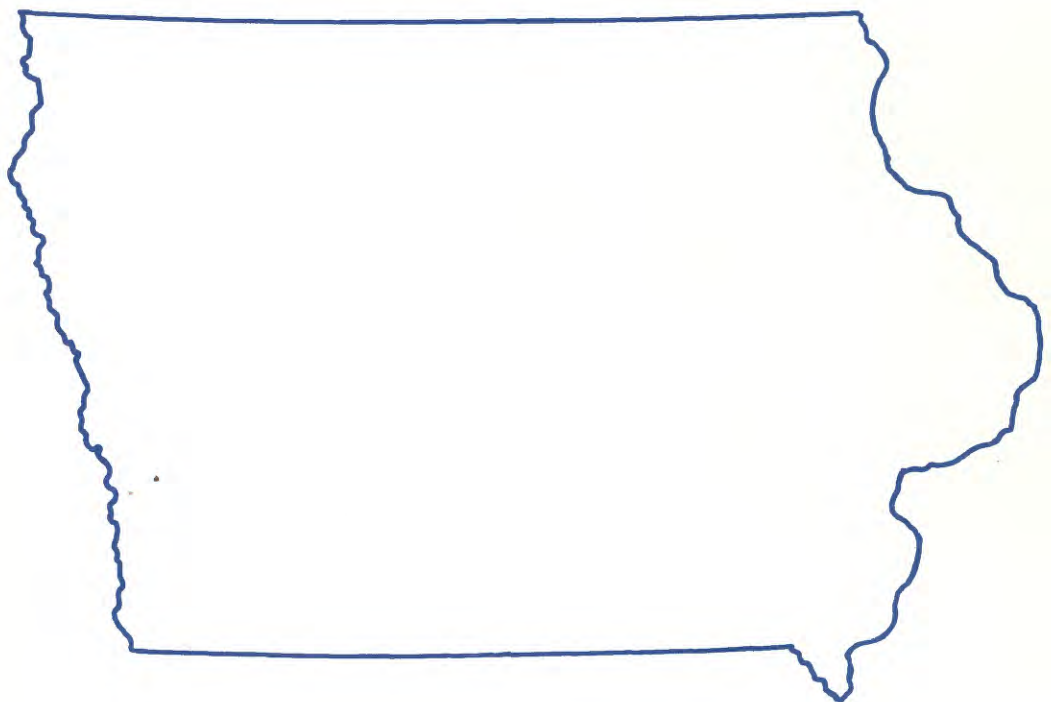




Water Resources Data Iowa Water Year 1991



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT IA-91-1
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 1991

1990

OCTOBER							NOVEMBER							DECEMBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
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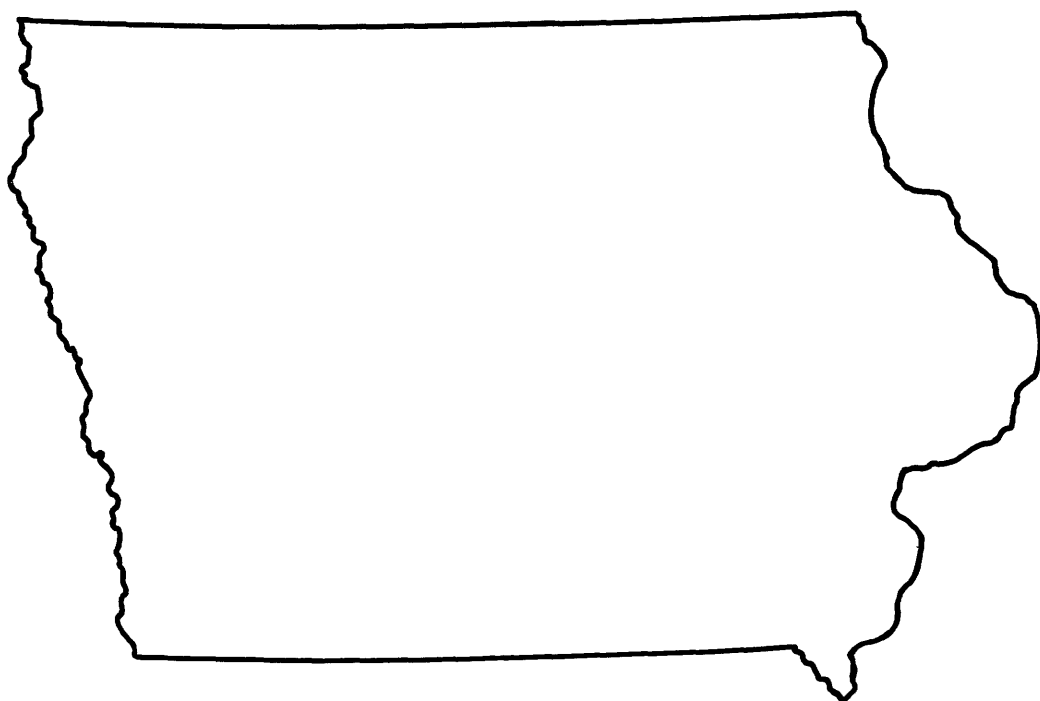
1991

JANUARY							FEBRUARY							MARCH						
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		1	2	3	4	5						1	2						1	2
6	7	8	9	10	11	12								5	4	5	6	7	8	9
13	14	15	16	17	18	19	3	4	5	6	7	8	9	10	11	12	13	14	15	16
20	21	22	23	24	25	26	10	11	12	13	14	15	16	17	18	19	20	21	22	23
27	28	29	30	31			17	18	19	20	21	22	23	24	25	26	27	28	29	30
							24	25	26	27	28			31						
APRIL							MAY							JUNE						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
	1	2	3	4	5	6					1	2	3							1
7	8	9	10	11	12	13								2	3	4	5	6	7	8
14	15	16	17	18	19	20	5	6	7	8	9	10	11	9	10	11	12	13	14	15
21	22	23	24	25	26	27	12	13	14	15	16	17	18	16	17	18	19	20	21	22
28	29	30					19	20	21	22	23	24	25	23	24	25	26	27	28	29
							26	27	28	29	30	31		30						
JULY							AUGUST							SEPTEMBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
	1	2	3	4	5	6					1	2	3	1	2	3	4	5	6	7
7	8	9	10	11	12	13								8	9	10	11	12	13	14
14	15	16	17	18	19	20	4	5	6	7	8	9	10	15	16	17	18	19	20	21
21	22	23	24	25	26	27	11	12	13	14	15	16	17	22	23	24	25	26	27	28
28	29	30	31				18	19	20	21	22	23	24	29	30					



Water Resources Data Iowa Water Year 1991

by D.J. O'Connell, R.B. Lambert, W.J. Matthes, and D. Sneck-Fahrer



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT IA-91-1
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
MANUEL LUJAN, JR., 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

1991

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. The authors would like to acknowledge Mr. Phil Soenksen for the assistance in the determination of peak flows with indirect methods and Mr. Woodrow Wang for writting the Surface Water Quality of the Hydrologic Conditions. 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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Von E. Miller, Iowa City Field Headquarters
Alvin R. Conkling, Fort Dodge Field Headquarters

The data were collected, computed and processed by the following personnel:

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P.D. Lustgraaf	V.D. Sanford	B.D. Schaap
J.R. Sondag	M.L. Stalzer	J.J. Wellman

This report was prepared in cooperation with the State of Iowa and with other agencies under the general supervision of N.B. Melcher, District Chief, Iowa.

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16. Abstract (Limit: 200 words) Water resources data for the 1991 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 118 stream-gaging stations; stage or contents for 9 lakes and reservoirs; water quality for 6 stream-gaging stations; sediment records for 11 stream-gaging stations; water levels for 213 observation wells; and chemical analyses for 233 municipal wells. Also included are 124 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.			
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FOR WHICH RECORDS ARE PUBLISHED

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[Letter after station name designates type of data: (d) discharge,
(c) chemical, (m) microbiological, (t) water temperature, (s) sediment]

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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; 1933-51
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	32.0	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
Davids Creek near Hamlin, Iowa	06809000	26.0	1952-73
Tarkio river at Blanchard, Iowa	06812000	200	1934-40
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

WATER RESOURCES DATA - IOWA, 1991
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).

WATER RESOURCES DATA - IOWA, 1991

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 118 gaging stations, stage or contents for 9 lakes and reservoirs, water quality records for 6 gaging stations, sediment records for 11 gaging stations, and water levels for 205 observation wells. Also included are data for 120 crest-stage partial-record stations and water-quality data from 233 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 Books and Open-File Reports Section, Federal Center, Box 25425, Denver, Colorado 80225.

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-91-1." 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. Beginning with the 1990 water year, all water-data reports will also be available on Compact Disk - Read Only Memory (CD-ROM). All data reports published for the current water year for the entire Nation, including Puerto Rico and the Trust Territories, will be reproduced on a single CD-ROM disc.

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. A limited number of CD-ROM discs will be available for sale by the Books and Open-File Reports Section, U.S. Geological Survey, Federal Center, Box 25425, Denver, Colorado 80225.

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 agreements with the U.S. Geological Survey in Iowa during wateryear 1991 are:

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

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

Iowa State University, Department of Agricultural Engineering and
Biosystems Engineering, James Gilley, Chairperson

Iowa State University, Department of Contracts and Grants, Richard
E. Hasbrook, Contracts and Grants Officer

Iowa State University, Iowa State Water Resources Research
Institute, Dennis Keeney, Director

University of Iowa, College of Engineering, Robert G. Hering,
Dean, Institute of Hydraulic Research, Robert Ettema,
Acting Director

University of Iowa, Department of Preventive Medicine and Environ-
mental Health, Robert B. Wallace, Department Head

University of Iowa, Hygienic Laboratory, W.J. Hausler, Jr., 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 U.S. Army Corps of Engineers in collecting streamflow records for 77 stream gaging stations. Assistance was also furnished by NOAA-National Weather Service, U.S. Department of Commerce.

The following organizations aided in collecting records:

Carroll County Soil and Water Conservation District; City of Charles City; City of Clear Lake; City of Denison; City of Des Moines Water Works; City of Iowa City; City of Marshalltown; City of Sioux City; City of Waterloo; City of Waterloo Sewage Treatment Plant; Union Electric Company, Keokuk; University of Iowa; and West Central Iowa Rural Water Association, Manning.

Organizations that supplied data are acknowledged in the station descriptions.

SUMMARY OF HYDROLOGIC CONDITIONS

Surface water

Water year 1991 (October 1, 1990, to September 30, 1991) was characterized by variable precipitation and streamflows across Iowa. Recorded precipitation for the year ranged from 5.91 inches less than normal in the southeast Iowa climatological district to 7.83 inches greater than normal in the north-central Iowa climatological district (fig. 1). Statewide average precipitation of 34.27 inches was 107 percent of the normal 32.09 inches for 1951-80 (table 1). Water year 1991 ranked as the 36th wettest and the 24th warmest in temperature in 118 years of record (in this summary of hydrologic conditions, all data and statistics pertaining to precipitation in Iowa were provided by Harry Hillaker, State Climatologist, Iowa Department of Agriculture and Land Stewardship, oral and written commun., 1991).

In the following discussion, deficient-, normal-, and excessive-flow ranges are defined by the percentile distribution of the mean daily discharges of a specific day for the period of record. A daily mean discharge is in the deficient-flow range if its value is less than or equal to the 25th percentile, in the normal-flow range if its value is between the 25th and 75th percentiles, and in the excessive-flow range if its value is equal to or greater than the 75th percentile.

Table 1.--Monthly and annual precipitation during water year 1991 as a percentage of normal precipitation (1951-80). [Source: Harry Hillaker, State Climatologist, Iowa Department of Agriculture and Land Stewardship, written commun., 1991]

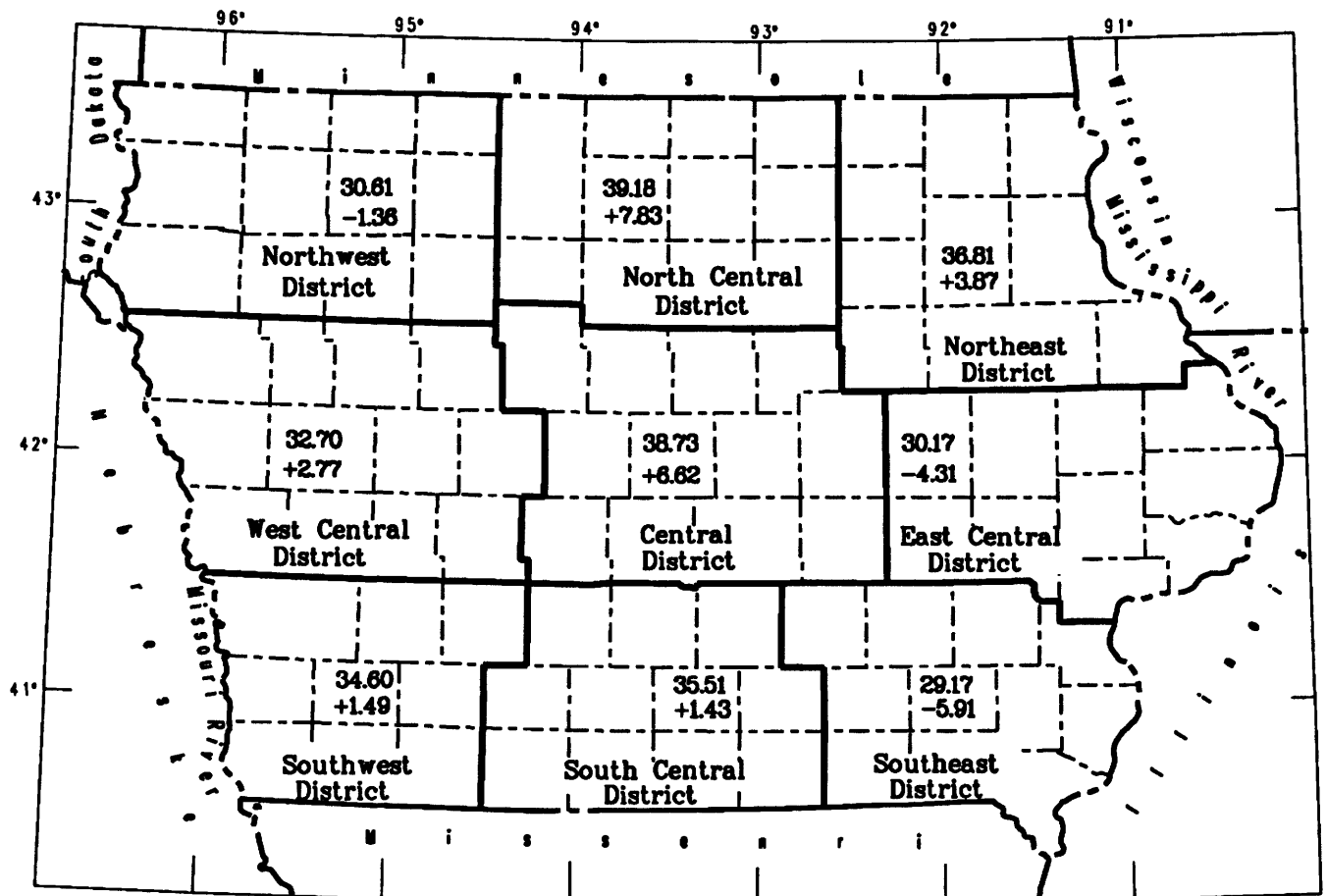
<u>Climatological</u> district	<u>1990</u>			<u>1991</u>									
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Annual
Northwest	105	63	126	82	55	168	197	134	101	108	76	86	111
North Central	78	44	177	78	27	180	221	202	103	92	107	96	125
Northeast	84	83	161	88	23	184	202	128	83	55	97	132	112
West Central	76	85	155	108	38	209	198	127	120	48	74	83	109
Central	85	107	185	97	14	230	237	153	100	34	98	107	121
East Central	86	139	132	76	21	225	95	100	53	10	94	75	88
Southwest	70	141	110	102	25	188	176	105	123	104	65	52	105
South Central	104	150	134	84	24	186	221	119	71	70	65	48	104
Southeast	59	177	144	84	38	183	82	110	39	30	82	57	83
Statewide	83	112	149	88	29	197	181	132	90	60	85	82	107

January to December 1990 was the 10th wettest for this period in 118 years of record. Daily mean discharge at the index station 05464500 Cedar River at Cedar Rapids was in the normal-flow range from October 1990 through February, July, and September 1991, and generally in the excessive-flow range from March through June and again in August (fig. 2). Daily mean discharge at

the index station 05480500 Des Moines River at Fort Dodge was generally in the normal-flow range from October through early March and again in September, and in the excessive-flow range from late March through August. Daily mean discharge at the index station 06810000 Nishnabotna River above Hamburg was in the normal-flow range from October through January, March, and July through September and in the excessive-flow range in February and April through June of water year 1991.

During October 1990, statewide average precipitation was 1.91 inches, or 83 percent of normal. Precipitation ranged from 59 percent of normal in southeast Iowa to 105 percent in northwest Iowa. Streamflow generally declined slightly during the month.

During November and December 1990, statewide average precipitation was about 130 percent of normal for the State. Streamflow generally declined, but at a less-than-normal rate because of the greater than normal precipitation.



EXPLANATION

35.51 PRECIPITATION, IN INCHES, DURING WATER YEAR 1991
 +1.43 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 1991. (Source: Harry Hillaker, State Climatologist, Iowa Department of Agriculture and Land Stewardship, written commun, 1991.)

DISCHARGE, IN CUBIC FEET PER SECOND

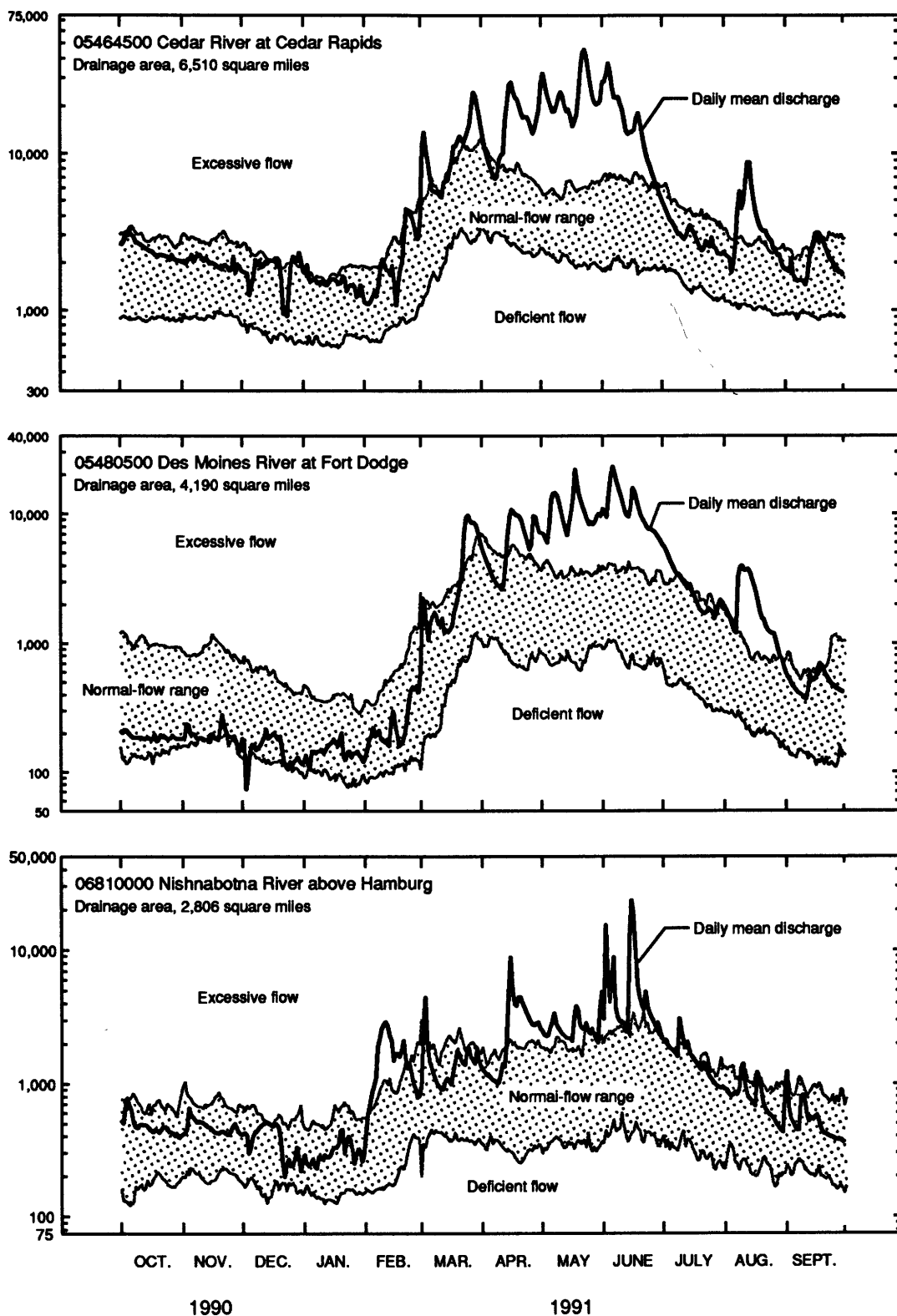


Figure 2.--Daily mean discharge for water year 1991 compared with percentile distribution of daily mean discharges for a specific day for period of record for three index stations. A daily mean discharge is in the deficient-flow range if its value is less than or equal to the 25th percentile, in the normal-flow range if its value is between the 25th and 75th percentiles, and in the excessive-sflow range if its value is equal to or greater than the 75th percentile.

The statewide average precipitation in January and February 1991 was 88 and 29 percent of normal, respectively. This was the 6th driest and 16th warmest February in 119 years of record. Streamflow generally declined in January and increased in February because of runoff from the melting snow cover. Many streams were free of ice at the end of February.

During March 1991, statewide average precipitation was 4.24 inches, or 197 percent of the normal precipitation of 2.15 inches. Precipitation ranged from 168 percent of normal in northwest Iowa to 230 percent of normal in central Iowa. This was the second wettest March in 119 years of record. Streamflows increased during the month because of greater than normal precipitation. Locally intense rainfall increased the discharge in rivers and streams on March 26-27. Flooding occurred along the lower Wapsipinicon and North Raccoon Rivers and the Iowa River upstream of Coralville Dam. The flooding was restricted largely to agricultural lands.

During April 1991, recorded precipitation varied from 82 percent of normal in southeast Iowa to 237 percent of normal in central Iowa. Statewide, the average precipitation was 5.78 inches or 181 percent of normal. This was the wettest April and third wettest January through April in 119 years of record. Intense rains in central and northeast Iowa caused severe flooding. On April 12th, a flash flood along the Little Maquoketa River at Durango swept a stalled vehicle down the river drowning the three people in the car. The computed discharge on April 12 at the crest-stage gage, Little Maquoketa River near Durango (station no. 05414500), was 21,400 ft³/s (cubic feet per second). The recurrence interval for this flood is less than 50 years. A new peak of record, 12,200 ft³/s and a gage height of 26.71 feet, was recorded on April 12 at the gaging station on Richland Creek near Haven (station no. 051451900). The recurrence interval of this flood was computed to be 2.05 times the 100-year recurrence interval. Intense rains continued over much of Iowa for the remainder of April, causing considerable flooding along the Iowa, Cedar, Skunk, Des Moines, and Wapsipinicon Rivers. Parts of these rivers remained above flood stage into May. A new peak of record, 7,900 ft³/s with a gage height of 16.93 feet, was recorded on April 29 at the gaging station on Walnut Creek near Hartwick (station no. 05452200). The recurrence interval was less than 50 years.

Statewide average precipitation for May 1991 was 5.24 inches or 132 percent of the normal statewide average precipitation of 3.96 inches. Precipitation ranged from 100 percent of normal in east-central Iowa to 202 percent of normal in north-central Iowa. Rainfall in May contributed to the second wettest spring (March-May) and fourth wettest January through May in 119 years of record. Rainfall was reported in some part of the State on 28 of the 31 days in May. The flow at all index stations was in the excessive-flow range. Near-record flooding occurred on Beaver Creek at New Hartford (station no. 05463000) on May 18th. The Iowa, Cedar, and Des Moines Rivers were above flood stage for most of the month. A new maximum monthly average discharge for May of 10,540 ft³/s was established at the Des Moines River at Fort Dodge index station. The index station also set a new maximum daily discharge of 21,800 ft³/s on May 18th.

Major flooding occurred along Beaver and Indian Creeks and in the Nishnabotna, Boyer, Little Sioux, and Turkey River basins during the first 15 days of June 1991. The statewide average precipitation for June was 4.03 inches, or 90 percent of the normal precipitation of 4.48 inches. Precipitation ranged from 39 percent of normal in southeast Iowa to 123 percent of normal in southwest Iowa. This was the eighth wettest January through June in 119 years of record. The discharge during June at all three index stations was in the excessive-flow range most of the month. The U.S. Army Corps of Engineers controlled releases of water from the Coralville, Saylorville, and Red Rock Reservoirs to minimize the flood damage downstream in the Iowa and Des Moines River basins. Water flowed over the emergency spillway at the Saylorville Reservoir from June 6 to 16. During the late afternoon hours of June 14th into the early morning hours of the 15th, torrential rains fell over the Turkey River basin. Rainfall averaging in excess of 6 inches, and exceeding 13 inches at two stations, resulted in record flooding in the Turkey River basin. By the end of June, all but 5 of Iowa's 99 counties had received some form of a Federal disaster declaration. New maximum discharge and stages were established at the following streamflow-gaging stations as a result of the June floods:

Station no.	Stream	Drainage area (square miles)	Date (June 1991)	Gage height (feet above datum)	Discharge (cubic feet per second)	Recurrence interval (years)
05471200	Indian Creek near Mingo	276	04	19.16	23,500	a 2.65
05412060	Silver Creek near Luana	4.39	15	14.97	3,300	a 1.23
05412070	Unnamed Creek near Luana	1.15	15	16.82	880	25
05412100	Roberts Creek above Saint Olaf	70.7	15	27.88	19,600	a 1.66
05412500	Turkey River at Garber	1,545	15	30.10	49,900	a 1.56

a, ratio to 100-year recurrence interval

Discharge at the gaging station on the Little Sioux River near Turin (station no. 06607500) reached a gage height of 21.80 feet, or 17,800 ft³/s, on June 16. Although not a new record, the recurrence interval of this flood was computed to be 1.44 times the 100-year recurrence interval.

Statewide average precipitation for July 1991 was 2.36 inches, or 60 percent of the normal precipitation of 3.95 inches. Precipitation ranged from 10 percent of normal in east-central Iowa to 108 percent of normal in northwest Iowa. Streamflow generally receded throughout the State. Flow at the three index stations was in the normal-flow range during most of the month (fig. 2).

Recorded statewide precipitation during August 1991 was 3.47 inches, or 85 percent of normal. Precipitation ranged from 65 percent of normal in southwest and south-central Iowa to 107 percent of normal in north-central Iowa. Locally intense rainfall on August 7-8 briefly increased the discharge in some rivers and streams in north-central Iowa. The flow at the three index stations was in the normal-flow range except for August 7-25, when discharge at two of the three index stations was in the excessive-flow range.

Statewide average precipitation during September 1991 was 2.82 inches or 82 percent of the normal statewide average of 3.42 inches. Precipitation ranged from 48 percent of normal in south-central Iowa to 132 percent in northeast Iowa. Streamflow generally decreased throughout the State. The flow at the three index stations was in the normal-flow range.

Suspended Sediment

Daily suspended-sediment data (hereafter referred to as sediment discharge in this report) were collected at five long-term streamflow-gaging stations (stations with 13 or more years of record), at two streamflow-gaging stations that were established during water year 1988, and at one station that was established in April 1991. The long-term stations are: 05389500 Mississippi River at McGregor, 05465500 Iowa River at Wapello, 05474000 Skunk River at Augusta, 05481650 Des Moines River near Saylorville, and 06817000 Nodaway River at Clarinda. The two newer stations are 05451500 Iowa River at Marshalltown and 05471050 South Skunk River at Colfax. The station established in 1991 is the 05483343 Hazelbrush Creek near Maple River. The location of active and discontinued sediment and surface-water-quality stations is shown in figure 3.

With the exception of the Mississippi River at McGregor, which has most of its drainage basin in Minnesota and Wisconsin, the sediment discharge at the sediment stations reflected the variability of statewide precipitation during water year 1991. Low sediment discharge was measured at the established stations for the first 5 months of the water year. The sediment discharge was highest at these stations from March through June and was substantially lower during August and September.

The Mississippi River at McGregor had an annual sediment discharge of 2.01 million tons, which is above the 16-year average sediment discharge of 1.96 million tons (fig. 4). About 76 percent of the annual sediment discharge was measured from May through September.

The Iowa River at Wapello and the Skunk River at Augusta stations are located in southeast Iowa and showed the variability of the storms in this area. The Iowa River basin drainage includes parts of the southeast, east-central, central, northeast, and north-central Iowa, and drains an area nearly three times as large as the Skunk Basin. The most intense precipitation for water year 1991 occurred in the central and north-central areas of the State and was more than 120 percent of normal. The Iowa River at Wapello had an annual sediment discharge of 3.66 million tons. This is above the 13-year average sediment discharge of 2.73 million tons (fig. 4) and the 4th highest annual sediment discharge on record for this station. During the month of March, 37 percent of the annual sediment discharge was measured, and from April through July another 55 percent was measured at the Iowa River at Wapello. The headwaters of the Skunk River basin are in central and southeast Iowa, and flow



is southeasterly to the confluence with the Mississippi River. A substantial part of the drainage basin is located in the southeast, and the annual precipitation for this area was 83 percent of normal. The annual sediment discharge for the Skunk River at Augusta was 2.15 million tons, below the 16-year annual average sediment discharge of 2.72 million tons (fig. 4). Of this 2.15 million tons annual sediment discharge, 45 percent was discharged during the month of March and 53 percent was discharged from April through June.

The sediment station on the Des Moines River at Saylorville is located in central Iowa and is downstream from a major flood-control reservoir (Saylorville Reservoir). The annual sediment discharge was 500,000 tons and was the third highest discharge in the 14 years since the closure of the dam. The average annual sediment discharge since the closure of the dam is 240,000 tons for 14 years of record (fig. 4).

The sediment station on the Nodaway River at Clarinda, located in the southwest part of the State, had the third highest annual sediment discharge, 4.09 million tons, in 16 years of record. The average annual sediment discharge is 2.35 million tons (fig. 4). The second highest daily sediment discharge for the period of record, 1.5 million tons, was measured on June 14. This discharge accounted for about 37 percent of the annual sediment discharge for water year 1991. During the month of June, 61 percent of the average annual sediment discharge was discharged, and 38 percent was discharged during the months of March through May.

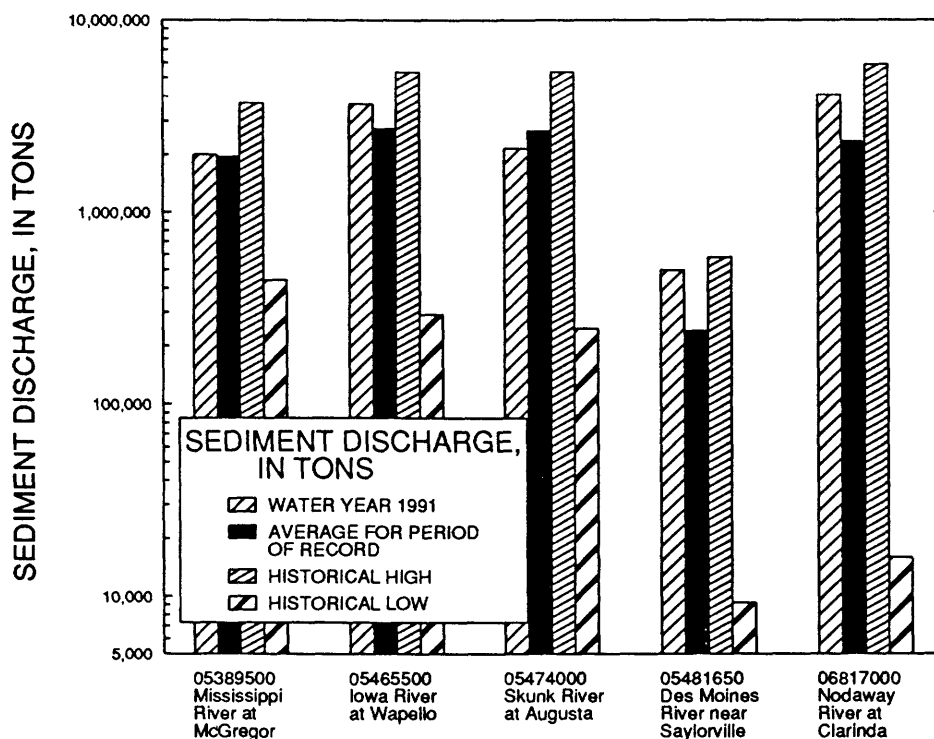


Figure 4.--Comparison of annual sediment discharge for water year 1991 with average, highest, and lowest annual sediment discharge for period of record at five long-term daily sediment stations.

New maximum annual sediment discharges were recorded at the sediment stations on the Iowa Rivers at Marshalltown (1.22 million tons) and the South Skunk River at Colfax (500,000 tons), located in central Iowa. Although only a few years of record are available for these stations, the sediment discharges recorded during the months of March through June can be considered representative of higher sediment discharges normally associated with severe storms. Hazelbrush Creek at Maple River, located in the west-central part of Iowa, has only a 9-square-mile drainage area and had a sediment discharge of 5,330 tons from April through September. Sediment discharge during June was 3,990 tons, of which, 3,570 tons was measured on June 15. This amount is almost equal to the record daily-sediment discharge for this station.

Ground Water

Monitoring the water-level changes in wells completed in aquifers provides valuable information on the effects of natural stresses and human activities on the ground-water resources of Iowa. This long-term, regional data base is used to evaluate changes in ground-water storage through time in the major aquifers, to assess the effects of development and collect data for use in predicting future supplies, and to provide information needed by State and local officials to effectively manage the resource. The 1991 ground-water-level monitoring network in Iowa consisted of 204 monitoring wells that were measured quarterly, intermittently, monthly, or on a daily basis (fig. 5).

Ground-water supplies in Iowa are withdrawn from unconsolidated aquifers and, in most areas of the State, deeper bedrock aquifers. There are three types of unconsolidated aquifers: (1) glacial-drift aquifers, which consist of shallow, discontinuous, permeable lenses of sand and gravel interbedded with less permeable glacial drift; (2) alluvial aquifers, which consist of sand and gravel deposits associated with present-day fluvial systems; and (3) buried-channel aquifers. Buried-channel aquifers are formed in areas where coarse sand and gravel were deposited in bedrock valleys and overlain by a thick layer of glacial drift.

Recharge to the shallow, unconsolidated aquifers occurs mainly by infiltration of precipitation and is dependent on the amount of precipitation received by the aquifer at the land surface in the immediate area. In general, water levels in unconsolidated glacial-drift and alluvial aquifers commonly exhibit a moderate rise during the fall, then a gradual decline during the winter. In the spring, precipitation and runoff from snowmelt will produce a perceptible rise in the water levels followed by a gradual decline throughout the summer growing season.

During water year 1991, the statewide average annual precipitation in Iowa was near normal (water years 1951-80). These near-normal amounts of precipitation are reflected in the water levels measured in key index wells in the State (fig. 6). The water level measured in the index well completed in glacial drift of Pleistocene age in Linn County was in the normal range (between the 25th and 75th percentiles of the monthly average water levels for the specified month for the period of record) from October 1990 through February 1991, April through June 1991, and August through September 1991. The water levels measured in the well completed in glacial drift in Webster County were in the normal range from October 1990 through January 1991 and July

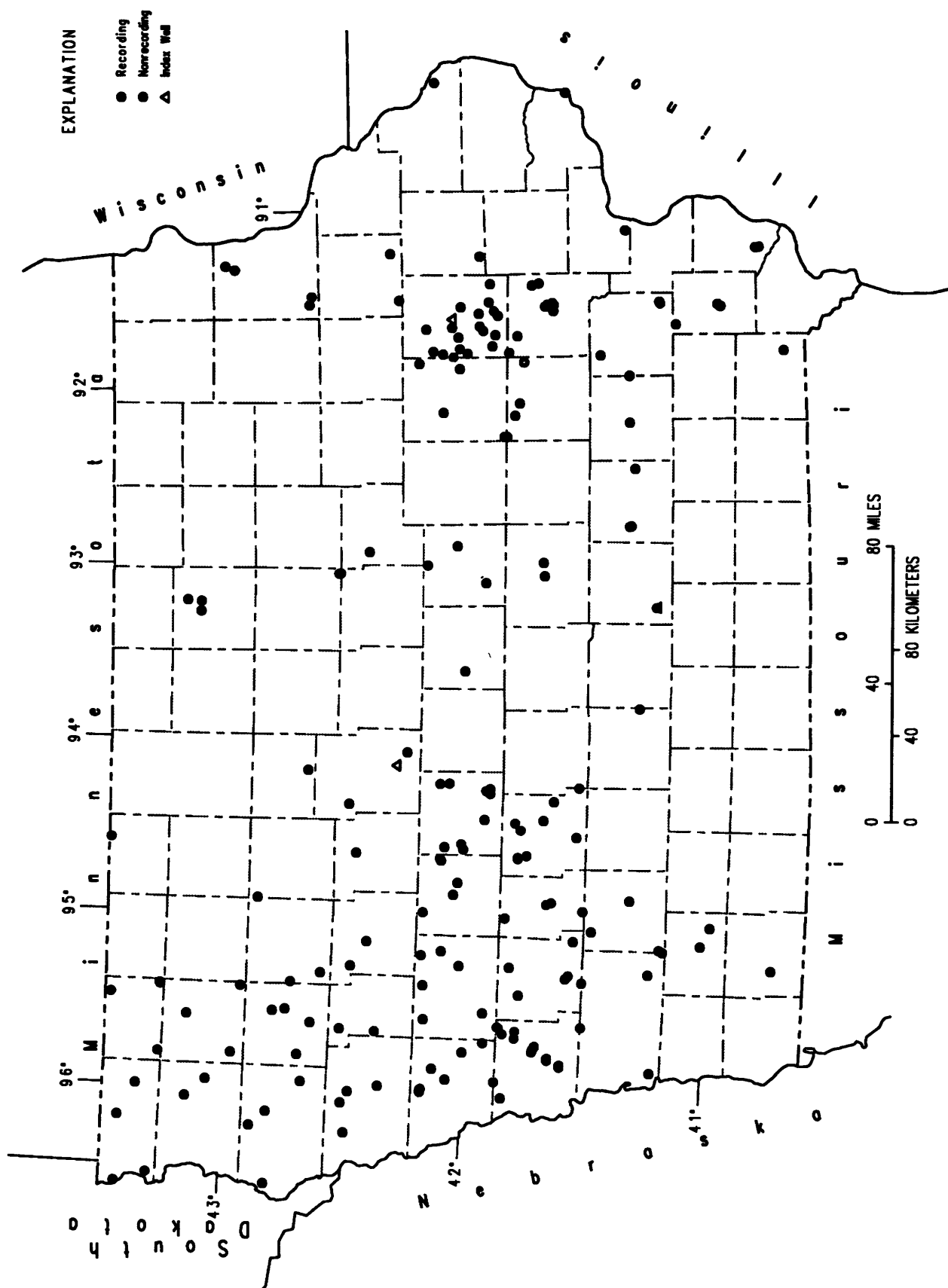


Figure 5. --- Location of recording and nonrecording wells in the ground-water-level observation network in Iowa.

WATER LEVEL, IN FEET BELOW LAND SURFACE

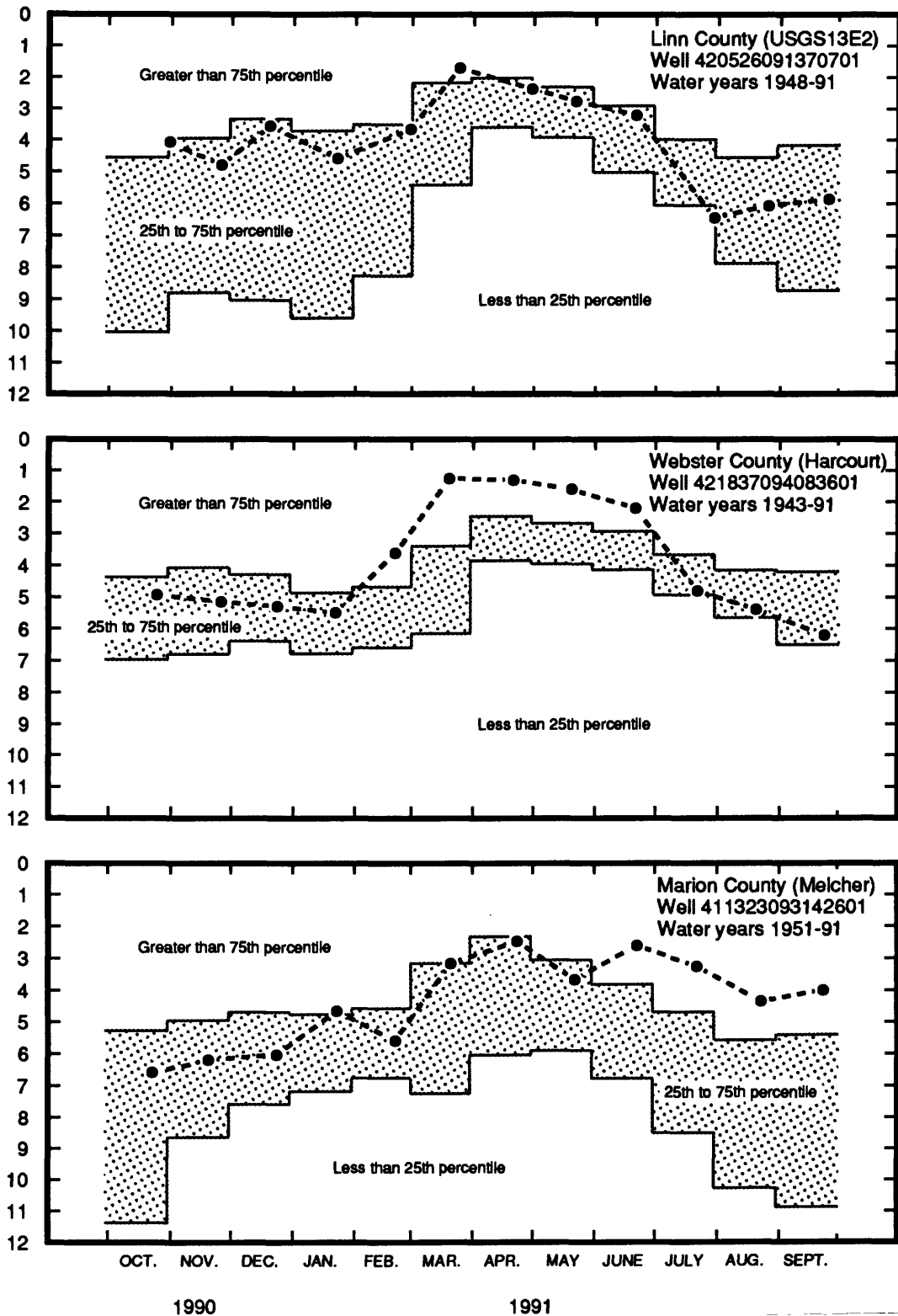


Figure 6.--Monthly water-level measurements made during water year 1991 compared to percentile distribution of monthly water levels for a specific month for period of record for three index wells completed in glacial drift.

through September 1991. The water-level measurements in this well were higher than normal (greater than the 75th percentile of the monthly average water levels for the specified month for the period of record) from February through June 1991. Water-level measurements in the well completed in glacial drift in Marion County remained in or near the normal range from October 1990 through May 1991. From June through September 1991, the water levels in this well were higher than normal.

Ground-water levels in wells completed in the unconsolidated aquifers were variable during water year 1991. Historical low water levels were measured in seven wells completed in unconsolidated alluvial and buried-channel aquifers; all these wells are located in west-central Iowa (table 2). Three of the record low water-level measurements were made in October, two in January, and two in July 1991. West-central Iowa received less-than-normal precipitation in October and November 1990, February 1991, and July through September 1991.

Table 2.--Historical low water levels measured during water year 1991 in wells completed in unconsolidated alluvial and buried-channel aquifers

[Water-level measurements are in feet below land surface]

County	Well number	Aquifer	New	Date	Previous	Date
			historical low water level	measured	historical low water level	measured
Crawford	415512095313801	Boyer River alluvial	26.40	10-17-90	26.09	08-09-89
Crawford	420608095111701	Fremont buried channel	212.90	01-09-91	212.32	10-03-83
Harrison	415124095361501	Boyer River alluvial	16.03	01-14-91	15.59	08-09-89
Monona	420730095510701	Maple River alluvial	16.47	07-01-91	15.79	01-11-90
Monona	420406095543301	Maple River alluvial	23.08	07-01-91	22.54	10-07-85
Monona	421006095580301	Little Sioux alluvial	14.90	10-10-90	14.58	01-11-90
Shelby	414856095160101	Fremont buried channel	212.97	10-11-90	211.08	01-12-90

Historical high water levels were measured in 10 wells completed in unconsolidated aquifers during water year 1991 (table 3). A new historical high water level was measured March 14, 1991 in the well completed in glacial drift in Story County. During the same month, the central Iowa climatological district received 230 percent of the normal precipitation (water years 1951-80). Seven of the new historical high water levels were measured in April and May of 1991 in east-central, west-central and north-central Iowa. Historical high water levels were measured in two wells during the fourth quarter of the water year; one of the wells is located in Clayton County in northeastern Iowa, and the other well is located in Harrison County in west-central Iowa.

Table 3.--Historical high water levels measured during water year 1991 in wells completed in unconsolidated aquifers

[Water-level measurements are in feet below land surface]

County	Well number	Aquifer	New	Date	Previous	Date
			historical high water level	measured	historical high water level	measured
Benton	415211092164101	Iowa River alluvial	0.18	05-28-91	0.52	05-28-86
Benton	415211092164102	Iowa River alluvial	.26	05-28-91	.48	08-25-86
Clayton	424023091291201	Glacial drift	11.68	08-07-91	14.06	03-26-86
Greene	420723094143201	Beaver buried channel	36.03	04-17-91	38.70	04-02-85
Harrison	413836095465502	Boyer River alluvial	5.68	09-26-91	8.36	05-30-84
Humboldt	424039094103601	Glacial drift	4.40	04-26-91	8.53	08-10-90
Iowa	414709091515801	Iowa River alluvial	.17	05-28-91	2.90	02-24-85
Iowa	414816092053401	Iowa River alluvial	.85	05-28-91	1.65	05-28-86
Iowa	415125092164201	Iowa River alluvial	2.64	05-28-91	3.35	05-28-86
Story	420137093361501	Glacial drift	49.98	03-14-91	52.65	03-12-90

There are five major bedrock-aquifer units in Iowa. The first is the Cambrian-Ordovician aquifer system, which consists of aquifers in sandstone of Early Cambrian age and dolomite and sandstone of Late Cambrian to Early Ordovician age. The basal aquifer of the Cambrian-Ordovician aquifer system, the Dresbach, is present locally in northeastern and east-central Iowa. Overlying the Dresbach aquifer is the more areally extensive Jordan-St. Peter aquifer. The uppermost aquifer in the Cambrian-Ordovician aquifer system is the Galena aquifer, which is separated from the underlying Jordan-St. Peter aquifer by a shale confining unit. Overlying the Cambrian-Ordovician aquifer system is the Silurian-Devonian aquifer, which yields water from fractures in Silurian dolomite and Devonian limestone. Above the Silurian-Devonian aquifer, the Mississippian aquifer is composed of limestone and dolomite of Mississippian age and is present in about 60 percent of Iowa. Overlying the Mississippian aquifer, discontinuous lenses of sandstone in the Cherokee and Kansas City Groups of Pennsylvanian age form small, localized aquifers. The Dakota aquifer, which yields water from sandstone of Cretaceous age in northwestern Iowa, is the youngest bedrock-aquifer unit in the State.

Although not directly dependent on local infiltration by precipitation, recharge to confined buried-channel and bedrock aquifers is affected by long-term changes in climatic conditions, as well as human-induced activities, such as withdrawals by pumping. In most cases, the response of the confined aquifers to natural- and human-induced stresses is not as rapid as the response exhibited by the unconfined, unconsolidated aquifers.

Water levels in a number of wells completed in bedrock aquifers continued

to decline during water year 1991, primarily in northwestern and west-central Iowa. New historical low water levels were measured in 17 wells completed in the bedrock aquifers in Iowa (table 4). As an indication of a continued decrease in the water stored in these aquifers from previous years of less-than-normal precipitation, 12 of the new historical lows exceeded previous historical low water levels that were measured during a period of drought in 1989 and 1990. Nine of the 17 new historical low water levels were measured in wells completed in the Dakota aquifer. New historical lows in five wells exceeded previous historical low water levels that were measured prior to 1985. New historical low water levels also were measured in wells completed in the Silurian-Devonian aquifer in east-central Iowa, the Mississippian aquifer in southeastern Iowa, the Pennsylvanian aquifer in west-central Iowa, and the Cambrian-Ordovician aquifer throughout the State.

Table 4.--Historical low water levels measured during water year 1991 in wells completed in bedrock aquifers

[Water-level measurements are in feet below land surface]

County	Well number	Aquifer	New historical low water level	Date measured	Previous historical low water level	Date measured
Buena Vista	413618095194511	Dakota	190.45	08-22-91	189.53	12-06-83
Cherokee	423833095365701	Dakota	40.85	01-15-91	37.25	01-10-90
Greene	420149094344701	Dakota	155.48	04-17-91	153.93	07-29-83
Jasper	414147093035401	Cambrian-Ordovician	276.14	02-28-91	272.07	07-20-89
Johnson	415052091483801	Silurian-Devonian	99.33	09-24-91	98.27	03-26-90
Linn	415534091251502	Cambrian-Ordovician	341.21	09-25-91	338.73	12-20-89
Lyon	431812096302701	Dakota	105.58	01-15-91	104.65	07-12-90
Mahaska	412020092471002	Cambrian-Ordovician	226.30	08-16-91	221.89	07-19-90
Monona	421018095591301	Dakota	56.22	07-08-91	56.81	07-11-90
O'Brien	430930095350401	Ordovician and Dakota	362.58	01-15-91	361.40	07-16-80
Osceola	431620095482402	Dakota	231.45	03-27-91	229.50	07-12-90
Plymouth	425249096125001	Dakota	124.25	07-02-91	122.97	10-03-89
Sac	422500095084801	Pennsylvanian and Dakota	165.46	08-06-91	165.40	12-16-90 and 03-29-90
Shelby	413255095070401	Dakota	44.25	03-28-91	42.86	09-24-81
Sioux	430140095573101	Dakota	218.30	07-02-91	218.24	03-13-84
Washington	411300091320701	Mississippian	77.04	11-27-90	76.22	09-05-89
Washington	411244091323501	Mississippian	78.85	09-27-91	78.50	09-05-89

Historical high water levels were measured in eight wells completed in bedrock aquifers (table 5). Seven of the historical high water levels were measured in the spring, during a period from late March through late May 1991. Two of the historical high water levels were measured in wells completed in the Cambrian-Ordovician aquifer in northwestern Iowa and three in wells completed in the Mississippian aquifer in west-central, central, and southeastern Iowa.

Table 5.--Historical high water levels measured during water year 1991 in wells completed in bedrock aquifers

[Water-level measurements are in feet below land surface]

County	Well number	Aquifer	New historical high water level	Date measured	Previous historical high water level	Date measured
Carroll	420705094394501	Dakota	48.87	07-09-91	49.24	07-12-84
Cherokee	424459095322411	Cambrian-Ordovician	19.52	03-28-91	20.59	04-12-87
Crawford	421031095225602	Mississippian	304.53	04-18-91	305.58	02-08-83
Delaware	422029091144302	Silurian	16.59	05-30-91	16.65	11-06-86
Mahaska	412002092470301	Pennsylvanian	6.78	04-16-91	8.50	07-19-90
Mahaska	412023092471201	Mississippian	79.12	04-16-91	80.50	08-30-90 and 08-31-90
Marshall	421120093003001	Mississippian	95.90	04-16-91	97.61	07-23-90
Plymouth	424850096074801	Cambrian-Ordovician	67.70	03-27-91	86.38	10-08-87

Surface-Water Quality

Surface-water-quality data were collected in Iowa during water year 1991 at five National Stream-Quality Accounting Network (NASQAN) stations and one Hydrologic Benchmark Network (HBMN) station. The NASQAN stations in Iowa are 05463050 Cedar River at Cedar Falls, 05465500 Iowa River at Wapello, 05474000 Skunk River at Augusta, 05484500 Raccoon River at Van Meter, and 06810000 Nishnabotna River above Hamburg. The HBMN station is 06897950 Elk Creek near Decatur City (fig. 3). The combined drainage area of the six stations is approximately 28,000 square miles. Land use throughout the six drainage basins is primarily agricultural. Samples were collected six times during the water year at each of the NASQAN stations and four times at the HBMN station.

Nearly all of the samples collected at the six stations contained detectable concentrations of agricultural chemicals. Large nitrate concentrations in Iowa streams during water year 1991 caused several municipalities that use surface water as their primary source to issue health advisories regarding the consumption of public water by small children and

pregnant women. Nitrate plus nitrite as nitrogen (hereafter referred to as nitrate) was detected frequently, with most samples containing concentrations greater than the detection level of 0.10 mg/L (milligrams per liter). Nitrate concentrations in two samples exceeded 10 mg/L, which is the U.S. Environmental Protection Agency (USEPA) Maximum Contaminant Level (MCL) for public drinking water (USEPA, 1990, Maximum contaminant levels, subpart B of part 141, National primary drinking-water regulations: U.S Code of Federal Regulations, Title 40, Parts 100 to 149, revised as of July 1, 1990, p. 553-677). The nitrate concentrations were 11 mg/L for the Iowa River at Wapello in April 1991, and 11 mg/L for the Skunk River at Augusta in June 1991.

Water samples collected at the six surface-water-quality stations were analyzed for six herbicides. Alachlor, atrazine, cyanazine, and metolachlor were detected at least once. Trifluralin and metribuzin were not detected. The largest herbicide concentration was 2.9 $\mu\text{g/L}$ (micrograms per liter) of metolachlor in a sample collected from the Iowa River at Wapello during June 1991. The same sample also contained 2.7 $\mu\text{g/L}$ of atrazine, 0.71 $\mu\text{g/L}$ of alachlor, and 1.3 $\mu\text{g/L}$ of cyanazine. These were the greatest concentrations detected during water year 1991. All concentrations of alachlor and atrazine detected during water year 1991 were greater than the concentrations of these compounds during water year 1990, and were less than the U.S. Environmental Protection Agency MCL's of 2.0 and 3.0 $\mu\text{g/L}$, respectively (USEPA, 1991, Fact Sheet: EPA 570/9-91-012FS, August 1991). Herbicide concentrations were greater in water samples collected during June than in samples collected at other times during water year 1991.

The dissolved-solids and nitrate data collected during water year 1991 from the Iowa River at Wapello, Skunk River at Augusta, and Nishnabotna River above Hamburg are plotted over boxplots of the respective historical data, grouped by month, in figures 7, 8, and 9. Boxplots graphically summarize the characteristics of the grouped data, showing the median, variation, and skewness of the data. The historical data were collected during water years 1978-90. Daily mean discharges for water year 1991 are included in the figures to illustrate the general relation between water-quality data and streamflow conditions at each site.

Concentrations of dissolved solids during water year 1991 were variable compared to monthly medians (50th percentile) for the period of record. Monthly medians were exceeded in three or fewer of the six samples collected at each location throughout the year. One or more samples were equal to monthly medians. One sample each from the Iowa River at Wapello and the Skunk River at Augusta contained dissolved-solids concentrations outside the interquartile range (25th to 75th percentile). Both samples exceeded the 75th percentile (figs. 7 and 8). Two samples from the Nishnabotna River above Hamburg were below the 25th percentile (fig. 9).

Nitrate concentrations also were variable during water year 1991. Nitrate concentrations exceeded monthly medians in four samples from Iowa River at Wapello, four samples from the Skunk River at Augusta, and five samples from the Nishnabotna River above Hamburg. The remaining samples were close to monthly medians at the respective sites. One sample each from the Iowa River at Wapello and the Skunk River at Augusta were outside the interquartile range, exceeding the 75th percentile. Two samples from the Nishnabotna River above Hamburg exceed the 75th percentile.

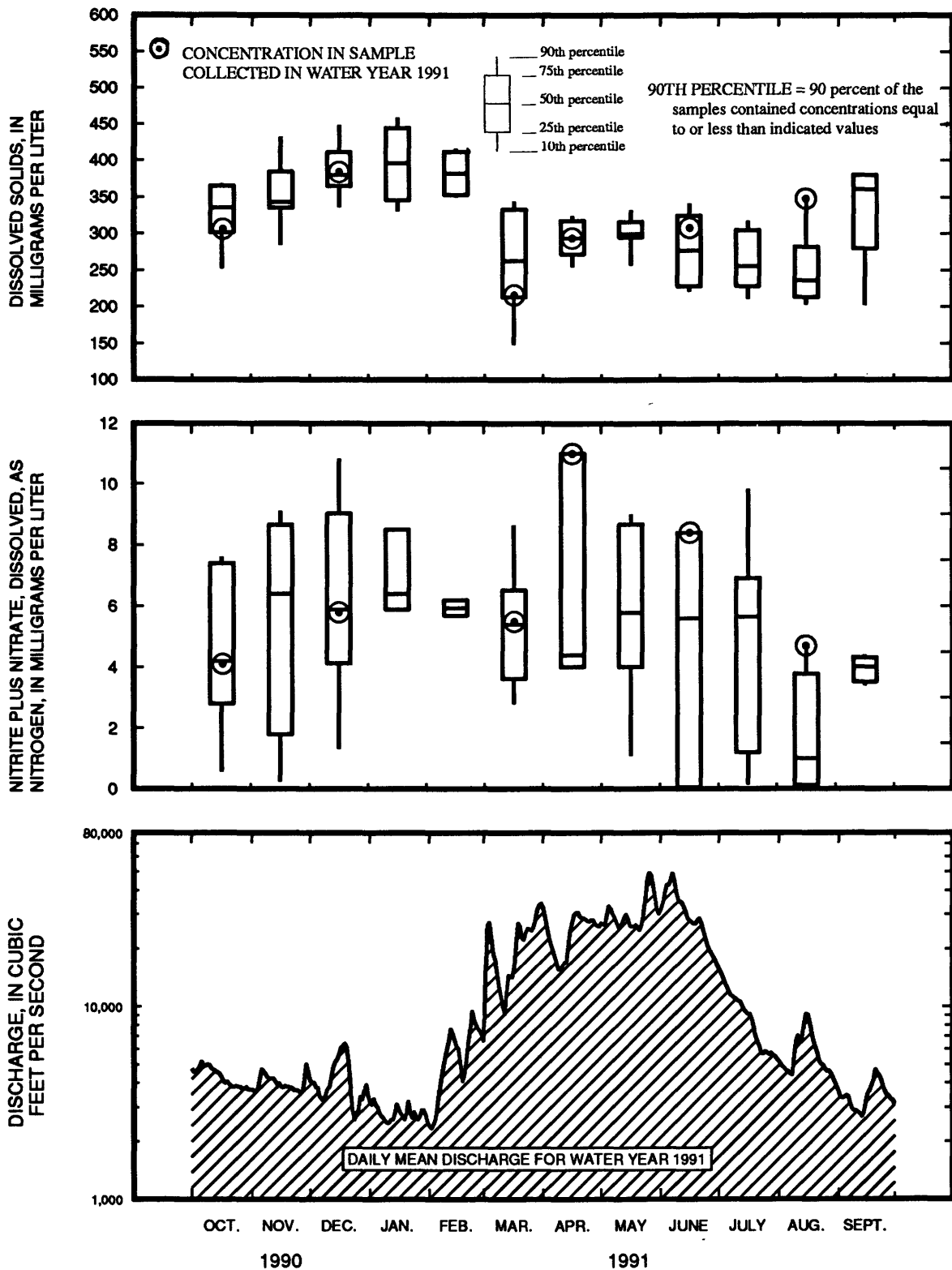


Figure 7.--Comparison of dissolved-solids and nitrate concentrations and daily mean discharge for water year 1991 with historical data (water years 1978-90) summarized by monthly boxplots at the NASQAN surface-water-quality station on the Iowa River at Wapello (station 05465500; period of record, water years 1978-91).

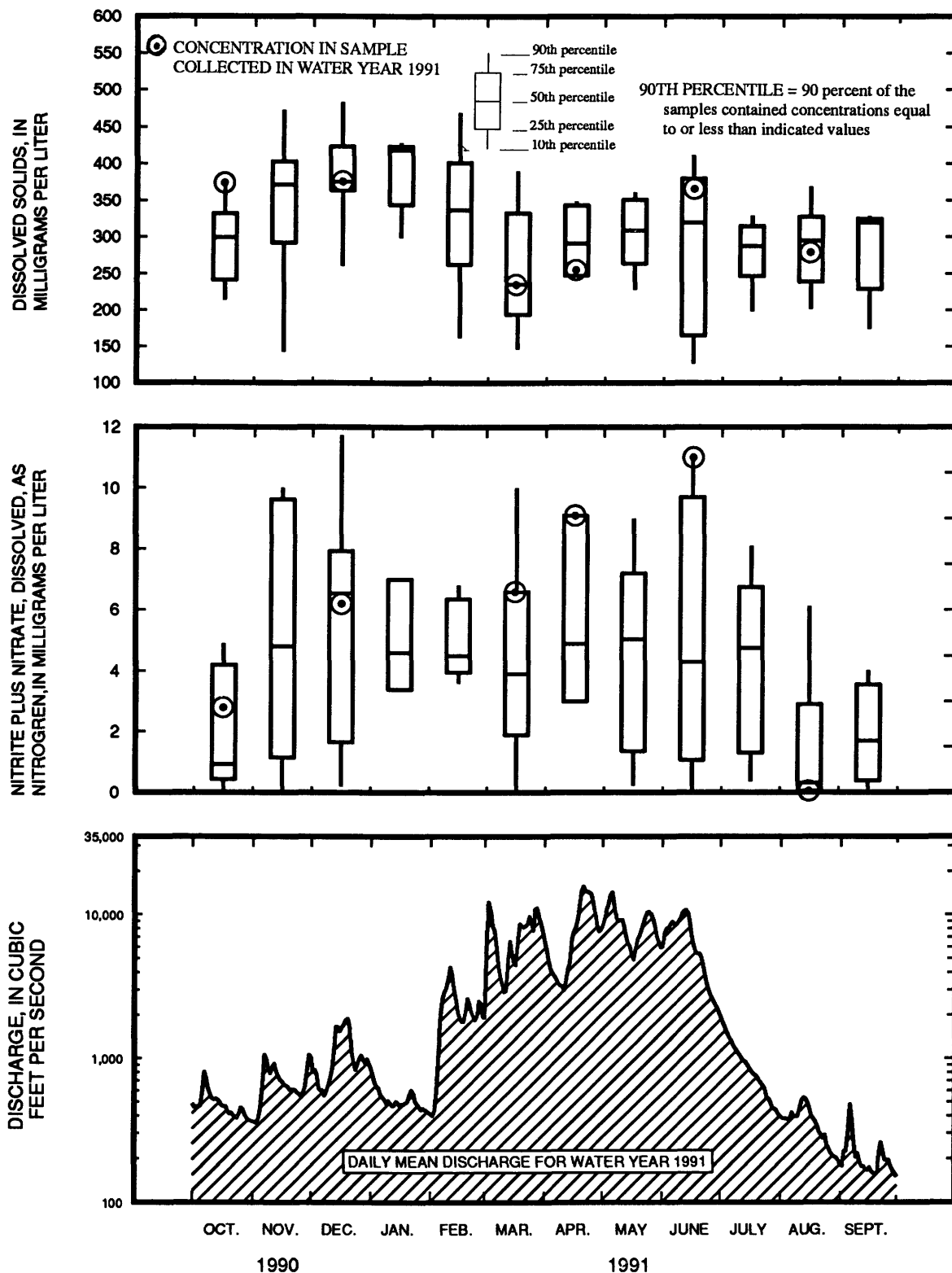


Figure 8.--Comparison of dissolved-solids and nitrate concentrations and daily mean discharge for water year 1991 with historical data (water years 1978-90) summarized by monthly boxplots at the NASQAN surface-water-quality station on the Skunk River at Augusta (station 05474000; period of record, water years 1978-91).

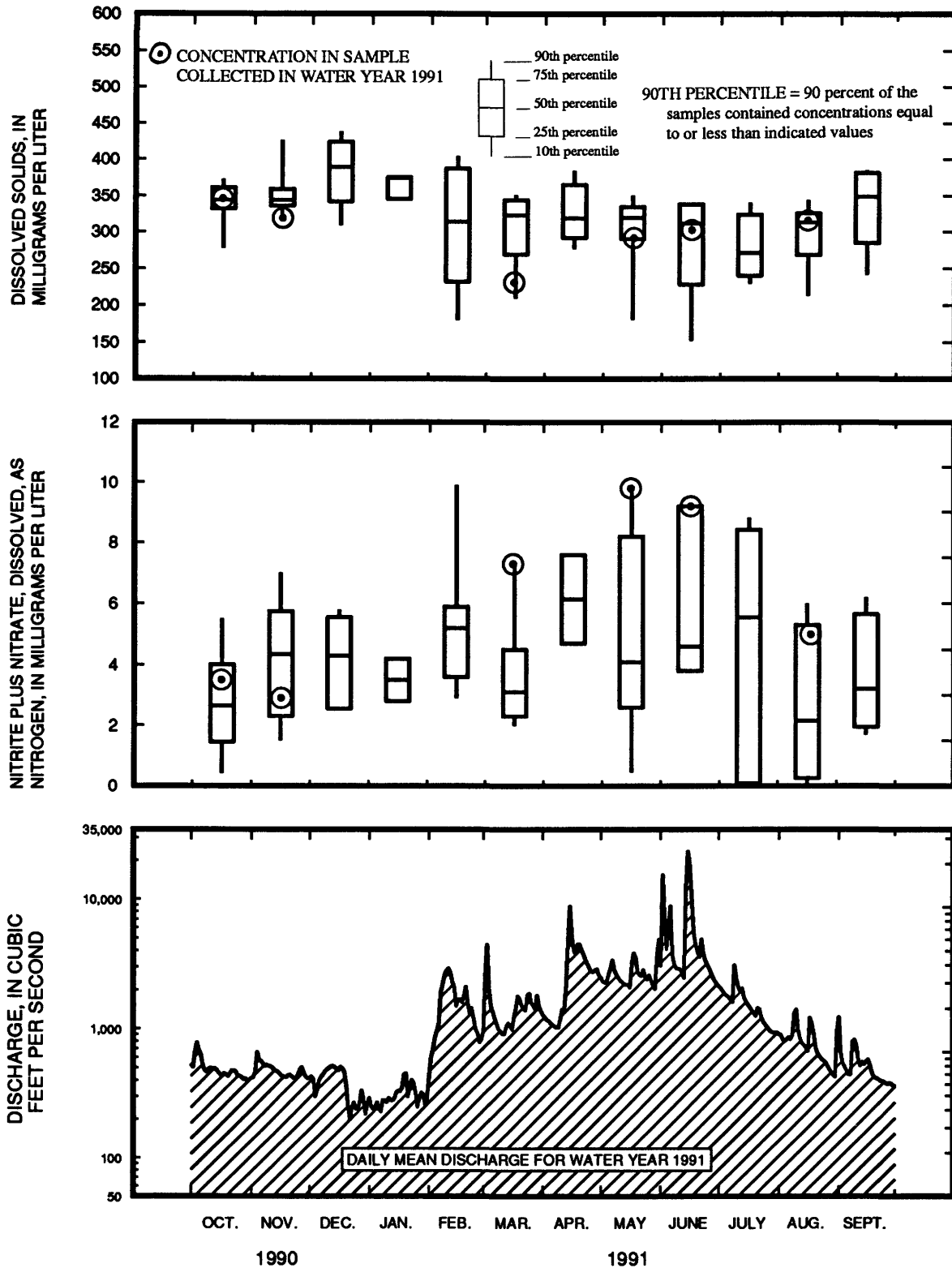


Figure 9.--Comparison of dissolved-solids and nitrate concentrations and daily mean discharge for water year 1991 with historical data (water years 1978-90) summarized by monthly boxplots at the NASQAN surface-water-quality station on the Nishnabotna River above Hamburg (station 06810000; period of record, water years 1978-91).

Ground-Water Quality

The Iowa ground-water-quality monitoring program has been operated since 1982 by the U.S. Geological Survey in cooperation with the University of Iowa Hygienic Laboratory and the Iowa Department of Natural Resources, Geological Survey Bureau. The purpose of the program is to provide consistent and representative ground-water-quality data describing the chemical quality of ground-water supplies from major aquifers in the State. Between 200 and 250 wells are selected annually for sampling from a current (1991) inventory comprised of approximately 2,000 municipal supply wells.

The monitoring program was designed so that wells are selected on a rotational basis and sampled annually between April and November. Since 1985, the emphasis of the program has been on the analysis of nitrate and herbicide concentrations from wells less than 200 feet in depth. In 1990, to provide year-to-year continuity of data and a more statistically sound basis for the study of long-term water-quality trends, a sampling strategy based on random selection of wells weighted by aquifer vulnerability was implemented. Aquifer vulnerability was determined by the frequency of atrazine detections in water samples collected from wells in the respective aquifers. A fixed network of 50 wells was selected to be sampled annually, and approximately 200 wells continued to be selected on a rotational basis. The current (1991) sampling strategy is a continuation of this philosophy.

During water year 1991, 233 well-water samples were collected from municipal wells (fig. 10) located throughout the State. These samples were analyzed by the University of Iowa Hygienic Laboratory, and the results are published in this report. Thirty-five samples are from the fixed network and 198 samples are from the rotational network. The wells that were sampled were grouped by aquifer type and randomly selected based on aquifer vulnerability. One hundred fifty-two wells are completed in unconsolidated aquifers, and 81 are completed in bedrock aquifers. One hundred forty-five wells are less than 150 feet deep, 53 wells are between 150 and 300 feet deep, and 35 wells are greater than 300 feet deep.

Samples were collected during July, August and September 1991. All samples were analyzed for nutrients and herbicides. Samples from wells that had never been sampled previously as part of the monitoring program were also analyzed for common dissolved inorganic constituents. In addition, samples from 24 wells less than 300 feet deep were analyzed for synthetic organic compounds (SOC's); samples from 13 wells greater than 300 feet deep were analyzed for radionuclides; and samples from 46 wells were analyzed for radon. The discussion of analytical results will be limited to the nitrogen species nitrate and ammonia, to herbicides, and to radon.

A summary of results of nutrient and herbicide analyses is listed by compound in table 6. Nitrate or ammonia was detected in 226 of 233 samples tested for these compounds, and herbicides were detected in 31 of 232 samples.

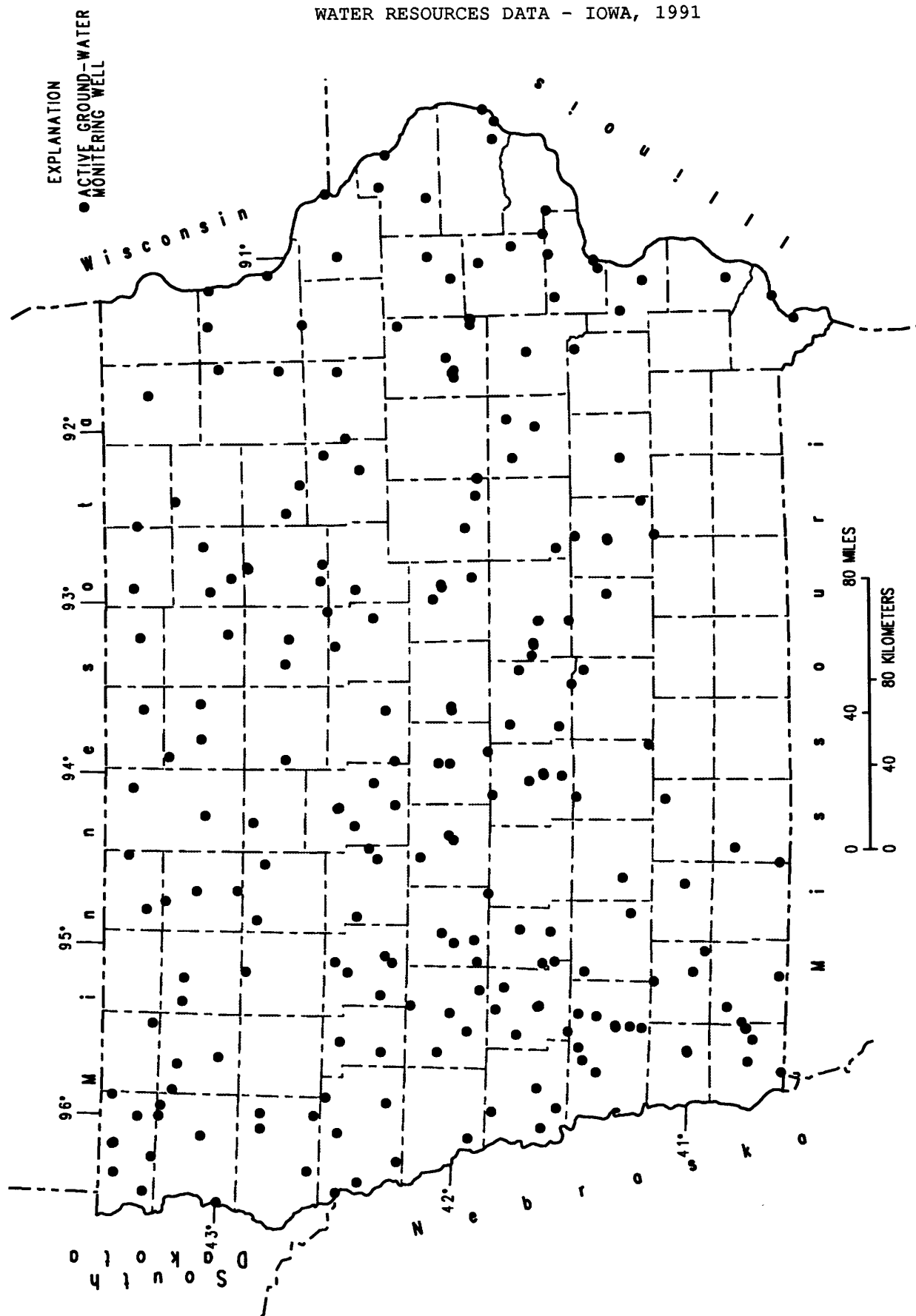


Figure 10.--Location of wells in the ground-water-quality monitoring program.

Table 6.--Summary of nitrogen species and herbicides detected in samples from the ground-water-quality monitoring network, water year 1991

[mg/L, milligrams per liter; µg/L, micrograms per liter; <, less than detection level]

Compound	Number of samples analyzed	Number of samples in which compound was detected	Detection level	Maximum concentration detected
Nitrate	231	139	0.10 mg/L	18.0 mg/L
Ammonia	233	187	0.10 mg/L	6.6 mg/L
Atrazine	232	31	0.10 µg/L	2.3 µg/L
Alachlor	232	3	0.10 µg/L	1.5 µg/L
Metolachlor	232	7	0.10 µg/L	9.1 µg/L
Cyanazine	232	4	0.10 µg/L	.63 µg/L
Metribuzin	232	3	0.10 µg/L	.67 µg/L
Butylate	232	0	0.10 µg/L	<0.10 µg/L
Trifluralin	232	0	0.10 µg/L	<0.10 µg/L

Concentrations of nitrate greater than 3.0 mg/L generally can be attributed to human activities, whereas concentrations less than 3.0 mg/L may indicate ambient concentrations from naturally occurring soil nitrogen or geologic deposits (Madison, R.J., and Brunett, J.O., 1984, Overview of the occurrence of nitrate in ground water of the United States, in National water summary 1984 -- Water-quality trends: U.S. Geological Survey Water-Supply Paper 2275, p. 93-105). Nitrate concentrations were greater than 3.0 mg/L in 61 of 231 samples. Concentrations in 7 samples exceeded 10 mg/L, which is the USEPA MCL for public drinking water. Of the 139 samples that contained detectable concentrations of nitrate, 76 percent were from shallow wells (less than 150 feet deep), 16 percent were from medium wells (150 to 300 feet deep), and 8 percent were from deep wells (greater than 300 feet deep). The median nitrate concentration of all samples from shallow wells was 0.7 mg/L, from medium wells was <0.1 mg/L, and from deep wells was <0.1 mg/L. The largest nitrate concentration was 18 mg/L. Of the 187 samples with detectable ammonia concentrations, 58 percent were from shallow wells, 24 percent were from medium wells, and 18 percent were from deep wells.

Water from 31 of the 232 wells sampled contained detectable concentrations of one or more herbicides. No concentrations exceeded the MCL or proposed MCL of any of the analytes. All 31 samples contained atrazine. Alachlor, metolachlor, cyanazine, and metribuzin also were detected in some samples. No detectable amounts of butylate and trifluralin were found in any of the samples. Twenty-four of 145 samples from shallow wells contained detectable herbicide concentrations, 6 of 40 samples from medium wells contained detectable herbicide concentrations, and 1 of 35 samples from deep wells

contained detectable herbicide concentrations. This distribution may be important because detectable concentrations of herbicides generally are not found in wells greater than 200 feet deep. The frequency of herbicide detections is 17, 15, and 3 percent in shallow wells, medium wells, and deep wells, respectively. The detection frequency in shallow wells (17 percent) is less than the rate of occurrence during the same period last year (26 percent) and also less than the 22-percent rate described for the same periods prior to 1988 (Detroy, M.G., 1988, Ground-water-quality-monitoring program in Iowa -- Nitrate and pesticides in shallow aquifers: U.S. Geological Survey Water-Resources Investigations Report 88-4123, 32 p.). However, a direct comparison of detection frequency between years may be misleading because each year different wells are sampled.

Reconnaissance sampling of ground-water resources for radon-222 was initiated during water year 1991 with the collection of 46 raw-water samples. Radon was detected in all samples, and the concentrations in 18 samples exceeded the USEPA proposed MCL of 300 picocuries per liter. The largest concentration was 1,214 picocuries per liter. To verify the results of this initial survey, 8 of the 18 wells that exceeded the proposed MCL were resampled. In all samples, radon concentrations exceeded 300 picocuries per liter, confirming initial results.

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 200-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 1991 water year that began October 1, 1990, and ended September 30, 1991. 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 3, 5, 10-12. 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.



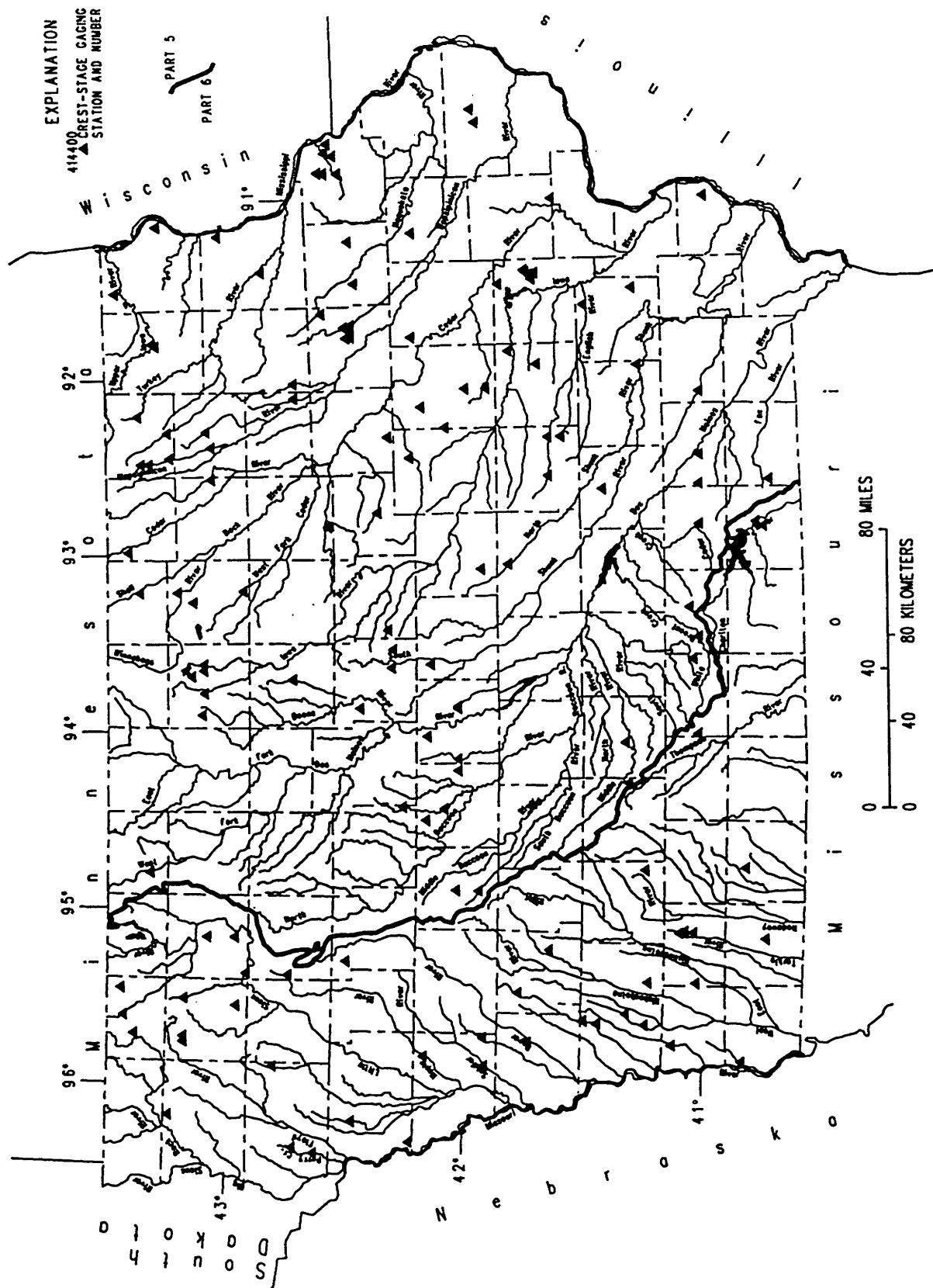


Figure 12. -- Location of active, crest-stage gaging stations.

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.

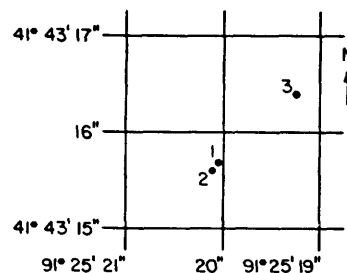


Figure 13.--Latitude-longitude well number.

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. 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.

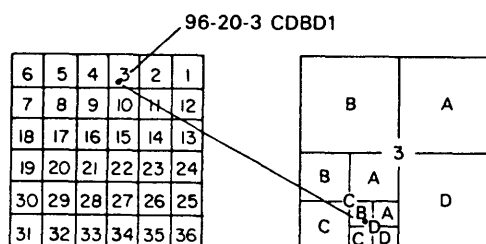


Figure 14.--Local well-numbering system for well 96-20-3CDBD1.

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 11.

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 12.

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 ft³/s the nearest tenth between 1.0 and 10 ft³/s; to whole numbers between 10 and 1,000 ft³/s; and to 3 significant figures for more than 1,000 ft³/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 3.

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. 57-58 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.

WATER RESOURCES DATA - IOWA, 1991

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 5. 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. 14).

Water-level records are obtained from direct measurements with a chalked steel tape, electric line, airline, or from an analog digital 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 chart 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 58 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 5.

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.

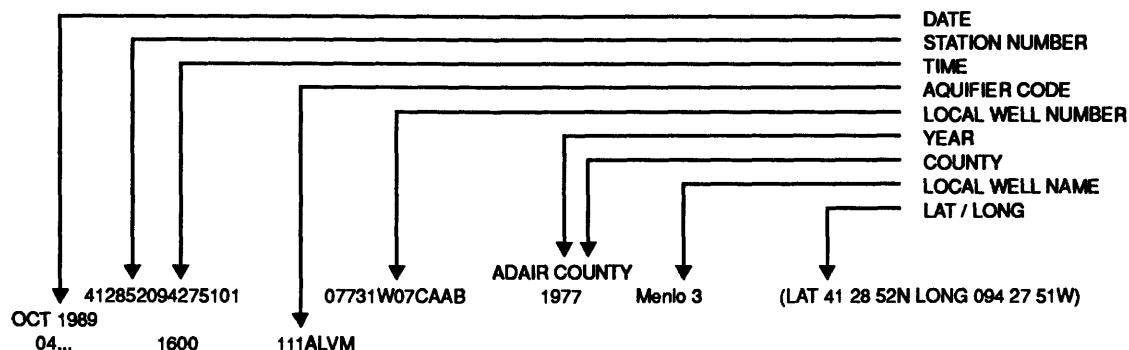
The records of ground-water quality in this report were obtained as a part a statewide ground-water quality monitoring network operated by the Iowa District. All samples were obtained from municipal wells throughout Iowa. This program is conducted in cooperation with the University of Iowa Hygienic Laboratory (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, possible 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;



Date: Date the well is sampled.

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

TIME: Time the sample is collected.

AQUIFER: Refers to the lithologic unit in which the well is completed.
CODE Derived from 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)

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

COUNTY: The name of the county where the well is located.

DATE OF CONSTRUCTION: The date the well's construction is complete.

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

LAT/LONG: Latitude and longitude location of well.

ACCESS TO WATSTORE DATA

U.S. Geological Survey is the principal Federal water-data agency and, as such, collects and disseminates about 70 percent of the water data currently being used by numerous State, local, private, and other Federal agencies to develop and manage our water resources. As part of the Geological Survey's program of releasing water data to the public, a large-scale computerized system has been developed for the storage and retrieval of water data collected through its activities. The National Water Data Storage and Retrieval System (WATSTORE) was established in 1972 to provide an effective and efficient means for the processing and maintenance of water data collected through the activities of the U.S. Geological Survey and to facilitate release of the data to the public. A variety of useful products, ranging from data tables to complex statistical analyses such as Log Pearson Type III, can be produced using WATSTORE. The system resides on the central computer facilities of the U.S. Geological Survey at its National Center in Reston, Virginia, and consists of related files and data bases.

- * Station Header File - Contains descriptive information on more than 440,000 sites throughout the United States and its territories where the Geological Survey collects or has collected data.
- * Daily Values File - Contains more than 220 million daily value of stream flows, stages, reservoir contents, water temperatures, specific conductances, sediment concentrations, sediment discharges, and ground-water levels.
- * Peak Flow File - Contains approximately 500,000 maximum (peak) streamflow and gage-height values at surface-water sites.
- * Water Quality File - Contains approximately 2 million analyses of water samples that describe the chemical, physical, biological, and radio-chemical characteristics of both surface and ground water.
- * Ground-Water Site Inventory Data Base - Contains inventory data for more than 900,000 wells, springs, and other sources of ground water. The data includes site location, geohydrologic characteristics, well-construction history, and one-time field measurements such as water temperature.

In 1976, the U.S. Geological Survey opened WATSTORE to the public for direct access. The signing of a Memorandum of Agreement with the Survey is required to obtain direct access to WATSTORE. The system can be accessed either synchronously or asynchronously. The requestor will be expected to pay all computer costs he/she incurs. Direct access may be obtained by contacting:

U.S. Geological Survey
National Water Data Exchange
421 USGS National Center
Reston, Virginia 22092

In addition to providing direct access to WATSTORE, data can be provided in various machine-readable formats on magnetic tape or 5-1/4 inch floppy disk; and, as noted in the introduction, on CD-ROM discs. Beginning with the 1990 water year, all water-data reports will also be available on Compact Disc - Read Only Memory (CD-ROM). All data reports published for the current water year for the entire Nation, including Puerto Rico and the Trust Territories, will be reproduced on a single CD-ROM disc. Information about the availability of specific types of data or products, and user charges, can be obtained locally from each of the Water Resources Division's District offices. (See address on the back of the title page.) A limited number of CD-ROM discs will be available for sale by the Books and Open-File Reports Section, U.S. Geological Survey, Federal Center, Box 25425, Denver Colorado 80225.

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 (ft^3/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 μm 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 (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 (ug/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 (UG/L, ug/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 (MG/L, 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 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 (1×10^{-12}) of the amount of radioactivity represented by a curie (Ci). A curie is the amount of radioactivity that yields 3.7×10^{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:
 $\text{concentration (mg/L)} \times \text{discharge ft}^3/\text{s} \times 0.0027.$

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 μ m 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, 1990, is called the "1990 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.

PUBLICATION OF 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. Picke, 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-D2. *Application of seismic-refraction techniques to hydrologic studies*, by F. P. Haeni: USGS--TWRI Book 2, Chapter D2. 1988. 86 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.
- 2-F1. *Application of drilling, coring, and sampling techniques to test holes and wells*, by Eugene Shuter and Warren E. Teasdale: USGS--TWRI Book 2, Chapter F1. 1989. 97 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. F. 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 in streams by dye tracing*, by F. A. Kilpatrick and J. F. Wilson, Jr.: USGS--TWRI Book 3, Chapter A9. 1989. 27 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.
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- 3-A19. *Levels of streamflow gaging stations*, by E. J. Kennedy: USGS--TWRI Book 3, Chapter A19. 1990. 27 pages.

PUBLICATIONS ON TECHNIQUES OF WATER-RESOURCES INVESTIGATIONS--Continued

- 3-B1. *Aquifer-test design, observation, and data analysis*, by R. W. Stallman: USGS--TWRI Book 3, Chapter B1. 1971. 26 pages.
- 3-B2. *Introduction to ground-water hydraulics, a programmed text 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-B4. *Regression modeling of ground-water flow*, by Richard L. Cooley and Richard L. Naff: USGS--TWRI Book 3, Chapter B4. 1990. 232 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. J. Fishman and L. C. Friedman: USGS--TWRI Book 5, Chapter A1. 1989. 545 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 the determination of organic substances in water and fluvial sediments*, edited by R. L. Wershaw, M. J. Fishman, R. R. Grabbe, and L. E. Lowe: USGS--TWRI Book 5, Chapter A3. 1987. 80 pages.
- 5-A4. *Methods for collection and analysis of aquatic biological and microbiological samples*, by L. J. Britton and P. E. Greeson, editors: USGS--TWRI Book 5, Chapter A4. 1989. 363 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.
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- 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.
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MISSISSIPPI RIVER BASIN
UPPER IOWA RIVER BASIN

59

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 mi².

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: Dec. 3 to Mar. 11. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Geological Survey gage-height telemeter and U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--16 years, (water years 1976-91), 552 ft³/s, 9.74 in/yr, 399,900 acre-ft/yr; median of yearly mean discharges, 510 ft³/s, 9.0 in/yr, 369,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 14,000 ft³/s Mar. 12, 1976, gage height, 17.67 ft; minimum daily discharge, 79 ft³/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 ft³/s on basis of slope-area determination of peak flow.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,000 ft³/s and maximum(*):

Date	Time	Discharge (ft ³ /s) *4,540	Gage height (ft) *12.23	Date	Time	Discharge (ft ³ /s) 4,280	Gage height (ft) 12.09
Apr. 30	0145			May 19	1845		

Minimum daily discharge, 83 ft³/s Dec. 23.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	321	250	195	140	135	260	911	3490	1570	473	354	267
2	313	250	191	150	155	300	830	2710	1390	462	342	263
3	310	247	165	130	180	280	778	2250	1260	440	340	267
4	308	242	175	120	190	280	734	1980	1130	430	331	261
5	308	238	200	130	200	300	698	1830	1010	422	319	255
6	308	235	235	130	210	340	667	2000	922	412	314	255
7	308	234	230	120	200	360	632	2330	853	402	329	253
8	308	229	230	125	190	400	620	2120	804	397	578	252
9	309	234	220	125	200	470	694	1870	767	387	573	279
10	311	231	205	125	190	560	697	1860	730	386	1590	272
11	304	228	200	130	190	640	663	1660	705	401	1280	277
12	300	227	200	130	205	572	691	1500	680	392	776	465
13	296	222	210	125	220	641	1500	1750	651	383	636	539
14	296	217	195	135	240	637	1960	1590	686	382	564	759
15	289	217	180	150	205	607	2470	1400	878	448	515	1150
16	288	217	190	140	170	619	2380	1400	850	408	474	937
17	280	214	200	145	170	657	2000	1920	839	383	454	1000
18	280	213	200	140	180	703	1690	2880	742	385	425	728
19	280	213	195	145	170	806	1590	4000	684	367	414	611
20	280	213	190	150	160	1010	1640	3710	659	560	423	549
21	280	213	175	145	170	1240	1630	2520	625	556	397	513
22	280	213	130	135	175	1400	1470	2390	599	483	376	484
23	280	212	130	120	170	1970	1380	2070	584	450	359	458
24	274	206	140	125	180	2270	1290	1890	566	462	346	445
25	268	206	155	120	190	2060	1180	1760	548	483	334	437
26	265	203	150	120	180	1660	1080	1670	534	436	321	420
27	265	203	160	130	180	1500	1220	1570	521	405	308	408
28	258	203	170	140	230	1430	1760	1530	504	399	297	397
29	253	203	175	130	---	1300	2830	1470	489	408	287	387
30	252	201	160	110	---	1130	3980	1560	472	383	282	375
31	250	---	130	130	---	1020	---	1380	---	369	275	---
TOTAL	8922	6634	5681	4090	5235	27422	41665	64060	23252	13154	14613	13963
MEAN	288	221	183	132	187	885	1389	2066	775	424	471	465
MAX	321	250	235	150	240	2270	3980	4000	1570	560	1590	1150
MIN	250	201	130	110	135	260	620	1380	472	367	275	252
AC-FT	17700	13160	11270	8110	10380	54390	82640	127100	46120	26090	28980	27700
CFSM	.37	.29	.24	.17	.24	1.15	1.80	2.68	1.01	.55	.61	.60
IN.	.43	.32	.27	.20	.25	1.32	2.01	3.09	1.12	.64	.71	.67

CAL YR 1990	TOTAL 190426	MEAN 522	MAX 6790	MIN 115	AC-FT 377700	CFSM .68	IN. 9.20
WTR YR 1991	TOTAL 228691	MEAN 627	MAX 4000	MIN 110	AC-FT 453600	CFSM .81	IN. 11.05

MISSISSIPPI RIVER MAIN STEM

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 mi², 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: Nov. 30 to Dec. 2 and Dec. 4 to Mar. 11. Records good except those for estimated daily discharges and for discharges less than 10,000 ft³/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.--55 years, 35,320 ft³/s, 7.10 in/yr, 25,600,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 276,000 ft³/s Apr. 24, 1965; maximum gage height, 25.38 ft Apr. 24, 1965; minimum daily discharge, 6,200 ft³/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, 104,000 ft³/s May 18, 19; maximum gage height, 14.89 ft June 9, 10; minimum daily discharge, 9,100 ft³/s Dec 29-31; minimum gage height, 6.33 ft Dec. 28, 29.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	21300	31000	14800	10700	10800	13000	93900	74000	77300	65400	38500	21900
2	20300	29200	16100	11700	10800	13200	94100	73900	80800	63500	37600	20200
3	18000	28500	17000	12400	10800	12800	93100	72200	85200	60900	37100	18700
4	20000	28600	16800	12400	10700	12200	92500	68900	89600	58200	36900	16700
5	22100	28400	17500	13300	10700	13400	90500	67500	92900	55600	37100	16900
6	22800	27400	18100	13100	10800	14000	88200	69200	95900	55600	37200	17100
7	24500	25600	16900	13000	10900	13900	84400	70200	97800	56900	37300	17800
8	26400	23900	16000	12900	11000	14800	79200	73200	99000	58900	40200	20200
9	26600	21900	15900	12900	11600	15900	74200	77100	99000	60400	42900	22700
10	26400	20800	16000	12800	12500	15900	65900	80700	97600	62400	44700	30300
11	25500	21500	15900	12400	12500	18000	58300	84900	95400	62800	46100	35200
12	24300	22900	15900	12800	12500	20900	56200	89700	92000	63800	46600	39400
13	23800	23700	16300	12800	12700	21700	60300	94600	87900	62100	45200	43600
14	22800	23500	16100	12700	13800	24200	64700	98400	84300	60100	41900	47700
15	22800	23000	17100	12700	14000	25500	69300	101000	81600	58000	38300	52800
16	22700	22300	17800	12700	14100	25400	71200	102000	80800	55000	37800	56800
17	21400	22500	17700	12700	14200	25200	71800	103000	80200	51700	38000	60000
18	19700	21000	17800	12600	14200	25200	72000	104000	79300	51800	38200	61700
19	19600	19600	17700	12600	14100	25200	72800	104000	77800	53200	38400	61900
20	19400	19100	17500	12600	13900	24700	76200	102000	76100	54600	37900	61500
21	22400	18800	17500	12500	13800	26000	79900	99300	74900	55600	36400	61600
22	26600	19400	15300	12400	13900	29500	82200	96000	73400	56500	34900	60900
23	30300	20900	12100	11700	13700	35600	82800	92700	70600	58300	33200	60200
24	33700	21600	10400	10800	13700	43500	82000	89900	68400	60500	31200	58100
25	37400	23000	9900	10200	13600	51300	80900	85600	66100	61100	30200	55000
26	40400	23700	9900	10100	13500	58700	79100	83000	64500	58600	29100	52800
27	41500	24100	9900	10000	13600	69200	77400	79700	66300	53100	28600	50100
28	40800	23700	9700	10800	13600	77500	75600	75800	69700	47700	27600	47800
29	38600	20500	9100	10900	---	83000	73500	72400	69600	44100	26300	45600
30	35700	15300	9100	10800	---	87600	73900	72500	67900	41200	24800	42100
31	34100	---	9100	10700	---	91700	---	74100	---	40100	23000	---
TOTAL	831900	695400	456900	372700	356000	1028700	2316100	2631500	2441900	1747700	1123200	1257300
MEAN	26840	23180	14740	12020	12710	33180	77200	84890	81400	56380	36230	41910
MAX	41500	31000	18100	13300	14200	91700	94100	104000	99000	65400	46600	61900
MIN	18000	15300	9100	10000	10700	12200	56200	67500	64500	40100	23000	16700
AC-FT	1650000	1379000	906300	739300	706100	2040000	4594000	5220000	4844000	3467000	2228000	2494000
CFSM	.40	.34	.22	.18	.19	.49	1.14	1.26	1.21	.84	.54	.62
IN.	.46	.38	.25	.21	.20	.57	1.28	1.45	1.35	.96	.62	.69
CAL YR 1990	TOTAL 11847700	MEAN 32460	MAX 98800	MIN 9100	AC-FT 23500000	CFSM .48	IN. 6.53					
WTR YR 1991	TOTAL 15259300	MEAN 41810	MAX 104000	MIN 9100	AC-FT 30270000	CFSM .62	IN. 8.41					

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, 2,350 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, Dec. 2, 6, 8-11, 1987, Dec. 26, 1988 to Jan. 4, 1989, Jan. 9-11, Feb. 20, 21, 1989, and Jan. 5, 6, 1990.

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, 361 mg/L Oct. 5; minimum daily mean, 2 mg/L Dec. 28-30.

SEDIMENT LOADS: Maximum daily, 26,700 tons Sept. 19; minimum daily, 49 tons Dec. 29, 30.

SPECIFIC CONDUCTANCE MICROSIEMENS/CM AT 25 DEG C, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	397	---	---	---	446	---	311	---	---	---	---	---
2	---	---	351	---	---	---	---	---	---	474	---	486
3	---	---	---	---	---	---	331	---	416	---	---	---
4	410	---	---	406	444	438	---	410	---	---	---	---
5	---	364	353	---	---	---	---	---	---	---	466	---
6	---	---	---	---	---	---	357	---	---	504	---	490
7	---	362	---	408	---	---	---	422	394	---	---	---
8	---	---	366	---	458	436	---	---	---	---	---	---
9	356	---	---	---	---	---	372	---	---	500	---	---
10	---	---	---	412	---	---	---	414	---	---	454	---
11	---	374	---	---	446	436	---	---	398	---	---	512
12	---	---	---	---	---	---	358	---	---	501	454	---
13	---	---	339	401	---	---	---	395	414	---	---	516
14	370	---	---	---	---	---	---	---	---	---	---	---
15	---	356	---	---	430	416	---	---	---	497	428	---
16	336	---	---	---	---	---	---	---	---	---	---	475
17	---	---	368	---	---	---	346	410	432	---	---	---
18	---	---	---	392	434	404	339	---	---	496	---	---
19	364	350	---	---	---	---	---	---	429	---	452	438
20	---	---	---	---	---	---	---	---	---	---	---	---
21	---	---	362	406	---	---	335	410	---	---	---	---
22	368	---	---	---	441	401	---	---	---	457	---	---
23	---	---	---	---	---	---	---	---	---	---	466	403
24	---	355	382	---	---	418	---	---	472	---	---	---
25	376	---	---	432	434	---	359	---	---	---	474	---
26	---	356	---	---	---	---	---	406	---	---	---	406
27	---	---	---	---	---	---	---	---	478	463	---	---
28	---	---	396	424	444	---	---	---	---	---	---	---
29	336	---	---	---	---	361	410	434	---	440	---	---
30	---	348	---	---	---	---	---	438	---	---	477	---
31	348	---	392	---	---	---	---	---	---	444	---	---

MISSISSIPPI RIVER MAIN STEM

05389500 MISSISSIPPI RIVER AT MCGREGOR, IA--Continued

WATER-QUALITY RECORDS

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	16.0	---	---	---	.0	---	7.0	---	---	---	---	---
2	---	---	2.0	---	---	---	---	---	---	26.0	---	24.0
3	---	---	---	---	---	---	8.0	---	18.0	---	---	---
4	14.0	---	---	.0	.0	2.0	---	14.0	---	---	---	---
5	---	6.0	2.0	---	---	---	---	---	---	---	26.0	---
6	---	---	---	---	---	---	10.0	---	---	26.0	---	22.0
7	---	6.0	---	.0	---	---	---	11.0	19.0	---	---	---
8	---	---	1.0	---	.0	3.0	---	---	---	---	---	---
9	13.0	---	---	---	---	---	13.0	---	---	25.0	---	---
10	---	---	---	.0	---	---	---	11.0	---	---	27.0	---
11	---	5.0	---	---	.0	3.0	---	---	24.0	---	---	24.0
12	---	---	---	---	---	---	12.0	---	---	26.0	---	---
13	---	---	1.0	.0	---	---	---	16.0	24.0	---	26.0	24.0
14	10.0	---	---	---	---	---	---	---	---	---	---	---
15	---	4.0	---	---	.0	4.0	---	---	---	23.0	24.0	---
16	10.0	---	---	---	---	---	---	---	---	---	---	24.0
17	---	---	.0	---	---	---	8.0	14.0	24.0	---	---	---
18	---	---	---	.0	.0	5.0	9.0	---	---	26.0	---	---
19	10.0	6.0	---	---	---	---	---	---	24.0	---	24.0	22.0
20	---	---	---	---	---	---	---	---	---	---	---	---
21	---	---	1.0	.0	---	---	12.0	16.0	---	---	---	---
22	10.0	---	---	---	.0	6.0	---	---	---	27.0	---	---
23	---	---	---	---	---	---	---	---	---	---	22.0	22.0
24	---	6.0	.0	---	---	6.0	---	---	25.0	---	---	---
25	8.0	---	---	.0	.0	---	10.0	---	---	---	26.0	---
26	---	5.0	---	---	---	---	---	14.0	---	---	---	17.0
27	---	---	---	---	---	---	---	---	26.0	28.0	---	---
28	---	---	.0	.0	2.0	---	---	---	---	---	---	---
29	8.0	---	---	---	---	6.0	---	15.0	---	28.0	---	---
30	---	4.0	---	---	---	---	11.0	20.0	---	---	24.0	---
31	8.0	---	.0	---	---	---	---	---	---	29.0	---	---

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)
OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH		
1	56	3230	33	2740	18	719	3	87	4	117	8	281
2	48	2640	32	2490	17	739	3	95	4	117	8	285
3	50	2430	34	2650	16	734	3	100	4	117	7	242
4	204	11400	39	3040	14	635	3	100	7	202	7	231
5	361	21600	45	3420	14	661	3	108	9	260	7	253
6	197	12100	42	3120	29	1420	3	106	8	233	8	302
7	88	5790	35	2390	38	1730	4	140	6	177	8	300
8	62	4420	30	1910	31	1340	5	174	4	119	8	320
9	52	3770	27	1600	25	1070	5	174	4	125	7	301
10	52	3680	26	1460	18	778	4	138	4	135	7	301
11	51	3480	26	1520	14	601	4	134	4	135	6	292
12	50	3300	26	1630	13	558	5	173	4	135	6	332
13	50	3180	25	1590	13	572	5	173	4	137	7	386
14	48	2990	22	1410	13	565	5	171	4	149	8	552
15	43	2670	19	1180	14	646	5	171	4	151	11	736
16	35	2130	18	1070	16	769	4	137	4	152	12	819
17	33	1900	17	1050	17	812	4	137	4	153	12	818
18	37	1960	17	975	16	769	4	136	4	153	11	781
19	42	2240	17	925	12	573	4	136	4	152	11	737
20	57	3030	18	919	6	283	4	136	4	150	10	687
21	93	5690	18	916	3	142	4	135	5	186	13	933
22	127	9190	18	968	3	124	4	134	5	188	21	1710
23	107	8770	19	1090	3	98	4	126	5	185	28	2740
24	77	6970	20	1190	3	84	4	117	4	148	32	3740
25	69	7010	20	1270	3	80	4	110	5	184	33	4640
26	65	7090	20	1260	3	80	3	82	7	255	34	5330
27	60	6730	19	1250	3	80	4	108	7	257	32	5950
28	56	6150	19	1220	2	52	4	117	8	294	29	6070
29	51	5280	19	1050	2	49	4	118	---	---	26	5730
30	44	4240	19	785	2	49	3	87	---	---	21	5050
31	36	3340	---	---	3	74	4	116	---	---	17	4250
TOTAL	---	168400	---	48088	---	16886	---	3976	---	4766	---	55099

MISSISSIPPI RIVER MAIN STEM

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05389500 MISSISSIPPI RIVER AT MCGREGOR, IA--Continued

WATER-QUALITY RECORDS

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)
APRIL			MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	18	4540	74	14700	46	9660	52	9220	64	6630	57	3380
2	28	7080	84	16800	49	10600	50	8650	67	6750	54	2950
3	18	4540	68	13300	49	11300	45	7460	98	9860	51	2570
4	14	3610	60	11100	48	11600	40	6250	133	13200	47	2110
5	17	4230	50	9210	46	11700	34	5140	128	12800	43	1950
6	22	5280	42	7850	45	11800	33	5030	103	10300	39	1790
7	28	6290	36	6760	45	11800	68	10400	83	8340	37	1780
8	33	7020	35	6840	44	11800	110	17500	72	7860	90	5040
9	38	7580	39	8180	43	11600	143	23300	67	7760	175	10800
10	40	7020	45	9890	43	11200	128	21500	64	7670	141	11500
11	37	5790	45	10300	42	10800	86	14600	68	8510	109	10400
12	32	4850	37	8940	43	10600	69	11900	76	9570	86	9130
13	30	4950	26	6580	43	10300	71	11900	76	9280	67	7860
14	30	5250	23	6200	46	10500	83	13400	70	7890	60	7760
15	30	5550	28	7540	70	15300	94	14800	62	6370	58	8320
16	29	5660	34	9260	57	12400	92	13700	56	5700	72	11200
17	29	5530	35	9820	52	11200	84	11700	61	6230	102	16500
18	25	4920	35	9900	50	10700	73	10200	91	9380	131	21800
19	24	4720	38	10500	50	10500	63	9100	118	12200	160	26700
20	25	5090	41	11400	49	10200	57	8410	107	11000	152	25300
21	25	5350	45	12200	49	9910	52	7840	93	9140	101	16700
22	24	5350	50	12900	54	10600	49	7510	81	7660	65	10600
23	25	5610	54	13600	65	12400	49	7640	72	6480	57	9280
24	28	6160	58	14000	71	13200	48	7860	69	5830	56	8780
25	31	6750	61	14000	67	12000	48	7870	67	5460	57	8430
26	33	6980	62	13800	62	10900	51	8080	65	5100	60	8500
27	33	6960	63	13400	58	10400	61	8730	64	4950	74	9980
28	33	6830	61	12600	56	10500	87	11200	64	4740	99	12800
29	34	6720	55	10800	54	10200	95	11300	63	4460	123	15200
30	43	8510	42	8250	53	9760	79	8780	62	4120	122	13900
31	---	---	43	8650	---	---	68	7330	60	3720	---	---
TOTAL	---	174720	---	329270	---	335430	---	328300	---	238960	---	303010
YEAR	2006905											

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	TEMPER- ATURE WATER (DEG C) (00010)	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	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)
APR						
02...	1530	7.5	90200	30	7310	93
MAY						
10...	1300	--	74800	46	9290	97
JUL						
31...	1130	24.0	40700	67	7360	99

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 mi².

PERIOD OF RECORD.--June 1956 to September 1973, October 1977 to September 1991 (discontinued). 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. 29 and Dec. 2 to Mar. 11. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data.

AVERAGE DISCHARGE.--31 years, 123 ft³/s, 9.44 in/yr, 89,110 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,600 ft³/s July 12, 1972, gage height, 16.73 ft; maximum gage height, 16.76 ft, Aug. 25, 1990; minimum daily discharge, 4.4 ft³/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 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,200 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Apr. 14	1600	1,310	8.17	Apr. 29	1415	*2,830	*10.85
Apr. 28	0500	1,730	9.01	May 19	1015	1,860	9.14

Minimum daily discharge, 21 ft³/s Jan. 31.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	66	61	46	32	23	64	224	876	316	106	62	42
2	65	60	44	33	25	83	200	622	289	100	61	43
3	81	60	37	30	29	76	180	522	260	94	60	45
4	90	59	40	28	34	85	165	472	230	91	59	44
5	91	58	48	30	40	100	151	469	210	88	57	44
6	86	58	53	29	45	120	139	558	192	86	55	43
7	80	57	56	27	47	150	127	525	180	84	62	40
8	78	57	54	28	45	180	126	458	170	84	193	43
9	76	57	52	29	44	220	140	435	161	81	128	45
10	75	56	48	29	44	280	136	406	154	80	113	44
11	73	56	46	30	45	260	119	376	146	77	95	47
12	71	55	45	29	47	246	291	351	139	80	83	111
13	70	54	46	30	50	253	812	333	137	77	75	78
14	68	54	45	32	52	210	964	313	172	74	71	84
15	67	54	43	33	48	226	1070	305	358	71	67	141
16	66	53	43	34	43	250	660	438	299	68	66	263
17	65	52	44	33	40	252	539	752	249	67	69	190
18	68	52	45	32	42	283	476	1020	220	77	64	138
19	68	51	44	33	42	335	482	1460	203	128	62	118
20	68	51	42	34	38	362	542	733	207	109	60	107
21	69	53	38	34	40	413	470	593	187	94	58	97
22	69	51	34	32	42	431	422	551	169	90	57	92
23	69	50	31	30	40	877	397	522	156	82	55	86
24	67	50	30	27	42	841	353	479	145	78	54	84
25	66	50	33	25	45	565	318	447	136	74	52	82
26	65	49	35	24	44	467	294	423	128	70	50	79
27	65	50	37	24	42	442	643	416	122	67	48	77
28	63	50	39	27	46	411	1170	377	113	72	46	74
29	63	49	40	25	---	346	1620	337	109	77	47	71
30	62	47	36	22	---	286	2150	306	104	70	44	68
31	62	---	32	21	---	252	---	308	---	65	42	---
TOTAL	2192	1614	1306	906	1164	9366	15380	16183	5661	2561	2115	2520
MEAN	70.7	53.8	42.1	29.2	41.6	302	513	522	189	82.6	68.2	84.0
MAX	91	61	56	34	52	877	2150	1460	358	128	193	263
MIN	62	47	30	21	23	64	119	305	104	65	42	40
AC-FT	4350	3200	2590	1800	2310	18580	30510	32100	11230	5080	4200	5000
CFSM	.40	.30	.24	.17	.23	1.71	2.90	2.95	1.07	.47	.39	.47
IN.	.46	.34	.27	.19	.24	1.97	3.23	3.40	1.19	.54	.44	.53

CAL YR 1990	TOTAL 43450.3	MEAN 119	MAX 4630	MIN 8.2	AC-FT 86180	CFSM .67	IN. 9.13
WTR YR 1991	TOTAL 60968	MEAN 167	MAX 2150	MIN 21	AC-FT 120900	CFSM .94	IN. 12.81

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LOCATION.--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 miles south of Highway 52 and 18, and 3.2 miles south of Luana.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,300 ft³/s June 15, 1991, gage height 14.97 ft from rating curve extended above 40 ft³/s on the basis of culvert type III indirect computation and road overflow measurement of peak flow; no flow at times most years.

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Apr. 12	1815	53	6.77	June 15	0215	*3,300	*14.97
Apr. 14	1100	64	6.87	Sept.12	0415	468	9.30
June 14	2000	1,860	13.64				

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.69	.56	.52	.52	.41	.80	4.7	6.9	7.1	4.2	1.4	1.2
2	.69	.53	.49	.52	.41	1.5	4.1	6.0	6.4	3.5	1.5	1.2
3	.85	.52	.45	.52	.39	1.0	3.0	5.4	5.7	2.9	1.6	2.5
4	.88	.52	.30	.52	.38	.80	2.4	5.1	5.5	2.3	1.8	1.6
5	.76	.52	.22	.52	.38	2.0	2.4	5.4	5.2	1.5	1.7	1.2
6	.71	.52	.27	.52	.38	3.0	2.1	5.3	4.8	1.4	2.0	1.2
7	.69	.52	.40	.53	.38	1.4	1.6	4.9	4.2	1.4	2.5	1.1
8	.65	.52	.50	.56	.38	.97	2.1	4.4	3.3	1.4	6.6	1.2
9	.64	.52	.53	.56	.38	1.0	5.7	3.8	2.7	1.3	3.1	2.4
10	.64	.52	.56	.56	.36	1.0	3.9	3.2	2.4	1.2	2.1	2.5
11	.64	.52	.57	.55	.35	2.0	2.5	2.5	1.8	2.1	2.0	1.3
12	.64	.52	.60	.52	.36	2.2	21	1.9	1.5	2.6	2.0	50
13	.64	.52	.60	.52	.38	6.0	21	6.9	1.4	1.3	1.7	4.9
14	.64	.52	.60	.52	.33	7.0	27	5.0	350	1.2	1.6	4.1
15	.64	.52	.60	.52	.32	1.9	14	3.9	431	1.2	1.6	4.5
16	.64	.52	.60	.49	.33	2.1	10	3.1	22	1.3	1.7	3.3
17	.64	.52	.60	.48	.35	3.7	8.9	2.4	15	1.1	2.2	2.9
18	.64	.52	.60	.48	.36	7.6	8.0	4.7	12	1.3	2.0	2.4
19	.60	.55	.60	.48	.35	7.9	9.5	5.0	11	1.3	1.8	2.0
20	.58	.52	.60	.45	.31	6.9	9.2	4.4	10	1.3	1.6	2.0
21	.56	.52	.60	.41	.33	6.6	8.0	3.5	9.1	1.1	1.7	2.0
22	.56	.52	.60	.41	.38	6.6	7.6	3.0	8.2	1.1	1.6	2.0
23	.56	.52	.60	.41	.38	12	7.3	3.8	7.7	1.2	1.5	2.0
24	.56	.52	.60	.41	.38	7.6	6.1	4.7	7.1	1.2	1.4	1.9
25	.56	.53	.56	.39	.38	6.2	5.8	5.3	6.6	1.2	1.3	1.6
26	.56	.56	.53	.38	.38	5.7	5.3	7.5	6.2	1.2	1.3	1.5
27	.56	.56	.48	.38	.39	11	12	6.0	5.7	1.1	1.3	1.5
28	.56	.51	.48	.38	.38	7.1	7.1	5.3	5.4	1.5	1.3	1.6
29	.56	.52	.48	.38	---	6.2	13	8.2	5.2	1.9	1.3	1.6
30	.56	.52	.51	.35	---	5.5	10	17	5.0	1.5	1.2	1.6
31	.56	---	.52	.39	---	5.3	---	8.3	---	1.6	1.2	---
TOTAL	19.66	15.76	16.17	14.63	10.29	140.57	245.3	162.8	969.2	50.4	57.6	110.8
MEAN	.63	.53	.52	.47	.37	4.53	8.18	5.25	32.3	1.63	1.86	3.69
MAX	.88	.56	.60	.56	.41	12	27	17	431	4.2	6.6	50
MIN	.56	.51	.22	.35	.31	.80	1.6	1.9	1.4	1.1	1.2	1.1
AC-FT	39	31	32	29	20	279	487	323	1920	100	114	220
CFSM	.14	.12	.12	.11	.08	1.03	1.86	1.20	7.36	.37	.42	.84
IN.	.17	.13	.14	.12	.09	1.19	2.08	1.38	8.21	.43	.49	.94
CAL YR 1990	TOTAL	538.97		MEAN 1.48	MAX 107	MIN .00	AC-FT 1070	CFSM .34	IN.	4.57		
WTR YR 1991	TOTAL	1813.18		MEAN 4.97	MAX 431	MIN .22	AC-FT 3600	CFSM 1.13	IN.	15.36		

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 mi².

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

GAGE.--Water-stage recorder.

REMARKS.--Estimated daily discharges: Mar. 1-3, 5, 6, 10-12, and June 26 to July 1. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data.

AVERAGE DISCHARGE.--5 years, 2.27 ft³/s, 5.31 in/yr, 326.0 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 880 ft³/s June 15, 1991, gage height, 16.82 ft from rating curve extended above 300 ft³/s on basis of culvert type III indirect computation and road overflow measurement of peak flow; no flow at times each year.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 25 ft³/s and maximum (*);

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 29	1930	45	11.13	June 15	0130	*880	*16.82
May 30	0630	35	10.93	Sept.12	0315	169	12.85
June 14	1945	365	15.24				

No flow for many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.07	.00	.00	.00	.00	.18	1.3	3.9	4.1	1.0	.16	.03
2	.07	.00	.00	.00	.00	1.4	1.2	3.1	3.3	1.0	.15	.01
3	.11	.01	.00	.00	.00	.03	1.0	2.6	2.7	.89	.18	.36
4	.06	.02	.00	.00	.00	.00	.95	2.2	2.1	.76	.16	.01
5	.12	.00	.00	.00	.00	1.2	.83	2.5	1.8	.75	.11	.00
6	.18	.00	.00	.00	.00	.03	.75	2.1	1.4	.73	.11	.00
7	.15	.00	.00	.00	.00	.02	.65	1.5	1.2	.74	.14	.00
8	.15	.33	.00	.00	.00	.02	.67	1.4	.98	.69	1.6	.00
9	.15	.00	.00	.00	.00	.02	1.5	1.3	.91	.61	.27	2.1
10	.15	.00	.00	.00	.00	.03	.80	1.0	.90	.71	.14	.04
11	.18	.00	.00	.00	.00	.36	.59	.86	.74	1.6	.11	.01
12	.18	.00	.00	.00	.00	.13	6.1	.76	.66	1.5	.08	21
13	.13	.00	.00	.00	.00	.03	12	3.4	1.1	1.3	.07	2.6
14	.05	.00	.00	.00	.00	.02	12	1.4	60	.94	.06	2.1
15	.05	.00	.00	.00	.00	.04	9.7	1.2	100	.59	.05	1.7
16	.03	.00	.00	.00	.00	.04	6.8	1.1	17	.59	.05	1.2
17	.03	.06	.00	.00	.00	.16	5.4	1.0	9.2	.54	.04	.89
18	.04	.00	.00	.00	.00	.67	4.9	1.8	6.0	.49	.03	.78
19	.04	.00	.00	.00	.00	1.9	5.7	1.1	4.2	.38	.01	.64
20	.03	.00	.00	.00	.00	1.3	3.7	.93	3.1	.33	.00	.48
21	.02	.07	.00	.00	.00	1.4	2.9	.82	2.3	.26	.03	.48
22	.02	.01	.00	.00	.00	.77	2.4	1.9	1.9	.26	.03	.44
23	.02	.00	.00	.00	.00	4.2	2.2	1.9	1.5	.23	.03	.37
24	.02	.00	.00	.00	.00	2.7	1.6	.83	1.3	.21	.03	.32
25	.03	.00	.00	.00	.00	2.0	1.5	2.7	1.2	.20	.04	.32
26	.01	.00	.00	.00	.00	1.8	1.3	4.1	1.2	.18	.05	.27
27	.04	.00	.00	.00	.00	5.2	4.2	1.6	1.2	.21	.05	.22
28	.05	.00	.00	.00	.00	3.5	2.2	1.5	1.1	.33	.06	.21
29	.02	.00	.00	.00	---	2.4	7.6	7.3	1.1	.27	.05	.21
30	.00	.00	.00	.00	---	1.9	5.7	11	1.0	.20	.05	.21
31	.00	---	.00	.00	---	1.7	---	5.3	---	.18	.03	---
TOTAL	2.20	0.50	0.00	0.00	0.00	35.15	108.14	74.10	235.19	18.67	3.97	37.00
MEAN	.071	.017	.000	.000	.000	1.13	3.60	2.39	7.84	.60	.13	1.23
MAX	.18	.33	.00	.00	.00	5.2	12	11	100	1.6	1.6	21
MIN	.00	.00	.00	.00	.00	.00	.59	.76	.66	.18	.00	.00
AC-FT	4.4	1.0	.00	.00	.00	70	214	147	466	37	7.9	73
CFSM	.06	.01	.00	.00	.00	.99	3.13	2.08	6.82	.52	.11	1.07
IN.	.07	.02	.00	.00	.00	1.14	3.50	2.40	7.61	.60	.13	1.20

CAL YR 1990	TOTAL	89.90	MEAN	.25	MAX	21	MIN	.00	AC-FT	178	CFSM	.21	IN.	2.91
WTR YR 1991	TOTAL	514.92	MEAN	1.41	MAX	100	MIN	.00	AC-FT	1020	CFSM	1.23	IN.	16.66

TURKEY RIVER BASIN

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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 mi².

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: Nov. 4, 5, Nov. 27 to Mar. 5. Records poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data.

AVERAGE DISCHARGE.--5 years, 18.0 ft³/s, 3.46 in/yr, 13,040 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 19,600 ft³/s June 15, 1991, gage height 27.88 ft, from rating curve extended above 4,700 ft³/s on basis of contracted-opening and flow-over-road measurement at peak flow; no flow for several days in 1989, 1990 and 1991.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Apr. 12	2400	625	14.45	June 15	0330	*19,600	*27.88

No flow many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.6	2.9	1.9	.20	.00	.70	45	102	116	33	1.4	.00
2	3.0	2.9	1.7	.23	.00	1.5	40	84	96	27	.85	.00
3	4.8	3.3	1.5	.17	.01	10	35	71	78	20	.72	.89
4	7.6	3.5	1.0	.14	.01	18	33	66	63	18	.90	.18
5	5.7	3.5	.80	.12	.01	15	30	65	52	18	.56	.01
6	3.8	3.4	.58	.14	.02	33	26	75	46	16	.20	.00
7	3.2	3.2	.70	.12	.03	29	23	58	42	15	.28	.00
8	2.8	3.2	.75	.14	.04	19	26	52	38	13	.22	.03
9	2.7	3.3	.80	.14	.05	13	83	51	35	12	.17	.07
10	3.1	3.8	.83	.13	.05	13	56	44	39	11	4.5	.00
11	3.2	3.8	.85	.17	.04	15	43	41	43	12	2.2	.00
12	3.0	3.5	.85	.15	.04	32	187	37	34	23	1.4	105
13	3.0	3.1	.80	.15	.03	20	342	85	28	15	.87	59
14	3.6	3.2	.70	.14	.02	10	272	58	111	11	.55	35
15	2.9	3.6	.60	.15	.02	20	196	44	7090	9.4	.40	41
16	2.7	3.2	.62	.16	.03	21	141	40	435	9.0	.22	24
17	2.7	2.9	.64	.13	.04	19	108	38	204	7.7	.51	14
18	2.8	2.9	.56	.14	.06	70	92	61	143	7.5	1.4	12
19	2.8	3.0	.45	.15	.08	96	103	56	110	7.3	.23	11
20	2.9	2.8	.50	.10	.15	103	108	45	90	6.4	.13	8.6
21	3.6	3.1	.30	.08	.40	100	84	41	78	5.6	.26	8.2
22	3.4	3.2	.21	.06	.50	71	74	40	69	4.9	.22	8.0
23	2.9	3.0	.17	.04	.50	171	70	37	63	3.6	.16	6.8
24	2.8	2.7	.17	.03	.45	117	63	39	55	2.8	.15	6.3
25	2.7	2.5	.21	.02	.43	80	52	32	50	2.1	.11	6.8
26	2.7	2.7	.25	.02	.40	65	49	77	47	1.7	.08	6.5
27	2.7	2.6	.22	.03	.40	137	117	56	42	1.4	.06	5.5
28	2.6	2.3	.24	.03	.50	112	91	46	38	1.8	.06	5.1
29	2.6	2.2	.27	.03	---	76	168	72	36	3.8	.05	5.0
30	2.5	2.5	.30	.02	---	60	150	225	33	3.4	.05	3.9
31	2.6	---	.23	.01	---	53	---	136	---	1.8	.03	---
TOTAL	101.0	91.8	19.70	3.34	4.31	1600.20	2907	1974	9404	324.2	57.55	372.88
MEAN	3.26	3.06	.64	.11	.15	51.6	96.9	63.7	313	10.5	1.86	12.4
MAX	7.6	3.8	1.9	.23	.50	171	342	225	7090	33	.22	105
MIN	2.5	2.2	.17	.01	.00	.70	23	32	28	1.4	.03	.00
AC-FT	200	182	39	6.6	8.5	3170	5770	3920	18650	643	114	740
CFSM	.05	.04	.01	.00	.00	.74	1.38	.91	4.48	.15	.03	.18
IN.	.05	.05	.01	.00	.00	.85	1.54	1.05	5.00	.17	.03	.20
CAL YR 1990	TOTAL 3252.44	MEAN 8.91	MAX 426	MIN .00	AC-FT 6450	CFSM .13	IN. 1.73					
WTR YR 1991	TOTAL 16859.98	MEAN 46.2	MAX 7090	MIN .00	AC-FT 33440	CFSM .66	IN. 8.96					

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 right bank 10 ft upstream 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 mi².

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 encoder. 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. 3 to Mar. 8 and Mar. 27-29. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--71 years (water years 1914-16, 1920-27, 1930, 1933-91), 950 ft³/s, 8.35 in/yr, 688,300 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 49,900 ft³/s June 15, 1991, gage height, 30.10 ft, from rating curve extended above 39,500 ft³/s on basis of contracted opening measurement of peak flow, from floodmark; minimum daily discharge, 49 ft³/s Jan. 28, 29, 1940.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since at least 1890, that of June 15, 1991.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 8,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Apr. 13	0015	15,700	20.63	June 15	1700	*49,900	(a) *30.10
Apr. 30	1800	9,940	17.46				

(a) from floodmark

Minimum daily discharge, 200 ft³/s Jan. 25.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	489	406	365	260	250	600	2260	7910	4320	1130	663	457
2	477	406	363	270	310	800	2040	5110	4050	1090	649	451
3	506	418	300	230	340	1000	1880	3790	3320	1020	640	495
4	566	435	330	240	360	930	1760	3290	2790	964	635	537
5	576	427	365	250	380	1100	1670	3090	2450	931	621	472
6	604	418	390	230	370	1300	1570	3290	2170	901	610	453
7	571	412	390	210	350	1500	1480	3480	1960	921	617	442
8	539	406	400	230	365	1700	1460	3220	1840	876	1020	443
9	525	407	390	250	360	1680	2270	2890	1690	841	876	448
10	515	409	385	230	350	1550	2280	2660	1610	821	844	442
11	504	405	372	240	365	1530	2000	2480	1620	806	740	440
12	494	402	372	250	400	1630	5020	2330	1500	1300	684	462
13	484	395	370	240	435	1740	15100	2280	1410	1110	651	653
14	481	394	345	250	400	1600	12600	2180	1680	933	627	635
15	474	393	390	270	350	1540	10300	2020	33700	859	610	692
16	465	389	390	280	310	1520	6990	1960	30400	812	595	703
17	461	383	385	280	320	1680	4900	2120	7180	774	613	776
18	459	382	395	285	330	2480	4080	3320	4490	754	603	766
19	450	380	390	270	310	3260	3740	4560	3560	739	585	683
20	454	376	380	260	290	3430	4040	5000	3010	733	563	630
21	473	391	370	230	310	3370	3810	4070	2680	759	558	605
22	465	387	310	210	330	3280	3320	3040	2380	746	552	590
23	454	382	250	220	320	4980	3080	3020	2140	731	543	572
24	445	376	270	210	340	6220	2910	2760	1940	715	532	559
25	438	374	290	200	360	5050	2600	2510	1760	703	514	558
26	432	369	290	220	320	3890	2390	2800	1610	693	500	553
27	430	379	300	250	350	4550	2800	2610	1490	681	490	543
28	420	380	315	230	450	4000	4510	2350	1380	681	482	541
29	418	371	330	220	---	3320	6080	2130	1280	708	474	539
30	416	369	270	201	---	2850	9050	5810	1200	696	470	541
31	410	---	240	210	---	2520	---	4540	---	680	463	---
TOTAL	14895	11821	10702	7426	9725	76600	127990	102620	132610	26108	19024	16681
MEAN	480	394	345	240	347	2471	4266	3310	4420	842	614	556
MAX	604	435	400	285	450	6220	15100	7910	33700	1300	1020	776
MIN	410	369	240	200	250	600	1460	1960	1200	680	463	440
AC-FT	29540	23450	21230	14730	19290	151900	253900	203500	263000	51790	37730	33090
CFSM	.31	.26	.22	.16	.22	1.60	2.76	2.14	2.86	.55	.40	.36
IN.	.36	.28	.26	.18	.23	1.84	3.08	2.47	3.19	.63	.46	.40

CAL YR 1990 TOTAL 341673 MEAN 936 MAX 22300 MIN 82 AC-FT 677700 CFSM .61 IN. 8.23
WTR YR 1991 TOTAL 556202 MEAN 1524 MAX 33700 MIN 200 AC-FT 1103000 CFSM .99 IN. 13.39

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, 5.5 mi north of junction of State Highway 64 and 61, and 0.5 mi south of Fulton.

DRAINAGE AREA.--516 mi².

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

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

REMARKS.--Estimated daily discharges: Dec. 22 to Feb. 24. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service Limited Automatic Remote Collector at station.

AVERAGE DISCHARGE.--14 years, 341 ft³/s, 8.97 in/yr, 247,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 10,700 ft³/s Aug. 31, 1981, gage height, 17.26 ft; minimum daily discharge, 46 ft³/s Dec. 24, 25, 1989.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of May 18, 1974 reached a stage of 16.0 ft., from floodmark, discharge 10,000 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 2	0945	*7,380	*13.52	Apr. 13	2345	5,430	11.53
Mar. 27	0845	3,040	8.70				

Minimum discharge, 50 ft³/s Dec. 3, result of freezeup

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	176	151	159	90	72	1390	598	462	412	196	138	138
2	173	154	151	87	74	6340	536	428	437	196	134	129
3	182	157	90	85	76	2190	497	404	387	193	132	132
4	204	168	134	88	83	1040	472	389	347	189	131	134
5	209	164	181	86	94	728	449	387	323	182	129	133
6	193	157	193	84	100	801	425	409	305	182	133	133
7	181	149	184	84	110	839	410	406	297	179	205	134
8	174	139	168	88	140	565	398	377	291	173	445	134
9	172	150	166	88	200	495	466	368	284	165	478	157
10	171	153	171	89	215	478	582	358	279	164	299	153
11	169	149	175	90	200	420	513	349	294	165	211	143
12	172	147	181	90	160	435	471	344	289	162	181	149
13	168	144	181	90	140	496	2570	338	274	173	168	175
14	166	145	156	92	130	383	2410	339	336	247	162	216
15	163	149	175	95	120	381	1510	356	318	189	155	219
16	161	148	198	96	110	386	1110	331	780	170	152	208
17	165	139	184	98	115	670	885	350	494	158	159	183
18	166	143	178	100	130	1670	755	380	378	157	158	156
19	164	145	171	100	170	1520	690	363	329	151	152	138
20	158	145	169	105	230	1210	629	334	298	149	144	135
21	157	162	153	105	320	1090	576	339	277	148	144	130
22	154	168	100	105	440	1030	541	326	266	147	144	135
23	154	166	110	105	390	1200	532	312	255	144	141	127
24	154	159	180	100	360	1080	527	308	243	142	138	128
25	151	156	170	99	277	873	497	297	233	142	138	129
26	148	153	155	98	228	776	472	333	225	136	136	130
27	149	177	135	98	223	2000	465	320	219	128	134	129
28	144	217	120	94	227	1780	473	302	213	137	132	126
29	143	179	105	93	---	1090	633	285	205	132	131	127
30	147	164	96	82	---	812	511	329	197	136	131	127
31	149	---	94	74	---	681	---	323	---	141	139	---
TOTAL	5137	4697	4783	2878	5134	34849	21603	10946	9485	5073	5374	4387
MEAN	166	157	154	92.8	183	1124	720	353	316	164	173	146
MAX	209	217	198	105	440	6340	2570	462	780	247	478	219
MIN	143	139	90	74	72	381	398	285	197	128	129	126
AC-FT	10190	9320	9490	5710	10180	69120	42850	21710	18810	10060	10660	8700
CFSM	.32	.30	.30	.18	.36	2.18	1.40	.68	.61	.32	.34	.28
IN.	.37	.34	.34	.21	.37	2.51	1.56	.79	.68	.37	.39	.32

CAL YR 1990	TOTAL 103395	MEAN 283	MAX 3510	MIN 61	AC-FT 205100	CFSM .55	IN. 7.45
WTR YR 1991	TOTAL 114346	MEAN 313	MAX 6340	MIN 72	AC-FT 226800	CFSM .61	IN. 8.24

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 mi².

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 encoder. 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. 11 to Jan. 17, Jan. 21-24, and June 16-18. Records good except those estimated daily discharges, which are poor. Diurnal fluctuation caused by powerplant 4 mi upstream of station. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--77 years, 1,021 ft³/s, 8.93 in/yr, 739,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 48,000 ft³/s June 27, 1944, gage height, 24.70 ft, at datum then in use; minimum daily discharge, 105 ft³/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 ft³/s, at datum in use prior to Oct. 1, 1972.

EXTREMES FOR CURRENT YEAR.-- Peak discharges greater than base discharge of 7,500 ft³/s and maximum (*)

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
June 29	2115	*11,900	*23.86	Aug. 20	0600	11,300	23.50
Aug. 18	0630	8,340	21.20	Aug. 26	1100	10,500	22.91

Minimum daily discharge, 125 ft³/s Dec. 23.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	532	419	498	255	200	2050	2390	2200	2230	778	454	387
2	536	420	476	240	200	14200	2140	2060	2370	717	458	380
3	531	443	386	240	210	6850	1940	1790	2340	701	463	390
4	523	468	341	248	215	3210	1850	1690	2090	661	468	395
5	640	476	393	245	240	2330	1770	1650	1740	699	454	411
6	544	490	424	230	275	2220	1640	1670	1640	639	458	409
7	534	474	532	240	305	2180	1540	1740	1430	660	638	445
8	536	423	497	250	350	1970	1490	1700	1360	634	860	426
9	544	435	507	250	440	1710	1570	1610	1290	599	1170	455
10	524	431	484	250	600	1340	1830	1550	1160	624	955	450
11	516	473	536	253	500	1260	2130	1490	1150	574	645	466
12	498	468	524	250	400	1410	2050	1440	1230	618	636	506
13	500	460	515	253	380	1410	3870	1360	1210	561	574	514
14	515	413	492	260	350	1280	8650	1340	1240	631	558	606
15	505	463	535	270	320	1210	8410	1530	1190	732	518	595
16	464	461	601	277	310	1250	5990	1640	1570	625	496	595
17	508	421	594	277	320	2290	4120	1820	1920	563	510	540
18	506	456	595	290	340	5330	3140	1690	1630	550	493	482
19	457	417	575	282	400	4790	2820	1840	1440	556	511	477
20	491	421	558	300	550	3940	2530	1710	1260	544	464	454
21	465	448	501	297	800	3330	2370	1880	1150	547	456	462
22	445	476	350	300	1200	3040	2270	1670	1090	542	447	462
23	467	424	400	292	1080	3480	2210	1590	997	511	495	454
24	476	461	450	280	960	3590	2080	1440	957	478	395	429
25	449	450	480	280	880	3670	2000	1430	933	466	438	418
26	470	457	410	280	851	3140	2200	1350	929	483	432	435
27	444	494	348	275	807	5590	2040	1400	890	461	430	407
28	437	538	310	250	799	6380	1890	1380	758	450	412	445
29	413	541	280	238	---	4770	2200	1290	775	473	418	450
30	458	481	280	212	---	3440	2680	1460	781	462	402	638
31	418	---	260	200	---	2750	---	1520	---	465	399	---
TOTAL	15346	13702	14132	8064	14282	105410	83810	49930	40750	18004	16507	13983
MEAN	495	457	456	260	510	3400	2794	1611	1358	581	532	466
MAX	640	541	601	300	1200	14200	8650	2200	2370	778	1170	638
MIN	413	413	260	200	200	1210	1490	1290	758	450	395	380
AC-FT	30440	27180	28030	15990	28330	209100	166200	99040	80830	35710	32740	27740
CFSM	.32	.29	.29	.17	.33	2.19	1.80	1.04	.87	.37	.34	.30
IN.	.37	.33	.34	.19	.34	2.52	2.01	1.20	.98	.43	.40	.33
CAL YR 1990	TOTAL 335536	MEAN 919	MAX 9660	MIN 175	AC-FT 665500	CFSM .59	IN. 8.04					
WTR YR 1991	TOTAL 393920	MEAN 1079	MAX 14200	MIN 200	AC-FT 781300	CFSM .69	IN. 9.44					

05420500 MISSISSIPPI RIVER AT CLINTON, IA

LOCATION.--Lat 41°46'50", long 90°15'07", in NW1/4 sec.34, T.81 N., R.6 E., Clinton County, Hydrologic Unit 07080101, on right bank at foot of Eight 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.

DRAINAGE AREA.--85,600 mi², 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 encoder. Datum of gage is 562.68 ft above NGVD. June 6, 1969 to Sept. 16 1988, water-stage recorder at site 400 ft upstream 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. 22 to Feb. 20. Records good except those for estimated daily discharges, which are poor. Minor flow regulation caused by navigation dams. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--118 years, 47,620 ft³/s, 7.56 in/yr, 34,500,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 307,000 ft³/s Apr. 28, 1965; maximum gage height, 24.65 ft Apr. 28, 1965; minimum daily discharge, 6,500 ft³/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, 137,000 ft³/s June 11; maximum gage height, 15.85 ft June 12; minimum daily discharge, 19,500 ft³/s Jan. 30; minimum gage height, 8.71 ft Jan. 1.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	34500	49000	27000	20000	19900	25800	107000	99700	93100	79700	47300	27200
2	34600	45100	23500	21000	20300	40400	111000	102000	92700	78400	43800	25200
3	31200	42400	20400	22600	20400	54000	117000	100000	92600	76400	44100	23200
4	28400	41600	23400	23100	20200	45200	123000	95900	94100	74000	46700	22200
5	31400	41800	23900	24700	20000	29600	128000	94800	100000	69500	48200	23200
6	30300	38900	26800	26100	20100	28800	132000	94600	111000	67200	46400	22400
7	31800	33000	26200	26900	21700	32400	132000	93800	115000	65300	45500	22100
8	36700	31000	23500	24500	22700	28600	126000	92700	119000	65600	47900	22200
9	35800	29200	24000	23000	23500	29000	116000	92200	124000	65900	54300	22700
10	36600	29000	26200	23100	24700	27900	104000	94000	130000	66800	55400	29600
11	37100	27900	25700	23200	26000	26300	95200	98200	137000	67500	56800	37200
12	34600	27600	23700	23300	26700	26700	90500	99500	134000	70400	58000	39100
13	34400	28100	24000	23200	26600	33100	87100	101000	131000	72400	57600	45600
14	34400	28900	26300	23200	26500	38000	99700	105000	125000	72300	56900	50100
15	33700	29200	26700	22500	26900	39300	109000	111000	118000	72500	53600	58400
16	32800	28200	25300	22400	26700	38500	113000	115000	122000	70800	49100	64600
17	32500	29200	24100	22100	26300	38400	114000	117000	135000	68000	47400	68800
18	30000	28400	24700	21900	25900	45400	111000	120000	133000	64800	47300	67800
19	31100	26400	26000	21700	25400	50900	110000	122000	119000	63700	45300	68200
20	29400	24500	25800	21700	26000	52100	107000	124000	110000	61400	44500	68000
21	28800	25200	26500	21800	25900	49800	109000	126000	97100	60800	44000	68600
22	31800	21900	24400	21900	25900	48000	110000	127000	92700	62600	43200	69500
23	35100	23900	22600	22100	26800	51000	112000	126000	92900	67400	43000	69300
24	34700	21800	22900	22100	28100	59400	111000	123000	87500	69900	40500	69100
25	45800	26200	22600	22100	27800	64600	110000	119000	83800	71100	37400	67800
26	53800	28900	22100	22000	26200	70100	108000	114000	82500	71300	35700	65400
27	54800	30100	21200	21500	25700	81700	106000	109000	82000	70100	34500	62300
28	54700	33800	20000	20100	25100	96000	105000	105000	81700	65800	34200	60300
29	54300	36000	20000	19700	---	102000	100000	101000	81500	62500	33500	57900
30	52800	37000	19900	19500	---	106000	96100	96600	81500	59900	33000	56400
31	53200	---	19800	19700	---	104000	---	94800	---	53000	30000	---
TOTAL	1161100	944200	739200	692700	688000	1563000	3299600	3313800	3198700	2107000	1405100	1454400
MEAN	37450	31470	23850	22350	24570	50420	110000	106900	106600	67970	45330	48480
MAX	54800	49000	27000	26900	28100	106000	132000	127000	137000	79700	58000	69500
MIN	28400	21800	19800	19500	19900	25800	87100	92200	81500	53000	30000	22100
AC-FT	2303000	1873000	1466000	1374000	1365000	3100000	6545000	6573000	6345000	4179000	2787000	2885000
CFSM	.44	.37	.28	.26	.29	.59	1.28	1.25	1.25	.79	.53	.57
IN.	.50	.41	.32	.30	.30	.68	1.43	1.44	1.39	.92	.61	.63

CAL YR 1990 TOTAL 16682600 MEAN 45710 MAX 123000 MIN 12200 AC-FT 33090000 CFSM .53 IN. 7.25
WTR YR 1991 TOTAL 20566800 MEAN 56350 MAX 137000 MIN 19500 AC-FT 40790000 CFSM .66 IN. 8.94

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 mi².

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. 26-30 and Dec. 14 to Feb. 17. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data.

AVERAGE DISCHARGE.--33 years, 65.6 ft³/s, 9.36 in/yr, 47,530 acre-ft/yr; median of yearly mean discharges, 56 ft³/s, 8.0 in/yr, 40,600 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 10,100 ft³/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 ft³/s Feb. 4-8, 1959.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 600 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Apr. 29	1930	827	11.62	May 16	1830	795	11.98
May 6	1445	645	10.99	May 18	0830	*1,480	*13.07

Minimum daily discharge, 7.0 ft³/s Aug. 31 and Sept. 1.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	13	18	13	9.4	8.6	32	95	505	192	21	18	7.9		
2	12	26	11	11	10	72	87	255	145	20	17	11		
3	17	27	9.2	8.2	13	93	81	194	121	18	16	16		
4	29	29	11	8.6	14	93	77	162	106	17	16	19		
5	23	26	13	9.0	15	106	74	318	94	17	15	21		
6	22	27	14	9.4	16	173	70	631	83	16	14	23		
7	19	26	13	7.4	14	173	67	417	75	15	16	23		
8	17	26	13	8.6	14	124	66	258	69	16	46	27		
9	17	24	13	9.0	15	112	80	272	64	16	160	30		
10	17	23	14	8.2	14	102	77	221	59	16	128	25		
11	15	22	14	9.0	14	100	71	179	57	15	72	26		
12	14	21	15	9.4	15	126	147	154	53	24	52	41		
13	14	20	14	8.6	18	109	281	136	50	27	42	72		
14	15	20	10	9.4	19	114	360	123	59	23	35	59		
15	14	19	11	11	15	101	384	120	124	18	29	108		
16	14	17	12	9.8	12	110	228	376	147	16	26	100		
17	17	16	13	10	12	107	167	579	99	14	33	58		
18	17	16	13	9.8	16	137	137	1030	80	36	33	46		
19	17	15	12	10	16	141	189	1060	68	141	29	40		
20	18	15	14	11	19	155	226	616	59	68	24	33		
21	18	15	7.8	10	21	212	171	291	53	42	22	29		
22	18	14	8.6	9.0	23	208	140	226	47	36	19	26		
23	17	14	8.2	7.8	27	346	135	216	43	47	17	23		
24	15	15	10	8.6	30	317	120	228	39	43	15	21		
25	15	14	12	7.4	27	211	106	177	35	32	13	21		
26	14	13	11	7.8	25	177	101	240	31	27	11	21		
27	14	12	12	9.0	25	175	303	232	28	22	9.8	19		
28	12	9.4	12	9.8	26	175	326	182	25	22	9.1	17		
29	13	10	14	9.0	---	135	568	180	23	27	8.0	17		
30	14	12	11	7.0	---	113	778	145	21	24	7.5	17		
31	15	---	8.6	8.2	---	104	---	154	---	21	7.2	---		
TOTAL	506	561.4	367.4	280.4	493.6	4453	5712	9877	2149	897	959.6	996.9		
MEAN	16.3	18.7	11.9	9.05	17.6	144	190	319	71.6	28.9	31.0	33.2		
MAX	29	29	15	11	30	346	778	1060	192	141	160	108		
MIN	12	9.4	7.8	7.0	8.6	32	66	120	21	14	7.2	7.9		
AC-FT	1000	1110	729	556	979	8830	11330	19590	4260	1780	1900	1980		
CFSM	.17	.20	.12	.10	.19	1.51	2.00	3.35	.75	.30	.33	.35		
IN.	.20	.22	.14	.11	.19	1.74	2.23	3.86	.84	.35	.37	.39		
CAL YR 1990	TOTAL	26148.4	MEAN	71.6	MAX	3450	MIN	4.7	AC-FT	51870	CFSM	.75	IN.	10.22
WTR YR 1991	TOTAL	27253.3	MEAN	74.7	MAX	1060	MIN	7.0	AC-FT	54060	CFSM	.78	IN.	10.65

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 mi².

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

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

GAGE.--Water-stage encoder 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. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--58 years, 627 ft³/s, 8.12 in/yr, 454,300 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 26,800 ft³/s July 18, 1968, gage height, 21.11 ft; minimum daily discharge, 7.0 ft³/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 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 28	0645	4,590	8.41	May 23	0345	6,600	10.28
Apr. 15	0445	*9,110	*12.14	June 1	0830	7,220	10.79
May 2	0430	7,210	10.78	June 18	1415	5,820	9.53

Minimum discharge, 96 ft³/s Dec. 4, result of freezeup.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	284	258	241	159	123	465	2120	6660	6870	457	193	122
2	260	261	217	152	119	1530	1840	6970	5530	385	155	114
3	329	271	220	141	117	1930	1590	6000	4810	387	158	185
4	353	293	151	143	119	1710	1400	5020	4110	359	155	252
5	356	324	185	154	122	1840	1280	4080	3140	340	144	171
6	451	329	220	136	124	2170	1160	3580	2420	323	147	140
7	518	321	262	137	130	1930	1070	3220	1870	297	190	125
8	498	302	293	152	143	1750	1050	2900	1540	276	352	120
9	462	312	305	152	143	1720	2370	2720	1320	264	406	136
10	429	310	291	149	151	1650	2660	2670	1190	255	364	145
11	396	307	288	164	172	1700	2040	2610	1080	243	333	146
12	378	303	309	152	163	1740	2750	2460	986	276	287	160
13	344	296	317	154	164	1800	7330	2170	927	826	299	152
14	339	293	283	161	212	1700	7890	1910	978	950	311	169
15	319	296	337	162	165	1750	8640	2170	1030	753	282	224
16	302	294	351	168	164	1740	7280	1780	2750	559	254	277
17	306	273	369	167	150	1760	6620	1950	4600	461	266	341
18	308	273	346	165	142	2210	5630	4220	5580	391	243	487
19	285	269	339	170	141	2420	4810	5960	4730	341	220	470
20	303	254	346	180	150	2430	4140	4940	3190	306	219	430
21	321	277	190	161	172	2410	3510	4840	2170	286	205	376
22	310	263	141	220	216	2350	2960	5720	1540	283	188	334
23	315	259	200	188	284	2820	2670	6380	1230	298	183	295
24	309	243	238	166	332	3610	2550	5340	1050	290	179	272
25	296	240	261	172	347	3910	2360	4280	904	255	165	258
26	286	232	215	171	363	3840	2110	3650	790	230	157	221
27	297	267	191	151	352	4090	2560	3140	691	211	148	204
28	267	252	175	137	341	4460	3600	2560	611	211	134	202
29	263	233	180	127	---	3800	3890	2200	571	228	123	192
30	267	230	167	123	---	3130	5640	2650	511	228	126	189
31	263	---	161	126	---	2610	---	4910	---	216	132	---
TOTAL	10414	8335	7789	4860	5321	72975	105520	119660	68719	11185	6718	6909
MEAN	336	278	251	157	190	2354	3517	3860	2291	361	217	230
MAX	518	329	369	220	363	4460	8640	6970	6870	950	406	487
MIN	260	230	141	123	117	465	1050	1780	511	211	123	114
AC-FT	20660	16530	15450	9640	10550	144700	209300	237300	136300	22190	13330	13700
CFSM	.32	.27	.24	.15	.18	2.25	3.36	3.68	2.19	.34	.21	.22
IN.	.37	.30	.28	.17	.19	2.59	3.75	4.25	2.44	.40	.24	.25

CAL YR 1990	TOTAL 382124	MEAN 1047	MAX 22100	MIN 48	AC-FT 757900	CFSM 1.00	IN. 13.56
WTR YR 1991	TOTAL 428405	MEAN 1174	MAX 8640	MIN 114	AC-FT 849700	CFSM 1.12	IN. 15.21

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 old 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 mi².

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

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

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

REMARKS.--Estimated daily discharges: Dec. 22 to Mar. 1. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U. S. Army Corps of Engineers gage-height telemeter and data collection platform at station.

AVERAGE DISCHARGE.--57 years, 1,550 ft³/s, 9.03 in/yr, 1,123,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 31,100 ft³/s June 17, 1990, gage height, 14.19 ft; minimum daily discharge, 46 ft³/s Jan. 22, 23, 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 6,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 3	1745	8,510	11.70	May 8	1800	8,280	11.62
Mar. 19	1715	8,840	11.79	May 19	0430	7,370	11.35
Mar. 31	1615	8,790	11.78	May 29	1530	7,750	11.47
Apr. 19	1845	*12,500	*12.28	June 7	1645	8,390	11.66

Minimum discharge, 283 ft³/s Sept. 13, 14.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	791	567	758	670	450	1100	8640	4850	5560	1550	545	349
2	764	555	716	640	450	5800	8320	5010	6080	1470	535	334
3	777	550	729	615	500	7970	7440	5220	6250	1390	526	331
4	819	647	649	550	800	7720	5720	5610	6630	1320	514	328
5	768	877	612	570	1000	5000	4220	6270	7070	1240	513	318
6	761	882	745	580	1200	3980	3600	7030	7680	1190	512	312
7	790	811	771	520	950	3600	3220	7650	8240	1140	564	321
8	772	772	809	580	820	3350	2950	8160	8160	1080	725	362
9	780	795	756	560	920	3320	2910	8060	6430	1040	850	362
10	840	822	713	580	1100	3130	2860	7150	3950	989	827	339
11	878	814	724	610	880	2840	2980	5810	3190	941	1010	320
12	862	794	789	580	780	2780	3540	4680	2900	904	901	312
13	817	769	901	595	700	3130	4050	4150	2950	861	807	302
14	790	759	877	600	640	3070	4600	3950	2690	825	738	304
15	762	753	916	620	540	3080	5670	5290	2530	797	682	352
16	731	734	1120	620	500	3150	6620	5040	2430	843	657	372
17	716	707	1180	610	520	4290	7630	4340	2340	1140	656	364
18	718	695	1250	610	660	7500	9680	5910	2360	1180	659	385
19	699	688	1270	600	760	8650	12100	6760	2640	1100	637	395
20	670	671	1210	625	720	8620	11900	4600	3420	994	574	422
21	651	682	1250	540	830	7600	11000	4570	4060	908	543	461
22	630	702	700	600	1050	6440	9990	5240	4580	844	520	525
23	620	689	450	630	1300	6320	9140	5930	5020	782	487	549
24	638	676	500	600	1150	6680	8550	6790	4170	734	470	541
25	643	665	580	580	960	6620	7800	7170	2830	689	453	512
26	633	653	660	540	820	6560	6670	7070	2390	656	431	483
27	628	677	720	520	750	7080	5460	7100	2130	640	412	455
28	606	796	780	500	900	7830	4630	7400	1940	622	405	438
29	591	822	820	470	---	8450	4180	7700	1780	598	388	426
30	589	776	760	450	---	8490	4420	7250	1670	581	371	403
31	582	---	700	440	---	8690	---	5980	---	562	355	---
TOTAL	22316	21800	25415	17805	22650	172840	190490	187740	124070	29610	18267	11677
MEAN	720	727	820	574	809	5575	6350	6056	4136	955	589	389
MAX	878	882	1270	670	1300	8690	12100	8160	8240	1550	1010	549
MIN	582	550	450	440	450	1100	2860	3950	1670	562	355	302
AC-FT	44260	43240	50410	35320	44930	342800	377800	372400	246100	58730	36230	23160
CFSM	.31	.31	.35	.25	.35	2.39	2.73	2.60	1.77	.41	.25	.17
IN.	.36	.35	.41	.28	.36	2.76	3.04	3.00	1.98	.47	.29	.19
CAL YR 1990	TOTAL 818901	MEAN 2244	MAX 24600	MIN 117	AC-FT 1624000	CFSM .96	IN. 13.07					
WTR YR 1991	TOTAL 844680	MEAN 2314	MAX 12100	MIN 302	AC-FT 1675000	CFSM .9	IN. 3.49					

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 mi².

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. 3-5, Dec. 22 to Feb. 16, Feb. 25-27, and Sept. 17-30. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data.

AVERAGE DISCHARGE.--14 years, 15.4 ft³/s, 11.7 in/yr, 11,160 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 7,700 ft³/s June 16, 1990, gage height, 11.03 ft; minimum discharge, 0.06 ft³/s Aug. 18, 1988.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 250 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 2	0700	*1,480	*7.25	May 30	1830	250	4.95
May 17	2145	503	5.55				

Minimum daily discharge, 0.42 ft³/s Sept. 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	3.9	4.6	8.9	10	4.5	40	24	11	24	4.7	.70	.46		
2	3.8	5.1	8.6	9.2	5.5	382	21	11	15	4.6	.49	.55		
3	5.5	4.5	8.0	8.8	20	26	20	11	13	4.5	.45	.84		
4	6.5	19	7.6	8.5	45	16	20	11	11	4.1	.47	.71		
5	4.3	18	8.4	9.4	25	12	18	13	10	4.0	.48	.70		
6	4.2	10	9.7	9.0	17	11	17	11	9.6	3.8	.55	.67		
7	3.8	7.8	13	8.6	14	9.2	16	10	9.2	3.6	14	.70		
8	4.0	6.6	9.4	8.4	11	8.5	16	10	8.9	3.3	7.8	.75		
9	6.5	9.5	9.5	8.0	9.5	7.8	41	11	8.2	3.1	1.8	6.4		
10	7.5	8.4	11	7.7	8.8	7.4	21	10	8.4	3.0	.98	7.5		
11	6.5	7.2	14	7.9	8.0	7.6	18	10	22	3.2	.71	1.4		
12	4.9	7.0	26	8.0	8.7	22	17	11	11	3.3	.58	1.3		
13	4.7	6.7	26	7.7	8.0	20	16	9.9	13	3.2	.55	5.7		
14	5.9	6.7	21	8.4	7.3	23	34	9.3	11	2.8	.55	1.7		
15	5.7	6.7	32	8.6	6.6	21	25	9.3	8.3	2.7	.54	1.7		
16	4.3	6.7	27	9.5	7.2	42	19	8.4	7.5	3.6	.51	3.7		
17	6.2	5.9	26	8.6	8.9	119	17	90	6.8	3.6	.92	1.5		
18	7.9	5.8	27	7.6	27	102	15	63	6.4	3.4	.69	1.1		
19	4.2	6.2	22	8.0	17	71	20	25	6.0	3.0	.57	.90		
20	4.0	6.7	21	9.0	11	55	15	20	5.8	2.6	.55	.78		
21	4.2	9.7	21	8.2	12	45	14	17	17	2.5	.54	.68		
22	4.1	10	15	8.5	11	45	14	16	29	2.2	.51	.60		
23	4.0	7.6	11	9.2	8.8	66	14	14	7.9	1.9	.51	.56		
24	4.0	7.1	13	8.2	7.9	50	12	27	6.7	1.7	.48	.52		
25	4.1	7.1	12	7.3	6.6	39	12	17	6.2	1.4	.48	.50		
26	4.3	6.7	10	6.7	6.8	36	12	17	5.8	1.1	.50	.47		
27	4.9	19	11	7.0	7.6	80	12	14	5.5	1.0	.48	.46		
28	4.6	15	16	6.6	8.2	45	11	12	5.1	1.1	.48	.45		
29	4.2	9.6	14	4.5	---	37	12	12	5.0	1.1	.45	.43		
30	4.9	9.1	11	3.9	---	32	11	33	4.7	.97	.50	.42		
31	4.9	---	9.6	4.1	---	29	---	30	---	.77	.50	---		
TOTAL	152.5	260.0	479.7	245.1	338.9	1506.5	534	573.9	308.0	85.84	39.32	44.15		
MEAN	4.92	8.67	15.5	7.91	12.1	48.6	17.8	18.5	10.3	2.77	1.27	1.47		
MAX	7.9	19	32	10	45	382	41	90	29	4.7	14	7.5		
MIN	3.8	4.5	7.6	3.9	4.5	7.4	11	8.4	4.7	.77	.45	.42		
AC-FT	302	516	951	486	672	2990	1060	1140	611	170	78	88		
CFSM	.28	.49	.87	.44	.68	2.73	1.00	1.04	.58	.16	.07	.08		
IN.	.32	.54	1.00	.51	.71	3.15	1.12	1.20	.64	.18	.08	.09		
CAL YR 1990	TOTAL	12340.4	MEAN	33.8	MAX	1660	MIN	1.4	AC-FT	24480	CFSM	1.90	IN.	25.79
WTR YR 1991	TOTAL	4567.91	MEAN	12.5	MAX	382	MIN	.42	AC-FT	9060	CFSM	.70	IN.	9.55

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 mi².

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. 2 to Mar. 1, Mar. 7-10, and Mar. 23-25. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data.

AVERAGE DISCHARGE.--42 years (water years 1948-76, 1978-91), 65.7 ft³/s, 6.71 in/yr, 47,600 acre-ft/yr; median of yearly mean discharges, 53 ft³/s, 5.4 in/yr, 38,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,960 ft³/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, backwater from ice; no flow Dec. 21, 1989 to Jan. 7, 1990.

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 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 23	unknown	807	8.60	June 5	1045	711	8.08
May 18	1715	*1,050	*9.17				

Minimum daily discharge, 4.0 ft³/s Jan. 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	15	18	14	8.9	5.1	98	143	340	554	117	40	12
2	16	17	15	10	7.0	160	131	267	536	107	36	12
3	30	17	17	5.6	11	220	116	235	433	101	31	11
4	30	18	19	4.6	12	200	105	221	476	96	26	10
5	31	17	20	6.6	15	210	95	306	691	90	22	11
6	31	18	27	6.9	14	300	89	550	593	85	19	10
7	25	18	26	5.1	13	437	84	493	476	84	63	9.9
8	23	22	25	6.2	14	410	86	401	389	85	339	13
9	21	19	22	6.5	13	322	89	352	323	83	349	11
10	21	17	21	6.0	12	235	83	294	277	79	216	9.5
11	23	16	22	6.2	11	198	80	251	234	77	139	37
12	26	16	25	7.0	13	199	126	222	202	129	102	188
13	19	16	24	6.7	13	264	315	203	181	104	83	162
14	19	16	21	7.6	21	196	461	190	175	90	69	134
15	17	17	22	8.9	20	151	556	228	333	80	58	102
16	17	15	23	8.6	12	166	445	538	461	73	54	82
17	18	15	23	8.5	11	170	315	881	357	66	51	69
18	17	16	22	7.6	9.3	213	242	1020	263	57	44	63
19	17	15	21	8.9	8.5	221	346	873	225	51	37	56
20	18	16	17	10	8.2	232	383	726	394	57	34	51
21	18	17	15	6.5	10	265	293	650	326	55	32	50
22	19	15	17	5.4	14	269	236	589	250	54	25	48
23	22	14	14	5.0	19	655	215	531	206	48	41	41
24	19	14	16	5.8	28	701	187	465	182	43	44	41
25	18	13	20	4.4	37	553	170	403	168	38	35	40
26	20	14	16	5.0	32	458	215	454	159	33	28	36
27	19	14	18	5.8	39	374	589	456	145	31	20	35
28	17	25	19	6.6	42	329	624	377	133	52	17	33
29	17	24	20	5.6	---	250	511	313	125	59	15	32
30	18	17	13	4.0	---	194	434	282	117	55	14	30
31	17	---	8.6	4.4	---	168	---	382	---	47	13	---
TOTAL	638	506	602.6	204.9	464.1	8818	7764	13493	9384	2226	2096	1439.4
MEAN	20.6	16.9	19.4	6.61	16.6	284	259	435	313	71.8	67.6	48.0
MAX	31	25	27	10	42	701	624	1020	691	129	349	188
MIN	15	13	8.6	4.0	5.1	98	80	190	117	31	13	9.5
AC-FT	1270	1000	1200	406	921	17490	15400	26760	18610	4420	4160	2860
CFSM	.15	.13	.15	.05	.12	2.14	1.95	3.27	2.35	.54	.51	.36
IN.	.18	.14	.17	.06	.13	2.47	2.17	3.77	2.62	.62	.59	.40
CAL YR 1990	TOTAL 18506.04	MEAN 50.7	MAX 793	MIN .00	AC-FT 36710	CFSM .38	IN. 5.18					
WTR YR 1991	TOTAL 47636.0	MEAN 131	MAX 1020	MIN 4.0	AC-FT 94490	CFSM .98	IN. 13.32					

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 mi².

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: Dec. 2 to Mar. 5. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data.

AVERAGE DISCHARGE.--50 years (water years 1941-76, 1978-91), 215 ft³/s, 6.81 in/yr, 155,800 acre-ft/yr; median of yearly mean discharges, 190 ft³/s, 6.0 in/yr, 138,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,460 ft³/s June 21, 1954, gage height, 14.88 ft; minimum daily discharge, 2.8 ft³/s Dec. 22, 1990.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,200 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 26	0545	1,660	10.54	May 18	2130	*5,930	*14.01
Apr. 16	0700	1,530	10.23	June 5	0415	3,830	12.59
Apr. 29	1445	1,960	11.02	June 21	0030	1,310	9.80
May 8	0030	1,660	10.43				

Minimum daily discharge, 20 ft³/s Dec. 31, and Jan. 31.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	69	59	46	21	22	210	750	1570	2010	386	142	141
2	67	58	28	23	28	350	649	1340	1840	362	142	138
3	69	60	29	22	38	330	582	1160	1690	334	141	135
4	76	61	30	22	41	340	539	1000	2240	313	140	131
5	82	60	33	38	51	440	493	1110	3480	293	138	123
6	79	58	38	38	39	787	452	1430	2290	275	136	117
7	78	56	37	35	42	811	421	1630	1880	254	134	113
8	74	52	35	37	45	680	402	1620	1600	247	361	110
9	72	53	34	36	34	631	401	1460	1350	245	705	109
10	70	60	30	38	32	496	403	1290	1190	231	803	108
11	68	56	32	33	30	400	389	1120	1050	220	670	107
12	68	53	35	37	32	466	432	967	928	299	423	106
13	68	52	33	41	26	515	811	830	814	324	304	269
14	66	51	31	43	51	490	1140	737	758	276	240	290
15	65	51	32	44	70	533	1430	815	862	232	199	293
16	62	51	34	48	47	552	1520	1380	1070	205	170	255
17	60	50	34	43	35	599	1430	2680	1160	184	156	207
18	66	48	32	39	23	717	1250	5140	1100	165	154	181
19	66	48	30	47	24	797	1160	5310	941	147	154	175
20	60	49	28	55	26	804	1210	3910	1070	141	154	174
21	65	48	24	26	32	833	1220	2700	1270	144	153	172
22	66	49	26	24	46	893	1120	2160	1100	144	153	170
23	63	47	22	29	76	1110	970	1890	915	139	152	168
24	64	47	23	30	100	1360	833	1680	761	137	152	165
25	65	44	27	25	103	1550	728	1500	669	132	152	161
26	64	44	24	28	87	1640	789	1540	599	129	152	158
27	64	42	25	27	90	1570	1510	1600	543	126	150	155
28	74	39	26	28	66	1420	1860	1640	493	133	149	151
29	60	44	28	25	---	1260	1940	1510	448	161	146	147
30	59	46	24	23	---	1070	1810	1360	413	179	144	144
31	59	---	20	20	---	883	---	1500	---	159	143	---
TOTAL	2088	1536	930	1025	1336	24537	28644	55579	36534	6716	7112	4873
MEAN	67.4	51.2	30.0	33.1	47.7	792	955	1793	1218	217	229	162
MAX	82	61	46	55	103	1640	1940	5310	3480	386	803	293
MIN	59	39	20	20	22	210	389	737	413	126	134	106
AC-FT	4140	3050	1840	2030	2650	48670	56820	110200	72470	13320	14110	9670
CFSM	.16	.12	.07	.08	.11	1.85	2.23	4.18	2.84	.51	.53	.38
IN.	.18	.13	.08	.09	.12	2.13	2.48	4.82	3.17	.58	.62	.42

CAL YR 1990	TOTAL	56640.5	MEAN	155	MAX	1750	MIN	4.2	AC-FT	112300	CFSM	.36	IN.	4.91
WTR YR 1991	TOTAL	170910	MEAN	468	MAX	5310	MIN	20	AC-FT	339000	CFSM	1.09	IN.	14.82

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 mi², including that of Burnett Creek.

WATER-DISCHARGE RECORDS

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 encoder. 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. 3 to Mar. 2. Records good except those for estimated daily discharges, which are poor. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--73 years (water years 1903, 1915-27, 1933-91), 825 ft³/s, 7.16 in/yr, 597,700 acre-ft/yr; median of yearly mean discharges, 730 ft³/s, 6.3 in/yr, 529,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 42,000 ft³/s June 4, 1918, gage height, 17.74 ft, from flood-mark, from rating curve extended above 19,000 ft³/s on basis of velocity-area study; maximum gage height, 20.47 ft, June 18, 1990; minimum daily discharge, 4.7 ft³/s Jan. 25, 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 5,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 18	1500	6,480	16.82	May 21	0600	10,400	18.55
Mar. 28	0500	6,120	16.50	June 5	1300	*15,200	*19.97
Apr. 13	1500	7,090	16.88				

Minimum daily discharge, 135 ft³/s Feb. 2.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	401	287	232	204	139	850	3150	4770	6930	1270	343	239
2	389	280	242	199	135	1500	2740	4580	8420	1170	365	260
3	394	297	220	195	148	2790	2430	4220	7740	1080	330	257
4	529	321	220	186	165	1930	2150	3820	8850	994	297	234
5	507	345	230	186	336	1790	1980	4170	14400	923	287	202
6	466	341	210	182	354	1790	1850	4910	11200	856	281	185
7	444	325	220	178	427	1560	1670	4490	7870	786	269	173
8	413	305	240	175	500	1410	1570	4200	7030	718	381	166
9	405	318	260	178	620	1500	3770	4050	6410	686	514	168
10	397	332	270	169	700	1370	3130	3870	5630	676	797	164
11	390	335	260	169	660	1340	2380	3700	4980	643	850	170
12	378	334	250	165	580	1430	3190	3380	4360	669	849	248
13	369	384	250	169	542	2450	6650	3100	3880	687	872	824
14	368	403	236	182	473	2360	6170	2820	3630	690	738	660
15	362	340	249	186	409	2170	6850	2700	3880	671	582	823
16	348	328	259	178	372	2170	5980	4770	3690	628	497	750
17	348	316	245	178	354	3410	5230	6360	3300	575	467	664
18	337	313	224	182	427	6120	4750	7420	3100	532	447	552
19	321	306	233	212	612	5580	5090	9130	2980	493	401	485
20	316	293	244	265	800	4940	5390	10000	2880	459	363	424
21	334	299	230	221	900	4160	4840	10300	2680	429	338	385
22	329	326	204	186	1000	3530	4280	9870	2430	450	329	350
23	318	292	212	221	1200	4180	3890	8790	2390	462	297	331
24	311	280	239	204	1300	5000	3540	7690	2450	459	311	318
25	301	276	261	182	1000	4720	3190	6610	2230	439	272	299
26	298	270	256	165	800	4440	2900	5920	1980	374	292	288
27	298	291	247	160	750	5060	4360	5440	1730	349	307	276
28	289	263	277	173	700	5790	4820	5230	1540	347	281	266
29	280	228	308	165	---	4970	4830	5250	1380	371	269	261
30	288	215	247	160	---	4340	4860	5280	1300	362	266	255
31	288	---	221	156	---	3750	---	5500	---	347	253	---
TOTAL	11216	9243	7496	5731	16403	98400	117630	172340	141270	19595	13145	10677
MEAN	362	308	242	185	586	3174	3921	5559	4709	632	424	356
MAX	529	403	308	265	1300	6120	6850	10300	14400	1270	872	824
MIN	280	215	204	156	135	850	1570	2700	1300	347	253	164
AC-FT	22250	18330	14870	11370	32540	195200	233300	341800	280200	38870	26070	21180
CFSM	.23	.20	.15	.12	.37	2.03	2.51	3.55	3.01	.40	.27	.23
IN.	.27	.22	.18	.14	.39	2.34	2.80	4.10	3.36	.47	.31	.25

CAL YR 1990	TOTAL 408525	MEAN 1119	MAX 14500	MIN 28	AC-FT 810300	CFSM .72	IN. 9.72
WTR YR 1991	TOTAL 623146	MEAN 1707	MAX 14400	MIN 135	AC-FT 1236000	CFSM 1.09	IN. 14.82

05451500 IOWA RIVER AT MARSHALLTOWN, IA--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--April 1988 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: April 1988 to current year.

WATER TEMPERATURES: April 1988 to current year.

SUSPENDED-SEDIMENT DISCHARGE: April 1988 to current year.

REMARKS.--Records of specific conductance are obtained from suspended-sediment samples at times 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, 805 microsiemens May 13, 1990; minimum daily, 270 microsiemens June 17, 1990.

WATER TEMPERATURES: Maximum daily, 34.0°C July 27, 1988; minimum daily, 0.0°C on many days during winter period.

SEDIMENT CONCENTRATIONS: Maximum daily mean, 4,960 mg/L Mar. 19, 1990; minimum daily mean, 2 mg/L Aug. 8, 16, 1988.

SEDIMENT LOADS: Maximum daily, 65,100 tons June 4, 1991; minimum daily, 0.20 ton Aug. 8, 16, 1988.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum daily, 706 microsiemens Mar. 31; minimum daily, 330 microsiemens Feb. 22.

WATER TEMPERATURES: Maximum daily, 29.0°C July 21; minimum daily, 0.0°C on many days during winter period.

SEDIMENT CONCENTRATIONS: Maximum daily mean, 2,830 mg/L May 17; minimum daily mean, 14 mg/L Jan. 28, 29.

SEDIMENT LOADS: Maximum daily, 65,100 tons June 4; minimum daily, 6.2 tons Jan. 29.

SPECIFIC CONDUCTANCE MICROSIEMENS/CM AT 25 DEG C, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	547	---	599	569	---	517	517	---
2	---	---	---	---	---	---	597	600	436	611	508	445
3	---	---	---	---	---	517	572	591	469	525	---	480
4	---	---	---	---	519	559	555	610	409	587	462	488
5	---	---	---	---	---	568	555	603	253	526	454	474
6	---	511	---	---	601	561	558	586	387	566	468	472
7	522	---	---	524	---	579	600	545	489	---	476	---
8	---	---	---	---	618	611	633	600	---	582	447	438
9	---	---	---	---	---	---	585	618	516	577	444	458
10	---	---	---	515	---	---	618	629	534	554	562	443
11	---	---	---	---	496	645	537	671	561	573	552	429
12	---	---	---	---	588	---	585	589	591	560	575	426
13	---	488	---	---	---	---	382	572	557	---	624	419
14	505	519	---	515	---	598	559	671	497	540	550	---
15	---	489	---	---	---	591	471	610	---	512	574	366
16	---	504	---	---	---	584	570	493	503	502	629	468
17	---	---	---	---	---	---	599	450	587	635	---	563
18	---	---	---	522	---	388	559	407	535	528	590	584
19	---	509	---	---	620	458	626	403	549	562	603	651
20	---	---	---	---	560	535	636	380	521	---	595	584
21	---	---	---	513	364	592	598	380	521	521	544	502
22	---	---	---	---	330	636	643	420	---	528	496	616
23	---	---	---	---	---	---	604	474	554	495	571	695
24	---	---	---	557	---	695	627	498	599	485	590	561
25	---	---	---	546	---	655	579	536	544	486	487	582
26	---	---	---	---	---	669	613	---	580	489	544	524
27	---	---	---	---	605	675	567	566	536	482	545	630
28	---	---	---	515	616	632	594	553	591	462	570	---
29	---	---	---	---	---	698	565	533	---	463	539	498
30	---	---	---	533	---	663	574	542	524	475	485	494
31	---	---	---	---	---	706	---	555	---	499	---	---

IOWA RIVER BASIN

05451500 IOWA RIVER AT MARSHALLTOWN, IA--Continued

WATER-QUALITY RECORDS

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	1.0	---	6.0	12.0	---	26.0	21.5	---
2	---	---	---	---	---	---	7.0	13.0	21.0	28.0	24.5	27.0
3	---	---	---	---	---	1.5	9.0	10.0	21.5	24.5	---	24.0
4	---	---	---	---	1.0	2.0	10.0	10.0	20.0	24.5	26.0	19.0
5	---	---	---	---	---	4.0	12.0	10.0	18.0	22.0	22.0	19.0
6	---	---	---	---	2.0	3.0	14.0	8.0	19.0	29.0	21.5	18.0
7	14.5	---	---	---	---	2.0	18.0	8.0	19.5	---	24.0	---
8	---	---	---	---	2.0	3.0	17.0	11.0	---	23.0	23.0	24.0
9	---	---	---	.0	---	---	12.0	12.0	22.0	23.0	21.0	22.5
10	---	---	---	.0	---	---	7.0	15.0	21.0	22.0	21.5	21.5
11	---	---	---	---	1.0	4.0	8.0	18.0	21.0	23.0	25.0	21.0
12	---	---	---	---	1.0	---	6.0	20.0	22.0	23.0	21.5	22.0
13	---	6.0	---	---	---	---	6.0	21.0	22.5	---	22.0	22.0
14	15.0	8.0	---	1.0	---	4.0	7.0	21.0	23.0	26.0	22.0	---
15	---	8.0	---	---	---	4.0	8.0	22.0	---	22.0	22.5	24.0
16	---	---	---	---	---	4.0	9.0	19.0	23.0	22.5	23.0	19.5
17	---	---	---	---	---	---	9.0	20.0	21.0	24.5	---	18.0
18	---	---	---	.0	---	3.0	10.0	14.5	21.5	25.0	26.0	15.5
19	---	8.0	---	---	1.0	5.0	9.0	14.5	22.5	25.0	20.5	12.0
20	---	---	---	---	2.0	7.0	9.0	14.0	23.0	---	19.0	10.0
21	---	---	---	.0	3.0	8.0	10.0	16.5	23.0	29.0	19.5	16.0
22	---	---	---	---	1.0	---	10.0	17.5	---	26.0	22.0	17.0
23	---	---	---	---	---	---	10.0	21.0	20.0	24.5	25.0	17.0
24	---	---	---	.0	---	6.0	9.0	20.0	19.5	22.0	22.0	13.5
25	---	---	---	.0	---	6.0	11.0	20.0	21.0	21.0	27.0	16.0
26	---	---	---	---	---	11.0	10.0	---	23.0	20.0	26.5	16.0
27	---	---	---	---	1.0	10.0	14.0	22.5	25.0	22.5	28.0	13.0
28	---	---	---	.0	2.0	7.0	14.0	21.5	25.0	21.0	25.0	---
29	---	---	---	---	---	5.0	15.0	23.0	---	24.0	25.0	19.0
30	---	---	---	.0	---	6.0	13.0	21.5	28.5	19.5	27.5	17.0
31	---	---	---	---	---	5.0	---	22.0	---	22.0	---	---

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)
OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH		
1	86	93	56	44	73	46	100	55	29	11	251	576
2	85	89	73	55	75	49	100	54	21	7.7	1610	6520
3	115	124	66	53	62	37	121	64	22	8.8	954	7270
4	217	303	61	52	57	34	119	60	22	9.8	982	5100
5	103	141	54	50	52	32	113	57	22	20	808	3910
6	82	103	39	36	50	28	102	50	35	33	1060	5110
7	74	88	37	32	50	30	86	41	36	42	672	2860
8	71	79	42	35	50	32	54	26	35	47	348	1330
9	71	78	57	49	50	35	43	21	65	109	639	2600
10	72	77	56	50	51	37	73	33	74	140	461	1700
11	71	75	54	49	50	35	24	11	55	98	476	1720
12	71	72	53	48	50	34	21	9.4	36	56	404	1550
13	70	70	111	120	50	34	20	9.1	34	50	1160	7910
14	67	67	107	118	50	32	20	9.8	29	37	971	6190
15	67	65	67	61	50	34	20	10	24	27	666	3910
16	68	64	85	76	56	39	20	9.6	24	24	462	2740
17	89	84	68	58	31	21	20	9.6	24	23	1040	12300
18	88	81	66	56	109	66	46	23	24	28	2210	36200
19	79	69	62	51	181	114	31	18	25	41	2330	35300
20	66	56	60	48	140	92	31	22	40	86	1040	14000
21	72	65	60	48	137	85	31	18	411	999	788	8860
22	58	52	95	84	158	87	31	16	737	1990	677	6450
23	56	48	79	62	136	78	32	19	590	1910	370	4130
24	51	43	80	60	135	87	34	19	496	1740	225	3040
25	48	39	81	60	142	100	17	8.4	403	1090	992	12600
26	47	38	82	59	166	115	15	6.7	309	667	1230	14800
27	53	43	103	81	119	79	15	6.5	207	419	1900	26900
28	50	39	85	60	111	83	14	6.5	116	219	1110	17400
29	51	39	70	43	105	87	14	6.2	---	---	792	10700
30	55	42	60	35	100	67	21	9.1	---	---	661	7740
31	52	41	---	---	99	59	22	9.3	---	---	572	5810
TOTAL	---	2367	---	1733	---	1788	---	717.2	---	9932.3	---	277226

IOWA RIVER BASIN

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05451500 IOWA RIVER AT MARSHALLTOWN, IA--Continued

WATER-QUALITY RECORDS

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MEAN CONCENTRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/ DAY)
APRIL			MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	528	4490	510	6570	1470	29000	273	932	94	87	122	79
2	568	4190	442	5460	820	18400	237	751	186	186	152	107
3	643	4210	468	5360	453	9480	264	768	147	131	180	125
4	526	3040	397	4100	2670	65100	231	621	99	79	110	68
5	371	1980	1220	13700	1060	40900	210	525	108	84	87	48
6	360	1800	754	10000	308	9350	168	388	108	83	86	43
7	275	1240	538	6570	334	7070	218	460	213	154	71	33
8	1390	5990	441	5010	330	6270	205	399	462	473	62	28
9	2410	23800	389	4240	292	5060	160	297	460	644	82	37
10	1240	10700	423	4420	370	5610	194	355	579	1230	68	30
11	866	5590	401	3990	278	3730	219	379	505	1160	127	61
12	1270	13200	525	4800	332	3910	264	477	390	895	364	245
13	1990	34900	441	3690	324	3390	203	376	379	891	975	3330
14	1720	28500	317	2420	386	3790	210	392	310	618	964	1750
15	1400	25900	318	2320	1140	12100	192	347	270	424	966	2200
16	1140	18500	1210	17500	543	5500	174	295	212	285	456	934
17	737	10400	2830	48000	550	4830	100	156	235	298	254	460
18	742	9510	2040	40700	739	6220	98	142	147	178	174	260
19	1090	15100	706	17000	317	2550	117	157	128	138	132	172
20	785	11500	723	19600	327	2530	110	137	124	121	133	152
21	640	8330	465	12900	392	2840	95	110	131	119	116	120
22	481	5590	456	12100	288	1890	106	131	173	155	86	81
23	520	5440	389	9330	519	3340	97	122	104	83	74	66
24	507	4850	358	7410	590	3920	118	147	132	111	76	65
25	440	3820	446	7940	250	1500	96	114	131	96	77	62
26	520	4080	503	8050	261	1390	98	98	96	76	84	65
27	1240	15700	580	8510	288	1340	101	95	88	72	47	35
28	1020	13300	477	6750	383	1590	93	87	101	77	39	28
29	671	8730	501	7100	326	1220	97	97	100	73	40	28
30	598	7860	439	6260	287	1010	104	102	118	84	44	30
31	---	---	369	5490	---	---	162	152	150	102	---	---
TOTAL	---	312240	---	317290	---	264830	---	9609	---	9207	---	10742
YEAR	1217681.5											

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	TEMPER- ATURE WATER (DEG C) (00010)	DIS- CHARGE, INST. CUBIC FEET PER SECOND (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)
DEC								
18...	1437	1.0	224	55	33	--	--	--
MAR								
15...	1327	5.0	2120	473	2710	--	--	--
18...	1345	5.0	2120	993	5680	36	42	50
APR								
10...	1421	9.5	2960	412	3290	--	--	--
13...	1547	6.0	4150	742	8310	49	51	61
25...	1200	12.0	11100	287	8600	--	--	--
MAY								
21...	1047	16.5	10600	518	14800	--	--	--
JUN								
05...	1621	20.0	15000	1370	55500	38	41	45
JUL								
08...	1320	26.0	712	676	1300	--	--	--
AUG								
22...	1551	24.0	326	122	107	--	--	--

IOWA RIVER BASIN

05451500 IOWA RIVER AT MARSHALLTOWN, IA--Continued

WATER-QUALITY RECORDS

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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)
DEC 18...	--	--	--	--	--	--	46
MAR 15...	--	--	--	--	--	--	74
MAR 18...	60	85	91	98	100	--	--
APR 10...	--	77	85	98	100	--	--
APR 13...	70	84	88	98	100	--	--
APR 25...	--	--	--	--	--	--	12
MAY 21...	--	51	56	66	85	100	--
JUN 05...	48	53	56	66	98	100	--
JUL 08...	--	--	--	--	--	--	24
AUG 22...	--	--	--	--	--	--	86

PARTICLE-SIZE DISTRIBUTION OF SURFACE BED MATERIAL, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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)	BED MAT. SIEVE DIAM. % FINER THAN 8.00 MM (80171)	BED MAT. SIEVE DIAM. % FINER THAN 16.0 MM (80172)
JUL 08...	1330	5	--	0	12	67	91	96	98	100	--
AUG 22...	1525	5	1	1	9	47	78	91	96	98	100

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 mi².

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

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

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

REMARKS.--Estimated daily discharges: Dec. 11 to Mar. 1, June 6-12, and Aug. 11-25. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and data collection platform at station.

AVERAGE DISCHARGE.--41 years, 73.9 ft³/s, 8.50 in/yr, 53,540 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 12,000 ft³/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 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 18	0045	1,500	12.63	May 18	0815	1,510	12.89
Apr. 27	unknown	1,080	11.00	May 31	unknown	2,320	14.97
May 16	unknown	*3,360	*15.92	June 1	unknown	1,820	13.96

Minimum discharge, 3.8 ft³/s Sept. 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	26	18	22	11	6.7	100	131	328	770	71	15	10		
2	25	19	18	10	6.0	465	123	252	468	66	15	8.8		
3	32	25	24	9.8	6.4	284	112	222	337	63	16	12		
4	35	34	24	9.4	7.2	121	106	210	432	61	15	11		
5	28	27	18	9.1	18	101	100	219	495	60	16	7.6		
6	24	24	31	8.8	20	91	93	269	402	57	17	6.3		
7	23	23	33	8.7	26	65	89	277	338	53	18	8.6		
8	24	21	31	8.4	62	65	85	279	288	50	66	7.9		
9	26	24	30	8.6	94	58	111	274	258	50	26	7.6		
10	25	26	29	7.9	101	51	101	252	231	50	17	6.3		
11	25	25	25	8.2	76	49	124	238	203	48	15	5.6		
12	23	23	23	7.7	56	130	199	223	184	55	15	10		
13	24	24	20	7.8	40	202	264	207	168	44	15	21		
14	23	22	20	8.5	28	142	343	195	172	44	14	13		
15	22	22	22	8.7	21	177	318	335	190	40	13	12		
16	23	21	23	8.0	20	232	248	1880	163	37	13	9.6		
17	23	19	21	8.1	20	763	202	675	148	34	12	6.8		
18	22	20	19	8.6	29	583	193	1060	137	31	11	7.6		
19	20	20	19	10	46	257	387	511	128	29	11	7.3		
20	21	19	18	13	54	213	299	460	122	28	9.9	6.0		
21	29	20	12	12	90	193	245	477	115	27	9.1	5.9		
22	24	18	11	10	72	170	212	502	109	26	8.4	5.6		
23	26	18	12	12	60	269	195	397	105	23	7.9	4.6		
24	24	18	14	11	52	259	170	352	102	22	7.5	5.1		
25	22	18	15	9.5	44	218	155	369	96	20	7.3	5.4		
26	23	18	16	8.1	41	194	146	339	91	20	7.8	5.2		
27	23	25	14	7.8	37	196	582	275	85	19	8.0	5.0		
28	21	26	15	8.6	42	214	307	250	80	20	7.5	5.2		
29	21	19	16	8.2	---	193	319	243	77	21	7.0	4.3		
30	19	20	14	8.1	---	162	356	298	74	18	24	3.9		
31	19	---	13	8.1	---	148	---	745	---	16	26	---		
TOTAL	745	656	622	283.7	1175.3	6365	6315	12613	6568	1203	470.4	235.2		
MEAN	24.0	21.9	20.1	9.15	42.0	205	210	407	219	38.8	15.2	7.84		
MAX	35	34	33	13	101	763	582	1880	770	71	66	21		
MIN	19	18	11	7.7	6.0	49	85	195	74	16	7.0	3.9		
AC-FT	1480	1300	1230	563	2330	12620	12530	25020	13030	2390	933	467		
CFSM	.20	.19	.17	.08	.36	1.74	1.78	3.45	1.86	.33	.13	.07		
IN.	.23	.21	.20	.09	.37	2.01	1.99	3.98	2.07	.38	.15	.07		
CAL YR 1990	TOTAL	47178.60	MEAN	129	MAX	2640	MIN	.37	AC-FT	93580	CFSM	1.10	IN.	14.87
WTR YR 1991	TOTAL	37251.6	MEAN	102	MAX	1880	MIN	3.9	AC-FT	73890	CFSM	.86	IN.	11.74

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 mi².

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

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

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

REMARKS.--Estimated daily discharges: Nov. 18, Dec. 3-10, Dec. 21 to Feb. 27, and July 30 to Aug. 11. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--42 years, 36.4 ft³/s, 8.81 in/yr, 26,370 acre-ft/yr; median of yearly mean discharges, 32 ft³/s, 7.7 in/yr, 23,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 12,200 ft³/s, Apr. 12, 1991, gage height, 26.71 ft; no flow Jan. 22 to Feb. 2, 1977 and July 9, 10, 1989.

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 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 2	0645	1,280	19.32	Apr. 27	0800	1,820	19.82
Mar. 17	1815	1,160	18.53	Apr. 29	0515	5,500	23.24
Apr. 12	2345	*12,200	*26.71	June 4	1145	1,080	18.44

Minimum discharge, 1.5 ft³/s Sept. 25, 26, 29, 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	8.0	8.2	8.4	10	6.9	200	77	202	202	32	7.2	2.7
2	7.7	8.2	7.3	9.8	7.6	570	71	180	217	32	6.4	2.6
3	41	8.7	7.0	10	8.6	68	65	167	111	30	5.7	2.8
4	19	11	8.0	9.8	9.8	42	61	157	376	30	5.3	2.8
5	12	9.9	10	9.5	13	38	56	452	141	29	5.0	2.2
6	10	9.2	12	9.4	15	34	52	246	109	25	5.3	2.1
7	9.2	8.7	13	9.1	15	28	48	176	96	22	6.0	2.1
8	9.4	8.6	14	9.3	21	27	50	150	88	20	7.0	2.8
9	10	10	13	9.1	32	24	126	132	82	21	7.6	2.8
10	9.8	11	12	8.5	21	23	77	120	78	20	5.0	2.1
11	8.8	9.9	12	9.0	11	24	68	114	74	20	4.2	2.4
12	8.5	9.2	13	9.0	8.3	60	2400	107	70	20	3.9	3.9
13	8.1	9.3	13	8.8	9.0	77	654	101	84	18	3.7	5.1
14	8.1	9.6	14	9.0	8.4	80	499	95	69	17	3.8	3.4
15	7.4	9.5	18	12	7.1	100	326	99	85	16	3.9	2.7
16	7.7	8.5	16	9.3	8.2	94	216	124	67	16	3.5	5.6
17	7.6	8.1	17	9.1	12	443	168	104	62	14	3.8	3.6
18	7.3	8.4	17	9.8	14	188	145	133	58	13	2.9	2.9
19	6.8	8.5	17	11	17	92	294	104	55	12	2.8	2.1
20	10	8.7	16	12	16	75	208	98	53	11	3.3	2.0
21	15	9.0	10	9.2	20	63	160	96	50	11	3.3	1.9
22	11	8.5	9.0	8.8	24	73	135	106	48	10	3.0	1.9
23	9.4	8.2	10	8.8	19	142	120	88	47	9.7	3.3	1.8
24	8.9	8.2	11	8.7	15	116	97	84	46	9.4	3.0	1.8
25	8.5	8.2	11	8.3	14	90	88	80	44	8.8	2.8	1.8
26	8.6	8.1	11	8.1	16	77	82	78	43	8.9	2.7	1.6
27	8.3	12	11	8.0	20	420	709	76	40	8.5	2.6	1.8
28	7.8	9.2	11	8.7	23	196	202	76	38	8.7	2.4	1.7
29	8.3	7.9	11	8.2	---	130	2160	77	36	8.9	2.5	1.7
30	8.3	8.6	10	6.7	---	103	276	82	34	8.7	2.4	1.6
31	8.1	---	10	6.5	---	90	---	171	---	7.9	3.0	---
TOTAL	318.6	271.1	372.7	283.5	411.9	3787	9690	4075	2603	518.5	127.3	76.3
MEAN	10.3	9.04	12.0	9.15	14.7	122	323	131	86.8	16.7	4.11	2.54
MAX	41	12	18	12	32	570	2400	452	376	32	7.6	5.6
MIN	6.8	7.9	7.0	6.5	6.9	23	48	76	34	7.9	2.4	1.6
AC-FT	632	538	739	562	817	7510	19220	8080	5160	1030	252	151
CFSM	.18	.16	.21	.16	.26	2.18	5.76	2.34	1.55	.30	.07	.05
IN.	.21	.18	.25	.19	.27	2.51	6.43	2.70	1.73	.34	.08	.05

CAL YR 1990	TOTAL 18378.81	MEAN 50.4	MAX 1680	MIN .75	AC-FT 36450	CFSM .90	IN. 12.19
WTR YR 1991	TOTAL 22534.9	MEAN 61.7	MAX 2400	MIN 1.6	AC-FT 44700	CFSM 1.10	IN. 14.94

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, on left bank 20 ft upstream from 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 mi².

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

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

GAGE.--Water-stage encoder. 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. 3-10, Dec. 21 to Mar. 17, July 7, 8, and July 30 to Aug. 7. Records good except those for estimated daily discharge, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain gage and data collection platform at station.

AVERAGE DISCHARGE.--46 years, 132 ft³/s, 8.92 in/yr, 95,630 acre-ft/yr; median of yearly mean discharges, 120 ft³/s, 8.1 in/yr, 86,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge observed, 35,000 ft³/s June 13, 1947, gage height, 17.6 ft from rating curve extended above 17,000 ft³/s; maximum gage height, 20.00 ft June 15, 1982; minimum daily discharge, 0.85 ft³/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 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 2	----	unknown	unknown	Apr. 29	1630	*7,350	*17.00
Mar. 18	unknown	2,630	15.50	June 1	1230	2,810	15.58
Mar. 27	----	2,200	unknown	June 14	0915	1,670	14.36
Apr. 27	2000	2,060	14.99				

Minimum discharge, 16 ft³/s Sept. 7, 8, 11.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	46	43	47	45	32	500	268	650	2170	130	37	17
2	44	44	41	44	35	2600	244	506	1780	123	36	18
3	154	43	37	45	39	800	225	448	625	116	36	20
4	138	53	40	44	45	220	217	409	576	111	35	19
5	80	53	42	43	60	140	205	1030	454	107	34	17
6	70	49	50	42	74	120	194	873	373	101	33	17
7	59	49	63	41	70	105	183	574	329	95	34	17
8	56	45	58	42	110	96	177	484	302	90	139	19
9	60	52	54	41	150	88	344	426	279	87	62	20
10	58	60	52	39	110	80	262	376	258	87	37	17
11	56	57	56	42	60	86	228	347	244	83	30	17
12	53	53	66	42	40	210	558	322	227	84	26	27
13	52	51	68	41	42	270	1060	300	292	76	25	204
14	54	52	76	40	39	280	1000	284	1210	72	24	84
15	49	51	78	50	34	370	707	321	526	68	24	52
16	47	48	79	44	39	350	499	320	384	65	23	36
17	50	44	78	42	56	1000	413	311	307	62	24	28
18	47	48	72	45	64	1200	367	558	272	59	22	28
19	44	48	77	49	74	277	453	369	244	55	21	25
20	49	47	69	54	70	255	422	321	228	54	20	24
21	70	49	46	43	90	243	370	298	214	51	22	24
22	57	45	41	40	110	256	331	656	202	50	21	24
23	56	44	46	39	88	597	323	349	193	47	20	22
24	52	44	52	38	70	492	280	304	185	44	21	22
25	49	44	54	37	64	367	262	273	177	42	19	23
26	49	43	49	36	74	306	251	276	169	40	18	22
27	49	57	50	37	94	1440	1590	242	158	40	18	21
28	44	52	49	35	110	814	665	236	149	40	18	21
29	44	43	48	33	---	448	3410	254	144	41	21	21
30	45	48	46	31	---	365	2010	430	137	39	23	20
31	42	---	45	30	---	321	---	670	---	38	20	---
TOTAL	1823	1459	1729	1274	1943	14696	17518	13217	12808	2197	943	926
MEAN	58.8	48.6	55.8	41.1	69.4	474	584	426	427	70.9	30.4	30.9
MAX	154	60	79	54	150	2600	3410	1030	2170	130	139	204
MIN	42	43	37	30	32	80	177	236	137	38	18	17
AC-FT	3620	2890	3430	2530	3850	29150	34750	26220	25400	4360	1870	1840
CFSM	.29	.24	.28	.20	.35	2.36	2.91	2.12	2.12	.35	.15	.15
IN.	.34	.27	.32	.24	.36	2.72	3.24	2.45	2.37	.41	.17	.17
CAL YR 1990	TOTAL 63455.2	MEAN 174	MAX 4330	MIN 2.4	AC-FT 125900	CFSM .86	IN. 11.74					
WTR YR 1991	TOTAL 70533	MEAN 193	MAX 3410	MIN 17	AC-FT 139900	CFSM .96	IN. 13.05					

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 mi².

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

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

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

REMARKS.--Estimated daily discharges: Dec. 3-12, Dec. 21 to Feb. 27, Mar. 2-5, and May 3-6. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--42 years, 45.4 ft³/s, 8.70 in/yr, 32,890 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 7,900 ft³/s Apr. 29, 1991, gage height, 16.93 ft, from rating curve extended above 2,600 ft³/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 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 17	1650	1,310	11.04	Apr. 27	0545	4,760	15.37
Mar. 27	0745	1,380	11.31	Apr. 29	0500	*7,900	*16.93
Apr. 12	1930	5,590	15.82				

Minimum daily discharge, 1.2 ft³/s Sept. 26, 27.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	8.9	7.3	11	11	7.0	206	96	263	333	27	3.8	1.9
2	8.3	7.1	9.4	12	7.8	100	86	205	219	26	3.6	1.9
3	33	7.2	8.6	11	9.4	62	78	197	151	24	3.3	1.9
4	24	12	7.8	11	12	46	74	188	320	23	3.3	1.6
5	14	11	9.6	11	17	38	69	412	165	23	3.3	1.5
6	11	9.2	13	10	19	30	65	355	126	22	4.5	1.6
7	8.4	9.1	16	9.8	19	23	62	207	110	21	4.2	1.6
8	10	8.4	17	10	25	21	60	177	98	19	18	2.1
9	13	12	19	9.8	32	18	88	150	90	19	6.2	1.9
10	11	12	18	8.8	17	17	69	133	82	19	4.0	2.0
11	9.2	11	18	9.4	9.8	17	66	131	78	19	3.9	2.7
12	8.1	10	17	9.8	9.0	103	1810	123	70	18	3.6	2.6
13	8.4	10	20	9.5	8.0	98	707	112	74	16	3.1	2.6
14	8.3	11	23	9.2	6.9	122	489	101	78	16	3.1	2.2
15	7.4	10	25	9.3	5.4	101	299	108	87	15	2.9	13
16	7.4	9.1	24	9.2	6.4	95	214	113	67	14	3.3	14
17	7.0	9.4	24	9.2	7.6	454	175	106	60	12	5.9	3.8
18	6.8	11	31	9.3	11	198	173	147	60	12	2.7	2.6
19	6.6	10	23	9.4	18	120	381	106	53	10	2.2	1.8
20	8.7	11	23	9.2	17	96	261	98	48	9.3	2.1	1.5
21	16	11	20	7.9	17	81	207	94	45	8.3	2.3	1.4
22	12	9.2	17	8.6	16	100	175	99	43	7.7	2.1	1.4
23	11	9.3	14	8.6	13	179	157	91	41	6.8	2.1	1.4
24	9.8	9.6	15	8.1	11	148	133	80	40	6.6	2.1	1.5
25	8.9	9.2	13	7.8	9.8	122	122	75	38	6.2	2.0	1.5
26	9.2	9.8	12	7.9	12	108	115	73	37	6.0	1.9	1.2
27	8.5	16	13	8.0	15	557	1230	64	34	5.6	1.8	1.2
28	7.4	11	13	7.6	24	239	250	63	32	5.3	1.8	1.3
29	8.0	10	12	7.0	---	168	2860	68	31	5.7	1.8	1.4
30	7.7	11	12	6.4	---	132	374	96	29	5.0	2.3	1.4
31	7.2	---	12	6.2	---	114	---	205	---	4.3	3.4	---
TOTAL	325.2	303.9	510.4	282.0	382.1	3913	10945	4440	2739	431.8	110.6	78.5
MEAN	10.5	10.1	16.5	9.10	13.6	126	365	143	91.3	13.9	3.57	2.62
MAX	33	16	31	12	32	557	2860	412	333	27	18	14
MIN	6.6	7.1	7.8	6.2	5.4	17	60	63	29	4.3	1.8	1.2
AC-FT	645	603	1010	559	758	7760	21710	8810	5430	856	219	156
CFSM	.15	.14	.23	.13	.19	1.78	5.15	2.02	1.29	.20	.05	.04
IN.	.17	.16	.27	.15	.20	2.05	5.74	2.33	1.44	.23	.06	.04
CAL YR 1990	TOTAL 27915.61	MEAN 76.5	MAX 3500	MIN .51	AC-FT 55370	CFSM 1.08	IN. 14.65					
WTR YR 1991	TOTAL 24461.5	MEAN 67.0	MAX 2860	MIN 1.2	AC-FT 48520	CFSM .95	IN. 12.83					

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 mi².

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 encoder. 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. 3-9, Dec. 21 to Feb. 27, and Apr. 30. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--46 years, 123 ft³/s, 8.84 in/yr, 89,110 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 10,500 ft³/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 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 2	0730	3,120	20.23	Apr. 29	2100	*5,570	*23.58
Apr. 13	0400	4,350	22.29	May 17	2015	2,020	18.11
Apr. 27	1100	2,600	19.27	May 31	2230	3,540	21.02

Minimum discharge, 6.6 ft³/s Sept. 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	25	22	28	40	22	279	268	880	1460	77	13	16
2	24	22	24	39	24	1920	245	531	932	73	13	12
3	61	21	22	38	27	362	226	464	542	68	13	11
4	115	34	21	35	31	238	214	442	795	66	13	11
5	45	33	24	36	44	169	205	689	501	64	12	9.9
6	34	26	30	37	52	136	192	829	365	64	16	8.9
7	29	25	37	35	50	107	179	548	341	59	19	9.1
8	29	24	44	34	64	91	170	461	339	54	33	11
9	33	30	48	35	86	81	283	413	308	52	33	12
10	32	29	56	32	52	71	227	367	279	51	16	11
11	30	28	59	35	28	69	197	340	280	49	12	11
12	27	26	78	38	29	223	993	324	269	48	11	11
13	27	25	92	36	29	373	2230	302	223	47	11	12
14	27	26	93	34	25	276	1200	287	228	42	11	10
15	24	25	100	35	30	240	827	306	239	38	10	11
16	24	23	96	34	27	172	568	425	252	35	11	51
17	28	22	86	34	23	730	478	633	171	33	20	30
18	26	23	89	35	28	771	433	865	157	29	15	16
19	23	23	90	35	50	358	1020	437	149	26	11	13
20	25	23	83	35	39	318	744	363	139	24	10	12
21	38	23	54	31	47	277	568	335	132	22	10	11
22	34	22	46	31	44	238	472	332	126	21	9.9	10
23	29	22	40	30	36	353	415	287	120	19	9.7	9.3
24	27	21	43	28	30	334	352	262	115	18	10	9.0
25	25	21	40	27	26	299	321	233	109	17	9.8	9.0
26	25	21	38	27	31	267	300	233	104	16	9.2	8.1
27	24	53	40	28	37	974	1450	217	97	15	8.7	8.0
28	23	42	42	28	66	691	687	198	91	15	8.7	8.0
29	23	27	44	26	---	471	3890	187	87	16	9.0	8.1
30	23	30	39	25	---	373	1700	627	83	15	14	7.8
31	23	---	39	23	---	314	---	898	---	15	17	---
TOTAL	982	792	1665	1016	1077	11575	21074	13715	9033	1188	419.0	377.2
MEAN	31.7	26.4	53.7	32.8	38.5	373	702	442	301	38.3	13.5	12.6
MAX	115	53	100	40	86	1920	3890	898	1460	77	33	51
MIN	23	21	21	23	22	69	170	187	83	15	8.7	7.8
AC-FT	1950	1570	3300	2020	2140	22960	41800	27200	17920	2360	831	748
CFSM	.17	.14	.28	.17	.20	1.98	3.72	2.34	1.59	.20	.07	.07
IN.	.19	.16	.33	.20	.21	2.28	4.15	2.70	1.78	.23	.08	.07
CAL YR 1990	TOTAL 56840.6	MEAN 156	MAX 5230	MIN 1.0	AC-FT 112700	CFSM .82	IN. 11.19					
WTR YR 1991	TOTAL 62913.2	MEAN 172	MAX 3890	MIN 7.8	AC-FT 124800	CFSM .91	IN. 12.38					

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 county highway V66, 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 mi².

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 encoder. Datum of gage is 720.52 ft above NGVD.

REMARKS.--Estimated daily discharges: Dec. 4-7, 14, Dec 21 to Mar. 2, and Mar. 9. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--35 years, 1,822 ft³/s, 8.86 in/yr, 1,320,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 30,800 ft³/s Mar. 31, 1960, gage height, 19.21 ft; maximum gage height, 19.79 ft July 12, 1969; minimum daily discharge, 24 ft³/s Jan. 29 to Feb. 1, 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 6,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 2	1400	7,320	(a)15.43	Apr. 30	1915	15,500	17.73
Mar. 29	0030	9,220	16.23	May 24	1615	14,600	17.71
Apr. 19	1800	11,100	16.83	June 8	1500	*16,300	*18.25

(a) backwater from ice

Minimum discharge, 171 ft³/s Sept. 12, 13.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	659	535	486	500	350	2200	7160	14700	10200	2370	529	287
2	633	530	458	490	340	6350	7000	11300	10100	2230	521	274
3	699	522	497	480	370	6420	6290	9420	10600	2110	507	245
4	1000	558	460	460	410	6590	5110	8520	11000	2000	507	240
5	862	591	440	460	800	6320	4260	8410	12000	1880	477	251
6	832	619	440	450	840	4850	3770	8920	12100	1810	469	236
7	805	623	470	440	1000	3430	3420	9020	12800	1730	462	210
8	745	619	548	435	1850	3040	3180	8450	15300	1620	545	197
9	729	624	602	440	2350	2640	3480	7980	14300	1550	791	195
10	711	618	619	420	2450	2430	3800	7850	13000	1490	799	184
11	689	624	607	420	2000	2330	4450	7490	11500	1420	825	178
12	657	632	606	410	1650	2840	5390	7030	10100	1400	1090	177
13	648	631	618	420	1250	3850	8790	6580	9270	1370	1190	190
14	634	627	629	450	1100	3960	10500	6090	8400	1360	1220	397
15	615	648	710	460	960	4300	9630	5600	8120	1310	1220	761
16	596	672	797	440	880	4400	8640	5250	7350	1290	1130	978
17	584	626	826	440	840	5030	9170	5320	6430	1240	1010	1080
18	562	594	835	450	1000	6530	9840	7480	5820	1170	819	1040
19	543	579	814	520	1400	6560	10700	7640	5300	1080	689	930
20	544	571	800	640	1500	6640	10400	9050	4780	998	598	766
21	601	569	560	540	1800	6580	9300	10200	4310	917	528	642
22	662	548	500	460	2450	7210	8590	11600	4030	857	471	524
23	669	535	520	540	2900	8110	8250	13200	3820	792	427	443
24	648	540	580	500	3000	8100	8170	14200	3610	754	404	379
25	617	524	630	450	2500	7500	7830	14000	3520	702	383	334
26	599	507	620	410	1900	6920	7310	13200	3420	667	380	303
27	581	576	580	400	1600	7670	8090	12000	3260	638	364	276
28	564	571	620	430	1400	8860	8740	10800	2970	604	339	253
29	561	544	660	410	---	8990	11200	9680	2740	566	320	243
30	555	515	600	400	---	7880	15100	9670	2510	549	310	221
31	540	---	540	390	---	7310	---	8890	---	547	305	---
TOTAL	20344	17472	18672	14155	40890	175840	227560	289540	232660	39021	19629	12434
MEAN	656	582	602	457	1460	5672	7585	9340	7755	1259	633	414
MAX	1000	672	835	640	3000	8990	15100	14700	15300	2370	1220	1080
MIN	540	507	440	390	340	2200	3180	5250	2510	547	305	177
AC-FT	40350	34660	37040	28080	81110	348800	451400	574300	461500	77400	38930	24660
CFSM	.23	.21	.22	.16	.52	2.03	2.71	3.34	2.78	.45	.23	.15
IN.	.27	.23	.25	.19	.54	2.34	3.03	3.86	3.10	.52	.26	.17
CAL YR 1990	TOTAL 793180	MEAN 2173	MAX 17100	MIN 54	AC-FT 1573000	CFSM .78	IN. 10.56					
WTR YR 1991	TOTAL 1108217	MEAN 3036	MAX 15300	MIN 177	AC-FT 2198000	CFSM 1.09	IN. 14.76					

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 mi².

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 ft³/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 ft³/s and maximum release of 10,000 ft³/s Dec. 15 to May 1 and 6,000 ft³/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, 429,000 acre-ft May 31; maximum elevation, 710.70 ft May 30; minimum daily contents, 15,200 acre-ft Apr. 13; minimum elevation, 673.80 ft Apr. 14.

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 1990 TO SEPTEMBER 1991
DAILY OBSERVATION AT 24:00 VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	44600	44600	44800	30300	30500	17600	47000	153000	427000	191000	30900	32800
2	44400	44500	43600	29800	30500	23000	46100	178000	423000	179000	30800	33300
3	45300	45000	45300	29600	30700	25400	45200	200000	415000	168000	30600	33600
4	45500	44700	44300	29500	31400	26700	43500	217000	411000	157000	30300	33700
5	46100	44400	44200	29800	32700	25600	40400	236000	408000	148000	30400	34200
6	46500	44300	44200	29700	33400	23400	35700	247000	406000	139000	31100	35000
7	46300	43800	44100	29800	32700	21600	30400	255000	404000	130000	30800	35600
8	46300	43900	44100	30000	32600	18200	27200	261000	406000	120000	31200	36100
9	46200	44200	44400	30000	34500	15800	25600	266000	416000	110000	30900	37100
10	46000	44300	44000	30100	35000	16200	20700	271000	421000	100000	31000	37300
11	45600	44500	43100	30200	34000	16500	18100	275000	422000	90200	30900	37700
12	45300	44600	42100	30300	32600	17200	16400	278000	417000	82900	30900	38500
13	44600	44700	41000	30400	30100	17900	15200	281000	414000	75300	30900	39100
14	44300	44900	39800	30500	27800	17800	15900	282000	406000	68500	31200	39600
15	44200	45400	39200	30700	26900	17400	26200	283000	399000	61400	31000	40200
16	44300	45300	38200	30800	25800	17400	43400	283000	389000	54700	31300	41500
17	46100	45000	37500	30900	24500	18300	64500	282000	377000	50500	31400	43600
18	45100	44900	36500	30900	23800	17000	83500	284000	364000	46700	31100	43600
19	44900	44700	35300	31200	22800	16500	106000	287000	351000	44700	30400	43600
20	45400	44300	34500	30900	22000	16500	127000	290000	338000	42700	30400	43800
21	45300	45200	32800	30600	21000	17300	142000	296000	323000	41800	31000	43800
22	45400	45100	32300	30200	19700	17500	150000	307000	309000	41400	31300	44200
23	45800	45000	32100	30200	19200	18000	151000	328000	298000	40500	31600	44400
24	45800	45100	32100	30200	19600	18200	148000	356000	282000	39500	31800	44800
25	45800	44700	32500	30100	19500	19700	144000	382000	269000	38300	31600	44700
26	45700	45000	32700	30100	18900	22000	138000	398000	256000	36900	31100	44600
27	45800	46600	33000	30000	17400	25800	134000	410000	243000	35600	30900	44500
28	45300	45300	32800	30100	16900	27700	131000	417000	229000	34600	30900	44400
29	45100	44800	32500	30200	---	32800	132000	422000	215000	33200	31400	44100
30	45100	44800	31900	30300	---	39600	135000	427000	203000	31900	32000	44200
31	44800	---	31100	30400	---	45300	---	429000	---	31300	32300	---
MEAN	45400	44800	38300	30300	26700	21600	76100	299000	355000	79500	31100	40100
MAX	46500	46600	45300	31200	35000	45300	151000	429000	427000	191000	32300	44800
MIN	44200	43800	31100	29500	16900	15800	15200	153000	203000	31300	30300	32800

CAL YR 1990 MEAN 93600 MAX 378000 MIN 31100
WTR YR 1991 MEAN 90800 MAX 429000 MIN 15200

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 mi².

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 IA-67-1: 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. 21-30, Jan. 3, 4, 21, and Feb. 4-22. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data.

AVERAGE DISCHARGE.--54 years, 16.0 ft³/s, 8.59 in/yr, 11,590 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,100 ft³/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 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s) *836	Gage height (ft) *9.41	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 2	0400			No other peak greater than base discharge.			

No flow Aug. 3, 4, Aug. 20 to Sept. 14, and Sept. 17-30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.9	3.6	9.3	11	5.0	95	36	24	53	3.6	.01	.00
2	2.8	3.9	7.9	9.9	5.3	310	33	21	32	3.4	.01	.00
3	5.2	4.5	7.7	8.8	7.7	39	32	20	25	3.1	.00	.00
4	4.9	14	8.1	8.4	10	27	31	19	21	2.9	.00	.00
5	3.1	12	9.8	8.8	12	22	28	29	18	2.8	.01	.00
6	3.0	9.6	8.9	8.4	10	18	26	26	15	2.5	.14	.00
7	2.8	8.5	7.7	7.9	8.0	14	24	22	14	2.3	.29	.00
8	3.1	7.5	7.4	8.4	13	13	23	20	13	1.8	.56	.00
9	3.9	9.7	7.4	7.9	20	12	30	19	12	1.6	.81	.00
10	3.5	10	7.8	7.6	12	11	23	17	11	1.8	.34	.00
11	3.4	9.0	8.5	8.5	8.2	11	21	16	11	1.7	.22	.00
12	3.3	8.0	11	7.7	6.0	35	21	15	9.8	1.7	.18	.00
13	3.1	7.5	12	7.9	7.0	43	22	14	16	1.4	.13	.00
14	3.3	7.3	12	8.0	5.6	32	26	13	23	.95	.04	.00
15	3.1	7.1	23	7.5	4.8	40	23	13	24	.77	.02	.02
16	2.7	6.6	24	7.7	6.0	49	22	12	12	.63	.01	.03
17	3.1	5.9	25	7.1	7.0	151	20	58	10	.53	.06	.00
18	3.5	6.1	27	6.7	8.0	83	20	55	9.0	.44	.03	.00
19	3.0	6.1	23	7.5	9.4	54	24	33	8.2	.35	.01	.00
20	3.1	5.8	25	8.6	11	46	21	28	7.8	.28	.00	.00
21	3.4	7.0	15	7.6	13	41	20	24	7.6	.24	.01	.00
22	2.8	6.8	10	8.2	15	123	19	22	7.4	.18	.00	.00
23	2.5	6.1	12	6.9	13	108	20	20	7.2	.13	.00	.00
24	2.8	5.9	13	5.6	9.7	76	17	18	6.8	.09	.00	.00
25	2.6	5.7	12	5.2	7.4	57	16	17	6.3	.06	.00	.00
26	2.4	5.2	11	5.5	7.9	61	16	19	5.8	.05	.00	.00
27	2.4	21	10	6.1	7.9	161	16	16	5.1	.03	.00	.00
28	3.3	13	11	6.0	8.5	71	22	13	4.7	.04	.00	.00
29	3.3	10	12	5.3	---	53	47	13	4.4	.07	.00	.00
30	4.0	9.8	10	5.1	---	45	30	51	4.2	.03	.00	.00
31	3.9	---	11	4.9	---	41	---	61	---	.01	.00	---
TOTAL	100.2	243.2	399.5	230.7	258.4	1942	729	748	404.3	35.48	2.88	0.05
MEAN	3.23	8.11	12.9	7.44	9.23	62.6	24.3	24.1	13.5	1.14	.093	.002
MAX	5.2	21	27	11	20	310	47	61	53	3.6	.81	.03
MIN	2.4	3.6	7.4	4.9	4.8	11	16	12	4.2	.01	.00	.00
AC-FT	199	482	792	458	513	3850	1450	1480	802	70	5.7	.1
CFSM	.13	.32	.51	.29	.36	2.48	.96	.95	.53	.05	.00	.00
IN.	.15	.36	.59	.34	.38	2.86	1.07	1.10	.59	.05	.00	.00

CAL YR 1990	TOTAL 9873.90	MEAN 27.1	MAX 1700	MIN .03	AC-FT 19580	CFSM 1.07	IN. 14.52
WTR YR 1991	TOTAL 5093.71	MEAN 14.0	MAX 310	MIN .00	AC-FT 10100	CFSM .55	IN. 7.49

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 100 ft upstream from bridge on county highway, prior to Sept. 25. After that date gage located 15 ft upstream of bridge. 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 mi².

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

GAGE.--Water-stage encoder. 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: Oct. 18-21, Dec. 3-8, 22 to Feb. 25, and Mar. 4-7. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--39 years, 66.4 ft³/s, 9.19 in/yr, 48,110 acre-ft/yr; median of yearly mean discharges, 58 ft³/s, 8.0 in/yr, 42,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 11,700 ft³/s June 17, 1990, gage height, 16.36 ft; no flow Jan. 18 to Feb. 4, 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 2	0645	1,180	9.30	No other peak greater than base discharge.			

Minimum daily discharge, 1.6 ft³/s Sept. 27.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	23	20	53	40	23	157	122	77	223	25	4.4	2.6
2	22	19	44	39	25	999	110	72	120	21	4.2	2.0
3	38	22	37	35	30	226	100	69	93	19	4.4	3.6
4	46	97	34	35	35	138	96	69	79	18	4.3	2.9
5	30	90	38	37	44	90	89	95	71	18	3.8	2.0
6	25	62	47	36	40	66	81	101	64	16	5.7	1.8
7	22	54	54	33	30	53	74	83	56	14	6.7	2.0
8	23	47	60	34	55	55	72	76	52	14	13	3.2
9	30	50	69	33	76	49	179	72	49	14	8.7	4.4
10	28	52	74	30	60	44	119	67	46	14	5.6	2.9
11	27	46	67	32	32	45	100	65	131	13	4.9	2.1
12	24	42	64	34	24	119	92	63	65	13	5.3	2.7
13	23	40	65	32	27	235	98	60	176	12	4.3	7.6
14	24	39	62	32	24	153	270	57	177	11	3.4	3.6
15	22	37	92	31	19	134	258	54	146	11	3.2	2.5
16	20	35	112	31	20	107	185	53	96	9.8	3.4	2.7
17	22	32	105	32	25	282	153	54	71	9.1	13	2.2
18	24	32	115	31	28	365	135	67	63	8.5	7.9	2.7
19	22	32	101	32	29	192	200	55	57	7.9	3.8	2.3
20	21	32	98	34	30	158	213	52	53	7.5	3.1	2.3
21	20	33	114	26	49	140	183	51	50	6.6	2.9	2.2
22	21	34	70	29	56	207	158	52	47	6.3	2.7	2.0
23	22	33	45	31	45	287	150	48	45	6.0	2.5	2.0
24	22	31	50	28	30	217	125	51	44	5.5	2.5	1.9
25	20	29	43	26	37	175	116	50	42	5.0	2.4	1.9
26	19	25	40	26	50	375	109	51	39	5.0	2.3	1.7
27	19	131	43	27	53	513	105	45	36	4.7	2.4	1.6
28	18	101	43	26	49	287	94	41	35	4.7	2.4	1.8
29	17	63	49	25	---	203	95	41	33	5.0	2.5	1.8
30	19	58	38	22	---	163	86	59	29	5.0	2.7	1.7
31	20	---	40	21	---	147	---	68	---	5.0	2.6	---
TOTAL	733	1418	1966	960	1045	6381	3967	1918	2288	334.6	141.0	76.7
MEAN	23.6	47.3	63.4	31.0	37.3	206	132	61.9	76.3	10.8	4.55	2.56
MAX	46	131	115	40	76	999	270	101	223	25	13	7.6
MIN	17	19	34	21	19	44	72	41	29	4.7	2.3	1.6
AC-FT	1450	2810	3900	1900	2070	12660	7870	3800	4540	664	280	152
CFSM	.24	.48	.65	.32	.38	2.10	1.35	.63	.78	.11	.05	.03
IN.	.28	.54	.75	.36	.40	2.42	1.50	.73	.87	.13	.05	.03

CAL YR 1990	TOTAL	43861.85	MEAN	120	MAX	7310	MIN	.95	AC-FT	87000	CFSM	1.22	IN.	16.63
WTR YR 1991	TOTAL	21228.3	MEAN	58.2	MAX	999	MIN	1.6	AC-FT	42110	CFSM	.59	IN.	8.05

IOWA RIVER BASIN

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 Raiston Creek, 3.6 mi downstream from Clear Creek, and at mile 74.2.

DRAINAGE AREA.--3,271 mi².

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

GAGE.--Water-stage encoder. 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.--Estimated daily discharges: Dec. 24 to Jan. 9. Records good except those for estimated daily discharges, which are fair. 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. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--88 years, 1,740 ft³/s, 7.22 in/yr, 1,261,000 acre-ft/yr; median of yearly mean discharges, 1,510 ft³/s, 6.3 in/yr, 1,090,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 42,500 ft³/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 ft³/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 ft³/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 ft³/s, estimated.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 13,700 ft³/s June 13, gage height, 23.35 ft; minimum daily discharge, 148 ft³/s Sept. 11.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	882	684	772	920	369	2670	7320	7230	10700	8740	893	291
2	875	683	757	740	368	5350	8060	4530	11200	8320	770	294
3	933	706	745	620	375	5150	8050	1680	12300	7750	766	412
4	906	959	726	560	475	6430	8050	1180	12400	7290	758	425
5	877	1030	690	520	814	7430	8030	2060	12400	6820	653	193
6	869	981	607	520	1190	7880	7640	3410	12300	6430	583	151
7	960	965	585	510	1620	7040	6740	5720	12400	6390	768	150
8	1070	828	584	500	2030	5870	5760	6360	12600	6350	969	178
9	1060	702	581	500	2210	4440	5730	6420	12600	6310	921	179
10	1070	682	755	491	2600	3160	5980	6430	12700	6270	910	154
11	1060	665	1220	491	3140	2600	5460	6440	12800	6190	908	148
12	1040	655	1420	490	3230	3050	5390	6450	12700	5690	1050	164
13	1030	653	1470	487	3210	4070	6580	6410	12900	5310	1140	205
14	1030	652	1570	484	2800	4730	6460	6250	13000	4940	1200	212
15	828	651	1620	485	1950	4990	6100	6240	12900	4520	1380	209
16	663	735	1710	481	1760	5240	4880	6250	12700	4450	1370	201
17	666	813	1780	479	1710	5770	1510	6330	12600	3900	1230	247
18	675	813	1790	472	1830	6910	1330	6370	12500	3160	1210	883
19	653	814	1750	480	1990	6910	1410	6280	12000	2440	1200	1040
20	647	751	1740	555	1860	7020	2000	6280	11500	2180	930	878
21	641	707	1520	632	2170	6920	4260	6300	11400	1840	563	868
22	634	693	804	635	2360	7820	6400	6010	11400	1470	545	663
23	635	685	585	552	2480	8310	8570	2450	10500	1480	548	531
24	632	678	590	471	2540	8200	9310	1240	9970	1560	548	531
25	625	667	610	468	2750	8120	9900	2570	9940	1580	691	544
26	659	661	645	466	2890	8600	10100	6310	9930	1580	812	553
27	685	955	740	465	2880	9120	10100	6930	9730	1510	731	591
28	675	1240	840	428	2380	8340	9990	8130	9340	1440	551	512
29	679	1050	900	375	---	6760	8090	8280	9130	1390	410	506
30	681	784	930	372	---	6830	8710	8580	9110	1330	296	432
31	683	---	960	372	---	6950	---	9420	---	1110	293	---
TOTAL	25023	23542	31996	16021	55981	192680	197910	174540	347650	129740	25597	12345
MEAN	807	785	1032	517	1999	6215	6597	5630	11590	4185	826	411
MAX	1070	1240	1790	920	3230	9120	10100	9420	13000	8740	1380	1040
MIN	625	651	581	372	368	2600	1330	1180	9110	1110	293	148
AC-FT	49630	46700	63460	31780	111000	382200	392600	346200	689600	257300	50770	24490
CAL YR 1990	TOTAL	990145	MEAN	2713	MAX	10500	MIN	132	AC-FT	1964000		
WTR YR 1991	TOTAL	1233025	MEAN	3378	MAX	13000	MIN	148	AC-FT	2446000		

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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.

REMARKS.--Estimated daily discharges: Dec. 3-6, Dec. 22 to Jan. 1, Jan. 16 to Feb. 9, and Feb. 14-20. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data.

EXTREMES FOR CURRENT YEAR.-- Peak discharges greater than base discharge of 200 ft³/s and maximum (*):

No flow many days.

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP			
1	.23	.18	1.1	1.1	.66	28	2.6	.63	4.6	.28	.00	.00			
2	.20	.21	.90	.92	2.0	21	2.3	.59	3.3	.28	.00	.00			
3	2.4	4.1	.72	.93	3.5	3.3	2.2	.88	2.4	.23	.00	.01			
4	.33	5.0	.90	.97	7.0	2.4	2.4	.79	2.1	.14	.00	.01			
5	.25	1.6	1.2	1.1	4.1	2.1	1.9	6.8	1.8	.17	.00	.00			
6	.21	.85	1.0	.85	3.0	1.8	1.7	2.0	1.7	.12	.00	.00			
7	.18	.64	1.1	.78	4.5	1.5	1.5	1.5	1.5	.10	.01	.00			
8	1.5	1.1	1.1	.83	6.0	1.4	1.8	1.4	1.4	.08	4.0	.02			
9	.39	1.9	1.3	.70	4.0	1.3	2.4	1.3	1.2	.20	.03	.01			
10	.50	.77	1.4	.69	2.6	1.3	1.6	1.1	1.2	.11	.02	.00			
11	.38	.69	1.8	.78	1.3	1.2	1.6	1.1	1.2	.38	.01	.00			
12	.38	.67	2.3	.70	1.1	11	1.1	1.0	1.1	.15	.00	.00			
13	.30	.63	1.7	.69	1.0	5.1	2.2	1.1	4.0	.40	.00	.00			
14	.60	.62	2.6	1.6	.70	4.1	2.7	1.1	1.8	.15	.00	.01			
15	.23	.60	4.2	.79	.56	4.0	1.3	1.0	5.1	.04	.00	.03			
16	.26	.56	2.5	.70	.74	4.0	1.1	1.3	1.5	.01	.76	.02			
17	1.3	.54	3.9	.60	1.0	15	.96	6.0	1.3	.00	.48	.00			
18	.27	.49	2.9	.52	3.1	6.1	.96	1.8	1.1	.00	.01	.00			
19	.21	.44	2.5	2.5	1.5	4.2	3.2	1.2	.98	.00	.00	.00			
20	.27	.55	2.7	.80	2.3	3.6	1.3	1.1	.91	.00	.00	.00			
21	.38	2.3	2.4	.44	2.9	3.1	1.2	1.4	.77	.00	.00	.00			
22	.26	.76	1.6	.54	1.5	17	1.4	.96	.74	.00	.00	.00			
23	.26	.61	.94	.70	1.1	9.3	1.5	1.1	.77	.00	.00	.00			
24	.25	.65	1.1	.42	.89	6.2	.83	1.0	.71	.00	.00	.00			
25	.23	.55	.96	.38	.81	4.4	.77	4.9	.63	.00	.00	.00			
26	.23	.54	.82	.50	.77	3.7	.76	1.1	.56	.00	.00	.00			
27	.23	6.7	.74	.60	.75	18	.87	4.1	.55	.00	.00	.00			
28	.22	1.7	.82	.54	.80	5.6	2.7	.93	.49	.00	.00	.00			
29	.21	1.4	.90	.43	---	4.1	1.4	12	.47	.00	.00	.00			
30	.21	1.4	.96	.36	---	3.4	.74	4.6	.39	.00	.00	.00			
31	.19	---	.93	.45	---	3.0	---	11	---	.00	.00	---			
TOTAL	13.06	38.75	49.99	23.91	60.18	200.2	48.99	76.78	46.27	2.84	5.32	0.11			
MEAN	.42	1.29	1.61	.77	2.15	6.46	1.63	2.48	1.54	.092	.17	.004			
MAX	2.4	6.7	4.2	2.5	7.0	28	3.2	12	5.1	.40	4.0	.03			
MIN	.18	.18	.72	.36	.56	1.2	.74	.59	.39	.00	.00	.00			
AC-FT	26	77	99	47	119	397	97	152	92	5.6	11	.2			
CFSM	.14	.44	.55	.26	.73	2.20	.56	.84	.52	.03	.06	.00			
IN.	.17	.49	.63	.30	.76	2.53	.62	.97	.59	.04	.07	.00			
CAL YR 1990	TOTAL	1083.21		MEAN	2.97	MAX	150	MIN	.03	AC-FT	2150	CFSM	1.01	IN.	13.71
WTR YR 1991	TOTAL	566.40		MEAN	1.55	MAX	28	MIN	.00	AC-FT	1120	CFSM	.53	IN.	7.17

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 mi².

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 encoder. 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: Dec. 3-8 and Dec. 21 to Feb. 27. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. 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.--21 years (1951-64, 1985-91), 105 ft³/s, 7.09 in/yr, 76,070 acre-ft/yr; median of yearly mean discharges, 98 ft³/s, 6.6 in/yr, 71,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 12,000 ft³/s May 29, 1962, gage height, 16.52 ft; maximum gage height, 17.20 ft, June 17, 1990, present datum; minimum daily discharge, 0.1 ft³/s for several days in 1957, 1958 and 1964.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum discharge, 13,500 ft³/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 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 2	0800	*1,890	*12.70	No other peak greater than base discharge.			

Minimum daily discharge, 1.8 ft³/s Sept. 25.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	35	23	105	87	47	222	263	158	792	40	4.4	2.9
2	34	22	90	80	51	1640	238	150	414	37	4.3	2.8
3	47	24	80	75	59	857	220	147	256	34	4.1	2.8
4	96	150	94	75	74	274	212	147	206	32	4.1	4.1
5	56	178	110	79	94	189	203	195	190	30	3.8	2.6
6	42	121	105	76	80	154	190	259	157	28	4.3	2.6
7	35	95	97	71	70	112	176	198	141	29	4.8	2.5
8	33	84	90	70	115	106	167	177	129	25	11	2.5
9	42	98	91	70	150	95	308	169	119	23	13	2.6
10	42	102	96	64	130	84	248	157	110	23	7.5	2.5
11	41	89	103	69	80	86	204	150	151	23	4.6	2.8
12	37	80	145	72	52	220	187	144	103	21	4.0	2.4
13	36	73	168	70	58	805	217	136	234	19	3.8	2.3
14	36	72	150	69	50	396	510	128	179	17	3.7	2.4
15	33	69	211	66	42	256	519	120	166	16	3.7	2.7
16	30	64	273	65	41	203	339	119	152	14	3.5	2.3
17	31	57	243	65	52	549	276	135	102	12	5.4	2.4
18	50	59	286	58	76	984	249	181	92	11	17	2.5
19	36	59	232	59	110	486	460	146	85	9.4	6.7	2.4
20	31	56	235	69	80	373	511	124	83	8.6	3.9	2.4
21	33	59	190	53	86	318	386	116	80	7.6	3.6	2.4
22	32	58	130	50	93	532	329	111	76	6.8	3.5	2.4
23	29	51	110	51	75	610	300	103	72	5.8	3.4	3.1
24	29	50	100	50	60	461	259	109	70	5.4	3.8	2.9
25	27	48	93	46	54	365	236	102	67	5.1	3.2	2.2
26	27	47	88	48	62	600	223	103	58	4.7	3.1	2.1
27	26	182	92	50	56	936	215	111	53	4.6	3.0	2.2
28	25	230	96	50	61	773	205	92	49	4.5	2.9	2.4
29	23	126	100	47	---	472	197	90	46	4.5	2.9	2.4
30	24	113	80	44	---	355	178	157	44	4.4	2.9	2.3
31	26	---	84	43	---	305	---	254	---	4.3	2.9	---
TOTAL	1124	2539	4167	1941	2058	13818	8225	4488	4476	509.7	152.8	76.9
MEAN	36.3	84.6	134	62.6	73.5	446	274	145	149	16.4	4.93	2.56
MAX	96	230	286	87	150	1640	519	259	792	40	17	4.1
MIN	23	22	80	43	41	84	167	90	44	4.3	2.9	2.1
AC-FT	2230	5040	8270	3850	4080	27410	16310	8900	8880	1010	303	153
CFSM	.18	.42	.67	.31	.37	2.22	1.36	.72	.74	.08	.02	.01
IN.	.21	.47	.77	.36	.38	2.56	1.52	.83	.83	.09	.03	.01
CAL YR 1990	TOTAL 84146.2	MEAN 231	MAX 5720	MIN 2.4	AC-FT 166900	CFSM 1.15	IN. 15.57					
WAT YR 1991	TOTAL 43575.4	MEAN 119	MAX 1640	MIN 2.1	AC-FT 86430	CFSM .59	IN. 8.06					

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 mi².

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 encoder. 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. 4-8 and Dec. 22 to Feb. 27. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--52 years, 370 ft³/s, 8.77 in/yr, 268,100 acre-ft/yr; median of yearly mean discharges, 340 ft³/s, 8.1 in/yr, 246,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 20,000 ft³/s Sept. 21, 1965, gage height, 21.45 ft; minimum daily discharge, 0.66 ft³/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 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 3	----	unknown	unknown	No other peak greater than base discharge.			
Minimum discharge, 6.4 ft ³ /s Sept. 30.							

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	65	78	230	150	88	290	658	811	1960	95	23	23
2	64	74	203	140	100	3090	582	619	2480	87	22	21
3	73	73	205	135	110	3030	529	538	2240	81	23	18
4	185	191	155	135	130	912	500	519	1120	76	22	18
5	313	427	150	140	160	558	480	701	1210	72	21	17
6	161	368	160	130	150	476	437	1610	836	70	21	17
7	117	256	170	135	120	384	399	1060	623	67	23	13
8	97	204	190	140	190	316	372	790	531	65	33	12
9	98	222	213	130	250	299	427	676	468	60	38	17
10	111	259	220	125	210	260	560	594	418	57	38	14
11	110	245	266	130	100	248	444	535	429	58	30	12
12	105	207	422	135	110	322	400	496	440	61	21	11
13	97	185	591	130	98	1890	1290	458	363	58	19	11
14	93	173	472	125	80	1040	1390	423	371	54	17	11
15	90	168	529	120	70	703	1500	391	355	51	15	13
16	84	159	676	120	80	595	978	412	393	48	15	12
17	81	141	598	120	88	972	755	692	356	46	24	10
18	90	132	683	120	98	2850	652	700	283	47	33	13
19	97	131	592	125	110	1780	1260	651	254	46	28	23
20	86	130	530	120	130	1120	2330	469	229	39	20	14
21	79	132	529	115	180	938	1400	417	216	37	16	10
22	83	132	190	110	230	1250	1050	386	203	39	14	9.1
23	94	124	160	120	210	1510	878	362	191	37	13	8.7
24	89	112	165	100	190	1430	749	367	183	33	13	8.3
25	86	109	155	94	180	1090	640	358	173	29	12	8.1
26	82	105	150	98	190	950	591	353	157	24	11	7.8
27	79	233	155	100	210	1230	633	350	140	22	11	7.3
28	78	595	155	100	237	2120	1490	408	123	22	11	7.3
29	76	368	165	86	---	1230	1010	352	110	21	11	7.2
30	74	254	140	78	---	901	1940	865	103	21	12	6.7
31	76	---	145	82	---	757	---	969	---	22	12	---
TOTAL	3113	5987	9364	3688	4099	34541	26324	18332	16958	1545	622	380.5
MEAN	100	200	302	119	146	1114	877	591	565	49.8	20.1	12.7
MAX	313	595	683	150	250	3090	2330	1610	2480	95	38	23
MIN	64	73	140	78	70	248	372	350	103	21	11	6.7
AC-FT	6170	11880	18570	7320	8130	68510	52210	36360	33640	3060	1230	755
CFSM	.18	.35	.53	.21	.26	1.94	1.53	1.03	.99	.09	.04	.02
IN.	.20	.39	.61	.24	.27	2.24	1.71	1.19	1.10	.10	.04	.02
CAL YR 1990	TOTAL 222977.4	MEAN 611	MAX 13100	MIN 6.9	AC-FT 442300	CFSM 1.07	IN. 14.48					
WTR YR 1991	TOTAL 124953.5	MEAN 342	MAX 3090	MIN 6.7	AC-FT 247800	CFSM .60	IN. 8.11					

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.

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

REMARKS.--Estimated daily discharges: Dec. 23 to Feb. 11 and Feb. 15-19. 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. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers gage height telemeter and data collection platform at station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 35,700 ft³/s May 19, 1974, gage height, 18.97 ft; maximum gage height, 20.27 ft Sept. 22, 1965; minimum daily discharge, 69 ft³/s Aug. 4, 1977.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 15,400 ft³/s June 3, gage height, 15.19 ft; minimum daily discharge 215 ft³/s Sept. 12.

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1070	920	1270	1250	820	2620	8240	9940	11800	9170	1100	393
2	1080	923	1210	1200	960	9540	8850	7230	14400	8580	969	392
3	1090	931	1190	1100	1200	11000	9000	4240	15300	8240	905	409
4	1170	1140	1060	1100	1700	8260	8950	2390	14600	7470	893	545
5	1270	1680	1060	1100	3000	7910	8880	2440	14200	7180	876	429
6	1210	1730	1120	1050	3500	8450	8700	4730	14200	6570	789	288
7	1130	1540	1040	1000	3200	8230	8020	6140	13700	6440	782	244
8	1230	1420	1040	970	3800	6850	6990	7380	13500	6380	1050	233
9	1280	1230	1020	950	4500	5590	6380	7370	13500	6330	1030	256
10	1270	1220	1030	920	5500	4490	6950	7270	13400	6310	1010	247
11	1260	1190	1410	900	4900	2980	6660	7200	13500	6230	997	223
12	1250	1150	1910	900	4310	3600	5980	7140	13600	6040	991	215
13	1240	1110	2320	900	3870	6140	6930	7100	13600	5380	1150	223
14	1230	1100	2440	920	3710	7020	8840	6910	14000	5230	1160	254
15	1210	1070	2490	900	3300	6250	8430	6800	14200	4600	1240	277
16	976	1070	2890	880	3000	6330	7870	6810	14000	4440	1360	272
17	921	1150	2970	890	3200	6760	4280	7100	13700	4260	1340	255
18	943	1160	3120	910	3500	10100	2750	7660	13400	3460	1240	324
19	936	1160	3010	950	4200	10700	2770	7300	13200	2750	1230	965
20	916	1150	2800	1000	3380	8970	4670	7030	12800	2300	1190	865
21	907	1080	2890	1050	2790	8450	5460	6930	12200	2180	845	826
22	892	1070	1810	1050	3080	8730	6750	6890	12000	1660	678	809
23	894	1030	1100	1050	3090	10700	8920	5140	11700	1560	650	607
24	896	1010	850	980	2990	10800	9740	2300	11000	1560	643	570
25	889	989	840	940	2980	10300	10300	2120	10500	1610	636	564
26	879	973	940	880	3180	9910	10800	5220	10300	1590	796	576
27	923	1140	1100	820	3210	10800	11000	7080	10200	1560	807	587
28	924	1880	1200	750	3120	12600	11500	8040	9950	1470	701	599
29	918	2140	1300	730	---	10700	10900	8550	9510	1400	617	549
30	918	1410	1350	720	---	8690	10700	9020	9310	1350	471	540
31	917	---	1300	760	---	8370	---	10000	---	1320	409	---
TOTAL	32639	36766	51080	29520	89990	251840	236210	201470	381270	134620	28555	13536
MEAN	1053	1226	1648	952	3214	8124	7874	6499	12710	4343	921	451
MAX	1280	2140	3120	1250	5500	12600	11500	10000	15300	9170	1360	965
MIN	879	920	840	720								

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 mi².

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

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

REMARKS.--Estimated daily discharges: Dec. 21 to Mar. 5 and Aug. 10.. Records good 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. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service Limited Automatic Remote Collector telemeter at station.

AVERAGE DISCHARGE.--27 years, 706 ft³/s, 9.10 in/yr, 511,500 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 21,000 ft³/s Apr. 7, 1965, gage height, 19.14 ft; maximum gage height, 21.64 ft Mar. 2, 1965, backwater from ice; minimum discharge, 45 ft³/s Nov. 17, 1989, result of freezeup.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Mar. 27, 1961, reached a stage of 21.6 ft, from floodmarks, discharge, 29,200 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,600 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 24	1415	5,240	8.42	May 19	0830	*11,600	*14.29
Apr. 28	1215	4,220	7.39	Aug. 10	unknown	6,710	9.79
May 7	0530	8,360	11.25				

Minimum discharge, 71 ft³/s Dec. 4, result of freezeup.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	429	315	255	165	155	220	1250	3560	1830	498	413	292
2	388	316	255	180	180	230	1150	2750	1700	493	385	281
3	385	322	121	150	215	260	966	2040	1560	489	365	277
4	378	327	136	155	230	250	999	1830	1410	467	348	271
5	385	326	221	160	240	280	944	2080	1320	441	327	263
6	390	660	259	170	250	507	888	6020	1260	416	315	263
7	386	400	263	140	230	700	840	8040	1180	389	346	260
8	378	341	263	155	235	725	816	5290	940	406	764	264
9	363	296	254	160	240	709	888	3610	951	535	4530	255
10	350	259	256	150	230	695	1380	3220	919	470	6000	252
11	343	263	261	160	220	710	1560	2610	921	497	3300	267
12	345	268	260	170	240	720	1440	2130	1160	706	1850	355
13	338	274	256	155	270	851	1710	1970	1070	861	1400	847
14	334	276	223	165	280	836	2070	1780	1020	822	942	718
15	333	241	243	180	240	745	2920	1620	1820	670	877	621
16	294	218	262	170	200	766	2930	1900	1640	550	758	556
17	242	214	279	175	205	857	2310	4540	1380	490	724	504
18	255	217	216	170	215	909	1880	6920	1240	436	962	459
19	256	249	228	175	200	994	1900	10600	1120	856	930	414
20	262	260	341	180	190	1080	2960	7050	997	955	735	388
21	280	244	250	180	200	1240	2750	4430	938	723	638	363
22	331	257	155	160	215	1620	2150	3190	877	846	573	352
23	363	267	150	145	200	2500	1830	2660	797	886	527	336
24	364	263	180	155	210	4980	1630	2290	743	956	481	329
25	364	257	190	140	230	4310	1450	2070	694	766	440	329
26	344	257	180	145	205	2650	1420	1950	652	615	410	332
27	338	260	200	160	210	2140	2070	2070	621	524	384	320
28	334	258	210	170	230	1850	3970	2240	583	503	363	314
29	322	251	220	160	---	1880	3880	2120	541	457	342	308
30	315	239	190	130	---	1590	3510	2010	514	440	325	299
31	315	---	155	150	---	1370	---	1860	---	435	310	---
TOTAL	10504	8595	6932	4980	6165	39174	56461	106450	32398	18598	31064	11089
MEAN	339	286	224	161	220	1264	1882	3434	1080	600	1002	370
MAX	429	660	341	180	280	4980	3970	10600	1830	956	6000	847
MIN	242	214	121	130	155	220	816	1620	514	389	310	252
AC-FT	20830	17050	13750	9880	12230	77700	112000	211100	64260	36890	61620	22000
CFSM	.32	.27	.21	.15	.21	1.20	1.79	3.26	1.02	.57	.95	.35
IN.	.37	.30	.24	.18	.22	1.38	1.99	3.76	1.14	.66	1.10	.39

CAL YR 1990 TOTAL 302054 MEAN 828 MAX 10700 MIN 74 AC-FT 599100 CFSM .79 IN. 10.66
WTR YR 1991 TOTAL 332410 MEAN 911 MAX 10600 MIN 121 AC-FT 659300 CFSM .86 IN. 11.73

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 mi².

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

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

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

REMARKS.--Estimated daily discharges: Dec. 22 to Mar. 17 and Apr. 5-12. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service Limited Automatic Remote Collector at station.

AVERAGE DISCHARGE.--37 years, 173 ft³/s, 7.68 in/yr, 125,300 acre-ft/yr; median of yearly mean discharges, 150 ft³/s, 6.7 in/yr, 109,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 10,800 ft³/s Mar. 27, 1961, gage height, 15.58 ft; minimum daily discharge, 3.0 ft³/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 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,200 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Apr. 27	1000	1,230	7.27	May 7	0645	2,030	8.58
Apr. 29	1615	2,180	8.79	May 20	0800	*2,840	*10.05

Minimum daily discharge, 16 ft³/s Jan. 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

MEAN VALUES

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	80	58	49	21	20	33	282	1760	491	87	93	59
2	78	58	43	24	24	45	260	1050	422	84	87	57
3	82	58	27	18	26	70	243	660	368	81	83	56
4	84	58	35	19	27	130	224	532	326	77	79	53
5	84	58	41	20	28	150	206	734	296	74	73	53
6	84	57	42	21	29	270	193	1500	267	72	70	53
7	81	56	43	17	28	360	181	1920	245	69	73	51
8	77	56	44	19	29	270	161	1140	229	69	93	49
9	76	55	44	20	31	210	144	684	213	74	278	52
10	74	55	45	19	32	170	131	601	201	87	688	51
11	74	54	46	20	33	160	153	515	193	84	505	51
12	72	53	48	21	32	150	454	451	183	331	292	60
13	70	51	45	20	32	190	818	407	171	145	223	144
14	69	50	43	22	33	170	862	373	180	147	181	421
15	67	50	49	25	31	180	953	412	507	117	154	359
16	66	50	47	23	29	160	690	582	323	100	139	331
17	66	49	49	24	30	170	518	815	273	89	131	255
18	66	49	45	23	29	160	427	1980	238	82	151	204
19	64	48	47	24	29	335	560	2390	213	171	175	173
20	63	48	45	25	26	354	634	2570	193	330	143	152
21	63	48	24	24	28	398	555	1310	176	213	126	136
22	63	49	25	21	31	472	454	798	161	179	114	126
23	63	49	22	18	27	672	420	644	149	193	106	118
24	62	48	26	20	29	954	385	577	138	229	96	112
25	62	48	28	17	32	774	344	518	128	185	90	108
26	62	48	24	18	27	563	421	661	119	145	82	105
27	60	48	27	21	28	500	968	671	112	124	77	103
28	60	48	29	23	30	488	900	542	105	116	73	98
29	60	43	31	21	---	417	1720	467	98	107	69	94
30	59	45	25	16	---	346	1700	414	91	98	66	89
31	58	---	19	19	---	308	---	421	---	97	62	---
TOTAL	2149	1545	1157	643	810	9629	15961	28099	6809	4056	4672	3773
MEAN	69.3	51.5	37.3	20.7	28.9	311	532	906	227	131	151	126
MAX	84	58	49	25	33	954	1720	2570	507	331	688	421
MIN	58	43	19	16	20	33	131	373	91	69	62	49
AC-FT	4260	3060	2290	1280	1610	19100	31660	55730	13510	8050	9270	7480
CFSM	.23	.17	.12	.07	.09	1.02	1.74	2.96	.74	.43	.49	.41
IN.	.26	.19	.14	.08	.10	1.17	1.94	3.42	.83	.49	.57	.46

CAL YR 1990	TOTAL 61194.7	MEAN 168	MAX 3710	MIN 4.4	AC-FT 121400	CFSM .55	IN. 7.44
WTR YR 1991	TOTAL 79303	MEAN 217	MAX 2570	MIN 16	AC-FT 157300	CFSM .71	IN. 9.64

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.

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.

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.

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 ft³/s. Flood of Mar. 16, 1929, reached a stage of about 16 ft, from information by City of Waterloo, discharge not determined.

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 26	0645	6,120	6.40	May 20	2030	14,500	10.98
Apr. 13	2130	5,000	5.47	June 1	0400	6,580	6.76
Apr. 22	0130	4,300	4.88	June 16	0645	5,210	5.64
Apr. 30	1400	7,820	7.66	Aug. 11	2115	6,100	6.38
May 8	1800	9,920	8.89				

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	767	521	459	280	260	533	2410	6570	6260	978	848	439
2	824	478	439	310	300	1090	2240	6170	4400	930	862	436
3	741	570	349	250	370	850	1940	5250	3660	886	549	445
4	864	540	400	260	390	748	1720	3920	3220	831	580	411
5	775	532	500	270	410	727	1640	3470	2880	814	580	407
6	784	511	540	280	430	849	1550	3780	2680	810	591	384
7	713	738	500	230	400	856	1460	6260	2240	785	713	389
8	700	633	511	260	390	990	1420	9430	2050	799	990	423
9	699	565	466	270	410	1110	1500	8240	1940	860	993	436
10	682	536	447	250	400	1120	1510	5740	1810	720	2850	420
11	661	485	441	270	380	1140	1540	5070	1820	831	5520	395
12	611	468	440	280	420	1230	2390	4330	1800	1000	5120	409
13	649	454	464	260	470	1200	4550	3590	1820	1530	2930	525
14	590	476	422	280	490	1540	4470	3230	2070	1100	2260	926
15	601	472	385	310	420	1450	4560	2920	2770	1210	1540	1220
16	591	457	453	290	340	1370	4820	2830	4760	1100	1310	1170
17	560	426	464	300	350	1390	4650	3110	3280	978	1260	1060
18	543	431	450	290	370	1640	3850	6770	2640	880	1130	929
19	524	415	413	300	340	1680	3290	10400	2290	829	1130	772
20	489	431	413	310	320	1720	3250	13400	1940	890	1280	700
21	548	468	240	300	340	1810	4000	12800	1730	1440	987	656
22	532	483	260	270	370	1970	4150	8690	1670	1230	909	627
23	532	435	250	240	340	2790	3460	6080	1570	1370	870	600
24	587	470	300	260	360	3410	3040	4820	1430	1050	733	578
25	541	462	330	230	400	4950	2780	4210	1360	1430	690	563
26	568	440	310	240	350	6000	2520	4050	1210	1190	629	538
27	562	472	340	270	360	4590	3110	3980	1060	931	591	549
28	562	522	360	290	390	3590	4550	3720	1100	975	554	548
29	548	436	380	270	---	3060	5720	3760	1060	893	526	489
30	526	397	320	220	---	2910	7540	4130	1010	828	498	508
31	529	---	260	250	---	2650	---	4990	---	803	460	---
TOTAL	19403	14724	12306	8390	10570	60963	95630	175710	69530	30901	40483	17952
MEAN	626	491	397	271	377	1967	3188	5668	2318	997	1306	598
MAX	864	738	540	310	490	6000	7540	13400	6260	1530	5520	1220
MIN	489	397	240	220	260	533	1420	2830	1010	720	460	384
AC-FT	38490	29210	24410	16640	20970	120900	189700	348500	137900	61290	80300	35610
CFSM	.38	.30	.24	.16	.23	1.18	1.92	3.41	1.40	.60	.79	.36
IN.	.43	.33	.28	.19	.24	1.37	2.14	3.94	1.56	.69	.91	.44

CAL YR 1990	TOTAL 468753	MEAN 1284	MAX 12300	MIN 82	AC-FT 929800	CFSM .77	IN. 10.50
WTR YR 1991	TOTAL 556562	MEAN 1525	MAX 13400	MIN 220	AC-FT 1104000	CFSM .92	IN. 12.46

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 from Shell Rock River, and 5.0 mi upstream from mouth.

DRAINAGE AREA.--846 mi².

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. 4-6, Dec. 11 to Mar. 9, and Apr. 15-19. Records good except those 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. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service gage-height telemeter at station.

AVERAGE DISCHARGE.--46 years, 512 ft³/s, 8.22 in/yr, 370,900 acre-ft/yr; median of yearly mean discharges, 450 ft³/s, 7.2 in/yr, 326,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 31,900 ft³/s June 27, 1951, gage height, 17.25 ft; maximum gage height, 18.45 ft, July 29, 1990; minimum daily discharge, 5.9 ft³/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 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 27	0945	2,960	10.88	June 2	1015	6,280	13.60
Apr. 16	----	4,430	12.12	June 7	0115	5,290	13.16
Apr. 29	2130	4,810	12.55	June 17	1830	2,540	11.11
May 20	1045	*11,900	*15.52				

Minimum daily discharge, 71 ft³/s Jan. 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	254	210	217	115	85	380	1550	3830	5680	686	228	161
2	249	210	208	127	102	840	1350	3290	6110	637	211	168
3	265	213	332	100	133	650	1190	2900	5380	593	199	171
4	344	217	290	104	145	580	1080	2500	4230	556	189	124
5	330	220	230	107	159	700	988	2150	3820	531	177	98
6	298	219	240	110	173	740	914	2130	4640	502	167	89
7	276	215	242	89	154	800	847	2240	5140	471	201	84
8	264	213	225	101	156	900	826	2600	4500	444	380	85
9	264	215	192	105	178	960	943	2760	3480	426	710	83
10	259	218	184	95	181	988	910	2560	2840	408	807	80
11	255	217	170	103	175	874	859	2190	2470	395	669	83
12	250	212	180	106	102	856	1340	1890	2190	420	525	86
13	247	209	190	98	235	900	2630	1670	1960	469	431	90
14	246	208	175	105	252	1170	2630	1510	1870	441	372	105
15	239	208	190	116	218	1160	3610	1380	1930	396	331	132
16	234	206	200	108	178	1120	4360	1400	1990	365	299	151
17	235	202	210	110	186	1180	4160	1660	2460	339	284	204
18	236	203	180	106	202	1600	3830	3520	2380	313	269	212
19	230	205	185	109	192	1820	3260	7070	1960	291	246	196
20	221	257	190	112	183	2070	2860	11200	1660	278	228	180
21	220	258	160	107	199	2080	2760	8300	1480	268	218	172
22	224	249	135	95	222	1920	2740	6060	1400	260	212	167
23	226	239	125	83	205	2020	2520	4780	1320	248	210	162
24	223	230	145	90	225	2350	2120	4120	1210	235	210	158
25	219	223	155	78	258	2640	1800	3730	1110	219	239	166
26	217	215	138	81	228	2860	1580	3690	1020	205	243	164
27	219	268	145	91	238	2940	1780	3110	941	194	224	162
28	215	283	154	98	265	2800	2070	2990	863	199	207	147
29	213	249	162	90	---	2540	3820	2970	793	228	196	136
30	212	221	134	71	---	2220	4490	2950	733	269	189	133
31	212	---	107	82	---	1830	---	3290	---	253	174	---
TOTAL	7596	6712	5790	3092	5329	46488	65817	106440	77560	11539	9245	4149
MEAN	245	224	187	99.7	190	1500	2194	3434	2585	372	298	138
MAX	344	283	332	127	265	2940	4490	11200	6110	686	807	212
MIN	212	202	107	71	85	380	826	1380	733	194	167	80
AC-FT	15070	13310	11480	6130	10570	92210	130500	211100	153800	22890	18340	8230
CFSM	.29	.26	.22	.12	.22	1.77	2.59	4.06	3.06	.44	.35	.16
IN.	.33	.30	.25	.14	.23	2.04	2.89	4.68	3.41	.51	.41	.18
CAL YR 1990	TOTAL 241290	MEAN 661	MAX 17100	MIN 12	AC-FT 478600	CFSM .78	IN. 10.61					
WTR YR 1991	TOTAL 349757	MEAN 958	MAX 11200	MIN 71	AC-FT 693700	CFSM 1.13	IN. 15.38					

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, 1.0 mi upstream from Willow Creek, and at mile 275.8 upstream from mouth of Iowa River.

DRAINAGE AREA.--526 mi².

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 encoder 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. 19 to Feb. 21. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Service Limited Automatic Remote Collector at station.

AVERAGE DISCHARGE.--59 years, 260 ft³/s, 6.71 in/yr, 188,400 acre-ft/yr; median of yearly mean discharges, 210 ft³/s, 5.4 in/yr, 152,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 10,800 ft³/s Mar. 30, 1933, gage height, 15.7 ft; no flow part of each day Aug. 14, 15, 21, 22, 1989.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 23	0900	2,430	7.39	May 18	1415	*5,630	*11.58
May 6	0045	2,050	7.09				

Minimum discharge, 15 ft³/s Dec. 3.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	85	88	70	33	34	105	764	1210	1430	318	257	104		
2	84	89	44	34	37	159	691	1030	1290	306	229	96		
3	104	88	20	38	41	183	630	926	1150	292	215	93		
4	119	90	31	33	48	216	569	894	1370	281	191	90		
5	123	90	51	31	51	297	523	1380	1730	258	167	86		
6	119	90	52	40	52	611	488	1900	1350	235	158	83		
7	108	88	51	40	51	598	449	1650	1170	227	180	79		
8	98	87	53	39	53	508	431	1680	1050	230	649	78		
9	95	85	53	40	55	477	449	1700	953	220	973	79		
10	94	85	56	40	48	438	442	1530	863	224	830	79		
11	93	85	61	41	47	436	436	1380	792	233	679	87		
12	94	82	68	39	46	586	485	1240	723	279	557	169		
13	93	79	68	41	48	806	697	1110	665	303	500	272		
14	92	78	67	44	50	506	1040	998	643	297	422	265		
15	86	78	69	45	47	473	1500	1040	1350	267	348	352		
16	82	77	69	46	44	469	1310	2110	1230	236	302	423		
17	86	72	70	48	53	478	1160	2950	1000	212	305	425		
18	96	71	59	46	58	613	1070	4900	879	249	312	400		
19	98	72	62	44	61	699	1370	4110	786	206	308	333		
20	97	76	65	45	62	736	1370	3250	742	216	287	272		
21	102	74	53	43	64	858	1170	2590	672	278	265	236		
22	111	74	41	37	79	976	1040	2130	620	289	233	212		
23	112	71	34	35	92	2170	953	1800	566	304	215	192		
24	112	72	32	39	92	1810	838	1580	526	283	201	180		
25	111	69	31	40	96	1610	748	1400	485	256	180	172		
26	101	66	34	37	99	1400	736	1530	444	225	164	159		
27	95	69	32	39	96	1290	1300	1670	403	200	148	149		
28	91	51	34	39	96	1210	1290	1740	367	239	133	145		
29	87	51	35	40	---	1050	1260	1650	341	404	120	137		
30	89	68	37	38	---	914	1530	1510	321	360	120	129		
31	88	---	34	37	---	840	---	1430	---	302	115	---		
TOTAL	3045	2315	1536	1231	1700	23522	26739	56018	25911	8229	9763	5576		
MEAN	98.2	77.2	49.5	39.7	60.7	759	891	1807	864	265	315	186		
MAX	123	90	70	48	99	2170	1530	4900	1730	404	973	425		
MIN	82	51	20	31	34	105	431	894	321	200	115	78		
AC-FT	6040	4590	3050	2440	3370	46660	53040	111100	51390	16320	19360	11060		
CFSM	.19	.15	.09	.08	.12	1.44	1.69	3.44	1.64	.50	.60	.35		
IN.	.22	.16	.11	.09	.12	1.66	1.89	3.96	1.83	.58	.69	.39		
CAL YR 1990	TOTAL	74954.4	MEAN	205	MAX	2350	MIN	7.8	AC-FT	1487000	CFSM	.39	IN.	5.3
WTR YR 1991	TOTAL	165585	MEAN	454	MAX	4900	MIN	20	AC-FT	328400	CFSM	.86	IN.	11.71

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 mi².

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, 0.76 ft Oct. 26, 1989.

EXTREMES FOR CURRENT YEAR.--Maximum gage height, 5.51 ft June 14; minimum, 1.80 ft Dec. 2.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.18	2.06	1.96	2.15	2.23	2.39	3.07	3.93	5.19	4.88	4.62	4.67
2	2.17	2.06	1.91	2.15	2.23	2.44	3.06	3.86	5.18	4.85	4.61	4.66
3	2.23	2.06	1.99	2.15	2.26	2.50	3.06	3.83	5.15	4.81	4.62	4.66
4	2.24	2.06	2.04	2.15	2.28	2.53	3.07	3.85	5.22	4.78	4.59	4.63
5	2.22	2.06	2.04	2.16	2.27	2.59	3.12	3.98	5.26	4.75	4.57	4.62
6	2.19	2.06	2.04	2.18	2.26	2.55	3.20	4.03	5.26	4.74	4.55	4.61
7	2.16	2.07	2.04	2.18	2.26	2.49	3.18	4.04	5.26	4.74	4.60	4.60
8	2.15	2.06	2.04	2.18	2.28	2.46	3.15	4.11	5.24	4.74	4.75	4.59
9	2.14	2.06	2.04	2.18	2.29	2.45	3.14	4.18	5.24	4.73	4.75	4.62
10	2.14	2.05	2.04	2.18	2.28	2.43	3.13	4.13	5.20	4.72	4.74	4.59
11	2.14	2.06	2.04	2.19	2.26	2.42	3.08	4.16	5.19	4.72	4.74	4.63
12	2.12	2.03	2.04	2.21	2.26	2.43	3.12	4.18	5.17	4.77	4.73	4.79
13	2.12	2.01	2.04	2.22	2.26	2.47	3.20	4.20	5.14	4.73	4.72	4.82
14	2.13	2.05	2.04	2.22	2.25	2.49	3.31	4.20	5.15	4.72	4.71	4.86
15	2.10	2.07	2.07	2.22	2.24	2.51	3.39	4.25	5.21	4.70	4.70	4.86
16	2.09	2.04	2.07	2.22	2.24	2.52	3.37	4.45	5.18	4.69	4.70	4.86
17	2.13	2.02	2.10	2.27	2.24	2.54	3.36	4.59	5.16	4.68	4.72	4.82
18	2.13	2.02	2.13	2.25	2.25	2.56	3.39	4.77	5.13	4.66	4.70	4.83
19	2.08	2.01	2.13	2.24	2.27	2.58	3.45	4.83	5.11	4.63	4.67	4.77
20	2.09	1.99	2.14	2.24	2.27	2.59	3.46	4.87	5.11	4.68	4.66	4.75
21	2.13	2.06	2.14	2.23	2.31	2.59	3.48	4.93	5.09	4.70	4.67	4.74
22	2.12	2.06	2.14	2.23	2.35	2.65	3.53	4.99	5.04	4.71	4.65	4.73
23	2.11	2.04	2.14	2.23	2.40	2.86	3.56	5.03	5.01	4.68	4.70	4.71
24	2.10	2.01	2.14	2.23	2.39	2.90	3.58	5.06	5.00	4.66	4.69	4.71
25	2.09	1.98	2.14	2.23	2.39	2.91	3.58	5.07	4.98	4.62	4.69	4.74
26	2.09	1.96	2.14	2.23	2.40	2.94	3.61	5.14	4.98	4.59	4.69	4.71
27	2.10	1.99	2.14	2.23	2.39	3.00	3.82	5.14	4.95	4.57	4.67	4.68
28	2.06	2.01	2.14	2.23	2.38	3.06	3.81	5.14	4.91	4.64	4.66	4.68
29	2.06	1.99	2.15	2.23	---	3.04	3.88	5.13	4.89	4.65	4.65	4.67
30	2.05	1.99	2.15	2.23	---	3.06	3.99	5.13	4.87	4.65	4.70	4.68
31	2.05	---	2.15	2.23	---	3.09	---	5.15	---	4.64	4.70	---
MEAN	2.13	2.03	2.08	2.21	2.29	2.65	3.37	4.53	5.12	4.70	4.67	4.71
MAX	2.24	2.07	2.15	2.27	2.40	3.09	3.99	5.15	5.26	4.88	4.75	4.86
MIN	2.05	1.96	1.91	2.15	2.23	2.39	3.06	3.83	4.87	4.57	4.55	4.59

05462000 SHELL ROCK RIVER AT SHELL ROCK, IA

LOCATION.--Lat 42°42'43", long 92°34'58", in NW1/4 NE1/4 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 mi².

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: Apr.14-17, 19-22, May 22-29, and June 23 to July 9. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service gage-height telemeter at station.

AVERAGE DISCHARGE.--38 years, 967 ft³/s, 7.52 in/yr, 700,600 acre-ft/yr; median of yearly mean discharges, 790 ft³/s, 6.1 in/yr, 572,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 33,500 ft³/s Mar. 28, 1961, gage height, 16.26 ft; minimum daily discharge, 27 ft³/s Dec. 22, 1989.

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 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 24	1815	4,940	11.01	May 19	2145	*17,100	*14.36
Apr. 15	unknown	5,500	(a)11.20	June 1	0015	8,210	12.17
Apr. 28	1245	5,750	11.28	June 6	0400	5,410	11.13
May 7	0500	6,880	11.71	June 16	0500	6,880	11.71

(a) from floodmark

Minimum daily discharge, 101 ft³/s Feb. 14.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	577	465	328	241	215	403	1780	5460	6020	651	816	514
2	566	464	345	243	217	537	1600	4520	4350	626	750	490
3	614	466	283	239	224	557	1420	3800	3770	603	709	475
4	638	459	250	239	235	690	1260	3370	3450	580	673	458
5	662	460	273	238	241	767	1150	3300	4490	543	640	443
6	653	459	289	241	248	1070	1080	5400	5120	528	610	434
7	621	456	304	239	254	1500	990	6660	4060	493	701	424
8	602	447	316	238	265	1660	919	5590	3430	514	970	418
9	584	446	320	244	278	1320	916	5070	3060	701	1540	417
10	573	440	324	245	279	1170	942	4830	2810	895	2220	409
11	567	435	332	248	287	1190	941	4350	2600	880	1960	411
12	557	424	340	256	291	1260	1100	3930	2510	1100	1680	421
13	545	417	344	258	302	1440	2620	3580	2410	1160	1480	554
14	542	409	319	261	256	1230	3500	3270	2430	1140	1380	778
15	528	408	325	267	223	1310	4500	3020	4270	1040	1250	813
16	520	408	364	269	273	1400	4000	3600	6450	936	1110	871
17	514	396	364	267	282	1480	3400	6490	4700	861	1050	910
18	521	389	332	269	293	1590	2770	13200	3470	799	1040	887
19	510	384	325	268	287	1800	3400	15200	2960	800	1060	829
20	518	377	316	244	286	1890	4200	14600	2640	753	1010	761
21	535	386	172	230	299	1850	3850	10300	2450	770	958	687
22	532	384	209	245	314	1980	3600	8020	2270	837	899	627
23	541	378	258	242	341	2650	3190	6600	1700	854	851	580
24	537	363	296	249	348	4630	2970	5700	1240	872	814	551
25	524	355	296	235	367	4440	2700	5100	1130	838	753	535
26	509	350	274	229	380	3800	2480	4700	1050	779	692	517
27	513	355	257	229	381	3290	3490	4500	979	723	641	497
28	497	347	259	230	379	3050	5490	4400	886	761	602	486
29	483	333	266	229	---	2720	5360	4330	808	788	576	468
30	477	298	256	221	---	2310	5230	4140	735	907	557	460
31	473	---	243	218	---	1970	---	5530	---	900	527	---
TOTAL	17033	12158	9179	7571	8045	56954	80848	182560	88248	24632	30519	17125
MEAN	549	405	296	244	287	1837	2695	5889	2942	795	984	571
MAX	662	466	364	269	381	4630	5490	15200	6450	1160	2220	910
MIN	473	298	172	218	215	403	916	3020	735	493	527	409
AC-FT	33780	24120	18210	15020	15960	113000	160400	362100	175000	48860	60530	33970
CFSM	.31	.23	.17	.14	.16	1.05	1.54	3.37	1.68	.46	.56	.33
IN.	.36	.26	.20	.16	.17	1.21	1.72	3.89	1.88	.52	.65	.36
CAL YR 1990	TOTAL 314002	MEAN 860	MAX 11500	MIN 42	AC-FT 622800	CFSM .49	IN. 6.69					
WTR YR 1991	TOTAL 534872	MEAN 1465	MAX 15200	MIN 172	AC-FT 1061000	CFSM .84	IN. 11.40					

05463000 BEAVER CREEK AT NEW HARTFORD, IA

LOCATION.--Lat 42°34'22", long 92°37'04s", 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 mi².

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 encoder. 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: Dec. 3 to Mar. 8. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service Limited Automatic Remote Collector at station.

AVERAGE DISCHARGE.--46 years, 204 ft³/s, 7.98 in/yr, 147,800 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 18,000 ft³/s June 13, 1947, gage height, 13.5 ft, from graph based on gage readings, from rating curve extended above 14,000 ft³/s; minimum daily discharge, 2.0 ft³/s Sept. 30, 1989.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,400 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 19	0600	2,460	9.11	May 6	1530	1,570	8.04
Mar. 24	0845	1,590	8.26	May 18	2330	13,000	13.09
Apr. 13	1215	5,150	10.71	June 1	1000	*13,400	13.17
Apr. 29	1015	1,880	8.56	June 5	2345	3,890	10.08

Minimum daily discharge, 39 ft³/s Jan. 30 and Feb. 1.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	142	114	78	50	39	172	390	1170	10400	275	75	51
2	138	113	73	52	41	490	351	863	4570	257	70	49
3	153	114	68	46	48	440	302	728	2530	238	67	50
4	313	118	74	45	52	420	284	660	1890	228	66	47
5	286	126	51	46	83	380	271	812	3100	217	63	45
6	242	126	50	47	88	400	253	1480	3320	206	61	45
7	217	120	49	42	95	390	239	1310	1810	193	92	43
8	191	115	53	44	105	340	247	950	1420	183	646	42
9	183	118	54	45	125	285	894	790	1190	175	719	43
10	178	120	54	42	128	256	908	679	1020	172	325	41
11	174	118	53	44	109	237	541	604	951	166	221	40
12	166	112	53	44	101	262	1140	549	829	167	175	44
13	159	109	55	43	88	344	4310	511	747	167	147	48
14	157	110	53	47	83	425	2920	476	890	158	128	77
15	150	110	55	50	70	389	2570	451	1210	149	114	91
16	141	105	64	47	78	396	1910	707	1080	142	103	102
17	143	101	67	48	77	601	1300	1450	829	135	104	75
18	145	98	66	48	88	1730	997	7490	715	127	97	66
19	139	97	62	54	106	2300	1020	7450	633	120	86	58
20	135	95	58	63	107	1560	1300	3390	575	116	80	54
21	140	96	53	55	124	1120	1110	2070	531	114	81	52
22	139	93	50	47	158	864	899	1790	495	110	80	50
23	138	90	53	50	170	1160	834	1510	460	104	76	47
24	132	86	58	49	178	1560	785	1550	431	98	79	46
25	126	85	64	43	165	1250	693	1330	404	91	77	45
26	126	81	61	41	128	866	629	1340	379	86	70	45
27	126	84	60	43	116	777	1280	1210	352	83	65	43
28	121	81	65	47	110	867	1680	1070	326	84	61	43
29	117	73	69	44	---	627	1740	1650	307	93	58	42
30	118	79	60	39	---	497	1560	1530	291	89	59	41
31	115	---	50	41	---	439	---	2210	---	83	54	---
TOTAL	4950	3087	1833	1446	2860	21844	33357	49780	43685	4626	4199	1565
MEAN	160	103	59.1	46.6	102	705	1112	1606	1456	149	135	52.2
MAX	313	126	78	63	178	2300	4310	7490	10400	275	719	102
MIN	115	73	49	39	39	172	239	451	291	83	54	40
AC-FT	9820	6120	3640	2870	5670	43330	66160	98740	86650	9180	8330	3100
CFSM	.46	.30	.17	.13	.29	2.03	3.20	4.63	4.20	.43	.39	.15
IN.	.53	.33	.20	.16	.31	2.34	3.58	5.34	4.68	.50	.45	.17

CAL YR 1990 TOTAL 118248.2 MEAN 324 MAX 5110 MIN 4.5 AC-FT 343600 CFSM .93 IN. 12.68
WTR YR 1991 TOTAL 173232 MEAN 475 MAX 10400 MIN 39 AC-FT 234500 CFSM 1.37 IN. 18.57

IOWA RIVER BASIN

105

05463050 CEDAR RIVER AT CEDAR FALLS, IA
(National stream-quality accounting network station)

WATER-QUALITY RECORDS

LOCATION--Lat 42°32'20", Long 92°26'58", in NW1/4 NE1/4 sec.12, T.89N., 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 of Iowa River.

DRAINAGE AREA.4,734 mi².

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 1990 TO SEPTEMBER 1991

		DIS-CHARGE, INST. CUBIC FEET PER SECOND (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 (NTU) (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)	
OCT	25...	1345	1670	588	8.2	9.0	13.0	2.0	13.2	117	748	K64	K76
DEC	10...	1345	1240	598	8.2	1.0	4.0	1.2	14.4	104	747	43	K15
MAR	06...	1245	4360	550	7.7	1.5	-2.0	18	13.0	97	733	M100	340
APR	24...	1435	11100	612	8.2	10.5	11.0	13	11.2	103	744	240	K52
JUL	02...	1515	3700	557	8.4	26.5	29.0	13	10.0	130	734	100	160
AUG	22...	1315	2560	582	8.8	24.0	21.0	1.5	12.0	147	742	87	47

	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 MG/L AS (00453)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	
OCT	25...	300	76	27	18	11	0.5	3.5	222	14	242	49	28
DEC	10...	300	82	24	12	8	0.3	2.7	239	7	277	53	33
MAR	06...	270	75	20	9.5	7	0.3	3.4	190	0	232	38	26
APR	24...	300	82	23	7.7	5	0.2	2.4	194	0	237	41	27
JUL	02...	280	74	24	9.3	7	0.2	2.8	201	13	218	41	23
AUG	22...	310	81	25	9.7	6	0.2	2.9	224	15	243	41	25

DATE	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)
OCT 25...	0.20	8.3	356	364	0.48	1610	0.97	4.60	0.020	0.020	0.030
DEC 10...	0.40	11	369	386	0.50	1240	0.97	5.50	0.020	0.030	0.030
MAR 06...	0.30	12	339	335	0.46	3990	0.84	8.00	0.050	0.170	0.160
APR 24...	0.20	11	372	369	0.51	11100	1.3	13.0	0.020	<0.010	0.020
JUL 02...	0.20	10	321	336	0.44	3210	1.6	7.10	0.030	<0.010	0.020
AUG 22...	0.30	15	355	358	0.48	2450	--	5.10	0.020	0.020	<0.010

K Results based on colony count outside ideal range.
M Presence of material verified but not quantified.

05463050~CEDAR-RIVER-AT-CEDAR-FALLS,~IA--Continued

WATER-QUALITY RECORDS

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	NITRO- GEN, AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	SEDI- MENT, DIS- SUS- PENDED (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDED (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)
OCT 25...	1.0	0.030	0.030	0.060	12	54	67	1	10	110	<0.5
DEC 10...	1.0	0.070	0.080	0.110	60	201	48	--	--	--	--
MAR 06...	1.0	0.160	0.160	0.210	71	836	96	1	30	84	<0.5
APR 24...	1.3	0.050	0.040	0.120	48	1440	94	1	10	94	<0.5
JUL 02...	1.6	0.040	0.050	0.120	86	859	87	--	--	--	--
AUG 22...	1.9	0.080	0.100	0.210	54	373	91	3	20	96	<0.5

DATE	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)	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)
OCT 25...	<1.0	2	<3	3	11	<1	12	36	<0.1	<10	2
DEC 10...	--	--	--	--	--	--	--	--	--	--	--
MAR 06...	<1.0	2	<3	2	76	1	8	27	<0.1	<10	1
APR 24...	<1.0	2	<3	3	18	<1	7	5	<0.1	10	<1
JUL 02...	--	--	--	--	--	--	--	--	--	--	--
AUG 22...	<1.0	2	<3	4	14	1	8	<1	<0.1	<10	<1

DATE	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)	ATRA- ZINE, TOTAL (UG/L) (39630)	CYAN- AZINE TOTAL (UG/L) (81757)	METRI- BUZIN IN WHOLE WATER (UG/L) (81408)	ALA- CHLOR TOTAL RECOVER (UG/L) (77825)	METOLA- CHLOR IN WHOLE WATER (UG/L) (39356)	TRI- FLURA- LIN TOTAL RECOVER (UG/L) (39030)
OCT 25...	<1	<1.0	210	<6	<3	0.12	<0.10	<0.10	<0.10	<0.10	<0.10
DEC 10...	--	--	--	--	--	--	--	--	--	--	--
MAR 06...	1	<1.0	150	<6	7	0.12	<0.10	<0.10	<0.10	<0.10	<0.10
APR 24...	<2	<1.0	160	<6	7	0.13	<0.10	<0.10	<0.10	<0.10	<0.10
JUL 02...	--	--	--	--	--	0.24	<0.10	<0.10	<0.10	0.17	<0.10
AUG 22...	1	<1.0	170	<6	10	--	--	--	--	--	--

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 mi².

PERIOD OF RECORD.--April 1952 to current year.

REVISED RECORDS.--WSP 1438: Drainage area.

GAGE.--Water-stage encoder. Datum of gage is 865.03 ft above NGVD.

REMARKS.--Estimated daily discharges: Dec. 5 to Mar. 8. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service Limited Automatic Remote Collector at station.

AVERAGE DISCHARGE.--39 years, 176 ft³/s, 7.89 in/yr, 127,500 acre-ft/yr; median of yearly mean discharges, 180 ft³/s, 8.1 in/yr, 130,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 19,300 ft³/s July 9, 1969, gage height, 18.23 ft; minimum daily discharge, 0.12 ft³/s Jan. 26, 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,200 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 18	2100	2,610	14.29	Apr. 29	1200	*8,770	*16.55
Mar. 24	0400	1,270	11.70	May 6	1645	1,970	13.45
Mar. 28	0800	1,740	13.02	May 18	1445	3,280	14.85
Apr. 10	0345	1,310	11.85	May 23	0015	1,570	12.59
Apr. 13	1200	4,890	15.57	June 2	0015	4,860	15.56
Apr. 28	1030	2,150	13.72	June 5	0800	2,280	13.89

Minimum discharge, 21 ft³/s Sept. 7, 8, 10, 11.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	87	71	76	45	25	156	435	1430	3770	227	45	27		
2	84	71	70	44	29	502	387	971	3550	213	43	24		
3	96	76	59	42	36	450	351	820	1540	198	41	31		
4	116	93	36	40	42	400	324	734	1360	189	38	30		
5	121	116	37	40	51	350	301	1000	2180	179	34	25		
6	112	113	34	38	53	370	281	1840	1430	170	37	24		
7	101	104	36	37	63	290	261	1400	896	160	47	23		
8	93	100	41	36	74	260	254	985	759	151	127	26		
9	92	103	46	36	90	241	875	853	671	142	130	26		
10	91	106	48	34	110	213	1090	731	610	142	77	22		
11	90	107	48	34	100	201	654	659	579	136	59	23		
12	87	105	48	33	88	254	1240	604	525	136	55	38		
13	84	101	50	33	73	471	4480	556	492	126	50	252		
14	85	100	51	35	63	400	2570	613	855	118	45	438		
15	82	101	59	36	53	470	1900	657	833	109	41	198		
16	77	97	62	34	48	642	1290	1020	809	102	38	157		
17	79	89	64	33	45	827	910	1440	629	95	42	125		
18	80	88	62	34	53	2070	764	2800	551	88	39	103		
19	77	90	59	39	75	1360	755	2320	494	81	33	86		
20	75	89	54	49	79	870	798	1310	455	78	32	75		
21	83	89	49	40	100	671	723	960	424	73	34	70		
22	81	88	44	33	144	572	639	1310	395	70	37	66		
23	79	84	46	39	178	997	601	1180	369	66	32	61		
24	79	83	53	35	190	1200	561	844	347	59	42	57		
25	80	82	58	31	161	828	507	732	328	57	45	55		
26	75	78	58	28	123	641	472	713	310	55	36	53		
27	75	80	54	27	105	1070	1260	626	291	52	32	51		
28	73	79	59	29	93	1540	1950	578	271	50	30	49		
29	72	68	63	27	---	816	5390	561	258	49	28	48		
30	73	74	56	26	---	602	3160	770	241	47	27	46		
31	72	---	50	27	---	512	---	1100	---	47	32	---		
TOTAL	2651	2725	1630	1094	2344	20246	35183	32117	26222	3465	1428	2309		
MEAN	85.5	90.8	52.6	35.3	83.7	653	1173	1036	874	112	46.1	77.0		
MAX	121	116	76	49	190	2070	5390	2800	3770	227	130	438		
MIN	72	68	34	26	25	156	254	556	241	47	27	22		
AC-FT	5260	5410	3230	2170	4650	40160	69790	63700	52010	6870	2830	4580		
CFSM	.28	.30	.17	.12	.28	2.16	3.87	3.42	2.88	.37	.15	.25		
IN.	.33	.33	.20	.13	.29	2.49	4.32	3.94	3.22	.43	.18	.28		
CAL YR 1990	TOTAL	114451.6	MEAN	314	MAX	10900	MIN	2.0	AC-FT	227000	CFSM	1.03	IN.	14.05
WTR YR 1991	TOTAL	131414	MEAN	360	MAX	5390	MIN	22	AC-FT	260700	CFSM	1.19	IN.	16.13

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 mi².

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 encoder. Datum of gage is 824.14 ft above NGVD.

REMARKS.--Estimated daily discharges: Dec. 21 to Jan. 13, Feb. 15-18, and Aug. 16. Records good except those for estimated daily discharges, which are poor. Slight diurnal fluctuation during low flow caused by powerplant upstream from station. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service gage-height telemeter and U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--51 years, 3,040 ft³/s, 8.02 in/yr, 2,202,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 76,700 ft³/s Mar. 29, 1961, gage height, 21.86 ft; minimum daily discharge, 152 ft³/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 ft³/s. Flood of Apr. 2, 1933, reached a stage of about 19.5 ft from information by City of Waterloo, discharge, 61,000 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 13,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 27	0345	15,900	9.86	May 21	0145	*48,200	*17.73
Apr. 14	0630	21,700	11.32	June 2	0400	38,500	15.40
Apr. 29	2400	27,300	12.70	June 17	0200	15,300	9.70
May 9	0830	21,500	11.27				

Minimum discharge, 256 ft³/s Dec. 4, result of freezeup.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2080	1640	1320	1400	770	1960	7940	22300	26600	3900	2090	1640
2	2070	1640	1310	1300	764	4640	7080	18800	34800	3720	2110	1610
3	2130	1660	1270	1200	757	5780	6510	16600	24100	3500	1780	1730
4	2290	1680	943	1100	752	5790	6020	13900	18200	3320	1570	1570
5	2460	1660	1040	1050	734	4410	5620	12300	16800	3160	1580	1460
6	2330	1690	1550	1150	713	4340	5220	12800	18300	3030	1520	1420
7	2230	1690	1320	1100	722	4390	5030	16100	18200	2850	2070	1380
8	2080	1880	1300	1050	749	4640	5100	19800	15200	2690	3090	1490
9	2020	1680	1310	1100	774	4600	6220	21100	12900	2760	4030	1430
10	1990	1650	1300	1100	817	4270	6680	18000	10800	2540	5070	1400
11	1930	1570	1310	1050	832	4010	6270	15200	9580	2530	7280	1360
12	1870	1540	1310	1050	880	4260	8000	13400	8720	2830	8370	1380
13	1810	1500	1370	1000	917	4720	15500	11700	8130	3450	6500	1490
14	1790	1490	1300	1170	913	4930	20600	10600	8120	3400	5040	2290
15	1770	1470	1310	1080	800	5230	17400	9720	9050	3220	4120	2650
16	1700	1480	1360	1020	640	5410	18300	9360	13200	3050	3750	2770
17	1720	1400	1480	1000	680	5670	17300	12100	14600	2750	3400	2660
18	1690	1380	1380	970	800	7090	15200	19500	12100	2460	3200	2570
19	1630	1390	1350	940	867	9240	13300	38200	9960	2260	3040	2330
20	1590	1420	1360	968	874	9120	12700	45000	8470	2150	3130	2090
21	1640	1500	1000	1290	1070	8080	13300	45700	7300	2540	3090	1930
22	1630	1480	660	1210	1560	7850	13400	35200	6860	2790	2540	1800
23	1610	1460	700	951	2010	8870	12500	26100	6480	2660	2610	1670
24	1640	1440	640	1100	2370	11500	11100	20300	6030	2640	2430	1590
25	1650	1400	940	917	1640	14000	9840	16900	5680	2490	2350	1550
26	1610	1400	1400	912	1540	15500	8860	15400	5360	2690	2220	1510
27	1650	1450	1300	890	1510	15400	10300	14800	4980	2180	2090	1450
28	1630	1540	1500	840	1450	13800	13600	13800	4660	2060	2010	1440
29	1600	1510	1700	827	---	12200	21400	13600	4450	2150	1920	1380
30	1610	1320	1500	848	---	10300	25500	14400	4190	2130	1830	1330
31	1610	---	1300	804	---	9160	---	16600	---	2180	1760	---
TOTAL	57060	46010	38833	32387	28905	231160	345790	589280	353820	86080	97590	52370
MEAN	1841	1534	1253	1045	1032	7457	11530	19010	11790	2777	3148	1746
MAX	2460	1880	1700	1400	2370	15500	25500	45700	34800	3900	8370	2770
MIN	1590	1320	640	804	640	1960	5030	9360	4190	2060	1520	1330
AC-FT	113200	91260	77030	64240	57330	458500	685900	1169000	701800	170700	193600	103900
CFSM	.36	.30	.24	.20	.20	1.45	2.24	3.69	2.29	.54	.61	.34
IN.	.41	.33	.28	.23	.21	1.67	2.50	4.26	2.56	.62	.71	.38
CAL YR 1990	TOTAL 1351758	MEAN 3703	MAX 45000	MIN 230	AC-FT 2681000	CFSM .72	IN. 9.77					
WTR YR 1991	TOTAL 1959285	MEAN 5368	MAX 45700	MIN 640	AC-FT 3886000	CFSM 1.04	IN. 14.16					

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 mi².

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 encoder. 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: Dec. 2-5 and Mar. 4. Records good except those for estimated daily discharges, which are fair. Flow regulated by city hydroelectric dam 1/2 mile upstream since June 1979. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U. S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--89 years, 3,503 ft³/s, 7.31 in/yr, 2,538,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 73,000 ft³/s Mar. 31, 1961, gage height, 19.66 ft; maximum gage height, 20.0 ft Mar. 18, 1929; minimum observed discharge 28 ft³/s Oct. 31, 1989, caused by accidental gate operations upstream; minimum daily, 140 ft³/s Nov. 18, 1989, caused by accidental gate operations.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1851 reached a stage of about 20 ft, discharge, 65,000 ft³/s, estimated.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 12,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 2	1715	27,600	10.15	May 11	1630	25,000	9.75
Mar. 28	1545	24,600	9.66	May 23	1245	*46,100	*15.26
Apr. 16	0945	29,100	10.83	June 4	1100	37,900	13.22
May 2	0430	32,800	11.86	June 19	0600	18,200	8.33

Minimum daily discharge, 914 ft³/s Dec. 24.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2650	2030	1780	1760	1120	3510	14200	27900	28400	4980	2330	1810
2	2630	2010	1750	1720	1100	11000	12200	32000	28600	4650	2230	1780
3	2780	1980	1730	1930	1090	13500	10500	28000	31600	4340	2190	1750
4	3120	2110	1710	1560	1130	10500	9380	24100	37000	4050	2120	2110
5	3000	2110	1250	1530	1210	8860	8500	21900	32400	3770	1750	1670
6	3100	2240	1440	1560	1300	7140	7850	20000	25900	3640	1980	1570
7	3000	2020	1610	1600	1220	5810	7210	18400	22700	3470	2640	1530
8	2910	2170	2080	1490	1420	5750	6850	18600	22600	3260	4420	1540
9	2680	2220	1930	1490	1820	5620	7130	20300	22800	3050	5690	1540
10	2680	2250	2050	1520	2090	5650	9130	22800	20700	3070	4440	1530
11	2630	2140	1870	1480	1950	5370	9740	24500	19100	2930	4860	1450
12	2570	2060	1900	1460	1800	5230	9960	23100	16300	2830	6670	1610
13	2520	2140	2030	1440	1780	6520	16300	20100	13800	2940	8700	2100
14	2460	2070	1980	1500	1670	6630	20800	18500	13300	3230	8710	2420
15	2420	1970	2080	1560	1910	6720	27200	19100	13600	3460	6270	2670
16	2370	2000	2050	1580	1480	7860	28100	17100	13700	3230	5070	3050
17	2370	1970	2050	1560	1070	8850	24700	14900	14100	3120	4240	3100
18	2280	1940	2120	1520	1430	11100	22800	15900	16700	2880	3790	3060
19	2220	1890	2130	1470	1820	11100	22100	17600	18000	2680	3440	2900
20	2190	1850	2040	1490	1990	11900	20400	23300	15900	2490	3250	2730
21	2250	1820	1590	1640	2940	12800	18300	34100	13400	2380	3180	2510
22	2230	1920	945	1600	4390	12100	16900	43400	11300	2460	3180	2350
23	2230	1940	1040	1320	4310	11700	17100	45500	9890	2740	2960	2160
24	2200	1870	914	1410	4250	12600	17100	40600	8920	2600	2820	2060
25	2180	1780	1440	1450	3870	13800	16100	33100	8270	2520	2740	2000
26	2080	1820	1990	1420	3450	15200	14600	27300	7470	2880	2440	1780
27	2240	2180	2180	1420	2980	20000	13400	23300	6870	2500	2460	1840
28	2110	1740	2040	1210	2840	24300	14500	21200	6290	2470	2220	1740
29	2080	1910	2060	1280	---	23000	16600	20500	5850	2270	2240	1740
30	2060	1910	2300	1440	---	20000	19200	20800	5380	2270	2000	1660
31	2060	---	2030	1320	---	17000	---	21500	---	2250	1850	---
TOTAL	76300	60060	56109	46730	59430	341120	458850	759400	510840	95410	112880	61760
MEAN	2461	2002	1810	1507	2122	11000	15290	24500	17030	3078	3641	2059
MAX	3120	2250	2300	1930	4390	24300	28100	45500	37000	4980	8710	3100
MIN	2060	1740	914	1210	1070	3510	6850	14900	5380	2250	1750	1450
AC-FT	151300	119100	111300	92690	117900	676600	910100	1506000	1013000	189200	223900	122500
CFSM	.38	.31	.28	.23	.33	1.69	2.35	3.76	2.62	.47	.56	.32
IN.	.44	.34	.32	.27	.34	1.95	2.62	4.34	2.92	.55	.65	.35
CAL YR 1990	TOTAL 1841951	MEAN 5046	MAX 44500	MIN 253	AC-FT 3654000	CFSM .78	IN. 10.53					
WTR YR 1991	TOTAL 2638889	MEAN 7230	MAX 45500	MIN 914	AC-FT 5234000	CFSM 1.11	IN. 15.08					

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 mi².

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

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1708: 1956.

GAGE.--Water-stage encoder. 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. 24 to Feb. 21 and Mar. 30, 31. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--52 years, 4,762 ft³/s, 8.31 in/yr, 3,450,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 70,800 ft³/s Apr. 2, 1961, gage height, 16.62 ft; maximum gage height, 16.85 ft Apr. 12, 1965; minimum daily discharge, 250 ft³/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 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 3	0915	16,900	12.58	May 4	1400	29,400	14.14
Mar. 29	2400	27,800	14.00	May 25	1600	*46,800	*15.45
Apr. 18	0715	26,500	13.88	June 6	1600	33,900	14.50

Minimum discharge, 913 ft³/s Dec. 23.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3100	2540	2340	2200	1450	3710	21200	17600	23100	6970	3020	2630
2	3010	2490	2280	1950	1400	10100	17200	19800	25000	6580	2970	2640
3	3020	2450	2170	2100	1350	16400	14400	24000	28100	6220	3030	2610
4	3150	2620	2130	1950	1400	15500	12700	28500	27800	5870	2810	2540
5	3430	2860	1830	1900	1550	12000	11600	27700	29300	5630	2820	2590
6	3520	2870	1720	1950	1500	10100	10700	24600	32800	5390	2620	2570
7	3390	2750	1510	1950	1700	8660	10000	21800	29900	5180	2450	2350
8	3410	2700	1750	1900	1900	7230	9430	20000	24400	4960	3240	2270
9	3330	2720	1950	1900	2350	6680	9150	18700	21600	4790	4390	2250
10	3240	2760	2220	1900	2500	6460	9310	18700	21100	4550	5970	2230
11	3030	2830	2160	1850	2250	6400	10200	19900	20800	4430	5200	2230
12	3000	2760	2300	1900	2150	6420	11000	21400	19000	4390	5070	2140
13	2930	2560	2250	1800	2100	7830	11100	22400	17000	4230	5930	2200
14	2880	2600	2360	1850	1950	7990	14800	22000	14500	4180	7440	2390
15	2830	2510	2500	1850	1900	8310	18400	19800	13600	4290	8030	2820
16	2740	2450	2780	1900	1700	8920	21500	19300	13400	4610	6930	2990
17	2720	2390	2910	1900	1500	10900	25100	19000	13100	4480	6050	3240
18	2740	2340	2940	1900	1700	14900	25900	18800	13000	4370	5370	3440
19	2720	2300	3020	1900	2500	15400	24300	19200	14100	4160	4790	3440
20	2600	2250	2950	1850	3500	13400	22900	18100	15400	3930	4430	3330
21	2560	2230	2930	1800	4500	13000	22300	19000	14800	3710	4180	3260
22	2550	2250	2030	1600	5670	13400	21100	21900	12900	3560	4070	3140
23	2590	2210	1040	1700	6430	13800	19000	29500	11600	3420	4020	2940
24	2590	2230	1200	1800	5590	13700	18100	42500	10500	3640	3890	2820
25	2580	2180	1500	1700	5060	14000	18100	46100	9840	3660	3660	2660
26	2550	2080	2000	1650	4620	14600	17600	43500	9360	3470	3600	2600
27	2510	2180	2350	1650	4290	16200	16400	36600	8810	3550	3410	2480
28	2570	2650	2500	1600	3840	19300	14800	29800	8310	3540	3290	2370
29	2530	2630	2350	1500	---	23300	15000	24100	7820	3480	3120	2350
30	2540	2340	2300	1600	---	25100	16100	22000	7350	3190	3040	2260
31	2570	---	2400	1500	---	23600	---	21400	---	3020	2950	---
TOTAL	88930	74730	68670	56500	78350	387310	489390	757700	518290	137450	131790	79780
MEAN	2869	2491	2215	1823	2798	12490	16310	24440	17280	4434	4251	2659
MAX	3520	2870	3020	2200	6430	25100	25900	46100	32800	6970	8030	3440
MIN	2510	2080	1040	1500	1350	3710	9150	17600	7350	3020	2450	2140
AC-FT	176400	148200	136200	112100	155400	768200	970700	1503000	1028000	272600	261400	158200
CFSM	.37	.32	.28	.23	.36	1.60	2.10	3.14	2.22	.57	.55	.34
IN.	.42	.36	.33	.27	.37	1.85	2.34	3.62	2.48	.66	.63	.38
CAL YR 1990	TOTAL 2259254	MEAN 6190	MAX 55000	MIN 370	AC-FT 4481000	CFSM .80	IN .10.80					
WTR YR 1991	TOTAL 2868890	MEAN 7860	MAX 46100	MIN 1040	AC-FT 5690000	CFSM 1.01	IN 13.71					

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DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4740	3710	4120	3200	2400	6650	32400	27000	31500	15800	5210	3580
2	4580	3660	4030	3100	2350	14100	29100	26600	34200	15100	5020	3400
3	4610	3630	4030	3300	2450	25900	25500	26400	38800	14300	4870	3350
4	4690	3780	3800	3100	2600	27100	22800	29400	42600	13400	4760	3390
5	4900	4270	3790	3000	3000	22700	20900	32900	42700	12700	4630	3440
6	5170	4710	3430	2800	3600	18800	19500	31900	45100	12100	4600	3400
7	4950	4590	3320	2700	4200	17300	18000	30100	48800	11500	4450	3130
8	4930	4460	3260	2650	4800	15100	16700	28900	44700	11300	4410	2940
9	5010	4290	3460	2550	5400	12800	15600	27200	38700	11100	5530	2880
10	4970	4240	3720	2500	6000	11300	15600	25800	35600	10900	6630	2890
11	4790	4240	3830	2500	6600	9900	16300	26000	35000	10700	7030	2840
12	4700	4230	4330	2600	7600	9200	16900	27200	34400	10600	6450	2780
13	4630	4090	4850	2600	7200	11800	17000	28800	32700	10100	6810	2690
14	4560	3940	5160	2800	6700	14500	20700	29800	30700	9640	8090	2820
15	4500	3990	5320	3100	6200	14200	24600	28300	28400	9370	9150	3170
16	4350	3830	5640	2950	6000	14200	27000	26100	27900	9150	9040	3540
17	4120	3810	6100	2800	5000	15900	29600	25900	27400	9140	8140	3690
18	4010	3870	6220	2700	4100	21800	30400	26000	26800	8580	7350	3910
19	4080	3830	6400	2600	4400	26800	30600	26400	26800	7820	6620	4180
20	3970	3820	6150	2800	5200	25800	29200	25800	28000	7080	6100	4680
21	3860	3800	5000	3200	6400	22600	28700	24800	28500	6610	5700	4500
22	3820	3750	3700	2800	7400	22200	28600	26400	26900	6230	5170	4370
23	3840	3660	2900	2650	9400	24200	28200	29700	24600	5730	5010	4140
24	3850	3680	2600	2850	8500	25400	27700	36400	22700	5690	4940	3790
25	3840	3650	2800	2700	8030	25100	27500	45700	20800	5860	4720	3600
26	3820	3590	2900	2600	7700	24700	28000	49100	19700	5760	4600	3460
27	3760	3620	3400	2700	7500	25800	27900	47600	18900	5670	4610	3430
28	3760	4140	3300	2900	7170	28100	26600	42100	18100	5740	4460	3300
29	3820	5000	3600	2900	---	31700	26200	36200	17300	5600	4230	3260
30	3710	4580	3900	2750	---	33400	25900	31800	16400	5520	4010	3120
31	3700	---	3500	2500	---	34100	---	30200	---	5350	3800	---
TOTAL	134040	120460	128560	86900	157900	633150	733700	956500	914700	284140	176140	103670
MEAN	4324	4015	4147	2803	5639	20420	24460	30850	30490	9166	5682	3456
MAX	5170	5000	6400	3300	9400	34100	32400	49100	48800	15800	9150	4680
MIN	3700	3590	2600	2500	2350	6650	15600	24800	16400	5350	3800	2690
AC-FT	265900	238900	255000	172400	313200	1256000	1455000	1897000	1814000	563600	349400	205600
CAL YR 1990	TOTAL 3842323		MEAN 10530	MAX 76000		MIN 600	AC-FT 7621000					
WTR YR 1991	TOTAL 4429860		MEAN 12140	MAX 49100		MIN 2350	AC-FT 8787000					

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, 920 microsiemens Dec. 17, 1988; minimum daily, 168 microsiemens June 21, 1990.

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, 604,000 tons June 20, 1990; minimum daily, 4.7 tons Dec. 23, 24, 1989.

EXTREMES FOR CURRENT YEAR.--

SEDIMENT CONCENTRATIONS: Maximum daily mean, 2,710 mg/L Mar. 2; minimum daily mean, 8 mg/L Jan. 16, 23.

SEDIMENT LOADS: Maximum daily, 181,000 tons Mar. 3; minimum daily, 57 tons Jan. 23.

SPECIFIC CONDUCTANCE MICROSIEMENS/CM AT 25 DEG C, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	487	---	760	---	---	521	459	421	---	---	---
2	---	466	705	760	---	330	556	463	424	---	---	483
3	---	472	479	763	---	327	561	463	428	---	516	489
4	---	---	463	799	---	---	---	458	---	---	528	467
5	---	---	460	---	435	---	---	459	438	519	520	---
6	645	488	484	---	422	---	---	---	432	512	504	---
7	647	485	---	---	426	---	---	---	443	536	---	---
8	643	---	---	723	426	---	---	---	---	---	---	447
9	593	---	474	615	---	---	606	---	---	---	---	457
10	588	---	466	584	---	---	600	479	---	533	---	457
11	579	---	464	663	431	---	608	485	---	533	---	458
12	578	511	---	622	434	---	597	489	---	---	---	446
13	591	477	---	539	433	---	588	---	---	---	---	478
14	606	485	483	604	431	---	579	529	---	---	447	566
15	567	497	490	677	---	---	494	508	501	---	443	574
16	552	510	629	600	---	---	---	---	503	---	444	---
17	---	395	---	---	---	464	---	---	482	522	---	---
18	---	508	---	---	423	448	---	501	479	516	---	---
19	---	---	---	---	415	---	---	490	---	492	---	---
20	516	536	686	---	395	---	---	490	---	---	483	---
21	536	---	659	---	400	---	---	---	485	---	---	---
22	533	512	638	726	---	---	---	---	---	---	---	582
23	---	---	---	---	---	---	---	391	---	---	479	585
24	---	---	---	---	---	486	---	391	---	---	471	---
25	456	---	650	---	---	480	---	---	---	---	470	---
26	---	---	627	---	449	---	---	---	526	---	470	---
27	---	513	---	---	452	---	530	---	516	---	---	---
28	---	525	---	---	---	466	535	507	514	---	470	622
29	---	520	---	---	---	471	524	513	---	---	470	605
30	470	---	---	---	---	503	---	516	---	---	---	596
31	462	---	---	---	---	523	---	---	---	---	---	---

IOWA RIVER BASIN

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05465500 IOWA RIVER AT WAPELLO, IA--Continued

WATER QUALITY RECORDS

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	11.0	---	.5	---	---	11.0	15.0	25.5	---	---	---
2	---	12.0	.5	.5	---	2.0	11.0	15.0	25.5	---	---	25.0
3	---	12.0	3.0	---	---	2.0	11.0	14.0	26.0	---	24.0	24.0
4	---	---	2.5	.0	---	---	---	14.5	---	---	24.0	24.0
5	---	---	2.5	---	.5	---	---	15.0	26.0	31.0	---	---
6	15.0	8.0	2.0	---	.5	---	---	---	26.0	31.0	---	---
7	15.0	7.0	---	---	.5	---	---	---	26.0	7.0	---	---
8	14.5	---	---	---	.5	---	---	---	---	---	---	24.0
9	13.0	---	3.5	.5	---	---	13.0	---	---	---	---	24.5
10	11.0	---	4.0	---	---	---	13.0	17.0	---	31.0	---	25.0
11	9.0	---	4.0	.5	.5	---	13.0	18.5	---	31.0	---	26.0
12	12.5	7.0	---	.5	.5	---	13.0	19.0	---	---	---	26.5
13	13.0	7.0	---	.5	.5	---	13.0	---	---	---	---	27.0
14	13.0	7.0	3.0	.5	.5	---	13.0	21.0	---	---	26.0	26.5
15	14.0	7.0	3.0	.5	---	---	12.5	22.0	26.0	---	26.5	26.5
16	14.0	6.5	3.0	.5	---	---	---	---	27.0	---	27.0	---
17	---	7.0	---	---	---	4.5	---	---	27.0	29.0	---	---
18	---	7.0	---	.0	.5	5.0	---	21.0	27.0	29.0	---	---
19	---	---	---	---	.5	---	---	20.0	---	30.0	---	---
20	11.5	7.5	1.5	---	1.0	---	---	20.0	---	---	26.5	---
21	11.0	---	.5	---	1.0	---	---	21.0	27.0	---	---	---
22	11.0	8.0	.5	---	---	---	---	21.0	---	---	---	23.0
23	---	---	---	---	---	---	---	23.0	---	---	26.0	23.0
24	---	---	---	---	---	8.0	---	24.0	---	---	27.0	---
25	11.0	---	.5	---	---	8.0	---	---	---	---	27.0	---
26	---	---	.5	---	1.5	---	---	---	27.0	---	27.0	---
27	---	6.5	---	---	1.5	---	16.0	---	27.0	---	---	---
28	---	6.0	---	---	---	8.0	16.0	23.0	27.0	---	27.0	15.0
29	---	5.0	---	---	---	9.0	16.0	24.0	---	---	27.0	14.5
30	11.0	---	---	---	---	10.0	---	25.0	---	---	---	14.0
31	11.0	---	---	---	---	10.0	---	---	---	---	---	---

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MEAN CONCENTRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/ DAY)
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	37	467	102	1020	109	1210	35	302	10	65	197	3540
2	35	434	94	924	104	1130	32	268	12	76	2710	111000
3	37	456	104	1020	111	1200	28	249	14	93	2600	181000
4	45	576	107	1090	126	1290	24	201	30	211	1210	88800
5	58	768	118	1370	125	1280	19	154	63	510	582	36000
6	57	788	126	1600	113	1040	15	113	75	729	431	21900
7	48	636	126	1560	114	1020	12	87	74	839	376	17600
8	43	574	125	1500	110	965	10	72	71	920	329	13400
9	53	723	116	1340	122	1140	12	83	79	1150	269	9240
10	44	589	104	1190	126	1270	43	290	72	1170	236	7190
11	43	556	97	1110	120	1240	9	61	55	980	210	5600
12	48	611	97	1110	142	1670	14	98	82	1680	391	9860
13	49	611	91	1000	164	2160	10	70	74	1440	1050	34300
14	43	533	91	973	157	2190	28	212	85	1540	1240	48500
15	52	630	132	1420	139	1990	16	134	95	1590	817	31500
16	69	812	125	1300	70	1070	8	64	89	1440	733	28200
17	66	732	140	1440	55	905	16	121	69	931	921	39500
18	65	705	131	1370	49	829	18	131	56	620	936	55000
19	82	903	120	1240	53	914	12	84	58	689	972	70400
20	83	887	129	1330	47	773	15	113	169	2370	874	61000
21	61	634	126	1290	95	1280	18	156	152	2630	707	43300
22	48	497	112	1130	165	1650	10	76	117	2340	598	36000
23	46	474	111	1100	85	666	8	57	141	3580	521	34000
24	73	758	111	1100	55	386	9	69	154	3530	459	31600
25	109	1130	109	1080	39	295	10	73	103	2240	446	30300
26	114	1180	107	1030	44	345	10	70	91	1890	422	28200
27	108	1100	107	1050	52	477	14	102	120	2440	667	46700
28	99	1010	124	1390	47	419	13	102	153	2950	975	74300
29	104	1070	127	1710	44	428	13	102	---	---	986	84200
30	99	994	116	1440	40	421	12	89	---	---	591	53300
31	98	978	---	---	37	350	11	74	---	---	251	23100
TOTAL	---	22816	---	37227	---	32003	---	3877	---	40643	---	1358530

05465500 IOWA RIVER AT WAPELLO, IA--Continued

WATER QUALITY RECORDS

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	212	18500	352	25600	696	59300	198	8460	68	960	19	182
2	253	19800	327	23500	865	79800	162	6640	61	832	37	344
3	276	19000	304	21600	416	43100	130	5010	54	706	67	604
4	280	17200	180	14200	282	32500	102	3710	43	559	40	364
5	268	15100	182	16200	252	29000	91	3130	42	525	57	528
6	261	13700	119	10300	262	31900	108	3520	52	641	75	687
7	256	12400	92	7450	225	29600	111	3450	49	592	62	526
8	259	11600	77	5960	201	24200	111	3390	46	543	51	405
9	350	14700	63	4670	191	19900	112	3360	59	892	41	318
10	326	13700	52	3640	217	20800	113	3310	155	2860	48	377
11	373	16400	72	5040	315	29800	112	3220	196	3720	48	367
12	297	13600	153	11200	284	26400	107	3050	145	2530	44	330
13	291	13400	215	16700	232	20500	103	2830	157	2910	33	238
14	375	21200	130	10500	316	26200	116	3020	245	5350	44	339
15	585	39100	91	6880	323	24700	114	2890	228	5680	65	559
16	808	59000	132	9280	325	24500	113	2780	183	4460	64	615
17	1040	83500	177	12400	242	17800	111	2740	150	3300	43	428
18	754	61900	266	18700	241	17400	111	2560	127	2520	36	379
19	234	19400	436	31000	350	25400	107	2250	112	2000	40	456
20	177	13900	482	33500	307	23200	103	1980	102	1670	93	1180
21	157	12200	305	20500	253	19500	102	1820	97	1490	69	839
22	148	11400	220	15700	233	16900	101	1700	78	1090	61	717
23	146	11100	213	17100	222	14800	100	1540	68	923	56	630
24	140	10500	212	20900	209	12800	98	1510	63	839	53	548
25	202	15000	217	26700	196	11100	97	1530	34	429	51	495
26	408	30800	221	29300	201	10600	96	1490	34	421	62	584
27	550	41400	224	28800	215	11000	95	1450	35	430	48	445
28	605	43500	193	21900	224	10900	94	1460	25	305	31	278
29	551	39000	243	23700	225	10500	91	1380	31	359	41	363
30	413	28800	236	20200	218	9630	84	1250	22	240	31	261
31	---	---	312	25500	---	---	77	1120	19	196	---	---
TOTAL	---	740800	---	538620	---	733730	---	87550	---	49972	---	14386
YEAR		3660154										

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	TEMPER- ATURE WATER (DEG C) (00010)	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (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)
OCT								
23...	1600	10.0	3770		46 468	--	--	--
MAR								
04...	1345	1.5	27400		1110 82100	42	47	54
MAY								
28...	1445	24.5	41800		179 20200	--	--	--
JUN								
25...	1430	25.5	20800		145 8140	44	48	53
AUG								
20...	1315	25.0	5900		107 1700	--	--	--

05465500 IOWA RIVER AT WAPELLO, IA--Continued

WATER QUALITY RECORDS

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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)
OCT 23...	--	--	--	--	--	--	98
MAR 04...	66	89	91	95	100	--	--
MAY 28...	--	--	--	--	--	--	59
JUN 25...	68	90	92	97	100	--	--
AUG 20...	--	--	--	--	--	--	98

PARTICLE-SIZE DISTRIBUTION OF SURFACE BED MATERIAL, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	NUMBER OF SAM- PLING POINTS (COUNT)	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 23...	1600	5	0	1	7	39	81	94	98	99	100
MAR 04...	1345	5	--	0	9	74	97	99	99	100	--
APR 19...	1000	5	--	0	3	38	87	97	99	100	--
JUN 25...	1430	5	0	1	6	45	88	96	99	100	--
AUG 20...	1315	6	0	3	14	62	91	98	100	--	--

IOWA RIVER BASIN

05465500 IOWA RIVER AT WAPELLO, IA--Continued

WATER QUALITY RECORDS

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (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 (NTU) (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)
OCT	23...1600	3770	510	8.7	10.0	11.0	11	15.8	142	751	K25	K70
DEC	11...1530	3790	610	8.6	3.0	13.0	4.0	15.3	116	745	120	210
MAR	04...1345	27400	355	7.7	1.5	5.0	220	12.7	93	743	5400	4000
APR	19...1000	32200	450	8.0	10.5	7.5	58	12.1	110	750	450	360
JUN	25...1430	20800	575	8.3	25.5	28.0	37	7.4	92	750	240	200
AUG	20...1315	5900	548	8.8	25.0	24.0	18	10.6	131	749	200	180

DATE	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)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)
OCT	23... 230	53	24	19	15	0.5	2.9	170	17	174	48	35
DEC	11... 290	77	24	20	13	0.5	2.9	214	10	242	41	25
MAR	04... 150	40	11	8.1	10	0.3	6.3	104	0	127	26	17
APR	19... 220	61	16	7.9	7	0.2	3.1	133	0	163	27	22
JUN	25... 260	73	18	7.4	6	0.2	3.1	187	0	228	27	18
AUG	20... 260	69	22	15	11	0.4	3.5	192	11	213	43	29

DATE	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 CONSTITUENTS, 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)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)
OCT	23... 0.30	0.68	306	304	0.42	3110	--	4.10	0.040	0.020	<0.010	2.1
DEC	11... 0.30	5.4	384	351	0.52	3930	1.7	5.80	0.020	0.070	0.070	1.8
MAR	04... 0.30	9.5	216	207	0.29	16000	2.1	5.50	0.050	0.650	0.600	2.7
APR	19... 0.10	10	294	277	0.40	25600	1.6	11.0	0.040	0.060	0.070	1.7
JUN	25... <0.10	13	308	309	0.42	17300	0.88	8.40	0.080	0.020	0.020	0.90
AUG	20... 0.30	11	348	330	0.47	5540	--	4.70	0.020	0.020	<0.010	1.3

05465500 IOWA RIVER AT WAPELLO, IA--Continued

WATER QUALITY RECORDS

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	SEDI- MENT, CHARGE, SUS- PENDED (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)	SED. SUSP. FALL DIAM. % FINER THAN .062 MM (70342)	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)
OCT 23...	<0.010	<0.010	0.130	46	468	98	--	<1	<10	87	<0.5
DEC 11...	0.070	0.080	0.200	--	--	--	--	--	--	--	--
MAR 04...	0.220	0.260	0.400	1110	82100	--	89	<1	110	170	<0.5
APR 19...	0.090	0.130	0.280	375	32600	--	--	1	50	97	<0.5
JUN 25...	0.140	0.160	0.270	145	8140	--	90	--	--	--	--
AUG 20...	0.110	0.160	0.300	107	1700	98	--	3	30	100	<0.5A

DATE	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)	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)
OCT 23...	<1.0	2	<3	2	19	1	10	5	<0.1	<10	3
DEC 11...	--	--	--	--	--	--	--	--	--	--	--
MAR 04...	<1.0	<1	<3	5	110	1	<4	35	<0.1	<10	3
APR 19...	<1.0	<1	<3	1	37	<1	6	3	<0.1	<10	1
JUN 25...	--	--	--	--	--	--	--	--	--	--	--
AUG 20...	<1.0	<1	<3	5	21	2	7	2	<0.1	<10	<1

DATE	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)	ATRA- ZINE, TOTAL (UG/L) (39630)	CYAN- AZINE TOTAL (UG/L) (81757)	METRI- BUZIN IN WHOLE WATER (UG/L) (81408)	ALA- CHLOR TOTAL RECOVER (UG/L) (77825)	METOLA- CHLOR IN WHOLE WATER (UG/L) (39356)	TRI- FLURA- LIN TOTAL RECOVER (UG/L) (39030)
OCT 23...	<1	<1.0	170	<6	10	0.19	<0.10	<0.10	<0.10	<0.10	<0.10
DEC 11...	--	--	--	--	--	--	--	--	--	--	--
MAR 04...	<1	<1.0	93	<6	76	0.38	<0.10	<0.10	<0.10	<0.10	<0.10
APR 19...	1	<1.0	120	<6	9	0.26	<0.10	<0.10	<0.10	0.40	<0.10
JUN 25...	--	--	--	--	--	0.57	<0.19	<0.10	<0.10	0.47	<0.10
AUG 20...	1	<1.0	160	<6	15	--	--	--	--	--	--

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 Kelgley Branch, 5.2 mi upstream from Squaw Creek, and at mile 228.1 upstream from mouth of Skunk River.

DRAINAGE AREA.--315 mi².

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 IA-67-1: 1965. WDR IA-74-1: 1973 (P).

GAGE.--Water-stage encoder. 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: Dec. 22 to Feb. 11 and Sept. 14, 15. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service Limited Automatic Remote Collector at station.

AVERAGE DISCHARGE.--66 years (water years 1921-27, 1933-91), 166 ft³/s, 7.10 in/yr, 120,300 acre-ft/yr; median of yearly mean discharges, 130 ft³/s, 5.6 in/yr, 94,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,630 ft³/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 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 2	2130	1,540	5.08	Apr. 14	1615	3,360	7.15
Mar. 18	0600	1,970	5.56	Apr. 19	1430	1,910	5.50
Mar. 23	2345	1,780	5.33	Apr. 27	2400	1,820	5.39
Mar. 28	0145	1,500	5.06	May 16	1700	4,000	7.86
Apr. 8	2315	1,670	5.24	May 19	0600	3,510	7.30
Apr. 13	0145	3,260	7.03	June 4	1400	*4,700	*8.73

Minimum discharge, 4.1 ft³/s Sept. 6.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	23	23	29	8.4	4.8	361	436	867	1210	192	23	9.2
2	24	26	28	6.8	5.8	1450	382	701	1250	174	22	9.1
3	41	30	22	6.4	11	1100	345	613	997	160	21	7.3
4	48	36	22	6.2	19	540	315	574	3680	151	18	6.9
5	44	38	25	6.2	18	532	290	682	3040	141	18	5.8
6	40	38	25	6.0	17	506	272	1090	1760	128	23	5.5
7	38	36	25	6.2	19	333	256	932	1090	117	21	6.3
8	36	35	26	5.8	24	199	470	746	832	107	54	6.6
9	36	32	29	5.8	33	174	1280	638	676	101	59	5.3
10	36	30	33	6.0	45	436	820	563	580	99	59	7.4
11	35	30	44	6.2	47	961	622	520	590	95	52	8.4
12	34	31	61	8.0	48	436	1900	486	608	95	42	11
13	33	31	74	10	49	1070	2950	462	563	84	34	17
14	33	31	78	11	44	690	2950	434	669	77	30	123
15	27	32	83	11	32	537	2990	487	731	71	22	118
16	25	32	73	10	34	591	1890	2720	644	64	17	89
17	26	30	68	8.8	37	1040	1350	2820	562	58	16	53
18	25	30	53	9.4	40	1940	1170	3090	496	52	18	38
19	24	31	73	11	50	1500	1800	3070	439	47	16	30
20	25	31	59	10	61	1050	1560	1850	405	45	14	26
21	27	33	25	9.0	251	846	1180	1380	388	44	13	22
22	26	32	14	9.2	591	707	953	1140	359	40	12	20
23	25	32	12	9.4	571	1430	812	949	329	36	11	18
24	25	31	16	9.5	337	1660	690	806	309	31	9.3	17
25	25	30	17	8.8	237	1150	600	748	291	29	9.0	16
26	24	29	12	8.0	206	840	556	1050	273	26	9.1	14
27	22	33	11	7.2	167	1010	1460	1120	252	24	8.2	14
28	22	32	10	7.8	152	1290	1520	795	230	29	8.8	13
29	22	26	12	6.2	---	833	1080	842	213	33	5.4	13
30	23	29	9.8	4.6	---	615	1060	1170	200	30	4.8	12
31	22	---	8.6	5.0	---	522	---	1140	---	26	8.0	---
TOTAL	916	940	1077.4	243.9	3150.6	26349	33959	34485	23666	2406	677.6	741.8
MEAN	29.5	31.3	34.8	7.87	113	850	1132	1112	789	77.6	21.9	24.7
MAX	48	38	83	11	591	1940	2990	3090	3680	192	59	123
MIN	22	23	8.6	4.6	4.8	174	256	434	200	24	4.8	5.3
AC-FT	1820	1860	2140	484	6250	52260	67360	68400	46940	4770	1340	1470
CFSM	.09	.10	.11	.02	.36	2.70	3.59	3.53	2.50	.25	.07	.08
IN.	.11	.11	.13	.03	.37	3.11	4.01	4.07	2.79	.28	.08	.09
CAL YR 1990	TOTAL 112188.5	MEAN 307	MAX 5200	MIN 2.5	AC-FT 222500	CFSM .98	IN. 13.25					
WTR YR 1991	TOTAL 128612.3	MEAN 352	MAX 3680	MIN 4.6	AC-FT 255100	CFSM 1.12	IN. 15.19					

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, Hydrologic 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 mi².

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 IA-66-1: 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. 21 to Feb. 19. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service gage-height telemeter at station.

AVERAGE DISCHARGE.--34 years (water years 1920-27, 1966-91), 131 ft³/s, 8.72 in/yr, 94,910 acre-ft/yr; median of yearly mean discharges, 100 ft³/s, 6.7 in/yr, 72,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 12,500 ft³/s June 17, 1990, gage height, 15.97 ft, from floodmark; 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 ft³/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 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,600 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 2	0600	1,620	5.97	May 18	1500	1,830	6.64
Apr. 12	1515	2,730	8.90	May 30	0915	2,570	8.56
Apr. 14	1330	2,680	8.79	June 4	1315	*3,000	*9.41
May 16	1930	1,970	7.08				

Minimum discharge, 0.51 ft³/s Sept. 9.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5.0	9.3	16	4.8	3.0	302	252	574	721	96	8.7	.65
2	5.3	15	13	3.9	3.5	1240	223	503	596	84	6.5	2.1
3	28	19	6.9	3.7	6.6	411	209	466	527	76	5.5	.92
4	15	18	11	3.6	12	290	215	436	1840	73	4.3	1.7
5	11	17	15	3.5	18	298	224	582	1130	69	3.9	1.4
6	9.0	22	14	3.7	16	282	234	764	727	63	16	1.2
7	7.3	16	13	3.6	15	199	241	602	533	56	8.7	1.0
8	8.0	15	16	3.8	20	143	507	519	432	52	70	3.3
9	8.8	18	18	4.2	60	135	912	466	368	50	62	.53
10	8.5	18	22	4.4	100	210	658	413	350	48	31	.82
11	8.6	20	30	4.8	84	457	540	385	297	48	17	8.6
12	9.3	19	44	5.3	70	213	1740	361	267	46	10	15
13	8.6	19	41	5.8	50	457	1930	340	251	42	7.7	7.0
14	8.5	17	43	6.6	40	325	2160	340	363	38	5.8	4.0
15	7.8	18	48	6.2	35	285	1760	375	384	34	4.8	6.8
16	7.7	18	38	5.6	45	359	1020	1330	299	30	4.0	7.6
17	8.1	16	41	5.1	42	783	786	1090	260	26	4.1	4.9
18	9.1	16	28	5.4	40	1200	781	1710	237	23	16	3.7
19	8.5	17	42	6.6	60	808	1340	1040	215	20	3.6	2.3
20	8.5	16	29	5.8	113	630	937	779	197	20	4.2	1.5
21	11	18	15	5.2	337	506	753	661	196	19	3.5	1.2
22	8.1	17	8.5	5.2	407	473	637	640	193	17	2.6	.99
23	8.2	17	6.9	5.4	203	1020	561	548	176	14	1.7	.87
24	8.4	16	9.2	5.3	119	902	491	503	162	12	1.6	.87
25	8.2	17	9.9	5.0	91	651	456	456	152	10	1.7	.82
26	8.0	16	6.8	4.5	92	504	444	562	142	9.3	2.0	.68
27	8.5	20	6.4	4.0	81	619	1020	500	129	8.5	1.8	.68
28	7.8	16	5.6	4.0	82	618	783	414	117	25	1.6	.88
29	8.1	14	7.0	3.5	---	456	704	645	108	17	1.4	.85
30	8.2	16	5.5	3.2	---	351	681	1900	101	13	1.8	.92
31	9.1	---	4.9	3.0	---	300	---	866	---	10	.66	---
TOTAL	284.2	510.3	614.6	144.7	2245.1	15427	23199	20770	11470	1148.8	314.16	83.78
MEAN	9.17	17.0	19.8	4.67	80.2	498	773	670	382	37.1	10.1	2.79
MAX	28	22	48	6.6	407	1240	2160	1900	1840	96	70	15
MIN	5.0	9.3	4.9	3.0	3.0	135	209	340	101	8.5	.66	.53
AC-FT	564	1010	1220	287	4450	30600	46020	41200	22750	2280	623	166
CFSM	.04	.08	.10	.02	.39	2.44	3.79	3.28	1.87	.18	.05	.01
IN.	.05	.09	.11	.03	.41	2.81	4.23	3.79	2.09	.21	.06	.02
CAL YR 1990	TOTAL 77441.15	MEAN 212	MAX 6270	MIN .19	AC-FT 153600	CFSM 1.04	IN. 14.12					
WTR YR 1991	TOTAL 76211.64	MEAN 209	MAX 2160	MIN .53	AC-FT 151200	CFSM 1.02	IN. 13.90					

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.

WATER-DISCHARGE RECORDS

DRAINAGE AREA.--803 mi².

PERIOD OF RECORD.--October 1985 to current year.

GAGE.--Water-stage encoder. Datum of gage is 770.00 ft above NGVD.

REMARKS.--Estimated daily discharges: Dec. 21 to Feb. 20, Mar. 20-26, Apr. 22, 23, Apr. 29 to May 2, and May 6, 7. Records good except those for estimated daily discharges, which are poor. U.S. National Weather Service Limited Automatic Remote Collector at station.

AVERAGE DISCHARGE.--6 years, 568 ft³/s, 9.61 in/yr, 411,500 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.-- Maximum discharge, 8,770 ft³/s June 20, 1990, gage height, 19.07 ft, from floodmark; minimum discharge, 1.2 ft³/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 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 18	unknown	3,350	14.14	May 18	0230	6,010	16.80
Apr. 16	0430	6,360	17.04	May 31	0030	3,930	14.69
Apr. 20	0400	4,220	15.25	June 6	unknown	*8,090	*18.05
Apr. 28	0600	3,280	14.04				

Minimum discharge, 35 ft³/s Sept. 10, 11.DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	117	82	87	122	74	501	1060	2100	2970	520	100	47
2	106	82	84	117	70	2430	963	1770	2970	483	93	45
3	124	89	72	110	76	2430	885	1570	2530	438	90	45
4	148	119	72	108	100	1430	827	1480	3930	409	86	45
5	142	124	102	102	150	1130	778	2080	6770	388	82	42
6	129	112	100	98	210	1030	731	2610	6960	367	110	41
7	119	112	100	95	280	908	692	2420	3890	339	107	38
8	118	111	95	90	360	705	664	1990	2690	305	172	39
9	117	113	91	86	430	610	1820	1720	2180	294	204	42
10	114	115	89	84	480	532	2000	1520	1850	280	250	39
11	113	116	98	82	450	502	1490	1370	1890	272	207	39
12	114	119	118	80	370	507	1840	1270	1560	268	158	47
13	110	118	144	80	310	1010	4180	1190	1390	254	136	55
14	109	116	146	84	280	1390	5660	1130	1670	239	122	62
15	104	114	176	88	260	1050	6010	1150	2450	223	111	76
16	102	109	187	86	240	970	5650	2160	2050	209	102	122
17	100	105	174	84	220	1370	3570	4390	1610	195	99	113
18	97	103	171	82	250	2810	2900	5550	1390	181	88	95
19	100	102	161	90	280	2900	3880	5280	1240	167	98	78
20	102	102	176	100	320	2170	3970	4640	1130	156	84	67
21	108	103	135	94	382	1870	3090	3660	1060	146	82	62
22	102	96	110	88	734	1660	2540	3520	1010	141	76	58
23	98	93	120	94	973	1910	2210	2830	944	133	70	53
24	95	92	130	90	758	2810	1890	2390	881	127	68	52
25	91	90	140	85	499	2340	1650	2110	821	118	61	50
26	90	90	135	80	411	1870	1540	2120	770	111	57	47
27	88	101	125	84	407	1700	2450	2390	710	107	53	45
28	86	98	135	90	363	2110	3140	2040	648	110	52	44
29	85	94	140	86	---	1830	2550	1820	590	121	49	42
30	84	89	138	82	---	1410	2410	3220	551	112	54	39
31	82	---	130	78	---	1200	---	3420	---	106	68	---
TOTAL	3294	3109	3881	2819	9737	47095	73040	76910	61105	7319	3189	1669
MEAN	106	104	125	90.9	348	1519	2435	2481	2037	236	103	55.6
MAX	148	124	187	122	973	2900	6010	5550	6960	520	250	122
MIN	82	82	72	78	70	501	664	1130	551	106	49	38
AC-FT	6530	6170	7700	5590	19310	93410	144900	152600	121200	14520	6330	3310
CFSM	.13	.13	.16	.11	.43	1.89	3.03	3.09	2.54	.29	.13	.07
IN.	.15	.14	.18	.13	.45	2.18	3.38	3.56	2.83	.34	.15	.08

CAL YR 1990	TOTAL	285545	MEAN	782	MAX	8510	MIN	13	AC-FT	566400	CFSM	.97	IN.	13.23
WTR YR 1991	TOTAL	293167	MEAN	803	MAX	6960	MIN	38	AC-FT	581500	CFSM	1.00	IN.	13.58

05471050 SOUTH SKUNK RIVER AT COLFAX, IA--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--April 1988 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: October 1988 to current year.

WATER TEMPERATURES: October 1988 to current year.

SUSPENDED-SEDIMENT DISCHARGE: October 1988 to current year.

REMARKS.--Records of specific conductance are obtained from suspended-sediment samples at time of analysis. Miscellaneous records of specific conductance, water temperature, and suspended-sediment discharge from May 13 to September 30, 1988 on file at the District Office in Iowa City.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum daily, 1051 microsiemens Dec. 15, 1989; minimum daily, 161 microsiemens Feb. 6 1991.

WATER TEMPERATURES: Maximum daily, 31.0°C July 7, 1989; minimum daily, 0.0°C on many days during winter periods.

SEDIMENT CONCENTRATIONS: Maximum daily mean, 2,480 mg/L Mar. 14, 1990; minimum daily mean, 2 mg/L Jan. 28, 1990, Sept. 7, 1991.

SEDIMENT LOADS: Maximum daily, 26,200 tons Apr. 13, 1991; minimum daily, 0.05 ton Jan. 7, 8, 1989.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum daily, 849 microsiemens Jan. 23; minimum daily, 161 microsiemens Feb. 6.

WATER TEMPERATURES: Maximum daily, 27.0°C, July 19.

SEDIMENT CONCENTRATIONS: Maximum daily mean, 2,310 mg/L Apr. 13; minimum daily mean, 2 mg/L Sept. 7

SEDIMENT LOADS: Maximum daily, 26,200 tons Apr. 13; minimum daily, 0.26 ton Sept. 7.

SPECIFIC CONDUCTANCE MICROSIEMENS/CM AT 25 DEG C, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	750	786	720	695	784	653	697	626	568	536	657	557
2	743	783	708	637	777	477	667	---	527	565	637	624
3	790	747	---	631	733	485	732	589	558	590	561	682
4	655	685	700	732	675	502	692	603	524	567	659	678
5	608	684	695	743	454	582	671	661	310	617	663	678
6	675	---	700	671	161	613	687	588	434	622	586	704
7	751	---	725	776	560	619	661	631	512	658	629	634
8	709	732	738	707	522	624	673	637	574	627	442	679
9	736	741	745	737	511	610	696	604	606	647	569	673
10	770	778	734	752	485	669	576	620	650	582	537	678
11	---	801	750	755	500	565	580	620	566	667	552	666
12	768	805	752	757	461	629	---	616	496	630	605	698
13	781	830	763	797	518	628	344	642	510	510	643	626
14	794	735	640	736	593	601	460	613	562	497	671	613
15	782	697	610	755	672	639	416	654	565	505	651	580
16	---	713	618	739	692	677	480	622	559	624	681	677
17	702	733	661	771	694	676	538	346	662	618	660	582
18	773	736	619	784	699	627	573	327	604	692	687	621
19	748	693	712	731	---	526	534	336	---	595	686	655
20	741	728	725	740	695	594	550	493	640	591	576	---
21	741	710	605	580	569	651	554	555	607	626	668	687
22	715	710	700	714	505	659	622	499	528	665	686	710
23	768	718	576	849	397	585	562	---	642	554	660	713
24	741	724	783	808	400	626	573	594	534	678	662	707
25	737	744	635	793	514	654	616	487	562	556	661	712
26	---	719	659	774	564	686	578	620	502	540	666	719
27	635	691	688	790	626	683	616	494	675	552	---	716
28	697	709	694	796	644	664	512	631	554	638	665	700
29	---	718	650	722	---	661	582	511	645	637	---	726
30	722	632	733	748	---	665	---	551	546	581	679	711
31	736	---	718	779	---	595	---	495	---	643	558	---

SKUNK RIVER BASIN

05471050 SOUTH SKUNK RIVER AT COLFAX, IA--Continued

WATER-QUALITY RECORDS

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	17.0	12.0	4.0	1.0	1.0	6.0	7.0	11.0	19.0	25.0	22.0	23.0
2	17.0	17.0	4.0	1.0	1.0	4.0	10.0	---	20.0	24.0	24.0	23.0
3	18.0	16.0	---	1.0	1.0	3.0	11.0	11.0	19.0	23.0	23.0	23.0
4	15.0	10.0	1.0	1.0	1.0	1.0	11.0	10.0	19.0	22.0	---	18.0
5	17.0	6.0	---	1.0	2.0	3.0	14.0	11.0	18.0	21.0	20.0	17.0
6	16.0	7.0	2.0	1.0	2.0	3.0	13.0	8.0	18.0	22.0	18.0	18.0
7	15.0	6.0	1.0	1.0	1.0	3.0	15.0	8.0	18.0	24.0	21.0	20.0
8	14.0	7.0	2.0	1.0	1.0	2.0	17.0	11.0	18.0	22.0	21.0	20.0
9	12.0	8.0	2.0	1.0	1.0	2.0	12.0	13.0	19.0	22.0	20.0	22.0
10	10.0	7.0	2.0	1.0	1.0	3.0	7.0	15.0	20.0	22.0	20.0	21.0
11	---	7.0	3.0	1.0	1.0	4.0	8.0	16.0	21.0	21.0	20.0	20.0
12	11.0	7.0	4.0	1.0	1.0	6.0	---	17.0	20.0	21.0	21.0	23.0
13	9.0	6.0	2.0	1.0	1.0	3.0	6.0	18.0	22.0	20.0	21.0	23.0
14	12.0	7.0	2.0	1.0	1.0	4.0	7.0	19.0	21.0	20.0	20.0	23.0
15	11.0	10.0	2.0	1.0	1.0	3.0	8.0	19.0	21.0	21.0	22.0	22.0
16	---	12.0	3.0	1.0	1.0	3.0	10.0	19.0	20.0	21.0	22.0	20.0
17	15.0	10.0	3.0	1.0	1.0	4.0	8.0	19.0	21.0	23.0	20.0	17.0
18	9.0	10.0	1.0	1.0	1.0	3.0	10.0	19.0	20.0	24.0	22.0	14.0
19	8.0	10.0	3.0	2.0	3.0	8.0	17.0	---	27.0	18.0	10.0	10.0
20	10.0	10.0	4.0	1.0	1.0	5.0	8.0	18.0	22.0	25.0	18.0	9.0
21	9.0	14.0	1.0	1.0	1.0	13.0	7.0	17.0	22.0	26.0	18.0	10.0
22	9.0	10.0	1.0	1.0	1.0	9.0	10.0	18.0	22.0	26.0	21.0	12.0
23	9.0	14.0	1.0	1.0	1.0	9.0	10.0	18.0	22.0	23.0	21.0	11.0
24	10.0	9.0	1.0	1.0	1.0	5.0	9.0	18.0	23.0	20.0	21.0	13.0
25	8.0	8.0	1.0	1.0	1.0	6.0	11.0	18.0	21.0	20.0	22.0	11.0
26	---	4.0	1.0	1.0	1.0	11.0	11.0	15.0	22.0	18.0	23.0	10.0
27	20.0	4.0	1.0	1.0	1.0	12.0	10.0	---	24.0	19.0	---	12.0
28	16.0	7.0	1.0	1.0	1.0	8.0	9.0	21.0	24.0	18.0	23.0	10.0
29	9.0	5.0	1.0	1.0	---	5.0	14.0	22.0	25.0	18.0	23.0	12.0
30	12.0	3.0	1.0	1.0	---	8.0	---	20.0	25.0	18.0	23.0	15.0
31	15.0	---	1.0	1.0	---	5.0	---	20.0	---	21.0	23.0	---

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)
OCTOBER			NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	10	3.3	11	2.4	10	2.5	72	24	5	1.0	337	636
2	7	2.1	12	2.6	10	2.2	66	21	5	.97	1580	9950
3	13	4.4	21	5.0	12	2.4	32	9.4	12	2.4	970	6490
4	16	6.6	14	4.4	16	3.1	19	5.6	37	10	620	2420
5	12	4.5	8	2.8	11	3.1	31	8.5	38	16	420	1280
6	10	3.6	7	2.1	8	2.2	38	10	39	22	398	1110
7	9	3.0	5	1.7	6	1.6	20	5.2	44	34	380	933
8	8	2.6	3	.77	5	1.3	17	4.1	39	38	320	612
9	6	2.0	5	1.5	5	1.1	12	2.9	29	34	136	226
10	8	2.5	3	.92	6	1.4	15	3.3	31	40	97	140
11	10	3.1	4	1.2	7	1.8	10	2.2	36	44	87	119
12	10	2.9	5	1.8	8	2.6	4	.80	28	28	87	119
13	9	2.7	6	2.0	19	7.5	4	.84	27	23	579	1990
14	10	2.8	9	2.9	35	14	5	1.2	19	14	1080	4080
15	7	1.9	15	4.6	35	17	6	1.5	64	45	633	1810
16	7	1.9	16	4.7	36	18	5	1.2	10	6.2	350	918
17	7	1.9	17	4.8	34	16	4	.93	23	14	455	1750
18	7	1.9	26	7.3	36	17	5	1.2	50	34	1850	14400
19	7	2.0	21	5.7	34	15	7	1.6	43	33	1350	10700
20	8	2.3	16	4.3	38	18	5	1.4	43	38	735	4300
21	10	2.9	16	4.5	80	29	5	1.3	54	57	600	3030
22	10	2.6	18	4.7	141	42	5	1.2	390	819	489	2190
23	6	1.7	20	5.1	100	33	5	1.3	569	1500	283	1460
24	6	1.6	12	3.1	46	16	4	.89	313	652	537	4070
25	8	1.9	6	1.5	49	19	3	.74	171	232	812	5130
26	9	2.1	6	1.4	45	16	3	.64	310	354	537	2710
27	8	2.0	16	4.4	46	16	5	1.1	73	81	418	1910
28	8	1.9	16	4.3	71	26	5	1.2	43	42	822	4770
29	9	2.0	15	3.8	84	32	4	.81	---	---	700	3530
30	13	2.8	14	3.3	45	17	3	.57	---	---	299	1130
31	15	3.3	---	---	62	22	3	.70	---	---	489	1590
TOTAL	---	82.8	---	99.59	---	415.8	---	117.32	---	4214.57	---	95503

SKUNK RIVER BASIN

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05471050 SOUTH SKUNK RIVER AT COLFAX, IA--Continued

WATER-QUALITY RECORDS

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)
APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER		
1	270	776	407	2310	653	5280	113	159	28	7.4	43	5.4
2	251	653	384	1830	657	5280	118	153	31	7.8	29	3.5
3	255	611	349	1480	461	3160	125	148	25	6.0	24	3.0
4	136	305	301	1200	1310	14400	120	132	23	5.4	22	2.7
5	121	255	613	3540	987	17700	92	96	22	4.9	15	1.7
6	117	231	587	4140	579	11000	103	102	150	49	12	1.3
7	126	235	475	3110	402	4260	88	80	130	38	2	2.6
8	125	224	340	1820	343	2490	85	70	410	199	23	2.6
9	748	4530	356	1660	325	1910	78	62	224	124	36	4.2
10	815	4470	289	1190	308	1540	69	52	194	133	28	3.0
11	423	1730	246	910	857	4440	61	45	51	29	34	3.6
12	813	4880	232	796	423	1800	81	59	49	21	49	7.1
13	2310	26200	209	673	335	1260	161	111	36	13	66	10
14	960	14600	214	653	743	3680	133	86	25	8.4	84	15
15	821	13300	261	813	1030	6850	91	55	26	7.7	92	24
16	650	9950	791	5220	425	2420	28	16	29	8.0	150	50
17	633	6080	1780	21200	245	1060	37	20	29	7.7	55	17
18	610	4790	1690	25400	240	901	32	16	26	6.2	35	9.2
19	1040	11000	1480	21100	228	765	31	14	34	9.3	10	2.1
20	839	9090	537	6820	208	635	40	17	33	7.4	8	1.4
21	516	4290	472	4720	153	438	38	15	20	4.4	15	2.5
22	527	3620	711	6800	156	425	57	22	18	3.7	13	2.0
23	438	2610	489	3760	137	350	58	21	42	7.9	10	1.4
24	317	1610	304	1970	124	295	37	13	52	9.6	12	1.6
25	336	1490	322	1830	113	251	34	11	23	3.7	7	.99
26	287	1190	342	1960	105	218	31	9.2	19	2.9	12	1.5
27	858	5880	370	2380	98	188	26	7.5	18	2.6	8	1.0
28	1000	8540	488	2680	97	170	25	7.5	18	2.5	4	.51
29	550	3790	445	2200	102	163	34	11	18	2.3	12	1.3
30	429	2790	1260	11300	108	161	28	8.4	38	6.0	12	1.3
31	---	---	838	7810	---	---	25	7.1	55	10	---	---
TOTAL	---	149720	---	153275	---	93490	---	1625.7	---	747.8	---	181.16
YEAR	499472.74											

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	TEMPER- ATURE WATER (DEG C) (00010)	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (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)
OCT								
25...	0955	6.0	89	5	1.2	--	--	--
APR								
08...	1355	17.5	671	132	239	--	--	--
15...	1215	9.0	6060	824	13500	39	42	46
MAY								
23...	1100	19.5	2920	364	5960	--	--	--
AUG								
14...	0845	22.0	120	25	8.1	--	--	--
SEP								
20...	0815	10.5	67	8	1.5	--	--	--

SKUNK RIVER BASIN

05471050 SOUTH SKUNK RIVER AT COLFAX, IA--Continued

WATER-QUALITY RECORDS

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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)
OCT 25...	--	--	--	--	--	--	83
APR 08...	--	--	--	--	--	--	76
15...	52	61	68	88	99	100	--
MAY 23...	--	68	77	96	100	--	--
AUG 14...	--	--	--	--	--	--	82
SEP 20...	--	--	--	--	--	--	86

PARTICLE-SIZE DISTRIBUTION OF SURFACE BED MATERIAL, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	NUMBER OF SAM- PLING POINTS (COUNT)	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 25...	1007	5	--	0	6	61	89	96	98	100	--
DEC 05...	1540	5	0	1	11	68	93	98	100	--	--
FEB 27...	1145	5	--	0	6	60	93	98	100	--	--
APR 08...	1500	5	0	1	10	72	94	98	99	100	--
MAY 23...	0920	5	--	0	16	82	98	99	100	--	--
JUL 12...	1300	5	0	1	12	74	93	97	98	100	--
AUG 14...	0959	5	0	1	11	73	94	96	97	99	100
SEP 20...	0815	5	2	3	10	70	92	96	99	99	100

05471200 INDIAN CREEK NEAR MINGO, IA

LOCATION.--Lat 41°48'17", long 93°18'36", in NW1/4 NW1/4 secs. 28, T.81 N., R.21 W., Jasper County, Hydrologic Unit 07080105, 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 mi².

PERIOD OF RECORD.--May 1958 to September 1975; October 1985 to current year.

REVISED RECORDS.--WSP 1728: 1958 (M), 1959 (M).

GAGE.--Water-stage encoder. Datum of gage is 810.47 ft above NGVD.

REMARKS.--Estimated daily discharges: Dec. 3-9, Dec. 21 to Feb. 21, and Aug. 16, 17. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service Limited Automatic Remote Collector at station.

AVERAGE DISCHARGE.--23 years (water years 1959-75, 1986-91), 195 ft³/s, 9.60 in/yr, 141,300 acre-ft/yr; median of yearly mean discharges, 180 ft³/s, 8.9 in/yr, 130,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 23,500 ft³/s June 4, 1991, gage height, 19.16 ft, from rating curve extended above 13,000 ft³/s on the basis of contracted-opening and flow-over-road measurement at peak flow; no flow part of each day Aug. 13, 16-19, 1989.

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 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 2	0730	2,720	11.77	May 17	1045	2,610	11.62
Mar. 18	0400	1,510	9.62	May 21	2145	1,660	9.97
Apr. 13	0730	1,700	10.07	June 4	1945	*23,500	*19.16
Apr. 15	0015	2,980	12.13	June 11	0245	3,210	12.44
Apr. 19	0930	1,880	10.46	June 15	1015	2,120	10.90

Minimum discharge 3.4 ft³/s, Sept. 7, 8.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	24	25	32	52	27	228	265	578	570	188	17	5.6
2	24	24	30	48	26	1880	242	494	569	172	16	4.5
3	32	29	28	45	26	624	225	449	497	154	17	4.2
4	48	56	30	42	40	370	212	423	8300	142	17	4.0
5	50	61	42	38	60	304	201	728	10800	133	15	3.9
6	48	68	34	35	80	283	192	1020	4170	122	18	3.9
7	45	66	46	33	110	214	183	782	1820	109	20	3.7
8	42	58	44	31	130	177	177	640	1450	95	34	5.1
9	41	65	42	30	160	150	599	561	1210	86	40	5.2
10	39	72	42	29	190	129	687	502	1360	82	34	6.2
11	37	83	52	29	170	124	497	447	1900	76	23	5.3
12	37	86	85	28	150	127	894	415	1020	73	18	6.1
13	35	80	95	28	130	229	1550	386	839	69	15	14
14	34	80	96	29	115	227	2170	370	1170	60	13	16
15	33	76	105	31	105	203	2270	394	1650	53	12	10
16	31	71	95	35	90	229	1200	1070	1190	48	11	7.7
17	30	61	90	33	84	622	907	2290	890	46	10	13
18	29	58	89	31	100	1330	847	1850	736	42	12	23
19	30	59	98	33	120	790	1710	1200	633	38	10	20
20	29	56	88	37	150	609	1250	918	560	34	9.0	20
21	33	55	80	35	200	521	967	970	501	32	9.2	19
22	35	53	66	33	319	445	777	1040	452	31	8.2	17
23	29	48	60	35	293	531	660	776	404	28	9.3	15
24	27	52	62	33	191	667	556	653	363	25	7.5	14
25	26	49	66	31	131	538	496	565	327	23	6.8	12
26	25	44	80	30	125	446	457	691	297	20	6.2	9.6
27	24	46	68	30	123	448	1060	532	266	19	5.5	8.6
28	23	43	76	32	115	468	1010	462	239	22	5.2	13
29	25	33	66	31	---	389	809	431	220	25	4.9	11
30	23	33	60	29	---	327	707	541	202	22	14	8.7
31	23	---	54	28	---	298	---	549	---	19	14	---
TOTAL	1011	1690	2001	1044	3560	13927	23777	22727	44605	2088	451.8	309.3
MEAN	32.6	56.3	64.5	33.7	127	449	793	733	1487	67.4	14.6	10.3
MAX	50	86	105	52	319	1880	2270	2290	10800	188	40	23
MIN	23	24	28	28	26	124	177	370	202	19	4.9	3.7
AC-FT	2010	3350	3970	2070	7060	27620	47160	45080	88470	4140	896	613
CFSM	.12	.20	.23	.12	.46	1.63	2.87	2.66	5.39	.24	.05	.04
IN.	.14	.23	.27	.14	.48	1.88	3.20	3.06	6.01	.28	.06	.04
CAL YR 1990	TOTAL 138012.6	MEAN 378	MAX 6090	MIN 1.4	AC-FT 273700	CFSM 1.37	IN. 18.60					
WTR YR 1991	TOTAL 117191.1	MEAN 321	MAX 10800	MIN 3.7	AC-FT 232400	CFSM 1.16	IN. 15.80					

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 mi².

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 encoder. 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: Dec. 22 to Feb. 28 and Mar. 2, 3. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--46 years, 974 ft³/s, 8.09 in/yr, 705,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 20,000 ft³/s June 15, 1947, gage height, 21.26 ft, from floodmarks; maximum gage height, 23.05 ft June 23, 1990; minimum daily discharge, 1.8 ft³/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 ft³/s, from rating curve extended above 18,000 ft³/s on basis of velocity-area study.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 5,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Apr. 19	1445	8,490	20.08	May 20	0015	8,400	20.02
Apr. 29	1815	9,240	20.56	May 31	2400	5,620	17.84
May 6	1200	5,740	17.97	June 8	1245	*10,500	*21.26

Minimum daily discharge, 98 ft³/s Sept. 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	249	217	281	340	165	998	2110	5170	5350	1020	220	227
2	246	218	271	320	162	3740	1930	4080	5170	955	216	181
3	305	219	241	290	170	4590	1790	3420	4430	887	206	149
4	328	256	194	270	225	3130	1680	3120	5750	811	204	133
5	289	289	236	250	340	2180	1580	4430	6990	762	205	125
6	285	290	306	235	450	1840	1480	5650	7900	727	220	121
7	267	286	337	220	620	1720	1390	5200	9440	684	274	118
8	255	284	336	205	830	1470	1320	4410	10300	631	300	117
9	260	297	347	195	960	1180	1450	3730	9080	589	378	114
10	257	300	354	185	1140	1030	2870	3240	6370	568	318	119
11	250	300	335	180	1200	943	2800	2880	5080	551	322	127
12	245	300	378	175	1000	965	3400	2640	4460	529	311	108
13	240	305	397	175	860	1200	5740	2460	3340	499	271	107
14	238	309	402	180	770	1650	6570	2290	2850	474	247	121
15	232	310	451	190	715	1860	7610	2260	3850	444	232	128
16	230	308	489	187	660	1570	8230	4810	4510	417	219	182
17	236	295	496	178	610	1900	8240	5700	3520	396	211	213
18	229	288	493	172	545	3990	7250	6720	2880	372	209	189
19	219	286	474	180	600	4670	8220	8070	2520	351	203	179
20	221	284	493	197	660	4100	8070	8310	2250	331	196	163
21	253	289	354	210	850	3290	7430	7580	2050	319	190	152
22	259	284	315	195	1180	2900	6150	6710	1920	307	182	145
23	240	279	320	190	1560	3170	5110	6290	1830	277	178	133
24	236	272	340	200	1600	3500	4200	5040	1720	260	178	126
25	226	267	360	193	960	4050	3530	4000	1610	252	167	122
26	220	266	375	185	830	3400	3110	3430	1500	240	163	116
27	223	383	365	180	760	3560	5680	3460	1400	231	154	111
28	218	332	340	192	800	3260	6600	3320	1280	225	141	106
29	213	298	355	192	---	3330	8130	2880	1180	223	133	99
30	213	288	360	183	---	2810	7110	3710	1100	225	134	98
31	221	---	355	175	---	2370	---	4640	---	226	234	---
TOTAL	7603	8599	11150	6419	21222	80366	140780	139650	121630	14783	6816	4129
MEAN	245	287	360	207	758	2592	4693	4505	4054	477	220	138
MAX	328	383	496	340	1600	4670	8240	8310	10300	1020	378	227
MIN	213	217	194	172	162	943	1320	2260	1100	223	133	98
AC-FT	15080	17060	22120	12730	42090	159400	279200	277000	241300	29320	13520	8190
CFSM	.15	.18	.22	.13	.46	1.59	2.87	2.76	2.48	.29	.13	.08
IN.	.17	.20	.25	.15	.48	1.83	3.20	3.18	2.77	.34	.16	.09
CAL YR 1990	TOTAL 605611	MEAN 1659	MAX 14900	MIN 16	AC-FT 1201000	CFSM 1.01	IN. 13.78					
WTR YR 1991	TOTAL 563147	MEAN 1543	MAX 10300	MIN 98	AC-FT 1117000	CFSM .94	IN. 12.81					

SKUNK RIVER BASIN

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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 10 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 mi².

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

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1558: 1946-47 (M).

GAGE.--Water-stage encoder. 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: Dec. 21 to Feb. 27, Mar. 2-5, 17-19, June 9-11, 17-25, July 12-27, Aug. 11, 12, 17, 20, and Sept. 19. Records good except those estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--46 years, 449 ft³/s, 8.35 in/yr, 325,300 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 27,500 ft³/s Mar. 31, 1960, gage height, 25.33 ft; minimum daily discharge, 0.1 ft³/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 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,800 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Apr. 16	1145	4,790	16.92	May 2	0400	*6,840	*18.81
Apr. 21	1800	4,850	16.91				

Minimum discharge, 13 ft³/s Aug. 6.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	85	83	176	210	120	375	890	5070	2710	262	38	28
2	85	81	162	200	115	1400	776	6230	3030	247	34	47
3	103	79	160	190	120	2600	692	3720	3660	234	26	114
4	230	163	106	180	140	3300	642	1610	2730	218	30	68
5	336	266	118	170	190	1500	603	2490	2360	207	24	45
6	201	240	162	160	280	749	569	3040	2750	197	19	34
7	147	198	172	150	340	577	532	3210	2700	186	47	28
8	126	164	174	145	430	468	503	3600	1300	174	95	27
9	121	178	186	140	540	412	516	2420	1070	162	113	27
10	130	192	189	135	700	366	696	1590	936	155	138	26
11	130	191	215	130	900	330	609	1370	967	152	114	28
12	121	174	308	130	740	649	537	1240	870	151	70	27
13	109	159	387	130	600	1200	1520	1130	781	145	53	28
14	105	145	336	135	450	1410	2560	1030	715	141	46	27
15	101	139	332	140	380	895	3380	942	671	132	41	27
16	97	134	429	135	350	821	4640	1230	790	118	38	31
17	91	129	425	130	320	1110	3630	2250	807	112	47	37
18	102	120	472	125	310	2390	1590	2650	630	101	46	85
19	102	113	454	130	370	2820	3180	3060	564	94	49	74
20	92	109	386	130	460	2870	3780	3460	518	86	62	47
21	87	111	240	135	540	1410	4660	2800	480	75	46	35
22	98	113	210	130	450	1130	4440	1420	450	70	33	29
23	141	113	220	130	415	1450	2360	1650	419	67	28	25
24	130	101	235	135	400	1870	1550	1350	402	62	27	23
25	112	94	250	130	360	1540	1310	1140	378	56	27	23
26	102	89	225	130	340	1220	1160	1020	359	51	27	21
27	91	123	210	130	330	1380	1290	932	335	50	27	18
28	88	446	215	140	326	2280	2460	959	318	45	26	17
29	89	304	225	130	---	1980	3010	773	294	41	24	16
30	84	210	230	125	---	1250	3800	1020	283	38	59	16
31	82	---	220	120	---	1030	---	1250	---	38	31	---
TOTAL	3718	4761	7829	4430	11016	42782	57885	65656	34277	3867	1485	1078
MEAN	120	159	253	143	393	1380	1929	2118	1143	125	47.9	35.9
MAX	336	446	472	210	900	3300	4660	6230	3660	262	138	114
MIN	82	79	106	120	115	330	503	773	283	38	19	16
AC-FT	7370	9440	15530	8790	21850	84860	114800	130200	67990	7670	2950	2140
CFSM	.16	.22	.35	.20	.54	1.89	2.64	2.90	1.57	.17	.07	.05
IN.	.19	.24	.40	.23	.56	2.18	2.95	3.35	1.75	.20	.08	.05
CAL YR 1990	TOTAL 247838	MEAN 679	MAX 15600	MIN 15	AC-FT 491600	CFSM .93	IN. 12.63					
WTR YR 1991	TOTAL 238784	MEAN 654	MAX 6230	MIN 16	AC-FT 473600	CFSM .90	IN. 12.17					

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 mi².

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. 3-5, 7-9, Dec. 22 to Feb. 28, Apr. 23-26, 28, May 11-14, 18, and June 2-6. 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. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data.

AVERAGE DISCHARGE.--14 years, 347 ft³/s, 8.89 in/yr, 251,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,560 ft³/s Apr. 3, 1983, gage height, 19.68 ft; minimum daily discharge, 0.42 ft³/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 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 3	0415	3,320	12.19	May 6	1045	3,860	13.15
Apr. 20	2015	*4,510	*14.49				

Minimum discharge, 1.5 ft³/s Sept.30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	10	14	68	41	20	218	245	197	480	21	2.6	2.3
2	9.5	13	59	42	40	2140	207	228	1120	19	2.8	2.2
3	12	12	50	37	140	2700	181	408	472	17	3.0	4.7
4	13	28	45	35	300	854	175	624	319	16	3.1	12
5	21	23	50	37	890	438	174	1190	427	15	3.3	7.7
6	60	211	60	39	720	343	167	3270	267	14	13	39
7	33	175	62	41	500	304	146	1200	169	13	9.4	21
8	24	114	65	38	390	225	134	688	154	11	9.9	12
9	21	89	68	37	400	187	126	506	202	12	9.0	7.9
10	20	95	74	36	410	162	163	435	258	12	12	7.3
11	19	157	79	36	270	138	122	361	428	12	12	8.4
12	27	109	140	35	160	299	109	292	513	13	7.8	8.2
13	26	86	303	34	100	1150	140	238	513	13	6.1	6.0
14	26	72	295	33	62	1030	482	200	434	13	5.6	5.2
15	23	64	189	32	68	536	663	218	155	9.7	4.5	3.9
16	21	61	174	31	75	379	418	164	228	9.4	3.8	3.7
17	20	56	187	32	86	455	299	155	237	8.5	3.3	2.6
18	19	51	157	32	98	1260	329	181	107	7.4	3.4	2.7
19	16	44	228	33	110	1010	1280	174	77	6.4	4.8	2.7
20	16	41	173	34	120	617	4180	133	64	5.8	12	3.3
21	16	46	121	35	96	469	2820	124	53	5.2	13	3.2
22	18	43	90	29	82	472	1580	183	45	5.8	7.1	2.7
23	17	42	70	30	70	742	1300	305	41	9.8	4.2	2.3
24	15	42	60	32	60	1000	1210	387	38	16	3.2	2.5
25	15	37	65	29	52	496	971	339	37	11	2.7	3.4
26	14	35	55	26	62	365	552	258	35	5.2	2.4	3.1
27	14	40	50	27	76	1800	355	149	32	3.5	2.1	2.4
28	14	69	48	28	90	1410	297	90	30	3.1	2.0	2.4
29	14	167	47	25	---	643	222	74	26	3.6	2.2	2.0
30	14	95	42	22	---	404	200	106	23	2.9	2.3	1.7
31	14	---	39	21	---	292	---	92	---	2.5	2.3	---
TOTAL	601.5	2131	3213	1019	5547	22538	19247	12969	6984	316.8	174.9	188.5
MEAN	19.4	71.0	104	32.9	198	727	642	418	233	10.2	5.64	6.28
MAX	60	211	303	42	890	2700	4180	3270	1120	21	13	39
MIN	9.5	12	39	21	20	138	109	74	23	2.5	2.0	1.7
AC-FT	1190	4230	6370	2020	11000	44700	38180	25720	13850	628	347	374
CFSM	.04	.13	.20	.06	.37	1.37	1.21	.79	.44	.02	.01	.01
IN.	.04	.15	.23	.07	.39	1.58	1.35	.91	.49	.02	.01	.01

CAL YR 1990	TOTAL	166866.7	MEAN	457	MAX	6920	MIN	6.6	AC-FT	331000	CFSM	.86	IN.	11.71
WTR YR 1991	TOTAL	74929.7	MEAN	205	MAX	4180	MIN	1.7	AC-FT	148600	CFSM	.39	IN.	5.26

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 mi².

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 encoder. 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. 22 to Feb. 26. Records good except those for estimated daily discharges, which are poor. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--77 years (water years 1915-91), 2,453 ft³/s, 7.74 in/yr, 1,777,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 66,800 ft³/s Apr. 23, 1973, gage height, 27.05 ft; minimum daily discharge, 7 ft³/a 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 ft³/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 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Apr. 21	0945	*15,900	*13.53	No other peak greater than base discharge.			

Minimum discharge, 148 ft³/s Sept. 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	483	365	1010	850	410	1920	6530	8390	6030	1960	398	181
2	460	361	808	760	400	7200	5730	9390	7570	1820	386	178
3	460	356	835	680	430	12100	4760	10700	8020	1690	384	226
4	461	385	774	640	600	10700	4190	11700	8120	1560	384	226
5	470	454	621	620	1100	8320	3930	13500	8600	1460	377	305
6	586	645	600	560	1900	7720	3780	14200	8930	1370	386	477
7	805	1060	605	540	2600	6090	3570	11600	8560	1280	422	375
8	723	983	552	520	2900	4440	3360	9500	8510	1200	396	261
9	620	855	594	490	3100	3720	3240	9020	8950	1150	396	205
10	567	790	659	510	3600	3300	3200	9170	9330	1100	399	218
11	531	868	736	490	4300	2920	3000	9220	10100	1050	455	192
12	520	920	860	470	3800	2970	3490	8260	10500	1000	512	176
13	527	822	1200	470	3000	4870	4210	7080	10700	968	535	177
14	517	757	1660	500	2600	6520	4730	6310	10300	943	525	168
15	497	715	1650	490	2100	5400	6830	6080	8640	900	493	166
16	471	694	1550	470	1900	4580	7670	5210	6960	856	450	174
17	467	665	1640	480	1800	4490	8200	4900	6090	816	399	163
18	466	651	1720	480	1800	6640	9320	5840	5510	783	382	158
19	432	637	1840	490	2100	8590	11200	6800	5380	768	365	156
20	413	608	1880	500	2600	8340	14300	7160	5390	744	341	159
21	422	610	1660	560	2400	8190	15600	7890	5040	702	308	217
22	405	613	1100	600	2100	8350	14600	8760	4370	676	294	257
23	390	606	940	570	1950	8610	14400	9670	3730	647	278	226
24	387	581	840	500	1850	9670	14200	10300	3250	611	293	196
25	414	570	910	480	1950	8720	13900	10400	2940	540	248	195
26	454	548	1000	460	2500	7780	12300	10000	2700	526	236	196
27	442	582	1050	440	2410	10800	10400	9280	2550	493	219	176
28	408	643	980	450	1940	11000	8480	8210	2400	454	211	165
29	386	843	940	440	---	9480	7660	7000	2270	447	206	157
30	373	1060	990	430	---	8660	7860	6450	2130	437	203	150
31	370	---	920	420	---	7620	---	5940	---	409	194	---
TOTAL	14927	20247	33124	16360	60140	219710	234640	267930	193570	29360	11075	6276
MEAN	482	675	1069	528	2148	7087	7821	8643	6452	947	357	209
MAX	805	1060	1880	850	4300	12100	15600	14200	10700	1960	535	477
MIN	370	356	552	420	400	1920	3000	4900	2130	409	194	150
AC-FT	29610	40160	65700	32450	119300	435800	465400	531400	383900	58240	21970	12450
CFSM	.11	.16	.25	.12	.50	1.65	1.82	2.01	1.50	.22	.08	.05
IN.	.13	.18	.29	.14	.52	1.90	2.03	2.32	1.67	.25	.10	.05

CAL YR 1990	TOTAL 1405421	MEAN 3850	MAX 43300	MIN 62	AC-FT 2788000	CFSM .89	IN. 12.15
WTR YR 1991	TOTAL 1107359	MEAN 3034	MAX 15600	MIN 150	AC-FT 2196000	CFSM .71	IN. 9.57

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, July 10-13, 1989; minimum daily, 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, 1.4 tons Dec. 11, 1989.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum daily, 731 microsiemens Jan. 3, 4; minimum daily, 266 microsiemens Feb. 7.

TEMPERATURES: Maximum daily, 33.0°C July 22, 23; minimum daily, 0.0°C on many days during winter periods.

SEDIMENT CONCENTRATIONS: Maximum daily mean, 3,740 mg/L Mar. 3; minimum daily mean, 3 mg/L Jan. 30.

SEDIMENT LOADS: Maximum daily, 121,000 tons Mar. 3; minimum daily, 3.5 tons Jan. 30.

SPECIFIC CONDUCTANCE MICROSIEMENS/CM AT 25 DEG C, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	562	602	634	653	598	282	395	418	547	613	456	542
2	530	573	622	718	611	317	374	403	543	622	451	557
3	531	568	566	731	604	300	357	378	389	549	450	553
4	505	560	549	731	625	314	396	458	407	564	466	527
5	516	560	552	607	590	279	373	442	425	621	467	562
6	493	583	606	616	540	347	394	445	443	582	467	562
7	530	650	597	603	266	304	377	469	396	653	544	528
8	559	647	633	602	271	328	602	471	348	622	488	546
9	554	592	631	642	319	295	603	452	340	559	474	533
10	578	580	619	604	315	365	585	483	341	571	484	490
11	556	582	637	561	319	368	525	540	378	618	510	462
12	552	598	648	609	304	310	600	560	390	573	518	474
13	607	600	641	610	319	312	582	572	451	562	538	456
14	585	612	614	576	324	335	549	572	470	550	511	467
15	560	604	577	524	312	307	458	563	476	529	452	495
16	534	620	563	667	323	346	381	567	500	513	435	520
17	532	633	564	584	321	327	384	573	512	509	427	541
18	565	640	581	446	322	341	410	570	527	479	432	568
19	574	631	571	573	324	352	420	574	490	461	444	597
20	615	646	572	566	383	330	402	399	513	445	469	593
21	570	651	591	496	406	332	426	379	557	436	483	593
22	542	635	626	550	407	310	437	401	577	428	490	592
23	613	617	618	541	402	348	433	420	585	416	480	597
24	525	628	669	585	452	300	464	455	591	421	470	584
25	537	633	676	620	465	344	509	465	606	415	478	567
26	580	627	666	566	485	345	531	484	608	407	493	596
27	599	611	684	572	327	319	546	514	590	402	516	636
28	578	641	663	606	284	347	559	537	595	417	531	607
29	540	652	662	596	---	358	569	558	615	421	528	563
30	512	636	679	598	---	361	403	546	588	433	544	521
31	600	---	643	577	---	373	---	538	---	443	542	---

05474000 SKUNK RIVER AT AUGUSTA, IA--Continued
(National stream-quality accounting network station)

WATER-QUALITY RECORDS

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	20.0	17.0	7.0	.0	1.0	3.0	11.0	16.0	26.0	30.0	28.0	27.0
2	21.0	17.0	7.0	.0	1.0	2.0	11.0	19.0	26.0	30.0	30.0	28.0
3	19.0	16.0	3.0	.0	1.0	3.0	12.0	15.0	27.0	29.0	29.0	27.0
4	20.0	15.0	3.0	.0	2.0	4.0	13.0	15.0	29.0	29.0	27.0	27.0
5	21.0	9.0	3.0	.0	2.0	4.0	15.0	12.0	24.0	30.0	24.0	26.0
6	25.0	9.0	3.0	.0	2.0	---	16.0	12.0	23.0	30.0	23.0	27.0
7	18.0	8.0	15.0	.0	1.0	5.0	19.0	15.0	23.0	30.0	27.0	26.0
8	15.0	5.0	4.0	.0	1.0	5.0	21.0	14.0	24.0	30.0	27.0	25.0
9	13.0	8.0	5.0	.0	1.0	6.0	16.0	15.0	25.0	25.0	27.0	28.0
10	12.0	8.0	6.0	.0	1.0	---	16.0	17.0	25.0	27.0	27.0	28.0
11	13.0	8.0	5.0	.0	1.0	8.0	12.0	19.0	25.0	27.0	27.0	28.0
12	15.0	8.0	5.0	.0	1.0	8.0	12.0	20.0	25.0	27.0	28.0	30.0
13	15.0	8.0	5.0	.0	1.0	5.0	12.0	22.0	26.0	27.0	28.0	30.0
14	15.0	10.0	5.0	.0	1.0	5.0	13.0	22.0	27.0	27.0	28.0	30.0
15	14.0	13.0	2.0	.0	.0	7.0	13.0	23.0	27.0	28.0	29.0	28.0
16	18.0	11.0	2.0	.0	.0	---	13.0	22.0	27.0	30.0	29.0	25.0
17	17.0	10.0	2.0	.0	.0	6.0	14.0	23.0	27.0	30.0	27.0	25.0
18	13.0	9.0	2.0	.0	.0	7.0	14.0	21.0	27.0	30.0	27.0	20.0
19	13.0	10.0	3.0	.0	.0	8.0	12.0	21.0	27.0	31.0	25.0	18.0
20	13.0	11.0	5.0	.0	3.0	9.0	12.0	21.0	27.0	31.0	25.0	18.0
21	12.0	15.0	5.0	.0	3.0	10.0	13.0	20.0	27.0	32.0	29.0	18.0
22	13.0	11.0	.0	.0	3.0	12.0	14.0	22.0	25.0	33.0	28.0	17.0
23	11.0	10.0	.0	.0	2.0	10.0	13.0	23.0	25.0	33.0	28.0	18.0
24	11.0	10.0	.0	.0	2.0	12.0	13.0	23.0	23.0	27.0	28.0	17.0
25	12.0	10.0	.0	.0	2.0	12.0	14.0	23.0	27.0	28.0	30.0	19.0
26	12.0	13.0	.0	.0	2.0	15.0	15.0	24.0	28.0	28.0	30.0	18.0
27	12.0	12.0	.0	.0	3.0	17.0	17.0	24.0	28.0	27.0	30.0	15.0
28	12.0	8.0	.0	.0	3.0	13.0	18.0	24.0	28.0	27.0	30.0	18.0
29	14.0	7.0	.0	.0	---	12.0	17.0	27.0	29.0	26.0	28.0	23.0
30	16.0	7.0	.0	.0	---	11.0	17.0	26.0	30.0	27.0	29.0	23.0
31	16.0	---	.0	.0	---	10.0	---	26.0	---	27.0	30.0	---

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)
OCTOBER			NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	37	49	28	28	17	47	18	41	7	7.7	508	2770
2	44	55	30	29	16	35	16	33	14	15	2750	60200
3	56	70	49	47	40	90	14	26	20	23	3740	121000
4	56	70	36	37	45	94	16	28	7	11	2360	67600
5	89	114	15	18	28	48	18	30	6	18	2720	61100
6	525	861	19	35	13	22	17	26	16	82	1870	39100
7	333	716	38	110	13	20	18	26	83	583	1280	21200
8	154	300	27	72	12	19	18	25	85	666	984	11900
9	120	202	27	62	10	15	12	16	77	644	768	7720
10	62	96	27	57	8	14	15	21	25	243	636	5670
11	26	38	57	136	9	18	24	32	31	360	533	4210
12	34	47	76	189	22	52	13	16	22	226	896	7670
13	82	117	52	115	37	122	10	13	16	130	1120	14600
14	119	167	36	73	120	546	8	11	36	253	1500	26500
15	90	121	33	64	91	406	5	6.6	80	454	584	8630
16	65	83	32	59	86	360	5	6.3	50	256	1090	13400
17	68	86	19	35	167	741	10	13	31	151	955	11600
18	70	88	15	26	79	363	17	22	22	107	1120	20200
19	48	56	13	23	57	286	13	17	46	261	1610	37400
20	42	46	15	25	94	476	19	26	225	1580	1840	41500
21	53	60	40	66	60	270	23	35	343	2220	1770	39300
22	57	62	34	57	35	104	24	39	271	1540	1380	31100
23	45	47	20	33	18	46	18	28	238	1250	1040	24300
24	29	30	19	30	5	11	9	12	214	1070	1580	41400
25	38	43	19	29	4	9.8	8	10	191	1010	1040	24500
26	35	43	21	31	6	16	10	12	211	1420	677	14300
27	35	42	33	52	6	17	10	12	334	2170	2380	74100
28	29	32	22	38	10	26	6	7.3	395	2070	1860	56100
29	35	37	20	45	17	43	6	7.1	---	---	1180	30200
30	39	40	19	55	19	51	3	3.5	---	---	1020	23900
31	34	34	---	---	21	52	4	4.5	---	---	944	19400
TOTAL	---	3852	---	1676	---	4419.8	---	605.3	---	18820.7	---	962570

SKUNK RIVER BASIN

05474000 SKUNK RIVER AT AUGUSTA, IA--Continued
(National stream-quality accounting network station)

WATER-QUALITY RECORDS

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)
APRIL			MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	879	15500	1020	23000	522	8500	283	1500	68	73	69	34
2	755	11700	663	16800	509	10400	213	1050	64	66	68	33
3	626	8050	587	17000	1480	32000	202	919	67	70	75	46
4	566	6400	551	17500	868	19000	184	778	70	73	79	49
5	519	5510	464	16800	666	15400	161	637	70	72	80	66
6	477	4870	1030	39700	532	12800	156	577	70	73	142	185
7	494	4760	742	23500	977	22500	154	532	85	97	93	95
8	306	2790	647	16600	828	19000	176	572	85	91	78	55
9	313	2760	510	12400	559	13500	168	522	83	89	83	46
10	585	5060	392	9720	493	12400	148	442	82	89	97	57
11	439	3560	323	8030	504	13700	139	396	89	110	97	51
12	401	3790	357	7950	420	11900	142	384	100	138	84	40
13	545	6220	377	7210	340	9860	165	431	95	137	92	44
14	740	9450	369	6290	395	11000	169	430	72	102	97	44
15	1970	37200	455	7450	404	9380	149	362	63	84	124	56
16	1870	38800	377	5310	412	7740	133	308	64	78	162	76
17	1160	25600	365	4840	396	6500	179	393	75	81	155	68
18	810	20300	496	7880	545	8100	149	316	72	74	116	49
19	680	20700	1770	32700	540	7840	132	274	69	68	74	31
20	1040	40700	1580	30300	443	6450	140	281	69	63	57	25
21	757	32000	872	18500	384	5220	126	238	71	59	61	36
22	485	19200	629	14800	393	4630	114	207	68	54	67	47
23	432	16700	463	12100	411	4140	113	198	67	50	67	41
24	359	13800	368	10200	408	3570	118	194	76	61	74	39
25	290	10800	403	11400	374	2970	108	157	62	42	115	61
26	343	11400	402	10900	314	2290	92	131	59	38	143	76
27	345	9740	366	9160	313	2160	84	112	63	37	143	68
28	342	7800	339	7530	337	2180	71	87	64	36	137	61
29	383	7930	353	6640	311	1910	68	82	72	40	103	44
30	1050	22400	510	8890	285	1640	67	79	68	37	79	32
31	---	---	520	8340	---	---	75	83	65	34	---	---
TOTAL	---	425490	---	429440	---	288680	---	12672	---	2216	---	1655
YEAR	2152096.8											

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	TEMPER- ATURE WATER (DEG C) (00010)	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY) (80155)	SED. SUSP. FALL DIAM. % FINER THAN .002 MM (70337)	SED. SUSP. FALL DIAM. % FINER THAN .004 MM (70338)	
OCT 24...	1230	10.0	382	25	26	--	--	
MAR 05...	1045	1.5	8700	2840	66700	48	52	
APR 18...	1000	13.0	8710	763	17900	39	40	
JUN 26...	1200	27.0	2710	246	1800	46	54	
AUG 21...	1000	24.0	302	71	58	--	--	
DATE		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 (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 .062 MM (70331)
OCT 24...	--	--	--	--	--	--	--	86
MAR 05...	61	77	98	98	99	100	--	--
APR 18...	41	54	93	96	98	100	--	--
JUN 26...	62	80	99	100	--	--	--	--
AUG 21...	--	--	--	--	--	--	--	98

05474000 SKUNK RIVER AT AUGUSTA, IA--Continued
(National stream-quality accounting network station)

WATER-QUALITY RECORDS

PARTICLE-SIZE DISTRIBUTION OF SURFACE BED MATERIAL, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	NUMBER OF SAMP- PLING POINTS (COUNT)	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 05...	1045	3	0	5	65	97	99	100	--	--
APR 18...	1000	3	0	8	58	85	93	97	98	100
JUN 26...	1315	4	0	4	57	92	98	99	100	--

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (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 (NTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED SATUR- ATION (00301)	BARO- METRIC PRES- SURE (MM HG) (00025)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)
OCT 24..	1230	382	588	8.6	10.0	13.5	5.4	16.4	146	758	K20	--
DEC 11..	1100	726	552	8.2	1.5	6.5	3.4	14.0	102	750	K17	32
MAR 05..	1045	8700	332	8.1	1.5	2.5	620	12.3	91	736	1700	14000
APR 18..	1000	8710	382	7.8	13.0	16.5	170	10.2	99	748	K1300	760
JUN 26..	1200	2710	562	8.2	27.0	25.0	73	8.0	102	751	280	150
AUG 21..	1000	302	474	8.9	24.0	19.0	21	7.9	96	749	88	80

DATE	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)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)
OCT 24...	290	75	26	18	12	0.5	3.6	233	15	254	59	26
DEC 11...	290	76	25	19	12	0.5	3.5	214	0	262	52	33
MAR 05...	140	37	11	6.0	8	0.2	7.7	80	0	98	23	16
APR 18...	190	50	15	6.7	7	0.2	4.0	101	0	123	25	9.9
JUN 26...	320	86	25	10	6	0.2	2.3	229	0	280	35	20
AUG 21...	220	53	22	17	14	0.5	4.0	171	11	187	53	25

K Results based on colony count outside ideal range.

SKUNK RIVER BASIN

05474000 SKUNK RIVER AT AUGUSTA, IA--Continued
(National stream-quality accounting network station)

WATER-QUALITY RECORDS

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991												
DATE	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)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)
OCT 24...	0.30	8.4	374	369	0.51	386	0.99	2.80	0.010	0.020	0.010	1.0
DEC 11...	0.20	10	376	375	0.51	737	0.87	6.20	0.020	0.140	0.130	1.0
MAR 05...	0.20	10	235	190	0.32	5520	2.4	6.60	0.050	0.620	0.620	3.0
APR 18...	<0.10	11	255	223	0.35	6000	2.6	9.10	0.050	0.070	0.140	2.7
JUN 26...	<0.10	17	366	382	0.50	2680	0.68	11.0	0.020	0.020	0.020	0.70
AUG 21...	0.40	0.89	279	279	0.38	227	--	<0.050	<0.010	0.010	<0.010	1.0
DATE	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS 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)	SED. SUSP. FALL DIAM. % FINER THAN .062 MM (70342)	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)	
OCT 24...	0.020	0.020	0.060	25	26	86	--	1	10	110	<0.5	
DEC 11...	0.080	0.090	0.110	9	18	--	--	--	--	--	--	
MAR 05...	0.090	0.130	0.320	2840	66700	--	98	<1	<10	86	<0.5	
APR 18...	0.070	0.110	0.600	763	17900	--	93	1	100	96	<0.5	
JUN 26...	0.170	0.190	0.370	246	1800	--	99	--	--	--	--	
AUG 21...	0.020	0.040	0.230	71	58	98	--	2	20	110	<0.5	
DATE	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)	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)	
OCT 24...	<1.0	2	<3	2	13	<1	14	36	<0.1	<10	2	
DEC 11...	--	--	--	--	--	--	--	--	--	--	--	
MAR 05...	2.0	1	<3	7	140	3	<4	12	0.1	<10	5	
APR 18...	<1.0	<1	<3	4	55	2	5	2	<0.1	<10	1	
JUN 26...	--	--	--	--	--	--	--	--	--	--	--	
AUG 21...	<1.0	1	<3	6	19	1	9	16	<0.1	<10	2	
DATE	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)	ATRA- ZINE, TOTAL (UG/L) (39630)	CYAN- AZINE TOTAL (UG/L) (81757)	METRI- BUZIN IN WHOLE WATER (UG/L) (81408)	ALA- CHLOR TOTAL RECOVER (UG/L) (77825)	METOLA- CHLOR IN WHOLE WATER (UG/L) (39356)	TRI- FLURA- LIN TOTAL RECOVER (UG/L) (39030)	
OCT 24...	<1	<10	210	<6	<3	0.23	<0.10	<0.10	<0.10	<0.10	<0.10	
DEC 11...	--	--	--	--	--	--	--	--	--	--	--	
MAR 05...	<1	<1.0	98	<6	17	0.45	0.11	<0.10	<0.10	<0.10	<0.10	
APR 18...	1	<1.0	130	<6	8	0.47	0.28	<0.10	<0.10	0.84	<0.10	
JUN 26...	--	--	--	--	--	1.0	0.45	<0.10	<0.10	0.68	<0.10	
AUG 21...	<1	<1.0	170	<6	9	--	--	--	--	--	--	

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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). Jan. 1, 1878 to May 1913, 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.

COOPERATION.--Records provided by Union Electric Co.

AVERAGE DISCHARGE.--113 years, 64,070 ft³/s, 7.31 in/yr, 46,420,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 344,000 ft³/s Apr. 24, 1973; maximum gage height, 23.35 ft Apr. 24, 1973; minimum daily discharge, 5,000 ft³/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 ft³/s.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 190,000 ft³/s Apr. 21; minimum daily discharge, 24,000 ft³/s Sept. 5.

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	38500	60100	50400	36000	25900	46100	177000	151000	158000	105000	60400	36200
2	40600	57900	49800	33600	26700	60700	178000	148000	154000	102000	47800	31000
3	38600	55300	43000	30500	29100	100000	176000	149000	154000	99400	52700	29200
4	37700	54300	36500	31800	32000	116000	174000	149000	153000	96500	51000	28000
5	30300	48800	40200	32200	44000	115000	170000	155000	155000	91700	53700	24000
6	33400	55200	40500	29400	47200	94700	170000	156000	157000	89800	55600	27000
7	39200	52500	43400	30200	53000	76900	171000	157000	160000	82400	56700	28200
8	48200	49200	40400	32500	47700	76300	172000	152000	166000	82600	54800	27500
9	48500	44500	34400	32200	48300	70500	171000	148000	170000	79000	55600	28300
10	45800	41100	36100	33200	50100	67600	169000	147000	172000	81600	60600	27700
11	44300	44300	39800	33400	51900	63700	157000	144000	174000	81700	63600	38300
12	43500	42300	40100	32900	54900	61900	146000	144000	176000	80400	68500	47500
13	44500	42500	40300	32200	55600	70500	139000	144000	180000	84500	67100	51900
14	42600	42900	42100	31600	51400	77100	133000	145000	180000	82200	66600	47500
15	43900	40200	45700	33800	40600	82500	134000	145000	175000	83800	67000	53900
16	42100	41600	46500	34000	38600	79300	152000	148000	169000	84500	59900	58700
17	38700	39600	48400	32700	37400	80000	168000	151000	160000	82300	64000	72600
18	38900	39900	44000	31600	40600	85500	174000	157000	155000	82600	57400	77900
19	41300	40600	42300	30100	46000	106000	181000	159000	158000	76300	53500	75500
20	39300	37700	48000	30500	48300	112000	186000	162000	159000	73800	53400	74900
21	40400	36300	48500	30200	52600	120000	190000	163000	156000	69500	49000	74900
22	36700	32100	40700	31500	53700	117000	187000	164000	150000	65000	53500	74400
23	40800	34700	33100	29700	49700	108000	185000	166000	143000	69700	50800	76500
24	45700	33600	24700	29700	58100	109000	184000	172000	133000	72200	49200	74900
25	50800	38600	25700	29700	57400	114000	183000	176000	126000	80000	49400	76500
26	54300	40900	26500	31100	51400	119000	180000	180000	118000	77000	44300	75000
27	59900	42900	31900	30500	51300	125000	174000	185000	113000	79400	41700	74300
28	62600	44300	31000	29900	48900	158000	171000	185000	110000	77000	41400	69100
29	58700	48700	31000	30100	---	159000	161000	181000	108000	76600	39900	64700
30	54300	49500	33400	29200	---	160000	152000	172000	107000	69100	39100	64

CAL YR 1990	TOTAL	25970300	MEAN	71150	MAX	263000	MIN	16500	AC-FT	51510000
WTR YR 1991	TOTAL	29626800	MEAN	81170	MAX	190000	MIN	24000	AC-FT	58760000

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 mi².

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 encoder and concrete control. Datum of gage is 1,247.55 ft above NGVD.

REMARKS.--Estimated daily discharges: Dec. 21-25. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--40 years, 378 ft³/s, 3.74 in/yr, 273,000 acre-ft/yr; median of yearly mean discharges, 250 ft³/s, 2.5 in/yr, 183,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 16,000 ft³/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 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Apr. 15	0200	2,010	6.90	June 4	1130	4,030	10.99
May 6	0045	1,530	5.81	June 11	1130	*4,120	*11.11
May 28	1015	1,600	5.97	June 22	1100	3,430	10.02
June 2	1030	2,210	7.35				

Minimum discharge, 3.7 ft³/s Oct. 2.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	3.9	15	23	5.5	4.3	26	432	846	1410	2220	402	51		
2	3.8	13	18	5.1	4.5	27	395	755	2130	1970	383	46		
3	6.2	13	14	5.3	4.9	23	326	667	1870	1770	377	43		
4	5.7	15	14	5.1	5.2	21	282	842	3850	1610	354	55		
5	8.3	12	24	4.8	5.6	33	251	1150	3440	1460	333	54		
6	18	10	24	4.5	6.7	45	227	1320	2820	1320	310	50		
7	11	9.3	25	5.1	9.1	40	213	969	2710	1230	321	52		
8	9.4	8.8	23	5.2	12	37	215	904	2760	1140	594	51		
9	7.7	9.5	22	4.8	26	35	206	884	2980	1050	519	50		
10	6.9	25	22	4.8	42	33	233	805	3460	993	396	50		
11	6.6	64	24	4.7	36	35	190	751	4000	969	311	60		
12	6.0	61	27	4.6	30	35	214	709	3600	1020	267	77		
13	5.6	44	25	4.6	30	31	901	678	3320	996	241	111		
14	5.5	35	25	4.6	23	41	1590	649	3190	898	227	209		
15	15	35	26	4.7	15	37	1760	867	3160	805	210	327		
16	14	35	24	4.8	11	35	1290	1040	3110	734	194	312		
17	11	59	22	4.8	10	38	1050	1440	3000	669	189	289		
18	11	56	21	4.9	10	52	974	1850	2820	609	255	255		
19	8.8	47	17	4.9	9.5	125	987	2000	2610	555	362	215		
20	10	46	16	4.9	9.8	248	830	1960	2410	545	313	191		
21	17	49	14	5.2	12	266	735	1960	2650	524	288	169		
22	20	47	10	5.8	29	268	662	1940	3360	548	245	160		
23	14	62	8.5	4.7	31	498	609	1840	3370	639	167	156		
24	11	52	7.9	4.8	37	360	542	1640	3340	579	133	154		
25	14	43	8.6	4.5	27	401	415	1440	3110	505	117	156		
26	8.8	35	7.0	4.4	22	558	414	1480	2990	450	101	142		
27	11	29	6.5	4.4	22	629	570	1520	2900	422	93	148		
28	12	14	6.8	4.5	20	520	610	1580	2740	504	84	144		
29	13	23	7.2	4.5	---	398	655	1410	2690	542	70	130		
30	17	23	8.1	4.4	---	349	885	1270	2520	491	62	128		
31	20	---	6.4	4.3	---	330	---	1220	---	443	56	---		
TOTAL	332.2	989.6	527.0	149.2	504.6	5574	18663	38386	88320	28210	7974	4035		
MEAN	10.7	33.0	17.0	4.81	18.0	180	622	1238	2944	910	257	134		
MAX	20	64	27	5.8	42	629	1760	2000	4000	2220	594	327		
MIN	3.8	8.8	6.4	4.3	4.3	21	190	649	1410	422	56	43		
AC-FT	659	1960	1050	296	1000	11060	37020	76140	175200	55950	15820	8000		
CFSM	.01	.02	.01	.00	.01	.13	.45	.90	2.15	.66	.19	.10		
IN.	.01	.03	.01	.00	.01	.15	.51	1.04	2.39	.76	.22	.11		
CAL YR 1990	TOTAL	28406.0	MEAN	77.8	MAX	818	MIN	3.0	AC-FT	56340	CFSM	.06	IN.	.77
WTR YR 1991	TOTAL	193664.6	MEAN	531	MAX	4000	MIN	3.8	AC-FT	384100	CFSM	39	IN.	5.25

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 mi².

PERIOD OF RECORD.--October 1964 to current year. Prior to October 1970, published as West Fork Des Moines River at Humboldt.

GAGE.--Water-stage encoder. 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. 21 to Feb. 8, 24-27, and Mar. 2-10, 13-14. 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. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--27 years, 905 ft³/s, 5.45 in/yr, 655,700 acre-ft/yr; median of yearly mean discharges, 750 ft³/s, 4.5 in/yr, 543,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 18,000 ft³/s Apr. 14, 1969, gage height, 15.40 ft; minimum daily discharge, 13 ft³/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 ft³/s at present site and datum.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,800 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 25	0900	3,270	7.14	May 18	0215	5,750	9.28
Apr. 16	2200	4,890	8.53	June 6	1315	*7,180	*10.32
May 7	2330	5,160	8.82	June 16	1200	6,490	9.86

Minimum discharge, 25 ft³/s Nov. 28.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	76	77	127	31	31	134	1720	2750	3450	3510	1020	278		
2	76	78	87	33	37	160	1590	2930	3620	3370	916	270		
3	87	176	56	29	38	170	1540	2670	3700	3140	851	256		
4	82	95	43	33	39	190	1380	2430	4520	2830	814	247		
5	73	86	63	32	43	230	1230	3200	5880	2550	742	238		
6	76	84	90	32	45	300	1110	4440	7010	2350	695	235		
7	72	85	98	31	44	310	1010	5000	6940	2150	708	236		
8	71	76	98	30	47	380	939	5120	6730	2060	1060	229		
9	71	87	98	31	53	360	923	4670	6610	2090	1340	233		
10	75	84	101	32	54	350	915	4090	6250	1920	1580	223		
11	76	82	110	31	61	375	851	3600	5610	1770	1440	234		
12	81	78	118	30	57	413	965	3230	5010	1680	1270	287		
13	81	75	96	33	72	280	1190	2850	4760	1620	1030	321		
14	85	96	93	32	78	330	2240	2610	4820	1610	866	280		
15	71	109	99	33	89	332	3540	2610	5500	1530	727	294		
16	71	103	91	32	83	315	4620	3120	6360	1410	677	344		
17	85	92	105	33	65	307	4810	4500	6290	1280	664	412		
18	75	93	73	34	67	322	4360	5490	5720	1180	598	416		
19	69	94	99	37	71	370	3710	5450	5200	1080	547	408		
20	82	99	89	35	71	498	3550	5300	4760	1030	601	386		
21	90	124	60	33	72	872	3370	4860	4460	1010	645	356		
22	85	117	52	32	88	1250	2960	4390	4210	983	583	337		
23	84	110	47	30	96	1830	2570	4040	4010	1110	608	313		
24	81	106	37	33	80	2720	2270	3750	3960	1200	543	298		
25	76	113	30	31	82	3210	2010	3510	4040	1090	482	297		
26	84	114	29	32	96	3130	1890	3320	4130	980	413	284		
27	83	121	31	34	101	2980	2280	3310	4130	795	377	281		
28	63	82	32	35	115	2930	2560	3470	4030	948	349	274		
29	71	70	33	33	---	2790	2500	3340	3850	1180	332	272		
30	73	95	31	32	---	2400	2380	3140	3670	1240	320	271		
31	74	---	30	31	---	1970	---	3160	---	1150	299	---		
TOTAL	2399	2901	2246	1000	1875	32208	66983	116350	149230	51846	23097	8810		
MEAN	77.4	96.7	72.5	32.3	67.0	1039	2233	3753	4974	1672	745	294		
MAX	90	176	127	37	115	3210	4810	5490	7010	3510	1580	416		
MIN	63	70	29	29	31	134	851	2430	3450	795	299	223		
AC-FT	4760	5750	4450	1980	3720	63880	132900	230800	296000	102800	45810	17470		
CFSM	.03	.04	.03	.01	.03	.46	.99	1.66	2.20	.74	.33	.13		
IN.	.04	.05	.04	.02	.03	.53	1.10	1.92	2.46	.85	.38	.15		
CAL YR 1990	TOTAL	88599	MEAN	243	MAX	2940	MIN	18	AC-FT	175700	CFSM	.11	IN.	1.46
WTR YR 1991	TOTAL	458945	MEAN	1257	MAX	7010	MIN	29	AC-FT	910300	CFSM	.56	IN.	7.57

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 mi².

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 encoder. 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. 27-29 and Dec. 15 to Mar. 14. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--51 years, 553 ft³/s, 5.74 in/yr, 400,600 acre-ft/yr; median of yearly mean discharges, 490 ft³/s, 5.1 in/yr, 355,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 18,000 ft³/s June 21, 1954, gage height, 16.95 ft, from floodmark, site and datum then in use (17,400 ft³/s, gage height, 24.02 ft, at present site); minimum daily discharge, 4.8 ft³/s Jan. 11-14, 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of September 1938 reached a stage of 17.4 ft, discharge, about 22,000 ft³/s, site and datum in use during the period 1940-54.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,700 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 29	0315	3,520	13.34	May 29	1845	6,050	15.93
Apr. 20	1445	3,970	13.83	June 6	0900	10,500	19.77
Apr. 28	0745	3,590	13.38	June 16	1130	7,620	17.39
May 9	0015	6,930	16.76	Aug. 13	1130	2,810	12.41
May 18	0415	*12,500	*21.16				

Minimum discharge, 12 ft³/s Dec. 3.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	82	84	59	36	41	160	2820	3140	5010	2050	999	310		
2	78	84	45	40	48	290	2560	3060	4510	1910	969	280		
3	80	87	18	34	57	260	2320	2910	4260	1770	880	254		
4	78	89	38	32	60	290	2110	2790	5270	1660	756	233		
5	78	89	60	44	70	346	1930	3210	8690	1560	655	213		
6	78	90	59	44	61	450	1770	4670	10300	1460	582	196		
7	76	85	46	42	64	600	1640	5930	9390	1360	544	181		
8	75	80	42	42	67	660	1540	6750	8210	1280	846	174		
9	76	80	42	41	58	700	1470	6840	7230	1240	1500	164		
10	76	79	46	40	56	760	1400	6280	6290	1180	1730	154		
11	74	77	48	42	55	880	1330	5500	5460	1150	2000	148		
12	75	81	54	46	58	1100	1490	4800	4820	1120	2490	175		
13	74	80	50	49	46	1220	1940	4270	4380	1050	2780	223		
14	75	76	57	50	70	1310	2460	3890	4180	1030	2680	214		
15	76	77	62	52	55	685	2950	4480	5010	1060	2360	232		
16	72	74	64	55	56	720	3160	5300	7290	1040	2040	252		
17	74	70	65	52	60	703	3250	7190	6320	1000	1750	290		
18	74	69	62	49	52	788	3520	10800	5610	932	1470	313		
19	71	75	59	56	54	901	3800	7140	4920	852	1210	286		
20	72	177	62	62	58	1100	3950	5940	4300	787	1040	256		
21	76	116	44	40	65	1290	3820	5390	3870	740	914	234		
22	78	83	35	39	81	1470	3560	5000	3530	717	788	222		
23	76	74	32	44	114	2080	3320	4570	3300	752	703	209		
24	77	71	31	45	100	2480	3040	4120	3190	782	673	199		
25	80	68	35	41	98	2660	2760	3730	3130	816	792	189		
26	83	65	32	44	102	2780	2710	3710	2960	842	813	176		
27	87	63	35	44	120	3080	3330	3850	2740	804	679	172		
28	88	52	37	46	125	3390	3550	4180	2530	841	545	165		
29	88	34	38	42	---	3500	3320	5780	2340	935	456	162		
30	90	63	36	41	---	3310	3150	5670	2190	935	406	157		
31	89	---	34	38	---	3070	---	5060	---	975	353	---		
TOTAL	2426	2392	1427	1372	1951	43033	79970	155950	151230	34630	36403	6433		
MEAN	78.3	79.7	46.0	44.3	69.7	1388	2666	5031	5041	1117	1174	214		
MAX	90	177	65	62	125	3500	3950	10800	10300	2050	2780	313		
MIN	71	34	18	32	41	160	1330	2790	2190	717	353	148		
AC-FT	4810	4740	2830	2720	3870	85360	158600	309300	300000	68690	72210	12760		
CFSM	.06	.06	.04	.03	.05	1.06	2.04	3.85	3.85	.85	.90	.16		
IN.	.07	.07	.04	.04	.06	1.22	2.27	4.44	4.30	.98	1.04	.18		
CAL YR 1990	TOTAL	93551	MEAN	256	MAX	2070	MIN	12	AC-FT	185600	CFSM	.20	IN.	2.66
WTR YR 1991	TOTAL	517217	MEAN	1417	MAX	10800	MIN	18	AC-FT	1026000	CFSM	1.08	IN.	14.71

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 mi².

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 encoder. 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. 15 to Feb. 25. Records good except those for estimated daily discharges, which are poor. Occasional minor regulation caused by dam 0.8 mi upstream from gage. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and data collection platform and City of Fort Dodge gage-height telemeter at station.

AVERAGE DISCHARGE.--59 years (water years 1914-27, 1947-91), 1,560 ft³/s, 5.06 in/yr, 1,130,000 acre-ft/yr; median of yearly mean discharges, 1,300 ft³/s, 4.2 in/yr, 942,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 35,600 ft³/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 ft³/s Nov. 3, 1955.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 6,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 25	0100	9,940	8.15	May 18	1015	*23,600	*13.24
Apr. 16	1145	10,800	8.50	June 6	0945	23,400	13.14
Apr. 27	0900	10,000	8.17	June 10	1015	14,100	9.75
May 8	1330	14,800	10.04	June 16	1800	16,500	10.67

Minimum discharge, 58 ft³/s Dec. 3.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	211	182	182	120	130	613	5480	7140	10900	5790	1960	593		
2	202	183	167	135	150	2240	4920	7020	10300	5520	1850	549		
3	213	235	74	115	180	2050	4490	6520	9450	5150	1710	519		
4	211	231	98	105	190	1390	4110	6040	14300	4720	1540	481		
5	201	199	145	145	220	1060	3750	8100	19600	4310	1390	457		
6	193	199	164	145	190	1440	3400	12800	23000	4000	1250	435		
7	186	196	163	140	200	1620	3160	14300	20400	3690	1210	416		
8	185	184	149	145	210	1740	2970	14400	17500	3450	3250	406		
9	186	183	153	145	180	1630	2850	13700	15600	3450	3870	395		
10	186	186	161	150	175	1410	2760	12100	13900	3250	3990	377		
11	186	183	174	140	170	1400	2610	10300	12200	3040	3690	369		
12	184	179	187	150	180	1570	2850	8810	10600	2890	3700	422		
13	181	179	214	160	160	1220	4290	7680	9720	2760	3750	573		
14	185	179	183	165	240	1270	6790	6860	9530	2720	3530	516		
15	185	196	190	170	295	1230	9510	8430	11200	2650	3150	516		
16	180	198	195	180	240	1300	10700	10300	15700	2470	2800	545		
17	180	185	200	170	200	1380	10300	13200	14700	2300	2460	638		
18	196	182	190	160	160	1780	9820	21800	12700	2110	2080	695		
19	174	179	180	180	165	1990	9730	17300	11100	1930	1750	666		
20	180	224	190	200	175	2380	9510	14100	9810	1810	1570	615		
21	195	277	150	130	200	2960	8840	12400	9150	1750	1520	571		
22	188	228	120	125	250	3800	7780	11100	8590	1700	1350	535		
23	190	205	110	140	350	7140	6870	10100	7980	1750	1270	506		
24	183	190	105	145	430	9280	6030	9060	7670	1870	1220	483		
25	182	189	120	130	460	9700	5340	8320	7600	1820	1200	473		
26	184	186	110	140	439	8870	5800	8660	7490	1740	1190	451		
27	193	192	120	140	472	8550	9560	8280	7260	1550	1050	443		
28	186	174	125	145	421	8560	9440	8680	6920	1750	901	433		
29	182	140	130	135	---	8240	8220	9600	6530	2010	785	423		
30	182	152	120	130	---	7290	7190	10000	6170	2160	759	418		
31	182	---	115	120	---	6250	---	9620	---	2080	660	---		
TOTAL	5852	5795	4684	4500	6832	111353	189070	326720	347570	88190	62405	14919		
MEAN	189	193	151	145	244	3592	6302	10540	11590	2845	2013	497		
MAX	213	277	214	200	472	9700	10700	21800	23000	5790	3990	695		
MIN	174	140	74	105	130	613	2610	6040	6170	1550	660	369		
AC-FT	11610	11490	9290	8930	13550	220900	375000	648000	689400	174900	123800	29590		
CFSM	.05	.05	.04	.03	.06	.86	1.50	2.52	2.77	.68	.48	.12		
IN.	.05	.05	.04	.04	.06	.99	1.68	2.90	3.09	.78	.55	.13		
CAL YR 1990	TOTAL	314696	MEAN	862	MAX	12200	MIN	28	AC-FT	624200	CFSM	.21	IN.	2.79
WTR YR 1991	TOTAL	1167890	MEAN	3200	MAX	23000	MIN	74	AC-FT	2317000	CFSM	.76	IN.	10.37

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 mi².

PERIOD OF RECORD.--March 1940 to current year.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1308: 1940 (M), WSP 1708: 1956.

GAGE.--Water-stage encoder. 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: Oct. 7-9, Dec. 3-9, and Dec. 13 to Mar. 5. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and gage-height satellite data collection platform at station.

AVERAGE DISCHARGE.--51 years, 422 ft³/s, 6.79 in/yr, 305,700 acre-ft/yr; median of yearly mean discharges, 370 ft³/s, 6.0 in/yr, 268,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 20,300 ft³/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 ft³/s. Flood of June 18, 1932, reached a stage of 16.0 ft, discharge, 15,000 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,200 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 4	----	2,690	ice jam	May 6	1630	4,840	8.37
Mar. 13	1445	2,560	6.04	May 19	1600	10,100	13.06
Mar. 26	0015	4,530	8.13	June 1	1330	7,310	10.72
Apr. 15	2100	4,140	7.79	June 5	0015	*13,500	*15.63
Apr. 28	0345	6,910	10.38	June 18	0200	3,230	6.71

Minimum daily discharge, 12 ft³/s Jan. 4.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	68	64	58	16	17	350	1630	3950	7130	775	117	90
2	66	65	45	20	23	1200	1380	3010	6360	714	122	71
3	69	64	22	14	34	1800	1200	2470	5080	639	120	64
4	79	67	28	12	39	1600	1060	2170	9300	587	118	58
5	82	70	40	23	53	1200	954	2960	11100	566	115	55
6	86	71	50	21	38	1320	877	4630	7260	555	105	52
7	90	72	45	22	43	1360	802	4490	6440	530	105	49
8	79	72	43	22	47	1200	772	4250	4890	477	1390	53
9	77	70	44	23	34	1050	768	3780	3490	442	1450	51
10	77	69	47	25	32	921	754	2990	2760	418	1240	49
11	74	69	51	21	30	846	735	2510	2320	407	1080	48
12	73	71	54	24	34	1010	1030	2170	1990	411	790	67
13	71	69	60	28	26	1700	1790	1910	1770	409	578	390
14	71	67	52	30	62	1480	3060	1710	1730	406	448	388
15	69	65	54	32	97	1240	4020	1630	1880	397	352	515
16	69	65	58	36	62	1430	3970	3070	2420	359	284	345
17	67	64	60	32	42	1840	3680	4930	2940	298	254	265
18	68	62	50	28	26	2260	3040	9440	3090	248	207	224
19	67	60	47	36	27	2250	3110	9980	2340	214	175	175
20	67	61	43	45	31	2210	3240	8920	1840	193	151	149
21	71	62	26	18	41	2210	2930	6640	1650	180	136	130
22	69	61	21	16	67	2150	2630	4810	1900	168	124	113
23	68	61	18	21	138	2950	2250	3750	1760	157	120	102
24	68	61	17	22	215	4130	1910	3050	1350	149	119	96
25	65	59	21	17	248	4450	1650	2560	1160	140	109	93
26	65	57	18	20	224	4410	1880	4020	1030	131	105	85
27	64	59	16	20	165	4050	5430	5210	935	121	93	81
28	63	53	17	22	250	3630	6610	5360	851	115	84	77
29	64	44	18	19	---	3030	5800	6050	801	116	78	74
30	63	52	16	17	---	2420	5110	5850	794	114	82	70
31	63	---	14	14	---	1970	---	5480	---	113	97	---
TOTAL	2192	1906	1153	716	2145	63667	74072	133750	98361	10549	10348	4079
MEAN	70.7	63.5	37.2	23.1	76.6	2054	2469	4315	3279	340	334	136
MAX	90	72	60	45	250	4450	6610	9980	11100	775	1450	515
MIN	63	44	14	12	17	350	735	1630	794	113	78	48
AC-FT	4350	3780	2290	1420	4250	126300	146900	265300	195100	20920	20530	8090
CFSM	.08	.08	.04	.03	.09	2.43	2.93	5.11	3.88	.40	.40	.16
IN.	.10	.08	.05	.03	.09	2.81	3.26	5.90	4.34	.46	.46	.18
CAL YR 1990	TOTAL 144963.2	MEAN 397	MAX 4900	MIN 8.8	AC-FT 287500	CFSM .47	IN. 6.39					
WTR YR 1991	TOTAL 402938	MEAN 1104	MAX 11100	MIN 12	AC-FT 799200	CFSM 1.31	IN. 17.76					

DES MOINES RIVER BASIN

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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 mi².

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 encoder. 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. 3-11 and Dec. 14 to Mar. 10. Records good except those for estimated daily discharges, which are poor. Occasional minor regulation caused by dam at Fort Dodge. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--71 years, 1,998 ft³/s, 4.98 in/yr, 1,448,000 acre-ft/yr; median of yearly mean discharges, 1,630 ft³/s, 4.1 in/yr, 1,180,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 57,400 ft³/s June 22, 1954, gage height, 25.35 ft, from graph based on hourly gage readings, site and datum then in use; 29.7 ft, present site and datum; 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 ft³/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 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 7,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 25	2030	15,600	16.38	May 19	0600	32,400	22.87
Apr. 16	1630	16,000	16.57	June 5	1300	*33,800	*23.31
Apr. 27	2330	19,000	17.99	June 17	1115	19,200	18.06
May 7	2000	19,300	18.12				

Minimum daily discharge, 120 ft³/s Dec. 3.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	331	279	247	185	170	1500	8240	12900	18700	7540	2480	887
2	323	279	275	215	215	2100	7170	11500	19000	7110	2330	819
3	334	287	120	165	280	3500	6480	10400	17000	6720	2170	753
4	354	325	185	155	310	2600	5910	9490	25700	6220	2000	711
5	333	340	280	240	410	2400	5360	10600	33400	5680	1820	675
6	315	298	355	245	290	2700	4870	16400	32200	5210	1680	651
7	308	300	330	250	310	2600	4460	18900	29900	4790	1570	621
8	310	296	260	250	330	2800	4360	18900	26100	4410	2930	608
9	314	289	270	255	260	2700	4320	18700	22100	4240	5750	603
10	309	279	280	260	240	2600	4000	17200	19400	4130	5840	577
11	306	281	325	230	225	2640	3800	15100	17100	3870	5530	616
12	301	279	356	255	235	2750	4630	12900	15100	3740	5020	560
13	299	278	408	280	190	3820	6690	11100	13400	3480	4830	689
14	295	280	420	290	340	3500	10600	9850	12700	3320	4650	843
15	293	277	400	300	460	2920	14500	9730	13000	3260	4190	888
16	295	281	410	330	325	3060	15800	12800	16200	3110	3650	918
17	293	290	420	300	240	3920	15500	17200	19000	2930	3260	924
18	294	281	410	270	200	5290	14400	26300	17900	2720	2800	918
19	304	272	330	330	230	5290	14500	31400	15900	2520	2390	934
20	286	277	360	360	270	5240	14300	27000	13800	2350	2040	937
21	292	309	290	185	320	5580	13400	22800	12500	2230	1920	928
22	305	351	205	170	510	5950	12000	19000	12100	2150	1780	924
23	293	315	175	205	780	9970	10700	16200	11500	2100	1610	861
24	292	298	155	210	1000	13800	9340	14100	10500	2170	1550	810
25	285	287	230	180	1050	15500	8230	12400	9990	2220	1460	718
26	284	282	160	205	930	15000	8830	12700	9730	2140	1440	690
27	276	282	175	205	980	14100	16700	14500	9410	2040	1400	665
28	280	283	185	215	760	13400	18800	14700	8980	1980	1260	647
29	281	266	195	185	---	12400	17400	16200	8490	2230	1110	637
30	273	249	165	175	---	11200	15100	17900	8000	2540	1010	623
31	277	---	160	155	---	9640	---	17400	---	2590	1010	---
TOTAL	9335	8690	8536	7255	11860	190470	300390	496270	498800	111740	82480	22635
MEAN	301	290	275	234	424	6144	10010	16630	16630	3605	2661	754
MAX	354	351	420	360	1050	15500	18800	31400	33400	7540	5840	937
MIN	273	249	120	155	170	1500	3800	9490	8000	1980	1010	560
AC-FT	18520	17240	16930	14390	23520	377800	595800	984400	989400	221600	163600	44900
CFSM	.06	.05	.05	.04	.08	1.13	1.84	2.94	3.05	.66	.49	.14
IN.	.06	.06	.06	.05	.08	1.30	2.05	3.39	3.40	.76	.56	.15
CAL YR 1990 TOTAL	580083	MEAN 1589	MAX 18100	MIN 44	AC-FT 1151000	CFSM .29	IN. 3.96					
WTR YR 1991 TOTAL	1748461	MEAN 4790	MAX 33400	MIN 120	AC-FT 3468000	CFSM .88	IN. 11.93					

05481630 SAYLORVILLE LAKE NEAR SAYLORVILLE, IA

LOCATION.--Lat 41°42'13", long 93°41'21", in SE 1/4 SW 1/4 sec.30, T.80 N., R.24 W., Polk County, Hydrologic Unit 07100004, in control tower of Saylorville Dam, 3.2 mi northwest of Saylorville, 4.2 mi upstream from Beaver Creek, and at mile 213.7.

DRAINAGE AREA.--5,823 mi².

PERIOD OF RECORD.--April 1977 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 1976. Storage began in April 1977. Release controlled at intake structure to forechamber of 22 ft diameter concrete conduit through dam. Ungated chute spillway 430 ft in length at right end of dam at elevation 884 ft, contents, 570,000 acre-ft. Conservation pool at elevation 833 ft, contents, 74,000 acre-ft, surface area, 5,400 acres. Flood pool elevation at 890 ft, contents, 676,000 acre-ft, surface area, 16,700 acres. Reservoir is used for flood control, low-flow augmentation, conservation and recreation. 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, 655,000 acre-ft June 22, 1984; maximum elevation, 889.25 ft June 22, 1984; minimum daily contents, 45,000 acre-ft May 15, 1985; minimum elevation, 832.61 ft Jan. 19, 1979.

EXTREMES FOR CURRENT YEAR.--Maximum daily contents, 651,000 acre-ft June 9; maximum elevation, 889.00 ft June 9; minimum daily contents, 85,500 acre-ft Jan. 27; minimum elevation, 835.90 ft Jan. 2

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

805	360	833	74,000	884	570,000
810	2,300	840	116,000	890	676,000
815	7,700	850	190,000	900	938,000
820	19,000	860	278,000	910	1,320,000
830	58,600	880	511,000	915	1,530,000

RESERVOIR STORAGE (ACRE-FEET), WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY OBSERVATION AT 24:00 VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	106000	105000	105000	92000	91900	93700	106000	299000	506000	376000	225000	93300
2	106000	106000	106000	92400	91700	95700	98600	301000	514000	364000	221000	93900
3	107000	106000	106000	92300	91700	95400	93500	300000	519000	352000	213000	94400
4	107000	106000	105000	92300	91900	95900	91900	296000	532000	340000	205000	94500
5	107000	105000	105000	92400	91900	97300	91500	293000	566000	328000	196000	95100
6	107000	105000	105000	92300	92200	96300	91300	298000	594000	318000	188000	95400
7	106000	104000	105000	92100	92500	94100	91200	310000	626000	309000	180000	95900
8	105000	104000	105000	91900	92800	92800	92400	326000	649000	300000	173000	96400
9	105000	104000	105000	91700	93100	91700	92000	342000	651000	290000	168000	97000
10	104000	104000	104000	86700	93000	91400	90200	356000	643000	280000	164000	97200
11	105000	104000	104000	92000	92400	91700	91100	364000	630000	272000	159000	97700
12	104000	104000	104000	91900	92200	92200	95600	367000	613000	268000	153000	98500
13	105000	104000	103000	91900	92300	92000	97200	365000	593000	265000	147000	99400
14	105000	104000	102000	91800	92300	92800	111000	361000	579000	263000	142000	101000
15	105000	105000	101000	91900	91900	92500	134000	357000	564000	261000	135000	102000
16	105000	104000	98800	91900	91700	91700	156000	357000	551000	259000	127000	102000
17	107000	104000	97500	91900	91400	93000	174000	365000	547000	257000	118000	101000
18	105000	105000	95200	91900	91200	95500	186000	386000	543000	254000	110000	101000
19	105000	105000	93500	92000	91000	96700	198000	426000	533000	251000	105000	101000
20	106000	105000	92700	92000	91000	96300	215000	465000	519000	249000	100000	101000
21	106000	105000	91600	92000	91200	94300	231000	490000	500000	247000	97800	101000
22	106000	105000	91200	91900	91900	93600	240000	501000	481000	245000	95700	101000
23	106000	106000	91100	91900	92700	94900	243000	503000	468000	243000	93500	101000
24	106000	106000	91200	91800	93300	104000	241000	500000	444000	241000	91700	101000
25	106000	106000	91500	91800	92900	112000	237000	494000	428000	239000	90100	101000
26	106000	106000	91800	91700	92600	118000	233000	486000	418000	237000	89600	101000
27	106000	106000	91900	85500	92300	123000	243000	482000	411000	236000	89300	101000
28	105000	106000	92200	92100	92000	125000	262000	479000	404000	235000	89300	100000
29	105000	105000	92200	92000	---	124000	279000	485000	396000	233000	90600	100000
30	105000	105000	92000	92000	---	120000	293000	493000	387000	231000	91800	99900
31	105000	---	92100	91900	---	114000	---	500000	---	229000	92600	---
MEAN	106000	105000	98400	91600	92100	100000	163000	398000	527000	273000	137000	98800
MAX	107000	106000	106000	92400	93300	125000	293000	503000	651000	376000	225000	102000
MIN	104000	104000	91100	85500	91000	91400	90200	293000	387000	229000	89300	93300
CAL YR 1990	MEAN 130000	MAX 395000	MIN 71200									
WTR YR 1991	MEAN 183000	MAX 651000	MIN 85500									

DES MOINES RIVER BASIN

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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 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1961 to current year.

GAGE.--Water-stage encoder. 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 discharges: Dec. 21 to Feb. 4. Records good except those for estimated daily discharges, which are poor. 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.--30 years, 2,846 ft³/s, 6.62 in/yr, 2,062,000 acre-ft/yr; median of yearly mean discharges, 2,280 ft³/s, 5.3 in/yr, 1,650,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 47,400 ft³/s Apr. 10, 1965, gage height, 24.02 ft; minimum daily discharge, 13 ft³/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 ft³/s.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 26,000 ft³/s June 10, gage height, 19.41 ft; minimum daily discharge, 170 ft³/s Jan. 5, 6, 29.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	436	411	347	200	220	1130	13000	11500	17100	11800	3870	612
2	438	408	345	190	230	1890	11600	11900	17000	11800	4420	614
3	443	572	343	180	270	3320	9970	12400	17100	11600	5250	605
4	433	730	343	180	300	3670	7660	12500	17600	11200	5600	568
5	523	729	342	170	328	3550	6740	12600	18900	10600	5610	427
6	586	726	343	170	329	4160	6190	12700	21900	9780	5600	355
7	705	724	342	180	325	4590	5730	12700	22000	8920	5540	358
8	804	620	346	180	474	4190	5500	12600	19900	8560	5600	362
9	801	387	352	180	566	3890	6130	12600	23000	8470	5970	361
10	518	515	809	180	821	3590	6170	12700	25700	8380	6630	357
11	341	515	909	200	1030	3330	5020	12700	25300	7890	7030	290
12	338	520	590	190	795	3350	5070	12800	23700	5710	7140	240
13	336	518	587	200	606	3850	7580	12800	22800	4680	6510	233
14	336	431	799	220	586	4230	7170	12700	21200	4430	6570	231
15	339	359	1440	200	619	4250	5370	12700	22200	4250	6840	633
16	336	357	1440	190	608	4250	6560	12700	22500	4060	6930	997
17	335	354	1430	190	605	4330	9040	12700	22300	3920	6680	1140
18	332	354	1420	210	605	5240	11300	12700	21700	3880	6030	940
19	334	354	1430	240	603	6150	11400	12800	21400	3630	4860	826
20	337	355	1120	210	609	6590	9360	13300	21100	3460	3830	832
21	340	355	680	190	616	7100	8160	15000	20800	3430	3030	832
22	338	353	540	200	628	7310	9210	16800	20500	3190	2740	830
23	337	349	450	190	802	7820	10600	17100	20200	3040	2720	832
24	347	348	320	180	1040	9270	11200	17000	19900	2860	2400	720
25	349	349	240	180	1380	11000	11100	16900	18200	2720	2180	648
26	352	393	200	190	1390	13100	11000	16900	14700	2700	1710	656
27	504	546	210	180	1260	13900	10300	16800	12400	2680	1490	655
28	710	631	220	180	1260	14000	10400	16800	11700	2670	1420	654
29	537	636	200	170	---	14100	11600	16800	11700	2800	651	656
30	409	474	180	180	---	14000	11600	17400	11800	2890	615	650
31	408	---	190	200	---	13800	---	17600	---	3470	614	---
TOTAL	13682	14373	18507	5900	18905	204950	261730	437200	586300	179470	136080	18114
MEAN	441	479	597	190	675	6611	8724	14100	19540	5789	4390	604
MAX	804	730	1440	240	1390	14100	13000	17600	25700	11800	7140	1140
MIN	332	348	180	170	220	1130	5020	11500	11700	2670	614	231
AC-FT	27140	28510	36710	11700	37500	406500	519100	867200	1163000	356000	269900	35930

CAL YR 1990 TOTAL 764870 MEAN 2096 MAX 11900 MIN 180 AC-FT 1517000
WTR YR 1991 TOTAL 1895211 MEAN 5192 MAX 25700 MIN 170 AC-FT 3759000

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. 1965, Sept. 1, 1988, Feb. 9, July 8, 1990.

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, 796 microsiemens Oct. 2; minimum daily, 359 microsiemens Jan. 14.

WATER TEMPERATURES: Maximum daily, 28.0°C July 11, 16-18, 20-22.

SEDIMENT CONCENTRATIONS: Maximum daily mean, 818 mg/L June 11; minimum daily mean, 1 mg/L June 22, 24.

SEDIMENT LOADS: Maximum daily, 55,800 tons Jun. 11; minimum daily, 1.2 tons Dec. 26.

SPECIFIC CONDUCTANCE MICROSIEMENS/CM AT 25 DEG C, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	685	767	---	---	662	669	641	---	550	505	566	584
2	796	697	---	704	---	---	644	550	567	---	626	642
3	695	---	---	---	---	---	672	636	564	---	---	541
4	750	---	730	681	646	674	700	---	567	---	---	583
5	748	636	---	---	---	738	---	---	572	---	---	571
6	594	645	---	675	700	619	---	631	573	577	---	568
7	607	---	---	---	---	---	620	593	578	563	---	585
8	624	696	---	692	671	667	731	584	569	---	---	578
9	622	---	---	---	---	---	689	614	573	569	552	580
10	598	787	650	692	---	---	---	625	566	530	---	657
11	643	793	613	---	727	688	655	---	564	575	---	666
12	631	726	---	---	694	---	654	535	571	---	560	556
13	595	658	629	694	---	---	643	635	506	---	570	646
14	655	709	626	359	---	629	657	610	511	---	604	667
15	683	668	715	687	---	613	---	642	508	---	587	636
16	640	735	---	---	663	616	---	601	511	521	560	575
17	656	680	684	---	---	---	---	---	512	630	---	588
18	574	690	---	656	676	---	630	---	513	637	570	568
19	654	633	---	---	---	607	---	---	509	---	661	628
20	543	731	701	---	701	614	654	581	505	594	541	640
21	597	639	---	657	682	621	---	587	---	595	659	658
22	624	---	699	---	656	613	573	586	525	594	675	637
23	585	746	---	664	---	611	---	569	520	---	682	628
24	585	678	---	---	---	---	573	564	517	---	---	643
25	650	735	---	---	---	585	625	567	518	---	---	---
26	638	664	---	670	---	640	612	567	518	698	643	633
27	694	---	685	---	674	640	635	563	519	597	---	657
28	---	638	---	675	---	649	---	554	---	637	548	642
29	631	---	---	---	---	---	---	561	493	591	593	648
30	710	677	---	680	---	647	637	563	515	657	575	646
31	733	---	689	---	---	644	---	562	---	---	---	---

DES MOINES RIVER BASIN

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05481650 DES MOINES RIVER NEAR SAYLORVILLE, IA--Continued

WATER-QUALITY RECORDS

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	18.0	11.0	---	---	3.0	6.0	9.0	---	20.0	26.0	24.0	25.0
2	17.0	11.0	---	2.0	---	---	9.0	12.0	20.0	---	24.0	25.0
3	17.0	---	---	---	---	---	9.0	12.0	21.0	---	---	24.0
4	17.0	---	3.0	2.0	4.0	6.0	9.0	---	21.0	---	---	24.0
5	17.0	11.0	---	---	---	6.0	---	---	21.0	---	---	24.0
6	17.0	4.0	---	2.0	4.0	6.0	---	12.0	21.0	26.0	---	24.0
7	17.0	---	---	---	---	---	10.0	13.0	22.0	26.0	---	24.0
8	17.0	11.0	---	2.0	---	6.0	10.0	13.0	22.0	---	---	24.0
9	17.0	---	---	---	---	---	10.0	13.0	22.0	27.0	24.0	23.0
10	17.0	11.0	4.0	2.0	---	---	---	13.0	22.0	27.0	---	23.0
11	17.0	11.0	4.0	---	5.0	5.0	10.0	---	22.0	28.0	---	23.0
12	17.0	11.0	---	---	5.0	---	10.0	14.0	23.0	---	25.0	22.0
13	17.0	11.0	3.0	2.0	---	---	10.0	14.0	23.0	---	25.0	22.0
14	17.0	10.0	3.0	---	---	5.0	10.0	15.0	23.0	---	25.0	22.0
15	16.0	10.0	3.0	2.0	---	5.0	---	15.0	23.0	---	26.0	22.0
16	16.0	10.0	---	---	6.0	5.0	---	15.0	23.0	28.0	26.0	22.0
17	16.0	10.0	3.0	---	---	---	---	---	23.0	28.0	---	22.0
18	15.0	10.0	---	2.0	6.0	---	11.0	---	23.0	28.0	25.0	22.0
19	15.0	10.0	---	---	---	6.0	---	---	23.0	---	25.0	19.0
20	14.0	10.0	3.0	---	6.0	6.0	11.0	16.0	23.0	28.0	25.0	19.0
21	14.0	10.0	---	2.0	6.0	6.0	---	16.0	23.0	28.0	25.0	19.0
22	14.0	---	3.0	---	6.0	6.0	11.0	16.0	23.0	28.0	25.0	18.0
23	14.0	10.0	---	2.0	---	6.0	---	16.0	23.0	---	25.0	18.0
24	13.0	10.0	---	---	---	---	11.0	---	24.0	---	---	18.0
25	13.0	10.0	---	---	---	7.0	11.0	18.0	24.0	---	---	---
26	13.0	10.0	---	2.0	---	7.0	12.0	19.0	26.0	27.0	25.0	18.0
27	13.0	---	2.0	---	6.0	8.0	12.0	19.0	26.0	27.0	---	17.0
28	---	6.0	---	2.0	---	8.0	---	20.0	---	27.0	25.0	17.0
29	13.0	---	---	---	---	---	---	20.0	26.0	---	25.0	17.0
30	12.0	6.0	---	3.0	---	9.0	12.0	20.0	26.0	---	25.0	17.0
31	12.0	---	2.0	---	---	9.0	---	20.0	---	---	---	---

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	27	32	24	27	24	23	6	3.0	9	5.5	6	19
2	24	28	24	26	29	27	9	4.7	9	5.6	19	110
3	95	114	27	44	42	39	11	5.2	11	7.8	4	34
4	57	67	26	51	48	45	17	8.0	10	7.8	5	54
5	42	60	31	61	21	19	13	5.7	5	4.0	3	32
6	46	73	39	76	20	19	11	5.0	5	4.1	6	73
7	43	84	33	64	20	18	11	5.5	2	1.9	7	90
8	49	107	22	38	20	19	31	15	4	6.2	11	120
9	48	103	21	22	21	20	17	8.2	6	9.9	12	128
10	42	60	23	32	308	657	17	8.2	18	47	12	116
11	65	60	27	37	21	60	18	9.6	24	66	12	106
12	83	76	31	44	7	11	17	8.9	11	25	12	105
13	81	74	31	43	7	11	33	18	10	16	34	370
14	71	64	25	30	22	52	32	19	10	16	34	394
15	54	49	23	22	24	92	30	16	37	63	6	68
16	36	33	12	12	17	64	19	10	29	47	3	32
17	27	24	13	12	4	15	20	10	20	33	3	37
18	60	54	12	12	7	27	31	18	31	51	3	39
19	45	40	19	18	12	47	29	19	20	33	3	55
20	52	47	18	17	3	9.6	20	11	24	40	3	51
21	45	41	21	20	2	4.1	17	8.6	24	41	3	52
22	95	87	22	21	7	9.9	17	9.1	6	10	4	71
23	93	84	49	46	3	3.8	25	13	14	32	10	213
24	28	26	61	57	2	2.0	20	9.6	18	53	15	373
25	23	21	58	55	2	1.4	20	9.6	55	220	54	1640
26	22	21	22	24	2	1.2	25	13	57	215	54	1920
27	22	30	27	41	3	1.5	20	9.7	36	121	54	2040
28	21	41	28	48	2	1.3	8	3.7	14	49	62	2350
29	21	31	25	43	4	2.2	7	3.3	---	---	58	2190
30	25	28	24	31	4	2.0	10	4.6	---	---	51	1930
31	24	26	---	---	22	11	9	4.8	---	---	49	1820
TOTAL	---	1685	---	1074	---	1315.0	---	297.0	---	1230.8	---	16632

DES MOINES RIVER BASIN

05481650 DES MOINES RIVER NEAR SAYLORVILLE, IA--Continued

WATER-QUALITY RECORDS

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	42	1470	8	233	429	19800	28	903	16	170	69	114
2	44	1380	7	238	432	19900	30	954	228	2700	47	78
3	49	1320	17	573	482	22200	30	947	161	2270	56	91
4	36	752	30	1010	435	20700	30	915	110	1660	39	61
5	35	628	31	1070	477	24300	30	866	103	1560	52	58
6	34	571	33	1130	412	24400	33	861	86	1290	58	56
7	34	518	61	2090	521	31300	40	952	79	1180	47	46
8	36	532	68	2310	262	14000	40	924	110	1660	42	41
9	49	811	14	491	178	10800	27	611	159	2600	20	19
10	49	809	13	452	744	51500	23	511	79	1420	16	15
11	48	653	13	461	818	55800	104	2220	27	512	25	19
12	49	671	14	479	626	40000	87	1360	20	386	41	26
13	57	1180	11	378	17	1060	79	999	20	353	22	14
14	55	1070	10	334	19	1110	57	694	78	1370	19	12
15	49	718	16	554	16	973	45	516	19	361	26	45
16	52	939	21	734	15	927	84	929	129	2410	39	107
17	80	1940	23	782	18	1080	55	580	75	1360	60	186
18	63	1920	28	965	14	849	54	565	50	827	65	164
19	74	2250	61	2120	3	148	57	560	48	619	24	54
20	125	3180	207	7430	16	896	54	507	69	729	24	53
21	80	1760	85	3410	2	123	50	466	52	421	29	64
22	73	1830	36	1600	1	38	62	531	78	577	28	62
23	96	2790	10	456	2	108	62	507	84	618	33	75
24	104	3150	15	674	1	71	49	378	66	426	38	73
25	121	3630	16	715	3	131	40	292	57	333	45	79
26	44	1300	15	669	38	1490	49	356	50	225	41	72
27	25	714	16	715	23	799	69	497	52	207	21	37
28	8	223	19	874	10	325	65	465	48	182	27	47
29	10	328	7	334	10	317	154	1160	59	102	26	47
30	8	238	5	233	11	338	163	1270	97	160	25	43
31	---	---	38	1800	---	---	102	920	80	132	---	---
TOTAL	---	39275	---	35314	---	345483	---	24216	---	28820	---	1858
YEAR		497199.8										

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	TEMPER- ATURE WATER (DEG C) (00010)	DIS- CHARGE, INST. CUBIC FEET PER SECOND (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)
APR						
02...	1212	12.0	11600	41	1280	80
MAY						
31...	1055	--	17700	16	765	81
JUN						
06...	1224	18.0	22100	97	5790	79

DES MOINES RIVER BASIN

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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 mi².

PERIOD OF RECORD.--April 1960 to current year.

REVISED RECORDS.--WDR IA-77-1: 1974 (P).

GAGE.--Water-stage encoder 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: Nov. 3, Nov. 28 to Dec. 5, Dec. 7, 8, Dec. 17 to Feb. 21, Mar. 3-5, 7-10, 19-27, July 11, 12, and Sept. 13-15. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers satellite data collection platform at station.

AVERAGE DISCHARGE.--31 years, 210 ft³/s, 7.97 in/yr, 152,100 acre-ft/yr; median of yearly mean discharges, 200 ft³/s, 7.6 in/yr, 145,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 7,980 ft³/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 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Apr. 15	1630	2,510	11.16	May 30	1845	1,850	9.89
Apr. 20	0500	1,830	9.84	June 7	1045	2,610	11.27
Apr. 29	1115	1,800	9.77	June 16	1145	*3,340	*11.96
May 29	2145	1,800	9.78				

Minimum discharge, 0.50 ft³/s Sept. 7.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	23	22	70	9.6	2.1	171	382	1140	1040	238	21	3.7
2	21	22	70	7.8	2.3	166	353	901	1080	222	18	3.0
3	29	28	56	7.0	3.6	169	332	747	925	200	15	2.3
4	35	45	51	6.9	16	307	314	671	1390	185	13	1.8
5	33	47	64	6.8	58	425	296	815	1460	172	12	1.7
6	29	46	29	7.0	50	418	282	1170	1990	163	34	1.5
7	26	44	22	6.6	46	402	269	1270	2450	151	28	1.0
8	24	44	22	7.0	44	326	267	992	1670	137	136	2.2
9	25	46	28	7.6	60	263	482	788	1020	136	139	4.3
10	25	47	31	7.8	90	216	642	668	901	136	101	2.8
11	26	51	37	8.6	100	183	530	590	762	135	65	2.0
12	25	55	51	8.6	84	153	688	538	625	133	45	6.2
13	25	58	69	9.8	74	146	1450	500	533	106	38	13
14	26	59	96	11	65	151	1910	457	1070	95	33	8.7
15	24	57	127	9.8	60	157	2350	446	2210	88	28	7.2
16	24	54	121	9.0	90	157	2320	525	3100	79	27	7.8
17	22	50	101	7.8	130	156	1820	671	2000	71	24	8.3
18	20	47	69	8.2	140	157	1250	801	1060	62	17	13
19	21	43	102	9.8	110	169	1580	1070	806	54	15	8.4
20	23	43	60	8.0	100	218	1810	1270	651	50	13	6.0
21	24	44	34	7.2	110	222	1560	948	538	47	14	4.6
22	23	41	19	7.2	131	202	1160	833	472	42	15	3.8
23	24	39	15	7.2	138	187	916	739	433	40	13	3.2
24	24	37	20	6.6	143	200	753	634	402	36	10	2.8
25	22	36	21	6.0	149	236	647	546	378	31	8.2	2.4
26	21	36	15	5.2	157	319	600	516	353	25	7.3	2.2
27	20	38	14	4.4	165	476	1110	590	328	23	6.0	2.2
28	19	50	12	4.0	169	643	1600	485	301	27	4.3	1.8
29	20	40	15	3.3	---	644	1740	679	285	31	3.8	1.6
30	20	52	11	2.3	---	497	1380	1610	260	32	4.6	1.1
31	20	---	10	2.2	---	425	---	1460	---	29	3.9	---
TOTAL	743	1321	1462	220.3	2487.0	8561	30793	25070	30493	2976	912.1	130.6
MEAN	24.0	44.0	47.2	7.11	88.8	276	1026	809	1016	96.0	29.4	4.35
MAX	35	59	127	11	169	644	2350	1610	3100	238	139	13
MIN	19	22	10	2.2	2.1	146	267	446	260	23	3.8	1.0
AC-FT	1470	2620	2900	437	4930	16980	61080	49730	60480	5900	1810	259
CFSM	.07	.12	.13	.02	.25	.77	2.87	2.26	2.84	.27	.08	.01
IN.	.08	.14	.15	.02	.26	.89	3.20	2.61	3.17	.31	.09	.01

CAL YR 1990	TOTAL 108998.76	MEAN 299	MAX 5310	MIN .06	AC-FT 216200	CFSM .83	IN. 11.33
WTR YR 1991	TOTAL 105169.0	MEAN 288	MAX 3100	MIN 1.0	AC-FT 208600	CFSM .80	IN. 10.93

DES MOINES RIVER BASIN

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 mi².

PERIOD OF RECORD.--October 1982 to current year.

GAGE.--Water-stage encoder. Datum of gage is 1235.50 ft above NGVD.

REMARKS.--Estimated daily discharges: Nov. 6-10, Dec. 3-6, Dec. 13 to Mar. 10, and Apr. 26. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. National Weather Service Limited Automatic Remote Collector at station.

AVERAGE DISCHARGE.--9 years, 165 ft³/s, 9.62 in/yr, 119,600 acre-ft/yr; median of yearly mean discharge 150 ft³/s, 8.7 in/yr, 109,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,850 ft³/s June 17, 1984, gage height, 16.73 ft, from flood-mark; minimum discharge, 0.07 ft³/s Dec. 22-24, 1989.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 750 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Apr. 15	1100	1,360	14.63	June 1	0500	1,240	14.37
Apr. 27	1700	1,030	13.96	June 4	0815	*1,910	*15.57
May 6	0115	1,290	14.48	June 15	1945	1,700	15.24
May 19	0145	1,590	15.06	Aug. 8	0830	1,180	14.18

Minimum daily discharge, 2.1 ft³/s Jan. 31.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	4.5	4.2	6.2	4.5	2.2	24	235	494	1190	194	16	6.8		
2	4.4	4.1	5.3	4.6	2.4	93	211	401	991	170	15	6.7		
3	4.5	4.7	10	4.1	2.8	94	190	348	774	153	14	6.9		
4	7.2	6.1	11	3.8	3.7	68	174	702	1800	140	12	6.5		
5	4.7	5.1	10	4.7	4.8	54	164	975	1680	129	11	6.3		
6	3.9	5.0	11	4.5	4.4	62	157	1200	1170	122	11	6.1		
7	4.1	4.9	13	4.3	4.5	64	144	879	817	121	36	5.7		
8	4.1	4.5	17	4.4	5.0	64	132	796	593	120	826	7.0		
9	4.0	4.7	19	4.4	5.6	57	126	820	478	109	357	7.0		
10	4.2	4.7	19	4.4	6.2	50	115	609	405	105	213	6.0		
11	5.3	4.9	18	4.2	6.5	46	110	485	359	96	151	6.8		
12	5.1	4.4	16	4.3	6.7	50	138	424	323	114	114	12		
13	3.8	4.5	15	4.5	5.8	42	361	376	297	96	91	10		
14	4.8	4.9	15	4.6	7.2	46	944	340	345	85	76	9.1		
15	4.2	5.4	16	4.6	8.2	31	1240	325	1520	76	62	8.4		
16	3.9	4.7	15	4.6	7.7	30	884	349	1460	66	49	7.4		
17	4.3	4.6	14	4.3	7.4	33	605	633	986	59	44	7.0		
18	4.5	5.1	12	4.1	6.5	46	510	1420	646	52	33	7.0		
19	4.5	5.2	10	4.4	6.8	50	686	1480	476	45	31	6.9		
20	4.8	6.7	8.9	4.5	7.7	53	549	1070	399	42	28	6.7		
21	7.9	5.0	7.2	3.3	9.2	64	443	781	382	41	30	6.6		
22	7.4	5.2	5.7	3.1	12	109	384	640	399	34	24	6.8		
23	5.2	5.2	5.1	3.3	14	424	324	528	339	31	27	6.6		
24	4.4	4.9	5.1	3.3	17	642	275	438	306	32	25	6.6		
25	4.2	4.6	5.6	3.0	17	476	245	380	281	27	22	7.3		
26	4.6	5.1	4.9	3.0	19	355	290	467	260	23	19	6.7		
27	4.7	4.5	5.1	2.8	17	363	860	466	232	20	21	6.5		
28	3.8	5.6	5.0	2.8	17	441	851	377	209	27	18	6.8		
29	4.0	5.5	5.3	2.6	---	418	596	328	192	26	13	6.7		
30	4.1	5.5	4.8	2.3	---	324	607	313	177	24	7.9	6.6		
31	3.9	---	4.5	2.1	---	276	---	720	---	20	7.2	---		
TOTAL	145.0	149.5	319.7	119.4	234.3	4949	12550	19564	19486	2399	2404.1	213.5		
MEAN	4.68	4.98	10.3	3.85	8.37	160	418	631	650	77.4	77.6	7.12		
MAX	7.9	6.7	19	4.7	19	642	1240	1480	1800	194	826	12		
MIN	3.8	4.1	4.5	2.1	2.2	24	110	313	177	20	7.2	5.7		
AC-FT	288	297	634	237	465	9820	24890	38810	38650	4760	4770	423		
CFSM	.02	.02	.04	.02	.04	.69	1.80	2.71	2.79	.33	.33	.03		
IN.	.02	.02	.05	.02	.04	.79	2.00	3.12	3.11	.38	.38	.03		
CAL YR 1990	TOTAL	34388.55	MEAN	94.2	MAX	2250	MIN	.14	AC-FT	68210	CFSM	.40	IN.	5.49
WTR YR 1991	TOTAL	62533.5	MEAN	171	MAX	1800	MIN	2.1	AC-FT	124000	CFSM	.74	IN.	9.98

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 mi².

PERIOD OF RECORD.--October 1959 to September 1991 (discontinued).

GAGE.--Water-stage recorder. Datum of gage is 1,225.12 ft above NGVD.

REMARKS.--Estimated daily discharges: Nov. 27-30, Dec. 16 to Mar. 9, and Mar. 13-15. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data.

AVERAGE DISCHARGE.--32 years, 43.0 ft³/s, 7.30 in/yr, 31,150 acre-ft/yr; median of yearly mean discharges, 36 ft³/s, 6.1 in/yr, 26,100 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,080 ft³/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 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 23	0500	860	9.19	May 18	0545	628	8.07
Apr. 14	1315	960	9.65	May 31	2145	574	7.72
Apr. 19	0515	405	6.47	June 4	1030	*1,360	*11.32
Apr. 27	0915	572	7.71	June 15	1200	654	8.20
Apr. 30	0330	541	7.49	Aug. 8	0345	449	6.82
May 5	1515	864	9.21				

Minimum discharge 0.24 ft³/s Dec. 3

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5.3	6.8	3.8	5.5	3.3	11	172	319	451	63	11	4.9
2	5.1	6.8	3.1	6.2	3.8	48	144	234	320	61	9.9	4.7
3	6.2	5.9	.66	5.1	4.6	44	120	194	239	57	9.1	4.5
4	5.5	5.8	3.8	4.6	4.7	29	106	256	1020	53	7.8	4.1
5	4.7	5.2	3.7	6.5	5.4	22	92	653	698	49	7.0	3.8
6	4.6	5.0	7.9	6.4	4.4	29	82	562	483	47	6.6	4.3
7	3.9	4.6	9.2	6.0	4.6	34	73	415	379	44	30	4.4
8	4.2	4.6	8.8	6.2	4.7	36	71	398	301	42	339	4.2
9	4.6	4.5	8.8	6.1	3.8	34	71	348	243	41	173	4.0
10	4.5	4.4	9.2	6.2	3.6	34	65	269	211	41	106	3.6
11	4.6	3.9	11	5.6	3.3	33	62	216	207	38	72	3.6
12	4.1	3.6	11	6.0	3.4	38	110	183	207	35	52	8.1
13	4.3	3.9	7.8	6.3	3.9	23	243	158	206	30	38	6.9
14	4.3	4.3	7.3	6.4	4.4	25	703	137	206	28	26	5.9
15	3.6	4.3	9.1	6	5.3	24	572	140	562	26	19	5.3
16	3.7	3.6	7.6	6.8	4.0	27	415	150	439	23	16	4.4
17	4.7	3.2	9.6	6.3	3.1	37	317	304	312	21	15	3.8
18	7.0	4.0	11	5.8	2.3	59	281	555	225	19	12	3.7
19	6.4	3.9	9.6	6.5	2.3	78	365	395	169	17	10	3.3
20	6.5	3.9	8.0	7.1	2.3	109	280	316	139	17	11	3.0
21	7.3	4.5	6.4	4.3	2.6	138	223	261	171	16	17	2.8
22	6.0	3.5	5.7	4.0	3.4	199	183	219	195	14	12	2.6
23	6.0	3.4	5.3	4.5	5.0	797	154	185	146	14	11	2.4
24	5.2	3.4	5.3	4.6	6.5	690	127	158	124	12	11	2.3
25	5.1	3.3	6.1	3.9	7.2	497	112	138	112	11	9.2	2.3
26	5.6	3.4	5.4	4.2	6.9	390	172	164	101	10	7.9	2.1
27	5.4	3.0	5.9	4.1	7.7	395	506	145	89	9.2	7.3	2.0
28	4.5	3.2	6.1	4.2	6.9	355	354	123	81	20	6.4	2.1
29	4.7	3.1	6.9	3.8	---	309	309	109	75	20	6.0	2.0
30	4.8	4.0	5.7	3.5	---	240	470	108	69	16	5.6	1.9
31	4.3	---	5.4	3.1	---	207	---	297	---	13	5.2	---
TOTAL	156.7	127.0	215.16	165.8	123.4	4991	6954	8109	8180	907.2	1069.0	113.0
MEAN	5.05	4.23	6.94	5.35	4.41	161	232	262	273	29.3	34.5	3.77
MAX	7.3	6.8	11	7.1	7.7	797	703	653	1020	63	339	8.1
MIN	3.6	3.0	.66	3.1	2.3	11	62	108	69	9.2	5.2	1.9
AC-FT	311	252	427	329	245	9900	13790	16080	16230	1800	2120	224
CFSM	.06	.05	.09	.07	.06	2.01	2.90	3.27	3.41	.37	.43	.05
IN.	.07	.06	.10	.08	.06	2.32	3.23	3.77	3.80	.42	.50	.05
CAL YR 1990	TOTAL 16579.90	MEAN 45.4	MAX 1110	MIN .00	AC-FT 32890	CFSM .57	IN. 7.71					
WTR YR 1991	TOTAL 31111.26	MEAN 85.2	MAX 1020	MIN .66	AC-FT 61710	CFSM 1.07	IN. 14.47					

DES MOINES RIVER BASIN

05482300 NORTH RACCOON RIVER NEAR SAC CITY, IA

LOCATION.--Lat 42°21'16", long 94°59'26", in NW1/4 NW1/4 sec.13, T.87 N., R.36 W., Sac County, Hydrologic Unit 07100006, on right bank 5 ft downstream from bridge on county highway, 2.1 mi upstream from Indian Creek, 0.3 mi upstream from Drainage ditch 73, 4.6 mi south of Sac City, and at mile 367.6 upstream from mouth of Des Moines River.

DRAINAGE AREA.--700 mi².

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

GAGE.--Water-stage recorder. Datum of gage is 1,146.03 ft above NGVD. Prior to Oct. 1, 1987 at site 1.7 miles downstream at datum 1.43 ft lower.

REMARKS.--Estimated daily discharges: Nov. 3-4, Dec. 2-5, Dec. 19 to Mar. 5, 20, 21, and Apr. 21. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data.

AVERAGE DISCHARGE.--33 years, 366 ft³/s, 6.97 in/yr, 265,200 acre-ft/yr; median of yearly mean discharges, 300 ft³/s, 5.7 in/yr, 217,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 13,100 ft³/s Mar. 23, 1979, gage height, 18.02 ft, site and datum then in use; maximum gage height, 20.14 ft, June 17, 1990; 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 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 23	2400	3,560	15.11	May 18	1615	3,670	15.23
Apr. 15	0330	4,330	16.07	June 1	0730	4,010	15.68
Apr. 19	1615	2,570	13.42	June 5	0600	*4,990	*16.84
Apr. 27	2000	3,480	14.96	June 15	2100	4,850	16.59
Apr. 30	1300	3,150	14.42	Aug. 8	2115	2,190	12.90
May 6	0315	4,400	16.15				

Minimum discharge, 21 ft³/s Nov. 28.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	70	48	53	28	31	380	1190	2310	3800	705	107	74		
2	69	51	38	32	35	840	1070	1860	3210	674	99	72		
3	75	47	30	27	42	700	960	1520	2430	533	97	68		
4	70	50	40	25	44	570	878	1690	3520	527	93	65		
5	60	54	50	34	51	400	810	3200	4590	502	87	63		
6	64	50	55	34	44	487	757	4070	3930	484	86	61		
7	58	46	58	33	46	347	710	3270	2980	449	89	61		
8	56	46	59	34	48	310	672	2580	2150	452	1280	60		
9	57	59	63	34	42	235	650	2470	1820	419	1720	59		
10	55	54	72	35	41	232	605	2120	1610	393	1040	58		
11	54	53	72	33	40	227	571	1840	1440	366	737	56		
12	54	52	80	35	42	252	707	1630	1310	351	547	62		
13	56	50	86	38	38	227	1240	1480	1230	348	422	91		
14	54	52	90	39	55	256	2930	1360	1350	304	336	68		
15	51	54	96	40	67	257	4060	1380	3840	274	271	61		
16	52	52	70	42	55	307	3290	1410	4400	252	230	56		
17	52	48	75	40	46	418	2380	1850	3420	230	207	53		
18	55	49	74	38	48	512	1980	3320	2350	211	179	53		
19	53	51	70	42	60	513	2450	3270	1760	191	152	52		
20	53	50	76	46	88	645	2240	2980	1520	178	147	50		
21	57	52	68	31	160	706	1920	2350	1390	173	164	49		
22	58	51	58	30	470	899	1790	1980	1470	161	152	48		
23	60	47	30	33	595	2710	1480	1710	1320	145	135	46		
24	56	47	36	34	550	3370	1290	1520	1190	139	121	46		
25	59	45	28	31	400	2510	1170	1360	1100	130	112	45		
26	54	43	26	33	380	1980	1220	1490	1010	121	102	44		
27	52	45	28	33	350	1860	2950	1480	933	114	92	43		
28	50	35	30	34	300	2000	3080	1650	849	131	86	42		
29	47	42	31	32	---	1830	2340	1360	785	139	80	43		
30	49	55	28	31	---	1550	2910	1590	731	129	82	42		
31	48	---	27	28	---	1350	---	2200	---	116	80	---		
TOTAL	1764	1478	1687	1059	4168	28880	50300	64400	63438	9341	9132	1691		
MEAN	56.9	49.3	54.4	34.2	149	932	1677	2077	2115	301	295	56.4		
MAX	75	59	90	46	595	3370	4060	4070	4590	705	1720	91		
MIN	47	35	26	25	31	227	571	1360	731	114	80	42		
AC-FT	3500	2930	3350	2100	8270	57280	99770	127700	125800	18530	18110	3350		
CFSM	.08	.07	.08	.05	.21	1.33	2.40	2.97	3.02	.43	.42	.08		
IN.	.09	.08	.09	.06	.22	1.53	2.67	3.42	3.37	.50	.49	.09		
CAL YR 1990	TOTAL	159053.4	MEAN	436	MAX	9150	MIN	3.6	AC-FT	315500	CFSM	.62	IN.	8.45
WTR YR 1991	TOTAL	237338	MEAN	650	MAX	4590	MIN	25	AC-FT	470800	CFSM	.93	IN.	12.61

DES MOINES RIVER BASIN

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05482315 BLACK HAWK LAKE AT LAKE VIEW, IA

LOCATION.--Lat 42°18'15", long 95°02'30", in NW1/4 SE1/4 sec.33, T.87 N., R.36 W., Sac County, Hydrologic Unit 07100006, on south shore across from swimming beach at Lake View and 2 mi upstream from lake outlet.

DRAINAGE AREA.--23.3 mi².

PERIOD OF RECORD.--April 1970 to September 1975, April 1978 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,218.50 ft above NGVD and 2.00 ft below crest of spillway of dam at outlet. Prior to June 25, 1970, nonrecording gage at lake outlet.

REMARKS.--Lake is formed by concrete dam with ungated overflow spillway at elevation 1,220.50 ft above NGVD. Lake is used for conservation and recreation. Area of lake is approximately 957 acres.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height, 4.08 ft Mar. 20, 1979; minimum, 0.02 ft Sept. 26, 1981.

EXTREMES FOR CURRENT YEAR.--Maximum gage height, 3.26 ft June 17; minimum, 1.35 ft Sept. 25.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.92	1.84	1.72	1.85	1.89	2.22	2.72	2.77	2.80	2.44	2.10	1.84
2	1.94	1.75	1.75	1.85	1.89	2.34	2.69	2.74	2.76	2.43	2.09	1.82
3	1.95	1.78	1.78	1.84	1.89	2.39	2.65	2.75	2.72	2.39	2.07	1.80
4	1.94	1.80	1.78	1.84	1.90	2.44	2.62	2.70	2.69	2.38	2.06	1.78
5	1.93	1.79	1.78	1.88	1.90	2.47	2.59	2.77	2.64	2.37	2.05	1.76
6	1.92	1.81	1.77	1.88	1.90	2.47	2.55	2.84	2.60	2.38	2.05	1.75
7	1.90	1.81	1.77	1.88	1.90	2.46	2.52	2.89	2.57	2.36	2.07	1.74
8	1.89	1.82	1.77	1.88	1.90	2.45	2.50	2.87	2.55	2.35	2.14	1.77
9	1.88	1.81	1.77	1.88	1.91	2.44	2.49	2.84	2.52	2.36	2.14	1.74
10	1.88	1.81	1.77	1.88	1.92	2.43	2.49	2.80	2.50	2.36	2.13	1.70
11	1.87	1.80	1.77	1.90	1.94	2.42	2.56	2.75	2.49	2.34	2.12	1.68
12	1.86	1.81	1.78	1.89	1.96	2.50	2.60	2.72	2.47	2.32	2.11	1.68
13	1.86	1.81	1.78	1.90	1.97	2.59	2.63	2.69	2.48	2.31	2.09	1.70
14	1.83	1.81	1.78	1.89	1.99	2.58	2.79	2.66	2.56	2.30	2.09	1.66
15	1.84	1.80	1.80	1.89	1.99	2.58	2.92	2.64	2.85	2.29	2.07	1.62
16	1.84	1.78	1.80	1.89	1.99	2.58	2.96	2.62	3.14	2.28	2.06	1.58
17	1.79	1.80	1.84	1.89	1.99	2.59	2.93	2.71	3.23	2.26	2.05	1.56
18	1.80	1.79	1.85	1.89	2.03	2.61	2.92	2.80	3.16	2.24	2.04	1.52
19	1.83	1.79	1.85	1.89	2.05	2.63	2.93	2.76	3.03	2.22	2.02	1.51
20	1.81	1.81	1.86	1.89	2.06	2.66	2.92	2.72	2.92	2.21	2.02	1.51
21	1.82	1.78	1.86	1.89	2.08	2.64	2.89	2.70	2.83	2.21	2.00	1.51
22	1.82	1.77	1.87	1.89	2.09	2.70	2.84	2.68	2.80	2.19	2.00	1.47
23	1.81	1.75	1.86	1.89	2.11	2.89	2.78	2.64	2.76	2.17	1.99	1.48
24	1.80	1.76	1.86	1.89	2.12	3.05	2.75	2.60	2.71	2.14	1.98	1.46
25	1.80	1.76	1.86	1.90	2.13	3.05	2.72	2.59	2.65	2.12	1.96	1.41
26	1.80	1.75	1.86	1.90	2.14	2.98	2.76	2.60	2.57	2.11	1.94	1.42
27	1.76	1.74	1.86	1.90	2.14	2.94	2.83	2.59	2.49	2.10	1.92	1.42
28	1.78	1.74	1.86	1.89	2.15	2.90	2.89	2.80	2.43	2.12	1.91	1.41
29	1.77	1.74	1.86	1.90	---	2.85	2.90	2.80	2.39	2.12	1.89	1.41
30	1.76	1.73	1.86	1.90	---	2.80	2.84	2.84	2.41	2.12	1.87	1.39
31	1.76	---	1.85	1.90	---	2.75	---	2.84	---	2.10	1.86	---
MEAN	1.84	1.78	1.81	1.88	2.00	2.63	2.74	2.73	2.69	2.26	2.03	1.60
MAX	1.95	1.82	1.87	1.90	2.15	3.05	2.96	2.89	3.23	2.44	2.14	1.84
MIN	1.76	1.73	1.72	1.84	1.89	2.22	2.49	2.59	2.39	2.10	1.86	1.39

DES MOINES RIVER BASIN

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 3 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 mi².

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 encoder. 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. 3, 4, 8-10, 12-20, 23-26, Jan. 10 to Feb. 21, Mar. 3-6, Apr. 2-4, and May 10. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--51 years, 754 ft³/s, 6.32 in/yr, 546,300 acre-ft/yr; median of yearly mean discharges, 600 ft³/s, 5.0 in/yr, 435,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 29,100 ft³/s June 23, 1947, gage height, 22.3 ft; minimum daily discharge, 0.6 ft³/s Oct. 5, 1956.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 26	0030	6,820	12.58	May 20	1130	8,190	13.60
Apr. 17	1000	9,400	14.34	May 29	2230	5,480	11.46
Apr. 29	1615	9,080	14.15	June 6	0600	*13,600	*16.60
May 8	0900	8,890	14.04	June 16	1130	9,610	14.15

Minimum discharge, 53 ft³/s Dec. 21.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	184	149	114	84	87	485	1970	6040	5280	1270	280	140		
2	181	150	113	72	88	556	1610	5300	6330	1170	263	134		
3	197	157	107	67	92	610	1210	3610	7380	1120	245	128		
4	206	166	100	72	96	907	1130	2900	9090	1040	232	124		
5	202	170	126	78	100	894	1040	3520	12400	957	222	122		
6	195	174	141	74	110	779	975	6310	13300	882	222	119		
7	183	163	135	72	115	659	902	8050	11800	822	216	117		
8	178	167	143	79	120	495	933	8700	10100	773	254	118		
9	176	167	158	80	150	420	1030	7080	7140	742	367	118		
10	168	159	164	78	230	349	895	5210	4940	727	1750	109		
11	164	163	188	82	250	283	833	3840	3830	694	1190	109		
12	167	166	180	84	248	271	1270	2690	3110	662	856	138		
13	165	162	170	86	250	495	1680	2170	2590	619	668	144		
14	167	163	160	82	260	1010	4830	1830	2930	592	544	156		
15	159	160	150	86	230	721	7020	2110	6120	561	460	153		
16	157	155	140	84	235	607	8530	3190	8170	521	391	143		
17	159	152	130	90	248	664	9120	4930	8910	489	348	126		
18	159	154	135	91	250	1090	7380	7270	9450	461	316	114		
19	156	151	145	98	270	1370	6050	8000	7490	434	291	108		
20	158	150	130	85	290	1200	6250	8120	4500	415	272	105		
21	167	158	55	76	300	1110	5930	7340	3320	397	257	105		
22	168	154	108	80	443	1090	4350	5750	2750	375	246	106		
23	163	148	84	88	519	1920	3170	4100	2630	354	245	104		
24	162	149	88	81	551	4920	2370	3060	2350	338	232	102		
25	155	144	92	86	583	6420	1940	2380	2090	327	217	100		
26	157	143	85	80	555	6540	3010	2170	1900	312	201	103		
27	154	146	86	88	489	5270	6470	2740	1730	296	187	105		
28	149	141	91	90	467	4490	7880	2340	1580	303	176	105		
29	153	115	84	84	---	4210	8930	4400	1440	308	165	105		
30	153	112	67	82	---	3390	7760	4230	1340	315	163	102		
31	148	---	79	80	---	2460	---	5360	---	302	150	---		
TOTAL	5210	4608	3748	2539	7626	55685	116468	144740	165990	18578	11626	3562		
MEAN	168	154	121	81.9	272	1796	3882	4669	5533	599	375	119		
MAX	206	174	188	98	583	6540	9120	8700	13300	1270	1750	156		
MIN	148	112	55	67	87	271	833	1830	1340	296	150	100		
AC-FT	10330	9140	7430	5040	15130	110500	231000	287100	329200	36850	23060	7070		
CFSM	.10	.09	.07	.05	.17	1.11	2.40	2.88	3.42	.37	.23	.07		
IN.	.12	.11	.09	.06	.18	1.28	2.68	3.33	3.81	.43	.27	.08		
CAL YR 1990	TOTAL	373476.2	MEAN	1023	MAX	16600	MIN	7.8	AC-FT	740800	CFSM	.63	IN.	8.58
WTR YR 1991	TOTAL	540380	MEAN	1480	MAX	13300	MIN	55	AC-FT	1072000	CFSM	.91	IN.	12.42

DES MOINES RIVER BASIN

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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 mi².

PERIOD OF RECORD.--July 1952 to September 1991 (discontinued).

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. 3, Dec. 20 to Feb. 4, Feb. 14-22, and Mar. 1-14. Records good except those for estimated daily discharges, which are poor. Small diversion for irrigation upstream from station.

AVERAGE DISCHARGE.--39 years, 10.9 ft³/s, 6.17 in/yr, 7,900 acre-ft/yr; median of yearly mean discharges, 8.9 ft³/s, 5.0 in/yr, 6,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 737 ft³/s June 30, 1986 determined from step backwater, 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 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 23	0530	208	5.52	Apr. 26	1145	*343	*7.08
Mar. 27	0630	216	5.63	May 17	1800	327	6.92
Apr. 14	0715	288	6.49	June 4	0645	233	5.87
Apr. 18	2215	179	5.16				

No flow many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.6	2.4	3.5	1.1	1.1	14	53	86	31	14	.43	.00
2	3.5	2.4	3.4	1.2	1.2	48	46	68	29	12	.40	.00
3	4.0	2.4	2.0	1.1	1.5	54	40	57	26	11	.29	.00
4	3.7	2.8	2.3	1.2	2.9	42	36	53	170	10	.15	.00
5	3.8	3.4	2.7	1.1	2.4	35	33	95	150	9.8	.14	.00
6	3.9	3.2	3.3	1.1	1.9	28	31	103	104	9.1	.21	.00
7	3.3	3.0	3.8	1.2	1.8	24	28	76	75	8.0	.22	.00
8	3.5	3.6	4.5	1.1	2.2	15	50	62	59	7.1	.58	.00
9	3.5	4.2	4.3	1.2	2.8	12	103	53	49	6.9	.28	.00
10	3.7	5.7	4.2	1.1	3.0	13	66	46	41	6.4	.07	.00
11	3.7	5.9	6.4	1.1	3.0	10	53	41	36	5.7	.00	.00
12	3.1	5.8	8.3	1.1	3.1	11	135	38	32	5.1	.00	.00
13	3.5	6.2	7.2	1.3	3.8	12	158	34	29	4.4	.00	.00
14	3.3	6.3	7.5	1.3	4.8	14	223	31	32	3.9	.00	.00
15	2.7	6.0	7.0	1.2	4.4	21	182	37	60	3.4	.00	.00
16	2.9	5.2	6.0	1.2	4.6	29	146	81	48	2.9	.00	.00
17	3.2	5.3	6.6	1.2	4.4	70	112	190	39	2.5	.00	.00
18	2.3	5.7	6.5	1.2	4.8	80	125	199	33	2.3	.10	.00
19	2.4	5.3	5.7	1.3	4.7	60	158	144	29	2.0	.02	.00
20	2.5	5.3	2.1	1.2	16	56	123	116	27	1.8	.00	.00
21	2.2	5.5	1.5	1.2	19	46	98	89	29	1.6	.00	.00
22	2.2	4.8	1.2	1.2	22	77	77	73	28	1.3	.00	.00
23	2.2	4.7	1.1	1.3	21	189	59	60	25	1.1	.00	.00
24	2.0	4.7	1.3	1.3	24	140	50	51	23	.98	.00	.00
25	2.0	4.2	1.3	1.2	21	110	45	46	22	.84	.00	.00
26	2.3	4.6	1.2	1.2	17	84	164	41	20	.82	.00	.00
27	2.1	4.3	1.1	1.2	13	178	225	36	18	.71	.00	.00
28	1.9	3.6	1.1	1.2	16	137	172	32	16	1.1	.00	.00
29	2.3	3.3	1.2	1.1	---	99	141	32	15	.88	.00	.00
30	2.3	4.0	1.1	1.1	---	76	110	42	14	.58	.00	.00
31	2.2	---	1.0	1.1	---	63	---	34	---	.47	.00	---
TOTAL	89.8	133.8	110.4	36.6	227.4	1847	3042	2146	1309	138.68	2.89	0.00
MEAN	2.90	4.46	3.56	1.18	8.12	59.6	101	69.2	43.6	4.47	.093	.000
MAX	4.0	6.3	8.3	1.3	24	189	225	199	170	14	.58	.00
MIN	1.9	2.4	1.0	1.1	1.1	10	28	31	14	.47	.00	.00
AC-FT	178	265	219	73	451	3660	6030	4260	2600	275	5.7	.00
CFSM	.12	.19	.15	.05	.34	2.48	4.22	2.88	1.82	.19	.00	.00
IN.	.14	.21	.17	.06	.35	2.86	4.72	3.33	2.03	.21	.00	.00
CAL YR 1990	TOTAL 7477.24	MEAN 20.5	MAX 437	MIN .00	AC-FT 14830	CFSM .85	IN. 11.59					
WTR YR 1991	TOTAL 9083.57	MEAN 24.9	MAX 225	MIN .00	AC-FT 18020	CFSM 1.04	IN. 14.08					

DES MOINES RIVER BASIN

05483343 HAZELBRUSH CREEK NEAR MAPLE RIVER, IA

LOCATION.--Lat 42°07'36", long 94°58'32", in SW1/4 SW1/4 sec.31, T.85 N., R.35 W., Carroll County, Hydrologic Unit 07100007, on right bank 0.26 mi upstream from bridge on county road, 0.40 mi above mouth, and 2.9 mi northeast of Maple River.

DRAINAGE AREA.--9.22 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1990 to September 1991.

GAGE.--Water-stage recorder and crest-stage gage. Datum of gage is 1,268.17 ft above NGVD.

REMARKS.--Estimated daily discharges: Dec. 3-7 and Dec. 21 to Jan. 9. Records good except those for estimated daily discharges, which are poor.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 957 ft³/s June 15, 1991, gage height, 13.59 ft; minimum daily discharge, .36 ft³/s, Sept. 10, 1991

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 957 ft³/s June 15, 1991, gage height, 13.59 ft; minimum daily discharge, .36 ft³/s, Sept. 10, 1991

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.0	1.6	1.4	1.5	1.3	39	15	24	12	11	2.5	.52
2	1.9	1.6	1.5	1.4	1.3	20	14	22	11	11	2.5	.51
3	2.3	1.9	1.3	1.2	1.5	10	13	23	11	10	2.3	.48
4	2.1	2.0	1.2	1.3	2.0	8.4	12	22	10	9.8	2.1	.41
5	2.0	1.9	1.4	1.4	2.2	7.9	11	47	10	9.3	2.0	.40
6	1.9	1.8	1.6	1.4	2.7	6.7	10	34	9.7	9.0	2.2	.40
7	1.7	1.8	1.5	1.3	3.9	5.8	9.6	29	9.3	8.4	2.3	.38
8	1.9	1.8	1.4	1.4	8.3	5.7	9.2	26	9.0	8.1	3.0	.54
9	1.9	1.8	1.5	1.3	7.7	5.3	8.5	24	8.8	8.1	2.5	.45
10	1.9	1.8	1.5	1.4	6.9	5.3	8.0	22	8.6	8.0	2.1	.36
11	2.0	1.8	2.0	1.4	5.7	5.2	7.8	20	8.1	7.7	1.9	.55
12	1.9	1.7	2.3	1.4	4.7	10	16	19	7.9	7.3	1.7	1.4
13	1.9	1.7	2.0	1.5	4.7	11	20	18	8.9	6.8	1.7	.91
14	1.9	1.6	1.8	1.4	6.6	9.6	60	17	31	6.7	1.5	.57
15	1.8	1.6	1.8	1.4	17	8.8	32	18	296	6.4	1.4	.56
16	1.8	1.6	1.6	1.4	8.2	8.9	27	18	39	6.0	1.5	.51
17	1.8	1.6	1.8	1.4	4.3	18	25	31	32	5.8	1.6	.45
18	1.8	1.6	2.8	1.4	4.6	23	38	21	28	5.2	1.3	.45
19	1.8	1.6	1.7	1.4	4.6	20	37	20	26	4.9	1.2	.45
20	1.8	1.6	2.3	1.4	5.3	18	33	19	24	5.0	1.4	.45
21	1.8	1.6	1.3	1.3	7.4	15	29	19	22	4.7	1.2	.45
22	1.8	1.4	1.0	1.3	6.1	31	27	18	21	4.4	1.1	.45
23	1.8	1.4	1.1	1.4	4.9	60	24	16	19	4.3	1.0	.45
24	1.7	1.4	1.2	1.4	4.7	34	22	15	18	3.9	1.0	.47
25	1.6	1.4	1.2	1.3	4.4	28	21	15	17	3.4	.88	.49
26	1.7	1.4	1.1	1.2	3.2	23	43	14	15	3.2	.79	.45
27	1.7	1.4	1.1	1.3	3.0	30	47	13	14	2.9	.72	.45
28	1.6	1.5	1.2	1.3	3.3	26	34	13	13	3.8	.67	.45
29	1.6	1.5	1.0	1.2	---	22	30	12	12	3.4	.61	.49
30	1.6	1.4	1.1	1.3	---	19	27	14	12	3.0	.59	.52
31	1.6	---	1.0	1.3	---	17	---	12	---	2.8	.56	---
TOTAL	56.6	48.8	46.7	42.0	140.5	551.6	710.1	635	763.3	194.3	47.82	15.42
MEAN	1.83	1.63	1.51	1.35	5.02	17.8	23.7	20.5	25.4	6.27	1.54	.51
MAX	2.3	2.0	2.8	1.5	17	60	60	47	296	11	3.0	1.4
MIN	1.6	1.4	1.0	1.2	1.3	5.2	7.8	12	7.9	2.8	.56	.36
AC-FT	112	97	93	83	279	1090	1410	1260	1510	385	95	31
CFSM	.20	.18	.16	.15	.54	1.93	2.57	2.22	2.76	.68	.17	.06

WTR YR 1991 TOTAL 3252.14 MEAN 8.91 MAX 296 MIN .36 AC-FT 6450 CFSM .97

05483343 HAZELBRUSH CREEK NEAR MAPLE RIVER, IOWA--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--April to September 1991.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: April to September 1991.

WATER TEMPERATURES: April to September 1991.

SUSPENDED-SEDIMENT DISCHARGE: April to September 1991.

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

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum daily, 686 microsiemens Sept. 14, 1991; minimum daily, 202 microsiemens June 15, 1991.

WATER TEMPERATURES: Maximum daily, 22.0 °C Aug. 29, 30, Sept. 3, 14, 1991.

SEDIMENT CONCENTRATIONS: Maximum daily mean, 2,240 mg/L June 15, 1991; minimum daily mean, 17 mg/L Apr. 7, 1991.

SEDIMENT LOADS: Maximum daily, 3,570 tons June 15, 1991; minimum daily, 0.03 ton Sept. 26-29, 1991.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum daily, 686 microsiemens Sept. 14; minimum daily, 202 microsiemens June 15.

WATER TEMPERATURES: Maximum daily, 22.0 °C, Aug. 29, 30, Sept. 3, 14.

SEDIMENT CONCENTRATIONS: Maximum daily mean, 2,240 mg/L June 15; minimum daily mean, 17 mg/L Apr. 7.

SEDIMENT LOADS: Maximum daily, 3,570 tons June 15; minimum daily, 0.03 ton Sept. 26-29.

SPECIFIC CONDUCTANCE MICROSIEMENS/CM AT 25 DEG C, WATER YEAR APRIL TO SEPTEMBER 1991
DAILY INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	---	---	623	467	489	449	428
2	---	---	---	---	---	---	---	579	483	450	481	466
3	---	---	---	---	---	---	---	508	492	543	441	477
4	---	---	---	---	---	---	---	407	463	428	490	445
5	---	---	---	---	---	---	---	377	431	602	452	422
6	---	---	---	---	---	---	---	448	432	447	449	431
7	---	---	---	---	---	---	---	437	432	442	451	454
8	---	---	---	---	---	---	---	508	427	469	527	506
9	---	---	---	---	---	---	---	542	451	442	547	517
10	---	---	---	---	---	---	---	544	414	586	425	460
11	---	---	---	---	---	---	---	518	523	452	429	499
12	---	---	---	---	---	---	---	603	419	460	430	559
13	---	---	---	---	---	---	---	625	---	460	442	508
14	---	---	---	---	---	---	---	380	523	354	436	686
15	---	---	---	---	---	---	---	637	555	202	423	550
17	---	---	---	---	---	---	---	631	529	484	428	607
18	---	---	---	---	---	---	---	653	628	453	459	497
19	---	---	---	---	---	---	---	645	624	590	433	451
20	---	---	---	---	---	---	---	655	611	521	465	508
21	---	---	---	---	---	---	---	647	605	422	438	436
22	---	---	---	---	---	---	---	549	637	434	475	462
23	---	---	---	---	---	---	---	630	635	510	449	448
24	---	---	---	---	---	---	---	636	503	425	434	442
25	---	---	---	---	---	---	---	600	526	574	446	457
26	---	---	---	---	---	---	---	638	564	418	416	461
27	---	---	---	---	---	---	---	586	434	---	468	449
28	---	---	---	---	---	---	---	597	428	---	---	490
29	---	---	---	---	---	---	---	568	627	427	436	467
30	---	---	---	---	---	---	---	594	562	415	506	507
31	---	---	---	---	---	---	---	439	---	441	431	---

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR APRIL TO SEPTEMBER 1991

DATE	TIME	TEMPER- ATURE WATER (DEG C) (00010)	DIS- CHARGE, INST. CUBIC FEET PER SECOND (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)
JUN 15...	1030	20.0	387	1050	1100	98

DES MOINES RIVER BASIN

05483343 HAZELBRUSH CREEK NEAR MAPLE RIVER, IA--Continued

WATER-QUALITY RECORDS

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR APRIL TO SEPTEMBER 1991
DAILY INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	---	---	7.0	15.0	20.0	18.0	19.0
2	---	---	---	---	---	---	---	8.0	14.0	16.0	21.0	21.0
3	---	---	---	---	---	---	---	8.0	14.0	15.0	20.0	22.0
4	---	---	---	---	---	---	---	9.0	14.0	15.0	18.0	15.0
5	---	---	---	---	---	---	---	5.0	14.0	15.0	18.0	16.0
6	---	---	---	---	---	---	---	8.0	13.0	17.0	17.0	17.0
7	---	---	---	---	---	---	---	7.0	13.0	17.0	19.0	19.0
8	---	---	---	---	---	---	9.0	9.0	14.0	16.0	20.0	21.0
9	---	---	---	---	---	---	7.0	10.0	15.0	16.0	17.0	21.0
10	---	---	---	---	---	---	4.0	11.0	15.0	16.0	16.0	19.0
11	---	---	---	---	---	---	5.0	12.0	14.0	18.0	16.0	17.0
12	---	---	---	---	---	---	6.0	12.0	20.0	17.0	16.0	20.0
13	---	---	---	---	---	---	7.0	---	16.0	17.0	17.0	19.0
14	---	---	---	---	---	---	7.0	11.0	20.0	15.0	17.0	22.0
15	---	---	---	---	---	---	7.0	12.0	19.0	16.0	17.0	21.0
16	---	---	---	---	---	---	6.0	13.0	15.0	18.0	19.0	14.0
17	---	---	---	---	---	---	7.0	13.0	17.0	19.0	18.0	15.0
18	---	---	---	---	---	---	4.0	10.0	15.0	18.0	19.0	10.0
19	---	---	---	---	---	---	8.0	10.0	15.0	20.0	15.0	6.0
20	---	---	---	---	---	---	7.0	12.0	15.0	19.0	15.0	6.0
21	---	---	---	---	---	---	7.0	15.0	15.0	20.0	17.0	10.0
22	---	---	---	---	---	---	8.0	14.0	15.0	19.0	18.0	11.0
23	---	---	---	---	---	---	8.0	15.0	15.0	---	19.0	8.0
24	---	---	---	---	---	---	6.0	13.0	15.0	---	18.0	11.0
25	---	---	---	---	---	---	9.0	14.0	16.0	16.0	20.0	8.0
26	---	---	---	---	---	---	8.0	12.0	18.0	15.0	21.0	8.0
27	---	---	---	---	---	---	10.0	14.0	---	17.0	21.0	10.0
28	---	---	---	---	---	---	8.0	17.0	---	---	21.0	9.0
29	---	---	---	---	---	---	12.0	15.0	18.0	16.0	22.0	13.0
30	---	---	---	---	---	---	9.0	15.0	19.0	16.0	22.0	13.0
31	---	---	---	---	---	---	---	15.0	---	19.0	19.0	---

SUSPENDED-SEDIMENT, WATER YEAR APRIL TO SEPTEMBER 1991

DAY	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)
APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER		
1	44	1.8	88	5.8	165	5.2	108	3.3	117	.78	55	.08
2	40	1.5	65	4.0	130	4.0	130	3.8	103	.68	52	.07
3	36	1.2	145	9.2	140	4.1	91	2.5	73	.46	56	.07
4	31	.96	94	5.6	126	3.5	84	2.2	71	.40	41	.05
5	26	.76	1150	168	107	2.9	71	1.8	73	.40	41	.05
6	21	.58	202	19	112	2.9	127	3.1	76	.45	57	.06
7	17	.44	112	8.7	128	3.2	117	2.7	93	.58	50	.05
8	64	1.6	110	7.7	116	2.8	94	2.1	129	1.1	92	.13
9	63	1.5	97	6.2	132	3.1	105	2.3	102	.69	91	.11
10	43	.92	103	6.0	133	3.1	106	2.3	83	.47	100	.10
11	37	.78	103	5.7	146	3.2	95	2.0	68	.35	165	.29
12	431	24	88	4.6	171	3.6	100	2.0	72	.34	251	.96
13	235	13	103	5.0	255	6.6	95	1.7	69	.31	173	.44
14	1670	356	72	3.4	1700	224	82	1.5	50	.20	98	.15
15	249	22	170	10	2240	3570	111	1.9	55	.20	79	.12
16	183	13	115	5.6	293	31	143	2.3	55	.22	65	.09
17	146	9.8	284	29	189	16	132	2.0	64	.27	57	.07
18	401	47	93	5.4	246	19	174	2.5	74	.27	54	.06
19	260	27	68	3.6	198	14	138	1.8	85	.29	52	.06
20	136	12	56	2.8	125	8.0	128	1.7	108	.40	47	.06
21	120	9.4	93	4.8	139	8.4	150	1.9	94	.30	42	.05
22	110	7.9	113	5.3	123	6.9	133	1.6	85	.25	36	.04
23	90	6.0	96	4.3	101	5.2	115	1.3	91	.25	32	.04
24	80	4.8	74	3.0	139	6.8	108	1.1	84	.23	32	.04
25	75	4.2	85	3.4	103	4.7	101	.94	81	.19	38	.05
26	1370	217	79	3.0	119	4.9	99	.84	73	.16	26	.03
27	530	71	79	2.8	118	4.5	99	.76	56	.11	25	.03
28	245	22	119	4.2	119	4.2	148	1.6	52	.09	24	.03
29	155	13	131	4.3	139	4.6	79	.72	55	.09	25	.03
30	115	8.3	349	15	161	5.2	112	.90	55	.09	50	.07
31	---	---	194	6.3	---	---	118	.89	56	.08	---	---
TOTAL	---	899.44	---	371.7	---	3985.6	---	58.05	---	10.70	---	3.48

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 mi².

PERIOD OF RECORD.--March 1979 to current year. Occasional low-flow measurements, water years 1976, 1977.

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. 1 to Feb. 25. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. Gage-height telemeter at station.

AVERAGE DISCHARGE.--12 years, 236 ft³/s, 8.55 in/yr 171,000 acre-ft/yr; median of yearly mean discharges, 260 ft³/s, 9.4 in/yr, 188,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 12,300 ft³/s June 30, 1986, gage height, 24.70 ft; minimum daily discharge, 5.5 ft³/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 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,200 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 23	1815	1,510	14.83	Apr. 27	1000	2,170	16.48
Apr. 14	2345	3,870	18.97	May 6	0330	1,460	14.66
Apr. 19	0815	1,730	15.51	June 16	1245	*4,170	*19.28

Minimum daily discharge, 12 ft³/s Jan. 2.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	64	47	51	13	25	160	497	787	558	342	72	46
2	63	48	49	12	50	823	465	697	664	311	68	35
3	66	54	54	13	110	436	436	660	517	285	67	33
4	76	62	49	14	100	302	413	672	775	270	65	29
5	66	60	52	15	90	259	393	888	824	260	62	27
6	61	55	54	13	80	251	375	1270	636	247	80	27
7	60	56	56	14	74	204	358	933	534	235	79	26
8	59	56	62	16	200	183	392	796	482	220	100	31
9	60	57	64	14	180	174	870	717	453	217	94	36
10	60	57	49	13	140	164	567	654	427	212	76	32
11	59	56	51	14	110	163	482	614	413	209	68	32
12	59	54	61	15	130	170	1030	582	390	193	60	50
13	58	54	61	16	110	225	1530	559	404	181	54	115
14	58	53	62	18	100	241	2820	527	774	166	55	82
15	57	52	58	15	90	246	2780	727	2020	159	52	88
16	55	50	54	14	130	238	1600	760	3590	150	49	47
17	54	50	53	16	150	333	1150	894	1530	141	56	40
18	54	49	37	17	160	613	1120	1000	1070	133	52	38
19	54	49	42	20	170	577	1640	776	842	126	47	37
20	54	50	36	17	150	517	1290	678	713	121	45	35
21	57	51	22	13	160	472	1050	633	629	119	46	33
22	58	51	16	15	150	465	895	602	583	115	51	32
23	54	49	15	16	130	1050	799	556	528	106	43	33
24	53	49	18	14	115	1010	704	523	490	102	40	32
25	52	49	19	13	150	747	646	505	456	93	38	34
26	51	49	15	16	145	644	926	698	426	87	36	32
27	51	50	16	14	118	841	2070	554	393	83	34	31
28	51	47	15	14	119	954	1610	487	366	91	31	30
29	50	44	17	13	---	752	1170	475	346	91	31	30
30	50	50	15	14	---	631	958	756	327	82	33	28
31	48	---	13	16	---	559	---	547	---	77	59	---
TOTAL	1772	1558	1236	457	3436	14404	31036	21527	22160	5224	1743	1201
MEAN	57.2	51.9	39.9	14.7	123	465	1035	694	739	169	56.2	40.0
MAX	76	62	64	20	200	1050	2820	1270	3590	342	100	115
MIN	48	44	13	12	25	160	358	475	327	77	31	26
AC-FT	3510	3090	2450	906	6820	28570	61560	42700	43950	10360	3460	2380
CFSM	.15	.14	.11	.04	.33	1.24	2.76	1.85	1.97	.45	.15	.11
IN.	.18	.15	.12	.05	.34	1.43	3.08	2.14	2.20	.52	.17	.12
CAL YR 1990	TOTAL 122638	MEAN 336	MAX 7750	MIN 13	AC-FT 243300	CFSM .90	IN. 12.17					
WTR YR 1991	TOTAL 105754	MEAN 290	MAX 3590	MIN 12	AC-FT 209800	CFSM .77	IN. 10.49					

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 mi².

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

REVISED RECORDS.--WDR IA-74-1: 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. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data.

AVERAGE DISCHARGE.--33 years, 226 ft³/s, 6.98 in/yr 163,700 acre-ft/yr; median of yearly mean discharges, 170 ft³/s, 5.2 in/yr, 123,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 15,300 ft³/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 ft³/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 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Apr. 15	0345	3,420	8.52	June 14	0745	*3,750	*8.83
Apr. 27	0045	3,100	8.21	June 16	0845	3,660	8.74

Minimum daily discharge, 29 ft³/s Sept. 28, 29.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	65	36	61	49	53	217	473	793	688	183	87	50
2	77	39	60	48	53	743	366	605	622	140	94	48
3	187	48	76	47	61	708	363	782	609	338	75	47
4	149	55	55	47	74	365	374	509	1070	379	72	43
5	59	58	54	51	95	226	390	1190	836	222	69	40
6	37	62	55	51	132	196	332	1390	735	113	93	37
7	40	66	56	49	206	203	284	901	520	192	99	36
8	41	65	60	49	276	200	410	745	500	185	183	37
9	44	67	65	49	352	192	1090	671	504	143	135	39
10	47	67	71	49	393	178	275	661	405	178	92	40
11	49	68	77	51	385	171	471	610	262	262	85	50
12	53	67	86	52	244	175	1010	445	412	211	79	80
13	54	65	88	52	83	200	1680	584	472	131	74	107
14	59	64	86	52	118	217	2890	442	1550	127	70	132
15	56	64	94	52	104	321	3030	801	2010	152	67	142
16	55	66	90	53	100	344	1640	670	3110	126	78	134
17	62	61	93	54	119	408	1060	1260	1420	107	60	68
18	61	60	88	54	145	538	1440	1080	1140	116	62	30
19	53	60	80	54	154	687	1700	815	772	117	60	34
20	57	60	84	55	159	553	1380	495	635	112	55	52
21	63	64	69	56	173	510	1140	780	596	107	54	66
22	69	64	64	55	186	503	756	617	467	99	54	78
23	132	61	71	55	195	986	803	506	516	102	53	50
24	174	58	68	54	181	1240	636	502	459	99	53	34
25	128	58	61	54	160	688	566	563	584	96	51	32
26	40	56	57	53	148	596	845	678	277	89	49	30
27	35	64	55	54	142	746	2490	682	293	84	47	30
28	35	63	52	54	139	1050	1810	411	265	98	44	29
29	35	58	52	54	---	774	1220	490	265	102	42	29
30	35	57	52	54	---	538	899	946	365	96	46	30
31	35	---	50	53	---	548	---	359	---	92	49	---
TOTAL	2086	1801	2130	1614	4630	15021	31823	21983	22359	4598	2231	1654
MEAN	67.3	60.0	68.7	52.1	165	485	1061	709	745	148	72.0	55.1
MAX	187	68	94	56	393	1240	3030	1390	3110	379	183	142
MIN	35	36	50	47	53	171	275	359	262	84	42	29
AC-FT	4140	3570	4220	3200	9180	29790	63120	43600	44350	9120	4430	3280
CFSM	.15	.14	.16	.12	.38	1.10	2.41	1.61	1.69	.34	.16	.13
IN.	.18	.15	.18	.14	.39	1.27	2.69	1.86	1.89	.39	.19	.14
CAL YR 1990	TOTAL 129166	MEAN 354	MAX 8000	MIN 29	AC-FT 256200	CFSM .80	IN. 10.92					
WTR YR 1991	TOTAL 111930	MEAN 307	MAX 3110	MIN 29	AC-FT 222000	CFSM .70	IN. 9.46					

05484000 SOUTH RACCOON RIVER AT REDFIELD, IA

LOCATION.--Lat 41°35'22", long 94°09'04", in SW1/4 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 mi².

PERIOD OF RECORD.--March 1940 to current year.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1508: 1940.

GAGE.--Water-stage encoder. Datum of gage is 888.88 ft (revised) above NGVD. Prior to June 12, 1946, nonrecording gage, June 12, 1946 to Sept. 30, 1966, water-stage recorder at site 20 ft upstream, Sept. 30, 1966 to Sept. 30, 1986, water-stage recorder at site 2.4 mi upstream at datum 7.55 ft higher.

REMARKS.--Estimated daily discharges: Dec. 3 to Feb. 22. Records fair except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and data collection platform at station.

AVERAGE DISCHARGE.--51 years, 472 ft³/s, 6.45 in/yr, 342,000 acre-ft/yr; median of yearly mean discharges, 420 ft³/s, 5.7 in/yr, 304,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 35,000 ft³/s July 2, 1958, gage height, 29.04 ft, from flood-mark; minimum daily discharge, 17 ft³/s Aug. 4, 1977, at site 2.4 mi upstream from present site.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 5,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Apr. 14	1515	11,500	14.70	May 6	1515	6,280	11.44
Apr. 18	2400	7,350	11.88	June 14	1615	*12,000	*16.20
Apr. 27	0500	8,610	12.80	June 15	1315	8,470	13.84

Minimum discharge, 54 ft³/s Dec. 31, Jan. 2, 15, 16.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	138	98	127	58	120	502	839	1720	1450	646	186	119
2	138	97	130	54	200	2310	651	1390	2580	419	179	102
3	231	122	120	56	300	1370	619	1340	1560	520	175	99
4	336	176	110	60	290	726	605	1340	2130	650	159	95
5	182	155	140	62	270	563	615	2970	2490	620	159	86
6	115	141	130	56	260	470	567	3180	1770	347	218	84
7	100	146	140	58	280	412	498	2230	1370	375	261	83
8	93	143	150	64	600	377	483	1790	1110	420	634	95
9	95	147	160	58	540	354	1430	1570	1070	394	438	120
10	103	153	150	62	450	320	947	1440	947	363	242	125
11	107	153	160	64	420	306	760	1360	904	514	217	104
12	110	147	150	60	500	311	1980	1140	674	502	193	143
13	112	139	140	58	400	376	3350	1130	906	373	177	176
14	113	138	140	62	330	372	7980	1090	7190	303	164	229
15	115	138	160	54	260	425	6030	1120	6940	318	153	221
16	115	138	170	54	370	540	3390	1560	5570	319	152	241
17	115	134	170	60	360	974	2410	1690	3550	264	158	199
18	123	128	130	66	320	1390	3770	2220	2340	259	149	111
19	118	128	100	70	300	1190	5180	1820	1750	264	138	88
20	113	128	103	66	400	1110	3520	1300	1510	246	128	90
21	127	131	76	60	500	890	2720	1340	1380	255	124	110
22	130	130	72	66	400	818	2000	1350	1180	231	122	124
23	155	124	79	68	438	1740	1780	1100	1120	229	115	133
24	229	123	82	64	337	2240	1550	1010	1080	221	115	92
25	259	125	66	58	308	1320	1340	1030	1040	209	114	85
26	137	123	68	64	274	1070	1650	1210	982	197	108	82
27	104	132	64	70	271	1110	5690	1270	594	190	103	78
28	96	137	60	72	296	1510	3500	1020	713	215	98	78
29	92	116	67	66	---	1350	2520	842	578	238	93	79
30	95	117	59	68	---	905	1940	2640	675	212	115	78
31	100	---	54	90	---	850	---	1500	---	196	133	---
TOTAL	4196	4007	3527	1948	9794	28201	70314	47712	57153	10509	5520	3549
MEAN	135	134	114	62.8	350	910	2344	1539	1905	339	178	118
MAX	336	176	170	90	600	2310	7980	3180	7190	650	634	241
MIN	92	97	54	54	120	306	483	842	578	190	93	78
AC-FT	8320	7950	7000	3860	19430	55940	139500	94640	113400	20840	10950	7040
CFSM	.14	.13	.11	.06	.35	.92	2.36	1.55	1.92	.34	.18	.12
IN.	.16	.15	.13	.07	.37	1.06	2.63	1.79	2.14	.39	.21	.13
CAL YR 1990	TOTAL 261395	MEAN 716	MAX 17200	MIN 54	AC-FT 518500	CFSM .72	IN. 9.78					
WTR YR 1991	TOTAL 246430	MEAN 675	MAX 7980	MIN 54	AC-FT 488800	CFSM .68	IN. 9.22					

DES MOINES RIVER BASIN

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05484500 RACCOON RIVER AT VAN METER, IA
(National stream-quality accounting network station)

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 07100006, 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 mi².

WATER-DISCHARGE RECORDS

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 encoder. 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. 21 to Feb. 26 and Sept. 21-24. Records good except those for estimated daily discharges, which are fair. U.S. Army Corps of Engineers rain-gage and data collection platform and U.S. Weather Service Limited Automatic Remote Collector telemeter at station.

AVERAGE DISCHARGE.--76 years, 1,446 ft³/s, 5.71 in/yr, 1,048,000 acre-ft/yr; median of yearly mean discharges, 1,150 ft³/s, 4.5 in/yr, 833,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 41,200 ft³/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 ft³/s Jan. 22-31, 1940.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 8,500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 27	1530	10,900	11.82	June 2	0430	13,600	13.36
Apr. 19	0500	*21,000	*16.78	June 7	1645	20,600	16.64
Apr. 29	1600	15,000	14.10	June 14	2145	18,900	15.94
May 9	1715	11,600	12.24	June 15	1830	18,300	15.67
May 21	2130	11,800	12.37				

Minimum discharge, 135 ft³/s Dec. 3, 4.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	426	296	321	250	260	1600	5930	13500	7860	3070	612	365
2	414	296	327	235	280	4760	5060	11000	11600	2650	578	329
3	479	334	214	230	350	5410	4480	9140	9040	2480	552	313
4	620	424	223	230	620	4410	4040	7710	10200	2580	514	294
5	532	403	330	230	1000	3880	3720	8790	12900	2440	485	284
6	434	381	350	235	1150	3310	3410	9910	15900	2090	582	275
7	379	386	381	235	950	2910	3130	10300	19800	1920	643	266
8	365	387	411	240	1000	2550	2950	10900	18900	1880	2050	295
9	364	394	424	250	1400	2150	3970	11400	15800	1780	1190	295
10	364	399	375	255	1600	1880	4850	11000	12200	1700	797	281
11	360	402	407	265	1700	1670	3730	8740	8390	1820	1890	266
12	355	393	472	270	1500	1570	4820	7140	6230	1750	1810	300
13	352	395	488	285	1150	1680	8420	6060	5690	1560	1440	373
14	352	394	525	300	960	2200	13500	5590	12500	1390	1180	444
15	348	397	527	295	880	3290	15000	5100	15900	1310	997	454
16	348	394	526	290	930	3080	13800	6000	14000	1270	862	527
17	345	381	549	280	1000	3430	13700	7030	13300	1160	777	462
18	337	374	445	290	960	4900	15100	8900	11300	1060	686	370
19	332	375	493	310	950	5720	18900	10200	11200	1010	622	291
20	325	382	461	295	1050	5780	14400	11300	10500	951	567	276
21	337	387	350	290	1200	5070	12400	11500	7400	905	539	328
22	340	375	290	295	1350	4730	11100	11100	5880	883	504	382
23	341	366	270	300	1300	5750	9320	9460	5380	840	470	398
24	397	359	300	300	1400	8370	7470	7320	5200	775	459	344
25	441	346	310	295	1250	9080	6250	6170	4750	725	448	294
26	403	350	275	290	1300	9980	5960	5770	4550	674	425	286
27	312	362	270	280	1430	10700	11500	5660	3780	634	400	287
28	297	363	260	280	1320	10500	12800	5680	3720	685	379	290
29	295	338	280	270	---	9810	14500	5190	3350	713	359	294
30	295	322	260	250	---	8080	14500	8290	3210	664	344	277
31	296	---	250	260	---	6890	---	7820	---	631	378	---
TOTAL	11585	11155	11364	8380	30240	155140	268710	263670	290430	44000	23539	9940
MEAN	374	372	367	270	1080	5005	8957	8505	9681	1419	759	331
MAX	620	424	549	310	1700	10700	18900	13500	19800	3070	2050	527
MIN	295	296	214	230	260	1570	2950	5100	3210	631	344	266
AC-FT	22980	22130	22540	16620	59980	307700	533000	523000	576100	87270	46690	19720
CFSM	.11	.11	.11	.08	.31	1.45	2.60	2.47	2.81	.41	.22	.10
IN.	.13	.12	.12	.09	.33	1.68	2.90	2.85	3.14	.48	.25	.11

CAL YR 1990	TOTAL	904431	MEAN	2478	MAX	32800	MIN	150	AC-FT	1794000	CFSM	.72	IN.	9.78
WTR YR 1991	TOTAL	1128153	MEAN	3091	MAX	19800	MIN	214	AC-FT	2238000	CFSM	.90	IN.	12.20

DES MOINES RIVER BASIN

05484500 RACCOON RIVER AT VAN METER, IA--Continued
(National stream-quality accounting network station)

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 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (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 (NTU) (00076)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, (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)
OCT												
22...	1345	342	600	8.5	9.5	13.5	3.5	13.1	118	744	K35	K30
DEC												
07...	1345	346	660	8.2	0.5	4.0	2.4	14.4	103	743	K6	K36
MAR												
07...	1300	2910	616	8.1	4.0	4.0	91	12.5	98	742	250	5700
APR												
25...	1200	6270	652	8.2	12.0	10.5	55	10.1	96	742	390	660
JUL												
03...	1200	2480	680	8.4	26.5	24.0	40	7.8	100	740	600	390
AUG												
23...	1000	470	520	8.8	24.0	22.5	13	8.1	99	743	240	K76
DATE		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 PERCENT (00932)	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)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)
OCT												
22...	310	72	31	18	11	0.4	3.0	233	7	270	55	28
DEC												
07...	330	83	31	17	10	0.4	2.9	258	0	315	45	38
MAR												
07...	320	86	25	8.6	6	0.2	2.9	230	0	281	38	24
APR												
25...	340	89	28	8.4	5	0.2	1.7	233	0	285	42	25
JUL												
03...	290	78	24	7.4	5	0.2	1.8	253	6	297	39	19
AUG												
23...	250	55	27	14	11	0.4	2.8	182	9	204	53	24
DATE		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)
OCT												
22...	0.40	5.9	373	373	0.51	344	--	4.40	0.030	0.020	<0.010	
DEC												
07...	0.30	8.0	397	405	0.54	371	0.77	5.50	0.030	0.130	0.130	
MAR												
07...	0.50	19	353	392	0.48	2770	0.99	11.0	0.060	0.180	0.210	
APR												
25...	0.50	19	414	421	0.56	7010	1.5	15.0	0.021	0.021	0.021	
JUL												
03...	0.50	21	395	401	0.54	2640	1.5	13.0	0.030	<0.010	0.020	
AUG												
23...	0.40	14	317	317	0.43	402	--	3.80	0.030	0.020	<0.010	

Results based on colony count outside ideal range.

05484500 RACCOON RIVER AT VAN METER, IA--Continued

WATER-QUALITY RECORDS

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	NITRO- GEN, AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	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)	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)
OCT 22...	1.2	0.010	0.020	0.030	38	35	76	<1	20	100	<0.5
DEC 07...	0.90	0.090	0.110	0.110	27	25	24	--	--	--	--
MAR 07...	1.2	0.210	0.200	0.260	488	3830	85	2	10	83	<0.5
APR 25...	1.5	0.110	0.090	0.150	287	4860	88	2	20	99	<0.5
JUL 03...	1.5	0.110	0.110	0.220	131	877	98	--	--	--	--
AUG 23...	1.4	0.020	0.030	0.140	78	99	96	2	20	88	<0.5

DATE	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)	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)
OCT 22...	<1.0	2	<3	3	18	<1	19	31	<0.1	<10	2
DEC 07...	--	--	--	--	--	--	--	--	--	--	--
MAR 07...	1.0	1	<3	3	18	1	17	4	<0.1	<10	1
APR 25...	<1.0	<1	<3	4	17	1	15	3	<0.1	<10	<1
JUL 03...	--	--	--	--	--	--	--	--	--	--	--
AUG 23...	<1.0	<1	<3	3	20	<1	16	2	<0.1	<10	12

DATE	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)	ATRA- ZINE, TOTAL (UG/L) (39630)	CYAN- AZINE TOTAL (UG/L) (81757)	METRI- BUZIN IN WHOLE WATER (UG/L) (81408)	ALA- CHLOR TOTAL RECOVER (UG/L) (77825)	METOLA- CHLOR IN WHOLE WATER (UG/L) (39356)	TRI- FLURA- LIN TOTAL RECOVER (UG/L) (39030)
OCT 22...	1	<1.0	240	<6	5	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
DEC 07...	--	--	--	--	--	--	--	--	--	--	--
MAR 07...	3	<1.0	220	<6	9	0.12	<0.10	<0.10	<0.10	<0.10	<0.10
APR 25...	4	<1.0	240	<6	15	0.11	<0.10	<0.10	0.10	<0.10	<0.10
JUL 03...	--	--	--	--	--	0.57	0.19	<0.10	<0.10	0.47	<0.10
AUG 23...	2	<1.0	210	<6	9	--	--	--	--	--	--

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 mi².

PERIOD OF RECORD.--October 1971 to current year.

REVISED RECORDS.--WDR IA-73-1: 1972. WDR IA-75-1: 1973-74.

GAGE.--Water-stage encoder. Datum of gage is 801.04 ft above NGVD (levels by Iowa Natural Resources Council).

REMARKS.--Estimated daily discharges: Dec. 4-6, Dec. 19 to Mar. 1, June 5-12, and July 26, 27. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance published in this report as miscellaneous water quality data. U.S. National Weather Service Limited Automatic Remote Collector at station.

AVERAGE DISCHARGE.--20 years, 60.8 ft³/s, 10.53 in/yr, 44,050 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 12,500 ft³/s May 10, 1986, gage height, 18.32 ft, from rating curve extended above 3,500 ft³/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 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Apr. 12	0800	652	7.71	June 4	unknown	*2,890	*13.95
Apr. 14	0500	806	8.34	June 11	unknown	702	7.94
Apr. 18	2200	677	7.82	June 14	0515	742	8.10
May 14	2015	621	7.56	June 15	1500	876	8.60
May 29	1945	1,850	11.56	Aug. 8	0230	2,160	12.35
May 31	1445	893	8.66				

Minimum discharge, 2.2 ft³/s Sept. 29.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	22	8.3	6.7	6.0	6.0	80	54	138	302	44	7.6	8.0
2	25	8.5	7.0	6.0	15	296	53	121	295	44	7.2	7.6
3	50	40	9.1	5.8	50	106	51	130	205	38	7.9	7.8
4	8.0	32	8.0	5.7	45	70	50	120	1070	36	8.6	7.9
5	5.7	13	9.0	5.8	60	62	48	385	300	35	9.7	7.9
6	5.0	15	9.5	5.8	45	56	47	265	202	38	7.7	7.8
7	7.6	11	10	5.9	52	47	46	192	169	32	24	8.2
8	8.3	13	10	6.0	64	44	98	165	151	29	608	22
9	5.0	14	11	6.0	50	41	73	144	141	33	67	10
10	3.9	10	11	6.2	30	38	59	129	158	36	32	9.2
11	4.3	9.4	13	6.3	20	38	64	119	385	33	22	11
12	3.6	9.2	18	6.6	16	52	234	113	148	30	17	8.7
13	3.6	8.7	17	7.0	11	49	223	104	125	27	15	8.6
14	3.7	8.6	21	8.0	9.0	41	500	161	466	25	13	11
15	3.8	8.7	22	7.6	8.0	41	265	143	623	23	11	27
16	4.1	8.4	15	7.4	7.4	46	184	148	273	21	14	10
17	4.4	7.8	22	7.2	9.0	180	149	153	191	20	12	5.1
18	6.0	7.7	17	7.0	11	162	370	217	156	18	18	5.0
19	6.4	8.0	13	8.0	10	114	452	143	132	17	9.9	3.9
20	6.6	8.6	11	7.2	9.0	98	290	126	115	16	8.6	3.6
21	11	8.6	9.0	6.8	8.0	82	222	143	104	15	8.1	3.3
22	3.7	8.1	7.6	7.0	7.0	85	189	188	95	19	7.4	3.1
23	3.5	7.9	7.0	7.2	6.4	115	164	165	85	15	7.3	2.9
24	3.5	7.8	7.6	7.4	6.2	89	136	141	81	12	7.4	2.8
25	4.2	7.8	8.0	7.2	6.0	82	134	148	74	10	7.8	3.0
26	4.3	8.6	7.0	7.0	6.0	77	143	161	68	9.0	8.2	2.9
27	5.2	28	6.6	6.8	9.0	98	306	116	60	7.8	8.1	2.8
28	6.4	9.2	6.4	6.6	14	73	199	112	56	41	8.1	2.7
29	6.9	7.0	6.8	6.4	---	66	203	390	51	11	8.0	2.6
30	7.6	6.9	6.6	6.0	---	60	166	420	47	9.1	16	3.0
31	7.6	---	6.2	5.8	---	59	---	389	---	9.0	11	---
TOTAL	250.9	349.8	339.1	205.7	590.0	2547	5172	5589	6328	752.9	1086.9	219.4
MEAN	8.09	11.7	10.9	6.64	21.1	82.2	172	180	211	24.3	35.1	7.31
MAX	50	40	22	8.0	64	296	500	420	1070	44	608	27
MIN	3.5	6.9	6.2	5.7	6.0	38	46	104	47	7.8	7.2	2.6
AC-FT	498	694	673	408	1170	5050	10260	11090	12550	1490	2160	435
CFSM	.10	.15	.14	.08	.27	1.05	2.20	2.30	2.69	.31	.45	.09
IN.	.12	.17	.16	.10	.28	1.21	2.45	2.65	3.00	.36	.52	.10
CAL YR 1990	TOTAL 29835.0	MEAN 81.7	MAX 3610	MIN 2.1	AC-FT 59180	CFSM 1.04	IN. 14.16					
WTR YR 1991	TOTAL 23430.7	MEAN 64.2	MAX 1070	MIN 2.6	AC-FT 46470	CFSM .82	IN. 11.12					

05485500 DES MOINES RIVER BELOW RACCOON RIVER AT DES MOINES, IA

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.

DRAINAGE AREA.--9,879 mi².

PERIOD OF RECORD.--April 1940 to current year.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1508: 1943 (P).

GAGE.--Water-stage encoder. 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.

REMARKS.--Estimated daily discharges: Dec. 22 to Feb. 7 and Aug. 27, 28. Records good except those for estimated daily discharges, which are poor. Des Moines municipal water supply is taken from infiltration galleries on Raccoon River, 3.5 mi upstream from station. Average daily pumpage was about 29 ft³/s. At times, water is pumped from Raccoon River into recharge basins, or into Waterworks Reservoir, capacity 4,800 acre-ft. Effluent from sewage treatment plant enters the river 2.3 mi downstream from station. Net effect diversions not known. Flow regulated by Saylorville Lake (station 05481630) 13.0 mi upstream, since Apr. 12, 1977. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform and Weather Service Limited Automatic Remote Collector (LARC) at station.

COOPERATION.--Average monthly pumpage from galleries provided by Des Moines Water Works.

AVERAGE DISCHARGE.--51 years, 4,532 ft³/s, 6.23 in/yr, 3,283,000 acre-ft/yr; median of yearly mean discharges, 3,770 ft³/s, 5.2 in/yr, 2,730,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 77,000 ft³/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 ft³/s Jan. 16-29, 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since at least 1893, that of June 26, 1947, site and datum then in use. Flood of May 31, 1903, reached a stage of 20.9 ft, from flood profile, at Scott Street site and datum, by office of Des Moines City Engineer.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 45,900 ft³/s June 10, gage height, 27.05 ft.; minimum daily discharge, 480 ft³/s Jan. 30, 31.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	957	758	740	720	490	3390	20600	28300	28300	17900	5490	1300
2	943	759	759	640	520	6030	18200	26700	30900	17500	5860	1260
3	1060	853	730	580	580	8750	16100	24500	30400	17000	6810	1220
4	1030	1100	662	540	900	8750	12700	23100	31600	16600	7250	1180
5	1090	1030	749	510	1200	7730	11100	23400	33900	15800	7310	1090
6	1060	1020	778	520	1500	7650	10100	25600	38600	14600	7500	1010
7	1040	1020	700	510	1700	7700	9300	25600	44600	13200	7410	993
8	1120	1030	721	500	1840	7080	8990	25800	44600	12500	9640	1040
9	1110	872	734	500	2140	6380	9680	26400	44400	12400	8730	1020
10	1010	879	843	510	2480	5890	11500	26700	44600	12100	8950	999
11	846	897	1210	520	2860	5450	9620	25100	40400	11800	9200	967
12	830	896	1020	530	2700	5330	9470	22800	34900	9550	10300	905
13	817	895	1020	540	2460	5640	15400	21200	33000	7950	9200	934
14	816	883	1040	550	2140	6180	20600	20600	33900	7500	8930	974
15	1160	799	1590	560	1880	7080	22000	20200	42800	7100	8950	1230
16	826	799	1690	550	1960	7370	22200	20600	44400	6850	8990	1610
17	812	797	1750	540	1970	7720	24300	21400	42500	6560	8630	1810
18	779	792	1670	560	2010	9530	27400	23600	39800	6380	7870	1600
19	780	784	1670	550	1970	11700	32200	24800	38000	6100	6500	1320
20	783	789	1610	540	2060	12600	29900	26700	37300	5790	5210	1270
21	822	794	1050	530	2280	12600	24400	28700	34600	5680	4260	1250
22	787	783	900	540	2500	12500	22900	30800	31700	5460	3830	1250
23	782	779	770	560	2920	12900	22800	30200	30500	5180	3750	1250
24	784	765	860	540	3270	17000	21300	28000	29900	4940	3480	1210
25	820	757	910	530	3410	20300	19600	25900	28600	4700	3140	1110
26	845	756	820	520	3380	23200	18700	25400	24600	4620	2830	1080
27	814	877	740	510	3190	25300	21700	24700	21200	4550	2230	1080
28	932	913	700	500	3150	25700	24900	24500	19200	4640	2250	1080
29	893	910	740	490	---	25400	28100	24600	18700	4670	1300	1070
30	754	876	800	480	---	23900	28900	27500	18200	4730	1310	1060
31	755	---	760	480	---	22200	---	29500	---	5040	1340	---
TOTAL	27857	25862	30736	16650	59460	368950	574660	782900	1016100	279390	188450	35172
MEAN	899	862	991	537	2124	11900	19160	25250	33870	9013	6079	1172
MAX	1160	1100	1750	720	3410	25700	32200	30800	44600	17900	10300	1810
MIN	754	756	662	480	490	3390	8990	20200	18200	4550	1300	905
AC-FT	55250	51300	60960	33030	117900	731800	1140000	1553000	2015000	554200	373800	69760
CFSM	.09	.09	.10	.05	.21	1.20	1.94	2.56	3.43	.91	.62	.12
IN.	.10	.10	.12	.06	.22	1.39	2.16	2.95	3.83	1.05	.71	.13
CAL YR 1990	TOTAL 1793424	MEAN 4913	MAX 44100	MIN 264	AC-FT 3557000	CFSM .50	IN. 6.75					
WTR YR 1991	TOTAL 3406187	MEAN 9332	MAX 44600	MIN 480	AC-FT 6756000	CFSM .94	IN. 12.83					

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 mi².

PERIOD OF RECORD.--October 1971 to current year.

REVISED RECORDS.--WDR IA-75-1: 1974 (P).

GAGE.--Water-stage encoder. Datum of gage is 795.87 ft above NGVD.

REMARKS.--Estimated daily discharges: Nov. 6 to Dec. 6, Dec. 21 to Feb. 23, Mar. 6, 7, 17-19, June 29 to July 5, and July 21, 22. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service Limited Automatic Remote Collector at station.

AVERAGE DISCHARGE.--20 years, 73.9 ft³/s, 10.83 in/yr, 53,540 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,340 ft³/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 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Apr. 14	1215	853	8.25	May 29	2200	1,420	10.08
Apr. 18	2300	949	8.59	May 31	1700	1,370	9.95
May 5	1415	815	8.11	June 1	1600	573	7.18
May 18	0345	509	6.91	June 4	0930	926	8.51
May 21	2045	*1,520	*10.30	June 15	1745	788	8.01
May 26	0315	878	8.34				

Minimum discharge, 1.0 ft³/s Aug. 5.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6.2	8.5	8.2	10	11	58	81	229	460	55	2.5	7.4
2	5.9	9.9	9.4	10	20	94	77	194	462	50	2.2	5.1
3	18	19	11	9.6	70	70	74	182	403	45	2.4	4.8
4	11	28	10	9.4	58	92	72	171	553	41	1.7	4.2
5	8.1	18	10	9.6	65	78	70	534	297	38	1.5	3.1
6	7.5	13	12	9.8	55	70	69	468	223	35	37	2.9
7	6.8	12	13	10	65	52	66	313	184	32	15	3.6
8	7.0	14	13	10	70	47	81	250	160	28	172	5.9
9	7.3	12	14	10	45	39	137	212	143	29	36	5.7
10	6.2	11	16	10	30	35	120	185	134	30	20	6.3
11	6.0	11	16	11	25	37	109	168	166	29	14	5.2
12	6.1	11	23	11	21	41	221	157	139	26	11	9.8
13	6.2	10	24	12	19	50	324	145	121	23	16	18
14	6.2	10	25	13	17	50	655	139	315	21	11	6.3
15	6.1	10	24	13	16	49	459	194	583	20	8.0	11
16	7.5	9.5	21	12	15	59	325	310	369	19	9.0	23
17	6.2	9.0	22	12	22	153	250	299	252	18	13	8.2
18	5.8	9.0	22	12	60	244	407	418	197	19	7.3	7.1
19	6.1	9.4	24	14	45	187	710	291	163	20	5.9	5.0
20	7.3	9.8	19	13	38	159	450	232	143	15	5.4	4.1
21	11	9.6	15	12	30	138	321	504	123	11	5.8	3.9
22	7.1	9.2	13	11	25	123	266	665	110	8.0	5.0	3.8
23	6.4	9.0	12	12	23	152	229	334	96	7.5	4.3	3.7
24	6.9	9.0	13	13	22	158	190	252	92	5.2	4.5	4.4
25	5.9	9.5	14	12	27	140	180	225	86	4.1	4.2	3.8
26	6.9	11	12	12	22	126	172	442	82	3.3	3.3	3.5
27	6.5	23	11	11	27	147	383	224	76	2.7	3.3	3.4
28	6.4	10	12	11	20	123	295	195	70	8.2	3.2	3.2
29	6.8	8.8	12	11	---	107	367	376	62	6.3	4.6	2.8
30	7.6	8.4	11	10	---	94	306	551	58	4.9	22	3.4
31	7.1	---	10	10	---	90	---	561	---	3.0	31	---
TOTAL	226.1	351.6	471.6	346.4	963	3062	7466	9420	6322	657.2	482.1	182.6
MEAN	7.29	11.7	15.2	11.2	34.4	98.8	249	304	211	21.2	15.6	6.09
MAX	18	28	25	14	70	244	710	665	583	55	172	23
MIN	5.8	8.4	8.2	9.4	11	35	66	139	58	2.7	1.5	2.8
AC-FT	448	697	935	687	1910	6070	14810	18680	12540	1300	956	362
CFSM	.08	.13	.16	.12	.37	1.07	2.68	3.28	2.27	.23	.17	.07
IN.	.09	.14	.19	.14	.39	1.23	3.00	3.78	2.54	.26	.19	.07
CAL YR 1990	TOTAL 41248.6	MEAN 113	MAX 3230	MIN 3.5	AC-FT 81820	CFSM 1.22	IN. 16.55					
WTR YR 1991	TOTAL 29950.6	MEAN 82.1	MAX 710	MIN 1.5	AC-FT 59410	CFSM .89	IN. 12.02					

DES MOINES RIVER BASIN

167

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 mi².

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 encoder. 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: Nov. 15-18, 27, 28, Dec. 13-24, Feb. 3-19, Mar. 6-8, and Aug. 5,7. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--51 years, 184 ft³/s, 7.16 in/yr, 133,300 acre-ft/yr; median of yearly mean discharges, 170 ft³/s, 6.6 in/yr, 123,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 32,000 ft³/s June 13, 1947, gage height, 25.3 ft, from floodmark, from rating curve extended above 9,100 ft³/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 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Apr. 15	0330	1,820	17.09	May 6	1200	1,970	17.55
Apr. 20	1515	*3,680	*20.97	June 3	1745	1,860	17.19

Minimum discharge, 1.3 ft³/s Sept. 29.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5.2	6.6	17	6.4	12	76	94	605	570	104	6.4	3.8
2	4.9	9.8	15	9.3	21	722	86	487	1370	94	6.4	3.6
3	6.0	7.4	14	5.9	50	831	78	436	1800	84	5.6	3.5
4	5.4	27	13	5.9	150	289	73	429	1200	74	5.1	3.4
5	6.0	64	12	7.0	500	229	69	1300	611	68	5.0	3.4
6	5.0	104	24	7.2	400	165	63	1910	436	63	5.3	3.3
7	13	72	22	7.5	310	112	58	1020	364	58	4.9	3.2
8	7.3	45	18	8.7	250	83	55	662	320	51	27	3.6
9	5.0	37	17	9.2	220	67	118	543	303	48	147	4.5
10	3.7	32	18	9.7	190	60	130	465	292	54	167	6.0
11	3.3	27	23	11	170	55	92	413	363	75	62	5.0
12	3.0	21	35	13	140	57	178	382	322	84	36	4.0
13	3.6	18	40	19	120	158	726	352	264	79	23	3.6
14	5.7	18	45	18	100	142	1390	322	344	63	19	3.5
15	5.1	17	50	14	80	114	1780	357	1440	50	13	3.3
16	4.4	17	40	13	74	98	917	348	1390	43	12	2.9
17	3.9	17	45	12	82	265	543	402	611	37	13	2.7
18	3.5	16	35	13	78	753	915	370	438	31	9.5	2.5
19	3.3	16	25	14	82	575	2460	343	362	26	8.3	2.8
20	4.2	15	20	17	84	375	3450	301	312	21	7.2	2.6
21	6.8	16	17	19	94	299	3060	318	275	18	6.4	2.5
22	5.4	36	14	18	93	250	1260	436	259	15	5.6	2.3
23	5.5	25	12	17	84	243	761	426	255	13	5.7	1.8
24	5.6	21	10	15	75	223	604	364	236	15	5.8	1.8
25	4.9	18	8.8	15	65	186	513	324	220	26	5.4	1.8
26	21	19	7.5	15	52	165	492	337	199	16	5.4	1.8
27	23	30	7.4	13	37	170	915	303	174	9.9	5.2	1.7
28	9.0	45	7.7	13	32	180	1270	250	147	8.2	4.9	1.6
29	14	26	7.6	13	---	157	913	223	128	7.0	5.2	1.5
30	9.9	18	6.4	13	---	124	792	312	115	7.0	4.9	1.6
31	6.5	---	16	12	---	105	---	382	---	6.3	4.6	---
TOTAL	213.1	840.8	642.4	383.8	3645	7328	23855	15122	15120	1348.4	641.8	89.6
MEAN	6.87	28.0	20.7	12.4	130	236	795	488	504	43.5	20.7	2.99
MAX	23	104	50	19	500	831	3450	1910	1800	104	167	6.0
MIN	3.0	6.6	6.4	5.9	12	55	55	223	115	6.3	4.6	1.5
AC-FT	423	1670	1270	761	7230	14540	47320	29990	29990	2670	1270	178
CFSM	.02	.08	.06	.04	.37	.68	2.28	1.40	1.44	.12	.06	.01
IN.	.02	.09	.07	.04	.39	.78	2.54	1.61	1.61	.14	.07	.01
CAL YR 1990	TOTAL 96636.4	MEAN 265	MAX 14100	MIN 3.0	AC-FT 191700	CFSM .76	IN. 10.30					
WTR YR 1991	TOTAL 69229.9	MEAN 190	MAX 3450	MIN 1.5	AC-FT 137300	CFSM .54	IN. 7.38					

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 mi².

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 encoder. 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, Oct. 31, 1952 to Sept. 30, 1962, water-stage recorder at site 1.6 mi downstream at datum 2.81 ft lower.

REMARKS.--Estimated daily discharges: Dec. 8 to Mar. 1. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--51 years, 261 ft³/s, 7.05 in/yr, 189,100 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 34,000 ft³/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 ft³/s July 2, 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Apr. 14	2000	4,720	16.80	Apr. 19	0800	*11,300	*22.27

Minimum discharge, 9.0 ft³/s Sept. 28, 29, 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	20	19	30	13	13	100	215	864	891	171	46	21
2	22	18	27	14	18	1830	196	681	1960	156	46	20
3	28	19	33	13	80	1170	178	610	1590	142	45	22
4	24	37	40	12	200	548	169	585	772	130	43	26
5	23	50	47	12	740	369	160	2800	579	117	43	21
6	24	55	45	13	450	310	148	2390	549	116	43	20
7	37	57	41	13	350	247	134	1310	437	104	43	18
8	31	47	35	14	300	199	130	911	384	94	65	21
9	26	42	30	14	260	167	262	731	351	93	86	24
10	24	36	35	15	230	152	233	636	336	99	149	23
11	21	34	42	16	200	142	195	572	346	111	119	27
12	20	32	48	17	170	169	697	520	360	127	72	22
13	19	31	55	16	140	839	1710	477	320	135	57	25
14	19	32	64	15	130	374	3620	435	322	141	53	20
15	18	28	70	16	120	289	2690	455	2250	105	49	18
16	18	25	60	15	110	259	1330	505	3230	90	45	17
17	17	23	65	14	100	973	863	414	1150	81	43	18
18	17	22	60	15	110	1450	2920	427	704	75	37	17
19	17	23	40	18	100	943	9060	514	566	68	32	15
20	20	22	30	20	90	659	2740	422	478	63	31	14
21	25	22	25	17	80	528	1940	435	417	60	31	13
22	20	20	22	15	70	438	1290	524	382	58	29	13
23	18	19	18	14	60	417	1020	611	360	57	27	12
24	19	20	17	18	54	448	815	534	352	56	27	12
25	17	20	15	17	48	439	704	470	325	53	28	11
26	19	21	14	16	46	342	663	493	302	50	25	9.8
27	18	32	13	15	45	391	2180	431	270	48	23	9.6
28	19	48	14	14	50	469	1970	352	236	47	22	9.6
29	17	41	15	14	---	333	2580	323	208	46	22	9.2
30	17	35	14	13	---	274	1300	485	187	45	22	9.5
31	16	---	13	13	---	238	---	1100	---	45	21	---
TOTAL	650	930	1077	461	4364	15506	42112	22017	20614	2783	1424	517.7
MEAN	21.0	31.0	34.7	14.9	156	500	1404	710	687	89.8	45.9	17.3
MAX	37	57	70	20	740	1830	9060	2800	3230	171	149	27
MIN	16	18	13	12	13	100	130	323	187	45	21	9.2
AC-FT	1290	1840	2140	914	8660	30760	83530	43670	40890	5520	2820	1030
CFSM	.04	.06	.07	.03	.31	.99	2.79	1.41	1.37	.18	.09	.03
IN.	.05	.07	.08	.03	.32	1.15	3.11	1.63	1.52	.21	.11	.04

CAL YR 1990	TOTAL	114264	MEAN	313	MAX	11800	MIN	12	AC-FT	226600	CFSM	.62	IN.	8.45
WTR YR 1991	TOTAL	112455.7	MEAN	308	MAX	9060	MIN	9.2	AC-FT	223100	CFSM	.61	IN.	8.32

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 mi².

PERIOD OF RECORD.--February 1940 to current year.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1508: 1941, 1945 (M), 1946.

GAGE.--Water-stage encoder. 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. 4 to Mar. 1, Mar. 3-8, 13, 16, Mar. 29 to Apr. 2, June 9-14, 16, June 18 to July 10, Sept. 15-18, and Sept. 21-30. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--51 years, 247 ft³/s, 7.29 in/yr, 179,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 38,100 ft³/s June 17, 1990, gage height, 31.25 ft; 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 ft³/s, at site 4.0 mi downstream.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 5,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Apr. 14	1015	10,500	21.37	Apr. 27	0615	9,750	20.81
Apr. 19	0615	*19,200	*26.93	May 5	1445	9,050	20.25

Minimum discharge, 2.3 ft³/s Oct. 18.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6.0	12	30	15	13	150	240	626	980	35	15	5.6
2	6.3	11	22	14	15	2500	210	458	1520	27	14	5.3
3	12	11	18	14	19	660	180	416	550	23	15	5.9
4	20	90	16	14	25	383	166	432	395	19	15	4.7
5	22	123	23	13	35	321	154	5070	269	16	16	5.6
6	15	57	40	14	60	267	138	2470	223	14	21	4.5
7	7.0	31	45	16	150	185	123	795	178	13	17	4.6
8	6.1	23	50	17	350	147	121	557	164	15	77	6.7
9	6.4	25	54	19	250	128	202	437	150	25	103	8.6
10	6.3	26	78	21	200	111	152	358	140	60	40	7.6
11	5.6	25	90	23	160	115	129	312	150	98	21	6.1
12	4.7	21	60	27	130	175	1610	280	160	129	13	8.2
13	4.8	18	45	25	110	1130	2240	243	150	86	9.7	7.4
14	4.4	20	32	23	100	552	6110	218	140	56	8.8	3.2
15	3.6	20	35	21	95	428	2230	240	1170	43	16	3.5
16	4.6	15	42	20	90	344	738	377	1360	37	11	5.0
17	4.3	13	38	19	80	1960	497	246	861	32	8.6	7.6
18	2.8	13	33	18	85	1960	4830	200	600	28	7.0	6.0
19	3.3	14	30	20	75	760	13300	174	400	27	6.3	4.4
20	10	15	27	22	66	552	2360	165	350	26	5.9	5.1
21	31	19	25	19	58	433	1170	326	290	23	5.8	4.8
22	31	15	22	17	52	360	754	389	270	22	5.2	4.6
23	20	13	20	16	45	383	617	365	250	22	5.3	4.4
24	17	12	22	18	40	308	481	465	210	22	6.7	4.1
25	13	11	20	20	37	249	438	311	170	20	5.2	3.9
26	12	13	18	18	34	223	434	304	130	18	5.0	3.7
27	10	121	17	16	33	1660	6440	247	100	16	5.1	3.6
28	8.6	190	15	15	37	897	1740	166	80	16	4.9	3.5
29	11	68	17	14	---	600	3210	262	60	17	4.7	3.4
30	11	42	16	14	---	450	1210	1990	45	15	6.1	3.5
31	11	---	15	13	---	320	---	618	---	15	6.7	---
TOTAL	330.8	1087	1015	555	2444	18711	52224	19517	11515	1015	501.0	155.1
MEAN	10.7	36.2	32.7	17.9	87.3	604	1741	630	384	32.7	16.2	5.17
MAX	31	190	90	27	350	2500	13300	5070	1520	129	103	8.6
MIN	2.8	11	15	13	13	111	121	165	45	13	4.7	3.2
AC-FT	656	2160	2010	1100	4850	37110	103600	38710	22840	2010	994	308
CFSM	.02	.08	.07	.04	.19	1.31	3.78	1.37	.83	.07	.04	.01
IN.	.03	.09	.08	.04	.20	1.51	4.22	1.58	.93	.08	.04	.01
CAL YR 1990	TOTAL 131291.1	MEAN 360	MAX 31400	MIN 2.8	AC-FT 260400	CFSM .78	IN. 10.62					
WTR YR 1991	TOTAL 109069.9	MEAN 299	MAX 13300	MIN 2.8	AC-FT 216300	CFSM .65	IN. 8.82					

DES MOINES RIVER BASIN

05487500 DES MOINES RIVER NEAR RUNNELLS, IA

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 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.

DRAINAGE AREA.--11,655 mi².

PERIOD OF RECORD.--October 1985 to current year.

GAGE.--Water-stage encoder. Datum of gage is 700.00 ft above NGVD (U.S. Army Corps of Engineers bench mark).

REMARKS.--Estimated daily discharges: Dec. 11, Dec. 22 to Feb. 26, Mar. 3, 4, Mar. 27 to Apr. 13, and Apr. 21. Records good except those for estimated daily discharges, which are poor. Flow regulated by Saylorville Lake (station 05481630) 34.2 mi upstream. Stage-discharge relation is affected at times by backwater from Lake Red Rock (05488100). U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--6 years, 6,402 ft³/s, 7.46 in/yr, 4,638,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 88,300 ft³/s June 18, 1990; maximum gage height, 79.20 ft June 19, 20, 1991, (backwater from Lake Red Rock); minimum daily discharge, 390 ft³/s, Jan. 10, 11, 1990.

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. Gage height and discharge information is available for these floods at other sites on the Des Moines River.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 52,000 ft³/s June 19, gage height, 79.20, occurred during period of backwater from Lake Red Rock; minimum daily discharge, 490 ft³/s Jan. 30 to Feb. 2.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	964	653	799	750	490	3180	26300	34000	33000	24000	5800	1530
2	928	658	725	700	490	10100	23500	32500	33000	23000	6400	1460
3	1020	713	716	660	520	12700	21300	30000	31000	22000	7200	1410
4	1150	1060	608	600	580	12500	17100	27500	31000	21000	7400	1360
5	1090	1150	618	560	800	10200	14200	26000	35000	20000	7600	1270
6	1110	1090	693	520	1200	9400	12600	26600	40000	20000	7800	1150
7	1050	1080	676	520	1400	9400	11500	27800	46000	18000	8400	1070
8	1110	1040	668	510	1700	8660	10800	28800	48000	17000	10000	1080
9	1140	1020	694	500	2000	7510	10100	29600	47000	16500	9400	1130
10	1080	871	744	500	2300	6890	11700	30100	41000	16500	9200	1090
11	881	892	1000	510	2600	6170	11500	30300	36000	16800	9500	1060
12	791	883	1200	510	2800	5990	11600	30400	32500	16000	9700	1010
13	778	870	1120	520	2600	7970	19200	29000	30700	13000	9700	978
14	766	861	1040	540	2200	7900	28500	26000	31000	11000	8940	1000
15	885	804	1370	560	2000	8080	31300	24000	45000	9300	8730	1050
16	982	748	1780	550	1850	9040	27400	24000	47000	8200	8820	1550
17	777	758	1800	540	1900	11000	25700	24000	48000	7800	8660	1800
18	753	746	1800	530	1900	16400	29900	25000	51000	7400	8100	1870
19	733	735	1740	550	1900	15700	46100	26000	52000	7000	7030	1510
20	746	730	1800	540	1950	16500	43100	27000	52000	6600	5530	1360
21	820	736	1280	530	2000	17400	34000	27900	51000	6400	4490	1330
22	790	732	1050	530	2200	18000	28000	28700	49000	6300	3820	1310
23	748	721	900	540	2500	16000	26000	28900	47500	6200	3730	1300
24	730	717	780	560	2800	18700	24000	28800	46000	6000	3680	1290
25	740	712	900	560	3100	22600	23000	28300	43000	5600	3250	1160
26	771	702	880	540	3100	25500	21000	27500	41700	5400	3160	1090
27	766	838	810	530	3030	29900	34000	26500	39600	5300	2500	1070
28	788	1040	760	520	3000	31500	32000	25300	34000	5200	2510	1060
29	848	978	720	500	---	32600	35500	24100	29000	5000	2240	1060
30	736	909	700	490	---	30900	35000	27000	25000	5000	1310	1060
31	653	---	780	490	---	28200	---	31000	---	5400	1680	---
TOTAL	27124	25447	31151	16960	54910	466590	725900	862600	1216000	362900	196280	37468
MEAN	875	848	1005	547	1961	15050	24200	27830	40530	11710	6332	1249
MAX	1150	1150	1800	750	3100	32600	46100	34000	52000	24000	10000	1870
MIN	653	653	608	490	490	3180	10100	24000	25000	5000	1310	978
AC-FT	53800	50470	61790	33640	108900	925500	1440000	1711000	2412000	719800	389300	74320

CAL YR 1990 TOTAL 2265289 MEAN 6206 MAX 77600 MIN 390 AC-FT 4493000

WTR YR 1991 TOTAL 4023330 MEAN 11020 MAX 52000 MIN 490 AC-FT 7980000

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 mi².

PERIOD OF RECORD.--October 1962 to current year.

GAGE.--Water-stage encoder. Datum of gage is 759.21 ft above NGVD.

REMARKS.--Estimated daily discharges: Dec. 21 to Feb. 4, Feb. 15-18, 26-28, Mar. 4-7, Apr. 24-26, May 15, May 21 to June 13, 15-17, June 19-25, June 27 to Aug. 4, Aug. 9-11, Aug. 14 to Sept. 4, Sept. 10-15, 20-23, and Sept. 25-30. Records fair except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--29 years, 202 ft³/s, 8.02 in/yr, 146,300 acre-ft/yr; median of yearly mean discharges, 160 ft³/s, 6.4 in/yr, 116,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 37,300 ft³/s July 16, 1982, gage height, 33.45 ft; minimum daily discharge, 0.02 ft³/s Oct. 14, 1989.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 11, 1962 reached a stage of 28.87 ft, from floodmark, discharge, about 12,000 ft³/s. Flood of June 6, 1947 may have been slightly higher.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Apr. 12	1445	3,870	16.75	Apr. 27	1100	*11,400	*23.73
Apr. 14	1100	7,310	21.26	Apr. 29	0500	5,220	18.12
Apr. 19	0330	*10,800	*24.28	May 5	1930	5,020	18.51

Minimum daily discharge, 1.4 ft³/s Sept. 29.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4.8	8.6	53	9.4	12	66	152	556	130	14	5.5	3.7
2	8.8	8.6	44	8.8	100	1560	134	339	400	12	5.0	4.0
3	18	11	50	8.0	800	821	119	345	110	10	4.8	4.3
4	85	81	62	7.4	1300	346	111	426	1000	9.0	4.7	3.7
5	48	145	72	8.2	907	268	100	3410	350	8.5	6.0	3.4
6	25	83	76	8.6	536	204	91	3030	140	8.0	14	3.4
7	12	53	78	9.2	387	148	84	1080	90	7.5	22	2.5
8	6.4	34	78	9.8	263	110	106	456	70	7.0	41	2.7
9	6.5	31	80	10	220	97	182	329	60	10	28	3.1
10	11	35	91	11	170	84	98	296	55	20	17	2.8
11	6.4	37	116	11	118	85	96	286	400	40	9.0	2.4
12	4.8	35	134	12	91	112	1650	270	50	30	7.1	2.5
13	4.8	32	137	12	92	229	2310	260	40	19	5.6	2.3
14	4.8	29	131	13	73	264	4430	284	51	13	5.2	2.2
15	4.3	27	126	14	69	184	2550	429	1000	10	4.8	2.3
16	4.4	25	124	15	65	168	931	538	500	9.0	4.5	2.7
17	3.9	22	122	17	63	917	369	318	300	8.0	4.2	4.9
18	3.9	20	120	19	100	1860	2420	229	194	7.2	4.5	4.0
19	4.4	20	122	21	162	644	9210	181	130	6.4	4.0	2.1
20	4.2	19	114	23	148	405	5360	146	100	6.0	3.5	1.8
21	16	20	84	19	102	287	1140	96	70	5.6	3.3	1.5
22	26	23	58	21	79	255	614	110	56	5.2	3.1	1.6
23	19	23	35	25	76	550	449	100	45	5.0	3.0	1.6
24	11	22	20	28	69	281	319	135	42	9.0	3.2	1.5
25	9.3	20	14	23	37	202	235	100	33	7.0	3.4	1.5
26	13	20	11	20	35	169	196	84	33	5.6	3.7	1.5
27	3.8	114	13	18	32	1200	4940	70	25	5.0	4.0	1.8
28	4.7	188	15	16	31	950	3210	60	22	4.7	3.0	1.6
29	7.6	109	13	15	---	339	4020	54	18	4.5	2.8	1.4
30	7.9	69	11	14	---	221	2140	450	16	4.6	3.1	1.7
31	8.4	---	10	13	---	178	---	140	---	5.0	4.0	---
TOTAL	398.1	1364.2	2214	459.4	6137	13204	47766	14607	5530	315.8	237.0	76.5
MEAN	12.8	45.5	71.4	14.8	219	426	1592	471	184	10.2	7.65	2.55
MAX	85	188	137	28	1300	1860	9210	3410	1000	40	41	4.9
MIN	3.8	8.6	10	7.4	12	66	84	54	16	4.5	2.8	1.4
AC-FT	790	2710	4390	911	12170	26190	94740	28970	10970	626	470	152
CFSM	.04	.13	.21	.04	.64	1.25	4.66	1.38	.54	.03	.02	.01
IN.	.04	.15	.24	.05	.67	1.44	5.20	1.59	.60	.03	.03	.01

CAL YR 1990	TOTAL 93837.8	MEAN 257	MAX 11300	MIN 2.6	AC-FT 186100	CFSM .75	IN. 10.21
WTR YR 1991	TOTAL 92309.0	MEAN 253	MAX 9210	MIN 1.4	AC-FT 183100	CFSM .74	IN. 10.04

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 mi².

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 ft³/s but normal flood control operation limits maximum outflow to 30,000 ft³/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. 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 ft³/s and maximum release of 30,000 ft³/s during the non-growing season, providing discharges at Ottumwa and Keosauqua do not exceed 30,000 ft³/s and 35,000 ft³/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, 1,710,000 acre-ft June 18-19; maximum elevation, 779.30 ft June 18-21; minimum daily contents, 135,000 acre-ft Feb. 15; minimum elevation, 734.00 ft Feb. 15-16.

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 1990 TO SEPTEMBER 1991
DAILY OBSERVATION AT 24:00 VALUES

	DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
	1	168000	168000	171000	142000	139000	143000	181000	686000	1250000	1440000	525000	144000
	2	168000	168000	171000	143000	139000	157000	164000	703000	1290000	1410000	500000	146000
	3	170000	169000	172000	142000	141000	163000	152000	723000	1320000	1390000	476000	147000
	4	171000	169000	168000	142000	145000	165000	144000	739000	1360000	1360000	450000	148000
	5	171000	169000	168000	142000	143000	165000	139000	809000	1380000	1330000	430000	149000
	6	171000	170000	168000	142000	139000	157000	138000	860000	1420000	1300000	410000	150000
	7	170000	169000	168000	142000	139000	150000	138000	888000	1460000	1270000	398000	151000
	8	170000	170000	167000	141000	140000	145000	139000	909000	1500000	1230000	377000	152000
	9	170000	170000	167000	141000	141000	140000	138000	926000	1530000	1200000	361000	154000
	10	170000	169000	163000	141000	141000	139000	140000	942000	1570000	1180000	342000	155000
	11	169000	169000	158000	141000	141000	138000	144000	956000	1600000	1160000	322000	156000
	12	167000	168000	154000	141000	141000	141000	155000	966000	1610000	1130000	308000	157000
	13	167000	167000	148000	141000	141000	143000	162000	973000	1610000	1100000	291000	158000
	14	167000	167000	145000	141000	138000	141000	203000	976000	1620000	1080000	273000	159000
	15	166000	168000	143000	141000	135000	141000	249000	990000	1650000	1040000	253000	162000
	16	167000	167000	142000	141000	137000	145000	265000	1000000	1680000	1010000	233000	163000
	17	173000	166000	142000	141000	140000	152000	263000	1010000	1700000	978000	215000	167000
	18	166000	166000	140000	141000	141000	160000	283000	1020000	1710000	943000	197000	166000
	19	165000	166000	140000	141000	139000	155000	391000	1030000	1710000	913000	180000	165000
	20	169000	166000	141000	141000	140000	150000	485000	1050000	1700000	883000	164000	165000
	21	168000	167000	139000	141000	141000	145000	528000	1070000	1700000	850000	154000	166000
	22	169000	168000	138000	141000	141000	144000	542000	1090000	1690000	818000	147000	166000
	23	171000	168000	138000	141000	142000	142000	540000	1110000	1670000	781000	144000	166000
	24	171000	168000	139000	141000	142000	139000	527000	1130000	1660000	746000	142000	167000
	25	170000	167000	139000	141000	142000	145000	511000	1140000	1640000	716000	139000	168000
	26	170000	170000	140000	140000	142000	151000	507000	1150000	1610000	688000	139000	167000
	27	171000	173000	140000	140000	141000	163000	555000	1160000	1580000	659000	138000	16

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 mi².

PERIOD OF RECORD.--July 1985 to current year.

GAGE.--Water-stage encoder. Datum of gage is 721.79 ft above NGVD.

REMARKS.--Estimated daily discharges: Dec. 25 to Mar. 1 and July 19 to Aug. 4. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers satellite data collection platform at station.

AVERAGE DISCHARGE.--6 years, 48.6 ft³/s, 7.32 in/yr, 35,210 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,220 ft³/s Apr. 19, 1991, gage height, 22.11 ft; no flow for several days in 1988, 1989, and 1991.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of July 16, 1982 reached a stage of 30.28 ft, gage datum, discharge 28,000 ft³/s, from contracted-opening indirect computations.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 600 ft³/s and maximum (*);

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 2	1745	798	15.85	Apr. 27	2230	2,960	21.81
Mar. 18	0045	678	15.16	Apr. 29	1730	2,860	21.69
Mar. 23	0215	746	15.55	May 6	0215	2,240	20.68
Apr. 13	2000	772	15.70	May 30	1330	912	16.52
Apr. 15	0400	1,580	19.08	June 2	0415	805	15.96
Apr. 19	1330	*3,220	*22.11	June 4	0830	1,330	18.25

No flow Sept. 6-10, 21, 25-30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.14	.59	4.0	1.6	2.3	25	37	122	47	1.7	.20	.05
2	.19	.51	3.3	1.5	4.0	594	32	76	493	1.3	.21	.04
3	14	.94	4.3	1.4	12	171	29	84	71	.97	.19	.03
4	5.7	10	5.6	1.3	30	85	27	115	937	.76	.16	.02
5	6.1	14	6.0	1.2	100	64	26	1270	164	.64	.23	.01
6	.93	8.9	8.0	1.3	90	52	23	1030	51	.59	.22	.00
7	.44	3.4	8.5	1.4	76	33	20	138	33	.51	.18	.00
8	.37	2.5	8.5	1.4	62	28	19	86	24	.41	3.5	.00
9	.47	3.4	9.5	1.5	50	25	21	64	20	.84	1.7	.00
10	.35	3.2	16	1.7	45	21	18	49	16	1.1	.89	.00
11	.35	3.6	31	1.8	40	21	17	42	30	1.6	1.0	.04
12	.45	2.8	60	2.0	35	32	153	38	22	2.4	.48	.05
13	.37	2.3	42	2.1	30	80	511	46	66	2.6	.30	.03
14	.35	1.9	27	2.0	27	50	932	35	47	1.6	.19	.01
15	.32	1.6	31	2.1	23	39	693	238	289	.86	.11	.16
16	.25	1.6	31	2.5	17	36	118	353	123	.56	.10	.13
17	.32	1.4	26	2.9	15	209	75	92	30	.47	.09	.03
18	.50	1.2	35	3.4	14	347	751	50	18	.31	.08	.07
19	.52	1.3	31	3.8	15	110	2800	36	13	.36	.08	.04
20	.70	1.6	22	4.5	17	72	944	31	10	.38	.07	.02
21	1.4	1.6	17	4.0	22	57	260	29	9.3	.32	.06	.00
22	1.0	1.5	11	3.5	30	169	149	26	8.0	.45	.06	.02
23	.50	1.6	6.1	4.1	25	460	125	21	7.6	.46	.12	.02
24	.50	1.6	3.5	4.9	20	113	101	25	7.6	.41	.10	.01
25	.55	1.7	2.5	5.4	15	69	87	21	6.8	.31	.10	.00
26	.67	1.6	2.0	4.5	13	57	88	19	5.7	.29	.10	.00
27	.91	46	1.8	3.9	11	280	2000	15	4.4	.27	.06	.00
28	.71	46	1.7	3.3	10	151	1110	11	3.4	.29	.04	.00
29	.66	12	2.0	3.0	---	67	2420	11	2.7	.28	.03	.00
30	.70	6.9	1.9	2.7	---	51	697	489	2.3	.28	.20	.00
31	.65	---	1.7	2.5	---	45	---	77	---	.24	.09	---
TOTAL	41.07	187.24	460.9	83.2	850.3	3613	14283	4739	2561.8	23.56	10.94	0.78
MEAN	1.32	6.24	14.9	2.68	30.4	117	476	153	85.4	.76	.35	.026
MAX	14	46	60	5.4	100	594	2800	1270	937	2.6	3.5	.16
MIN	.14	.51	1.7	1.2	2.3	21	17	11	2.3	.24	.03	.00
AC-FT	81	371	914	165	1690	7170	28330	9400	5080	47	22	1.5
CFSM	.01	.07	.17	.03	.34	1.29	5.28	1.70	.95	.01	.00	.00
IN.	.02	.08	.19	.03	.35	1.49	5.90	1.96	1.06	.01	.00	.00

CAL YR 1990	TOTAL 24468.94	MEAN 67.0	MAX 1950	MIN .08	AC-FT 48530	CFSM .74	IN. 10.10
WTR YR 1991	TOTAL 26854.79	MEAN 73.6	MAX 2800	MIN .00	AC-FT 53270	CFSM .82	IN. 11.09

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 mi².

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 encoder. 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. 22 to Jan. 16, Jan. 21-23, 25, 26, 30, and 31. Records good except those for periods of estimated daily discharges, which are fair. Flow regulated by Lake Red Rock (station 05488100) 11.9 mi upstream, since March 12, 1969. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers gage-height telemeter and data collection platform at station.

AVERAGE DISCHARGE.--71 years, 5,144 ft³/s, 5.60 in/yr, 3,727,000 acre-ft/yr; median of yearly mean discharges, 4,190 ft³/s, 4.6 in/yr, 3,040,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 155,000 ft³/s, June 14, 1947, gage height, 26.5 ft; minimum daily discharge, 40 ft³/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 ft³/s. Minimum daily discharge since at least 1910, that of Jan. 29 to Feb. 1, 1940.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 35,200 ft³/s June 21, gage height 15.76 ft; minimum daily discharge, 220 ft³/s Dec. 25.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1150	1060	1340	660	850	3630	25100	23600	19400	33600	17200	842
2	1150	1070	1330	740	825	5800	28100	20800	21600	30000	17100	833
3	1250	1080	1530	880	899	9630	26500	20100	21500	29700	17100	820
4	1190	1260	1800	920	4060	11000	20900	18800	21700	29600	17100	760
5	1160	1500	1540	940	8010	11100	16400	18600	19900	29700	17100	577
6	1170	1520	1130	930	7110	11500	13100	13400	21200	29500	17200	436
7	1230	1520	1130	940	5100	12100	11400	16200	21400	29400	17200	426
8	1380	1520	1130	930	3520	11400	11000	18400	21900	28300	17200	427
9	1370	1520	1130	920	3510	10200	10900	19800	24100	25200	16700	425
10	1360	1520	2050	910	3480	8110	10500	20000	24600	24800	17200	416
11	1370	1520	3800	920	3610	6120	10200	20300	25900	23800	17300	424
12	1370	1520	4250	920	3730	5950	11700	20300	28400	21200	17400	415
13	1230	1440	4240	920	3660	6300	18500	20300	28600	21200	17200	412
14	995	1320	3660	930	3720	9470	21400	20400	29700	21100	17300	415
15	986	1310	2940	940	3020	8440	18000	19900	33100	21300	17300	427
16	1000	1310	2920	920	1170	7170	22200	19100	33900	21600	17100	462
17	1010	1240	2920	897	845	8390	26600	19100	33600	21500	16900	610
18	995	1110	2930	885	1880	12700	30600	19800	34600	21300	16300	1230
19	934	1100	2930	879	3220	17300	30200	20300	34900	21300	15000	1880
20	849	1040	2800	867	2310	17700	19500	20500	35200	21300	13200	1190
21	850	921	2230	870	2290	17100	16900	21100	35200	21300	11200	1180
22	663	907	700	870	2500	17300	24000	21400	35200	21300	8290	1190
23	328	916	400	880	2820	16600	28000	21500	35100	21100	6590	1190
24	348	913	260	886	2950	16900	31800	21600	35100	20900	5590	1130
25	917	918	220	900	3380	16800	31800	21600	35000	19800	5180	998
26	933	922	250	890	3620	18100	29600	21600	35000	17600	4020	999
27	947	1180	350	896	3600	21900	26100	21600	34900	17500	2870	1010
28	1010	1390	450	870	3580	23700	26200	21600	34700	17400	2680	1010
29	1140	1350	400	883	---	23400	24400	21600	34600	17300	2080	1010
30	1090	1340	500	880	---	23500	25000	21700	34500	17400	1360	1000
31	1050	---	580	900	---	23500	---	22000	---	17300	980	---
TOTAL	32425	37237	53840	27573	89269	412810	646600	627000	884500	714300	386940	24144
MEAN	1046	1241	1737	889	3188	13320	21550	20230	29480	23040	12480	805
MAX	1380	1520	4250	940	8010	23700	31800	23600	35200	33600	17400	1880
MIN	328	907	220	660	825	3630	10200	13400	19400	17300	980	412
AC-FT	64310	73860	106800	54690	177100	818800	1283000	1244000	1754000	1417000	767500	47890
CAL YR 1990	TOTAL 2459333		MEAN 6738	MAX 23100		MIN 220	AC-FT 4878000					
WTR YR 1991	TOTAL 3936638		MEAN 10790	MAX 35200		MIN 220	AC-FT 7808000					

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 mi².

PERIOD OF RECORD.--October 1947 to current year.

REVISED RECORDS.--WSP 1438: Drainage area.

GAGE.--Water-stage encoder. 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: Dec. 21 to Feb. 4, Feb. 7-16, and Feb. 22-28. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers satellite data collection platform.

AVERAGE DISCHARGE.--44 years, 217 ft³/s, 7.88 in/yr, 157,200 acre-ft/yr; median of yearly mean discharges, 180 ft³/s, 6.5 in/yr, 130,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 96,000 ft³/s July 3, 1982, gage height, 34.61 ft; no flow Sept. 6-20, 1955, Oct. 11, 12, 1956, Aug. 12, 13, 1989.

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 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Apr. 14	2045	4,360	18.07	Apr. 29	1515	11,000	22.67
Apr. 19	1300	*12,400	*23.34	May 5	2315	8,150	21.29
Apr. 27	1630	4,250	17.84	June 15	2115	4,490	18.32

Minimum discharge, 1.3 ft³/s, Sept. 17, 21, 28.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	7.5	16	31	14	15	133	156	588	199	22	6.6	3.6		
2	6.8	12	27	13	15	2580	138	391	297	19	6.2	4.3		
3	15	6.1	28	12	120	828	133	335	144	17	6.5	3.5		
4	146	78	23	11	1000	349	127	518	1670	15	6.2	3.3		
5	63	178	36	12	1510	287	125	4760	590	14	5.9	2.7		
6	27	99	49	13	774	246	108	4430	194	14	7.5	3.0		
7	15	58	53	14	400	172	95	813	121	13	8.9	3.3		
8	11	38	50	15	280	143	91	486	93	11	26	3.6		
9	14	38	55	16	220	135	101	359	79	14	35	3.4		
10	20	54	90	17	170	114	100	281	79	23	20	2.7		
11	18	47	136	18	140	118	81	238	946	65	9.7	2.4		
12	15	32	212	17	130	142	621	213	170	63	6.6	2.6		
13	12	27	160	18	120	410	1840	197	146	36	5.5	2.3		
14	11	23	93	20	105	262	3160	170	267	22	5.0	2.3		
15	8.4	23	111	22	95	198	1860	1370	2140	16	4.5	2.7		
16	8.6	20	116	24	84	186	530	1380	1680	13	4.0	6.9		
17	7.1	20	93	26	77	574	326	500	301	11	4.1	2.6		
18	6.1	19	147	28	93	1250	2220	303	169	9.5	4.2	3.9		
19	8.8	18	123	30	416	469	10400	241	122	8.9	3.3	2.4		
20	9.7	17	97	33	219	306	4050	191	92	8.1	3.2	1.7		
21	13	19	60	27	156	248	1170	169	74	7.3	3.2	1.5		
22	13	21	32	31	130	263	602	214	63	6.8	2.9	1.8		
23	12	21	20	34	100	1130	427	170	59	6.8	3.1	1.8		
24	13	22	23	40	84	425	311	315	58	12	3.1	1.6		
25	10	18	26	30	75	261	255	192	54	12	3.3	1.6		
26	8.9	15	22	23	66	216	236	177	47	8.0	3.7	1.6		
27	7.8	114	20	21	58	794	3240	205	39	6.4	2.8	2.0		
28	6.3	127	18	19	52	707	1090	115	33	5.9	3.0	1.5		
29	6.2	66	20	18	---	291	6930	95	28	5.8	3.0	1.7		
30	6.8	39	18	17	---	209	2660	809	25	5.8	3.2	2.4		
31	6.9	---	16	16	---	182	---	191	---	6.2	4.1	---		
TOTAL	533.9	1285.1	2005	649	6704	13628	43173	20416	9979	497.5	214.3	80.7		
MEAN	17.2	42.8	64.7	20.9	239	440	1439	659	333	16.0	6.91	2.69		
MAX	146	178	212	40	1510	2580	10400	4760	2140	65	35	6.9		
MIN	6.1	6.1	16	11	15	114	81	95	25	5.8	2.8	1.5		
AC-FT	1060	2550	3980	1290	13300	27030	85630	40500	19790	987	425	160		
CFSM	.05	.11	.17	.06	.64	1.18	3.85	1.76	.89	.04	.02	.01		
IN.	.05	.13	.20	.06	.67	1.36	4.29	2.03	.99	.05	.02	.01		
CAL YR 1990	TOTAL	113771.7	MEAN	312	MAX	10200	MIN	4.2	AC-FT	225700	CFSM	.83	IN.	11.32
WTR YR 1991	TOTAL	99165.5	MEAN	272	MAX	10400	MIN	1.5	AC-FT	196700	CFSM	.73	IN.	9.86

DES MOINES RIVER BASIN

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 mi².

PERIOD OF RECORD.--March 1917 to current year (published as "at Eldon" October 1930 to March 1935). Monthly discharge 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 encoder. 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. 22 to Feb. 1. 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. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers satellite data collection platform at station.

AVERAGE DISCHARGE.--74 years, 5,573 ft³/s, 5.66 in/yr, 4,038,000 acre-ft/yr; median of yearly mean discharges, 4,690 ft³/s, 4.8 in/yr, 3,400,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 135,000 ft³/s June 7, 1947, gage height, 20.2 ft, site and datum then in use; minimum daily discharge, 26 ft³/s Oct. 25, 1990, when gates at dam in Ottumwa were closed.

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 ft³/s.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 37,400 ft³/s Apr. 19, gage height, 13.07 ft; minimum daily discharge, 26 ft³/s Oct. 25, when gates at dam in Ottumwa were closed.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1460	1150	1500	700	1300	5420	23400	24200	23800	34400	17500	958
2	1440	1130	1480	760	2040	9310	26000	21200	22400	32500	17400	770
3	1620	1130	1470	930	3400	11800	26400	20700	23300	30100	17400	1020
4	1740	1340	1740	950	7130	12600	22700	19700	24200	29700	17300	986
5	1670	1540	2270	960	13600	12600	18600	25600	23300	29700	17500	767
6	1550	1830	1530	950	15500	12400	15200	21000	22800	29500	17500	576
7	1440	1590	1400	950	13400	13200	12600	16600	23200	29300	17600	563
8	1560	1590	1370	940	8270	13200	11700	18600	23300	29000	17800	568
9	1710	1640	1390	1000	5500	11800	11500	19700	24800	27000	17400	517
10	1680	1590	1430	970	4980	10700	11400	19900	26400	25700	17400	640
11	1660	1580	3290	940	4840	8130	10600	20300	27000	25400	17800	506
12	1650	1550	4990	930	4980	8210	10800	20500	28700	22600	17900	540
13	1640	1560	5160	930	4990	7950	16600	20500	29700	22100	17900	518
14	1480	1470	4930	940	4880	10200	23100	20600	29800	21900	17800	542
15	1200	1370	3830	950	3930	10800	21100	21100	32300	21600	18000	302
16	1190	1380	3660	960	3750	9130	19800	20700	34400	22000	17900	835
17	1230	1360	3700	920	2360	9660	23100	20300	34900	22000	17800	562
18	1170	1300	3720	940	2590	13400	27000	20300	34700	21900	17500	795
19	1180	1190	3790	960	4950	17500	35700	20800	35100	21700	16400	1900
20	995	1200	3690	1000	4810	19200	32500	21000	35300	21500	14700	1860
21	900	1090	2860	1300	3770	17900	17800	21500	35400	21300	12800	1230
22	1050	963	1700	1050	3640	19000	20900	22000	35400	21300	9710	1460
23	2270	975	700	1000	4030	18600	24400	22200	35400	21000	7140	1340
24	40	958	450	1050	4030	18600	27600	22400	35400	20800	5830	1380
25	26	966	290	1000	4520	18100	28900	22400	35300	20400	5210	1320
26	604	961	330	1000	4930	18200	28900	22500	35200	18100	4810	1170
27	1160	1230	450	1050	5030	21600	27100	22500	35100	17600	3120	1100
28	1130	1500	500	1100	4990	24400	26200	22500	35000	17500	2690	1130
29	1210	1650	560	1050	---	23500	25400	22600	34800	17400	2650	1200
30	1320	1550	800	1050	---	23400	27100	23100	34600	17600	1870	1190
31	1240	---	730	1100	---	23200	---	23800	---	17600	1270	---
TOTAL	40215	40333	65710	30330	152140	453710	654100	660800	911000	730200	405600	28245
MEAN	1297	1344	2120	978	5434	14640	21800	21320	30370	23550	13080	941
MAX	2270	1830	5160	1300	15500	24400	35700	25600	35400	34400	18000	1900
MIN	26	958	290	700	1300	5420	10600	16600	22400	17400	1270	302
AC-FT	79770	80000	130300	60160	301800	899900	1297000	1311000	1807000	1448000	804500	56020
CAL YR 1990	TOTAL 2788313		MEAN 7639	MAX 28300	MIN 26	AC-FT 5531000						
WTR YR 1991	TOTAL 4172383		MEAN 11430	MAX 35700	MIN 26	AC-FT 8276000						

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.

PERIOD OF RECORD.--May 1903 to July 1906, April to December 1910, August 1911 to current year. Monthly discharge only for some periods, published in WSP 1308.

GAGE.--Water-stage encoder. Datum of gage is 547.36 ft above NGVD. Prior to Dec. 24, 1933, nonrecording gage, and Dec. 25, 1933, to Sept. 30, 1972, water-stage recorder, at same site at datum 10.00 ft higher.

AVERAGE DISCHARGE.--82 years (water years 1904-05, 1912-91), 5,937 ft³/s, 5.74 in/yr, 4,301,000 acre-ft/yr;
median of yearly mean discharges, 5,020 ft³/s, 4.9 in/yr, 3,640,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 146,000 ft³/s June 1, 1903, gage height, 27.85 ft, from floodmark, datum then in use; minimum daily discharge, 40 ft³/s Jan. 30, 1940.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 1, 1851, reached a stage of 24 ft, discharge not determined.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 47,600 ft³/s Apr. 19, maximum gage height, 23.26 ft Apr. 19; minimum daily discharge, 115 ft³/s Oct. 27.

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1400	1170	1260	780	1400	3830	22500	25900	26700	32800	18100	1390
2	1420	1050	1210	860	1600	7390	23900	23200	21600	32100	18000	1170
3	1700	1030	1380	920	2000	10600	25900	21700	22500	28900	18000	1340
4	1660	1450	1270	1000	4500	10500	24400	21000	22900	28200	18000	1070
5	1680	1440	1540	1050	8500	11100	19900	28900	23100	28100	18000	840
6	1630	1550	1730	1050	13000	11000	16000	28800	21100	28100	18000	790
7	1580	1820	1250	1050	14000	11200	12900	18200	21800	28100	18100	720
8	1650	1540	1080	1050	12800	11600	10800	18300	21900	28000	18300	680
9	1820	1690	1030	1050	13700	10900	10400	19900	22500	27100	18100	640
10	2060	1630	1030	1000	9570	9640	10300	20700	24200	25200	17600	670
11	1750	1590	1060	1000	7140	8010	9940	20700	24600	25000	18100	650
12	1650	1530	3400	1000	6750	6400	9430	20900	25900	23700	18200	670
13	1620	1490	4650	1050	5240	7660	12700	20800	27100	21900	18300	640
14	1600	1460	4620	1050	4830	7050	21700	20800	27300	21900	18100	660
15	1440	1330	4310	1000	11000	9260	23700	21000	28300	21800	18200	590
16	1150	1210	3340	1000	8610	8520	19700	21500	31000	22000	18200	920
17	1120	1190	3310	1000	7910	7520	22400	21000	33200	22200	18100	600
18	1150	1150	3320	1000	4780	10600	25700	20300	32100	22300	18000	960
19	1110	1130	3320	1000	3840	14500	41700	20500	32800	22100	17600	2150
20	1080	992	3250	1050	6080	17500	41900	20800	33100	22100	15300	2100
21	927	1020	3080	1050	3610	17500	25900	20900	33600	22000	13400	1800
22	987	914	1780	1100	2740	17200	20400	21500	33800	22000	10000	1650
23	1300	765	800	1000	2550	18700	24900	22000	33700	22000	7400	1530
24	1960	792	600	1150	2930	18000	27000	22100	33600	21800	6000	1270
25	344	774	350	1050	2830	17400	29400	22300	33600	21600	5500	1300
26	155	753	450	1100	3210	17100	29400	22200	33500	20100	5000	1240
27	115	941	660	1200	3570	20800	28200	22200	33400	18400	4600	1110
28	996	1130	800	1200	3560	23700	27200	22200	33300	18200	4200	1060
29	1050	1260	900	1150	---	23200	25700	22200	33200	18100	3500	1030
30	1090	1340	840	1300	---	22600	26800	22300	33000	18100	2800	1110
31	1210	---	750	1500	---	22500	---	22700	---	18200	1700	---
TOTAL	40404	37131	58370	32760	172250	413480	670770	677500	858400	732100	422400	32350
MEAN	1303	1238	1883	1057	6152	13340	22360	21850	28610	23620	13630	1078
MAX	2060	1820	4650	1500	14000	23700	41900	28900	33800	32800	18300	2150
MIN	115	753	350	780	1400	3830	9430	18200	21100	18100	1700	590
AC-FT	80140	73650	115800	64980	341700	820100	1330000	1344000	1703000	1452000	837800	64170
CAL YR 1990	TOTAL 3007517		MEAN 8240	MAX 44300		MIN 115	AC-FT 5965000					
WTR YR 1991	TOTAL 4147915		MEAN 11360	MAX 41900		MIN 115	AC-FT 8227000					

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 mi².

PERIOD OF RECORD.--June 1948 to current year.

REVISED RECORDS.--WSP 1439: Drainage area.

GAGE.--Water-stage encoder. 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. 3-6 and Dec. 13 to Mar. 9. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--43 years, 398 ft³/s, 3.40 in/yr, 288,400 acre-ft/yr; median of yearly mean discharges, 260 ft³/s, 2.2 in/yr, 188,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 40,400 ft³/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 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
June 6	1800	*1,390	*7.72				

Minimum daily discharge, 4.8 ft³/s Dec. 21.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	15	33	43	17	8.0	37	171	139	377	233	37	5.9
2	15	30	43	10	10	35	161	149	309	202	37	6.4
3	27	33	40	9.2	14	60	155	155	303	177	38	7.9
4	37	36	34	9.6	20	120	150	163	344	160	35	8.1
5	38	36	43	12	19	73	144	178	791	146	33	10
6	34	37	39	8.0	18	70	137	199	1320	134	32	9.4
7	31	33	48	7.0	17	68	131	218	1250	131	38	8.5
8	27	39	52	11	16	74	124	230	1080	124	51	8.6
9	27	35	52	7.4	17	86	118	222	936	114	43	8.9
10	27	38	56	6.2	16	91	112	220	765	105	36	9.7
11	24	39	53	12	15	103	108	221	633	109	32	12
12	24	38	47	7.6	14	128	115	206	532	129	30	14
13	24	38	44	8.2	20	110	138	187	464	103	27	22
14	23	39	45	6.2	17	90	259	172	542	92	25	34
15	22	41	48	6.6	13	95	508	161	581	83	25	39
16	21	40	40	7.4	17	95	490	151	599	74	25	36
17	22	39	48	6.2	15	94	390	332	553	64	26	30
18	27	39	33	6.8	16	92	322	441	499	57	24	26
19	28	41	20	11	20	92	271	486	480	54	21	26
20	30	39	11	8.0	25	97	232	438	387	55	32	27
21	40	39	4.8	5.2	35	108	206	406	366	48	36	25
22	42	37	5.6	7.0	45	120	184	377	383	60	27	23
23	41	36	10	10	37	143	168	347	618	57	20	23
24	38	36	13	6.6	35	144	153	303	737	45	18	25
25	37	34	14	5.2	33	141	139	264	654	38	16	24
26	36	31	10	7.0	38	147	129	239	537	35	15	23
27	34	31	17	11	48	179	125	247	450	36	12	21
28	32	35	19	11	40	218	120	220	377	50	11	20
29	32	44	7.4	9.0	---	229	126	231	316	59	10	19
30	31	44	6.4	8.0	---	204	139	226	268	54	8.5	17
31	31	---	15	6.0	---	189	---	359	---	43	6.7	---
TOTAL	917	1110	961.2	263.4	638.0	3532	5725	7887	17451	2871	827.2	569.4
MEAN	29.6	37.0	31.0	8.50	22.8	114	191	254	582	92.6	26.7	19.0
MAX	42	44	56	17	48	229	508	486	1320	233	51	39
MIN	15	30	4.8	5.2	8.0	35	108	139	268	35	67	5.9
AC-FT	1820	2200	1910	522	1270	7010	11360	15640	34610	5690	1640	1130
CFSM	.02	.02	.02	.01	.01	.07	.12	.16	.37	.06	.02	.01
IN.	.02	.03	.02	.01	.01	.08	.13	.18	.41	.07	.02	.01
CAL YR 1990	TOTAL 43177.7	MEAN 118	MAX 2160	MIN 4.0	AC-FT 85640	CFSM .07	IN. 1.01					
WTR YR 1991	TOTAL 42752.2	MEAN 117	MAX 1320	MIN 4.8	AC-FT 84800	CFSM .07	IN. 1.00					

BIG SIOUX RIVER BASIN

179

06485500 BIG SIOUX RIVER AT AKRON, IA
(National stream-quality accounting network station)

LOCATION.--Lat 42°50'14", long 96°33'41", in SW1/4 SE1/4 SW1/4 sec.30, T.93 N., R.48 W., Plymouth County, Hydrologic Unit 10170203, 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 mi², of which 1,487 mi² 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 and crest-stage gage. 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. Additional water temperature and specific conductance measured during the year are compiled in the Miscellaneous Temperature Measurements and Field Determinations section.

AVERAGE DISCHARGE.--63 years, 1,010 ft³/s, 731,700 acre-ft/yr; median of yearly mean discharges, 730 ft³/s, 529,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 80,800 ft³/s, Apr. 9, 1969, gage height, 22.99 ft; minimum daily, 4.0 ft³/s, Jan. 17, 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
June 15	1200	*2,270	*9.26				

Minimum daily discharge, 50 ft³/s, Jan. 7-11, 24, 25, 30.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	156	181	e190	e70	e60	e320	444	498	1270	1840	409	239
2	146	179	e195	e65	e65	e300	420	562	1180	1750	392	235
3	161	180	e200	e60	e65	e290	393	517	937	1610	380	237
4	165	187	e210	e60	e70	e300	381	527	932	1420	386	226
5	176	193	e210	e55	e70	e320	372	587	1110	1210	385	221
6	240	204	e200	e55	e70	e350	352	757	1410	1080	363	218
7	190	205	e200	e50	e80	295	345	744	2100	1120	357	212
8	179	193	e200	e50	e100	285	330	793	2080	1110	408	218
9	179	198	e195	e50	e150	291	315	819	1920	1010	398	207
10	175	200	e190	e50	e190	285	306	826	1970	961	369	206
11	171	194	e180	e50	e200	292	310	815	1910	892	365	225
12	172	193	e180	e55	e190	285	335	788	2150	851	375	222
13	172	195	e180	e55	e190	295	360	748	2080	821	395	251
14	178	191	e180	e60	e180	310	421	694	1860	789	432	341
15	182	188	e175	e65	e170	293	492	656	2140	693	427	317
16	181	188	e170	e65	e160	282	703	623	1880	689	448	341
17	181	185	e160	e65	e160	290	767	636	1790	768	424	294
18	182	186	e150	e65	e160	299	742	938	1660	830	405	261
19	179	184	e140	e65	e160	300	725	1160	1460	988	391	248
20	178	186	e130	e60	e170	302	711	1150	1290	864	372	244
21	194	187	e110	e55	e220	307	692	974	1240	809	362	238
22	202	182	e80	e60	e300	318	657	926	1180	727	351	232
23	203	187	e70	e55	e340	340	610	971	1290	663	351	226
24	206	188	e70	e50	e350	342	570	977	1650	590	336	230
25	195	186	e70	e50	e350	363	540	923	1990	511	316	231
26	194	180	e60	e55	e330	376	496	846	1920	476	301	245
27	195	e160	e70	e55	e330	388	467	844	1920	470	288	265
28	188	e170	e80	e55	e310	409	435	868	1950	464	276	238
29	188	e185	e70	e55	---	433	444	742	1930	429	269	224
30	186	e190	e65	e50	---	460	459	730	1890	466	261	213
31	183	---	e65	e55	---	463	---	779	---	440	245	---
TOTAL	5677	5625	4445	1765	5190	10183	14594	24418	50089	27341	11237	7305
MEAN	183	187	143	56.9	185	328	486	788	1670	882	362	243
MAX	240	205	210	70	350	463	767	1160	2150	1840	448	341
MIN	146	160	60	50	60	282	306	498	932	429	245	206
AC-FT	11260	11160	8820	3500	10290	20200	28950	48430	99350	54230	22290	14490

CAL YR 1990 TOTAL 170443 MEAN 467 MAX 5080 MIN 60 AC-FT 338100
WTR YR 1991 TOTAL 167869 MEAN 460 MAX 2150 MIN 50 AC-FT 333000

e Estimated

06486000 MISSOURI RIVER AT SIOUX CITY, IA

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 102300001, on right bank 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.

DRAINAGE.--314,600 mi², approximately. The 3,959 mi² in Great Divide basin are not included.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1897 to current year in reports of the U.S. Geological Survey. Prior to October 1928 and October 1931 to September 1938, monthly discharges only, published in WSP 1310. January 1879 to December 1890, monthly discharges only, in House Document 238, 73rd Congress, 2d session, Missouri River. Gage height records collected in this vicinity September 1878 to December 1899 are contained in reports of Missouri River Commission and since July 1889 are contained in reports of U.S. Weather Bureau.

REVISED RECORDS.--WSP 716: 1929-30. WSP 876: Drainage area.

GAGE.--Water-stage encoder. Datum of gage is 1,056.98 ft above NGVD. Sept. 2, 1878 to Dec. 31, 1905, nonrecording gages at various locations within 1.7 mi of present site and at various datums. Jan. 1, 1906 to Feb. 14, 1935, nonrecording gage, and Feb. 15, 1935 to Sept. 30, 1969, water-stage recorder at site 227 ft downstream at datum 19.98 ft higher, and Oct. 1, 1969 to Sept. 30, 1970 at datum 20.00 ft higher. Oct. 1, 1970 to Jan. 30, 1981, water-stage recorder at site 227 ft downstream at present datum.

REMARKS.--Estimated daily discharges: Dec. 24 to Feb. 23. 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.

AVERAGE DISCHARGE.--94 years, 31,740 ft³/s, 22,996,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 441,000 ft³/s Apr. 14, 1952, gage height, 24.28 ft, datum then in use; minimum, 2,500 ft³/s Dec. 29, 1941; minimum gage height, 7.83 ft Jan. 9, 1989.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 35,200 ft³/s, June 1; maximum gage height, 19.04 ft, June 1; minimum daily discharge, 5,880 ft³/s, Dec. 21; minimum gage height, 8.64 ft, Dec. 21.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	29200	11700	9770	17100	13200	10600	22700	23200	31400	30600	27700	31500
2	29300	10700	9990	16700	12500	10200	23100	23200	28700	27900	27800	32100
3	30000	10600	10300	16500	12000	9090	23100	24000	27400	25600	27800	32500
4	29100	10600	10400	16400	11500	9310	23200	24600	30600	28400	27600	32500
5	28900	10200	10200	16400	11500	9270	24000	24000	27800	27400	27800	32100
6	29000	10300	9440	16400	11500	9280	24100	24200	25900	25500	27800	32100
7	28900	10300	9200	16300	11400	8880	24200	24100	26200	28100	28500	32000
8	29100	9920	9260	16000	11400	9490	24300	24500	30000	27000	29500	32000
9	29300	9940	9230	15500	11300	9600	24200	24300	25600	25200	28600	32300
10	29100	10000	9270	15500	10900	9770	24000	27600	29300	27900	28200	32000
11	28700	9950	9310	15000	10700	9720	24100	26600	27500	27100	28100	32600
12	28100	10000	9320	14300	10600	9690	25200	24200	24900	25700	28000	32400
13	28000	9930	9230	14400	10200	9580	25600	27500	29100	27500	27900	32400
14	28100	9890	9090	14500	9300	9360	24700	26300	27900	26500	28100	32600
15	28200	9620	9300	14000	9000	9370	24400	24200	28400	24800	27900	31600
16	28300	9430	9130	13400	11300	9460	24300	27600	29700	27200	28200	31400
17	28500	9310	9590	13000	14700	9530	24300	27500	27400	26400	28500	31700
18	28800	9410	10100	12400	14500	9640	24000	25000	25100	25300	28000	31000
19	28200	9440	11900	13000	12500	9610	24100	28000	28900	27800	27800	30800
20	28400	9500	12900	14000	11000	9720	24100	27200	27200	27400	27900	30600
21	28900	9740	5880	14300	10900	9830	24200	25000	25100	26200	28300	30500
22	28600	9580	7580	14500	12500	9790	24500	28400	30100	28000	28500	30900
23	28500	9630	13000	14600	13000	9750	24600	27400	27300	27800	28700	30600
24	28400	9480	16000	14600	11700	9270	24600	25000	24700	26700	28600	30800
25	28400	9620	18500	14600	11100	10300	24500	28100	28600	27600	29600	30600
26	27700	9530	16500	14600	11200	13200	24300	26800	27700	27000	29500	30300
27	25500	9640	17000	14600	11200	16500	24100	24500	25200	26400	29200	30500
28	21900	9370	17300	14600	11100	19200	23800	27600	29200	28100	29300	30800
29	18400	9320	17300	14600	---	21400	23700	26700	27700	27800	30000	31200
30	15000	9810	17300	14800	---	22900	24000	24700	25600	26700	30300	31200
31	13100	---	17300	14000	---	23000	---	28000	---	27400	31100	---
TOTAL	839600	296460	360590	460600	323700	356310	724000	800000	830200	839000	884800	945600
MEAN	27080	9882	11630	14860	11560	11490	24130	25810	27670	27060	28540	31520
MAX	30000	11700	18500	17100	14700	23000	25600	28400	31400	30600	31100	32600
MIN	13100	9310	5880	12400	9000	8880	22700	23200	24700	24800	27600	30300
AC-FT	1665000	588000	715200	913600	642100	706700	1436000	1587000	1647000	1664000	1755000	1876000
CAL YR 1990	TOTAL 7656150		MEAN 20980		MAX 36700		MIN 5880		AC-FT 15190000			
WTR YR 1991	TOTAL 7660860		MEAN 20990		MAX 32600		MIN 5880		AC-FT 15200000			

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 year 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 winter period.

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.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)
OCT 1990					MAY 1991				
02...	0915	29300	16.0	800	01...	0950	23100	9.0	720
11...	0845	30100	11.0	740	08...	0950	24400	11.0	520
16...	1325	28300	12.0	800	14...	0645	27700	16.0	750
22...	1000	28500	9.0	785	29...	0905	26700	22.0	740
31...	0945	12800	12.0	750	JUN				
NOV					03...	1800	27800	22.0	720
06...	0835	10900	6.0	750	12...	1020	24900	24.0	600
16...	0815	8940	8.0	790	19...	0745	28200	23.0	704
23...	0810	9590	5.0	750	25...	0930	27500	23.0	760
28...	0850	8930	1.0	628	JUL				
DEC					01...	1415	31900	25.0	700
05...	0830	9640	1.0	700	10...	1515	29700	23.0	750
11...	0800	8960	4.0	750	18...	1005	25100	26.0	697
FEB 1991					31...	0935	27200	25.0	620
20...	0745	11000	0.0	690	AUG				
25...	1415	11000	1.0	675	14...	0700	28000	24.0	695
MAR					22...	0745	28500	24.0	610
07...	1245	9010	5.0	800	28...	0925	29100	23.0	750
15...	0935	9250	7.0	700	SEP				
18...	1215	9620	5.0	650	03...	1015	32700	24.0	690
26...	1515	13700	10.0	650	09...	0945	33400	23.0	800
APR					19...	0740	30800	13.0	740
01...	1320	22900	8.5	750	26...	0840	30300	14.0	700
16...	1830	24300	11.0	750					
24...	0940	25000	12.0	600					

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	SAMPLE LOC- ATION, CROSS SECTION (FT FM L BANK) (00009)	DEPTH AT SAMPLE LOC- 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. (70338)	SED. SUSP. FALL DIAM. (70342)	SED. SUSP. FALL DIAM. (70343)	SED. SUSP. FALL DIAM. (70344)	SED. SUSP. FALL DIAM. (70345)	SED. SUSP. FALL DIAM. (70346)
OCT												
11...	0845	480	18.4	4.30	2.46	145	--	78	86	100	--	--
11...	0848	480	--	9.20	2.35	162	--	82	89	100	--	--
11...	0851	480	--	13.1	2.29	175	--	75	83	98	100	--
11...	0855	480	--	15.3	2.22	192	--	78	84	100	--	--
11...	0900	480	--	16.6	2.16	171	--	83	89	98	100	--
11...	0910	480	--	17.3	1.98	203	--	75	82	100	--	--
11...	0912	480	--	--	--	144	--	79	87	100	--	--
11...	0925	370	15.6	3.60	3.22	145	--	69	80	100	--	--

11...WATER TEMPERATURE, 5.0°C (0845-1145); DISCHARGE, 30,100 ft³/s.

MISSOURI RIVER MAIN STEM

06486000 MISSOURI RIVER AT SIOUX CITY, IA--Continued

WATER-QUALITY RECORDS

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	SAMPLE LOC- ATION, CROSS SECTION 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)
OCT--Continued												
11...	0928	370	--	7.80	2.81	202	--	58	71	100	--	--
11...	0931	370	--	11.1	2.59	252	--	56	68	100	--	--
11...	0935	370	--	13.0	2.20	269	--	48	63	100	--	--
11...	0940	370	--	14.0	2.07	309	--	41	50	85	100	--
11...	0945	370	--	14.7	1.98	382	--	42	57	100	--	--
11...	0950	370	--	--	--	175	--	63	75	100	--	--
11...	1000	245	15.6	3.60	4.37	--	--	--	--	--	--	--
11...	1004	245	--	7.80	3.83	--	--	--	--	--	--	--
11...	1008	245	--	11.1	3.55	--	--	--	--	--	--	--
11...	1014	245	--	13.0	3.48	--	--	--	--	--	--	--
11...	1015	245	--	14.0	2.66	--	--	--	--	--	--	--
11...	1017	245	--	14.7	2.07	--	--	--	--	--	--	--
11...	1020	245	--	--	--	289	--	43	56	96	100	--
11...	1028	245	--	--	--	269	8	11	--	--	--	--
11...	1035	160	17.4	4.00	4.80	229	--	57	67	97	100	--
11...	1039	160	--	8.70	4.15	2070	--	93	94	100	--	--
11...	1042	160	--	12.4	3.55	336	--	25	38	91	100	--
11...	1045	160	--	14.5	3.55	376	--	24	37	91	100	--
11...	1048	160	--	15.7	2.85	420	--	15	25	82	100	--
11...	1050	160	--	16.4	2.40	402	--	25	38	91	100	--
11...	1055	160	--	--	--	199	--	30	44	95	100	--
11...	1120	85.0	18.4	4.30	4.91	194	--	61	69	96	100	--
11...	1123	85.0	--	9.20	4.46	242	--	56	63	94	100	--
11...	1126	85.0	--	13.1	4.04	301	--	46	55	92	100	--
11...	1131	85.0	--	15.3	3.72	338	--	36	44	82	100	--
11...	1135	85.0	--	16.6	3.72	515	--	27	33	72	100	--
11...	1140	85.0	--	17.3	3.78	604	--	15	20	68	100	--
11...	1145	85.0	--	--	--	223	--	27	37	82	100	--

APR

12... WATER TEMPERATURE, 5.0°C (1130-1510); DISCHARGE, 25,800 ft³/s.

12...	1135	135	10.6	2.50	4.37	253	--	77	86	99	100	--
12...	1140	135	--	5.60	3.94	326	--	54	61	90	100	--
12...	1145	135	--	7.60	3.46	443	--	39	45	67	100	--
12...	1150	135	--	8.80	1.92	1200	--	15	17	45	99	100
12...	1155	135	--	9.50	1.11	1190	--	14	17	38	96	100
12...	1200	135	--	--	--	328	--	46	54	77	100	--
12...	1215	255	12.0	2.80	4.04	267	--	65	75	95	100	--
12...	1218	255	--	6.00	3.72	323	--	57	66	99	100	--
12...	1220	255	--	8.60	3.28	402	--	40	52	97	100	--
12...	1225	255	--	10.0	3.11	468	--	40	52	98	100	--
12...	1230	255	--	10.8	2.85	410	--	42	54	98	100	--
12...	1235	255	--	--	--	328	--	55	65	98	100	--
12...	1245	350	11.4	2.60	4.04	--	--	--	--	--	--	--
12...	1248	350	--	5.70	3.94	--	--	--	--	--	--	--
12...	1250	350	--	8.10	3.61	--	--	--	--	--	--	--
12...	1253	350	--	9.5	3.50	--	--	--	--	--	--	--
12...	1255	350	--	10.4	3.50	--	--	--	--	--	--	--
12...	1300	350	--	--	--	416	--	49	60	97	100	--
12...	1310	350	--	--	--	467	9	21	--	--	--	--
12...	1315	450	13.2	3.10	5.02	257	--	74	84	98	100	--
12...	1318	450	--	6.60	4.59	352	--	54	64	96	100	--
12...	1324	450	--	9.40	3.94	366	--	47	57	96	100	--
12...	1327	450	--	11.0	3.83	398	--	44	54	95	100	--

MISSOURI RIVER MAIN STEM

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06486000 MISSOURI RIVER AT SIOUX CITY, IA--Continued

WATER-QUALITY RECORDS

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	SAMPLE LOC- ATION, CROSS SECTION (FT FM L BANK) (00009)	DEPTH AT SAMPLE 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 (70338)	SED. SUSP. FALL DIAM. % FINER THAN (70342)	SED. SUSP. FALL DIAM. % FINER THAN (70343)	SED. SUSP. FALL DIAM. % FINER THAN (70344)	SED. SUSP. FALL DIAM. % FINER THAN (70345)	SED. SUSP. FALL DIAM. % FINER THAN (70346)
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APR--Continued

12...	1330	450	--	11.9	3.50	516	--	36	46	92	100	--
12...	1333	450	--	12.4	3.42	631	--	29	35	80	100	--
12...	1335	450	--	--	--	290	--	51	61	97	100	--
12...	1400	525	16.0	3.70	4.70	257	--	71	81	99	100	--
12...	1403	525	--	8.00	4.59	222	--	66	75	98	100	--
12...	1408	525	--	11.4	3.94	311	--	49	59	98	100	--
12...	1411	525	--	13.3	3.61	388	--	48	56	95	100	--
12...	1415	525	--	14.4	3.50	444	--	36	43	90	100	--
12...	1418	525	--	15.1	3.28	534	--	33	40	89	100	--
12...	1420	525	--	--	--	1790	--	94	96	100	--	--

MAY

08... WATER TEMPERATURE, 19.0°C (0800-1025); DISCHARGE, 27,900 ft³/s.

23	0800	555	19.4	4.50	4.44	91	--	81	86	100	--	--
23...	0804	555	--	9.70	4.35	133	--	87	92	100	--	--
23...	0808	555	--	13.9	3.94	99	--	88	91	100	--	--
23...	0811	555	--	16.2	3.61	100	--	84	88	99	100	--
23...	0814	555	--	17.5	3.33	100	--	76	84	98	100	--
23...	0817	555	--	18.3	2.46	141	--	60	65	85	100	--
23...	0820	555	--	--	--	133	--	90	94	100	--	--
23...	0830	500	19.2	4.40	4.44	100	--	73	85	100	--	--
23...	0834	500	--	9.60	4.15	180	--	76	83	100	--	--
23...	0838	500	--	13.7	3.61	121	--	56	65	100	--	--
23...	0841	500	--	16.0	3.39	242	--	52	58	98	100	--
23...	0844	500	--	17.3	3.09	272	--	28	38	87	100	--
23...	0847	500	--	18.1	2.74	291	--	35	51	99	100	--
23...	0850	500	--	--	--	181	--	68	72	94	100	--
23...	0900	440	17.4	4.00	4.37	--	--	--	--	--	--	--
23...	0904	440	--	8.70	4.24	--	--	--	--	--	--	--
23...	0908	440	--	12.4	3.63	--	--	--	--	--	--	--
23...	0912	440	--	14.5	2.92	--	--	--	--	--	--	--
23...	0916	440	--	15.7	2.81	--	--	--	--	--	--	--
23...	0920	440	--	16.4	2.31	--	--	--	--	--	--	--
23...	0925	440	--	--	--	141	--	55	65	100	--	--
23...	0930	440	--	--	--	244	7	17	--	--	--	--
23...	0940	330	12.4	2.90	4.33	215	--	75	81	97	100	--
23...	0943	330	--	6.20	3.83	194	--	61	69	100	--	--
23...	0946	330	--	8.90	3.65	175	--	39	50	96	100	--
23...	0949	330	--	10.3	3.39	271	--	29	39	91	100	--
23...	0952	330	--	11.2	3.18	260	--	28	39	88	100	--
23...	0955	330	--	--	--	135	--	38	50	94	100	--
23...	1010	230	11.6	2.60	2.91	230	--	79	86	98	100	--
23...	1013	230	--	5.80	3.76	214	--	60	68	95	100	--
23...	1016	230	--	8.30	3.65	244	--	47	54	91	100	--
23...	1019	230	--	9.70	3.59	356	--	37	45	80	100	--
23...	1022	230	--	10.4	3.20	508	--	21	25	56	100	--
23...	1025	230	--	--	--	229	--	45	51	80	100	--

JUN

19... WATER TEMPERATURE, 21.0°C (0800-1040); DISCHARGE, 28,200 ft³/s.

19...	0800	560	19.6	4.50	3.83	184	--	96	97	100	--	--
19...	0803	560	--	9.80	3.94	190	--	95	95	100	--	--
19...	0806	560	--	14.0	3.81	170	--	93	95	100	--	--
19...	0809	560	--	16.3	3.37	183	--	87	89	98	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 1990 TO SEPTEMBER 1991

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)
JUN--Continued												
19...	0812	560	--	17.6	2.87	218	--	71	73	95	100	--
19...	0812	560	--	18.4	2.87	271	--	58	60	94	100	--
19...	0820	560	--	--	--	166	--	89	91	100	--	--
19...	0830	500	18.2	4.20	3.89	164	--	83	90	100	--	--
19...	0833	500	--	9.10	3.94	158	--	72	80	96	100	--
19...	0836	500	--	13.0	3.39	186	--	70	78	97	100	--
19...	0839	500	--	15.2	3.11	192	--	58	66	97	100	--
19...	0842	500	--	16.4	2.74	255	--	47	55	94	100	--
19...	0845	500	--	17.1	2.81	289	--	41	50	95	100	--
19...	0850	500	--	--	--	162	--	74	81	100	--	--
19...	0905	395	13.4	3.10	4.28	--	--	--	--	--	--	--
19...	0909	395	--	6.70	3.81	--	--	--	--	--	--	--
19...	0913	395	--	9.60	3.42	--	--	--	--	--	--	--
19...	0917	395	--	11.2	3.28	--	--	--	--	--	--	--
19...	0921	395	--	12.1	3.28	--	--	--	--	--	--	--
19...	0925	395	--	12.6	2.98	--	--	--	--	--	--	--
19...	0930	395	--	--	--	154	--	63	73	96	100	--
19...	0935	395	--	--	--	212	17	28	--	--	--	--
19...	0940	290	12.0	2.70	4.39	190	--	71	79	97	100	--
19...	0945	290	--	6.00	3.74	165	--	77	83	98	100	--
19...	0950	290	--	8.60	3.28	257	--	46	56	93	100	--
19...	0955	290	--	10.0	3.28	242	--	38	47	85	100	--
19...	1000	290	--	10.8	2.87	270	--	33	44	84	100	--
19...	1005	290	--	--	--	188	--	64	72	96	100	--
19...	1020	180	12.6	2.90	4.49	202	--	70	76	95	100	--
19...	1024	180	--	6.30	4.26	124	--	67	76	93	100	--
19...	1028	180	--	9.00	3.69	243	--	38	44	82	100	--
19...	1032	180	--	10.5	3.50	318	--	36	41	69	100	--
19...	1036	180	--	11.3	3.39	448	--	22	24	56	100	--
19...	1040	180	--	--	--	255	--	48	52	77	100	--
AUG												
08... WATER TEMPERATURE, 21.0°C (0815-1105); DISCHARGE, 28,800 ft³/s.												
08...	0815	120	15.0	3.50	4.04	208	--	96	96	100	--	--
08...	0820	120	--	7.50	3.61	191	--	93	94	98	100	--
08...	0825	120	--	10.7	3.28	175	--	90	93	97	100	--
08...	0830	120	--	12.5	3.07	181	--	86	88	95	100	--
08...	0835	120	--	13.5	2.85	203	--	76	80	91	100	--
08...	0840	120	--	14.1	2.85	200	--	75	79	89	100	--
08...	845	120	--	--	--	182	--	80	82	92	100	--
08...	00	225	13.8	3.20	4.15	235	--	81	87	100	--	--
08...	0903	225	--	6.90	3.83	248	--	75	82	97	100	--
08...	0906	225	--	9.90	3.61	292	--	63	70	95	100	--
08...	0909	225	--	11.5	3.07	326	--	49	57	85	100	--
08...	0912	225	--	12.4	3.07	335	--	49	58	86	100	--
08...	0915	225	--	13.0	2.74	562	--	31	38	65	100	--
08...	0918	225	--	--	--	263	--	66	73	94	100	--
08...	0925	325	--	--	--	279	21	39	--	--	--	--
08...	0930	325	14.4	3.30	4.48	--	--	--	--	--	--	--
08...	0933	325	--	7.20	4.00	--	--	--	--	--	--	--
08...	0936	325	--	10.3	3.50	--	--	--	--	--	--	--
08...	0939	325	--	12.0	3.50	--	--	--	--	--	--	--
08...	0942	325	--	13.0	2.96	--	--	--	--	--	--	--
08...	0945	325	--	13.6	3.07	--	--	--	--	--	--	--

06486000 MISSOURI RIVER AT SIOUX CITY, IA--Continued

WATER-QUALITY RECORDS

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	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- SUS- PENDE (MG/L) (80154)	SED. SUSP. FALL DIAM. % FINER THAN (70338)	SED. SUSP. FALL DIAM. % FINER THAN (70342)	SED. SUSP. FALL DIAM. % FINER THAN (70343)	SED. SUSP. FALL DIAM. % FINER THAN (70344)	SED. SUSP. FALL DIAM. % FINER THAN (70345)
AUG--Continued											
08...	0948	325	--	--	--	319	--	70	77	97	100
08...	1005	420	17.4	4.00	4.37	267	--	84	90	100	--
08...	1009	420	--	8.70	3.94	270	--	76	83	99	100
08...	1013	420	--	12.4	3.39	398	--	50	58	95	100
08...	1017	420	--	14.5	2.31	554	--	34	40	78	100
08...	1021	420	--	15.7	1.65	906	--	27	32	71	100
08...	1025	420	--	16.4	1.00	947	--	52	56	84	100
08...	1029	420	--	--	--	349	--	63	68	94	100
08...	1045	540	17.0	3.90	4.37	225	--	89	92	97	100
08...	1048	540	--	8.50	4.15	239	--	87	91	97	100
08...	1051	540	--	12.1	3.61	255	--	75	79	93	100
08...	1054	540	--	14.2	3.07	322	--	65	69	93	100
08...	1057	540	--	15.3	2.63	316	--	65	69	88	100
08...	1100	540	--	16.0	2.53	359	--	58	62	84	100
08...	1103	540	--	--	--	238	--	84	86	97	100
SEP											
26...	WATER TEMPERATURE, 15.0°C (1000-1235); DISCHARGE, 30,300 ft ³ /s.										
26...	0845	105	20.4	4.70	4.26	126	--	89	94	100	--
26...	0849	105	--	10.2	4.04	145	--	85	93	100	--
26...	0853	105	--	14.6	3.94	133	--	84	94	100	--
26...	0857	105	--	17.0	3.39	171	--	82	91	100	--
26...	0901	105	--	18.4	3.28	609	--	70	86	100	--
26...	0906	105	--	19.2	2.63	155	--	79	88	95	100
26...	0910	105	--	--	--	167	--	93	97	100	--
26...	0925	200	19.0	4.40	4.26	175	--	86	91	100	--
26...	0926	200	--	9.5	4.26	196	--	60	72	100	--
26...	0934	200	--	13.6	3.61	305	--	40	54	95	100
26...	0939	200	--	15.8	3.50	411	--	40	54	95	100
26...	0940	200	--	17.1	3.39	421	--	32	45	95	100
26...	0942	200	--	17.9	3.28	481	--	27	40	90	100
26...	0945	200	--	--	--	252	--	54	64	95	100
26...	1000	280	28.0	3.70	4.37	--	--	--	--	--	--
26...	1004	280	--	8.00	3.83	--	--	--	--	--	--
26...	1009	280	--	11.4	3.61	--	--	--	--	--	--
26...	1013	280	--	13.3	3.50	--	--	--	--	--	--
26...	1016	280	--	14.4	2.96	--	--	--	--	--	--
26...	1018	280	--	15.1	2.74	--	--	--	--	--	--
26...	1020	280	--	--	3.26	--	--	45	56	94	100
26...	1025	280	--	--	--	343	6	11	--	--	--
26...	1030	305	13.0	3.00	4.37	253	--	48	57	94	100
26...	1034	385	--	6.50	3.61	378	--	38	48	81	100
26...	1038	385	--	9.30	3.28	398	--	34	42	78	100
26...	1042	385	--	10.8	3.07	586	--	22	29	64	100
26...	1048	385	--	11.7	2.85	648	--	26	33	67	100
26...	1051	385	--	12.2	2.74	698	--	22	29	69	100
26...	1055	385	--	--	--	367	--	35	44	76	100
26...	1105	525	10.8	2.50	4.91	201	--	74	79	93	100
26...	1107	525	--	5.40	4.80	232	--	59	64	87	100
26...	1110	525	--	7.70	3.83	300	--	40	47	72	100
26...	1113	525	--	9.00	3.83	402	--	41	46	64	100
26...	1116	525	--	9.70	3.50	393	--	28	34	60	100
26...	1120	525	--	--	--	279	--	42	47	70	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 1990 TO SEPTEMBER 1991

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (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)
OCT							
11...	1240	30100	5	0	1	31	89
APR							
12...	1205	25800	5	--	0	16	76
MAY							
23...	0822	27900	5	--	0	16	81
JUN							
19...	0824	28200	1	0	1	27	94
AUG							
08...	1110	28800	5	--	0	12	88
SEP							
26...	1130	30300	5	--	0	10	66

DATE	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)	BED MAT. SIEVE DIAM. % FINER THAN 32.0 MM (80173)
OCT						
11...	99	100	--	--	--	--
APR						
12...	98	99	100	--	--	--
MAY						
23...	95	98	99	100	--	--
JUN						
19...	99	99	100	--	--	--
AUG						
08...	99	100	--	--	--	--
SEP						
26...	88	90	92	93	96	100

PERRY CREEK BASIN

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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 mi².

PERIOD OF RECORD.--October 1945 to September 1969, June 1981 to current year.

REVISED RECORDS.--WSP 1440: Drainage area.

GAGE.--Water-stage encoder. 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. 1-3, Oct. 6 to Feb. 19, Feb. 24, 25, and Sept. 20-23. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service Limited Automatic Remote Collector at station. U.S. Army Corps of Engineers data collection platform and rain-gage at station.

AVERAGE DISCHARGE.--34 years (water years 1946-69, 1982-91), 17.2 ft³/s, 3.59 in/yr, 12,460 acre-ft/yr; median of yearly mean discharges, 14 ft³/s, 2.9 in/yr, 10,100 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,670 ft³/s May 19, 1990, gage height, 28.54 ft, present datum, from rating curve extended above 1,700 ft³/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 ft³/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 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
June 1	0900	*3,360	*17.88	June 15	0700	1,920	14.43

Minimum daily discharge 1.7 ft³/s Dec. 21.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.8	4.7	7.0	5.2	4.0	11	14	7.8	702	75	4.6	3.6
2	3.8	5.2	6.0	2.8	4.5	10	10	7.8	34	13	4.5	3.8
3	7.0	7.2	5.4	2.6	75	7.2	8.2	14	20	10	4.4	5.9
4	5.7	6.0	7.4	2.8	125	7.5	6.9	15	106	10	4.2	4.5
5	4.0	4.5	6.8	3.5	110	12	6.2	11	66	10	3.9	3.6
6	3.3	4.7	8.6	2.3	92	9.5	5.9	10	20	10	4.3	3.5
7	3.1	6.0	10	2.0	60	6.6	6.2	9.8	14	9.0	17	3.5
8	3.2	7.0	10	3.3	38	6.7	6.9	22	12	8.6	49	3.6
9	4.5	5.6	8.0	2.0	20	6.5	6.1	18	11	8.4	8.6	3.7
10	6.4	5.0	6.8	1.8	12	5.9	5.6	12	125	8.4	5.4	3.6
11	6.0	4.7	5.8	4.7	8.0	6.5	9.3	11	16	12	5.0	8.6
12	4.5	4.7	5.0	3.3	7.4	8.4	20	10	11	11	4.6	6.0
13	4.0	5.2	5.4	3.7	9.4	7.5	48	9.6	21	9.0	4.2	8.9
14	3.5	6.8	6.2	2.6	7.6	6.4	22	9.4	23	8.3	4.5	39
15	3.1	5.0	5.0	3.0	6.2	7.1	16	13	553	8.6	3.8	5.3
16	3.2	4.7	4.8	3.5	7.8	6.7	13	8.5	34	8.0	4.9	3.7
17	4.0	4.6	5.8	2.6	6.8	9.2	11	15	20	7.6	4.1	3.6
18	5.6	5.0	7.0	3.1	7.6	9.8	11	12	15	6.5	4.0	3.8
19	5.2	4.8	4.5	5.0	8.6	7.9	10	10	12	6.8	3.7	3.8
20	8.0	5.2	3.2	4.7	49	10	9.4	9.8	11	6.6	3.6	3.7
21	6.0	4.9	1.7	3.7	70	10	8.7	9.5	194	6.1	3.5	3.6
22	5.0	4.8	1.9	4.3	32	14	8.3	10	70	6.0	3.4	3.4
23	4.1	4.7	2.9	5.0	14	15	7.1	8.1	22	6.1	4.3	3.2
24	3.7	4.5	3.7	4.5	10	10	6.6	6.8	18	5.5	3.6	3.0
25	4.5	4.5	4.0	4.1	7.7	8.2	6.5	5.8	15	5.1	3.4	2.9
26	5.0	5.2	2.9	4.5	8.4	7.6	11	6.0	12	5.0	3.2	3.3
27	4.6	6.0	4.5	5.2	9.6	11	8.9	6.0	10	5.0	3.4	3.1
28	4.4	5.4	5.0	5.1	10	11	7.6	5.6	9.2	6.9	3.2	3.1
29	4.3	5.8	2.2	4.5	---	12	11	6.0	8.1	7.2	3.0	2.9
30	4.4	7.4	1.9	4.2	---	10	11	6.5	20	5.3	3.8	2.8
31	5.4	---	4.5	3.9	---	11	---	21	---	5.0	3.7	---
TOTAL	143.3	159.8	163.9	113.5	820.6	282.2	332.4	327.0	2204.3	310.0	186.8	157.0
MEAN	4.62	5.33	5.29	3.66	29.3	9.10	11.1	10.5	73.5	10.0	6.03	5.23
MAX	8.0	7.4	10	5.2	125	15	48	22	702	75	49	39
MIN	3.1	4.5	1.7	1.8	4.0	5.9	5.6	5.6	8.1	5.0	3.0	2.8
AC-FT	284	317	325	225	1630	560	659	649	4370	615	371	311
CFSM	.07	.08	.08	.06	.45	.14	.17	.16	1.13	.15	.09	.08
IN.	.08	.09	.09	.06	.47	.16	.19	.19	1.26	.18	.11	.09

CAL YR 1990 TOTAL 7490.3 MEAN 20.5 MAX 2260 MIN 1.7 AC-FT 14860 CFSM .32 IN. 4.28
WTR YR 1991 TOTAL 5200.8 MEAN 14.2 MAX 702 MIN 1.7 AC-FT 10320 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 mi².

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 encoder. Datum of gage is 1,269.55 ft above NGVD.

REMARKS.--Estimated daily discharges: Dec. 4-5, Dec. 19 to Feb.2, Feb. 9-16, and Feb. 24 to Mar. 2. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--36 years, 68.5 ft³/s, 3.47 in/yr, 49,630 acre-ft/yr; median of yearly mean discharges, 53 ft³/s, 2.7 in/yr, 38,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 16,300 ft³/s June 20, 1983, gage height 18.54 ft, from flood-mark, from rating curve extended above 8,500 ft³/s; no flow at times in 1956, 1958, 1959, 1965, 1968, and 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1953 reached a discharge of about 45,500 ft³/s, from information by U. S. Army Corps of Engineers.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 800 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Apr. 14	1200	*357	*7.71				

Minimum daily discharge, 0.80 ft³/s Dec. 21.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.4	5.2	3.3	2.9	1.1	9.4	48	91	114	28	13	3.5
2	3.2	5.1	3.3	1.6	1.4	9.0	59	91	92	25	11	3.7
3	6.5	5.8	3.5	1.4	1.7	18	65	86	82	22	10	3.9
4	8.2	6.7	2.1	1.5	2.1	16	60	90	87	20	9.7	4.0
5	6.5	8.1	2.7	1.8	3.1	17	51	100	185	18	8.9	4.0
6	4.9	7.2	3.3	1.2	5.6	19	44	107	148	17	8.7	4.7
7	4.4	5.7	3.8	1.1	9.6	20	39	102	117	27	9.8	4.5
8	4.1	4.8	4.2	1.7	12	20	35	105	103	29	13	4.5
9	4.5	6.6	4.5	1.2	10	21	31	109	94	25	14	5.4
10	4.4	6.7	4.8	1.0	8.0	19	27	111	88	25	12	5.7
11	4.6	6.2	5.1	1.9	7.0	16	26	103	82	25	10	5.8
12	6.2	5.8	5.4	1.1	5.6	16	41	94	75	27	8.6	6.4
13	3.8	5.7	5.1	1.2	12	11	191	88	68	24	7.9	11
14	3.7	5.8	4.6	1.0	8.0	10	334	82	68	20	7.1	15
15	4.4	5.5	4.5	1.1	4.5	14	275	75	77	17	6.5	13
16	4.7	4.6	4.5	1.2	6.6	13	210	71	79	15	6.7	10
17	5.4	4.3	4.5	1.0	8.8	13	163	176	72	13	6.5	8.0
18	6.1	3.9	4.6	1.1	7.6	12	137	291	66	12	6.6	5.7
19	6.4	3.8	1.8	1.7	6.7	13	123	236	59	11	6.1	4.5
20	7.2	3.8	1.2	1.1	7.6	14	111	190	53	12	6.1	4.1
21	9.4	4.1	.80	.90	15	17	100	161	59	16	11	3.8
22	10	4.0	.90	1.2	21	24	95	140	60	22	10	3.8
23	8.2	4.0	1.5	1.5	17	45	88	125	56	41	7.2	3.9
24	7.4	4.0	2.1	1.1	12	48	79	111	53	31	6.2	3.5
25	6.6	3.8	2.2	.90	8.4	47	72	100	50	23	5.3	3.2
26	6.2	3.5	1.6	1.2	10	45	68	100	47	17	4.7	3.3
27	6.3	3.4	2.7	1.6	11	44	69	95	41	15	4.0	3.6
28	5.8	3.0	3.0	1.5	10	39	68	87	35	18	3.8	4.0
29	5.5	2.8	1.2	1.4	---	39	70	81	31	19	3.8	4.4
30	5.3	3.1	1.0	1.2	---	38	88	78	28	17	3.6	3.2
31	5.0	---	2.5	.90	---	40	---	98	---	15	3.5	---
TOTAL	178.3	147.0	96.30	41.20	233.4	726.4	2867	3574	2269	646	245.3	164.1
MEAN	5.75	4.90	3.11	1.33	8.34	23.4	95.6	115	75.6	20.8	7.91	5.47
MAX	10	8.1	5.4	2.9	21	48	334	291	185	41	14	15
MIN	3.2	2.8	.80	.90	1.1	9.0	26	71	28	11	3.5	3.2
AC-FT	354	292	191	82	463	1440	5690	7090	4500	1280	487	325
CFSM	.02	.02	.01	.00	.03	.09	.36	.43	.28	.08	.03	.02
IN.	.02	.02	.01	.01	.03	.10	.40	.50	.31	.09	.03	.02

CAL YR 1990	TOTAL	11251.23	MEAN	30.8	MAX	1320	MIN	.80	AC-FT	22320	CFSM	.12	IN.	1.56
WTR YR 1991	TOTAL	11188.00	MEAN	30.7	MAX	334	MIN	.80	AC-FT	22190	CFSM	.11	IN.	1.55

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 upstream 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 mi².

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 encoder. 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: Nov.28 to Dec. 7, Dec. 13 to Mar. 4, Mar.6-10, 13, 14, and June 25-27. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service Limited Automatic Remote Collector at station.

AVERAGE DISCHARGE.--36 years, 44.7 ft³/s, 3.37 in/yr, 32,380 acre-ft/yr; median of yearly mean discharges, 32 ft³/s, 2.4 in/yr, 23,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,060 ft³/s Mar. 28, 1962, gage height, 15.63 ft; maximum gage height, 15.86 ft June 20, 1983; no flow at times some years.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 400 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Feb. 7	1400	ice jam	*5.86	June 5	0215	*221	5.84

Minimum daily discharge, 2.3 ft³/s Dec. 21, Jan. 21, 31.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	10	7.6	8.8	8.4	3.1	12	25	27	91	42	12	4.3
2	9.9	7.2	8.2	4.5	4.5	11	26	25	54	39	11	4.0
3	17	9.6	6.8	4.3	6.0	13	24	27	46	38	11	4.7
4	16	9.3	6.4	4.5	7.5	26	22	30	59	37	9.9	4.5
5	11	8.3	9.0	5.4	7.0	16	20	28	116	36	9.3	4.4
6	8.9	8.4	8.3	3.6	6.8	11	20	27	84	39	8.7	4.0
7	7.5	9.2	10	3.2	6.4	9.9	19	26	69	46	11	4.2
8	7.0	9.5	11	5.0	6.2	10	17	35	59	39	22	4.5
9	7.8	8.4	11	3.5	6.4	11	16	34	54	25	18	4.2
10	8.0	7.9	9.1	2.8	6.0	9.7	16	34	53	23	15	3.5
11	8.0	7.8	8.0	5.6	5.6	10	17	32	46	25	13	5.4
12	8.0	7.8	6.9	3.3	5.4	9.9	26	31	42	30	10	6.7
13	8.0	8.5	5.8	3.7	6.8	9.2	67	30	39	22	9.1	7.1
14	7.7	9.1	6.0	2.8	5.4	7.8	82	28	42	20	8.6	11
15	6.5	9.3	7.4	3.1	4.5	8.5	67	27	102	18	8.0	9.8
16	6.5	7.6	5.6	3.4	6.0	8.2	58	26	75	16	9.1	4.3
17	7.2	7.6	7.0	2.8	5.2	7.9	51	55	62	15	9.0	3.5
18	7.7	7.7	7.8	3.0	5.6	7.6	46	87	61	16	7.9	3.5
19	8.2	8.2	6.0	5.0	7.2	7.4	42	88	67	21	7.2	3.7
20	8.1	7.9	4.0	3.2	10	9.1	38	68	65	19	7.3	4.1
21	9.9	8.3	2.3	2.3	17	9.3	36	62	93	18	6.8	4.3
22	8.3	7.4	2.6	3.2	14	11	34	58	86	37	6.6	4.1
23	7.3	7.3	4.8	4.5	13	19	32	54	81	31	6.4	3.8
24	7.0	7.0	6.2	3.6	12	20	30	49	75	26	6.8	4.2
25	6.7	6.9	6.4	2.6	11	20	28	43	56	23	6.2	4.5
26	7.2	7.2	4.7	3.5	12	20	28	41	48	19	5.3	3.8
27	7.2	7.8	8.0	5.2	13	19	29	40	42	18	4.9	3.9
28	6.9	6.8	9.0	5.0	13	18	27	38	38	18	5.0	4.0
29	6.9	7.6	3.8	3.6	---	19	29	35	39	16	4.7	4.0
30	7.0	8.4	3.3	3.0	---	19	30	34	39	13	4.9	3.7
31	7.4	---	7.0	2.3	---	22	---	39	---	13	4.7	---
TOTAL	260.8	241.6	211.2	119.9	226.6	411.5	1002	1258	1883	798	279.4	141.7
MEAN	8.41	8.05	6.81	3.87	8.09	13.3	33.4	40.6	62.8	25.7	9.01	4.72
MAX	17	9.6	11	8.4	17	26	82	88	116	46	22	11
MIN	6.5	6.8	2.3	2.3	3.1	7.4	16	25	38	13	4.7	3.5
AC-FT	517	479	419	238	449	816	1990	2500	3730	1580	554	281
CFSM	.05	.04	.04	.02	.04	.07	.19	.23	.35	.14	.05	.03
IN.	.05	.05	.04	.02	.05	.09	.21	.26	.39	.16	.06	.03
CAL YR 1990	TOTAL	11522.5	MEAN	31.6	MAX	2440	MIN	1.5	AC-FT	22850	CFSM	.18
WTR YR 1991	TOTAL	6833.7	MEAN	18.7	MAX	116	MIN	2.3	AC-FT	13550	CFSM	.10
											IN.	1.41

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 left bank at upstream 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 mi².

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 encoder. 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. 4-6, Dec. 16 to Mar.3, and Mar. 17, 18. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--56 years (water years 1936-91), 218 ft³/s, 3.34 in/yr, 157,900 acre-ft/yr; median of yearly mean discharges, 160 ft³/s, 2.4 in/yr, 116,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 71,500 ft³/s June 8, 1953, gage height, 25.3 ft, from flood-marks, datum then in use, from rating curve extended above 16,000 ft³/s on basis of contracted-opening and flow-over-embankment measurement of peak flow; minimum daily discharge, 0.90 ft³/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 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
June 1	0945	*6,780	*19.38	No other peak greater than base discharge.			

Minimum daily discharge, 9.6 ft³/s Dec. 21.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	42	44	51	35	15	68	117	229	2480	218	104	49
2	42	45	49	19	22	66	131	211	490	165	102	47
3	54	47	38	18	30	86	134	207	354	154	100	47
4	54	48	35	19	38	121	133	212	1070	147	97	47
5	51	47	45	23	37	69	128	207	726	145	95	47
6	48	48	42	15	35	68	120	207	522	144	96	47
7	45	47	57	14	34	64	111	209	463	143	98	47
8	46	46	56	21	33	69	105	231	383	182	203	44
9	46	47	55	14	34	71	98	242	341	155	114	43
10	45	47	56	12	32	68	91	244	423	147	97	41
11	45	48	55	23	30	69	93	237	316	144	90	47
12	45	47	51	14	29	69	110	227	281	157	82	53
13	45	47	49	15	38	66	196	216	256	151	77	50
14	45	49	50	12	32	64	457	204	247	140	72	71
15	44	48	52	13	25	64	476	194	845	134	68	62
16	44	47	39	14	32	65	422	186	427	127	64	54
17	45	46	50	12	29	66	368	198	335	121	64	50
18	45	46	30	13	30	67	329	278	295	112	60	48
19	46	45	23	20	40	66	317	375	267	108	56	46
20	48	47	15	13	52	67	287	365	245	108	55	45
21	50	48	9.6	10	86	69	264	335	374	107	54	44
22	49	47	11	15	74	77	249	310	336	106	53	44
23	48	46	20	19	70	96	231	285	261	111	54	42
24	46	46	26	14	66	112	217	261	240	112	54	43
25	45	45	27	11	64	121	203	240	226	113	52	43
26	45	46	20	15	74	118	197	231	213	109	51	41
27	44	44	34	20	78	120	193	225	196	108	50	41
28	43	43	37	20	73	117	184	216	185	112	50	41
29	44	49	15	17	---	115	178	211	174	108	49	40
30	44	52	13	15	---	112	208	204	170	106	49	40
31	43	---	30	12	---	111	---	205	---	104	50	---
TOTAL	1426	1402	1140.6	507	1232	2581	6347	7402	13141	4098	2360	1404
MEAN	46.0	46.7	36.8	16.4	44.0	83.3	212	239	438	132	76.1	46.8
MAX	54	52	57	35	86	121	476	375	2480	218	203	71
MIN	42	43	9.6	10	15	64	91	186	170	104	49	40
AC-FT	2830	2780	2260	1010	2440	5120	12590	14680	26070	8130	4680	2780
CFSM	.05	.05	.04	.02	.05	.09	.24	.27	.49	.15	.09	.05
IN.	.06	.06	.05	.02	.05	.11	.27	.31	.55	.17	.10	.06
CAL YR 1990	TOTAL 53386.6	MEAN 146	MAX 5310	MIN 9.6	AC-FT 105900	CFSM .17	IN. 2.24					
WTR YR 1991	TOTAL 43040.6	MEAN 118	MAX 2480	MIN 9.6	AC-FT 85370	CFSM .13	IN. 1.81					

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 mi², approximately. The 3,959 mi² in Great Divide basin are not included.

PERIOD OF RECORD.--October 1987 to current year.

GAGE.--Water-stage encoder. Datum of gage is 1,010.00 ft above NGVD, supplementary adjustment of 1954.

REMARKS.--Estimated daily discharges: Dec. 24 to Jan. 29. Records good except those for estimated daily discharges, which are poor. Flow regulated by upstream main-stem reservoirs. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 40,900 ft³/s May 19, 1990; maximum gage height 25.59 ft Sept. 16, 1988; minimum daily discharge, 7,130 ft³/s Dec. 22, 1990; minimum gage height, 13.78 ft, Jan. 9, 1989.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 34,900 ft³/s June 1, gage height, 23.99 ft; minimum daily discharge, 7,130 ft³/s Dec. 22; minimum gage height, 14.04 ft, Dec. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	29100	13800	10000	17700	14400	11100	23200	23600	30600	28700	28500	31600
2	29000	12300	9930	17500	13800	10600	23200	23200	30300	31300	28600	32000
3	29600	11700	10300	17000	13000	10000	23400	23800	27300	26900	28700	32700
4	29400	11500	10500	17000	12300	9670	23500	24700	29500	26900	28600	32800
5	28900	11000	10600	17000	12400	9730	23800	24900	30100	29700	28600	33000
6	28900	10800	10400	17000	12200	9700	24200	24600	26700	26600	28700	32800
7	28800	10800	9930	17000	12100	9790	24300	24700	25300	26600	28900	32900
8	29000	10600	9820	16800	11900	9540	24400	24800	28700	28900	30100	32800
9	29300	10400	9860	16300	11800	9920	24400	25000	27400	26100	29900	32900
10	29300	10500	9880	16000	11300	9870	24400	25700	26500	26200	29100	32900
11	29000	10400	9880	15600	11200	10000	24400	29100	30000	28900	28800	33200
12	28400	10400	9840	15000	11000	9910	25000	25600	25800	26600	28600	33600
13	28000	10300	9760	15000	10900	9790	26000	26000	26900	26400	28600	33100
14	27900	10300	9630	15000	11000	9720	25600	29300	31300	28400	28600	33600
15	28000	10200	9550	14900	11100	9500	25000	26200	28600	25900	28600	32600
16	28100	9990	9600	14000	9770	9530	24800	26100	29200	26100	28600	31600
17	28300	9930	9470	13500	12800	9600	24600	29800	30100	28300	28900	31800
18	28600	9960	9740	13000	15400	9790	24700	26800	26000	26100	28800	31600
19	28600	10000	10200	13500	14300	9890	24500	26000	26400	26800	28300	31300
20	28200	10100	11700	14200	12900	10100	24600	29300	29700	29000	28300	31300
21	28700	10200	10800	14600	11800	10100	24600	25700	25800	27300	28500	30900
22	28600	10300	7130	14800	11500	10200	24800	26000	28000	27400	28700	31200
23	28500	10100	13400	14900	13200	10300	24800	29000	30800	29200	28800	31300
24	28400	10000	16500	15100	13700	10200	24800	25500	26400	27900	28800	31300
25	28300	9860	19300	15200	12100	9930	24700	25700	27000	27700	29300	31400
26	28200	9880	17000	15200	11500	11700	24600	28700	30700	28600	29800	31200
27	27000	9730	17500	15200	11300	14600	24300	25000	26900	27200	29600	31300
28	24200	9720	18000	15200	11200	17900	24100	25600	27300	27700	29500	31300
29	21000	9580	18000	15500	---	20300	23600	28300	30900	29300	30000	31600
30	18200	9660	18000	15600	---	22600	23900	25400	26900	27600	30400	31600
31	15500	---	18000	14800	---	23300	---	26000	---	27700	30900	---
TOTAL	851000	314010	374220	479100	341870	358880	732200	810100	847100	858000	900100	963200
MEAN	27450	10470	12070	15450	12210	11580	24410	26130	28240	27680	29040	32110
MAX	29600	13800	19300	17700	15400	23300	26000	29800	31300	31300	30900	33600
MIN	15500	9580	7130	13000	9770	9500	23200	23200	25300	25900	28300	30900
AC-FT	1688000	622800	742300	950300	678100	711800	1452000	1607000	1680000	1702000	1785000	1911000
CAL YR 1990	TOTAL	7802090	MEAN	21380	MAX	36500	MIN	7130	AC-FT	15480000		
WTR YR 1991	TOTAL	7829780	MEAN	21450	MAX	33600	MIN	7130	AC-FT	15530000		

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 mi².

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 encoder. 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: Nov. 9-16, Nov. 26 to Dec. 9, Dec. 16 to Feb. 21, Feb. 26, Mar. 2-7, Apr. 16-19, June 1, 6-13, and June 20 to July 3. 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. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service gage-height telemeter at station.

AVERAGE DISCHARGE.--47 years (water years 1940-69, 1975-91), 108 ft³/s, 3.64 in/yr, 78,250 acre-ft/yr; median of yearly mean discharges, 84 ft³/s, 2.8 in/yr, 60,800 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 12,400 ft³/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 ft³/s July 30, Aug. 17, 1956.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,800 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
June 15	1615	*2,370	*16.41	No other peak greater than base discharge.			

Minimum daily discharge, 9.2 ft³/s Dec. 21.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	27	27	29	37	17	43	71	142	350	120	51	34
2	27	26	28	20	25	38	77	148	257	120	50	34
3	39	28	20	19	32	40	71	137	310	110	49	33
4	40	30	19	21	42	70	64	139	410	107	48	33
5	33	29	26	25	40	44	58	152	1120	103	47	33
6	28	31	23	16	38	42	54	142	1000	102	47	32
7	26	31	35	15	37	37	49	133	400	97	49	32
8	26	27	33	22	36	44	45	154	140	92	238	32
9	28	27	32	15	37	43	45	171	130	95	257	31
10	28	28	29	13	35	42	44	178	120	92	103	29
11	28	28	30	25	33	44	45	162	110	88	76	33
12	28	29	30	15	32	47	62	153	105	88	64	41
13	27	29	27	16	41	39	108	145	100	90	57	37
14	27	29	27	13	34	35	381	134	206	87	54	45
15	27	30	27	14	27	37	255	129	1340	80	51	49
16	27	29	23	15	35	37	207	138	792	76	50	38
17	27	28	28	13	31	36	184	382	349	72	50	33
18	26	28	20	14	33	36	160	266	276	68	49	32
19	29	28	15	22	45	36	150	149	241	66	47	31
20	28	28	12	15	60	37	141	139	220	66	44	32
21	29	28	9.2	11	120	39	129	135	210	78	42	32
22	30	27	11	16	96	40	123	129	230	69	41	30
23	29	26	21	21	88	49	118	119	195	63	42	30
24	29	26	28	15	67	75	112	111	180	61	40	30
25	28	26	29	12	50	78	105	104	180	59	39	31
26	27	26	21	16	42	65	163	104	160	57	38	29
27	26	25	37	22	40	63	139	429	150	56	37	29
28	26	24	40	21	41	71	138	199	140	56	36	28
29	26	28	16	19	---	64	126	141	130	57	36	28
30	26	30	14	16	---	71	127	172	125	57	35	27
31	27	---	34	13	---	69	---	242	---	54	34	---
TOTAL	879	836	773.2	547	1254	1511	3551	5178	9676	2486	1901	988
MEAN	28.4	27.9	24.9	17.6	44.8	48.7	118	167	323	80.2	61.3	32.9
MAX	40	31	40	37	120	78	381	429	1340	120	257	49
MIN	26	24	9.2	11	17	35	44	104	100	54	34	27
AC-FT	1740	1660	1530	1080	2490	3000	7040	10270	19190	4930	3770	1960
CFSM	.07	.07	.06	.04	.11	.12	.29	.41	.80	.20	.15	.08
IN.	.08	.08	.07	.05	.12	.14	.33	.48	.89	.23	.18	.09
CAL YR 1990	TOTAL 30968.2	MEAN 84.8	MAX 2710	MIN 9.2	AC-FT 61430	CFSM .21	IN. 2.86					
WTR YR 1991	TOTAL 29580.2	MEAN 81.0	MAX 1340	MIN 9.2	AC-FT 58670	CFSM .20	IN. 2.73					

MONONA-HARRISON DITCH BASIN

193

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 mi².

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 encoder. 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: Dec. 17 to Feb. 7 and Feb. 15, 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. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--33 years (water years 1959-91), 242 ft³/s, 3.65 in/yr, 175,300 acre-ft/yr; median of yearly mean discharges, 200 ft³/s, 3.0 in/yr, 145,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 19,900 ft³/s Feb. 19, 1971, gage height, 28.03 ft, present datum; minimum discharge, 7.6 ft³/s Jan. 12, 1990, result of freezeup.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
June 5	1830	*4,090	*15.96	June 16	0200	3,370	14.54

Minimum discharge, 9.8 ft³/s Feb. 19, but may have been lower during period of freezeup on Feb. 19.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	67	78	83	56	30	109	136	200	726	243	91	64
2	69	75	75	33	40	91	138	210	758	343	90	64
3	89	72	49	28	50	102	137	204	393	213	90	64
4	116	76	59	32	60	111	127	233	1750	188	88	63
5	98	82	74	40	64	116	121	284	3110	181	88	62
6	82	79	73	30	80	121	115	289	2650	179	88	62
7	74	77	71	25	150	114	113	239	1080	177	93	62
8	74	76	77	35	220	105	110	286	554	166	145	74
9	75	82	80	30	204	98	106	331	420	167	420	71
10	79	85	79	24	169	98	105	296	424	175	191	65
11	80	82	82	32	147	101	109	269	384	167	137	67
12	79	79	85	29	112	104	137	250	343	164	117	91
13	78	81	75	31	115	101	252	239	329	159	107	107
14	79	82	74	28	80	86	429	229	540	153	101	99
15	77	83	81	26	62	89	380	218	1540	149	97	148
16	78	79	73	32	130	91	304	261	2370	141	96	101
17	79	77	50	29	94	92	265	930	677	131	100	79
18	74	81	35	35	91	89	244	949	471	123	98	71
19	79	79	25	41	84	89	246	436	390	118	94	67
20	84	82	21	35	88	91	264	328	349	115	88	67
21	82	84	18	30	176	102	247	302	332	120	86	69
22	86	77	22	40	214	105	224	284	495	121	83	69
23	88	76	25	52	166	118	208	264	370	108	80	64
24	84	77	44	45	121	136	196	241	323	104	82	66
25	81	76	47	35	112	139	185	227	304	102	78	67
26	82	77	35	39	103	131	278	221	292	99	76	66
27	82	76	50	46	93	131	325	363	289	97	73	66
28	78	59	55	42	95	150	243	429	277	95	71	71
29	81	66	36	35	---	157	209	302	261	96	72	67
30	82	78	30	30	---	146	201	398	245	99	73	67
31	80	---	45	25	---	139	---	505	---	98	69	---
TOTAL	2516	2333	1728	1070	3150	3452	6154	10217	22446	4591	3262	2220
MEAN	81.2	77.8	55.7	34.5	112	111	205	330	748	148	105	74.0
MAX	116	85	85	56	220	157	429	949	3110	343	420	148
MIN	67	59	18	24	30	86	105	200	245	95	69	62
AC-FT	4990	4630	3430	2120	6250	6850	12210	20270	44520	9110	6470	4400
CFSM	.09	.09	.06	.04	.12	.12	.23	.37	.83	.16	.12	.08
IN.	.10	.10	.07	.04	.13	.14	.25	.42	.93	.19	.13	.09

CAL YR 1990	TOTAL	75622	MEAN	207	MAX	6260	MIN	18	AC-FT	150000	CFSM	.23	IN.	3.13
WTR YR 1991	TOTAL	63139	MEAN	173	MAX	3110	MIN	18	AC-FT	125200	CFSM	.19	IN.	2.61

LITTLE SIOUX RIVER BASIN

06604000 SPIRIT LAKE NEAR ORLEANS, IA

LOCATION.--Lat 43°28'11", long 95°07'25", in NE1/4 NW1/4 sec.20, T.100N., R.36W., Dickinson County, Hydrologic Unit 10230003, 2.3 mi upstream from lake outlet and 2.3 mi northwest of Orleans.

DRAINAGE AREA.--75.6 mi².

PERIOD OF RECORD.--May 1933 to September 1975 (fragmentary prior to 1951), April 1990 to current year. Prior to October 1949, published as "at Orleans".

GAGE.--Water-stage recorder. Datum of gage is 1,387.25 ft above NGVD, 90.0 ft above Iowa Lake Survey datum, and 14.2 ft below crest of spillway. Prior to July 6, 1950, non-recording gage or water-stage recorder at various sites near outlet, all at present datum.

REMARKS.--Lake formed by concrete dam with ungated spillway at elevation 1,401.4 ft above NGVD. Dam constructed in 1969. A previous outlet works had been constructed in 1944. Lake is used for conservation and recreation.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height, 15.74 ft June 19, 1944; minimum observed, 6.75 ft Oct. 20, 1935.

EXTREMES FOR CURRENT YEAR.--Maximum gage height, 14.59 ft June 21; minimum, 10.16 ft Nov. 29, 30.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	10.46	10.40	10.18	10.22	10.24	10.26	10.70	12.07	13.68	14.54	14.18	14.09
2	10.43	10.40	10.18	10.22	10.24	10.26	10.73	12.11	13.74	14.51	14.20	14.06
3	10.51	10.40	10.20	10.23	10.24	10.26	10.76	12.17	13.77	14.48	14.19	14.08
4	10.50	10.41	10.20	10.23	10.24	10.26	10.78	12.25	13.86	14.46	14.18	14.06
5	10.52	10.39	10.20	10.23	10.23	10.26	10.80	12.36	13.88	14.44	14.16	14.04
6	10.52	10.38	10.19	10.23	10.23	10.26	10.81	12.38	13.89	14.43	14.14	14.04
7	10.50	10.37	10.19	10.23	10.23	10.26	10.82	12.44	13.91	14.42	14.17	14.02
8	10.49	10.33	10.19	10.23	10.23	10.26	10.83	12.53	13.92	14.40	14.33	14.04
9	10.48	10.32	10.19	10.23	10.23	10.25	10.87	12.58	13.94	14.38	14.34	14.03
10	10.48	10.32	10.19	10.23	10.23	10.26	10.87	12.63	14.07	14.38	14.34	14.02
11	10.46	10.30	10.19	10.24	10.23	10.25	10.88	12.67	14.14	14.38	14.34	14.05
12	10.46	10.30	10.19	10.24	10.24	10.27	10.90	12.70	14.17	14.39	14.34	14.07
13	10.44	10.29	10.18	10.24	10.24	10.31	11.15	12.76	14.20	14.37	14.33	14.07
14	10.43	10.26	10.19	10.25	10.23	10.31	11.30	12.79	14.25	14.36	14.32	14.15
15	10.42	10.27	10.21	10.25	10.23	10.31	11.36	12.87	14.36	14.33	14.30	14.15
16	10.41	10.26	10.22	10.25	10.23	10.32	11.42	12.92	14.41	14.31	14.29	14.11
17	10.40	10.25	10.23	10.25	10.23	10.32	11.47	13.05	14.42	14.31	14.29	14.09
18	10.40	10.25	10.23	10.25	10.25	10.32	11.55	13.21	14.43	14.29	14.28	14.04
19	10.40	10.25	10.22	10.25	10.27	10.33	11.63	13.32	14.44	14.29	14.26	14.02
20	10.40	10.25	10.23	10.25	10.27	10.34	11.67	13.34	14.45	14.33	14.24	13.99
21	10.41	10.25	10.23	10.24	10.27	10.36	11.68	13.32	14.54	14.33	14.23	13.96
22	10.40	10.24	10.24	10.24	10.27	10.38	11.71	13.31	14.55	14.32	14.23	13.93
23	10.40	10.23	10.24	10.25	10.27	10.45	11.72	13.30	14.53	14.29	14.21	13.92
24	10.38	10.22	10.23	10.25	10.27	10.50	11.73	13.29	14.54	14.26	14.21	13.93
25	10.38	10.22	10.23	10.25	10.27	10.55	11.75	13.31	14.53	14.23	14.19	13.91
26	10.37	10.21	10.23	10.25	10.27	10.58	11.81	13.52	14.44	14.21	14.18	13.90
27	10.35	10.20	10.23	10.25	10.27	10.64	11.93	13.64	14.47	14.19	14.16	13.89
28	10.35	10.20	10.22	10.24	10.27	10.65	11.96	13.66	14.55	14.24	14.15	13.87
29	10.34	10.19	10.22	10.24	---	10.66	11.99	13.64	14.54	14.23	14.14	13.87
30	10.34	10.18	10.22	10.24	---	10.68	12.05	13.63	14.54	14.21	14.13	13.85
31	10.37	---	10.22	10.24	---	10.69	---	13.62	---	14.20	14.11	---
MEAN	10.43	10.28	10.21	10.24	10.25	10.38	11.32	12.95	14.24	14.34	14.23	14.01
MAX	10.52	10.41	10.24	10.25	10.27	10.69	12.05	13.66	14.55	14.54	14.34	14.15
MIN	10.34	10.18	10.18	10.22	10.23	10.25	10.70	12.07	13.68	14.19	14.11	13.85

WTR YR 1991 MEAN 11.91 MAX 14.55 MIN 10.18

LITTLE SIOUX RIVER BASIN

195

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 mi².

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, 4.80 June 1; minimum, 1.56 Dec. 1, 10, 12-15.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.95	1.75	1.58	1.62	1.65	1.75	2.45	3.78	4.70	4.61	4.19	4.01
2	1.93	1.75	1.58	1.62	1.66	1.75	2.47	3.80	4.68	4.57	4.21	3.99
3	2.00	1.76	1.59	1.63	1.65	1.75	2.49	3.85	4.67	4.54	4.19	4.03
4	2.00	1.75	1.61	1.63	1.65	1.75	2.50	3.92	4.69	4.52	4.18	4.02
5	1.98	1.74	1.60	1.63	1.65	1.76	2.51	4.02	4.67	4.49	4.15	4.01
6	1.99	1.74	1.59	1.64	1.66	1.76	2.51	4.06	4.64	4.48	4.13	4.00
7	1.96	1.73	1.58	1.64	1.66	1.76	2.52	4.10	4.61	4.46	4.15	3.99
8	1.95	1.71	1.58	1.64	1.66	1.76	2.55	4.17	4.59	4.44	4.29	4.00
9	1.93	1.71	1.58	1.64	1.67	1.75	2.55	4.20	4.57	4.42	4.30	3.99
10	1.92	1.70	1.58	1.64	1.67	1.75	2.54	4.23	4.60	4.43	4.29	3.99
11	1.91	1.70	1.58	1.64	1.67	1.75	2.56	4.25	4.59	4.45	4.28	4.00
12	1.90	1.69	1.58	1.65	1.67	1.76	2.65	4.27	4.57	4.45	4.27	4.01
13	1.88	1.68	1.58	1.65	1.68	1.81	2.90	4.29	4.56	4.44	4.26	4.01
14	1.87	1.67	1.58	1.65	1.68	1.81	3.04	4.30	4.57	4.42	4.24	4.10
15	1.86	1.67	1.58	1.65	1.67	1.81	3.12	4.34	4.63	4.39	4.22	4.10
16	1.85	1.67	1.60	1.65	1.67	1.82	3.18	4.44	4.64	4.36	4.21	4.07
17	1.85	1.67	1.61	1.65	1.67	1.83	3.22	4.64	4.63	4.34	4.21	4.05
18	1.84	1.66	1.63	1.65	1.69	1.83	3.30	4.69	4.62	4.33	4.20	4.01
19	1.82	1.66	1.63	1.66	1.72	1.84	3.35	4.69	4.60	4.32	4.17	3.98
20	1.83	1.65	1.63	1.65	1.72	1.86	3.38	4.69	4.59	4.33	4.16	3.96
21	1.84	1.65	1.62	1.65	1.72	1.89	3.40	4.70	4.67	4.32	4.15	3.93
22	1.82	1.65	1.63	1.65	1.73	1.93	3.42	4.69	4.67	4.34	4.14	3.90
23	1.82	1.64	1.63	1.66	1.74	2.14	3.44	4.69	4.65	4.32	4.13	3.89
24	1.81	1.64	1.63	1.66	1.74	2.19	3.44	4.68	4.64	4.28	4.12	3.90
25	1.80	1.64	1.63	1.66	1.74	2.22	3.46	4.68	4.64	4.25	4.11	3.87
26	1.79	1.63	1.63	1.66	1.74	2.26	3.50	4.71	4.63	4.23	4.09	3.86
27	1.78	1.62	1.63	1.66	1.74	2.34	3.60	4.71	4.63	4.20	4.08	3.85
28	1.77	1.62	1.63	1.66	1.74	2.40	3.64	4.69	4.62	4.25	4.07	3.83
29	1.76	1.60	1.63	1.66	---	2.41	3.70	4.67	4.61	4.24	4.06	3.82
30	1.76	1.59	1.63	1.66	---	2.42	3.75	4.65	4.60	4.22	4.06	3.81
31	1.75	---	1.62	1.66	---	2.43	---	4.65	---	4.21	4.04	---
MEAN	1.87	1.68	1.61	1.65	1.69	1.94	3.04	4.40	4.63	4.38	4.17	3.97
MAX	2.00	1.76	1.63	1.66	1.74	2.43	3.75	4.71	4.70	4.61	4.30	4.10
MIN	1.75	1.59	1.58	1.62	1.65	1.75	2.45	3.78	4.56	4.20	4.04	3.81

WTR YR 1991 MEAN 2.92 MAX 4.71 MIN 1.58

06605000 OCHEYEDAN RIVER NEAR SPENCER, IA

LOCATION.--Lat 43°07'44", long 95°12'37", in SW1/4 SW1/4 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 mi².

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: Nov. 7-9 and Nov. 26 to Mar. 15. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data.

AVERAGE DISCHARGE.--14 years, 214 ft³/s, 6.82 in/yr, 155,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,450 ft³/s June 21, 1983, gage height, 10.49 ft; no flow Jan. 24 to Mar. 9, 1979, and Dec. 22, 1989 to Jan. 5, 1990.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 8, 1953 reached a stage of 12.89 ft, discharge, 26,000 ft³/s on basis of contracted-opening measurement of peak flow.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,700 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Apr. 14	1415	*1,900	*8.30	No other peak greater than base discharge.			

Minimum discharge, 1.6 ft³/s Feb. 1.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	13	15	17	3.3	1.6	52	276	583	384	176	63	31		
2	12	15	18	3.7	1.8	51	331	486	375	162	60	31		
3	19	16	16	4.2	2.1	53	307	445	400	150	59	32		
4	21	16	14	5.2	2.9	59	260	668	465	140	56	30		
5	18	16	15	4.6	4.5	72	227	838	718	133	53	29		
6	16	16	21	4.2	4.9	81	204	798	589	129	52	28		
7	15	15	20	4.4	5.6	80	183	646	481	146	54	28		
8	15	16	21	4.2	5.2	79	169	612	423	202	85	30		
9	15	14	23	4.5	6.1	74	156	644	389	153	109	28		
10	16	17	25	4.7	6.8	70	142	572	395	138	96	27		
11	14	16	23	4.1	7.2	66	139	498	380	134	79	30		
12	15	15	21	4.3	7.3	59	172	447	348	129	69	32		
13	14	15	22	4.2	7.6	66	839	419	324	119	63	33		
14	14	15	15	4.0	6.7	51	1760	392	329	104	58	40		
15	14	15	12	3.6	6.7	48	1540	366	368	95	54	41		
16	13	15	12	3.4	8.9	40	1030	358	408	89	51	34		
17	15	14	13	3.1	7.9	39	775	608	384	81	52	30		
18	16	14	12	3.0	8.5	39	663	889	349	76	49	29		
19	15	15	11	3.4	7.7	44	612	824	294	71	46	28		
20	16	15	10	3.5	7.5	52	530	694	278	73	50	28		
21	18	16	9.1	2.6	8.6	57	462	607	297	71	51	27		
22	18	15	9.0	2.7	11	57	420	539	379	92	46	27		
23	17	15	7.8	2.8	17	123	383	481	353	89	40	27		
24	16	15	6.6	2.5	25	188	338	430	324	75	40	27		
25	15	14	5.8	2.3	32	293	315	391	302	66	37	28		
26	16	18	4.6	2.4	35	410	306	490	276	61	36	26		
27	16	19	3.6	2.7	41	413	568	608	247	59	34	25		
28	15	17	2.3	2.6	44	306	624	527	220	92	33	25		
29	15	15	2.2	2.1	---	263	538	461	200	107	32	25		
30	15	16	2.9	1.9	---	226	627	417	183	85	33	22		
31	15	---	3.6	1.7	---	221	---	404	---	73	31	---		
TOTAL	482	465	398.5	105.9	331.1	3732	14896	17142	10862	3370	1671	878		
MEAN	15.5	15.5	12.9	3.42	11.8	120	497	553	362	109	53.9	29.3		
MAX	21	19	25	5.2	44	413	1760	889	718	202	109	41		
MIN	12	14	2.2	1.7	1.6	39	139	358	183	59	31	22		
AC-FT	956	922	790	210	657	7400	29550	34000	21540	6680	3310	1740		
CFSM	.04	.04	.03	.01	.03	.28	1.17	1.30	.85	.26	.13	.07		
IN.	.04	.04	.03	.01	.03	.33	1.30	1.50	.95	.29	.15	.08		
CAL YR 1990	TOTAL	17908.60	MEAN	49.1	MAX	904	MIN	.00	AC-FT	35520	CFSM	.12	IN.	1.56
WTR YR 1991	TOTAL	54333.5	MEAN	149	MAX	1760	MIN	1.6	AC-FT	107800	CFSM	.35	IN.	4.74

LITTLE SIOUX RIVER BASIN

197

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 mi².

PERIOD OF RECORD.--October 1972 to current year.

REVISED RECORDS.--WDR IA-80-1: 1978-79.

GAGE.--Water-stage encoder. Datum of gage is 1,223.60 ft above NGVD.

REMARKS.--Estimated daily discharges: Dec. 16, 18, Dec. 20 to Jan. 1, Jan. 20 to Feb. 4, Feb. 6-20, Feb. 24 to Mar. 15, Mar. 19 and June 19, 20. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--19 years, 663 ft³/s, 5.82 in/yr, 480,300 acre-ft/yr; median of yearly mean discharges, 650 ft³/s, 5.7 in/yr, 471,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 13,100 ft³/s June 17, 1984, gage height, 19.58 ft; minimum daily discharge, 0.70 ft³/s Feb. 4, 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 29	1300	1,710	9.63	May 21	1930	2,820	12.65
Apr. 18	0930	*3,940	*14.46	June 4	2330	2,090	10.79
May 8	1400	3,350	13.65	June 24	1300	1,640	9.42

Minimum daily discharge, 14 ft³/s Jan. 21, 26, 27.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	36	40	34	24	17	130	1350	2360	1840	1040	453	135
2	36	41	26	24	22	300	1320	2380	1780	926	441	128
3	36	42	20	23	25	350	1330	2340	1630	841	421	123
4	36	43	19	24	26	220	1320	2420	1940	772	387	119
5	44	44	26	32	24	180	1240	2680	2030	718	355	115
6	47	45	29	26	25	250	1120	2970	1960	654	330	114
7	46	45	30	24	30	290	1020	3220	2040	601	311	112
8	43	42	31	24	31	220	929	3320	2050	666	380	114
9	43	42	34	23	33	250	856	3220	1990	789	547	111
10	42	44	36	23	36	200	785	3000	1940	694	701	106
11	42	47	39	30	40	180	705	2750	1970	594	684	110
12	42	49	42	26	39	190	661	2510	2060	559	610	114
13	43	47	47	22	35	190	911	2270	2080	545	542	117
14	42	45	46	19	38	185	1680	2020	2040	506	481	118
15	40	45	40	17	43	160	2290	1810	2000	493	425	133
16	40	46	39	17	39	177	2940	1660	1960	456	379	146
17	40	45	37	17	37	194	3580	1890	1960	431	344	138
18	41	44	37	17	35	199	3860	2160	1930	395	316	146
19	42	43	37	17	39	220	3460	2390	1810	364	288	147
20	45	43	34	15	45	248	3120	2610	1600	385	271	138
21	48	42	29	14	54	280	2930	2780	1510	372	274	128
22	49	42	23	15	74	352	2750	2780	1560	366	255	119
23	52	42	21	16	98	543	2520	2630	1590	438	296	112
24	51	41	24	17	130	943	2240	2440	1620	472	263	109
25	51	40	29	15	135	1180	1890	2250	1570	432	224	106
26	50	39	30	14	120	1300	1600	2240	1500	391	200	106
27	49	35	34	14	132	1450	1630	2150	1430	355	183	102
28	49	24	29	15	120	1600	1810	2080	1360	368	172	99
29	46	24	27	16	---	1690	1970	2000	1250	558	162	98
30	42	31	26	15	---	1620	2130	1880	1140	538	152	96
31	41	---	26	15	---	1460	---	1790	---	474	143	---
TOTAL	1354	1242	981	610	1522	16751	55947	75000	53140	17193	10990	3559
MEAN	43.7	41.4	31.6	19.7	54.4	540	1865	2419	1771	555	355	119
MAX	52	49	47	32	135	1690	3860	3320	2080	1040	701	147
MIN	36	24	19	14	17	130	661	1660	1140	355	143	96
AC-FT	2690	2460	1950	1210	3020	33230	111000	148800	105400	34100	21800	7060
CFSM	.03	.03	.02	.01	.04	.35	1.20	1.56	1.14	.36	.23	.08
IN.	.03	.03	.02	.01	.04	.40	1.34	1.80	1.28	.41	.26	.09

CAL YR 1990 TOTAL 64100.4 MEAN 176 MAX 2170 MIN 4.8 AC-FT 127100 CFSM .11 IN. 1.54
WTR YR 1991 TOTAL 238289 MEAN 653 MAX 3860 MIN 14 AC-FT 472600 CFSM .42 IN. 5.73

LITTLE SIOUX RIVER BASIN

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 mi².

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 encoder. 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. 3-6, Dec. 16 to Jan. 2, Jan. 6 to Feb. 3, Feb. 14-16, 25-27, and Mar. 8-12. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--64 years (water years 1919-24, 1929-31, 1937-91), 818 ft³/s, 4.44 in/yr, 592,600 acre-ft/yr; median of yearly mean discharges, 640 ft³/s, 3.5 in/yr, 464,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 29,800 ft³/s Apr. 7, 1965, gage height, 25.86 ft; minimum daily discharge, 2.6 ft³/s July 17, 25, 1936, caused by construction dam above gage; minimum daily discharge excluding regulation, 4.0 ft³/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 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Apr. 20	0900	4,710	12.80	May 31	1600	4,550	12.60
May 10	0300	4,840	12.96	June 15	0700	*7,240	*15.58
May 27	0300	5,330	13.54				

Minimum discharge, 3.6 ft³/s Dec. 21, result of freezeup.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	100	107	110	45	58	292	1960	3080	3830	1910	784	272
2	97	108	82	34	58	261	1840	3260	3460	1750	734	259
3	139	110	27	40	66	319	1770	3360	3200	1590	708	249
4	150	113	46	40	79	337	1740	3440	3530	1480	684	235
5	135	114	70	45	180	370	1720	3670	3220	1400	650	231
6	125	121	64	34	222	397	1650	3970	3360	1320	637	222
7	114	123	108	45	257	324	1530	4240	3190	1250	608	215
8	115	118	106	50	263	300	1420	4490	3130	1200	819	225
9	120	121	110	39	294	310	1310	4730	3140	1170	782	218
10	119	129	118	41	298	330	1220	4830	3080	1210	776	208
11	114	125	125	46	289	330	1160	4670	2980	1200	863	229
12	112	122	129	42	278	350	1150	4330	2920	1160	938	252
13	112	121	95	45	270	390	1300	3990	2940	1070	913	241
14	109	123	124	41	130	338	1960	3610	3160	1030	849	263
15	107	125	135	43	120	333	2810	3260	4480	984	778	262
16	106	121	90	46	150	334	3300	2960	3240	925	725	239
17	105	116	120	44	197	330	3600	2770	3050	874	690	227
18	107	115	93	50	191	337	4000	3210	2930	815	622	233
19	110	117	120	57	178	351	4450	3840	2860	769	563	230
20	111	117	40	40	190	363	4680	3820	2720	806	518	224
21	117	118	23	35	298	410	4440	3900	2610	774	502	225
22	119	114	26	58	335	469	4110	4020	2540	733	498	216
23	121	111	36	61	320	723	3870	4080	2490	712	481	204
24	120	111	55	50	296	845	3580	3960	2460	717	459	200
25	115	111	60	52	258	1030	3230	3730	2450	764	473	195
26	113	111	40	56	240	1340	2900	4690	2390	761	426	185
27	112	111	50	61	275	1570	2690	4870	2280	717	381	178
28	108	77	52	58	272	1700	2670	3880	2180	693	350	174
29	106	81	35	47	---	1820	2660	3490	2080	692	326	170
30	106	105	30	59	---	1960	2810	3280	1970	707	307	165
31	107	---	40	59	---	2040	---	4010	---	828	289	---
TOTAL	3551	3416	2359	1463	6062	20603	77530	119440	87870	32011	19135	6646
MEAN	115	114	76.1	47.2	216	665	2584	3853	2929	1033	617	222
MAX	150	129	135	61	335	2040	4680	4870	4480	1910	938	272
MIN	97	77	23	34	58	261	1150	2770	1970	692	289	165
AC-FT	7040	6780	4680	2900	12020	40870	153800	236900	174300	63490	37950	13180
CFSM	.05	.05	.03	.02	.09	.27	1.03	1.54	1.17	.41	.25	.09
IN.	.05	.05	.04	.02	.09	.31	1.15	1.78	1.31	.48	.28	.10

CAL YR 1990 TOTAL 146828 MEAN 402 MAX 3910 MIN 17 AC-FT 291200 CFSM .16 IN. 2.18
WTR YR 1991 TOTAL 380086 MEAN 1041 MAX 4870 MIN 23 AC-FT 753900 CFSM .42 IN. 5.66

LITTLE SIOUX RIVER BASIN

199

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 mi².

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 encoder. 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. 3-6, Dec. 18 to Feb. 22, and Mar. 2, 3. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--50 years, 271 ft³/s, 5.50 in/yr, 196,300 acre-ft/yr; median of yearly mean discharges, 240 ft³/s, 4.9 in/yr, 174,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 20,800 ft³/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 ft³/s Feb. 17-20, 1959.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 31	2300	4,510	7.32	June 14	0315	9,510	10.71
June 13	1345	4,170	6.60	June 15	2045	*16,100	*14.99

Minimum daily discharge, 21 ft³/s Dec. 21.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	108	104	123	100	60	275	416	1070	3060	678	261	131
2	106	105	111	50	80	190	384	878	1710	687	254	128
3	119	107	100	48	110	210	357	806	1220	631	250	127
4	123	109	90	54	140	255	341	908	1650	604	241	122
5	111	110	120	74	133	359	326	1090	1560	578	230	117
6	105	108	110	50	130	286	311	1410	1210	559	226	115
7	100	107	134	47	125	230	294	1120	893	542	240	114
8	98	107	133	62	119	211	290	999	802	514	347	115
9	100	106	154	45	120	199	292	1100	761	524	576	115
10	101	107	157	37	115	187	280	957	714	512	372	112
11	101	107	129	70	110	186	275	843	673	495	294	125
12	101	107	122	44	100	258	345	774	637	478	261	224
13	99	107	114	47	130	299	516	728	2660	472	242	210
14	100	107	107	37	110	198	803	682	7080	453	233	178
15	99	109	109	40	90	188	1180	677	12900	434	217	149
16	99	107	108	48	110	189	915	770	4750	414	211	133
17	100	106	108	42	100	185	746	1290	2330	395	227	127
18	101	107	70	45	120	203	676	1610	1690	375	221	125
19	101	108	45	74	160	242	728	986	1390	358	198	121
20	103	108	30	60	220	256	719	863	1220	353	182	119
21	109	110	21	31	325	262	663	795	1160	350	177	117
22	110	108	23	70	450	253	614	746	1210	352	175	114
23	106	107	40	91	494	600	573	696	1060	335	169	112
24	103	108	76	80	314	723	528	647	997	324	164	112
25	101	107	80	71	263	574	497	609	953	309	159	112
26	102	107	60	80	239	485	533	1290	900	298	154	110
27	103	108	86	90	225	490	2660	1110	828	289	147	107
28	102	103	95	88	227	595	1750	1740	767	295	141	107
29	101	95	29	64	---	549	1230	1030	720	312	136	107
30	101	108	26	54	---	512	1260	1560	686	291	134	107
31	102	---	80	45	---	459	---	2130	---	274	133	---
TOTAL	3215	3204	2790	1838	4919	10108	20502	31914	58191	13485	6972	3812
MEAN	104	107	90.0	59.3	176	326	683	1029	1940	435	225	127
MAX	123	110	157	100	494	723	2660	2130	12900	687	576	224
MIN	98	95	21	31	60	185	275	609	637	274	133	107
AC-FT	6380	6360	5530	3650	9760	20050	40670	63300	115400	26750	13830	7560
CFSM	.16	.16	.13	.09	.26	.49	1.02	1.54	2.90	.65	.34	.19
IN.	.18	.18	.16	.10	.27	.56	1.14	1.77	3.24	.75	.39	.21

CAL YR 1990	TOTAL	117290	MEAN	321	MAX	10900	MIN	21	AC-FT	232600	CFSM	.48	IN.	6.52
WTR YR 1991	TOTAL	160950	MEAN	441	MAX	12900	MIN	21	AC-FT	319200	CFSM	.66	IN.	8.95

LITTLE SIOUX RIVER BASIN

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 mi². Prior to Jan. 15, 1958, 4,426 mi², 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 encoder. 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: Nov. 27 to Dec. 11, Dec. 17 to Mar. 3, and Aug. 4-7. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and and satellite data collection platform at station.

AVERAGE DISCHARGE.--33 years (water years 1959-91), 1,379 ft³/s, 5.31 in/yr, 999,100 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 31,200 ft³/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 ft³/s Jan. 18-20, Jan. 28 to Feb. 1, 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 5,500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Apr. 21	0330	5,550	13.28	June 1	0800	9,010	16.64
Apr. 27	1800	6,360	13.98	June 14	0900	8,840	16.52
May 28	1700	6,710	14.90	June 16	0100	*17,800	*21.80

Minimum daily discharge, 70 ft³/s Dec. 21.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	284	289	270	110	150	740	2240	3900	8080	2460	1130	406
2	285	288	200	90	160	650	2140	3870	5900	2420	1050	393
3	339	301	120	100	180	800	2060	3890	4700	2260	984	383
4	370	307	150	95	250	1080	2030	3930	5140	2130	935	365
5	362	312	200	115	450	925	2000	4110	4880	2030	930	358
6	330	320	270	90	600	889	1940	4780	4470	1960	900	358
7	296	313	280	110	660	832	1860	4840	4060	1890	900	355
8	291	319	270	130	680	713	1800	4980	3720	1810	975	362
9	297	322	300	95	750	725	1710	5450	3650	1790	1440	345
10	306	324	330	100	770	752	1640	5570	3620	1770	1230	338
11	316	324	335	120	740	745	1600	5430	3440	1800	1140	340
12	307	315	346	105	680	775	1650	4950	3310	1770	1220	443
13	302	312	301	110	500	948	1790	4500	4060	1720	1280	545
14	298	314	258	100	300	808	1990	4380	7700	1630	1210	478
15	289	316	318	103	270	690	3140	3790	12400	1590	1100	472
16	288	312	283	114	400	684	3880	3610	11000	1520	1000	432
17	291	299	225	108	500	691	4120	3740	6030	1420	966	408
18	284	302	200	130	470	691	4380	4530	4910	1320	921	388
19	295	296	150	145	450	718	4870	4450	4380	1230	823	389
20	304	304	100	120	570	752	5390	4490	4020	1150	748	396
21	311	313	70	110	760	758	5430	4450	3690	1210	696	404
22	316	303	80	150	840	820	5000	4480	3700	1170	670	393
23	315	298	100	180	800	1090	4600	4430	3400	1090	648	379
24	301	295	140	150	700	1640	4300	3890	3250	1050	629	374
25	296	295	160	130	600	1630	3920	3700	3140	1050	609	367
26	302	299	100	145	650	1720	3500	4520	3040	1080	606	365
27	293	250	120	160	700	1900	4890	5990	2880	1060	555	359
28	281	200	130	140	660	2090	4690	6310	2740	1010	511	347
29	290	230	100	130	---	2140	3940	4880	2640	1020	475	345
30	288	300	80	154	---	2200	3750	4710	2540	994	447	337
31	286	---	100	150	---	2260	---	4980	---	1010	424	---
TOTAL	9413	8972	6086	3789	15240	33856	96250	141530	140490	47414	27152	11624
MEAN	304	299	196	122	544	1092	3208	4565	4683	1529	876	387
MAX	370	324	346	180	840	2260	5430	6310	12400	2460	1440	545
MIN	281	200	70	90	150	650	1600	3610	2540	994	424	337
AC-FT	18670	17800	12070	7520	30230	67150	190900	280700	278700	94050	53860	23060
CFSM	.09	.08	.06	.03	.15	.31	.91	1.29	1.33	.43	.25	.11
IN.	.10	.09	.06	.04	.16	.36	1.02	1.49	1.48	.50	.29	.12
CAL YR 1990	TOTAL 295620	MEAN 810	MAX 17800	MIN 56	AC-FT 586400	CFSM .23	IN. 3.12					
WTR YR 1991	TOTAL 541816	MEAN 1484	MAX 12400	MIN 70	AC-FT 1075000	CFSM .42	IN. 5.72					

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 upstream 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 mi².

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 encoder. 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. Prior to June 21, 1989, at site 100 ft downstream at same datum.

REMARKS.--Estimated daily discharges: Dec. 4-6 and Dec. 18 to Feb. 21. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--51 years, 137 ft³/s, 4.57 in/yr, 99,260 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 22,500 ft³/s June 12, 1950, gage height, 28.17 ft; minimum daily discharge, 2.0 ft³/s Jan. 2-10, 1945.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 5,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Apr. 27	0245	5,710	12.63	June 14	1315	9,680	16.15
June 13	1800	19,000	23.48	June 15	1345	*20,800	*25.04

Minimum daily discharge, 27 ft³/s Dec. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	53	59	71	50	50	836	177	391	768	299	129	80
2	53	58	61	40	68	1090	168	350	449	286	128	79
3	81	61	59	35	90	223	161	364	333	263	130	79
4	98	80	50	36	120	206	157	411	1370	257	125	77
5	66	70	90	39	140	206	154	646	528	247	122	76
6	56	67	75	38	160	186	147	516	320	234	144	76
7	52	66	115	36	190	136	140	384	273	228	147	75
8	54	63	103	47	250	133	175	374	244	210	345	85
9	57	67	79	46	330	123	185	364	248	249	202	85
10	58	67	70	44	400	120	140	342	254	248	145	75
11	59	66	77	48	320	125	141	328	232	235	129	77
12	58	63	82	47	220	329	449	319	205	239	124	169
13	58	62	71	46	240	667	459	323	8320	210	122	566
14	59	63	68	50	160	197	679	311	5240	201	123	160
15	58	62	78	56	100	172	517	303	9480	200	118	126
16	60	58	65	55	150	159	353	434	1400	196	114	111
17	61	56	82	54	250	183	313	1470	922	184	144	102
18	62	60	100	64	330	236	302	1070	751	174	126	104
19	66	60	70	78	450	173	328	402	646	165	132	99
20	64	61	50	70	350	163	320	352	582	172	108	100
21	74	63	35	52	600	165	300	334	590	171	103	101
22	76	60	27	60	483	157	282	317	663	170	101	98
23	68	59	30	70	193	452	273	295	516	161	98	94
24	64	60	40	60	124	289	250	273	481	159	99	97
25	62	59	33	40	109	215	236	250	450	154	97	98
26	64	60	36	35	94	197	420	741	404	144	94	92
27	63	60	42	45	95	300	2540	316	360	144	88	89
28	57	51	52	60	101	306	622	1160	332	143	86	88
29	61	48	36	54	---	227	477	441	316	145	85	87
30	61	68	40	49	---	194	507	317	304	140	84	83
31	59	---	45	40	---	191	---	301	---	140	83	---
TOTAL	1942	1857	1932	1544	6167	8356	11372	14199	36981	6168	3875	3328
MEAN	62.6	61.9	62.3	49.8	220	270	379	458	1233	199	125	111
MAX	98	80	115	78	600	1090	2540	1470	9480	299	345	566
MIN	52	48	27	35	50	120	140	250	205	140	83	75
AC-FT	3850	3680	3830	3060	12230	16570	22560	28160	73350	12230	7690	6600
CFSM	.15	.15	.15	.12	.54	.66	.93	1.13	3.03	.49	.31	.27
IN.	.18	.17	.18	.14	.56	.76	1.04	1.30	3.38	.56	.35	.30
CAL YR 1990	TOTAL 57886	MEAN 159	MAX 7880	MIN 14	AC-FT 114800	CFSM .39	IN. 5.29					
WTR YR 1991	TOTAL 97721	MEAN 268	MAX 9480	MIN 27	AC-FT 193800	CFSM .66	IN. 8.93					

BOYER RIVER BASIN

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 mi².

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 encoder. 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: Nov. 17 to Mar. 2. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--59 years (water years 1919-24, 1939-91), 338 ft³/s, 5.27 in/yr, 244,900 acre-ft/yr; median of yearly mean discharges, 280 ft³/s, 4.4 in/yr, 203,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 30,800 ft³/s June 17, 1990, gage height, 22.54 ft; maximum gage height, 25.22 ft Mar. 1, 1965, backwater from ice; minimum daily discharge, 1.5 ft³/s July 16, 1938.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 6,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
June 15	1615	*23,700	*20.76	No other peak greater than base discharge.			

Minimum discharge, 80 ft³/s Dec. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	158	163	231	150	150	774	754	1600	2110	810	343	185
2	152	163	210	120	205	2430	688	1370	2160	789	326	182
3	208	169	153	100	240	846	642	1310	1350	725	331	179
4	255	228	134	110	260	616	612	1390	1390	694	322	171
5	197	211	164	115	285	619	585	2700	1710	668	310	156
6	174	194	180	110	300	573	548	2640	1250	642	360	146
7	155	202	199	105	330	450	523	1800	1060	625	400	150
8	150	201	209	135	400	390	514	1570	968	604	465	163
9	160	211	220	130	500	378	552	1500	947	662	508	185
10	162	214	230	133	633	346	500	1430	990	659	568	166
11	163	209	240	140	719	341	482	1310	922	624	414	163
12	161	199	256	135	623	357	879	1230	865	611	363	205
13	161	196	221	130	609	897	1480	1170	1780	565	323	419
14	163	193	187	145	450	466	2680	1090	4700	536	294	314
15	160	192	194	160	350	415	2710	1120	17400	523	278	224
16	158	188	188	162	400	386	1740	1750	6710	502	377	197
17	157	181	183	160	425	405	1440	1810	3360	475	363	178
18	161	186	131	180	350	587	1320	2540	2020	453	300	166
19	169	190	125	220	500	555	1640	1990	1700	435	336	161
20	170	190	100	190	700	515	1530	1440	1480	434	248	155
21	171	192	90	150	720	521	1380	1340	1390	431	236	167
22	188	184	80	175	680	480	1250	1300	1690	430	233	160
23	182	174	90	200	621	1600	1170	1170	1270	424	224	153
24	171	170	110	135	512	1580	1050	1090	1190	410	218	150
25	164	171	100	90	408	1160	974	1020	1120	387	215	153
26	159	178	105	115	340	1000	1220	1340	1040	367	201	148
27	169	183	120	145	324	1150	3940	1140	969	354	195	142
28	162	180	150	170	310	1360	2220	1370	901	349	190	142
29	157	169	100	160	---	1070	1720	1850	854	380	187	142
30	162	197	120	135	---	916	2720	1160	819	375	200	142
31	166	---	130	120	---	820	---	1500	---	360	190	---
TOTAL	5245	5678	4950	4425	12344	24003	39463	47040	66115	16303	9518	5364
MEAN	169	189	160	143	441	774	1315	1517	2204	526	307	179
MAX	255	228	256	220	720	2430	3940	2700	17400	810	568	419
MIN	150	163	80	90	150	341	482	1020	819	349	187	142
AC-FT	10400	11260	9820	8780	24480	47610	78270	93300	131100	32340	18880	10640
CFSM	.19	.22	.18	.16	.51	.89	1.51	1.74	2.53	.60	.35	.21
IN.	.22	.24	.21	.19	.53	1.03	1.69	2.01	2.82	.70	.41	.23
CAL YR 1990	TOTAL 189712	MEAN 520	MAX 19300	MIN 24	AC-FT 376300	CFSM .60	IN. 8.10					
WTR YR 1991	TOTAL 240448	MEAN 659	MAX 17400	MIN 80	AC-FT 476900	CFSM .76	IN. 10.27					

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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

REVISED RECORDS.--WSP 761: Drainage area.

REMARKS.--Estimated daily discharges: Dec. 22-23, Dec. 27 to Jan. 22, and Aug. 14, 15, 17, 18. 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.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 396,000 ft³/s Apr. 18, 1952, gage height, 40.20 ft, present datum; minimum, about 2,200 ft³/s Jan. 6, 1937; minimum gage height, 6.85 ft, present datum, Feb. 5, 1989, result of freezeup.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	32400	17900	11700	18700	16200	14700	28000	33600	37900	32200	29500	31600
2	32000	16200	12100	18300	16300	18600	27700	32600	47300	35100	30300	32100
3	32200	14800	12100	17800	16300	15500	27400	31900	41300	37500	30400	32400
4	32600	14000	12200	17500	15800	13900	27500	32100	36400	32100	30300	33000
5	32400	13900	12600	17500	15100	13700	27400	34100	45100	31900	30200	32900
6	31700	13700	12900	17500	15500	13900	27600	36300	45200	33800	30100	33000
7	31400	13200	12700	17400	15800	13600	28000	34200	37800	30400	30500	33100
8	31200	13100	12200	17200	15700	13500	27900	33500	33800	30400	31200	33200
9	31000	12900	12000	16900	15800	13300	27800	33600	36800	30500	32600	33000
10	30400	12600	12000	16500	16100	13600	27600	33900	36000	30000	32700	33100
11	30600	12600	12000	16300	15400	13600	27500	34800	35100	30100	31600	33200
12	30600	12500	12000	15900	15000	13700	28500	37800	37800	32400	31000	33200
13	30500	12400	12000	15900	14600	14300	31300	33900	34000	30000	30800	34600
14	30400	12400	12000	16000	14500	14700	32900	33700	61100	29800	30900	34400
15	30500	12400	11800	16000	14100	13600	34200	36400	74100	31200	30900	34100
16	30600	12300	11700	16000	13900	13300	32700	33700	74100	28900	30800	33100
17	30700	12100	11800	15600	13300	13500	32200	35700	49900	28900	31900	32100
18	30800	11900	11700	15100	15600	13600	32000	41700	41100	30800	31500	32100
19	31000	11800	11700	14800	19600	13800	32100	37000	34800	28600	31100	31900
20	31000	11800	12000	14700	19000	13800	32900	34100	34700	29400	30100	31500
21	30700	11800	13200	15000	17300	13800	33200	36900	37000	31600	29900	31700
22	30900	11900	9500	15300	16600	14000	32900	32800	33100	29700	30000	31100
23	30900	12000	8000	15300	16600	14200	32400	33700	35700	29600	30300	31500
24	30800	11900	14300	16400	16500	15700	32100	36700	37800	31200	30300	31600
25	30700	11800	18200	17400	16700	15300	31900	33300	33100	29900	30300	31600
26	30600	11700	22000	16900	14700	14500	31700	34100	34200	29700	30900	31900
27	30600	11700	18500	16300	14200	16000	38900	38800	37600	30300	31300	31800
28	29300	11600	19000	16300	14300	19300	36300	35500	33400	29100	31000	31900
29	26600	11600	19000	16900	---	22600	34200	39000	33800	29600	30700	32100
30	23400	11500	18900	16600	---	25100	33700	38500	36500	31000	31200	32600
31	20600	---	18900	16400	---	27100	---	34900	---	29500	31300	

MISSOURI RIVER MAIN STEM

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 to 1976, 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, 1975.

SEDIMENT LOADS: Maximum daily, 1,060,000 tons May 19, 1974; minimum daily, 3,990 tons Jan. 14, 1975.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)
OCT 1990					APR 1991				
01...	0845	32700	17.0	800	15...	0810	34400	8.0	750
10...	1045	29200	11.0	750	22...	0810	32800	10.0	745
15...	0815	30500	12.5	780	29...	0810	34100	14.0	700
23...	0845	30800	11.0	790	MAY				
29...	0820	26900	11.0	795	06...	0815	36900	10.0	680
NOV					28...	0840	35000	22.0	740
05...	0840	13900	8.0	750	JUN				
13...	0810	12400	8.5	800	06...	1100	45500	22.0	640
19...	0830	11800	9.0	780	10...	0825	36900	22.0	650
DEC					28...	0830	33500	26.0	790
05...	1015	12600	3.0	720	JUL				
10...	0815	12000	4.0	700	02...	1015	34800	28.0	650
FEB 1991					15...	0820	32500	27.0	666
05...	0930	15000	1.0	750	22...	0815	31000	27.0	720
19...	0930	19800	2.0	740	29...	0840	29500	23.0	630
MAR					SEP				
04...	0830	14100	3.0	750	03...	0810	32200	25.0	790
11...	0805	13700	6.0	710	10...	0830	34400	23.0	850
18...	0810	13600	5.0	810	16...	0845	37000	22.0	735
25...	0815	15400	9.0	675	25...	0945	31500	15.0	665

PARTICLE-SIZE DISTRIBUTION OF SURFACE BED-MATERIAL, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (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)
OCT											
10...	1425	29200	4	0	1	36	97	100	--	--	--
APR											
10...	1020	27500	5	0	1	23	91	99	100	--	--
MAY											
22...	1012	32500	4	0	1	23	92	98	99	100	--
JUN											
18...	1041	41600	5	0	1	26	94	98	99	99	100
AUG											
07...	1248	29000	5	0	2	34	89	99	100	--	--
SEP											
25...	1245	31500	4	0	1	20	73	88	95	99	100

MISSOURI RIVER MAIN STEM

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06610000 MISSOURI RIVER AT OMAHA, NE--Continued

WATER-QUALITY RECORDS

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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 (70338)	SED. SUSP. FALL DIAM. % FINER THAN (70342)	SED. SUSP. FALL DIAM. % FINER THAN (70343)	SED. SUSP. FALL DIAM. % FINER THAN (70344)	SED. SUSP. FALL DIAM. % FINER THAN (70345)
OCT											
10...		WATER TEMPERATURE, 11.0°C (1045-1330); DISCHARGE, 29,200 ft ³ /s.									
10...	1045	150	10.2	2.40	3.31	193	--	63	71	96	100
10...	1048	150	--	5.10	3.02	189	--	45	57	92	100
10...	1050	150	--	7.30	2.94	188	--	39	50	80	100
10...	1053	150	--	8.50	2.40	296	--	29	41	83	100
10...	1105	150	--	9.20	2.31	375	--	37	46	83	100
10...	1110	150	--	--	--	247	--	52	62	93	100
10...	1125	305	10.8	2.50	3.72	298	--	58	70	98	100
10...	1129	305	--	5.40	3.50	304	--	47	61	98	100
10...	1133	305	--	7.70	2.94	325	--	28	45	96	100
10...	1137	305	--	9.00	2.92	377	--	34	49	96	100
10...	1141	305	--	9.70	2.61	462	--	26	39	89	100
10...	1145	305	--	--	--	312	--	41	55	97	100
10...	1200	435	16.0	3.70	4.26	219	--	56	72	98	100
10...	1204	435	--	8.00	4.04	320	--	35	52	97	100
10...	1208	435	--	11.4	3.52	354	--	39	56	98	100
10...	1212	435	--	13.3	3.50	433	--	31	49	97	100
10...	1216	435	--	14.4	3.33	438	--	26	42	96	100
10...	1218	435	--	15.1	3.18	678	--	12	28	91	100
10...	1220	435	--	--	--	298	--	44	61	99	100
10...	1235	525	17.2	4.00	4.78	155	--	65	79	100	--
10...	1239	525	--	8.60	4.37	144	--	56	70	100	--
10...	1243	525	--	12.3	4.00	297	--	33	52	97	100
10...	1246	525	--	14.3	3.63	364	--	42	58	99	100
10...	1250	525	--	15.5	2.76	419	--	35	50	99	100
10...	1253	525	--	16.2	2.33	1080	--	11	20	91	100
10...	1255	525	--	--	--	245	--	56	71	100	--
10...	1310	605	17.4	4.00	4.80	132	--	82	94	100	--
10...	1313	605	--	8.70	4.52	205	--	85	92	100	--
10...	1316	605	--	12.4	3.78	201	--	79	88	100	--
10...	1320	605	--	14.5	3.55	176	--	74	83	100	--
10...	1323	605	--	15.7	3.63	134	--	65	74	100	--
10...	1326	605	--	16.4	3.39	200	--	62	73	100	--
10...	1330	605	--	--	--	184	--	77	86	100	--
APR											
10...		WATER TEMPERATURE, 11.0°C (0955-1440); DISCHARGE, 27,500 ft ³ /s.									
10...	0955	230	11.4	2.80	3.61	279	--	85	96	100	--
10...	0958	230	--	5.70	3.61	298	--	81	92	100	--
10...	1000	230	--	8.10	3.18	1930	--	21	59	100	--
10...	1005	230	--	9.50	3.07	291	--	66	82	99	100
10...	1010	230	--	10.4	2.63	432	--	63	74	100	--
10...	1015	230	--	--	--	324	--	80	90	100	--
10...	1025	345	14.2	3.30	3.94	365	--	71	83	100	--
10...	1030	345	--	7.10	3.72	434	--	60	72	99	100
10...	1035	345	--	10.1	3.50	544	--	51	62	98	100
10...	1040	345	--	11.8	3.07	574	--	45	55	98	100
10...	1045	345	--	12.8	2.74	663	--	38	48	96	100
10...	1050	345	--	13.4	1.87	5610	--	5	7	74	100
10...	1055	345	--	--	--	415	--	61	70	99	100
10...	1105	445	12.6	2.90	4.15	--	--	--	--	--	--
10...	1108	445	--	6.30	3.72	--	--	--	--	--	--
10...	1110	445	--	9.00	3.72	--	--	--	--	--	--
10...	1115	445	--	10.5	3.39	--	--	--	--	--	--
10...	1120	445	--	11.3	3.18	--	--	--	--	--	--
10...	1125	445	--	--	--	343	--	69	80	99	100
10...	1150	445	--	--	--	330	15	44	--	--	--
10...	1220	565	13.6	3.10	4.04	310	--	71	85	100	--
10...	1225	565	--	6.80	3.72	394	--	66	80	99	100
10...	1230	565	--	9.70	3.72	451	--	53	67	97	100
10...	1235	565	--	11.3	3.25	468	--	47	60	92	100
10...	1240	565	--	12.2	3.18	529	--	46	60	91	100
10...	1245	565	--	12.8	3.18	732	--	34	47	84	100
10...	1358	565	--	--	--	366	--	63	77	98	100
10...	1415	660	15.4	3.50	4.26	264	--	87	99	100	--
10...	1418	660	--	7.60	4.26	269	--	80	93	100	--
10...	1420	660	--	10.9	3.39	310	--	74	85	99	100
10...	1425	660	--	12.7	3.18	370	--	66	79	98	100
10...	1430	660	--	13.7	2.85	369	--	61	72	96	100
10...	1435	660	--	14.3	2.74	432	--	51	63	88	100
10...	1440	660	--	--	--	313	--	70	83	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 1990 TO SEPTEMBER 1991

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 (70338)	SED. SUSP. FALL DIAM. % FINER THAN (70342)	SED. SUSP. FALL DIAM. % FINER THAN (70343)	SED. SUSP. FALL DIAM. % FINER THAN (70344)	SED. SUSP. FALL DIAM. % FINER THAN (70345)	SED. SUSP. FALL DIAM. % FINER THAN (70346)
MAY												
22...	0950	190	10.2	2.40	3.18	416	--	90	95	100	--	--
22...	0954	190	--	5.10	3.07	368	--	90	95	100	--	--
22...	0957	190	--	7.30	3.09	380	--	89	94	99	100	--
22...	1000	190	--	8.50	2.89	385	--	89	94	99	100	--
22...	1005	190	--	9.20	2.63	429	--	78	84	96	100	--
22...	1010	190	--	--	--	319	--	87	92	98	100	--
22...	1025	350	11.2	2.60	3.76	472	--	79	85	98	100	--
22...	1029	350	--	5.60	3.50	414	--	73	79	98	100	--
22...	1033	350	--	8.00	3.39	493	--	61	68	94	100	--
22...	1035	350	--	9.30	3.28	488	--	61	69	92	100	--
22...	1037	350	--	10.1	3.33	614	--	57	65	94	100	--
22...	1040	350	--	--	--	457	--	74	80	98	100	--
22...	1055	475	15.6	3.60	4.28	--	--	--	--	--	--	--
22...	1059	475	--	7.80	4.15	--	--	--	--	--	--	--
22...	1103	475	--	11.1	3.83	--	--	--	--	--	--	--
22...	1107	475	--	13.0	3.65	--	--	--	--	--	--	--
22...	1111	475	--	14.0	3.26	--	--	--	--	--	--	--
22...	1115	475	--	14.7	3.28	--	--	--	--	--	--	--
22...	1120	475	--	--	--	438	--	62	73	96	100	--
22...	1125	475	--	--	--	440	18	53	--	--	--	--
22...	1130	575	18.8	4.30	4.85	425	--	79	87	99	100	--
22...	1134	575	--	9.40	4.57	471	--	65	76	98	100	--
22...	1138	575	--	13.4	4.15	643	--	59	69	97	100	--
22...	1142	575	--	15.7	4.07	482	--	67	75	97	100	--
22...	1146	575	--	16.9	2.27	3050	--	10	15	72	100	--
22...	1150	575	--	17.7	1.00	4710	--	7	11	61	100	--
22...	1155	575	--	--	--	511	--	61	71	96	100	--
22...	1215	660	19.2	4.40	4.91	299	--	83	92	97	100	--
22...	1219	660	--	9.60	4.70	292	--	84	95	100	--	--
22...	1223	660	--	13.7	3.61	339	--	86	94	100	--	--
22...	1227	660	--	16.0	3.35	297	--	84	93	99	100	--
22...	1231	660	--	17.3	3.22	380	--	85	92	99	100	--
22...	1235	660	--	18.1	2.57	336	--	75	85	98	100	--
22...	1240	660	--	--	--	320	--	88	96	100	--	--
JUN												
18...	1015	250	16.0	3.70	4.15	1380	--	96	98	100	--	--
18...	1020	250	--	8.00	3.68	1410	--	95	98	99	100	--
18...	1025	250	--	11.4	3.28	1430	--	94	96	99	100	--
18...	1030	250	--	13.3	2.68	1600	--	84	87	95	100	--
18...	1035	250	--	14.4	2.03	1780	--	79	83	93	100	--
18...	1040	250	--	15.1	1.76	1790	--	76	81	93	100	--
18...	1045	250	--	--	--	1400	--	95	98	99	100	--
18...	1055	375	13.4	3.10	4.80	1370	--	94	97	100	--	--
18...	1100	375	--	6.70	4.54	1420	--	90	94	99	100	--
18...	1105	375	--	9.60	4.37	1480	--	91	94	99	100	--
18...	1110	375	--	11.2	3.96	1620	--	85	89	95	100	--
18...	1115	375	--	12.1	3.68	1690	--	81	86	98	100	--
18...	1117	375	--	12.6	3.35	1710	--	79	83	95	100	--
18...	1120	375	--	--	--	1400	--	93	95	99	100	--
18...	1130	500	20.6	4.80	4.91	--	--	--	--	--	--	--
18...	1136	500	--	10.3	4.26	--	--	--	--	--	--	--
18...	1142	500	--	14.7	3.63	--	--	--	--	--	--	--
18...	1148	500	--	17.2	3.63	--	--	--	--	--	--	--
18...	1154	500	--	18.5	2.89	--	--	--	--	--	--	--
18...	1158	500	--	19.4	2.09	--	--	--	--	--	--	--
18...	1200	500	--	--	--	1510	--	89	93	99	100	--
18...	1205	500	--	--	--	1570	31	80	--	--	--	--
18...	1210	590	20.2	4.70	5.35	1430	--	94	97	100	--	--
18...	1216	590	--	10.1	4.91	1430	--	92	96	100	--	--
18...	1222	590	--	14.4	4.37	1450	--	89	93	100	--	--

MISSOURI RIVER MAIN STEM

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06610000 MISSOURI RIVER AT OMAHA, NE--Continued

WATER-QUALITY RECORDS

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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, (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--Continued												
18...	1228	590	--	16.8	4.04	1690	--	84	89	99	100	--
18...	1234	590	--	18.2	3.46	1630	--	81	87	99	100	--
18...	1237	590	--	19.0	3.07	1790	--	77	84	99	100	--
18...	1240	590	--	--	--	1520	--	86	91	99	100	--
18...	1300	690	21.0	4.90	5.24	1250	--	96	99	100	--	--
18...	1306	690	--	10.5	4.59	1280	--	95	99	100	--	--
18...	1312	690	--	15.0	4.26	1210	--	95	99	100	--	--
18...	1318	690	--	17.5	4.00	1230	--	94	98	100	--	--
18...	1324	690	--	18.9	3.57	1250	--	94	98	100	--	--
18...	1330	690	--	19.8	3.18	1320	--	92	97	100	--	--
18...	1335	690	--	20.2	3.02	1260	--	94	98	100	--	--
18...	1340	690	--	--	--	1200	--	95	98	100	--	--

AUG

07...WATER TEMPERATURE, 22.0°C (1005-1245); DISCHARGE, 29,000 ft³/s.												
07...	1004	250	9.40	2.20	3.61	172	--	94	98	100	--	--
07...	1008	250	--	4.70	3.50	195	--	78	88	99	100	--
07...	1012	250	--	6.70	2.74	177	--	58	68	93	100	--
07...	1016	250	--	7.80	2.74	247	--	68	77	95	100	--
07...	1020	250	--	8.50	2.20	298	--	49	57	83	100	--
07...	1024	250	--	--	--	202	--	68	78	96	100	--
07...	1040	425	12.2	2.80	3.83	143	--	75	88	99--	100	--
07...	1045	425	--	6.10	3.39	276	--	56	69	97	100	--
07...	1050	425	--	8.70	3.50	294	--	53	65	97	100	--
07...	1055	425	--	10.2	3.18	417	--	39	55	94--	100	--
07...	1100	425	--	11.0	3.07	394	--	43	56	94	100	--
07...	1105	425	--	--	--	261	--	67	78	98	100	--
07...	1120	520	--	--	--	291	13	30	--	--	--	--
07...	1125	520	15.6	3.60	4.59	--	--	--	--	--	--	--
07...	1127	520	--	7.80	4.04	--	--	--	--	--	--	--
07...	1129	520	--	11.1	4.04	--	--	--	--	--	--	--
07...	1131	520	--	13.0	3.61	--	--	--	--	--	--	--
07...	1133	520	--	14.0	3.28	--	--	--	--	--	--	--
07...	1135	520	--	14.7	2.96	--	--	--	--	--	--	--
07...	1137	520	--	--	--	231	--	62	77	100	--	--
07...	1155	620	17.6	4.10	4.80	223	--	71	84	100	--	--
07...	1159	620	--	8.80	4.59	284	--	62	78	100	--	--
07...	1203	620	--	12.6	4.04	272	--	65	76	98	100	--
07...	1207	620	--	14.7	3.61	280	--	55	71	98	100	--
07...	1211	620	--	15.8	3.50	377	--	54	67	97	100	--
07...	1215	620	--	16.6	3.07	392	--	39	56	90	100	--
07...	1219	620	--	--	--	256	--	69	82	100	--	--
07...	1230	695	17.8	4.10	4.59	186	--	93	100	--	--	--
07...	1232	695	--	8.90	4.37	175	--	88	95	100	--	--
07...	1234	695	--	12.7	3.94	148	--	88	95	100	--	--
07...	1236	695	--	14.8	3.28	182	--	87	96	100	--	--
07...	1238	695	--	16.0	3.50	181	--	86	95	100	--	--
07...	1240	695	--	16.8	3.18	214	--	81	93	100	--	--
07...	1242	695	--	--	--	192	--	92	96	100	--	--

SEP

25...WATER TEMPERATURE, 15.0° C (1015-1235); DISCHARGE, 31,500 ft³/s.												
25...	1000	250	12.4	2.90	3.83	214	--	82	90	100	----	--
25...	1003	250	--	6.20	3.61	214	--	67	76	98	100	--
25...	1008	250	--	8.90	3.18	300	--	64	73	96	100	--
25...	1010	250	--	10.3	2.85	399	--	56	64	92	100	--
25...	1013	250	--	11.2	2.63	444	--	47	55	86	100	--
25...	1015	250	--	--	--	315	--	69	76	96	100	--
25...	1030	400	11.0	2.60	4.37	251	--	62	73	96~	100	--
25...	1033	400	--	5.50	4.15	323	--	59	71	98	100	--
25...	1035	400	--	7.90	4.04	397	--	51	64	99	100	--
25...	1038	400	--	9.20	3.72	445	--	41	56	97	100	--
25...	1041	400	--	9.90	3.72	445	--	41	55	97	100	--
25...	1045	400	--	--	--	317	--	51	65	97	100	--
25...	1100	515	18.0	4.20	4.48	--	--	--	--	--	--	--
25...	1104	515	--	9.00	4.26	--	--	--	--	--	--	--
25...	1108	515	--	12.9	3.61	--	--	--	--	--	--	--
25...	1112	515	--	15.0	2.96	--	--	--	--	--	--	--
25...	1118	515	--	17.0	2.63	--	--	--	--	--	--	--
25...	1120	515	--	--	--	470	--	--	53	93	100	--
25...	1130	515	--	--	--	477	7	15	--	--	--	--
25...	1135	595	18.0	4.20	4.70	306	--	66	76	100	--	--
25...	1138	595	--	9.00	4.15	340	--	55	68	100	--	--
25...	1142	595	--	12.9	3.72	409	--	46	60	97	100	--
25...	1145	595	--	15.0	3.28	604	--	32	45	89	100	--
25...	1149	595	--	16.2	2.96	719	--	24	36	79	100	--
25...	1152	595	--	17.0	2.85	984	--	20	30	78	100	--

MISSOURI RIVER MAIN STEM

06610000 MISSOURI RIVER AT OMAHA, NE--Continued

WATER-QUALITY RECORDS

		PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991									
DATE	TIME	SAMPLE	DEPTH			SED.	SED.	SED.	SED.	SED.	SED.
		LOC-	AT			SUSP.	SUSP.	SUSP.	SUSP.	SUSP.	SUSP.
		ATION,	SAMPLE		STREAM	FALL	FALL	FALL	FALL	FALL	FALL
		CROSS	LOC-		VELOC-	DIAM.	DIAM.	DIAM.	DIAM.	DIAM.	DIAM.
		SECTION	ATION,	SAM-	ITY,	SUS-	% FINER	% FINER	% FINER	% FINER	% FINER
		(FT FM	TOTAL	PLING	POINT	PENDED	THAN	THAN	THAN	THAN	THAN
		L BANK)	(FEET)	DEPTH	(FPS)	(MG/L)	.004 MM	.062 MM	.125 MM	.250 MM	.500 MM
		(00009)	(81903)	(00003)	(81904)	(80154)	(70338)	(70342)	(70343)	(70344)	(70345)
SEP--Continued											
25...	1155	595	--	--	--	311	--	54	67	98	100
25...	1215	675	18.4	4.30	4.91	210	--	74	84	100	--
25...	1219	675	--	9.20	4.80	148	--	80	91	100	--
25...	1222	675	--	13.1	4.37	185	--	72	82	100	--
25...	1226	675	--	15.3	4.04	181	--	73	84	100	--
25...	1229	675	--	16.6	3.72	200	--	68	79	100	--
25...	1232	675	--	17.3	3.39	271	--	58	69	100	--
25...	1235	675	--	--	--	156	--	76	86	100	--

06807000 MISSOURI RIVER AT NEBRASKA CITY, NE

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 2.0 mi upstream from Highway 2 Bridge at Nebraska City, and at mile 562.6.

DRAINAGE AREA.--410,000 mi², approximately. The 3,959 mi² in Great Divide basin are not included.

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.

REVISED RECORDS.--WSP 761: Drainage area.

GAGE.--Water-stage encoder. 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.--Estimated daily discharges: Dec. 24. 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.

AVERAGE DISCHARGE.--62 years, 36,720 ft³/s, 26,600,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 414,000 ft³/s Apr. 19, 1952; maximum gage height, 27.66 ft Apr. 18, 1952; minimum discharge, 1,600 ft³/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, 91,200 ft³/s June 16, gage height, 18.04 ft; minimum daily discharge, 5,200 ft³/s Dec. 24, gage height, unknown, result of freezeup.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	32800	22100	13500	15900	18000	20700	30000	35000	41100	37300	30200	31500
2	32800	20300	14000	16900	17900	23600	31300	35600	52100	34600	30500	32000
3	33000	18300	15200	18300	18200	26000	30900	36500	54300	37900	30800	32300
4	33100	18000	15400	19400	18700	20600	30600	35800	50600	37200	30800	32700
5	32900	17000	14300	19500	18700	18000	30400	36700	55000	33700	30800	33000
6	32600	17000	14500	19000	18800	18400	30800	38500	78900	34700	30600	33000
7	32400	17300	16000	18300	19700	18400	31000	39400	76000	34500	30700	33200
8	32200	18100	15800	18000	20500	17200	31800	38200	56400	32100	31800	34700
9	32800	16300	15700	17800	21700	16600	32000	37700	49200	39700	32300	33700
10	32300	16300	16100	17600	22300	16400	31800	37600	49000	42700	33200	33500
11	32200	16700	16200	17700	22100	16600	32000	38200	48300	35300	32500	34200
12	31800	16600	15800	17600	21100	16700	32700	39100	46500	34200	31700	34400
13	31600	16300	15800	17700	20900	16900	35900	39200	44200	34700	31400	34500
14	31300	16000	15800	17800	20800	18500	40300	36500	67200	33500	31300	35300
15	30800	15800	15700	17800	19900	18400	41400	37700	85300	33900	31500	34600
16	31100	15900	15500	18000	19400	16800	39200	37700	89200	33400	31300	34600
17	31200	15400	15400	18000	19100	16600	38100	38800	71500	31100	33000	33900
18	31300	15500	15800	17900	18900	17200	37100	42500	53000	32300	31600	33900
19	31400	15400	14700	17600	22600	17400	36600	45000	46000	31600	31400	33900
20	32000	15300	15500	17500	24300	17400	36200	43500	42100	30100	30900	33100
21	32400	15400	13500	17400	24100	16500	36200	43200	42700	32200	30300	32800
22	32800	14700	10800	17400	24100	16100	36100	43500	42300	32200	30200	32400
23	32800	15100	6080	17100	25600	16200	36500	41200	41700	30300	30500	31800
24	32600	14900	5200	17100	24400	17000	36500	41700	42600	31000	30600	32100
25	32500	14700	5580	18700	24700	18000	35600	41400	40400	31300	30600	32300
26	32200	15000	8070	19400	22800	17900	34800	39900	37700	30300	30500	32500
27	31600	14800	11800	19000	20500	18400	36500	42600	39400	30500	31200	32700
28	30800	14900	16000	18000	20500	20600	39300	43400	38800	30600	31300	32400
29	29200	14700	17400	18100	---	24500	36200	42000	36400	29900	31000	32800
30	26700	13900	16800	18400	---	27300	35400	45100	37800	31100	31000	32900
31	24200	---	16400	18300	---	29600	---	41700	---	31500	31700	---
TOTAL	979400	487700	434330	557200	590300	590500	1043200	1234900	1555700	1035400	967200	996700
MEAN	31590	16260	14010	17970	21080	19050	34770	39840	51860	33400	31200	33220
MAX	33100	22100	17400	19500	25600	29600	41400	45100	89200	42700	33200	35300
MIN	24200	13900	5200	15900	17900	16100	30000	35000	36400	29900	30200	31500
AC-FT	1943000	967400	861500	1105000	1171000	1171000	2069000	2449000	3086000	2054000	1918000	1977000

CAL YR 1990 TOTAL 10132130 MEAN 27760 MAX 114000 MIN 5200 AC-FT 20100000
WTR YR 1991 TOTAL 10472530 MEAN 28690 MAX 89200 MIN 5200 AC-FT 20770000

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.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)
OCT 1990					MAY 1991				
02...	1215	32900	18.0	800	10...	0915	37700	17.0	710
05...	1300	32900	19.0	840	13...	0945	39800	19.0	760
09...	1000	32800	14.0	750	16...	0800	38000	21.0	710
12...	1010	31700	15.0	695	21...	1000	42900	16.0	660
16...	0845	30900	13.0	780	24...	1130	41600	22.0	675
19...	0930	31400	11.0	775	28...	1305	42300	24.0	650
22...	1215	32900	10.5	673	31...	1030	41500	24.0	720
25...	1430	32500	10.5	800	JUN				
29...	1230	29100	11.0	800	10...	1200	48900	22.0	625
NOV					14...	0835	59800	25.0	620
07...	1020	17400	6.5	700	18...	0930	52800	25.0	620
13...	1220	16300	8.0	800	20...	1015	43400	24.0	636
19...	1210	15200	8.0	790	24...	0940	41300	23.0	740
28...	1300	14900	3.5	750	27...	1100	38600	26.0	725
DEC					JUL				
05...	1310	14000	1.5	800	01...	0925	37700	29.0	725
11...	1200	16300	5.0	780	03...	1015	37700	27.0	650
JAN 1991					09...	0905	37500	23.0	500
15...	1250	17800	0.0	1000	12...	0935	32800	24.0	625
23...	1255	17100	0.0	755	14...	1325	28500	26.0	670
FEB					15...	0915	32900	25.0	600
04...	1000	18700	1.0	850	22...	0950	30600	28.0	620
12...	0920	21100	1.0	595	25...	1015	30400	27.0	679
22...	1030	23700	3.0	610	30...	0935	29800	24.0	700
MAR					AUG				
07...	0825	18000	3.0	780	02...	1020	29200	27.0	645
12...	0915	16800	8.0	780	09...	1045	31200	22.0	680
18...	1305	17100	8.0	582	15...	1010	30900	25.0	625
29...	0930	24000	9.0	780	22...	1000	30100	25.0	695
APR					27...	0930	30200	26.0	750
02...	1025	31400	10.0	600	30...	1000	29700	26.0	725
05...	0855	30200	13.0	710	SEP				
09...	1000	31900	12.0	765	03...	1005	31200	26.0	760
16...	0915	39400	10.0	675	06...	0850	32900	24.0	770
19...	0930	36600	10.0	750	09...	1015	33700	24.0	750
22...	1305	36000	11.0	740	13...	0955	32500	26.0	750
26...	0850	33000	13.0	720	17...	0900	32200	22.0	630
30...	0945	35500	13.0	700	20...	1015	32600	12.0	700
MAY					24...	0915	32000	16.0	630
03...	0930	36400	14.0	680	27...	0935	33200	15.0	775

06807000 MISSOURI RIVER AT NEBRASKA CITY, NE--Continued

WATER-QUALITY RECORDS

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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, 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)
APR												
09...		WATER TEMPERATURE, 12.0°C (1015-1315); DISCHARGE, 31,900 ft ³ /s.										
09...	1015	120	16.0	3.70	4.37	375	--	88	94	100	--	--
09...	1018	120	--	8.00	4.04	318	--	84	91	99	100	--
09...	1021	120	--	11.4	3.61	432	--	79	84	97	100	--
09...	1024	120	--	13.3	3.07	516	--	70	76	88	100	--
09...	1026	120	--	14.4	2.96	529	--	68	75	89	100	--
09...	1028	120	--	15.1	1.98	729	--	40	43	57	99	100
09...	1030	120	--	--	--	567	--	63	68	81	100	--
09...	1050	205	13.8	3.20	4.04	466	--	78	85	99	100	--
09...	1054	205	--	6.90	4.04	537	--	63	73	99	100	--
09...	1056	205	--	9.90	4.14	649	--	55	63	96	100	--
09...	1058	205	--	11.5	4.37	590	--	55	64	98	100	--
09...	1100	205	--	12.4	3.72	587	--	58	68	97	100	--
09...	1110	205	--	13.0	3.72	677	--	51	59	92	100	--
09...	1120	205	--	--	--	535	--	64	73	99	100	--
09...	1135	310	13.4	3.10	5.02	--	--	--	--	--	--	--
09...	1137	310	--	6.70	4.80	--	--	--	--	--	--	--
09...	1140	310	--	9.60	3.61	--	--	--	--	--	--	--
09...	1148	310	--	11.2	3.18	--	--	--	--	--	--	--
09...	1150	310	--	12.1	2.96	--	--	--	--	--	--	--
09...	1155	310	--	12.6	2.96	--	--	--	--	--	--	--
09...	1200	310	--	--	--	773	--	51	61	98	100	--
09...	1205	310	--	--	--	901	9	28	--	--	--	--
09...	1210	405	12.2	2.80	4.70	472	--	74	83	99	100	--
09...	1213	405	--	6.10	4.37	437	--	75	83	98	100	--
09...	1215	405	--	8.70	3.72	469	--	69	77	98	100	--
09...	1220	405	--	10.2	3.28	476	--	68	77	99	100	--
09...	1225	405	--	11.0	2.96	507	--	64	73	98	100	--
09...	1230	405	--	--	--	420	--	80	87	99	100	--
09...	1245	565	13.4	3.10	4.04	318	--	93	98	100	--	--
09...	1250	565	--	6.70	3.50	315	--	95	99	100	--	--
09...	1255	565	--	9.60	3.18	349	--	91	97	100	--	--
09...	1300	565	--	11.2	2.74	342	--	91	97	100	--	--
09...	1305	565	--	12.1	2.31	414	--	81	88	95	100	--
09...	1310	565	--	12.6	2.42	376	--	77	84	95	99	100
09...	1315	565	--	--	--	306	--	93	98	100	--	--
MAY												
21...		WATER TEMPERATURE, 1.0°C (1010-1250); DISCHARGE, 42,900 ft ³ /s.										
21...	1010	110	18.4	4.30	4.93	1090	--	99	100	--	--	--
21...	1013	110	--	9.20	4.70	1140	--	96	98	100	--	--
21...	1016	110	--	13.1	4.04	1160	--	96	98	100	--	--
21...	1018	110	--	15.3	3.37	1240	--	93	95	99	100	--
21...	1020	110	--	16.6	2.63	1250	--	92	94	99	100	--
21...	1025	110	--	17.3	2.42	1290	--	89	92	97	99	100
21...	1030	110	--	--	--	1160	--	94	97	100	--	--
21...	1050	225	16.0	3.70	6.24	1300	--	89	92	100	--	--
21...	1053	225	--	8.00	5.76	1350	--	84	87	98	100	--
21...	1055	225	--	11.4	5.19	1670	--	71	75	97	100	--
21...	1058	225	--	13.3	4.41	1510	--	74	79	98	100	--
21...	1102	225	--	14.4	4.39	1580	--	73	78	98	100	--
21...	1107	225	--	15.1	4.24	1770	--	67	71	94	100	--
21...	1110	225	--	--	--	1360	--	85	89	100	--	--
21...	1120	305	14.0	3.20	6.41	--	--	--	--	--	--	--
21...	1123	305	--	7.00	6.21	--	--	--	--	--	--	--
21...	1125	305	--	10.0	5.82	--	--	--	--	--	--	--
21...	1130	305	--	11.7	5.48	--	--	--	--	--	--	--
21...	1132	305	--	12.6	4.80	--	--	--	--	--	--	--
21...	1135	305	--	13.2	4.37	--	--	--	--	--	--	--
21...	1140	305	--	--	--	1760	--	70	73	91	100	--
21...	1150	305	--	--	--	1700	33	65	--	--	--	--
21...	1155	405	15.6	3.60	4.72	1220	--	95	97	100	--	--
21...	1157	405	--	7.80	4.33	1340	--	90	93	99	100	--
21...	1200	405	--	11.1	3.81	1450	--	84	87	99	100	--
21...	1203	405	--	13.0	3.74	1550	--	80	83	96	100	--
21...	1207	405	--	14.0	3.31	1630	--	76	79	92	100	--
21...	1210	405	--	14.7	3.20	1840	--	70	73	89	100	--
21...	1215	405	--	--	--	1410	--	89	91	99	100	--
21...	1230	560	15.0	3.50	4.41	1230	--	99	99	100	--	--
21...	1233	560	--	7.50	3.98	1350	--	98	99	100	--	--
21...	1235	560	--	10.7	3.44	1340	--	97	99	100	--	--
21...	1238	560	--	12.5	3.11	1330	--	98	99	100	--	--
21...	1242	560	--	13.5	2.96	1350	--	97	98	100	--	--
21...	1245	560	--	14.1	2.96	1330	--	96	97	99	100	--
21...	1250	560	--	--	--	1280	--	98	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 1990 TO SEPTEMBER 1991

DATE	TIME	SAMPLE LOC- ATION, CROSS SECTION (FT FM L BANK) (000009)	DEPTH AT SAMPLE LOCATION, 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)
JUN											
20..		WATER TEMPERATURE, 24.0°C (1025-1310); DISCHARGE, 30,000 ft ³ /s.									
20..	1025	120	20.4	4.70	5.24	1100	--	89	90	91	100
20..	1028	120	--	10.2	4.91	1030	--	95	98	99	100
20..	1031	120	--	14.6	4.04	1080	--	92	95	100	--
20..	1034	120	--	17.0	3.72	1090	--	91	94	99	100
20..	1037	120	--	18.4	2.96	1170	--	90	93	99	100
20..	1040	120	--	19.2	2.74	1240	--	86	90	98	100
20..	1045	120	--	--	--	1020	--	94	97	100	--
20..	1100	200	17.4	4.00	5.35	1080	--	94	97	100	--
20..	1103	200	--	8.70	5.13	1110	--	92	95	100	--
20..	1106	200	--	12.4	4.17	1170	--	86	90	98	100
20..	1109	200	--	14.5	4.07	1260	--	82	86	97	100
20..	1112	200	--	15.7	3.83	1360	--	79	83	95	100
20..	1115	200	--	16.4	3.63	1340	--	78	82	95	100
20..	1120	200	--	--	--	1150	--	89	92	99	100
20..	1130	300	15.8	3.70	5.13	--	--	--	--	--	--
20..	1134	300	--	7.90	4.80	--	--	--	--	--	--
20..	1138	300	--	11.3	4.59	--	--	--	--	--	--
20..	1142	300	--	13.2	4.07	--	--	--	--	--	--
20..	1146	300	--	14.2	3.94	--	--	--	--	--	--
20..	1150	300	--	14.9	3.94	--	--	--	--	--	--
20..	1155	300	--	--	--	1170	--	87	91	98	100
20..	1205	300	--	--	--	1280	30	78	--	--	--
20..	1210	425	15.0	3.50	4.93	1120	--	89	92	99	100
20..	1213	425	--	7.50	4.48	1150	--	89	92	99	100
20..	1216	425	--	10.7	4.37	1220	--	84	88	99	100
20..	1219	425	--	12.5	3.61	1290	--	82	86	99	100
20..	1222	425	--	13.5	3.57	1310	--	81	84	99	100
20..	1225	425	--	14.1	3.39	1490	--	70	73	96	100
20..	1230	425	--	--	--	1110	--	90	92	99	100
20..	1250	560	15.0	3.50	4.76	979	--	97	99	100	--
20..	1253	560	--	7.50	4.00	1010	--	96	98	100	--
20..	1256	560	--	10.7	3.68	1040	--	95	97	100	--
20..	1259	560	--	12.5	3.28	1000	--	95	97	99	100
20..	1302	560	--	13.5	3.07	1020	--	94	97	100	--
20..	1305	560	--	14.1	2.81	1060	--	93	96	99	100
20..	1310	560	--	--	--	980	--	95	98	100	--
AUG											
06..		WATER TEMPERATURE, 23.0°C (1025-1400); DISCHARGE, 30,600 ft ³ /s.									
06..	1025	120	14.0	3.20	4.70	224	--	91	97	100	--
06..	1030	120	--	7.00	4.70	283	--	76	83	98	100
06..	1035	120	--	10.0	4.26	257	--	66	74	95	100
06..	1040	120	--	11.7	4.04	437	--	54	59	92	100
06..	1045	120	--	12.6	3.61	387	--	52	62	89	100
06..	1050	120	--	13.2	3.28	400	--	9	20	70	100
06..	1055	120	--	--	--	250	--	68	76	97	100
06..	1110	225	12.4	2.90	4.37	289	--	68	79	100	--
06..	1115	225	--	6.20	4.48	416	--	48	63	98	100
06..	1120	225	--	8.90	3.94	480	--	40	57	97	100
06..	1125	225	--	10.3	3.61	485	--	42	59	98	100
06..	1130	225	--	11.2	3.72	592	--	35	49	97	100
06..	1135	225	--	--	--	467	--	56	70	99	100
06..	1140	350	--	--	--	411	10	30	--	--	--
06..	1145	350	13.0	3.00	4.48	--	--	--	--	--	--
06..	1150	350	--	6.50	4.15	--	--	--	--	--	--
06..	1155	350	--	9.30	4.04	--	--	--	--	--	--
06..	1200	350	--	10.8	3.50	--	--	--	--	--	--
06..	1205	350	--	11.7	3.72	--	--	--	--	--	--
06..	1210	350	--	12.2	3.28	--	--	--	--	--	--
06..	1215	350	--	--	--	303	--	64	77	95	100
06..	1220	450	12.6	2.90	4.49	214	--	87	95	98	100
06..	1225	450	--	6.30	4.37	952	--	94	97	99	100
06..	1230	450	--	9.00	4.14	527	--	85	92	99	100
06..	1235	450	--	10.5	4.15	310	--	64	76	94	100
06..	1240	450	--	11.3	3.18	345	--	64	73	92	100
06..	1245	450	--	--	--	445	--	83	88	97	100
06..	1303	600	14.4	3.30	3.61	180	--	96	98	100	--
06..	1308	600	--	7.20	3.28	189	--	96	99	100	--
06..	1313	600	--	10.3	2.85	201	--	94	99	100	--
06..	1318	600	--	12.0	2.85	173	--	92	97	100	--
06..	1323	600	--	13.0	2.63	202	--	93	97	100	--
06..	1328	600	--	13.6	2.31	238	--	92	97	100	--
06..	1333	600	--	--	--	197	--	95	98	99	100

06807000 MISSOURI RIVER AT NEBRASKA CITY, NE--Continued

WATER-QUALITY RECORDS

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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)
SEP												
24...		WATER TEMPERATURE, 16.0°C (1020-1310); DISCHARGE, 32,000 ft ³ /s.										
24...	1020	125	15.8	3.70	3.94	5730	--	99	99	100	--	--
24...	1024	125	--	7.90	3.72	264	--	66	76	95	100	--
24...	1028	125	--	11.3	3.50	323	--	47	57	85	100	--
24...	1032	125	--	13.2	3.28	365	--	53	61	81	100	--
24...	1036	125	--	14.2	3.07	610	--	28	34	51	99	100
24...	1040	125	--	14.9	2.74	571	--	33	41	62	100	--
24...	1045	125	--	--	--	230	--	54	65	89	100	--
24...	1100	225	15.6	3.60	4.91	275	--	46	60	98	100	--
24...	1104	225	--	7.80	4.59	534	--	39	52	97	100	--
24...	1108	225	--	11.1	4.26	473	--	44	57	97	100	--
24...	1112	225	--	13.0	3.94	697	--	25	38	92	100	--
24...	1116	225	--	14.0	3.72	635	--	32	45	94	100	--
24...	1120	225	--	14.7	3.07	971	--	15	25	91	100	--
24...	1125	225	--	--	--	506	--	29	43	90	100	--
24...	1140	310	13.6	3.10	5.24	--	--	--	--	--	--	--
24...	1143	310	--	6.80	4.70	--	--	--	--	--	--	--
24...	1147	310	--	9.70	4.59	--	--	--	--	--	--	--
24...	1150	310	--	11.3	4.15	--	--	--	--	--	--	--
24...	1153	310	--	12.2	3.50	--	--	--	--	--	--	--
24...	1157	310	--	12.8	1.87	--	--	--	--	--	--	--
24...	1200	310	--	--	--	742	--	45	57	98	100	--
24...	1210	310	--	--	--	635	6	16	--	--	--	--
24...	1215	410	13.0	3.00	4.70	268	--	75	84	100	--	--
24...	1218	410	--	6.50	3.72	254	--	69	79	96	100	--
24...	1222	410	--	9.30	3.28	403	--	46	58	90	100	--
24...	1225	410	--	10.8	2.96	478	--	41	52	82	100	--
24...	1229	410	--	11.7	2.85	490	--	38	48	81	100	--
24...	1232	410	--	12.2	2.53	413	--	30	47	83	100	--
24...	1235	410	--	--	--	372	--	50	61	93	--	--
24...	1255	570	13.0	3.00	3.94	191	--	94	98	100	--	--
24...	1257	570	--	6.50	3.50	186	--	88	95	100	--	--
24...	1300	570	--	9.30	3.50	171	--	86	94	100	--	--
24...	1305	570	--	11.7	3.07	158	--	80	88	96	100	--
24...	1307	570	--	12.2	2.85	182	--	73	85	96	100	--
24...	1310	570	--	--	--	146	--	87	94	100	--	--

PARTICLE-SIZE DISTRIBUTION OF SURFACE BED-MATERIAL, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	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)
APR											
09...	1039	31900	3	0	11	52	73	86	97	99	100
MAY											
21...	1035	42900	5	0	19	51	70	88	97	100	--
JUN											
20...	1046	43400	5	0	10	41	73	90	97	100	--
AUG											
06...	1340	30600	5	0	18	61	84	97	100	--	--
SEP											
24...	1320	32000	5	0	1	70	86	95	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 mi².

PERIOD OF RECORD.--October 1959 to current year.

GAGE.--Water-stage encoder. 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. 3-11, Dec. 19 to Feb. 10, and Feb. 14-27. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--32 years, 299 ft³/s, 6.67 in/yr, 216,600 acre-ft/yr; median of yearly mean discharges, 260 ft³/s, 5.8 in/yr, 188,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 26,400 ft³/s Sept. 13, 1972, gage height, 22.12 ft; minimum daily discharge, 2.2 ft³/s Feb. 8, 9, 1971.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
June 14	0400	*7,870	*12.68	No other peak greater than base discharge.			

Minimum daily discharge, 40 ft³/s Dec. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	153	153	159	75	110	589	337	689	1500	526	230	127
2	151	154	144	60	160	2010	318	637	1350	508	210	123
3	177	159	105	52	190	617	304	640	888	479	207	121
4	198	184	90	54	220	418	293	701	1150	462	202	119
5	166	183	125	58	240	362	283	802	1370	450	199	113
6	154	169	155	56	260	330	270	1290	865	433	200	112
7	148	167	140	52	280	269	257	950	765	418	238	114
8	146	163	145	70	300	243	267	857	709	398	411	180
9	152	169	150	68	350	230	367	803	689	469	314	163
10	154	172	160	66	450	214	301	757	668	452	244	128
11	153	171	170	72	795	213	290	721	711	477	226	143
12	152	167	191	70	605	217	359	689	605	438	217	159
13	150	163	173	68	532	231	1010	703	573	401	217	184
14	154	163	155	76	400	200	2100	648	3730	381	191	221
15	156	161	175	84	290	211	1840	614	2100	367	177	181
16	156	158	158	83	330	209	1430	641	1790	352	181	141
17	156	153	164	82	380	225	1190	861	1160	335	417	125
18	154	153	157	94	320	295	1080	1140	999	320	262	115
19	155	156	110	120	400	315	1330	764	893	306	198	112
20	157	156	80	100	500	299	1180	724	821	299	177	114
21	163	160	50	76	470	293	1090	722	1050	307	170	115
22	166	152	40	94	430	263	997	808	1130	292	165	115
23	164	148	50	110	350	334	934	701	826	280	158	112
24	157	147	60	90	320	459	838	663	765	274	156	111
25	153	147	50	74	290	351	780	625	721	262	155	110
26	154	149	54	58	270	317	765	627	684	247	148	109
27	155	151	63	70	250	477	953	590	643	239	140	103
28	150	143	82	95	323	780	910	560	606	237	132	105
29	151	138	52	86	---	479	796	561	577	241	129	104
30	152	156	58	68	---	399	780	760	548	234	154	102
31	152	---	68	84	---	364	---	622	---	234	139	---
TOTAL	4859	4765	3533	2365	9815	12213	23649	22870	30886	11118	6364	3881
MEAN	157	159	114	76.3	351	394	788	738	1030	359	205	129
MAX	198	184	191	120	795	2010	2100	1290	3730	526	417	221
MIN	146	138	40	52	110	200	257	560	548	234	129	102
AC-FT	9640	9450	7010	4690	19470	24220	46910	45360	61260	22050	12620	7700
CFSM	.26	.26	.19	.13	.58	.65	1.29	1.21	1.69	.59	.34	.21
IN.	.30	.29	.22	.14	.60	.75	1.44	1.40	1.89	.68	.39	.24

CAL YR 1990	TOTAL 131501	MEAN 360	MAX 11700	MIN 40	AC-FT 260800	CFSM .59	IN. 8.03
WTR YR 1991	TOTAL 136318	MEAN 373	MAX 3730	MIN 40	AC-FT 270400	CFSM .61	IN. 8.33

NISHNABOTNA RIVER BASIN

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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 mi².

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 encoder. Datum of gage is 932.99 ft above NGVD, unadjusted. Prior to Aug. 26, 1955, nonrecording 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: Dec. 19 to Feb. 9, Feb. 15, 16, Apr. 18-26, and May 13-17. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service Limited Automatic Remote Collector at station.

AVERAGE DISCHARGE.--43 years, 593 ft³/s, 6.07 in/yr, 429,600 acre-ft/yr; median of yearly mean discharges, 530 ft³/s, 5.4 in/yr, 384,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 40,800 ft³/s May 26, 1987, gage height, 24.50 ft, from rating curve extended above 35,800 ft³/s; maximum gage height, 24.8 ft Mar. 5, 1949, from graph based on gage readings, backwater from ice; minimum daily discharge, 10 ft³/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 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
June 2	0600	10,600	19.67	June 14	1730	*17,000	*21.61
June 5	2000	9,870	19.30				

Minimum daily discharge, 72 ft³/s Dec. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	277	224	211	130	190	599	659	1090	1750	1010	452	358
2	278	227	222	100	290	2500	628	1010	6660	978	441	284
3	362	244	206	86	380	1860	601	1030	2040	942	419	269
4	377	288	180	90	420	824	581	1070	1640	908	408	248
5	338	275	205	100	460	718	564	1170	4930	889	423	240
6	298	271	208	93	520	628	544	1310	3220	870	432	232
7	268	266	214	84	660	558	526	1490	1720	834	409	234
8	261	257	223	120	900	493	516	1260	1490	799	575	484
9	261	255	240	115	1200	453	554	1200	1400	1080	777	359
10	264	253	240	110	1630	431	636	1150	1430	1200	538	295
11	268	251	244	120	1330	424	591	1120	1330	1030	431	263
12	266	244	252	120	1180	444	710	1090	1270	993	393	266
13	262	236	252	115	1020	536	1030	1110	1150	898	382	271
14	256	232	242	125	851	503	2480	1120	9070	812	379	270
15	250	228	231	140	450	451	3380	1070	4450	776	362	384
16	246	226	233	140	750	450	2100	1050	3210	728	406	322
17	243	221	243	135	704	571	1790	1770	2060	696	1040	247
18	235	218	234	150	598	691	1730	1580	1700	664	664	226
19	240	218	210	200	751	708	1660	1500	1530	639	515	218
20	238	222	140	190	863	695	1740	1250	1410	614	407	216
21	247	224	88	110	850	659	1610	1220	1590	735	379	221
22	251	219	72	140	781	630	1500	1220	2440	659	361	220
23	249	212	83	170	830	627	1410	1270	1660	587	349	222
24	240	210	94	150	670	703	1300	1130	1430	561	342	221
25	245	206	82	120	592	809	1220	1060	1350	544	332	222
26	229	206	87	86	517	692	1180	1410	1270	518	317	219
27	225	224	100	100	460	661	1150	1060	1190	496	301	227
28	222	218	140	150	504	806	1280	979	1120	484	285	224
29	219	205	100	130	---	974	1210	935	1070	479	276	218
30	219	208	80	95	---	770	1130	2060	1030	473	277	206
31	222	---	105	120	---	703	---	1160	---	466	779	---
TOTAL	8056	6988	5461	3834	20351	22571	36010	37944	67610	23362	13851	7886
MEAN	260	233	176	124	727	728	1200	1224	2254	754	447	263
MAX	377	288	252	200	1630	2500	3380	2060	9070	1200	1040	484
MIN	219	205	72	84	190	424	516	935	1030	466	276	206
AC-FT	15980	13860	10830	7600	40370	44770	71430	75260	134100	46340	27470	15640
CFSM	.20	.18	.13	.09	.55	.55	.91	.92	1.70	.57	.34	.20
IN.	.23	.20	.15	.11	.57	.63	1.01	1.06	1.90	.66	.39	.22

CAL YR 1990 TOTAL 246072 MEAN 674 MAX 20200 MIN 72 AC-FT 488100 CFSM .51 IN. 6.90
WTR YR 1991 TOTAL 253924 MEAN 696 MAX 9070 MIN 72 AC-FT 503700 CFSM .52 IN. 7.12

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 mi².

PERIOD OF RECORD.--October 1960 to current year.

GAGE.--Water-stage encoder. 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. 3-9, Dec. 18 to Feb. 9, Feb. 15-21, and Aug. 26-29. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--31 years, 227 ft³/s, 7.07 in/yr, 164,500 acre-ft/yr; median of yearly mean discharges, 230 ft³/s, 7.2 in/yr, 167,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 26,700 ft³/s Sept. 12, 1972, gage height, 22.81 ft; minimum daily discharge, 2.5 ft³/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 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Apr. 14	1000	3,930	9.86	June 14	1400	*20,100	*18.39
May 30	0300	3,340	9.17	June 15	1300	4,930	10.93
June 2	0100	5,100	11.09				

Minimum daily discharge, 15 ft³/s Dec. 18.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	87	67	68	44	64	280	264	544	1670	333	134	78		
2	88	66	58	32	100	1270	258	514	2530	316	130	78		
3	117	75	32	28	140	356	252	535	1050	293	121	75		
4	119	98	40	30	170	290	241	559	805	280	116	65		
5	99	89	65	33	200	265	234	729	793	274	120	63		
6	90	80	70	30	220	236	230	809	642	263	123	64		
7	84	81	58	27	270	197	217	638	566	250	153	67		
8	85	77	68	43	350	191	215	584	525	238	308	168		
9	87	85	88	41	500	178	515	551	506	298	208	108		
10	85	82	96	39	768	169	348	511	480	286	146	83		
11	87	78	101	44	444	167	316	489	475	418	128	94		
12	84	76	108	43	256	173	535	464	450	370	125	95		
13	78	72	102	42	272	239	1080	477	452	290	118	87		
14	76	73	97	50	180	189	2580	443	16300	263	115	82		
15	76	70	104	54	120	207	1650	422	4380	246	106	119		
16	72	65	92	53	170	194	1170	456	1790	229	120	93		
17	74	63	98	51	250	282	1060	976	1150	214	161	75		
18	70	64	45	54	240	604	1550	689	836	204	116	71		
19	74	67	37	58	300	382	1560	535	695	194	105	69		
20	73	70	30	60	220	344	1360	499	608	190	95	70		
21	76	70	25	37	200	320	1160	524	580	192	92	72		
22	77	66	22	48	299	339	998	597	602	183	87	69		
23	76	65	29	62	205	644	888	506	529	170	79	65		
24	71	65	33	50	167	488	748	467	501	163	80	66		
25	69	65	27	40	153	386	681	428	474	159	79	66		
26	68	66	30	30	144	344	662	420	439	147	80	65		
27	66	71	38	35	141	353	864	388	405	142	77	64		
28	63	59	46	54	143	373	727	370	381	140	78	63		
29	65	59	30	45	---	317	651	575	363	154	72	64		
30	68	68	25	34	---	291	610	2160	346	143	208	61		
31	68	---	38	45	---	280	---	793	---	158	112	---		
TOTAL	2472	2152	1800	1336	6686	10348	23624	18652	41323	7200	3792	2359		
MEAN	79.7	71.7	58.1	43.1	239	334	787	602	1377	232	122	78.6		
MAX	119	98	108	68	768	1270	2580	2160	16300	418	308	168		
MIN	63	59	22	27	64	167	215	370	346	140	72	61		
AC-FT	4900	4270	3570	2650	13260	20530	46860	37000	81960	14280	7520	4680		
CFSM	.18	.16	.13	.10	.55	.77	1.81	1.38	3.16	.53	.28	.18		
IN.	.21	.18	.15	.11	.57	.88	2.02	1.59	3.53	.61	.32	.20		
CAL YR 1990	TOTAL	94161	MEAN	258	MAX	6500	MIN	22	AC-FT	186800	CFSM	.59	IN.	8.03
WTR YR 1991	TOTAL	121744	MEAN	334	MAX	16300	MIN	22	AC-FT	241500	CFSM	.77	IN.	10.39

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 upstream side of Coolbaugh Street and 200 ft left of left end of Coolbaugh Street bridge in Red Oak, 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.

DRAINAGE AREA.--894 mi².

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 encoder. 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. 5, Dec. 20 to Feb. 10, Feb. 15, 16, June 27 to July 12, and Aug. 21-29. Records good except those for daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service Limited Automatic Remote Collector at station.

AVERAGE DISCHARGE.--61 years (water years 1919-24, 1937-91), 399 ft³/s, 6.06 in/yr, 289,100 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 38,000 ft³/s Sept. 13, 1972, gage height, 27.43 ft; maximum gage height, 28.23 ft June 13, 1947, present datum; minimum daily discharge, 6 ft³/s Aug. 18, 1936.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Apr. 14	1930	6,660	14.50	June 2	0645	8,640	16.19
May 30	1115	5,420	13.32	June 15	0545	*22,000	*22.25

Minimum daily discharge, 35 ft³/s Dec. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	134	120	121	76	110	327	464	1030	2640	650	275	241
2	132	123	124	50	160	2390	438	939	6470	654	245	185
3	179	135	98	45	250	1200	430	927	2420	588	236	183
4	213	153	68	50	300	551	419	1070	1700	559	226	166
5	181	169	100	58	330	512	404	1220	2210	522	230	152
6	143	157	124	50	370	440	391	1820	1640	495	242	147
7	126	152	120	44	470	387	379	1330	1270	483	252	168
8	119	145	136	72	630	334	368	1170	1140	460	356	262
9	124	145	140	70	800	321	442	1080	1070	526	691	300
10	130	147	145	65	1300	293	751	993	1060	611	373	207
11	132	147	154	76	1030	279	526	937	1040	554	301	171
12	133	140	161	72	550	280	747	887	947	779	278	218
13	131	134	169	68	461	358	1510	848	877	559	270	190
14	125	128	152	78	426	387	4470	896	12800	489	255	171
15	123	127	156	85	170	317	3500	799	16700	455	249	165
16	124	123	162	86	300	333	2250	817	5210	429	256	199
17	121	117	149	84	426	367	1760	1700	3010	405	398	165
18	121	115	147	94	384	776	2410	1880	2280	384	347	145
19	119	117	123	120	522	765	2970	1270	1800	368	267	141
20	123	118	60	110	546	590	2350	1090	1360	355	231	137
21	125	122	42	60	438	546	2260	1030	1210	351	192	136
22	129	121	35	80	554	496	1850	1360	1290	337	176	137
23	131	116	50	105	459	946	1650	1110	1170	322	169	134
24	128	115	56	86	339	1000	1460	1040	1070	302	188	129
25	121	113	44	66	289	710	1300	970	1000	291	176	127
26	118	114	48	48	242	613	1240	907	933	276	161	125
27	118	121	60	58	251	563	1300	834	869	264	158	123
28	117	121	82	90	250	625	1440	773	792	259	157	119
29	116	114	50	78	---	569	1190	747	739	257	151	116
30	118	114	40	52	---	509	1140	3810	690	264	154	112
31	120	---	60	70	---	480	---	2110	---	256	721	---
TOTAL	4074	3883	3176	2246	12357	18264	41809	37394	77407	13504	8381	4971
MEAN	131	129	102	72.5	441	589	1394	1206	2580	436	270	166
MAX	213	169	169	120	1300	2390	4470	3810	16700	779	721	300
MIN	116	113	35	44	110	279	368	747	690	256	151	112
AC-FT	8080	7700	6300	4450	24510	36230	82930	74170	153500	26790	16620	9860
CFSM	.15	.14	.11	.08	.49	.66	1.56	1.35	2.89	.49	.30	.19
IN.	.17	.16	.13	.09	.51	.76	1.74	1.56	3.22	.56	.35	.21

CAL YR 1990	TOTAL 159450	MEAN 437	MAX 10900	MIN 35	AC-FT 316300	CFSM .49	IN. 6.63
WTR YR 1991	TOTAL 227466	MEAN 623	MAX 16700	MIN 35	AC-FT 451200	CFSM .70	IN. 9.47

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 mi².

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 encoder. 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: Dec. 4 and Dec. 21 to Feb. 20. 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--64 years (water years 1923, 1929-91), 1,131 ft³/s, 5.47 in/yr, 819,400 acre-ft/yr; median of yearly mean discharges, 960 ft³/s, 4.6 in/yr, 696,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 55,500 ft³/s June 24, 1947, gage height, 26.03 ft, from flood-mark, present site and datum; maximum gage height, 28.27 ft Sept. 10, 1989; minimum daily discharge, 4.5 ft³/s Aug. 30, 1934.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 9,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Apr. 14	2230	9,640	20.02	June 6	0045	15,400	22.74
June 2	1230	19,900	24.42	June 15	0100	*27,300	*26.75

Minimum daily discharge, 200 ft³/s Dec. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	531	416	415	290	430	943	1280	2500	3070	2130	906	1220
2	506	422	426	250	600	2480	1230	2330	15300	2060	898	651
3	662	463	410	240	700	4410	1170	2280	7270	1960	830	541
4	778	657	300	250	850	2040	1150	2320	4110	1860	804	508
5	684	576	335	270	960	1490	1110	2640	6300	1810	825	471
6	633	563	397	240	1100	1350	1070	2930	8810	1760	862	443
7	520	537	426	230	1900	1190	1050	3360	3700	1690	831	444
8	475	514	440	280	2200	1090	1020	2820	3150	1610	892	795
9	465	523	466	280	2600	991	1020	2630	2930	3070	1300	818
10	489	515	484	270	2800	955	1180	2490	2910	2460	1400	739
11	498	510	495	290	2900	907	1410	2370	2880	2110	986	576
12	488	496	508	280	2700	910	1350	2300	2710	1960	837	518
13	493	478	513	280	2300	1050	2070	2220	2480	2050	774	553
14	482	472	505	290	2100	1100	4810	2190	12800	1750	747	532
15	461	462	491	320	1500	1050	8760	2190	23300	1620	713	558
16	443	441	478	330	1700	991	5190	2090	18000	1540	674	576
17	431	429	504	330	1700	1240	3970	3160	10100	1460	1210	522
18	453	426	493	350	1600	1470	3840	3810	5490	1390	1090	460
19	443	422	467	440	1800	1780	4480	3530	4460	1320	926	423
20	429	436	371	450	2100	1690	4480	2750	3910	1260	719	416
21	451	439	250	300	1570	1510	4060	2600	3590	1440	648	411
22	475	426	200	350	1310	1430	3750	2560	4880	1410	611	401
23	475	415	250	400	1440	1390	3430	2840	3830	1230	587	395
24	466	414	270	380	1200	1810	3180	2520	3360	1130	568	392
25	432	438	240	320	1000	1860	2940	2410	3130	1080	552	382
26	431	479	240	250	925	1590	2780	2600	2910	1030	522	375
27	422	501	270	290	789	1510	2750	2360	2690	985	487	380
28	406	462	330	320	822	1420	2840	2150	2480	948	463	376
29	413	427	280	310	---	1800	2880	2040	2330	938	441	365
30	394	414	220	260	---	1500	2600	3580	2210	925	427	357
31	405	---	260	290	---	1370	---	4880	---	937	935	---
TOTAL	15134	14173	11734	9430	43596	46317	82850	83450	175090	48923	24465	15598
MEAN	488	472	379	304	1557	1494	2762	2692	5836	1578	789	520
MAX	778	657	513	450	2900	4410	8760	4880	23300	3070	1400	1220
MIN	394	414	200	230	430	907	1020	2040	2210	925	427	357
AC-FT	30020	28110	23270	18700	86470	91870	164300	165500	347300	97040	48530	30940
CFSM	.17	.17	.13	.11	.55	.53	.98	.96	2.08	.56	.28	.19
IN.	.20	.19	.16	.13	.58	.61	1.10	1.11	2.32	.65	.32	.21

CAL YR 1990	TOTAL 553345	MEAN 1516	MAX 28700	MIN 154	AC-FT 1098000	CFSM .54	IN. 7.34
WTR YR 1991	TOTAL 570760	MEAN 1564	MAX 23300	MIN 200	AC-FT 1132000	CFSM .56	IN. 7.57

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 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPECIFIC CONDUCTANCE (US/CM) (00095)	PH (STANDARD UNITS) (00400)	TEMPERATURE WATER (DEG C) (00010)	TEMPERATURE AIR (DEG C) (00020)	TURBIDITY (NTU) (00076)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATURATION) (00301)	BAROMETRIC PRESSURE (MM HG) (00025)	COLIFORM, FECAL, UM-MF (COLS./100 ML) (31625)	STREPTOCOCCI, FECAL, KF AGAR (COLS. PER 100 ML) (31673)
OCT 25...	1130	432	555	7.8	8.5	15.0	6.5	5.2	46	743	62	56
NOV 29...	1230	429	520	8.5	1.0	4.0	4.1	13.6	97	749	800	530
MAR 05...	1100	1500	425	7.6	3.0	13.0	310	11.9	93	723	2700	3600
MAY 08...	0900	2800	470	8.2	13.0	19.0	190	9.3	91	739	20000	26000
JUN 26...	1200	3180	510	8.0	24.0	32.0	150	7.2	89	733	3600	3300
AUG 21...	0930	651	518	8.3	21.5	18.5	93	7.6	90	735	4400	2000

DATE	HARDNESS TOTAL (MG/L AS CaCO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS Ca) (00915)	MAGNESIUM, DIS-SOLVED (MG/L AS Mg) (00925)	SODIUM, DIS-SOLVED (MG/L AS Na) (00930)	SODIUM PERCENT (00932)	SODIUM ADSORPTION RATIO (00931)	POTASSIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKALINITY, WAT DIS TOT IT FIELD (MG/L AS CaCO3) (39086)	CARBONATE WATER DIS IT FIELD (MG/L AS CO3) (00452)	BICARBONATE WATER DIS IT FIELD (MG/L AS HCO3) (00453)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLORIDE, DIS-SOLVED (MG/L AS Cl) (00940)
OCT 25...	300	80	24	12	8	0.3	3.2	223	0	272	38	13
NOV 29...	290	77	23	14	10	0.4	2.4	238	0	291	39	16
MAR 05...	170	48	13	11	12	0.4	6.2	132	0	161	27	14
MAY 08...	230	63	18	9.8	8	0.3	3.2	170	0	208	33	16
JUN 26...	260	71	19	9.3	7	0.3	3.2	192	0	234	33	13
AUG 21...	270	75	21	11	8	0.3	4.1	229	0	280	43	17

DATE	FLUORIDE, 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 CONSTITUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITROGEN, ORGANIC TOTAL (MG/L AS N) (00605)	NITROGEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITROGEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITROGEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	NITROGEN, AMMONIA TOTAL (MG/L AS N) (00610)
OCT 25...	0.30	13	346	334	0.47	404	--	3.50	0.020	0.020	<0.010
NOV 29...	0.30	11	319	339	0.43	369	0.71	2.90	0.010	0.090	0.090
MAR 05...	0.30	12	231	245	0.31	936	2.7	7.30	0.050	0.730	0.730
MAY 08...	0.40	14	292	304	0.40	2210	1.2	9.80	0.030	0.030	0.040
JUN 26...	0.40	16	303	321	0.41	2600	--	9.20	0.030	0.020	<0.010
AUG 21...	0.40	16	316	348	0.43	555	1.2	5.00	0.010	0.030	0.020

NISHNABOTNA RIVER BASIN

06810000 NISHNABOTNA RIVER ABOVE HAMBURG, IA--Continued

WATER-QUALITY RECORDS

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	NITRO- GEN, AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS 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)
OCT 25...	0.60	0.090	0.090	0.110	50	58	61	2	<10	150	0.5
NOV 29...	0.80	0.080	0.060	0.130	45	52	56	--	--	--	--
MAR 05...	3.4	0.080	0.100	0.730	--	--	--	<1	50	210	<0.5
MAY 08...	1.2	0.110	0.130	0.700	1560	11800	92	2	20	170	<0.5
JUN 26...	0.90	0.140	0.150	0.480	917	7870	91	--	--	--	--
AUG 21...	1.2	0.170	0.210	0.480	343	603	97	4	<10	160	<0.5

DATE	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)	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)
OCT 25...	<1.0	<1	<3	2	17	1	15	37	0.2	<10	2
NOV 29...	--	--	--	--	--	--	--	--	--	--	--
MAR 05...	2.0	<1	<3	6	96	1	9	33	0.2	<10	4
MAY 08...	<1.0	<1	<3	2	7	<1	10	4	<0.1	<10	2
JUN 26...	--	--	--	--	--	--	--	--	--	--	--
AUG 21...	<1.0	<1	<3	3	18	<1	9	6	<0.1	<10	2

DATE	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)	ATRA- ZINE, TOTAL (UG/L) (39630)	CYAN- AZINE TOTAL (UG/L) (81757)	METRI- BUZIN IN WHOLE WATER (UG/L) (81408)	ALA- CHLOR TOTAL RECOVER (UG/L) (77825)	METOLA- CHLOR IN WHOLE WATER (UG/L) (39356)	TRI- FLURA- LIN TOTAL RECOVER (UG/L) (39030)
OCT 25...	2	<1.0	280	<6	<3	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
NOV 29...	--	--	--	--	--	--	--	--	--	--	--
MAR 05...	3	<1.0	160	<6	120	0.48	<0.10	<0.10	<0.10	<0.10	<0.10
MAY 08...	3	<1.0	210	<6	46	--	--	--	--	--	--
JUN 26...	--	--	--	--	--	2.0	0.57	<0.10	<0.10	0.77	<0.10
AUG 21...	3	<1.0	250	<6	8	--	--	--	--	--	--

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 mi².

PERIOD OF RECORD.--October 1957 to September 1991 (discontinued). Annual maximum, water years 1952-57.

REVISED RECORDS.--WSP 1919: 1960 (M).

GAGE.--Water-stage recorder and concrete and wood control. Datum of gage is 1,104.67 ft above NGVD.

REMARKS.--Estimated daily discharges: Nov. 8 to Dec. 16, Dec. 20 to Feb. 2, Feb. 13-22, and July 25 to Aug. 30. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data.

AVERAGE DISCHARGE.--34 years, 28.6 ft³/s, 7.88 in/yr, 20,720 acre-ft/yr; median of yearly mean discharges, 25 ft³/s, 6.9 in/yr, 18,100 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 22,500 ft³/s June 9, 1967, gage height, 28.56 ft, from rating curve extended above 1,600 ft³/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 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
June 14	0700	*2,730	*15.16	No other peak greater than base discharge.			

Minimum daily discharge, 0.33 ft³/s Sept. 25-27 and 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.8	3.7	4.4	2.2	3.0	7.6	19	39	297	32	1.9	.66
2	2.7	3.7	4.5	1.5	4.0	28	21	38	237	32	1.7	.62
3	3.3	3.8	4.0	1.4	5.2	6.0	19	42	75	31	1.4	.64
4	2.9	4.5	2.7	1.5	129	4.7	20	40	61	30	1.3	.65
5	2.7	3.7	4.2	1.8	199	4.2	19	194	306	29	1.3	.59
6	2.8	3.7	4.5	1.6	115	3.7	17	105	98	27	1.4	.57
7	2.8	3.8	4.4	1.3	69	3.3	15	77	69	26	1.8	.62
8	2.9	3.7	4.7	1.7	48	3.5	15	64	62	26	10	.79
9	2.9	3.7	4.8	2.2	37	3.6	16	53	60	37	6.0	.57
10	2.9	3.9	4.9	1.9	29	3.6	15	49	66	32	3.0	.48
11	3.0	4.0	5.2	2.3	13	3.5	21	44	56	31	2.3	.44
12	3.0	3.9	5.4	2.1	6.2	3.5	67	41	47	29	2.0	.43
13	3.0	3.8	5.6	1.8	4.5	3.7	117	38	149	26	1.8	.39
14	3.1	3.7	5.2	2.0	4.0	3.4	473	37	813	26	1.7	.39
15	3.1	3.8	4.8	2.4	2.0	3.4	146	36	317	24	1.7	.37
16	3.1	3.8	5.2	2.3	4.0	3.6	100	35	83	22	1.8	.36
17	3.2	3.9	4.8	2.4	3.7	23	79	122	64	19	3.5	.35
18	3.2	4.0	4.8	2.2	3.5	26	204	53	52	15	2.0	.35
19	3.2	4.0	4.7	5.5	3.9	22	154	45	45	7.3	1.5	.35
20	3.3	4.1	2.5	3.5	4.2	22	126	45	42	5.5	1.2	.35
21	3.3	3.9	1.2	1.7	3.5	18	101	226	55	5.2	.98	.34
22	3.4	3.8	.70	2.6	3.8	168	86	104	77	4.9	.86	.34
23	3.4	3.7	1.0	5.0	3.5	89	69	90	48	4.4	.76	.34
24	3.5	3.7	1.7	3.0	3.5	39	56	85	44	4.1	.90	.34
25	3.5	3.7	1.3	1.9	3.5	33	50	77	42	3.5	.82	.33
26	3.5	3.8	1.5	1.1	3.6	28	50	74	40	3.0	.74	.33
27	3.6	4.0	2.6	1.3	3.6	29	59	57	37	2.6	.68	.33
28	3.6	4.0	2.0	1.9	3.6	24	45	52	37	2.4	.66	.34
29	3.6	3.9	1.3	1.6	---	22	47	53	35	2.2	.65	.34
30	3.6	4.1	.90	1.2	---	21	44	89	33	2.4	.64	.33
31	3.6	---	1.5	2.0	---	20	---	63	---	2.1	.75	---
TOTAL	98.5	115.8	107.00	66.9	715.8	673.3	2270	2167	3447	543.6	57.74	13.33
MEAN	3.18	3.86	3.45	2.16	25.6	21.7	75.7	69.9	115	17.5	1.86	.44
MAX	3.6	4.5	5.6	5.5	199	168	473	226	813	37	10	.79
MIN	2.7	3.7	.70	1.1	2.0	3.3	15	35	33	2.1	.64	.33
AC-FT	195	230	212	133	1420	1340	4500	4300	6840	1080	115	26
CFSM	.06	.08	.07	.04	.52	.44	1.53	1.42	2.33	.36	.04	.01
IN.	.07	.09	.08	.05	.54	.51	1.71	1.64	2.60	.41	.04	.01

CAL YR 1990	TOTAL	6458.90	MEAN	17.7	MAX	617	MIN	.70	AC-FT	12810	CFSM	.36	IN.	4.87
WTR YR 1991	TOTAL	10275.97	MEAN	28.2	MAX	813	MIN	.33	AC-FT	20380	CFSM	.57	IN.	7.75

06813500 MISSOURI RIVER AT RULO, NE

LOCATION.--Lat 40°03'13", long 95°25'19", in NW1/4 NW1/4 sec.17, T.1 N., R.18 E., Richardson County, Hydrologic Unit 10240005, on right bank at downstream side of bridge on U.S. Highway 159 at Rulo, 3.2 mi upstream from Big Nemaha River, and at mile 498.0.

DRAINAGE AREA.--414,900 mi², approximately. The 3,959 mi² in Great Divide basin are not included.

PERIOD OF RECORD.--October 1949 to current year in reports of U.S. Geological Survey. Gage-height record collected at site 80 ft upstream January 1886 to December 1899 published in reports of Missouri River Commission; September 1929 to September 1950 in files of Kansas City office of U.S. Army Corps of Engineers.

GAGE.--Water-stage encoder. Datum of gage is 837.23 ft above NGVD. Oct. 1949 to Sept. 12, 1950, nonrecording gage at site 80 ft upstream and Sept. 13, 1950 to Apr. 19, 1983, recording gage on downstream end of middle pier, all at same datum.

REMARKS.--Records good. Flow regulated by upstream main-stem reservoirs. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers satellite data collection platform at station.

AVERAGE DISCHARGE.--42 years, 40,930 ft³/s, 29,650,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 358,000 ft³/s Apr. 22, 1952, gage height, 25.60 ft; minimum daily discharge, 4,420 ft³/s Jan. 13, 1957; minimum gage height, -0.19 ft Dec. 25, 1990, result of freezeup.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in 1881 reached a stage of 22.9 ft, from floodmark, discharge not determined.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 99,300 ft³/s June 15, gage height, 18.83 ft; minimum daily discharge, 7,450 ft³/s Dec. 25, minimum gage height -0.19 Dec. 25.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	33500	25000	15100	16100	19600	20900	33800	39400	48700	40600	32400	33300
2	33500	23000	14900	15900	19100	22100	33800	39100	60600	38300	31700	33100
3	33600	21300	15400	17000	19700	29900	33600	39300	71300	37500	32300	33200
4	34400	19900	16000	18300	21700	29500	32800	39800	62500	40400	32600	33300
5	34500	19400	15900	19500	22500	22500	32600	40100	58800	37000	32600	33800
6	34300	18300	15100	19400	22400	20400	32400	42400	80800	35400	32900	33800
7	33800	18300	15700	19000	22300	21100	32500	44700	83800	36500	32700	33500
8	33700	18500	16600	18600	23000	20700	32400	44100	67000	34300	32900	35000
9	33900	19000	16400	18500	24400	19400	33000	42900	55400	37000	33800	34500
10	34400	17300	16500	18300	26000	18700	32800	42800	53100	48500	34800	34200
11	34200	17300	16900	18500	26600	18600	32900	42700	53000	42200	34800	34500
12	34200	17500	16800	18600	25600	18800	33400	43000	50600	37000	33900	34700
13	33400	17300	16600	18700	24100	19000	35900	44400	49200	37100	33400	36000
14	33300	17200	16500	19200	23600	19700	42900	42300	52200	36400	33000	35500
15	32800	17200	16500	19500	22400	21200	51200	41200	94600	35200	32700	35400
16	32800	17000	16300	19600	21200	20700	46700	43200	88000	35800	32500	35000
17	33100	17000	16200	19800	20900	19400	43500	53100	79500	34300	33000	34400
18	33000	16600	16300	19800	20600	20200	42900	50100	66200	33100	33900	34800
19	33300	16700	16300	19500	21900	21000	42900	52300	58800	34400	32600	34800
20	33100	16600	15500	19300	26000	21500	43000	51100	52000	32600	33500	34800
21	32900	16700	15500	19100	28100	20900	42400	48700	50500	32800	32600	34100
22	33200	16500	13600	19100	26700	19700	42000	50900	61300	34900	32200	33900
23	33200	16000	11500	19100	27200	19300	41600	46400	52000	34700	32200	33400
24	32800	16300	8340	18600	27000	19800	41000	46000	50500	32400	32400	33200
25	33100	16100	7450	18900	25400	21300	40500	51300	47300	33500	32300	33500
26	33400	16200	7910	20600	24800	21900	40200	47000	41700	32800	31900	33600
27	33000	16400	9780	21000	22200	22300	40800	45300	41300	32100	31900	33900
28	32400	16200	12400	20300	20500	22700	44300	50000	42300	32500	32500	33700
29	31400	16100	15600	19500	---	25200	43200	47600	39800	32000	32300	33600
30	29700	15900	16700	19800	---	29400	40600	55300	38900	31700	31900	33600
31	27100	---	16300	19900	---	32100	---	54600	---	32900	32300	---

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 mi².

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. 19 to Feb. 3, Feb. 8-21, May 25-30, and June 10-14. 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 1.39 ft³/s. U.S. National Weather Service Limited Automatic Remote Collector (LARC) at station.

COOPERATION.--Average pumpage provided by City of Clarinda water works.

AVERAGE DISCHARGE.--61 years (1918-24, 1936-91), 354 ft³/s, 6.31 in/yr, 256,500 acre-ft/yr; median of yearly mean discharges, 280 ft³/s, 5.0 in/yr, 203,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 31,100 ft³/s June 13, 1947, gage-height, 25.3 ft, from flood-mark, from rating curve extended above 15,000 ft³/s on basis of an overflow profile and extended channel rating; minimum daily discharge, 1.0 ft³/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 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Apr. 14	1245	8,380	13.37	May 21	1115	11,700	14.93
Apr. 18	1915	9,420	13.66	June 2	0645	7,890	13.22
Apr. 27	0945	5,610	12.54	June 5	1700	7,570	13.12
May 5	1915	5,840	12.50	June 14	1530	*25,100	*19.69

Minimum daily discharge, 19 ft³/s Dec. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	49	63	62	40	40	204	273	995	1570	387	129	80		
2	52	67	58	31	100	1510	259	880	5550	368	130	68		
3	69	74	55	26	600	823	250	881	1800	345	117	63		
4	76	106	56	27	748	379	242	1070	1320	325	114	53		
5	76	111	65	29	1180	400	234	3400	3370	309	121	51		
6	63	94	63	27	504	328	228	3050	2450	297	123	53		
7	49	77	65	25	392	272	219	1710	1380	279	123	54		
8	48	78	68	35	330	235	212	1380	1130	258	146	87		
9	50	79	68	34	300	228	211	1210	1040	306	269	96		
10	54	77	68	31	250	214	223	1080	1030	389	199	90		
11	55	78	70	38	230	208	223	1020	1320	389	139	70		
12	55	76	78	35	210	215	935	972	1280	507	121	57		
13	54	70	73	32	230	237	1710	915	956	388	109	54		
14	52	66	72	36	160	252	4820	850	15500	311	101	53		
15	51	67	75	40	110	221	2150	812	15700	280	97	51		
16	50	61	76	38	150	229	1460	803	3600	255	92	47		
17	55	62	77	37	220	305	1160	2200	1660	237	116	46		
18	51	64	82	42	200	671	5210	1640	1250	222	120	45		
19	53	64	55	60	250	610	4600	1100	1020	212	91	40		
20	55	65	37	52	260	529	2290	941	874	198	78	39		
21	56	65	25	30	220	455	2080	5560	1150	191	76	40		
22	57	57	19	39	240	393	1710	3690	1710	188	75	42		
23	58	58	27	52	218	906	1480	1860	950	184	74	41		
24	56	58	31	42	189	524	1290	1470	777	167	74	41		
25	58	59	25	30	173	412	1140	1250	699	156	70	38		
26	56	60	28	23	151	370	1100	1240	622	147	65	37		
27	57	70	35	30	147	358	3450	1070	546	144	61	39		
28	57	62	45	45	160	379	1780	985	483	142	59	39		
29	58	62	32	37	---	338	1310	902	446	137	60	39		
30	59	63	23	25	---	300	1150	2310	413	136	60	36		
31	59	---	32	30	---	281	---	1510	---	133	72	---		
TOTAL	1748	2113	1645	1098	7962	12786	43399	48756	71596	7987	3281	1589		
MEAN	56.4	70.4	53.1	35.4	284	412	1447	1573	2387	258	106	53.0		
MAX	76	111	82	60	1180	1510	5210	5560	15700	507	269	96		
MIN	48	57	19	23	40	204	211	803	413	133	59	36		
AC-FT	3470	4190	3260	2180	15790	25360	86080	96710	142000	15840	6510	3150		
CFSM	.07	.09	.07	.05	.37	.54	1.90	2.06	3.13	.34	.14	.07		
IN.	.09	.10	.08	.05	.39	.62	2.12	2.38	3.50	.39	.16	.08		
CAL YR 1990	TOTAL	120550	MEAN	330	MAX	9710	MIN	19	AC-FT	239100	CFSM	.43	IN.	5.89
WTR YR 1991	TOTAL	203960	MEAN	559	MAX	15700	MIN	19	AC-FT	404600	CFSM	.73	IN.	9.96

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 or the Highway 2 bridge.

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, 602 microsiemens Dec. 23, 1990; minimum daily, 130 microsiemens June 15, 1976.

WATER TEMPERATURES: Maximum daily, 33.0°C Jul. 16, 1991; 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, 602 microsiemens Dec 23; minimum daily, 182 microsiemens June 15.

WATER TEMPERATURE: Maximum daily, 33.0°C July 16.

SEDIMENT CONCENTRATIONS: Maximum daily mean, 22,600 mg/L June 14; minimum daily mean, 9 mg/L Dec. 2, Jan. 20, 30.

SEDIMENT LOADS: Maximum daily, 1,380,000 tons June 14; minimum daily, 0.61 ton Jan. 30.

SPECIFIC CONDUCTANCE MICROSIEMENS/CM AT 25 DEG C, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	399	432	471	373	393	428	380	363	424	430	414
2	---	401	423	468	415	326	425	391	257	422	413	412
3	---	436	419	474	375	278	422	396	269	421	---	394
4	---	397	411	475	301	317	426	370	361	433	421	386
5	---	416	432	361	---	360	416	350	377	443	410	378
6	---	423	417	438	237	375	428	286	260	451	402	398
7	446	440	429	435	223	389	424	357	346	436	440	---
8	---	---	429	428	223	398	430	374	386	434	387	371
9	439	450	---	497	226	408	418	379	402	409	375	368
10	427	454	449	493	242	415	418	386	398	395	336	388
11	425	444	456	492	263	419	430	396	383	394	379	419
12	429	443	451	456	282	429	398	403	285	361	408	405
13	399	445	438	425	306	424	284	406	374	353	424	418
14	410	439	438	483	327	419	323	403	322	391	430	413
15	407	438	428	486	---	414	259	400	182	418	434	406
16	414	---	437	496	328	419	361	407	223	433	410	421
17	---	450	438	509	411	403	369	314	330	436	410	---
18	418	448	425	---	362	390	364	311	376	434	390	450
19	432	434	430	414	360	369	266	358	384	437	402	430
20	420	438	430	522	341	336	318	---	395	435	419	421
21	---	436	448	535	341	387	333	310	401	431	433	408
22	410	435	503	529	348	405	360	265	---	452	409	396
23	413	426	602	476	339	239	381	314	---	427	406	384
24	406	437	504	536	355	356	376	358	398	451	402	380
25	404	421	508	503	372	390	386	378	408	453	388	396
26	423	421	539	521	375	406	391	377	409	447	387	396
27	423	407	536	531	404	407	263	395	411	446	370	405
28	426	421	454	520	407	405	---	402	408	438	361	414
29	432	426	452	526	---	411	350	402	411	436	366	416
30	421	427	460	485	---	424	379	405	419	424	387	410
31	---	---	492	465	---	428	---	293	---	---	395	---

NODAWAY RIVER BASIN

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06817000 NODAWAY RIVER AT CLARINDA, IA--Continued

WATER-QUALITY RECORDS

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	15.0	7.0	---	---	---	12.0	14.0	24.0	27.0	25.0	24.0
2	---	18.0	5.0	---	---	4.0	14.0	15.0	22.0	27.0	26.0	25.0
3	---	13.0	4.0	---	---	2.0	14.0	16.0	23.0	25.0	---	24.0
4	---	7.0	5.0	---	---	3.0	15.0	14.0	24.0	24.0	26.0	19.0
5	---	6.0	5.0	---	---	---	17.0	11.0	22.0	26.0	25.0	---
6	---	8.0	5.0	---	---	---	19.0	10.0	18.0	27.0	21.0	---
7	15.0	6.0	5.0	---	---	6.0	18.0	11.0	20.0	27.0	26.0	---
8	---	---	5.0	---	---	7.0	18.0	15.0	20.0	24.0	26.0	---
9	10.0	5.0	---	---	---	7.0	11.0	15.0	21.0	23.0	23.0	25.0
10	8.0	6.0	4.0	---	---	7.0	12.0	20.0	22.0	27.0	21.0	23.0
11	11.0	7.0	5.0	---	---	5.0	10.0	20.0	22.0	23.0	24.0	24.0
12	11.0	8.0	---	---	---	10.0	9.0	22.0	24.0	26.0	22.0	25.0
13	11.0	8.0	4.0	---	---	7.0	---	23.0	25.0	24.0	23.0	26.0
14	11.0	10.0	---	---	---	5.0	11.0	23.0	23.0	---	22.0	25.0
15	11.0	12.0	5.0	---	---	---	9.0	22.0	22.0	25.0	23.0	23.0
16	12.0	---	4.0	---	---	7.0	---	22.0	---	33.0	---	19.0
17	---	---	---	---	---	8.0	13.0	---	22.0	28.0	---	14.0
18	10.0	---	---	---	---	8.0	13.0	13.0	22.0	26.0	---	12.0
19	10.0	8.0	---	---	---	7.0	11.0	17.0	26.0	26.0	21.0	12.0
20	11.0	11.0	---	---	---	12.0	10.0	---	24.0	27.0	26.0	12.0
21	---	---	---	---	---	11.0	11.0	17.0	24.0	27.0	21.0	14.0
22	9.0	10.0	---	---	---	13.0	12.0	20.0	---	26.0	23.0	13.0
23	---	11.0	---	---	5.0	10.0	13.0	21.0	---	26.0	24.0	13.0
24	12.0	8.0	---	---	4.0	12.0	13.0	21.0	20.0	25.0	23.0	15.0
25	10.0	10.0	---	---	5.0	12.0	14.0	---	24.0	23.0	23.0	11.0
26	13.0	10.0	---	---	3.0	---	15.0	---	25.0	23.0	24.0	---
27	12.0	8.0	---	---	7.0	---	17.0	21.0	---	23.0	25.0	13.0
28	---	---	---	---	6.0	9.0	---	26.0	---	23.0	26.0	15.0
29	10.0	4.0	---	---	---	10.0	16.0	26.0	26.0	21.0	25.0	17.0
30	14.0	7.0	---	---	---	9.0	15.0	23.0	---	22.0	25.0	20.0
31	---	---	---	---	---	9.0	---	25.0	---	---	24.0	---

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)
OCTOBER			NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	34	4.5	58	9.8	11	1.8	29	3.1	67	7.2	326	210
2	27	3.8	60	11	9	1.4	20	1.7	114	31	11600	58400
3	34	6.6	53	10	10	1.4	15	1.1	79	128	6760	17400
4	66	14	31	8.9	10	1.5	36	2.6	76	160	1310	1370
5	67	14	30	9.0	13	2.3	54	4.2	2230	7320	886	968
6	68	12	30	7.6	10	1.8	25	1.8	1330	1860	620	551
7	47	6.3	23	4.7	11	1.9	21	1.4	821	917	373	276
8	14	1.8	19	4.0	12	2.1	25	2.4	465	367	267	170
9	14	1.9	17	3.6	13	2.3	29	2.7	376	267	249	153
10	12	1.7	17	3.6	12	2.2	29	2.4	389	276	205	118
11	19	2.8	21	4.4	11	2.1	19	1.9	338	240	193	108
12	23	3.5	21	4.3	12	2.4	29	2.7	229	162	202	117
13	28	4.0	25	4.7	12	2.4	21	1.8	264	187	210	134
14	26	3.7	29	5.2	13	2.6	18	1.7	226	159	250	170
15	21	2.9	34	6.2	12	2.4	10	1.1	139	97	207	123
16	21	2.9	12	2.1	12	2.5	12	1.2	81	58	201	124
17	23	3.4	11	1.9	12	2.5	11	1.1	100	71	412	380
18	12	1.6	15	2.7	12	2.6	19	2.2	197	139	2850	5580
19	17	2.5	16	2.8	11	1.6	18	2.9	354	251	2580	4280
20	21	3.1	34	6.1	15	1.5	9	1.3	314	223	1350	1960
21	20	3.1	42	7.5	17	1.1	10	.81	243	163	868	1070
22	18	2.8	42	6.4	25	1.3	12	1.3	231	152	592	630
23	22	3.5	23	3.7	23	1.7	12	1.7	177	104	15000	44400
24	27	4.0	24	3.8	21	1.8	12	1.4	152	78	1860	2730
25	20	3.1	17	2.8	21	1.4	23	1.9	118	55	767	858
26	19	2.9	19	3.0	21	1.6	13	.81	102	41	537	537
27	31	4.8	38	7.1	20	1.9	12	.97	96	39	438	424
28	10	1.5	14	2.4	23	2.8	16	1.9	102	44	447	458
29	29	4.6	17	2.9	25	2.2	12	1.2	---	---	374	343
30	62	9.9	15	2.6	19	1.2	9	.61	---	---	189	154
31	47	7.5	---	---	20	1.7	17	1.4	---	---	155	117
TOTAL	---	144.7	---	154.8	---	60.0	---	55.30	---	13596.2	---	144313

NODAWAY RIVER BASIN

06817000 NODAWAY RIVER AT CLARINDA, IA--Continued

WATER-QUALITY RECORDS

SEDIMENT-SUSPENDED, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MEAN CONCE TRATI (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN TRATIO (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCE TRATI (MG/L)	LOAD (TON DAY)	MEAN CONCE TRATI (MG/L)	LOAD (TONS/ DAY)	MEAN CONCE TRATI (MG/L)	LOAD (TONS DAY)
APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER		
1	151	112	684	1840	2020	12500	205	214	42	15	47	10
2	128	89	577	1370	9280	146000	189	188	40	14	45	8.3
3	120	81	529	1270	3640	18600	78	73	33	10	57	9.7
4	97	63	1050	3030	1270	4560	83	73	31	9.4	42	6.0
5	85	53	5190	65200	6650	90400	92	77	68	22	52	7.1
6	68	42	4050	37600	4470	33900	59	47	64	21	67	9.6
7	50	29	1440	6740	1140	4310	50	38	65	21	44	6.4
8	42	24	940	3510	669	2060	78	54	56	22	51	12
9	39	22	633	2080	513	1450	158	134	167	141	70	18
10	38	23	512	1500	626	1740	250	263	284	154	88	21
11	38	23	404	1110	2160	9800	273	287	235	88	57	11
12	4780	26600	317	833	2970	11000	456	640	198	65	54	8.3
13	11900	55900	305	754	605	1580	484	516	204	60	57	8.3
14	12200	164000	272	625	22600	1380000	252	212	154	42	56	7.9
15	8080	48500	247	542	15400	691000	203	154	145	38	45	6.2
16	3140	12600	226	491	5930	64500	177	122	98	24	79	10
17	1680	5280	6990	44500	1920	8870	153	98	134	45	67	8.4
18	12600	211000	3620	17500	1030	3510	129	77	148	48	56	6.9
19	9110	129000	1100	3280	890	2460	48	27	126	31	14	1.6
20	4330	27000	787	2000	689	1630	30	16	91	19	16	1.6
21	3260	18800	9400	209000	764	3080	37	19	86	18	23	2.5
22	1660	7690	5640	63200	1000	4950	37	19	94	19	27	3.0
23	1330	5310	2110	10700	629	1620	52	26	75	15	31	3.4
24	1010	3540	1030	4110	485	1020	48	22	88	17	34	3.8
25	753	2330	695	2360	392	737	35	15	73	14	14	1.5
26	662	1960	717	2420	381	641	30	12	71	12	19	1.9
27	8660	98600	480	1390	314	463	32	12	67	11	30	3.2
28	4060	20500	399	1060	296	386	30	11	57	9.1	38	4.1
29	1530	5410	359	875	260	313	36	13	59	9.5	36	3.8
30	971	3030	7790	66100	217	242	40	15	51	8.1	54	5.3
31	---	---	4430	19300	---	---	49	18	60	12	---	---
TOTAL	---	847611	---	576290	---	2503322	---	3492	---	1034.1	---	210.8
YEAR	4090283.90											

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	TEMPER- ATURE WATER (DEG C) (00010)	DIS- CHARGE, INST. CUBIC FEET PER SECOND (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)
NOV							
05...	1515	5.5	118	29	9.2	--	--
DEC							
19...	1135	0.0	56	14	2.1	--	--
FEB							
01...	0945	0.0	35	27	2.6	--	--
MAR							
21...	1005	10.5	463	811	1010	52	57
APR							
27...	1412	15.0	4720	13000	166000	43	47
JUN							
05...	1149	20.0	1520	7460	30600	37	40
JUL							
15...	1730	29.0	286	156	120	--	--
AUG							
29...	0907	24.0	56	49	7.3	--	--

NODAWAY RIVER BASIN

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06817000 NODAWAY RIVER AT CLARINDA, IA--Continued

WATER-QUALITY RECORDS

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	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 (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 .062 MM (70331)
NOV 05...	--	--	--	--	--	--	98
DEC 19...	--	--	--	--	--	--	91
FEB 01...	--	--	--	--	--	--	57
MAR 21...	67	80	98	99	100	--	--
APR 27...	46	60	95	98	100	--	--
JUN 05...	40	51	89	94	99	100	--
JUL 15...	--	--	--	--	--	--	99
AUG 29...	--	--	--	--	--	--	97

PARTICLE-SIZE DISTRIBUTION OF SURFACE BED MATERIAL, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	NUMBER OF SAMPLING POINTS (COUNT)	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)	BED MAT. SIEVE DIAM. % FINER THAN 32.0 MM (80173)
NOV 05..	1540	3	1	2	8	42	71	81	87	91	100	--
DEC 19..	1135	3	1	1	6	33	48	57	65	73	85	100
FEB 01..	0945	3	1	1	7	51	76	87	93	99	100	--
JUN 05..	1203	3	0	2	24	85	95	98	99	100	--	--
JUL 15..	1740	2	--	0	6	72	97	100	--	--	--	--
AUG 29..	0930	3	0	1	12	75	96	98	99	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 mi².

PERIOD OF RECORD.--April 1968 to September 1991 (discontinued).

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. 4-5, Dec. 18 to Feb. 3, Feb. 8-12, 14-16, 20, Mar. 3-4, May 6-11, and July 11-14. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data.

AVERAGE DISCHARGE.--23 years, 129 ft³/s, 8.07 in/yr, 93,460 acre-ft/yr; median of yearly mean discharges, 110 ft³/s, 6.9 in/yr, 79,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,630 ft³/s Sept. 9, 1989, gage height, 23.60 ft; minimum daily discharge, 0.21 ft³/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 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Apr. 18	1915	*4,070	18.24	June 15	1300	3,060	15.65

Minimum daily discharge, 1.2 ft³/s Dec. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4.4	2.8	4.3	4.0	10	42	33	195	576	22	12	4.2
2	4.3	2.9	5.1	3.0	25	827	28	150	1010	17	9.2	3.4
3	5.7	4.3	6.1	1.7	150	158	25	207	263	16	8.5	3.6
4	8.0	23	3.5	2.0	606	63	23	242	163	18	8.4	3.4
5	7.6	19	6.0	3.0	421	57	22	1830	237	16	9.2	3.0
6	3.7	11	6.9	2.1	194	46	18	811	341	15	8.9	3.2
7	3.0	7.3	6.6	1.6	114	46	18	392	145	14	10	3.2
8	3.0	5.1	4.9	3.5	100	30	17	296	108	11	17	4.3
9	3.1	5.0	5.6	3.0	44	27	26	235	91	16	29	4.3
10	3.9	4.9	6.2	2.3	40	25	27	191	80	26	15	30
11	4.0	5.7	8.1	3.1	32	24	30	170	428	18	9.3	10
12	3.8	5.2	11	2.9	26	25	168	156	147	40	7.3	4.3
13	3.4	4.8	12	2.7	21	106	368	142	91	90	6.6	3.2
14	3.1	4.2	12	4.0	17	68	1290	123	211	50	6.4	3.0
15	2.8	4.2	10	5.6	9.0	52	495	114	2060	34	5.9	3.4
16	3.1	4.0	10	4.5	12	44	253	105	577	28	5.3	4.3
17	3.3	3.2	10	4.2	14	203	174	115	253	23	5.1	4.4
18	3.1	3.0	9.4	3.8	14	345	2500	107	175	21	5.0	3.3
19	3.2	3.5	8.7	8.0	20	226	1890	90	120	19	4.8	2.6
20	3.7	3.4	6.0	6.0	13	162	648	79	94	17	4.4	2.1
21	4.7	3.5	2.0	3.0	15	118	455	257	76	17	4.3	2.1
22	4.0	3.4	1.2	6.4	13	93	338	196	95	15	4.2	2.1
23	3.9	3.0	1.7	5.2	11	90	265	180	79	15	4.3	2.0
24	4.2	3.1	3.0	3.7	9.6	69	202	161	65	13	4.4	1.9
25	3.8	3.2	2.5	3.0	9.0	53	176	170	58	14	4.4	1.6
26	3.6	3.1	1.6	2.3	8.2	48	184	780	46	13	4.3	1.8
27	3.3	7.0	3.3	3.3	8.5	138	930	176	38	12	3.8	2.1
28	3.0	13	5.0	5.4	7.0	86	592	126	28	12	4.5	2.3
29	3.2	9.5	2.5	4.7	---	53	629	101	25	12	3.6	2.1
30	3.2	6.9	1.4	2.9	---	44	300	158	24	12	3.5	2.7
31	3.0	---	2.5	4.3	---	36	---	110	---	11	3.5	---
TOTAL	120.1	182.2	179.1	115.2	1963.3	3404	12124	8165	7704	657	232.1	123.9
MEAN	3.87	6.07	5.78	3.72	70.1	110	404	263	257	21.2	7.49	4.13
MAX	8.0	23	12	8.0	606	827	2500	1830	2060	90	29	30
MIN	2.8	2.8	1.2	1.6	7.0	24	17	79	24	11	3.5	1.6
AC-FT	238	361	355	228	3890	6750	24050	16200	15280	1300	460	246
CFSM	.02	.03	.03	.02	.32	.51	1.86	1.21	1.18	.10	.03	.02
IN.	.02	.03	.03	.02	.34	.58	2.08	1.40	1.32	.11	.04	.02
CAL YR 1990	TOTAL 41329.1	MEAN 113	MAX 3900	MIN 1.2	AC-FT 81980	CFSM .52	IN. 7.08					
WTR YR 1991	TOTAL 34969.9	MEAN 95.8	MAX 2500	MIN 1.2	AC-FT 69360	CFSM .44	IN. 5.99					

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 mi².

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 encoder. Datum of gage is 1,069.16 ft above NGVD.

REMARKS.--Estimated daily discharges: Dec. 4, Dec. 21 to Feb. 7, Feb. 15, Aug. 9 to Sept. 15, and Sept. 18-21. Records fair except those for estimated daily discharges, which are poor. Slight regulation at low flow by low dam used for water supply in Bedford. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service Limited Automatic Remote Collector at station.

AVERAGE DISCHARGE.--8 years, 54.1 ft³/s, 8.6 in/yr, 39,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,570 ft³/s July 14, 1986, gage height 23.47 ft.; no flow several days in July and August, 1989, Dec. 24, 1990.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Apr. 14	0645	2,260	16.95	May 5	1200	2,060	16.70
Apr. 18	1515	*3,140	*18.28	June 1	2315	2,440	17.53

Minimum discharge, 0.10 ft³/s Sept. 26, 27.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.65	.45	.59	.70	.70	25	9.0	44	292	3.9	.80	.52
2	.55	.99	.50	.58	1.5	216	8.5	37	537	3.7	.83	.40
3	.76	.78	.54	.33	35	32	8.5	74	68	3.2	.83	.43
4	.90	3.6	.45	.37	120	15	8.4	75	44	3.1	.82	.47
5	.85	1.3	.51	.48	60	18	6.5	1150	32	3.1	.91	.40
6	.79	1.1	.52	.37	30	13	6.4	239	24	3.2	1.0	.36
7	.71	.95	.51	.29	15	6.7	6.4	121	17	2.3	1.1	.34
8	.63	.82	.52	.54	12	4.7	6.9	88	14	2.2	1.0	.35
9	.58	.81	.53	.48	10	5.4	8.6	69	14	14	.80	.40
10	.53	.77	.57	.34	7.6	13	5.8	57	13	11	.70	.50
11	.47	.73	.65	.48	5.6	20	11	51	16	144	.64	.39
12	.42	.69	.74	.44	4.8	13	72	46	12	47	.60	.33
13	.39	.65	.86	.37	5.6	21	169	42	11	12	.58	.30
14	.39	.50	.97	.52	3.8	10	884	36	11	5.9	.56	.27
15	.39	.49	1.1	.70	1.7	8.1	144	37	465	4.4	.52	.29
16	.39	.51	1.1	.64	1.9	8.4	79	33	75	3.6	.49	.34
17	.40	.50	1.3	.60	2.2	131	59	58	38	3.1	.48	.32
18	.41	.50	1.4	.54	8.9	90	1670	39	26	1.9	.50	.30
19	.39	.50	1.3	.84	6.6	75	467	31	18	1.2	.49	.28
20	.39	.47	1.3	.70	4.2	54	139	30	14	1.1	.48	.27
21	.39	.54	.70	.40	4.4	39	92	78	12	1.1	.45	.30
22	.39	.52	.22	.76	3.8	29	68	57	25	1.1	.44	.31
23	.40	.48	.30	.64	2.9	26	52	96	14	1.8	.45	.30
24	.40	.46	.45	.43	2.6	15	40	120	12	1.2	.47	.27
25	.40	.44	.42	.30	2.4	12	39	98	11	1.1	.46	.16
26	.40	.41	.30	.25	2.0	12	51	358	8.1	.97	.44	.11
27	.40	.86	.70	.38	1.7	62	380	83	6.9	.88	.43	.12
28	.42	.94	.84	.70	1.8	33	89	57	5.4	.84	.60	.15
29	.44	.85	.50	.62	---	22	102	49	4.9	.83	.79	.17
30	.45	.72	.26	.36	---	13	61	418	4.4	.82	.43	.14
31	.45	---	.45	.46	---	12	---	93	---	.81	.41	---
TOTAL	15.53	23.33	21.10	15.61	358.70	1054.3	4743.0	3864	1844.7	285.35	19.50	9.29
MEAN	.50	.78	.68	.50	12.8	34.0	158	125	61.5	9.20	.63	.31
MAX	.90	3.6	1.4	.84	120	216	1670	1150	537	144	1.1	.52
MIN	.39	.41	.22	.25	.70	4.7	5.8	30	4.4	.81	.41	.11
AC-FT	31	46	42	31	711	2090	9410	7660	3660	566	39	.18
CFSM	.01	.01	.01	.01	.15	.40	1.85	1.46	.72	.11	.01	.00
IN.	.01	.01	.01	.01	.16	.46	2.07	1.68	.80	.12	.01	.00
CAL YR 1990	TOTAL 18266.62	MEAN 50.0	MAX 1530	MIN .22	AC-FT 36230	CFSM .59	IN. 7.96					
WTR YR 1991	TOTAL 12254.41	MEAN 33.6	MAX 1670	MIN .11	AC-FT 24310	CFSM .39	IN. 5.34					

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 mi².

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. 26 to Nov. 3, Nov. 14 to Feb. 3, Feb. 14-16, and Feb. 24. Records good except those for estimated daily discharges, which are poor.

AVERAGE DISCHARGE.--24 years, 31.3 ft³/s, 8.10 in/yr, 22,680 acre-ft/yr; median of yearly mean discharges, 29 ft³/s, 7.5 in/yr, 21,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 18,000 ft³/s July 20, 1990, gage height, 28.19 ft, estimated from rating curve extended above 5,300 ft³/s on basis of contracted-opening and flow-over-road measurement of peak flow; maximum gage height, 28.22 ft, June 2, 1980; 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 ft³/s, estimated from rating curve extended above 5,300 ft³/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, from information by assistant county engineer, discharge not determined.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Feb. 3	----	820	ice jam	Apr. 18	1845	3,260	18.63
Mar. 1	2215	1,690	15.69	Apr. 27	0245	3,250	18.60
Mar. 17	1330	1,580	15.40	Apr. 29	0300	505	13.22
Mar. 27	0745	825	13.98	May 5	0230	2,400	17.10
Apr. 13	0800	730	13.75	May 30	0030	1,110	14.61
Apr. 14	0615	4,070	19.88	June 15	0645	*4,600	*20.65

No flow many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.08	.60	3.5	.30	7.0	224	20	42	59	1.7	.14	.00
2	.30	1.0	2.5	.12	140	376	18	32	69	.80	.09	.00
3	16	5.0	.70	.05	300	48	17	33	19	.45	.09	.01
4	2.6	23	.15	.09	224	30	17	62	14	.32	.07	.00
5	.60	6.0	1.0	.15	116	27	15	1010	12	.27	.41	.00
6	.32	3.5	3.0	.08	62	25	14	128	9.0	.19	.32	.00
7	.23	1.9	1.0	.04	40	16	14	60	7.1	.14	.19	.00
8	.36	4.1	.80	.20	26	16	13	41	6.0	.13	3.5	.35
9	.38	8.3	3.0	.11	23	14	16	31	5.9	12	1.2	.05
10	.31	6.7	6.0	.12	20	13	13	25	4.6	9.8	.21	.04
11	.28	5.3	15	.16	15	15	39	22	4.1	43	.11	.02
12	.23	4.5	7.0	.14	13	27	176	19	2.9	20	.08	.01
13	.21	4.0	3.5	.20	7.7	77	264	17	5.3	8.4	.07	.00
14	.19	3.0	2.5	.50	9.0	31	1070	15	9.0	4.7	.05	.13
15	.14	2.3	5.0	1.0	1.7	23	129	22	911	2.4	.04	.17
16	.16	3.0	12	.50	4.0	24	70	16	69	.80	.05	.08
17	.18	2.2	5.0	.60	9.5	529	59	14	31	.43	.05	.05
18	.09	1.8	7.4	1.0	17	138	1940	12	21	.24	.03	.06
19	.13	1.5	.15	4.5	18	132	514	12	17	.22	.02	.03
20	.40	6.0	.06	1.2	15	65	130	12	14	.16	.00	.03
21	1.2	3.5	.03	.10	16	43	76	15	12	.10	.01	.04
22	1.7	2.0	.02	.45	15	35	53	13	13	2.9	.00	.03
23	2.7	1.4	.03	3.0	11	37	39	19	12	7.3	.20	.02
24	3.7	1.2	.15	1.5	8.0	27	30	25	11	.28	.05	.01
25	5.5	.90	.25	.70	9.4	24	28	59	9.8	.10	.02	.01
26	1.2	.70	.04	.35	9.1	22	90	31	8.2	.06	.01	.01
27	.50	30	.07	.60	8.9	236	850	18	6.3	.05	.00	.01
28	.30	9.0	.35	2.3	11	50	94	13	4.9	.06	.00	.00
29	.25	3.5	.14	1.3	---	31	244	89	3.8	.05	.00	.01
30	2.5	1.2	.03	.55	---	25	66	220	2.7	.05	.01	.00
31	1.2	---	.05	2.5	---	23	---	25	---	.06	.00	---
TOTAL	43.94	147.10	80.42	24.41	1156.3	2403	6118	2152	1373.6	117.16	7.02	1.17
MEAN	1.42	4.90	2.59	.79	41.3	77.5	204	69.4	45.8	3.78	.23	.039
MAX	16	30	15	4.5	300	529	1940	1010	911	43	3.5	.35
MIN	.08	.60	.02	.04	1.7	13	13	12	2.7	.05	.00	.00
AC-FT	87	292	160	.48	2290	4770	12140	4270	2720	232	14	2.3
CFSM	.03	.09	.05	.01	.79	1.48	3.88	1.32	.87	.07	.00	.00
IN.	.03	.10	.06	.02	.82	1.70	4.34	1.52	.97	.08	.00	.00

CAL YR 1990 TOTAL 18347.83 MEAN 50.3 MAX 3990 MIN .00 AC-FT 36390 CFSM .96 IN. 13.00
WTR YR 1991 TOTAL 13624.12 MEAN 37.3 MAX 1940 MIN .00 AC-FT 27020 CFSM .71 IN. 9.65

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 1990 TO SEPTEMBER 1991

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991												
DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (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 (NTU) (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 30...	1030	4.1	525	8.0	1.0	5.0	15	11.8	86	735	3700	
MAR 06...	1010	23	500	8.0	2.5	0.0	33	12.2	93	732	1100	
MAY 07...	1200	62	425	8.0	9.0	13.0	51	10.6	95	740	7100	
AUG 20...	0930	0.01	508	8.3	21.0	16.5	8.4	6.4	74	737	290	
DATE		STREP-TOCOCCHI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	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)	BICAR-BONATE WATER DIS IT FIELD (MG/L AS HCO3) (00453)	
NOV 30...	2600	280	85	17	11	8	0.3	5.7	226	0	276	
MAR 06...	2100	250	74	15	10	8	0.3	5.4	181	0	220	
MAY 07...	5500	200	62	12	8.2	8	0.2	3.0	167	0	203	
AUG 20...	170	260	77	17	12	9	0.3	5.2	238	0	291	
DATE		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)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)
NOV 30...	64	7.8	0.20	11	337	341	0.46	3.71	0.58	0.400	0.020	
MAR 06...	70	7.3	0.20	11	295	308	0.40	18.5	0.52	1.20	0.020	
MAY 07...	47	12	0.30	13	261	262	0.35	44.0	0.40	0.820	0.020	
AUG 20...	29	15	0.30	8.0	301	307	0.41	0.01	0.77	<0.050	<0.010	
DATE		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-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	PHOS-PHORUS DIS-SOLVED (MG/L AS P) (00666)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)	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)	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	ALUM-INUM, DIS-SOLVED (UG/L AS AL) (01106)
NOV 30...	0.210	0.220	0.80	0.030	0.030	0.120	28	0.31	92	1	10	
MAR 06...	0.260	0.280	0.80	0.030	0.050	0.120	113	7.1	83	<1	<10	
MAY 07...	0.090	0.100	0.50	0.030	0.050	0.150	129	22	97	<1	<10	
AUG 20...	0.041	0.030	0.80	0.010	0.041	0.100	19	0.00	98	3	<10	

GRAND RIVER BASIN

06897950 ELK CREEK NEAR DECATUR CITY, IA--Continued

WATER-QUALITY RECORDS

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	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)	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)
	NOV 30...	140	<0.5	<1.0	<1	<3	1	31	<1	8	1200
MAR 06...	140	0.5	2.0	<1	<3	1	13	<1	7	430	<0.1
MAY 07...	130	<0.5	<1.0	1	<3	2	18	1	5	78	<0.1
AUG 20...	150	<0.5	<1.0	<1	<3	2	10	<1	6	250	<0.1
DATE	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)	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)	
NOV 30...	<10	1	<1	<1.0	280	<6	6	--	--	--	
MAR 06...	<10	2	2	<1.0	240	<6	17	--	--	--	
MAY 07...	<10	3	<1	<1.0	210	<6	37	3.7	4.7	5.4	
AUG 20...	10	2	<1	<1.0	320	<6	7	5.3	<0.6	8.1	
DATE	GROSS BETA, DIS- SOLVED (PCI/L AS SR/ YT-90) (80050)	GROSS BETA, SUSP. TOTAL (PCI/L AS CS-137) (03516)	GROSS BETA, SUSP. TOTAL (PCI/L AS SR/ YT-90) (80060)	RADIUM 226, DIS- SOLVED, RADON METHOD (PCI/L) (09511)	ATRA- ZINE, TOTAL (UG/L) (39630)	CYAN- AZINE TOTAL (UG/L) (81757)	METRI- BUZIN IN WHOLE WATER (UG/L) (81408)	ALA- CHLOR TOTAL RECOVER (UG/L) (77825)	METOLA- CHLOR IN WHOLE WATER (UG/L) (39356)	TRI- FLURA- LIN TOTAL RECOVER (UG/L) (39030)	
NOV 30...	--	--	--	--	--	--	--	--	--	--	
MAR 06...	--	--	--	--	0.10	<0.10	<0.10	<0.10	<0.10	0.10	
MAY 07...	4.1	3.4	3.2	0.09	--	--	--	--	--	--	
AUG 20...	6.2	1.3	1.2	0.10	--	--	--	--	--	--	

GRAND RIVER BASIN

233

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 mi².

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 encoder. 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. 4, Dec. 21 to Jan. 17, Jan. 20 to Feb. 3, Feb. 9-13, 15, and 20-21. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service Limited Automatic Remote Collector at station.

AVERAGE DISCHARGE.--56 years (water years 1919-24, 1942-91), 375 ft³/s, 7.26 in/yr, 271,700 acre-ft/yr; median of yearly mean discharges, 340 ft³/s, 6.6 in/yr 246,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 24,300 ft³/s June 10, 1974, gage height, 19.43 ft, from rating curve extended above 17,000 ft³/s on basis of velocity-area study; minimum daily discharge, 0.1 ft³/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 ft³/s, from rating curve extended as explained above.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Apr. 14	1145	8,310	9.50	May 5	1645	7,400	8.93
Apr. 19	2330	*11,800	*11.95	June 16	1415	6,340	8.25
Apr. 27	0815	6,480	8.34				

Minimum discharge, 4.9 ft³/s Sept. 28-29.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	16	23	45	16	20	195	240	1040	505	92	34	10
2	16	23	38	14	27	3340	211	705	1500	86	29	9.1
3	162	48	34	13	1000	1740	188	611	1020	79	27	9.8
4	122	132	25	14	1690	617	175	796	566	76	25	9.5
5	41	140	36	15	1420	373	164	5400	375	74	34	8.7
6	31	86	40	14	875	318	151	5100	982	76	29	9.1
7	24	61	40	13	623	238	143	1960	467	72	26	8.8
8	21	57	40	16	471	183	138	1070	320	66	31	10
9	26	52	52	15	340	155	137	798	252	84	38	11
10	23	46	73	15	290	132	149	640	217	88	52	11
11	19	38	77	17	240	125	219	539	193	206	71	11
12	18	33	92	16	190	134	1200	473	546	540	59	13
13	16	30	86	18	160	545	2260	426	280	127	38	14
14	15	28	65	19	141	595	5900	376	225	114	28	27
15	15	28	63	19	60	343	4780	375	2880	90	22	21
16	15	29	70	18	77	292	1650	422	5570	73	27	16
17	15	24	75	18	77	1490	863	337	1400	62	23	10
18	16	23	97	19	108	2990	5560	298	606	55	20	8.7
19	16	23	85	19	118	1620	10900	292	422	50	15	8.3
20	17	22	80	16	130	1030	10300	277	327	47	13	7.8
21	24	22	30	14	110	656	5130	271	267	42	12	6.2
22	24	22	10	18	128	482	1640	478	226	40	12	5.5
23	27	22	11	19	114	427	1120	608	211	53	12	6.3
24	31	23	14	17	92	379	924	812	196	44	12	6.8
25	30	23	15	16	70	314	741	1220	181	38	12	6.5
26	26	20	13	13	65	276	620	682	158	35	16	6.2
27	22	118	15	15	52	1250	5360	666	140	31	24	5.8
28	19	119	17	17	61	1280	3900	402	124	28	14	5.0
29	18	84	15	15	---	523	3010	297	111	28	12	5.7
30	21	56	12	13	---	347	2050	2420	102	26	11	6.3
31	23	---	14	15	---	277	---	982	---	26	10	---
TOTAL	909	1455	1379	496	8749	22666	69823	30773	20369	2548	788	294.1
MEAN	29.3	48.5	44.5	16.0	312	731	2327	993	679	82.2	25.4	9.80
MAX	162	140	97	19	1690	3340	10900	5400	5570	540	71	27
MIN	15	20	10	13	20	125	137	271	102	26	10	5.0
AC-FT	1800	2890	2740	984	17350	44960	138500	61040	40400	5050	1560	583
CFSM	.04	.07	.06	.02	.45	1.04	3.32	1.42	.97	.12	.04	.01
IN.	.05	.08	.07	.03	.46	1.20	3.71	1.63	1.08	.14	.04	.02

CAL YR 1990 TOTAL 161457.5 MEAN 442 MAX 11700 MIN 8.2 AC-FT 320300 CFSM .63 IN. 8.57
WTR YR 1991 TOTAL 160249.1 MEAN 439 MAX 10900 MIN 5.0 AC-FT 317900 CFSM .63 IN. 8.50

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 mi².

PERIOD OF RECORD--October 1958 to September 1991 (discontinued).

GAGE--Water-stage recorder. Datum of gage is 906.26 ft above NGVD.

REMARKS--Estimated daily discharges: Oct. 1 to Feb. 1, Feb. 14-16, Mar. 20, 22, and July 17 to Sept. 30. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data.

AVERAGE DISCHARGE--33 years, 69.4 ft³/s, 9.06 in/yr, 50,280 acre-ft/yr; median of yearly mean discharges, 63 ft³/s, 8.2 in/yr, 45,600 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD--Maximum discharge, 48,600 ft³/s Aug. 6, 1959, gage height, 25.27 ft, from rating curve extended above 5,600 ft³/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 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Apr. 18	1930	*5,480	*16.70	No other peak greater than base discharge.			

No flow Sept. 26.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.4	3.7	15	2.5	3.5	266	30	88	16	3.8	1.2	.47
2	2.9	12	22	2.0	.87	1220	27	65	39	3.6	1.0	.40
3	111	84	26	.90	889	149	24	145	17	3.5	.82	1.4
4	24	134	7.0	1.1	963	83	22	195	13	3.4	.72	1.1
5	6.0	40	23	2.0	462	67	19	2240	39	3.4	.88	.44
6	3.8	12	40	1.1	327	57	17	286	12	3.3	.69	.33
7	3.2	6.4	20	.80	236	35	16	115	8.6	3.3	.55	.24
8	5.5	6.1	13	2.2	163	31	16	77	7.7	3.3	1.4	.36
9	7.6	12	18	1.9	131	27	21	60	7.5	6.5	.82	.26
10	9.0	8.6	93	1.3	94	24	16	51	7.1	4.0	.62	.18
11	7.0	6.4	78	1.8	62	26	167	46	6.9	87	.49	.17
12	5.2	5.4	65	1.7	55	39	946	42	6.5	39	.37	.15
13	4.0	4.5	40	1.6	45	79	1200	38	6.5	6.6	.39	.13
14	3.3	3.7	23	2.3	30	49	2050	41	6.9	3.7	.40	.32
15	2.7	5.0	26	3.5	10	39	295	166	513	3.0	.38	.43
16	3.5	4.0	30	2.5	22	36	134	60	53	2.5	.39	.30
17	4.5	3.0	32	2.2	24	940	93	37	18	2.3	.54	.13
18	3.7	2.5	46	2.1	73	427	2880	29	12	2.1	.50	.13
19	4.0	3.5	22	6.0	84	436	1710	26	9.4	1.9	.46	.03
20	6.0	3.0	9.0	3.5	50	156	294	25	7.9	1.9	.41	.01
21	15	4.0	2.0	1.5	45	88	147	25	7.0	1.8	.38	.05
22	10	3.5	.70	4.0	39	124	95	24	6.7	1.8	.38	.02
23	8.0	2.6	1.3	3.2	31	85	76	332	6.8	3.3	.41	.02
24	10	2.9	2.2	2.2	29	52	62	204	6.7	1.7	.44	.03
25	8.0	3.3	1.7	1.8	28	42	59	297	6.6	1.4	.46	.02
26	6.6	2.8	.90	1.5	22	36	131	71	6.3	1.3	.52	.00
27	5.2	158	2.1	2.2	20	484	1850	31	6.4	1.3	.47	.11
28	4.3	95	3.2	3.6	24	114	458	21	5.7	1.4	.46	.11
29	5.2	67	1.6	3.2	---	57	1590	17	4.3	1.3	.44	.10
30	5.0	35	.80	2.0	---	41	176	22	4.1	1.3	.73	.09
31	4.3	---	1.8	3.0	---	35	---	19	---	1.6	.77	---
TOTAL	300.9	733.9	666.30	71.20	4048.5	5344	14621	4895	867.6	206.3	18.49	7.53
MEAN	9.71	24.5	21.5	2.30	145	172	487	158	28.9	6.65	.60	.25
MAX	111	158	93	6.0	963	1220	2880	2240	513	87	1.4	1.4
MIN	2.4	2.5	.70	.80	3.5	24	16	17	4.1	1.3	.37	.00
AC-FT	597	1460	1320	141	8030	10600	29000	9710	1720	409	37	15
CFSM	.09	.24	.21	.02	1.39	1.66	4.69	1.52	.28	.06	.01	.00
IN.	.11	.26	.24	.03	1.45	1.91	5.23	1.75	.31	.07	.01	.00
CAL YR 1990	TOTAL 31755.25	MEAN 87.0	MAX 4100	MIN .45	AC-FT 62990	CFSM .84	IN. 11.36					
WTR YR 1991	TOTAL 31780.72	MEAN 87.1	MAX 2880	MIN .00	AC-FT 63040	CFSM .84	IN. 11.37					

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 mi².

PERIOD OF RECORD.--October 1965 to current year. Occasional low-flow measurements, water years 1958-60, 1962, 1964.

GAGE.--Water-stage encoder. Datum of gage is 917.90 ft above NGVD (U.S. Army Corps of Engineers bench mark).

REMARKS.--Estimated daily discharges: Oct. 12 to Nov. 11, Nov. 20-25, 27, 28, Dec. 2-4, and Dec. 21 to Feb. 28. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--26 years, 116 ft³/s, 8.66 in/yr, 84,040 acre-ft/yr; median of yearly mean discharges, 100 ft³/s, 7.5 in/yr, 72,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 16,600 ft³/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 ft³/s and flood of June 5, 1947 reached a stage of 21.65 ft, from floodmark, discharge, 11,000 ft³/s. A discharge of 0.08 ft³/s was measured on Oct. 30, 1963.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,600 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Apr. 14	2100	2,360	17.21	Apr. 29	1200	4,180	18.04
Apr. 19	0900	*6,010	*19.07	May 5	1900	3,280	17.29
Apr. 27	1800	3,320	17.33				

No flow many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.53	3.6	41	5.0	3.9	46	40	2150	45	3.4	.10	.48
2	.49	3.2	30	4.7	3.8	930	33	522	33	3.2	.10	.42
3	10	2.9	26	4.5	8.0	560	28	241	45	2.7	.12	.34
4	78	15	25	4.3	23	324	25	355	43	2.2	.14	.28
5	75	80	25	4.2	100	97	23	2710	24	2.0	.10	.18
6	35	100	25	4.0	400	75	20	2360	16	1.8	.17	.11
7	15	50	26	4.2	240	59	17	2380	12	1.2	.19	.07
8	6.2	26	28	4.0	150	48	16	1000	9.0	1.0	1.1	.06
9	5.5	15	36	4.0	100	39	20	188	7.8	2.0	3.3	.10
10	3.7	20	67	4.3	56	31	20	116	6.5	2.5	2.9	.09
11	3.1	25	92	4.5	44	29	18	88	7.4	3.9	1.8	.05
12	2.9	21	112	4.3	36	35	490	74	6.9	5.6	.85	.00
13	1.9	16	104	4.9	30	72	1350	65	5.8	20	.44	.00
14	1.2	11	87	5.2	23	77	2100	123	5.7	20	.19	.00
15	1.0	10	65	5.6	19	77	1850	272	803	8.3	.15	.03
16	.90	8.9	60	6.4	16	62	1460	643	418	5.5	.15	.16
17	.80	8.2	56	6.6	12	376	569	137	310	4.0	.14	.14
18	.70	6.9	79	6.4	14	889	1310	62	54	3.3	.14	.06
19	.68	6.6	80	6.8	15	664	5030	44	26	3.4	.18	.00
20	.66	6.4	74	6.2	17	351	3650	35	16	2.9	.16	.00
21	.81	5.6	40	6.8	20	124	2380	32	11	2.4	.11	.00
22	1.3	5.0	18	7.4	24	116	855	29	9.1	2.0	.05	.00
23	5.7	4.5	10	7.0	25	400	258	27	8.1	2.6	.04	.00
24	4.4	5.0	8.0	6.8	21	143	161	30	7.6	3.0	.50	.00
25	4.2	6.0	6.0	6.2	17	92	123	78	7.1	2.3	.84	.00
26	5.4	5.7	5.2	5.6	15	69	113	220	6.2	1.4	.75	.00
27	5.6	10	5.8	4.8	12	255	2670	138	5.5	.92	.51	.00
28	5.2	40	5.2	5.0	10	335	2110	41	4.8	.55	.34	.00
29	4.9	103	5.0	4.7	---	160	3630	28	4.3	.44	.26	.00
30	4.4	62	5.2	4.4	---	75	2430	37	3.9	.21	.32	.00
31	3.9	---	5.4	4.1	---	52	---	37	---	.10	.45	---
TOTAL	289.07	682.5	1251.8	162.9	1454.7	6662	32799	14262	1961.7	114.82	16.59	2.57
MEAN	9.32	22.7	40.4	5.25	52.0	215	1093	460	65.4	3.70	.54	.086
MAX	78	103	112	7.4	400	930	5030	2710	803	20	3.3	.48
MIN	.49	2.9	5.0	4.0	3.8	29	16	27	3.9	.10	.04	.00
CFSM	.05	.12	.22	.03	.29	1.18	6.01	2.53	.36	.02	.00	.00
IN.	.06	.14	.26	.03	.30	1.36	6.70	2.92	.40	.02	.00	.00

CAL YR 1990	TOTAL 47945.94	MEAN 131	MAX 2710	MIN .00	CFSM .72	IN. 9.80
WTR YR 1991	TOTAL 59659.65	MEAN 163	MAX 5030	MIN .00	CFSM .90	IN. 12.19

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 mi².

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 encoder. Datum of gage is 913.70 ft above NGVD (U.S. Army Corps of Engineers bench mark).

REMARKS.--Estimated daily discharges: Oct. 5 to Feb. 28. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers satellite data collection platform at station.

AVERAGE DISCHARGE.--24 years, 112 ft³/s, 9.05 in/yr, 81,140 acre-ft/yr; median of yearly mean discharges, 110 ft³/s, 8.9 in/yr, 79,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 28,000 ft³/s July 4, 1981, gage height, 29.95 ft; no flow at times some years.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Sept. 21, 1965, reached a stage of 25.5 ft, from floodmarks, discharge, about 18,000 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Apr. 13	1500	2,050	13.76	Apr. 27	1000	3,210	17.12
Apr. 14	1300	3,820	18.19	Apr. 29	1800	*6,760	*20.70
Apr. 19	1000	6,470	20.49	May 5	1300	5,740	19.93

Minimum discharge, 0.04 ft³/s Sept.26.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	44	9.4	5.9	3.5	4.7	99	47	178	35	2.4	.87	.46
2	41	17	4.7	3.8	8.0	1010	41	113	65	2.1	.88	.40
3	58	22	4.5	4.1	18	182	39	170	62	1.6	.94	.57
4	93	37	7.0	3.8	40	100	39	858	568	1.4	.88	1.5
5	50	42	9.2	3.7	160	83	37	4330	149	1.4	1.3	2.9
6	35	23	7.8	3.6	140	78	32	741	68	1.4	1.7	1.1
7	25	12	8.2	4.0	120	57	30	230	37	1.3	1.5	.57
8	30	7.7	9.5	4.3	100	45	30	154	27	1.2	4.1	.70
9	38	9.7	14	4.0	84	41	42	118	22	4.5	2.5	.62
10	46	13	27	3.9	72	36	38	93	19	6.4	2.3	.59
11	35	10	32	4.0	58	37	46	80	17	39	1.2	.56
12	25	7.3	34	4.3	52	52	565	71	16	192	.93	.53
13	20	6.1	26	4.7	35	95	1170	62	15	47	.80	.45
14	16	6.0	19	5.4	25	75	2490	621	18	19	.68	.34
15	14	6.2	16	5.6	19	68	534	498	1040	9.2	.51	.44
16	12	5.7	17	6.6	16	63	171	383	178	5.3	.46	.64
17	14	5.4	18	5.8	15	531	111	152	56	3.4	.62	.55
18	12	5.2	31	6.2	13	389	1510	101	31	2.4	.51	.59
19	15	4.9	26	5.6	19	199	5090	73	22	1.9	.46	.49
20	25	4.7	19	5.0	24	133	691	60	15	1.7	.41	.31
21	20	4.5	10	5.4	32	94	273	54	11	1.4	.50	.28
22	17	4.2	5.0	6.4	28	142	161	69	9.1	1.5	.50	.24
23	15	4.0	4.0	5.4	24	364	120	56	8.9	1.7	.40	.19
24	17	4.5	3.7	5.2	21	114	90	69	8.6	1.2	.45	.17
25	15	9.0	3.5	4.8	18	77	77	260	6.9	1.0	.39	.15
26	13	15	3.2	4.3	16	63	78	704	5.7	.94	.31	.07
27	11	52	3.7	4.8	12	535	1920	132	4.4	.85	.28	.09
28	9.4	33	4.0	4.2	22	179	417	70	3.6	.80	.24	.10
29	12	9.2	4.0	3.9	---	90	5320	51	3.1	.93	.27	.10
30	11	5.0	3.6	3.6	---	65	682	47	2.8	.65	.36	.10
31	10	---	3.4	3.4	---	55	---	41	---	.84	.68	---
TOTAL	798.4	394.7	383.9	143.3	1195.7	5151	21891	10639	2524.1	356.41	27.93	15.80
MEAN	25.8	13.2	12.4	4.62	42.7	166	730	343	84.1	11.5	.90	.53
MAX	93	52	34	6.6	160	1010	5320	4330	1040	192	4.1	2.9
MIN	9.4	4.0	3.2	3.4	4.7	36	30	41	2.8	.65	.24	.07
AC-FT	1580	783	761	284	2370	10220	43420	21100	5010	707	55	31
CFSM	.15	.08	.07	.03	.25	.99	4.34	2.04	.50	.07	.01	.00
IN.	.18	.09	.09	.03	.26	1.14	4.85	2.36	.56	.08	.01	.00

CAL YR 1990	TOTAL	46166.6	MEAN	126	MAX	5410	MIN	3.0	AC-FT	91570	CFSM	.75	IN.	10.22
WTR YR 1991	TOTAL	43521.24	MEAN	119	MAX	5320	MIN	.07	AC-FT	86320	CFSM	.71	IN.	9.64

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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 CURRENT YEAR.--Maximum daily contents, 373,000 acre-ft May 17-18; maximum elevation 916.75 ft May 17; minimum daily contents, 198,000 acre-ft Apr. 11; minimum elevation, 903.87 ft Apr. 11.

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	258000	221000	222000	210000	200000	200000	208000	332000	366000	333000	258000	206000
	2	256000	221000	222000	209000	200000	203000	206000	334000	366000	331000	255000	206000
	3	254000	221000	224000	207000	200000	207000	205000	334000	366000	328000	253000	206000
	4	255000	222000	223000	206000	202000	210000	205000	335000	366000	325000	250000	207000
	5	255000	223000	223000	205000	206000	211000	204000	345000	366000	321000	248000	207000
	6	253000	222000	223000	204000	211000	211000	203000	360000	364000	318000	246000	207000
	7	252000	223000	223000	203000	215000	209000	202000	366000	362000	316000	243000	206000
	8	250000	222000	223000	202000	217000	208000	201000	369000	361000	313000	242000	206000
	9	250000	223000	223000	201000	217000	207000	201000	370000	359000	311000	241000	206000
	10	249000	223000	223000	201000	218000	205000	200000	369000	357000	310000	239000	206000
	11	247000	223000	223000	201000	218000	204000	198000	368000	356000	307000	236000	206000
	12	246000	222000	223000	201000	217000	202000	199000	367000	354000	307000	234000	206000
	13	244000	222000	224000	201000	216000	203000	202000	366000	352000	305000	231000	206000
	14	242000	222000	224000	201000	214000	202000	210000	365000	350000	303000	229000	205000
	15	240000	222000	225000	201000	213000	202000	223000	369000	352000	300000	226000	205000
	16	238000	223000	224000	201000	211000	201000	230000	372000	357000	297000	223000	206000
	17	237000	222000	225000	201000	210000	201000	233000	373000	357000	295000	222000	205000
	18	236000	222000	225000	201000	209000	204000	236000	373000	356000	292000	219000	205000
	19	233000	222000	225000	201000	208000	207000	252000	372000	355000	289000	217000	205000
	20	231000	222000	224000	201000	207000	208000	275000	370000	353000	287000	215000	204000
	21	230000	221000	223000	201000	206000	209000	287000	369000	351000	284000	213000	203000
	22	228000	222000	223000	200000	205000	208000	293000	368000	349000	282000	212000	203000
	23	226000	222000	221000	200000	204000	209000	295000	366000	348000	282000	211000	203000
	24	225000	222000	219000	200000	203000	208000	294000	366000	346000	280000	210000	202000
	25	223000	222000	221000	200000	202000	207000	293000	364000	344000	277000	209000	202000
	26	222000	221000	221000	200000	201000	206000	292000	364000	342000	274000	209000	202000
	27	222000	222000	216000	200000	200000	206000	293000	365000	340000	272000	208000	202000
	28	221000	223000	214000									

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, 3.7 mi upstream from Walnut Creek, and at mile 142.1.

DRAINAGE AREA.--549 mi².

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. 27 to Dec. 26, Apr. 18-20 and May 5,6. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. 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 ³ /s)	Date	Discharge (ft ³ /s)
Oct. 1-26	10	Sept. 28-30	8
Oct. 27 to Sept. 27	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 ft³/s) and maximum quantity of 638 million gallons per year (1,955 acre-ft).

AVERAGE DISCHARGE.--35 years, 338 ft³/s, 8.36 in/yr, (unadjusted) 244,900 acre-ft/yr; median of yearly mean discharges, 270 ft³/s, 6.7 in/yr, 196,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 21,800 ft³/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, 1,320 ft³/s July 1, gage height, 10.86 ft; minimum daily discharge, 18 ft³/s June 2.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	808	21	21	658	21	24	643	578	186	1090	1240	20
2	810	22	20	657	21	25	642	739	18	1310	1240	20
3	361	22	21	657	22	23	641	664	301	1300	1230	20
4	149	23	20	657	32	240	642	478	635	1300	951	20
5	659	22	21	657	21	623	642	20	695	1300	1260	20
6	823	21	21	656	19	821	642	20	806	1300	1260	20
7	828	21	20	654	195	818	641	235	804	1300	1260	20
8	600	21	21	451	444	817	641	644	804	1300	585	20
9	143	20	21	68	442	817	525	750	804	947	765	19
10	670	20	20	68	441	817	156	749	802	1100	1160	20
11	851	20	20	68	515	818	20	749	801	847	1250	20
12	861	20	20	67	737	561	20	748	794	736	1250	20
13	863	21	20	68	841	362	22	746	794	1130	1250	20
14	865	20	20	68	842	634	30	746	793	1130	1240	21
15	867	21	20	67	840	450	20	749	615	1200	1240	21
16	863	21	21	67	843	239	297	755	635	1250	1120	20
17	870	21	20	66	844	244	583	748	812	1250	1020	20
18	883	21	21	66	847	362	259	745	810	1250	1020	19
19	880	20	371	68	852	552	22	744	808	1250	899	20
20	882	20	669	65	846	713	22	765	816	1240	804	20
21	885	20	669	65	845	845	22	805	819	1240	707	21
22	888	20	669	66	737	843	321	827	822	1110	620	21
23	889	20	669	66	549	841	616	828	825	414	477	21
24	881	20	669	65	545	846	678	826	828	1020	325	21
25	707	19	669	65	545	848	677	823	829	1250	325	21
26	179	19	669	65	545	849	678	556	830	1250	326	20
27	20	20	661	65	314	224	680	21	829	1240	325	19
28	21	20	663	40	22	147	682	21	827	1240	214	19
29	21	20	662	19	---	523	488	21	822	1240	116	23
30	20	21	658	20	---	643	399	19	814	1240	59	24
31	21	---	658	21	---	642	---	175	---	1240	21	---
TOTAL	19068	617	8724	6410	13767	17211	12351	17294	21778	36014	25559	610
MEAN	615	20.6	281	207	492	555	412	558	726	1162	824	20.3
MAX	889	23	669	658	852	849	682	828	830	1310	1260	24
MIN	20	19	20	19	19	23	20	19	18	414	21	19
AC-FT	37820	1220	17300	12710	27310	34140	24500	34300	43200	71430	50700	1210

CAL YR 1990 TOTAL 121239 MEAN 332 MAX 1190 MIN 17 AC-FT 240500
WTR YR 1991 TOTAL 179403 MEAN 492 MAX 1310 MIN 18 AC-FT 355800

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 mi².

PERIOD OF RECORD--August 1979 to current year.

GAGE--Water stage encoder. Datum of gage is 800.00 ft above NGVD (U.S. Army Corps of Engineers bench mark).

REMARKS.--Estimated daily discharges: Dec. 21 to Feb. 7 and Feb. 17-22. Records good except those for estimated daily discharges, which are poor. Flow regulated by Rathbun Reservoir (station 06903880) 20.8 mi upstream. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--12 years, 542 ft³/s, 9.95 in/yr, 392,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 11,200 ft³/s July 16, 1982, gage height, 36.83 ft; minimum daily discharge, 14 ft³/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, 5,450 ft³/s May 5, gage height, 33.01 ft; minimum daily discharge, 27 ft³/s Sept. 29, 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	734	33	36	630	66	107	650	538	1630	847	1220	38
2	741	32	39	640	66	897	641	724	296	1280	1220	36
3	716	32	55	660	150	436	635	909	93	1300	1220	35
4	134	68	50	660	550	192	647	903	610	1300	1090	41
5	363	106	47	650	1000	498	643	4830	661	1300	1080	43
6	793	84	41	660	700	825	635	2760	787	1300	1250	35
7	794	57	53	680	600	825	627	853	805	1300	1250	34
8	787	47	43	500	662	811	624	685	802	1290	1010	35
9	229	59	44	150	564	801	614	862	801	1160	420	38
10	320	59	62	90	518	793	349	840	806	930	1060	34
11	792	51	91	85	487	793	100	822	855	1160	1230	33
12	807	44	111	80	648	800	91	808	805	502	1230	34
13	811	40	96	88	828	342	273	795	801	1070	1230	33
14	814	38	68	100	818	658	780	786	798	1110	1230	33
15	815	37	61	120	800	636	830	822	732	1130	1230	35
16	816	36	57	125	803	309	282	1030	611	1220	1200	36
17	821	34	55	115	820	417	589	957	819	1230	1030	34
18	826	35	74	110	810	720	1440	805	821	1220	1010	34
19	828	34	86	110	800	676	4750	774	817	1230	975	33
20	826	34	620	105	790	662	2390	770	817	1220	800	33
21	823	35	630	110	770	979	938	803	815	1220	771	32
22	820	36	620	110	710	1200	372	841	812	1220	614	31
23	823	34	620	115	577	1140	688	846	810	521	581	31
24	819	33	640	110	532	929	773	884	812	776	322	31
25	803	34	640	100	524	879	761	868	812	1190	299	31
26	420	33	630	95	519	863	758	851	809	1230	295	30
27	79	61	650	100	500	1420	747	224	807	1230	294	30
28	36	68	670	110	139	658	755	66	805	1220	284	28
29	35	52	660	80	---	484	974	53	802	1220	132	27
30	33	41	640	70	---	672	622	56	802	1230	114	27
31	33	---	640	68	---	661	---	222	---	1230	57	---
TOTAL	18491	1387	8829	7426	16751	22083	24978	27987	23253	35386	25748	1005
MEAN	596	46.2	285	240	598	712	833	903	775	1141	831	33.5
MAX	828	106	670	680	1000	1420	4750	4830	1630	1300	1250	43
MIN	33	32	36	68	66	107	91	53	93	502	57	27
AC-FT	36680	2750	17510	14730	33230	43800	49540	55510	46120	70190	51070	1990
CFSM	.81	.06	.38	.32	.81	.96	1.13	1.22	1.05	1.54	1.12	.05
IN.	.93	.07	.44	.37	.84	1.11	1.26	1.41	1.17	1.78	1.29	.05

CAL YR 1990 TOTAL 169245 MEAN 464 MAX 3230 MIN 21 AC-FT 335700 CFSM .63 IN. 8.51
WTR YR 1991 TOTAL 213324 MEAN 584 MAX 4830 MIN 27 AC-FT 423100 CFSM .79 IN. 10.72

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.

Maximum discharge at crest-stage partial-record stations

Station Name and number	Location and drainage area	Period of record	Water year 1991 maximum			Period of record maximum		
			Date	Gage height (ft)	Dis- charge (ft ³ /s)	Date	Gage height (ft)	Dis- charge (ft ³ /s)
UPPER IOWA RIVER BASIN								
Dry Run Creek near Decorah, Ia. (05387490)	Lat 43°17'29", long 91°48'33", in SE1/4, sec.20, T.98 N., R.8 W., Winneshiek County, Hydrologic Unit 07060002, on State Highway 9, 0.5 mi west of Decorah, Drainage area is 21.0 mi ² .	1978-	04-29-91	18.72	2,140	10-12-86	19.22	2,620
Waterloo Creek near Dorches- ter, Ia. (05388310)	Lat 43°27'04", long 91°30'18", in NW1/4, sec.25, T.100 N., R.6 W., Allamakee County, Hydrologic Unit 07060002, on State Highway 76, 1.4 mi south of Dorchester. Drainage area is 46.6 mi ²	1966-	08-08-91	697.86	(+)	07-01-78	704.80	9,380
MISSISSIPPI RIVER BASIN								
Mississippi River tributary at McGregor, Ia. (05389501)	Lat 43°01'01", long 91°11'53", in NE1/4, sec.28, T.95 N., R.3 W., Clayton County, Hydrologic Unit 07060001, at culvert on county road X50, at intersection with U.S. Highway 18 (Business Route), in McGregor.	1991-	06-15-91	(+)	(+)	06-15-91	(+)	(+)
TURKEY RIVER BASIN								
North Branch Turkey River near Cresco, Ia. (05411530)	Lat 43°22'15", long 92°12'49", in NW1/4, sec.25, T.99 N., R.12.W., Howard County, Hydrologic Unit 07060004, at bridge on State Highway 9, 5 mi west of Cresco. Drainage area is 19.5 mi ²	1966-	05-18-91	90.06	545	08-25-90	93.88	11,500
French Hollow Creek near Elkader, Ia (05412030)	Lat 42°50'19", long 91°24'25", in SW1/4, sec.26, T.93 N., R.5 W., Clayton County, Hydrologic Unit 07060004, at culvert on State Highway 13, 1.1 mi south of Elkader.	1991-	06-15-91	(+)	(+)	06-15-91	(+)	(+)
LITTLE MAQUOKETA RIVER BASIN								
Little Maquoketa River near Graf Ia. (05414350)	Lat 42°30'09", long 90°51'50", in SE1/4 NW1/4, sec.20, T.89 N., R.1 E., Dubuque County, Hydrologic Unit 07060003, at bridge on county highway, 300 ft downstream from Illinois Central rail- road bridge, 0.5 mi northeast of Graf, Drainage area is 39.6 mi ² .	1951-	04-12-91	11.68	3,590	07-08-51	15.78	7,220
Middle Fork Little Maquoketa River near Rickardsville, Ia. (05414400)	Lat 42°33'38", long 90°51'50", in SE1/4, sec.32, T.90 N., R.1 E., Dubuque County, Hydrologic Unit 07060003, at bridge on county highway, 2 mi southeast of Rickardsville. Drainage area is 30.2 mi ² .	1951-	04-13-91	21.81	6,880	08-02-72	27.70	23,000

Maximum discharge at crest-stage partial-record stations

Station Name and	Location and	Period of	Water year 1991 maximum			Period of record maximum		
			Date	Gage height	Dis- charge	Date	Gage height	Dis- charge
LITTLE MAQUOKETA RIVER BASIN--Continued								
North Fork Little Maquoketa River near Rickardsville, Ia. (05414450)	Lat 42°35'09", long 90°51'20", near NW corner, sec.28, T.90 N., R.1 E., Dubuque County, Hydrologic Unit 07060003, at bridge on county highway, 1 mi northeast of Rickardsville. Drainage area is 21.6 mi ² .	1951-	04-12-91	10.04	2,600	08-02-72	14.02	7,180
Little Maquoketa River near Durango, Ia. (05414500)	Lat 42°33'18", long 90°44'46", in NW1/4 NE1/4, sec.5, T.89 N., R.2 E., Dubuque County, Hydrologic Unit 07060003, 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. Drainage area is 130 mi ² .	1934-	04-12-91	21.28	21,400	08-02-72	23.13	40,000
Little Maquoketa River tributary at Dubuque, Ia. (05414600)	Lat 42°32'33", long 90°41'38", near NW corner, sec.11, T.89 N., R.2 E., Dubuque County, Hydrologic Unit 07060003, at bridge on State Highway 386, near north city limits of Dubuque. Drainage area is 1.54 mi ² .	1951-	04-12-91	12.07	302	07-31-57	17.98	11,650
Bloody Run tributary near Sherrill, Ia. (05414605)	Lat 42°37'13", long 90°45'44", in SE1/4, sec.7, T.90 N., R.2 E., Dubuque County, Hydrologic Unit 07060003, at culvert on county road 1.6 mi northeast of Sherrill.	1991-	06-15-91	(+)	(+)	06-15-91	(+)	(+)
LAMONT CREEK BASIN								
Lamont Creek tributary near Lamont, Ia. (05416200)	Lat 42°35'22", long 91°38'52", in SE1/4, sec.22, T.90 N., R.7 W., Buchanan County, Hydrologic Unit 07060006, at culvert on State Highway 187, 0.8 mi southwest of Lamont.	1991-	04-13-91	(+)	(+)	04-13-91	(+)	(+)
MAQUOKETA RIVER BASIN								
Sand Creek near Manchester, Ia. (05416972)	Lat 42°26'57", long 91°28'50", in SE1/4, sec.12, T.88 N., R.6 W., Delaware County, Hydrologic Unit 07060006, at culvert on State Highway 13, 2.7 mi southwest of Manchester.	1991-	04-13-91	(+)	(+)	04-13-91	(+)	(+)
Plum Creek at Earlville, Ia. (05417530)	Lat 42°28'13", long 91°14'53", in NE1/4, sec.1, T.88 N., R.4 W., Delaware County, Hydrologic Unit 07060006, at bridge on U.S. Highway 20, 1.5 mi southeast of Earlville. Drainage area is 41.1 mi ² .	1966-	04-13-91	86.51	2,010	06-21-74	88.75	16,200
Kitty Creek near Langworthy, Ia. (05417590)	Lat 42°12'04", long 91°12'27", in NW1/4, sec.4, T.85 N., R.3 W., Jones County, Hydrologic Unit 07060006, at bridge on U.S. Highway 151, 1 mi northeast of Langworthy. Drainage area is 14.4 mi ² .	1966-	04-13-91	86.44	782	07-19-69	90.24	3,700
Williams Creek near Charlotte, Ia. (05418645)	Lat 41°55'55", long 90°31'44", in SE1/4, sec.6, T.82 N., R.4 E., Clinton County, Hydrologic Unit 07060006, at culvert on county road Y70, 5 mi southwest of Charlotte, 2.1 mi north of county highway E63.	1990-	03-02-91	(+)	(+)	08-19-90	(+)	(+)

Maximum discharge at crest-stage partial-record stations

Station Name and	Location and	Period of	Water year 1991 maximum			Period of record maximum		
			Date	Gage height	Dis- charge	Date	Gage height	Dis- charge
WAPSIPINICON RIVER BASIN								
Little Wapsi- pinicon River tributary near Riceville, Ia. (05420600)	Lat 43°21'31", long 92°29'08", near S1/4 corner, sec. 27, T.99 N., R.14 W., Howard County, Hydrologic Unit 07080102, at culvert on county highway, 3.5 mi east of Riceville. Drainage area is 0.90 mi ² .	1953-	05-18-91	5.26	(+)	08-25-90	5.64	d1,900
Little Wapsi- pinicon River near Acme, Ia. (05420620)	Lat 43°19'37", long 92°29'07", near N1/4 corner, sec.10, T.98 N., R.14 W., Howard County, Hydrologic Unit 07080102, at bridge on county highway, 1 mi north of Acme. Drainage area is 7.76 mi ² .	1953-	05-18-91	5.32	370	08-31-62	9.02	2,380
Little Wapsi- pinicon River at Elma, Ia. (05420640)	Lat 43°14'30", long 92°27'04", in NW1/4, sec. 12, T.97 N., R.14 W., Howard County, Hydrologic Unit 07080102, at bridge on county highway B17, near west city limits of Elma. Drainage area is 37.3 mi ² .	1953-	05-18-91	9.36	1,210	08-31-62	12.53	5,740
Little Wapsi- pinicon River near New Hampton, Ia. (05420650)	Lat 43°03'58", long 92°23'38", in NW1/4, sec.9, T.95 N., R.13 W., Chickasaw County, Hydrologic Unit 07080102, at bridge on U.S. Highway 18, 4 mi west of New Hampton, Drainage area is 95.0 mi ² .	1966-	05-18-91	88.04	4,630	08-25-90	89.69	14,900
East Fork Wapsi- pinicon River near New Hampton, Ia. (05420690)	Lat 43°05'11", long 92°18'22", in SE1/4, sec.31, T.96 N., R.12 W., Chickasaw County, Hydrologic Unit 07080102, at bridge on U.S. Highway 16, 2 mi north of New Hampton. Drainage area is 30.3 mi ² .	1966-	05-18-91	85.04	2,060	06-26-69	89.61	11,000
Little Wapsi- pinicon River near Oran, Ia. (05420850)	Lat 42°42'53", long 92°02'29", near NW corner, sec.9, T.91 N., R.10 W., Fayette County, Hydrologic Unit 07080102, at bridge on State Highway 3, 2 mi northeast of Oran. Drainage area is 94.1 mi ² .	1966-	06-15-91	91.04	(+)	08-30-79	91.81	d5,000
Buck Creek near Oran, Ia. (05420855)	Lat 42°42'53", long 92°07'33", in NE1/4, sec.10, T.91 N., R.11 W., Bremer County, Hydrologic Unit 07080102, at bridge on State Highway 3, 2.5 mi northwest of Winthrop, Drainage area is 37.9 mi ² .	1966-	06-15-91	90.18	1,720	06-15-91	90.18	1,720
Pine Creek tributary near Winthrop, Ia. (05421100)	Lat 42°29'17", long 91°47'10", in SW1/4, sec.27, T.89 N., R.8 W., Buchanan County, Hydrologic Unit 07080102, at culvert on county road, 2.5 mi northwest of Winthrop, Drainage area is 0.33 mi ² .	1953-	06-01-91	5.53	96	07-17-68	8.97	334
Pine Creek near Winthrop, Ia. (05421200)	Lat 42°28'11", long 91°47'01", in SW1/4, sec.34, T.89 N., R.8 W., Buchanan County, Hydrologic Unit 07080102, at railroad bridge, 500 ft upstream from State Highway 939, 2.5 mi northwest of Winthrop. Drainage area is 28.3 mi ² .	1950-	04-13-91	14.65	1,820	07-17-68	22.98	24,200

Maximum discharge at crest-stage partial-record stations

Station Name and	Location and	Period of	Water year 1991 maximum			Period of record maximum		
			Date	Gage height	Dis- charge	Date	Gage height	Dis- charge
WAPSIPINICON RIVER BASIN--Continued								
Pine Creek tributary No. 2 at Winthrop, Ia. (05421300)	Lat 42°28'06", long 91°44'33", at N1/4 corner sec.2, T.88 N., R.8 W., Buchanan County, Hydrologic Unit 07080102, at culvert on State Highway 939, near west city limits of Winthrop. Drainage area is 0.70 mi ² .	1953-	1991	(a)	(+)	07-17-68	7.26	570
Silver Creek at Welton, Ia. (05421890)	Lat 41°54'54", long 90°36'00", in NW1/4, sec.15, T.82 N., R.3 E., Clinton County, Hydrologic Unit 07080103, at bridge on U.S. Highway 61, at north edge of Welton. Drainage area is 9.03 mi ² .	1966-	03-03-91	b88.70	(+)	05-17-74	89.77	d4,820
IOWA RIVER BASIN								
Westmain drain- age ditch 1 & 2 near Britt, Ia. (05448400)	Lat 43°06'09", long 93°47'04", in SW1/4, sec.27, T.96 N., R.25 W., Hancock County, Hydrologic Unit 07080207, at bridge on U.S. Highway 18, near east city limits of Britt. Drainage area is 21.2 mi ² .	1966-	05-18-91	81.65	112	04-28-75	83.59	372
East Branch Iowa River above Hayfield, Ia. (05448600)	Lat 43°09'21", long 93°41'21", near S1/4 corner sec.4, T.96 N., R.24 W., Hancock County, Hydrologic Unit 07080207, at bridge on county highway, 1.5 mi southeast of Hayfield. Drainage area is 2.23 mi ² .	1953-	05-18-91	3.78	20	04-06-65	7.31	250
East Branch Iowa River near Hayfield, Ia. (05448700) (discontinued)	Lat 43°10'50", long 93°39'20", in NW1/4, sec.35, T.97 N., R.24 W., Hancock County, Hydrologic Unit 07080207, at bridge on county highway B20, 2 mi east of Hayfield. Drainage area is 7.94 mi ² .	1952-	05-18-91	9.39	157	06-18-54	13.01	457
East Branch Iowa River near Garner, Ia. (05448800) (discontinued)	Lat 43°06'17", long 93°37'20", near center sec.25, T.96 N., R.24 W., Hancock County, Hydrologic Unit 07080207, at bridge on U.S. Highway 18, 1.2 mi west of Garner. Drainage area is 45.1 mi ² .	1952-	05-18-91	10.40	528	03-26-61	12.81	1,120
East Branch Iowa River tributary near Garner, Ia. (05448900) (discontinued)	Lat 43°06'18", long 93°39'29", near E1/4 corner, sec. 27, T.96 N., R.24 W., Hancock County, Hydrologic Unit 07080207, at culvert on U.S. Highway 18, 1.2 mi south of Garner. Drainage area is 5.98 mi ² .	1952-	1991	(a)	(+)	06-07-84	10.46	660
Honey Creek tributary near Radcliffe, Ia. (0545129280)	Lat 42°19'44", long 93°25'28", in SW1/4, sec.21, T.87 N., R.22 W., Hardin County, Hydrologic Unit 07080207, at culvert on county road highway S27, 1.1 mi northeast of Radcliffe.	1991-	09-13-91	(a)	(+)	09-13-91	(a)	(+)
Stein Creek near Clutier, Ia. (05451955)	Lat 42°04'46", long 92°18'00", in NE1/4, sec.24, T.84 N., R.13 W., Tama County, Hydrologic Unit 07080208, at bridge on county highway E36, 5 mi east of Clutier. Drainage area is 23.4 mi ² .	1971-	03-02-91	76.50	5,930	06-15-82	77.92	11,400

Maximum discharge at crest-stage partial-record stations

Station Name and	Location and	Period of	Water year 1991 maximum			Period of record maximum		
			Date	Gage height	Dis- charge	Date	Gage height	Dis- charge
IOWA RIVER BASIN--Continued								
Price Creek at Amana, Ia. (05453200)	Lat 41°48'18", long 91°52'23", in SE1/4, sec.22, T.81 N., R.9 W., Iowa County, Hydrologic Unit 07080208, at bridge on State Highway 151, near north edge of Amana. Drainage area is 29.1 mi ² .	1966-	04-29-91	84.81	(+)	06-17-90	88.80	(+)
North Fork tributary to Mill Creek near Solon, Ia. (05453430)	Lat 41°50'24", long 91°30'04", in NW1/4, sec.12, T.81 N., R.9 W., Johnson County, Hydrologic Unit 07080208, at culvert on State Highway 1, 2 mi north of Solon.	1990-	03-17-91	(+)	(+)	06-17-90	(+)	(+)
Rapid Creek below Morse, Ia. (05453600)	Lat 41°43'45", long 91°25'38", near NE corner sec.21, T.80 N., R.5 W., Johnson County, Hydrologic Unit 07080209, at bridge on county highway, 1.5 mi southeast of Morse. Drainage area is 8.12 mi ² .	1951-	03-17-91	24.31	2,060	06-21-87	25.99	3,000
Rapid Creek southwest of Morse, Ia. (05453750)	Lat 41°43'23", long 91°26'16", in W1/2 sec.21, T.80 N., R.5 W., Johnson County, Hydrologic Unit 07080209, at bridge on county highway, 2 mi southwest of Morse. Drainage area is 15.2 mi ² .	1951-	03-17-91	28.52	2,550	07-17-72	29.74	4,300
Rapid Creek tributary no.3 near Oasis, Ia. (05453850)	Lat 41°42'33", long 91°27'14", near center sec.29, T.80 N., R.5 W., Johnson County, Hydrologic Unit 07080209, at bridge on county highway, 3.5 mi west of Oasis. Drainage area is 1.62 mi ² .	1951-	03-17-91	20.52	217	09-21-65	24.16	1,200
Rapid Creek tributary near Oasis, Ia. (05453900)	Lat 41°41'14", long 91°26'37", near SW corner sec.33, T.80 N., R.5 W., Johnson County, Hydrologic Unit 07080209, at bridge on county highway X16, 3 mi southwest of Oasis. Drainage area is 0.97 mi ² .	1951-	1991	(a)	(+)	07-18-56	18.32	809
Rapid Creek tributary near Iowa City, Ia. (05453950)	Lat 41°41'56", long 91°28'39", in NW1/4, sec.31, T.80 N., R.5 W., Johnson County, Hydrologic Unit 07080209, at bridge on county highway, 4 mi northeast of Iowa City. Drainage area is 3.43 mi ² .	1951-	03-17-91	20.35	128	07-17-72	26.57	2,000
Clear Creek tributary near Williamsburg, Ia. (05454180)	Lat 41°41'16", long 91°57'02", in SE1/4, sec.36, T.80 N., R.10 W., Iowa County, Hydrologic Unit 07080209, at culvert on county road, 4 mi northeast of Williamsburg, 1 mi south of county highway F35.	1990-	03-02-91	(+)	(+)	06-17-90	(+)	(+)
North English River near Montezuma, Ia. (05455140)	Lat 41°38'45", long 92°34'20", in SW1/4, sec.14, T.79 N., R.15 W., Poweshiek County, Hydrologic Unit 07080209, at bridge on county highway, 5.0 mi northwest of Montezuma. Drainage area is 31.0 mi ² .	1972-	04-29-91	27.33	3,560	07-20-78	28.18	4,640
North English River at Guernsey, Ia. (05455210)	Lat 41°38'42", long 92°21'28", at NW corner sec.22, T.79 N., R.13 W., Poweshiek County, Hydrologic Unit 07080209, at bridge on State Highway 21, 1 mi southwest of Guernsey. Drainage area is 81.5 mi ² .	1960, 1966-	06-01-91	84.32	3,840	06-15-82	87.43	7,460

Maximum discharge at crest-stage partial-record stations

Station Name and	Location and	Period of	Water year 1991 maximum			Period of record maximum		
			Date	Gage height	Dis- charge	Date	Gage height	Dis- charge
IOWA RIVER BASIN--Continued								
Deep River at Deep River, Ia. (05455230)	Lat 41°35'29", long 92°21'18", in SW1/4, sec.3, T.78 N., R.13 W., Poweshiek County, Hydrologic Unit 07080209, at bridge on State Highway 21, 1 mi northeast of Deep River. Drainage area is 30.5 mi ² .	1960, 1966-	06-01-91	80.68	(+)	c05-14-70	83.85	6,200
Bulgers Run near Riverside, Ia. (05455550)	Lat 41°29'02", long 91°37'36", in SE1/4, sec.11, T.77 N., R.7 W., Washington County, Hydrologic Unit 07080209, at bridge on State Highway 22, 2.5 mi west of Riverside. Drainage area is 6.31 mi ² .	1965-	1991	(a)	(+)	09-21-65	89.04	3,080
Deer Creek near Carpenter, Ia. (05457440)	Lat 43°24'54", long 92°59'05", at NW corner sec.9, T.99 N., R.18 W., Mitchell County, Hydrologic Unit 07080201, at bridge on State Highway 105, 1.5 mi east of Carpenter. Drainage area is 91.6 mi ² .	1966-	05-18-91	83.21	2,700	03-21-79	83.40	(+)
Gizzard Creek tributary near Bassett, Ia. (0545776680)	Lat 43°04'01", long 92°34'31", in SE1/4, sec.2, T.95 N., R.15 W., Floyd County, Hydrologic Unit 07080201, at culvert on U.S. Highway 18, 3.3 mi west of Bassett.	1990-	08-10-91	100.59	(+)	08-10-91	100.59	(+)
Spring Creek near Mason City, Ia. (05459490)	Lat 43°12'48", long 93°12'38", in SE1/4, sec.16, T.97 N., R.20 W., Cerro Gordo County, Hydrologic Unit 07080203, at bridge on U.S. Highway 65, 4 mi north of Mason City. Drainage area is 29.3 mi ² .	1966-	05-18-91	88.82	1,900	05-30-80	90.32	(+)
Willow Creek near Mason City, Ia. (05460100)	Lat 43°08'55", long 93°16'07", near center sec.12, T.96 N., R.21 W., Cerro Gordo County, Hydrologic Unit 07080203, at bridge on U.S. Highway 18, 3.5 mi west of Mason City. Drainage area is 78.6 mi ² .	1966-	05-18-91	91.40	980	07-08-69	91.30	d1,100
Beaver Creek tributary near Aplington, Ia. (05462750) (discontinued)	Lat 42°34'40", long 92°50'49", in NW1/4, sec.27, T.90 N., R.17 W., Butler County, Hydrologic Unit 07080205, at bridge on U.S. Highway 20, 2 mi east of Aplington. Drainage area is 11.6 mi ² .	1966-	06-01-91	94.26	2,820	05-19-83	94.27	d3,000
Black Hawk Creek at Grundy Center, Ia. (05463090) (discontinued)	Lat 42°22'10", long 92°46'05", in NW1/4 sec.7, T.87 N., R.16 W., Grundy County, Hydrologic Unit 07080205, at bridge on State Highway 14, at north edge of Grundy Center. Drainage area is 56.9 mi ² .	1966-	05-20-90 06-01-91	87.28 88.71	1,690 4,390	07-08-69	89.60	7,000
Miller Creek near Eagle Center, Ia. (05464075)	Lat 42°19'22", long 92°20'52", in NW1/4, sec.27, T.87 N., R.13 W., Blackhawk County, Hydrologic Unit 07080205, at culvert on State Highway 21, 1.3 mi southeast of Eagle Center.	1991-	04-29-91	(+)	(+)	04-29-91	(+)	(+)
Twelve Mile Creek near Traer, Ia. (05464145)	Lat 42°13'50", long 92°27'56", in SE1/4, sec.27, T.86 N., R.14 W., Tama County, Hydrologic Unit 07080205, at bridge on U.S. Highway 63, 2.5 mi north of Traer. Drainage area is 43.8 mi ² .	1966-	04-29-91	88.74	(+)	07-03-79	88.36	3,800

DISCHARGE AT PARTIAL-RECORD AND MISCELLANEOUS SITES

Maximum discharge at crest-stage partial-record stations

Station Name and	Location and	Period of	Water year 1991 maximum			Period of record maximum		
			Date	Gage height	Dis- charge	Date	Gage height	Dis- charge
IOWA RIVER BASIN--Continued								
Pratt Creek near Garrison, Ia. (05464310)	Lat 42°10'53", long 92°11'10", in SE1/4, sec.12, T.85 N., R.12 W., Benton County, Hydrologic Unit 07080205, at bridge on U.S. Highway 218, 3.5 mi northwest of Garrison. Drainage area is 23.4 mi ² .	1966-	04-29-91	89.01	1,140	06-15-82	96.17	10,800
East Blue Creek at Center Point, Ia. (05464318)	Lat 42°12'44", long 91°47'21", in SW1/4, sec.33, T.86 N., R.8 W., Linn County, Hydrologic Unit 07080205, at bridge on State Highway 150, 1.5 mi north of Center Point. Drainage area is 17.6 mi ² .	1966-	04-13-91	80.53	(+)	07-18-69	83.73	4,000
Prairie Creek tributary near Van Horne, Ia. (05464535)	Lat 41°59'33", long 92°05'06", in NW1/4, sec.24, T.83 N., R.11 W., Benton County, Hydrologic Unit 07080205, at culvert on county highway V64, 1.1 mi south of Van Horne.	1991-	04-29-91	(+)	(+)	04-29-91	(+)	(+)
Thunder Creek at Blairstown, Ia. (05464562)	Lat 41°54'12", long 92°05'03", in NE1/4, sec.23, T.82 N., R.11 W., Benton County, Hydrologic unit 07080205, at culvert on county highway V56, near city limits of Blairstown.	1991-	04-29-91	(+)	(+)	04-29-91	(+)	(+)
Otter Creek at Wilton, Ia. (05464880)	Lat 41°36'17", long 91°02'08", in NE1/4, sec.35, T.79 N., R.2 W., Cedar County, Hydrologic Unit 07080206, at bridge on State Highway 38, 1.5 mi northwest of Wilton. Drainage area is 10.7 mi ² .	1966-	06-01-91	87.00	1,350	06-16-90	89.68	(+)
North Fork Long Creek at Ainsworth, Ia. (05465150)	Lat 41°16'51", long 91°32'16", in SW1/4, sec.22, T.75 N., R.6 W., Washington County, Hydrologic Unit 07080209, at bridge on U.S. Highway 218, 1 mi southeast of Ainsworth. Drainage area is 30.2 mi ² .	1951, 1965-	03-02-91	88.20	706	09-21-65	89.78	2,560
Haight Creek at Kingston, Ia. (05469350)	Lat 40°58'14", long 91°02'30", in NW1/4, sec.12, T.71 N., R.2 W., Des Moines County, Hydrologic Unit 07080104, at culvert on State Highway 99, 0.5 mi south of Kingston.	1990-	03-02-91	(a)	(+)	06-20-90	(+)	(+)
SKUNK RIVER BASIN								
Mud Lake drainage ditch 71, at Jewell, Ia. (05469860)	Lat 42°18'52", long 93°38'23", in SW1/4, sec.27, T.87 N., R.24 W., Hamilton County, Hydrologic Unit 07080105, at bridge on U.S. Highway 69, in Jewell. Drainage area is 65.4 mi ² .	1966-	06-04-91	87.29	994	06-27-75	90.04	2,300
Long Dick Creek near Ellsworth, Ia. (05469970)	Lat 42°18'38", long 93°32'06", in NW1/4, sec.33, T.27 N., R.23 W., Hamilton County, Hydrologic Unit 07080105, at culvert on State Highway 175, 2.2 mi east of Ellsworth.	1991-	03-18-91	92.30	(+)	03-18-91	92.30	(+)
Keigley Branch near Story City, Ia. (05469990)	Lat 42°09'01", long 93°37'13", in NW1/4, sec.26, T.85 N., R.24 W., Story County, Hydrologic Unit 07080105, at bridge on U.S. Highway 69, 3 mi south of Story City. Drainage area is 31.0 mi ² .	1966-	06-04-91	89.06	641	06-27-75	91.38	2,250

Maximum discharge at crest-stage partial-record stations

Station Name and	Location and	Period of	Water year 1991 maximum			Period of record maximum		
			Date	Gage height	Dis- charge	Date	Gage height	Dis- charge
SKUNK RIVER BASIN--Continued								
North Skunk River near Baxter, Ia. (05472090)	Lat 41°49'13", long 93°03'41", in NE1/4, sec.21, T.81 N., R.19 W., Jasper County, Hydrologic Unit 07080106, at bridge on State Highway 223, 4.5 mi east of Baxter. Drainage area is 52.2 mi ² .	1966-	03-03-91	74.87	1,250	06-09-74	83.60	(+)
Snipe Creek tributary at Melbourne, Ia. (0547209280)	Lat 41°56'08", long 93°05'08", in SE1/4, sec.5, T.82 N., R.19 W., Marshall County, Hydrologic Unit 07080106, at culvert on county highway E63, 0.5 mi east of Melbourne.	1990-	03-03-91	(+)	(+)	06-17-90	(+)	(+)
Middle Creek near Lacey, Ia. (05472390)	Lat 42°43'55", long 93°42'26", at N1/4 corner sec.1, T.76 N., R.16 W., Mahaska County, Hydrologic Unit 07080106, at bridge on U.S. Highway 63, 1.5 mi northwest of Lacey. Drainage area is 23.0 mi ² .	1966-	06-04-91	86.49	1,030	04-24-76	90.06	9,650
Skunk River tributary near Richland, Ia. (05472555)	Lat 41°50'15", long 91°57'52", in NE1/4, sec.35, T.75 N., R.10 W., Keokuk County, Hydrologic Unit 07080107, at culvert on county highway W15, 4.9 mi north of Richland, 5.1 mi south of State Highway 92.	1990-	04-19-91	(+)	(+)	06-20-90	(+)	(+)
Des Moines River tributary near Wallingford, Ia. (05476515)	Lat 43°19'47", long 94°47'48", in SE1/4, sec.1, T.98 N., R.34 W., Emmet County, Hydrologic Unit 07100002, at culvert on State Highway 4, 0.7 mi north of Wallingford.	1991-	1991	(a)	(+)	1991	(a)	(+)
Drainage Ditch 97 tributary near Britt, Ia. (0548065350)	Lat 43°06'42", long 93°54'22", in SW1/4, sec.22, T.96 N., R.26 W., Hancock County, Hydrologic Unit 07100005, at culvert on county road, 5.4 mi northwest of Britt.	1991-	05-18-91	92.20	(+)	05-18-91	92.20	(+)
DES MOINES RIVER BASIN								
White Fox Creek at Clarion, Ia. (05480930)	Lat 42°43'55", long 93°42'26", in NW1/4, sec.5, T.91 N., R.24 W., Wright County, Hydrologic Unit 07100005, at bridge on State Highway 3, 1.5 mi east of Clarion. Drainage area is 13.3 mi ² .	1966-	06-18-91	93.27	(+)	06-16-84	93.11	(+)
Brewers Creek tributary near Webster City, Ia. (05480993)	Lat 42°26'57", long 93°51'59", in NW1/4, sec.10, T.88 N., R.26 W., Hamilton County, Hydrologic Unit 07100005, at culvert on U.S. Highway 20, 2.5 mi southwest of Webster City.	1990-	06-04-91	99.25	(+)	06-04-91	99.25	(+)
Bluff Creek at Pilot Mound, Ia. (05481510)	Lat 42°09'59", long 94°01'15", in NW1/4, sec.20 T.85 N., R.27 W., Boone County, Hydrologic Unit 07100004, at bridge on State Highway 329, at northwest edge of Pilot Mound. Drainage area is 23.5 mi ² .	1966-	06-04-91	88.58	1,180	06-16-90	88.85	1,290
Peas Creek tributary at Boone, Ia. (05481528)	Lat 42°02'06", long 93°51'13", in SW1/4, sec.35, T.84 N., R.26 W., Boone County, Hydrologic Unit 07100004, at culvert on Corporal Rodger Snedden Drive, at intersection with U.S. Highway 30, at the south edge of Boone city limits.	1990-	05-16-91	90.89	(+)	05-16-91	90.89	(+)

DISCHARGE AT PARTIAL-RECORD AND MISCELLANEOUS SITES

Maximum discharge at crest-stage partial-record stations

Station Name and	Location and	Period of	Water year 1991 maximum			Period of record maximum		
			Date	Gage height	Dis- charge	Date	Gage height	Dis- charge
DES MOINES RIVER BASIN--Continued								
Peas Creek at Boone, Ia. (05481530)	Lat 42°02'04", long 93°51'25", in SE1/4, sec.34, T.84 N., R.26 W., Boone County, Hydrologic Unit 07100004, at culvert on U.S. Highway 30, at the southwest side of Boone city limits.	1990-	04-14-91	(a)	(+)	04-14-91	(a)	(+)
Hardin Creek at Farnhamville, Ia. (05482600)	Lat 42°16'01", long 94°25'10", near NE corner, sec.14, T.86 N., R.31 W., Calhoun County, Hydrologic Unit 07100006, at bridge on State Highway 175, near west city limits of Farnhamville. Drainage area is 43.7 mi ² .	1952-	1991	(+)	(+)	08-26-54	10.48	2,000
Hardin Creek near Farlin, Ia. (05482900)	Lat 42°05'34, long 94°25'39", near N1/4 corner sec.14, T.84 N., R.31 W., Greene County, Hydrologic Unit 07100006, at bridge on county highway, 1.5 mi northeast of Farlin. Drainage area is 101 mi ² .	1951-	06-01-91	13.02	2,630	06-01-91	13.02	2,630
Brushy Fork Creek near Templeton, Ia. (05483318)	Lat 41°56'45", long 94°25'39", in NW1/4, sec.1, T.82 N., R.35 W., Carroll County, Hydrologic Unit 07100007, at bridge on U.S. Highway 71, 4 mi northeast of Templeton. Drainage area is 45.0 mi ² .	1966-	1991	(a)	(+)	06-23-74	90.96	(+)
Middle Raccoon River tributary at Carroll, Ia. (05483349)	Lat 42°02'30", long 94°52'43", in NW1/4, sec.36, T.84 N., R.35 W., Carroll County, Hydrologic Unit 07100007, at bridge on U.S. Highway 71, 1.5 mi south of Carroll. Drainage area is 6.58 mi ² .	1966-	1991	(a)	<106	06-29-86	24.81	3,350
Cedar Creek tributary No.2 near Winterset, Ia. (05485940)	Lat 41°19'49", long 94°03'05", in SW1/4, sec.35, T.76 N., R.28 W., Madison County, Hydrologic Unit 07100008, at culvert on State Highway 92, 0.5 mi west of U.S. Highway 169, 1 mi west of Winterset.	1990-	04-18-91	93.86	(+)	06-17-90	96.39	(+)
Bush Branch Creek near Stanzel, Ia. (05486230)	Lat 41°18'57", long 94°16'42", in SW1/4, sec.2, T.75 N., R.30 W., Adair County, Hydrologic Unit 07100008, at culvert on State Highway 92, 1 mi west of Stanzel.	1990-	04-18-91	87.95	(+)	06-17-90	92.19	(+)
South Otter Creek tributary near Woodburn, Ia. (05487350)	Lat 41°02'08", long 93°35'26", near SW corner sec.11, T.72 N., R.24 W., Clarke County, Hydrologic Unit 07100008, at bridge on county highway, 2 mi north of Woodburn. Drainage area is 0.71 mi ² .	1955-	04-18-91	(+)	(+)	06-07-81	14.06	1,670
White Breast Creek at Lucas, Ia. (05487800)	Lat 41°01'24", long 93°27'56", in NE1/4, sec.23, T.72 N., R.23 W., Lucas County, Hydrologic Unit 07100008, at brige on U.S. Highway 65, near south city limits of Lucas. Drainage area is 128 mi ² .	1953-	04-18-91	16.58	7,760	07-04-81	18.27	15,500
Little White Breast Creek tributary near Chariton, Ia. (05487825)	Lat 41°03'36", long 93°18'12", in SW1/4, sec. 5, T.72 N., R.21 W., Lucas County, Hydrologic Unit 07100008, at culvert on State Highway 14, 2.0 mi mi north of Chariton.	1990-	04-18-91	(+)	(+)	04-18-91	(+)	(+)

Maximum discharge at crest-stage partial-record stations

Station Name and	Location and	Period of	Water year 1991 maximum			Period of record maximum		
			Date	Gage height	Dis- charge	Date	Gage height	Dis- charge
DES MOINES RIVER BASIN--Continued								
Coal Creek near Albia, Ia. (05488620)	Lat 41°01'02", long 92°50'46", in SW1/4, sec.20, T.72 N., R.17 W., Monroe County, Hydrologic Unit 07100009, at bridge on U.S. Highway 34, 2 mi southwest of Albia. Drainage area is 13.5 mi ² .	1966-	04-18-91	82.10	2,080	07-03-82	88.51	12,700
South Avery Creek near Blakesburg, Ia. (04389350)	Lat 41°00'59", long 92°50'46", in SE1/4, sec.19, T.72 N., R.15 W., Wapello County, Hydrologic Unit 07100009, at bridge on U.S. Highway 34, 3.5 mi north of Blakesburg. Drainage area is 33.1 mi ² .	1965-	04-18-91	83.82	4,240	07-03-82	90.20	(+)
Bear Creek at Ottumwa, Ia. (05489490)	Lat 41°00'43", long 92°27'54", in NW1/4, sec.27, T.72 N., R.14 W., Wapello County, Hydrologic Unit 07100009, at bridge on U.S. Highway 34, near west edge of Ottumwa. Drainage area is 22.9 mi ² .	1965-	04-18-91	86.86	1,940	08-07-77	92.13	4,300
FOX RIVER BASIN								
South Fox Creek near West Grove, Ia. (05494110)	Lat 40°43'31", long 92°36'16", in SE1/4, sec.32, T.69 N., R.15 W., Davis County, Hydrologic Unit 07110001, at bridge on State Highway 2, 2.4 mi west of West Grove. Drainage area is 12.2 mi ² .	1965-	04-29-91	80.62	(+)	07-19-82	90.40	(+)
BIG SIOUX RIVER BASIN								
Dawson Creek near Sibley, Ia. (06483440)	Lat 43°23'23", long 95°42'53", near NW corner sec.20, T.99 N., R.41 W., Osceola County, Hydrologic Unit 10170204, at culvert on county highway A30, 2 mi southeast of Sibley. Drainage area is 4.35 mi ² .	1952-	06-05-91	6.17	(+)	02-23-82	7.29	(+)
Burr Oak Creek near Perkins, Ia. (06483495)	Lat 43°14'43", long 96°10'38", in SE1/4, sec.5, T.97 N., R.45 W., Sioux County, Hydrologic Unit 10170204, at bridge on U.S. Highway 75, 4 mi north of Perkins. Drainage area is 30.9 mi ² .	1966-	1991	(a)	(+)	06-20-83	88.37	(+)
PERRY CREEK BASIN								
Perry Creek near Merrill, Ia. (06599800)	Lat 42°43'16", long 96°10'38", in NW1/4, sec.12, T.91 N., R.47 W., Plymouth County, Hydrologic Unit 10230001, at bridge on county highway C44, 5 mi west of Merrill. Drainage area is 8.17 mi ² .	1953-	06-01-91	11.06	(+)	03-27-62	12.22	(+)
Perry Creek near Hinton, Ia. (06599950)	Lat 42°37'57", long 96°22'13", in NE1/4, sec.15, T.90 N., R.47 W., Plymouth County, Hydrologic Unit 10230001, at bridge on county highway, 4 mi west of Hinton. Drainage area is 30.8 mi ² .	1953-	1991	(+)	(+)	06-14-81	38.68	(+)
FLOYD RIVER BASIN								
Little Floyd River near Sanborn, Ia. (06600030)	Lat 43°11'10", long 95°43'30", in NE1/4, sec.31, T.97 N., R.41 W., O'Brien County, Hydrologic Unit 10230002, at bridge on U.S. Highway 18, 3.5 mi west of Sanborn. Drainage area is 8.44 mi ² .	1966-	1991	(a)	(+)	03-02-70	89.04	(+)

Maximum discharge at crest-stage partial-record stations

Station Name and	Location and	Period of	Water year 1991 maximum		Period of record maximum			
			Date	Gage height	Dis- charge	Date	Gage height	Dis- charge
FLOYD RIVER BASIN--Continued								
Sweeney Creek tributary near Sheldon, Ia. (06600036)	Lat 43°11'10", long 95°45'25", in SW1/4, sec.25, T.97 N., R.42 W., O'Brien County, Hydrologic Unit 10230002, at culvert on U.S. Highway 18, 4.8 mi east of Sheldon.	1991-	1991	(a)	(+)	1991	(a)	(+)
Sand Hill Lake Ditch near Sloan, Ia. (06600880)	Lat 42°13'44", long 96°17'39", in SE1/4, sec.27, T.86 N., R.47 W., Woodbury County, Hydrologic Unit 10230001, at culvert on county road, 3.5 mi west of Sloan.	1991-	06-05-91	7.86	(+)	06-05-91	7.86	(+)
MONONA-HARRISON DITCH BASIN								
Big Whiskey Slough near Remsen, Ia. (06601480)	Lat 42°48'28", long 95°53'21", in NW1/4, sec.11, T.92 N., R.43 W., Plymouth County, Hydrologic Unit 10230004, at bridge on State Highway 3, 4.2 mi east of Remsen. Drainage area is 12.9 mi ² .	1966-	1991	(a)	(+)	03-22-79	94.87	(+)
Elliott Creek at Lawton, Ia. (06602190)	Lat 42°28'30", long 96°11'22", in NW1/4, sec.3, T.88 N., R.46 W., Woodbury County, Hydrologic Unit 10230004, at bridge on U.S. Highway 20, at west edge of Lawton. Drainage area is 34.8 mi ² .	1966-	1991	(a)	(+)	06-12-84	86.14	3,150
LITTLE SIOUX RIVER BASIN								
Ocheyedan River near Ocheydan, Ia. (06604510)	Lat 43°25'58", long 95°36'41", in NE1/4, sec.6, T.99 N., R.40 W., Osceola County, Hydrologic Unit 10230003, at bridge on State Highway 9, 4 mi northwest of Ocheyedan. Drainage area is 73.5 mi ² .	1966-	06-06-91	82.55	(+)	04-06-69	86.07	(+)
Dry Run Creek near Harris, Ia. (06604584)	Lat 43°26'42", long 95°27'41", in NE1/4, sec.33, T.100 N., R.39 W., Osceola County, Hydrologic Unit 10230003, at culvert on county highway M12, 1 mi west of Harris.	1990-	04-15-91	12.24	(+)	04-15-91	12.24	(+)
Prairie Creek near Spencer, Ia. (06605340)	Lat 43°05'16", long 95°09'40", in SE1/4, sec.36, T.96 N., R.37 W., Clay County, Hydrologic Unit 10230003, at bridge on U.S. Highway 71, 4 mi south of Spencer. Drainage area is 22.3 mi ² .	1966-	04-14-91	88.24	334	07-04-71	90.77	2,200
Willow Creek near Cornell, Ia. (06605750)	Lat 42°58'21", long 95°09'40", in SE1/4, sec.12, T.94 N., R.37 W., Clay County, Hydrologic Unit 10230003, at bridge on U.S. Highway 71, 2 mi northwest of Cornell. Drainage area is 78.6 mi ² .	1966-	04-14-91	85.44	457	03-22-79	91.49	4,200
Little Sioux River tributary near Peterson, Ia. (06605868)	Lat 42°55'25", long 95°21'55", in NW1/4, sec.32, T.94 N., R.38 W., Clay County, Hydrologic Unit, 10230003, at culvert on State Highway 10, 1.2 mi northwest of Peterson.	1991-	1991	(+)	(+)	1991	(+)	(+)
Willow Creek near Calumet, Ia. (06606231)	Lat 42°58'05", long 95°32'56", in NE1/4, sec.15, T.94 N., R.40 W., O'Brien County, Hydrologic Unit 10230003, at culvert on State Highway 10, 1.5 mi north of Calumet.	1991-	1991	(a)	(+)	1991	(a)	(+)

Maximum discharge at crest-stage partial-record stations

Station Name and	Location and	Period of	Water year 1991 maximum			Period of record maximum		
			Date	Gage height	Dis- charge	Date	Gage height	Dis- charge
LITTLE SIOUX RIVER BASIN--Continued								
Halfway Creek at Schaller, Ia. (0660683710)	Lat 42°30'18", long 95°17'19", in SW1/4, sec.24, T.85 N., R.38 W., Sac County, Hydrologic Unit 10230005, at culvert on State Highway 110, 0.1 mi north of Schaller.	1990-	06-05-91	92.14	(+)	06-05-91	92.14	(+)
Simmons Creek at Mapleton, Ia. (06607197) (discontinued)	Lat 42°10'09", long 95°48'42", in SE1/4, sec.14, T.85 N., R.43 W., Monona County, Hydrologic Unit 10230005, at bridge on county road E16, 1 mi west of Mapleton.	1989-	06-15-91	13.06	(+)	06-17-90	e13.82	(+)
BOYER RIVER BASIN								
Boyer River tributary at Woodbine, Ia. (06609482)	Lat 41°43'58", long 95°43'19", in SE1/4, sec.15, T.80 N., R.43 W., Harrison County, Hydrologic Unit 10230007, at culvert on county highway F32, 0.5 mi west of Woodbine.	1990-	05-18-91	90.84	(+)	05-18-91	90.84	(+)
Willow Creek near Soldier, Ia. (06609560)	Lat 41°55'17", long 95°42'05", near S1/4 corner sec.11, T.82 N., R.42 W., Monona County, Hydrologic Unit 10230001, at bridge on State Highway 37, 6 mi southeast of Soldier. Drainage area is 29.1 mi ² .	1966-	06-15-91	78.73	3,120	07-12-87	81.10	4,440
MOSQUITO CREEK BASIN								
Moser Creek near Earling, Ia. (06610510)	Lat 41°46'35", long 95°26'55", in NE1/4, sec.1, T.80 N., R.40 W., Shelby County, Hydrologic Unit 10230006, at bridge on State Highway 37, 1.5 mi west of Earling. Drainage area is 21.6 mi ² .	1966-	1991	(a)	(+)	06-15-84	87.89	(+)
Mosquito Creek tributary near Neola, Ia. (06610581)	Lat 41°30'06", long 95°35'44", in NE1/4, sec.6, T.77 N., R.41 W., Pottawattamie County, Hydrologic Unit 10230006, at culvert on State Highway 91, 3.8 mi north of Neola.	1991-	06-14-91	80.98	(+)	06-14-91	80.98	(+)
Mosquito Creek at Neola, Ia. (06610600)	Lat 41°26'36", long 95°36'42", in NE1/4, sec.25, T.77 N., R.42 W., Pottawattamie County, Hydrologic Unit 10230006, at bridge on county highway, 0.5 mi south of Neola. Prior to 04-19-63, gage located 0.9 mi upstream, D.A. 128 mi. Drainage area is 131 mi ² .	1952-	06-14-91	17.88	2,430	07-02-58	c23.26	17,300
Keq Creek tributary near Mineola, Ia. (06805849)	Lat 41°07'53", long 95°43'31", in SW1/4, sec.7, T.73 N., R.42 W., Mills County, Hydrologic Unit 10240001, at culvert on county highway H12, 2.4 mi southwest of Mineola.	1991-	06-14-91	78.61	(+)	06-14-91	78.61	(+)
Township Ditch tributary near Thurman, Ia. (06806200)	Lat 40°50'23", long 95°48'30", in NE1/4, sec.29, T.70 N., R.43 W., Fremont County, Hydrologic Unit 10240001, at culvert on county highway I31, 3.2 mi northwest of Thurman.	1991-	04-13-91	(a)	(+)	04-13-91	(a)	(+)

DISCHARGE AT PARTIAL-RECORD AND MISCELLANEOUS SITES

Maximum discharge at crest-stage partial-record stations

Station Name and	Location and	Period of	Water year 1991 maximum			Period of record maximum		
			Date	Gage height	Dis- charge	Date	Gage height	Dis- charge
NISHNABOTNA RIVER BASIN								
Elm Creek near Jacksonville, Ia. (0680737930)	Lat 41°38'44", long 95°12'18", in SW1/4, sec.18, T.79 N., R.37 W., Shelby County, Hydrologic Unit 10240002, at culvert on State Highway 44, 2.8 mi west of Jacksonville.	1990-	06-14-91	91.05	(+)	06-17-90	95.01	(+)
Indian Creek near Emerson, Ia. (06807470)	Lat 41°01'50", long 95°22'51", in NW1/4, sec.19, T.72 N., R.39 W., Montgomery County, Hydrologic Unit 10240002, at bridge on U.S. State Highway 34, 1 mi east of Emerson. Drainage area is 37.3 mi ² .	1966-	06-02-91	86.61	1,610	06-15-82	92.63	15,800
Middle Silver Oakland, Ia (06807760)	Lat 41°19'28", long 95°33'19", in E1/4 corner, sec.4, T.75 N., R.41 W., Pottawattamie County, Hydrologic Unit 10240002, at bridge on county highway, 8.5 mi northwest of Oakland. Drainage area is 25.7 mi ² .	1953-	06-14-91	15.54	2,500	07-04-73	14.73	2,110
Bluegrass Creek at Audubon, Ia. (06808880)	Lat 41°42'46", long 94°55'43", in NW1/4, sec.28, T.73 N., R.35 W., Audubon County, Hydrologic Unit 10240003, at bridge on U.S. Highway 71, near south edge of Audubon. Drainage area is 15.4 mi ² .	1966-	1991	(a)	(+)	06-16-90	86.92	(+)
TARKIO RIVER BASIN								
Tarkio River near Elliott, Ia. (06811760)	Lat 41°06'06", long, 95°06'09", near NE corner sec.28, T.73 N., R.37 W., Montgomery County, Hydrologic Unit 10240005, at bridge on county highway, 4.5 mi southeast of Elliott. Drainage area is 10.7 mi ² .	1952-	06-14-91	11.33	(+)	05-26-87	12.26	3,210
East Tarkio Creek near Stanton, Ia. (06811800)	Lat 41°04'48", long 95°05'34", in W1/2 sec.34, T.73 N., R.37 W., Montgomery County, Hydrologic Unit 10240005, at bridge on county highway H24, 7 mi north of Stanton. Drainage area is 4.66 mi ² .	1952-	06-14-91	9.48	888	06-09-67	13.74	4,790
Tarkio River tributary near Stanton, Ia. (06811820)	Lat 41°02'38", long 95°05'55", near NE corner sec.16, T.72 N., R.37 W., Montgomery County, Hydrologic Unit 10240005, at box culvert on county highway H63, 4 mi north of Stanton. Drainage area is 0.67 mi ² .	1952-	1991	(a)	(+)	06-09-67	5.18	835
Snake Creek near Yorktown, Ia. (06811875)	Lat 40°44'33", long 95°07'46", in NW1/4, sec.32, T.69 N., R.37 W., Page County, Hydrologic Unit 10240005, at bridge on State Highway 2, 1.5 mi northeast of Yorktown. Drainage area is 9.10 mi ² .	1966-	06-01-91	88.69	934	07-09-87	95.24	3,080
NODAWAY RIVER BASIN								
West Nodaway River at Massena, Ia. (06816290)	Lat 41°14'44", long 94°45'27", in SE1/4, sec.27, T.70 N., R.34 W., Cass County, Hydrologic Unit 10240009, at bridge on State Highway 148, at southeast corner of Massena. Drainage area is 23.4 mi ² .	1966-	06-14-91	80.11	3,770	02-01-73	82.39	(+)

Maximum discharge at crest-stage partial-record stations

Station Name and	Location and	Period of	Water year 1991 maximum			Period of record maximum		
			Date	Gage height	Dis- charge	Date	Gage height	Dis- charge
PLATTE RIVER BASIN								
Middle Branch 102 River near Gravity, Ia. (06819110)	Lat 40°49'40", long 94°44'18", in SE1/4, sec.27, T.70 N., R.34 W., Taylor County, Hydrologic Unit 10240013, at bridge on State Highway 148, 4.8 mi north of Gravity. Drainage area is 33.5 mi ² .	1966-	1991	(a)	(+)	02-01-73	83.65	(+)
Seven Mile Creek near Thayer, Ia. (06897858)	Lat 41°01'37", long 94°00'03", in SE1/4, sec.18, T.72 N., R.27 W., Clarke County, Hydrologic Unit 10280102, at culvert on U.S. Highway 34, 2.6 mi east of Thayer.	1991-	06-15-91	21.69	(+)	06-15-91	21.69	(+)
CHARITON RIVER BASIN								
Chariton River near Udell, Ia. (06903980)	Lat 40°46'53", long 92°50'12", in NE1/4, sec.17, T.69 N., R.17 W., Appanoose County, Hydrologic Unit 10280201, at bridge on county highway, 5 west of Udell. Drainage area is 47.8 mi ² .	1972-	04-29-91	852.88	2,550	07-16-82	860.22	(+)

+ Not determined.

a Peak stage did not reach bottom of gage.

b Ice affected.

c Old gage datum.

d Estimate.

e Peak affected by backwater.

< Less than.

MISCELLANEOUS WATER QUALITY DATA

MISCELLANEOUS WATER QUALITY DATA									
		DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)			DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)
DATE	TIME				DATE	TIME			
05388250		UPPER IOWA RIVER NEAR DORCHESTER, IA (LAT 43 25 16N LONG 091 30 31W)							
NOV 1990 06...	0915	236	5.5	570	APR 1991 16...	1720	2340	11.0	490
DEC 18...	1220	204	0.0	565	JUN 05...	1700	992	19.0	550
JAN 1991 31...	1130	129	0.0	600	JUL 30...	1425	392	21.5	430
MAR 13...	1000	625	2.0	500	SEP 10...	0915	263	18.0	530
05411600		TURKEY RIVER AT SPILLVILLE, IA (LAT 43 12 28N LONG 091 56 56W)							
NOV 1990 05...	1440	59	8.0	590	APR 1991 16...	1015	685	8.0	470
DEC 17...	1615	44	0.0	560	JUN 04...	1455	232	19.0	560
JAN 1991 31...	1530	21	0.0	600	JUL 30...	1030	70	19.5	550
MAR 12...	0940	240	2.5	500	SEP 09...	1435	44	27.0	580
05412500		TURKEY RIVER AT GARBER, IA (LAT 42 44 24N LONG 091 15 42W)							
NOV 1990 06...	1505	418	5.0	590	JUN 1991 06...	1745	2160	28.0	580
DEC 19...	1400	390	0.0	550	JUL 30...	1830	700	22.0	600
JAN 1991 30...	1400	201	0.0	650	SEP 10...	1405	447	24.0	580
MAR 13...	1600	1810	3.0	500					
05418450		NORTH FORK MAQUOKETA RIVER AT FULTON, IA (LAT 42 08 48N LONG 090 40 33W)							
NOV 1990 07...	1130	147	4.5	608	APR 1991 18...	1615	718	12.0	625
DEC 20...	1345	171	2.0	625	JUN 07...	1220	300	21.5	655
JAN 1991 29...	1615	93	0.0	650	SEP 09...	1455	165	25.0	500
MAR 14...	1520	381	5.0	550					
05418500		MAQUOKETA RIVER NEAR MAQUOKETA, IA (LAT 42 05 05N LONG 090 38 04W)							
NOV 1990 07...	0945	459	5.0	580	JUN 1991 18...	1345	1600	26.0	550
DEC 20...	1000	503	1.5	650	AUG 01...	1400	467	24.5	475
MAR 1991 14...	1230	1010	4.0	500	SEP 09...	1215	500	24.0	500
APR 18...	1300	3070	11.0	600					
05421000		WAPSIPINICON RIVER AT INDEPENDENCE, IA (LAT 42 27 49N LONG 091 53 42W)							
NOV 1990 05...	1140	328	8.5	490	APR 1991 15...	1400	8540	10.0	300
DEC 17...	1200	366	1.0	525	JUN 03...	1300	4830	22.5	345
FEB 1991 01...	1130	124	0.0	550	JUL 29...	1510	243	23.0	400
MAR 11...	1300	1710	2.5	400	SEP 09...	1025	132	23.0	355
05422000		WAPSIPINICON RIVER NEAR DE WITT, IA (LAT 41 46 01N LONG 090 32 05W)							
NOV 1990 05...	1705	918	6.0	505	APR 1991 19...	1300	12100	--	320
DEC 20...	1700	1210	2.0	640	JUN 18...	1800	2340	27.0	500
JAN 1991 28...	1750	495	0.0	500	AUG 01...	1700	545	26.0	320
MAR 15...	1130	3010	4.0	425	SEP 10...	0945	338	23.5	318
05422470		CROW CREEK AT BETTENDORF, IA (LAT 41 33 03N LONG 090 27 15W)							
DEC 1990 21...	1215	20	1.5	750	JUN 1991 19...	1140	5.7	25.0	700
JAN 1991 28...	1215	6.6	0.0	800	AUG 02...	1015	0.44	25.0	600
MAR 15...	1445	20	5.5	700	SEP 10...	1215	3.4	23.0	266
APR 17...	1115	17	11.5	720					

MISCELLANEOUS WATER QUALITY DATA

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DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)
05449000 EAST BRANCH IOWA RIVER NEAR KLEMME, IA (LAT 43 00 31N LONG 093 37 42W)									
NOV 1990					MAY 1991				
13...	1340	16	3.0	1000	08...	1315	4.0	16.0	650
JAN 1991					JUL				
04...	1315	4.6	0.0	950	26...	1230	34	20.0	760
FEB					SEP				
22...	1440	14	0.0	440	17...	1510	68	20.0	740
MAR									
15...	1140	14	1.0	800					
05449500 IOWA RIVER NEAR ROWAN, IA (LAT 42 45 36N LONG 093 37 23W)									
NOV 1990					MAY 1991				
13...	1455	53	7.0	940	18...	1225	5140	13.0	320
JAN 1991					19...	1130	5430	14.0	420
04...	1515	22	0.0	850	SEP				
FEB					17...	1300	203	13.0	690
22...	1205	46	0.0	430					
MAR									
20...	1115	804	4.0	640					
05451700 TIMBER CREEK NEAR MARSHALLTOWN, IA (LAT 42 00 25N LONG 092 51 15W)									
NOV 1990					APR 1991				
06...	1340	24	6.0	0	10...	1605	96	10.0	730
DEC					MAY				
18...	1110	19	1.0	600	16...	1345	1700	21.5	700
FEB 1991					JUL				
27...	1050	37	0.5	580	08...	1505	51	24.0	510
MAR					AUG				
14...	1155	130	3.0	0	22...	1000	8.4	23.0	530
05451900 RICHLAND CREEK NEAR HAVEN, IA (LAT 41 53 58N LONG 092 28 27W)									
OCT 1990					MAY 1991				
24...	1345	9.0	9.5	600	28...	1400	75	26.0	520
DEC					JUL				
07...	1515	13	0.5	530	09...	1300	21	25.0	450
MAR 1991					AUG				
11...	1445	23	9.0	510	14...	1345	4.0	27.0	430
APR					SEP				
08...	1310	46	12.0	510	19...	1420	2.0	15.0	470
05452000 SALT CREEK NEAR ELBERON, IA (LAT 41 57 51N LONG 092 18 47W)									
OCT 1990					MAY 1991				
25...	1215	49	7.0	650	22...	1220	949	22.0	315
DEC					JUL				
07...	1230	63	0.5	630	09...	1545	85	26.0	500
JAN 1991					AUG				
18...	1215	45	0.0	600	14...	1125	24	24.0	540
MAR					SEP				
04...	1225	194	2.0	480	18...	1500	28	17.0	600
APR									
08...	1055	176	17.0	550					
05452200 WALNUT CREEK NEAR HARTWICK, IA (LAT 41 50 06N LONG 092 23 10W)									
DEC 1990					MAY 1991				
10...	1130	18	0.5	500	28...	1140	61	25.0	490
JAN 1991					JUL				
22...	1320	8.7	0.0	400	09...	1110	19	23.0	540
MAR					AUG				
04...	1630	50	8.0	450	16...	1240	2.7	24.0	440
APR									
08...	1555	57	13.0	500					
05453000 BIG BEAR CREEK AT LADORA, IA (LAT 41 44 58N LONG 092 10 55W)									
OCT 1990					MAY 1991				
26...	1130	24	6.0	680	29...	1600	179	25.0	500
DEC					JUL				
06...	1300	30	0.0	630	08...	1445	54	28.0	600
MAR 1991					AUG				
11...	1105	67	5.0	550	16...	0920	10	23.0	540
APR					SEP				
11...	1420	198	9.0	520	17...	1600	22	23.0	610
05453100 IOWA RIVER AT MARENGO, IA (LAT 41 48 48N LONG 092 03 51W)									
OCT 1990					APR 1991				
25...	1550	616	9.0	675	11...	1210	4330	10.0	480
DEC					JUN				
06...	1045	442	0.0	630	27...	1225	3230	27.0	570
26...	1320	625	0.0	550	AUG				
JAN 1991					15...	1245	1220	27.0	560
15...	1205	464	0.0	650	SEP				
MAR					18...	1215	1050	19.0	400
15...	1212	4420	3.0	470					

MISCELLANEOUS WATER QUALITY DATA

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)
05454000 RAPID CREEK NEAR IOWA CITY, IA (LAT 41 41 19N LONG 091 29 15W)									
OCT 1990					APR 1991				
22...	1515	2.3	7.0	600	09...	1310	30	11.0	400
DEC 11...	1545	8.4	1.0	600	MAY 24...	1000	19	20.0	570
JAN 1991	1245	7.8	0.0	600	JUL 02...	1230	3.3	29.0	590
16...					SEP 16...	1545	0.02	19.0	450
MAR 06...	1600	18	5.0	570					
05454300 CLEAR CREEK NEAR CORALVILLE, IA (LAT 41 40 36N LONG 091 35 55W)									
OCT 1990					MAY 1991				
22...	1045	21	6.5	575	21...	1100	52	22.0	560
DEC 04...	1320	33	0.5	610	JUL 02...	1500	21	31.0	625
JAN 1991	1510	31	0.0	600	AUG 19...	1430	3.8	27.0	650
15...					SEP 16...	1130	3.2	22.0	710
MAR 07...	1216	54	4.0	450					
APR 09...	1055	189	12.0	400					
05454500 IOWA RIVER AT IOWA CITY, IA (LAT 41 39 24N LONG 091 32 27W)									
OCT 1990					JUL 1991				
30...	1440	676	12.0	650	01...	1615	8230	29.0	480
MAR 1991	1315	3060	5.0	500	AUG 20...	0900	1030	25.0	410
12...					SEP 17...	1230	196	23.0	610
APR 10...	1142	5950	15.0	610					
MAY 20...	0830	6300	17.0	440					
05455010 SOUTH BRANCH RALSTON CREEK AT IOWA CITY, IA (LAT 41 39 05N LONG 091 30 27W)									
OCT 1990					MAY 1991				
23...	0935	0.25	6.0	760	21...	1500	1.0	22.0	680
MAR 1991	1255	1.7	5.0	650	JUL 02...	1000	0.26	26.0	600
06...									
APR 09...	1520	1.8	10.0	625					
05455100 OLD MANS CREEK NEAR IOWA CITY, IA (LAT 41 36 23N LONG 091 36 56W)									
OCT 1990					MAY 1991				
26...	1320	28	7.0	680	20...	1525	124	19.0	500
DEC 05...	1125	108	0.0	550	JUL 01...	1245	40	29.0	550
MAR 1991	1405	108	5.0	575	AUG 19...	1000	8.0	20.0	450
08...					SEP 16...	0900	2.3	21.0	455
APR 10...	1040	251	8.0	480					
05455500 ENGLISH RIVER AT KALONA, IA (LAT 41 27 59N LONG 091 42 56W)									
NOV 1990					JUN 1991				
19...	1530	132	9.0	526	25...	1015	174	22.0	540
JAN 1991	1440	126	0.0	500	AUG 07...	1815	24	26.0	480
11...					SEP 16...	0855	11	21.5	452
APR 05...	1700	471	15.0	475					
05455700 IOWA RIVER NEAR LONE TREE, IA (LAT 41 25 15N LONG 091 28 25W)									
NOV 1990					MAY 1991				
20...	0950	1150	9.0	618	08...	0940	7400	14.0	548
JAN 1991	1220	918	0.0	700	JUN 25...	0920	10300	24.5	451
14...					JUL 30...	0930	1340	24.5	578
FEB 14...	1155	3730	0.0	409	SEP 10...	0950	255	25.0	581
MAR 28...	1050	12900	12.0	455					
05457700 CEDAR RIVER AT CHARLES CITY, IA (LAT 43 03 45N LONG 092 40 23W)									
NOV 1990					APR 1991				
20...	0820	256	6.0	580	24...	0810	1590	9.0	560
DEC 20...	1040	291	1.0	480	JUL 11...	0715	420	24.0	550
FEB 1991	1655	214	2.0	610	AUG 20...	0740	742	20.0	530

MISCELLANEOUS WATER QUALITY DATA

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DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)
05458000 LITTLE CEDAR RIVER NEAR IONIA, IA (LAT 43 02 05N LONG 092 30 05W)									
NOV 1990					MAY 1991				
20...	1015	49	6.0	550	01...	1200	1840	11.0	640
DEC					JUL				
26...	1400	24	0.5	610	11...	0900	78	23.0	470
FEB 1991					AUG				
19...	1530	29	1.0	590	20...	1000	147	20.0	400
APR									
23...	1715	424	9.0	620					
05458500 CEDAR RIVER AT JANESVILLE, IA (LAT 42 38 54N LONG 092 27 54W)									
NOV 1990					APR 1991				
20...	1545	456	6.0	800	24...	1615	2860	9.5	790
DEC					MAY				
27...	1045	356	0.5	570	20...	1655	13500	10.0	750
JAN 1991					JUL				
02...	1445	313	0.0	640	10...	1130	684	24.0	500
09...	1345	272	0.0	610	AUG				
16...	1115	312	0.0	610	20...	1655	1240	22.5	540
FEB									
01...	1230	261	0.0	640					
20...	1300	341	2.5	570					
28...	1100	403	2.5	620					
05463000 BEAVER CREEK AT NEW HARTFORD, IA (LAT 42 30 50N LONG 092 37 55W)									
NOV 1990					APR 1991				
21...	1135	95	6.0	820	25...	1150	688	0.0	630
DEC					JUL				
27...	1730	60	0.0	540	09...	1435	176	24.0	575
FEB 1991					AUG				
01...	1110	39	0.0	750	21...	1045	82	22.0	540
MAR									
28...	1525	868	6.0	700					
05463500 BLACK HAWK CREEK AT HUDSON, IA (LAT 42 24 28N LONG 092 27 47W)									
NOV 1990					APR 1991				
21...	0935	87	6.0	800	25...	0920	503	9.0	600
DEC					JUL				
28...	1240	59	0.0	580	09...	1635	141	23.0	570
FEB 1991					AUG				
20...	1655	79	0.5	560	21...	0920	32	19.0	530
MAR									
28...	1235	1700	6.0	620					
05464500 CEDAR RIVER AT CEDAR RAPIDS, IA (LAT 41 58 14N LONG 091 40 01W)									
DEC 1990					JUN 1991				
05...	1445	1220	2.5	860	28...	1215	5990	27.0	540
MAR 1991					AUG				
08...	1215	5500	3.0	528	28...	1245	2540	27.5	442
MAY									
22...	1400	43600	18.0	400					
05465000 CEDAR RIVER NEAR CONESVILLE, IA (LAT 41 24 36N LONG 091 17 06W)									
JAN 1991					JUN 1991				
14...	1610	1830	0.0	580	24...	1040	10300	22.5	602
FEB					JUL				
15...	0948	--	0.0	634	29...	1045	3510	23.0	458
MAR					SEP				
29...	1515	22900	9.5	436	09...	0915	2230	23.0	438
MAY									
07...	1030	21700	10.5	537					
05470000 SOUTH SKUNK RIVER NEAR AMES, IA (LAT 42 04 05N LONG 093 37 02W)									
NOV 1990					APR 1991				
09...	1140	34	3.0	800	03...	1150	344	10.0	840
DEC					MAY				
19...	1450	74	1.0	850	16...	1700	3940	14.5	540
FEB 1991					SEP				
27...	1620	171	3.0	700	16...	1338	88	22.0	570
05470500 SQUAW CREEK AT AMES, IA (LAT 42 01 21N LONG 093 37 45W)									
DEC 1990					APR 1991				
19...	1325	39	1.0	760	03...	0925	205	10.0	700
FEB 1991					SEP				
27...	1415	82	2.0	600	16...	1500	6.3	22.0	580
MAR									
20...	1250	608	8.0	690					

MISCELLANEOUS WATER QUALITY DATA

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05471200 INDIAN CREEK NEAR MINGO, IA (LAT 41 48 17N LONG 093 18 36W)									
OCT 1990					MAY 1991				
25...	1045	26	7.5	780	23...	1140	797	18.0	640
DEC					JUL				
05...	1255	43	0.5	810	12...	1005	72	22.5	660
JAN 1991					AUG				
17...	1650	33	0.0	760	14...	1345	13	27.5	580
FEB					SEP				
28...	1105	115	0.5	710	20...	1200	19	12.5	500
APR									
08...	1120	175	18.0	700					
05471500 SOUTH SKUNK RIVER NEAR OSKALOOSA, IA (LAT 41 21 19N LONG 092 39 31W)									
OCT 1990					JUN 1991				
22...	1145	262	8.5	640	26...	0935	1480	24.0	680
DEC					AUG				
17...	1350	494	2.0	580	07...	1005	297	21.0	545
JAN 1991					SEP				
15...	1030	191	0.0	640	17...	1045	207	20.0	370
APR									
04...	1630	1670	14.0	680					
05472500 NORTH SKUNK RIVER NEAR SIGOURNEY, IA (LAT 41 18 03N LONG 092 12 16W)									
NOV 1990					JUN 1991				
13...	1610	154	6.0	522	25...	1700	378	24.0	540
JAN 1991					AUG				
11...	1140	126	0.0	550	07...	1410	59	23.0	500
APR					SEP				
05...	1120	609	14.0	480	16...	1230	31	23.0	526
05473400 CEDAR CREEK NEAR OAKLAND MILLS, IA (LAT 40 55 20N LONG 091 40 10W)									
NOV 1990					MAY 1991				
19...	1230	43	7.0	599	09...	1610	--	17.5	528
JAN 1991					JUN				
10...	1345	36	0.0	650	21...	1025	50	27.0	493
FEB					JUL				
07...	0938	--	0.0	194	18...	1625	6.9	27.0	433
MAR					SEP				
25...	1225	492	9.5	469	23...	0925	2.4	12.5	493
05476500 DES MOINES RIVER AT ESTHERVILLE, IA (LAT 43 23 51N LONG 094 50 38W)									
OCT 1990					APR 1991				
04...	1015	115	10.0	620	30...	1145	950	9.5	770
NOV					MAY				
14...	1200	34	7.0	1250	21...	1300	1970	18.0	790
DEC					JUN				
28...	1245	6.6	0.0	2400	04...	1030	4030	19.5	860
FEB 1991					AUG				
06...	1110	6.2	2.0	650	21...	1500	285	22.5	990
MAR									
21...	1215	279	5.0	640					
05476750 DES MOINES RIVER AT HUMBOLDT, IA (LAT 42 43 12N LONG 094 13 06W)									
NOV 1990					MAR 1991				
16...	1030	104	8.5	850	25...	1345	3250	5.0	640
DEC					JUN				
20...	1250	75	0.0	760	07...	1000	6930	21.0	600
FEB 1991									
20...	1445	71	3.0	780					
05479000 EAST FORK DES MOINES RIVER AT DAKOTA CITY, IA (LAT 42 43 26N LONG 094 11 30W)									
NOV 1990					MAY 1991				
16...	1245	71	9.0	780	08...	1000	6830	12.0	590
DEC					18...	0945	11800	11.0	500
20...	1500	55	0.0	540	JUL				
FEB 1991					03...	1000	1720	22.0	570
20...	1300	58	3.0	760					
MAR									
15...	0930	614	4.0	840					
05480500 DES MOINES RIVER AT FORT DODGE, IA (LAT 42 30 22N LONG 094 12 04W)									
OCT 1990					FEB 1991				
02...	1600	199	15.5	560	20...	1000	175	3.0	650
DEC					26...	1400	463	2.0	550
05...	1040	127	2.0	790	MAR				
17...	1030	196	2.0	670	25...	1000	9860	8.0	740
31...	1010	115	0.0	650	MAY				
JAN 1991					18...	1300	22900	13.5	490
07...	1615	138	0.0	620					
14...	1130	167	0.0	650					
28...	1145	145	0.0	640					

MISCELLANEOUS WATER QUALITY DATA

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DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)
05481000 BOONE RIVER NEAR WEBSTER CITY, IA (LAT 42 26 01N LONG 093 48 12W)									
NOV 1990					MAY 1991				
13...	0955	66	3.0	1000	18...	1650	9860	14.0	360
FEB 1991					JUN				
26...	1100	224	1.0	560	05...	1040	12000	18.0	320
MAR					AUG				
21...	1305	2220	8.0	700	05...	1325	115	27.0	650
APR					SEP				
29...	1300	5800	9.0	770	17...	1030	260	20.0	840
05481300 DES MOINES RIVER NEAR STRATFORD, IA (LAT 42 15 04N LONG 093 59 52W)									
NOV 1990					APR 1991				
09...	1410	287	3.0	800	03...	1425	6390	10.0	750
MAR 1991					MAY				
11...	1305	2550	3.5	750	19...	1225	31900	13.0	410
05481950 BEAVER CREEK NEAR GRIMES, IA (LAT 41 41 18N LONG 093 44 08W)									
NOV 1990					APR 1991				
08...	1250	44	4.0	640	02...	1440	370	12.0	800
DEC					SEP				
19...	0920	121	1.0	750	16...	1715	7.8	22.0	660
FEB 1991									
27...	1800	175	3.0	600					
05482135 NORTH RACCOON RIVER NEAR NEWELL, IA (LAT 42 36 16N LONG 095 02 42W)									
NOV 1990					MAR 1991				
15...	1210	6.0	15.0	750	11...	1315	40	13.0	600
DEC					JUL				
18...	1515	9.9	0.0	660	01...	1700	20	26.0	560
FEB 1991									
22...	1330	12	0.0	790					
05482170 BIG CEDAR CREEK NEAR VARINA, IA (LAT 42 41 16N LONG 094 47 52W)									
NOV 1990					APR 1991				
16...	0950	3.7	5.0	800	19...	1520	360	6.0	760
DEC					JUL				
18...	1100	11	0.0	680	01...	1315	67	23.0	540
FEB 1991					AUG				
21...	1055	2.6	0.0	860	21...	1130	15	24.0	740
MAR									
11...	1030	31	7.0	670					
05482300 NORTH RACCOON RIVER NEAR SAC CITY, IA (LAT 42 21 16N LONG 094 59 26W)									
NOV 1990					APR 1991				
15...	1440	56	15.0	740	27...	1315	3400	6.5	660
DEC					JUN				
19...	1542	86	0.0	760	05...	1350	5170	16.0	480
FEB 1991					JUL				
22...	1745	474	0.0	860	03...	1545	511	24.0	690
MAR					AUG				
11...	1600	232	10.0	620	23...	1000	139	23.0	840
29...	1145	1860	3.0	660					
05482500 NORTH RACCOON RIVER NEAR JEFFERSON, IA (LAT 41 59 17N LONG 094 22 36W)									
NOV 1990					MAY 1991				
14...	1330	16	15.0	650	07...	1615	8260	12.0	580
DEC					JUN				
19...	1100	142	1.0	760	06...	1230	13400	20.0	540
MAR 1991									
28...	1300	4470	4.0	660					
05483000 EAST FORK HARDIN CREEK NEAR CHURDAN, IA (LAT 42 06 27N LONG 094 22 12W)									
OCT 1990					APR 1991				
04...	0900	3.9	14.0	630	19...	1120	159	8.0	670
NOV					MAY				
14...	0915	6.2	11.0	670	24...	1135	52	7.0	480
DEC					JUL				
19...	0935	5.7	1.0	740	05...	1145	9.7	23.0	560
FEB 1991									
25...	1435	19	4.0	720					
05483600 MIDDLE RACCOON RIVER AT PANORA, IA (LAT 41 41 14N LONG 094 22 15W)									
FEB 1991					MAY 1991				
27...	1045	143	3.0	660	06...	1340	1740	7.0	640
APR					SEP				
01...	1420	398	11.0	650	09...	1620	38	29.0	660

MISCELLANEOUS WATER QUALITY DATA

MISCELLANEOUS WATER QUALITY DATA									
DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)
05484000 SOUTH RACCOON RIVER AT REDFIELD, IA (LAT 41 35 22N LONG 094 09 04W)									
NOV 1990					MAY 1991				
18...	1350	16	1.0	590	07...	1215	2220	12.0	580
FEB 1991					SEP				
27...	1300	275	1.0	600	09...	1345	118	29.0	770
05484800 WALNUT CREEK AT DES MOINES, IA (LAT 41 35 14N LONG 093 42 11W)									
OCT 1990					MAY 1991				
24...	0845	3.6	8.5	720	21...	0750	168	17.5	610
DEC					JUL				
07...	1155	10	1.0	1030	09...	1135	38	22.0	670
JAN 1991					29...	1420	10	25.0	540
17...	0940	7.2	0.0	350	SEP				
FEB					19...	1650	3.8	14.5	680
26...	0845	5.9	0.0	740					
APR									
09...	1620	64	12.0	690					
05485500 DES MOINES RIVER BELOW RACCOON R AT DES MOINES, IA (LAT 41 34 30N LONG 093 35 48W)									
OCT 1990					JUL 1991				
24...	1305	771	12.0	650	09...	1645	12200	26.0	630
DEC					AUG				
06...	1545	748	2.0	750	13...	1435	9410	25.0	520
FEB 1991					SEP				
26...	1215	3410	2.5	760	19...	1430	1330	20.0	760
MAY									
21...	1105	28500	18.0	620					
05485640 FOURMILE CREEK AT DES MOINES, IA (LAT 41 36 50N LONG 093 32 43W)									
OCT 1990					MAY 1991				
23...	1605	6.5	13.0	1010	21...	1245	240	17.5	690
DEC					JUL				
06...	1315	11	0.5	980	09...	1335	29	23.0	820
JAN 1991					AUG				
17...	1240	12	0.0	980	13...	1140	10	23.0	900
FEB					SEP				
26...	1405	26	0.0	940	19...	1030	5.6	10.5	910
APR									
09...	1210	125	11.0	710					
05486000 NORTH RIVER NEAR NORWALK, IA (LAT 41 27 25N LONG 093 39 10W)									
OCT 1990					JUL 1991				
23...	1405	5.6	8.5	560	09...	0900	49	23.0	480
DEC					AUG				
07...	0915	22	0.5	480	12...	1615	33	24.0	350
FEB 1991					29...	1525	5.4	26.0	500
25...	1600	61	0.0	410	SEP				
APR					18...	1650	2.4	16.0	470
10...	1005	141	11.0	410					
05486490 MIDDLE RIVER NEAR INDIANOLA, IA (LAT 41 25 27N LONG 093 35 09W)									
OCT 1990					APR 1991				
23...	1240	19	10.0	560	10...	1140	237	10.5	450
DEC					JUL				
10...	1305	38	1.0	590	08...	1200	91	25.5	510
JAN 1991					AUG				
16...	1505	14	0.0	520	12...	1445	68	26.0	400
FEB					SEP				
25...	1350	47	0.5	430	18...	1425	17	18.0	560
05487470 SOUTH RIVER NEAR ACKWORTH, IA (LAT 41 20 14N LONG 093 29 10W)									
OCT 1990					MAY 1991				
23...	1055	19	8.5	500	20...	1130	163	18.0	475
DEC					JUL				
10...	1125	78	0.5	560	03...	0955	23	24.5	510
JAN 1991					AUG				
16...	1300	21	0.0	550	12...	1320	12	28.0	470
FEB					SEP				
25...	1200	37	0.0	440	18...	1215	6.6	17.0	520
APR									
10...	1340	145	12.5	540					

MISCELLANEOUS WATER QUALITY DATA

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MIDDLEBURY WATER QUALITY DATA					MIDDLEBURY WATER QUALITY DATA				
DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)
05487980 WHITE BREAST CREEK NEAR DALLAS, IA (LAT 41 14 41N LONG 093 16 08W)									
OCT 1990					JUN 1991				
23...	0905	21	8.5	575	26...	1415	29	31.0	520
DEC					AUG				
18...	1335	122	0.5	510	05...	1430	7.0	22.0	500
APR 1991					SEP				
03...	0950	122	11.0	575	18...	1040	4.2	15.5	570
05488200 ENGLISH CREEK NEAR KNOXVILLE, IA (LAT 41 16 00N LONG 093 05 00W)									
OCT 1990					JUN 1991				
22...	1725	0.94	10.0	880	26...	1230	5.6	26.0	545
DEC					AUG				
18...	1555	48	0.5	500	05...	1745	0.27	22.0	870
JAN 1991					SEP				
15...	1530	2.1	0.0	900	27...	1705	0.07	21.0	1550
APR									
02...	1745	31	12.0	580					
05488500 DES MOINES RIVER NEAR TRACY, IA (LAT 41 16 53N LONG 092 51 34W)									
OCT 1990					AUG 1991				
22...	1405	721	12.0	650	06...	1200	17500	23.0	580
APR 1991					30...	1220	1450	25.0	640
02...	1445	27700	9.0	640	SEP				
					17...	1325	613	24.0	670
05489000 CEDAR CREEK NEAR BUSSEY, IA (LAT 41 13 09N LONG 092 54 38W)									
OCT 1990					FEB 1991				
22...	1600	12	10.0	790	13...	1445	118	1.5	520
DEC					APR				
06...	1400	55	2.0	663	03...	1330	116	12.0	650
17...	1630	76	2.5	560	AUG				
JAN 1991					06...	1800	7.8	22.0	690
08...	1030	15	0.0	850					
15...	1210	22	0.0	780					
05489500 DES MOINES RIVER AT OTTUMWA, IA (LAT 41 00 39N LONG 092 24 40W)									
NOV 1990					JUL 1991				
15...	0710	1350	9.0	664	26...	0640	18200	26.0	562
MAR 1991					AUG				
27...	1205	21900	11.0	609	15...	1230	18200	25.5	616
MAY					SEP				
10...	0705	19900	14.5	524	19...	1150	2550	20.0	773
05490500 DES MOINES RIVER AT KEOSAUQUA, IA (LAT 40 43 40N LONG 091 57 34W)									
NOV 1990					JUN 1991				
15...	1340	1250	14.0	617	20...	1320	32800	25.0	528
MAR 1991					JUL				
25...	1640	17100	11.5	581	18...	0830	22300	26.0	550
MAY					SEP				
06...	1410	27900	12.0	354	20...	0940	2080	12.0	670
06483500 ROCK RIVER NEAR ROCK VALLEY, IA (LAT 43 12 52N LONG 096 17 39W)									
NOV 1990					APR 1991				
06...	1415	36	3.0	840	17...	1715	367	13.0	850
DEC					MAY				
18...	1600	33	0.0	940	29...	0830	231	22.0	810
JAN 1991					JUL				
24...	0950	6.0	0.0	865	09...	1315	110	21.0	625
FEB					AUG				
27...	1200	49	0.0	790	20...	1230	45	22.0	550
06600000 PERRY CREEK AT 38TH STREET, SIOUX CITY, IA (LAT 42 32 05N LONG 096 24 35W)									
NOV 1990					MAY 1991				
06...	0900	4.8	2.0	790	30...	1345	6.3	22.0	795
DEC					JUN				
17...	1515	5.8	0.0	820	15...	0955	965	19.0	215
JAN 1991					JUL				
25...	0940	4.1	0.0	765	11...	1230	11	23.0	595
FEB					AUG				
25...	1645	7.7	1.0	700	21...	1300	3.5	24.0	695
APR					SEP				
17...	0815	11	8.0	780	30...	1645	2.9	16.0	750

MISCELLANEOUS WATER QUALITY DATA

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06600100 FLOYD RIVER AT ALTON, IA (LAT 42 58 55N LONG 096 00 03W)									
NOV 1990					APR 1991				
07...	1145	6.2	3.0	1200	17...	1345	160	10.0	900
DEC					MAY				
18...	0915	4.8	0.0	1350	30...	0930	77	24.0	925
JAN 1991					JUL				
24...	1220	1.1	0.0	1320	09...	1530	25	22.0	915
FEB					AUG				
27...	1530	11	1.0	1180	21...	0815	9.5	22.0	875
06600300 WEST BRANCH FLOYD RIVER NEAR STRUBLE, IA (LAT 42 55 15N LONG 096 10 30W)									
NOV 1990					MAY 1991				
06...	1145	8.4	2.0	1410	29...	1430	35	26.0	1190
DEC					JUL				
18...	1330	7.7	0.0	1420	09...	1800	23	22.0	1100
JAN 1991					AUG				
24...	1545	3.6	0.0	1360	20...	0815	6.7	17.0	1210
FEB					SEP				
27...	0845	13	0.0	1130	19...	1120	13	15.0	1130
APR									
17...	1140	51	12.0	1200					
06600500 FLOYD RIVER AT JAMES, IA (LAT 42 34 36N LONG 096 18 43W)									
NOV 1990					FEB 1991				
05...	1615	47	5.0	1090	14...	1115	34	1.0	1000
DEC					20...	1115	53	0.0	1100
06...	1215	42	0.0	1380	28...	0930	73	0.0	920
17...	1315	54	0.0	1180	MAR				
20...	0915	21	0.0	1200	18...	1600	67	10.0	975
28...	1115	37	0.0	600	APR				
JAN 1991					19...	0830	310	8.0	930
08...	1320	21	0.0	500	MAY				
10...	1120	13	0.0	1140	28...	1800	217	27.0	990
14...	1610	11	0.0	680	JUL				
23...	1630	19	0.0	481	10...	1730	147	26.0	900
29...	1100	17	0.0	1100	AUG				
FEB					21...	1100	55	23.0	940
06...	1120	33	2.0	1120	SEP				
					30...	1430	41	18.0	1010
06601200 MISSOURI RIVER AT DECATUR, NE (LAT 42 00 26N LONG 096 14 29W)									
OCT 1990					APR 1991				
01...	0920	29100	18.0	780	08...	1000	24300	14.0	740
10...	1115	29400	13.0	780	15...	1300	24800	9.0	805
16...	0930	28100	11.0	800	25...	0920	24500	12.0	750
24...	1130	28400	10.0	795	MAY				
NOV					01...	1250	23500	11.0	750
05...	1235	11100	9.5	790	14...	1150	30200	18.0	750
10...	0930	13900	13.0	800	20...	0950	30200	15.0	730
15...	0910	10200	9.0	750	29...	1210	29000	28.0	675
21...	0905	10300	10.0	850	JUN				
28...	1235	9770	2.0	705	03...	1115	27300	23.0	710
DEC					11...	0915	31300	23.0	675
04...	1045	10600	1.5	710	JUL				
10...	1215	9870	4.5	700	01...	1015	27900	27.0	720
FEB 1991					10...	0940	25200	21.0	630
05...	1320	12600	1.0	800	17...	1030	28800	28.0	674
19...	1330	14300	2.0	750	AUG				
25...	1045	12200	2.0	700	23...	0945	28600	25.0	750
27...	1355	11400	3.0	700	28...	1105	28300	25.0	750
MAR					SEP				
07...	0840	9690	5.0	750	04...	1010	31800	24.0	750
15...	1155	9560	6.5	609	09...	1120	33600	23.0	760
20...	0925	10100	8.0	800	26...	1400	31300	15.0	679
					30...	1220	31200	15.0	700
06602020 WEST FORK DITCH AT HORNICK, IA (LAT 42 13 37N LONG 096 04 40W)									
OCT 1990					MAY 1991				
31...	1015	26	10.0	675	28...	1130	195	24.0	600
DEC					JUN				
20...	1200	13	0.0	650	05...	1115	1180	18.0	235
JAN 1991					JUL				
22...	1625	16	0.0	725	10...	1230	94	23.0	800
FEB					AUG				
26...	1600	42	1.0	585	19...	1600	50	26.0	735
APR									
16...	1140	198	10.0	750					

MISCELLANEOUS WATER QUALITY DATA

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MISCELLANEOUS WATER QUALITY DATA					MISCELLANEOUS WATER QUALITY DATA				
DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)
06602400		MONONA-HARRISON DITCH NEAR TURIN, IA (LAT 41 57 52N LONG 095 59 30W)							
OCT 1990					APR 1991				
17...	0915	81	10.5	535	17...	0940	265	10.0	750
DEC					MAY				
18...	1030	36	0.0	600	22...	1000	288	18.0	500
JAN 1991					AUG				
22...	0950	44	0.0	679	14...	1035	101	23.0	710
MAR									
08...	0850	102	1.0	1000					
06606600		LITTLE SIOUX RIVER AT CORRECTIONVILLE, IA (LAT 42 28 20N LONG 095 47 49W)							
NOV 1990					MAY 1991				
05...	1315	114	4.0	775	28...	1430	3680	25.0	700
05...	1400	114	4.0	775	JUN				
DEC					15...	1200	4180	21.5	570
19...	1430	118	0.0	900	JUL				
JAN 1991					08...	1345	1190	24.0	755
23...	0820	62	0.0	615	AUG				
FEB					22...	1130	499	24.0	590
26...	0915	241	0.0	655					
APR									
18...	1500	4060	10.0	620					
06607200		MAPLE RIVER AT MAPLETON, IA (LAT 42 09 28N LONG 095 48 27W)							
OCT 1990					APR 1991				
31...	1245	105	14.0	730	16...	1430	880	11.0	675
DEC					MAY				
19...	1145	64	0.0	760	31...	0930	1500	20.0	430
JAN 1991					JUL				
25...	1300	71	0.0	798	10...	1015	511	21.0	700
FEB					AUG				
26...	1245	267	0.0	600	22...	1415	174	27.0	720
06607500		LITTLE SIOUX RIVER NEAR TURIN, IA (LAT 41 57 52N LONG 095 58 21W)							
OCT 1990					MAY 1991				
17...	1050	286	11.0	620	06...	1220	5000	8.0	640
JAN 1991					22...	1140	4630	19.0	690
22...	1245	156	0.0	768	AUG				
MAR					12...	1440	1230	24.0	695
08...	1110	719	4.0	750					
APR									
17...	1140	4100	11.0	800					
06608500		SOLDIER RIVER AT PISGAH, IA (LAT 41 49 52N LONG 095 55 50W)							
OCT 1990					APR 1991				
18...	1145	61	6.5	700	18...	1150	298	10.0	680
DEC					MAY				
19...	1330	69	0.0	575	23...	1035	292	18.0	620
JAN 1991					JUL				
25...	1320	39	0.0	700	02...	1300	281	25.0	600
MAR					AUG				
06...	1140	194	6.0	720	13...	1505	123	25.0	700
06609500		BOYER RIVER AT LOGAN, IA (LAT 41 38 33N LONG 095 46 57W)							
OCT 1990					MAY 1991				
19...	1020	168	8.0	700	23...	1245	1100	20.0	705
DEC					JUN				
19...	1050	113	0.0	550	17...	1400	2700	21.0	360
JAN 1991					JUL				
25...	1040	88	0.0	580	02...	0835	838	24.0	600
MAR					AUG				
06...	0905	567	5.0	900	13...	1055	316	23.0	690
APR									
18...	1400	1300	10.0	800					
06807410		WEST NISHNABOTNA RIVER AT HANCOCK, IA (LAT 41 23 24N LONG 095 22 17W)							
OCT 1990					MAY 1991				
15...	1150	156	11.5	690	24...	1400	662	19.5	580
15...	1310	156	11.5	690	JUL				
JAN 1991					03...	1320	482	24.0	580
22...	1150	95	0.0	500	AUG				
MAR					15...	1245	176	25.0	650
04...	1410	420	6.0	900					
APR									
19...	1105	1480	8.0	500					

MISCELLANEOUS WATER QUALITY DATA

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06808500		WEST NISHNABOTNA RIVER AT RANDOLPH, IA (LAT 40 52 23N LONG 095 34 48W)							
NOV 1990					MAY 1991				
05...	1000	281	4.0	640	02...	1400	997	15.0	580
DEC					JUL				
19...	1355	227	0.0	650	15...	0920	769	22.0	630
MAR 1991					SEP				
18...	0945	716	4.0	580	03...	1345	280	26.0	580
06809210		EAST NISHNABOTNA RIVER NEAR ATLANTIC, IA (LAT 41 20 47N LONG 095 04 31W)							
OCT 1990					MAR 1991				
04...	0930	123	12.0	540	01...	1410	230	6.0	388
04...	1050	123	12.0	540	APR				
15...	0950	73	10.5	600	19...	0900	1630	10.0	860
15...	1100	73	10.5	600	MAY				
24...	1300	84	12.0	578	24...	1150	465	19.0	800
DEC					JUL				
07...	1040	56	2.0	680	09...	1345	336	21.0	490
JAN 1991					AUG				
18...	1210	53	0.0	600	15...	0835	103	20.0	550
06809500		EAST NISHNABOTNA RIVER NEAR RED OAK, IA (LAT 41 00 41N LONG 095 14 07W)							
NOV 1990					FEB 1991				
06...	0805	162	5.0	540	06...	1015	364	0.0	420
DEC					21...	0900	415	2.0	355
05...	0925	92	0.0	550	MAR				
17...	0930	149	0.5	580	18...	1300	878	5.0	440
27...	1030	60	0.0	625	APR				
31...	1025	61	0.0	500	29...	0910	1140	15.0	480
JAN 1991					JUL				
09...	1020	70	0.0	550	18...	1145	385	27.0	530
15...	0945	85	0.0	600	AUG				
23...	0955	107	0.0	680	29...	1530	150	29.0	510
28...	1400	90	0.0	610					
06811840		TARKIO RIVER AT STANTON, IA (LAT 40 58 52N LONG 095 06 32W)							
NOV 1990					APR 1991				
06...	1100	3.7	4.0	570	19...	1205	46	13.0	430
DEC					JUN				
17...	1200	4.8	0.0	500	12...	1205	44	19.0	440
JAN 1991					JUL				
28...	1600	1.9	0.0	630	18...	0855	15	24.0	450
MAR					AUG				
18...	1620	25	5.0	460	30...	0945	0.64	24.0	420
06813500		MISSOURI RIVER AT RULO, NE (LAT 40 03 14N LONG 095 25 12W)							
OCT 1990					APR 1991				
05...	1150	34400	18.0	780	03...	0945	33600	11.0	710
12...	1000	34500	13.0	810	08...	0950	32300	16.0	700
15...	1300	32900	14.0	780	17...	1015	43500	10.5	660
26...	1015	33400	10.0	790	23...	0950	41700	12.0	710
30...	1010	30000	12.0	790	MAY				
NOV					02...	1010	39100	16.0	680
14...	0935	17100	9.0	800	10...	0940	42800	14.0	700
20...	0955	16800	10.0	800	15...	0945	40900	21.0	710
28...	1515	16300	8.0	750	20...	1115	51200	20.0	645
DEC					JUN				
12...	0945	17200	2.0	700	06...	0955	81400	22.0	500
26...	1435	7970	0.0	802	11...	0930	52100	22.0	680
JAN 1991					18...	1320	66000	25.0	750
17...	1015	19900	1.0	800	25...	1110	48100	23.0	650
24...	1015	18700	1.0	800	JUL				
FEB					01...	1315	41000	29.0	770
07...	0950	22300	3.0	740	16...	1135	37300	28.0	594
MAR					25...	1005	32600	24.0	760
01...	1000	20800	5.0	700	29...	1000	32100	25.0	625
14...	0950	19600	7.0	800	SEP				
19...	1045	20900	8.0	780	05...	1215	34800	25.0	750
					11...	1040	32900	26.0	700
					18...	1145	34500	21.0	705
					23...	1145	34200	15.0	590
06819185		EAST FORK 102 RIVER AT BEDFORD, IA (LAT 40 39 40N LONG 094 42 58W)							
NOV 1990					MAY 1991				
08...	1235	0.82	4.0	525	02...	1055	36	15.0	375
DEC					06...	1250	207	9.0	330
19...	0750	1.2	2.0	620	JUN				
JAN 1991					05...	1420	33	23.0	410
31...	0900	0.46	0.0	790	JUL				
MAR					16...	0925	3.5	24.0	380
21...	1235	39	11.0	390	AUG				
					29...	1150	0.79	26.5	570

MISCELLANEOUS WATER QUALITY DATA

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MISCELLANEOUS WATER QUALITY DATA									
DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)
		06898000	THOMPSON RIVER AT DAVIS CITY, IA (LAT 40 38 25N LONG 093 48 29W)						
NOV 1990					JUN 1991				
07...	1150	58	4.0	520	06...	1405	1340	20.0	220
DEC 18...	1045	104	0.0	540	JUL 17...	0800	64	25.0	390
MAR 1991					AUG 27...	0830	28	24.5	480
20...	0800	1060	5.5	330					
MAY 01...	1030	1050	19.0	370					
06...	1600	4340	10.5	240					
		06898400	WELDON RIVER NEAR LEON, IA (LAT 40 41 45N LONG 093 38 07W)						
NOV 1990					MAY 1991				
07...	0840	6.6	1.0	450	01...	0720	93	10.5	380
DEC 18...	0845	40	0.0	500	JUN 07...	0750	9.0	16.0	490
JAN 1991					JUL 17...	1100	2.2	25.0	490
29...	1530	3.2	0.0	630	AUG 27...	1405	0.51	27.0	500
MAR 19...	1325	364	7.0	310					
		06903400	CHARITON RIVER NEAR CHARITON, IA (LAT 40 57 06N LONG 093 15 34W)						
NOV 1990					JUN 1991				
14...	1045	11	7.0	397	19...	1010	27	23.0	303
FEB 1991					JUL 15...	1345	7.8	24.0	370
12...	0740	36	1.5	362	AUG 14...	0810	0.15	19.0	409
MAR 26...	0940	74	13.0	396	SEP 18...	0855	0.03	16.0	438
APR 16...	1010	1430	12.0	170					
MAY 15...	1055	186	21.0	280					
		06903700	SOUTH FORK CHARITON RIVER NEAR PROMISE CITY, IA (LAT 40 48 02N LONG 093 11 32)						
NOV 1990					JUN 1991				
14...	1415	6.2	9.0	523	19...	0745	24	21.5	376
FEB 1991					JUL 17...	0810	3.4	24.0	383
12...	1220	52	0.5	367	AUG 14...	1140	0.77	23.0	385
MAR 26...	1355	63	19.5	447	SEP 18...	1135	0.65	17.0	482
APR 16...	1335	161	13.5	348					
MAY 15...	0730	392	19.0	226					
		06903900	CHARITON RIVER NEAR RATHBUN, IA (LAT 40 49 22N LONG 092 53 22W)						
NOV 1990					JUN 1991				
16...	0900	11	9.0	238	20...	0730	810	16.5	237
JAN 1991					JUL 17...	1035	1240	21.0	232
09...	1000	56	2.0	280	AUG 15...	0720	1250	23.5	236
FEB 13...	1015	831	3.5	272	SEP 19...	0715	11	18.5	239
APR 17...	1315	573	13.0	256					
MAY 16...	0755	715	14.0	242					
		06904010	CHARITON RIVER NEAR MOULTON, IA (LAT 40 41 30N LONG 092 46 15W)						
NOV 1990					MAY 1991				
15...	1630	36	12.0	464	06...	1430	2360	11.0	200
JAN 1991					JUN 19...	1625	846	20.0	236
09...	1400	148	0.0	320	JUL 17...	1535	1230	22.0	233
FEB 12...	1545	652	3.0	290	AUG 14...	1525	1230	24.0	233
MAR 26...	1820	859	11.0	294	SEP 18...	1455	33	20.5	294
APR 17...	0730	604	12.5	306					

GROUND-WATER LEVELS

AUDUBON COUNTY

413044094565601. Local number, 78-36-35 ADCC1.

LOCATION.--Lat 41°30'44", long 94°56'56", Hydrologic Unit 10240003, 2.5 mi south of the Town of Brayton on Highway 71, and 0.3 mi west on the north side of County Road F-67. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota; in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 115 ft, cased to 115 ft, slotted from 94-101 ft, gravel-packed.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,230 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.15 ft above land-surface datum.

REMARKS.--Well WC-69.

PERIOD OF RECORD.--June 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 43.55 ft below land-surface datum, January 14, 1987; lowest measured, 53.55 ft below land-surface datum, April 12, 1990.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 11	51.89	MAR 28	50.31

WATER YEAR 1991 HIGHEST 50.31 MAR 28, 1991 LOWEST 51.89 OCT 11, 1990

413958094544501. Local number, 79-35-10 CABB.

LOCATION.--Lat 41°39'58", long 94°54'45", Hydrologic Unit 10240003, approximately 0.3 mi west of the Town of Hamlin, on the south side of Highway 44. Owner: Geological Survey Bureau/DNR and U.S. Geological Survey.

AQUIFER.--Dakota; in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 221 ft, cased to 210 ft, slotted from 168-188 ft, open hole 210-221 ft, gravel-packed.

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 casing, 3.70 ft above land-surface datum.

REMARKS.--Well WC-17

PERIOD OF RECORD.--August 1981 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 35.60 ft below land-surface datum, April 15, 1987; lowest measured, 41.47 ft below land-surface datum, July 3, 1991.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 11	38.65	JAN 16	38.43	MAR 28	38.72	JUL 03	41.47

WATER YEAR 1991 HIGHEST 38.43 JAN 16, 1991 LOWEST 39.80 JUL 03, 1991

413843094541701. Local number, 79-35-15 DCDD.

LOCATION.--Lat 41°38'43", long 94°54'17", Hydrologic Unit 10240003, approximately 1.5 mi south of the Town of Hamlin and 0.5 mi west of Highway 71. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--East Nishnabotna alluvial; in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 32 ft, cased to 30 ft, slotted from 25-30 ft, open hole 30-32 ft, gravel-packed.

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, 1.50 ft above land-surface datum.

REMARKS.--Well WC-75

PERIOD OF RECORD.--June 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 11.28 ft below land-surface datum, May 3, 1983; lowest measured, 18.81 ft below land-surface datum, October 19, 1988.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 11	18.06	MAR 28	16.97	JUL 03	16.39	SEP 25	18.15
JAN 16	14.50						

WATER YEAR 1991 HIGHEST 14.50 JAN 16, 1991 LOWEST 18.15 SEP 25, 1991

AUDUBON COUNTY

415023094593801. Local number, 81-36-12 CBCA

LOCATION.--Lat 41°50'23", long 94°59'38", Hydrologic Unit 10240002, approximately 0.5 mi west of the Town of Gray on the east side of County Road N-14, south of the Gray Cemetery. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 315 ft, cased to 315 ft, slotted from 279-295 ft, gravel-packed.

INSTRUMENTATION.--Quarterly measurement with chalked tape or electric line by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,393 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 WC-18.

PERIOD OF RECORD.--August 1981 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 160.59 ft below land-surface datum, October 2, 1989; lowest measured, 168.52 ft below land-surface datum, October 6, 1987.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 10	161.45	JAN 09	161.71	APR 17	161.12	JUL 10	161.12
WATER YEAR 1991		HIGHEST 161.12 APR 17, 1991 JUL 10, 1991 LOWEST 161.71 JAN 09, 1991					

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 alluvial: 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.

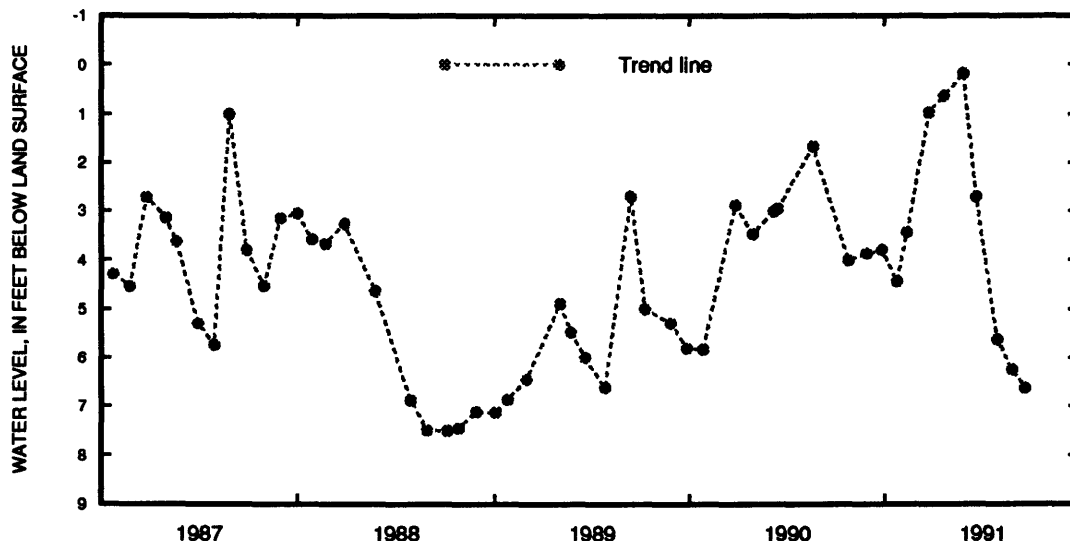
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 0.18 ft below land-surface datum, May 28, 1991; lowest measured, 7.50 ft below land-surface datum, October 6, 1988.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 25	4.01	JAN 24	4.44	APR 22	.64	JUL 30	5.63
NOV 28	3.87	FEB 12	3.44	MAY 28	.18	AUG 27	6.25
DEC 27	3.80	MAR 25	.98	JUN 21	2.71	SEP 20	6.63

WATER YEAR 1991 HIGHEST .18 MAY 28, 1991 LOWEST 6.63 SEP 20, 1991

415211092164101



GROUND-WATER LEVELS

BENTON COUNTY

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 alluvial: 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, 0.26 ft below land-surface datum, May 28, 1991; lowest measured, 7.54 ft below land-surface datum, August 29, 1988.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 25	4.06	JAN 24	3.51	APR 22	.71	JUL 30	5.69
NOV 28	3.90	FEB 12	3.52	MAY 28	.26	AUG 27	6.31
DEC 27	3.84	MAR 25	1.04	JUN 21	2.79	SEP 20	6.70

WATER YEAR 1991

HIGHEST .26 MAY 28, 1991 LOWEST 6.70 SEP 20, 1991

420459091500201. Local number, 84-09-13 DADD1.

LOCATION.--Lat 42°04'56", long 91°50'02", Hydrologic Unit 07080205, approximately 1.75 mi southeast of the Town of Shellsburg, north of the Chicago, Rock Island and Pacific Railroad tracks. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Silurian-Devonian: in dolomite of Silurian and limestone of Devonian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 5", depth 421 ft, cased to 35 ft and 163.5-184 ft, open hole 35-163.5 ft and 184-421 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel. Graphic water-level recorder November 1975 to April 1978.

DATUM.--Elevation of land-surface datum is 753 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.23 ft above land-surface datum.

REMARKS.--Shellsburg Quarry/Flood Hole. Records for November 1975 to September 1988 are unpublished and on file in the Iowa District Office.

PERIOD OF RECORD.--November 1975 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, +0.65 ft above land-surface datum, April 3, 1979; lowest measured, 12.47 ft below land-surface datum, December 1, 1989.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 15	5.82	MAR 27	3.68	MAY 31	+.12	SEP 24	4.09

WATER YEAR 1991

HIGHEST +.12 MAY 31, 1991 LOWEST 5.82 NOV 15, 1990

420319091540102. Local number, 84-09-28 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 dolomite of Silurian age and limestone of Devonian 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 265-590 ft. Cement plug 260-265 ft. Well open to 59.7 ft of Devonian rock reported to yield little, if any, water.

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.

PERIOD OF RECORD.--April 1975 to current year.

REVISION.--Lowest water level measured, 169.18 ft below land-surface datum, March 26, 1990.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 150.73 ft below land-surface datum, April 14, 1975; lowest measured, 169.18 ft below land-surface datum, March 26, 1990.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 15	162.61	MAR 27	162.27	MAY 31	159.06	SEP 24	161.97

WATER YEAR 1991

HIGHEST 159.06 MAY 31, 1991 LOWEST 162.61 NOV 15, 1990

BENTON COUNTY

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.--Devonian: in Cedar Valley limestone of Middle Devonian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 0.75 in., depth 237 ft, cased to 170 ft, slotted below cement plug, open hole 170 to 237 ft. Cement plugs from 97-100 ft and 237- 240 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.

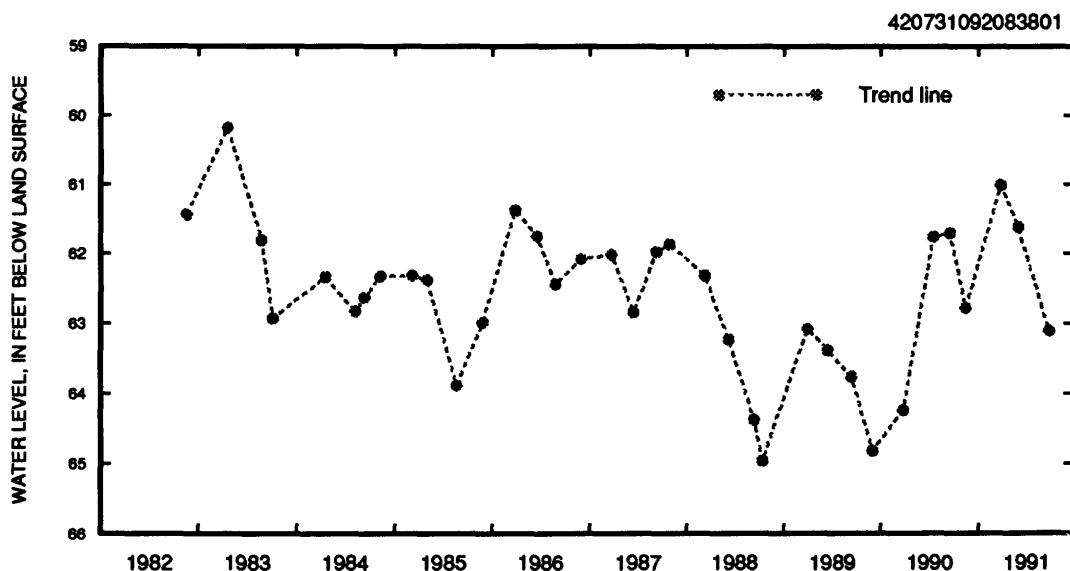
REMARKS.--Garrison 170 well.

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

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 60.18 ft below land-surface datum, April 19, 1983; lowest measured, 64.96 ft below land-surface datum, October 12, 1988.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 15	62.78	MAR 27	61.01	MAY 31	61.62	SEP 24	63.11
WATER YEAR 1991		HIGHEST 61.01 MAR 27, 1991 LOWEST 63.11 SEP 24, 1991					



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.--Devonian: in Cedar Valley limestone of Middle 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. Cement plug from 97-100 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.

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

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 60.63 ft below land-surface datum, March 23, 1979; lowest measured, 65.03 ft below land-surface datum, October 12, 1988.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 15	62.80	MAR 27	60.98	MAY 31	61.68	SEP 24	63.14
WATER YEAR 1991		HIGHEST 60.98 MAR 27, 1991 LOWEST 63.14 SEP 24, 1991					

GROUND-WATER LEVELS

BENTON COUNTY

421326091522701. Local number, 86-09-34 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.--Ordovician and Silurian-Devonian: open from limestone and dolomite of the Platteville formation into limestone of Devonian age.

WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 8 in., depth 1,033 ft, cased to 142 ft, open hole 142-1,033 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.

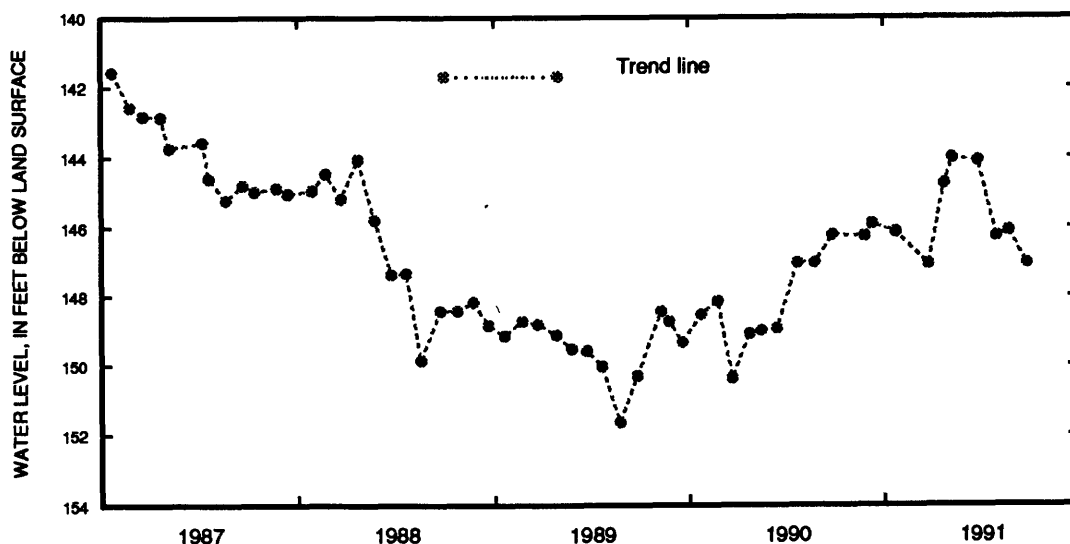
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 141.37 ft below land-surface datum, December 17, 1986; lowest measured, 151.64 ft below land-surface datum, August 24, 1989.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 26	146.25	MAR 25	147.06	JUN 26	144.10	AUG 22	146.10
DEC 10	145.90	APR 24	144.75	JUL 30	146.25	SEP 25	147.04
JAN 23	146.13	MAY 09	144.02				

WATER YEAR 1991

HIGHEST 144.02 MAY 09, 1991 LOWEST 147.06 MAR 25, 1991

421326091522701



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 Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 497 ft, cased to 497 ft, perforated 346.5-349.5 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape or 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, August 12, 1988; lowest measured, 190.45 ft below land-surface datum, August 22, 1991.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 28	189.28	MAR 22	190.04	MAY 22	190.37	AUG 22	190.45

WATER YEAR 1991

HIGHEST 189.28 DEC 28, 1990 LOWEST 190.45 AUG 22, 1991

GROUND-WATER LEVELS

271

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 Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 357 ft, cased to 357 ft, perforated 338-347 ft. Paleozoic rock present at 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.

PERIOD OF RECORD.--December 1978 to current year.

REVISION.--Period of record December 1978 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 18.40 ft below land-surface datum, January 7, 1980; lowest measured, 64.03 ft below land-surface datum, August 7, 1991.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 28	61.94	MAR 22	63.09	MAY 21	63.50	AUG 07	64.03
WATER YEAR 1991				HIGHEST 61.94 DEC 28, 1990 LOWEST 64.03 AUG 07, 1991			

425233094545001. Local number, 93-35-13 ADA1.

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 Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 1.50 in., depth 381 ft, cased to 381 ft, perforated 350-360 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, 133.85 ft below land-surface datum, September 18, 1990.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991					
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
MAR 22	133.08	MAY 22	133.16	AUG 07	133.42
WATER YEAR 1991			HIGHEST 133.08 MAR 22, 1991 LOWEST 133.42 AUG 07, 1991		

CALHOUN COUNTY

422812094383501. Local number, 88-33-01 BACD.

LOCATION.--Lat 42°28'12", long 94°38'35", Hydrologic Unit 07100006, located approximately 4.5 mi north of Rockwell City, in a trailer park at the south end of North Twin Lake in Twin Lakes State Park. Owner: Pauline Goins.

AQUIFER.--Glacial drift: in material of Pleistocene age.

WELL CHARACTERISTICS.--Dug unused water-table well, diameter 24 in., depth 35 ft, casing interval unknown.

INSTRUMENTATION.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,222 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.12 ft above land-surface datum.

REMARKS.--Twin Lakes (33F2) well.

PERIOD OF RECORD.--May 1989 to present.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 1.86 ft below land-surface datum, April 19, 1991; lowest measured, 16.96 ft below land-surface datum, February 28, 1990.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 23	9.94	JAN 22	10.52	APR 19	1.86	JUL 25	8.49
NOV 14	9.90	FEB 21	9.28	MAY 21	3.00	AUG 06	10.25
DEC 18	9.34	MAR 14	7.59				
WATER YEAR 1991				HIGHEST 1.86 APR 19, 1991 LOWEST 10.52 JAN 22, 1991			

GROUND-WATER LEVELS

CARROLL COUNTY

420705094394501. Local number, 84-33-02 BDBA1.

LOCATION.--Lat 42°07'05", long 94°39'45", Hydrologic Unit 07100006, 3.75 mi north and 3.25 mi east of the Town of Glidden, east of County Road N-50 and the Kendal Bridge. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., cased to 76 ft, slotted from 73-76 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape or electric line by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,110 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-132.

PERIOD OF RECORD.--September 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 48.87 ft below land-surface datum, July 9, 1991; lowest measured, 57.30 ft below land-surface datum, February 13, 1990.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 04	52.95	APR 17	53.14	JUL 09	48.87

WATER YEAR 1991 HIGHEST 48.87 JUL 09, 1991 LOWEST 53.14 APR 17, 1991

420643094403701. Local number, 84-33-03 CADA1.

LOCATION.--Lat 42°06'43", long 94°40'37", Hydrologic Unit 07100006, 3.5 mi north and 2.5 mi east of the Town of Glidden, on the west side of County Road N-50. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--North Raccoon alluvial: in alluvial sand and gravel of Pleistocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 21 ft, cased to 15 ft, slotted from 13-15 ft, gravel-packed. Glacial till penetrated 15-21 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape or electric line 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: Top of casing, 2.31 ft above land-surface datum.

REMARKS.--Well WC-131.

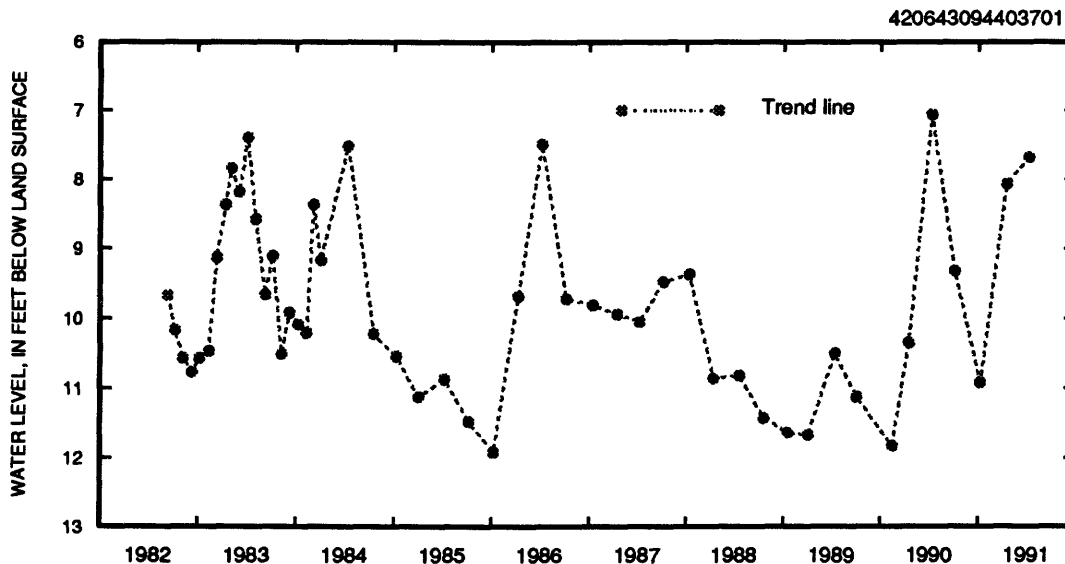
PERIOD OF RECORD.--September 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 7.06 ft below land-surface datum, July 10, 1990; lowest measured, 11.92 ft below land-surface datum, January 7, 1986.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 04	9.32	JAN 09	10.92	APR 17	8.07	JUL 09	7.68

WATER YEAR 1991 HIGHEST 7.68 JUL 09, 1991 LOWEST 10.92 JAN 09, 1991



CARROLL COUNTY

420233094475901. Local number, 83-35-34 BCDCl.

LOCATION.--Lat 42°02'33", long 94°47'59", Hydrologic Unit 07100007, approximately 3.5 mi west and 1.5 mi south of the Town of Glidden near the airport, west of County Road N-38. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 100 ft, cased to 99 ft, slotted from 72-76 ft; gravel packed, open hole 99-100 ft. Pennsylvanian rock 80-100 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,225 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 WC-148.

PERIOD OF RECORD.--October 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 15.56 ft below land-surface datum, May 4, 1983; lowest measured, 21.54 ft below land-surface datum, April 3, 1989.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 04	19.04	JAN 09	20.12	APR 17	17.07	JUL 09	18.70

WATER YEAR 1991 HIGHEST 17.07 APR 17, 1991 LOWEST 20.12 JAN 09, 1991

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 Cretaceous age.

WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 8 in., depth 120 ft, cased to 100 ft, open hole 100-120 ft.

INSTRUMENTATION.--Quarterly measurement 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, 3.90 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.

REVISED RECORDS.--WDR IA-88-1.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 34.55 ft below land-surface datum, September 8, 1945; lowest measured, 87.50 ft below land-surface datum, June 13, 1981.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 02	72.03	FEB 26	63.46	MAY 30	61.06	JUL 24	68.90

WATER YEAR 1991 HIGHEST 61.06 MAY 30, 1991 LOWEST 72.03 OCT 02, 1990

421058094582701. Local number, 85-35-07 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 Cretaceous age.

WELL CHARACTERISTICS.--Drilled municipal artesian water well, diameter 10 in., depth 340 ft, cased to 320 ft, screen 320-340 ft. Original depth 349 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. 2. Water levels affected by pumping.

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, March 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 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 19	199.75	MAR 14	200.67	MAY 30	202.85	AUG 23	202.23

WATER YEAR 1991 HIGHEST 199.75 DEC 19, 1990 LOWEST 202.85 MAY 30, 1991

GROUND-WATER LEVELS

CASS COUNTY

411117095091902. Local number, 74-37-30 BBBB2.

LOCATION.--Lat 41°11'17", long 95°09'19", Hydrologic Unit 10240003, approximately 3 mi south of the Town of Griswold, and 1 mi west of Highway 48 on the Pottawattamie County-Cass County border. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--East Nishnabotna alluvial: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 70 ft, cased to 70 ft, slotted 69-70 ft, gravel packed.

INSTRUMENTATION.--Twice-a-month measurement with chalked tape by observer.

DATUM.--Elevation of land-surface datum is 1,090 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 SW-16B(L).

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

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 11.62 ft below land-surface datum, June 1, 1987; lowest measured, 21.89 ft below land-surface datum, May 27, 1991.

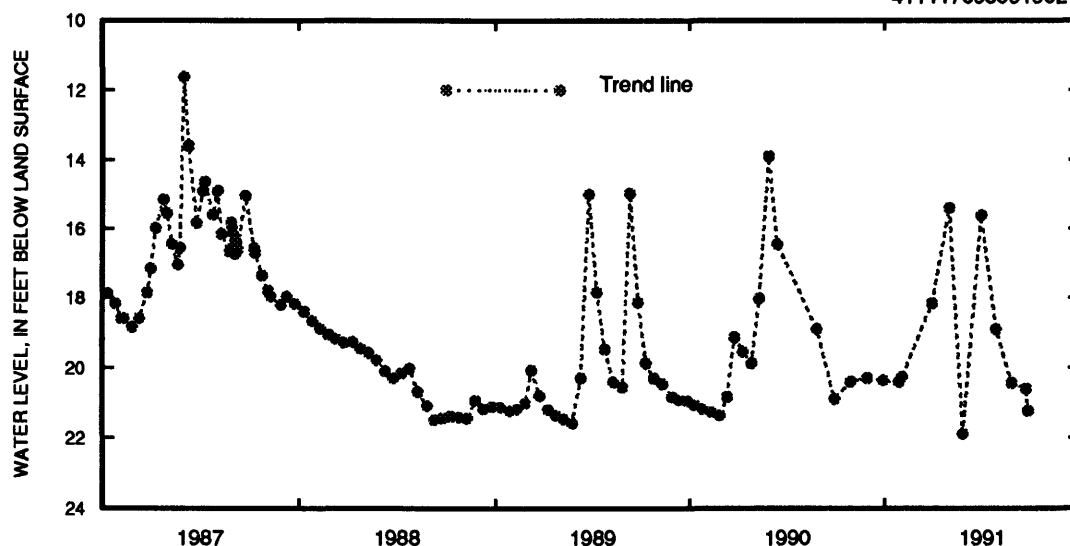
WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 29	20.40	FEB 02	20.27	MAY 27	21.89	AUG 26	20.44
NOV 29	20.30	MAR 30	18.17	JUN 30	15.62	SEP 22	20.60
DEC 29	20.36	MAY 01	15.41	JUL 28	18.91	26	21.24
JAN 27	20.41						

WATER YEAR 1991

HIGHEST 15.41 MAY 01, 1991 LOWEST 21.89 MAY 27, 1991

411117095091902



411900094530101. Local number, 75-35-07 BBAB.

LOCATION.--Lat 41°19'00", long 94°55'30", Hydrologic Unit 10240003, approximately 3 mi north and 2.9 mi west of the Town of Cumberland, 2 mi south of County Road G-35 and 2.9 mi west of County Road N-28. Owner: Geological Survey Bureau/DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian well, diameter 2 in., depth 218 ft, cased to 189 ft, slotted 189-209 ft.

INSTRUMENTATION.--Intermittent measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1295 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.35 ft above land-surface datum.

REMARKS.--Well SW-17.

PERIOD OF RECORD.--July 1986 to October 1987, February 1990 to present.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 113.57 ft below land-surface datum, December 8, 1986; lowest measured, 125.75 ft below land-surface datum, March 14, 1990.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 12	117.85	JAN 18	117.99	MAR 04	117.48	APR 16	117.55
MAY 24	116.35	JUL 03	114.67	AUG 15	116.38		

WATER YEAR 1991

HIGHEST 114.67 JUL 03, 1991 LOWEST 117.99 JAN 18, 1991

CASS COUNTY

412832095033501. Local number, 77-37-13 BBBB.

LOCATION.--Lat 41°28'32", long 95°03'35", Hydrologic Unit 10240003, approximately 1 mi south of U.S. Interstate 80, and east of Highway 173. Approximately 2 mi north and 3 mi east of the Town of Marne. Owner: Geological Survey Bureau/DNR and U.S. Geological Survey.

AQUIFER.--Buried channel: in sand of Pleistocene age.

WELL CHARACTERISTICS.--Drilled observation artesian well, diameter 2 in., depth 201 ft, cased to 196 ft, slotted 196-201 ft. Open to Pennsylvanian limestone, 196-201'.

INSTRUMENTATION.--Intermittent measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1298 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.20 ft above land-surface datum.

REMARKS.--Well SW-18.

PERIOD OF RECORD.--July 1986 to October 1987, February 1990 to present.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 115.90 ft below land-surface datum, December 8, 1986; lowest measured, 128.40 ft below land-surface datum, March 14, 1990.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 12	122.19	MAR 04	122.70	MAY 24	120.80	AUG 14	120.14
JAN 16	123.28	APR 16	121.20	JUL 03	120.64		

WATER YEAR 1991

HIGHEST 120.14 AUG 14, 1991 LOWEST 123.28 JAN 16, 1991

CERRO GORDO COUNTY

430757093131801. Local number, 96-20-17 DAAD1.

LOCATION.--Lat 43°07'57", long 93°13'18", Hydrologic Unit 07080203, in southwest Mason City, 1 mi west of Highway 65 and south of the Iowa Terminal Railyard. Owner: AMPI Creamery (formerly State Brand Creameries).

AQUIFER.--Cambrian-Ordovician: in sandstone of Late Cambrian and sandy dolomite of Early Ordovician age.

WELL CHARACTERISTICS.--Unused drilled industrial artesian water well, diameter 10 in., depth 1,336 ft, cased from 0-1,080 ft, open hole from 1,080-1,336 ft.

INSTRUMENTATION.--Quarterly measurement with electric line by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,162 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.50 ft above land-surface datum.

REMARKS.--State Brand Creameries Well #1. Records for 1968-1971 and 1973-1989 are unpublished and available in the files of the Iowa District Office.

PERIOD OF RECORD.--October 1968 to 1971, and March 1973 to current year.

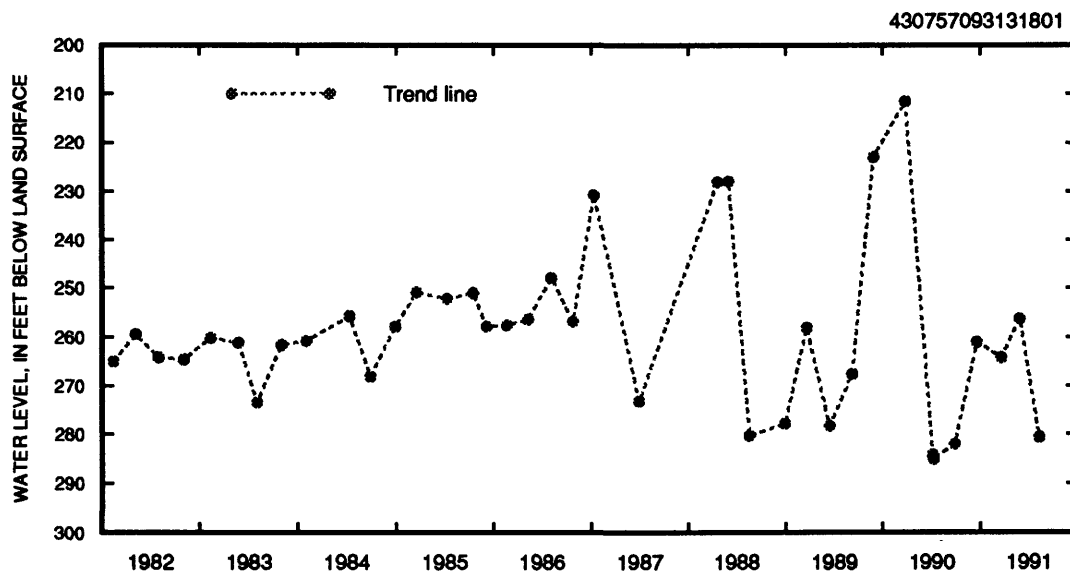
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 170.80 ft below land-surface datum, August 4, 1977; lowest measured, 298.80 ft below land-surface datum, October 22, 1968.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 19	261.11	MAR 20	264.24	MAY 29	256.20	AUG 09	280.66

WATER YEAR 1991

HIGHEST 256.20 MAY 29, 1991 LOWEST 280.66 AUG 09, 1991



GROUND-WATER LEVELS

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.--Devonian: in Cedar Valley limestone of Middle Devonian age.

WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 5 in., depth 198 ft. Casing information is not available.

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.--None.

PERIOD OF RECORD.--November 1940 to August 1971, March 1973 to current year.

REVISION.--Highest water level measured, 1.44 ft below land-surface datum, December 12, 1982.

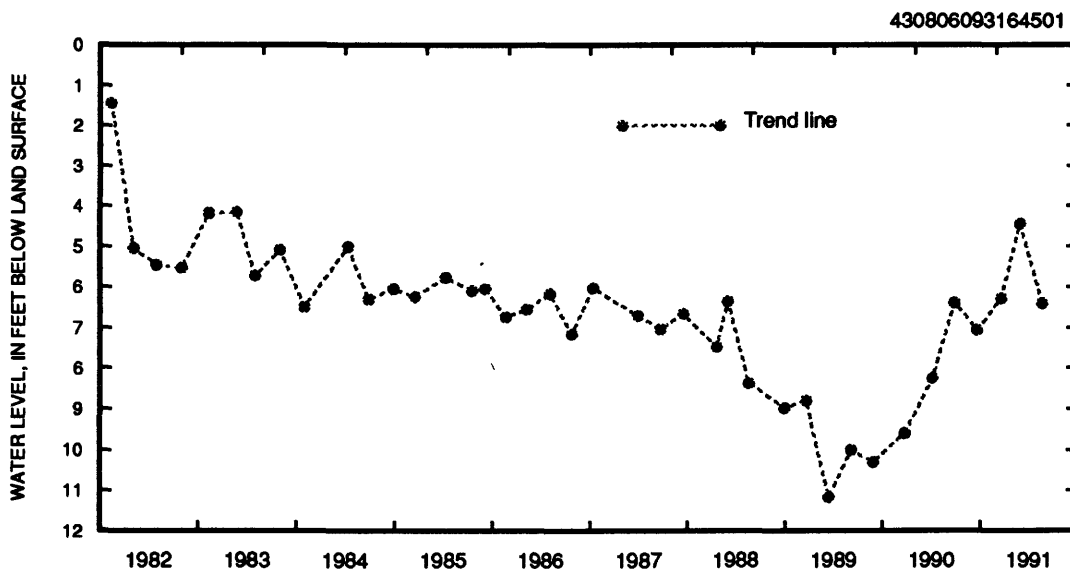
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 1.44 ft below land-surface datum, December 12, 1982; lowest measured, 17.26 ft below land-surface datum, November 18, 1955.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 19	7.06	MAR 20	6.28	MAY 29	4.45	AUG 19	6.40

WATER YEAR 1991

HIGHEST 4.45 MAY 29, 1991 LOWEST 7.06 DEC 19, 1990



431123093124301. Local number, 97-20-28 CAAC1.

LOCATION.--Lat 43°11'23", long 93°12'43", Hydrologic Unit 07080203, north of Mason City at the southwest corner of the junction of Highway 65 and County Road D-20. Owner: American Crystal Sugar Corporation.

AQUIFER.--Cambrian-Ordovician and Devonian: in sandstone of Late Cambrian and Middle Ordovician age and limestone of Devonian age.

WELL CHARACTERISTICS.--Unused industrial drilled artesian water well, diameter 20 in., original depth 1,347 ft, back-filled to 1,257 ft in 1932, cased to 241 ft and 653-815 ft, open hole from 241-653 ft and 815-1,257 ft.

INSTRUMENTATION.--Quarterly measurement with electric line by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,127 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.77 ft above land-surface datum.

REMARKS.--Records for 1943 to September 1988 are on file in the Iowa District Office.

PERIOD OF RECORD.--June 1943 to October 1970, March 1973 to current year.

REVISION.--Period of record is June 1943 to October 1970, March 1973 to current year. Highest water level measured is 148.25 ft below land-surface datum, July 29, 1944.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 148.25 ft below land-surface datum, July 29, 1944; lowest measured, 318.23 ft below land-surface datum, November 6, 1968.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 19	236.36	MAR 20	223.81	MAY 29	213.39	AUG 19	222.81

WATER YEAR 1991

HIGHEST 213.39 MAY 29, 1991 LOWEST 236.36 DEC 19, 1990

CHEROKEE COUNTY

423833095365701. Local number, 90-40-06 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 Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 1.25 in., depth 253 ft, cased to 252 ft, sandpoint 252-253 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, August 27, 1983; lowest measured, 40.85 ft below land-surface datum, January 15, 1991.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
JAN 15	40.85	MAR 28	37.15	JUL 02	33.57

WATER YEAR 1991

HIGHEST 33.57 JUL 02, 1991 LOWEST 40.85 JAN 15, 1991

424348095231601. Local number, 91-39-01 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 sandstone of Cambrian age and dolomite of Ordovician 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 or chalked tape 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, 1.55 ft above land-surface datum.

REMARKS.--Well D-28.

PERIOD OF RECORD.--September 1979 to current year.

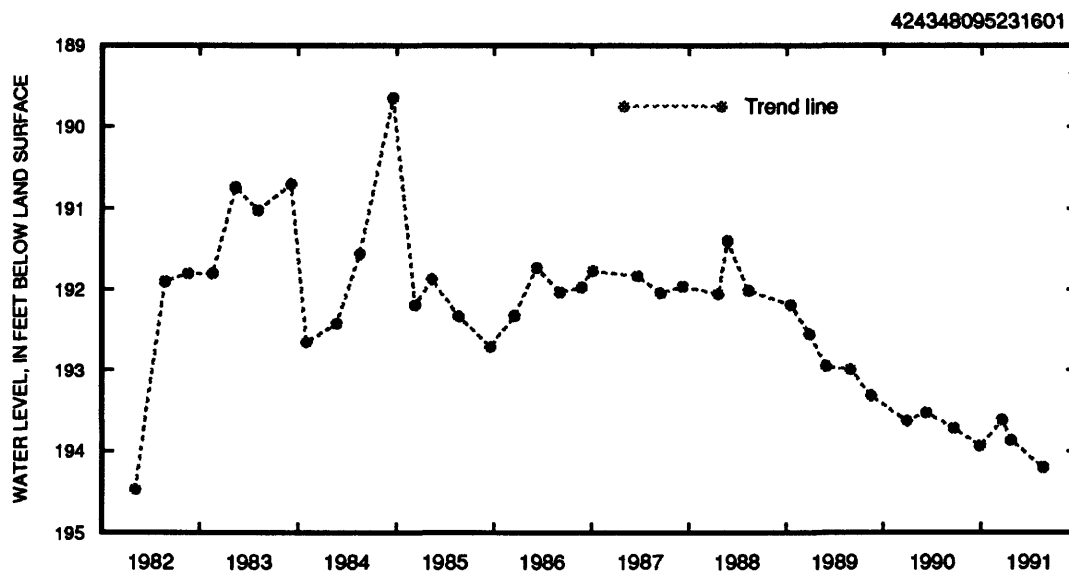
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 189.65 ft below land-surface datum, December 19, 1984; lowest measured, 194.47 ft below land-surface datum, May 5, 1982.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 28	193.94	MAR 21	193.62	MAY 22	193.87	AUG 22	194.20

WATER YEAR 1991

HIGHEST 193.62 MAR 21, 1991 LOWEST 194.20 AUG 22, 1991



GROUND-WATER LEVELS

CHEROKEE COUNTY

424348095231602. Local number, 91-39-01 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 Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 4 in., depth 340 ft, cased to 340 ft, perforated 235-240 ft.

INSTRUMENTATION.--Quarterly measurement with electric line or chalked tape 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, April 20, 1988; lowest measured, 194.15 ft below land-surface datum, August 24, 1982.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 28	190.27	MAR 21	190.34	MAY 22	191.07	AUG 22	191.21
WATER YEAR 1991				HIGHEST 190.27 DEC 28, 1990 LOWEST 191.21 AUG 22, 1991			

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 Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 390 ft, cased to 390 ft, perforated 386-390 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.

REVISION.--Lowest water level measured, 156.20 ft below land-surface datum, January 10, 1990.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 152.75 ft below land-surface datum, June 27, 1984; lowest measured, 156.20 ft below land-surface datum, January 10, 1990.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 11	155.50	JAN 15	155.27	MAR 28	155.13	JUL 02	154.65
WATER YEAR 1991				HIGHEST 154.65 JUL 02, 1991 LOWEST 155.50 OCT 11, 1990			

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 Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2.50 in., depth 300 ft, cased to 300 ft, perforated 114-118 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, 2.80 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, June 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 1990 TO SEPTEMBER 1991					
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 11	28.95	MAR 28	28.37	JUL 02	28.30
WATER YEAR 1991			HIGHEST 28.3 JUL 02, 1991 LOWEST 28.95 OCT 11, 1990		

CHEROKEE COUNTY

424459095322411. Local number, 92-40-26 CCDD1.

LOCATION.--Lat 42°44'59", long 95°32'24", Hydrologic Unit 10230003, in the City of Cherokee, to the north of County Road C-38 and east of Highway 59 near the old pumping station. Owner: City of Cherokee.

AQUIFER.--Cambrian-Ordovician: in sandstone of Late Cambrian age and sandy dolomite of Early Ordovician age

WELL CHARACTERISTICS.--Unused drilled municipal artesian test water well, diameter 8 in., depth 1,055 ft, cased to 965 ft, open hole from 965-1055 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,180 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.53 ft above land-surface datum.

REMARKS.--City of Cherokee Test #1.

PERIOD OF RECORD.--November 1987 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 19.52 ft below land-surface datum, March 28, 1991; lowest measured, 27.21 ft below land-surface datum, July 12, 1990.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 11	26.72	MAR 28	19.52	JUL 07	25.27

WATER YEAR 1991

HIGHEST 19.52 MAR 28, 1991 LOWEST 26.72 OCT 11, 1990

CLAYTON COUNTY

424023091291201. Local number, 91-05-30 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. Casing information not available.

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.--None.

PERIOD OF RECORD.--June 1957 to current year.

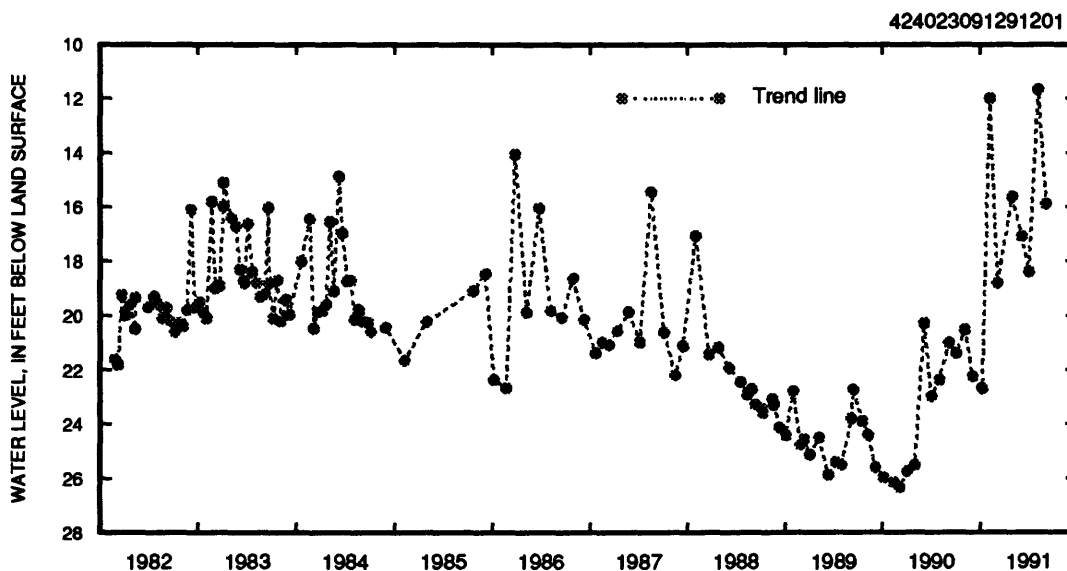
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 11.68 ft below land-surface datum, August 7, 1991; lowest measured, 30.68 ft below land-surface datum, January 12, 1959.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 04	21.37	DEC 05	22.24	MAR 07	18.80	JUL 03	18.38
NOV 06	20.52	JAN 09	22.68	MAY 02	15.62	AUG 07	11.68
09	21.35	FEB 07	14.43	JUN 07	17.07	SEP 05	15.89

WATER YEAR 1991

HIGHEST 11.68 AUG 07, 1991 LOWEST 22.68 JAN 09, 1991



GROUND-WATER LEVELS

CLAYTON COUNTY

424057091320001. Local number, 91-06-22 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.

WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 16 in., depth 492 ft, cased to 161 ft with 16 in., 12 in. 130-161 ft; 10 in. liner 229-370 ft, open hole 161-229 ft and 370-492 ft.

INSTRUMENTATION.--Intermittent measurement with chalked tape by USGS personnel. Graphic water-level recorder March 1963 to October 1987.

DATUM.--Elevation of land-surface datum is 1,219 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of pipe nipple, 2.55 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.

REVISION.--Highest water level recorded, 114.38 ft below land-surface datum, May 10, 1973.

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 114.38 ft below land-surface datum, May 10, 1973; lowest recorded, 134.76 ft below land-surface datum, August 1, 1989.

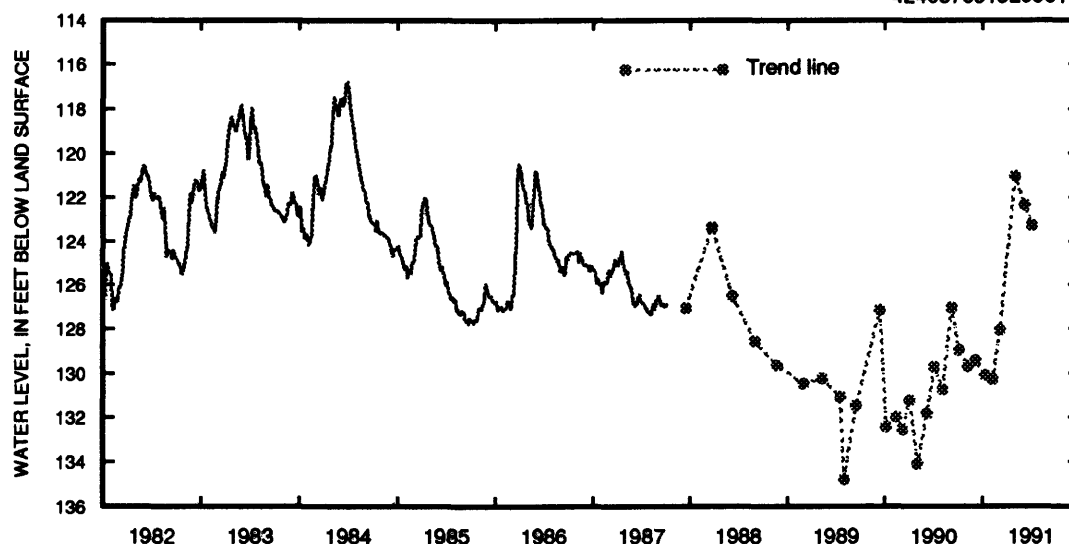
WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 04	128.97	JAN 09	130.08	MAY 02	121.03	AUG 07	125.59
NOV 06	129.70	FEB 07	130.28	JUN 07	122.33	SEP 05	126.04
DEC 05	129.44	MAR 07	128.12	JUL 03	123.27		

WATER YEAR 1991

HIGHEST 121.03 MAY 02, 1991 LOWEST 130.28 FEB 07, 1991

424057091320001



430156091182901. Local number, 95-04-22 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.--Cambrian-Ordovician: in St. Peter sandstone of Middle Ordovician age.

WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 6 in., depth 49 ft. Casing information not available.

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.--None.

PERIOD OF RECORD.--October 1957 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 13.98 ft below land-surface datum, December 7, 1983; lowest measured, 27.88 ft below land-surface datum, March 4, 1968.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 06	23.65	DEC 19	24.16	MAR 13	24.30	JUN 06	23.99

WATER YEAR 1991

HIGHEST 23.65 NOV 06, 1990 LOWEST 24.30 MAR 13, 1991

CLAYTON COUNTY

425940091194701. Local number, 95-04-32 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.--Cambrian-Ordovician: in St. Peter sandstone of Middle Ordovician age.

WELL CHARACTERISTICS.--Drilled stock artesian water well, diameter 6 in., depth 380 ft (reported). Casing information not available.

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.--None.

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, January 13, 1969.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 06	111.27	DEC 19	103.00	APR 03	94.73	JUN 06	98.99

WATER YEAR 1991

HIGHEST 94.73 APR 03, 1991 LOWEST 111.27 NOV 06, 1990

CRAWFORD COUNTY

415514095312001. Local number, 82-40-17 AAB1.

LOCATION.--Lat 41°55'14", long 95°31'20", Hydrologic Unit 10230007, approximately 1.5 mi west of the Town of Dow City on the south side of U.S. Highway 30. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 141 ft, cased to 141 ft, slotted from 123-141 ft, gravel-packed.

INSTRUMENTATION.--Intermittent measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,150 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 WC-9.

PERIOD OF RECORD.--June 1981 to current year.

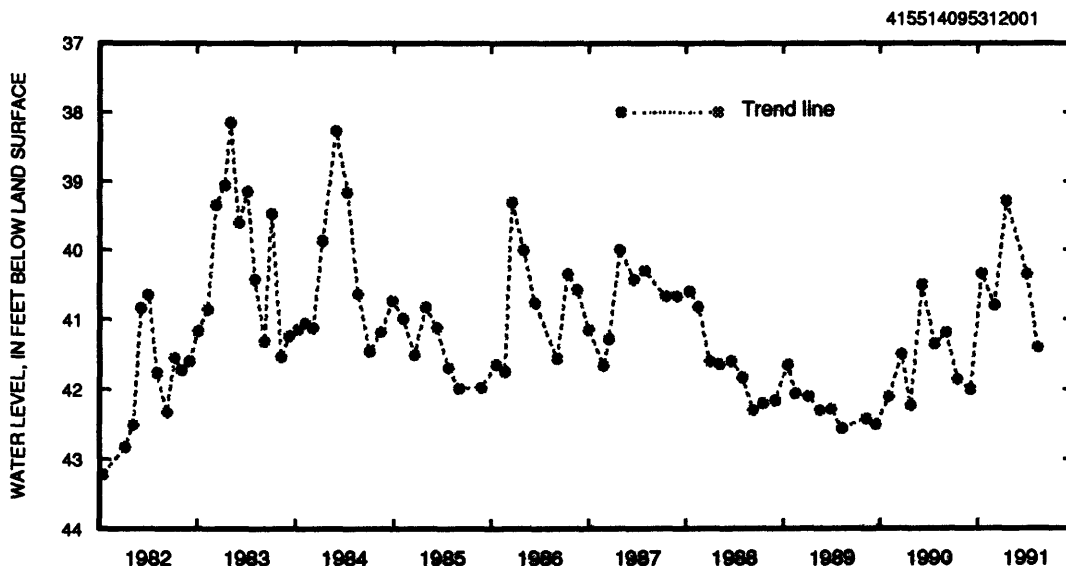
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 38.15 ft below land-surface datum, May 3, 1983; lowest measured, 43.86 ft below land-surface datum, June 11, 1981.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 17	41.86	JAN 16	40.34	APR 18	39.70	JUL 05	40.35
DEC 05	42.00	MAR 05	40.80	MAY 21	39.28	AUG 14	41.40

WATER YEAR 1991

HIGHEST 39.28 MAY 21, 1991 LOWEST 42.00 DEC 05, 1990



CRAWFORD COUNTY

415512095313801. Local number, 82-40-17 ABBC1.

LOCATION.--Lat 41°55'12", long 95°31'38", Hydrologic Unit 10230007, approximately 1.75 mi west of the Town of Dow City on County Road E-5L, north of U.S. Highway 30. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Boyer alluvial: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 46 ft, cased to 46 ft, slotted from 40-46 ft, gravel-packed.

INSTRUMENTATION.--Intermittent measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,122 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.60 ft above land-surface datum.

REMARKS.--Well WC-188.

PERIOD OF RECORD.--May 1983 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 21.55 ft below land-surface datum, May 30, 1984; lowest measured, 26.40 ft below land-surface datum, October 17, 1990.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 17	26.40	JAN 16	23.50	APR 18	22.80	JUL 05	23.80
DEC 05	25.35	MAR 05	24.25	MAY 21	23.20	AUG 14	24.83
WATER YEAR 1991				HIGHEST 22.80 APR 18, 1991 LOWEST 26.40 OCT 17, 1990			

420608095111701. Local number, 84-37-08 BCCB1.

LOCATION.--Lat 42°06'08", long 95°11'17", Hydrologic Unit 10230007, approximately 3 mi north of the Town of Vail on the east side of County Road E-25. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Fremont buried channel: in sand and gravel of Pleistocene age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 541 ft, cased to 541 ft, slotted from 527-541 ft, gravel-packed. Open to Pennsylvanian limestone 539-541 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape or electric line by USGS personnel.

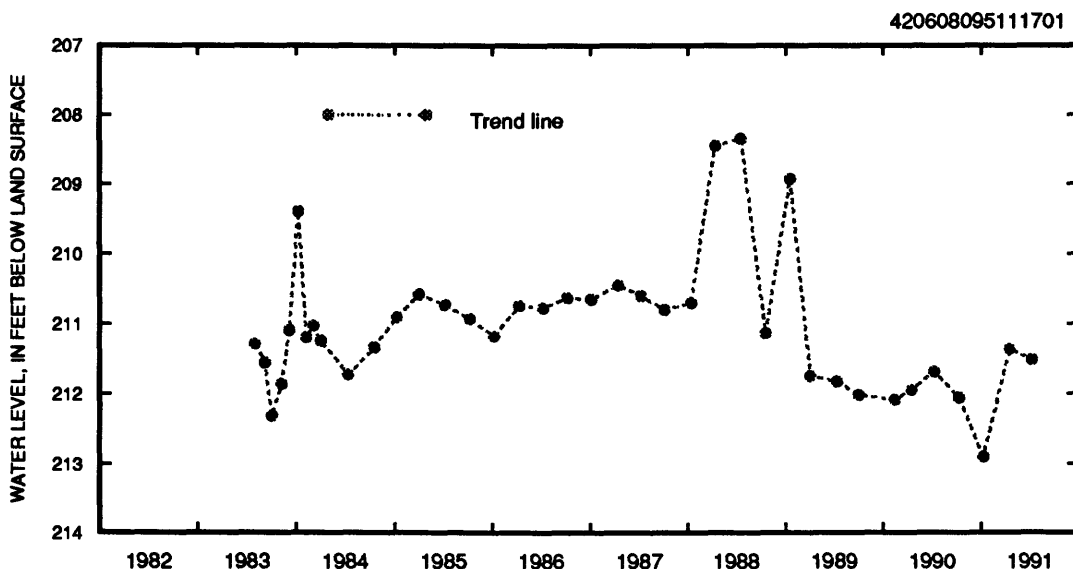
DATUM.--Elevation of land-surface datum is 1,380 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.65 ft above land-surface datum.

REMARKS.--Well WC-226.

PERIOD OF RECORD.--July 1983 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 208.35 ft below land-surface datum, July 17, 1988; lowest measured, 212.90 ft below land-surface datum, January 9, 1991.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 10	212.06	JAN 09	212.90	APR 18	211.37	JUL 09	211.52
WATER YEAR 1991				HIGHEST 211.37 APR 18, 1991 LOWEST 212.90 JAN 09, 1991			



CRAWFORD COUNTY

421106095125501. Local number, 85-38-12 DCBA1.

LOCATION.--Lat 42°11'06", long 95°12'55", Hydrologic Unit 10230007, approximately 5.5 mi east of the Town of Kiron on the south side of County Road E-16 near the Town of Boyer. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Fremont buried channel: in sand and gravel of Pleistocene age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 341 ft, cased to 315 ft, slotted from 300-310 ft, gravel-packed open hole from 315-341 ft. Open to Pennsylvanian limestone and shale from 331-341 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,225 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 WC-14.

PERIOD OF RECORD.--July 1981 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 62.76 ft below land-surface datum, April 16, 1987; lowest measured, 64.86 ft below land-surface datum, September 22, 1981.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 10	64.69	JAN 09	64.40	APR 18	63.97	JUL 09	64.18
WATER YEAR 1991				HIGHEST 63.97 APR 18, 1991 LOWEST 64.69 OCT 10, 1990			

421031095225601. Local number, 85-39-16 ADDD1.

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 on the west side of County Road M-27. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 5 in., depth 351 ft, cased to 351 ft, slotted from 315-330 ft, gravel-packed. Open to Pennsylvanian rock from 344-351 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape or electric line by USGS personnel.

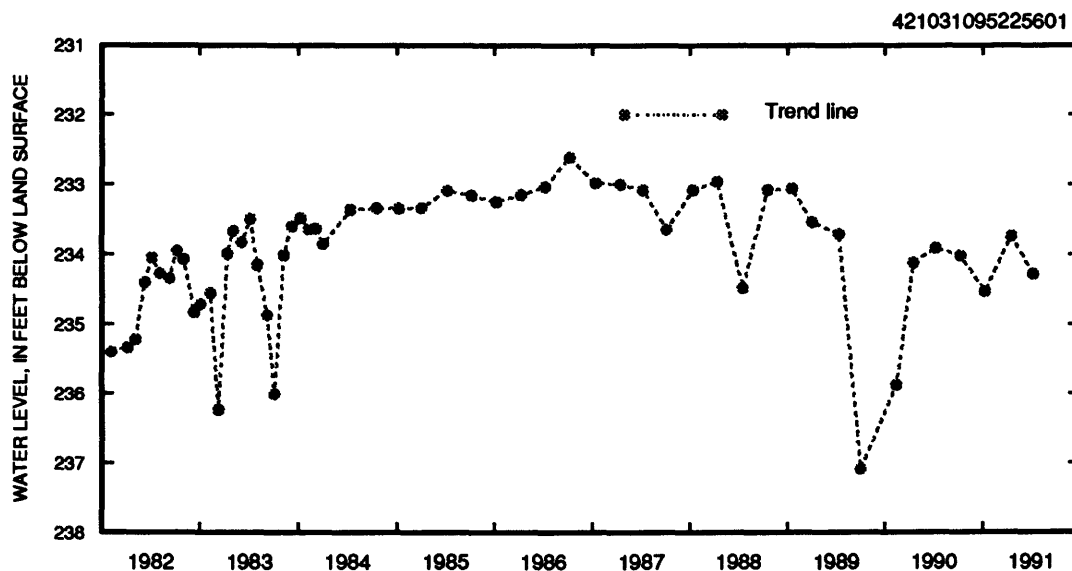
DATUM.--Elevation of land-surface datum is 1,370 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.14 ft above land-surface datum.

REMARKS.--Well WC-7A.

PERIOD OF RECORD.--June 1981 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 232.61 ft below land-surface datum, October 7, 1986; lowest measured, 238.35 ft below land-surface datum, June 10, 1981.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 10	234.02	JAN 09	234.53	APR 18	233.74	JUL 09	234.28
WATER YEAR 1991				HIGHEST 233.74 APR 18, 1991 LOWEST 234.53 JAN 09, 1991			



GROUND-WATER LEVELS

CRAWFORD COUNTY

421031095225602. Local number, 85-39-16 ADDD2.

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 on the west side of County Road M-27. 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 543-561 ft, gravel-packed.

INSTRUMENTATION.--Quarterly measurement with electric line by USGS personnel.

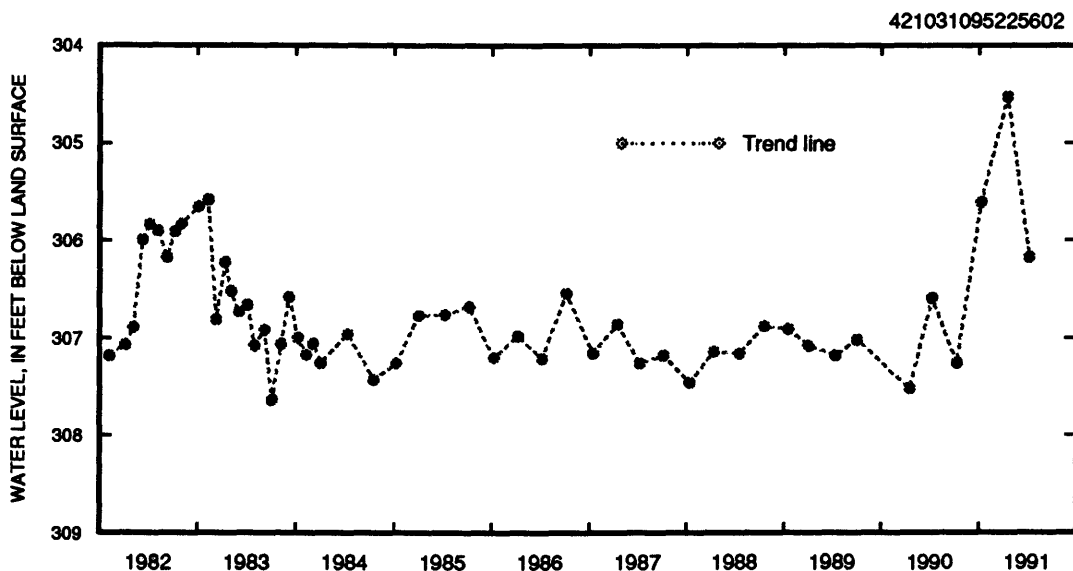
DATUM.--Elevation of land-surface datum is 1,370 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.14 ft above land-surface datum.

REMARKS.--Well WC-7B.

PERIOD OF RECORD.--June 1981 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 304.53 ft below land-surface datum, April 18, 1991, lowest measured, 307.64 ft below land-surface datum, October 4, 1983.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 10	307.26	JAN 09	305.61	APR 18	304.53	JUL 09	306.17
WATER YEAR 1991				HIGHEST 304.53 APR 18, 1991 LOWEST 307.26 OCT 10, 1990			



421005095342801. Local number, 85-41-13 CCCCI.

LOCATION.--Lat 42°10'05", long 95°34'28", Hydrologic Unit 10230001, approximately 7 mi west of the Town of Schleswig, northeast of the junction of County Roads L-51 and E-16. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota and glacial drift: in sandstone of Cretaceous age and sand and gravel of Pleistocene age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 361 ft, cased to 322 ft, slotted from 307-322 ft, gravel-packed. Open to Dakota Formation from 320-361 ft.

INSTRUMENTATION.--Quarterly measurement with electric line or chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,375 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.49 ft above land-surface datum.

REMARKS.--Well WC-6.

PERIOD OF RECORD.--May 1981 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 244.23 ft below land-surface datum, July 28, 1981; lowest measured, 249.05 ft below land-surface datum, February 4, 1982.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 10	247.45	JAN 09	248.96	APR 18	246.98	JUL 09	247.22
WATER YEAR 1991				HIGHEST 246.98 APR 18, 1991 LOWEST 248.96 JAN 09, 1991			

DELAWARE COUNTY

422029091144302. Local number, 87-03-18 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. Casing information not available.

INSTRUMENTATION.--Monthly 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.--Hopkinton #1 well. Water levels affected by pumping of a nearby well.

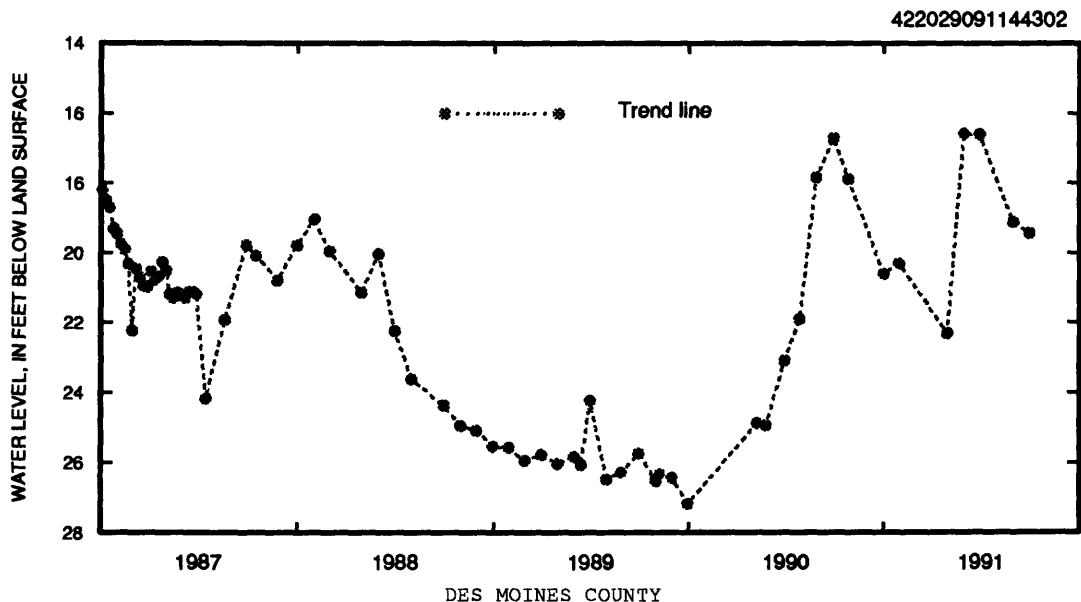
PERIOD OF RECORD.--December 1984 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 16.59 ft below land-surface datum, May 30, 1991; lowest measured, 27.19 ft below land-surface datum, December 30, 1989.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 26	17.89	FEB 27	21.44	MAY 30	16.59	AUG 30	19.12
DEC 31	20.61	APR 29	22.32	JUN 28	16.61	SEP 30	19.44
JAN 29	20.31						

WATER YEAR 1991

HIGHEST 16.59 MAY 30, 1991 LOWEST 22.32 APR 29, 1991



404844091142701. Local number, 69-03-06 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.--Cambrian-Ordovician: in St. Peter 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 855-1,209 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. Measurements discontinued December 1990.

PERIOD OF RECORD.--March 1950 to December 1990.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 102.34 ft below land-surface datum, June 20, 1990; lowest measured, 201.75 ft below land-surface datum, Aug. 15, 1978.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 10	102.59	DEC 13	102.93

WATER YEAR 1991

HIGHEST 102.59 NOV 10, 1990 LOWEST 102.93 DEC 13, 1990

GROUND-WATER LEVELS

DES MOINES COUNTY

404753091142501. Local number, 69-03-06 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.--Devonian and Mississippian: in Cedar Valley limestone of Devonian age and limestone of Mississippian age.

WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 19 in., depth 675 ft, cased to 75 ft, open hole 75-675 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. Measurements discontinued December 1990.

PERIOD OF RECORD.--March 1950 to December 1990.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 74.46 ft below land-surface datum, April 18, 1975; lowest measured, 86.04 ft below land-surface datum, April 22, 1989.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 10	84.29	DEC 13	84.04

WATER YEAR 1991

HIGHEST 84.04 DEC 13, 1990 LOWEST 84.29 NOV 10, 1990

EMMET COUNTY

432927094345501. Local number, 100-32-11 DDDD1.

LOCATION.--Lat 43°29'27", long 94°34'55", Hydrologic Unit 07100003, at Okamanapedan Lake Reserve State Park, north of the Town of Dolliver. Owner: State of Iowa.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled public-supply artesian water well, diameter 6 in., depth 277 ft. Casing information is not available.

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.--None.

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

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 59.60 ft below land-surface datum, December 19, 1946; lowest measured, 77.86 ft below land-surface datum, August 7, 1979.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 29	70.84	MAR 21	73.41	MAY 21	69.17	AUG 13	69.13

WATER YEAR 1991

HIGHEST 69.13 AUG 13, 1991 LOWEST 73.41 MAR 21, 1991

FRANKLIN COUNTY

423332093034302. Local number, 90-19-35 CDCC.

LOCATION.--Lat 42°33'32", long 90°19'35", Hydrologic Unit 07080205, 0.25 mi west of intersection of U.S. Highway 20 and County Road S-56, on the north side of U.S. Highway 20 adjacent to the canning plant Owner: City of Ackley.

AQUIFER.--Mississippian: in limestone and dolomite of Mississippian age.

WELL CHARACTERISTICS.--Drilled unused public-supply artesian well, diameter 10 in., depth 175 ft, cased to 159 ft, perforated 99-159 ft, open hole 159-278 ft. Open to Devonian rock 124-175'.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,008 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.85 ft above land-surface datum.

REMARKS.--Ackley No. 1 well, formerly Marshall Canning Co. No. 2.

PERIOD OF RECORD.--September 1988 to present.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 26.05 ft below land-surface datum, May 30, 1991; lowest measured, 34.05 ft below land-surface datum, November 21, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1987 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 28	32.15	MAR 28	31.62	MAY 30	26.05	AUG 21	30.91

WATER YEAR 1991

HIGHEST 26.05 MAY 30, 1991 LOWEST 32.15 DEC 28, 1990

GREENE COUNTY

415449094161501. Local number, 82-29-18 CAA1.

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 89-100 ft, gravel-packed; open hole 100-101 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 W-116.

PERIOD OF RECORD.--September 1982 to current year.

REVISION.--Highest water level measured, 0.41 ft above land-surface datum, July 5, 1983.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 0.41 ft above land-surface datum, July 5, 1989; lowest measured, 6.57 ft below land-surface datum, February 13, 1990.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 04	3.39	JAN 09	4.38	APR 17	.67	JUL 09	1.38
WATER YEAR 1991		HIGHEST .67 APR 17, 1991		LOWEST 4.38 JAN 09, 1991			

415448094163401. Local number, 82-29-18 CBAA1.

LOCATION.--Lat 41°54'48", long 94°16'34", Hydrologic Unit 07100006, approximately 3.75 west and 1.5 mi south of the Town of Rippey, south of County Road E-57 on the west edge of the North Raccoon River. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--North Raccoon alluvial: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 34 ft, cased to 30 ft, slotted from 20-30 ft, gravel-packed. Open hole from 30-34 ft into glacial till.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

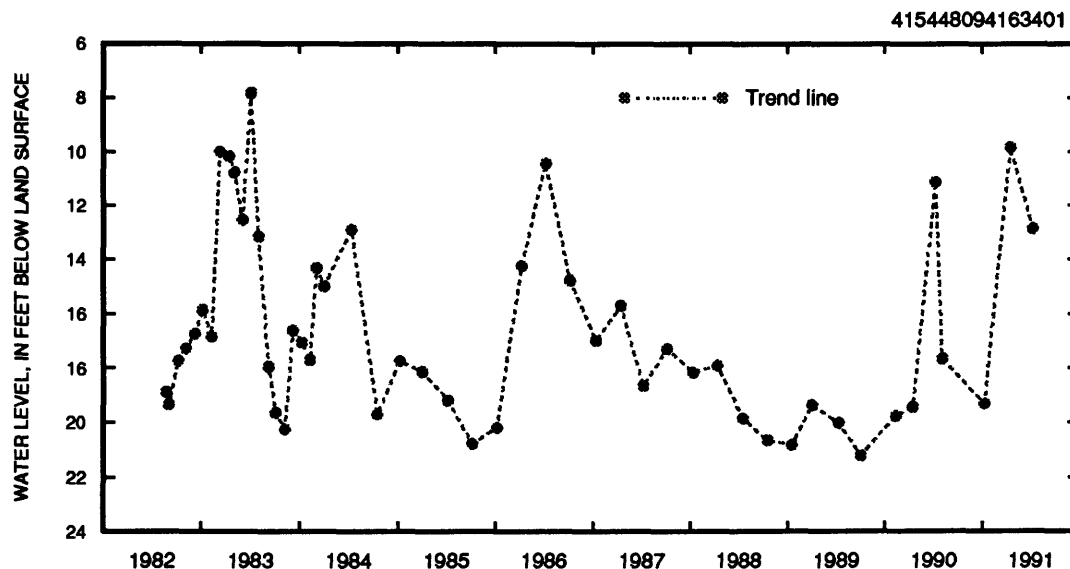
DATUM.--Elevation of land-surface datum is 965 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.45 ft above land-surface datum.

REMARKS.--Well WC-115.

PERIOD OF RECORD.--August 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 7.84 ft below land-surface datum, July 5, 1983; lowest measured, 21.21 ft below land-surface datum, October 2, 1989.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 04	17.65	JAN 09	19.30	APR 17	9.83	JUL 09	12.85
WATER YEAR 1991		HIGHEST 9.83 APR 17, 1991		LOWEST 19.30 JAN 09, 1991			



GREENE COUNTY

415449094155601. Local number, 82-29-18 DBAA.

LOCATION.--Lat 41°54'49", long 94°15'56", Hydrologic Unit 07100006, approximately 3.25 mi west and 1.5 mi south of the Town of Rippey, south of County Road E-57. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Glacial drift: in sand and gravel of Pleistocene age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 90 ft, cased to 75 ft, slotted 65-75 ft, gravel-packed; open hole from 75-90 ft. Pleistocene glacial till open from 75-86 ft, and Pennsylvanian shale and siltstone open from 86-90 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,005 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.85 ft above land-surface datum.

REMARKS.--Well WC-117.

PERIOD OF RECORD.--August 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 32.64 ft below land-surface datum, July 5, 1983; lowest measured, 40.13 ft below land-surface datum, February 13, 1990.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 04	36.26	JAN 09	37.23	APR 17	34.39	JUL 09	34.37
WATER YEAR 1991				HIGHEST 34.37 JUL 09, 1991 LOWEST 37.23 JAN 09, 1991			

415449094173201. Local number, 82-30-13 CABAL.

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: in sandstone of Pennsylvanian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 230 ft, cased to 230 ft, perforated 209-230 ft, gravel-packed. Original depth 245 ft, casing plugged at 230 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

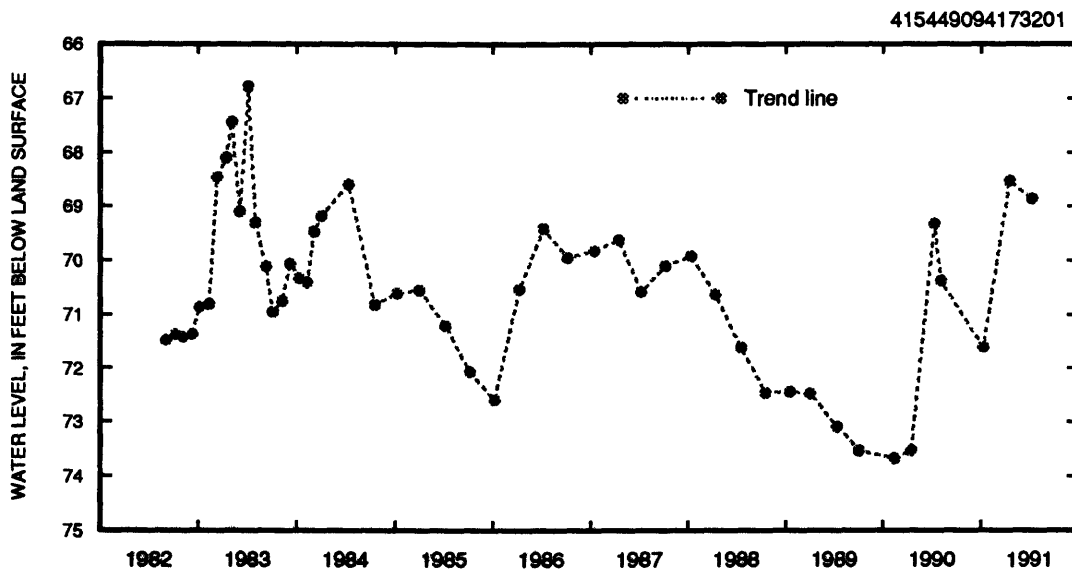
DATUM.--Elevation of land-surface datum is 1,035 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.45 ft above land-surface datum.

REMARKS.--Well WC-118.

PERIOD OF RECORD.--September 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 66.79 ft below land-surface datum, July 5, 1983; lowest measured, 73.67 ft below land-surface datum, February 13, 1990.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 04	70.38	JAN 09	71.61	APR 17	68.53	JUL 09	68.86
WATER YEAR 1991				HIGHEST 68.53 APR 17, 1991 LOWEST 71.61 JAN 09, 1991			



GREENE COUNTY

415608094260701. Local number, 82-31-10 AAAA1.

LOCATION.--Lat 41°56'08", long 94°26'07", Hydrologic Unit 07100006, approximately 7 mi south and 3.5 mi west of the City of Jefferson, 1.0 mi east of the junction of County Roads E-57 and P-14 on the south side of County Road E-57. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 125 ft, cased to 125 ft, slotted 111-120, gravel-packed. Open to Pennsylvanian shale and coal 121-125 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

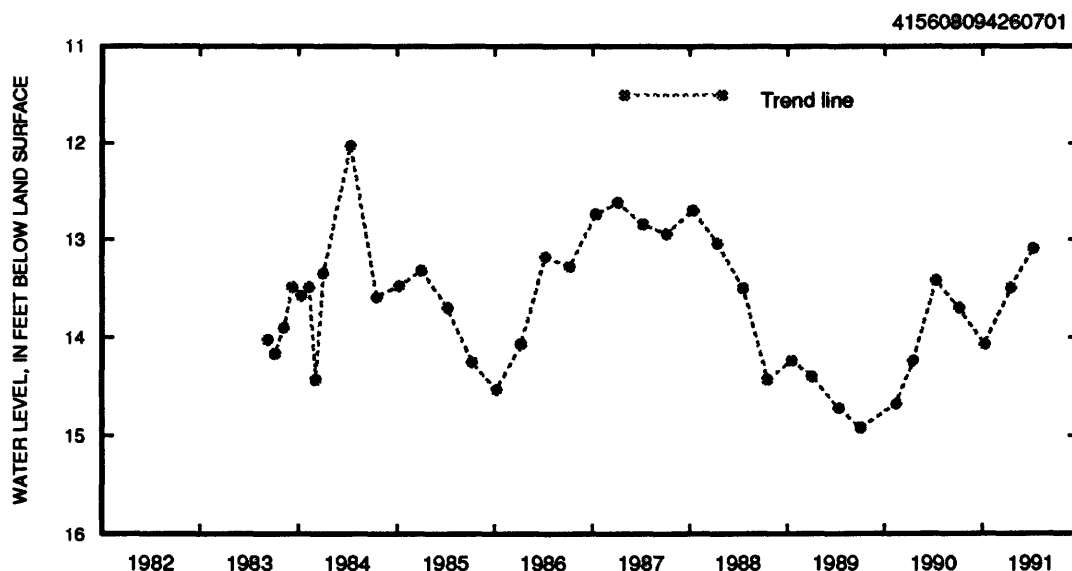
DATUM.--Elevation of land-surface datum is 1,108 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.00 ft above land-surface datum.

REMARKS.--Well WC-235.

PERIOD OF RECORD.--September 1983 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 12.03 ft below land-surface datum, July 12, 1984; lowest measured, 14.92 ft below land-surface datum, October 2, 1989.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 04	13.70	JAN 09	14.07	APR 17	13.49	JUL 09	13.09
WATER YEAR 1991				HIGHEST 13.09 JUL 09, 1991 LOWEST 14.07 JAN 09, 1991			



420146094272301. Local number, 83-31-04 ADDB.

LOCATION.--Lat 42°01'46", long 94°27'23", Hydrologic Unit 07100006, approximately 4 mi west of the City of Jefferson and 0.5 mi south of U.S. Highway 30, on the west side of County Road P-14. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 54 ft, cased to 51 ft, slotted 40-51 ft, gravel-packed. Open to Pennsylvanian shale 51-54 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,000 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.10 ft above land-surface datum.

REMARKS.--Well WC-120.

PERIOD OF RECORD.--August 1982 to July 1987, February 1990 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 6.39 ft below land-surface datum, July 5, 1983; lowest measured, 19.23 ft below land-surface datum, October 7, 1985.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 04	17.21	JAN 09	18.52	APR 17	8.46	JUL 09	14.82
WATER YEAR 1991				HIGHEST 8.46 APR 17, 1991 LOWEST 18.52 JAN 09, 1991			

GROUND-WATER LEVELS

GREENE COUNTY

420149094344701. Local number, 83-32-04 ACCC1.

LOCATION.--Lat 42°01'49", long 94°34'47", Hydrologic Unit 07100006, 1.5 mi west of the Town of Scranton south of U.S. Highway 30, adjacent to the Scranton Cemetery. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 240 ft, cased to 240 ft, slotted 220-240 ft, gravel-packed. Open to Pennsylvanian shale 234-240 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape or electric line by USGS personnel.

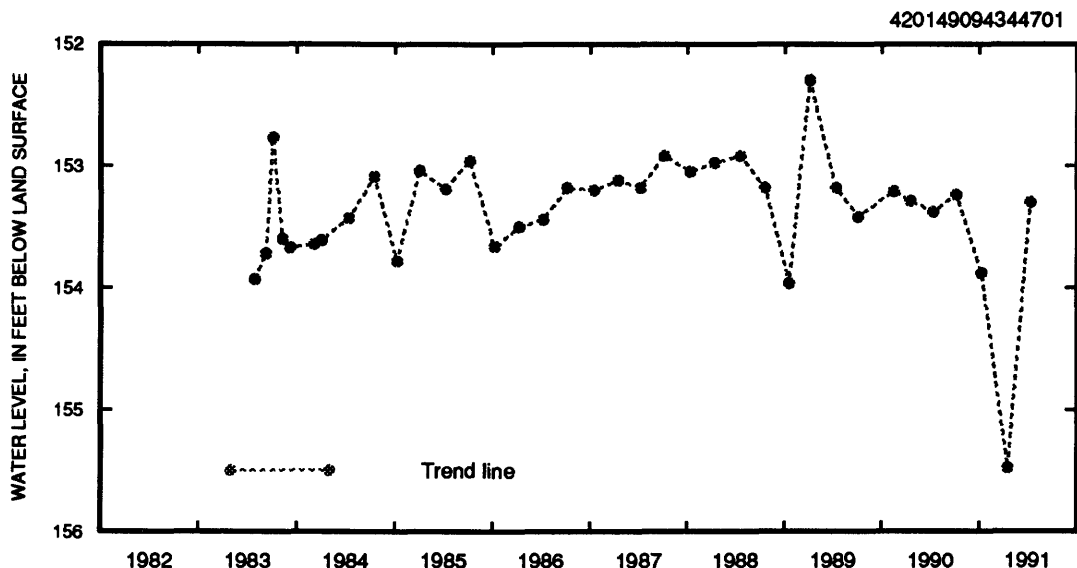
DATUM.--Elevation of land-surface datum is 1,202 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.10 ft above land-surface datum.

REMARKS.--Well WC-228.

PERIOD OF RECORD.--July 1983 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 152.77 ft below land-surface datum, October 4, 1983; lowest measured, 155.48 ft below land-surface datum, April 17, 1991.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 04	153.24	JAN 09	153.88	APR 17	155.48	JUL 09	153.30
WATER YEAR 1991				HIGHEST 153.24 OCT 04, 1990 LOWEST 155.48 APR 17, 1991			



420116094363001. Local number, 83-32-08 BBBC1.

LOCATION.--Lat 42°01'16", long 94°36'30", Hydrologic Unit 07100006, approximately 3 mi west of the Town of Scranton, south of U.S. Highway 30. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Hardin Creek buried channel: in sand and gravel of Pleistocene age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 181 ft, cased to 181 ft, slotted 161-171 ft, gravel-packed. Open to Pennsylvanian shale and siltstone, 171-181 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,135 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.20 ft above land-surface datum.

REMARKS.--Well WC-229.

PERIOD OF RECORD.--September 1983 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 39.64 ft below land-surface datum, July 12, 1984; lowest measured, 51.03 ft below land-surface datum, July 8, 1985.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 04	42.50	JAN 09	41.89	APR 17	41.29	JUL 09	45.97
WATER YEAR 1991				HIGHEST 41.29 APR 17, 1991 LOWEST 45.97 JUL 09, 1991			

GREENE COUNTY

420507094141901. Local number, 84-29-16 CBAB1.

LOCATION.--Lat 42°05'07", long 94°14'19", Hydrologic Unit 07100006, approximately 1.5 mi south of the Town of Dana, east of Iowa Highway 144 near the Chicago and Northwestern Railroad. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Beaver buried channel: in sand and gravel of Pleistocene age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 181 ft, cased to 181 ft, slotted 161-176 ft, gravel-packed. Open to Pennsylvanian shale 177-181 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, 1.80 ft above land-surface datum.

REMARKS.--Well WC-233.

PERIOD OF RECORD.--August 1983 to current year.

REVISION.--Lowest water level measured, 43.28 ft below land-surface datum, October 2, 1989.

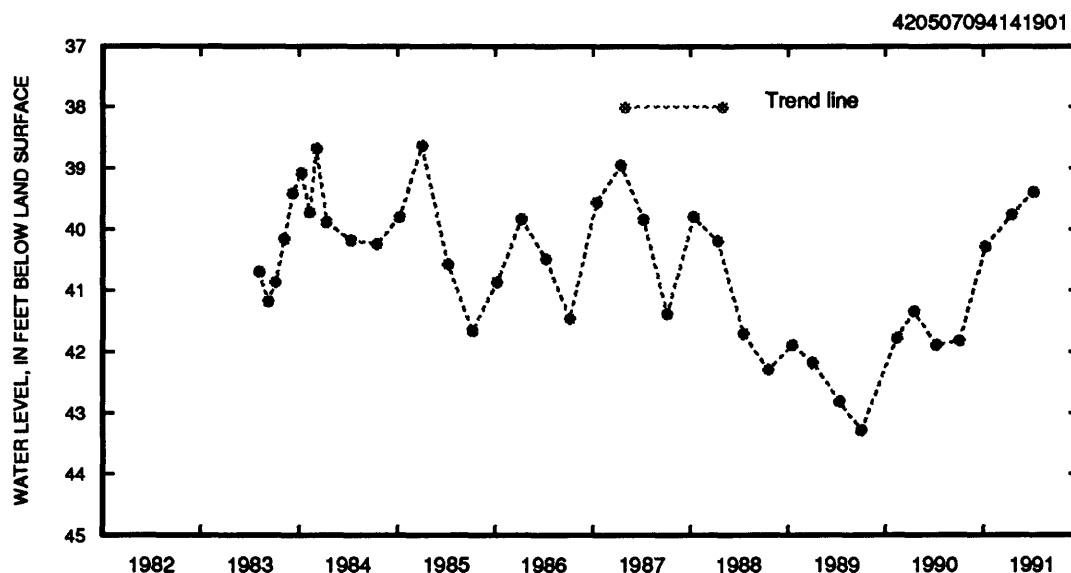
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 38.63 ft below land-surface datum, April 2, 1985; lowest measured, 43.28 ft below land-surface datum, October 2, 1989.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 04	41.82	JAN 09	40.28	APR 17	39.76	JUL 08	39.39

WATER YEAR 1991

HIGHEST 39.39 JUL 08, 1991 LOWEST 41.82 OCT 04, 1990



420603094355101. Local number, 84-32-08 ACDB1.

LOCATION.--Lat 42°06'03", long 94°35'51", Hydrologic Unit 07100006, approximately 3.5 mi north and 1.5 mi east of the Town of Ralston near the Raccoon River Bible Camp. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Pennsylvanian and Dakota: in sandstone of Pennsylvanian and Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian well, diameter 2 in., depth 141 ft, cased to 129 ft, slotted 119-129 ft, gravel-packed. Open to Pennsylvanian sandstones from 129-141 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,070 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.55 ft above land-surface datum.

REMARKS.--Well WC-124.

PERIOD OF RECORD.--September 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 33.36 ft below land-surface datum, July 5, 1983; lowest measured, 41.60 ft below land-surface datum, February 13, 1990.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 04	37.64	APR 17	35.34	JUL 09	34.27

WATER YEAR 1991

HIGHEST 34.27 JUL 09, 1991 LOWEST 37.64 OCT 04, 1990

GROUND-WATER LEVELS

GREENE COUNTY

420723094143201. Local number, 85-29-32 DDDD1.

LOCATION.--Lat 42°07'23", long 94°14'32", Hydrologic Unit 07100006, 1 mi north of the Town of Dana on the west side of Iowa Highway 144. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Beaver buried channel: in sand and gravel of Pleistocene age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 171 ft, cased to 171 ft, slotted 153-168 ft, gravel-packed. Open to Pennsylvanian shale and sandy limestone from 165- 171 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape or electric line by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,091 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 WC-232.

PERIOD OF RECORD.--August 1983 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 36.03 ft below land-surface datum, April 17, 1991; lowest measured, 41.78 ft below land-surface datum, October 2, 1989.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 04	40.78	JAN 09	38.08	APR 17	36.03	JUL 09	37.21
WATER YEAR 1991				HIGHEST 36.03 APR 17, 1991 LOWEST 40.78 OCT 04, 1990			

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 Late Devonian age.

WELL CHARACTERISTICS.--Drilled public-emergency-supply artesian water well, diameter 12 in., depth 280 ft, cased to 128 ft, open hole 128-280 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

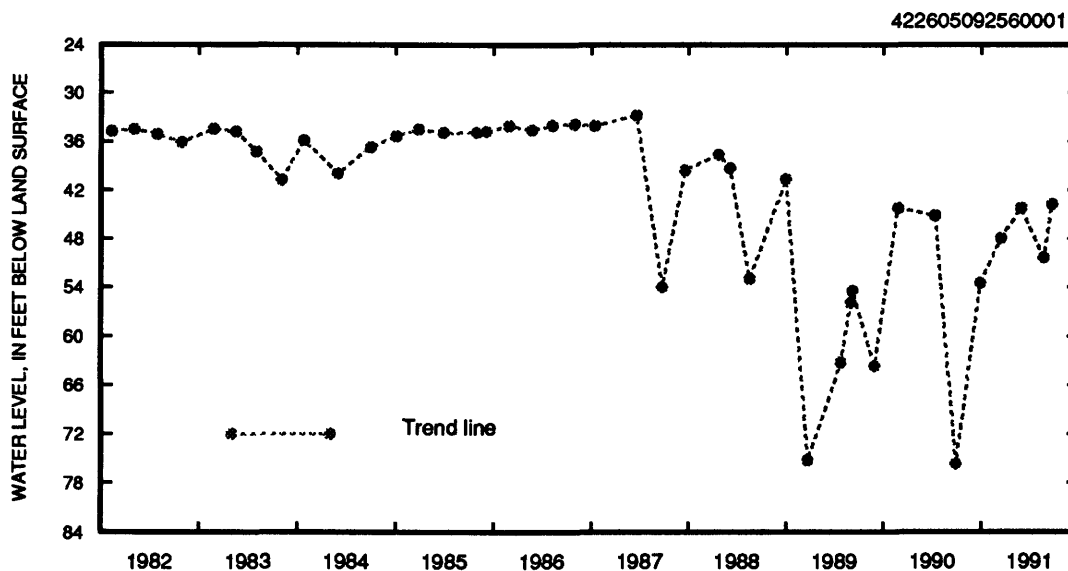
DATUM.--Elevation of land-surface datum is 1,060 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Edge of vent pipe, 1.25 ft above land-surface datum.

REMARKS.--None. Water levels affected by pumping and nearby pumping.

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, June 18, 1987; lowest measured, 96.81 ft below land-surface datum, September 27, 1960.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 28	53.51	MAY 28	44.23	AUG 21	50.34	SEP 21	43.73
MAR 15	47.95						
WATER YEAR 1991				HIGHEST 43.73 SEP 21, 1991 LOWEST 53.51 DEC 28, 1990			



GUTHRIE COUNTY

413223094150801. Local number, 78-30-24 CAAB1

LOCATION.--Lat 41°32'23", long 94°15'08", Hydrologic Unit 07100007, approximately 0.5 mi west and 1.5 north of the Town of Dexter. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota; in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drill observation artesian water well, diameter 2 in., depth 72 ft, cased to 72 ft, slotted 60-68 ft, gravel-packed. Open to Pennsylvanian shale 65-72 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,020 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.10 ft above land-surface datum.

REMARKS.--Well WC-238.

PERIOD OF RECORD.--August 1983 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 41.90 ft below land-surface datum, October 6, 1987; lowest measured, 48.82 ft below land-surface datum, April 10, 1986.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 10	45.91	JAN 10	42.54	APR 17	42.07	JUL 10	42.03
WATER YEAR 1991				HIGHEST 42.03 JUL 10, 1991 LOWEST 45.91 OCT 10, 1990			

413248094314301. Local number, 78-32-21 AAAA1.

LOCATION.--Lat 41°32'48", long 94°31'43", Hydrologic Unit 07100008, approximately 2.25 mi north of the Town of Casey. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota; in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 161 ft, cased to 135 ft, slotted 125-135 ft, gravel-packed. Open to Pennsylvanian shale 158-161 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,250 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.90 ft above land-surface datum.

REMARKS.--Well WC-239.

PERIOD OF RECORD.--August 1983 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 70.50 ft below land-surface datum, January 12, 1988; lowest measured, 74.38 ft below land-surface datum, January 9, 1985.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 10	73.19	JAN 10	73.46	APR 17	73.13	JUL 10	72.98
WATER YEAR 1991				HIGHEST 72.98 JUL 10, 1991 LOWEST 73.46 JAN 10, 1991			

413837094194601. Local number, 79-30-22 BAAC1.

LOCATION.--Lat 41°38'37", long 94°19'46", Hydrologic Unit 07100007, approximately 2.5 mi west of the Town of Linden on the west side of County Road F-51. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota; in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 152 ft, cased to 150 ft, slotted 140-150 ft, gravel-packed. Open to Pennsylvanian shale 149-152 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape or electric line by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,140 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.85 ft above land-surface datum.

REMARKS.--Well WC-109.

PERIOD OF RECORD.--August 1982 to current year.

REVISION.--Lowest water level measured, 140.88 ft below land-surface datum, July 12, 1990.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 135.85 ft below land-surface datum, January 15, 1987; lowest measured, 140.88 ft below land-surface datum, July 12, 1990.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 10	139.95	JAN 10	140.15	APR 17	140.23	JUL 10	139.37
WATER YEAR 1991				HIGHEST 139.37 JUL 10, 1991 LOWEST 140.23 APR 17, 1991			

GROUND-WATER LEVELS

GUTHRIE COUNTY

414110094260501. Local number, 79-31-23 BBBB1.

LOCATION.--Lat 41°41'10", long 94°26'05", Hydrologic Unit 07100007, approximately 1 mi north of the Town of Monteith on the east side of County Road P-20. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--South Raccoon alluvial: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 30 ft, cased to 27 ft, slotted 21-27 ft, gravel-packed. Open to Pennsylvanian shale 27-30 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,037 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 WC-85.

PERIOD OF RECORD.--July 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 3.93 ft below land-surface datum, April 11, 1983; lowest measured, 11.07 ft below land-surface datum, October 19, 1988.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 10	10.17	JAN 10	9.75	APR 17	4.34	JUL 10	7.92
WATER YEAR 1991				HIGHEST 4.34 APR 17, 1991 LOWEST 10.17 OCT 10, 1990			

414514094381601. Local number, 80-33-12 ACCC1.

LOCATION.--Lat 41°45'14", long 94°38'16", Hydrologic Unit 07100007, approximately 6.5 mi west and 4.5 mi north of the Town of Guthrie Center on County Road N-56. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 81 ft, cased to 81 ft, slotted 60-66 ft, gravel-packed.

INSTRUMENTATION.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,170 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.20 ft above land-surface datum.

REMARKS.--Well WC-90.

PERIOD OF RECORD.--July 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 7.42 ft below land-surface datum, May 4, 1983; lowest measured, 12.75 ft below land-surface datum, October 19, 1988.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 10	10.99	JAN 10	11.70	APR 17	9.60	JUL 10	9.03
WATER YEAR 1991				HIGHEST 9.03 JUL 10, 1991 LOWEST 11.70 JAN 10, 1991			

414821094271301. Local number, 81-31-22 CCCC1.

LOCATION.--Lat 41°48'21", long 94°27'13", Hydrologic Unit 07100007, approximately 2.5 mi south and 1 mi west of the Town of Bagley, north of Spring Brook State Park. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 153 ft, cased to 153 ft, slotted 143-153 ft, gravel-packed. Open to Pennsylvanian shale 149-153 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape or electric line by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,190 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.10 ft above land-surface datum.

REMARKS.--Well WC-105.

PERIOD OF RECORD.--August 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 60.52 ft below land-surface datum, October 6, 1987, and April 13, 1988; lowest measured, 69.88 ft below land-surface datum, December 9, 1982.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 10	65.39	JAN 10	65.63	APR 17	64.32	JUL 10	62.44
WATER YEAR 1991				HIGHEST 62.44 JUL 10, 1991 LOWEST 65.63 JAN 10, 1991			

GUTHRIE COUNTY

414652094293301. Local number, 81-31-32 CBCC1.

LOCATION.--Lat 41°46'52", long 94°29'33", Hydrologic Unit 07100007, approximately 1 mi west of Springbrook State Park at the junction of Iowa Highways 25 and 384. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Middle Raccoon alluvial: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 52 ft, cased to 51 ft, slotted 40-51 ft, gravel-packed, open hole 51-52 ft. Open to Pennsylvanian shale, 49-52 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

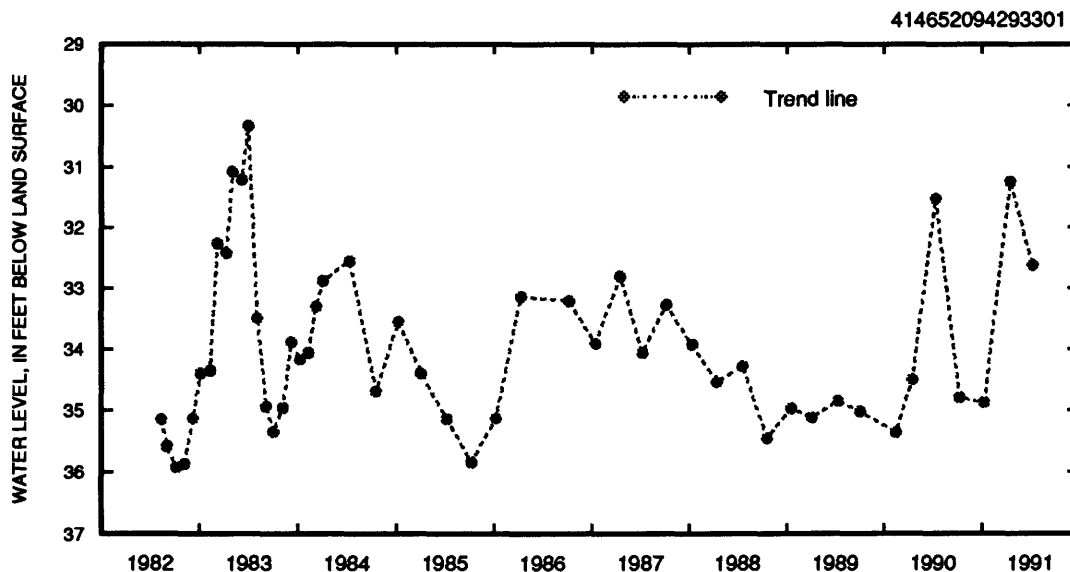
DATUM.--Elevation of land-surface datum is 1,090 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.03 ft above land-surface datum.

REMARKS.--Well WC-106.

PERIOD OF RECORD.--August 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 30.33 ft below land-surface datum, July 1, 1983; lowest measured, 35.92 ft below land-surface datum, October 6, 1982.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991			
DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 10	34.79	JAN 10	34.87
		APR 17	31.25
		JUL 10	32.62
WATER YEAR 1991		HIGHEST 31.25 APR 17, 1991 LOWEST 34.87 JAN 10, 1991	



414728094385301. Local number, 81-33-26 DDDD1.

LOCATION.--Lat 41°47'28", long 94°38'53", Hydrologic Unit 07100007, approximately 5 mi south and 1.25 mi east of the Town of Coon Rapids on the north side of County Road F-24. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 80 ft, cased to 75 ft, slotted 60-65 ft, gravel-packed, open hole 75-80 ft. Open to Pennsylvanian shale 67-80 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,205 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.20 ft above land-surface datum.

REMARKS.--Well WC-93.

PERIOD OF RECORD.--July 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 38.52 ft below land-surface datum, June 7, 1983; lowest measured, 40.98 ft below land-surface datum, January 3, 1983.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991			
DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 10	40.13	JAN 10	40.39
		APR 17	40.41
		JUL 10	39.28
WATER YEAR 1991		HIGHEST 39.28 JUL 10, 1991 LOWEST 40.41 APR 17, 1991	

GROUND-WATER LEVELS

GUTHRIE COUNTY

414728094392401. Local number, 81-33-35 ABBC1.

LOCATION.--Lat 41°47'28", long 94°39'24", Hydrologic Unit 07100007, approximately 5 mi south and 1 mi east of the Town of Coon Rapids, on the south side of County Road F-24. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--South Raccoon alluvial: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 41 ft, cased to 35 ft, slotted 26-35 ft gravel-packed, open hole 35-41 ft. Open to Early Cretaceous sandstone and shale 38-41 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,150 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 0.80 ft above land-surface datum.

REMARKS.--Well WC-94.

PERIOD OF RECORD.--July 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 12.80 ft below land-surface datum, July 1, 1983; lowest measured, 16.94 ft below land-surface datum, February 14, 1990.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 10	16.30	JAN 10	16.21	APR 17	14.69	JUL 10	15.43
WATER YEAR 1991				HIGHEST 14.69 APR 17, 1991 LOWEST 16.30 OCT 10, 1990			

HARDIN COUNTY

423310093032802. Local number, 89-19-02 BDAC.

LOCATION.--Lat 42°33'10", long 93°03'28", Hydrologic Unit 07080205, 0.35 south and 0.10 mi west of the intersection of U.S. Highway 20 and County Road S-56. Well is in a shed at the west end of 2nd Avenue adjacent to railroad tracks. Owner: City of Ackley.

AQUIFER.--Mississippian: in limestone and dolomite of Mississippian age.

WELL CHARACTERISTICS.--Drilled unused public-supply artesian well, diameter 10 in., depth 134 ft, cased to 68 ft, perforated 57-60 ft, open hole 68-134 ft. Open to Devonian rock 131-134 ft.

INSTRUMENTATION.--Analog digital recorder.

DATUM.--Elevation of land-surface datum is 1,085 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of recorder base, 0.8 ft above land-surface datum.

REMARKS.--Ackley No. 5 well.

PERIOD OF RECORD.--September 1988 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 18.50 ft below land-surface datum, July 13, 1991; lowest measured, 24.15 ft below land-surface datum, February 25, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1990 TO SEPTEMBER 1991												
LOWEST VALUES												
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT
05	19.83	20.25	20.45	----	----	----	----	----	----	----	20.33	20.97
10	19.96	20.18	20.37	----	----	----	----	----	----	----	20.21	21.12
15	20.01	20.10	20.32	----	----	----	----	----	----	18.68	19.88	21.05
20	20.01	20.23	20.34	----	----	----	----	----	----	19.17	20.06	21.17
25	20.19	20.25	20.40	----	----	----	----	----	----	19.65	20.19	20.98
EOM	20.17	20.57	----	----	----	----	----	----	----	20.38	20.76	21.14
WATER YEAR 1991				HIGHEST 18.50 JUL 13, 1991 LOWEST 21.21 SEP 19, 1991								

HARRISON COUNTY

413024095353901. Local number, 78-41-31 DDDD1.

LOCATION.--Lat 41°30'24", long 95°35'39", Hydrologic Unit 10230006, approximately 4.5 mi south of the Town of Persia and west of Iowa Highway 191 to the north of the Tri-County High School. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Glacial drift: in sand and gravel of Pleistocene age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 129 ft, cased to 129 ft, slotted 109-119 ft, gravel-packed. Open to Pennsylvanian shale and limestone 118-129 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,158 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.05 ft above land-surface datum.

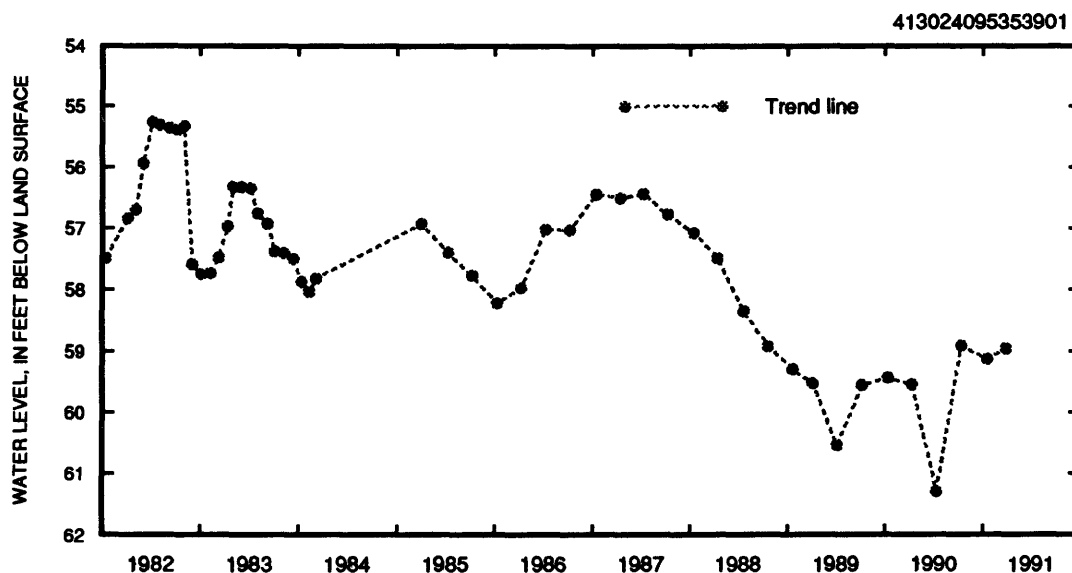
REMARKS.--Well WC-27.

PERIOD OF RECORD.--January 1982 to current year.

REVISION.--Lowest water level measured, 60.54 ft below land-surface datum, July 5, 1989

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 55.26 ft below land-surface datum, July 7, 1982; lowest measured, 60.54, July 5, 1989.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991					
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 12	58.91	JAN 16	59.13	MAR 28	58.96
WATER YEAR 1991			HIGHEST 58.91 OCT 12, 1990 LOWEST 59.13 JAN 16, 1991		



413523095483101. Local number, 78-45-05 ACDD1.

LOCATION.--Lat 41°35'23", long 95°48'31", Hydrologic Unit 10230007, approximately 3.25 mi south of the Town of Logan and 1.5 mi east of U.S. Highway 30. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 179 ft, cased to 179 ft, slotted 168-175 ft, gravel-packed. Open to Pennsylvanian shale 175-179 ft.

INSTRUMENTATION.--Intermittent measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,080 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.35 ft above land-surface datum.

REMARKS.--Well WC-33.

PERIOD OF RECORD.--May 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 66.90 ft below land-surface datum, March 21, 1990; lowest measured, 74.90 ft below land-surface datum, February 16, 1988.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 18	73.01	JAN 14	74.82	APR 18	72.38	JUL 05	72.38
DEC 05	73.90	MAR 05	72.93	MAY 21	72.19	AUG 14	73.58
WATER YEAR 1991				HIGHEST 72.19 MAY 21, 1991 LOWEST 74.82 JAN 14, 1991			

GROUND-WATER LEVELS

HARRISON COUNTY

413524095490601. Local number, 78-43-05 BCDD1.

LOCATION.--Lat 41°35'24", long 95°49'06", Hydrologic Unit 10230007, approximately 2 mi north and 3.5 mi east of the Town of Missouri Valley and 1 mi east of U.S. Highway 30. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Boyer alluvial: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 51 ft, cased to 51 ft, slotted 48-51 ft, gravel-packed.

INSTRUMENTATION.--Intermittent measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,010 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.40 ft above land-surface datum.

REMARKS.--Well WC-32.

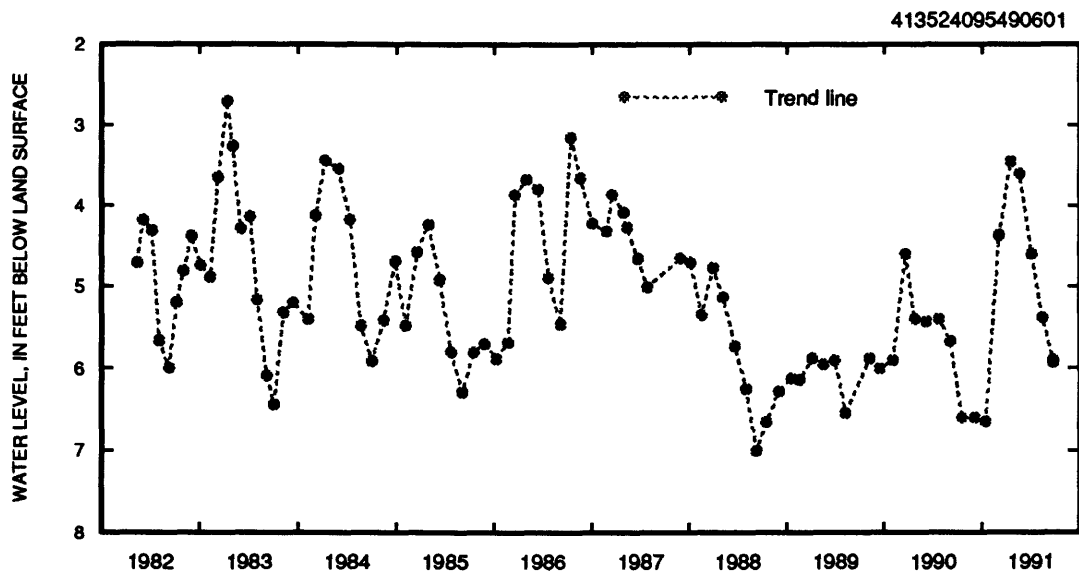
PERIOD OF RECORD.--May 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 2.71 ft below land-surface datum, April 12, 1983; lowest measured, 7.00 ft below land-surface datum, September 9, 1988.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 18	6.60	MAR 05	4.37	MAY 21	3.60	AUG 14	5.39
DEC 05	6.60	APR 18	3.45	JUL 05	4.60	SEP 24	5.90
JAN 14	6.65						

WATER YEAR 1991

HIGHEST 3.45 APR 18, 1991 LOWEST 6.65 JAN 14, 1991



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 588-628 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, June 9, 1987; lowest measured, 16.37 ft below land-surface datum, June 3, 1982.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 18	3.42	JAN 14	3.35	APR 18	8.35	JUL 05	9.60
DEC 05	3.60	MAR 05	2.69	MAY 21	9.40	AUG 14	9.91

WATER YEAR 1991

HIGHEST 2.69 MAR 05, 1991 LOWEST 9.91 AUG 14, 1991

HARRISON COUNTY

413836095465502. Local number, 79-42-19 BADC2.

LOCATION.--Lat 41°38'36", long 95°46'55", Hydrologic Unit 10230007, approximately 0.25 mi east of the Town of Logan, north of U.S. Highway 30. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Boyer alluvial: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 5 in., depth 49 ft, cased to 49 ft, slotted 31-49 ft, gravel-packed.

INSTRUMENTATION.--Intermittent measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,030 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.40 ft above land-surface datum.

REMARKS.--Well WC-196.

PERIOD OF RECORD.--June 1983 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 5.68 ft below land-surface datum, September 16, 1991; lowest measured, 14.73 ft below land-surface datum, December 20, 1989.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 19	11.90	APR 18	12.95	JUL 02	8.90	SEP 26	5.68
JAN 25	11.55	MAY 23	11.50	AUG 13	10.72		
MAR 05	10.72						

WATER YEAR 1991

HIGHEST 5.68 SEP 26, 1991 LOWEST 12.95 APR 18, 1991

414517095453401. Local number, 80-42-08 ACCC.

LOCATION.--Lat 41°45'17", long 95°45'34", Hydrologic Unit 10230007, approximately 2.75 mi west and 1 mi north of the City of Woodbine, on the north side of County Road F20L. 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 336 ft, cased to 336 ft, slotted 311-336 ft, gravel-packed.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,220 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: top of casing, 1.0' above land-surface datum.

REMARKS.--Well WC-3.

PERIOD OF RECORD.--May 1981 to current year.

EXTREMES FOR PERIOD OF RECORD.-- Highest water level measured, 146.60 ft below land-surface datum, January 6, 1986; lowest water level measured, 292.54 ft below land-surface datum, May 7, 1981.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEARS OCTOBER 1980 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
MAY 07, 1981	292.54	DEC 10, 1982	205.16	MAR 06, 1984	169.52	OCT 07, 1987	154.46
19	286.59	JAN 03, 1983	203.23	APR 11	167.10	JAN 11, 1988	152.54
JUN 10	277.95	FEB 08	201.61	JUL 12	161.08	JUL 18	153.99
26	273.23	MAR 10	198.25	OCT 15	155.18	OCT 17	154.77
JUL 28	264.41	APR 12	196.63	JAN 07, 1985	150.34	JAN 19, 1989	155.20
NOV 03	246.87	MAY 02	192.86	APR 01	148.61	APR 06	155.94
FEB 05, 1982	234.41	JUN 02	188.53	JUL 11	147.22	JUL 07	156.59
APR 06	227.59	JUL 06	184.88	OCT 07	146.61	OCT 05	157.04
MAY 06	224.45	AUG 02	182.61	JAN 06, 1986	146.60	JAN 12, 1990	157.19
JUN 03	221.61	SEP 07	179.62	APR 07	147.03	APR 10	157.14
JUL 07	217.72	OCT 04	177.85	JUL 07	147.67	OCT 10	156.89
AUG 03	215.46	NOV 08	175.85	OCT 08	148.59	JAN 14, 1991	155.61
SEP 09	211.89	DEC 13	174.15	JAN 12, 1987	149.48	MAR 26	155.31
OCT 07	209.67	JAN 11, 1984	172.74	APR 13	149.43	JUL 08	154.14
NOV 01	207.37	FEB 07	173.27	JUL 06	151.12		

WATER YEAR 1991

HIGHEST 154.14 JUL 08, 1991 LOWEST 156.89 OCT 10, 1990

GROUND-WATER LEVELS

HARRISON COUNTY

414226095435002. Local number, 80-42-27 CCBA2.

LOCATION.--Lat 41°42'26", long 95°43'50", Hydrologic Unit 10230007, approximately 2 mi south and 1.5 mi west of the Town of Woodbine, west of U.S. Highway 30. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Boyer alluvial: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 41 ft, cased to 40 ft, slotted 35-40 ft, gravel-packed, open hole 40-41 ft.

INSTRUMENTATION.--Intermittent measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,050 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.65 ft above land-surface datum.

REMARKS.--Well WC-192.

PERIOD OF RECORD.--June 1983 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 8.26 ft below land-surface datum, June 13, 1986; lowest measured, 14.27 ft below land-surface datum, August 9, 1989.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 18	12.51	MAR 05	11.45	MAY 21	9.75	AUG 14	12.08
DEC 05	13.75	APR 18	10.70	JUL 05	9.35	SEP 24	13.24
JAN 14	13.52						

WATER YEAR 1991

HIGHEST 9.35 JUL 05, 1991 LOWEST 13.75 DEC 05, 1990

414228095442301. Local number, 80-42-28 DBCD1.

LOCATION.--Lat 41°42'28", long 95°44'23", Hydrologic Unit 10230007, approximately 2 mi south and 1.75 mi west of the Town of Woodbine, west of U.S. Highway 30. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Boyer alluvial: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 53 ft, cased to 52 ft, slotted 46-52 ft, gravel-packed, open hole 52-53 ft. Open to Pennsylvanian shale 51-53 ft.

INSTRUMENTATION.--Intermittent 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: Top of casing, 2.80 ft above land-surface datum.

REMARKS.--Well WC-37.

PERIOD OF RECORD.--May 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 13.75 ft below land-surface datum, April 12, 1983; lowest measured, 24.50 ft below land-surface datum, February 2, 1990.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 18	21.31	MAR 05	19.43	MAY 21	16.20	AUG 14	18.72
DEC 05	21.95	APR 18	17.95	JUL 05	16.50	SEP 24	20.16
JAN 14	22.97						

WATER YEAR 1991

HIGHEST 16.20 MAY 21, 1991 LOWEST 22.97 JAN 14, 1991

414213095431602. Local number, 80-42-34 ABBB2.

LOCATION.--Lat 41°42'13", long 95°43'16", Hydrologic Unit 10230007, approximately 2 mi south of the Town of Woodbine and 1 mi west of U.S. Highway 30. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Boyer alluvial: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 37 ft, cased to 37 ft, slotted 32-37 ft, gravel-packed.

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, 2.30 ft above land-surface datum.

REMARKS.--Well WC-191.

PERIOD OF RECORD.--May 1983 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 4.08 ft below land-surface datum, October 14, 1986; lowest measured, 7.20 ft below land-surface datum, September 9, 1988.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 18	6.50	MAR 05	4.10	MAY 21	4.70	AUG 14	6.31
DEC 05	6.30	APR 18	4.70	JUL 05	5.77	SEP 24	6.04
JAN 14	6.37						

WATER YEAR 1991

HIGHEST 4.10 MAR 05, 1991 LOWEST 6.50 OCT 18, 1990

GROUND-WATER LEVELS

301

HARRISON COUNTY

414149095422401. Local number, 80-42-35 BDCC1.

LOCATION.--Lat 41°41'49", long 95°42'24", Hydrologic Unit 10230007, approximately 3 mi south of the Town of Woodbine, on the west side of U.S. Highway 30. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Glacial drift: in sand and gravel of Pleistocene age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 120 ft, cased to 118 ft, slotted 103-105 ft, gravel-packed, open hole 118-120 ft. Open to Pennsylvanian shale 112-120 ft.

INSTRUMENTATION.--Intermittent measurement with chalked tape by USGS personnel.

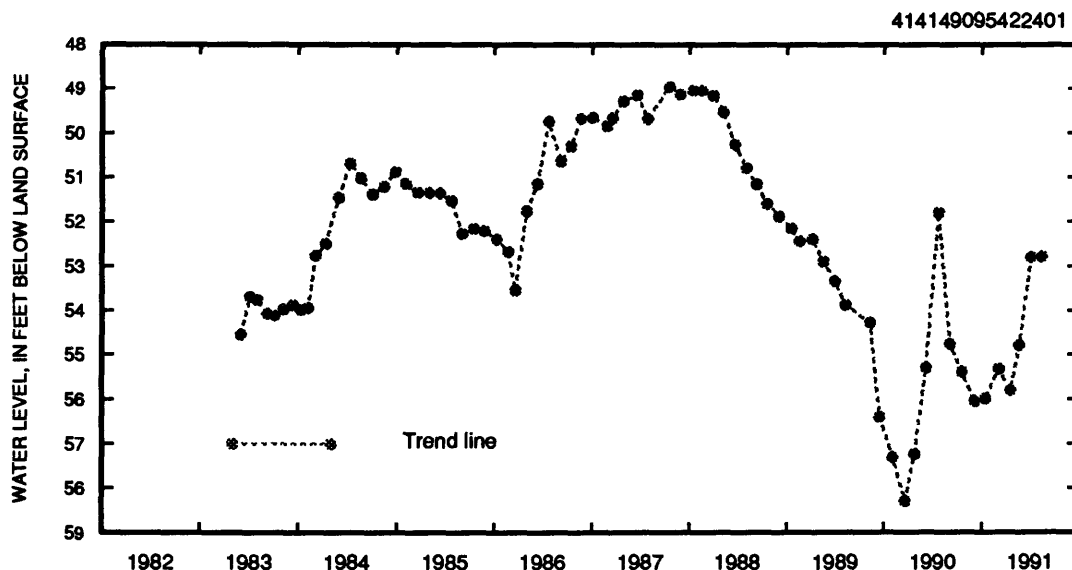
DATUM.--Elevation of land-surface datum is 1,140 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.70 ft above land-surface datum.

REMARKS.--Well WC-193.

PERIOD OF RECORD.--June 1983 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 48.96 ft below land-surface datum, October 16, 1987; lowest measured, 58.3 ft below land-surface datum, March 21, 1990.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 18	55.38	JAN 14	55.99	APR 18	55.80	JUL 05	52.80
DEC 05	56.06	MAR 05	55.32	MAY 21	54.79	AUG 14	52.79
WATER YEAR 1991				HIGHEST 52.79 AUG 14, 1991 LOWEST 56.06 DEC 05, 1990			



415124095361501. Local number, 81-41-03 ACCC1.

LOCATION.--Lat 41°51'24", long 95°36'15", Hydrologic Unit 10230007, in the northwest part of the Town of Dunlap, south of Iowa Highway 37 and west of U.S. Highway 30, adjacent to the Illinois Central Gulf Railroad. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Boyer alluvial: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 61 ft, cased to 46 ft, slotted 40-46 ft, gravel-packed, open hole 46-61 ft. Open to Pennsylvanian shale, sandstone, and lignite 50-61 ft.

INSTRUMENTATION.--Intermittent measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,095 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.95 ft above land-surface datum.

REMARKS.--Well WC-189.

PERIOD OF RECORD.--May 1983 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 10.14 ft below land-surface datum, May 30, 1984; lowest measured, 16.03 ft below land-surface datum, January 14, 1991.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 17	15.13	MAR 05	13.65	MAY 21	11.90	AUG 14	14.00
DEC 05	15.15	APR 18	11.85	JUL 05	12.05	SEP 24	14.74
JAN 14	16.03						

WATER YEAR 1991

HIGHEST 11.85 APR 18, 1991 LOWEST 16.03 JAN 14, 1991

GROUND-WATER LEVELS

HARRISON COUNTY

415109095363201. Local number, 81-41-03 CDBB1.

LOCATION.--Lat 41°51'09", long 95°36'32", Hydrologic Unit 10230007, in the southwest part of the Town of Dunlap, 0.25 mi west of U.S. Highway 30 and north of County Road F-14. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Boyer alluvial: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 50 ft, cased to 40 ft, slotted 35-40 ft, gravel-packed, open hole 40-50 ft. Open to Cretaceous sandstone 40-50 ft.

INSTRUMENTATION.--Intermittent 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: Top of casing, 1.40 ft above land-surface datum.

REMARKS.--Well WC-190.

PERIOD OF RECORD.--May 1983 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 8.14 ft below land-surface datum, May 30, 1984; lowest measured, 13.50 ft below land-surface datum, January 14, 1991.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 17	13.40	MAR 05	11.25	MAY 21	8.30	AUG 14	11.59
DEC 05	12.77	APR 18	10.12	JUL 05	9.60	SEP 24	12.49
JAN 14	13.50						

WATER YEAR 1991 HIGHEST 8.30 MAY 21, 1991 LOWEST 13.50 JAN 14, 1991

415003095382301. Local number, 81-41-17 ABAAL.

LOCATION.--Lat 41°50'03", long 95°38'23", Hydrologic Unit 10230007, 2.5 mi southwest of the Town of Dunlap, 1 mi west of U.S. Highway 30. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 166 ft, cased to 166 ft, slotted from 149-166 ft, gravel-packed. Open to Pennsylvanian shale 158-166 ft.

INSTRUMENTATION.--Intermittent measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,135 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 WC-11.

PERIOD OF RECORD.--June 1981 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 65.77 ft below land-surface datum, May 3, 1983; lowest measured, 72.45 ft below land-surface datum, June 26, 1981.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 18	70.47	JAN 14	71.83	APR 18	69.73	JUL 05	68.93
DEC 05	71.94	MAR 05	70.44	MAY 21	68.50	AUG 14	70.49

WATER YEAR 1991 HIGHEST 68.50 MAY 21, 1991 LOWEST 71.94 DEC 05, 1990

414702095395101. Local number, 81-41-31 BDD1.

LOCATION.--Lat 41°47'02", long 95°39'51", Hydrologic Unit 10230007, approximately 4 mi northeast of the Town of Woodbine, on the east side of U.S. Highway 30. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Boyer alluvial: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 30 ft, cased to 30 ft, slotted 24-30 ft, gravel-packed.

INSTRUMENTATION.--Intermittent measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,065 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.90 ft above land-surface datum.

REMARKS.--Well WC-53.

PERIOD OF RECORD.--June 1982 to current year.

REVISION.--Lowest water level measured, 12.65 ft below land-surface datum, November 8, 1989.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 4.61 ft below land-surface datum, May 3, 1983; lowest measured, 12.65 ft below land-surface datum, November 8, 1989.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 18	11.41	MAR 05	8.88	MAY 21	7.10	AUG 14	9.43
DEC 05	11.70	APR 18	8.20	JUL 05	7.38	SEP 24	9.87
JAN 14	10.50						

WATER YEAR 1991 HIGHEST 7.10 MAY 21, 1991 LOWEST 11.70 DEC 05, 1990

HARRISON COUNTY

414700095373001. Local number, 81-41-33 CAA1.

LOCATION.--Lat 41°47'00", long 95°37'30", Hydrologic Unit 10230007, approximately 4.5 mi south of the Town of Dunlap, and 2 mi east of U.S. Highway 30. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 169 ft, cased to 155 ft, slotted 145-154 ft, gravel-packed.

INSTRUMENTATION.--Intermittent measurement 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, 2.90 ft above land-surface datum.

REMARKS.--Well WC-52.

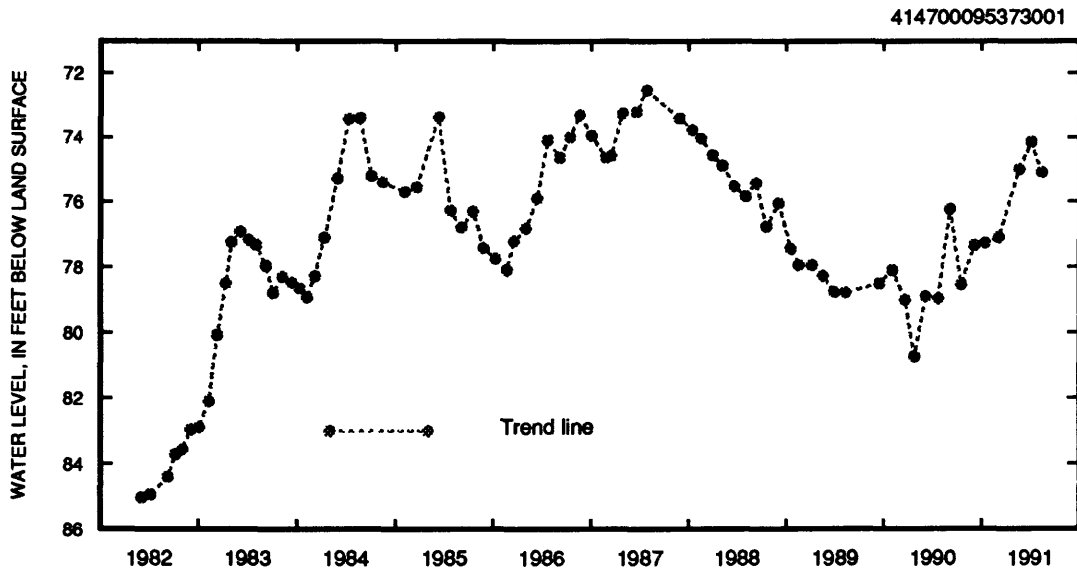
PERIOD OF RECORD.--June 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 72.54 ft below land-surface datum, July 27, 1987; lowest measured, 85.03 ft below land-surface datum, June 4, 1982.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991			
DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 17	78.53	JAN 14	77.27
DEC 05	77.34	MAR 05	77.10
		MAY 21	75.00
		JUL 05	74.15
		AUG 14	75.09

WATER YEAR 1991

HIGHEST 74.15 JUL 05, 1991 LOWEST 78.53 OCT 17, 1990



415148095545001. Local number, 81-44-01 ABAB1.

LOCATION.--Lat 41°51'48", long 95°54'50", Hydrologic Unit 10230001, approximately 2 mi north of the Town of Pisgah on the west side of Iowa Highway 183. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Soldier alluvial: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 61 ft, cased to 58 ft, slotted 53-58 ft, gravel packed, open hole 58-61 ft. Pleistocene glacial drift 57-61 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,065 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.80 ft above land-surface datum.

REMARKS.--Well WC-177.

PERIOD OF RECORD.--May 1983 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 7.13 ft below land-surface datum, April 11, 1984; lowest measured, 12.12 ft below land-surface datum, October 17, 1988.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991			
DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 10	7.95	MAR 26	9.30
JAN 14	11.29	JUL 01	11.10
		SEP 24	11.48

WATER YEAR 1991

HIGHEST 7.95 OCT 10, 1990 LOWEST 11.48 SEP 24, 1991

GROUND-WATER LEVELS

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 108-126 ft, gravel-packed. Open to Pleistocene glacial drift 108-112 ft. Original depth 209 ft, casing plugged at 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, 2.98 ft above land-surface datum.

REMARKS.--Well WC-23.

PERIOD OF RECORD.--January 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 52.33 ft below land-surface datum, July 12, 1984; lowest measured, 65.30 ft below land-surface datum, April 10, 1990.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 10	65.16	JAN 14	64.45	MAR 26	64.13	JUL 01	58.02
WATER YEAR 1991				HIGHEST 58.02 JUL 01, 1991 LOWEST 65.16 OCT 10, 1990			

HENRY COUNTY

405810091330502. Local number, 71-06-09 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.--Cambrian-Ordovician: in sandstone and sandy dolomite of Late Cambrian and Early Ordovician age.

WELL CHARACTERISTICS.--Drilled municipal artesian water well, diameter 20 to 19 in., depth 1,860 ft, cased to 623 ft, open hole 623-1,860 ft. Open from the Middle Devonian Cedar Valley Formation into the Late Cambrian St. Lawrence Formation. Originally drilled to 2,650 ft, back-filled to 1,860 ft.

INSTRUMENTATION.--Quarterly airline measurement by personnel from the City of Mt. Pleasant, checked 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.

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, February 25, 1987.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL		
JAN 07	214	JUN 17	219 p	SEP 23	240 p	p = pumping	
WATER YEAR 1991				HIGHEST 214 JAN 07, 1991 LOWEST 240 SEP 23, 1991			

405741091334501. Local number, 71-06-09 CBCA1.

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.--Cambrian-Ordovician: in sandstone of Late Cambrian and sandy dolomite of Early 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 1,689-1,896 ft. Well deepened from 1,802 ft to 1,896 ft in 1955.

INSTRUMENTATION.--Quarterly airline measurement by personnel from the City of Mt. Pleasant, checked 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.

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, December 31, 1945; lowest measured (pumping), 259.32 ft below land-surface datum, January 1981.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL		
JAN 07	217	JUN 17	217	SEP 23	226	p = pumping	
WATER YEAR 1991				HIGHEST 217 JAN 07 and JUN 17, 1991 LOWEST 226 SEP 23, 1991			

GROUND-WATER LEVELS

305

HENRY COUNTY

410852091394301. Local number, 73-07-09 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. Casing information not available.

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.--None.

PERIOD OF RECORD.--September 1960 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 2.30 ft below land-surface datum, September 1, 1965; lowest measured, 14.69 ft below land-surface datum, February 15, 1977.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991					
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
MAY 09	8.94	JUN 21	8.88	SEP 20	12.34
WATER YEAR 1991			HIGHEST 8.88 JUN 21, 1991 LOWEST 12.34 SEP 20, 1991		

HUMBOLDT COUNTY

424039094103601. Local number, 91-28-20 CAAA.

LOCATION.--Lat 42°40'39", long 94°10'36", Hydrologic Unit 07100004, approximately 3 mi south of the Town of Dakota City, on the west side of County Road P-56. Owner: Elmer Gravdlund.

AQUIFER.--Glacial drift: in material of Pleistocene age.

WELL CHARACTERISTICS.--Unused water-table well, diameter 3 ft, cribbed with filed stone, depth 24.5 ft, casing information unavailable.

INSTRUMENTATION.--Monthly measurement with chalked tape or electric line by USGS personnel.

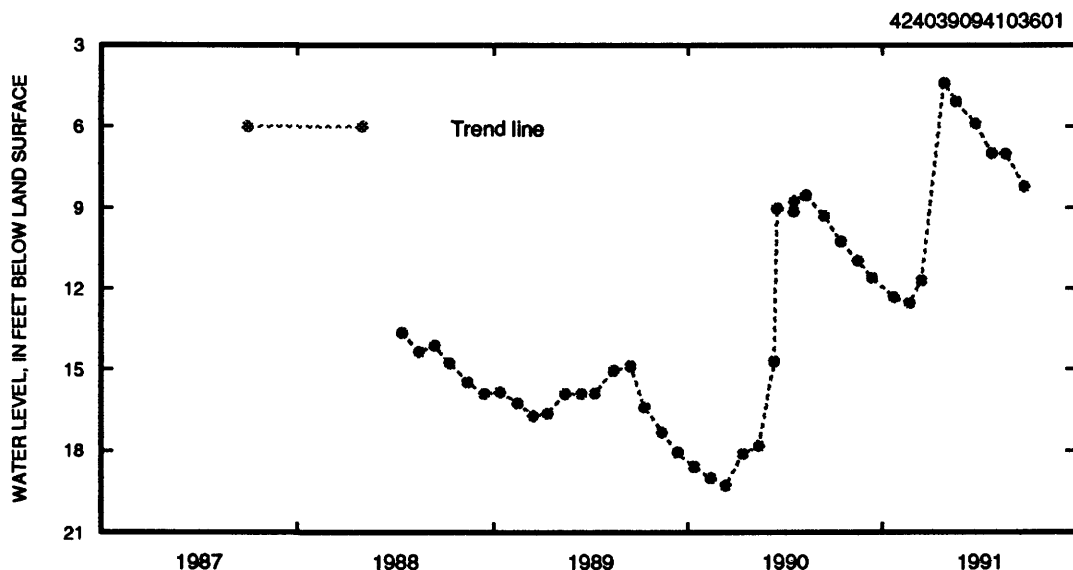
DATUM.--Elevation of land-surface datum is 1,135 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 0.30 ft above land-surface datum.

REMARKS.--None.

PERIOD OF RECORD.--July 1988 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 4.40 ft below land-surface datum, April 16, 1991; lowest measured, 19.29 ft below land-surface datum, March 12, 1990.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 15	10.24	JAN 22	12.32	APR 26	4.40	JUL 25	6.98
NOV 15	10.96	FEB 20	12.54	MAY 19	5.08	AUG 20	7.00
DEC 12	11.60	MAR 15	11.79	JUN 24	5.90	SEP 24	8.21
WATER YEAR 1991				HIGHEST 4.40 APR 26, 1991 LOWEST 12.54 FEB 20, 1991			



IDA COUNTY

422215095390811. Local number, 87-41-05 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 Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 490 ft, cased to 490 ft, perforated 301-305 ft. Original depth 510 ft, cemented back to 490 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.

PERIOD OF RECORD.--June 1980 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 202.55 ft below land-surface datum, June 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 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 11	205.92	JAN 15	206.02	MAR 28	205.08	JUL 02	205.85
WATER YEAR 1991				HIGHEST 205.08 MAR 28, 1991 LOWEST 206.02 JAN 15, 1991			

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 465-468 ft, open hole 468-469 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.

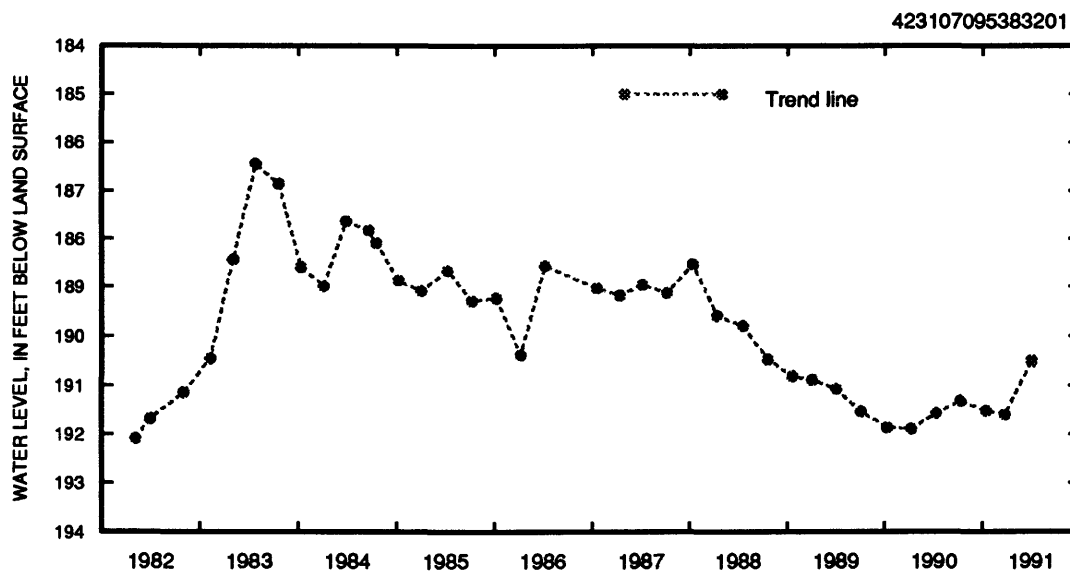
REMARKS.--Well D-9.

PERIOD OF RECORD.--December 1978 to current year.

REVISION.--Lowest water level measured, 360.01 ft below land-surface datum, May 5, 1980.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 186.45 ft below land-surface datum, July 27, 1983; lowest measured, 244.55 ft below land-surface datum, July 9, 1980.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 11	191.32	JAN 15	191.52	MAR 27	191.59	JUL 02	190.51
WATER YEAR 1991				HIGHEST 190.51 JUL 02, 1991 LOWEST 191.59 MAR 27, 1991			



IOWA COUNTY

414709091515801. Local number, 81-09-35 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 alluvial: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 10 in, depth 27 ft, cased to 18 ft, screened 18-27 ft.

INSTRUMENTATION.--Analog digital water-level recorder--60 minute punch. Graphic water-level recorder December 1984 to June 1991.

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, .30 ft above land-surface datum, May 31, 1991; lowest recorded, 12.45 ft below land-surface datum, December 31, 1988, and January 3, 1989.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
(MEASUREMENTS ABOVE LAND SURFACE INDICATED BY "+")
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT
05	8.51	9.03	9.02	8.67	8.8 E	4.70	----	3.46	.33	----	9.13	9.91
10	8.66	9.06	9.18	8.83	7.8 E	6.25	5.17	3.88	+20	----	9.17	10.08
15	8.84	9.14	8.93	----	8.08	6.05	----	4.46	.86	----	9.29	10.21
20	8.90	9.23	8.62	----	7.90	----	----		3.45	8.37	9.37	10.33
25	9.03	9.35	8.72	----	7.59	3.76	3.83		----	8.67	9.53	10.39
EOM	9.14	8.92	8.66	----	7.61	3.15	2.85	+30	----	8.93	9.75	10.46

WATER YEAR 1991

HIGHEST +.30 MAY 31, 1991 LOWEST 10.46 SEP 30, 1991

414930092093801. Local number, 81-11-17 CBBC1.

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 alluvial: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 30 ft, cased to 27 ft, screened 27-30 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. 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, 3.47 ft below land-surface datum, May 28, 1991; lowest measured, 10.55 ft below land-surface datum, January 3, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 02	6.95	JAN 24	7.28	APR 22	3.70	JUL 30	7.18
25	7.04	FEB 12	6.83	MAY 28	3.47	AUG 27	8.12
NOV 28	7.22	APR 16	3.68	JUN 21	5.09	SEP 20	8.78
DEC 27	6.72						

WATER YEAR 1991

HIGHEST 3.47 MAY 28, 1991 LOWEST 8.78 SEP 20, 1991

GROUND-WATER LEVELS

IOWA COUNTY

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 alluvial: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 31 ft, cased to 28 ft, screened 28-31 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. 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, 0.85 ft below land-surface datum, May 28, 1991; lowest measured, 9.33 ft below land-surface datum, January 26, 1990.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 02	5.39	JAN 24	6.34	APR 22	1.59	JUL 30	5.99
25	6.06	FEB 12	5.48	MAY 28	.85	AUG 27	7.03
NOV 28	6.27	MAR 25	1.92	JUN 21	2.80	SEP 20	7.74
DEC 27	5.29						

WATER YEAR 1991

HIGHEST .85 MAY 28, 1991 LOWEST 7.74 SEP 20, 1991

415125092164201. Local number, 81-12-06 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 alluvial: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in, depth 36 ft, cased to 33 ft, screened 33-36 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, 2.00 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, 3.24 ft below land-surface datum, May 28, 1991; lowest measured, 13.47 ft below land-surface datum, July 27, 1989.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 02	10.59	JAN 24	10.88	APR 22	3.59	JUL 30	11.32
25	10.92	FEB 12	7.59	MAY 28	3.24	AUG 27	11.87
NOV 28	11.21	MAR 25	3.64	JUN 21	5.74	SEP 20	11.50
DEC 27	10.09						

WATER YEAR 1991

HIGHEST 3.24 MAY 28, 1991 LOWEST 11.87 AUG 27, 1991

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 Rail- road tracks in the Upper Mississippi River Wildlife and Fish Refuge. Owner: U.S. Geological Survey.

AQUIFER.--Dresbach: in Mt. Simon 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 1,705-1,725 ft, open hole 1,725-1,804 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. Green Island #1.

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, September 6, 1984.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
(MEASUREMENTS ABOVE LAND SURFACE INDICATED BY "+")							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 06	+9.90	APR 18	+10.18	JUN 07	+9.81	AUG 01	+9.60
DEC 19	+9.88						

WATER YEAR 1991

HIGHEST +10.18 APR 18, 1991 LOWEST +9.60 AUG 01, 1991

JACKSON COUNTY

420842090165702. Local number, 85-06E-29 ACAD2.

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.-- Cambrian-Ordovician, in Wonewoc sandstone of Late Cambrian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 1,275 ft, cased to 1,204.4 ft, screened 1,204.4 to 1,224.4 ft, open hole 1,224.4 to 1,275 ft.

INSTRUMENTATION.--Intermittent 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, 2.0 ft above land-surface datum

REMARKS.--Green Island No. 2 well. Well pumped during winter 1990-1991 to supply water to goose pond. Water levels water years 1986 to 1989 affected by oil in the well.

PERIOD OF RECORD.--July 1982 to November 1983, September 1986 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 1.84 ft above land-surface datum, May 21, 1987; lowest measured, 3.88 below land-surface datum, November 4, 1982.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1981 TO SEPTEMBER 1991
(MEASUREMENTS ABOVE LAND SURFACE INDICATED BY "+")

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
JUL 22, 1982	3.07	JUN 15, 1987	+1.21	SEP 20, 1988	.16	FEB 28, 1990	1.36
OCT 12	3.61	JUL 06	+1.45	NOV 22	.22	APR 12	.89
NOV 04	3.88	AUG 17	+1.52	DEC 14	+.28	MAY 09	.22
DEC 07	3.65	SEP 11	+1.26	JAN 05, 1989	+1.11	22	.61
APR 22, 1983	2.80	OCT 05	+1.54	FEB 27	.21	JUL 10	.56
NOV 14	1.32	NOV 10	+1.54	MAR 15	.35	AUG 22	.77
SEP 15, 1986	+.48	DEC 16	+1.12	APR 04	.05	SEP 25	.55
OCT 28	+1.19	FEB 01, 1988	+1.05	MAY 08	.34	NOV 06	.66
DEC 08	+1.17	MAR 10	+1.26	JUN 26	.49	DEC 19	.83
JAN 21, 1987	+1.27	APR 25	+1.45	AUG 01	.89	JAN 30, 1991	.98
FEB 17	+1.05	MAY 16	+1.20	06	.59	APR 18	1.14
MAR 19	+1.04	JUN 06	+.71	OCT 24	.88	JUN 07	.69
APR 13	+1.29	JUL 18	+.16	DEC 06	+.31	AUG 01	1.28
MAY 21	+1.84	AUG 29	.23	JAN 17, 1990	1.10		

WATER YEAR 1991

HIGHEST .66 NOV 06, 1990 LOWEST 1.28 AUG 01, 1991

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.--Cambrian-Ordovician: in Prairie du Chien dolomite of Early Ordovician age and St. Peter sandstone of Middle Ordovician age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 910 ft, cased to 604.2 ft, screened 604.2-624.2 ft, open hole 624.2- 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.--Green Island No. 3.

PERIOD OF RECORD.--May 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 5.19 ft below land-surface datum, January 8, 1986; lowest measured 9.90 ft below land-surface datum, August 31, 1983.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 06	7.89	JAN 30	7.53	APR 18	7.30	AUG 01	8.04
DEC 19	7.68	MAR 14	7.40	JUN 07	7.60		

WATER YEAR 1991

HIGHEST 7.30 APR 18, 1991 LOWEST 8.04 AUG 01, 1991

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 Rail- road tracks in the Upper Mississippi River Wildlife and Fish Refuge. Owner: U.S. Geological Survey.

AQUIFER.--Cambrian-Ordovician: in Galena dolomite of Middle Ordovician age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 400 ft, cased to 299.6 ft, screened 299.6-319.6 ft, open hole 319.6-400 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.--Green Island No. 4.

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, September 20, 1988.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991			
DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 06	16.70	JAN 30	17.49
DEC 19	17.24	MAR 14	16.49
		APR 18	13.82
		JUN 07	13.85
		AUG 01	15.97

WATER YEAR 1991 HIGHEST 13.82 APR 18, 1991 LOWEST 17.49 JAN 30, 1991

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.

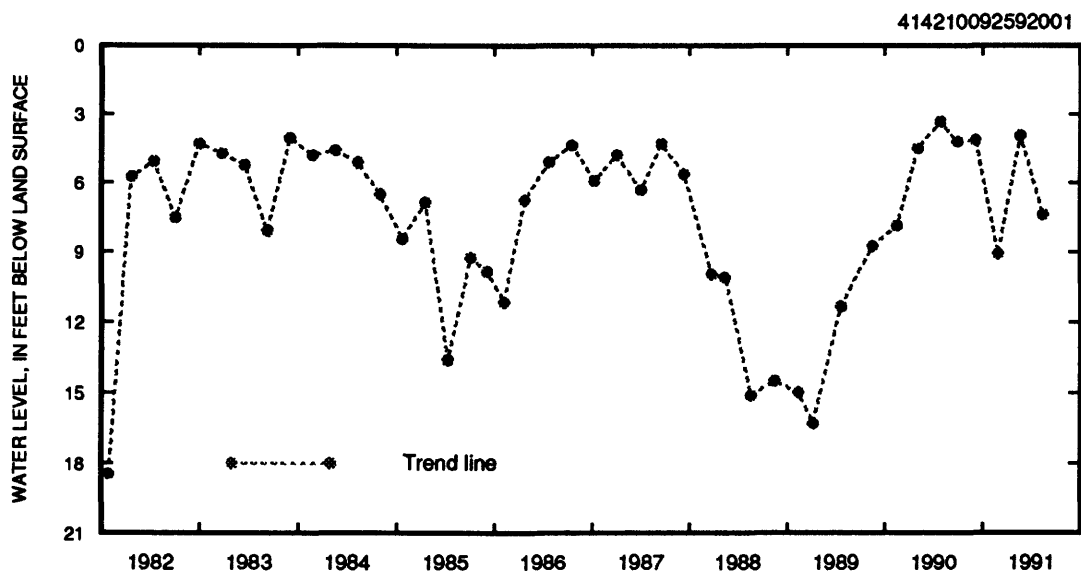
REMARKS.--None.

PERIOD OF RECORD.--February 1940 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 2.67 ft below land-surface datum, June 10, 1947; lowest measured, 27.15 ft below land-surface datum, December 18, 1948.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991			
DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 05	4.13	FEB 28	9.08
		MAY 21	3.94
		AUG 14	7.38

WATER YEAR 1991 HIGHEST 3.94 MAY 21, 1991 LOWEST 9.08 FEB 28, 1991



GROUND-WATER LEVELS

311

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.--Cambrian-Ordovician: in sandstone and sandy dolomite of Late Cambrian and Early 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 1,750-2,567 ft. Open to 461 ft of Early Ordovician Prairie du Chien formation, 262 ft of Late Cambrian St. Lawrence formation, and 94 ft of Middle Cambrian Franconia formation.

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.--None.

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

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 98.43 ft below land-surface datum, June 14, 1966; lowest measured, 276.14 ft below land-surface datum, February 28, 1991.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 05	275.75	FEB 28	276.14	MAY 21	274.85	AUG 14	267.59
WATER YEAR 1991				HIGHEST 267.59 AUG 14, 1991 LOWEST 276.14 FEB 28, 1991			

JOHNSON COUNTY

414107091322901. Local number, 79-06-04 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 96-280 ft.

INSTRUMENTATION.--Monthly measurement with chalked tape by USGS personnel. Graphic water-level recorder May 1971 to October 1986.

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.

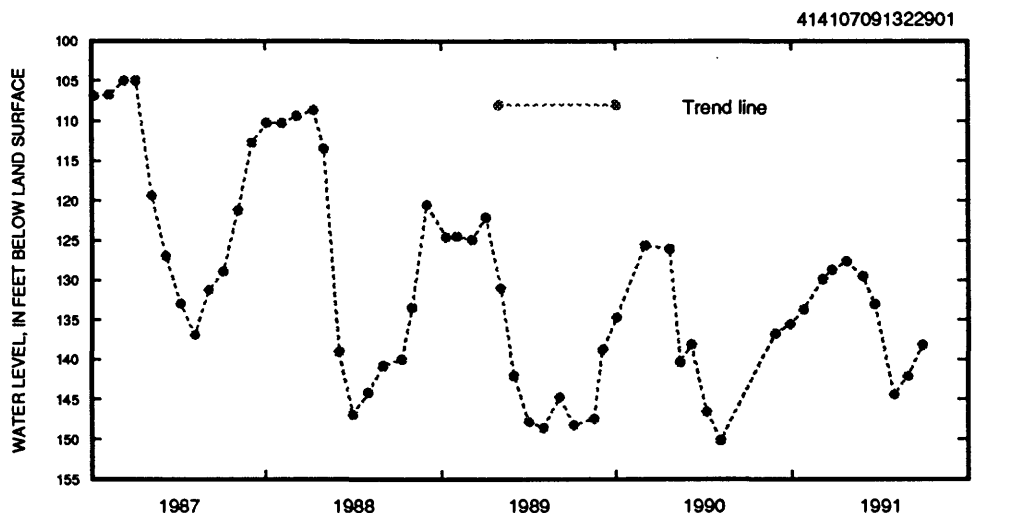
PERIOD OF RECORD.--May 1971 to current year.

REVISED RECORDS.--WDR IA-84-1.

REVISION.--Lowest water level measured, 150.14 ft below land-surface datum, August 6, 1990.

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 96.93 ft below land-surface datum, March 23, 1979; lowest measured, 150.14 ft below land-surface datum, August 6, 1990.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 27	136.76	MAR 06	129.85	MAY 28	129.48	AUG 28	142.14
DEC 28	135.54	25	128.70	JUN 21	133.02	SEP 27	138.23
JAN 25	133.68	APR 24	127.63	JUL 31	144.45		
WATER YEAR 1991				HIGHEST 127.63 APR 24, 1991 LOWEST 144.45 JUL 31, 1991			



GROUND-WATER LEVELS

JOHNSON COUNTY

413940091344701. Local number, 79-06-07 DAAC1.

LOCATION.--Lat 41°39'40", long 91°34'47", Hydrologic Unit 07080209, in Iowa City, north of Hawkeye Village (married student housing), University of Iowa, and north of County Road F-46. Owner: University of Iowa.

AQUIFER.--Silurian: in limestone and dolomite of Silurian age.

WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 12 in., depth 400 ft, cased to 211 ft, open hole 211-400 ft.

INSTRUMENTATION.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 685 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.81 ft above land-surface datum.

REMARKS.--Hawkeye Village #1. Water levels affected by wells in the area pumping in late spring, summer, and early fall.

PERIOD OF RECORD.--June 1987 to current year.

REVISION.--Lowest water level measured, 137.16 ft below land-surface datum, October 5, 1989.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 45.51 ft below land-surface datum, June 5, 1987; lowest measured, 137.16 ft below land-surface datum, October 5, 1989.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 27	70.86	FEB 28	62.11	MAY 21	62.29	AUG 28	90.21
DEC 28	67.58	MAR 22	60.69	JUN 21	67.20	SEP 27	78.95
JAN 25	66.77	APR 24	58.67	JUL 31	128.38		

WATER YEAR 1991

HIGHEST 58.67 APR 24, 1991 LOWEST 90.21 AUG 28, 1991

413925091324001. Local number, 79-06-09 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 225-430.5 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.

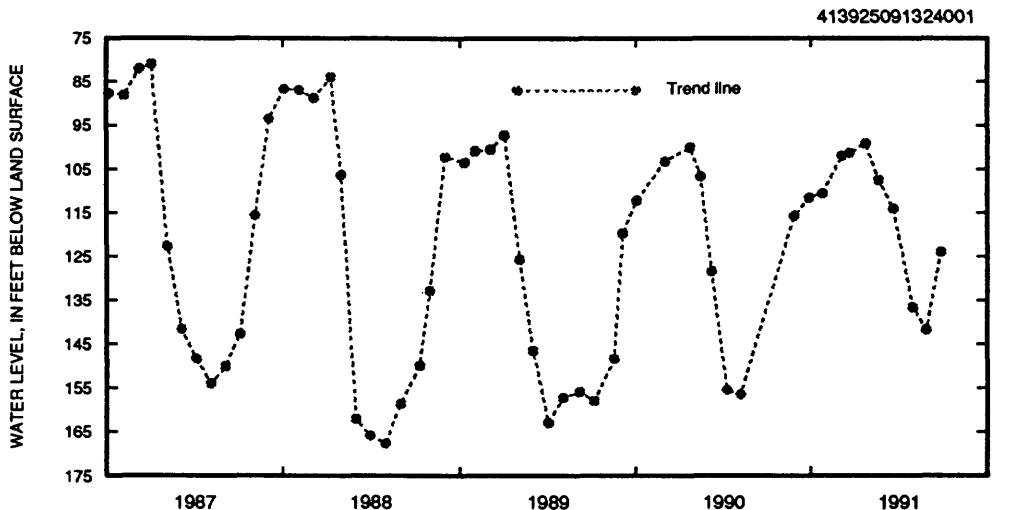
REVISED RECORDS.--WDR IA-84-1, WDR IA-88-1.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 74.63 ft below land-surface datum, March 21, 1979; lowest measured, 167.63 ft below land-surface datum, August 2, 1988.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 27	115.65	MAR 06	102.00	MAY 21	107.49	AUG 28	141.72
DEC 28	111.56	22	101.32	JUN 21	114.05	SEP 27	123.91
JAN 25	110.56	APR 24	99.18	JUL 31	136.65		

WATER YEAR 1991

HIGHEST 99.18 APR 24, 1991 LOWEST 141.72 AUG 28, 1991



JOHNSON COUNTY

414458091260201. Local number, 80-05-09 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 13-15 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 unpublished and available in the files of the Iowa District Office.

PERIOD OF RECORD.--August 1950 to current year.

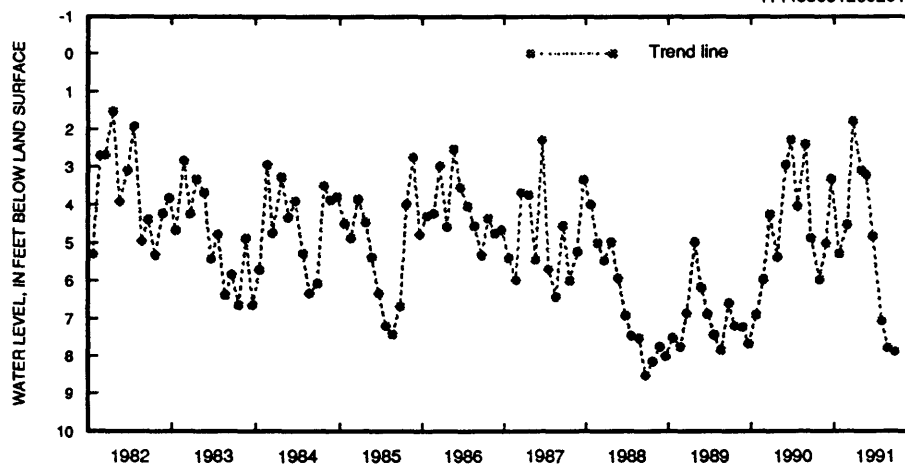
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 0.60 ft above land-surface datum, March 14, 1953; lowest measured, 9.22 ft below land-surface datum, September 8, 1955.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 30	5.97	JAN 23	5.28	APR 30	3.09	JUL 30	7.06
NOV 26	5.02	FEB 28	4.52	MAY 22	3.21	AUG 26	7.78
DEC 20	3.31	MAR 25	1.79	JUN 21	4.83	SEP 25	7.88

WATER YEAR 1991

HIGHEST 1.79 MAR 25, 1991 LOWEST 7.88 SEP 25, 1991

414458091260201



414315091252001. Local number, 80-05-22 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 18.43 ft, cased to 18 ft, screened 18-20 ft. Depth originally 20 ft, re-measured June 23, 1989.

INSTRUMENTATION.--Monthly measurement with chalked tape by USGS personnel. Graphic water-level recorder February 1942 to October 1965.

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.

REVISED RECORDS.--WDR IA-88-1.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 5.78 ft below land-surface datum, September 20, 1977; lowest measured, dry, November 10, 15, 20, 25, and 30, 1964, December 5, 10, 15, 20, 25 and 31, 1964, December 1 and 10, 1975, October 21, 1976, November 23, 1976, December 17, 1976, January 20, 1977, and February 18, 1977.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 30	13.02	JAN 23	12.88	APR 30	12.10	JUL 30	11.90
NOV 26	13.01	FEB 28	12.82	MAY 22	11.90	AUG 26	12.03
DEC 20	12.98	MAR 25	13.31	JUN 21	11.75	SEP 25	13.26

WATER YEAR 1991

HIGHEST 11.75 JUN 21, 1991 LOWEST 13.31 MAR 25, 1991

GROUND-WATER LEVELS

JOHNSON COUNTY

414315091252002. Local number, 80-05-22 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.--Devonian: in Cedar Valley limestone of Middle Devonian age.

WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 5 in., depth 82 ft. Casing information not available.

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.--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, April 21, 1952; lowest measured, 21.65 ft below land-surface datum, August 21, 1989.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 30	18.25	JAN 23	17.46	APR 30	14.79	JUL 30	18.40
NOV 26	17.74	FEB 28	16.94	MAY 22	15.48	AUG 26	19.50
DEC 20	16.48	MAR 25	12.76	JUN 21	16.46	SEP 25	19.99

WATER YEAR 1991

HIGHEST 12.76 MAR 25, 1991 LOWEST 19.99 SEP 25, 1991

414132091345501. Local number, 80-06-31 ADAC1.

LOCATION.--Lat 41°41'44", long 91°34'52", Hydrologic Unit 07080209, located in the City of Coralville, approximately 0.25 mi north of U.S. Interstate 80. Owner: City of Coralville.

AQUIFER.--Silurian: in dolomite of Silurian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, depth 500 ft, cased from 0-130 ft with 5 in. diameter steel, 0-300 ft with 2 in. diameter PVC, open hole 300-500 ft.

INSTRUMENTATION.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 795 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: top of casing, 0.70 ft above land-surface datum.

REMARKS.--Coralville Observation No. 2, East.

PERIOD OF RECORD.--June 1988 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 192.75 ft below land-surface datum, March 20, 1990; lowest water level measured, 253.87 ft below land-surface datum, July 31, 1991.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEARS OCTOBER 1987 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
JUN 20, 1988	230.16	AUG 22, 1988	225.67	NOV 17, 1988	210.52	MAY 22, 1990	230.84
20	240.12	29	211.07	DEC 13	203.90	JUL 10	245.67
21	228.75	29	224.45	13	199.52	AUG 06	251.77
21	240.26	SEP 06	209.34	JAN 11, 1989	216.82	NOV 27	243.30
22	228.66	06	225.36	FEB 22	223.35	DEC 28	245.38
22	227.01	12	210.11	MAR 16	225.21	JAN 25, 1991	234.57
27	225.99	12	226.79	APR 20	222.99	MAR 06	232.26
JUL 05	218.44	19	211.38	MAY 16	233.17	22	230.15
11	220.47	19	224.62	JUN 21	244.94	APR 24	217.90
18	209.88	26	206.50	JUL 20	253.97	MAY 21	219.44
25	205.92	26	220.41	AUG 24	248.18	JUN 21	237.99
AUG 01	210.38	OCT 19	217.30	NOV 21	245.54	JUL 31	253.87
08	213.56	19	223.73	JAN 24, 1990	229.03	AUG 28	242.79
15	211.91	20	212.09	FEB 21	204.47	SEP 27	233.80
15	225.30	20	217.81	MAR 20	192.75		
22	213.01	NOV 17	199.87	APR 18	230.35		

WATER YEAR 1991

HIGHEST 217.90 APR 24, 1991 LOWEST 253.87 JUL 31, 1991

GROUND-WATER LEVELS

315

JOHNSON COUNTY

414132091345502. Local number, 80-06-31 ADBC2.

LOCATION.--Lat 41°41'45", long 91°34'58", Hydrologic Unit 07080209, located in the City of Coralville, approximately 0.25 mi north of U.S. Interstate 80. Owner: City of Coralville.

AQUIFER.--Silurian: in dolomite of Silurian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, depth 500 ft, cased 0-130 ft with 5 in. diameter steel, 0-300 ft with 2 in. diameter PVC, open hole 300-500 ft.

INSTRUMENTATION.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 795 ft above National Geodetic Vertical Datum of 1939, from topographic map. Measuring point: top of casing, 1.03' above land-surface datum.

REMARKS.--Coralville Observation No. 3, North.

PERIOD OF RECORD.--June 1988 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 169.04 ft below land-surface datum, June 21, 1988; lowest water level measured, 246.43, July 31, 1991.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEARS OCTOBER 1987 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
JUN 20, 1988	199.92	AUG 22, 1988	219.26	NOV 17, 1988	204.24	JUL 10, 1990	238.26
20	200.11	29	206.25	DEC 13	197.62	AUG 06	244.27
21	174.06	29	217.51	13	195.15	NOV 27	235.73
21	169.04	SEP 06	204.65	JAN 11, 1989	216.60	DEC 28	237.69
22	182.41	06	218.01	FEB 22	217.87	JAN 25, 1991	227.11
22	171.08	12	205.33	APR 20	216.31	MAR 06	224.42
27	219.11	12	219.86	MAY 16	230.85	22	222.33
JUL 05	213.82	19	206.70	JUN 21	237.74	APR 24	207.47
11	216.08	19	217.72	JUL 20	246.67	MAY 21	216.43
18	205.04	26	201.89	AUG 24	241.95	JUN 21	230.55
25	201.15	26	213.59	NOV 29	238.08	JUL 31	246.43
AUG 01	205.55	OCT 19	210.87	JAN 24, 1990	225.56	AUG 28	235.05
08	208.74	19	217.34	FEB 21	200.16	SEP 27	225.81
15	209.27	20	207.35	MAR 20	188.29		
15	218.45	20	210.04	APR 18	223.79		
22	207.79	NOV 17	195.38	MAY 22	223.99		

WATER YEAR 1991

HIGHEST 224.42 MAR 06, 1991 LOWEST 246.43 JUL 31, 1991

414132091345503. Local number, 80-06-31 ADBD.

LOCATION.--Lat 41°41'44", long 91°34'35", Hydrologic Unit 07080209, located in the City of Coralville, north of U.S. Interstate 80. Owner: City of Coralville.

AQUIFER.--Silurian: in dolomite of Silurian age.

WELL CHARACTERISTICS.--Drilled public-supply water well, 12 in. diameter, depth 500 ft, cased 0-200 ft, open hole 200-500 ft.

INSTRUMENTATION.--Monthly airline measurement by USGS personnel.

DATUM.--Elevation of land-surface datum is 795 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: airline gauge, 2.88 ft above land-surface datum.

REMARKS.--Coralville Production No. 9.

PERIOD OF RECORD.--June 1988 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 204 ft below land-surface datum, July 25, 1988; lowest water level measured, 287 ft below land-surface datum, July 31, 1991.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEARS OCTOBER 1987 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
JUN 20, 1988	219	AUG 22, 1988	262	NOV 17, 1988	237	MAY 22, 1990	255
20	271	29	213	DEC 13	229	JUL 10	275
21	223	29	260	13	206	AUG 09	283
21	273	SEP 06	219	JAN 11, 1989	245	NOV 27	283
22	223	06	259	FEB 22	249	DEC 28	286
22	219	12	207	MAR 16	249	JAN 25, 1991	269
27	225	12	259	APR 20	247	MAR 06	271
JUL 05	248	19	205	MAY 16	257	APR 01	225
11	213	19	260	JUN 21	269	24	216
18	211	26	215	JUL 20	277	MAY 21	220
25	204	26	254	AUG 24	272	JUN 21	273
AUG 01	207	OCT 19	241	NOV 21	267	JUL 31	287
08	215	19	248	JAN 24, 1990	262	AUG 28	225
15	217	20	219	FEB 21	224	SEP 27	265
15	261	20	241	MAR 21	227		
22	217	NOV 17	210	APR 18	255		

WATER YEAR 1991

HIGHEST 225 APR 01, 1991 LOWEST 287 JUL 31, 1991

GROUND-WATER LEVELS

JOHNSON COUNTY

414221091361101. Local number, 80-07-25 DBAC1.

LOCATION.--Lat 41°42'24", long 91°36'16", Hydrologic Unit 07080209, located at the Iowa Department of Natural Resources/Geological Survey Bureau's Oakdale core repository. Owner: Geological Survey Bureau/DNR.

AQUIFER.--Silurian: in dolomite of Silurian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, depth 532 ft, cased 0-164 ft with 6 in., 0-319 ft of 5 in., 319-361.5 ft of 4 in. diameter pipe, and liner set 310-361.5 ft. Open hole 361.5-532 ft.

INSTRUMENTATION.--Intermittent measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 790 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: top of recorder platform, 2.65 ft above land-surface datum.

REMARKS.--Oakdale No. 1 (ODW-1).

PERIOD OF RECORD.--December 1990 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 228.43 ft below land-surface datum, April 17, 1991; lowest water level measured, 245.93 ft below land-surface datum, July 26, 1991.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 12	233.74	JAN 09	235.78	FEB 08	228.74	JUL 26	245.93
JAN 07	235.54	31	228.95	APR 17	228.42	AUG 28	242.35

WATER YEAR 1991 HIGHEST 228.42 APR 17, 1991 LOWEST 245.93 JUL 26, 1991

414221091361102. Local number, 80-07-25 DBAC2.

LOCATION.--Lat 41°42'24", long 91°36'16", Hydrologic Unit 07080209, located at the Iowa Department of Natural Resources/Geological Survey Bureau's Oakdale core repository. Owner: Geological Survey Bureau/DNR.

AQUIFER.--Devonian: in limestone and dolomite of Devonian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 5 in., depth 301 ft, cased 0-175 ft, open hole 175-301 ft.

INSTRUMENTATION.--Intermittent measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 790 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: top of recorder platform, 2.55 ft above land-surface datum.

REMARKS.--Oakdale No. 2, (ODW-2).

PERIOD OF RECORD.--December 1990 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 213.70 ft below land-surface datum, April 16, 1991; lowest water level measured, 227.09 ft below land-surface datum, August 28, 1991.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 12	219.20	JAN 09	221.09	FEB 08	216.40	JUL 26	226.73
JAN 07	220.29	31	217.24	APR 16	213.70	AUG 28	227.09

WATER YEAR 1991 HIGHEST 213.70 APR 16, 1991 LOWEST 227.09 AUG 28, 1991

414221091361103. Local number, 80-07-25 DBAD1.

LOCATION.--Lat 41°42'24", long 91°36'16", Hydrologic Unit 07080209, located at the Iowa Department of Natural Resources/Geological Survey Bureau's Oakdale core repository. Owner: Geological Survey Bureau/DNR.

AQUIFER.--Buried channel: in sand and gravel of Pleistocene age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 4 in., depth 171 ft, cased 0-171 ft, slotted 153-171 ft.

INSTRUMENTATION.--Intermittent measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 790 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: top of recorder platform, 2.55 ft above land-surface datum.

REMARKS.--Oakdale No. 3 (ODW-3).

PERIOD OF RECORD.--December 1990 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 127.57 ft below land-surface datum, December 12, 1990; lowest water level measured, 128.15 ft below land-surface datum, January 7, 1991.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 12	127.57	APR 16	127.61	JUL 26	127.75	AUG 28	127.96
JAN 07	128.15						

WATER YEAR 1991 HIGHEST 127.57 DEC 12, 1990 LOWEST 128.15 JAN 07, 1991

JOHNSON COUNTY

414853091425101. Local number, 81-07-19 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 and dolomite of Devonian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 6 in., depth 535 ft, cased to 130 ft, open hole 130-535 ft.

INSTRUMENTATION.--Monthly measurement with chalked tape by USGS personnel. Graphic water-level recorder November 1976 to October 1989.

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.

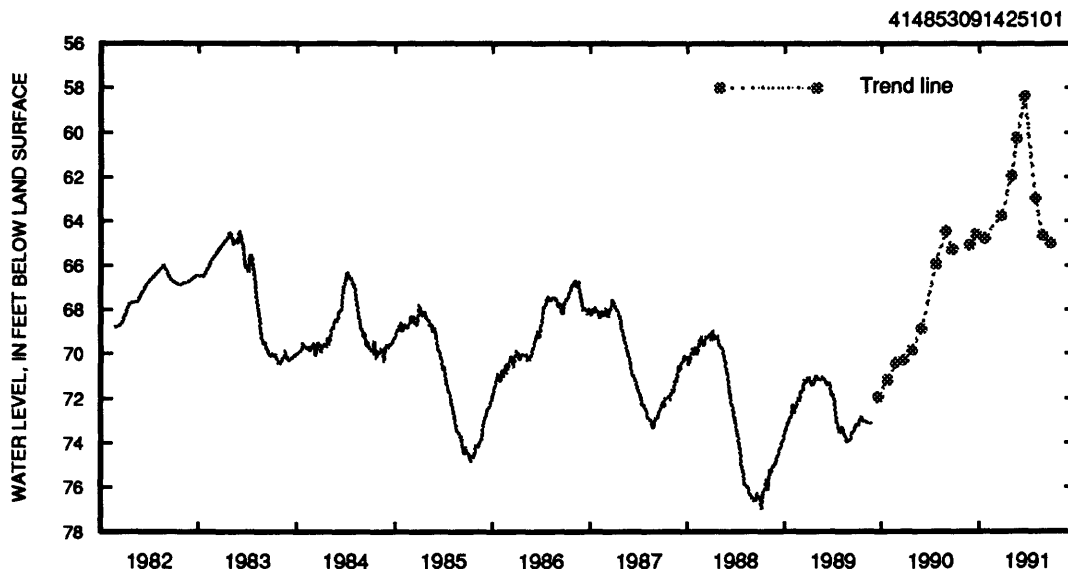
PERIOD OF RECORD.--November 1976 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 58.39 ft below land-surface datum, June 21, 1991; lowest recorded, 76.97 ft below land-surface datum, October 6, 1988.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 26	65.07	MAR 25	63.72	JUN 21	58.39	AUG 26	64.63
DEC 20	64.59	MAY 02	61.92	JUL 31	62.95	SEP 25	64.98
JAN 22	64.77	22	60.23				

WATER YEAR 1991

HIGHEST 58.39 JUN 21, 1991 LOWEST 65.07 NOV 26, 1990



415052091483801. Local number, 81-08-05 CCDD1.

LOCATION.--Lat 41°50'52", long 91°48'38", Hydrologic Unit 07080208, approximately 7 mi west of the Town of Swisher, on the north side of County Road F-12. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Silurian-Devonian: in dolomite of Silurian and limestone and dolomite of Devonian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 5 in., depth 533 ft, cased to 135 ft, open hole 133-533 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 818 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.23 ft above land-surface datum.

REMARKS.--First Hole/Swisher.

PERIOD OF RECORD.--June 1972, March 1973, November 1975 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 70.73 ft below land-surface datum, March 28, 1973; lowest measured, 99.33 ft below land-surface datum, September 24, 1991.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 15	86.95	MAR 27	92.19	MAY 31	91.01	SEP 24	99.33

WATER YEAR 1991

HIGHEST 86.95 NOV 15, 1990 LOWEST 99.33 SEP 24, 1991

GROUND-WATER LEVELS

JONES COUNTY

415808091160501. Local number, 83-04-25 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, April 3, 1979; lowest measured, 6.21 ft below land-surface datum, September 11, 1989.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 07	4.42	MAR 26	1.39	JUN 25	2.73	SEP 24	5.02
WATER YEAR 1991				HIGHEST 1.39 MAR 26, 1991 LOWEST 5.02 SEP 24, 1991			

KEOKUK COUNTY

412030092121601. Local number, 76-12-35 DBDC.

LOCATION.--Lat 41°20'30", long 92°12'16", Hydrologic Unit 07080106, approximately 0.25 mi north of the town of Sigourney, 0.25 mi north of Highway 92. Owner: City of Sigourney.

AQUIFER.--Mississippian: in limestone and dolomite of Mississippian age.

WELL CHARACTERISTICS.--Drilled unused public-supply artesian well, diameter 14 in., depth 300 ft, cased to 128 ft, open hole 128-300 ft.

INSTRUMENTATION.--Analog digital water-level recorder--60 minute punch. Intermittent measurement with chalked tape by USGS personnel July 1988 to January 1989.

DATUM.--Elevation of land-surface datum is 769 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of recorder base, 1.50 ft above land-surface datum.

REMARKS.--Sigourney South Rock Island No. 1 well. Water levels affected by nearby pumping.

PERIOD OF RECORD.--September 1988 to present.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 81.15 ft below land-surface datum, March 29, 1991; lowest measured, 118.29 ft below land-surface datum, August 31, 1991.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991												
LOWEST VALUES												
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT
05	92.58	97.69	83.86	100.87	102.82	101.80	99.02	84.48	103.95	101.48	106.57	99.47
10	101.56	100.15	101.23	83.97	86.06	84.75	84.71	98.64	83.49	86.16	95.10	108.37
15	97.10	96.43	89.17	104.56	100.15	100.19	101.52	83.76	85.85	88.01	101.93	91.89
20	84.90	92.45	82.57	88.11	101.81	84.64	92.25	99.14	88.89	82.89	108.41	105.16
25	81.44	87.47	88.91	100.81	102.43	99.46	83.31	89.67	86.11	99.33	115.38	100.06
EOM	82.71	100.33	102.59	84.27	84.05	84.64	101.60	85.46	100.39	87.23	118.29	105.94
WATER YEAR 1991				HIGHEST 81.15 MAR 29, 1991 LOWEST 118.29 AUG 31, 1991								

LINN COUNTY

415534091251502. Local number, 82-05-10 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.--Cambrian-Ordovician: in sandstone of Late Cambrian age and sandstone and sandy dolomite of Early 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 1,054-1,557 ft.

INSTRUMENTATION.--Monthly measurement with chalked tape by USGS personnel.

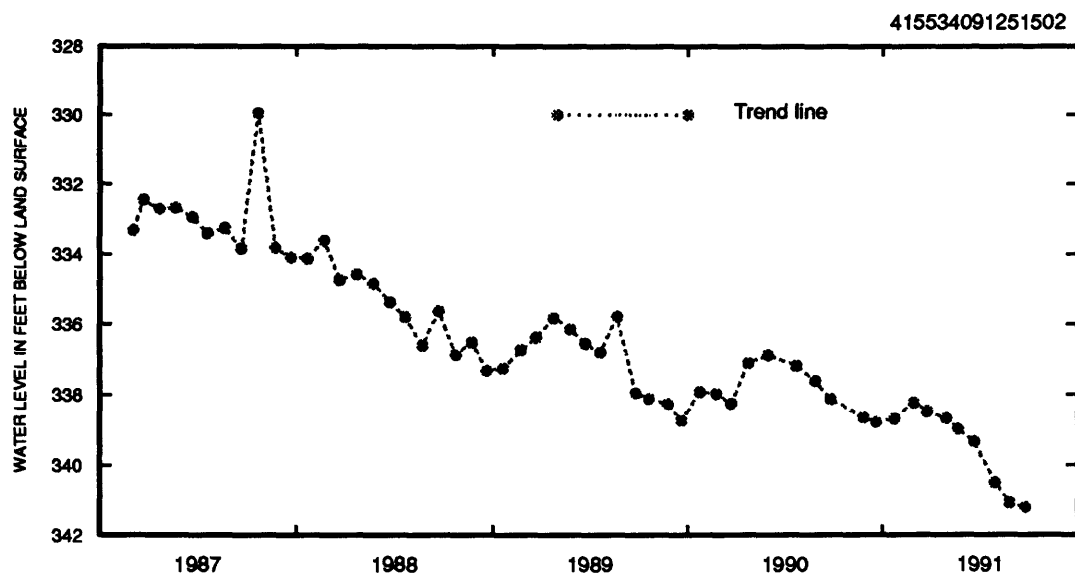
DATUM.--Elevation of land-surface datum is 895 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple on plate welded to casing, 1.59 ft above land-surface datum.

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, October 22, 1987; lowest measured, 341.21 ft below land-surface datum, September 25, 1991.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 26	338.65	FEB 28	338.24	MAY 22	338.98	AUG 26	341.08
DEC 20	338.78	MAR 25	338.48	JUN 21	339.34	SEP 25	341.21
JAN 23	338.68	APR 30	338.67	JUL 30	340.50		
WATER YEAR 1991				HIGHEST 338.24 FEB 28, 1991 LOWEST 341.21 SEP 25, 1991			



415556091313001. Local number, 82-06-10 AABB1.

LOCATION.--Lat 41°55'56", long 91°16'41", Hydrologic Unit 07080206, approximately 1.25 mi south of the Town of Bertram, 1.5 mi east of Iowa Highway 13, and 0.5 mi north of U.S. Highway 30. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Silurian: in limestone and dolomite of Silurian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 6 in., depth 471 ft, cased to 126 ft, open hole 126-471 ft.

INSTRUMENTATION.--Quarterly 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: Top of casing, 1.21 ft above land-surface datum.

REMARKS.--Bertram well.

PERIOD OF RECORD.--June 1976 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 44.18 ft below land-surface datum, March 16, 1983; lowest measured, 53.29 ft below land-surface datum, December 1, 1989.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 15	49.03	MAR 26	46.94	MAY 31	44.94	SEP 24	49.55
WATER YEAR 1991				HIGHEST 44.94 MAY 31, 1991 LOWEST 49.55 SEP 24, 1991			

LINN COUNTY

415442091343101. Local number, 82-06-17 CBAB1.

LOCATION.--Lat 41°54'42", long 91°34'30", Hydrologic Unit 07080206, approximately 2.5 mi north of the Town of Ely, on the north side of County Road W-8E. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Silurian-Devonian: in dolomite of Silurian age and limestone and dolomite of Devonian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 6 in., depth 541 ft, cased to 64 ft, open hole 64-541 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel. Graphic water-level recorder April 1978 to December 1979.

DATUM.--Elevation of land-surface datum is 825 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.55 ft above land-surface datum.

REMARKS.--Ely North well. Records for April 1976 to September 1988 are unpublished and available in the files of the Iowa District Office.

PERIOD OF RECORD.--April 1976 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 69.67 ft below land-surface datum, May 8, 1979; lowest measured, 85.59 ft below land-surface datum, August 9, 1977.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 15	76.91	MAR 26	75.52	MAY 31	73.92	SEP 24	80.29
WATER YEAR 1991				HIGHEST 73.92 MAY 31, 1991 LOWEST 80.29 SEP 24, 1991			

415422091422601. Local number, 82-07-18 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: Edwin J. Hynek.

AQUIFER.--Glacial drift: in material of Pleistocene age.

WELL CHARACTERISTICS.--Dug unused water-table well, diameter 4 ft, depth 13.5 ft, cribbed with brick.

INSTRUMENTATION.--Monthly measurement with chalked tape by USGS personnel. Graphic water-level recorder July 1959 to September 1987.

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, 0.37 ft above land-surface datum.

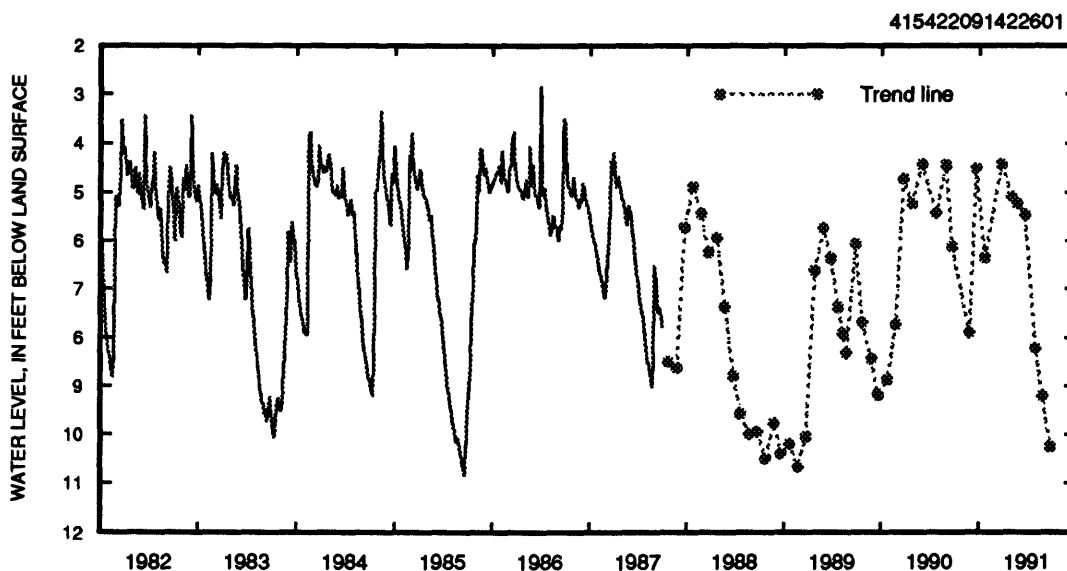
REMARKS.--Well previously owned by Lester Petrak.

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, August 4, 1968; lowest recorded, 11.75 ft below land-surface datum, February 8, 1977.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 26	7.90	MAR 25	4.43	JUN 21	5.45	AUG 26	9.19
DEC 20	4.51	MAY 02	5.09	JUL 31	8.20	SEP 25	10.25
JAN 22	6.35	22	5.23				
WATER YEAR 1991				HIGHEST 4.43 MAR 25, 1991 LOWEST 10.25 SEP 25, 1991			



LINN COUNTY

415343091360101. Local number, 82-07-25 AAAB1.

LOCATION.--Lat 41°53'43", long 91°36'01", Hydrologic Unit 07080208, 0.5 mi northwest of the Town of Ely at the southwest corner of the junction of County Roads E-70 and W-6E. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Silurian: in limestone and dolomite of Silurian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 6 in., depth 401 ft, cased to 121.5 ft, open hole 121.5-401 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel. Graphic water-level recorder April 1978 to October 1979. Intermittent measurement with chalked tape by USGS personnel May 1976 to April 1978.

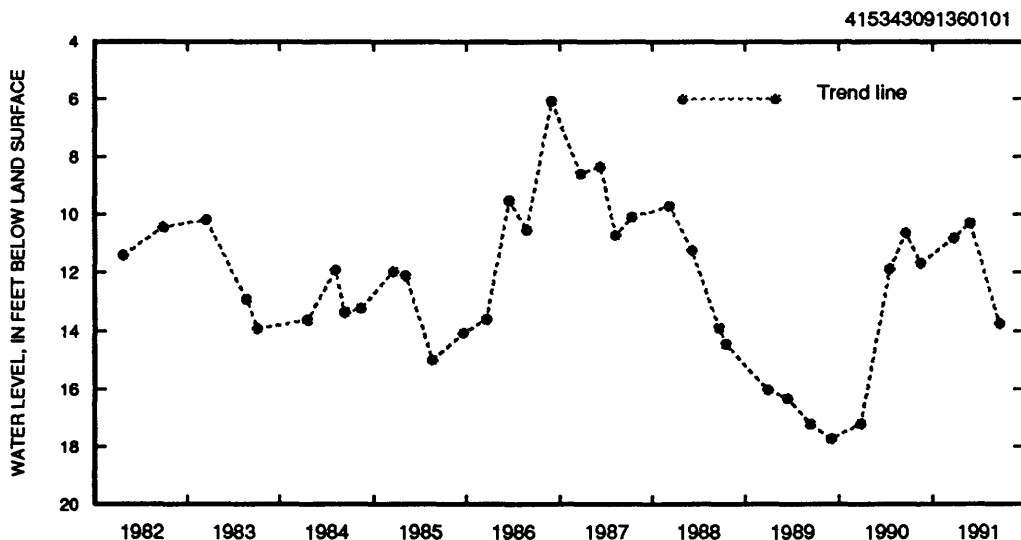
DATUM.--Elevation of land-surface datum is 772 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.76 ft above land-surface datum.

REMARKS.--Ely (Northwest) Railroad well. Records for May 1976 to September 1988 are unpublished and available in the files of the Iowa District Office.

PERIOD OF RECORD.--May 1976 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 6.08 ft below land-surface datum, December 1, 1986; lowest measured, 19.96 ft below land-surface datum, July 6, 1977.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 15	11.68	MAR 26	10.82	MAY 31	10.30	SEP 24	13.75
WATER YEAR 1991				HIGHEST 10.30 MAY 31, 1991 LOWEST 13.75 SEP 24, 1991			



415509091461801. Local number, 82-08-20 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 dolomite of Silurian age and limestone and dolomite of Devonian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 5 in., depth 569 ft, cased to 100.5 ft, open hole 100.5-569 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel. Graphic water-level recorder February 1974 to July 1978. Intermittent measurement with chalked tape by USGS personnel March 1973 to February 1974.

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, June 21, 1974; lowest measured, 109.17 ft below land-surface datum, September 11, 1989.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 15	105.63	MAR 27	105.18	MAY 31	104.28	SEP 24	107.80
WATER YEAR 1991				HIGHEST 104.28 MAY 31, 1991 LOWEST 107.80 SEP 24, 1991			

LINN COUNTY

415834091351601. Local number, 83-06-30 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 dolomite of Silurian and limestone and dolomite of Devonian age.

WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 6 in., depth 76.5 ft. Casing information not available. Devonian rock reported to yield little, if any, water.

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.

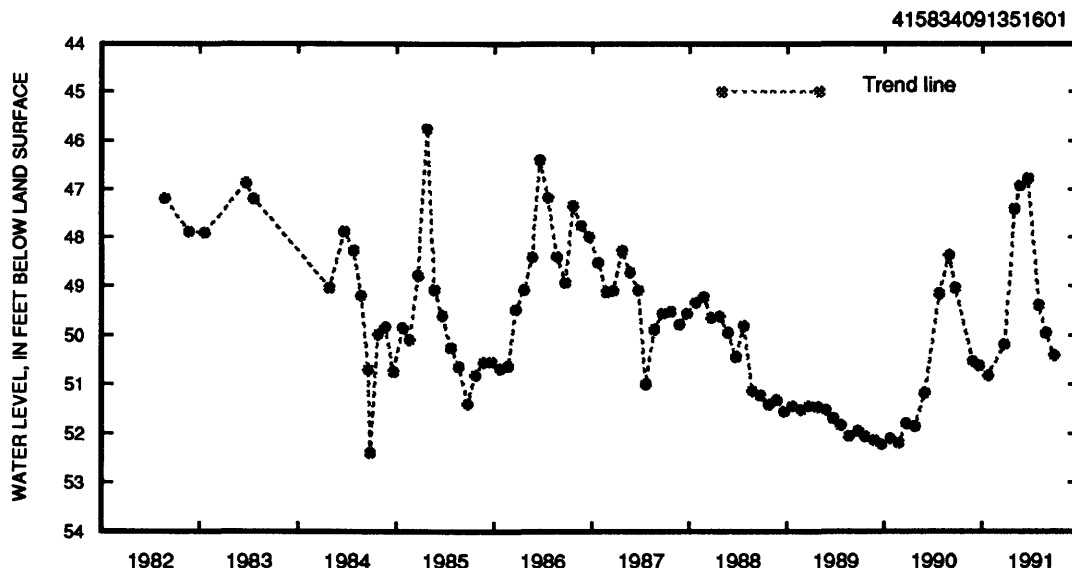
PERIOD OF RECORD.--May 1940 to current year.

EXTREMES OF PERIOD OF RECORD.--Highest water level measured, 41.93 ft below land-surface datum, April 25, 1973; lowest measured, 53.90 ft below land-surface datum, December 21, 1970.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991			
DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 26	50.54	MAR 25	50.19
DEC 20	50.62	MAY 02	47.41
JAN 23	50.82	22	46.93
		JUN 21	46.78
		JUL 30	49.39
		AUG 26	49.96
		SEP 25	50.41

WATER YEAR 1991

HIGHEST 46.78 JUN 21, 1991 LOWEST 50.82 JAN 23, 1991



415816091393401. Local number, 83-07-28 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 75-420 ft.

INSTRUMENTATION.--Monthly measurement with chalked tape by USGS personnel. Graphic water-level recorder January 1962 to October 1987.

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. Measurements discontinued water year 1991.

PERIOD OF RECORD.--January 1962 to March 1991.

REVISED RECORDS.--WDR IA-84-1.

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 51.10 ft below land-surface datum, February 25, 1963; lowest recorded, 101.40 ft below land-surface datum, July 27, 1981.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991			
DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 26	79.29	DEC 20	77.40
		JAN 22	74.93
		MAR 25	67.81

WATER YEAR 1991

HIGHEST 67.81 MAR 25, 1991 LOWEST 79.29 NOV 26, 1990

LINN COUNTY

415725091410101. Local number, 83-07-32 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. Casing information not available.

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.--Water levels may be affected by pumping of near by wells.

PERIOD OF RECORD.--July 1940 to current year.

REVISED RECORDS.--WDR IA-88-1.

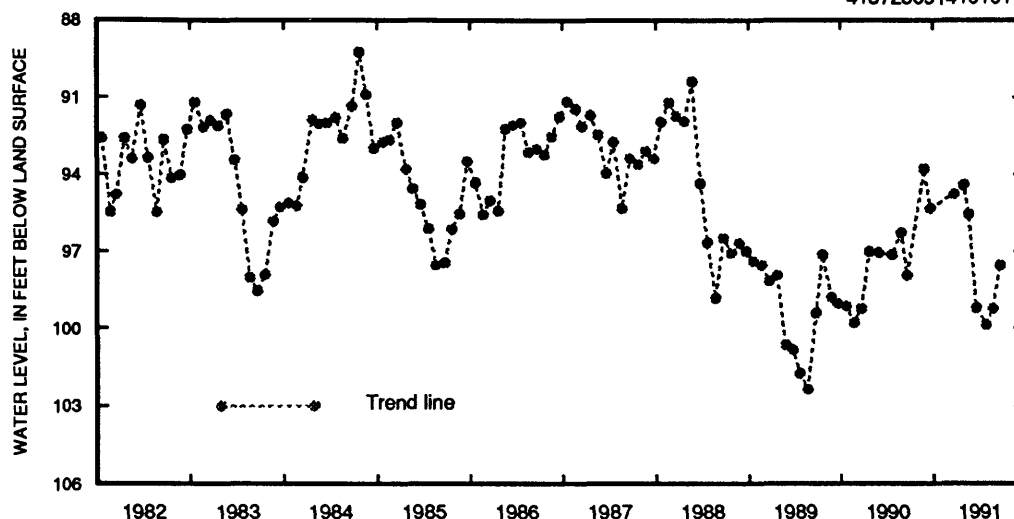
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 75.88 ft below land-surface datum, January 26, 1942; lowest measured, 107.00 ft below land-surface datum, September 16, 1976.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 26	93.77	MAY 02	94.40	JUN 21	99.22	AUG 26	99.24
DEC 20	95.31	22	95.54	JUL 30	99.86	SEP 25	97.54
MAR 25	94.75						

WATER YEAR 1991

HIGHEST 93.77 NOV 26, 1990 LOWEST 99.86 JUL 30, 1991

415725091410101



420126091484701. Local number, 83-08-06-DDAD1.

LOCATION.--Lat 42°01'26", long 91°48'48", Hydrologic Unit 07080205, approximately 2.5 mi southwest of the Town of Palo, south of County Road E-40 near the former site of the Lincoln Church. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Silurian-Devonian: in dolomite of Silurian and limestone and dolomite of Devonian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 5 in., depth 561 ft, cased to 83 ft, open hole 83-561 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel. Graphic water-level recorder February 1974 to September 1978. Intermittent measurement October 1972 to February 1974.

DATUM.--Elevation of land-surface datum is 842 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.97 ft above land-surface datum.

REMARKS.--Lincoln Church well. Records for October 1972 to September 1988 are unpublished and available in the files of the Iowa District Office.

PERIOD OF RECORD.--October 1972 to current year.

REVISION.--Highest water level measured, 60.95 ft below land-surface datum, March 28, 1973.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 60.95 ft below land-surface datum, March 28, 1973; lowest measured, 88.27 ft below land-surface datum, January 31, 1976.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 15	79.44	MAR 27	82.36	MAY 31	79.18	SEP 24	83.52

WATER YEAR 1991

HIGHEST 79.18 MAY 31, 1991 LOWEST 83.52 SEP 24, 1991

GROUND-WATER LEVELS

LINN COUNTY

420300091325801. Local number, 84-06-33 ABBB1.

LOCATION.--Lat 42°03'00", long 91°32'58", Hydrologic Unit 07080206, near the City of Marion on the east side of Iowa Highway 13, approximately 1 mi north of U.S. Highway 151. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Silurian: in dolomite of Silurian age.

WELL CHARACTERISTICS.--Drilled observation artesian well, diameter 6 in., depth 481 ft, cased to 142 ft, open hole 142-481 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 838 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 0.90 ft above land-surface datum.

REMARKS.--Marion well.

PERIOD OF RECORD.--June 1976 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 42.15 ft below land-surface datum, June 18, 1986; lowest measured, 50.26 ft below land-surface datum, December 1, 1989.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 15	47.29	MAR 26	45.47	MAY 31	44.82	SEP 24	47.78

WATER YEAR 1991

HIGHEST 44.82 MAY 31, 1991 LOWEST 47.78 SEP 24, 1991

420526091370701. Local number, 84-07-13 BCB1.

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 15-17 ft.

INSTRUMENTATION.--Twice a month 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.--USGS13E2 well.

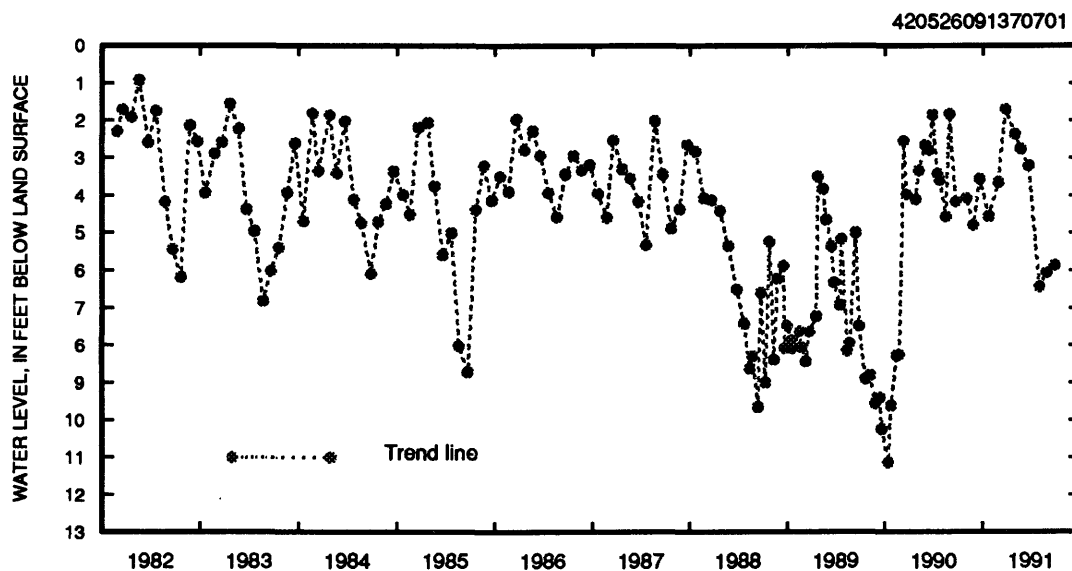
PERIOD OF RECORD.--September 1948 to current year.

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, January 20, 1977.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 31	4.08	JAN 23	4.59	APR 30	2.37	JUL 30	6.44
NOV 26	4.79	FEB 28	3.65	MAY 22	2.76	AUG 26	6.06
DEC 20	3.56	MAR 25	1.70	JUN 21	3.20	SEP 25	5.86

WATER YEAR 1991

HIGHEST 1.70 MAR 25, 1991 LOWEST 6.44 JUL 30, 1991



LINN COUNTY

420508091395811. Local number, 84-07-16 DBBB1.

LOCATION.--Lat 42°05'16", long 91°40'02", Hydrologic Unit 07080205, approximately 0.5 mi south of County Road E-34, north of the Town of Robins. 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 5 in., depth 520 ft, cased to 173 ft, open hole 173-520 ft, 18 ft of Devonian rock open.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel. Graphic water-level recorder November 1975 to September 1979. Intermittent measurement with chalked tape by USGS personnel April 1975 to November 1975.

DATUM.--Elevation of land-surface datum is 873 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.20 ft above land-surface datum.

REMARKS.--Robins well. Records for April 1975 to September 1988 are unpublished and available in the files of the Iowa District Office.

PERIOD OF RECORD.--April 1975 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 36.74 ft below land-surface datum, April 11, 1979; lowest measured, 57.50 ft below land-surface datum, December 1, 1989.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 15	46.79	MAR 26	42.95	MAY 31	40.56	SEP 24	48.39
WATER YEAR 1991				HIGHEST 40.56 MAY 31, 1991 LOWEST 48.39 SEP 24, 1991			

420340091431601. Local number, 84-08-25 ACAD1.

LOCATION.--Lat 42°03'38", long 91°43'16", Hydrologic Unit 07080205, approximately 1.5 mi northwest of the Town of Hiawatha near the Morrison Cemetery and the KCRG-TV Radio Tower. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Silurian: in dolomite Silurian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 6 in., depth 468 ft, cased to 153 ft, open hole 153-468 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel. Graphic water-level recorder October 1973 to December 1977.

DATUM.--Elevation of land-surface datum is 805 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.38 ft above land-surface datum.

REMARKS.--Hiawatha well. Records for October 1973 to September 1988 are unpublished and available in the files of the Iowa District Office.

PERIOD OF RECORD.--October 1973 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 29.82 ft below land-surface datum, July 7, 1974; lowest measured, 46.51 ft below land-surface datum, December 1, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 15	39.39	MAR 26	36.99	MAY 31	34.97	SEP 24	40.89
WATER YEAR 1991				HIGHEST 34.97 MAY 31, 1991 LOWEST 40.89 SEP 24, 1991			

420320091472201. Local number, 84-08-28 CBDD1.

LOCATION.--Lat 42°03'20", long 91°47'22", Hydrologic Unit 07080205, 0.5 mi southeast of the Town of Palo, 0.25 mi east of Iowa Highway 94. 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 5 in., depth 442 ft, cased to 148 ft, open hole 148-442 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel. Graphic water-level recorder April 1976 to December 1979.

DATUM.--Elevation of land-surface datum is 743 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.08 ft above land-surface datum.

REMARKS.--Palo well. Records for April 1976 to September 1988 are unpublished and available in the files of the Iowa District Office.

PERIOD OF RECORD.--April 1976 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 3.64 ft below land-surface datum, April 5, 1979; lowest measured, 13.26 ft below land-surface datum, July 17, 1977.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 15	9.84	MAR 27	6.14	MAY 31	5.07	SEP 24	9.82
WATER YEAR 1991				HIGHEST 5.07 MAY 31, 1991 LOWEST 9.84 NOV 15, 1990			

LINN COUNTY

421149091403301. Local number, 85-07-04 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 and dolomite of Devonian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 6 in., depth 435 ft, cased to 41 ft, 5 in. liner 129-147 ft, open hole 41-129 ft and 147-435 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel. Graphic water-level recorder March 1974 to December 1979. Intermittent measurement with chalked tape by USGS personnel July 1973 to March 1974.

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, June 10, 1974; lowest measured, 34.27 ft below land-surface datum, December 1, 1989.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 15	28.35	MAR 27	27.08	MAY 31	24.55	SEP 24	29.42
WATER YEAR 1991				HIGHEST 24.55 MAY 31, 1991 LOWEST 29.42 SEP 24, 1991			

420954091480801. Local number, 85-08-20 ABCD1.

LOCATION.--Lat 42°09'54", long 91°48'08", Hydrologic Unit 07080205, approximately 1.5 mi south of the Town of Center Point near the Lewis Bottoms Access County Park on the south side of County Road W-36. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Silurian-Devonian: in dolomite of Silurian age and limestone and dolomite of Devonian age.

WELL CHARACTERISTICS.--Drilled observation artesian well, diameter 5 and 4 in., depth 433 ft, cased to 39.5 ft and a liner 147.7-177 ft, open hole 39.5-147.7 ft, and 177-437 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel. Graphic water-level recorder March 1974 to April 1978.

DATUM.--Elevation of land-surface datum is 805 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.84 ft above land-surface datum.

REMARKS.--Center Point Bridge well. Records for March 1974 to September 1988 are unpublished and available in the files of the Iowa District Office.

PERIOD OF RECORD.--March 1974 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 21.50 ft below land-surface datum, June 14 and 15, 1974; lowest measured, 35.12 ft below land-surface datum, December 1, 1989.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 15	30.70	MAR 27	28.48	MAY 31	25.81	SEP 24	29.33
WATER YEAR 1991				HIGHEST 25.81 MAY 31, 1991 LOWEST 30.70 NOV 15, 1990			

420730091490401. Local number, 85-08-31 DDCD1.

LOCATION.--Lat 42°07'30", long 91°49'04", Hydrologic Unit 07080205, at the fenced north end of Pleasant Creek Reservoir near the beach house in the beach area. 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 5 in., depth 481 ft, cased to 214 ft, open hole 214-481 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel. Graphic water-level recorder May 1975 to December 1979.

DATUM.--Elevation of land-surface datum is 833 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.17 ft above land-surface datum.

REMARKS.--Pleasant Creek Reservoir/Silurian well. Records for May 1975 to September 1988 are unpublished and available in the files of the Iowa District Office.

PERIOD OF RECORD.--May 1975 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 84.17 ft below land-surface datum, April 5, 1976; lowest measured, 108.11 ft below land-surface datum, December 1, 1989.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 15	94.62	MAR 27	100.21	MAY 31	96.92	SEP 24	99.75
WATER YEAR 1991				HIGHEST 94.62 NOV 15, 1990 LOWEST 100.21 MAR 27, 1991			

LINN COUNTY

420730091490402. Local number, 85-08-31 DDCD2.

LOCATION.--Lat 42°07'30", long 91°49'04", Hydrologic Unit 07080205, at the fenced north end of Pleasant Creek Reservoir near the beach house in the beach area. Owner: Geological Survey Bureau, DNR, and U.S. Geological Survey.

AQUIFER.--Devonian: in limestone and dolomite of Devonian age.

WELL CHARACTERISTICS.--Drilled observation artesian well, diameter 5 in., depth 205 ft, cased to 52 ft, open hole 52 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel. Graphic water-level recorder May 1975 to December 1979.

DATUM.--Elevation of land-surface datum is 841 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.38 ft above land-surface datum.

REMARKS.--Pleasant Creek Reservoir/Devonian well. Records for May 1975 to September 1989 are unpublished and available in the Iowa District Office.

PERIOD OF RECORD.--May 1975 to May 1980, April 1984 to present.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 14.60 ft below land-surface datum, May 31, 1991; lowest measured, 48.55 ft below land-surface datum, November 12, 1976.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 15	17.22	MAR 27	15.57	MAY 31	14.60	SEP 24	17.24
WATER YEAR 1991				HIGHEST 14.60 MAY 31, 1991 LOWEST 17.24 SEP 24, 1991			

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 Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 358 ft, cased to 358 ft, perforated 335-355 ft. Open to Late Precambrian Sioux quartzite from 353-358 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

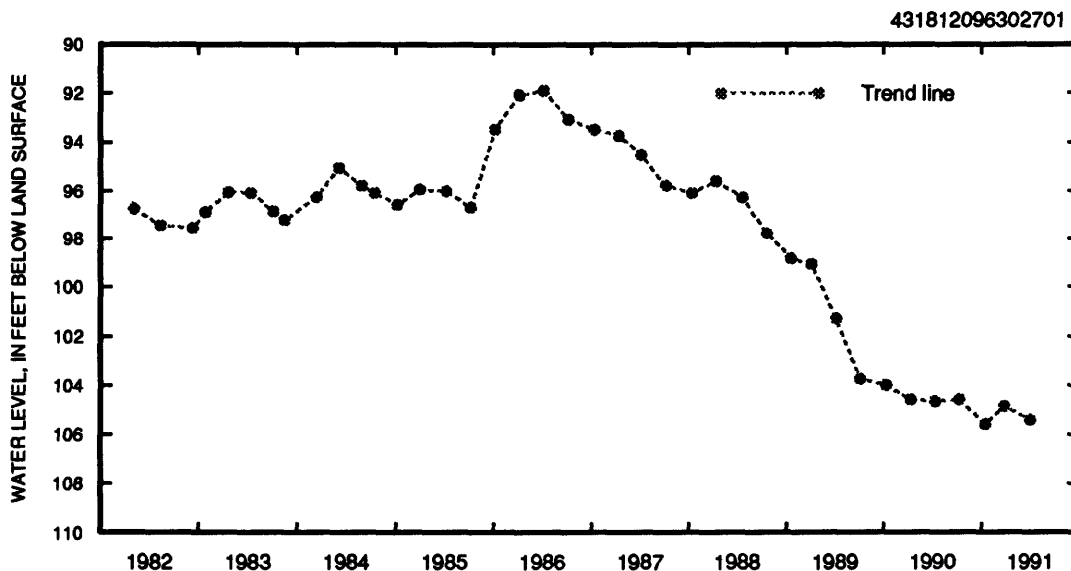
DATUM.--Elevation of land-surface datum is 1,268 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.00 ft above land-surface datum.

REMARKS.--Well D-20.

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, July 8, 1986; lowest measured, 105.58 ft below land-surface datum, January 15, 1991.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 11	104.58	JAN 15	105.58	MAR 27	104.86	JUL 02	105.40
WATER YEAR 1991				HIGHEST 104.58 OCT 11, 1990 LOWEST 105.58 JAN 15, 1991			



GROUND-WATER LEVELS

LYON COUNTY

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.

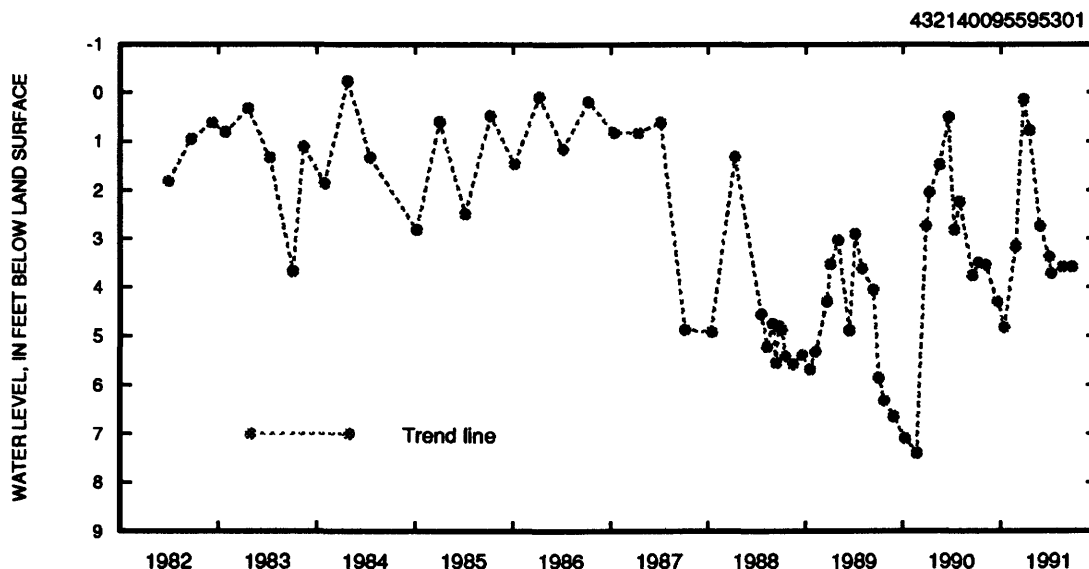
DATUM.--Elevation of land-surface datum is 1,400 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Plug in well cover, 2.01 ft above land-surface datum.

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, October 24, 1940.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 11	3.49	JAN 15	4.83	APR 18	.78	JUL 09	3.71
NOV 06	3.54	FEB 27	3.16	MAY 29	2.74	AUG 20	3.58
DEC 19	4.29	MAR 27	.14	JUL 02	3.38	SEP 25	3.58
WATER YEAR 1991				HIGHEST .14 MAR 27, 1991 LOWEST 4.83 JAN 15, 1991			



432553096105701. Local number, 99-45-05 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 Cretaceous age.

WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 10 in., depth 375 ft, cased to 296 ft, open hole 296-375 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, July 27, 1964; lowest measured, 115.39 ft below land-surface datum, August 20, 1991.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 05	115.25	JAN 24	115.33	APR 17	115.20	JUL 09	115.38
DEC 19	115.13	FEB 27	115.10	MAY 29	115.18	AUG 20	115.39
WATER YEAR 1991				HIGHEST 115.10 FEB 27, 1991 LOWEST 115.39 AUG 20, 1991			

LYON COUNTY

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 Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 657 ft, cased to 657 ft, perforated 450-455 ft and 630-650 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

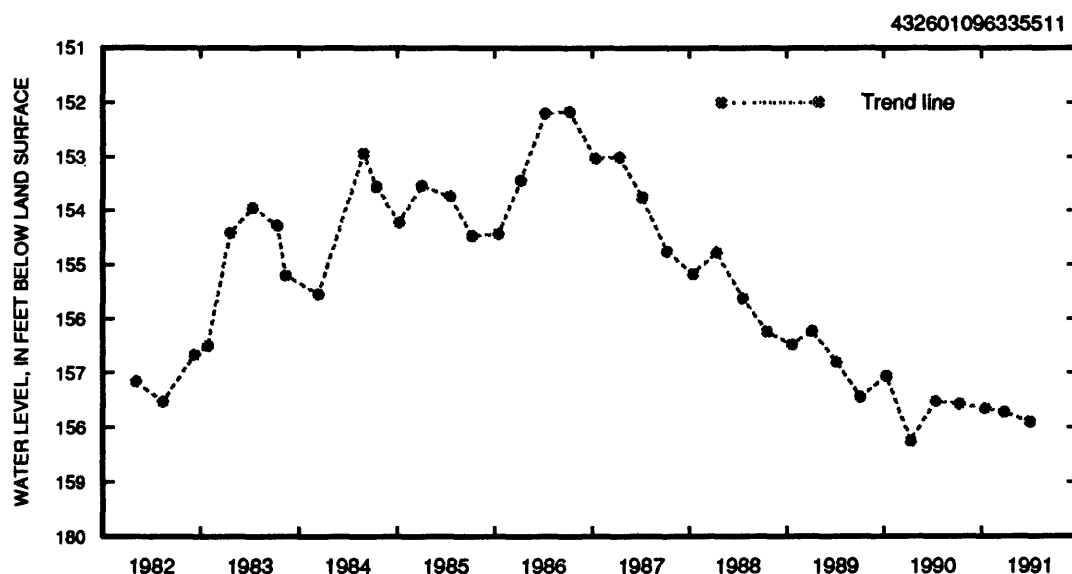
DATUM.--Elevation of land-surface datum is 1,417 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing at land-surface datum.

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, October 9, 1986; lowest measured, 158.25 ft below land-surface datum, April 11, 1990.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 11	157.57	JAN 15	157.65	MAR 27	157.72	JUL 02	157.90
WATER YEAR 1991				HIGHEST 157.57 OCT 11, 1990 LOWEST 157.90 JUL 02, 1991			



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 657-867 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, November 20, 1962; lowest measured, 275.93 ft below land-surface datum, August 26, 1991.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 06	275.45	MAR 19	275.45	JUN 07	275.69	AUG 26	275.93
JAN 29	275.54						
WATER YEAR 1991				HIGHEST 275.45 NOV 06, 1990 and MAR 19, 1991 LOWEST 276.65 MAR 19, 1991			

MAHASKA COUNTY

411912092273601. Local number, 75-14-10 BAAC.

LOCATION.--Lat 41°19'12", long 92°27'30", Hydrologic Unit 07080106, approximately 0.5 mi south of Iowa Highway 92 in the town of Rose Hill Owner: City of Rose Hill.

AQUIFER.--Mississippian: in limestone and dolomite of Mississippian age.

WELL CHARACTERISTICS.--Drilled unused public-supply artesian well, diameter 6 in., depth 370 ft, casing interval unknown.

INSTRUMENTATION.--Analog digital recorder--60 minute punch. Intermittent measurement with chalked tape by USGS personnel May 1989 to June 1989.

DATUM.--Elevation of land-surface datum is 815 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of recorder platform, 1.63 ft above land-surface datum.

REMARKS.--Rose Hill No. 2 well.

PERIOD OF RECORD.--May 1989 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 102.13 ft below land-surface datum, April 29, 1991; lowest measured, 103.61 ft below land-surface datum, March 5, 6, 7, and 8, 1990.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT
05	102.75	102.75	102.38	102.37	102.37	---	---	102.45	102.44	102.44	102.44	102.79
10	102.75	102.75	102.38	102.37	102.37	---	---	102.44	102.44	102.44	102.44	102.80
15	102.73	103.08	102.38	102.37	102.37	---	---	102.44	102.44	102.44	102.69	102.57
20	102.75	102.38	102.38	102.37	102.37	---	103.03	102.44	102.44	102.44	102.77	103.20
25	102.75	102.38	102.38	102.38	102.37	---	102.82	102.44	102.44	102.44	102.87	102.78
EOM	102.75	102.38	102.38	102.37	102.37	---	102.45	102.44	102.44	102.44	102.76	102.93

WATER YEAR 1991 HIGHEST 102.13 APR 29, 1991 LOWEST 103.20 OCT 1, 1990 AND SEP 20, 21 1991

411914092274701. Local number, 75-14-10 BABC.

LOCATION.--Lat 41°19'14", long 92°27'47", Hydrologic Unit 07080106, approximately 0.45 mi south of Iowa Highway 92, behind City Hall in the Town of Rose Hill. Owner: City of Rose Hill.

AQUIFER.--Mississippian: in limestone and dolomite of Mississippian age.

WELL CHARACTERISTICS.--Drilled unused public-supply artesian well, diameter 5 in., depth 273 ft, casing interval unknown.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 817 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.53 ft above land-surface datum.

REMARKS.--Rose Hill No. 4 well.

PERIOD OF RECORD.--September 1988 to current year.

REVISION.--Site identification number. Previously published as 411914092273001.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 102.30 ft below land-surface datum, May 24 1989; lowest measured, 103.20 ft below land-surface datum, October 26, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
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NOV 15	102.68	APR 16	102.48	AUG 14	102.46
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WATER YEAR 1991 HIGHEST 102.46 AUG 14, 1991 LOWEST 102.68 NOV 15, 1990

MAHASAKA COUNTY

412002092470301. Local number, 75-17-02 BAAB.

LOCATION.--Lat 41°20'02", long 92°47'03", Hydrologic Unit 07100009, just south of County Road G-39, in a field at the south end of Main Street in the Town of Leighton. Owner: Royce Pierson.

AQUIFER.--Pennsylvanian: in sandstone of Pennsylvanian age.

WELL CHARACTERISTICS.--Drilled unused private semi-confined well, diameter 12 in., depth 50 ft, cased to 30.25 ft, open 30.25 to 50 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 780 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.38 ft above land-surface datum.

REMARKS.--Formerly Leighton No. 2 well.

PERIOD OF RECORD.--October 1988 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 6.78 ft below land-surface datum, April 16, 1991; lowest measured, 15.41 ft below land-surface datum, January 3, 1990.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 15	11.16	APR 16	6.78	AUG 16	11.64		
WATER YEAR 1991			HIGHEST 6.78 APR 16, 1991 LOWEST 11.64 AUG 16, 1991				

412023092471201. Local number, 76-17-35 CADB.

LOCATION.--Lat 41°20'23", long 92°47'12", Hydrologic Unit 07100009, inside the old treatment plant at the north end of the Town of Leighton. Owner: Town of Leighton.

AQUIFER.--Mississippian: in limestone and dolomite of Mississippian age.

WELL CHARACTERISTICS.--Drilled unused public-supply artesian well, diameter 6 in., depth 210 ft, cased 0-210 ft, perforated 140-210 ft. Open to Pleistocene sand and gravel 140-142 ft.

INSTRUMENTATION.--Analog Digital Recorder--60 minute punch.

DATUM.--Elevation of land-surface datum is 823 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of recorder platform, 2.06 ft above land-surface datum.

REMARKS.--Leighton No. 1 well.

PERIOD OF RECORD.--May 1989 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 76.50 ft below land-surface datum, April 29, 1991; lowest measured, 84.15 ft below land-surface datum, September 6 and 7, 1989.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT
05	78.59	78.75	78.43	77.82	77.70	77.57	77.22	76.74	78.29	78.77	78.93	79.42
10	78.62	78.76	78.37	77.76	77.72	77.42	77.20	77.11	78.34	78.81	78.96	79.55
15	78.65	78.76	78.18	77.75	77.72	77.49	77.04	77.25	78.43	78.84	79.03	79.81
20	78.67	78.67	78.13	77.74	77.63	77.42	76.82	77.55	78.60	78.93	79.08	79.99
25	78.73	78.61	78.04	77.67	77.53	77.25	76.61	77.95	78.71	78.91	79.14	80.08
EOM	78.75	78.63	77.96	77.67	77.58	77.20	76.55	78.19	78.73	78.83	79.28	80.18

WATER YEAR 1991 HIGHEST 76.50 APR 29, 1991 LOWEST 80.18 SEP 30, 1991

MAHASKA COUNTY

412020092471002. Local number, 76-17-35 CADB.

LOCATION.--Lat 41°20'20", long 92°47'10", Hydrologic Unit 07100009, 150 ft east of the old treatment plant near a retirement village on the north end of the Town of Leighton. Owner: Town of Leighton.

AQUIFER.--Cambrian-Ordovician: in sandstone of Late Cambrian and sandstone and sandy dolomite of Early Ordovician age.

WELL CHARACTERISTICS.--Drilled unused public-supply artesian well, diameter 8 in., depth 2200 ft, cased to 1778 ft, open 1778-2200 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 820 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 5.43 ft above land-surface datum.

REMARKS.--Leighton No. 4 well.

PERIOD OF RECORD.--May 1989 to present.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 215.38 ft below land-surface datum, May 11, 1989; lowest measured, 226.30 ft below land-surface datum, August 16, 1991.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 15	222.34	APR 16	223.72	AUG 16	226.30		
WATER YEAR 1991			HIGHEST 222.34 NOV 15, 1990 LOWEST 226.30 AUG 16, 1991				

MARION COUNTY

411323093142601. Local number, 74-21-11 DBCB1.

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. Depth originally 25 ft, re-measured in 1981.

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.

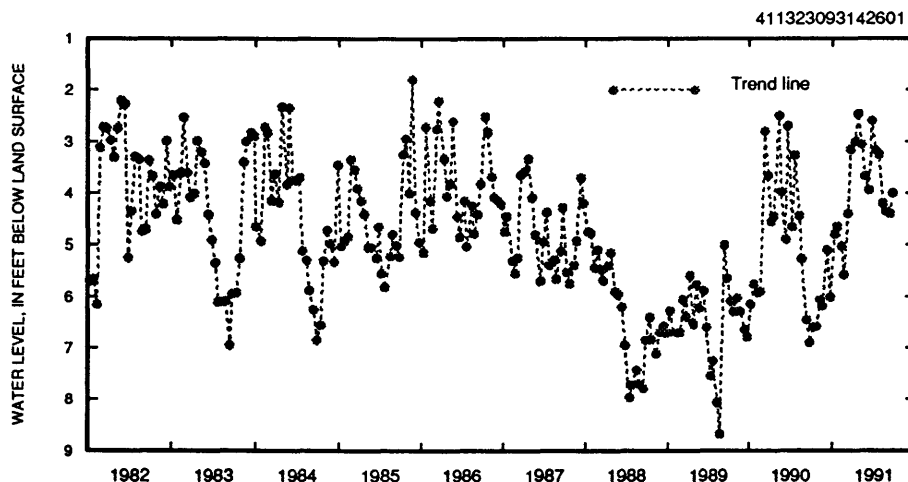
REMARKS.--Town well No. 2.

PERIOD OF RECORD.--March 1950 to current year.

REVISION.--Highest water level measured, 0.20 ft below land-surface datum, October 10, 1973; lowest measured, 15.27 ft below land-surface datum, October 22, 1953.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 0.20 ft below land-surface datum, October 10, 1973; lowest measured, 15.27 ft below land-surface datum, October 22, 1953.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 10	6.60	JAN 11	4.80	APR 11	3.00	JUL 10	3.18
23	6.58	23	4.65	23	2.47	22	3.26
NOV 10	6.07	FEB 10	5.03	MAY 10	3.06	AUG 10	4.20
20	6.18	21	5.58	22	3.67	23	4.35
DEC 10	5.10	MAR 11	4.40	JUN 10	3.94	SEP 10	4.40
24	6.02	21	3.16	22	2.60	23	4.00
WATER YEAR 1991			HIGHEST 2.47 APR 23, 1991 LOWEST 6.60 OCT 10, 1990				



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 76-119 ft. Sand and gravel 103-117 ft. Pennsylvanian shale 117-119 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.--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, December 4, 6-7, 1949.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 10	21.46	JAN 11	20.77	APR 11	20.34	JUL 10	20.40
23	21.51	23	20.75	23	20.18	22	20.18
NOV 10	21.38	FEB 10	21.04	MAY 10	20.08	AUG 10	20.38
20	21.46	21	20.95	22	20.18	23	20.44
DEC 10	20.81	MAR 11	20.63	JUN 10	20.18	SEP 10	20.48
24	20.79	21	20.44	22	19.98	23	20.40

WATER YEAR 1991

HIGHEST 19.98 JUN 22, 1991 LOWEST 21.51 OCT 23, 1990

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, screened 80-82 ft, open hole 82-96.5 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.

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, January 26, 1956.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 10	12.83	JAN 11	12.55	APR 11	11.79	JUL 10	11.59
23	12.91	23	12.53	23	11.49	22	11.39
NOV 10	12.87	FEB 10	12.59	MAY 10	11.13	AUG 10	11.49
20	12.84	21	12.39	22	11.19	23	11.49
DEC 10	12.59	MAR 11	12.09	JUN 10	10.99	SEP 10	11.47
24	12.57	21	11.77	22	11.39	23	11.43

WATER YEAR 1991

HIGHEST 10.99 JUN 10, 1991 LOWEST 12.91 OCT 23, 1990

GROUND-WATER LEVELS

MARSHALL COUNTY

415640093062101. Local number, 82-19-06 ACCB.

LOCATION.--Lat 41°56'40", long 93°06'21", Hydrologic Unit 07080106, located on the west side of Iowa Highway 395, approximately 0.4 mi south of the junction of Iowa Highway 395 and 330, in the old treatment plant in the City of Melbourne. Owner: City of Melbourne.

AQUIFER.--Silurian: in dolomite of Silurian age.

WELL CHARACTERISTICS.--Drilled unused public-supply artesian well, diameter 10 in., depth 1,340 ft, cased to 1,212 ft, open hole 1,212-1,340 ft. Open to Ordovician rock 1,305-1,340 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, 0.65 ft above land-surface datum.

REMARKS.--Melbourne No. 1 well.

PERIOD OF RECORD.--September 1988 to present.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 207.47 ft below land-surface datum, August 16, 1991; lowest measured, 228.72 ft below land-surface datum, July 25, 1990.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL
AUG 16	207.47

420355092534701. Local number, 84-18-24 CDCA1.

LOCATION.--Lat 41°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 190-200 ft.

INSTRUMENTATION.--Quarterly measurement with electric line or chalked tape 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, 0.22 ft above 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, July 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 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 18	40.86	MAR 14	41.15	MAY 28	32.34	AUG 26	42.19
WATER YEAR 1991				HIGHEST 32.34 MAY 28, 1991 LOWEST 42.19 AUG 26, 1991			

421120093003001. Local number, 85-19-12 ADCD.

LOCATION.--Lat 41°11'20", long 93°00'30", Hydrologic Unit 07080207, located behind the old City Hall across the street from the Community Center and Fire Station. Owner: City of Liscomb.

AQUIFER.--Mississippian: in limestone and dolomite of Mississippian age.

WELL CHARACTERISTICS.--Drilled unused public-supply artesian well, diameter 8 in., depth 278 ft, cased to 159 ft, perforated 110-159 ft, open hole 159-278 ft. Open to Devonian rock 274-278 ft.

INSTRUMENTATION.--Intermittent measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,008 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 0.56 ft above land-surface datum.

REMARKS.--Liscomb No. 1 well.

PERIOD OF RECORD.--September 1988 to present.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 95.90 ft below land-surface datum, April 16, 1991; lowest measured, 101.50 ft below land-surface datum, November 29, 1989.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEARS OCTOBER 1990 TO SEPTEMBER 1991			
DATE	WATER LEVEL	DATE	WATER LEVEL
APR 16	95.90	AUG 15	97.69
WATER YEAR 1991		HIGHEST 95.90 APR 16, 1991 LOWEST 97.69 AUG 15, 1991	

MONONA COUNTY

415456095414101. Local number, 82-42-14 ADC1.

LOCATION.--Lat 41°54'56", long 95°41'41", Hydrologic Unit 10230007, approximately 6 mi southeast of the Town of Soldier, on the north side of Iowa Highway 37. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 341 ft, cased to 336 ft, slotted 311-336 ft, gravel-packed.

INSTRUMENTATION.--Quarterly measurement with chalked tape or electric line 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, 2.02 ft above land-surface datum.

REMARKS.--Well WC-4.

PERIOD OF RECORD.--May 1981 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 240.25 ft below land-surface datum, January 10, 1984; lowest measured, 246.69 ft below land-surface datum, July 28, 1981.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 10	244.90	JAN 14	243.62	MAR 26	243.58	JUL 01	244.64
WATER YEAR 1991			HIGHEST 243.58 MAR 26, 1991 LOWEST 244.90 OCT 10, 1990				

420004095451501. Local number, 83-42-17 ACDD1.

LOCATION.--Lat 41°00'04", long 95°45'15", Hydrologic Unit 10230001, approximately 1.75 mi northeast of the Town of Soldier, 0.25 mi west of Iowa Highway 183. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Glacial drift: in material of Pleistocene age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 161 ft, cased to 161 ft, slotted 149-154 ft. Open to 8 ft of Pennsylvanian shale and limestone, 153-161 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,160 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.20 ft above land-surface datum.

REMARKS.--Well WC-176.

PERIOD OF RECORD.--May 1983 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 55.17 ft below land-surface datum, January 7, 1985; lowest measured, 64.09 ft below land-surface datum, September 7, 1983.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 10	60.69	JAN 14	60.90	MAR 26	59.43	JUL 01	57.79
WATER YEAR 1991			HIGHEST 57.79 JUL 01, 1991 LOWEST 60.90 JAN 14, 1991				

420139095155701. Local number, 83-43-04 CBCB1.

LOCATION.--Lat 41°01'39", long 95°15'57", Hydrologic Unit 10230005, approximately 5.5 mi northwest of the Town of Soldier and 1.5 mi north of Iowa Highway 37. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 321 ft, cased to 315 ft, slotted 297-315 ft, gravel-packed, open hole 315-321 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape or electric line by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,235 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.53 ft above land-surface datum.

REMARKS.--Well WC-5.

PERIOD OF RECORD.--May 1981 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 184.67 ft below land-surface datum, October 15, 1984; lowest measured, 189.96 ft below land-surface datum, February 2, 1982.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991					
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 10	186.47	MAR 26	186.96	JUL 01	187.43
WATER YEAR 1991		HIGHEST 186.47 OCT 10, 1990 LOWEST 187.43 JUL 01, 1991			

GROUND-WATER LEVELS

MONONA COUNTY

420730095510701. Local number, 84-43-04 ABAA1.

LOCATION.--Lat 41°07'30", long 95°51'07", Hydrologic Unit 10230005, approximately 4 mi southwest of the Town of Mapleton, on the north side of Iowa Highway 175. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Maple alluvial: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 72 ft, cased to 58 ft, slotted 53-58 ft, gravel-packed, open hole 58-72 ft.

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: Top of casing, 2.40 ft above land-surface datum.

REMARKS.--Well WC-163.

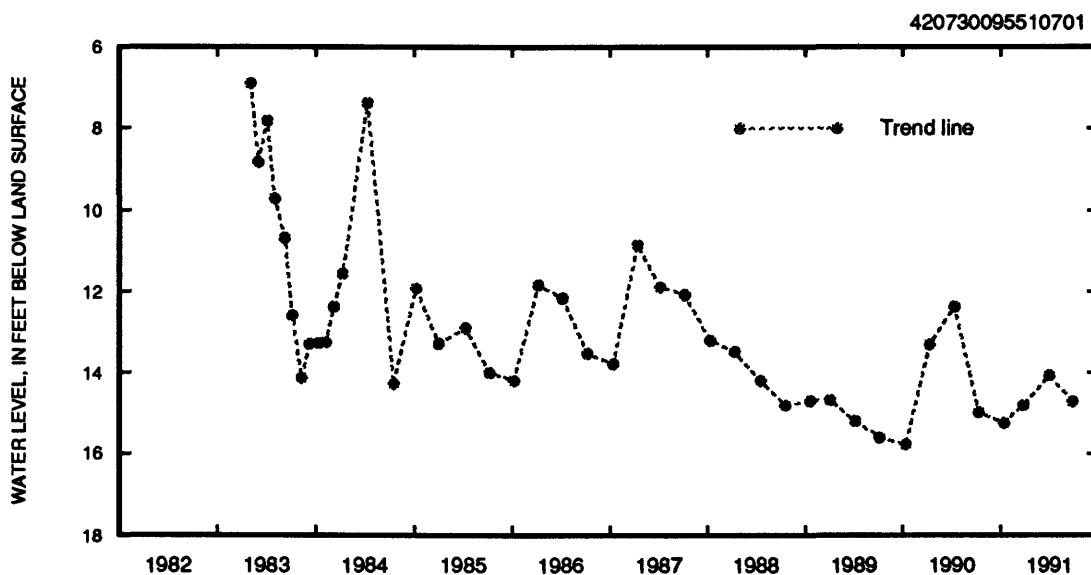
PERIOD OF RECORD.--May 1983 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 6.90 ft below land-surface datum, May 5, 1983; lowest measured, 15.79 ft below land-surface datum, January 11, 1990.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991			
DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 10	14.98	MAR 26	14.81
JAN 14	15.25		

WATER YEAR 1991

HIGHEST 14.07 JUL 01, 1991 LOWEST 15.25 JAN 14, 1991



420406095543301. Local number, 84-44-24 DCAD1.

LOCATION.--Lat 41°04'06", long 95°54'33", Hydrologic Unit 10230005, on the south side of the Town of Castana, 0.25 mi east of Iowa Highway 175. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Maple alluvial: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 74 ft, cased to 71 ft, slotted 66.5-71 ft, gravel-packed, open hole 71-74 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,105 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.10 ft above land-surface datum.

REMARKS.--Well WC-166. Well abandoned and destroyed August 1991.

PERIOD OF RECORD.--May 1983 to August 1991.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 18.79 ft below land-surface datum, April 13, 1987; lowest measured, 22.54 ft below land-surface datum, October 7, 1985.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991			
DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 10	21.10	JAN 14	21.00
		MAR 26	20.39
		JUL 01	20.98

WATER YEAR 1991

HIGHEST 20.39 MAR 26, 1991 LOWEST 21.10 OCT 10, 1990

MONONA COUNTY

421018095582001. Local number, 85-44-16 CDAAL.

LOCATION.--Lat 41°10'18", long 95°58'20", Hydrologic Unit 10230003, approximately 1.25 mi west of the Town of Ticonic on the north side of County Road E-16. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 81 ft, cased to 77 ft, slotted 67-77 ft, gravel-packed, open hole 77-81 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

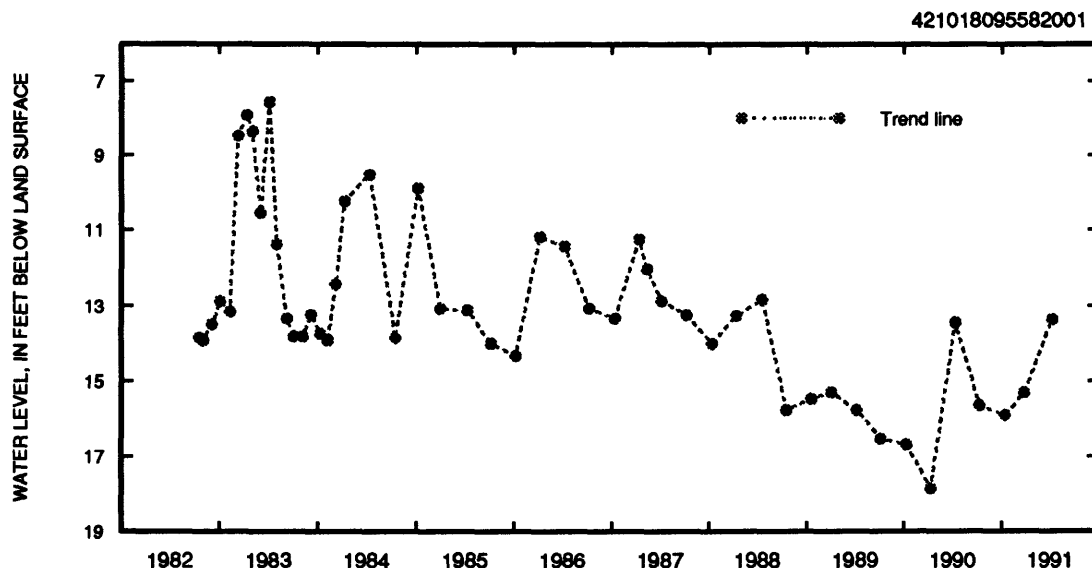
DATUM.--Elevation of land-surface datum is 1,060 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.25 ft above land-surface datum.

REMARKS.--Well WC-155.

PERIOD OF RECORD.--October 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 7.57 ft below land-surface datum, July 5, 1983; lowest measured, 17.85 ft below land-surface datum, April 10, 1990.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991			
DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 10	15.65	JAN 14	15.90
MAR 26	15.31	JUL 08	13.37
WATER YEAR 1991 HIGHEST 13.37 JUL 08, 1991 LOWEST 15.90 JAN 14, 1991			



421006095580301. Local number, 85-44-16 DCDD1.

LOCATION.--Lat 41°10'06", long 95°58'03", Hydrologic Unit 10230003, approximately 0.75 mi west of the Town of Ticonic on the north side of County Road E-16. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Little Sioux alluvial: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 43 ft, cased to 40 ft, slotted 35-40 ft, gravel-packed. Open to Dakota sandstone 40-43 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: Top of casing, 2.50 ft above land-surface datum.

REMARKS.--Well WC-156.

PERIOD OF RECORD.--October 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 3.92 ft below land-surface datum, March 10, 1983; lowest measured, 14.90 ft below land-surface datum, October 10, 1990.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991			
DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 10	14.90	MAR 26	12.96
JAN 14	14.10	JUL 08	11.50
SEP 25	13.90		
WATER YEAR 1991 HIGHEST 11.50 JUL 08, 1991 LOWEST 14.90 OCT 10, 1990			

GROUND-WATER LEVELS

MONONA COUNTY

421018095591301. Local number, 85-44-17 DCAA1.

LOCATION.--Lat 41°10'18", long 95°59'13", Hydrologic Unit 10230003, approximately 2.5 mi southwest of the Town of Rodney on the north side of County Road L-12. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 135 ft, cased to 135 ft, slotted 115-125 ft, gravel-packed.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,110 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 WC-158.

PERIOD OF RECORD.--October 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 49.89 ft below land-surface datum, July 11, 1984; lowest measured, 55.99 ft below land-surface datum, January 11, 1990.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 10	54.80	JAN 14	55.33	MAR 26	55.40	JUL 08	53.52
WATER YEAR 1991				HIGHEST 53.52 JUL 08, 1991 LOWEST 55.40 MAR 26, 1991			

MONTGOMERY COUNTY

405841095012702. Local number, 71-36-06 DADA2.

LOCATION.--Lat 40°58'41", long 95°01'27", Hydrologic Unit 10240009, located east of dam at Viking Lake State Park, approximately 0.3 mi south of Iowa Highway 34 on the west side of road. Owner: Geological Survey Bureau, DNR, and U.S. Geological Survey.

AQUIFER.--Glacial drift: in material of Pleistocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 36 ft, cased to 33 ft, screened 33-36 ft.

INSTRUMENTATION.--Monthly measurement with chalked tape by observer and U.S.G.S. personnel.

DATUM.--Elevation of land-surface datum is 1,080 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.28 ft above land-surface datum.

REMARKS.--Viking Lake No. 2 (6J2) well.

PERIOD OF RECORD.--June 1989 to present.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 11.51 ft below land-surface datum, September 9, 1989; lowest measured, 17.15 ft below land-surface datum, August 15, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 22	16.28	JAN 22	15.84	APR 25	12.87	JUL 18	16.11
NOV 06	16.20	29	15.90	29	12.09	AUG 20	16.77
20	16.14	FEB 20	15.69	MAY 20	13.04	30	17.05
DEC 17	16.10	MAR 19	14.98	30	13.27	SEP 22	16.90
21	16.20	22	14.79	JUN 24	13.67	23	16.93
				JUL 18	16.04	26	16.86
WATER YEAR 1991				HIGHEST 12.09 APR 29, 1991 LOWEST 17.05 AUG 30, 1991			

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. Interval of perforation not available.

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, 1.20 ft above land-surface datum.

REMARKS.--None.

PERIOD OF RECORD.--June 1937 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 2.94 ft below land-surface datum, June 20, 1984; lowest measured, dry, July 8, 1963 and February 3, 1964.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 06	17.83	MAR 19	16.25	MAY 30	9.82	AUG 30	17.72
DEC 17	17.79	APR 29	11.26	JUL 18	12.46	SEP 23	19.39
JAN 29	19.08						

WATER YEAR 1991

HIGHEST 9.82 MAY 30, 1991 LOWEST 19.39 SEP 23, 1991

MUSCATINE COUNTY

412120091080401. Local number, 76-02-30 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 24-27 ft.

INSTRUMENTATION.--Intermittent measurement with chalked tape by USGS personnel. Graphic water-level recorder May 1966 to October 1987.

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.--Fruitland/30M4 well.

PERIOD OF RECORD.--May 1966 to current year.

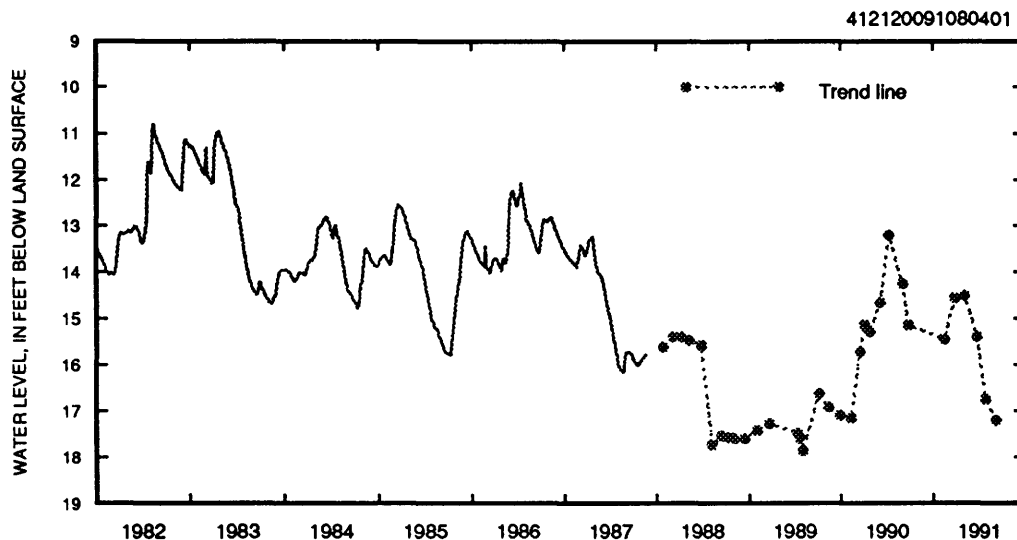
REVISED RECORDS.--WDR IA-84-1.

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 8.51 ft below land-surface datum, May 16, 1973; lowest measured, 17.86 ft below land-surface datum, August 2, 1989.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
FEB 15	15.45	MAY 07	14.51	JUL 29	16.74	SEP 09	17.21
MAR 29	14.56	JUN 24	15.40				

WATER YEAR 1991

HIGHEST 14.51 MAY 07, 1991 LOWEST 15.45 FEB 15, 1991



GROUND-WATER LEVELS

O'BRIEN COUNTY

425610095250611. Local number, 94-39-26 BADB11.

LOCATION.--Lat 41°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 Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2.50 in., depth 329 ft, cased to 329 ft, perforated 291-295 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape 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, 2.30 ft above 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, June 8, 1986 and January 6, 1987; lowest measured, 36.85 ft below land-surface datum, December 15, 1980.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 28	36.40	MAR 22	36.29	MAY 22	35.94	AUG 22	36.38
WATER YEAR 1991				HIGHEST 35.94 MAY 22, 1991 LOWEST 36.40 DEC 28, 1990			

425808095480311. Local number, 94-42-09 DDDD11.

LOCATION.--Lat 41°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 Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 638 ft, cased to 638 ft, perforated 516-536 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 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 11	244.90	MAR 28	245.82	JUL 02	244.60		
WATER YEAR 1991				HIGHEST 244.60 JUL 02, 1991 LOWEST 245.82 MAR 28, 1991			

430930095350401. Local number, 96-40-05 DDDA1.

LOCATION.--Lat 41°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.--Ordovician and Dakota: in sandy shale of Ordovician age and sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 701 ft, cased to 701 ft, perforated 661-701 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, 2.06 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, July 8, 1986; lowest measured, 362.58 ft below land-surface datum, January 15, 1991.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 11	362.38	JAN 15	362.58	MAR 28	360.12	JUL 02	361.98
WATER YEAR 1991				HIGHEST 360.12 MAR 28, 1991 LOWEST 362.58 JAN 15, 1991			

OSCEOLA COUNTY

431620095250501. Local number, 98-39-26 CDAD1.

LOCATION.--Lat 41°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.--Cambrian-Ordovician: in St. Peter sandstone of Middle Ordovician age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 662 ft, cased to 662 ft, perforated 622-662 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, August 5, 1980.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 29	198.19	MAR 21	198.41	MAY 22	198.51	AUG 21	199.32
WATER YEAR 1991			HIGHEST 198.19 DEC 29, 1990 LOWEST 199.32 AUG 21, 1991				

431620095250511. Local number, 98-39-26 CDAD11.

LOCATION.--Lat 41°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 Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 345 ft, cased to 345 ft, perforated 335-345 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, September 10, 1981; lowest measured, 194.20 ft below land-surface datum, August 21, 1991.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 29	193.89	MAR 21	193.75	MAY 22	194.09	AUG 21	194.20
WATER YEAR 1991			HIGHEST 193.75 MAR 21, 1991 LOWEST 194.20 AUG 21, 1991				

431613095251801. Local number, 98-39-26 CDCC1.

LOCATION.--Lat 41°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 Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 500 ft, cased to 500 ft, perforated 490-500 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, June 17, 1980; lowest measured, 196.85 ft (nearby well pumping) below land-surface datum, September 6, 1984.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 29	191.76	MAR 21	191.67	MAY 22	191.96	AUG 21	196.47
WATER YEAR 1991			HIGHEST 191.67 MAR 21, 1991 LOWEST 196.47 AUG 21, 1991				

OSCEOLA COUNTY

431620095482402. Local number, 98-42-33 AAB2.

LOCATION.--Lat 41°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 Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 400 ft, cased to 400 ft, perforated 385-395 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, 231.45 ft below land-surface datum, March 27, 1991.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991			
DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 11	229.16	JAN 15	231.10
		MAR 27	231.45
		JUL 02	231.40
WATER YEAR 1991		HIGHEST 229.16 OCT 11, 1990 LOWEST 231.45 MAR 27, 1991	

432828095283611. Local number, 100-39-17 DCCB11.

LOCATION.--Lat 41°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 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 680-700 ft.

INSTRUMENTATION.--Quarterly measurement with electric line or chalked tape by USGS personnel.

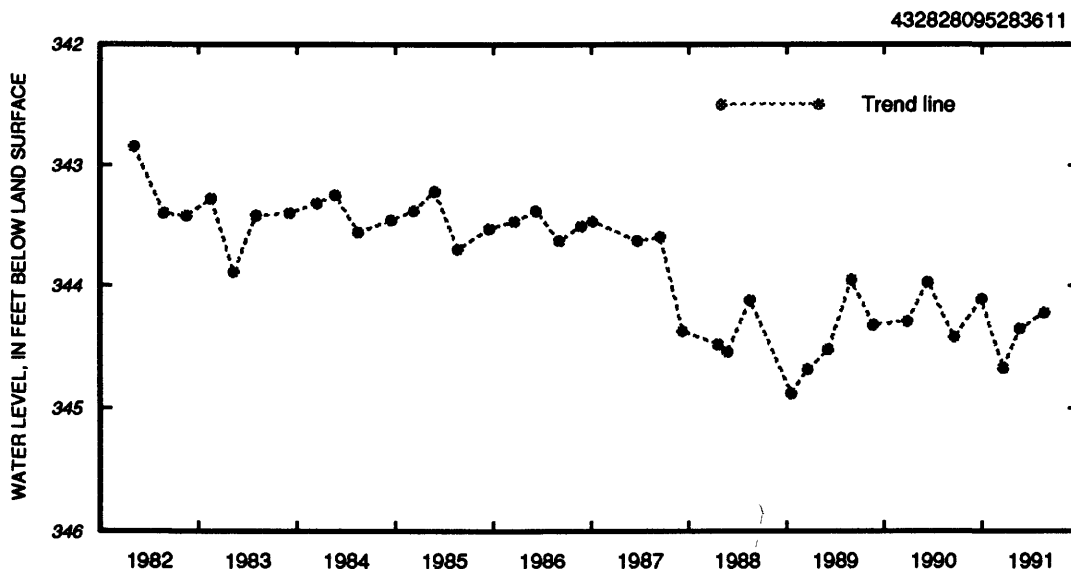
DATUM.--Elevation of land-surface datum is 1,560 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.00 ft above land-surface datum.

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, August 5, 1980; lowest measured, 344.88 ft below land-surface datum, January 18, 1989.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991			
DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 29	344.11	MAR 21	344.67
		MAY 22	344.35
		AUG 21	344.22
WATER YEAR 1991		HIGHEST 344.11 DEC 29, 1990 LOWEST 344.67 MAR 21, 1991	



PAGE COUNTY

404257095150801. Local number, 68-38-07 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.

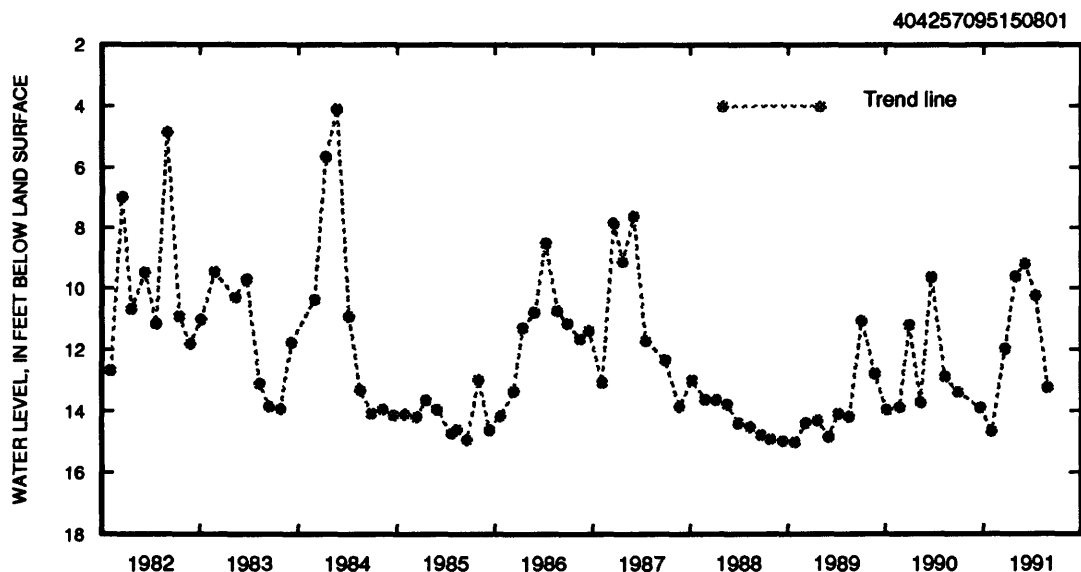
DATUM.--Elevation of land-surface datum is 1,087 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of pipe inserted through board cover, 1.00 ft above land-surface datum.

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, March 26, 1946; lowest measured, 22.76 ft below land-surface datum, June 23, 1947.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 20	13.90	MAR 22	11.98	JUN 05	9.19	AUG 29	13.24
FEB 01	14.65	APR 30	9.61	JUL 15	10.24		
WATER YEAR 1991				HIGHEST 9.19 JUN 05, 1991 LOWEST 14.65 FEB 01, 1991			



424850096074801. Local number, 92-45-02 CBCB1.

LOCATION.--Lat 41°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 ft, 2 in. to 1,340 ft, depth 1,340 ft, cased to 598 ft, open hole 598-1,340 ft. Well deepened from 1,089 to 1,340 ft in May, 1984. Well penetrates Precambrian-aged rocks.

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.

PERIOD OF RECORD.--May 1979 to January 1981, May 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 67.70 ft below land-surface datum, March 27, 1991; lowest measured, 102.10 ft below land-surface datum, August 6, 1980.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991					
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 11	79.63	MAR 27	67.70	JUL 02	71.15
WATER YEAR 1991			HIGHEST 67.70 MAR 27, 1991 LOWEST 79.63 OCT 11, 1990		

GROUND-WATER LEVELS

PLYMOUTH COUNTY

424833096324701. Local number, 92-48-06 DDDA1.

LOCATION.--Lat 41°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 Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, depth 581 ft, diameter 4 in. to 184 ft, 2 in. to 581 ft, cased to 576 ft, perforated 430-434 ft and 510-515 ft, open hole 576-581 ft. Paleozoic rock open 576-581 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.

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, April 22, 1987; lowest measured, 159.82 ft below land-surface datum, August 6, 1980.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 08	138.45	FEB 04	138.5	APR 16	138.38	JUL 17	138.27
DEC 12	138.49						
WATER YEAR 1991				HIGHEST 138.27 JUL 17, 1991 LOWEST 138.5 FEB 04, 1991			

425249096125001. Local number, 93-46-12 DDDD1.

LOCATION.--Lat 41°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 Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2.5 in., depth 570 ft, cased to 570 ft, perforated 356-360 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

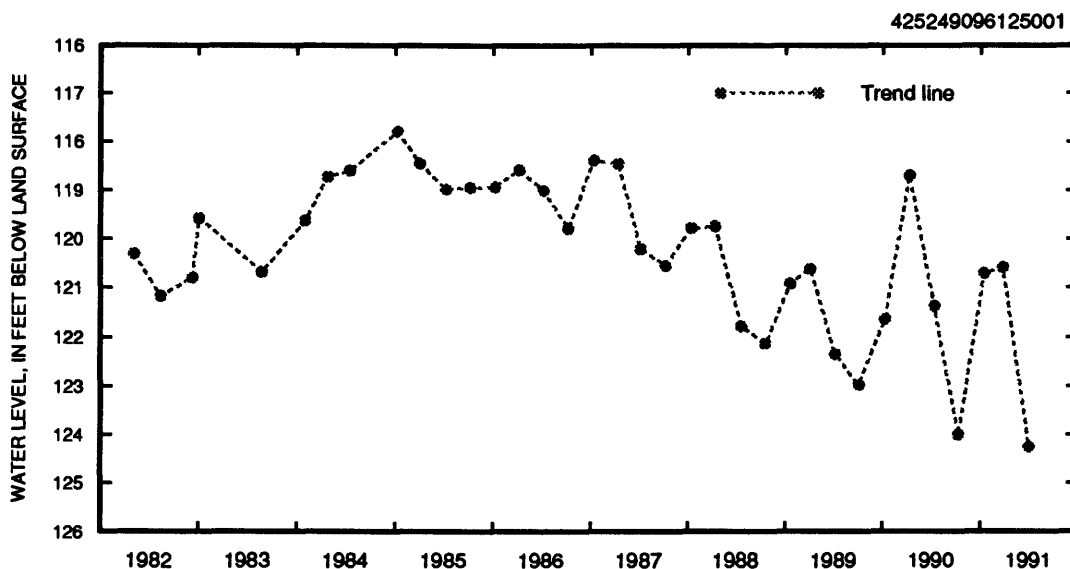
DATUM.--Elevation of land-surface datum is 1,280 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of coupling, 2.25 ft above land-surface datum.

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, April 9, 1980; lowest measured, 124.25 ft below land-surface datum, July 2, 1991.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 11	124.00	JAN 15	120.71	MAR 27	120.59	JUL 02	124.25
WATER YEAR 1991				HIGHEST 120.59 MAR 27, 1991 LOWEST 124.25 JUL 02, 1991			



POTTAWATTAMIE COUNTY

411024095095502. Local number, 74-38-36 BAAA2.

LOCATION.--Lat 41°10'24", long 95°09'55", Hydrologic Unit 10240003, approximately 1.5 mi north of the Town of Elliott on the southwest corner of the junction of County Roads M-55 and G-66. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--East Nishnabotna alluvial: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 40 ft, cased 34-39 ft, gravel-packed. Original depth was 101 ft, back-filled with sand and a bentonite seal to 40 ft.

INSTRUMENTATION.--Twice a month measurement with chalked tape by observer.

DATUM.--Elevation of land-surface datum is 1,073 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.20 ft above land-surface datum.

REMARKS.--Well SW-34 B/L.

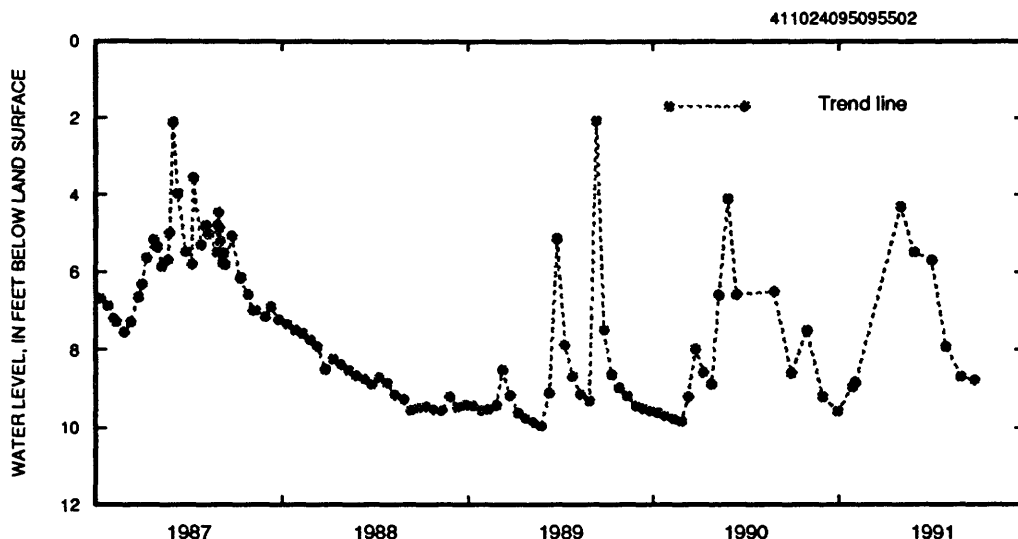
PERIOD OF RECORD.--August 1986 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 2.07 ft below land-surface datum, September 10, 1989; lowest measured, 9.95 ft below land-surface datum, May 25, 1989.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 29	7.50	JAN 27	8.95	MAY 27	5.48	AUG 26	8.69
NOV 29	9.20	FEB 02	8.83	JUN 30	5.69	SEP 22	8.78
DEC 29	9.57	MAY 01	4.31	JUL 28	7.92		

WATER YEAR 1991

HIGHEST 4.31 MAY 01, 1991 LOWEST 9.57 DEC 29, 1990



411359095171901. Local number, 74-39-01 CCCC1.

LOCATION.--Lat 41°13'59", long 95°17'19", Hydrologic Unit 10240002, approximately 6.5 mi east of the Town of Carson, on the northeast corner of the junction of Iowa Highway 92 and County Road M-41. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Buried channel: in sand and gravel of Pleistocene age.

WELL CHARACTERISTICS.--Drilled observation well, diameter 2 in., depth 216 ft, cased to 206 ft, slotted 189-206 ft, gravel-packed, open to Pennsylvanian shale 207-216 ft.

INSTRUMENTATION.--Intermittent 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, 2.32 ft above land-surface datum.

REMARKS.--Well SW-21.

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

REVISION.--Lowest water level measured, 129.38 ft below land-surface datum, August 20, 1986.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 124.86 ft below land-surface datum, April 4, 1988; lowest measured, 129.38 ft below land-surface datum, August 20, 1986.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 15	127.28	FEB 04	126.85	MAY 24	128.26	AUG 15	127.90
JAN 18	128.26	APR 16	128.39	JUL 03	128.10		

WATER YEAR 1991

HIGHEST 126.85 FEB 04, 1991 LOWEST 128.39 APR 16, 1991

GROUND-WATER LEVELS

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 14-16 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.--Well 18E1.

PERIOD OF RECORD.--November 1950 to current year.

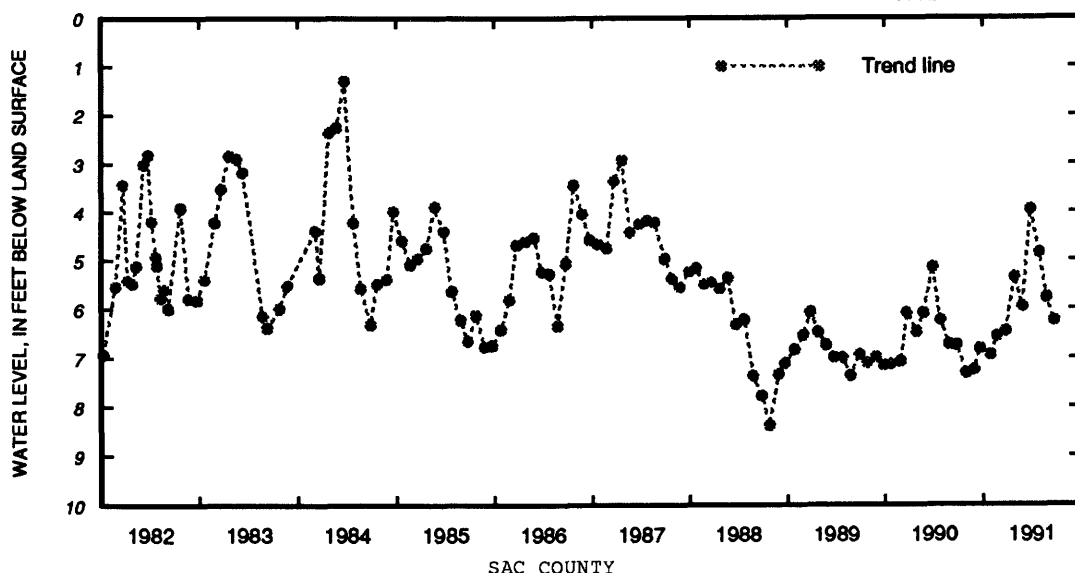
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 0.45 ft below land-surface datum, May 2, 1951; lowest measured, 11.86 ft below land-surface datum, June 26, 1956.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 29	7.32	JAN 29	6.94	APR 30	5.35	JUL 30	4.85
NOV 29	7.25	FEB 22	6.57	MAY 29	5.96	AUG 27	5.78
DEC 20	6.82	MAR 25	6.46	JUN 27	3.95	SEP 23	6.25

WATER YEAR 1991

HIGHEST 3.95 JUN 27, 1991 LOWEST 7.32 OCT 29, 1990

411246095502001



422500095084801. Local number, 88-37-22 CCCC1.

LOCATION.--Lat 41°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.--Pennsylvanian and Dakota: in limestone of Pennsylvanian age and sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 435 ft, cased to 435 ft, perforated 417-435 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, 163.92 ft below land-surface datum, May 12, 1984; lowest measured, 165.46 ft below land-surface datum, August 6, 1991.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 28	165.36	MAR 22	164.80	MAY 22	164.92	AUG 06	165.46

WATER YEAR 1991

HIGHEST 164.80 MAR 22, 1991 LOWEST 165.46 AUG 06, 1991

GROUND-WATER LEVELS

347

SAC COUNTY

422850095171501. Local number, 89-38-36 CBCC1.

LOCATION.--Lat 41°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 Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 521 ft, cased to 512 ft, perforated 410-430 ft, open hole 512-521 ft. Open to 9 ft of Paleozoic rock.

INSTRUMENTATION.--Quarterly measurement with electric line or chalked tape 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.

PERIOD OF RECORD.--December 1978 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 288.05 ft below land-surface datum, June 2, 1980; lowest measured, 292.46 ft below land-surface datum, June 12, 1990.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 28	291.76	MAR 22	291.52	MAY 22	291.98	AUG 22	292.27
WATER YEAR 1991				HIGHEST 291.52 MAR 22, 1991 LOWEST 292.27 AUG 22, 1991			

SCOTT COUNTY

413544090212901. Local number, 78-5E-03 AADA1.

LOCATION.--Lat 41°35'44", long 41°21'29", Hydrologic Unit 07080101, at the Bridgeview Elementary School corner of 12th and Davenport Streets, Le Claire. Owner: City of Le Claire.

AQUIFER.--Cambrian-Ordovician: in sandstone of Late Cambrian and sandstone and sandy dolomite of Early 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 1,128-1,607 ft.

INSTRUMENTATION.--Intermittent measurement with chalked tape by USGS personnel. Graphic water-level recorder July 1975 to December 1984.

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.

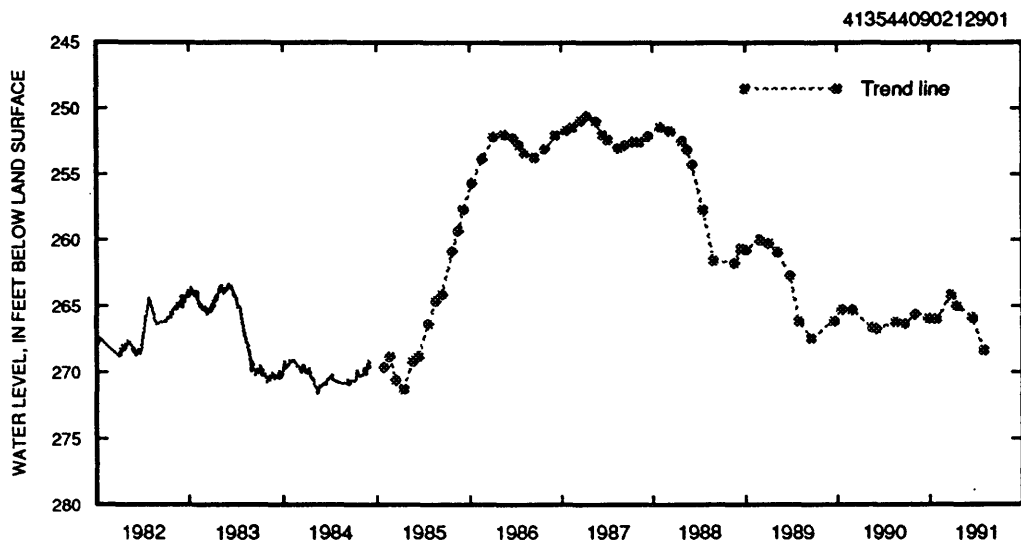
REMARKS.--Le Claire Well No. 3.

PERIOD OF RECORD.--July 1975 to current year.

REVISED RECORDS.--WRD IA-84-1, WDR IA-88-1.

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 247.46 ft below land-surface datum, July 8, 1975; lowest recorded, 276.88 ft below land-surface datum, September 1, 1978.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 05	265.63	JAN 28	265.98	APR 17	264.98	AUG 02	268.37
DEC 27	265.94	MAR 26	264.18	JUN 19	265.89		
WATER YEAR 1991				HIGHEST 264.18 MAR 26, 1991 LOWEST 268.37 AUG 02, 1991			



GROUND-WATER LEVELS

SHELBY COUNTY

413255095070401. Local number, 78-37-17 DDDD1.

LOCATION.--Lat 41°32'55", long 95°07'04", Hydrologic Unit 10240003, 3 mi south and 3 mi west of the Town of Elkhorn on the east side of County Road M-56 near Elkhorn Creek. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 181 ft, cased to 181 ft, slotted 121-179 ft, gravel-packed, open to Pennsylvanian shale and limestone 140-181 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

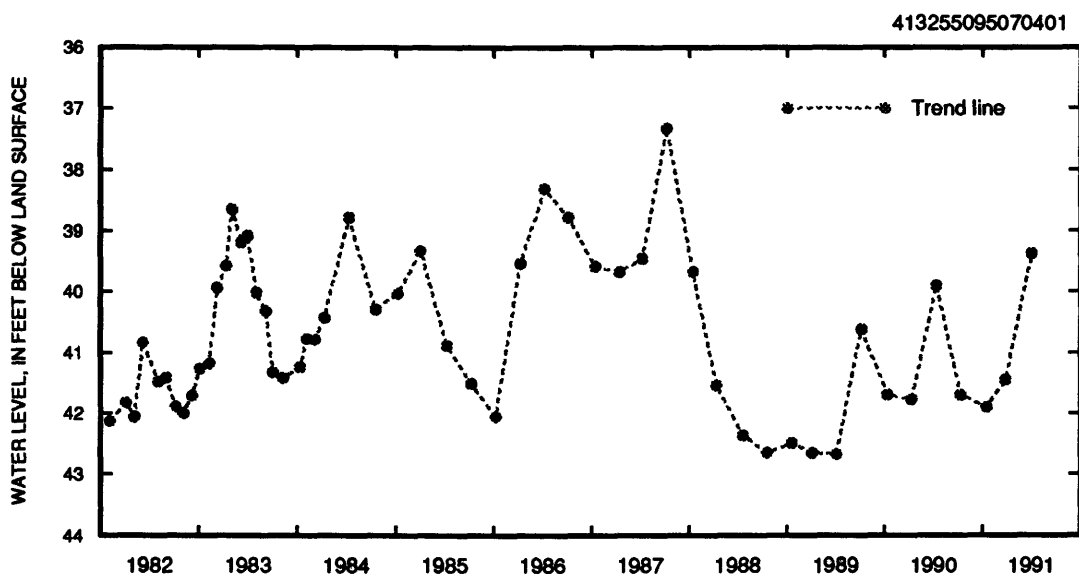
DATUM.--Elevation of land-surface datum is 1,208 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.80 ft above land-surface datum.

REMARKS.--Well WC-16.

PERIOD OF RECORD.--August 1981 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 37.33 ft below land-surface datum, October 9, 1987; lowest measured, 42.86 ft below land-surface datum, September 24, 1981.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR		OCTOBER 1990 TO SEPTEMBER 1991	
DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 11	41.70	JAN 16	41.90
		MAR 28	41.45
		JUL 03	39.37
WATER YEAR 1991		HIGHEST 39.37 JUL 03, 1991 LOWEST 41.90 JAN 16, 1991	



413442095193101. Local number, 78-39-10 BBBA1.

LOCATION.--Lat 41°34'42", long 95°19'31", Hydrologic Unit 10240002, approximately 4.5 mi south of the City of Harlan and 0.25 mi east of the Town of Corely on the north side of County Road F-58. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--West Nishnabotna alluvial: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 44 ft, cased to 44 ft, slotted 40-44 ft, gravel-packed.

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, 2.50 ft above land-surface datum.

REMARKS.--Well WC-200.

PERIOD OF RECORD.--June 1983 to current year.

REVISION.--Highest water level measured, 18.87 ft below land-surface datum, July 13, 1990.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 18.87 ft below land-surface datum, July 13, 1990; lowest measured, 22.98 ft below land-surface datum, October 19, 1988.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR		OCTOBER 1990 TO SEPTEMBER 1991	
DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 11	20.80	MAR 28	20.71
JAN 16	20.50	JUL 03	19.30
		SEP 25	21.75
WATER YEAR 1991		HIGHEST 19.30 JUL 03, 1991 LOWEST 21.75 SEP 25, 1991	

SHELBY COUNTY

413359095182701. Local number, 78-39-11 CCBC1.

LOCATION.--Lat 41°33'59", long 95°18'27", Hydrologic Unit 10240002, approximately 5.5 mi south of the City of Harlan, 0.75 mi south of County Road F-58, and 1.5 mi east of U.S. Highway 59. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Fremont buried channel: in sand and gravel of Pleistocene age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 541 ft, cased to 541 ft, slotted 520-535 ft, gravel-packed. Open to Pennsylvanian shale 537-541 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,310 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.65 ft above land-surface datum.

REMARKS.--Well WC-227.

PERIOD OF RECORD.--July 1983 to current year.

REVISION.--Lowest water level measured, 153.32 ft below land-surface datum, April 12, 1990.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 146.61 ft below land-surface datum, September 6, 1983; lowest measured, 153.32 ft below land-surface datum, April 12, 1990.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 11	152.10	JAN 16	152.73	MAR 28	152.15	JUL 03	151.51
WATER YEAR 1991				HIGHEST 151.51 JUL 03, 1991 LOWEST 152.73 JAN 16, 1991			

413031095204901. Local number, 78-39-32 DDAA1.

LOCATION.--Lat 41°30'31", long 95°20'49", Hydrologic Unit 10240002, approximately 2 mi north of the Town of Avoca, 0.60 mi west of U.S. Highway 59. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--West Nishnabotna alluvial: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 27 ft, cased to 24 ft, slotted 21-24 ft, gravel-packed, open hole 24-27 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape by USGS personnel.

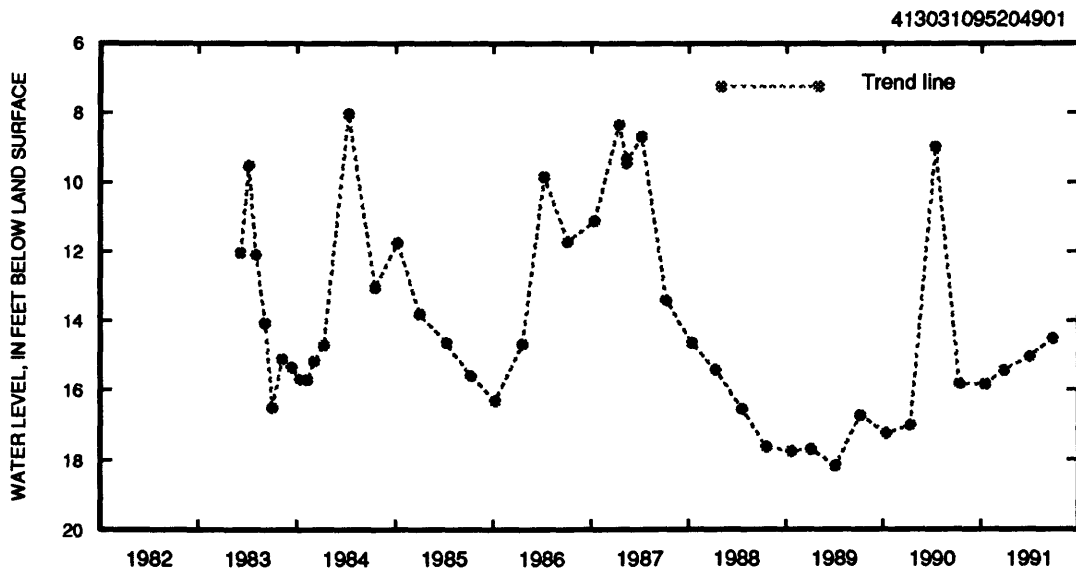
DATUM.--Elevation of land-surface datum is 1,144 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.95 ft above land-surface datum.

REMARKS.--Well WC-197.

PERIOD OF RECORD.--June 1983 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 8.04 ft below land-surface datum, July 10, 1984; lowest measured, 18.17 ft below land-surface datum, July 5, 1989.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 12	15.83	MAR 28	15.44	JUL 03	15.03	SEP 25	14.51
JAN 16	15.85						
WATER YEAR 1991				HIGHEST 14.51 SEP 25, 1991 LOWEST 15.85 JAN 16, 1991			



GROUND-WATER LEVELS

SHELBY COUNTY

414624095252301. Local number, 80-39-06 AADC1.

LOCATION.--Lat 41°46'24", long 95°25'23", Hydrologic Unit 10230006, west of the Town of Earling on the north side of Iowa Highway 37 near the junction of Iowa Highways 37 and 191. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 370 ft, cased to 370 ft, slotted 332-347 ft, open to Pennsylvanian sandstone, shale, and limestone 347-370 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape or electric line by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,305 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 WC-10.

PERIOD OF RECORD.--June 1981 to current year.

REVISION.--Highest water level measured, 89.91 ft below land-surface datum, April 10, 1984.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 89.91 ft below land-surface datum, April 10, 1984; lowest measured, 131.70 ft below land-surface datum, April 12, 1990.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 11	128.45	JAN 16	111.69	MAR 28	111.06	JUL 03	109.10
WATER YEAR 1991				HIGHEST 109.10 JUL 03, 1991 LOWEST 128.45 OCT 11, 1990			

414856095160101. Local number, 81-38-21 ADAD1.

LOCATION.--Lat 41°48'56", long 95°16'01", Hydrologic Unit 10240002, approximately 3.75 mi east of the Town of Defiance on the west side of County Road M-36. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Fremont buried channel: in sand and gravel of Pleistocene age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 535 ft, cased to 535 ft, slotted 525-535 ft, gravel-packed. Open to Pennsylvanian shale 530-535 ft.

INSTRUMENTATION.--Quarterly measurement with chalked tape or 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, 2.90 ft above land-surface datum.

REMARKS.--Well WC-222.

PERIOD OF RECORD.--August 1983 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 208.09 ft below land-surface datum, April 15, 1987; lowest measured, 212.97 ft below land-surface datum, October 11, 1990.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 11	212.97	JAN 16	210.29	MAR 28	210.11		
WATER YEAR 1991				HIGHEST 210.11 MAR 28, 1991 LOWEST 212.97 OCT 11, 1990			

SIOUX COUNTY

430140095573101. Local number, 95-43-07 AAAA1.

LOCATION.--Lat 41°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 Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 681 ft, cased to 681 ft, perforated 641-681 ft. Open to Paleozoic rock from 674-681 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.

PERIOD OF RECORD.--July 1980 to December 1980, May 1982 to current year.

REVISED RECORDS.--WDR IA-88-1.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 213.66 ft below land-surface datum, March 13, 1984; lowest measured, 218.30 ft below land-surface datum, July 2, 1991.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 11	217.86	JAN 15	217.80	MAR 27	217.50	JUL 02	218.30
WATER YEAR 1991				HIGHEST 217.50 MAR 27, 1991 LOWEST 218.30 JUL 02, 1991			

GROUND-WATER LEVELS

351

SIOUX COUNTY

430913096033201. Local number, 96-44-08 ADAAL.

LOCATION.--Lat 41°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 Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 682 ft, cased to 682 ft, perforated 647-667 ft. Open to Paleozoic rock 681-682 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.

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, October 16, 1984; lowest measured, 195.86 ft below land-surface datum, October 4, 1989.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991			
DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 10	195.53	JAN 15	195.32
		MAR 27	194.95
		JUL 02	195.20
WATER YEAR 1991		HIGHEST 194.95 MAR 27, 1991 LOWEST 195.53 OCT 10, 1990	

STORY COUNTY

420137093361501. Local number, 83-24-02 DEAD1.

LOCATION.--Lat 41°01'37", long 41°36'15", Hydrologic Unit 07080105, in Ames, north of the Chicago and Northwestern Railroad and County Road E-41, approximately 0.75 mi east of U.S. Highway 69. Owner: City of Ames.

AQUIFER.--Glacial drift: in sand and gravel of Pleistocene age.

WELL CHARACTERISTICS.--Drilled municipal well, depth 124 ft, casing information unavailable.

INSTRUMENTATION.--Quarterly measurement with chalked tape or electric line by USGS personnel.

DATUM.--Elevation of land-surface datum is 926 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 0.82 ft above land-surface datum.

REMARKS.--City well No. 4.

PERIOD OF RECORD.--September 1987 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 49.98 ft below land-surface datum, March 14, 1991; lowest measured, 64.74 ft below land-surface datum, August 24, 1990.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991			
DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 19	55.26	MAR 14	49.98
		JUL 29	54.89
WATER YEAR 1991		HIGHEST 49.98 MAR 14, 1991 LOWEST 55.26 DEC 19, 1990	

VAN BUREN COUNTY

404150091483001. Local number, 68-08-08 CDD.

LOCATION.--Lat 40°41'53", long 91°48'20", Hydrologic Unit 07100009, located at the west end of the park in the City of Bonaparte, south of County Road J-40. Owner: City of Bonaparte.

AQUIFER.--Mississippian: in limestone and dolomite of Mississippian age.

WELL CHARACTERISTICS.--Drilled unused semi-confined public-supply well, diameter 6 in., depth 205 ft, cased to 18 ft, open hole 18-205 ft.

INSTRUMENTATION.--Intermittent measurement with chalked tape by USGS personnel. Graphic water-level recorder December 1988 to July 1990. Intermittent measurement with chalked tape by USGS personnel August 1988 to December 1988.

DATUM.--Elevation of land-surface datum is 552 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of recorder platform, 0.65 ft above land-surface datum.

REMARKS.--Bonaparte No. 1 well. Recorder removed July 17, 1990.

PERIOD OF RECORD.--August 1988 to present.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 16.10 ft below land-surface datum, June 18, 1990; lowest measured, 32.13 ft below land-surface datum, August 16, 1989.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991			
DATE	WATER LEVEL	DATE	WATER LEVEL
MAY 09	16.95		

WASHINGTON COUNTY

411300091320701. Local number, 74-06-15 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 132-215 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.--None.

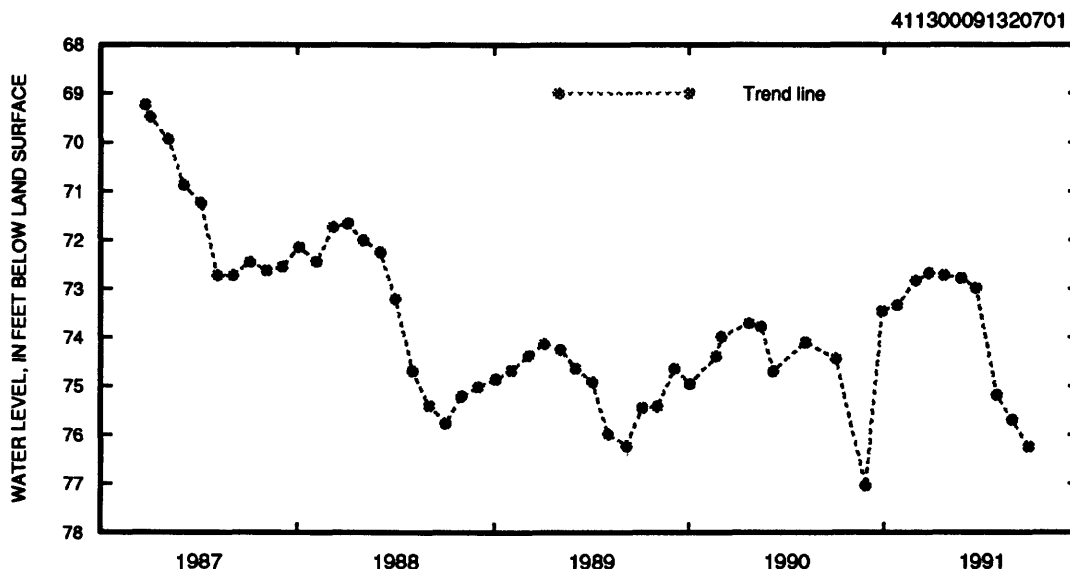
PERIOD OF RECORD.--September 1983, March 1987 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 69.23 ft below land-surface datum, March 25, 1987; lowest measured, 77.04 ft below land-surface datum, November 27, 1990.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991			
DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 02	74.44	JAN 25	73.34
NOV 27	77.04	FEB 28	72.83
DEC 28	73.46	MAR 25	72.68
		APR 22	72.72
		MAY 24	72.78
		JUN 21	72.98
		JUL 30	75.10
		AUG 28	75.70
		SEP 27	76.24

WATER YEAR 1991

HIGHEST 72.68 MAR 25, 1991 LOWEST 77.04 NOV 27, 1990



411244091323501. Local number, 74-06-15 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 142-217 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.--None.

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, March 25, 1987; lowest measured, 78.85 ft below land-surface datum, September 27, 1991.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991			
DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 02	76.63	JAN 25	75.50
NOV 27	73.80	FEB 28	75.13
DEC 28	75.65	MAR 25	75.05
		APR 22	74.94
		MAY 24	75.01
		JUN 21	75.23
		JUL 30	77.86
		AUG 28	78.21
		SEP 27	78.85

WATER YEAR 1991

HIGHEST 73.80 NOV 27, 1990 LOWEST 78.85 SEP 27, 1991

GROUND-WATER LEVELS

353

WASHINGTON COUNTY

421829091304701. Local number, 75-06-14 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.

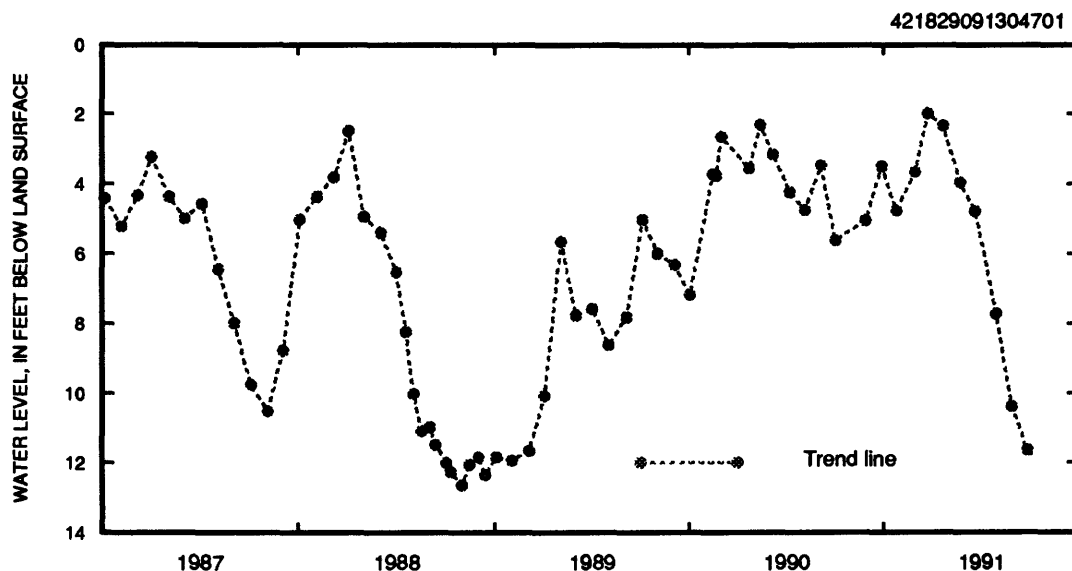
PERIOD OF RECORD.--December 1983 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 1.53 ft below land-surface datum, May 23, 1984; lowest measured, 12.65 ft below land-surface datum, November 1, 1988.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 02	5.62	JAN 25	4.76	APR 22	2.34	JUL 30	7.72
NOV 27	5.05	FEB 28	3.66	MAY 24	3.96	AUG 28	10.38
DEC 28	3.51	MAR 25	1.99	JUN 21	4.78	SEP 27	11.66

WATER YEAR 1991

HIGHEST 1.99 MAR 25, 1991 LOWEST 11.66 SEP 27, 1991



412037091564701. Local number, 76-09-31 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 19-136 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, 2.88 ft above land-surface datum.

REMARKS.--Water levels affected by quarrying operations. Recorder removed December 1989.

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, March 4, 1985; lowest recorded, 25.72 ft below land-surface datum, December 10, 1989.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 02	20.83	JAN 25	16.20	APR 22	11.43	JUL 30	20.62
NOV 27	15.43	FEB 28	15.40	MAY 24	12.29	AUG 21	20.79
DEC 28	13.79	MAR 25	10.52	JUN 21	15.73	SEP 24	20.17

WATER YEAR 1991

HIGHEST 10.52 MAR 25, 1991 LOWEST 20.83 OCT 02, 1990

GROUND-WATER LEVELS

WASHINGTON COUNTY

412750091495201. Local number, 77-09-24 ADA1.

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, 1.50 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, WDR IA-88-1.

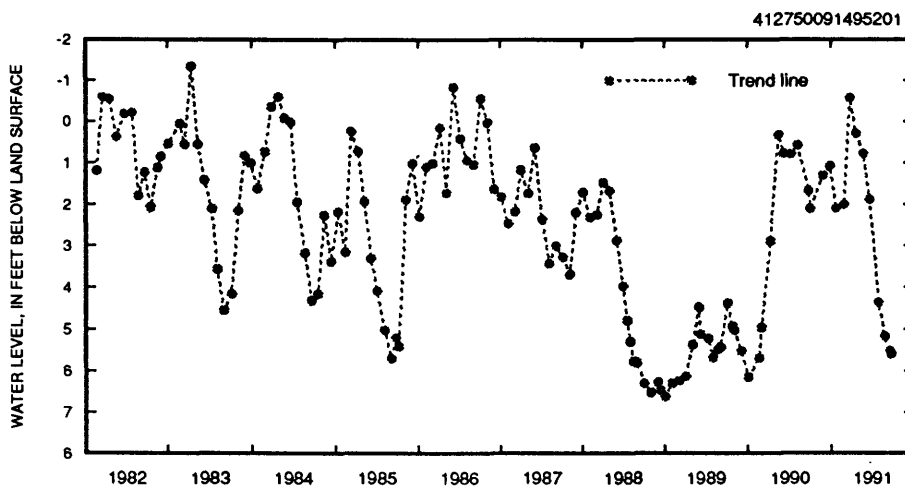
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 1.35 ft above land-surface datum, November 3, 1977, March 28, 1979, and April 13, 1983; lowest measured, 6.80 ft below land-surface datum, October 20, 1964.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
(READINGS ABOVE LAND SURFACE INDICATED BY "+")

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 02	2.10	FEB 28	2.00	MAY 24	.78	AUG 27	5.17
NOV 27	1.30	MAR 25	+.57	JUN 21	1.88	SEP 20	5.52
DEC 28	1.08	APR 22	.29	JUL 30	4.37	SEP 24	5.60
JAN 25	2.09						

WATER YEAR 1991

HIGHEST +.57 MAR 25, 1991 LOWEST 5.60 SEP 24, 1991



WEBSTER COUNTY

421550094041001. Local number, 86-28-14 ADAB1.

LOCATION.--Lat 41°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 770-966 ft, open hole 505-770 ft and 966-1,240 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.

REVISED RECORDS.--WRD IA-85-1.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 69.93 ft below land-surface datum, November 17, 1942; lowest measured, 164 ft below land-surface datum (pumping), March 28, 1991.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 19	131	MAR 28	164 p	AUG 09	162 p

p = pumping

WATER YEAR 1991

HIGHEST 131 DEC 19, 1990 LOWEST 164 MAR 28, 1991

WEBSTER COUNTY

421837094083601. Local number, 87-28-29 CCCD1.

LOCATION.--Lat 41°18'37", long 94°08'36", Hydrologic Unit 07100006, 3 mi north and 2 mi east of the Town of Harcourt. Owner: Grace 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. Graphic water-level recorder October 1942 to December 1976.

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, 1.29 ft above land-surface datum.

REMARKS.--None.

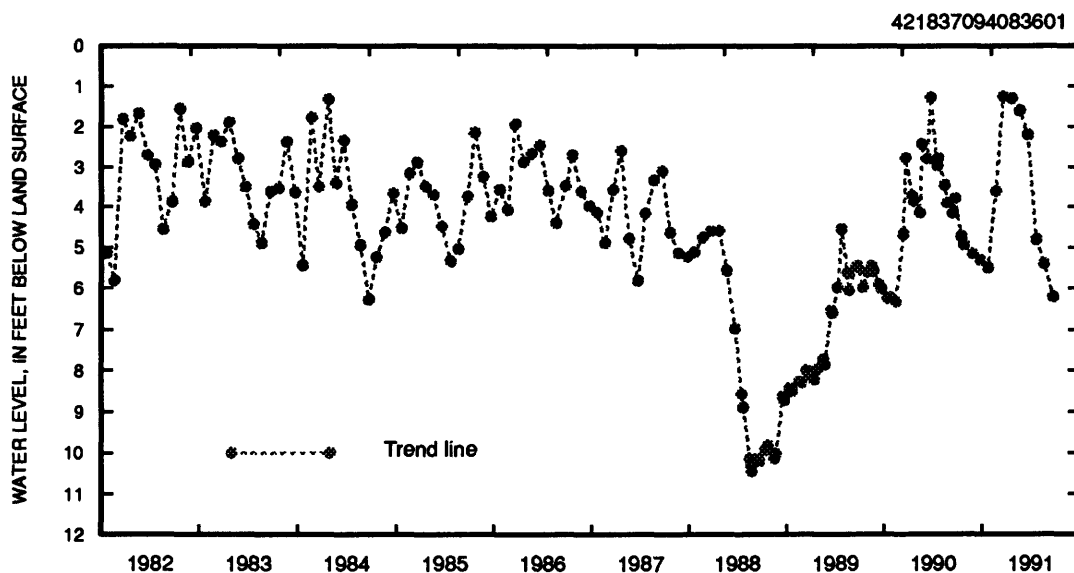
PERIOD OF RECORD.--October 1942 to June 1956, March 1958 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 0.05 ft below land-surface datum, August 1, 1972; lowest measured, 13.62 ft below land-surface datum, March 12, 1956.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 15	4.73	JAN 22	5.49	APR 21	1.30	JUL 22	4.81
25	4.93	FEB 21	3.60	MAY 20	1.60	AUG 20	5.39
NOV 26	5.15	MAR 20	1.25	JUN 21	2.20	SEP 23	6.20
DEC 24	5.30						

WATER YEAR 1991

HIGHEST 1.25 MAR 20, 1991 LOWEST 6.20 SEP 23, 1991



423018094214701. Local number, 89-30-23 CCB1.

LOCATION.--Lat 41°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 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.

REVISED RECORDS.--WDR IA-88-1.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 30.36 ft below land-surface datum, October 21, 1942; lowest measured, 45.85 ft below land-surface datum, July 28, 1980.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
MAR 21	42.12	MAY 21	41.69	AUG 06	41.73		

WATER YEAR 1991

HIGHEST 41.69 MAY 21, 1991 LOWEST 42.12 MAR 21, 1991

WOODBURY COUNTY

422058095573701. Local number, 87-44-15 CBBB1.

LOCATION.--Lat 41°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 Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 197 ft, cased to 197 ft, perforated 185-189 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, January 11, 1988; lowest measured, 63.56 ft below land-surface datum, November 2, 1982.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 10	59.15	JAN 14	59.14	MAR 26	58.87	JUL 08	58.55
WATER YEAR 1991			HIGHEST 58.55 JUL 08, 1991 LOWEST 59.15 OCT 10, 1990				

422830096000511. Local number, 88-44-16 BAAB11.

LOCATION.--Lat 41°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 Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 337 ft, cased to 337 ft, perforated 332-337 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, April 13, 1987; lowest measured, 202.90 ft below land-surface datum, October 17, 1979.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 10	199.75	JAN 14	200.71	MAR 26	200.50	JUL 08	200.72
WATER YEAR 1991			HIGHEST 199.75 OCT 10, 1990 LOWEST 200.72 JUL 08, 1991				

423015096034601. Local number, 89-44-20 DCDC1.

LOCATION.--Lat 41°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 Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 221 ft, cased to 221 ft, perforated 206-221 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, August 8, 1984; lowest measured, 26.65 ft below land-surface datum, December 11, 1980.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 10	26.40	JAN 14	26.50	MAR 26	26.29	JUL 08	25.81
WATER YEAR 1991			HIGHEST 25.81 JUL 08, 1991 LOWEST 26.50 JAN 14, 1991				

WOODBURY COUNTY

422910096135811. Local number, 89-46-36 BBDC11.

LOCATION.--Lat 41°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 Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 500 ft, cased to 500 ft, perforated 358-362 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, July 8, 1987; lowest measured, 135.35 ft below land-surface datum, November 2, 1982.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991							
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 10	131.23	JAN 14	131.81	MAR 26	131.02	JUL 08	131.57
WATER YEAR 1991			HIGHEST 131.02 MAR 26, 1991 LOWEST 131.81 JAN 14, 1991				

STATION NUMBER	LOCAL WELL NUMBER	DATE	LOCAL WELL NAME	COUNTY	SAMPLE DATE	SAMPLE TIME	GEO-LOGIC UNIT	DEPTH OF WELL, TOTAL (FEET)
411720094343002	07532W18DCAD	1965	FONTANELLE 4	ADAIR	08-16-91	0900	112PLSC	329.00
410115094362201	07233W23DBAA	1981	PRESCOTT 2	ADAMS	08-20-91	1600	112PLSC	40.00
413534094532501	07835W04BCBD	1964	EXIRA 10	AUDUBON	08-14-91	1600	111ALVM	37.00
413743095041201	07936W29BBCA	1978	KIMBALLTON 5	AUDUBON	08-14-91	1130	111ALVM	38.00
414323094524301	08035W21CBBC	1968	AUDUBON 11	AUDUBON	08-14-91	1430	111ALVM	35.00
414333094525201	08035W23ADDB	1932	AUDUBON 3	AUDUBON	08-14-91	1340	111ALVM	35.00
415442092180201	08213W13DACB	1977	BELLE PLAINE 5	BENTON	08-12-91	1500	111ALVM	37.00
422448092144501	088N12W26BAAA	1983	GILBERTVILLE 3	BLACK HAWK	08-28-91	0930	340DVSL	385.00
423351092092801	09011W33BCB	1940	DUNKERTON 1	BLACK HAWK	08-27-91	1630	355NIGR	255.00
415212093520701	08226W34BDCC	1974	MADRID 9	BOONE	08-14-91	0950	111ALVM	91.00
420158093562001	083N27W01ABCA	1980	OGDEN 5	BOONE	08-14-91	1350	111ALVM	71.00
420449093560901	08427W13DCAD	1940	BOONE 18	BOONE	08-14-91	1150	111ALVM	55.00
424007092194001	09113W25BADA	1968	DENVER 3	BREMER	08-06-91	1245	358KNKK	191.00
424341092291901	091N14W03BACA	1979	WAVERLY 6	BREMER	08-27-91	1500	340DVSL	172.00
422810092035201	08910W31DDCA	1976	JESUP 3	BUCHANAN	08-06-91	1715	340DVSL	400.00
425344095090401	09337W01DDDD	1977	SIOUX RAPIDS 2	BUENA VISTA	08-07-91	1330	111ALVM	54.00
423437092471001	09016W30CDB	1955	PARKERSBURG 2	BUTLER	08-06-91	1030	344CDVL	300.00
423505092530101	090N17W29BABBB	1977	APLINGTON 3	BUTLER	08-01-91	1430	341LMCK	154.00
425330092483701	09317W01DDDA	1960	GREENE 2	BUTLER	08-27-91	1315	344CDVL	150.00
425355092475801	09317W01ACCC	1948	GREENE 1	BUTLER	08-27-91	1200	344CDVL	115.00
422023094291601	087N31W17CDDC	1968	RINARD 2	CALHOUN	08-02-91	0820	210CRCS	317.00
422236094254601	08731W02BDC	1968	SOMERS 1	CALHOUN	08-19-91	2030	330MSSP	410.00
422525094492401	088N34W21BCBA	1985	LYTTON 4	CALHOUN	08-19-91	1150	217DKOT	162.00
415147094403501	08233W34DCCC	1957	COON RAPIDS 5	CARROLL	08-01-91	1545	217DKOT	130.00
415430095041601	08236W17CCCA	1958	MANNING 6	CARROLL	08-02-91	1315	111ALVM	50.00
415512094565201	08235W17BAAA	1925	TEMPLETON 1	CARROLL	08-02-91	1200	111ALVM	15.00
420024094575901	08335W18BAAD	1936	HALBUR 1	CARROLL	08-01-91	1200	111ALVM	20.00
420331094543101	08435W27BDD	1953	CARROLL 9	CARROLL	08-01-91	0930	210CRCS	149.00
411507094464601	07534W32ADBD	1977	MASSENA 10	CASS	08-15-91	0830	112PLSC	38.00
412652095064201	077N37W21CDDC	1913	MARNE 1	CASS	09-04-91	1300	111ALVM	35.00
413605090542901	07901W36DCCB	1974	DURANT 3	CEDAR	08-07-91	1410	112PLSC	80.00
414423090582201	08001W16BB	1951	BENNETT 1	CEDAR	08-13-91	1600	350SLRN	265.00
415255091034301	08202W27ACBD	1950	CLARENCE 2	CEDAR	08-13-91	1245	355GOWR	200.00
425841093114101	094N20W10BACA	1983	ROCKWELL 3	CERRO GORDO	08-28-91	1040	344CDVL	480.00
431155092245801	09713W20CCCC	1911	ALTA VISTA 1	CHICKASAW	08-28-91	0900	344CDVL	150.00
430923095113401	09637W03DDDD	1971	SPENCER 1	CLAY	08-13-91	0830	112PLSC	35.00
430945095194101	09638W03CBBB	1921	EVERLY 1	CLAY	08-13-91	1000	112PLSC	23.00
424706091061101	09202W17ACC	1937	GUTTENBERG 1	CLAYTON	08-05-91	1610	371JRDN	450.00
430213091105901	095N03W	1988	MARQUETTE 2	CLAYTON	08-06-91	1130	370CMBR	515.00
430241091234501	09505W14ACDD	1978	MONONA 3	CLAYTON	08-06-91	1010	371JRDN	850.00
414729090151801	08106E27CBC	1971	CAMANCHE 3	CLINTON	08-29-91	1145	112PLSC	65.00
414806090212302	08105E22DDC	1923	LOW MOOR 1	CLINTON	08-29-91	1100	350SLRN	256.00
415025090110611	08107E07ACA	1936	CLINTON 7	CLINTON	08-14-91	1030	371GLVL	2242.00
415343095134901	08238W26ADDB	1931	MANILLA 1	CRAWFORD	08-19-91	1335	111WNRV	87.00
415650095275603	08240W02ABDD	1965	ARTON 2	CRAWFORD	08-19-91	1535	111ALVM	65.00
420119095215201	083N39W10AAAC	1983	DENISON 8	CRAWFORD	08-06-91	1000	111ALVM	91.00
420422095352001	08441W23CABB	1967	CHARTER OAK 6	CRAWFORD	08-06-91	1120	111ALVM	53.00
421125095193101	08539W12ADDB	1977	KIRON 4	CRAWFORD	08-08-91	1200	111ALVM	19.00
413305094001001	07827W18DBCB	1956	DE SOTO 1	DALLAS	08-20-91	1250	111ALVM	36.00
413744093595501	07927W28BAAA	1969	ADEL 2	DALLAS	08-15-91	1035	111ALVM	44.00
413749093592601	07927W21CDDA	1977	ADEL 3	DALLAS	08-16-91	1000	111ALVM	54.00
414125094020701	080N27W31DCBD	1977	DALLAS CENTER 5	DALLAS	08-15-91	1350	111ALVM	45.00
415057094065301	081N28W09ABBB	1987	PERRY 9R	DALLAS	08-19-91	1150	111ALVM	46.00
423837091235001	09005W02ABB	1952	EDGEWOOD 2	DELAWARE	08-05-91	1400	350SLRN	269.00
404933091105701	070N03W34AA	1978	WEST BURLINGTON 5	DES MOINES	08-09-91	0830	371JRDN	1811.00
422906091001901	08801W07CDA	1894	FARLEY 1	DUBUQUE	08-15-91	1400	350SLRN	208.00
423136090383001	08903E18AAD	1981	DUBUQUE 10	DUBUQUE	08-15-91	1130	111ALVM	145.00
423136090383501	08903E18AAD	1956	DUBUQUE 3	DUBUQUE	08-15-91	0945	111ALVM	200.00
431910094473601	09833W07CBA	1981	WALLINGFORD 4	EMMET	08-13-91	1845	112PLSC	161.00
432348094285201	09931W14BBC	1981	ARMSTRONG 5	EMMET	08-13-91	1430	112PLSC	130.00
424455091395501	09207W27CCB	1980	ARLINGTON 4	FAYETTE	08-06-91	1450	371JRDN	1310.00
430010091390102	09507W34ACA	1924	CLERMONT 2	FAYETTE	08-06-91	1145	364GLEN	240.00
425754092515202	09417W16BBA	1920	MARBLE ROCK 2	FLOYD	08-27-91	1230	344CDVL	101.00
430315092563401	09518W11CCB	1978	ROCKFORD 2	FLOYD	08-27-91	1340	344CDVL	214.00
430458092403701	09516W01AAB	1950	CHARLES CITY 5	FLOYD	08-27-91	1530	344CDVL	187.00
424312093132101	09120W05DAD	1975	HAMPTON 6	FRANKLIN	08-07-91	1215	110QRNR	41.00
424413093220601	09221W31DBB	1923	COULTER 1	FRANKLIN	08-28-91	1530	344CDVL	628.00
403558095393901	06742W28AAAB	1982	HAMBURG 6	FREMONT	08-14-91	1340	111ALVM	98.00
404327095284801	068N40W07BCAA	1980	FARRAGUT 79-2 (NORTH)	FREMONT	08-14-91	1120	111ALVM	65.00
404432095361701	06941W31BAAA	1981	SIDNEY 6	FREMONT	09-04-91	0830	111ALVM	32.00

GROUND-WATER QUALITY DATA

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STATION	NUMBER	DATE	FLOW RATE (G/M) (00058)	PUMP OR FLOW 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)	OXYGEN, DIS- SOLVED (MG/L) (00300)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	IRON, DIS- SOLVED (UG/L AS FE) (01046)
411720094343002	08-16-91	75	30	12.0	3140	7.3	0.3	1800	294	2950	5600	
410115094362201	08-20-91	65	20	12.0	1180	6.4	--	--	--	--	--	
413534094532501	08-14-91	45	30	10.0	1140	7.0	0.5	640	293	796	18000	
413743095041201	08-14-91	50	30	10.0	710	7.1	0.6	--	--	--	--	
414323094524301	08-14-91	58	20	10.0	720	7.1	0.8	390	228	490	4800	
414333094525201	08-14-91	50	20	10.0	670	7.3	4.4	--	--	--	--	
415442092180201	08-12-91	189	20	12.0	520	6.7	1.8	300	177	360	870	
422448092144501	08-28-91	200	30	10.5	787	7.7	2.3	400	265	486	190	
423351092092801	08-27-91	200	20	10.5	508	7.6	0.5	250	259	276	790	
415212093520701	08-14-91	275	20	12.0	1010	7.3	--	--	--	--	--	
420158093562001	08-14-91	300	20	11.0	860	7.1	4.6	450	309	506	<20	
420449093560901	08-14-91	280	240	14.0	770	7.2	--	380	250	434	30	
424007092194001	08-06-91	200	45	10.5	630	7.1	0.2	280	263	378	30	
424341092291901	08-27-91	1050	30	10.5	550	7.7	2.5	290	228	302	50	
422810092035201	08-06-91	400	15	11.5	500	8.1	--	250	246	284	50	
425344095090401	08-07-91	290	30	11.0	950	7.1	3.2	--	--	--	--	
423437092471001	08-06-91	260	60	13.0	400	7.3	2.4	210	215	280	390	
423505092530101	08-01-91	175	40	10.5	710	7.0	0.4	320	286	--	950	
425330092483701	08-27-91	220	30	9.5	470	7.6	0.2	250	204	384	120	
425355092475801	08-27-91	200	30	10.5	444	7.6	0.3	250	212	262	<20	
422023094291601	08-02-91	33	20	14.0	1330	8.6	--	620	364	890	690	
422236094254601	08-19-91	55	20	13.0	1170	7.3	--	550	362	768	190	
422525094492401	08-19-91	375	30	10.5	1650	7.4	0.5	510	384	1160	2000	
415147094403501	08-01-91	300	760	11.5	440	6.9	2.3	230	184	306	120	
415430095041601	08-02-91	80	30	11.0	1190	7.0	2.3	510	336	--	720	
415512094565201	08-02-91	27	30	14.0	720	6.8	--	--	--	--	--	
420024094575901	08-01-91	10	30	11.0	860	7.2	2.5	410	238	454	<20	
420331094543101	08-01-91	250	30	12.0	710	6.6	0.4	380	331	498	120	
411507094464601	08-15-91	40	30	11.0	540	7.2	0.4	--	--	--	--	
412652095064201	09-04-91	10	40	12.0	1180	6.7	3.6	600	308	676	<20	
413605090542901	08-07-91	100	20	14.0	846	6.9	--	360	362	510	<20	
414423090582201	08-13-91	180	45	12.0	695	7.2	0.4	400	389	418	260	
415255091034301	08-13-91	200	60	13.0	570	7.3	2.6	340	286	350	530	
425841093114101	08-28-91	285	30	12.0	762	7.4	--	380	362	420	100	
431155092245801	08-28-91	--	45	14.0	400	7.2	--	--	--	--	--	
430923095113401	08-13-91	200	30	12.5	630	7.3	--	--	--	--	--	
430945095194101	08-13-91	220	30	13.5	825	7.1	2.7	410	284	504	60	
424706091061101	08-05-91	390	10	13.0	680	7.7	--	290	297	394	<20	
430213091105901	08-06-91	250	20	10.5	530	7.8	--	240	239	318	390	
430241091234501	08-06-91	325	60	12.0	460	8.1	--	220	206	268	30	
414729090151801	08-29-91	290	60	15.0	400	6.4	--	170	84	268	<20	
414806090212302	08-29-91	170	15	16.0	620	6.6	--	390	316	396	1900	
415025090110611	08-14-91	950	2400	17.5	700	7.4	--	270	266	422	90	
415343095134901	08-19-91	90	20	10.0	765	7.2	0.3	440	326	506	1400	
415650095275603	08-19-91	40	20	12.0	1140	7.1	--	--	--	--	--	
420119095215201	08-06-91	500	20	13.0	1690	7.3	0.6	550	330	736	7800	
420422095352001	08-06-91	100	20	10.0	840	7.4	0.5	430	369	548	12000	
421125095193101	08-08-91	60	20	10.0	540	7.5	0.8	270	197	340	<20	
413305094001001	08-20-91	90	30	12.0	1180	7.5	2.5	--	--	--	--	
413744093595501	08-15-91	250	30	14.0	732	7.3	--	370	275	400	1100	
413749093592601	08-16-91	130	240	14.0	740	7.4	--	390	273	420	1500	
414125094020701	08-15-91	100	30	15.0	782	7.4	3.4	370	288	628	110	
415057094065301	08-19-91	240	30	12.0	1000	7.2	0.3	600	271	702	2400	
423837091235001	08-05-91	100	20	10.5	570	7.8	--	280	292	342	800	
404933091105701	08-09-91	600	25	21.5	1740	7.3	--	280	232	316	1100	
422906091001901	08-15-91	40	60	11.5	835	7.4	1.6	390	234	482	<20	
423136090383001	08-15-91	2200	60	12.5	400	7.5	0.3	--	169	--	--	
423136090383501	08-15-91	2200	60	12.5	475	7.0	0.3	250	227	276	1700	
431910094473601	08-13-91	65	30	10.0	1330	7.1	0.1	--	--	--	--	
432348094285201	08-13-91	320	30	10.0	1120	7.1	0.0	530	431	764	2100	
424455091395501	08-06-91	143	10	11.5	480	8.2	--	210	213	280	770	
430010091390102	08-06-91	100	10	10.0	650	8.0	3.3	330	280	400	30	
425754092515202	08-27-91	110	30	10.0	480	7.1	0.2	290	204	292	--	
430315092563401	08-27-91	200	40	11.5	500	7.1	0.2	280	231	276	150	
430458092403701	08-27-91	2900	60	10.0	480	7.1	0.2	240	216	262	950	
424312093132101	08-07-91	275	120	10.0	670	6.9	0.1	--	--	--	--	
424413093220601	08-28-91	85	30	11.0	730	7.0	--	380	364	406	70	
403558095393901	08-14-91	300	30	13.0	1130	6.8	1.6	520	387	634	8200	
404327095284801	08-14-91	165	30	13.0	688	6.4	1.5	340	245	414	680	
404432095361701	09-04-91	150	30	12.0	675	6.9	--	350	331	400	1800	

GROUND-WATER QUALITY DATA

STATION	NUMBER	DATE	MANGA- NESE, DIS- SOLVED	CALCIUM DIS- SOLVED	MAGNE- SIUM, DIS- SOLVED	SODIUM, DIS- SOLVED	POTAS- SIUM, DIS- SOLVED	FLUO- RIDE, DIS- SOLVED	SILICA, DIS- SOLVED	CHLO- RIDE, DIS- SOLVED	SULFATE DIS- SOLVED	NITRO- GEN, NO2+NO3 DIS- SOLVED
			(UG/L AS MN) (01056)	(MG/L AS CA) (00915)	(MG/L AS MG) (00925)	(MG/L AS NA) (00930)	(MG/L AS K) (00935)	(MG/L AS F) (00950)	(MG/L AS SIO2) (00955)	(MG/L AS CL) (00940)	(MG/L AS SO4) (00945)	(MG/L AS N) (00631)
411720094343002	08-16-91		300	460	150	330	6.4	0.20	18	20	1800	<0.100
410115094362201	08-20-91		--	--	--	--	--	--	--	--	--	<0.100
413534094532501	08-14-91		2600	190	40	26	3.3	0.20	21	65	220	<0.100
413743095041201	08-14-91		--	--	--	--	--	--	--	--	--	<0.100
414323094524301	08-14-91		650	120	23	9.7	1.3	0.25	22	13	100	3.00
414333094525201	08-14-91		--	--	--	--	--	--	--	--	--	6.60
415442092180201	08-12-91		140	82	22	10	<1.0	0.25	15	12	100	0.400
422448092144501	08-28-91		<20	110	30	14	1.8	0.55	16	28	85	8.00
423351092092801	08-27-91		30	67	19	16	1.6	0.70	13	3.0	8.5	<0.100
415212093520701	08-14-91		--	--	--	--	--	--	--	--	--	0.800
420158093562001	08-14-91		<20	120	36	6.8	2.0	0.20	27	31	79	3.10
420449093560901	08-14-91		180	96	34	12	2.5	0.35	21	32	79	5.50
424007092194001	08-06-91		30	78	21	10	1.1	0.20	13	18	40	1.00
424341092291901	08-27-91		<20	76	25	6.4	1.0	0.20	13	17	20	5.20
422810092035201	08-06-91		30	63	22	4.2	1.1	0.55	12	3.0	11	0.100
425344095090401	08-07-91		--	--	--	--	--	--	--	--	--	9.90
423437092471001	08-06-91		40	55	17	5.9	1.2	0.70	14	1.0	16	0.100
423505092530101	08-01-91		<20	72	34	30	4.2	0.45	14	1.5	87	<0.100
425330092483701	08-27-91		<20	72	16	2.1	1.0	0.25	12	190	32	<0.100
425355092475801	08-27-91		<20	72	17	2.7	<1.0	0.30	12	4.6	22	<0.100
422023094291601	08-02-91		90	150	59	54	7.6	--	10	8.0	300	1.00
422236094254601	08-19-91		20	120	61	56	8.5	1.2	9.3	9.7	270	<0.100
422525094492401	08-19-91		730	97	64	89	6.9	0.35	28	1.5	510	<0.100
415147094403501	08-01-91		60	63	18	6.3	<1.0	0.30	19	3.0	27	3.20
415430095041601	08-02-91		340	140	38	20	1.2	0.25	22	44	--	5.60
415512094565201	08-02-91		--	--	--	--	--	--	--	--	--	18.0
420024094575901	08-01-91		20	110	32	20	<1.0	0.35	19	36	79	15.0
420331094543101	08-01-91		740	100	31	14	3.2	0.35	22	12	53	<0.100
411507094464601	08-15-91		--	--	--	--	--	--	--	--	--	<0.100
412652095064201	09-04-91		<20	140	61	28	1.6	0.30	25	88	160	11.0
413605090542901	08-07-91		<20	83	36	18	<1.0	--	21	23	74	8.10
414423090582201	08-13-91		<20	95	39	15	1.7	0.40	18	5.3	8.7	<0.100
415255091034301	08-13-91		140	90	27	6.1	<1.0	0.30	14	2.7	34	<0.100
425841093114101	08-28-91		<20	80	44	20	7.4	2.3	8.0	9.8	30	<0.100
431155092245801	08-28-91		--	--	--	--	--	--	--	--	--	<0.100
430923095113401	08-13-91		--	--	--	--	--	--	--	--	--	1.40
430945095194101	08-13-91		<20	110	34	14	6.3	0.25	27	62	44	10.0
424706091061101	08-05-91		130	65	30	29	2.1	0.20	9.1	30	37	0.200
430213091105901	08-06-91		<20	56	24	14	4.2	0.35	9.1	12	29	0.200
430241091234501	08-06-91		<20	52	23	3.2	2.5	0.35	8.2	1.5	30	<0.100
414729090151801	08-29-91		<20	42	17	13	1.0	<0.10	20	37	22	8.10
414806090212302	08-29-91		60	90	39	6.2	<1.0	0.20	14	14	44	<0.100
415025090110611	08-14-91		<20	66	26	48	9.2	0.50	8.0	44	51	<0.100
415343095134901	08-19-91		290	120	33	13	1.3	0.35	24	5.5	83	<0.100
415650095275603	08-19-91		--	--	--	--	--	--	--	--	--	6.00
420119095215201	08-06-91		1300	160	36	26	3.0	0.25	23	78	140	<0.100
420422095352001	08-06-91		1300	120	32	12	2.3	0.25	22	28	61	0.200
421125095193101	08-08-91		1400	79	18	9.4	<1.0	0.30	22	12	72	0.900
413305094001001	08-20-91		--	--	--	--	--	--	--	--	--	3.30
413744093595501	08-15-91		430	97	31	12	2.5	0.35	21	23	--	0.300
413749093592601	08-16-91		370	100	33	9.3	1.7	--	20	22	59	0.200
414125094020701	08-15-91		50	100	30	9.5	2.7	0.30	22	25	--	8.00
415057094065301	08-19-91		670	170	42	5.7	2.0	0.30	22	33	230	<0.100
423837091235001	08-05-91		60	73	23	8.4	1.5	0.30	12	6.0	21	0.200
404933091105701	08-09-91		30	65	29	230	18	1.9	12	24	470	<0.100
422906091001901	08-15-91		<20	100	35	28	1.6	0.15	11	90	68	2.50
423136090383001	08-15-91		--	--	--	--	--	0.15	--	--	--	<0.100
423136090383501	08-15-91		2500	62	24	7.8	1.3	0.15	19	15	12	0.100
431910094473601	08-13-91		--	--	--	--	--	--	--	--	--	0.100
432348094285201	08-13-91		500	140	45	50	3.4	0.25	31	2.8	200	<0.100
424455091395501	08-06-91		<20	46	24	11	6.3	0.65	8.4	1.0	37	0.200
430010091390102	08-06-91		<20	81	31	5.5	3.0	0.20	15	18	25	8.10
425754092515202	08-27-91		--	--	--	--	--	0.25	12	9.8	36	<0.100
430315092563401	08-27-91		<20	71	24	3.9	1.0	0.65	10	5.8	29	<0.100
430458092403701	08-27-91		30	66	19	4.2	1.0	0.70	12	3.8	18	<0.100
424312093132101	08-07-91		--	--	--	--	--	--	--	--	--	<0.100
424413093220601	08-28-91		30	90	38	16	5.4	1.0	14	7.3	19	<0.100
403558095393901	08-14-91		520	140	42	32	5.3	0.35	29	46	100	<0.100
404327095284801	08-14-91		110	93	27	19	2.5	0.30	21	17	81	1.70
404432095361701	09-04-91		330	98	26	18	1.6	0.30	24	7.3	35	<0.100

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STATION	NUMBER	DATE	NITRO- GEN, AMMONIA DIS- SOLVED	PHOS- PHORUS ORTHO, DIS- SOLVED	ATRA- ZINE, TOTAL	CYAN- AZINE TOTAL	METRI- BUZIN IN WHOLE WATER	ALA- CHLOR TOTAL RECOVER	METOLA- CHLOR IN WHOLE WATER	BUTY- LATE TOTAL	TRI- FLURA- LIN TOTAL
			(MG/L AS N)	(MG/L AS P)	(UG/L) (39630)	(UG/L) (81757)	(UG/L) (81408)	(UG/L) (77825)	(UG/L) (39356)	(UG/L) (99901)	(UG/L) (39030)
			(00608)	(00671)							
411720094343002	08-16-91	4.20	0.200	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
410115094362201	08-20-91	1.00	<0.100	<0.10	<0.10	<0.10	<0.20	<0.20	<0.10	<0.10	<0.10
413534094532501	08-14-91	1.30	0.200	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
413743095041201	08-14-91	0.800	0.500	0.22	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
414323094524301	08-14-91	0.200	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
414333094525201	08-14-91	0.200	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
415440292180201	08-12-91	0.300	0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
422448092144501	08-28-91	0.300	<0.100	<0.10	<0.10	<0.10	<0.20	<0.20	<0.10	<0.10	<0.10
423351092092801	08-27-91	1.10	<0.100	<0.10	<0.10	<0.10	<0.20	<0.20	<0.10	<0.10	<0.10
415212093520701	08-14-91	0.200	0.100	<0.10	<0.10	<0.10	<0.20	<0.20	<0.10	<0.10	<0.10
4201580935562001	08-14-91	<0.100	0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
4204490935560901	08-14-91	0.100	0.100	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
424007092194001	08-06-91	0.100	<0.100	0.11	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
424341092291901	08-27-91	<0.100	0.100	<0.10	<0.10	<0.10	<0.20	<0.20	<0.10	<0.10	<0.10
422810092035201	08-06-91	<0.100	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
425344095090401	08-07-91	<0.100	<0.100	1.9	0.40	0.60	0.26	9.10	<0.10	<0.10	<0.10
423437092471001	08-06-91	0.100	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
423505092530101	08-01-91	2.10	<0.100	--	--	--	--	--	--	--	--
425330092483701	08-27-91	<0.100	0.100	<0.10	<0.10	<0.10	<0.20	<0.20	<0.10	<0.10	<0.10
425355092475801	08-27-91	<0.100	0.200	<0.10	<0.10	<0.10	<0.20	<0.20	<0.10	<0.10	<0.10
422023094291601	08-02-91	0.600	0.100	<0.10	<0.10	<0.10	<0.20	<0.20	<0.10	<0.10	<0.10
422236094254601	08-19-91	0.800	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
422525094492401	08-19-91	1.50	0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
415147094403501	08-01-91	<0.100	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
415430095041601	08-02-91	0.400	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
415512094565201	08-02-91	<0.100	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
420024094575901	08-01-91	<0.100	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
420331094543101	08-01-91	1.40	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
411507094464601	08-15-91	1.20	1.00	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
412652095064201	09-04-91	0.100	0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
413605090542901	08-07-91	<0.100	<0.100	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
414423090582201	08-13-91	0.800	0.200	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
415255091034301	08-13-91	<0.100	0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
425841093114101	08-28-91	0.500	<0.100	<0.10	<0.10	<0.10	<0.20	<0.20	<0.10	<0.10	<0.10
431155092245801	08-28-91	<0.100	<0.100	<0.10	<0.10	<0.10	<0.20	<0.20	<0.10	<0.10	<0.10
430923095113401	08-13-91	<0.100	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
430945095194101	08-13-91	0.400	<0.100	2.3	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
424706091061101	08-05-91	0.100	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
430213091105901	08-06-91	0.300	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
430241091234501	08-06-91	0.200	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
414729090151801	08-29-91	<0.100	0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
414806090212302	08-29-91	0.100	0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
415025090110611	08-14-91	0.600	0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
415343095134901	08-19-91	0.700	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
415650095275603	08-19-91	0.200	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
420119095215201	08-06-91	0.500	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
420422095352001	08-06-91	0.300	0.300	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
421125095193101	08-08-91	<0.100	0.200	0.28	<0.10	<0.10	<0.10	0.35	<0.10	<0.10	<0.10
413305094001001	08-20-91	0.200	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
413744093595501	08-15-91	0.600	0.200	0.15	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
413749093592601	08-16-91	0.200	0.200	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
414125094020701	08-15-91	<0.100	0.200	0.39	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
415057094065301	08-19-91	0.200	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
423837091235001	08-05-91	0.300	0.200	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
404933091105701	08-09-91	1.40	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
422906091001901	08-15-91	0.100	<0.100	0.46	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
423136090383001	08-15-91	1.00	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
423136090383501	08-15-91	1.00	0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
431910094473601	08-13-91	1.50	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
432348094285201	08-13-91	1.00	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
424455091395501	08-06-91	0.500	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
430010091390102	08-06-91	<0.100	<0.100	0.40	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
425754092515202	08-27-91	0.100	0.100	<0.10	<0.10	<0.10	<0.20	<0.20	<0.10	<0.10	<0.10
430315092563401	08-27-91	0.200	0.100	<0.10	<0.10	<0.10	<0.20	<0.20	<0.10	<0.10	<0.10
430458092403701	08-27-91	0.500	<0.100	<0.10	<0.10	<0.10	<0.20	<0.20	<0.10	<0.10	<0.10
424312093132101	08-07-91	0.200	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
424413093220601	08-28-91	0.700	<0.100	<0.10	<0.10	<0.10	<0.10	<0.20	<0.10	<0.10	<0.10
403558095393901	08-14-91	0.700	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
404327095284801	08-14-91	0.300	0.200	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
404432095361701	09-04-91	0.200	0.200	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10

GROUND-WATER QUALITY DATA

STATION NUMBER	LOCAL WELL NUMBER	DATE	LOCAL WELL NAME	COUNTY	SAMPLE DATE	SAMPLE TIME	GEO-LOGIC UNIT	DEPTH OF WELL, TOTAL (FEET)
404501095245601	069N40W26BDDC	1975	SHENANDOAH 26	FREMONT	08-09-91	1245	111ALVM	36.00
404520095250501	069N40W26BBAD	1975	SHENANDOAH 22	FREMONT	08-09-91	1325	111ALVM	34.00
404615095225701	069N39W19BBBA	1920	SHENANDOAH 3	FREMONT	08-09-91	1200	111ALVM	44.00
420053094223001	08330W08CBBA	1980	JEFFERSON 6	GREENE	08-19-91	1320	112PLSC	160.00
420203094205201	083N30W04ABBB	1981	JEFFERSON 7	GREENE	08-19-91	1400	112PLSC	189.00
420921094282501	08531W21CBCC	1967	CHURDAN 3	GREENE	08-21-91	0950	112PLSC	157.00
422605092560001	088N18W15DBBB	1949	WELLSBURG (1), 3	GRUNDY	08-01-91	1200	340DVSL	280.00
421610093553011	08626W07CD	1959	STRATFORD 3	HAMILTON	08-13-91	1130	330MSSP	550.00
421828093381701	087N24W34BBBD	1985	JEWELL 3	HAMILTON	08-13-91	1250	330MSSP	375.00
430540093482001	09625W28CAC		BRITT 2	HANCOCK	08-29-91	1515	340DVNN	200.00
430546093360901	09623W31ABAD	1957	GARNER 2	HANCOCK	08-29-91	1415	344CDVL	325.00
431350093544201	09726W10CBBD	1948	WODEN 1	HANCOCK	08-28-91	1600	361MQKT	531.00
422134093060701	08719W07DAC	1935	ELDORA 4	HARDIN	08-01-91	1000	339HMPN	315.00
423125093160601	089N21W13ACAC	1978	IOWA FALLS 6	HARDIN	08-07-91	0935	330MSSP	250.00
423323093034701	08919W02BB	1942	ACKLEY 3	HARDIN	08-28-91	1300	339KDRK	140.00
413321095533601	07844W15CBAD	1958	MISSOURI VALLEY 3	HARRISON	08-08-91	1500	111ALVM	90.00
413323095533101	07844W15CABC	1964	MISSOURI VALLEY 1	HARRISON	08-08-91	1430	111ALVM	87.00
413715096003102	07944W30DCAB	1961	MODALE 2	HARRISON	08-07-91	1530	111ALVM	105.00
413830095465802	07942W19BDBD	1975	LOGAN 6	HARRISON	08-19-91	1145	111ALVM	58.00
415004095552101	08144W12CCDD	1967	PISGAH 2	HARRISON	08-22-91	1000	111ALVM	142.00
432144092332501	09914W30CACA	1964	RICEVILLE 2	HOWARD	08-28-91	1100	364GLEN	468.00
425208094171401	09329W17DAD	1948	BODE 2	HUMBOLDT	08-20-91	1415	341APLG	259.00
421849095354901	08741W27DDCA	1950	BATTLE CREEK 2	IDA	08-06-91	1240	112PLSC	42.00
422915095323505	089N39W33DCCC	1985	HOLSTEIN 4	IDA	08-06-91	1430	111ALVM	28.00
413927092003601	079N10W16A	1972	WILLIAMSBURG 6	IOWA	08-27-91	1420	112PLSC	270.00
414520092112001	08012W12AC	1952	LADORA 1	IOWA	09-03-91	1610	112PLSC	72.00
414647091580701	081N10W35DAAD	1979	SOUTH AMANA (12) 120	IOWA	08-27-91	1145	112PLSC	38.00
420544090405101	084N02E12CBDA		HURSTVILLE 1	JACKSON	08-16-91	0830	340DVSL	135.00
421558090254301	08605E07CCD	1948	BELLEVUE 2	JACKSON	08-14-91	1500	371CMBRU	1640.00
421750090365001	08703E33DC	1940	LA MOTTE 2	JACKSON	08-14-91	1745	358ALXD	170.00
413121093070201	078N20W36BBAA	1955	MONROE 3	JASPER	08-16-91	0945	325DSMS	260.00
413907093070501	07920W13ADDC	1952	NEWTON 7	JASPER	08-15-91	1900	111ALVM	54.00
413917093071401	07920W13ADBC	1970	NEWTON 5	JASPER	08-15-91	1800	111ALVM	56.00
414022093153801	07921W11ABBB	1964	PRAIRIE CITY 2	JASPER	07-25-91	1305	111ALVM	43.00
414029093145601	07921W01CCCA	1972	COLFAX 2	JASPER	07-25-91	1045	111HLCN	47.00
414051093190901	079N21W05CAAA	1939	MITCHELLVILLE 1	JASPER	07-25-91	0845	111ALVM	58.00
414111091350701	80N06W31DCDC	1975	CORALVILLE 7	JOHNSON	07-22-91	1055	112PLSC	85.00
420009091084902	08303W13BA	1910	OLIN 1	JONES	08-16-91	1215	350SLRN	180.00
420607091011001	08402W12A	1913	ONSLOW 1	JONES	08-15-91	1700	112PLSC	275.00
411818092115201	07512W12CBCA	1975	SIGOURNEY 9	KEOKUK	08-14-91	1100	111ALVM	34.00
430427094145801	09529W02CABB	1959	ALGONA 5	KOSSUTH	08-14-91	1515	217DKOT	135.00
432247094052802	09928W24ADCA	1969	LAKOTA 2	KOSSUTH	08-13-91	1615	344CDVL	211.00
403226091252702	066N05W03CDA	1985	MONTROSE 2	LEE	08-09-91	1145	111ALVM	48.00
403748091174301	06704W02CBBA	1967	FORT MADISON 1	LEE	08-09-91	0955	110QRNR	149.00
415518091230901	08205W11DADD		LISBON 3	LINN	08-05-91	1130	340DVSL	180.00
415534091251501	08205W10CBAA	1936	MOUNT VERNON 2	LINN	08-05-91	1030	358KNKK	400.00
415541091230201	082N05W12BCB		LISBON 2	LINN	08-05-91	1230	350SLRN	270.00
415959091410501	083N07W17DBB	1984	CEDAR RAPIDS E13	LINN	08-29-91	1115	111ALVM	65.00
415959091433001	083N08W13DBB	1970	CEDAR RAPIDS S7	LINN	08-29-91	1210	111ALVM	63.00
420031091415701	083N07W07DDB	1980	CEDAR RAPIDS W9	LINN	08-29-91	1315	111ALVM	67.00
420200091363002	08307W01BAAA	1953	MARION 2	LINN	08-02-91	1210	355NIGR	441.00
421420091251501	08605W22CCCC	1910	PRAIRIEBURG 1	LINN	08-29-91	1450	350SLRN	180.00
423002091405101	08407W32DACB	1976	HIAWATHA 4	LINN	08-05-91	1400	350SLRN	250.00
411056091111501	07403W27BDDD	1976	WAPELLO 3	LOUISA	08-08-91	1530	112PLSC	77.00
411652091212801	07504W19		COLUMBUS JUNCTION 89-1	LOUISA	08-08-91	1300	112PLSC	105.00
431646096142901	09816W26ACDD	1976	DOON 4	LYON	07-31-91	0830	111ALVM	57.00
431844096263501	09847W18BDB	1941	INWOOD 1	LYON	07-31-91	1030	217DKOT	518.00
432023096002201	09844W02ACCA	1935	GEORGE 2	LYON	08-01-91	0900	110QRNR	30.00
432608096201501	10047W36DCBD	1968	LESTER 2	LYON	07-31-91	1815	111ALVM	32.00
432616096101101	10045W33CACB	1978	ROCK RAPIDS 11	LYON	07-31-91	1400	111ALVM	27.00
432636096100801	10045W33BDBA	1972	ROCK RAPIDS 6	LYON	07-31-91	1300	111ALVM	26.00
432656095525701	10043W26DDDB	1908	LITTLE ROCK 1	LYON	07-31-91	1615	112WSCS	28.00
411047093493501	07426W27DADA	1956	TRURO 1	MADISON	08-15-91	1130	112PLSC	50.00
412923094072302	07728W06CDCC	1941	EARLHAM 2	MADISON	08-20-91	1150	325CHRK	603.00
412924094072201		1986	EARLHAM 4	MADISON	08-20-91	1115	111ALVM	43.00
412924094072203		1986	EARLHAM 6	MADISON	08-20-91	1040	111ALVM	39.00
411233092262201	074N14W14CADD	1983	FREMONT 2, (83-1)	MAHASKA	08-14-91	1400	112PLSC	71.00
412114092393001	076N16W25CBDD	1991	OSKALOOSA 30	MAHASKA	08-14-91	1615	111ALVM	55.00
412115092391201	07616W25CADC	1980	OSKALOOSA 26	MAHASKA	08-14-91	1720	111ALVM	49.00
412938092380601	07715W07BAAC	1966	NEW SHARON 2	MAHASKA	08-16-91	1610	111ALVM	61.00

GROUND-WATER QUALITY DATA

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STATION	NUMBER	DATE	FLOW RATE (G/M) (00058)	PUMP	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	OXYGEN, DIS- SOLVED (MG/L) (00300)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	SOLIDS,	IRON, DIS- SOLVED (UG/L AS FE) (01046)
				OR FLOW PERIOD PRIOR TO SAM- PLING (MIN) (72004)							RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	
404501095245601	08-09-91	160	1440	12.0	443	6.6	3.4	190	126	254	<20	
404520095250501	08-09-91	80	1440	12.0	417	6.4	0.3	180	136	240	1100	
404615095225701	08-09-91	125	240	13.0	1030	6.6	1.2	460	226	697	210	
420053094223001	08-19-91	350	240	11.0	954	7.5	0.2	560	393	594	8800	
420203094205201	08-19-91	900	30	13.0	1170	7.8	0.7	510	570	726	1900	
420921094282501	08-21-91	100	75	12.0	1460	7.8	--	660	613	942	7400	
422605092560001	08-01-91	200	240	11.0	790	7.1	0.4	310	362	504	1200	
421610093553011	08-13-91	180	20	16.0	1290	7.3	--	630	284	848	330	
421828093381701	08-13-91	200	20	10.0	801	7.2	--	310	380	416	2100	
430540093482001	08-29-91	350	20	11.0	661	7.3	--	360	303	378	1200	
430546093360901	08-29-91	200	20	11.0	706	7.2	--	390	370	342	740	
431350093544201	08-28-91	120	20	11.0	663	7.5	--	330	338	382	320	
422134093060701	08-01-91	200	30	10.5	630	7.1	0.5	330	279	412	460	
423125093160601	08-07-91	450	60	11.0	750	6.8	0.3	360	335	426	920	
423323093034701	08-28-91	110	30	11.5	1040	7.1	0.1	560	348	698	4600	
413321095533601	08-08-91	350	60	13.0	1570	6.9	1.4	680	448	1040	1100	
413323095533101	08-08-91	800	30	13.0	1150	6.6	1.0	510	418	664	700	
413715096003102	08-07-91	140	30	11.0	818	6.6	2.3	--	--	--	--	
413830095465802	08-19-91	--	20	16.0	775	7.3	0.4	410	332	452	670	
415004095552101	08-22-91	150	20	12.0	650	7.3	3.8	--	--	--	--	
432144092332501	08-28-91	145	60	10.0	640	7.1	0.2	320	1040	348	860	
425208094171401	08-20-91	125	30	11.0	921	7.5	1.4	480	329	560	70	
421849095354901	08-06-91	240	20	11.5	910	7.3	4.8	460	329	594	<20	
422915095323505	08-06-91	--	30	10.0	800	7.3	5.1	390	286	512	<20	
413927092003601	08-27-91	240	15	12.5	710	7.4	0.3	140	364	416	90	
414520092112001	09-03-91	150	15	13.0	1000	7.9	--	340	377	628	1400	
414647091580701	08-27-91	100	10	11.5	660	7.4	1.3	350	264	446	<20	
420544090405101	08-16-91	20	60	13.0	815	7.2	2.8	450	346	494	<20	
421558090254301	08-14-91	325	60	16.0	505	7.4	--	290	268	282	230	
421750090365001	08-14-91	30	45	10.5	750	7.2	--	420	323	432	20	
413121093070201	08-16-91	50	20	14.0	825	7.8	--	440	378	694	160	
413907093070501	08-15-91	250	30	11.0	680	7.6	0.7	490	310	544	2100	
413917093071401	08-15-91	500	30	11.0	560	7.6	2.3	400	252	448	30	
414022093153801	07-25-91	220	27	12.0	554	7.2	3.1	280	200	--	300	
414029093145601	07-25-91	325	25	13.5	888	7.3	5.4	410	178	--	20	
414051093190901	07-25-91	250	20	12.0	646	7.0	0.8	320	262	314	490	
414111091350701	07-22-91	130	20	13.5	774	7.3	0.7	430	387	452	130	
420009091084902	08-16-91	260	60	12.0	520	7.4	0.6	--	--	--	--	
420607091011001	08-15-91	50	60	12.5	600	7.3	0.2	--	--	--	--	
411818092115201	08-14-91	68	30	13.5	509	7.3	--	320	158	450	20000	
430427094145801	08-14-91	500	90	10.5	1250	7.1	0.1	490	408	850	1500	
432247094052802	08-13-91	135	30	13.5	910	7.1	--	--	--	--	--	
403226091252702	08-09-91	280	30	13.5	598	7.0	--	--	249	374	500	
403748091174301	08-09-91	150	1000	14.0	459	7.1	0.2	--	--	--	--	
415518091230901	08-05-91	110	15	12.0	653	7.1	--	310	187	422	<20	
415534091251501	08-05-91	60	240	13.0	804	7.3	--	380	204	506	50	
415541091230201	08-05-91	140	20	11.5	746	7.3	--	350	211	472	<20	
415959091410501	08-29-91	1000	15	24.0	484	--	--	260	184	274	30	
415959091433001	08-29-91	1000	15	10.0	530	--	--	270	199	320	<20	
420031091415701	08-29-91	1000	60	22.0	488	--	--	250	192	290	80	
420200091363002	08-02-91	300	60	11.5	450	7.5	--	310	246	354	330	
421420091251501	08-29-91	100	15	12.0	650	--	0.1	--	--	--	--	
423002091405101	08-05-91	430	60	11.5	642	7.5	4.2	290	191	412	<20	
411056091111501	08-08-91	255	600	13.5	423	7.6	0.2	170	170	276	1200	
411652091212801	08-08-91	280	15	15.0	1050	7.0	0	340	388	598	4300	
431646096142901	07-31-91	>375	20	10.0	880	7.4	3.0	--	--	--	--	
431844096263501	07-31-91	8.5	30	12.0	1380	7.4	0.4	--	270	1070	800	
432023096002201	08-01-91	74	30	10.0	685	7.3	2.4	--	308	592	100	
432608096201501	07-31-91	45	30	9.5	1170	7.4	0.7	--	--	--	--	
432616096101101	07-31-91	65	30	10.0	1130	7.2	1.0	550	399	806	40	
432636096100801	07-31-91	120	20	13.5	720	7.5	2.0	320	243	456	<20	
432656095525701	07-31-91	100	40	9.5	1580	7.2	1.5	--	--	--	--	
411047093493501	08-15-91	50	20	12.0	599	7.1	0.2	250	213	340	10000	
412923094072302	08-20-91	50	30	13.0	2740	8.4	--	160	197	1980	<20	
412924094072201	08-20-91	85	30	12.0	803	7.3	0.1	--	--	--	--	
412924094072203	08-20-91	85	30	13.0	864	7.4	0.1	470	361	514	4000	
411233092262201	08-14-91	32	30	14.0	585	7.9	1.0	390	--	426	1300	
412114092393001	08-14-91	500	30	12.0	660	7.6	0.6	460	392	512	10000	
412115092391201	08-14-91	500	30	19.0	520	8.0	--	310	224	378	300	
412938092380601	08-16-91	--	25	11.0	445	6.9	0.5	340	279	336	3000	

GROUND-WATER QUALITY DATA

STATION	NUMBER	DATE	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	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)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SiO2) (00955)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)
404501095245601	08-09-91	<20	49	16	10	1.8	0.25	27	11	44	7.70	
404520095250501	08-09-91	340	48	15	10	1.6	0.25	22	12	52	<0.100	
404615095225701	08-09-91	250	120	39	27	3.0	0.30	17	54	230	0.100	
420053094223001	08-19-91	100	150	44	29	2.0	0.20	23	62	85	<0.100	
420203094205201	08-19-91	50	120	51	83	6.6	0.50	30	12	98	<0.100	
420921094282501	08-21-91	70	150	69	100	7.0	0.25	35	3.1	200	<0.100	
422605092560001	08-01-91	40	74	30	58	3.8	0.45	10	0.50	70	<0.100	
421610093553011	08-13-91	<20	140	67	52	16	2.1	7.4	90	350	0.100	
421828093381701	08-13-91	130	68	34	35	2.3	0.80	15	26	18	<0.100	
430540093482001	08-29-91	210	89	33	5.6	2.0	0.25	27	5.8	38	<0.100	
430546093360901	08-29-91	30	88	41	9.5	2.7	0.85	14	8.3	15	<0.100	
431350093544201	08-28-91	40	82	30	18	3.3	0.40	14	2.8	21	--	
422134093060701	08-01-91	50	79	32	12	2.2	0.30	16	11	46	1.20	
423125093160601	08-07-91	170	90	32	12	2.0	0.30	15	19	28	0.100	
423323093034701	08-28-91	750	160	39	25	1.2	0.20	16	45	150	<0.100	
413321095533601	08-08-91	500	170	63	62	8.3	0.30	23	35	330	<0.100	
413323095533101	08-08-91	370	120	50	34	5.2	0.25	25	38	120	0.700	
413715096003102	08-07-91	--	--	--	--	--	--	--	--	--	<0.100	
413830095465802	08-19-91	2000	110	32	10	2.5	0.25	24	21	48	3.40	
415004095552101	08-22-91	--	--	--	--	--	--	--	--	--	0.300	
432144092332501	08-28-91	30	76	31	18	3.2	0.75	10	1.8	50	<0.100	
425208094171401	08-20-91	30	120	43	8.9	1.9	0.30	21	32	100	3.70	
421849095354901	08-06-91	<20	120	38	23	3.6	0.25	30	35	88	12.0	
422915095323505	08-06-91	20	110	28	15	<1.0	0.25	22	22	90	6.10	
413927092003601	08-27-91	<20	21	21	99	2.6	0.80	12	4.0	26	<0.100	
414520092112001	09-03-91	<20	86	31	99	2.4	0.55	13	6.5	170	<0.100	
414647091580701	08-27-91	60	92	28	27	2.8	0.15	15	43	62	--	
420544090405101	08-16-91	<20	99	49	18	6.3	0.45	19	28	55	8.60	
421558090254301	08-14-91	<20	57	35	1.7	4.6	0.25	8.4	4.3	14	<0.100	
421750090365001	08-14-91	<20	94	46	12	1.1	0.10	15	27	39	6.60	
413121093070201	08-16-91	20	110	40	94	4.3	0.60	9.8	4.6	230	0.200	
413907093070501	08-15-91	930	140	34	8.5	1.5	0.20	21	21	110	1.30	
413917093071401	08-15-91	190	110	31	7.5	<1.0	0.25	22	17	88	4.90	
414022093153801	07-25-91	170	74	22	7.9	1.9	--	25	9.0	30	8.90	
414029093145601	07-25-91	<20	110	32	28	1.2	0.20	24	84	87	3.40	
414051093190901	07-25-91	210	85	27	13	1.4	0.20	21	18	25	0.200	
414111091350701	07-22-91	400	110	37	12	1.1	0.25	25	14	26	0.100	
420009091084902	08-16-91	--	--	--	--	--	0.20	--	--	--	<0.100	
420607091011001	08-15-91	--	--	--	--	--	0.20	--	--	--	<0.100	
411818092115201	08-14-91	1700	99	17	11	1.1	0.15	29	20	120	<0.100	
430427094145801	08-14-91	460	130	40	110	5.4	0.35	25	30	260	0.100	
432247094052802	08-13-91	--	--	--	--	--	--	--	--	--	<0.100	
403226091252702	08-09-91	170	69	22	7.6	<1.0	--	27	10	42	3.80	
403748091174301	08-09-91	--	--	--	--	--	--	--	--	--	<0.100	
415518091230901	08-05-91	20	62	37	9.0	<1.0	0.25	15	10	72	0.400	
415534091251501	08-05-91	20	85	40	15	<1.0	0.20	19	28	41	4.20	
415541091230201	08-05-91	20	77	38	8.4	<1.0	0.25	15	12	64	5.30	
415959091410501	08-29-91	650	70	20	10	2.3	--	13	24	38	0.800	
415959091433001	08-29-91	800	73	22	13	2.3	0.20	10	27	41	2.20	
420031091415701	08-29-91	990	67	20	11	3.4	0.30	14	24	34	0.600	
420200091363002	08-02-91	<20	86	23	6.9	1.1	0.15	10	12	45	<0.100	
421420091251501	08-29-91	--	--	--	--	--	--	--	--	--	<0.100	
423002091405101	08-05-91	<20	87	17	8.8	1.5	0.20	16	22	48	4.80	
411056091111501	08-08-91	220	50	12	6.4	<1.0	0.15	20	5.5	42	<0.100	
411652091212801	08-08-91	90	88	29	61	2.7	--	20	18	31	<0.100	
431646096142901	07-31-91	--	--	--	--	--	--	--	--	--	6.90	
431844096263501	07-31-91	60	160	59	62	15	0.75	--	6.0	--	<0.100	
432023096002201	08-01-91	110	100	40	18	2.0	0.65	--	18	--	6.50	
432608096201501	07-31-91	--	--	--	--	--	--	--	--	--	0.100	
432616096101101	07-31-91	1500	140	48	26	3.2	0.35	--	42	--	0.700	
432636096100801	07-31-91	<20	77	32	18	2.6	0.30	--	30	--	0.900	
432656095525701	07-31-91	--	--	--	--	--	--	--	--	--	0.100	
411047093493501	08-15-91	940	79	12	18	<1.0	0.25	--	40	--	0.100	
412923094072302	08-20-91	30	40	15	650	5.3	0.65	8.2	33	1200	<0.100	
412924094072201	08-20-91	--	--	--	--	--	--	--	--	--	0.600	
412924094072203	08-20-91	1500	140	29	7.1	2.0	--	24	15	85	0.200	
411233092262201	08-14-91	40	110	28	22	2.0	0.50	24	2.0	13	<0.100	
412114092393001	08-14-91	2400	110	46	10	1.1	0.25	28	20	45	<0.100	
412115092391201	08-14-91	920	84	25	11	3.5	0.35	18	25	63	0.800	
412938092380601	08-16-91	180	96	24	12	1.1	0.40	19	6.5	36	<0.100	

365

STATION	NUMBER	DATE	NITRO- GEN, AMMONIA DIS- SOLVED	PHOS- PHORUS ORTHO, DIS- SOLVED	ATRA- ZINE, TOTAL	CYAN- AZINE TOTAL	METRI- BUZIN IN WHOLE WATER	ALA- CHLOR TOTAL RECOVER	METOLA- CHLOR IN WHOLE WATER	BUTY- LATE TOTAL	TRI- FLUO- LIN TOTAL
			(MG/L AS N) (00608)	(MG/L AS P) (00671)	(UG/L) (39630)	(UG/L) (81757)	(UG/L) (81408)	(UG/L) (77825)	(UG/L) (39356)	(UG/L) (99901)	(UG/L) (39030)
404501095245601	08-09-91		<0.100	0.200	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
404520095250501	08-09-91		0.100	0.200	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
404615095225701	08-09-91		0.100	0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
420053094223001	08-19-91		2.70	0.400	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
420203094205201	08-19-91		3.70	0.200	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
420921094282501	08-21-91		6.60	0.300	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
422605092560001	08-01-91		2.80	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
421610093553011	08-13-91		2.00	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
421828093381701	08-13-91		3.30	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
430540093482001	08-29-91		0.200	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
430546093360901	08-29-91		0.400	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
431350093544201	08-28-91		1.00	<0.100	<0.10	<0.10	<0.10	<0.10	<0.20	<0.10	<0.10
422134093060701	08-01-91		0.400	<0.100	0.12	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
423125093160601	08-07-91		1.10	0.200	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
423323093034701	08-28-91		0.400	0.200	<0.10	<0.10	<0.10	<0.10	<0.20	<0.10	<0.10
413321095533601	08-08-91		0.300	0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
413323095533101	08-08-91		0.100	0.200	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
413715096003102	08-07-91		1.10	0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
413830095465802	08-19-91		0.400	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
415004095552101	08-22-91		<0.100	0.200	<0.10	<0.10	<0.10	<0.20	<0.20	<0.10	<0.10
432144092332501	08-28-91		3.00	<0.100	<0.10	<0.10	<0.10	<0.10	<0.20	<0.10	<0.10
425208094171401	08-20-91		0.200	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
421849095354901	08-06-91		<0.100	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
422915095323505	08-06-91		<0.100	<0.100	0.34	<0.10	<0.10	<0.10	0.14	<0.10	<0.10
413927092003601	08-27-91		3.10	0.200	<0.10	<0.10	<0.10	<0.20	<0.20	<0.10	<0.10
414520092112001	09-03-91		5.10	0.400	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
414647091580701	08-27-91		<0.100	0.200	<0.10	<0.10	<0.10	<0.20	<0.20	<0.10	<0.10
420544090405101	08-16-91		0.200	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
421558090254301	08-14-91		0.300	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
421750090365001	08-14-91		<0.100	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
413121093070201	08-16-91		2.70	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
413907093070501	08-15-91		0.300	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
413917093071401	08-15-91		0.200	<0.100	0.14	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
414022093153801	07-25-91		0.400	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
414029093145601	07-25-91		0.200	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
414051093190901	07-25-91		0.200	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
4141110913150701	07-22-91		0.300	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
420009091084902	08-16-91		0.600	0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
420607091011001	08-15-91		0.900	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
411818092115201	08-14-91		0.200	0.600	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
430427094145801	08-14-91		0.500	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
432247094052802	08-13-91		1.40	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
403226091252702	08-09-91		0.100	0.200	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
403748091174301	08-09-91		3.70	0.900	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
415518091230901	08-05-91		0.100	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
415534091251501	08-05-91		0.100	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
415541091230201	08-05-91		<0.100	<0.100	0.74	<0.10	0.67	1.50	0.30	<0.10	<0.10
415959091410501	08-29-91		0.500	<0.100	0.53	<0.10	<0.10	<0.10	0.19	<0.10	<0.10
415959091433001	08-29-91		0.300	<0.100	0.24	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
420031091415701	08-29-91		0.400	0.100	0.49	<0.10	<0.10	<0.10	0.15	<0.10	<0.10
42020091363002	08-02-91		<0.100	0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
421420091251501	08-29-91		4.10	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
423002091405101	08-05-91		0.100	<0.100	0.13	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
411056091111501	08-08-91		0.200	0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
411652091212801	08-08-91		1.50	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
431646096142901	07-31-91		0.100	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
431844096263501	07-31-91		2.20	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
432023096002201	08-01-91		<0.100	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
432608096201501	07-31-91		0.400	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
432616096101101	07-31-91		1.40	0.200	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
432636096100801	07-31-91		0.100	<0.100	0.19	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
432656095525701	07-31-91		1.90	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
411047093493501	08-15-91		0.300	0.500	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
412923094072302	08-20-91		1.50	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
412924094072201	08-20-91		0.100	0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
412924094072203	08-20-91		0.400	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
411233092262201	08-14-91		0.500	0.200	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
412114092393001	08-14-91		0.600	0.200	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
412115092391201	08-14-91		<0.100	0.200	0.89	0.30	<0.10	<0.10	0.66	<0.10	<0.10
412938092380601	08-16-91		0.800	0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10

STATION NUMBER	LOCAL WELL NUMBER	DATE	LOCAL WELL NAME	COUNTY	SAMPLE DATE	SAMPLE TIME	GEO- LOGIC UNIT	DEPTH OF WELL, TOTAL (FEET)
412132092575201	07618W29BCA	1971	PELLA RANEY WELL	MARION	07-25-91	1543	111ALVM	15.00
415614092520601	08217W06DCAD	1979	FERGUSON 2	MARSHALL	08-15-91	2045	339HMPN	160.00
420400092552401	084N18W22DDAA	1981	MARSHALLTOWN 6	MARSHALL	08-15-91	1000	330MSSP	156.00
420410092543801	084N18W23DBAC	1977	MARSHALLTOWN 9	MARSHALL	08-15-91	1130	330MSSP	270.00
420613092593601	08418W07BACA	1969	ALBION 2	MARSHALL	08-15-91	1500	111ALVM	26.00
410007095330501	07241W27CDCC	1978	MALVERN 11	MILLS	08-14-91	0940	111ALVM	56.00
410007095331901	07241W27CCCC	1978	MALVERN 10	MILLS	08-14-91	0845	111ALVM	59.00
432241092550802	09918W24CABA	1960	SAINT ANSGAR 2	MITCHELL	08-28-91	1300	344CDVL	240.00
415558096044901	08245W09ADAD	1964	BLENCOE 1	MONONA	08-08-91	1220	111ALVM	100.00
405558094592501	071N36W21DCAA	1954	VILLISCA 4	MONTGOMERY	08-28-91	0950	111ALVM	50.00
405855095061201	071N37W04ADBC	1970	STANTON 2	MONTGOMERY	08-13-91	1415	217DKOT	151.00
410857095094201	07338W01DBDC	1935	ELLIOTT 1	MONTGOMERY	08-28-91	1135	112PLSC	56.00
412213091063601	07602W20CAAA	1981	MUSCATINE 26	MUSCATINE	08-08-91	1115	111ALVM	140.00
412319091034801	07602W15AACD	1965	MUSCATINE 12	MUSCATINE	08-08-91	1030	111ALVM	79.00
412321091040101	07602W15ABDB	1965	MUSCATINE 9	MUSCATINE	08-08-91	0930	111ALVM	79.00
413336091161501	07804W13CBB	1964	WEST LIBERTY 4	MUSCATINE	08-07-91	1040	371JRDN	1655.00
413455091012601	078N02W01DCAA	1981	WILTON 3	MUSCATINE	08-07-91	1230	112PLSC	195.00
430014095385801	095N41W35DBAA	1978	PAULLINA 4	O'BRIEN	07-30-91	1200	111ALVM	60.00
431045095413401	09741W33ACCC	1980	SANBORN 4	O'BRIEN	07-30-91	1630	112PLSC	75.00
431147095504701	09742W30ADBB	1932	SHELDON 3	O'BRIEN	07-30-91	1430	112PLSC	28.00
431703095272401	09839W28ABBB	1972	MELVIN 2	OSCEOLA	07-30-91	1815	110QRNR	37.00
403657095072701	067N37W17CBBA	1971	COLLEGE SPRINGS 3	PAGE	08-13-91	1140	112PLSC	42.00
405006095175601	070N39W26CAAD	1968	ESSEX 4	PAGE	08-13-91	0940	111ALVM	53.00
425608094405701	09433W25AABC	1961	MALLARD 4	PALO ALTO	08-12-91	1600	217DKOT	205.00
430625094411701	096N33W25ACBC	1985	EMMETSBURG 5	PALO ALTO	08-14-91	1045	111ALVM	37.00
431421094445201	09733W09ABCC	1978	GRAETTINGER 5	PALO ALTO	08-14-91	0900	112PLSC	30.00
423537095583901	09043W19CCBB	1956	KINGSLEY 1	PLYMOUTH	08-07-91	1335	110QRNR	37.00
423650096175701	09046W17ACAC	1974	HINTON 4	PLYMOUTH	08-07-91	0825	217DKOT	270.00
424911096033001	09244W05AA	1953	OYENS 1	PLYMOUTH	08-12-91	1235	217DKOT	215.00
424916095581201	09243W06BABD	1968	REMSEN 5	PLYMOUTH	08-07-91	1130	110QRNR	35.00
424907094313001	09231W05AAC	1947	ROLFE 3	POCAHONTAS	08-12-91	1115	330MSSP	260.00
425058094510801	09334W27BBAA	1961	LAURENS 6	POCAHONTAS	08-12-91	1400	217DKOT	229.00
425058094510802	09334W27BBAA	1961	LAURENS 5	POCAHONTAS	08-12-91	1330	112PLSC	229.00
413351093432301	07825W15ABCC	1971	WEST DES MOINES 2	POLK	07-23-91	1315	371JRDN	2480.00
414409093241601	08022W15CBCD	1981	BONDURANT 3	POLK	07-24-91	1200	111ALVM	70.00
414625093424301	08125W01BACC	1951	POLK CITY 1	POLK	07-24-91	0920	112PLSC	66.00
414634093423601	08125W01BABA	1978	POLK CITY 3	POLK	07-24-91	0950	112PLSC	60.00
411154095252501	074N40W22ADDB	1962	MACEDONIA (2), 3	POTTAWATTAMIE	08-09-91	0945	111ALVM	30.00
411501095251301	075N40W35CBAC	1975	CARSON (5), 3	POTTAWATTAMIE	09-04-91	1100	111ALVM	28.00
411837095245401	075N40W11CAAB	1964	OAKLAND (8), 5	POTTAWATTAMIE	08-07-91	0940	111ALVM	33.00
411838095252801	075N40W10DAAB	1979	OAKLAND 11	POTTAWATTAMIE	08-07-91	1040	111ALVM	42.00
412326095410101	076N42W16BABB	1956	UNDERWOOD 1	POTTAWATTAMIE	08-07-91	1330	112PLSC	80.00
412334095214201	076N39W08CCAA	1967	HANCOCK 4	POTTAWATTAMIE	08-07-91	1200	111ALVM	34.00
412655095365701	077N42W24DDCC	1953	NEOLA (2), 1	POTTAWATTAMIE	08-28-91	1410	111ALVM	53.00
412754095323701	077N41W15DCBD	1905	MINDEN (1), (2), 9	POTTAWATTAMIE	08-06-91	1130	112PLSC	51.00
412812095322701	07741W15ACDD	1940	MINDEN 2	POTTAWATTAMIE	08-06-91	1305	111ALVM	48.00
412813095210701	077N39W17ACDD	1978	AVOCA 4	POTTAWATTAMIE	08-09-91	1330	111ALVM	30.00
413429092420401	07816W09ADDD	1955	SEARSBORO 1	POWESHIEK	08-29-91	0908	338KKUK	200.00
404835094240201	06931W03	1967	CLEARFIELD 1	RINGGOLD	08-28-91	1230	111ALVM	41.00
421617095051001	08636W07CDBB	1971	WALL LAKE 3	SAC	08-06-91	1145	112PLSC	43.00
421808095025301	08736W33CBAD	1956	LAKE VIEW 2	SAC	08-06-91	0915	112PLSC	48.00
421909095162301	08738W28DBBB	1972	ODEBOLT 6	SAC	08-07-91	0945	112PLSC	42.00
422739095084202	08837W03CCAC	1957	EARLY 1	SAC	08-07-91	1145	112PLSC	33.00
423057095052201	08936W22BBBA	1966	NEMAHA 2	SAC	08-02-91	1630	112PLSC	275.00
413500090462401	07802E06DCC	1966	WALCOTT 3	SCOTT	08-07-91	1600	355NIGR	230.00
413055095271001	07840W33BDAC	1944	SHELBY 2	SHELBY	08-06-91	1430	111ALVM	68.00
413434095033701	07837W11AAAD	1968	ELK HORN 10	SHELBY	08-14-91	1010	111ALVM	45.00
413816095185801	079N38W19CAAD2	1978	HARLAN 24	SHELBY	08-09-91	1130	111ALVM	36.00
413823095190501	079N38W19BDBA	1965	HARLAN 11	SHELBY	08-09-91	1050	111ALVM	36.00
413842095184401	079N38W19ABAB1	1978	HARLAN 20	SHELBY	08-09-91	1005	111ALVM	36.00
414407095284101	08040W14CCBD	1967	PANAMA 1	SHELBY	08-13-91	0900	111ALVM	39.00
414729095124001	08138W36AAAB	1946	IRWIN 2	SHELBY	08-08-91	1550	111ALVM	54.00
414934095201701	08139W13ACAB	1944	DEFIANCE WEST	SHELBY	08-08-91	1340	111ALVM	45.00
425943096294301	09448W03ABAD	1950	HAWARDEN 3	STIOUX	08-01-91	1330	110QRNU	42.00
430416096063701	095N45W01CDCB	1976	STIOUX CENTER (10) 8	STIOUX	08-01-91	1630	111ALVM	49.00
431441095562501	09743W04CCCD	1959	MATLOCK 3	STIOUX	08-01-91	1030	110QRNR	23.00
431507096000801	09744W02AC	1982	BOYDEN 4	STIOUX	08-02-91	0815	111ALVM	41.00
420130093380901	08324W03CDBB	1982	AMES 17	STORY	08-14-91	0745	112PLSC	147.00
420141093365701	08324W02CBAA	1968	AMES 12	STORY	08-13-91	1530	112PLSC	128.00
415422092180101	08213W13DDDD	1945	BELLE PLAINE 2	TAMA	08-12-91	1350	111ALVM	42.00

GROUND-WATER QUALITY DATA

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STATION	NUMBER	DATE	FLOW RATE (G/M) (00058)	PUMP	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	OXYGEN, DIS- SOLVED (MG/L) (00300)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	SOLIDS,	IRON, DIS- SOLVED (UG/L AS FE) (01046)
				OR FLOW PERIOD PRIOR TO SAM- PLING (MIN) (72004)							RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	
412132092575201	07-25-91	1400	--	22.5	593	7.2	1.0	290	182	274	170	
415614092520601	08-15-91	--	30	19.0	1020	7.4	--	700	335	880	40	
420400092552401	08-15-91	1250	240	12.0	500	7.8	0.4	380	260	440	800	
420410092543801	08-15-91	730	30	11.0	650	7.9	0.5	440	297	534	2300	
420613092593601	08-15-91	--	30	12.0	560	7.9	7.2	--	--	--	--	
410007095330501	08-14-91	150	25	11.0	698	6.9	4.5	360	280	178	<20	
410007095331901	08-14-91	125	35	11.0	757	6.6	1.3	380	294	412	570	
432241092550802	08-28-91	215	240	10.5	680	7.1	--	--	--	--	--	
415558096044901	08-08-91	60	90	11.0	1310	6.7	2.3	--	--	--	--	
405558094592501	08-28-91	40	35	13.0	592	6.5	0.8	230	134	344	15000	
405855095061201	08-13-91	130	30	12.0	518	6.5	--	--	--	--	--	
410857095094201	08-28-91	--	30	15.0	404	6.9	6.5	--	--	--	--	
412213091063601	08-08-91	1300	120	15.0	306	7.5	2.4	110	85	188	130	
412319091034801	08-08-91	800	15	16.0	402	7.3	0.8	160	155	248	150	
412321091040101	08-08-91	900	500	13.5	578	6.8	1.2	250	257	364	50	
413336091161501	08-07-91	420	30	19.0	1660	7.3	--	300	235	1070	420	
413455091012601	08-07-91	300	60	12.0	523	7.3	0	250	287	318	2200	
430014095385801	07-30-91	320	20	10.0	750	7.3	1.8	--	296	512	90	
431045095413401	07-30-91	120	30	10.0	880	7.2	0.6	--	348	608	120	
431147095504701	07-30-91	60	30	13.5	795	7.3	0.5	--	288	536	540	
431703095272401	07-30-91	90	25	9.5	760	7.4	0.4	--	--	--	--	
403657095072701	08-13-91	18	60	12.0	852	6.5	4.4	420	262	512	<20	
405006095175601	08-13-91	100	60	12.0	466	6.1	6.7	--	--	--	--	
425608094405701	08-12-91	130	20	10.0	1400	7.0	0.1	660	452	990	7900	
430625094411701	08-14-91	225	30	10.5	660	7.2	0.1	--	220	392	1200	
431421094445201	08-14-91	200	30	12.0	890	7.1	2.4	450	335	554	50	
423537095583901	08-07-91	200	30	10.0	700	7.3	3.8	430	308	526	<20	
423650096175701	08-07-91	145	20	11.5	655	7.4	0.6	--	--	--	--	
424911096033001	08-12-91	110	5	12.0	665	7.4	--	--	--	--	--	
424916095581201	08-07-91	90	20	10.0	820	7.4	1.5	510	261	718	20	
424907094313001	08-12-91	200	30	10.0	1110	7.0	0.3	550	420	758	1500	
425058094510801	08-12-91	170	30	10.5	2050	7.2	0.2	910	386	1640	--	
425058094510802	08-12-91	190	30	10.5	1540	7.3	--	--	--	--	--	
413351093432301	07-23-91	950	5	26.0	1730	7.1	--	360	276	--	200	
414409093241601	07-24-91	300	25	11.5	675	--	--	350	292	310	410	
414625093424301	07-24-91	6.5	20	12.5	1230	7.0	--	--	406	740	10000	
414634093423601	07-24-91	205	25	13.0	696	7.3	--	--	--	--	--	
411154095252501	08-09-91	45	75	11.0	782	6.1	3.0	390	303	492	70	
411501095251301	09-04-91	50	30	12.0	725	7.0	2.7	370	289	406	890	
411837095245401	08-07-91	35	120	10.0	679	6.9	1.7	300	282	358	<20	
411838095252801	08-07-91	35	120	11.0	611	7.1	2.8	270	262	332	120	
412326095410101	08-07-91	45	40	11.0	637	6.9	4.9	290	267	376	<20	
412334095214201	08-07-91	50	35	15.0	847	6.9	6.4	400	300	522	160	
412655095365701	08-28-91	100	40	15.0	1250	6.3	1.4	580	380	670	40	
412754095323701	08-06-91	10	35	12.0	740	6.7	--	330	262	426	80	
412812095322701	08-06-91	19	25	12.0	750	7.6	--	--	--	--	--	
412813095210701	08-09-91	40	20	11.0	1060	7.1	1.2	540	271	719	240	
413429092420401	08-29-91	9.0	20	15.0	2	7.3	0.3	910	147	1680	450	
404835094240201	08-28-91	80	20	12.0	445	6.8	0.4	170	162	298	17000	
421617095051001	08-06-91	300	30	13.5	1020	7.2	--	--	--	--	--	
421808095025301	08-06-91	225	30	12.0	825	7.1	2.1	--	277	422	<20	
421909095162301	08-07-91	40	30	10.0	890	7.2	0.2	390	269	--	2700	
422739095084202	08-07-91	65	30	14.5	830	7.3	--	330	242	438	<20	
423057095052201	08-02-91	--	10	14.0	1320	7.4	--	--	--	--	--	
413500090462401	08-07-91	200	20	11.5	650	7.0	--	290	274	380	1200	
413055095271001	08-06-91	30	45	11.5	994	6.7	--	460	338	580	<20	
413434095033701	08-14-91	--	20	11.0	810	7.2	0.9	--	--	--	--	
413816095185801	08-09-91	45	30	10.0	1000	7.0	0.5	510	358	650	8800	
413823095190501	08-09-91	70	30	10.0	795	7.1	2.4	370	296	470	<20	
413842095184401	08-09-91	75	30	12.0	1430	7.0	0.5	640	450	958	26000	
414407095284101	08-13-91	3.0	30	11.0	750	7.1	0.9	400	--	468	11000	
414729095124001	08-08-91	35	30	12.0	1180	7.2	1.6	--	--	--	--	
414934095201701	08-08-91	12	20	11.0	910	7.2	0.4	470	370	586	3300	
425943096294301	08-01-91	140	30	10.5	1020	7.2	1.5	--	318	714	<20	
430416096063701	08-01-91	100	30	10.0	1190	7.3	1.4	--	329	638	2700	
431441095562501	08-01-91	7.0	30	10.0	975	7.3	0.4	--	--	--	--	
431507096000801	08-02-91	170	30	16.0	760	7.4	0.8	--	210	516	620	
420130093380901	08-14-91	570	1440	12.0	932	7.2	--	--	--	--	--	
420141093365701	08-13-91	355	1440	12.0	765	7.4	--	--	--	--	--	
415422092180101	08-12-91	241	20	10.0	790	7.6	--	--	--	--	--	

GROUND-WATER QUALITY DATA

STATION	NUMBER	DATE	MANGA- NESE, DIS- SOLVED	CALCIUM DIS- SOLVED	MAGNE- SIUM, DIS- SOLVED	SODIUM, DIS- SOLVED	POTAS- SIUM, DIS- SOLVED	FLUO- RIDE, DIS- SOLVED	SILICA, DIS- SOLVED	CHLO- RIDE, DIS- SOLVED	SULFATE DIS- SOLVED	NITRO- GEN, NO2+NO3 DIS- SOLVED
			(UG/L AS MN) (01056)	(MG/L AS CA) (00915)	(MG/L AS MG) (00925)	(MG/L AS NA) (00930)	(MG/L AS K) (00935)	(MG/L AS F) (00950)	(MG/L AS SIO2) (00955)	(MG/L AS CL) (00940)	(MG/L AS SO4) (00945)	(MG/L AS N) (00631)
412132092575201	07-25-91		220	78	23	8.2	3.1	--	17	18	46	7.00
415614092520601	08-15-91		80	170	66	48	3.0	0.20	12	23	340	0.300
420400092552401	08-15-91		620	100	31	9.0	1.7	0.20	14	22	78	<0.100
420410092543801	08-15-91		50	110	39	30	2.5	0.40	15	26	130	<0.100
420613092593601	08-15-91		--	--	--	--	--	--	--	--	--	6.80
410007095330501	08-14-91		<20	97	29	12	2.3	0.30	23	12	39	6.50
410007095331901	08-14-91		220	100	31	11	3.2	0.40	20	7.7	76	<0.100
432241092550802	08-28-91		--	--	--	--	--	--	--	--	--	5.80
415558096044901	08-08-91		--	--	--	--	--	--	--	--	--	<0.100
405558094592501	08-28-91		1600	68	15	16	1.1	0.20	21	14	100	0.100
405855095061201	08-13-91		--	--	--	--	--	--	--	--	--	<0.100
410857095094201	08-28-91		--	--	--	--	--	--	--	--	--	5.10
412213091063601	08-08-91		300	33	6.8	6.9	<1.0	0.15	14	10	29	4.30
412319091034801	08-08-91		840	40	14	11	1.6	0.15	15	17	24	<0.100
412321091040101	08-08-91		190	67	20	9.0	1.5	<0.10	14	18	28	0.300
413336091161501	08-07-91		<20	65	33	200	15	--	9.2	120	430	<0.100
413455091012601	08-07-91		70	65	21	11	<1.0	--	22	5.5	11	0.100
430014095385801	07-30-91		310	110	34	9.9	2.3	0.35	--	9.0	--	3.80
431045095413401	07-30-91		280	130	37	14	3.0	0.45	--	12	--	1.90
431147095504701	07-30-91		690	110	35	14	1.4	0.45	--	22	--	0.400
431703095272401	07-30-91		--	--	--	--	--	--	--	--	--	0.100
403657095072701	08-13-91		<20	130	23	22	<1.0	0.30	28	39	89	9.80
405006095175601	08-13-91		--	--	--	--	--	--	--	--	--	12.0
425608094405701	08-12-91		80	150	70	68	3.1	0.30	28	4.9	340	<0.100
430625094411701	08-14-91		350	85	24	16	3.9	0.25	27	64	60	0.100
431421094445201	08-14-91		50	120	36	5.3	16	0.20	24	34	75	6.90
423537095583901	08-07-91		20	120	31	15	1.8	0.30	27	26	75	7.80
423650096175701	08-07-91		--	--	--	--	--	--	--	--	--	<0.100
424911096033001	08-12-91		--	--	--	--	--	--	--	--	--	<0.100
424916095581201	08-07-91		70	140	39	20	2.1	0.40	22	32	200	8.50
424907094313001	08-12-91		370	140	49	42	2.7	0.45	19	38	210	0.100
425058094510801	08-12-91		--	--	--	--	--	0.25	29	45	820	0.100
425058094510802	08-12-91		--	--	--	--	--	--	--	--	--	0.400
413351093432301	07-23-91		<20	85	35	220	16	2.8	12	64	520	<0.100
414409093241601	07-24-91		80	94	29	8.2	1.3	0.25	21	16	27	6.10
414625093424301	07-24-91		290	180	54	13	2.5	--	31	48	160	0.200
414634093423601	07-24-91		--	--	--	--	--	--	--	--	--	0.600
411154095252501	08-09-91		<20	110	28	9.1	1.6	0.40	26	14	88	0.200
411501095251301	09-04-91		760	100	29	10	1.5	0.35	10	20	67	1.00
411837095254501	08-07-91		90	81	24	9.3	1.6	0.35	17	9.5	34	1.90
411838095252801	08-07-91		120	71	23	10	1.6	0.25	19	12	32	1.30
412326095410101	08-07-91		<20	75	26	11	2.6	0.30	21	7.5	17	7.90
412334095214201	08-07-91		350	100	36	16	1.6	0.25	22	24	96	4.30
412655095365701	08-28-91		310	150	50	34	2.1	0.50	21	75	120	10.0
412754095323701	08-06-91		<20	86	29	15	1.3	0.40	21	24	28	10.0
412812095322701	08-06-91		--	--	--	--	--	--	--	--	--	12.0
412813095210701	08-09-91		330	150	41	25	3.0	0.25	15	40	230	2.30
413429092420401	08-29-91		80	200	100	160	7.3	0.75	7.0	9.8	1000	<0.100
404835094240201	08-28-91		1300	48	11	28	<1.0	0.30	40	7.8	40	0.100
421617095051001	08-06-91		--	--	--	--	--	--	--	--	--	5.20
421808095025301	08-06-91		<20	81	29	10	2.4	0.25	25	17	39	5.90
421909095162301	08-07-91		200	110	27	14	2.0	0.45	25	11	130	<0.100
422739095084202	08-07-91		<20	84	29	8.6	1.2	0.30	26	14	57	10.0
423057095052201	08-02-91		--	--	--	--	--	--	--	--	--	0.200
413500090462401	08-07-91		130	72	27	9.0	<1.0	--	18	7.0	26	<0.100
413055095271001	08-06-91		540	130	33	27	2.5	0.40	20	38	97	4.90
413434095033701	08-14-91		--	--	--	--	--	--	--	--	--	<0.100
413816095185801	08-09-91		1400	150	34	16	3.3	0.15	15	45	120	<0.100
413823095190501	08-09-91		<20	100	28	22	1.7	0.30	20	46	45	6.60
413842095184401	08-09-91		9500	190	40	56	6.5	0.20	24	60	240	0.200
414407095284101	08-13-91		870	110	30	8.0	2.7	0.30	44	15	29	0.200
414729095124001	08-08-91		--	--	--	--	--	--	--	--	--	<0.100
414934095201701	08-08-91		850	120	42	12	3.1	0.30	30	13	110	<0.100
425943096294301	08-01-91		40	120	40	23	7.2	0.30	--	30	--	0.500
4304160960603701	08-01-91		900	150	49	21	7.3	0.35	--	44	--	2.10
431441095562501	08-01-91		--	--	--	--	--	--	--	--	--	0.100
431507096000801	08-02-91		740	66	40	22	2.0	0.45	--	26	--	<0.100
420130093380901	08-14-91		--	--	--	--	--	--	--	--	--	0.300
420141093365701	08-13-91		--	--	--	--	--	--	--	--	--	0.100
415422092180101	08-12-91		--	--	--	--	--	--	--	--	--	3.80

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STATION	NUMBER	DATE	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	ATRA- ZINE, TOTAL (UG/L) (39630)	CYAN- AZINE TOTAL (UG/L) (81757)	METRI- BUZIN IN WHOLE WATER (UG/L) (81408)	ALA- CHLOR TOTAL RECOVER (UG/L) (77825)	METOLA- CHLOR IN WHOLE WATER (UG/L) (39356)	BUTY- LATE TOTAL (UG/L) (99901)	TRI- FLURA- LIN TOTAL RECOVER (UG/L) (39030)
412132092575201	07-25-91		0.300	<0.100	1.2	0.63	<0.10	<0.10	1.10	<0.10	<0.10
415614092520601	08-15-91		1.60	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
420400092552401	08-15-91		0.200	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
420410092543801	08-15-91		1.80	0.200	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
420613092593601	08-15-91		0.200	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
410007095330501	08-14-91		0.200	0.200	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
410007095331901	08-14-91		1.00	0.200	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
432241092550802	08-28-91		<0.100	<0.100	0.16	<0.10	<0.10	<0.10	<0.20	<0.10	<0.10
415558096044901	08-08-91		1.40	0.300	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
405558094592501	08-28-91		0.400	0.200	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
405855095061201	08-13-91		0.200	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
410857095094201	08-28-91		<0.100	0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
412213091063601	08-08-91		0.100	0.800	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
412319091034801	08-08-91		0.100	<0.100	0.12	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
412321091040101	08-08-91		0.100	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
413336091161501	08-07-91		1.30	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
413455091012601	08-07-91		0.400	0.200	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
430014095385801	07-30-91		<0.100	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
431045095413401	07-30-91		<0.100	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
431147095504701	07-30-91		0.100	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
431703095272401	07-30-91		0.200	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
403657095072701	08-13-91		<0.100	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
40506095175601	08-13-91		0.200	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
425608094405701	08-12-91		2.70	0.400	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
430625094411701	08-14-91		0.600	0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
431421094445201	08-14-91		<0.100	<0.100	1.7	<0.10	0.19	0.17	3.50	<0.10	<0.10
423537095583901	08-07-91		<0.100	0.200	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
423650096175701	08-07-91		0.500	0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
424911096033001	08-12-91		0.300	0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
424916095581201	08-07-91		<0.100	<0.100	0.11	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
424907094313001	08-12-91		1.70	0.200	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
425058094510801	08-12-91		4.60	0.200	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
425058094510802	08-12-91		3.00	0.200	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
413351093432301	07-23-91		1.30	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
414409093241601	07-24-91		0.200	<0.100	0.12	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
414625093424301	07-24-91		1.60	0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
414634093423601	07-24-91		1.50	0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
411154095252501	08-09-91		<0.100	0.300	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
411501095251301	09-04-91		0.200	0.200	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
411837095245401	08-07-91		0.200	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
411838095252801	08-07-91		0.200	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
412326095410101	08-07-91		0.100	0.200	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
412334095214201	08-07-91		0.200	0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
412655095365701	08-28-91		<0.100	0.200	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
412754095323701	08-06-91		<0.100	0.200	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
412812095322701	08-06-91		<0.100	0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
412813095210701	08-09-91		0.100	0.200	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
413429092420401	08-29-91		4.00	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
404835094240201	08-28-91		0.800	1.00	<0.10	<0.10	<0.10	<0.10	<0.20	<0.10	<0.10
421617095051001	08-06-91		0.200	<0.100	0.15	0.13	<0.10	<0.10	<0.10	<0.10	<0.10
421808095025301	08-06-91		<0.100	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
421909095162301	08-07-91		<0.100	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
422739095084202	08-07-91		<0.100	0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
423057095052201	08-02-91		5.70	0.500	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
413500090462401	08-07-91		0.400	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
413055095271001	08-06-91		0.100	0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
413434095033701	08-14-91		0.900	0.600	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
413816095185801	08-09-91		0.500	0.200	0.53	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
413823095190501	08-09-91		<0.100	0.200	1.5	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
413842095184401	08-09-91		1.50	0.400	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
414407095284101	08-13-91		1.30	0.600	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
414729095124001	08-08-91		0.500	0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
414934095201701	08-08-91		0.500	0.200	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
425943096294301	08-01-91		0.200	0.200	0.14	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
430416096063701	08-01-91		0.300	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
431441095562501	08-01-91		0.400	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
431507096000801	08-02-91		0.400	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
420130093380901	08-14-91		0.300	0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
420141093365701	08-13-91		1.20	0.200	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
415422092180101	08-12-91		<0.100	<0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10

GROUND-WATER QUALITY DATA

STATION NUMBER	LOCAL WELL NUMBER	DATE	LOCAL WELL NAME	COUNTY	SAMPLE DATE	SAMPLE TIME	GEO-LOGIC UNIT	DEPTH OF WELL, TOTAL (FEET)
415502092240104	08213W18AAC	1961	CHELSEA 2	TAMA	09-03-91	1145	111ALVM	40.00
415749092345301	08315W34ABBB	1966	TAMA 4	TAMA	09-03-91	1300	111ALVM	43.00
403659094285301	06732W12CAAD	1960	BLOCKTON 1	TAYLOR	08-26-91	1320	112PLSC	271.00
410625094074901	07329W24ADDC	1971	LORIMOR 1	UNION	08-15-91	1430	111ALVM	30.00
410907092375101	07315W06CADD	1970	EDDYVILLE 2	WAPELLO	08-29-91	1140	112PLSC	30.00
412736093241301	07722W21BCBD	1978	HARTFORD 4	WARREN	07-24-91	1530	367PRDC	2135.00
413040093290501	07823W34DDBD	1979	CARLISLE 5	WARREN	07-24-91	1415	111ALVM	30.00
412849091343301	07706W17BBDD	1973	RIVERSIDE 6	WASHINGTON	09-04-91	1430	111ALVM	225.00
421552094103702	08629W13BACC	1955	HARCOURT 1	WEBSTER	08-29-91	1830	340DVNN	1247.00
422132094030401	08728W12DACA	1937	LEHIGH 2	WEBSTER	08-13-91	0850	340DVNN	1015.00
422615094175801	08830W14AAAD	1957	MOORLAND 1	WEBSTER	08-19-91	1845	339KDRK	747.00
423018094120101	08928W19CACC	1930	FORT DODGE 9	WEBSTER	08-20-91	1100	339KDRK	553.00
423043094120401	08928W19BDBB	1962	FORT DODGE 16	WEBSTER	08-20-91	1200	360OVCB	1850.00
432016093380301	09824W01BCBD	1972	LELAND 1	WINNEBAGO	08-28-91	1430	360ODVC	325.00
431818091474301	09808W16CAAB	1962	DECORAH 3	WINNEBAGO	07-24-91	0845	111ALVM	60.00
421406096134501	08646W29CBAB	1981	SLOAN 4	WOODBURY	08-12-91	1025	111ALVM	104.00
421705095533602	086N43W06CCDD	1984	OTO 3	WOODBURY	08-08-91	0900	111ALVM	65.00
422403096212101	088N47W30DCDD	1981	SERGEANT BLUFF 4	WOODBURY	08-08-91	1040	111ALVM	120.00
422924096042001	08944W29CCDC	1924	MOVILLE 1	WOODBURY	08-06-91	1600	111ALVM	36.00
422931096250901	08947W29CCCB	1971	SIOUX CITY RIVER 1	WOODBURY	08-08-91	0915	217DKOT	308.00
423237095521101	08943W12BADD	1956	PIERSON 2	WOODBURY	08-07-91	1530	111ALVM	34.00
432109093124501	09920W33BDAB	1966	KENSETT 2	WORTH	08-28-91	1315	344CDVL	303.00
424405093551511	09226W33DCBB	1915	GOLDFIELD 1	WRIGHT	08-05-91	1235	112PLSC	200.00

GROUND-WATER QUALITY DATA

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STATION	NUMBER	DATE	FLOW RATE (G/M) (00058)	PUMP OR FLOW 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)	OXYGEN, DIS- SOLVED (MG/L) (00300)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	ALKA- LITY LAB (MG/L AS CACO3) (90410)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	IRON, DIS- SOLVED (UG/L AS FE) (01046)
415502092240104	09-03-91	110	20	12.5	460	7.7	--	250	185	276	2200	
415749092345301	09-03-91	400	15	11.0	710	7.7	1.3	350	246	422	<20	
403659094285301	08-26-91	80	30	13.0	1650	7.9	0.2	--	--	--	--	
410625094074901	08-15-91	20	25	10.0	400	6.8	4.4	--	--	--	--	
410907092375101	08-29-91	90	25	14.0	748	7.4	2.1	--	--	--	--	
412736093241301	07-24-91	280	25	22.5	841	7.4	--	250	--	--	1600	
413040093290501	07-24-91	250	15	12.5	560	7.3	1.7	280	174	284	450	
412849091343301	09-04-91	225	15	13.5	622	8.2	--	--	--	--	--	
421552094103702	08-29-91	60	20	11.5	1270	7.6	--	600	309	894	1900	
422132094030401	08-13-91	150	60	15.0	2050	7.1	--	1200	247	1720	1800	
422615094175801	08-19-91	60	30	13.0	1200	7.2	--	610	420	804	2000	
423018094120101	08-20-91	500	30	11.0	1700	7.6	--	490	387	560	640	
423043094120401	08-20-91	1600	30	11.0	1300	7.5	--	400	316	788	350	
432016093380301	08-28-91	120	20	11.0	767	7.4	--	390	373	430	910	
431818091474301	07-24-91	250	45	12.0	513	7.4	2.1	310	240	338	--	
421406096134501	08-12-91	335	20	11.5	1220	7.3	0.5	--	--	--	--	
421705095533602	08-08-91	100	30	11.0	970	7.2	0.4	490	402	608	190	
422403096212101	08-08-91	105	120	11.0	989	6.6	2.4	480	431	586	8200	
422924096042001	08-06-91	175	30	12.0	760	7.4	--	400	293	476	<20	
422931096250901	08-08-91	700	3600	12.0	1170	6.8	2.6	440	268	762	800	
423237095521101	08-07-91	120	30	10.0	765	7.2	3.6	380	294	464	<20	
432109093124501	08-28-91	240	30	10.5	516	7.6	--	280	240	298	890	
424405093551511	08-05-91	180	30	10.5	690	6.8	0.2	--	--	--	--	

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[illegible]

GROUND-WATER QUALITY DATA

STATION NUMBER	LOCAL WELL NUMBER	DATE	LOCAL WELL NAME	COUNTY	SAMPLE DATE	SAMPLE TIME	GEO-LOGIC UNIT	DEPTH OF WELL, TOTAL (FEET)
415255091034301	08202W27ACBD	1950	CLARENCE 2	CEDAR	08-13-91	1245	355GOWR	200.00
430010091390102	09507W34ACAD	1924	CLERMONT 2	FAYETTE	08-06-91	1145	364GLEN	240.00
424312093132101	09120W05DADD	1975	HAMPTON 6	FRANKLIN	08-07-91	1215	110QRNR	41.00
404327095284801	068N40W07BCAA	1980	FARRAGUT 79-2 (NORTH)	FREMONT	08-14-91	1120	111ALVM	65.00
404432095361701	06941W31BAAA	1981	SIDNEY 6	FREMONT	09-04-91	0830	111ALVM	32.00
423323093034701	08919W02BB	1942	ACKLEY 3	HARDIN	08-28-91	1300	339KDRK	140.00
421849095354901	08741W27DDCA	1950	BATTLE CREEK 2	IDA	08-06-91	1240	112PLSC	42.00
414520092112001	08012W12AC	1952	LADORA 1	IOWA	09-03-91	1610	112PLSC	72.00
420544090405101	084N02E12CBDA		HURSTVILLE 1	JACKSON	08-16-91	0830	340DVSL	135.00
413907093070501	07920W13ADDC	1952	NEWTON 7	JASPER	08-15-91	1900	111ALVM	54.00
414051093190901	079N21W05CAAA	1939	MITCHELLVILLE 1	JASPER	07-25-91	0845	111ALVM	58.00
420009091084902	08303W13BA	1910	OLIN 1	JONES	08-16-91	1215	350SLRN	180.00
432636096100801	10045W33BDBA	1972	ROCK RAPIDS 6	LYON	07-31-91	1300	111ALVM	26.00
412924094072203		1986	EARLHAM 6	MADISON	08-20-91	1040	111ALVM	39.00
410007095330501	07241W27CDCC	1978	MALVERN 11	MILLS	08-14-91	0940	111ALVM	56.00
405558094592501	071N36W21DCAA	1954	VILLISCA 4	MONTGOMERY	08-28-91	0950	111ALVM	50.00
405855095061201	071N37W04ADBC	1970	STANTON 2	MONTGOMERY	08-13-91	1415	217DKOT	151.00
413455091012601	078N02W01DCAA	1981	WILTON 3	MUSCATINE	08-07-91	1230	112PLSC	195.00
431045095413401	09741W33ACCC	1980	SANBORN 4	O'BRIEN	07-30-91	1630	112PLSC	75.00
403657095072701	067N37W17CBBA	1971	COLLEGE SPRINGS 3	PAGE	08-13-91	1140	112PLSC	42.00
423537095583901	09043W19CCBB	1956	KINGSLEY 1	PLYMOUTH	08-07-91	1335	110QRNR	37.00
411501095251301	075N40W35CBCA	1975	CARSON (5), 3	POTTAWATTAMIE	09-04-91	1100	111ALVM	28.00
414407095284101	08040W14CCBD	1967	PANAMA 1	SHELBY	08-13-91	0900	111ALVM	39.00
414934095201701	08139W13CACB	1944	DEFIANCE WEST	SHELBY	08-08-91	1340	111ALVM	45.00

STATION NUMBER	DATE	FLOW RATE (G/M) (00058)	PUMP OR FLOW 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)	OXYGEN, DIS-SOLVED (MG/L) (00300)	1,1-DI-CHLORO-ENE TOTAL (UG/L) (34501)	1,1,1-TRI-CHLORO-ETHANE TOTAL (UG/L) (34506)	CARBON-TETRA-CHLO-RIDE TOTAL (UG/L) (32102)
415255091034301	08-13-91	200	60	13.0	570	7.3	2.6	<0.5	<0.5	<0.5
430010091390102	08-06-91	100	10	10.0	650	8.0	3.3	<0.5	<0.5	<0.5
424312093132101	08-07-91	275	120	10.0	670	6.9	0.1	<0.5	<0.5	<0.5
404327095284801	08-14-91	165	30	13.0	688	6.4	1.5	<0.5	<0.5	<0.5
404432095361701	09-04-91	150	30	12.0	675	6.9	--	<0.5	<0.5	<0.5
423323093034701	08-28-91	110	30	11.5	1040	7.1	0.1	<0.5	<0.5	<0.5
421849095354901	08-06-91	240	20	11.5	910	7.3	4.8	<0.5	<0.5	<0.5
414520092112001	09-03-91	150	15	13.0	1000	7.9	--	<0.5	<0.5	<0.5
420544090405101	08-16-91	20	60	13.0	815	7.2	2.8	<0.5	<0.5	<0.5
413907093070501	08-15-91	250	30	11.0	680	7.6	0.7	<0.5	<0.5	<0.5
414051093190901	07-25-91	250	20	12.0	646	7.0	0.8	<0.5	<0.5	<0.5
420009091084902	08-16-91	260	60	12.0	520	7.4	0.6	<0.5	<0.5	<0.5
432636096100801	07-31-91	120	20	13.5	720	7.5	2.0	<0.5	<0.5	<0.5
412924094072203	08-20-91	85	30	13.0	864	7.4	0.1	<0.5	<0.5	<0.5
410007095330501	08-14-91	150	25	11.0	698	6.9	4.5	<0.5	<0.5	<0.5
405558094592501	08-28-91	40	35	13.0	592	6.5	0.8	<0.5	<0.5	<0.5
405855095061201	08-13-91	130	30	12.0	518	6.5	--	<0.5	<0.5	<0.5
413455091012601	08-07-91	300	60	12.0	523	7.3	0	<0.5	<0.5	<0.5
431045095413401	07-30-91	120	30	10.0	880	7.2	0.6	<0.5	<0.5	<0.5
403657095072701	08-13-91	18	60	12.0	852	6.5	4.4	<0.5	<0.5	<0.5
423537095583901	08-07-91	200	30	10.0	700	7.3	3.8	<0.5	<0.5	<0.5
411501095251301	09-04-91	50	30	12.0	725	7.0	2.7	<0.5	<0.5	<0.5
414407095284101	08-13-91	3.0	30	11.0	750	7.1	0.9	<0.5	<0.5	<0.5
414934095201701	08-08-91	12	20	11.0	910	7.2	0.4	<0.5	<0.5	<0.5

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			1,2-DI- CHLORO- ETHANE	BENZENE	TRI- CHLORO- ETHYL- ENE	1,4-DI- CHLORO- BENZENE	CHLORO- METHANE WATER WHOLE	BROMO- METHANE WATER WHOLE	CHLORO- ETHANE	METHYL- ENE	1,2- TRANS- CHLORO- ETHENE
STATION	NUMBER	DATE	TOTAL (UG/L) (32103)	TOTAL (UG/L) (34030)	TOTAL (UG/L) (39180)	TOTAL (UG/L) (34571)	RECOVER (UG/L) (30201)	RECOVER (UG/L) (30202)	TOTAL (UG/L) (34311)	TOTAL (UG/L) (34423)	TOTAL (UG/L) (34546)
415255091034301	08-13-91		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.1	<0.5
430010091390102	08-06-91		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.1	<0.5
424312093132101	08-07-91		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.1	<0.5
404327095284801	08-14-91		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.1	<0.5
404432095361701	09-04-91		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.1	<0.5
423323093034701	08-28-91		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.1	<0.5
421849095354901	08-06-91		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.1	<0.5
414520092112001	09-03-91		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.1	<0.5
420544090405101	08-16-91		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.1	<0.5
413907093070501	08-15-91		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.1	<0.5
414051093190901	07-25-91		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.1	<0.5
420009091084902	08-16-91		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.1	<0.5
432636096100801	07-31-91		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.1	<0.5
412924094072203	08-20-91		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.1	<0.5
410007095330501	08-14-91		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.1	<0.5
405558094592501	08-28-91		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.1	<0.5
405855095061201	08-13-91		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.1	<0.5
413455091012601	08-07-91		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.1	<0.5
431045095413401	07-30-91		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.1	<0.5
403657095072701	08-13-91		0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.1	<0.5
423537095583901	08-07-91		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.1	<0.5
411501095251301	09-04-91		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.1	<0.5
414407095284101	08-13-91		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.1	<0.5
414934095201701	08-08-91		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.1	<0.5
STATION	NUMBER	DATE	1,1-DI- CHLORO- ETHANE TOTAL (UG/L) (34496)	CHLORO- FORM TOTAL (UG/L) (32106)	1,1-DI- CHLORO- PRO- PENE, WAT, WH TOTAL (UG/L) (77168)	1,2-DI- CHLORO- PROPANE TOTAL (UG/L) (34541)	DI- CHLORO- BROMO- METHANE TOTAL (UG/L) (32101)	DI- BROMO- METHANE WATER RECOVER (UG/L) (30217)	CIS 1,3-DI- CHLORO- PROPENE TOTAL (UG/L) (34704)	TOLUENE TOTAL (UG/L) (34010)	TRANS- 1,3-DI- CHLORO- PROPENE TOTAL (UG/L) (34699)
415255091034301	08-13-91		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
430010091390102	08-06-91		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
424312093132101	08-07-91		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
404327095284801	08-14-91		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
404432095361701	09-04-91		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
423323093034701	08-28-91		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
421849095354901	08-06-91		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
414520092112001	09-03-91		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
420544090405101	08-16-91		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
413907093070501	08-15-91		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
414051093190901	07-25-91		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
420009091084902	08-16-91		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
432636096100801	07-31-91		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
412924094072203	08-20-91		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
410007095330501	08-14-91		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
405558094592501	08-28-91		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
405855095061201	08-13-91		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
413455091012601	08-07-91		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
431045095413401	07-30-91		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
403657095072701	08-13-91		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.1	<0.5
423537095583901	08-07-91		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.1	<0.5
411501095251301	09-04-91		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.1	<0.5
414407095284101	08-13-91		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.1	<0.5
414934095201701	08-08-91		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.1	<0.5

GROUND-WATER QUALITY DATA

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STATION NUMBER	LOCAL WELL NUMBER	DATE	LOCAL WELL NAME	COUNTY	SAMPLE DATE	SAMPLE TIME	GEO- LOGIC UNIT	DEPTH OF WELL, TOTAL (FEET)
410115094362201	07233W23DBAA	1981	PRESCOTT 2	ADAMS	08-20-91	1600	112PLSC	40.00
415442092180201	08213W13DACB	1977	BELLE PLAINE 5	BENTON	08-12-91	1500	111ALVM	37.00
422810092035201	08910W31DDCA	1976	JESUP 3	BUCHANAN	08-06-91	1715	340DVSL	400.00
425355092475801	09317W01ACCC	1948	GREENE 1	BUTLER	08-27-91	1200	344CDVL	115.00
422236094254601	08731W02BDC	1968	SOMERS 1	CALHOUN	08-19-91	2030	330MSSP	410.00
422525094492401	088N34W21BCB	1985	LYTTON 4	CALHOUN	08-19-91	1150	217DKOT	162.00
412652095064201	077N37W21CDC	1913	MARNE 1	CASS	09-04-91	1300	111ALVM	35.00
412652095064201	077N37W21CDC	1913	MARNE 1	CASS	11-18-91	0930	111ALVM	35.00
413605090542901	07901W36DCCB	1974	DURANT 3	CEDAR	08-07-91	1410	112PLSC	80.00
430241091234501	09505W14ACDD	1978	MONONA (3),2	CLAYTON	08-06-91	1010	371JRDN	850.00
414729090151801	08106E27CBC	1971	CAMANCHE 3	CLINTON	08-29-91	1145	112PLSC	65.00
415025090110611	08107E07ACA	1936	CLINTON 1	CLINTON	08-14-91	1030	371GLVL	2242.00
415343095134901	08238W26ADDB	1931	MANILLA 7	CRAWFORD	08-19-91	1335	111WNRV	87.00
415313095134601	08238W26ADDB	1939	MANILLA 2	CRAWFORD	11-18-91	1130	112PLSC	87.00
415650095275603	08240W02ABDD	1965	ARION 2	CRAWFORD	08-19-91	1535	111ALVM	65.00
415650095275603	08240W02ABDD	1965	ARION 2	CRAWFORD	11-27-91	0945	111ALVM	65.00
424455091395501	09207W27CCBB	1980	ARLINGTON 4	FAYETTE	08-06-91	1450	371JRDN	1310.00
430315092563401	09518W11CCBD	1978	ROCKFORD 2	FLOYD	08-27-91	1340	344CDVL	214.00
430458092403701	09516W01AAB	1950	CHARLES CITY 5	FLOYD	08-27-91	1530	344CDVL	187.00
403558095393901	06742W28AAAB	1982	HAMBURG 6	FREMONT	08-14-91	1340	111ALVM	98.00
404432095361701	06941W31BAAA	1981	SIDNEY 6	FREMONT	09-04-91	0830	111ALVM	32.00
421610093553011	08626W07CD	1959	STRATFORD 3	HAMILTON	08-13-91	1130	330MSSP	550.00
431350093544201	09726W10CBBD	1948	WODEN 1	HANCOCK	08-28-91	1600	361MQKT	531.00
423125093160601	089N21W13ACA	1978	IOWA FALLS 6	HARDIN	08-07-91	0935	330MSSP	250.00
423125093160601	089N21W13ACA	1978	IOWA FALLS 6	HARDIN	11-14-91	1040	330MSSP	250.00
413830095465802	07942W19BDBD	1975	LOGAN 6	HARRISON	08-19-91	1145	111ALVM	58.00
432144092332501	09914W30CACA	1964	RICEVILLE 2	HOWARD	08-28-91	1100	364GLEN	468.00
413927092003601	079N10W16A	1972	WILLIAMSBURG 6	IOWA	08-27-91	1420	112PLSC	270.00
414647091580701	081N10W35DAA	1979	SOUTH AMANA (12) 120	IOWA	08-27-91	1145	112PLSC	38.00
420009091084902	08303W13BA	1910	OLIN 1	JONES	08-16-91	1215	350SLRN	180.00
430427094145801	09529W02CABB	1959	ALGONA 5	KOSSUTH	08-14-91	1515	217DKOT	135.00
403226091252702	066N05W03CDA	1985	MONTROSE 2	LEE	08-09-91	1145	111ALVM	48.00
431646096142901	09816W26ACDD	1976	DOON 4	LYON	07-31-91	0830	111ALVM	57.00
431844096263501	09847W18BDB	1941	INWOOD 1	LYON	07-31-91	1030	217DKOT	518.00
411047093493501	07426W27DADA	1956	TRURO 1	MADISON	08-15-91	1130	112PLSC	50.00
411047093493501	07426W27DADA	1956	TRURO 1	MADISON	11-19-91	1220	112PLSC	50.00
420400092552401	084N18W22DDA	1981	MARSHALLTOWN 6	MARSHALL	08-15-91	1000	330MSSP	156.00
420410092543801	084N18W23DBA	1977	MARSHALLTOWN 9	MARSHALL	08-15-91	1130	330MSSP	270.00
420613092593601	08418W07BACA	1969	ALBION 2	MARSHALL	08-15-91	1500	111ALVM	26.00
410857095094201	07338W01DBDC	1935	ELLIOTT 1	MONTGOMERY	08-28-91	1135	112PLSC	56.00
430014095385801	095N41W35DBA	1978	PAULLINA 4	O'BRIEN	07-30-91	1200	111ALVM	60.00
430014095385801	095N41W35DBA	1978	PAULLINA 4	O'BRIEN	11-05-91	1100	111ALVM	60.00
4131147095504701	09742W30ADBB	1932	SHELDON 3	O'BRIEN	07-30-91	1430	112PLSC	28.00
423650096175701	09046W17ACAC	1974	HINTON 4	PLYMOUTH	08-07-91	0825	217DKOT	270.00
424911096033001	09244W05AA	1953	OYENS 1	PLYMOUTH	08-12-91	1235	217DKOT	215.00
424907094313001	09231W05AAC	1947	ROLFE (3),2	POCAHONTAS	08-12-91	1115	330MSSP	250.00
424907094313001	09231W05AAC	1947	ROLFE (3),2	POCAHONTAS	11-25-91	1100	330MSSP	250.00
425058094510801	09334W27BBAA	1961	LAURENS 6	POCAHONTAS	08-12-91	1400	217DKOT	229.00
413351093432301	07825W15ABCC	1971	WEST DES MOINES 2	POLK	07-23-91	1315	371JRDN	2480.00
414625093424301	08125W01BACC	1951	POLK CITY 1	POLK	07-24-91	0920	112PLSC	66.00
404835094240201	06931W03	1967	CLEARFIELD 1	RINGGOLD	08-28-91	1230	111ALVM	41.00
421909095162301	08738W28DBBB	1972	ODEBOLT 6	SAC	08-07-91	0945	112PLSC	42.00
413500090462401	07802E06DCC	1966	WALCOTT 3	SCOTT	08-07-91	1600	355NIGR	230.00
420130093380901	08324W03CDBB	1982	AMES 17	STORY	08-14-91	0745	112PLSC	147.00
412736093241301	07722W21BCBD	1978	HARTFORD 4	WARREN	07-24-91	1530	367PRDC	2135.00
422132094030401	08728W12DACA	1937	LEHIGH 2	WEBSTER	08-13-91	0850	340DVNN	1015.00
422615094175801	08830W14AAAD	1957	MOORLAND 1	WEBSTER	08-19-91	1845	339KDRK	747.00
423043094120401	08928W19BDBB	1962	FORT DODGE 16	WEBSTER	08-20-91	1200	360OVCC	1850.00
432016093380301	09824W01BCBD	1972	LELAND 1	WINNEBAGO	08-28-91	1430	360ODVC	325.00
432016093380301	09824W01BCBD	1972	LELAND 1	WINNEBAGO	11-18-91	1035	360ODVC	325.00
431818091474301	09808W16CAAB	1962	DECORAH 3	WINNESHIEK	07-24-91	0845	111ALVM	60.00
421406096134501	08646W29CBAB	1981	SLOAN (4),3	WOODBURY	08-12-91	1025	111ALVM	104.00
422931096250901	08947W29DCCB	1971	SIOUX CITY RIVER 1	WOODBURY	08-08-91	0915	217DKOT	308.00

GROUND-WATER QUALITY DATA

STATION	NUMBER	DATE	PUMP OR FLOW		TEMPER- ATURE WATER (DEG C)	SPE- CIFIC CON- DUCT- ANCE (US/CM)	PH (STAND- ARD UNITS)	OXYGEN, DIS- SOLVED (MG/L)	GROSS ALPHA DIS- SOLVED (PCI/L AS U-NAT)	GROSS BETA DIS- SOLVED (PCI/L AS CS-137)	RADIUM 226, DIS- SOLVED (PCI/L RA-228)		RADON 222 DISSOLV (PC/L)
			FLOW RATE (G/M) (00058)	TO SAM- PLING PERIOD (MIN) (72004)							(09503)	(81366)	
410115094362201	08-20-91	65	20	12.0	1180	6.4	--	--	--	--	--	--	266
415442092180201	08-12-91	189	20	12.0	520	6.7	1.8	--	--	--	--	--	281
422810092035201	08-06-91	400	15	11.5	500	8.1	--	--	--	--	--	--	107
425355092475801	08-27-91	200	30	10.5	444	7.6	0.3	--	--	--	--	--	89.8
422236094254601	08-19-91	55	20	13.0	1170	7.3	--	--	--	--	--	--	370
422525094492401	08-19-91	375	30	10.5	1650	7.4	0.5	--	--	--	--	--	191
412652095064201	09-04-91	10	40	12.0	1180	6.7	3.6	--	--	--	--	--	803
412652095064201	11-18-91	10	30	11.0	1380	6.5	0	--	--	--	--	--	852
413605090542901	08-07-91	100	20	14.0	846	6.9	--	--	--	--	--	--	239
430241091234501	08-06-91	325	60	12.0	460	8.1	--	3.1	5.0	1.2	<0.90	--	--
414729090151801	08-29-91	290	60	15.0	400	6.4	--	--	--	--	--	--	164
415025090110611	08-14-91	950	2400	17.5	700	7.4	--	4.6	9.1	2.3	<1.0	--	30.4
415343095134901	08-19-91	90	20	10.0	765	7.2	0.3	--	--	--	--	--	902
415313095134601	11-18-91	108	20	11.0	790	6.9	--	--	--	--	--	--	711
415650095275603	08-19-91	40	20	12.0	1140	7.1	--	--	--	--	--	--	390
415650095275603	11-27-91	40	>30	11.5	1160	7.1	--	--	--	--	--	--	313
424455091395501	08-06-91	143	10	11.5	480	8.2	--	7.6	10	3.0	1.7	--	101
430315092563401	08-27-91	200	40	11.5	500	7.1	0.2	--	--	--	--	--	181
430458092403701	08-27-91	2900	60	10.0	480	7.1	0.2	--	--	--	--	--	252
403558095393901	08-14-91	300	30	13.0	1130	6.8	1.6	--	--	--	--	--	163
404432095361701	09-04-91	150	30	12.0	675	6.9	--	--	--	--	--	--	61.1
421610093553011	08-13-91	180	20	16.0	1290	7.3	--	4.5	21	8.7	<0.90	--	--
431350093544201	08-28-91	120	20	11.0	663	7.5	--	--	--	--	--	--	110
423125093160601	08-07-91	450	60	11.0	750	6.8	0.3	--	--	--	--	--	884
423125093160601	11-14-91	--	20	12.0	655	7.1	--	--	--	--	--	--	303
413830095465802	08-19-91	--	20	16.0	775	7.3	0.4	--	--	--	--	--	316
432144092332501	08-28-91	145	60	10.0	640	7.1	0.2	3.0	4.7	1.3	<0.90	--	--
413927092003601	08-27-91	240	15	12.5	710	7.4	0.3	--	--	--	--	--	406
414647091580701	08-27-91	100	10	11.5	660	7.4	1.3	--	--	--	--	--	83.3
420009091084902	08-16-91	260	60	12.0	520	7.4	0.6	--	--	--	--	--	79.1
430427094145801	08-14-91	500	90	10.5	1250	7.1	0.1	--	--	--	--	--	253
403226091252702	08-09-91	280	30	13.5	598	7.0	--	--	--	--	--	--	270
431646096142901	07-31-91	>375	20	10.0	880	7.4	3.0	--	--	--	--	--	821
431844096263501	07-31-91	8.5	30	12.0	1380	7.4	0.4	3.1	23	1.1	1.3	--	--
411047093493501	08-15-91	50	20	12.0	599	7.1	0.2	--	--	--	--	--	614
411047093493501	11-19-91	48	15	11.0	490	7.0	--	--	--	--	--	--	653
420400092552401	08-15-91	1250	240	12.0	500	7.8	0.4	--	--	--	--	--	387
420410092543801	08-15-91	730	30	11.0	650	7.9	0.5	--	--	--	--	--	296
420613092593601	08-15-91	--	30	12.0	560	7.9	7.2	--	--	--	--	--	419
410857095094201	08-28-91	--	30	15.0	404	6.9	6.5	--	--	--	--	--	291
430014095385801	07-30-91	320	20	10.0	750	7.3	1.8	--	--	--	--	--	435
430014095385801	11-05-91	350	25	9.0	779	6.9	1.2	--	--	--	--	--	477
431147095504701	07-30-91	60	30	13.5	795	7.3	0.5	--	--	--	--	--	429
423650096175701	08-07-91	145	20	11.5	655	7.4	0.6	--	--	--	--	--	97.1
424911096033001	08-12-91	110	5	12.0	665	7.4	--	--	--	--	--	--	102
424907094313001	08-12-91	200	30	10.0	1110	7.0	0.3	--	--	--	--	--	1214
424907094313001	11-25-91	210	20	10.0	860	7.1	--	--	--	--	--	--	880
425058094510801	08-12-91	170	30	10.5	2050	7.2	0.2	1.4	6.0	0.5	<0.90	--	255
413351093432301	07-23-91	950	5	26.0	1730	7.1	--	16	53	8.4	<0.80	--	--
414625093424301	07-24-91	6.5	20	12.5	1230	7.0	--	--	--	--	--	--	57.3
404835094240201	08-28-91	80	20	12.0	445	6.8	0.4	--	--	--	--	--	378
421909095162301	08-07-91	40	30	10.0	890	7.2	0.2	--	--	--	--	--	230
413500090462401	08-07-91	200	20	11.5	650	7.0	--	--	--	--	--	--	242
420130093380901	08-14-91	570	1440	12.0	932	7.2	--	--	--	--	--	--	232
412736093241301	07-24-91	280	25	22.5	841	7.4	--	8.4	20	4.1	<0.80	--	--
422132094030401	08-13-91	150	60	15.0	2050	7.1	--	2.4	21	0.5	5.8	--	--
422615094175801	08-19-91	60	30	13.0	1200	7.2	--	5.5	6.0	2.8	<0.90	--	361
423043094120401	08-20-91	1600	30	11.0	1300	7.5	--	18	9.4	4.6	2.2	--	--
432016093380301	08-28-91	120	20	11.0	767	7.4	--	--	--	--	--	--	547
432016093380301	11-18-91	120	20	10.0	759	7.1	--	--	--	--	--	--	539
431818091474301	07-24-91	250	45	12.0	513	7.4	2.1	--	--	--	--	--	550
421406096134501	08-12-91	335	20	11.5	1220	7.3	0.5	--	--	--	--	--	237
422931096250901	08-08-91	700	3600	12.0	1170	6.8	2.6	7.0	19	3.9	2.7	--	--

PRECIPITATION WATER-QUALITY DATA

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MCNAY RESEARCH STATION NEAR CHARITON, IOWA

LOCATION.--Lat 40°57'47", long 93°23'34", 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 dry or contained little water. 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, 6.38, March 19-26; minimum field pH, 4.44, April 16-23.

WET DEPOSITION DATA

DATE	PH (STANDARD UNITS) (00400)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	MAGNE- CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	POTAS- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	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- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)
OCT											
02-09	4.56	15	0.05	0.009	0.01	0.01	0.440	0.180	0.27	2.0	<0.007
09-16	--	--	0.27	0.02	0.008	0.22	0.200	0.190	0.17	0.74	<0.007
16-23	4.80	20	0.85	0.05	0.05	0.09	0.430	0.440	0.09	2.6	<0.007
23-30	--	--	--	--	--	--	--	--	--	--	--
OCT 30-											
NOV 06	5.02	7	0.13	0.01	0.03	0.07	0.190	0.070	0.08	0.70	<0.007
06-13	4.48	17	0.07	0.009	0.01	0.04	0.210	0.250	0.15	1.5	<0.007
13-20	--	--	--	--	--	--	--	--	--	--	--
20-27	5.45	5	0.23	0.02	0.01	0.03	0.230	0.120	0.07	0.67	<0.007
NOV 27-											
DEC 04	4.65	10	0.07	0.01	0.005	0.07	0.070	0.240	0.13	0.76	0.013
DEC											
04-11	--	--	--	--	--	--	--	--	--	--	--
11-18	4.49	21	0.17	0.01	0.01	0.09	0.260	0.270	0.10	2.2	<0.007
18-25	--	--	--	--	--	--	--	--	--	--	--
DEC 25 1990-											
JAN 01 1991	4.85	8	0.07	0.007	0.02	0.03	0.070	0.120	0.06	0.65	<0.007
JAN											
01-08	--	--	--	--	--	--	--	--	--	--	--
08-15	4.50	17	0.12	0.01	0.02	0.08	0.090	0.500	0.16	0.67	<0.007
15-22	4.90	12	0.10	0.01	0.003	0.10	0.420	0.350	0.14	1.3	<0.007
22-29	--	--	0.50	0.03	0.04	0.13	0.050	0.250	0.28	0.42	<0.007
JAN 29-											
FEB 05	--	--	--	--	--	--	--	--	--	--	--
FEB											
05-12	--	--	--	--	--	--	--	--	--	--	--
12-19	4.78	20	.38	0.05	0.04	0.07	0.800	0.420	0.13	3.0	<0.007
19-26	--	--	--	--	--	--	--	--	--	--	--
FEB 26-											
MAR 05	5.20	6	0.08	0.009	0.004	0.03	0.350	0.150	0.04	0.54	<0.007
MAR											
12-19	4.54	22	0.59	0.08	0.03	0.21	0.370	0.430	0.24	3.1	<0.007
19-26	6.38	14	1.1	0.08	0.06	0.14	0.500	0.290	0.13	1.6	<0.007
MAR 26-											
APR 02	5.98	9	0.86	0.08	0.12	0.15	0.360	0.200	0.16	1.2	<0.007
APR											
02-09	5.12	11	0.36	0.02	0.02	0.05	0.420	0.260	0.07	1.3	<0.007
09-16	4.64	17	0.22	0.04	0.03	0.07	0.280	0.260	0.12	1.8	<0.007
16-23	4.44	31	0.24	0.03	0.02	0.02	0.800	0.720	0.12	2.8	<0.007
23-30	4.86	12	0.20	0.03	0.06	0.05	0.370	0.210	0.07	1.7	<0.007
APR 30-											
MAY 07	5.26	9	0.27	0.03	0.05	0.04	0.290	0.270	0.09	1.2	<0.007
MAY											
07- 14	--	--	--	--	--	--	--	--	--	--	--
14-21	5.55	9	0.21	0.05	0.11	0.12	0.580	0.230	0.16	1.1	0.029

MCNAY RESEARCH STATION NEAR CHARITON, IOWA

WET DEPOSITION DATA

[illegible]

RECIPITATION 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 dry or contained little water. Fifty (50) ml of dilution water was added to the sample bucket to dissolve dry precipitate and then analyzed. No sample available for analysis June 11 to July 23 because of inundation of sampling equipment.

EXTREMES FOR PERIOD OF RECORD.--Maximum field pH, 6.98, May 5-12, 1987, June 26 to July 3, 1990; minimum field pH, 3.83, July 30 to August 6, 1985.

EXTREMES FOR CURRENT YEAR.--Maximum field pH, 6.89, September 17-24; minimum field pH, 3.99, July 23-30.

WET DEPOSITION DATA

DATE	PH (STAND- ARD UNITS) (00400)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	MAGNE- CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	POTAS- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	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- PHORUS DIS- SOLVED (MG/L AS P) (00671)
OCT											
02-09	5.34	7	0.22	0.06	0.08	0.01	0.210	0.090	0.09	1.0	<0.007
09-16	6.09	14	1.3	0.21	0.09	0.09	0.580	0.480	0.16	1.3	<0.007
16-23	5.37	15	1.0	0.11	0.06	0.67	0.470	0.430	0.09	2.4	<0.007
23-30	--	--	--	--	--	--	--	--	--	--	--
OCT 30-											
NOV 06	5.96	11	0.47	0.06	0.02	0.05	0.610	0.290	0.13	1.6	<0.007
06-13	5.48	10	0.26	0.06	0.02	0.11	0.490	0.230	0.12	1.4	<0.007
13-20	--	--	--	--	--	--	--	--	--	--	--
20-27	6.08	14	0.66	0.11	0.08	0.10	0.780	0.280	0.12	2.2	<0.007
NOV 27-											
DEC 04	5.82	4	0.25	0.05	0.01	0.04	0.140	0.140	0.08	0.41	<0.007
04-11	--	--	--	--	--	--	--	--	--	--	--
11-18	--	--	0.27	0.04	0.02	0.03	0.260	0.240	0.13	0.80	<0.007
18-26	--	--	--	--	--	--	--	--	--	--	--
DEC 26 1990-											
JAN 01 1991	--	--	0.41	0.06	0.03	0.23	1.17	0.740	0.27	4.9	<0.007
01-08	--	--	0.03	0.01	<0.003	0.004	0.050	0.110	0.04	0.11	<0.007
08-15	4.69	13	0.11	0.03	0.004	0.02	0.030	0.390	0.11	0.29	<0.007
15-22	--	--	--	--	--	--	--	--	--	--	--
22-29	--	--	3.8	0.13	0.23	0.30	0.090	0.250	0.73	0.96	<0.037
JAN 29-											
FEB 05	--	--	--	--	--	--	--	--	--	--	--
05-12	--	--	--	--	--	--	--	--	--	--	--
12-19	5.35	32	0.99	0.15	0.06	0.16	1.77	1.04	0.22	5.4	<0.007
19-26	--	--	--	--	--	--	--	--	--	--	--
FEB 26-											
MAR 05	4.67	17	0.09	0.01	0.03	0.03	0.590	0.370	0.08	1.9	<0.007
MAR											
05-12	4.34	43	0.90	0.13	0.05	0.19	1.23	1.15	0.31	4.7	<0.007
12-19	4.74	15	0.14	0.02	0.01	0.03	0.220	0.250	0.08	1.5	<0.007
19-26	6.54	12	0.79	0.10	0.19	0.06	0.450	0.330	0.13	1.9	<0.007
MAR 26-											
APR 02	6.30	10	0.67	0.07	0.14	0.18	0.380	0.190	0.12	1.3	<0.007
02-09	6.11	11	0.55	0.10	0.42	0.03	0.470	0.240	0.11	0.95	0.026
09-16	4.55	18	0.09	0.01	0.01	0.02	0.140	0.180	0.06	1.5	<0.007
16-23	4.59	24	0.48	0.08	0.03	0.04	0.690	0.640	0.12	2.7	<0.007
23-30	4.92	20	0.21	0.04	0.07	0.04	1.10	0.410	0.10	3.0	<0.007
APR 30-											
MAY 07	4.47	26	0.21	0.05	0.01	0.05	0.540	0.530	0.09	2.3	<0.007
07-14	5.65	21	0.90	0.16	0.11	0.25	0.750	0.680	0.32	3.2	<0.007
14-21	5.44	11	0.28	0.05	0.10	0.04	0.510	0.360	0.08	1.5	<0.007
21-28	5.10	15	0.19	0.06	0.03	0.02	0.590	0.310	0.06	2.3	<0.007
MAY 28-											
JUN 04	6.45	10	0.63	0.11	0.05	0.06	0.350	0.240	0.11	1.3	<0.007

PRECIPITATION WATER-QUALITY DATA

BIG SPRINGS FISH HATCHERY NEAR ELKADER, IOWA

WET DEPOSITION DATA

DATE	PH (STAND- ARD UNITS) (00400)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	MAGNE- CALCIUM DIS- SOLVED (MG/L) AS CA) (00915)	POTAS- SIUM, DIS- SOLVED (MG/L) AS MG) (00925)	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- PHORUS ORTHO, DIS- SOLVED (MG/L) AS P) (00671)
JUN											
04-11	6.83	13	1.3	0.20	0.02	0.04	0.150	0.460	0.12	1.3	<0.007
JUL											
23-30	3.99	61	0.32	0.08	0.005	0.03	0.530	0.710	0.19	5.6	<0.007
JUL 30-											
AUG 06	6.84	27	3.9	0.76	1.7	0.09	0.800	0.380	0.41	1.4	<0.007
AUG											
06-13	4.64	19	0.17	0.02	0.007	0.02	0.370	0.360	0.06	0.72	<0.007
13-20	6.51	7	0.62	0.07	0.04	0.02	0.220	0.190	0.06	0.72	<0.007
20-27	6.64	17	1.1	0.15	0.10	0.04	0.570	0.590	0.08	1.6	<0.007
AUG 27-											
SEP 03	5.08	12	0.25	0.05	0.02	0.02	0.300	0.290	0.05	1.1	<0.007
SEP											
03-10	5.33	12	0.40	0.08	0.04	0.05	0.370	0.260	0.08	1.8	<0.007
10-17	5.41	15	0.49	0.05	0.03	0.07	0.570	0.440	0.11	2.2	<0.007
17-24	6.89	71	1.6	0.12	0.09	0.04	0.940	0.650	0.10	1.8	<0.007
SEP 24-											
OCT 01	--	--	2.5	0.33	0.07	0.41	0.660	0.580	0.24	3.5	<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)	2.54×10^1	millimeters (mm)
	2.54×10^{-2}	meters (m)
feet (ft)	3.048×10^{-1}	meters (m)
miles (mi)	1.609×10^0	kilometers (km)
<i>Area</i>		
acres	4.047×10^3	square meters (m ²)
	4.047×10^{-1}	square hectometers (hm ²)
	4.047×10^{-3}	square kilometers (km ²)
square miles (mi ²)	2.590×10^0	square kilometers (km ²)
<i>Volume</i>		
gallons (gal)	3.785×10^0	liters (L)
	3.785×10^0	cubic decimeters (dm ³)
	3.785×10^{-3}	cubic meters (m ³)
million gallons	3.785×10^3	cubic meters (m ³)
	3.785×10^{-3}	cubic hectometers (hm ³)
cubic feet (ft ³)	2.832×10^1	cubic decimeters (dm ³)
	2.832×10^{-2}	cubic meters (m ³)
cfs-days	2.447×10^3	cubic meters (m ³)
	2.447×10^{-3}	cubic hectometers (hm ³)
acre-feet (acre-ft)	1.233×10^3	cubic meters (m ³)
	1.233×10^{-3}	cubic hectometers (hm ³)
	1.233×10^{-6}	cubic kilometers (km ³)
<i>Flow</i>		
cubic feet per second (ft ³ /s)	2.832×10^1	liters per second (L/s)
	2.832×10^1	cubic decimeters per second (dm ³ /s)
	2.832×10^{-2}	cubic meters per second (m ³ /s)
gallons per minute (gal/min)	6.309×10^{-2}	liters per second (L/s)
	6.309×10^{-2}	cubic decimeters per second (dm ³ /s)
	6.309×10^{-5}	cubic meters per second (m ³ /s)
million gallons per day	4.381×10^1	cubic decimeters per second (dm ³ /s)
	4.381×10^{-2}	cubic meters per second (m ³ /s)
<i>Mass</i>		
tons (short)	9.072×10^{-1}	megagrams (Mg) or metric tons

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