988											
09...	1030	350SLRN	155	15	13.0	705	7.40	340	96	25	16
No. 90	432018095594101	98-44W-01BCDC	1978	GEORGE 4		Quaternary		37 feet		Lyon County	
AUG 1988											
10...	1430	110QRNR	170	20	10.0	780	7.40	390	100	34	12
No. 91	432622096101901	100-45W-33CBAB	1925	ROCK RAPIDS 2		Quaternary		38 feet		Lyon County	
APR 1988											
14...	1000	111ALVM	200	45	10.5	860	7.05	420	110	36	14
JUL 19...	1430	111ALVM	200	30	11.0	890	7.25	--	--	--	--
SEP 21...	1600	111ALVM	100	20	12.0	895	7.35	--	--	--	--
No. 92	432656095525701	100-43W-26DDDB	1908	LITTLE ROCK 1		Quaternary		28 feet		Lyon County	
AUG 1988											
10...	1710	112WSCS	200	30	9.0	2310	7.21	1400	360	120	67
No. 93	411348093553101	74-27W-11ABCA	----	EAST PERU 1		Quaternary		18 feet		Madison County	
AUG 1988											
10...	1345	111ALVM	--	15	21.5	876	6.89	430	150	14	16
No. 94	411726093503201	75-26W-15CCDA	1979	SAINT CHARLES 3		Quaternary		51 feet		Madison County	
AUG 1988											
11...	0945	111ALVM	60	15	28.0	520	7.01	210	67	9.6	34
No. 95	411647092520601	75-17W-19CBC	1966	TRACY 1		Mississippian		123 feet		Mahaska County	
AUG 1988											
10...	1300	333MRMC	--	>120	13.0	1160	7.30	650	210	30	14
No. 96	415250092552701	82-18W-27DADC	1947	LAUREL 1		Mississippian		248 feet		Marshall County	
AUG 1988											
18...	1420	339HMPN	25	15	14.0	2100	7.36	1000	220	110	140
No. 97	415423092470801	82-17W-13CCCC	1972	GILMAN 1		Quaternary		22 feet		Marshall County	
AUG 1988											
19...	1045	111ALVM	9.0	240	18.0	545	7.78	270	70	23	11
No. 98	415529093110801	82-20W-09CADC	1952	RHODES 2		Quaternary		278 feet		Marshall County	
AUG 1988											
17...	1445	112PLSC	60	15	21.0	1500	7.58	590	150	53	120

## GROUND-WATER-QUALITY DATA

DATE	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY LAB (MG/L AS CAC03) (90410)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	PHOS- PHOROUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)
No. 87 421138091471801	85-08W-09BAB	1966	CENTER POINT 1	Devonian	49 feet	Linn County				
JUN 1988										
03...	2.6	224	42	70	0.15	15	398	2.90	<0.100	<0.100
JUL 07...	--	--	--	--	--	--	--	3.50	0.100	<0.100
SEP 15...	--	--	--	--	--	--	--	2.90	<0.100	<0.100
No. 88 421205091312401	85-06W-03DABC	1963	CENTRAL CITY 2	Silurian	104 feet	Linn County				
AUG 1988										
09...	4.4	268	17	22	0.20	15	348	2.60	<0.100	<0.100
No. 89 421646091315101	86-06W-10BADB	1910	COGGON 1	Silurian	247 feet	Linn County				
AUG 1988										
09...	2.8	270	20	52	0.15	14	410	2.80	<0.100	<0.100
No. 90 432018095594101	98-44W-01BCDC	1978	GEORGE 4	Quaternary	37 feet	Lyon County				
AUG 1988										
10...	2.6	196	19	71	0.40	25	480	11.0	<0.100	<0.100
No. 91 432622096101901	100-45W-33CBAB	1925	ROCK RAPIDS 2	Quaternary	38 feet	Lyon County				
APR 1988										
14...	4.9	320	25	110	0.30	20	532	11.0	0.400	<0.100
JUL 19...	--	--	--	--	--	--	--	8.50	0.500	<0.100
SEP 21...	--	--	--	--	--	--	--	9.20	0.400	<0.100
No. 92 432656095525701	100-43W-26DDDB	1908	LITTLE ROCK 1	Quaternary	28 feet	Lyon County				
AUG 1988										
10...	12	381	2.0	1000	0.25	31	2040	<0.100	3.20	<0.100
No. 93 411348093553101	74-27W-11ABCA	----	EAST PERU 1	Quaternary	18 feet	Madison County				
AUG 1988										
10...	4.8	352	20	71	0.15	15	506	1.00	<0.100	0.200
No. 94 411726093503201	75-26W-15CCDA	1979	SAINT CHARLES 3	Quaternary	51 feet	Madison County				
AUG 1988										
11...	4.2	266	5.5	39	0.35	24	316	<0.100	0.800	0.200
No. 95 411647092520601	75-17W-19CBC	1966	TRACY 1	Mississippian	123 feet	Mahaska County				
AUG 1988										
10...	2.5	266	3.5	110	0.20	17	876	<0.100	<0.100	<0.100
No. 96 415250092552701	82-18W-27DADC	1947	LAUREL 1	Mississippian	248 feet	Marshall County				
AUG 1988										
18...	9.6	244	3.5	890	0.45	14	1730	<0.100	4.20	<0.100
No. 97 415423092470801	82-17W-13CCCC	1972	GILMAN 1	Quaternary	22 feet	Marshall County				
AUG 1988										
19...	<0.10	176	14	24	0.25	25	306	13.0	<0.100	<0.100
No. 98 415529093110801	82-20W-09CADC	1952	RHODES 2	Quaternary	278 feet	Marshall County				
AUG 1988										
17...	7.6	298	3.5	510	0.55	12	1100	<0.100	5.70	<0.100

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[illegible]

## GROUND-WATER-QUALITY DATA

DATE	TIME	GEOLOGIC UNIT	FLOW RATE (G/M) (00058)	PUMPING PERIOD PRIOR TO SAM- PLING (MIN) (72004)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)
No. 99 415614092520601 82-17W-06DCAD 1979 FERGUSON 2 Mississippi 160 feet Marshall County											
AUG 1988 18...	1300	339HMPN	33	15	15.0	1370	7.26	600	140	60	56
No. 100 420020092465001 83-17W-13BA 1955 LE GRAND 2 Mississippi 100 feet Marshall County											
JUN 1988 03...	1300	339PPCH	90	20	12.0	560	7.54	330	89	26	14
JUL 21...	1000	339PPCH	--	15	12.0	730	7.50	--	--	--	--
SEP 21...	1005	339PPCH	85	30	12.0	695	7.15	--	--	--	--
No. 101 420145093100501 83-20W-03ADBD 1955 STATE CENTER 3 Quaternary 32 feet Marshall County											
AUG 1988 18...	0830	112FLSC	130	15	16.5	645	7.74	330	90	26	8.4
No. 102 420352092552401 84-18W-22DDDD 1981 MARSHALLTOWN 14 Quaternary 160 feet Marshall County											
AUG 1988 19...	0845	111ALVM	740	660	13.0	675	7.63	340	90	29	13
No. 103 420613092593601 84-18W-07BACA 1969 ALBION 2 Quaternary 26 feet Marshall County											
APR 1988 15...	1100	111ALVM	--	20	10.0	740	7.25	350	94	29	11
JUL 21...	0830	111ALVM	--	60	11.5	770	7.90	--	--	--	--
SEP 21...	1145	111ALVM	120	60	12.5	690	6.78	--	--	--	--
No. 104 421117093002201 85-19W-12ADCC 1962 LISCOMB 2 Mississippi 148 feet Marshall County											
AUG 1988 18...	1015	330MSSP	85	15	15.0	600	7.78	300	81	24	13
No. 105 432610092465801 100-16W-31BDDC 1915 STACYVILLE 1 Devonian 117 feet Mitchell County											
AUG 1988 09...	1600	344CDVL	--	--	9.0	535	7.74	270	74	21	5.8
No. 106 420241095422001 84-42W-35CABB 1974 UTE 3 Quaternary 58 feet Monona County											
APR 1988 12...	0900	111SDRV	125	20	12.0	870	7.11	410	110	33	9.6
JUL 20...	1300	111SDRV	--	45	15.0	900	7.03	--	--	--	--
SEP 20...	0915	111SDRV	125	30	12.5	890	7.20	--	--	--	--
No. 107 405850095061701 71-37W-04ACD 1953 STANTON 1 Cretaceous 150 feet Montgomery County											
AUG 1988 12...	0900	217DKOT	140	60	13.0	575	7.15	270	78	18	14
No. 108 410216095113401 72-38W-14CBBB 1955 RED OAK 4 Cretaceous 160 feet Montgomery County											
AUG 1988 12...	1030	217DKOT	500	60	14.0	385	6.90	190	54	13	9.5
No. 109 410857095094201 73-38W-01DBDC 1935 ELLIOTT 1 Quaternary 56 feet Montgomery County											
AUG 1988 11...	1630	112FLSC	110	30	14.5	290	6.90	170	45	13	7.5

## GROUND-WATER-QUALITY DATA

355

	DATE	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINIT LAB (MG/L AS CACO3) (90410)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	PHOS- PHOROUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)
No. 99	415614092520601		82-17W-06DCAD	1979	FERGUSON	2		Mississippian	160 feet	Marshall County	
	AUG 1988	4.8	324	21	350	0.50	11	938	<0.100	1.40	<0.100
No.100	420020092465001		83-17W-13BA	1955	LE GRAND	2		Mississippian	100 feet	Marshall County	
	JUN 1988	1.2	228	20	60	0.20	<0.10	404	12.0	<0.100	0.100
	03...										
	21...	--	--	--	--	--	--	--	11.0	<0.100	0.200
	SEP 21...	--	--	--	--	--	--	--	11.0	<0.100	<0.100
No.101	420145093100501		83-20W-03ADBD	1955	STATE CENTER	3		Quaternary	32 feet	Marshall County	
	AUG 1988	2.8	270	6.5	80	0.25	28	374	<0.100	0.300	<0.100
No.102	420352092552401		84-18W-22DDDD	1981	MARSHALLTOWN	14		Quaternary	160 feet	Marshall County	
	AUG 1988	3.4	278	21	46	0.30	14	390	0.200	<0.100	<0.100
No.103	420613092593601		84-18W-07BACA	1969	ALBION	2		Quaternary	26 feet	Marshall County	
	APR 1988	0.90	299	21	60	0.20	20	424	4.40	<0.100	<0.100
	15...										
	JUL 21...	--	--	--	--	--	--	--	3.90	<0.100	0.100
	SEP 21...	--	--	--	--	--	--	--	3.90	<0.100	0.100
No.104	421117093002201		85-19W-12ADCC	1962	LISCOMB	2		Mississippian	148 feet	Marshall County	
	AUG 1988	2.6	266	2.0	38	0.35	12	324	<0.100	0.200	<0.100
No.105	432610092465801		100-16W-31BDDC	1915	STACYVILLE	1		Devonian	117 feet	Mitchell County	
	AUG 1988	1.9	211	18	21	0.35	15	316	8.50	<0.100	0.100
No.106	420241095422001		84-42W-35CABB	1974	UTE	3		Quaternary	58 feet	Monona County	
	APR 1988	4.7	315	27	60	0.25	23	524	15.0	<0.100	<0.100
	12...										
	JUL 20...	--	--	--	--	--	--	--	17.0	<0.100	<0.100
	SEP 20...	--	--	--	--	--	--	--	16.0	<0.100	<0.100
No.107	405850095061701		71-37W-04ACD	1953	STANTON	1		Cretaceous	150 feet	Montgomery County	
	AUG 1988	3.4	255	20	21	0.45	24	322	<0.100	0.400	0.100
No.108	410216095113401		72-38W-14CBBB	1955	RED OAK	4		Cretaceous	160 feet	Montgomery County	
	AUG 1988	2.0	182	3.5	12	0.30	20	236	2.70	<0.100	<0.100
No.109	410857095094201		73-38W-01DBDC	1935	ELLIOTT	1		Quaternary	56 feet	Montgomery County	
	AUG 1988	1.6	141	4.5	16	0.30	26	214	5.60	<0.100	<0.100
	11...										

## GROUND-WATER-QUALITY DATA

[illegible]

## GROUND-WATER-QUALITY DATA

357

DATE	TIME	GEOLOGIC UNIT	FLOW RATE (G/M) (00058)	PUMPING PERIOD PRIOR TO SAM- PLING (MIN) (72004)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)
No.110	415559094591501	71-36W-21DDAB	1974	VILLISCA	7		Quaternary	42 feet	Montgomery County		
OCT 1987											
20...	0930	111ALVM	--	--	12.0	690	6.80	280	79	21	18
No.111	415604094593701	71-36W-21DBC	1975	VILLISCA	8		Quaternary	42 feet	Montgomery County		
OCT 1987											
20...	1000	111ALVM	--	--	12.0	510	6.70	210	62	13	16
No.112	432314095320201	99-40W-15BBBB	1958	OCHEYEDAN	3		Quaternary	33 feet	Osceola County		
SEP 1988											
06...	1530	110QRNR	1.0	60	22.0	510	7.70	250	63	23	2.3
No.113	403445095011501	67-36W-31BAAB	1967	BRADDYVILLE	2		Quaternary	32 feet	Page County		
OCT 1987											
21...	1200	111ALVM	--	--	--	--	--	170	50	11	9.5
No.114	403712095070601	67-37W-17BDAB	1968	COLLEGE SPRINGS	1		Quaternary	52 feet	Page County		
SEP 1988											
01...	0930	111ALVM	18	120	12.0	831	7.15	370	110	22	21
No.115	403906095015001	67-37W-01AAAA	1985	SHAMBAUGH	3		Quaternary	30 feet	Page County		
OCT 1987											
22...	0900	111ALVM	--	--	--	480	6.70	200	60	11	19
No.116	424305096145301	91-46W-11BBDD	1967	MERRILL	3		Quaternary	42 feet	Plymouth County		
APR 1988											
14...	1620	110QRNR	220	30	12.0	945	7.30	450	120	37	17
JUL 21...	1030	110QRNR	220	30	12.5	950	6.85	--	--	--	--
SEP 22...	1330	110QRNR	220	30	13.0	950	7.20	--	--	--	--
No.117	424528096362001	92-49W-27DAAA	1965	WESTFIELD	1		Quaternary	41 feet	Plymouth County		
APR 1988											
14...	1100	110QRNR	35	30	11.0	1270	7.13	600	170	42	25
SEP 21...	1200	110QRNR	35	15	12.0	1220	7.20	--	--	--	--
No.118	424921095581501	92-43W-06BABA	1956	REMSEN	3		Quaternary	35 feet	Plymouth County		
APR 1988											
14...	1700	110QRNR	75	60	10.5	960	7.03	460	130	34	20
JUL 19...	0915	110QRNR	75	30	10.0	970	7.05	--	--	--	--
SEP 21...	0920	110QRNR	90	30	12.0	960	7.20	--	--	--	--
No.119	424948096332901	93-48W-31BDDC	1959	AKRON	4		Quaternary	49 feet	Plymouth County		
APR 1988											
14...	1445	112PLSC	250	30	12.0	1340	6.03	630	180	45	22
JUL 21...	0845	112PLSC	250	30	12.0	1280	6.75	--	--	--	--
SEP 21...	1100	112PLSC	200	30	13.0	1240	7.15	--	--	--	--
No.120	424907094313001	92-31W-05AAC	1947	ROLFE	3		Mississippian	185 feet	Pocahontas County		
AUG 1988											
09...	1715	330MSSP	200	30	10.0	991	7.16	580	160	45	43

## GROUND-WATER-QUALITY DATA

DATE	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	PHOS- PHOROUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)
No.110 415559094591501	71-36W-21DDAB 1974	VILLISCA 7	Quaternary	42 feet	Montgomery County					
OCT 1987										
20...	3.4	142	61	120	0.25	--	402	<0.100	0.200	0.400
No.111 415604094593701	71-36W-21DBC 1975	VILLISCA 8	Quaternary	42 feet	Montgomery County					
OCT 1987										
20...	3.0	120	6.0	95	0.25	--	300	<0.100	<0.100	0.400
No.112 432314095320201	99-40W-15BBBB 1958	OCHEYEDAN 3	Quaternary	33 feet	Osceola County					
SEP 1988										
06...	3.8	206	7.0	38	0.20	19	254	5.10	<0.100	<0.100
No.113 403445095011501	67-36W-31BAAB 1967	BRADYVILLE 2	Quaternary	32 feet	Page County					
OCT 1987										
21...	3.6	162	9.0	30	0.25	--	218	<0.100	0.700	0.400
No.114 403712095070601	67-37W-17BDAB 1968	COLLEGE SPRINGS 1	Quaternary	52 feet	Page County					
SEP 1988										
01...	1.1	256	40	100	0.30	27	480	9.80	<0.100	0.100
No.115 403906095015001	67-37W-01AAAA 1985	SHAMBAUGH 3	Quaternary	30 feet	Page County					
OCT 1987										
22...	1.9	148	47	44	0.25	--	302	<0.100	<0.100	0.500
No.116 424305096145301	91-46W-11BBDD 1967	MERRILL 3	Quaternary	42 feet	Plymouth County					
APR 1988										
14...	4.8	357	26	71	0.30	26	546	15.0	<0.100	<0.100
JUL 21...	--	--	--	--	--	--	--	13.0	<0.100	<0.100
SEP 22...	--	--	--	--	--	--	--	13.0	<0.100	<0.100
No.117 424528096362001	92-49W-27DAAA 1965	WESTFIELD 1	Quaternary	41 feet	Plymouth County					
APR 1988										
14...	9.6	332	33	240	0.25	26	846	19.0	<0.100	<0.100
SEP 21...	--	--	--	--	--	--	--	17.0	<0.100	<0.100
No.118 424921095581501	92-43W-06BABA 1956	REMSEN 3	Quaternary	35 feet	Plymouth County					
APR 1988										
14...	4.3	318	31	180	0.40	23	628	10.0	0.100	<0.100
JUL 19...	--	--	--	--	--	--	--	8.50	<0.100	0.100
SEP 21...	--	--	--	--	--	--	--	6.70	<0.100	<0.100
No.119 424948096332901	93-48W-31BDDC 1959	AKRON 4	Quaternary	49 feet	Plymouth County					
APR 1988										
14...	8.6	366	29	290	0.15	27	870	15.0	<0.100	<0.100
JUL 21...	--	--	--	--	--	--	--	12.0	<0.100	<0.100
SEP 21...	--	--	--	--	--	--	--	12.0	<0.100	<0.100
No.120 424907094313001	92-31W-05AAC 1947	ROLFE 3	Mississippian	185 feet	Pocahontas County					
AUG 1988										
09...	4.8	421	0.50	200	0.45	20	740	<0.100	1.50	<0.100





## GROUND-WATER-QUALITY DATA

DATE	TIME	GEOLOGIC UNIT	FLOW RATE (G/M) (00058)	PUMPING PERIOD PRIOR TO SAM- PLING (MIN) (72004)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)
No.121	425001094421701	93-33W-35ABAC	1963	HAVELOCK 3				Cretaceous	190 feet	Pocahontas	County
AUG 1988	10...	1045 217DKOT	100	30	10.0	1330	7.17	710	190	56	48
No.122	425240094371002	93-32W-15BBBB	1977	PLOVER 2				Quaternary	46 feet	Pocahontas	County
SEP 1988	02...	1530 112PLSC	60	60	10.0	835	7.33	400	100	37	8.6
No.123	413342093432801	78-25W-15CAAC	1954	WEST DES MOINES 9				Quaternary	42 feet	Polk	County
APR 1988	14...	1130 111ALVM	280	20	13.0	725	7.31	350	95	27	14
JUL 18...	1500	111ALVM	--	120	15.0	690	7.30	--	--	--	--
SEP 27...	1400	111ALVM	285	20	14.0	725	7.03	--	--	--	--
No.124	414051093190902	79-21W-05CAAA	1958	MITCHELLVILLE 2				Quaternary	61 feet	Polk	County
APR 1988	14...	1600 111ALVM	250	20	11.0	500	7.32	310	81	25	7.9
JUL 18...	1130	111ALVM	--	60	14.5	550	7.30	--	--	--	--
SEP 27...	1600	111ALVM	250	20	11.0	625	7.00	--	--	--	--
No.125	414738093313601	81-23W-28DCD	1966	ELKHART 2				Quaternary	280 feet	Polk	County
AUG 1988	17...	1245 112PLSC	--	15	19.0	1020	7.30	350	94	29	88
No.126	414816093361701	81-24W-26AABC	1975	ALLEMAN 2				Quaternary	235 feet	Polk	County
AUG 1988	17...	1150 112PLSC	70	15	17.0	1000	8.13	280	52	36	97
No.127	411649095525001	75-44W-22DADA	1957	COUNCIL BLUFFS 1				Quaternary	121 feet	Pottawattamie	County
AUG 1988	18...	0830 111ALVM	700	30	12.0	2040	7.10	1000	270	83	96
No.128	412144095515501	76-44W-23DCDD	1971	CRESCENT 1				Quaternary	148 feet	Pottawattamie	County
AUG 1988	22...	0645 112PLSC	80	30	12.0	1820	7.58	600	150	54	220
No.129	412812095322701	77-41W-15ACDD	1940	MINDEN 2				Quaternary	48 feet	Pottawattamie	County
AUG 1988	17...	1130 111ALVM	18	30	11.0	830	7.15	450	120	36	17
No.130	413429092420402	78-16W-09ADDD	1968	SEARSBORO 2				Mississippian	150 feet	Poweshiek	County
AUG 1988	11...	1400 338KKUK	25	60	13.0	1730	7.50	740	170	76	140
No.131	421826095025101	87-36W-33BCAA	1978	LAKE VIEW 3				Quaternary	115 feet	Sac	County
APR 1988	13...	1415 112PLSC	200	60	12.5	750	7.03	370	98	30	12
JUL 19...	1130	112PLSC	200	120	12.0	780	7.09	--	--	--	--
SEP 20...	1330	112PLSC	200	25	13.0	770	7.30	--	--	--	--

## GROUND-WATER-QUALITY DATA

361

DATE	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LITY LAB (MG/L AS CACO3) (90410)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	PHOS- PHOROUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)
No.121 425001094421701	93-33W-35ABAC	1963	HAVELOCK 3			Cretaceous	190 feet	Pocahontas County		
AUG 1988 10...	4.6	421	0.50	350	0.40	17	976	<0.100	1.00	<0.100
No.122 425240094371002	93-32W-15BBBB	1977	PLOVER 2			Quaternary	46 feet	Pocahontas County		
SEP 1988 02...	4.1	310	32	100	0.40	30	494	<0.100	0.200	<0.100
No.123 413342093432801	78-25W-15CAAC	1954	WEST DES MOINES 9			Quaternary	42 feet	Polk County		
APR 1988 14...	3.1	268	26	98	0.30	24	444	0.800	0.300	0.200
JUL 18...	--	--	--	--	--	--	--	1.00	<0.100	<0.100
SEP 27...	--	--	--	--	--	--	--	1.00	<0.100	<0.100
No.124 414051093190902	79-21W-05CAAA	1958	MITCHELLVILLE 2			Quaternary	61 feet	Polk County		
APR 1988 14...	1.2	287	14	30	0.20	23	362	4.20	<0.100	<0.100
JUL 18...	--	--	--	--	--	--	--	4.10	<0.100	<0.100
SEP 27...	--	--	--	--	--	--	--	4.60	<0.100	<0.100
No.125 414738093313601	81-23W-28DCD	1966	ELKHART 2			Quaternary	280 feet	Polk County		
AUG 1988 17...	5.0	378	3.0	200	0.40	18	608	<0.100	2.00	<0.100
No.126 414816093361701	81-24W-26AABC	1975	ALLEMAN 2			Quaternary	235 feet	Polk County		
AUG 1988 17...	6.7	348	3.0	290	0.45	9.0	580	<0.100	3.20	0.200
No.127 411649095525001	75-44W-22DADA	1957	COUNCIL BLUFFS 1			Quaternary	121 feet	Pottawattamie County		
AUG 1988 18...	12	434	290	330	0.25	32	1440	<0.100	1.30	<0.100
No.128 412144095515501	76-44W-23DCDD	1971	CRESCENT 1			Quaternary	148 feet	Pottawattamie County		
AUG 1988 22...	29	190	120	610	2.8	17	1400	<0.100	1.40	<0.100
No.129 412812095322701	77-41W-15ACDD	1940	MINDEN 2			Quaternary	48 feet	Pottawattamie County		
AUG 1988 17...	2.3	314	34	32	0.30	19	476	9.30	<0.100	<0.100
No.130 413429092420402	78-16W-09ADDD	1968	SEARSBORO 2			Mississippian	150 feet	Poweshiek County		
AUG 1988 11...	9.9	172	5.5	790	0.70	7.2	1420	<0.100	3.10	<0.100
No.131 421826095025101	87-36W-33BCAA	1978	LAKE VIEW 3			Quaternary	115 feet	Sac County		
APR 1988 13...	3.5	287	14	80	0.20	27	436	9.60	<0.100	<0.100
JUL 19...	--	--	--	--	--	--	--	8.60	<0.100	<0.100
SEP 20...	--	--	--	--	--	--	--	8.30	<0.100	<0.100

## GROUND-WATER-QUALITY DATA

[illegible]

## GROUND-WATER-QUALITY DATA

363

DATE	TIME	GEOLOGIC UNIT	FLOW RATE (G/M) (00058)	PUMPING PERIOD PRIOR TO SAM- PLING (MIN) (72004)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)
No.132	422644095085501	88-37W-09DDAD	1973	EARLY 2		Quaternary		44 feet		Sac County	
APR 1988											
13...	1630	112PLSC	75	30	11.0	650	7.06	310	84	24	10
JUL											
19...	0930	112PLSC	70	45	9.5	680	7.15	--	--	--	--
SEP											
20...	1445	112PLSC	60	25	11.0	680	7.43	--	--	--	--
No.133	413459090463502	78-02E-06CDD	1943	WALCOTT 2		Silurian		118 feet		Scott County	
AUG 1988											
12...	1000	350SLRN	200	15	12.5	695	7.20	340	88	30	13
No.134	413855090430701	79-02E-15BDC	1955	MAYSVILLE 1		Silurian		160 feet		Scott County	
AUG 1988											
12...	1100	355NIGR	--	--	13.0	648	7.70	300	71	29	26
No.135	413810095185401	79-38W-19BDDDB	1981	HARLAN 27		Quaternary		36 feet		Shelby County	
APR 1988											
12...	1130	111ALVM	40	20	13.0	775	7.11	370	110	23	9.0
JUL											
20...	1215	111ALVM	--	360	12.0	750	7.20	--	--	--	--
SEP											
19...	1200	111ALVM	45	60	10.0	755	7.25	--	--	--	--
No.136	425946096292901	94-48W-03AAAB	1960	HAWARDEN 6		Quaternary		37 feet		Sioux County	
APR 1988											
14...	1320	110QRCU	120	30	12.0	1130	6.96	500	140	37	27
JUL											
21...	1200	110QRCU	120	60	12.5	1100	6.74	--	--	--	--
SEP											
21...	1345	110QRCU	150	30	13.5	1070	7.20	--	--	--	--
No.137	431441095562501	97-43W-04CCCD	1959	MATLOCK 3		Quaternary		23 feet		Sioux County	
AUG 1988											
10...	1615	110QRNR	13	45	10.0	920	7.30	480	130	38	18
No.138	420628093390001	84-24W-04CDDD	1914	GILBERT 1		Mississippian		160 feet		Story County	
AUG 1988											
17...	0950	330MSSP	--	60	17.0	775	7.87	290	73	27	41
No.139	421011093300501	85-23W-14CCBB	1930	ROLAND 1		Mississippian		255 feet		Story County	
AUG 1988											
17...	0830	330MSSP	175	20	15.0	755	7.35	350	85	34	20
No.140	415852092424901	83-16W-21DCAB	1970	MONTOUR 2		Quaternary		46 feet		Tama County	
APR 1988											
15...	1200	112PLSC	55	30	11.0	630	6.89	280	81	19	14
JUL											
21...	1100	112PLSC	--	10	12.0	625	7.20	--	--	--	--
SEP											
21...	0900	112PLSC	65	15	11.5	577	7.27	--	--	--	--
No.141	420533092403801	84-16W-14ABA	1943	GARWIN 2		Devonian		170 feet		Tama County	
AUG 1988											
11...	1230	341LMCK	>75	15	12.5	1670	7.50	510	100	64	230

## GROUND-WATER-QUALITY DATA

DATE	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	PHOS- PHOROUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)
No.132 422644095085501	88-37W-09DDAD	1973	EARLY 2	Quaternary	44 feet	Sac County				
APR 1988										
13...	3.6	258	14	33	0.25	16	350	12.0	<0.100	<0.100
JUL 19...	--	--	--	--	--	--	--	10.0	<0.100	0.100
SEP 20...	--	--	--	--	--	--	--	10.0	<0.100	<0.100
No.133 413459090463502	78-02E-06CDD	1943	WALCOTT 2	Silurian	118 feet	Scott County				
AUG 1988										
12...	0.50	322	9.5	44	0.30	14	392	0.500	<0.100	<0.100
No.134 413855090430701	79-02E-15BDC	1955	MAYSVILLE 1	Silurian	160 feet	Scott County				
AUG 1988										
12...	2.1	336	0.50	2.6	0.35	17	334	<0.100	1.20	<0.100
No.135 413810095185401	79-38W-19BDDDB	1981	HARLAN 27	Quaternary	36 feet	Shelby County				
APR 1988										
12...	3.9	293	18	110	0.30	25	476	<0.100	0.400	0.400
JUL 20...	--	--	--	--	--	--	--	<0.100	0.300	0.100
SEP 19...	--	--	--	--	--	--	--	0.100	0.300	<0.100
No.136 425946096292901	94-48W-03AAAB	1960	HAWARDEN 6	Quaternary	37 feet	Sioux County				
APR 1988										
14...	5.5	295	26	250	0.25	25	724	11.0	<0.100	0.200
JUL 21...	--	--	--	--	--	--	--	9.60	<0.100	0.200
SEP 21...	--	--	--	--	--	--	--	6.40	<0.100	0.100
No.137 431441095562501	97-43W-04CCCD	1959	MATLOCK 3	Quaternary	23 feet	Sioux County				
AUG 1988										
10...	3.7	302	18	200	0.35	26	644	<0.100	0.100	<0.100
No.138 420628093390001	84-24W-04CDDD	1914	GILBERT 1	Mississippian	160 feet	Story County				
AUG 1988										
17...	5.1	408	3.0	20	0.55	17	414	<0.100	2.50	<0.100
No.139 421011093300501	85-23W-14CCBB	1930	ROLAND 1	Mississippian	255 feet	Story County				
AUG 1988										
17...	5.6	330	3.5	54	2.1	7.6	408	<0.100	0.400	<0.100
No.140 415852092424901	83-16W-21DCAB	1970	MONTOUR 2	Quaternary	46 feet	Tama County				
APR 1988										
15...	3.0	227	14	60	0.20	19	370	6.80	<0.100	<0.100
JUL 21...	--	--	--	--	--	--	--	6.00	<0.100	0.100
SEP 21...	--	--	--	--	--	--	--	7.40	<0.100	<0.100
No.141 420533092403801	84-16W-14ABA	1943	GARWIN 2	Devonian	170 feet	Tama County				
AUG 1988										
11...	11	181	4.5	750	0.80	6.5	1250	<0.100	2.80	<0.100

## 365

[illegible]

## GROUND-WATER-QUALITY DATA

DATE	TIME	GEOLOGIC UNIT	FLOW RATE (G/M) (00058)	PUMPING PERIOD PRIOR TO SAM- PLING (MIN) (72004)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)
No.142 404454094372901 69-33W-27ADDD 1971 CONWAY 1 Quaternary 56 feet Taylor County											
APR 1988											
13...	1030	112PLSC	20	60	13.0	785	6.47	290	80	21	24
JUL											
20...	0930	112PLSC	--	15	13.0	788	6.70	--	--	--	--
SEP											
16...	1330	112PLSC	5.5	60	13.0	760	6.70	--	--	--	--
No.143 403844091442901 68-08W-35DABB 1941 FARMINGTON 1 Quaternary 38 feet Van Buren County											
APR 1988											
07...	1430	112PLSC	120	60	13.0	905	7.25	460	130	33	18
AUG											
02...	1430	112PLSC	--	10	15.0	940	7.50	--	--	--	--
SEP											
29...	0900	112PLSC	150	20	13.0	857	7.16	--	--	--	--
No.144 410907092375101 73-15W-06CADD 1970 EDDYVILLE 2 Quaternary 30 feet Wapello County											
APR 1988											
19...	1100	112PLSC	125	60	12.5	680	7.48	300	85	22	9.7
AUG											
02...	1145	112PLSC	--	60	15.0	678	7.40	--	--	--	--
SEP											
28...	1600	112PLSC	112	20	13.0	653	7.10	--	--	--	--
No.145 411806093440501 75-25W-16ADCA 1979 SAINT MARYS 2 Quaternary 55 feet Warren County											
APR 1988											
14...	1300	112PLSC	20	20	7.0	400	7.04	190	49	16	9.8
JUL											
18...	1315	112PLSC	--	10	15.0	382	7.30	--	--	--	--
SEP											
28...	1000	112PLSC	20	20	16.0	375	6.82	--	--	--	--
No.146 412849091343301 77-06W-17BBDD 1973 RIVERSIDE 6 Quaternary 225 feet Washington County											
AUG 1988											
10...	0930	111ALVM	250	60	14.0	740	8.00	200	52	18	87
No.147 431747091592601 98-10W-23ABCA 1930 RIDGEWAY 1 Devonian 192 feet Winneshiek County											
AUG 1988											
11...	1000	344CDVL	90	15	10.0	552	7.35	330	91	24	7.4
No.148 431814091474501 98-08W-16CAC 1948 DECORAH 1 Quaternary 67 feet Winneshiek County											
AUG 1988											
11...	1400	111ALVM	340	60	13.0	590	7.38	310	86	24	6.2
No.149 421405095433001 86-42W-27BCDA 1939 DANBURY 3 Quaternary 61 feet Woodbury County											
APR 1988											
15...	1230	111ALVM	225	30	12.0	825	7.00	410	110	33	10
JUL											
20...	1445	111ALVM	250	45	11.0	850	7.14	--	--	--	--
SEP											
19...	1455	111ALVM	195	20	13.0	850	7.20	--	--	--	--
No.150 422400096212501 88-47W-30DCAB 1938 SERGEANT BLUFF 2 Devonian 230 feet Woodbury County											
AUG 1988											
12...	0900	340DVNN	150	30	13.0	1620	7.16	730	220	43	87



## GROUND-WATER-QUALITY DATA

367

DATE	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	PHOS- PHOROUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)
No.142 404454094372901	69-33W-27ADDD	1971	CONWAY 1	Quaternary	56 feet	Taylor County				
APR 1988										
13...	2.7	179	26	170	0.20	33	488	2.80	0.700	0.700
JUL 20...	--	--	--	--	--	--	--	2.20	0.700	0.200
SEP 16...	--	--	--	--	--	--	--	1.50	0.600	<0.100
No.143 403844091442901	68-08W-35DABB	1941	FARMINGTON 1	Quaternary	38 feet	Van Buren County				
APR 1988										
07...	2.4	261	16	180	0.45	25	606	4.90	<0.100	<0.100
AUG 02...	--	--	--	--	--	--	--	4.50	<0.100	<0.100
SEP 29...	--	--	--	--	--	--	--	5.10	<0.100	<0.100
No.144 410907092375101	73-15W-06CADD	1970	EDDYVILLE 2	Quaternary	30 feet	Wapello County				
APR 1988										
19...	2.3	233	20	91	0.15	16	368	3.00	<0.100	<0.100
AUG 02...	--	--	--	--	--	--	--	3.90	<0.100	<0.100
SEP 28...	--	--	--	--	--	--	--	3.40	<0.100	<0.100
No.145 411806093440501	75-25W-16ADCA	1979	SAINT MARYS 2	Quaternary	55 feet	Warren County				
APR 1988										
14...	<0.10	170	4.0	23	0.35	26	232	5.60	<0.100	<0.100
JUL 18...	--	--	--	--	--	--	--	6.20	0.100	0.100
SEP 28...	--	--	--	--	--	--	--	6.80	<0.100	0.200
No.146 412849091343301	77-06W-17BBDD	1973	RIVERSIDE 6	Quaternary	225 feet	Washington County				
AUG 1988										
10...	4.8	368	2.5	4.4	0.15	10	394	<0.100	4.70	0.200
No.147 431747091592601	98-10W-23ABCA	1930	RIDGEWAY 1	Devonian	192 feet	Winneshiek County				
AUG 1988										
11...	3.2	259	30	48	0.45	13	412	<0.100	<0.100	<0.100
No.148 431814091474501	98-08W-16CAC	1948	DECORAH 1	Quaternary	67 feet	Winneshiek County				
AUG 1988										
11...	3.2	264	16	21	0.30	12	354	2.80	<0.100	<0.100
No.149 421405095433001	86-42W-27BCDA	1939	DANBURY 3	Quaternary	61 feet	Woodbury County				
APR 1988										
15...	4.4	331	20	60	0.30	25	476	14.0	<0.100	0.100
JUL 20...	--	--	--	--	--	--	--	14.0	<0.100	0.100
SEP 19...	--	--	--	--	--	--	--	15.0	<0.100	<0.100
No.150 422400096212501	88-47W-30DCAB	1938	SERGEANT BLUFF 2	Devonian	230 feet	Woodbury County				
AUG 1988										
12...	26	259	24	620	2.0	8.9	1260	<0.100	0.500	<0.100

## GROUND-WATER-QUALITY DATA

[illegible]

## GROUND-WATER-QUALITY DATA

369

DATE	TIME	GEOLOGIC UNIT	FLOW RATE (G/M) (00058)	PUMPING PERIOD TO SAM- PLING (MIN) (72004)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)
No.151	422759095402502	88-42W-01ADCC	1959	CUSHING	2		Quaternary	36 feet	Woodbury County		
APR 1988											
15...	1000	111ALVM	90	20	10.0	890	7.31	460	130	32	13
JUL											
20...	1615	111ALVM	90	20	10.5	820	6.90	--	--	--	--
SEP											
20...	1620	111ALVM	90	20	12.0	780	7.35	--	--	--	--
No.152	422924096041801	89-44W-29CCDD	1934	MOVILLE	2		Quaternary	48 feet	Woodbury County		
AUG 1988											
11...	1430	111ALVM	200	60	12.0	645	7.38	330	93	24	8.8
No.153	423242095521501	89-43W-12BADB	1920	PIERSON	1		Quaternary	26 feet	Woodbury County		
APR 1988											
15...	1015	111ALVM	200	45	10.0	790	6.95	400	110	30	16
JUL											
21...	1500	111ALVM	200	20	11.0	860	6.71	--	--	--	--
SEP											
22...	1145	111ALVM	200	30	12.5	850	7.25	--	--	--	--
DATE		POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	PHOS- PHOROUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)
No.151	422759095402502	88-42W-01ADCC	1959	CUSHING	2		Quaternary	36 feet	Woodbury County		
APR 1988											
15...	3.5	283	22	110	0.35	22	564	18.0	<0.100	<0.100	
JUL											
20...	--	--	--	--	--	--	--	20.0	<0.100	<0.100	
SEP											
20...	--	--	--	--	--	--	--	15.0	<0.100	<0.100	
No.152	422924096041801	89-44W-29CCDD	1934	MOVILLE	2		Quaternary	48 feet	Woodbury County		
AUG 1988											
11...	4.3	266	8.0	34	0.30	25	396	7.90	<0.100	0.200	
No.153	423242095521501	89-43W-12BADB	1920	PIERSON	1		Quaternary	26 feet	Woodbury County		
APR 1988											
15...	3.2	310	14	65	0.45	23	470	14.0	<0.100	<0.100	
JUL											
21...	--	--	--	--	--	--	--	18.0	0.200	<0.100	
SEP											
22...	--	--	--	--	--	--	--	19.0	<0.100	<0.100	

## GROUND-WATER-QUALITY DATA

[illegible]

## PRECIPITATION WATER-QUALITY DATA

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## BIG SPRING FISH HATCHERY NEAR ELKADER, IOWA

LOCATION.--Lat 42°54'35", long 91°28'11", in SE1/4 SE1/4 sec. 31, T.94 N., R.5 W., Clayton County, Hydrologic Unit 07060004, 3.0 mi north and 2.8 mi west of Elkader, Iowa.

OWNER.--U.S. Geological Survey.

PERIOD OF RECORD.--August 1984 to current year.

INSTRUMENTATION.--Wet/dry precipitation collector, weighing-bucket type recording rain gage with alter wind shield and event recorder and National Weather Service standard 8-inch rain and snow gage (back-up only).

REMARKS.--Samples marked with an asterik (\*) were received dry. Fifty (50) ml of dilution water was added to the sample bucket to dissolve dry precipitate and then analyzed.

EXTREMES FOR PERIOD OF RECORD.--Maximum field pH, 6.98, May 5 to May 12, 1987; minimum field pH, 3.83, July 30 to August 6, 1985.

EXTREMES FOR CURRENT YEAR.-- No data available for the 1988 Water Year.

## WET DEPOSITION DATA

DATE	PH (STAND- ARD UNITS) (00400)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, NITRATE DIS- SOLVED (MG/L AS N) (00618)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	PHOS- PHOROUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)
SEP 29-											
OCT 06	--	--	--	--	--	--	--	--	--	--	--
*OCT											
06-13	--	--	0.020	0.005	0.004	0.030	<0.160	<0.007	0.06	<0.03	<0.007
OCT											
13-20	--	--	0.479	0.069	0.045	0.066	0.584	0.331	0.10	1.93	<0.007
OCT											
20-27	--	--	3.274	0.365	0.147	0.538	1.766	1.778	0.40	7.07	<0.029
OCT 27-											
NOV 03	--	--	0.345	0.089	0.030	0.089	0.895	0.508	0.16	2.05	<0.007
NOV											
03-10	--	--	0.259	0.038	0.023	0.046	0.373	0.231	0.09	1.97	<0.007
NOV											
10-17	--	--	0.104	0.028	0.012	0.036	0.171	0.133	0.08	1.00	<0.007
NOV											
17-25	--	--	0.847	0.096	0.073	0.353	0.902	0.773	0.39	3.62	<0.007
NOV 25-											
DEC 01	--	--	--	--	--	--	--	--	--	--	--
*DEC											
01-08	--	--	0.820	0.066	<0.003	0.046	0.132	0.060	0.08	0.34	0.010
DEC											
08-15	--	--	--	--	--	--	--	--	--	--	--
*DEC											
15-22	--	--	0.142	0.030	0.197	0.121	0.062	<0.007	0.22	<0.03	<0.007
DEC											
22-29	--	--	0.079	0.015	<0.003	0.025	0.031	0.102	0.060	0.140	<0.007
DEC 29 1987-											
JAN 05 1988	--	--	--	--	--	--	--	--	--	--	--
*JAN											
05-12	--	--	0.037	0.008	0.016	0.053	<0.016	<0.007	0.04	0.09	<0.026
JAN											
12-19	--	--	--	--	--	--	--	--	--	--	--
JAN											
19-26	--	--	0.213	0.031	0.005	0.030	0.109	0.311	0.07	1.17	<0.007
JAN 26-											
FEB 02	--	--	--	--	--	--	--	--	--	--	--
FEB											
02-09	--	--	4.360	0.485	0.033	0.127	0.373	0.568	0.18	1.33	<0.010
FEB											
09-16	--	--	0.557	0.057	0.021	0.160	0.257	0.468	0.12	0.69	<0.007
FEB											
16-23	--	--	--	--	--	--	--	--	--	--	--
FEB 23-											
MAR 01	--	--	--	--	--	--	--	--	--	--	--
MAR											
01-08	--	--	3.503	0.304	0.072	0.518	<0.140	0.357	0.54	9.20	<0.058
MAR											
08-15	--	--	4.350	0.176	0.365	0.593	0.871	0.952	0.58	3.92	0.023
MAR											
15-22	--	--	--	--	--	--	--	--	--	--	--
MAR											
22-29	--	--	0.834	0.103	0.119	0.168	0.794	0.331	0.19	2.75	<0.007
MAR 29-											
APR 05	--	--	0.158	0.022	0.033	0.066	0.731	0.539	0.12	3.37	<0.007
APR											
05-12	--	--	0.482	0.057	0.207	0.196	0.809	0.699	0.30	4.42	0.013
APR											
12-19	--	--	1.985	0.317	0.141	4.532	<0.062	0.027	0.90	1.68	0.038
APR											
19-26	--	--	1.694	0.210	0.701	0.199	0.389	0.897	0.28	3.99	<0.007

## PRECIPITATION WATER-QUALITY DATA.--Continued.

## BIG SPRINGS FISH HATCHERY NEAR ELKADER, IOWA

## WET DEPOSITION DATA

DATE	PH (STAND- ARD UNITS) (00400)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, NITRATE DIS- SOLVED (MG/L AS N) (00618)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	PHOS- PHOROUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)
APR 26- MAY 03	--	--	0.244	0.041	0.006	0.068	0.685	0.417	0.07	2.26	0.088
MAY 03-10	--	--	0.916	0.177	0.119	0.085	0.187	0.224	0.15	1.90	<0.007
MAY 10-17	--	--	--	--	--	--	--	--	--	--	--
*MAY 17-24	--	--	0.033	0.012	0.012	0.031	<0.016	<0.007	0.03	<0.03	0.026
*MAY 24-31	--	--	0.046	0.012	0.019	0.023	<0.016	<0.007	0.05	<0.03	<0.007
*MAY 31- JUN 07	--	--	0.080	0.011	0.007	0.036	<0.016	<0.007	<0.03	0.06	0.029
*JUN 07-14	--	--	0.084	0.010	0.013	0.033	<0.016	<0.007	<0.03	0.05	<0.007
JUN 14-21	--	--	1.152	0.172	0.087	0.208	0.303	0.781	0.30	3.53	<0.007
JUN 21-28	--	--	0.907	0.110	0.114	0.120	<0.016	0.717	0.19	2.56	<0.007
JUN 28- JUL 05	--	--	2.114	0.327	0.043	0.045	0.428	0.826	0.18	3.42	<0.007
JUL 05-12	--	--	0.474	0.058	0.005	0.065	<0.016	0.320	0.07	1.47	<0.007
JUL 12-19	--	--	1.204	0.152	0.053	0.162	<0.016	0.786	0.27	2.83	<0.007
JUL 19-26	--	--	0.813	0.122	0.003	0.247	0.358	0.391	0.11	1.60	<0.007
*JUL 26- AUG 02	--	--	0.115	0.015	0.014	0.018	<0.016	<0.007	0.04	<0.03	<0.007
AUG 02-09	--	--	0.529	0.073	0.029	0.049	0.366	0.309	0.08	1.58	<0.007
*AUG 09-16	--	--	0.089	0.010	0.012	0.018	<0.016	0.007	0.04	<0.03	0.020
AUG 16-23	--	--	0.294	0.068	0.018	0.027	0.436	0.395	0.10	4.64	<0.007
AUG 23-30	--	--	1.842	0.165	0.088	0.200	1.520	0.804	0.14	3.45	<0.007
AUG 30- SEP 06	--	--	0.692	0.115	0.213	0.202	0.303	0.218	0.32	1.20	<0.007
*SEP 06-13	--	--	0.045	0.005	0.029	0.052	<0.016	<0.007	0.06	<0.03	0.010
SEP 13-20	--	--	0.075	0.030	0.026	0.035	<0.016	<0.007	0.05	0.49	<0.007
SEP 20-27	--	--	0.241	0.037	0.030	0.107	0.390	0.253	0.13	1.44	<0.007
SEP 27- OCT 04	--	--	2.549	0.522	0.446	0.717	0.980	0.740	1.11	8.82	0.

## MCNAY RESEARCH STATION NEAR CHARITON, IOWA

LOCATION.--Lat 40°57'47", long 93°23'32", in SW1/4 NE1/4 sec. 9, T.71 N., R.23 W., Lucas County, Hydrologic Unit 10280201, 3.1 mi east and 2.0 mi north of Derby, Iowa, 3.4 mi west and 2.8 mi south of Chariton, Iowa.

OWNER.--U.S. Geological Survey.

PERIOD OF RECORD.--September 1984 to current year.

INSTRUMENTATION.--Wet/dry precipitation collector, weighing-bucket type recording rain gage with alter wind shield and event recorder. National Weather Service standard 8-inch rain and snow gage (back-up only).

REMARKS.--Samples marked with an asterik (\*) were received dry. Fifty (50) ml of dilution water was added to the sample bucket to dissolve dry precipitate and then analyzed.

EXTREMES FOR PERIOD OF RECORD.--Maximum field pH, 7.07, April 19 to April 26, 1988; minimum field pH, 3.84, February 12 to February 19, 1985.

EXTREMES FOR CURRENT YEAR.--Maximum field pH, 7.07, April 19 to April 26, 1988; minimum field pH, 4.10, January 12 to January 19, 1988.

## WET DEPOSITION DATA

DATE	PH (STAND- ARD UNITS) (00400)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, NITRATE DIS- SOLVED (MG/L AS N) (00618)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	PHOS- PHOROUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)
SEP 29- OCT 06	--	--	--	--	--	--	--	--	--	--	--
OCT 06-13	6.18	15.9	1.873	0.311	0.120	0.192	0.148	0.519	0.21	1.00	<0.007
OCT 13-20	4.48	24.0	0.199	0.018	0.050	0.078	0.646	0.346	0.11	2.69	<0.007
OCT 20-27	5.08	29.4	2.250	0.159	0.088	0.276	0.599	0.908	0.29	4.50	<0.007
OCT 27- NOV 03	4.52	9.60	0.081	0.013	0.003	0.059	<0.016	0.138	0.08	0.91	<0.007
NOV 03-10	--	--	1.202	0.093	0.068	0.660	<0.132	0.619	0.42	4.06	<0.055
NOV 10-17	4.73	9.00	0.165	0.014	0.011	0.032	<0.016	0.127	0.07	0.96	<0.007
NOV 17-24	--	--	1.896	0.150	0.080	0.562	<0.054	1.454	0.86	5.45	<0.022
NOV 24- DEC 01	4.58	15.6	0.020	0.005	<0.003	0.017	0.132	0.204	0.04	1.42	<0.007
DEC 01-08	--	--	0.528	0.075	0.075	0.339	<0.296	<0.127	0.57	3.21	<0.123
DEC 08-15	4.66	17.2	0.452	0.037	0.025	0.092	0.257	0.406	0.11	2.05	<0.007
DEC 15-22	4.83	7.00	0.027	0.004	<0.003	0.021	<0.016	0.098	<0.03	0.44	<0.007
DEC 22-29	4.49	17.0	0.067	0.011	0.012	0.035	0.241	0.313	0.07	1.51	<0.007
DEC 29 1987- JAN 05 1988	--	--	--	--	--	--	--	--	--	--	--
JAN 05-12	--	--	--	--	--	--	--	--	--	--	--
JAN 12-19	4.10	44.7	1.077	0.063	0.006	0.293	0.443	0.766	0.32	4.50	0.036
JAN 19-26	--	--	3.020	0.116	0.140	0.312	<0.016	0.493	0.29	4.25	<0.007
JAN 26- FEB 02	--	--	--	--	--	--	--	--	--	--	--
FEB 02-09	--	--	0.385	0.020	0.041	0.147	<0.078	<0.033	<0.15	0.56	<0.033
FEB 09-16	--	--	0.598	0.058	0.003	0.179	0.420	0.906	0.14	1.96	0.010
FEB 16-23	--	--	--	--	--	--	--	--	--	--	--
*FEB 23- MAR 01	--	--	0.027	<0.003	0.003	0.049	<0.016	<0.007	<0.03	0.04	0.016
MAR 01-08	--	--	--	--	--	--	--	--	--	--	--
MAR 09-15	--	--	--	--	--	--	--	--	--	--	--
MAR 15-22	--	--	0.510	<0.153	0.306	0.765	<0.794	<0.340	<1.53	<1.53	<0.333
MAR 22-29	--	14.6	0.921	0.070	0.032	0.189	0.568	0.078	0.05	0.38	<0.007
MAR 29- APR 05	--	34.7	0.488	0.058	0.016	0.046	0.195	0.624	0.09	3.27	<0.007
APR 05-12	--	--	0.479	0.054	0.024	0.087	1.214	0.815	0.21	2.82	0.101
APR 12-19	--	--	2.107	0.271	0.034	0.220	<0.132	<0.056	<0.25	1.69	0.138
APR 19-26	7.07	32.0	3.660	0.175	0.057	0.055	0.731	0.009	0.14	2.01	<0.007

## PRECIPITATION WATER-QUALITY DATA.--Continued.

## MCNAY RESEARCH STATION NEAR CHARITON, IOWA

## WET DEPOSITION DATA

DATE	PH (STAND- ARD UNITS) (00400)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, NITRATE DIS- SOLVED (MG/L AS N) (00618)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	PHOS- PHOROUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)
APR 26- MAY 03 MAY	--	--	0.696	0.057	0.004	0.057	0.638	0.733	0.21	5.28	0.121
03-10 *MAY	5.87	12.1	0.794	0.068	0.042	0.130	0.327	0.269	0.21	2.37	<0.007
10-17 MAY	--	--	0.020	0.004	<0.003	0.020	<0.016	<0.007	<0.03	0.05	0.026
17-24 *MAY	--	60.7	0.791	0.142	0.034	0.033	0.817	0.904	0.19	6.84	<0.007
24-31 MAY 31-	--	--	0.034	0.004	<0.003	0.041	<0.016	<0.007	<0.03	0.11	0.021
JUN 07 JUN	4.20	37.6	0.765	0.049	0.104	0.093	0.389	0.577	0.20	4.73	0.010
07-14 *JUN	5.80	22.3	1.451	0.201	0.108	0.124	<0.016	0.677	0.17	3.66	<0.007
14-21 JUN	--	--	0.149	0.010	0.033	0.098	<0.016	<0.007	0.08	0.14	0.036
21-28 JUN 28-	5.46	--	2.016	0.133	0.213	0.279	0.296	1.268	0.32	4.06	<0.007
JUL 05 JUL	5.08	24.0	2.126	0.135	0.035	0.169	0.039	0.910	0.25	3.23	<0.007
05-12 JUL	4.58	19.4	0.553	0.027	0.003	0.086	0.062	0.433	0.12	2.24	<0.007
12-19 JUL	5.91	11.2	0.596	0.045	0.023	0.106	0.482	0.522	0.15	1.43	<0.007
19-26 JUL 26-	--	--	--	--	--	--	--	--	--	--	--
AUG 02 AUG	--	--	--	--	--	--	--	--	--	--	--
02-09 AUG	5.71	13.3	1.180	0.071	0.032	0.100	0.490	0.402	0.13	1.66	<0.007
09-16 AUG	4.64	16.0	0.283	0.030	0.013	0.097	<0.016	0.340	0.13	1.39	0.010
16-23 AUG	4.95	10.6	0.308	0.023	0.018	0.038	0.373	0.260	0.06	1.58	<0.007
23-30 AUG 30-	5.72	35.9	2.243	0.207	0.255	0.162	1.240	1.270	0.28	5.41	<0.007
SEP 06 *SEP	--	--	1.463	0.109	0.073	0.082	0.529	0.344	0.10	1.60	<0.007
06-13 SEP	--	--	0.018	<0.003	<0.003	0.018	<0.016	<0.007	0.03	<0.03	<0.007
13-20 *SEP	4.42	17.1	0.247	0.026	0.011	0.071	0.147	0.240	0.14	2.18	<0.007
20-27 SEP 27-	--	--	<0.009	<0.003	<0.003	0.045	<0.015	0.007	<0.03	<0.03	0.020
OCT 04	5.73	22.9	2.127	0.085	0.041	0.071	0.933	0.659	0.11	3.71	<0.007



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## FACTORS FOR CONVERTING INCH-POUND UNITS TO INTERNATIONAL SYSTEM UNITS (SI)

The following factors may be used to convert the inch-pound units published herein to the International System of Units (SI).

Multiply inch-pound units	By	To obtain SI units
<i>Length</i>		
inches (in)	$2.54 \times 10^1$	millimeters (mm)
	$2.54 \times 10^{-2}$	meters (m)
feet (ft)	$3.048 \times 10^{-1}$	meters (m)
miles (mi)	$1.609 \times 10^0$	kilometers (km)
<i>Area</i>		
acres	$4.047 \times 10^3$	square meters (m <sup>2</sup> )
	$4.047 \times 10^{-1}$	square hectometers (hm <sup>2</sup> )
	$4.047 \times 10^{-3}$	square kilometers (km <sup>2</sup> )
square miles (mi <sup>2</sup> )	$2.590 \times 10^0$	square kilometers (km <sup>2</sup> )
<i>Volume</i>		
gallons (gal)	$3.785 \times 10^0$	liters (L)
	$3.785 \times 10^0$	cubic decimeters (dm <sup>3</sup> )
	$3.785 \times 10^{-3}$	cubic meters (m <sup>3</sup> )
million gallons	$3.785 \times 10^3$	cubic meters (m <sup>3</sup> )
	$3.785 \times 10^{-3}$	cubic hectometers (hm <sup>3</sup> )
cubic feet (ft <sup>3</sup> )	$2.832 \times 10^1$	cubic decimeters (dm <sup>3</sup> )
	$2.832 \times 10^{-2}$	cubic meters (m <sup>3</sup> )
cfs-days	$2.447 \times 10^3$	cubic meters (m <sup>3</sup> )
	$2.447 \times 10^{-3}$	cubic hectometers (hm <sup>3</sup> )
acre-feet (acre-ft)	$1.233 \times 10^3$	cubic meters (m <sup>3</sup> )
	$1.233 \times 10^{-3}$	cubic hectometers (hm <sup>3</sup> )
	$1.233 \times 10^{-6}$	cubic kilometers (km <sup>3</sup> )
<i>Flow</i>		
cubic feet per second (ft <sup>3</sup> /s)	$2.832 \times 10^1$	liters per second (L/s)
	$2.832 \times 10^1$	cubic decimeters per second (dm <sup>3</sup> /s)
	$2.832 \times 10^{-2}$	cubic meters per second (m <sup>3</sup> /s)
gallons per minute (gal/min)	$6.309 \times 10^{-2}$	liters per second (L/s)
	$6.309 \times 10^{-2}$	cubic decimeters per second (dm <sup>3</sup> /s)
	$6.309 \times 10^{-5}$	cubic meters per second (m <sup>3</sup> /s)
million gallons per day	$4.381 \times 10^1$	cubic decimeters per second (dm <sup>3</sup> /s)
	$4.381 \times 10^{-2}$	cubic meters per second (m <sup>3</sup> /s)
<i>Mass</i>		
tons (short)	$9.072 \times 10^{-1}$	megagrams (Mg) or metric tons

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