

STATISTICAL SUMMARIES OF SELECTED IOWA STREAMFLOW DATA THROUGH SEPTEMBER 30 ,1988

By Edward E. Fischer, Norwood B. Melcher, and Scott P. Kluesner

U.S. GEOLOGICAL SURVEY

Open-File Report 90-170

Prepared in cooperation with the

**U.S. ARMY CORPS OF ENGINEERS,
IOWA DEPARTMENT OF NATURAL RESOURCES,
and
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Iowa City, Iowa
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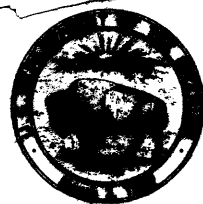
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DEPARTMENT OF THE INTERIOR

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CONVERSION FACTORS

For readers who prefer the International System (SI) units rather than the inch-pound terms used in this report, the following conversion factors may be used:

<u>Multiply</u>	<u>by</u>	<u>To obtain</u>
<u>Length</u>		
foot (ft)	0.3048	meter (m)
mile (mi)	1.609	kilometer (km)
<u>Area</u>		
square mile (mi ²)	2.590	square kilometer (km ²)
<u>Volume</u>		
cubic foot (ft ³)	0.02832	cubic meter (m ³)
gallon (gal)	0.003785	cubic meter (m ³)
<u>Flow</u>		
cubic foot per second (ft ³ /s)	0.02832	cubic meter per second (m ³ /s)

DEFINITION OF TERMS

Average -- The arithmetic average of a list of values. It is computed by summing the values and dividing the sum by the number of values.

Base flow -- Sustained or fair weather runoff which is composed primarily of ground-water effluent.

Climatic year -- The 12-month period April 1 through March 31. The climatic year is designated by the calendar year in which it begins.

Discharge -- The volume of water in a stream at a given point and for a given period of time.

Drainage area -- (of a stream at a stream-gaging station) 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 upstream from the station. Figures of drainage area given herein include all closed basins, or noncontributing areas, within the area unless otherwise specified.

Flow volume -- The total quantity of water for a given interval of time.

Gage height -- The water-surface elevation referred to some arbitrary gage datum.

Ground-water -- Water in the ground that is in the zone of saturation, from which wells, springs, and ground water runoff are supplied.

Mean -- see "Average".

Median -- The middle value of a list of values that have been ordered from minimum to maximum. If there are an even number of values, the median is the average of the two middle values.

National Geodetic Vertical Datum of 1929 (NGVD of 1929) -- 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." 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 location.

Period of record -- The time during which a stream-gaging station is in operation and for which the records are published.

Probability of Occurrence -- The likelihood that an event will occur. Probabilities are generally expressed as a decimal number between 0 and 1. If the probability is 0, the event will not occur; if the probability is 1, the event will occur absolutely. Probability can also be expressed as a percent, where 0 percent corresponds to 0 probability and 100 percent corresponds to a probability of 1.

Regulation -- The artificial manipulation of the flow of a stream.

River mileage -- The distance upstream from the mouth of a river to the stream-gaging station, measured along the main channel of the river.

Runoff -- That part of the precipitation that appears in surface streams. It is the same as streamflow unaffected by artificial diversions or storage.

DEFINITION OF TERMS—Continued

Standard deviation -- A measure of the variability of the values in a list of values. If all of the values are nearly equal to each other, the standard deviation will be close to zero; if the values are well dispersed, the standard deviation will tend to be larger (Iman and Conover, 1983).

Skeleton Rating table -- A rating table which lists discharge for a few selected gage heights over the range of gage heights.

Stage -- see "gage height".

Station rating table -- A table listing discharge for discrete intervals of gage height for a given stream-gaging station.

Streamflow -- see "discharge".

Stream-gaging station -- A particular site on a stream where a record of discharge is obtained.

Surface-water -- Water on the surface of the earth.

Water year -- 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.

Zone of saturation -- The zone in which the functional permeable rocks are saturated with water under hydrostatic pressure. Water in the zone of saturation will flow into a well, and is called ground water.

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ABSTRACT

Statistical summaries of streamflow data collected at 144 active and discontinued stream-gaging stations in Iowa through water year 1988 are presented in the report. The summaries for each stream-gaging station include: 1) station description, 2) the most recent stage-discharge rating table, 3) statistics of monthly and annual mean discharges, 4) boxplots of monthly and annual mean discharges, 5) monthly and annual flow durations, 6) probabilities of annual high discharges, 7) probabilities of annual low discharges, and 8) probabilities of seasonal low discharges. The minimum period of record at stations included in the report is 10 years. The location of each station is shown on a map of Iowa.

INTRODUCTION

A significant part of the mission of the United States Geological Survey is the collection of data on a systematic basis for determining the quantity as well as the quality and use of surface and ground water (Cardin and others, 1986). Data on surface-water quantity primarily are collected by the operation of a stream-gaging network. Approximately 7,239 stream-gaging stations are operated on major rivers and tributaries throughout the United States (Condes, 1989) and currently (1988) 117 stream-gaging stations are in operation in Iowa.

At these stream-gaging stations, river stage is monitored continually. A relation between river stage and discharge is defined by making periodic discharge measurements at varying river stages. This relation is referred to as a station rating. A continuous record of stream discharge is computed for each stream-gaging station using the record of stage and the station rating.

Streamflow data are published annually in state water reports by U.S. Geological Survey offices. The data include records of daily mean discharges, annual high and low discharges, and annual mean discharges. These data also are stored in the WATSTORE (Water Data Storage and Retrieval System) computer files (Hutchinson, 1975) maintained in Reston, Virginia. Streamflow statistics which characterize the temporal distribution of flow at stream-gaging stations are maintained and periodically updated in an auxiliary WATSTORE file. Because these statistics generally do not change significantly with each additional year of data, they are updated every 5 to 10 years.

Streamflow statistics are published periodically because many water users, managers, and planners do not have direct access to the WATSTORE data files, or because they have a need for these data in tabular form. This publication is a compilation of commonly used streamflow statistics for all active and discontinued stream-gaging stations on rivers in or adjacent to Iowa that have at least 10 years of daily discharge record. Active and discontinued stream-gaging stations are listed in table 1; their locations are shown in figure 1.

Table 1.--*List of stream-gaging stations for which streamflow statistics are supplied in this report*

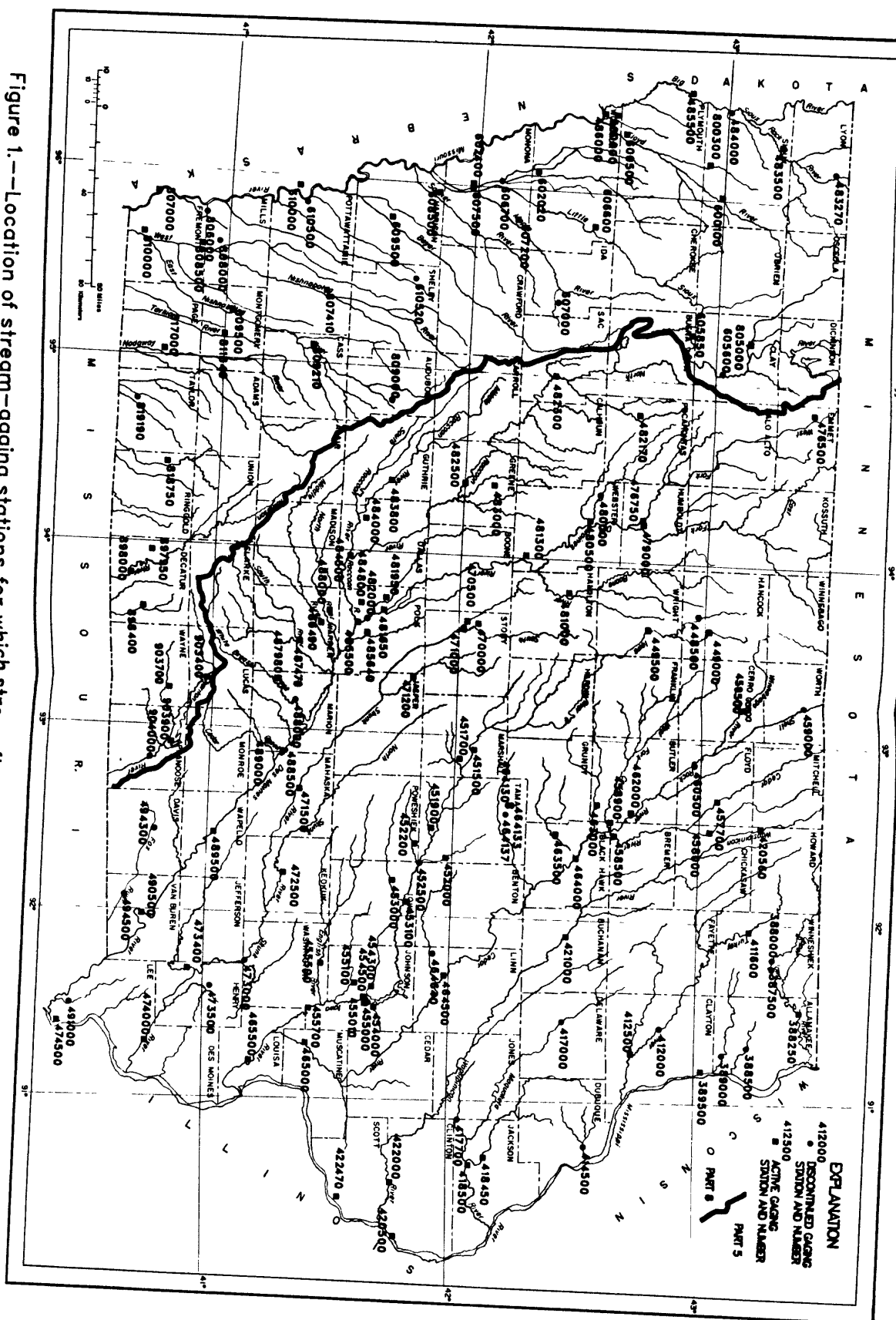
(All stations are located in Iowa except as noted)

05387500 UPPER IOWA RIVER at DECORAH	05458500 CEDAR RIVER at JANESVILLE
05388000 UPPER IOWA RIVER near DECORAH	05458900 WEST FORK CEDAR RIVER at FINCHFORD
05388250 UPPER IOWA RIVER near DORCHESTER	05459000 SHELL ROCK RIVER near NORTHWOOD
05388500 PAINT CREEK at WATERVILLE	05459500 WINNEBAGO RIVER at MASON CITY
05389000 YELLOW RIVER at ION	05460500 SHELL ROCK RIVER at MARBLE ROCK
05389500 MISSISSIPPI RIVER at MCGREGOR	05462000 SHELL ROCK RIVER at SHELL ROCK
05411600 TURKEY RIVER at SPILLVILLE	05463000 BEAVER CREEK at NEW HARTFORD
05412000 TURKEY RIVER at ELKADER	05463500 BLACK HAWK CREEK at HUDSON
05412500 TURKEY RIVER at GARBER	05464000 CEDAR RIVER at WATERLOO
05414500 LITTLE MAQUOKETA RIVER near DURANGO	05464130 FOURMILE CREEK near LINCOLN
05417000 MAQUOKETA RIVER near MANCHESTER	05464133 HALF MILE CREEK near GLADBROOK
05417700 BEAR CREEK near MONMOUTH	05464137 FOURMILE CREEK near TRAER
05418450 NORTH FORK MAQUOKETA RIVER at FULTON	05464500 CEDAR RIVER at CEDAR RAPIDS
05418500 MAQUOKETA RIVER near MAQUOKETA	05464640 PRAIRIE CREEK at FAIRFAX
05420500 MISSISSIPPI RIVER at CLINTON	05465000 CEDAR RIVER near CONESVILLE
05420560 WAPSIPINICON RIVER near ELMA	05465500 IOWA RIVER at WAPELLO
05421000 WAPSIPINICON RIVER at INDEPENDENCE	05470000 SOUTH SKUNK RIVER near AMES
05422000 WAPSIPINICON RIVER near DEWITT	05470500 SQUAW CREEK at AMES
05422470 CROW CREEK at BETTENDORF	05471000 SOUTH SKUNK RIVER below SQUAW CREEK near AMES
05448500 WEST BRANCH IOWA RIVER near KLEMME	05471200 INDIAN CREEK near MINGO
05449000 EAST BRANCH IOWA RIVER near KLEMME	05471500 SOUTH SKUNK RIVER near OSKALOOSA
05449500 IOWA RIVER near ROWAN	05472500 NORTH SKUNK RIVER near SIGOURNEY
05451500 IOWA RIVER at MARSHALLTOWN	05473000 SKUNK RIVER at COPPOCK
05451700 TIMBER CREEK near MARSHALLTOWN	05473400 CEDAR CREEK near OAKLAND MILLS
05451900 RICHLAND CREEK near HAVEN	05473500 BIG CREEK near MOUNT PLEASANT
05452000 SALT CREEK near ELBERON	05474000 SKUNK RIVER at AUGUSTA
05452200 WALNUT CREEK near HARTWICK	05474500 MISSISSIPPI RIVER at KEOKUK
05452500 IOWA RIVER near BELLE PLAINE	05476500 DES MOINES RIVER at ESTHERVILLE
05453000 BIG BEAR CREEK at LADORA	05476750 DES MOINES RIVER at HUMBOLDT
05453100 IOWA RIVER at MARENGO	05479000 EAST FORK DES MOINES RIVER at DAKOTA CITY
05454000 RAPID CREEK near IOWA CITY	05480000 LIZARD CREEK near CLARE
05454300 CLEAR CREEK near CORALVILLE	05480500 DES MOINES RIVER at FORT DODGE
05454500 IOWA RIVER at IOWA CITY	05481000 BOONE RIVER near WEBSTER CITY
05455000 RALSTON CREEK at IOWA CITY	05481300 DES MOINES RIVER near STRATFORD
05455010 SOUTH BRANCH RALSTON CREEK at IOWA CITY	05481650 DES MOINES RIVER near SAYLORVILLE
05455100 OLD MANS CREEK near IOWA CITY	05481950 BEAVER CREEK near GRIMES
05455500 ENGLISH RIVER at KALONA	05482000 DES MOINES RIVER at DES MOINES
05455700 IOWA RIVER near LONE TREE	05482170 BIG CEDAR CREEK near VARINA
05457700 CEDAR RIVER at CHARLES CITY	05482300 NORTH RACCOON RIVER near SAC CITY
05458000 LITTLE CEDAR RIVER near IONIA	05482500 NORTH RACCOON RIVER near JEFFERSON

**Table 1.--List of stream-gaging stations for which streamflow statistics are supplied
in this report--Continued**

05483000 EAST FORK HARDIN CREEK near CHURDAN	06607000 ODEBOLT CREEK near ARTHUR
05483600 MIDDLE RACCOON RIVER at PANORA	06607200 MAPLE RIVER at MAPLETON
05484000 SOUTH RACCOON RIVER at REDFIELD	06607500 LITTLE SIOUX RIVER near TURIN
05484500 RACCOON RIVER at VAN METER	06608500 SOLDIER RIVER at PISGAH
05484800 WALNUT CREEK at DES MOINES	06609500 BOYER RIVER at LOGAN
05485500 DES MOINES RIVER below RACCOON RIVER at DES MOINES	06610000 MISSOURI RIVER at OMAHA, NEBRASKA
05485640 FOURMILE CREEK at DES MOINES	06610500 INDIAN CREEK at COUNCIL BLUFFS
05486000 NORTH RIVER near NORWALK	06610520 MOSQUITO CREEK near EARLING
05486490 MIDDLE RIVER near INDIANOLA	06806000 WAUBONSIE CREEK near BARTLETT
05487470 SOUTH RIVER near ACKWORTH	06807000 MISSOURI RIVER at NEBRASKA CITY, NEBRASKA
05487980 WHITE BREAST CREEK near DALLAS	06807410 WEST NISHNABOTNA RIVER at HANCOCK
05488000 WHITE BREAST CREEK near KNOXVILLE	06808000 MULE CREEK near MALVERN
05488500 DES MOINES RIVER near TRACY	06808500 WEST NISHNABOTNA RIVER at RANDOLPH
05489000 CEDAR CREEK near BUSSEY	06809000 DAVIDS CREEK near HAMLIN
05489500 DES MOINES RIVER at OTTUMWA	06809210 EAST NISNABOTNA RIVER near ATLANTIC
05490500 DES MOINES RIVER at KEOSAUQUA	06809500 EAST NISHNABOTNA RIVER at RED OAK
05491000 SUGAR CREEK near KEOKUK	06810000 NISHNABOTNA RIVER above HAMBURG
05494300 FOX RIVER at BLOOMFIELD	06811840 TARKIO RIVER at STANTON
05494500 FOX RIVER at CANTRIL	06813500 MISSOURI RIVER at RULO, NEBRASKA
06483270 ROCK RIVER at ROCK RAPIDS	06817000 NODAWAY RIVER at CLARINDA
06483500 ROCK RIVER near ROCK VALLEY	06818750 PLATTE RIVER near DIAGONAL
06484000 DRY CREEK at HAWARDEN	06819190 EAST FORK ONE HUNDRED AND TWO RIVER near BEDFORD
06485500 BIG SIOUX RIVER at AKRON	06897950 ELK CREEK near DECATUR CITY
06486000 MISSOURI RIVER at SIOUX CITY	06898000 THOMPSON RIVER at DAVIS CITY
06600000 PERRY CREEK at 38 th STREET, SIOUX CITY	06898400 WELDON RIVER near LEON
06600100 FLOYD RIVER at ALTON	06903400 CHARITON RIVER near CHARITON
06600300 WEST BRANCH FLOYD RIVER near STRUBLE	06903700 SOUTH FORK CHARITON RIVER near PROMISE CITY
06600500 FLOYD RIVER at JAMES	06903900 CHARITON RIVER near RATHBUN
06602020 WEST FORK DITCH at HORNICK	06904000 CHARITON RIVER near CENTERVILLE
06602400 MONONA-HARRISON DITCH near TURIN	
06605000 OCHEYEDAN RIVER near SPENCER	
06605600 LITTLE SIOUX RIVER at GILLETT GROVE	
06605850 LITTLE SIOUX RIVER at LINN GROVE	
06606600 LITTLE SIOUX RIVER at CORRECTIONVILLE	
06606700 LITTLE SIOUX RIVER near KENNEBEC	

Figure 1.—Location of stream-gaging stations for which streamflow statistics are published in this report.



History of the Stream-Gaging Network in Iowa

Systematic records of the river stage of the Mississippi and Missouri Rivers were first obtained during the middle of the 19th Century by the U.S. Geological Survey (fig. 2). Stream-gaging stations were established on the Mississippi River at LeClaire, Iowa, during 1873 and at the Mississippi River at Keokuk, Iowa, during 1878 (fig. 1). A stream-gaging station was established on the Missouri River at Sioux City during 1879. Stream-gaging stations also were established on the Iowa River at Iowa City and Cedar River at Cedar Rapids during 1903 (Burmeister, 1970).

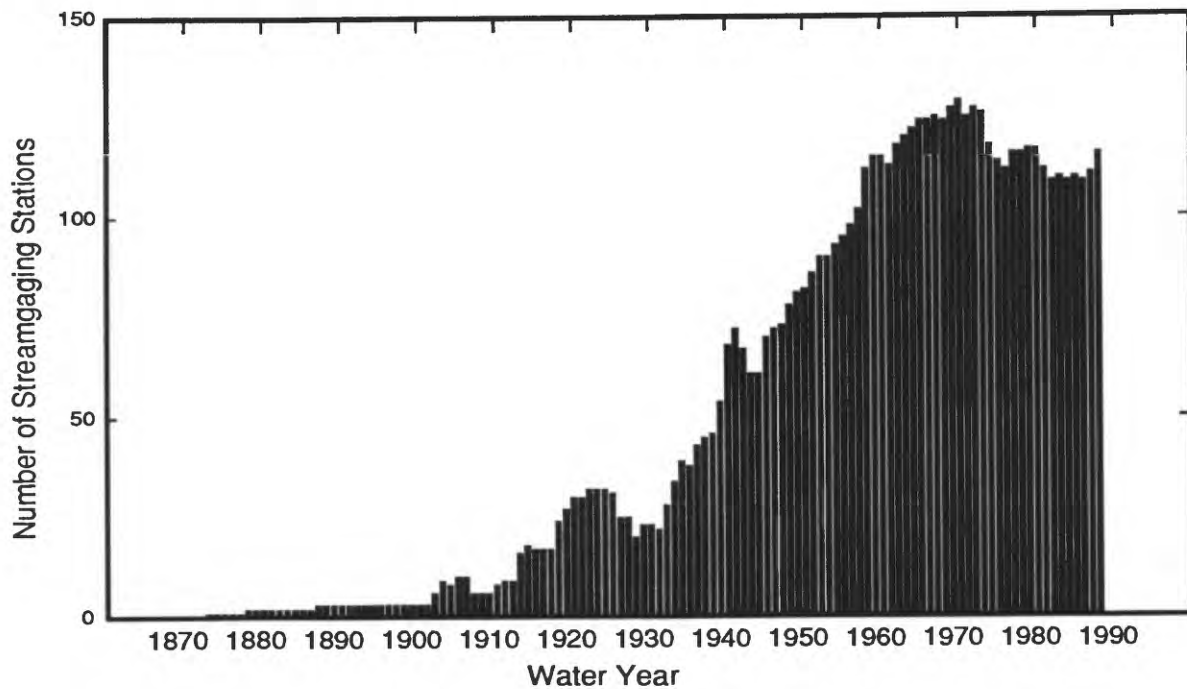


Figure 2.--Number of stream-gaging stations operated in Iowa for each year, 1873-1988.

In Iowa, the Federal-State cooperative program for the collection of streamflow records was established in 1914. The stream-gaging network increased from 18 stream-gaging stations during 1914 to 32 stream-gaging stations during 1922. The cooperative program was dissolved during 1928 and the number of stream-gaging stations decreased to 20. The cooperative program was resumed in 1932, and eight more stations were added to the stream-gaging network (Burmeister, 1970).

Primarily due to the U.S. Army Corps of Engineers' flood-control program the number of stream-gaging stations was increased to 59 by 1939 (Burmeister, 1970). The stream-gaging network declined by about 10 stream-gaging stations during World War II (1941 to 1945) and then increased steadily from 70 stream-gaging stations during 1945 to 129 stream-gaging stations during 1970. There was a decrease in to 110 stream-gaging stations between 1970 and 1982. The stream-gaging network increased to 111 stream-gaging stations in 1987 and 116 stream-gaging stations in 1988 (fig. 2).

During the first one-half of the 20th century, stream-gaging stations generally were established because of an immediate need for streamflow data for a specific river location. As the need for streamflow data increased, it became apparent that establishing a stream-gaging station at every location where data might be needed was impractical. Because of this, many stream-gaging stations were established at sites considered to be typical of a region in the State. Data from these stream-gaging stations are considered to be transferable and can be used to estimate hydrologic properties of nearby stream sites. Once sufficient

data has been collected to adequately define the hydrologic properties of a particular stream-gaging site the station is discontinued and an additional stream-gaging station is established at a previously ungaged site. This system of streamgage replacement, which started about 1970, permits the streamflow data base to expand without increasing the resources necessary to operate the stream-gaging network.

Significance of Streamflow Statistics

Streamflow provides water for domestic, commercial, and industrial purposes; irrigation water for crops; dilution and transport for waste removal; energy for hydroelectric power generation; cooling for thermoelectric power generation; transport channels for commerce; and water recreation. Surface-water records are used for the planning, design, and operation of surface-water related projects. Streamflow data is the record of the availability and distribution of streamflow (Rantz and others, 1982). Because streamflow is variable, streamflow statistics that describe flow characteristics throughout a stream regimen are needed for the wise management of surface-water resources.

The discharge of Iowa streams is extremely variable and does not have a statistically normal distribution. Peak flows commonly are several thousand times greater than low flows (Burmeister, 1970). As much as 50 percent of the total annual flow at a stream-gaging station may result from the four or five largest storms of the year, but the typical duration of the increased flow from each storm is only a few days. Low-flow periods may occur for a substantial part of the year, but account for only a small part of total annual flow. The average discharge for most stream-gaging stations is a level that occurs only for a few days each year when streamflow is receding from a high flow period to base flow. Therefore, for many purposes, average discharge does not adequately describe streamflow, and at times could be a misleading statistic. Because of the variability of streamflow in Iowa, water users and managers need statistics that analyze the frequency and duration of high, medium, and low discharges. The purpose of this report, therefore, is to provide statistics of streamflow to those water users and managers.

EXPLANATION OF STATION SUMMARIES

Station summaries are presented so that each station description, rating table, and tables of streamflow statistics and probabilities of occurrence occur in the same order and format for each station, including the same relative placement on the pages. The order of presentation is as follows:

- 1) Manuscript (station description)
- 2) Rating table
- 3) Table of statistics of monthly and annual mean discharges for the period of record
- 4) Boxplots of monthly and annual mean discharges
- 5) Table of monthly and annual flow duration
- 6) Table of probability of annual high discharges
- 7) Table of probability of annual low discharges
- 8) Table of probability of seasonal low discharges

Where both pre-regulation and post-regulation statistics are presented for a station, the manuscript and rating table are presented once, followed by the pre-regulation data and the post-regulation data. The respective tables and boxplots are presented in the same relative page formats.

Manuscripts

The location, drainage area, period of record, and other information about each stream-gaging station included in this report are presented in manuscript form. This information is compiled from records maintained by the U.S. Geological Survey, and generally is presented in the same format as published in the annual water data report. The following comments clarify information presented under the various headings of the station manuscript.

LOCATION.--Information on gage location is obtained from the most accurate maps available, and is furnished with respect to cultural and physical features in the vicinity of the gage and the community or landmark included in the station name. In the case of discontinued stations, the location is furnished using features in the vicinity at the time the gage was in operation. In many instances, the identifying features have been altered since the stream-gaging station was discontinued. River mileage was determined by methods given in "River Mileage Measurement," Bulletin 14, Revision of October 1968 (U.S. Water Resources Council, 1968), or was provided by the U.S. Army Corps of Engineers.

DRAINAGE AREA.--Drainage area is measured using U.S. Geological Survey 7.5-minute topographic quadrangle maps. The type of maps that are available varies from one drainage basin to another; therefore the accuracy of drainage areas also varies. Drainage areas of discontinued stations are those determined while the gage was in operation and were not verified for this report.

PERIOD OF RECORD.--The period of record is the period for which there are published records for the station or for an equivalent station. An equivalent station is a station that was in operation prior to the subject station, and whose location is such that records from it can reasonably be considered equivalent with records from the subject station. This situation arises when a station is relocated upstream or downstream and given a new station number and name, but the changes in drainage area and other basin characteristics are not significantly different.

GAGE.--The type of gage that is or was used to collect the data. Included is the datum of the gage with reference to National Geodetic Vertical Datum (NGVD) of 1929 and a condensed history of types, locations, and datums of previous gages used at the station. The datum of some discontinued stations may be referenced to a datum other than the NGVD of 1929.

EXTREMES FOR PERIOD OF RECORD.--Extremes may include maximum and minimum stages and maximum and minimum discharges. Unless otherwise qualified, the maximum discharge 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, it is listed separately. Similarly, the minimum discharge is the instantaneous minimum corresponding to the lowest stage that occurred, unless qualified and listed otherwise.

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

Station Rating Tables

A skeleton rating table of the most recent rating for each stream-gaging station is included with the data tables. These ratings can be used to relate discharges given in the various tables to the gage datum of the stream-gaging station. Gage datum is referenced to an arbitrary datum chosen so zero flow of a gage usually is several feet above zero gage height. Gage datum can be converted to National Geodetic Vertical Datum of 1929 by adding the given gage datum to datum of gage zero listed in the "GAGE" paragraph of the station description.

Rating tables for active stream-gaging stations are periodically updated when changes that affect the stage-discharge relation of the channel occur. The stability and duration of these ratings vary from station to station. Generally, the stage-discharge relation is less stable at the lower stages of a rating than at the higher stages. Thus, the lower portions of the rating will need revision more often than the higher portions. In time, the ratings of many of the stream-gaging stations listed in this report will be superseded. Also, many of the rating tables are not correct during periods of ice cover because of the effect of backwater on river stage. Data users are advised to validate the use of the published station ratings by contacting the U.S. Geological Survey, Iowa District Office.

Statistics of Monthly and Annual Mean Discharges

Statistics of monthly mean and annual mean discharges that are presented for each station include; 1) the minimum, maximum, and average monthly mean discharges, and 2) the minimum, maximum, and average annual mean discharges. The water years in which the minimum and maximum discharges occurred are listed with the respective values, and the standard deviations of the average mean discharges are listed with the respective average values. Also, the percentage of total annual discharge is listed for each average monthly mean discharge.

Each of the statistics is explained in the following paragraphs. As an aid to the readers' understanding of how the monthly mean and annual mean discharges are determined, mean discharges for each month of each year are given in table 2 for stream-gaging station Upper Iowa River at Decorah, IA (05387500). The associated statistics are provided at the bottom of table 2. Each monthly value in table 2 is the average of the daily values for the month. Each annual value (shown in the far right column) is the average of all the daily values for the water year. Months or years for which all daily values are not available are not included in the compilation of statistics.

The minimum monthly mean discharge is the minimum value of all of the monthly mean values. The minimum mean value for the month of October in table 2 is 37.2 ft³/s (cubic feet per second), which occurred during water year 1959. Similarly, the maximum monthly mean discharge is the maximum value of all of the monthly mean values. The maximum mean value for October in table 2 is 896 ft³/s, which occurred during water year 1973.

The average monthly mean discharge is the average of all of the monthly mean values for a particular month, and the standard deviation is a measure of the variability of the values. The average of the October mean values in table 2 is 248 ft³/s, and the standard deviation of the values is 229 ft³/s. The average October discharge obtained in this manner (the average of the monthly means) is the same as the average of all October daily values in the period of record. The standard deviation, however, is not the same as the standard deviation obtained when using daily values directly, but will be smaller. This is because the computation of the monthly mean values has the effect of decreasing the variability of the daily values.

The percentage of annual discharge is the percent of the total annual discharge that occurred during each month. It is calculated by dividing the total of the 12 monthly mean discharges by the mean discharge for the month. Because of rounding of the monthly percentage, the sum of the 12 percentages may not equal 100 percent.

The minimum, maximum, and average annual mean discharges are selected or computed from the annual mean discharges for the period of record. The water years of occurrence of the minimum and maximum values are listed with the respective values, and the standard deviation of the average of the annual mean values is listed with the average value. For the annual mean values in table 2, the minimum annual mean discharge is 96.7 ft³/s and occurred in water year 1958, the maximum annual mean discharge is 845 ft³/s and occurred during water year 1983, and the average annual mean discharge is 327 ft³/s with a standard deviation of 167 ft³/s.

Table 2.--Example of monthly mean discharges, annual mean discharges, and statistics of the monthly mean and annual mean discharges for the period of record at streamgaging station 05387500 Upper Iowa River at Decorah, IA

[ft³/s, cubic feet per second; --, indicates a no-value month or no-value year]

Water Year	Monthly mean discharge (ft ³ /s)												Annual mean discharge (ft ³ /s)
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	
1952	322	263	194	155	237	1,084	1,209	313	207	166	154	87.8	351
1953	73.6	70.8	63.6	69.0	71.0	494	346	390	517	673	1,353	190	363
1954	139	123	99.6	56.6	117	90.6	162	387	1,025	234	339	175	345
1955	378	179	127	91.5	109	423	366	225	234	171	102	66.1	207
1956	68.9	57.9	47.3	52.2	55.1	477	601	272	152	134	107	69.9	175
1957	49.6	60.1	49.4	41.8	60.4	150	89.6	92.4	158	362	167	169	121
1958	77.7	113	117	78.5	170	144	185	81.6	64.5	53.0	44.8	39.6	96.7
1959	37.2	48.0	40.2	25.7	25.2	621	667	165	237	205	178	247	208
1960	169	263	231	186	111	326	383	691	539	299	290	249	312
1961	167	186	115	84.4	178	1,937	442	250	131	110	124	86.2	320
1962	119	222	139	85.0	78.0	998	1,108	301	232	534	390	880	425
1963	614	213	115	87.5	67.7	738	268	411	165	143	107	85.0	254
1964	76.1	77.9	57.8	63.2	72.9	97.6	300	223	151	70.0	47.0	59.6	108
1965	46.2	43.2	50.3	70.3	267	694	2,067	303	157	124	66.1	1,305	429
1966	624	258	348	166	789	717	446	223	290	195	105	73.2	350
1967	117	77.1	73.9	161	94.1	901	284	162	1,103	141	90.4	64.3	273
1968	61.2	55.4	49.4	80.8	52.3	72.6	114	322	402	303	138	143	150
1969	223	129	95.5	79.0	78.7	863	883	291	1,652	1,028	235	171	478
1970	140	123	99.3	90.9	81.2	414	352	296	241	176	182	168	198
1971	436	532	268	129	196	1,138	1,233	400	369	181	109	92.6	424
1972	84.0	107	95.0	64.7	57.2	873	216	259	114	395	394	910	298
1973	896	920	456	662	368	1,261	1,252	1,453	612	288	233	216	721
1974	512	319	235	214	122	1,071	944	852	1,468	371	208	142	540
1975	126	131	103	90.2	87.2	550	1,238	512	347	225	159	110	307
1976	93.4	117	129	97.2	141	769	779	395	216	118	107	71.4	253
1977	76.3	80.3	75.3	55.6	269	346	131	121	75.0	74.3	60.4	69.3	119
1978	103	85.4	90.4	75.5	57.0	314	542	256	672	823	222	153	284
1979	135	136	113	133	103	1,314	930	724	377	321	757	334	451
1980	291	400	236	321	169	529	361	351	567	179	432	711	379
1981	407	279	171	119	328	298	539	370	256	571	451	483	356
1982	230	184	155	116	119	1,182	799	1,085	496	233	212	412	438
1983	744	1,111	940	473	497	1,485	1,253	1,108	568	937	307	692	845
1984	557	--	--	--	--	--	--	--	--	--	--	--	--

Statistics of mean discharge values:

Minimum	37.2	43.2	40.2	25.7	25.2	72.6	89.6	81.6	64.5	53.0	44.8	39.6	96.7
Maximum	896	1,111	940	662	789	1,937	2,067	1,453	1,652	1,028	1,353	1,305	845
Average	248	218	162	134	163	699	635	415	431	307	246	273	327
Standard deviation	229	238	170	130	156	453	457	316	388	251	252	305	167
Percentage of annual discharge	6.3	5.5	4.1	3.4	4.2	17.8	16.1	10.6	11.0	7.8	6.3	6.9	100.0

Boxplots of Monthly and Annual Mean Discharges

Boxplots graphically summarize the characteristics of the monthly and annual mean discharges. They are particularly useful for comparing data sets. Boxplots display the following:

- 1) The median, or center, of the data
- 2) The variation of the data
- 3) The skewness of the data
- 4) The presence of outlying values

The boxplots presented in this report are constructed as shown in figure 3. This example uses the October mean discharges for the period of record at stream-gaging station 05387500 Upper Iowa River at Decorah (table 2). The column of points next to the boxplot in the figure is the set of values, called the sample, that is described by the boxplot. They are included in the example to show graphically how the data are distributed.

To construct the boxplot in figure 3, the 33 October monthly values in the sample are first sorted in ascending order:

37.2, 46.2, 49.6, 61.2, 68.9, 73.6, 76.1, 76.3, 77.7, 84.0,
93.4, 103, 117, 119, 126, 135, 139, 140, 167, 169, 223,
230, 291, 322, 378, 407, 436, 512, 557, 614, 624, 744,
896.

The sorted values are then divided into four equal parts delimited by the lower fourth (LF), the sample median, and the upper fourth (UF). LF is the median of the values less than or equal to the sample median and defines the bottom of the box. UF is the median of the values greater than or equal to the sample median and defines the top of the box. The sample median defines the bar that is drawn within the box. In this example, LF is 77.7 ft³/s, the sample median is 139 ft³/s, and UF is 378 ft³/s. The intermediate range (IMR) is the difference between UF and LF. By definition, 50 percent of the values fall within the IMR. In the example, IMR is 300 ft³/s.

The vertical lines, called whiskers (Tukey, 1977), extending from the ends of the box are drawn to the highest and lowest data values such that the length of each whisker is less than or equal to 1.5 times the IMR (shown as "1.5*IMR"). Thus, the maximum value to which the upper whisker can be drawn (UWL, upper whisker limit) is equal to UF plus 1.5 *IMR and the minimum value to which the lower whisker can be drawn (LWL, lower whisker limit) is equal to LF minus 1.5*IMR. In the example, 1.5*IMR is 450 ft³/s. The UWL is 828 ft³/s; the largest value that is less than or equal to this limit is 744 ft³/s. The LWL is -372 ft³/s, and the smallest value that is greater than or equal to this limit is 37.2 ft³/s. Because there are no values less than zero, the lower whisker cannot extend below 0.0 ft³/s.

One value, 896 ft³/s, is greater than the UWL. It is plotted as a single point.

Monthly and Annual Flow Duration

The monthly and annual flow duration table is a magnitude frequency analysis of daily discharge values. It is computed by tabulating the number of daily discharge values that fall within preselected class limits (based on individual station data), computing the percentage of values within each class, and interpolating discharge values for the percentages shown in the table. The monthly figures are calculated for all complete months of daily values in the record, and the annual figures are calculated for all complete water years. For example, if the 90-percent flow duration value for October is 300 ft³/s, then 90 percent of the October daily discharge values for the period of record were equal to or greater than 300 ft³/s.

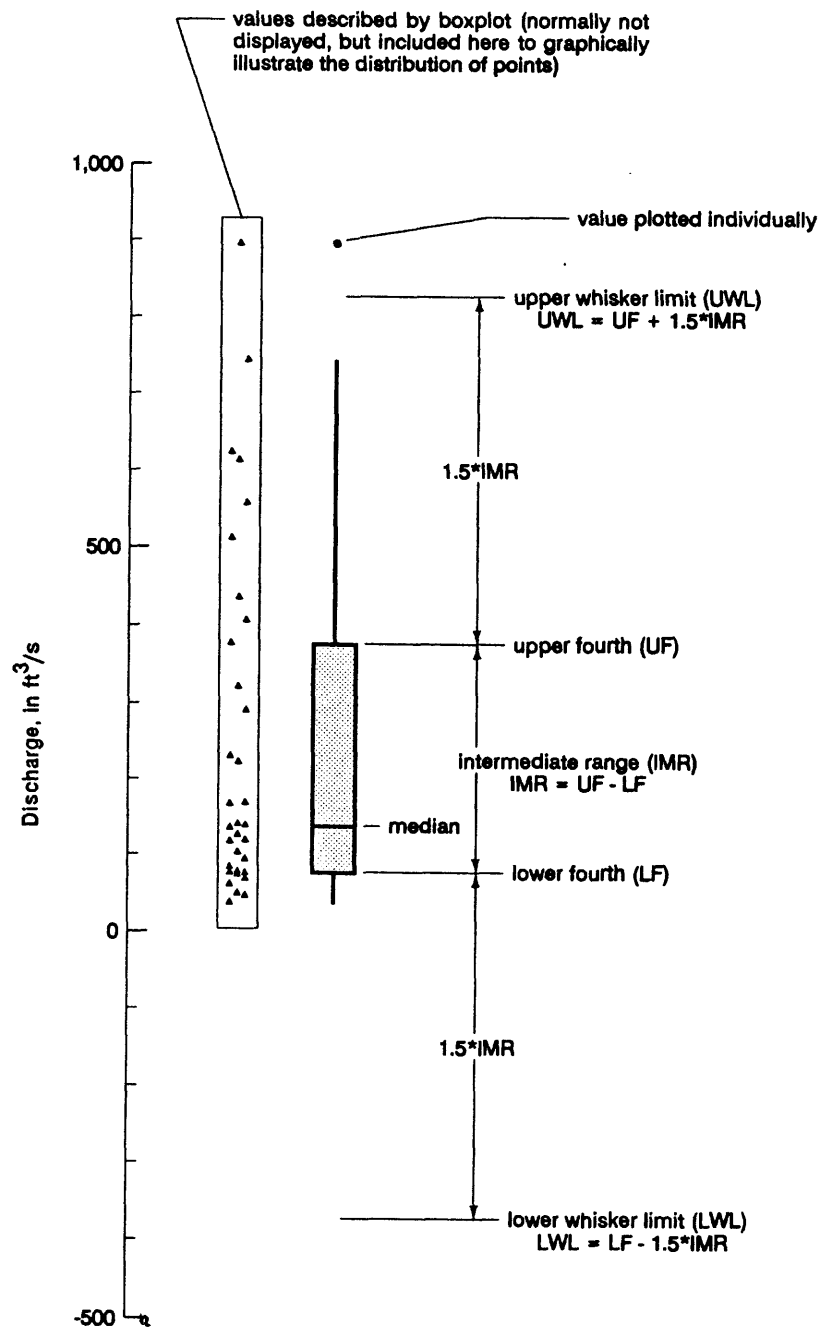


Figure 3.--Explanation of boxplots. The values described by the boxplot in this explanation are the October mean discharge for the period of record at streamflow gaging stations 05387500 Upper Iowa River at Decorah, Iowa.

Class limits are based on a geometric relation between the lowest positive non-zero (second low) daily discharge value and the second highest daily discharge value of the period being processed. Thirty-five class limit values are chosen ranging from zero to the second high value.

Probability of Occurrence of High or Low Discharges

The probabilities of occurrence of annual high discharges, annual low discharges, and seasonal low discharges are presented in 3 tables for each station. Probability of occurrence is an estimate of the likelihood that a particular discharge in a stream will be equalled or exceeded in one year or, in the case of low flows, the likelihood that the discharge will not be equalled or exceeded during the year. The probability of occurrence of a high flow is called the exceedance probability, and the probability of occurrence of a low flow is called the nonexceedance probability. For example, if the discharge for the 0.20 exceedance probability is listed as 500 ft³/s, then there is a 20 percent chance that a discharge that is greater than or equal to 500 ft³/s will occur once during the year.

Recurrence interval is another way of expressing annual probability and is the reciprocal of probability of occurrence. The recurrence interval for an exceedance probability of 0.20 is 5 years (1 divided by 0.20). This means that the annual maximum discharge is estimated to equal or exceed 500 ft³/s at intervals averaging 5 years.

The table of probability of annual high discharges for each station lists the theoretical maximum instantaneous discharge and the theoretical maximum average discharge for 3, 7, 15, and 30 consecutive-day periods for selected exceedance probabilities and recurrence intervals. Values for the theoretical maximum instantaneous discharge of unregulated streams and of the pre-regulation period in regulated streams are computed from the streamflow record according to the guidelines established by the United States Water Resources Council (1981). According to the guidelines, adjustments are made for length of record and regional skew. Values for the theoretical maximum instantaneous discharge for the post-regulation period of streams regulated by the U.S. Army Corps of Engineers are provided by the Corps of Engineers. These values are derived from an analysis of both actual and simulated peak flows for the entire period of record of a stream. The Corps of Engineers District providing the values is noted in a footnote in the respective table.

Values for the theoretical maximum average discharges for 3, 7, 15, and 30 consecutive-day periods are computed from the annual high average values of the corresponding periods. The computations are based on the log-Pearson Type III distribution using values obtained for the water year (U.S. Water Resources Council, 1981).

The table of probability of annual low discharges for each station lists the minimum average discharge for 1, 3, 7, 14, 30, 60, 90, 120, and 183 consecutive-day periods for selected nonexceedance probabilities and recurrence intervals. Values for the minimum average discharges are computed from the annual low average values of the corresponding periods using the log-Pearson Type III distribution. Probabilities of annual low discharges are computed using values obtained for the climatic year.

The table of probability of seasonal low discharges for each station lists the minimum average discharge for 1, 7, 14, and 30 consecutive-day periods for selected probabilities and recurrence intervals. These values are computed from the seasonal low average values of the corresponding periods using the log-Pearson Type III distribution.

In all of the tables, values that cannot be calculated are indicated by a double-dash, "--". This condition occurs when the record is short, when many of the data values are zero or near-zero, or when the magnitude of the skewness coefficient (a parameter that is computed during fitting of the log-Pearson Type III distribution) is too large.

Data Rounding

The number of significant figures used to report a discharge value in this report is based only on the type of computation and on the magnitude of the value. The number of significant figures used is not based on the accuracy of the daily discharge values that were used to compute the listed value. Monthly and annual mean discharge values compiled in the individual stream-gaging station tables of statistics of monthly and annual means discharges are rounded according to the criteria listed in table 3. Discharge values listed in the individual stream-gaging station duration tables and probability of occurrence tables are rounded according to the criteria listed in table 4.

Table 3.-- *Significant figures used for reporting monthly and annual mean discharges*

Range of discharge (ft ³ /s)	Significant figures
<0.010	1
0.010 to 0.099	2
0.10 to 0.99	2
1.00 to 9.99	3
10.0 to 99.9	3
100 to 999	3
≥ 1,000	4

[ft³/s, cubic feet per second; <, less than; ≥, greater than or equal to]

Table 4.-- *Significant figures used for reporting probable discharges*

Range of discharge (ft ³ /s)	Significant figures
<0.010	1
0.10 to 0.99	2
1.0 to 9.1	2
10 to 99	2
≥100	3

[ft³/s, cubic feet per second; <, less than; ≥, greater than or equal to]

DATA CONSIDERATIONS

Period of Record

The reliability of statistical data is related to the length of record for a stream. The U.S. Water Resources Council (1981) recommends that at least 10 years of record be used for computing flood frequency estimates. Therefore, the length of record criterium for inclusion of a stream-gaging station in this report is at least 10 years. Even with this criterium, the lengths of record for each of the stations varies substantially. Subsequently, extreme high or low flows may be included in the streamflow record of one station and not in another, resulting in inconsistencies in the streamflow statistics when comparing station data. Also, longer record lengths for many of the stations in this report may result in different streamflow statistics when comparing data in this report with data in previous publications.

Effects of Regulation and Water Use

Several stream-gaging stations in Iowa are affected by reservoir regulation. Reservoir regulation has the affect of decreasing high flows and augmenting low flows (Melcher and Ruhl, 1984). Because regulation affects streamflow characteristics, two sets of streamflow statistics are computed for stream-gaging stations located downstream from reservoirs. The first set of statistics is computed for the period of record before reservoir operation, and the second set is computed for the period of record after reservoir operation began. Only one set of statistics is calculated for each of the stations on the Mississippi River because the Mississippi River dams and pools were built for river navigation purposes and have only a minimal regulatory affect during extreme low flow. For the purposes of this report, significant regulation on the lower Missouri River is considered to have begun during 1957.

The primary uses of surface-water in Iowa are thermoelectric power generation, self-supplied industrial use, and public-water supply (Clark and Thamke, 1988). Other surface-water uses include agricultural use (livestock), irrigation, mining use, and self-supplied commercial use. Of the estimated surface-water use of 764 billion gallons during 1985, approximately 8 percent was used consumptively. While the use of water may influence some streamflow characteristics, the streamflow statistics presented in this report are not adjusted to reflect the effects of water use.

Limits of Data Use

Data from this report should be used solely for broad planning purposes and general basin investigations. This limitation is necessary because the lengths of records for stations in this report are extremely variable, and because factors that may affect streamflows were not isolated, other than reservoir regulation. Such factors include, for example, the effects of historic hydrologic events, changes in land use with time, and other localized impacts of water use. Site-specific studies require a more detailed analysis of streamflow data.

REFERENCES

- Burmeister, I.L., 1970, The streamflow data program in Iowa: U.S. Geological Survey Open-File Report, 82 p.
- Cardin, C.W., and others, 1986, Water Resources in the 1980's: A summary of activities and programs of the U.S. Geological Survey's Water Resources Division: U.S. Geological Survey Circular 1005, 80 p.
- Clark, M.L., and Thamke, J.N., 1988, Estimated water use in Iowa, 1985: U.S. Geological Survey Open-File Report 87-704, 28 p.
- Condes, A., 1989, Operation of hydrologic data collection stations by the United States Geological Survey in 1989: U.S. Geological Survey Open-File Report, in press.
- Hutchinson, N.E., 1975, WATSTORE -- National Water Data Storage and Retrieval System of the U.S. Geological Survey -- User's Guide: U.S. Geological Survey Open-File Report 75-426, 7 vols., 791 p.
- Iman, R.L., and Conover, W.J., 1983, A modern approach to statistics: John Wiley & Sons, New York, 497 p.
- Melcher, N.B., and Ruhl, K.J., 1984, Streamflow characteristics at selected sites in Kentucky: U.S. Geological Survey Open-File Report 84-704, 80 p.
- Rantz, S.E., and others, 1982, Measurement and computation of streamflow, vols. 1 and 2: U.S. Geological Survey Water-Supply Paper 2175, 613 p.
- Tukey, J.W., 1977, Exploratory data analysis: Addison-Wesley, Reading, Mass., 688 p.
- U.S. Water Resources Council, 1968, River mileage measurement: Hydrology Committee, Bulletin 14, revision of October 1968, 17 p.
- _____, 1981, Guidelines for determining flood flow frequency: Hydrology Committee, Bulletin 17B, 102 p.

STREAMFLOW STATISTICS

UPPER IOWA RIVER BASIN
05387500 UPPER IOWA RIVER AT DECORAH, IA

LOCATION.--Lat 43°18'19", long 91°47'48", in NE1/4 SW1/4 sec. 16, T.98 N., R.8 W., Winneshiek County, Hydrologic Unit 07060002, on right bank 1,200 ft upstream from bridge on U.S. Highway 52 (city route) in Decorah, 1500 ft downstream from Dry Run cutoff and 3.0 mi upstream from Trout Run.

DRAINAGE AREA.--511 mi².

PERIOD OF RECORD.--August 1951 to September 30, 1983 (discontinued).

GAGE.--Water-stage recorder. Datum of gage is 850.00 ft above National Geodetic Vertical Datum of 1929.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 20,200 ft³/s Mar. 27, 1961, gage height, 13.08 ft; minimum daily discharge, 22 ft³/s Feb. 2-7, 1959.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum flood known, probably since at least 1913, occurred May 29, 1941, at site of former gaging station near Decorah, 4 mi downstream, discharge, 28,500 ft³/s.

Rating table number 10, developed March 1972
(A discharge measurement to validate this rating
has not been made since November 1983.)

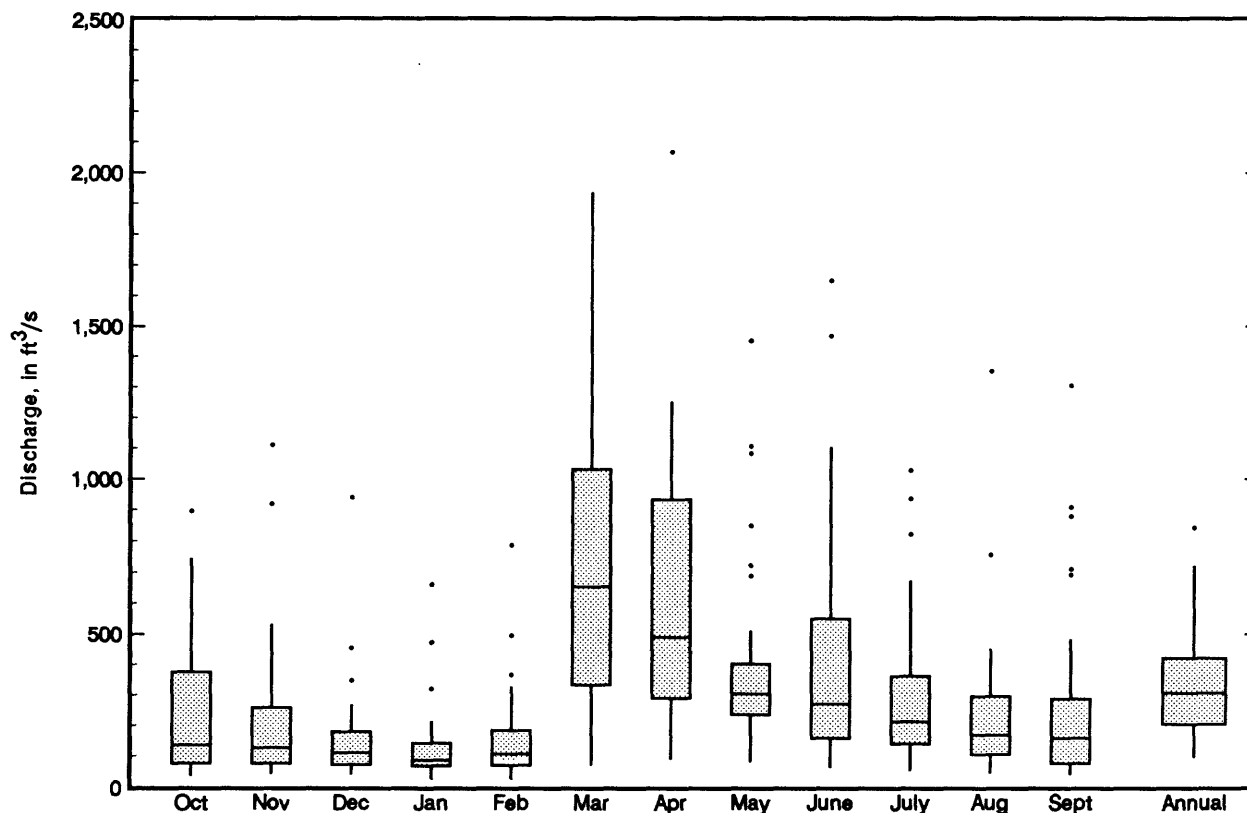
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
3.5	27	6.0	1,470
3.7	61	7.0	2,620
4.0	141	8.0	4,000
4.5	345	9.0	5,530
5.0	625	10.0	7,400
5.5	990		

UPPER IOWA RIVER BASIN
05387500 UPPER IOWA RIVER AT DECORAH, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	896	1973	37.2	1959	248	229	6.3
November	1,111	1983	43.2	1965	218	238	5.5
December	940	1983	40.2	1959	162	170	4.1
January	662	1973	25.7	1959	134	130	3.4
February	789	1966	25.2	1959	163	156	4.2
March	1,937	1961	72.6	1968	699	453	17.8
April	2,067	1965	89.6	1957	635	457	16.1
May	1,453	1973	81.6	1958	415	316	10.6
June	1,652	1969	64.5	1958	431	388	11.0
July	1,028	1969	53.0	1958	307	251	7.8
August	1,353	1953	44.8	1958	246	252	6.3
September	1,305	1965	39.6	1958	273	305	6.9
Annual	845	1983	96.7	1958	327	167	100.0

Boxplots of monthly and annual mean discharges



UPPER IOWA RIVER BASIN
05387500 UPPER IOWA RIVER AT DECORAH, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												Annual
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	
99	24	24	35	63	60	57	48	40	36	35	39	34	34
95	35	40	58	95	87	74	62	50	53	44	46	43	49
90	46	49	69	126	113	101	81	65	62	59	58	49	61
85	52	55	77	156	144	119	95	76	68	66	66	55	71
80	57	61	86	189	166	134	107	85	74	73	73	63	79
75	62	66	96	219	186	149	119	92	80	79	80	72	89
70	67	71	112	254	202	165	132	100	86	86	90	81	99
65	73	75	132	289	218	182	144	108	93	95	102	89	111
60	78	79	157	323	238	198	158	116	101	109	113	97	124
55	83	83	197	360	260	214	172	125	115	125	125	105	139
50	88	89	260	399	283	231	189	138	131	136	137	112	156
45	94	96	316	441	306	249	209	151	147	147	150	119	178
40	99	104	371	487	333	272	229	168	161	176	169	128	203
35	109	115	456	546	365	301	249	187	175	211	189	139	232
30	119	127	569	623	404	336	277	206	199	251	211	149	267
25	134	141	693	712	453	381	315	228	234	305	235	171	314
20	150	164	933	816	527	436	367	261	286	369	264	197	376
15	174	210	1,360	1,040	652	512	448	316	353	450	327	228	471
10	225	283	1,920	1,300	864	653	560	390	481	556	437	269	645
5	353	454	2,850	1,920	1,280	1,130	905	656	712	806	620	380	1,100

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	—	562	411	268	181
0.95	1.05	—	1,030	719	478	327
0.90	1.11	2,360	1,390	952	636	437
0.80	1.25	3,340	1,960	1,320	881	606
0.50	2	6,150	3,610	2,350	1,550	1,060
0.20	5	10,500	6,230	3,960	2,550	1,700
0.10	10	13,600	8,070	5,080	3,210	2,110
0.04	25	17,500	10,400	6,540	4,020	2,590
0.02	50	20,400	12,200	7,620	4,600	2,930
0.01	100	23,200	13,900	8,700	5,160	3,240

UPPER IOWA RIVER BASIN
05387500 UPPER IOWA RIVER AT DECORAH, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	20	20	20	22	25	28	30	31	31
0.02	50	23	23	23	25	28	31	34	36	35
0.05	20	27	28	29	31	34	37	41	43	45
0.10	10	32	33	34	36	40	44	48	52	55
0.20	5	39	40	42	44	49	54	59	65	72
0.50	2	55	57	61	64	71	80	90	101	123
0.80	1.25	77	80	85	91	100	121	141	162	221
0.90	1.11	91	94	101	108	119	150	179	209	304
0.96	1.04	109	112	119	129	142	191	233	277	434
0.98	1.02	121	124	133	144	159	224	277	333	550
0.99	1.01	134	137	145	159	176	258	324	395	684

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	20	21	23	31	35	38	39	53
0.02	50	23	24	26	34	41	45	46	62
0.05	20	28	29	32	38	52	57	59	79
0.10	10	33	35	37	44	64	70	75	97
0.20	5	41	43	46	52	83	91	98	125
0.50	2	60	65	70	77	135	148	165	204
0.80	1.25	91	101	108	124	220	242	275	335
0.90	1.11	113	127	137	165	285	313	358	435
0.96	1.04	143	162	177	228	375	411	474	576
0.98	1.02	167	191	210	286	448	491	568	690
0.99	1.01	191	221	246	353	527	576	667	813
		July-August-September				October-November-December			
0.01	100	28	31	31	34	23	26	28	32
0.02	50	33	35	36	39	26	29	32	36
0.05	20	40	43	44	48	31	36	39	42
0.10	10	47	51	53	58	38	43	46	50
0.20	5	59	63	66	73	48	55	58	62
0.50	2	88	93	101	113	77	88	94	102
0.80	1.25	131	139	153	175	129	145	158	182
0.90	1.11	161	170	191	220	171	191	213	256
0.96	1.04	200	212	241	280	235	260	296	380
0.98	1.02	230	244	281	328	290	318	370	498
0.99	1.01	260	277	322	378	351	383	455	642

UPPER IOWA RIVER BASIN
05388000 UPPER IOWA RIVER NEAR DECORAH, IA

LOCATION.--Lat 43°18'20", long 91°44'50", in SE1/4 NE1/4 sec. 14, T.98 N., R.8 W., Winneshiek County, Hydrologic Unit 07060002, on left bank 500 ft upstream from county highway bridge in Freeport, 1.4 mi downstream from Trout Run and 3 mi downstream from Decorah.

DRAINAGE AREA.--560 mi².

PERIOD OF RECORD.--August 1913 to November 1914 (no winter records), June 1919 to September 1927 and July 1933 to September 1951 (discontinued).

GAGE.--Water-stage recorder at present site since Oct. 28, 1936. Datum of gage is 829.8 ft above National Geodetic Vertical Datum of 1929 (Winneshiek County bench mark). Aug. 27, 1913 to Nov. 21, 1914 and May 12, 1919 to Aug. 27, 1920 chain gage at same site, at datum 3.96 ft lower. Aug. 28, 1920 to June 30, 1927 water-stage recorder at present site and datum. July 1, 1933 to Sept. 30, 1936 staff gage 4 mi downstream at different datum.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 28,500 ft³/s May 29, 1941, gage height, 15.19 ft (from floodmarks), from rating curve extended above 12,000 ft³/s on basis of slope-area determination of peak flow; minimum daily discharge, 10 ft³/s, on many days during 1933-34.

Rating table developed October 1950
(A discharge measurement to validate this rating
has not been made since August 1952.)

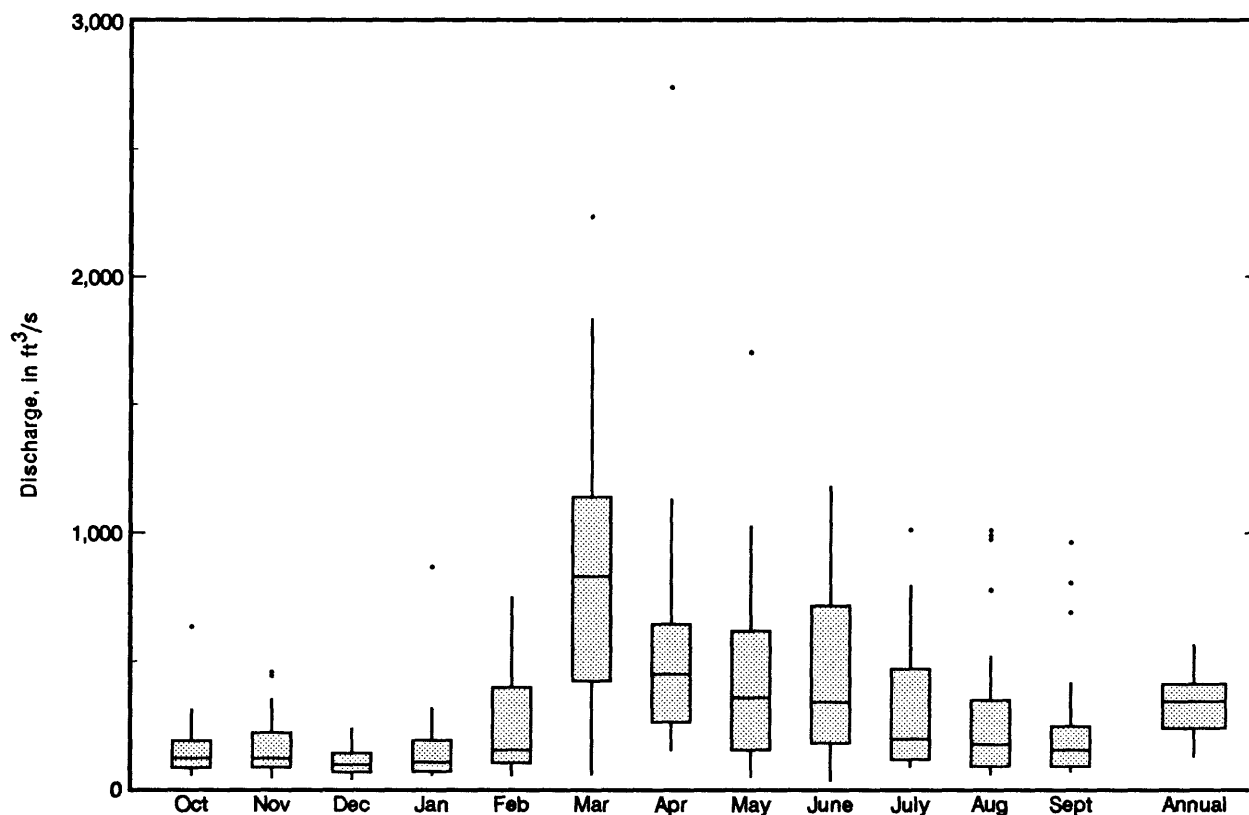
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
0.4	27.0	3.0	1,190
0.8	87.0	5.0	2,890
1.0	140	7.0	4,800
1.5	325	9.0	7,600
2.0	565	11.0	12,600
2.5	850	13.0	19,600

UPPER IOWA RIVER BASIN
05388000 UPPER IOWA RIVER NEAR DECORAH, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	637	1943	51.0	1934	160	123	4.0
November	459	1939	40.8	1934	171	120	4.3
December	238	1921	36.3	1934	119	61.9	3.0
January	868	1946	50.0	1926	160	164	4.0
February	750	1948	48.5	1940	238	186	5.9
March	2,237	1936	54.7	1934	897	564	22.3
April	2,744	1951	148	1925	557	511	13.9
May	1,704	1921	43.2	1934	428	356	10.7
June	1,182	1947	29.6	1934	450	339	11.2
July	1,012	1950	83.0	1936	305	249	7.6
August	1,011	1942	53.6	1934	298	302	7.4
September	964	1938	63.1	1937	236	233	5.9
Annual	567	1951	124	1934	335	124	100.0

Boxplots of monthly and annual mean discharges



UPPER IOWA RIVER BASIN
05388000 UPPER IOWA RIVER NEAR DECORAH, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	37	30	42	87	37	18	30	30	40	31	30	28	31
95	45	46	79	116	74	60	65	55	58	53	51	46	52
90	49	52	118	151	93	92	74	66	65	64	61	52	63
85	53	57	146	183	125	108	80	72	71	71	69	57	72
80	57	63	175	208	143	122	87	76	76	76	75	63	80
75	62	69	202	226	158	136	94	81	82	81	80	68	89
70	68	76	233	244	177	149	103	87	88	87	86	73	99
65	73	84	270	266	196	163	121	96	97	92	94	78	113
60	78	100	313	289	217	188	139	107	107	98	102	82	126
55	83	111	360	314	240	220	157	120	119	106	111	89	143
50	90	123	424	342	269	260	180	136	130	116	119	97	161
45	97	135	503	370	301	298	203	155	147	125	128	106	184
40	107	147	589	405	333	334	231	176	164	137	145	116	208
35	120	161	679	444	364	370	260	197	184	150	165	126	237
30	133	183	810	495	401	428	293	229	206	163	186	142	273
25	151	208	992	555	443	502	338	268	237	183	214	164	323
20	171	242	1,250	655	513	587	390	325	274	203	255	193	382
15	194	320	1,650	790	619	737	475	422	332	235	292	213	487
10	230	495	2,280	1,020	817	963	586	615	429	287	344	229	671
5	362	828	3,200	1,800	1,250	1,420	919	1,080	694	395	427	246	1,120

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	2,320	1,580	1,080	661	368
0.95	1.05	3,430	2,080	1,370	871	542
0.90	1.11	4,200	2,420	1,580	1,010	658
0.80	1.25	5,330	2,910	1,870	1,220	825
0.50	2	8,230	4,170	2,630	1,740	1,230
0.20	5	12,400	6,040	3,740	2,500	1,760
0.10	10	15,200	7,350	4,520	3,030	2,080
0.04	25	18,800	9,100	5,540	3,740	2,470
0.02	50	21,500	10,500	6,330	4,280	2,740
0.01	100	24,100	11,900	7,150	4,850	3,000

UPPER IOWA RIVER BASIN
05388000 UPPER IOWA RIVER NEAR DECORAH, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	10	11	14	23	27	32	38	42	42
0.02	50	13	15	17	26	30	35	41	46	47
0.05	20	19	20	23	31	34	40	47	52	55
0.10	10	25	27	29	36	40	45	53	58	64
0.20	5	34	36	39	43	48	53	62	69	78
0.50	2	57	59	61	62	69	78	89	98	123
0.80	1.25	84	86	89	92	104	122	135	150	208
0.90	1.11	99	102	106	113	130	158	173	192	284
0.96	1.04	115	118	125	142	168	214	229	255	405
0.98	1.02	124	128	137	165	199	264	278	310	517
0.99	1.01	132	137	148	189	232	322	333	372	651

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	9.8	24	28	31	10	19	23	25
0.02	50	13	27	30	35	16	26	31	34
0.05	20	20	32	35	40	30	42	47	52
0.10	10	27	38	41	47	48	60	67	75
0.20	5	39	46	49	58	78	89	97	112
0.50	2	68	68	73	89	153	163	177	215
0.80	1.25	103	105	113	148	227	252	281	359
0.90	1.11	122	134	144	198	255	298	340	445
0.96	1.04	141	174	191	277	275	342	402	541
0.98	1.02	152	208	232	348	284	367	440	603
0.99	1.01	162	245	277	432	289	387	472	657
		July-August-September				October-November-December			
0.01	100	8.9	23	33	39	12	23	31	31
0.02	50	12	27	36	43	15	27	34	35
0.05	20	19	34	43	51	22	33	40	43
0.10	10	28	42	50	59	30	40	46	51
0.20	5	42	55	61	72	42	49	55	63
0.50	2	81	89	93	112	72	76	81	95
0.80	1.25	136	142	151	188	113	118	124	147
0.90	1.11	169	180	200	255	137	148	156	185
0.96	1.04	207	231	276	362	163	190	203	238
0.98	1.02	231	271	343	460	180	223	242	280
0.99	1.01	252	312	421	576	195	257	284	326

UPPER IOWA RIVER BASIN
05388250 UPPER IOWA RIVER NEAR DORCHESTER, IA

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

DRAINAGE AREA.--770 mi².

PERIOD OF RECORD.--July 1975 to September 1988.

GAGE.--Water-stage recorder. Datum of gage is 660.00 ft above National Geodetic Vertical Datum of 1929. 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.

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.

Rating table number 4, developed October 1978

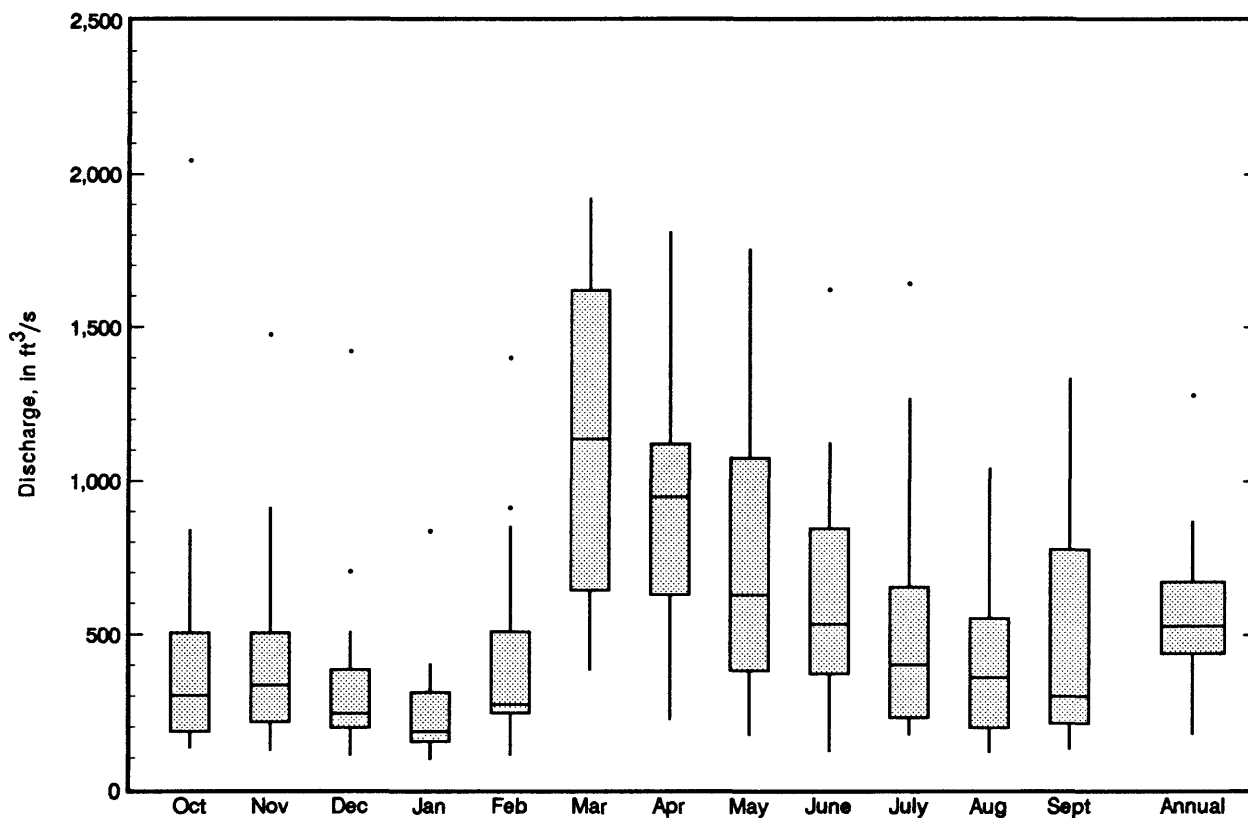
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
6.7	74	12.0	4,050
7.0	146	14.0	6,850
7.5	320	16.0	10,600
8.0	550	18.0	15,600
9.0	1,230	20.0	22,000
10.0	2,020		

UPPER IOWA RIVER BASIN
05388250 UPPER IOWA RIVER NEAR DORCHESTER, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	2,045	1987	134	1977	496	519	7.2
November	1,476	1983	126	1977	456	379	6.6
December	1,421	1983	109	1977	384	350	5.6
January	836	1983	96.7	1977	270	194	3.9
February	1,400	1984	112	1978	443	383	6.4
March	1,922	1983	386	1981	1,076	557	15.6
April	1,812	1983	225	1977	921	440	13.4
May	1,755	1983	175	1977	765	486	11.1
June	1,622	1984	123	1977	647	421	9.4
July	1,640	1983	176	1988	537	431	7.8
August	1,043	1979	119	1977	407	252	5.9
September	1,334	1986	131	1976	482	376	7.0
Annual	1,280	1983	178	1977	577	278	100.0

Boxplots of monthly and annual mean discharges



UPPER IOWA RIVER BASIN
05388250 UPPER IOWA RIVER NEAR DORCHESTER, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	87	94	87	172	143	103	116	103	110	123	106	91	97
95	101	104	165	230	169	125	158	118	118	135	128	112	123
90	120	120	202	330	245	196	178	132	130	161	145	128	146
85	132	132	226	402	293	233	197	151	146	171	165	162	169
80	143	143	249	460	330	256	217	171	178	181	179	180	188
75	152	154	280	518	378	294	236	189	203	191	196	195	211
70	161	169	323	569	405	318	258	219	220	203	216	209	236
65	168	192	405	625	432	349	291	250	233	215	256	222	261
60	175	215	479	680	475	384	319	270	246	237	274	234	285
55	182	232	535	743	528	427	346	289	265	264	295	245	316
50	190	247	578	802	590	470	376	309	287	290	317	259	353
45	205	261	647	860	668	516	403	329	332	341	341	272	394
40	223	277	753	919	744	558	429	359	382	372	363	286	436
35	251	293	910	1,000	820	609	463	394	423	409	397	308	499
30	273	317	1,110	1,090	895	680	503	433	460	456	471	334	566
25	298	351	1,320	1,180	986	751	575	506	496	541	554	378	659
20	341	410	1,580	1,300	1,120	843	686	556	553	641	613	432	791
15	395	537	2,020	1,480	1,340	1,020	818	616	672	790	677	503	963
10	453	1,130	2,550	1,710	1,610	1,240	1,050	726	855	1,050	846	862	1,250
5	620	2,100	3,800	2,050	1,900	1,640	1,600	1,000	1,480	1,530	1,250	1,160	1,790

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	2,350	803	516	497	364
0.95	1.05	3,110	1,420	977	796	600
0.90	1.11	3,640	1,860	1,310	1,000	763
0.80	1.25	4,410	2,490	1,790	1,300	994
0.50	2	6,430	4,010	2,880	2,010	1,540
0.20	5	9,530	5,800	4,010	2,900	2,180
0.10	10	11,800	6,750	4,530	3,420	2,530
0.04	25	14,800	7,730	5,000	4,010	2,900
0.02	50	17,300	8,330	5,260	4,390	3,130
0.01	100	19,800	8,820	5,440	4,740	3,330

UPPER IOWA RIVER BASIN
05388250 UPPER IOWA RIVER NEAR DORCHESTER, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	62	70	67	70	76	75	86	84	82
0.02	50	65	73	72	76	82	84	94	94	94
0.05	20	72	80	80	86	93	99	108	112	118
0.10	10	79	87	90	96	105	115	124	132	144
0.20	5	90	99	105	112	123	138	148	163	186
0.50	2	124	133	145	156	171	201	220	249	307
0.80	1.25	187	195	214	228	249	297	348	394	520
0.90	1.11	241	247	269	283	309	367	456	508	693
0.96	1.04	326	327	350	364	396	464	621	673	948
0.98	1.02	398	398	419	432	469	541	768	813	1,170
0.99	1.01	480	480	496	508	549	623	937	967	1,410

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	55	66	69	76	72	73	77	88
0.02	50	60	72	76	83	87	90	95	107
0.05	20	69	83	88	95	115	120	128	142
0.10	10	79	95	100	109	146	155	164	183
0.20	5	95	112	119	129	193	207	221	246
0.50	2	138	158	171	185	319	347	374	424
0.80	1.25	211	231	252	277	507	554	603	710
0.90	1.11	270	284	314	349	635	695	759	919
0.96	1.04	358	360	400	454	799	872	957	1,200
0.98	1.02	433	421	471	541	921	1,000	1,100	1,420
0.99	1.01	517	487	548	638	1,040	1,130	1,250	1,640
		July-August-September				October-November-December			
0.01	100	68	72	76	79	64	70	81	86
0.02	50	77	82	86	90	72	79	90	95
0.05	20	94	99	104	110	86	96	106	110
0.10	10	111	117	122	131	101	114	123	128
0.20	5	136	143	150	163	124	140	149	156
0.50	2	199	209	221	249	184	209	220	243
0.80	1.25	288	304	330	385	276	312	335	412
0.90	1.11	349	370	407	486	343	385	423	564
0.96	1.04	427	456	510	624	434	482	547	809
0.98	1.02	485	521	592	735	506	557	650	1,040
0.99	1.01	544	588	676	853	582	635	761	1,310

PAINT CREEK BASIN
05388500 PAINT CREEK AT WATERVILLE, IA

LOCATION.--Lat 43°12'37", long 91°18'21", in NW1/4 NW1/4 sec. 22, T.97 N., R.4 W., Allamakee County, Hydrologic Unit 07060001, on right bank 100 ft downstream from bridge on county highway X32, 0.5 mi northwest of Waterville and 10 mi upstream from mouth.

DRAINAGE AREA.--42.8 mi².

PERIOD OF RECORD.--October 1952 to September 1973 (discontinued).

GAGE.--Water-stage recorder.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,010 ft³/s July 29, 1970, gage height, 10.31 ft; minimum daily discharge, 1.1 ft³/s for several days in August and September 1958.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in August 1951 reached a stage of 17.35 ft, from information by local resident on floodmarks in vicinity of gage, discharge, 9,100 ft³/s, computed by unit-runoff studies based on contracted-opening measurement of peak flow at station 05388600. A higher stage may have occurred during the spring of 1949.

Rating table number 8, developed March 1968
(A discharge measurement to validate this rating
has not been made since October 1973.)

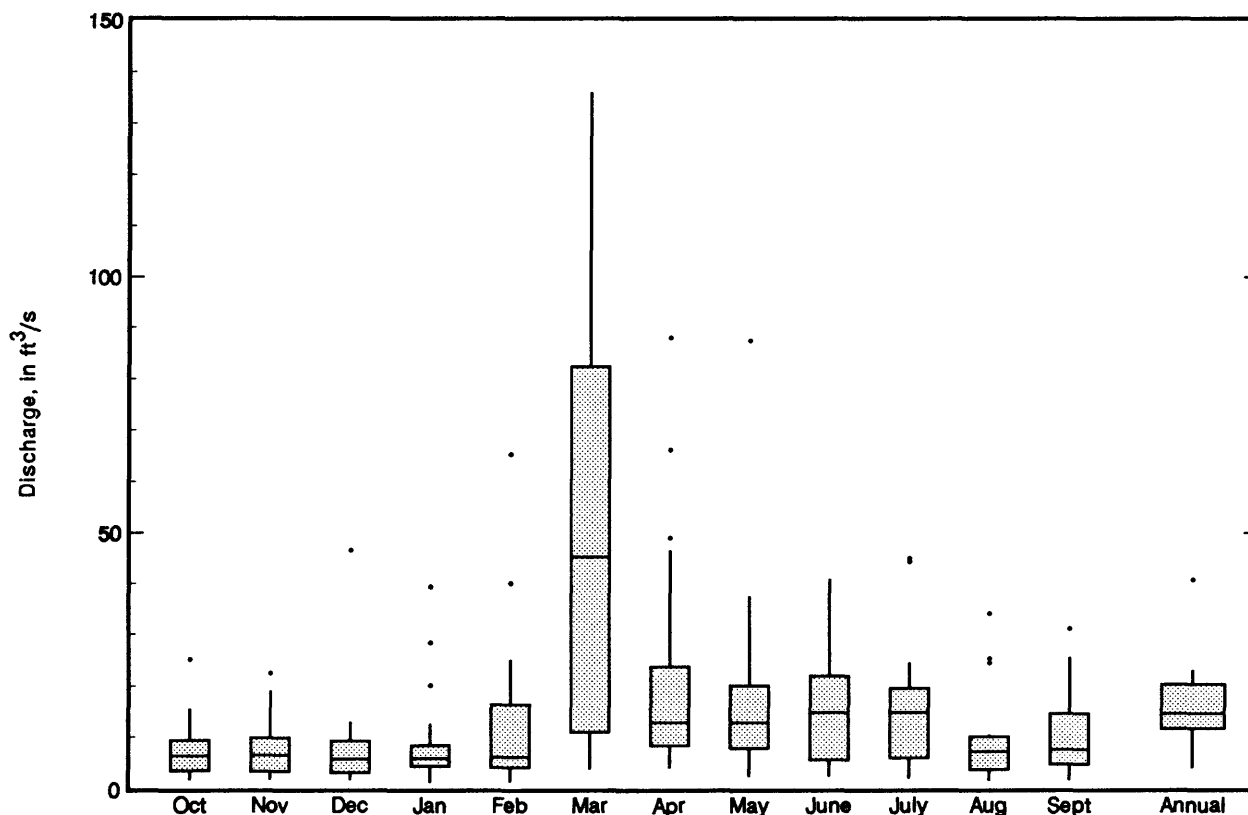
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
3.0	7.5	6.0	1,020
3.5	35	7.0	1,600
4.0	109	8.0	2,650
4.5	250	9.0	3,800
5.0	510	10.0	4,750
5.5	800		

PAINT CREEK BASIN
05388500 PAINT CREEK AT WATERVILLE, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	25.1	1973	1.86	1959	7.82	5.70	4.1
November	22.5	1973	1.82	1968	7.88	5.68	4.1
December	46.5	1973	1.77	1959	8.06	9.45	4.2
January	39.3	1973	1.30	1959	9.20	9.31	4.8
February	65.3	1966	1.50	1959	14.0	16.3	7.3
March	136	1961	3.80	1964	50.6	41.1	26.6
April	88.0	1965	4.06	1958	23.1	22.6	12.2
May	87.3	1973	2.46	1958	17.9	18.0	9.4
June	40.8	1973	2.45	1958	15.7	11.0	8.3
July	45.0	1970	2.12	1958	15.9	12.0	8.3
August	34.1	1953	1.65	1958	9.45	8.38	5.0
September	31.1	1965	1.70	1958	10.7	8.49	5.6
Annual	40.7	1973	4.10	1958	15.9	7.76	100.0

Boxplots of monthly and annual mean discharges



PAINT CREEK BASIN
05388500 PAINT CREEK AT WATERVILLE, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	1.2	1.4	1.4	1.8	1.9	1.9	1.7	1.2	1.4	1.7	1.6	1.5	1.5
95	1.5	1.6	1.9	2.7	2.4	2.5	2.1	1.9	1.8	2.0	1.9	1.8	1.9
90	2.0	2.2	2.6	3.5	2.9	3.2	2.6	2.3	2.1	2.4	2.2	1.9	2.4
85	2.4	2.4	3.4	4.3	3.4	3.5	2.9	2.8	2.9	2.7	2.5	2.1	2.8
80	2.7	2.6	3.9	5.1	3.9	3.9	3.2	3.1	3.2	3.0	2.8	2.7	3.2
75	2.9	3.1	4.6	5.9	5.0	4.4	3.8	3.4	3.6	3.3	3.3	2.9	3.7
70	3.2	3.4	5.2	6.5	5.8	4.8	4.3	3.8	4.1	3.7	3.7	3.2	4.2
65	3.8	3.7	5.8	7.1	6.4	5.5	4.8	4.4	4.7	4.1	4.3	3.9	4.8
60	4.2	4.0	6.4	7.7	7.0	6.1	5.4	5.0	5.3	4.8	5.0	4.6	5.3
55	4.6	4.6	7.0	8.4	7.5	6.9	5.9	5.4	5.9	5.4	5.5	5.2	5.8
50	5.0	5.0	7.7	9.1	8.8	7.8	6.9	5.8	6.3	6.0	5.9	5.5	6.4
45	5.5	5.3	8.7	10	10	9.4	8.2	6.4	6.7	6.5	6.8	5.9	7.0
40	5.9	5.7	11	12	12	11	10	7.1	7.1	7.0	7.6	6.6	7.7
35	6.3	6.0	14	14	13	13	12	7.7	7.6	7.6	8.4	7.4	8.6
30	6.7	6.7	20	17	15	14	13	8.3	8.6	8.7	9.2	8.1	9.9
25	7.0	7.4	27	21	17	16	14	8.9	10	10	10	8.9	12
20	7.4	8.8	37	24	20	18	16	10	12	11	12	9.6	14
15	8.0	12	60	29	23	21	19	13	14	13	15	10	17
10	8.8	16	108	37	33	30	24	21	17	15	18	12	23
5	14	27	280	77	60	49	32	26	25	18	21	16	39

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	—	71	45	24	14
0.95	1.05	851	114	66	36	22
0.90	1.11	1,070	145	81	46	29
0.80	1.25	1,380	194	105	60	38
0.50	2	2,240	328	174	102	64
0.20	5	3,560	538	294	174	105
0.10	10	4,510	687	390	229	134
0.04	25	5,780	886	529	308	171
0.02	50	6,760	1,040	646	373	200
0.01	100	7,770	1,190	775	443	229

PAINT CREEK BASIN
05388500 PAINT CREEK AT WATERVILLE, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.75	0.78	0.89	0.95	1.00	1.0	1.0	1.0	1.1
0.02	50	0.88	0.91	1.0	1.1	1.2	1.2	1.3	1.3	1.4
0.05	20	1.1	1.1	1.3	1.3	1.4	1.6	1.7	1.7	1.9
0.10	10	1.3	1.4	1.5	1.6	1.7	2.0	2.1	2.2	2.5
0.20	5	1.7	1.7	1.9	2.0	2.2	2.6	2.8	3.0	3.4
0.50	2	2.7	2.7	2.9	3.1	3.4	4.0	4.5	5.0	5.9
0.80	1.25	4.1	4.2	4.4	4.7	5.1	6.1	6.9	7.8	9.5
0.90	1.11	5.2	5.3	5.5	5.8	6.3	7.5	8.5	9.8	12
0.96	1.04	6.6	6.7	7.0	7.3	8.0	9.2	11	12	15
0.98	1.02	7.6	7.8	8.1	8.5	9.2	10	12	14	17
0.99	1.01	8.8	9.0	9.3	9.6	10	12	13	15	19

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.97	0.93	0.96	1.3	1.0	1.1	1.4	1.7
0.02	50	1.1	1.1	1.1	1.4	1.2	1.3	1.5	1.9
0.05	20	1.4	1.4	1.4	1.7	1.5	1.7	1.9	2.3
0.10	10	1.7	1.7	1.8	2.0	1.9	2.1	2.3	2.8
0.20	5	2.2	2.3	2.3	2.5	2.5	2.7	3.0	3.7
0.50	2	3.5	3.7	3.8	4.1	4.4	4.8	5.3	6.6
0.80	1.25	5.7	5.9	6.2	7.0	8.3	9.1	10	13
0.90	1.11	7.3	7.6	8.1	9.5	12	13	14	19
0.96	1.04	9.6	9.8	11	13	17	19	22	30
0.98	1.02	11	12	13	17	22	25	29	41
0.99	1.01	13	13	15	21	29	32	37	55
		July-August-September				October-November-December			
0.01	100	0.74	0.90	1.0	1.1	0.91	0.94	0.94	0.93
0.02	50	0.88	1.0	1.2	1.3	1.1	1.1	1.1	1.1
0.05	20	1.1	1.3	1.5	1.7	1.4	1.5	1.5	1.5
0.10	10	1.5	1.7	1.8	2.2	1.8	1.9	1.9	2.0
0.20	5	2.0	2.2	2.4	2.9	2.3	2.5	2.6	2.7
0.50	2	3.6	3.9	4.3	5.0	3.9	4.1	4.4	4.8
0.80	1.25	7.0	7.3	7.9	8.9	6.2	6.7	7.3	8.3
0.90	1.11	9.9	10	11	12	7.8	8.6	9.4	11
0.96	1.04	15	15	16	17	9.9	11	12	14
0.98	1.02	19	20	21	22	11	13	15	17
0.99	1.01	24	25	26	26	13	15	17	20

YELLOW RIVER BASIN
05389000 YELLOW RIVER AT ION, IA

LOCATION.--Lat 43°06'35", long 91°15'45", in SE1/4 SW1/4 sec. 24, T.96 N., R.4 W., Allamakee County, Hydrologic Unit 07060001, on downstream side of county highway bridge at Ion, 7.5 mi northwest of McGregor and 8 mi upstream from mouth.

DRAINAGE AREA.--224 mi².

PERIOD OF RECORD.--October 1934 to September 1951 (discontinued).

GAGE.--Wire-weight gage and crest-stage indicator; gage read once daily, more often at high stages. Datum of gage is 664.65 ft above mean sea level, adjustment of 1912.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 18,500 ft³/s May 29, 1941, gage height 15.2 (from floodmarks), from rating curve extended above 7,300 ft³/s on basis of slope-area determination of peak flow; minimum daily discharge, 14 ft³/s Dec. 30 and 31, 1939.

Rating table developed October 1949
(A discharge measurement to validate this rating
has not been made since December 1951.)

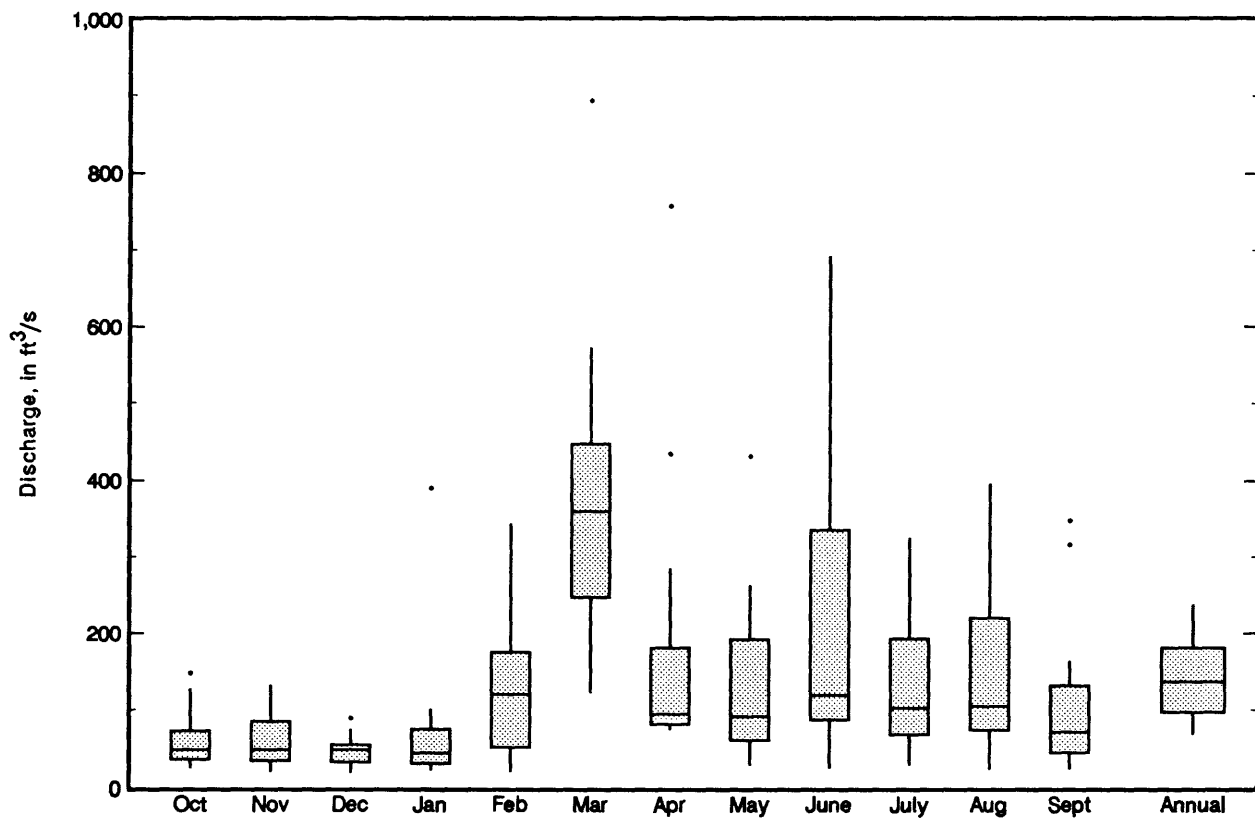
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
1.7	25	5.0	1,380
2.0	64	6.0	2,340
2.5	153	8.0	4,900
3.0	285	10.0	8,550
3.5	470	12.0	13,300
4.0	715		

YELLOW RIVER BASIN
05389000 YELLOW RIVER AT ION, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	148	1943	25.6	1938	60.3	35.7	3.6
November	132	1943	21.1	1938	63.5	35.6	3.8
December	89.4	1943	19.9	1938	47.9	18.4	2.8
January	390	1946	23.1	1940	71.9	85.3	4.3
February	344	1938	21.4	1940	125	92.5	7.4
March	894	1950	123	1938	381	185	22.6
April	757	1951	75.6	1940	180	177	10.7
May	432	1941	29.6	1940	137	102	8.1
June	692	1944	25.1	1940	229	207	13.6
July	325	1951	29.7	1936	135	97.1	8.0
August	396	1943	24.8	1937	148	115	8.8
September	349	1938	24.8	1937	105	95.7	6.2
Annual	238	1951	69.8	1940	140	51.1	100.0

Boxplots of monthly and annual mean discharges



YELLOW RIVER BASIN
05389000 YELLOW RIVER AT ION, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	19	20	22	33	27	23	21	21	21	21	19	17	20
95	22	22	40	53	34	29	26	24	25	23	23	21	24
90	24	24	55	58	50	38	31	30	29	25	26	24	28
85	27	26	68	64	54	43	35	34	34	28	28	26	32
80	29	29	80	69	57	47	41	43	38	30	30	28	36
75	31	32	94	74	60	51	48	48	40	34	33	30	40
70	32	34	110	79	63	58	53	52	43	37	36	32	45
65	34	36	122	84	67	66	57	55	47	39	39	35	50
60	35	39	136	89	73	71	62	59	51	42	41	38	55
55	38	42	150	94	80	78	67	62	56	45	45	41	60
50	42	45	168	101	90	86	74	69	62	51	52	43	65
45	46	48	190	108	99	98	85	76	68	55	56	46	71
40	49	51	214	120	107	114	100	86	75	58	60	49	79
35	52	57	241	137	117	144	115	96	82	61	66	53	89
30	58	64	271	155	127	182	129	105	90	64	74	56	101
25	63	71	319	184	139	216	144	120	101	71	83	60	117
20	69	82	406	218	154	258	159	145	114	79	94	63	140
15	75	104	563	267	177	340	186	178	129	87	109	74	175
10	86	230	810	349	213	470	227	243	156	101	123	83	240
5	115	474	1,620	576	313	810	318	389	260	125	146	96	409

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	1,940	666	423	270	178
0.95	1.05	3,030	996	601	365	242
0.90	1.11	3,800	1,210	714	427	285
0.80	1.25	4,950	1,510	869	516	346
0.50	2	8,010	2,200	1,220	732	496
0.20	5	12,500	3,010	1,630	1,030	707
0.10	10	15,600	3,460	1,870	1,220	846
0.04	25	19,500	3,980	2,130	1,470	1,020
0.02	50	22,400	4,290	2,300	1,640	1,150
0.01	100	25,300	4,580	2,450	1,820	1,280

YELLOW RIVER BASIN
05389000 YELLOW RIVER AT ION, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												Annual
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	
99	19	20	22	33	27	23	21	21	21	21	19	17	20
95	22	22	40	53	34	29	26	24	25	23	23	21	24
90	24	24	55	58	50	38	31	30	29	25	26	24	28
85	27	26	68	64	54	43	35	34	34	28	28	26	32
80	29	29	80	69	57	47	41	43	38	30	30	28	36
75	31	32	94	74	60	51	48	48	40	34	33	30	40
70	32	34	110	79	63	58	53	52	43	37	36	32	45
65	34	36	122	84	67	66	57	55	47	39	39	35	50
60	35	39	136	89	73	71	62	59	51	42	41	38	55
55	38	42	150	94	80	78	67	62	56	45	45	41	60
50	42	45	168	101	90	86	74	69	62	51	52	43	65
45	46	48	190	108	99	98	85	76	68	55	56	46	71
40	49	51	214	120	107	114	100	86	75	58	60	49	79
35	52	57	241	137	117	144	115	96	82	61	66	53	89
30	58	64	271	155	127	182	129	105	90	64	74	56	101
25	63	71	319	184	139	216	144	120	101	71	83	60	117
20	69	82	406	218	154	258	159	145	114	79	94	63	140
15	75	104	563	267	177	340	186	178	129	87	109	74	175
10	86	230	810	349	213	470	227	243	156	101	123	83	240
5	115	474	1,620	576	313	810	318	389	260	125	146	96	409

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	1,940	666	423	270	178
0.95	1.05	3,030	996	601	365	242
0.90	1.11	3,800	1,210	714	427	285
0.80	1.25	4,950	1,510	869	516	346
0.50	2	8,010	2,200	1,220	732	498
0.20	5	12,500	3,010	1,630	1,030	707
0.10	10	15,600	3,460	1,870	1,220	846
0.04	25	19,500	3,960	2,130	1,470	1,020
0.02	50	22,400	4,290	2,300	1,640	1,150
0.01	100	25,300	4,580	2,450	1,820	1,280

YELLOW RIVER BASIN
05389000 YELLOW RIVER AT ION, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	11	12	14	14	14	15	15	16	15
0.02	50	12	13	15	16	15	16	17	18	18
0.05	20	14	15	17	18	18	19	20	22	23
0.10	10	16	17	19	20	21	22	24	26	28
0.20	5	19	20	22	23	24	26	28	31	36
0.50	2	25	26	28	30	34	38	41	46	58
0.80	1.25	32	35	38	41	48	54	59	66	89
0.90	1.11	36	41	44	49	57	65	71	80	110
0.96	1.04	41	47	52	59	69	80	87	97	137
0.98	1.02	44	53	58	66	79	92	99	110	157
0.99	1.01	47	57	64	74	89	104	112	122	177

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	14	15	15	18	17	17	19	22
0.02	50	15	17	16	19	19	20	22	25
0.05	20	17	19	19	21	24	25	28	32
0.10	10	19	21	22	24	29	31	34	39
0.20	5	21	24	25	28	36	39	42	50
0.50	2	27	32	34	41	56	61	65	77
0.80	1.25	35	42	46	67	83	91	96	120
0.90	1.11	40	48	53	90	102	112	117	150
0.96	1.04	46	56	62	127	125	139	143	189
0.98	1.02	50	62	69	162	143	158	163	220
0.99	1.01	55	68	76	205	161	178	183	251
		July-August-September				October-November-December			
0.01	100	13	14	16	16	11	15	15	15
0.02	50	15	16	18	19	12	16	16	16
0.05	20	18	19	22	24	14	18	19	19
0.10	10	22	23	26	28	16	20	21	23
0.20	5	27	29	32	36	19	23	25	27
0.50	2	41	43	47	54	26	32	34	40
0.80	1.25	61	65	69	82	35	45	49	57
0.90	1.11	76	80	84	101	41	55	61	70
0.96	1.04	94	100	103	126	48	69	77	86
0.98	1.02	108	115	118	144	53	80	90	99
0.99	1.01	123	131	132	163	57	92	104	112

**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.

PERIOD OF RECORD.--August 1936 to September 1988.

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.

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.

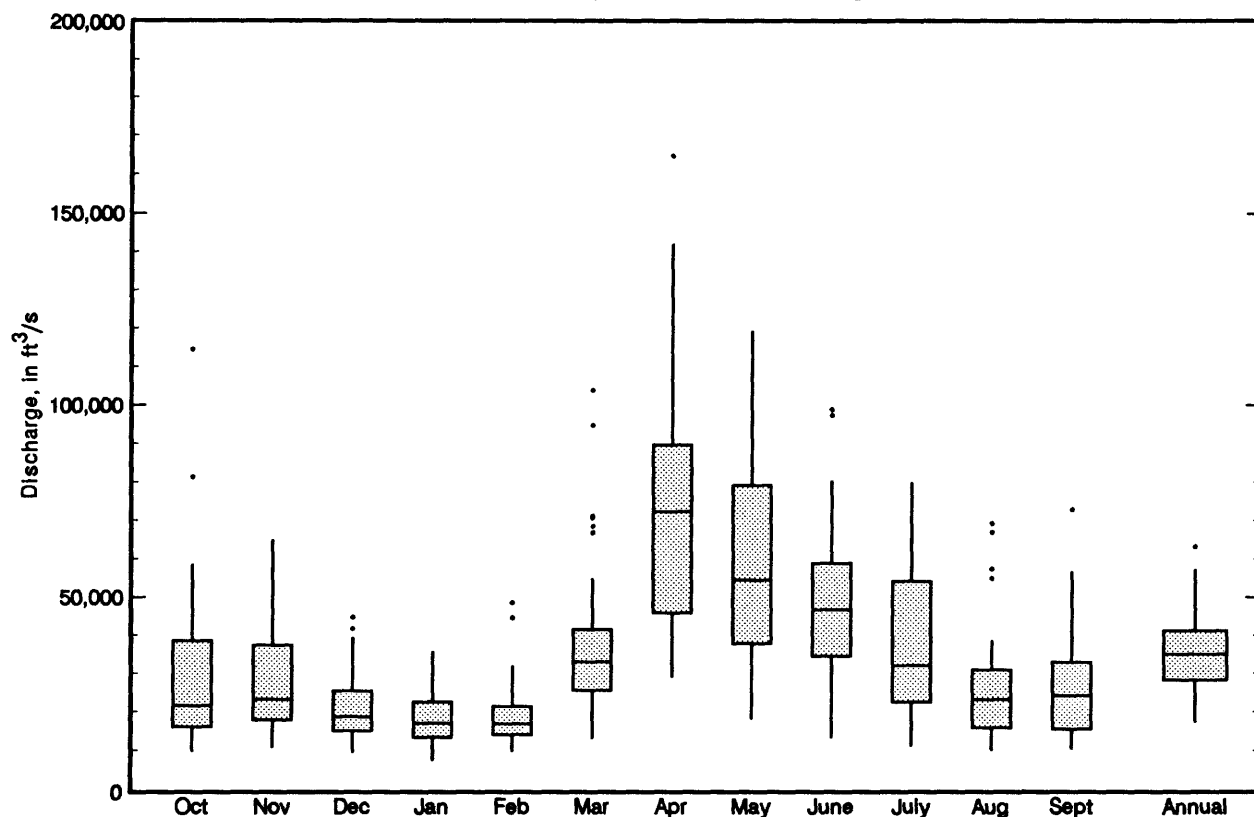
REMARKS.--Stage-discharge relation affected by backwater from Wisconsin River and Lock and Dam No. 10. Minor flow regulation caused by navigation dams. Rating table not published because discharge is a function of river stage and river slope at this station.

MISSISSIPPI RIVER MAIN STEM
05389500 MISSISSIPPI RIVER AT MCGREGOR, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	114,600	1987	9,874	1937	28,430	19,300	6.7
November	64,840	1983	10,870	1938	27,910	13,660	6.6
December	44,830	1983	9,506	1937	21,170	8,554	5.0
January	35,700	1983	7,665	1940	18,650	6,420	4.4
February	48,540	1984	9,934	1940	19,170	7,673	4.5
March	103,800	1983	13,190	1940	37,900	18,010	8.9
April	164,800	1965	29,100	1977	73,630	31,700	17.3
May	119,200	1975	18,240	1977	59,410	27,420	14.0
June	98,970	1944	13,420	1988	47,460	19,840	11.2
July	79,970	1978	11,220	1988	37,990	19,800	8.9
August	69,240	1972	10,330	1964	25,710	13,040	6.0
September	72,890	1986	10,650	1940	27,570	14,370	6.5
Annual	63,250	1986	17,400	1977	35,470	10,380	100.0

Boxplots of monthly and annual mean discharges



MISSISSIPPI RIVER MAIN STEM
05389500 MISSISSIPPI RIVER AT MCGREGOR, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equalled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	7,630	8,950	11,600	19,700	14,600	12,100	9,690	8,880	9,170	9,000	9,930	7,810	9,110
95	9,550	10,300	14,200	28,200	18,800	15,400	11,600	10,600	10,700	10,600	11,300	10,100	11,300
90	11,200	12,000	16,000	33,000	23,300	18,500	13,500	11,900	12,000	12,200	12,900	11,500	13,000
85	12,400	12,600	17,800	36,700	27,500	21,800	15,700	13,000	13,100	13,200	14,600	12,600	14,400
80	13,100	13,200	19,300	40,600	31,400	26,200	17,600	14,000	14,200	14,200	16,000	13,800	15,700
75	13,800	13,800	20,800	45,400	35,200	31,100	19,500	15,200	15,300	15,100	17,200	14,600	17,000
70	14,500	14,500	22,300	50,000	39,000	35,000	21,300	16,300	16,400	16,100	18,300	15,500	18,400
65	15,200	15,200	23,900	54,300	42,500	37,400	23,400	17,700	17,600	17,100	19,400	16,200	19,800
60	16,000	15,800	25,600	59,500	46,700	39,800	26,100	19,300	19,200	18,300	20,500	16,900	21,500
55	16,500	16,500	27,300	65,100	50,800	41,900	28,900	20,800	20,800	19,500	21,500	17,700	23,500
50	17,100	17,100	29,300	70,200	54,200	44,100	31,300	22,400	22,400	20,900	22,900	18,600	25,800
45	18,000	17,900	31,800	73,600	58,500	46,500	34,500	24,100	24,100	22,700	24,400	19,500	28,700
40	18,900	18,700	34,700	77,100	62,900	48,800	37,700	25,800	26,300	25,200	26,400	20,500	32,000
35	19,900	19,600	38,200	81,300	67,400	52,000	41,700	27,700	28,800	28,200	29,000	21,800	35,900
30	21,300	20,500	41,900	85,800	72,400	55,400	47,300	29,700	31,600	31,800	32,300	23,500	40,100
25	22,900	21,700	46,300	92,000	77,800	60,300	52,700	31,900	35,500	35,600	35,900	25,600	45,300
20	24,400	23,200	52,800	98,800	84,900	66,500	58,900	34,400	39,500	39,900	39,800	28,500	52,100
15	26,200	24,800	61,200	106,000	93,200	73,400	67,000	37,700	43,700	45,600	43,700	31,500	61,000
10	28,400	27,400	72,600	116,000	103,000	81,000	74,600	43,800	50,800	53,000	50,700	35,400	73,600
5	33,000	35,700	93,100	146,000	118,000	94,100	83,500	54,700	60,500	69,700	59,900	41,800	90,600

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge ¹ (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	—	42,100	40,100	37,500	31,900
0.95	1.05	—	55,500	53,400	50,100	43,800
0.90	1.11	—	64,100	62,100	58,200	51,300
0.80	1.25	—	76,300	74,200	69,600	61,700
0.50	2	—	106,000	104,000	96,600	85,500
0.20	5	138,000	146,000	143,000	132,000	115,000
0.10	10	166,000	172,000	168,000	154,000	132,000
0.04	25	—	205,000	199,000	182,000	152,000
0.02	50	227,000	230,000	222,000	201,000	166,000
0.01	100	256,000	254,000	245,000	220,000	179,000

¹ Data supplied by U.S. Army Corps of Engineers, St. Paul District.

MISSISSIPPI RIVER MAIN STEM
05389500 MISSISSIPPI RIVER AT MCGREGOR, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	6,530	6,900	6,880	7,030	7,630	8,190	8,600	9,010	9,130
0.02	50	6,890	7,280	7,370	7,610	8,250	8,880	9,330	9,780	10,000
0.05	20	7,510	7,930	8,200	8,590	9,290	10,000	10,600	11,100	11,500
0.10	10	8,150	8,590	9,020	9,550	10,300	11,200	11,800	12,400	13,100
0.20	5	9,070	9,540	10,200	10,900	11,700	12,800	13,500	14,300	15,300
0.50	2	11,400	11,900	12,900	13,900	15,100	16,500	17,500	18,700	21,000
0.80	1.25	14,700	15,200	16,600	17,800	19,400	21,300	22,900	24,900	29,200
0.90	1.11	17,100	17,600	19,000	20,200	22,200	24,500	26,300	29,000	34,800
0.96	1.04	20,200	20,600	22,000	23,200	25,600	28,300	30,600	34,200	42,200
0.98	1.02	22,600	23,000	24,300	25,300	28,100	31,100	33,800	38,100	48,000
0.99	1.01	25,100	25,400	26,500	27,400	30,500	33,800	37,000	42,000	53,900

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	7,060	7,180	7,300	7,690	7,560	9,400	10,500	11,600
0.02	50	7,650	7,840	8,000	8,420	8,730	10,800	12,000	13,600
0.05	20	8,630	8,920	9,160	9,620	10,800	13,100	14,700	17,000
0.10	10	9,600	9,990	10,300	10,800	12,900	15,600	17,400	20,600
0.20	5	10,900	11,400	11,800	12,400	16,000	19,000	21,300	25,600
0.50	2	14,000	14,700	15,300	16,100	23,500	27,200	30,500	37,300
0.80	1.25	17,800	18,700	19,500	20,800	33,600	37,800	42,300	51,700
0.90	1.11	20,200	21,200	22,000	23,600	40,200	44,400	49,700	60,300
0.98	1.04	23,200	24,100	25,000	27,000	48,200	52,400	58,500	70,100
0.98	1.02	25,300	26,100	27,100	29,400	54,000	58,000	64,800	76,700
0.99	1.01	27,300	28,100	29,100	31,800	59,700	63,300	70,700	82,700
		July-August-September				October-November-December			
0.01	100	6,990	7,290	7,750	8,130	6,060	6,890	7,380	8,120
0.02	50	7,340	7,810	8,350	8,860	6,560	7,450	8,040	8,860
0.05	20	7,960	8,700	9,390	10,100	7,420	8,420	9,180	10,100
0.10	10	8,660	9,650	10,500	11,500	8,320	9,420	10,300	11,500
0.20	5	9,720	11,000	12,100	13,400	9,610	10,900	12,000	13,300
0.50	2	12,700	14,800	16,100	18,400	12,900	14,400	16,100	18,100
0.80	1.25	17,800	20,500	22,300	26,000	17,700	19,600	21,900	25,100
0.90	1.11	21,900	24,800	26,700	31,400	21,000	23,300	25,800	29,900
0.96	1.04	27,900	30,800	32,700	38,700	25,500	28,100	30,900	36,300
0.98	1.02	33,100	35,700	37,500	44,400	29,000	31,800	34,800	41,300
0.99	1.01	38,900	41,000	42,600	50,500	32,700	35,700	38,800	46,400

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 1988.

GAGE.--Water-stage recorder. Datum of gage is 1,034.92 ft above National Geodetic Vertical Datum of 1929.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,600 ft³/s July 12, 1972, gage height, 16.73 ft; 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.

Rating table number 14, developed October 1981

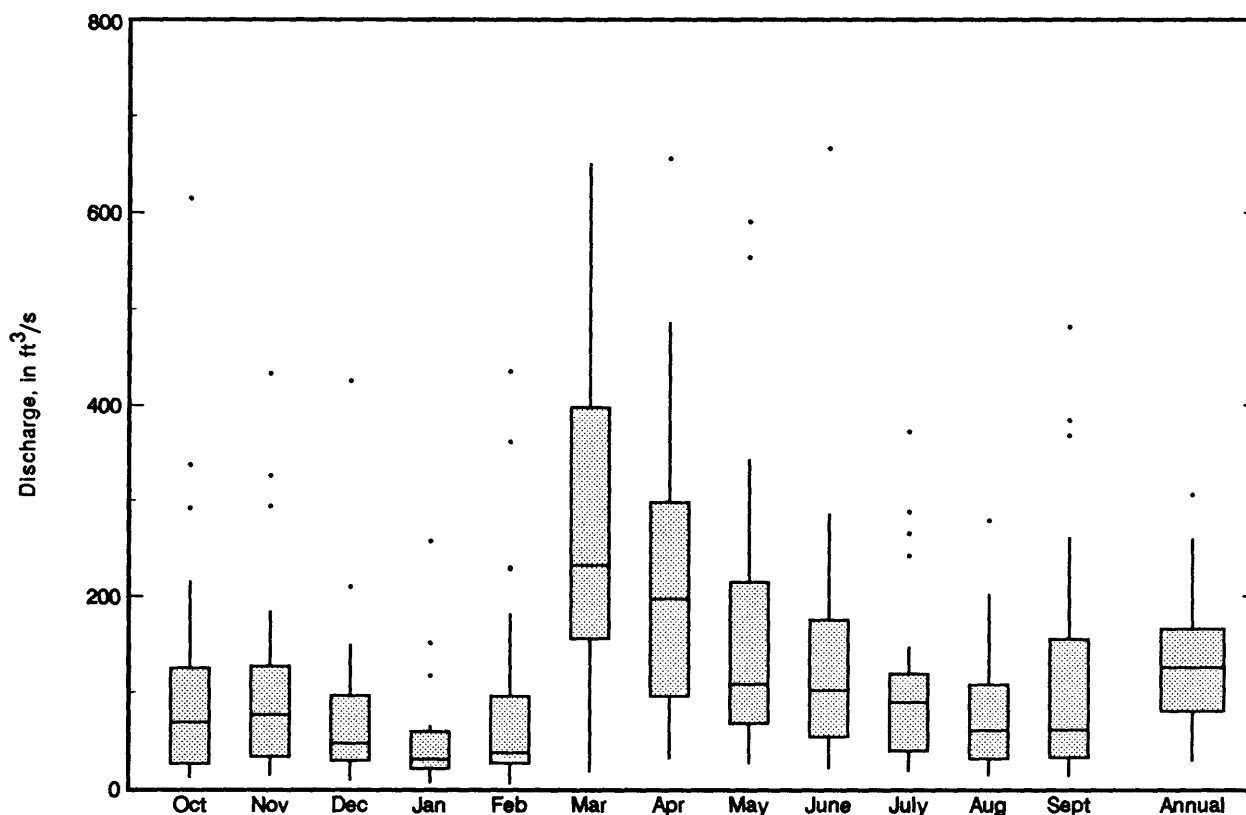
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
3.5	12	7.0	757
3.7	21	8.0	1,170
4.0	45	9.0	1,680
4.5	103	10.0	2,260
5.0	190	12.0	3,670
5.5	298	14.0	5,400
6.0	430	16.0	7,450

TURKEY RIVER BASIN
05411600 TURKEY RIVER AT SPILLVILLE, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	614	1987	10.7	1959	110	130	7.3
November	433	1983	13.2	1959	101	102	6.7
December	425	1983	8.52	1959	72.6	83.7	4.8
January	257	1973	5.53	1959	49.5	51.7	3.3
February	435	1985	4.84	1959	86.4	107	5.8
March	650	1961	16.9	1964	266	173	17.8
April	655	1985	30.1	1957	218	153	14.5
May	590	1983	25.6	1958	161	144	10.7
June	666	1959	20.1	1958	136	129	9.1
July	372	1972	17.5	1988	105	87.8	7.0
August	279	1981	13.2	1964	76.5	63.9	5.1
September	481	1972	12.5	1958	117	128	7.8
Annual	306	1983	28.4	1964	125	65.0	100.0

Boxplots of monthly and annual mean discharges



TURKEY RIVER BASIN
05411600 TURKEY RIVER AT SPILLVILLE, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	5.0	4.7	8.6	18	20	18	14	11	10	9.9	11	7.6	8.4
95	7.9	12	18	31	30	24	19	13	13	14	14	11	14
90	11	15	23	46	37	28	25	18	16	17	17	14	19
85	15	18	27	59	44	35	31	22	21	20	21	17	23
80	18	21	31	69	50	40	34	26	25	22	24	22	27
75	20	24	37	83	56	44	36	30	30	25	33	26	32
70	22	25	50	95	64	49	40	34	33	31	39	30	36
65	25	27	62	107	72	55	44	37	36	40	45	33	41
60	27	29	76	121	79	63	50	41	40	48	51	36	46
55	30	30	92	135	86	70	58	45	44	55	57	40	53
50	32	32	106	149	95	79	65	49	49	62	67	43	60
45	34	35	128	163	106	87	72	53	54	69	74	48	68
40	36	37	153	178	122	99	79	57	60	79	80	54	78
35	41	42	181	195	140	112	87	62	68	89	86	60	89
30	47	48	222	214	159	127	97	68	86	100	96	66	104
25	54	57	271	243	181	145	107	75	101	110	107	75	124
20	61	73	343	279	205	164	125	84	119	125	132	89	152
15	68	96	439	325	246	195	153	101	149	164	169	120	189
10	84	149	654	397	313	242	196	127	197	237	214	153	250
5	155	320	1,160	600	508	338	309	198	364	370	295	201	404

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	305	206	130	78	56
0.95	1.05	638	382	244	155	111
0.90	1.11	920	521	333	217	154
0.80	1.25	1,390	746	477	316	222
0.50	2	2,860	1,400	896	594	407
0.20	5	5,330	2,460	1,560	1,000	663
0.10	10	7,120	3,210	2,030	1,270	820
0.04	25	9,430	4,200	2,640	1,580	997
0.02	50	11,100	4,930	3,090	1,800	1,110
0.01	100	12,800	5,670	3,530	2,000	1,220

TURKEY RIVER BASIN
05411600 TURKEY RIVER AT SPILLVILLE, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	3.7	3.8	3.8	4.1	4.3	5.1	5.9	6.2	6.2
0.02	50	4.7	4.8	4.9	5.1	5.6	6.5	7.4	7.9	8.2
0.05	20	6.5	6.7	6.8	7.2	8.0	9.1	10	11	12
0.10	10	8.6	8.9	9.0	9.5	11	12	14	15	18
0.20	5	12	12	12	13	15	17	19	22	27
0.50	2	20	21	21	23	26	30	35	42	55
0.80	1.25	32	33	34	36	41	50	62	77	108
0.90	1.11	40	40	42	45	50	63	82	105	150
0.96	1.04	49	49	52	55	60	79	109	142	208
0.98	1.02	55	55	58	62	67	92	130	172	255
0.99	1.01	60	61	64	69	73	103	151	204	304

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	3.9	4.1	4.2	5.1	10	11	11	15
0.02	50	4.8	5.0	5.3	6.3	12	13	14	18
0.05	20	6.6	6.9	7.2	8.7	16	17	18	23
0.10	10	8.6	9.0	9.5	11	20	22	23	30
0.20	5	12	13	13	16	26	29	31	40
0.50	2	22	23	24	29	45	50	56	71
0.80	1.25	39	41	44	51	79	88	103	127
0.90	1.11	53	56	58	68	105	120	141	172
0.96	1.04	74	77	79	92	143	166	199	237
0.98	1.02	90	93	96	112	175	205	248	291
0.99	1.01	108	112	115	133	211	248	303	352
		July-August-September				October-November-December			
0.01	100	6.3	6.7	7.1	8.1	5.2	5.7	6.0	6.7
0.02	50	7.8	8.3	8.8	9.9	6.3	7.0	7.4	8.2
0.05	20	11	11	12	13	8.6	9.6	10	11
0.10	10	14	14	15	17	11	13	13	15
0.20	5	18	19	20	23	16	17	18	21
0.50	2	29	31	34	38	29	32	34	40
0.80	1.25	43	47	53	63	53	57	64	80
0.90	1.11	51	56	65	80	73	78	88	115
0.96	1.04	61	66	80	101	102	107	123	171
0.98	1.02	66	73	91	118	126	132	153	221
0.99	1.01	72	79	101	135	153	158	186	280

TURKEY RIVER BASIN
05412000 TURKEY RIVER AT ELKADER, IA

LOCATION.--Lat 42°51'15", long 91°24'15" in SE1/4 SW1/4 sec. 23, T.93 N., R.5 W., Clayton County, Hydrologic Unit 07060004, in tailrace of Central States Power and Light Corporations's hydroelectric plant in Elkader.

DRAINAGE AREA.--892 mi².

PERIOD OF RECORD.--July 1933 to September 1942 (discontinued).

GAGE.--Wire-weight gage. Datum of gage is 701.61 ft above National Geodetic Vertical Datum of 1929.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge observed, 19,300 ft³/s May 31, 1941, head gage height, 29.1 ft; minimum daily discharge, 21 ft³/s Jan. 23, 26, 29, 31, 1940.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 1916 reached a stage of 34.3 ft on head gage, from floodmark.

Rating table developed October 1938
(A discharge measurement to validate this rating
has not been made since August 1942.)

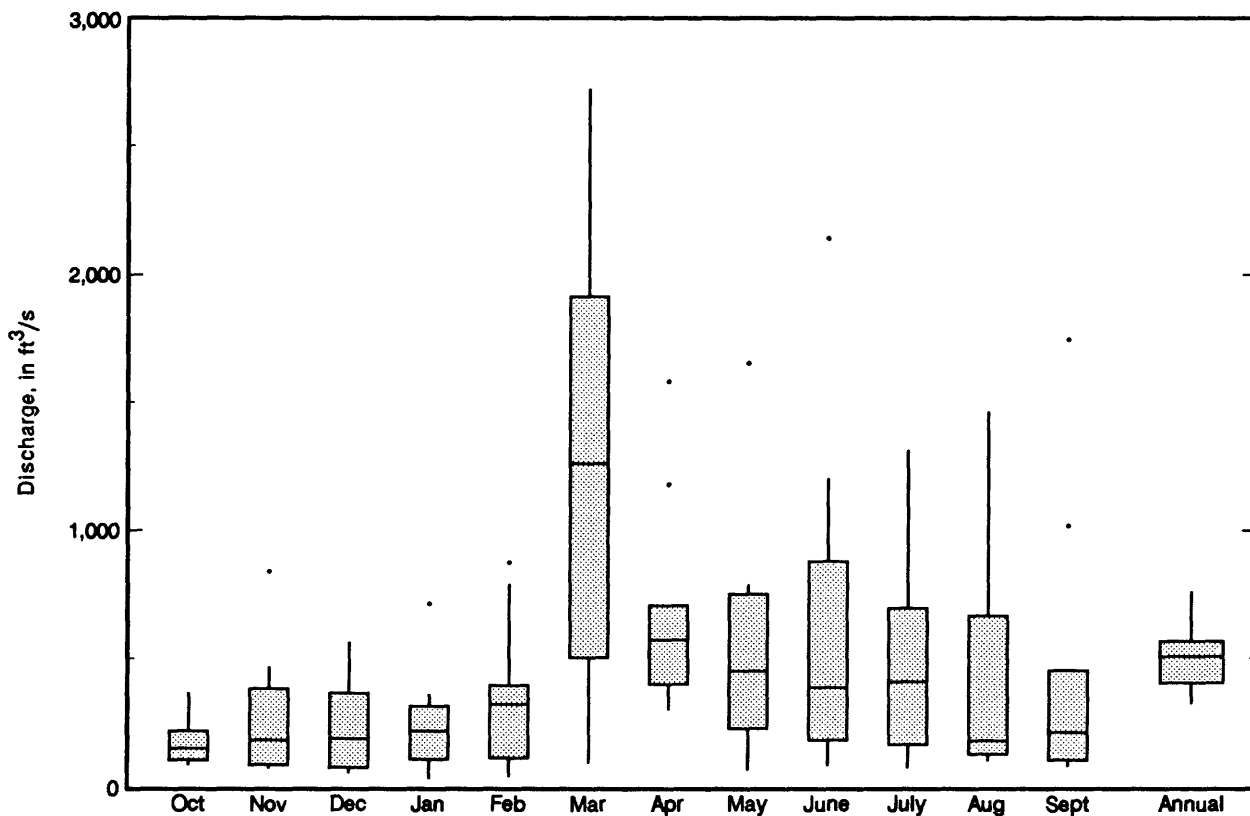
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
6.8	11	7.6	180
7.0	26	7.8	264
7.2	60		

TURKEY RIVER BASIN
05412000 TURKEY RIVER AT ELKADER, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	364	1939	83.6	1934	175	96.2	3.0
November	842	1939	71.5	1934	278	242	4.8
December	563	1933	52.6	1938	232	173	4.0
January	717	1941	33.9	1940	241	195	4.1
February	877	1938	40.3	1940	353	282	6.1
March	2,723	1936	92.3	1934	1,315	829	22.5
April	1,582	1933	298	1940	684	407	11.7
May	1,654	1941	65.6	1934	544	458	9.3
June	2,141	1941	81.4	1934	635	650	10.9
July	1,311	1942	74.4	1936	479	381	8.2
August	1,461	1942	99.6	1933	454	517	7.8
September	1,745	1938	79.3	1933	443	539	7.6
Annual	764	1941	137	1934	487	179	100.0

Boxplots of monthly and annual mean discharges



TURKEY RIVER BASIN
05412000 TURKEY RIVER AT ELKADER, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												Annual
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	
99	25	33	63	99	36	26	32	36	54	60	47	34	34
95	35	37	83	155	70	44	55	49	64	72	63	44	53
90	39	50	102	209	105	69	65	58	71	78	72	56	68
85	50	56	140	250	133	95	75	76	77	85	79	64	80
80	67	68	183	287	172	131	86	93	82	92	86	69	94
75	83	84	244	318	200	151	110	107	88	99	96	77	108
70	95	101	307	345	238	180	138	118	97	105	106	83	128
65	108	126	391	377	259	207	166	130	105	113	121	93	146
60	117	151	450	415	278	223	186	143	118	121	136	105	168
55	126	169	544	452	297	238	208	157	134	129	148	122	193
50	144	184	662	487	327	272	229	178	150	140	161	142	218
45	168	199	777	522	360	312	253	203	187	152	178	164	244
40	193	233	921	561	388	357	277	221	224	164	194	186	283
35	215	273	1,110	618	417	439	306	239	266	177	216	210	331
30	234	323	1,280	676	444	518	354	296	340	189	240	237	389
25	267	390	1,460	762	502	614	430	405	443	204	296	264	455
20	306	450	1,930	865	568	765	542	565	605	223	353	290	575
15	354	577	2,490	1,000	664	972	738	703	805	255	425	366	750
10	619	801	3,180	1,190	820	1,330	982	1,030	1,080	332	640	409	1,020
5	917	1,310	4,650	1,460	1,300	2,300	1,630	1,820	2,140	408	1,030	490	1,680

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	3,290	907	700	341	189
0.95	1.05	4,970	1,590	1,220	780	493
0.90	1.11	6,120	2,120	1,610	1,140	751
0.80	1.25	7,780	3,000	2,230	1,690	1,160
0.50	2	12,000	5,680	3,970	3,030	2,120
0.20	5	17,600	10,500	6,680	4,460	3,010
0.10	10	21,300	14,300	8,580	5,110	3,340
0.04	25	25,700	19,700	11,000	5,670	3,580
0.02	50	28,900	24,100	12,800	5,940	3,670
0.01	100	31,900	28,800	14,700	6,140	3,730

TURKEY RIVER BASIN
05412000 TURKEY RIVER AT ELKADER, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	17	22	21	24	25	28	35	34	40
0.02	50	18	23	22	25	27	31	39	39	46
0.05	20	20	24	24	28	30	36	46	48	56
0.10	10	22	27	27	31	35	42	53	59	69
0.20	5	26	30	32	36	42	52	66	76	89
0.50	2	37	42	47	54	65	83	103	129	157
0.80	1.25	61	67	77	93	117	149	176	237	300
0.90	1.11	83	90	106	132	169	210	241	334	437
0.96	1.04	122	130	155	201	263	315	346	493	672
0.98	1.02	159	169	202	271	360	416	444	642	902
0.99	1.01	206	218	261	361	486	543	561	821	1,190

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	10	14	15	16	11	16	20	23
0.02	50	13	18	19	22	17	23	29	34
0.05	20	19	25	27	33	30	39	47	56
0.10	10	27	34	37	47	47	59	69	84
0.20	5	39	48	52	69	75	93	105	130
0.50	2	74	87	95	134	154	182	203	255
0.80	1.25	128	147	160	234	250	292	329	417
0.90	1.11	165	188	205	301	298	348	398	504
0.96	1.04	211	239	260	382	342	402	468	591
0.98	1.02	245	276	300	440	365	431	509	641
0.99	1.01	277	312	339	495	382	453	542	681
		July-August-September				October-November-December			
0.01	100	24	34	37	31	18	21	29	32
0.02	50	25	35	38	36	21	26	33	37
0.05	20	27	38	42	45	27	34	42	48
0.10	10	31	42	48	56	34	44	51	59
0.20	5	37	50	57	75	44	58	65	76
0.50	2	60	80	93	144	70	95	103	121
0.80	1.25	124	162	189	312	107	148	161	192
0.90	1.11	202	263	300	494	132	183	202	242
0.96	1.04	370	479	531	838	163	226	258	310
0.98	1.02	572	743	803	1,210	187	257	300	362
0.99	1.01	876	1,140	1,200	1,700	209	286	345	417

TURKEY RIVER BASIN
05412500 TURKEY RIVER AT GARBER, IA

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

DRAINAGE AREA.--1,545 mi².

PERIOD OF RECORD.--August 1913 to November 1916, May 1919 to September 1927, April 1929 to September 1930, October 1932 to September 1988.

GAGE.--Water-stage recorder. Datum of gage is 634.46 ft above National Geodetic Vertical Datum of 1929. Prior to Feb. 7, 1935, nonrecording gage at same site and datum.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 32,300 ft³/s Feb. 23, 1922, gage height, 28.06 ft, 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 Feb. 23, 1922.

Rating table number 11, developed October 1986

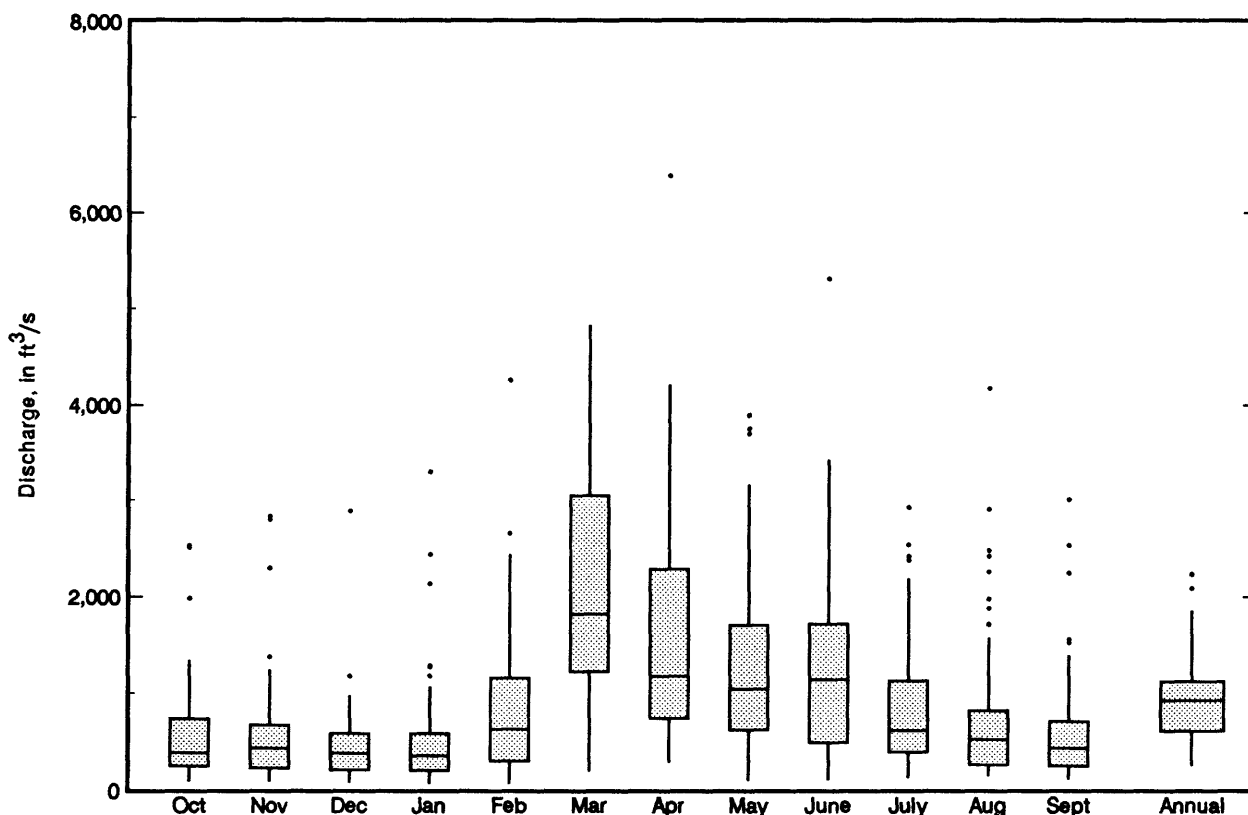
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
6.0	183	16.0	8,210
6.5	333	18.0	11,100
7.0	515	20.0	14,500
8.0	955	22.0	18,500
9.0	1,510	24.0	22,700
10.0	2,170	26.0	27,300
14.0	5,770	28.0	32,200

TURKEY RIVER BASIN
05412500 TURKEY RIVER AT GARBER, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	2,527	1987	88.2	1950	565	507	5.0
November	2,834	1962	92.2	1950	584	545	5.1
December	2,889	1983	78.5	1959	448	395	3.9
January	3,306	1916	62.0	1940	522	551	4.6
February	4,265	1922	60.9	1959	845	735	7.4
March	4,832	1979	188	1934	2,050	1,229	18.0
April	6,382	1951	288	1957	1,609	1,152	14.1
May	3,896	1983	95.7	1934	1,250	889	11.0
June	5,316	1947	103	1934	1,267	941	11.1
July	2,927	1969	121	1936	871	645	7.6
August	4,174	1979	140	1964	770	747	6.7
September	3,011	1938	108	1958	623	569	5.5
Annual	2,234	1983	249	1934	953	421	100.0

Boxplots of monthly and annual mean discharges



TURKEY RIVER BASIN
05412500 TURKEY RIVER AT GARBER, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												Annual
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	
99	62	63	120	205	109	90	104	95	93	86	91	73	85
95	95	101	202	284	213	190	160	134	112	111	120	101	122
90	118	136	265	372	311	257	206	163	130	134	146	124	163
85	138	172	318	473	360	305	240	185	159	164	173	155	200
80	158	200	401	558	411	355	275	208	189	193	200	177	235
75	183	226	466	626	472	413	311	237	221	226	228	201	270
70	205	253	574	695	539	483	355	271	249	251	259	224	307
65	227	280	670	769	613	546	401	314	278	277	290	247	349
60	248	308	786	852	691	624	445	356	304	307	320	271	394
55	269	343	909	951	764	710	492	397	335	335	366	299	443
50	299	384	1,040	1,070	840	806	542	437	370	363	405	328	498
45	333	439	1,170	1,190	926	909	602	479	406	390	439	364	561
40	375	496	1,360	1,350	1,020	1,020	666	530	442	440	473	401	639
35	416	555	1,600	1,510	1,140	1,140	749	586	483	503	541	442	729
30	456	670	1,910	1,680	1,290	1,280	841	646	537	584	611	484	837
25	509	783	2,270	1,890	1,500	1,430	950	724	621	668	684	530	986
20	574	963	2,760	2,130	1,760	1,650	1,090	826	749	768	771	585	1,190
15	660	1,310	3,490	2,540	2,130	1,990	1,300	995	943	910	893	656	1,520
10	860	1,850	4,880	3,290	2,660	2,480	1,690	1,370	1,280	1,130	1,130	764	2,030
5	1,500	3,310	8,110	4,750	3,740	3,650	2,580	2,530	2,000	1,600	1,660	1,050	3,220

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	—	2,110	1,360	883	605
0.95	1.05	7,790	3,520	2,320	1,540	1,090
0.90	1.11	9,140	4,520	3,000	2,000	1,430
0.80	1.25	11,000	5,970	4,010	2,680	1,930
0.50	2	15,300	9,550	6,460	4,350	3,120
0.20	5	20,500	14,100	9,520	6,390	4,500
0.10	10	23,600	16,800	11,300	7,540	5,230
0.04	25	27,200	19,900	13,200	8,770	5,970
0.02	50	29,700	21,900	14,400	9,550	6,410
0.01	100	32,000	23,700	15,500	10,200	6,770

TURKEY RIVER BASIN
05412500 TURKEY RIVER AT GARBER, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	41	43	45	47	51	57	63	69	76
0.02	50	48	50	53	55	61	68	76	83	93
0.05	20	61	64	67	71	78	88	100	111	126
0.10	10	75	79	84	89	97	111	127	143	164
0.20	5	97	102	108	115	127	146	169	192	224
0.50	2	157	164	175	186	208	245	288	330	399
0.80	1.25	252	262	276	295	335	408	480	550	691
0.90	1.11	322	334	349	373	428	530	622	710	911
0.96	1.04	418	430	444	476	551	699	816	924	1,220
0.98	1.02	495	505	518	556	648	834	969	1,090	1,460
0.99	1.01	575	584	594	637	748	977	1,130	1,260	1,710

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	48	50	51	58	64	78	87	102
0.02	50	57	60	62	70	80	96	108	129
0.05	20	74	78	81	92	111	132	148	182
0.10	10	92	98	103	118	147	173	194	243
0.20	5	120	129	137	160	205	239	268	342
0.50	2	199	213	228	286	376	430	485	629
0.80	1.25	323	345	368	509	664	748	848	1,100
0.90	1.11	414	438	466	688	881	985	1,120	1,440
0.96	1.04	536	563	594	948	1,180	1,310	1,500	1,890
0.98	1.02	632	659	692	1,170	1,410	1,570	1,790	2,240
0.99	1.01	732	758	790	1,400	1,650	1,830	2,100	2,590
		July-August-September				October-November-December			
0.01	100	49	61	66	76	49	56	59	63
0.02	50	58	71	77	91	58	66	71	76
0.05	20	76	91	98	118	75	86	91	101
0.10	10	96	112	122	148	94	107	115	128
0.20	5	126	145	157	194	123	141	150	171
0.50	2	209	233	254	318	205	233	250	294
0.80	1.25	337	371	407	510	340	380	413	493
0.90	1.11	429	471	519	648	443	488	533	641
0.96	1.04	549	605	671	829	586	634	699	843
0.98	1.02	642	711	791	968	702	749	830	1,000
0.99	1.01	737	820	915	1,110	826	869	968	1,170

LITTLE MAQUOKETA RIVER BASIN
05414500 LITTLE MAQUOKETA RIVER NEAR DURANGO, IA

LOCATION.--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.--130 mi².

PERIOD OF RECORD.--October 1934 to January 1982 (discontinued).

GAGE.--Water-stage recorder. Datum of gage is 612.03 ft above National Geodetic Vertical Datum of 1929. Prior to Jan. 5, 1939, nonrecording gage at same site and datum

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 40,000 ft³/s Aug. 2, 1972, gage height, 23.13 ft, in gage well, 23.8 ft, from floodmarks, on basis of slope-area measurement of peak flow; minimum daily discharge, 5 ft³/s July 12 and 13, 1936.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 15, 1925, reached a stage of about 22.1 ft, discharge about 29,000 ft³/s, computed by U.S. Army Corps of Engineers.

Rating table number 7, developed August 1972
(A discharge measurement to validate this rating
has not been made since December 1982.)

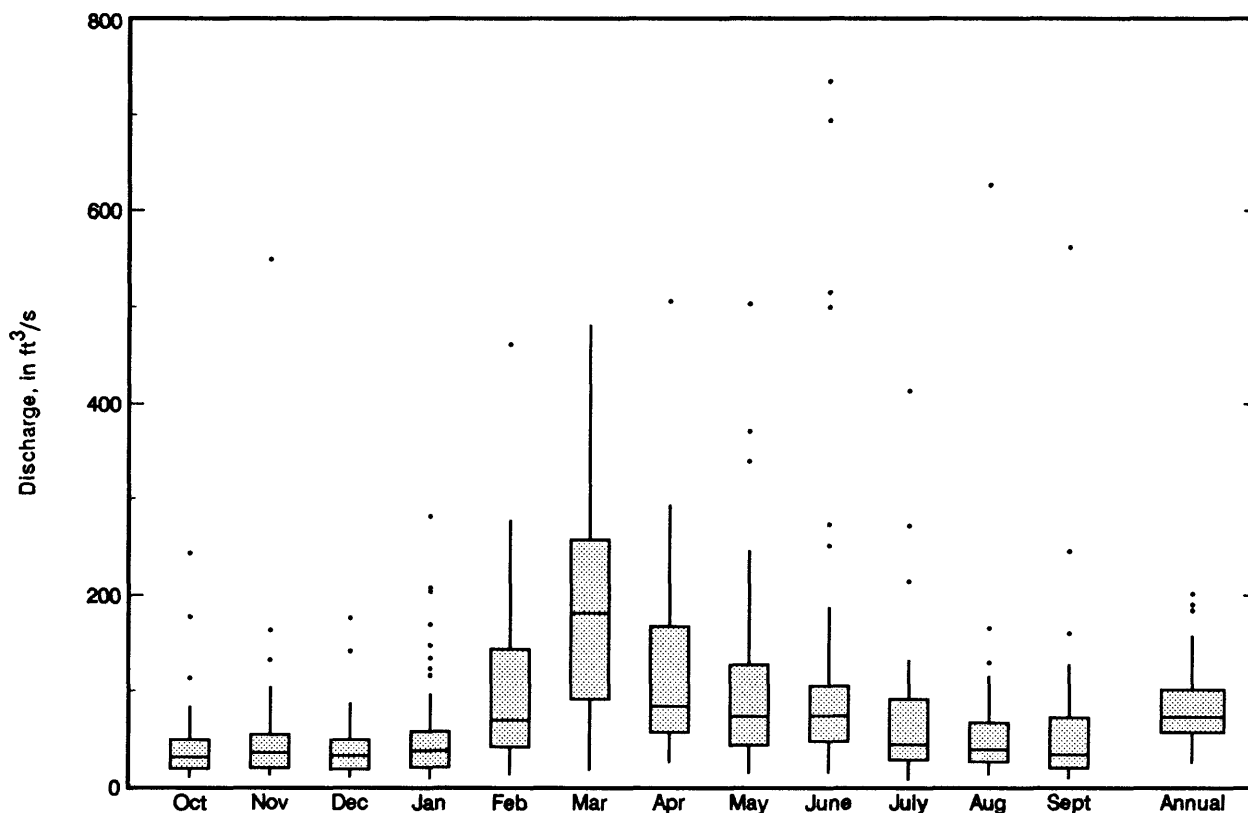
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
3.0	24	11.0	3,150
3.5	77	13.0	4,770
4.0	153	15.0	6,920
4.5	250	17.0	9,800
5.0	375	19.0	13,700
6.0	660	21.0	20,000
7.0	1,020	23.0	37,900
9.0	1,950		

LITTLE MAQUOKETA RIVER BASIN
05414500 LITTLE MAQUOKETA RIVER NEAR DURANGO, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	243	1962	9.68	1957	44.7	45.9	4.4
November	549	1962	11.7	1956	54.6	79.6	5.3
December	176	1973	10.0	1959	39.7	31.9	3.9
January	281	1960	8.39	1977	57.8	59.5	5.6
February	461	1971	12.1	1959	102	87.6	9.9
March	481	1959	17.3	1957	181	115	17.7
April	506	1973	24.8	1957	119	93.2	11.6
May	503	1960	13.8	1958	107	99.3	10.5
June	735	1947	14.3	1977	127	162	12.4
July	413	1969	7.24	1936	67.4	71.9	6.6
August	626	1972	12.1	1937	63.2	90.4	6.2
September	562	1972	8.41	1958	59.8	87.2	5.9
Annual	201	1973	24.2	1958	84.9	44.3	100.0

Boxplots of monthly and annual mean discharges



LITTLE MAQUOKETA RIVER BASIN
05414500 LITTLE MAQUOKETA RIVER NEAR DURANGO, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	7.4	8.2	14	14	13	9.9	6.5	6.2	6.9	8.3	8.6	8.2	8.0
95	9.7	12	18	22	18	14	10	9.3	9.8	11	13	11	12
90	12	14	22	30	25	18	14	12	12	13	14	13	14
85	13	16	27	35	29	23	17	14	14	15	16	14	16
80	14	18	32	39	33	26	19	16	15	16	17	16	19
75	16	20	36	43	36	29	21	17	17	17	19	17	21
70	18	22	42	47	40	33	22	19	18	19	21	19	24
65	20	24	49	53	44	37	24	21	20	21	24	21	26
60	22	27	56	57	48	41	27	22	22	23	27	24	29
55	24	29	64	64	53	45	29	24	24	25	30	26	32
50	26	32	71	71	59	50	32	27	27	27	32	28	36
45	29	36	82	80	65	55	35	30	29	29	35	30	40
40	31	40	97	88	71	60	38	34	32	31	38	32	44
35	34	44	118	100	79	69	43	39	36	34	41	35	50
30	37	50	140	113	88	79	48	44	40	37	44	38	57
25	42	56	169	129	104	91	58	50	44	43	49	42	68
20	48	69	212	149	124	113	70	57	50	51	55	47	83
15	58	98	281	179	152	143	85	69	60	62	65	56	108
10	76	162	416	226	199	202	110	94	89	82	84	68	153
5	149	373	779	335	310	404	198	178	180	134	157	92	266

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	—	235	149	87	56
0.95	1.05	—	380	228	137	91
0.90	1.11	—	487	286	174	117
0.80	1.25	4,170	656	376	231	157
0.50	2	6,590	1,140	634	397	273
0.20	5	10,800	1,930	1,060	678	461
0.10	10	14,200	2,520	1,390	894	601
0.04	25	19,200	3,330	1,860	1,200	791
0.02	50	23,500	3,970	2,230	1,440	941
0.01	100	28,200	4,640	2,640	1,710	1,100

LITTLE MAQUOKETA RIVER BASIN
05414500 LITTLE MAQUOKETA RIVER NEAR DURANGO, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	4.1	4.2	4.7	4.9	5.5	6.5	7.9	8.9	9.9
0.02	50	4.6	4.8	5.3	5.6	6.3	7.4	8.9	9.8	11
0.05	20	5.5	5.8	6.3	6.8	7.7	8.9	11	11	13
0.10	10	6.5	6.9	7.4	8.0	9.2	11	12	13	16
0.20	5	7.9	8.5	9.1	9.9	11	13	15	16	20
0.50	2	12	13	14	15	17	20	23	25	31
0.80	1.25	18	20	21	23	26	32	38	41	53
0.90	1.11	23	25	26	28	32	41	50	55	71
0.96	1.04	29	32	34	35	41	54	68	76	100
0.98	1.02	35	37	39	41	47	64	83	95	125
0.99	1.01	41	43	46	47	54	76	100	116	155

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	5.0	5.5	5.6	6.7	6.6	7.5	8.0	10
0.02	50	5.7	6.4	6.6	7.8	7.7	8.8	9.5	12
0.05	20	7.0	7.8	8.3	9.7	9.8	11	12	16
0.10	10	8.4	9.4	10	12	12	14	16	20
0.20	5	10	12	13	16	16	18	21	27
0.50	2	16	18	20	26	26	30	35	47
0.80	1.25	25	28	31	47	43	49	58	81
0.90	1.11	31	35	39	64	56	63	75	107
0.96	1.04	40	45	48	92	74	83	99	144
0.96	1.02	47	53	56	116	89	100	118	175
0.99	1.01	54	61	63	144	106	118	137	207
		July-August-September				October-November-December			
0.01	100	3.9	4.6	5.2	5.6	4.9	6.0	6.3	7.4
0.02	50	4.7	5.4	6.0	6.6	5.6	6.8	7.2	8.5
0.05	20	6.0	6.8	7.4	8.6	6.8	8.2	8.8	10
0.10	10	7.4	8.3	9.0	11	8.2	9.8	10	12
0.20	5	9.6	11	11	14	10	12	13	15
0.50	2	16	17	18	23	16	19	20	24
0.80	1.25	25	27	30	38	26	30	32	38
0.90	1.11	32	34	39	49	33	38	41	49
0.96	1.04	41	44	53	64	44	50	54	64
0.98	1.02	49	52	64	76	53	60	65	77
0.99	1.01	56	60	76	89	63	71	76	90

MAQUOKETA RIVER BASIN
05417000 MAQUOKETA RIVER NEAR MANCHESTER, IA

LOCATION.--Lat 42°27'22", long 91°25'56", in NW1/4 NE1/4 sec. 9, T.88 N., R.5 W., Delaware County, Hydrologic Unit 07060006, on left bank 0.6 ft downstream from Sand Creek, 1.5 mi upstream from Spring Branch, 2.3 mi southeast from dam on Maquoketa River in Manchester and at mile 100.5.

DRAINAGE AREA.--305 mi².

PERIOD OF RECORD.--April 1933 to September 1973 (discontinued).

GAGE.--Water-stage recorder. Concrete control since June 1, 1935. Datum of gage is 895.06 ft above mean sea level, adjustment of 1912.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 20,000 ft³/s June 13, 1947, gage height, 21.36 ft (from floodmarks), from rating curve extended above 10,000 ft³/s by velocity-area studies; minimum daily discharge, 6 ft³/s June 8 and 29, 1934.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood at Manchester on June 15, 1925, stage unknown, exceeded all other known floods, discharge, 25,400 ft³/s, from determination of peak flow completed by the University of Iowa.

Rating table number 4, developed April 1964
(A discharge measurement to validate this rating
has not been made since October 1973.)

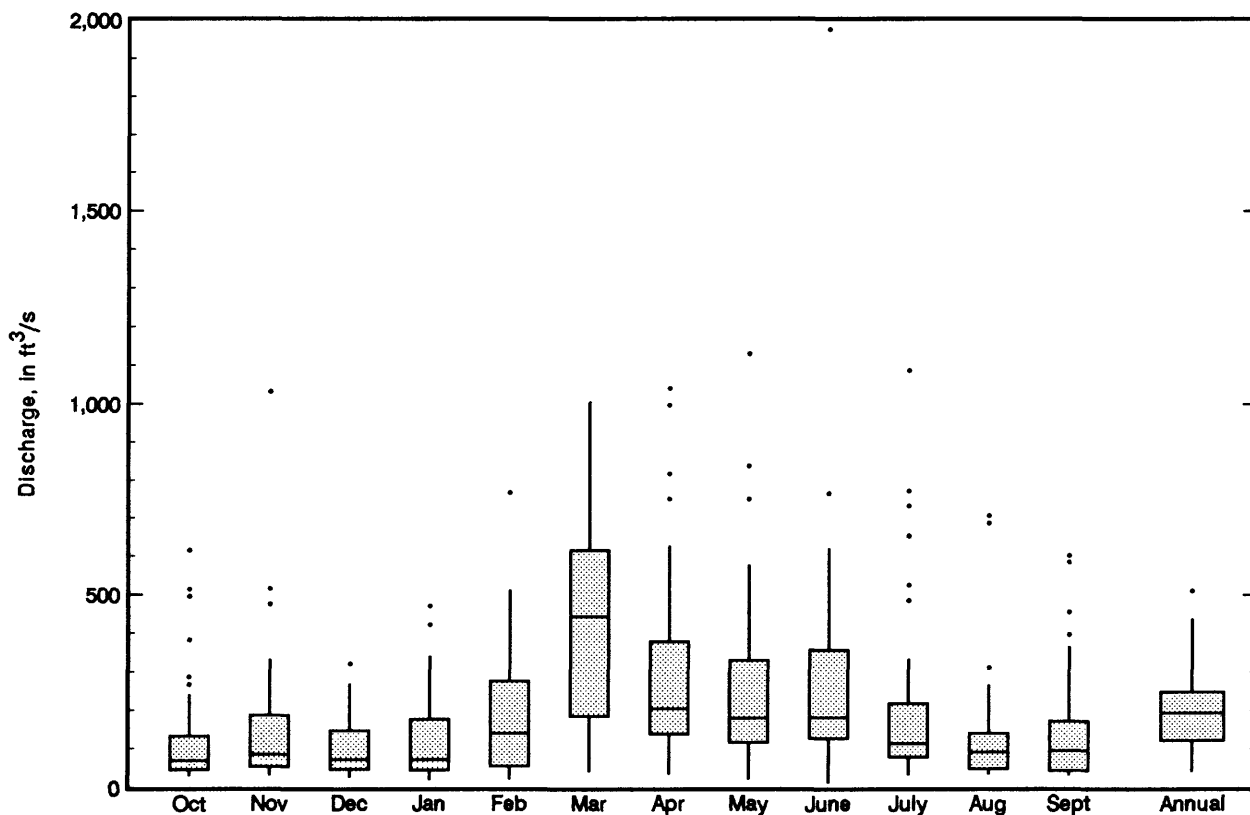
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
4.5	35	9.0	2,610
5.0	75	10.0	3,480
5.5	200	12.0	5,550
6.0	420	14.0	8,000
6.5	720	16.0	10,800
7.0	1,060	18.0	14,000
8.0	1,810	20.0	17,500

MAQUOKETA RIVER BASIN
05417000 MAQUOKETA RIVER NEAR MANCHESTER, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	616	1962	31.6	1959	131	142	5.3
November	1,032	1962	32.3	1959	158	185	6.3
December	320	1973	26.9	1959	106	74.0	4.2
January	471	1946	21.0	1959	118	106	4.7
February	768	1971	22.7	1959	194	165	7.8
March	1,005	1962	41.7	1934	435	286	17.4
April	1,041	1951	36.0	1934	299	249	12.0
May	1,131	1960	22.7	1934	261	233	10.4
June	1,976	1947	11.7	1934	299	322	11.9
July	1,067	1969	34.6	1936	216	236	8.6
August	707	1968	35.1	1934	138	148	5.5
September	603	1941	32.1	1958	147	144	5.9
Annual	510	1962	42.7	1934	208	112	100.0

Boxplots of monthly and annual mean discharges



MAQUOKETA RIVER BASIN
05417000 MAQUOKETA RIVER NEAR MANCHESTER, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												Annual
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	
99	20	20	31	28	21	11	27	25	26	25	26	24	23
95	28	27	42	46	39	40	37	32	33	32	34	30	33
90	33	36	50	63	56	55	45	38	38	37	39	36	39
85	37	40	58	82	71	65	52	42	42	40	44	39	45
80	40	44	71	99	81	75	59	47	45	44	48	42	50
75	43	48	88	113	91	83	65	51	50	48	52	46	56
70	46	52	102	125	100	94	71	55	54	52	57	51	63
65	49	56	119	136	108	105	77	60	60	57	63	55	70
60	53	63	138	148	120	117	84	66	66	62	68	61	79
55	56	71	161	161	132	130	91	72	73	67	75	67	88
50	64	78	184	177	146	145	100	80	80	72	83	74	99
45	71	84	208	196	164	163	109	88	88	79	93	82	110
40	79	95	254	218	182	185	124	96	98	86	105	91	126
35	88	109	302	246	201	208	140	104	108	96	123	102	143
30	102	125	361	275	227	245	161	114	122	107	144	115	165
25	118	143	435	316	261	289	187	132	136	128	167	133	193
20	137	170	516	367	316	348	222	152	158	164	202	152	233
15	167	219	657	438	388	436	288	181	190	210	245	170	294
10	214	344	958	567	511	604	416	241	251	290	312	201	397
5	308	712	1,720	905	842	980	631	334	399	400	452	264	649

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	—	335	198	126	86
0.95	1.05	1,490	670	399	249	175
0.90	1.11	1,940	934	557	346	246
0.80	1.25	2,650	1,350	807	500	358
0.50	2	4,670	2,480	1,480	923	659
0.20	5	7,870	4,030	2,400	1,530	1,070
0.10	10	10,200	4,970	2,980	1,910	1,310
0.04	25	13,200	6,020	3,570	2,340	1,570
0.02	50	15,600	6,710	3,970	2,640	1,740
0.01	100	17,900	7,320	4,320	2,910	1,890

MAQUOKETA RIVER BASIN
05417000 MAQUOKETA RIVER NEAR MANCHESTER, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	8.6	10	12	13	15	19	22	24	22
0.02	50	10	12	14	15	17	21	24	27	26
0.05	20	13	15	17	19	21	25	28	31	32
0.10	10	16	19	21	23	25	29	33	36	39
0.20	5	21	24	27	29	32	36	40	44	50
0.50	2	33	38	41	44	49	55	62	69	84
0.80	1.25	50	56	61	66	75	86	104	117	150
0.90	1.11	62	68	75	82	94	111	141	160	207
0.96	1.04	76	83	92	101	119	148	201	231	298
0.98	1.02	87	93	104	115	139	179	257	296	380
0.99	1.01	97	104	117	130	160	213	324	375	477

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	16	16	17	20	7.9	13	14	16
0.02	50	17	18	19	23	11	17	19	22
0.05	20	20	21	23	27	16	25	27	33
0.10	10	23	25	27	32	22	34	37	46
0.20	5	27	31	33	40	33	48	52	67
0.50	2	39	47	51	62	64	87	96	128
0.80	1.25	59	73	79	103	111	143	163	218
0.90	1.11	75	93	102	138	142	179	209	276
0.96	1.04	98	122	134	191	180	222	266	344
0.98	1.02	117	146	161	238	207	252	308	392
0.99	1.01	139	172	190	292	232	280	348	436
		July-August-September				October-November-December			
0.01	100	14	20	22	23	13	21	23	23
0.02	50	16	22	24	26	14	23	25	26
0.05	20	19	26	28	31	17	26	28	30
0.10	10	23	30	33	36	20	30	32	35
0.20	5	28	37	39	44	25	36	39	43
0.50	2	42	53	58	68	41	54	58	66
0.80	1.25	63	80	89	107	71	88	95	112
0.90	1.11	79	99	112	139	99	119	128	151
0.96	1.04	101	125	146	185	144	168	180	214
0.98	1.02	119	146	174	225	186	214	229	272
0.99	1.01	137	169	205	269	237	269	286	341

MAQUOKETA RIVER BASIN
05417700 BEAR CREEK NEAR MONMOUTH, IA

LOCATION.--Lat 42°02'18", long 90°52'59", in NE1/4 SE1/4 sec. 31, T.84 N., R.1 E., Jackson County, Hydrologic Unit 07060006, on right bank 15 ft downstream from bridge on county highway, 1.6 mi upstream from Rat Run, 2.8 mi south of Monmouth and 8.2 mi upstream from mouth.

DRAINAGE AREA.--61.3 mi².

PERIOD OF RECORD.--October 1957 to September 1976 (discontinued).

GAGE.--Water-stage recorder and concrete control. Datum of gage is 728.80 above National Geodetic Vertical Datum of 1929.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 7,340 ft³/s Sept. 21, 1965, gage height, 13.76 ft; minimum daily discharge, 1.8 ft³/s Dec. 8-12, 1958.

EXTREMES OUTSIDE OF PERIOD OF RECORD.--Flood in June 1944 reached a stage of about 21.5 ft (from floodmarks), from information by local residents, discharge not determined.

Rating table number 6, developed March 1976
(A discharge measurement to validate this rating
has not been made since October 1976.)

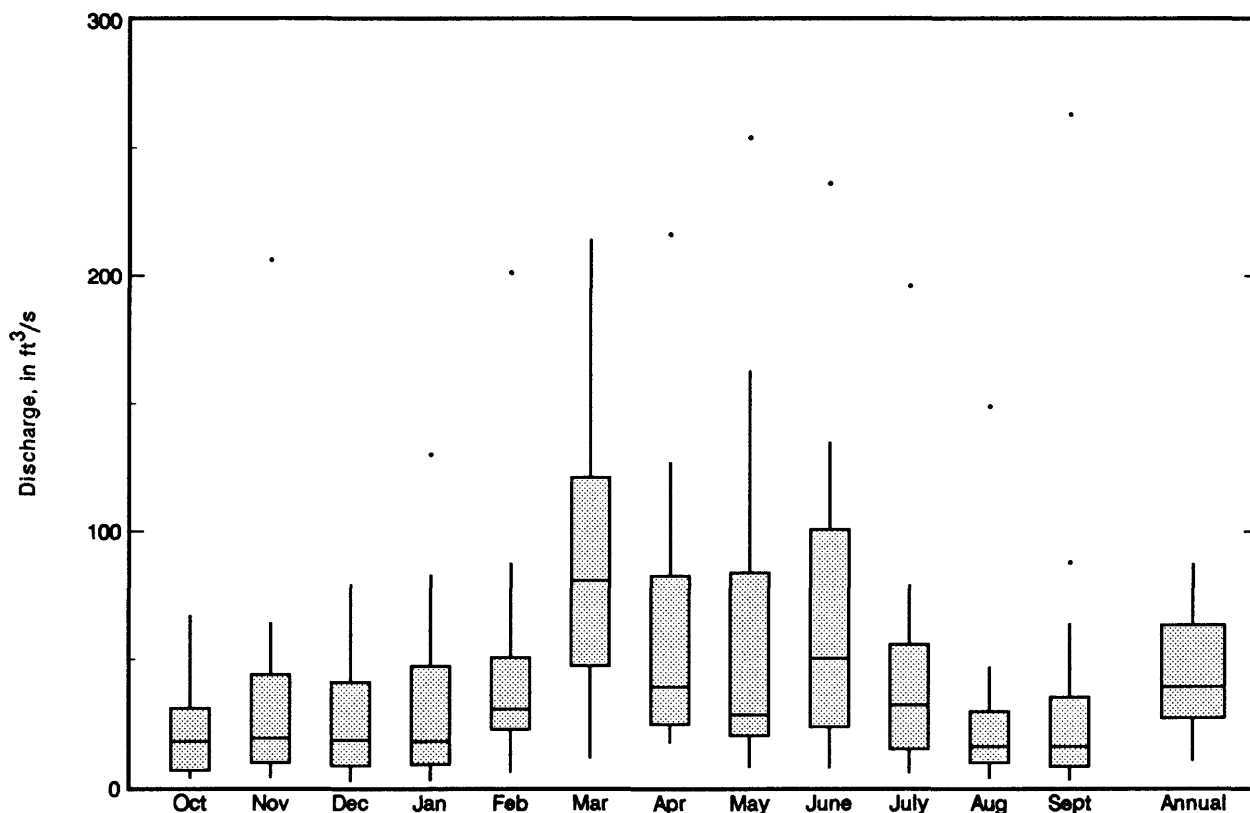
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
5.0	5.5	9.0	1,350
5.5	38	10.0	1,900
6.0	146	11.0	2,640
6.5	308	12.0	3,640
7.0	500	13.0	5,020
8.0	900		

MAQUOKETA RIVER BASIN
05417700 BEAR CREEK NEAR MONMOUTH, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	66.7	1962	3.51	1958	22.2	17.2	4.1
November	206	1962	3.99	1959	34.6	45.9	6.4
December	78.6	1972	2.35	1959	24.8	21.7	4.6
January	130	1960	2.52	1959	32.2	33.9	6.0
February	201	1971	5.79	1964	44.3	43.0	8.2
March	214	1962	11.3	1958	88.3	57.8	16.4
April	216	1973	17.3	1958	61.0	51.5	11.3
May	254	1974	7.94	1958	60.4	64.8	11.2
June	236	1974	7.67	1963	66.7	59.7	12.4
July	196	1969	5.74	1958	43.3	43.8	8.0
August	149	1972	3.75	1976	25.7	32.2	4.8
September	263	1965	2.76	1958	35.9	59.2	6.7
Annual	87.0	1974	10.3	1958	44.9	24.2	100.0

Boxplots of monthly and annual mean discharges



MAQUOKETA RIVER BASIN
05417700 BEAR CREEK NEAR MONMOUTH, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	2.2	2.3	7.2	10	5.2	5.6	3.9	3.0	2.4	2.2	2.4	2.0	2.4
95	2.7	2.8	9.5	14	8.1	7.1	5.3	3.7	3.1	2.8	3.6	2.9	3.8
90	3.8	5.3	13	16	11	8.5	5.9	5.1	3.9	3.7	4.5	3.7	5.4
85	4.6	6.3	15	18	13	9.7	6.6	6.5	5.0	4.5	5.4	4.7	6.7
80	5.4	7.4	18	19	15	11	8.0	7.2	5.9	5.4	6.3	5.9	8.3
75	6.2	8.9	20	21	16	14	9.4	8.0	6.7	6.4	8.8	7.4	10
70	7.3	11	22	22	18	16	12	9.2	7.6	7.7	11	9.3	12
65	8.5	12	23	25	19	19	14	10	8.9	9.6	14	11	14
60	9.8	14	25	27	21	22	16	11	10	13	15	12	16
55	11	16	28	31	23	25	17	12	12	16	17	14	18
50	13	18	32	35	27	29	19	14	14	17	18	16	20
45	15	20	39	40	30	35	21	15	15	19	19	18	22
40	19	23	48	45	34	41	24	17	17	20	21	20	25
35	23	25	59	52	41	49	28	19	18	22	22	22	28
30	27	28	68	58	49	59	34	21	19	24	27	24	34
25	31	32	86	65	60	71	42	24	23	27	34	27	41
20	36	39	106	79	72	85	52	27	30	32	43	32	51
15	44	50	136	99	93	105	65	33	42	40	57	38	65
10	63	81	209	123	125	130	86	43	56	50	72	45	90
5	109	156	360	217	213	225	128	67	93	66	111	64	149

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	270	76	40	26	15
0.95	1.05	487	144	78	51	33
0.90	1.11	655	198	110	72	48
0.80	1.25	925	286	161	105	73
0.50	2	1,710	550	316	201	146
0.20	5	2,960	992	568	347	256
0.10	10	3,870	1,320	747	444	326
0.04	25	5,050	1,750	979	561	407
0.02	50	5,940	2,080	1,150	644	461
0.01	100	6,840	2,420	1,320	722	510

MAQUOKETA RIVER BASIN
05417700 BEAR CREEK NEAR MONMOUTH, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	1.3	1.4	1.5	1.6	1.7	1.9	2.0	1.9	2.1
0.02	50	1.5	1.6	1.7	1.9	2.1	2.3	2.5	2.5	2.8
0.05	20	1.9	2.0	2.2	2.4	2.8	3.2	3.5	3.6	4.3
0.10	10	2.3	2.4	2.8	3.0	3.5	4.2	4.7	5.0	6.2
0.20	5	2.9	3.1	3.6	4.0	4.7	5.8	6.6	7.4	9.3
0.50	2	4.8	5.1	6.0	6.6	8.1	10	12	14	19
0.80	1.25	8.2	8.8	9.9	11	13	18	22	26	36
0.90	1.11	11	12	13	14	17	23	29	35	48
0.96	1.04	15	17	17	18	22	30	38	47	64
0.98	1.02	19	21	21	22	25	35	45	56	76
0.99	1.01	23	26	24	26	29	41	52	66	88

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	1.1	1.3	1.3	1.5	2.6	2.9	3.6	4.7
0.02	50	1.4	1.6	1.7	2.0	3.2	3.5	4.2	5.4
0.05	20	1.8	2.2	2.4	2.9	4.2	4.7	5.3	6.9
0.10	10	2.4	2.9	3.3	4.0	5.3	6.0	6.8	8.6
0.20	5	3.3	4.1	4.7	5.9	7.2	8.2	9.2	12
0.50	2	6.0	7.7	9.1	13	13	15	17	22
0.80	1.25	11	14	17	27	24	29	35	44
0.90	1.11	15	20	23	41	33	41	52	67
0.96	1.04	21	28	31	63	46	60	82	106
0.98	1.02	26	35	38	83	58	77	110	146
0.99	1.01	31	43	45	106	71	97	146	196
		July-August-September				October-November-December			
0.01	100	1.6	1.9	1.9	2.2	1.1	1.0	1.1	1.4
0.02	50	1.9	2.2	2.3	2.6	1.4	1.4	1.5	1.8
0.05	20	2.5	2.9	3.0	3.5	2.0	2.1	2.3	2.7
0.10	10	3.1	3.6	3.8	4.4	2.8	3.0	3.3	3.9
0.20	5	4.1	4.7	5.0	5.9	4.0	4.5	5.0	5.7
0.50	2	6.8	7.6	8.1	10	7.7	9.2	10	12
0.80	1.25	11	12	13	17	14	17	19	22
0.90	1.11	14	15	16	22	18	24	25	30
0.96	1.04	18	19	20	29	23	32	34	41
0.98	1.02	22	22	23	34	27	38	40	49
0.99	1.01	25	26	26	40	32	44	46	58

MAQUOKETA RIVER BASIN
05418450 NORTH FORK MAQUOKETA RIVER AT FULTON, IA

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

DRAINAGE AREA.--516 mi².

PERIOD OF RECORD.--July 1977 to September 1988.

GAGE.--Water-stage recorder. Datum of gage is 666.19 ft above National Geodetic Vertical Datum of 1929. Nonrecording gage July 7 to September 22, 1977.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 10,700 ft³/s Aug. 31, 1981, gage height, 17.26 ft; minimum discharge, 63 ft³/s Jan. 2, 1988 (result of freezeup).

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

Rating table number 3, developed March 1985

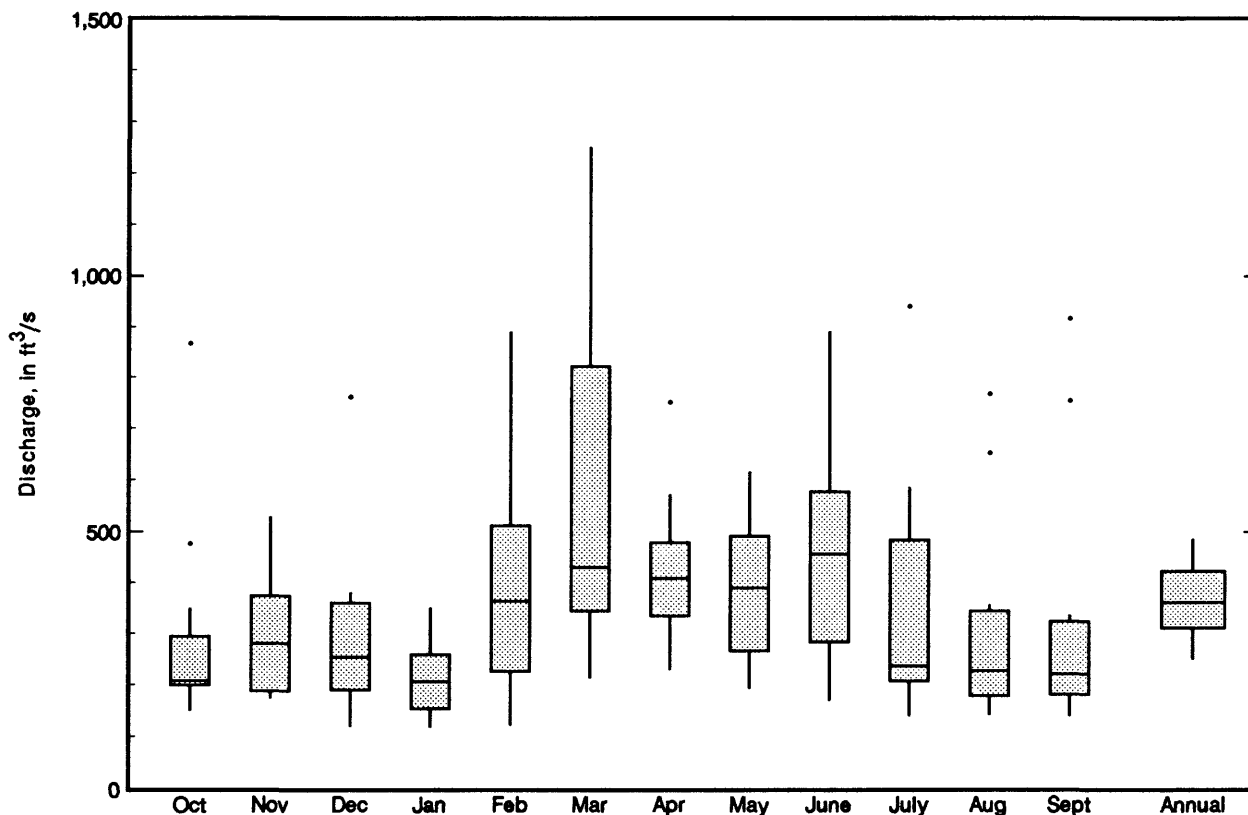
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
2.8	30	8.0	2,530
3.0	52	10.0	4,080
3.5	182	12.0	5,870
4.0	340	14.0	7,880
5.0	748	16.0	10,100
6.0	1,260	18.0	12,500

MAQUOKETA RIVER BASIN
05418450 NORTH FORK MAQUOKETA RIVER AT FULTON, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	867	1987	151	1979	299	210	6.8
November	528	1983	174	1978	304	127	6.9
December	762	1983	120	1979	300	179	6.9
January	350	1980	119	1981	215	80.0	4.9
February	891	1985	123	1978	385	223	8.8
March	1,250	1982	214	1981	605	392	13.8
April	752	1983	231	1980	429	145	9.8
May	615	1978	194	1981	395	144	9.0
June	891	1984	171	1988	462	223	10.5
July	941	1983	141	1988	350	235	8.0
August	768	1981	143	1988	313	200	7.1
September	917	1986	141	1988	324	248	7.4
Annual	486	1983	251	1988	367	83.2	100.0

Boxplots of monthly and annual mean discharges



MAQUOKETA RIVER BASIN

05418450 NORTH FORK MAQUOKETA RIVER AT FULTON, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	82	72	92	187	151	147	75	100	104	132	134	82	90
95	103	83	109	226	164	159	113	130	120	140	149	101	125
90	116	95	173	250	180	172	135	138	134	151	167	123	145
85	126	110	190	270	198	198	153	145	145	164	176	141	159
80	135	127	218	285	219	218	164	153	155	175	182	154	173
75	142	145	241	302	240	234	178	163	164	185	189	164	187
70	150	164	263	317	261	250	191	172	174	192	198	176	198
65	156	178	279	332	283	267	199	183	164	196	208	191	209
60	163	190	295	347	305	287	207	198	194	200	217	212	221
55	170	202	321	363	328	310	215	209	203	204	233	231	237
50	186	214	353	379	351	338	225	222	213	209	251	250	254
45	197	227	376	395	369	362	243	234	223	213	272	268	274
40	205	243	400	415	386	382	259	244	235	217	293	284	296
35	214	258	436	439	408	404	293	256	248	224	314	302	325
30	225	295	473	462	441	439	317	272	260	242	333	339	356
25	241	346	533	497	474	480	341	292	283	260	358	371	389
20	257	408	656	537	509	530	373	325	311	345	403	403	435
15	278	515	789	589	549	620	413	368	379	435	447	463	497
10	299	720	1,230	680	628	795	498	449	493	620	498	514	603
5	364	1,300	2,150	840	770	1,170	810	663	780	807	590	670	845

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	—	461	372	307	282
0.95	1.05	—	964	727	536	440
0.90	1.11	2,580	1,360	989	696	543
0.80	1.25	3,600	1,950	1,370	924	682
0.50	2	6,340	3,440	2,250	1,440	984
0.20	5	10,200	5,130	3,180	2,000	1,300
0.10	10	12,700	5,980	3,620	2,280	1,450
0.04	25	15,600	6,790	4,010	2,560	1,610
0.02	50	17,600	7,240	4,210	2,710	1,700
0.01	100	19,500	7,590	4,370	2,840	1,770

MAQUOKETA RIVER BASIN
05418450 NORTH FORK MAQUOKETA RIVER AT FULTON, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	45	47	48	50	70	83	96	100	119
0.02	50	52	55	56	59	78	92	106	110	129
0.05	20	65	68	70	73	92	107	122	128	148
0.10	10	77	80	83	86	105	121	138	146	166
0.20	5	94	96	99	104	122	139	158	170	192
0.50	2	127	129	134	141	156	177	202	222	255
0.80	1.25	159	160	168	178	192	219	251	284	341
0.90	1.11	174	174	185	196	210	241	279	320	398
0.96	1.04	188	188	201	213	229	265	310	361	471
0.98	1.02	198	196	210	223	241	280	331	390	526
0.99	1.01	202	202	217	232	251	294	350	416	581

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	45	52	53	75	103	108	111	112
0.02	50	51	59	61	82	111	118	122	125
0.05	20	63	71	73	94	125	133	139	147
0.10	10	74	83	86	106	140	149	157	168
0.20	5	90	99	104	123	160	172	182	198
0.50	2	124	137	145	165	211	226	242	267
0.80	1.25	165	184	198	221	283	299	323	354
0.90	1.11	189	213	229	259	333	348	376	408
0.96	1.04	215	245	267	306	398	410	443	472
0.98	1.02	232	268	293	341	448	456	493	517
0.99	1.01	247	289	318	376	499	503	543	560
		July-August-September				October-November-December			
0.01	100	56	60	63	116	47	68	77	95
0.02	50	66	69	73	121	54	75	85	104
0.05	20	81	85	89	130	66	88	99	118
0.10	10	97	101	106	140	78	101	113	133
0.20	5	117	122	127	154	95	118	132	154
0.50	2	159	167	175	188	135	159	175	204
0.80	1.25	202	214	226	237	190	212	228	272
0.90	1.11	222	239	254	271	224	245	259	316
0.96	1.04	243	264	283	316	266	284	297	373
0.98	1.02	255	279	302	351	295	313	322	414
0.99	1.01	265	292	318	387	324	340	347	456

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 September 1988. Prior to October 1939, published as "below North Fork near Maquoketa".

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

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.

Rating table number 7, developed October 1977

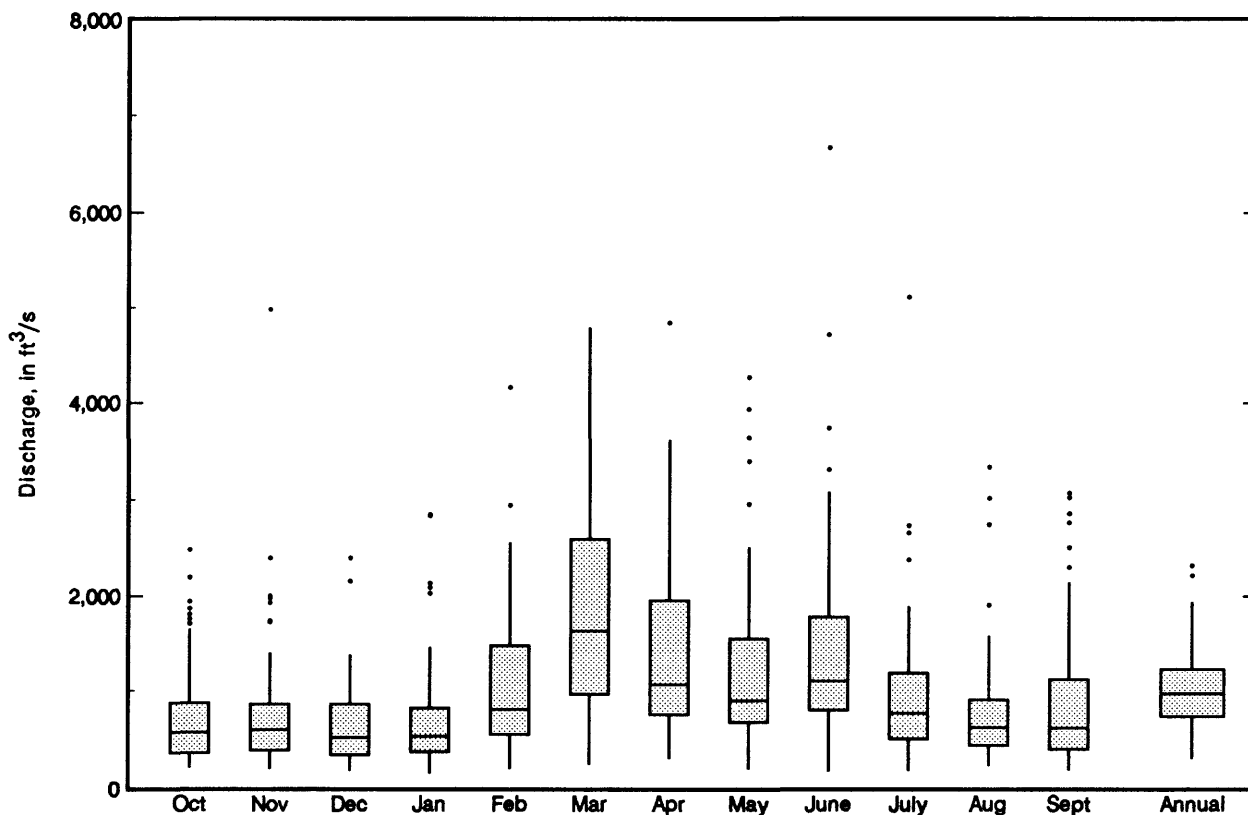
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
10.0	184	18.0	5,150
10.5	332	20.0	7,010
11.0	507	22.0	9,300
12.0	920	24.0	12,100
13.0	1,400	28.0	21,000
14.0	2,000	32.0	35,500
16.0	3,400	35.0	49,500

MAQUOKETA RIVER BASIN
05418500 MAQUOKETA RIVER NEAR MAQUOKETA, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	2,486	1987	210	1957	731	504	5.9
November	4,983	1962	198	1959	789	682	6.4
December	2,397	1983	177	1959	645	411	5.2
January	2,851	1960	150	1940	699	548	5.6
February	4,161	1971	196	1936	1,101	739	8.9
March	4,788	1962	241	1934	1,864	1,175	15.0
April	4,843	1973	305	1934	1,326	858	10.7
May	4,267	1974	198	1934	1,186	840	9.6
June	6,670	1947	170	1934	1,400	1,045	11.3
July	5,109	1969	177	1936	964	710	7.8
August	3,340	1924	227	1958	792	570	6.4
September	3,074	1981	182	1958	891	707	7.2
Annual	2,320	1973	306	1958	1,031	415	100.0

Boxplots of monthly and annual mean discharges



MAQUOKETA RIVER BASIN
05418500 MAQUOKETA RIVER NEAR MAQUOKETA, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	144	120	233	230	189	179	172	141	174	183	184	157	164
95	182	197	299	356	337	306	279	237	233	244	243	206	239
90	221	270	388	434	407	393	341	294	282	277	277	237	294
85	257	316	465	498	461	452	379	333	313	306	307	268	337
80	296	355	538	571	510	506	413	365	335	332	330	302	377
75	329	387	617	634	550	562	450	392	359	362	357	330	416
70	360	420	701	692	590	621	489	420	387	399	398	362	458
65	387	459	778	760	638	682	527	449	416	434	441	397	501
60	415	499	861	828	687	751	567	478	454	469	485	433	546
55	449	546	953	906	752	825	610	511	494	503	532	472	592
50	485	593	1,060	983	823	900	659	552	538	541	579	512	647
45	521	652	1,190	1,070	901	975	711	594	582	578	622	551	702
40	557	716	1,320	1,170	979	1,080	779	645	637	625	664	590	777
35	595	806	1,460	1,280	1,070	1,180	854	695	694	675	710	643	860
30	658	895	1,640	1,390	1,170	1,320	950	772	768	742	780	696	960
25	725	983	1,880	1,560	1,310	1,510	1,070	855	855	822	867	772	1,090
20	801	1,180	2,240	1,750	1,530	1,760	1,220	954	979	939	997	860	1,260
15	938	1,550	2,930	2,010	1,820	2,120	1,370	1,110	1,180	1,130	1,190	978	1,510
10	1,140	2,200	4,060	2,410	2,280	2,630	1,690	1,350	1,530	1,400	1,430	1,170	1,930
5	1,690	3,500	6,460	3,320	3,220	4,000	2,510	1,990	2,570	1,880	1,950	1,500	2,950

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	3,590	1,980	1,430	1,030	712
0.95	1.05	5,660	3,200	2,250	1,580	1,100
0.90	1.11	7,130	4,090	2,820	1,960	1,380
0.80	1.25	9,340	5,440	3,680	2,520	1,770
0.50	2	15,200	9,100	5,900	3,930	2,760
0.20	5	23,700	14,700	9,030	5,890	4,100
0.10	10	29,400	18,500	11,100	7,160	4,940
0.04	25	36,600	23,500	13,600	8,710	5,950
0.02	50	42,000	27,200	15,400	9,830	6,660
0.01	100	47,300	30,900	17,200	10,900	7,340

MAQUOKETA RIVER BASIN
05418500 MAQUOKETA RIVER NEAR MAQUOKETA, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	88	93	95	98	103	125	146	161	179
0.02	50	101	107	110	114	121	144	166	183	206
0.05	20	122	132	137	142	152	177	201	222	253
0.10	10	144	157	165	171	185	212	239	263	303
0.20	5	176	193	204	213	232	263	294	325	378
0.50	2	256	281	299	314	347	393	439	485	574
0.80	1.25	367	397	423	446	499	576	655	727	871
0.90	1.11	440	470	500	529	595	698	808	899	1,080
0.96	1.04	533	558	593	626	708	853	1,010	1,130	1,360
0.98	1.02	601	621	658	695	788	968	1,170	1,310	1,580
0.99	1.01	670	682	720	761	864	1,080	1,330	1,490	1,810

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	102	106	107	116	134	165	181	202
0.02	50	119	124	127	137	156	190	208	233
0.05	20	148	156	161	176	195	235	255	289
0.10	10	178	189	197	219	239	283	306	350
0.20	5	221	236	248	282	303	355	383	443
0.50	2	327	354	376	452	475	545	590	698
0.80	1.25	467	512	546	707	736	831	917	1,110
0.90	1.11	555	613	653	885	922	1,040	1,160	1,410
0.96	1.04	661	736	781	1,120	1,170	1,310	1,490	1,840
0.98	1.02	736	823	872	1,290	1,360	1,520	1,750	2,180
0.99	1.01	808	908	958	1,470	1,560	1,730	2,030	2,540
		July-August-September				October-November-December			
0.01	100	109	131	137	152	103	118	129	151
0.02	50	126	150	158	176	118	136	147	172
0.05	20	156	183	193	217	145	167	180	208
0.10	10	187	217	229	260	172	201	215	247
0.20	5	231	265	281	321	213	249	265	305
0.50	2	337	381	405	468	315	374	398	455
0.80	1.25	478	531	570	661	460	552	594	682
0.90	1.11	566	626	674	782	559	674	732	842
0.96	1.04	672	740	800	927	686	829	914	1,060
0.98	1.02	747	820	890	1,030	781	945	1,050	1,220
0.99	1.01	818	898	976	1,130	877	1,060	1,200	1,400

MISSISSIPPI RIVER MAIN STEM
05420500 MISSISSIPPI RIVER AT CLINTON, IA

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

DRAINAGE AREA.--85,600 mi², approximately, at Fulton-Lyons Bridge at Clinton.

PERIOD OF RECORD.--June to August 1873 (fragmentary), October 1873 to September 1988 (October 1932 to September 1939, published as "at Le Claire").

GAGE.--Water-stage recorder. Datum of gage is 562.68 ft above National Geodetic Vertical Datum of 1929. Oct. 1, 1955 to June 5, 1969, water-stage recorder at site 400 ft downstream at same datum. Auxiliary water-stage recorder at Lock and Dam 13 since Oct. 1, 1958. See WSP 1728 for history of changes prior to Oct. 1, 1955.

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.

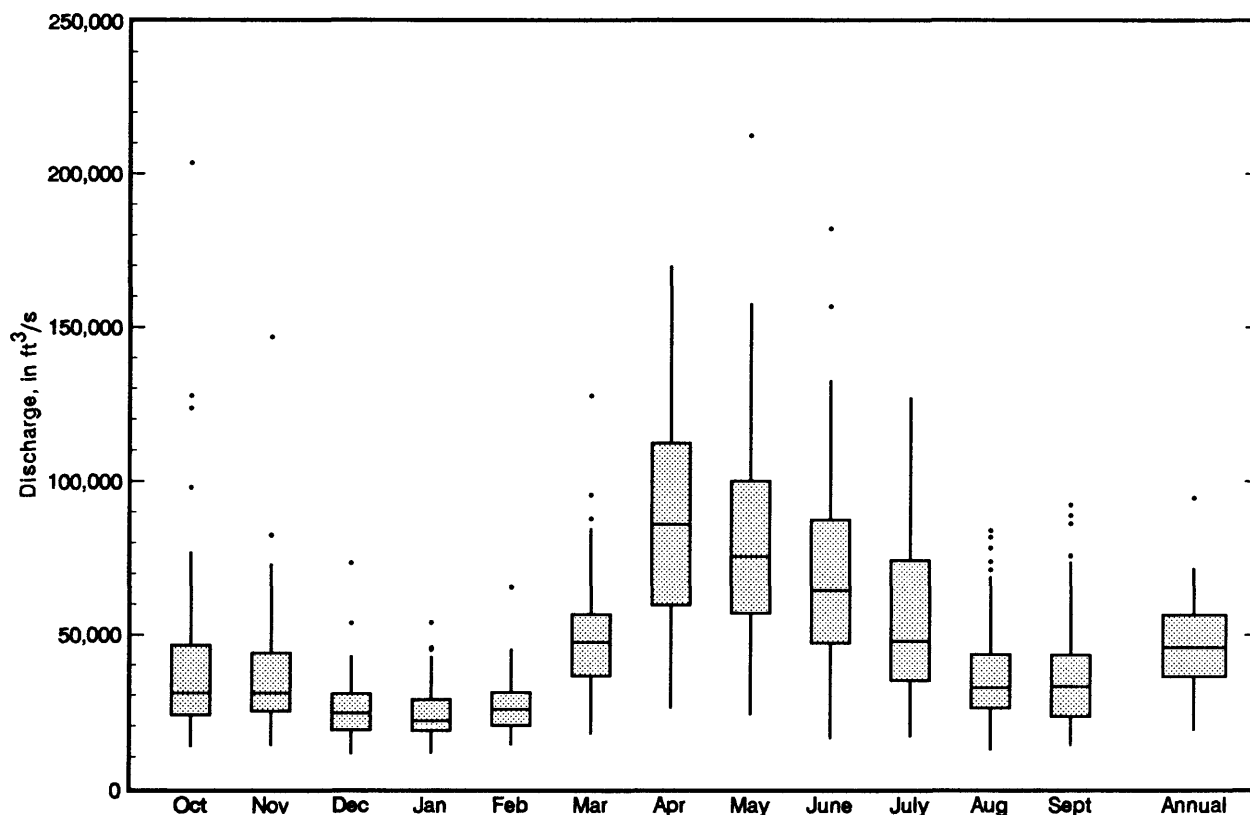
REMARKS.--Minor flow regulation caused by navigation dams. Rating table not published because discharge is a function of river stage and river slope at this station.

MISSISSIPPI RIVER MAIN STEM
05420500 MISSISSIPPI RIVER AT CLINTON, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	203,600	1882	13,490	1934	39,630	26,800	7.0
November	146,800	1882	13,760	1934	37,320	18,720	6.6
December	73,590	1882	11,120	1934	25,830	9,593	4.5
January	54,100	1973	11,390	1890	24,550	8,336	4.3
February	65,680	1966	14,000	1893	26,670	8,750	4.7
March	127,500	1973	17,600	1934	48,250	16,960	8.5
April	169,900	1965	26,040	1931	87,930	34,790	15.5
May	212,400	1888	23,800	1931	80,770	33,260	14.2
June	182,100	1892	16,100	1934	69,230	30,780	12.2
July	127,000	1892	16,700	1936	54,920	25,270	9.7
August	84,110	1953	12,460	1936	36,920	16,220	6.5
September	92,380	1938	13,870	1933	36,590	17,160	6.4
Annual	94,690	1882	18,870	1934	47,420	13,140	100.0

Boxplots of monthly and annual mean discharges



MISSISSIPPI RIVER MAIN STEM
05420500 MISSISSIPPI RIVER AT CLINTON, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	10,500	12,400	15,600	25,200	20,500	15,900	15,100	11,500	13,600	14,100	12,800	8,860	12,400
95	13,900	14,600	20,000	33,900	28,600	23,600	18,900	15,600	16,700	17,100	17,100	12,400	16,200
90	15,700	16,300	22,900	40,400	35,900	29,300	22,100	18,300	18,900	19,500	19,100	14,400	18,800
85	17,000	17,500	25,400	46,400	41,200	35,200	25,500	20,500	20,500	21,100	21,300	16,000	20,700
80	17,900	18,500	27,800	51,800	47,100	40,000	28,900	22,600	22,000	22,600	23,500	17,300	22,700
75	18,900	19,500	30,200	57,400	52,400	44,000	32,100	24,600	23,600	23,900	25,200	18,600	24,600
70	19,600	20,400	32,600	62,600	56,600	47,500	35,100	26,400	25,100	25,300	26,700	19,900	26,700
65	20,300	21,300	35,100	67,700	60,900	50,800	38,000	28,000	26,700	26,700	28,200	21,100	28,800
60	20,900	22,300	37,600	73,700	65,800	54,200	40,800	29,600	28,300	28,100	29,600	22,200	31,200
55	21,800	23,400	40,200	79,500	70,600	58,200	43,900	31,200	30,000	29,600	31,200	23,300	33,900
50	22,700	24,500	43,100	85,100	75,300	62,100	47,300	32,900	31,900	31,800	33,000	24,500	36,800
45	23,900	25,600	46,600	89,500	80,300	66,000	51,700	34,700	33,900	34,300	35,300	25,600	40,200
40	25,100	26,900	50,700	93,800	85,300	70,300	57,000	36,500	36,800	36,800	37,700	27,000	44,100
35	26,500	28,500	54,700	99,000	90,900	74,900	62,200	38,800	38,500	39,700	40,000	28,500	49,200
30	28,300	30,100	58,500	105,000	96,700	80,700	67,100	41,300	41,100	42,900	42,700	30,100	55,300
25	30,100	32,200	63,200	110,000	103,000	86,700	72,300	44,600	44,700	47,600	46,400	32,200	62,100
20	32,400	34,700	68,600	119,000	110,000	92,700	78,100	48,700	49,700	54,100	51,300	34,700	70,000
15	35,000	37,700	74,500	130,000	120,000	101,000	84,700	54,900	56,400	61,300	58,300	38,300	80,400
10	38,400	41,500	84,000	145,000	133,000	110,000	94,000	62,900	64,200	71,500	65,600	44,400	93,500
5	45,100	51,000	102,000	166,000	153,000	134,000	109,000	73,000	75,500	96,000	76,700	54,100	115,000

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge ¹ (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	51,000	48,900	46,400	43,300	39,400
0.95	1.05	69,000	68,100	65,000	60,500	54,700
0.90	1.11	80,000	80,200	76,800	71,500	64,400
0.80	1.25	95,000	96,800	93,000	86,600	77,600
0.50	2	130,000	134,000	130,000	121,000	108,000
0.20	5	177,000	179,000	175,000	163,000	144,000
0.10	10	205,000	206,000	201,000	188,000	165,000
0.04	25	242,000	235,000	230,000	215,000	188,000
0.02	50	271,000	255,000	250,000	234,000	204,000
0.01	100	295,000	273,000	269,000	252,000	219,000

¹ Data supplied by U.S. Army Corps of Engineers, Rock Island District.

MISSISSIPPI RIVER MAIN STEM
05420500 MISSISSIPPI RIVER AT CLINTON, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	6,300	6,450	7,020	8,570	10,300	11,300	12,300	13,200	14,100
0.02	50	7,010	7,160	7,730	9,280	11,100	12,100	13,100	14,100	15,200
0.05	20	8,200	8,350	8,920	10,400	12,400	13,500	14,500	15,700	17,000
0.10	10	9,380	9,540	10,100	11,600	13,600	14,900	16,000	17,400	18,900
0.20	5	11,000	11,200	11,700	13,200	15,400	16,800	18,000	19,600	21,700
0.50	2	14,600	14,900	15,500	17,000	19,500	21,400	23,000	25,200	28,600
0.80	1.25	19,000	19,500	20,300	21,900	24,800	27,600	29,800	32,800	39,000
0.90	1.11	21,600	22,400	23,300	25,100	28,300	31,700	34,400	38,000	46,300
0.96	1.04	24,700	25,700	27,000	29,000	32,600	36,800	40,400	44,700	56,100
0.98	1.02	26,800	28,100	29,600	31,800	35,700	40,600	44,900	49,800	63,800
0.99	1.01	28,800	30,300	32,100	34,700	38,800	44,500	49,400	55,000	72,000

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	7,490	8,390	9,860	11,100	12,600	14,100	15,100	16,800
0.02	50	8,450	9,320	10,700	12,000	14,600	16,200	17,400	19,500
0.05	20	10,000	10,900	12,200	13,400	17,900	19,900	21,300	24,100
0.10	10	11,600	12,400	13,600	14,900	21,400	23,600	25,400	29,000
0.20	5	13,600	14,400	15,500	16,900	26,300	28,900	31,100	35,800
0.50	2	18,100	18,800	19,800	21,500	38,200	41,500	44,900	52,400
0.80	1.25	23,100	24,000	25,100	27,500	53,600	57,700	62,900	73,900
0.90	1.11	25,800	27,000	28,300	31,300	63,200	67,800	74,100	87,300
0.96	1.04	28,800	30,400	32,200	36,000	74,700	79,800	87,500	103,000
0.98	1.02	30,700	32,700	35,000	39,500	82,800	88,300	97,000	114,000
0.99	1.01	32,500	34,800	37,600	42,900	90,600	96,400	106,000	125,000
		July-August-September				October-November-December			
0.01	100	9,690	10,400	11,100	11,800	6,910	7,700	9,230	11,700
0.02	50	10,800	11,600	12,200	13,100	7,590	8,380	9,950	12,500
0.05	20	12,600	13,500	14,200	15,200	8,750	9,560	11,200	13,900
0.10	10	14,400	15,400	16,100	17,400	9,940	10,800	12,500	15,400
0.20	5	17,000	18,100	18,900	20,500	11,600	12,500	14,300	17,500
0.50	2	23,000	24,300	25,400	27,800	15,700	17,000	19,100	23,000
0.80	1.25	30,700	32,300	34,100	37,600	21,300	23,500	26,000	31,300
0.90	1.11	35,600	37,400	39,700	44,100	25,000	28,100	31,000	37,200
0.96	1.04	41,400	43,500	46,600	52,100	29,800	34,300	37,600	45,300
0.98	1.02	45,700	47,800	51,700	58,000	33,400	39,100	42,900	51,700
0.99	1.01	49,800	52,100	56,700	63,900	37,000	44,100	48,400	58,400

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 September 1988.

GAGE.--Water-stage recorder. Datum of gage is 1,130.05 ft above National Geodetic Vertical Datum of 1929.

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.

Rating table number 7, developed October 1985

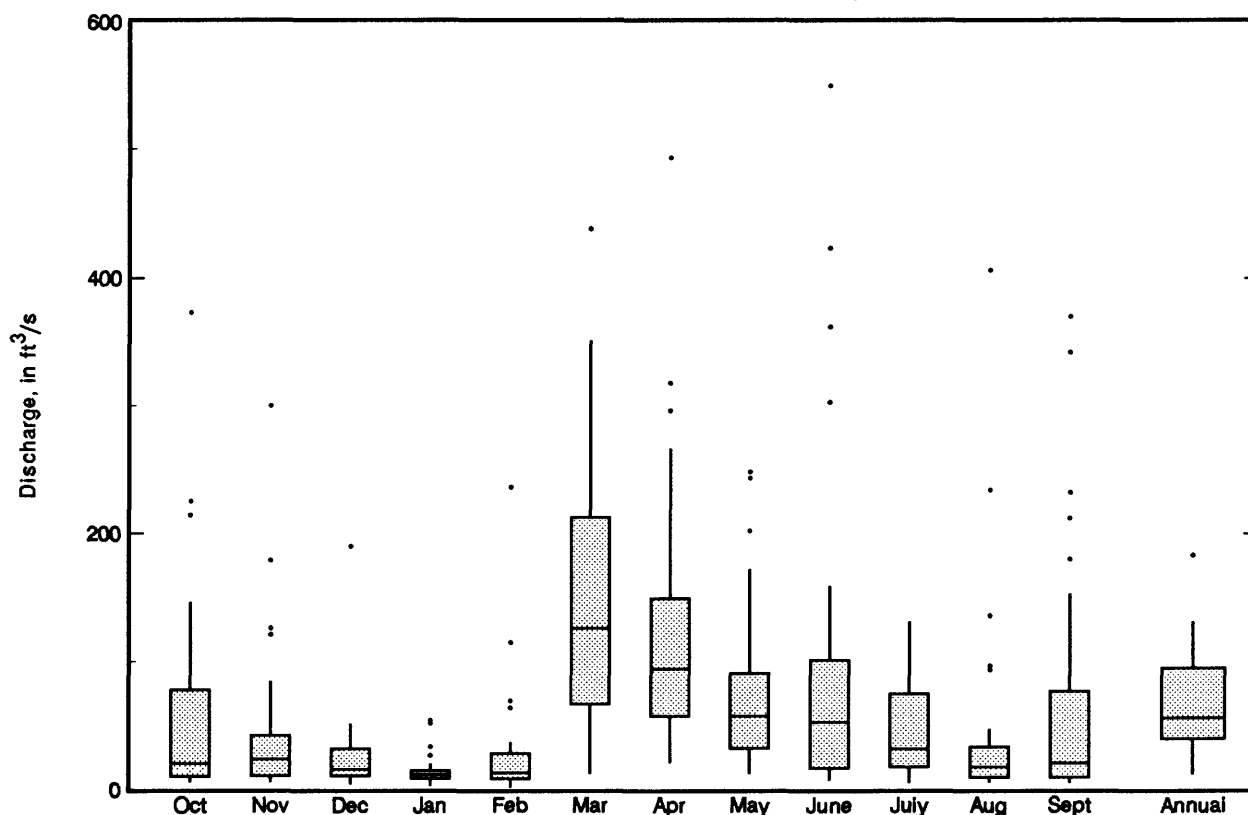
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
3.5	2.9	9.0	416
4.0	11	11.0	680
4.5	29	12.0	1,050
5.0	55	13.0	1,990
5.5	86	14.0	3,550
6.0	122	15.0	6,000
7.0	206		

WAPSIPINICON RIVER BASIN
05420560 WAPSIPINICON RIVER NEAR ELMA, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	373	1987	5.97	1959	62.9	84.0	7.9
November	300	1983	5.83	1959	47.7	63.6	5.9
December	190	1983	4.16	1959	26.3	33.6	3.3
January	54.0	1983	2.55	1959	14.8	12.1	1.8
February	236	1984	1.99	1959	28.8	45.7	3.6
March	438	1982	12.4	1984	155	113	19.3
April	493	1965	20.8	1968	126	105	15.8
May	248	1983	12.4	1959	76.7	64.8	9.6
June	550	1984	7.02	1988	100	134	12.5
July	131	1969	5.43	1984	44.1	35.7	5.5
August	406	1979	5.69	1984	47.2	83.2	5.9
September	370	1965	5.06	1988	71.5	100	8.9
Annual	183	1983	11.8	1977	66.9	39.2	100.0

Boxplots of monthly and annual mean discharges



WAPSIPINICON RIVER BASIN
05420560 WAPSIPINICON RIVER NEAR ELMA, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	2.3	2.1	2.9	11	8.4	5.7	4.3	3.7	4.0	4.9	5.0	3.8	3.2
95	3.2	3.9	7.1	16	11	7.0	5.8	5.1	5.4	6.0	6.2	5.2	5.7
90	5.0	5.9	9.4	23	15	8.4	6.9	6.2	6.3	7.1	7.6	6.7	7.1
85	6.1	6.9	11	29	18	10	7.8	6.9	7.1	8.2	8.5	8.0	8.2
80	7.0	7.7	13	34	21	12	8.9	7.5	7.9	9.0	9.4	8.9	9.2
75	7.8	8.3	16	39	23	13	10	8.2	8.7	9.9	10	9.9	10
70	8.4	8.8	21	44	25	15	12	8.9	9.4	11	13	11	12
65	9.1	9.3	29	49	28	18	13	9.6	10	12	15	12	13
60	9.7	9.8	38	54	31	21	15	10	12	14	17	14	15
55	10	11	45	60	34	25	17	12	13	16	20	16	17
50	11	12	51	66	38	29	20	13	14	19	23	17	20
45	12	13	62	74	42	33	22	14	16	24	25	18	24
40	13	14	78	83	48	38	25	15	19	30	28	19	28
35	14	15	100	95	55	44	28	16	24	36	31	21	33
30	15	16	124	108	64	52	33	19	29	45	37	23	41
25	16	19	151	127	77	63	38	22	38	58	46	25	51
20	18	22	192	150	92	79	46	26	51	74	60	29	65
15	20	27	259	185	111	103	59	32	68	99	78	37	90
10	25	39	407	249	168	162	83	57	105	136	100	47	131
5	39	83	670	385	258	338	154	140	211	228	144	70	240

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	—	40	37	28	23
0.95	1.05	329	135	103	71	55
0.90	1.11	522	236	167	110	83
0.80	1.25	886	431	283	178	129
0.50	2	2,230	1,090	644	387	257
0.20	5	5,020	2,090	1,180	697	429
0.10	10	7,360	2,680	1,510	888	525
0.04	25	10,700	3,290	1,850	1,100	625
0.02	50	13,500	3,650	2,060	1,230	685
0.01	100	16,300	3,930	2,240	1,350	735

WAPSIPINICON RIVER BASIN
05420560 WAPSIPINICON RIVER NEAR ELMA, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	1.9	2.2	2.3	2.4	2.6	3.5	4.3	4.5	3.4
0.02	50	2.3	2.6	2.7	2.8	3.0	4.0	4.7	5.0	4.2
0.05	20	2.9	3.2	3.3	3.5	3.8	4.8	5.6	5.9	5.6
0.10	10	3.5	3.8	4.0	4.2	4.6	5.7	6.5	7.0	7.4
0.20	5	4.5	4.7	4.9	5.2	5.7	7.0	8.0	8.8	10
0.50	2	6.6	6.8	7.1	7.6	8.5	11	13	14	21
0.80	1.25	9.2	9.5	9.8	11	12	16	22	26	46
0.90	1.11	11	11	11	13	15	20	30	37	71
0.96	1.04	12	13	13	15	18	26	44	56	115
0.98	1.02	14	14	14	17	21	30	56	74	158
0.99	1.01	14	15	16	18	23	35	72	97	212

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	1.9	1.9	2.0	2.2	3.4	3.6	3.8	4.8
0.02	50	2.2	2.3	2.4	2.6	3.9	4.3	4.5	5.9
0.05	20	2.9	3.0	3.2	3.5	5.0	5.5	5.9	7.9
0.10	10	3.7	3.9	4.0	4.4	6.2	6.8	7.6	10
0.20	5	4.8	5.1	5.3	5.8	8.1	9.0	10	14
0.50	2	7.8	8.2	8.6	9.7	14	16	19	26
0.80	1.25	12	12	14	16	24	28	34	50
0.90	1.11	14	15	17	20	32	38	48	69
0.96	1.04	18	19	21	26	45	53	69	99
0.98	1.02	20	21	24	31	55	66	88	125
0.99	1.01	22	23	27	35	67	81	109	154
		July-August-September				October-November-December			
0.01	100	2.0	2.6	2.9	3.4	2.9	3.7	3.8	4.2
0.02	50	2.4	3.0	3.3	3.8	3.2	4.0	4.2	4.6
0.05	20	3.2	3.7	4.0	4.4	3.8	4.6	4.9	5.5
0.10	10	3.9	4.5	4.7	5.2	4.5	5.3	5.8	6.5
0.20	5	5.1	5.6	5.9	6.5	5.6	6.4	7.2	8.2
0.50	2	7.9	8.4	9.1	10	9.2	10	12	14
0.80	1.25	12	13	14	18	17	18	21	27
0.90	1.11	14	16	19	26	24	26	30	39
0.96	1.04	18	20	25	37	36	40	45	62
0.98	1.02	20	23	30	49	48	53	60	85
0.99	1.01	22	26	35	63	63	71	78	115

WAPSIPINICON RIVER BASIN
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 September 1988.

GAGE.--Water-stage recorder and concrete control. Datum of gage is 882.85 ft above National Geodetic Vertical Datum of 1929. Prior to May 24, 1941 nonrecording gage in tailrace of powerplant 1,800 ft upstream at datum 80.00 ft lower.

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.

Rating table number 10, developed September 1987

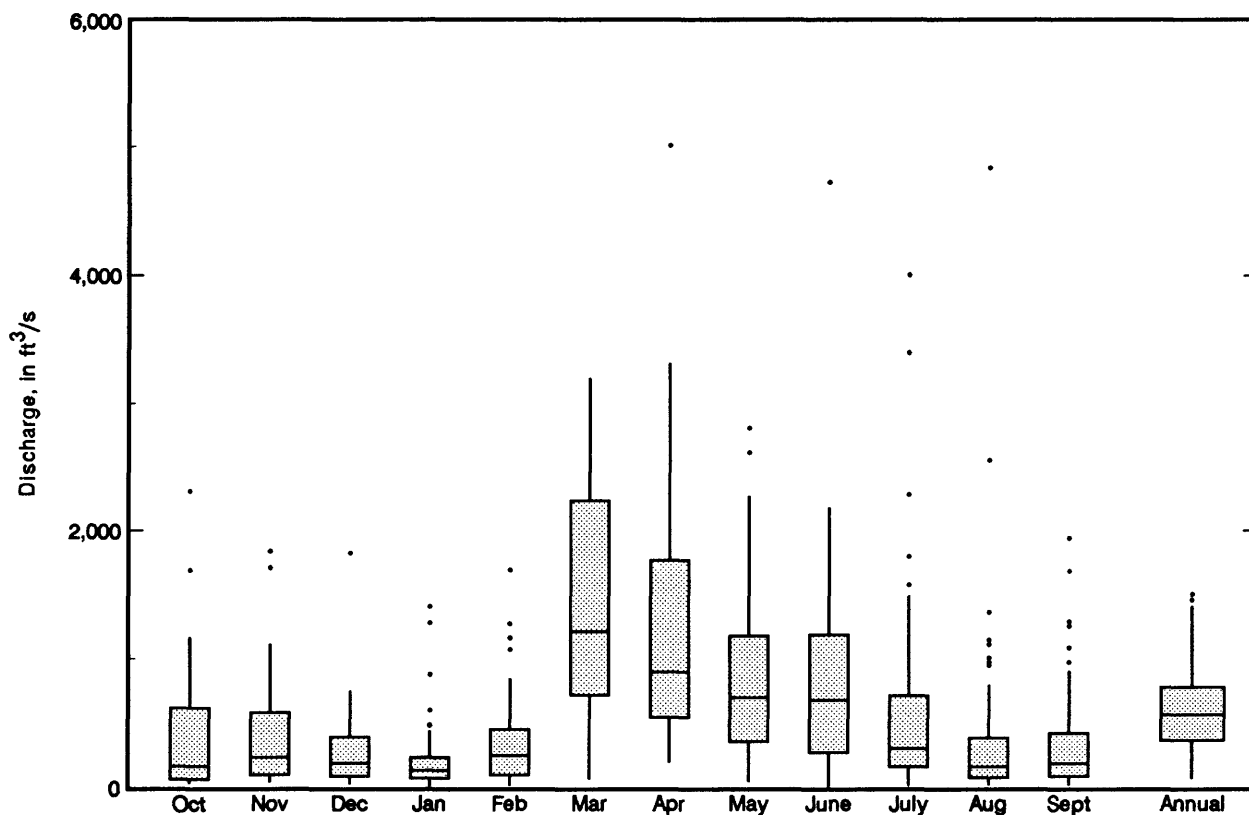
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
4.5	29	7.0	2,340
4.7	91	8.0	3,650
5.0	248	10.0	6,190
5.2	383	12.0	8,900
5.5	620	16.0	15,500
6.0	1,120	20.0	23,700

WAPSIPINICON RIVER BASIN
05421000 WAPSIPINICON RIVER AT INDEPENDENCE, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	2,306	1973	30.3	1977	393	466	5.3
November	1,841	1973	42.2	1977	414	443	5.6
December	1,828	1983	26.9	1977	268	278	3.6
January	1,411	1946	12.6	1977	222	272	3.0
February	1,698	1984	19.0	1956	343	344	4.6
March	3,201	1986	68.4	1934	1,435	925	19.3
April	5,012	1951	199	1957	1,272	971	17.1
May	2,813	1973	45.3	1934	840	647	11.3
June	4,721	1947	12.4	1934	827	772	11.2
July	4,009	1969	18.9	1936	618	791	8.3
August	4,833	1979	21.5	1934	426	751	5.7
September	1,940	1981	20.5	1976	363	430	4.9
Annual	1,505	1983	74.5	1934	619	339	100.0

Boxplots of monthly and annual mean discharges



WAPSIPINICON RIVER BASIN
05421000 WAPSIPINICON RIVER AT INDEPENDENCE, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	9.3	9.8	36	101	33	8.7	9.1	8.2	11	10	12	12	9.9
95	20	23	79	184	87	54	34	21	21	26	35	26	30
90	32	32	117	251	157	101	52	34	33	42	49	42	49
85	42	44	151	323	200	136	74	48	49	53	63	56	65
80	52	56	198	376	240	165	96	61	62	60	77	71	84
75	60	67	276	434	282	205	117	73	72	68	99	87	106
70	72	80	352	502	326	242	138	89	83	76	119	104	128
65	86	92	442	581	370	285	159	105	94	92	138	122	151
60	100	107	536	664	416	334	190	118	107	112	156	137	179
55	112	125	655	749	468	394	220	135	123	134	183	152	212
50	127	142	775	834	521	466	251	153	141	158	215	174	251
45	147	159	910	937	585	546	294	173	159	197	251	202	302
40	165	180	1,070	1,040	651	631	344	195	194	239	301	232	363
35	182	205	1,320	1,170	735	734	398	224	238	298	366	261	441
30	199	255	1,580	1,310	827	850	483	256	294	389	441	292	540
25	228	309	1,890	1,500	992	1,030	596	311	365	517	521	323	670
20	257	388	2,250	1,750	1,200	1,240	754	399	451	639	640	371	836
15	311	516	2,680	2,150	1,460	1,500	1,000	586	588	779	786	434	1,080
10	409	763	3,450	2,790	1,890	1,920	1,470	886	860	982	971	538	1,530
5	718	1,440	5,070	4,170	2,800	2,700	2,300	1,640	1,380	1,440	1,330	786	2,470

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	784	534	497	376	256
0.95	1.05	1,560	1,170	1,030	769	550
0.90	1.11	2,190	1,700	1,470	1,080	789
0.80	1.25	3,240	2,600	2,170	1,590	1,170
0.50	2	6,400	5,240	4,140	2,980	2,190
0.20	5	11,600	9,290	6,990	4,940	3,510
0.10	10	15,300	12,000	8,780	6,150	4,260
0.04	25	20,100	15,100	10,800	7,530	5,040
0.02	50	23,700	17,300	12,200	8,440	5,510
0.01	100	27,200	19,300	13,500	9,250	5,910

WAPSIPINICON RIVER BASIN
05421000 WAPSIPINICON RIVER AT INDEPENDENCE, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	3.6	5.4	6.0	7.2	8.2	12	16	18	20
0.02	50	4.6	7.2	8.1	9.4	11	16	21	24	26
0.05	20	6.8	11	12	14	16	23	30	34	39
0.10	10	9.7	15	18	20	23	31	41	47	56
0.20	5	15	23	26	29	35	45	59	69	86
0.50	2	33	46	54	59	71	89	116	143	188
0.80	1.25	73	88	101	110	133	170	226	285	393
0.90	1.11	110	120	135	149	180	233	316	406	571
0.96	1.04	164	164	180	202	243	324	450	588	839
0.98	1.02	199	199	213	242	293	399	563	743	1,070
0.99	1.01	235	235	247	284	343	478	686	915	1,330

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	3.6	8.3	9.2	11	4.3	14	19	21
0.02	50	5.0	11	12	15	7.0	21	28	34
0.05	20	8.1	17	19	22	14	38	47	62
0.10	10	12	25	26	31	25	60	74	102
0.20	5	20	37	40	47	47	99	120	173
0.50	2	49	76	80	99	136	220	265	395
0.80	1.25	112	140	151	203	319	404	499	714
0.90	1.11	169	187	203	291	463	519	652	898
0.96	1.04	257	246	272	423	653	645	833	1,090
0.96	1.02	335	291	326	535	794	725	955	1,200
0.99	1.01	422	335	379	659	931	794	1,070	1,290
		July-August-September				October-November-December			
0.01	100	4.1	7.0	9.1	12	2.8	11	14	19
0.02	50	5.4	9.4	12	15	4.1	15	18	23
0.05	20	8.3	15	18	23	7.1	22	26	33
0.10	10	12	21	25	32	11	31	36	44
0.20	5	19	33	37	49	20	46	53	64
0.50	2	44	70	79	104	56	97	108	131
0.80	1.25	101	138	160	213	149	194	214	272
0.90	1.11	155	192	228	307	242	274	303	399
0.96	1.04	245	266	328	447	402	391	435	604
0.98	1.02	327	326	413	567	552	488	547	790
0.99	1.01	425	387	506	699	730	593	671	1,010

WAPSIPINICON RIVER BASIN
05422000 WAPSIPINICON RIVER NEAR DEWITT, IA

LOCATION.--Lat 41°46'01", long 90°32'05", in SW1/4 NE1/4 sec.6, T.80 N., R.4 E., Clinton County, Hydrologic Unit 07080103, on left bank 5 ft upstream from bridge on U.S. Highway 61, 0.9 mi downstream from Silver Creek, 4.0 mi south of water tower in DeWitt, 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 September 1988.

GAGE.--Water-stage recorder. Datum of gage is 598.81 ft above National Geodetic Vertical Datum of 1929.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 29,900 ft³/s May 17, 1974, gage height, 13.07 ft; minimum daily discharge, 46 ft³/s Jan. 22, 23, 1977.

Rating table number 15, developed October 1987

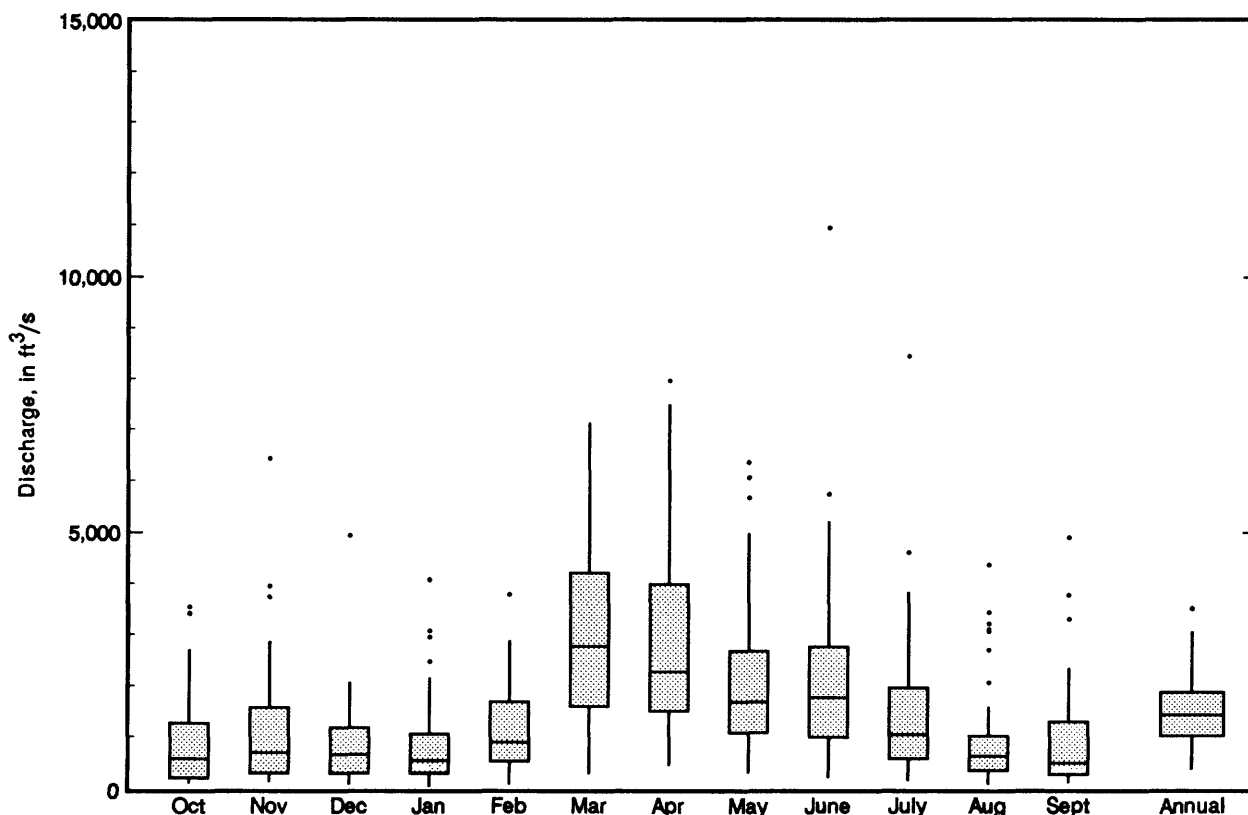
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
3.5	75	9.0	3,340
4.0	170	10.0	4,520
4.5	304	11.0	6,520
5.0	478	12.0	11,700
6.0	944	13.0	27,000
7.0	1,580		

WAPSIPINICON RIVER BASIN
05422000 WAPSIPINICON RIVER NEAR DEWITT, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	3,549	1973	137	1977	922	909	5.0
November	6,435	1962	159	1965	1,098	1,132	5.9
December	4,945	1983	104	1977	865	787	4.7
January	4,086	1946	59.4	1977	850	818	4.6
February	3,798	1984	104	1940	1,215	868	6.6
March	7,137	1986	301	1964	2,994	1,740	16.1
April	7,966	1951	453	1977	2,904	1,947	15.7
May	6,351	1974	323	1977	2,142	1,488	11.6
June	10,950	1947	234	1977	2,148	1,772	11.6
July	8,462	1969	165	1936	1,504	1,427	8.1
August	4,378	1979	103	1936	968	942	5.2
September	4,900	1979	133	1976	934	965	5.0
Annual	3,515	1973	384	1977	1,547	743	100.0

Boxplots of monthly and annual mean discharges



WAPSIPINICON RIVER BASIN
05422000 WAPSIPINICON RIVER NEAR DEWITT, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	56	99	282	390	288	195	148	100	115	125	135	90	106
95	104	129	415	519	400	368	222	172	150	152	161	125	166
90	150	190	525	812	610	479	292	204	188	174	194	152	226
85	188	246	672	1,000	727	572	363	245	225	200	227	204	283
80	233	316	868	1,160	830	657	423	284	254	222	261	252	351
75	272	364	1,100	1,310	929	784	500	325	278	240	311	290	418
70	315	418	1,330	1,460	1,040	938	575	367	303	276	396	344	491
65	379	472	1,520	1,590	1,160	1,090	647	412	337	329	466	397	570
60	437	524	1,720	1,770	1,270	1,250	720	459	372	384	523	447	657
55	494	589	1,960	1,940	1,390	1,400	796	507	407	454	588	511	773
50	549	671	2,200	2,140	1,520	1,540	890	563	442	543	667	596	891
45	598	795	2,430	2,350	1,680	1,710	1,000	623	499	610	787	690	1,030
40	651	871	2,720	2,600	1,860	1,890	1,140	698	573	706	900	784	1,200
35	745	953	3,080	2,870	2,050	2,100	1,310	780	694	841	1,040	874	1,400
30	842	1,140	3,550	3,240	2,250	2,360	1,530	887	853	996	1,220	974	1,620
25	940	1,440	4,070	3,640	2,530	2,680	1,810	1,010	1,030	1,190	1,410	1,100	1,920
20	1,100	1,790	4,650	4,080	2,960	3,080	2,120	1,200	1,270	1,460	1,650	1,300	2,270
15	1,360	2,270	5,400	4,820	3,480	3,630	2,530	1,450	1,580	1,780	1,930	1,520	2,780
10	1,960	2,970	6,680	6,110	4,660	4,530	3,230	1,960	1,990	2,280	2,300	1,850	3,640
5	2,800	4,440	8,750	8,100	6,260	6,000	5,040	3,470	3,090	3,180	3,270	2,450	5,330

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	2,420	1,980	1,370	1,000	808
0.95	1.05	3,750	3,110	2,380	1,810	1,450
0.90	1.11	4,690	3,920	3,110	2,410	1,920
0.80	1.25	6,100	5,130	4,220	3,320	2,630
0.50	2	9,820	8,320	7,110	5,680	4,470
0.20	5	15,300	12,900	11,100	8,830	6,900
0.10	10	19,000	16,100	13,600	10,700	8,370
0.04	25	23,800	20,000	16,500	12,900	10,000
0.02	50	27,400	22,900	18,600	14,400	11,100
0.01	100	31,000	25,700	20,500	15,700	12,100

WAPSIPINICON RIVER BASIN
05422000 WAPSIPINICON RIVER NEAR DEWITT, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	48	49	48	50	53	64	74	77	88
0.02	50	59	59	59	61	66	79	91	98	113
0.05	20	78	79	80	83	90	108	126	138	161
0.10	10	100	101	103	108	117	141	167	186	220
0.20	5	133	136	139	146	161	194	233	264	316
0.50	2	226	232	241	256	287	349	434	500	614
0.80	1.25	372	383	403	431	494	610	790	912	1,140
0.90	1.11	477	493	521	557	647	808	1,070	1,230	1,560
0.98	1.04	615	639	678	726	854	1,080	1,470	1,670	2,140
0.98	1.02	721	751	800	856	1,020	1,300	1,790	2,020	2,610
0.99	1.01	829	866	925	989	1,180	1,530	2,140	2,400	3,100

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	48	48	48	52	138	155	176	207
0.02	50	61	62	63	70	169	189	215	258
0.05	20	87	90	93	106	230	255	289	354
0.10	10	117	124	129	152	298	330	375	465
0.20	5	167	179	189	230	405	447	509	641
0.50	2	312	344	371	476	706	785	896	1,150
0.80	1.25	550	618	680	916	1,180	1,340	1,540	1,980
0.90	1.11	723	818	910	1,250	1,520	1,740	2,020	2,600
0.96	1.04	953	1,080	1,220	1,710	1,980	2,300	2,680	3,420
0.98	1.02	1,130	1,280	1,450	2,070	2,320	2,740	3,200	4,070
0.99	1.01	1,310	1,490	1,690	2,440	2,680	3,190	3,750	4,730
		July-August-September				October-November-December			
0.01	100	75	79	84	91	62	61	63	67
0.02	50	87	92	98	108	75	75	77	83
0.05	20	110	115	124	139	99	102	106	117
0.10	10	135	142	153	174	128	134	141	157
0.20	5	174	184	198	229	173	185	197	225
0.50	2	286	305	328	389	309	342	372	441
0.80	1.25	474	512	553	667	546	624	696	853
0.90	1.11	621	676	732	886	732	852	962	1,200
0.96	1.04	830	914	992	1,200	1,000	1,180	1,360	1,720
0.98	1.02	1,000	1,110	1,210	1,470	1,220	1,460	1,690	2,160
0.99	1.01	1,190	1,330	1,450	1,750	1,460	1,760	2,060	2,650

CROW CREEK BASIN
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 September 1988.

GAGE.--Water-stage recorder. Datum of gage is 576.23 ft above National Geodetic Vertical Datum of 1929.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,490 ft³/s June 15, 1982, gage height, 10.24 ft; minimum discharge, 0.06 ft³/s Aug. 18, 1988.

Rating table number 3, developed October 1986

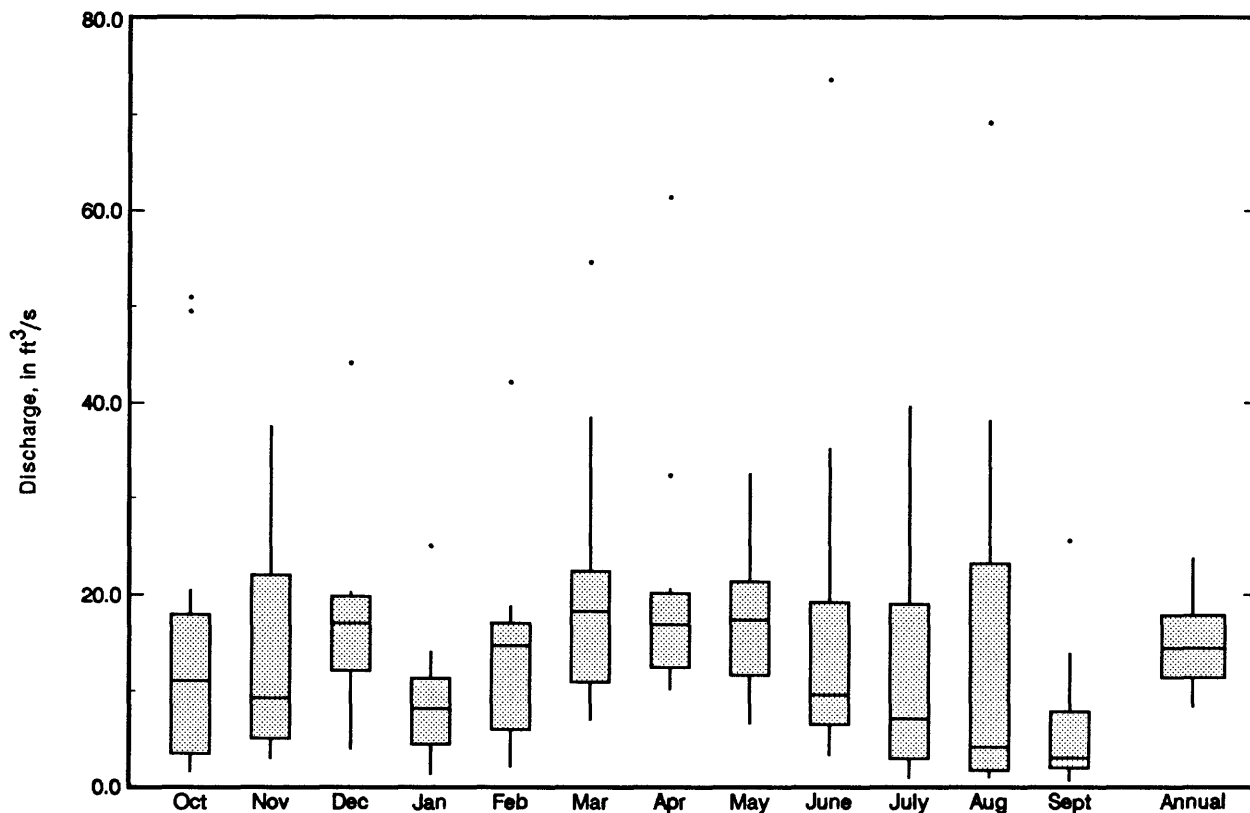
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
3.50	2.0	5.00	232
3.75	7.9	6.00	646
4.00	22	7.00	1,080
4.50	89	8.00	1,560

CROW CREEK BASIN
05422470 CROW CREEK AT BETTENDORF, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	50.9	1982	1.45	1979	15.9	18.0	8.6
November	37.5	1978	2.85	1979	14.6	11.4	7.9
December	44.1	1983	3.80	1979	16.9	10.8	9.2
January	25.0	1988	1.18	1979	9.03	6.59	4.9
February	42.1	1985	1.97	1979	14.1	11.1	7.7
March	54.6	1979	6.87	1981	20.8	14.2	11.3
April	61.3	1983	10.1	1986	21.0	14.7	11.4
May	32.5	1986	6.50	1988	17.6	8.34	9.6
June	73.6	1982	3.17	1988	18.6	20.4	10.1
July	39.6	1983	0.74	1988	13.3	14.6	7.3
August	69.1	1979	0.85	1978	15.6	21.8	8.5
September	25.5	1981	0.49	1988	6.30	7.55	3.4
Annual	23.7	1983	8.24	1988	15.3	5.08	100.0

Boxplots of monthly and annual mean discharges



CROW CREEK BASIN
05422470 CROW CREEK AT BETTENDORF, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.89	1.5	2.7	4.7	2.9	1.9	0.33	0.18	0.20	0.97	1.2	2.0	0.34
95	1.0	1.7	4.1	7.5	4.5	2.9	0.65	0.41	0.30	1.5	1.9	2.9	1.1
90	2.1	2.1	5.2	8.4	5.5	3.6	1.4	0.63	0.42	1.7	2.5	3.5	1.8
85	2.9	2.8	6.0	9.4	6.1	4.1	1.8	0.84	0.55	1.9	3.0	4.1	2.5
80	3.6	3.3	6.6	10	6.6	4.6	2.1	1.0	0.71	2.3	3.4	4.9	3.1
75	4.1	3.9	7.3	11	7.1	5.1	2.4	1.3	1.1	2.6	3.9	5.8	3.7
70	4.7	4.4	8.1	12	7.6	5.6	2.9	1.5	1.4	2.8	4.3	6.7	4.3
65	5.2	4.8	9.0	13	8.1	6.2	3.3	1.7	1.7	3.1	5.1	7.6	5.1
60	5.8	5.1	9.9	14	8.6	6.8	3.9	2.1	2.0	3.3	6.1	8.4	5.8
55	6.3	5.5	11	14	9.2	7.4	4.5	2.5	2.4	3.7	7.5	9.2	6.7
50	6.8	6.1	12	15	10	8.2	5.0	3.0	2.7	4.2	9.3	11	7.6
45	7.2	6.9	14	16	12	9.1	5.6	3.4	3.1	5.2	12	13	8.7
40	8.0	7.8	15	18	14	10	6.3	4.0	3.5	6.6	14	15	9.9
35	8.8	8.8	17	19	16	11	7.0	4.7	3.9	8.6	15	17	12
30	9.7	10	20	21	18	13	8.3	5.5	4.2	12	17	19	14
25	11	13	24	24	20	14	10	6.7	5.0	20	19	22	16
20	12	17	30	27	23	16	12	8.7	6.1	26	22	26	20
15	14	22	38	32	27	20	18	15	7.6	34	26	30	25
10	16	28	46	40	36	27	27	33	10	45	34	35	33
5	20	55	70	62	54	44	62	56	23	62	48	46	51

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	73	41	22	16	14
0.95	1.05	147	57	34	24	19
0.90	1.11	210	69	43	31	23
0.80	1.25	322	88	57	41	29
0.50	2	704	153	101	67	44
0.20	5	1,480	289	179	108	65
0.10	10	2,150	418	243	138	80
0.04	25	3,160	637	339	177	99
0.02	50	4,040	851	422	207	114
0.01	100	5,000	1,120	514	237	128

CROW CREEK BASIN
05422470 CROW CREEK AT BETTENDORF, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.08	0.08	0.10	0.16	0.34	0.40	0.57	0.63	0.98
0.02	50	0.11	0.12	0.15	0.23	0.45	0.53	0.74	0.88	1.4
0.05	20	0.20	0.21	0.26	0.37	0.66	0.80	1.1	1.4	2.1
0.10	10	0.31	0.32	0.40	0.54	0.91	1.1	1.4	2.0	3.0
0.20	5	0.50	0.53	0.64	0.82	1.3	1.6	2.1	3.0	4.5
0.50	2	1.1	1.2	1.3	1.6	2.2	2.9	3.9	5.7	8.3
0.80	1.25	1.9	2.1	2.3	2.6	3.2	4.5	7.0	9.3	13
0.90	1.11	2.4	2.6	2.8	3.2	3.8	5.4	9.2	11	16
0.96	1.04	3.0	3.2	3.3	3.9	4.4	6.4	12	14	19
0.98	1.02	3.3	3.5	3.6	4.2	4.7	7.1	14	15	20
0.99	1.01	3.6	3.8	3.8	4.6	5.0	7.6	17	16	21

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.58	0.58	0.62	0.75	1.00	1.4	1.7	2.5
0.02	50	0.73	0.75	0.81	0.99	1.3	1.7	2.0	2.9
0.05	20	1.0	1.1	1.2	1.5	1.7	2.2	2.6	3.5
0.10	10	1.4	1.4	1.6	2.0	2.2	2.7	3.2	4.2
0.20	5	1.9	2.0	2.3	2.8	2.9	3.5	4.0	5.2
0.50	2	3.2	3.6	4.0	5.0	4.3	5.0	5.9	7.9
0.80	1.25	5.3	5.7	6.2	7.7	5.8	6.7	8.2	12
0.90	1.11	6.6	7.1	7.5	9.3	6.6	7.6	9.5	15
0.96	1.04	8.3	8.7	8.9	11	7.2	8.4	11	19
0.98	1.02	9.5	9.7	9.8	12	7.6	8.9	12	22
0.99	1.01	11	11	11	13	7.9	9.3	13	25
		July-August-September				October-November-December			
0.01	100	0.04	0.07	0.13	0.23	0.17	0.76	0.74	0.64
0.02	50	0.07	0.10	0.18	0.30	0.25	0.89	0.90	0.87
0.05	20	0.12	0.18	0.29	0.44	0.44	1.1	1.2	1.3
0.10	10	0.20	0.29	0.42	0.63	0.69	1.4	1.6	2.0
0.20	5	0.36	0.49	0.66	0.98	1.2	1.9	2.2	3.0
0.50	2	0.96	1.2	1.5	2.1	2.7	3.2	4.1	6.4
0.80	1.25	2.2	2.6	3.1	4.7	5.3	5.9	7.5	13
0.90	1.11	3.1	3.6	4.4	7.1	7.1	8.2	10	17
0.96	1.04	4.4	5.0	6.2	11	9.3	12	14	24
0.98	1.02	5.4	6.1	7.8	14	11	15	18	29
0.99	1.01	6.3	7.1	9.4	19	12	19	22	35

IOWA RIVER BASIN
05448500 WEST BRANCH IOWA RIVER NEAR KLEMME, IA

LOCATION.--Lat 42°57'50", long 93°42'20", in NE1/4 NW1/4 sec. 17, T.94 N., R.24 W., Hancock County, Hydrologic Unit 07080207, on downstream side of highway bridge, 6 mi southwest of Klemme and 12.4 mi upstream from confluence with East Fork Iowa River.

DRAINAGE AREA.--122 mi².

PERIOD OF RECORD.--April 1948 to September 1958 (discontinued).

GAGE.--Wire-weight gage read once daily, more often at high stages. Datum of gage is 1,180.83 ft above NGVD. Prior to June 13, 1948, at datum 1.00 ft higher.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,920 ft³/s June 21, 1954, gage height, 14.97 ft, from floodmark; no flow for part of day Jan. 12, 1950.

Rating table number 1, developed April 1955
(A discharge measurement to validate this rating
has not been made since October 1958.)

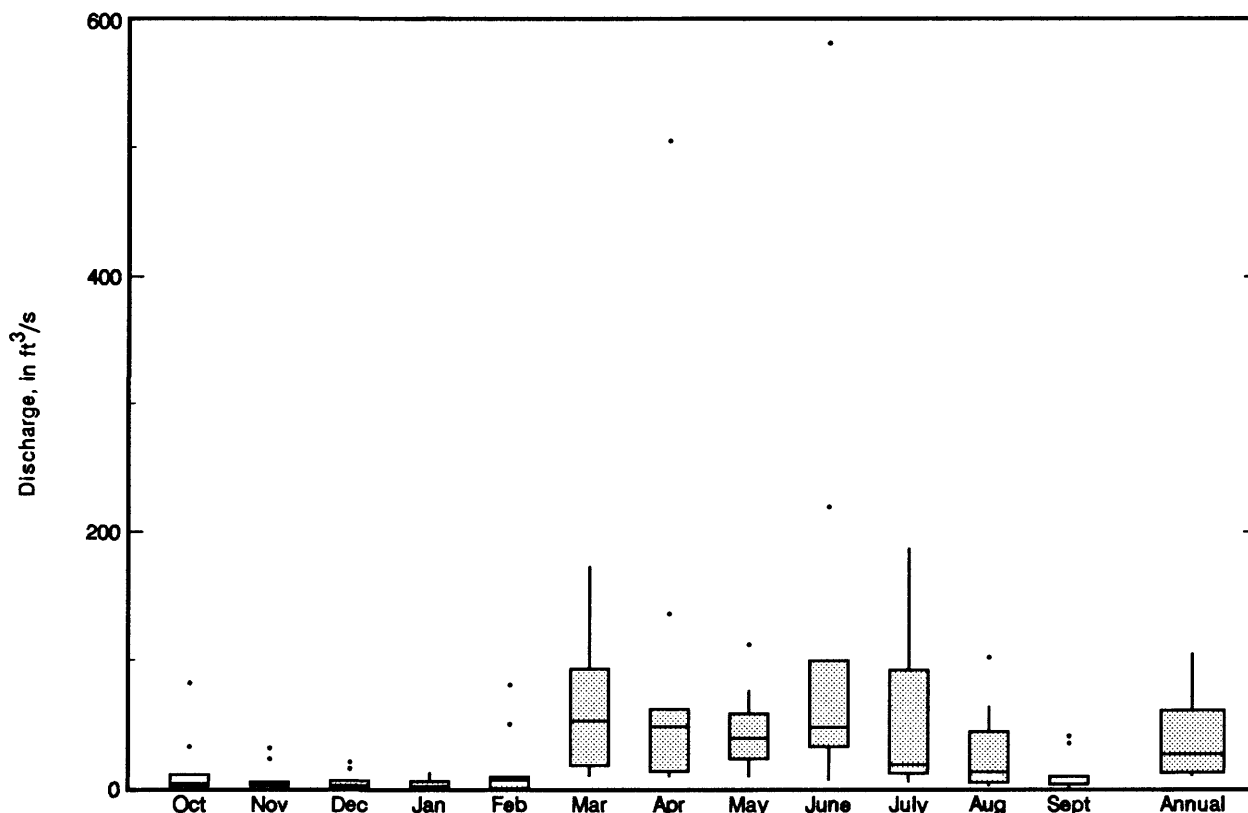
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
2.0	25.2	10.0	940
4.0	155	12.0	1,290
6.0	360	14.0	1,700
8.0	630		

IOWA RIVER BASIN
05448500 WEST BRANCH IOWA RIVER NEAR KLEMME, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	81.7	1955	1.80	1949	14.9	25.2	3.2
November	30.9	1955	1.78	1957	8.06	10.0	1.8
December	19.6	1955	0.57	1956	5.54	6.42	1.2
January	11.9	1952	0.44	1956	3.95	4.36	0.9
February	80.3	1952	0.63	1956	16.5	26.7	3.6
March	173	1952	9.31	1958	71.0	59.9	15.5
April	505	1951	8.68	1957	90.2	151	19.7
May	112	1951	8.94	1949	45.1	31.4	9.9
June	582	1954	6.32	1956	114	176	24.8
July	187	1951	4.61	1949	52.0	60.1	11.4
August	102	1954	1.52	1949	26.2	33.3	5.7
September	39.7	1954	0.51	1958	10.9	14.1	2.4
Annual	105	1951	9.46	1958	38.2	32.1	100.0

Boxplots of monthly and annual mean discharges



IOWA RIVER BASIN
05448500 WEST BRANCH IOWA RIVER NEAR KLEMME, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.29	0.28	1.4	5.7	4.0	4.3	2.8	0.68	0.35	0.98	1.2	0.38	0.37
95	0.40	0.34	2.6	6.6	5.2	4.8	4.1	1.0	0.48	1.3	1.6	0.55	0.84
90	0.50	0.43	3.9	7.7	6.7	5.4	5.0	1.6	0.90	1.8	1.8	1.0	1.4
85	0.62	0.69	6.8	8.6	8.3	9.2	6.0	2.3	1.3	2.1	2.1	1.5	1.9
80	0.87	0.82	8.1	9.7	9.9	12	6.9	3.1	2.5	2.4	2.3	1.7	2.4
75	1.0	0.90	9.4	11	13	14	7.9	3.8	2.9	2.6	2.5	1.9	2.9
70	1.2	0.98	14	13	15	17	8.9	4.4	3.3	2.9	2.8	2.0	3.6
65	1.5	1.1	17	17	20	19	10	5.0	3.5	3.1	3.1	2.2	4.3
60	1.7	1.4	20	21	24	21	12	5.7	3.8	3.5	3.3	2.3	5.3
55	1.9	1.6	25	25	27	23	14	6.6	4.0	3.9	3.6	2.5	6.7
50	2.0	1.8	30	28	30	26	17	7.6	4.3	4.4	3.8	2.7	8.4
45	2.2	2.1	36	33	34	30	21	9.0	4.9	4.8	4.1	3.0	11
40	2.3	2.4	43	40	38	35	25	11	5.5	5.3	4.5	3.2	14
35	2.5	2.9	51	49	42	41	30	13	6.5	6.4	5.0	3.6	18
30	3.0	5.2	58	61	47	48	38	15	7.8	7.9	5.5	4.1	23
25	6.3	7.0	69	79	53	56	48	20	10	10	6.5	5.9	29
20	9.2	10	91	108	60	65	61	28	20	18	16	10	37
15	11	15	121	143	72	85	89	37	25	29	21	13	50
10	12	43	209	224	94	160	155	54	29	49	27	17	73
5	14	86	333	450	150	890	260	94	40	74	33	23	146

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	64	76	55	39	23
0.95	1.05	121	107	76	53	34
0.90	1.11	169	133	93	65	43
0.80	1.25	249	178	125	87	59
0.50	2	507	341	247	173	120
0.20	5	985	751	587	419	285
0.10	10	1,370	1,200	999	724	476
0.04	25	1,920	2,070	1,870	1,390	864
0.02	50	2,370	3,020	2,910	2,200	1,310
0.01	100	2,850	4,310	4,430	3,400	1,930

IOWA RIVER BASIN
05448500 WEST BRANCH IOWA RIVER NEAR KLEMME, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.13	0.13	0.12	0.13	0.16	0.22	0.27	0.61	0.90
0.02	50	0.16	0.16	0.15	0.16	0.20	0.27	0.33	0.69	1.00
0.05	20	0.21	0.22	0.22	0.22	0.28	0.38	0.47	0.85	1.2
0.10	10	0.29	0.29	0.30	0.31	0.39	0.52	0.66	1.0	1.4
0.20	5	0.42	0.44	0.46	0.48	0.59	0.79	1.0	1.4	1.9
0.50	2	1.0	1.1	1.2	1.2	1.5	1.9	2.5	3.0	4.0
0.80	1.25	3.2	3.4	3.6	3.7	4.1	5.1	6.7	7.6	11
0.90	1.11	6.3	6.5	6.8	7.0	7.5	9.0	12	14	20
0.96	1.04	14	14	14	14	15	17	22	28	44
0.98	1.02	24	24	23	23	24	26	35	45	76
0.99	1.01	39	39	38	37	37	39	52	72	128

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.15	0.15	0.15	0.20	2.0	2.1	2.0	2.2
0.02	50	0.18	0.18	0.18	0.24	2.3	2.4	2.4	2.8
0.05	20	0.24	0.24	0.25	0.31	2.9	3.1	3.2	3.9
0.10	10	0.32	0.32	0.33	0.41	3.7	4.0	4.2	5.2
0.20	5	0.47	0.48	0.50	0.60	4.8	5.3	5.7	7.5
0.50	2	1.1	1.1	1.2	1.4	8.4	9.5	11	15
0.80	1.25	3.2	3.3	3.4	3.8	16	18	22	31
0.90	1.11	6.0	6.1	6.3	7.0	22	25	31	46
0.96	1.04	12	13	13	14	32	36	47	69
0.98	1.02	21	21	21	23	41	46	62	91
0.99	1.01	33	33	33	36	51	58	80	116
		July-August-September				October-November-December			
0.01	100	0.07	0.16	0.20	0.23	0.26	0.25	0.28	0.43
0.02	50	0.12	0.25	0.29	0.33	0.31	0.31	0.34	0.51
0.05	20	0.25	0.44	0.50	0.58	0.41	0.44	0.48	0.67
0.10	10	0.48	0.72	0.81	0.93	0.54	0.61	0.65	0.88
0.20	5	0.99	1.3	1.4	1.7	0.78	0.92	0.98	1.3
0.50	2	3.3	3.5	3.9	4.8	1.8	2.2	2.3	2.8
0.80	1.25	8.6	8.9	10	14	4.9	5.7	5.9	7.1
0.90	1.11	13	14	17	23	9.0	9.8	10	12
0.96	1.04	19	22	27	40	18	18	19	23
0.98	1.02	24	29	37	58	29	28	28	36
0.99	1.01	29	37	49	77	46	41	42	54

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 September 1988. Prior to October 1958, published as East Fork Iowa River near Klemme.

GAGE.--Water-stage recorder. Datum of gage is 1,179.33 ft above National Geodetic Vertical Datum of 1929. 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.

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 (corrected), backwater from ice; minimum daily discharge, 0.2 ft³/s Feb. 22-26, 1959.

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

Rating table number 6, developed October 1985

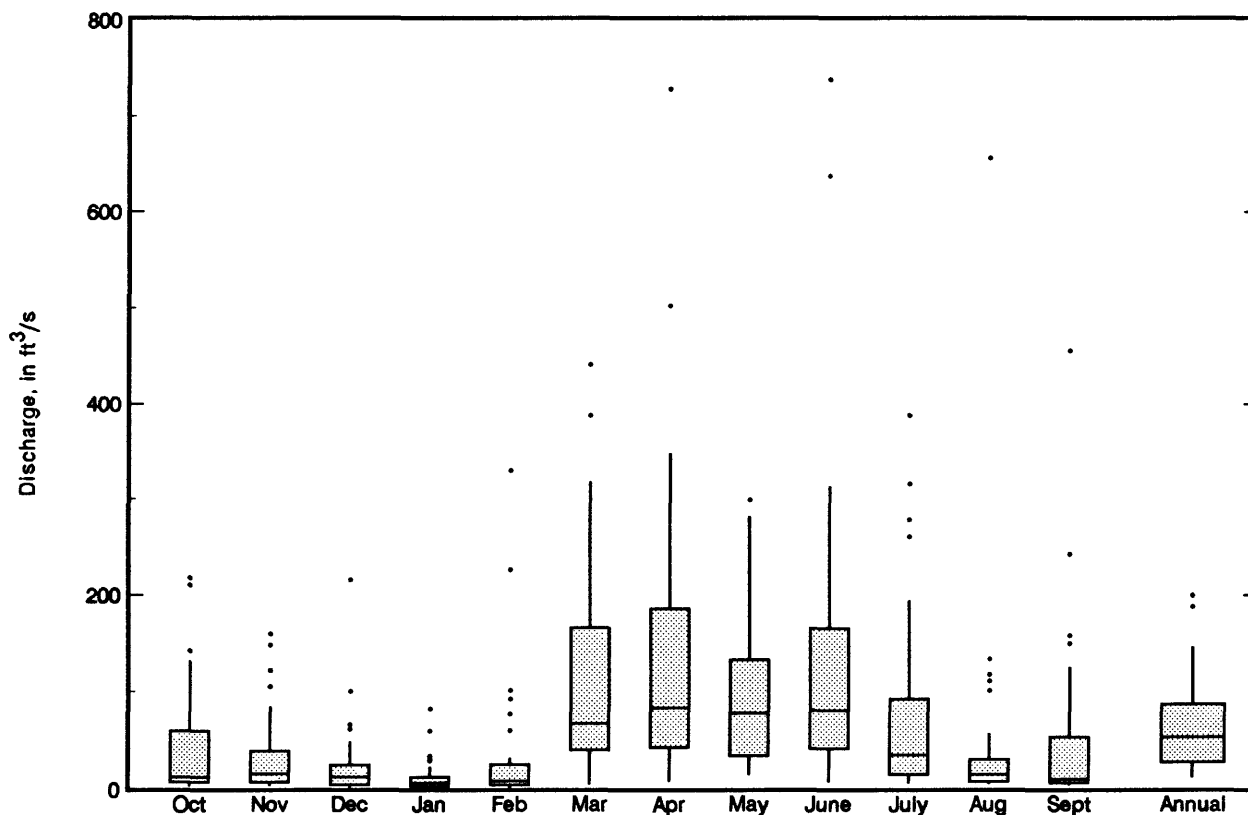
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
2.0	4.5	7.0	530
2.5	11	8.0	697
3.0	45	9.0	966
3.5	87	10.0	1,900
4.0	134	10.5	3,190
5.0	247	11.0	5,200
6.0	380		

IOWA RIVER BASIN
05449000 EAST BRANCH IOWA RIVER NEAR KLEMME, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	217	1987	2.08	1949	41.4	55.1	5.3
November	159	1973	3.06	1959	33.2	40.3	4.2
December	215	1983	0.98	1959	23.8	37.5	3.0
January	82.0	1983	0.38	1959	12.1	16.3	1.5
February	330	1984	0.28	1959	30.6	64.3	3.9
March	441	1973	4.25	1975	115	107	14.6
April	728	1965	7.41	1957	140	150	17.7
May	299	1973	14.1	1949	91.6	73.3	11.6
June	738	1984	7.00	1956	133	155	16.9
July	388	1962	5.41	1977	74.5	92.6	9.5
August	656	1979	4.70	1949	42.6	105	5.4
September	455	1965	3.63	1958	50.4	87.9	6.4
Annual	199	1983	11.4	1956	66.0	48.3	100.0

Boxplots of monthly and annual mean discharges



IOWA RIVER BASIN
05449000 EAST BRANCH IOWA RIVER NEAR KLEMME, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.35	0.29	0.56	5.4	5.3	6.4	4.2	2.8	2.4	1.9	1.9	0.93	0.89
95	0.93	0.92	3.8	8.9	9.7	9.9	6.0	4.5	3.4	3.3	3.6	2.0	2.5
90	1.6	1.4	5.1	14	15	13	7.5	5.4	4.3	4.3	4.5	2.8	3.9
85	2.0	1.7	6.8	20	18	15	8.9	6.0	4.9	4.9	5.2	3.3	5.0
80	2.6	2.1	8.6	27	22	18	10	6.6	5.5	5.5	5.9	3.8	6.2
75	3.0	2.6	11	33	27	21	12	7.3	6.1	6.2	6.7	4.5	7.4
70	3.4	3.2	15	40	32	24	14	8.2	6.7	6.9	7.5	5.6	8.7
65	3.8	3.7	21	48	36	28	16	9.2	7.4	7.7	8.6	6.8	11
60	4.3	4.4	27	56	41	33	18	10	8.3	8.5	9.9	8.1	13
55	4.8	5.1	34	65	47	40	22	12	9.1	9.3	12	9.4	16
50	5.6	5.9	40	74	54	47	26	13	10	12	15	12	19
45	6.8	6.9	50	86	62	54	31	15	12	16	19	14	24
40	8.2	8.1	62	99	71	63	37	16	14	21	24	17	30
35	10	9.4	76	117	83	74	43	19	16	29	29	20	37
30	13	12	95	136	96	91	53	22	19	38	35	23	46
25	15	18	132	161	113	116	68	26	26	51	40	27	59
20	18	22	176	188	132	149	91	32	39	67	52	31	78
15	22	29	234	234	163	206	131	43	62	89	67	40	108
10	28	41	340	314	213	314	199	65	100	115	88	52	161
5	41	135	505	511	320	582	327	158	220	159	129	76	287

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	121	93	72	46	30
0.95	1.05	228	172	126	81	55
0.90	1.11	316	236	168	110	75
0.80	1.25	467	342	239	158	110
0.50	2	964	674	461	311	216
0.20	5	1,930	1,280	880	602	410
0.10	10	2,750	1,750	1,230	844	563
0.04	25	3,960	2,430	1,740	1,210	780
0.02	50	4,990	2,990	2,180	1,510	957
0.01	100	6,130	3,580	2,670	1,850	1,150

IOWA RIVER BASIN
05449000 EAST BRANCH IOWA RIVER NEAR KLEMME, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.15	0.16	0.19	0.23	0.30	0.42	0.57	0.82	1.2
0.02	50	0.23	0.24	0.28	0.33	0.43	0.59	0.79	1.1	1.6
0.05	20	0.42	0.44	0.50	0.57	0.71	0.98	1.3	1.7	2.4
0.10	10	0.69	0.73	0.80	0.89	1.1	1.5	1.9	2.5	3.5
0.20	5	1.2	1.3	1.4	1.5	1.8	2.5	3.2	4.0	5.6
0.50	2	3.2	3.4	3.6	3.8	4.4	6.1	8.0	9.9	14
0.80	1.25	7.4	7.8	8.1	8.7	10	14	20	24	36
0.90	1.11	11	11	12	13	15	21	31	39	60
0.96	1.04	16	16	17	19	23	31	50	65	104
0.98	1.02	19	20	21	24	29	40	68	90	150
0.99	1.01	23	24	26	30	37	49	89	121	209

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.17	0.21	0.25	0.33	2.3	3.0	3.4	3.9
0.02	50	0.25	0.30	0.34	0.45	2.8	3.7	4.3	5.0
0.05	20	0.43	0.50	0.56	0.72	3.8	5.2	6.0	7.3
0.10	10	0.70	0.78	0.87	1.1	5.1	7.0	8.1	10
0.20	5	1.2	1.3	1.5	1.8	7.5	10	12	16
0.50	2	3.5	3.7	3.9	4.6	16	21	25	35
0.80	1.25	9.4	9.7	10	12	36	45	54	78
0.90	1.11	15	16	17	20	56	68	83	118
0.96	1.04	26	27	29	34	92	107	131	184
0.98	1.02	35	37	41	49	127	144	178	246
0.99	1.01	46	50	56	67	172	189	234	320
		July-August-September				October-November-December			
0.01	100	1.2	1.7	2.1	2.8	0.41	0.68	0.74	0.88
0.02	50	1.5	2.1	2.4	3.1	0.55	0.88	0.98	1.2
0.05	20	2.1	2.7	3.0	3.6	0.88	1.3	1.5	1.8
0.10	10	2.8	3.4	3.7	4.3	1.3	1.8	2.2	2.6
0.20	5	3.8	4.5	4.8	5.4	2.2	2.9	3.4	4.1
0.50	2	7.0	7.8	8.2	9.3	5.8	6.9	8.2	10.0
0.80	1.25	12	14	15	19	15	17	20	25
0.90	1.11	16	18	20	29	26	28	32	41
0.96	1.04	22	25	29	48	44	49	53	68
0.98	1.02	26	31	37	68	63	69	73	96
0.99	1.01	30	38	47	95	87	96	98	131

IOWA RIVER BASIN
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 September 1988.

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.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,460 ft³/s June 21, 1954, gage height, 14.88 ft; minimum daily discharge, 2.9 ft³/s Jan. 21-23, 1959.

Rating table number 10, developed October 1985

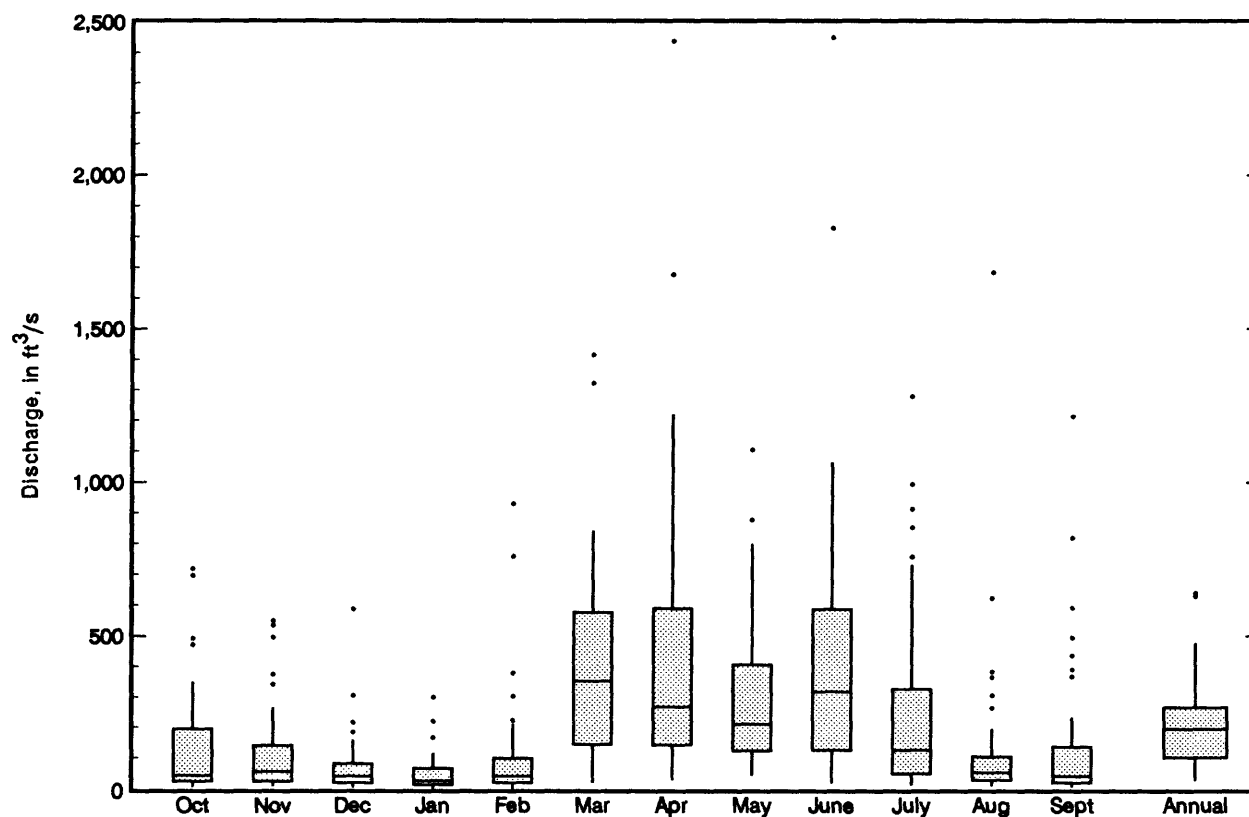
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
3.0	11	7.0	557
3.5	28	8.0	790
4.0	66	9.0	1,060
4.5	121	10.0	1,360
5.0	191	11.0	1,860
6.0	361	12.0	2,750

IOWA RIVER BASIN
05449500 IOWA RIVER NEAR ROWAN, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	720	1987	9.19	1959	133	172	5.2
November	551	1942	12.0	1959	118	138	4.6
December	588	1983	6.30	1959	77.8	98.9	3.0
January	298	1983	3.63	1959	52.3	57.4	2.0
February	931	1984	3.54	1959	106	177	4.1
March	1,415	1973	23.9	1968	381	321	14.8
April	2,439	1965	32.4	1957	442	470	17.2
May	1,105	1984	46.7	1968	303	249	11.8
June	2,452	1984	21.1	1956	432	454	16.8
July	1,279	1969	15.2	1977	253	296	9.8
August	1,684	1979	14.3	1948	131	257	5.1
September	1,213	1965	8.83	1958	141	232	5.5
Annual	640	1983	30.4	1956	215	145	100.0

Boxplots of monthly and annual mean discharges



IOWA RIVER BASIN
05449500 IOWA RIVER NEAR ROWAN, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	3.7	3.4	8.0	24	20	19	13	10	7.1	8.8	11	6.0	6.2
95	6.3	6.2	19	38	38	34	21	14	12	13	15	12	13
90	8.4	8.3	26	56	51	44	27	18	14	16	18	15	18
85	13	11	33	83	63	56	33	21	16	19	21	17	22
80	15	14	40	103	80	70	38	25	19	23	24	19	26
75	18	17	57	120	98	84	46	30	23	26	27	22	30
70	20	20	76	139	112	100	55	34	26	29	31	25	36
65	21	22	102	159	126	118	64	38	29	33	35	29	43
60	23	24	122	184	141	139	74	42	31	36	40	33	52
55	24	26	145	209	157	163	86	46	36	40	50	38	63
50	27	28	171	236	180	189	101	50	40	46	59	44	76
45	31	31	202	265	205	218	119	57	48	55	72	52	91
40	37	38	247	310	235	254	141	64	56	72	86	59	111
35	47	49	308	362	268	305	167	73	65	94	99	67	134
30	56	67	390	417	310	366	197	82	76	118	116	75	167
25	66	78	480	496	367	447	242	95	91	154	139	87	208
20	76	93	585	602	443	569	327	117	122	206	178	108	266
15	92	124	741	778	535	779	442	153	182	273	215	137	365
10	116	194	1,020	1,060	678	1,080	665	227	297	353	305	179	524
5	169	380	1,630	1,620	1,030	1,630	1,100	480	655	504	420	245	917

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	287	232	171	146	107
0.95	1.05	539	462	350	269	201
0.90	1.11	742	648	497	367	276
0.80	1.25	1,070	952	740	527	396
0.50	2	2,070	1,840	1,450	1,010	743
0.20	5	3,740	3,220	2,580	1,820	1,290
0.10	10	4,980	4,160	3,340	2,430	1,680
0.04	25	6,630	5,330	4,290	3,250	2,170
0.02	50	7,900	6,160	4,970	3,890	2,530
0.01	100	9,200	6,980	5,610	4,540	2,680

IOWA RIVER BASIN
05449500 IOWA RIVER NEAR ROWAN, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	2.4	2.5	2.6	2.8	3.3	4.0	4.9	5.9	5.7
0.02	50	3.0	3.1	3.3	3.5	4.1	5.1	6.1	7.3	7.3
0.05	20	4.2	4.3	4.6	4.9	5.7	7.1	8.5	9.9	11
0.10	10	5.7	5.9	6.1	6.5	7.7	9.6	11	13	15
0.20	5	8.1	8.4	8.8	9.3	11	14	16	19	23
0.50	2	16	17	17	18	21	27	33	39	53
0.80	1.25	32	32	34	36	40	52	68	85	124
0.90	1.11	45	46	47	50	55	73	100	129	194
0.96	1.04	65	66	68	72	77	105	151	205	316
0.96	1.02	83	83	86	90	96	132	198	278	434
0.99	1.01	102	102	106	111	117	162	252	368	578

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	2.5	2.6	2.7	3.1	12	12	13	15
0.02	50	3.2	3.2	3.4	3.9	14	15	16	20
0.05	20	4.4	4.6	4.8	5.6	18	20	22	28
0.10	10	6.0	6.3	6.6	7.7	24	27	30	39
0.20	5	8.7	9.1	9.6	11	33	38	44	58
0.50	2	18	19	20	24	63	76	91	122
0.80	1.25	38	40	43	52	130	156	189	259
0.90	1.11	57	59	63	79	192	228	280	386
0.96	1.04	89	91	96	123	298	346	427	589
0.96	1.02	118	120	127	164	399	454	562	776
0.99	1.01	154	154	163	213	523	581	720	994
		July-August-September				October-November-December			
0.01	100	4.1	4.9	5.9	7.3	4.0	4.7	5.1	5.9
0.02	50	5.2	6.1	7.1	8.6	4.9	5.7	6.2	7.3
0.05	20	7.4	8.5	9.5	11	6.7	7.7	8.5	9.9
0.10	10	10	11	12	14	8.9	10	11	13
0.20	5	14	16	17	19	13	14	16	19
0.50	2	27	29	31	36	26	29	33	39
0.80	1.25	50	54	59	72	54	61	69	84
0.90	1.11	67	73	83	108	82	93	103	129
0.96	1.04	90	100	120	169	129	146	160	205
0.98	1.02	109	123	152	229	174	197	213	279
0.99	1.01	128	147	190	303	229	260	278	370

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.

PERIOD OF RECORD.--October 1902 to September 1903, October 1914 to September 1927, October 1932 to September 1988.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 42,000 ft³/s June 4, 1918, gage height, 17.74 ft (from floodmark), from rating curve extended above 19,000 ft³/s on basis of velocity-area study; maximum gage height, 19.77 ft March 19, 1979; minimum daily discharge, 4.7 ft³/s Jan. 25, 1977.

Rating table number 22, developed September 1986

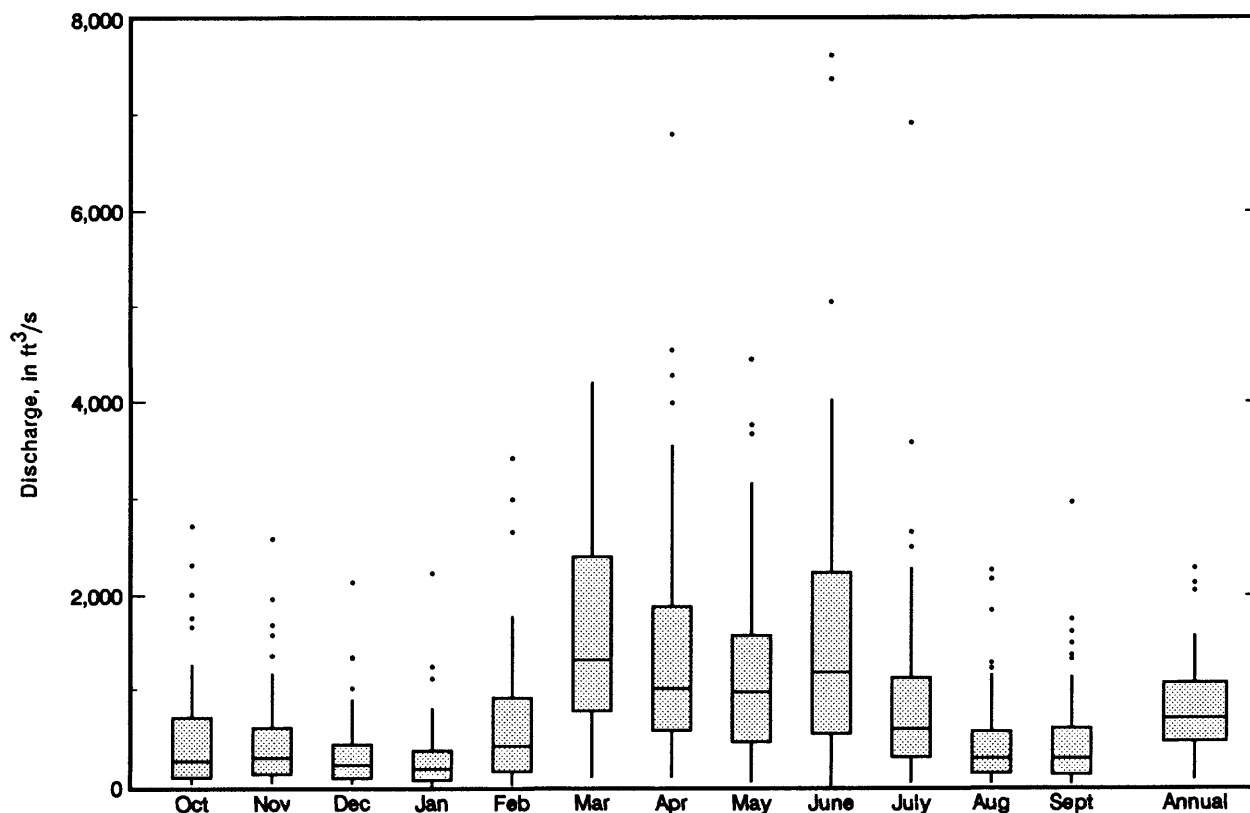
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
7.2	51	12.0	2,280
7.5	105	14.0	3,780
8.0	233	16.0	6,000
8.5	405	18.0	10,300
9.5	835	20.0	18,500
11.0	1,650		

IOWA RIVER BASIN
05451500 IOWA RIVER AT MARSHALLTOWN, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	2,721	1987	39.2	1940	500	564	5.1
November	2,593	1973	46.2	1940	474	496	4.8
December	2,139	1983	35.7	1977	332	358	3.4
January	2,231	1973	10.2	1977	297	347	3.0
February	3,424	1915	20.9	1940	630	666	6.4
March	4,206	1973	98.4	1934	1,578	1,064	16.0
April	6,796	1965	99.3	1934	1,426	1,266	14.5
May	4,443	1944	49.9	1934	1,194	962	12.1
June	7,619	1918	16.0	1934	1,594	1,488	16.2
July	6,915	1969	41.8	1977	876	1,013	8.9
August	2,263	1924	35.9	1934	456	472	4.6
September	2,965	1965	27.5	1939	478	510	4.9
Annual	2,281	1983	77.3	1934	819	467	100.0

Boxplots of monthly and annual mean discharges



IOWA RIVER BASIN
05451500 IOWA RIVER AT MARSHALLTOWN, IA—Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												Annual
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	
99	12	17	61	94	65	18	29	27	26	33	43	26	26
95	28	30	123	147	130	94	58	48	45	53	59	39	50
90	37	51	175	214	174	159	94	67	61	70	74	52	73
85	49	71	231	310	234	228	134	86	75	79	88	63	94
80	62	94	315	398	297	301	176	104	88	87	107	75	120
75	74	109	399	491	366	384	217	122	102	102	128	90	150
70	87	126	496	570	451	466	257	138	117	125	150	110	184
65	104	147	603	650	536	556	303	155	140	150	180	135	222
60	123	171	714	730	621	656	351	175	168	181	218	163	267
55	153	202	832	812	707	767	411	197	210	216	255	190	318
50	175	245	964	911	793	903	476	225	246	251	292	217	373
45	195	294	1,130	1,020	887	1,060	558	259	286	291	329	249	448
40	221	344	1,300	1,170	982	1,250	658	305	332	334	370	281	539
35	264	419	1,490	1,330	1,130	1,450	791	358	382	401	435	316	647
30	307	520	1,730	1,520	1,300	1,680	921	421	441	500	513	350	778
25	351	653	2,060	1,740	1,500	1,980	1,070	495	516	599	605	406	938
20	418	818	2,430	2,070	1,750	2,340	1,260	604	607	789	725	469	1,180
15	502	1,040	2,990	2,490	2,180	2,840	1,490	755	764	973	865	616	1,490
10	609	1,530	3,790	3,080	2,740	3,710	1,900	973	1,100	1,270	1,070	779	2,030
5	938	2,700	5,410	4,670	3,760	5,520	2,800	1,620	1,810	1,830	1,530	1,060	3,070

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	1,520	788	549	392	263
0.95	1.05	2,600	1,560	1,180	872	633
0.90	1.11	3,410	2,170	1,700	1,270	946
0.80	1.25	4,680	3,160	2,540	1,910	1,450
0.50	2	8,290	5,970	4,840	3,660	2,770
0.20	5	14,000	10,200	7,990	5,960	4,330
0.10	10	18,100	13,000	9,850	7,270	5,100
0.04	25	23,500	16,400	11,900	8,640	5,810
0.02	50	27,600	18,800	13,100	9,470	6,190
0.01	100	31,700	21,000	14,300	10,200	6,480

IOWA RIVER BASIN
05451500 IOWA RIVER AT MARSHALLTOWN, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	6.4	6.5	6.9	8.0	11	15	20	24	27
0.02	50	8.7	8.9	9.5	11	14	19	26	30	36
0.05	20	13	14	15	17	21	27	36	43	54
0.10	10	20	20	22	24	30	38	49	59	77
0.20	5	30	32	34	37	44	56	72	87	117
0.50	2	67	70	74	80	92	118	150	185	254
0.80	1.25	135	142	149	160	184	246	320	399	534
0.90	1.11	191	199	208	224	260	359	479	599	777
0.96	1.04	270	279	290	314	373	535	743	925	1,150
0.98	1.02	334	343	356	388	469	691	990	1,230	1,470
0.99	1.01	401	410	425	465	573	869	1,280	1,580	1,830

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	7.3	7.7	8.6	12	18	21	23	29
0.02	50	10	11	12	17	26	32	35	44
0.05	20	17	18	20	26	46	55	62	79
0.10	10	26	28	30	39	72	87	99	129
0.20	5	43	46	49	63	120	146	167	222
0.50	2	100	107	116	149	286	345	402	547
0.80	1.25	207	226	247	338	595	701	827	1,130
0.90	1.11	292	320	354	511	829	961	1,140	1,550
0.96	1.04	407	452	506	783	1,140	1,290	1,530	2,080
0.98	1.02	497	555	628	1,020	1,370	1,530	1,820	2,460
0.99	1.01	589	662	756	1,300	1,600	1,780	2,090	2,810
		July-August-September				October-November-December			
0.01	100	11	14	17	23	15	16	17	23
0.02	50	14	18	22	28	19	20	22	28
0.05	20	22	26	31	39	26	28	31	40
0.10	10	31	37	43	53	36	39	43	54
0.20	5	47	54	62	76	52	57	63	79
0.50	2	100	112	125	155	107	121	136	167
0.80	1.25	202	223	249	320	225	261	296	365
0.90	1.11	288	317	355	470	334	392	447	557
0.96	1.04	412	458	516	711	512	607	699	880
0.98	1.02	516	578	656	932	676	807	934	1,190
0.99	1.01	629	710	812	1,190	869	1,040	1,220	1,570

IOWA RIVER BASIN
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 September 1988.

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

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.

Rating table number 11, developed July 1981

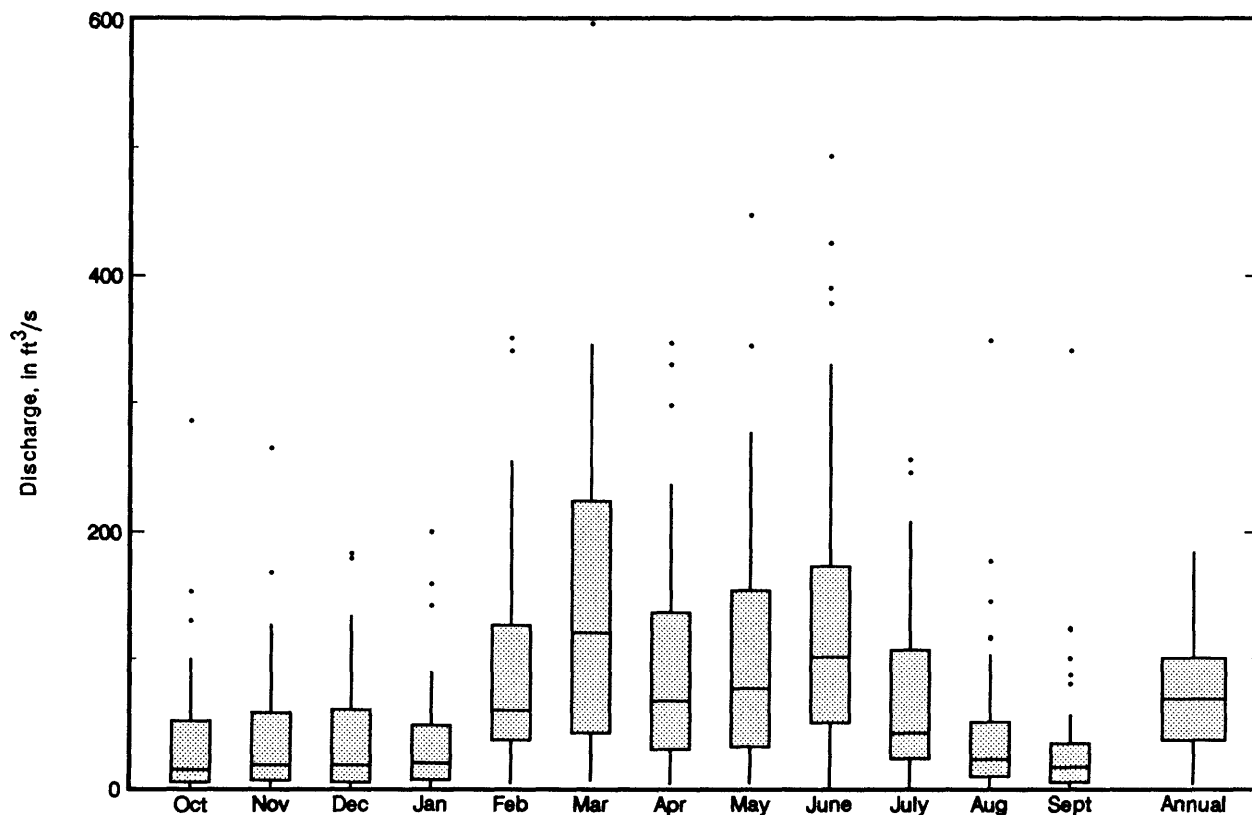
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
1.6	5.0	7.5	612
2.0	19	10.5	1,210
2.5	45	13.5	2,480
3.0	81	15.5	4,620
4.0	173	17.0	8,600
5.5	336	17.5	10,900

IOWA RIVER BASIN
05451700 TIMBER CREEK NEAR MARSHALLTOWN, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	286	1987	0.76	1951	38.8	55.9	4.3
November	265	1984	1.11	1951	41.5	54.7	4.6
December	183	1984	0.60	1956	36.3	46.5	4.1
January	200	1973	0.050	1977	37.7	45.8	4.2
February	351	1971	3.07	1954	92.8	89.4	10.4
March	597	1979	5.11	1956	144	127	16.1
April	347	1983	2.84	1956	99.7	92.9	11.2
May	447	1974	3.08	1977	112	105	12.6
June	493	1984	1.09	1977	134	125	15.0
July	256	1983	1.03	1956	73.7	69.2	8.3
August	349	1977	1.16	1956	46.5	65.5	5.2
September	341	1986	1.21	1950	35.9	60.1	4.0
Annual	184	1984	2.84	1956	74.3	46.3	100.0

Boxplots of monthly and annual mean discharges



IOWA RIVER BASIN
05451700 TIMBER CREEK NEAR MARSHALLTOWN, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.03	0.25	3.2	1.9	2.0	0.53	0.20	0.36	0.64	0.38	0.77	0.39	0.37
95	0.37	0.76	4.9	4.7	4.6	3.0	2.6	1.8	1.4	1.1	1.4	0.59	1.4
90	0.53	2.7	7.5	8.3	8.2	9.0	5.9	3.2	2.0	1.8	2.0	1.3	2.8
85	1.8	4.1	12	13	12	15	9.0	4.6	2.5	2.9	3.0	2.2	4.3
80	3.1	5.5	18	19	19	20	13	5.9	3.1	3.6	4.0	3.1	5.9
75	3.9	7.2	23	26	26	26	16	7.3	3.8	4.4	5.0	4.1	8.0
70	5.3	8.9	28	33	32	33	19	8.9	5.0	5.2	5.9	5.7	11
65	6.7	12	34	40	38	41	23	11	6.3	6.0	7.7	7.1	15
60	8.0	21	40	48	44	50	27	13	7.9	8.3	10	8.5	19
55	9.8	28	46	55	55	60	32	16	10	11	14	11	25
50	14	33	55	62	66	70	39	19	13	14	18	13	30
45	22	37	64	72	77	80	46	22	16	18	23	18	37
40	30	41	77	83	88	91	55	26	19	23	30	24	44
35	35	46	92	95	100	103	63	29	23	28	36	33	53
30	39	55	111	111	117	121	74	35	27	38	42	46	63
25	45	64	134	131	135	139	85	41	32	48	53	53	78
20	55	86	165	150	155	163	96	50	41	60	69	60	93
15	65	125	220	186	190	199	120	60	56	76	87	71	122
10	83	192	314	221	234	260	145	79	79	97	114	89	162
5	115	416	624	310	365	424	217	123	128	158	166	128	263

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	—	52	28	16	11
0.95	1.05	671	165	95	58	40
0.90	1.11	939	277	164	102	69
0.80	1.25	1,380	477	289	183	123
0.50	2	2,740	1,060	642	410	277
0.20	5	5,030	1,770	1,040	654	455
0.10	10	6,710	2,110	1,200	750	532
0.04	25	8,940	2,400	1,330	819	594
0.02	50	10,600	2,550	1,390	847	621
0.01	100	12,300	2,650	1,420	864	639

IOWA RIVER BASIN
05451700 TIMBER CREEK NEAR MARSHALLTOWN, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.04	0.16	0.28	0.36	0.48
0.02	50	0.00	0.00	0.00	0.00	0.08	0.27	0.45	0.56	0.76
0.05	20	0.00	0.00	0.00	0.13	0.24	0.58	0.88	1.1	1.5
0.10	10	0.20	0.32	0.39	0.40	0.58	1.1	1.6	1.9	2.7
0.20	5	0.85	0.90	1.0	1.1	1.5	2.3	3.1	3.8	5.3
0.50	2	3.9	3.9	4.3	4.9	6.6	8.3	10	12	17
0.80	1.25	12	12	13	15	19	25	32	37	51
0.90	1.11	19	20	22	24	30	42	56	63	85
0.96	1.04	31	33	35	37	42	69	99	109	143
0.98	1.02	41	44	46	48	51	93	140	152	196
0.99	1.01	52	57	59	58	58	120	190	204	257

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.09	0.09	0.10	0.04	0.10	0.30	0.43	0.69
0.02	50	0.16	0.17	0.19	0.11	0.25	0.60	0.82	1.3
0.05	20	0.38	0.40	0.47	0.40	0.86	1.6	2.0	3.0
0.10	10	0.79	0.84	0.99	1.1	2.2	3.4	4.2	5.9
0.20	5	1.8	1.9	2.3	3.3	6.0	7.7	9.2	13
0.50	2	7.5	8.2	9.5	16	25	27	32	41
0.80	1.25	26	29	32	46	60	68	78	102
0.90	1.11	45	51	54	65	80	95	111	148
0.96	1.04	78	89	91	86	99	127	150	205
0.98	1.02	108	124	123	97	108	146	175	244
0.99	1.01	142	164	158	105	114	163	197	279
		July-August-September				October-November-December			
0.01	100	0.37	0.18	0.29	0.53	0.12	0.16	0.18	0.27
0.02	50	0.53	0.30	0.44	0.77	0.20	0.26	0.29	0.42
0.05	20	0.88	0.59	0.81	1.3	0.42	0.53	0.59	0.84
0.10	10	1.4	1.1	1.4	2.1	0.81	1.0	1.1	1.5
0.20	5	2.3	2.1	2.5	3.6	1.7	2.1	2.3	3.0
0.50	2	6.1	6.6	7.3	9.7	6.6	7.8	8.4	11
0.80	1.25	16	18	19	24	23	26	29	35
0.90	1.11	25	28	31	38	43	47	53	64
0.96	1.04	40	43	49	61	79	85	98	117
0.98	1.02	54	57	66	81	117	122	144	171
0.99	1.01	71	71	84	104	163	168	202	240

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 September 1988.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 7,000 ft³/s May 28, 1974, gage height, 24.00 ft; no flow Jan. 22 to Feb. 2, 1977.

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

Rating table number 19, developed October 1987

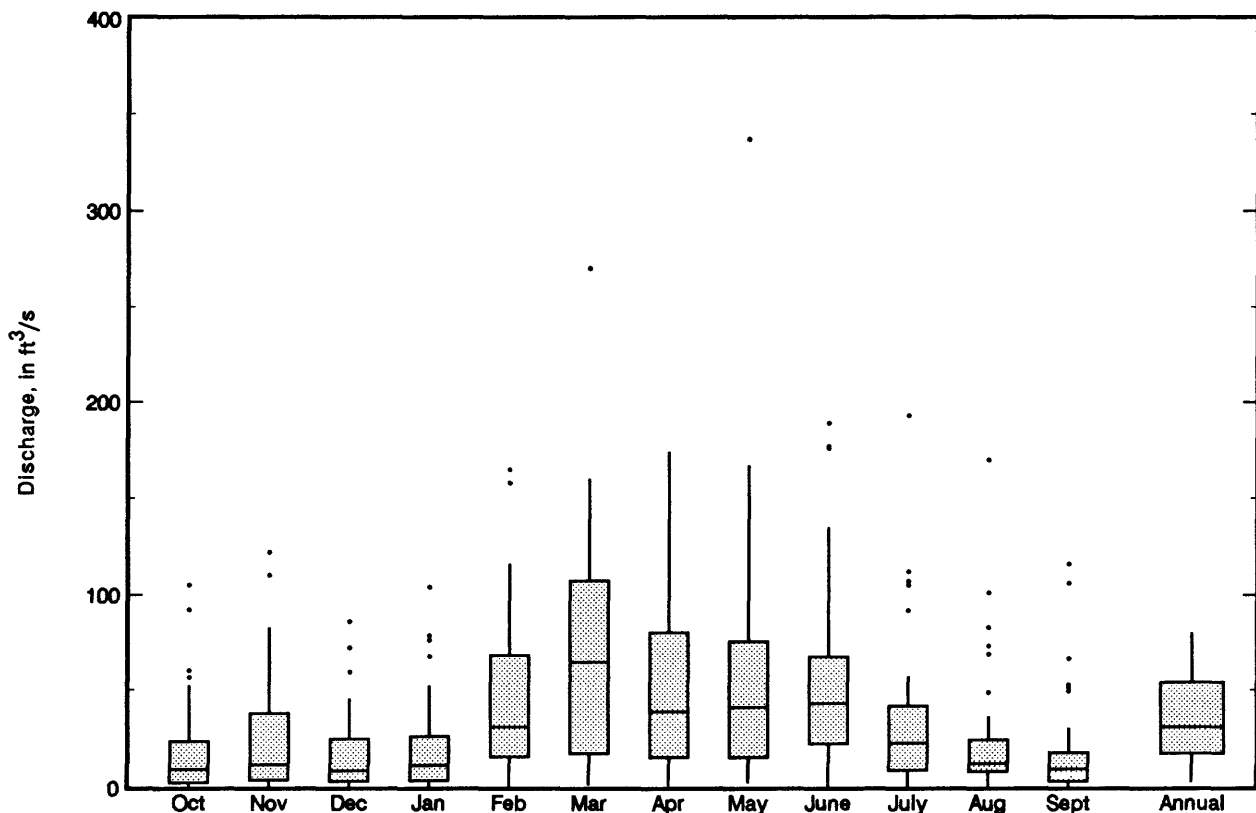
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
9.5	2.4	13.0	298
10.0	14	14.0	445
10.5	35	16.0	810
11.0	70	18.0	1,310
11.5	114	20.0	2,100
12.0	170	22.0	3,750

IOWA RIVER BASIN
05451900 RICHLAND CREEK NEAR HAVEN, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	105	1987	0.24	1957	18.5	24.6	4.2
November	122	1984	0.31	1951	23.0	29.1	5.3
December	85.8	1983	0.25	1957	17.2	20.5	3.9
January	104	1960	0.020	1977	20.7	25.1	4.8
February	165	1965	0.42	1954	46.4	42.8	10.6
March	270	1979	1.05	1956	67.8	59.1	15.5
April	174	1983	0.85	1956	52.1	46.6	11.9
May	337	1974	2.04	1956	55.4	62.5	12.7
June	189	1969	0.25	1956	56.5	50.3	13.0
July	193	1983	0.66	1977	35.2	39.4	8.1
August	170	1977	0.76	1955	24.8	33.4	5.7
September	116	1965	0.58	1950	18.5	26.9	4.2
Annual	80.0	1974	2.49	1956	36.3	22.0	100.0

Boxplots of monthly and annual mean discharges



IOWA RIVER BASIN
05451900 RICHLAND CREEK NEAR HAVEN, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.01	0.12	0.47	0.45	0.37	0.22	0.12	0.35	0.20	0.13	0.27	0.14	0.20
95	0.14	0.38	1.2	1.3	1.6	1.3	0.76	0.68	0.45	0.32	0.40	0.27	0.42
90	0.32	1.1	3.1	4.6	4.0	3.7	2.2	0.94	0.81	0.49	0.63	0.40	1.1
85	0.86	2.2	5.1	7.8	6.1	5.6	3.3	1.5	1.3	1.2	1.2	0.77	2.0
80	1.5	2.7	7.3	11	8.6	7.5	4.3	2.6	1.8	1.7	1.8	1.3	3.0
75	2.0	3.7	9.7	13	12	10	5.6	3.4	2.6	2.3	2.6	2.2	4.0
70	2.7	5.1	13	16	14	14	7.4	4.1	3.2	3.0	3.4	3.0	5.4
65	3.5	7.2	15	19	17	17	9.3	4.8	3.7	3.9	4.3	3.9	6.9
60	4.5	9.4	17	23	21	21	12	5.7	4.2	5.2	5.7	5.1	8.7
55	5.4	11	21	27	26	24	14	6.7	5.0	6.6	7.8	6.2	11
50	6.8	13	25	32	31	28	16	7.9	5.8	8.2	9.9	7.4	14
45	8.5	16	31	37	36	32	19	9.4	7.2	9.9	12	8.5	17
40	12	18	37	43	42	37	22	11	8.7	12	15	11	20
35	15	22	44	49	48	42	26	13	11	14	20	15	24
30	18	26	50	55	54	49	29	15	13	17	24	19	29
25	22	31	56	64	63	56	34	18	15	21	30	23	36
20	25	37	70	74	75	67	39	22	17	28	38	28	44
15	31	52	90	87	92	79	48	27	22	35	46	34	55
10	41	88	139	111	118	105	60	36	29	49	54	41	75
5	69	222	270	168	173	163	108	64	70	75	74	61	124

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	346	86	46	26	17
0.95	1.05	564	154	85	51	33
0.90	1.11	724	205	114	71	46
0.80	1.25	971	285	160	102	66
0.50	2	1,650	504	284	185	121
0.20	5	2,710	824	462	298	201
0.10	10	3,460	1,030	576	366	252
0.04	25	4,430	1,290	711	442	312
0.02	50	5,180	1,470	805	492	354
0.01	100	5,930	1,650	893	536	392

IOWA RIVER BASIN
05451900 RICHLAND CREEK NEAR HAVEN, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.01	0.05	0.10	0.11	0.23
0.02	50	0.00	0.00	0.00	0.00	0.03	0.10	0.17	0.20	0.39
0.05	20	0.03	0.07	0.09	0.10	0.10	0.24	0.39	0.46	0.84
0.10	10	0.10	0.18	0.21	0.25	0.25	0.51	0.77	0.90	1.6
0.20	5	0.31	0.40	0.49	0.60	0.68	1.2	1.6	1.9	3.2
0.50	2	1.5	1.5	1.8	2.2	3.0	4.3	5.7	6.8	10
0.80	1.25	4.5	4.5	5.1	6.0	8.3	12	16	19	27
0.90	1.11	7.2	7.6	8.3	9.4	12	18	24	30	41
0.96	1.04	11	13	13	14	16	26	36	46	61
0.98	1.02	14	18	18	18	18	31	45	59	76
0.99	1.01	16	24	23	22	20	36	55	72	91

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.05	0.05	0.05	0.02	0.03	0.11	0.14	0.25
0.02	50	0.08	0.09	0.09	0.05	0.07	0.22	0.29	0.49
0.05	20	0.19	0.21	0.22	0.19	0.25	0.58	0.77	1.2
0.10	10	0.38	0.42	0.47	0.56	0.66	1.3	1.7	2.6
0.20	5	0.85	0.94	1.1	1.7	1.9	2.9	3.8	5.7
0.50	2	3.3	3.7	4.2	8.3	8.8	11	14	19
0.80	1.25	10	12	13	21	25	28	33	45
0.90	1.11	18	19	22	27	37	40	47	62
0.96	1.04	30	32	35	32	50	55	61	62
0.98	1.02	41	42	45	34	57	64	70	93
0.99	1.01	53	53	56	35	64	72	77	103
		July-August-September				October-November-December			
0.01	100	0.01	0.07	0.10	0.22	0.03	0.04	0.05	0.09
0.02	50	0.03	0.12	0.16	0.34	0.05	0.07	0.09	0.15
0.05	20	0.09	0.25	0.33	0.62	0.12	0.16	0.21	0.34
0.10	10	0.22	0.45	0.60	1.0	0.25	0.33	0.44	0.67
0.20	5	0.58	0.89	1.1	1.8	0.58	0.77	1.00	1.4
0.50	2	2.4	2.8	3.4	4.6	2.5	3.2	4.1	5.3
0.80	1.25	6.4	6.9	8.0	10	9.1	11	13	17
0.90	1.11	9.1	10	12	15	16	19	22	28
0.96	1.04	12	15	17	21	30	32	37	47
0.98	1.02	14	19	21	26	42	44	49	63
0.99	1.01	15	22	24	31	57	58	63	81

IOWA RIVER BASIN
05452000 SALT CREEK NEAR ELBERON, IA

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

DRAINAGE AREA.--201 mi².

PERIOD OF RECORD.--October 1945 to September 1988.

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

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.

Rating table number 16, developed March 1986

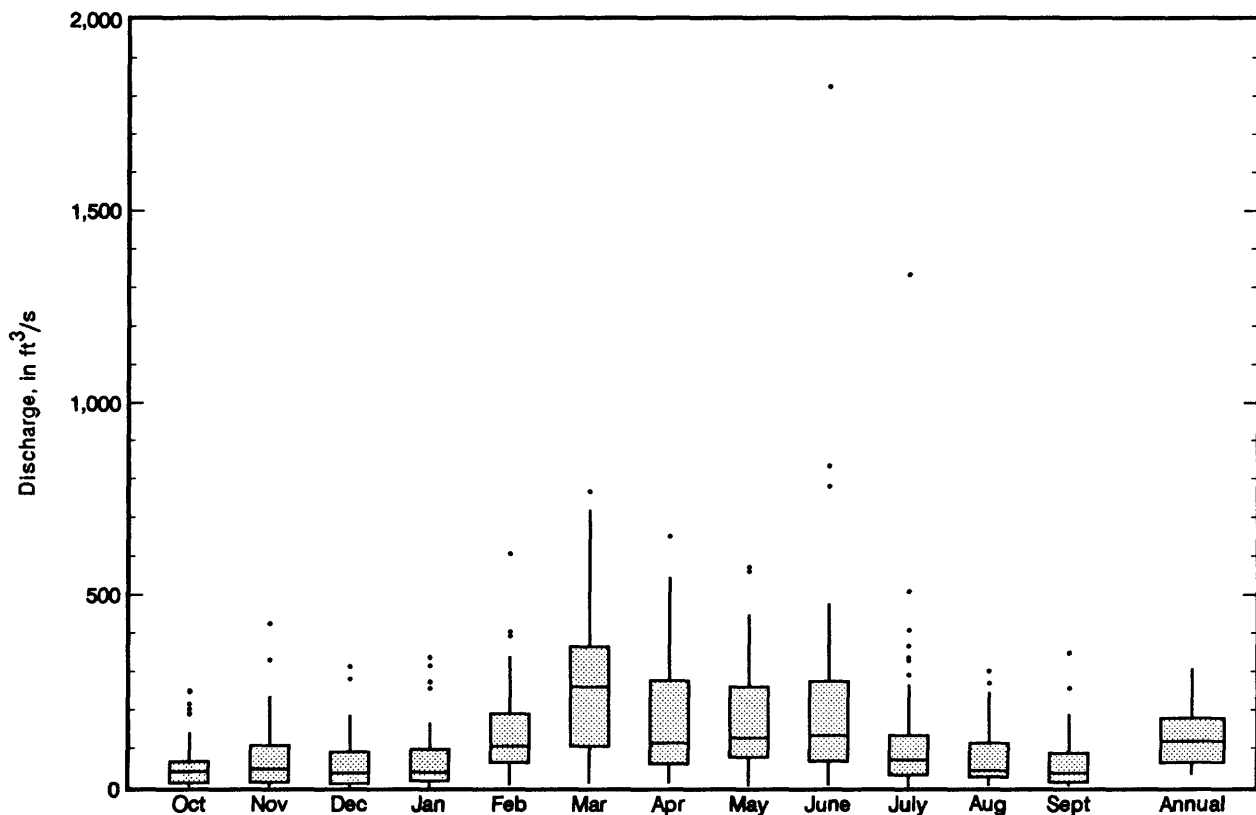
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
5.5	20	10.0	611
6.0	49	12.0	1,120
6.5	85	14.0	1,900
7.0	129	16.0	4,770
8.0	250	18.0	13,900
9.0	415	20.0	33,200

IOWA RIVER BASIN
05452000 SALT CREEK NEAR ELBERON, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	250	1978	4.85	1951	65.0	69.5	4.1
November	425	1983	4.08	1951	79.6	90.9	5.0
December	314	1983	2.29	1977	63.6	70.6	4.0
January	337	1973	1.14	1977	76.1	85.0	4.8
February	607	1982	7.02	1977	146	131	9.2
March	767	1979	11.7	1954	272	211	17.1
April	652	1983	12.2	1977	185	164	11.6
May	573	1982	5.75	1977	183	148	11.5
June	1,826	1947	7.79	1977	232	310	14.6
July	1,334	1969	4.05	1977	143	222	9.0
August	303	1987	5.65	1949	83.4	84.9	5.2
September	349	1965	5.43	1950	63.4	71.8	4.0
Annual	307	1982	33.6	1967	133	78.9	100.0

Boxplots of monthly and annual mean discharges



IOWA RIVER BASIN
05452000 SALT CREEK NEAR ELBERON, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	1.2	2.8	7.5	7.5	5.5	3.9	3.2	4.5	3.5	4.4	3.8	2.2	3.2
95	3.2	5.0	13	17	19	13	9.0	6.9	5.3	6.2	6.4	4.1	6.1
90	4.4	8.4	19	29	28	20	13	9.0	6.8	7.8	7.8	5.5	8.9
85	6.2	12	30	38	36	26	15	12	8.9	9.5	9.5	7.2	13
80	7.7	16	39	46	44	33	19	14	11	11	12	8.9	17
75	10	20	50	56	51	42	24	17	14	14	15	12	21
70	14	25	58	65	59	53	29	20	18	17	20	16	26
65	20	30	66	75	68	66	33	22	18	20	25	20	32
60	25	37	75	85	77	76	39	25	21	26	30	24	38
55	30	42	84	97	87	86	46	27	23	31	35	29	45
50	35	47	101	110	102	101	54	31	26	35	42	33	53
45	41	56	120	125	117	116	62	34	32	42	49	38	62
40	47	66	146	141	135	134	73	39	38	47	56	46	73
35	55	77	171	158	154	154	85	46	44	54	64	55	84
30	64	88	198	184	185	177	102	55	50	62	79	67	103
25	74	108	232	213	220	203	122	64	59	73	99	83	124
20	84	140	272	251	253	242	147	77	70	87	122	100	153
15	108	190	364	297	296	296	182	97	83	116	150	118	195
10	145	297	548	369	378	419	249	139	113	150	187	149	262
5	218	570	1,290	563	559	762	424	257	205	219	253	198	441

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	702	270	158	115	76
0.95	1.05	1,180	511	302	201	131
0.90	1.11	1,570	699	413	266	173
0.80	1.25	2,230	996	589	369	240
0.50	2	4,410	1,820	1,070	660	433
0.20	5	8,910	3,040	1,750	1,110	749
0.10	10	13,000	3,840	2,180	1,430	980
0.04	25	19,500	4,800	2,680	1,840	1,290
0.02	50	25,400	5,480	3,020	2,150	1,530
0.01	100	32,400	6,120	3,340	2,450	1,770

IOWA RIVER BASIN
05452000 SALT CREEK NEAR ELBERON, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.82	0.87	0.90	0.95	1.1	1.4	1.8	2.2	2.7
0.02	50	1.1	1.2	1.2	1.3	1.6	2.0	2.5	3.0	3.9
0.05	20	1.7	1.8	1.9	2.1	2.5	3.3	4.1	4.8	6.6
0.10	10	2.5	2.7	2.9	3.2	3.8	5.0	6.2	7.2	10
0.20	5	4.0	4.2	4.5	5.1	6.1	8.1	10	12	17
0.50	2	8.9	9.4	10	12	14	19	24	28	41
0.80	1.25	19	20	21	24	30	42	55	65	90
0.90	1.11	27	29	31	34	44	62	82	99	130
0.96	1.04	40	42	44	49	63	91	125	153	187
0.98	1.02	50	53	55	60	79	116	161	200	233
0.99	1.01	62	65	67	72	97	143	202	254	280

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.73	0.76	0.81	0.98	2.7	3.1	3.6	5.1
0.02	50	1.1	1.2	1.3	1.6	3.8	4.4	5.1	7.3
0.05	20	2.0	2.1	2.4	3.1	6.2	7.2	8.4	12
0.10	10	3.3	3.5	4.0	5.5	9.3	11	13	19
0.20	5	5.8	6.4	7.4	10	15	18	21	30
0.50	2	16	18	21	30	36	42	49	69
0.80	1.25	40	46	51	72	78	90	105	139
0.90	1.11	61	71	77	106	113	131	150	193
0.96	1.04	94	110	114	152	165	190	215	263
0.98	1.02	122	143	144	188	207	238	267	317
0.99	1.01	153	180	176	223	253	289	321	370
		July-August-September				October-November-December			
0.01	100	1.7	2.1	2.3	3.1	0.92	1.1	1.3	1.7
0.02	50	2.2	2.6	2.9	3.9	1.3	1.6	1.9	2.4
0.05	20	3.1	3.8	4.2	5.4	2.2	2.7	3.2	4.0
0.10	10	4.3	5.1	5.7	7.3	3.5	4.2	5.0	6.2
0.20	5	6.3	7.4	8.3	10	5.8	7.1	8.3	10
0.50	2	13	15	16	21	15	18	21	26
0.80	1.25	24	28	32	42	37	43	49	60
0.90	1.11	34	39	44	61	57	65	73	91
0.96	1.04	48	55	62	90	90	99	111	139
0.98	1.02	50	69	77	117	119	129	144	180
0.99	1.01	72	84	93	148	152	162	179	226

IOWA RIVER BASIN
05452200 WALNUT CREEK NEAR HARTWICK, IA

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

DRAINAGE AREA.--70.9 mi².

PERIOD OF RECORD.--October 1949 to September 1988.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 7,100 ft³/s July 2, 1983, gage height, 16.65 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.

Rating table number 15, developed October 1987

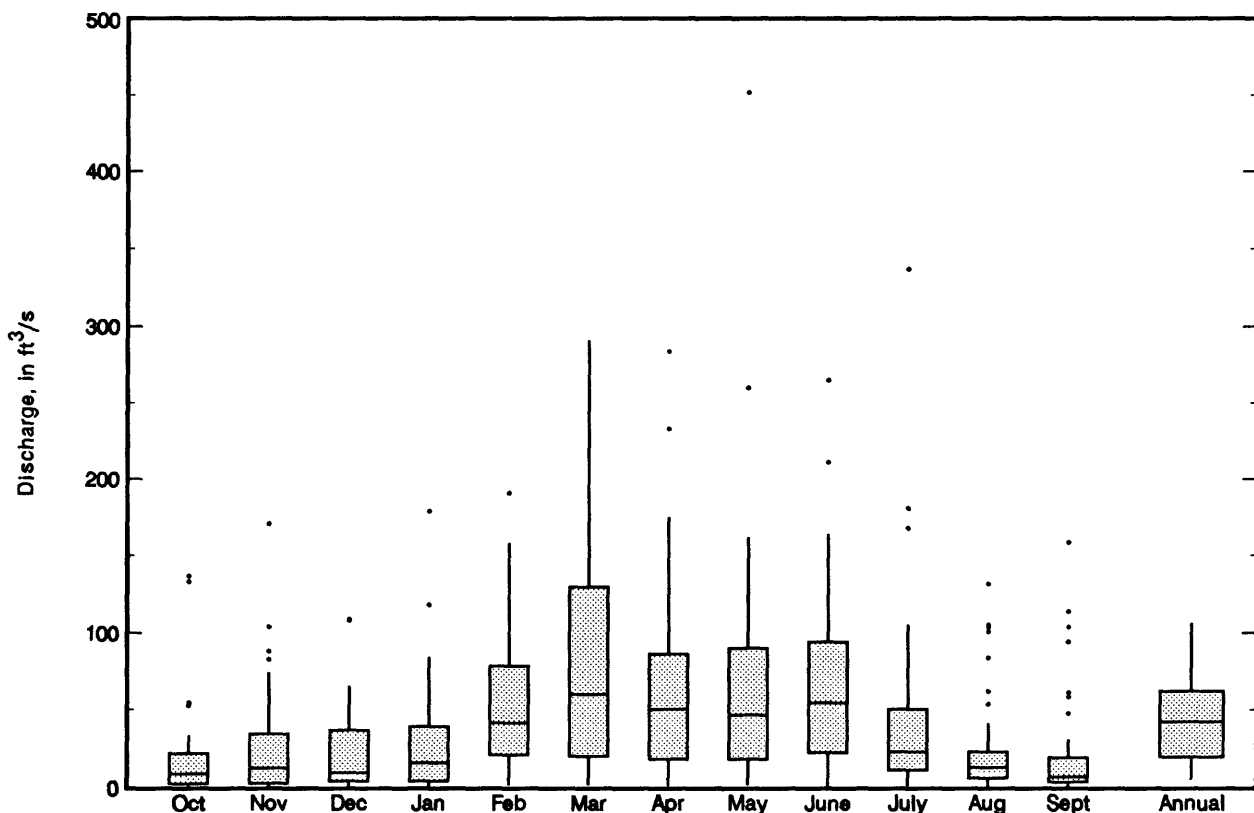
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
3.2	1.9	7.0	395
3.5	18	9.0	705
4.0	58	11.0	1,090
4.5	112	13.0	1,520
5.5	215	15.0	3,400

IOWA RIVER BASIN
05452200 WALNUT CREEK NEAR HARTWICK, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	137	1987	0.000	1957	20.0	31.4	3.7
November	171	1984	0.29	1956	27.3	36.6	5.0
December	109	1983	0.060	1977	22.6	27.3	4.2
January	179	1960	0.010	1956	27.3	36.1	5.0
February	191	1971	1.40	1954	53.8	46.8	9.9
March	291	1979	1.64	1954	82.9	72.7	15.3
April	284	1973	1.03	1957	71.1	66.7	13.1
May	452	1974	1.62	1977	72.7	85.2	13.4
June	265	1969	0.76	1956	68.4	60.7	12.6
July	337	1983	1.01	1954	45.0	63.0	8.3
August	132	1974	0.38	1955	26.8	33.7	5.0
September	159	1958	0.28	1953	23.3	36.4	4.3
Annual	106	1983	4.76	1956	45.0	27.9	100.0

Boxplots of monthly and annual mean discharges



IOWA RIVER BASIN
05452200 WALNUT CREEK NEAR HARTWICK, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.00	0.01	0.43	0.01	0.31	0.01	0.10	0.07	0.00	0.00	0.11	0.01	0.01
95	0.05	0.34	2.4	1.0	1.6	1.8	0.53	0.44	0.20	0.21	0.29	0.12	0.30
90	0.13	1.2	4.5	4.7	4.1	3.8	2.0	0.88	0.66	0.42	0.62	0.30	0.97
85	0.59	2.3	6.6	8.0	6.3	6.2	3.4	1.7	1.2	0.90	1.4	0.59	2.0
80	1.5	3.8	8.9	12	10	9.4	4.9	2.4	1.6	1.3	2.0	1.6	3.0
75	2.4	5.5	12	16	14	12	6.6	3.1	1.9	1.7	2.4	2.5	4.2
70	3.3	7.6	15	20	19	16	8.2	3.8	2.6	2.4	2.8	3.4	5.8
65	4.2	9.8	19	25	24	19	10	4.7	3.3	3.3	4.2	4.7	7.7
60	5.4	12	23	30	28	23	12	5.6	3.9	4.0	6.1	6.4	10
55	8.1	16	28	36	33	27	15	6.6	4.8	5.4	7.5	7.7	13
50	11	19	33	43	39	32	18	8.0	5.8	6.8	9.0	9.5	16
45	13	22	39	50	45	38	21	9.4	7.4	8.2	12	13	19
40	17	26	46	57	51	44	24	11	9.0	9.9	16	17	24
35	22	30	54	65	58	51	27	13	11	12	19	21	30
30	25	36	64	73	70	59	33	16	14	15	26	26	36
25	30	43	75	81	82	70	38	19	16	18	35	33	45
20	35	53	91	96	99	81	46	24	19	24	44	40	55
15	42	75	122	116	117	100	55	31	26	35	57	48	71
10	55	118	172	156	153	123	77	40	38	53	73	56	97
5	84	226	326	241	228	203	146	74	93	96	102	77	162

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	378	92	63	42	27
0.95	1.05	708	174	110	74	47
0.90	1.11	966	239	146	97	62
0.80	1.25	1,380	342	203	133	86
0.50	2	2,560	634	364	232	154
0.20	5	4,390	1,080	620	381	259
0.10	10	5,650	1,370	803	483	332
0.04	25	7,230	1,740	1,040	610	427
0.02	50	8,380	2,000	1,220	703	497
0.01	100	9,500	2,250	1,410	794	567

IOWA RIVER BASIN
05452200 WALNUT CREEK NEAR HARTWICK, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.07	0.21
0.02	50	0.00	0.00	0.00	0.00	0.00	0.02	0.08	0.13	0.37
0.05	20	0.00	0.00	0.00	0.00	0.00	0.07	0.22	0.34	0.81
0.10	10	0.00	0.00	0.00	0.00	0.09	0.21	0.49	0.71	1.5
0.20	5	0.15	0.17	0.22	0.30	0.47	0.68	1.2	1.7	3.2
0.50	2	1.4	1.5	1.7	1.9	2.5	4.1	5.3	6.8	11
0.80	1.25	5.1	5.3	5.9	6.5	8.2	14	17	21	32
0.90	1.11	8.5	8.9	9.9	11	14	21	28	36	51
0.96	1.04	14	14	15	17	22	29	44	57	79
0.98	1.02	18	18	20	22	29	34	57	75	102
0.99	1.01	22	23	24	28	37	38	70	94	127

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.03	0.02	0.03	0.11	0.11	0.18	0.10	0.14
0.02	50	0.06	0.05	0.06	0.23	0.24	0.37	0.24	0.31
0.05	20	0.18	0.15	0.18	0.60	0.65	0.97	0.77	0.95
0.10	10	0.42	0.37	0.45	1.3	1.5	2.1	1.9	2.3
0.20	5	1.1	0.99	1.2	3.0	3.4	4.6	4.8	5.7
0.50	2	4.8	4.9	5.9	11	12	15	19	23
0.80	1.25	16	18	20	27	28	35	44	61
0.90	1.11	26	31	33	39	39	46	58	86
0.96	1.04	41	51	51	53	49	58	70	113
0.98	1.02	52	68	65	62	55	64	77	129
0.99	1.01	64	86	78	70	60	69	81	142
		July-August-September				October-November-December			
0.01	100	0.03	0.02	0.05	0.06	0.01	0.00	0.01	0.04
0.02	50	0.06	0.05	0.09	0.14	0.02	0.01	0.03	0.08
0.05	20	0.15	0.13	0.21	0.33	0.08	0.05	0.10	0.23
0.10	10	0.32	0.30	0.43	0.66	0.19	0.16	0.27	0.53
0.20	5	0.73	0.73	0.93	1.4	0.53	0.52	0.76	1.3
0.50	2	2.7	2.9	3.3	4.8	2.8	3.3	4.1	5.9
0.80	1.25	7.2	8.4	9.1	12	11	12	15	19
0.90	1.11	11	13	14	18	19	21	24	32
0.96	1.04	15	18	21	26	31	32	38	51
0.98	1.02	18	22	26	32	42	39	49	67
0.99	1.01	21	26	31	37	52	47	59	82

IOWA RIVER BASIN
05452500 IOWA RIVER NEAR BELLE PLAINE, IA

LOCATIONS.--Lat 41°51'30", long 92°16'50", in SW1/4 NW1/4 sec. 5, T.81 N., R.12 W., Iowa County, Hydrologic Unit 07080208 on right bank 5 ft downstream from bridge on State Highway 212, 1.0 mi downstream from Salt Creek, 1.1 mi downstream from Walnut Creek and 2.7 mi south of Belle Plaine.

DRAINAGE AREA.--2,455 mi².

PERIOD OF RECORD.--September 1939 to September 1959 (discontinued).

GAGE.--Water-stage recorder. Datum of gage is 749.82 NGVD. Prior to Mar. 13, 1940, wire-weight at same site and datum.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 34,000 ft³/s June 14, 1947, gage height, 17.07 ft; minimum daily discharge, 19 ft³/s Jan. 6, 1940.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum discharge since at least 1902, 43,000 ft³/s June 5, 1918, gage height, 17.86 ft, from information by U.S. Army Corps of Engineers.

Rating table number 1, developed October 1956
(A discharge measurement to validate this rating
has not been made since September 1959.)

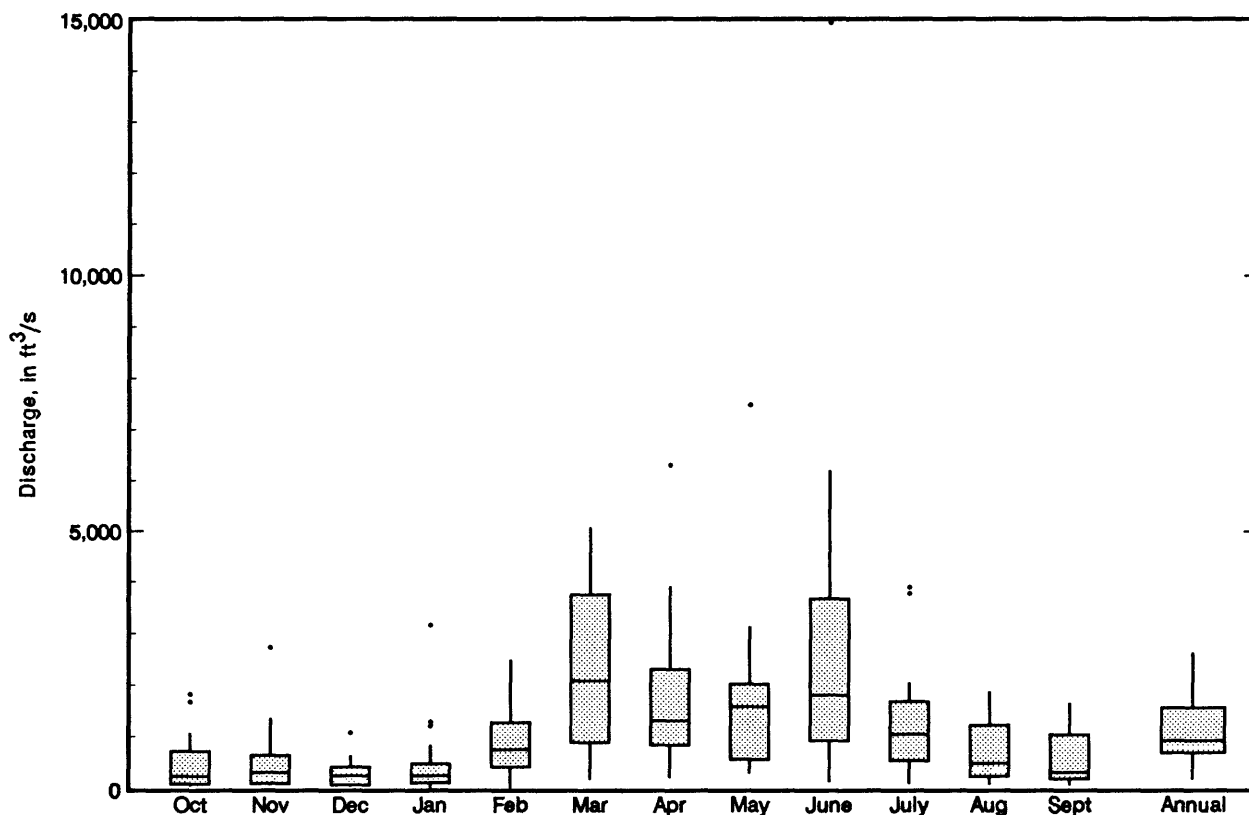
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
4.5	72	10.0	2,470
4.7	120	11.0	3,290
5.0	192	12.0	4,400
5.5	327	13.0	5,900
6.0	486	14.0	8,350
7.0	850	15.0	14,100
8.0	1,290	16.0	23,000
9.0	1,820		

IOWA RIVER BASIN
05452500 IOWA RIVER NEAR BELLE PLAINE, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	1,837	1955	71.8	1940	488	545	3.5
November	2,742	1942	82.8	1956	513	629	3.7
December	1,081	1942	51.2	1956	313	257	2.3
January	3,170	1946	27.1	1940	514	721	3.7
February	2,497	1943	33.6	1940	885	642	6.4
March	5,075	1959	193	1954	2,308	1,592	16.6
April	6,320	1951	229	1957	1,752	1,518	12.6
May	7,495	1944	311	1940	1,711	1,609	12.3
June	14,950	1947	138	1956	2,838	3,286	20.4
July	3,901	1947	104	1940	1,291	1,040	9.3
August	1,884	1943	99.5	1949	699	557	5.0
September	1,654	1942	83.7	1955	576	490	4.1
Annual	2,634	1947	195	1956	1,156	651	100.0

Boxplots of monthly and annual mean discharges



IOWA RIVER BASIN
05452500 IOWA RIVER NEAR BELLE PLAINE, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equalled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	25	26	105	145	188	87	53	75	61	59	64	46	40
95	38	37	193	209	242	153	97	96	77	67	76	63	73
90	49	50	266	305	301	236	186	117	90	76	82	76	90
85	57	93	364	430	355	364	255	140	102	82	88	81	121
80	71	122	497	556	415	478	337	168	117	89	98	87	160
75	86	142	642	693	493	644	413	205	143	104	112	97	203
70	127	194	822	781	601	875	490	245	177	120	130	117	249
65	168	228	995	882	781	1,020	573	284	203	135	155	146	305
60	192	255	1,170	1,010	1,020	1,210	664	323	232	158	192	171	369
55	209	286	1,370	1,120	1,160	1,460	760	370	269	187	240	197	435
50	234	340	1,590	1,210	1,260	1,720	867	422	328	247	286	223	521
45	281	421	1,820	1,300	1,390	1,950	1,040	478	410	317	344	258	637
40	322	653	2,050	1,460	1,530	2,190	1,180	536	484	366	386	301	779
35	369	924	2,360	1,630	1,690	2,460	1,310	624	555	406	427	356	956
30	423	1,130	2,690	1,880	1,880	2,840	1,470	717	632	465	523	405	1,150
25	508	1,330	3,030	2,180	2,080	3,390	1,670	815	729	574	645	453	1,380
20	592	1,500	3,460	2,730	2,350	4,030	1,930	949	855	763	772	501	1,680
15	679	1,810	4,000	3,130	2,660	4,840	2,210	1,100	1,080	1,020	929	564	2,080
10	976	2,340	5,000	3,870	3,450	6,620	2,540	1,480	1,290	1,380	1,150	701	2,750
5	1,730	3,070	7,910	5,650	4,630	9,560	4,000	2,390	1,770	1,830	1,600	921	4,240

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	1,640	872	566	411	328
0.95	1.05	2,950	1,810	1,310	939	741
0.90	1.11	3,980	2,600	1,960	1,400	1,100
0.80	1.25	5,640	3,920	3,070	2,190	1,710
0.50	2	10,600	7,950	6,390	4,610	3,570
0.20	5	18,900	14,600	11,500	8,490	6,540
0.10	10	25,100	19,400	14,800	11,100	8,550
0.04	25	33,600	25,500	18,700	14,300	11,000
0.02	50	40,200	30,000	21,300	16,500	12,700
0.01	100	47,000	34,400	23,600	18,600	14,300

IOWA RIVER BASIN
05452500 IOWA RIVER NEAR BELLE PLAINE, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	23	23	23	24	28	29	29	31	41
0.02	50	27	28	27	29	33	35	37	40	53
0.05	20	35	36	36	38	43	49	53	58	77
0.10	10	45	45	45	48	55	64	73	80	107
0.20	5	59	59	61	64	74	90	106	119	158
0.50	2	103	104	109	117	135	171	212	245	324
0.80	1.25	184	188	201	219	252	324	414	490	646
0.90	1.11	251	258	281	308	354	452	581	693	916
0.96	1.04	352	365	404	447	513	645	829	996	1,320
0.98	1.02	440	459	514	573	655	811	1,040	1,250	1,660
0.99	1.01	539	565	640	718	818	997	1,270	1,530	2,040

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	12	13	14	15	39	46	53	68
0.02	50	17	18	19	21	54	63	72	92
0.05	20	27	28	29	34	85	99	111	143
0.10	10	39	40	42	51	125	145	163	210
0.20	5	61	63	66	84	197	226	256	330
0.50	2	132	144	153	216	448	508	580	758
0.80	1.25	259	314	343	558	961	1,070	1,250	1,670
0.90	1.11	354	465	516	915	1,400	1,550	1,820	2,480
0.96	1.04	483	697	791	1,550	2,050	2,250	2,680	3,730
0.98	1.02	581	900	1,040	2,170	2,600	2,830	3,420	4,830
0.99	1.01	680	1,130	1,320	2,940	3,210	3,460	4,230	6,060
		July-August-September				October-November-December			
0.01	100	22	25	29	37	28	30	31	31
0.02	50	28	31	36	45	33	35	36	37
0.05	20	40	43	50	61	42	44	46	49
0.10	10	55	59	67	82	54	56	59	64
0.20	5	81	86	97	118	72	75	80	90
0.50	2	170	182	203	251	130	142	152	181
0.80	1.25	361	396	442	578	244	290	315	389
0.90	1.11	538	601	674	922	346	437	477	599
0.96	1.04	825	946	1,070	1,550	507	696	764	968
0.98	1.02	1,090	1,270	1,460	2,210	654	953	1,050	1,340
0.99	1.01	1,400	1,670	1,930	3,050	826	1,280	1,410	1,800

IOWA RIVER BASIN
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 September 1988. Prior to October 1966, published as Bear Creek at Ladora.

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

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.

Rating table number 16, developed October 1987

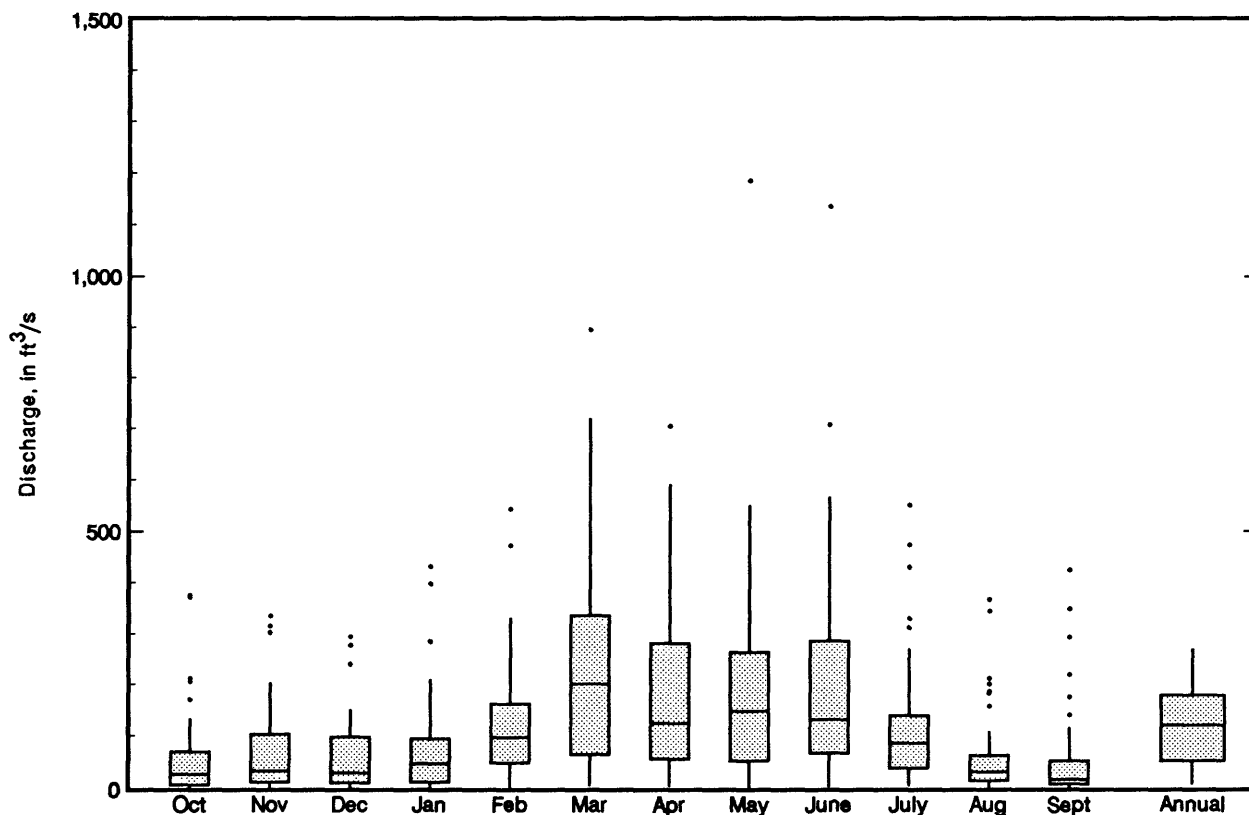
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
10.5	10	16.0	1,250
11.0	38	18.0	2,050
11.5	88	20.0	3,000
12.0	160	22.0	4,100
13.0	345	24.0	6,000
14.0	590		

IOWA RIVER BASIN
05453000 BIG BEAR CREEK AT LADORA, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	375	1987	0.49	1957	60.3	88.2	4.1
November	335	1984	1.68	1956	74.6	89.6	5.0
December	294	1983	0.33	1956	63.3	72.3	4.3
January	432	1960	0.020	1977	78.7	102	5.3
February	543	1971	2.07	1977	125	116	8.4
March	895	1979	5.99	1957	237	200	15.9
April	704	1973	4.17	1956	191	172	12.9
May	1,185	1974	2.25	1956	194	210	13.1
June	1,136	1947	2.94	1956	204	216	13.7
July	551	1978	5.00	1988	120	128	8.1
August	368	1986	2.36	1955	65.6	85.7	4.4
September	425	1986	1.34	1956	72.1	114	4.9
Annual	270	1974	8.26	1956	124	74.8	100.0

Boxplots of monthly and annual mean discharges



IOWA RIVER BASIN
05453000 BIG BEAR CREEK AT LADORA, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.01	0.02	4.7	2.4	1.5	0.51	2.4	1.8	0.43	0.43	1.4	0.25	0.39
95	0.49	1.7	9.1	7.4	6.9	7.9	4.8	3.0	2.6	2.5	2.7	0.69	2.5
90	1.3	3.4	15	19	17	15	9.3	5.1	3.6	3.6	4.3	1.4	4.8
85	2.3	7.2	22	30	23	22	15	7.2	4.5	4.5	5.8	3.9	7.3
80	4.7	11	31	40	31	28	19	9.1	5.5	5.6	7.4	6.3	11
75	8.2	15	40	48	39	35	24	11	6.5	6.6	9.3	9.0	14
70	12	22	52	56	49	43	29	13	7.8	8.0	11	12	19
65	14	28	64	68	61	53	33	15	9.6	9.8	15	15	24
60	17	34	76	80	75	64	39	18	11	12	19	20	30
55	25	40	89	96	91	77	45	20	14	15	24	25	36
50	33	47	105	114	110	92	52	23	16	21	29	31	46
45	41	54	121	133	129	109	60	26	20	27	35	37	55
40	49	64	140	153	150	127	71	30	23	31	45	49	68
35	58	76	163	173	172	152	81	34	28	36	58	61	81
30	67	90	186	195	196	180	96	40	35	47	74	73	101
25	76	110	226	232	229	217	114	49	45	61	96	85	124
20	86	131	270	268	262	257	133	59	56	80	129	106	157
15	110	177	355	326	306	312	169	78	75	109	160	126	198
10	144	259	520	415	406	420	234	111	117	156	190	159	270
5	251	547	972	625	633	673	414	180	284	281	274	210	440

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	—	210	107	72	48
0.95	1.05	1,900	429	232	151	101
0.90	1.11	2,330	604	336	217	143
0.80	1.25	2,950	885	506	323	213
0.50	2	4,410	1,660	989	623	412
0.20	5	6,270	2,770	1,680	1,050	707
0.10	10	7,380	3,450	2,110	1,320	897
0.04	25	8,670	4,230	2,600	1,630	1,120
0.02	50	9,540	4,750	2,910	1,830	1,270
0.01	100	10,300	5,210	3,190	2,010	1,410

IOWA RIVER BASIN
05453000 BIG BEAR CREEK AT LADORA, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.08	0.24	0.53	1.2
0.02	50	0.00	0.00	0.00	0.00	0.00	0.18	0.45	0.88	1.8
0.05	20	0.03	0.03	0.03	0.05	0.22	0.53	1.1	1.8	3.4
0.10	10	0.50	0.51	0.56	0.68	0.72	1.3	2.3	3.3	5.8
0.20	5	1.3	1.4	1.5	1.8	2.1	3.3	5.0	6.6	11
0.50	2	5.3	5.6	6.3	7.1	9.5	14	18	21	31
0.80	1.25	15	16	17	19	26	37	48	59	84
0.90	1.11	23	24	26	29	38	55	73	93	136
0.96	1.04	34	37	38	43	52	75	105	145	219
0.98	1.02	44	46	47	53	61	87	129	189	293
0.99	1.01	53	56	56	64	68	97	151	235	378

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.21	0.24	0.27	0.11	0.26	0.41	0.63	1.0
0.02	50	0.37	0.42	0.48	0.28	0.58	0.86	1.3	2.0
0.05	20	0.84	0.93	1.1	0.96	1.7	2.3	3.2	4.8
0.10	10	1.7	1.8	2.1	2.5	4.1	5.2	6.7	9.8
0.20	5	3.6	3.9	4.6	7.0	9.9	12	15	21
0.50	2	14	14	17	30	36	42	50	69
0.80	1.25	42	45	50	75	84	98	115	158
0.90	1.11	71	75	81	102	112	133	157	218
0.96	1.04	116	125	128	126	138	169	201	283
0.98	1.02	155	169	168	138	152	189	228	323
0.99	1.01	198	218	210	147	162	205	249	356
		July-August-September				October-November-December			
0.01	100	0.17	0.20	0.37	1.0	0.06	0.06	0.10	0.19
0.02	50	0.31	0.36	0.59	1.4	0.12	0.13	0.20	0.36
0.05	20	0.71	0.83	1.2	2.3	0.32	0.38	0.53	0.90
0.10	10	1.4	1.6	2.1	3.5	0.75	0.91	1.2	1.9
0.20	5	2.9	3.3	3.9	5.8	1.9	2.3	3.0	4.5
0.50	2	8.9	10	11	14	9.0	11	13	18
0.80	1.25	20	23	26	35	31	36	43	56
0.90	1.11	28	32	37	54	52	60	72	93
0.96	1.04	37	42	53	86	85	95	116	148
0.98	1.02	43	48	65	115	112	122	151	193
0.99	1.01	48	53	76	149	139	149	188	239

IOWA RIVER BASIN
05453100 IOWA RIVER AT MARENGO, IA

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

DRAINAGE AREA.--2,794 mi².

PERIOD OF RECORD.--October 1956 to September 1988.

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

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.

Rating table number 22, developed October 1987

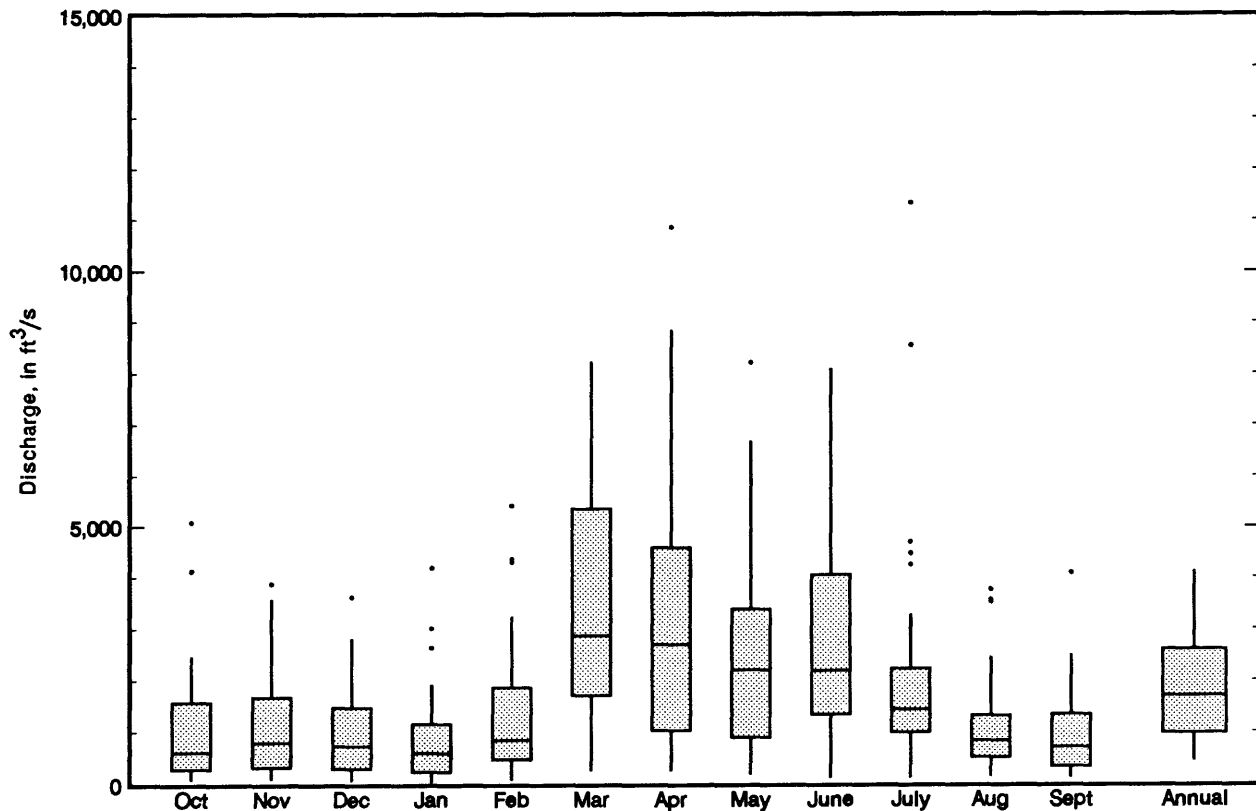
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
5.0	144	10.0	2,800
5.5	267	13.0	5,000
6.0	470	16.0	9,800
7.0	980	18.0	16,800
8.0	1,530	20.0	30,500

IOWA RIVER BASIN
05453100 IOWA RIVER AT MARENGO, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	5,078	1987	80.8	1957	1,082	1,148	4.9
November	3,878	1973	90.0	1957	1,167	1,058	5.3
December	3,633	1983	64.5	1977	953	838	4.4
January	4,194	1973	31.3	1977	874	942	4.0
February	5,424	1984	79.0	1977	1,407	1,346	6.4
March	8,227	1979	256	1964	3,263	2,230	14.9
April	10,850	1965	259	1977	3,269	2,720	14.9
May	8,220	1974	179	1977	2,705	2,153	12.4
June	8,096	1964	114	1977	2,824	2,092	12.9
July	11,340	1969	116	1977	2,215	2,359	10.1
August	3,768	1972	143	1988	1,151	979	5.3
September	4,098	1965	123	1988	966	882	4.5
Annual	4,120	1983	449	1977	1,825	1,023	100.0

Boxplots of monthly and annual mean discharges



IOWA RIVER BASIN
05453100 IOWA RIVER AT MARENGO, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equalled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	28	42	182	214	154	103	83	105	101	69	81	56	73
95	76	138	248	303	284	263	191	203	145	126	130	82	149
90	121	161	327	528	425	453	433	263	203	165	182	144	209
85	161	188	399	700	550	635	530	310	243	190	243	193	272
80	191	221	539	840	718	641	617	352	273	220	274	241	338
75	226	282	752	1,090	914	1,020	708	394	304	276	312	284	415
70	263	353	1,050	1,290	1,060	1,170	811	436	346	350	387	331	501
65	299	410	1,250	1,510	1,260	1,300	920	480	397	414	466	381	598
60	341	465	1,580	1,710	1,480	1,460	1,040	529	461	486	538	444	705
55	398	534	1,820	1,900	1,680	1,640	1,160	586	532	572	636	527	836
50	494	653	2,080	2,170	1,870	1,930	1,280	659	599	639	768	640	988
45	591	780	2,380	2,530	2,070	2,230	1,440	742	663	711	918	790	1,150
40	680	894	2,770	2,810	2,320	2,550	1,620	837	742	820	1,050	967	1,310
35	773	1,000	3,290	3,170	2,640	2,910	1,840	965	843	976	1,250	1,130	1,550
30	871	1,120	3,860	3,670	3,070	3,370	2,070	1,100	948	1,150	1,490	1,250	1,820
25	1,050	1,300	4,590	4,250	3,610	3,860	2,320	1,260	1,050	1,370	1,700	1,380	2,150
20	1,220	1,670	5,470	4,990	4,190	4,380	2,650	1,450	1,210	1,680	1,880	1,530	2,610
15	1,470	2,460	6,510	6,010	4,880	5,170	3,360	1,690	1,490	1,970	2,140	1,750	3,390
10	2,060	4,160	7,950	7,440	6,000	6,470	4,570	2,260	2,080	2,450	2,590	2,080	4,570
5	2,940	6,470	10,400	10,500	8,460	8,510	8,170	4,380	3,340	3,630	3,620	2,680	6,770

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	3,000	2,120	1,720	1,180	954
0.95	1.05	4,840	3,640	2,940	2,120	1,660
0.90	1.11	6,140	4,760	3,850	2,830	2,190
0.80	1.25	8,080	6,430	5,230	3,930	3,000
0.50	2	13,000	10,800	8,940	6,940	5,210
0.20	5	19,800	16,700	14,400	11,400	8,460
0.10	10	24,200	20,400	18,000	14,300	10,600
0.04	25	29,400	24,700	22,400	17,800	13,300
0.02	50	33,000	27,600	25,600	20,300	15,200
0.01	100	36,500	30,400	28,700	22,700	17,000

IOWA RIVER BASIN
05453100 IOWA RIVER AT MARENGO, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence Interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	25	25	26	27	31	40	51	62	82
0.02	50	34	34	35	37	41	53	68	81	109
0.05	20	53	53	54	57	64	80	102	121	163
0.10	10	76	76	78	83	93	115	145	170	231
0.20	5	113	114	118	125	142	174	218	256	346
0.50	2	227	230	238	255	297	367	460	538	712
0.80	1.25	410	416	437	470	567	730	921	1,080	1,370
0.90	1.11	537	546	578	621	768	1,020	1,300	1,540	1,890
0.96	1.04	698	709	758	814	1,040	1,440	1,840	2,200	2,610
0.98	1.02	815	828	890	956	1,240	1,770	2,280	2,760	3,190
0.99	1.01	928	942	1,020	1,090	1,440	2,130	2,760	3,360	3,790

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	21	22	24	35	68	77	83	88
0.02	50	30	31	34	48	95	107	117	129
0.05	20	50	52	56	77	152	173	191	222
0.10	10	77	80	86	115	226	258	288	347
0.20	5	126	131	139	184	355	407	457	572
0.50	2	295	309	329	432	777	889	1,010	1,320
0.80	1.25	622	651	705	954	1,530	1,740	2,000	2,620
0.90	1.11	881	923	1,010	1,410	2,100	2,370	2,730	3,550
0.96	1.04	1,240	1,300	1,450	2,090	2,870	3,190	3,700	4,720
0.98	1.02	1,520	1,590	1,800	2,680	3,450	3,810	4,420	5,560
0.99	1.01	1,810	1,900	2,160	3,330	4,040	4,430	5,140	6,360
		July-August-September				October-November-December			
0.01	100	63	64	67	81	29	32	34	42
0.02	50	77	79	83	100	40	44	47	58
0.05	20	103	107	114	138	64	69	75	91
0.10	10	132	139	149	181	94	102	112	135
0.20	5	178	190	206	250	148	161	178	214
0.50	2	308	333	367	453	332	361	408	491
0.80	1.25	514	562	630	793	685	755	862	1,050
0.90	1.11	664	726	822	1,050	971	1,080	1,240	1,520
0.96	1.04	864	944	1,080	1,400	1,380	1,550	1,780	2,210
0.98	1.02	1,020	1,110	1,280	1,680	1,710	1,930	2,220	2,790
0.99	1.01	1,180	1,280	1,480	1,970	2,050	2,340	2,690	3,410

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 September 1988.

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

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.

Rating table number 8, developed March 1977

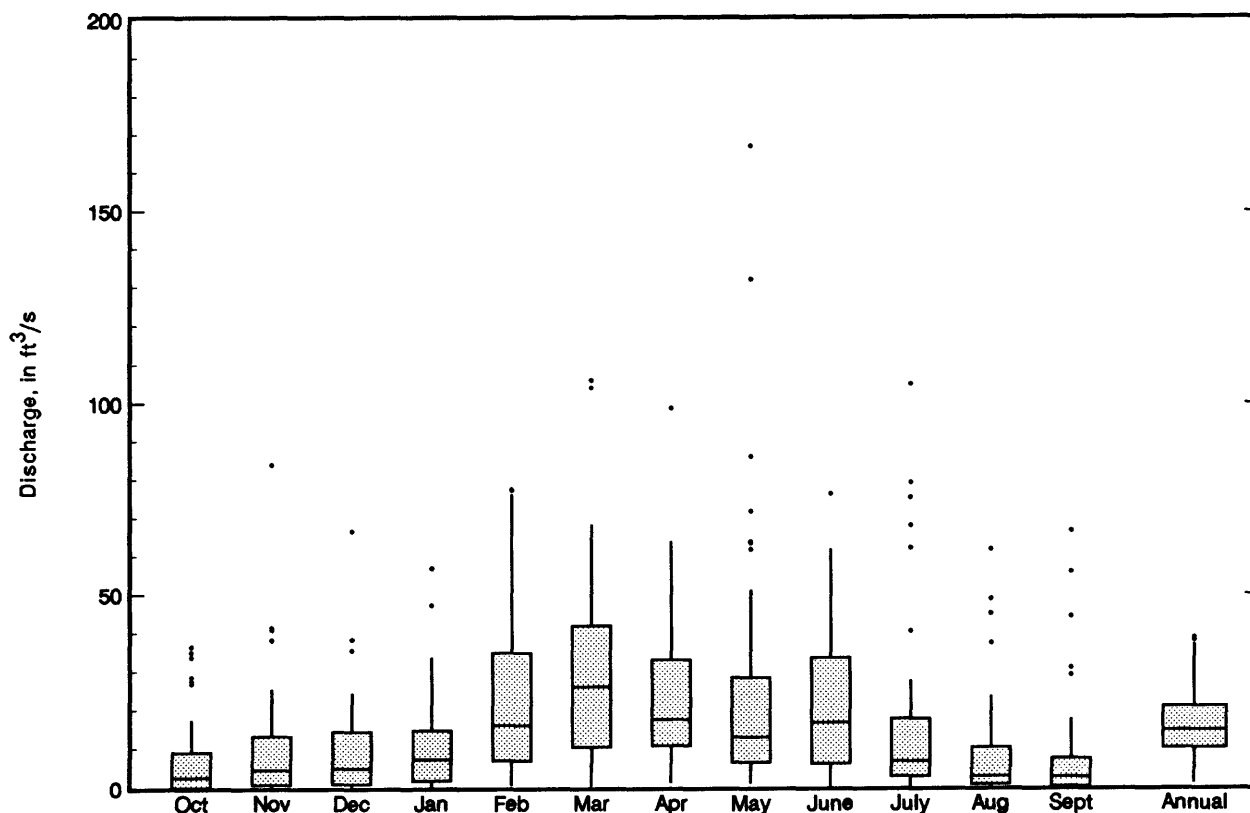
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
3.5	5.1	6.5	288
4.0	21	8.0	530
4.5	51	10.0	1,100
5.0	98	12.0	2,240
5.5	152	14.0	4,200

IOWA RIVER BASIN
05454000 RAPID CREEK NEAR IOWA CITY, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	36.5	1942	0.000	1954	7.09	10.1	3.6
November	83.8	1962	0.000	1956	9.95	14.8	5.1
December	66.6	1983	0.000	1956	9.43	12.2	4.8
January	56.8	1946	0.000	1940	10.6	12.0	5.4
February	77.5	1953	0.53	1967	24.3	22.4	12.4
March	106	1979	0.42	1956	30.2	23.6	15.5
April	98.6	1973	1.25	1956	23.7	18.8	12.2
May	167	1974	1.13	1977	25.7	32.7	13.2
June	76.3	1967	0.21	1956	22.1	19.2	11.3
July	105	1969	0.000	1957	15.6	22.9	8.0
August	61.7	1977	0.030	1955	8.84	13.5	4.5
September	66.6	1965	0.000	1955	7.54	13.9	3.9
Annual	38.6	1986	1.09	1957	16.2	9.31	100.0

Boxplots of monthly and annual mean discharges



IOWA RIVER BASIN
05454000 RAPID CREEK NEAR IOWA CITY, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.00	0.00	0.19	0.12	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95	0.00	0.06	1.0	2.0	0.83	0.24	0.01	0.00	0.00	0.00	0.01	0.01	0.01
90	0.01	0.42	2.2	3.2	2.3	0.81	0.11	0.01	0.01	0.01	0.12	0.11	0.10
85	0.12	0.77	3.5	4.7	3.4	1.4	0.31	0.06	0.01	0.03	0.23	0.18	0.25
80	0.38	1.4	4.7	5.8	4.1	2.0	0.60	0.12	0.03	0.10	0.31	0.27	0.50
75	0.67	2.0	5.6	7.0	4.9	2.7	0.90	0.24	0.07	0.13	0.46	0.47	0.93
70	1.1	2.5	6.5	8.3	5.8	3.5	1.3	0.38	0.11	0.22	0.80	0.75	1.5
65	1.7	3.1	7.6	9.6	6.7	4.5	1.8	0.52	0.17	0.40	1.2	1.1	2.3
60	2.3	3.8	8.8	11	7.9	5.7	2.5	0.78	0.28	0.53	2.0	1.8	3.1
55	2.9	4.6	10	13	9.2	7.0	3.2	1.1	0.46	0.87	2.8	2.6	3.9
50	3.7	5.7	12	15	11	8.5	4.0	1.5	0.68	1.4	3.4	3.5	4.9
45	4.5	6.7	15	17	12	10	4.9	1.9	1.1	2.2	4.1	4.4	6.1
40	5.4	7.9	18	19	14	13	5.8	2.4	1.6	2.8	5.1	5.5	7.4
35	6.3	9.1	21	21	16	15	6.6	3.2	2.2	3.5	6.4	6.8	9.1
30	7.4	11	25	24	19	18	8.0	4.2	3.0	4.5	8.7	8.4	11
25	8.8	14	30	28	23	21	9.5	5.6	3.9	6.1	11	10	14
20	11	19	37	33	28	26	13	7.5	5.1	8.4	15	13	18
15	14	29	48	39	36	35	18	10	6.7	12	18	16	24
10	20	49	67	51	50	47	26	16	12	18	24	22	35
5	35	110	117	74	78	77	51	33	26	30	36	33	57

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	127	24	13	7.4	4.7
0.95	1.05	293	56	34	21	13
0.90	1.11	441	83	52	32	21
0.80	1.25	703	129	81	52	33
0.50	2	1,550	263	159	100	65
0.20	5	3,060	454	250	150	100
0.10	10	4,160	569	294	170	115
0.04	25	5,600	695	334	186	126
0.02	50	6,670	774	355	193	132
0.01	100	7,730	843	370	197	135

IOWA RIVER BASIN
05454000 RAPID CREEK NEAR IOWA CITY, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.05	20	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.08	0.18
0.10	10	0.00	0.00	0.00	0.00	0.00	0.04	0.12	0.21	0.43
0.20	5	0.00	0.00	0.00	0.00	0.01	0.15	0.32	0.53	1.0
0.50	2	0.06	0.07	0.12	0.16	0.32	0.85	1.4	2.1	3.8
0.80	1.25	0.49	0.57	0.72	1.1	1.5	3.1	4.7	6.4	10
0.90	1.11	1.1	1.2	1.5	2.0	2.9	5.5	8.0	11	16
0.96	1.04	2.5	2.7	2.9	3.4	5.4	9.6	13	17	25
0.98	1.02	4.1	4.4	4.5	4.5	8.1	13	18	22	31
0.99	1.01	6.8	6.9	6.7	5.7	12	18	23	28	38

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.04	0.06	0.01	0.01	0.06	0.02	0.14	0.23
0.02	50	0.06	0.10	0.02	0.04	0.10	0.05	0.22	0.37
0.05	20	0.14	0.21	0.07	0.15	0.20	0.16	0.43	0.75
0.10	10	0.27	0.39	0.21	0.41	0.37	0.38	0.75	1.3
0.20	5	0.54	0.75	0.60	1.2	0.75	0.96	1.4	2.5
0.50	2	1.7	2.2	2.6	5.0	2.5	3.7	4.3	7.4
0.80	1.25	4.3	4.9	6.1	11	7.0	9.2	11	18
0.90	1.11	6.5	6.9	7.8	14	11	13	17	27
0.96	1.04	9.4	9.4	9.3	16	18	16	26	38
0.98	1.02	12	11	9.9	17	24	18	34	47
0.99	1.01	14	13	10	17	30	19	42	56
		July-August-September				October-November-December			
0.01	100	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.02
0.02	50	0.02	0.02	0.01	0.02	0.01	0.01	0.02	0.03
0.05	20	0.03	0.04	0.02	0.04	0.03	0.02	0.04	0.08
0.10	10	0.05	0.07	0.04	0.08	0.06	0.06	0.08	0.16
0.20	5	0.10	0.13	0.10	0.18	0.13	0.16	0.20	0.36
0.50	2	0.33	0.45	0.45	0.77	0.65	0.88	1.0	1.6
0.80	1.25	1.1	1.5	1.7	2.8	2.9	3.7	4.2	6.1
0.90	1.11	2.1	2.7	3.1	5.1	6.0	7.1	8.2	12
0.96	1.04	4.3	5.0	5.6	9.4	13	13	16	22
0.98	1.02	6.6	7.3	8.0	14	20	19	24	33
0.99	1.01	9.9	10	11	19	30	26	34	46

IOWA RIVER BASIN
05454300 CLEAR CREEK NEAR CORALVILLE, IA

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

DRAINAGE AREA.--98.1 mi².

PERIOD OF RECORD.--October 1952 to September 1988.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,900 ft³/s June 15, 1982, gage height, 14.61 ft; no flow Jan. 18 to Feb. 4, 1977.

Rating table number 15, developed October 1986

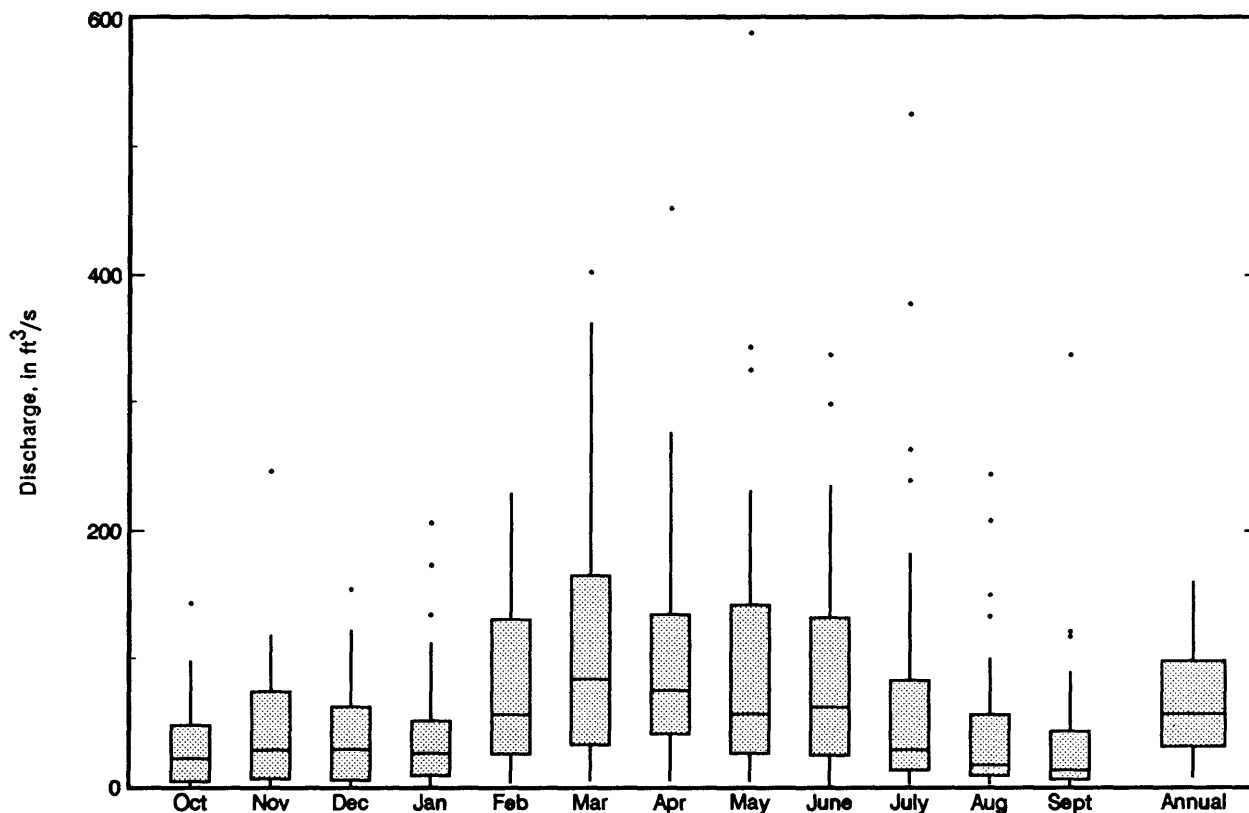
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
1.5	3.9	6.0	488
2.0	26	7.0	665
2.5	58	8.0	861
3.0	99	10.0	1,350
4.0	206	12.0	2,200
5.0	336	14.0	5,800

IOWA RIVER BASIN
05454300 CLEAR CREEK NEAR CORALVILLE, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	143	1987	0.55	1958	30.6	32.2	3.8
November	246	1962	0.95	1956	44.3	49.4	5.5
December	154	1983	0.54	1956	39.9	37.7	5.0
January	206	1960	0.10	1977	42.5	52.5	5.3
February	229	1959	2.79	1954	74.1	61.1	9.2
March	402	1979	4.40	1954	116	101	14.4
April	452	1973	4.15	1956	105	91.7	13.0
May	589	1974	3.79	1956	103	121	12.9
June	337	1962	0.83	1956	89.9	85.8	11.2
July	525	1969	1.69	1954	76.6	114	9.5
August	244	1972	1.94	1953	43.2	58.3	5.4
September	337	1965	0.69	1953	38.4	61.3	4.8
Annual	160	1974	6.57	1957	66.8	43.6	100.0

Boxplots of monthly and annual mean discharges



IOWA RIVER BASIN
05454300 CLEAR CREEK NEAR CORALVILLE, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equalled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.04	0.22	3.3	2.0	0.10	0.58	0.79	0.66	0.43	0.45	0.81	0.31	0.40
95	0.40	1.2	5.7	5.5	3.6	2.7	1.5	1.4	0.74	0.96	1.3	0.59	1.3
90	1.1	3.0	9.6	10	6.7	4.5	2.6	2.3	1.2	1.5	2.3	1.3	2.5
85	2.2	5.1	14	17	14	7.3	4.4	3.2	1.7	2.3	3.5	1.9	3.9
80	3.3	8.0	19	25	18	11	6.7	4.1	2.4	3.1	4.5	3.6	5.4
75	5.1	13	23	30	22	15	8.8	5.0	3.0	3.9	5.5	5.2	7.5
70	7.3	15	28	35	26	18	11	5.8	3.8	4.7	6.6	8.1	11
65	10	18	33	41	30	22	13	6.8	4.7	5.8	8.6	11	14
60	13	21	40	48	34	26	15	8.0	5.7	7.3	12	14	18
55	17	25	48	55	40	31	18	9.6	7.1	9.8	18	18	22
50	21	29	55	63	47	36	22	12	9.0	14	23	25	27
45	24	33	63	71	55	42	26	15	13	18	29	30	32
40	27	38	71	82	65	49	32	17	16	22	34	34	37
35	31	45	86	92	76	61	39	21	19	27	41	40	45
30	35	55	102	104	87	75	46	26	23	32	49	46	54
25	42	69	122	121	96	91	55	32	28	39	58	54	66
20	49	89	144	138	123	112	68	42	34	48	67	63	82
15	64	116	186	171	154	142	94	55	45	60	81	75	103
10	85	169	255	213	197	187	146	79	72	76	98	91	141
5	134	311	434	325	340	308	295	153	140	112	142	125	243

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	257	77	43	26	19
0.95	1.05	472	168	98	63	44
0.90	1.11	646	246	146	96	65
0.80	1.25	936	379	226	151	101
0.50	2	1,840	790	473	318	209
0.20	5	3,500	1,470	863	567	379
0.10	10	4,820	1,950	1,120	723	493
0.04	25	6,710	2,550	1,440	899	629
0.02	50	8,260	2,990	1,660	1,010	723
0.01	100	9,920	3,410	1,860	1,110	810

IOWA RIVER BASIN
05454300 CLEAR CREEK NEAR CORALVILLE, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.05	0.13	0.34	0.43	0.51
0.02	50	0.00	0.00	0.00	0.00	0.11	0.23	0.54	0.68	0.88
0.05	20	0.12	0.15	0.20	0.23	0.29	0.55	1.0	1.3	1.9
0.10	10	0.32	0.37	0.47	0.56	0.65	1.1	1.8	2.3	3.6
0.20	5	0.76	0.84	1.0	1.2	1.5	2.4	3.4	4.4	7.1
0.50	2	2.8	3.0	3.4	4.0	5.7	8.2	10	13	21
0.80	1.25	8.1	8.4	9.2	11	15	21	27	34	50
0.90	1.11	13	13	15	17	21	32	43	53	71
0.96	1.04	20	21	23	26	29	46	68	82	97
0.98	1.02	27	28	30	34	34	56	89	106	116
0.99	1.01	34	35	39	42	38	65	111	132	132

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.12	0.14	0.14	0.05	0.22	0.44	0.65	0.90
0.02	50	0.22	0.26	0.27	0.13	0.42	0.75	1.0	1.5
0.05	20	0.53	0.61	0.66	0.47	0.98	1.6	2.1	3.0
0.10	10	1.1	1.2	1.4	1.3	2.0	2.8	3.6	5.4
0.20	5	2.4	2.7	3.0	3.7	4.2	5.5	6.8	10
0.50	2	8.6	9.5	11	17	14	16	20	30
0.80	1.25	24	25	28	43	35	39	48	74
0.90	1.11	37	39	41	59	50	57	70	110
0.96	1.04	54	56	58	74	69	80	102	158
0.98	1.02	67	69	70	81	81	96	126	195
0.99	1.01	80	82	80	87	93	112	150	231
		July-August-September				October-November-December			
0.01	100	0.11	0.26	0.33	0.44	0.06	0.08	0.08	0.16
0.02	50	0.17	0.36	0.45	0.62	0.11	0.14	0.16	0.28
0.05	20	0.33	0.58	0.72	1.0	0.27	0.33	0.39	0.63
0.10	10	0.58	0.89	1.1	1.6	0.55	0.67	0.83	1.3
0.20	5	1.1	1.5	1.8	2.8	1.2	1.5	1.9	2.7
0.50	2	3.5	4.0	4.7	7.3	5.0	6.1	7.8	11
0.80	1.25	9.6	11	12	18	16	20	25	34
0.90	1.11	16	18	20	29	28	34	43	58
0.96	1.04	25	31	34	48	48	58	70	98
0.98	1.02	34	44	48	65	66	79	93	134
0.99	1.01	43	60	65	85	85	103	118	175

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

DRAINAGE AREA.--3,271 mi².

PERIOD OF RECORD.--June 1903 to September 1988.

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

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.

REMARKS.--Flow regulated by Coralville Lake (station 05453510), 9.1 mi upstream, since Sept. 17, 1958. Data for unregulated period is compiled using data from water years 1903 to 1958. Data for regulated period is compiled using data from water years 1959 to 1988.

Rating table number 11, developed October 1978

Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
8.5	51.0	18.0	6,850
9.0	120	20.0	8,700
9.5	240	22.0	11,200
10.0	430	24.0	15,150
11.0	1,050	26.0	20,700
12.0	1,775	28.0	29,800
14.0	3,300	29.5	40,350
16.0	5,050		

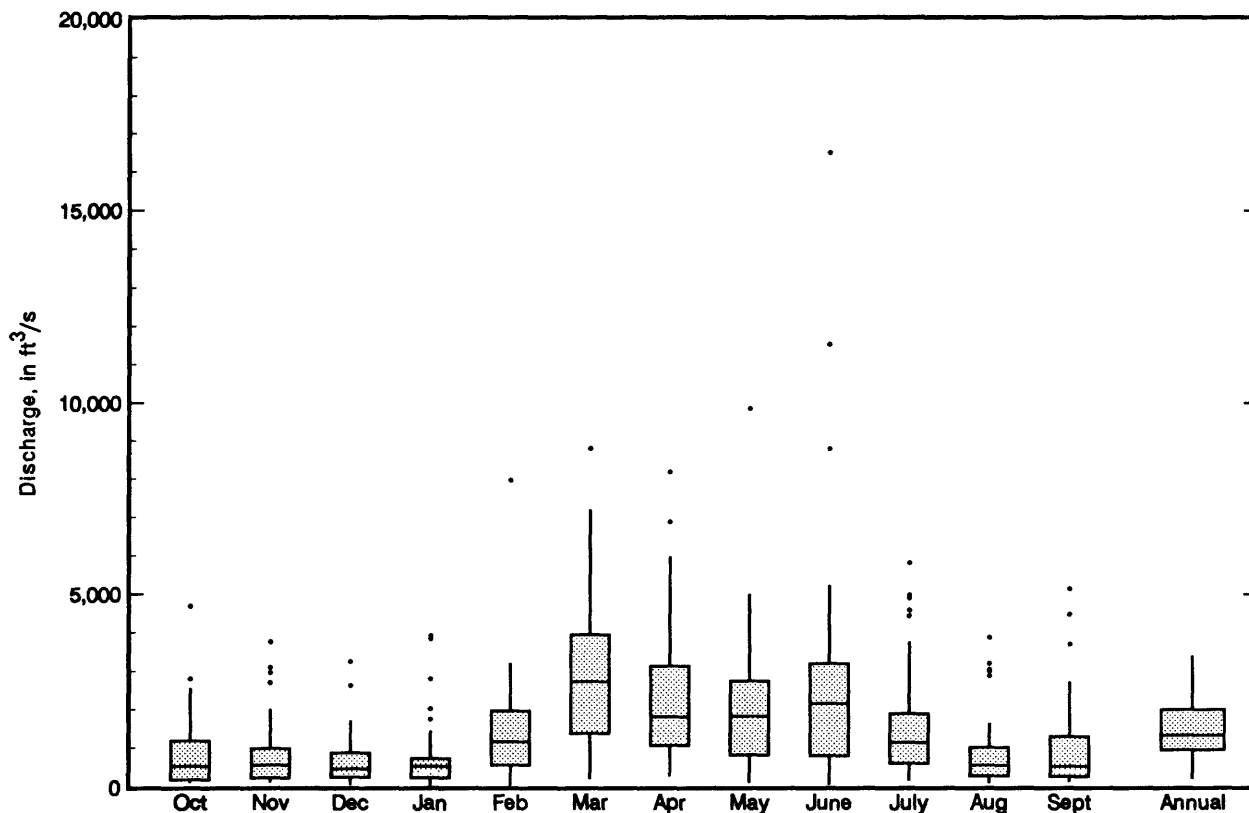
IOWA RIVER BASIN
05454500 IOWA RIVER AT IOWA CITY, IA--Continued

Pre-regulation Period

Statistics of monthly and annual mean discharges, pre-regulation period

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	4,694	1916	116	1957	825	905	4.7
November	3,779	1942	109	1956	819	818	4.6
December	3,253	1932	64.5	1956	629	603	3.6
January	3,936	1946	49.4	1940	709	817	4.0
February	7,971	1915	48.8	1940	1,399	1,230	7.9
March	8,800	1929	202	1931	2,900	1,942	16.4
April	8,185	1951	282	1934	2,322	1,691	13.1
May	9,856	1944	112	1934	2,105	1,671	11.9
June	16,500	1947	56.0	1934	2,668	2,818	15.1
July	5,819	1947	156	1911	1,515	1,357	8.6
August	3,895	1924	83.5	1931	858	868	4.9
September	5,149	1926	124	1934	937	1,056	5.3
Annual	3,399	1947	204	1934	1,472	717	100.0

Boxplots of monthly and annual mean discharges, pre-regulation period



IOWA RIVER BASIN
05454500 IOWA RIVER AT IOWA CITY, IA--Continued

Monthly and annual flow duration, pre-regulation period

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	44	44	173	202	115	60	77	63	72	70	80	61	63
95	69	93	249	372	321	231	145	107	101	103	113	87	111
90	95	153	427	531	432	428	221	148	125	130	135	106	157
85	121	214	610	665	542	542	314	183	149	150	159	131	207
80	153	273	832	809	653	637	387	218	175	173	186	170	262
75	193	332	1,040	995	771	742	464	256	206	197	218	209	323
70	228	413	1,230	1,150	870	948	545	292	240	221	257	252	401
65	266	500	1,400	1,300	990	1,120	631	328	280	245	313	287	486
60	309	558	1,630	1,450	1,170	1,300	733	368	323	286	408	323	573
55	356	621	1,860	1,580	1,360	1,500	844	417	386	337	489	370	670
50	408	742	2,090	1,710	1,540	1,720	962	475	455	424	547	420	782
45	469	896	2,360	1,860	1,720	1,960	1,090	551	539	524	605	470	923
40	543	1,090	2,650	2,050	1,910	2,200	1,230	638	637	623	679	532	1,100
35	624	1,340	2,960	2,260	2,110	2,540	1,420	732	740	738	758	603	1,300
30	700	1,610	3,290	2,560	2,380	2,880	1,640	856	891	863	869	687	1,550
25	787	1,890	3,820	2,920	2,690	3,250	1,870	1,000	1,120	1,040	999	797	1,810
20	896	2,150	4,480	3,550	3,160	3,790	2,190	1,190	1,370	1,300	1,160	975	2,190
15	1,060	2,680	5,210	4,190	3,720	4,470	2,610	1,440	1,610	1,590	1,430	1,140	2,740
10	1,390	3,180	6,410	5,000	4,290	5,290	3,340	1,900	1,930	2,050	1,840	1,380	3,500
5	2,910	4,110	8,660	6,350	5,730	7,870	4,850	3,180	3,050	2,950	2,640	1,830	5,030

Probability of annual high discharges, pre-regulation period

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	—	1,350	1,050	693	493
0.95	1.05	3,520	2,480	2,050	1,490	1,100
0.90	1.11	4,590	3,360	2,840	2,150	1,600
0.80	1.25	6,270	4,750	4,100	3,200	2,410
0.50	2	11,100	8,730	7,620	6,090	4,590
0.20	5	19,000	15,000	12,800	10,000	7,420
0.10	10	24,800	19,300	16,100	12,300	9,010
0.04	25	32,700	24,800	20,100	14,800	10,600
0.02	50	38,900	28,900	22,800	16,400	11,600
0.01	100	45,200	32,900	25,300	17,700	12,400

IOWA RIVER BASIN
05454500 IOWA RIVER AT IOWA CITY, IA--Continued

Probability of annual low discharges, pre-regulation period

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	19	24	27	30	35	40	50	56	72
0.02	50	23	30	33	37	43	51	63	70	91
0.05	20	32	41	45	50	58	71	87	100	127
0.10	10	42	54	60	66	77	96	117	135	172
0.20	5	59	75	83	91	108	138	167	194	245
0.50	2	113	140	155	170	205	269	327	384	484
0.80	1.25	218	255	286	316	389	515	634	745	939
0.90	1.11	306	347	391	437	543	718	892	1,050	1,320
0.96	1.04	441	481	545	616	774	1,020	1,280	1,500	1,900
0.98	1.02	559	591	674	769	972	1,270	1,610	1,880	2,390
0.99	1.01	692	711	814	938	1,190	1,540	1,980	2,300	2,940

Probability of seasonal low discharges, pre-regulation period

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	26	32	33	41	40	60	69	93
0.02	50	32	40	43	54	60	88	100	131
0.05	20	45	56	62	81	106	147	166	214
0.10	10	62	77	86	115	167	225	253	320
0.20	5	91	114	129	176	277	357	401	504
0.50	2	194	242	277	390	629	756	854	1,080
0.80	1.25	428	525	596	843	1,200	1,350	1,550	2,010
0.90	1.11	654	795	890	1,250	1,570	1,720	2,000	2,640
0.96	1.04	1,040	1,250	1,360	1,890	2,000	2,130	2,510	3,420
0.98	1.02	1,400	1,670	1,800	2,460	2,290	2,400	2,850	3,970
0.99	1.01	1,850	2,180	2,310	3,110	2,550	2,630	3,160	4,480
		July-August-September				October-November-December			
0.01	100	27	45	51	62	28	39	42	51
0.02	50	32	53	60	74	34	48	52	63
0.05	20	43	68	77	96	46	66	72	86
0.10	10	56	86	98	123	61	87	96	114
0.20	5	79	117	132	168	87	123	136	161
0.50	2	164	222	250	324	173	236	262	314
0.80	1.25	369	454	511	673	351	454	501	614
0.90	1.11	585	679	767	1,010	514	638	702	874
0.96	1.04	983	1,070	1,210	1,610	777	917	1,000	1,280
0.98	1.02	1,400	1,450	1,650	2,200	1,020	1,160	1,260	1,630
0.99	1.01	1,940	1,930	2,200	2,930	1,310	1,430	1,550	2,040

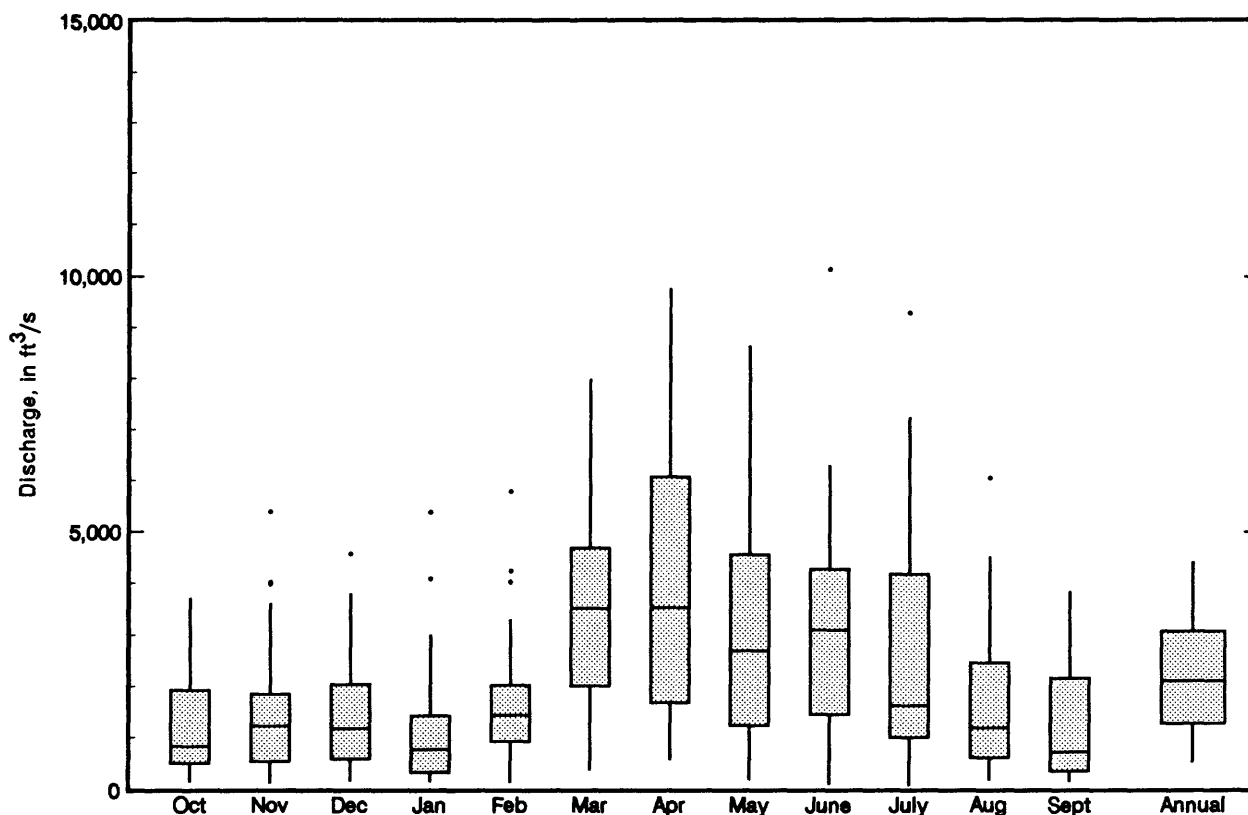
IOWA RIVER BASIN
05454500 IOWA RIVER AT IOWA CITY, IA--Continued

Post-regulation Period

Statistics of monthly and annual mean discharges, post-regulation period

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	3,713	1987	144	1964	1,214	1,006	4.6
November	5,395	1987	121	1967	1,572	1,367	6.0
December	4,580	1983	156	1977	1,449	1,133	5.5
January	5,381	1973	145	1977	1,162	1,191	4.4
February	5,789	1973	125	1977	1,747	1,229	6.6
March	7,988	1971	366	1977	3,413	1,996	12.9
April	9,764	1979	572	1977	3,920	2,646	14.9
May	8,644	1973	184	1977	3,020	2,108	11.4
June	10,140	1974	99.1	1977	3,117	2,236	11.8
July	9,296	1969	72.8	1977	2,751	2,365	10.4
August	6,056	1969	167	1959	1,746	1,564	6.6
September	3,842	1986	147	1976	1,269	1,133	4.8
Annual	4,424	1973	516	1977	2,199	1,131	100.0

Boxplots of monthly and annual mean discharges, post-regulation period



IOWA RIVER BASIN
05454500 IOWA RIVER AT IOWA CITY, IA--Continued

Monthly and annual flow duration, post-regulation period

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	131	113	116	230	125	82	58	87	115	128	118	142	112
95	150	208	344	540	261	149	168	171	148	144	145	172	158
90	173	329	510	859	434	311	245	208	165	152	184	257	231
85	234	475	685	1,010	610	533	446	263	182	160	295	326	329
80	268	584	876	1,160	805	755	586	344	213	232	357	393	438
75	296	682	1,160	1,350	1,000	1,020	694	414	275	424	442	473	549
70	333	791	1,360	1,600	1,240	1,270	796	476	333	509	565	533	657
65	417	907	1,620	1,880	1,500	1,440	935	535	386	577	633	648	785
60	492	976	1,910	2,150	1,690	1,780	1,130	591	439	636	747	775	938
55	593	1,050	2,190	2,400	2,010	2,330	1,400	653	520	719	951	915	1,090
50	686	1,130	2,580	2,740	2,510	2,910	1,710	749	637	810	1,060	1,030	1,300
45	791	1,240	3,020	3,170	3,030	3,550	2,180	919	728	915	1,230	1,180	1,510
40	886	1,360	3,380	3,760	3,580	3,850	2,770	1,160	859	1,050	1,460	1,350	1,790
35	1,020	1,490	3,890	4,460	3,990	4,150	3,550	1,590	1,070	1,230	1,680	1,530	2,140
30	1,180	1,710	4,650	5,170	4,330	4,410	3,900	2,060	1,320	1,410	1,910	1,710	2,650
25	1,380	1,970	5,460	5,850	4,620	4,670	4,280	2,830	1,810	1,660	2,180	1,910	3,370
20	1,590	2,370	6,180	7,140	4,900	4,920	4,710	3,850	2,160	2,010	2,520	2,140	3,970
15	1,860	3,050	7,000	8,460	5,750	5,590	5,600	4,380	3,030	2,470	3,450	2,540	4,570
10	2,680	3,970	8,030	9,060	6,380	6,310	6,500	4,750	3,950	3,060	3,930	3,480	5,450
5	4,170	6,340	9,050	9,660	6,940	6,940	7,590	5,360	4,590	3,830	4,610	4,380	6,910

Probability of annual high discharges, post-regulation period

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge ¹ (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	2,500	2,030	1,820	1,380	1,080
0.95	1.05	3,900	3,210	2,910	2,340	1,890
0.90	1.11	4,900	3,990	3,650	3,030	2,470
0.80	1.25	6,600	5,090	4,700	4,020	3,340
0.50	2	9,800	7,570	7,140	6,410	5,540
0.20	5	11,500	10,400	10,000	9,330	8,410
0.10	10	12,000	11,900	11,600	11,000	10,100
0.04	25	13,000	13,500	13,400	12,700	12,000
0.02	50	18,000	14,500	14,500	13,900	13,300
0.01	100	22,000	15,300	15,400	14,800	14,500

¹ Data supplied by U.S. Army Corps of Engineers, Rock Island District.

IOWA RIVER BASIN
05454500 IOWA RIVER AT IOWA CITY, IA--Continued

Probability of annual low discharges, post-regulation period

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	52	53	51	50	55	50	57	80	133
0.02	50	59	61	60	61	67	66	77	106	171
0.05	20	73	76	78	82	91	100	120	158	246
0.10	10	90	94	99	107	119	142	176	225	338
0.20	5	116	122	132	148	167	217	274	340	489
0.50	2	198	211	237	276	326	471	614	726	949
0.80	1.25	360	387	439	513	660	991	1,290	1,490	1,750
0.90	1.11	504	544	612	711	968	1,440	1,850	2,130	2,360
0.96	1.04	738	796	882	1,010	1,470	2,130	2,680	3,090	3,200
0.98	1.02	954	1,030	1,120	1,260	1,940	2,730	3,370	3,900	3,870
0.99	1.01	1,210	1,300	1,400	1,540	2,490	3,390	4,120	4,790	4,560

Probability of seasonal low discharges, post-regulation period

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	68	69	73	86	33	36	44	74
0.02	50	83	87	91	110	50	55	70	117
0.05	20	112	121	128	156	92	103	135	220
0.10	10	146	161	171	214	150	173	232	371
0.20	5	201	226	243	311	258	310	425	660
0.50	2	368	419	465	631	638	841	1,170	1,700
0.80	1.25	666	751	867	1,270	1,320	1,950	2,670	3,610
0.90	1.11	904	1,000	1,190	1,810	1,810	2,860	3,840	4,990
0.96	1.04	1,250	1,360	1,660	2,650	2,430	4,130	5,400	6,700
0.98	1.02	1,540	1,640	2,040	3,380	2,870	5,120	6,570	7,900
0.99	1.01	1,850	1,930	2,460	4,190	3,280	6,130	7,720	9,020
		July-August-September				October-November-December			
0.01	100	54	58	61	66	61	59	59	62
0.02	50	63	68	72	80	76	76	77	83
0.05	20	79	87	94	110	105	108	112	129
0.10	10	98	111	123	148	140	149	158	189
0.20	5	131	152	172	217	198	217	238	296
0.50	2	246	295	353	482	376	440	518	670
0.80	1.25	508	632	803	1,170	699	874	1,120	1,440
0.90	1.11	773	981	1,280	1,920	959	1,240	1,670	2,110
0.96	1.04	1,250	1,620	2,190	3,360	1,340	1,800	2,550	3,110
0.98	1.02	1,740	2,270	3,150	4,900	1,650	2,270	3,340	3,970
0.99	1.01	2,360	3,120	4,410	6,950	1,990	2,800	4,270	4,920

IOWA RIVER BASIN
05455000 RALSTON CREEK AT IOWA CITY, IA

LOCATION.--Lat 41°39'50", long 91°30'48", in SE1/4 NW1/4 sec. 11, T.79 N., R.6 W., Johnson County, Hydrologic Unit 07080209, on left bank 10 ft upstream from bridge on Rochester Avenue, 1.0 mi northeast of post office in Iowa City and 2.2 mi upstream from mouth.

DRAINAGE AREA.--3.01 mi².

PERIOD OF RECORD.--September 1924 to September 30, 1987 (discontinued).

GAGE.--Water-stage recorder and V-notch sharp-crested weir. Datum of gage is 663.27 ft above NGVD (University of Iowa bench mark).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,760 ft³/s July 17, 1972, gage height, 9.01 ft; maximum gage height, 9.06 ft July 18, 1956; no flow at times most years.

REMARKS.--Retention dam upstream 1,500 feet since 1984.

Rating table number 8, developed October 1978
(A discharge measurement to validate this rating
has not been made since November 1987.)

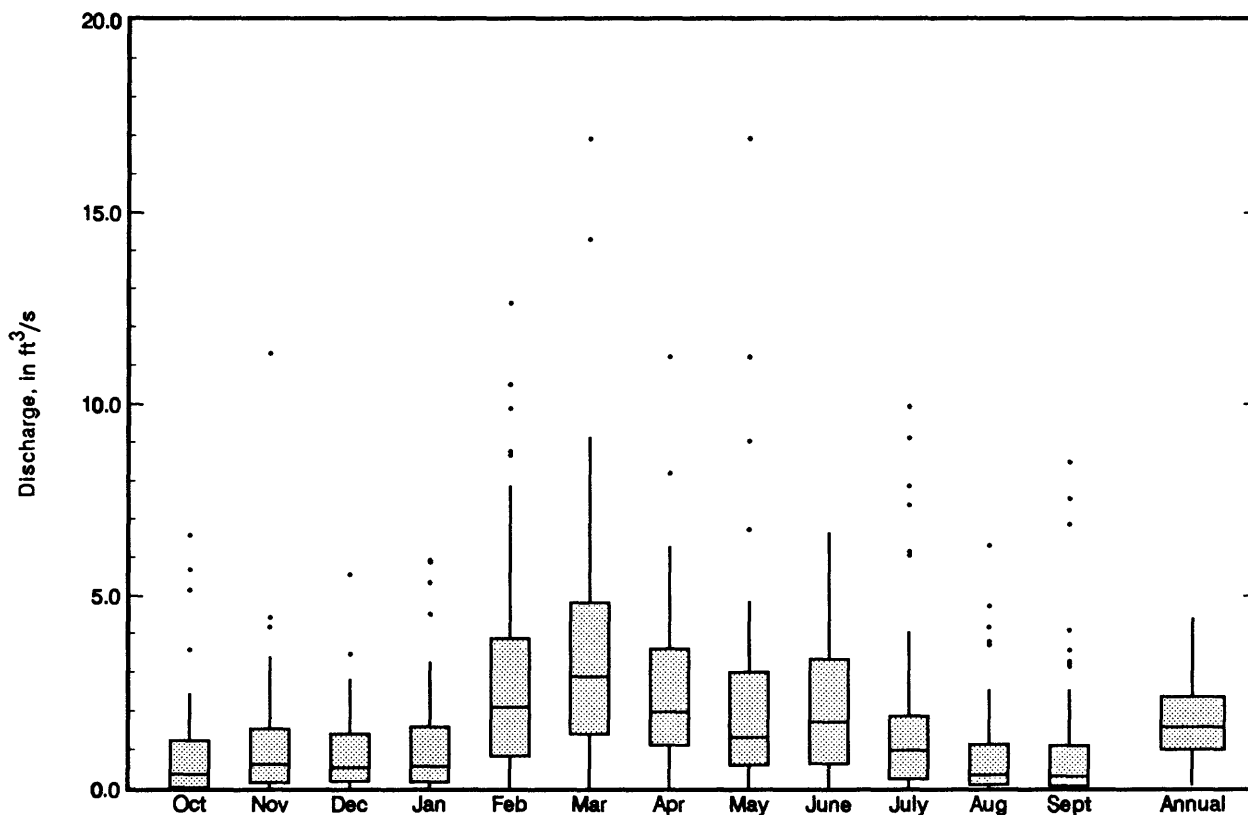
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
2.5	1.3	6.0	510
3.0	17	7.0	730
3.5	68	8.0	1,060
4.0	165	9.0	1,750
5.0	340		

IOWA RIVER BASIN
05455000 RALSTON CREEK AT IOWA CITY, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	6.57	1928	0.000	1941	0.90	1.36	4.2
November	11.3	1962	0.000	1941	1.12	1.68	5.2
December	5.54	1983	0.000	1956	0.92	1.03	4.3
January	5.91	1938	0.000	1940	1.14	1.43	5.4
February	12.6	1982	0.010	1934	2.91	2.81	13.7
March	16.9	1979	0.010	1956	3.50	3.22	16.5
April	11.2	1973	0.010	1956	2.58	2.11	12.1
May	16.9	1974	0.000	1934	2.29	2.84	10.7
June	6.64	1927	0.000	1934	2.26	2.02	10.6
July	9.93	1969	0.000	1957	1.67	2.26	7.8
August	6.31	1972	0.000	1936	0.96	1.30	4.5
September	8.47	1965	0.000	1933	1.04	1.78	4.9
Annual	4.40	1986	0.080	1957	1.77	1.01	100.0

Boxplots of monthly and annual mean discharges



IOWA RIVER BASIN
05455000 RALSTON CREEK AT IOWA CITY, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95	0.00	0.01	0.05	0.07	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
90	0.01	0.03	0.20	0.26	0.11	0.02	0.01	0.00	0.00	0.00	0.01	0.01	0.01
85	0.01	0.10	0.30	0.39	0.21	0.07	0.01	0.01	0.00	0.01	0.03	0.02	0.02
80	0.04	0.14	0.40	0.50	0.29	0.11	0.02	0.01	0.01	0.01	0.05	0.04	0.05
75	0.07	0.19	0.51	0.63	0.36	0.17	0.05	0.01	0.01	0.02	0.07	0.07	0.08
70	0.10	0.24	0.64	0.75	0.44	0.23	0.08	0.02	0.01	0.04	0.10	0.10	0.12
65	0.14	0.30	0.76	0.89	0.54	0.30	0.11	0.04	0.02	0.06	0.15	0.15	0.18
60	0.18	0.35	0.89	1.1	0.65	0.37	0.15	0.05	0.03	0.08	0.22	0.20	0.25
55	0.22	0.45	1.0	1.3	0.80	0.46	0.19	0.08	0.05	0.10	0.29	0.26	0.32
50	0.27	0.54	1.2	1.5	0.95	0.56	0.25	0.10	0.07	0.14	0.37	0.32	0.42
45	0.33	0.62	1.4	1.7	1.1	0.67	0.31	0.14	0.09	0.21	0.46	0.39	0.53
40	0.40	0.74	1.7	1.9	1.3	0.83	0.40	0.19	0.13	0.30	0.57	0.47	0.66
35	0.46	0.88	2.0	2.1	1.5	1.0	0.51	0.25	0.18	0.42	0.69	0.58	0.83
30	0.58	1.1	2.5	2.5	1.7	1.3	0.67	0.33	0.24	0.57	0.85	0.73	1.0
25	0.75	1.4	3.2	2.8	2.0	1.6	0.90	0.45	0.34	0.73	1.1	0.89	1.3
20	0.98	2.0	4.1	3.4	2.5	2.1	1.2	0.61	0.52	0.94	1.3	1.1	1.7
15	1.3	3.2	5.3	4.3	3.4	2.8	1.7	0.90	0.86	1.3	1.6	1.3	2.3
10	1.8	5.9	7.6	5.5	4.8	4.2	2.6	1.4	1.4	1.8	2.2	1.7	3.5
5	3.9	14	15	7.9	7.8	8.5	4.9	3.6	3.2	3.1	3.8	2.7	6.5

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	42	3.2	1.7	0.81	0.59
0.95	1.05	86	7.1	3.9	2.2	1.5
0.90	1.11	123	10	5.8	3.4	2.3
0.80	1.25	188	16	8.9	5.4	3.5
0.50	2	401	30	17	11	7.0
0.20	5	803	51	28	17	11
0.10	10	1,130	63	34	20	13
0.04	25	1,590	76	40	23	15
0.02	50	1,970	84	44	24	16
0.01	100	2,370	91	46	25	17

IOWA RIVER BASIN
05455000 RALSTON CREEK AT IOWA CITY, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.05	20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
0.10	10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.07
0.20	5	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.07	0.16
0.50	2	0.00	0.00	0.00	0.00	0.02	0.10	0.19	0.29	0.48
0.80	1.25	0.04	0.05	0.06	0.08	0.14	0.33	0.52	0.76	1.1
0.90	1.11	0.11	0.12	0.14	0.17	0.28	0.55	0.82	1.1	1.6
0.96	1.04	0.27	0.29	0.32	0.38	0.52	0.88	1.2	1.6	2.3
0.98	1.02	0.47	0.50	0.52	0.61	0.75	1.2	1.6	2.0	2.9
0.99	1.01	0.78	0.80	0.81	0.94	1.1	1.6	2.0	2.4	3.4

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.00	0.01	0.01	0.01	0.01	0.03	0.01	0.02
0.02	50	0.01	0.01	0.01	0.01	0.02	0.03	0.02	0.03
0.05	20	0.01	0.02	0.03	0.03	0.03	0.05	0.03	0.07
0.10	10	0.02	0.03	0.05	0.06	0.05	0.06	0.06	0.12
0.20	5	0.05	0.06	0.06	0.12	0.06	0.13	0.12	0.23
0.50	2	0.14	0.16	0.23	0.41	0.21	0.30	0.37	0.69
0.80	1.25	0.35	0.38	0.51	1.1	0.51	0.68	0.95	1.8
0.90	1.11	0.53	0.57	0.74	1.6	0.81	1.0	1.4	2.7
0.96	1.04	0.81	0.85	1.0	2.4	1.3	1.6	2.1	4.0
0.98	1.02	1.0	1.1	1.3	3.0	1.7	2.1	2.7	5.1
0.99	1.01	1.3	1.3	1.5	3.5	2.3	2.7	3.2	6.3
		July-August-September				October-November-December			
0.01	100	0.00	0.01	0.01	0.01	0.00	0.01	0.00	0.01
0.02	50	0.00	0.01	0.01	0.01	0.00	0.01	0.01	0.01
0.05	20	0.01	0.01	0.01	0.02	0.01	0.02	0.01	0.02
0.10	10	0.01	0.02	0.02	0.03	0.01	0.03	0.02	0.04
0.20	5	0.02	0.03	0.03	0.05	0.02	0.05	0.05	0.08
0.50	2	0.06	0.06	0.07	0.12	0.08	0.14	0.16	0.24
0.80	1.25	0.20	0.24	0.22	0.34	0.24	0.38	0.48	0.68
0.90	1.11	0.38	0.44	0.41	0.58	0.45	0.61	0.78	1.1
0.96	1.04	0.80	0.86	0.86	1.0	0.86	1.0	1.3	1.9
0.98	1.02	1.3	1.4	1.4	1.5	1.3	1.4	1.7	2.5
0.99	1.01	2.1	2.1	2.3	2.1	2.0	1.9	2.2	3.3

IOWA RIVER BASIN
05455010 SOUTH BRANCH RALSTON CREEK AT IOWA CITY, IA

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

DRAINAGE AREA.--2.94 mi².

PERIOD OF RECORD.--October 1963 to September 1988.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,070 ft³/s July 17, 1972, gage height, 9.47 ft; no flow at times most years.

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

Rating table number 7, developed October 1985

Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
2.0	3.8	4.5	189
2.5	20	6.0	327
3.0	54	8.0	654
3.5	107	9.5	1,080

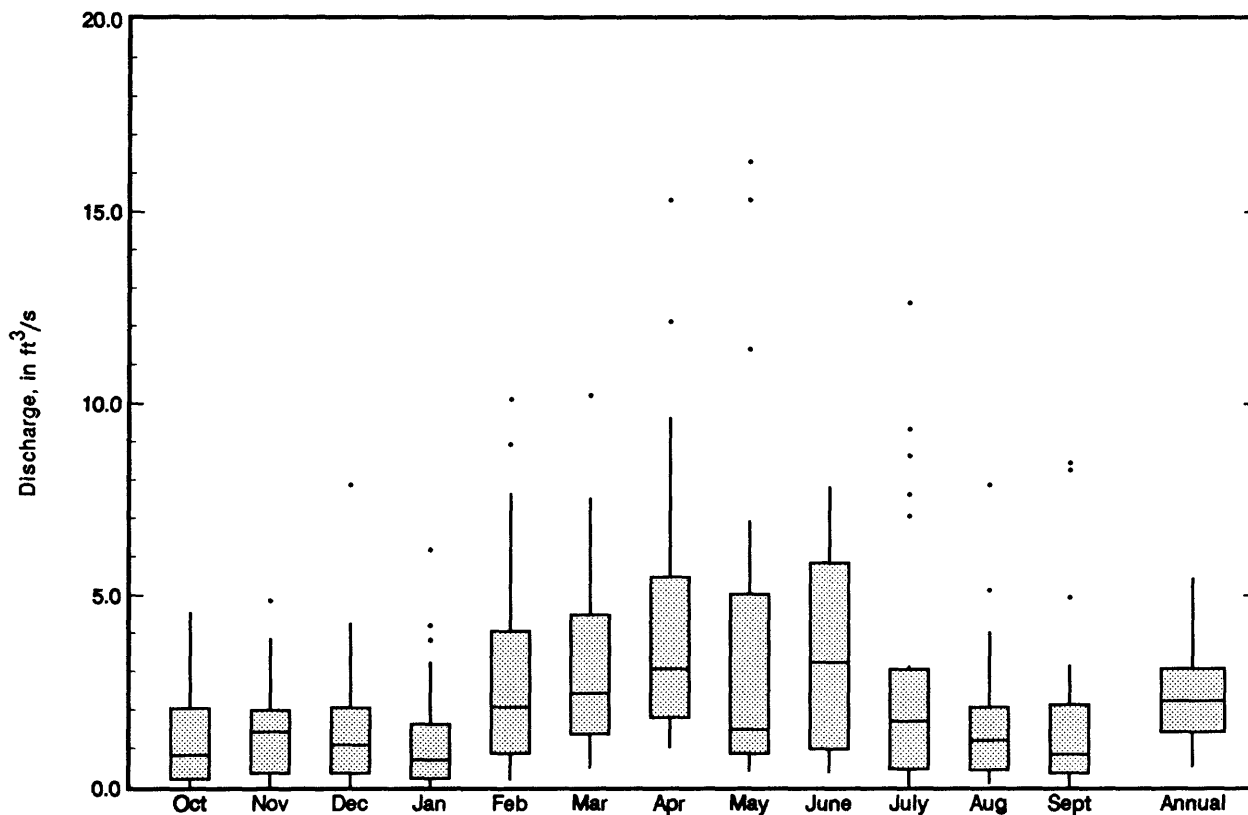
IOWA RIVER BASIN

05455010 SOUTH BRANCH RALSTON CREEK AT IOWA CITY, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	4.52	1985	0.000	1954	1.33	1.32	4.5
November	4.84	1986	0.020	1977	1.42	1.17	4.9
December	7.85	1983	0.000	1977	1.61	1.74	5.5
January	6.17	1974	0.000	1977	1.35	1.53	4.6
February	10.1	1982	0.19	1978	2.88	2.85	9.8
March	10.2	1979	0.49	1981	3.19	2.45	10.9
April	15.3	1973	1.01	1971	4.21	3.63	14.4
May	16.3	1974	0.41	1980	3.73	4.47	12.7
June	7.82	1967	0.37	1988	3.48	2.53	11.9
July	12.6	1969	0.030	1988	2.73	3.46	9.3
August	7.88	1972	0.10	1954	1.64	1.82	5.6
September	8.44	1970	0.030	1966	1.73	2.30	5.9
Annual	5.45	1974	0.52	1954	2.44	1.29	100.0

Boxplots of monthly and annual mean discharges



IOWA RIVER BASIN

05455010 SOUTH BRANCH RALSTON CREEK AT IOWA CITY, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equalled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.00	0.00	0.13	0.27	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95	0.00	0.01	0.27	0.44	0.24	0.08	0.01	0.00	0.00	0.00	0.01	0.00	0.01
90	0.01	0.10	0.40	0.62	0.34	0.17	0.03	0.01	0.00	0.01	0.04	0.01	0.03
85	0.05	0.13	0.52	0.74	0.43	0.26	0.08	0.01	0.01	0.01	0.12	0.10	0.11
80	0.11	0.19	0.62	0.89	0.51	0.35	0.12	0.03	0.01	0.04	0.16	0.15	0.17
75	0.15	0.23	0.70	1.1	0.58	0.45	0.17	0.06	0.05	0.07	0.22	0.24	0.24
70	0.18	0.29	0.77	1.2	0.67	0.52	0.22	0.10	0.09	0.11	0.28	0.32	0.32
65	0.23	0.38	0.90	1.4	0.75	0.59	0.27	0.13	0.13	0.17	0.36	0.40	0.42
60	0.28	0.50	1.1	1.6	0.88	0.70	0.33	0.20	0.17	0.24	0.48	0.48	0.52
55	0.37	0.61	1.3	1.8	1.0	0.81	0.45	0.26	0.22	0.33	0.61	0.56	0.63
50	0.48	0.71	1.5	2.0	1.2	0.97	0.56	0.34	0.28	0.47	0.74	0.65	0.74
45	0.59	0.81	1.8	2.2	1.5	1.1	0.67	0.41	0.34	0.56	0.89	0.73	0.88
40	0.71	0.95	2.1	2.5	1.8	1.3	0.79	0.51	0.41	0.69	1.0	0.86	1.1
35	0.82	1.1	2.5	2.9	2.2	1.6	1.1	0.62	0.50	0.86	1.2	1.0	1.3
30	0.94	1.5	2.9	3.4	2.7	2.1	1.4	0.76	0.62	1.1	1.4	1.2	1.6
25	1.1	2.2	3.4	4.1	3.2	2.7	1.8	0.97	0.78	1.4	1.6	1.4	2.0
20	1.2	3.0	4.2	5.0	4.2	3.4	2.4	1.3	1.1	1.7	1.9	1.8	2.6
15	1.6	4.1	5.3	6.5	5.9	4.4	3.3	1.8	1.8	2.3	2.3	2.3	3.5
10	2.5	6.4	7.4	8.9	7.8	7.0	5.2	3.2	3.1	3.2	3.1	3.3	5.2
5	5.7	15	12	15	13	15	10	7.5	6.6	5.4	5.3	5.6	9.6

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	62	6.9	3.8	2.2	1.6
0.95	1.05	115	12	7.0	4.2	2.8
0.90	1.11	157	16	9.3	5.7	3.7
0.80	1.25	224	22	13	7.8	5.0
0.50	2	416	37	21	13	8.4
0.20	5	717	55	31	19	13
0.10	10	926	65	36	22	16
0.04	25	1,190	76	41	26	19
0.02	50	1,390	83	44	28	22
0.01	100	1,580	89	46	29	24

IOWA RIVER BASIN
05455010 SOUTH BRANCH RALSTON CREEK AT IOWA CITY, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10
0.05	20	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.07	0.18
0.10	10	0.00	0.00	0.00	0.00	0.01	0.05	0.11	0.18	0.28
0.20	5	0.00	0.00	0.00	0.00	0.04	0.12	0.22	0.32	0.46
0.50	2	0.00	0.00	0.00	0.04	0.16	0.36	0.54	0.70	1.0
0.80	1.25	0.13	0.15	0.17	0.20	0.38	0.73	0.95	1.2	1.9
0.90	1.11	0.23	0.26	0.30	0.38	0.54	0.96	1.2	1.5	2.4
0.96	1.04	0.38	0.40	0.49	0.68	0.75	1.2	1.4	1.9	2.9
0.98	1.02	0.50	0.51	0.63	0.98	0.90	1.3	1.6	2.1	3.3
0.99	1.01	0.62	0.62	0.77	1.3	1.0	1.5	1.7	2.3	3.6

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.02	0.02	0.01	0.02	0.04	0.06	0.01	0.15
0.02	50	0.03	0.03	0.02	0.02	0.05	0.07	0.02	0.19
0.05	20	0.05	0.06	0.03	0.05	0.07	0.10	0.05	0.26
0.10	10	0.07	0.08	0.06	0.08	0.10	0.14	0.10	0.35
0.20	5	0.11	0.13	0.11	0.16	0.15	0.21	0.21	0.50
0.50	2	0.24	0.30	0.31	0.47	0.31	0.42	0.65	1.1
0.80	1.25	0.48	0.59	0.73	1.2	0.61	0.85	1.4	2.5
0.90	1.11	0.66	0.81	1.0	1.8	0.87	1.2	1.9	3.9
0.96	1.04	0.91	1.1	1.5	2.8	1.3	1.8	2.3	6.5
0.98	1.02	1.1	1.3	1.8	3.5	1.6	2.3	2.6	9.2
0.99	1.01	1.3	1.5	2.0	4.4	1.9	2.9	2.8	13
		July-August-September				October-November-December			
0.01	100	0.02	0.01	0.00	0.01	0.00	0.01	0.03	0.02
0.02	50	0.02	0.01	0.01	0.01	0.01	0.02	0.04	0.04
0.05	20	0.04	0.02	0.01	0.03	0.02	0.03	0.06	0.07
0.10	10	0.06	0.04	0.02	0.05	0.03	0.06	0.09	0.12
0.20	5	0.09	0.07	0.04	0.08	0.05	0.10	0.15	0.21
0.50	2	0.19	0.19	0.13	0.23	0.15	0.26	0.33	0.52
0.80	1.25	0.34	0.43	0.36	0.55	0.37	0.55	0.66	1.0
0.90	1.11	0.43	0.60	0.60	0.83	0.56	0.75	0.92	1.3
0.96	1.04	0.52	0.80	1.0	1.2	0.82	1.0	1.3	1.7
0.98	1.02	0.58	0.95	1.4	1.5	1.0	1.2	1.5	1.9
0.99	1.01	0.63	1.1	1.9	1.9	1.2	1.3	1.8	2.0

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, October 1984 to September 1988.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 12,000 ft³/s May 29, 1962, gage height, 16.52 ft, 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.

Rating table number 4, developed October 1987

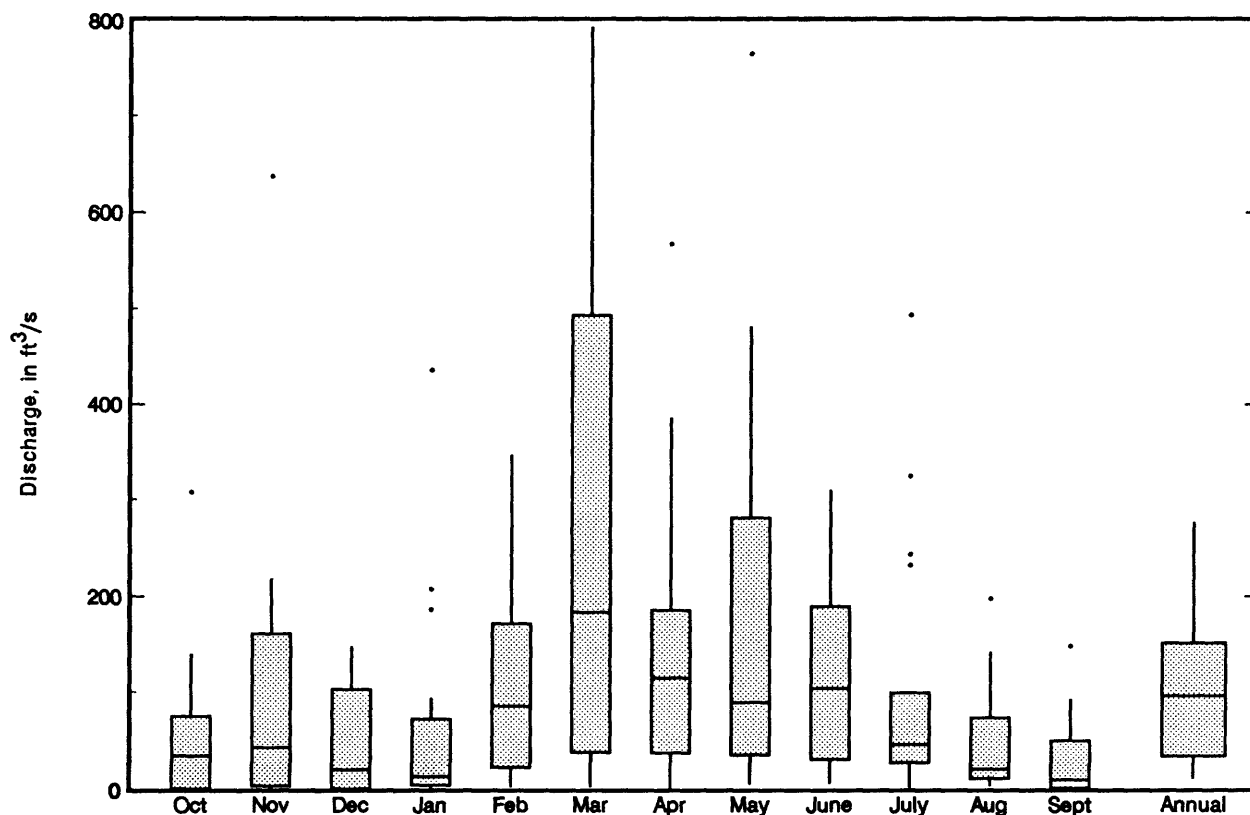
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
2.0	2.2	9.0	1,040
2.5	16	11.0	1,480
3.0	51	13.0	2,130
3.5	103	15.0	3,720
4.0	165	16.0	6,070
5.0	310	17.0	11,100
7.0	652		

IOWA RIVER BASIN
05455100 OLD MANS CREEK NEAR IOWA CITY, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	307	1987	0.21	1958	53.7	75.7	4.2
November	636	1962	0.39	1956	99.9	154	7.8
December	147	1987	0.35	1956	48.8	56.4	3.8
January	436	1960	0.26	1956	68.4	111	5.3
February	346	1953	2.50	1954	122	113	9.5
March	793	1962	2.12	1954	264	252	20.6
April	567	1960	1.29	1956	150	145	11.7
May	765	1986	4.97	1956	172	197	13.5
June	309	1986	5.34	1956	120	101	9.4
July	494	1962	1.43	1954	105	133	8.2
August	197	1986	2.97	1988	47.6	57.0	3.7
September	148	1986	0.36	1957	29.7	41.6	2.3
Annual	276	1962	10.3	1954	107	82.5	100.0

Boxplots of monthly and annual mean discharges



IOWA RIVER BASIN
05455100 OLD MANS CREEK NEAR IOWA CITY, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equalled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.22	0.13	1.5	0.77	1.2	0.52	0.77	0.51	0.12	0.14	0.30	0.27	0.24
95	0.30	0.33	2.4	2.2	3.8	2.5	1.7	0.84	0.30	0.26	0.49	0.44	0.50
90	0.40	1.8	3.6	5.8	5.5	6.8	2.7	1.3	0.42	0.55	0.84	0.61	0.99
85	0.48	3.2	6.3	7.7	15	11	3.7	1.8	0.67	0.71	1.1	0.76	1.6
80	0.65	4.5	17	17	26	13	5.4	2.4	1.1	0.91	1.3	0.99	3.0
75	1.6	5.7	27	33	33	16	8.9	4.0	1.5	1.1	1.6	1.3	4.7
70	4.2	7.5	37	41	39	20	13	5.0	2.5	1.4	2.4	1.7	6.7
65	5.4	13	48	51	47	24	16	6.1	3.4	1.9	3.5	2.8	11
60	7.8	33	59	61	55	29	20	7.3	4.1	3.6	7.3	5.6	16
55	12	50	70	79	65	37	24	8.8	4.7	5.1	15	10	23
50	14	61	80	95	75	48	30	11	5.3	7.6	27	17	32
45	21	69	97	111	86	61	37	13	6.4	17	35	25	42
40	42	77	119	124	98	79	45	15	7.8	23	45	38	53
35	49	87	148	136	111	100	54	18	12	28	68	49	65
30	56	101	198	149	131	124	65	23	19	37	97	59	81
25	67	122	255	162	150	150	83	31	26	51	121	73	103
20	79	151	304	193	176	190	106	42	33	69	144	87	131
15	99	191	430	228	213	243	151	58	40	108	174	102	164
10	132	251	717	304	303	300	230	90	53	158	232	130	237
5	231	483	1,180	505	610	454	486	157	118	265	397	185	424

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	294	94	62	33	22
0.95	1.05	564	217	138	84	56
0.90	1.11	788	329	205	132	88
0.80	1.25	1,170	531	326	220	146
0.50	2	2,410	1,230	736	515	338
0.20	5	4,760	2,570	1,520	1,050	668
0.10	10	6,680	3,650	2,160	1,440	900
0.04	25	9,470	5,150	3,050	1,950	1,190
0.02	50	11,800	6,350	3,760	2,320	1,390
0.01	100	14,300	7,590	4,510	2,680	1,580

IOWA RIVER BASIN
05455100 OLD MANS CREEK NEAR IOWA CITY, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.03	0.03	0.03	0.04	0.06	0.05	0.08	0.09	0.11
0.02	50	0.05	0.05	0.05	0.06	0.09	0.09	0.14	0.19	0.24
0.05	20	0.10	0.10	0.11	0.13	0.18	0.21	0.35	0.48	0.67
0.10	10	0.19	0.20	0.20	0.25	0.33	0.44	0.75	1.1	1.6
0.20	5	0.39	0.43	0.44	0.52	0.68	1.0	1.8	2.6	4.2
0.50	2	1.6	1.8	1.9	2.1	2.8	5.1	8.7	12	20
0.80	1.25	6.0	6.7	7.8	8.5	12	24	35	47	69
0.90	1.11	12	13	16	17	25	54	68	88	118
0.96	1.04	24	27	34	36	55	124	131	161	192
0.98	1.02	38	41	54	57	92	210	195	230	252
0.99	1.01	56	61	82	87	147	336	274	312	313

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.02	0.02	0.02	0.03	0.23	0.34	0.42	0.54
0.02	50	0.04	0.04	0.04	0.08	0.40	0.59	0.75	1.0
0.05	20	0.12	0.12	0.13	0.25	0.88	1.3	1.7	2.6
0.10	10	0.31	0.31	0.34	0.67	1.7	2.4	3.3	5.4
0.20	5	0.92	0.95	1.0	2.0	3.7	5.1	7.1	12
0.50	2	6.3	6.6	7.1	13	14	18	26	44
0.80	1.25	34	36	38	58	44	56	77	122
0.90	1.11	74	80	85	116	75	95	127	185
0.96	1.04	161	175	186	221	124	159	203	269
0.98	1.02	255	279	299	321	169	216	269	330
0.99	1.01	377	415	447	438	218	280	338	387
		July-August-September				October-November-December			
0.01	100	0.02	0.04	0.06	0.09	0.04	0.05	0.04	0.04
0.02	50	0.04	0.08	0.10	0.16	0.06	0.07	0.07	0.08
0.05	20	0.09	0.18	0.23	0.36	0.13	0.16	0.17	0.19
0.10	10	0.18	0.36	0.45	0.71	0.23	0.30	0.35	0.43
0.20	5	0.41	0.80	0.96	1.6	0.50	0.68	0.86	1.1
0.50	2	1.7	3.1	3.5	6.2	2.3	3.3	4.6	7.1
0.80	1.25	6.6	9.5	11	21	11	16	24	43
0.90	1.11	13	16	18	37	27	36	57	108
0.96	1.04	24	26	30	66	71	89	142	285
0.98	1.02	37	34	40	94	133	158	254	533
0.99	1.01	52	44	51	127	237	266	429	930

IOWA RIVER BASIN
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 September 1988.

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

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.

Rating table number 8, developed October 1972

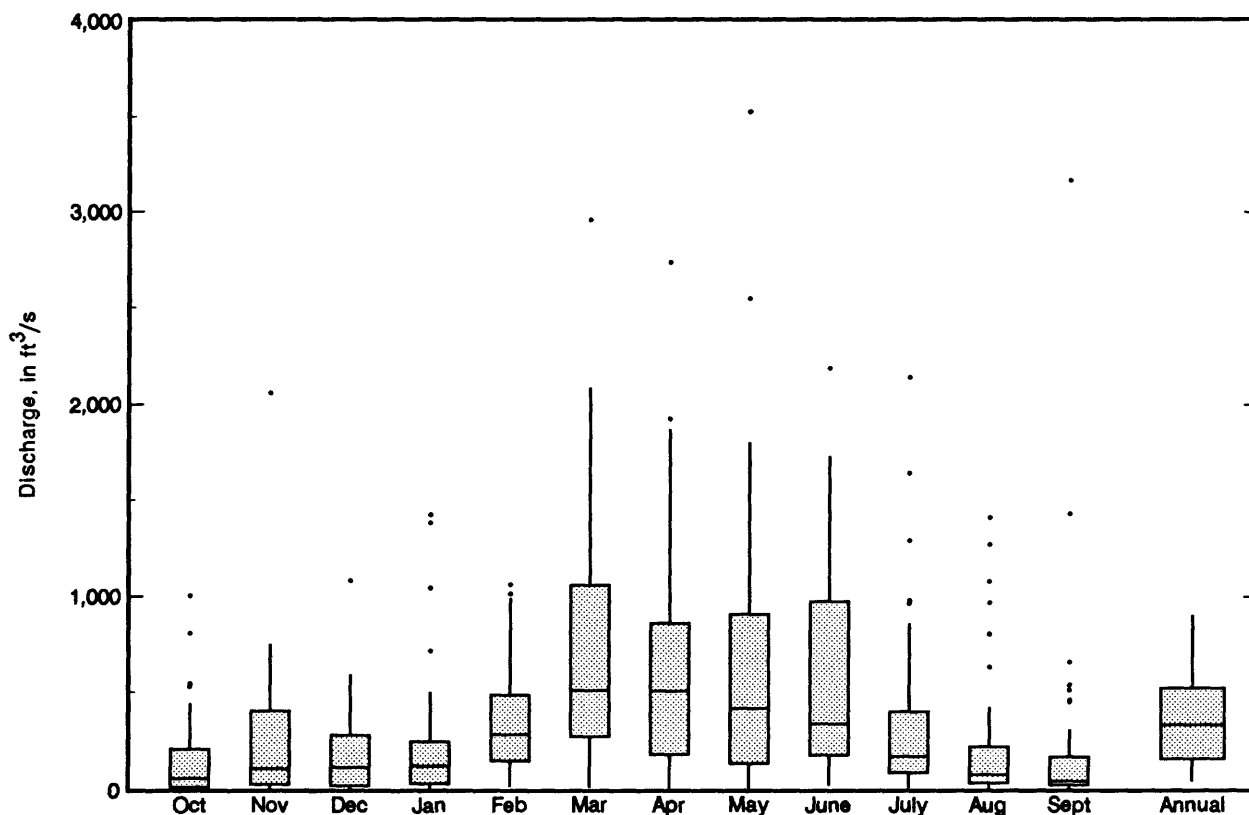
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
2.5	49	9.0	2,020
2.7	81	11.0	2,950
3.0	135	13.0	4,200
3.5	235	15.0	5,900
4.0	345	17.0	8,500
5.0	604	19.0	13,300
7.0	1,240		

IOWA RIVER BASIN
05455500 ENGLISH RIVER AT KALONA, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	1,004	1987	2.98	1954	157	214	3.5
November	2,060	1962	2.38	1956	246	348	5.5
December	1,085	1983	2.19	1956	188	210	4.2
January	1,429	1946	0.76	1977	227	337	5.1
February	1,066	1984	13.8	1954	376	294	8.4
March	2,957	1979	10.8	1954	712	593	15.9
April	2,736	1973	5.35	1956	648	603	14.5
May	3,529	1974	9.62	1956	610	685	13.7
June	2,187	1947	21.7	1940	532	491	11.9
July	2,142	1969	7.31	1954	352	435	7.9
August	1,413	1943	6.34	1955	218	333	4.9
September	3,169	1965	3.10	1955	205	497	4.6
Annual	903	1974	41.7	1954	372	227	100.0

Boxplots of monthly and annual mean discharges



IOWA RIVER BASIN
05455500 ENGLISH RIVER AT KALONA, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equalled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.79	1.7	8.4	5.2	5.1	2.3	3.3	2.7	2.3	2.1	2.1	2.0	2.2
95	2.4	5.6	18	33	23	18	7.1	7.2	4.6	4.2	5.1	3.5	5.4
90	3.8	16	60	69	47	32	20	11	7.3	5.8	7.1	4.9	11
85	10	22	81	97	70	44	30	15	10	7.6	10	7.1	17
80	17	31	105	121	91	58	39	18	13	9.9	15	13	25
75	26	46	136	145	112	76	50	21	15	13	23	19	33
70	31	70	170	168	136	98	63	25	18	16	30	28	45
65	35	84	197	201	162	121	75	30	21	19	38	36	60
60	45	101	224	240	189	149	87	35	24	25	48	48	76
55	60	123	257	285	218	179	101	41	28	34	60	61	96
50	82	147	290	330	257	216	116	49	33	46	75	80	120
45	109	171	333	376	297	263	135	58	40	56	92	105	149
40	132	205	395	422	348	309	156	68	50	66	121	136	181
35	151	248	478	484	404	383	181	81	61	82	167	170	217
30	171	300	582	544	478	472	215	97	77	107	214	198	271
25	195	366	731	649	559	588	271	119	99	150	277	229	338
20	220	450	904	767	706	748	351	158	132	207	347	278	431
15	282	608	1,200	980	909	952	492	215	184	289	423	341	568
10	442	909	1,740	1,450	1,300	1,360	757	342	306	437	548	434	835
5	748	1,700	2,870	2,600	2,710	2,320	1,640	703	855	700	901	634	1,590

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	1,070	488	253	152	108
0.95	1.05	1,830	1,000	576	368	254
0.90	1.11	2,420	1,430	856	559	381
0.80	1.25	3,340	2,140	1,330	884	598
0.50	2	6,010	4,250	2,760	1,850	1,250
0.20	5	10,400	7,610	4,970	3,250	2,230
0.10	10	13,600	9,940	6,420	4,110	2,850
0.04	25	17,900	12,900	8,140	5,070	3,570
0.02	50	21,200	15,000	9,310	5,670	4,040
0.01	100	24,600	17,000	10,400	6,200	4,460

IOWA RIVER BASIN
05455500 ENGLISH RIVER AT KALONA, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.46	0.64	0.69	0.75	0.81	1.1	1.6	1.7	2.7
0.02	50	0.67	0.88	0.97	1.1	1.2	1.7	2.4	2.7	4.5
0.05	20	1.2	1.4	1.6	1.8	2.2	3.3	4.6	5.4	9.2
0.10	10	1.9	2.2	2.5	2.8	3.6	5.6	8.0	9.6	17
0.20	5	3.2	3.7	4.2	4.8	6.4	10	15	18	32
0.50	2	9.0	9.7	11	13	18	31	45	58	95
0.80	1.25	24	25	27	32	46	85	119	155	232
0.90	1.11	38	40	44	51	71	137	189	245	343
0.96	1.04	62	66	72	83	112	222	298	383	492
0.98	1.02	85	92	98	113	147	298	392	500	605
0.99	1.01	111	122	129	147	186	384	497	627	715

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.40	0.39	0.41	0.61	1.3	2.1	2.9	4.2
0.02	50	0.76	0.75	0.81	1.2	2.4	3.6	4.8	7.2
0.05	20	1.9	1.9	2.1	3.4	5.3	7.6	10	15
0.10	10	3.9	4.0	4.5	7.5	10	14	18	29
0.20	5	8.8	9.4	11	18	21	28	36	57
0.50	2	33	37	42	71	69	87	110	181
0.80	1.25	98	109	121	200	175	217	275	460
0.90	1.11	155	174	190	303	259	323	411	690
0.98	1.04	235	265	284	435	369	466	598	1,000
0.98	1.02	298	336	355	526	448	574	742	1,240
0.99	1.01	361	406	423	609	524	680	885	1,480
		July-August-September				October-November-December			
0.01	100	0.73	1.5	1.8	3.0	0.65	0.90	0.90	1.1
0.02	50	1.0	1.9	2.3	3.8	0.96	1.3	1.3	1.7
0.05	20	1.7	2.8	3.4	5.4	1.7	2.2	2.4	3.2
0.10	10	2.6	3.9	4.9	7.6	2.9	3.6	4.1	5.6
0.20	5	4.3	6.1	7.6	12	5.3	6.5	7.7	11
0.50	2	11	14	18	27	17	20	25	38
0.80	1.25	29	34	42	68	55	64	82	126
0.90	1.11	47	55	67	113	99	116	151	230
0.96	1.04	77	92	110	199	187	221	287	431
0.98	1.02	106	128	152	289	281	336	433	640
0.99	1.01	140	175	204	409	404	490	626	909

IOWA RIVER BASIN
05455700 IOWA RIVER NEAR LONE TREE, IA

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

DRAINAGE AREA.--4,293 mi².

PERIOD OF RECORD.--October 1956 to September 1988.

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

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

REMARKS.--Flow regulated by Coralville Lake (station 05453510), 36.1 mi upstream, since Sept. 17, 1958. Insufficient data to compile pre-regulation statistics.

Rating table number 12, developed June 1977

Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
2.7	46.2	10.0	6,334
3.0	133	12.0	9,040
3.5	334	14.0	12,140
4.0	591	16.0	17,980
5.0	1,237	18.0	29,010
6.0	2,031	19.0	39,400
8.0	3,978		

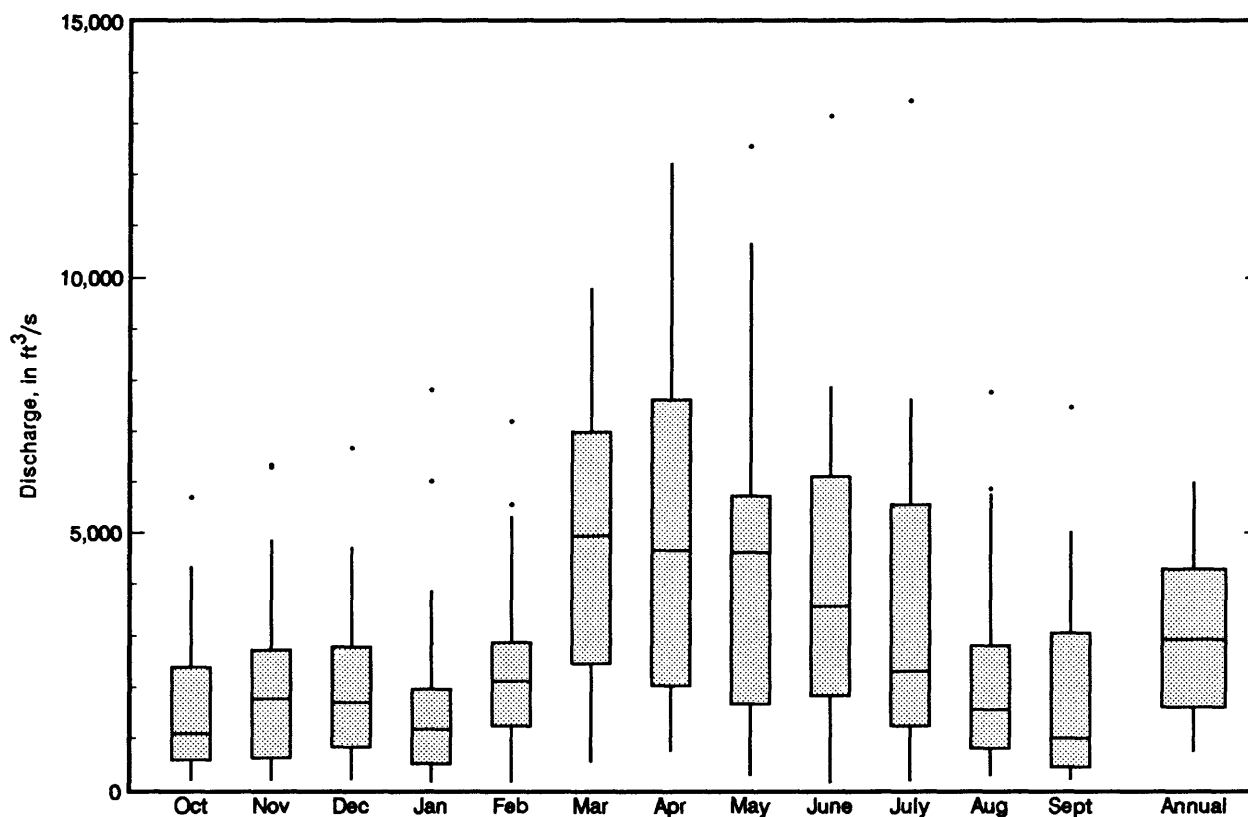
IOWA RIVER BASIN
05455700 IOWA RIVER NEAR LONE TREE, IA--Continued

Post-regulation Period

Statistics of monthly and annual mean discharges, post-regulation period

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	5,695	1987	195	1964	1,591	1,366	4.4
November	6,347	1962	190	1967	2,126	1,764	5.9
December	6,678	1983	203	1977	1,937	1,509	5.4
January	7,814	1973	154	1977	1,849	1,718	4.6
February	7,205	1973	158	1977	2,441	1,610	6.8
March	9,798	1961	539	1977	4,822	2,697	13.4
April	12,230	1979	760	1977	5,357	3,506	14.9
May	12,550	1973	282	1977	4,282	3,050	11.9
June	13,150	1974	147	1977	4,084	2,827	11.4
July	13,460	1969	180	1977	3,568	3,028	9.9
August	7,779	1969	283	1988	2,260	1,974	6.3
September	7,476	1965	210	1988	1,796	1,749	5.0
Annual	6,003	1973	748	1977	2,993	1,503	100.0

Boxplots of monthly and annual mean discharges, post-regulation period



IOWA RIVER BASIN
05455700 IOWA RIVER NEAR LONE TREE, IA--Continued

Monthly and annual flow duration, post-regulation period

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	140	141	240	403	228	144	81	212	167	174	172	170	160
95	190	300	520	846	492	278	275	271	204	190	194	226	228
90	244	509	739	1,290	707	576	472	330	230	209	282	346	350
85	314	663	989	1,530	989	740	702	404	255	235	372	432	476
80	372	792	1,270	1,780	1,150	1,100	837	506	316	295	430	537	616
75	423	948	1,680	2,030	1,370	1,450	975	591	389	525	578	644	749
70	490	1,090	2,010	2,320	1,710	1,800	1,140	661	457	609	775	730	902
65	610	1,200	2,380	2,670	1,980	2,160	1,360	726	520	719	897	865	1,100
60	725	1,310	2,760	3,080	2,430	2,640	1,580	797	591	823	1,080	1,100	1,290
55	861	1,430	3,210	3,520	3,070	3,110	1,860	873	669	926	1,250	1,230	1,530
50	1,010	1,540	3,690	3,990	3,760	3,910	2,280	1,020	754	1,020	1,480	1,390	1,800
45	1,150	1,690	4,230	4,660	4,320	4,330	2,940	1,250	961	1,150	1,720	1,580	2,090
40	1,280	1,900	4,820	5,690	4,820	4,750	3,910	1,520	1,200	1,370	1,950	1,800	2,500
35	1,460	2,070	5,620	6,490	5,280	5,140	4,310	2,040	1,470	1,670	2,240	2,070	3,040
30	1,650	2,290	6,720	7,370	5,740	5,520	4,700	2,830	1,880	1,960	2,600	2,360	3,820
25	1,860	2,660	7,520	8,370	6,220	5,990	5,420	4,010	2,390	2,300	3,080	2,660	4,480
20	2,100	3,360	8,360	9,700	6,680	6,480	6,080	4,730	3,400	2,670	3,990	3,070	5,170
15	2,570	4,310	9,390	10,500	7,370	7,090	6,760	5,140	4,370	3,200	4,470	3,750	6,030
10	4,300	5,980	10,600	11,300	8,080	7,790	7,640	5,540	5,010	3,820	5,090	4,500	7,250
5	6,530	8,870	12,000	12,400	11,000	9,700	9,700	6,450	5,570	4,700	5,980	5,530	9,610

Probability of annual high discharges, post-regulation period

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge ¹ (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	5,000	2,840	2,520	1,960	1,410
0.95	1.05	5,800	4,600	4,020	3,270	2,520
0.90	1.11	6,200	5,840	5,080	4,180	3,340
0.80	1.25	7,600	7,660	6,540	5,500	4,550
0.50	2	16,000	12,200	10,100	8,670	7,570
0.20	5	22,500	18,300	14,600	12,600	11,300
0.10	10	27,000	22,000	17,200	14,800	13,500
0.04	25	32,500	26,400	20,100	17,100	15,800
0.02	50	37,000	29,400	22,000	18,700	17,200
0.01	100	42,000	32,100	23,800	20,000	18,500

¹ Data supplied by U.S. Army Corps of Engineers, Rock Island District.

IOWA RIVER BASIN
05455700 IOWA RIVER NEAR LONE TREE, IA--Continued

Probability of annual low discharges, post-regulation period

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	65	66	68	74	88	85	94	115	176
0.02	50	76	79	81	89	105	108	123	150	229
0.05	20	97	102	107	117	138	153	182	222	335
0.10	10	122	129	138	151	178	209	257	312	463
0.20	5	163	173	187	205	243	305	387	465	672
0.50	2	289	309	338	374	455	629	820	972	1,300
0.80	1.25	534	567	618	686	887	1,300	1,680	1,950	2,340
0.90	1.11	748	788	851	970	1,280	1,890	2,410	2,770	3,110
0.96	1.04	1,090	1,130	1,200	1,390	1,910	2,830	3,510	3,970	4,110
0.98	1.02	1,390	1,430	1,510	1,760	2,500	3,670	4,440	4,980	4,880
0.99	1.01	1,750	1,770	1,850	2,180	3,190	4,640	5,470	6,080	5,660

Probability of seasonal low discharges, post-regulation period

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	73	86	97	114	76	85	98	123
0.02	50	94	109	122	146	110	123	145	190
0.05	20	136	154	171	212	186	210	254	348
0.10	10	186	209	230	294	289	329	407	570
0.20	5	270	300	328	434	477	550	691	984
0.50	2	534	582	638	899	1,130	1,340	1,710	2,390
0.80	1.25	1,010	1,100	1,220	1,820	2,370	2,920	3,690	4,800
0.90	1.11	1,400	1,510	1,690	2,610	3,340	4,210	5,230	6,450
0.96	1.04	1,940	2,100	2,400	3,810	4,660	6,010	7,320	8,430
0.98	1.02	2,390	2,580	2,990	4,840	5,660	7,440	8,930	9,780
0.99	1.01	2,860	3,100	3,840	5,990	6,710	8,920	10,500	11,000
		July-August-September				October-November-December			
0.01	100	79	86	92	122	80	84	83	82
0.02	50	91	101	108	142	99	105	107	111
0.05	20	115	129	140	182	137	147	155	173
0.10	10	144	163	179	232	182	198	215	253
0.20	5	192	220	246	319	259	285	321	395
0.50	2	358	419	487	639	508	578	686	883
0.80	1.25	730	870	1,060	1,440	1,000	1,180	1,460	1,860
0.90	1.11	1,100	1,320	1,660	2,320	1,430	1,730	2,160	2,690
0.96	1.04	1,750	2,120	2,750	4,010	2,100	2,610	3,290	3,920
0.98	1.02	2,400	2,930	3,880	5,840	2,700	3,400	4,300	4,940
0.99	1.01	3,230	3,960	5,360	8,310	3,370	4,330	5,480	6,060

IOWA RIVER BASIN
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 September 1988.

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

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 daily discharge, 60 ft³/s Nov. 23, 1977 and Jan. 7, 1978.

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

Rating table number 4, developed October 1975

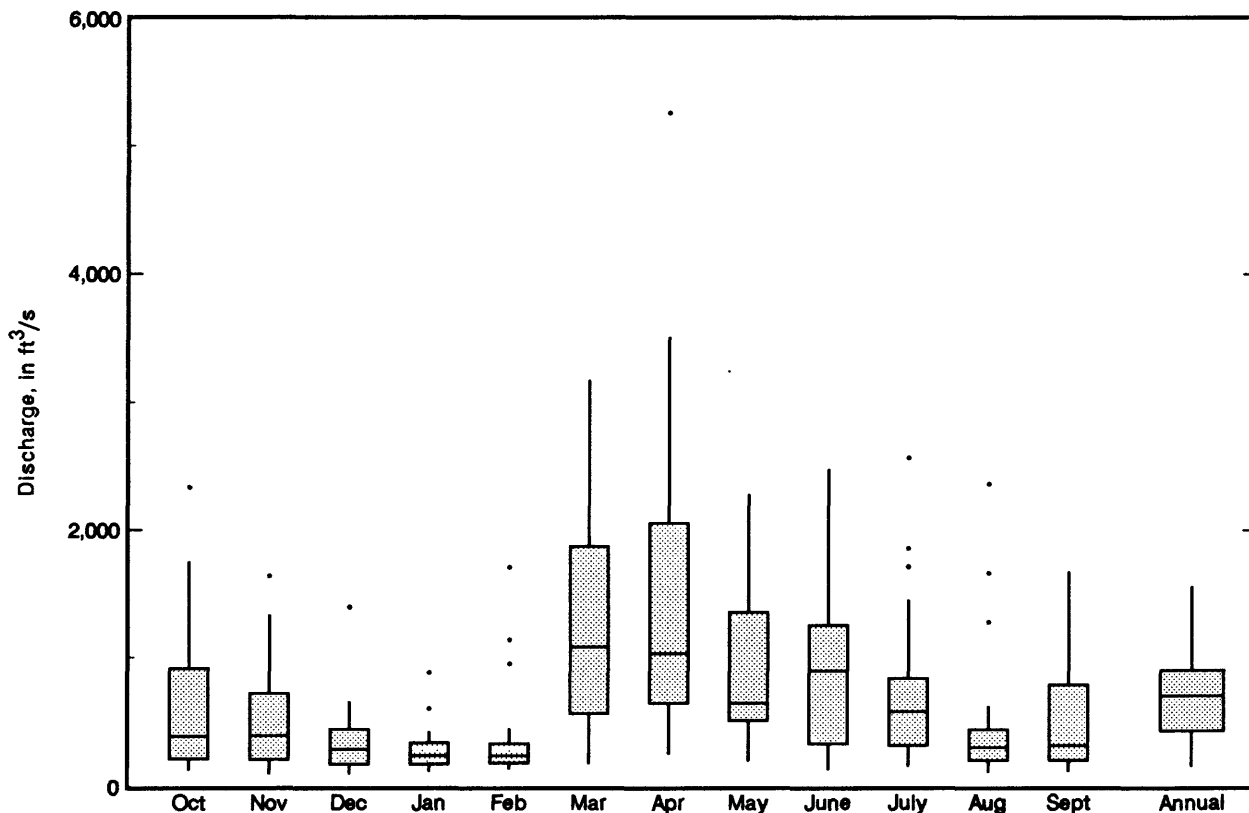
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
1.7	35	5.0	2,150
1.8	57	7.0	3,860
2.0	130	9.0	5,850
2.2	231	13.0	10,600
2.5	407	17.0	16,800
3.0	736	21.0	26,700
4.0	1,420		

IOWA RIVER BASIN
05457700 CEDAR RIVER AT CHARLES CITY, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	2,339	1987	126	1977	653	586	7.6
November	1,639	1983	97.7	1977	521	412	6.1
December	1,396	1983	96.8	1977	366	267	4.3
January	888	1973	117	1978	282	172	3.3
February	1,707	1984	135	1968	378	372	4.4
March	3,172	1983	176	1968	1,291	853	15.1
April	5,264	1965	251	1968	1,465	1,168	17.1
May	2,281	1982	197	1977	937	619	11.0
June	2,484	1969	130	1977	908	621	10.6
July	2,571	1978	159	1988	725	608	8.5
August	2,365	1980	114	1988	490	537	5.7
September	1,670	1965	116	1976	528	427	6.2
Annual	1,556	1983	159	1977	713	329	100.0

Boxplots of monthly and annual mean discharges



IOWA RIVER BASIN
05457700 CEDAR RIVER AT CHARLES CITY, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	88	105	103	71	156	118	106	95	90	122	85	75	98
95	105	124	156	255	213	163	139	124	114	145	129	112	130
90	119	145	191	365	280	222	171	143	152	167	160	132	160
85	132	157	225	428	324	256	198	164	174	184	180	152	182
80	149	169	256	472	361	282	225	181	187	200	197	173	200
75	169	178	284	524	392	318	253	197	200	211	213	186	219
70	181	186	341	583	428	359	284	213	210	221	230	199	239
65	193	194	393	642	466	401	316	229	220	232	253	225	265
60	207	203	457	700	513	446	349	246	230	249	288	252	293
55	222	213	519	773	565	492	390	262	241	280	348	279	329
50	238	222	576	859	620	582	428	278	262	331	373	304	366
45	253	232	693	990	678	674	463	294	282	428	396	328	405
40	268	244	817	1,100	775	758	502	313	316	490	426	353	458
35	284	268	969	1,230	901	839	557	332	356	562	467	377	524
30	304	292	1,170	1,400	1,040	923	629	352	401	651	528	400	613
25	327	321	1,510	1,640	1,200	1,020	745	391	476	769	628	432	739
20	350	349	1,960	1,950	1,350	1,170	899	455	587	933	750	470	912
15	386	385	2,680	2,460	1,550	1,390	1,140	571	770	1,180	875	535	1,160
10	455	478	3,440	2,990	1,900	1,800	1,480	1,010	1,110	1,460	1,100	645	1,550
5	598	990	4,800	4,460	2,550	2,700	2,280	1,850	1,850	2,070	1,450	846	2,510

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	—	439	398	306	258
0.95	1.05	2,680	1,190	927	683	556
0.90	1.11	3,690	1,860	1,380	998	797
0.80	1.25	5,300	2,980	2,120	1,510	1,180
0.50	2	9,770	6,010	4,180	2,910	2,160
0.20	5	16,300	9,520	6,960	4,790	3,390
0.10	10	20,400	11,200	8,540	5,870	4,040
0.04	25	25,400	12,600	10,200	7,010	4,700
0.02	50	28,700	13,400	11,200	7,710	5,090
0.01	100	31,900	13,900	12,000	8,310	5,400

IOWA RIVER BASIN
05457700 CEDAR RIVER AT CHARLES CITY, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	46	51	57	61	70	92	95	96	90
0.02	50	54	59	66	71	80	100	105	107	105
0.05	20	68	74	81	86	96	114	122	126	132
0.10	10	82	89	96	102	113	130	141	147	163
0.20	5	102	109	117	124	136	152	168	179	210
0.50	2	146	154	163	172	190	211	241	267	344
0.80	1.25	197	206	218	228	255	301	356	412	567
0.90	1.11	224	234	250	260	295	367	442	524	739
0.96	1.04	254	264	285	296	340	457	561	685	982
0.98	1.02	274	283	308	319	371	530	658	819	1,180
0.99	1.01	291	299	329	341	400	607	763	967	1,400

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	56	66	73	88	84	90	94	108
0.02	50	64	75	81	98	99	106	111	129
0.05	20	78	89	96	114	125	136	142	169
0.10	10	93	104	111	130	155	168	178	214
0.20	5	113	124	132	153	200	218	233	285
0.50	2	159	172	183	206	326	357	389	484
0.80	1.25	216	235	250	276	532	583	653	815
0.90	1.11	249	275	292	320	687	752	856	1,060
0.96	1.04	288	323	345	373	902	985	1,140	1,410
0.98	1.02	314	358	383	412	1,070	1,170	1,380	1,690
0.99	1.01	338	392	420	450	1,260	1,370	1,630	1,980
		July-August-September				October-November-December			
0.01	100	69	74	77	96	54	64	71	77
0.02	50	80	85	89	105	62	73	80	88
0.05	20	97	103	108	121	75	90	98	107
0.10	10	114	121	127	138	90	108	117	128
0.20	5	138	146	154	163	113	136	146	161
0.50	2	188	200	213	230	180	213	230	260
0.80	1.25	245	259	280	334	298	342	376	441
0.90	1.11	275	292	318	411	394	440	492	592
0.96	1.04	308	326	360	518	537	580	662	824
0.98	1.02	328	348	387	605	661	695	807	1,030
0.99	1.01	346	368	411	697	799	820	969	1,270

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 September 1988.

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

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.

Rating table number 11, developed October 1986

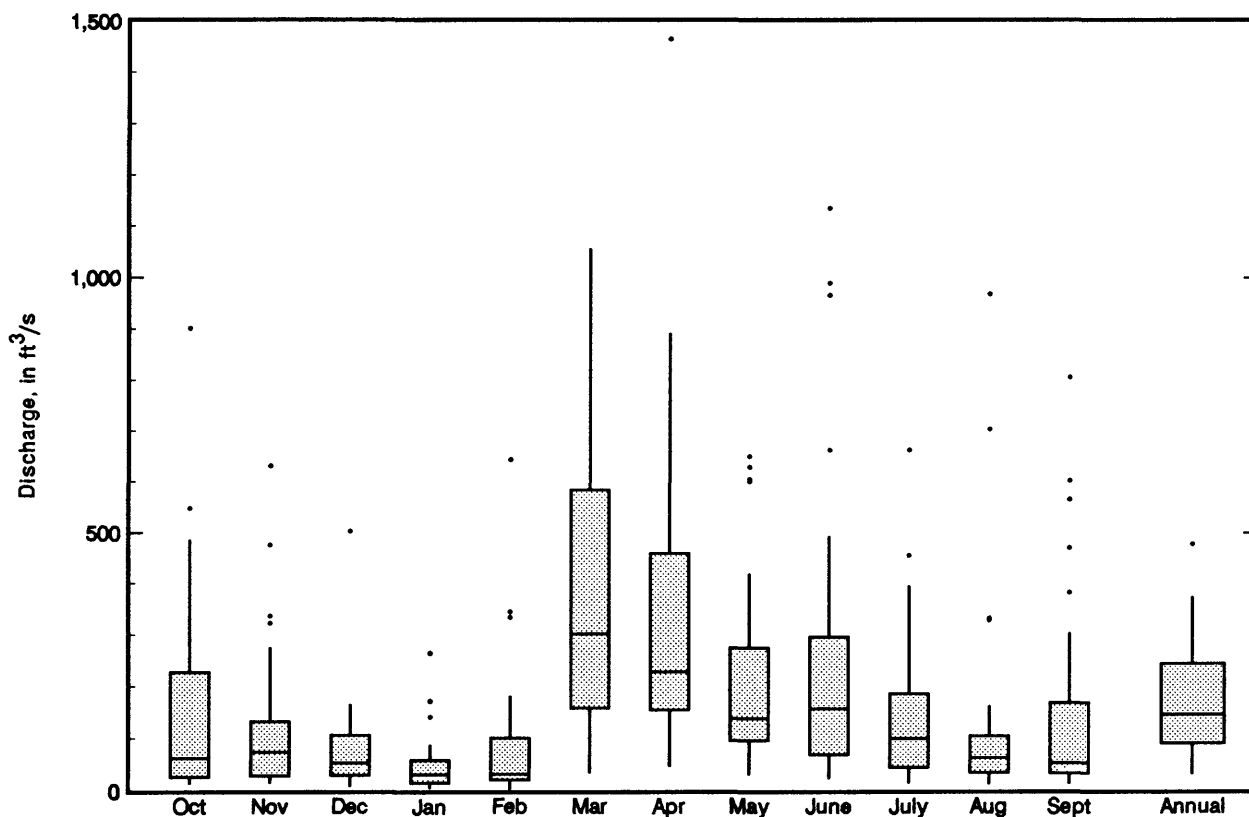
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
2.5	6.6	5.5	485
2.7	13	6.5	858
3.0	28	7.5	1,350
3.2	43	9.0	2,340
3.5	71	11.0	4,140
4.0	136	13.0	6,530
4.5	226	15.0	9,550

IOWA RIVER BASIN
05458000 LITTLE CEDAR RIVER NEAR IONIA, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	902	1987	13.0	1959	163	199	7.7
November	632	1983	14.6	1956	122	140	5.8
December	503	1983	7.51	1956	76.1	88.2	3.6
January	265	1973	4.20	1959	48.4	52.9	2.3
February	644	1984	3.40	1959	83.9	128	4.0
March	1,056	1981	34.5	1964	382	289	18.2
April	1,466	1965	47.3	1957	336	287	16.0
May	650	1973	30.5	1958	218	178	10.3
June	1,136	1969	23.5	1977	254	285	12.0
July	663	1969	14.2	1964	151	146	7.2
August	968	1980	11.5	1964	123	198	5.9
September	807	1965	12.7	1988	148	197	7.0
Annual	478	1983	32.0	1977	176	110	100.0

Boxplots of monthly and annual mean discharges



IOWA RIVER BASIN
05458000 LITTLE CEDAR RIVER NEAR IONIA, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	3.3	3.2	5.8	32	23	17	11	8.3	7.8	13	11	6.5	5.7
95	5.3	6.2	20	46	34	23	18	14	14	17	16	8.8	13
90	7.6	11	25	60	46	30	23	18	19	20	21	13	19
85	12	13	30	77	55	38	28	23	24	23	24	17	24
80	14	16	35	97	67	45	32	27	27	25	27	22	28
75	17	20	42	115	75	51	37	30	30	29	30	27	32
70	20	22	52	129	83	59	42	33	33	32	34	31	37
65	23	24	67	143	92	67	49	38	36	36	41	35	42
60	26	26	84	157	101	78	57	42	38	42	49	39	49
55	28	29	113	173	110	90	67	46	41	50	60	44	57
50	31	31	136	195	125	105	78	51	46	59	72	48	65
45	34	34	158	218	141	119	90	55	51	70	86	53	79
40	39	38	188	246	158	133	100	61	59	85	94	59	92
35	44	41	233	275	179	154	111	66	69	114	102	66	108
30	50	49	291	312	207	182	127	73	84	141	112	78	130
25	59	58	367	350	242	211	146	82	104	171	133	90	157
20	68	70	505	418	285	251	180	95	133	210	160	101	197
15	78	90	744	536	348	314	227	117	175	270	204	118	258
10	92	127	1,160	692	494	461	317	163	259	391	264	152	359
5	125	298	1,640	1,010	724	875	578	428	459	644	399	205	682

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	242	108	87	59	47
0.95	1.05	550	287	216	146	112
0.90	1.11	825	459	335	226	169
0.80	1.25	1,310	774	548	367	268
0.50	2	2,930	1,840	1,240	821	571
0.20	5	5,890	3,700	2,420	1,570	1,040
0.10	10	8,150	5,020	3,250	2,090	1,350
0.04	25	11,200	6,660	4,280	2,710	1,710
0.02	50	13,500	7,820	5,000	3,150	1,950
0.01	100	15,900	8,910	5,690	3,550	2,160

IOWA RIVER BASIN
05458000 LITTLE CEDAR RIVER NEAR IONIA, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	2.2	2.2	2.2	2.3	2.5	3.2	4.0	5.2	6.0
0.02	50	3.0	3.0	3.0	3.1	3.3	4.2	5.3	6.7	7.8
0.05	20	4.5	4.5	4.5	4.7	5.1	6.4	7.9	9.7	11
0.10	10	6.3	6.3	6.5	6.7	7.4	9.0	11	14	16
0.20	5	9.3	9.4	9.7	10	11	14	17	20	25
0.50	2	18	19	20	21	23	29	36	42	56
0.80	1.25	32	35	36	38	44	56	73	86	127
0.90	1.11	42	46	48	51	59	79	105	124	197
0.96	1.04	55	61	64	68	80	110	153	181	313
0.98	1.02	65	73	75	81	95	136	193	232	423
0.99	1.01	74	84	87	93	111	163	238	288	555

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	2.2	2.2	2.3	2.7	9.9	11	12	15
0.02	50	3.0	3.0	3.1	3.6	12	14	14	19
0.05	20	4.6	4.6	4.8	5.5	16	18	19	25
0.10	10	6.6	6.7	7.0	8.0	20	23	25	34
0.20	5	10.0	10	11	12	27	31	35	47
0.50	2	21	22	23	27	49	56	65	88
0.80	1.25	39	42	45	54	90	102	121	167
0.90	1.11	53	58	62	75	124	140	168	233
0.96	1.04	71	80	85	107	175	197	239	332
0.98	1.02	84	96	103	132	218	246	301	418
0.99	1.01	98	113	121	159	267	301	370	513
		July-August-September				October-November-December			
0.01	100	4.9	5.3	5.8	7.2	4.3	4.7	4.9	5.7
0.02	50	6.1	6.7	7.2	8.7	5.4	5.9	6.3	7.2
0.05	20	8.5	9.3	9.9	12	7.5	8.4	9.0	10
0.10	10	11	12	13	15	10	11	12	14
0.20	5	15	17	18	21	14	17	18	20
0.50	2	27	30	32	37	28	34	37	43
0.80	1.25	45	49	54	68	56	67	75	92
0.90	1.11	57	62	69	90	80	95	109	137
0.96	1.04	72	78	89	123	118	138	162	212
0.98	1.02	83	90	105	152	151	175	209	281
0.99	1.01	93	102	120	183	189	217	262	363

IOWA RIVER BASIN
05458500 CEDAR RIVER AT JANESVILLE, IA

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

DRAINAGE AREA.--1,661 mi².

PERIOD OF RECORD.--October 1904 to September 1906, October 1914 to September 1927, October 1932 to September 1942, October 1945 to September 1988. 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 FOR PERIOD OF RECORD.--Maximum discharge, 37,000 ft³/s Mar. 28, 1961, gage height, 16.33 ft; minimum daily discharge, 28 ft³/s Oct. 21, 1922.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Mar. 17, 1945, reached a stage of 16.2 ft, from floodmark at site 300 ft upstream, discharge, 34,300 ft³/s. Flood of Mar. 16, 1929, reached a stage of about 16 ft, from information by City of Waterloo, discharge not determined.

Rating table number 8, developed February 1975

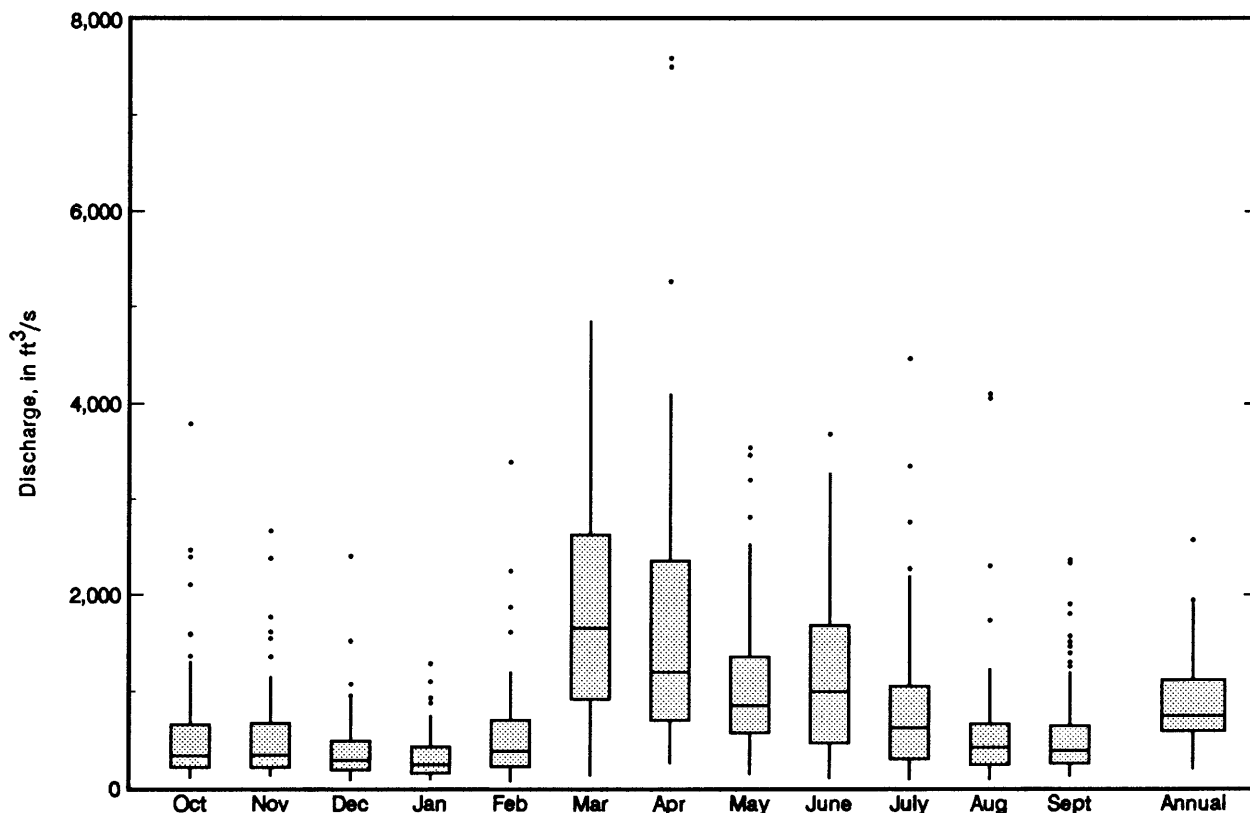
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
0.8	77	5.0	4,410
1.0	140	6.0	5,640
1.5	396	8.0	8,330
2.0	792	10.0	12,200
2.5	1,340	12.0	17,500
3.0	1,970	14.0	24,500
4.0	3,240		

IOWA RIVER BASIN
05458500 CEDAR RIVER AT JANESVILLE, IA—Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	3,793	1987	101	1935	615	690	5.9
November	2,672	1983	121	1934	549	513	5.3
December	2,404	1983	75.2	1934	400	365	3.9
January	1,293	1983	80.3	1917	332	255	3.2
February	3,393	1984	61.2	1959	546	541	5.3
March	4,851	1973	124	1934	1,853	1,177	17.9
April	7,598	1951	247	1957	1,705	1,510	16.5
May	3,546	1982	134	1934	1,105	831	10.7
June	3,686	1984	95.2	1934	1,174	874	11.3
July	4,470	1969	84.7	1934	856	788	8.3
August	4,104	1980	83.6	1934	618	722	6.0
September	2,372	1980	117	1934	597	531	5.8
Annual	2,579	1983	187	1934	864	460	100.0

Boxplots of monthly and annual mean discharges



IOWA RIVER BASIN
05458500 CEDAR RIVER AT JANESVILLE, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	75	55	116	196	129	35	80	80	77	86	86	72	78
95	88	83	189	277	202	165	138	134	130	128	137	99	122
90	101	113	238	364	273	215	179	160	157	157	164	122	157
85	116	138	289	436	322	266	215	185	181	179	184	141	186
80	133	164	364	519	377	319	250	208	207	199	202	160	213
75	149	189	449	585	444	372	282	230	233	217	221	177	242
70	164	208	524	646	511	425	323	253	262	235	240	194	273
65	179	227	646	725	572	496	366	275	289	258	260	212	308
60	195	249	748	809	627	566	411	304	314	281	262	230	345
55	215	272	848	892	685	633	463	333	339	308	317	259	389
50	234	298	951	976	749	708	518	367	366	335	353	287	437
45	259	325	1,120	1,100	813	788	588	404	395	366	396	317	501
40	286	353	1,320	1,240	899	899	670	444	425	403	444	346	571
35	325	401	1,530	1,420	987	1,030	761	487	469	451	510	382	650
30	365	460	1,830	1,650	1,100	1,180	863	531	517	532	577	420	759
25	406	535	2,230	1,930	1,230	1,380	979	588	584	632	645	476	894
20	457	628	2,760	2,340	1,470	1,630	1,140	650	674	778	742	540	1,080
15	526	770	3,520	2,820	1,830	1,940	1,370	801	812	976	873	634	1,380
10	632	1,040	4,670	3,580	2,440	2,570	1,770	1,060	1,100	1,270	1,170	797	1,890
5	890	1,900	6,480	5,090	3,430	3,840	2,720	1,850	1,840	2,110	1,690	1,100	3,090

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	1,230	896	743	553	421
0.95	1.05	2,480	1,860	1,460	1,060	803
0.90	1.11	3,500	2,650	2,030	1,480	1,100
0.80	1.25	5,190	3,930	2,930	2,120	1,550
0.50	2	10,200	7,580	5,440	3,830	2,730
0.20	5	18,400	13,000	9,070	6,180	4,330
0.10	10	24,100	16,500	11,400	7,620	5,280
0.04	25	31,300	20,600	14,100	9,240	6,350
0.02	50	36,600	23,300	15,900	10,300	7,050
0.01	100	41,700	25,900	17,600	11,300	7,670

IOWA RIVER BASIN
05458500 CEDAR RIVER AT JANESVILLE, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	30	39	40	44	53	62	66	77	82
0.02	50	36	45	47	51	60	71	76	88	96
0.05	20	47	57	59	64	74	87	95	109	120
0.10	10	60	70	73	79	90	105	116	132	149
0.20	5	80	90	94	101	114	133	148	169	195
0.50	2	135	146	153	164	182	214	247	278	337
0.80	1.25	226	240	252	270	299	359	426	478	607
0.90	1.11	293	313	328	352	392	477	576	646	840
0.96	1.04	385	416	436	468	526	655	803	901	1,210
0.98	1.02	459	500	524	563	640	809	1,000	1,130	1,530
0.99	1.01	536	591	619	667	765	982	1,230	1,380	1,910

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	41	43	46	52	56	79	88	105
0.02	50	49	51	55	61	68	96	106	128
0.05	20	62	66	70	78	92	129	142	172
0.10	10	78	82	87	97	120	167	183	224
0.20	5	101	107	113	127	166	227	248	305
0.50	2	165	179	188	216	306	400	440	549
0.80	1.25	270	296	311	377	564	687	771	976
0.90	1.11	347	383	404	509	775	902	1,030	1,310
0.96	1.04	454	505	535	704	1,090	1,200	1,390	1,790
0.98	1.02	539	602	641	872	1,350	1,440	1,690	2,190
0.99	1.01	629	705	755	1,060	1,640	1,680	2,020	2,620
		July-August-September				October-November-December			
0.01	100	43	59	67	87	39	60	64	72
0.02	50	52	71	79	99	46	68	72	81
0.05	20	68	93	102	122	61	83	88	99
0.10	10	87	116	127	147	77	100	107	120
0.20	5	116	152	165	185	103	127	136	154
0.50	2	194	244	262	291	178	208	225	259
0.80	1.25	314	375	402	466	308	359	396	470
0.90	1.11	398	463	497	601	409	488	544	661
0.96	1.04	507	573	616	792	553	688	778	972
0.98	1.02	590	653	703	950	672	867	990	1,260
0.99	1.01	673	732	790	1,120	800	1,070	1,240	1,610

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 September 1988.

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.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 31,900 ft³/s June 27, 1951, gage height, 17.28 ft, from floodmarks; 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.

REMARKS.--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.

Rating table number 11, developed October 1986

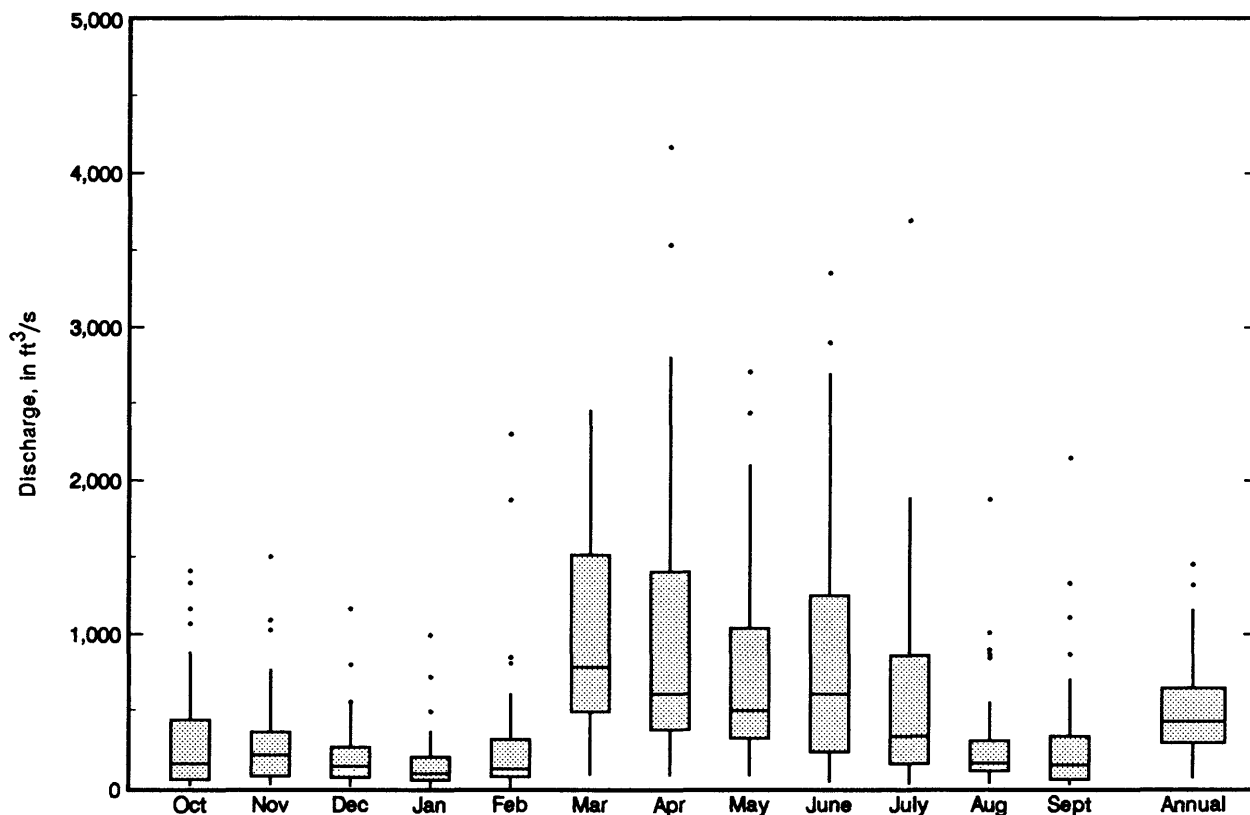
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
4.5	28.9	11.0	2,780
5.0	101	12.0	4,200
5.5	196	13.0	6,450
6.0	303	14.0	9,690
7.0	584	15.0	13,900
8.0	953	16.0	19,600
9.0	1,400	17.0	27,300
10.0	1,940		

IOWA RIVER BASIN
05458900 WEST FORK CEDAR RIVER AT FINCHFORD, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	1,412	1973	18.0	1957	320	370	5.2
November	1,502	1973	22.3	1959	291	310	4.8
December	1,165	1983	14.2	1959	221	226	3.6
January	995	1973	9.35	1959	157	188	2.6
February	2,303	1984	6.37	1959	296	451	4.8
March	2,456	1961	86.2	1954	1,011	744	16.6
April	4,170	1965	81.8	1957	1,002	907	16.4
May	2,707	1983	80.1	1957	724	644	11.9
June	3,358	1984	39.5	1977	879	857	14.4
July	3,694	1969	26.6	1977	620	699	10.2
August	1,877	1979	29.3	1956	286	346	4.7
September	2,149	1965	21.3	1955	295	411	4.8
Annual	1,454	1983	65.5	1956	509	339	100.0

Boxplots of monthly and annual mean discharges



IOWA RIVER BASIN
05458900 WEST FORK CEDAR RIVER AT FINCHFORD, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	8.1	6.6	37	73	52	34	23	21	17	15	20	13	13
95	12	14	75	103	89	70	53	34	24	26	28	24	30
90	23	25	97	153	127	102	80	45	30	35	44	36	45
85	33	41	115	228	160	130	104	60	39	43	55	46	60
80	43	47	132	285	202	162	123	79	49	49	65	57	76
75	49	54	160	324	251	196	141	91	58	57	78	68	93
70	58	63	205	365	294	232	160	102	67	65	94	83	111
65	66	72	265	412	327	274	182	114	78	81	115	102	130
60	75	82	330	463	359	319	209	128	90	113	139	119	152
55	85	90	391	524	393	369	244	141	103	135	164	135	178
50	95	99	452	592	428	426	287	154	117	152	191	149	214
45	106	107	534	695	482	493	342	167	132	169	220	163	257
40	118	122	647	804	548	561	410	188	155	218	254	183	306
35	132	152	793	920	635	669	491	209	183	272	290	210	362
30	154	191	969	1,090	740	803	588	238	217	324	334	242	428
25	181	235	1,180	1,270	877	971	707	274	272	401	381	278	523
20	219	291	1,430	1,480	1,080	1,170	876	330	342	507	429	329	662
15	260	384	1,840	1,770	1,330	1,460	1,110	417	428	639	507	399	875
10	340	541	2,650	2,190	1,680	1,890	1,420	600	610	810	629	501	1,230
5	491	1,080	4,090	3,060	2,300	3,190	2,130	1,020	1,140	1,160	958	674	1,910

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	305	247	206	168	125
0.95	1.05	777	664	543	421	318
0.90	1.11	1,230	1,060	859	650	493
0.80	1.25	2,070	1,800	1,420	1,050	793
0.50	2	5,080	4,220	3,220	2,290	1,690
0.20	5	10,900	8,280	6,060	4,200	2,980
0.10	10	15,500	11,000	7,900	5,420	3,750
0.04	25	21,900	14,300	10,000	6,820	4,570
0.02	50	26,700	16,600	11,400	7,740	5,090
0.01	100	31,600	18,600	12,600	8,560	5,520

IOWA RIVER BASIN
05458900 WEST FORK CEDAR RIVER AT FINCHFORD, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	4.6	4.7	4.8	5.1	5.7	7.0	8.8	11	12
0.02	50	6.3	6.5	6.7	7.0	7.9	9.6	12	14	17
0.05	20	10	10	11	11	13	15	19	22	27
0.10	10	15	15	16	17	19	23	27	33	39
0.20	5	23	24	24	26	29	35	43	52	63
0.50	2	49	50	52	56	63	78	97	117	147
0.80	1.25	94	96	100	107	124	159	207	252	324
0.90	1.11	127	129	134	145	169	224	301	368	481
0.96	1.04	170	172	179	194	229	313	440	542	722
0.98	1.02	202	203	212	230	274	384	558	691	930
0.99	1.01	234	235	244	266	320	458	686	855	1,160

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	4.7	4.9	5.3	6.3	20	22	23	31
0.02	50	6.7	6.9	7.3	8.6	26	29	31	41
0.05	20	11	11	12	14	40	44	48	62
0.10	10	17	17	18	20	57	63	70	89
0.20	5	27	28	29	33	87	97	108	137
0.50	2	62	65	68	78	189	212	239	305
0.80	1.25	129	136	145	177	393	444	505	653
0.90	1.11	181	194	210	266	567	641	731	959
0.96	1.04	253	275	304	405	827	936	1,070	1,430
0.98	1.02	310	340	381	528	1,050	1,190	1,360	1,840
0.99	1.01	368	407	464	666	1,290	1,460	1,670	2,300
		July-August-September				October-November-December			
0.01	100	9.4	10	11	14	6.9	8.4	9.2	10
0.02	50	12	13	14	17	9.3	11	12	14
0.05	20	17	19	20	24	14	17	18	21
0.10	10	24	25	27	32	21	24	26	31
0.20	5	35	37	39	47	32	37	41	48
0.50	2	68	73	79	95	73	84	91	111
0.80	1.25	128	141	156	197	158	183	201	251
0.90	1.11	176	196	222	291	231	273	302	379
0.96	1.04	243	277	322	443	344	416	461	586
0.98	1.02	297	345	409	583	441	543	605	774
0.99	1.01	355	419	506	748	548	688	771	990

IOWA RIVER BASIN
05459000 SHELL ROCK RIVER NEAR NORTHWOOD, IA

LOCATION.--Lat 43°24'51", long 93°13'14", in NW1/4 NW1/4 sec. 9, T.99 N., R.20 W., Worth County, Hydrologic Unit 07080202, on right bank 50 ft downstream from bridge on county highway A27, 1.3 mi downstream from drainage ditch 2, 2.0 mi south of Northwood, 3.7 mi upstream from Elk Creek and 84.5 mi upstream from mouth.

DRAINAGE AREA.--300 mi².

PERIOD OF RECORD.--October 1945 to September 30, 1986 (discontinued).

GAGE.--Water-stage recorder. Datum of gage is 1,176.48 ft above NGVD. Prior to May 17, 1956, nonrecording gage at same site and datum.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,400 ft³/s Apr. 8, 1965, gage height, 12.07 ft, backwater from ice; no flow Jan. 14-19, 26-30, 1977.

Rating table number 3, developed October 1967

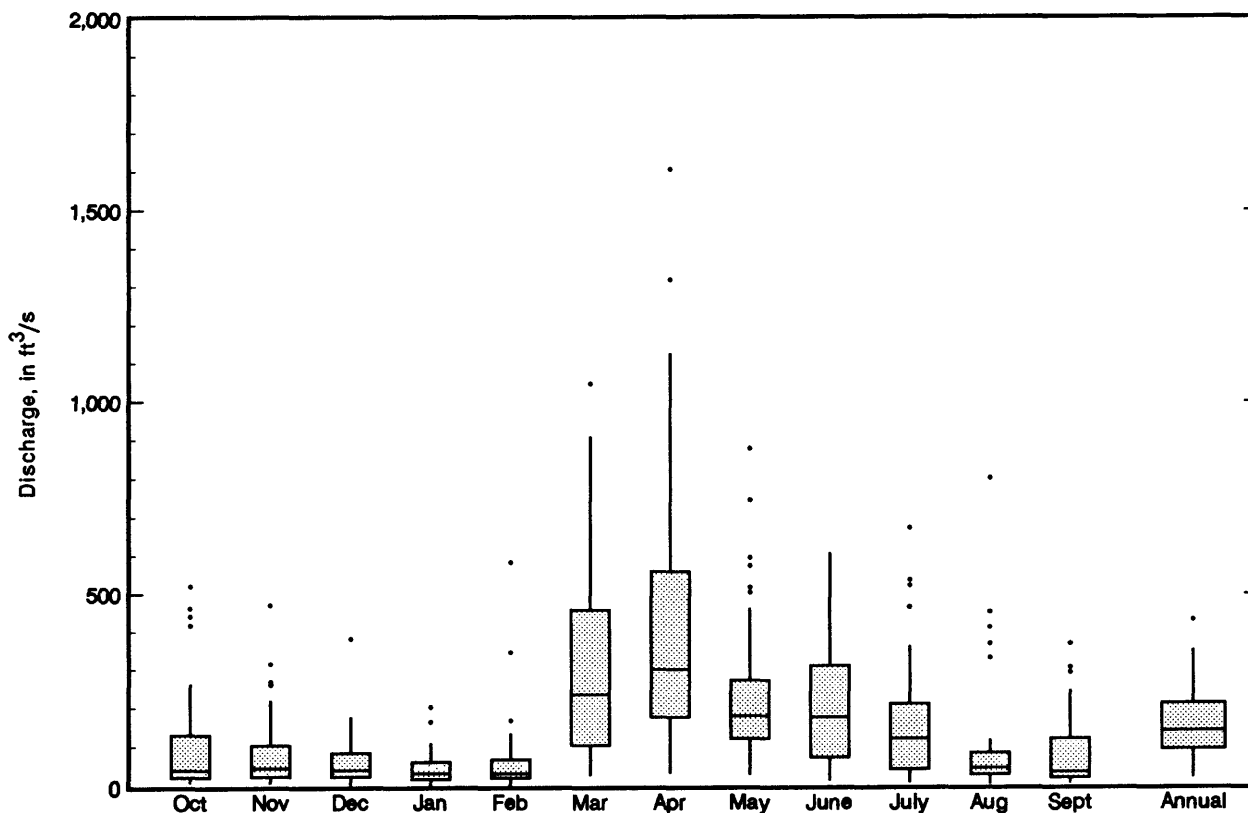
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
3.5	8.40	6.0	535
3.7	19.8	7.0	901
4.0	48.1	9.0	1,880
4.5	138	11.0	3,250
5.0	255		

IOWA RIVER BASIN
05459000 SHELL ROCK RIVER NEAR NORTHWOOD, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	520	1969	9.10	1977	109	132	5.6
November	470	1983	8.08	1959	96.1	100	5.0
December	383	1983	3.76	1959	69.2	69.1	3.6
January	203	1983	0.18	1977	45.8	41.3	2.4
February	584	1984	0.42	1959	67.5	103	3.5
March	1,048	1973	27.1	1959	295	252	15.2
April	1,606	1965	34.7	1957	438	358	22.6
May	879	1984	29.9	1977	244	195	12.6
June	608	1975	14.8	1977	214	162	11.0
July	674	1969	9.61	1984	168	161	8.7
August	803	1968	5.41	1984	102	155	5.3
September	369	1968	7.21	1976	89.2	98.0	4.6
Annual	430	1983	21.7	1977	162	88.8	100.0

Boxplots of monthly and annual mean discharges



IOWA RIVER BASIN
05459000 SHELL ROCK RIVER NEAR NORTHWOOD, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.01	0.22	2.6	27	20	13	7.1	4.1	6.0	8.1	7.5	3.4	3.3
95	2.7	7.1	23	47	35	25	14	9.4	10	13	14	9.9	13
90	11	12	27	85	54	35	18	15	16	16	18	16	18
85	15	15	33	113	69	42	23	18	18	18	21	20	22
80	18	18	40	134	83	50	29	21	20	20	24	23	26
75	21	21	47	156	98	60	36	24	23	23	27	26	29
70	23	23	56	179	110	70	45	27	25	26	30	29	34
65	25	25	64	201	122	83	56	30	27	29	35	33	40
60	27	27	80	228	135	95	68	33	30	33	41	37	46
55	29	29	98	257	150	112	82	38	33	39	47	42	56
50	32	31	137	286	167	131	96	43	37	44	57	46	66
45	36	36	184	319	184	156	114	47	41	56	67	53	82
40	41	40	230	368	201	183	133	54	45	74	79	60	99
35	46	45	272	417	226	211	156	60	54	97	91	67	121
30	52	51	321	474	259	250	187	66	66	115	105	78	146
25	59	59	410	581	291	290	219	83	90	132	121	88	186
20	66	66	515	696	352	346	262	103	123	163	136	99	235
15	83	90	640	856	448	420	304	132	183	202	180	122	298
10	105	121	839	1,040	575	534	414	206	262	282	238	152	426
5	134	205	1,150	1,330	768	734	615	530	391	450	310	205	665

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	245	131	114	89	77
0.95	1.05	413	282	244	193	155
0.90	1.11	535	403	349	277	216
0.80	1.25	719	592	515	412	314
0.50	2	1,200	1,080	953	773	579
0.20	5	1,880	1,660	1,510	1,250	945
0.10	10	2,310	1,970	1,820	1,510	1,170
0.04	25	2,830	2,270	2,140	1,790	1,410
0.02	50	3,190	2,440	2,340	1,970	1,580
0.01	100	3,530	2,570	2,500	2,110	1,720

IOWA RIVER BASIN
05459000 SHELL ROCK RIVER NEAR NORTHWOOD, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	10.0	0.70	1.8	2.9	4.7
0.02	50	0.00	0.00	0.00	0.00	10.0	1.4	2.9	4.3	6.3
0.05	20	1.2	1.2	1.3	1.4	10.0	3.3	5.6	7.3	9.5
0.10	10	3.2	3.3	3.5	3.9	10.0	6.5	9.3	11	14
0.20	5	7.2	7.5	8.0	8.7	100	13	16	18	21
0.50	2	18	19	20	21	100	31	36	41	48
0.80	1.25	27	27	29	31	100	49	64	78	102
0.90	1.11	29	30	31	33	100	55	78	103	150
0.96	1.04	30	31	32	34	100	58	92	133	223
0.98	1.02	31	31	33	35	100	60	100	155	287
0.99	1.01	31	31	33	35	100	60	106	174	359

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.57	0.58	0.64	100	8.2	11	13	15
0.02	50	1.1	1.1	1.3	100	9.9	13	15	19
0.05	20	2.8	2.9	3.1	100	13	17	20	26
0.10	10	5.5	5.8	6.2	100	17	22	26	35
0.20	5	11	12	12	100	24	30	36	49
0.50	2	28	30	31	100	48	58	68	96
0.80	1.25	47	49	51	100	100	118	137	188
0.90	1.11	54	56	58	100	151	175	202	268
0.96	1.04	58	60	62	100	238	270	309	390
0.98	1.02	60	62	64	100	322	359	410	498
0.99	1.01	61	62	65	100	426	468	531	620
		July-August-September				October-November-December			
0.01	100	4.0	4.7	5.1	5.4	2.6	3.3	3.8	4.6
0.02	50	4.7	5.4	5.9	6.4	3.5	4.4	4.9	6.0
0.05	20	6.1	6.9	7.4	8.3	5.4	6.5	7.3	8.9
0.10	10	7.8	8.7	9.3	11	7.8	9.2	10	12
0.20	5	11	12	12	15	12	14	15	19
0.50	2	19	21	23	29	26	29	33	40
0.80	1.25	36	41	45	60	54	60	68	84
0.90	1.11	51	60	66	91	77	86	98	123
0.96	1.04	74	91	103	145	110	124	144	184
0.98	1.02	96	121	139	198	138	157	184	238
0.99	1.01	121	157	183	266	168	193	228	299

IOWA RIVER BASIN
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 September 1988. Prior to October 1959, published as Lime Creek at Mason City.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 10,800 ft³/s Mar. 30, 1933, gage height, 15.7 ft; minimum discharge, 0.86 ft³/s Aug. 18, 19, 1988.

Rating table number 6, developed October 1979

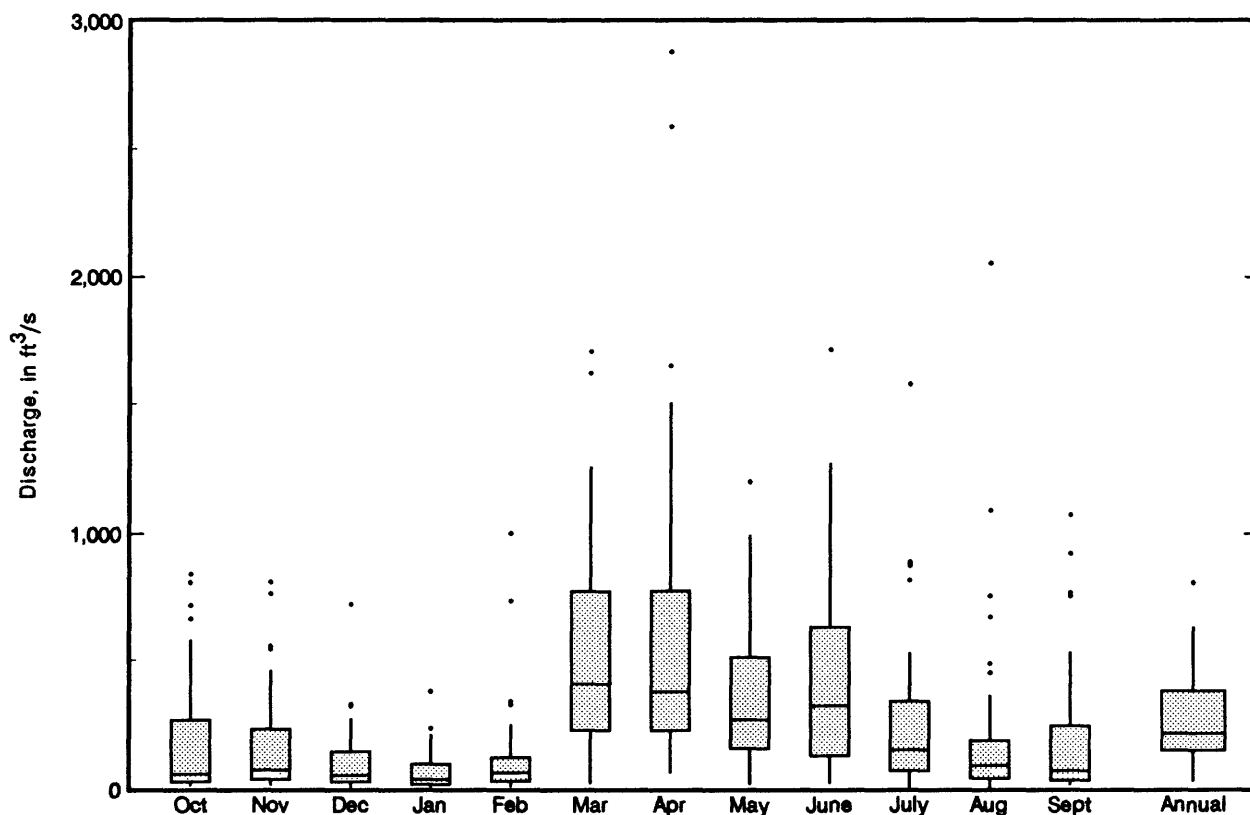
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
2.8	4.7	5.0	793
3.0	27	6.0	1,410
3.3	88	8.0	2,940
3.5	143	10.0	4,700
4.0	316	12.0	6,600
4.5	540		

IOWA RIVER BASIN
05459500 WINNEBAGO RIVER AT MASON CITY, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	840	1966	11.3	1935	176	216	5.6
November	811	1942	12.7	1934	162	184	5.1
December	724	1983	7.45	1934	102	118	3.3
January	378	1983	6.61	1977	71.6	78.4	2.3
February	1,002	1984	7.50	1959	112	168	3.6
March	1,707	1973	17.6	1934	513	384	16.3
April	2,880	1965	61.0	1957	575	560	18.3
May	1,202	1984	16.1	1934	363	284	11.6
June	1,715	1984	21.9	1934	431	380	13.7
July	1,579	1969	7.29	1934	258	288	8.2
August	2,054	1979	4.89	1934	194	324	6.2
September	1,073	1938	12.6	1933	183	239	5.8
Annual	809	1983	28.1	1934	262	160	100.0

Boxplots of monthly and annual mean discharges



IOWA RIVER BASIN
05459500 WINNEBAGO RIVER AT MASON CITY, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equalled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	5.0	6.2	12	39	17	13	6.6	4.8	7.8	7.6	9.8	5.6	7.1
95	9.4	8.9	20	68	45	26	14	13	13	15	17	13	14
90	12	12	33	97	65	43	25	17	17	20	21	17	20
85	14	15	46	126	85	58	34	24	21	24	26	20	26
80	17	19	58	152	103	75	43	30	26	27	30	24	32
75	20	23	75	180	121	96	54	36	33	32	35	27	40
70	23	26	94	210	140	114	66	42	39	37	40	31	48
65	26	29	126	239	162	131	78	49	46	43	47	36	57
60	30	33	167	268	181	150	94	55	53	48	54	41	69
55	34	37	211	306	200	174	111	62	60	54	62	48	83
50	39	43	252	347	224	205	128	72	68	59	74	56	101
45	45	49	301	398	252	249	151	83	75	72	95	66	125
40	54	56	364	455	284	303	179	95	87	93	125	79	152
35	64	65	447	522	323	367	209	109	102	133	154	95	186
30	73	77	541	600	379	438	253	124	125	185	184	117	228
25	84	91	669	686	451	524	301	148	160	236	214	138	281
20	98	113	834	820	539	633	361	189	220	290	250	156	361
15	125	149	1,050	1,000	697	788	466	264	314	370	309	189	483
10	154	202	1,360	1,240	868	1,060	618	436	459	486	414	236	669
5	241	382	1,860	1,800	1,170	1,590	930	877	745	671	567	323	1,070

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	—	325	227	154	112
0.95	1.05	1,010	605	448	315	231
0.90	1.11	1,330	824	625	445	328
0.80	1.25	1,840	1,180	908	654	483
0.50	2	3,270	2,180	1,710	1,250	916
0.20	5	5,560	3,760	2,900	2,120	1,530
0.10	10	7,190	4,860	3,680	2,680	1,920
0.04	25	9,340	6,250	4,610	3,340	2,350
0.02	50	11,000	7,280	5,250	3,790	2,640
0.01	100	12,600	8,280	5,860	4,200	2,900

IOWA RIVER BASIN
05459500 WINNEBAGO RIVER AT MASON CITY, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	2.4	2.5	2.8	3.2	3.4	4.4	5.1	6.2	6.4
0.02	50	3.1	3.3	3.7	4.1	4.4	5.6	6.6	7.9	8.4
0.05	20	4.6	4.8	5.3	5.9	6.4	8.1	9.6	11	13
0.10	10	6.4	6.7	7.3	8.1	8.8	11	13	16	19
0.20	5	9.4	10.0	11	12	13	17	20	24	30
0.50	2	19	20	21	23	26	35	44	52	70
0.80	1.25	36	39	41	45	53	72	95	117	168
0.90	1.11	49	53	57	62	74	104	143	180	264
0.96	1.04	68	74	80	88	106	154	220	286	429
0.98	1.02	83	90	99	110	134	199	291	387	587
0.99	1.01	99	108	119	133	164	249	375	509	778

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	3.2	3.7	4.0	4.6	6.8	8.4	9.7	15
0.02	50	4.1	4.7	5.0	5.7	9.3	11	13	20
0.05	20	5.9	6.6	7.0	8.0	15	18	21	31
0.10	10	8.1	8.9	9.4	11	21	26	31	44
0.20	5	12	13	14	16	34	41	48	69
0.50	2	24	26	27	33	76	91	107	151
0.80	1.25	49	53	57	69	163	190	222	308
0.90	1.11	71	78	83	104	236	272	316	436
0.96	1.04	104	116	125	159	344	391	451	620
0.98	1.02	134	151	164	211	435	490	561	770
0.99	1.01	167	191	209	273	534	595	677	929
		July-August-September				October-November-December			
0.01	100	2.4	4.0	4.4	5.2	3.3	4.4	5.0	6.0
0.02	50	3.4	5.3	5.9	6.8	4.2	5.5	6.3	7.6
0.05	20	5.5	8.0	8.8	10	6.2	7.9	9.0	11
0.10	10	8.3	11	13	15	8.9	11	12	15
0.20	5	13	17	19	22	14	16	19	23
0.50	2	30	36	40	49	31	37	42	51
0.80	1.25	62	71	79	105	73	86	98	121
0.90	1.11	88	99	110	155	114	137	157	195
0.96	1.04	122	137	155	233	185	228	262	327
0.98	1.02	150	169	191	302	253	320	368	461
0.99	1.01	177	202	230	381	337	436	502	631

IOWA RIVER BASIN
05460500 SHELL ROCK RIVER AT MARBLE ROCK, IA

LOCATION.--Lat 42°58'00", long 92°52'00', in SE1/4 sec. 8, T.94 N., R.17 W., Floyd County, Hydrologic Unit 07080202, on left wingwall of dam at Marble Rock, 0.5 mi upstream from unnamed creek entering from right bank and 10 mi downstream from Lime Creek.

DRAINAGE AREA.--1,330 mi².

PERIOD OF RECORD.--July 1933 to September 1953 (discontinued).

GAGE.--Staff gage read once daily, more often at high stages. Datum of gage is 961.17 NGVD. Prior to Oct. 1, 1942 staff gage at Greene, 6 mi downstream at different datum. Oct 1, 1942 to Mar. 12, 1945 water-stage recorder, Mar. 13, 1945 to June 5, 1946 staff gage and June 6, 1946 to June 19, 1950 water-stage recorder at same site and datum.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 22,700 ft³/s Apr. 7, 1951, gage height, 3.83; minimum daily discharge, 6 ft³/s Jan. 20, 23, 30, 31, 1935.

Rating table developed January 1953
(A discharge measurement to validate this rating
has not been made since October 1953.)

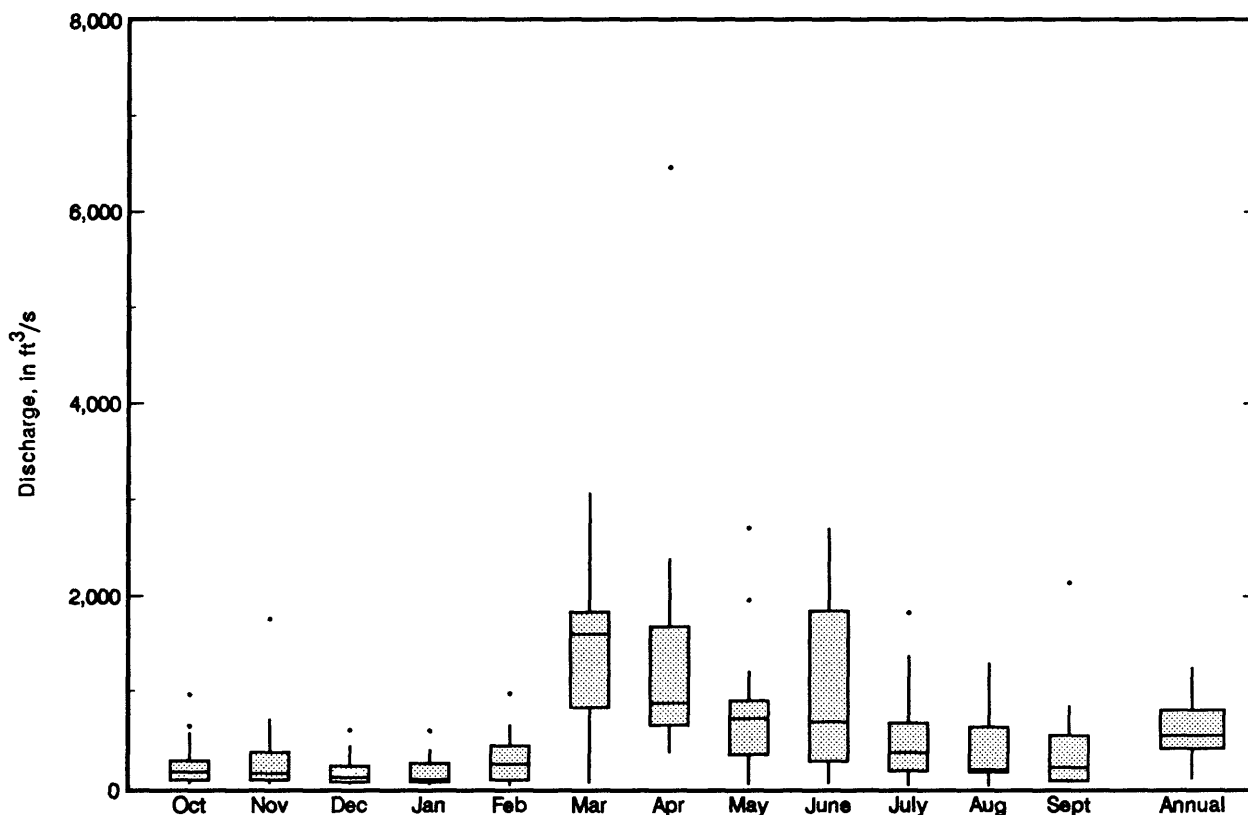
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
0.5	125	4.0	4,930
0.7	242	5.0	7,050
1.0	469	6.0	9,410
1.5	950	7.0	12,100
2.0	1,550	8.0	15,000
3.0	3,060		

IOWA RIVER BASIN
05460500 SHELL ROCK RIVER AT MARBLE ROCK, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	964	1942	53.6	1935	256	238	3.5
November	1,762	1942	54.1	1934	319	396	4.3
December	598	1942	47.6	1934	180	143	2.5
January	589	1942	41.8	1935	181	152	2.5
February	975	1948	34.0	1936	301	244	4.1
March	3,070	1936	65.3	1934	1,519	810	20.7
April	6,465	1951	370	1940	1,338	1,367	18.2
May	2,712	1944	47.5	1934	819	682	11.2
June	2,700	1947	55.8	1934	1,065	931	14.5
July	1,830	1947	36.2	1934	535	474	7.3
August	1,298	1945	28.9	1934	420	405	5.7
September	2,136	1938	67.0	1934	402	480	5.5
Annual	1,252	1951	105	1934	612	298	100.0

Boxplots of monthly and annual mean discharges



IOWA RIVER BASIN
05460500 SHELL ROCK RIVER AT MARBLE ROCK, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	19	26	40	106	29	30	20	20	30	36	31	29	25
95	36	40	75	249	76	65	39	37	55	54	53	50	48
90	48	47	138	341	156	97	51	70	71	65	69	61	66
85	56	53	231	405	201	132	91	90	82	78	82	69	81
80	63	59	339	458	240	153	118	105	90	89	89	76	93
75	69	66	444	508	282	189	138	119	98	100	97	82	109
70	75	77	565	559	329	248	155	134	111	110	107	87	128
65	82	86	648	610	391	332	192	151	127	120	117	92	153
60	88	94	734	661	446	405	238	168	146	131	128	97	183
55	95	104	820	736	494	473	286	184	168	149	146	105	215
50	103	123	950	816	545	540	338	200	194	166	166	117	253
45	118	156	1,110	906	601	615	402	222	224	183	186	129	311
40	135	185	1,280	1,000	657	709	467	253	259	200	206	147	379
35	172	213	1,480	1,110	730	855	532	314	299	221	235	171	456
30	211	257	1,700	1,300	807	1,020	598	379	345	248	274	204	548
25	235	321	2,000	1,520	913	1,260	664	482	407	293	343	231	652
20	259	384	2,380	1,840	1,050	1,550	787	585	489	358	423	257	812
15	322	477	2,950	2,260	1,390	1,970	961	752	632	435	520	309	1,040
10	382	640	3,570	2,810	1,860	2,740	1,210	1,050	947	555	764	393	1,470
5	506	968	5,040	4,050	2,900	4,320	1,740	1,600	1,360	719	1,070	521	2,430

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	2,240	2,070	1,560	887	526
0.95	1.05	3,550	2,740	2,040	1,300	850
0.90	1.11	4,500	3,190	2,360	1,570	1,080
0.80	1.25	5,980	3,850	2,840	1,980	1,420
0.50	2	10,100	5,550	4,110	3,020	2,270
0.20	5	16,900	8,100	6,070	4,490	3,420
0.10	10	21,800	9,920	7,520	5,470	4,140
0.04	25	28,600	12,400	9,500	6,720	5,000
0.02	50	33,900	14,300	11,100	7,640	5,590
0.01	100	39,400	16,300	12,800	8,550	6,150

IOWA RIVER BASIN
05460500 SHELL ROCK RIVER AT MARBLE ROCK, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	4.6	11	17	19	20	25	29	34	33
0.02	50	6.3	13	19	22	23	29	34	39	39
0.05	20	10.0	17	24	27	29	36	42	48	52
0.10	10	15	22	30	33	36	44	51	59	68
0.20	5	23	31	38	42	46	56	66	77	94
0.50	2	50	56	63	68	77	97	113	132	178
0.80	1.25	97	102	107	115	132	169	201	243	351
0.90	1.11	132	140	144	154	176	229	278	342	507
0.96	1.04	178	196	198	210	242	320	399	503	759
0.98	1.02	214	243	246	258	299	400	508	652	990
0.99	1.01	249	295	299	313	361	490	636	830	1,260

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	4.5	20	21	22	9.9	21	21	29
0.02	50	6.4	23	24	25	16	30	31	41
0.05	20	10	28	30	32	30	49	52	69
0.10	10	16	35	37	39	51	74	80	104
0.20	5	26	45	48	52	90	118	130	169
0.50	2	60	77	83	95	219	258	288	382
0.80	1.25	125	144	154	187	424	492	545	769
0.90	1.11	177	206	219	277	552	656	719	1,060
0.96	1.04	249	308	327	431	692	859	927	1,440
0.98	1.02	305	404	429	583	780	1,000	1,070	1,730
0.99	1.01	363	522	552	772	854	1,140	1,200	2,020
		July-August-September				October-November-December			
0.01	100	8.1	15	18	24	8.7	27	31	34
0.02	50	11	20	23	29	11	30	34	39
0.05	20	18	28	32	40	16	36	40	47
0.10	10	26	39	43	53	21	42	48	56
0.20	5	41	57	62	75	31	53	59	71
0.50	2	91	111	119	148	63	89	98	121
0.80	1.25	182	206	226	303	128	164	178	223
0.90	1.11	253	277	313	446	185	236	254	318
0.96	1.04	350	375	441	678	273	360	383	479
0.98	1.02	425	452	549	893	349	482	509	634
0.99	1.01	502	531	666	1,150	437	635	666	825

IOWA RIVER BASIN
05462000 SHELL ROCK RIVER AT SHELL ROCK, IA

LOCATION.--Lat 42°39'10", long 92°35'45", In NE1/4 NW1/4 sec.11, T.91 N., R.15 W., Butler County, Hydrologic Unit 07080202 on right bank 400 ft upstream from bridge on county highway C45 in Shell Rock, 2.2 mi downstream from Curry Creek and 10.4 mi upstream from mouth.

DRAINAGE AREA.--1,746 mi².

PERIOD OF RECORD.--June 1953 to September 1988.

GAGE.--Water-stage recorder. Rockfill dam since Oct. 19, 1957. Datum of gage is 885.34 ft above NGVD.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 33,500 ft³/s Mar. 28, 1961, gage height, 16.26 ft; minimum daily discharge, 37 ft³/s Sept. 10, 1988 result of dam construction.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in 1856 reached a stage of 17.7 ft at bridge 400 ft downstream, from information provided by U.S. Army Corps of Engineers, discharge, about 45,000 ft³/s.

Rating table number 16, developed March 1987

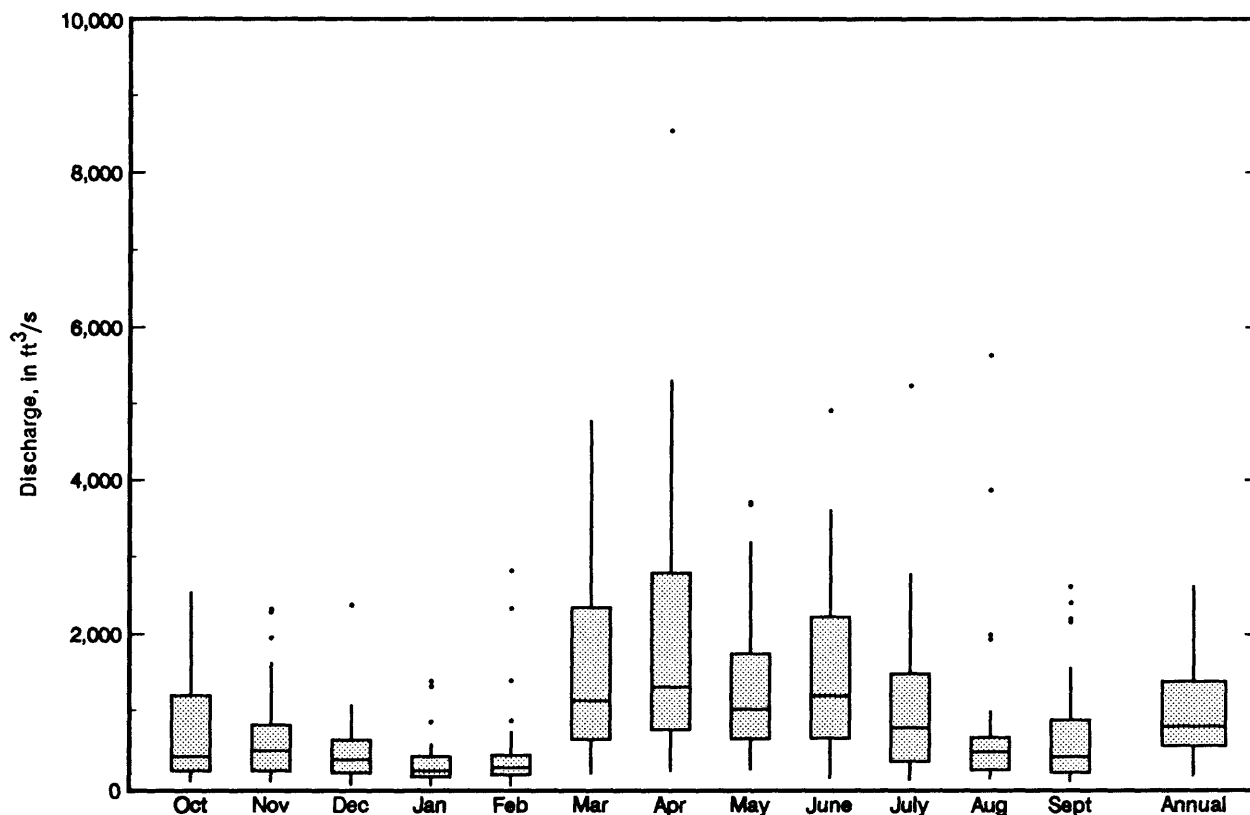
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
6.5	72	9.0	1,660
7.0	169	10.0	3,460
7.5	353	11.0	6,320
8.0	644	12.0	10,500
8.5	1,070		

IOWA RIVER BASIN
05462000 SHELL ROCK RIVER AT SHELL ROCK, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	2,544	1987	93.4	1959	789	728	6.7
November	2,326	1983	98.1	1959	679	607	5.8
December	2,381	1983	55.3	1959	489	434	4.2
January	1,375	1983	45.6	1959	339	304	2.9
February	2,833	1984	44.7	1959	476	595	4.1
March	4,782	1983	193	1968	1,578	1,314	13.4
April	8,540	1965	226	1957	1,915	1,704	16.3
May	3,713	1984	243	1958	1,408	1,026	12.0
June	4,912	1984	138	1977	1,530	1,124	13.0
July	5,236	1969	114	1977	1,072	999	9.1
August	5,637	1979	128	1958	763	1,102	6.5
September	2,620	1962	98.3	1958	703	703	6.0
Annual	2,628	1983	171	1977	980	578	100.0

Boxplots of monthly and annual mean discharges



IOWA RIVER BASIN
05462000 SHELL ROCK RIVER AT SHELL ROCK, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equalled or exceeded	Discharge (ft ³ /s)												Annual
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	
99	42	42	102	164	142	114	92	84	80	84	86	50	68
95	71	84	163	242	229	191	147	110	105	110	112	87	109
90	91	109	190	348	327	264	204	154	130	144	144	107	152
85	109	126	213	493	401	346	257	184	152	168	175	152	183
80	136	146	240	603	476	409	301	205	173	190	206	181	210
75	160	163	269	699	537	476	345	227	203	210	235	208	242
70	179	179	320	780	606	571	395	252	236	240	262	235	278
65	192	193	400	860	695	669	451	278	269	278	301	261	322
60	204	207	493	972	791	757	516	313	299	320	346	290	370
55	216	222	595	1,090	888	840	593	355	328	357	398	322	425
50	238	240	730	1,240	985	958	681	404	361	392	471	356	490
45	265	258	868	1,450	1,080	1,090	799	441	395	496	532	390	568
40	297	283	1,020	1,660	1,220	1,310	924	479	441	678	591	445	665
35	331	320	1,170	1,830	1,370	1,480	1,040	522	497	828	663	504	782
30	370	361	1,360	2,080	1,550	1,660	1,180	566	569	976	741	557	931
25	409	405	1,680	2,420	1,800	1,870	1,330	634	684	1,120	834	616	1,110
20	455	458	2,500	2,820	2,150	2,190	1,520	722	844	1,290	999	681	1,380
15	522	596	3,330	3,260	2,600	2,580	1,780	918	1,190	1,580	1,260	788	1,730
10	645	782	4,440	3,970	3,170	3,170	2,180	1,510	1,560	1,900	1,590	990	2,290
5	964	1,570	5,940	5,590	4,080	4,610	3,100	2,740	2,540	2,410	2,120	1,390	3,430

Probability of annual high discharges

Exceedance probability	Recurrence Interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	839	555	443	351	290
0.95	1.05	1,770	1,270	1,000	760	613
0.90	1.11	2,560	1,900	1,490	1,110	884
0.80	1.25	3,920	2,970	2,320	1,710	1,340
0.50	2	8,240	6,330	4,900	3,560	2,700
0.20	5	15,900	11,800	9,110	6,630	4,890
0.10	10	21,700	15,600	12,000	8,810	6,410
0.04	25	29,400	20,200	15,600	11,600	8,290
0.02	50	35,400	23,500	18,100	13,600	9,640
0.01	100	41,400	26,600	20,500	15,600	10,900

IOWA RIVER BASIN
05462000 SHELL ROCK RIVER AT SHELL ROCK, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	27	27	29	33	38	45	46	53	56
0.02	50	33	35	37	42	48	55	58	66	71
0.05	20	44	48	52	58	66	75	81	91	102
0.10	10	57	64	69	76	86	98	107	120	139
0.20	5	77	89	95	104	116	133	150	168	200
0.50	2	136	156	167	179	200	233	275	311	392
0.80	1.25	232	259	272	287	323	391	482	564	746
0.90	1.11	303	328	342	358	405	505	636	762	1,030
0.96	1.04	400	415	428	444	508	655	844	1,040	1,440
0.98	1.02	477	478	490	506	583	770	1,010	1,280	1,780
0.99	1.01	540	540	550	564	656	886	1,170	1,520	2,140

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	28	31	34	43	47	75	82	103
0.02	50	35	39	43	52	61	94	103	130
0.05	20	48	55	59	69	92	131	143	185
0.10	10	64	73	78	88	129	175	192	250
0.20	5	87	101	108	119	194	248	274	360
0.50	2	156	182	192	211	409	481	535	703
0.80	1.25	268	310	329	371	823	922	1,040	1,330
0.90	1.11	351	402	427	498	1,160	1,290	1,470	1,840
0.96	1.04	462	521	558	680	1,670	1,840	2,120	2,580
0.98	1.02	548	612	659	831	2,090	2,310	2,680	3,190
0.99	1.01	637	703	761	995	2,540	2,830	3,320	3,860
		July-August-September				October-November-December			
0.01	100	32	50	59	66	35	42	43	48
0.02	50	41	61	70	79	44	52	54	61
0.05	20	57	81	92	101	60	73	76	86
0.10	10	76	103	115	127	80	97	103	116
0.20	5	107	138	151	168	113	137	147	166
0.50	2	197	234	250	287	214	260	284	325
0.80	1.25	345	380	406	494	400	480	531	623
0.90	1.11	452	483	518	659	551	655	729	869
0.96	1.04	596	617	667	897	772	905	1,010	1,230
0.98	1.02	706	717	784	1,100	957	1,110	1,250	1,540
0.99	1.01	819	819	904	1,310	1,160	1,330	1,500	1,870

IOWA RIVER BASIN
05463000 BEAVER CREEK AT NEW HARTFORD, IA

LOCATION.--Lat 42°30'50", long 92°37'55", in SE1/4 SE1/4 sec.28, T.90 N., R.15 W., Butler County, Hydrologic Unit 07080205, on right bank 5 ft from right end of bridge on county highway T55, 0.2 mi north of New Hartford and 8 mi upstream from mouth.

DRAINAGE AREA.--347 mi².

PERIOD OF RECORD.--October 1945 to September 1988.

GAGE.--Water-stage recorder. Datum of gage is 882.44 ft above NGVD. Prior to July 14, 1959, nonrecording gage at same site and datum.

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, 2.3 ft³/s Jan. 20-24, 1956 and Jan. 24, 1977.

Rating table number 9, developed October 1987

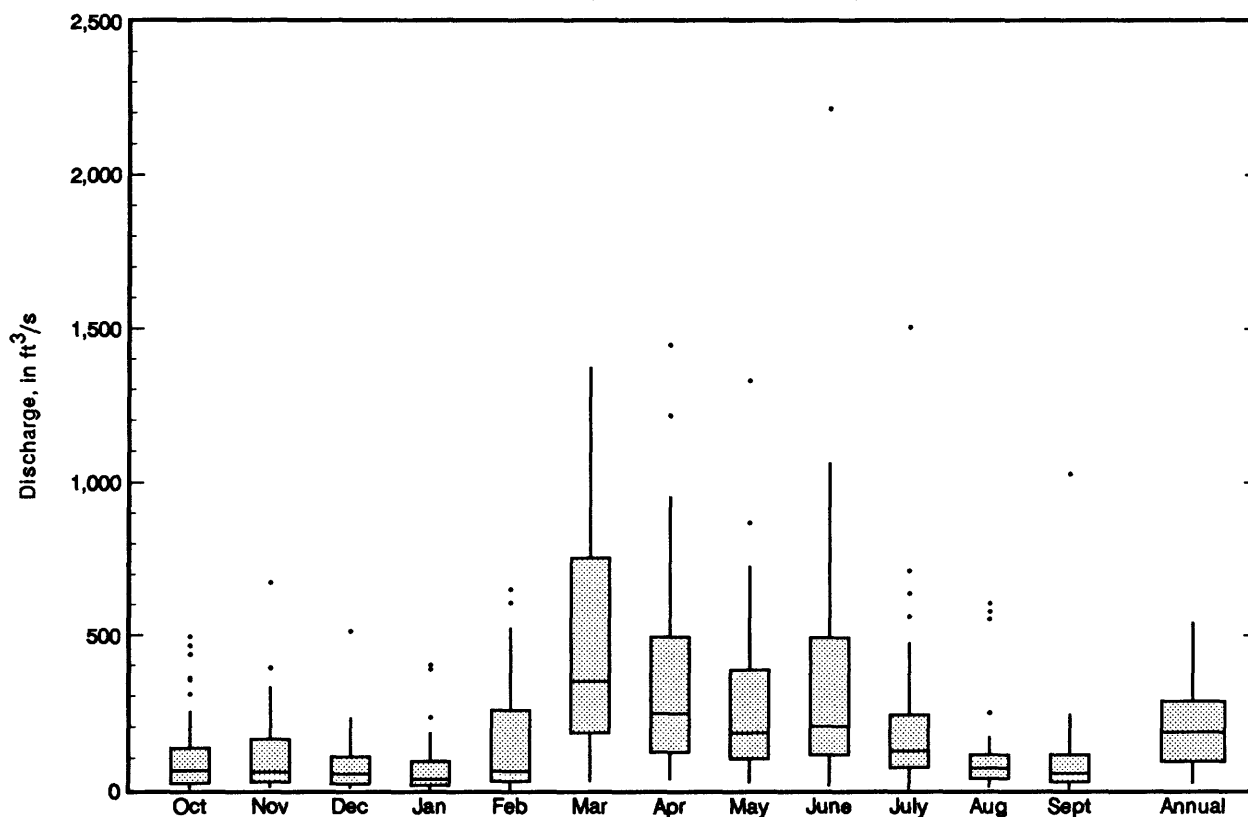
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
1.5	9.4	6.0	704
2.0	38	7.0	1,070
2.5	81	9.0	2,330
3.0	136	11.0	5,830
4.0	268	13.0	12,600
5.0	452		

IOWA RIVER BASIN
05463000 BEAVER CREEK AT NEW HARTFORD, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	495	1987	4.98	1957	115	132	4.8
November	673	1973	8.80	1957	116	130	4.9
December	514	1983	7.43	1956	79.8	91.0	3.4
January	403	1946	2.88	1956	72.1	91.4	3.0
February	651	1983	3.84	1956	151	169	6.3
March	1,373	1986	28.1	1954	460	357	19.3
April	1,447	1965	33.8	1954	362	326	15.2
May	1,331	1983	23.2	1977	278	263	11.7
June	2,213	1947	12.5	1956	326	374	13.7
July	1,506	1969	4.47	1956	213	258	9.0
August	606	1951	8.59	1956	110	139	4.6
September	1,028	1965	6.02	1988	98.2	159	4.1
Annual	543	1983	21.8	1956	199	127	100.0

Boxplots of monthly and annual mean discharges



IOWA RIVER BASIN
05463000 BEAVER CREEK AT NEW HARTFORD, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equalled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	2.7	3.7	18	25	20	8.8	3.9	5.5	4.8	4.5	8.6	5.5	4.9
95	5.3	5.7	29	35	31	20	15	11	9.5	14	15	8.6	11
90	7.4	10	36	53	44	37	29	17	14	17	19	11	17
85	11	14	44	75	56	47	38	23	18	20	22	15	22
80	13	16	54	92	66	57	47	28	21	22	26	19	28
75	16	18	64	107	77	68	55	33	25	25	29	22	34
70	18	22	82	125	88	86	63	38	28	29	35	25	41
65	21	26	110	144	105	101	72	43	31	35	41	29	49
60	25	31	134	166	123	118	81	48	35	43	47	34	58
55	28	36	159	188	142	141	91	53	40	51	54	40	67
50	32	41	185	217	163	164	104	59	46	58	62	51	79
45	38	51	218	248	185	189	119	64	52	64	71	58	93
40	46	61	255	288	211	220	137	71	59	73	86	65	111
35	58	74	302	331	238	252	157	79	67	83	111	75	134
30	72	93	363	376	275	292	183	87	77	97	133	89	160
25	85	120	438	424	320	342	215	99	87	120	155	105	194
20	106	167	540	501	388	413	248	114	105	157	176	124	243
15	129	241	698	599	469	507	309	138	130	220	209	144	314
10	155	352	1,010	731	584	652	429	174	171	292	263	174	436
5	234	586	2,000	1,130	865	1,090	695	279	349	410	383	241	687

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	150	102	84	65	49
0.95	1.05	442	306	231	165	122
0.90	1.11	748	513	373	258	189
0.80	1.25	1,350	904	632	423	304
0.50	2	3,650	2,230	1,470	947	658
0.20	5	8,330	4,420	2,800	1,790	1,210
0.10	10	12,100	5,850	3,650	2,350	1,560
0.04	25	17,100	7,470	4,630	3,000	1,960
0.02	50	20,900	8,520	5,260	3,430	2,220
0.01	100	24,800	9,440	5,810	3,830	2,460

IOWA RIVER BASIN
05463000 BEAVER CREEK AT NEW HARTFORD, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	1.5	1.6	1.7	1.8	2.2	2.9	3.7	4.6	6.1
0.02	50	2.1	2.1	2.2	2.4	2.9	3.8	4.8	5.9	7.9
0.05	20	3.2	3.3	3.5	3.7	4.4	5.6	7.1	8.7	11
0.10	10	4.7	4.8	5.0	5.3	6.3	7.9	10.0	12	16
0.20	5	7.3	7.5	7.8	8.3	9.6	12	15	19	24
0.50	2	17	17	18	19	21	27	34	42	53
0.80	1.25	36	37	39	42	47	62	79	96	119
0.90	1.11	54	55	58	62	71	97	121	149	182
0.96	1.04	81	83	88	95	110	155	193	240	287
0.98	1.02	104	108	114	124	146	210	262	327	386
0.99	1.01	130	136	144	157	187	277	344	434	504

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	1.6	1.7	1.8	2.4	5.1	6.5	6.9	9.4
0.02	50	2.2	2.4	2.5	3.1	7.2	9.0	9.6	13
0.05	20	3.6	3.8	4.0	4.8	12	14	16	20
0.10	10	5.4	5.7	5.9	7.1	18	21	23	30
0.20	5	8.7	9.2	9.6	11	29	34	37	48
0.50	2	21	23	24	29	67	76	87	110
0.80	1.25	50	54	58	75	141	160	186	237
0.90	1.11	78	85	91	126	199	228	268	346
0.96	1.04	122	134	146	220	279	326	387	509
0.98	1.02	162	179	197	317	343	406	485	646
0.99	1.01	208	232	258	442	408	490	589	796
		July-August-September				October-November-December			
0.01	100	2.4	2.7	2.9	3.5	2.6	2.9	3.1	3.9
0.02	50	3.4	3.8	4.1	4.9	3.5	3.9	4.2	5.2
0.05	20	5.5	6.1	6.7	7.8	5.3	6.0	6.4	7.9
0.10	10	8.2	9.1	10.0	12	7.7	8.6	9.4	11
0.20	5	13	14	16	18	12	13	15	18
0.50	2	27	30	32	39	27	30	34	40
0.80	1.25	50	54	59	76	58	67	73	88
0.90	1.11	65	70	77	104	85	99	109	131
0.96	1.04	83	88	98	140	128	151	163	199
0.98	1.02	95	101	112	167	165	197	210	259
0.99	1.01	107	113	126	194	208	249	263	328

IOWA RIVER BASIN
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 September 1988.

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

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.

Rating table number 9, developed October 1987

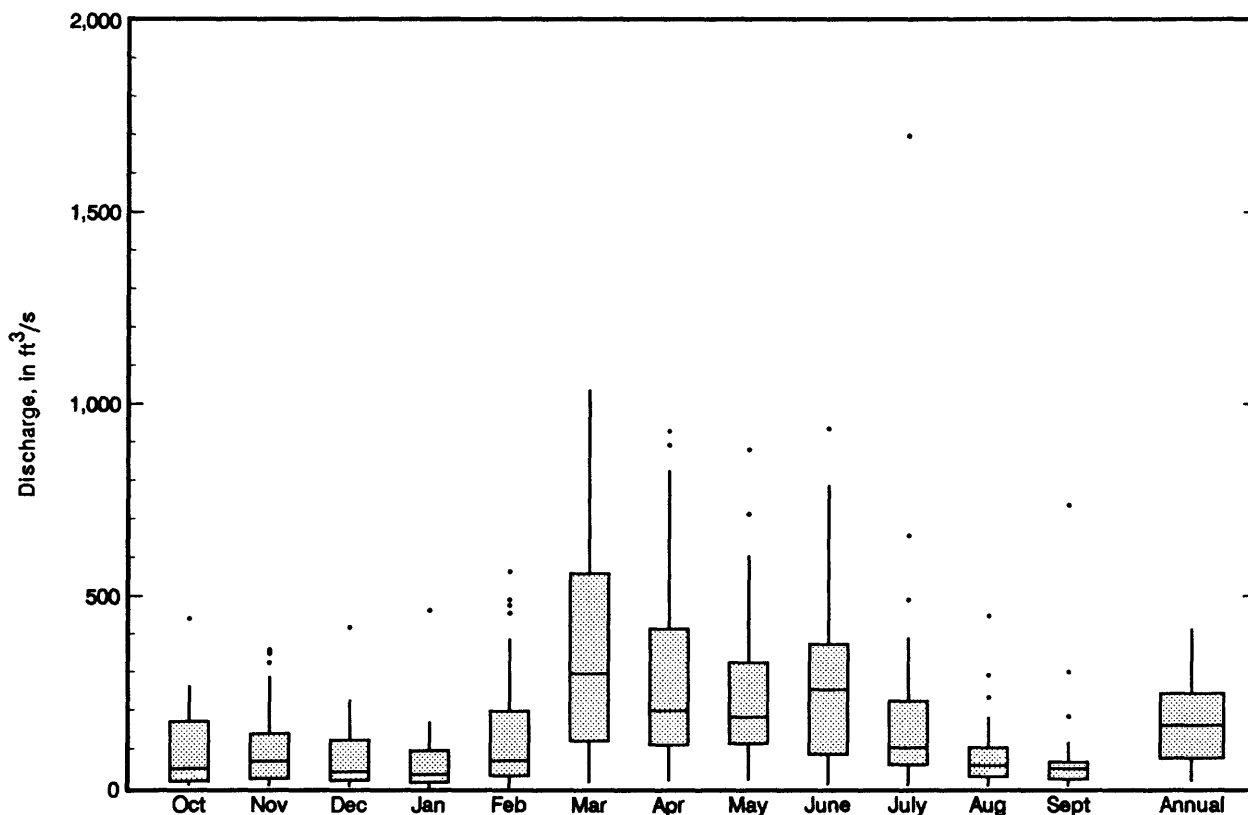
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
5.0	23	12.0	1,360
5.5	59	13.0	1,730
6.0	101	14.0	2,360
7.0	216	15.0	3,500
8.0	371	16.0	6,220
9.0	563	17.0	11,500
10.0	793	18.0	20,000
11.0	1,060		

IOWA RIVER BASIN
05463500 BLACK HAWK CREEK AT HUDSON, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	440	1966	9.25	1956	97.2	98.7	4.7
November	359	1973	7.45	1956	105	101	5.1
December	418	1983	5.05	1956	82.1	85.7	4.0
January	463	1973	2.34	1956	70.5	84.9	3.4
February	564	1984	3.07	1956	144	155	7.0
March	1,035	1986	15.9	1954	366	298	17.7
April	929	1965	20.5	1956	296	257	14.4
May	881	1983	22.9	1977	249	209	12.1
June	935	1974	10.2	1956	277	224	13.4
July	1,698	1969	9.38	1956	206	295	10.0
August	449	1968	8.15	1988	92.9	95.6	4.5
September	735	1965	7.20	1955	77.4	125	3.8
Annual	414	1969	18.4	1956	172	107	100.0

Boxplots of monthly and annual mean discharges



IOWA RIVER BASIN
05463500 BLACK HAWK CREEK AT HUDSON, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equalled or exceeded	Discharge (ft ³ /s)												Annual
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	
99	1.8	2.4	14	14	14	8.1	3.0	5.3	4.3	7.1	6.9	4.0	3.9
95	3.7	5.7	21	26	26	20	18	9.2	10	12	11	7.2	10
90	6.8	12	30	36	36	30	25	15	14	15	15	11	16
85	8.7	15	38	58	45	39	30	20	17	17	17	14	20
80	12	17	49	76	56	49	36	24	20	19	22	18	25
75	15	20	59	93	68	62	42	28	22	22	26	21	31
70	18	24	69	108	81	77	49	31	24	25	31	25	36
65	22	28	87	121	94	94	58	34	28	30	37	30	43
60	27	33	107	135	112	118	67	38	31	36	45	35	51
55	33	41	130	155	132	143	79	42	35	41	54	40	60
50	40	50	154	180	154	167	92	47	39	47	66	45	71
45	47	58	179	208	176	191	108	51	43	53	77	52	86
40	55	66	210	240	202	228	126	59	48	63	88	64	102
35	65	77	248	277	233	266	145	66	53	76	101	80	123
30	75	90	306	320	269	316	170	76	60	99	119	100	148
25	85	112	375	364	322	366	199	89	67	125	137	119	180
20	95	151	465	425	377	432	243	105	79	154	166	138	228
15	116	213	603	490	453	499	316	128	96	189	199	163	299
10	137	332	937	609	540	621	429	178	139	246	249	188	409
5	240	642	1,530	883	754	873	689	315	243	351	349	249	626

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	—	119	89	70	44
0.95	1.05	573	303	216	162	109
0.90	1.11	826	472	331	242	167
0.80	1.25	1,270	770	531	378	267
0.50	2	2,750	1,700	1,150	787	561
0.20	5	5,650	3,150	2,140	1,410	985
0.10	10	8,050	4,080	2,790	1,810	1,240
0.04	25	11,600	5,150	3,560	2,270	1,510
0.02	50	14,500	5,860	4,080	2,590	1,690
0.01	100	17,700	6,490	4,550	2,870	1,840

IOWA RIVER BASIN
05463500 BLACK HAWK CREEK AT HUDSON, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.18	0.24	0.40	0.84	1.5	2.3	3.5	3.8	4.8
0.02	50	0.41	0.50	0.74	1.3	2.1	3.2	4.6	5.2	6.5
0.05	20	1.2	1.3	1.7	2.5	3.5	5.2	7.1	8.2	10
0.10	10	2.7	2.8	3.3	4.2	5.4	7.8	10	12	15
0.20	5	6.0	6.1	6.6	7.4	8.9	12	16	19	24
0.50	2	18	18	18	18	21	28	35	43	55
0.80	1.25	33	33	35	37	42	58	74	90	117
0.90	1.11	38	40	44	50	58	82	107	130	170
0.96	1.04	42	45	53	64	79	116	157	187	248
0.98	1.02	43	47	57	73	95	143	200	235	314
0.99	1.01	44	49	60	82	111	172	247	286	385

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.20	0.42	0.84	1.6	4.8	6.0	6.6	7.5
0.02	50	0.44	0.77	1.3	2.4	6.5	8.1	8.9	10
0.05	20	1.3	1.8	2.6	4.1	10	12	14	17
0.10	10	3.0	3.6	4.5	6.6	15	18	20	28
0.20	5	7.2	7.5	8.4	12	24	29	32	42
0.50	2	25	24	24	31	55	66	75	101
0.80	1.25	55	58	60	74	123	148	170	226
0.90	1.11	71	83	90	114	184	223	257	336
0.96	1.04	86	112	133	174	280	343	394	503
0.98	1.02	93	131	167	227	364	451	518	645
0.99	1.01	98	148	203	285	459	574	660	802
		July-August-September				October-November-December			
0.01	100	1.8	2.2	2.6	3.5	1.9	2.2	2.8	3.9
0.02	50	2.6	3.2	3.7	4.8	2.6	3.1	3.7	5.1
0.05	20	4.6	5.4	6.1	7.6	4.2	4.8	5.7	7.7
0.10	10	7.1	8.2	9.1	11	6.3	7.2	8.4	11
0.20	5	11	13	14	17	10	11	13	17
0.50	2	23	25	27	33	24	27	30	37
0.80	1.25	38	41	45	58	55	60	66	82
0.90	1.11	46	49	55	74	82	90	99	122
0.96	1.04	54	58	65	94	124	137	152	187
0.98	1.02	58	62	72	107	160	179	198	245
0.99	1.01	61	66	77	119	201	226	251	313

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 September 1988.

GAGE.—Water-stage recorder. Datum of gage is 824.14 ft above NGVD.

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.

Rating table number 6, developed October 1987

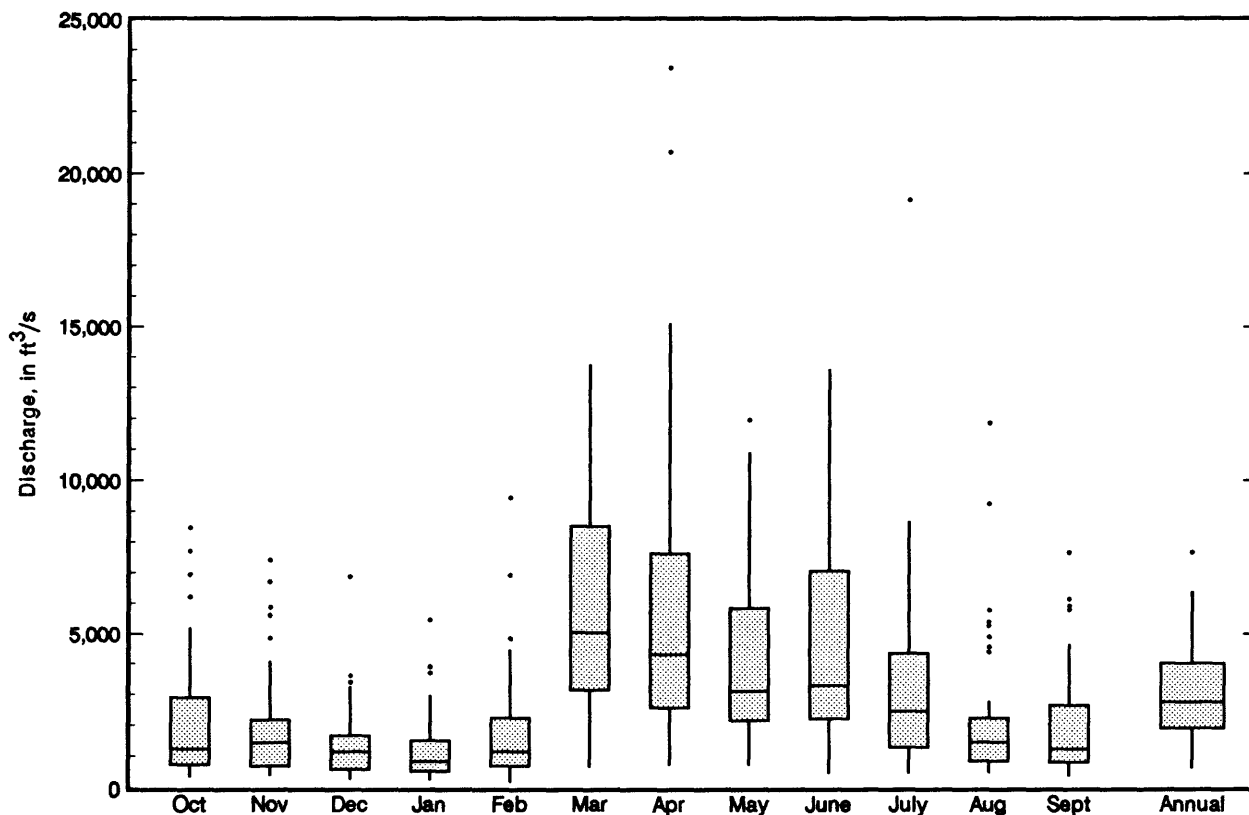
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
4.7	320	10.0	15,300
5.0	558	12.0	22,200
5.5	1,290	14.0	29,500
6.0	2,380	16.0	37,200
7.0	5,340	18.0	47,000
8.0	8,560	19.5	56,200
9.0	12,000		

IOWA RIVER BASIN
05464000 CEDAR RIVER AT WATERLOO, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	8,499	1987	366	1957	2,159	2,032	5.9
November	7,434	1973	413	1956	1,970	1,702	5.4
December	6,891	1983	276	1956	1,436	1,177	4.0
January	5,479	1973	252	1959	1,208	1,041	3.3
February	9,448	1984	188	1959	1,750	1,720	4.8
March	13,760	1973	687	1984	5,641	3,532	15.5
April	23,430	1965	741	1957	5,903	4,807	16.2
May	11,970	1983	732	1977	4,101	2,874	11.3
June	13,600	1947	474	1977	4,627	3,240	12.7
July	19,160	1969	476	1977	3,378	3,120	9.3
August	11,860	1979	491	1955	2,208	2,250	6.1
September	7,678	1965	387	1955	1,962	1,693	5.4
Annual	7,675	1983	636	1977	3,032	1,591	100.0

Boxplots of monthly and annual mean discharges



IOWA RIVER BASIN
05464000 CEDAR RIVER AT WATERLOO, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	225	194	464	671	554	466	441	410	365	335	333	246	284
95	287	294	672	877	862	808	627	504	453	420	421	339	436
90	354	391	800	1,380	1,140	1,010	816	590	523	509	508	415	552
85	426	483	893	1,760	1,350	1,260	926	673	595	602	590	472	657
80	486	560	1,020	2,050	1,580	1,510	1,050	745	669	685	665	544	754
75	533	610	1,320	2,360	1,830	1,740	1,180	820	760	736	758	622	857
70	586	660	1,680	2,620	2,070	1,930	1,320	909	848	787	856	701	967
65	643	707	2,070	2,880	2,260	2,160	1,510	1,000	932	871	956	782	1,100
60	704	752	2,440	3,220	2,460	2,400	1,750	1,090	1,010	964	1,090	913	1,250
55	770	799	2,860	3,590	2,660	2,710	1,990	1,190	1,100	1,080	1,220	1,020	1,440
50	838	872	3,280	4,030	2,860	3,040	2,240	1,300	1,180	1,210	1,390	1,110	1,680
45	909	946	3,740	4,490	3,150	3,440	2,510	1,430	1,280	1,370	1,600	1,190	1,930
40	988	1,070	4,280	4,980	3,460	3,910	2,800	1,590	1,390	1,620	1,780	1,300	2,210
35	1,100	1,230	4,970	5,640	3,880	4,460	3,150	1,750	1,610	1,980	1,950	1,420	2,520
30	1,210	1,480	5,850	6,440	4,370	5,080	3,530	1,980	1,870	2,300	2,160	1,590	2,890
25	1,400	1,780	7,060	7,390	4,950	5,820	4,050	2,220	2,190	2,710	2,380	1,780	3,430
20	1,710	2,110	8,770	8,410	5,870	6,740	4,690	2,560	2,580	3,260	2,710	2,050	4,180
15	1,960	2,510	10,900	9,770	7,100	7,940	5,580	3,170	3,090	3,980	3,230	2,400	5,200
10	2,280	3,280	14,000	11,700	8,750	9,790	7,050	4,300	3,970	4,940	4,200	2,830	6,990
5	2,880	5,880	19,000	16,500	11,800	13,800	10,000	7,400	6,280	6,780	5,820	3,830	10,400

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	2,550	1,830	1,560	1,300	1,060
0.95	1.05	5,300	4,220	3,490	2,810	2,300
0.90	1.11	7,600	6,290	5,130	4,050	3,300
0.80	1.25	11,400	9,770	7,820	6,050	4,890
0.50	2	23,000	20,000	15,500	11,600	9,090
0.20	5	41,900	34,900	26,400	19,300	14,400
0.10	10	55,100	44,200	33,100	23,900	17,400
0.04	25	71,900	54,800	40,500	28,900	20,400
0.02	50	84,100	61,600	45,300	32,100	22,200
0.01	100	95,900	67,700	49,400	34,900	23,700

IOWA RIVER BASIN
05464000 CEDAR RIVER AT WATERLOO, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	155	159	165	175	194	214	221	237	250
0.02	50	179	186	193	204	223	247	258	278	300
0.05	20	223	233	242	254	277	307	327	355	396
0.10	10	271	284	295	309	335	373	405	442	506
0.20	5	340	360	374	391	422	475	526	580	682
0.50	2	522	558	580	605	659	765	878	989	1,210
0.80	1.25	793	851	885	925	1,030	1,250	1,490	1,720	2,180
0.90	1.11	981	1,050	1,100	1,150	1,300	1,630	1,970	2,310	2,960
0.96	1.04	1,230	1,320	1,370	1,440	1,670	2,180	2,680	3,190	4,110
0.98	1.02	1,410	1,520	1,580	1,670	1,970	2,630	3,270	3,940	5,090
0.99	1.01	1,610	1,720	1,790	1,900	2,280	3,130	3,920	4,770	6,170

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	150	160	170	193	313	345	356	417
0.02	50	177	189	199	222	377	417	435	516
0.05	20	227	243	254	277	497	553	587	706
0.10	10	281	303	314	340	634	709	762	927
0.20	5	364	395	408	440	850	954	1,040	1,280
0.50	2	592	652	675	750	1,480	1,660	1,860	2,300
0.80	1.25	951	1,070	1,120	1,340	2,550	2,870	3,270	4,020
0.90	1.11	1,210	1,370	1,460	1,850	3,380	3,790	4,350	5,320
0.96	1.04	1,570	1,790	1,950	2,650	4,550	5,080	5,860	7,090
0.98	1.02	1,840	2,130	2,350	3,370	5,510	6,130	7,090	8,500
0.99	1.01	2,130	2,480	2,780	4,210	6,530	7,240	8,400	9,970
		July-August-September				October-November-December			
0.01	100	244	282	301	336	171	199	206	224
0.02	50	278	318	336	374	199	233	243	264
0.05	20	340	382	400	443	250	295	310	339
0.10	10	408	451	471	521	308	365	388	426
0.20	5	509	557	580	643	398	476	511	566
0.50	2	782	848	892	1,010	659	804	878	994
0.80	1.25	1,210	1,330	1,430	1,680	1,110	1,390	1,540	1,800
0.90	1.11	1,530	1,690	1,870	2,260	1,460	1,870	2,080	2,480
0.96	1.04	1,970	2,220	2,520	3,150	1,980	2,580	2,900	3,520
0.98	1.02	2,320	2,650	3,080	3,960	2,420	3,180	3,590	4,450
0.99	1.01	2,690	3,120	3,700	4,900	2,890	3,860	4,370	5,500

IOWA RIVER BASIN
05464130 FOURMILE CREEK NEAR LINCOLN, IA

LOCATION.--Lat 42°13'32", long 92°36'39", in SW1/4 SW1/4 sec. 28, T.86 N., R.15 W., Tama County, Hydrologic Unit 07080205, on left bank 10 ft downstream from bridge on county highway, 1.0 mi upstream from Half Mile Creek and 4.7 mi southeast of Lincoln.

DRAINAGE AREA.--13.78 mi².

PERIOD OF RECORD.--October 1962 to September 1967, October 1969 to September 1974 (discontinued).

GAGE.--Water-stage recorder and concrete control with V-notch sharp-crested weir. Datum of gage is 931.26 ft above mean sea level.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,450 ft³/s June 22, 1974, gage height, 13.98 ft; minimum daily discharge, 0.11 ft³/s July 29, 1964.

Rating table number 4, developed October 1978
(A discharge measurement to validate this rating
has not been made since October 1980.)

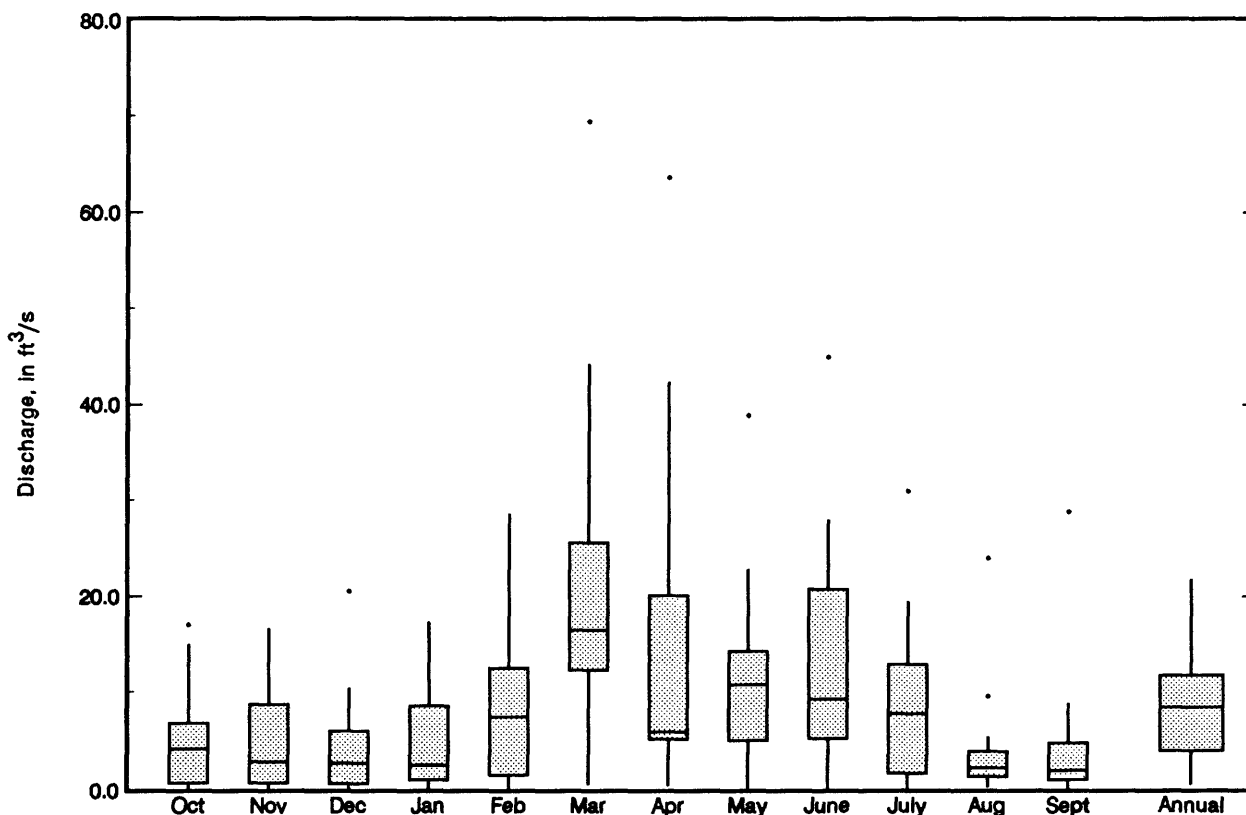
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
7.0	15	11.0	278
7.5	38	12.0	479
8.0	55	13.0	829
9.0	96	14.0	1,410
10.0	165		

IOWA RIVER BASIN
05464130 FOURMILE CREEK NEAR LINCOLN, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	17.0	1966	0.090	1977	5.25	5.39	4.9
November	16.6	1973	0.070	1977	4.94	5.09	4.6
December	20.4	1973	0.000	1977	4.78	5.65	4.5
January	17.2	1973	0.000	1977	4.84	5.29	4.5
February	28.5	1971	0.010	1977	8.49	8.29	8.0
March	69.4	1979	0.49	1977	20.4	18.2	19.2
April	63.6	1973	0.37	1977	14.8	17.8	13.9
May	38.8	1973	0.050	1977	11.4	10.0	10.7
June	45.0	1974	0.040	1977	13.9	12.1	13.1
July	30.9	1979	0.060	1977	8.88	8.73	8.3
August	23.9	1972	0.23	1976	4.24	5.91	4.0
September	28.8	1965	0.050	1976	4.59	7.15	4.3
Annual	21.7	1973	0.49	1977	8.98	5.99	100.0

Boxplots of monthly and annual mean discharges



IOWA RIVER BASIN
05464130 FOURMILE CREEK NEAR LINCOLN, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equalled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.00	0.00	0.20	0.08	0.01	0.01	0.01	0.05	0.02	0.06	0.04	0.00	0.01
95	0.01	0.01	0.40	0.48	0.04	0.04	0.03	0.15	0.05	0.10	0.09	0.01	0.12
90	0.36	0.32	0.66	2.0	1.2	1.3	0.60	0.29	0.22	0.21	0.49	0.29	0.43
85	0.46	0.51	0.89	2.5	2.0	2.0	0.85	0.42	0.33	0.48	0.57	0.43	0.61
80	0.58	0.63	1.2	3.0	2.6	2.7	1.1	0.53	0.45	0.58	0.65	0.55	0.79
75	0.70	0.78	1.8	3.4	3.0	3.5	1.4	0.63	0.61	0.69	0.75	0.67	1.0
70	0.84	0.96	2.9	4.0	3.4	4.3	1.7	0.77	0.72	0.82	0.86	0.81	1.3
65	1.0	1.1	3.8	4.6	3.9	5.2	2.1	0.91	0.82	1.0	1.3	0.99	1.8
60	1.2	1.4	4.6	5.1	4.3	6.2	2.5	1.1	0.91	1.4	1.9	1.2	2.2
55	1.4	1.7	5.7	5.6	5.3	7.0	2.9	1.3	1.1	2.1	2.2	1.5	2.8
50	1.7	1.9	7.0	6.1	6.6	7.8	3.4	1.7	1.4	2.7	2.6	2.0	3.4
45	2.4	2.2	8.2	7.2	7.8	8.6	4.0	2.0	1.6	3.1	3.5	3.3	4.1
40	2.9	2.6	9.8	8.7	9.0	10	4.6	2.4	1.8	3.9	4.3	4.0	4.9
36	3.4	3.5	12	10	10	12	5.5	2.8	2.1	4.7	5.2	4.8	5.8
30	3.9	4.8	15	11	12	13	6.4	3.3	2.4	5.5	6.3	5.5	7.0
25	4.5	5.7	18	13	14	15	7.4	4.0	3.1	6.2	7.7	6.2	8.4
20	5.4	6.9	21	15	17	18	8.5	4.8	4.6	7.8	9.3	7.0	11
15	6.6	8.9	29	19	20	21	11	5.9	6.6	11	11	8.0	14
10	8.6	16	41	24	25	28	15	8.0	10	14	14	9.7	18
5	15	42	86	43	38	42	23	18	22	19	16	13	30

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	55	9.7	4.8	3.0	1.9
0.95	1.05	109	23	12	7.3	4.7
0.90	1.11	153	35	18	11	7.3
0.80	1.25	225	55	30	18	12
0.50	2	437	118	68	42	27
0.20	5	771	218	135	82	54
0.10	10	1,000	285	182	111	73
0.04	25	1,290	364	242	147	96
0.02	50	1,500	419	285	173	116
0.01	100	1,700	469	326	198	133

IOWA RIVER BASIN
05464130 FOURMILE CREEK NEAR LINCOLN, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.03	0.18
0.02	50	0.00	0.00	0.00	0.01	0.01	0.02	0.02	0.05	0.26
0.05	20	0.00	0.00	0.00	0.02	0.04	0.05	0.07	0.12	0.43
0.10	10	0.05	0.05	0.07	0.06	0.09	0.13	0.16	0.24	0.68
0.20	5	0.13	0.14	0.17	0.16	0.22	0.33	0.41	0.54	1.1
0.50	2	0.31	0.36	0.43	0.61	0.85	1.3	1.8	2.0	3.0
0.80	1.25	0.73	0.87	1.0	1.4	2.1	3.5	5.5	5.9	7.5
0.90	1.11	1.2	1.4	1.5	1.8	3.0	5.1	8.7	9.4	12
0.96	1.04	2.0	2.3	2.5	2.2	3.9	6.8	13	15	19
0.98	1.02	2.9	3.1	3.4	2.3	4.5	7.8	16	19	25
0.99	1.01	4.1	4.3	4.6	2.4	4.9	8.7	19	23	33

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.06	0.09	0.15	0.28	0.00	0.00	0.01	0.01
0.02	50	0.08	0.12	0.19	0.33	0.01	0.01	0.02	0.04
0.05	20	0.12	0.19	0.28	0.42	0.05	0.06	0.10	0.17
0.10	10	0.16	0.28	0.39	0.55	0.19	0.22	0.30	0.49
0.20	5	0.25	0.45	0.58	0.77	0.64	0.79	0.95	1.4
0.50	2	0.65	1.1	1.3	1.7	3.2	3.8	4.2	5.7
0.80	1.25	1.9	2.8	3.0	4.4	7.0	7.7	8.8	11
0.90	1.11	3.6	4.5	4.7	7.9	8.4	8.9	11	13
0.96	1.04	7.3	7.4	7.6	15	9.3	9.5	12	15
0.98	1.02	12	10	11	24	9.5	9.6	12	15
0.99	1.01	19	14	14	38	9.7	9.7	12	15
		July-August-September				October-November-December			
0.01	100	0.02	0.00	0.01	0.02	0.04	0.05	0.08	0.10
0.02	50	0.03	0.01	0.01	0.03	0.05	0.08	0.11	0.15
0.05	20	0.05	0.02	0.04	0.07	0.09	0.13	0.18	0.25
0.10	10	0.10	0.05	0.08	0.14	0.15	0.21	0.29	0.40
0.20	5	0.19	0.14	0.18	0.29	0.27	0.38	0.50	0.69
0.50	2	0.55	0.60	0.68	0.93	0.84	1.1	1.4	1.9
0.80	1.25	1.3	1.6	1.8	2.3	2.7	3.3	3.8	5.1
0.90	1.11	2.0	2.4	2.7	3.3	5.1	5.7	6.3	8.3
0.96	1.04	2.9	3.2	3.8	4.6	9.9	10	11	14
0.98	1.02	3.6	3.7	4.5	5.5	15	15	15	19
0.99	1.01	4.2	4.1	5.1	6.3	23	20	20	25

IOWA RIVER BASIN
05464133 HALF MILE CREEK NEAR GLADBROOK, IA

LOCATION.--Lat 42°12'40", long 92°36'39", in SW1/4 SW1/4 sec. 33, T.86 N., R.15 W., Tama County, Hydrologic Unit 07080205, on right bank 10 ft downstream from bridge on county highway, 0.8 mi upstream from mouth and 5.3 mi northeast of Gladbrook.

DRAINAGE AREA.--1.33 mi².

PERIOD OF RECORD.--October 1962 to September 1967, October 1969 to September 1974 (discontinued).

GAGE.--Water-stage recorder and V-notch sharp-crested weir. Datum of gage is 948.16 ft above NGVD.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 307 ft³/s July 9, 1965, gage height, 9.24 ft; no flow for several days in 1964-67 and 1971-72.

Rating table number 3, developed October 1978
(A discharge measurement to validate this rating
has not been made since October 1980.)

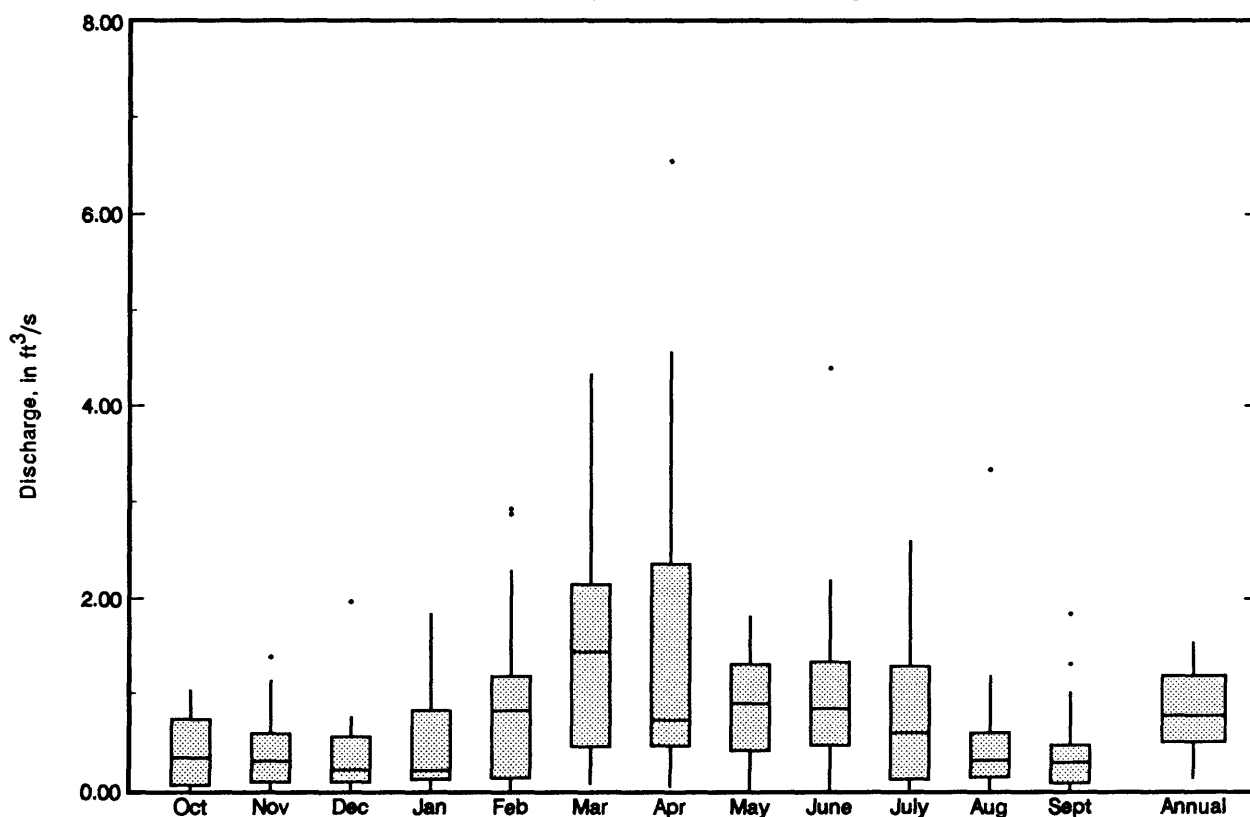
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
4.0	1.2	6.5	84
4.5	5.0	7.0	128
5.0	13	8.0	259
5.5	28	9.0	460
6.0	51		

IOWA RIVER BASIN
05464133 HALF MILE CREEK NEAR GLADBROOK, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	1.03	1966	0.000	1977	0.41	0.36	4.3
November	1.38	1973	0.000	1977	0.41	0.41	4.3
December	1.96	1973	0.000	1977	0.40	0.51	4.1
January	1.84	1973	0.000	1977	0.47	0.51	4.9
February	2.92	1971	0.000	1977	1.00	1.01	10.4
March	4.33	1979	0.070	1977	1.56	1.23	16.2
April	6.54	1965	0.040	1977	1.55	1.87	16.0
May	1.81	1974	0.010	1977	0.91	0.61	9.5
June	4.39	1974	0.000	1977	1.11	1.12	11.5
July	2.60	1979	0.020	1977	0.81	0.80	8.4
August	3.33	1972	0.010	1976	0.57	0.82	5.9
September	1.84	1965	0.000	1976	0.45	0.53	4.7
Annual	1.54	1973	0.12	1977	0.82	0.47	100.0

Boxplots of monthly and annual mean discharges



IOWA RIVER BASIN
05464133 HALF MILE CREEK NEAR GLADBROOK, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.00	0.00	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95	0.00	0.01	0.04	0.04	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.01
90	0.01	0.02	0.08	0.18	0.13	0.08	0.04	0.02	0.01	0.01	0.03	0.03	0.03
85	0.04	0.04	0.10	0.23	0.17	0.12	0.08	0.02	0.02	0.01	0.07	0.04	0.06
80	0.06	0.08	0.13	0.27	0.19	0.20	0.09	0.03	0.03	0.05	0.08	0.06	0.08
75	0.08	0.09	0.17	0.31	0.23	0.26	0.11	0.04	0.05	0.08	0.09	0.08	0.10
70	0.10	0.11	0.26	0.35	0.27	0.33	0.13	0.05	0.08	0.09	0.11	0.10	0.13
65	0.12	0.11	0.31	0.41	0.33	0.41	0.15	0.07	0.08	0.10	0.15	0.12	0.16
60	0.15	0.13	0.38	0.47	0.39	0.47	0.18	0.10	0.09	0.14	0.21	0.15	0.20
55	0.17	0.16	0.46	0.54	0.45	0.53	0.24	0.11	0.11	0.23	0.24	0.18	0.25
50	0.18	0.21	0.57	0.62	0.53	0.60	0.30	0.13	0.12	0.30	0.27	0.22	0.30
45	0.20	0.23	0.69	0.70	0.64	0.67	0.37	0.16	0.15	0.35	0.31	0.26	0.35
40	0.23	0.25	0.83	0.80	0.77	0.74	0.45	0.19	0.18	0.39	0.36	0.31	0.42
35	0.26	0.27	1.0	0.91	0.93	0.84	0.53	0.22	0.21	0.43	0.42	0.37	0.51
30	0.30	0.34	1.4	1.1	1.1	0.94	0.63	0.29	0.29	0.50	0.49	0.45	0.61
25	0.33	0.52	1.7	1.4	1.3	1.1	0.73	0.39	0.36	0.57	0.56	0.51	0.72
20	0.42	0.70	2.0	1.7	1.5	1.3	0.87	0.53	0.44	0.64	0.65	0.57	0.89
15	0.59	1.1	2.5	2.1	1.8	1.6	1.1	0.76	0.60	0.72	0.76	0.64	1.2
10	0.86	2.4	3.3	2.6	2.1	2.6	1.6	1.2	0.80	0.87	1.1	0.71	1.7
5	1.4	5.1	5.9	4.6	2.7	3.8	2.8	2.3	1.6	1.2	1.4	0.90	2.9

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	32	2.5	1.2	0.68	0.42
0.95	1.05	50	4.0	2.0	1.2	0.78
0.90	1.11	64	5.0	2.6	1.6	1.1
0.80	1.25	85	6.6	3.6	2.3	1.5
0.50	2	147	11	6.4	4.2	2.8
0.20	5	250	17	11	7.4	4.8
0.10	10	329	21	15	9.9	6.2
0.04	25	439	27	20	13	7.9
0.02	50	527	31	24	16	9.1
0.01	100	622	35	28	19	10

IOWA RIVER BASIN
05464133 HALF MILE CREEK NEAR GLADBROOK, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.04
0.05	20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.06
0.10	10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.09
0.20	5	0.00	0.00	0.00	0.00	0.01	0.02	0.03	0.05	0.14
0.50	2	0.01	0.02	0.02	0.03	0.05	0.12	0.15	0.18	0.32
0.80	1.25	0.04	0.05	0.07	0.08	0.13	0.28	0.40	0.48	0.68
0.90	1.11	0.07	0.08	0.11	0.12	0.22	0.41	0.62	0.73	0.97
0.96	1.04	0.11	0.14	0.17	0.19	0.38	0.58	0.93	1.1	1.4
0.98	1.02	0.15	0.19	0.23	0.25	0.56	0.73	1.2	1.4	1.8
0.99	1.01	0.19	0.25	0.30	0.33	0.82	0.90	1.5	1.7	2.1

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.01	0.01	0.01	0.02	0.02	0.03	0.04	0.05
0.02	50	0.01	0.02	0.02	0.03	0.03	0.04	0.05	0.07
0.05	20	0.02	0.02	0.03	0.04	0.05	0.06	0.07	0.10
0.10	10	0.03	0.03	0.04	0.05	0.06	0.08	0.09	0.14
0.20	5	0.04	0.05	0.06	0.08	0.09	0.11	0.13	0.20
0.50	2	0.10	0.12	0.14	0.16	0.20	0.24	0.28	0.43
0.80	1.25	0.22	0.26	0.29	0.37	0.43	0.50	0.61	0.88
0.90	1.11	0.33	0.37	0.41	0.59	0.65	0.75	0.93	1.3
0.96	1.04	0.51	0.53	0.58	0.99	0.99	1.1	1.5	1.9
0.98	1.02	0.66	0.66	0.72	1.4	1.3	1.5	2.0	2.4
0.99	1.01	0.84	0.81	0.86	1.9	1.7	1.9	2.6	3.0
		July-August-September				October-November-December			
0.01	100	0.01	0.01	0.00	0.00	0.02	0.01	0.01	0.01
0.02	50	0.01	0.01	0.00	0.01	0.02	0.01	0.01	0.02
0.05	20	0.01	0.02	0.01	0.01	0.03	0.02	0.02	0.03
0.10	10	0.01	0.02	0.01	0.02	0.05	0.03	0.04	0.05
0.20	5	0.02	0.03	0.02	0.03	0.07	0.06	0.06	0.09
0.50	2	0.04	0.06	0.06	0.07	0.14	0.15	0.15	0.22
0.80	1.25	0.09	0.14	0.14	0.19	0.28	0.32	0.35	0.48
0.90	1.11	0.15	0.22	0.23	0.31	0.40	0.44	0.51	0.69
0.96	1.04	0.26	0.35	0.37	0.50	0.58	0.61	0.76	0.97
0.98	1.02	0.39	0.48	0.51	0.68	0.72	0.74	0.96	1.2
0.99	1.01	0.58	0.64	0.68	0.89	0.88	0.86	1.2	1.4

IOWA RIVER BASIN
05464137 FOURMILE CREEK NEAR TRAER, IA

LOCATION.--Lat 42°12'07", long 92°33'44", near center of sec. 2, T.85 N., R.15 W., Tama County, Hydrologic Unit 07080205, on left bank 10 ft downstream from bridge on county highway, 2.0 mi upstream from mouth and 5.0 mi northwest of Traer.

DRAINAGE AREA.--19.51 mi².

PERIOD OF RECORD.--October 1962 to September 1974 (discontinued).

GAGE.--Water-stage recorder and V-notch sharp-crested weir. Datum of gage is 905.87 ft above mean sea level.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,040 ft³/s June 22, 1974, gage height, 12.91 ft; maximum gage height, 13.41 ft Feb. 19, 1971, backwater from ice; minimum daily discharge, 0.2 ft³/s Dec. 16, 17, 23, 1963, Nov. 30, 1964, Feb. 1, 1965 and Jan. 10, 1968.

Rating table number 7, developed October 1978
(A discharge measurement to validate this rating
has not been made since January 1981.)

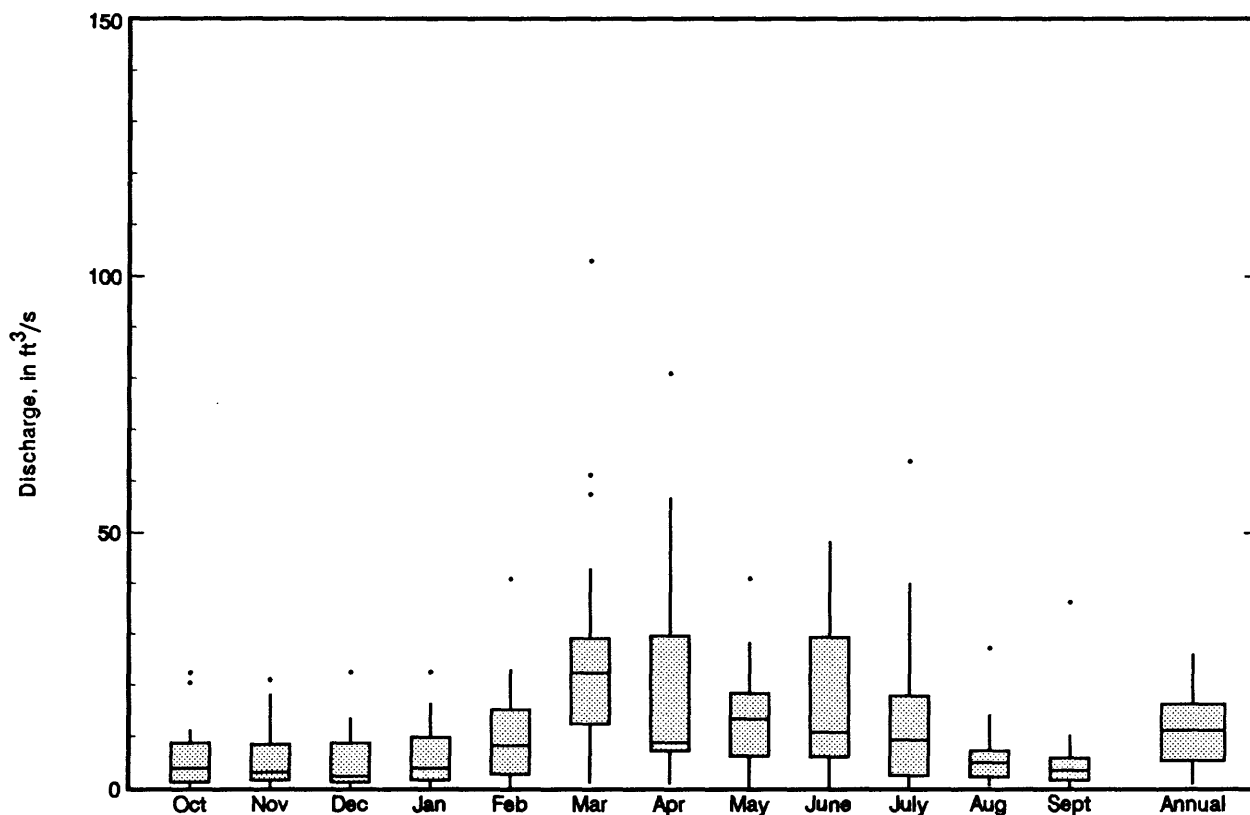
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
7.0	4.7	9.0	300
7.5	20	10.0	611
8.0	64	11.0	947
8.5	161	12.0	1,500

IOWA RIVER BASIN
05464137 FOURMILE CREEK NEAR TRAER, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	22.3	1966	0.19	1977	6.08	6.52	4.3
November	20.9	1973	0.21	1977	5.85	6.28	4.1
December	22.4	1973	0.000	1977	5.56	6.00	3.9
January	22.4	1973	0.000	1977	6.27	6.47	4.4
February	40.8	1971	0.010	1977	10.6	10.5	7.5
March	103	1979	0.92	1977	27.7	26.2	19.5
April	80.9	1973	0.77	1977	20.8	21.6	14.6
May	41.0	1973	0.16	1977	15.0	10.8	10.6
June	48.2	1974	0.030	1977	18.3	15.3	12.9
July	63.8	1969	0.25	1977	13.9	16.5	9.8
August	27.2	1972	0.43	1976	6.45	6.81	4.5
September	36.2	1965	0.20	1976	5.55	8.40	3.9
Annual	25.9	1973	0.64	1977	11.9	7.98	100.0

Boxplots of monthly and annual mean discharges



IOWA RIVER BASIN
05464137 FOURMILE CREEK NEAR TRAER, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equalled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.00	0.00	0.40	0.24	0.06	0.00	0.00	0.12	0.14	0.10	0.12	0.00	0.01
95	0.01	0.02	0.69	1.5	0.26	0.07	0.19	0.32	0.23	0.25	0.33	0.01	0.29
90	0.41	0.61	1.1	2.8	2.0	1.6	1.0	0.47	0.40	0.50	0.83	0.52	0.67
85	0.60	0.79	1.4	3.4	2.7	2.2	1.3	0.70	0.66	0.86	1.0	0.70	0.96
80	0.74	0.98	1.7	4.1	3.6	2.9	1.7	0.85	0.88	1.0	1.1	0.84	1.2
75	0.86	1.2	2.5	4.8	4.2	4.1	2.1	1.0	1.1	1.1	1.2	1.0	1.5
70	1.0	1.4	3.7	5.6	4.8	5.0	2.4	1.3	1.3	1.2	1.5	1.2	1.9
65	1.3	1.6	5.2	6.4	5.6	6.0	2.9	1.5	1.5	1.4	1.7	1.5	2.3
60	1.5	1.9	6.3	7.2	6.5	7.1	3.4	1.8	1.7	1.7	2.1	1.7	2.9
55	1.7	2.2	7.6	8.2	8.6	8.4	4.0	2.1	1.8	2.1	2.7	2.0	3.6
50	2.2	2.5	9.1	9.2	11	9.8	4.7	2.5	2.1	2.7	3.1	2.3	4.4
45	3.3	3.1	11	11	12	12	5.6	3.3	2.4	3.6	3.6	2.6	5.3
40	4.0	3.7	14	13	14	14	6.8	4.1	2.8	4.3	4.2	3.3	6.4
35	4.6	4.3	16	15	16	16	8.3	4.9	3.2	5.1	4.8	5.0	7.8
30	5.3	5.0	19	17	18	18	9.8	6.0	3.6	6.3	6.4	6.3	9.2
25	6.0	6.9	23	20	20	22	12	7.2	4.6	7.6	8.2	7.4	12
20	6.7	8.4	28	24	24	25	14	8.7	6.1	9.0	10	8.4	15
15	8.8	11	35	30	28	32	19	11	8.1	12	13	9.7	18
10	12	22	58	40	34	40	25	14	11	16	17	12	25
5	22	58	121	64	46	56	44	24	27	23	22	16	42

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	115	9.6	5.5	3.1	2.1
0.95	1.05	184	23	14	8.4	5.6
0.90	1.11	234	35	22	13	8.9
0.80	1.25	310	57	35	23	15
0.50	2	516	133	84	54	35
0.20	5	829	277	173	109	71
0.10	10	1,050	389	239	146	95
0.04	25	1,330	541	326	193	126
0.02	50	1,540	659	391	226	147
0.01	100	1,760	779	455	256	167

IOWA RIVER BASIN
05464137 FOURMILE CREEK NEAR TRAER, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.05
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.10
0.05	20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.25
0.10	10	0.00	0.00	0.00	0.00	0.05	0.08	0.13	0.26	0.51
0.20	5	0.16	0.19	0.21	0.27	0.23	0.36	0.49	0.62	1.1
0.50	2	0.47	0.56	0.64	0.74	1.1	1.7	2.3	2.5	3.7
0.80	1.25	1.1	1.3	1.5	1.7	2.8	4.3	6.2	6.9	9.0
0.90	1.11	1.8	2.0	2.4	2.6	3.9	6.0	9.3	10	13
0.96	1.04	3.0	3.2	3.7	4.0	5.0	7.7	13	15	17
0.98	1.02	4.2	4.4	5.1	5.4	5.7	8.8	16	18	19
0.99	1.01	5.7	5.8	6.7	7.2	6.3	9.6	19	20	21

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.08	0.11	0.17	0.42	0.50	0.68	0.76	0.01
0.02	50	0.10	0.15	0.22	0.48	0.61	0.83	0.92	0.05
0.05	20	0.16	0.23	0.32	0.60	0.84	1.1	1.3	0.22
0.10	10	0.23	0.35	0.45	0.75	1.1	1.5	1.7	0.69
0.20	5	0.37	0.56	0.68	1.0	1.6	2.1	2.3	2.1
0.50	2	0.97	1.4	1.6	2.1	3.4	4.1	4.8	8.6
0.80	1.25	2.7	3.4	3.7	5.2	7.6	8.7	10	16
0.90	1.11	4.6	5.4	5.7	8.8	12	13	15	18
0.96	1.04	8.3	8.9	9.4	17	19	21	24	19
0.98	1.02	12	12	13	26	26	28	33	19
0.99	1.01	18	16	17	40	35	37	44	19
		July-August-September				October-November-December			
0.01	100	0.03	0.09	0.02	0.11	0.07	0.11	0.17	0.21
0.02	50	0.05	0.12	0.04	0.16	0.10	0.15	0.22	0.27
0.05	20	0.09	0.19	0.09	0.25	0.16	0.23	0.32	0.41
0.10	10	0.17	0.28	0.18	0.39	0.24	0.34	0.46	0.59
0.20	5	0.31	0.44	0.37	0.63	0.41	0.56	0.71	0.93
0.50	2	0.90	1.0	1.1	1.5	1.1	1.4	1.7	2.2
0.80	1.25	2.1	2.2	2.7	3.3	3.2	3.8	4.3	5.6
0.90	1.11	3.1	3.4	3.9	4.8	5.5	6.4	7.1	9.1
0.96	1.04	4.3	5.1	5.2	6.9	10.0	11	12	15
0.98	1.02	5.2	6.7	6.2	8.7	15	16	18	22
0.99	1.01	6.1	8.5	7.0	11	21	22	24	30

IOWA RIVER BASIN
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 September 1988.

GAGE.--Water-stage recorder. Datum of gage is 700.47 ft above NGVD. Prior to August 20, 1920, nonrecording gage at same site and datum.

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 discharge 53 ft³/s Jan. 6, 1950, caused by construction operations upstream; minimum daily, 212 ft³/s Dec. 10, 1949.

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

Rating table number 16, developed July 1977

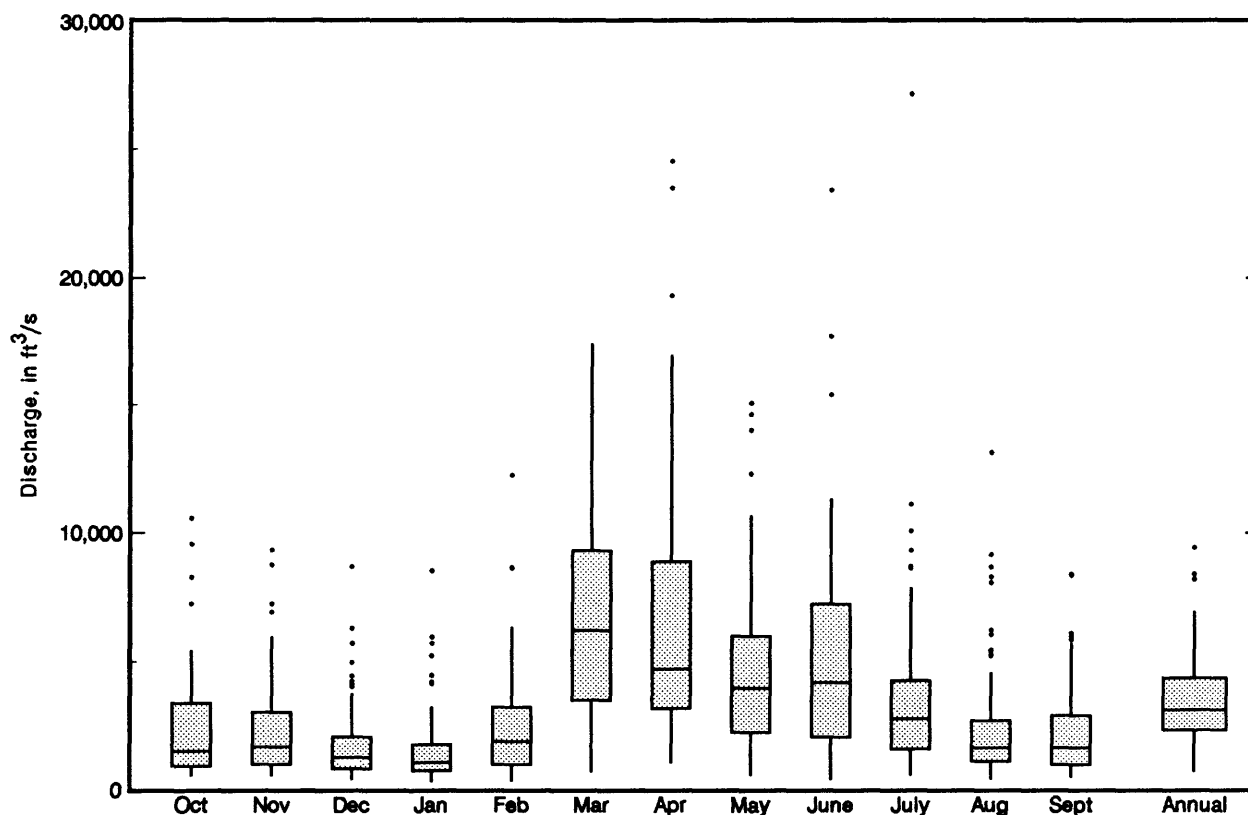
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
2.0	164	5.0	5,900
2.2	244	6.0	10,100
2.5	400	8.0	18,500
3.0	860	11.0	31,300
3.5	1,730	15.0	49,100
4.0	2,900		

IOWA RIVER BASIN
05464500 CEDAR RIVER AT CEDAR RAPIDS, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	10,570	1987	509	1957	2,321	1,977	5.6
November	9,327	1973	506	1957	2,322	1,877	5.6
December	8,675	1983	351	1956	1,748	1,446	4.2
January	8,529	1973	299	1911	1,549	1,434	3.7
February	12,230	1984	304	1940	2,441	2,023	5.9
March	17,420	1929	664	1934	6,667	4,023	16.0
April	24,530	1965	1,045	1957	6,405	4,911	15.4
May	15,080	1983	527	1934	4,714	3,227	11.3
June	23,420	1947	350	1934	5,179	3,928	12.4
July	27,190	1969	538	1911	3,611	3,505	8.7
August	13,130	1979	377	1934	2,478	2,269	5.9
September	8,418	1979	466	1934	2,256	1,714	5.4
Annual	9,430	1983	689	1934	3,476	1,755	100.0

Boxplots of monthly and annual mean discharges



IOWA RIVER BASIN
05464500 CEDAR RIVER AT CEDAR RAPIDS, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	276	281	599	875	626	391	455	385	412	474	422	317	344
95	349	380	833	1,180	1,020	827	608	552	559	561	554	409	526
90	432	502	1,040	1,560	1,330	1,130	827	697	668	650	642	488	665
85	494	619	1,380	2,030	1,590	1,350	1,010	801	756	743	732	559	795
80	580	693	1,700	2,330	1,830	1,610	1,220	907	835	826	831	639	925
75	647	772	2,130	2,630	2,070	1,950	1,420	1,020	925	904	953	733	1,060
70	706	853	2,670	2,940	2,340	2,270	1,570	1,110	1,020	979	1,070	835	1,200
65	779	936	3,140	3,260	2,610	2,560	1,720	1,210	1,140	1,080	1,190	931	1,370
60	857	1,030	3,550	3,600	2,890	2,850	1,920	1,310	1,250	1,190	1,340	1,030	1,560
55	945	1,140	3,940	3,960	3,180	3,190	2,150	1,410	1,350	1,330	1,470	1,130	1,780
50	1,030	1,300	4,360	4,370	3,490	3,580	2,390	1,550	1,480	1,510	1,600	1,240	2,020
45	1,110	1,550	4,820	4,810	3,830	4,040	2,710	1,680	1,630	1,700	1,740	1,380	2,320
40	1,200	1,810	5,500	5,400	4,200	4,540	3,050	1,880	1,820	1,930	1,940	1,560	2,670
35	1,390	2,080	6,370	6,120	4,640	5,090	3,410	2,090	2,040	2,220	2,220	1,750	3,060
30	1,570	2,400	7,410	7,010	5,150	5,760	3,860	2,320	2,290	2,560	2,540	1,930	3,560
25	1,770	2,810	8,600	7,950	5,770	6,600	4,380	2,640	2,590	2,940	2,840	2,170	4,120
20	2,030	3,350	10,000	9,240	6,690	7,580	5,030	3,070	2,980	3,470	3,380	2,460	4,840
15	2,490	4,020	11,900	10,800	7,820	8,830	6,000	3,800	3,650	4,160	3,990	2,950	5,960
10	3,030	5,280	15,200	12,800	9,500	10,900	7,530	4,890	4,660	4,820	4,810	3,630	7,820
5	4,580	8,070	21,100	17,400	12,900	15,200	9,970	7,260	6,460	6,780	6,720	4,770	11,300

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	3,870	3,060	2,620	1,990	1,490
0.95	1.05	7,060	5,850	4,960	3,800	2,890
0.90	1.11	9,500	8,030	6,760	5,180	3,970
0.80	1.25	13,300	11,500	9,570	7,320	5,620
0.50	2	24,000	21,000	17,100	13,000	9,930
0.20	5	39,900	34,900	27,700	20,600	15,500
0.10	10	50,500	43,900	34,300	25,100	18,800
0.04	25	63,600	54,700	41,900	30,200	22,300
0.02	50	73,000	62,100	47,000	33,500	24,500
0.01	100	82,000	69,100	51,700	36,500	28,400

IOWA RIVER BASIN
05464500 CEDAR RIVER AT CEDAR RAPIDS, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	206	215	217	230	243	265	291	313	349
0.02	50	229	240	246	260	276	303	335	364	412
0.05	20	271	286	297	314	336	373	417	459	528
0.10	10	316	334	353	373	402	451	509	565	659
0.20	5	384	407	437	461	502	570	650	729	864
0.50	2	568	606	662	704	779	909	1,060	1,200	1,460
0.80	1.25	868	924	1,020	1,100	1,240	1,490	1,750	2,010	2,490
0.90	1.11	1,100	1,170	1,290	1,400	1,590	1,940	2,300	2,650	3,310
0.96	1.04	1,420	1,500	1,650	1,820	2,090	2,600	3,100	3,560	4,490
0.98	1.02	1,690	1,780	1,950	2,170	2,500	3,160	3,770	4,330	5,470
0.99	1.01	1,980	2,080	2,270	2,540	2,950	3,770	4,510	5,160	6,540

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	217	220	230	244	348	396	411	454
0.02	50	245	252	262	281	423	481	504	569
0.05	20	297	309	323	350	566	641	681	790
0.10	10	355	374	392	430	729	823	885	1,050
0.20	5	444	474	500	559	983	1,110	1,210	1,460
0.50	2	701	768	821	958	1,710	1,920	2,130	2,640
0.80	1.25	1,150	1,290	1,400	1,730	2,910	3,250	3,660	4,570
0.90	1.11	1,510	1,720	1,890	2,410	3,810	4,250	4,810	5,980
0.96	1.04	2,040	2,360	2,630	3,500	5,030	5,600	6,380	7,860
0.98	1.02	2,500	2,910	3,270	4,490	6,000	6,680	7,630	9,320
0.99	1.01	3,010	3,540	4,010	5,650	7,010	7,800	8,920	10,800
		July-August-September				October-November-December			
0.01	100	276	304	318	362	213	266	283	309
0.02	50	315	347	363	410	242	302	322	354
0.05	20	386	424	444	499	294	367	393	436
0.10	10	465	509	534	598	352	439	473	529
0.20	5	583	637	671	752	442	551	598	676
0.50	2	909	991	1,060	1,200	698	875	963	1,120
0.80	1.25	1,440	1,570	1,710	2,000	1,140	1,440	1,620	1,930
0.90	1.11	1,840	2,010	2,220	2,650	1,500	1,900	2,150	2,610
0.96	1.04	2,400	2,620	2,950	3,640	2,020	2,590	2,960	3,660
0.98	1.02	2,860	3,130	3,570	4,490	2,470	3,180	3,670	4,580
0.99	1.01	3,350	3,670	4,240	5,460	2,970	3,840	4,460	5,640

IOWA RIVER BASIN
05464640 PRAIRIE CREEK AT FAIRFAX, IA

LOCATION.--Lat 41°55'22", long 91°47'02", in SE1/4 SW1/4 sec. 9, T.82 N., R.8 W., Linn County, Hydrologic Unit 07080205, on right bank 12 ft upstream from bridge on State Highway 149 at west side of Fairfax and 10.7 mi upstream from mouth.

DRAINAGE AREA.--178 mi².

PERIOD OF RECORD.--October 1966 to September 1982 (discontinued).

GAGE.--Water-stage recorder. Datum of gage is 737.00 ft NGVD.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,140 ft³/s Mar. 19, 1979, gage height, 14.63 ft; no flow July 10-15, 30, Aug. 1, 3, 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--An outstanding flood occurred in June 1944, stage and discharge unknown.

Rating table number 10, developed October 1980
(A discharge measurement to validate this rating
has not been made since October 1982.)

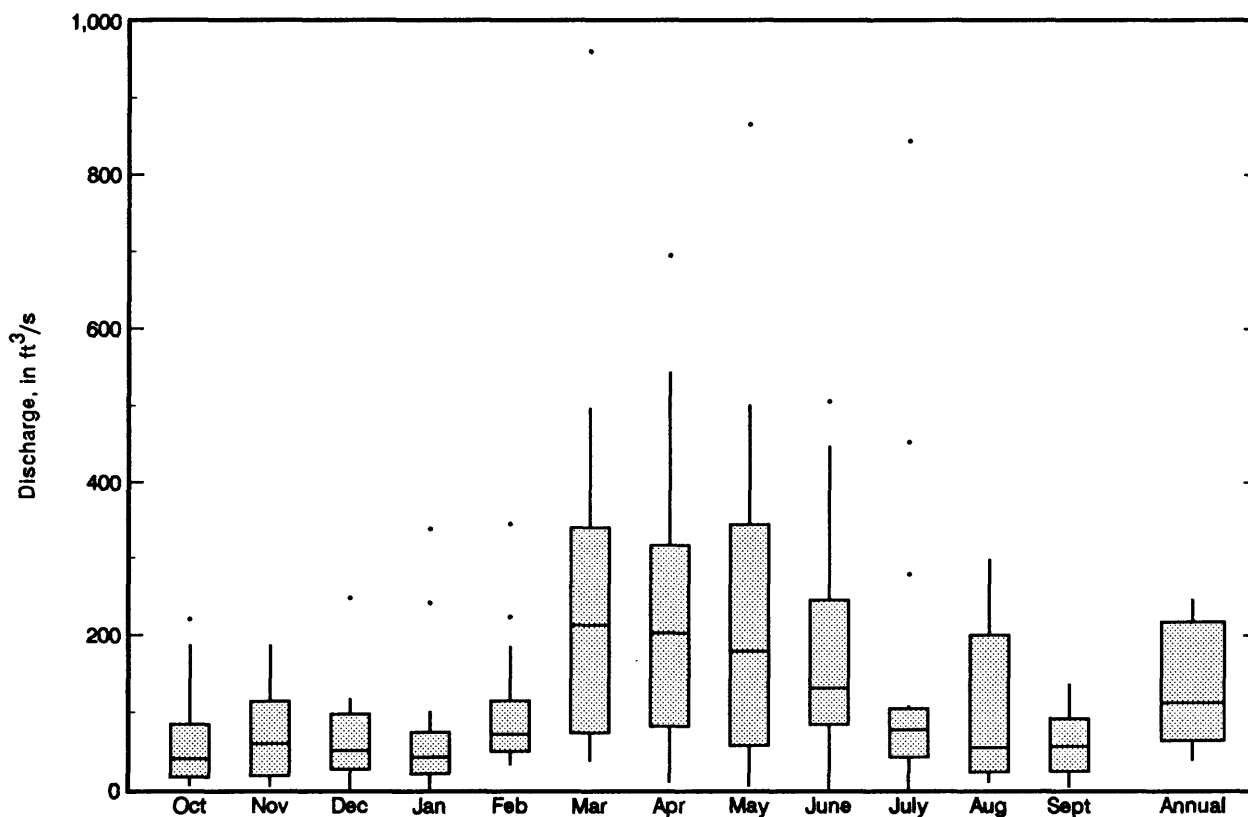
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
2.5	30	6.0	972
2.7	62	8.0	1,790
3.0	112	10.0	2,960
3.5	214	12.0	4,600
4.0	336	14.0	7,050
5.0	628		

IOWA RIVER BASIN
05464640 PRAIRIE CREEK AT FAIRFAX, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	220	1978	5.00	1977	66.0	64.7	4.1
November	187	1973	4.78	1977	70.3	58.1	4.4
December	248	1973	1.66	1977	66.1	61.6	4.1
January	339	1973	0.23	1977	72.4	91.1	4.5
February	345	1971	32.2	1968	102	83.9	6.4
March	961	1979	36.7	1968	256	235	16.0
April	695	1973	9.20	1977	233	186	14.6
May	865	1974	4.81	1977	234	226	14.6
June	506	1969	2.04	1977	184	148	11.5
July	844	1969	0.97	1977	149	217	9.3
August	299	1979	9.24	1976	105	100	6.6
September	137	1978	3.84	1976	62.0	42.5	3.9
Annual	246	1973	37.5	1977	134	76.8	100.0

Boxplots of monthly and annual mean discharges



IOWA RIVER BASIN
05464640 PRAIRIE CREEK AT FAIRFAX, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.12	0.13	12	7.4	3.3	1.2	0.08	2.0	3.0	4.2	3.8	1.4	0.46
95	0.37	6.7	22	11	6.4	2.9	1.8	8.3	4.8	6.3	5.8	1.9	5.9
90	5.8	14	29	44	28	23	18	11	8.3	8.0	8.9	6.4	10
85	7.0	17	34	53	35	36	23	13	10	9.4	11	9.8	16
80	11	21	41	60	43	48	28	16	13	12	13	14	21
75	15	27	47	66	52	58	34	18	16	17	19	19	27
70	19	29	61	76	63	67	38	21	20	22	25	23	32
65	22	32	76	87	76	75	43	25	23	26	30	28	38
60	25	34	90	100	88	84	47	30	27	30	35	34	44
55	31	38	103	116	104	92	53	35	30	35	43	41	50
50	37	41	117	133	122	107	58	40	33	39	51	49	58
45	41	44	130	154	144	123	63	45	37	43	58	56	66
40	45	48	149	177	170	140	69	53	44	47	66	63	78
35	49	56	168	206	196	158	79	61	50	57	76	70	89
30	57	64	199	234	224	179	90	71	57	70	87	76	107
25	66	78	231	273	258	207	107	83	63	83	101	82	128
20	81	97	296	314	304	235	126	100	75	99	117	88	160
15	102	130	400	387	381	291	166	134	97	119	135	101	208
10	139	230	596	503	512	370	289	201	134	148	166	124	286
5	263	421	930	774	796	512	536	352	217	217	213	163	468

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	616	192	113	73	47
0.95	1.05	1,040	399	235	150	97
0.90	1.11	1,350	569	335	213	140
0.80	1.25	1,830	847	499	316	210
0.50	2	3,140	1,650	979	613	424
0.20	5	5,110	2,870	1,710	1,060	769
0.10	10	6,460	3,660	2,200	1,350	1,010
0.04	25	8,180	4,620	2,790	1,700	1,310
0.02	50	9,440	5,280	3,200	1,950	1,530
0.01	100	10,700	5,890	3,580	2,170	1,740

IOWA RIVER BASIN
05464640 PRAIRIE CREEK AT FAIRFAX, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.03	0.03	0.18	0.43	0.86	1.6
0.02	50	0.00	0.00	0.01	0.08	0.10	0.40	0.84	1.5	2.8
0.05	20	0.00	0.00	0.10	0.35	0.44	1.2	2.1	3.1	6.1
0.10	10	0.30	0.31	0.44	1.1	1.3	2.7	4.3	5.7	11
0.20	5	2.6	2.7	2.0	3.3	4.1	6.5	9.1	11	21
0.50	2	14	15	13	15	18	23	28	32	51
0.80	1.25	23	25	33	31	39	49	61	71	90
0.90	1.11	25	27	40	38	47	64	81	99	108
0.96	1.04	25	27	44	42	52	76	100	131	123
0.98	1.02	25	27	45	44	54	82	111	153	130
0.99	1.01	25	27	46	45	55	86	119	173	135

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.05	0.05	0.05	0.06	0.24	0.52	0.75	1.0
0.02	50	0.14	0.15	0.15	0.20	0.65	1.2	1.6	2.3
0.05	20	0.60	0.66	0.69	0.95	2.5	3.7	4.6	6.4
0.10	10	1.8	2.0	2.2	3.0	6.5	8.7	10	14
0.20	5	5.3	6.1	6.7	9.5	17	20	23	32
0.50	2	22	25	27	39	53	59	69	99
0.80	1.25	45	47	51	72	86	101	127	189
0.90	1.11	53	54	58	82	94	114	150	227
0.96	1.04	58	58	62	86	98	122	167	256
0.98	1.02	59	59	62	87	99	124	173	267
0.99	1.01	60	60	63	88	99	125	177	274
		July-August-September				October-November-December			
0.01	100	1.9	0.01	0.21	0.28	0.27	0.70	0.86	0.82
0.02	50	2.6	0.03	0.48	0.60	0.55	1.2	1.4	1.4
0.05	20	4.1	0.28	1.4	1.7	1.5	2.4	3.0	3.2
0.10	10	5.9	1.3	3.1	3.7	3.1	4.3	5.3	5.9
0.20	5	8.8	5.3	7.1	8.4	6.8	8.2	9.9	12
0.50	2	17	24	22	27	22	23	26	33
0.80	1.25	29	37	40	55	46	49	55	70
0.90	1.11	37	38	48	69	60	67	73	93
0.96	1.04	45	39	53	81	73	87	93	119
0.98	1.02	51	39	55	87	79	101	106	134
0.99	1.01	57	39	56	90	84	113	117	147

IOWA RIVER BASIN
05465000 CEDAR RIVER NEAR CONESVILLE, IA

LOCATION.--Lat 41°24'36", long 91°17'06", in SW1/4 SW1/4 sec.2, T.76 N., R.4 W., Muscatine County, Hydrologic Unit 07080206, on right bank 10 ft downstream from bridge on county highway G28, 3.4 mi northeast of Conesville, 5.2 mi downstream from Wapsinonoc Creek, 10.7 mi upstream from mouth and at mile 39.8 upstream from mouth of Iowa River.

DRAINAGE AREA.--7,785 mi².

PERIOD OF RECORD.--September 1939 to September 1988.

GAGE.--Water-stage recorder. Datum of gage is 581.95 ft above NGVD. Prior to Feb. 2, 1940 and Apr. 11, 1952 to July 1, 1954, nonrecording gage, Feb. 2, 1940 to Apr. 10, 1952 and July 2, 1954 to Sept. 16, 1963, water-stage recorder, at site 150 ft downstream on left bank at same datum.

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.

Rating table number 5, developed October 1976

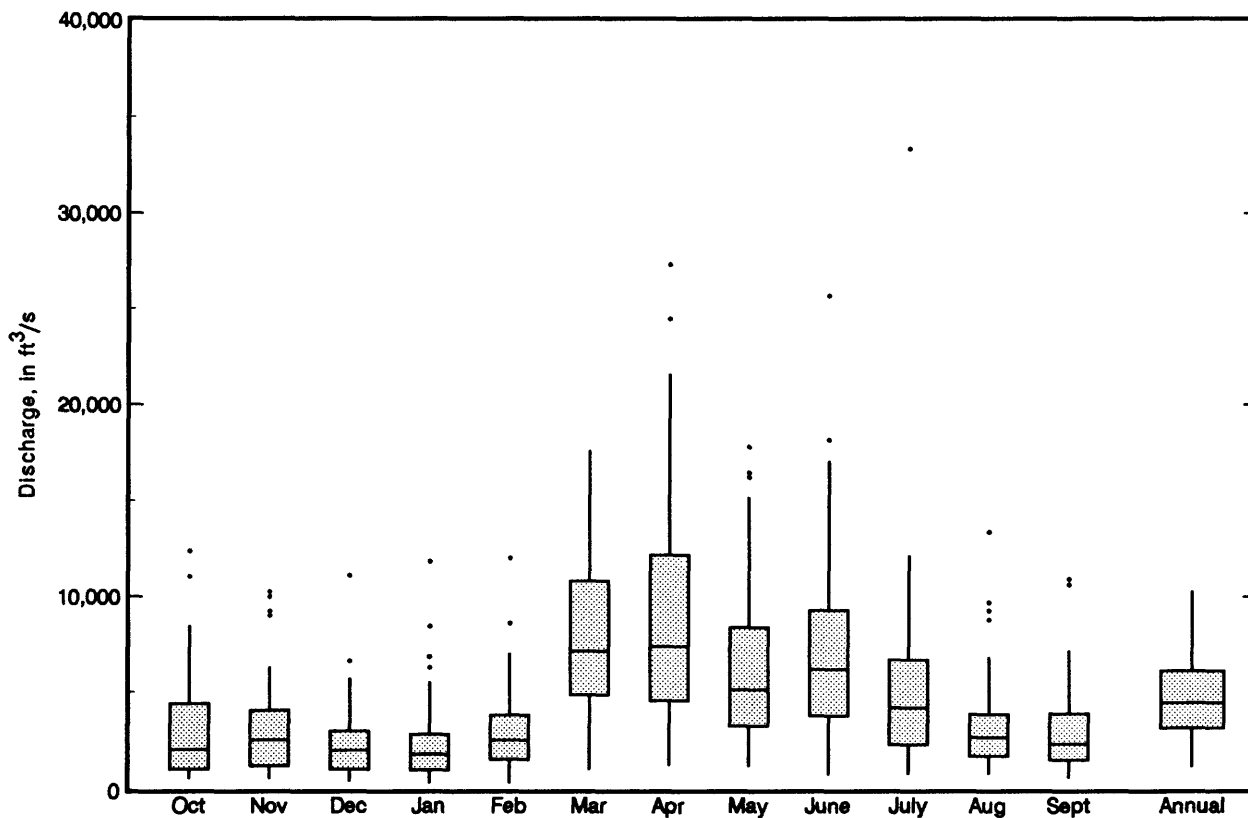
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
3.5	550	11.0	12,800
4.0	790	12.0	16,200
5.0	1,500	13.0	21,200
6.0	2,520	14.0	29,600
7.0	3,820	15.0	41,000
8.0	5,470	16.0	54,500
9.0	7,520	17.0	70,800
10.0	9,940		

IOWA RIVER BASIN
05465000 CEDAR RIVER NEAR CONESVILLE, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	12,380	1987	599	1957	3,124	2,635	5.5
November	10,240	1973	590	1956	3,195	2,477	5.6
December	11,110	1983	449	1956	2,421	1,947	4.3
January	11,860	1973	365	1977	2,449	2,202	4.3
February	12,000	1984	359	1940	3,164	2,342	5.6
March	17,590	1948	1,056	1954	8,008	4,622	14.1
April	27,300	1965	1,244	1957	9,097	6,444	16.0
May	17,780	1973	1,219	1940	6,625	4,458	11.6
June	25,680	1947	768	1977	7,069	4,907	12.4
July	33,340	1969	827	1956	5,413	5,076	9.5
August	13,370	1979	832	1955	3,371	2,562	5.9
September	10,920	1979	620	1955	3,017	2,237	5.3
Annual	10,290	1983	1,176	1956	4,749	2,312	100.0

Boxplots of monthly and annual mean discharges



IOWA RIVER BASIN
05465000 CEDAR RIVER NEAR CONESVILLE, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	336	352	862	1,100	961	734	672	714	546	582	495	420	445
95	438	481	1,170	1,540	1,340	1,210	1,000	905	764	687	681	523	712
90	551	695	1,460	2,190	2,010	1,770	1,340	1,050	883	760	785	607	914
85	746	866	1,790	2,960	2,430	2,230	1,650	1,210	1,010	847	881	696	1,120
80	888	1,110	2,180	3,460	2,810	2,600	1,940	1,380	1,160	963	985	807	1,340
75	1,000	1,210	2,870	3,910	3,180	2,990	2,190	1,570	1,330	1,070	1,190	1,030	1,560
70	1,110	1,310	3,450	4,330	3,520	3,440	2,440	1,710	1,470	1,240	1,430	1,190	1,790
65	1,270	1,410	3,990	4,750	3,850	3,900	2,690	1,840	1,590	1,410	1,650	1,330	2,050
60	1,430	1,550	4,490	5,180	4,170	4,340	3,040	1,990	1,730	1,590	1,910	1,520	2,330
55	1,560	1,740	4,990	5,950	4,510	4,850	3,420	2,160	1,870	1,860	2,130	1,720	2,640
50	1,730	1,960	5,530	6,670	4,920	5,380	3,800	2,350	2,060	2,130	2,400	1,920	3,000
45	1,910	2,180	6,100	7,380	5,360	5,980	4,170	2,530	2,290	2,510	2,700	2,080	3,420
40	2,110	2,510	6,870	8,240	5,880	6,610	4,620	2,740	2,590	2,920	3,120	2,260	3,860
35	2,330	2,860	7,920	9,280	6,490	7,280	5,160	3,030	2,870	3,330	3,510	2,460	4,340
30	2,560	3,250	9,380	10,600	7,280	8,080	5,830	3,390	3,130	3,730	3,920	2,650	4,950
25	2,830	3,690	11,000	12,100	8,190	9,070	6,570	3,780	3,520	4,170	4,350	3,020	5,740
20	3,170	4,250	12,900	13,500	9,450	10,500	7,410	4,300	4,030	4,760	4,810	3,500	6,780
15	3,620	5,180	15,500	15,400	11,500	12,100	8,640	5,040	4,730	5,580	5,340	4,100	8,260
10	4,420	6,660	18,600	18,300	14,000	15,200	10,600	6,580	5,750	6,660	6,190	4,950	10,900
5	6,990	10,400	23,900	23,800	18,500	19,200	15,000	9,580	8,550	8,790	8,350	6,670	15,600

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	4,370	3,400	2,920	2,430	2,000
0.95	1.05	7,930	6,610	5,710	4,610	3,800
0.90	1.11	10,600	9,100	7,870	6,280	5,170
0.80	1.25	14,900	13,000	11,200	8,860	7,260
0.50	2	26,500	23,600	20,100	15,700	12,700
0.20	5	43,500	38,200	32,000	25,200	20,000
0.10	10	54,800	47,200	39,100	31,000	24,300
0.04	25	68,500	57,500	47,000	37,600	29,100
0.02	50	78,200	64,300	52,000	41,900	32,200
0.01	100	87,400	70,500	56,500	45,900	35,000

IOWA RIVER BASIN
05465000 CEDAR RIVER NEAR CONESVILLE, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	223	250	268	285	305	325	344	365	424
0.02	50	265	295	317	336	360	390	416	445	520
0.05	20	341	377	406	428	462	508	551	595	701
0.10	10	424	465	501	529	573	640	703	766	908
0.20	5	548	595	643	680	740	842	939	1,030	1,230
0.50	2	875	935	1,010	1,080	1,190	1,400	1,600	1,790	2,150
0.80	1.25	1,350	1,430	1,550	1,680	1,880	2,270	2,650	3,010	3,630
0.90	1.11	1,680	1,760	1,910	2,100	2,360	2,900	3,420	3,910	4,710
0.96	1.04	2,100	2,190	2,380	2,640	3,010	3,740	4,450	5,130	6,170
0.98	1.02	2,420	2,500	2,720	3,060	3,500	4,390	5,250	6,080	7,300
0.99	1.01	2,730	2,820	3,060	3,480	4,000	5,060	6,080	7,060	8,470

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	246	240	251	271	479	523	547	627
0.02	50	295	294	308	334	597	654	693	804
0.05	20	384	396	417	455	824	904	977	1,150
0.10	10	485	512	540	598	1,090	1,190	1,310	1,560
0.20	5	639	692	734	827	1,500	1,650	1,840	2,200
0.50	2	1,070	1,200	1,280	1,520	2,680	2,970	3,350	4,040
0.80	1.25	1,750	1,990	2,170	2,730	4,570	5,080	5,740	6,890
0.90	1.11	2,260	2,560	2,830	3,680	5,940	6,610	7,440	8,860
0.96	1.04	2,930	3,320	3,700	5,040	7,750	8,640	9,640	11,300
0.98	1.02	3,470	3,890	4,380	6,150	9,130	10,200	11,300	13,200
0.99	1.01	4,020	4,480	5,080	7,350	10,500	11,800	12,900	14,900
		July-August-September				October-November-December			
0.01	100	416	439	476	542	213	292	304	320
0.02	50	474	500	537	611	258	348	365	389
0.05	20	579	608	648	738	342	451	481	521
0.10	10	692	726	769	878	439	568	612	673
0.20	5	861	904	952	1,090	592	749	819	916
0.50	2	1,320	1,390	1,460	1,700	1,040	1,270	1,420	1,630
0.80	1.25	2,030	2,160	2,320	2,740	1,790	2,120	2,450	2,880
0.90	1.11	2,560	2,740	2,980	3,570	2,360	2,780	3,240	3,860
0.96	1.04	3,280	3,550	3,920	4,780	3,170	3,690	4,370	5,250
0.98	1.02	3,860	4,200	4,710	5,800	3,830	4,420	5,290	6,400
0.99	1.01	4,470	4,900	5,580	6,940	4,530	5,210	6,280	7,630

IOWA RIVER BASIN
05465500 IOWA RIVER AT WAPELLO, IA

LOCATION.--Lat 41°10'48", long 91°10'57", in NW1/4 SE1/4 sec.27, T.74 N., R.3 W., Louisa County, Hydrologic Unit 07080209, on right bank 30 ft downstream from bridge on State Highway 99 at east edge of Wapello, 13.0 mi downstream from Cedar River and at mile 16.0.

DRAINAGE AREA.--12,499 mi².

PERIOD OF RECORD.--October 1914 to September 1988.

GAGE.--Water-stage recorder. Datum of gage is 538.17 ft above NGVD; Oct. 1, 1914 to Apr. 15, 1934, nonrecording gage and Apr. 16, 1934 to Sept. 30, 1972, water-stage recorder at datum 10.00 ft higher.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 94,000 ft³/s June 18, 1947, gage height, 16.14 ft, datum then in use; maximum gage height, 28.63 ft Apr. 22, 1973; minimum daily discharge, 300 ft³/s Nov. 28, 1955, result of freezeup.

REMARKS.--Flow regulated by Coralville Lake (station 05453510) 67.3 mi upstream, since Sept. 17, 1958. Data for unregulated period is compiled using data from water years 1914 to 1958. Data for regulated period is compiled using data from water years 1959 to 1988.

Rating table number 14, developed October 1988

Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
9.5	793	18.0	19,000
10.0	1,280	20.0	26,800
11.0	2,520	22.0	36,400
12.0	4,100	24.0	48,600
14.0	8,000	26.0	65,200
16.0	12,700	28.0	84,900

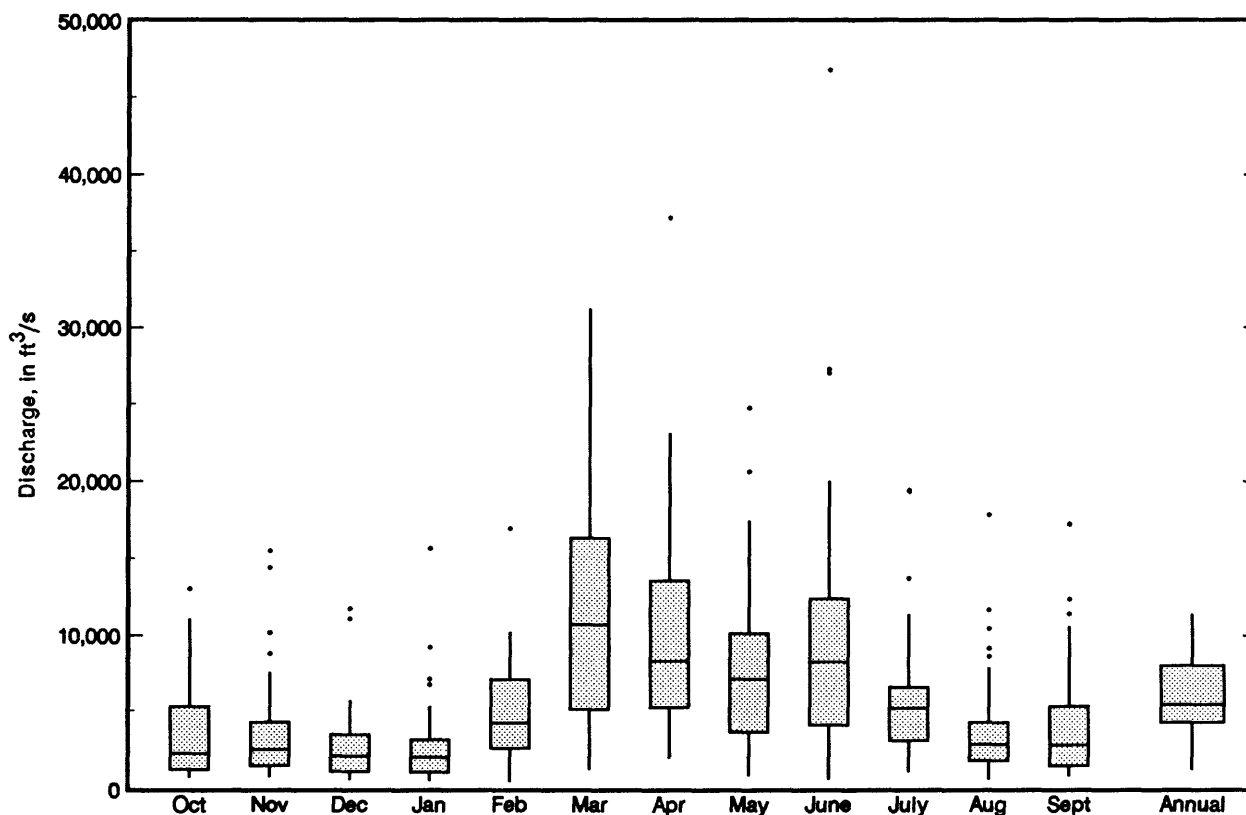
IOWA RIVER BASIN
05465500 IOWA RIVER AT WAPELLO, IA--Continued

Pre-regulation Period

Statistics of monthly and annual mean discharges, pre-regulation period

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	13,070	1916	718	1957	3,557	3,072	5.0
November	15,500	1929	774	1956	3,718	3,318	5.2
December	11,770	1932	604	1956	2,707	2,315	3.8
January	15,670	1946	503	1956	2,822	2,713	4.0
February	16,990	1915	497	1940	4,975	3,235	7.0
March	31,210	1929	1,231	1931	11,430	7,399	16.0
April	37,200	1951	1,967	1957	10,270	6,962	14.4
May	24,790	1944	865	1934	8,018	5,437	11.2
June	46,810	1947	604	1934	10,140	8,548	14.2
July	19,440	1947	1,100	1936	5,833	4,124	8.2
August	17,860	1924	588	1931	4,024	3,382	5.6
September	17,290	1926	826	1955	3,921	3,494	5.5
Annual	11,410	1947	1,211	1934	5,947	2,608	100.0

Boxplots of monthly and annual mean discharges, pre-regulation period



IOWA RIVER BASIN
05465500 IOWA RIVER AT WAPELLO, IA--Continued

Monthly and annual flow duration, pre-regulation period

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												Annual
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	
99	441	465	1,020	1,410	835	607	631	547	728	696	715	549	572
95	600	658	1,290	1,950	1,540	1,310	996	816	887	877	890	678	840
90	696	878	1,820	2,640	2,090	2,140	1,440	1,080	1,010	978	1,010	799	1,060
85	803	1,140	2,780	3,300	2,490	2,540	1,880	1,330	1,110	1,080	1,090	927	1,260
80	962	1,400	3,810	3,950	2,970	2,880	2,360	1,510	1,210	1,170	1,180	1,050	1,510
75	1,120	1,630	4,510	4,560	3,410	3,260	2,710	1,660	1,380	1,290	1,340	1,160	1,750
70	1,260	1,880	5,210	5,210	3,990	4,080	3,070	1,880	1,540	1,420	1,600	1,300	2,050
65	1,410	2,130	5,880	5,810	4,460	4,790	3,410	2,110	1,700	1,590	1,830	1,440	2,360
60	1,540	2,380	6,560	6,350	4,990	5,580	3,730	2,320	1,900	1,760	2,050	1,580	2,690
55	1,660	2,640	7,370	7,010	5,550	6,290	4,080	2,530	2,150	1,940	2,350	1,710	3,080
50	1,850	3,070	8,150	7,700	6,270	6,990	4,410	2,740	2,410	2,150	2,580	1,900	3,540
45	2,060	3,690	8,910	8,460	6,920	7,670	4,790	2,990	2,650	2,410	2,810	2,090	4,060
40	2,260	4,270	10,100	9,250	7,530	8,680	5,230	3,250	2,930	2,760	3,110	2,300	4,640
35	2,530	4,910	11,400	10,300	8,270	9,820	5,730	3,580	3,280	3,380	3,430	2,620	5,370
30	2,810	5,680	12,800	11,400	9,050	11,000	6,350	3,950	3,750	3,860	3,820	2,940	6,270
25	3,270	6,620	14,800	13,200	10,300	12,600	7,050	4,560	4,520	4,450	4,430	3,280	7,310
20	3,780	7,540	17,300	15,700	11,800	14,900	7,860	5,220	5,670	5,200	5,040	3,740	8,630
15	4,300	8,860	20,700	18,200	13,500	18,000	9,480	6,140	6,850	6,390	5,860	4,260	10,500
10	5,080	10,700	26,500	21,700	16,200	22,300	11,500	8,490	8,560	7,940	7,370	5,210	13,500
5	7,420	14,600	34,300	27,400	21,500	30,000	15,800	12,700	11,300	10,500	11,100	8,270	20,000

Probability of annual high discharges, pre-regulation period

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	6,250	3,950	3,220	2,370	1,980
0.95	1.05	11,300	8,430	7,070	5,400	4,340
0.90	1.11	15,100	12,000	10,200	7,900	6,260
0.80	1.25	20,900	17,700	15,200	11,900	9,280
0.50	2	36,100	32,500	28,200	22,300	17,100
0.20	5	56,500	51,300	44,500	35,000	26,800
0.10	10	69,000	61,600	53,300	41,500	31,800
0.04	25	83,400	72,200	62,000	47,900	36,800
0.02	50	92,900	78,500	67,200	51,400	39,700
0.01	100	102,000	83,700	71,300	54,300	42,000

IOWA RIVER BASIN
05465500 IOWA RIVER AT WAPELLO, IA--Continued

Probability of annual low discharges, pre-regulation period

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	314	357	357	370	368	393	452	477	562
0.02	50	352	395	399	415	422	457	525	563	662
0.05	20	421	461	474	496	517	575	658	722	850
0.10	10	495	533	555	583	622	707	808	901	1,060
0.20	5	603	639	674	712	778	907	1,040	1,180	1,400
0.50	2	892	925	993	1,060	1,200	1,470	1,710	1,970	2,370
0.80	1.25	1,340	1,380	1,490	1,620	1,880	2,400	2,870	3,310	4,050
0.90	1.11	1,660	1,720	1,860	2,040	2,380	3,100	3,790	4,330	5,390
0.96	1.04	2,110	2,190	2,370	2,610	3,070	4,100	5,130	5,790	7,320
0.98	1.02	2,460	2,580	2,770	3,080	3,630	4,910	6,250	6,980	8,930
0.99	1.01	2,830	2,990	3,210	3,590	4,210	5,770	7,490	8,260	10,700

Probability of seasonal low discharges, pre-regulation period

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	362	340	339	361	493	549	590	676
0.02	50	415	399	403	436	626	693	747	865
0.05	20	511	506	522	578	883	971	1,050	1,240
0.10	10	617	626	656	744	1,180	1,290	1,410	1,680
0.20	5	776	810	863	1,010	1,660	1,810	1,990	2,400
0.50	2	1,220	1,330	1,450	1,820	3,020	3,290	3,680	4,540
0.80	1.25	1,930	2,180	2,410	3,310	5,160	5,670	6,430	8,150
0.90	1.11	2,470	2,830	3,140	4,530	6,680	7,380	8,440	10,800
0.98	1.04	3,220	3,730	4,150	6,340	8,630	9,630	11,100	14,400
0.98	1.02	3,830	4,470	4,980	7,890	10,100	11,300	13,200	17,200
0.99	1.01	4,490	5,250	5,810	9,600	11,600	13,100	15,200	20,100
		July-August-September				October-November-December			
0.01	100	399	476	505	542	322	410	443	533
0.02	50	453	532	564	616	372	466	503	597
0.05	20	552	633	672	753	464	566	611	714
0.10	10	662	748	795	909	566	677	732	847
0.20	5	834	926	989	1,160	722	846	916	1,050
0.50	2	1,340	1,460	1,580	1,910	1,160	1,320	1,440	1,670
0.80	1.25	2,220	2,420	2,680	3,340	1,880	2,120	2,330	2,790
0.90	1.11	2,950	3,230	3,640	4,570	2,430	2,740	3,030	3,730
0.96	1.04	4,040	4,490	5,140	6,500	3,210	3,640	4,050	5,180
0.98	1.02	4,990	5,600	6,500	8,250	3,850	4,390	4,920	6,470
0.99	1.01	6,050	6,880	8,100	10,300	4,550	5,210	5,870	7,960

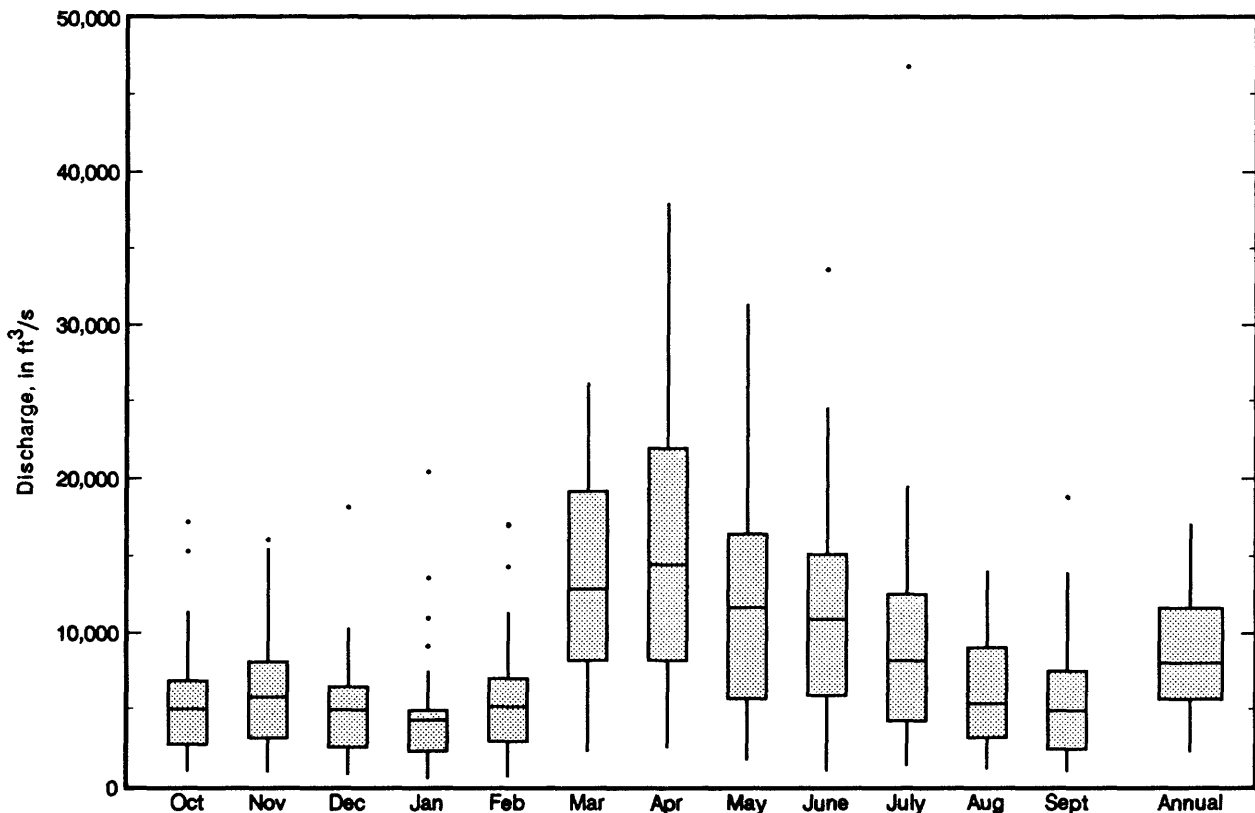
IOWA RIVER BASIN
05465500 IOWA RIVER AT WAPELLO, IA--Continued

Post-regulation Period

Statistics of monthly and annual mean discharges, post-regulation period

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	17,200	1987	968	1977	5,648	3,994	5.5
November	16,060	1962	942	1977	6,191	4,191	6.0
December	18,150	1983	761	1977	5,216	3,661	5.0
January	20,420	1973	533	1977	4,771	4,160	4.6
February	17,080	1984	661	1977	6,126	4,258	5.9
March	26,130	1982	2,273	1977	13,830	7,432	13.4
April	37,970	1965	2,536	1977	16,370	10,270	15.8
May	31,360	1973	1,709	1977	12,260	7,467	11.9
June	33,660	1974	1,022	1977	11,510	7,112	11.1
July	46,810	1969	1,363	1988	9,964	8,667	9.6
August	14,050	1979	1,160	1988	6,095	3,615	5.9
September	18,810	1965	982	1988	5,453	3,873	5.3
Annual	17,050	1973	2,224	1977	8,626	3,864	100.0

Boxplots of monthly and annual mean discharges, post-regulation period



IOWA RIVER BASIN
05465500 IOWA RIVER AT WAPELLO, IA--Continued

Monthly and annual flow duration, post-regulation period

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	510	552	1,510	1,970	1,610	934	990	979	877	914	897	695	806
95	832	1,420	2,310	3,230	3,080	2,140	1,520	1,350	1,080	1,250	1,170	920	1,300
90	1,230	1,950	2,760	4,880	3,860	3,040	2,330	1,680	1,570	1,360	1,460	1,200	1,770
85	1,490	2,170	3,220	5,620	4,570	3,650	2,870	2,080	1,800	1,510	1,760	1,670	2,250
80	1,750	2,350	3,870	6,390	5,160	4,340	3,260	2,380	2,020	1,840	2,330	2,130	2,670
75	2,010	2,510	5,510	7,310	5,710	5,210	3,690	2,660	2,280	2,220	2,980	2,510	3,080
70	2,260	2,710	6,600	8,290	6,310	6,150	4,230	2,930	2,510	2,940	3,270	2,770	3,490
65	2,520	2,980	7,410	9,290	7,040	7,210	4,900	3,200	2,770	3,330	3,560	3,010	3,950
60	2,780	3,280	8,340	10,400	7,910	8,130	5,650	3,470	3,050	3,670	3,910	3,420	4,490
55	3,080	3,570	9,450	11,500	9,120	8,920	6,680	3,970	3,360	4,030	4,310	3,740	5,120
50	3,550	3,930	10,700	12,700	10,200	9,870	7,880	4,490	3,710	4,480	4,770	4,040	5,830
45	3,850	4,330	12,100	14,000	11,200	10,900	8,900	5,100	4,090	5,000	5,530	4,500	6,680
40	4,150	4,770	13,800	16,200	12,300	12,200	9,930	5,640	4,630	5,610	6,280	5,020	7,610
35	4,490	5,190	15,600	18,400	13,400	13,300	11,000	6,920	5,330	6,370	7,080	5,600	8,620
30	4,640	5,630	17,500	20,400	14,800	14,400	11,900	7,860	6,270	7,010	7,880	6,200	9,820
25	5,450	6,530	19,900	22,100	16,400	15,700	13,000	8,630	7,240	7,610	8,570	6,900	11,200
20	6,180	7,800	22,900	24,500	18,200	17,000	14,000	9,460	8,150	8,540	9,390	7,780	13,000
15	7,270	9,540	26,400	28,100	20,500	19,200	15,800	10,500	9,080	9,790	10,700	9,050	15,600
10	9,560	13,600	30,500	32,800	23,900	22,000	18,200	11,800	11,000	11,300	12,300	10,600	19,400
5	15,900	23,400	35,700	40,300	29,900	28,300	26,500	17,300	14,000	13,900	15,200	13,400	26,000

Probability of annual high discharges, post-regulation period

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge ¹ (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	7,000	8,320	7,070	5,900	4,780
0.95	1.05	15,000	12,900	11,300	9,540	7,940
0.90	1.11	20,000	16,100	14,200	12,100	10,200
0.80	1.25	23,000	20,900	18,600	15,900	13,500
0.50	2	36,000	33,500	29,600	25,500	21,900
0.20	5	67,000	51,600	44,900	38,500	32,900
0.10	10	70,000	63,800	54,600	46,700	39,700
0.04	25	85,000	79,000	66,300	56,500	47,500
0.02	50	100,000	90,300	74,500	63,200	52,900
0.01	100	118,000	101,000	82,400	69,600	57,800

¹ Data supplied by U.S. Army Corps of Engineers, Rock Island District.

IOWA RIVER BASIN
05465500 IOWA RIVER AT WAPELLO, IA--Continued

Probability of annual low discharges, post-regulation period

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	394	429	480	500	527	569	588	656	806
0.02	50	484	523	581	605	640	697	736	823	1,020
0.05	20	650	695	764	796	847	936	1,020	1,140	1,430
0.10	10	831	881	961	1,000	1,080	1,210	1,340	1,510	1,880
0.20	5	1,100	1,150	1,250	1,310	1,420	1,620	1,850	2,070	2,580
0.50	2	1,780	1,830	1,950	2,080	2,320	2,750	3,240	3,640	4,420
0.80	1.25	2,680	2,730	2,870	3,120	3,610	4,470	5,350	6,010	6,950
0.90	1.11	3,230	3,270	3,430	3,780	4,470	5,670	6,800	7,620	8,560
0.96	1.04	3,880	3,900	4,070	4,560	5,530	7,200	8,640	9,660	10,400
0.98	1.02	4,320	4,330	4,510	5,110	6,300	8,350	9,990	11,100	11,700
0.99	1.01	4,730	4,730	4,910	5,630	7,050	9,500	11,300	12,600	12,900

Probability of seasonal low discharges, post-regulation period

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	424	455	483	527	813	855	890	988
0.02	50	522	558	591	655	1,030	1,090	1,170	1,330
0.05	20	708	751	795	900	1,440	1,560	1,720	2,020
0.10	10	918	972	1,030	1,190	1,910	2,100	2,380	2,850
0.20	5	1,240	1,320	1,400	1,650	2,670	2,970	3,430	4,180
0.50	2	2,140	2,280	2,440	3,000	4,850	5,460	6,360	7,820
0.80	1.25	3,540	3,830	4,160	5,290	8,360	9,360	10,700	12,900
0.90	1.11	4,510	4,950	5,430	7,020	10,900	12,100	13,500	16,000
0.96	1.04	5,780	6,440	7,160	9,410	14,200	15,600	16,900	19,500
0.98	1.02	6,730	7,590	8,520	11,300	16,700	18,200	19,300	21,800
0.99	1.01	7,680	8,770	9,930	13,300	19,300	20,800	21,500	23,900
		July-August-September				October-November-December			
0.01	100	649	657	691	730	368	500	515	523
0.02	50	754	767	800	865	472	621	647	675
0.05	20	942	965	1,000	1,110	675	850	901	973
0.10	10	1,140	1,180	1,220	1,390	913	1,110	1,200	1,320
0.20	5	1,440	1,500	1,560	1,820	1,290	1,520	1,660	1,890
0.50	2	2,230	2,360	2,510	3,030	2,360	2,670	2,980	3,500
0.80	1.25	3,380	3,670	4,070	4,990	4,030	4,470	5,070	6,000
0.90	1.11	4,180	4,610	5,270	6,450	5,170	5,740	6,550	7,740
0.96	1.04	5,230	5,850	6,950	8,470	6,620	7,400	8,480	9,940
0.98	1.02	6,020	6,810	8,330	10,100	7,690	8,660	9,930	11,500
0.99	1.01	6,830	7,800	9,810	11,800	8,730	9,920	11,400	13,100

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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 mlie 228.1 upstream from mouth of Skunk River.

DRAINAGE AREA.--315 mi².

PERIOD OF RECORD.--July 1920 to September 1927, October 1932 to September 1988. Prior to October 1966, published as Skunk River near Ames.

GAGE.--Water-stage recorder. Concrete control since July 21, 1934. Datum of gage is 893.61 ft above NGVD (Iowa Highway Commission benchmark). Prior to Aug. 25, 1921, nonrecording gage at same site and datum.

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.

Rating table number 3, developed August 1976

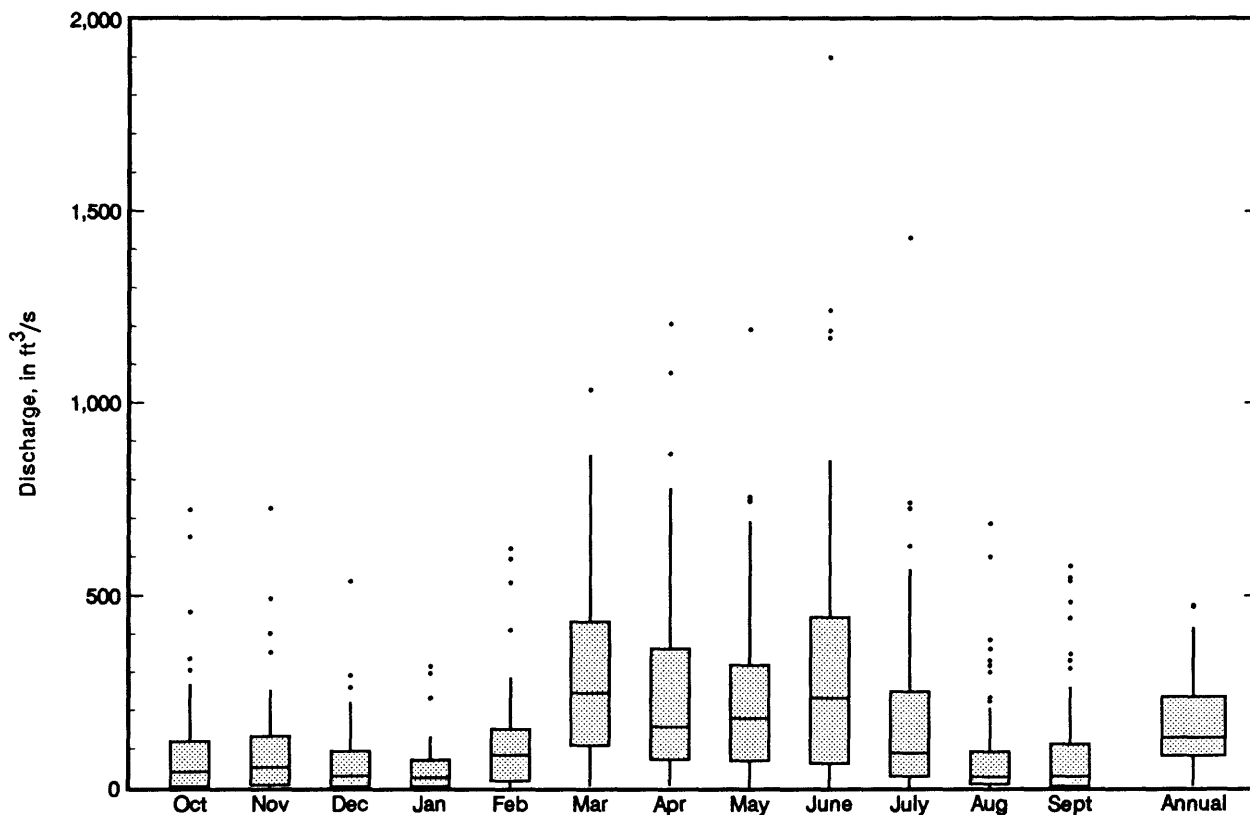
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
2.0	6.3	4.0	576
2.2	17	5.0	1,280
2.5	49	6.0	2,190
2.7	83	8.0	3,940
3.0	156	10.0	5,800
3.5	332		

SKUNK RIVER BASIN
05470000 SOUTH SKUNK RIVER NEAR AMES, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	723	1987	0.12	1954	98.1	147	5.0
November	726	1973	0.14	1956	96.6	131	4.9
December	537	1983	0.000	1977	66.0	91.4	3.4
January	315	1973	0.000	1977	49.8	65.2	2.5
February	623	1984	0.31	1956	117	137	6.0
March	1,034	1979	6.35	1981	303	245	15.5
April	1,208	1965	6.67	1956	264	260	13.5
May	1,193	1944	2.28	1934	251	239	12.8
June	1,900	1947	0.010	1977	341	372	17.4
July	1,430	1969	0.020	1977	182	242	9.3
August	687	1977	0.090	1934	92.2	140	4.7
September	577	1926	0.080	1976	97.5	150	5.0
Annual	476	1983	5.58	1956	163	111	100.0

Boxplots of monthly and annual mean discharges



SKUNK RIVER BASIN
05470000 SOUTH SKUNK RIVER NEAR AMES, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equalled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.00	0.00	1.1	5.5	0.69	0.01	0.01	0.01	0.01	0.08	0.10	0.00	0.01
95	0.10	0.35	7.3	12	6.7	2.7	1.0	0.34	0.24	0.36	0.94	0.38	0.62
90	0.67	1.4	15	22	15	12	2.6	1.2	0.76	0.71	2.2	1.6	2.1
85	1.5	3.0	27	34	30	25	5.2	2.4	1.6	1.3	3.3	2.5	3.9
80	2.4	4.7	40	47	44	35	9.4	3.7	2.5	2.4	4.7	3.4	7.0
75	3.7	7.9	54	64	57	45	16	5.2	3.6	4.3	7.2	5.3	12
70	6.0	13	70	79	70	57	21	6.7	5.1	7.2	12	8.4	18
65	9.5	17	83	94	84	70	29	8.8	7.2	11	20	13	25
60	13	21	96	109	96	87	40	12	9.7	15	28	19	33
55	16	26	117	127	116	108	53	16	14	21	37	25	43
50	21	32	140	144	134	138	66	20	19	29	46	31	55
45	26	42	170	171	153	172	82	26	25	41	58	38	69
40	32	53	205	201	182	208	98	33	33	54	70	45	86
35	39	67	243	233	211	251	120	42	44	68	85	55	105
30	48	87	295	280	247	305	145	55	57	88	100	65	133
25	61	109	351	328	297	371	185	73	74	113	126	82	168
20	75	136	439	404	354	461	229	96	101	145	152	99	215
15	91	183	547	490	460	604	312	140	146	197	190	130	291
10	117	276	740	645	633	870	460	216	227	273	228	173	416
5	186	495	1,240	923	955	1,550	737	407	459	422	339	248	698

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	—	196	134	79	47
0.95	1.05	1,060	461	307	194	126
0.90	1.11	1,380	680	451	293	197
0.80	1.25	1,870	1,030	682	455	315
0.50	2	3,100	1,940	1,300	892	630
0.20	5	4,750	3,020	2,080	1,430	991
0.10	10	5,740	3,560	2,500	1,700	1,160
0.04	25	6,870	4,070	2,920	1,970	1,310
0.02	50	7,630	4,350	3,160	2,110	1,380
0.01	100	8,330	4,560	3,360	2,220	1,430

SKUNK RIVER BASIN
05470000 SOUTH SKUNK RIVER NEAR AMES, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.15
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.21	0.33
0.05	20	0.00	0.00	0.00	0.00	0.00	0.08	0.26	0.61	0.98
0.10	10	0.00	0.01	0.01	0.02	0.11	0.32	0.80	1.5	2.4
0.20	5	0.29	0.33	0.39	0.49	0.57	1.3	2.5	3.8	6.4
0.50	2	2.0	2.2	2.5	3.0	4.8	9.0	14	19	32
0.80	1.25	8.8	9.3	10	12	20	37	54	72	114
0.90	1.11	18	19	21	24	36	64	95	127	195
0.98	1.04	35	37	41	47	60	103	158	216	318
0.98	1.02	54	56	63	72	79	131	210	292	418
0.99	1.01	78	83	93	105	98	159	264	374	520

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.04	0.06	0.07	0.06	0.29	0.69	0.11	0.06
0.02	50	0.08	0.12	0.15	0.15	0.60	1.3	0.36	0.25
0.05	20	0.24	0.33	0.40	0.47	1.7	3.0	1.6	1.5
0.10	10	0.59	0.77	0.90	1.2	3.8	5.9	5.0	5.8
0.20	5	1.6	2.0	2.3	3.3	9.1	13	15	21
0.50	2	7.9	9.3	11	17	36	44	69	108
0.80	1.25	29	34	39	61	97	116	148	220
0.90	1.11	51	59	68	103	142	175	178	253
0.96	1.04	87	100	117	163	196	253	198	269
0.98	1.02	117	136	160	210	231	310	204	273
0.99	1.01	149	174	207	256	261	364	208	275
		July-August-September				October-November-December			
0.01	100	0.02	0.04	0.03	0.02	0.05	0.02	0.05	0.05
0.02	50	0.05	0.07	0.06	0.05	0.11	0.05	0.10	0.13
0.05	20	0.13	0.18	0.18	0.18	0.29	0.17	0.30	0.41
0.10	10	0.31	0.41	0.42	0.54	0.66	0.48	0.76	1.1
0.20	5	0.79	1.0	1.1	1.7	1.7	1.5	2.1	3.1
0.50	2	3.9	4.8	6.0	11	8.5	9.8	12	18
0.80	1.25	15	18	24	43	33	43	52	73
0.90	1.11	29	34	45	74	63	81	98	134
0.96	1.04	52	63	81	118	114	143	181	235
0.98	1.02	74	90	114	150	163	198	258	321
0.99	1.01	100	123	151	181	220	256	345	414

SKUNK RIVER BASIN
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 September 1988.

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.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 11,300 ft³/s June 27, 1975, gage height, 14.00 ft, on basis of contracted-opening measurement; no flow at times most years.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 4, 1918, reached a stage of 14.5 ft, from floodmarks, site and datum used 1919-25, discharge, 6,900 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.

Rating table number 6, developed August 1975

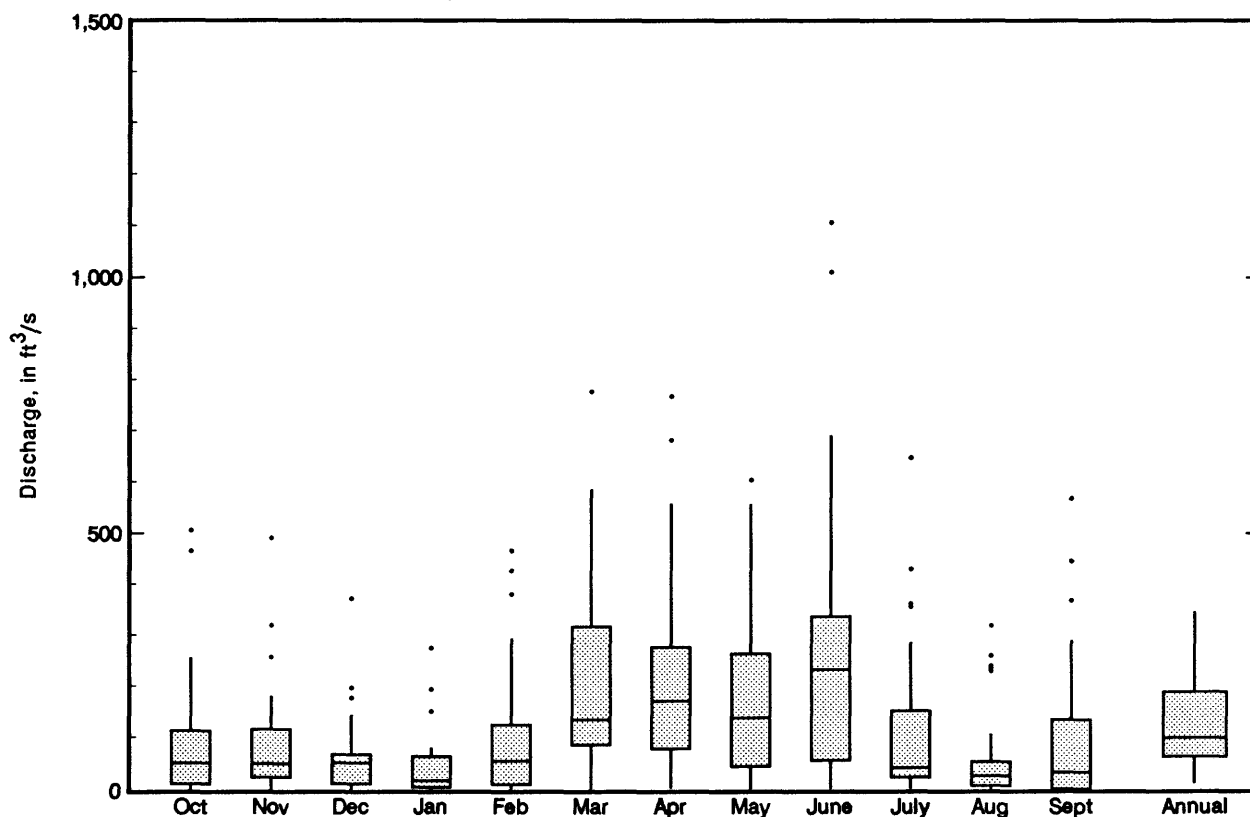
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
1.5	9.9	4.0	1,000
1.7	30	6.0	1,730
2.0	84	8.0	2,460
2.5	261	10.0	3,690
3.0	529	12.0	6,150
3.5	771	14.0	11,100

SKUNK RIVER BASIN
05470500 SQUAW CREEK AT AMES, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	505	1974	0.51	1967	99.3	127	6.4
November	491	1973	0.63	1967	92.5	106	5.9
December	372	1983	0.000	1977	63.7	77.2	4.1
January	275	1973	0.000	1977	43.6	61.9	2.8
February	465	1973	0.090	1977	100	128	6.4
March	777	1979	2.51	1981	209	186	13.4
April	768	1983	4.32	1977	207	196	13.3
May	604	1974	1.42	1981	194	183	12.4
June	1,107	1975	2.97	1977	265	270	17.0
July	648	1969	3.61	1927	122	151	7.9
August	319	1987	1.60	1971	64.8	88.5	4.2
September	568	1926	0.070	1971	95.4	140	6.1
Annual	345	1973	13.6	1981	130	89.1	100.0

Boxplots of monthly and annual mean discharges



SKUNK RIVER BASIN
05470500 SQUAW CREEK AT AMES, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.00	0.00	0.55	1.2	0.10	0.04	0.01	0.00	0.00	0.01	0.08	0.00	0.00
95	0.01	0.24	2.5	3.9	1.9	2.2	0.78	0.28	0.04	0.35	0.91	0.26	0.42
90	0.24	0.68	6.9	10	5.1	6.8	2.3	1.0	0.27	0.75	2.4	1.2	1.5
85	0.65	2.0	19	19	11	19	3.9	1.9	0.80	1.7	4.3	3.8	3.5
80	2.5	5.8	32	37	28	28	7.0	2.4	1.1	2.9	7.6	6.7	6.5
75	5.5	8.0	43	53	37	38	11	3.4	1.9	7.8	20	11	12
70	7.0	13	52	66	46	48	16	5.1	3.2	14	29	16	17
65	8.8	16	60	78	56	59	21	7.0	5.2	17	34	21	23
60	13	18	72	90	68	74	27	9.3	8.7	24	39	26	31
55	16	23	84	104	82	89	35	13	14	34	46	32	39
50	19	28	100	119	100	110	45	16	17	44	54	39	49
45	24	34	118	136	121	133	57	20	23	54	63	46	59
40	28	40	140	165	144	165	69	25	29	65	72	52	72
35	34	51	167	195	168	197	82	32	40	78	82	58	86
30	40	64	194	231	192	241	98	40	54	92	92	67	107
25	49	81	245	270	235	288	118	52	71	110	109	77	130
20	59	109	304	318	287	355	148	70	94	128	126	88	172
15	77	163	397	401	370	431	194	99	140	175	162	112	230
10	104	251	545	516	494	620	280	148	231	252	205	147	327
5	173	466	851	702	769	1,140	503	265	450	396	351	199	554

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	574	203	119	80	57
0.95	1.05	920	411	248	166	114
0.90	1.11	1,170	572	350	233	159
0.80	1.25	1,540	823	514	341	230
0.50	2	2,520	1,470	953	630	426
0.20	5	3,950	2,300	1,540	1,020	704
0.10	10	4,900	2,760	1,880	1,250	878
0.04	25	6,090	3,250	2,260	1,500	1,080
0.02	50	6,960	3,540	2,490	1,660	1,210
0.01	100	7,820	3,790	2,690	1,800	1,340

SKUNK RIVER BASIN
05470500 SQUAW CREEK AT AMES, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.16
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.36
0.05	20	0.00	0.00	0.00	0.00	0.04	0.13	0.31	0.90	1.1
0.10	10	0.00	0.00	0.00	0.00	0.26	0.59	1.2	2.0	2.8
0.20	5	0.02	0.03	0.23	0.39	0.90	1.9	3.5	5.0	7.4
0.50	2	1.4	1.7	2.0	2.8	5.3	9.6	15	21	35
0.80	1.25	7.5	8.3	8.8	11	19	32	47	66	111
0.90	1.11	14	15	17	21	32	54	76	106	174
0.96	1.04	24	25	30	37	51	86	117	163	256
0.98	1.02	31	33	43	53	66	113	150	206	314
0.99	1.01	39	41	58	71	81	140	184	248	366

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.01	0.02	0.04	0.05	0.11	0.19	0.40	0.35
0.02	50	0.02	0.06	0.09	0.12	0.24	0.41	0.81	0.76
0.05	20	0.11	0.22	0.29	0.37	0.75	1.2	2.1	2.2
0.10	10	0.40	0.63	0.78	0.92	1.9	2.8	4.7	5.4
0.20	5	1.5	1.9	2.2	2.6	5.1	7.3	11	14
0.50	2	9.9	11	12	14	25	33	44	62
0.80	1.25	33	38	42	57	83	103	125	194
0.90	1.11	48	62	70	104	135	165	192	306
0.96	1.04	64	92	108	181	206	247	282	456
0.98	1.02	73	113	136	249	260	308	347	564
0.99	1.01	78	131	162	323	310	365	408	665
		July-August-September				October-November-December			
0.01	100	0.05	0.01	0.02	0.02	0.02	0.04	0.02	0.15
0.02	50	0.08	0.02	0.04	0.05	0.04	0.10	0.05	0.32
0.05	20	0.18	0.06	0.11	0.17	0.16	0.36	0.22	0.95
0.10	10	0.34	0.15	0.25	0.46	0.48	0.96	0.74	2.3
0.20	5	0.73	0.45	0.67	1.4	1.6	2.8	2.6	5.9
0.50	2	2.9	2.7	3.6	7.8	10	14	17	26
0.80	1.25	10	12	15	29	40	47	60	78
0.90	1.11	18	23	29	49	68	75	92	121
0.96	1.04	34	43	56	77	106	110	128	175
0.98	1.02	50	61	82	98	135	134	150	212
0.99	1.01	70	82	114	119	161	155	166	246

SKUNK RIVER BASIN

05471000 SOUTH SKUNK RIVER BELOW SQUAW CREEK NEAR AMES, IA

LOCATION.--Lat 42°00'31", long 93°35'37", in NE1/4 NW1/4 sec. 13, T.83 N., R.24 W., Story County, Hydrologic Unit 07080105, on right bank 15 ft downstream from bridge on county highway, 0.2 mi downstream from Squaw Creek, 0.2 upstream from bridge on U.S. Highway 30, 2 mi southeast of Ames and at mile 222.6 upstream from mouth of Skunk River.

DRAINAGE AREA.--556 mi².

PERIOD OF RECORD.--October 1952 to September 1979 (discontinued).

GAGE.--Water-stage recorder. Datum of gage is 857.10 ft NGVD. Prior to Oct. 1, 1973, at datum 10.00 ft higher.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 14,700 ft³/s June 27, 1975, gage height, 25.57 ft; no flow at times most years.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of May 19, 1944, reached a stage of 13 ft, from floodmarks, discharge, 10,000 ft³/s, datum then in use.

Rating table number 8, developed March 1976
(A discharge measurement to validate this rating
has not been made since October 1979.)

Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
9.50	6.5	14.00	1,070
10.00	38	16.00	2,120
10.50	88	18.00	3,320
11.00	159	20.00	4,720
12.00	369	22.00	6,270
13.00	675	24.00	9,000

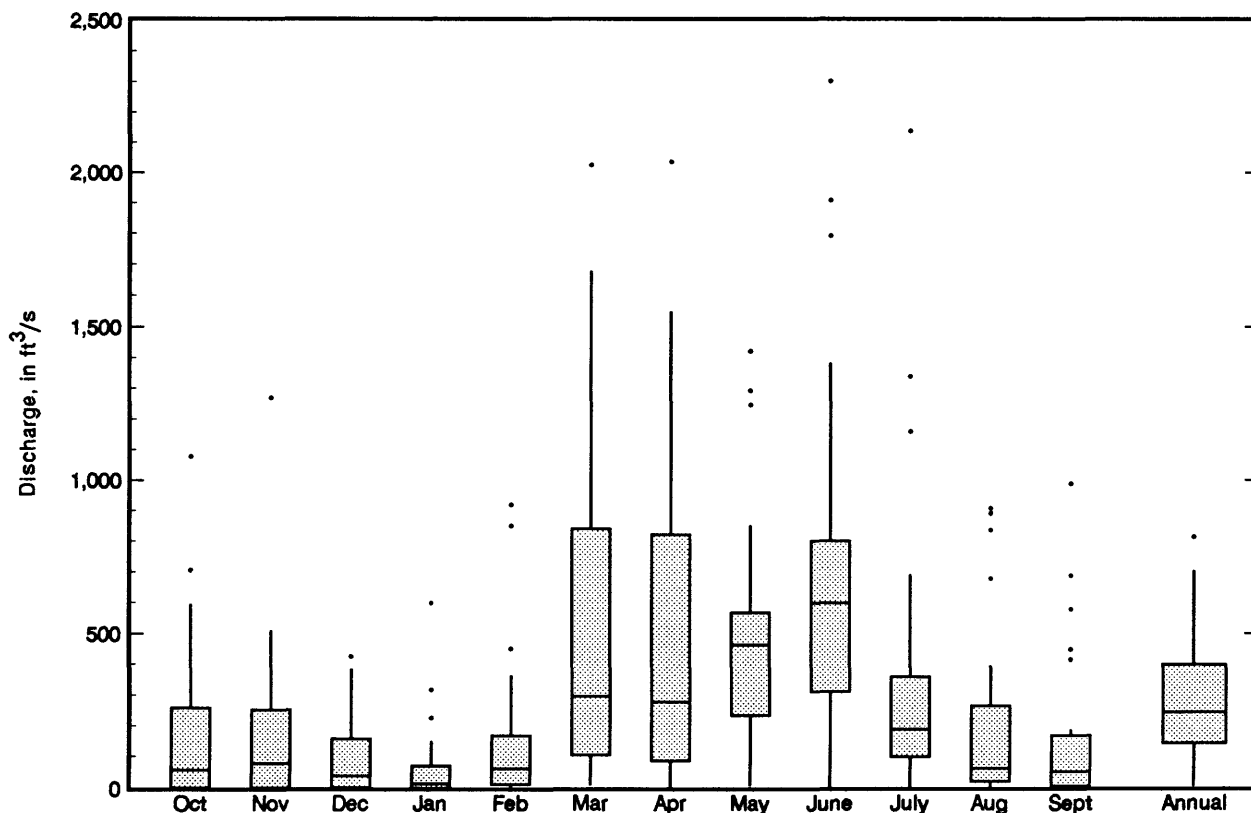
SKUNK RIVER BASIN

05471000 SOUTH SKUNK RIVER BELOW SQUAW CREEK NEAR AMES, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	1,079	1974	0.000	1957	180	275	5.0
November	1,270	1973	0.010	1977	172	263	4.7
December	426	1973	0.000	1977	100.0	127	2.8
January	599	1973	0.000	1956	73.1	131	2.0
February	919	1973	0.000	1956	155	240	4.3
March	2,026	1979	8.71	1956	542	553	15.0
April	2,037	1965	3.62	1956	518	531	14.3
May	1,421	1974	6.71	1967	477	380	13.2
June	2,304	1975	0.000	1977	682	586	18.8
July	2,138	1969	0.000	1956	357	477	9.9
August	908	1977	0.030	1956	204	286	5.6
September	988	1978	0.16	1976	161	248	4.5
Annual	814	1973	5.95	1956	301	204	100.0

Boxplots of monthly and annual mean discharges



SKUNK RIVER BASIN

05471000 SOUTH SKUNK RIVER BELOW SQUAW CREEK NEAR AMES, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.00	0.00	0.00	0.96	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
95	0.00	0.00	0.95	6.6	3.9	0.11	0.01	1.7	0.42	0.05	0.25	0.00	0.01
90	0.01	0.01	12	13	19	43	26	4.2	1.2	0.36	0.42	0.01	0.57
85	0.01	0.19	19	20	50	87	36	7.0	2.1	0.64	1.0	0.24	2.3
80	0.11	0.42	25	38	79	113	47	9.7	3.3	0.86	2.0	0.80	5.2
75	1.0	2.9	43	68	120	139	59	13	4.7	1.4	3.0	2.6	12
70	2.1	4.8	75	104	158	168	75	15	8.3	2.1	6.5	4.0	22
65	3.0	12	102	150	193	198	90	20	14	4.5	13	6.1	34
60	4.4	24	122	189	228	236	108	27	20	10	22	12	49
55	7.3	30	143	230	265	284	125	36	27	17	45	24	67
50	18	34	175	269	302	333	144	45	36	40	65	41	90
45	27	38	205	309	344	389	167	55	47	60	91	57	119
40	36	48	262	395	389	443	191	68	59	75	121	79	151
35	47	64	332	484	435	529	219	85	73	91	154	102	193
30	58	88	437	567	490	640	269	114	88	148	191	124	244
25	81	121	584	652	584	781	325	154	117	228	233	151	302
20	111	169	766	766	679	958	416	214	157	298	280	192	399
15	144	247	994	956	856	1,200	547	301	240	391	345	238	530
10	193	361	1,400	1,200	1,080	1,710	805	455	363	512	444	291	744
5	295	639	2,560	1,830	1,770	2,780	1,530	872	691	710	683	400	1,320

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	—	197	108	55	36
0.95	1.05	2,490	754	444	269	188
0.90	1.11	3,110	1,320	808	520	370
0.80	1.25	3,990	2,280	1,450	979	702
0.50	2	6,060	4,430	3,000	2,090	1,460
0.20	5	8,570	5,870	4,150	2,820	1,900
0.10	10	10,000	6,190	4,430	2,970	1,970
0.04	25	11,600	6,330	4,560	3,020	2,000
0.02	50	12,600	6,360	4,600	3,030	2,000
0.01	100	13,500	6,370	4,610	3,040	2,000

SKUNK RIVER BASIN

05471000 SOUTH SKUNK RIVER BELOW SQUAW CREEK NEAR AMES, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
0.05	20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.18
0.10	10	0.00	0.00	0.00	0.00	0.00	0.01	0.11	0.28	0.75
0.20	5	0.00	0.00	0.00	0.00	0.00	0.30	1.1	1.6	3.4
0.50	2	1.9	2.0	1.9	2.4	3.3	7.4	13	20	37
0.80	1.25	14	16	20	22	36	62	85	127	214
0.90	1.11	25	27	36	42	78	151	197	279	427
0.96	1.04	39	41	54	69	140	327	436	574	767
0.98	1.02	47	50	63	87	187	506	706	866	1,040
0.99	1.01	55	57	69	105	232	720	1,070	1,210	1,310

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.02	0.03	0.03	0.00	0.76	1.0	0.05	1.4
0.02	50	0.06	0.06	0.07	0.01	1.6	2.2	0.20	3.1
0.05	20	0.24	0.23	0.26	0.06	4.2	5.7	1.4	8.9
0.10	10	0.73	0.66	0.74	0.25	9.3	13	6.1	21
0.20	5	2.4	2.1	2.4	1.1	22	29	25	50
0.50	2	16	15	16	13	81	104	149	186
0.80	1.25	70	71	79	95	207	255	329	456
0.90	1.11	126	140	157	220	296	357	386	629
0.96	1.04	211	263	298	473	398	470	415	810
0.98	1.02	278	376	430	726	463	539	422	914
0.99	1.01	345	502	579	1,020	517	595	426	995
		July-August-September				October-November-December			
0.01	100	0.03	0.03	0.04	0.10	0.17	0.00	0.00	0.02
0.02	50	0.06	0.06	0.09	0.23	0.33	0.00	0.01	0.05
0.05	20	0.21	0.27	0.33	0.69	0.89	0.04	0.05	0.19
0.10	10	0.54	0.74	0.90	1.7	2.0	0.21	0.22	0.60
0.20	5	1.5	2.2	2.7	4.5	5.0	1.2	1.1	2.3
0.50	2	8.1	12	14	22	24	19	16	21
0.80	1.25	29	39	49	76	93	127	125	135
0.90	1.11	48	62	79	127	170	262	301	309
0.96	1.04	76	92	117	202	305	474	670	680
0.98	1.02	98	112	143	260	429	637	1,050	1,080
0.99	1.01	119	130	166	318	572	790	1,490	1,570

SKUNK RIVER BASIN
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., Hydrologic Unit 07080105, Jasper County, on right bank 30 ft downstream from bridge on State Highway 117, 0.7 mi downstream from Wolf Creek, 2.2 mi upstream from Byers Branch, 2.9 mi northwest of Mingo, and 11.3 mi upstream from South Skunk River.

DRAINAGE AREA.--276 mi².

PERIOD OF RECORD.--May 1958 to September 1975; October 1985 to September 1988.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 7,380 ft³/s June 12, 1966, gage height, 16.41 ft; minimum daily discharge, 0.01 ft³/s Aug. 18, 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.

Rating table number 8, developed March 1986

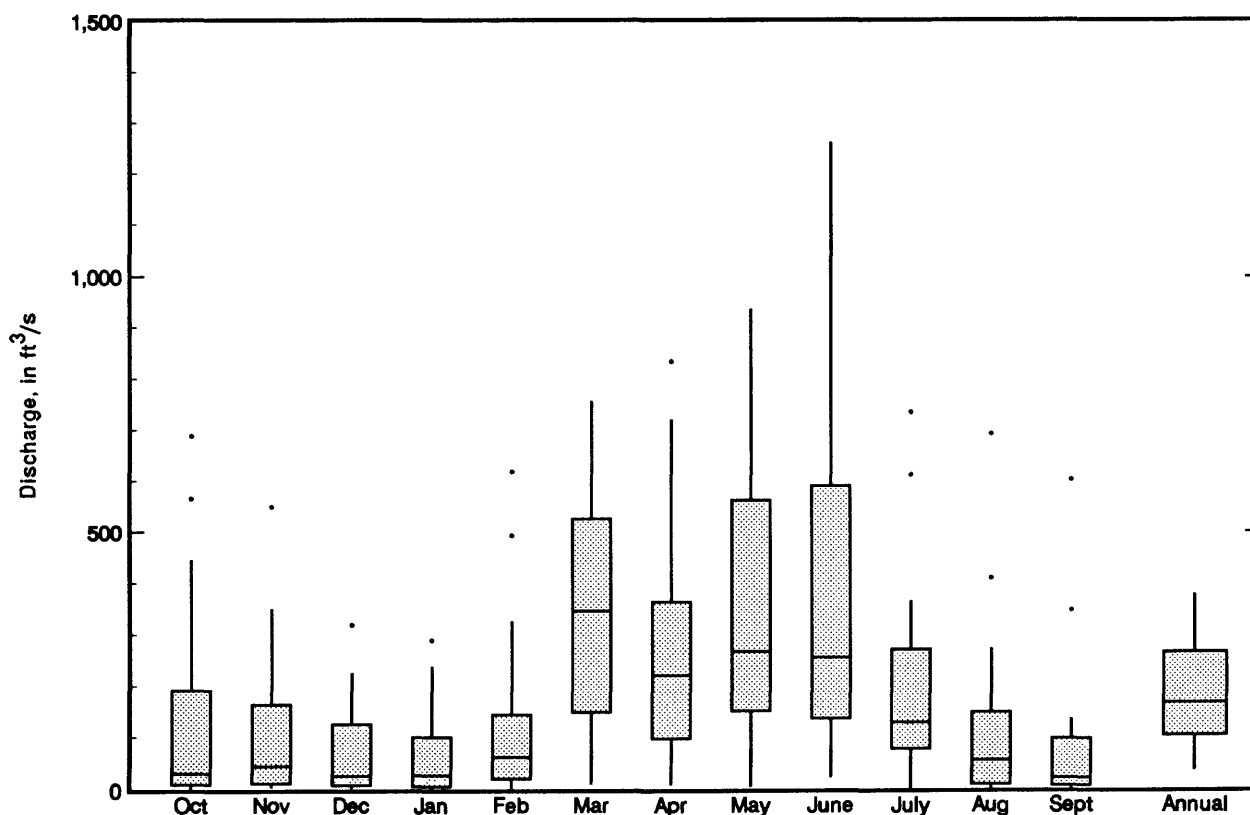
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
4.0	13	8.0	960
4.5	52	9.0	1,390
5.0	115	10.0	1,890
5.5	202	12.0	3,070
6.0	313	14.0	4,680
7.0	596	16.0	7,730

SKUNK RIVER BASIN
05471200 INDIAN CREEK NEAR MINGO, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	689	1987	1.11	1972	136	203	6.0
November	549	1973	4.12	1968	110	140	4.9
December	319	1973	3.16	1967	80.4	94.2	3.5
January	289	1973	1.87	1968	66.3	80.7	2.9
February	619	1971	2.25	1967	126	167	5.6
March	757	1962	10.9	1968	328	223	14.4
April	834	1965	8.76	1967	260	235	11.8
May	936	1974	5.58	1967	354	274	15.6
June	1,262	1974	22.6	1968	402	359	17.7
July	736	1969	3.49	1968	199	193	8.7
August	693	1987	1.44	1988	119	175	5.2
September	603	1986	0.91	1988	83.3	147	3.7
Annual	378	1974	36.4	1968	190	104	100.0

Boxplots of monthly and annual mean discharges



SKUNK RIVER BASIN
05471200 INDIAN CREEK NEAR MINGO, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.18	1.5	4.3	6.3	3.7	5.2	2.3	0.84	0.34	0.78	3.6	1.7	0.88
95	1.5	2.1	12	8.8	9.7	20	5.6	2.1	0.94	1.3	4.7	3.6	2.8
90	3.3	2.6	17	27	33	40	13	3.8	1.5	1.9	5.7	4.4	5.0
85	4.6	3.4	27	51	66	52	20	4.8	2.2	4.8	6.6	5.5	7.3
80	5.6	6.7	42	66	80	66	28	6.4	3.1	6.1	8.6	6.9	11
75	6.6	8.7	54	80	94	79	37	8.0	4.8	8.6	12	8.8	15
70	7.7	15	68	95	110	95	44	10	7.5	12	15	11	21
65	8.8	21	86	109	129	114	53	13	11	16	19	13	31
60	11	30	108	127	152	137	63	17	14	19	28	16	44
55	15	44	132	151	177	162	77	22	15	22	37	19	58
50	28	53	161	178	203	190	91	27	18	28	46	25	73
45	45	61	198	205	231	218	108	33	21	39	64	48	89
40	58	69	243	233	263	253	126	39	25	53	88	66	109
35	69	77	299	261	296	288	147	48	31	86	106	83	132
30	79	85	358	289	338	334	175	62	47	111	125	112	159
25	89	105	417	322	390	401	213	89	62	148	144	132	204
20	102	128	495	374	453	492	272	117	80	209	170	147	259
15	114	157	579	427	557	623	360	157	114	285	234	167	331
10	141	212	751	548	744	981	504	253	193	407	301	207	455
5	227	450	1,230	800	1,200	1,570	786	537	365	579	459	270	727

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	—	448	343	257	185
0.95	1.05	2,030	876	619	435	307
0.90	1.11	2,410	1,190	812	557	390
0.80	1.25	2,930	1,640	1,090	729	506
0.50	2	4,150	2,630	1,690	1,120	769
0.20	5	5,640	3,590	2,310	1,550	1,060
0.10	10	6,520	4,010	2,590	1,760	1,210
0.04	25	7,540	4,360	2,850	1,980	1,360
0.02	50	8,230	4,530	2,990	2,100	1,450
0.01	100	8,870	4,650	3,090	2,210	1,530

SKUNK RIVER BASIN
05471200 INDIAN CREEK NEAR MINGO, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.10	0.10	0.11	0.14	0.28	0.46	0.64	0.86	0.94
0.02	50	0.17	0.17	0.19	0.24	0.43	0.69	0.98	1.3	1.5
0.05	20	0.36	0.37	0.41	0.50	0.82	1.3	1.8	2.4	2.9
0.10	10	0.69	0.71	0.79	0.94	1.4	2.2	3.2	4.2	5.1
0.20	5	1.4	1.5	1.7	1.9	2.7	4.1	6.3	8.2	10
0.50	2	5.2	5.5	6.1	7.0	9.1	14	22	28	36
0.80	1.25	16	17	19	22	28	49	75	95	122
0.90	1.11	26	28	32	38	50	92	141	176	226
0.98	1.04	44	46	53	66	91	183	274	338	432
0.98	1.02	59	62	72	93	132	284	419	512	650
0.99	1.01	76	79	94	124	183	423	612	743	935

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.08	0.09	0.12	0.49	0.87	1.2	1.8	2.7
0.02	50	0.16	0.19	0.24	0.76	1.6	2.3	3.2	4.8
0.05	20	0.46	0.52	0.63	1.5	4.0	5.2	7.0	11
0.10	10	1.1	1.2	1.4	2.6	8.0	10	13	21
0.20	5	2.7	3.0	3.5	5.2	17	21	27	42
0.50	2	13	14	15	19	54	64	78	118
0.80	1.25	43	47	51	69	124	146	173	241
0.90	1.11	74	79	87	135	170	202	236	313
0.98	1.04	120	130	142	272	220	265	309	385
0.98	1.02	159	171	188	426	251	305	355	426
0.99	1.01	199	214	237	637	277	339	394	457
		July-August-September				October-November-December			
0.01	100	0.13	0.14	0.22	0.37	0.24	0.25	0.31	0.40
0.02	50	0.22	0.25	0.35	0.58	0.39	0.41	0.52	0.67
0.05	20	0.47	0.53	0.71	1.1	0.81	0.87	1.1	1.4
0.10	10	0.89	1.0	1.3	2.0	1.5	1.7	2.1	2.7
0.20	5	1.9	2.2	2.6	3.9	3.2	3.6	4.5	5.8
0.50	2	6.7	7.8	9.1	14	13	15	18	23
0.80	1.25	20	24	29	45	47	57	65	84
0.90	1.11	34	41	50	83	90	111	123	160
0.96	1.04	56	68	88	157	175	224	236	309
0.98	1.02	76	92	125	235	267	349	356	466
0.99	1.01	99	120	168	335	386	515	509	667

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 September 1988. Prior to October 1966, published as Skunk River near Oskaloosa.

GAGE.--Water-stage recorder. Datum of gage is 685.50 ft above NGVD. Prior to Nov. 21, 1947, nonrecording gage at site 400 ft downstream at same datum.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 20,000 ft³/s June 15, 1947, gage height, 21.26 ft, from floodmarks; maximum gage height, 22.52 ft Feb. 3, 1973, backwater from ice; minimum daily discharge, 1.8 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.

Rating table number 8, developed October 1987

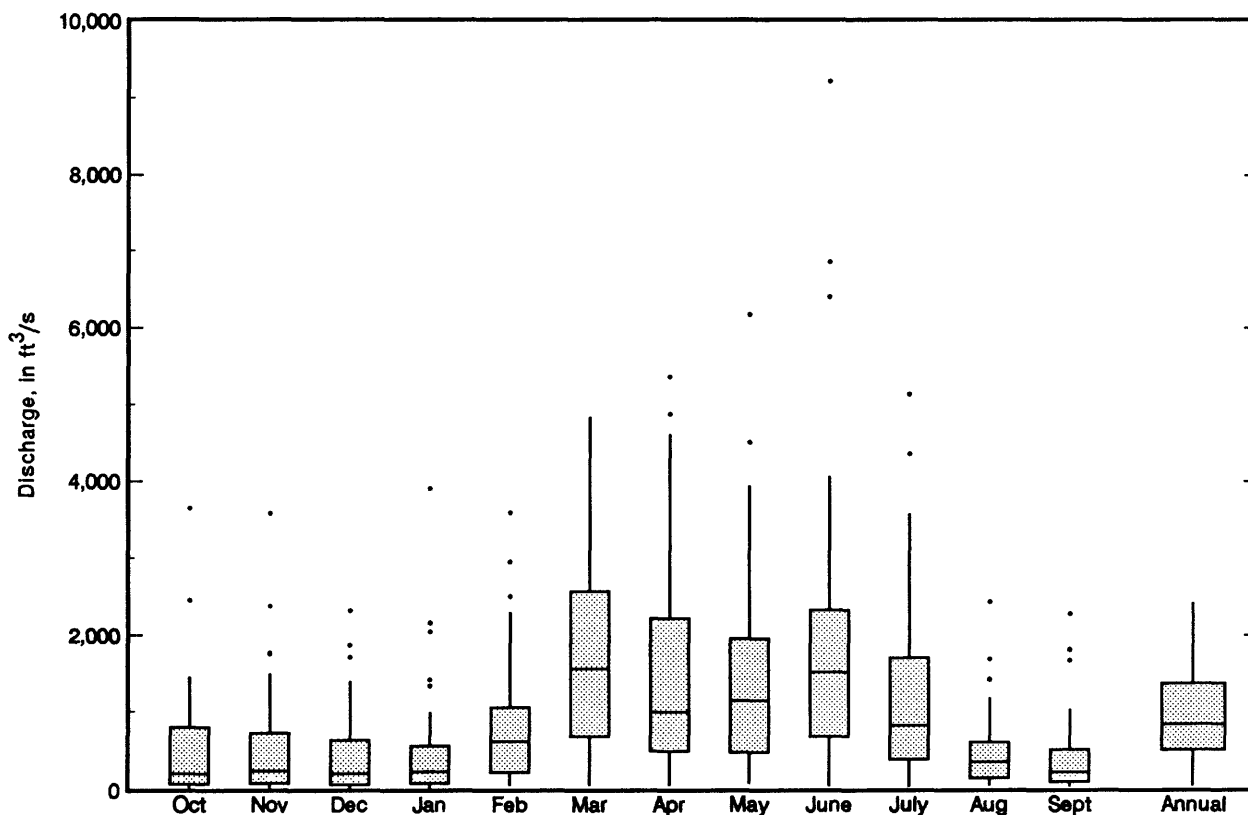
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
6.0	14	10.0	1,150
6.2	26	12.0	2,170
6.5	60	14.0	3,360
7.0	154	16.0	4,810
8.0	385	18.0	7,100
9.0	720	20.0	10,600

SKUNK RIVER BASIN
05471500 SOUTH SKUNK RIVER NEAR OSKALOOSA, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	3,646	1987	8.47	1957	535	732	4.6
November	3,576	1984	14.5	1957	565	719	4.9
December	2,322	1983	7.55	1956	454	550	3.9
January	3,906	1973	5.30	1956	490	736	4.2
February	3,587	1973	42.9	1954	845	839	7.3
March	4,841	1979	45.9	1954	1,620	1,165	14.0
April	5,366	1983	42.1	1956	1,567	1,435	13.5
May	6,168	1974	74.2	1956	1,523	1,352	13.1
June	9,222	1947	39.4	1977	1,909	1,886	16.5
July	5,135	1969	27.3	1977	1,164	1,129	10.0
August	2,441	1987	43.3	1988	507	511	4.4
September	2,278	1986	27.8	1956	417	503	3.6
Annual	2,418	1984	40.1	1956	966	616	100.0

Boxplots of monthly and annual mean discharges



SKUNK RIVER BASIN
05471500 SOUTH SKUNK RIVER NEAR OSKALOOSA, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	4.5	5.3	30	39	55	29	13	24	13	7.5	14	6.3	8.4
95	7.1	24	66	77	91	78	54	48	27	27	28	13	30
90	16	43	105	120	139	178	126	68	42	40	42	27	52
85	30	65	149	224	219	247	187	86	56	51	54	40	71
80	37	85	258	336	310	337	238	103	67	56	62	49	96
75	68	109	375	453	410	431	286	121	79	62	74	61	128
70	85	147	490	547	518	529	334	142	93	71	96	80	169
65	101	183	602	640	637	635	401	164	110	84	127	110	215
60	125	217	714	728	760	747	477	189	134	104	155	139	266
55	165	248	835	835	876	896	574	220	159	141	190	179	337
50	207	297	965	965	990	1,060	666	257	183	180	259	224	429
45	237	375	1,120	1,130	1,120	1,240	756	296	212	217	359	270	529
40	277	495	1,290	1,300	1,260	1,450	860	335	249	255	451	325	639
35	338	618	1,540	1,500	1,450	1,680	969	392	299	410	538	392	758
30	466	734	1,800	1,690	1,650	1,950	1,110	454	357	558	626	473	923
25	547	887	2,140	1,930	1,900	2,320	1,270	539	425	713	721	580	1,130
20	648	1,150	2,560	2,240	2,240	2,860	1,550	642	526	883	850	748	1,400
15	776	1,670	3,060	2,770	2,750	3,900	1,920	776	675	1,090	1,080	1,010	1,780
10	1,130	2,270	4,120	3,520	3,530	5,180	2,690	1,070	923	1,430	1,460	1,220	2,450
5	2,030	3,650	6,040	5,690	5,400	7,120	4,520	1,800	1,640	2,190	2,100	1,680	3,930

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	—	450	388	270	174
0.95	1.05	3,560	1,610	1,280	893	617
0.90	1.11	4,400	2,750	2,130	1,500	1,060
0.80	1.25	5,590	4,580	3,520	2,510	1,820
0.50	2	8,420	8,450	6,730	4,960	3,660
0.20	5	12,000	10,800	9,180	7,050	5,180
0.10	10	14,100	11,300	9,850	7,710	5,630
0.04	25	16,500	11,500	10,200	8,090	5,880
0.02	50	18,100	11,500	10,300	8,220	5,950
0.01	100	19,600	11,500	10,400	8,280	5,990

SKUNK RIVER BASIN
05471500 SOUTH SKUNK RIVER NEAR OSKALOOSA, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence Interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	1.7	1.7	1.8	2.3	2.9	4.1	5.7	6.6	12
0.02	50	2.8	2.8	3.0	3.7	4.6	6.2	8.7	10	18
0.05	20	5.8	5.9	6.2	7.2	8.8	12	16	19	30
0.10	10	11	11	11	13	15	20	27	32	49
0.20	5	20	21	22	24	28	37	50	60	85
0.50	2	61	64	67	71	84	110	149	179	235
0.80	1.25	151	157	167	179	222	298	394	488	614
0.90	1.11	225	234	250	274	350	481	630	792	992
0.96	1.04	327	339	364	413	551	778	1,010	1,290	1,630
0.98	1.02	404	418	452	525	725	1,050	1,340	1,750	2,220
0.99	1.01	481	498	539	643	917	1,350	1,720	2,270	2,920

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	2.1	2.2	2.3	3.3	13	16	20	25
0.02	50	3.5	3.6	3.9	5.5	21	25	30	39
0.05	20	7.3	7.5	8.0	12	39	47	55	72
0.10	10	14	14	15	22	67	79	92	121
0.20	5	28	29	31	46	121	141	164	217
0.50	2	95	104	111	165	325	380	436	586
0.80	1.25	286	323	352	507	739	875	1,000	1,350
0.90	1.11	480	555	613	862	1,060	1,280	1,460	1,970
0.96	1.04	800	950	1,070	1,460	1,500	1,830	2,100	2,830
0.98	1.02	1,090	1,320	1,500	2,000	1,830	2,270	2,590	3,500
0.99	1.01	1,420	1,750	2,010	2,610	2,150	2,700	3,100	4,170
		July-August-September				October-November-December			
0.01	100	3.8	6.4	8.4	14	2.1	2.3	3.0	4.8
0.02	50	6.3	9.5	12	19	3.6	3.9	4.9	7.4
0.05	20	12	17	20	29	7.5	8.3	10.0	14
0.10	10	22	26	31	42	14	15	18	24
0.20	5	39	44	50	66	28	31	36	46
0.50	2	99	105	118	152	95	106	120	150
0.80	1.25	196	216	250	338	274	303	354	450
0.90	1.11	256	298	355	507	445	491	592	777
0.96	1.04	322	402	502	773	716	785	986	1,360
0.98	1.02	362	479	618	1,010	949	1,040	1,340	1,940
0.99	1.01	396	553	737	1,280	1,200	1,310	1,750	2,640

SKUNK RIVER BASIN
05472500 NORTH SKUNK RIVER NEAR SIGOURNEY, IA

LOCATION.--Lat 41°18'03", long 92°12'16", in NE1/4 SE1/4 sec.14, T.75 N., R.12 W., Keokuk County, Hydrologic Unit 07080106, on right bank 20 ft downstream from bridge on State Highway 149, 1.2 mi downstream from Cedar Creek, 2.2 mi south of Sigourney, 4.0 mi upstream from Bridge Creek and 16.2 mi upstream from confluence with South Skunk River.

DRAINAGE AREA.--730 mi².

PERIOD OF RECORD.--October 1945 to September 1988.

GAGE.--Water-stage recorder. Datum of gage is 651.53 ft above NGVD. Prior to June 10, 1953, nonrecording gage at same site and datum.

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.

Rating table number 9, developed March 1988

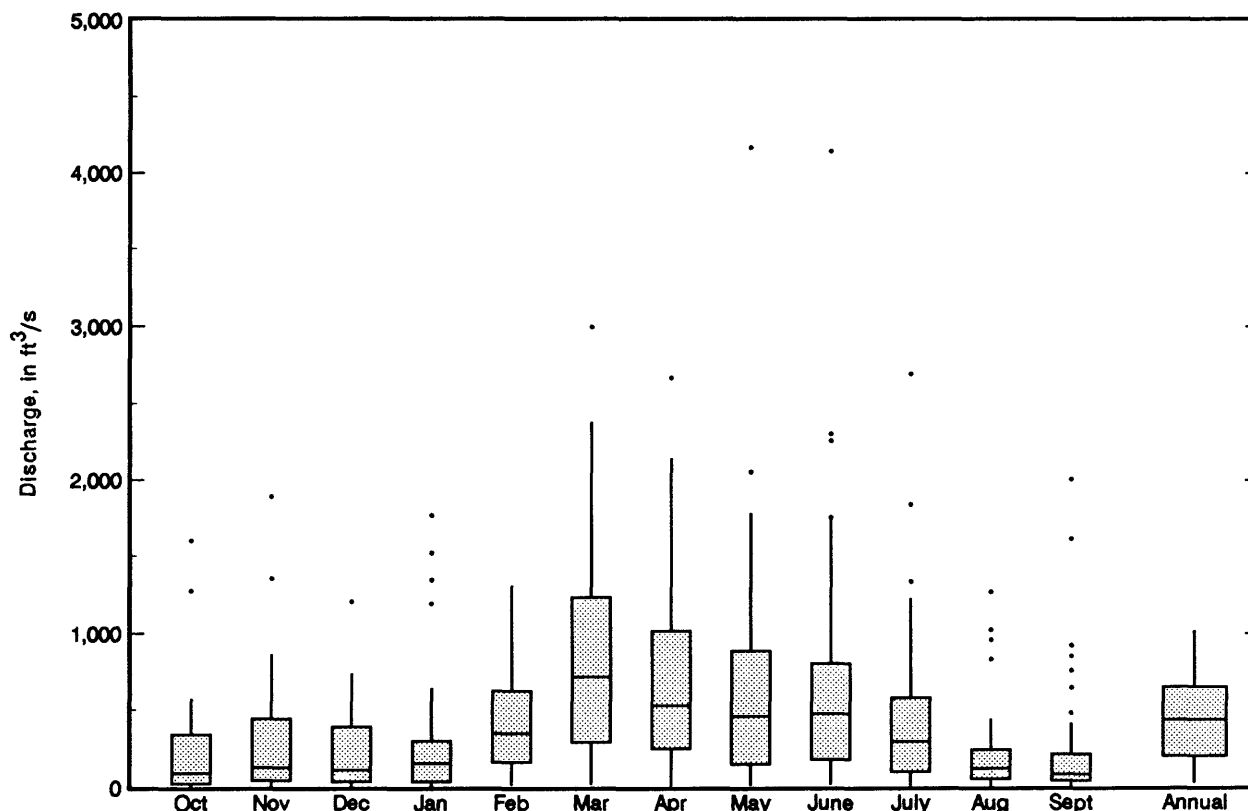
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
3.0	3.5	6.0	484
3.2	8.4	8.0	939
3.5	23	12.0	2,030
3.7	46	16.0	3,620
4.0	92	20.0	6,950
4.5	182	22.0	10,400
5.0	280	24.0	18,000

SKUNK RIVER BASIN
05472500 NORTH SKUNK RIVER NEAR SIGOURNEY, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	1,603	1987	0.13	1957	223	325	4.1
November	1,890	1962	3.38	1957	291	375	5.4
December	1,208	1983	2.58	1956	231	260	4.3
January	1,767	1946	2.26	1954	283	417	5.2
February	1,311	1973	12.8	1954	420	331	7.8
March	2,996	1979	17.0	1954	862	672	16.0
April	2,668	1973	11.2	1956	740	674	13.7
May	4,170	1974	14.4	1956	700	764	13.0
June	4,145	1947	20.1	1977	699	784	13.0
July	2,694	1969	11.2	1977	462	527	8.6
August	1,274	1970	7.90	1955	225	284	4.2
September	2,006	1965	4.35	1956	249	421	4.6
Annual	1,019	1974	27.7	1956	448	272	100.0

Boxplots of monthly and annual mean discharges



SKUNK RIVER BASIN
05472500 NORTH SKUNK RIVER NEAR SIGOURNEY, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	2.0	3.2	12	9.8	10	9.3	6.2	6.1	0.77	0.12	0.13	2.2	2.3
95	2.6	7.8	30	31	36	31	17	12	5.6	4.2	5.7	3.9	8.5
90	7.6	20	59	78	64	52	29	18	10	8.8	11	8.3	17
85	16	29	83	113	90	66	46	24	14	14	18	13	26
80	21	43	124	152	114	83	62	32	19	17	24	20	37
75	28	60	176	187	138	104	77	40	24	21	30	29	51
70	35	82	211	220	165	135	94	47	30	26	38	37	66
65	47	101	252	261	207	175	110	55	38	34	48	49	83
60	60	126	299	305	255	220	132	64	46	43	64	63	105
55	75	153	352	359	312	265	154	72	54	52	88	80	133
50	101	186	417	425	369	309	182	84	63	63	115	100	165
45	130	222	485	493	424	366	212	98	72	74	142	129	204
40	160	266	579	563	484	434	249	112	84	106	173	169	249
35	191	312	671	633	564	526	295	130	98	151	216	206	305
30	222	369	826	714	644	641	355	148	116	200	280	252	376
25	266	432	1,000	843	761	811	449	176	156	252	363	316	460
20	315	547	1,280	970	922	1,030	571	218	216	311	453	391	591
15	399	770	1,690	1,210	1,180	1,390	728	291	316	416	573	470	769
10	553	1,180	2,270	1,630	1,690	1,900	1,150	414	476	597	709	609	1,110
5	951	1,930	3,380	2,710	2,730	2,740	1,950	753	1,060	968	1,070	855	1,950

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	701	399	271	163	111
0.95	1.05	1,390	913	649	418	288
0.90	1.11	1,960	1,360	983	649	449
0.80	1.25	2,900	2,110	1,550	1,040	725
0.50	2	5,780	4,360	3,210	2,190	1,530
0.20	5	10,600	7,790	5,630	3,790	2,620
0.10	10	14,100	10,000	7,110	4,690	3,240
0.04	25	18,700	12,600	8,740	5,630	3,860
0.02	50	22,200	14,300	9,780	6,200	4,230
0.01	100	25,700	15,900	10,700	6,660	4,530

SKUNK RIVER BASIN
05472500 NORTH SKUNK RIVER NEAR SIGOURNEY, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.15	0.16	0.18	0.19	0.22	0.43	1.3	1.4	3.7
0.02	50	0.33	0.35	0.39	0.41	0.49	0.88	2.2	2.5	5.8
0.05	20	0.95	1.0	1.1	1.2	1.5	2.4	4.9	5.5	11
0.10	10	2.2	2.3	2.6	2.9	3.6	5.4	9.3	11	20
0.20	5	5.3	5.7	6.4	7.1	9.2	13	19	23	37
0.50	2	21	22	24	28	36	51	67	81	112
0.80	1.25	56	58	61	69	90	139	188	235	297
0.90	1.11	81	82	85	96	123	207	298	380	468
0.96	1.04	109	110	111	123	157	290	463	598	733
0.98	1.02	126	126	125	139	175	346	598	779	960
0.99	1.01	140	140	137	152	189	396	739	969	1,210

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.61	0.69	0.75	1.2	3.6	4.9	6.5	8.0
0.02	50	1.1	1.2	1.4	2.2	5.7	7.6	9.9	13
0.05	20	2.5	2.8	3.1	5.2	11	14	18	25
0.10	10	5.0	5.5	6.3	11	19	24	30	43
0.20	5	11	12	14	24	36	43	54	79
0.50	2	42	45	51	89	102	121	148	223
0.80	1.25	129	140	156	255	238	292	354	535
0.90	1.11	215	236	257	403	346	437	531	792
0.96	1.04	353	391	413	616	491	647	790	1,150
0.98	1.02	471	527	545	782	600	817	1,000	1,430
0.99	1.01	601	677	686	948	708	993	1,220	1,720
		July-August-September				October-November-December			
0.01	100	0.42	0.63	0.75	2.4	0.19	0.20	0.21	0.22
0.02	50	0.80	1.1	1.4	3.6	0.43	0.46	0.48	0.53
0.05	20	1.9	2.6	3.1	6.5	1.3	1.4	1.5	1.8
0.10	10	3.9	5.0	5.9	11	3.2	3.6	3.8	4.8
0.20	5	8.4	10	12	19	8.3	9.5	10	14
0.50	2	28	32	38	52	37	42	48	68
0.80	1.25	65	74	89	126	106	121	148	209
0.90	1.11	91	104	125	192	160	180	229	319
0.96	1.04	121	139	168	289	225	250	332	449
0.98	1.02	140	163	196	369	268	294	402	532
0.99	1.01	155	183	221	455	304	332	464	601

SKUNK RIVER BASIN
05473000 SKUNK RIVER AT COPPOCK, IA

LOCATION.--Lat 41°09'26", long 91°43'05", in NE1/4 NW1/4 sec.1, T.73 N., R.8 W., Jefferson County, Hydrologic Unit 07080107, at bridge on State Highway 78, a 1/2 mi west of Coppock and 3/4 mi upstream from Crooked Creek.

DRAINAGE AREA.--2,890 mi².

PERIOD OF RECORD.--October 1913 to September 1944 (discontinued).

GAGE.--Wire weight gage.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 41,500 ft³/s May 24, 1944, gage height, 22.27 ft; minimum daily discharge, 8.0 ft³/s Jan. 27, 28, 1940, occurred during period of ice effect.

Rating table number 16, developed May 1944
(A discharge measurement to validate this rating
has not been made since September 1944.)

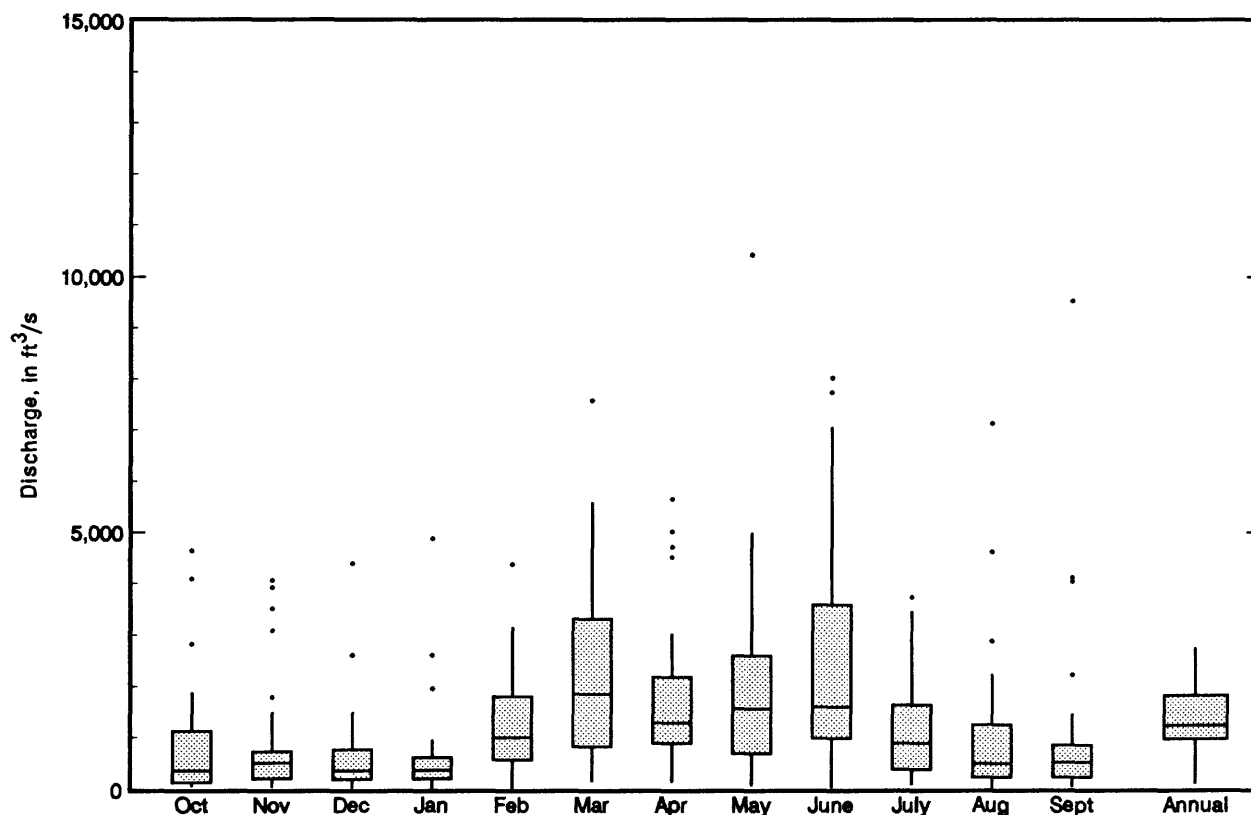
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
3.5	100	10.0	4,350
4.0	261	14.0	8,910
4.5	492	16.0	13,400
5.0	810	18.0	20,300
6.0	1,510	22.0	39,900
7.0	2,210		

SKUNK RIVER BASIN
05473000 SKUNK RIVER AT COPPOCK, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	4,638	1916	58.0	1938	870	1,150	5.4
November	4,071	1932	45.4	1938	904	1,154	5.6
December	4,395	1932	34.6	1938	645	878	4.0
January	4,876	1932	14.0	1940	648	949	4.0
February	4,383	1915	31.0	1940	1,290	982	8.0
March	7,583	1929	159	1934	2,314	1,819	14.3
April	5,657	1944	140	1934	1,745	1,433	10.8
May	10,430	1944	67.8	1934	2,049	2,024	12.6
June	8,031	1917	44.2	1934	2,429	2,123	15.0
July	3,738	1915	96.3	1940	1,187	1,030	7.3
August	7,126	1943	23.0	1934	1,056	1,497	6.5
September	9,527	1926	41.1	1934	1,080	1,854	6.7
Annual	2,761	1944	111	1934	1,350	680	100.0

Boxplots of monthly and annual mean discharges



SKUNK RIVER BASIN
05473000 SKUNK RIVER AT COPPOCK, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	11	17	131	112	63	34	52	20	33	39	37	18	23
95	21	52	196	255	193	173	99	50	67	61	59	40	64
90	49	125	377	370	259	292	153	91	86	77	75	64	104
85	102	170	464	473	315	378	203	130	98	92	94	84	143
80	123	239	565	579	413	495	246	160	114	108	118	110	191
75	153	310	687	706	541	595	287	188	132	126	156	129	244
70	180	363	819	823	651	719	338	215	160	154	210	161	304
65	199	415	920	899	745	856	394	251	210	185	291	195	369
60	218	467	1,040	974	856	991	457	290	255	219	351	230	439
55	282	552	1,200	1,070	992	1,160	559	326	304	269	403	263	517
50	345	663	1,400	1,170	1,170	1,330	675	363	369	347	451	301	606
45	397	805	1,610	1,270	1,360	1,530	780	422	450	419	504	351	734
40	442	924	1,840	1,390	1,600	1,740	900	498	538	489	561	412	874
35	487	1,080	2,070	1,530	1,850	2,030	1,040	646	633	592	619	479	1,030
30	532	1,310	2,390	1,670	2,110	2,390	1,260	824	733	723	720	560	1,250
25	578	1,610	2,810	1,980	2,550	2,890	1,510	1,030	859	926	858	695	1,530
20	641	1,980	3,400	2,440	3,120	3,510	1,780	1,350	1,060	1,230	1,120	909	1,900
15	890	2,490	4,300	3,150	3,780	4,430	2,110	1,770	1,500	1,620	1,520	1,140	2,450
10	1,300	3,250	5,540	4,020	4,740	5,900	2,780	2,490	2,410	2,220	2,090	1,510	3,420
5	3,090	4,850	8,190	5,390	6,530	8,950	4,640	3,800	5,680	3,610	3,700	2,610	5,390

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	—	1,080	729	441	316
0.95	1.05	4,050	2,400	1,830	1,260	926
0.90	1.11	5,310	3,510	2,800	2,030	1,490
0.80	1.25	7,270	5,340	4,420	3,320	2,450
0.50	2	12,800	10,600	8,870	6,810	4,970
0.20	5	21,600	18,100	14,500	10,800	7,640
0.10	10	27,800	22,700	17,500	12,600	8,770
0.04	25	36,000	27,800	20,300	14,000	9,640
0.02	50	42,200	31,100	22,000	14,800	10,000
0.01	100	48,500	34,100	23,200	15,300	10,300

SKUNK RIVER BASIN
05473000 SKUNK RIVER AT COPPOCK, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	5.5	5.7	5.9	6.5	7.3	14	19	24	46
0.02	50	8.0	8.2	8.6	9.6	11	21	28	34	60
0.05	20	13	14	15	17	19	35	47	57	90
0.10	10	21	22	23	26	31	54	72	87	128
0.20	5	34	36	39	44	53	89	118	142	194
0.50	2	82	85	92	105	131	203	274	333	423
0.80	1.25	173	179	193	217	280	401	563	701	897
0.90	1.11	244	252	270	300	392	542	784	994	1,320
0.96	1.04	342	352	372	408	542	720	1,080	1,400	1,960
0.98	1.02	418	428	449	488	653	848	1,310	1,720	2,530
0.99	1.01	496	506	525	567	763	971	1,530	2,050	3,170

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	6.5	7.1	7.1	12	31	35	42	50
0.02	50	10	11	12	19	47	54	63	75
0.05	20	20	21	24	37	83	95	109	132
0.10	10	34	36	42	63	129	150	171	209
0.20	5	61	66	78	116	208	243	276	348
0.50	2	166	178	213	316	433	508	581	808
0.80	1.25	374	404	467	703	722	850	995	1,580
0.90	1.11	534	581	648	993	875	1,030	1,230	2,120
0.96	1.04	745	816	868	1,360	1,020	1,200	1,460	2,760
0.98	1.02	900	991	1,020	1,630	1,100	1,300	1,600	3,210
0.99	1.01	1,050	1,160	1,160	1,880	1,170	1,370	1,710	3,620
		July-August-September				October-November-December			
0.01	100	18	20	22	22	8.0	9.0	12	20
0.02	50	23	25	27	29	11	13	17	27
0.05	20	32	35	38	45	19	22	28	42
0.10	10	43	47	52	66	30	35	43	62
0.20	5	62	69	77	103	52	60	71	99
0.50	2	130	147	169	246	137	159	179	235
0.80	1.25	282	326	388	583	343	390	427	553
0.90	1.11	428	501	609	915	542	605	661	858
0.96	1.04	676	804	999	1,480	869	946	1,040	1,370
0.98	1.02	915	1,100	1,390	2,010	1,170	1,250	1,370	1,840
0.99	1.01	1,200	1,460	1,870	2,650	1,520	1,590	1,760	2,400

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.--July 1977 to September 1988.

GAGE.--Water-stage recorder. Datum of gage is 565.07 ft above NGVD.

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.

Rating table number 3, developed March 1988

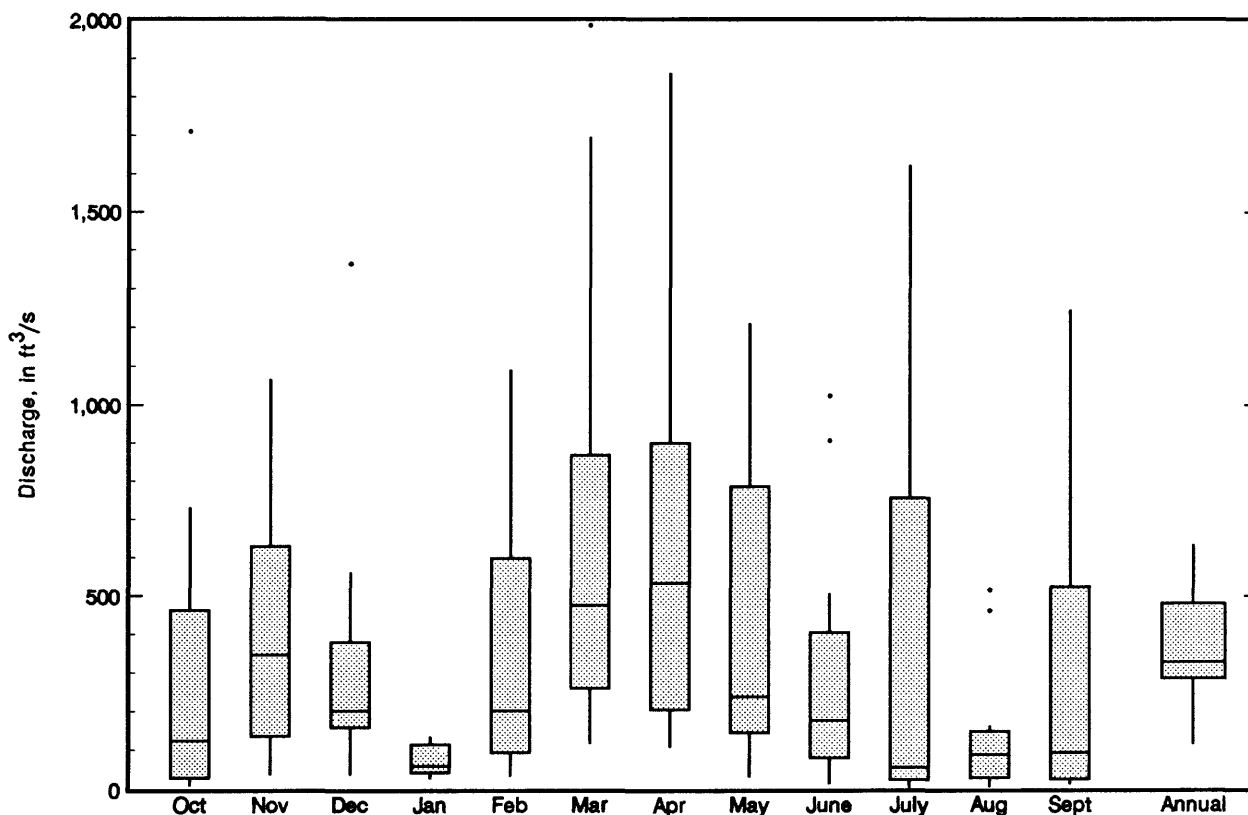
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
3.5	68	8.0	1,290
4.0	156	12.0	2,880
4.5	264	16.0	5,180
5.0	387	20.0	9,100
6.0	655		

SKUNK RIVER BASIN
05473400 CEDAR CREEK NEAR OAKLAND MILLS, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	1,711	1987	9.68	1988	368	508	8.1
November	1,065	1986	36.7	1980	394	328	8.7
December	1,364	1983	38.0	1980	345	371	7.6
January	134	1988	26.9	1980	78.3	40.0	1.7
February	1,091	1985	34.8	1978	366	366	8.1
March	1,987	1979	118	1981	699	633	15.4
April	1,863	1983	109	1988	652	527	14.4
May	1,210	1978	33.3	1988	466	461	10.3
June	1,024	1980	14.6	1988	332	344	7.3
July	1,623	1982	3.52	1988	385	526	8.5
August	516	1980	5.35	1983	142	170	3.1
September	1,245	1986	12.1	1988	307	380	6.8
Annual	633	1982	115	1988	376	154	100.0

Boxplots of monthly and annual mean discharges



SKUNK RIVER BASIN
05473400 CEDAR CREEK NEAR OAKLAND MILLS, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	6.8	16	39	38	18	5.8	1.4	0.66	0.56	2.7	13	13	1.9
95	23	20	49	49	29	16	3.6	2.8	1.4	3.6	24	30	5.7
90	30	28	65	65	35	19	4.9	4.2	2.8	6.0	31	42	12
85	35	34	82	83	42	25	7.3	6.8	3.9	9.1	37	55	19
80	39	41	102	103	51	32	11	9.9	4.9	11	43	67	29
75	43	49	123	128	60	41	14	13	6.0	15	50	76	37
70	47	52	143	162	71	49	18	16	7.3	19	67	84	45
65	51	56	163	195	86	58	25	18	9.1	30	83	93	54
60	55	59	185	226	107	67	31	20	12	43	99	102	63
55	59	63	207	259	125	84	36	24	14	54	115	111	76
50	63	70	259	290	140	105	45	27	18	63	130	122	92
45	68	85	316	335	153	129	55	34	25	74	144	142	112
40	75	122	380	377	174	153	65	41	34	87	158	163	135
35	82	147	479	432	203	182	87	50	58	109	194	189	162
30	90	184	597	484	247	214	120	61	81	148	235	218	201
25	102	258	776	564	301	290	178	81	114	203	282	263	266
20	113	396	1,060	683	400	353	290	107	167	322	374	313	355
15	130	652	1,390	930	591	468	478	144	313	551	504	370	508
10	158	1,000	2,130	1,430	1,090	770	1,140	290	930	961	930	577	896
5	198	1,820	3,040	2,940	2,300	1,460	2,570	563	1,700	1,900	1,960	1,460	1,880

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	—	2,140	1,400	765	463
0.95	1.05	—	3,120	2,010	1,140	696
0.90	1.11	4,040	3,690	2,380	1,370	845
0.80	1.25	5,890	4,400	2,830	1,670	1,050
0.50	2	6,760	5,690	3,680	2,300	1,480
0.20	5	7,640	6,710	4,410	2,920	1,940
0.10	10	8,110	7,100	4,710	3,210	2,170
0.04	25	8,590	7,390	4,960	3,490	2,400
0.02	50	8,910	7,530	5,080	3,640	2,540
0.01	100	9,180	7,620	5,170	3,770	2,660

SKUNK RIVER BASIN
05473400 CEDAR CREEK NEAR OAKLAND MILLS, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.52	0.88	1.2	1.3	1.5	3.2	9.0	9.0	16
0.02	50	0.68	1.1	1.4	1.6	1.9	4.3	11	12	21
0.05	20	1.0	1.4	1.9	2.2	2.7	6.8	15	18	31
0.10	10	1.4	1.8	2.4	2.9	3.8	10.0	19	26	43
0.20	5	2.1	2.5	3.3	4.0	5.6	16	27	40	66
0.50	2	4.7	5.1	6.2	8.0	13	36	54	87	141
0.80	1.25	10	11	12	17	30	77	110	183	291
0.90	1.11	15	16	18	25	47	112	163	264	420
0.96	1.04	23	26	28	39	79	165	252	387	614
0.98	1.02	30	36	37	52	112	210	336	492	781
0.99	1.01	38	48	48	68	153	259	436	608	965

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	3.0	3.6	7.0	17	3.0	3.4	4.6	8.3
0.02	50	4.5	5.3	9.2	19	4.0	4.8	6.3	11
0.05	20	7.9	9.0	13	23	6.3	7.7	9.9	18
0.10	10	12	14	18	28	9.1	12	15	27
0.20	5	20	21	25	34	14	19	24	42
0.50	2	40	42	44	53	33	44	56	93
0.80	1.25	64	67	70	86	71	96	126	195
0.90	1.11	76	79	85	111	105	140	190	278
0.96	1.04	87	91	102	147	157	207	291	399
0.98	1.02	92	97	113	178	202	263	379	498
0.99	1.01	97	101	123	211	252	324	480	603
		July-August-September				October-November-December			
0.01	100	0.19	0.32	0.43	0.90	0.76	0.71	0.83	4.0
0.02	50	0.27	0.47	0.61	1.3	1.1	1.1	1.3	5.9
0.05	20	0.47	0.82	1.0	2.2	2.0	2.2	2.7	10
0.10	10	0.76	1.3	1.6	3.5	3.2	3.8	4.8	16
0.20	5	1.3	2.3	2.8	6.1	5.7	7.2	9.4	27
0.50	2	3.7	5.8	7.5	17	16	22	30	63
0.80	1.25	9.3	13	20	43	44	57	82	130
0.90	1.11	15	19	32	68	72	90	132	181
0.96	1.04	24	29	54	110	119	140	211	247
0.98	1.02	32	36	74	148	163	182	280	296
0.99	1.01	41	44	99	193	216	228	355	344

SKUNK RIVER BASIN
05473500 BIG CREEK NEAR MOUNT PLEASANT, IA

LOCATION.--Lat 41°00'52", long 91°34'49", In NW1/4 NW1/4 sec. 29, T.72 N., R.6 W., Henry County, Hydrologic Unit 07080107, on left bank 12 ft downstream from bridge on county highway, 100 ft downstream from Lynn Creek, 0.7 mi downstream from Brandywine Creek and 3.7 mi northwest of Court House at Mount Pleasant.

DRAINAGE AREA.--106 mi².

PERIOD OF RECORD.--October 1955 to September 1979 (discontinued).

GAGE.--Water-stage recorder and concrete control. Datum of gage is 630.53 ft NGVD.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 10,500 ft³/s Apr. 22, 1973, gage height, 25.58 ft, on basis of contracted-opening measurement at gage height 18.51 ft and contracted-opening measurements of the 1973 peak flow at sites 2 mi upstream and 6 mi downstream; no flow at times most years.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Aug. 3, 1948 reached a stage of about 27 ft, from floodmarks established by local residents, discharge not determined.

Rating table number 9, developed March 1973
 (A discharge measurement to validate this rating
 has not been made since September 1979.)

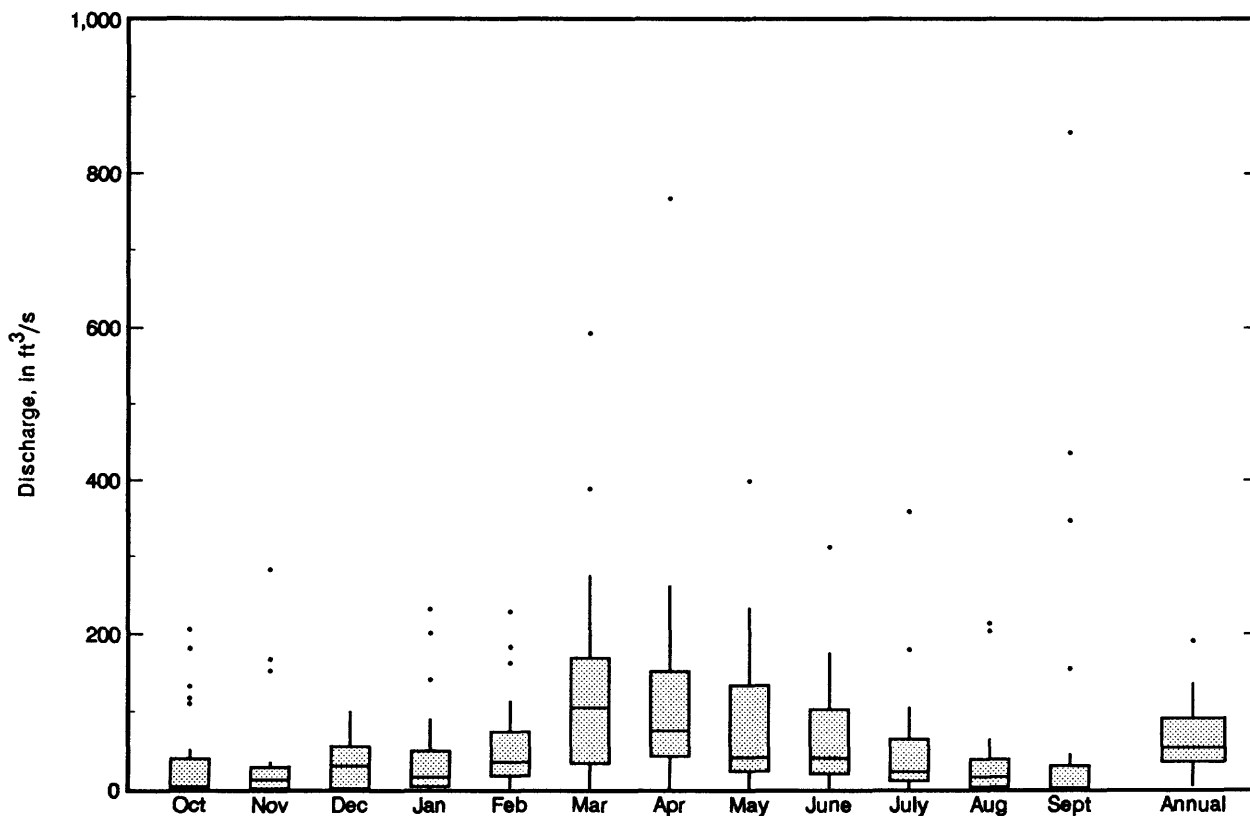
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
2.2	7.6	6.0	690
2.4	20	8.0	1,240
2.8	67	12.0	2,730
3.0	98	18.0	5,750
3.5	184	24.0	9,390
4.5	366		

SKUNK RIVER BASIN
05473500 BIG CREEK NEAR MOUNT PLEASANT, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	206	1974	0.000	1957	38.4	62.1	4.8
November	283	1962	0.000	1956	36.4	68.0	4.6
December	100	1966	0.000	1956	31.9	31.7	4.0
January	232	1974	0.000	1956	41.7	63.4	5.2
February	229	1959	2.45	1957	57.3	60.0	7.2
March	593	1979	0.54	1956	136	141	17.1
April	767	1973	0.33	1956	127	155	15.9
May	399	1973	0.38	1956	88.0	96.6	11.1
June	312	1960	1.77	1961	70.7	73.8	8.9
July	359	1969	0.23	1957	52.9	78.1	6.6
August	214	1970	0.090	1966	33.3	56.6	4.2
September	854	1965	0.000	1956	82.3	198	10.3
Annual	191	1973	3.89	1957	66.2	46.1	100.0

Boxplots of monthly and annual mean discharges



SKUNK RIVER BASIN
05473500 BIG CREEK NEAR MOUNT PLEASANT, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95	0.01	0.20	0.24	4.8	2.7	0.48	0.05	0.00	0.00	0.00	0.00	0.01	0.01
90	0.02	1.7	4.6	12	7.7	1.3	0.46	0.01	0.00	0.01	0.01	0.09	0.10
85	0.33	3.4	8.2	16	11	3.7	1.1	0.07	0.01	0.01	0.33	0.22	0.47
80	0.81	4.6	12	20	14	5.7	2.0	0.16	0.01	0.08	0.54	0.36	1.1
75	2.1	6.1	15	25	17	8.4	2.9	0.36	0.19	0.21	1.1	0.54	2.4
70	3.1	7.7	19	30	20	12	4.2	0.72	0.43	0.43	1.6	1.3	3.9
65	4.6	9.4	23	36	23	15	5.4	1.1	0.64	0.79	2.7	2.9	5.6
60	6.7	11	28	42	27	17	6.8	1.7	0.91	1.7	4.1	4.9	8.0
55	8.7	13	33	48	31	21	8.5	2.4	1.3	2.5	5.1	7.2	11
50	12	16	40	55	35	25	11	3.1	1.8	3.8	6.1	11	15
45	14	20	48	61	40	29	13	3.7	2.5	5.0	9.1	15	19
40	17	26	60	69	44	35	16	4.6	3.4	6.1	13	19	24
35	19	33	75	82	53	42	19	5.6	4.8	12	18	22	30
30	23	43	98	95	62	51	25	7.3	6.9	19	23	26	38
25	29	54	132	115	76	64	33	10	12	28	29	29	47
20	38	65	179	141	97	84	44	15	26	39	36	37	62
15	48	96	254	182	138	112	61	20	51	54	43	45	90
10	67	147	385	250	208	172	108	37	129	79	62	66	144
5	182	262	633	417	341	319	220	110	348	180	139	138	293

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	229	72	40	28	19
0.95	1.05	459	169	100	70	45
0.90	1.11	651	256	156	107	69
0.80	1.25	978	412	256	174	110
0.50	2	2,020	931	574	381	246
0.20	5	3,890	1,880	1,090	713	477
0.10	10	5,350	2,600	1,440	932	641
0.04	25	7,360	3,550	1,860	1,190	847
0.02	50	8,950	4,280	2,150	1,370	995
0.01	100	10,600	5,010	2,410	1,530	1,140

SKUNK RIVER BASIN
05473500 BIG CREEK NEAR MOUNT PLEASANT, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.41
0.05	20	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.16	0.84
0.10	10	0.00	0.00	0.00	0.00	0.00	0.08	0.42	0.72	1.5
0.20	5	0.00	0.00	0.00	0.00	0.00	0.29	1.1	1.8	3.1
0.50	2	0.00	0.02	0.05	0.19	0.64	2.0	4.6	7.1	11
0.80	1.25	0.54	0.57	0.77	1.1	2.5	8.9	15	23	36
0.90	1.11	1.1	1.2	1.8	2.5	5.3	18	27	40	64
0.96	1.04	2.0	2.2	3.9	5.5	11	36	48	71	115
0.96	1.02	2.6	3.1	6.1	8.9	19	54	69	101	165
0.99	1.01	3.2	4.1	9.1	14	32	76	94	137	226

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.03	0.04	0.08	0.08	0.04	0.09	0.18	1.1
0.02	50	0.06	0.08	0.14	0.16	0.08	0.18	0.34	1.7
0.05	20	0.18	0.22	0.35	0.46	0.24	0.47	0.83	3.3
0.10	10	0.40	0.50	0.74	1.1	0.58	1.0	1.7	5.5
0.20	5	1.0	1.3	1.7	2.6	1.5	2.4	3.8	9.9
0.50	2	4.4	5.4	6.3	11	6.6	9.3	13	26
0.80	1.25	14	16	18	32	20	27	34	58
0.90	1.11	23	26	28	49	32	41	49	81
0.96	1.04	35	38	43	70	47	61	69	112
0.96	1.02	44	47	54	85	58	75	82	135
0.99	1.01	54	55	65	98	67	88	94	157
		July-August-September				October-November-December			
0.01	100	0.00	0.01	0.03	0.05	0.02	0.02	0.02	0.06
0.02	50	0.01	0.01	0.04	0.07	0.03	0.05	0.04	0.10
0.05	20	0.02	0.03	0.07	0.13	0.08	0.11	0.11	0.24
0.10	10	0.06	0.06	0.12	0.22	0.17	0.26	0.26	0.49
0.20	5	0.14	0.14	0.22	0.42	0.41	0.65	0.71	1.1
0.50	2	0.50	0.55	0.69	1.3	2.1	3.3	3.9	5.0
0.80	1.25	1.2	1.7	2.1	3.9	9.7	14	16	19
0.90	1.11	1.6	2.8	3.6	6.8	21	28	31	35
0.96	1.04	2.0	4.6	6.4	12	47	55	58	67
0.96	1.02	2.2	6.1	9.2	17	78	83	84	99
0.99	1.01	2.4	7.7	13	24	121	119	114	138

SKUNK RIVER BASIN
05474000 SKUNK RIVER AT AUGUSTA, IA

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.

PERIOD OF RECORD.--September to November 1913, October 1914 to September 1988.

GAGE.--Water-stage recorder. Datum of gage is 521.24 ft above NGVD. Prior to Nov. 15, 1913, nonrecording gage at site 400 ft upstream at datum about 0.7 ft higher. May 27, 1915 to Jan. 14, 1935, nonrecording gage at site 400 ft upstream at present datum.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 66,800 ft³/s Apr. 23, 1973, gage height, 27.05 ft; minimum daily discharge, 7 ft³/s Aug. 27 to Sept. 1, 1934.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 1, 1903, reached a stage of about 21 ft, discharge, about 45,000 ft³/s. Stage and discharge for flood of April 1973 are believed to be the greatest since 1851.

Rating table number 8, developed October 1986

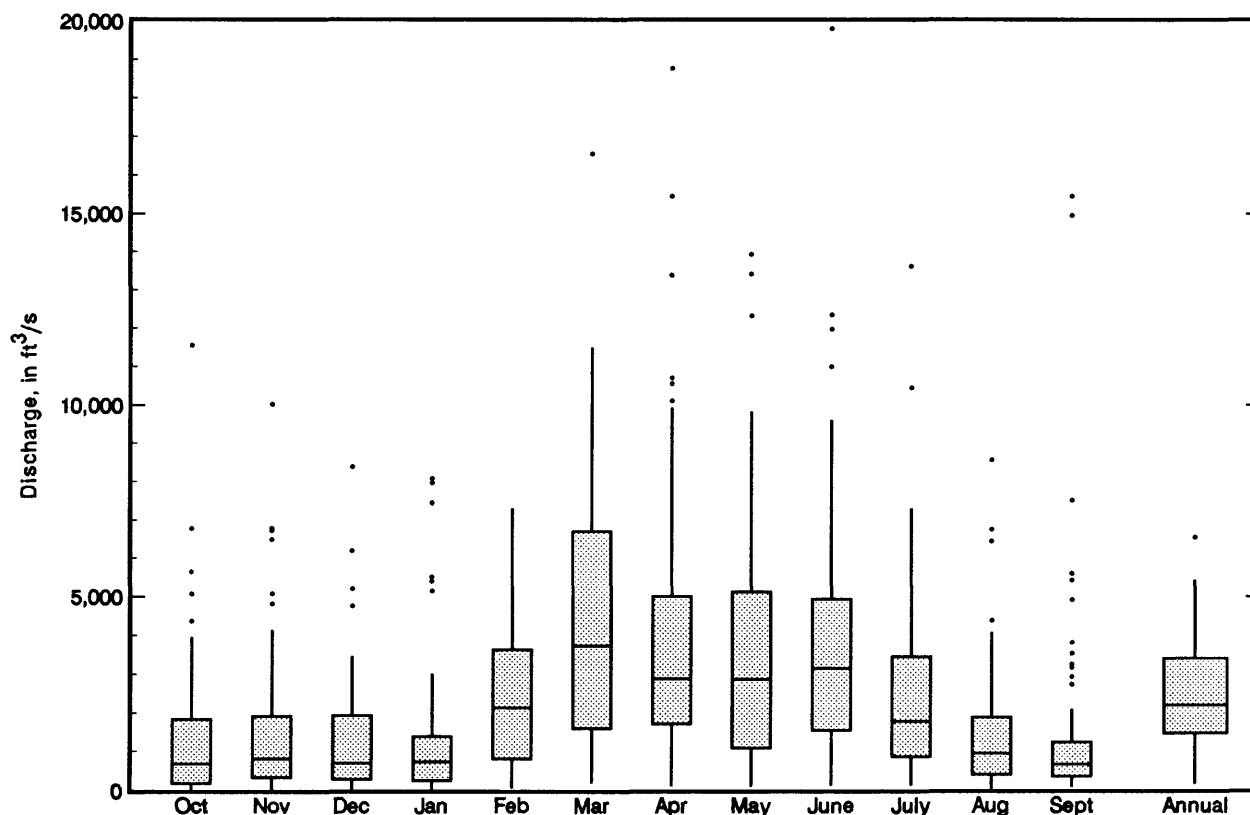
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
1.2	60	6.0	4,730
1.5	134	10.0	9,550
1.7	220	14.0	15,700
2.0	432	16.0	21,000
2.5	820	18.0	27,400
3.0	1,380	22.0	42,700
4.0	2,560	26.0	61,600

SKUNK RIVER BASIN
05474000 SKUNK RIVER AT AUGUSTA, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	11,560	1987	15.5	1957	1,384	1,861	4.7
November	10,020	1962	20.5	1957	1,548	1,922	5.2
December	8,387	1983	21.2	1957	1,276	1,556	4.3
January	8,090	1946	21.3	1940	1,359	1,915	4.6
February	7,306	1984	56.5	1940	2,390	1,814	8.1
March	16,560	1979	191	1957	4,354	3,304	14.8
April	18,770	1973	104	1956	4,041	3,619	13.7
May	13,940	1974	92.5	1934	3,634	3,142	12.3
June	19,800	1947	130	1977	3,995	3,440	13.6
July	13,630	1969	122	1988	2,454	2,400	8.3
August	8,572	1943	25.8	1934	1,479	1,575	5.0
September	15,460	1926	71.4	1953	1,568	2,707	5.3
Annual	6,545	1973	152	1934	2,455	1,336	100.0

Boxplots of monthly and annual mean discharges



SKUNK RIVER BASIN
05474000 SKUNK RIVER AT AUGUSTA, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	17	24	111	103	89	79	74	35	37	19	24	19	28
95	30	84	234	409	295	279	151	107	67	66	55	41	82
90	57	145	483	639	465	439	293	177	111	92	94	72	143
85	122	204	646	878	631	565	395	227	146	115	126	100	214
80	172	271	889	1,100	785	722	488	271	182	137	173	148	292
75	217	354	1,140	1,290	954	925	576	312	220	167	234	193	376
70	262	448	1,360	1,460	1,150	1,150	677	360	259	202	302	252	471
65	308	541	1,590	1,630	1,360	1,400	798	416	303	246	387	319	577
60	360	653	1,880	1,830	1,600	1,660	950	481	352	315	488	377	707
55	417	815	2,210	2,050	1,860	1,940	1,110	548	411	390	593	433	871
50	530	1,060	2,530	2,310	2,170	2,250	1,290	642	482	478	689	508	1,060
45	643	1,260	2,860	2,670	2,510	2,610	1,500	753	559	581	804	598	1,280
40	748	1,550	3,390	3,080	2,860	3,010	1,710	888	671	726	939	757	1,550
35	888	1,920	3,990	3,580	3,310	3,530	1,990	1,040	797	937	1,120	930	1,870
30	1,060	2,420	4,860	4,120	3,780	4,170	2,310	1,240	938	1,240	1,350	1,150	2,260
25	1,310	3,090	5,950	4,760	4,480	5,090	2,790	1,500	1,160	1,590	1,630	1,470	2,800
20	1,660	3,960	7,250	5,610	5,350	6,270	3,480	1,820	1,510	1,990	2,080	1,930	3,560
15	2,070	5,000	8,920	6,770	6,650	7,930	4,530	2,310	2,140	2,610	2,700	2,510	4,650
10	3,080	6,810	11,200	9,450	8,600	10,400	6,200	3,350	3,410	3,700	3,700	3,350	6,440
5	5,840	10,000	14,700	13,600	12,700	14,300	9,600	5,510	7,210	5,880	6,130	4,840	10,300

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	—	2,040	1,380	831	601
0.95	1.05	7,920	4,700	3,510	2,400	1,770
0.90	1.11	10,000	6,860	5,320	3,830	2,830
0.80	1.25	13,100	10,300	8,230	6,180	4,580
0.50	2	20,900	18,800	15,500	12,000	8,880
0.20	5	31,200	28,300	23,200	17,600	12,900
0.10	10	37,500	32,800	26,600	19,700	14,400
0.04	25	44,800	36,900	29,400	21,300	15,400
0.02	50	49,800	39,000	30,700	21,900	15,800
0.01	100	54,500	40,600	31,600	22,200	16,000

SKUNK RIVER BASIN
05474000 SKUNK RIVER AT AUGUSTA, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	6.5	7.1	7.4	9.0	10	16	19	21	47
0.02	50	9.5	11	11	13	16	24	29	34	68
0.05	20	16	18	20	24	28	43	54	64	114
0.10	10	26	30	33	38	46	70	90	110	178
0.20	5	45	51	57	66	81	122	162	202	297
0.50	2	117	133	150	169	215	320	441	559	735
0.80	1.25	283	306	341	381	499	734	1,040	1,300	1,650
0.90	1.11	434	455	498	555	737	1,080	1,540	1,900	2,420
0.96	1.04	667	671	719	801	1,080	1,570	2,250	2,710	3,550
0.98	1.02	849	849	894	997	1,350	1,960	2,810	3,340	4,480
0.99	1.01	1,040	1,040	1,070	1,200	1,630	2,360	3,390	3,960	5,470

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	8.7	9.6	9.7	15	46	68	83	96
0.02	50	14	15	16	24	66	94	114	140
0.05	20	26	28	31	47	111	150	182	239
0.10	10	44	48	54	83	172	224	272	372
0.20	5	81	90	103	158	284	355	429	616
0.50	2	240	266	314	486	671	804	962	1,460
0.80	1.25	625	696	817	1,300	1,400	1,670	1,970	3,020
0.90	1.11	983	1,100	1,270	2,060	1,970	2,370	2,780	4,210
0.96	1.04	1,540	1,720	1,950	3,250	2,750	3,370	3,910	5,800
0.98	1.02	2,010	2,270	2,510	4,270	3,340	4,170	4,800	7,000
0.99	1.01	2,540	2,870	3,110	5,390	3,950	5,010	5,740	8,190
		July-August-September				October-November-December			
0.01	100	11	15	21	35	8.0	11	13	16
0.02	50	16	22	30	48	12	17	19	24
0.05	20	29	39	50	77	22	29	34	43
0.10	10	46	62	77	113	36	47	54	71
0.20	5	78	104	124	178	65	83	96	128
0.50	2	193	245	282	393	192	234	270	370
0.80	1.25	412	491	572	795	524	610	710	986
0.90	1.11	582	665	791	1,110	861	980	1,150	1,600
0.96	1.04	809	880	1,080	1,550	1,430	1,590	1,870	2,610
0.98	1.02	982	1,030	1,300	1,900	1,960	2,150	2,550	3,540
0.99	1.01	1,150	1,170	1,520	2,260	2,580	2,800	3,330	4,620

MISSISSIPPI RIVER MAIN STEM
05474500 MISSISSIPPI RIVER AT KEOKUK, IA

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.

DRAINAGE AREA.--119,000 mi², approximately.

PERIOD OF RECORD.--January 1878 to September 1988.

GAGE.--Water-stage recorder. Datum of gage is 477.41 ft above NGVD (levels by U.S. Army Corps of Engineers). May 1913 to Jan. 1, 1978, nonrecording gage at Galland (formerly Nashville), 8 mi upstream; zero of gage was set to low-water mark of 1864, or 496.52 ft above NGVD.

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.

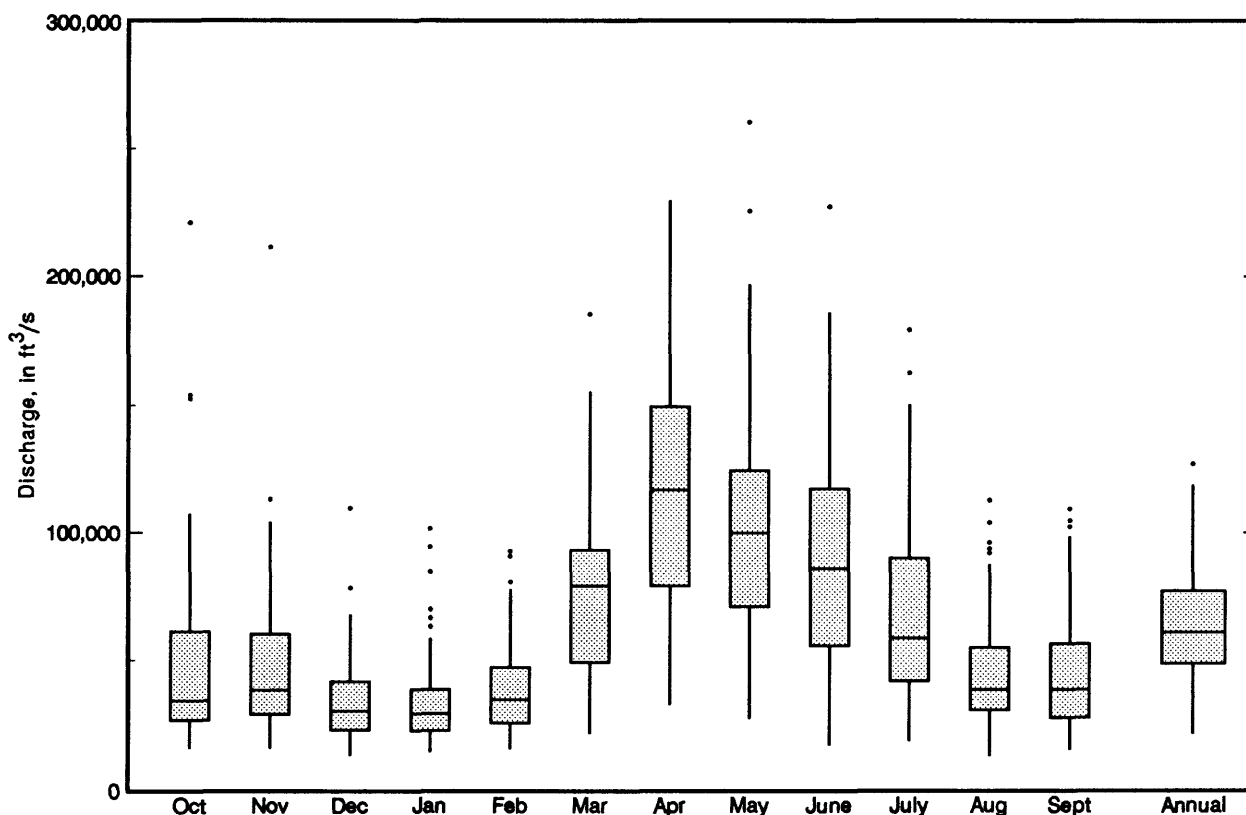
REMARKS.--Discharge computed from records of operation of turbines in powerplant and spillway gates in dam. Minor flow regulation caused by powerplant since 1913 and navigation dams. Records for May 1913 to September 1937 adjusted for change in contents in Keokuk Reservoir, those after September 1937 unadjusted. Rating table not published because discharge is a function of river stage and river slope at this station.

MISSISSIPPI RIVER MAIN STEM
05474500 MISSISSIPPI RIVER AT KEOKUK, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	221,100	1882	16,060	1934	48,160	32,570	6.4
November	211,300	1882	16,020	1934	47,540	27,160	6.3
December	109,600	1882	13,450	1934	34,730	15,470	4.6
January	101,600	1973	14,650	1940	33,770	16,240	4.5
February	92,730	1973	15,790	1899	39,230	16,670	5.2
March	185,400	1973	21,780	1934	76,380	29,200	10.2
April	229,700	1973	32,930	1895	116,000	45,600	15.4
May	260,700	1888	27,600	1934	104,100	45,630	13.9
June	227,300	1892	17,400	1934	91,530	42,120	12.2
July	179,400	1892	18,790	1936	69,530	34,630	9.3
August	112,800	1972	13,030	1936	45,720	20,920	6.1
September	109,300	1938	15,530	1976	44,550	21,930	5.9
Annual	127,000	1882	21,540	1934	62,640	19,160	100.0

Boxplots of monthly and annual mean discharges



MISSISSIPPI RIVER MAIN STEM
05474500 MISSISSIPPI RIVER AT KEOKUK, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	12,400	14,200	20,300	30,900	24,400	18,300	16,400	13,200	14,600	15,400	16,100	10,700	14,500
95	16,700	17,700	26,800	43,100	37,000	30,600	23,500	18,300	18,600	19,300	20,600	15,000	19,400
90	18,600	20,100	32,600	53,200	45,900	38,600	28,300	22,200	21,400	22,600	22,700	17,800	23,000
85	20,200	22,000	36,700	61,800	53,000	44,600	32,800	25,200	23,700	24,300	24,900	20,000	25,600
80	21,600	23,700	40,300	69,900	59,100	50,400	36,700	27,500	25,500	25,800	27,400	21,800	28,400
75	23,000	25,200	44,500	77,400	65,700	55,400	40,300	29,700	27,600	27,400	30,100	23,600	31,200
70	24,300	26,800	49,500	84,600	72,100	60,800	43,700	31,800	29,600	28,900	32,100	25,200	34,200
65	25,600	28,600	53,500	92,300	78,700	66,400	47,400	33,800	31,800	30,600	34,200	26,800	37,400
60	27,100	30,400	57,600	99,800	85,300	72,300	51,300	36,200	34,000	33,000	36,300	28,400	40,800
55	28,800	32,100	63,300	107,000	91,600	78,000	55,700	38,500	36,500	35,500	38,300	30,000	44,600
50	30,500	33,900	69,600	115,000	97,900	83,600	60,200	40,900	39,000	38,000	40,900	31,900	49,300
45	32,500	36,300	76,300	122,000	104,000	89,500	64,900	43,300	41,500	41,400	43,700	33,900	54,500
40	34,600	38,700	83,000	130,000	111,000	95,500	71,500	46,300	44,100	45,500	48,300	36,300	60,400
35	36,900	42,300	90,300	137,000	119,000	103,000	78,200	49,700	47,400	50,300	53,000	38,700	67,300
30	39,200	46,500	97,700	145,000	127,000	110,000	84,900	53,900	51,200	55,900	57,600	41,700	75,800
25	42,100	51,000	105,000	153,000	135,000	119,000	91,500	58,800	56,600	62,500	62,700	45,100	85,500
20	45,400	55,500	113,000	161,000	146,000	130,000	100,000	64,500	63,800	70,600	68,900	49,900	96,500
15	49,500	61,000	125,000	175,000	159,000	141,000	112,000	72,900	72,000	81,500	77,700	57,200	111,000
10	56,600	69,300	140,000	191,000	182,000	155,000	128,000	81,400	83,400	93,800	89,600	65,900	131,000
5	70,000	89,400	167,000	217,000	207,000	179,000	152,000	92,800	101,000	130,000	109,000	79,200	159,000

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge ¹ (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	72,000	59,600	55,700	51,700	45,300
0.95	1.05	95,000	87,800	83,400	77,000	68,000
0.90	1.11	110,000	106,000	101,000	93,100	82,600
0.80	1.25	130,000	129,000	124,000	115,000	102,000
0.50	2	170,000	180,000	174,000	161,000	145,000
0.20	5	218,000	234,000	226,000	210,000	190,000
0.10	10	247,000	261,000	252,000	236,000	213,000
0.04	25	290,000	288,000	277,000	261,000	236,000
0.02	50	320,000	304,000	292,000	276,000	250,000
0.01	100	351,000	318,000	304,000	289,000	261,000

¹ Data supplied by U.S. Army Corps of Engineers, Rock Island District.

MISSISSIPPI RIVER MAIN STEM
05474500 MISSISSIPPI RIVER AT KEOKUK, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	6,390	6,910	7,990	9,690	11,700	13,300	14,600	15,100	15,900
0.02	50	7,270	7,810	8,880	10,600	12,700	14,300	15,600	16,400	17,400
0.05	20	8,760	9,330	10,400	12,100	14,300	16,100	17,500	18,600	19,900
0.10	10	10,300	10,900	12,000	13,700	16,000	17,900	19,400	20,900	22,600
0.20	5	12,400	13,100	14,200	15,900	18,400	20,400	22,300	24,200	26,500
0.50	2	17,400	18,200	19,500	21,200	24,200	27,000	29,500	32,700	36,800
0.80	1.25	23,700	25,000	26,600	28,500	32,300	36,700	40,500	45,300	52,600
0.90	1.11	27,600	29,200	31,300	33,400	37,800	43,500	48,500	54,300	64,100
0.96	1.04	32,100	34,300	37,100	39,600	44,900	52,800	59,300	66,500	79,900
0.98	1.02	35,300	37,900	41,400	44,300	50,300	60,000	68,000	76,100	92,600
0.99	1.01	38,400	41,400	45,700	49,000	55,800	67,600	77,100	86,300	106,000

Probability of seasonal low discharges

		Minimum average discharge (ft ³ /s)							
Nonexceedance probability	Recurrence interval (years)	Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	8,390	9,890	11,500	13,300	14,400	16,400	18,000	20,500
0.02	50	9,450	11,000	12,600	14,400	17,000	19,100	21,000	24,100
0.05	20	11,300	13,000	14,400	16,300	21,500	24,000	26,300	30,400
0.10	10	13,200	14,900	16,400	18,200	26,300	29,200	31,900	37,100
0.20	5	15,900	17,700	19,100	21,000	33,200	36,600	39,900	46,600
0.50	2	22,400	24,400	25,800	28,400	50,200	55,000	59,700	69,800
0.80	1.25	31,200	33,500	35,200	39,500	72,700	79,700	86,400	100,000
0.90	1.11	37,000	39,400	41,500	47,500	87,000	95,600	103,000	120,000
0.96	1.04	44,200	45,800	49,700	58,500	104,000	115,000	124,000	142,000
0.98	1.02	49,400	52,200	55,900	67,300	116,000	129,000	139,000	158,000
0.99	1.01	54,600	57,600	62,300	76,600	127,000	142,000	154,000	174,000
		July-August-September				October-November-December			
0.01	100	9,960	11,200	12,000	13,200	7,140	8,870	10,700	13,600
0.02	50	11,200	12,500	13,300	14,700	8,000	9,770	11,600	14,600
0.05	20	13,300	14,800	15,700	17,300	9,520	11,400	13,300	16,500
0.10	10	15,400	17,100	18,100	19,900	11,100	13,000	15,000	18,500
0.20	5	18,500	20,400	21,600	23,800	13,500	15,500	17,600	21,500
0.50	2	26,000	28,300	30,000	33,500	19,600	22,100	24,500	29,600
0.80	1.25	36,200	39,200	41,800	47,300	28,800	32,300	35,500	42,400
0.90	1.11	43,000	46,200	49,600	56,800	35,300	39,900	43,800	52,100
0.96	1.04	51,600	55,100	59,500	69,000	44,100	50,300	55,400	65,900
0.98	1.02	57,900	61,700	66,900	78,400	50,900	58,700	64,900	77,200
0.99	1.01	64,200	68,200	74,300	87,900	58,100	67,700	75,200	89,500

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 September 1988.

GAGE.--Water-stage recorder and concrete control. Datum of gage is 1,247.55 ft above NGVD.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 16,000 ft³/s Apr. 12, 1969, gage height, 17.68 ft, from floodmark; no flow Jan. 16-18, 1977.

Rating table number 7, developed October 1982

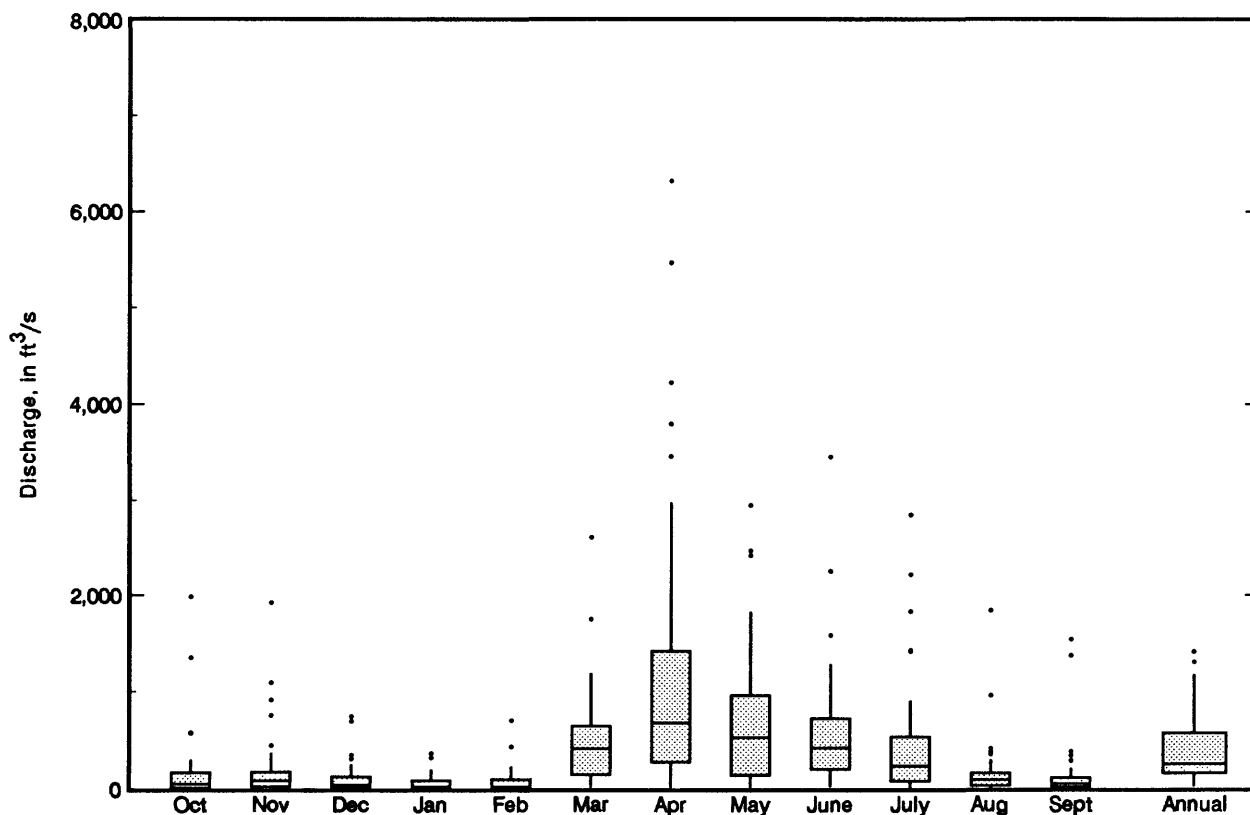
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
1.7	6.0	5.0	1,160
2.0	36	7.0	2,050
2.2	66	9.0	2,990
2.5	126	13.0	6,370
3.0	262	15.0	9,420
3.5	441	17.0	13,900
4.0	659		

DES MOINES RIVER BASIN
05476500 DES MOINES RIVER AT ESTHERVILLE, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	1,980	1987	0.92	1959	201	395	4.3
November	1,920	1980	1.66	1959	219	383	4.7
December	741	1980	1.32	1956	121	172	2.6
January	354	1983	0.46	1977	61.6	82.2	1.3
February	703	1983	0.77	1959	86.0	134	1.8
March	2,608	1983	16.0	1959	502	518	10.7
April	6,314	1969	13.4	1959	1,331	1,597	28.4
May	2,947	1984	15.7	1968	712	737	15.2
June	3,450	1984	22.6	1976	618	678	13.2
July	2,851	1983	4.16	1976	488	659	10.4
August	1,845	1979	2.36	1976	193	332	4.1
September	1,541	1979	0.74	1958	157	329	3.3
Annual	1,417	1983	26.5	1956	391	366	100.0

Boxplots of monthly and annual mean discharges



DES MOINES RIVER BASIN
05476500 DES MOINES RIVER AT ESTHERVILLE, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.29	0.51	2.9	11	15	9.0	1.9	0.80	0.50	0.59	1.5	0.97	0.75
95	0.94	1.2	8.2	28	24	17	6.9	2.4	1.2	1.3	2.7	1.9	2.7
90	1.9	3.2	15	61	38	35	13	4.5	3.6	3.8	10	7.3	8.8
85	3.8	4.8	21	99	57	64	21	11	7.8	11	15	11	14
80	6.7	9.3	30	187	87	100	32	23	13	15	22	15	20
75	9.9	11	43	256	141	140	52	32	19	20	30	19	28
70	12	13	65	320	219	179	75	41	25	26	37	26	37
65	15	16	100	385	285	223	104	50	31	34	43	34	47
60	19	19	137	459	332	268	139	59	36	41	50	39	61
55	24	22	174	534	378	321	175	68	42	49	63	44	77
50	29	26	223	623	446	373	218	81	47	58	77	49	100
45	33	31	274	736	519	448	261	99	58	67	89	59	133
40	41	36	335	848	599	533	324	119	69	80	101	70	172
35	49	49	403	1,020	708	625	389	146	84	103	119	90	229
30	65	67	513	1,210	814	724	482	174	100	130	147	117	300
25	81	89	640	1,680	962	824	575	210	123	160	188	154	385
20	99	114	798	2,340	1,180	952	743	247	158	218	280	195	526
15	126	163	1,030	2,970	1,480	1,120	939	318	212	339	379	238	727
10	170	223	1,420	3,790	1,890	1,280	1,250	427	299	535	627	318	1,050
5	274	355	2,200	5,070	2,600	1,920	1,990	710	523	821	1,110	527	1,840

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	232	187	150	122	78
0.95	1.05	464	367	302	248	178
0.90	1.11	665	525	437	361	272
0.80	1.25	1,020	810	683	566	446
0.50	2	2,250	1,850	1,590	1,330	1,090
0.20	5	4,810	4,190	3,680	3,100	2,520
0.10	10	7,050	6,410	5,680	4,800	3,810
0.04	25	10,500	10,100	8,990	7,630	5,810
0.02	50	13,500	13,500	12,100	10,300	7,560
0.01	100	16,900	17,500	15,700	13,400	9,510

DES MOINES RIVER BASIN
05476500 DES MOINES RIVER AT ESTHERVILLE, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.05	0.15	0.22	0.42	0.54	0.71	0.65
0.02	50	0.00	0.00	0.11	0.27	0.39	0.70	0.93	1.2	1.2
0.05	20	0.27	0.37	0.35	0.65	0.90	1.5	2.0	2.6	2.8
0.10	10	0.74	0.92	0.87	1.3	1.8	2.7	3.8	4.8	5.7
0.20	5	1.9	2.2	2.4	3.0	3.9	5.6	7.9	10.0	13
0.50	2	8.3	8.7	11	12	15	19	28	35	50
0.80	1.25	29	29	35	38	44	58	82	106	160
0.90	1.11	53	53	55	63	72	96	134	177	271
0.96	1.04	94	96	81	104	115	159	216	294	448
0.98	1.02	135	138	99	139	152	215	287	397	602
0.99	1.01	184	191	115	177	191	277	364	514	770

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.27	0.05	0.15	0.22	2.0	2.5	3.1	4.7
0.02	50	0.46	0.12	0.29	0.41	3.5	4.3	5.4	8.2
0.05	20	1.0	0.44	0.76	1.0	7.8	9.5	12	18
0.10	10	2.0	1.2	1.7	2.2	15	19	23	34
0.20	5	4.2	3.5	4.0	5.0	33	39	49	69
0.50	2	15	18	17	21	120	143	174	235
0.80	1.25	47	54	55	66	365	427	501	655
0.90	1.11	79	81	91	110	609	705	807	1,040
0.96	1.04	131	113	146	179	999	1,140	1,270	1,610
0.98	1.02	177	133	190	237	1,340	1,520	1,660	2,090
0.99	1.01	228	149	236	299	1,710	1,930	2,060	2,580
		July-August-September				October-November-December			
0.01	100	0.08	0.20	0.25	0.35	0.13	0.29	0.37	0.41
0.02	50	0.18	0.39	0.49	0.70	0.27	0.55	0.69	0.78
0.05	20	0.54	1.0	1.3	1.9	0.75	1.3	1.7	1.9
0.10	10	1.3	2.2	2.8	4.1	1.8	2.8	3.4	4.1
0.20	5	3.6	5.3	6.6	9.9	4.6	6.6	7.9	9.6
0.50	2	19	23	29	41	22	27	32	41
0.80	1.25	71	80	94	127	74	90	109	143
0.90	1.11	126	139	159	203	126	154	189	252
0.96	1.04	212	234	260	312	205	257	322	435
0.98	1.02	285	318	344	395	269	347	442	600
0.99	1.01	362	409	433	477	335	444	575	786

DES MOINES RIVER BASIN
05476750 DES MOINES RIVER AT HUMBOLDT, IA

LOCATION.--Lat 42°43'12", long 94°E13'06", 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 September 1988. Prior to October 1970, published as West Fork Des Moines River at Humboldt.

GAGE.--Water-stage recorder. Datum of gage is 1,053.54 ft above NGVD. Prior to Oct. 3, 1966, nonrecording gage at same site and datum.

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.

Rating table number 8, developed October 1982

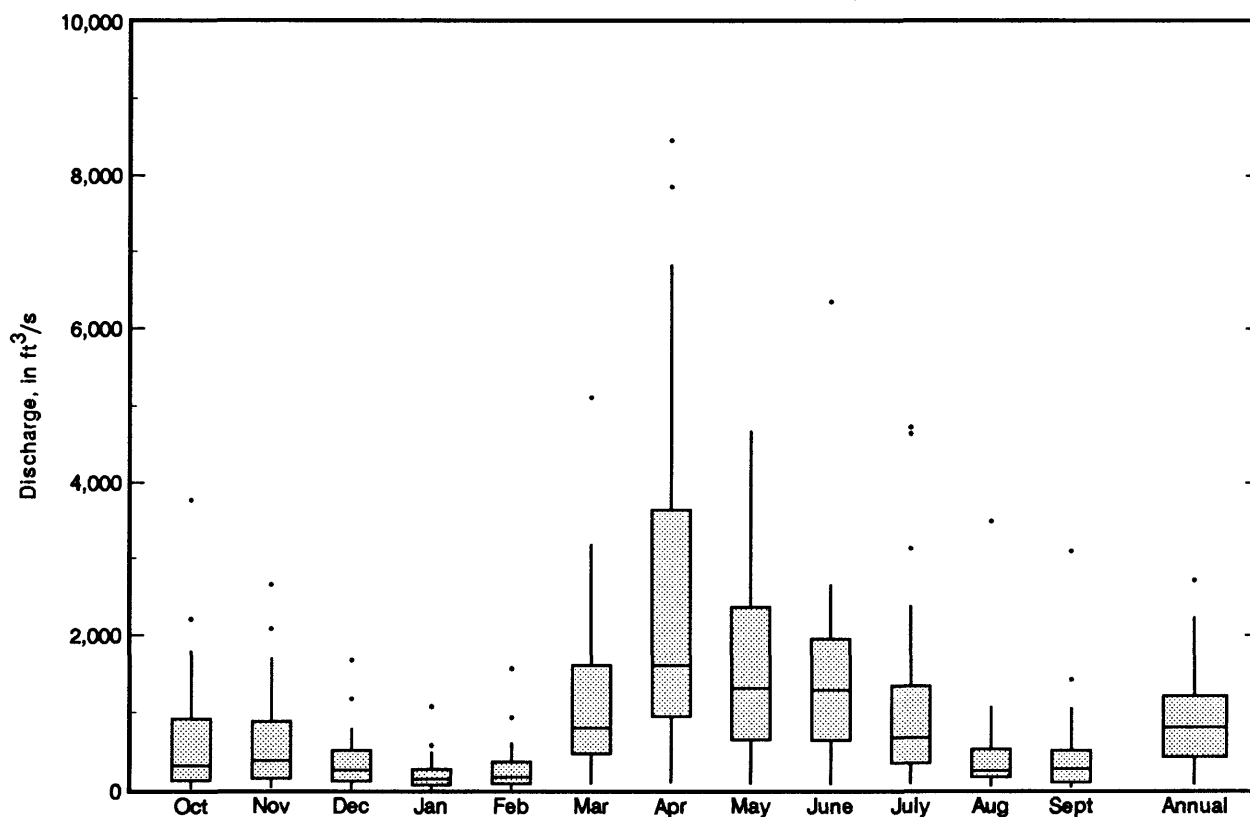
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
2.7	56	5.0	1,300
3.0	141	6.0	2,190
3.5	343	8.0	4,470
4.0	608	10.0	7,339
4.5	931	12.0	10,700

DES MOINES RIVER BASIN
05476750 DES MOINES RIVER AT HUMBOLDT, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	3,768	1987	20.4	1977	669	867	5.9
November	2,656	1980	28.8	1977	649	686	5.7
December	1,675	1983	19.9	1977	391	393	3.4
January	1,078	1983	13.5	1977	221	237	1.9
February	1,571	1983	19.8	1977	297	349	2.6
March	5,110	1983	78.9	1968	1,233	1,180	10.8
April	8,454	1969	94.4	1968	2,643	2,505	23.2
May	4,678	1984	77.6	1968	1,687	1,329	14.8
June	6,348	1984	72.3	1977	1,465	1,269	12.9
July	4,725	1969	81.0	1976	1,177	1,307	10.3
August	3,495	1979	42.4	1976	489	698	4.3
September	3,097	1979	30.1	1976	474	655	4.2
Annual	2,715	1983	74.3	1977	951	698	100.0

Boxplots of monthly and annual mean discharges



DES MOINES RIVER BASIN
05476750 DES MOINES RIVER AT HUMBOLDT, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equalled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	14	15	38	69	67	48	51	33	27	17	20	19	21
95	23	32	62	149	96	93	78	47	42	60	49	42	48
90	35	41	89	203	206	180	107	69	60	71	75	61	68
85	46	49	139	437	278	295	153	112	77	81	97	74	88
80	54	57	220	585	457	423	225	137	89	91	128	92	114
75	64	66	277	768	603	564	273	155	99	115	154	115	144
70	76	75	357	961	705	676	328	173	109	158	181	141	182
65	92	83	428	1,150	803	789	389	191	120	197	221	164	224
60	105	91	491	1,300	923	904	459	210	135	233	257	191	269
55	118	111	568	1,460	1,070	1,020	537	233	162	264	301	227	322
50	135	131	674	1,620	1,240	1,140	623	260	198	305	357	263	395
45	161	157	763	1,810	1,430	1,270	729	288	240	373	413	297	486
40	189	190	862	2,000	1,630	1,390	851	318	283	484	490	328	599
35	213	223	996	2,420	1,970	1,520	986	360	337	545	615	372	735
30	240	280	1,250	2,870	2,300	1,680	1,190	420	405	625	738	421	901
25	268	320	1,530	3,700	2,620	1,880	1,440	507	491	752	855	498	1,130
20	308	368	2,040	4,490	2,910	2,150	1,750	621	618	970	1,040	592	1,420
15	383	428	2,710	5,310	3,270	2,500	2,190	775	786	1,200	1,270	724	1,850
10	550	527	3,560	6,380	3,770	2,880	2,920	988	1,120	1,790	1,680	932	2,550
5	756	1,150	4,670	8,530	4,570	3,860	4,910	1,450	2,050	2,670	2,540	1,370	3,830

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	424	400	322	237	179
0.95	1.05	919	860	712	552	447
0.90	1.11	1,340	1,260	1,050	836	695
0.80	1.25	2,060	1,930	1,650	1,340	1,140
0.50	2	4,270	4,060	3,580	3,010	2,580
0.20	5	7,930	7,690	7,020	6,020	5,040
0.10	10	10,500	10,300	9,600	8,270	6,750
0.04	25	13,800	13,800	13,000	11,300	8,860
0.02	50	16,200	16,400	15,700	13,500	10,400
0.01	100	18,500	18,900	18,300	15,700	11,800

DES MOINES RIVER BASIN
05476750 DES MOINES RIVER AT HUMBOLDT, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	9.5	9.8	10	10	11	12	13	14	17
0.02	50	12	13	13	13	14	16	17	19	23
0.05	20	17	18	19	20	21	24	27	30	38
0.10	10	24	25	26	27	30	34	41	46	57
0.20	5	35	36	38	41	45	53	65	76	94
0.50	2	72	74	78	84	95	119	156	189	236
0.80	1.25	146	150	156	166	195	261	358	447	570
0.90	1.11	210	215	220	234	280	391	544	689	890
0.96	1.04	309	315	316	333	409	596	839	1,080	1,420
0.98	1.02	396	402	397	415	519	780	1,100	1,430	1,900
0.99	1.01	495	500	486	505	641	991	1,410	1,830	2,460

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	9.3	10	10	11	20	25	27	33
0.02	50	12	13	14	14	32	39	42	53
0.05	20	19	20	21	22	59	72	81	101
0.10	10	27	29	30	32	99	119	137	172
0.20	5	41	44	46	49	176	209	245	308
0.50	2	89	93	99	111	449	526	628	794
0.80	1.25	184	191	203	243	947	1,090	1,310	1,660
0.90	1.11	264	272	291	361	1,310	1,500	1,780	2,260
0.96	1.04	383	392	420	545	1,750	1,990	2,340	2,990
0.98	1.02	483	492	528	708	2,060	2,340	2,720	3,490
0.99	1.01	592	601	646	892	2,350	2,660	3,070	3,940
		July-August-September				October-November-December			
0.01	100	18	23	25	26	11	14	15	16
0.02	50	23	28	30	33	15	19	21	22
0.05	20	32	37	40	45	23	29	33	36
0.10	10	42	48	52	59	34	42	48	54
0.20	5	60	68	72	85	55	67	77	89
0.50	2	120	132	142	173	131	157	181	219
0.80	1.25	245	268	298	369	305	359	408	518
0.90	1.11	359	395	450	557	469	548	614	797
0.96	1.04	541	604	712	876	737	852	936	1,240
0.98	1.02	707	801	968	1,180	983	1,130	1,220	1,650
0.99	1.01	902	1,040	1,290	1,550	1,270	1,450	1,540	2,110

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 September 1988

GAGE.--Water-stage recorder. Datum of gage is 1,038.71 ft above NGVD. Prior to Oct. 1, 1954, nonrecording gage at site 8 mi upstream at different datum.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 18,800 ft³/s June 21, 1954, gage height, 16.95 ft, from floodmark, site and datum then in use; minimum daily discharge, 4.8 ft³/s Jan. 11-14, 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 21, 1954, reached a stage of 24.02 ft, discharge, 17,400 ft³/s at present site. 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.

Rating table number 6, developed July 1988

Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
7.5	39	12.0	2,487
8.0	143	14.0	4,164
8.5	312	16.0	6,119
9.0	543	20.0	10,700
9.5	834	24.0	17,400
10.0	1,138		

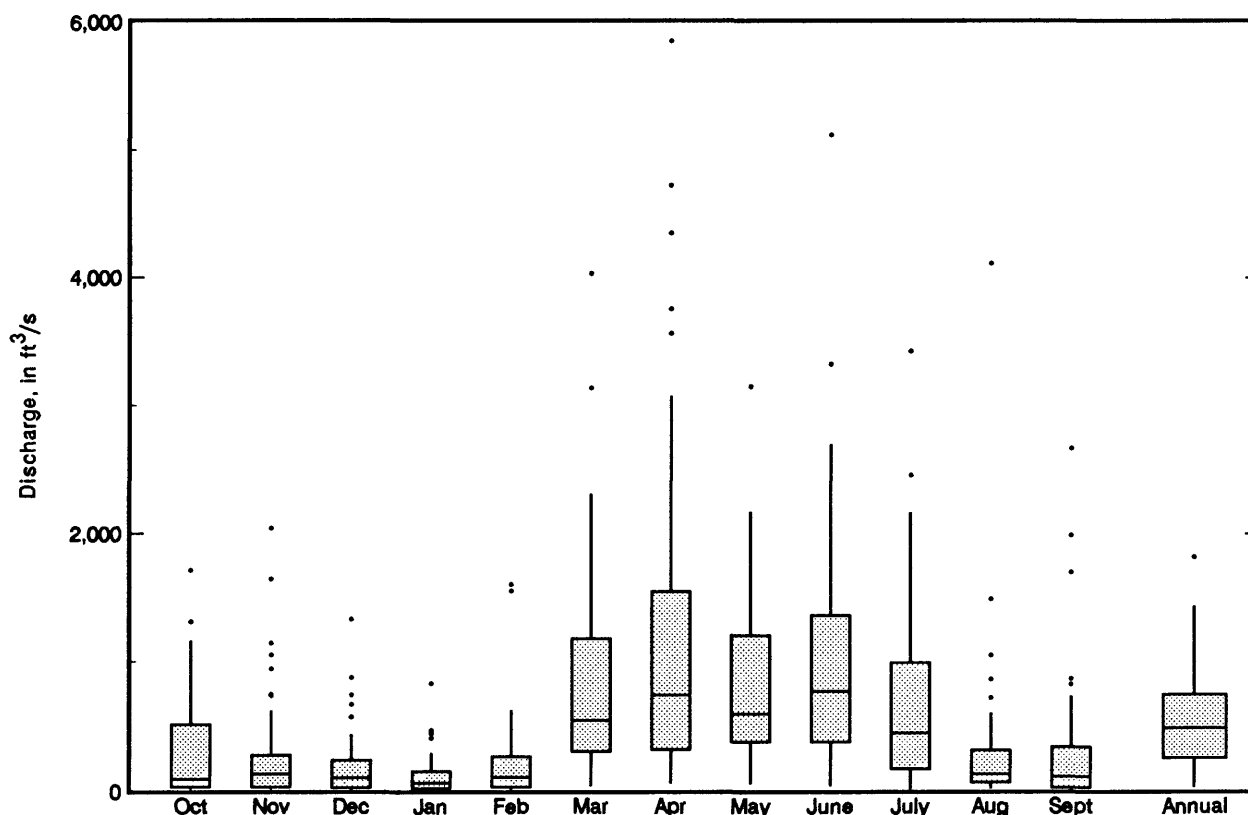
DES MOINES RIVER BASIN

05479000 EAST FORK DES MOINES RIVER AT DAKOTA CITY, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	1,713	1983	12.0	1959	312	422	4.8
November	2,042	1942	14.2	1959	299	431	4.6
December	1,331	1983	8.45	1977	197	263	3.0
January	834	1983	5.12	1977	116	156	1.8
February	1,602	1984	10.4	1959	220	331	3.4
March	4,033	1983	39.4	1968	849	830	13.0
April	5,852	1965	58.8	1977	1,261	1,337	19.4
May	3,152	1984	52.2	1940	865	695	13.3
June	5,121	1984	36.3	1977	1,052	961	16.2
July	3,428	1969	13.7	1977	696	736	10.7
August	4,114	1979	15.5	1976	322	625	4.9
September	2,866	1979	7.40	1976	324	533	5.0
Annual	1,819	1983	29.7	1977	551	379	100.0

Boxplots of monthly and annual mean discharges



DES MOINES RIVER BASIN

05479000 EAST FORK DES MOINES RIVER AT DAKOTA CITY, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	5.5	9.9	18	38	38	20	14	10	6.6	8.3	13	8.3	9.1
95	14	15	30	66	62	73	31	20	11	13	18	14	17
90	16	17	42	107	112	115	56	27	15	16	22	20	23
85	19	19	54	164	157	163	76	35	19	20	27	23	29
80	21	22	74	204	204	221	95	42	22	24	30	26	38
75	24	28	111	256	258	270	118	49	27	28	34	30	50
70	26	31	169	319	321	312	144	57	33	33	40	35	66
65	29	34	222	409	376	369	180	67	40	39	51	44	87
60	34	43	281	495	426	447	225	77	48	52	64	51	115
55	42	52	352	592	474	554	280	88	60	72	83	65	148
50	53	63	434	696	538	670	339	105	76	97	114	87	191
45	62	80	524	809	618	771	401	122	95	127	169	111	246
40	72	103	650	940	724	882	486	143	118	157	212	135	304
35	85	124	760	1,160	847	1,010	588	171	149	232	245	158	381
30	103	147	884	1,440	1,020	1,190	717	216	200	306	279	189	485
25	130	189	1,050	1,700	1,210	1,400	885	281	290	389	318	239	634
20	175	241	1,290	2,010	1,420	1,610	1,130	358	397	496	385	303	820
15	231	303	1,620	2,410	1,660	1,880	1,440	492	554	687	545	387	1,100
10	286	461	2,340	3,070	2,050	2,170	1,910	754	930	941	806	540	1,540
5	438	884	3,520	4,320	2,660	2,950	2,690	1,190	1,610	1,470	1,300	801	2,270

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	400	306	233	158	113
0.95	1.05	823	704	580	426	320
0.90	1.11	1,180	1,050	894	677	519
0.80	1.25	1,810	1,660	1,440	1,120	871
0.50	2	3,840	3,580	3,140	2,490	1,940
0.20	5	7,600	6,790	5,780	4,520	3,440
0.10	10	10,600	9,030	7,480	5,750	4,290
0.04	25	14,700	11,800	9,440	7,070	5,140
0.02	50	18,100	13,900	10,700	7,900	5,640
0.01	100	21,600	15,800	11,900	8,600	6,040

DES MOINES RIVER BASIN
05479000 EAST FORK DES MOINES RIVER AT DAKOTA CITY, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	3.4	3.8	4.1	4.5	5.2	6.0	6.2	6.1	5.5
0.02	50	4.4	4.8	5.1	5.6	6.4	7.4	7.8	7.9	7.7
0.05	20	6.2	6.7	7.1	7.8	8.8	10	11	12	13
0.10	10	8.4	9.0	9.5	10	12	14	16	17	20
0.20	5	12	13	14	15	16	20	24	27	35
0.50	2	24	25	26	28	32	44	56	69	98
0.80	1.25	46	47	50	53	63	98	143	187	278
0.90	1.11	65	66	69	73	90	153	240	325	479
0.98	1.04	92	93	98	104	133	250	429	595	856
0.98	1.02	114	116	122	130	171	346	631	891	1,250
0.99	1.01	139	141	149	159	214	466	901	1,290	1,750

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	5.0	5.1	5.3	5.3	10	12	15	27
0.02	50	6.1	6.3	6.5	6.7	15	18	22	37
0.05	20	8.3	8.7	9.1	9.5	26	31	38	60
0.10	10	11	12	12	13	41	50	60	89
0.20	5	16	17	18	20	70	86	102	144
0.50	2	34	37	39	45	181	218	259	341
0.80	1.25	78	83	89	109	419	493	582	766
0.90	1.11	123	131	141	178	624	721	852	1,140
0.96	1.04	205	215	235	305	928	1,050	1,240	1,730
0.98	1.02	288	300	329	437	1,180	1,310	1,550	2,230
0.99	1.01	395	407	449	607	1,450	1,580	1,880	2,800
		July-August-September				October-November-December			
0.01	100	3.1	4.1	4.8	6.2	3.3	3.9	4.3	4.9
0.02	50	4.1	5.3	6.1	7.7	4.2	5.0	5.5	6.4
0.05	20	6.3	7.7	8.7	11	6.3	7.4	8.3	9.8
0.10	10	9.1	11	12	15	9.1	11	12	14
0.20	5	14	17	18	24	15	17	20	24
0.50	2	34	38	42	58	40	46	53	67
0.80	1.25	79	89	103	159	120	138	160	207
0.90	1.11	124	142	167	280	222	257	297	390
0.96	1.04	199	234	286	533	444	517	595	790
0.98	1.02	270	325	408	822	708	830	949	1,270
0.99	1.01	355	438	565	1,230	1,090	1,290	1,460	1,970

DES MOINES RIVER BASIN
05480000 LIZARD CREEK NEAR CLARE, IA

LOCATION.-- Lat 42°32'35" long 94°20'45", in NE1/4 NE1/4 sec. 11, T.89 N., R.30 W., Webster County, Hydrologic Unit 07100004, on right bank 20 ft downstream from bridge on county highway, 2.3 mi downstream from Drainage ditch 3, 3.0 mi south of Clare and 8.2 mi upstream from South Lizard Creek

DRAINAGE AREA.--257 mi².

PERIOD OF RECORD.--March 1940 to December 1981 (discontinued). Prior to October 1954, published as North Lizard Creek near Clare.

GAGE.--Water-stage recorder and concrete control. Datum of gage is 1,079.30 ft NGVD. Prior to May 6, 1953, nonrecording gage at same site and datum.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 10,000 ft³/s June 23, 1947, gage height, 16.0 ft, from floodmark, from rating curve extended above 5,300 ft³/s; no flow on a few days in 1943, 1956 and 1968 and many days in 1977.

Rating table number 2, developed October 1967
(A discharge measurement to validate this rating
has not been made since January 1982.)

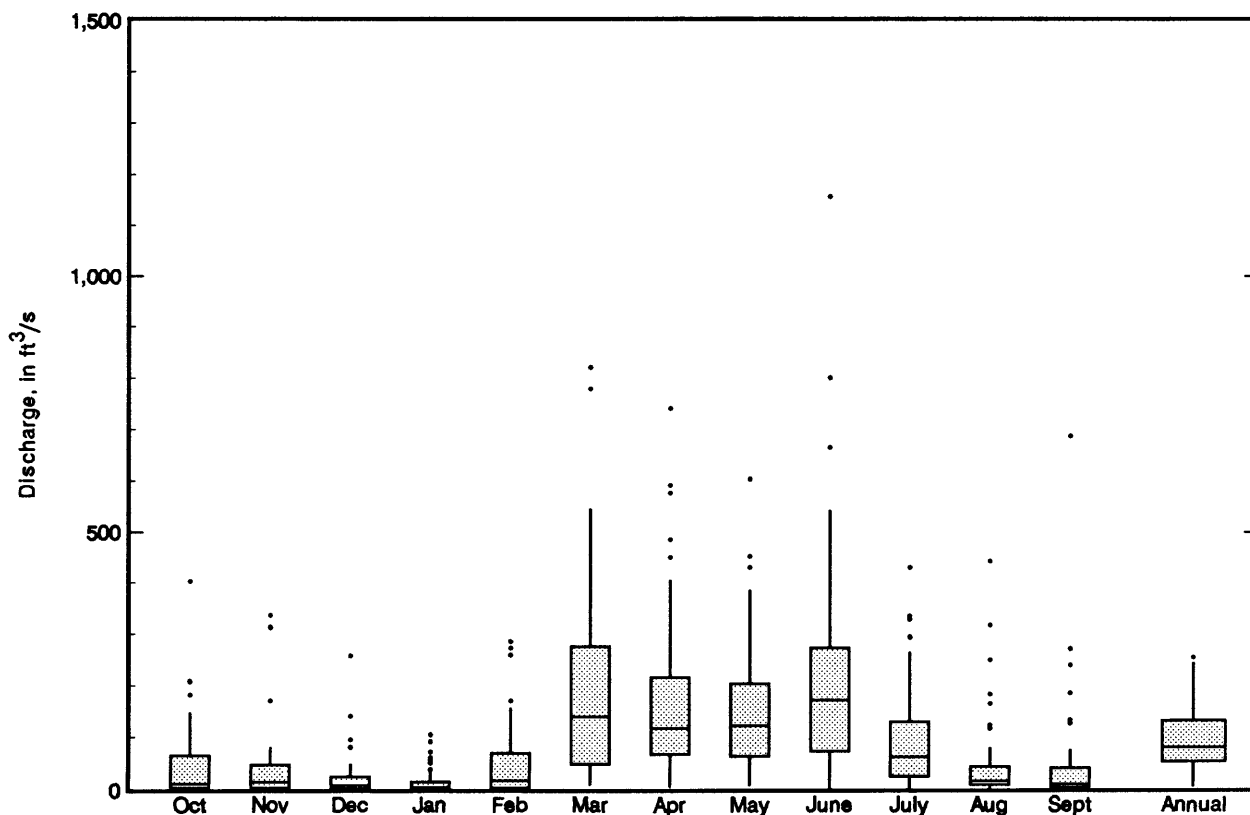
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
3.0	1.1	5.0	500
3.2	14	6.0	945
3.5	56	7.0	1,510
3.7	97	8.0	2,150
4.0	173	10.0	3,680
4.5	324	12.0	5,500

DES MOINES RIVER BASIN
05480000 LIZARD CREEK NEAR CLARE, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	403	1974	0.47	1957	47.7	80.5	4.1
November	337	1942	1.41	1977	46.7	83.2	4.0
December	259	1974	0.070	1977	27.2	47.3	2.3
January	106	1942	0.000	1977	16.9	26.0	1.5
February	287	1974	0.13	1959	52.2	76.9	4.5
March	822	1979	7.82	1977	193	196	16.7
April	742	1965	3.79	1956	178	182	15.4
May	604	1944	7.17	1968	157	134	13.6
June	1,158	1954	1.37	1977	219	228	18.9
July	431	1962	1.06	1977	103	107	8.9
August	443	1979	0.21	1956	56.0	93.2	4.8
September	688	1962	0.32	1955	59.5	125	5.1
Annual	256	1973	3.95	1956	96.3	64.2	100.0

Boxplots of monthly and annual mean discharges



DES MOINES RIVER BASIN
05480000 LIZARD CREEK NEAR CLARE, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.00	0.04	1.5	2.0	1.7	0.48	0.22	0.08	0.08	0.13	0.81	0.05	0.10
95	0.25	0.26	4.7	7.4	7.0	3.5	1.5	0.58	0.22	0.71	1.5	0.55	0.72
90	0.39	0.38	8.1	13	14	18	6.0	1.7	0.92	1.2	2.3	0.97	1.6
85	0.68	1.0	12	21	28	30	10	3.0	1.5	1.9	3.0	1.3	2.8
80	1.0	1.6	15	31	36	39	15	4.7	2.3	2.5	3.7	1.8	4.1
75	1.4	2.3	18	39	45	49	19	6.4	3.0	3.1	4.6	2.6	5.7
70	1.9	3.0	24	48	53	59	23	7.6	3.8	3.7	5.8	3.8	8.0
65	2.6	3.7	31	57	61	69	28	8.9	4.8	4.7	8.1	4.9	11
60	4.0	4.7	41	67	72	78	34	11	5.8	6.0	10	6.0	15
55	4.7	5.6	53	79	83	87	40	13	7.2	8.3	12	7.7	19
50	5.3	7.2	68	91	95	99	47	15	8.6	11	15	10	25
45	6.2	9.4	86	107	108	115	56	18	11	14	18	13	34
40	7.8	14	108	123	121	132	65	21	14	18	22	16	44
35	9.5	19	132	140	134	157	79	26	18	23	28	18	57
30	12	27	161	174	153	188	94	32	24	30	36	22	74
25	15	41	194	208	178	230	119	39	30	49	45	27	93
20	23	56	241	266	204	289	150	53	48	69	57	34	124
15	35	83	301	340	256	390	198	74	68	95	75	47	169
10	53	150	480	443	329	566	263	115	112	141	108	78	244
5	79	293	884	656	460	866	383	232	243	230	220	129	411

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	107	44	28	22	15
0.95	1.05	261	141	97	69	49
0.90	1.11	406	244	171	119	85
0.80	1.25	671	442	314	213	153
0.50	2	1,590	1,120	801	530	374
0.20	5	3,350	2,230	1,560	1,030	703
0.10	10	4,710	2,940	2,000	1,340	892
0.04	25	6,560	3,720	2,470	1,670	1,080
0.02	50	7,990	4,210	2,740	1,870	1,190
0.01	100	9,420	4,620	2,960	2,030	1,280

DES MOINES RIVER BASIN
05480000 LIZARD CREEK NEAR CLARE, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.32	0.45
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.45	0.64
0.05	20	0.00	0.00	0.04	0.07	0.11	0.23	0.44	0.77	1.1
0.10	10	0.00	0.06	0.11	0.16	0.25	0.47	0.79	1.2	1.8
0.20	5	0.15	0.20	0.27	0.37	0.56	0.97	1.6	2.2	3.3
0.50	2	1.1	1.1	1.3	1.5	2.3	3.5	5.4	7.2	11
0.80	1.25	4.9	5.1	5.5	6.1	8.5	12	18	25	37
0.90	1.11	10	11	12	12	17	23	32	48	72
0.96	1.04	21	23	26	27	34	45	60	98	147
0.98	1.02	32	38	43	44	54	70	88	157	236
0.99	1.01	48	59	68	69	83	105	123	242	363

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.05	0.05	0.06	0.10	0.09	0.18	0.34	1.1
0.02	50	0.08	0.07	0.10	0.15	0.23	0.44	0.75	2.1
0.05	20	0.16	0.16	0.21	0.29	0.83	1.4	2.2	4.7
0.10	10	0.30	0.30	0.38	0.52	2.2	3.6	5.0	9.1
0.20	5	0.63	0.64	0.79	1.1	6.3	9.1	12	19
0.50	2	2.5	2.7	3.1	4.2	27	34	42	58
0.80	1.25	10.0	11	12	16	65	75	93	133
0.90	1.11	20	22	24	33	86	95	122	184
0.96	1.04	43	46	50	72	104	111	149	244
0.98	1.02	70	73	79	117	112	119	163	282
0.99	1.01	107	111	120	182	117	123	173	315
		July-August-September				October-November-December			
0.01	100	0.01	0.02	0.04	0.11	0.06	0.08	0.03	0.10
0.02	50	0.03	0.04	0.07	0.19	0.10	0.13	0.06	0.17
0.05	20	0.08	0.11	0.18	0.41	0.19	0.25	0.17	0.38
0.10	10	0.20	0.26	0.38	0.79	0.35	0.46	0.38	0.74
0.20	5	0.56	0.67	0.91	1.7	0.73	0.96	0.97	1.6
0.50	2	3.2	3.6	4.3	7.1	3.0	3.9	5.0	6.8
0.80	1.25	13	15	17	26	13	16	21	26
0.90	1.11	25	30	33	49	27	35	41	51
0.96	1.04	46	59	65	94	60	79	78	100
0.98	1.02	65	89	98	141	101	133	117	153
0.99	1.01	87	125	140	200	163	215	164	221

DES MOINES RIVER BASIN
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 September 1988.

GAGE.--Water-stage recorder. Datum of gage is 969.38 ft above NGVD.

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.

Rating table number 9, developed March 1971

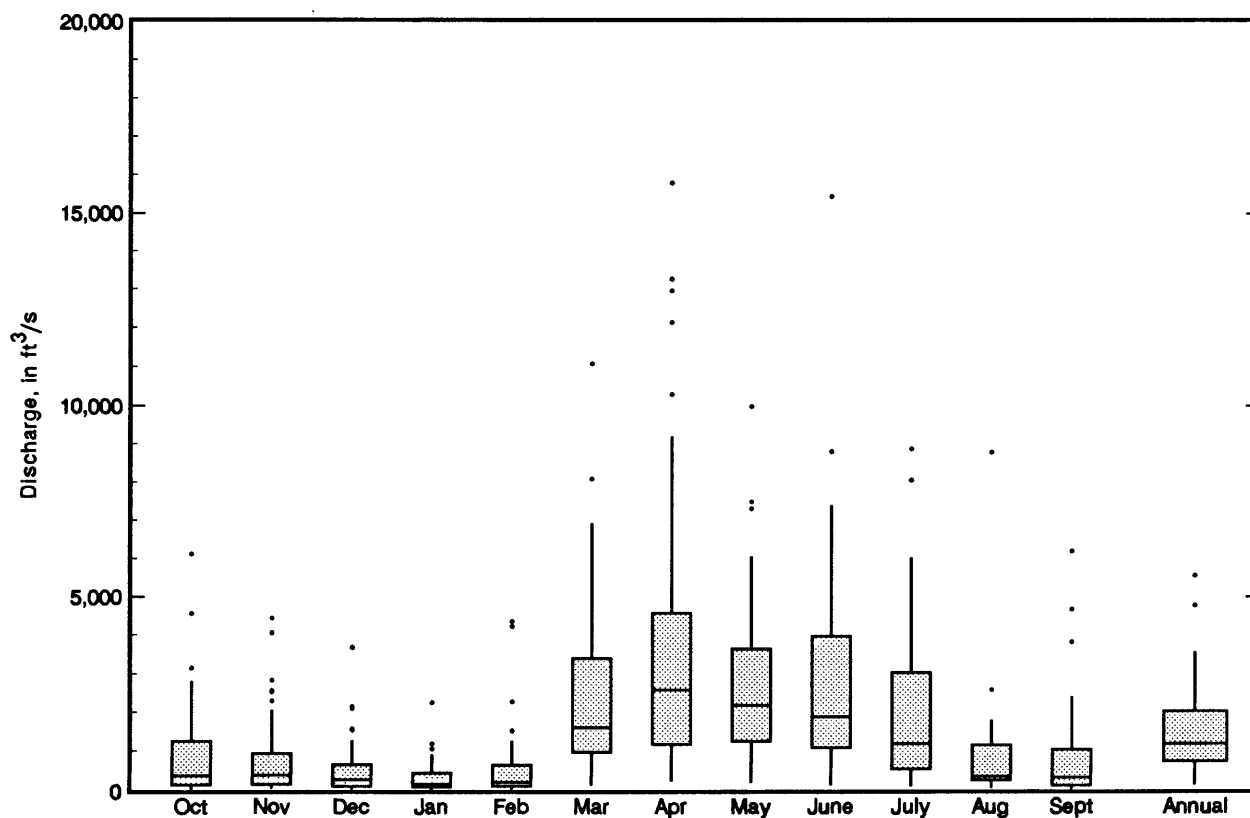
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
2.5	39	4.5	1,670
2.7	66	5.0	2,700
3.0	150	6.0	4,780
3.2	238	8.0	9,570
3.5	420	12.0	20,200
4.0	890	16.0	31,800

DES MOINES RIVER BASIN
05480500 DES MOINES RIVER AT FORT DODGE, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	6,120	1987	32.8	1957	918	1,268	4.8
November	4,447	1983	54.5	1959	849	1,059	4.4
December	3,698	1983	34.7	1977	563	719	2.9
January	2,257	1983	24.0	1977	339	415	1.8
February	4,352	1984	35.5	1959	590	936	3.1
March	11,070	1983	141	1968	2,450	2,338	12.8
April	15,790	1965	238	1968	4,119	4,097	21.5
May	9,985	1984	207	1968	2,729	2,104	14.3
June	15,440	1984	138	1977	2,803	2,698	14.7
July	8,883	1969	114	1977	2,011	2,076	10.5
August	8,788	1979	69.0	1976	880	1,351	4.6
September	6,206	1979	49.9	1976	876	1,270	4.6
Annual	5,566	1983	143	1977	1,595	1,206	100.0

Boxplots of monthly and annual mean discharges



DES MOINES RIVER BASIN

05480500 DES MOINES RIVER AT FORT DODGE, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	24	30	64	143	156	89	80	54	40	32	37	29	33
95	34	36	126	267	236	263	118	84	56	45	63	40	64
90	46	54	166	429	422	446	183	113	78	80	93	63	98
85	66	72	211	644	634	570	263	155	93	100	123	92	125
80	82	88	259	807	825	692	351	193	111	117	146	109	154
75	96	101	332	989	1,040	828	419	224	133	134	174	126	192
70	111	113	477	1,180	1,220	1,000	479	256	160	153	201	143	239
65	124	126	675	1,520	1,370	1,170	556	288	184	185	227	169	296
60	136	140	864	1,820	1,520	1,350	653	326	215	255	260	203	369
55	148	158	1,050	2,140	1,700	1,540	796	369	248	309	307	245	458
50	170	184	1,270	2,490	1,890	1,760	961	422	285	354	380	283	570
45	194	210	1,500	2,890	2,140	2,010	1,180	479	333	424	463	327	709
40	228	238	1,810	3,330	2,460	2,310	1,460	543	394	562	573	376	881
35	274	290	2,140	3,970	2,800	2,630	1,780	606	468	716	688	445	1,110
30	341	396	2,420	4,600	3,160	2,990	2,210	714	568	888	804	537	1,430
25	422	503	2,840	5,390	3,700	3,450	2,740	849	734	1,090	952	666	1,820
20	507	605	3,430	6,730	4,300	4,050	3,350	1,050	1,020	1,370	1,230	823	2,360
15	632	755	4,760	8,350	5,020	4,880	4,030	1,330	1,480	1,720	1,720	1,020	3,070
10	834	980	7,210	10,500	6,130	5,990	5,100	1,830	2,340	2,430	2,390	1,600	4,280
5	1,190	2,460	10,000	14,100	7,840	8,270	7,460	3,000	4,020	4,060	3,420	2,160	6,750

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	2,010	826	657	477	367
0.95	1.05	3,320	1,940	1,570	1,190	905
0.90	1.11	4,310	2,930	2,390	1,840	1,390
0.80	1.25	5,840	4,590	3,800	2,970	2,250
0.50	2	10,200	9,600	8,090	6,490	4,940
0.20	5	17,200	17,200	14,800	12,000	9,250
0.10	10	22,300	22,000	19,100	15,500	12,100
0.04	25	29,100	27,600	24,100	19,600	15,500
0.02	50	34,400	31,200	27,500	22,300	17,800
0.01	100	39,900	34,500	30,500	24,700	19,900

DES MOINES RIVER BASIN
05480500 DES MOINES RIVER AT FORT DODGE, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	10	14	18	19	21	23	24	26	26
0.02	50	13	17	22	23	25	28	30	33	35
0.05	20	18	24	29	32	35	39	43	48	53
0.10	10	25	32	38	41	46	53	60	67	78
0.20	5	37	46	53	58	65	77	90	102	126
0.50	2	80	94	103	112	131	163	204	240	317
0.80	1.25	177	196	208	224	272	363	489	604	817
0.90	1.11	270	289	305	325	403	561	788	1,010	1,360
0.96	1.04	430	439	465	489	620	906	1,330	1,770	2,340
0.98	1.02	578	578	615	638	824	1,240	1,890	2,580	3,350
0.99	1.01	741	741	795	815	1,070	1,670	2,610	3,660	4,640

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	15	19	19	21	35	49	59	102
0.02	50	19	23	24	26	53	72	87	141
0.05	20	26	31	32	36	96	124	148	226
0.10	10	35	41	43	48	155	196	232	336
0.20	5	50	58	61	70	269	329	386	532
0.50	2	107	120	128	148	680	797	929	1,200
0.80	1.25	242	263	281	336	1,490	1,690	1,970	2,510
0.90	1.11	380	407	434	527	2,120	2,390	2,790	3,560
0.96	1.04	627	660	702	869	2,970	3,340	3,910	5,060
0.98	1.02	875	911	968	1,210	3,620	4,060	4,780	6,280
0.99	1.01	1,190	1,230	1,300	1,650	4,270	4,790	5,650	7,550
		July-August-September				October-November-December			
0.01	100	16	30	35	38	11	20	21	22
0.02	50	21	37	42	46	15	25	26	29
0.05	20	32	50	56	62	22	35	38	42
0.10	10	46	66	72	82	32	49	54	61
0.20	5	71	93	100	118	50	73	83	96
0.50	2	159	184	199	251	130	172	199	239
0.80	1.25	343	381	423	576	360	442	512	645
0.90	1.11	506	565	646	916	631	748	862	1,120
0.96	1.04	758	873	1,040	1,540	1,180	1,350	1,530	2,050
0.98	1.02	980	1,160	1,430	2,190	1,780	2,010	2,250	3,070
0.99	1.01	1,230	1,510	1,910	3,030	2,600	2,890	3,200	4,470

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 September 1988.

GAGE.--Water-stage recorder. Datum of gage is 989.57 ft above NGVD. Prior to June 26, 1940, nonrecording gage at same site and datum.

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.

Rating table number 7, developed November 1982

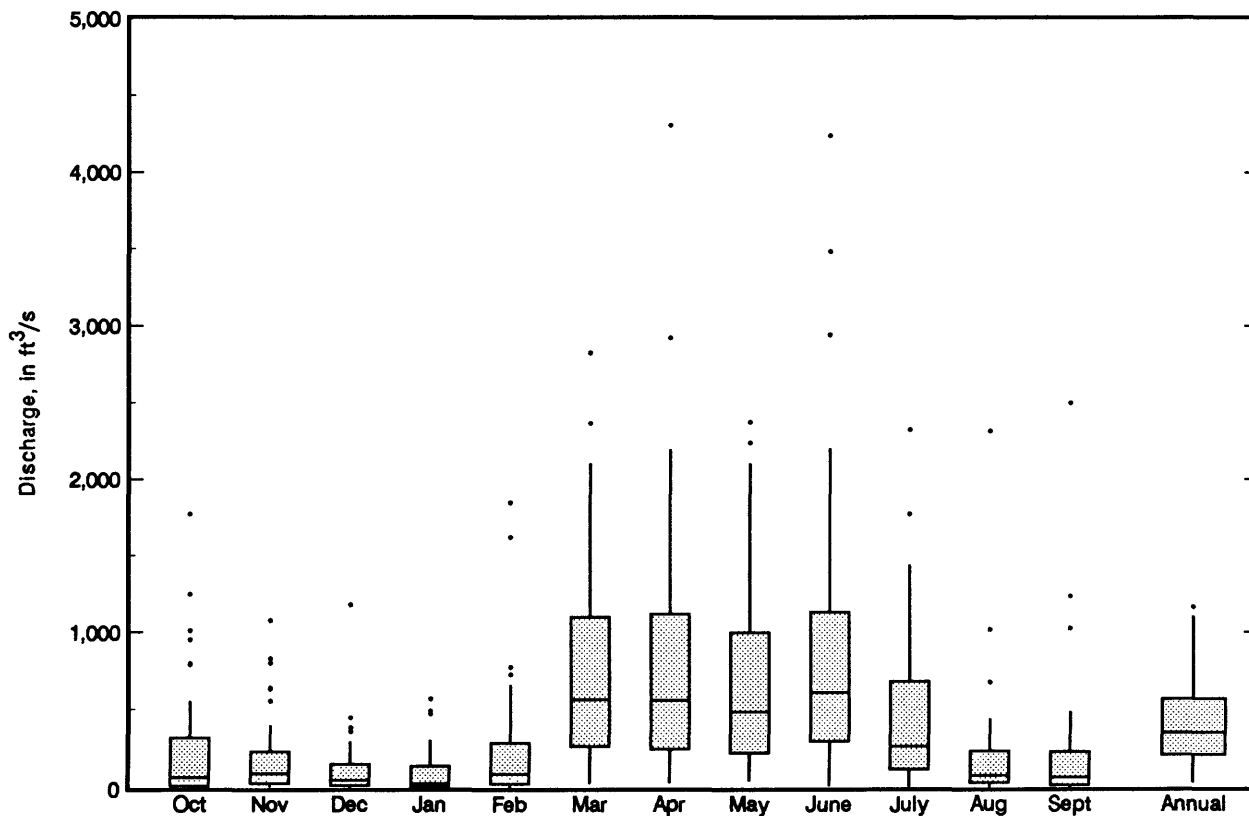
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
1.7	22	5.0	1,620
2.0	54	7.0	3,310
2.2	97	9.0	5,480
2.5	197	11.0	8,130
3.0	420	15.0	14,700
4.0	980		

DES MOINES RIVER BASIN
05481000 BOONE RIVER NEAR WEBSTER CITY, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	1,771	1987	6.66	1950	241	374	4.8
November	1,078	1973	11.0	1950	190	245	3.8
December	1,181	1983	4.62	1977	128	191	2.6
January	568	1983	0.32	1977	95.7	131	1.9
February	1,847	1984	3.60	1950	249	379	5.0
March	2,826	1973	32.5	1968	766	672	15.4
April	4,307	1965	33.7	1957	822	845	16.5
May	2,379	1982	46.0	1968	684	582	13.7
June	4,239	1984	14.1	1977	907	886	18.2
July	2,327	1969	8.66	1977	487	512	9.8
August	2,319	1979	9.79	1949	200	365	4.0
September	2,501	1965	6.48	1976	214	418	4.3
Annual	1,163	1983	36.1	1956	415	278	100.0

Boxplots of monthly and annual mean discharges



DES MOINES RIVER BASIN
05481000 BOONE RIVER NEAR WEBSTER CITY, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.22	0.19	15	24	23	10	6.0	4.8	2.9	3.1	9.2	4.2	4.1
95	5.2	6.0	31	42	40	42	24	9.8	6.2	7.7	13	8.9	10
90	7.7	9.8	40	70	72	76	35	15	10	10	16	12	15
85	10	13	53	120	114	119	48	19	13	13	19	15	21
80	13	16	68	166	161	159	64	24	16	15	24	17	28
75	16	20	89	209	199	196	82	30	19	17	30	23	37
70	19	23	125	251	236	233	100	37	23	23	38	29	48
65	23	28	175	290	277	282	122	44	27	30	48	35	61
60	26	34	223	330	318	333	143	51	35	40	60	41	79
55	30	42	281	369	360	389	172	58	43	54	73	50	99
50	35	53	344	444	413	455	204	66	51	70	86	59	128
45	41	66	420	518	470	522	236	78	60	92	100	70	161
40	54	86	504	607	528	604	289	91	73	115	122	86	207
35	68	109	602	727	602	725	344	105	89	137	145	103	260
30	84	140	751	848	724	846	428	126	111	173	187	126	331
25	99	190	905	1,020	843	1,020	534	147	142	228	235	147	427
20	130	254	1,180	1,230	1,030	1,240	689	195	196	354	292	186	548
15	169	351	1,520	1,490	1,260	1,520	871	256	277	492	351	228	761
10	225	563	2,000	1,960	1,620	2,040	1,290	378	439	684	497	320	1,110
5	435	1,260	3,230	2,910	2,420	3,300	1,970	771	861	1,080	787	482	1,830

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	807	492	294	191	125
0.95	1.05	1,470	988	649	436	305
0.90	1.11	1,980	1,390	951	647	463
0.80	1.25	2,790	2,050	1,450	1,000	729
0.50	2	5,120	3,970	2,940	2,060	1,500
0.20	5	8,790	6,950	5,220	3,670	2,580
0.10	10	11,400	8,980	6,700	4,710	3,210
0.04	25	14,700	11,500	8,440	5,920	3,880
0.02	50	17,200	13,300	9,630	6,740	4,290
0.01	100	19,600	15,000	10,700	7,480	4,640

DES MOINES RIVER BASIN
05481000 BOONE RIVER NEAR WEBSTER CITY, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.05	0.08	0.25	1.2	3.0	3.9	3.7
0.02	50	0.00	0.00	0.16	0.24	0.54	1.9	4.1	5.1	5.4
0.05	20	2.3	2.4	0.75	0.95	1.5	3.5	6.3	7.9	9.2
0.10	10	3.6	3.7	2.3	2.6	3.4	6.0	9.4	12	15
0.20	5	5.7	5.9	6.7	7.0	7.9	11	15	19	26
0.50	2	13	14	22	23	26	30	39	50	75
0.80	1.25	29	30	32	37	51	72	99	133	211
0.90	1.11	43	45	34	41	63	107	164	225	356
0.96	1.04	66	69	34	42	73	157	280	398	619
0.98	1.02	88	92	34	42	77	196	396	580	879
0.99	1.01	113	118	34	42	80	237	543	815	1,200

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	2.3	0.08	0.10	0.29	5.7	7.1	9.0	13
0.02	50	3.0	0.19	0.28	0.63	8.7	11	14	19
0.05	20	4.4	0.93	1.1	1.8	16	20	24	35
0.10	10	6.2	3.0	3.3	4.2	26	32	40	57
0.20	5	9.6	9.4	9.4	10	46	57	70	100
0.50	2	23	38	38	42	119	148	181	260
0.80	1.25	58	69	78	111	267	330	407	588
0.90	1.11	97	78	93	162	385	474	590	856
0.96	1.04	170	82	102	220	546	670	843	1,230
0.98	1.02	246	83	105	256	670	821	1,040	1,520
0.99	1.01	346	83	107	286	795	971	1,240	1,820
		July-August-September				October-November-December			
0.01	100	1.3	1.6	2.0	3.7	1.0	1.3	1.6	2.8
0.02	50	1.8	2.2	2.7	4.8	1.5	1.8	2.3	3.8
0.05	20	3.0	3.6	4.4	7.0	2.7	3.2	4.0	6.0
0.10	10	4.7	5.5	6.6	9.9	4.5	5.3	6.4	9.1
0.20	5	7.9	9.1	11	15	8.2	9.6	11	15
0.50	2	20	23	26	37	25	29	34	42
0.80	1.25	47	54	63	96	69	85	98	121
0.90	1.11	71	82	97	161	115	148	169	216
0.96	1.04	107	128	154	287	195	264	301	406
0.98	1.02	138	169	206	421	272	382	435	614
0.99	1.01	173	216	266	599	364	530	606	897

DES MOINES RIVER BASIN
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 September 1988. Published as "near Boone" 1920-67.

GAGE.--Water-stage recorder. Datum of gage is 894.00 ft above NGVD. Prior to May 1, 1920, nonrecording gage 16.6 mi downstream at datum 23.49 ft lower. Oct. 9, 1924 to Jan. 10, 1933, nonrecording gage 17.6 mi downstream at datum 28.53 ft lower. Jan. 11, 1933 to Sept. 30, 1934, nonrecording gage 17.9 mi downstream at datum 22.25 ft lower. Oct. 1, 1934 to Feb. 6, 1935, nonrecording gage and Feb. 7, 1935 to Sept. 30, 1967, water-stage recorder 17.9 mi downstream at datum 21.84 ft lower.

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; 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. Flood of June 22, 1954, reached a stage of 29.7 ft, from floodmark, present site and datum, discharge, 54,200 ft³/s.

Rating table number 6, developed October 1987

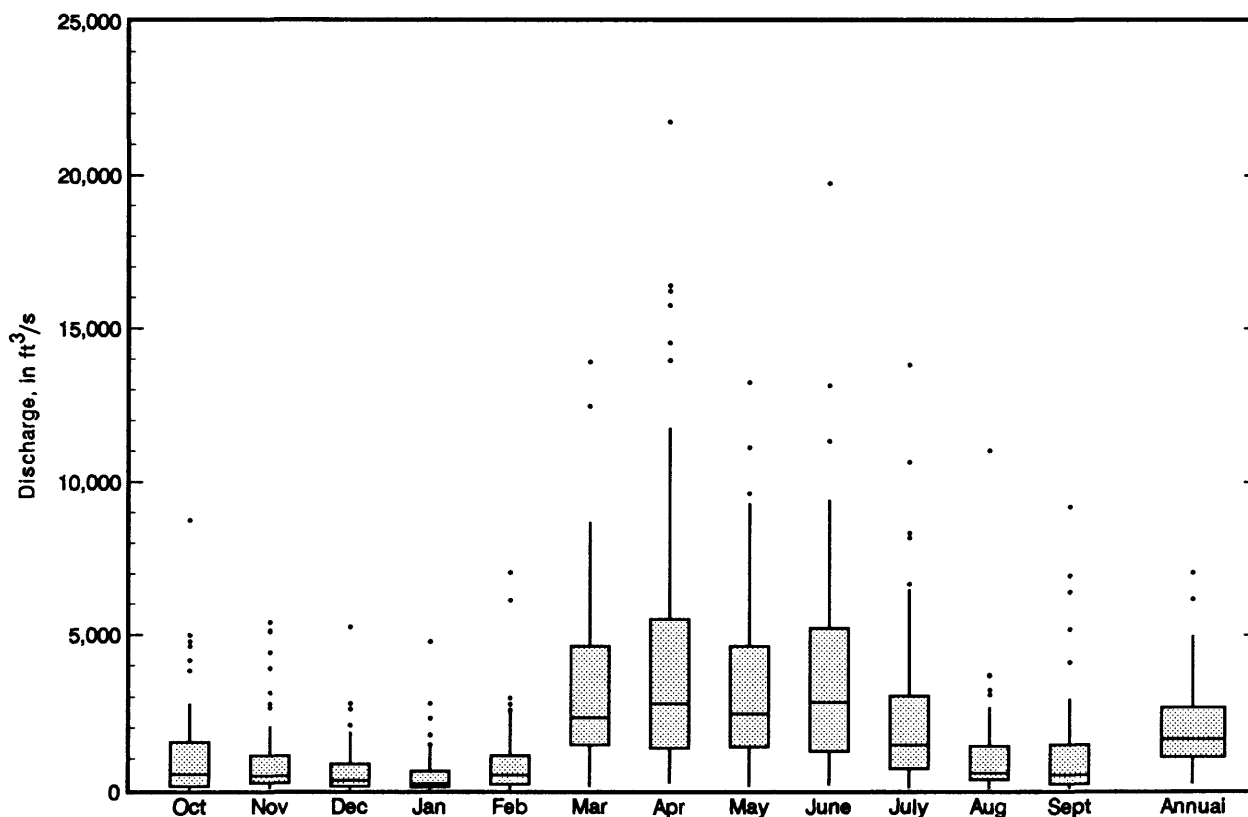
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
4.0	119	10.0	5,710
4.5	300	12.0	8,700
5.0	529	16.0	15,600
5.5	820	22.0	29,800
6.0	1,140	30.0	60,000
8.0	2,900		

DES MOINES RIVER BASIN
05481300 DES MOINES RIVER NEAR STRATFORD, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	8,763	1987	47.2	1957	1,122	1,532	4.7
November	5,400	1942	82.5	1959	1,034	1,291	4.3
December	5,267	1983	44.4	1977	687	852	2.9
January	4,781	1932	18.7	1977	530	756	2.2
February	7,061	1984	42.3	1959	971	1,262	4.1
March	13,920	1983	132	1934	3,332	2,845	13.9
April	21,730	1965	236	1931	4,490	4,531	18.7
May	13,270	1984	131	1934	3,312	2,768	13.8
June	19,730	1984	177	1977	3,682	3,374	15.4
July	13,820	1969	96.1	1926	2,425	2,641	10.1
August	11,030	1979	81.4	1931	1,136	1,524	4.7
September	9,194	1938	67.2	1955	1,231	1,719	5.1
Annual	7,053	1983	213	1956	1,986	1,405	100.0

Boxplots of monthly and annual mean discharges



DES MOINES RIVER BASIN
05481300 DES MOINES RIVER NEAR STRATFORD, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	19	31	93	207	138	107	71	55	53	43	64	41	46
95	45	51	173	351	232	218	147	93	75	76	93	62	87
90	67	75	238	551	389	448	228	135	103	105	127	90	126
85	95	105	324	824	632	600	310	185	129	131	160	114	166
80	109	128	448	1,040	893	790	425	228	165	152	194	135	207
75	121	155	643	1,290	1,120	983	541	267	194	175	229	156	257
70	136	178	899	1,540	1,330	1,220	639	307	224	199	265	183	323
65	156	199	1,190	1,800	1,540	1,520	728	347	255	249	305	213	406
60	179	230	1,500	2,060	1,760	1,780	857	397	300	317	345	252	507
55	203	269	1,790	2,350	2,000	2,030	1,020	448	358	397	401	295	631
50	234	361	2,080	2,650	2,260	2,330	1,250	516	421	488	466	341	779
45	269	439	2,370	2,990	2,560	2,670	1,490	587	498	579	560	410	969
40	323	552	2,680	3,330	2,930	3,090	1,770	706	589	699	674	495	1,190
35	388	671	3,020	3,960	3,310	3,570	2,070	853	721	839	800	592	1,510
30	469	821	3,370	4,720	3,860	4,130	2,450	1,030	910	1,020	940	703	1,880
25	564	1,010	4,040	5,580	4,470	4,780	2,960	1,240	1,220	1,270	1,140	841	2,320
20	701	1,160	4,910	6,700	5,200	5,480	3,640	1,530	1,620	1,630	1,450	1,020	2,910
15	983	1,470	6,240	8,460	6,130	6,620	4,570	1,950	2,180	2,070	1,930	1,320	3,750
10	1,240	2,210	8,500	11,100	7,320	8,170	6,230	2,640	3,110	2,820	2,740	1,800	5,210
5	1,990	3,920	12,900	15,600	10,100	11,500	8,880	3,900	5,380	4,620	4,430	2,440	7,980

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	2,510	1,390	1,090	811	540
0.95	1.05	4,530	2,840	2,300	1,740	1,240
0.90	1.11	6,050	4,030	3,300	2,520	1,840
0.80	1.25	8,420	6,000	4,980	3,830	2,870
0.50	2	14,900	11,900	10,000	7,800	6,000
0.20	5	24,200	21,600	18,200	14,200	10,900
0.10	10	30,400	28,300	23,800	18,600	14,200
0.04	25	37,800	36,900	30,900	24,000	18,100
0.02	50	43,100	43,200	36,000	27,900	20,800
0.01	100	48,100	49,400	40,900	31,600	23,300

DES MOINES RIVER BASIN
05481300 DES MOINES RIVER NEAR STRATFORD, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	15	16	17	20	23	29	35	41	42
0.02	50	18	20	22	25	29	36	44	52	56
0.05	20	26	28	30	34	40	50	61	72	85
0.10	10	35	38	41	46	54	68	83	99	124
0.20	5	51	55	59	66	78	98	123	146	194
0.50	2	104	112	120	132	159	205	266	321	457
0.80	1.25	218	233	249	271	329	445	604	746	1,070
0.90	1.11	324	343	366	398	485	677	945	1,190	1,670
0.96	1.04	496	521	554	601	736	1,070	1,550	1,980	2,690
0.98	1.02	655	684	727	788	966	1,450	2,150	2,770	3,650
0.99	1.01	844	876	928	1,010	1,240	1,910	2,890	3,790	4,810

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	16	18	19	21	44	52	61	92
0.02	50	21	23	25	28	65	78	91	133
0.05	20	30	34	37	41	114	137	159	226
0.10	10	42	48	52	59	184	220	255	352
0.20	5	65	74	80	91	316	376	437	588
0.50	2	150	169	181	214	803	950	1,100	1,440
0.80	1.25	364	395	422	521	1,810	2,100	2,460	3,160
0.90	1.11	586	620	662	841	2,630	3,040	3,560	4,580
0.96	1.04	989	1,010	1,080	1,410	3,800	4,330	5,120	6,600
0.96	1.02	1,400	1,380	1,480	1,990	4,740	5,350	6,350	8,220
0.99	1.01	1,910	1,850	1,970	2,710	5,700	6,390	7,620	9,920
		July-August-September				October-November-December			
0.01	100	21	28	33	43	23	26	30	35
0.02	50	27	35	41	53	28	32	36	44
0.05	20	39	49	56	72	39	44	51	61
0.10	10	54	67	76	97	52	60	69	83
0.20	5	82	96	110	141	75	89	102	124
0.50	2	185	212	237	312	163	203	231	284
0.80	1.25	428	481	544	754	380	501	571	715
0.90	1.11	670	752	863	1,240	611	835	948	1,200
0.96	1.04	1,090	1,230	1,440	2,170	1,040	1,480	1,680	2,160
0.96	1.02	1,500	1,700	2,030	3,160	1,480	2,170	2,460	3,200
0.99	1.01	2,010	2,290	2,780	4,480	2,060	3,110	3,500	4,620

DES MOINES RIVER BASIN
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.

PERIOD OF RECORD.--October 1961 to September 1988.

GAGE.--Water-stage recorder. Datum of gage is 787.42 ft above NGVD (levels by U.S. Army Corps of Engineers). Prior to Aug. 6, 1970, nonrecording gage at same site and datum.

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.

REMARKS.--Flow regulated by Saylorville Lake (Station 05481630) 2.3 mi upstream since Apr. 12, 1977. Data for unregulated period is compiled using data from water years 1903 through 1958. Data for regulated period is compiled using data from water years 1959 through 1988.

Rating table number 19, developed October 1987

Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
3.5	234	10.0	6,200
4.0	543	12.0	8,870
4.5	882	14.0	11,900
5.0	1,250	16.0	15,900
6.0	2,070	18.0	21,400
8.0	4,010		

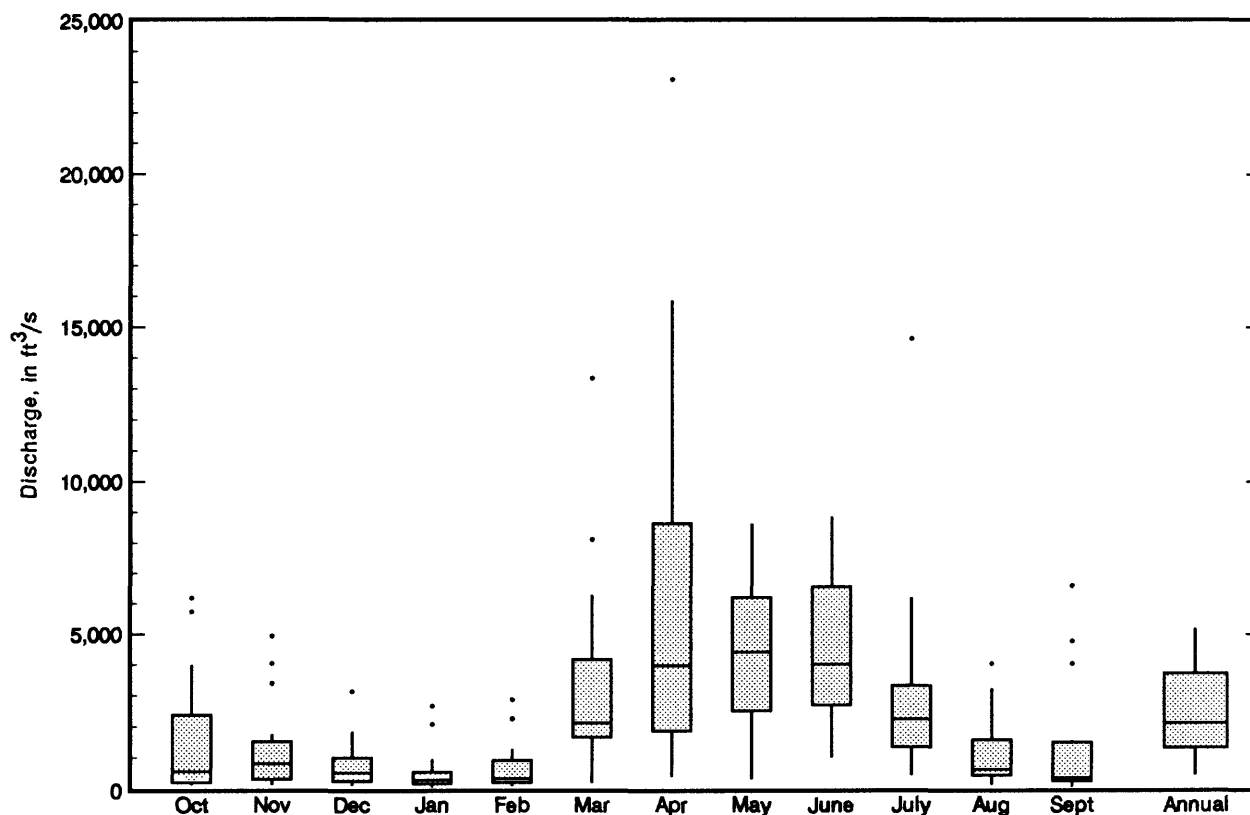
DES MOINES RIVER BASIN
05481650 DES MOINES RIVER NEAR SAYLORVILLE, IA--Continued

Pre-regulation Period

Statistics of monthly and annual mean discharges, pre-regulation period

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	6,196	1974	153	1976	1,783	2,047	5.8
November	4,943	1973	160	1968	1,417	1,506	4.6
December	3,149	1974	127	1968	836	831	2.7
January	2,667	1973	74.8	1968	613	761	2.0
February	2,875	1973	119	1967	808	916	2.6
March	13,370	1973	222	1968	3,488	3,483	11.4
April	23,110	1965	435	1968	6,724	6,721	22.0
May	8,636	1973	353	1968	4,466	2,523	14.6
June	8,858	1967	1,029	1968	4,517	2,507	14.8
July	14,630	1969	466	1976	3,163	3,502	10.4
August	4,058	1972	156	1976	1,215	1,157	4.0
September	6,611	1962	77.9	1976	1,487	2,012	4.9
Annual	5,175	1969	466	1968	2,546	1,502	100.0

Boxplots of monthly and annual mean discharges, pre-regulation period



DES MOINES RIVER BASIN
05481650 DES MOINES RIVER NEAR SAYLORVILLE, IA--Continued

Monthly and annual flow duration, pre-regulation period

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	49	88	116	192	259	252	245	113	58	103	131	92	88
95	88	107	214	450	405	840	405	185	93	140	156	112	142
90	115	137	266	1,020	712	1,260	577	275	167	158	180	131	190
85	133	167	321	1,200	1,390	1,540	701	325	188	179	224	160	241
80	149	193	428	1,400	1,900	1,810	819	370	218	203	294	210	289
75	169	205	526	1,650	2,180	2,070	932	409	247	230	327	258	351
70	208	217	661	1,920	2,440	2,270	1,070	450	270	271	359	308	439
65	251	229	1,070	2,440	2,740	2,510	1,240	495	297	331	532	360	541
60	275	243	1,360	2,840	3,050	2,780	1,450	540	334	425	680	427	664
55	299	264	1,600	3,190	3,400	3,060	1,670	585	375	564	777	487	832
50	324	286	1,860	3,490	3,810	3,450	1,870	633	416	739	864	545	1,090
45	349	344	2,140	4,280	4,290	3,850	2,070	678	468	1,030	944	607	1,380
40	381	436	2,460	5,370	4,730	4,270	2,310	770	546	1,290	1,050	669	1,700
35	422	499	2,840	6,440	5,140	4,720	2,720	888	699	1,590	1,240	748	2,050
30	485	555	3,310	7,450	5,560	5,160	3,340	1,090	840	1,970	1,450	833	2,480
25	584	669	3,870	8,500	6,050	5,640	3,960	1,280	1,140	2,320	1,690	1,050	3,050
20	680	1,060	4,790	11,000	6,550	6,510	4,580	1,530	1,600	2,740	1,970	1,380	3,780
15	1,300	1,480	6,770	13,800	7,240	7,890	5,560	1,960	2,300	3,320	2,660	1,710	4,990
10	1,790	2,070	11,000	17,400	8,400	9,800	6,900	2,840	4,300	4,610	3,490	2,070	6,550
5	2,500	3,830	14,400	22,200	11,000	12,500	11,500	4,500	7,220	7,390	5,360	2,580	10,200

Probability of annual high discharges, pre-regulation period

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	2,710	2,620	2,190	1,800	1,430
0.95	1.05	4,720	4,420	3,690	2,970	2,380
0.90	1.11	6,280	5,770	4,840	3,870	3,100
0.80	1.25	8,750	7,900	6,670	5,310	4,260
0.50	2	16,000	14,000	12,100	9,620	7,680
0.20	5	27,900	24,000	21,400	17,200	13,600
0.10	10	36,800	31,300	28,500	23,200	18,200
0.04	25	48,700	41,100	36,500	31,800	24,600
0.02	50	57,900	48,800	46,500	38,900	29,800
0.01	100	67,500	56,700	55,000	46,600	35,400

DES MOINES RIVER BASIN
05481650 DES MOINES RIVER NEAR SAYLORVILLE, IA--Continued

Probability of annual low discharges, pre-regulation period

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	36	38	43	50	58	72	67	67	66
0.02	50	42	45	50	56	66	81	78	81	83
0.05	20	54	58	63	69	80	98	100	107	119
0.10	10	68	72	78	84	98	118	127	141	166
0.20	5	91	96	102	108	127	153	174	202	251
0.50	2	165	173	182	190	224	277	354	438	577
0.80	1.25	315	326	346	367	432	575	824	1,070	1,400
0.90	1.11	451	462	497	539	635	894	1,360	1,780	2,280
0.96	1.04	672	681	748	837	985	1,500	2,410	3,210	3,900
0.98	1.02	877	882	985	1,130	1,330	2,150	3,590	4,790	5,560
0.99	1.01	1,120	1,120	1,270	1,500	1,770	3,020	5,210	6,970	7,710

Probability of seasonal low discharges, pre-regulation period

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	40	44	50	63	95	112	121	169
0.02	50	46	51	57	71	145	174	187	255
0.05	20	59	65	71	86	257	318	343	451
0.10	10	75	81	88	105	407	512	554	715
0.20	5	103	111	119	139	667	846	926	1,180
0.50	2	207	221	234	272	1,430	1,790	2,040	2,610
0.80	1.25	474	500	531	646	2,450	2,970	3,550	4,740
0.90	1.11	772	810	868	1,100	3,010	3,560	4,370	6,030
0.96	1.04	1,350	1,410	1,540	2,080	3,570	4,090	5,190	7,430
0.98	1.02	1,990	2,080	2,290	3,260	3,890	4,370	5,650	8,300
0.99	1.01	2,860	2,980	3,330	5,000	4,140	4,570	6,020	9,040
		July-August-September				October-November-December			
0.01	100	45	45	47	59	39	46	46	51
0.02	50	57	59	61	75	47	56	58	65
0.05	20	82	86	90	108	62	75	82	92
0.10	10	110	118	124	148	81	99	112	128
0.20	5	156	170	180	214	115	143	167	193
0.50	2	283	316	342	423	243	310	371	437
0.80	1.25	476	540	596	804	573	741	869	1,040
0.90	1.11	606	691	771	1,110	939	1,220	1,380	1,670
0.96	1.04	769	879	991	1,540	1,650	2,130	2,310	2,820
0.98	1.02	886	1,010	1,150	1,890	2,410	3,120	3,240	3,980
0.99	1.01	1,000	1,140	1,310	2,270	3,450	4,450	4,430	5,460

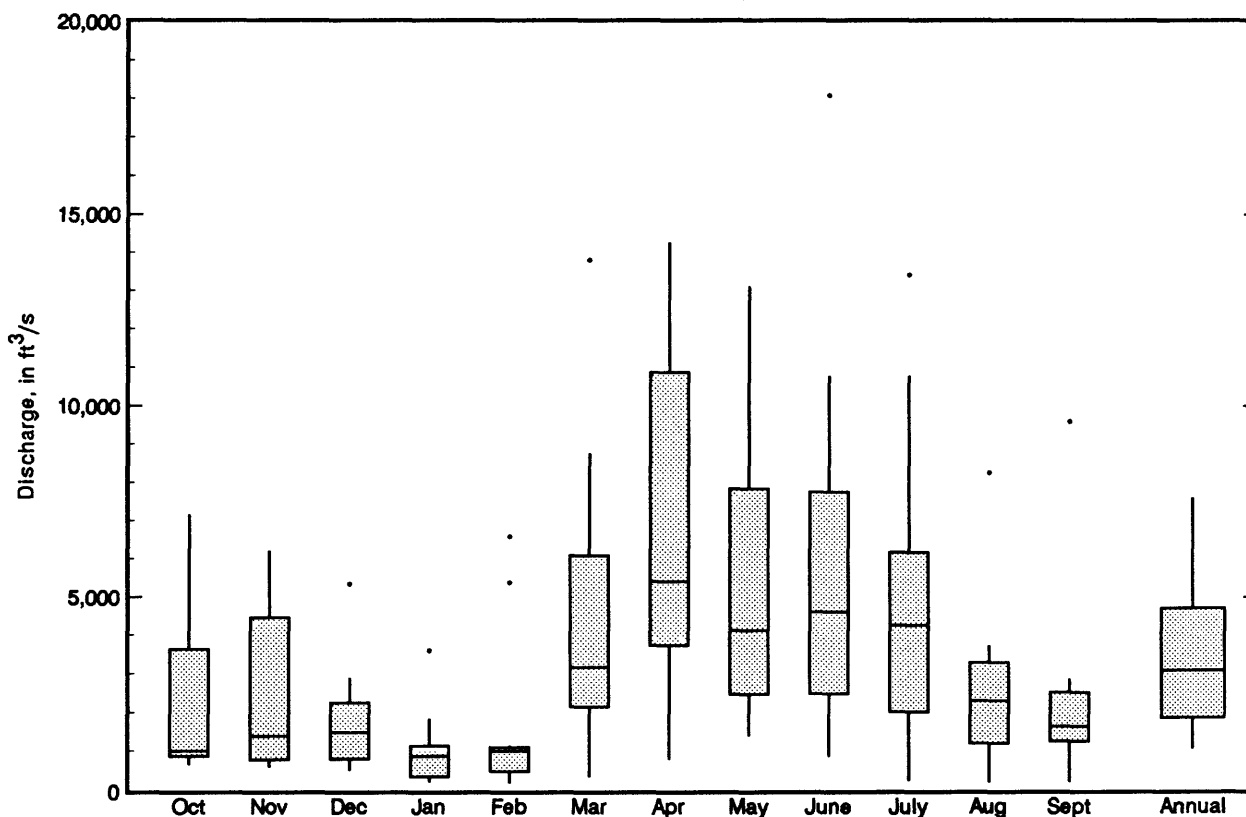
DES MOINES RIVER BASIN
05481650 DES MOINES RIVER NEAR SAYLORVILLE, IA--Continued

Post-regulation Period

Statistics of monthly and annual mean discharges, post-regulation period

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	7,161	1987	669	1988	2,428	2,206	5.7
November	6,210	1987	607	1979	2,567	2,215	6.0
December	5,345	1983	520	1981	1,834	1,393	4.3
January	3,605	1983	229	1981	1,045	985	2.4
February	6,591	1984	209	1978	1,686	2,170	3.9
March	13,800	1983	362	1981	4,575	3,899	10.7
April	14,260	1979	810	1981	6,840	4,521	16.0
May	13,110	1983	1,414	1981	5,838	4,277	13.6
June	18,080	1984	877	1988	6,059	4,982	14.1
July	13,420	1984	254	1988	5,006	4,112	11.7
August	8,258	1979	223	1988	2,596	2,234	6.1
September	9,598	1979	225	1988	2,376	2,542	5.5
Annual	7,593	1983	1,069	1988	3,576	2,157	100.0

Boxplots of monthly and annual mean discharges, post-regulation period



DES MOINES RIVER BASIN
05481650 DES MOINES RIVER NEAR SAYLORVILLE, IA--Continued

Monthly and annual flow duration, post-regulation period

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	177	164	151	492	695	398	212	204	204	294	338	247	181
95	203	182	183	854	1,070	710	259	219	230	380	499	380	233
90	229	197	390	1,650	1,470	1,000	400	244	286	561	562	460	338
85	250	208	635	2,160	1,680	1,330	637	295	388	641	620	575	540
80	272	217	1,040	2,580	1,940	1,670	788	554	527	688	676	650	669
75	308	227	1,380	2,890	2,100	1,990	1,170	745	586	750	746	738	800
70	364	261	1,740	3,230	2,330	2,310	1,900	914	666	827	830	834	947
65	467	313	2,040	3,670	2,670	2,640	2,130	1,070	791	905	910	972	1,130
60	551	369	2,410	4,200	2,930	3,330	2,570	1,250	933	988	996	1,100	1,360
55	639	632	2,800	4,900	3,400	4,070	3,500	1,440	1,180	1,120	1,250	1,230	1,650
50	745	755	3,170	5,650	3,940	4,810	3,880	1,830	1,450	1,260	1,460	1,410	1,960
45	818	830	3,470	6,230	4,820	5,750	4,270	1,890	1,660	1,390	1,850	1,530	2,320
40	910	985	4,000	6,850	6,070	6,150	4,900	2,170	1,830	1,750	2,290	1,690	2,740
35	1,010	1,050	4,500	8,150	7,030	6,580	5,820	2,430	2,080	2,370	2,880	1,890	3,310
30	1,120	1,130	5,060	9,510	8,170	7,580	6,500	2,820	2,330	3,110	3,410	2,180	4,050
25	1,260	1,200	6,450	11,200	9,300	8,730	7,280	3,400	2,570	3,700	4,300	2,470	4,880
20	1,550	1,370	7,690	12,100	11,100	9,800	8,250	4,310	2,950	4,300	5,070	2,800	6,080
15	1,800	1,830	10,300	13,100	11,800	11,000	10,100	4,790	4,550	5,070	5,760	3,200	7,360
10	2,200	3,000	13,300	14,400	12,600	12,000	11,700	6,700	6,300	5,670	6,280	3,790	9,880
5	2,770	11,000	14,400	16,200	14,400	13,000	12,700	7,900	9,100	6,700	7,040	4,670	12,600

Probability of annual high discharges, post-regulation period

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge ¹ (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	2,600	3,340	2,890	2,640	2,110
0.95	1.05	4,000	5,090	4,490	3,880	3,140
0.90	1.11	6,500	6,290	5,610	4,750	3,880
0.80	1.25	8,200	8,020	7,250	6,080	5,020
0.50	2	12,000	12,300	11,400	9,680	8,190
0.20	5	16,000	18,000	17,100	15,400	13,400
0.10	10	16,000	21,600	20,800	19,500	17,300
0.04	25	21,500	25,900	25,300	25,100	22,700
0.02	50	26,700	28,900	28,400	29,600	27,100
0.01	100	32,000	31,800	31,500	34,300	31,700

¹ Data supplied by U.S. Army Corps of Engineers, Rock Island District.

DES MOINES RIVER BASIN
05481650 DES MOINES RIVER NEAR SAYLORVILLE, IA--Continued

Probability of annual low discharges, post-regulation period

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	138	141	125	107	98	116	168	192	299
0.02	50	143	146	133	120	115	142	208	239	357
0.05	20	151	156	149	144	148	193	285	330	466
0.10	10	162	168	168	172	187	253	375	438	594
0.20	5	180	187	199	217	251	354	521	613	799
0.50	2	241	253	298	360	463	679	960	1,150	1,430
0.80	1.25	369	386	504	650	905	1,320	1,730	2,100	2,620
0.90	1.11	487	510	697	915	1,310	1,890	2,340	2,860	3,620
0.96	1.04	687	718	1,020	1,350	1,990	2,760	3,200	3,940	5,150
0.98	1.02	881	918	1,350	1,770	2,640	3,550	3,900	4,830	6,480
0.99	1.01	1,120	1,160	1,750	2,280	3,410	4,450	4,660	5,780	7,990

Probability of seasonal low discharges, post-regulation period

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	76	75	77	78	116	201	252	371
0.02	50	90	91	93	97	168	264	328	467
0.05	20	118	120	124	134	284	398	487	661
0.10	10	150	154	161	180	436	572	693	908
0.20	5	203	210	221	256	707	883	1,060	1,340
0.50	2	367	383	412	502	1,590	2,010	2,430	2,930
0.80	1.25	680	711	783	985	3,080	4,510	5,610	6,600
0.90	1.11	948	988	1,110	1,400	4,140	6,840	8,700	10,200
0.96	1.04	1,360	1,410	1,610	2,040	5,450	10,600	13,900	16,600
0.98	1.02	1,730	1,780	2,050	2,590	6,390	14,100	18,900	22,700
0.99	1.01	2,150	2,200	2,560	3,220	7,280	18,100	24,900	30,300
		July-August-September				October-November-December			
0.01	100	167	186	147	149	95	159	205	278
0.02	50	168	191	163	177	112	177	231	317
0.05	20	170	203	196	233	144	212	281	391
0.10	10	176	220	237	301	181	255	342	479
0.20	5	190	254	309	418	242	331	445	626
0.50	2	268	402	569	830	435	603	805	1,120
0.80	1.25	559	855	1,230	1,780	819	1,290	1,650	2,210
0.90	1.11	995	1,450	1,960	2,730	1,160	2,040	2,530	3,270
0.96	1.04	2,160	2,850	3,400	4,420	1,700	3,510	4,160	5,130
0.98	1.02	3,900	4,690	4,990	6,110	2,200	5,140	5,880	6,990
0.99	1.01	7,080	7,670	7,210	8,260	2,790	7,390	8,140	9,330

DES MOINES RIVER BASIN
05481950 BEAVER CREEK NEAR GRIMES, IA

LOCATION.—Lat 41°41'18", long 93°44'08", in SW1/4 SW1/4 sec.35, T.80 N., R.25 W., Polk County, Hydrologic Unit 07100004, on right bank 6 ft upstream from bridge on Northwest 70th Avenue, 0.5 mi downstream from Little Beaver Creek, 2.5 mi east of Grimes and 6 mi upstream from mouth.

DRAINAGE AREA.—358 mi².

PERIOD OF RECORD.—April 1960 to September 1988.

GAGE.—Water-stage recorder and concrete and steel sheeting broad-crested control. Datum of gage is 806.98 ft above NGVD. Prior to Aug. 31, 1966, nonrecording gage at same site and datum.

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, 1971 and many days in 1977.

Rating table number 13, developed October 1987

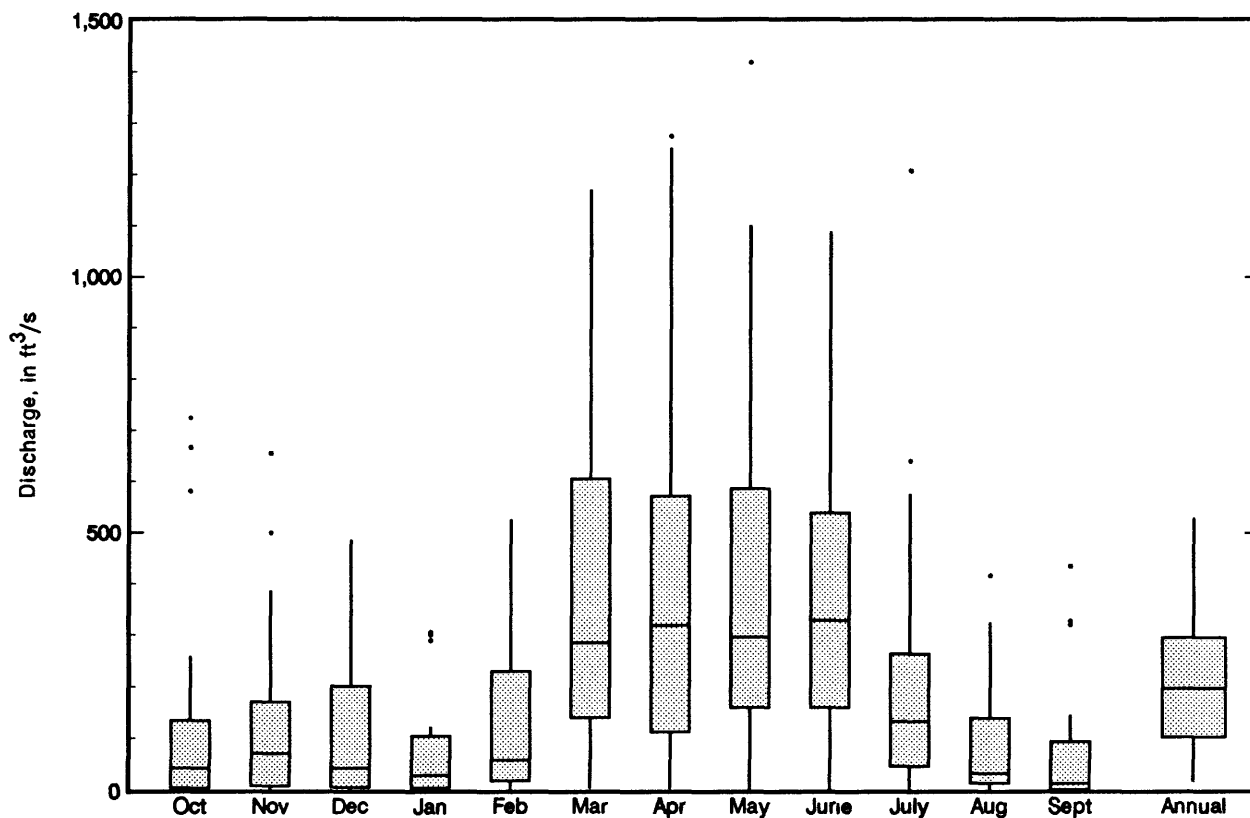
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
3.5	21	7.0	721
4.0	65	9.0	1,460
4.5	131	11.0	2,400
5.0	216	13.0	4,670
5.5	319	15.0	8,200
6.0	438		

DES MOINES RIVER BASIN
05481950 BEAVER CREEK NEAR GRIMES, IA—Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	724	1974	0.35	1967	122	200	4.8
November	655	1973	0.63	1967	129	164	5.0
December	486	1983	0.77	1977	104	127	4.1
January	305	1974	0.000	1977	66.8	91.5	2.6
February	526	1973	0.35	1977	138	163	5.4
March	1,171	1979	3.98	1981	395	350	15.4
April	1,275	1965	3.26	1981	390	375	15.2
May	1,419	1974	1.11	1981	429	386	16.8
June	1,088	1967	1.41	1977	405	316	15.8
July	1,208	1986	0.24	1977	217	259	8.5
August	417	1987	0.73	1988	94.0	114	3.7
September	436	1978	0.26	1988	71.4	111	2.8
Annual	528	1973	17.3	1981	212	140	100.0

Boxplots of monthly and annual mean discharges



DES MOINES RIVER BASIN
05481950 BEAVER CREEK NEAR GRIMES, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.00	0.01	2.1	2.4	0.38	0.11	0.00	0.01	0.04	0.01	0.47	0.41	0.03
95	0.46	0.57	5.6	5.8	2.8	2.0	0.68	0.34	0.14	0.22	0.91	0.70	0.57
90	0.79	1.1	11	14	15	24	6.2	1.0	0.34	0.51	2.7	1.3	1.7
85	1.2	1.9	19	40	42	53	13	2.9	0.56	1.4	4.0	2.3	3.9
80	2.1	6.5	53	64	62	72	21	4.8	0.91	2.7	5.8	3.3	7.2
75	3.1	13	72	84	81	102	31	6.7	1.9	4.7	8.2	6.6	12
70	4.9	17	94	102	114	127	41	8.8	4.1	7.0	12	11	18
65	10	20	120	123	153	151	52	12	5.7	11	16	16	27
60	15	24	148	148	186	176	63	15	7.6	14	33	23	40
55	20	30	177	176	214	207	75	20	10	18	50	34	55
50	25	37	205	224	243	236	91	25	15	23	64	46	72
45	32	46	233	271	279	277	108	31	20	36	78	59	93
40	41	59	278	317	318	325	137	39	27	54	96	72	119
35	53	75	343	363	357	374	169	47	34	70	117	92	152
30	76	96	418	426	411	442	209	62	42	93	142	116	193
25	92	127	501	500	488	514	250	81	54	124	168	146	241
20	108	181	597	577	565	604	308	110	86	161	212	182	314
15	140	262	768	726	773	768	367	155	133	246	270	233	405
10	176	431	1,030	920	1,120	1,010	510	221	206	366	377	300	552
5	285	675	1,550	1,400	1,700	1,440	824	399	332	552	570	378	899

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	482	275	192	158	106
0.95	1.05	851	533	387	300	207
0.90	1.11	1,130	739	544	411	287
0.80	1.25	1,560	1,070	798	585	414
0.50	2	2,750	2,030	1,520	1,070	763
0.20	5	4,540	3,500	2,600	1,760	1,260
0.10	10	5,740	4,510	3,310	2,210	1,580
0.04	25	7,250	5,750	4,160	2,740	1,950
0.02	50	8,340	6,650	4,750	3,110	2,210
0.01	100	9,400	7,510	5,300	3,450	2,440

DES MOINES RIVER BASIN
05481950 BEAVER CREEK NEAR GRIMES, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.03	0.09	0.16	0.22
0.02	50	0.00	0.00	0.00	0.00	0.00	0.06	0.16	0.32	0.43
0.05	20	0.00	0.00	0.00	0.00	0.03	0.16	0.43	0.81	1.1
0.10	10	0.00	0.00	0.00	0.00	0.18	0.40	0.97	1.8	2.6
0.20	5	0.03	0.06	0.19	0.26	0.65	1.1	2.5	4.5	6.5
0.50	2	1.3	1.6	2.1	2.9	4.7	7.6	14	22	33
0.80	1.25	9.4	10	12	17	27	44	67	94	133
0.90	1.11	23	24	28	39	62	103	145	185	257
0.96	1.04	50	53	62	87	146	245	318	362	490
0.98	1.02	81	86	103	143	249	420	516	545	722
0.99	1.01	122	132	160	224	400	672	786	772	1,000

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.01	0.06	0.08	0.15	0.07	0.01	0.04	0.36
0.02	50	0.02	0.13	0.16	0.28	0.21	0.04	0.15	0.97
0.05	20	0.10	0.35	0.43	0.71	1.0	0.38	0.92	3.6
0.10	10	0.36	0.82	0.98	1.6	3.4	2.1	3.7	10
0.20	5	1.4	2.2	2.6	3.9	12	11	15	30
0.50	2	12	12	14	20	69	91	103	141
0.80	1.25	60	59	65	85	204	251	284	377
0.90	1.11	115	125	135	171	286	314	372	521
0.96	1.04	198	265	284	345	362	350	435	660
0.98	1.02	264	420	448	528	399	361	458	731
0.99	1.01	329	623	663	762	424	366	471	782
		July-August-September				October-November-December			
0.01	100	0.00	0.01	0.01	0.03	0.02	0.03	0.04	0.07
0.02	50	0.01	0.02	0.03	0.07	0.05	0.06	0.08	0.15
0.05	20	0.04	0.05	0.10	0.21	0.16	0.18	0.25	0.43
0.10	10	0.11	0.15	0.25	0.52	0.41	0.46	0.67	1.1
0.20	5	0.37	0.45	0.75	1.5	1.2	1.4	2.0	3.1
0.50	2	2.7	3.2	4.9	8.9	8.3	9.2	13	19
0.80	1.25	14	17	24	43	45	50	68	99
0.90	1.11	28	37	50	88	99	111	145	212
0.96	1.04	56	77	102	180	216	247	303	454
0.98	1.02	83	119	155	276	346	400	469	717
0.99	1.01	114	171	220	396	518	605	678	1,060

DES MOINES RIVER BASIN
05482000 DES MOINES RIVER AT DES MOINES, IA

LOCATION.-- Lat 41°36'45" long 93°37'15", in NE1/4 NE1/4 sec. 34, T.79 N., R.24 W., Polk County, Hydrologic Unit 07100004, on right bank 5 ft upstream from Second Avenue bridge in Des Moines, 1.8 mi upstream from Center Street Dam, 2.8 mi upstream from Raccoon River and 4.5 mi downstream from Beaver Creek.

DRAINAGE AREA.--6,245 mi².

PERIOD OF RECORD.--October 1902 to August 1903, October 1914 to February 1915 (gage heights and discharges measurements only); May 1905 to July 1906, March 1915 to September 1961 (discontinued).

GAGE.--Water-stage recorder and concrete multiple-arch control dam. Datum of gage is 773.68 ft NGVD and at city datum. Prior to Aug. 21, 1941, staff, chain, or recording gages at several sites within 3 mi of present site at various datums.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 60,200 ft³/s June 24, 1954, gage height, 30.16 ft; minimum unregulated discharge, 24 ft³/s Jan. 29, 30, 1940; operation of sluice gates in control dam at times has caused brief periods of no flow.

Rating table number 4, developed July 1961
 (A discharge measurement to validate this rating
 has not been made since October 1961.)

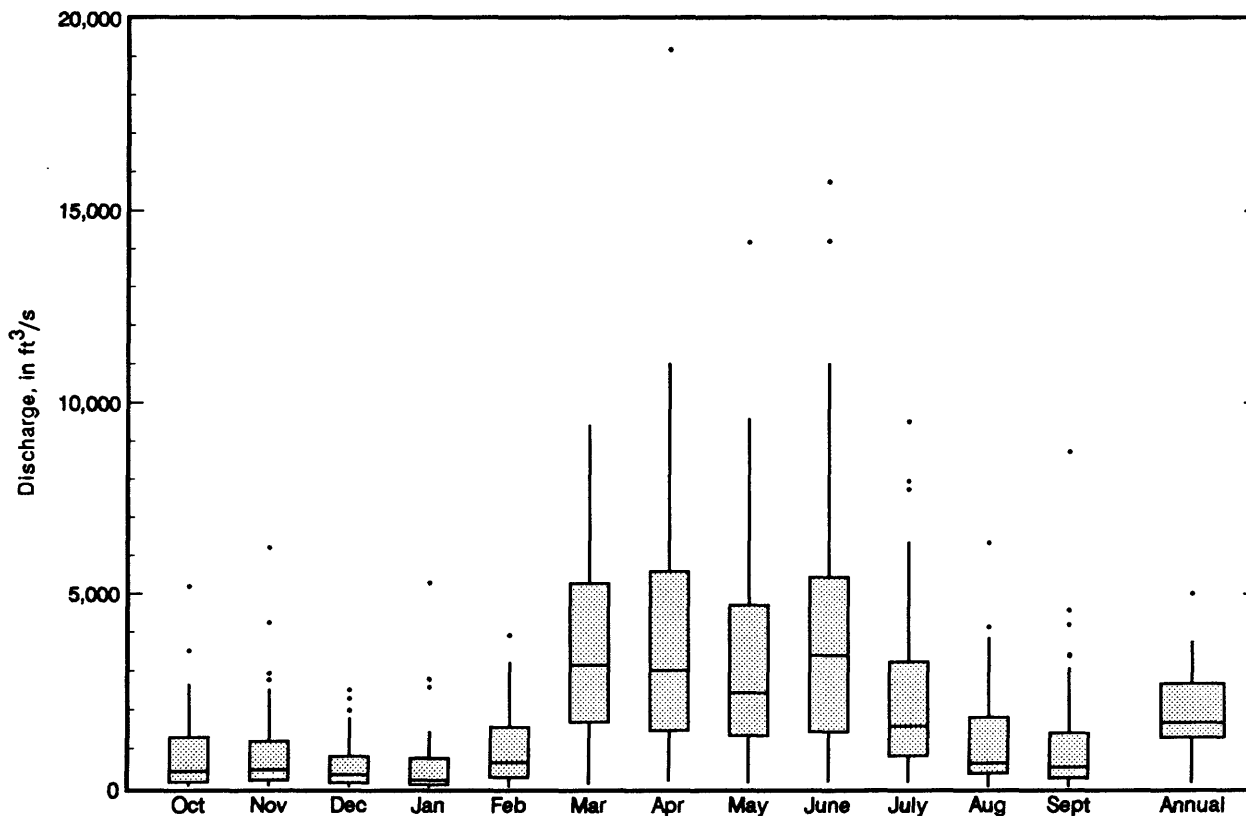
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
9.5	112	14.0	2,850
10.0	209	15.0	4,850
11.0	379	16.0	6,890
12.0	530	18.0	11,600
13.0	1,160		

DES MOINES RIVER BASIN
05482000 DES MOINES RIVER AT DES MOINES, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	5,196	1916	67.3	1957	908	1,066	3.7
November	6,215	1942	78.7	1956	945	1,193	3.9
December	2,511	1942	57.6	1956	589	618	2.4
January	5,286	1932	34.9	1940	593	926	2.4
February	3,917	1916	55.1	1940	1,080	996	4.4
March	9,424	1932	123	1931	3,731	2,566	15.3
April	19,190	1951	213	1931	4,112	3,592	16.9
May	14,170	1944	165	1931	3,307	2,714	13.6
June	15,750	1947	198	1931	4,304	3,710	17.7
July	9,527	1951	175	1926	2,324	2,210	9.6
August	6,342	1915	65.4	1931	1,257	1,358	5.2
September	8,719	1938	52.6	1930	1,182	1,598	4.9
Annual	5,012	1951	158	1931	1,984	1,111	100.0

Boxplots of monthly and annual mean discharges



DES MOINES RIVER BASIN
05482000 DES MOINES RIVER AT DES MOINES, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	31	40	106	174	134	101	82	54	49	62	71	53	53
95	54	64	176	421	268	257	160	89	75	93	98	76	90
90	66	87	325	666	446	518	266	156	111	121	128	94	132
85	84	112	539	889	678	693	357	212	160	142	151	119	173
80	103	137	781	1,120	930	887	476	262	202	165	185	140	222
75	118	169	979	1,400	1,150	1,110	616	309	242	190	224	160	280
70	133	206	1,290	1,700	1,360	1,360	765	357	271	216	264	179	353
65	149	247	1,580	1,940	1,550	1,650	890	407	298	242	304	202	443
60	170	309	1,980	2,200	1,850	1,990	1,010	462	335	280	350	231	548
55	193	403	2,280	2,480	2,130	2,340	1,160	521	381	335	400	275	671
50	227	514	2,580	2,810	2,360	2,710	1,300	584	458	409	466	340	829
45	267	610	2,880	3,160	2,630	3,120	1,550	663	548	491	527	400	1,030
40	321	743	3,190	3,550	2,980	3,570	1,830	765	652	582	586	453	1,270
35	390	944	3,660	3,980	3,320	4,040	2,150	923	795	697	680	515	1,580
30	490	1,140	4,200	4,550	3,740	4,780	2,510	1,140	972	870	833	601	1,980
25	620	1,350	4,900	5,210	4,240	5,590	2,980	1,430	1,230	1,140	1,040	721	2,450
20	751	1,640	5,870	5,990	4,850	6,420	3,520	1,920	1,590	1,460	1,350	890	3,040
15	944	2,050	7,160	7,170	5,730	7,820	4,230	2,520	2,180	1,860	1,700	1,170	3,810
10	1,250	2,820	9,320	9,320	6,970	9,740	5,290	3,350	3,030	2,470	2,320	1,510	5,070
5	2,190	3,960	12,600	12,500	9,360	13,600	7,730	4,780	4,450	3,730	3,540	2,190	7,610

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	—	1,290	1,110	799	502
0.95	1.05	4,500	2,900	2,540	1,940	1,360
0.90	1.11	5,950	4,280	3,770	2,920	2,130
0.80	1.25	8,230	6,560	5,790	4,560	3,430
0.50	2	14,600	13,200	11,500	9,100	6,980
0.20	5	24,600	22,800	19,500	15,100	11,200
0.10	10	31,600	28,800	24,200	18,300	13,300
0.04	25	40,600	35,600	29,400	21,600	15,100
0.02	50	47,300	40,000	32,600	23,500	16,000
0.01	100	54,000	44,000	35,300	25,100	16,700

DES MOINES RIVER BASIN
05482000 DES MOINES RIVER AT DES MOINES, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	22	23	25	27	30	37	44	48	51
0.02	50	25	27	29	32	36	44	53	59	67
0.05	20	32	34	36	40	46	58	71	81	98
0.10	10	40	42	45	50	59	75	93	109	138
0.20	5	54	57	61	68	80	103	132	157	210
0.50	2	102	106	115	128	154	203	266	326	468
0.80	1.25	212	221	238	263	320	435	568	708	1,040
0.90	1.11	323	338	363	396	487	669	866	1,080	1,590
0.96	1.04	521	547	587	633	780	1,090	1,380	1,730	2,500
0.98	1.02	722	762	815	869	1,070	1,510	1,890	2,350	3,340
0.99	1.01	979	1,040	1,110	1,170	1,440	2,040	2,520	3,130	4,340

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	21	23	25	28	47	58	66	101
0.02	50	25	28	31	34	73	88	100	148
0.05	20	35	39	42	47	133	157	179	254
0.10	10	46	52	57	63	217	253	289	399
0.20	5	67	76	82	93	375	431	493	663
0.50	2	144	164	178	214	922	1,040	1,200	1,570
0.80	1.25	330	377	418	548	1,890	2,120	2,470	3,260
0.90	1.11	524	598	674	938	2,570	2,890	3,400	4,520
0.96	1.04	876	998	1,150	1,720	3,410	3,850	4,570	6,190
0.98	1.02	1,240	1,400	1,640	2,600	3,990	4,540	5,400	7,440
0.99	1.01	1,700	1,930	2,290	3,620	4,540	5,180	6,200	8,670
		July-August-September				October-November-December			
0.01	100	31	33	35	42	28	40	45	48
0.02	50	38	40	43	52	33	46	51	57
0.05	20	51	55	61	75	43	58	64	74
0.10	10	68	75	84	104	56	72	80	95
0.20	5	98	110	125	159	77	98	108	131
0.50	2	214	246	282	370	150	183	204	264
0.80	1.25	520	596	687	922	314	383	436	592
0.90	1.11	863	980	1,130	1,530	474	589	679	942
0.96	1.04	1,530	1,710	1,960	2,670	752	965	1,130	1,600
0.98	1.02	2,270	2,490	2,830	3,870	1,030	1,350	1,600	2,300
0.99	1.01	3,260	3,530	3,980	5,450	1,370	1,850	2,230	3,220

DES MOINES RIVER BASIN
05482170 BIG CEDAR CREEK NEAR VARINA, IA

LOCATION.--Lat 42°41'16", long 94°47'52", in NE1/4 NE1/4 sec.24, T.91 N., R.34 W., Pocahontas County, Hydrologic Unit 07100006, on left bank 2 ft downstream from bridge on county highway N33, 2.0 mi downstream from Drainage ditch 21, 3.5 mi upstream from Drainage ditch 74 and 5.5 mi northeast of Varina.

DRAINAGE AREA.--80.0 mi².

PERIOD OF RECORD.--October 1959 to September 1988.

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

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.

Rating table number 9, developed October 1987

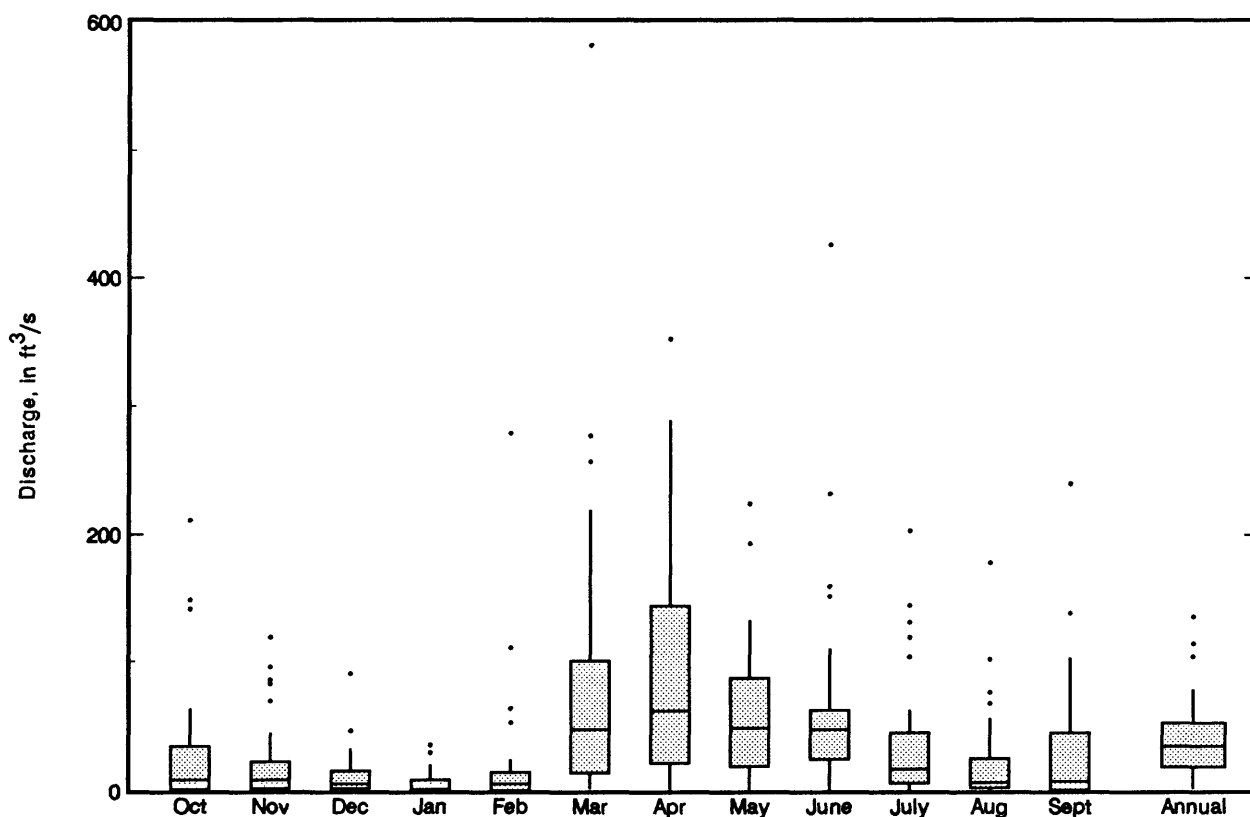
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
2.5	15	5.0	230
2.7	26	6.0	348
3.0	44	8.0	615
3.5	81	10.0	1,040
4.0	125	14.0	2,140

DES MOINES RIVER BASIN
05482170 BIG CEDAR CREEK NEAR VARINA, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	211	1983	0.40	1977	32.1	51.0	6.3
November	119	1974	0.12	1977	24.1	33.2	4.7
December	90.7	1983	0.000	1977	12.5	18.5	2.4
January	35.5	1983	0.000	1967	6.18	8.94	1.2
February	279	1984	0.000	1967	22.5	54.8	4.4
March	582	1979	1.82	1975	88.6	123	17.3
April	352	1975	1.08	1967	96.3	98.0	18.8
May	224	1986	0.65	1977	62.6	55.0	12.2
June	426	1984	0.37	1977	70.4	85.5	13.7
July	203	1962	0.29	1977	39.7	51.3	7.8
August	178	1979	0.44	1976	23.4	39.3	4.6
September	240	1962	0.45	1976	33.7	53.8	6.6
Annual	135	1983	1.89	1968	42.7	33.8	100.0

Boxplots of monthly and annual mean discharges



DES MOINES RIVER BASIN
05482170 BIG CEDAR CREEK NEAR VARINA, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.00	0.00	0.00	0.38	0.34	0.21	0.18	0.09	0.30	0.22	0.06	0.00	0.00
95	0.00	0.00	0.40	1.2	0.93	0.98	1.2	0.38	0.43	0.40	0.31	0.01	0.03
90	0.00	0.00	1.5	5.0	5.4	8.6	2.5	0.73	0.55	0.49	0.50	0.02	0.46
85	0.01	0.01	2.7	7.8	10	13	3.5	1.2	0.69	0.57	0.80	0.36	0.82
80	0.01	0.01	4.0	12	14	15	4.4	1.6	0.84	0.80	1.3	0.76	1.5
75	0.10	0.12	5.1	15	17	17	5.3	1.9	1.3	1.3	2.0	1.3	2.3
70	0.36	0.58	6.8	21	20	20	6.4	2.3	1.7	1.8	2.8	2.0	3.4
65	0.67	1.0	9.3	27	23	22	7.5	2.7	2.1	2.3	4.0	2.6	4.6
60	0.95	1.5	13	33	27	25	9.1	3.2	2.7	3.2	5.0	3.4	6.2
55	1.2	2.3	16	40	32	28	11	3.7	3.4	4.8	6.5	4.2	8.3
50	1.8	3.6	22	47	36	31	13	4.3	4.2	9.1	8.9	5.0	11
45	3.0	4.6	28	56	41	34	15	4.9	5.1	15	13	6.4	14
40	4.0	5.8	35	65	47	40	19	5.9	7.2	19	15	7.9	18
35	5.5	7.1	43	78	55	46	22	7.3	11	23	18	10	22
30	7.2	8.6	53	92	65	54	28	9.5	14	28	21	13	29
25	9.0	10	68	111	78	65	35	12	20	32	26	15	37
20	11	13	95	136	95	81	44	16	31	42	37	17	48
15	14	17	140	189	117	104	61	23	49	59	50	22	67
10	18	25	217	272	144	153	100	40	80	88	66	34	101
5	24	77	405	407	209	325	185	90	188	140	103	49	193

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	—	15	10	7.3	4.6
0.95	1.05	129	49	34	23	15
0.90	1.11	190	85	60	40	27
0.80	1.25	295	156	111	73	50
0.50	2	631	411	300	199	137
0.20	5	1,210	868	651	446	296
0.10	10	1,640	1,180	899	631	406
0.04	25	2,200	1,560	1,200	869	538
0.02	50	2,620	1,810	1,410	1,040	626
0.01	100	3,030	2,040	1,590	1,200	706

DES MOINES RIVER BASIN
05482170 BIG CEDAR CREEK NEAR VARINA, IA—Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.05
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.10
0.05	20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.24
0.10	10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.52
0.20	5	0.00	0.00	0.00	0.00	0.00	0.10	0.49	0.61	1.2
0.50	2	0.54	0.60	0.68	0.60	0.94	1.3	2.7	3.7	5.9
0.80	1.25	2.6	2.8	3.1	3.6	5.1	7.2	10	16	24
0.90	1.11	4.5	4.9	5.3	6.0	8.9	16	21	30	46
0.96	1.04	7.5	7.8	8.2	9.1	14	32	40	54	90
0.98	1.02	9.9	10	10	11	17	50	62	76	136
0.99	1.01	13	13	13	14	19	73	92	99	193

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.05	0.06	0.06	0.00	0.06	0.09	0.15	0.19
0.02	50	0.10	0.10	0.11	0.01	0.15	0.21	0.32	0.42
0.05	20	0.22	0.23	0.24	0.05	0.47	0.65	0.91	1.3
0.10	10	0.43	0.46	0.48	0.13	1.2	1.5	2.1	3.0
0.20	5	0.90	0.95	1.0	0.39	3.0	3.8	4.9	7.2
0.50	2	3.0	3.2	3.4	2.4	12	14	17	26
0.80	1.25	7.7	8.2	8.9	9.9	27	33	39	57
0.90	1.11	12	12	13	18	34	43	51	74
0.96	1.04	17	18	19	29	41	53	62	89
0.98	1.02	20	22	24	39	44	58	68	96
0.99	1.01	24	26	28	48	46	62	72	101
		July-August-September				October-November-December			
0.01	100	0.03	0.05	0.08	0.13	0.02	0.07	0.11	0.01
0.02	50	0.05	0.08	0.12	0.18	0.05	0.11	0.17	0.03
0.05	20	0.11	0.15	0.21	0.30	0.11	0.23	0.33	0.11
0.10	10	0.19	0.26	0.34	0.47	0.24	0.42	0.58	0.31
0.20	5	0.37	0.50	0.60	0.84	0.57	0.86	1.1	0.97
0.50	2	1.2	1.6	1.8	2.6	2.6	3.2	3.7	5.4
0.80	1.25	3.5	4.4	5.2	8.8	9.4	11	12	18
0.90	1.11	5.8	7.2	9.1	17	17	19	21	27
0.96	1.04	9.7	12	16	35	31	35	38	38
0.98	1.02	13	16	24	56	45	50	55	45
0.99	1.01	17	21	33	87	60	70	77	51

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.24, T.87 N., R.36 W., Sac County, Hydrologic Unit 07100006, on right bank 5 ft downstream from bridge on county highway, 1.2 mi upstream from Indian Creek, 0.1 mi upstream from Drainage ditch 73, 4.6 mi south of Sac City and at mile 366.9 upstream from mouth of Des Moines River.

DRAINAGE AREA.--700 mi².

PERIOD OF RECORD.--June 1958 to September 1988.

GAGE.--Water-stage recorder. Datum of gage is 1,132.33 ft above NGVD (levels by Iowa Natural Resources Council).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 13,100 ft³/s Mar. 23, 1979, gage height, 18.02 ft; maximum gage height, 18.12 ft Sept. 1, 1962; no flow Jan. 30 to Feb. 4, 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 21, 1954, reached a stage of 15.61 ft, from floodmark, discharge, 7,000 ft³/s.

Rating table number 9, developed October 1987

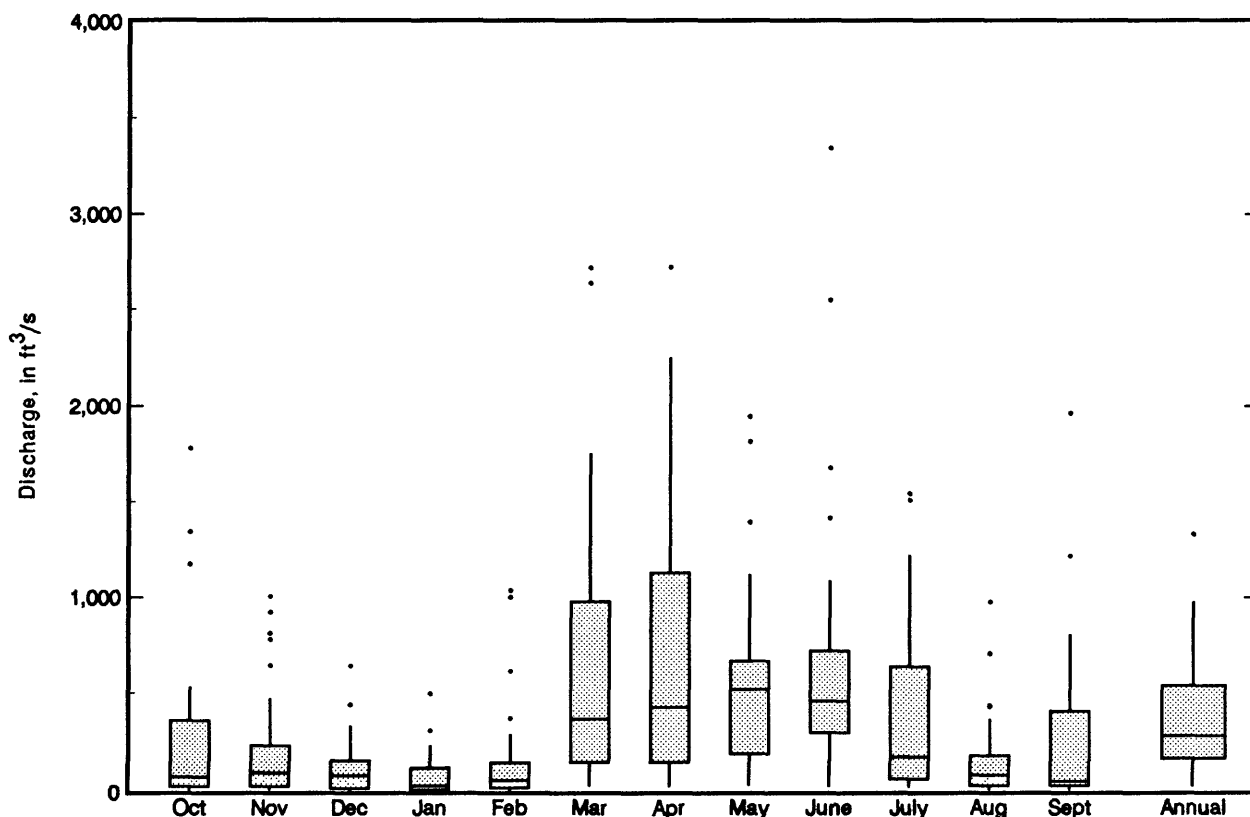
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
6.0	14.5	8.0	359
6.2	28	9.0	651
6.5	54	10.0	993
7.0	130	11.0	1,380
7.5	236	12.0	1,800

DES MOINES RIVER BASIN
05482300 NORTH RACCOON RIVER NEAR SAC CITY, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	1,782	1983	6.39	1959	274	431	6.3
November	1,005	1984	9.44	1959	226	297	5.2
December	641	1983	4.39	1959	126	147	2.9
January	498	1983	0.87	1977	84.1	112	1.9
February	1,038	1984	1.16	1959	167	267	3.8
March	2,723	1983	27.2	1968	655	723	15.0
April	2,726	1983	25.6	1967	736	735	16.9
May	1,947	1984	31.9	1967	566	489	13.0
June	3,344	1984	24.7	1977	675	726	15.5
July	1,545	1983	23.0	1977	414	476	9.5
August	977	1979	9.29	1976	170	224	3.9
September	1,966	1962	7.80	1976	268	438	6.1
Annual	1,331	1983	25.3	1977	364	299	100.0

Boxplots of monthly and annual mean discharges



DES MOINES RIVER BASIN
05482300 NORTH RACCOON RIVER NEAR SAC CITY, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.37	0.93	12	18	12	12	11	7.3	4.4	5.1	7.4	3.4	2.8
95	1.6	3.1	21	30	30	36	21	12	9.7	7.4	11	5.2	9.4
90	5.5	8.4	30	55	65	86	29	15	14	10	14	8.0	14
85	8.4	12	36	74	106	112	39	19	18	14	18	11	20
80	11	15	44	101	131	138	46	22	21	21	23	15	26
75	13	17	54	137	155	163	53	26	25	25	30	19	34
70	15	19	74	178	180	192	63	31	28	31	38	28	44
65	18	26	100	219	205	220	74	35	32	37	54	42	55
60	21	33	130	269	239	252	90	39	35	45	68	55	71
55	25	40	167	319	287	283	108	46	39	56	82	63	91
50	33	46	212	372	334	315	139	53	47	74	99	71	115
45	43	51	280	426	384	366	174	64	55	106	117	79	145
40	56	60	352	509	434	420	213	76	74	137	134	91	180
35	73	75	426	614	510	490	286	98	99	172	151	104	219
30	92	102	521	736	597	579	366	123	133	214	178	126	282
25	114	144	629	862	716	689	450	152	174	276	214	157	358
20	162	184	886	1,070	862	847	582	199	234	361	345	203	457
15	197	222	1,190	1,370	1,090	1,110	778	261	352	515	498	262	622
10	242	311	1,770	2,030	1,380	1,580	1,110	336	577	768	640	333	914
5	310	865	3,060	3,190	1,990	2,990	1,960	630	1,340	1,250	1,020	462	1,620

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	251	114	90	61	48
0.95	1.05	612	371	285	192	150
0.90	1.11	946	643	490	332	255
0.80	1.25	1,550	1,170	882	604	454
0.50	2	3,570	2,970	2,240	1,580	1,130
0.20	5	7,220	5,910	4,500	3,300	2,240
0.10	10	9,930	7,760	5,960	4,490	2,950
0.04	25	13,500	9,790	7,600	5,880	3,740
0.02	50	16,100	11,100	8,650	6,820	4,240
0.01	100	18,700	12,100	9,550	7,660	4,680

DES MOINES RIVER BASIN
05482300 NORTH RACCOON RIVER NEAR SAC CITY, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.02	0.18	0.74	1.8	2.9	3.8	3.9
0.02	50	0.00	0.00	0.07	0.40	1.2	2.5	4.0	5.1	5.4
0.05	20	2.2	2.3	0.47	1.2	2.3	4.2	6.2	7.9	9.0
0.10	10	4.0	4.2	1.8	2.8	4.2	6.5	9.4	12	14
0.20	5	6.9	7.1	6.7	6.8	8.1	11	16	19	25
0.50	2	17	18	30	26	26	32	43	53	72
0.80	1.25	44	45	53	61	72	93	122	155	214
0.90	1.11	72	74	57	82	117	163	215	278	382
0.96	1.04	122	127	59	103	189	301	400	529	712
0.98	1.02	173	181	59	114	252	450	601	811	1,070
0.99	1.01	240	252	59	122	323	645	871	1,200	1,540

Probability of seasonal low discharges

Nonexceedance probability	Recurrence Interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.83	0.02	0.14	0.45	5.2	6.1	7.4	13
0.02	50	1.3	0.07	0.32	0.80	7.9	9.2	11	18
0.05	20	2.5	0.41	1.00	1.8	14	16	20	32
0.10	10	4.3	1.6	2.5	3.6	23	27	33	50
0.20	5	8.1	6.2	6.5	7.9	40	46	57	85
0.50	2	26	36	30	30	106	123	151	213
0.80	1.25	74	84	88	96	243	290	353	477
0.90	1.11	124	102	135	165	356	433	522	698
0.96	1.04	209	112	192	278	517	643	767	1,020
0.98	1.02	289	115	229	379	644	817	964	1,270
0.99	1.01	382	117	262	492	776	1,000	1,170	1,540
		July-August-September				October-November-December			
0.01	100	2.8	3.3	3.8	4.5	1.2	1.3	1.4	2.1
0.02	50	3.5	4.1	4.7	5.7	1.7	1.9	2.2	3.1
0.05	20	4.9	5.8	6.6	8.1	3.0	3.5	4.0	5.5
0.10	10	6.8	7.9	9.0	11	5.0	5.9	7.0	9.3
0.20	5	10	12	13	17	9.2	11	13	17
0.50	2	23	26	29	42	29	36	42	54
0.80	1.25	53	60	69	112	95	112	126	161
0.90	1.11	85	96	112	195	176	200	218	281
0.96	1.04	141	159	189	362	342	368	383	503
0.98	1.02	198	223	269	550	525	542	545	729
0.99	1.01	271	305	372	809	773	765	743	1,010

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 5 ft downstream from bridge on State Highway 4, 0.1 mi downstream from Drainage ditch 33 and 40, 1.9 mi south of Jefferson, 4.2 mi upstream from Hardin Creek and at mile 292.5 upstream from mouth of Des Moines River.

DRAINAGE AREA.--1,619 mi².

PERIOD OF RECORD.--March 1940 to September 1988. Prior to October 1955, published as Raccoon River near Jefferson.

GAGE.--Water-stage recorder. Datum of gage is 967.09 ft above NGVD. Prior to Apr. 22, 1946, nonrecording gage at site 4 mi upstream at different datum. Apr. 22 to June 25, 1946, nonrecording gage, June 26, 1946 to Sept. 30, 1955, water-stage recorder, Oct. 1, 1955 to Apr. 30, 1958, nonrecording gage, at present site and datum.

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.

Rating table number 7, developed May 1989

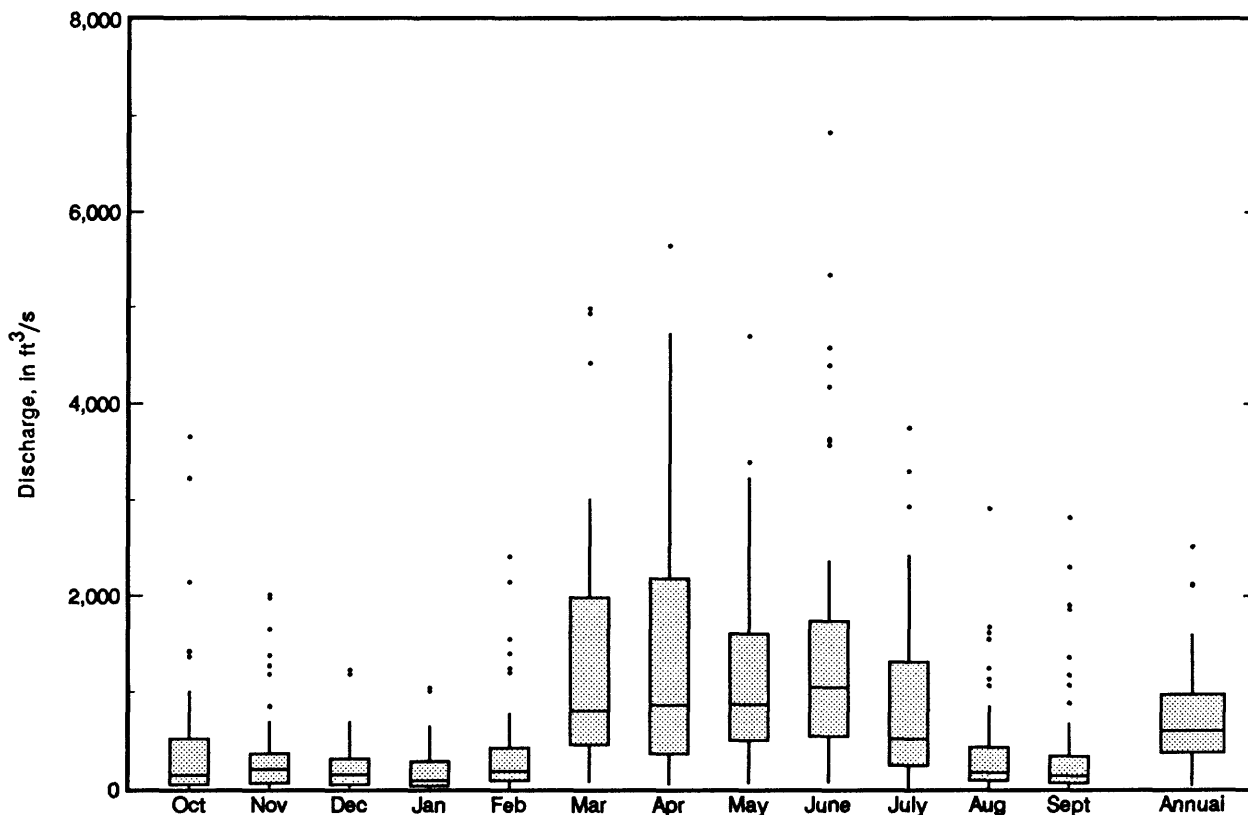
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
6.0	75	10.0	2,840
6.5	170	11.0	4,120
7.0	327	13.0	6,830
7.5	548	15.0	10,100
8.0	909	17.0	13,100
9.0	1,750	19.0	16,400

DES MOINES RIVER BASIN
05482500 NORTH RACCOON RIVER NEAR JEFFERSON, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	3,654	1974	5.04	1957	455	781	5.2
November	2,011	1974	19.8	1956	378	505	4.3
December	1,228	1974	13.4	1977	241	275	2.7
January	1,045	1973	3.58	1977	195	240	2.2
February	2,407	1984	6.89	1977	409	552	4.6
March	4,990	1983	68.5	1956	1,267	1,226	14.3
April	5,650	1983	46.3	1956	1,353	1,368	15.3
May	4,702	1984	54.7	1967	1,223	1,080	13.8
June	6,831	1984	61.9	1977	1,593	1,486	18.0
July	3,749	1983	18.1	1956	877	889	9.9
August	2,916	1951	12.1	1956	435	568	4.9
September	2,823	1962	16.6	1955	406	638	4.6
Annual	2,516	1983	32.8	1956	745	553	100.0

Boxplots of monthly and annual mean discharges



DES MOINES RIVER BASIN
05482500 NORTH RACCOON RIVER NEAR JEFFERSON, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	3.3	6.4	33	36	34	30	16	9.6	7.3	2.6	18	12	12
95	15	15	61	66	66	99	43	35	25	22	30	20	26
90	19	24	80	109	125	174	92	46	36	31	40	26	39
85	26	31	102	171	196	258	122	56	43	39	47	33	52
80	31	38	129	251	270	340	150	67	50	47	55	42	65
75	36	47	203	331	336	404	177	78	57	54	64	52	85
70	43	57	270	393	401	470	207	90	63	60	80	66	108
65	52	69	331	457	472	540	240	106	72	67	102	84	133
60	64	91	399	527	552	614	287	122	82	82	126	102	165
55	77	106	476	598	634	716	344	141	93	103	146	119	210
50	90	120	568	705	721	818	422	162	111	132	166	138	265
45	108	144	680	814	806	1,010	523	191	129	160	198	157	329
40	127	199	807	960	923	1,200	635	227	159	191	234	181	407
35	152	264	991	1,120	1,050	1,380	752	280	198	224	286	214	505
30	183	323	1,200	1,350	1,230	1,620	891	344	243	282	341	258	623
25	229	399	1,410	1,640	1,430	1,930	1,080	429	302	391	404	311	784
20	295	503	1,720	2,020	1,770	2,340	1,330	536	398	580	513	382	1,020
15	386	677	2,100	2,530	2,210	2,870	1,640	684	542	830	752	468	1,360
10	541	996	3,030	3,420	2,860	3,750	2,080	936	830	1,270	1,120	592	1,910
5	775	1,820	5,680	5,530	4,600	5,780	3,280	1,620	1,820	2,220	1,490	878	3,130

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	—	252	178	134	116
0.95	1.05	1,610	861	639	451	363
0.90	1.11	2,290	1,500	1,130	784	613
0.80	1.25	3,420	2,680	2,070	1,410	1,070
0.50	2	6,810	6,290	4,970	3,430	2,490
0.20	5	12,300	11,000	8,730	6,290	4,480
0.10	10	16,000	13,300	10,600	7,850	5,560
0.04	25	20,800	15,300	12,100	9,360	6,620
0.02	50	24,200	16,300	12,900	10,200	7,210
0.01	100	27,600	17,100	13,500	10,800	7,670

DES MOINES RIVER BASIN
05482500 NORTH RACCOON RIVER NEAR JEFFERSON, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	1.3	1.6	1.8	2.0	3.6	6.2	8.1	9.9	11
0.02	50	2.2	2.5	2.8	3.1	5.1	8.1	10	13	15
0.05	20	4.5	4.9	5.3	5.8	8.4	12	16	19	23
0.10	10	8.1	8.5	9.1	9.9	13	18	22	27	34
0.20	5	15	16	17	18	22	28	35	43	56
0.50	2	46	46	48	51	58	70	88	107	145
0.80	1.25	110	112	116	124	143	179	236	286	394
0.90	1.11	162	167	173	186	226	296	406	491	675
0.96	1.04	231	245	255	276	362	511	737	893	1,210
0.98	1.02	283	305	320	349	487	730	1,100	1,330	1,780
0.99	1.01	335	367	387	424	633	1,010	1,580	1,910	2,520

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	3.7	3.7	3.8	4.5	14	16	18	28
0.02	50	5.2	5.2	5.4	6.3	21	24	27	40
0.05	20	8.4	8.6	9.0	10	37	42	47	68
0.10	10	13	13	14	16	59	68	77	107
0.20	5	21	23	24	28	102	116	133	180
0.50	2	56	61	65	78	260	293	346	459
0.80	1.25	146	159	172	220	575	652	793	1,070
0.90	1.11	238	260	285	379	826	947	1,170	1,620
0.96	1.04	399	435	483	677	1,170	1,360	1,700	2,440
0.98	1.02	556	604	677	984	1,440	1,690	2,130	3,150
0.99	1.01	747	808	915	1,380	1,710	2,030	2,570	3,920
		July-August-September				October-November-December			
0.01	100	2.5	5.7	7.7	12	1.6	2.2	4.2	5.8
0.02	50	4.1	7.9	10	15	2.8	3.6	6.1	8.1
0.05	20	8.3	13	15	21	6.0	7.3	11	14
0.10	10	15	19	22	29	11	13	17	21
0.20	5	27	31	34	44	23	25	31	37
0.50	2	75	76	81	103	72	80	87	104
0.80	1.25	166	176	193	259	182	215	236	287
0.90	1.11	233	268	306	434	272	340	388	486
0.96	1.04	317	414	503	770	394	532	649	847
0.98	1.02	375	545	695	1,130	486	695	897	1,210
0.99	1.01	430	693	930	1,610	577	871	1,190	1,660

DES MOINES RIVER BASIN

05483000 EAST FORK HARDIN CREEK NEAR CHURDAN, IA

LOCATION.--Lat 42°06'27", long 94°22'12", in SE1/4 SW1/4 sec. 5, T.84 N., R.30 W., Greene County, Hydrologic Unit 07100006, on left bank 35 ft upstream from bridge on county highway E26, 1.6 mi upstream from small left-bank tributary, 4.4 mi upstream from mouth and 6.5 mi southeast of Churdan.

DRAINAGE AREA.--24.0 mi².

PERIOD OF RECORD.--July 1952 to September 1988.

GAGE.--Water-stage recorder. Datum of gage is 1,050.90 ft above NGVD.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 870 ft³/s June 30, 1986 gage height, 10.78 ft, from floodmark; no flow at times most years.

Rating table number 10, developed October 1986

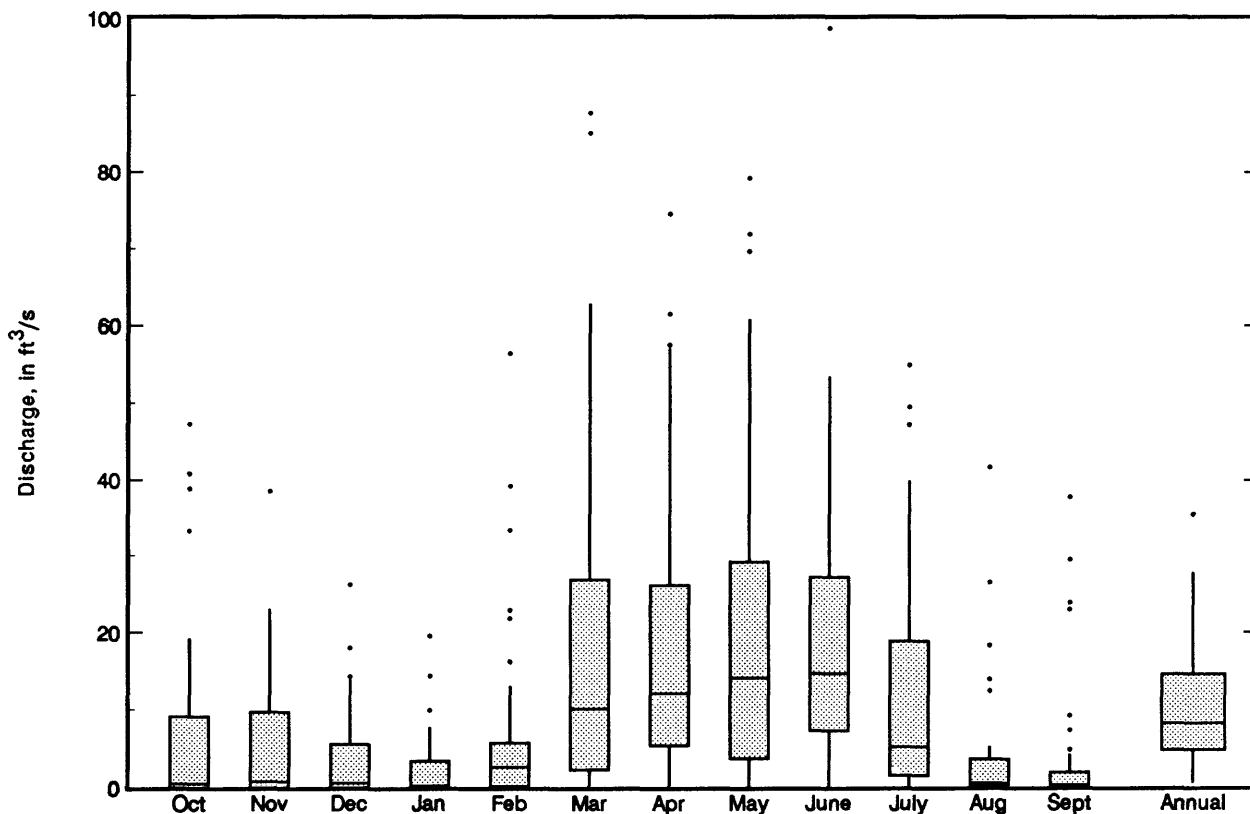
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
1.5	3.7	6.0	245
1.7	7.0	7.0	335
2.0	14	8.0	440
2.5	31	9.0	575
3.0	51	10.0	715
4.0	102	11.0	920
5.0	167		

DES MOINES RIVER BASIN
05483000 EAST FORK HARDIN CREEK NEAR CHURDAN, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	47.3	1955	0.000	1954	7.27	12.8	5.7
November	38.5	1973	0.000	1954	5.60	8.51	4.4
December	26.1	1983	0.000	1954	4.25	6.22	3.4
January	19.5	1973	0.000	1954	2.52	4.35	2.0
February	56.4	1984	0.000	1956	7.32	12.7	5.8
March	87.6	1973	0.010	1977	19.4	22.7	15.3
April	74.5	1984	0.010	1977	18.2	18.9	14.4
May	79.1	1982	0.000	1977	20.7	21.5	16.3
June	98.7	1967	0.000	1977	20.6	19.6	16.3
July	54.9	1969	0.000	1977	12.3	15.7	9.7
August	41.6	1954	0.000	1956	4.28	8.59	3.4
September	37.7	1978	0.000	1953	4.18	9.17	3.3
Annual	35.4	1973	0.56	1956	10.6	8.14	100.0

Boxplots of monthly and annual mean discharges



DES MOINES RIVER BASIN
05483000 EAST FORK HARDIN CREEK NEAR CHURDAN, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95	0.00	0.00	0.01	0.01	0.04	0.30	0.01	0.00	0.00	0.00	0.00	0.00	0.00
90	0.00	0.00	0.08	0.12	0.58	1.4	0.32	0.01	0.00	0.00	0.00	0.00	0.01
85	0.00	0.01	0.19	0.52	1.6	2.2	0.50	0.03	0.01	0.01	0.01	0.01	0.01
80	0.01	0.01	0.29	1.4	2.8	3.4	0.71	0.09	0.01	0.01	0.01	0.01	0.04
75	0.01	0.01	0.68	2.8	4.0	4.6	1.0	0.12	0.01	0.01	0.05	0.01	0.12
70	0.01	0.02	1.7	4.4	5.0	5.6	1.3	0.18	0.03	0.03	0.10	0.03	0.25
65	0.01	0.16	2.7	5.3	6.1	6.6	1.6	0.23	0.07	0.10	0.14	0.10	0.44
60	0.02	0.29	3.7	6.5	7.1	7.5	2.0	0.29	0.10	0.15	0.27	0.15	0.75
55	0.10	0.41	4.7	7.7	8.5	8.7	2.4	0.36	0.12	0.24	0.43	0.26	1.4
50	0.23	0.65	5.9	9.2	10	9.9	2.9	0.43	0.20	0.42	0.75	0.60	2.2
45	0.47	1.2	7.4	11	13	12	3.8	0.57	0.29	0.63	1.3	1.7	3.3
40	0.82	1.8	9.9	14	15	14	4.9	0.79	0.41	0.81	3.5	3.0	4.6
35	2.1	2.1	13	16	18	16	6.3	1.1	0.57	1.5	4.9	3.7	6.0
30	2.6	3.0	16	18	20	19	8.0	1.4	0.74	5.0	6.3	4.7	7.6
25	3.2	4.4	20	22	24	23	11	1.9	1.0	7.0	8.1	5.9	10
20	3.9	6.0	26	26	29	28	14	2.8	1.5	9.2	11	7.2	14
15	5.4	11	35	33	37	35	19	4.2	2.8	14	13	9.2	19
10	7.4	20	50	46	51	47	28	7.1	5.9	22	17	13	27
5	12	42	100	75	84	84	56	16	18	34	26	18	48

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	—	14	8.0	5.1	3.8
0.95	1.05	84	31	19	12	8.9
0.90	1.11	107	45	28	18	13
0.80	1.25	141	67	43	29	20
0.50	2	227	128	88	60	42
0.20	5	347	211	154	105	72
0.10	10	424	259	196	133	91
0.04	25	516	310	243	164	112
0.02	50	581	343	274	183	126
0.01	100	643	370	301	201	138

DES MOINES RIVER BASIN
05483000 EAST FORK HARDIN CREEK NEAR CHURDAN, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.05	20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.10	10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.20	5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.04
0.50	2	0.00	0.00	0.00	0.00	0.00	0.10	0.21	0.33	0.69
0.80	1.25	0.11	0.13	0.18	0.24	0.46	0.85	1.8	2.7	5.1
0.90	1.11	0.40	0.45	0.58	0.70	1.2	2.2	4.9	7.4	13
0.96	1.04	1.1	1.2	1.4	1.8	3.2	5.6	12	20	33
0.98	1.02	1.8	2.0	2.3	3.1	5.4	10.0	21	38	60
0.99	1.01	2.8	3.1	3.4	5.0	8.6	17	36	70	102

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.05	0.06	0.06	0.00	0.01	0.01	0.03	0.01
0.02	50	0.08	0.10	0.10	0.00	0.03	0.02	0.07	0.03
0.05	20	0.17	0.19	0.18	0.02	0.10	0.09	0.21	0.13
0.10	10	0.29	0.34	0.31	0.04	0.29	0.25	0.50	0.39
0.20	5	0.54	0.62	0.57	0.14	0.80	0.77	1.3	1.2
0.50	2	1.5	1.7	1.7	0.95	3.5	3.8	5.0	6.3
0.80	1.25	3.5	4.0	4.4	4.8	8.5	10	13	18
0.90	1.11	5.0	5.9	6.9	9.8	11	14	18	25
0.98	1.04	6.9	8.3	11	19	13	18	24	32
0.98	1.02	8.4	10	15	28	15	20	27	35
0.99	1.01	9.8	12	19	39	15	21	30	38
		July-August-September				October-November-December			
0.01	100	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00
0.02	50	0.00	0.01	0.02	0.01	0.01	0.00	0.01	0.00
0.05	20	0.01	0.01	0.03	0.02	0.02	0.01	0.02	0.01
0.10	10	0.02	0.03	0.05	0.05	0.07	0.03	0.06	0.04
0.20	5	0.04	0.05	0.09	0.09	0.22	0.11	0.16	0.13
0.50	2	0.15	0.20	0.29	0.37	1.2	0.88	0.94	1.1
0.80	1.25	0.51	0.63	0.90	1.4	4.1	4.5	4.5	6.2
0.90	1.11	0.92	1.1	1.6	2.8	6.5	9.0	9.5	14
0.96	1.04	1.7	1.9	3.0	5.8	9.5	17	20	29
0.98	1.02	2.4	2.6	4.5	9.2	11	25	31	46
0.99	1.01	3.3	3.4	6.4	14	13	33	45	66

DES MOINES RIVER BASIN
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 September 1988.

GAGE.--Water-stage recorder and concrete control. Datum of gage is 991.20 ft above NGVD.

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.

REMARKS.--City of Panora diverts approximately 100 acre-ft/yr upstream of station. Flow regulated by dam on Lake Panorama since August 1970. Data for unregulated period is compiled using data from water years 1958 to 1970. Data for regulated period is compiled using data from water years 1971 to 1988.

Rating table number 6, developed June 1986

Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
4.0	31	7.0	1,900
4.2	61	8.0	2,800
4.5	132	10.0	5,120
5.0	331	12.0	7,830
5.5	622	14.0	11,400
6.0	1,010		

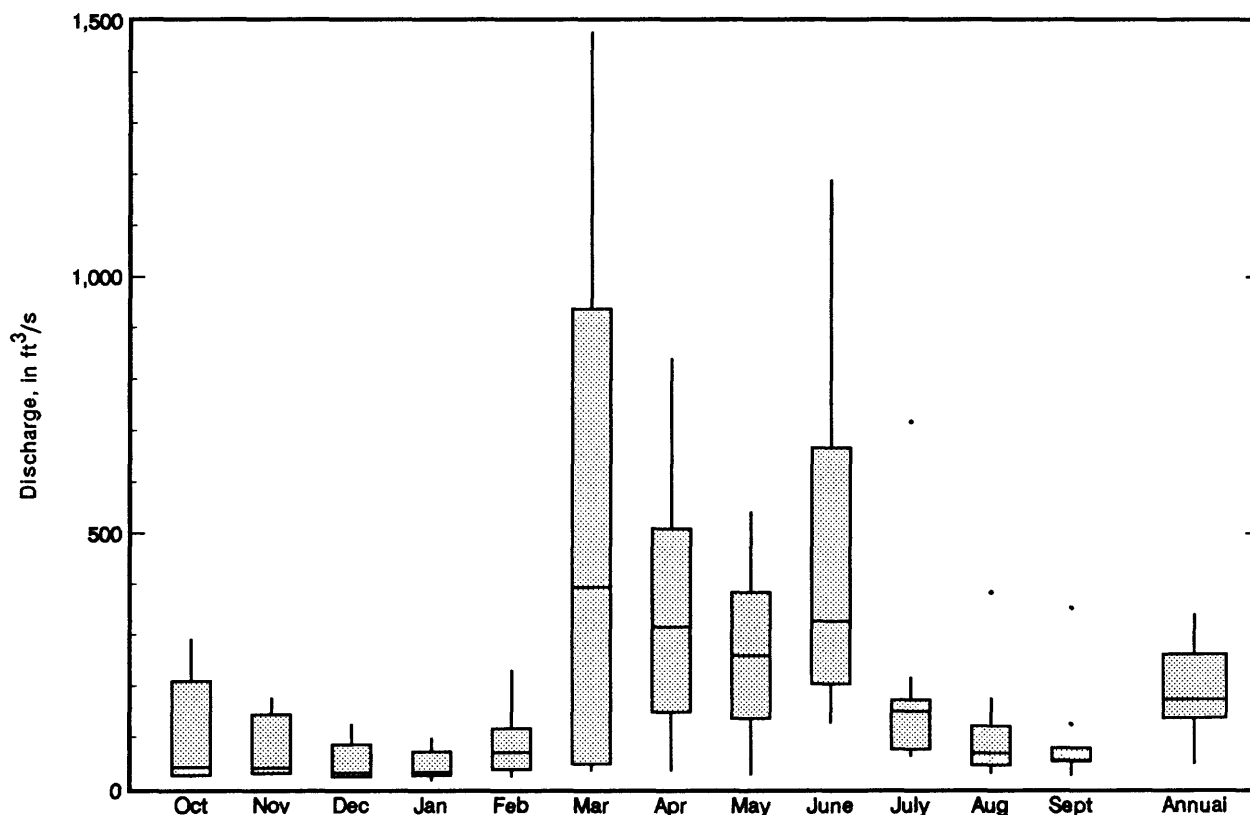
DES MOINES RIVER BASIN
05483600 MIDDLE RACCOON RIVER AT PANORA, IA--Continued

Pre-regulation Period

Statistics of monthly and annual mean discharges, pre-regulation period

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	292	1966	24.6	1960	103	109	4.5
November	177	1962	27.7	1968	73.2	59.4	3.2
December	126	1966	24.8	1967	53.6	39.8	2.3
January	98.6	1966	16.5	1968	46.7	28.6	2.0
February	231	1965	24.1	1968	93.2	73.0	4.0
March	1,478	1969	36.2	1968	514	509	22.2
April	840	1965	35.3	1967	350	271	15.1
May	542	1960	28.2	1967	254	166	11.0
June	1,189	1957	128	1968	438	333	18.9
July	718	1969	63.6	1963	188	193	8.1
August	384	1963	31.0	1965	109	106	4.7
September	353	1965	26.8	1966	91.3	95.9	3.9
Annual	340	1969	47.9	1968	193	86.4	100.0

Boxplots of monthly and annual mean discharges, pre-regulation period



DES MOINES RIVER BASIN
05483600 MIDDLE RACCOON RIVER AT PANORA, IA--Continued

Monthly and annual flow duration, pre-regulation period

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												Annual
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	
99	11	16	24	25	19	23	32	23	23	19	18	15	17
95	16	20	30	31	26	32	42	26	26	22	24	19	23
90	19	24	33	35	34	71	48	29	28	25	26	21	26
85	22	27	36	46	44	97	56	33	31	27	28	23	30
80	24	30	39	72	84	117	64	37	36	29	30	25	33
75	26	32	44	87	107	131	70	41	39	31	34	26	37
70	28	35	49	109	123	145	76	44	42	34	38	27	41
65	30	37	58	131	140	159	81	48	45	37	40	28	45
60	32	40	86	161	152	173	89	51	47	40	42	29	50
55	34	42	100	192	165	191	100	54	50	42	44	31	58
50	36	45	114	219	178	216	109	58	54	45	46	33	68
45	38	48	130	244	193	240	125	62	57	48	48	35	82
40	43	52	154	267	208	273	139	65	61	51	50	38	101
35	48	59	233	289	224	306	159	74	64	59	57	46	122
30	54	66	305	313	239	368	178	83	70	67	75	60	144
25	62	78	418	363	276	442	206	95	76	131	122	76	172
20	73	107	566	424	315	520	234	107	81	164	141	100	213
15	85	155	962	514	395	781	283	129	94	203	157	118	270
10	95	218	1,500	725	512	1,190	362	163	114	252	174	129	379
5	106	304	3,300	1,260	837	1,960	670	275	258	370	206	140	725

Probability of annual high discharges, pre-regulation period

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	0.00	327	293	168	94
0.95	1.05	0.00	731	539	318	209
0.90	1.11	2,420	1,050	727	436	304
0.80	1.25	3,040	1,550	1,020	625	455
0.50	2	4,650	2,750	1,850	1,160	854
0.20	5	7,020	4,030	3,090	1,990	1,350
0.10	10	8,660	4,610	3,920	2,560	1,620
0.04	25	10,800	5,120	4,950	3,260	1,880
0.02	50	12,400	5,380	5,690	3,760	2,040
0.01	100	14,000	5,570	6,400	4,250	2,160

DES MOINES RIVER BASIN
05483600 MIDDLE RACCOON RIVER AT PANORA, IA--Continued

Probability of annual low discharges, pre-regulation period

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	8.9	9.1	9.8	11	15	20	18	16	18
0.02	50	9.4	9.9	10	11	15	20	19	17	19
0.05	20	10	11	12	13	16	21	20	20	22
0.10	10	11	13	13	14	17	22	22	22	25
0.20	5	13	15	15	16	19	23	26	27	31
0.50	2	17	20	21	23	26	30	37	43	49
0.80	1.25	23	28	32	34	40	46	60	76	89
0.90	1.11	28	33	40	43	54	62	83	108	129
0.96	1.04	34	40	54	58	78	90	123	163	199
0.98	1.02	40	46	65	70	102	120	163	218	270
0.99	1.01	46	52	78	85	131	158	214	287	362

Probability of seasonal low discharges, pre-regulation period

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	8.3	7.6	8.2	13	0.18	8.4	8.7	9.8
0.02	50	9.2	8.8	9.5	14	0.53	12	13	15
0.05	20	11	11	12	16	2.1	20	22	27
0.10	10	13	13	14	19	6.0	30	34	42
0.20	5	16	17	19	23	17	46	54	68
0.50	2	25	28	30	34	68	89	107	137
0.80	1.25	42	47	50	55	138	141	172	214
0.90	1.11	57	63	66	72	165	167	204	250
0.96	1.04	79	86	89	98	181	193	233	280
0.98	1.02	98	106	108	122	187	207	249	294
0.99	1.01	121	129	129	149	190	218	260	304
		July-August-September				October-November-December			
0.01	100	15	17	17	18	8.7	14	13	14
0.02	50	16	18	18	20	9.1	14	13	15
0.05	20	19	21	21	24	10	15	15	17
0.10	10	21	23	24	28	11	16	17	20
0.20	5	24	26	28	33	13	19	21	24
0.50	2	31	34	37	47	19	27	33	37
0.80	1.25	41	45	49	67	31	48	62	69
0.90	1.11	48	53	58	80	42	70	92	101
0.96	1.04	58	63	68	97	61	113	149	160
0.98	1.02	65	71	76	110	79	159	210	222
0.99	1.01	72	79	83	123	102	223	292	305

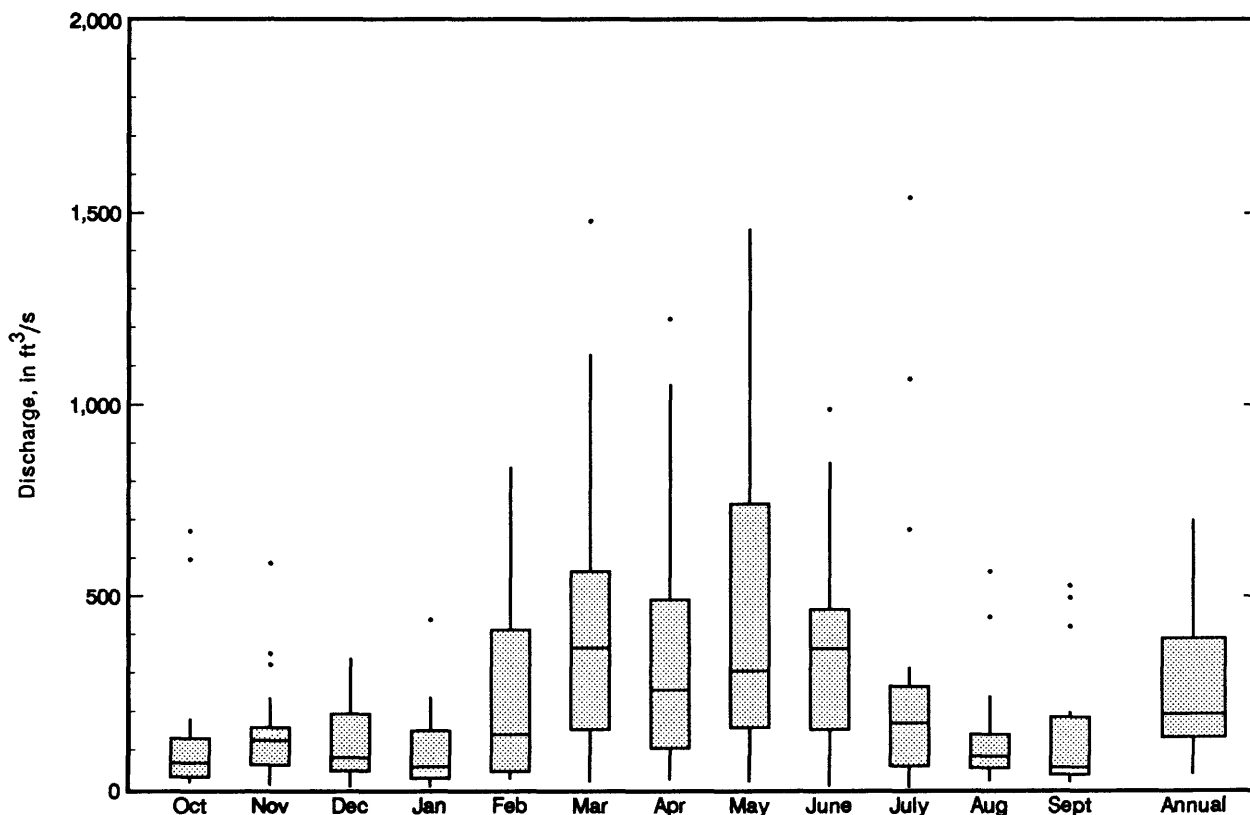
DES MOINES RIVER BASIN
05483600 MIDDLE RACCOON RIVER AT PANORA, IA--Continued

Post-regulation Period

Statistics of monthly and annual mean discharges, post-regulation period

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	670	1987	19.5	1981	138	187	4.6
November	588	1973	12.8	1971	157	143	5.2
December	337	1974	7.60	1971	123	97.8	4.1
January	439	1973	6.95	1971	105	107	3.5
February	838	1971	27.8	1972	256	265	8.4
March	1,479	1979	20.2	1981	418	379	13.8
April	1,222	1984	26.4	1977	386	375	12.7
May	1,458	1974	20.0	1977	486	432	16.1
June	989	1984	9.40	1977	375	283	12.4
July	1,540	1973	5.56	1977	304	403	10.0
August	565	1986	22.2	1971	142	147	4.7
September	528	1973	19.3	1980	139	166	4.6
Annual	701	1973	38.6	1977	252	170	100.0

Boxplots of monthly and annual mean discharges, post-regulation period



DES MOINES RIVER BASIN
05483600 MIDDLE RACCOON RIVER AT PANORA, IA--Continued

Monthly and annual flow duration, post-regulation period

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	6.4	5.8	17	17	18	4.5	3.3	4.5	15	17	7.7	6.7	6.1
95	7.9	20	23	23	21	17	8.1	18	20	19	17	9.4	19
90	21	25	33	28	37	37	25	23	25	22	21	26	25
85	26	29	42	33	53	60	31	29	29	28	33	33	31
80	30	32	65	42	70	79	35	32	32	30	39	39	35
75	33	35	85	68	95	98	43	34	34	32	46	44	42
70	37	44	107	99	122	117	60	38	38	35	52	51	49
65	42	50	125	120	160	137	75	43	40	38	58	60	58
60	46	54	146	148	183	159	90	48	44	43	69	66	69
55	52	58	169	183	206	183	105	53	48	49	83	72	83
50	58	72	193	224	239	206	121	58	52	57	100	79	101
45	71	86	219	281	286	253	142	66	57	66	113	90	121
40	88	104	248	321	353	294	169	75	63	75	127	101	146
35	107	130	292	371	425	334	199	88	70	91	154	120	176
30	124	159	346	430	493	383	230	105	80	109	183	146	209
25	141	199	430	505	560	437	265	135	102	129	213	177	255
20	156	282	543	588	664	527	309	168	126	160	254	205	319
15	186	409	684	698	937	648	377	214	181	229	314	236	412
10	223	689	1,020	983	1,190	817	533	273	272	329	393	275	575
5	285	1,070	1,680	1,430	1,540	1,270	910	430	422	532	529	336	965

Probability of annual high discharges, post-regulation period

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	1,110	199	135	100	77
0.95	1.05	1,800	445	299	214	159
0.90	1.11	2,300	668	446	311	228
0.80	1.25	3,090	1,070	705	481	345
0.50	2	5,340	2,490	1,590	1,030	709
0.20	5	9,020	5,360	3,270	2,020	1,330
0.10	10	11,700	7,770	4,620	2,780	1,800
0.04	25	15,400	11,300	6,520	3,820	2,400
0.02	50	18,400	14,200	8,030	4,630	2,870
0.01	100	21,400	17,400	9,610	5,460	3,330

DES MOINES RIVER BASIN
05483600 MIDDLE RACCOON RIVER AT PANORA, IA--Continued

Probability of annual low discharges, post-regulation period

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	2.2	2.6	2.9	3.0	4.4	5.5	7.0	14
0.02	50	0.00	3.4	3.8	4.3	4.6	6.2	7.6	9.5	17
0.05	20	0.00	6.0	6.4	7.3	8.1	10	12	15	24
0.10	10	9.4	9.4	9.8	11	13	15	18	21	31
0.20	5	15	15	16	18	21	24	28	33	44
0.50	2	26	29	33	38	45	54	63	71	88
0.80	1.25	35	44	57	67	80	109	129	142	177
0.90	1.11	41	50	72	84	100	152	182	199	258
0.96	1.04	47	55	88	102	121	210	256	278	388
0.98	1.02	51	57	98	113	133	255	315	342	507
0.99	1.01	54	58	106	123	143	300	377	408	647

Probability of seasonal low discharges, post-regulation period

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	3.3	4.6	5.0	5.4	12	3.0	4.1	5.4
0.02	50	5.0	6.3	6.8	7.3	14	4.8	6.4	8.7
0.05	20	8.7	10	11	11	16	9.2	12	17
0.10	10	14	15	16	16	19	16	20	30
0.20	5	22	24	24	26	24	30	38	56
0.50	2	46	52	54	60	42	87	108	160
0.80	1.25	78	104	113	135	90	217	270	378
0.90	1.11	95	144	162	204	145	329	413	554
0.96	1.04	113	199	234	314	254	493	628	792
0.98	1.02	123	241	293	413	379	625	806	973
0.99	1.01	131	284	357	527	556	764	997	1,150
		July-August-September				October-November-December			
0.01	100	2.3	2.5	2.9	4.8	6.8	6.6	6.0	5.8
0.02	50	3.6	3.9	4.4	6.7	8.2	8.3	7.8	7.9
0.05	20	6.7	7.1	8.0	11	11	12	12	12
0.10	10	11	11	13	16	14	16	16	18
0.20	5	17	19	21	24	19	23	24	28
0.50	2	31	38	43	50	36	45	51	62
0.80	1.25	42	61	70	90	66	91	106	131
0.90	1.11	45	72	84	117	92	131	153	190
0.96	1.04	47	81	95	150	132	192	225	278
0.98	1.02	48	86	101	173	167	247	288	353
0.99	1.01	48	89	106	195	206	310	358	436

DES MOINES RIVER BASIN
05484000 SOUTH RACCOON RIVER AT REDFIELD, IA

LOCATION.--Lat 41°35'22", long 94°09'33", in NE1/4 NE1/4 sec. 2, T.78 N., R.28 W., Dallas County, Hydrologic Unit 07100007, on right bank 20 ft upstream from bridge on county highway at Redfield, 3.2 mi downstream from bridge on U.S. Highway 6, 3.4 mi downstream from Middle Raccoon River, 14.0 mi upstream from mouth and at mile 245.6 upstream from mouth of Des Moines River.

DRAINAGE AREA.--994 mi².

PERIOD OF RECORD.--March 1940 to September 1988.

GAGE.--Water-stage recorder. Datum of gage is 876.43 ft above NGVD. Prior to June 12, 1946, nonrecording gage, June 12, 1946 to Sept. 30, 1966, water-stage recorder at site 20 ft upstream at same datum. Sept. 30, 1966 to Sept. 30, 1986 water-stage recorder at site 1.5 mi upstream at datum 20.0 ft higher.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 35,000 ft³/s July 2, 1958, gage height, 29.04 ft, from floodmark; minimum daily discharge, 17 ft³/s Aug. 4, 1977 at site 1.5 mi upstream from present site.

Rating table number 8, developed March 1988

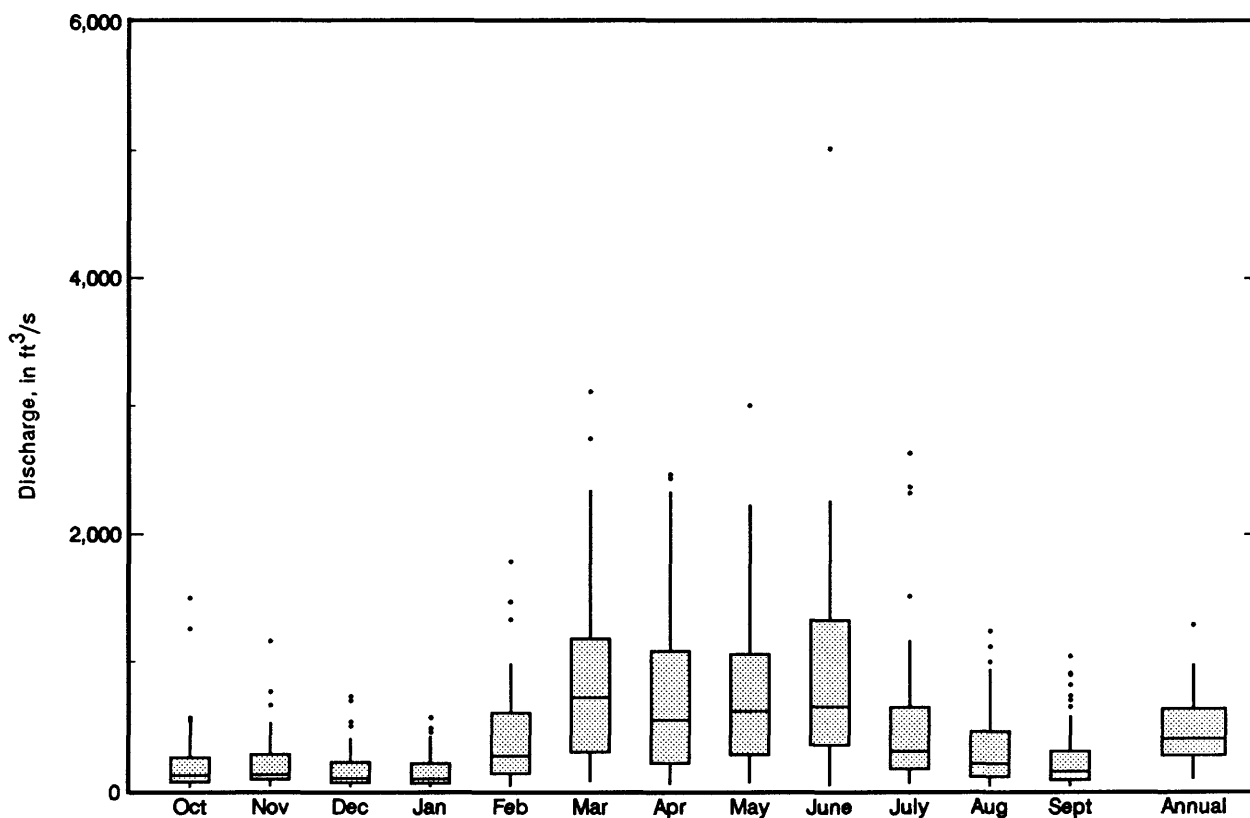
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
3.0	70	7.0	2,170
3.2	1,125	9.0	3,970
3.5	230	11.0	6,220
4.0	410	13.0	8,900
5.0	872	15.0	12,000
6.0	1,460		

DES MOINES RIVER BASIN
05484000 SOUTH RACCOON RIVER AT REDFIELD, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	1,501	1987	28.6	1941	229	284	4.1
November	1,162	1973	36.2	1956	221	213	3.9
December	732	1983	32.4	1956	173	164	3.1
January	565	1983	30.4	1950	167	151	3.0
February	1,785	1971	35.5	1956	405	381	7.2
March	3,112	1979	74.2	1981	863	726	15.3
April	2,474	1984	50.0	1956	726	639	12.9
May	3,005	1974	62.9	1967	816	717	14.5
June	5,017	1947	43.2	1977	916	846	16.3
July	2,638	1973	57.4	1954	520	589	9.3
August	1,242	1986	37.8	1955	324	292	5.8
September	1,048	1978	36.0	1955	263	270	4.7
Annual	1,292	1973	91.4	1968	468	262	100.0

Boxplots of monthly and annual mean discharges



DES MOINES RIVER BASIN
05484000 SOUTH RACCOON RIVER AT REDFIELD, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	23	28	58	48	43	37	31	26	26	28	35	32	30
95	33	40	74	70	58	69	56	41	42	38	51	41	45
90	41	51	90	90	78	103	73	52	50	49	58	47	55
85	46	57	108	117	114	149	89	62	56	56	67	52	65
80	52	64	134	156	157	184	111	71	61	63	77	57	76
75	57	73	169	190	204	218	134	81	69	70	86	62	88
70	63	86	220	220	270	256	155	91	76	78	94	70	101
65	70	101	269	254	319	298	177	104	88	89	101	78	116
60	77	116	319	294	365	343	204	116	99	97	108	84	134
55	84	131	367	341	409	393	233	129	109	103	118	91	157
50	91	151	416	399	466	455	263	141	120	110	129	103	188
45	102	184	475	482	525	525	295	159	131	122	142	117	227
40	118	231	545	589	591	602	328	181	143	135	161	133	272
35	137	287	624	686	673	693	383	210	159	155	192	153	323
30	161	341	731	778	770	804	448	247	180	193	230	181	385
25	198	404	886	887	899	981	523	293	216	239	269	218	467
20	253	491	1,100	1,040	1,080	1,190	608	358	283	295	315	258	583
15	319	681	1,410	1,260	1,340	1,520	728	468	366	371	380	304	748
10	388	967	2,020	1,590	1,810	2,080	984	659	482	474	477	376	1,050
5	528	1,580	3,280	2,420	2,870	3,210	1,590	1,220	760	833	720	527	1,720

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	—	602	456	288	211
0.95	1.05	3,620	1,300	908	578	420
0.90	1.11	4,640	1,870	1,270	810	585
0.80	1.25	6,190	2,810	1,840	1,180	847
0.50	2	10,300	5,430	3,440	2,220	1,570
0.20	5	16,300	9,150	5,730	3,740	2,590
0.10	10	20,300	11,400	7,180	4,710	3,230
0.04	25	25,400	13,900	8,880	5,850	3,960
0.02	50	29,000	15,600	10,000	6,620	4,450
0.01	100	32,600	17,000	11,100	7,330	4,900

DES MOINES RIVER BASIN
05484000 SOUTH RACCOON RIVER AT REDFIELD, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	15	16	19	20	24	31	33	33	34
0.02	50	17	18	20	21	26	33	36	37	39
0.05	20	20	21	23	25	30	37	41	44	50
0.10	10	23	24	26	29	34	42	48	52	62
0.20	5	28	30	32	35	42	51	58	65	82
0.50	2	45	48	51	55	65	80	94	108	145
0.80	1.25	81	85	90	98	113	147	173	197	269
0.90	1.11	114	120	128	139	159	214	252	282	379
0.96	1.04	170	180	194	209	237	336	391	426	555
0.98	1.02	225	239	259	277	314	463	534	567	717
0.99	1.01	293	312	341	363	409	629	718	742	906

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	17	17	18	21	19	22	24	28
0.02	50	19	19	20	24	25	29	32	38
0.05	20	23	24	26	30	37	42	47	57
0.10	10	28	30	32	38	51	59	65	82
0.20	5	36	39	42	51	75	88	98	127
0.50	2	62	70	76	95	152	186	211	288
0.80	1.25	118	136	149	194	298	384	447	634
0.90	1.11	171	198	217	293	416	554	657	948
0.96	1.04	262	305	334	469	589	815	985	1,440
0.98	1.02	351	408	446	646	733	1,040	1,280	1,890
0.99	1.01	461	536	585	871	888	1,290	1,610	2,390
		July-August-September				October-November-December			
0.01	100	16	22	23	28	21	24	25	26
0.02	50	19	25	26	32	23	26	27	29
0.05	20	24	30	32	40	26	30	32	35
0.10	10	30	36	39	49	30	35	38	43
0.20	5	39	45	49	63	36	42	48	55
0.50	2	66	74	81	106	58	69	80	96
0.80	1.25	112	126	140	189	107	129	151	182
0.90	1.11	148	170	189	260	158	189	220	264
0.96	1.04	201	238	265	370	251	300	342	405
0.98	1.02	245	298	333	469	348	414	464	543
0.99	1.01	294	368	410	585	477	563	620	715

DES MOINES RIVER BASIN
05484500 RACCOON RIVER AT VAN METER, IA

LOCATION.--Lat 41°32'02", long 93°56'59", in SW1/4 SW1/4 sec.22, T.78 N., R.27 W., Dallas County, Hydrologic Unit 07100007, on right bank 10 ft downstream from bridge on county highway R16, 0.3 mi northeast of Van Meter, 0.7 mi upstream from small left bank tributary, 1.1 mi downstream from confluence of North and South Raccoon Rivers, 29.0 mi upstream from mouth and at mile 230.5 upstream from mouth of Des Moines River.

DRAINAGE AREA.--3,441 mi².

PERIOD OF RECORD.--April 1915 to September 1988.

GAGE.--Water-stage recorder. Datum of gage is 841.16 ft above NGVD.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 41,200 ft³/s June 13, 1947, gage height, 21.37 ft, from floodmark; maximum gage height, 22.69 ft July 1, 1986; minimum daily discharge, 10 ft³/s Jan. 22-31, 1940.

Rating table number 5, developed March 1969

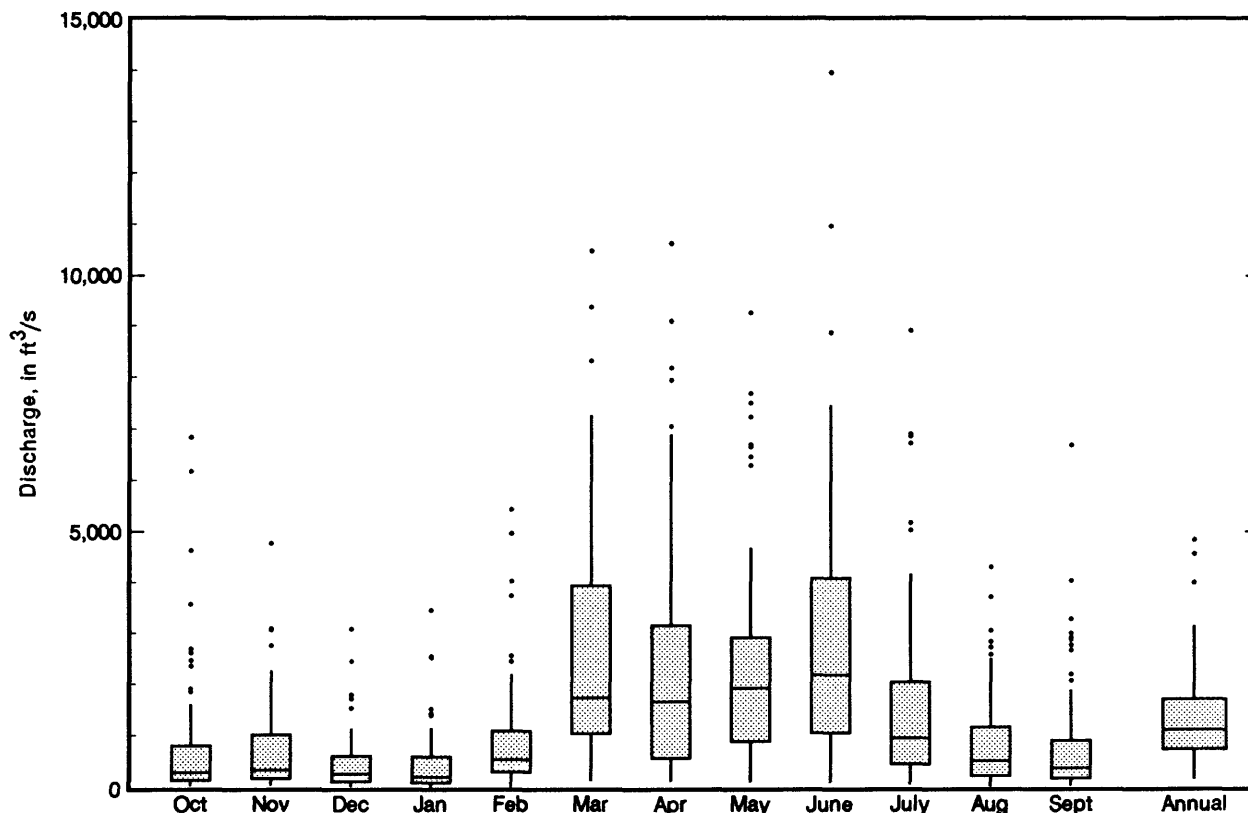
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
2.2	35	9.0	6,220
2.5	141	11.0	9,220
2.7	235	13.0	12,500
3.0	405	15.0	16,400
3.5	746	17.0	21,000
4.0	1,140	19.0	26,900
5.0	2,000	21.0	33,300
7.0	4,010	23.0	41,300

DES MOINES RIVER BASIN
05484500 RACCOON RIVER AT VAN METER, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	6,840	1974	48.6	1940	846	1,298	4.9
November	4,774	1973	51.5	1938	741	872	4.3
December	3,085	1983	31.0	1938	513	592	3.0
January	3,461	1932	17.2	1940	469	625	2.7
February	5,438	1984	31.5	1940	966	1,090	5.6
March	10,480	1979	146	1931	2,592	2,230	15.1
April	10,630	1983	125	1956	2,430	2,373	14.1
May	9,257	1984	121	1934	2,338	2,122	13.6
June	13,970	1947	112	1977	2,925	2,551	17.0
July	8,909	1973	68.1	1936	1,616	1,811	9.4
August	4,309	1951	28.1	1936	888	923	5.2
September	6,692	1926	43.1	1939	873	1,157	5.1
Annual	4,840	1973	166	1956	1,423	965	100.0

Boxplots of monthly and annual mean discharges



DES MOINES RIVER BASIN
05484500 RACCOON RIVER AT VAN METER, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	17	26	115	125	90	72	51	27	39	39	49	35	39
95	46	51	171	186	146	184	111	85	68	64	77	60	73
90	58	76	228	259	227	302	183	113	95	88	106	77	107
85	69	103	292	344	345	457	248	137	111	106	130	92	140
80	85	128	395	458	519	619	303	161	129	125	153	115	173
75	101	160	580	604	682	767	353	189	148	145	176	137	210
70	116	181	731	758	798	935	402	221	175	167	203	159	251
65	144	223	889	910	964	1,130	473	255	204	190	234	180	302
60	170	274	1,050	1,060	1,150	1,300	553	291	233	218	267	206	369
55	193	328	1,220	1,220	1,300	1,500	643	331	268	246	304	235	455
50	218	391	1,400	1,390	1,460	1,710	768	378	310	289	352	268	562
45	243	470	1,640	1,600	1,630	1,950	919	436	366	348	407	307	688
40	285	566	1,900	1,830	1,790	2,220	1,090	503	431	420	509	365	848
35	346	684	2,180	2,180	2,050	2,620	1,330	617	507	500	617	434	1,060
30	428	854	2,580	2,630	2,360	3,050	1,590	760	622	615	770	519	1,300
25	526	1,060	3,050	3,130	2,750	3,550	1,880	975	774	820	940	625	1,600
20	620	1,340	3,670	3,660	3,300	4,240	2,250	1,270	989	1,090	1,100	757	1,990
15	764	1,700	4,710	4,430	4,070	5,270	2,840	1,620	1,320	1,540	1,360	956	2,610
10	1,140	2,200	6,620	5,740	5,420	7,070	3,800	2,150	2,070	2,170	1,770	1,270	3,590
5	1,900	4,090	9,770	8,860	8,350	11,000	5,660	3,610	3,860	3,610	2,750	1,830	5,680

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	—	1,630	1,140	739	542
0.95	1.05	4,880	3,080	2,320	1,570	1,140
0.90	1.11	6,300	4,210	3,260	2,250	1,630
0.80	1.25	8,460	5,990	4,750	3,350	2,410
0.50	2	14,300	10,900	8,880	6,400	4,590
0.20	5	23,200	18,100	14,700	10,700	7,640
0.10	10	29,300	22,800	18,300	13,200	9,510
0.04	25	37,100	28,400	22,400	16,100	11,600
0.02	50	42,900	32,300	25,100	18,000	12,900
0.01	100	48,600	35,900	27,500	19,600	14,200

DES MOINES RIVER BASIN
05484500 RACCOON RIVER AT VAN METER, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	14	15	16	17	20	29	36	39	44
0.02	50	18	19	20	21	25	35	43	48	55
0.05	20	24	26	27	29	34	46	58	65	79
0.10	10	32	34	35	38	45	60	75	87	110
0.20	5	45	48	50	55	65	84	106	125	163
0.50	2	91	96	102	112	133	170	217	260	359
0.80	1.25	192	201	215	234	282	368	480	577	811
0.90	1.11	287	300	321	350	425	568	749	896	1,260
0.96	1.04	447	467	500	541	663	923	1,240	1,460	2,020
0.98	1.02	600	627	669	721	890	1,280	1,730	2,020	2,770
0.99	1.01	785	820	874	936	1,160	1,730	2,360	2,730	3,680

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	15	15	16	18	29	37	46	62
0.02	50	19	19	21	24	43	53	65	87
0.05	20	28	29	31	36	73	89	107	143
0.10	10	40	42	45	51	115	139	163	219
0.20	5	62	66	69	81	195	232	268	362
0.50	2	142	154	163	199	486	571	656	894
0.80	1.25	331	362	393	511	1,090	1,280	1,490	2,060
0.90	1.11	520	567	628	853	1,590	1,880	2,220	3,100
0.96	1.04	844	914	1,040	1,490	2,310	2,760	3,340	4,700
0.98	1.02	1,160	1,250	1,450	2,160	2,890	3,490	4,290	6,080
0.99	1.01	1,540	1,650	1,950	3,030	3,500	4,260	5,340	7,610
		July-August-September				October-November-December			
0.01	100	17	21	24	31	22	23	26	32
0.02	50	22	26	31	40	26	28	32	40
0.05	20	33	38	44	58	36	39	44	54
0.10	10	46	53	61	80	47	52	59	73
0.20	5	68	79	90	121	66	75	85	106
0.50	2	148	169	193	265	134	160	182	230
0.80	1.25	316	358	416	588	290	367	421	537
0.90	1.11	469	529	625	896	445	582	672	865
0.96	1.04	713	801	967	1,410	716	975	1,130	1,470
0.98	1.02	933	1,050	1,280	1,890	983	1,380	1,610	2,100
0.99	1.01	1,190	1,330	1,660	2,460	1,320	1,900	2,230	2,930

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 September 1988.

GAGE.--Water-stage recorder. Datum of gage is 801.04 ft above NGVD (levels by Iowa Department of Natural Resources Council).

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.

Rating table number 10, developed April 1986

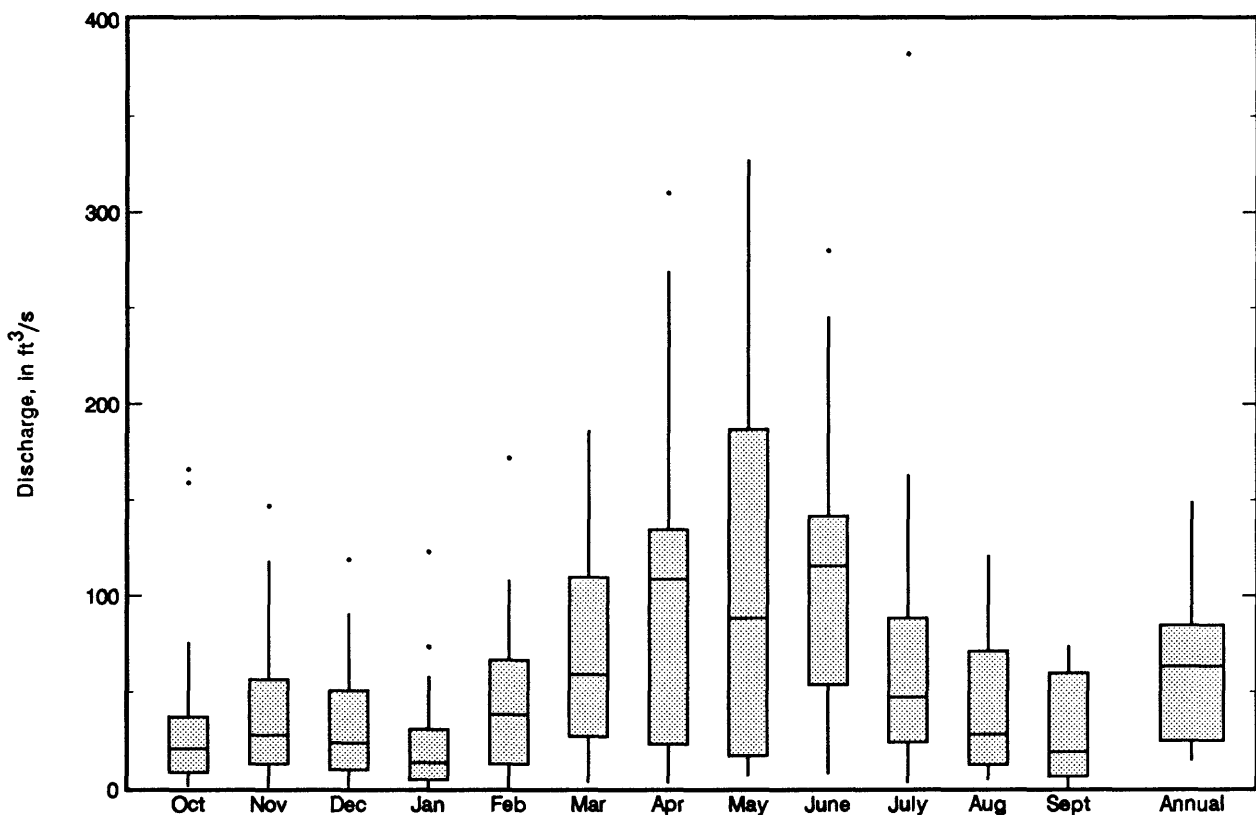
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
3.5	12	8.0	717
3.7	22	10.0	1,300
4.0	41	12.0	2,020
4.5	85	14.0	2,920
5.0	141	16.0	4,500
5.5	210	17.0	6,000
6.5	381	18.0	10,000

DES MOINES RIVER BASIN
05484800 WALNUT CREEK AT DES MOINES, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	166	1974	1.33	1972	39.0	50.9	5.2
November	147	1973	0.88	1977	42.7	43.0	5.7
December	119	1983	0.17	1977	34.8	35.0	4.7
January	123	1974	0.000	1977	26.8	32.4	3.6
February	172	1973	0.48	1977	48.0	46.0	6.4
March	186	1979	3.17	1981	73.6	51.4	9.9
April	310	1973	2.71	1981	113	93.6	15.1
May	327	1986	6.36	1977	113	97.4	15.2
June	280	1984	7.62	1977	110	81.3	14.8
July	382	1973	2.96	1985	73.7	91.6	9.9
August	121	1975	4.37	1976	42.5	38.3	5.7
September	73.5	1986	0.57	1976	28.5	27.0	3.8
Annual	149	1973	14.3	1981	62.1	38.0	100.0

Boxplots of monthly and annual mean discharges



DES MOINES RIVER BASIN
05484800 WALNUT CREEK AT DES MOINES, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.00	0.01	2.3	1.6	0.72	0.00	0.54	0.08	0.03	0.12	0.55	0.11	0.02
95	0.01	0.74	3.8	3.7	3.8	2.1	1.1	0.38	0.38	0.58	0.97	0.26	0.90
90	1.3	2.0	8.1	6.8	7.4	5.0	2.0	0.95	0.80	1.4	2.0	1.8	2.0
85	2.1	4.7	11	14	10	8.5	3.6	1.6	1.3	2.2	3.7	2.6	3.8
80	3.9	7.2	14	19	13	15	7.5	2.9	1.9	2.9	4.9	4.6	5.9
75	5.0	8.4	18	25	17	23	10	4.8	2.7	4.1	7.1	7.0	8.1
70	6.3	9.6	22	30	26	30	14	6.0	3.9	6.2	9.8	8.8	10
65	7.7	11	31	39	42	38	17	7.3	5.3	8.0	12	11	13
60	9.3	14	37	50	55	46	20	8.9	6.8	9.5	15	13	17
55	11	16	42	57	64	54	23	11	8.7	12	19	16	21
50	13	20	48	65	76	63	29	13	11	16	23	21	26
45	15	25	57	74	88	72	34	15	13	19	28	27	33
40	20	32	66	83	101	81	41	18	16	22	34	33	41
35	26	40	77	93	116	91	48	22	20	26	41	38	49
30	31	48	90	107	131	100	59	28	25	29	49	44	60
25	37	57	103	130	145	124	70	35	32	33	59	49	71
20	43	66	125	156	173	148	88	44	44	46	69	57	89
15	50	86	145	203	205	187	113	59	61	71	93	65	114
10	64	122	184	283	263	235	149	92	81	104	120	77	149
5	94	187	245	421	372	330	266	172	111	176	150	114	231

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	256	100	77	54	36
0.95	1.05	490	163	120	86	59
0.90	1.11	688	211	153	110	75
0.80	1.25	1,030	290	203	145	102
0.50	2	2,220	536	350	244	176
0.20	5	4,700	994	599	398	294
0.10	10	6,910	1,380	793	508	380
0.04	25	10,400	1,950	1,070	655	496
0.02	50	13,400	2,450	1,290	767	586
0.01	100	16,900	3,000	1,530	882	678

DES MOINES RIVER BASIN
05484800 WALNUT CREEK AT DES MOINES, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.02	0.05	0.19	0.39
0.02	50	0.00	0.00	0.00	0.00	0.00	0.05	0.13	0.39	0.73
0.05	20	0.00	0.00	0.00	0.00	0.00	0.24	0.47	1.1	1.7
0.10	10	0.00	0.00	0.00	0.06	0.78	0.77	1.3	2.3	3.5
0.20	5	0.06	0.12	0.45	0.45	1.8	2.5	3.6	5.2	7.3
0.50	2	1.2	1.8	2.4	3.7	5.7	11	15	18	23
0.80	1.25	5.9	6.6	7.4	11	14	24	35	39	51
0.90	1.11	11	11	12	15	22	28	44	52	70
0.96	1.04	15	15	19	18	33	31	52	64	90
0.98	1.02	18	18	26	20	42	32	55	70	102
0.99	1.01	20	20	33	21	53	32	57	75	112

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.44	0.44	0.42	0.57	0.13	0.22	0.01	0.38
0.02	50	0.62	0.63	0.63	0.86	0.29	0.47	0.03	0.78
0.05	20	1.0	1.1	1.1	1.6	0.86	1.3	0.21	2.1
0.10	10	1.6	1.7	1.9	2.6	2.0	2.9	0.99	4.7
0.20	5	2.8	3.0	3.4	4.7	5.0	7.0	4.5	11
0.50	2	7.5	8.5	9.9	13	20	26	33	43
0.80	1.25	20	23	27	34	51	62	86	116
0.90	1.11	33	38	43	54	73	86	108	173
0.96	1.04	57	64	71	85	98	111	121	242
0.98	1.02	79	90	97	112	113	125	125	289
0.99	1.01	107	120	128	142	125	136	127	330
		July-August-September				October-November-December			
0.01	100	0.00	0.02	0.12	0.24	0.01	0.02	0.03	0.07
0.02	50	0.00	0.04	0.18	0.39	0.02	0.04	0.07	0.16
0.05	20	0.02	0.10	0.34	0.76	0.06	0.15	0.23	0.48
0.10	10	0.04	0.22	0.59	1.3	0.17	0.39	0.59	1.1
0.20	5	0.15	0.52	1.1	2.5	0.52	1.1	1.6	2.9
0.50	2	1.2	2.3	3.5	7.4	3.4	6.1	8.2	13
0.80	1.25	6.6	8.4	10	19	16	21	27	36
0.90	1.11	14	15	18	29	31	36	42	55
0.96	1.04	30	28	30	43	58	55	62	78
0.98	1.02	47	40	42	55	84	69	76	94
0.99	1.01	67	54	57	68	112	82	89	107

DES MOINES RIVER BASIN

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 September 1988.

GAGE.--Water-stage recorder. Datum of gage is 762.52 ft above NGVD. Prior to Oct. 1, 1951 and Oct. 1, 1953 to Sept. 30, 1959, water-stage recorder upstream of Scott Street Dam, 0.8 mi upstream at datum 11.16 ft higher. Oct. 1, 1951 to Sept. 30, 1953 and Oct. 1, 1959 to Sept. 30, 1961, nonrecording gage at present site and datum.

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.

REMARKS.--Flow regulated by Saylorville Lake (station 05481630) 13.0 mi upstream, since Apr. 12, 1977. Data for unregulated period is compiled using data from water years 1940 to 1977. Data for regulated period is compiled using data from water years 1978 to 1988.

Rating table number 14, developed October 1974

Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
7.2	46	15.0	8,400
7.5	87	17.0	12,300
8.0	235	19.0	16,900
8.5	472	21.0	22,000
9.0	774	23.0	28,000
10.0	1,550	25.0	35,500
11.0	2,550	27.0	45,500
13.0	5,120	29.0	64,500

DES MOINES RIVER BASIN

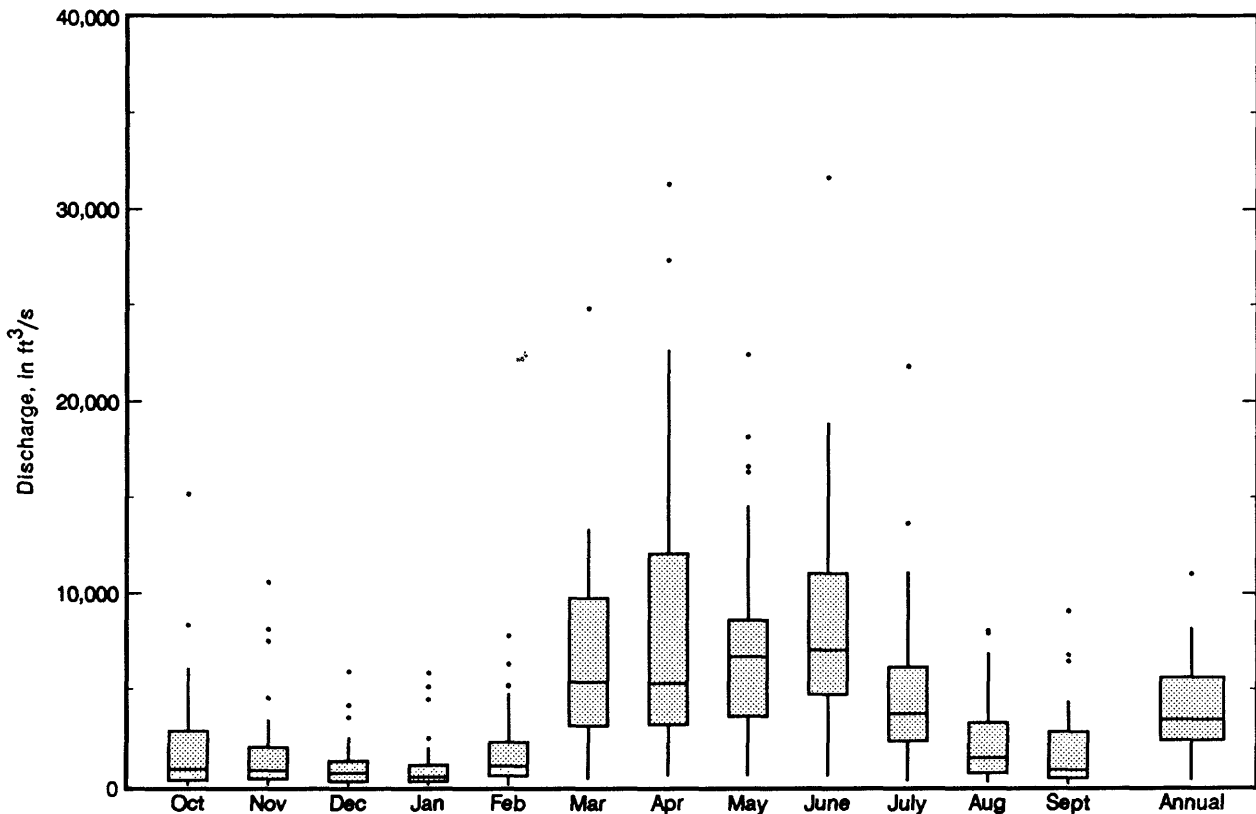
05485500 DES MOINES RIVER BELOW RACCOON RIVER AT DES MOINES, IA--Continued

Pre-regulation Period

Statistics of monthly and annual mean discharges, pre-regulation period

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	15,170	1974	100	1957	2,150	3,046	4.3
November	10,580	1973	127	1956	1,837	2,410	3.7
December	5,910	1974	90.5	1956	1,123	1,251	2.3
January	5,849	1973	104	1956	1,079	1,404	2.2
February	7,780	1973	115	1956	1,958	1,938	4.0
March	24,800	1973	432	1968	6,537	5,130	13.2
April	31,320	1965	592	1956	8,894	8,118	18.0
May	22,430	1944	575	1956	7,352	5,270	14.9
June	31,660	1947	567	1956	8,957	6,482	18.1
July	21,830	1969	308	1956	5,192	4,531	10.5
August	8,049	1951	253	1955	2,464	2,255	5.0
September	9,089	1962	159	1955	1,945	2,173	3.9
Annual	11,000	1973	355	1956	4,126	2,382	100.0

Boxplots of monthly and annual mean discharges, pre-regulation period



DES MOINES RIVER BASIN

05485500 DES MOINES RIVER BELOW RACCOON RIVER AT DES MOINES, IA--Continued

Monthly and annual flow duration, pre-regulation period

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	86	102	232	302	393	258	266	179	102	73	109	88	103
95	106	119	410	680	610	962	650	324	167	154	201	140	184
90	129	160	587	1,370	1,010	1,530	940	434	237	220	262	185	284
85	159	231	720	1,660	1,960	2,190	1,190	521	300	271	299	220	370
80	202	302	1,200	1,980	2,640	2,860	1,460	608	359	307	355	253	473
75	266	341	1,660	2,450	3,130	3,460	1,670	704	424	348	432	300	577
70	329	377	2,040	3,050	3,550	3,910	1,920	795	486	394	521	361	711
65	376	443	2,420	3,650	3,930	4,410	2,200	884	541	457	605	436	894
60	429	512	2,940	4,180	4,370	4,900	2,500	987	606	537	674	517	1,110
55	481	579	3,610	4,670	4,830	5,490	2,930	1,090	705	649	759	599	1,400
50	530	747	4,230	5,290	5,390	6,110	3,430	1,260	835	830	870	677	1,750
45	578	945	4,710	6,240	6,000	6,900	3,900	1,430	993	1,010	1,000	761	2,210
40	653	1,210	5,340	7,190	6,610	7,720	4,410	1,650	1,200	1,210	1,170	852	2,790
35	743	1,620	6,180	8,530	7,230	8,860	4,930	1,960	1,460	1,470	1,440	967	3,460
30	950	2,050	7,360	10,300	7,960	10,100	5,650	2,380	1,720	2,000	1,670	1,110	4,170
25	1,140	2,650	8,620	12,000	8,950	11,500	6,440	2,980	2,080	2,680	2,180	1,350	4,980
20	1,320	3,240	10,100	14,000	10,400	13,700	7,460	3,690	2,640	3,320	2,730	1,670	6,170
15	1,600	3,850	11,900	16,700	12,500	16,300	8,950	4,560	3,420	3,980	3,240	2,040	7,900
10	2,490	4,900	16,100	20,900	15,900	19,900	11,300	5,890	4,770	5,220	4,260	2,710	10,700
5	5,180	7,620	23,100	28,600	22,000	26,900	18,000	9,070	7,370	8,340	7,950	3,820	16,200

Probability of annual high discharges, pre-regulation period

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	—	3,040	1,900	1,440	1,100
0.95	1.05	10,300	7,170	5,290	3,940	3,040
0.90	1.11	13,100	10,600	8,340	6,170	4,770
0.80	1.25	17,500	16,000	13,300	9,830	7,630
0.50	2	28,900	29,600	25,600	19,200	14,900
0.20	5	45,600	44,700	37,900	29,000	22,600
0.10	10	56,700	51,800	42,700	33,100	25,800
0.04	25	70,400	58,100	46,200	36,400	28,300
0.02	50	80,400	61,400	47,700	37,900	29,500
0.01	100	90,200	63,700	48,600	38,900	30,200

DES MOINES RIVER BASIN

05485500 DES MOINES RIVER BELOW RACCOON RIVER AT DES MOINES, IA--Continued

Probability of annual low discharges, pre-regulation period

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	39	44	46	47	56	76	88	91	104
0.02	50	49	53	56	58	69	90	104	111	132
0.05	20	66	73	76	79	94	119	137	151	190
0.10	10	88	96	99	105	125	153	177	202	264
0.20	5	124	134	139	150	177	214	249	292	396
0.50	2	239	257	273	299	353	428	518	624	877
0.80	1.25	466	501	555	613	724	931	1,210	1,440	2,000
0.90	1.11	663	713	817	902	1,070	1,450	1,970	2,300	3,120
0.96	1.04	968	1,040	1,250	1,370	1,620	2,370	3,460	3,890	5,050
0.98	1.02	1,240	1,340	1,650	1,810	2,140	3,310	5,070	5,520	6,920
0.99	1.01	1,550	1,670	2,130	2,320	2,750	4,520	7,250	7,640	9,220

Probability of seasonal low discharges, pre-regulation period

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	53	49	52	62	104	134	159	264
0.02	50	62	60	64	75	165	207	243	381
0.05	20	82	83	88	102	310	378	437	642
0.10	10	106	112	118	136	517	617	708	989
0.20	5	149	162	172	200	902	1,050	1,200	1,610
0.50	2	303	348	373	452	2,190	2,500	2,860	3,690
0.80	1.25	681	792	867	1,150	4,270	4,850	5,620	7,400
0.90	1.11	1,080	1,250	1,390	1,960	5,600	6,380	7,480	10,100
0.96	1.04	1,830	2,070	2,340	3,590	7,100	8,140	9,690	13,700
0.98	1.02	2,610	2,900	3,320	5,430	8,060	9,290	11,200	16,300
0.99	1.01	3,630	3,960	4,580	7,980	8,880	10,300	12,500	18,800
		July-August-September				October-November-December			
0.01	100	48	72	81	121	61	58	64	69
0.02	50	64	91	102	149	70	70	78	85
0.05	20	96	129	143	205	88	94	106	118
0.10	10	139	176	196	273	111	125	142	161
0.20	5	214	259	287	392	152	180	207	239
0.50	2	481	547	608	810	304	391	455	544
0.80	1.25	1,050	1,180	1,320	1,750	701	935	1,100	1,350
0.90	1.11	1,560	1,770	2,010	2,670	1,150	1,540	1,820	2,260
0.96	1.04	2,360	2,760	3,160	4,240	2,040	2,700	3,210	4,020
0.98	1.02	3,080	3,690	4,250	5,760	3,040	3,950	4,700	5,920
0.99	1.01	3,890	4,790	5,570	7,630	4,410	5,630	6,710	8,480

DES MOINES RIVER BASIN

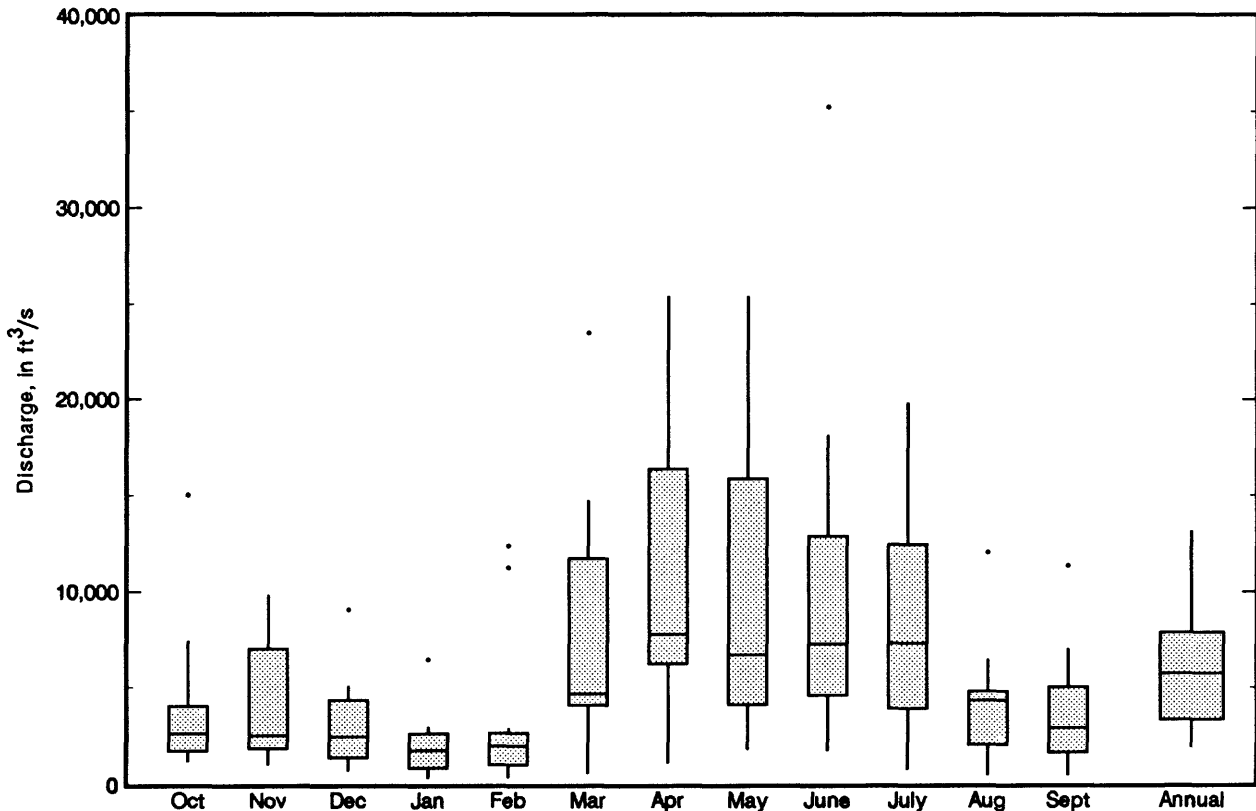
05485500 DES MOINES RIVER BELOW RACCOON RIVER AT DES MOINES, IA--Continued

Post-regulation Period

Statistics of monthly and annual mean discharges, post-regulation period

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	15,060	1987	1,163	1985	4,054	4,072	5.4
November	9,828	1987	986	1981	4,102	3,176	5.5
December	9,045	1983	680	1981	3,175	2,464	4.3
January	6,439	1983	310	1981	1,964	1,737	2.6
February	12,400	1984	343	1978	3,452	4,229	4.6
March	23,530	1983	560	1981	8,478	6,715	11.4
April	25,420	1983	1,082	1981	11,400	8,019	15.3
May	25,400	1984	1,794	1981	10,660	8,071	14.3
June	35,250	1984	1,716	1988	10,450	9,579	14.0
July	19,800	1983	739	1988	8,691	6,693	11.7
August	12,060	1979	441	1988	4,137	3,254	5.6
September	11,390	1979	434	1988	3,840	3,190	5.2
Annual	13,160	1983	1,883	1981	6,209	3,854	100.0

Boxplots of monthly and annual mean discharges, post-regulation period



DES MOINES RIVER BASIN

05485500 DES MOINES RIVER BELOW RACCOON RIVER AT DES MOINES, IA--Continued

Monthly and annual flow duration, post-regulation period

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	234	286	234	696	908	802	504	304	356	584	811	359	302
95	313	343	321	1,150	1,500	1,300	627	369	440	740	939	660	480
90	380	393	617	2,730	2,510	2,020	979	463	677	1,020	1,090	866	721
85	500	445	1,630	3,600	2,830	2,730	1,240	630	824	1,220	1,290	1,010	1,000
80	635	499	2,680	4,050	3,160	3,200	1,680	1,000	987	1,390	1,480	1,130	1,260
75	718	563	3,120	4,570	3,900	3,540	2,290	1,380	1,180	1,540	1,660	1,250	1,540
70	792	604	3,420	5,100	4,410	3,940	2,900	1,660	1,330	1,750	1,790	1,380	1,850
65	894	649	3,790	5,990	4,780	4,500	4,300	1,900	1,510	1,920	1,930	1,500	2,200
60	1,030	930	4,250	7,010	5,170	5,490	5,320	2,340	1,760	2,070	2,060	1,670	2,560
55	1,200	1,380	4,710	7,980	5,780	6,450	6,060	2,760	2,130	2,230	2,190	1,980	2,960
50	1,420	1,580	5,250	8,870	6,860	7,380	6,820	3,120	2,380	2,450	2,410	2,300	3,430
45	1,670	1,790	5,910	9,780	8,820	8,420	7,570	3,410	2,620	2,710	2,670	2,580	4,000
40	1,860	2,030	6,650	11,100	10,700	9,740	8,370	3,740	2,890	3,100	3,050	3,180	4,680
35	2,110	2,260	7,640	12,800	12,900	11,000	9,530	4,120	3,230	3,650	4,430	3,500	5,530
30	2,390	2,480	9,300	14,800	15,700	12,100	10,900	4,660	3,650	4,110	5,600	3,920	6,610
25	2,690	2,720	11,400	18,300	17,800	13,400	12,400	5,340	4,550	4,680	6,700	4,410	8,010
20	2,990	3,020	15,500	20,700	19,400	15,100	14,400	6,020	5,740	5,600	7,670	5,030	9,740
15	3,440	4,070	19,100	22,800	21,300	18,000	16,400	7,630	7,360	7,200	8,740	5,780	12,300
10	3,970	9,400	22,600	25,000	23,300	22,500	19,000	9,460	10,000	8,520	9,490	6,520	16,800
5	4,990	21,800	26,400	27,800	26,600	31,800	27,200	13,000	15,000	13,000	10,700	7,400	22,600

Probability of annual high discharges, post-regulation period

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge ¹ (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	4,800	3,800	3,460	3,220	2,630
0.95	1.05	8,000	6,860	6,070	5,420	4,280
0.90	1.11	11,600	9,170	8,050	7,070	5,510
0.80	1.25	14,500	12,800	11,100	9,630	7,460
0.50	2	22,000	22,500	19,700	16,900	13,200
0.20	5	31,200	36,600	32,700	28,300	22,800
0.10	10	37,000	45,800	41,600	36,500	30,300
0.04	25	45,000	57,000	52,900	47,300	40,700
0.02	50	50,000	64,800	61,200	55,600	49,100
0.01	100	63,900	72,200	69,400	63,900	58,000

¹ Data supplied by U.S. Army Corps of Engineers, Rock Island District.

DES MOINES RIVER BASIN

05485500 DES MOINES RIVER BELOW RACCOON RIVER AT DES MOINES, IA--Continued

Probability of annual low discharges, post-regulation period

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	117	121	120	120	141	187	299	328	447
0.02	50	149	154	152	153	180	243	371	414	559
0.05	20	211	217	216	218	257	354	509	581	774
0.10	10	284	290	292	298	352	488	672	778	1,030
0.20	5	399	406	417	431	512	709	932	1,100	1,430
0.50	2	727	740	796	858	1,030	1,380	1,710	2,040	2,620
0.80	1.25	1,240	1,270	1,470	1,660	2,020	2,520	3,040	3,640	4,610
0.90	1.11	1,600	1,650	1,990	2,320	2,850	3,380	4,060	4,840	6,110
0.96	1.04	2,050	2,150	2,730	3,290	4,090	4,530	5,490	6,470	8,160
0.98	1.02	2,390	2,520	3,320	4,110	5,140	5,420	6,640	7,760	9,780
0.99	1.01	2,720	2,900	3,950	5,000	6,300	6,340	7,850	9,090	11,500

Probability of seasonal low discharges, post-regulation period

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	86	99	102	117	185	319	426	569
0.02	50	113	128	133	151	275	438	563	737
0.05	20	170	187	195	222	483	695	853	1,090
0.10	10	242	261	273	312	778	1,040	1,230	1,540
0.20	5	367	389	410	469	1,340	1,670	1,920	2,330
0.50	2	788	819	883	1,010	3,490	3,980	4,420	5,170
0.80	1.25	1,630	1,690	1,870	2,140	8,060	9,060	10,100	11,500
0.90	1.11	2,330	2,440	2,760	3,150	11,900	13,700	15,400	17,300
0.96	1.04	3,390	3,600	4,150	4,730	17,600	20,900	24,200	27,000
0.98	1.02	4,290	4,610	5,390	6,140	22,200	27,300	32,300	35,900
0.99	1.01	5,280	5,750	6,800	7,750	27,100	34,500	41,900	46,300
		July-August-September				October-November-December			
0.01	100	214	210	197	273	181	265	362	481
0.02	50	242	243	240	331	220	312	415	553
0.05	20	295	310	324	446	294	403	517	688
0.10	10	358	390	428	586	381	511	636	846
0.20	5	465	526	605	821	525	689	833	1,100
0.50	2	825	995	1,210	1,610	974	1,270	1,470	1,920
0.80	1.25	1,630	2,060	2,530	3,290	1,830	2,470	2,810	3,550
0.90	1.11	2,430	3,130	3,780	4,840	2,560	3,570	4,050	5,030
0.96	1.04	3,850	5,040	5,880	7,400	3,660	5,370	6,150	7,440
0.98	1.02	5,280	6,970	7,890	9,800	4,630	7,070	8,150	9,690
0.99	1.01	7,120	9,430	10,300	12,700	5,720	9,090	10,600	12,400

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 Muchikinock Creek and 5.0 mi upstream from Des Moines River.

DRAINAGE AREA.--92.7 mi².

PERIOD OF RECORD.--October 1971 to September 1988.

GAGE.--Water-stage recorder. Datum of gage is 795.87 ft above NGVD.

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.

Rating table number 8, developed January 1988

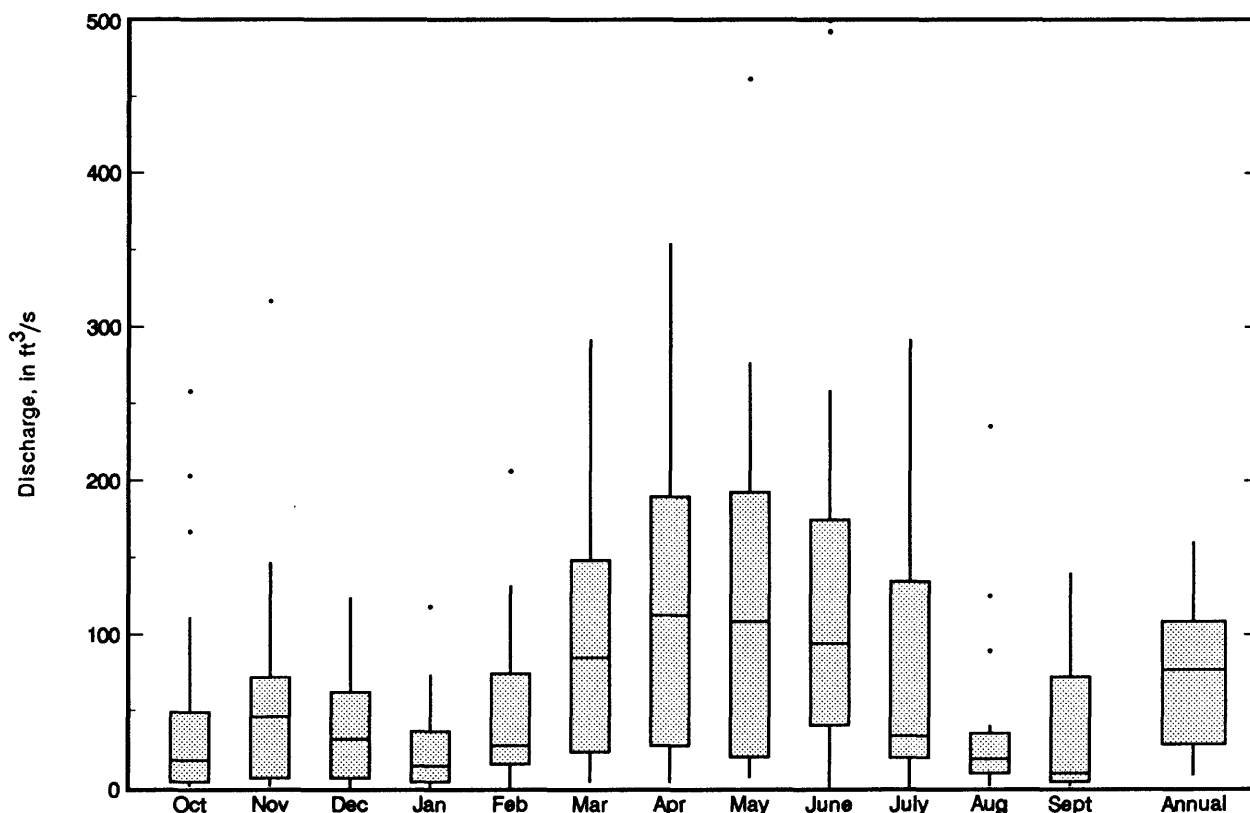
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
3.5	7.4	6.0	318
3.7	18	7.0	530
4.0	38	9.0	1,070
4.5	85	13.0	3,120
5.0	149	15.0	5,600

DES MOINES RIVER BASIN
05485640 FOURMILE CREEK AT DES MOINES, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	258	1987	1.51	1977	55.9	79.6	6.2
November	317	1984	1.57	1977	59.4	77.6	6.6
December	124	1983	0.25	1977	42.6	42.6	4.7
January	118	1974	0.000	1977	27.1	31.7	3.0
February	206	1973	0.55	1977	50.3	56.2	5.6
March	292	1979	4.04	1981	101	83.4	11.2
April	354	1973	3.67	1981	133	117	14.7
May	462	1974	6.67	1977	134	123	14.9
June	500	1974	0.73	1977	143	153	15.9
July	292	1982	0.070	1977	76.9	84.4	8.5
August	235	1987	1.66	1988	40.4	59.7	4.5
September	140	1986	1.37	1988	38.6	45.6	4.3
Annual	160	1984	7.97	1981	75.2	50.4	100.0

Boxplots of monthly and annual mean discharges



DES MOINES RIVER BASIN
05485640 FOURMILE CREEK AT DES MOINES, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.00	0.01	2.5	1.1	1.6	0.00	0.00	0.00	0.47	0.14	0.52	0.15	0.01
95	0.01	0.32	3.9	2.8	3.1	1.4	0.01	0.42	0.82	0.85	1.5	0.40	0.95
90	0.97	1.3	6.5	4.3	8.6	4.3	1.5	1.3	1.2	1.4	2.8	2.2	2.1
85	2.1	2.9	11	16	15	7.4	2.6	2.0	1.7	2.0	3.8	2.8	3.1
80	2.7	6.4	15	23	18	12	4.1	2.7	2.2	2.9	4.6	3.6	4.5
75	3.3	8.8	19	30	22	21	6.8	3.7	2.8	3.7	5.9	5.6	6.6
70	5.0	11	24	37	29	33	9.8	4.9	3.5	4.4	7.7	7.6	9.2
65	7.4	12	30	45	41	41	14	6.5	4.7	5.3	11	9.7	13
60	9.7	14	39	53	58	49	19	8.3	5.9	6.2	19	13	17
55	12	17	48	62	72	56	25	10	7.1	7.9	26	16	23
50	14	21	56	72	84	62	32	12	8.4	13	31	21	29
45	17	25	64	85	95	70	37	14	9.7	20	37	29	36
40	23	29	75	97	108	62	43	16	13	26	44	37	43
35	28	33	90	113	123	94	52	20	20	33	54	45	53
30	33	39	108	129	138	111	61	25	28	40	64	52	65
25	37	44	129	146	156	139	73	30	37	48	78	60	82
20	42	60	155	178	196	172	90	38	50	75	94	67	102
15	46	89	197	216	246	212	115	47	75	116	121	84	133
10	64	129	258	299	312	303	154	67	104	154	155	103	183
5	99	199	390	463	449	628	300	146	170	273	234	145	299

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	—	47	31	28	20
0.95	1.05	—	126	85	68	47
0.90	1.11	1,170	201	137	104	71
0.80	1.25	1,560	335	231	164	111
0.50	2	2,590	765	528	348	235
0.20	5	4,120	1,450	988	623	426
0.10	10	5,150	1,890	1,270	796	550
0.04	25	6,450	2,400	1,590	992	696
0.02	50	7,410	2,730	1,790	1,120	794
0.01	100	8,350	3,020	1,960	1,230	883

DES MOINES RIVER BASIN
05485640 FOURMILE CREEK AT DES MOINES, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.01	0.06	0.26	0.41
0.02	50	0.00	0.00	0.00	0.00	0.00	0.03	0.14	0.46	0.72
0.05	20	0.00	0.00	0.00	0.00	0.00	0.12	0.41	1.0	1.6
0.10	10	0.00	0.00	0.00	0.00	0.00	0.37	0.98	2.0	3.1
0.20	5	0.40	0.54	0.71	0.87	1.3	1.2	2.5	4.3	6.4
0.50	2	1.6	1.8	2.3	3.0	5.5	7.6	11	16	22
0.80	1.25	4.9	5.4	6.4	9.3	16	25	33	45	63
0.90	1.11	8.9	9.6	11	17	26	39	52	72	100
0.96	1.04	16	18	21	33	42	54	75	112	154
0.98	1.02	25	27	32	52	58	63	92	146	198
0.99	1.01	37	40	48	80	76	70	107	180	243

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.04	0.10	0.18	0.27	0.18	0.28	0.09	0.27
0.02	50	0.10	0.20	0.32	0.47	0.39	0.59	0.24	0.62
0.05	20	0.30	0.53	0.73	1.0	1.1	1.6	0.85	1.9
0.10	10	0.75	1.1	1.4	2.0	2.5	3.6	2.3	4.6
0.20	5	2.0	2.6	3.1	4.0	6.0	8.4	6.5	12
0.50	2	8.3	9.6	10	13	23	30	30	46
0.80	1.25	22	25	27	36	57	71	82	117
0.90	1.11	32	36	40	56	81	97	117	163
0.96	1.04	42	49	58	84	106	124	152	210
0.98	1.02	48	58	71	106	121	140	171	236
0.99	1.01	53	66	84	129	133	152	186	257
		July-August-September				October-November-December			
0.01	100	0.02	0.11	0.28	0.37	0.01	0.03	0.08	0.12
0.02	50	0.05	0.18	0.39	0.55	0.02	0.07	0.15	0.22
0.05	20	0.13	0.35	0.63	0.96	0.08	0.18	0.34	0.57
0.10	10	0.27	0.60	0.98	1.6	0.21	0.43	0.70	1.2
0.20	5	0.63	1.1	1.6	2.7	0.64	1.1	1.6	2.9
0.50	2	2.4	3.3	4.4	7.8	4.1	5.6	6.9	12
0.80	1.25	6.5	8.3	12	21	19	21	26	41
0.90	1.11	9.8	13	20	35	36	39	48	69
0.96	1.04	14	20	34	58	65	70	91	113
0.98	1.02	17	25	48	79	92	98	133	150
0.99	1.01	20	31	65	105	121	130	186	189

DES MOINES RIVER BASIN
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 September 1988.

GAGE.—Water-stage recorder. Datum of gage is 788.45 ft above NGVD (levels by U.S. Army Corps of Engineers). Prior to June 12, 1946, nonrecording gage at same site and datum. Jan. 7 to Oct. 11, 1960, nonrecording gage at site 2.1 mi upstream at different datum.

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.

Rating table number 14, developed October 1986

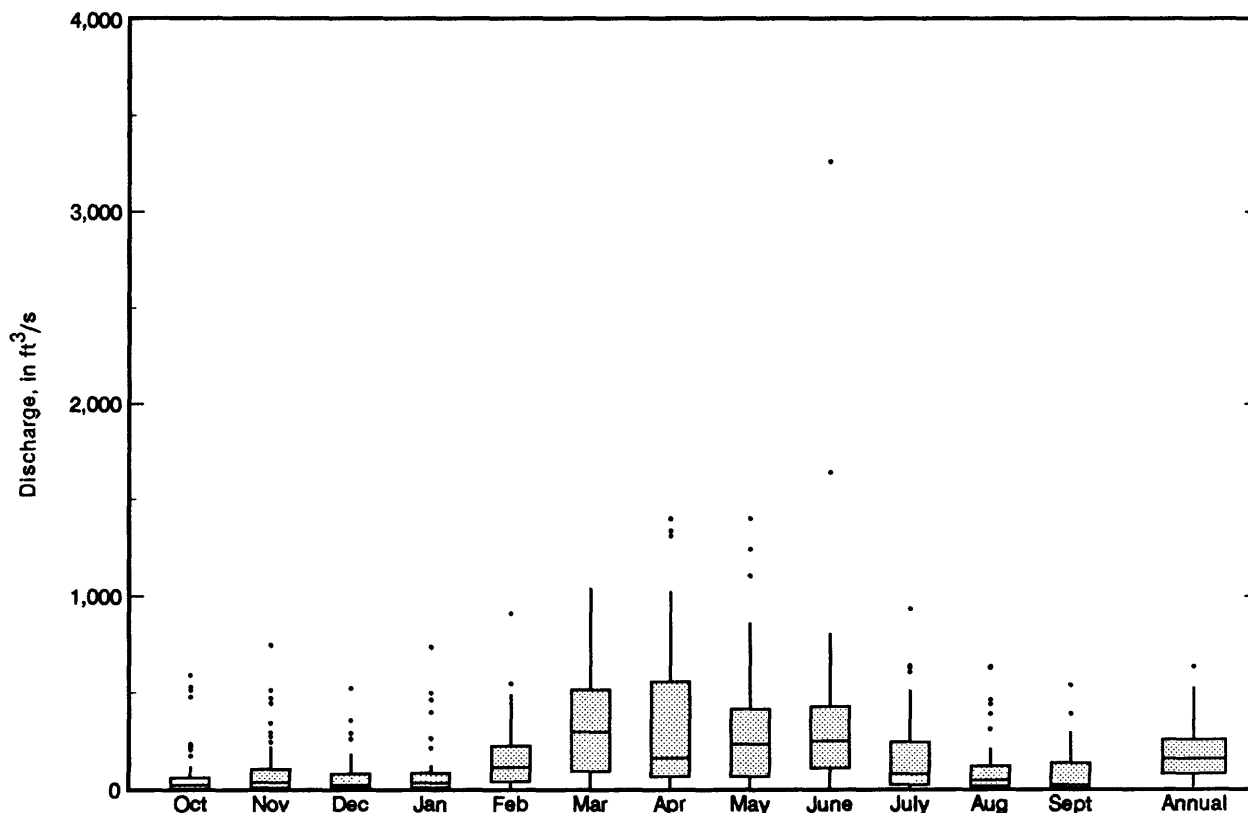
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
6.0	2.6	10.0	305
6.2	5.0	12.0	575
6.5	13	14.0	920
6.7	21	16.0	1,370
7.0	37	18.0	2,000
7.5	68	22.0	5,220
8.0	106	24.0	16,900
9.0	197		

DES MOINES RIVER BASIN
05486000 NORTH RIVER NEAR NORWALK, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	593	1987	0.20	1950	83.5	150	3.8
November	747	1973	0.37	1956	102	162	4.6
December	526	1983	0.36	1956	69.3	105	3.1
January	739	1973	0.38	1954	83.6	149	3.8
February	911	1973	3.21	1956	164	184	7.4
March	1,041	1965	3.90	1954	345	281	15.5
April	1,401	1973	1.22	1956	346	384	15.6
May	1,402	1984	3.71	1967	323	337	14.5
June	3,260	1947	1.58	1977	355	517	15.9
July	935	1973	1.10	1977	168	211	7.6
August	638	1946	0.21	1968	106	158	4.7
September	541	1972	0.26	1957	79.5	116	3.6
Annual	638	1973	8.08	1968	185	139	100.0

Boxplots of monthly and annual mean discharges



DES MOINES RIVER BASIN
05486000 NORTH RIVER NEAR NORWALK, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.33	0.87	2.6	1.0	0.93	0.56	0.10	0.02	0.02	0.02	0.16	0.34	0.11
95	0.71	1.7	5.5	6.6	3.8	3.0	0.69	0.32	0.27	0.12	0.58	0.99	0.62
90	1.3	3.1	12	17	7.6	6.6	3.1	0.89	0.46	0.28	1.2	1.6	1.8
85	1.9	5.1	19	25	14	15	6.1	2.3	0.76	0.44	2.0	2.2	3.7
80	3.8	7.7	31	35	27	26	9.3	4.1	1.4	0.93	3.0	3.1	6.5
75	5.6	11	45	45	40	40	14	5.8	2.5	1.7	7.3	5.1	9.5
70	7.5	15	59	56	53	53	19	7.7	3.8	4.0	11	8.2	14
65	9.5	22	75	67	72	64	25	9.7	5.4	6.9	15	11	19
60	13	27	92	86	94	79	30	12	7.4	9.5	19	14	25
55	17	31	110	108	118	98	38	15	9.1	14	23	17	32
50	21	40	138	139	146	118	46	18	12	19	27	20	42
45	25	50	168	173	178	140	57	22	17	25	30	25	54
40	31	67	210	208	218	164	70	27	23	31	36	30	70
35	40	94	257	247	260	198	88	32	33	38	43	40	94
30	53	126	311	293	305	234	107	43	44	45	57	53	124
25	72	161	381	339	356	298	138	57	59	57	95	76	161
20	94	204	473	429	436	384	176	74	80	73	152	108	215
15	121	273	616	533	529	510	223	105	110	121	206	144	296
10	165	423	840	740	757	875	322	159	171	190	288	189	438
5	337	810	1,460	1,560	1,390	1,450	717	356	340	368	478	264	818

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	448	254	152	100	59
0.95	1.05	827	549	348	228	142
0.90	1.11	1,140	796	515	336	215
0.80	1.25	1,660	1,210	791	515	337
0.50	2	3,370	2,420	1,590	1,020	692
0.20	5	6,660	4,280	2,720	1,720	1,200
0.10	10	9,400	5,500	3,410	2,130	1,500
0.04	25	13,500	6,960	4,170	2,580	1,820
0.02	50	16,900	7,960	4,650	2,860	2,020
0.01	100	20,700	8,890	5,080	3,100	2,200

DES MOINES RIVER BASIN
05486000 NORTH RIVER NEAR NORWALK, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.07	0.09	0.11	0.35
0.02	50	0.00	0.00	0.00	0.00	0.00	0.13	0.18	0.23	0.65
0.05	20	0.00	0.00	0.00	0.00	0.08	0.33	0.48	0.63	1.6
0.10	10	0.01	0.02	0.04	0.07	0.24	0.71	1.1	1.4	3.2
0.20	5	0.16	0.20	0.28	0.34	0.70	1.7	2.7	3.6	7.4
0.50	2	1.4	1.6	2.0	2.6	4.0	8.0	13	18	31
0.80	1.25	7.7	8.2	9.5	12	18	31	51	66	102
0.90	1.11	17	18	20	25	38	60	95	119	177
0.96	1.04	38	38	42	49	79	113	173	210	301
0.98	1.02	62	62	67	74	123	167	246	291	412
0.99	1.01	98	98	102	105	182	232	331	382	535

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.11	0.13	0.15	0.22	0.04	0.16	0.29	0.76
0.02	50	0.19	0.22	0.25	0.39	0.10	0.34	0.57	1.4
0.05	20	0.41	0.49	0.56	0.94	0.40	0.98	1.5	3.6
0.10	10	0.81	0.98	1.1	2.0	1.2	2.3	3.5	7.5
0.20	5	1.8	2.2	2.5	4.6	3.8	6.1	8.7	17
0.50	2	7.9	9.7	11	20	24	30	40	73
0.80	1.25	32	38	45	78	93	107	142	239
0.90	1.11	64	76	90	147	159	186	249	409
0.96	1.04	132	153	183	276	253	312	421	679
0.98	1.02	208	236	285	406	323	418	570	911
0.99	1.01	311	346	421	565	389	531	732	1,160
		July-August-September				October-November-December			
0.01	100	0.02	0.03	0.01	0.05	0.01	0.02	0.02	0.04
0.02	50	0.03	0.06	0.02	0.10	0.03	0.04	0.05	0.08
0.05	20	0.08	0.14	0.08	0.27	0.08	0.12	0.14	0.24
0.10	10	0.19	0.31	0.21	0.63	0.22	0.32	0.37	0.58
0.20	5	0.50	0.76	0.65	1.6	0.66	0.94	1.1	1.6
0.50	2	2.7	3.6	4.2	8.1	4.6	6.2	7.5	10
0.80	1.25	12	14	18	32	26	33	41	53
0.90	1.11	23	27	35	61	57	72	92	114
0.98	1.04	44	51	64	112	126	155	203	248
0.98	1.02	66	75	89	162	204	247	330	396
0.99	1.01	93	104	117	220	308	368	498	593

DES MOINES RIVER BASIN
05486490 MIDDLE RIVER NEAR INDIANOLA, IA

LOCATION.--Lat 41°25'27", long 93°35'09", in SW1/4 SE1/4 sec.35, T.77 N., R.24 W., Warren County, Hydrologic Unit 07100008, on right bank 10 ft downstream from bridge on county highway, 0.4 mi upstream from Cavitt Creek, 1.5 mi upstream from bridge on U.S. Highway 69 and 4.6 mi northwest of Indianola.

DRAINAGE AREA.--503 mi².

PERIOD OF RECORD.--March 1940 to September 1988.

GAGE.--Water-stage recorder. Datum of gage is 776.15 ft above NGVD (U.S. Army Corps of Engineers bench mark). Prior to June 11, 1946, June 9, 1947 to Nov. 23, 1948 and Sept. 8, 1951 to Oct. 30, 1952, nonrecording gage and June 11, 1946 to June 8, 1947 (destroyed by flood), Nov. 24, 1948 to Sept. 7, 1951, Oct. 31, 1952 to Sept. 30, 1962, water-stage recorder at site 1.6 mi downstream at datum 2.81 ft lower.

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.

Rating table number 16, developed May 1986

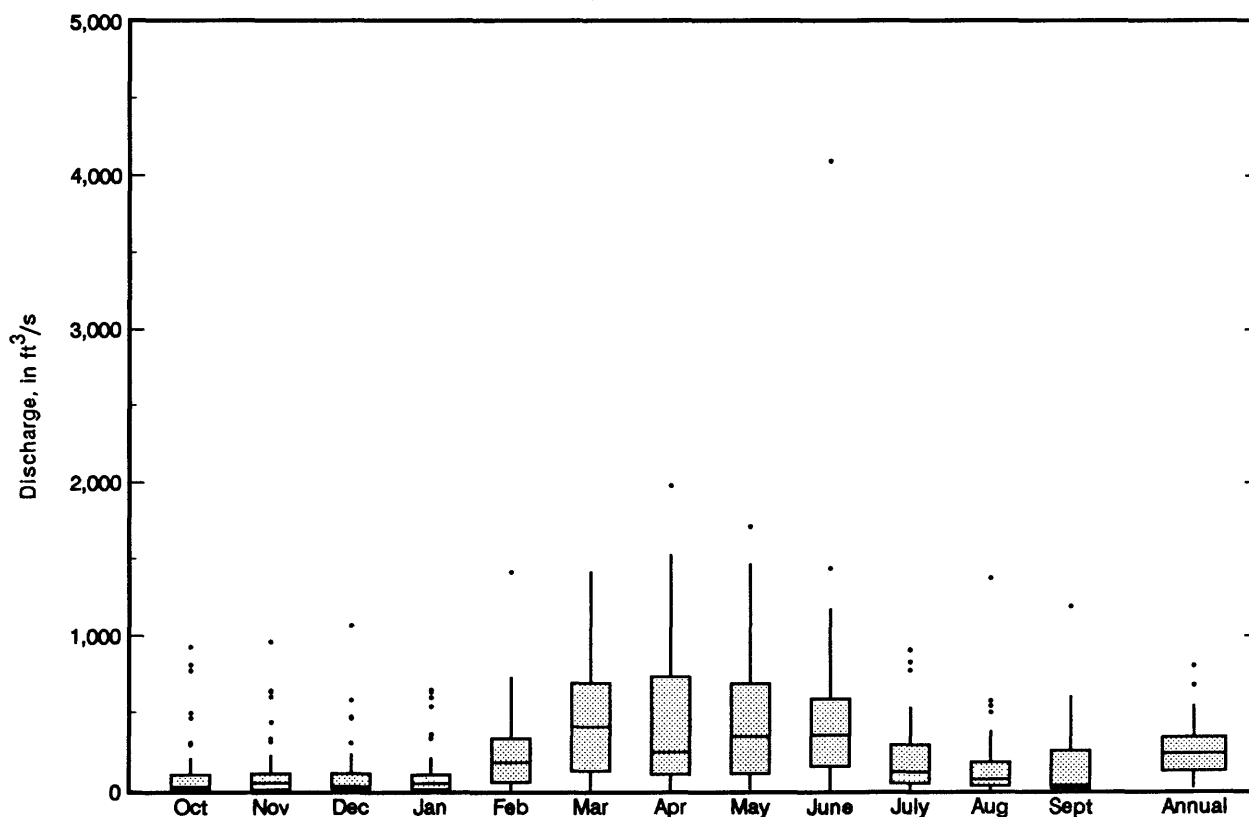
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
5.0	3.0	8.5	730
5.2	8.6	10.0	1,250
5.5	26	14.0	3,050
5.7	44	18.0	5,620
6.0	82	22.0	10,700
6.5	176	24.0	16,400
7.0	296		

DES MOINES RIVER BASIN
05486490 MIDDLE RIVER NEAR INDIANOLA, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	928	1974	4.28	1959	124	217	3.9
November	961	1973	2.80	1956	136	207	4.3
December	1,070	1983	1.62	1956	111	192	3.5
January	646	1973	1.02	1977	111	169	3.5
February	1,415	1973	4.68	1977	241	263	7.6
March	1,417	1962	7.35	1954	480	391	15.2
April	1,983	1973	4.81	1956	474	482	15.0
May	1,716	1944	10.1	1956	460	431	14.6
June	4,094	1947	3.81	1977	485	625	15.4
July	911	1959	5.20	1977	219	239	6.9
August	1,375	1987	4.47	1968	163	238	5.2
September	1,194	1972	3.92	1968	152	224	4.8
Annual	805	1973	17.8	1968	263	172	100.0

Boxplots of monthly and annual mean discharges



DES MOINES RIVER BASIN
05486490 MIDDLE RIVER NEAR INDIANOLA, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.88	2.0	6.1	4.0	4.1	3.1	1.3	1.7	1.7	1.2	2.4	1.6	1.7
95	2.0	3.9	12	20	14	11	7.8	4.9	4.1	3.3	4.7	3.3	4.4
90	3.5	6.2	23	37	22	23	16	9.5	6.4	4.4	6.6	5.2	7.5
85	5.3	8.3	37	53	36	37	22	14	7.7	5.5	8.4	7.1	11
80	7.6	13	51	65	55	54	29	18	9.5	6.8	11	9.4	16
75	10	17	72	78	74	69	35	21	12	8.4	14	12	21
70	13	24	93	95	96	86	42	25	15	11	19	15	28
65	17	32	113	111	119	104	50	29	17	14	23	19	35
60	21	40	134	130	143	123	58	32	20	18	27	22	45
55	27	47	158	150	174	141	68	36	23	22	33	26	55
50	33	59	192	201	207	165	78	42	28	28	40	32	69
45	40	77	229	245	246	192	92	47	35	38	47	39	87
40	48	108	281	283	290	219	106	52	44	48	55	50	109
35	59	153	337	323	339	267	125	63	54	60	67	62	137
30	74	197	411	385	405	316	146	74	73	75	84	74	176
25	103	249	502	447	480	402	180	92	103	94	117	101	223
20	134	308	633	576	606	520	217	111	143	115	173	139	292
15	175	416	862	762	792	709	290	150	205	158	235	192	397
10	227	618	1,220	1,070	1,120	1,070	420	243	302	240	311	259	599
5	412	1,100	2,090	1,880	1,770	1,900	859	519	573	503	591	392	1,130

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	—	476	302	196	123
0.95	1.05	2,600	980	621	404	258
0.90	1.11	3,310	1,380	871	566	367
0.80	1.25	4,360	2,010	1,260	817	539
0.50	2	7,120	3,700	2,260	1,460	996
0.20	5	11,100	5,940	3,530	2,270	1,590
0.10	10	13,700	7,240	4,220	2,710	1,940
0.04	25	16,900	8,640	4,940	3,160	2,300
0.02	50	19,200	9,530	5,370	3,430	2,520
0.01	100	21,500	10,300	5,730	3,650	2,710

DES MOINES RIVER BASIN
05486490 MIDDLE RIVER NEAR INDIANOLA, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.15	0.24	0.31	0.44	0.70	1.1	1.2	1.5	2.2
0.02	50	0.26	0.38	0.48	0.64	0.99	1.5	1.8	2.1	3.3
0.05	20	0.57	0.75	0.88	1.1	1.6	2.5	3.1	3.7	5.8
0.10	10	1.1	1.3	1.5	1.8	2.5	3.9	5.0	6.1	9.5
0.20	5	2.3	2.5	2.8	3.2	4.4	6.6	8.8	11	17
0.50	2	7.6	7.8	8.3	9.4	12	18	26	33	52
0.80	1.25	21	21	23	26	34	50	75	94	148
0.90	1.11	32	34	37	43	58	85	129	160	251
0.96	1.04	49	54	61	74	103	148	228	281	438
0.98	1.02	62	71	83	103	148	213	329	401	622
0.99	1.01	76	89	109	139	206	294	456	551	849

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.52	0.50	0.58	0.72	0.74	1.1	1.7	2.9
0.02	50	0.77	0.77	0.88	1.2	1.4	2.1	2.9	4.9
0.05	20	1.4	1.5	1.7	2.3	3.5	4.8	6.4	10
0.10	10	2.3	2.5	2.9	4.2	7.2	9.4	12	19
0.20	5	4.4	4.9	5.6	8.6	16	19	25	39
0.50	2	14	17	19	32	52	62	79	125
0.80	1.25	47	56	64	108	124	150	199	338
0.90	1.11	88	102	118	201	173	214	296	528
0.96	1.04	170	190	224	380	230	292	423	809
0.98	1.02	260	284	337	568	265	344	517	1,040
0.99	1.01	380	404	484	809	295	391	606	1,280
		July-August-September				October-November-December			
0.01	100	0.19	0.61	0.91	1.8	0.37	0.49	0.61	1.2
0.02	50	0.37	0.93	1.3	2.5	0.55	0.71	0.87	1.7
0.05	20	0.89	1.7	2.3	4.0	1.00	1.3	1.5	2.7
0.10	10	1.8	2.9	3.7	6.0	1.7	2.1	2.5	4.1
0.20	5	3.9	5.2	6.3	9.9	3.2	3.8	4.6	7.1
0.50	2	13	14	16	25	11	13	15	21
0.80	1.25	31	33	39	60	36	42	52	66
0.90	1.11	43	50	58	95	66	79	100	125
0.96	1.04	57	73	87	152	127	157	203	251
0.98	1.02	66	92	111	205	193	244	322	399
0.99	1.01	74	112	138	268	281	365	489	610

DES MOINES RIVER BASIN
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 September 1988.

GAGE.--Water-stage recorder. Datum of gage is 769.97 ft above NGVD. Prior to June 12, 1946, nonrecording gage, June 13, 1946, to Apr. 13, 1960, water-stage recorder and Apr. 14, 1960 to Sept. 30, 1961, nonrecording gage, all at site 4.0 mi downstream at datum 8.06 ft lower.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 34,000 ft³/s June 5, 1947, gage height, 24.60 ft, site and datum then in use; maximum gage height, 32.85 ft July 5, 1981; no flow Sept. 19 to Oct. 13, 1956.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1930 reached a stage of 24.5 ft, from information by local residents, discharge, about 30,000 ft³/s, at site 4.0 mi downstream.

Rating table number 19, developed May 1987

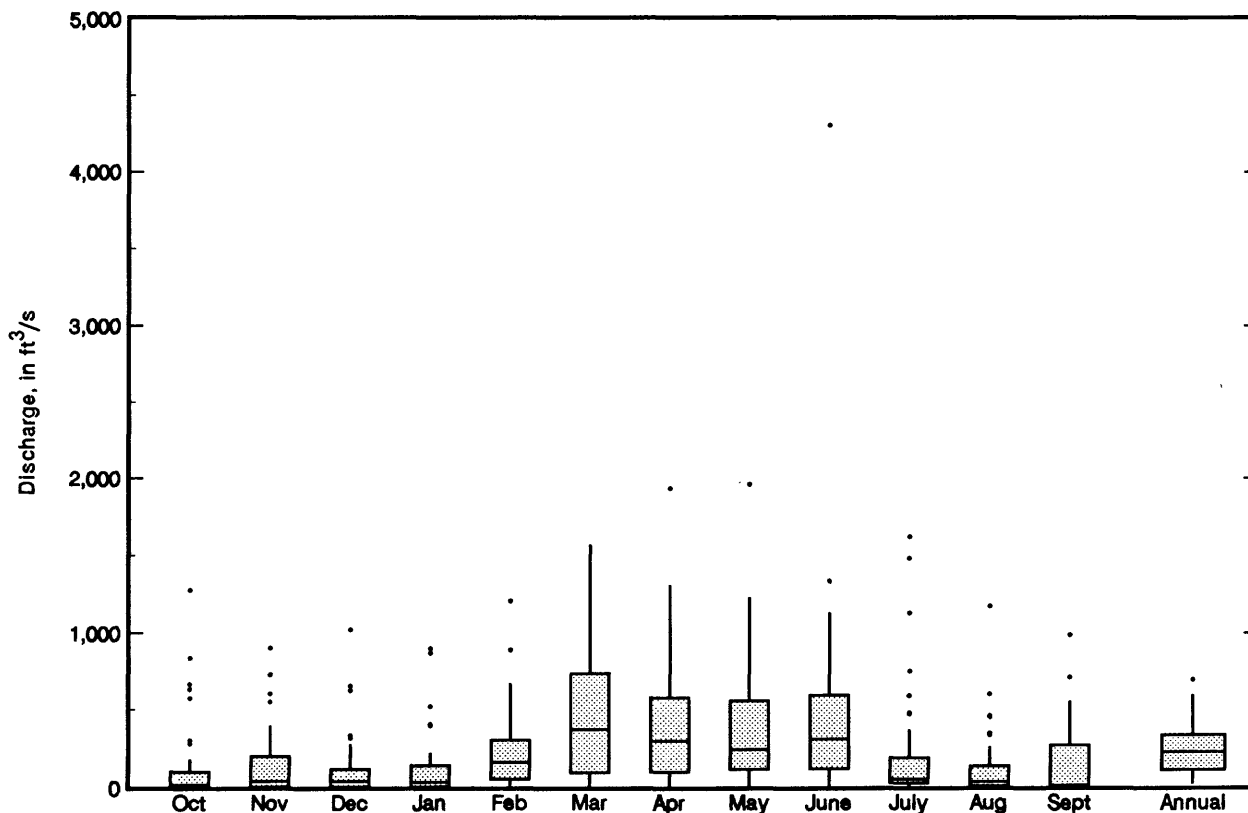
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
5.0	12	14.0	2,830
5.5	52	18.0	5,320
6.0	114	22.0	8,860
7.0	294	26.0	13,500
8.0	522	32.0	27,800
10.0	1,093		

DES MOINES RIVER BASIN
05487470 SOUTH RIVER NEAR ACKWORTH, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	1,283	1974	0.35	1957	128	258	4.3
November	906	1962	1.05	1957	136	201	4.5
December	1,022	1983	0.88	1956	114	198	3.8
January	901	1974	1.05	1956	116	198	3.9
February	1,209	1973	4.50	1964	236	256	7.9
March	1,568	1960	3.61	1957	460	423	15.4
April	1,937	1973	1.70	1956	439	437	14.7
May	1,962	1959	7.14	1980	426	439	14.2
June	4,305	1947	1.79	1977	474	660	15.8
July	1,624	1982	1.48	1977	204	359	6.8
August	1,177	1987	2.02	1957	117	209	3.9
September	990	1972	1.05	1957	142	220	4.8
Annual	696	1973	18.2	1956	249	159	100.0

Boxplots of monthly and annual mean discharges



DES MOINES RIVER BASIN
05487470 SOUTH RIVER NEAR ACKWORTH, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.50	1.1	2.2	1.3	0.89	0.58	0.60	0.90	0.12	0.43	0.79	0.73	0.71
95	1.2	1.8	4.9	7.7	6.1	3.7	1.9	1.9	1.4	1.1	1.5	1.7	1.8
90	1.9	3.4	12	17	12	6.7	4.1	2.8	2.2	1.7	2.5	2.4	3.1
85	2.8	4.7	21	31	19	11	6.3	4.3	3.0	2.3	3.2	2.9	4.3
80	4.1	6.4	31	44	27	17	8.6	5.3	3.8	2.9	3.8	3.6	5.8
75	5.0	13	44	55	39	25	12	6.3	4.5	3.5	4.9	4.7	7.9
70	6.0	21	58	67	53	32	14	7.2	5.1	4.2	6.2	6.3	11
65	8.2	28	73	80	69	40	17	8.2	5.7	5.1	7.6	9.2	16
60	13	37	92	101	86	50	20	9.5	6.7	6.0	10	13	22
55	18	45	113	126	103	62	24	11	7.7	7.3	15	17	30
50	24	56	140	152	122	77	28	13	9.0	9.4	20	25	40
45	31	75	170	181	142	99	34	16	11	15	31	34	52
40	40	96	207	211	166	124	41	19	14	22	51	43	69
35	55	120	252	246	200	153	51	23	19	34	67	51	91
30	71	152	308	291	239	196	66	30	28	45	85	66	118
25	94	192	400	343	303	257	87	37	43	57	109	87	154
20	120	237	544	449	406	366	118	51	71	76	146	118	207
15	146	330	778	636	587	550	162	74	121	107	197	166	294
10	197	555	1,220	994	972	1,030	279	120	218	194	286	225	475
5	382	1,070	2,100	2,020	2,010	2,270	700	314	563	480	563	413	1,110

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	—	830	407	230	135
0.95	1.05	3,730	1,420	762	447	271
0.90	1.11	4,820	1,860	1,030	614	378
0.80	1.25	6,470	2,540	1,440	874	547
0.50	2	10,800	4,370	2,520	1,570	1,010
0.20	5	17,000	7,070	3,950	2,500	1,650
0.10	10	21,000	8,880	4,800	3,070	2,040
0.04	25	25,900	11,100	5,760	3,700	2,480
0.02	50	29,400	12,800	6,380	4,110	2,770
0.01	100	32,800	14,400	6,940	4,480	3,030

DES MOINES RIVER BASIN
05487470 SOUTH RIVER NEAR ACKWORTH, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.07	0.42	0.46	0.43	0.66
0.02	50	0.00	0.00	0.00	0.00	0.14	0.60	0.68	0.69	1.1
0.05	20	0.31	0.37	0.52	0.67	0.37	1.0	1.2	1.4	2.3
0.10	10	0.55	0.65	0.82	1.0	0.78	1.7	2.1	2.6	4.4
0.20	5	1.0	1.2	1.4	1.6	1.8	3.0	4.0	5.4	9.4
0.50	2	2.9	3.1	3.4	4.0	6.7	9.7	14	21	37
0.80	1.25	7.5	7.9	8.6	10	18	32	51	81	133
0.90	1.11	12	13	14	17	28	62	102	159	250
0.96	1.04	20	21	25	30	40	125	216	323	475
0.98	1.02	27	29	35	45	49	199	352	506	710
0.99	1.01	36	38	49	64	57	302	547	756	1,010

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.22	0.23	0.24	0.31	0.20	0.43	0.55	0.91
0.02	50	0.35	0.37	0.40	0.54	0.37	0.74	0.99	1.7
0.05	20	0.67	0.73	0.82	1.2	0.92	1.6	2.2	4.4
0.10	10	1.2	1.3	1.5	2.4	1.9	3.1	4.4	9.2
0.20	5	2.5	2.8	3.3	5.5	4.3	6.3	9.4	21
0.50	2	9.3	11	13	24	16	22	34	83
0.80	1.25	34	40	50	93	46	61	97	249
0.90	1.11	68	78	97	181	72	97	156	401
0.96	1.04	138	157	196	359	108	150	242	620
0.98	1.02	217	245	305	549	136	195	313	792
0.99	1.01	326	364	452	794	162	241	386	966
		July-August-September				October-November-December			
0.01	100	0.30	0.56	0.04	0.95	0.27	0.35	0.16	0.29
0.02	50	0.41	0.70	0.11	1.2	0.38	0.48	0.26	0.44
0.05	20	0.65	0.99	0.34	1.6	0.63	0.79	0.53	0.85
0.10	10	0.97	1.4	0.84	2.2	1.0	1.3	1.00	1.5
0.20	5	1.6	2.0	2.1	3.3	1.8	2.2	2.1	3.1
0.50	2	3.8	4.5	7.3	8.1	5.6	7.2	8.6	12
0.80	1.25	8.8	10	15	23	19	25	34	47
0.90	1.11	14	17	18	42	37	51	68	96
0.96	1.04	21	28	20	84	76	110	140	205
0.96	1.02	28	40	21	134	124	184	222	335
0.99	1.01	37	55	21	210	193	296	335	520

DES MOINES RIVER BASIN
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., Marlon 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 September 1988.

GAGE.--Water-stage recorder. Datum of gage is 759.21 ft above NGVD.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 37,300 ft³/s July 16, 1982, gage height, 33.45 ft; minimum daily discharge, 0.07 ft³/s Sept. 29, 1968

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 11, 1962, reached a stage of 28.87 ft, from floodmark, discharge, about 30,000 ft³/s, at site 4.0 mi downstream.

Rating table number 11, developed October 1975

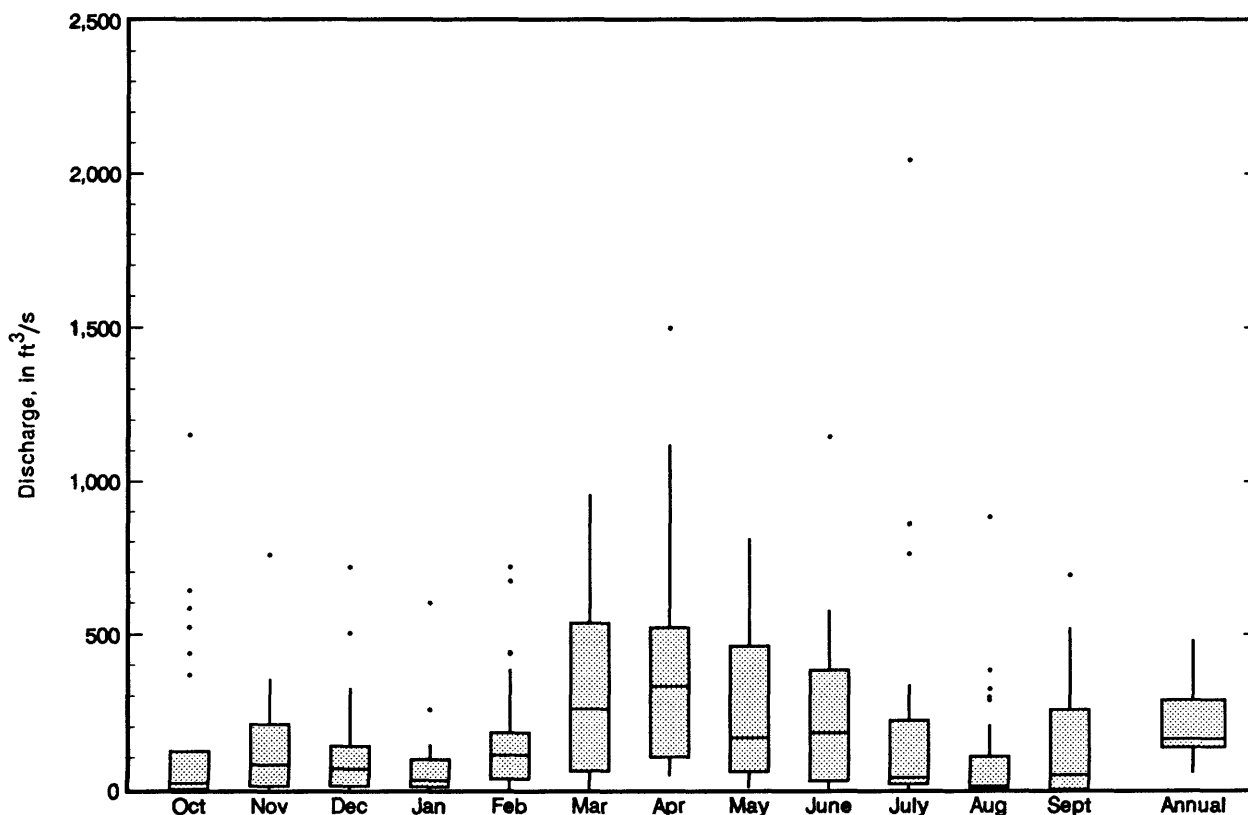
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
5.0	15	12.0	1,410
5.5	50	16.0	2,950
6.0	99	20.0	5,200
6.5	159	24.0	8,640
7.0	230	28.0	14,200
8.0	400	32.0	28,500
10.0	843		

DES MOINES RIVER BASIN
05487980 WHITE BREAST CREEK NEAR DALLAS, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	1,153	1974	1.33	1964	161	286	6.5
November	757	1964	1.35	1977	125	165	5.1
December	718	1983	0.80	1964	119	168	4.8
January	601	1974	0.49	1977	76.7	122	3.1
February	718	1973	1.82	1964	173	199	7.0
March	958	1979	4.05	1964	332	285	13.5
April	1,499	1973	45.3	1971	435	394	17.7
May	811	1984	6.44	1980	295	284	12.0
June	1,146	1967	5.13	1977	252	261	10.2
July	2,045	1982	1.47	1988	214	433	8.7
August	884	1987	2.09	1971	110	196	4.5
September	690	1972	1.11	1968	170	217	6.9
Annual	481	1973	53.3	1977	205	120	100.0

Boxplots of monthly and annual mean discharges



DES MOINES RIVER BASIN
05487980 WHITE BREAST CREEK NEAR DALLAS, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.39	0.83	2.1	6.5	4.4	1.8	0.95	0.65	0.36	0.21	0.56	0.62	0.59
95	0.70	1.8	6.4	16	9.0	3.6	2.2	1.3	0.89	0.76	1.0	0.93	1.3
90	1.3	3.4	13	27	15	5.1	3.1	1.9	1.3	1.2	1.7	1.3	2.4
85	2.5	6.2	22	36	20	7.3	3.7	2.2	1.6	1.6	2.6	2.7	3.8
80	5.0	9.4	34	43	27	11	4.7	2.6	2.0	2.5	4.4	5.4	5.6
75	7.0	13	52	52	36	16	6.0	3.3	2.4	3.7	7.9	9.2	8.4
70	8.7	16	64	66	43	22	7.9	4.0	2.9	4.7	12	12	12
65	10	25	76	89	52	28	11	4.8	3.5	5.9	14	15	16
60	13	29	87	109	62	34	14	5.7	4.2	7.7	18	22	22
55	16	34	100	127	75	44	17	7.1	5.3	12	23	28	29
50	21	43	114	148	91	56	20	9.1	7.4	16	33	33	38
45	27	54	130	177	108	69	25	12	11	20	45	41	49
40	34	69	151	208	127	86	33	14	19	24	56	50	64
35	43	89	187	252	148	104	50	17	29	30	68	63	83
30	53	113	237	301	179	129	74	21	44	39	85	79	105
25	62	141	305	374	228	170	95	29	69	58	103	99	133
20	76	187	430	486	319	240	127	41	109	95	127	127	179
15	101	251	637	726	464	374	186	58	167	158	169	163	260
10	136	366	966	1,160	716	672	313	94	344	248	256	217	429
5	279	759	1,670	2,090	1,480	1,470	708	314	1,050	619	600	480	1,010

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	2,730	1,400	760	500	344
0.95	1.05	3,540	1,730	992	666	441
0.90	1.11	4,070	1,960	1,150	776	506
0.80	1.25	4,850	2,320	1,390	935	601
0.50	2	6,860	3,380	2,020	1,340	844
0.20	5	9,850	5,260	3,020	1,910	1,210
0.10	10	12,000	6,830	3,760	2,310	1,470
0.04	25	14,800	9,220	4,800	2,820	1,820
0.02	50	17,100	11,300	5,650	3,210	2,090
0.01	100	19,400	13,800	6,550	3,610	2,380

DES MOINES RIVER BASIN
05487980 WHITE BREAST CREEK NEAR DALLAS, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.04	0.05	0.09	0.18	0.26	0.39	0.28	0.30	0.55
0.02	50	0.06	0.08	0.13	0.24	0.35	0.53	0.45	0.52	1.00
0.05	20	0.12	0.15	0.22	0.36	0.55	0.86	0.92	1.2	2.3
0.10	10	0.22	0.26	0.36	0.53	0.84	1.4	1.7	2.3	4.8
0.20	5	0.43	0.50	0.64	0.89	1.4	2.4	3.7	5.2	11
0.50	2	1.5	1.7	2.0	2.5	4.1	8.2	15	23	45
0.80	1.25	5.2	5.6	6.5	8.1	13	32	62	90	152
0.90	1.11	9.6	10	12	15	26	69	126	177	270
0.96	1.04	18	20	24	32	53	162	268	352	472
0.98	1.02	28	30	38	53	87	290	434	541	660
0.99	1.01	40	44	58	83	137	496	668	788	876

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.07	0.11	0.18	0.29	0.21	0.66	1.3	2.1
0.02	50	0.13	0.20	0.30	0.53	0.36	0.97	1.8	3.2
0.05	20	0.33	0.46	0.63	1.2	0.80	1.7	3.1	6.0
0.10	10	0.72	0.94	1.2	2.5	1.5	2.8	4.8	10
0.20	5	1.8	2.2	2.6	5.7	3.1	5.0	8.3	19
0.50	2	8.4	9.4	11	23	10	14	22	56
0.80	1.25	32	35	39	75	27	37	58	150
0.90	1.11	60	66	73	130	40	60	94	242
0.96	1.04	111	125	141	221	59	98	155	391
0.98	1.02	160	184	213	303	73	133	212	525
0.99	1.01	218	256	305	396	87	174	280	678
		July-August-September				October-November-December			
0.01	100	0.10	0.27	0.51	0.50	0.06	0.08	0.11	0.22
0.02	50	0.15	0.33	0.58	0.62	0.11	0.14	0.19	0.37
0.05	20	0.27	0.48	0.72	0.89	0.25	0.31	0.42	0.79
0.10	10	0.43	0.67	0.92	1.3	0.49	0.63	0.85	1.5
0.20	5	0.77	1.0	1.3	2.1	1.1	1.4	1.9	3.2
0.50	2	2.2	2.5	3.0	6.1	4.8	6.3	8.4	12
0.80	1.25	5.7	6.8	9.1	23	19	24	32	43
0.90	1.11	9.1	12	18	49	38	46	62	78
0.96	1.04	15	22	41	122	79	89	120	146
0.98	1.02	20	34	74	227	123	134	181	214
0.99	1.01	26	50	130	410	182	191	258	300

DES MOINES RIVER BASIN
05488000 WHITEBREAST CREEK NEAR KNOXVILLE, IA

LOCATION.--Lat 41°19'25", long 93°08'55", in NE1/4 SW1/4 sec.3, T.75 N., R.20 W., Marion County, Hydrologic Unit 07100008, on right bank 10 ft downstream from bridge on State Highway 92, 1.1 mi upstream from Butcher Creek, 2.2 mi west of Knoxville and 11.1 mi upstream from mouth.

DRAINAGE AREA.--380 mi².

PERIOD OF RECORD.--July 1945 to September 1962 (discontinued).

GAGE.--Water-stage recorder. Datum of gage is 734.73 ft NGVD (U.S. Army Corps of Engineers benchmark). Prior to Feb. 18, 1949, wire weight gage at same site and datum.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 14,000 ft³/s June 6, 1947, gage height, 19.6 ft, from floodmark; minimum daily discharge, 0.2 ft³/s June 27, 1956.

Rating table number 5, developed March 1962
(A discharge measurement to validate this rating
has not been made since October 1962.)

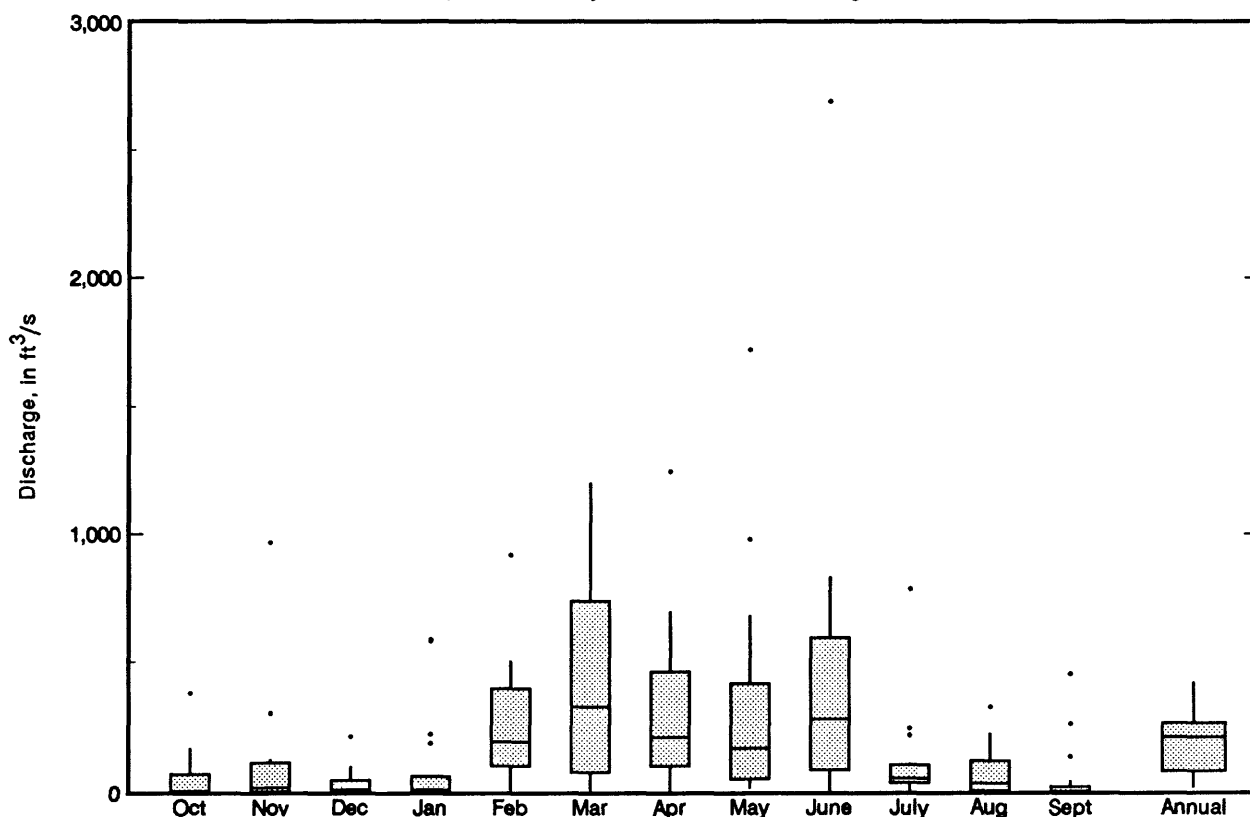
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
2.5	377	10.0	3,070
3.0	506	12.0	3,900
4.0	790	14.0	4,850
6.0	1,490	16.0	6,150
8.0	2,270	18.0	8,000

DES MOINES RIVER BASIN
05488000 WHITEBREAST CREEK NEAR KNOXVILLE, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	382	1962	0.82	1957	55.0	96.7	2.3
November	966	1962	0.70	1957	111	234	4.6
December	213	1960	0.67	1956	35.9	54.0	1.5
January	588	1960	0.92	1957	106	192	4.4
February	917	1962	2.74	1954	256	234	10.7
March	1,202	1961	3.92	1954	460	408	19.3
April	1,247	1947	1.67	1956	313	325	13.1
May	1,723	1959	13.8	1956	342	451	14.4
June	2,693	1947	3.45	1955	460	636	19.3
July	783	1958	1.60	1954	116	185	4.8
August	328	1959	3.10	1953	72.4	91.8	3.0
September	456	1961	1.59	1956	57.3	123	2.4
Annual	423	1947	16.0	1956	198	137	100.0

Boxplots of monthly and annual mean discharges



DES MOINES RIVER BASIN
05488000 WHITEBREAST CREEK NEAR KNOXVILLE, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equalled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.43	0.58	1.5	0.88	1.1	0.66	0.62	0.94	0.47	0.59	0.55	0.47	0.55
95	0.74	1.2	2.1	2.4	2.3	2.2	1.3	1.3	0.74	0.83	0.70	0.66	1.1
90	1.1	1.7	2.8	7.4	8.1	3.4	2.0	1.9	1.2	1.3	1.2	1.2	1.6
85	1.3	2.3	10	24	15	4.8	4.5	2.4	1.4	1.5	1.8	1.5	2.1
80	1.7	3.0	22	31	20	6.5	7.1	2.9	1.6	1.8	2.1	1.8	2.7
75	2.4	4.2	29	38	26	9.8	9.3	3.6	1.8	2.1	2.4	2.1	3.5
70	3.5	5.2	37	49	33	17	12	4.4	2.1	2.3	2.6	2.4	4.7
65	4.2	8.0	57	63	42	23	15	5.4	2.7	2.6	2.8	2.8	6.9
60	4.9	20	78	79	55	30	17	6.8	3.1	2.9	3.2	3.7	10
55	5.9	33	92	97	65	39	19	8.0	3.5	3.3	3.6	5.5	16
50	7.2	62	112	115	76	50	22	9.3	3.8	3.8	4.5	8.0	22
45	13	89	142	135	88	65	27	11	4.8	5.1	8.7	9.9	30
40	20	113	188	158	100	84	32	14	5.9	9.0	16	15	39
35	26	140	248	185	128	119	37	17	7.1	14	27	20	55
30	39	191	326	215	159	182	46	21	8.4	20	41	27	76
25	59	253	452	252	193	258	59	28	9.8	27	53	33	103
20	91	362	632	307	255	419	81	39	13	38	66	39	143
15	125	485	853	459	353	648	118	53	23	55	88	54	224
10	176	759	1,290	717	650	1,150	170	109	40	87	134	78	394
5	313	1,370	2,130	1,580	1,660	2,530	430	360	113	227	380	119	976

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	1,460	424	203	135	71
0.95	1.05	2,350	872	440	273	148
0.90	1.11	2,970	1,240	639	386	215
0.80	1.25	3,910	1,830	968	573	331
0.50	2	6,330	3,540	1,930	1,140	706
0.20	5	9,760	6,090	3,370	2,070	1,390
0.10	10	12,000	7,750	4,290	2,730	1,920
0.04	25	14,800	9,720	5,380	3,580	2,640
0.02	50	16,700	11,100	6,110	4,210	3,220
0.01	100	18,700	12,300	6,780	4,820	3,800

DES MOINES RIVER BASIN
05488000 WHITEBREAST CREEK NEAR KNOXVILLE, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.15	0.24	0.26	0.27	0.33	0.33	0.32	0.22	0.39
0.02	50	0.19	0.29	0.32	0.33	0.40	0.42	0.44	0.34	0.61
0.05	20	0.27	0.38	0.43	0.47	0.56	0.64	0.71	0.67	1.2
0.10	10	0.38	0.49	0.56	0.63	0.77	0.95	1.1	1.2	2.2
0.20	5	0.57	0.69	0.80	0.93	1.2	1.6	2.0	2.5	4.4
0.50	2	1.3	1.4	1.7	2.0	2.8	4.5	6.5	10	17
0.80	1.25	3.1	3.2	3.6	4.6	7.6	15	24	40	66
0.90	1.11	5.0	5.1	5.7	7.3	13	30	50	81	131
0.96	1.04	8.5	8.6	9.3	12	26	64	114	174	273
0.98	1.02	12	12	13	17	40	109	199	284	438
0.99	1.01	17	17	18	23	61	177	332	440	667

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.18	0.17	0.15	0.15	0.09	0.26	0.39	0.47
0.02	50	0.24	0.24	0.23	0.25	0.18	0.45	0.66	0.90
0.05	20	0.38	0.41	0.43	0.51	0.48	0.96	1.4	2.3
0.10	10	0.59	0.67	0.75	0.99	1.0	1.8	2.7	5.0
0.20	5	1.0	1.3	1.5	2.2	2.5	3.8	5.5	12
0.50	2	3.4	4.8	6.2	11	10	14	20	51
0.80	1.25	14	21	28	56	33	42	63	170
0.90	1.11	30	46	63	135	54	72	108	292
0.96	1.04	72	116	155	349	84	120	185	485
0.98	1.02	132	215	281	650	109	164	255	651
0.99	1.01	231	379	486	1,150	134	213	337	829
		July-August-September				October-November-December			
0.01	100	0.22	0.26	0.36	0.57	0.19	0.26	0.30	0.28
0.02	50	0.27	0.33	0.44	0.70	0.24	0.32	0.37	0.37
0.05	20	0.39	0.48	0.61	0.96	0.34	0.46	0.53	0.59
0.10	10	0.54	0.67	0.83	1.3	0.49	0.66	0.76	0.89
0.20	5	0.81	1.0	1.2	1.9	0.78	1.1	1.2	1.5
0.50	2	1.8	2.2	2.7	4.4	2.2	3.0	3.5	4.9
0.80	1.25	4.1	5.1	6.4	12	7.8	10	12	18
0.90	1.11	6.4	7.8	10	20	16	22	26	39
0.96	1.04	10	12	18	38	39	51	60	92
0.98	1.02	14	17	26	58	70	90	109	164
0.99	1.01	19	22	37	86	123	157	191	281

DES MOINES RIVER BASIN
05488500 DES MOINES RIVER NEAR TRACY, IA

LOCATION.--Lat 41°16'53", long 92°51'34", in NW1/4 SE1/4 sec.19, T.75 N., R.17 W., Mahaska County, Hydrologic Unit 07100009, on right bank 250 ft upstream from abandoned Bellefontaine Bridge, 0.8 mi east of Tracy, 3.1 mi upstream from Cedar Creek, 3.8 mi downstream from bridge on newly located State Highway 92, 6.4 mi downstream from English Creek and at mile 130.4.

DRAINAGE AREA.--12,479 mi².

PERIOD OF RECORD.--March 1920 to September 1988.

GAGE.--Water-stage recorder. Datum of gage is 670.91 ft above NGVD. Prior to June 26, 1940 and June 30, 1952 to Nov. 4, 1960, nonrecording gage and June 27, 1940 to June 29, 1952, water-stage recorder, at site 250 ft downstream at same datum.

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.

Rating table number 11, developed October 1985

Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
2.2	230	6.0	6,300
2.5	620	8.0	10,400
3.0	1,330	10.0	15,300
3.5	2,090	12.0	21,000
4.0	2,870	14.0	27,300
4.5	3,680	16.0	34,200
5.0	4,500	18.0	42,000

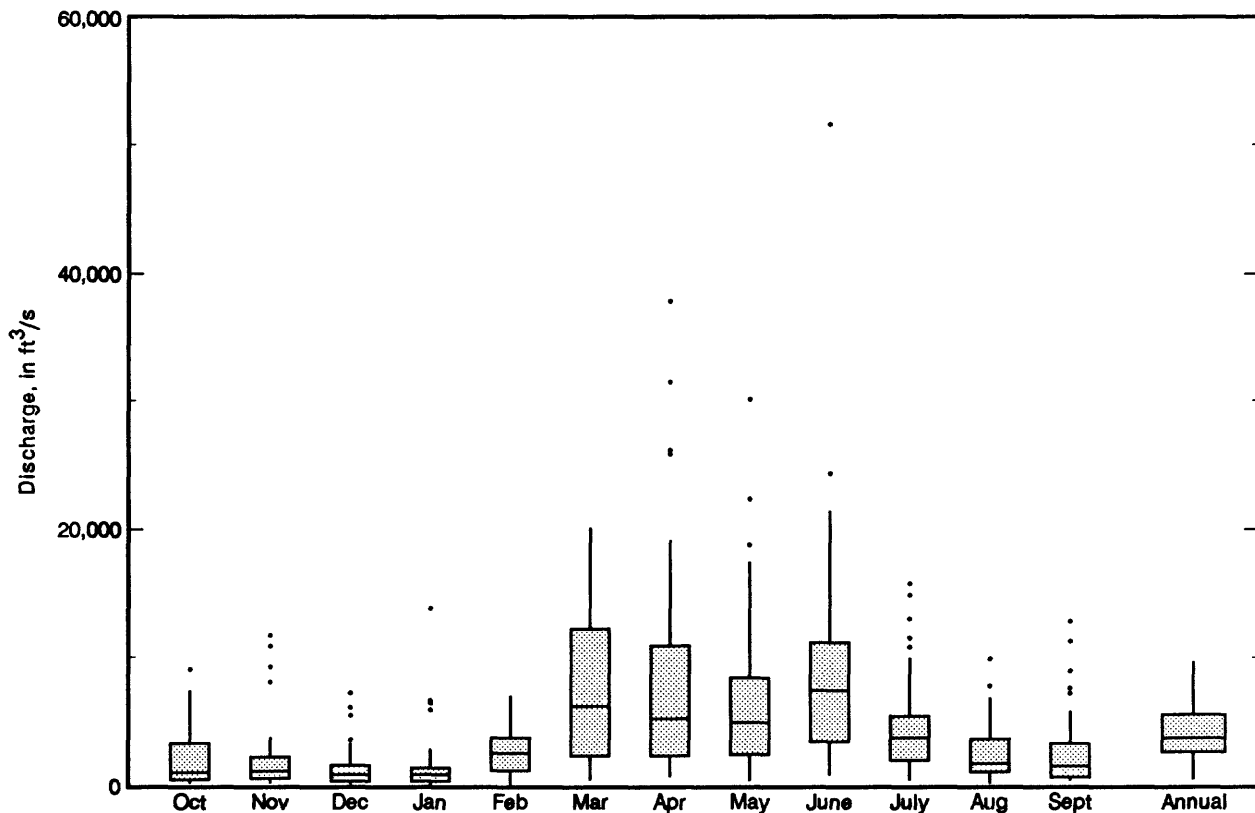
DES MOINES RIVER BASIN
05488500 DES MOINES RIVER NEAR TRACY, IA--Continued

Pre-regulation Period

Statistics of monthly and annual mean discharges, pre-regulation period

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	9,065	1966	176	1957	2,092	2,232	4.1
November	11,700	1942	177	1956	2,068	2,655	4.1
December	7,242	1932	133	1956	1,330	1,515	2.6
January	13,810	1932	72.1	1940	1,518	2,367	3.0
February	6,952	1962	78.4	1940	2,740	1,984	5.4
March	20,130	1929	425	1931	7,221	5,557	14.2
April	37,890	1965	699	1956	8,322	8,451	16.4
May	30,140	1944	356	1934	6,644	5,997	13.1
June	51,550	1947	808	1956	9,053	8,711	17.8
July	15,770	1951	415	1936	4,569	3,783	9.0
August	9,940	1943	191	1936	2,606	2,157	5.1
September	12,830	1926	350	1955	2,624	2,889	5.2
Annual	9,660	1947	496	1956	4,229	2,443	100.0

Boxplots of monthly and annual mean discharges, pre-regulation period



DES MOINES RIVER BASIN
05488500 DES MOINES RIVER NEAR TRACY, IA--Continued

Monthly and annual flow duration, pre-regulation period

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	76	78	312	435	323	337	264	163	185	132	173	126	136
95	135	169	410	766	556	727	444	304	275	235	241	163	248
90	180	303	606	1,150	760	1,160	752	539	384	313	332	219	366
85	221	366	882	1,560	1,130	1,450	987	654	459	360	389	269	475
80	264	454	1,350	1,910	1,580	1,850	1,200	743	523	408	440	320	599
75	316	546	1,720	2,380	2,080	2,330	1,480	852	587	456	504	378	716
70	409	643	2,180	2,830	2,480	2,840	1,750	966	670	531	580	439	869
65	512	746	2,760	3,280	2,890	3,400	2,030	1,070	762	617	660	508	1,060
60	604	979	3,340	3,720	3,360	4,010	2,290	1,180	871	699	740	584	1,280
55	670	1,140	3,920	4,170	3,890	4,640	2,570	1,330	991	795	870	674	1,520
50	736	1,390	4,510	4,630	4,520	5,290	2,900	1,490	1,150	927	1,020	769	1,860
45	823	1,780	5,120	5,170	5,190	5,980	3,280	1,680	1,350	1,170	1,170	893	2,270
40	925	2,250	5,880	5,950	5,900	6,930	3,730	1,870	1,590	1,430	1,380	1,020	2,760
35	1,080	2,810	6,830	7,100	6,660	8,130	4,250	2,150	1,930	1,800	1,630	1,150	3,350
30	1,250	3,450	8,000	8,580	7,520	9,410	4,870	2,580	2,360	2,260	1,910	1,300	4,070
25	1,410	4,130	9,600	10,300	8,470	11,000	5,720	3,070	2,850	2,770	2,240	1,450	4,940
20	1,670	4,940	11,700	12,600	9,540	12,900	6,740	4,020	3,560	3,350	2,660	1,740	6,070
15	2,110	5,850	14,400	15,500	11,300	16,700	7,970	4,870	4,750	4,090	3,360	2,240	7,760
10	2,750	7,010	18,500	19,600	13,900	21,900	10,000	6,280	6,300	5,370	4,140	3,040	10,400
5	5,160	9,110	24,600	29,100	21,200	31,900	13,000	8,940	10,400	7,200	7,460	4,860	15,900

Probability of annual high discharges, pre-regulation period

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	—	3,380	2,280	1,780	1,200
0.95	1.05	13,500	7,350	5,460	4,050	2,870
0.90	1.11	16,400	10,600	8,190	5,970	4,320
0.80	1.25	20,800	15,800	12,700	9,150	6,760
0.50	2	32,500	29,700	24,800	18,200	13,800
0.20	5	50,100	47,800	40,400	31,100	23,700
0.10	10	62,500	58,000	48,700	38,900	29,500
0.04	25	79,000	68,700	56,900	47,600	35,700
0.02	50	91,600	75,200	61,600	53,100	39,600
0.01	100	105,000	80,600	65,400	57,900	42,800

DES MOINES RIVER BASIN
05488500 DES MOINES RIVER NEAR TRACY, IA--Continued

Probability of annual low discharges, pre-regulation period

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	46	46	48	51	62	78	103	112	133
0.02	50	59	59	62	66	79	100	130	143	173
0.05	20	85	86	89	96	115	144	184	206	257
0.10	10	114	117	122	131	157	197	251	282	362
0.20	5	162	167	175	190	227	284	361	411	544
0.50	2	301	316	332	366	437	554	713	832	1,150
0.80	1.25	525	557	597	664	794	1,030	1,370	1,650	2,360
0.90	1.11	686	732	793	887	1,060	1,410	1,920	2,330	3,390
0.96	1.04	896	961	1,050	1,190	1,420	1,930	2,720	3,360	4,940
0.98	1.02	1,060	1,130	1,260	1,420	1,700	2,350	3,400	4,240	6,260
0.99	1.01	1,210	1,310	1,460	1,650	1,990	2,790	4,130	5,210	7,730

Probability of seasonal low discharges, pre-regulation period

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	51	48	51	67	140	173	190	237
0.02	50	66	64	68	88	192	237	262	328
0.05	20	95	96	104	131	305	374	417	525
0.10	10	133	141	151	188	452	552	620	786
0.20	5	197	217	233	290	715	868	981	1,260
0.50	2	416	478	527	666	1,630	1,940	2,230	2,940
0.80	1.25	870	1,010	1,150	1,520	3,460	4,030	4,680	6,380
0.90	1.11	1,270	1,460	1,710	2,350	4,990	5,720	6,690	9,330
0.96	1.04	1,900	2,150	2,590	3,720	7,230	8,150	9,600	13,700
0.98	1.02	2,460	2,740	3,370	5,010	9,100	10,100	12,000	17,400
0.99	1.01	3,100	3,390	4,250	6,540	11,100	12,200	14,500	21,400
		July-August-September				October-November-December			
0.01	100	104	113	125	161	67	77	87	106
0.02	50	127	137	152	195	82	93	105	127
0.05	20	171	184	204	262	110	124	139	170
0.10	10	223	240	268	344	145	163	182	223
0.20	5	308	333	373	482	203	228	254	313
0.50	2	581	636	717	942	393	450	505	631
0.80	1.25	1,110	1,240	1,410	1,910	778	934	1,070	1,360
0.90	1.11	1,560	1,780	2,030	2,800	1,120	1,400	1,610	2,080
0.96	1.04	2,250	2,620	3,010	4,250	1,660	2,180	2,560	3,330
0.98	1.02	2,870	3,390	3,910	5,610	2,160	2,930	3,490	4,580
0.99	1.01	3,560	4,280	4,950	7,230	2,730	3,850	4,640	6,140

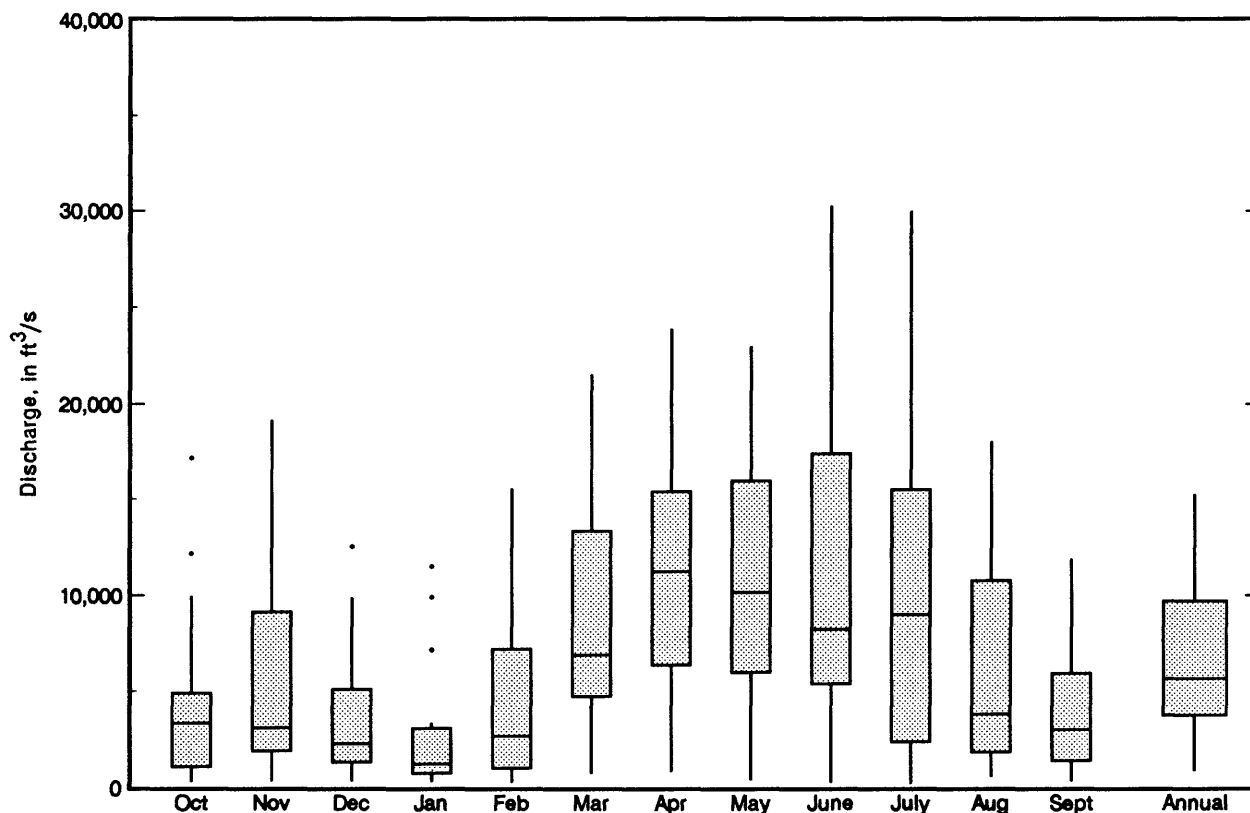
DES MOINES RIVER BASIN
05488500 DES MOINES RIVER NEAR TRACY, IA--Continued

Post-regulation Period

Statistics of monthly and annual mean discharges, post-regulation period

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	17,190	1974	318	1977	4,260	4,470	5.0
November	19,160	1987	341	1977	5,499	5,314	6.5
December	12,540	1983	344	1977	3,841	3,304	4.5
January	11,510	1973	305	1977	2,824	3,224	3.3
February	15,560	1973	276	1977	4,774	5,109	5.6
March	21,520	1983	746	1977	9,123	5,875	10.8
April	23,890	1979	866	1977	11,470	7,217	13.5
May	22,990	1973	425	1977	10,890	6,424	12.9
June	30,260	1984	277	1977	11,480	8,015	13.6
July	29,990	1984	220	1977	9,895	8,282	11.7
August	18,040	1984	593	1988	6,603	6,368	7.8
September	11,880	1979	342	1976	3,992	3,459	4.7
Annual	15,260	1983	898	1977	7,061	4,388	100.0

Boxplots of monthly and annual mean discharges, post-regulation period



DES MOINES RIVER BASIN

05488500 DES MOINES RIVER NEAR TRACY, IA--Continued

Monthly and annual flow duration, post-regulation period

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	281	225	237	462	312	213	206	213	326	255	333	298	230
95	350	320	630	1,130	534	375	230	360	351	327	450	430	374
90	462	426	1,080	1,790	2,250	2,230	1,020	441	382	366	811	805	553
85	545	558	1,660	3,190	3,040	3,120	1,260	616	435	481	974	945	814
80	599	705	2,680	4,110	4,020	3,600	1,490	797	540	565	1,160	1,180	1,070
75	695	801	3,660	4,780	4,620	4,060	1,990	948	794	710	1,460	1,390	1,370
70	830	866	4,230	5,600	5,280	4,670	2,540	1,130	903	1,040	1,810	1,600	1,770
65	971	971	4,730	6,320	6,090	5,540	3,100	1,340	1,160	1,490	2,080	1,790	2,230
60	1,130	1,140	5,350	7,300	7,210	6,490	3,960	1,610	1,400	1,890	2,380	1,980	2,690
55	1,280	1,400	5,970	8,600	8,790	8,270	6,210	2,270	1,790	2,220	2,650	2,170	3,270
50	1,440	1,720	6,610	9,940	10,500	10,600	7,800	3,110	2,240	2,470	2,920	2,360	3,970
45	1,710	2,020	7,400	11,500	12,300	13,200	9,430	4,140	2,610	2,740	3,400	2,680	4,760
40	2,080	2,350	8,430	12,900	14,200	15,200	11,400	5,510	2,960	3,130	3,930	3,140	5,880
35	2,400	2,800	10,000	15,100	15,600	16,000	14,000	7,260	3,280	3,680	5,270	3,750	7,240
30	2,800	3,890	11,700	16,300	16,400	16,800	15,900	9,070	3,860	4,440	6,870	4,300	9,070
25	3,270	4,520	13,600	17,600	17,300	17,600	17,500	12,100	5,170	5,530	8,200	4,880	11,400
20	3,970	6,400	16,100	19,500	18,200	18,500	18,800	15,400	7,080	6,500	9,890	5,700	14,600
15	4,750	10,500	19,200	21,700	19,400	19,700	20,000	16,900	8,870	8,390	12,300	6,800	16,700
10	7,450	16,600	22,200	23,800	20,500	20,900	21,200	18,600	11,800	12,000	15,600	9,160	18,800
5	10,700	23,500	24,700	25,900	21,700	22,400	24,100	20,400	15,200	17,600	18,100	13,300	21,400

Probability of annual high discharges, post-regulation period

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge ¹ (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	5,200	7,240	5,910	5,520	4,140
0.95	1.05	12,100	10,700	9,150	8,020	6,330
0.90	1.11	19,300	12,800	11,300	9,670	7,830
0.80	1.25	19,800	15,800	14,100	12,000	10,000
0.50	2	25,300	21,900	20,400	17,500	15,400
0.20	5	31,900	28,400	27,000	24,400	22,500
0.10	10	33,000	31,700	30,300	28,600	27,000
0.04	25	36,300	35,000	33,700	33,500	32,300
0.02	50	44,000	37,000	35,600	36,800	36,000
0.01	100	50,600	38,600	37,200	39,900	39,500

¹ Data supplied by U.S. Army Corps of Engineers, Rock Island District.

DES MOINES RIVER BASIN
05488500 DES MOINES RIVER NEAR TRACY, IA—Continued

Probability of annual low discharges, post-regulation period

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	119	119	113	122	115	117	129	144	210
0.02	50	137	137	136	149	144	154	179	204	291
0.05	20	170	173	180	202	204	234	290	337	467
0.10	10	207	215	233	267	282	341	443	520	701
0.20	5	268	287	324	378	423	539	728	861	1,130
0.50	2	475	530	633	758	961	1,320	1,820	2,130	2,650
0.80	1.25	926	1,070	1,310	1,580	2,320	3,310	4,350	4,910	5,820
0.90	1.11	1,370	1,600	1,950	2,360	3,780	5,400	6,730	7,380	8,550
0.96	1.04	2,140	2,520	3,040	3,660	6,470	9,150	10,600	11,200	12,600
0.98	1.02	2,910	3,440	4,090	4,890	9,270	12,900	14,100	14,400	16,100
0.99	1.01	3,890	4,600	5,370	6,380	12,900	17,700	18,100	18,000	19,900

Probability of seasonal low discharges, post-regulation period

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	140	171	165	162	114	146	161	185
0.02	50	167	201	198	198	186	236	270	323
0.05	20	220	262	264	273	372	467	557	698
0.10	10	285	338	348	370	657	820	1,000	1,290
0.20	5	401	472	498	547	1,240	1,540	1,900	2,480
0.50	2	826	972	1,070	1,250	3,520	4,380	5,320	6,830
0.80	1.25	1,880	2,250	2,570	3,160	8,200	10,300	11,700	14,000
0.90	1.11	3,010	3,660	4,260	5,350	11,800	15,000	16,100	18,400
0.96	1.04	5,120	6,390	7,540	9,690	16,600	21,300	21,400	23,100
0.98	1.02	7,350	9,350	11,100	14,500	20,100	26,000	25,000	25,800
0.99	1.01	10,300	13,400	16,000	21,100	23,500	30,600	28,200	28,100
		July-August-September				October-November-December			
0.01	100	182	153	138	116	119	119	151	154
0.02	50	196	177	168	157	148	155	197	209
0.05	20	224	223	228	245	206	230	294	331
0.10	10	260	280	303	364	278	326	420	494
0.20	5	325	381	437	587	402	497	645	795
0.50	2	575	757	938	1,460	825	1,110	1,460	1,920
0.80	1.25	1,260	1,720	2,190	3,600	1,730	2,450	3,300	4,480
0.90	1.11	2,080	2,810	3,540	5,760	2,570	3,690	5,050	6,880
0.96	1.04	3,840	4,940	6,070	9,500	3,950	5,710	7,930	10,800
0.98	1.02	5,940	7,300	8,720	13,100	5,230	7,560	10,600	14,300
0.99	1.01	9,050	10,500	12,200	17,500	6,750	9,730	13,800	18,300

DES MOINES RIVER BASIN
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 September 1988.

GAGE.--Water-stage recorder. Datum of gage is 682.15 ft above NGVD (levels by U.S. Army Corps of Engineers). Prior to Feb. 21, 1949, nonrecording gage at same site and datum.

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.

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.

Rating table number 11, developed April 1986

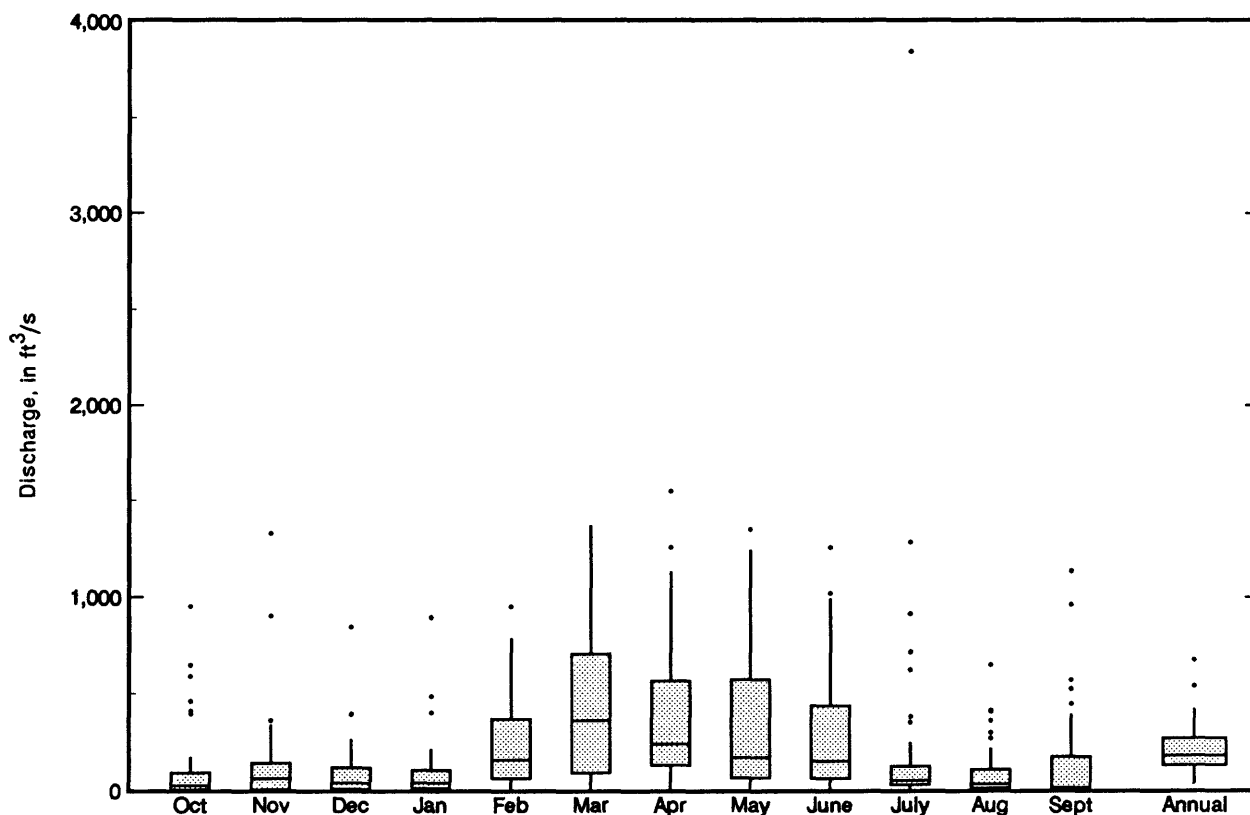
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
4.5	12	14.0	2,650
5.0	60	17.0	4,180
5.5	133	20.0	6,400
6.0	222	26.0	15,500
7.0	428	29.0	28,500
8.0	666	32.0	56,500
9.0	940	35.0	105,000
11.0	1,530		

DES MOINES RIVER BASIN
05489000 CEDAR CREEK NEAR BUSSEY, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	950	1974	0.18	1957	113	212	4.3
November	1,331	1962	0.33	1956	138	250	5.3
December	844	1983	0.39	1956	94.8	154	3.6
January	894	1974	0.20	1956	96.1	164	3.7
February	952	1949	2.29	1954	247	246	9.4
March	1,371	1960	3.78	1954	422	369	16.1
April	1,553	1973	0.79	1956	386	357	14.7
May	1,350	1960	7.19	1956	357	381	13.6
June	1,258	1967	2.74	1977	278	317	10.6
July	3,846	1962	2.26	1988	245	636	9.4
August	650	1977	2.51	1953	93.6	144	3.6
September	1,136	1961	0.60	1953	147	260	5.6
Annual	677	1962	29.9	1954	218	139	100.0

Boxplots of monthly and annual mean discharges



DES MOINES RIVER BASIN
05489000 CEDAR CREEK NEAR BUSSEY, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.14	0.13	1.5	0.54	0.20	0.36	0.32	0.75	0.08	0.12	0.23	0.21	0.18
95	0.30	1.2	3.8	16	9.0	4.0	1.8	1.7	0.62	0.49	0.63	1.0	1.1
90	1.2	3.2	14	32	18	7.0	3.8	2.6	1.2	0.75	1.7	1.7	2.4
85	2.4	5.5	31	43	26	8.9	5.6	3.4	1.9	1.4	2.7	2.5	3.7
80	4.1	8.9	40	54	33	12	7.3	4.2	2.6	1.9	3.4	3.6	5.5
75	7.2	14	52	65	40	17	8.9	5.2	3.3	2.4	4.2	5.2	8.0
70	9.6	20	65	83	49	23	11	6.4	3.9	2.8	5.3	7.2	12
65	12	26	80	100	59	30	14	7.6	4.6	3.4	6.9	11	17
60	15	32	95	114	70	38	17	8.8	5.4	4.3	12	16	22
55	18	40	111	128	82	45	21	11	6.2	5.9	20	20	29
50	22	51	128	144	95	56	25	14	7.5	9.1	25	25	38
45	29	69	149	169	111	68	30	17	9.3	15	31	30	48
40	36	92	178	193	128	83	38	20	12	22	40	37	62
35	43	116	207	223	149	101	49	24	17	28	51	46	80
30	56	141	278	264	179	127	64	31	25	39	64	57	101
25	71	183	376	313	208	170	83	39	38	55	83	72	129
20	86	247	513	401	278	233	114	52	57	79	107	90	172
15	108	370	712	557	401	346	169	73	90	114	137	118	243
10	163	588	1,060	891	678	600	261	116	171	177	204	165	410
5	323	1,270	1,960	1,700	1,570	1,380	640	318	623	355	471	353	961

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	1,620	904	470	325	189
0.95	1.05	2,570	1,340	741	494	314
0.90	1.11	3,320	1,670	938	615	405
0.80	1.25	4,550	2,180	1,240	801	542
0.50	2	8,510	3,700	2,090	1,320	903
0.20	5	16,400	6,390	3,440	2,140	1,420
0.10	10	23,500	8,570	4,420	2,750	1,760
0.04	25	34,700	11,800	5,740	3,580	2,170
0.02	50	44,900	14,500	6,770	4,240	2,460
0.01	100	56,900	17,600	7,830	4,930	2,750

DES MOINES RIVER BASIN
05489000 CEDAR CREEK NEAR BUSSEY, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.08	0.15	0.19	0.18	0.39
0.02	50	0.00	0.00	0.00	0.00	0.13	0.26	0.34	0.34	0.75
0.05	20	0.00	0.08	0.13	0.17	0.28	0.55	0.80	0.90	1.9
0.10	10	0.22	0.22	0.29	0.37	0.54	1.1	1.6	2.0	4.1
0.20	5	0.55	0.55	0.65	0.80	1.1	2.3	3.7	4.8	9.8
0.50	2	2.0	2.3	2.4	2.8	4.3	8.8	15	22	41
0.80	1.25	6.0	6.9	7.4	8.7	14	30	50	74	129
0.90	1.11	10	11	13	15	25	54	86	128	214
0.96	1.04	18	18	22	27	43	98	147	214	342
0.98	1.02	24	24	31	38	61	142	202	288	447
0.99	1.01	31	31	41	52	81	195	264	368	555

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.04	0.04	0.05	0.08	0.20	0.33	0.34	0.68
0.02	50	0.09	0.09	0.13	0.19	0.38	0.62	0.66	1.4
0.05	20	0.27	0.30	0.39	0.64	0.98	1.5	1.7	3.9
0.10	10	0.66	0.76	0.95	1.7	2.1	3.0	3.6	8.6
0.20	5	1.8	2.1	2.5	4.9	4.6	6.4	8.2	20
0.50	2	9.3	11	13	26	16	22	31	75
0.80	1.25	34	40	45	87	40	56	86	189
0.90	1.11	60	67	78	142	57	83	132	268
0.96	1.04	101	107	129	214	77	117	191	357
0.98	1.02	135	139	171	265	89	141	234	412
0.99	1.01	171	170	214	312	100	163	274	457
		July-August-September				October-November-December			
0.01	100	0.08	0.15	0.25	0.60	0.09	0.07	0.07	0.08
0.02	50	0.13	0.22	0.35	0.78	0.14	0.12	0.13	0.16
0.05	20	0.25	0.39	0.58	1.2	0.28	0.26	0.31	0.40
0.10	10	0.44	0.63	0.89	1.8	0.50	0.52	0.64	0.87
0.20	5	0.85	1.1	1.5	2.9	1.0	1.2	1.5	2.1
0.50	2	2.7	3.3	4.1	7.5	4.0	5.2	6.8	10
0.80	1.25	7.6	8.9	11	21	15	21	27	39
0.90	1.11	12	15	18	36	32	41	53	74
0.96	1.04	20	25	31	66	68	82	103	137
0.98	1.02	27	34	44	98	111	126	155	199
0.99	1.01	34	46	60	142	173	185	221	271

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 September 1988 (published as "at Eldon" October 1930 to March 1935).

GAGE.--Water-stage recorder. Datum of gage is 622.00 ft above NGVD. Prior to Sept. 30, 1930, nonrecording gage at Market Street Bridge 1,700 ft upstream at datum 0.83 ft higher. Oct. 1, 1930 to Mar. 31, 1935, nonrecording gage at Eldon 15 mi downstream at different datum. Apr. 1, 1935 to Oct. 25, 1963, water-stage recorder at site 1,100 ft downstream at Vine Street Bridge at datum 0.77 ft higher.

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, 30 ft³/s Jan. 27-29, 31, Feb. 2, 3, 5-7, 1940.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since at least 1850, that of June 7, 1947. Flood of May 31, 1903, reached a stage of 19.4 ft, former site and datum at Vine Street Bridge or about 22 ft at Market Street Bridge, from information by U.S. Army Corps of Engineers and U.S. National Weather Service, discharge, about 140,000 ft³/s.

REMARKS.--Flow regulated by Lake Red Rock (station 05488100) 48.2 mi upstream, since March 12, 1969.

Rating table number 7, developed October 1974

Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
0.5	40	5.0	10,200
0.7	125	7.0	16,100
1.0	355	9.0	23,000
1.5	950	11.0	30,500
2.0	1,800	13.0	39,100
2.5	2,910	15.0	50,000
3.5	5,610	17.0	64,700

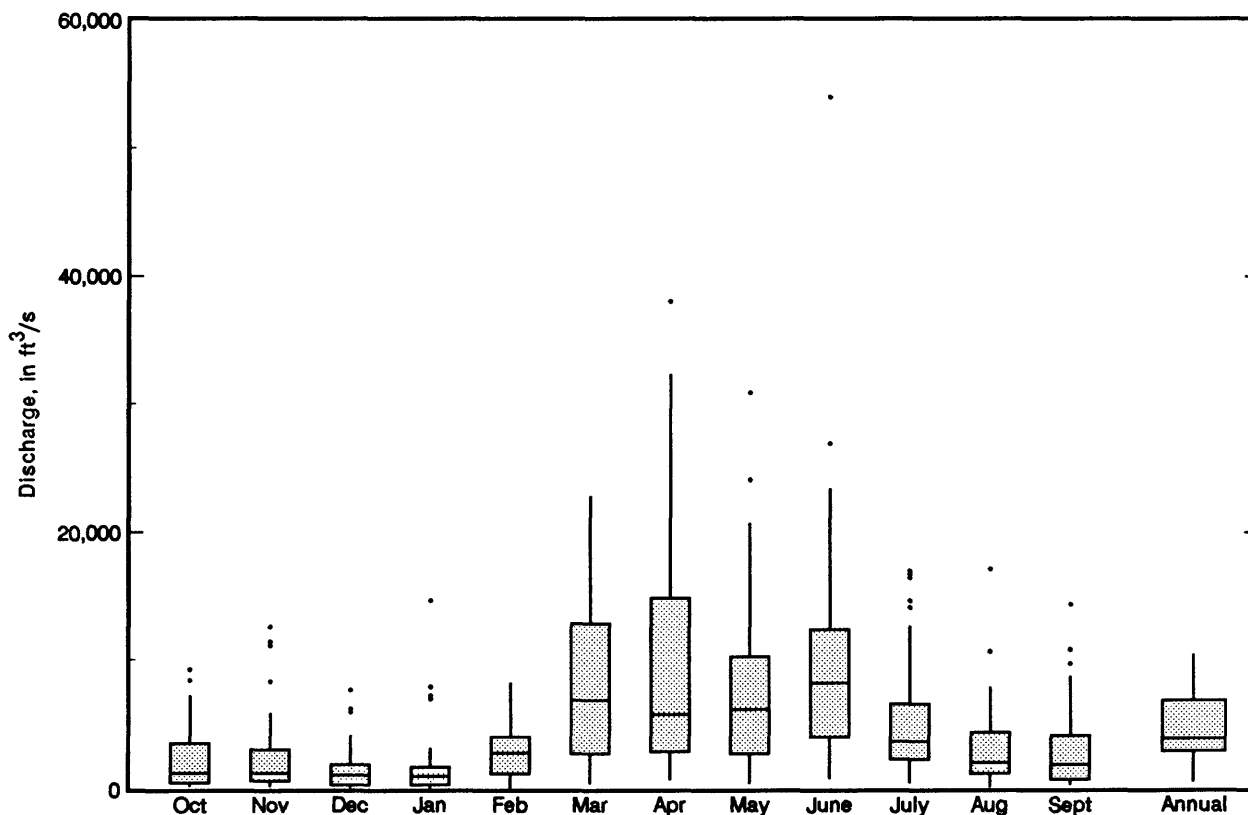
DES MOINES RIVER BASIN
05489500 DES MOINES RIVER AT OTTUMWA, IA--Continued

Pre-regulation Period

Statistics of monthly and annual mean discharges, pre-regulation period

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	9,285	1966	209	1957	2,266	2,299	4.0
November	12,570	1942	223	1956	2,377	2,817	4.2
December	7,686	1932	142	1956	1,485	1,560	2.6
January	14,610	1932	87.8	1940	1,660	2,481	2.9
February	8,218	1962	102	1940	2,971	2,050	5.2
March	22,840	1929	449	1931	7,981	5,992	13.9
April	38,020	1965	716	1956	9,298	8,658	16.2
May	30,880	1944	413	1931	7,558	6,380	13.2
June	54,020	1947	830	1956	10,140	9,011	17.7
July	16,960	1951	462	1956	5,316	4,453	9.3
August	17,110	1969	167	1934	3,114	2,952	5.4
September	14,330	1926	348	1955	3,048	3,176	5.3
Annual	10,430	1947	572	1956	4,766	2,655	100.0

Boxplots of monthly and annual mean discharges, pre-regulation period



DES MOINES RIVER BASIN

05489500 DES MOINES RIVER AT OTTUMWA, IA--Continued

Monthly and annual flow duration, pre-regulation period

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	57	72	317	492	351	408	261	132	174	125	152	91	111
95	122	211	463	1,030	643	896	509	346	279	231	243	157	253
90	180	311	689	1,380	971	1,360	815	569	415	327	332	208	398
85	229	407	1,210	1,770	1,390	1,700	1,140	720	519	399	406	260	535
80	273	502	1,640	2,190	1,940	2,170	1,430	868	607	471	482	325	679
75	348	591	2,080	2,750	2,390	2,710	1,690	1,020	694	541	564	409	848
70	453	736	2,530	3,220	2,800	3,460	1,950	1,150	781	611	665	489	1,040
65	579	954	3,040	3,710	3,330	4,090	2,220	1,290	880	701	787	556	1,270
60	682	1,170	3,620	4,230	3,930	4,720	2,500	1,440	950	797	930	635	1,520
55	775	1,370	4,170	4,760	4,560	5,370	2,780	1,600	1,150	933	1,080	757	1,790
50	872	1,580	4,830	5,300	5,220	6,090	3,220	1,770	1,370	1,130	1,240	899	2,140
45	968	1,910	5,670	5,900	5,890	6,940	3,700	1,950	1,640	1,370	1,470	1,060	2,560
40	1,090	2,390	6,490	6,950	6,700	7,970	4,220	2,210	1,950	1,580	1,720	1,250	3,100
35	1,230	2,890	7,320	8,270	7,530	9,390	4,860	2,560	2,300	1,840	1,950	1,420	3,760
30	1,400	3,420	8,720	9,900	8,560	11,100	5,630	2,970	2,680	2,260	2,270	1,590	4,540
25	1,600	4,260	10,500	11,800	9,610	13,500	6,730	3,490	3,300	2,840	2,700	1,810	5,550
20	1,930	5,130	12,800	15,000	11,100	16,400	8,090	4,530	4,250	3,590	3,270	2,140	6,900
15	2,390	6,150	16,100	18,500	13,400	19,500	9,700	5,770	5,380	4,440	3,910	2,680	8,910
10	2,930	7,590	20,700	22,900	17,200	24,900	12,100	7,460	7,290	5,770	4,710	3,310	12,000
5	4,740	9,830	27,900	31,300	23,800	33,800	17,400	11,500	11,700	8,110	7,780	4,870	19,100

Probability of annual high discharges, pre-regulation period

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	—	4,610	3,220	2,240	1,610
0.95	1.05	14,300	9,320	7,040	4,950	3,580
0.90	1.11	17,600	12,900	10,100	7,200	5,230
0.80	1.25	22,500	18,400	14,900	10,800	7,900
0.50	2	35,500	32,100	27,100	20,400	15,300
0.20	5	54,800	48,200	41,600	32,900	25,300
0.10	10	68,300	56,600	48,900	39,900	31,100
0.04	25	85,800	64,900	56,000	47,100	37,300
0.02	50	99,000	69,700	60,000	51,400	41,200
0.01	100	112,000	73,500	63,000	54,900	44,400

DES MOINES RIVER BASIN
05489500 DES MOINES RIVER AT OTTUMWA, IA--Continued

Probability of annual low discharges, pre-regulation period

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	21	28	43	51	65	83	104	114	139
0.02	50	29	40	58	67	86	109	136	151	189
0.05	20	47	64	87	101	129	162	201	229	293
0.10	10	71	96	124	142	180	227	282	325	425
0.20	5	114	151	185	211	266	335	417	489	652
0.50	2	259	325	372	421	523	669	848	1,010	1,390
0.80	1.25	539	617	681	773	950	1,240	1,630	1,970	2,730
0.90	1.11	764	824	903	1,030	1,260	1,670	2,250	2,720	3,770
0.96	1.04	1,080	1,090	1,190	1,360	1,660	2,250	3,120	3,760	5,200
0.98	1.02	1,280	1,280	1,400	1,620	1,960	2,700	3,820	4,590	6,320
0.99	1.01	1,460	1,460	1,620	1,870	2,260	3,160	4,550	5,450	7,470

Probability of seasonal low discharges, pre-regulation period

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	25	42	48	62	63	176	230	275
0.02	50	36	58	66	85	108	248	315	381
0.05	20	61	93	104	136	226	407	497	610
0.10	10	97	138	155	202	406	616	732	913
0.20	5	163	221	248	324	761	985	1,140	1,460
0.50	2	412	515	579	769	2,000	2,210	2,520	3,400
0.80	1.25	953	1,130	1,280	1,740	3,990	4,420	5,130	7,370
0.90	1.11	1,430	1,660	1,900	2,610	5,190	6,080	7,210	10,700
0.96	1.04	2,140	2,460	2,840	3,960	6,440	8,280	10,100	15,700
0.98	1.02	2,740	3,140	3,650	5,180	7,180	9,940	12,400	19,900
0.99	1.01	3,390	3,890	4,550	6,530	7,780	11,600	14,900	24,400
		July-August-September				October-November-December			
0.01	100	37	88	113	163	29	65	77	100
0.02	50	55	115	145	203	40	82	97	125
0.05	20	94	170	209	284	63	117	136	176
0.10	10	148	239	288	383	94	161	185	238
0.20	5	247	357	423	551	150	236	270	346
0.50	2	600	745	859	1,120	354	495	562	722
0.80	1.25	1,280	1,490	1,700	2,290	798	1,040	1,190	1,540
0.90	1.11	1,820	2,100	2,390	3,360	1,200	1,540	1,770	2,310
0.96	1.04	2,570	2,990	3,420	5,060	1,830	2,330	2,730	3,580
0.98	1.02	3,140	3,740	4,300	6,620	2,390	3,050	3,620	4,770
0.99	1.01	3,720	4,540	5,260	8,430	3,020	3,890	4,680	6,190

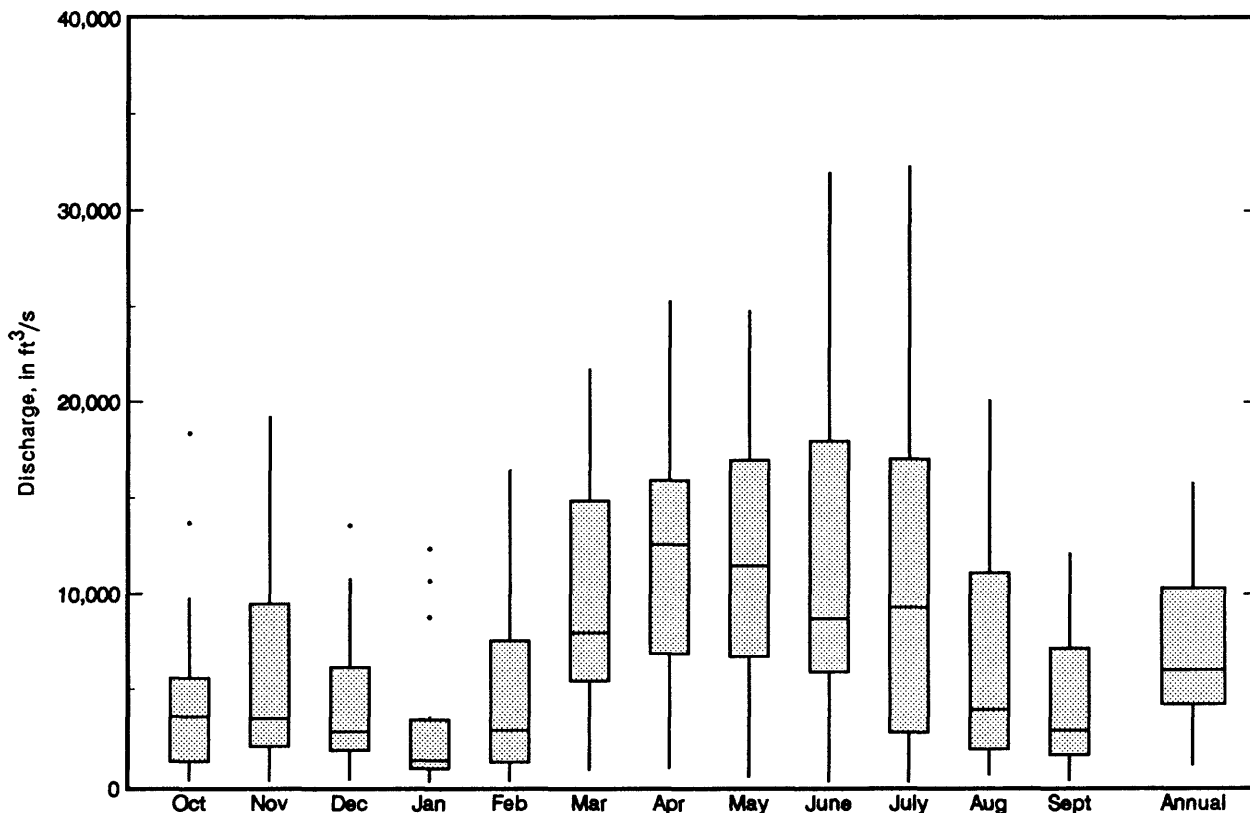
DES MOINES RIVER BASIN
05489500 DES MOINES RIVER AT OTTUMWA, IA--Continued

Post-regulation Period

Statistics of monthly and annual mean discharges, post-regulation period

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	18,390	1974	353	1977	4,667	4,779	5.1
November	19,250	1987	327	1977	5,912	5,332	6.5
December	13,590	1983	381	1977	4,353	3,507	4.8
January	12,380	1973	290	1977	3,163	3,526	3.5
February	16,470	1973	328	1977	5,045	5,103	5.5
March	21,750	1983	891	1977	9,966	6,050	10.9
April	25,330	1983	962	1977	12,380	7,682	13.6
May	24,800	1973	519	1977	11,720	6,826	12.9
June	31,980	1984	282	1977	12,050	8,182	13.2
July	32,320	1984	238	1977	10,550	8,794	11.6
August	20,120	1984	610	1988	6,925	6,493	7.6
September	12,150	1979	366	1976	4,383	3,582	4.8
Annual	15,830	1983	1,120	1977	7,600	4,528	100.0

Boxplots of monthly and annual mean discharges, post-regulation period



DES MOINES RIVER BASIN
05489500 DES MOINES RIVER AT OTTUMWA, IA--Continued

Monthly and annual flow duration, post-regulation period

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	237	260	279	529	360	213	182	219	277	279	289	296	253
95	340	429	698	1,420	760	400	387	398	346	352	405	510	415
90	551	580	1,310	2,010	2,370	2,560	991	551	431	405	828	956	658
85	648	726	1,970	3,710	3,310	3,410	1,260	712	505	535	1,050	1,210	942
80	741	845	3,240	4,640	4,320	3,850	1,610	892	677	652	1,290	1,460	1,230
75	847	952	4,140	5,420	5,170	4,520	2,200	1,080	944	841	1,670	1,670	1,570
70	975	1,040	4,780	6,130	6,030	5,210	2,770	1,200	1,070	1,230	2,030	1,890	2,030
65	1,130	1,170	5,440	6,870	6,850	6,040	3,380	1,500	1,290	1,760	2,350	2,110	2,540
60	1,280	1,400	6,130	8,140	8,150	7,240	4,460	1,770	1,550	2,120	2,670	2,330	3,070
55	1,430	1,700	6,820	9,650	9,940	9,350	6,480	2,740	1,970	2,420	3,040	2,550	3,720
50	1,590	2,070	7,690	11,100	11,800	11,800	8,800	3,460	2,490	2,730	3,450	2,910	4,480
45	1,890	2,420	8,640	12,700	13,500	14,200	10,800	4,600	2,990	3,010	3,900	3,310	5,420
40	2,310	2,820	10,100	14,300	15,400	16,100	12,700	6,090	3,450	3,410	4,710	3,810	6,590
35	2,660	3,360	11,700	16,000	16,500	16,900	15,100	7,670	3,900	4,060	6,200	4,350	8,110
30	3,060	4,310	13,100	17,200	17,100	17,500	16,700	9,900	4,710	4,730	7,590	4,900	10,200
25	3,650	5,220	15,200	18,500	17,800	18,200	17,700	13,200	6,110	6,230	9,020	5,610	12,700
20	4,300	6,790	17,500	19,800	18,500	18,900	18,700	16,200	7,920	7,550	10,600	6,680	15,500
15	5,220	11,800	20,000	23,000	19,200	19,600	19,800	17,600	9,820	9,220	13,400	8,130	17,400
10	8,040	17,200	22,800	25,800	19,800	21,100	22,000	18,900	12,400	13,300	16,100	10,200	19,100
5	12,400	22,900	26,300	28,500	23,300	23,600	26,100	20,700	15,700	17,900	18,100	13,900	22,300

Probability of annual high discharges, post-regulation period

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge ¹ (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	7,800	9,500	8,400	6,910	5,470
0.95	1.05	14,300	12,700	11,200	9,430	7,660
0.90	1.11	20,800	14,700	12,900	11,100	9,120
0.80	1.25	24,100	17,400	15,300	13,300	11,200
0.50	2	29,900	23,500	20,900	18,700	16,400
0.20	5	40,300	31,100	27,900	25,700	23,600
0.10	10	42,300	35,600	32,200	30,100	28,300
0.04	25	50,700	40,800	37,300	35,400	34,200
0.02	50	57,900	44,400	40,900	39,100	38,500
0.01	100	65,000	47,800	44,300	42,800	42,800

¹ Data supplied by U.S. Army Corps of Engineers, Rock Island District.

DES MOINES RIVER BASIN
05489500 DES MOINES RIVER AT OTTUMWA, IA--Continued

Probability of annual low discharges, post-regulation period

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	37	114	120	118	118	126	143	169	237
0.02	50	51	135	145	147	151	168	202	242	334
0.05	20	81	175	195	206	219	260	334	406	547
0.10	10	121	225	256	278	307	382	513	628	831
0.20	5	194	309	360	404	467	610	849	1,040	1,340
0.50	2	471	596	718	841	1,080	1,500	2,100	2,520	3,100
0.80	1.25	1,100	1,240	1,500	1,800	2,580	3,680	4,850	5,530	6,470
0.90	1.11	1,700	1,870	2,260	2,710	4,150	5,900	7,300	8,030	9,150
0.96	1.04	2,670	2,960	3,540	4,220	6,960	9,760	11,100	11,600	12,900
0.96	1.02	3,550	4,030	4,780	5,650	9,830	13,500	14,300	14,500	15,800
0.99	1.01	4,570	5,380	6,290	7,370	13,400	18,100	17,900	17,600	18,900

Probability of seasonal low discharges, post-regulation period

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	152	211	213	214	104	145	171	195
0.02	50	181	247	251	258	176	240	291	347
0.05	20	240	319	329	348	364	488	606	766
0.10	10	312	408	426	463	664	874	1,100	1,430
0.20	5	438	563	598	671	1,300	1,670	2,100	2,780
0.50	2	900	1,130	1,240	1,470	3,920	4,830	5,840	7,540
0.80	1.25	2,030	2,520	2,870	3,580	9,570	11,300	12,600	14,900
0.90	1.11	3,220	4,020	4,660	5,970	14,100	16,200	17,200	19,000
0.96	1.04	5,430	6,840	8,110	10,600	20,200	22,700	22,500	23,100
0.98	1.02	7,740	9,830	11,800	15,700	24,800	27,400	26,000	25,400
0.99	1.01	10,800	13,800	16,900	22,700	29,200	31,900	29,000	27,100
		July-August-September				October-November-December			
0.01	100	43	130	124	128	92	136	146	148
0.02	50	57	157	156	174	122	178	198	210
0.05	20	86	211	221	272	187	265	308	349
0.10	10	126	278	305	405	270	376	453	539
0.20	5	203	398	456	651	418	573	715	894
0.50	2	519	839	1,020	1,600	934	1,260	1,660	2,210
0.80	1.25	1,390	1,930	2,400	3,840	2,010	2,740	3,690	5,040
0.90	1.11	2,380	3,090	3,830	6,040	2,950	4,080	5,510	7,520
0.96	1.04	4,260	5,240	6,410	9,740	4,390	6,210	8,360	11,300
0.98	1.02	6,280	7,480	9,010	13,200	5,640	8,120	10,900	14,500
0.99	1.01	8,930	10,400	12,300	17,400	7,040	10,300	13,700	18,000

DES MOINES RIVER BASIN
05490500 DES MOINES RIVER AT KEOSAUQUA, IA

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.

DRAINAGE AREA.--14,038 mi².

PERIOD OF RECORD.--May 1903 to July 1906, April to December 1910, August 1911 to September 1988.

GAGE.--Water-stage recorder. 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.

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.

REMARKS.--Prior to Dec. 21, 1958, and since Nov. 30, 1960, some diurnal fluctuation at medium and low stages caused by power plant at Ottumwa. Flow regulated by Lake Red Rock (station 05488100) 91.0 mi upstream, since March 12, 1969. U.S. Army Corps of Engineers satellite data collection platform at station.

Rating table number 3, developed May 1971

Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
9.5	144	21.0	36,100
10.0	510	23.0	45,800
10.5	1,240	25.0	56,000
11.0	2,220	27.0	66,600
13.0	7,180	29.0	77,700
15.0	13,200	31.0	89,400
17.0	19,900	33.0	104,000
19.0	27,400	35.0	123,000

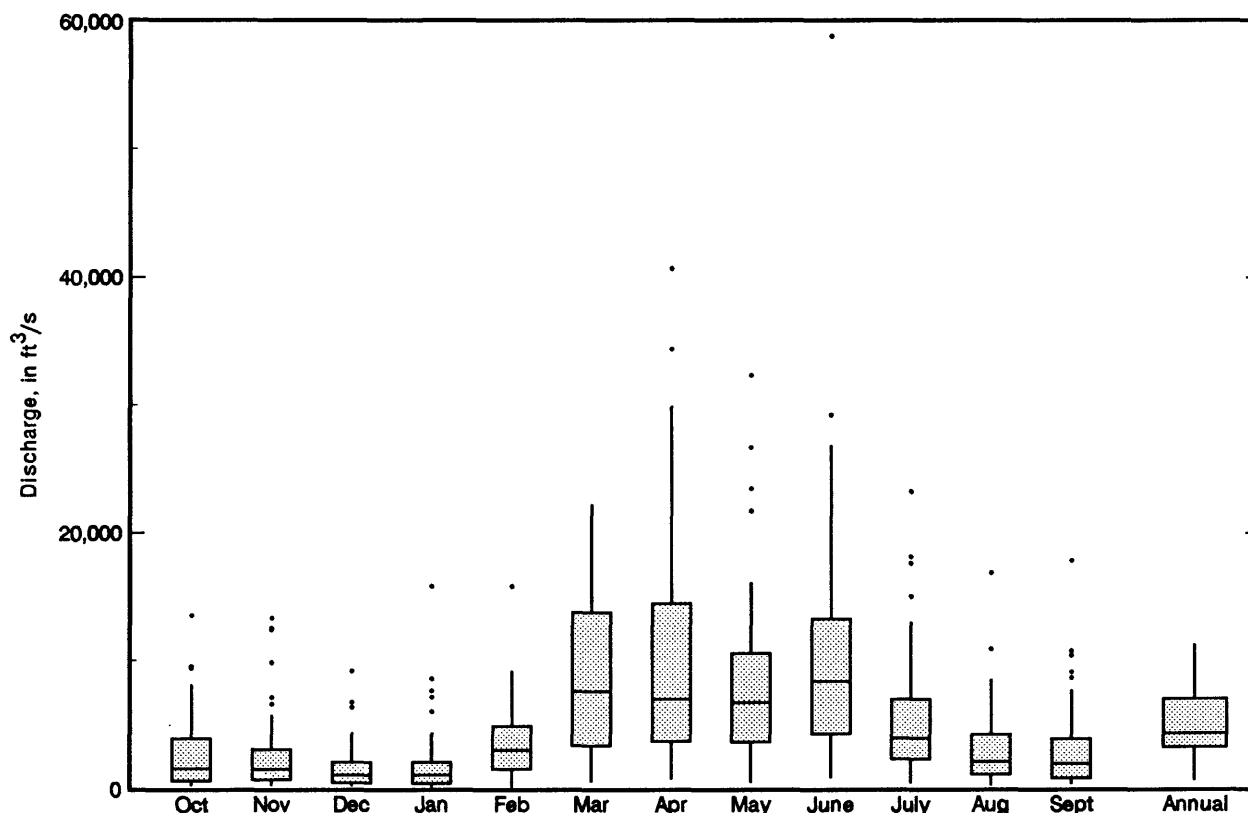
DES MOINES RIVER BASIN
05490500 DES MOINES RIVER AT KEOSAUQUA, IA--Continued

Pre-regulation Period

Statistics of monthly and annual mean discharges, pre-regulation period

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	13,560	1916	248	1957	2,767	2,897	4.5
November	13,370	1942	242	1956	2,525	2,994	4.1
December	9,210	1932	160	1956	1,579	1,674	2.6
January	15,890	1932	102	1940	1,824	2,589	3.0
February	15,850	1915	122	1940	3,496	2,843	5.7
March	22,230	1929	528	1934	8,793	6,063	14.3
April	40,650	1965	710	1956	9,886	8,531	16.1
May	32,370	1944	485	1934	8,107	6,445	13.2
June	58,890	1947	821	1934	10,660	9,502	17.3
July	23,200	1915	448	1956	5,515	4,810	9.0
August	16,910	1915	201	1934	3,065	2,910	5.0
September	17,850	1926	340	1955	3,243	3,462	5.3
Annual	11,320	1915	607	1934	5,159	2,739	100.0

Boxplots of monthly and annual mean discharges, pre-regulation period



DES MOINES RIVER BASIN
05490500 DES MOINES RIVER AT KEOSAUQUA, IA--Continued

Monthly and annual flow duration, pre-regulation period

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	102	120	380	585	450	455	320	164	182	173	178	118	146
95	145	230	535	1,150	709	1,070	608	307	314	306	291	179	300
90	196	364	801	1,620	1,160	1,520	924	586	433	384	391	252	448
85	256	437	1,420	2,050	1,740	1,960	1,240	726	575	461	471	319	594
80	339	550	1,860	2,560	2,290	2,480	1,430	841	657	535	549	391	730
75	427	649	2,390	3,200	2,750	3,120	1,660	964	743	612	622	474	905
70	523	776	3,010	3,750	3,230	3,730	1,930	1,100	839	690	692	545	1,110
65	623	987	3,520	4,360	3,910	4,300	2,240	1,230	942	799	807	626	1,340
60	725	1,190	4,050	4,990	4,510	4,850	2,570	1,380	1,070	929	954	710	1,610
55	810	1,390	4,750	5,650	5,120	5,550	2,940	1,530	1,210	1,100	1,130	815	1,910
50	895	1,680	5,540	6,320	5,740	6,280	3,360	1,710	1,410	1,290	1,310	924	2,300
45	1,010	2,090	6,420	7,180	6,370	7,270	3,830	1,880	1,670	1,500	1,500	1,060	2,820
40	1,140	2,540	7,460	8,050	7,180	8,330	4,360	2,140	1,970	1,810	1,790	1,210	3,440
35	1,310	3,070	8,740	9,240	7,970	9,600	4,890	2,430	2,340	2,200	2,080	1,420	4,170
30	1,540	3,890	10,300	10,700	9,030	11,200	5,750	2,890	2,830	2,780	2,360	1,660	5,030
25	1,780	4,760	12,400	12,500	10,100	12,900	6,810	3,510	3,450	3,500	2,870	1,910	6,150
20	2,090	5,750	14,600	15,100	11,900	15,900	8,080	4,430	4,340	4,360	3,480	2,250	7,620
15	2,530	6,970	17,000	18,100	14,100	20,000	9,660	5,690	5,690	5,510	4,220	2,780	9,660
10	3,380	8,790	21,800	22,300	17,700	26,500	12,200	7,330	7,670	7,290	5,290	3,550	12,900
5	5,920	12,600	28,100	31,700	25,000	37,700	17,100	10,700	12,300	9,970	8,600	5,170	20,000

Probability of annual high discharges, pre-regulation period

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	10,900	6,020	4,070	3,080	2,130
0.95	1.05	15,900	11,300	8,440	6,200	4,430
0.90	1.11	19,400	15,200	11,800	8,630	6,260
0.80	1.25	24,500	21,000	17,000	12,400	9,140
0.50	2	38,200	35,000	29,800	22,300	16,800
0.20	5	58,900	51,400	44,500	35,000	26,800
0.10	10	73,600	60,000	52,000	42,300	32,500
0.04	25	92,900	68,700	59,100	50,000	38,500
0.02	50	108,000	73,800	63,100	54,800	42,200
0.01	100	123,000	78,000	66,200	58,900	45,400

DES MOINES RIVER BASIN
05490500 DES MOINES RIVER AT KEOSAUQUA, IA--Continued

Probability of annual low discharges, pre-regulation period

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	34	43	57	63	76	93	117	130	165
0.02	50	45	56	73	81	97	120	151	170	219
0.05	20	69	84	105	117	140	173	218	251	332
0.10	10	99	118	143	161	192	239	302	353	474
0.20	5	149	176	207	234	278	350	445	528	720
0.50	2	315	357	403	459	551	710	915	1,100	1,530
0.80	1.25	623	680	748	856	1,050	1,390	1,840	2,230	3,070
0.90	1.11	869	929	1,020	1,160	1,450	1,960	2,620	3,160	4,320
0.96	1.04	1,220	1,270	1,390	1,590	2,030	2,790	3,790	4,550	6,120
0.98	1.02	1,500	1,540	1,690	1,930	2,500	3,480	4,790	5,720	7,600
0.99	1.01	1,790	1,830	2,000	2,290	3,010	4,240	5,900	6,990	9,180

Probability of seasonal low discharges, pre-regulation period

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	37	57	64	80	134	242	283	343
0.02	50	52	76	85	106	199	328	384	469
0.05	20	85	116	130	161	348	509	596	740
0.10	10	130	168	187	234	550	737	863	1,090
0.20	5	211	259	287	365	910	1,130	1,320	1,710
0.50	2	492	567	633	851	2,070	2,370	2,790	3,800
0.80	1.25	1,040	1,180	1,340	1,950	3,950	4,540	5,400	7,840
0.90	1.11	1,490	1,690	1,950	3,000	5,210	6,160	7,370	11,100
0.96	1.04	2,130	2,430	2,870	4,730	6,680	8,320	10,000	15,800
0.98	1.02	2,640	3,060	3,660	6,330	7,670	9,980	12,100	19,500
0.99	1.01	3,170	3,740	4,540	8,210	8,570	11,600	14,200	23,500
		July-August-September				October-November-December			
0.01	100	71	134	151	192	50	78	96	121
0.02	50	94	164	186	235	65	98	118	149
0.05	20	144	223	255	322	96	137	163	204
0.10	10	206	294	337	427	136	186	217	272
0.20	5	313	411	474	604	204	268	309	388
0.50	2	669	790	914	1,190	434	541	620	785
0.80	1.25	1,350	1,530	1,780	2,390	895	1,090	1,270	1,640
0.90	1.11	1,900	2,180	2,530	3,470	1,290	1,580	1,860	2,440
0.96	1.04	2,690	3,180	3,680	5,200	1,880	2,330	2,820	3,760
0.98	1.02	3,330	4,070	4,710	6,770	2,400	3,000	3,700	5,010
0.99	1.01	4,020	5,090	5,870	8,600	2,960	3,770	4,730	6,510

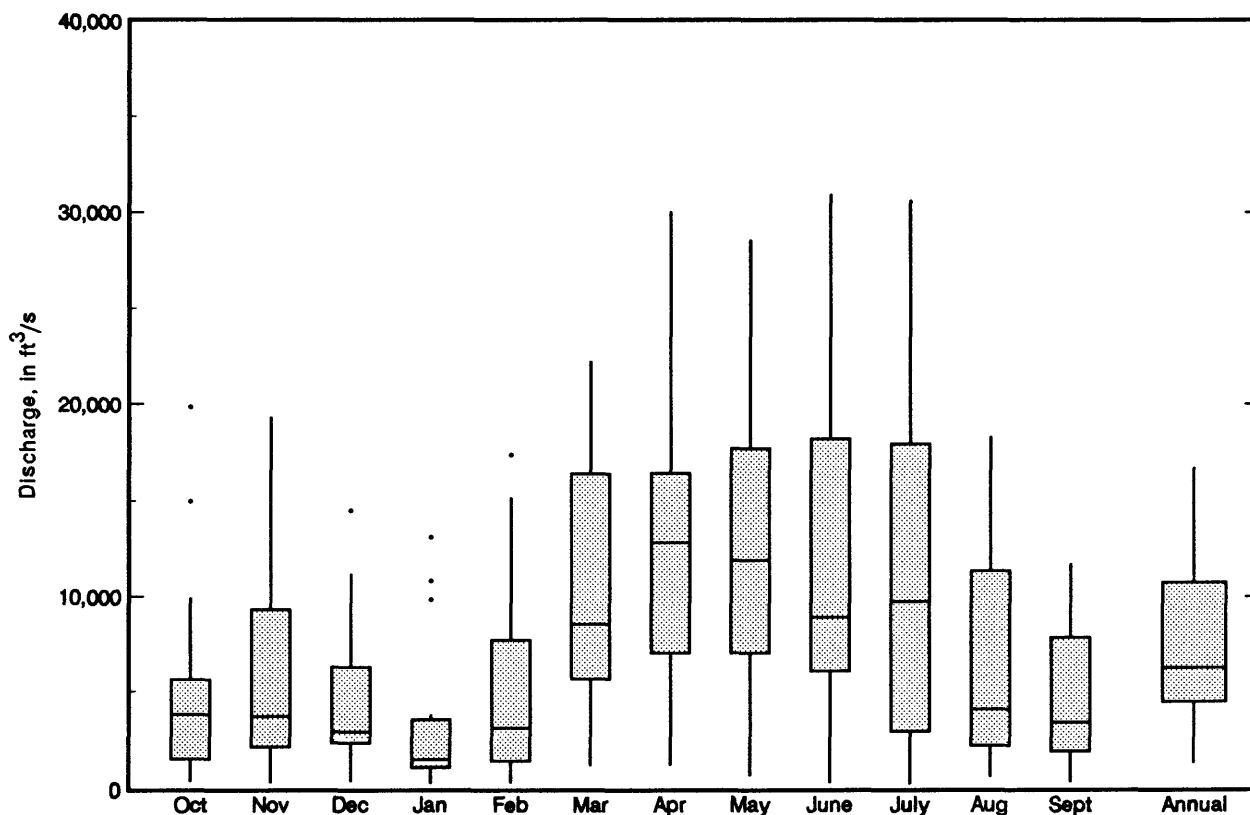
DES MOINES RIVER BASIN
05490500 DES MOINES RIVER AT KEOSAUQUA, IA--Continued

Post-regulation Period

Statistics of monthly and annual mean discharges, post-regulation period

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	19,850	1974	383	1977	4,982	5,140	5.2
November	19,320	1987	333	1977	6,067	5,408	6.3
December	14,510	1983	385	1977	4,639	3,616	4.8
January	13,120	1973	291	1977	3,369	3,720	3.5
February	17,370	1973	331	1977	5,357	5,347	5.6
March	22,200	1983	1,170	1981	10,580	6,405	11.1
April	30,030	1973	1,224	1977	13,080	8,072	13.6
May	28,560	1973	696	1977	12,360	7,410	12.9
June	30,900	1984	300	1977	12,270	8,119	12.8
July	30,610	1984	258	1977	11,070	9,024	11.6
August	18,320	1973	631	1988	7,128	6,294	7.4
September	11,700	1979	362	1976	4,893	3,748	5.1
Annual	16,720	1973	1,303	1977	7,989	4,678	100.0

Boxplots of monthly and annual mean discharges, post-regulation period



DES MOINES RIVER BASIN
05490500 DES MOINES RIVER AT KEOSAUQUA, IA--Continued

Monthly and annual flow duration, post-regulation period

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	262	267	360	619	380	243	188	353	293	308	299	348	277
95	350	466	830	1,470	1,280	600	320	449	367	369	413	485	441
90	608	662	1,490	2,410	2,470	2,500	1,060	642	440	460	850	1,030	738
85	729	772	2,390	3,790	3,450	3,540	1,330	844	565	585	1,120	1,300	1,040
80	842	883	3,540	4,870	4,480	4,100	1,650	982	710	702	1,400	1,570	1,360
75	981	1,030	4,460	5,680	5,150	4,680	2,370	1,170	1,060	941	1,820	1,810	1,730
70	1,110	1,170	5,130	6,370	5,800	5,280	2,900	1,430	1,300	1,360	2,150	2,030	2,230
65	1,240	1,350	5,690	7,050	6,810	5,950	3,410	1,670	1,560	1,890	2,410	2,260	2,740
60	1,380	1,590	6,300	8,400	8,290	7,350	4,750	2,280	1,870	2,280	2,770	2,510	3,310
55	1,540	1,960	6,910	9,730	9,840	9,630	6,890	3,090	2,390	2,560	3,160	2,840	3,990
50	1,720	2,330	7,750	11,400	12,100	12,200	8,930	3,980	2,870	2,900	3,540	3,270	4,760
45	2,000	2,630	8,710	13,000	14,100	14,300	10,800	5,220	3,350	3,290	4,060	3,690	5,680
40	2,360	2,920	9,980	14,800	15,800	16,300	13,100	6,600	3,870	3,750	4,770	4,130	6,770
35	2,830	3,410	11,800	16,300	17,200	17,500	15,500	8,020	4,540	4,350	6,340	4,640	8,270
30	3,380	4,500	13,600	17,900	18,000	18,300	17,200	10,300	5,480	5,140	7,550	5,230	10,400
25	3,940	5,560	16,300	19,300	18,800	19,000	18,400	13,900	6,930	6,480	8,940	6,000	13,200
20	4,530	7,240	19,000	20,700	19,500	19,800	19,600	16,000	8,100	7,820	10,800	6,800	16,000
15	5,530	11,800	21,900	23,600	20,300	20,600	20,800	17,700	10,300	9,590	14,000	8,430	18,200
10	7,800	18,200	24,400	26,400	21,500	22,100	23,300	19,000	13,500	14,400	16,700	10,700	20,000
5	13,000	23,800	27,200	29,000	26,400	24,800	28,300	20,300	16,900	18,900	19,000	15,000	23,600

Probability of annual high discharges, post-regulation period

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge ¹ (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	10,800	8,850	7,850	6,120	5,410
0.95	1.05	17,600	13,100	11,500	9,330	7,960
0.90	1.11	22,800	15,900	13,800	11,400	9,660
0.80	1.25	28,600	19,700	17,000	14,300	12,100
0.50	2	37,700	28,800	24,100	20,900	17,900
0.20	5	51,400	39,900	32,300	28,300	25,400
0.10	10	65,000	46,300	36,800	32,300	30,000
0.04	25	72,800	53,600	41,700	36,500	35,400
0.02	50	74,100	58,500	44,800	39,100	39,100
0.01	100	75,400	62,900	47,600	41,400	42,600

¹ Data supplied by U.S. Army Corps of Engineers, Rock Island District.

DES MOINES RIVER BASIN
05490500 DES MOINES RIVER AT KEOSAUQUA, IA--Continued

Probability of annual low discharges, post-regulation period

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	108	108	123	123	121	132	150	189	254
0.02	50	131	135	153	158	158	178	214	269	364
0.05	20	173	187	213	223	235	278	358	448	605
0.10	10	225	252	288	308	335	411	555	690	926
0.20	5	314	364	418	458	519	660	924	1,130	1,500
0.50	2	622	751	873	991	1,220	1,620	2,290	2,700	3,430
0.80	1.25	1,320	1,600	1,880	2,190	2,910	3,980	5,180	5,820	6,920
0.90	1.11	2,010	2,400	2,840	3,350	4,630	6,290	7,690	8,380	9,550
0.96	1.04	3,220	3,740	4,460	5,300	7,650	10,300	11,400	12,000	13,000
0.98	1.02	4,420	5,010	6,000	7,150	10,600	14,100	14,600	14,900	15,600
0.99	1.01	5,930	6,530	7,860	9,380	14,300	18,700	18,000	17,900	18,200

Probability of seasonal low discharges, post-regulation period

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	185	213	216	229	110	142	185	213
0.02	50	220	252	259	277	186	237	310	378
0.05	20	289	331	346	376	390	487	639	828
0.10	10	372	429	455	501	713	878	1,140	1,540
0.20	5	515	600	647	727	1,390	1,690	2,160	2,950
0.50	2	1,010	1,220	1,350	1,590	4,160	4,900	5,920	7,830
0.80	1.25	2,120	2,720	3,080	3,840	9,910	11,400	12,700	15,100
0.90	1.11	3,220	4,290	4,910	6,340	14,400	16,400	17,300	19,000
0.98	1.04	5,130	7,200	8,300	11,200	20,200	22,700	22,600	22,800
0.98	1.02	7,020	10,200	11,800	16,400	24,400	27,300	26,100	24,800
0.99	1.01	9,390	14,200	16,500	23,400	28,300	31,600	29,100	26,300
		July-August-September				October-November-December			
0.01	100	108	133	124	129	124	146	153	154
0.02	50	130	165	161	180	158	190	208	219
0.05	20	174	231	239	291	228	283	326	367
0.10	10	231	313	341	442	316	400	481	569
0.20	5	332	459	524	725	469	605	759	945
0.50	2	715	993	1,210	1,800	1,000	1,320	1,750	2,330
0.80	1.25	1,700	2,270	2,810	4,240	2,150	2,810	3,850	5,280
0.90	1.11	2,780	3,570	4,400	6,520	3,220	4,150	5,700	7,830
0.96	1.04	4,840	5,890	7,110	10,200	4,940	6,240	8,540	11,600
0.98	1.02	7,050	8,220	9,730	13,400	6,520	8,100	11,000	14,800
0.99	1.01	10,000	11,200	12,900	17,200	8,370	10,200	13,700	18,300

DES MOINES RIVER BASIN
05491000 SUGAR CREEK NEAR KEOKUK, IA

LOCATION.--Lat 40°26'33", long 91°28'24", in NW1/4 SE1/4 sec. 7, T.65 N., R.5 W., Lee County, Hydrologic Unit 07100009, on left bank 13 ft downstream from bridge on county highway W62, 2.8 mi downstream from Barlean Creek, 4.6 mi upstream from mouth and 6.0 mi northwest of post office in Keokuk.

DRAINAGE AREA.--105 mi².

PERIOD OF RECORD.--April 1922 to September 1931, August 1958 to September 1973 (discontinued).

GAGE.--Water-stage recorder. Datum of gage is 510.20 ft above mean sea level. Prior to June 25, 1923 and Nov 28, 1928 to Sept. 30, 1931, nonrecording gage; June 25, 1923 to Oct. 8, 1928 and Aug. 29, 1958 to Oct. 1, 1967, water-stage recorder at site of former bridge on old channel 0.6 mi downstream at same datum. Oct. 6, 1967 to Mar. 11, 1968, nonrecording gage at present site and datum.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge not determined, occurred Nov. 17, 1928; maximum discharge recorded, 6,620 ft³/s Oct. 1, 1927, gage height, 13.85 ft, at former site 0.6 mi downstream; no flow at times most years.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 9, 1905, reached a 20.6 ft, from floodmarks, at former site 0.6 mi downstream, discharge, 33,000 ft³/s, estimated on basis of velocity-area study.

Rating table number 13, developed February 1971
(A discharge measurement to validate this rating
has not been made since October 1974.)

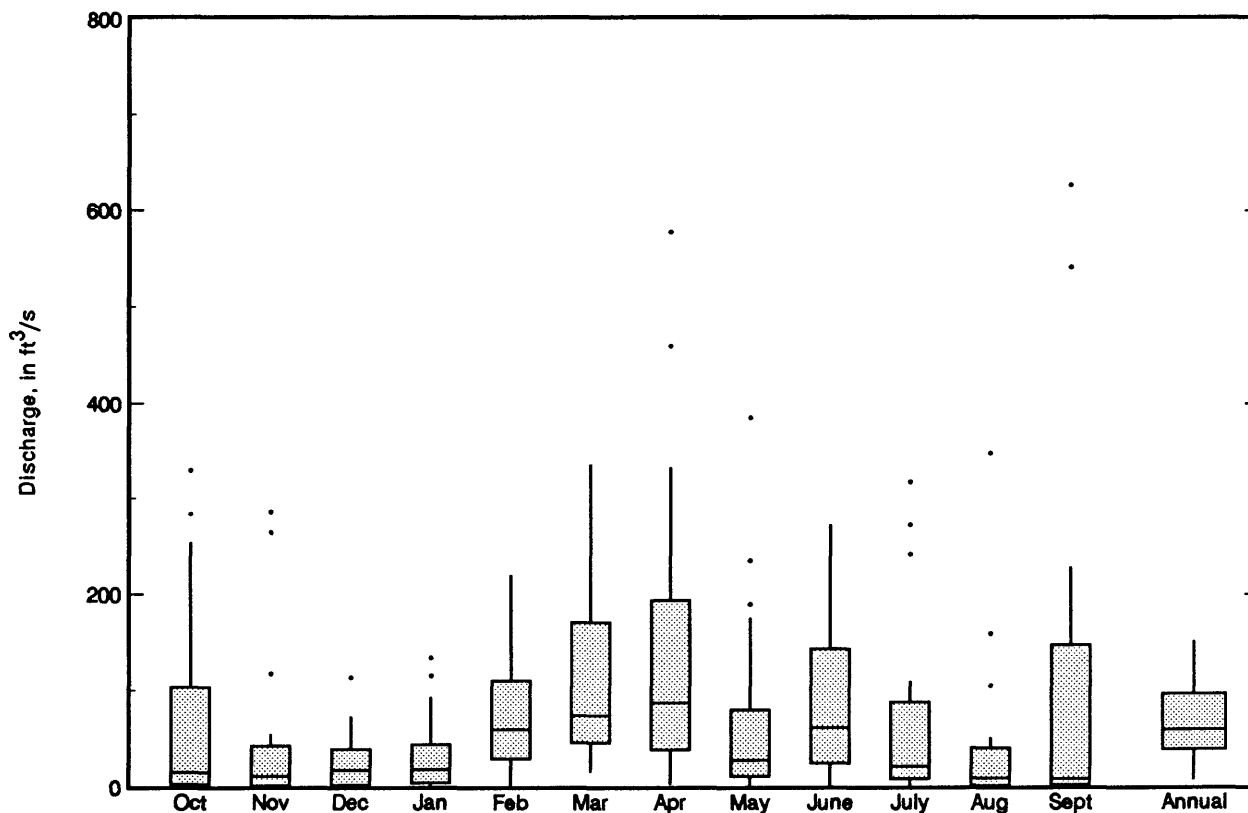
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
4.0	7.8	7.0	420
4.2	16	8.0	675
4.5	34	9.0	980
5.0	79	11.0	1,710
5.5	142	13.0	3,000
6.0	218	15.0	5,300

DES MOINES RIVER BASIN
05491000 SUGAR CREEK NEAR KEOKUK, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	329	1927	0.000	1923	67.0	97.3	7.9
November	285	1962	0.000	1964	41.1	76.7	4.8
December	113	1972	0.000	1964	25.4	28.5	3.0
January	134	1965	0.000	1964	30.6	37.6	3.6
February	219	1925	1.02	1923	75.8	65.8	8.9
March	335	1973	14.7	1964	114	90.7	13.4
April	577	1973	2.46	1923	143	146	16.8
May	385	1973	1.25	1924	68.7	92.8	8.1
June	272	1927	0.69	1963	91.0	84.3	10.7
July	317	1969	1.30	1923	63.1	69.8	7.4
August	348	1970	0.000	1963	37.2	76.2	4.4
September	626	1970	0.000	1963	93.8	167	11.0
Annual	151	1973	6.83	1923	70.6	40.7	100.0

Boxplots of monthly and annual mean discharges



DES MOINES RIVER BASIN
05491000 SUGAR CREEK NEAR KEOKUK, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.00	0.00	3.7	0.96	0.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95	0.01	0.01	7.1	3.6	1.0	0.38	0.01	0.00	0.00	0.00	0.00	0.00	0.00
90	0.08	1.2	10	6.2	2.2	1.2	0.44	0.00	0.00	0.00	0.01	0.01	0.01
85	0.47	4.2	13	8.1	3.4	1.7	0.87	0.01	0.01	0.01	0.18	0.36	0.55
80	0.89	5.9	15	11	4.9	2.7	1.4	0.01	0.01	0.01	0.52	0.65	1.2
75	1.4	9.2	17	14	6.3	4.1	1.9	0.30	0.01	0.08	0.81	1.1	2.0
70	2.4	12	21	18	7.7	5.6	2.4	0.63	0.10	0.71	1.1	1.9	3.2
65	3.7	14	25	22	9.6	6.9	3.1	1.1	0.43	1.1	1.5	2.6	4.8
60	5.7	17	29	26	12	8.5	4.0	1.5	0.87	1.7	2.5	3.4	6.8
55	7.7	21	34	31	14	11	5.2	2.0	1.4	2.6	4.2	4.3	9.2
50	9.1	25	38	35	16	16	7.6	2.6	2.1	3.9	6.3	5.2	12
45	11	33	44	42	18	21	11	3.4	3.6	6.9	9.1	7.5	15
40	12	42	51	51	23	28	15	4.6	5.8	10	12	9.2	18
35	14	53	58	61	27	37	21	6.1	9.2	14	14	11	24
30	16	64	74	78	33	48	27	8.1	14	19	16	13	31
25	22	76	94	100	40	60	32	11	20	25	21	15	40
20	31	96	121	132	54	76	38	15	30	37	29	19	54
15	44	146	174	189	79	108	53	21	55	55	42	31	79
10	65	222	282	325	123	192	88	35	132	102	69	54	135
5	116	377	488	681	322	462	221	104	500	270	201	113	318

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	665	198	126	75	50
0.95	1.05	1,080	365	219	131	87
0.90	1.11	1,390	492	288	172	115
0.80	1.25	1,850	691	396	237	159
0.50	2	3,070	1,230	688	419	274
0.20	5	4,860	2,010	1,120	697	439
0.10	10	6,070	2,520	1,410	891	546
0.04	25	7,580	3,120	1,770	1,140	675
0.02	50	8,690	3,540	2,030	1,320	766
0.01	100	9,770	3,930	2,280	1,500	852

DES MOINES RIVER BASIN
05491000 SUGAR CREEK NEAR KEOKUK, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.05	20	0.00	0.00	0.00	0.00	0.00	0.01	0.12	0.20	0.23
0.10	10	0.00	0.00	0.00	0.00	0.00	0.16	0.53	1.2	1.6
0.20	5	0.00	0.00	0.00	0.00	0.00	0.50	1.3	3.0	4.2
0.50	2	0.00	0.00	0.00	0.00	0.54	2.6	4.9	11	17
0.80	1.25	0.57	0.75	1.0	1.6	3.3	9.3	17	28	52
0.90	1.11	0.87	1.0	1.5	2.6	7.2	16	31	43	85
0.96	1.04	1.1	1.3	1.8	3.8	14	28	60	64	136
0.98	1.02	1.3	1.3	2.0	4.7	22	39	90	81	180
0.99	1.01	1.3	1.4	2.2	5.7	32	52	132	99	228

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.28	0.32	0.05	0.04	0.20	0.09	0.01	0.34
0.02	50	0.39	0.44	0.10	0.09	0.27	0.14	0.03	0.54
0.05	20	0.64	0.70	0.27	0.30	0.44	0.29	0.12	1.1
0.10	10	0.98	1.0	0.58	0.77	0.66	0.53	0.37	1.9
0.20	5	1.5	1.7	1.3	2.1	1.1	1.1	1.2	3.8
0.50	2	3.5	4.1	4.9	11	3.2	3.9	6.7	13
0.80	1.25	7.3	9.4	13	34	9.3	13	21	43
0.90	1.11	10	14	19	53	17	23	32	79
0.98	1.04	15	22	26	77	32	41	43	145
0.98	1.02	18	30	31	94	48	60	50	214
0.99	1.01	22	38	35	108	71	82	55	301
		July-August-September				October-November-December			
0.01	100	0.03	0.00	0.08	0.01	0.00	0.01	0.00	0.01
0.02	50	0.04	0.01	0.12	0.01	0.01	0.02	0.01	0.02
0.05	20	0.07	0.03	0.22	0.04	0.04	0.07	0.03	0.07
0.10	10	0.12	0.09	0.36	0.11	0.13	0.19	0.10	0.20
0.20	5	0.23	0.27	0.63	0.30	0.42	0.57	0.36	0.65
0.50	2	0.72	1.3	1.8	1.7	2.2	2.8	2.7	4.7
0.80	1.25	2.2	3.7	4.7	7.5	6.4	8.1	12	22
0.90	1.11	3.8	5.2	7.4	15	8.9	12	23	43
0.96	1.04	6.8	6.8	12	27	11	15	38	80
0.98	1.02	9.8	7.6	16	39	13	17	51	112
0.99	1.01	14	8.2	21	53	13	19	63	147

FOX RIVER BASIN
05494300 FOX RIVER AT BLOOMFIELD, IA

LOCATION.--Lat 40°46'10", long 92°25'05", in SW1/4 SE1/4 sec. 13, T.69 N., R.14 W., Davis County, Hydrologic Unit 07110001, on left bank 15 ft downstream from bridge on county highway V20, 1.3 mi northwest of county court house at Bloomfield and 8.6 mi downstream from North Fox Creek.

DRAINAGE AREA.--87.7 mi².

PERIOD OF RECORD.--October 1957 to September 1973 (discontinued).

GAGE.--Water-stage recorder. Datum of gage is 755.57 ft above mean sea level.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,600 ft³/s May 6, 1960, gage height, 24.02 ft, from rating curve extended above 5,400 ft³/s on basis of slope-area measurement of peak flow; no flow at times most years.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 9, 1905 and June 18, 1946 exceeded all other known floods at this location, stage and discharge unknown.

Rating table number 8, developed June 1970
(A discharge measurement to validate this rating
has not been made since October 1974.)

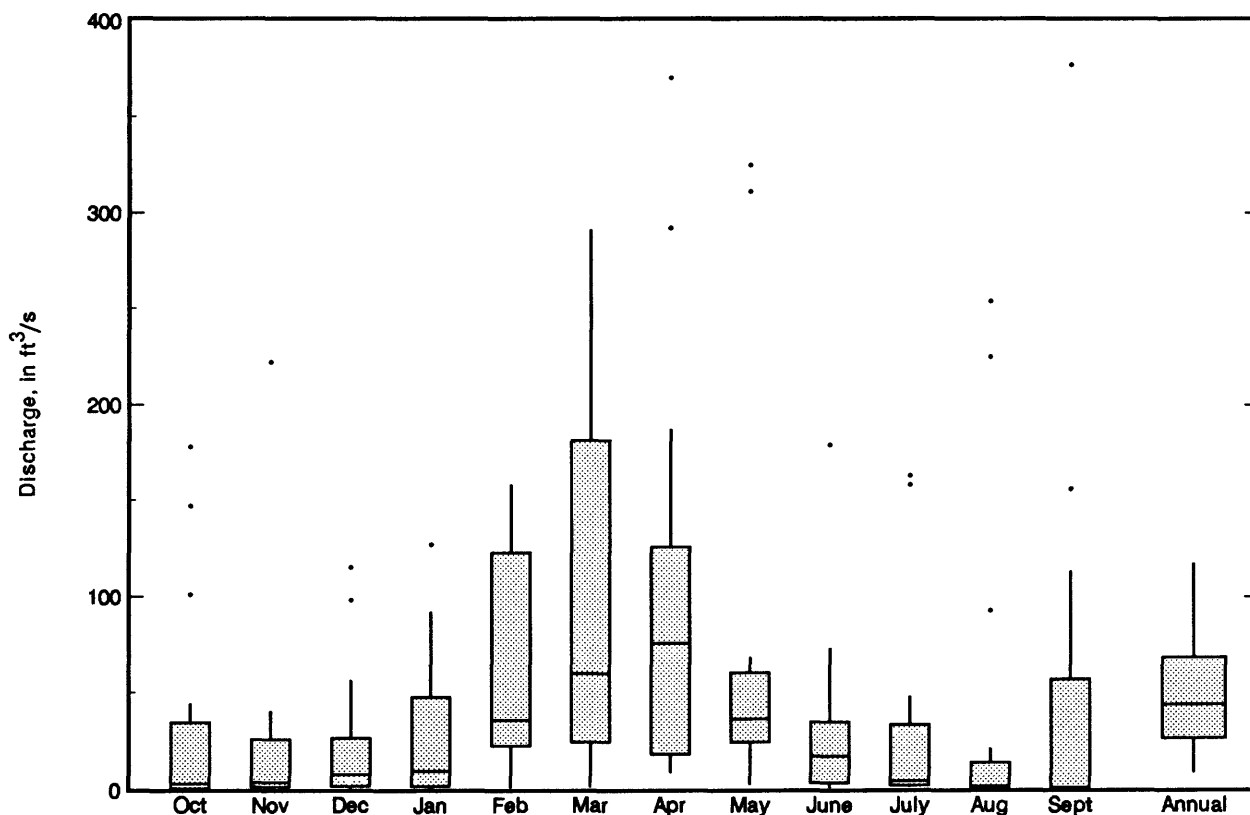
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
3.5	2.4	8.0	564
3.7	6.6	10.0	930
4.0	23	14.0	1,840
4.2	42	18.0	2,970
4.5	75	20.0	3,730
5.0	130	22.0	4,720
6.0	254		

FOX RIVER BASIN
05494300 FOX RIVER AT BLOOMFIELD, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	178	1960	0.21	1964	32.3	57.4	5.4
November	222	1962	0.53	1965	24.2	54.4	4.1
December	115	1971	0.32	1964	23.4	35.7	3.9
January	127	1973	0.59	1964	29.7	39.6	5.0
February	158	1959	0.67	1964	61.6	56.1	10.4
March	291	1960	1.07	1964	102	93.8	17.2
April	370	1973	8.48	1971	98.6	106	16.6
May	325	1973	2.35	1964	71.1	98.1	12.0
June	179	1967	0.73	1963	31.7	44.9	5.3
July	163	1969	1.09	1972	30.6	52.8	5.2
August	254	1970	0.20	1961	38.5	81.8	6.5
September	377	1970	0.78	1969	49.8	99.4	8.4
Annual	117	1973	8.40	1964	49.4	31.2	100.0

Boxplots of monthly and annual mean discharges



FOX RIVER BASIN
05494300 FOX RIVER AT BLOOMFIELD, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equalled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.23	0.50	0.79	0.44	0.46	0.26	0.09	0.08	0.02	0.01	0.17	0.09	0.08
95	0.43	0.65	1.2	3.3	1.4	0.53	0.27	0.10	0.09	0.08	0.29	0.17	0.22
90	0.59	0.86	2.7	5.8	2.5	0.70	0.42	0.16	0.13	0.15	0.39	0.45	0.42
85	0.72	1.7	5.4	7.0	3.6	0.84	0.52	0.21	0.21	0.26	0.51	0.60	0.61
80	0.87	2.8	8.5	8.6	5.1	0.98	0.62	0.26	0.33	0.33	0.63	0.77	0.80
75	1.1	3.8	11	11	6.1	1.1	0.71	0.32	0.43	0.48	0.78	0.98	1.0
70	1.3	4.8	13	13	7.1	1.3	0.81	0.40	0.54	0.60	0.96	1.4	1.4
65	1.7	5.9	15	15	8.4	1.5	0.90	0.53	0.65	0.79	1.2	1.6	1.8
60	2.1	7.5	18	17	9.9	1.8	1.0	0.72	0.79	1.1	1.6	1.9	2.4
55	2.6	13	20	20	12	2.2	1.2	0.88	0.94	1.5	2.0	2.2	3.3
50	3.4	19	23	24	14	2.7	1.4	1.1	1.2	1.9	2.4	2.5	4.7
45	4.9	24	27	28	16	3.6	1.7	1.4	1.5	2.2	3.2	2.9	6.4
40	7.2	30	31	32	18	4.5	2.2	1.8	1.9	2.6	4.7	3.8	8.7
35	9.6	38	40	37	21	5.7	2.9	2.2	2.5	3.4	6.3	5.2	12
30	14	47	51	43	26	8.4	4.2	2.8	3.9	4.9	8.2	6.8	16
25	21	57	65	54	34	12	5.9	3.6	5.4	7.1	11	8.9	21
20	29	73	94	72	43	20	9.2	5.2	9.0	11	14	12	30
15	41	94	137	109	61	35	14	9.0	16	15	18	15	44
10	66	157	258	212	104	61	22	21	41	30	25	22	78
5	133	292	481	549	262	144	58	84	190	88	53	62	200

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	345	107	62	36	31
0.95	1.05	670	238	130	79	59
0.90	1.11	934	348	184	114	81
0.80	1.25	1,370	530	273	171	116
0.50	2	2,710	1,050	522	328	210
0.20	5	4,970	1,810	880	541	341
0.10	10	6,650	2,270	1,100	665	424
0.04	25	8,890	2,790	1,360	799	519
0.02	50	10,600	3,140	1,530	883	583
0.01	100	12,400	3,440	1,680	955	641

FOX RIVER BASIN
05494300 FOX RIVER AT BLOOMFIELD, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.01	0.03	0.15	0.21	0.27	0.20	0.24
0.02	50	0.00	0.00	0.01	0.04	0.16	0.25	0.31	0.26	0.34
0.05	20	0.00	0.00	0.02	0.06	0.19	0.32	0.41	0.39	0.57
0.10	10	0.00	0.00	0.04	0.09	0.23	0.41	0.54	0.58	0.92
0.20	5	0.00	0.05	0.08	0.15	0.30	0.57	0.79	0.99	1.7
0.50	2	0.10	0.13	0.24	0.33	0.55	1.2	2.0	3.1	5.8
0.80	1.25	0.28	0.34	0.55	0.69	1.3	2.7	6.5	11	22
0.90	1.11	0.52	0.58	0.77	0.99	2.1	4.4	13	24	47
0.96	1.04	0.97	1.1	1.0	1.4	3.9	7.7	32	57	108
0.96	1.02	1.5	1.6	1.2	1.8	6.1	11	58	104	189
0.99	1.01	2.4	2.5	1.4	2.1	9.3	16	104	180	315

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.06	0.11	0.16	0.19	0.14	0.23	0.26	0.15
0.02	50	0.08	0.13	0.20	0.27	0.18	0.27	0.32	0.24
0.05	20	0.13	0.19	0.27	0.49	0.25	0.36	0.43	0.47
0.10	10	0.21	0.27	0.37	0.82	0.34	0.45	0.57	0.85
0.20	5	0.35	0.44	0.59	1.6	0.48	0.62	0.83	1.7
0.50	2	1.1	1.3	1.7	5.5	0.91	1.2	1.8	6.1
0.80	1.25	3.8	4.8	6.6	20	1.7	2.3	4.2	20
0.90	1.11	7.6	11	15	40	2.2	3.3	6.9	37
0.96	1.04	17	26	41	85	3.0	5.0	12	68
0.98	1.02	28	49	82	140	3.6	6.6	17	100
0.99	1.01	46	88	158	219	4.3	8.5	24	140
		July-August-September				October-November-December			
0.01	100	0.02	0.01	0.03	0.16	0.01	0.02	0.05	0.09
0.02	50	0.02	0.01	0.04	0.17	0.02	0.04	0.07	0.12
0.05	20	0.04	0.02	0.07	0.21	0.04	0.07	0.13	0.19
0.10	10	0.06	0.05	0.10	0.25	0.08	0.13	0.22	0.30
0.20	5	0.09	0.10	0.17	0.35	0.16	0.26	0.40	0.51
0.50	2	0.23	0.33	0.43	0.80	0.58	0.86	1.3	1.6
0.80	1.25	0.59	0.85	1.1	2.6	2.0	2.6	4.2	5.8
0.90	1.11	0.97	1.3	1.7	5.6	3.6	4.6	7.7	12
0.96	1.04	1.7	1.8	2.7	14	6.6	8.0	15	27
0.98	1.02	2.4	2.2	3.6	28	9.6	11	22	47
0.99	1.01	3.3	2.6	4.8	54	13	15	32	78

FOX RIVER BASIN
05494500 FOX RIVER AT CANTRIL, IA

LOCATION.--Lat 40°39'20", long 92°03'30", in SW1/4 sec. 30, T.68 N., R.10 W., Van Buren County, Hydrologic Unit 07110002, on left bank 5 ft downstream from bridge on State Highway 2, 0.3 mi upstream from Bone Run and 1.0 mi northeast of Cantril.

DRAINAGE AREA.--161 mi².

PERIOD OF RECORD.--August 1940 to September 1951 (discontinued).

GAGE.--Water-stage recorder. Datum of gage is 657.98 ft NGVD. Prior to Nov. 8, 1940, wire weight gage on downstream side of bridge at same site and datum.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 16,500 ft³/s June 18, 1946; no flow Aug. 9-16, Aug. 31 to Sept. 3, 1941.

Rating table developed February 1950
(A discharge measurement to validate this rating
has not been made since December 1952.)

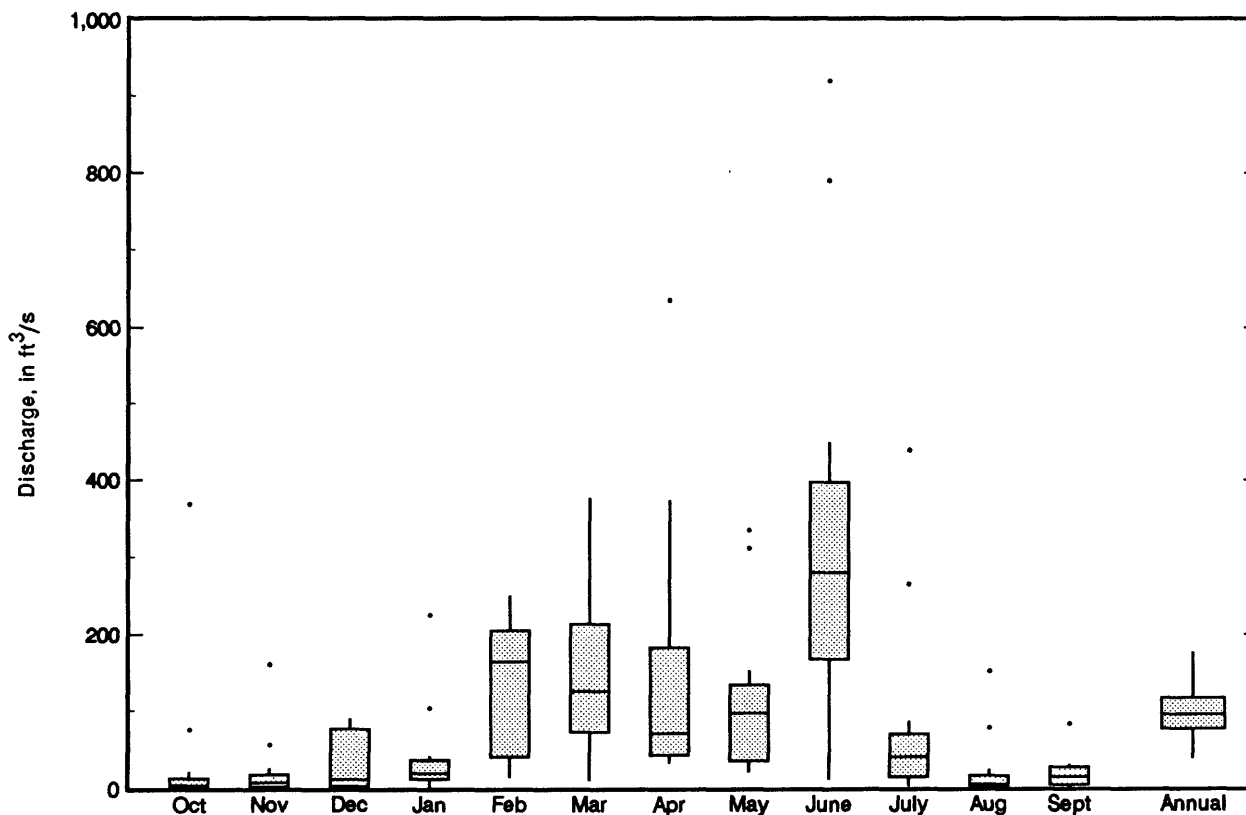
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
2.5	11	8.0	1,520
3.0	30	10.0	2,480
3.5	78	12.0	3,500
4.0	165	14.0	4,900
4.5	280	16.0	7,200
5.0	410	18.0	11,700
6.0	740		

FOX RIVER BASIN
05494500 FOX RIVER AT CANTRIL, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	369	1942	1.05	1943	44.6	110	3.8
November	161	1942	1.48	1941	25.9	47.4	2.2
December	89.8	1943	1.02	1951	33.7	38.3	2.9
January	225	1946	1.08	1951	45.3	65.9	3.8
February	250	1945	13.6	1947	135	88.9	11.5
March	376	1946	9.78	1941	145	109	12.3
April	635	1944	32.2	1942	160	189	13.5
May	335	1945	20.1	1949	116	111	9.9
June	920	1947	11.0	1948	336	290	28.5
July	439	1946	2.97	1944	91.5	137	7.8
August	152	1951	0.31	1941	26.3	47.2	2.2
September	83.0	1941	1.32	1942	20.5	23.3	1.7
Annual	176	1946	37.7	1941	97.6	38.1	100.0

Boxplots of monthly and annual mean discharges



FOX RIVER BASIN
05494500 FOX RIVER AT CANTRIL, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.31	0.62	3.4	7.5	2.6	0.32	0.49	0.04	0.79	0.57	0.82	0.45	0.43
95	0.63	1.0	7.2	11	5.3	2.6	1.0	0.28	0.98	0.82	1.1	0.74	0.94
90	0.96	3.7	13	15	8.7	3.3	2.5	0.89	1.2	0.96	1.4	0.89	1.5
85	1.4	6.1	16	18	12	6.1	3.4	1.4	1.5	1.1	1.7	1.0	2.3
80	2.4	9.2	21	22	15	8.9	4.3	2.0	1.8	1.3	2.1	1.1	2.8
75	4.3	11	27	26	16	14	5.0	2.4	2.1	1.5	2.4	1.5	3.6
70	5.5	13	35	30	18	18	5.6	2.7	2.3	1.8	2.7	2.1	4.5
65	6.9	16	41	34	21	21	6.2	3.1	2.6	2.2	3.0	2.6	5.8
60	8.8	22	47	38	23	23	7.6	3.5	2.8	2.5	3.4	3.1	7.8
55	10	29	55	42	25	28	9.4	3.9	3.0	2.8	3.9	3.7	11
50	12	36	64	46	29	33	12	4.3	3.2	3.1	4.4	4.2	14
45	14	47	73	51	32	44	14	4.9	3.9	3.4	5.2	5.5	17
40	18	57	83	59	35	61	17	5.5	4.7	3.8	6.0	7.2	22
35	21	67	94	68	41	85	20	6.2	5.7	4.3	7.7	9.0	28
30	25	81	108	79	47	116	24	7.8	7.5	4.9	10	12	35
25	30	98	126	92	59	170	30	9.7	10	5.7	14	15	47
20	36	124	154	120	79	327	38	12	13	6.7	20	20	65
15	48	172	229	170	98	513	49	17	17	12	29	26	91
10	67	372	345	280	176	816	81	29	24	41	40	50	147
5	163	707	648	698	390	1,600	200	85	57	120	70	134	390

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	2,630	710	496	293	162
0.95	1.05	3,350	908	608	354	220
0.90	1.11	3,810	1,050	689	399	259
0.80	1.25	4,450	1,290	812	467	317
0.50	2	6,020	1,990	1,160	666	469
0.20	5	8,130	3,340	1,780	1,020	700
0.10	10	9,530	4,520	2,290	1,310	866
0.04	25	11,300	6,410	3,050	1,760	1,090
0.02	50	12,600	8,140	3,710	2,150	1,260
0.01	100	13,900	10,200	4,470	2,600	1,450

FOX RIVER BASIN
05494500 FOX RIVER AT CANTRIL, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.02	0.11	0.34	0.41	0.47	0.88
0.02	50	0.00	0.00	0.00	0.05	0.16	0.47	0.56	0.66	1.3
0.05	20	0.00	0.00	0.00	0.11	0.29	0.74	0.89	1.1	2.2
0.10	10	0.00	0.00	0.00	0.20	0.46	1.1	1.3	1.7	3.5
0.20	5	0.16	0.24	0.36	0.40	0.77	1.7	2.2	2.9	5.9
0.50	2	0.50	0.56	0.67	1.1	1.8	3.7	5.4	8.1	15
0.80	1.25	1.1	1.1	1.2	2.1	3.6	7.1	13	23	32
0.90	1.11	1.5	1.6	1.7	2.6	4.8	9.7	21	38	46
0.96	1.04	2.0	2.2	2.4	3.1	6.3	13	33	68	65
0.98	1.02	2.4	2.8	3.1	3.4	7.3	16	45	97	81
0.99	1.01	2.8	3.4	3.9	3.6	8.3	18	59	135	96

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.08	0.09	0.10	0.50	0.02	0.19	0.94	1.7
0.02	50	0.12	0.14	0.17	0.77	0.06	0.36	1.4	2.6
0.05	20	0.22	0.29	0.36	1.4	0.25	0.84	2.4	4.8
0.10	10	0.38	0.52	0.67	2.4	0.67	1.6	3.8	7.8
0.20	5	0.72	1.0	1.3	4.4	1.8	3.2	6.3	14
0.50	2	2.3	3.3	4.6	13	6.8	8.9	14	33
0.80	1.25	6.8	9.1	13	34	13	17	26	68
0.90	1.11	12	15	22	54	16	22	34	93
0.96	1.04	20	23	35	86	17	26	43	123
0.98	1.02	29	31	47	115	18	28	48	145
0.99	1.01	39	39	59	147	18	29	53	165
		July-August-September				October-November-December			
0.01	100	0.40	0.60	0.02	0.15	0.23	0.27	0.39	0.54
0.02	50	0.44	0.64	0.05	0.23	0.27	0.31	0.44	0.61
0.05	20	0.51	0.72	0.15	0.42	0.35	0.41	0.53	0.76
0.10	10	0.60	0.82	0.32	0.69	0.44	0.52	0.65	0.95
0.20	5	0.75	1.00	0.72	1.2	0.61	0.72	0.86	1.3
0.50	2	1.3	1.6	2.2	3.0	1.2	1.5	1.7	2.9
0.80	1.25	2.5	3.3	4.5	6.3	2.7	3.3	3.7	7.9
0.90	1.11	3.7	5.0	5.5	8.7	4.2	5.3	6.1	15
0.96	1.04	6.0	8.6	6.4	12	7.0	9.2	11	31
0.98	1.02	8.4	12	6.7	14	9.9	13	17	53
0.99	1.01	12	18	7.0	16	14	19	24	89

BIG SIOUX RIVER BASIN
06483270 ROCK RIVER AT ROCK RAPIDS, IA

LOCATION.--Lat 43°26'13", long 96°09'58", in NE1/4 SW1/4 sec. 33, T.100 N., R.45 W., Lyon County, Hydrologic Unit 10170204, on right bank at dam on north side of city park in Rock Rapids, 0.3 mi upstream from Tom Creek, 0.5 mi northeast of junction of U.S. Highway 75 and State Highway 9 and at mile 42.8.

DRAINAGE AREA.--788 mi².

PERIOD OF RECORD.--August 1958 to September 1974 (discontinued).

GAGE.--Water-stage recorder. Datum of gage is 1,331.55 ft above mean sea level.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 29,000 ft³/s Apr. 8, 1969, gage height, 10.23 ft; minimum daily discharge, 0.8 ft³/s Feb. 1-5, 1965.

Rating table number 5, developed May 1969
(A discharge measurement to validate this rating
has not been made since September 1975.)

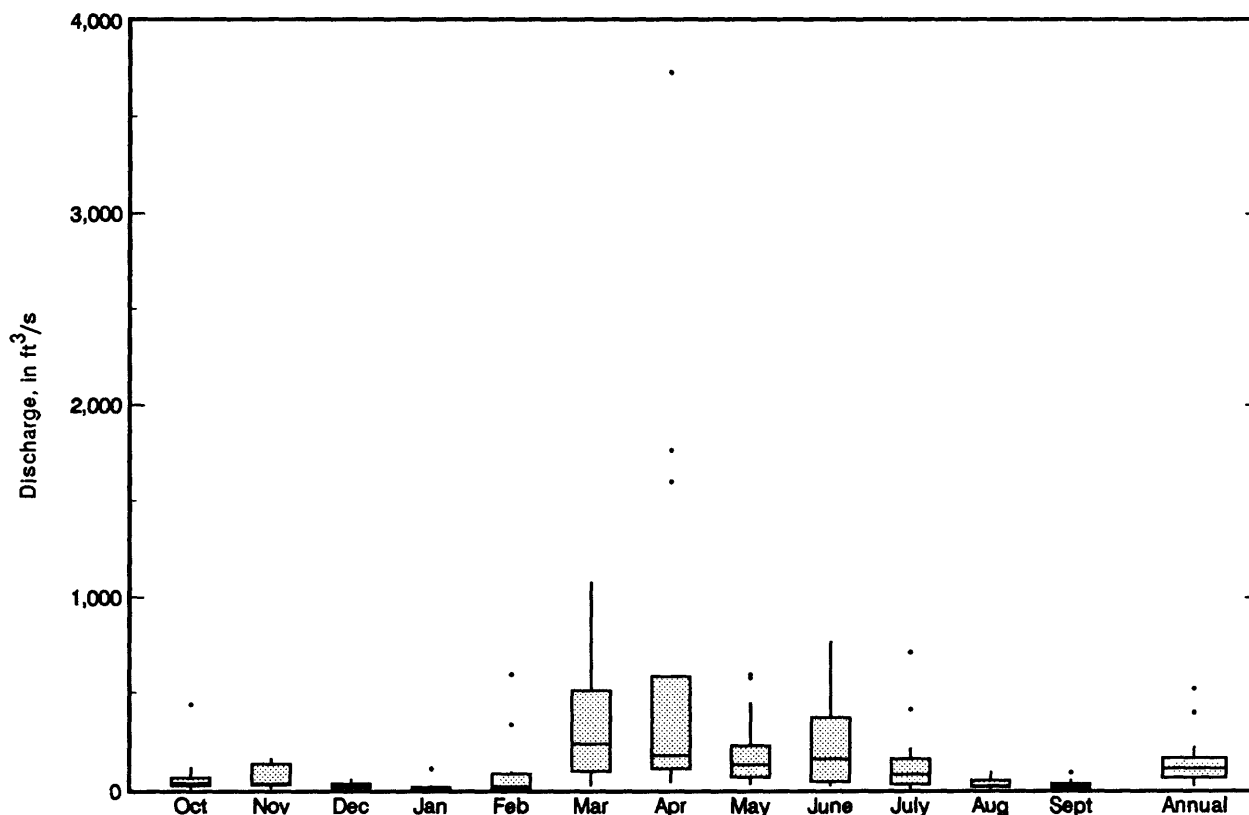
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
1.6	4.1	3.0	1,410
1.7	26	3.5	2,280
1.8	70	4.0	3,280
1.9	130	5.0	5,520
2.0	206	6.0	8,000
2.2	380	8.0	13,200
2.5	710	10.0	25,600

BIG SIOUX RIVER BASIN
06483270 ROCK RIVER AT ROCK RAPIDS, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	438	1969	5.45	1968	69.9	109	3.7
November	163	1969	8.76	1968	63.1	57.1	3.3
December	55.2	1971	6.29	1965	26.4	15.9	1.4
January	107	1973	2.21	1968	18.8	26.1	1.0
February	595	1966	1.59	1965	89.7	169	4.7
March	1,082	1962	22.4	1968	339	349	17.8
April	3,730	1969	37.8	1968	654	1,046	34.4
May	596	1972	26.9	1968	199	196	10.4
June	770	1969	21.6	1964	229	226	12.0
July	714	1969	8.61	1974	147	195	7.8
August	92.0	1969	8.97	1964	36.8	28.0	1.9
September	86.8	1964	5.50	1967	28.4	21.6	1.5
Annual	523	1969	19.1	1968	158	141	100.0

Boxplots of monthly and annual mean discharges



BIG SIOUX RIVER BASIN
06483270 ROCK RIVER AT ROCK RAPIDS, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	1.2	0.95	3.2	25	17	9.4	4.6	3.8	3.6	3.6	6.8	3.0	2.2
95	2.3	2.0	9.7	43	24	17	6.5	5.9	4.7	6.5	8.2	5.3	5.1
90	3.9	3.0	15	52	31	22	8.5	7.8	6.3	13	13	7.0	7.3
85	4.9	4.0	18	64	41	26	13	9.7	7.7	16	15	8.8	10
80	5.6	4.8	20	79	49	31	19	12	9.1	18	19	12	14
75	6.2	5.6	24	91	56	40	24	14	11	21	22	13	16
70	7.0	6.4	31	102	63	46	30	15	13	23	25	15	19
65	8.0	7.1	51	115	69	52	36	17	13	26	29	16	22
60	9.3	7.8	71	127	76	58	43	19	14	29	32	18	26
55	12	8.5	92	140	87	67	51	21	15	32	35	19	30
50	14	9.9	112	157	101	76	59	24	17	35	38	21	36
45	15	13	131	173	122	94	68	27	20	38	41	22	43
40	16	16	153	190	142	114	76	29	22	40	46	24	52
35	17	19	180	233	164	134	92	33	27	44	52	27	64
30	19	22	217	278	185	171	118	39	31	49	60	29	79
25	20	27	259	334	217	220	153	47	37	54	80	31	103
20	22	37	331	431	251	274	194	55	44	61	96	35	137
15	25	66	458	644	326	352	278	66	51	74	129	40	185
10	28	173	735	1,170	434	459	366	81	61	108	163	50	273
5	50	270	1,500	2,870	652	704	530	113	77	222	211	72	478

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	—	75	62	37	23
0.95	1.05	—	210	152	95	63
0.90	1.11	966	356	245	155	106
0.80	1.25	1,660	665	435	278	192
0.50	2	4,400	2,080	1,290	826	557
0.20	5	10,900	6,100	3,780	2,360	1,460
0.10	10	16,900	10,400	6,610	4,030	2,310
0.04	25	26,600	18,100	11,900	7,030	3,680
0.02	50	35,300	25,700	17,400	10,000	4,890
0.01	100	45,200	34,800	24,500	13,700	6,260

BIG SIOUX RIVER BASIN
06483270 ROCK RIVER AT ROCK RAPIDS, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.45	0.45	0.51	0.59	0.85	1.3	1.9	2.9	3.9
0.02	50	0.61	0.61	0.70	0.80	1.1	1.8	2.5	3.7	5.2
0.05	20	0.96	0.97	1.1	1.3	1.7	2.6	3.7	5.3	7.7
0.10	10	1.4	1.4	1.6	1.8	2.5	3.6	5.2	7.2	11
0.20	5	2.1	2.2	2.4	2.8	3.7	5.3	7.7	10	15
0.50	2	4.3	4.7	5.2	5.9	7.6	10	15	20	27
0.80	1.25	8.1	9.2	10	11	14	19	27	36	44
0.90	1.11	11	13	14	15	19	25	36	48	55
0.96	1.04	15	17	19	20	24	34	46	65	66
0.98	1.02	18	20	23	24	29	40	55	78	74
0.99	1.01	21	24	27	27	33	46	63	92	81

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.38	0.45	0.59	1.0	4.6	6.1	7.5	10
0.02	50	0.56	0.65	0.80	1.3	5.7	7.6	9.1	13
0.05	20	0.97	1.1	1.3	1.9	7.9	10	12	17
0.10	10	1.5	1.7	1.9	2.6	11	14	16	22
0.20	5	2.6	2.8	3.0	3.8	15	19	23	32
0.50	2	6.2	6.7	7.2	8.4	32	39	45	64
0.80	1.25	13	14	16	19	67	80	91	138
0.90	1.11	19	20	25	29	102	117	134	210
0.96	1.04	26	28	38	47	160	178	204	336
0.98	1.02	32	34	50	64	215	235	270	458
0.99	1.01	37	40	63	84	282	302	349	611
		July-August-September				October-November-December			
0.01	100	1.6	2.3	2.8	4.0	0.82	1.7	1.9	2.9
0.02	50	1.8	2.5	3.2	4.4	1.2	2.3	2.6	3.8
0.05	20	2.3	3.1	3.8	5.1	2.2	3.6	4.1	5.5
0.10	10	2.7	3.8	4.6	5.9	3.4	5.0	5.8	7.6
0.20	5	3.6	4.9	5.8	7.3	5.4	7.2	8.4	11
0.50	2	6.5	8.5	9.8	12	11	13	16	21
0.80	1.25	14	16	18	22	17	19	25	36
0.90	1.11	21	24	26	33	20	22	30	47
0.96	1.04	34	37	40	51	23	26	36	60
0.98	1.02	49	50	53	70	24	27	39	70
0.99	1.01	68	66	69	95	25	29	42	79

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 September 1988.

GAGE.--Water-stage recorder. Datum of gage is 1,222.54 ft above NGVD. Prior to Aug. 13, 1952, nonrecording gage with supplementary water-stage recorder operating above 6.2 ft gage height. June 4, 1949 to Aug. 12, 1952 and Aug. 13, 1952 to May 4, 1976, water-stage recorder, at site 3.2 mi downstream at datum 10.73 ft lower.

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.

Rating table number 20, developed March 1988

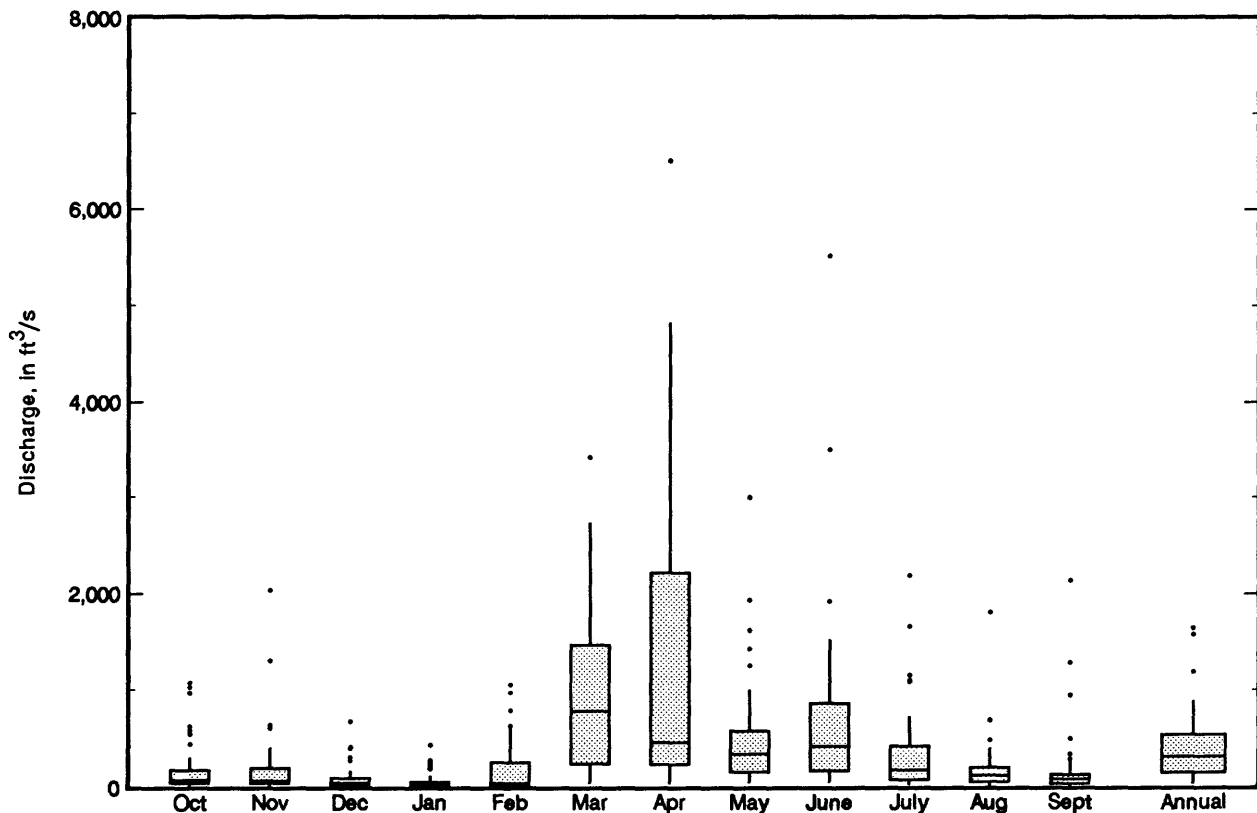
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
3.5	39	9.0	2,000
4.0	116	11.0	3,100
4.5	203	13.0	4,400
5.0	325	15.0	7,520
6.0	665	17.0	12,700
7.0	1,090	19.0	20,000

BIG SIOUX RIVER BASIN
06483500 ROCK RIVER NEAR ROCK VALLEY, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	1,075	1983	2.39	1959	198	286	3.9
November	2,039	1980	9.70	1959	216	385	4.3
December	676	1983	3.22	1959	117	166	2.3
January	432	1983	0.040	1977	61.7	92.2	1.2
February	1,059	1966	0.30	1959	186	280	3.7
March	3,421	1983	35.1	1959	969	869	19.2
April	6,507	1959	35.9	1959	1,267	1,535	25.1
May	3,002	1984	44.4	1968	544	602	10.8
June	5,516	1984	46.3	1964	727	1,013	14.4
July	2,192	1983	21.9	1976	366	467	7.3
August	1,809	1979	6.79	1976	188	294	3.7
September	2,135	1986	3.26	1955	201	396	4.0
Annual	1,645	1983	31.0	1968	419	385	100.0

Boxplots of monthly and annual mean discharges



BIG SIOUX RIVER BASIN
06483500 ROCK RIVER NEAR ROCK VALLEY, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equalled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.01	0.04	1.1	34	32	19	14	3.8	2.1	2.3	6.4	2.1	1.2
95	1.1	1.1	6.9	68	51	38	21	8.2	4.2	9.7	13	4.2	6.9
90	3.0	2.9	17	113	71	56	29	17	15	16	22	8.8	14
85	6.3	7.1	26	144	89	71	38	28	21	28	29	15	22
80	8.4	8.9	41	174	108	92	48	38	27	34	35	20	29
75	11	11	59	206	130	114	63	46	33	40	42	24	38
70	13	13	79	238	153	139	78	53	40	46	49	29	47
65	16	15	116	270	178	164	96	61	48	52	55	33	58
60	19	19	185	321	213	196	114	68	56	58	61	38	69
55	22	22	234	372	248	231	136	78	64	64	67	42	86
50	25	26	289	438	287	265	158	91	72	71	73	47	105
45	29	29	358	541	336	326	185	105	82	81	87	55	134
40	32	38	445	647	384	390	220	122	92	94	101	63	167
35	38	53	579	781	450	466	254	142	102	107	121	72	213
30	45	70	743	915	535	547	309	163	118	135	147	92	261
25	56	137	931	1,140	619	629	380	195	147	169	181	117	341
20	75	196	1,250	1,450	788	792	494	234	183	233	259	169	444
15	115	280	1,750	2,000	986	968	638	276	247	332	370	250	620
10	210	396	2,680	3,140	1,330	1,470	946	372	379	625	546	346	931
5	270	810	4,550	5,800	1,980	2,850	1,400	575	849	1,030	884	515	1,660

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	—	138	114	85	66
0.95	1.05	965	479	361	253	186
0.90	1.11	1,530	866	631	431	309
0.80	1.25	2,590	1,660	1,170	784	545
0.50	2	6,450	4,790	3,290	2,140	1,420
0.20	5	14,300	11,000	7,600	4,940	3,130
0.10	10	20,700	15,600	11,000	7,160	4,460
0.04	25	29,800	21,400	15,400	10,200	6,230
0.02	50	37,000	25,400	18,600	12,500	7,560
0.01	100	44,500	29,200	21,800	14,800	8,870

BIG SIOUX RIVER BASIN
06483500 ROCK RIVER NEAR ROCK VALLEY, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.26	0.72	2.0	2.9
0.02	50	0.00	0.00	0.00	0.00	0.00	0.51	1.2	2.9	4.3
0.05	20	0.00	0.00	0.00	0.19	0.54	1.3	2.7	5.2	7.4
0.10	10	1.4	1.6	1.7	0.92	1.7	2.9	5.2	8.5	12
0.20	5	3.5	3.8	4.0	3.6	4.8	6.8	11	15	22
0.50	2	14	14	15	21	21	27	37	45	63
0.80	1.25	43	44	45	55	62	82	106	126	177
0.90	1.11	76	77	79	76	95	131	171	210	297
0.96	1.04	133	136	138	95	139	199	271	359	509
0.98	1.02	191	196	198	104	171	252	354	502	715
0.99	1.01	262	271	274	110	201	303	443	675	966

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.69	0.70	0.05	0.24	8.2	9.9	13	17
0.02	50	1.0	1.0	0.15	0.46	11	13	17	22
0.05	20	1.8	1.9	0.55	1.2	18	21	27	35
0.10	10	3.0	3.1	1.6	2.5	26	32	39	51
0.20	5	5.6	5.7	4.7	5.8	43	51	62	81
0.50	2	18	18	23	23	107	128	149	197
0.80	1.25	55	56	66	72	266	313	361	474
0.90	1.11	99	100	93	118	426	497	575	748
0.96	1.04	182	184	120	186	702	809	943	1,210
0.98	1.02	270	272	135	240	967	1,100	1,300	1,660
0.99	1.01	383	384	146	297	1,290	1,460	1,730	2,200
		July-August-September				October-November-December			
0.01	100	0.58	1.1	1.3	1.9	0.75	1.3	1.6	2.0
0.02	50	1.1	1.8	2.2	3.1	1.2	1.9	2.4	3.0
0.05	20	2.6	3.7	4.5	6.2	2.3	3.4	4.2	5.4
0.10	10	5.1	6.8	8.1	11	4.2	5.6	6.9	9.0
0.20	5	11	13	16	21	8.1	10	12	16
0.50	2	37	40	46	59	27	32	38	50
0.80	1.25	92	97	109	137	81	96	112	145
0.90	1.11	133	142	160	196	138	168	193	248
0.96	1.04	184	203	227	273	236	304	344	431
0.98	1.02	219	247	276	330	329	442	496	610
0.99	1.01	250	290	325	383	439	617	687	830

BIG SIOUX RIVER BASIN
06484000 DRY CREEK AT HAWARDEN, IA

LOCATION.--Lat 42°59'48", long 96°28'10", in NE1/4 NE1/4 sec. 2, T.94 N., R.48 W., Sioux County, Hydrologic Unit 10170203, on left bank 6 ft downstream from bridge on State Highway 10, at east edge of Hawarden and 2.0 mi upstream from mouth.

DRAINAGE AREA.--48.4 mi².

PERIOD OF RECORD.--June 1948 to September 1973 (discontinued).

GAGE.--Water-stage recorder and concrete control. Datum of gage is 1,170.42 ft above mean sea level (U.S. Army Corps of Engineers benchmark). Prior to Oct. 30, 1949, nonrecording gage at same site and datum.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 10,900 ft³/s June 7, 1958, gage height, 17.57 ft, from rating curve extended above 860 ft³/s on basis of contracted-opening measurement of peak flow; no flow for many days in most years.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in September 1926 reached a stage of 18.0 ft, discharge not determined. Flood in 1934 reached a stage of 15.8 ft, discharge not determined, from information by State Highway Commission.

Rating table number 6, developed March 1969
(A discharge measurement to validate this rating
has not been made since October 1969.)

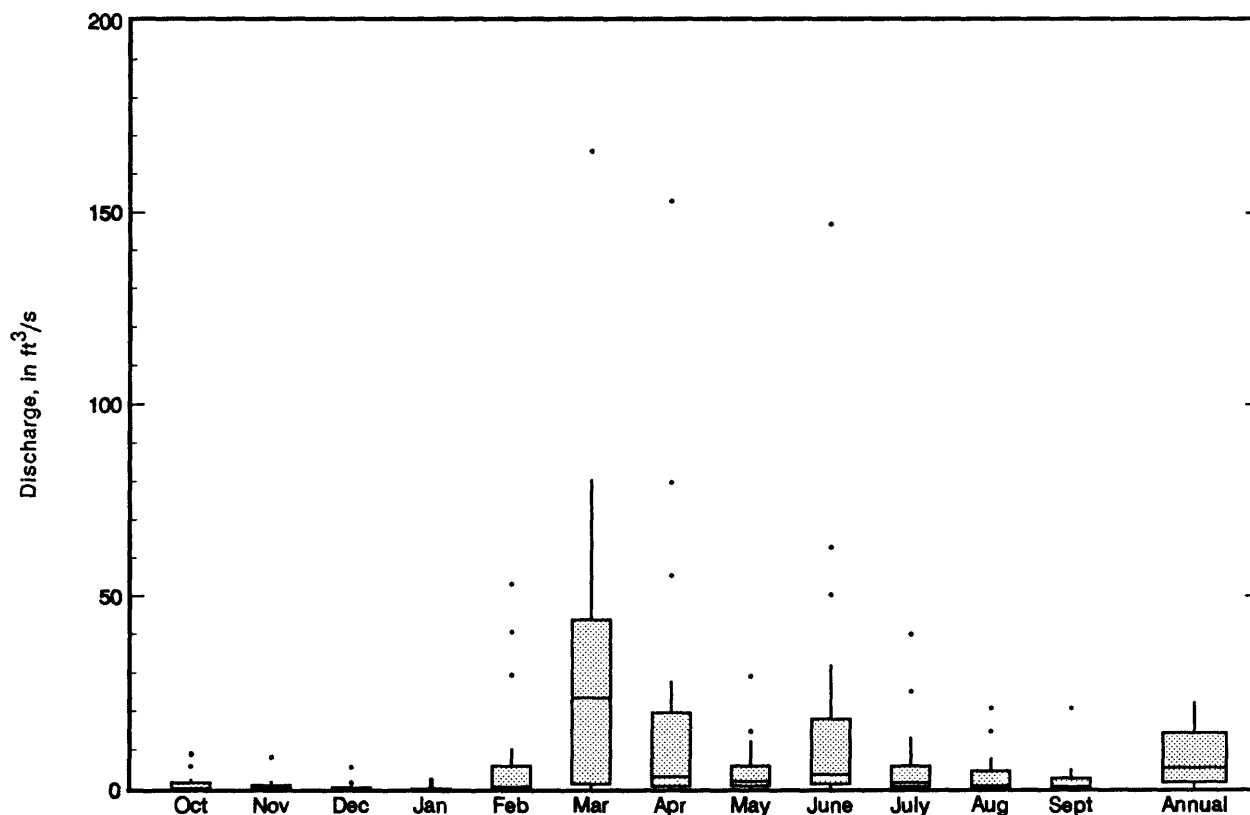
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
6.0	21	8.5	610
6.5	61	9.0	950
7.0	126	9.5	1,460
7.5	229	10.0	2,210
8.0	375	10.5	3,240

BIG SIOUX RIVER BASIN
06484000 DRY CREEK AT HAWARDEN, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	8.84	1952	0.000	1957	1.63	2.74	1.7
November	8.06	1952	0.000	1959	0.96	1.76	1.0
December	5.48	1952	0.000	1951	0.65	1.23	0.7
January	2.18	1952	0.000	1951	0.27	0.55	0.3
February	53.1	1966	0.000	1959	7.40	14.8	7.6
March	166	1962	0.23	1968	31.7	40.4	32.7
April	153	1969	0.030	1959	18.9	37.0	19.5
May	29.1	1959	0.080	1968	5.21	7.16	5.4
June	147	1953	0.010	1958	18.5	34.2	19.1
July	39.9	1951	0.000	1958	6.03	9.86	6.2
August	20.7	1952	0.000	1958	3.40	5.41	3.5
September	20.8	1951	0.000	1956	2.27	4.52	2.3
Annual	22.3	1962	0.33	1958	8.05	7.47	100.0

Boxplots of monthly and annual mean discharges



BIG SIOUX RIVER BASIN
06484000 DRY CREEK AT HAWARDEN, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95	0.00	0.00	0.00	0.09	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
90	0.00	0.00	0.01	0.24	0.10	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00
85	0.00	0.00	0.01	0.38	0.13	0.01	0.01	0.01	0.00	0.00	0.01	0.00	0.01
80	0.00	0.00	0.11	0.61	0.26	0.12	0.11	0.01	0.01	0.01	0.01	0.01	0.01
75	0.00	0.00	0.27	0.75	0.41	0.34	0.20	0.01	0.01	0.01	0.09	0.01	0.01
70	0.00	0.01	0.45	0.97	0.56	0.49	0.26	0.09	0.01	0.01	0.11	0.01	0.10
65	0.01	0.01	0.64	1.4	0.74	0.69	0.33	0.13	0.11	0.09	0.12	0.05	0.12
60	0.01	0.01	0.89	1.9	0.96	0.99	0.42	0.23	0.21	0.11	0.20	0.10	0.24
55	0.01	0.01	1.2	2.2	1.3	1.4	0.54	0.27	0.26	0.12	0.26	0.12	0.35
50	0.01	0.01	1.7	2.5	1.5	1.7	0.73	0.35	0.35	0.22	0.33	0.13	0.51
45	0.01	0.01	2.4	3.0	1.8	2.1	1.2	0.50	0.56	0.34	0.43	0.22	0.73
40	0.01	0.11	3.5	3.8	2.2	2.6	1.7	0.78	0.82	0.52	0.55	0.26	1.1
35	0.01	0.28	4.9	4.7	2.5	3.1	2.5	1.3	1.2	0.85	0.69	0.34	1.5
30	0.10	0.46	7.3	5.6	3.3	3.7	3.1	1.7	1.5	1.3	0.83	0.50	1.9
25	0.13	1.1	9.9	7.2	4.2	5.5	3.8	2.1	1.9	1.6	1.2	0.87	2.4
20	0.51	2.0	17	9.1	5.2	8.4	4.8	2.5	2.4	2.0	1.5	1.1	3.3
15	0.73	4.5	27	12	7.4	12	6.2	3.1	3.1	2.5	2.0	1.4	5.0
10	1.3	12	64	18	11	17	8.4	4.8	4.5	3.5	2.4	1.7	8.7
5	1.8	33	162	40	16	44	19	11	9.3	7.4	3.7	2.5	19

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	--	4.2	2.1	1.2	0.70
0.95	1.05	86	15	7.8	4.6	2.7
0.90	1.11	143	28	15	8.8	5.1
0.80	1.25	262	58	31	18	11
0.50	2	786	203	115	65	38
0.20	5	2,200	609	354	192	109
0.10	10	3,680	1,020	600	315	176
0.04	25	6,220	1,700	1,010	507	278
0.02	50	8,640	2,300	1,370	672	364
0.01	100	11,500	2,990	1,780	850	455

BIG SIOUX RIVER BASIN
06484000 DRY CREEK AT HAWARDEN, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.05	20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.10	10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.20	5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.04
0.50	2	0.00	0.00	0.00	0.00	0.00	0.02	0.07	0.15	0.33
0.80	1.25	0.00	0.00	0.00	0.07	0.22	0.48	0.68	0.78	1.6
0.90	1.11	0.25	0.55	0.74	0.84	0.74	1.3	1.6	1.8	3.5
0.96	1.04	1.1	1.1	1.5	2.1	1.9	3.1	3.7	4.5	7.5
0.98	1.02	1.7	1.7	2.2	2.8	3.2	5.1	5.9	8.1	12
0.99	1.01	2.6	2.6	3.1	3.4	4.8	8.0	9.3	14	19

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.10	0.10	0.00	0.00	0.05	0.03	0.06	0.03
0.02	50	0.13	0.13	0.00	0.01	0.07	0.05	0.09	0.05
0.05	20	0.19	0.19	0.00	0.02	0.11	0.09	0.15	0.09
0.10	10	0.26	0.26	0.02	0.03	0.17	0.15	0.24	0.17
0.20	5	0.38	0.38	0.08	0.07	0.28	0.27	0.42	0.33
0.50	2	0.80	0.80	0.56	0.31	0.73	0.82	1.2	1.1
0.80	1.25	1.6	1.6	1.8	1.1	1.9	2.3	3.1	3.6
0.90	1.11	2.4	2.4	2.7	2.1	3.2	3.9	5.0	6.3
0.96	1.04	3.5	3.5	3.5	3.9	5.4	6.6	8.1	11
0.98	1.02	4.5	4.5	4.0	5.7	7.5	9.1	11	16
0.99	1.01	5.6	5.6	4.3	8.0	10	12	14	23
		July-August-September				October-November-December			
0.01	100	0.03	0.03	0.01	0.02	0.03	0.00	0.01	0.00
0.02	50	0.05	0.05	0.01	0.03	0.03	0.01	0.01	0.01
0.05	20	0.08	0.08	0.03	0.05	0.05	0.01	0.02	0.02
0.10	10	0.13	0.13	0.08	0.08	0.06	0.03	0.04	0.03
0.20	5	0.23	0.22	0.18	0.16	0.09	0.06	0.08	0.06
0.50	2	0.60	0.60	0.68	0.54	0.22	0.24	0.31	0.24
0.80	1.25	1.4	1.6	1.9	1.8	0.73	0.98	1.1	1.0
0.90	1.11	2.0	2.5	2.8	3.5	1.5	2.0	2.1	2.2
0.96	1.04	2.9	4.1	3.9	6.8	3.7	4.5	4.3	5.2
0.98	1.02	3.7	5.5	4.7	11	6.9	7.5	6.7	9.0
0.99	1.01	4.5	7.2	5.4	16	13	12	10	15

BIG SIOUX RIVER BASIN
06485500 BIG SIOUX RIVER AT AKRON, IA

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, 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, approximately, of which about 1,487 mi² is probably noncontributing.

PERIOD OF RECORD.--October 1928 to September 1988.

GAGE.--Water-stage recorder. Datum of gage is 1,118.90 ft above NGVD. 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.

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.

Rating table number 18, developed March 1988

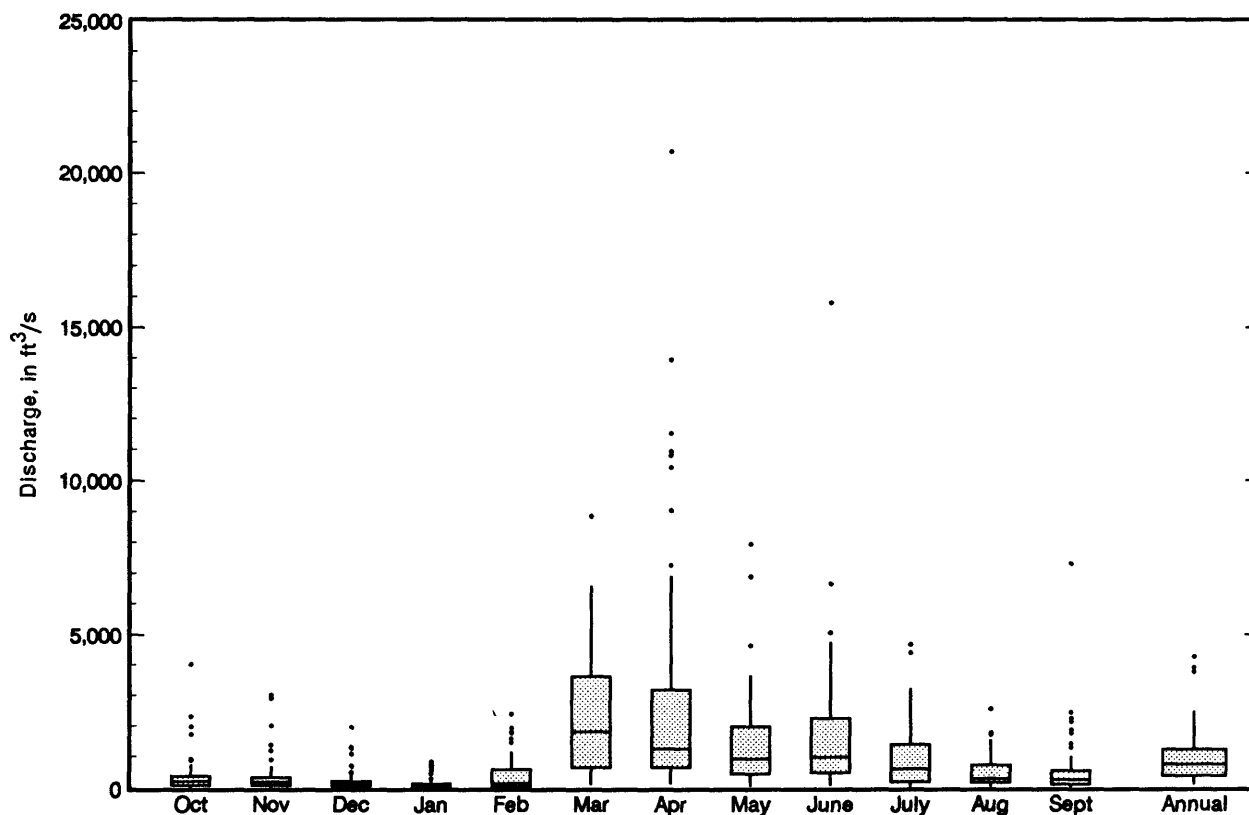
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
2.0	16	8.0	1,660
2.5	44	10.0	2,650
3.0	91	12.0	3,840
3.5	157	16.0	6,930
4.0	250	18.0	10,800
5.0	507	20.0	17,300
6.0	838	22.0	26,500

BIG SIOUX RIVER BASIN
06485500 BIG SIOUX RIVER AT AKRON, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	4,039	1987	32.9	1959	430	651	3.4
November	3,022	1980	47.9	1959	405	592	3.2
December	1,967	1983	32.1	1977	263	353	2.1
January	841	1983	6.68	1977	166	200	1.3
February	2,399	1966	12.1	1936	467	564	3.7
March	8,866	1983	124	1931	2,317	1,940	18.6
April	20,690	1969	139	1931	2,988	4,100	23.9
May	7,946	1986	73.3	1934	1,439	1,524	11.5
June	15,820	1984	100	1933	1,816	2,372	14.6
July	4,703	1983	50.7	1931	1,020	1,083	8.2
August	2,595	1979	45.2	1976	570	581	4.6
September	7,313	1986	36.4	1976	594	1,053	4.8
Annual	4,272	1984	120	1931	1,039	898	100.0

Boxplots of monthly and annual mean discharges



BIG SIOUX RIVER BASIN
06485500 BIG SIOUX RIVER AT AKRON, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	6.3	11	51	131	79	68	48	34	33	33	39	28	26
95	26	23	73	208	154	118	85	53	41	45	53	38	46
90	33	38	113	314	224	179	117	79	62	62	68	52	66
85	41	50	144	411	261	242	142	96	79	77	83	63	84
80	48	60	188	508	335	306	170	119	102	97	98	73	106
75	55	66	269	606	392	375	202	144	121	113	116	85	127
70	61	73	407	699	449	447	245	168	140	128	135	98	151
65	67	81	558	793	522	527	291	193	159	146	153	110	180
60	74	92	721	911	600	608	338	223	179	175	170	121	218
55	82	104	902	1,040	695	719	415	256	207	200	187	133	264
50	93	119	1,100	1,170	793	832	501	302	247	223	210	145	321
45	104	134	1,330	1,310	918	971	600	353	289	245	235	160	397
40	115	164	1,570	1,450	1,050	1,110	728	423	331	276	261	174	491
35	126	215	1,920	1,710	1,260	1,320	873	502	388	309	292	188	604
30	137	302	2,320	2,050	1,510	1,550	1,050	592	448	343	322	216	757
25	162	447	2,790	2,600	1,840	1,850	1,270	719	540	407	374	246	963
20	191	549	3,490	3,600	2,250	2,270	1,520	872	657	483	458	314	1,250
15	272	724	4,700	5,010	2,710	2,900	1,940	1,080	815	623	582	430	1,660
10	458	1,030	6,270	7,780	3,370	4,070	2,530	1,380	1,180	895	794	639	2,420
5	700	1,890	9,160	12,000	4,800	6,710	3,520	1,830	2,020	1,870	1,660	1,040	4,210

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	678	544	434	319	233
0.95	1.05	1,620	1,310	1,040	766	567
0.90	1.11	2,500	2,030	1,620	1,190	879
0.80	1.25	4,150	3,370	2,680	1,960	1,450
0.50	2	10,100	8,250	6,520	4,720	3,400
0.20	5	22,600	18,400	14,400	10,300	7,110
0.10	10	33,100	27,000	20,900	14,800	9,990
0.04	25	48,500	39,500	30,400	21,300	13,900
0.02	50	61,300	49,800	38,100	26,500	16,900
0.01	100	75,000	60,800	46,300	32,000	19,900

BIG SIOUX RIVER BASIN
06485500 BIG SIOUX RIVER AT AKRON, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	6.6	6.7	7.6	8.1	9.5	16	21	26	30
0.02	50	8.4	8.6	9.6	10	12	19	25	30	36
0.05	20	12	13	14	15	17	25	33	39	48
0.10	10	17	18	19	21	24	33	42	51	63
0.20	5	26	27	29	31	36	47	59	70	90
0.50	2	60	61	63	68	79	96	118	139	186
0.80	1.25	138	142	145	154	177	215	260	305	421
0.90	1.11	216	222	227	237	271	340	407	476	668
0.96	1.04	350	359	368	380	431	567	676	788	1,130
0.98	1.02	479	492	507	517	584	801	954	1,110	1,600
0.99	1.01	638	655	678	684	768	1,100	1,310	1,530	2,220

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	6.6	7.5	8.2	9.7	36	41	45	59
0.02	50	8.6	9.7	11	12	48	54	60	78
0.05	20	13	14	15	18	72	81	90	117
0.10	10	18	20	21	25	104	117	130	167
0.20	5	28	30	33	38	160	180	200	257
0.50	2	64	68	73	83	361	405	451	572
0.80	1.25	151	157	166	186	798	894	997	1,250
0.90	1.11	236	246	258	285	1,200	1,340	1,500	1,860
0.96	1.04	382	399	415	451	1,840	2,050	2,290	2,830
0.98	1.02	522	546	565	609	2,430	2,690	3,010	3,690
0.99	1.01	693	727	748	798	3,100	3,430	3,840	4,670
		July-August-September				October-November-December			
0.01	100	17	19	20	22	19	23	25	27
0.02	50	21	24	25	29	23	27	28	31
0.05	20	30	33	36	42	29	34	36	39
0.10	10	42	46	49	58	38	43	44	50
0.20	5	62	67	73	88	52	57	60	68
0.50	2	135	147	160	199	101	110	117	136
0.80	1.25	310	336	368	462	211	236	261	310
0.90	1.11	486	527	579	726	322	367	420	505
0.96	1.04	794	863	951	1,180	516	610	732	885
0.98	1.02	1,100	1,200	1,320	1,630	711	864	1,070	1,300
0.99	1.01	1,480	1,610	1,780	2,180	957	1,200	1,540	1,880

MISSOURI RIVER MAIN STEM
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 10230001, 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.

PERIOD OF RECORD.--October 1897 to September 1988.

GAGE.--Water-stage recorder. 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.

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, 9.00 ft Jan. 8, 1980, based on gage readings at site 14 mi downstream.

REMARKS.--Flow regulated by upstream main-stem reservoirs.

Rating table number 9, developed October 1979

Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
8.0	4,000	20.0	40,250
9.0	6,500	24.0	59,000
10.0	9,000	28.0	82,000
12.0	14,000	32.0	122,000
14.0	19,400	36.0	183,000
16.0	25,300	40.0	277,000
18.0	32,200	44.0	429,000

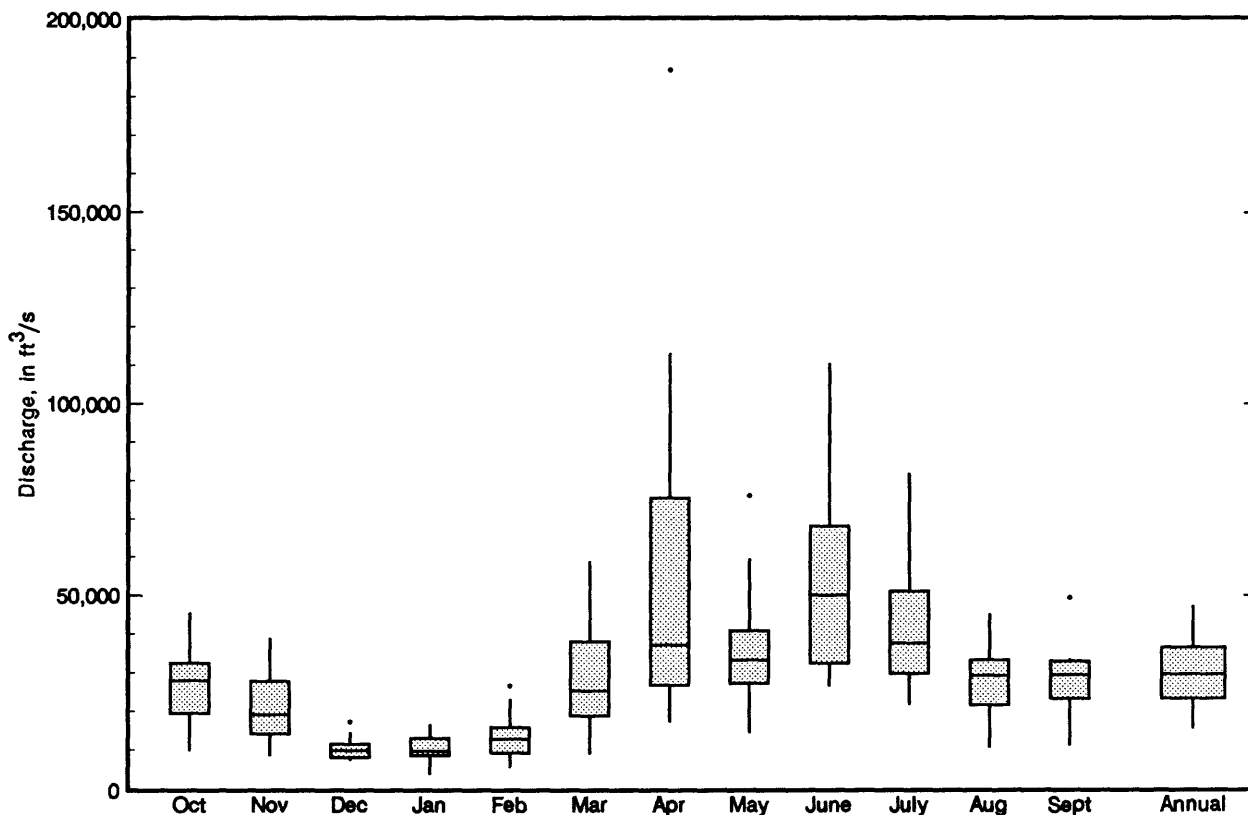
MISSOURI RIVER MAIN STEM
06486000 MISSOURI RIVER AT SIOUX CITY, IA--Continued

Pre-regulation Period

Statistics of monthly and annual mean discharges, pre-regulation period

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	45,340	1952	9,875	1940	26,970	8,833	7.6
November	38,890	1952	8,590	1941	20,920	8,027	5.9
December	17,380	1944	7,410	1947	10,460	2,589	2.9
January	16,590	1951	3,735	1940	10,580	3,080	3.0
February	26,730	1952	5,576	1940	13,340	5,085	3.8
March	58,950	1945	9,135	1957	29,210	13,790	8.2
April	186,900	1952	17,450	1957	55,260	40,250	15.6
May	76,180	1942	14,630	1931	35,890	14,310	10.1
June	110,600	1929	26,780	1957	54,140	22,220	15.3
July	81,840	1944	21,950	1931	42,100	15,990	11.9
August	45,160	1951	10,790	1931	28,740	8,336	8.1
September	49,410	1951	8,394	1931	27,220	9,152	7.7
Annual	47,250	1952	15,550	1940	29,580	8,493	100.0

Boxplots of monthly and annual mean discharges, pre-regulation period



MISSOURI RIVER MAIN STEM
06486000 MISSOURI RIVER AT SIOUX CITY, IA--Continued

Monthly and annual flow duration, pre-regulation period

Percentage of days discharge equalled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	3,250	5,460	6,960	9,240	13,200	20,500	13,900	9,140	7,580	9,200	4,740	3,440	4,960
95	4,950	6,200	8,400	16,600	15,900	24,500	19,100	13,600	9,280	10,900	7,910	4,720	7,530
90	6,690	7,460	10,700	20,000	18,700	26,800	23,600	16,700	12,400	15,100	9,700	5,830	8,920
85	7,340	8,190	12,800	22,100	21,300	28,700	26,400	18,800	15,300	16,300	10,800	6,500	10,200
80	7,810	8,720	14,200	24,000	23,300	30,200	28,500	20,400	19,300	17,400	12,000	7,090	11,900
75	8,290	9,160	15,300	25,400	25,600	31,700	29,700	22,100	21,900	19,600	13,300	7,520	13,900
70	8,630	9,610	16,200	26,800	28,000	33,400	30,800	23,900	23,700	21,900	14,600	7,890	15,900
65	8,940	10,200	17,000	28,300	29,000	36,700	32,000	25,400	25,500	23,400	15,800	8,270	17,800
60	9,240	11,000	17,900	30,300	29,900	40,000	33,200	27,000	27,200	24,900	16,900	8,660	20,200
55	9,540	11,600	19,100	32,400	30,900	43,400	35,000	28,300	28,400	26,400	18,100	9,060	22,900
50	9,880	12,300	20,400	35,400	31,900	46,600	36,800	29,300	29,100	27,800	19,300	9,460	25,400
45	10,400	12,900	23,200	38,700	32,800	49,700	38,800	30,300	29,800	28,900	20,600	9,880	27,700
40	11,000	13,700	25,800	42,600	34,700	53,200	41,100	31,300	30,400	30,000	22,400	10,400	29,400
35	11,700	14,600	27,900	47,700	36,800	57,600	43,400	32,200	31,100	31,100	24,300	11,000	31,100
30	12,500	15,500	31,300	55,000	39,200	62,900	46,800	33,300	31,800	32,100	25,900	11,600	32,700
25	13,300	16,500	36,200	65,900	42,100	69,400	50,800	34,700	32,500	33,300	27,400	12,200	35,500
20	14,100	17,500	42,400	76,300	45,600	76,900	55,700	36,100	33,500	35,000	29,400	12,800	39,000
15	14,900	19,200	49,700	90,900	50,900	84,800	61,300	37,500	35,300	36,600	31,600	14,300	44,000
10	16,100	21,700	62,100	123,000	58,200	93,200	67,700	40,300	37,100	38,800	35,400	16,600	53,800
5	17,500	25,500	79,300	165,000	70,000	113,000	81,600	43,900	41,700	43,000	40,900	20,100	73,900

Probability of annual high discharges, pre-regulation period

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	26,100	20,000	19,500	19,700	19,900
0.95	1.05	42,500	33,000	31,200	29,700	28,100
0.90	1.11	54,500	42,700	40,000	37,000	33,800
0.80	1.25	72,900	58,300	53,700	48,100	42,300
0.50	2	124,000	104,000	93,600	78,800	65,000
0.20	5	201,000	181,000	161,000	128,000	99,800
0.10	10	256,000	241,000	212,000	165,000	125,000
0.04	25	327,000	324,000	284,000	215,000	159,000
0.02	50	380,000	391,000	342,000	255,000	186,000
0.01	100	434,000	462,000	404,000	297,000	214,000

MISSOURI RIVER MAIN STEM
06486000 MISSOURI RIVER AT SIOUX CITY, IA--Continued

Probability of annual low discharges, pre-regulation period

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	2,180	2,290	2,660	3,040	3,610	4,370	5,220	6,130	7,070
0.02	50	2,410	2,540	2,930	3,370	4,030	4,860	5,680	6,670	8,000
0.05	20	2,810	2,980	3,400	3,910	4,720	5,670	6,450	7,540	9,540
0.10	10	3,220	3,430	3,870	4,440	5,400	6,440	7,200	8,410	11,000
0.20	5	3,830	4,070	4,540	5,180	6,280	7,450	8,230	9,580	13,000
0.50	2	5,360	5,670	6,150	6,860	8,130	9,580	10,600	12,300	17,100
0.80	1.25	7,610	7,940	8,340	8,980	10,200	11,900	13,500	15,600	21,600
0.90	1.11	9,200	9,480	9,780	10,200	11,200	13,100	15,300	17,700	24,000
0.96	1.04	11,300	11,500	11,600	11,800	12,400	14,400	17,400	20,100	26,400
0.98	1.02	12,900	13,000	13,000	12,900	13,100	15,300	19,000	21,900	28,000
0.99	1.01	14,500	14,500	14,300	13,900	13,800	16,100	20,400	23,600	29,400

Probability of seasonal low discharges, pre-regulation period

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	3,110	3,100	3,210	3,610	7,800	7,980	8,450	12,100
0.02	50	3,510	3,580	3,760	4,240	9,110	9,370	9,920	13,600
0.05	20	4,170	4,380	4,670	5,280	11,400	11,800	12,400	16,100
0.10	10	4,820	5,170	5,570	6,290	13,600	14,200	15,000	18,500
0.20	5	5,690	6,200	6,740	7,610	16,700	17,600	18,600	21,800
0.50	2	7,570	8,350	9,090	10,200	23,700	25,200	26,500	29,400
0.80	1.25	9,690	10,600	11,300	12,700	31,600	33,900	35,500	38,600
0.90	1.11	10,900	11,700	12,400	13,900	35,900	38,700	40,500	44,000
0.96	1.04	12,200	12,800	13,300	14,900	40,600	43,800	45,800	50,300
0.98	1.02	13,000	13,500	13,900	15,500	43,600	47,100	49,200	54,600
0.99	1.01	13,700	14,000	14,300	15,900	46,200	50,000	52,200	58,700
		July-August-September				October-November-December			
0.01	100	4,670	5,390	5,780	6,830	2,200	3,000	4,000	5,970
0.02	50	5,800	6,610	7,180	8,430	2,490	3,310	4,300	6,250
0.05	20	7,850	8,790	9,660	11,200	2,980	3,820	4,810	6,720
0.10	10	10,000	11,100	12,200	14,100	3,490	4,340	5,310	7,210
0.20	5	13,200	14,300	15,800	17,900	4,210	5,050	5,990	7,900
0.50	2	20,400	21,600	23,400	25,700	5,940	6,730	7,560	9,590
0.80	1.25	28,600	29,800	30,900	32,700	8,260	8,920	9,550	12,000
0.90	1.11	32,900	34,100	34,400	35,600	9,760	10,300	10,800	13,600
0.96	1.04	37,300	38,400	37,600	38,100	11,600	12,000	12,300	15,700
0.98	1.02	40,000	41,100	39,300	39,400	12,900	13,200	13,400	17,300
0.99	1.01	42,300	43,200	40,600	40,200	14,300	14,400	14,500	19,000

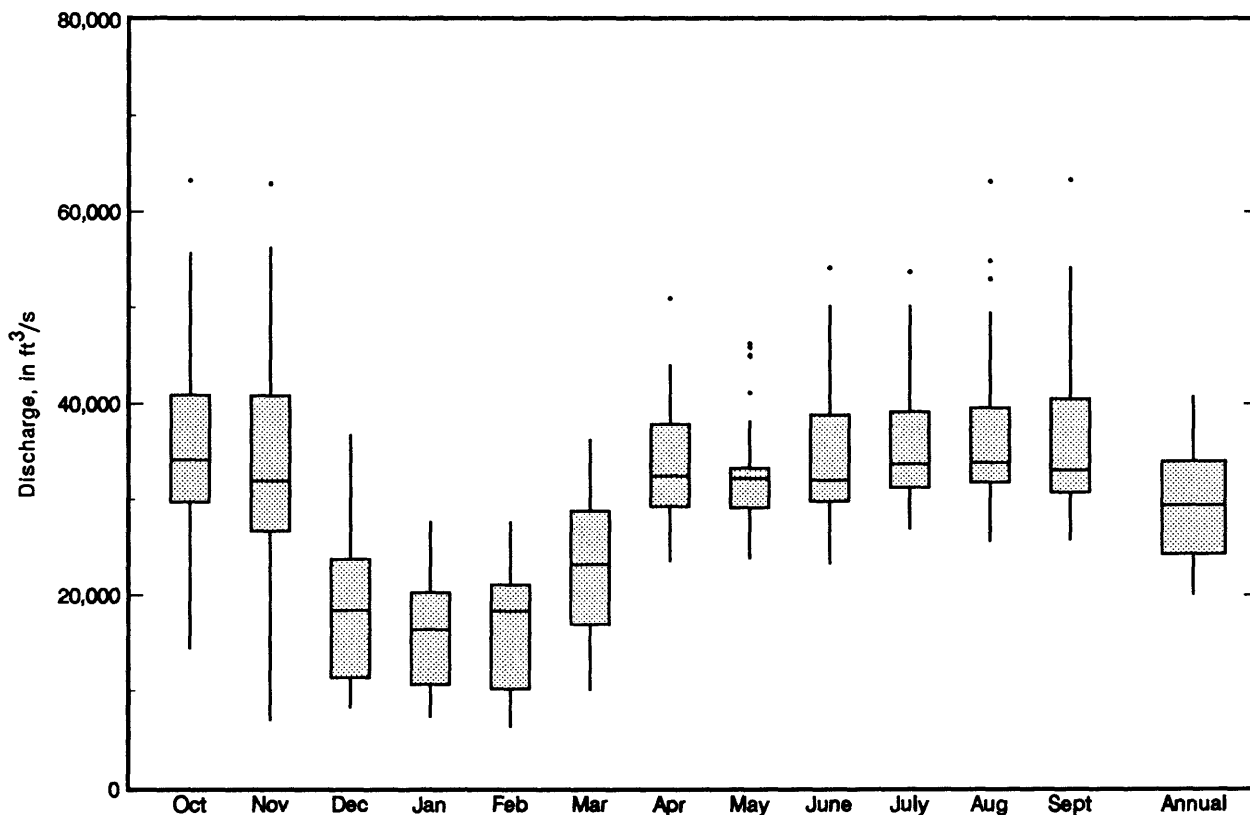
MISSOURI RIVER MAIN STEM
06486000 MISSOURI RIVER AT SIOUX CITY, IA--Continued

Post-regulation Period

Statistics of monthly and annual mean discharges, post-regulation period

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	63,260	1976	14,350	1962	36,500	10,040	10.3
November	62,930	1976	6,951	1962	33,340	13,380	9.4
December	36,770	1987	8,271	1962	19,270	8,284	5.4
January	27,720	1987	7,316	1964	16,120	5,418	4.5
February	27,730	1983	6,293	1963	17,090	6,172	4.8
March	36,270	1983	10,130	1958	22,750	7,536	6.4
April	50,970	1969	23,480	1961	33,430	6,352	9.4
May	46,250	1986	23,820	1962	32,820	6,228	9.2
June	54,190	1971	23,270	1960	34,430	7,701	9.7
July	53,720	1975	26,890	1958	35,930	7,219	10.1
August	63,090	1975	25,640	1962	37,340	8,983	10.5
September	63,290	1975	25,790	1962	36,980	9,139	10.4
Annual	40,750	1972	20,030	1962	29,710	6,372	100.0

Boxplots of monthly and annual mean discharges, post-regulation period



MISSOURI RIVER MAIN STEM
06486000 MISSOURI RIVER AT SIOUX CITY, IA--Continued

Monthly and annual flow duration, post-regulation period

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	6,620	5,740	5,870	20,300	21,100	20,300	23,000	23,100	25,200	7,610	6,730	6,250	7,030
95	7,850	7,290	8,020	23,400	23,500	23,400	26,300	27,500	27,100	25,400	8,130	7,810	8,930
90	8,730	8,000	9,190	25,300	25,400	25,700	27,900	28,800	28,100	27,300	10,300	8,450	12,700
85	9,200	8,550	10,900	26,300	26,400	27,300	29,100	30,000	29,000	28,500	16,800	9,160	16,900
80	9,840	9,400	12,400	27,400	27,500	28,200	30,200	30,600	30,000	29,700	22,400	10,100	19,000
75	10,700	10,900	15,200	28,700	28,600	29,200	30,800	31,200	30,600	30,500	27,200	11,400	21,500
70	12,600	14,200	16,800	29,900	29,700	30,100	31,400	31,700	31,200	31,200	29,400	13,800	24,300
65	14,200	16,200	18,100	30,500	30,400	30,700	32,000	32,300	31,900	31,900	30,600	15,500	26,500
60	15,200	16,800	19,200	31,000	30,800	31,300	32,600	32,800	32,500	32,600	31,500	16,700	28,200
55	16,100	17,500	20,500	31,600	31,300	32,000	33,300	33,400	33,100	33,300	32,300	17,700	29,700
50	16,700	18,200	22,100	32,100	31,800	32,600	33,900	33,900	33,800	34,100	33,100	18,400	30,700
45	17,200	18,700	23,700	32,700	32,300	33,200	35,000	35,200	34,800	35,300	34,000	19,000	31,500
40	17,800	19,200	25,500	33,200	32,800	33,800	36,200	36,500	36,000	36,600	36,100	19,600	32,400
35	18,500	19,800	27,400	33,800	33,200	35,200	37,500	37,900	37,300	38,000	38,000	20,500	33,200
30	19,300	20,500	29,300	34,900	33,700	36,900	38,700	39,300	39,100	39,600	39,600	21,800	34,200
25	20,200	21,400	30,900	36,600	35,100	38,800	39,900	40,800	41,000	41,500	41,600	24,100	36,200
20	21,300	22,400	32,300	38,200	37,600	40,700	41,200	45,300	46,100	45,700	44,900	26,000	38,400
15	22,500	23,500	33,700	39,800	40,000	43,000	44,800	48,200	48,500	48,300	48,400	28,300	40,600
10	23,900	24,600	36,100	42,200	43,600	45,400	47,800	50,700	50,900	50,800	52,100	32,800	45,500
5	25,600	26,700	39,000	48,000	47,700	49,300	50,500	55,400	55,500	55,700	55,900	38,400	50,500

Probability of annual high discharges, post-regulation period

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge ¹ (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	—	25,900	25,200	24,700	24,900
0.95	1.05	—	29,900	29,500	29,300	28,900
0.90	1.11	—	32,500	32,200	32,000	31,300
0.80	1.25	—	36,300	36,100	35,800	34,600
0.50	2	26,500	46,200	45,500	44,400	42,100
0.20	5	—	61,100	58,600	55,200	51,600
0.10	10	62,000	71,800	67,500	62,000	57,500
0.04	25	—	86,300	79,100	70,300	64,600
0.02	50	104,000	97,900	87,900	76,300	69,800
0.01	100	124,000	110,000	96,900	82,100	74,900

¹ Data supplied by U.S. Army Corps of Engineers, Omaha District.

MISSOURI RIVER MAIN STEM
06486000 MISSOURI RIVER AT SIOUX CITY, IA--Continued

Probability of annual low discharges, post-regulation period

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	2,530	3,680	4,070	4,100	4,330	4,750	5,040	5,320	8,940
0.02	50	3,040	4,250	4,750	4,870	5,180	5,640	5,970	6,330	10,300
0.05	20	3,950	5,230	5,920	6,210	6,660	7,190	7,590	8,100	12,500
0.10	10	4,950	6,250	7,130	7,590	8,190	8,770	9,240	9,920	14,700
0.20	5	6,400	7,710	8,830	9,510	10,300	10,900	11,500	12,500	17,700
0.50	2	10,100	11,300	12,800	13,900	15,000	15,700	16,600	18,200	24,100
0.80	1.25	15,000	16,100	17,700	18,900	20,200	21,000	22,300	24,700	31,200
0.90	1.11	18,200	19,200	20,600	21,700	23,000	23,800	25,400	28,300	35,000
0.96	1.04	22,000	23,000	24,000	24,700	25,900	26,700	28,600	32,200	39,100
0.98	1.02	24,600	25,700	26,300	26,600	27,600	28,500	30,600	34,600	41,700
0.99	1.01	27,200	28,400	28,300	28,300	29,100	30,100	32,400	36,700	44,000

Probability of seasonal low discharges, post-regulation period

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	3,860	4,100	4,250	4,600	12,800	17,100	19,200	20,900
0.02	50	4,370	4,810	5,030	5,450	14,100	18,200	20,200	21,800
0.05	20	5,260	6,020	6,370	6,910	16,200	19,900	21,800	23,200
0.10	10	6,180	7,280	7,760	8,400	18,300	21,600	23,300	24,500
0.20	5	7,510	9,030	9,670	10,500	20,900	23,700	25,200	26,300
0.50	2	10,800	13,100	14,000	15,000	26,400	28,300	29,300	30,100
0.80	1.25	15,400	18,100	19,000	20,200	32,200	33,500	34,000	34,600
0.90	1.11	18,500	21,000	21,800	23,100	35,400	36,500	36,700	37,300
0.96	1.04	22,400	24,200	24,800	26,000	38,700	39,900	39,800	40,400
0.98	1.02	25,300	26,400	26,700	27,900	40,800	42,200	42,000	42,600
0.99	1.01	28,200	28,400	28,400	29,500	42,600	44,300	44,000	44,700
		July-August-September				October-November-December			
0.01	100	18,100	20,700	21,700	23,600	2,060	4,260	4,690	4,730
0.02	50	19,200	21,700	22,600	24,300	2,680	5,050	5,530	5,640
0.05	20	21,100	23,300	24,100	25,600	3,890	6,430	7,000	7,260
0.10	10	23,000	24,900	25,600	26,900	5,280	7,890	8,530	8,980
0.20	5	25,400	27,000	27,700	28,700	7,430	9,990	10,700	11,500
0.50	2	30,600	31,800	32,500	33,400	13,100	15,100	15,900	17,600
0.80	1.25	36,700	37,900	38,800	40,100	20,800	21,800	22,600	25,800
0.90	1.11	40,300	41,600	42,900	44,700	25,500	25,900	26,600	30,800
0.96	1.04	44,400	46,200	48,000	50,700	30,800	30,700	31,200	36,800
0.98	1.02	47,300	49,400	51,700	55,400	34,200	34,100	34,400	40,900
0.99	1.01	50,000	52,600	55,400	60,100	37,400	37,300	37,300	44,800

PERRY CREEK BASIN
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 September 1988..

GAGE.--Water-stage recorder. Datum of gage is 1,112.04 ft above NGVD (City of Sioux City benchmark). Prior to May 20, 1954, nonrecording gage with supplementary water-stage recorder in operation above 5.0 ft gage height and May 20, 1954 to Sept. 30, 1969, water-stage recorder at present site at datum 5.0 ft higher.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 7,780 ft³/s Sept. 10, 1949, gage height, 26.80 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.

Rating table number 9, developed October 1988

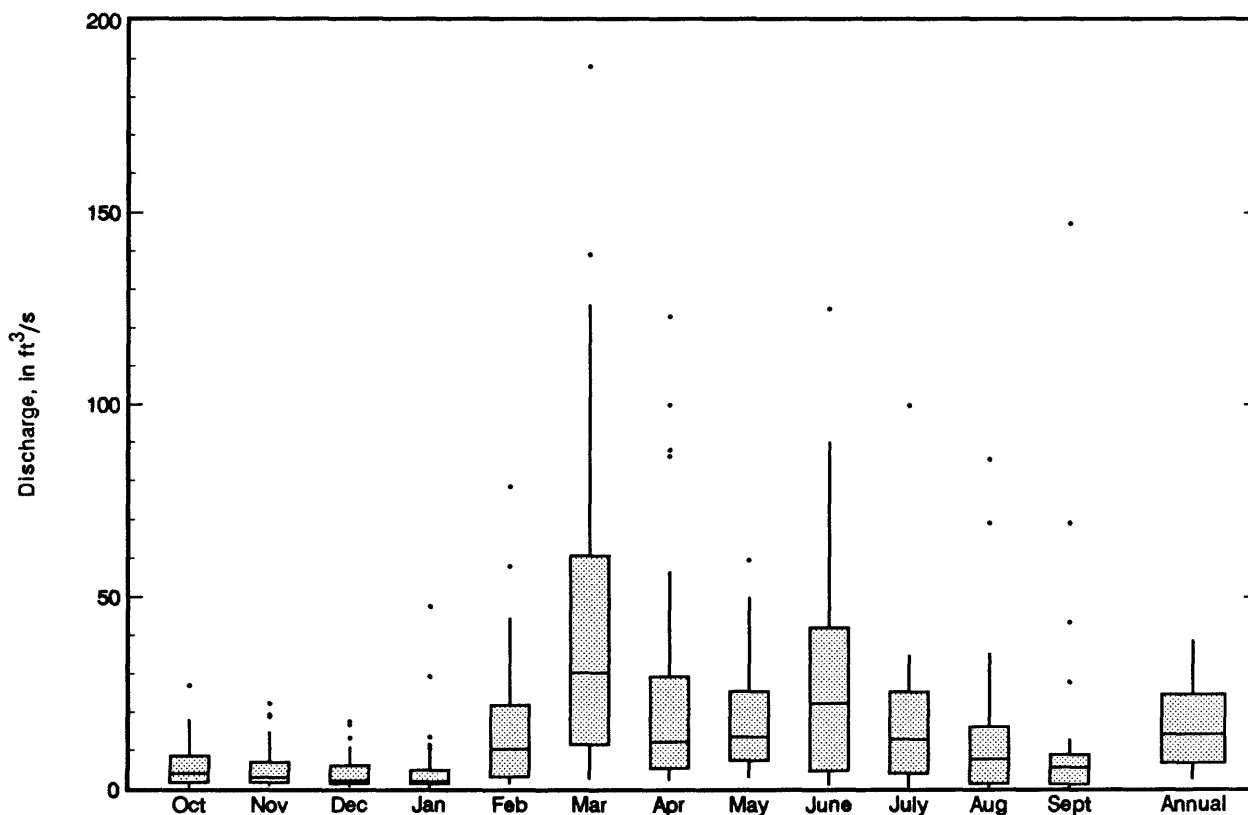
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
5.5	1.2	9.0	335
6.0	7.2	10.0	545
6.5	28	12.0	1,080
7.0	62	16.0	2,550
7.5	112	20.0	4,340
8.0	172	28.0	8,400

PERRY CREEK BASIN
06600000 PERRY CREEK AT 38th STREET, SIOUX CITY, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	27.0	1987	0.38	1959	6.40	6.29	3.1
November	22.3	1987	0.81	1982	5.80	6.04	2.8
December	17.5	1986	0.48	1959	4.81	5.16	2.3
January	47.5	1952	0.33	1982	5.77	9.65	2.8
February	78.4	1948	1.31	1959	16.8	18.1	8.1
March	188	1962	2.62	1964	47.3	46.2	22.8
April	123	1985	2.30	1959	26.1	32.1	12.6
May	59.4	1984	2.91	1968	19.1	15.4	9.2
June	125	1984	0.94	1956	30.5	31.7	14.8
July	99.6	1952	0.35	1946	18.8	23.6	9.1
August	85.5	1951	0.30	1965	12.7	18.9	6.1
September	147	1949	0.080	1958	12.9	28.2	6.2
Annual	38.6	1951	2.38	1968	17.3	11.7	100.0

Boxplots of monthly and annual mean discharges



PERRY CREEK BASIN
06600000 PERRY CREEK AT 38th STREET, SIOUX CITY, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.31	0.18	0.47	1.2	0.77	0.35	0.09	0.04	0.01	0.09	0.44	0.35	0.10
95	0.43	0.71	2.1	1.9	1.5	0.68	0.32	0.15	0.09	0.42	0.79	0.53	0.43
90	0.59	0.98	2.8	2.8	2.1	1.1	0.49	0.31	0.30	0.53	1.0	0.83	0.71
85	0.82	1.2	3.6	3.5	2.5	1.4	0.71	0.39	0.43	0.66	1.2	1.0	1.0
80	1.0	1.5	4.2	4.1	2.9	1.8	1.1	0.47	0.54	0.82	1.4	1.1	1.3
75	1.2	1.7	4.9	4.6	3.3	2.3	1.5	0.59	0.72	1.0	1.6	1.3	1.7
70	1.3	1.9	6.0	5.2	3.8	2.8	1.8	0.85	1.0	1.4	1.8	1.4	2.0
65	1.5	2.2	7.4	5.7	4.4	3.3	2.3	1.2	1.2	1.7	2.1	1.7	2.4
60	1.7	2.4	9.0	6.3	5.2	3.9	2.9	1.6	1.3	1.9	2.4	1.9	3.1
55	1.8	3.2	11	7.5	6.3	4.6	3.6	2.1	1.7	2.7	2.8	2.2	3.8
50	2.1	4.0	14	8.9	7.5	5.6	4.4	2.7	2.3	3.5	3.3	2.4	4.5
45	2.3	4.8	17	11	8.7	7.0	5.8	3.9	3.1	4.3	3.8	2.9	5.5
40	2.8	7.1	19	13	11	11	7.3	5.0	4.0	5.2	4.4	3.4	6.6
35	3.6	9.8	22	16	14	14	9.0	6.3	5.0	6.0	5.1	4.0	8.2
30	4.6	12	27	19	16	17	12	8.0	6.3	7.0	5.9	4.6	10
25	6.2	15	33	24	20	20	14	9.8	7.6	8.0	7.0	6.2	13
20	7.6	18	41	29	26	25	17	12	9.0	9.5	8.7	8.1	16
15	8.9	26	55	36	33	31	21	14	13	13	13	11	21
10	12	37	94	48	42	48	28	17	17	18	17	15	29
5	17	71	207	76	63	107	50	26	29	23	21	18	52

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	222	27	12	7.6	5.7
0.95	1.05	499	62	31	19	13
0.90	1.11	741	93	48	29	20
0.80	1.25	1,160	147	79	48	31
0.50	2	2,460	326	183	107	68
0.20	5	4,640	644	366	208	128
0.10	10	6,170	881	498	278	171
0.04	25	8,110	1,190	665	364	223
0.02	50	9,510	1,430	786	424	261
0.01	100	10,900	1,660	902	481	296

PERRY CREEK BASIN
06600000 PERRY CREEK AT 38th STREET, SIOUX CITY, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.04	0.08	0.21	0.29	0.40
0.02	50	0.00	0.00	0.00	0.00	0.05	0.12	0.27	0.37	0.51
0.05	20	0.00	0.00	0.00	0.01	0.11	0.21	0.41	0.54	0.74
0.10	10	0.00	0.00	0.04	0.06	0.18	0.33	0.59	0.77	1.0
0.20	5	0.08	0.09	0.14	0.19	0.36	0.60	0.94	1.2	1.6
0.50	2	0.57	0.63	0.72	0.99	1.3	1.8	2.3	2.8	3.7
0.80	1.25	2.6	2.8	3.0	3.8	4.4	5.3	6.1	7.0	9.0
0.90	1.11	5.6	5.9	6.4	7.1	8.3	9.3	10	11	15
0.96	1.04	12	13	14	13	16	17	18	20	25
0.98	1.02	21	21	22	19	24	25	26	28	36
0.99	1.01	34	35	35	26	36	35	37	38	50

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.11	0.13	0.16	0.25	0.15	0.24	0.37	0.71
0.02	50	0.14	0.17	0.21	0.30	0.21	0.32	0.47	0.88
0.05	20	0.21	0.26	0.32	0.42	0.33	0.49	0.70	1.2
0.10	10	0.32	0.37	0.46	0.58	0.50	0.72	0.99	1.7
0.20	5	0.52	0.59	0.73	0.88	0.85	1.2	1.5	2.5
0.50	2	1.4	1.5	1.8	2.2	2.4	3.1	3.8	5.5
0.80	1.25	3.9	4.1	4.6	6.1	7.4	8.6	10	13
0.90	1.11	6.8	7.2	7.6	11	13	15	17	22
0.96	1.04	13	13	13	22	26	28	31	38
0.98	1.02	19	20	19	34	40	42	46	55
0.99	1.01	27	29	26	53	60	61	66	78
		July-August-September				October-November-December			
0.01	100	0.02	0.02	0.02	0.03	0.06	0.04	0.10	0.30
0.02	50	0.03	0.03	0.04	0.05	0.08	0.06	0.15	0.37
0.05	20	0.07	0.06	0.08	0.12	0.13	0.12	0.24	0.52
0.10	10	0.13	0.13	0.16	0.22	0.21	0.22	0.37	0.72
0.20	5	0.27	0.28	0.34	0.48	0.36	0.44	0.64	1.1
0.50	2	1.1	1.2	1.3	1.9	1.1	1.5	1.8	2.4
0.80	1.25	4.1	4.4	4.8	7.1	3.4	4.5	4.8	5.9
0.90	1.11	8.2	8.6	8.9	13	6.4	7.5	8.2	9.8
0.96	1.04	17	17	17	26	13	13	14	17
0.98	1.02	27	26	25	39	20	17	20	25
0.99	1.01	41	38	35	56	31	23	28	35

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 September 1988.

GAGE.--Water-stage recorder. Datum of gage is 1,269.55 ft above NGVD.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 16,300 ft³/s June 20, 1983, gage height 18.54 ft, from floodmark, from rating curve extended above 8,500 ft³/s; no flow at times in 1956, 1958-59, 1965, 1968, 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1953 reached a discharge of about 45,500 ft³/s, from information by U.S. Army Corps of Engineers.

Rating table number 11, developed October 1985

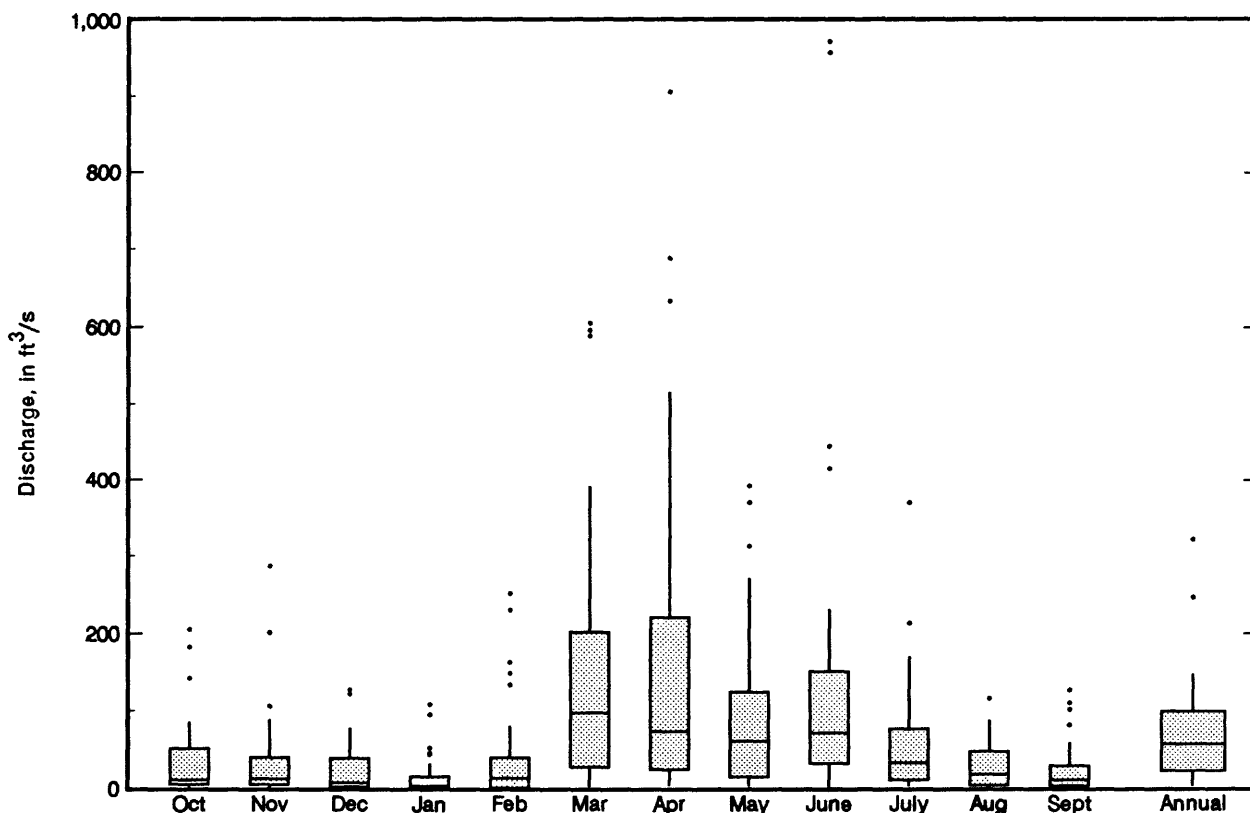
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
6.0	33	10.0	913
6.2	64	12.0	1,490
6.5	112	14.0	2,170
7.0	203	17.0	4,790
8.0	410	18.0	9,000
9.0	651		

FLOYD RIVER BASIN
06600100 FLOYD RIVER AT ALTON, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	205	1983	0.060	1957	35.6	52.3	4.1
November	287	1980	0.30	1959	37.6	61.3	4.3
December	128	1983	0.070	1959	23.9	33.2	2.7
January	109	1973	0.050	1959	15.0	26.6	1.7
February	252	1971	0.15	1977	41.4	67.4	4.8
March	605	1979	1.77	1959	170	179	19.6
April	906	1969	3.67	1959	181	230	20.8
May	392	1984	2.92	1968	98.6	107	11.3
June	973	1984	2.36	1968	151	234	17.4
July	370	1983	3.29	1958	57.8	75.3	6.6
August	116	1979	0.37	1968	30.7	31.0	3.5
September	127	1985	0.080	1958	26.3	33.7	3.0
Annual	322	1983	2.66	1968	72.4	69.4	100.0

Boxplots of monthly and annual mean discharges



FLOYD RIVER BASIN
06600100 FLOYD RIVER AT ALTON, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.00	0.01	0.11	2.0	1.9	0.58	0.34	0.03	0.01	0.01	0.11	0.08	0.08
95	0.11	0.11	0.74	4.6	3.1	2.0	1.3	0.57	0.11	0.19	1.1	0.32	0.36
90	0.33	0.21	2.1	7.0	4.9	3.4	2.4	1.5	0.65	0.72	1.7	0.89	0.98
85	0.47	0.26	2.8	9.5	7.5	6.3	3.6	2.1	1.1	1.5	2.3	1.3	1.8
80	0.59	0.42	4.1	13	12	14	5.3	2.7	1.6	2.5	2.9	2.1	2.5
75	0.81	0.57	6.0	19	17	22	7.3	3.4	2.2	3.8	4.6	2.6	3.5
70	1.2	1.1	10	27	22	28	9.6	4.2	3.1	5.4	6.0	3.2	4.8
65	1.6	1.5	15	35	28	33	13	5.4	4.5	6.8	7.3	3.9	6.6
60	2.0	1.9	21	46	34	39	16	6.9	6.2	8.1	8.6	4.6	8.9
55	2.5	2.3	30	56	40	46	20	9.2	8.1	9.2	9.9	5.8	12
50	3.0	2.8	40	65	47	52	24	13	10	11	13	7.1	16
45	3.9	3.7	50	74	53	63	29	17	13	14	16	9.0	21
40	4.9	7.7	62	88	67	74	34	20	16	17	20	12	27
35	6.0	16	76	109	81	89	42	22	20	20	23	16	35
30	8.1	23	104	132	99	108	52	28	24	25	30	20	45
25	15	30	140	161	116	127	65	34	30	40	40	26	56
20	23	37	178	203	161	155	79	44	39	50	54	42	74
15	37	46	260	284	213	188	108	57	50	70	82	54	102
10	47	63	415	394	263	265	147	75	75	118	107	71	148
5	68	156	804	717	371	557	226	116	117	169	166	104	252

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	71	20	13	8.4	4.8
0.95	1.05	196	72	45	29	18
0.90	1.11	331	135	84	53	34
0.80	1.25	611	274	167	105	68
0.50	2	1,860	888	537	329	216
0.20	5	5,280	2,330	1,430	854	543
0.10	10	8,840	3,570	2,220	1,310	809
0.04	25	15,000	5,320	3,380	1,970	1,170
0.02	50	20,900	6,690	4,320	2,490	1,430
0.01	100	27,900	8,070	5,290	3,020	1,690

FLOYD RIVER BASIN
06600100 FLOYD RIVER AT ALTON, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.01	0.04	0.08	0.13	0.13
0.02	50	0.00	0.00	0.00	0.00	0.02	0.07	0.13	0.22	0.22
0.05	20	0.00	0.00	0.00	0.01	0.06	0.14	0.28	0.44	0.51
0.10	10	0.00	0.00	0.00	0.04	0.13	0.28	0.54	0.82	1.0
0.20	5	0.00	0.01	0.09	0.15	0.32	0.62	1.2	1.7	2.3
0.50	2	1.0	1.1	1.0	1.3	1.8	2.8	4.9	6.7	9.6
0.80	1.25	6.6	6.7	6.8	7.6	9.0	12	19	24	34
0.90	1.11	15	16	17	18	21	25	37	47	63
0.96	1.04	33	35	41	44	49	55	76	91	116
0.98	1.02	55	58	71	76	86	90	118	140	168
0.99	1.01	86	92	118	124	140	140	175	203	230

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.01	0.01	0.02	0.02	0.05	0.13	0.26	0.64
0.02	50	0.02	0.02	0.03	0.04	0.12	0.25	0.49	1.1
0.05	20	0.05	0.05	0.07	0.09	0.38	0.70	1.2	2.3
0.10	10	0.12	0.11	0.13	0.17	0.98	1.6	2.4	4.2
0.20	5	0.29	0.28	0.31	0.40	2.8	4.0	5.4	8.6
0.50	2	1.7	1.7	1.7	2.1	15	19	22	30
0.80	1.25	10.0	9.7	9.6	11	58	67	73	91
0.90	1.11	25	25	24	27	103	118	125	153
0.96	1.04	65	66	67	71	174	200	211	254
0.98	1.02	120	125	131	132	233	270	288	345
0.99	1.01	209	221	240	232	294	346	372	448
		July-August-September				October-November-December			
0.01	100	0.04	0.00	0.01	0.04	0.05	0.11	0.01	0.03
0.02	50	0.08	0.01	0.03	0.09	0.06	0.17	0.02	0.07
0.05	20	0.17	0.05	0.10	0.24	0.19	0.32	0.09	0.21
0.10	10	0.34	0.15	0.26	0.56	0.38	0.58	0.26	0.52
0.20	5	0.77	0.50	0.74	1.4	0.87	1.2	0.83	1.4
0.50	2	3.2	3.4	4.2	6.5	3.9	4.6	5.4	7.8
0.80	1.25	12	14	16	22	16	19	23	30
0.90	1.11	22	25	28	37	34	40	42	54
0.96	1.04	41	42	47	61	70	88	72	92
0.98	1.02	61	55	62	79	112	147	97	125
0.99	1.01	85	68	77	99	170	236	122	160

FLOYD RIVER BASIN
06600300 WEST BRANCH FLOYD RIVER NEAR STRUBLE, IA

LOCATION.--Lat 42°55'25", long 96°10'34", in NE1/4 NE1/4 sec. 32, T.94 N., R.45 W., Sioux County, Hydrologic Unit 10230002, on left bank near wingwall at downstream side of bridge on county highway B62, 0.1 mi west of U.S. Highway 75, 0.8 mi downstream from Orange City slough, 2.2 mi northeast of Struble, 21.4 mi upstream from Floyd River and at mile 45.2 upstream from mouth of Floyd River.

DRAINAGE AREA.--180 mi².

PERIOD OF RECORD.--October 1955 to September 1988.

GAGE.--Water-stage recorder. Datum of gage is 1,239.40 ft above NGVD (State Highway Commission bench mark). Prior to Jan. 5, 1978 at site 721 ft right at old channel at same datum.

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 most years.

Rating table number 14, developed October 1985

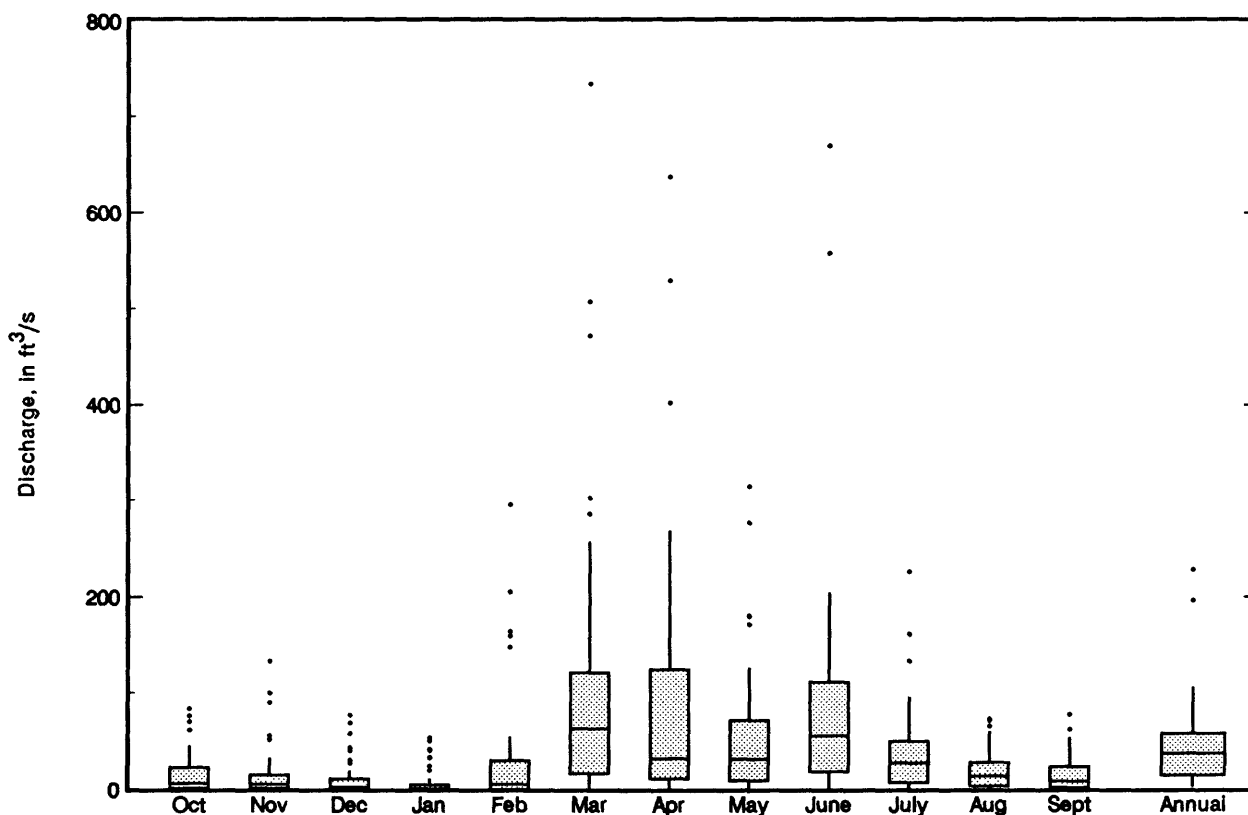
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
4.0	4.6	8.0	593
4.2	16	9.0	824
4.5	37	11.0	1,420
5.0	86	13.0	2,570
5.5	147	14.0	3,960
6.0	218	15.0	6,220
7.0	390	16.0	9,400

FLOYD RIVER BASIN
06600300 WEST BRANCH FLOYD RIVER NEAR STRUBLE, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	83.1	1966	0.22	1959	18.0	23.9	3.2
November	133	1980	0.35	1959	19.0	31.8	3.4
December	76.4	1984	0.050	1965	13.0	20.7	2.3
January	53.1	1983	0.000	1959	8.99	15.9	1.6
February	295	1984	0.000	1959	38.3	71.6	6.8
March	734	1962	1.26	1968	127	170	22.5
April	637	1969	1.21	1959	106	157	18.9
May	314	1984	1.00	1968	59.8	76.2	10.6
June	669	1983	0.82	1977	95.9	146	17.1
July	225	1983	0.89	1958	40.9	50.0	7.3
August	72.4	1983	0.24	1958	18.9	20.7	3.4
September	77.3	1965	0.17	1958	16.2	18.9	2.9
Annual	227	1983	2.49	1977	46.7	50.6	100.0

Boxplots of monthly and annual mean discharges



FLOYD RIVER BASIN
06600300 WEST BRANCH FLOYD RIVER NEAR STRUBLE, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.00	0.00	0.01	0.67	0.43	0.41	0.29	0.13	0.10	0.19	0.25	0.01	0.00
95	0.00	0.00	0.12	1.3	0.84	0.91	0.73	0.49	0.28	0.64	0.52	0.10	0.11
90	0.01	0.01	0.45	2.1	1.7	1.5	1.3	0.96	0.58	0.87	0.82	0.32	0.44
85	0.01	0.01	0.99	3.1	2.5	2.6	2.0	1.5	1.1	1.1	1.1	0.53	0.82
80	0.02	0.02	2.0	5.8	3.8	5.4	3.0	1.9	1.6	1.3	1.4	0.75	1.2
75	0.16	0.11	3.2	8.7	6.5	10	4.2	2.3	2.1	1.7	1.7	0.97	1.7
70	0.36	0.23	4.7	13	8.7	13	5.7	2.8	3.0	2.4	2.4	1.3	2.5
65	0.59	0.32	6.8	16	11	17	7.6	3.7	4.1	3.3	4.0	1.6	3.6
60	0.74	0.47	9.5	19	13	21	10	5.4	4.9	4.5	4.6	2.1	5.0
55	0.91	0.73	13	23	17	25	13	6.7	5.8	5.5	5.3	2.7	6.7
50	1.1	1.0	19	27	21	30	16	8.0	6.7	6.5	6.2	3.3	8.7
45	1.4	1.6	27	33	27	36	19	9.8	7.6	7.6	7.5	3.8	12
40	1.7	3.6	34	40	34	43	23	12	8.7	9.1	8.9	4.6	16
35	2.6	9.4	43	52	41	50	26	15	10	12	11	5.4	20
30	3.7	12	54	67	50	60	32	17	12	16	13	6.8	26
25	6.9	16	78	84	62	72	37	22	18	21	17	9.6	34
20	18	22	112	107	76	89	46	26	24	27	24	22	44
15	24	31	162	149	131	114	59	33	33	34	38	34	59
10	36	45	245	246	175	172	103	43	47	50	63	46	87
5	48	102	502	433	240	349	181	70	69	70	97	65	169

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	110	25	13	7.3	4.7
0.95	1.05	296	77	40	23	15
0.90	1.11	483	133	72	41	27
0.80	1.25	840	250	137	79	51
0.50	2	2,170	730	417	241	152
0.20	5	4,910	1,810	1,070	632	384
0.10	10	7,140	2,750	1,650	987	585
0.04	25	10,300	4,090	2,500	1,520	876
0.02	50	12,700	5,170	3,200	1,970	1,110
0.01	100	15,200	6,290	3,930	2,450	1,350

FLOYD RIVER BASIN
06600300 WEST BRANCH FLOYD RIVER NEAR STRUBLE, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.10
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.07	0.16
0.05	20	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.16	0.34
0.10	10	0.00	0.00	0.00	0.00	0.00	0.02	0.10	0.31	0.64
0.20	5	0.00	0.00	0.00	0.00	0.00	0.12	0.31	0.70	1.4
0.50	2	0.37	0.38	0.45	0.48	0.78	1.3	2.2	3.1	5.3
0.80	1.25	4.3	4.4	4.6	4.7	5.5	8.1	11	13	19
0.90	1.11	12	12	12	13	14	19	25	28	36
0.96	1.04	30	30	30	32	35	45	52	59	70
0.98	1.02	53	53	51	58	64	75	80	96	106
0.99	1.01	90	90	84	98	115	117	115	148	152

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.01	0.02	0.01	0.01	0.05	0.12	0.16	0.22
0.02	50	0.02	0.03	0.01	0.02	0.10	0.20	0.27	0.38
0.05	20	0.05	0.07	0.04	0.04	0.25	0.46	0.59	0.83
0.10	10	0.12	0.15	0.09	0.10	0.57	0.92	1.1	1.6
0.20	5	0.31	0.37	0.24	0.25	1.5	2.1	2.5	3.5
0.50	2	1.9	2.1	1.6	1.6	7.4	9.0	10	14
0.80	1.25	11	11	9.9	9.4	30	35	39	49
0.90	1.11	26	26	25	24	59	67	74	91
0.96	1.04	66	63	66	65	113	131	145	169
0.98	1.02	118	111	123	122	167	199	219	249
0.99	1.01	197	183	213	216	232	285	315	348
		July-August-September				October-November-December			
0.01	100	0.04	0.03	0.05	0.10	0.09	0.02	0.02	0.04
0.02	50	0.07	0.06	0.10	0.17	0.13	0.03	0.03	0.07
0.05	20	0.16	0.15	0.22	0.34	0.22	0.08	0.09	0.15
0.10	10	0.32	0.31	0.43	0.63	0.37	0.18	0.19	0.31
0.20	5	0.71	0.75	0.94	1.3	0.71	0.46	0.50	0.71
0.50	2	2.9	3.3	3.6	4.5	2.5	2.5	2.6	3.2
0.80	1.25	10	11	12	14	9.9	11	12	13
0.90	1.11	19	20	21	25	21	22	24	26
0.96	1.04	35	35	37	45	47	45	49	54
0.98	1.02	50	48	51	63	81	70	76	84
0.99	1.01	69	63	68	86	132	100	111	124

FLOYD RIVER BASIN
06600500 FLOYD RIVER AT JAMES, IA

LOCATION.--Lat 42°34'36", long 96°18'43", in SE1/4 SE1/4 sec.30, T.90 N., R.46 W., Plymouth County, Hydrologic Unit 10230002, on right bank at downstream side of bridge on county highway C70, 0.2 mi east of James, 14.3 mi downstream from West Branch Floyd River and at mile 7.5.

DRAINAGE AREA.--886 mi².

PERIOD OF RECORD.--December 1934 to September 1988.

GAGE.--Water-stage recorder. Datum of gage is 1,092.59 ft above NGVD. Prior to Sept. 11, 1938, June 9 to Nov. 5, 1953 and Oct. 1, 1955 to May 22, 1957, nonrecording gage and May 23, 1957 to Sept. 30, 1970, water-stage recorder at same site at datum 10.0 ft higher.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 71,500 ft³/s June 8, 1953, gage height, 25.3 ft, from flood-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.

Rating table number 24, developed October 1983

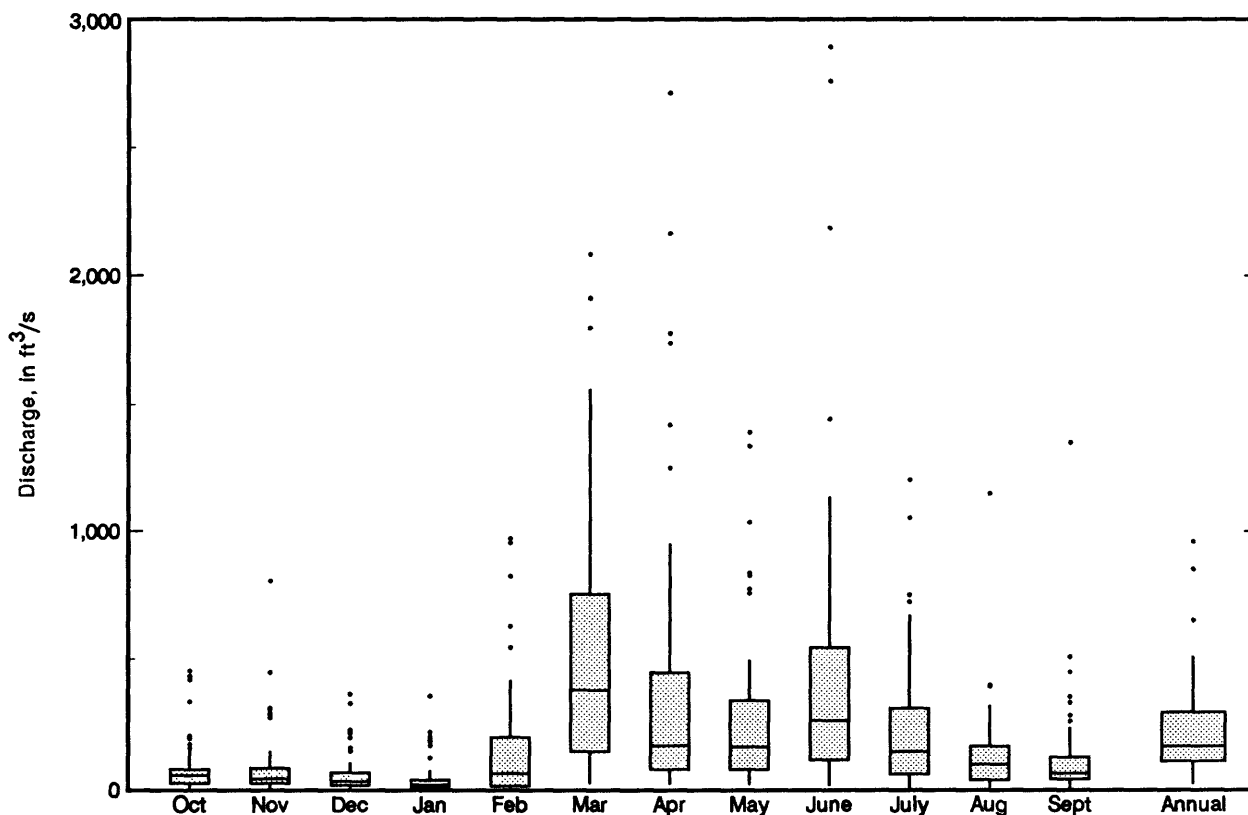
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
10.0	83	19.0	5,780
10.5	191	23.0	9,800
11.0	338	25.0	12,100
12.0	731	31.0	25,400
13.0	1,232	33.0	41,000
15.0	2,480	35.0	66,700
17.0	4,010		

FLOYD RIVER BASIN
06600500 FLOYD RIVER AT JAMES, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	456	1987	4.55	1959	92.1	118	3.4
November	804	1980	4.54	1959	91.7	138	3.4
December	366	1980	3.05	1959	66.8	90.4	2.5
January	359	1973	1.63	1959	47.2	72.1	1.8
February	970	1952	1.62	1959	161	235	6.0
March	2,080	1979	21.5	1964	541	517	20.1
April	2,715	1969	18.7	1959	426	594	15.8
May	1,393	1984	15.1	1968	287	319	10.7
June	2,897	1984	14.4	1968	471	619	17.5
July	1,205	1983	7.32	1936	242	264	9.0
August	1,151	1951	6.12	1958	136	174	5.1
September	1,353	1951	3.40	1958	129	206	4.8
Annual	958	1983	19.9	1956	224	196	100.0

Boxplots of monthly and annual mean discharges



FLOYD RIVER BASIN
06600500 FLOYD RIVER AT JAMES, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	1.4	1.2	5.7	16	12	8.6	6.4	2.1	3.6	4.4	4.7	3.2	3.3
95	3.1	4.6	11	24	19	16	13	10	7.6	7.1	8.8	5.2	7.5
90	5.5	7.7	19	34	28	26	20	15	11	12	13	7.6	11
85	6.6	8.5	26	49	37	38	27	18	15	15	15	10	15
80	7.9	9.3	44	60	46	53	34	22	19	17	17	13	19
75	9.8	10	57	73	60	68	42	27	24	20	22	16	24
70	11	12	73	87	73	87	51	32	30	26	29	18	30
65	12	14	92	100	85	109	61	39	37	32	34	21	37
60	14	17	113	115	98	135	76	47	44	37	38	23	45
55	16	22	139	134	111	164	95	57	50	42	41	26	54
50	18	28	170	152	135	192	115	68	56	46	45	29	65
45	20	34	206	176	160	226	135	80	63	51	50	32	80
40	23	49	247	199	190	260	158	93	72	56	55	37	100
35	27	70	298	237	223	304	186	107	80	61	60	42	126
30	32	89	363	279	258	351	218	127	98	73	71	48	158
25	39	115	474	348	306	431	254	148	123	90	83	58	195
20	51	164	610	447	362	529	307	179	159	127	105	74	248
15	103	203	916	616	500	652	391	220	199	171	161	139	325
10	151	330	1,380	864	764	933	583	284	283	244	271	207	468
5	210	720	2,370	1,700	1,140	1,810	884	460	448	426	341	278	848

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	396	125	73	48	33
0.95	1.05	771	331	211	141	97
0.90	1.11	1,100	537	355	238	164
0.80	1.25	1,680	936	637	427	292
0.50	2	3,790	2,480	1,720	1,140	758
0.20	5	8,480	5,870	3,960	2,550	1,620
0.10	10	12,900	8,820	5,780	3,640	2,250
0.04	25	20,100	13,200	8,270	5,100	3,040
0.02	50	26,800	16,800	10,200	6,190	3,600
0.01	100	34,700	20,700	12,100	7,250	4,120

FLOYD RIVER BASIN
06600500 FLOYD RIVER AT JAMES, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.81	0.92	0.94	0.99	1.4	2.0	2.6	3.3	3.7
0.02	50	1.1	1.2	1.2	1.3	1.8	2.6	3.3	4.2	5.0
0.05	20	1.7	1.8	1.9	2.0	2.7	3.7	4.8	6.0	7.7
0.10	10	2.5	2.7	2.8	3.0	3.9	5.2	6.8	8.4	11
0.20	5	4.1	4.4	4.6	4.9	6.1	8.0	11	13	18
0.50	2	11	12	12	13	15	19	26	31	45
0.80	1.25	32	33	34	36	41	51	66	78	112
0.90	1.11	57	58	60	63	70	87	112	130	180
0.96	1.04	107	107	110	115	128	158	200	229	297
0.98	1.02	163	163	166	171	191	236	294	333	410
0.99	1.01	238	238	241	246	276	341	419	471	549

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.99	0.99	1.1	1.5	3.1	4.9	5.6	8.1
0.02	50	1.3	1.3	1.4	2.0	4.4	6.6	7.6	11
0.05	20	1.9	2.0	2.1	2.9	7.4	10	12	17
0.10	10	2.8	2.9	3.1	4.2	12	15	18	24
0.20	5	4.6	4.8	5.1	6.6	20	25	29	39
0.50	2	12	13	14	17	57	65	74	96
0.80	1.25	36	38	40	48	154	172	190	243
0.90	1.11	66	68	71	84	256	288	314	396
0.96	1.04	128	131	136	159	437	503	539	672
0.98	1.02	199	203	210	242	614	722	764	948
0.99	1.01	300	303	313	358	830	1,000	1,050	1,290
		July-August-September				October-November-December			
0.01	100	1.3	1.9	2.0	2.4	1.9	2.5	2.8	3.2
0.02	50	2.0	2.7	2.8	3.6	2.3	3.0	3.4	4.0
0.05	20	3.5	4.5	4.9	6.2	3.3	4.1	4.6	5.6
0.10	10	5.6	7.0	7.7	9.9	4.6	5.6	6.3	7.8
0.20	5	9.9	12	13	17	6.9	8.4	9.4	12
0.50	2	27	30	34	45	17	20	22	28
0.80	1.25	66	73	80	106	46	53	59	72
0.90	1.11	102	112	122	161	80	94	104	123
0.96	1.04	158	175	187	245	153	181	197	224
0.98	1.02	207	231	242	316	236	281	304	335
0.99	1.01	260	295	304	394	353	426	457	485

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 September 1988.

GAGE.--Water-stage recorder. Datum of gage is 1,045.82 ft above NGVD. Prior to June 16, 1959, nonrecording gage at site 3.0 mi upstream and June 16, 1959 to Sept. 30, 1969, recording gage at site 2.2 mi upstream at datum 7.0 ft higher.

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.

REMARKS.--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.

Rating table number 7, developed October 1985

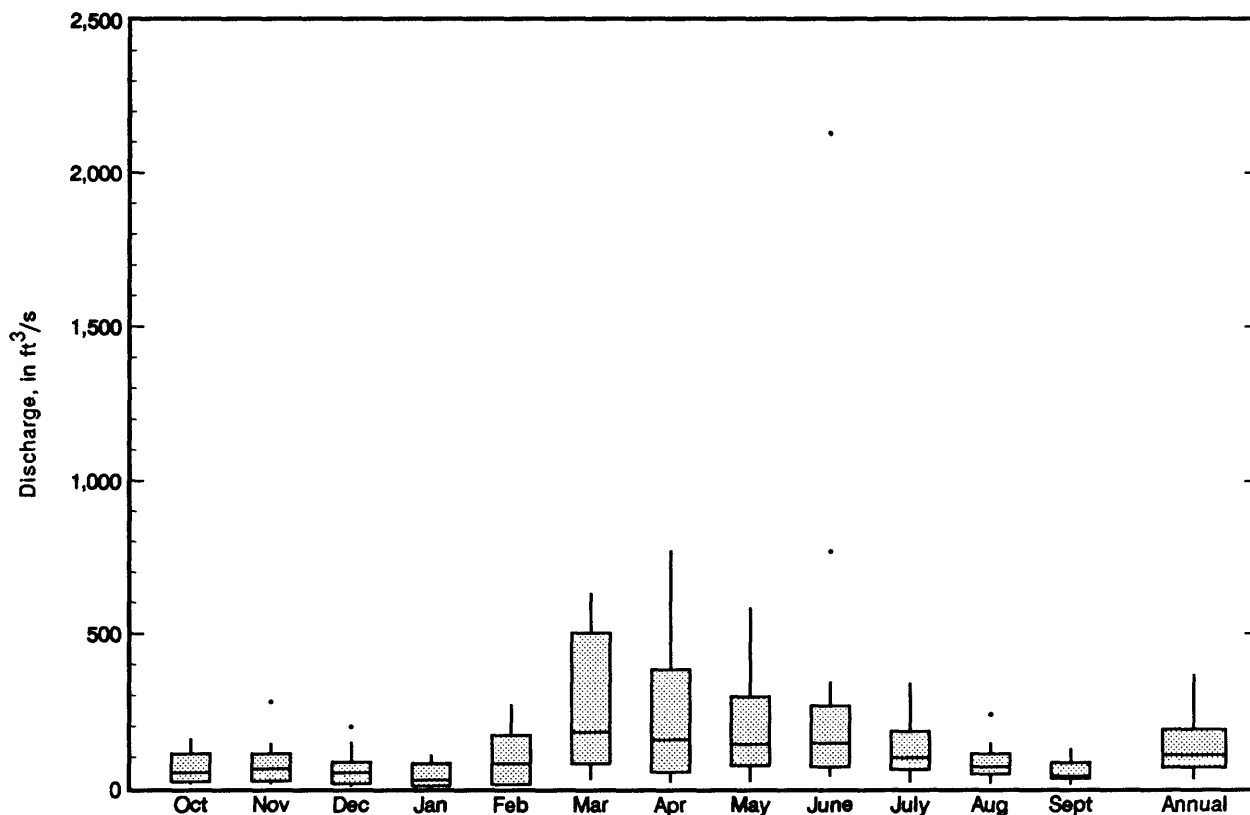
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
4.0	1.5	8.0	320
4.5	16	10.0	642
5.0	38	12.0	1,090
5.5	66	16.0	2,490
6.0	103	20.0	5,550
7.0	200	24.0	12,500

MONONA-HARRISON DITCH BASIN
06602020 WEST FORK DITCH AT HORNICK, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	160	1987	14.8	1977	67.1	49.7	4.0
November	281	1980	16.2	1977	82.1	72.7	4.9
December	199	1985	6.61	1979	65.6	57.9	3.9
January	108	1986	2.86	1977	43.3	37.1	2.6
February	271	1982	11.0	1979	95.4	84.9	5.7
March	633	1979	29.7	1981	266	229	15.8
April	772	1983	21.7	1977	249	231	14.8
May	585	1983	23.1	1977	199	165	11.8
June	2,131	1984	40.9	1976	332	550	19.7
July	341	1984	22.7	1976	135	97.8	8.0
August	241	1979	16.7	1976	86.1	57.1	5.1
September	129	1985	13.4	1976	60.9	39.0	3.6
Annual	367	1984	29.9	1977	141	102	100.0

Boxplots of monthly and annual mean discharges



MONONA-HARRISON DITCH BASIN
06602020 WEST FORK DITCH AT HORNICK, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	2.1	2.8	16	17	13	12	19	14	11	12	13	4.7	5.0
95	3.0	5.3	21	22	20	23	22	17	13	15	17	7.5	12
90	6.9	10	24	28	27	32	29	20	15	17	19	9.9	17
85	9.4	12	27	40	34	38	35	24	19	18	22	13	20
80	11	13	31	48	41	44	39	30	25	21	24	17	24
75	13	15	43	58	59	50	45	34	27	24	27	20	29
70	15	17	57	71	70	60	51	38	30	26	29	24	35
65	17	20	72	86	76	72	57	41	33	29	32	28	42
60	20	31	84	101	82	86	63	45	35	31	37	35	50
55	22	44	93	122	102	104	71	49	38	36	46	42	61
50	28	49	103	150	129	121	81	55	43	52	66	47	71
45	41	56	113	174	157	138	96	65	54	66	73	54	78
40	46	63	126	197	184	158	112	74	69	71	79	66	87
35	51	73	138	220	215	179	129	83	73	76	89	72	101
30	63	85	170	256	247	203	149	91	78	80	105	78	117
25	73	96	212	306	282	227	176	99	83	90	120	87	136
20	81	107	275	371	320	275	212	107	93	113	134	113	165
15	92	138	367	449	361	374	259	125	107	127	151	131	207
10	104	196	564	563	435	620	322	157	124	144	171	158	279
5	120	281	1,080	790	590	1,390	400	206	149	168	230	195	441

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	382	139	79	57	49
0.95	1.05	726	296	167	112	90
0.90	1.11	1,010	436	245	160	124
0.80	1.25	1,480	684	388	247	183
0.50	2	2,950	1,540	905	560	384
0.20	5	5,610	3,250	2,030	1,260	799
0.10	10	7,700	4,680	3,060	1,920	1,170
0.04	25	10,600	6,770	4,680	3,000	1,740
0.02	50	13,000	8,520	6,120	3,990	2,260
0.01	100	15,500	10,400	7,750	5,160	2,850

MONONA-HARRISON DITCH BASIN
06602020 WEST FORK DITCH AT HORNICK, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.83	0.83	0.83	0.81	0.93	2.0	2.8	3.9	5.1
0.02	50	1.3	1.3	1.3	1.3	1.5	2.9	4.0	5.4	6.9
0.05	20	2.4	2.4	2.4	2.4	2.9	4.8	6.7	8.6	11
0.10	10	4.0	4.0	4.0	4.2	5.0	7.4	10	13	15
0.20	5	7.1	7.2	7.3	7.7	9.1	12	17	20	23
0.50	2	20	20	20	22	25	30	39	44	50
0.80	1.25	47	48	48	51	59	67	83	90	100
0.90	1.11	71	72	72	75	85	98	118	128	139
0.96	1.04	105	106	107	109	121	144	167	180	194
0.98	1.02	133	134	135	136	148	182	206	222	238
0.99	1.01	162	163	164	162	174	223	247	266	285

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.97	0.97	0.96	1.1	5.7	5.6	7.0	8.7
0.02	50	1.5	1.5	1.5	1.7	7.7	7.7	9.4	12
0.05	20	2.7	2.7	2.8	3.1	12	12	15	18
0.10	10	4.5	4.6	4.6	5.2	18	19	21	25
0.20	5	8.0	8.2	8.4	9.4	28	30	34	39
0.50	2	22	23	24	26	65	72	78	90
0.80	1.25	52	54	57	63	147	164	174	203
0.90	1.11	77	81	87	95	223	246	262	306
0.96	1.04	114	119	130	142	343	376	398	474
0.98	1.02	143	151	166	180	451	489	520	625
0.99	1.01	175	184	203	221	575	617	658	801
		July-August-September				October-November-December			
0.01	100	6.4	7.2	7.7	8.0	2.3	2.5	2.7	3.3
0.02	50	7.8	8.7	9.4	10	3.1	3.4	3.7	4.5
0.05	20	10	12	13	14	5.0	5.5	5.9	7.0
0.10	10	13	15	16	18	7.5	8.2	8.8	10
0.20	5	18	20	22	25	12	13	14	16
0.50	2	32	34	37	44	27	30	32	37
0.80	1.25	56	58	62	71	56	65	70	79
0.90	1.11	74	76	79	90	80	94	101	115
0.96	1.04	100	102	103	113	112	137	147	168
0.98	1.02	120	122	121	130	138	172	186	213
0.99	1.01	142	144	139	147	166	211	227	261

MONONA-HARRISON DITCH BASIN
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 September 1988. Records for April 1939 to January 1958 not equivalent owing to diversion from Little Sioux River through equalizer ditch 1.5 mi upstream. Prior to May 1942, published as "near Blencoe".

GAGE.--Water-stage recorder. Datum of gage is 1,015.00 ft above NGVD (U.S. Army Corps of Engineers bench mark). Prior to May 7, 1942, nonrecording gage at site 4.8 mi downstream at datum 5.40 ft lower. May 7, 1942 to Oct. 13, 1953, nonrecording gage and Oct. 14, 1953 to Sept. 30, 1975, recording gage at same site at datum 5.00 ft higher.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 19,900 ft³/s Feb. 19, 1971, gage height, 28.03 ft, present datum; minimum daily discharge, 8.5 ft³/s Jan. 3-11, 1959.

REMARKS.--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.

Rating table number 20, developed October 1987

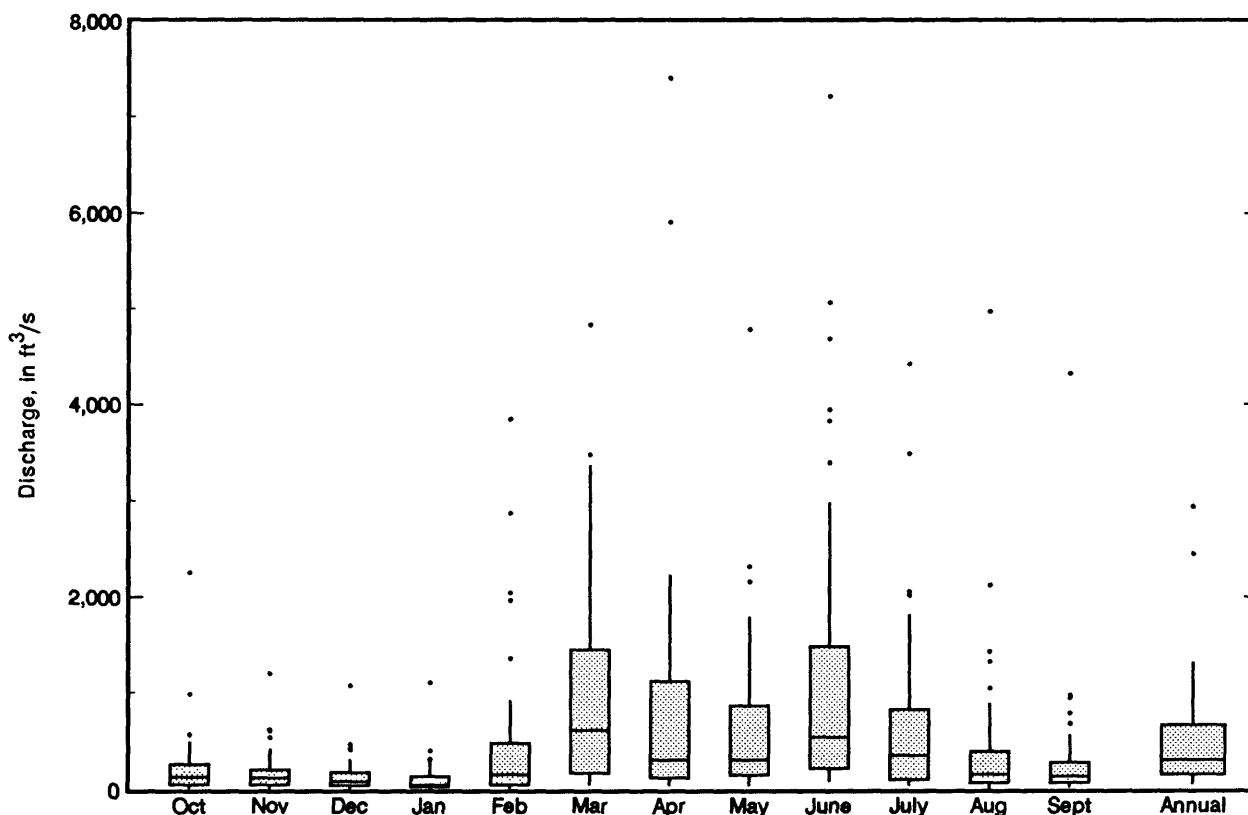
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
3.5	14.0	9.0	1,140
4.0	48	11.0	1,820
4.5	105	15.0	3,810
5.0	176	19.0	7,210
6.0	356	23.0	12,000
7.0	580	27.0	18,300

MONONA-HARRISON DITCH BASIN
06602400 MONONA-HARRISON DITCH NEAR TURIN, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	2,254	1952	16.0	1959	222	342	3.6
November	1,197	1952	18.0	1959	188	206	3.0
December	1,072	1952	11.4	1959	146	173	2.4
January	1,101	1952	10.5	1959	122	170	2.0
February	3,851	1952	13.9	1959	443	759	7.2
March	4,836	1952	46.9	1968	991	1,103	16.0
April	7,406	1951	41.1	1968	837	1,348	13.5
May	4,788	1951	43.7	1968	648	836	10.5
June	7,210	1954	89.7	1976	1,167	1,556	18.9
July	4,420	1951	46.1	1976	679	898	11.0
August	4,978	1951	8.87	1941	435	788	7.0
September	4,321	1951	20.5	1958	304	629	4.9
Annual	2,940	1951	55.5	1968	515	573	100.0

Boxplots of monthly and annual mean discharges



MONONA-HARRISON DITCH BASIN
06602400 MONONA-HARRISON DITCH NEAR TURIN, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	9.2	12	27	33	29	24	16	7.9	19	13	13	12	14
95	22	21	42	49	42	57	46	31	28	31	29	23	29
90	27	28	55	63	58	85	59	42	36	40	39	29	38
85	31	32	66	78	74	104	68	49	44	47	47	34	46
80	34	37	81	94	91	120	78	55	51	53	55	39	55
75	37	42	102	113	110	141	88	66	59	59	62	44	65
70	40	47	123	133	129	162	102	76	66	65	69	50	76
65	43	53	146	154	148	188	118	87	73	72	80	57	91
60	47	64	174	183	170	216	144	100	85	84	92	65	107
55	52	80	211	218	200	258	177	116	100	97	106	74	124
50	58	99	266	263	240	310	217	136	121	110	119	88	144
45	66	112	354	322	294	371	270	157	139	124	135	102	166
40	80	128	500	397	388	439	349	186	158	143	151	117	197
35	101	150	691	518	517	587	449	221	185	162	171	134	237
30	119	180	902	720	659	857	582	280	215	193	198	151	296
25	139	221	1,180	895	780	1,140	761	389	257	226	230	172	393
20	158	318	1,610	1,090	962	1,570	972	556	330	262	264	198	557
15	198	594	2,090	1,400	1,250	2,360	1,300	708	445	353	326	237	821
10	252	1,300	2,710	1,940	1,680	3,590	1,960	954	598	471	422	304	1,260
5	347	2,400	4,110	3,720	2,480	5,490	3,040	1,720	994	752	595	449	2,360

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	847	312	182	124	102
0.95	1.05	1,720	762	464	303	231
0.90	1.11	2,430	1,170	735	476	350
0.80	1.25	3,590	1,900	1,240	799	570
0.50	2	6,960	4,280	3,030	2,000	1,380
0.20	5	12,100	8,330	6,500	4,520	3,120
0.10	10	15,600	11,200	9,230	6,660	4,650
0.04	25	19,800	14,700	12,900	9,820	7,000
0.02	50	22,700	17,300	15,800	12,400	9,020
0.01	100	25,500	19,700	18,700	15,200	11,300

MONONA-HARRISON DITCH BASIN
06602400 MONONA-HARRISON DITCH NEAR TURIN, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	5.2	5.9	6.9	7.3	9.6	13	14	15	18
0.02	50	6.4	7.2	8.2	8.7	11	15	16	18	21
0.05	20	8.9	9.8	11	12	15	19	21	24	29
0.10	10	12	13	14	15	19	23	28	31	38
0.20	5	18	19	20	21	25	32	39	44	55
0.50	2	38	40	41	43	50	62	77	88	116
0.80	1.25	85	88	90	95	107	132	166	189	265
0.90	1.11	131	136	140	147	167	205	256	292	421
0.96	1.04	213	222	231	242	274	341	416	476	708
0.98	1.02	293	308	324	338	385	481	576	660	1,000
0.99	1.01	393	415	443	460	527	666	779	894	1,390

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	8.2	8.4	9.2	13	12	16	20	24
0.02	50	9.7	10	11	14	14	20	23	29
0.05	20	13	13	14	18	20	26	31	39
0.10	10	16	18	19	22	28	36	41	52
0.20	5	23	25	26	30	44	53	61	77
0.50	2	45	49	52	57	110	126	143	180
0.80	1.25	96	105	111	126	316	355	399	495
0.90	1.11	148	161	170	202	577	652	735	899
0.96	1.04	240	258	276	348	1,140	1,310	1,490	1,790
0.98	1.02	332	355	383	507	1,820	2,130	2,440	2,870
0.99	1.01	448	476	518	723	2,810	3,350	3,880	4,490
		July-August-September				October-November-December			
0.01	100	6.0	8.5	10.0	12	8.7	9.4	11	14
0.02	50	7.9	11	12	15	10	11	13	16
0.05	20	12	15	18	21	14	16	17	21
0.10	10	17	21	24	30	19	21	23	27
0.20	5	28	32	37	45	26	30	32	38
0.50	2	69	75	85	105	54	62	67	77
0.80	1.25	177	192	214	276	117	138	148	169
0.90	1.11	293	325	357	477	179	214	232	264
0.96	1.04	507	588	632	884	289	348	382	437
0.98	1.02	727	875	925	1,340	398	481	535	615
0.99	1.01	1,010	1,260	1,320	1,980	534	650	729	846

LITTLE SIOUX RIVER BASIN
06605000 OCHEYEDAN RIVER NEAR SPENCER, IA

LOCATION.--Lat 43°07'44", long 95°12'37", in SW1/4SW1/4 sec.15, T.96 N., R.37 W., 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 September 1988.

GAGE.--Water-stage recorder. Datum of gage is 1,311.66 ft above NGVD.

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.

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.

Rating table number 3, developed March 1974

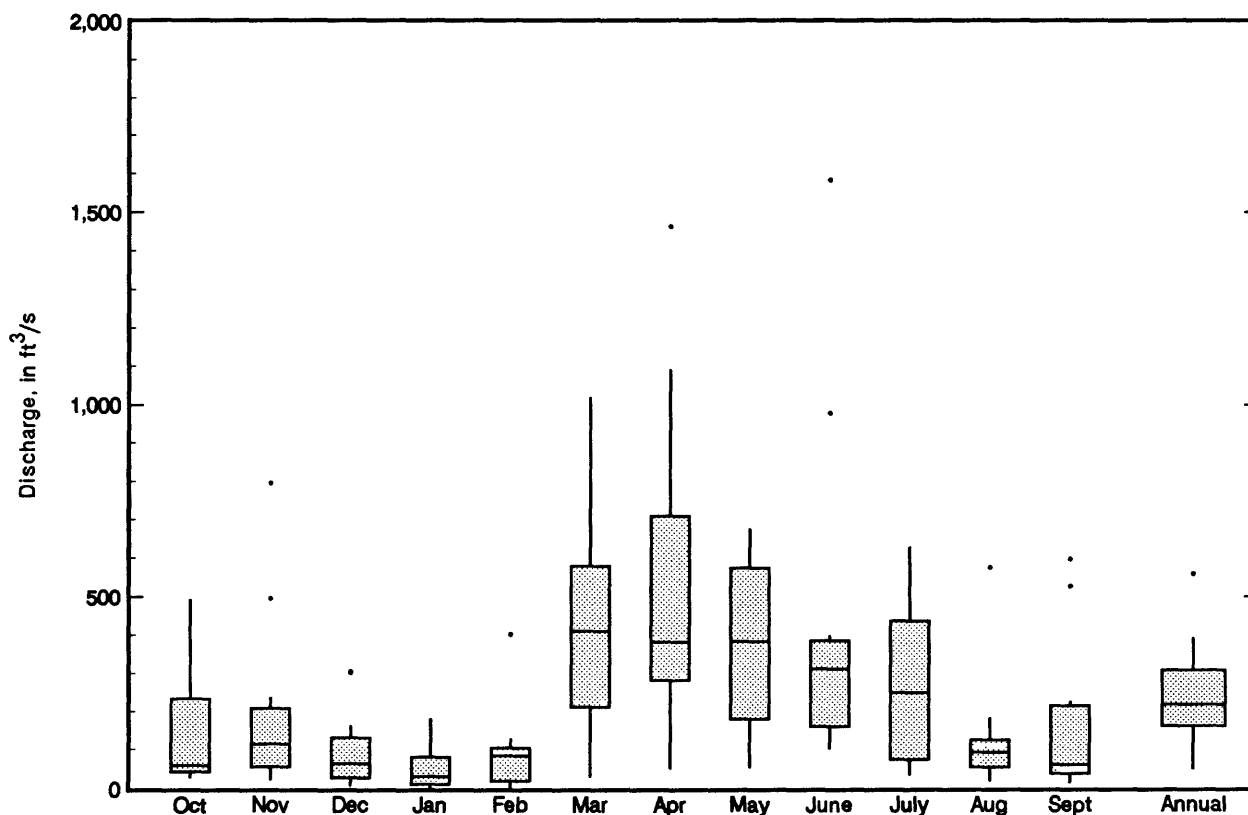
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
1.5	16	5.0	580
1.7	30	6.0	858
2.0	55	8.0	1,700
2.5	110	9.0	2,640
3.0	180	10.0	5,960
4.0	359		

LITTLE SIOUX RIVER BASIN
06605000 OCHEYEDAN RIVER NEAR SPENCER, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	492	1983	27.7	1979	161	155	5.4
November	796	1980	22.0	1979	206	237	6.8
December	305	1983	8.07	1979	106	108	3.5
January	180	1983	0.51	1979	53.9	55.4	1.8
February	402	1983	0.000	1979	91.7	112	3.0
March	1,019	1983	28.9	1981	428	297	14.2
April	1,463	1983	50.3	1981	560	426	18.6
May	676	1984	54.9	1981	376	221	12.5
June	1,582	1984	102	1988	436	451	14.5
July	629	1983	33.5	1988	279	232	9.3
August	576	1979	18.7	1988	134	155	4.4
September	597	1979	14.2	1988	180	205	6.0
Annual	559	1983	48.8	1981	251	140	100.0

Boxplots of monthly and annual mean discharges



LITTLE SIOUX RIVER BASIN
06605000 OCHEYEDAN RIVER NEAR SPENCER, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.01	0.00	0.01	38	30	52	21	12	9.7	20	17	4.0	0.02
95	0.13	0.01	5.9	51	46	64	30	17	15	26	21	8.7	9.8
90	4.1	5.8	20	103	80	78	37	27	20	30	26	11	20
85	5.7	7.3	30	143	100	96	44	33	26	33	33	14	28
80	8.6	8.8	86	178	121	113	50	40	31	36	40	19	36
75	11	11	109	215	143	138	62	46	37	41	47	26	46
70	14	18	124	248	166	161	75	52	41	46	55	31	57
65	19	22	138	281	197	182	92	60	46	51	67	37	68
60	23	27	152	313	228	202	108	67	51	58	79	48	82
55	27	35	172	348	275	224	137	74	58	66	95	58	100
50	33	56	199	392	326	248	168	83	64	74	111	69	121
45	45	62	224	438	364	275	196	92	71	127	129	80	143
40	57	69	279	482	399	300	223	101	84	172	145	93	169
35	65	76	345	554	433	327	262	110	112	194	166	105	204
30	73	89	436	628	468	364	303	122	150	217	200	127	245
25	86	102	541	705	516	417	348	135	206	246	242	154	300
20	103	121	666	834	591	466	413	147	271	284	305	192	365
15	121	143	838	975	666	642	478	159	354	322	432	237	458
10	140	185	1,170	1,300	778	915	630	205	469	396	576	295	618
5	159	290	1,950	1,810	942	1,810	947	303	695	519	710	370	923

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	359	322	258	181	130
0.95	1.05	778	651	483	317	242
0.90	1.11	1,150	900	649	419	326
0.80	1.25	1,830	1,270	900	577	453
0.50	2	4,210	2,180	1,520	1,020	780
0.20	5	9,100	3,190	2,290	1,680	1,210
0.10	10	13,300	3,700	2,710	2,130	1,450
0.04	25	19,500	4,170	3,150	2,700	1,730
0.02	50	24,800	4,430	3,430	3,120	1,900
0.01	100	30,600	4,630	3,660	3,530	2,060

LITTLE SIOUX RIVER BASIN
06605000 OCHEYEDAN RIVER NEAR SPENCER, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.26	1.5	4.7
0.02	50	0.00	0.00	0.00	0.00	0.00	0.01	0.63	2.7	6.7
0.05	20	0.00	0.00	0.00	0.00	0.00	0.10	2.1	5.7	12
0.10	10	0.00	0.00	0.00	0.00	0.00	0.71	5.2	11	18
0.20	5	7.4	7.5	7.9	8.2	8.8	4.6	13	21	31
0.50	2	24	25	26	27	30	45	55	65	82
0.80	1.25	52	52	54	57	64	115	134	154	196
0.90	1.11	71	71	73	76	87	137	181	221	301
0.96	1.04	93	93	95	97	113	147	226	305	462
0.98	1.02	108	108	110	111	130	149	249	364	602
0.99	1.01	122	122	123	123	147	150	266	419	758

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	1.4	1.5	1.5	1.6	15	18	21	23
0.02	50	2.0	2.2	2.3	2.4	19	22	27	30
0.05	20	3.6	3.8	4.0	4.2	27	32	37	45
0.10	10	5.8	6.1	6.4	6.8	37	43	49	63
0.20	5	10	11	11	12	53	61	70	92
0.50	2	27	28	29	32	108	122	138	180
0.80	1.25	68	70	71	77	212	238	268	330
0.90	1.11	105	108	109	119	300	337	379	441
0.96	1.04	165	167	168	183	431	486	547	590
0.98	1.02	218	219	218	239	542	614	693	705
0.99	1.01	277	278	273	301	666	757	857	821
		July-August-September				October-November-December			
0.01	100	5.4	5.9	6.9	8.4	0.91	1.4	2.0	3.0
0.02	50	7.0	7.7	8.8	11	1.5	2.2	3.0	4.5
0.05	20	10	11	13	15	3.1	4.3	5.6	7.9
0.10	10	14	15	17	20	5.7	7.5	9.5	13
0.20	5	20	22	24	28	11	14	17	22
0.50	2	36	40	43	51	38	45	51	61
0.80	1.25	59	66	72	91	109	123	135	154
0.90	1.11	73	83	93	122	177	198	215	241
0.96	1.04	89	103	118	164	284	318	341	379
0.98	1.02	99	117	136	198	378	422	453	500
0.99	1.01	109	130	154	233	481	539	578	637

LITTLE SIOUX RIVER BASIN
06605600 LITTLE SIOUX RIVER AT GILLETT GROVE, IA

LOCATION.--Lat 43°01'06", long 95°02'34", in SW1/4 NE1/4 sec. 25, T.95 N., R.36 W., Clay County, Hydrologic Unit 10230003, on left bank 5 ft downstream from bridge on county highway B53, 0.4 mi northwest of Gillett Grove, 0.9 mi above Elk Creek and at mile 146.1.

DRAINAGE AREA.--1,334 mi².

PERIOD OF RECORD.--June 1958 to September 1973 (discontinued).

GAGE.--Water-stage recorder. Datum of gage is 1,266.84 ft above mean sea level.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 20,200 ft³/s Apr. 7, 1965 gage height, 18.67 ft; minimum daily discharge, 1.0 ft³/s Feb. 3-27, 1959.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 9, 1953 reached a discharge of about 24,000 ft³/s, estimated on basis of interpretive flood studies.

Rating table number 8, developed October 1969
(A discharge measurement to validate this rating
has not been made since October 1973.)

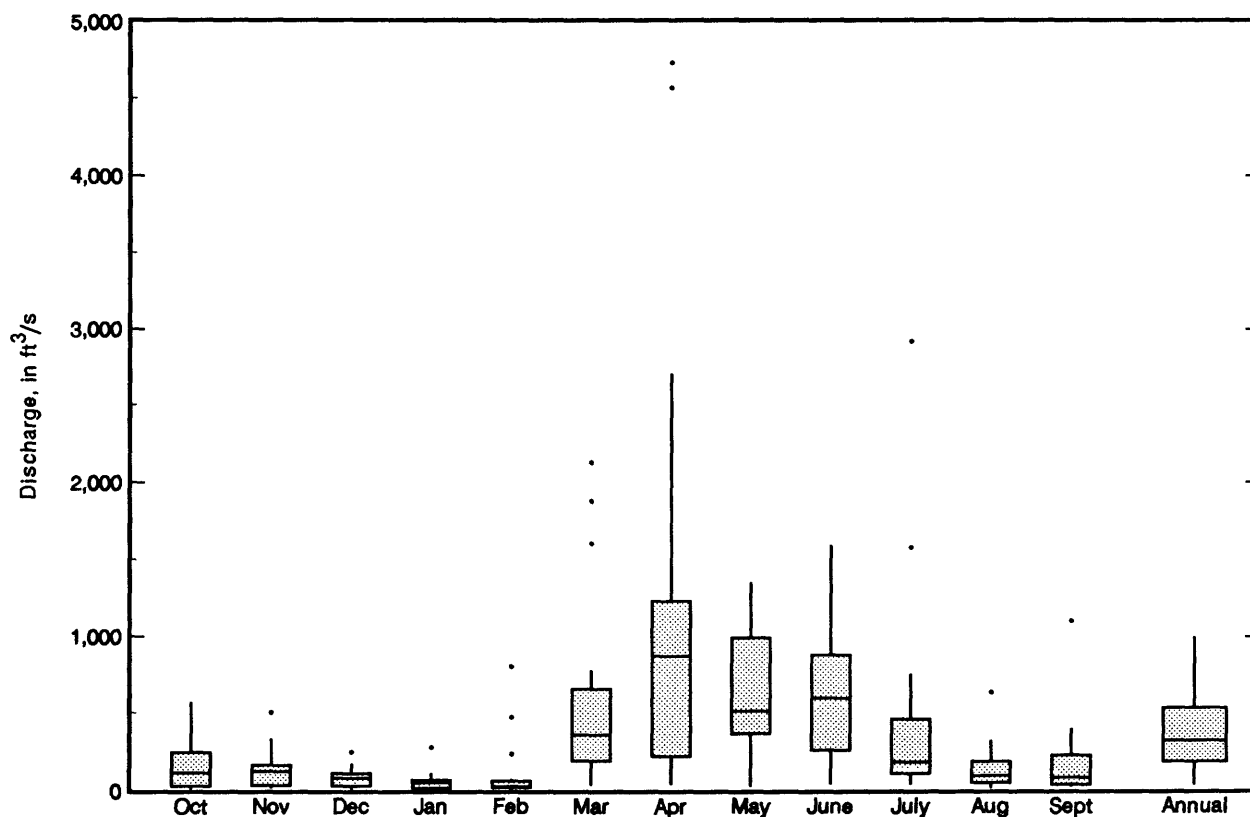
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
3.0	37	6.0	524
3.2	59	8.0	1,030
3.5	96	10.0	1,750
4.0	166	12.0	3,100
4.5	244	14.0	6,000
5.0	326	16.0	10,400

LITTLE SIOUX RIVER BASIN
06605600 LITTLE SIOUX RIVER AT GILLETT GROVE, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	568	1969	9.43	1959	170	177	3.7
November	503	1971	13.0	1959	145	140	3.2
December	247	1971	5.89	1959	84.5	64.8	1.9
January	276	1973	2.44	1959	60.9	66.5	1.3
February	802	1971	1.01	1959	128	223	2.8
March	2,127	1961	36.1	1964	635	680	13.9
April	4,732	1965	38.0	1968	1,260	1,539	27.7
May	1,351	1960	27.4	1968	635	442	13.9
June	1,595	1971	40.2	1968	596	444	13.1
July	2,918	1969	40.6	1968	502	780	11.0
August	635	1969	15.6	1968	150	162	3.3
September	1,104	1964	24.0	1967	192	283	4.2
Annual	998	1969	35.1	1968	380	259	100.0

Boxplots of monthly and annual mean discharges



LITTLE SIOUX RIVER BASIN
06605600 LITTLE SIOUX RIVER AT GILLETT GROVE, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	1.2	1.1	1.4	26	22	18	17	8.4	13	7.1	10	4.8	2.7
95	3.3	1.3	20	33	31	50	30	20	19	12	17	6.4	14
90	7.2	11	28	46	72	71	41	30	22	21	24	9.7	22
85	11	16	31	97	100	91	52	36	26	25	28	20	28
80	14	18	35	135	137	130	63	41	30	29	31	26	33
75	17	20	43	167	213	185	75	46	34	33	34	30	41
70	23	23	57	206	280	236	88	51	39	39	41	35	50
65	30	26	74	290	323	280	100	56	44	47	55	42	59
60	35	28	101	398	367	322	113	61	50	57	73	50	71
55	44	31	153	526	408	365	134	67	55	73	91	58	85
50	50	33	225	615	450	410	164	75	61	99	103	66	106
45	54	37	274	708	491	460	193	84	69	119	116	73	131
40	58	42	336	794	556	508	227	98	80	134	130	81	163
35	62	48	418	885	645	571	269	114	96	148	146	89	206
30	68	55	553	1,050	766	633	344	135	116	166	162	103	271
25	75	62	698	1,300	897	711	457	162	162	193	189	116	357
20	81	79	902	1,560	1,030	823	613	212	200	241	220	136	476
15	92	168	1,220	2,010	1,170	960	848	270	303	316	277	160	647
10	117	201	1,600	2,950	1,450	1,180	1,380	387	544	389	352	193	912
5	191	320	2,600	5,080	1,850	1,980	2,530	581	883	628	483	245	1,530

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	421	411	274	159	79
0.95	1.05	888	766	559	369	233
0.90	1.11	1,310	1,070	808	560	385
0.80	1.25	2,060	1,600	1,250	903	664
0.50	2	4,750	3,480	2,810	2,070	1,570
0.20	5	10,500	7,590	6,070	4,280	2,980
0.10	10	15,600	11,400	8,950	6,000	3,850
0.04	25	23,400	17,700	13,400	8,380	4,800
0.02	50	30,300	23,600	17,300	10,200	5,390
0.01	100	38,000	30,400	21,600	12,100	5,890

LITTLE SIOUX RIVER BASIN
06605600 LITTLE SIOUX RIVER AT GILLETT GROVE, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	2.8	2.8	3.0	3.3	4.5	5.3	7.6	8.5	8.8
0.02	50	3.5	3.6	3.8	4.1	5.5	6.8	9.3	11	12
0.05	20	4.9	5.0	5.3	5.7	7.6	9.7	13	15	17
0.10	10	6.5	6.7	7.1	7.7	10.0	13	17	19	25
0.20	5	9.3	9.5	10	11	14	19	23	27	37
0.50	2	18	19	20	21	26	36	44	53	76
0.80	1.25	35	36	37	41	48	64	82	103	149
0.90	1.11	49	50	52	57	67	84	113	147	208
0.96	1.04	71	72	74	82	94	112	160	214	291
0.98	1.02	90	91	93	104	117	133	200	272	358
0.99	1.01	110	112	113	128	142	155	245	339	429

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.55	0.56	0.58	0.62	5.9	6.9	8.8	9.6
0.02	50	0.98	1.0	1.0	1.1	9.3	11	14	15
0.05	20	2.1	2.2	2.3	2.5	18	21	25	30
0.10	10	4.0	4.2	4.3	4.9	30	36	42	51
0.20	5	8.0	8.5	8.7	10	54	64	74	93
0.50	2	24	25	26	32	139	164	188	247
0.80	1.25	52	56	60	76	295	336	393	532
0.90	1.11	72	76	85	107	406	451	540	739
0.96	1.04	94	100	113	144	542	586	721	994
0.98	1.02	108	115	132	170	636	675	848	1,170
0.99	1.01	121	127	148	192	724	755	966	1,340
		July-August-September				October-November-December			
0.01	100	4.6	5.7	7.4	11	2.0	2.1	2.2	3.3
0.02	50	6.1	7.2	9.0	13	3.1	3.2	3.4	4.9
0.05	20	8.9	10	12	16	5.5	5.9	6.3	8.5
0.10	10	12	14	16	19	8.8	9.6	10	14
0.20	5	18	20	22	25	15	17	18	23
0.50	2	36	39	43	49	34	39	46	56
0.80	1.25	68	75	83	107	64	77	100	119
0.90	1.11	92	104	119	171	83	101	139	168
0.96	1.04	125	147	174	297	104	128	191	234
0.98	1.02	151	182	223	435	118	146	228	284
0.99	1.01	179	221	280	625	131	161	265	334

LITTLE SIOUX RIVER BASIN
06605850 LITTLE SIOUX RIVER AT LINN GROVE, IA

LOCATION.--Lat 42°53'24", long 95°14'30", in SW1/4 SW1/4 sec.5, T.93 N., R.37 W., Buena Vista County, Hydrologic Unit 10230003, on right bank at downstream side of bridge on State Highway 264, in Linn Grove and at mile 123.7.

DRAINAGE AREA.--1,548 mi².

PERIOD OF RECORD.--October 1972 to September 1988.

GAGE.--Water-stage recorder. Datum of gage is 1,223.60 ft above NGVD.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 13,100 ft³/s June 17, 1984, gage height, 19.58 ft; maximum gage height, 19.58 ft June 17, 1984; minimum daily discharge, 0.70 ft³/s Feb. 4, 1977.

Rating table number 8, developed October 1983

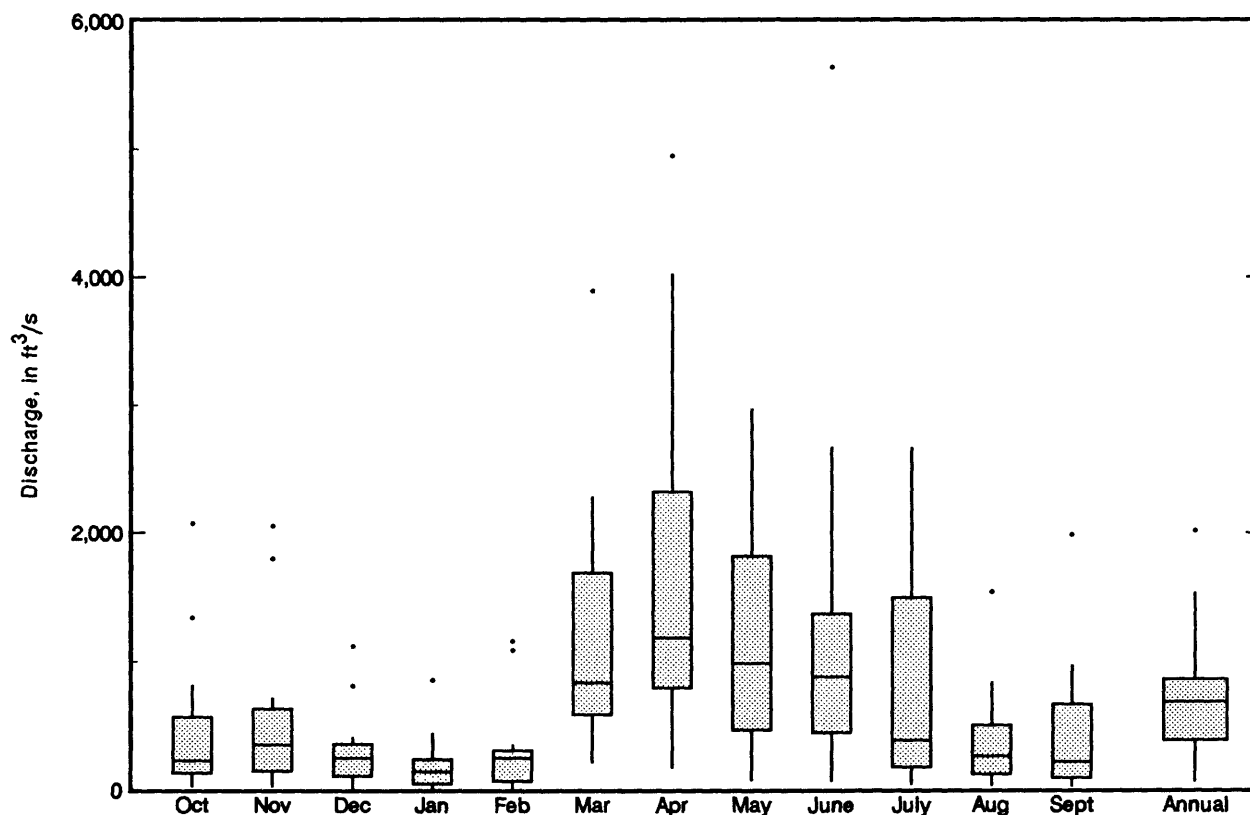
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
3.0	9.2	6.0	581
3.2	28	8.0	1,110
3.5	70	12.0	2,420
4.0	152	16.0	5,400
4.5	247	18.0	8,900
5.0	350		

LITTLE SIOUX RIVER BASIN
06605850 LITTLE SIOUX RIVER AT LINN GROVE, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	2,070	1983	21.3	1977	456	552	5.2
November	2,050	1980	22.0	1977	530	592	6.0
December	1,122	1983	7.52	1977	296	295	3.4
January	859	1983	3.12	1977	197	218	2.2
February	1,161	1983	5.92	1977	289	347	3.3
March	3,894	1983	208	1977	1,199	961	13.7
April	4,952	1983	169	1981	1,677	1,352	19.1
May	2,972	1986	69.4	1977	1,189	904	13.6
June	5,640	1984	60.3	1977	1,269	1,382	14.5
July	2,666	1983	36.3	1977	854	847	9.8
August	1,542	1979	26.4	1976	379	383	4.3
September	1,989	1979	22.7	1976	427	519	4.9
Annual	2,015	1983	56.3	1977	731	505	100.0

Boxplots of monthly and annual mean discharges



LITTLE SIOUX RIVER BASIN
06605850 LITTLE SIOUX RIVER AT LINN GROVE, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equalled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	1.4	1.2	12	111	49	23	25	9.0	11	15	17	7.0	7.3
95	5.4	7.7	28	154	91	85	43	24	23	27	27	9.1	22
90	9.3	11	48	214	186	148	59	35	30	49	50	22	40
85	22	20	97	424	259	209	80	51	39	82	68	37	62
80	38	33	160	574	342	275	110	73	51	104	101	55	96
75	48	38	292	690	391	351	148	99	78	117	128	93	125
70	55	48	415	794	440	449	177	117	106	129	177	114	157
65	76	68	535	863	506	519	211	134	124	143	203	133	193
60	88	104	619	931	569	592	246	159	141	160	228	162	229
55	100	149	685	1,000	673	690	294	193	168	178	255	194	272
50	138	183	751	1,140	787	789	353	240	193	231	286	222	319
45	165	203	847	1,280	953	892	450	277	218	276	317	249	392
40	188	223	967	1,440	1,160	996	580	315	246	320	375	274	483
35	207	245	1,120	1,650	1,380	1,140	725	356	292	376	454	299	596
30	226	274	1,300	1,860	1,590	1,280	910	403	351	440	536	324	734
25	251	305	1,540	2,170	1,810	1,440	1,150	457	485	565	641	367	899
20	291	352	1,850	2,490	2,050	1,670	1,430	540	640	732	774	416	1,130
15	336	469	2,280	3,170	2,310	1,900	1,840	664	824	908	1,080	580	1,450
10	487	580	2,930	4,080	2,680	2,620	2,230	835	1,240	1,210	1,480	765	1,900
5	763	1,230	4,280	5,400	3,460	4,860	3,080	1,220	1,970	1,780	2,030	1,040	2,770

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	557	479	359	237	175
0.95	1.05	1,130	924	743	527	417
0.90	1.11	1,620	1,280	1,060	777	631
0.80	1.25	2,470	1,880	1,590	1,210	994
0.50	2	5,300	3,700	3,200	2,540	2,070
0.20	5	10,700	6,780	5,790	4,760	3,650
0.10	10	15,200	9,070	7,610	6,320	4,630
0.04	25	21,600	12,100	9,900	8,290	5,730
0.02	50	26,900	14,500	11,600	9,720	6,430
0.01	100	32,600	16,900	13,200	11,100	7,050

LITTLE SIOUX RIVER BASIN
06605850 LITTLE SIOUX RIVER AT LINN GROVE, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.24	0.29	0.39	0.43	0.65	1.3	1.7	3.4	6.0
0.02	50	0.61	0.69	0.88	0.96	1.4	2.5	3.1	5.7	9.7
0.05	20	2.1	2.3	2.7	2.9	3.9	6.0	7.4	12	19
0.10	10	5.4	5.8	6.4	6.9	8.8	12	15	22	34
0.20	5	15	15	16	17	21	27	34	45	65
0.50	2	66	67	68	71	81	97	126	149	198
0.80	1.25	172	175	180	187	210	266	366	416	520
0.90	1.11	239	245	259	268	300	407	583	666	812
0.96	1.04	305	317	345	357	401	596	899	1,050	1,250
0.98	1.02	340	357	397	411	464	735	1,150	1,370	1,620
0.99	1.01	366	387	439	455	516	869	1,400	1,720	2,020

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.27	0.44	0.47	0.67	11	13	19	26
0.02	50	0.72	1.0	1.1	1.5	19	22	30	41
0.05	20	2.7	3.4	3.5	4.3	38	45	57	79
0.10	10	7.3	8.5	8.8	10	68	79	97	134
0.20	5	21	22	23	25	129	147	173	238
0.50	2	94	94	97	103	352	395	444	598
0.80	1.25	239	244	253	282	747	831	935	1,200
0.90	1.11	323	340	356	414	1,010	1,120	1,280	1,600
0.96	1.04	399	438	463	567	1,310	1,460	1,710	2,050
0.98	1.02	437	492	524	665	1,510	1,680	2,010	2,350
0.99	1.01	463	533	570	748	1,680	1,870	2,280	2,610
		July-August-September				October-November-December			
0.01	100	3.4	3.6	4.1	7.6	2.6	3.0	2.9	3.5
0.02	50	5.6	6.0	6.7	12	4.3	4.9	5.1	6.2
0.05	20	11	12	13	21	8.8	10	11	14
0.10	10	20	21	23	35	16	19	21	27
0.20	5	37	40	43	60	32	37	43	55
0.50	2	95	105	114	148	101	120	141	177
0.80	1.25	189	215	240	297	275	321	359	436
0.90	1.11	247	287	324	403	436	502	537	635
0.96	1.04	311	368	422	534	677	770	777	887
0.98	1.02	350	420	486	624	880	990	956	1,070
0.99	1.01	382	464	543	708	1,100	1,220	1,130	1,230

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 September 1988.

GAGE.--Water-stage recorder. Datum of gage is 1,096.49 ft above NGVD. May 28, 1918, to July 1, 1925 and Oct. 29, 1928 to July 15, 1929, nonrecording gage 0.2 mi downstream at datum 1.25 ft lower. July 16, 1929 to July 2, 1932 and June 15, 1936, to Nov. 7, 1938, nonrecording gage at present site and datum.

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).

Rating table number 15, developed March 1988

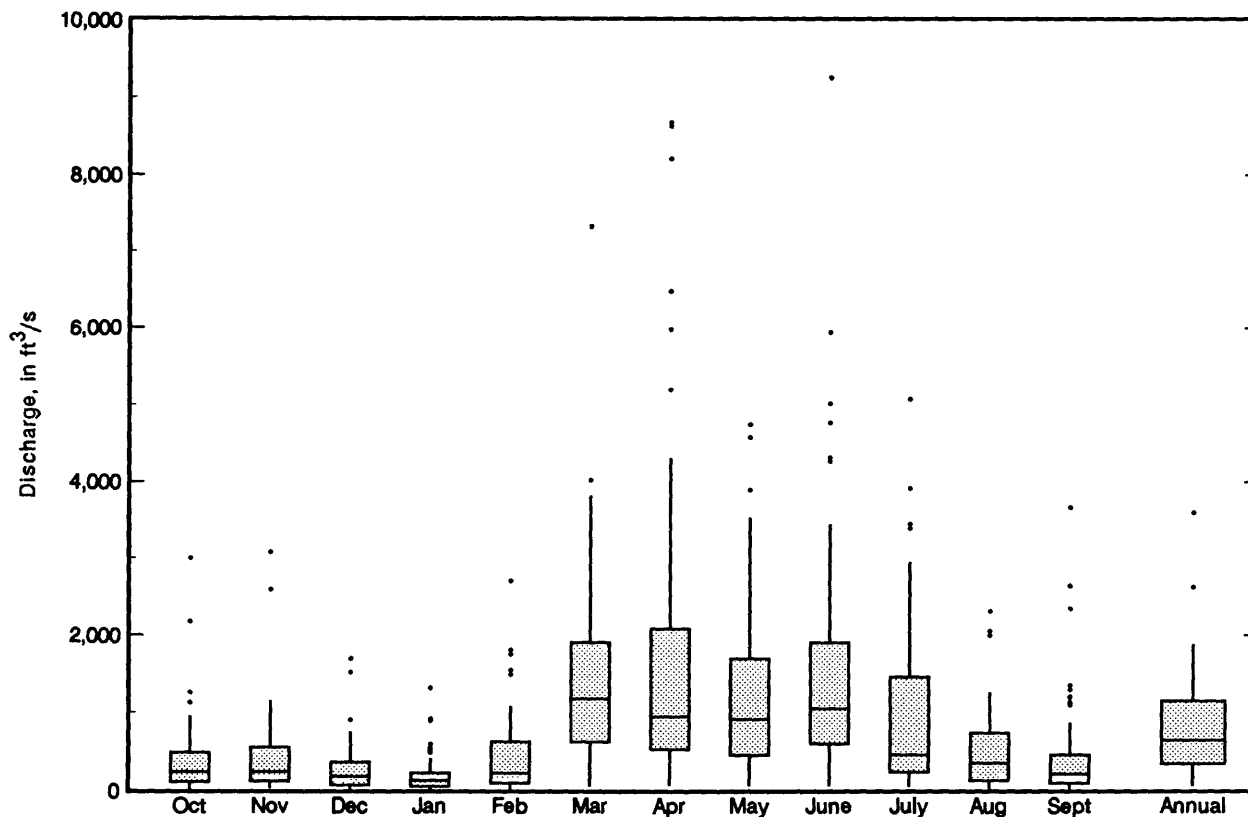
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
4.0	57	10.0	2,450
4.5	131	14.0	5,360
5.0	217	18.0	9,300
6.0	474	22.0	17,300
7.0	880	26.0	30,000
8.0	1,380		

LITTLE SIOUX RIVER BASIN
06606600 LITTLE SIOUX RIVER AT CORRECTIONVILLE, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	2,994	1983	8.33	1957	397	504	4.0
November	3,079	1980	25.3	1959	406	522	4.1
December	1,698	1983	15.1	1959	276	319	2.8
January	1,323	1983	8.31	1959	201	243	2.0
February	2,708	1971	7.08	1959	439	523	4.5
March	7,328	1983	53.5	1931	1,452	1,269	14.8
April	8,677	1983	61.9	1931	1,804	2,082	18.4
May	4,743	1986	57.3	1931	1,242	1,105	12.7
June	9,254	1984	58.1	1956	1,582	1,617	16.1
July	5,075	1983	43.4	1956	1,027	1,112	10.5
August	2,312	1951	15.0	1931	512	501	5.2
September	3,671	1938	14.4	1958	476	662	4.8
Annual	3,600	1983	53.7	1931	831	635	100.0

Boxplots of monthly and annual mean discharges



LITTLE SIOUX RIVER BASIN
06606600 LITTLE SIOUX RIVER AT CORRECTIONVILLE, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	8.3	7.4	40	62	52	26	22	13	11	7.8	25	15	13
95	14	20	66	120	106	91	62	28	23	33	39	25	32
90	22	30	105	214	182	188	100	47	42	43	54	34	51
85	31	47	150	301	246	258	128	65	54	52	66	45	71
80	41	58	203	382	314	341	159	85	70	71	79	56	95
75	51	67	283	466	374	433	193	109	65	96	98	70	122
70	65	78	418	553	454	526	233	137	100	110	134	88	152
65	80	93	528	646	540	610	278	169	120	125	160	108	188
60	92	119	619	744	633	702	333	204	142	163	187	126	232
55	104	140	737	843	722	818	399	246	167	203	214	146	284
50	116	158	887	961	809	938	482	294	207	234	245	167	349
45	128	182	1,030	1,090	901	1,070	577	339	257	259	277	190	425
40	144	234	1,170	1,230	1,020	1,190	687	386	307	283	318	213	511
35	159	330	1,400	1,400	1,140	1,350	848	461	354	330	368	251	621
30	184	411	1,630	1,630	1,320	1,530	1,050	557	419	388	428	298	759
25	231	493	1,850	1,920	1,550	1,820	1,300	693	506	485	490	358	933
20	281	594	2,140	2,360	1,870	2,200	1,710	823	633	599	573	428	1,160
15	378	742	2,540	3,040	2,350	2,710	2,240	987	830	739	666	507	1,480
10	485	1,050	3,340	4,370	2,990	3,420	2,890	1,170	1,190	943	857	621	2,050
5	750	1,860	5,130	7,060	4,090	5,680	3,660	1,540	1,900	1,380	1,310	876	3,230

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	—	558	433	270	185
0.95	1.05	1,960	1,090	859	598	441
0.90	1.11	2,580	1,540	1,220	890	674
0.80	1.25	3,600	2,310	1,850	1,410	1,090
0.50	2	6,670	4,840	3,970	3,140	2,430
0.20	5	12,100	9,670	8,110	6,420	4,770
0.10	10	16,300	13,600	11,600	9,020	6,470
0.04	25	22,400	19,400	16,700	12,600	8,630
0.02	50	27,300	24,200	21,000	15,500	10,200
0.01	100	32,700	29,300	25,700	18,500	11,700

LITTLE SIOUX RIVER BASIN
06606600 LITTLE SIOUX RIVER AT CORRECTIONVILLE, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	3.4	3.7	4.4	5.2	5.9	8.5	12	14	14
0.02	50	4.9	5.3	6.1	7.0	8.1	11	15	18	19
0.05	20	8.3	8.8	9.8	11	13	17	23	28	32
0.10	10	13	14	15	17	19	25	34	41	49
0.20	5	22	23	24	27	30	39	53	64	82
0.50	2	58	60	61	65	75	94	125	151	203
0.80	1.25	140	147	150	157	179	225	295	351	469
0.90	1.11	218	230	235	245	280	355	461	542	707
0.96	1.04	341	365	377	393	448	579	741	859	1,070
0.98	1.02	452	487	509	531	604	794	1,010	1,150	1,390
0.99	1.01	577	629	665	694	790	1,050	1,330	1,500	1,740

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	5.5	5.6	5.8	7.2	11	16	20	34
0.02	50	7.6	7.7	8.1	9.9	18	25	31	49
0.05	20	12	13	13	16	36	47	56	85
0.10	10	19	19	20	24	64	79	93	133
0.20	5	31	32	33	39	118	141	163	224
0.50	2	79	81	84	97	328	372	424	546
0.80	1.25	192	196	203	239	747	835	941	1,180
0.90	1.11	300	306	317	379	1,070	1,200	1,350	1,690
0.96	1.04	476	485	504	616	1,480	1,680	1,890	2,400
0.98	1.02	637	649	675	840	1,780	2,050	2,310	2,960
0.99	1.01	825	839	875	1,110	2,070	2,420	2,720	3,520
		July-August-September				October-November-December			
0.01	100	2.6	5.4	7.3	9.7	4.7	6.4	7.1	8.6
0.02	50	4.3	8.1	10	14	7.0	9.1	10	12
0.05	20	9.0	14	18	23	12	15	17	20
0.10	10	17	23	28	37	19	24	26	31
0.20	5	33	42	48	62	34	40	44	53
0.50	2	105	115	128	167	89	103	115	136
0.80	1.25	276	293	320	423	217	252	280	334
0.90	1.11	426	459	506	674	332	392	436	523
0.96	1.04	643	724	811	1,090	510	619	687	832
0.98	1.02	817	958	1,090	1,480	664	822	912	1,110
0.99	1.01	996	1,220	1,410	1,940	835	1,060	1,170	1,440

LITTLE SIOUX RIVER BASIN
06606700 LITTLE SIOUX RIVER NEAR KENNEBEC, IA

LOCATION.--Lat 42°04'50", long 96°00'50", in SE1/4 SW1/4 sec. 18, T.84 N., R.44 W., Monona County, Hydrologic Unit 10230003, near left bank on downstream side of pier of bridge on county highway, 1.1 mi south of Kennebec, 1.2 mi downstream from Gard Creek, 5.5 mi northeast of Onawa, 6.2 mi upstream from Maple River and at mile 22.0

DRAINAGE AREA.--2,738 mi².

PERIOD OF RECORD.--April 1939 to September 1969 (discontinued).

GAGE.--Water-stage recorder. Datum of gage is 1,027.02 ft above mean sea level (Monona County Highway Department benchmark). Prior to May 24, 1950, nonrecording gage and May 24, 1950 to Oct. 12, 1959, water-stage recorder at same site at datum 0.87 ft higher.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 29,700 ft³/s Apr. 8, 1965; maximum gage height, 26.63 ft June 21, 1954 (before levees broke in vicinity of gage); minimum daily discharge, 11 ft³/s Oct. 11, 1956.

Rating table number 5, developed October 1967
(A discharge measurement to validate this rating
has not been made since September 1969.)

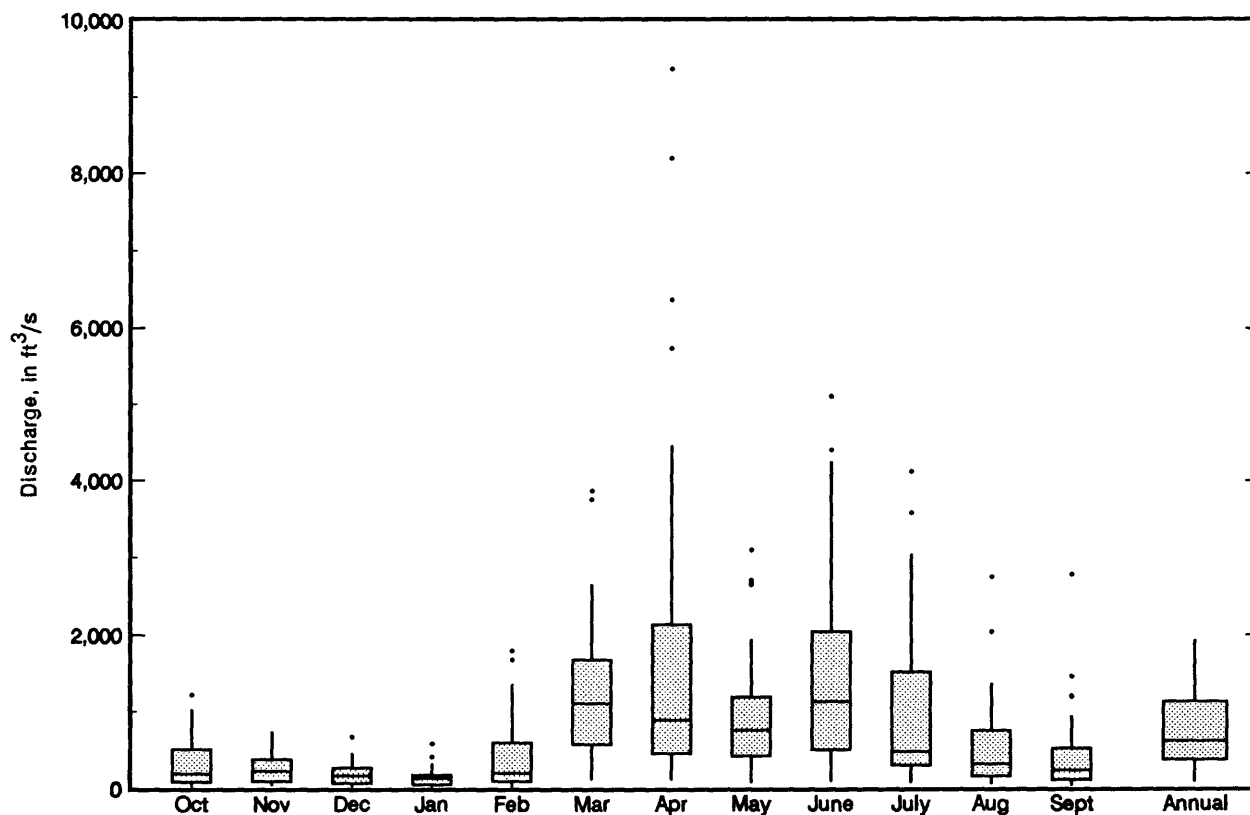
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
6.0	45	10.0	1,390
6.5	133	12.0	2,500
7.0	250	13.0	3,100
8.0	558	15.0	4,500
9.0	940		

LITTLE SIOUX RIVER BASIN
06606700 LITTLE SIOUX RIVER NEAR KENNEBEC, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	1,219	1952	17.9	1957	328	319	3.5
November	735	1952	38.5	1959	267	207	2.9
December	668	1952	24.9	1959	197	151	2.1
January	577	1952	19.0	1959	147	119	1.6
February	1,793	1946	20.1	1959	424	495	4.6
March	3,873	1961	115	1968	1,270	992	13.7
April	9,371	1965	109	1968	1,910	2,444	20.6
May	3,108	1951	74.2	1968	1,046	839	11.3
June	5,115	1954	89.2	1956	1,571	1,341	17.0
July	4,118	1969	69.3	1956	1,075	1,109	11.6
August	2,758	1951	57.0	1956	575	620	6.2
September	2,782	1951	29.5	1958	448	572	4.8
Annual	1,926	1951	82.5	1956	780	510	100.0

Boxplots of monthly and annual mean discharges



LITTLE SIOUX RIVER BASIN
06606700 LITTLE SIOUX RIVER NEAR KENNEBEC, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	19	19	50	98	65	42	43	37	22	14	32	24	21
95	22	24	76	140	118	161	86	48	32	25	46	33	38
90	27	30	107	203	192	214	125	69	48	50	60	46	60
85	35	36	135	285	239	254	155	97	68	62	75	56	79
80	45	51	177	348	296	292	182	119	81	69	86	64	104
75	53	63	211	430	358	364	220	136	94	88	98	72	127
70	64	73	277	514	415	461	261	155	111	104	110	86	147
65	88	84	381	591	472	586	304	181	127	120	124	104	174
60	109	100	494	667	550	689	348	208	143	136	148	123	208
55	123	127	588	742	628	799	411	237	162	154	173	137	248
50	130	145	728	831	708	919	509	278	186	186	208	151	297
45	137	169	898	922	796	1,070	634	333	223	242	242	167	359
40	144	195	1,070	1,080	897	1,230	765	394	277	269	268	184	441
35	152	219	1,250	1,280	1,020	1,410	943	456	338	306	296	209	544
30	165	278	1,490	1,520	1,180	1,630	1,130	557	403	369	336	235	675
25	179	391	1,750	1,860	1,350	1,920	1,400	702	485	448	378	271	844
20	199	583	2,010	2,240	1,540	2,340	1,810	869	673	538	440	310	1,070
15	221	876	2,260	3,010	1,780	2,970	2,500	1,090	879	645	504	353	1,400
10	292	1,210	2,730	4,690	2,170	3,720	3,100	1,370	1,180	784	572	440	1,890
5	409	1,900	3,900	8,270	3,080	5,520	3,900	1,890	1,680	1,120	726	551	3,020

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	—	382	329	226	158
0.95	1.05	2,320	958	775	553	406
0.90	1.11	3,080	1,490	1,180	858	641
0.80	1.25	4,270	2,460	1,930	1,420	1,070
0.50	2	7,700	5,640	4,480	3,360	2,510
0.20	5	13,200	11,200	9,330	7,100	5,090
0.10	10	17,200	15,100	13,200	10,000	6,950
0.04	25	22,500	20,000	18,400	14,000	9,320
0.02	50	26,500	23,500	22,500	17,100	11,000
0.01	100	30,600	26,800	26,700	20,300	12,700

LITTLE SIOUX RIVER BASIN
06606700 LITTLE SIOUX RIVER NEAR KENNEBEC, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	9.6	10	11	11	12	14	16	18	17
0.02	50	12	13	13	14	15	18	21	24	24
0.05	20	17	17	18	19	21	26	31	35	38
0.10	10	22	23	24	25	29	36	43	49	56
0.20	5	32	32	33	35	41	51	64	72	89
0.50	2	60	61	63	67	79	99	126	145	197
0.80	1.25	112	116	118	123	145	182	234	274	397
0.90	1.11	154	161	163	168	196	246	315	374	554
0.96	1.04	216	227	229	234	268	335	423	513	769
0.98	1.02	267	284	284	288	326	407	507	623	937
0.99	1.01	322	347	345	347	387	481	592	738	1,110

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	11	10	11	12	25	29	33	48
0.02	50	14	13	14	15	35	41	46	66
0.05	20	20	19	20	21	57	67	75	103
0.10	10	26	27	28	30	86	100	112	150
0.20	5	38	39	40	44	138	160	179	234
0.50	2	73	76	79	90	315	359	403	513
0.80	1.25	137	141	148	182	646	725	817	1,040
0.90	1.11	186	192	201	260	904	1,010	1,140	1,470
0.98	1.04	257	263	275	378	1,260	1,380	1,570	2,070
0.98	1.02	314	319	333	480	1,530	1,670	1,910	2,560
0.99	1.01	375	378	394	593	1,820	1,970	2,250	3,070
		July-August-September				October-November-December			
0.01	100	11	13	15	21	9.6	10	11	13
0.02	50	14	17	19	25	13	14	15	18
0.05	20	21	24	27	36	21	22	24	28
0.10	10	30	34	38	49	30	32	34	40
0.20	5	47	52	57	73	46	49	53	62
0.50	2	112	121	132	170	93	103	111	133
0.80	1.25	268	290	322	432	166	199	216	264
0.90	1.11	425	466	526	730	214	271	296	366
0.96	1.04	699	780	904	1,310	272	368	405	508
0.98	1.02	966	1,090	1,290	1,950	312	441	491	621
0.99	1.01	1,290	1,490	1,800	2,820	350	515	578	739

LITTLE SIOUX RIVER BASIN
06607000 ODEBOLT CREEK NEAR ARTHUR, IA

LOCATION.--Lat 42°20'10", long 95°22'52", in SE1/4 NE1/4 sec.21, T.87 N., R.39 W., Ida County, Hydrologic Unit 10230005, near center of span on downstream side of bridge on county highway M27, 700 ft south of State Highway 175, 1.0 mi downstream from Hoskins Creek, 1.8 mi west of Arthur, 4.6 mi southeast of Ida Grove and 6.5 mi upstream from mouth

DRAINAGE AREA.--39.3 mi².

PERIOD OF RECORD.--October 1957 to September 1975 (discontinued).

GAGE.--Water-stage recorder. Datum of gage is 1,258.57 ft above mean sea level.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,200 ft³/s Aug. 30, 1962, gage height, 13.78 ft; maximum gage height, 14.11 ft Mar. 31, 1965, backwater from ice; minimum daily discharge, 0.2 ft³/s Jan. 2 to Feb. 27, 1959.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of July 3, 1951 reached a stage of 11.96 ft, from floodmark, discharge, 4,320 ft³/s, from contracted-opening measurement of peak flow.

Rating table number 8, developed January 1973
(A discharge measurement to validate this rating
has not been made since August 1976.)

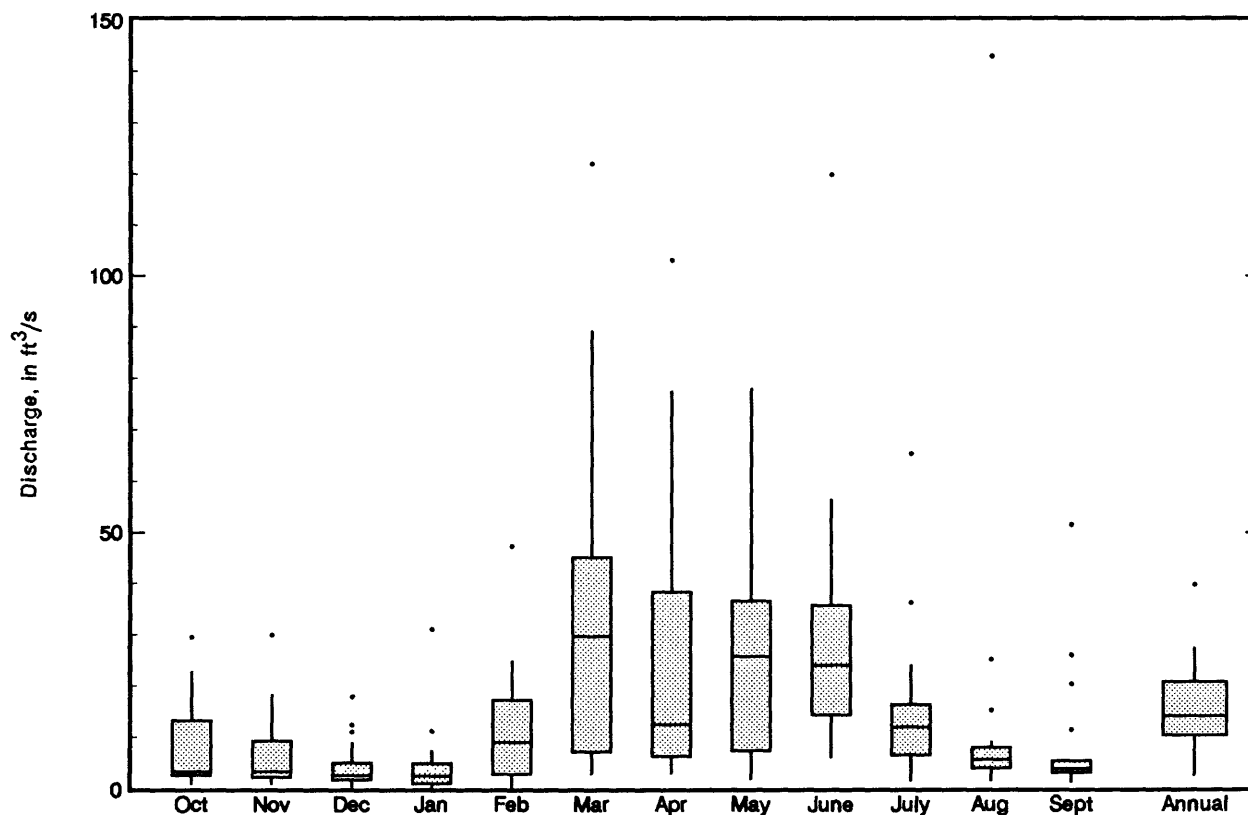
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
2.5	13	5.0	290
3.0	45	6.0	461
3.5	91	7.0	660
4.0	146	8.0	892
4.5	200	10.0	1,460

LITTLE SIOUX RIVER BASIN
06607000 ODEBOLT CREEK NEAR ARTHUR, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	29.4	1963	0.85	1959	7.82	8.57	4.2
November	29.8	1973	0.81	1959	6.90	7.79	3.7
December	17.8	1973	0.33	1959	4.65	4.73	2.5
January	30.9	1973	0.20	1959	4.62	7.09	2.5
February	47.2	1971	0.20	1959	11.7	11.8	6.2
March	122	1962	2.82	1968	33.2	32.0	17.7
April	103	1965	2.90	1968	24.2	27.4	12.8
May	78.0	1959	1.83	1968	26.3	20.1	14.0
June	120	1967	5.99	1968	30.5	27.2	16.2
July	65.3	1972	1.47	1968	15.2	15.1	8.1
August	143	1962	1.45	1971	14.5	32.5	7.7
September	51.5	1962	1.20	1971	8.63	12.6	4.6
Annual	39.6	1962	2.47	1968	15.7	8.73	100.0

Boxplots of monthly and annual mean discharges



LITTLE SIOUX RIVER BASIN
06607000 ODEBOLT CREEK NEAR ARTHUR, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equalled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.21	0.21	1.0	2.0	1.4	1.2	1.00	0.70	0.85	0.81	0.69	0.28	0.29
95	0.26	0.26	2.5	2.7	1.8	3.0	2.0	1.2	1.1	0.94	1.1	0.44	0.98
90	0.63	0.85	2.8	3.5	2.4	4.3	2.8	1.5	1.2	1.1	1.8	1.1	1.4
85	0.83	1.0	3.1	4.4	3.4	5.3	3.5	1.8	1.4	1.6	2.0	1.3	1.9
80	1.1	1.3	3.6	5.4	5.5	7.0	4.2	2.6	1.8	2.1	2.2	1.5	2.3
75	1.2	1.7	4.3	6.3	7.1	10	5.8	3.3	2.5	2.4	2.3	1.7	2.7
70	1.3	2.1	5.1	7.2	8.3	12	6.9	3.7	2.8	2.6	2.5	1.9	3.0
65	1.7	2.5	5.8	8.3	9.5	14	7.9	4.1	3.1	2.7	2.7	2.1	3.5
60	2.0	2.7	6.5	9.3	12	15	8.9	4.5	3.4	2.9	2.9	2.2	4.0
55	2.3	2.9	7.1	11	14	17	9.8	4.9	3.7	3.1	3.1	2.4	4.7
50	2.6	3.1	8.2	13	15	19	11	5.3	4.1	3.4	3.3	2.6	5.5
45	2.8	3.5	9.3	15	17	21	12	5.8	4.4	3.8	3.7	2.9	6.8
40	3.0	4.0	13	16	19	23	12	6.3	4.7	4.2	4.0	3.1	8.3
35	3.3	5.4	16	18	21	25	13	6.8	5.0	4.9	4.6	3.8	10
30	3.9	8.1	20	20	23	27	15	7.4	5.3	5.9	5.7	4.6	13
25	4.5	11	26	22	28	30	16	8.4	5.7	8.4	8.9	5.5	15
20	5.1	14	37	26	32	35	18	9.5	7.1	14	13	7.8	18
15	6.8	18	56	32	38	42	20	11	13	19	15	9.6	22
10	9.8	22	74	40	48	55	24	14	22	23	18	12	30
5	21	42	118	59	71	102	35	20	39	29	22	15	49

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	133	23	12	7.9	4.7
0.95	1.05	242	46	27	18	12
0.90	1.11	332	66	41	27	19
0.80	1.25	485	101	65	43	30
0.50	2	994	222	144	92	64
0.20	5	2,010	470	289	175	111
0.10	10	2,890	685	401	233	139
0.04	25	4,240	1,010	553	306	167
0.02	50	5,430	1,300	670	359	184
0.01	100	6,760	1,610	789	409	199

LITTLE SIOUX RIVER BASIN
06607000 ODEBOLT CREEK NEAR ARTHUR, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.14	0.14	0.13	0.14	0.15	0.18	0.23	0.37	0.57
0.02	50	0.18	0.18	0.18	0.18	0.20	0.25	0.31	0.46	0.68
0.05	20	0.25	0.26	0.27	0.29	0.32	0.39	0.48	0.65	0.90
0.10	10	0.34	0.36	0.39	0.42	0.49	0.58	0.70	0.89	1.2
0.20	5	0.50	0.54	0.60	0.66	0.77	0.92	1.1	1.3	1.7
0.50	2	1.0	1.2	1.3	1.5	1.8	2.2	2.7	3.0	3.5
0.80	1.25	2.2	2.5	2.8	3.1	3.8	5.2	6.4	7.0	8.1
0.90	1.11	3.4	3.7	4.0	4.4	5.5	8.0	10.0	11	13
0.96	1.04	5.3	5.6	6.0	6.3	8.0	13	16	19	23
0.98	1.02	7.2	7.4	7.6	8.0	10	17	22	27	33
0.99	1.01	9.4	9.4	9.5	9.7	12	22	29	37	46

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.13	0.13	0.14	0.16	0.47	0.57	0.69	0.96
0.02	50	0.17	0.18	0.19	0.22	0.66	0.79	0.94	1.3
0.05	20	0.26	0.28	0.31	0.36	1.1	1.3	1.5	2.0
0.10	10	0.38	0.42	0.46	0.55	1.6	1.9	2.1	2.9
0.20	5	0.62	0.68	0.76	0.90	2.6	3.0	3.3	4.4
0.50	2	1.6	1.7	1.9	2.3	5.8	6.6	7.2	9.3
0.80	1.25	4.1	4.3	4.7	5.4	12	13	15	18
0.90	1.11	6.8	7.0	7.4	8.4	17	19	21	25
0.96	1.04	12	12	12	13	24	26	29	33
0.98	1.02	17	16	16	18	30	32	36	40
0.99	1.01	24	22	21	23	35	38	44	47
		July-August-September				October-November-December			
0.01	100	0.28	0.42	0.44	0.63	0.26	0.24	0.26	0.30
0.02	50	0.38	0.53	0.55	0.77	0.31	0.31	0.34	0.40
0.05	20	0.58	0.75	0.79	1.0	0.42	0.44	0.51	0.59
0.10	10	0.83	1.0	1.1	1.4	0.55	0.61	0.72	0.85
0.20	5	1.3	1.4	1.5	1.9	0.78	0.92	1.1	1.3
0.50	2	2.6	2.8	2.9	3.4	1.6	2.0	2.4	2.9
0.80	1.25	4.9	5.1	5.4	6.3	3.6	4.5	5.1	6.3
0.90	1.11	6.7	7.0	7.3	8.6	5.6	7.0	7.6	9.5
0.96	1.04	8.9	9.5	9.9	12	9.1	11	11	14
0.98	1.02	11	12	12	15	13	15	15	19
0.99	1.01	12	14	14	18	17	20	19	24

LITTLE SIOUX RIVER BASIN
06607200 MAPLE RIVER AT MAPLETON, IA

LOCATION.--Lat 42°09'25", long 95°48'35", in SE1/4 SE1/4 sec.23, T.85 N., R.43 W., Monona County, Hydrologic Unit 10230005, on right bank at downstream side of bridge on State Highway 175, 1.0 mi downstream from Simmons Creek, 1.1 mi southwest of intersection of State Highways 175 and 141 in Mapleton, 2.1 mi upstream from McCleery Creek and 16.0 mi upstream from mouth.

DRAINAGE AREA.--669 mi².

PERIOD OF RECORD.--October 1941 to September 1988.

GAGE.--Water-stage recorder. Datum of gage is 1,085.86 ft above NGVD.

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.

Rating table number 20, developed October 1987

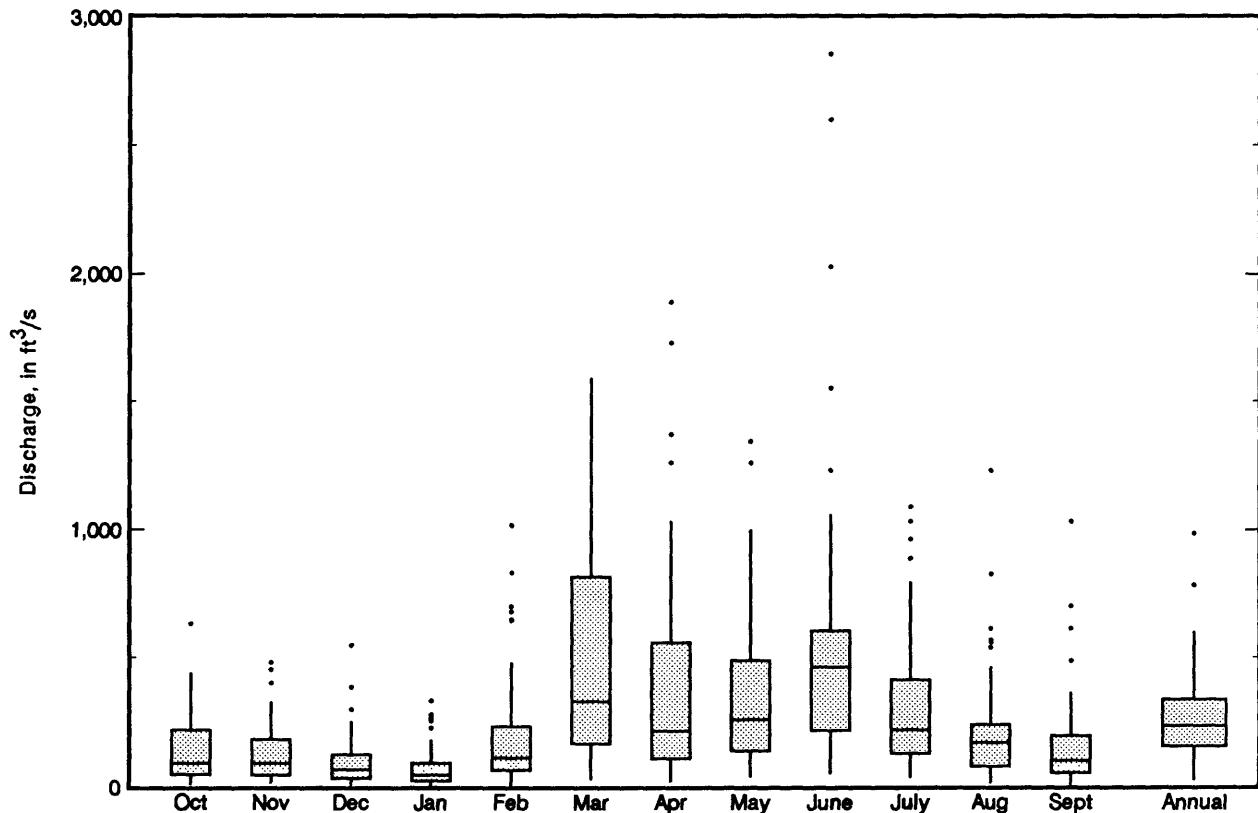
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
0.5	73	7.0	4,160
1.0	130	9.0	6,360
1.5	256	11.0	8,770
2.0	421	13.0	11,400
3.0	874	15.0	14,400
4.0	1,500	17.0	17,500
5.0	2,280		

LITTLE SIOUX RIVER BASIN
06607200 MAPLE RIVER AT MAPLETON, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	634	1983	9.36	1957	145	139	4.5
November	480	1983	14.6	1959	131	118	4.1
December	548	1985	5.74	1959	102	106	3.2
January	330	1983	3.25	1959	79.2	85.7	2.5
February	1,016	1971	3.64	1959	216	243	6.7
March	1,588	1983	25.6	1957	508	445	15.7
April	1,889	1983	19.9	1957	400	447	12.4
May	1,345	1984	35.9	1968	361	313	11.2
June	2,856	1984	48.5	1955	574	603	17.8
July	1,092	1982	33.3	1956	319	273	9.9
August	1,230	1951	12.6	1956	227	233	7.0
September	1,034	1951	5.48	1956	170	196	5.3
Annual	983	1983	24.5	1956	269	186	100.0

Boxplots of monthly and annual mean discharges



LITTLE SIOUX RIVER BASIN
06607200 MAPLE RIVER AT MAPLETON, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	3.3	2.9	18	19	13	9.3	11	8.6	4.8	7.4	11	5.5	5.4
95	5.0	7.7	27	36	32	35	40	27	21	20	21	13	17
90	9.7	13	45	52	46	56	52	34	26	27	29	19	26
85	15	18	59	65	62	88	65	45	32	35	37	23	35
80	18	24	72	78	78	114	78	52	39	39	41	27	43
75	21	30	85	92	93	136	94	61	47	43	46	32	52
70	25	37	101	110	111	157	108	74	54	50	52	38	61
65	30	42	121	131	132	181	123	85	62	57	58	43	72
60	35	51	147	154	156	206	141	96	70	66	67	50	86
55	39	61	175	179	176	237	159	108	80	75	76	56	101
50	43	71	205	204	195	268	183	120	92	85	86	64	119
45	49	89	237	233	216	316	207	136	106	95	97	72	142
40	55	116	269	262	254	365	241	152	120	109	109	83	166
35	63	146	316	307	302	417	276	173	144	127	121	93	193
30	71	175	372	364	359	475	317	199	168	153	148	111	226
25	91	202	458	456	436	545	366	229	189	191	176	130	268
20	143	248	606	565	534	637	445	262	210	232	206	151	328
15	179	336	805	689	666	752	562	339	273	273	258	184	420
10	211	535	1,140	865	872	1,160	718	443	329	338	319	241	575
5	287	874	2,030	1,280	1,270	2,100	972	657	520	442	411	320	921

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	822	213	132	82	62
0.95	1.05	1,600	519	320	208	156
0.90	1.11	2,240	798	493	326	241
0.80	1.25	3,270	1,290	803	536	392
0.50	2	6,360	2,900	1,830	1,220	857
0.20	5	11,400	5,650	3,670	2,360	1,580
0.10	10	15,000	7,590	5,020	3,150	2,040
0.04	25	19,600	10,000	6,770	4,100	2,560
0.02	50	23,100	11,800	8,060	4,760	2,900
0.01	100	26,500	13,400	9,320	5,380	3,210

LITTLE SIOUX RIVER BASIN
06607200 MAPLE RIVER AT MAPLETON, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	2.0	2.0	2.1	2.3	3.4	4.5	6.6	8.1
0.02	50	0.00	2.8	2.8	2.9	3.3	4.6	6.1	8.6	11
0.05	20	2.9	4.4	4.6	4.8	5.5	7.4	9.7	13	16
0.10	10	5.1	6.7	6.9	7.3	8.4	11	14	18	23
0.20	5	8.9	11	11	12	14	18	23	28	36
0.50	2	23	27	28	30	35	44	54	62	80
0.80	1.25	57	63	68	73	83	103	123	138	172
0.90	1.11	90	97	105	113	127	159	184	208	253
0.96	1.04	144	153	167	178	197	248	280	321	377
0.98	1.02	195	204	222	238	258	330	364	425	485
0.99	1.01	255	262	287	306	328	424	460	546	606

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	2.0	2.1	2.1	2.3	5.0	6.9	8.2	15
0.02	50	2.7	2.9	3.0	3.3	7.4	9.8	12	20
0.05	20	4.3	4.8	4.9	5.5	13	16	19	30
0.10	10	6.6	7.4	7.7	8.7	21	25	29	42
0.20	5	11	12	13	15	37	43	49	64
0.50	2	29	33	34	40	96	108	121	145
0.80	1.25	76	84	88	104	222	253	283	330
0.90	1.11	124	135	143	166	329	384	428	508
0.96	1.04	210	224	236	272	484	587	654	806
0.98	1.02	295	308	325	371	611	763	850	1,090
0.99	1.01	399	410	432	487	744	960	1,070	1,420
		July-August-September				October-November-December			
0.01	100	4.7	6.2	6.7	7.7	3.4	3.9	4.4	5.7
0.02	50	6.5	8.4	9.1	11	4.6	5.4	6.0	7.7
0.05	20	11	13	14	17	7.1	8.4	9.5	12
0.10	10	16	19	21	25	10	12	14	18
0.20	5	25	29	32	39	16	20	22	28
0.50	2	58	64	70	87	37	45	51	63
0.80	1.25	119	130	141	176	79	99	110	134
0.90	1.11	167	183	197	246	117	146	161	194
0.96	1.04	234	258	276	343	173	218	237	281
0.98	1.02	287	320	338	419	222	280	302	354
0.99	1.01	342	384	404	498	276	349	374	434

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 September 1988. April 1939 to May 1942 at site 4.7 mi downstream, published as "near Blencoe" June 1942 to January 1958 at site 1,200 ft east on old river channel; records not equivalent owing to diversion into Monona-Harrison ditch through equalizer ditch 1.5 mi upstream.

GAGE.--Water-stage recorder. Datum of gage is 1,019.85 ft above NGVD (U.S. Army Corps of Engineers bench mark). Prior to July 15, 1958, nonrecording gages near present site at different datums. July 15 to Sept. 3, 1958, nonrecording gage at present site and datum.

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.

Rating table number 17, developed March 1985

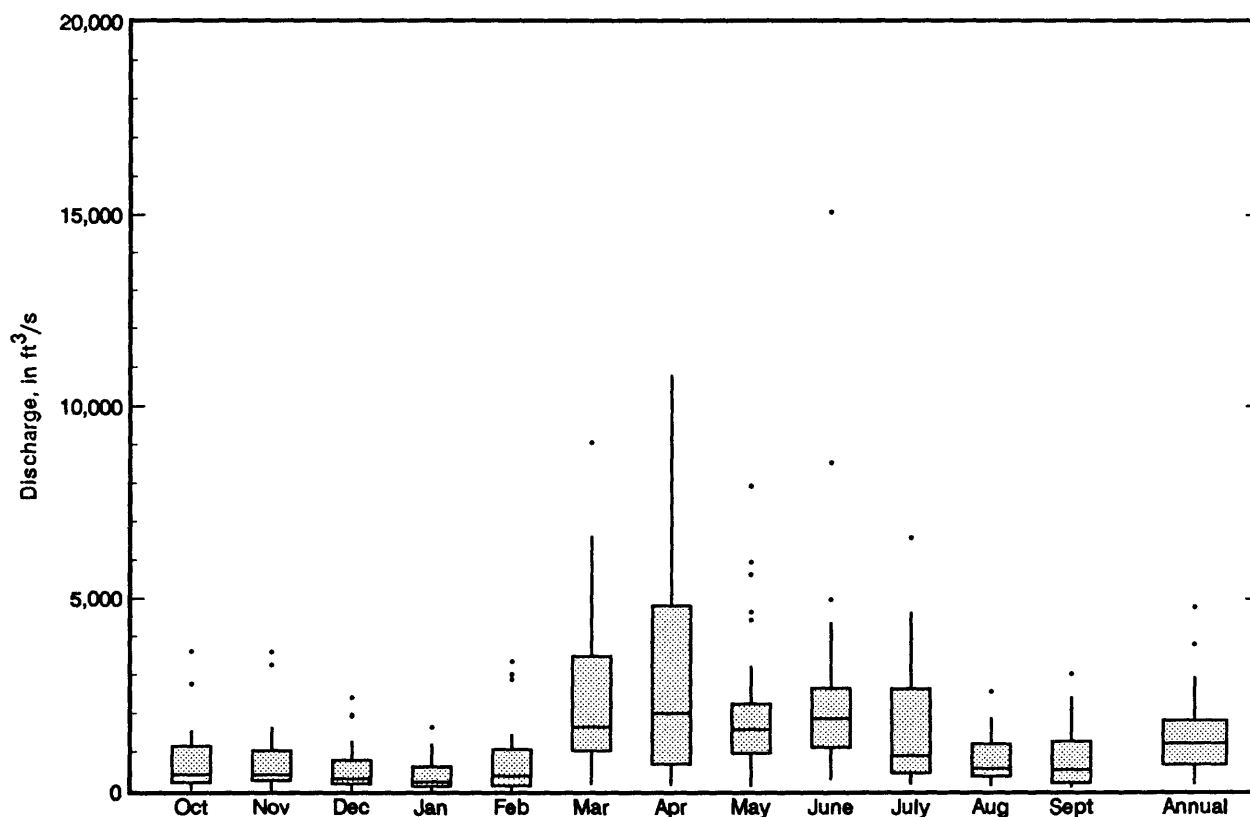
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
4.5	50	12.0	4,880
5.0	161	16.0	12,000
5.5	321	18.0	16,800
6.0	524	20.0	22,400
7.0	1,040	22.0	29,000
8.0	1,650	24.0	36,500
10.0	2,700	26.0	45,000

LITTLE SIOUX RIVER BASIN
06607500 LITTLE SIOUX RIVER NEAR TURIN, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	3,625	1983	37.5	1959	780	803	4.6
November	3,612	1980	48.0	1959	808	854	4.7
December	2,424	1983	31.2	1959	601	611	3.5
January	1,634	1983	18.5	1977	392	387	2.3
February	3,353	1971	25.1	1959	763	900	4.5
March	9,054	1983	171	1964	2,437	2,137	14.2
April	10,790	1965	157	1968	3,258	3,166	19.0
May	7,938	1986	118	1968	2,184	1,853	12.8
June	15,080	1984	315	1968	2,568	2,876	15.0
July	6,591	1983	181	1968	1,679	1,683	9.8
August	2,583	1979	140	1976	846	606	4.9
September	3,028	1979	90.2	1976	802	750	4.7
Annual	4,791	1983	167	1968	1,427	1,028	100.0

Boxplots of monthly and annual mean discharges



LITTLE SIOUX RIVER BASIN
06607500 LITTLE SIOUX RIVER NEAR TURIN, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	18	21	112	130	99	100	134	77	81	36	44	29	29
95	24	36	147	225	193	270	194	155	111	92	106	56	100
90	67	73	178	321	310	463	250	183	139	127	140	85	140
85	92	105	223	406	477	584	304	211	161	150	173	119	175
80	112	120	275	494	692	733	358	244	181	179	221	165	214
75	127	134	349	713	819	869	411	283	202	221	263	196	263
70	146	149	495	1,050	924	1,020	461	326	238	281	288	217	315
65	166	166	724	1,260	1,030	1,180	539	378	292	329	314	237	380
60	185	191	959	1,410	1,130	1,310	630	437	357	361	347	263	462
55	205	234	1,140	1,580	1,250	1,430	718	498	424	396	380	302	563
50	230	282	1,330	1,810	1,400	1,560	836	552	490	437	449	352	679
45	258	355	1,550	2,060	1,560	1,700	981	614	547	479	608	429	808
40	297	496	1,820	2,320	1,740	1,850	1,140	707	608	627	693	523	947
35	365	582	2,050	2,680	2,010	2,040	1,390	826	722	806	784	595	1,120
30	462	665	2,280	3,160	2,320	2,240	1,720	965	877	963	887	713	1,330
25	600	746	2,930	3,930	2,760	2,560	2,160	1,130	1,040	1,070	1,010	819	1,580
20	691	853	3,720	5,060	3,330	3,000	2,790	1,320	1,200	1,180	1,160	915	1,930
15	794	1,030	4,710	6,710	4,090	3,620	3,440	1,550	1,460	1,400	1,460	1,110	2,420
10	912	1,530	6,120	8,760	5,120	4,960	4,190	1,860	1,960	1,750	1,920	1,470	3,360
5	1,330	3,180	9,340	11,800	7,440	9,720	5,870	2,330	2,740	2,690	2,930	2,130	5,300

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	252	811	644	445	321
0.95	1.05	541	1,790	1,400	1,010	756
0.90	1.11	790	2,650	2,060	1,510	1,150
0.80	1.25	1,220	4,140	3,220	2,400	1,840
0.50	2	2,570	8,910	7,010	5,380	4,100
0.20	5	4,930	17,200	13,900	10,900	8,020
0.10	10	6,680	23,300	19,300	15,200	10,900
0.04	25	8,980	31,400	26,600	21,000	14,500
0.02	50	10,700	37,400	32,200	25,500	17,100
0.01	100	12,400	43,300	38,000	30,100	19,700

LITTLE SIOUX RIVER BASIN
06607500 LITTLE SIOUX RIVER NEAR TURIN, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	14	14	15	17	18	25	36	47	53
0.02	50	19	19	21	22	25	33	45	58	68
0.05	20	29	30	32	34	39	49	65	82	98
0.10	10	43	44	47	50	57	69	91	110	137
0.20	5	68	70	73	78	89	106	135	160	203
0.50	2	158	162	168	178	204	239	293	336	429
0.80	1.25	352	361	370	389	441	531	645	724	894
0.90	1.11	527	539	550	576	648	802	978	1,100	1,310
0.98	1.04	802	819	828	867	963	1,240	1,530	1,720	1,950
0.98	1.02	1,040	1,070	1,070	1,120	1,230	1,650	2,050	2,320	2,520
0.99	1.01	1,320	1,350	1,350	1,410	1,530	2,120	2,670	3,040	3,180

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	12	12	13	13	52	60	71	78
0.02	50	17	17	18	19	73	84	98	111
0.05	20	28	29	30	32	118	136	156	183
0.10	10	44	44	46	51	178	203	232	280
0.20	5	72	74	77	85	284	324	366	451
0.50	2	181	185	191	214	647	730	813	1,030
0.80	1.25	421	429	442	496	1,340	1,490	1,650	2,080
0.90	1.11	637	647	666	745	1,900	2,090	2,300	2,870
0.96	1.04	972	981	1,010	1,120	2,680	2,920	3,210	3,940
0.98	1.02	1,260	1,270	1,310	1,440	3,290	3,570	3,930	4,740
0.99	1.01	1,590	1,590	1,630	1,800	3,930	4,230	4,660	5,540
		July-August-September				October-November-December			
0.01	100	35	41	48	59	17	21	23	26
0.02	50	45	52	60	74	23	29	32	36
0.05	20	65	75	85	103	37	45	51	58
0.10	10	90	101	114	138	57	66	76	87
0.20	5	131	146	162	196	92	105	122	140
0.50	2	265	288	316	385	224	250	289	334
0.80	1.25	515	553	602	755	515	580	650	750
0.90	1.11	717	769	837	1,070	778	889	973	1,120
0.96	1.04	1,010	1,080	1,180	1,560	1,190	1,390	1,470	1,670
0.98	1.02	1,250	1,350	1,480	1,990	1,550	1,850	1,910	2,160
0.99	1.01	1,510	1,640	1,790	2,470	1,960	2,390	2,400	2,690

SOLDIER RIVER BASIN
06608500 SOLDIER RIVER AT PISGAH, IA

LOCATION.--Lat 41°49'50", long 95°55'54", in NW1/4 NE1/4 sec.14, T.81 N., R.44 W., Harrison County, Hydrologic Unit 10230001, on right bank at downstream side of bridge on county highway F20, at west edge of Pisgah, 0.4 mi downstream from Cobb Creek, 0.5 mi upstream from Mogger Ditch and 13.1 mi upstream from mouth.

DRAINAGE AREA.--407 mi².

PERIOD OF RECORD.--March 1940 to September 1988.

GAGE.--Water-stage recorder. Datum of gage is 1,036.53 ft above NGVD. Prior to Oct. 11, 1954, nonrecording gage at same site and datum with supplementary water-stage recorder operating above 8.2 ft gage height Mar. 2, 1946 to Sept. 24, 1953. Prior to Feb. 1954, on left bank at downstream side of bridge.

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.

Rating table number 12, developed October 1984

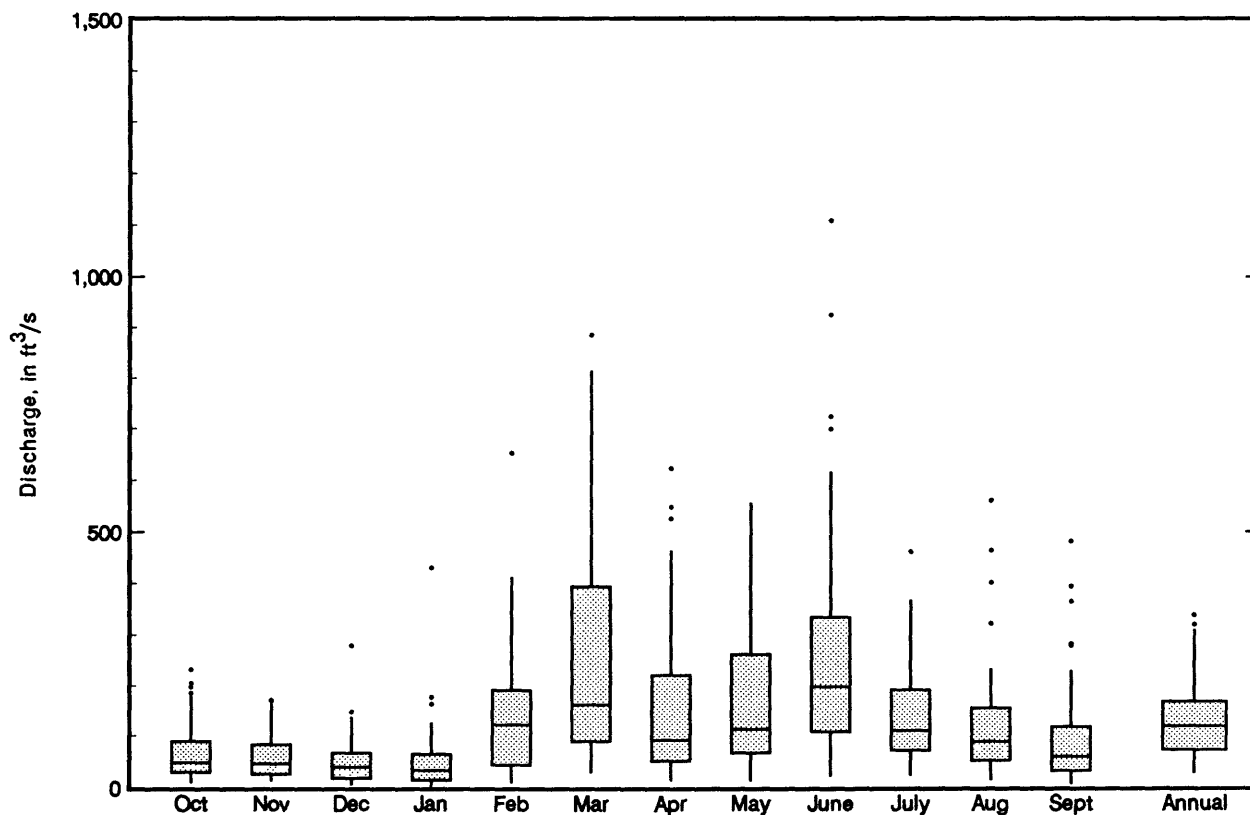
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
4.0	27	9.0	1,580
4.5	87	11.0	2,680
5.0	173	15.0	5,540
5.5	283	19.0	9,200
6.0	413	23.0	13,600
7.0	732	27.0	18,700

SOLDIER RIVER BASIN
06608500 SOLDIER RIVER AT PISGAH, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	233	1952	9.61	1957	69.8	58.7	4.3
November	172	1984	12.8	1959	62.3	45.4	3.8
December	281	1985	6.05	1959	53.2	49.6	3.3
January	431	1952	3.29	1959	54.1	69.6	3.3
February	653	1971	9.43	1956	146	128	9.0
March	885	1979	27.8	1957	273	237	16.8
April	623	1983	12.5	1957	154	149	9.5
May	555	1984	13.6	1957	179	145	11.0
June	1,109	1984	22.1	1956	268	238	16.5
July	462	1987	22.8	1970	145	103	8.9
August	562	1951	14.4	1971	122	113	7.5
September	482	1978	6.70	1956	99.1	106	6.1
Annual	339	1984	27.3	1956	135	75.6	100.0

Boxplots of monthly and annual mean discharges



SOLDIER RIVER BASIN
06608500 SOLDIER RIVER AT PISGAH, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	2.6	3.8	19	9.4	5.8	7.1	7.7	7.6	6.1	7.5	9.9	5.1	5.5
95	4.2	7.3	27	19	16	13	16	11	10	11	13	7.6	10
90	6.9	11	35	27	22	27	21	14	13	13	16	11	15
85	8.5	17	44	33	29	34	25	18	15	15	20	14	19
80	11	25	51	39	37	41	30	22	18	18	22	17	25
75	13	29	59	44	44	49	38	28	23	22	26	20	30
70	16	33	67	50	50	58	47	34	27	26	30	23	34
65	20	37	75	57	57	68	56	39	31	30	34	27	39
60	26	42	84	65	64	85	64	45	35	34	38	30	45
55	29	48	97	75	72	101	73	51	40	38	42	34	51
50	31	55	112	86	81	118	82	57	45	43	46	37	59
45	35	63	128	101	91	135	91	64	51	47	50	41	67
40	38	77	144	116	105	154	100	71	59	51	56	47	79
35	41	92	161	130	127	173	109	80	66	59	63	53	91
30	54	107	178	148	159	197	123	90	79	69	72	60	106
25	65	123	215	174	193	222	136	105	95	86	84	67	125
20	78	141	268	208	225	259	166	125	116	106	97	78	148
15	93	186	372	249	283	341	218	156	144	127	110	90	181
10	108	279	568	310	388	521	295	210	178	152	139	108	244
5	135	576	1,140	462	597	1,120	482	365	251	191	166	133	439

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	1,360	238	141	95	66
0.95	1.05	2,460	456	274	178	123
0.90	1.11	3,310	630	380	242	166
0.80	1.25	4,650	911	551	345	235
0.50	2	8,450	1,740	1,050	635	426
0.20	5	14,300	3,060	1,810	1,070	714
0.10	10	18,300	3,990	2,340	1,370	907
0.04	25	23,400	5,190	3,000	1,730	1,150
0.02	50	27,200	6,080	3,470	1,990	1,320
0.01	100	30,900	6,960	3,920	2,240	1,480

SOLDIER RIVER BASIN
06608500 SOLDIER RIVER AT PISGAH, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	1.3	1.3	1.3	1.5	2.0	3.1	4.3	5.9	7.4
0.02	50	1.7	1.8	1.8	2.1	2.7	4.1	5.6	7.3	9.3
0.05	20	2.7	2.8	2.9	3.3	4.2	6.1	8.1	10	13
0.10	10	3.9	4.1	4.3	4.9	6.2	8.7	11	14	17
0.20	5	6.3	6.6	6.9	7.8	9.9	13	17	20	25
0.50	2	16	16	17	19	23	29	35	39	48
0.80	1.25	39	40	42	46	52	62	70	76	93
0.90	1.11	62	64	67	71	78	91	99	108	130
0.96	1.04	104	106	109	113	119	137	144	157	186
0.98	1.02	144	146	149	151	156	178	181	200	233
0.99	1.01	194	195	197	197	198	224	223	248	286

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	1.3	1.3	1.5	2.3	2.8	3.6	4.4	5.8
0.02	50	1.8	1.9	2.2	3.2	3.9	5.0	6.1	8.0
0.05	20	3.0	3.2	3.6	5.0	6.4	8.0	9.8	13
0.10	10	4.6	4.9	5.5	7.5	9.9	12	15	19
0.20	5	7.6	8.3	9.1	12	16	20	24	30
0.50	2	19	21	23	29	40	46	55	70
0.80	1.25	46	51	54	65	91	103	119	149
0.90	1.11	72	78	84	98	136	152	173	215
0.96	1.04	114	122	130	150	205	227	252	312
0.98	1.02	151	160	171	196	264	290	318	391
0.99	1.01	195	204	218	247	329	360	389	476
		July-August-September				October-November-December			
0.01	100	3.0	3.5	4.6	6.3	2.5	2.8	3.2	4.6
0.02	50	3.9	4.5	5.8	8.0	3.3	3.7	4.2	5.9
0.05	20	5.7	6.6	8.2	11	4.8	5.4	6.2	8.5
0.10	10	8.1	9.2	11	16	6.6	7.7	8.8	12
0.20	5	12	14	16	23	9.9	12	13	17
0.50	2	27	29	34	45	21	25	28	34
0.80	1.25	58	63	69	85	46	53	58	67
0.90	1.11	86	93	100	116	69	79	84	95
0.96	1.04	130	141	148	162	107	119	124	137
0.98	1.02	170	184	191	199	141	155	159	172
0.99	1.01	217	234	240	239	180	195	198	212

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 September 1988.

GAGE.--Water-stage recorder. Datum of gage is 1,009.38 ft above NGVD (Chicago and Northwestern Railway Company bench mark).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 25,000 ft³/s Feb. 19, 1971, gage height, 22.65 ft, from floodmark; maximum gage height, 25.22 ft Mar. 1, 1965, backwater from ice; minimum daily discharge, 1.5 ft³/s July 16, 1938.

Rating table number 16, developed October 1987

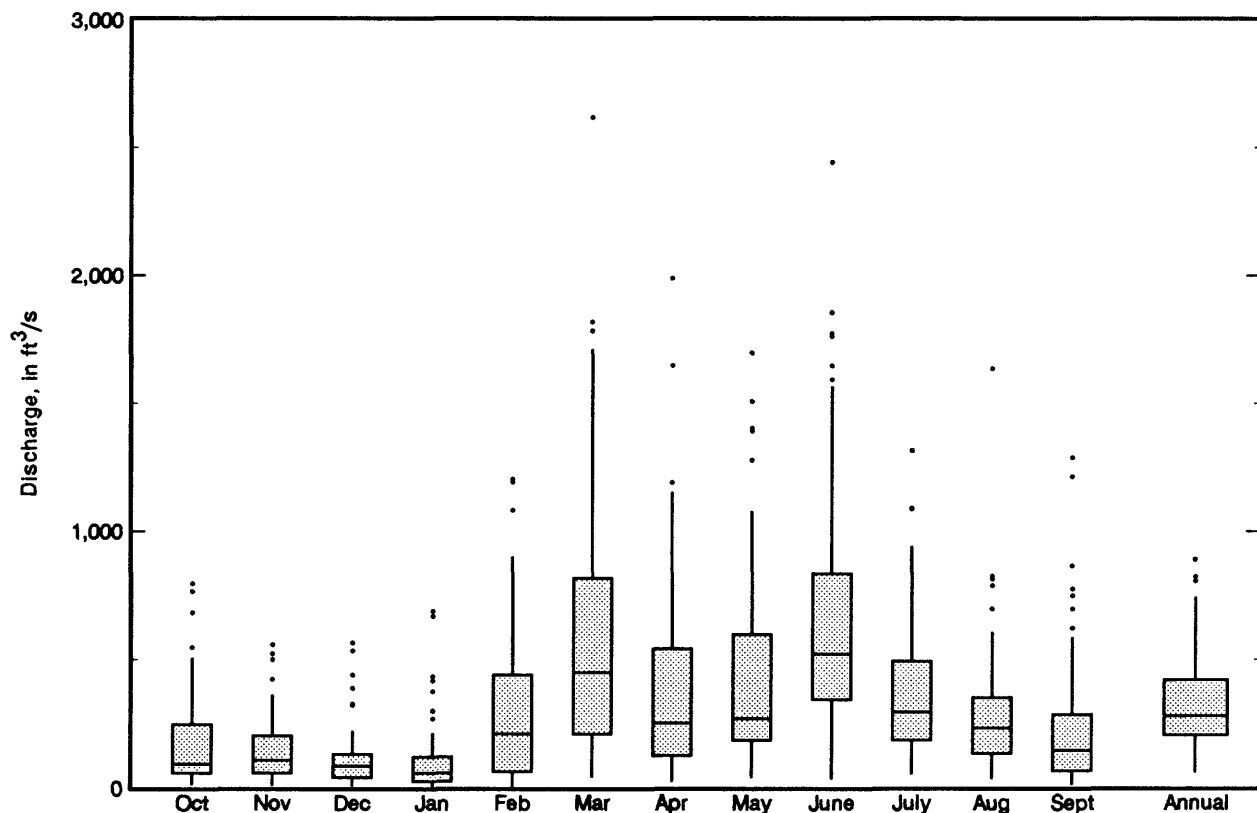
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
3.0	64	8.0	2,250
3.5	148	10.0	3,910
4.0	264	12.0	5,990
4.5	411	14.0	8,470
5.0	587	18.0	14,700
6.0	1,030	22.0	22,400

BOYER RIVER BASIN
06609500 BOYER RIVER AT LOGAN, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	796	1974	11.1	1957	174	186	4.4
November	558	1974	8.33	1940	156	133	3.9
December	565	1973	6.68	1938	121	124	3.1
January	692	1973	3.06	1940	114	147	2.9
February	1,209	1971	3.55	1940	305	297	7.7
March	2,619	1979	40.4	1981	615	551	15.5
April	1,988	1983	23.3	1957	422	419	10.6
May	1,698	1984	39.9	1968	465	406	11.7
June	2,443	1984	33.3	1956	679	543	17.1
July	1,317	1945	51.0	1977	385	288	9.7
August	1,636	1951	34.5	1976	286	266	7.2
September	1,288	1978	11.6	1939	246	283	6.2
Annual	892	1983	58.7	1956	333	200	100.0

Boxplots of monthly and annual mean discharges



BOYER RIVER BASIN
06609500 BOYER RIVER AT LOGAN, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												Annual
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	
99	2.4	3.2	22	15	13	14	11	14	8.3	6.9	8.0	5.3	6.9
95	5.7	8.9	41	38	34	29	34	23	17	19	23	11	20
90	8.9	17	62	55	47	56	52	34	25	24	35	18	31
85	17	29	88	71	69	82	65	45	33	29	43	29	41
80	23	37	106	89	96	110	81	57	40	37	50	35	51
75	27	45	130	110	121	145	102	71	49	47	57	40	63
70	32	53	157	135	142	184	124	84	58	54	66	46	76
65	37	62	184	159	165	221	145	95	89	61	77	54	91
60	43	73	214	182	187	259	167	107	80	70	87	62	107
55	51	88	245	206	213	305	188	123	93	79	97	70	126
50	59	108	278	229	240	353	216	140	106	92	107	79	147
45	69	137	311	254	279	404	244	163	123	106	119	92	173
40	80	177	349	297	325	461	280	186	140	122	131	106	203
35	95	222	396	347	384	527	318	219	161	142	147	120	240
30	111	275	457	411	447	599	368	255	183	174	169	133	287
25	131	332	554	490	527	702	425	303	218	215	195	151	340
20	159	388	724	576	627	847	517	362	264	269	255	176	410
15	201	467	951	731	765	1,120	633	440	323	326	299	209	520
10	287	664	1,320	928	1,080	1,570	809	599	470	408	356	269	709
5	403	1,190	2,330	1,460	1,610	2,690	1,240	981	765	563	465	375	1,190

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	—	687	431	252	174
0.95	1.05	4,250	1,120	706	433	303
0.90	1.11	5,510	1,440	911	570	400
0.80	1.25	7,360	1,950	1,240	787	552
0.50	2	12,000	3,440	2,170	1,410	981
0.20	5	17,900	5,950	3,730	2,410	1,650
0.10	10	21,400	7,880	4,910	3,140	2,120
0.04	25	25,300	10,600	6,530	4,100	2,720
0.02	50	27,900	12,700	7,820	4,850	3,180
0.01	100	30,300	15,000	9,180	5,600	3,630

BOYER RIVER BASIN
06609500 BOYER RIVER AT LOGAN, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	1.2	1.3	1.6	1.8	2.4	3.9	5.5	7.4	10
0.02	50	1.9	1.9	2.3	2.8	3.6	5.6	7.6	10	14
0.05	20	3.5	3.7	4.2	4.9	6.3	9.4	12	16	22
0.10	10	5.9	6.2	6.9	8.0	10	15	19	23	32
0.20	5	11	11	12	14	18	24	31	37	50
0.50	2	32	33	35	38	46	60	73	84	110
0.80	1.25	81	84	87	92	107	134	162	180	227
0.90	1.11	127	131	135	139	160	197	239	262	323
0.96	1.04	198	203	210	211	239	290	355	384	460
0.98	1.02	258	263	275	271	303	367	452	487	572
0.99	1.01	325	329	347	335	372	449	558	599	691

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	1.4	1.6	1.7	2.2	4.8	6.9	9.3	13
0.02	50	2.2	2.4	2.6	3.3	7.3	10.0	13	18
0.05	20	4.0	4.4	4.8	6.1	13	17	22	30
0.10	10	6.8	7.5	8.1	10	21	27	33	46
0.20	5	13	14	15	19	38	46	55	75
0.50	2	38	41	44	55	101	117	136	183
0.80	1.25	102	112	118	146	236	271	314	416
0.90	1.11	165	181	190	234	351	405	471	623
0.96	1.04	267	295	308	376	518	605	713	938
0.98	1.02	360	399	413	503	654	773	920	1,210
0.99	1.01	467	517	533	646	796	955	1,150	1,510
		July-August-September				October-November-December			
0.01	100	2.4	4.0	6.3	12	3.4	3.8	5.4	6.6
0.02	50	3.8	5.8	8.6	16	4.7	5.3	7.3	9.1
0.05	20	7.3	10	14	23	7.6	8.5	11	14
0.10	10	12	16	20	32	11	13	16	21
0.20	5	23	27	32	48	19	21	26	33
0.50	2	60	65	73	100	46	52	60	75
0.80	1.25	130	142	156	199	107	122	133	159
0.90	1.11	182	203	227	281	164	189	200	230
0.96	1.04	246	288	331	404	254	297	306	333
0.98	1.02	292	354	419	507	335	395	401	418
0.99	1.01	335	422	514	620	428	507	509	510

MISSOURI RIVER MAIN STEM
06610000 MISSOURI RIVER AT OMAHA, NE

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.

DRAINAGE AREA.--322,800 mi², approximately. The 3,959 mi² in Great Divide basin are not included.

PERIOD OF RECORD.--September 1928 to September 1988.

GAGE.--Water-stage recorder. Datum of gage is 948.24 ft above NGVD. See WSP 1730 for history of changes prior to Sept. 30, 1936. Oct. 1, 1936 to Sept. 30, 1982 at datum 10.00 ft higher.

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 observed, 7.23 ft, present datum, Jan. 10, 1957, result of freezeup.

REMARKS.--Flow regulated by upstream main-stem reservoirs.

Rating table number 5, developed January 1984

Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
6.0	4,000	18.0	38,600
7.0	6,450	20.0	48,700
8.0	8,900	22.0	61,200
10.0	13,500	24.0	76,100
12.0	18,200	26.0	94,000
14.0	23,900	28.0	121,200
16.0	30,300	30.0	159,200

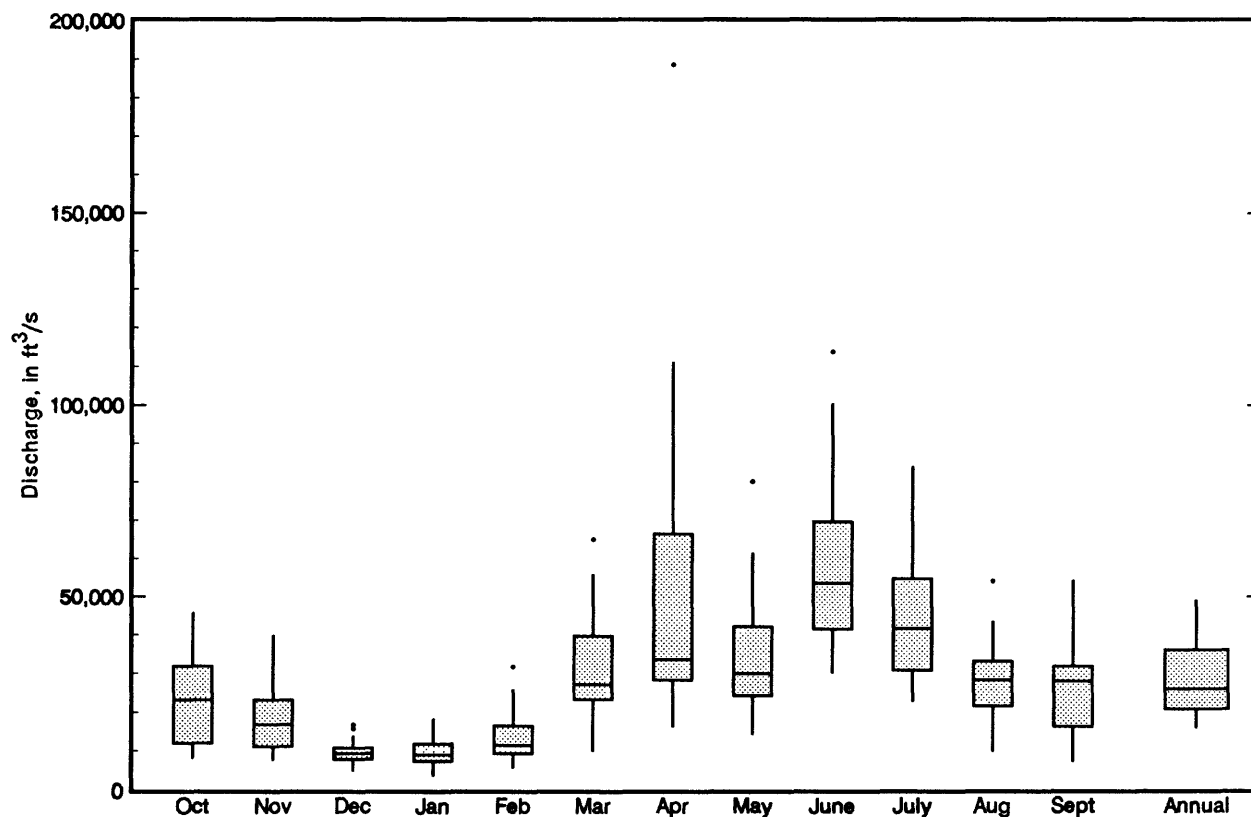
MISSOURI RIVER MAIN STEM
06610000 MISSOURI RIVER AT OMAHA, NE--Continued

Pre-regulation Period

Statistics of monthly and annual mean discharges, pre-regulation period

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	45,790	1952	8,294	1935	23,180	10,610	6.7
November	39,920	1952	7,671	1936	18,990	8,506	5.5
December	16,890	1944	5,158	1938	9,834	2,863	2.8
January	18,430	1951	3,706	1940	9,996	3,291	2.9
February	31,790	1952	5,679	1940	13,520	5,809	3.9
March	65,080	1945	10,080	1940	31,150	13,940	9.0
April	188,800	1952	16,480	1957	50,590	37,560	14.6
May	80,230	1942	14,380	1931	35,280	14,210	10.2
June	113,900	1929	30,290	1955	56,000	21,460	16.1
July	84,110	1944	22,900	1934	45,560	17,670	13.1
August	54,140	1951	9,981	1934	27,660	10,070	8.0
September	54,180	1951	7,350	1934	25,130	10,510	7.2
Annual	49,150	1952	16,050	1931	28,920	8,977	100.0

Boxplots of monthly and annual mean discharges, pre-regulation period



MISSOURI RIVER MAIN STEM
06610000 MISSOURI RIVER AT OMAHA, NE--Continued

Monthly and annual flow duration, pre-regulation period

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	3,150	4,940	7,010	10,500	14,100	21,100	13,800	9,170	6,500	7,050	4,570	3,250	4,390
95	4,280	5,780	9,510	16,700	16,800	25,700	18,600	10,700	8,550	8,290	7,180	4,300	6,660
90	5,610	6,810	11,900	19,500	19,400	27,700	22,900	13,100	9,760	9,270	8,550	5,120	8,300
85	6,200	7,830	13,900	20,900	20,900	29,700	26,700	15,500	11,600	10,100	9,770	5,720	9,490
80	6,820	8,340	15,200	22,300	22,300	31,600	29,000	17,500	13,600	11,100	10,600	6,160	10,800
75	7,480	8,860	16,400	24,100	23,800	33,900	31,200	19,400	15,500	12,300	11,300	6,600	12,300
70	7,930	9,350	17,400	26,000	25,200	36,100	32,400	21,000	17,800	14,400	12,000	7,050	14,300
65	8,320	9,830	18,400	27,400	26,700	39,100	33,700	22,600	20,800	16,300	13,000	7,490	16,400
60	8,720	10,400	19,700	28,800	28,100	42,000	35,000	24,600	23,300	18,800	14,100	7,930	18,600
55	9,090	11,000	21,400	30,300	29,600	45,900	36,600	26,500	25,300	21,200	15,400	8,360	21,100
50	9,440	11,700	23,200	32,400	31,000	49,600	39,500	28,100	26,800	23,600	16,600	8,790	23,700
45	9,790	12,400	25,200	35,400	32,600	52,700	42,400	29,500	28,000	25,900	18,000	9,320	26,400
40	10,200	13,400	27,600	39,000	34,200	55,800	45,500	31,100	29,200	27,600	19,400	9,890	28,500
35	10,800	14,300	30,100	43,300	35,900	60,500	48,500	32,200	30,300	29,300	21,300	10,600	30,700
30	11,400	15,400	33,700	49,500	38,800	65,900	52,800	33,400	31,500	30,900	23,200	11,400	33,000
25	12,000	16,500	38,600	57,700	41,800	72,600	57,200	34,500	32,500	32,300	25,700	12,100	35,300
20	13,300	18,000	45,200	71,100	45,800	79,400	61,900	35,700	33,600	33,600	27,700	13,000	39,400
15	14,600	20,300	54,000	85,400	50,500	86,400	66,700	38,100	34,700	34,900	29,800	13,900	45,800
10	16,200	23,400	64,800	113,000	57,700	95,600	75,900	40,900	35,800	36,600	33,600	16,300	56,100
5	18,100	28,400	81,500	143,000	70,700	110,000	92,900	46,300	41,700	40,800	39,600	20,000	76,300

Probability of annual high discharges, pre-regulation period

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	35,500	28,100	24,200	22,700	22,700
0.95	1.05	50,900	40,800	36,100	33,000	31,200
0.90	1.11	61,400	49,700	44,500	40,200	37,000
0.80	1.25	76,600	63,100	57,200	50,800	45,400
0.50	2	115,000	99,400	91,600	79,100	67,000
0.20	5	170,000	156,000	145,000	122,000	98,800
0.10	10	207,000	198,000	183,000	152,000	121,000
0.04	25	254,000	255,000	234,000	192,000	150,000
0.02	50	289,000	300,000	273,000	222,000	172,000
0.01	100	324,000	347,000	314,000	254,000	195,000

MISSOURI RIVER MAIN STEM
06610000 MISSOURI RIVER AT OMAHA, NE--Continued

Probability of annual low discharges, pre-regulation period

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	1,910	2,110	2,530	2,760	3,380	4,300	5,230	5,730	5,600
0.02	50	2,120	2,310	2,740	3,050	3,740	4,700	5,590	6,170	6,340
0.05	20	2,470	2,660	3,100	3,530	4,340	5,350	6,200	6,920	7,600
0.10	10	2,830	3,020	3,470	4,010	4,920	6,000	6,830	7,690	8,890
0.20	5	3,350	3,530	3,990	4,650	5,700	6,880	7,720	8,780	10,700
0.50	2	4,650	4,830	5,280	6,130	7,420	8,870	9,930	11,500	15,000
0.80	1.25	6,510	6,690	7,110	7,970	9,430	11,400	13,100	15,300	20,600
0.90	1.11	7,790	7,980	8,360	9,090	10,600	12,900	15,300	17,900	24,100
0.96	1.04	9,450	9,670	9,980	10,400	11,900	14,700	18,200	21,300	28,300
0.98	1.02	10,700	11,000	11,200	11,300	12,800	16,000	20,400	23,900	31,400
0.99	1.01	12,000	12,300	12,500	12,200	13,700	17,300	22,700	26,600	34,300

Probability of seasonal low discharges, pre-regulation period

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	2,060	2,570	3,060	3,890	9,340	9,540	10,100	13,200
0.02	50	2,380	2,910	3,450	4,370	10,300	10,600	11,300	14,400
0.05	20	2,920	3,500	4,110	5,170	12,000	12,500	13,300	16,500
0.10	10	3,490	4,110	4,770	5,950	13,800	14,500	15,400	18,600
0.20	5	4,300	4,950	5,680	7,010	16,200	17,100	18,200	21,500
0.50	2	6,250	6,960	7,770	9,340	22,000	23,600	25,000	28,400
0.80	1.25	8,840	9,580	10,400	12,000	29,900	32,200	33,900	37,500
0.90	1.11	10,500	11,200	12,000	13,600	35,100	37,700	39,600	43,400
0.98	1.04	12,500	13,200	13,800	15,300	41,600	44,600	46,700	50,700
0.98	1.02	13,900	14,600	15,100	16,500	46,400	49,600	51,800	56,100
0.99	1.01	15,200	16,000	16,300	17,500	51,100	54,500	56,800	61,500
		July-August-September				October-November-December			
0.01	100	4,360	4,550	4,810	5,500	2,160	2,920	3,310	4,300
0.02	50	5,230	5,500	5,870	6,710	2,380	3,160	3,630	4,720
0.05	20	6,810	7,210	7,770	8,870	2,760	3,570	4,170	5,410
0.10	10	8,520	9,060	9,820	11,200	3,160	3,990	4,700	6,100
0.20	5	11,000	11,800	12,800	14,400	3,720	4,580	5,420	7,020
0.50	2	17,500	18,600	20,000	22,100	5,140	6,020	7,030	9,110
0.80	1.25	26,400	27,700	29,000	31,400	7,180	8,030	8,990	11,700
0.90	1.11	32,100	33,400	34,300	36,600	8,590	9,380	10,200	13,200
0.98	1.04	39,200	40,100	40,300	42,200	10,400	11,100	11,600	15,100
0.98	1.02	44,200	44,800	44,200	45,800	11,900	12,500	12,500	16,400
0.99	1.01	49,000	49,200	47,800	48,900	13,300	13,800	13,400	17,600

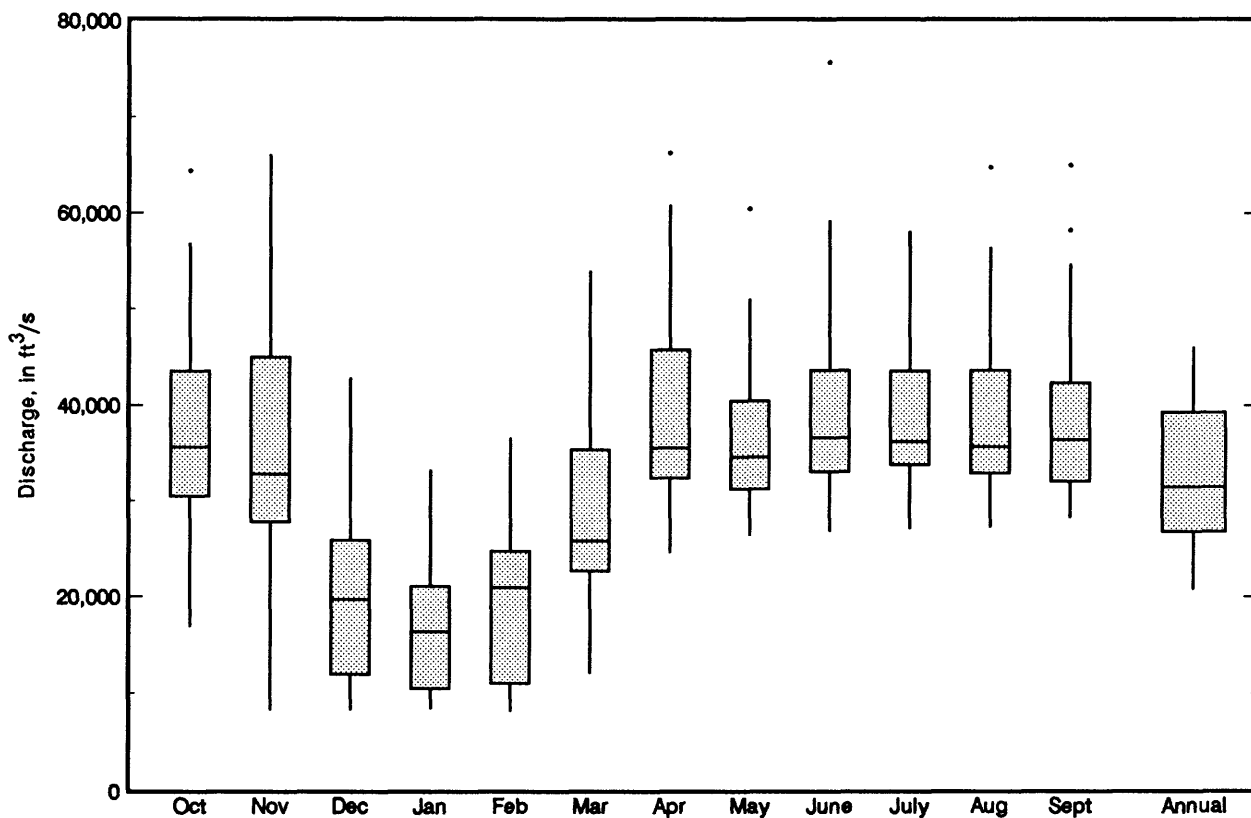
MISSOURI RIVER MAIN STEM
06610000 MISSOURI RIVER AT OMAHA, NE--Continued

Post-regulation Period

Statistics of monthly and annual mean discharges, post-regulation period

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	64,410	1976	16,920	1962	38,380	10,470	9.8
November	66,130	1976	8,324	1962	35,890	14,200	9.1
December	42,800	1987	8,296	1962	21,020	9,687	5.4
January	33,250	1987	8,425	1964	17,350	6,754	4.4
February	36,590	1983	8,162	1963	19,500	7,407	5.0
March	53,980	1983	12,090	1958	27,930	10,090	7.1
April	66,320	1969	24,630	1959	39,080	10,510	9.9
May	60,430	1986	26,450	1961	37,080	8,137	9.4
June	75,730	1984	26,890	1961	39,470	10,500	10.1
July	58,070	1984	27,150	1958	38,980	8,583	9.9
August	64,830	1975	27,280	1958	39,080	9,195	9.9
September	65,020	1975	28,290	1958	39,010	9,490	9.9
Annual	46,090	1984	20,790	1958	32,770	7,593	100.0

Boxplots of monthly and annual mean discharges, post-regulation period



MISSOURI RIVER MAIN STEM
06610000 MISSOURI RIVER AT OMAHA, NE--Continued

Monthly and annual flow duration, post-regulation period

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												Annual
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	
99	5,700	7,490	7,280	21,800	24,200	24,300	24,100	25,100	25,700	9,550	7,870	4,460	7,810
95	8,020	8,380	9,280	25,200	25,800	26,400	27,200	28,100	28,200	26,200	9,220	8,230	9,820
90	8,880	9,110	11,300	26,600	27,000	28,200	28,900	29,500	29,100	28,200	13,500	9,280	14,000
85	9,480	9,710	13,400	28,100	28,200	29,600	30,100	30,800	30,000	29,200	19,100	10,000	18,000
80	10,200	10,500	16,200	29,600	29,800	31,000	31,300	32,100	30,900	30,200	25,800	10,800	20,800
75	11,100	11,900	17,900	31,100	31,300	32,200	32,400	32,700	31,800	31,100	28,600	12,100	24,600
70	12,300	14,900	19,300	32,300	32,400	33,100	33,200	33,300	32,700	32,100	30,200	14,100	26,900
65	14,200	16,600	20,900	33,100	33,200	34,000	34,100	34,000	33,600	33,100	31,900	16,300	28,700
60	15,400	17,700	22,800	33,800	33,900	34,800	34,900	34,600	34,500	34,100	32,900	17,700	30,200
55	16,300	18,500	24,900	34,600	34,600	35,700	35,800	35,200	35,400	35,000	34,000	18,600	31,700
50	17,000	19,300	26,600	35,400	35,400	36,800	37,000	35,800	36,400	36,000	35,000	19,400	32,900
45	17,700	20,000	28,300	36,300	36,100	38,000	38,400	37,000	37,500	37,400	36,000	20,300	34,000
40	18,500	20,900	30,100	37,700	37,300	39,100	39,700	38,500	38,600	38,900	38,000	21,400	35,100
35	19,600	21,800	31,800	39,100	38,500	40,500	41,300	39,900	39,800	40,400	40,000	22,600	36,400
30	20,700	23,100	33,400	41,000	39,700	42,200	42,800	41,800	41,800	42,400	42,500	24,300	38,200
25	22,000	24,500	35,100	44,200	41,600	44,100	44,400	43,800	44,200	44,400	45,100	26,400	40,100
20	23,700	26,100	37,600	47,400	43,800	46,500	46,800	46,500	47,200	47,900	50,400	29,300	42,900
15	25,500	27,700	41,300	50,900	46,600	49,900	49,600	50,000	50,600	51,600	52,800	32,900	46,300
10	27,400	30,000	45,600	55,900	50,200	53,500	53,100	53,300	53,800	54,900	55,100	35,900	51,200
5	30,500	33,400	53,100	66,300	55,100	58,400	56,600	56,700	57,900	59,900	59,200	42,700	56,000

Probability of annual high discharges, post-regulation period

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge ¹ (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	—	29,700	27,100	25,100	24,400
0.95	1.05	—	35,400	32,500	30,600	29,700
0.90	1.11	—	39,100	36,000	34,100	33,000
0.80	1.25	—	44,300	41,100	38,900	37,300
0.50	2	70,000	57,600	53,700	50,600	47,200
0.20	5	—	76,600	72,100	66,400	59,300
0.10	10	125,000	89,800	85,000	76,800	66,700
0.04	25	—	107,000	102,000	90,000	75,500
0.02	50	170,000	121,000	115,000	99,900	81,800
0.01	100	190,000	135,000	129,000	110,000	87,700

¹ Data supplied by U.S. Army Corps of Engineers, Omaha District.

MISSOURI RIVER MAIN STEM
06610000 MISSOURI RIVER AT OMAHA, NE--Continued

Probability of annual low discharges, post-regulation period

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	1,850	2,040	3,290	4,710	5,200	5,630	5,770	6,150	9,920
0.02	50	2,280	2,540	3,930	5,420	6,020	6,500	6,720	7,230	11,300
0.05	20	3,100	3,490	5,080	6,670	7,440	8,000	8,360	9,110	13,600
0.10	10	4,040	4,560	6,320	7,970	8,900	9,540	10,100	11,100	16,000
0.20	5	5,510	6,220	8,140	9,800	10,900	11,700	12,400	13,800	19,100
0.50	2	9,660	10,800	12,700	14,300	15,800	16,700	18,000	20,100	26,100
0.80	1.25	16,200	17,500	19,000	20,100	21,800	22,900	24,900	27,900	34,200
0.90	1.11	21,000	22,100	23,100	23,800	25,500	26,600	29,000	32,400	38,800
0.96	1.04	27,200	27,900	28,000	28,300	29,700	30,900	33,700	37,500	44,000
0.98	1.02	31,900	32,100	31,500	31,500	32,600	33,800	36,900	40,900	47,400
0.99	1.01	36,200	36,200	34,800	34,600	35,400	36,500	39,900	44,000	50,400

Probability of seasonal low discharges, post-regulation period

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	3,490	4,530	5,330	5,620	15,100	18,900	20,700	22,200
0.02	50	3,920	5,150	6,010	6,400	16,900	20,300	21,900	23,300
0.05	20	4,700	6,240	7,180	7,740	19,600	22,400	23,800	25,000
0.10	10	5,560	7,370	8,400	9,120	22,200	24,400	25,600	26,700
0.20	5	6,840	9,020	10,100	11,100	25,400	27,000	27,900	28,900
0.50	2	10,400	13,200	14,400	15,700	31,300	32,200	32,800	33,700
0.80	1.25	16,300	19,000	20,100	21,600	36,600	37,700	38,400	39,600
0.90	1.11	20,800	23,000	23,900	25,400	39,000	40,700	41,500	43,100
0.96	1.04	27,300	28,000	28,700	29,900	41,100	44,000	45,100	47,400
0.98	1.02	32,600	31,800	32,200	33,100	42,300	46,100	47,500	50,300
0.99	1.01	38,500	35,700	35,700	36,100	43,300	48,100	49,800	53,200
		July-August-September				October-November-December			
0.01	100	20,000	21,600	22,400	23,800	1,500	3,020	4,610	5,150
0.02	50	21,200	22,700	23,400	24,800	2,040	3,790	5,460	6,090
0.05	20	23,100	24,500	25,200	26,400	3,160	5,210	6,970	7,770
0.10	10	25,000	26,300	26,900	28,000	4,520	6,810	8,580	9,570
0.20	5	27,400	28,600	29,200	30,200	6,750	9,220	10,900	12,200
0.50	2	33,000	34,100	34,700	35,600	13,200	15,500	16,700	18,900
0.80	1.25	39,900	41,000	41,800	42,900	22,800	24,100	24,600	28,300
0.90	1.11	44,100	45,300	46,300	47,800	29,000	29,500	29,500	34,400
0.96	1.04	49,200	50,600	51,900	54,000	36,300	35,900	35,500	42,000
0.98	1.02	52,800	54,500	56,000	58,600	41,300	40,300	39,800	47,500
0.99	1.01	56,300	58,300	60,100	63,400	45,900	44,400	43,800	52,900

INDIAN CREEK BASIN
06610500 INDIAN CREEK AT COUNCIL BLUFFS, IA

LOCATION.--Lat $41^{\circ}17'32''$, long $95^{\circ}49'59''$, in SE1/4 SW1/4 sec. 18, T.75 N., R.43 W., Pottawattamie County, Hydrologic Unit 10230006, on left bank at downstream side of first bridge off State Highway 183, on Mud Hollow Road at north edge of Council Bluffs and 8.8 mi upstream from mouth.

DRAINAGE AREA.--7.99 mi².

PERIOD OF RECORD.--July 1954 to September 1976 (discontinued).

GAGE.--Water-stage recorder. Datum of gage is 1,038.86 ft above mean sea level (City of Council Bluffs benchmark). Prior to Apr. 12, 1955, nonrecording gage at site 0.2 mi downstream at different datum.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,980 ft³/s Sept. 7, 1965, gage height, 15.36 ft; no flow at times most years.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 20, 1942, reached a discharge of 9,200 ft³/s, from information by U.S. Army Corps of Engineers.

Rating table number 8, developed July 1975
(A discharge measurement to validate this rating
has not been made since October 1975.)

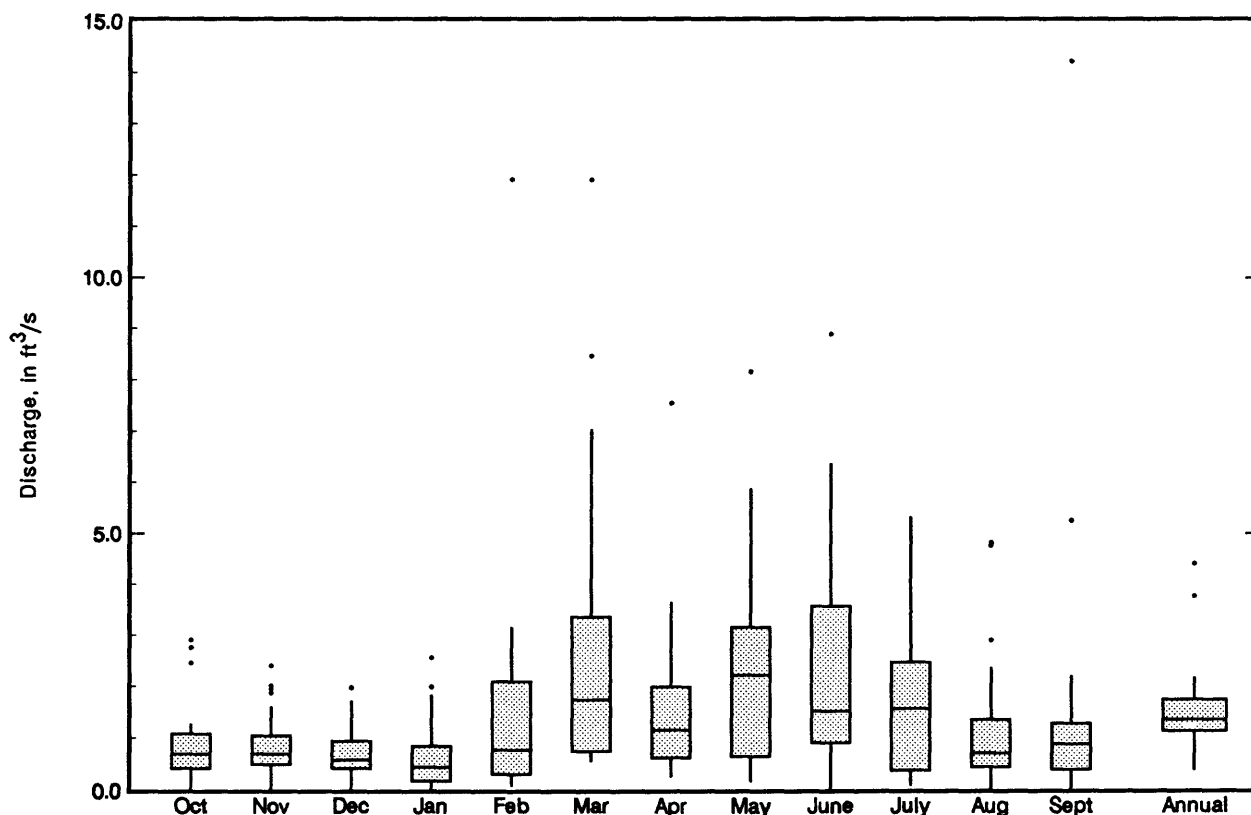
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
2.5	1.3	5.0	212
2.7	7.6	6.0	340
3.0	22	7.0	486
3.5	58	8.0	643
4.0	103		

INDIAN CREEK BASIN
06610500 INDIAN CREEK AT COUNCIL BLUFFS, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	2.89	1962	0.000	1956	0.91	0.81	4.9
November	2.39	1973	0.010	1956	0.89	0.66	4.8
December	1.97	1973	0.020	1956	0.68	0.50	3.7
January	2.54	1973	0.000	1956	0.65	0.68	3.5
February	11.9	1965	0.080	1970	1.58	2.47	8.5
March	11.9	1965	0.55	1964	2.76	3.06	14.9
April	7.53	1973	0.25	1956	1.64	1.58	8.8
May	8.14	1959	0.15	1956	2.43	2.03	13.1
June	8.88	1967	0.020	1956	2.39	2.27	12.9
July	5.31	1973	0.080	1976	1.73	1.57	9.3
August	4.80	1959	0.000	1955	1.25	1.35	6.8
September	14.2	1965	0.000	1976	1.63	3.00	8.8
Annual	4.40	1965	0.37	1976	1.54	0.94	100.0

Boxplots of monthly and annual mean discharges



INDIAN CREEK BASIN
06610500 INDIAN CREEK AT COUNCIL BLUFFS, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equalled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.00	0.00	0.01	0.09	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95	0.00	0.01	0.24	0.24	0.10	0.02	0.00	0.00	0.00	0.00	0.01	0.01	0.01
90	0.01	0.06	0.39	0.34	0.24	0.11	0.01	0.01	0.01	0.01	0.12	0.09	0.07
85	0.02	0.09	0.50	0.45	0.31	0.21	0.05	0.02	0.01	0.09	0.22	0.21	0.13
80	0.09	0.10	0.56	0.53	0.40	0.27	0.10	0.09	0.08	0.22	0.25	0.24	0.24
75	0.11	0.22	0.62	0.60	0.51	0.40	0.19	0.17	0.17	0.29	0.32	0.31	0.30
70	0.24	0.28	0.68	0.67	0.60	0.53	0.24	0.25	0.24	0.33	0.40	0.39	0.37
65	0.29	0.36	0.75	0.75	0.72	0.61	0.28	0.31	0.30	0.38	0.48	0.44	0.45
60	0.34	0.42	0.82	0.84	0.87	0.72	0.33	0.36	0.36	0.44	0.55	0.49	0.52
55	0.39	0.49	0.93	0.98	1.1	0.84	0.41	0.42	0.44	0.49	0.61	0.53	0.57
50	0.45	0.55	1.1	1.1	1.2	0.98	0.51	0.48	0.50	0.55	0.68	0.57	0.63
45	0.50	0.61	1.2	1.3	1.3	1.1	0.61	0.51	0.55	0.60	0.75	0.61	0.72
40	0.56	0.72	1.4	1.5	1.5	1.3	0.70	0.54	0.59	0.68	0.82	0.65	0.82
35	0.61	0.87	1.6	1.7	1.6	1.4	0.80	0.58	0.64	0.78	0.92	0.75	0.96
30	0.68	1.0	1.9	1.8	1.8	1.5	0.92	0.61	0.73	0.90	1.1	0.84	1.1
25	0.77	1.2	2.2	2.0	2.0	1.8	1.1	0.66	0.82	1.1	1.2	0.96	1.4
20	0.86	1.8	2.9	2.3	2.4	2.1	1.3	0.78	1.0	1.4	1.6	1.1	1.6
15	1.1	2.2	3.7	2.6	3.1	2.8	1.5	0.99	1.3	1.7	1.8	1.2	2.0
10	1.6	2.7	5.7	3.2	4.3	3.6	2.0	1.5	1.8	2.1	2.1	1.5	2.6
5	2.2	4.2	9.1	4.9	7.5	8.3	5.5	2.5	4.1	2.8	2.5	1.8	4.3

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	—	2.0	1.0	0.63	0.56
0.95	1.05	66	4.6	2.4	1.5	1.3
0.90	1.11	108	6.8	3.7	2.4	1.8
0.80	1.25	194	11	5.9	3.8	2.8
0.50	2	561	23	12	8.0	5.4
0.20	5	1,520	44	23	14	9.1
0.10	10	2,480	59	29	18	11
0.04	25	4,110	77	36	23	14
0.02	50	5,640	90	41	25	15
0.01	100	7,440	103	46	28	16

INDIAN CREEK BASIN
06610500 INDIAN CREEK AT COUNCIL BLUFFS, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12
0.05	20	0.00	0.00	0.00	0.00	0.00	0.02	0.05	0.05	0.17
0.10	10	0.00	0.00	0.00	0.00	0.00	0.07	0.12	0.15	0.23
0.20	5	0.00	0.00	0.00	0.00	0.03	0.12	0.19	0.23	0.32
0.50	2	0.00	0.00	0.01	0.07	0.16	0.28	0.39	0.47	0.62
0.80	1.25	0.15	0.21	0.22	0.25	0.38	0.60	0.74	0.87	1.1
0.90	1.11	0.27	0.33	0.39	0.44	0.55	0.88	1.0	1.2	1.5
0.96	1.04	0.44	0.46	0.61	0.74	0.77	1.3	1.5	1.6	2.1
0.98	1.02	0.55	0.55	0.78	1.0	0.92	1.7	1.9	2.0	2.5
0.99	1.01	0.62	0.62	0.94	1.4	1.1	2.1	2.3	2.3	2.9

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.02	0.00	0.01	0.02	0.01	0.02	0.05	0.02
0.02	50	0.03	0.00	0.01	0.02	0.01	0.03	0.07	0.03
0.05	20	0.06	0.01	0.02	0.04	0.03	0.06	0.11	0.07
0.10	10	0.09	0.02	0.03	0.07	0.06	0.10	0.16	0.14
0.20	5	0.16	0.05	0.06	0.13	0.14	0.17	0.25	0.29
0.50	2	0.39	0.25	0.20	0.35	0.44	0.45	0.54	0.86
0.80	1.25	0.86	0.81	0.61	0.90	0.95	1.0	1.2	1.7
0.90	1.11	1.3	1.4	1.1	1.4	1.2	1.5	1.7	2.2
0.96	1.04	1.8	2.1	2.0	2.2	1.5	2.3	2.5	2.6
0.98	1.02	2.3	2.8	3.0	3.0	1.7	2.9	3.2	2.9
0.99	1.01	2.7	3.4	4.3	3.8	1.8	3.6	4.0	3.0
		July-August-September				October-November-December			
0.01	100	0.01	0.02	0.01	0.01	0.02	0.03	0.02	0.05
0.02	50	0.02	0.04	0.02	0.02	0.02	0.04	0.04	0.06
0.05	20	0.03	0.07	0.03	0.05	0.04	0.07	0.06	0.10
0.10	10	0.05	0.10	0.06	0.10	0.06	0.11	0.10	0.16
0.20	5	0.10	0.16	0.11	0.18	0.11	0.18	0.17	0.24
0.50	2	0.23	0.32	0.28	0.45	0.27	0.39	0.40	0.51
0.80	1.25	0.42	0.49	0.55	0.80	0.64	0.75	0.81	0.95
0.90	1.11	0.53	0.57	0.71	0.98	0.99	0.98	1.1	1.2
0.96	1.04	0.64	0.63	0.87	1.1	1.5	1.3	1.5	1.6
0.98	1.02	0.70	0.66	0.96	1.2	2.0	1.4	1.8	1.9
0.99	1.01	0.75	0.68	1.0	1.3	2.6	1.6	2.0	2.1

MOSQUITO CREEK BASIN
06610520 MOSQUITO CREEK NEAR EARLING, IA

LOCATION.--Lat 41°45'10" long 95°27'50", in N1/2 SE1/4 sec. 11, T.80 N., R.40 W., Shelby County, Hydrologic Unit 10230006, on right bank at stream-stabilization structure 1,300 ft downstream from bridge on State Highway 191, 0.5 mi downstream from small left-bank tributary and 2.3 mi southwest of Earling

DRAINAGE AREA.--32.0 mi².

PERIOD OF RECORD.--August 1965 to September 1979 (discontinued).

GAGE.--Duplex water-stage recorder. Datum of gage is 1,222.56 ft NGVD. Gage heights obtained of headwater (base gage) and tailwater (supplementary gage) elevations at stream-stabilization structure.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 12,000 ft³/s Sept. 11, 1972, gage height, 31.18 ft, from floodmarks; no flow for several days in 1970-72 and 1977.

Rating table number 3, developed March 1969
(A discharge measurement to validate this rating
has not been made since June 1973.)

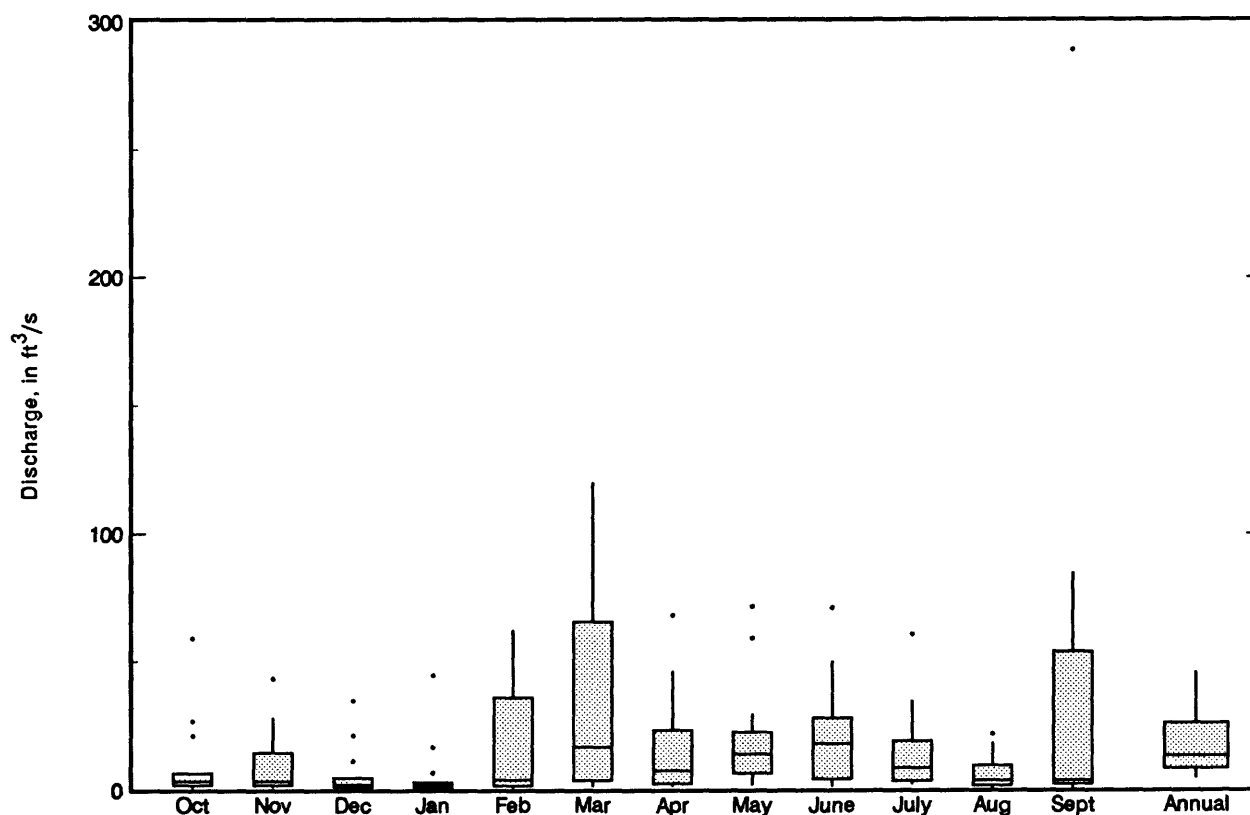
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
18.5	8.0	21.0	1,030
18.7	13	23.0	2,780
18.9	35	25.0	5,000
19.0	55	27.0	7,400
19.5	219	31.0	11,800
20.0	445		

MOSQUITO CREEK BASIN
06610520 MOSQUITO CREEK NEAR EARLING, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	58.8	1974	0.40	1977	9.99	16.0	5.0
November	42.8	1973	0.58	1977	9.72	12.8	4.9
December	34.4	1973	0.18	1977	6.26	9.82	3.1
January	44.5	1973	0.080	1971	5.90	11.9	3.0
February	61.9	1971	0.62	1977	15.2	20.5	7.6
March	120	1979	1.21	1968	35.9	42.0	18.0
April	67.7	1973	1.25	1977	15.9	20.1	7.9
May	71.1	1973	1.57	1968	19.7	20.9	9.9
June	70.6	1967	1.17	1977	21.4	19.8	10.7
July	60.4	1973	1.88	1970	14.0	16.1	7.0
August	21.5	1973	0.48	1971	6.70	6.65	3.4
September	289	1972	0.28	1971	39.1	78.1	19.6
Annual	45.5	1973	4.05	1970	16.6	11.8	100.0

Boxplots of monthly and annual mean discharges



MOSQUITO CREEK BASIN
06610520 MOSQUITO CREEK NEAR EARLING, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.01	0.15	0.64	0.10	0.01	0.04	0.03	0.01	0.09	0.10	0.31	0.06	0.04
95	0.03	0.23	1.0	1.0	0.76	0.42	0.59	0.22	0.22	0.22	0.60	0.14	0.23
90	0.15	0.47	1.6	1.4	1.2	0.92	1.1	0.35	0.41	0.34	0.89	0.22	0.56
85	0.19	0.89	1.9	1.7	1.5	1.4	1.5	0.51	0.61	0.51	1.2	0.51	0.91
80	0.25	1.1	2.3	2.0	1.9	2.1	1.8	0.74	0.91	0.81	1.5	0.78	1.2
75	0.56	1.4	3.0	2.4	2.8	2.7	2.1	1.0	1.2	1.2	1.8	0.97	1.5
70	0.74	1.6	3.6	3.1	3.9	3.4	2.5	1.4	1.5	1.5	2.0	1.1	1.9
65	0.98	1.9	4.3	4.1	4.9	4.4	3.1	1.8	1.8	1.9	2.2	1.3	2.2
60	1.2	2.1	4.9	5.0	5.5	5.3	3.6	2.1	2.0	2.2	2.5	1.5	2.7
55	1.4	2.4	5.5	5.8	6.0	6.1	4.2	2.5	2.3	2.6	3.0	1.8	3.2
50	1.8	2.7	6.2	6.6	6.6	7.0	4.8	3.0	2.9	2.9	3.5	2.2	3.9
45	2.2	3.1	7.1	7.9	7.9	8.8	5.6	3.5	3.5	3.3	4.0	2.7	4.6
40	2.5	3.6	8.5	9.2	9.4	11	6.4	4.1	4.1	4.3	4.6	3.1	5.6
35	2.9	4.3	11	12	12	13	7.6	4.8	4.7	5.3	5.5	3.6	6.5
30	3.2	5.3	17	15	15	15	9.1	5.9	6.1	6.4	6.5	4.2	8.4
25	4.1	6.6	24	18	17	17	11	6.9	8.0	8.7	10	5.3	11
20	5.5	9.3	31	22	19	20	12	8.0	10	15	15	9.9	14
15	9.3	13	48	28	25	26	14	9.2	14	22	21	12	19
10	17	19	72	42	35	41	18	12	23	30	28	16	27
5	20	46	165	62	75	86	45	21	49	41	42	23	52

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	—	17	10	6.5	5.2
0.95	1.05	—	48	27	16	12
0.90	1.11	950	79	43	25	19
0.80	1.25	1,460	139	73	42	30
0.50	2	3,110	369	186	104	67
0.20	5	6,170	843	417	225	132
0.10	10	8,590	1,230	607	323	179
0.04	25	12,000	1,770	875	460	240
0.02	50	14,700	2,190	1,090	568	285
0.01	100	17,500	2,610	1,310	680	328

MOSQUITO CREEK BASIN
06610520 MOSQUITO CREEK NEAR EARLING, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.01	0.01	0.08	0.15	0.30	0.28
0.02	50	0.00	0.00	0.00	0.02	0.02	0.11	0.19	0.36	0.34
0.05	20	0.00	0.00	0.00	0.03	0.05	0.17	0.28	0.47	0.48
0.10	10	0.00	0.00	0.01	0.06	0.09	0.25	0.39	0.62	0.67
0.20	5	0.00	0.00	0.06	0.13	0.20	0.42	0.61	0.88	1.0
0.50	2	0.24	0.29	0.34	0.51	0.76	1.2	1.5	1.9	2.8
0.80	1.25	1.0	1.1	1.4	1.9	2.7	3.5	4.0	4.6	9.2
0.90	1.11	2.4	2.4	2.9	3.7	5.1	6.2	7.0	7.8	19
0.96	1.04	5.8	5.8	6.0	7.4	9.7	12	13	14	42
0.98	1.02	11	11	9.8	11	14	18	20	22	72
0.99	1.01	21	21	15	17	21	26	29	32	122

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.01	0.01	0.01	0.03	0.15	0.25	0.07	0.18
0.02	50	0.02	0.02	0.02	0.05	0.22	0.35	0.13	0.28
0.05	20	0.04	0.04	0.04	0.11	0.37	0.57	0.28	0.52
0.10	10	0.08	0.09	0.09	0.20	0.59	0.87	0.55	0.89
0.20	5	0.20	0.22	0.24	0.41	1.0	1.4	1.2	1.6
0.50	2	0.92	1.0	1.2	1.6	3.0	3.7	3.9	4.9
0.80	1.25	3.4	4.0	4.7	5.5	8.5	9.5	10	13
0.90	1.11	6.3	7.6	8.7	10	15	15	16	21
0.96	1.04	11	14	16	20	26	25	24	34
0.98	1.02	16	21	22	29	37	35	29	45
0.99	1.01	22	29	30	42	52	47	35	58
		July-August-September				October-November-December			
0.01	100	0.05	0.01	0.02	0.10	0.01	0.02	0.06	0.13
0.02	50	0.08	0.01	0.04	0.14	0.02	0.03	0.09	0.18
0.05	20	0.13	0.03	0.08	0.25	0.04	0.06	0.15	0.28
0.10	10	0.22	0.06	0.16	0.41	0.07	0.11	0.24	0.43
0.20	5	0.38	0.16	0.32	0.73	0.16	0.24	0.42	0.72
0.50	2	1.2	0.77	1.2	2.1	0.74	1.1	1.4	2.1
0.80	1.25	3.4	3.2	3.7	5.6	3.7	4.9	5.1	6.6
0.90	1.11	6.0	6.2	6.5	9.2	8.8	10	10	12
0.96	1.04	11	12	12	15	23	24	23	25
0.98	1.02	16	18	16	21	43	40	39	40
0.99	1.01	22	26	22	27	75	63	64	61

WAUBONSIE CREEK BASIN
06806000 WAUBONSIE CREEK NEAR BARTLETT, IA

LOCATION.--Lat 40°53'04" long 95°44'47", in NE1/4 NE1/4 sec. 11, T.70 N., R.43 W., Fremont County, Hydrologic Unit 10240001, on left pier on downstream side of highway bridge, 2.5 mi east of Bartlett, 3.5 mi west of Tabor and 3.6 mi upstream from mouth.

DRAINAGE AREA.--30.4 mi².

PERIOD OF RECORD.--January 1946 to September 1969 (discontinued).

GAGE.--Water-stage recorder. Datum of gage is 936.96 ft above mean sea level. Prior to June 16, 1951, nonrecording gage and Jan. 10, 1946 to May 8, 1950, supplementary high-stage recorder, at same site and datum.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 14,500 ft³/s May 8, 1950 gage height, 37.8 ft, from floodmark, from rating curve extended above 3,900 ft³/s on basis of slope-area measurements at gage heights 32.8 and 37.8; no flow at times in 1954-59.

Rating table number 8, developed March 1965
(A discharge measurement to validate this rating
has not been made since October 1969.)

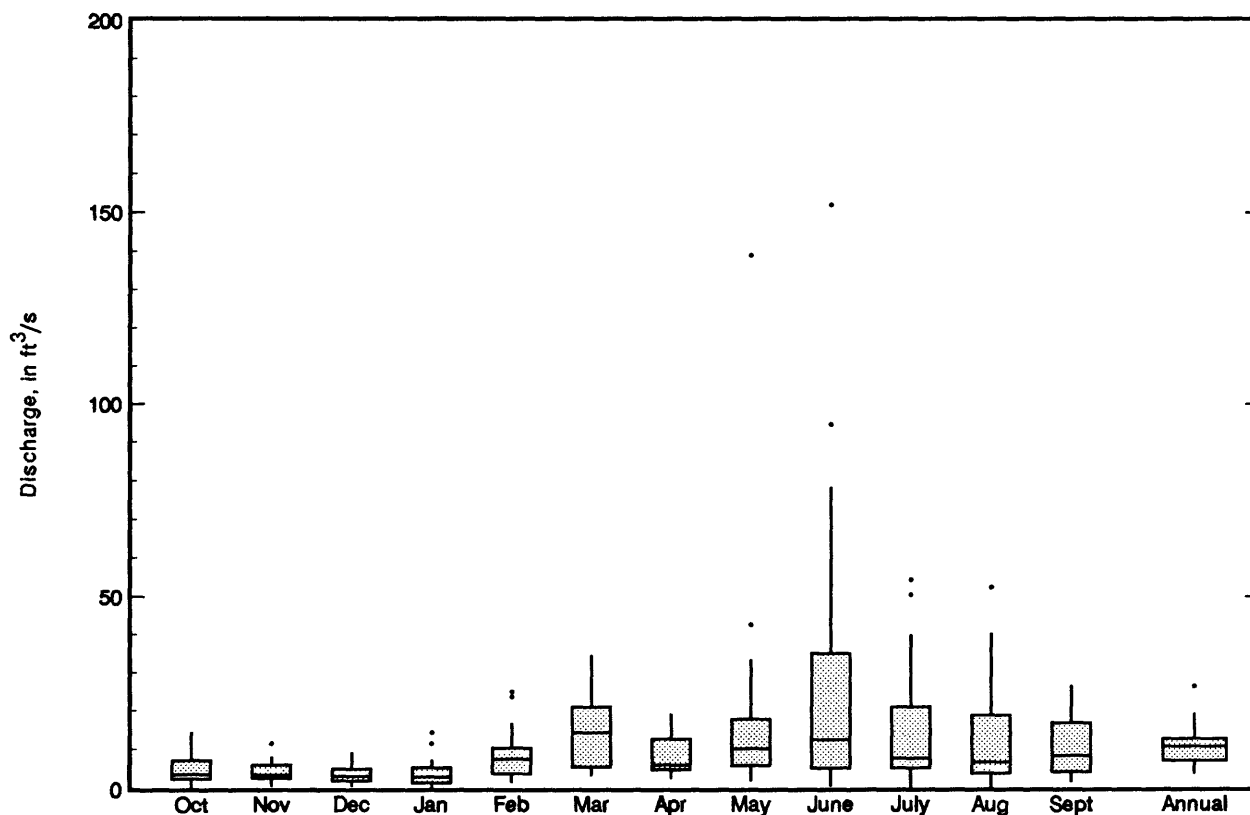
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
11.5	18	15.0	411
12.0	42	16.0	625
12.5	75	17.0	890
13.0	120	18.0	1,190
14.0	244		

WAUBONSIE CREEK BASIN
06806000 WAUBONSIE CREEK NEAR BARTLETT, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	14.2	1947	0.060	1957	5.27	3.93	3.9
November	11.4	1962	0.63	1957	4.34	2.59	3.2
December	9.04	1962	0.53	1956	3.65	2.28	2.7
January	14.3	1949	0.23	1957	4.04	3.41	3.0
February	25.0	1969	1.58	1957	8.38	6.51	6.3
March	34.6	1949	3.30	1957	14.8	9.59	11.0
April	19.1	1952	2.63	1956	8.64	5.02	6.4
May	139	1950	1.87	1956	18.1	28.4	13.5
June	152	1947	0.55	1958	29.2	37.9	21.8
July	54.2	1958	0.29	1955	14.9	15.6	11.1
August	52.2	1954	0.070	1955	12.6	13.1	9.4
September	26.6	1961	1.52	1953	10.2	7.53	7.6
Annual	26.5	1950	3.63	1968	11.2	5.04	100.0

Boxplots of monthly and annual mean discharges



WAUBONSIE CREEK BASIN
06806000 WAUBONSIE CREEK NEAR BARTLETT, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.12	0.05	1.7	1.4	0.95	0.05	0.04	0.02	0.02	0.02	0.34	0.24	0.05
95	0.49	0.31	2.3	2.1	1.7	0.39	0.20	0.08	0.08	0.33	0.60	0.62	0.52
90	0.69	0.97	2.6	2.8	2.2	0.96	0.46	0.95	0.82	1.0	1.4	1.1	1.1
85	0.93	1.7	3.2	3.2	2.6	1.6	0.71	1.4	1.2	1.4	1.8	1.4	1.6
80	1.2	1.9	3.8	3.6	3.1	2.1	1.3	1.7	1.6	1.6	2.1	1.7	1.9
75	1.4	2.2	4.5	4.0	3.6	3.0	1.7	2.0	1.8	1.8	2.4	1.8	2.3
70	1.7	2.4	5.2	4.4	4.0	3.6	2.3	2.2	2.1	2.1	2.7	2.0	2.6
65	1.9	2.6	5.9	4.8	4.4	4.1	2.9	2.4	2.5	2.3	2.9	2.3	3.0
60	2.2	3.0	6.6	5.2	4.8	4.6	3.4	2.6	2.9	2.6	3.1	2.6	3.4
55	2.6	3.8	7.2	5.6	5.3	5.1	3.9	3.0	3.2	2.9	3.3	2.9	3.8
50	2.9	4.4	7.9	6.1	5.9	5.7	4.3	3.5	3.5	3.3	3.5	3.1	4.3
45	3.3	5.0	8.5	6.5	6.4	6.4	4.8	4.0	4.0	3.6	3.7	3.3	4.8
40	3.6	5.6	9.1	7.1	7.0	7.2	5.3	4.6	4.5	4.0	4.1	3.6	5.4
35	4.1	6.2	11	8.0	7.6	8.3	5.8	5.2	5.0	4.4	4.6	3.9	6.0
30	4.6	6.7	12	8.8	8.3	9.7	6.3	5.9	5.7	4.9	5.0	4.5	6.6
25	5.2	7.5	14	10	9.0	13	6.9	6.6	6.6	5.4	5.6	5.1	7.5
20	5.9	8.3	16	12	11	16	8.3	8.3	7.7	6.0	6.2	5.9	8.5
15	6.6	9.1	20	14	13	21	10	12	9.1	6.6	6.8	6.7	10
10	7.6	13	30	16	19	38	14	19	13	7.9	8.0	7.7	15
5	8.7	26	50	24	37	98	36	53	45	12	9.4	8.7	28

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	—	22	12	6.2	4.8
0.95	1.05	633	44	24	13	9.8
0.90	1.11	898	64	33	20	14
0.80	1.25	1,360	96	50	30	21
0.50	2	2,870	199	103	64	42
0.20	5	5,780	380	200	121	77
0.10	10	8,170	516	277	162	102
0.04	25	11,700	700	383	216	134
0.02	50	14,600	842	469	256	157
0.01	100	17,700	986	558	295	180

WAUBONSIE CREEK BASIN
06806000 WAUBONSIE CREEK NEAR BARTLETT, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.03	0.25	0.34	0.57
0.02	50	0.00	0.00	0.00	0.00	0.00	0.06	0.37	0.48	0.78
0.05	20	0.00	0.00	0.00	0.00	0.00	0.19	0.61	0.76	1.2
0.10	10	0.00	0.00	0.00	0.01	0.11	0.42	0.93	1.1	1.7
0.20	5	0.00	0.04	0.08	0.18	0.55	0.94	1.5	1.7	2.5
0.50	2	0.70	0.85	0.96	1.1	1.7	2.7	3.0	3.3	4.4
0.80	1.25	1.6	2.1	2.3	2.9	3.6	4.6	5.0	5.5	6.9
0.90	1.11	2.6	2.8	3.1	3.9	4.7	5.3	6.1	6.8	8.3
0.96	1.04	3.4	3.4	3.8	5.0	6.1	5.6	7.3	8.2	9.6
0.98	1.02	3.8	3.8	4.3	5.5	7.0	5.8	8.0	9.0	10
0.99	1.01	4.0	4.0	4.7	5.9	7.8	5.8	8.6	9.8	11

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.08	0.06	0.01	0.11	0.31	0.12	0.06	0.25
0.02	50	0.12	0.09	0.03	0.18	0.41	0.22	0.13	0.40
0.05	20	0.22	0.18	0.09	0.34	0.61	0.46	0.32	0.75
0.10	10	0.36	0.32	0.22	0.59	0.85	0.82	0.66	1.2
0.20	5	0.61	0.59	0.52	1.0	1.3	1.5	1.4	2.1
0.50	2	1.5	1.6	1.8	2.6	2.4	3.4	3.7	4.8
0.80	1.25	3.3	3.5	3.9	5.2	4.2	5.4	6.5	8.4
0.90	1.11	4.7	4.9	5.0	6.8	5.3	6.1	7.6	10
0.96	1.04	6.5	6.6	5.9	8.6	6.8	6.7	8.4	12
0.98	1.02	7.9	7.8	6.4	9.8	7.8	6.9	8.8	13
0.99	1.01	9.3	8.9	6.7	11	8.8	7.1	8.9	14
		July-August-September				October-November-December			
0.01	100	0.16	0.05	0.05	0.13	0.19	0.20	0.31	0.04
0.02	50	0.22	0.09	0.09	0.22	0.26	0.27	0.41	0.10
0.05	20	0.33	0.20	0.21	0.46	0.42	0.44	0.61	0.28
0.10	10	0.47	0.38	0.41	0.83	0.61	0.64	0.86	0.60
0.20	5	0.71	0.76	0.81	1.5	0.94	0.98	1.3	1.3
0.50	2	1.5	2.0	2.3	3.7	1.9	2.0	2.4	3.2
0.80	1.25	2.8	3.7	4.7	6.8	3.3	3.6	4.1	4.8
0.90	1.11	3.9	4.5	6.2	8.4	4.1	4.8	5.2	5.2
0.96	1.04	5.3	5.2	7.6	9.9	5.1	6.1	6.6	5.4
0.98	1.02	6.4	5.6	8.4	11	5.7	7.1	7.5	5.4
0.99	1.01	7.6	5.8	9.0	11	6.3	8.0	8.4	5.5

MISSOURI RIVER MAIN STEM
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 0.7 mi upstream from Waubonsie Highway 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.

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.

GAGE.--Water-stage recorder. Datum of gage is 905.36 ft above NGVD, supplementary adjustment of 1954. See WSP 1918 or 1919 for history of changes prior to Apr. 1, 1963.

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.

REMARKS.--Flow regulated by upstream main-stem reservoirs.

Rating table number 7, developed January 1984

Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
1.0	7,571	12.0	48,900
1.5	9,000	14.0	60,470
2.0	10,430	16.0	74,900
3.0	13,500	18.0	90,900
4.0	16,820	20.0	109,300
6.0	24,190	22.0	134,500
8.0	32,100	24.0	167,000
10.0	40,000	26.0	200,000

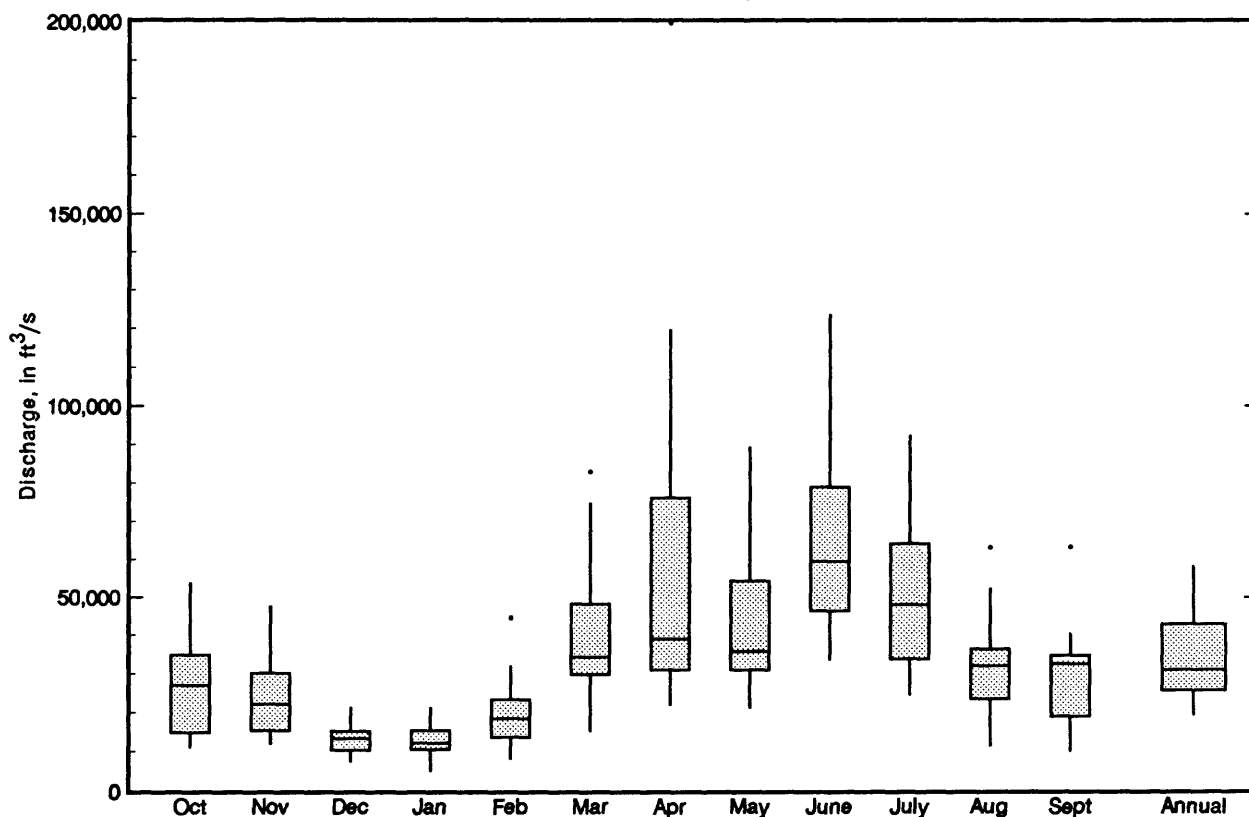
MISSOURI RIVER MAIN STEM
06807000 MISSOURI RIVER AT NEBRASKA CITY, NE--Continued

Pre-regulation Period

Statistics of monthly and annual mean discharges, pre-regulation period

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	53,860	1952	11,050	1935	26,960	11,620	6.5
November	47,550	1952	11,960	1941	23,160	9,165	5.6
December	21,450	1952	7,449	1933	13,250	3,449	3.2
January	21,400	1952	5,009	1940	13,330	4,226	3.2
February	44,520	1952	8,103	1940	19,570	7,927	4.8
March	83,030	1949	15,310	1957	39,990	16,820	9.7
April	199,600	1952	21,850	1957	56,680	39,650	13.8
May	89,370	1942	21,270	1931	43,110	17,280	10.5
June	123,500	1944	33,780	1956	64,640	23,580	15.7
July	92,380	1944	24,540	1936	50,960	20,300	12.4
August	63,270	1951	11,460	1934	31,470	11,640	7.6
September	63,200	1951	10,090	1934	28,880	11,420	7.0
Annual	58,180	1952	19,360	1940	34,340	10,520	100.0

Boxplots of monthly and annual mean discharges, pre-regulation period



MISSOURI RIVER MAIN STEM
06807000 MISSOURI RIVER AT NEBRASKA CITY, NE--Continued

Monthly and annual flow duration, pre-regulation period

Percentage of days discharge equalled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	3,970	6,740	12,200	16,800	18,200	24,200	15,100	10,500	8,680	8,430	6,840	4,030	5,460
95	5,650	7,930	14,900	20,700	21,300	29,800	20,300	12,300	10,500	10,600	10,700	5,050	8,930
90	6,730	8,810	18,000	23,500	23,600	33,200	25,800	15,100	11,900	11,500	12,200	6,080	11,100
85	7,670	10,300	20,300	25,500	25,600	35,300	29,300	18,200	14,200	12,500	12,900	7,540	12,700
80	8,600	11,400	21,600	27,500	27,500	37,500	32,200	20,300	16,600	13,800	13,700	8,490	14,400
75	9,410	12,400	22,800	29,200	29,000	40,300	33,500	22,100	19,400	15,300	14,600	9,230	16,400
70	10,100	13,200	24,300	30,900	30,500	43,100	34,800	23,900	21,900	17,000	15,500	9,830	18,900
65	10,800	14,000	25,800	32,600	32,100	46,600	36,100	25,800	24,800	21,300	16,500	10,400	21,500
60	11,400	14,900	27,500	34,200	33,600	50,400	37,700	27,800	27,600	24,000	17,700	11,000	23,900
55	12,000	15,700	29,900	35,800	35,100	54,200	40,700	30,000	29,500	25,700	19,300	11,600	26,500
50	12,600	16,600	32,200	37,800	36,600	57,900	43,700	32,100	31,500	27,400	20,900	12,200	29,000
45	13,200	17,900	34,600	41,400	39,100	62,100	47,200	33,200	32,600	29,500	22,600	12,900	31,500
40	13,900	19,800	37,000	45,300	42,000	66,800	50,800	34,300	33,300	31,700	24,900	13,700	33,500
35	14,800	21,300	40,400	49,800	45,000	71,800	54,900	35,400	34,100	32,900	27,300	14,600	35,200
30	15,800	22,800	43,900	57,100	48,800	77,400	59,100	36,500	34,800	34,100	29,000	15,500	37,100
25	16,800	24,900	49,700	67,300	53,000	83,200	63,900	38,300	35,600	35,200	30,800	16,400	41,200
20	18,300	27,100	56,900	78,300	57,600	89,400	68,900	40,400	36,300	36,300	32,700	17,600	46,200
15	20,000	29,600	66,000	98,300	63,900	95,700	76,300	42,600	37,500	38,100	34,900	19,300	54,400
10	21,700	32,600	77,100	125,000	72,200	106,000	87,300	46,200	41,300	41,400	37,500	21,600	66,700
5	24,200	41,400	94,600	153,000	84,200	125,000	106,000	54,200	48,100	47,300	42,600	26,000	87,800

Probability of annual high discharges, pre-regulation period

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	44,600	39,500	33,900	27,800	26,600
0.95	1.05	60,900	52,800	46,400	39,100	35,900
0.90	1.11	71,700	61,700	54,900	46,700	42,200
0.80	1.25	87,100	74,900	67,500	58,000	51,300
0.50	2	125,000	110,000	100,000	87,000	74,500
0.20	5	179,000	162,000	150,000	130,000	109,000
0.10	10	214,000	200,000	186,000	159,000	132,000
0.04	25	259,000	251,000	233,000	198,000	163,000
0.02	50	292,000	291,000	270,000	227,000	187,000
0.01	100	325,000	333,000	309,000	258,000	212,000

MISSOURI RIVER MAIN STEM
06807000 MISSOURI RIVER AT NEBRASKA CITY, NE--Continued

Probability of annual low discharges, pre-regulation period

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	1,840	2,510	3,050	3,490	4,580	5,500	7,140	7,590	7,480
0.02	50	2,130	2,760	3,320	3,870	5,090	6,140	7,680	8,250	8,440
0.05	20	2,650	3,200	3,790	4,500	5,930	7,180	8,600	9,350	10,100
0.10	10	3,200	3,660	4,270	5,130	6,730	8,190	9,520	10,500	11,700
0.20	5	3,970	4,310	4,940	5,980	7,770	9,510	10,800	12,000	14,000
0.50	2	5,830	5,960	6,600	7,870	9,930	12,300	13,600	15,700	19,300
0.80	1.25	8,280	8,340	8,890	10,100	12,300	15,300	17,700	20,600	25,800
0.90	1.11	9,810	9,990	10,400	11,500	13,500	17,000	20,300	23,800	29,800
0.96	1.04	11,600	12,200	12,400	13,000	14,800	18,800	23,400	27,800	34,500
0.98	1.02	12,900	13,800	13,900	14,100	15,600	19,900	25,800	30,800	37,700
0.99	1.01	14,200	15,600	15,500	15,100	16,400	20,900	28,100	33,800	40,800

Probability of seasonal low discharges, pre-regulation period

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	2,510	3,290	3,900	4,820	12,600	13,400	14,400	17,700
0.02	50	2,910	3,750	4,420	5,470	13,600	14,500	15,500	18,900
0.05	20	3,610	4,520	5,280	6,570	15,300	16,300	17,300	21,000
0.10	10	4,330	5,300	6,150	7,650	17,100	18,200	19,300	23,100
0.20	5	5,330	6,380	7,320	9,100	19,700	20,900	22,100	26,100
0.50	2	7,650	8,850	9,930	12,300	26,100	27,800	29,500	33,800
0.80	1.25	10,500	11,900	13,000	15,900	35,300	38,000	40,600	45,200
0.90	1.11	12,200	13,700	14,800	17,900	41,700	45,200	48,600	53,300
0.96	1.04	14,100	15,800	16,800	20,100	50,200	55,000	59,600	64,200
0.98	1.02	15,400	17,200	18,100	21,500	56,800	62,700	68,300	72,700
0.99	1.01	16,600	18,600	19,400	22,800	63,600	70,700	77,600	81,700
		July-August-September				October-November-December			
0.01	100	5,340	5,650	6,120	7,410	1,860	3,190	4,080	6,070
0.02	50	6,380	6,790	7,380	8,810	2,190	3,560	4,550	6,660
0.05	20	8,230	8,820	9,610	11,300	2,760	4,190	5,320	7,610
0.10	10	10,200	11,000	12,000	13,800	3,360	4,820	6,080	8,540
0.20	5	13,100	14,100	15,300	17,300	4,220	5,710	7,090	9,780
0.50	2	20,200	21,500	23,000	25,400	6,320	7,780	9,300	12,500
0.80	1.25	29,700	30,900	32,200	34,900	9,090	10,500	11,800	15,700
0.90	1.11	35,600	36,500	37,400	40,300	10,800	12,100	13,300	17,500
0.96	1.04	42,600	42,800	43,000	46,000	12,900	14,200	14,900	19,600
0.98	1.02	47,500	47,000	46,800	49,700	14,300	15,600	15,900	21,100
0.99	1.01	52,100	50,900	49,700	53,000	15,700	17,100	16,900	22,400

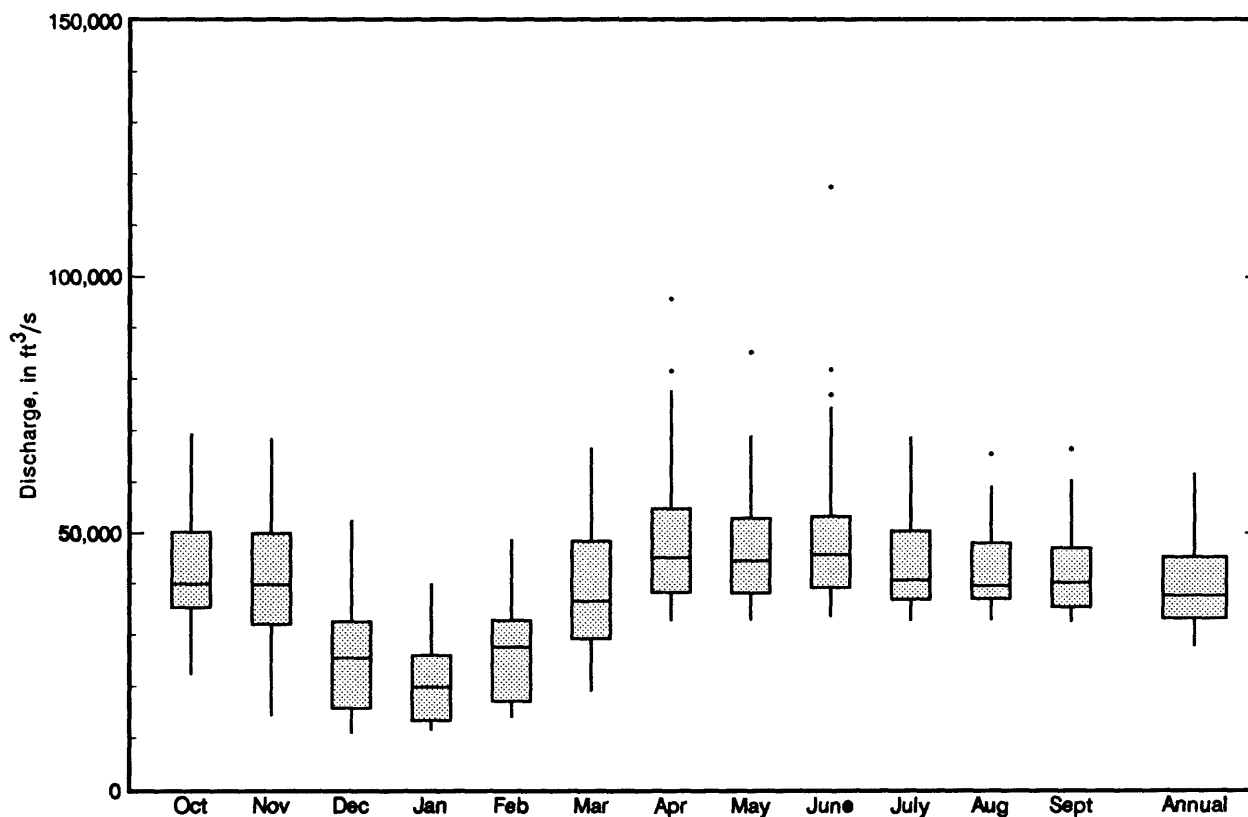
MISSOURI RIVER MAIN STEM
06807000 MISSOURI RIVER AT NEBRASKA CITY, NE--Continued

Post-regulation Period

Statistics of monthly and annual mean discharges, post-regulation period

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	69,440	1987	22,420	1962	43,440	10,890	9.1
November	68,480	1976	14,380	1962	41,050	14,160	8.6
December	52,410	1987	10,980	1964	25,880	10,810	5.4
January	39,970	1987	11,610	1960	21,150	7,964	4.5
February	48,630	1983	14,040	1963	26,660	9,646	5.6
March	66,730	1983	19,240	1964	39,060	12,970	8.2
April	95,660	1984	32,840	1981	49,540	15,700	10.4
May	85,160	1984	32,980	1958	47,250	11,830	9.9
June	117,500	1984	33,530	1958	50,650	17,150	10.7
July	68,870	1984	32,760	1981	44,490	10,220	9.4
August	65,540	1975	32,890	1961	42,840	8,393	9.0
September	66,510	1975	32,560	1958	42,910	9,277	9.0
Annual	61,700	1984	27,810	1958	39,600	8,751	100.0

Boxplots of monthly and annual mean discharges, post-regulation period



MISSOURI RIVER MAIN STEM

06807000 MISSOURI RIVER AT NEBRASKA CITY, NE--Continued

Monthly and annual flow duration, post-regulation period

Percentage of days discharge equalled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	6,830	10,500	12,800	28,800	31,000	30,500	29,400	29,400	31,000	14,600	13,100	6,140	10,400
95	9,990	12,900	15,400	31,900	32,200	32,400	31,800	31,700	31,800	31,400	14,700	10,700	14,400
90	11,800	14,000	19,300	33,900	33,600	34,200	33,300	33,000	32,800	32,400	18,900	13,300	18,300
85	13,000	15,000	21,500	35,500	35,000	35,700	34,700	34,200	33,800	33,300	24,400	14,200	22,700
80	13,800	15,900	23,700	36,500	36,100	36,900	35,600	35,300	34,800	34,300	31,300	15,000	26,800
75	14,600	17,200	25,800	37,500	37,200	38,200	36,400	36,000	35,600	35,200	33,200	16,000	31,100
70	15,500	19,200	27,700	38,500	38,300	39,500	37,200	36,600	36,300	36,300	35,000	17,800	32,700
65	16,700	21,000	30,200	39,700	39,400	41,000	37,900	37,300	37,100	37,300	36,300	20,300	34,300
60	18,000	22,300	32,600	40,900	40,600	42,400	38,700	38,000	37,800	38,400	37,600	21,900	35,700
55	19,000	23,600	34,800	42,200	41,700	43,900	39,800	38,700	38,500	39,400	38,900	23,300	36,900
50	20,100	24,900	36,300	43,400	42,900	45,400	41,000	39,700	39,500	40,500	40,100	24,300	38,000
45	21,100	26,100	37,600	44,900	44,700	47,000	42,200	41,100	40,800	41,600	41,200	25,300	39,300
40	22,100	27,300	38,900	46,300	46,600	48,600	43,700	42,400	42,100	42,700	42,300	26,600	40,900
35	23,100	28,700	41,200	47,700	48,700	50,700	45,800	44,600	43,900	45,300	44,500	27,800	42,500
30	24,600	30,500	43,500	50,300	51,300	52,700	48,000	47,500	46,700	48,500	48,300	29,600	45,000
25	26,500	33,000	46,300	53,300	53,800	55,100	50,700	49,900	49,500	50,900	51,500	31,800	47,700
20	28,800	35,500	49,900	58,000	57,900	58,300	53,400	52,200	52,300	53,400	54,900	34,600	51,100
15	31,200	37,400	55,100	66,000	62,200	62,400	56,900	54,700	55,200	56,700	59,800	38,500	54,800
10	33,600	39,800	62,600	76,500	66,700	68,500	60,700	57,400	58,000	60,200	62,700	43,700	59,600
5	37,400	49,600	75,300	91,100	75,900	94,000	66,000	60,400	63,300	64,900	65,500	51,100	66,700

Probability of annual high discharges, post-regulation period

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge ¹ (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	—	40,100	35,500	31,900	31,200
0.95	1.05	—	47,800	42,300	38,300	37,100
0.90	1.11	—	53,000	47,000	42,600	40,800
0.80	1.25	—	60,700	53,800	48,900	46,000
0.50	2	108,000	80,700	71,900	65,000	58,800
0.20	5	—	112,000	100,000	89,300	76,300
0.10	10	160,000	135,000	122,000	107,000	88,100
0.04	25	—	166,000	152,000	131,000	103,000
0.02	50	200,000	192,000	176,000	150,000	115,000
0.01	100	220,000	220,000	203,000	170,000	126,000

¹ Data supplied by U.S. Army Corps of Engineers, Omaha District.

MISSOURI RIVER MAIN STEM
06807000 MISSOURI RIVER AT NEBRASKA CITY, NE--Continued

Probability of annual low discharges, post-regulation period

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	3,310	3,740	4,440	6,600	8,410	8,880	9,210	10,200	14,500
0.02	50	3,810	4,300	5,140	7,340	9,200	9,820	10,300	11,500	16,000
0.05	20	4,730	5,290	6,400	8,610	10,500	11,400	12,200	13,600	18,500
0.10	10	5,740	6,380	7,740	9,950	11,900	13,000	14,000	15,800	20,900
0.20	5	7,290	8,030	9,700	11,900	13,900	15,300	16,600	18,800	24,200
0.50	2	11,600	12,600	14,800	16,700	18,700	20,600	22,800	25,800	31,500
0.80	1.25	18,900	19,900	22,200	23,600	25,500	27,600	30,700	34,500	40,300
0.90	1.11	24,500	25,400	27,300	28,300	30,100	32,100	35,700	39,700	45,600
0.96	1.04	32,400	33,100	33,800	34,500	36,000	37,600	41,800	45,900	51,600
0.98	1.02	38,900	39,300	38,800	39,300	40,500	41,600	46,100	50,300	55,800
0.99	1.01	46,000	46,000	43,800	44,100	45,100	45,500	50,300	54,400	59,800

Probability of seasonal low discharges, post-regulation period

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	4,510	5,490	7,570	8,910	23,800	27,600	29,000	31,000
0.02	50	5,020	6,140	8,210	9,650	24,900	28,300	29,600	31,500
0.05	20	5,910	7,280	9,320	10,900	26,600	29,500	30,700	32,400
0.10	10	6,900	8,490	10,500	12,200	28,400	30,800	32,000	33,500
0.20	5	8,380	10,300	12,200	14,100	30,800	32,700	33,800	35,200
0.50	2	12,500	15,000	16,700	18,900	36,400	37,600	38,600	40,000
0.80	1.25	19,500	22,100	23,500	25,900	43,600	44,900	46,100	47,800
0.90	1.11	24,900	27,300	28,500	30,800	48,300	49,900	51,400	53,700
0.96	1.04	32,800	34,400	35,300	37,300	54,100	56,600	58,600	62,000
0.98	1.02	39,400	40,100	40,800	42,400	58,300	61,900	64,300	68,600
0.99	1.01	46,700	46,000	46,700	47,700	62,500	67,300	70,200	75,800
		July-August-September				October-November-December			
0.01	100	25,700	27,300	27,900	28,900	2,670	4,300	6,510	8,110
0.02	50	26,500	28,100	28,700	29,600	3,410	5,270	7,560	9,270
0.05	20	28,000	29,500	30,000	30,900	4,850	7,040	9,400	11,300
0.10	10	29,500	30,800	31,400	32,300	6,510	8,980	11,300	13,400
0.20	5	31,600	32,800	33,400	34,200	9,120	11,900	14,100	16,400
0.50	2	36,500	37,500	38,200	39,100	16,300	19,200	20,900	23,700
0.80	1.25	43,100	43,900	44,800	46,200	26,900	29,000	29,900	33,800
0.90	1.11	47,400	48,200	49,300	51,100	33,900	35,200	35,700	40,400
0.96	1.04	52,800	53,700	54,900	57,500	42,500	42,400	42,700	48,700
0.98	1.02	56,800	57,900	59,200	62,400	48,600	47,400	47,700	54,700
0.99	1.01	60,800	62,100	63,500	67,400	54,400	52,100	52,500	60,600

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 September 1988.

GAGE.--Water-stage recorder. Datum of gage is 1,085.83 ft above NGVD. Prior to Sept. 15, 1980, on downstream end of right pier at same datum.

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.

Rating table number 14, developed October 1986

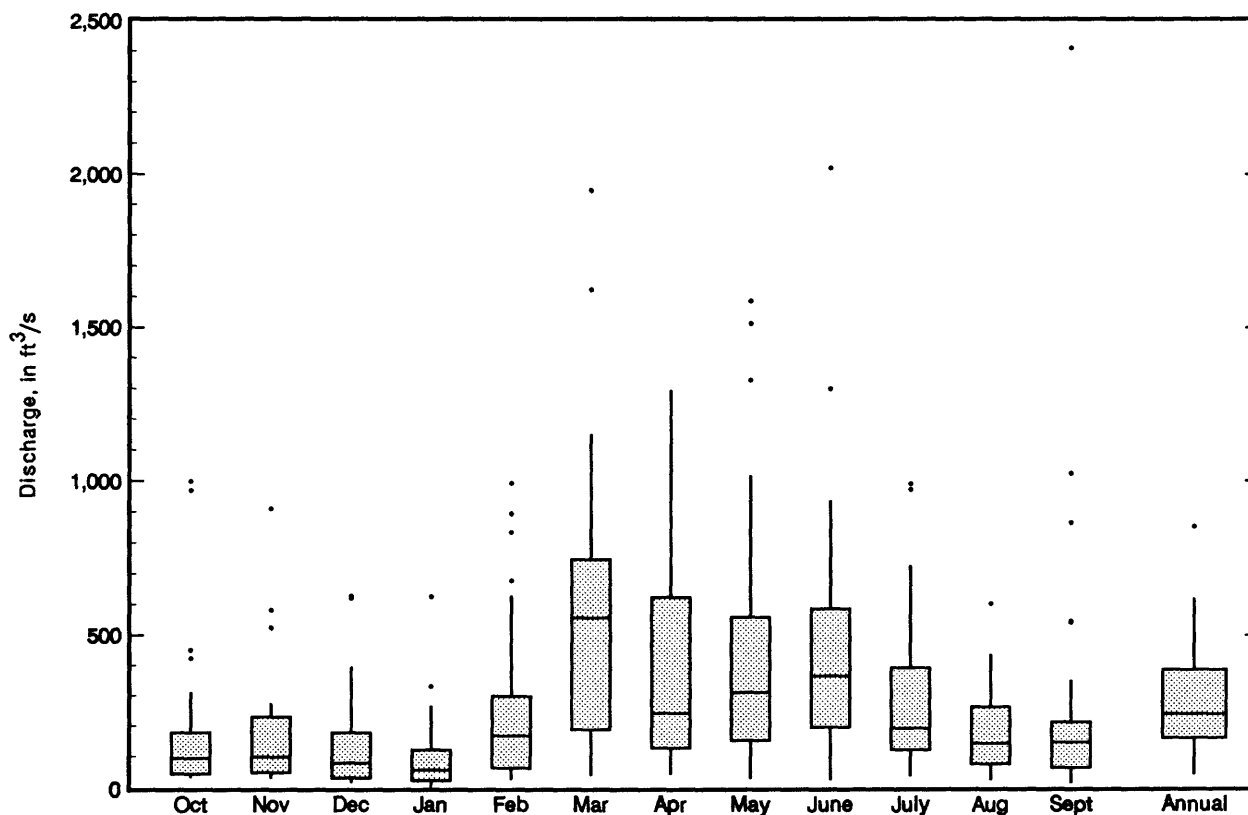
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
1.0	50	7.0	2,410
1.5	112	9.0	4,900
2.0	199	11.0	5,930
3.0	446	13.0	8,270
4.0	791	19.0	17,600
5.0	1,230		

NISHNABOTNA RIVER BASIN
06807410 WEST NISHNABOTNA RIVER AT HANCOCK, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	998	1987	35.3	1972	189	246	5.3
November	910	1973	32.1	1971	174	197	4.8
December	628	1973	17.9	1971	145	168	4.0
January	625	1973	4.58	1971	106	131	3.0
February	993	1983	27.2	1967	274	280	7.6
March	1,946	1979	40.3	1968	571	489	15.9
April	1,295	1983	45.6	1968	408	373	11.4
May	1,586	1973	30.1	1967	466	434	13.0
June	2,019	1984	26.7	1977	476	434	13.3
July	990	1986	38.4	1970	302	267	8.4
August	603	1987	26.4	1968	189	144	5.3
September	2,412	1972	14.7	1971	287	475	8.0
Annual	854	1973	42.4	1968	299	192	100.0

Boxplots of monthly and annual mean discharges



NISHNABOTNA RIVER BASIN

06807410 WEST NISHNABOTNA RIVER AT HANCOCK, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	2.5	2.7	31	25	19	13	16	15	12	13	25	12	12
95	9.8	16	39	38	29	26	32	22	17	25	30	16	20
90	16	22	48	49	46	58	42	30	25	31	35	20	30
85	18	29	58	63	79	89	62	41	39	37	39	25	39
80	21	36	74	89	106	114	86	51	46	42	42	30	47
75	25	46	98	113	124	140	103	61	52	47	47	35	56
70	30	53	122	133	142	161	115	72	58	53	54	40	70
65	37	63	145	153	161	186	127	82	72	62	62	46	87
60	46	79	167	173	183	213	143	93	89	78	73	55	103
55	51	88	192	198	210	244	161	108	105	89	92	65	120
50	56	98	217	226	243	276	181	130	119	100	108	75	138
45	65	117	249	271	280	314	203	146	133	112	118	88	159
40	76	141	283	327	323	354	227	162	145	124	129	102	184
35	94	169	353	394	369	401	260	180	158	141	153	117	212
30	110	198	453	457	431	479	296	200	170	160	179	136	251
25	127	231	592	528	507	562	353	219	199	193	207	168	296
20	168	274	757	625	705	645	422	259	233	252	238	211	371
15	211	350	966	764	885	805	513	307	297	329	274	279	476
10	270	497	1,360	972	1,120	1,060	654	375	445	445	427	353	659
5	355	1,040	2,220	1,370	1,580	1,670	911	501	659	713	652	445	1,060

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	—	267	165	98	62
0.95	1.05	2,690	580	374	241	166
0.90	1.11	3,610	858	558	373	262
0.80	1.25	5,030	1,350	880	602	431
0.50	2	8,950	3,020	1,920	1,300	937
0.20	5	14,800	6,220	3,720	2,370	1,650
0.10	10	18,600	8,810	5,040	3,050	2,060
0.04	25	23,400	12,500	6,740	3,810	2,490
0.02	50	26,800	15,500	8,000	4,310	2,740
0.01	100	30,000	18,600	9,240	4,740	2,950

NISHNABOTNA RIVER BASIN
06807410 WEST NISHNABOTNA RIVER AT HANCOCK, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	1.9	1.9	2.1	2.3	2.6	5.1	8.2	11	13
0.02	50	2.7	2.8	3.1	3.4	3.9	6.8	10	14	16
0.05	20	4.7	4.8	5.2	5.7	6.7	11	15	19	22
0.10	10	7.5	7.6	8.3	9.0	11	15	21	26	31
0.20	5	13	13	14	15	18	24	31	37	45
0.50	2	34	35	36	39	47	56	66	75	97
0.80	1.25	80	83	86	93	108	127	143	157	220
0.90	1.11	122	126	132	142	160	193	216	236	343
0.96	1.04	185	194	202	217	237	298	338	366	557
0.98	1.02	239	251	262	281	301	393	451	489	769
0.99	1.01	298	315	330	352	369	503	586	637	1,030

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	2.1	2.3	2.4	3.0	4.8	6.2	8.3	11
0.02	50	3.1	3.4	3.6	4.4	7.4	9.3	12	16
0.05	20	5.5	5.9	6.2	7.8	14	17	21	27
0.10	10	9.1	9.6	10	13	23	27	33	42
0.20	5	16	17	18	22	41	48	56	71
0.50	2	44	45	48	58	115	131	147	179
0.80	1.25	107	113	120	139	279	318	352	419
0.90	1.11	164	176	188	211	421	484	536	635
0.96	1.04	251	277	295	321	628	734	821	969
0.98	1.02	326	365	389	414	798	944	1,070	1,260
0.99	1.01	408	465	495	515	977	1,170	1,340	1,580
		July-August-September				October-November-December			
0.01	100	4.8	5.7	6.8	10	4.8	5.8	7.0	10.0
0.02	50	6.8	7.9	9.3	14	6.0	7.3	8.7	12
0.05	20	11	13	15	21	8.6	10	12	17
0.10	10	17	19	21	30	12	15	17	22
0.20	5	27	30	33	45	18	22	25	32
0.50	2	59	66	72	92	42	50	56	69
0.80	1.25	119	130	142	177	104	122	131	156
0.90	1.11	164	178	195	241	172	197	209	247
0.96	1.04	224	242	268	330	301	336	346	410
0.98	1.02	270	290	324	399	436	478	485	575
0.99	1.01	316	339	381	471	613	660	659	787

NISHNABOTNA RIVER BASIN
06808000 MULE CREEK NEAR MALVERN, IA

LOCATION.--Lat 40°56'36" long 95°35'42", in NE1/4 SE1/4 sec. 19, T.71 N., R.41 W., Mills County, Hydrologic Unit 10240002, on right bank 170 ft from culvert on county highway L63, 0.2 mi downstream from unnamed tributary, 1.8 mi upstream from mouth and 4.3 mi south of Malvern.

DRAINAGE AREA.--10.6 mi².

PERIOD OF RECORD.--June 1954 to September 1969 (discontinued).

GAGE.--Water-stage recorder. Datum of gage is 874.20 ft above mean sea level (levels by Soil Conservation Service). Prior to Oct. 1, 1964, water-stage recorder at site 180 ft downstream. Oct. 1, 1964 to Mar. 25, 1965, nonrecording gage with supplemental water-stage recorder at site 180 ft downstream. Mar. 26 to July 13, 1965, nonrecording gages at various locations.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,070 ft³/s Aug. 21, 1954, gage height, 15.84 ft, from rating curve extended above 510 ft³/s on basis of slope-area measurement of peak flow; no flow Jan. 20-25, 1956.

Rating table number 3, developed March 1961
(A discharge measurement to validate this rating
has not been made since March 1961.)

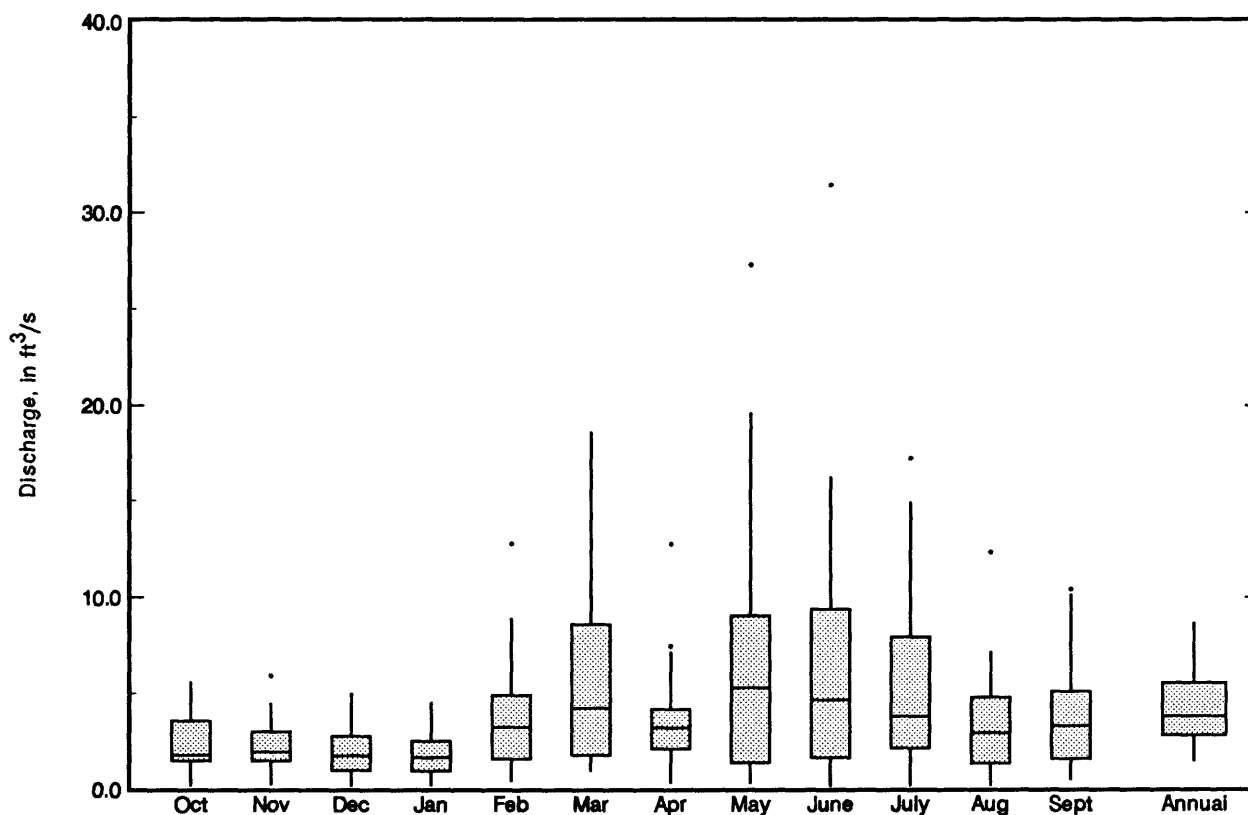
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
3.0	3.8	7.0	386
3.2	12	8.0	533
3.5	30	9.0	702
4.0	65	10.0	886
5.0	149	11.0	1,080
6.0	256		

NISHNABOTNA RIVER BASIN
06808000 MULE CREEK NEAR MALVERN, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	5.57	1961	0.15	1956	2.46	1.66	4.9
November	5.91	1962	0.21	1956	2.41	1.52	4.8
December	4.98	1962	0.12	1956	1.99	1.34	3.9
January	4.51	1962	0.14	1956	1.80	1.19	3.6
February	12.7	1965	0.39	1957	4.07	3.55	8.0
March	18.6	1965	0.93	1956	5.79	4.97	11.5
April	12.7	1960	0.27	1956	3.92	3.11	7.8
May	27.3	1959	0.24	1956	7.24	7.56	14.3
June	31.4	1967	0.11	1956	7.42	8.19	14.7
July	17.2	1958	0.15	1955	5.90	5.38	11.7
August	12.3	1960	0.15	1955	3.56	3.13	7.0
September	10.4	1965	0.44	1956	3.99	3.33	7.9
Annual	8.66	1965	1.43	1968	4.21	2.04	100.0

Boxplots of monthly and annual mean discharges



NISHNABOTNA RIVER BASIN
06808000 MULE CREEK NEAR MALVERN, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.08	0.17	0.41	0.11	0.11	0.10	0.11	0.11	0.13	0.11	0.12	0.11	0.11
95	0.17	0.19	0.69	0.32	0.29	0.12	0.13	0.18	0.20	0.17	0.27	0.13	0.19
90	0.21	0.32	1.0	1.0	0.52	0.50	0.29	0.33	0.33	0.21	0.70	0.48	0.44
85	0.72	0.68	1.3	1.3	0.73	0.66	0.52	0.58	0.58	0.63	1.0	0.72	0.74
80	0.82	0.90	1.5	1.5	0.98	0.78	0.73	0.83	0.74	1.1	1.2	0.85	0.97
75	0.89	1.1	1.7	1.7	1.3	1.0	1.1	1.0	1.1	1.3	1.4	0.98	1.2
70	0.98	1.2	1.9	1.9	1.5	1.5	1.4	1.2	1.3	1.4	1.5	1.1	1.4
65	1.1	1.4	2.2	2.1	1.8	2.0	1.7	1.5	1.6	1.5	1.6	1.2	1.5
60	1.2	1.5	2.5	2.3	2.1	2.4	1.9	1.7	1.8	1.6	1.7	1.3	1.7
55	1.3	1.7	2.7	2.5	2.5	2.7	2.2	1.9	1.9	1.8	1.9	1.4	2.0
50	1.4	1.9	3.0	2.7	2.8	3.3	2.6	2.1	2.2	1.9	2.0	1.6	2.2
45	1.6	2.2	3.2	3.0	3.2	3.8	3.0	2.3	2.4	2.1	2.2	1.8	2.5
40	1.8	2.6	3.6	3.2	3.6	4.3	3.4	2.5	2.6	2.4	2.5	2.0	2.8
35	2.0	3.1	4.0	3.7	4.1	4.8	3.6	2.7	2.9	2.7	2.8	2.2	3.1
30	2.4	3.5	4.5	4.4	4.9	5.4	3.9	3.0	3.2	3.1	3.0	2.5	3.5
25	2.7	4.0	5.1	5.6	5.7	6.1	4.2	3.4	3.8	3.5	3.3	2.8	4.0
20	3.0	4.9	7.1	6.3	6.4	6.9	4.7	3.9	4.6	4.1	3.7	3.1	4.6
15	3.3	6.1	8.6	7.1	7.3	8.3	5.3	4.5	5.5	4.6	4.1	3.6	5.4
10	3.8	7.8	12	8.2	9.5	12	6.5	5.3	6.6	5.1	4.8	4.4	6.8
5	4.5	15	18	11	19	33	9.9	11	13	5.9	5.5	5.2	11

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	—	1.7	1.6	1.4	1.4
0.95	1.05	—	6.6	5.1	4.0	3.4
0.90	1.11	142	12	8.7	6.6	5.2
0.80	1.25	265	24	15	11	8.1
0.50	2	762	62	35	23	16
0.20	5	1,840	116	60	37	24
0.10	10	2,730	145	73	44	29
0.04	25	3,980	171	84	49	33
0.02	50	4,950	185	90	52	35
0.01	100	5,930	194	95	53	36

NISHNABOTNA RIVER BASIN
06808000 MULE CREEK NEAR MALVERN, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.02	0.03	0.05	0.05	0.08	0.18
0.02	50	0.00	0.00	0.01	0.04	0.05	0.08	0.09	0.13	0.25
0.05	20	0.00	0.00	0.03	0.08	0.11	0.16	0.18	0.25	0.39
0.10	10	0.05	0.06	0.07	0.14	0.19	0.28	0.32	0.41	0.58
0.20	5	0.16	0.18	0.19	0.27	0.36	0.51	0.58	0.71	0.90
0.50	2	0.55	0.58	0.76	0.80	1.0	1.3	1.5	1.7	1.9
0.80	1.25	1.4	1.4	1.8	1.8	2.3	2.6	3.0	3.2	3.5
0.90	1.11	2.1	2.2	2.4	2.6	3.2	3.5	4.0	4.1	4.6
0.96	1.04	3.2	3.3	2.9	3.6	4.3	4.4	5.1	5.1	5.9
0.98	1.02	4.1	4.2	3.1	4.3	5.1	5.0	5.8	5.7	6.9
0.99	1.01	5.2	5.2	3.3	5.0	5.8	5.6	6.4	6.2	7.9

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.05	0.00	0.03	0.06	0.03	0.05	0.05	0.06
0.02	50	0.08	0.01	0.05	0.10	0.05	0.08	0.09	0.10
0.05	20	0.16	0.04	0.11	0.19	0.09	0.14	0.17	0.22
0.10	10	0.26	0.11	0.22	0.32	0.16	0.25	0.30	0.39
0.20	5	0.45	0.30	0.42	0.58	0.32	0.46	0.55	0.74
0.50	2	1.0	1.1	1.2	1.4	0.99	1.3	1.5	2.1
0.80	1.25	1.9	2.2	2.3	2.7	2.6	3.0	3.5	4.4
0.90	1.11	2.4	2.6	3.0	3.5	4.1	4.5	5.0	6.0
0.96	1.04	2.9	2.8	3.7	4.3	6.2	6.4	6.9	7.9
0.98	1.02	3.2	2.9	4.1	4.7	8.0	7.9	8.3	9.1
0.99	1.01	3.4	2.9	4.3	5.1	9.9	9.5	9.6	10
		July-August-September				October-November-December			
0.01	100	0.03	0.03	0.04	0.05	0.03	0.04	0.05	0.06
0.02	50	0.04	0.06	0.06	0.08	0.05	0.07	0.08	0.10
0.05	20	0.08	0.11	0.13	0.17	0.10	0.14	0.16	0.20
0.10	10	0.14	0.20	0.23	0.31	0.18	0.24	0.29	0.35
0.20	5	0.25	0.38	0.43	0.58	0.33	0.43	0.55	0.65
0.50	2	0.71	1.0	1.2	1.6	0.92	1.1	1.4	1.6
0.80	1.25	1.8	2.3	2.7	3.2	2.1	2.3	2.7	3.0
0.90	1.11	2.8	3.2	3.7	4.3	3.0	3.1	3.4	3.7
0.96	1.04	4.2	4.4	5.0	5.4	4.1	4.1	4.1	4.4
0.98	1.02	5.5	5.2	5.8	6.1	4.9	4.7	4.5	4.8
0.99	1.01	6.8	5.9	6.6	6.7	5.7	5.3	4.8	5.0

NISHNABOTNA RIVER BASIN
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 September 1988.

GAGE.--Water-stage recorder. 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.

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.

Rating table number 9, developed May 1987

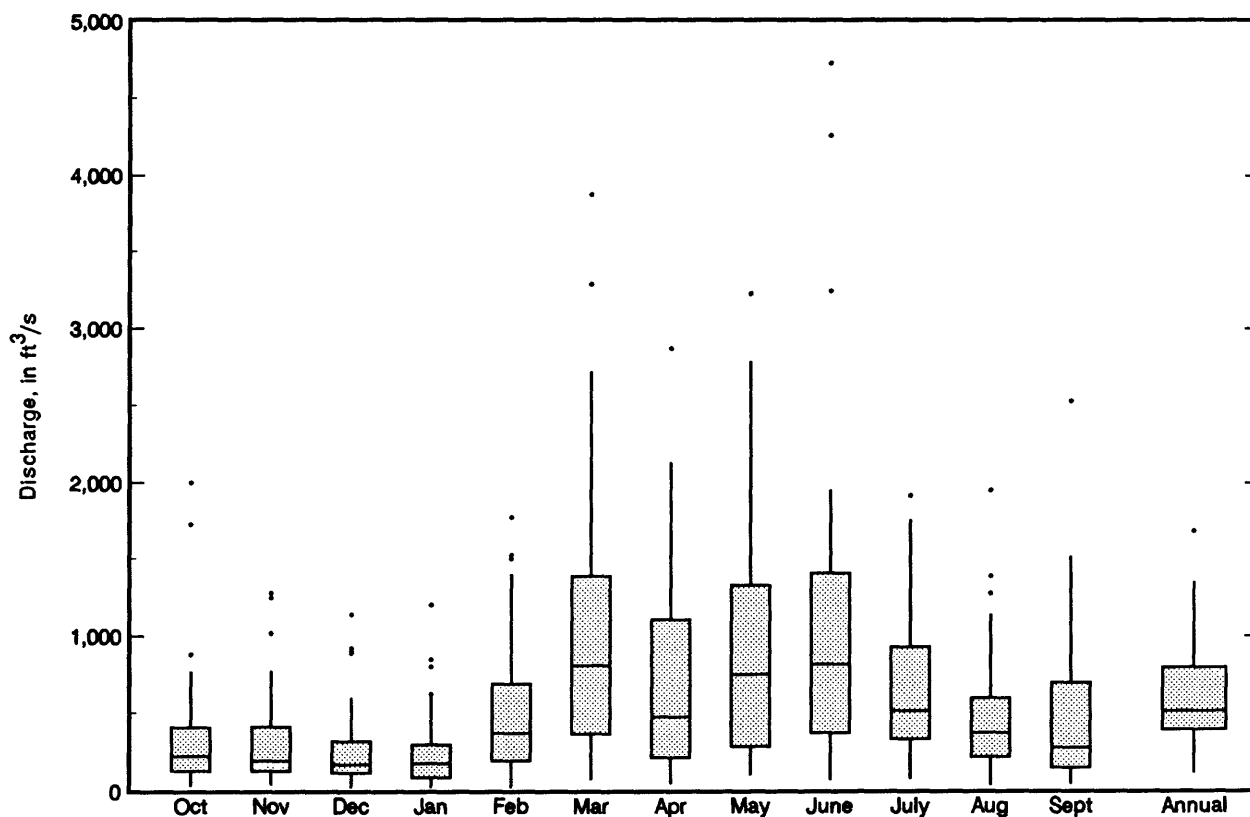
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
7.0	80	11.0	2,380
7.5	220	13.0	3,900
8.0	434	15.0	5,850
8.5	700	19.0	11,650
9.0	1,000	23.0	27,150
10.0	1,680		

NISHNABOTNA RIVER BASIN
06808500 WEST NISHNABOTNA RIVER AT RANDOLPH, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	2,002	1987	27.1	1956	361	404	5.1
November	1,277	1973	33.6	1956	323	301	4.5
December	1,140	1973	20.6	1956	275	268	3.9
January	1,201	1973	17.4	1956	252	255	3.5
February	1,777	1973	19.4	1956	533	445	7.5
March	3,877	1979	67.8	1956	1,006	882	14.1
April	2,867	1973	42.7	1956	739	655	10.4
May	3,227	1973	97.3	1967	952	819	13.4
June	4,728	1967	65.6	1956	1,044	1,023	14.7
July	1,918	1951	71.2	1954	660	492	9.3
August	1,950	1987	30.1	1955	482	402	6.8
September	2,531	1972	41.0	1955	480	499	6.8
Annual	1,685	1973	111	1968	595	349	100.0

Boxplots of monthly and annual mean discharges



NISHNABOTNA RIVER BASIN

06808500 WEST NISHNABOTNA RIVER AT RANDOLPH, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	13	18	57	37	39	34	39	21	16	23	32	20	23
95	28	50	100	89	86	77	69	57	53	48	76	39	57
90	54	63	132	116	112	111	101	81	69	72	92	65	80
85	61	83	150	135	147	153	129	99	87	88	101	83	100
80	69	99	167	164	194	199	165	119	110	104	111	94	119
75	77	118	204	203	251	261	223	148	124	122	125	105	140
70	87	143	249	250	294	330	269	183	142	142	137	116	164
65	100	168	305	297	333	394	303	217	163	161	149	126	192
60	114	184	363	344	402	451	336	247	188	179	161	139	224
55	138	200	414	396	487	502	369	276	216	197	177	155	259
50	168	222	475	457	574	554	402	302	247	218	203	172	300
45	188	258	541	538	653	631	438	328	278	251	233	199	344
40	208	317	625	637	732	719	497	361	311	286	265	224	397
35	232	385	720	747	812	847	557	399	350	323	309	248	458
30	257	451	838	864	905	984	648	444	415	364	355	273	535
25	297	522	1,030	994	1,080	1,140	750	519	481	410	401	321	637
20	362	634	1,360	1,140	1,340	1,330	866	600	546	479	462	384	771
15	448	825	1,700	1,330	1,650	1,660	1,040	682	679	582	554	482	961
10	587	1,170	2,220	1,690	2,100	2,140	1,300	850	897	755	671	635	1,280
5	821	2,020	3,820	2,190	2,970	3,380	1,930	1,420	1,370	1,200	1,120	876	1,990

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	—	406	297	199	165
0.95	1.05	3,810	1,130	765	513	397
0.90	1.11	5,360	1,800	1,180	793	596
0.80	1.25	7,840	2,960	1,880	1,260	923
0.50	2	14,800	6,250	3,820	2,550	1,820
0.20	5	24,900	10,400	6,280	4,170	2,950
0.10	10	31,400	12,600	7,570	5,000	3,560
0.04	25	38,900	14,600	8,810	5,790	4,160
0.02	50	44,000	15,600	9,500	6,230	4,500
0.01	100	48,700	16,500	10,000	6,560	4,770

NISHNABOTNA RIVER BASIN
06808500 WEST NISHNABOTNA RIVER AT RANDOLPH, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	8.3	8.8	9.4	11	13	17	21	28	30
0.02	50	11	12	13	14	17	22	27	35	39
0.05	20	18	19	20	22	26	33	40	49	56
0.10	10	26	28	29	32	37	46	55	65	77
0.20	5	41	43	45	49	57	69	80	93	112
0.50	2	92	96	100	106	120	144	163	180	226
0.80	1.25	191	200	207	218	241	288	320	344	445
0.90	1.11	273	284	296	310	338	406	450	482	627
0.96	1.04	392	407	424	443	476	580	640	687	895
0.98	1.02	489	506	529	553	589	724	799	863	1,120
0.99	1.01	593	613	642	671	709	881	973	1,060	1,370

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	11	11	12	13	14	18	25	31
0.02	50	15	15	16	18	20	25	34	43
0.05	20	24	24	25	28	34	42	53	67
0.10	10	34	35	36	41	54	66	79	100
0.20	5	53	54	56	65	91	108	126	159
0.50	2	116	119	125	149	229	263	291	367
0.80	1.25	239	251	264	324	514	581	633	799
0.90	1.11	340	363	380	477	752	849	926	1,170
0.96	1.04	488	529	554	711	1,100	1,240	1,370	1,740
0.98	1.02	609	669	699	913	1,370	1,560	1,740	2,220
0.99	1.01	740	823	858	1,140	1,670	1,900	2,140	2,750
		July-August-September				October-November-December			
0.01	100	9.1	13	15	20	12	14	17	24
0.02	50	13	18	21	28	16	18	22	30
0.05	20	23	29	33	45	24	27	32	42
0.10	10	35	44	49	67	34	39	45	56
0.20	5	58	71	78	105	52	59	67	81
0.50	2	138	158	171	229	114	131	142	164
0.80	1.25	286	314	337	447	249	282	296	335
0.90	1.11	399	429	462	609	372	418	437	487
0.96	1.04	549	580	627	821	570	631	657	730
0.98	1.02	662	693	753	980	749	820	852	949
0.99	1.01	775	805	878	1,140	956	1,040	1,080	1,200

NISNABOTNA RIVER BASIN
06809000 DAVIDS CREEK NEAR HAMLIN, IA

LOCATION.--Lat 41°40'25", long 94°48'20", in NE1/4 NE1/4 sec. 9, T.79 N., R.34 W., Audubon County, Hydrologic Unit 10240003, on left bank 20 ft downstream from bridge on State Highway 64, 5.2 mi east of Hamlin and 8.0 mi upstream from mouth.

DRAINAGE AREA.--26.0 mi².

PERIOD OF RECORD.--June 1952 to September 1973 (discontinued).

GAGE.--Water-stage recorder. Datum of gage is 1,261.54 ft above mean sea level. Prior to Oct. 1, 1972, at datum 5.0 ft higher.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 22,700 ft³/s July 2, 1958, gage height, 24.35 ft, present datum, from rating curve extended above 500 ft³/s on basis of slope-area measurement of peak flow; no flow on many days in 1952-56 and 1972.

Rating table number 21, developed July 1973
(A discharge measurement to validate this rating
has not been made since October 1973.)

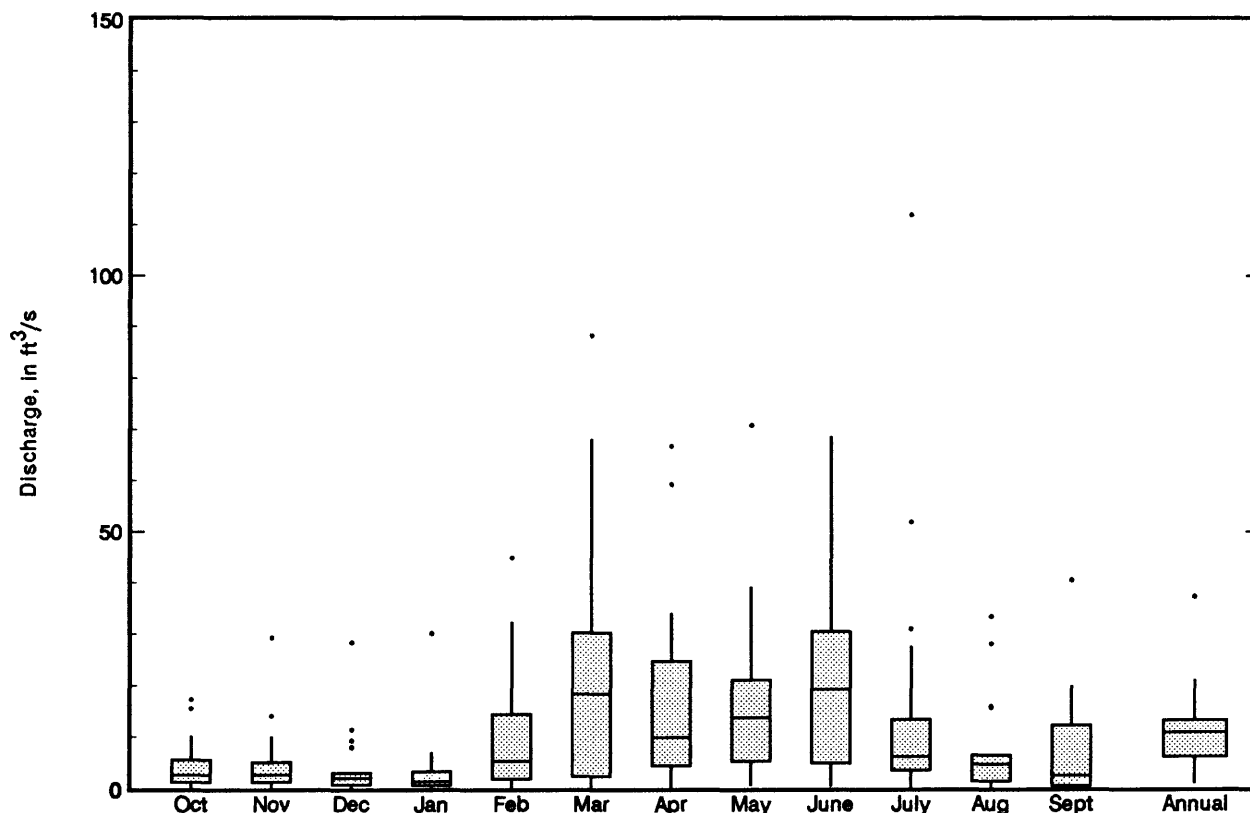
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
4.5	6.0	7.2	151
4.7	12	7.8	205
5.0	22	9.5	405
5.5	42	10.5	545
6.0	67	11.5	705
6.5	98		

NISNABOTNA RIVER BASIN
06809000 DAVIDS CREEK NEAR HAMLIN, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	17.2	1962	0.11	1956	4.33	4.72	3.2
November	29.2	1973	0.10	1956	5.08	6.59	3.7
December	28.3	1973	0.010	1956	4.13	6.42	3.0
January	30.1	1973	0.000	1956	3.34	6.46	2.5
February	44.8	1971	0.000	1956	10.5	12.2	7.7
March	88.2	1969	0.19	1956	24.3	25.2	17.9
April	66.7	1973	0.13	1956	17.0	18.2	12.5
May	70.8	1973	0.56	1956	16.2	16.2	12.0
June	68.6	1967	0.45	1968	20.9	18.7	15.4
July	112	1958	0.18	1968	15.1	24.9	11.1
August	33.3	1952	0.020	1955	7.34	9.03	5.4
September	40.5	1972	0.030	1953	7.54	9.90	5.5
Annual	37.2	1973	0.98	1968	11.1	8.30	100.0

Boxplots of monthly and annual mean discharges



NISNABOTNA RIVER BASIN
06809000 DAVIDS CREEK NEAR HAMLIN, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.00	0.00	0.01	0.09	0.01	0.09	0.09	0.00	0.00	0.08	0.09	0.00	0.00
95	0.01	0.01	0.40	0.36	0.62	0.38	0.14	0.10	0.01	0.10	0.16	0.01	0.10
90	0.04	0.18	0.79	0.95	0.90	0.68	0.24	0.17	0.12	0.21	0.59	0.17	0.26
85	0.10	0.39	1.0	1.4	1.3	1.5	0.58	0.38	0.19	0.34	0.73	0.32	0.51
80	0.17	0.65	1.3	2.3	2.2	2.7	1.3	0.65	0.39	0.49	0.93	0.42	0.76
75	0.35	0.86	1.7	3.0	3.5	3.9	1.9	0.79	0.57	0.77	1.2	0.67	1.0
70	0.47	0.98	2.2	3.8	5.1	5.0	2.5	1.1	0.80	1.0	1.4	0.86	1.4
65	0.65	1.1	2.7	4.7	6.6	6.1	3.5	1.5	1.1	1.3	1.6	1.1	1.7
60	0.80	1.4	3.6	5.8	7.6	7.1	4.3	1.8	1.3	1.5	2.1	1.3	2.1
55	1.1	1.7	5.4	7.1	8.6	8.2	5.0	2.1	1.5	1.8	2.4	1.5	2.7
50	1.3	2.5	7.3	8.4	10	9.6	5.8	2.6	1.9	2.2	2.7	1.7	3.3
45	1.5	3.1	9.5	10	12	11	6.7	3.1	2.4	2.6	2.9	1.9	4.2
40	1.8	3.8	12	12	13	13	7.8	3.8	3.0	2.9	3.3	2.1	5.3
35	2.2	4.6	14	15	15	15	9.2	4.6	3.8	3.3	3.8	2.5	6.6
30	2.9	5.8	17	18	16	18	11	5.6	4.7	4.0	4.3	3.1	8.2
25	3.7	8.5	20	21	18	21	14	7.2	6.2	4.9	5.4	4.4	11
20	4.6	12	28	24	22	24	16	9.5	8.1	6.0	7.4	6.5	14
15	5.5	18	43	29	28	31	20	12	11	7.9	9.9	8.1	18
10	6.6	25	61	39	36	41	26	16	15	13	12	11	24
5	17	44	113	63	57	66	42	23	27	17	21	18	41

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	—	5.9	3.8	2.7	1.6
0.95	1.05	165	23	15	9.9	6.2
0.90	1.11	239	43	28	18	11
0.80	1.25	374	80	53	32	21
0.50	2	892	197	124	74	49
0.20	5	2,140	342	201	120	80
0.10	10	3,400	407	231	139	92
0.04	25	5,590	460	252	153	102
0.02	50	7,710	484	261	159	106
0.01	100	10,300	499	265	162	108

NISNABOTNA RIVER BASIN
06809000 DAVIDS CREEK NEAR HAMLIN, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.03
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.05
0.05	20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.14
0.10	10	0.00	0.00	0.00	0.00	0.02	0.06	0.24	0.21	0.30
0.20	5	0.00	0.00	0.00	0.04	0.09	0.20	0.45	0.50	0.68
0.50	2	0.39	0.40	0.41	0.42	0.53	0.93	1.2	1.8	2.4
0.80	1.25	1.2	1.3	1.3	1.4	1.8	2.6	2.9	4.2	6.1
0.90	1.11	1.7	1.8	2.0	2.3	3.0	3.8	4.5	5.6	8.9
0.96	1.04	2.2	2.4	2.6	3.5	4.7	5.4	7.0	7.0	12
0.98	1.02	2.6	2.8	3.0	4.5	6.1	6.4	9.2	7.7	14
0.99	1.01	2.8	3.1	3.4	5.4	7.4	7.4	12	8.2	16

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.01	0.01	0.01	0.01	0.13	0.15	0.03	0.06
0.02	50	0.02	0.02	0.02	0.02	0.20	0.23	0.06	0.13
0.05	20	0.05	0.04	0.05	0.06	0.38	0.44	0.19	0.33
0.10	10	0.10	0.09	0.10	0.12	0.64	0.76	0.44	0.71
0.20	5	0.24	0.20	0.22	0.28	1.2	1.4	1.1	1.6
0.50	2	0.97	0.85	0.91	1.1	3.3	4.0	4.5	5.9
0.80	1.25	2.9	2.8	3.1	3.8	8.0	9.4	12	15
0.90	1.11	4.6	5.0	5.6	6.5	12	14	17	22
0.96	1.04	7.0	8.4	9.9	11	17	20	23	30
0.98	1.02	8.8	12	14	15	22	25	27	35
0.99	1.01	11	15	19	20	26	30	30	40
		July-August-September				October-November-December			
0.01	100	0.02	0.03	0.03	0.01	0.04	0.05	0.01	0.12
0.02	50	0.04	0.04	0.05	0.02	0.06	0.07	0.02	0.16
0.05	20	0.08	0.09	0.11	0.07	0.09	0.12	0.05	0.25
0.10	10	0.14	0.16	0.20	0.16	0.14	0.19	0.11	0.38
0.20	5	0.27	0.33	0.41	0.40	0.23	0.33	0.29	0.62
0.50	2	0.92	1.2	1.4	1.8	0.62	0.92	1.3	1.6
0.80	1.25	2.8	3.7	4.3	6.0	1.7	2.5	3.7	4.2
0.90	1.11	4.8	6.4	7.1	9.9	2.9	4.2	5.5	6.9
0.96	1.04	8.3	11	12	16	5.0	7.3	7.8	12
0.98	1.02	12	15	16	20	7.3	10	9.3	17
0.99	1.01	16	21	20	25	10	14	11	23

NISHNABOTNA RIVER BASIN

06809210 EAST NISHNABOTNA RIVER NEAR ATLANTIC, IA

LOCATION.--Lat 41°20'46", long 95°04'36", in NW1/4 NW1/4 sec.35, T.76 N., R.37 W., Cass County, Hydrologic Unit 10240003, on left bank at downstream side of bridge on county highway, 1.6 mi upstream from Turkey Creek, 5.2 mi southwest of junction of U.S. Highway 6 and State Highway 83 in Atlantic, 69.1 mi upstream from confluence with West Nishnabotna River and at mile 84.6 upstream from mouth of Nishnabotna River.

DRAINAGE AREA.--436 mi².

PERIOD OF RECORD.--October 1960 to September 1988.

GAGE.--Water-stage recorder. Datum of gage is 1,105.83 ft above NGVD. Prior to Oct. 1, 1970, at site 2.2 mi upstream at datum 5.00 ft higher.

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.

Rating table number 12, developed December 1983

Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
3.0	34	8.0	2,540
3.2	74	10.0	4,380
3.5	156	14.0	9,880
4.0	322	16.0	13,900
4.5	505	18.0	19,000
5.0	704	22.0	32,300
6.0	1,200		

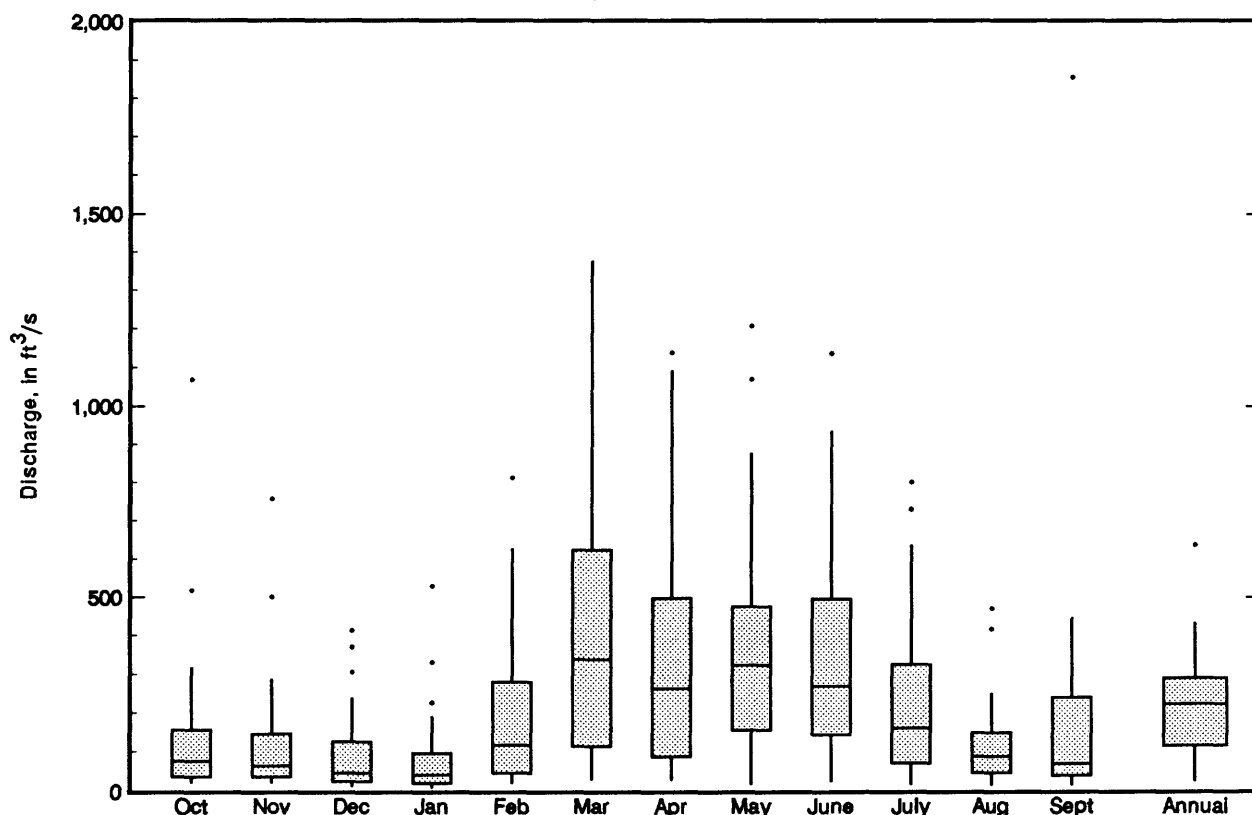
NISHNABOTNA RIVER BASIN

06809210 EAST NISHNABOTNA RIVER NEAR ATLANTIC, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	1,069	1987	21.0	1967	145	210	5.3
November	757	1973	20.3	1969	126	160	4.6
December	414	1973	10.6	1964	98.2	112	3.6
January	529	1973	7.68	1971	84.5	114	3.1
February	812	1971	18.7	1967	201	207	7.4
March	1,378	1965	28.4	1968	442	403	16.3
April	1,139	1973	27.9	1981	350	327	12.9
May	1,208	1986	15.0	1967	373	324	13.7
June	1,137	1984	23.4	1977	356	280	13.1
July	803	1986	15.6	1968	228	220	8.4
August	470	1986	13.4	1968	122	110	4.5
September	1,855	1972	14.8	1971	188	350	6.9
Annual	638	1973	23.7	1968	226	140	100.0

Boxplots of monthly and annual mean discharges



NISHNABOTNA RIVER BASIN
06809210 EAST NISHNABOTNA RIVER NEAR ATLANTIC, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	7.1	8.2	19	19	12	11	11	7.8	8.6	14	14	7.4	8.7
95	9.1	12	25	26	18	18	17	15	14	19	20	11	16
90	13	16	33	35	28	36	28	22	20	22	24	16	21
85	15	19	47	48	45	60	35	26	24	25	27	19	26
80	18	23	62	61	70	80	49	33	28	27	31	22	32
75	21	28	74	71	100	98	63	40	32	35	34	27	40
70	26	35	86	84	121	117	72	47	37	42	41	31	48
65	30	43	99	99	144	139	83	55	42	48	47	35	56
60	35	49	115	121	168	164	95	62	48	54	53	39	65
55	40	55	133	153	196	185	109	69	54	61	59	44	75
50	44	61	154	194	223	205	126	76	61	68	67	50	90
45	49	68	180	238	253	228	145	85	67	75	77	56	108
40	54	76	226	279	284	261	166	95	74	89	91	64	127
35	61	98	278	332	324	294	191	108	86	106	105	73	153
30	71	126	346	391	367	336	218	118	101	124	119	95	186
25	89	169	448	453	441	384	258	130	129	149	134	119	228
20	115	218	559	528	522	455	304	154	159	179	154	147	281
15	148	313	716	623	617	551	364	185	208	213	191	201	362
10	214	476	1,070	806	806	716	458	232	303	284	276	253	502
5	290	820	1,720	1,160	1,200	1,270	709	332	485	552	534	310	805

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	—	123	69	45	36
0.95	1.05	2,250	376	236	159	124
0.90	1.11	3,080	632	411	281	214
0.80	1.25	4,410	1,110	733	504	376
0.50	2	8,250	2,650	1,720	1,160	834
0.20	5	14,300	5,000	3,010	1,910	1,350
0.10	10	18,400	6,420	3,650	2,240	1,570
0.04	25	23,700	7,930	4,220	2,490	1,730
0.02	50	27,600	8,850	4,510	2,610	1,810
0.01	100	31,400	9,600	4,710	2,680	1,850

NISHNABOTNA RIVER BASIN

06809210 EAST NISHNABOTNA RIVER NEAR ATLANTIC, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	2.0	2.7	3.5	3.8	4.2	5.1	6.8	8.7	10
0.02	50	2.7	3.5	4.4	4.8	5.3	6.4	8.4	10	12
0.05	20	4.3	5.2	6.3	6.8	7.6	9.0	12	14	16
0.10	10	6.5	7.4	8.6	9.2	11	12	16	19	22
0.20	5	10	11	13	13	16	18	22	26	31
0.50	2	24	25	27	28	33	39	46	52	66
0.80	1.25	52	53	56	59	70	86	100	109	151
0.90	1.11	77	80	83	88	105	132	151	164	241
0.96	1.04	113	122	128	134	161	211	238	257	407
0.98	1.02	143	160	168	177	212	287	322	346	579
0.99	1.01	177	203	216	227	273	381	425	454	802

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	3.4	3.9	4.3	5.7	3.5	4.3	5.1	6.3
0.02	50	4.4	4.9	5.3	6.9	5.3	6.6	7.7	9.7
0.05	20	6.5	7.0	7.5	9.3	9.8	12	14	18
0.10	10	9.1	9.7	10	12	16	20	23	30
0.20	5	14	14	15	18	29	36	41	52
0.50	2	31	33	34	40	77	94	107	139
0.80	1.25	70	77	81	98	180	214	244	318
0.90	1.11	107	124	131	166	266	310	355	463
0.96	1.04	169	208	222	299	387	444	509	664
0.98	1.02	228	293	317	448	483	548	630	821
0.99	1.01	298	402	438	653	583	653	752	980
		July-August-September				October-November-December			
0.01	100	2.4	5.8	6.2	8.6	4.3	4.3	4.8	6.6
0.02	50	3.5	7.3	7.8	11	5.4	5.5	6.1	8.1
0.05	20	6.0	10	11	15	7.6	8.0	8.8	11
0.10	10	9.4	14	15	20	10	11	12	15
0.20	5	16	20	21	29	15	17	19	22
0.50	2	36	39	42	56	34	38	42	47
0.80	1.25	71	75	83	105	77	89	96	108
0.90	1.11	95	105	116	145	121	139	152	172
0.96	1.04	126	150	167	202	198	226	248	289
0.98	1.02	148	189	211	249	275	311	343	410
0.99	1.01	168	231	259	299	372	415	461	565

NISHNABOTNA RIVER BASIN
06809500 EAST NISHNABOTNA RIVER AT RED OAK, IA

LOCATION.—Lat 41°00'31", long 95°14'29", in NW1/4 SE1/4 sec.29, T.72 N., R.38 W., Montgomery County, Hydrologic Unit 10240003, on left bank on downstream side of Coolbaugh Street bridge in Red Oak and 0.2 mi upstream from Red Oak Creek, 38.0 mi upstream from confluence with West Nishnabotna River and at mile 53.6 upstream from mouth of Nishnabotna River. Gage shelter relocated July 28, 1988 to upstream side of Coolbaugh Street and 200 ft left of left end of Coolbaugh Street bridge in Red Oak.

DRAINAGE AREA.—894 mi².

PERIOD OF RECORD.—May 1918 to July 1925, May 1936 to September 1988.

GAGE.—Water-stage recorder. Datum of gage is 1,005.45 ft above NGVD. Prior to July 5, 1925, nonrecording gage at present site at datum 4.60 ft higher. May 29, 1936 to Nov. 13, 1952, nonrecording gage with supplementary water-stage recorder in operation above 3.2 ft gage height July 30, 1939 to Nov. 13, 1952, and Nov. 14, 1952 to June 13, 1966, water-stage recorder, all at site 0.5 mi upstream at datum 5.00 ft higher. June 14, 1966 to Sept. 30, 1969, at present site at datum 5.00 ft higher.

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.

Rating table number 19, developed October 1985

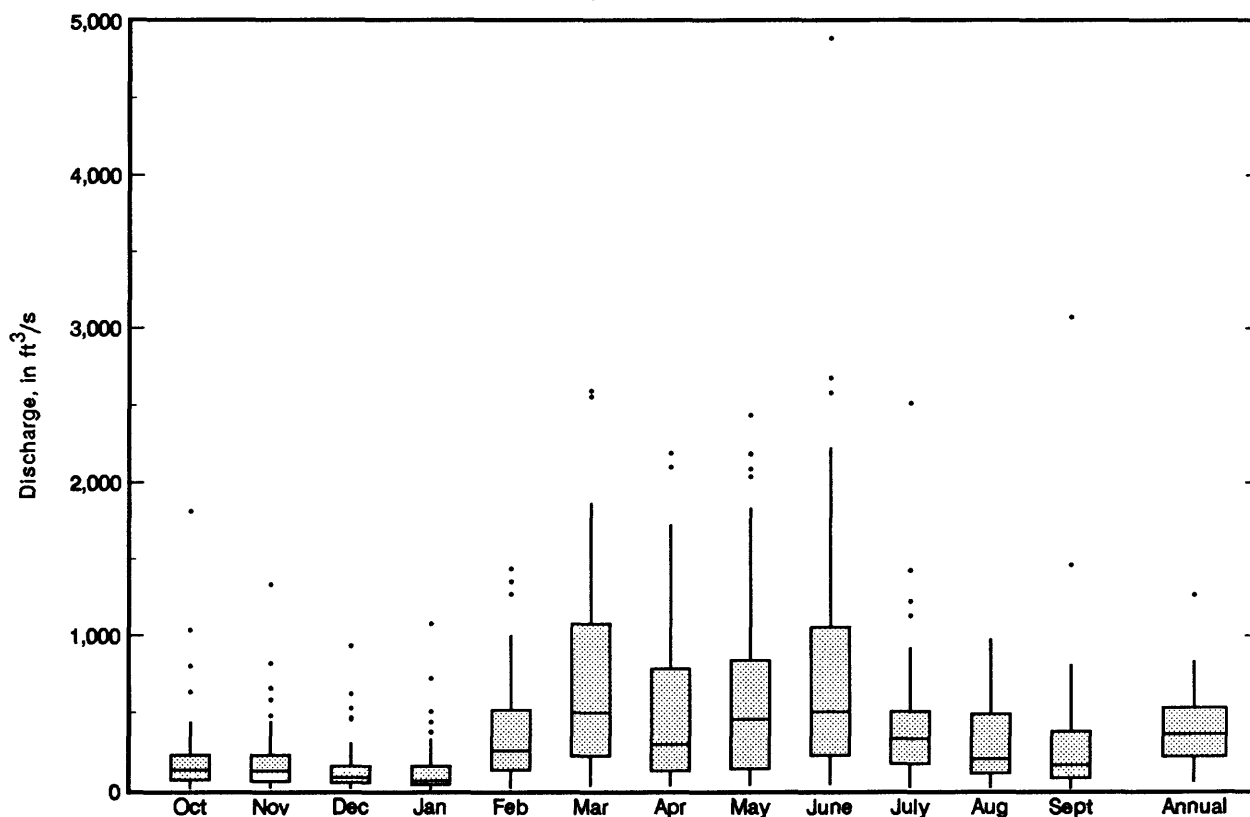
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
4.5	49	9.0	1,920
5.0	130	11.0	3,330
5.5	275	15.0	7,220
6.0	441	19.0	12,600
7.0	858	23.0	19,500
8.0	1,350	27.0	38,000

NISHNABOTNA RIVER BASIN
06809500 EAST NISHNABOTNA RIVER AT RED OAK, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	1,816	1987	16.5	1938	215	283	4.5
November	1,335	1973	19.9	1940	194	222	4.1
December	935	1973	14.6	1938	147	167	3.1
January	1,078	1973	12.3	1940	146	190	3.1
February	1,438	1973	17.2	1940	368	335	7.8
March	2,596	1965	32.3	1938	697	606	14.7
April	2,194	1973	30.4	1956	530	509	11.2
May	2,440	1973	35.2	1939	631	608	13.3
June	4,891	1947	40.5	1968	762	807	16.1
July	2,519	1958	24.5	1936	420	410	8.9
August	977	1946	17.0	1936	312	261	6.6
September	3,074	1972	14.9	1937	324	454	6.8
Annual	1,268	1973	54.9	1968	400	236	100.0

Boxplots of monthly and annual mean discharges



NISHNABOTNA RIVER BASIN

06809500 EAST NISHNABOTNA RIVER AT RED OAK, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	12	14	32	26	26	27	16	15	15	16	18	14	16
95	17	21	55	51	44	41	27	30	26	24	29	21	27
90	22	29	70	68	60	62	44	43	34	32	39	28	37
85	26	40	88	83	73	85	62	53	42	40	47	35	49
80	32	52	110	96	95	111	78	64	51	48	55	43	60
75	37	63	135	116	122	145	104	80	63	55	63	50	71
70	43	74	163	141	159	189	133	97	75	66	71	56	84
65	51	88	191	170	195	235	159	113	88	79	81	63	99
60	60	104	219	203	239	278	182	130	101	93	92	70	118
55	66	123	247	239	287	319	207	146	116	106	104	77	140
50	72	140	282	278	340	366	237	162	133	120	117	86	163
45	80	157	324	322	397	420	268	180	152	137	132	94	192
40	91	193	377	381	458	491	304	199	175	154	149	107	227
35	118	226	439	460	523	568	342	226	205	174	168	121	265
30	140	258	515	554	600	665	393	255	238	195	189	143	320
25	160	317	627	657	694	782	454	303	277	224	218	168	391
20	192	386	811	780	849	931	542	363	329	255	253	202	488
15	236	505	1,100	947	1,090	1,190	662	443	415	325	309	250	630
10	329	815	1,560	1,260	1,470	1,700	851	553	611	432	397	318	873
5	564	1,470	2,810	1,890	2,190	2,910	1,270	1,040	1,070	692	635	479	1,470

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	—	283	195	151	124
0.95	1.05	2,340	889	596	426	321
0.90	1.11	3,280	1,480	976	675	493
0.80	1.25	4,830	2,520	1,620	1,090	775
0.50	2	9,400	5,420	3,340	2,150	1,510
0.20	5	16,700	8,720	5,160	3,260	2,320
0.10	10	21,700	10,200	5,900	3,720	2,690
0.04	25	28,000	11,400	6,470	4,080	3,010
0.02	50	32,600	11,900	6,710	4,230	3,170
0.01	100	37,100	12,300	6,870	4,340	3,280

NISHNABOTNA RIVER BASIN
06809500 EAST NISHNABOTNA RIVER AT RED OAK, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	5.8	6.2	6.9	8.3	9.7	11	14	15	17
0.02	50	7.1	7.6	8.4	10	12	14	17	18	21
0.05	20	9.9	10	11	13	16	19	23	25	31
0.10	10	13	14	15	17	20	25	31	34	43
0.20	5	19	20	21	24	28	35	43	48	63
0.50	2	38	40	42	46	54	67	81	93	129
0.80	1.25	78	81	85	91	107	134	157	180	259
0.90	1.11	115	119	124	132	154	193	223	254	369
0.96	1.04	174	179	187	198	230	288	325	365	535
0.98	1.02	228	234	245	260	299	375	416	461	676
0.99	1.01	291	299	313	332	380	477	519	569	833

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	7.1	7.7	8.2	9.3	9.6	12	15	18
0.02	50	8.8	9.4	10.0	11	13	16	20	24
0.05	20	12	13	14	16	21	25	30	38
0.10	10	16	17	18	21	31	36	44	56
0.20	5	24	25	26	32	50	58	69	89
0.50	2	50	53	56	70	117	137	162	214
0.80	1.25	108	122	130	170	265	316	377	501
0.90	1.11	164	193	209	280	398	486	582	775
0.96	1.04	259	322	353	489	605	763	921	1,230
0.98	1.02	350	453	503	711	787	1,020	1,240	1,640
0.99	1.01	460	621	698	1,010	992	1,310	1,610	2,130
		July-August-September				October-November-December			
0.01	100	5.5	7.4	9.4	12	7.2	8.2	9.7	14
0.02	50	7.5	9.9	12	15	9.0	10	12	17
0.05	20	12	15	18	24	13	14	16	22
0.10	10	18	21	26	34	17	19	22	29
0.20	5	28	33	38	52	25	28	32	40
0.50	2	63	71	80	111	52	60	66	78
0.80	1.25	129	143	160	223	114	131	142	164
0.90	1.11	182	204	225	313	173	200	217	247
0.96	1.04	255	291	320	442	272	317	346	391
0.98	1.02	313	363	399	548	367	430	471	531
0.99	1.01	374	441	485	660	483	568	624	704

NISHNABOTNA RIVER BASIN
06810000 NISHNABOTNA RIVER ABOVE HAMBURG, IA

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.

PERIOD OF RECORD.--March 1922 to September 1923, October 1928 to September 1988.

GAGE.--Water-stage recorder. Datum of gage is 894.17 ft above NGVD.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 55,500 ft³/s June 24, 1947, gage height, 26.03 ft, from floodmark, present site and datum; maximum gage height, 28.14 ft May 27, 1987; minimum daily discharge, 4.5 ft³/s Aug. 30, 1934.

Rating table number 13, developed October 1987

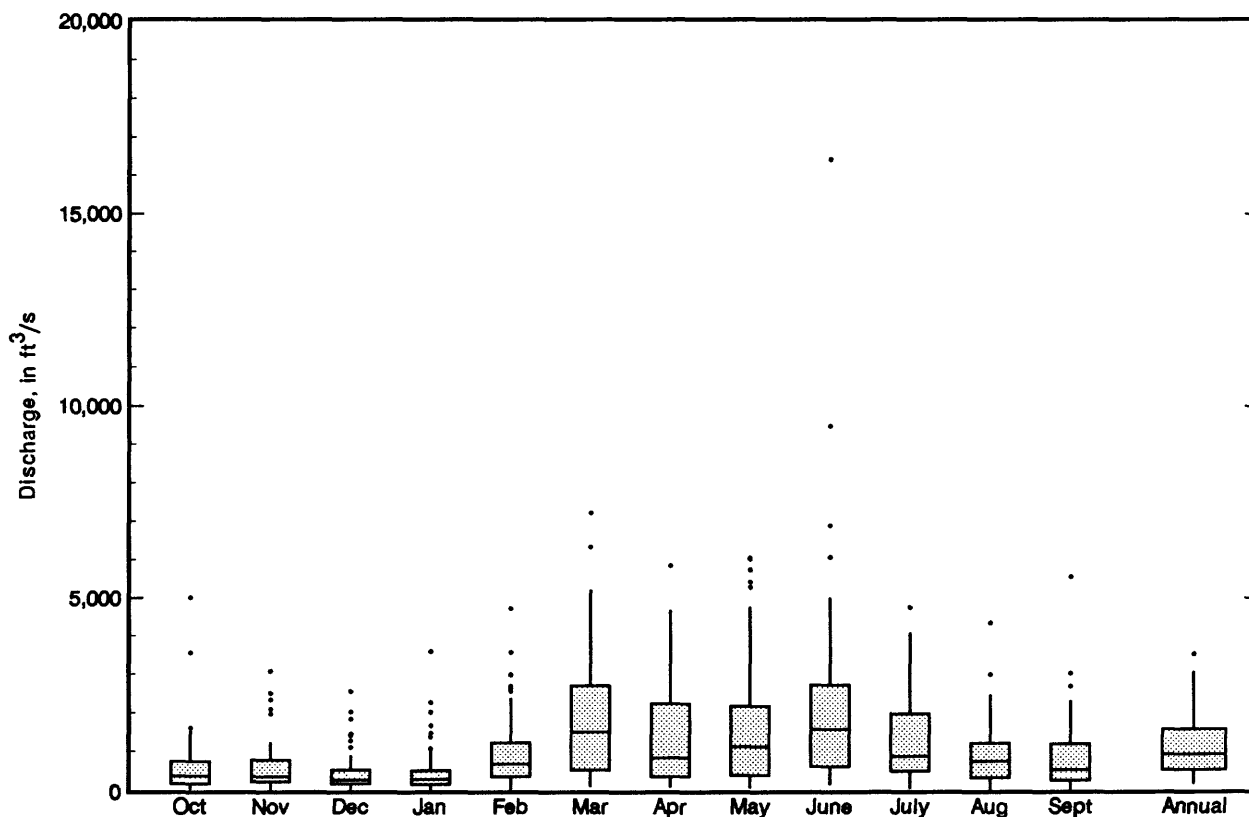
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
7.0	77	12.0	2,240
7.5	163	14.0	3,360
8.0	289	16.0	4,630
8.5	460	20.0	9,610
9.0	678	24.0	18,700
10.0	1,180	28.0	31,800

NISHNABOTNA RIVER BASIN
06810000 NISHNABOTNA RIVER ABOVE HAMBURG, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	5,004	1987	39.5	1938	632	805	4.7
November	3,083	1973	42.9	1938	615	635	4.6
December	2,557	1973	27.1	1938	498	525	3.7
January	3,585	1973	21.3	1940	525	625	3.9
February	4,720	1973	30.3	1940	1,009	942	7.5
March	7,229	1979	115	1931	1,849	1,589	13.7
April	5,866	1973	89.7	1956	1,374	1,319	10.2
May	6,061	1973	68.2	1934	1,661	1,626	12.3
June	16,430	1947	151	1956	2,210	2,557	16.4
July	4,756	1958	52.8	1936	1,269	1,038	9.4
August	4,344	1987	16.8	1934	952	808	7.1
September	5,553	1972	44.1	1937	861	938	6.4
Annual	3,523	1973	170	1934	1,122	724	100.0

Boxplots of monthly and annual mean discharges



NISHNABOTNA RIVER BASIN

06810000 NISHNABOTNA RIVER ABOVE HAMBURG, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	23	25	75	65	55	62	41	16	25	27	42	24	30
95	44	55	139	109	96	118	88	69	52	47	70	49	69
90	67	97	208	185	152	183	129	106	83	78	102	80	107
85	94	134	262	231	205	271	188	143	115	106	146	106	148
80	119	167	327	268	283	337	242	186	149	136	178	135	187
75	143	191	395	331	365	424	304	238	194	174	204	167	227
70	167	227	461	412	456	549	362	295	235	213	230	188	266
65	190	271	572	498	539	690	482	354	276	243	256	209	318
60	220	335	681	581	631	830	595	415	316	274	287	231	373
55	254	387	790	676	772	991	685	479	358	314	326	253	432
50	292	437	901	776	919	1,150	771	551	410	355	364	280	510
45	334	515	1,020	895	1,080	1,310	884	626	464	397	403	327	605
40	381	619	1,210	1,030	1,250	1,510	1,010	709	531	440	442	375	726
35	432	744	1,390	1,250	1,440	1,760	1,170	792	599	503	520	422	858
30	499	890	1,680	1,520	1,670	2,100	1,330	901	707	586	635	482	1,010
25	582	1,070	2,040	1,880	1,970	2,470	1,560	1,030	836	719	777	593	1,230
20	717	1,310	2,490	2,200	2,340	2,980	1,830	1,260	1,020	866	908	761	1,510
15	900	1,770	3,300	2,600	2,970	3,840	2,240	1,540	1,300	1,000	1,070	983	1,960
10	1,310	2,560	4,510	3,140	3,960	5,300	2,870	2,050	1,900	1,330	1,320	1,250	2,610
5	1,980	3,910	6,800	4,580	5,570	8,440	4,160	3,400	3,010	2,080	2,130	1,800	4,090

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	--	813	623	467	347
0.95	1.05	5,450	2,120	1,530	1,080	784
0.90	1.11	7,060	3,280	2,320	1,600	1,150
0.80	1.25	9,440	5,220	3,630	2,460	1,760
0.50	2	15,500	10,500	7,320	4,910	3,500
0.20	5	23,600	17,000	12,200	8,300	5,950
0.10	10	28,500	20,200	14,900	10,300	7,420
0.04	25	34,200	23,300	17,600	12,400	9,040
0.02	50	38,000	24,900	19,200	13,800	10,100
0.01	100	41,600	26,100	20,500	14,900	11,000

NISHNABOTNA RIVER BASIN
06810000 NISHNABOTNA RIVER ABOVE HAMBURG, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	4.7	6.2	7.3	9.5	13	21	32	36	41
0.02	50	7.4	9.2	11	14	18	28	41	46	55
0.05	20	14	17	19	23	30	43	59	68	84
0.10	10	23	27	30	36	45	63	83	96	121
0.20	5	43	48	53	61	74	99	124	143	185
0.50	2	121	129	140	154	179	223	261	302	396
0.80	1.25	299	314	335	354	395	479	542	616	799
0.90	1.11	457	478	508	529	577	701	787	884	1,130
0.96	1.04	690	727	770	789	844	1,040	1,170	1,290	1,590
0.98	1.02	882	937	993	1,010	1,060	1,320	1,500	1,630	1,980
0.99	1.01	1,090	1,160	1,240	1,250	1,300	1,640	1,870	2,020	2,380

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	12	15	17	21	20	25	31	44
0.02	50	17	21	23	29	30	36	44	61
0.05	20	28	33	37	45	51	61	73	99
0.10	10	43	49	54	67	81	95	113	150
0.20	5	72	79	88	109	138	160	189	245
0.50	2	183	196	213	267	358	410	476	603
0.80	1.25	447	468	502	644	854	976	1,120	1,410
0.90	1.11	701	731	777	1,010	1,300	1,490	1,700	2,150
0.96	1.04	1,120	1,170	1,230	1,620	1,990	2,300	2,610	3,330
0.98	1.02	1,500	1,570	1,640	2,200	2,580	3,010	3,400	4,370
0.99	1.01	1,940	2,050	2,120	2,880	3,230	3,810	4,280	5,560
		July-August-September				October-November-December			
0.01	100	5.6	9.0	13	17	9.9	12	16	30
0.02	50	9.3	14	20	26	14	17	22	39
0.05	20	19	26	36	48	23	28	36	57
0.10	10	34	44	58	80	35	43	54	80
0.20	5	65	80	99	140	59	73	88	120
0.50	2	190	216	250	358	154	188	216	262
0.80	1.25	443	495	548	767	394	462	502	568
0.90	1.11	638	718	785	1,070	635	724	764	850
0.96	1.04	890	1,020	1,110	1,460	1,050	1,150	1,180	1,310
0.98	1.02	1,070	1,250	1,360	1,750	1,440	1,540	1,550	1,720
0.99	1.01	1,250	1,490	1,610	2,020	1,920	1,990	1,960	2,210

TARKIO RIVER BASIN
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 1988.

GAGE.--Water-stage recorder and concrete control. Datum of gage is 1,104.67 ft above NGVD.

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.

Rating table number 13, developed October 1987

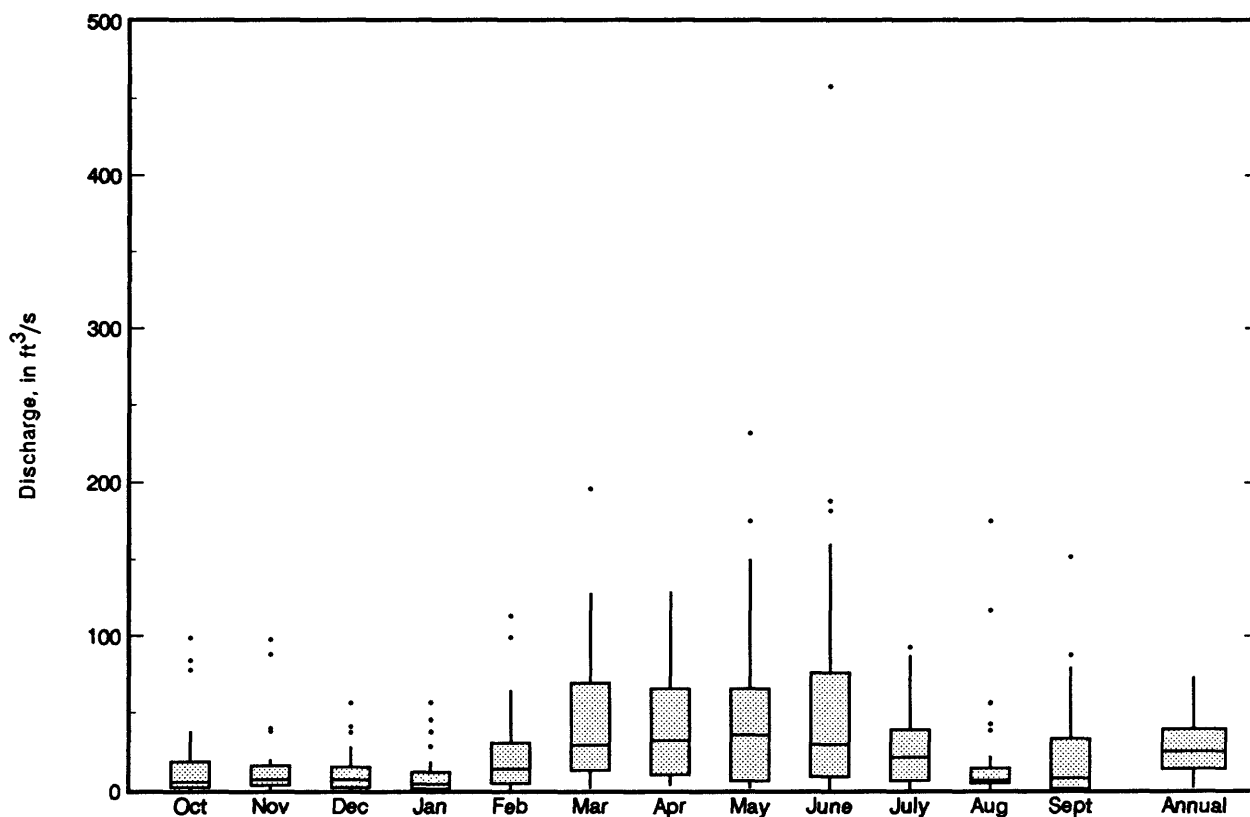
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
8.0	2.5	11.5	584
8.5	4.5	12.0	837
9.0	6.9	13.0	1,480
9.5	30	14.0	2,310
10.0	101	16.0	4,550
10.5	217	18.0	7,560
11.0	378		

TARKIO RIVER BASIN
06811840 TARKIO RIVER AT STANTON, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	98.7	1987	0.30	1969	16.3	25.4	4.6
November	97.9	1978	0.26	1969	15.8	23.3	4.5
December	56.5	1973	0.010	1977	11.7	13.7	3.3
January	57.0	1973	0.000	1977	9.99	14.0	2.8
February	113	1973	0.82	1968	24.6	27.7	7.0
March	196	1979	1.59	1968	45.8	46.9	13.0
April	129	1984	3.18	1968	41.4	37.5	11.7
May	232	1982	1.44	1967	52.9	57.2	15.0
June	458	1967	0.25	1977	62.2	90.7	17.7
July	92.9	1986	0.070	1977	26.3	25.2	7.5
August	175	1987	0.080	1988	19.8	36.8	5.6
September	152	1977	0.14	1968	25.3	35.9	7.2
Annual	73.2	1987	1.46	1968	29.3	19.3	100.0

Boxplots of monthly and annual mean discharges



TARKIO RIVER BASIN
06811840 TARKIO RIVER AT STANTON, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.00	0.01	0.56	1.4	0.51	0.05	0.00	0.00	0.00	0.03	0.14	0.00	0.01
95	0.07	0.34	1.4	2.4	1.6	0.59	0.04	0.03	0.01	0.17	0.48	0.15	0.16
90	0.38	0.81	1.9	3.4	2.8	1.5	0.16	0.08	0.05	0.49	1.1	0.49	0.63
85	0.63	1.3	2.6	4.7	3.7	2.6	0.47	0.21	0.25	0.78	1.5	1.2	1.2
80	0.89	1.7	3.9	5.7	4.7	3.9	1.3	0.61	0.53	1.1	1.9	1.7	1.9
75	1.2	2.3	6.0	6.6	6.0	5.6	3.6	1.1	0.92	1.6	2.5	2.1	2.5
70	1.6	2.8	8.1	7.9	7.5	7.4	5.2	1.8	1.4	2.1	3.4	2.5	3.4
65	2.1	3.4	9.9	10	10	11	7.1	2.6	1.8	2.6	4.2	3.0	4.4
60	2.6	4.1	12	13	13	13	8.9	3.3	2.2	3.4	4.9	3.8	5.5
55	3.2	4.9	14	16	17	16	11	4.1	2.9	4.4	5.7	4.8	6.6
50	3.9	5.9	16	21	21	19	13	4.9	4.0	5.3	6.4	5.8	8.1
45	4.7	6.9	19	25	27	22	15	5.8	5.3	6.2	7.1	6.8	10
40	5.7	8.9	23	30	33	26	17	6.6	6.6	7.1	8.5	8.1	13
35	6.7	12	29	34	39	30	20	7.6	9.0	9.3	10	9.7	16
30	8.2	14	36	41	45	35	23	9.4	13	14	14	12	21
25	11	19	45	48	53	43	28	11	19	19	18	15	26
20	14	33	57	59	66	51	33	14	27	22	22	19	33
15	18	45	72	74	84	66	41	18	38	29	30	25	44
10	26	63	99	99	109	91	53	23	53	40	42	31	62
5	37	98	175	151	160	184	84	47	91	65	64	42	101

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	—	13	7.2	5.1	4.1
0.95	1.05	363	46	27	18	14
0.90	1.11	602	84	48	33	24
0.80	1.25	1,070	158	92	61	44
0.50	2	2,820	426	247	157	108
0.20	5	6,390	869	495	299	204
0.10	10	9,250	1,150	644	378	259
0.04	25	13,200	1,450	798	456	315
0.02	50	16,200	1,630	889	500	347
0.01	100	19,200	1,780	961	533	372

TARKIO RIVER BASIN
06811840 TARKIO RIVER AT STANTON, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.16	0.25
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.23	0.37
0.05	20	0.00	0.00	0.00	0.00	0.02	0.10	0.25	0.41	0.67
0.10	10	0.00	0.00	0.00	0.00	0.08	0.25	0.44	0.69	1.1
0.20	5	0.00	0.00	0.00	0.04	0.22	0.56	0.86	1.3	2.0
0.50	2	0.16	0.20	0.31	0.53	1.1	2.1	2.9	3.8	6.2
0.80	1.25	1.3	1.5	1.9	2.6	4.1	6.7	9.0	11	18
0.90	1.11	3.1	3.8	4.3	5.3	7.5	12	16	19	31
0.96	1.04	7.4	8.7	9.1	10	13	22	28	33	54
0.98	1.02	13	15	15	15	19	33	39	46	76
0.99	1.01	21	24	23	21	25	47	53	63	104

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.03	0.04	0.05	0.38	0.01	0.02	0.06	0.16
0.02	50	0.05	0.06	0.08	0.46	0.03	0.05	0.13	0.30
0.05	20	0.10	0.12	0.15	0.64	0.08	0.17	0.35	0.72
0.10	10	0.19	0.24	0.28	0.88	0.22	0.42	0.79	1.5
0.20	5	0.41	0.50	0.58	1.3	0.63	1.1	1.9	3.2
0.50	2	1.7	2.0	2.2	3.3	3.4	5.3	7.5	12
0.80	1.25	6.5	7.0	7.5	9.6	12	17	20	34
0.90	1.11	13	13	14	18	21	26	30	54
0.96	1.04	25	25	27	36	34	38	42	83
0.98	1.02	39	38	41	59	44	46	50	106
0.99	1.01	57	54	58	94	53	54	58	129
		July-August-September				October-November-December			
0.01	100	0.00	0.00	0.00	0.01	0.01	0.02	0.03	0.15
0.02	50	0.01	0.01	0.01	0.02	0.02	0.03	0.06	0.22
0.05	20	0.03	0.03	0.03	0.07	0.04	0.08	0.16	0.41
0.10	10	0.06	0.09	0.07	0.16	0.09	0.17	0.33	0.69
0.20	5	0.16	0.25	0.21	0.41	0.24	0.41	0.79	1.3
0.50	2	0.82	1.4	1.3	2.1	1.3	1.9	3.3	4.1
0.80	1.25	3.4	5.5	5.8	8.3	6.8	8.1	11	13
0.90	1.11	6.6	10	11	16	15	16	18	22
0.96	1.04	13	18	21	29	35	33	30	40
0.98	1.02	19	24	30	41	58	51	40	58
0.99	1.01	26	31	41	56	91	74	51	81

MISSOURI RIVER MAIN STEM
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 September 1988 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 recorder. 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.

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, 0.65 ft Jan. 7, 1971, result of freezeup.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in 1881 reached a stage of 22.9 ft, from floodmark, discharge not determined.

REMARKS.--Flow regulated by upstream main-stem reservoirs.

Rating table number 4, developed February 1978

Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
0.5	5,300	10.0	42,200
1.0	6,800	12.0	55,300
2.0	9,800	14.0	70,000
4.0	16,450	16.0	87,000
6.0	24,100	18.0	107,000
8.0	322,500		

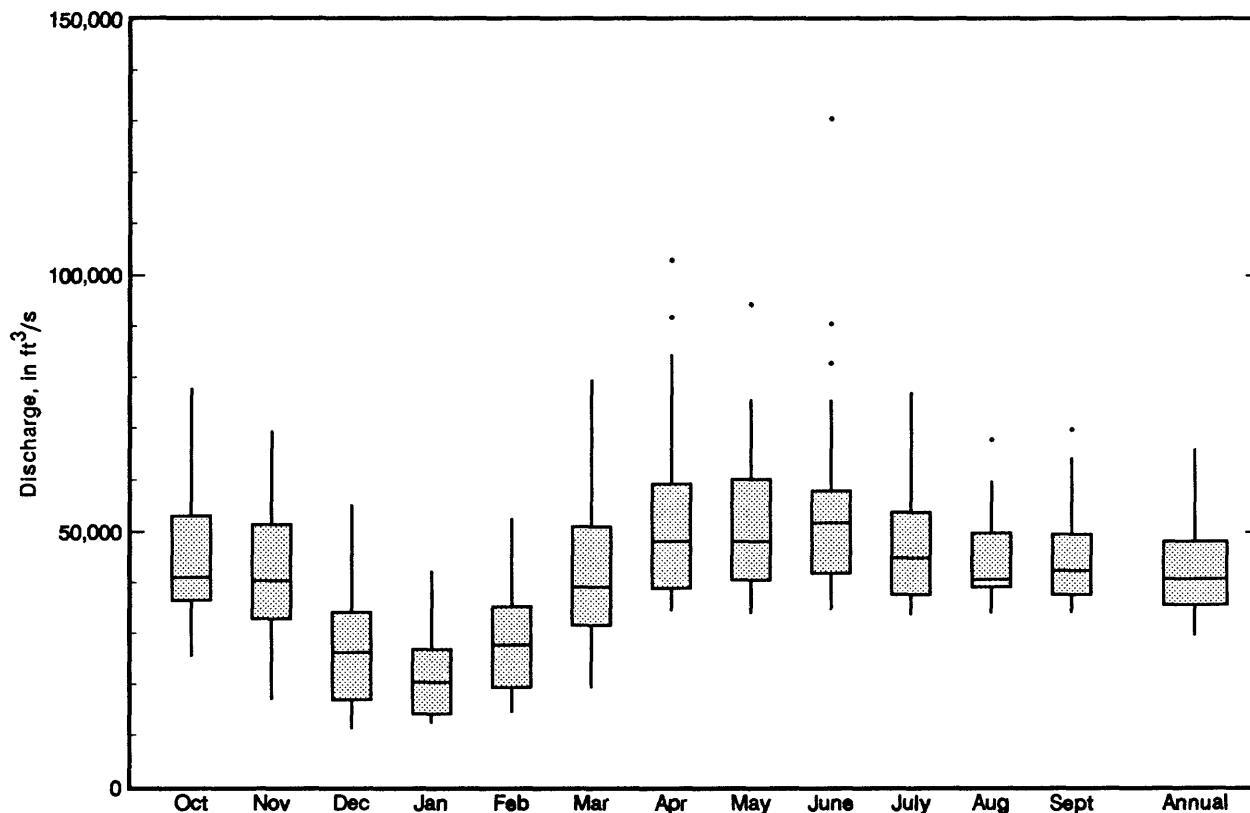
MISSOURI RIVER MAIN STEM
06813500 MISSOURI RIVER AT RULO, NE--Continued

Post-regulation Period

Statistics of monthly and annual mean discharges, post-regulation period

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	77,770	1987	25,580	1962	45,210	11,430	9.0
November	69,430	1976	17,000	1962	42,700	14,240	8.5
December	55,240	1987	11,330	1964	27,280	11,300	5.4
January	42,280	1973	12,430	1964	22,280	8,720	4.4
February	52,560	1983	14,530	1964	28,410	10,440	5.6
March	79,590	1979	19,380	1964	42,630	15,650	8.5
April	102,900	1984	34,520	1983	53,080	17,730	10.5
May	94,370	1984	34,040	1958	51,040	13,650	10.1
June	130,600	1984	34,830	1958	54,410	19,200	10.8
July	77,010	1984	33,860	1963	47,690	11,500	9.5
August	67,800	1975	34,070	1981	44,420	8,524	8.8
September	69,780	1975	34,200	1963	45,240	9,722	9.0
Annual	65,930	1984	29,670	1963	42,060	9,421	100.0

Boxplots of monthly and annual mean discharges, post-regulation period



MISSOURI RIVER MAIN STEM
06813500 MISSOURI RIVER AT RULO, NE--Continued

Monthly and annual flow duration, post-regulation period

Percentage of days discharge equalled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	7,250	9,870	12,900	30,400	30,900	31,100	31,200	30,400	30,800	16,800	14,500	6,410	10,800
95	10,500	13,400	16,700	33,300	33,500	33,800	33,500	32,600	33,300	32,200	16,800	11,600	15,400
90	12,300	14,800	21,200	35,100	34,900	35,400	34,700	33,900	34,300	33,800	21,300	14,100	19,300
85	13,400	15,900	23,200	37,000	36,300	37,100	35,800	35,100	35,400	34,800	26,300	15,400	23,900
80	14,400	17,000	25,300	38,100	37,500	38,600	36,900	36,200	36,400	35,900	33,100	16,200	28,200
75	15,200	18,200	27,400	39,200	38,700	40,100	37,900	37,200	37,400	36,900	34,700	17,000	32,200
70	16,100	19,900	29,600	40,200	39,900	41,600	38,800	37,900	38,100	37,800	36,400	18,700	34,200
65	17,100	21,700	32,400	41,500	41,000	43,300	39,800	38,600	38,900	38,800	37,700	21,200	35,800
60	18,600	23,000	35,100	43,100	42,700	44,900	40,700	39,300	39,700	39,800	38,700	22,700	37,300
55	19,800	24,400	37,400	44,700	44,400	46,600	42,100	40,000	40,500	40,800	39,800	24,200	38,500
50	20,900	26,000	38,800	46,300	46,200	48,400	43,700	40,700	41,600	42,100	40,900	25,200	39,800
45	22,100	27,400	40,300	47,900	48,300	50,200	45,200	42,200	43,100	43,500	42,700	26,300	41,000
40	23,200	28,600	42,000	49,500	50,300	52,200	47,100	44,300	44,600	45,000	44,600	27,700	43,100
35	24,500	29,700	44,000	51,200	52,800	54,600	49,300	46,400	46,300	47,000	46,700	29,900	45,200
30	25,900	32,300	46,100	54,000	55,400	56,900	51,600	48,500	48,500	50,600	49,300	31,600	47,700
25	27,500	34,800	49,200	56,900	58,800	60,300	54,400	50,700	50,800	53,000	52,800	33,500	50,500
20	29,700	37,100	53,600	62,700	63,300	63,900	57,200	53,700	53,700	55,300	57,700	36,700	54,100
15	32,200	39,800	61,400	71,900	68,000	68,800	60,800	56,700	56,700	58,000	61,200	40,300	58,300
10	35,400	44,500	72,300	83,500	74,200	77,700	65,700	59,800	61,200	62,500	64,700	46,100	64,000
5	40,600	57,700	85,800	102,000	86,300	101,000	74,500	62,900	69,500	68,600	68,300	53,700	73,600

Probability of annual high discharges, post-regulation period

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge ¹ (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	—	41,900	36,600	33,100	33,000
0.95	1.05	—	51,700	45,200	40,900	39,600
0.90	1.11	—	58,100	50,900	46,000	43,800
0.80	1.25	—	67,300	59,100	53,300	49,700
0.50	2	115,000	90,200	80,300	71,800	64,100
0.20	5	—	123,000	112,000	99,100	84,000
0.10	10	170,000	146,000	135,000	118,000	97,400
0.04	25	—	176,000	165,000	144,000	115,000
0.02	50	220,000	199,000	189,000	164,000	128,000
0.01	100	241,000	223,000	215,000	185,000	141,000

¹ Data supplied by U.S. Army Corps of Engineers, Omaha District.

MISSOURI RIVER MAIN STEM
06813500 MISSOURI RIVER AT RULO, NE--Continued

Probability of annual low discharges, post-regulation period

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	3,570	3,990	4,660	6,660	8,710	9,330	9,740	10,900	15,900
0.02	50	4,120	4,600	5,410	7,460	9,550	10,300	10,900	12,300	17,400
0.05	20	5,130	5,710	6,740	8,850	11,000	12,000	12,800	14,500	19,800
0.10	10	6,230	6,910	8,170	10,300	12,400	13,700	14,700	16,800	22,200
0.20	5	7,920	8,720	10,300	12,400	14,500	16,000	17,500	19,900	25,500
0.50	2	12,600	13,600	15,700	17,500	19,600	21,600	23,900	27,100	32,900
0.80	1.25	20,200	21,400	23,500	24,800	26,800	29,200	32,400	36,300	42,100
0.90	1.11	26,000	27,100	28,800	29,800	31,600	34,000	37,800	41,900	47,700
0.96	1.04	34,100	34,900	35,600	36,100	37,900	40,100	44,400	48,600	54,300
0.98	1.02	40,600	41,200	40,800	40,900	42,600	44,600	49,200	53,300	59,100
0.99	1.01	47,600	47,700	46,000	45,800	47,400	49,000	53,900	57,800	63,600

Probability of seasonal low discharges, post-regulation period

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	4,130	5,450	7,590	9,280	23,700	28,400	29,900	31,900
0.02	50	4,690	6,140	8,290	10,000	25,000	29,200	30,600	32,500
0.05	20	5,690	7,350	9,490	11,300	27,100	30,500	31,800	33,600
0.10	10	6,790	8,650	10,800	12,700	29,200	32,000	33,100	34,800
0.20	5	8,440	10,600	12,600	14,600	32,000	34,100	35,100	36,800
0.50	2	13,000	15,600	17,400	19,700	38,300	39,500	40,400	42,300
0.80	1.25	20,500	23,300	24,600	27,200	46,000	47,400	48,600	51,200
0.90	1.11	26,200	28,800	29,700	32,600	50,800	53,000	54,600	58,000
0.96	1.04	34,300	36,300	36,800	40,000	56,600	60,400	62,700	67,400
0.98	1.02	41,000	42,200	42,400	45,800	60,700	66,100	69,100	75,000
0.99	1.01	48,200	48,400	48,300	51,900	64,700	72,100	75,900	83,300
		July-August-September				October-November-December			
0.01	100	26,900	28,100	29,100	30,300	3,180	4,580	6,640	8,580
0.02	50	27,800	28,900	29,800	31,000	4,040	5,640	7,800	9,800
0.05	20	29,200	30,200	31,200	32,300	5,680	7,580	9,830	11,900
0.10	10	30,600	31,600	32,500	33,600	7,550	9,700	12,000	14,100
0.20	5	32,600	33,500	34,500	35,600	10,400	12,800	15,000	17,300
0.50	2	37,400	38,300	39,300	40,500	18,000	20,600	22,300	25,000
0.80	1.25	43,900	45,000	46,100	47,600	28,500	30,700	31,700	35,600
0.90	1.11	48,100	49,400	50,700	52,500	35,100	36,800	37,400	42,500
0.96	1.04	53,500	55,100	56,600	59,000	42,900	43,800	44,100	51,000
0.98	1.02	57,500	59,500	61,100	63,900	48,200	48,500	48,800	57,300
0.99	1.01	61,500	63,900	65,700	69,000	53,200	52,800	53,100	63,400

NODAWAY RIVER BASIN
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.

PERIOD OF RECORD.--May 1918 to July 1925, May 1936 to September 1988.

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.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 31,100 ft³/s June 13, 1947, gage-height, 25.3 ft, from floodmark, 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.

Rating table number 26, developed October 1987

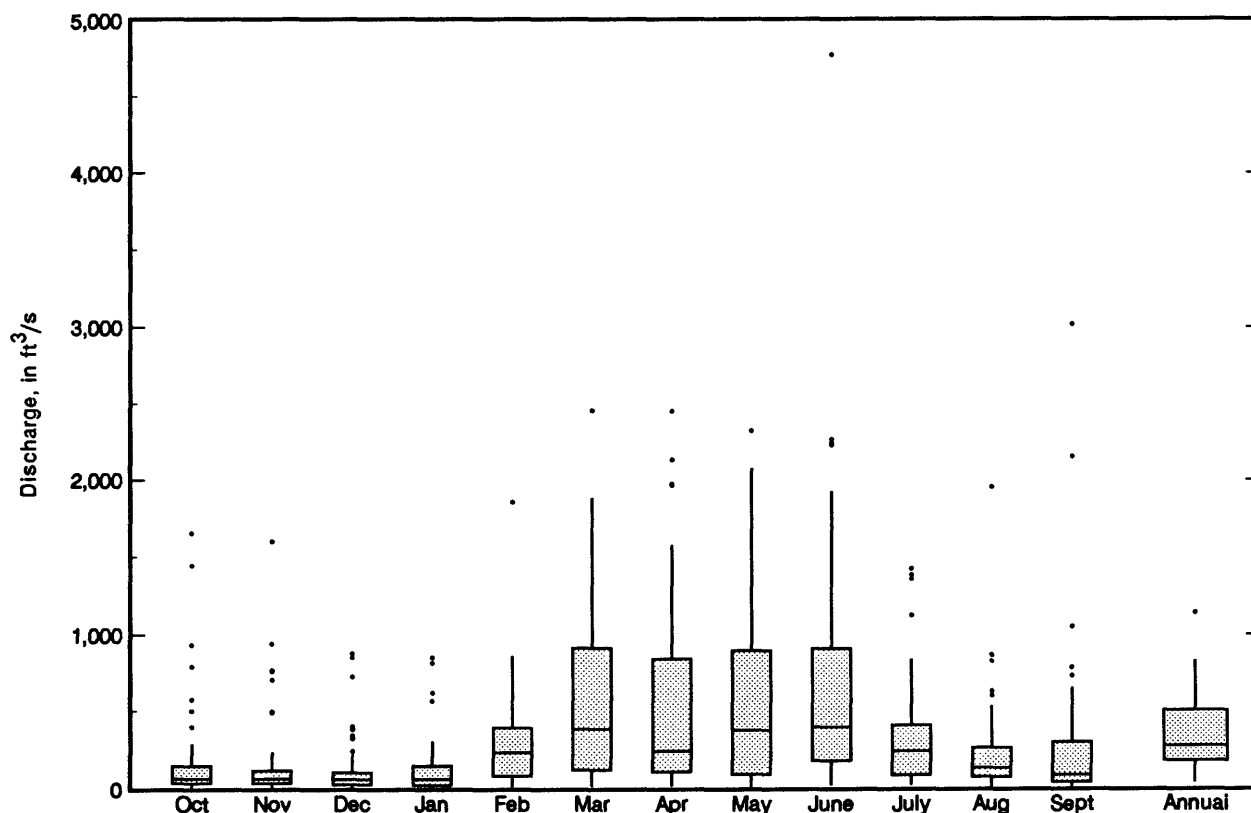
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
4.0	7.0	8.0	981
4.5	26	9.0	1,560
5.0	72	10.0	2,050
5.5	151	12.0	4,630
6.0	260	14.0	10,200
6.5	396	18.0	17,300
7.0	558	22.0	25,800

NODAWAY RIVER BASIN
06817000 NODAWAY RIVER AT CLARINDA, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	1,658	1974	7.52	1938	179	321	4.3
November	1,602	1973	8.27	1938	164	283	3.9
December	875	1983	2.10	1924	123	193	3.0
January	853	1974	6.00	1924	132	196	3.2
February	1,857	1973	11.3	1940	320	327	7.7
March	2,456	1979	14.0	1938	576	556	13.8
April	2,450	1973	14.4	1956	536	597	12.9
May	2,321	1982	10.3	1939	606	631	14.5
June	4,779	1947	20.0	1968	689	800	16.6
July	1,429	1958	17.3	1954	330	338	7.9
August	1,953	1987	9.81	1936	225	300	5.4
September	3,019	1972	6.83	1937	284	503	6.8
Annual	1,142	1973	36.8	1968	355	239	100.0

Boxplots of monthly and annual mean discharges



NODAWAY RIVER BASIN
06817000 NODAWAY RIVER AT CLARINDA, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	5.0	8.8	14	12	9.9	11	9.2	6.3	5.5	6.9	6.7	2.2	6.5
95	6.7	12	27	22	20	20	13	14	9.9	11	12	8.7	13
90	9.4	17	38	35	31	29	18	19	16	14	18	12	18
85	14	24	47	50	41	40	26	24	20	19	24	16	24
80	17	31	60	67	50	56	36	30	24	24	29	19	31
75	20	38	77	84	65	81	50	38	29	28	33	21	38
70	24	45	94	101	85	113	65	45	34	32	36	27	45
65	29	51	120	119	111	142	80	52	38	35	41	32	53
60	34	63	147	138	145	170	94	59	44	39	46	37	64
55	40	77	174	161	186	197	112	67	49	45	51	44	77
50	47	92	202	195	229	225	131	76	57	51	57	50	93
45	54	114	230	242	279	269	152	87	66	63	64	57	116
40	63	140	282	305	332	316	174	100	81	78	72	64	144
35	73	174	342	384	406	383	206	117	105	94	85	71	179
30	89	223	423	472	505	469	245	137	137	117	100	84	225
25	112	292	530	569	632	599	299	164	176	145	123	98	292
20	144	375	698	713	785	774	365	208	234	185	162	130	384
15	206	492	947	938	1,060	1,070	450	275	349	242	220	194	524
10	301	739	1,310	1,310	1,520	1,600	637	394	522	344	348	320	777
5	511	1,390	2,370	2,050	2,590	3,010	1,350	769	1,020	634	681	511	1,470

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	—	303	201	136	102
0.95	1.05	2,310	885	545	367	262
0.90	1.11	3,380	1,440	865	579	405
0.80	1.25	5,160	2,430	1,420	943	650
0.50	2	10,500	5,360	3,060	1,990	1,360
0.20	5	18,900	9,230	5,320	3,380	2,330
0.10	10	24,500	11,300	6,580	4,130	2,880
0.04	25	31,200	13,200	7,850	4,870	3,450
0.02	50	35,900	14,300	8,590	5,280	3,790
0.01	100	40,300	15,100	9,180	5,610	4,060

NODAWAY RIVER BASIN
06817000 NODAWAY RIVER AT CLARINDA, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	1.8	1.9	2.3	3.1	3.6	5.4	7.1	8.6	9.8
0.02	50	2.3	2.6	3.0	3.8	4.5	6.5	8.5	10	12
0.05	20	3.5	3.8	4.4	5.2	6.3	8.6	11	14	17
0.10	10	5.0	5.5	6.1	7.0	8.6	11	14	18	23
0.20	5	7.6	8.4	9.1	10	12	16	20	25	35
0.50	2	17	19	20	22	26	34	43	51	79
0.80	1.25	38	41	44	48	57	80	99	118	193
0.90	1.11	58	61	66	75	87	131	160	190	319
0.96	1.04	89	93	102	121	137	227	278	326	555
0.98	1.02	118	122	137	166	185	330	404	471	806
0.99	1.01	152	155	177	223	243	469	573	664	1,140

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	3.0	3.0	3.1	3.9	3.1	4.3	6.5	8.0
0.02	50	3.8	3.8	3.9	5.0	4.4	6.0	8.8	11
0.05	20	5.3	5.5	5.8	7.5	7.2	9.6	14	18
0.10	10	7.4	7.7	8.2	11	11	15	20	28
0.20	5	11	12	13	17	19	25	33	47
0.50	2	27	29	32	46	53	67	86	131
0.80	1.25	69	77	88	131	145	179	227	368
0.90	1.11	119	132	154	236	245	301	379	634
0.96	1.04	218	242	286	454	429	523	660	1,140
0.98	1.02	328	362	433	703	616	746	946	1,660
0.99	1.01	479	527	635	1,050	851	1,030	1,310	2,330
		July-August-September				October-November-December			
0.01	100	2.6	4.3	4.6	5.3	1.9	2.3	3.1	3.9
0.02	50	3.3	5.3	5.8	6.8	2.5	3.1	4.0	4.9
0.05	20	4.9	7.4	8.1	10	3.8	4.6	5.8	7.2
0.10	10	6.9	9.9	11	14	5.6	6.7	8.3	10
0.20	5	11	14	16	22	9.0	11	13	16
0.50	2	23	29	34	49	23	27	31	39
0.80	1.25	50	61	72	112	59	72	81	102
0.90	1.11	76	90	108	175	99	121	138	173
0.96	1.04	117	140	167	280	173	215	248	311
0.98	1.02	154	186	221	381	249	314	366	460
0.99	1.01	197	242	287	503	347	444	523	660

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 1988.

GAGE.--Water-stage recorder. Datum of gage is 1,095.27 ft above NGVD.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,580 ft³/s Aug. 27, 1987, gage height, 23.67 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.

Rating table number 8, developed October 1987

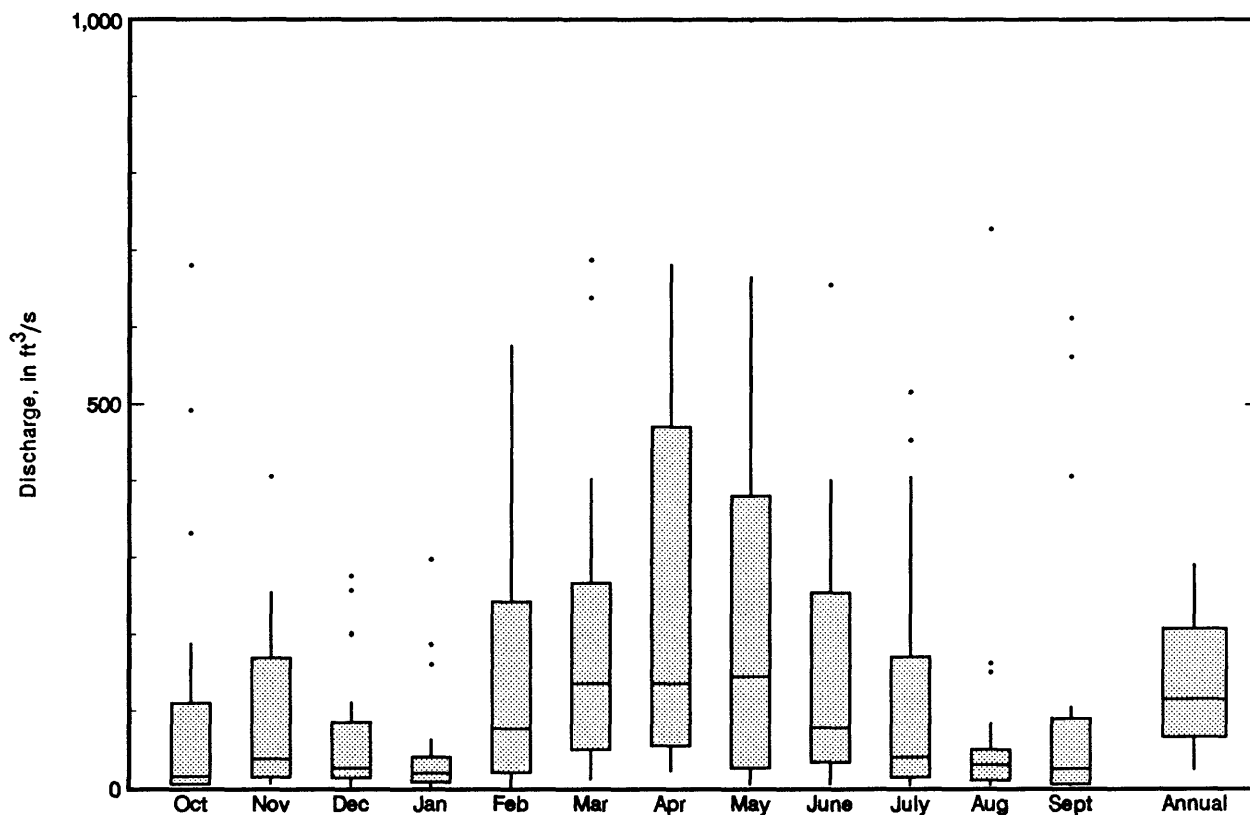
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
4.0	6.3	8.0	649
4.5	36	10.0	1,160
5.0	81	14.0	2,430
5.5	142	18.0	3,970
6.0	216	22.0	6,020
7.0	408		

PLATTE RIVER BASIN
06818750 PLATTE RIVER NEAR DIAGONAL, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	680	1978	3.41	1985	105	187	6.6
November	405	1973	4.31	1977	95.4	107	6.0
December	276	1983	2.31	1977	69.2	89.3	4.4
January	298	1974	0.81	1977	48.5	77.3	3.1
February	577	1973	0.74	1978	142	165	8.9
March	688	1979	10.8	1981	197	194	12.4
April	682	1973	21.6	1985	242	228	15.2
May	1,001	1982	4.09	1977	231	254	14.5
June	655	1984	3.58	1977	160	167	10.1
July	516	1969	3.15	1977	124	166	7.8
August	728	1987	2.83	1988	71.8	157	4.5
September	613	1977	2.54	1971	104	183	6.6
Annual	291	1973	22.7	1981	135	82.6	100.0

Boxplots of monthly and annual mean discharges



PLATTE RIVER BASIN
06818750 PLATTE RIVER NEAR DIAGONAL, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.28	0.32	6.9	3.5	2.2	2.5	1.4	1.3	1.5	1.6	2.8	1.1	0.83
95	0.57	1.3	10	8.6	7.5	4.1	2.4	2.2	1.9	2.1	3.3	2.7	2.5
90	0.96	3.2	17	13	12	5.5	3.0	2.9	2.5	2.5	4.6	4.0	3.5
85	3.6	4.2	22	19	15	7.8	3.5	3.6	2.9	2.9	6.2	5.3	4.7
80	4.6	5.4	26	24	18	11	4.2	4.7	3.3	3.3	7.9	7.0	6.2
75	5.6	6.8	31	31	22	15	5.1	5.4	3.7	3.8	9.8	8.7	8.0
70	6.6	8.7	36	37	25	18	6.8	6.0	4.2	4.6	12	10	10
65	7.9	11	42	44	32	23	9.1	6.6	4.7	6.2	14	12	13
60	9.4	13	51	54	40	28	12	7.3	5.3	7.9	17	14	17
55	11	18	62	65	50	33	15	8.5	6.2	9.3	21	19	21
50	13	26	76	78	62	39	19	9.7	7.3	11	28	24	27
45	17	34	90	92	75	47	23	12	9.0	14	35	29	34
40	23	40	106	105	90	57	30	14	11	18	44	35	43
35	29	50	123	119	110	69	39	16	15	23	56	43	55
30	35	78	148	146	139	82	50	19	22	36	69	54	71
25	42	101	185	186	181	100	63	24	39	56	84	67	90
20	52	120	238	245	238	119	80	30	58	78	106	86	115
15	68	190	310	344	350	158	109	39	92	110	157	108	160
10	95	325	443	510	547	265	177	60	145	171	250	140	268
5	157	604	784	1,010	1,060	769	443	205	338	365	413	216	548

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	—	274	159	92	57
0.95	1.05	2,250	573	345	215	133
0.90	1.11	2,710	811	495	316	196
0.80	1.25	3,340	1,190	729	472	296
0.50	2	4,770	2,190	1,330	851	552
0.20	5	6,460	3,500	2,040	1,250	848
0.10	10	7,420	4,250	2,410	1,420	992
0.04	25	8,480	5,040	2,770	1,570	1,120
0.02	50	9,180	5,530	2,970	1,640	1,200
0.01	100	9,810	5,950	3,120	1,690	1,250

PLATTE RIVER BASIN
06818750 PLATTE RIVER NEAR DIAGONAL, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.14	0.14	0.14	0.18	0.29	0.71	1.2	1.5	1.9
0.02	50	0.20	0.20	0.20	0.26	0.41	0.90	1.6	1.9	2.6
0.05	20	0.33	0.34	0.36	0.43	0.67	1.3	2.3	2.8	4.1
0.10	10	0.50	0.53	0.57	0.68	1.0	1.9	3.2	4.0	6.3
0.20	5	0.82	0.89	0.99	1.2	1.7	3.0	4.9	6.2	11
0.50	2	2.1	2.3	2.6	3.1	4.4	8.0	12	15	29
0.80	1.25	5.1	5.6	6.4	7.7	11	23	32	40	79
0.90	1.11	8.1	8.6	9.8	12	18	43	54	69	136
0.96	1.04	13	13	15	20	28	85	99	125	243
0.98	1.02	18	18	20	27	39	135	147	186	356
0.99	1.01	23	23	25	35	51	207	214	269	502

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.08	0.08	0.10	0.19	0.84	1.1	1.5	2.7
0.02	50	0.14	0.15	0.18	0.34	1.1	1.5	2.0	3.6
0.05	20	0.35	0.37	0.43	0.77	1.8	2.4	3.1	5.6
0.10	10	0.74	0.79	0.91	1.5	2.6	3.6	4.6	8.4
0.20	5	1.7	1.8	2.1	3.4	4.2	5.7	7.4	14
0.50	2	7.1	7.8	9.0	14	10	14	19	37
0.80	1.25	23	26	31	50	25	33	50	103
0.90	1.11	40	46	56	92	40	51	84	180
0.96	1.04	66	78	96	170	66	80	147	327
0.98	1.02	89	107	136	246	91	108	211	486
0.99	1.01	114	139	180	339	120	137	294	696
		July-August-September				October-November-December			
0.01	100	0.74	0.79	0.98	1.7	0.40	0.56	0.65	1.2
0.02	50	0.82	0.89	1.1	1.8	0.51	0.70	0.85	1.5
0.05	20	0.97	1.1	1.3	2.0	0.73	0.99	1.3	2.1
0.10	10	1.2	1.3	1.6	2.3	1.0	1.4	1.9	3.0
0.20	5	1.5	1.7	2.1	2.9	1.6	2.1	3.1	4.8
0.50	2	2.6	3.1	3.7	5.4	4.3	5.5	8.3	12
0.80	1.25	5.1	6.1	7.8	13	13	16	24	33
0.90	1.11	7.8	9.2	12	25	24	30	43	59
0.96	1.04	13	15	20	53	51	61	83	111
0.98	1.02	18	20	29	93	83	99	127	171
0.99	1.01	25	27	41	160	132	155	189	255

PLATTE RIVER BASIN

06819190 EAST FORK ONE HUNDRED AND TWO RIVER AT BEDFORD, IA

LOCATION.--Lat 40°38'01", long 94°44'41", in NE1/4 NE 1/4 sec.9, T.67 N., R.34 W., Taylor County, Hydrologic Unit 10240013, on left bank at downstream side of bridge of county highway J55, 1.0 mi upstream from Daugherty Creek and 2.8 mi southwest of junction of U.S. Highways 2 and 148 in Bedford.

DRAINAGE AREA.--92.1 mi².

PERIOD OF RECORD.--September 1959 to September 1983 (discontinued).

GAGE.--Water-stage recorder. Datum of gage is 1,057.51 ft above NGVD (levels by U.S. Army Corps of Engineers). Prior to Oct. 1, 1968, at datum 5.0 ft higher.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,980 ft³/s Oct. 11, 1973, gage height 20.72 ft; maximum gage height, 20.95 ft Jan. 12, 1960, present datum; no flow at times in 1966-68, 1972 and 1977.

Rating table number 25, developed April 1980
(A discharge measurement to validate this rating
has not been made since October 1983.)

Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
9.5	112	14.0	2,850
10.0	209	15.0	4,850
11.0	379	16.0	6,890
12.0	530	18.0	11,600
13.0	1,160		

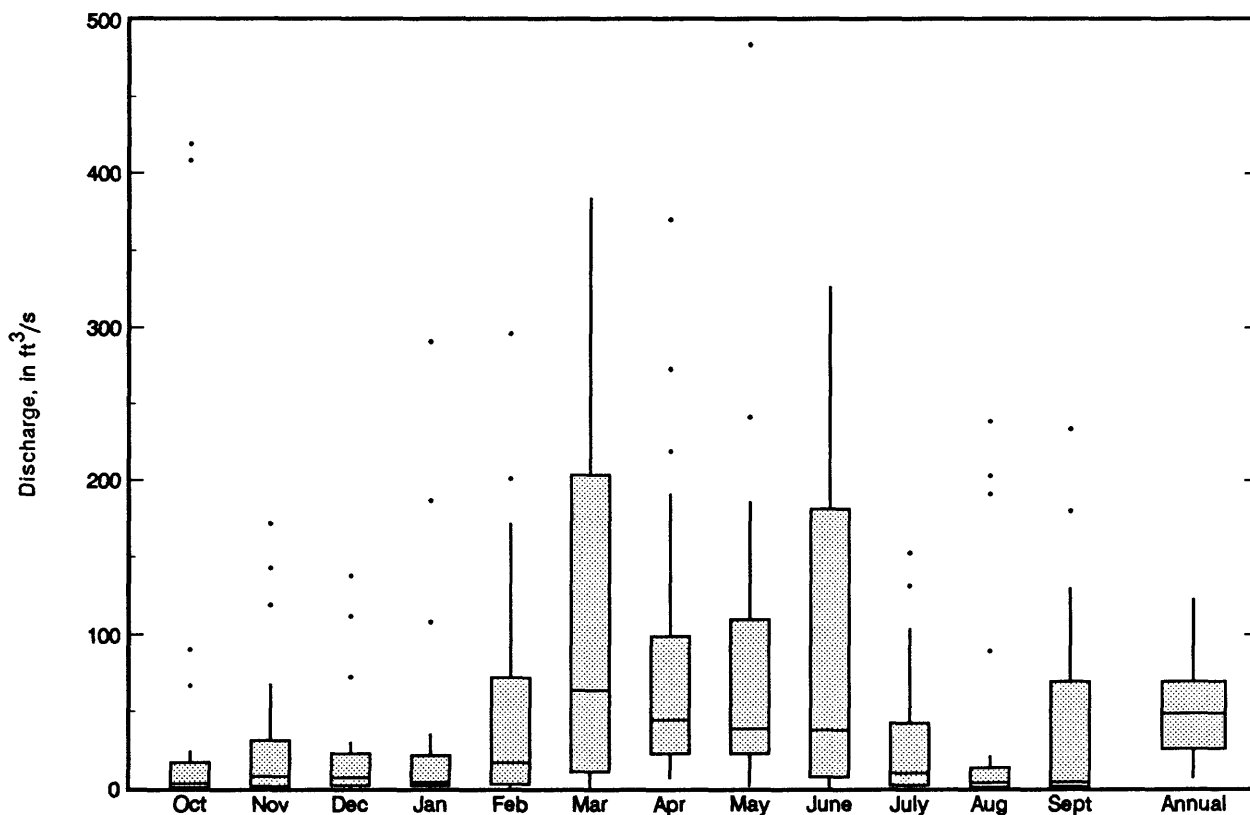
PLATTE RIVER BASIN

06819190 EAST FORK ONE HUNDRED AND TWO RIVER AT BEDFORD, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	419	1974	0.24	1976	45.5	115	7.0
November	172	1962	0.22	1964	29.5	47.9	4.5
December	138	1983	0.090	1977	20.5	36.0	3.1
January	291	1960	0.010	1977	30.9	69.6	4.7
February	296	1973	0.49	1978	54.1	77.0	8.3
March	384	1973	0.66	1968	104	111	15.9
April	370	1976	6.40	1977	84.2	93.5	12.9
May	484	1982	1.53	1977	82.6	105	12.6
June	327	1967	1.17	1977	93.0	99.5	14.2
July	153	1969	0.16	1977	32.9	46.1	5.0
August	239	1977	0.41	1967	33.9	71.1	5.2
September	234	1977	0.40	1968	43.6	64.1	6.7
Annual	123	1982	6.62	1968	54.5	36.3	100.0

Boxplots of monthly and annual mean discharges



PLATTE RIVER BASIN

06819190 EAST FORK ONE HUNDRED AND TWO RIVER AT BEDFORD, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equalled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.00	0.01	0.21	0.31	0.39	0.19	0.03	0.02	0.07	0.03	0.09	0.00	0.01
95	0.01	0.14	0.70	1.7	0.92	0.33	0.11	0.12	0.20	0.09	0.20	0.09	0.18
90	0.12	0.30	1.6	2.8	2.3	1.0	0.28	0.23	0.28	0.19	0.29	0.19	0.32
85	0.27	0.55	2.7	4.5	3.8	1.6	0.47	0.32	0.34	0.29	0.38	0.33	0.49
80	0.40	0.98	4.3	6.1	4.8	2.1	0.68	0.40	0.42	0.39	0.50	0.67	0.75
75	0.60	1.6	6.1	8.0	5.7	2.6	0.91	0.47	0.50	0.48	0.81	1.3	1.1
70	1.2	2.3	8.8	10	7.4	3.4	1.2	0.55	0.60	0.60	1.3	1.8	1.7
65	1.8	3.1	11	13	9.1	4.5	1.4	0.68	0.73	0.75	1.7	2.2	2.3
60	2.2	3.9	14	16	11	5.7	1.7	0.83	0.91	1.0	2.4	2.6	3.0
55	2.6	4.8	17	19	13	6.8	2.0	0.99	1.1	1.5	3.2	3.4	3.9
50	3.2	5.8	21	22	16	8.0	2.4	1.2	1.5	2.2	4.1	4.2	5.3
45	3.8	7.6	26	26	19	9.9	3.0	1.4	2.0	3.0	5.4	5.1	6.9
40	4.9	9.9	32	30	23	13	3.8	1.6	2.9	3.8	6.7	6.2	8.8
35	6.4	13	41	35	27	17	5.4	1.8	3.8	5.3	8.1	7.6	12
30	7.9	21	54	40	34	23	7.2	2.4	5.2	7.1	11	9.1	17
25	12	30	72	49	42	30	9.5	3.4	8.8	9.2	15	11	23
20	20	39	94	65	58	43	13	5.4	15	14	24	16	31
15	25	57	144	99	91	73	20	9.8	24	19	38	24	46
10	36	98	216	165	165	161	37	22	45	29	58	39	80
5	76	210	516	345	380	415	99	58	171	72	112	62	207

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	—	119	64	38	20
0.95	1.05	1,630	273	149	91	52
0.90	1.11	2,030	404	222	137	82
0.80	1.25	2,640	617	342	212	130
0.50	2	4,210	1,210	669	411	260
0.20	5	6,460	2,000	1,100	653	412
0.10	10	7,960	2,450	1,330	777	485
0.04	25	9,820	2,930	1,570	894	549
0.02	50	11,200	3,210	1,710	959	582
0.01	100	12,500	3,450	1,820	1,010	606

PLATTE RIVER BASIN

06819190 EAST FORK ONE HUNDRED AND TWO RIVER AT BEDFORD, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.03	0.05	0.08	0.11
0.02	50	0.00	0.00	0.00	0.00	0.00	0.04	0.07	0.12	0.19
0.05	20	0.00	0.00	0.00	0.00	0.00	0.09	0.14	0.22	0.41
0.10	10	0.00	0.00	0.00	0.00	0.04	0.16	0.25	0.39	0.79
0.20	5	0.00	0.00	0.02	0.03	0.12	0.31	0.51	0.76	1.7
0.50	2	0.14	0.17	0.22	0.28	0.55	1.2	1.9	2.7	7.2
0.80	1.25	0.52	0.58	0.71	0.90	1.7	4.6	7.0	9.8	28
0.90	1.11	0.84	0.93	1.1	1.4	2.7	9.3	14	19	54
0.96	1.04	1.3	1.4	1.6	2.1	4.2	19	28	39	108
0.98	1.02	1.5	1.7	2.0	2.6	5.5	31	44	62	166
0.99	1.01	1.9	2.0	2.3	3.0	6.9	48	66	94	243

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.04	0.03	0.03	0.04	0.02	0.10	0.22	0.36
0.02	50	0.07	0.05	0.06	0.07	0.03	0.15	0.31	0.56
0.05	20	0.13	0.11	0.13	0.16	0.08	0.25	0.51	1.1
0.10	10	0.22	0.20	0.25	0.32	0.16	0.41	0.80	1.9
0.20	5	0.44	0.41	0.53	0.74	0.36	0.74	1.4	3.6
0.50	2	1.6	1.6	2.1	3.4	1.4	2.2	3.7	11
0.80	1.25	5.6	5.9	7.7	15	4.3	6.2	10.0	28
0.90	1.11	11	12	15	32	7.0	11	17	44
0.96	1.04	22	23	28	70	11	19	28	67
0.98	1.02	34	36	41	116	14	27	40	87
0.99	1.01	50	53	58	181	18	37	54	109
		July-August-September				October-November-December			
0.01	100	0.01	0.00	0.01	0.07	0.01	0.01	0.01	0.03
0.02	50	0.01	0.01	0.01	0.09	0.01	0.02	0.02	0.05
0.05	20	0.03	0.02	0.04	0.14	0.02	0.04	0.05	0.12
0.10	10	0.05	0.05	0.08	0.20	0.05	0.08	0.10	0.23
0.20	5	0.10	0.12	0.18	0.33	0.10	0.18	0.22	0.51
0.50	2	0.29	0.40	0.56	0.90	0.46	0.81	1.0	2.0
0.80	1.25	0.63	0.85	1.1	2.7	2.2	3.4	4.5	7.2
0.90	1.11	0.86	1.1	1.4	5.1	5.1	7.0	9.6	13
0.96	1.04	1.1	1.3	1.6	10	13	15	21	24
0.98	1.02	1.3	1.4	1.7	16	23	24	35	36
0.99	1.01	1.4	1.5	1.8	25	39	36	55	50

GRAND RIVER BASIN
06897950 ELK CREEK NEAR DECATUR CITY, IA

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.

PERIOD OF RECORD.—October 1967 to September 1988.

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.

EXTREMES FOR PERIOD OF RECORD.—Maximum discharge, 16,400 ft³/s June 2, 1980, gage height, 28.22 ft, from rating curve extended above 5,300 ft³/s on basis of step-backwater computation; no flow at times most years.

EXTREMES OUTSIDE PERIOD OF RECORD.—Flood of June 14, 1967 reached a stage of 18.35 ft, datum in use prior to Oct. 1, 1974, discharge, 17,800 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, 300 ft downstream, from information by assistant county engineer, discharge not determined.

Rating table number 8, developed October 1986

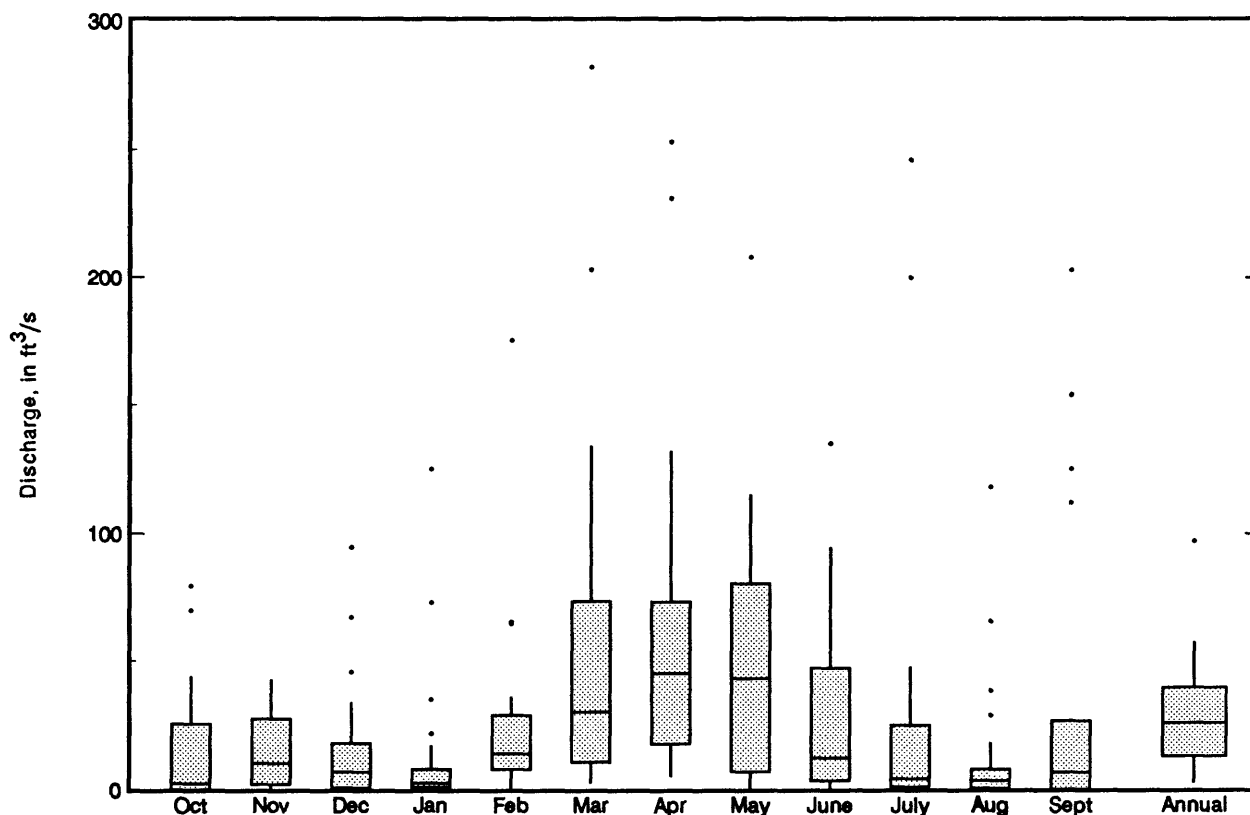
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
10.0	13	14.0	952
10.5	42	16.0	1,830
11.0	89	20.0	4,070
11.5	160	24.0	7,050
12.0	257	28.0	14,700
13.0	545		

GRAND RIVER BASIN
06897950 ELK CREEK NEAR DECATUR CITY, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	79.5	1978	0.000	1977	17.2	27.4	4.6
November	42.6	1973	0.000	1977	15.5	14.7	4.1
December	94.4	1983	0.000	1977	17.3	24.8	4.6
January	125	1973	0.000	1977	15.1	30.3	4.0
February	175	1973	0.27	1970	26.4	38.8	7.0
March	282	1982	2.47	1968	57.6	71.3	15.3
April	253	1973	4.91	1977	67.3	68.4	17.9
May	208	1982	0.17	1977	52.0	53.6	13.8
June	135	1980	0.000	1977	28.2	37.1	7.5
July	246	1987	0.010	1977	30.1	66.0	8.0
August	118	1987	0.000	1971	14.7	28.7	3.9
September	203	1973	0.000	1976	34.4	59.5	9.1
Annual	98.9	1973	2.27	1977	31.3	22.8	100.0

Boxplots of monthly and annual mean discharges



GRAND RIVER BASIN
06897950 ELK CREEK NEAR DECATUR CITY, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equalled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.00	0.01	0.19	0.57	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95	0.01	0.06	1.4	1.9	0.30	0.01	0.00	0.00	0.00	0.00	0.02	0.01	0.01
90	0.02	0.17	2.4	3.3	0.87	0.17	0.01	0.00	0.00	0.01	0.10	0.08	0.02
85	0.04	0.33	3.8	4.5	1.9	0.39	0.01	0.01	0.00	0.01	0.25	0.17	0.10
80	0.15	0.56	5.0	5.6	2.8	0.64	0.03	0.01	0.01	0.04	0.50	0.35	0.25
75	0.58	0.98	6.3	7.1	3.6	1.0	0.06	0.04	0.01	0.10	0.76	0.74	0.53
70	0.92	1.4	7.6	9.0	4.5	1.4	0.13	0.10	0.01	0.19	1.1	1.3	0.94
65	1.3	2.1	9.0	11	5.5	1.8	0.30	0.17	0.04	0.34	1.6	2.2	1.5
60	1.8	3.0	10	13	6.8	2.4	0.51	0.28	0.12	0.59	3.3	3.3	2.2
55	2.3	4.3	12	16	8.3	3.0	0.84	0.40	0.19	0.91	5.4	4.2	3.1
50	2.9	6.0	14	19	10	3.5	1.2	0.55	0.32	1.4	6.8	5.0	4.3
45	3.4	7.5	16	22	13	4.8	1.6	0.78	0.52	1.9	8.3	6.1	5.8
40	4.4	11	18	25	16	6.2	2.2	1.1	0.92	2.3	9.8	7.4	7.3
35	5.6	14	22	29	20	7.8	3.1	1.6	1.6	3.4	11	8.7	9.5
30	6.7	18	29	34	24	11	4.4	2.3	2.9	6.2	13	10	12
25	7.8	21	37	40	32	14	6.0	3.0	4.5	9.0	16	12	16
20	11	25	52	50	43	17	8.2	4.0	6.6	12	19	15	21
15	15	35	78	71	60	23	13	5.8	10	16	23	19	29
10	24	54	132	108	95	34	24	10	19	25	30	29	47
5	51	93	214	286	198	82	67	25	78	55	61	52	104

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	207	62	33	21	12
0.95	1.05	589	134	70	44	26
0.90	1.11	982	195	102	63	39
0.80	1.25	1,750	301	156	96	60
0.50	2	4,710	642	330	194	121
0.20	5	10,900	1,240	646	352	214
0.10	10	16,000	1,700	889	460	273
0.04	25	23,000	2,300	1,220	594	341
0.02	50	28,600	2,770	1,480	689	387
0.01	100	34,200	3,230	1,750	781	428

GRAND RIVER BASIN
06897950 ELK CREEK NEAR DECATUR CITY, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
0.05	20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15
0.10	10	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.13	0.41
0.20	5	0.00	0.00	0.00	0.00	0.00	0.08	0.17	0.40	1.2
0.50	2	0.00	0.00	0.00	0.00	0.14	0.61	1.2	2.0	6.2
0.80	1.25	0.05	0.08	0.16	0.35	1.3	3.1	6.0	7.7	20
0.90	1.11	0.15	0.25	0.49	1.1	3.3	7.1	13	15	31
0.96	1.04	0.51	0.80	1.7	3.6	8.3	16	28	28	45
0.98	1.02	1.1	1.7	3.5	7.1	15	28	45	42	55
0.99	1.01	2.3	3.3	7.1	14	25	47	68	60	63

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.00	0.00	0.00	0.02	0.01	0.07	0.02	0.09
0.02	50	0.00	0.00	0.01	0.04	0.02	0.09	0.05	0.16
0.05	20	0.02	0.02	0.03	0.10	0.04	0.15	0.11	0.38
0.10	10	0.05	0.06	0.08	0.22	0.06	0.22	0.24	0.75
0.20	5	0.19	0.20	0.26	0.55	0.13	0.38	0.55	1.7
0.50	2	1.3	1.5	1.8	2.8	0.52	1.1	2.3	6.5
0.80	1.25	5.3	6.2	8.0	12	2.3	3.7	7.2	21
0.90	1.11	9.0	11	15	24	5.1	7.0	12	36
0.96	1.04	14	17	26	49	12	14	20	61
0.98	1.02	17	22	36	75	22	23	26	84
0.99	1.01	21	26	46	109	37	36	32	109
		July-August-September				October-November-December			
0.01	100	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.01
0.02	50	0.00	0.01	0.02	0.00	0.01	0.01	0.01	0.02
0.05	20	0.01	0.01	0.03	0.01	0.02	0.02	0.03	0.04
0.10	10	0.01	0.02	0.05	0.03	0.06	0.04	0.08	0.10
0.20	5	0.02	0.05	0.09	0.07	0.17	0.11	0.19	0.24
0.50	2	0.09	0.17	0.34	0.44	1.0	0.70	1.00	1.2
0.80	1.25	0.39	0.73	1.3	2.4	4.4	3.5	4.5	5.8
0.90	1.11	0.89	1.6	2.7	5.7	8.2	7.7	9.4	12
0.96	1.04	2.3	3.9	6.0	14	15	17	20	27
0.98	1.02	4.2	7.0	10	23	20	26	32	43
0.99	1.01	7.5	12	17	37	27	40	47	66

GRAND RIVER BASIN
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 September 1988. Prior to October 1918, published as "Grand River".

GAGE.--Water-stage recorder. Datum of gage is 874.04 ft above NGVD. May 14, 1918 to July 2, 1925, July 14, 1941 to Feb. 24, 1942, nonrecording gage, and Feb. 25, 1942 to Feb. 8, 1967, water-stage recorder at same site at datum 2.00 ft higher.

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.

Rating table number 13, developed October 1986

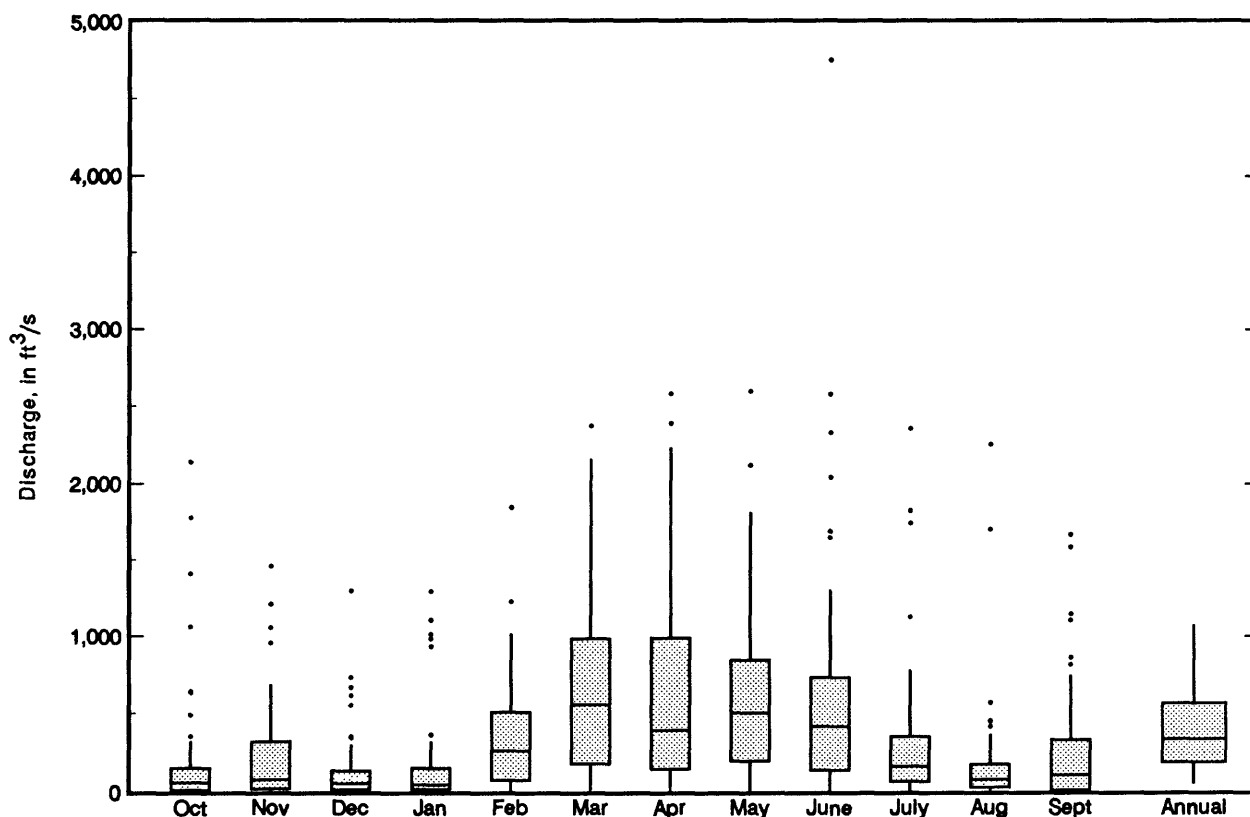
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
1.0	6.8	4.0	1,390
1.2	22	5.0	2,270
1.5	86	7.0	4,570
1.7	146	9.0	7,510
2.0	253	13.0	13,400
2.5	474	17.0	19,600
3.0	741	21.0	26,300

GRAND RIVER BASIN
06898000 THOMPSON RIVER AT DAVIS CITY, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	2,138	1974	1.41	1957	214	434	4.7
November	1,462	1962	2.07	1956	225	327	5.0
December	1,299	1983	0.94	1956	145	236	3.2
January	1,292	1960	0.62	1956	172	307	3.8
February	1,849	1973	1.14	1956	339	348	7.5
March	2,375	1979	10.7	1954	668	571	14.8
April	2,586	1973	2.55	1956	677	671	15.0
May	2,600	1951	1.19	1956	627	574	13.9
June	4,750	1947	3.08	1956	652	816	14.4
July	2,362	1987	1.98	1977	329	470	7.3
August	2,255	1987	9.35	1955	195	383	4.3
September	1,667	1964	4.13	1953	271	398	6.0
Annual	1,073	1973	52.3	1956	380	230	100.0

Boxplots of monthly and annual mean discharges



GRAND RIVER BASIN
06898000 THOMPSON RIVER AT DAVIS CITY, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.55	1.1	4.8	2.5	1.1	1.6	2.0	3.0	1.4	1.1	1.9	0.99	1.3
95	2.7	3.8	15	35	16	11	10	7.0	4.4	2.9	4.3	3.7	4.9
90	4.8	9.3	38	48	29	23	17	12	6.7	4.8	7.9	5.9	9.4
85	8.2	14	53	66	43	39	22	15	9.0	6.8	12	8.7	14
80	12	20	69	83	57	51	29	18	12	8.6	15	12	18
75	14	29	91	98	75	65	37	21	14	11	18	16	25
70	17	38	114	116	97	80	46	24	16	13	22	19	33
65	20	46	134	143	121	97	54	27	18	15	26	24	42
60	23	58	155	176	147	116	62	31	21	18	31	30	51
55	31	78	187	211	177	138	69	35	25	24	35	36	65
50	38	104	218	250	207	164	80	40	32	31	45	44	82
45	44	129	273	291	247	198	93	47	41	40	57	51	102
40	50	155	332	336	293	239	106	54	51	50	76	60	128
35	64	197	420	394	351	292	128	65	64	68	96	70	162
30	84	249	543	456	421	370	158	77	84	91	120	86	205
25	109	316	693	573	536	486	202	97	119	115	160	106	271
20	146	441	906	730	698	637	269	124	171	146	209	145	365
15	198	606	1,250	1,030	1,010	930	379	174	253	207	298	204	527
10	293	924	1,860	1,630	1,600	1,660	609	275	461	335	450	296	854
5	620	1,640	3,020	3,400	3,270	3,150	1,280	624	1,360	784	935	520	1,820

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	1,980	1,210	802	480	322
0.95	1.05	2,990	1,900	1,250	783	521
0.90	1.11	3,700	2,410	1,560	1,000	664
0.80	1.25	4,760	3,170	2,040	1,330	881
0.50	2	7,530	5,240	3,340	2,200	1,460
0.20	5	11,600	8,420	5,310	3,450	2,320
0.10	10	14,400	10,700	6,690	4,270	2,900
0.04	25	17,900	13,600	8,490	5,300	3,640
0.02	50	20,600	15,900	9,860	6,040	4,180
0.01	100	23,300	18,100	11,200	6,760	4,720

GRAND RIVER BASIN
06898000 THOMPSON RIVER AT DAVIS CITY, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.13	0.22	0.34	0.46	0.62	0.85	1.1	1.2	2.0
0.02	50	0.24	0.37	0.53	0.69	0.92	1.3	1.7	1.9	3.2
0.05	20	0.58	0.78	1.0	1.2	1.7	2.3	3.2	3.8	6.5
0.10	10	1.2	1.4	1.7	2.1	2.8	3.9	5.5	6.8	12
0.20	5	2.6	2.9	3.2	3.8	5.0	7.2	11	13	23
0.50	2	8.9	9.1	9.7	11	15	23	34	43	76
0.80	1.25	23	24	26	30	40	67	98	123	214
0.90	1.11	34	36	41	49	66	116	165	203	347
0.96	1.04	48	54	65	80	110	205	280	336	558
0.98	1.02	58	68	86	109	150	294	389	456	742
0.99	1.01	66	83	109	143	198	404	518	594	945

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.63	0.61	0.63	0.75	0.32	0.86	1.1	1.8
0.02	50	0.98	0.97	1.0	1.3	0.80	1.7	2.2	3.4
0.05	20	1.9	1.9	2.0	2.7	2.7	4.5	5.5	8.7
0.10	10	3.2	3.4	3.6	5.1	6.6	9.4	12	18
0.20	5	6.1	6.7	7.1	11	16	21	25	42
0.50	2	19	22	24	40	56	66	85	155
0.80	1.25	54	62	73	131	106	141	198	423
0.90	1.11	90	102	126	231	126	184	272	637
0.96	1.04	150	168	217	409	138	224	351	915
0.98	1.02	205	227	304	579	143	246	398	1,110
0.99	1.01	270	295	406	782	145	262	436	1,290
		July-August-September				October-November-December			
0.01	100	0.30	0.69	1.2	2.1	0.32	0.46	0.68	0.93
0.02	50	0.53	1.0	1.7	2.8	0.51	0.71	1.0	1.4
0.05	20	1.1	1.8	2.7	4.5	1.0	1.4	1.8	2.6
0.10	10	2.1	3.0	4.0	6.7	1.8	2.4	3.1	4.5
0.20	5	4.1	5.3	6.6	11	3.6	4.7	5.7	8.4
0.50	2	12	14	17	28	13	16	19	27
0.80	1.25	27	34	42	70	40	51	61	84
0.90	1.11	38	52	67	114	71	90	111	148
0.96	1.04	51	78	111	191	127	165	211	267
0.98	1.02	60	100	152	266	183	240	319	386
0.99	1.01	68	123	203	359	250	334	462	536

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 1988.

GAGE--Water-stage recorder. Datum of gage is 906.26 ft above NGVD.

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.

Rating table number 7, developed

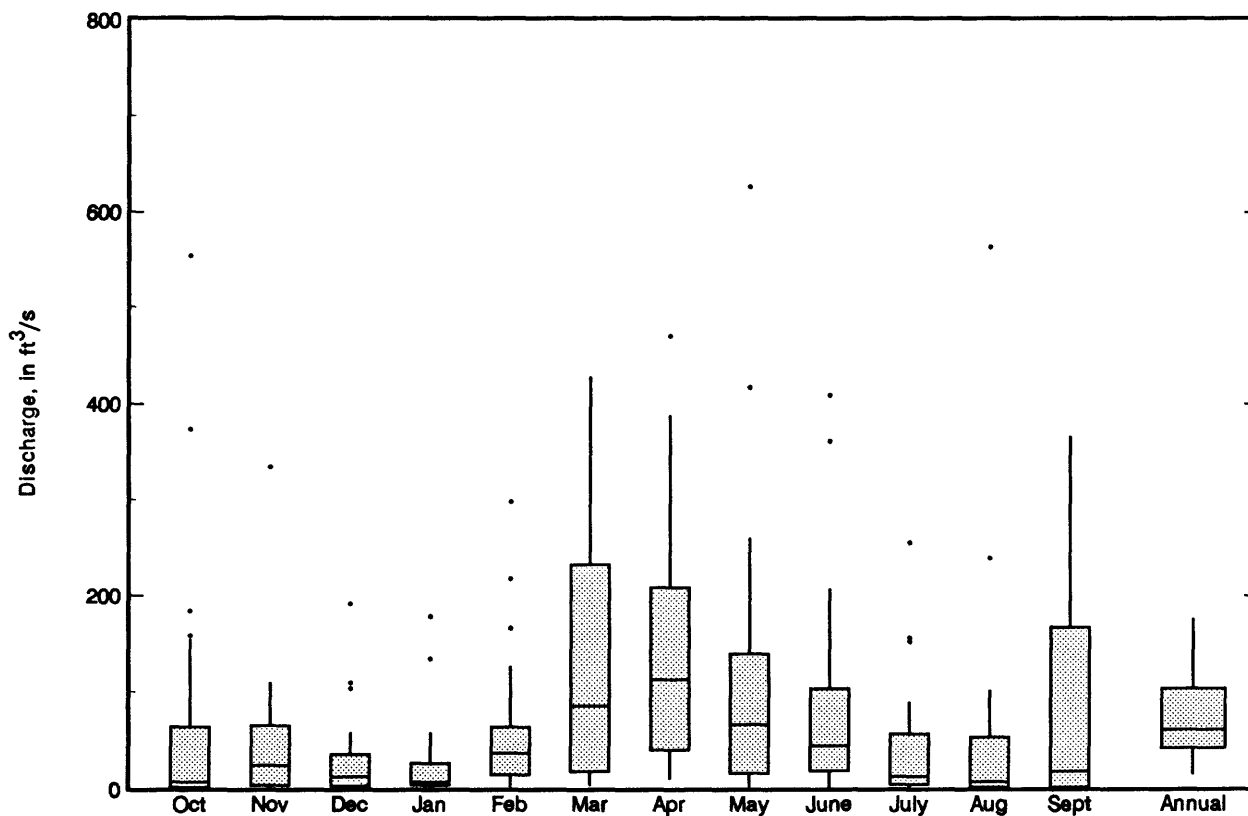
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
3.5	1.4	9.0	1,150
4.0	8.7	11.0	2,110
4.5	31	13.0	3,200
5.0	70	16.0	5,190
5.5	126	19.0	7,600
6.0	205	22.0	12,000
7.0	441	23.5	23,400
8.0	761	25.0	43,600

GRAND RIVER BASIN
06898400 WELDON RIVER NEAR LEON, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	554	1978	0.25	1967	65.8	124	7.8
November	334	1962	0.73	1977	44.0	64.9	5.2
December	191	1983	0.28	1977	28.9	41.6	3.4
January	178	1960	0.000	1977	22.9	39.4	2.7
February	298	1973	1.35	1977	56.4	68.3	6.7
March	428	1973	3.03	1964	128	124	15.2
April	470	1973	9.86	1985	136	119	16.2
May	626	1959	1.61	1980	112	138	13.4
June	409	1967	0.34	1977	82.9	101	9.8
July	255	1981	0.33	1988	40.5	58.2	4.8
August	563	1959	0.29	1975	44.6	109	5.3
September	366	1961	0.16	1967	79.7	106	9.5
Annual	175	1959	14.0	1977	70.1	42.3	100.0

Boxplots of monthly and annual mean discharges



GRAND RIVER BASIN
06898400 WELDON RIVER NEAR LEON, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.00	0.20	0.76	1.1	0.31	0.03	0.00	0.00	0.00	0.09	0.28	0.24	0.01
95	0.11	0.81	2.4	4.9	1.2	0.55	0.06	0.12	0.07	0.21	0.52	0.34	0.28
90	0.33	1.2	4.5	7.1	2.0	0.85	0.30	0.25	0.15	0.36	0.78	0.51	0.57
85	0.72	1.7	7.5	9.2	3.2	1.3	0.51	0.36	0.26	0.51	1.1	0.91	0.88
80	1.1	2.3	11	12	4.4	1.9	0.72	0.49	0.47	0.68	1.4	1.4	1.3
75	1.6	2.8	13	14	6.1	2.7	0.92	0.62	0.65	0.92	2.0	2.0	1.8
70	2.5	3.6	16	18	8.0	3.7	1.2	0.78	0.82	1.3	2.8	2.9	2.5
65	3.3	5.4	18	21	11	5.0	1.6	0.97	1.0	1.7	4.5	4.1	3.5
60	3.9	8.1	21	25	13	6.2	2.0	1.2	1.3	2.1	5.8	5.1	4.7
55	4.5	12	24	29	15	8.0	2.5	1.5	1.6	2.6	7.0	6.0	6.3
50	5.5	14	30	33	18	11	3.0	1.8	1.9	3.1	9.1	7.0	8.5
45	6.5	17	36	38	21	13	3.9	2.2	2.3	3.9	11	8.5	11
40	8.2	22	45	46	24	16	4.9	2.8	3.0	4.9	14	10	14
35	11	28	54	53	30	20	6.5	3.5	4.4	8.2	16	12	18
30	13	35	72	66	37	23	9.2	4.5	6.5	12	20	15	23
25	15	45	97	80	48	30	13	6.2	10	18	23	20	31
20	18	59	137	105	63	40	21	9.0	16	28	30	25	42
15	24	81	200	153	100	61	33	15	31	38	40	32	61
10	35	131	305	263	216	114	58	31	73	71	59	44	106
5	81	225	567	679	530	280	155	77	272	235	118	75	272

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	1,300	243	133	88	56
0.95	1.05	2,050	433	235	155	97
0.90	1.11	2,600	580	313	204	128
0.80	1.25	3,440	813	434	278	173
0.50	2	5,760	1,480	769	468	291
0.20	5	9,410	2,540	1,270	720	447
0.10	10	12,000	3,300	1,610	874	542
0.04	25	15,600	4,280	2,040	1,050	651
0.02	50	18,300	5,010	2,350	1,170	725
0.01	100	21,100	5,750	2,650	1,270	792

GRAND RIVER BASIN
06898400 WELDON RIVER NEAR LEON, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.05	0.11	0.12	0.19
0.02	50	0.00	0.00	0.00	0.00	0.00	0.08	0.18	0.21	0.34
0.05	20	0.00	0.00	0.00	0.00	0.02	0.17	0.34	0.45	0.80
0.10	10	0.00	0.00	0.00	0.05	0.08	0.30	0.61	0.89	1.6
0.20	5	0.00	0.01	0.03	0.12	0.22	0.62	1.2	1.9	3.7
0.50	2	0.13	0.18	0.28	0.45	0.91	2.4	4.5	7.4	15
0.80	1.25	0.59	0.70	1.0	1.4	2.8	8.9	16	24	50
0.90	1.11	1.1	1.3	1.8	2.4	4.6	18	31	43	88
0.96	1.04	1.9	2.2	2.9	4.4	7.5	36	62	74	152
0.98	1.02	2.7	3.1	3.8	6.5	10	57	97	103	210
0.99	1.01	3.7	4.2	4.8	9.3	13	87	144	136	276

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.05	0.01	0.03	0.30	0.03	0.02	0.20	0.26
0.02	50	0.08	0.02	0.06	0.41	0.06	0.04	0.29	0.46
0.05	20	0.19	0.08	0.15	0.68	0.12	0.12	0.52	1.0
0.10	10	0.36	0.21	0.32	1.1	0.22	0.30	0.84	1.9
0.20	5	0.75	0.60	0.73	1.9	0.44	0.78	1.5	3.9
0.50	2	2.6	2.9	3.0	5.5	1.5	3.3	4.4	13
0.80	1.25	7.5	8.6	10.0	17	4.6	8.3	12	33
0.90	1.11	12	13	17	30	7.7	12	20	50
0.96	1.04	19	17	28	57	13	15	34	73
0.98	1.02	25	20	38	86	17	16	47	91
0.99	1.01	31	22	49	126	23	18	63	108
		July-August-September				October-November-December			
0.01	100	0.00	0.01	0.03	0.02	0.02	0.03	0.06	0.10
0.02	50	0.01	0.02	0.04	0.04	0.04	0.05	0.09	0.16
0.05	20	0.02	0.05	0.08	0.08	0.08	0.09	0.17	0.30
0.10	10	0.03	0.08	0.13	0.17	0.13	0.16	0.28	0.52
0.20	5	0.07	0.15	0.24	0.36	0.27	0.33	0.53	1.0
0.50	2	0.24	0.48	0.68	1.4	0.96	1.2	1.8	3.3
0.80	1.25	0.74	1.3	1.8	4.5	3.5	4.5	6.2	10
0.90	1.11	1.2	2.0	2.9	7.9	6.6	8.9	12	18
0.96	1.04	2.0	3.1	4.7	14	13	18	24	33
0.98	1.02	2.8	4.0	6.3	19	20	29	38	48
0.99	1.01	3.5	4.9	8.2	25	30	44	57	66

CHARITON RIVER BASIN
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 September 1988.

GAGE.--Water-stage recorder. Datum of gage is 917.90 ft above NGVD (U.S. Army Corps of Engineers bench mark).

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.

Rating table number 11, developed October 1986

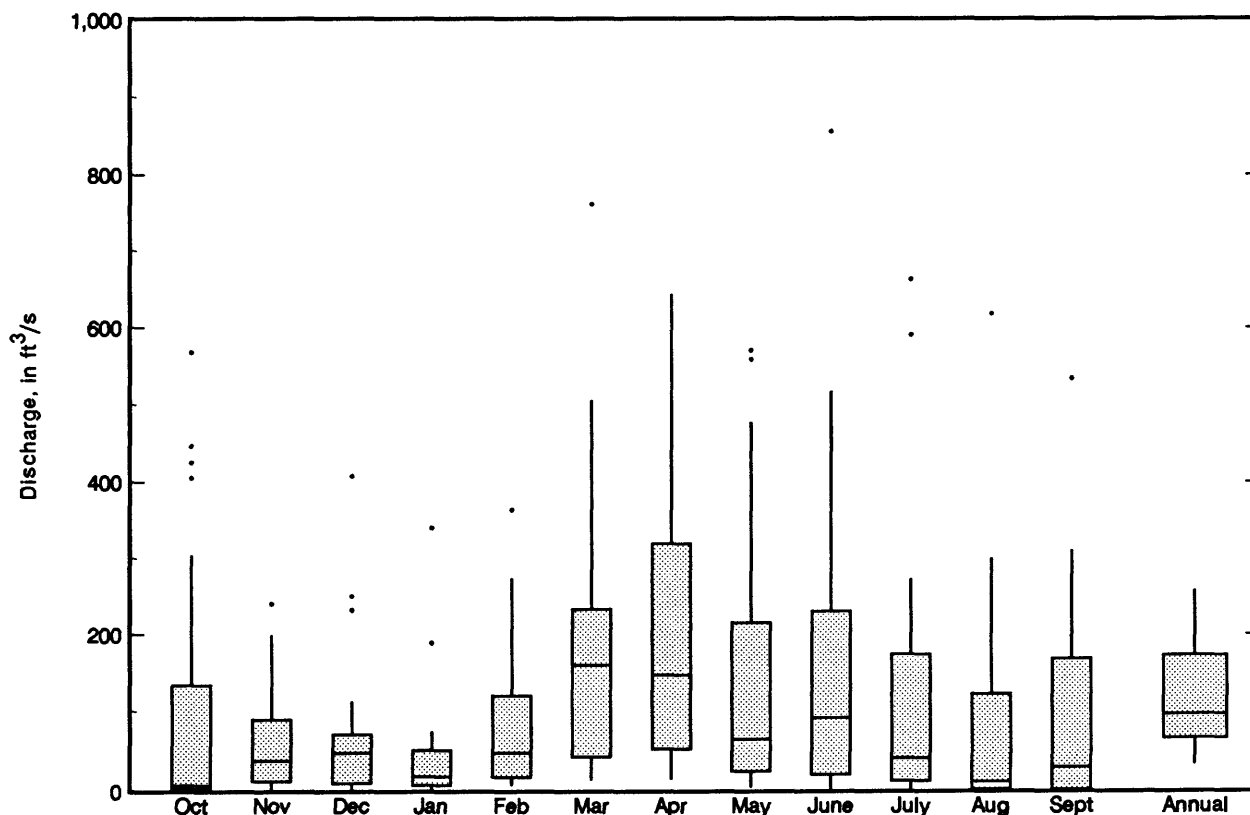
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
5.0	2.8	12.0	516
5.5	10	14.0	897
6.0	22	16.0	1,610
7.0	58	18.0	3,400
8.0	110	20.0	8,200
10.0	265		

CHARITON RIVER BASIN
06903400 CHARITON RIVER NEAR CHARITON, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	568	1974	0.36	1967	109	184	7.7
November	240	1984	0.71	1967	65.4	72.1	4.6
December	408	1983	0.24	1977	70.8	98.7	5.0
January	340	1974	0.23	1977	44.4	76.4	3.1
February	364	1973	5.90	1978	84.5	94.2	6.0
March	761	1979	12.5	1968	182	180	12.9
April	643	1973	14.1	1985	217	192	15.3
May	570	1986	3.91	1977	156	177	11.1
June	856	1967	0.38	1988	171	212	12.1
July	663	1981	0.000	1988	119	180	8.5
August	618	1987	1.01	1968	82.6	143	5.8
September	534	1986	0.40	1966	109	144	7.7
Annual	258	1973	32.6	1977	118	65.6	100.0

Boxplots of monthly and annual mean discharges



CHARITON RIVER BASIN
06903400 CHARITON RIVER NEAR CHARITON, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.19	0.31	2.2	3.9	1.4	0.01	0.00	0.01	0.05	0.11	0.22	0.21	0.07
95	0.35	2.0	7.3	7.7	2.9	0.45	0.04	0.30	0.24	0.33	0.53	0.50	0.43
90	0.98	2.7	12	11	4.1	1.0	0.39	0.51	0.41	0.47	0.83	0.80	0.84
85	2.4	3.6	15	13	5.4	1.8	0.73	0.82	0.54	0.62	1.2	1.4	1.3
80	3.1	4.6	19	16	6.8	2.7	1.0	0.98	0.68	0.79	1.9	3.6	2.2
75	3.7	5.8	22	21	8.5	3.7	1.3	1.1	0.83	1.1	3.3	4.9	3.1
70	4.7	7.0	27	24	11	4.7	1.7	1.4	0.99	1.6	5.0	6.3	4.2
65	5.9	8.2	31	28	13	6.0	2.1	1.7	1.1	2.2	7.0	7.7	5.8
60	6.8	9.9	36	34	16	7.9	2.6	2.1	1.4	2.9	9.2	9.1	7.7
55	7.6	14	42	41	19	11	3.2	2.5	1.7	3.7	12	11	10
50	8.4	17	48	49	24	15	3.9	3.0	2.1	4.6	14	14	14
45	9.6	21	57	60	28	20	5.2	3.7	2.9	5.5	18	16	18
40	14	26	65	74	35	27	7.7	4.6	4.5	6.9	22	19	23
35	17	32	82	97	44	37	13	5.7	7.8	9.9	27	23	29
30	20	44	106	128	61	52	22	7.7	13	15	34	29	39
25	25	61	172	175	92	82	35	12	21	23	42	39	54
20	29	83	280	255	141	132	63	17	34	33	56	54	81
15	42	125	412	454	264	207	117	31	86	61	80	87	143
10	68	202	605	706	494	548	238	64	267	182	150	170	300
5	230	425	962	1,150	983	1,190	667	442	722	708	351	428	711

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	762	624	357	238	152
0.95	1.05	1,220	872	540	345	219
0.90	1.11	1,570	1,040	662	416	263
0.80	1.25	2,120	1,290	836	518	327
0.50	2	3,730	1,960	1,250	764	486
0.20	5	6,500	2,960	1,770	1,090	700
0.10	10	8,640	3,670	2,080	1,290	838
0.04	25	11,700	4,620	2,430	1,520	1,010
0.02	50	14,200	5,360	2,670	1,690	1,130
0.01	100	16,800	6,130	2,890	1,850	1,250

CHARITON RIVER BASIN
06903400 CHARITON RIVER NEAR CHARITON, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.02	0.06	0.11	0.10	0.11	0.15	0.18
0.02	50	0.00	0.00	0.03	0.07	0.14	0.14	0.17	0.26	0.37
0.05	20	0.00	0.01	0.06	0.11	0.20	0.23	0.36	0.60	0.99
0.10	10	0.05	0.05	0.09	0.16	0.29	0.38	0.69	1.2	2.2
0.20	5	0.12	0.12	0.17	0.26	0.47	0.74	1.5	2.8	5.6
0.50	2	0.39	0.45	0.53	0.72	1.3	2.9	6.6	12	26
0.80	1.25	1.2	1.5	1.7	2.2	4.4	14	29	46	93
0.90	1.11	2.4	2.7	3.2	4.2	9.0	35	62	87	163
0.96	1.04	4.8	5.0	6.4	8.7	20	97	138	166	278
0.98	1.02	7.5	7.5	10	14	35	193	233	247	379
0.99	1.01	11	11	15	22	58	369	371	348	488

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.09	0.09	0.12	0.26	0.08	0.11	0.19	0.14
0.02	50	0.15	0.16	0.19	0.41	0.13	0.19	0.31	0.29
0.05	20	0.30	0.33	0.38	0.81	0.29	0.39	0.66	0.76
0.10	10	0.55	0.60	0.68	1.4	0.54	0.72	1.2	1.7
0.20	5	1.1	1.2	1.3	2.8	1.1	1.4	2.4	4.3
0.50	2	3.5	3.9	4.5	9.9	3.1	4.2	7.5	20
0.80	1.25	9.4	11	14	32	6.8	9.7	19	73
0.90	1.11	15	17	23	58	9.2	14	30	129
0.96	1.04	23	26	40	107	12	19	44	222
0.98	1.02	29	33	56	156	14	23	55	304
0.99	1.01	36	41	76	219	16	26	67	395
		July-August-September				October-November-December			
0.01	100	0.05	0.02	0.08	0.12	0.02	0.05	0.07	0.08
0.02	50	0.06	0.04	0.10	0.16	0.04	0.08	0.10	0.14
0.05	20	0.09	0.06	0.13	0.23	0.08	0.14	0.18	0.29
0.10	10	0.12	0.11	0.18	0.33	0.14	0.24	0.32	0.55
0.20	5	0.19	0.19	0.28	0.57	0.30	0.46	0.62	1.2
0.50	2	0.51	0.64	0.79	2.0	1.2	1.7	2.3	4.5
0.80	1.25	1.6	2.2	2.9	9.1	5.1	6.3	9.2	16
0.90	1.11	3.1	4.1	6.4	23	11	13	19	28
0.96	1.04	6.6	8.1	16	68	24	29	43	52
0.98	1.02	11	13	31	145	40	48	72	76
0.99	1.01	18	19	58	297	63	76	115	106

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 September 1988.

GAGE.--Water-stage recorder. Datum of gage is 913.70 ft above NGVD (U.S. Army Corps of Engineers benchmark).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 28,000 ft³/s July 4, 1981, gage height, 29.95 ft; no flow July 6, 7, 21-24, 28-31 and Aug. 1, 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Sept. 21, 1965, reached a stage of 25.5 ft, from floodmarks, discharge, about 18,000 ft³/s.

Rating table number 5, developed April 1983

Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
3.0	2.5	12.0	1,660
3.5	25	15.0	2,530
4.0	66	18.0	3,950
4.5	117	21.0	7,800
5.0	180	24.0	13,900
6.0	324	27.0	22,400
7.0	494	30.0	28,000
9.0	895		

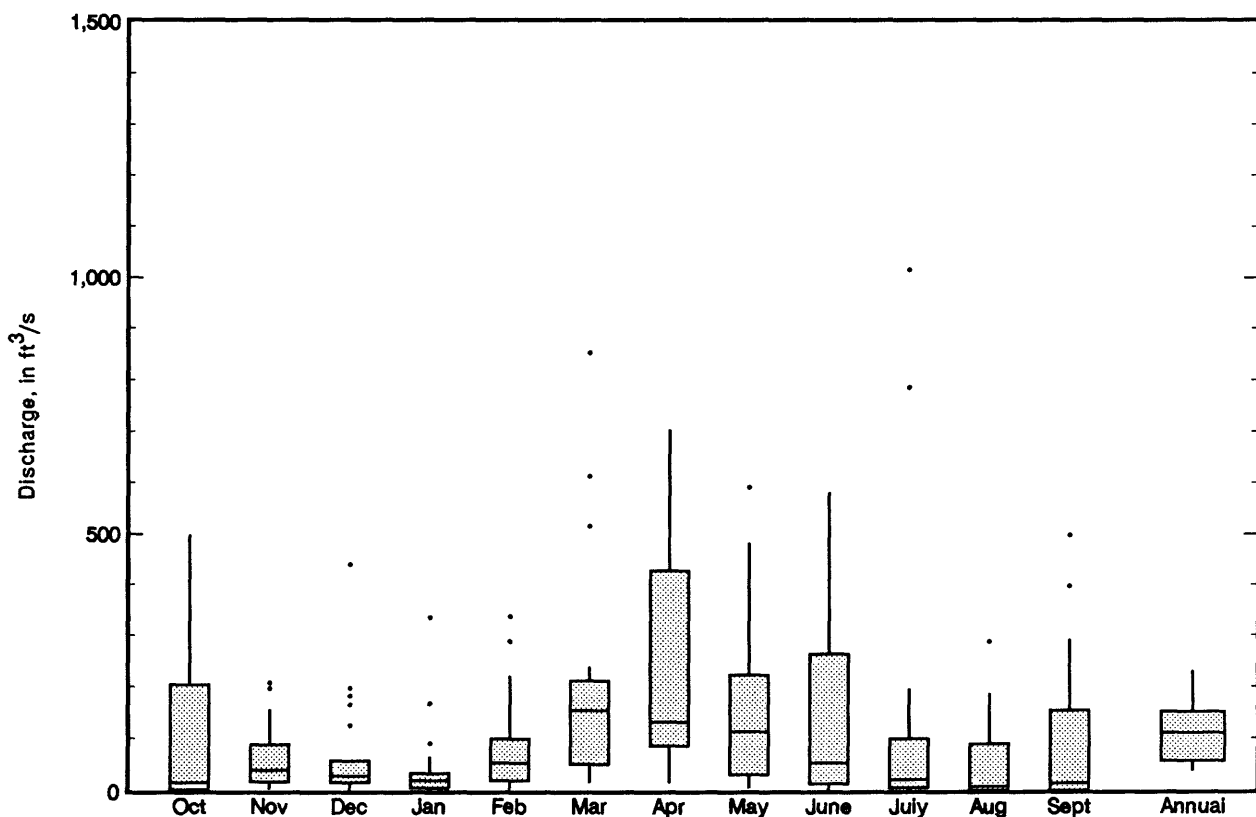
CHARITON RIVER BASIN

06903700 SOUTH FORK CHARITON RIVER NEAR PROMISE CITY, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	498	1978	0.86	1976	114	173	8.2
November	208	1983	4.07	1969	61.1	61.4	4.4
December	440	1983	0.40	1977	70.9	104	5.1
January	335	1974	0.19	1977	43.8	77.0	3.1
February	337	1971	3.33	1978	89.8	95.8	6.5
March	853	1979	15.7	1968	195	214	14.0
April	703	1978	15.0	1971	227	216	16.4
May	592	1986	5.14	1980	163	181	11.8
June	580	1980	1.18	1988	137	159	9.8
July	1,015	1981	0.24	1977	130	265	9.3
August	288	1987	0.76	1984	55.6	78.8	4.0
September	498	1970	0.82	1971	103	143	7.4
Annual	231	1973	38.6	1977	116	59.6	100.0

Boxplots of monthly and annual mean discharges



CHARITON RIVER BASIN

06903700 SOUTH FORK CHARITON RIVER NEAR PROMISE CITY, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.16	0.16	5.2	5.2	1.8	0.35	0.01	0.14	0.16	0.16	0.68	0.33	0.17
95	0.35	2.1	9.8	8.5	3.4	0.77	0.16	0.32	0.38	0.40	1.2	0.58	0.59
90	1.1	2.8	14	12	4.9	1.2	0.40	0.49	0.59	0.68	1.8	1.3	1.1
85	1.9	3.6	18	15	6.8	1.8	0.88	0.67	0.74	0.96	2.8	2.3	1.7
80	2.7	4.4	22	18	8.6	2.6	1.2	0.85	0.89	1.3	4.1	4.3	2.5
75	3.6	6.0	25	22	11	3.6	1.5	1.1	1.1	1.8	5.3	6.1	3.6
70	4.6	7.6	29	26	14	4.6	1.8	1.4	1.3	2.3	6.4	7.9	4.9
65	6.2	9.2	32	31	17	5.9	2.3	1.8	1.6	2.9	8.1	9.8	6.7
60	7.9	12	35	36	20	7.2	3.0	2.1	1.8	3.5	11	11	8.9
55	9.7	14	41	43	23	9.0	4.2	2.6	2.2	4.3	14	13	12
50	12	17	48	49	27	11	5.5	3.1	2.7	5.7	17	15	15
45	13	22	54	57	31	15	6.9	4.0	3.3	7.8	20	17	19
40	15	28	66	69	36	19	8.7	5.1	4.1	12	24	21	23
35	18	36	78	82	44	23	11	6.5	6.1	17	29	26	30
30	21	49	103	104	53	30	17	8.7	9.4	22	35	33	37
25	25	63	137	133	71	42	27	12	15	30	43	40	49
20	33	77	191	183	101	62	45	17	23	44	51	50	67
15	46	115	310	269	162	97	74	27	44	68	68	67	101
10	68	176	497	602	289	208	133	49	109	124	99	107	189
5	154	352	923	1,090	833	557	480	180	457	396	265	242	511

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	1,770	623	350	213	144
0.95	1.05	2,530	904	510	321	210
0.90	1.11	3,060	1,100	623	396	255
0.80	1.25	3,860	1,410	795	505	321
0.50	2	6,030	2,260	1,260	781	490
0.20	5	9,450	3,660	2,000	1,160	732
0.10	10	12,000	4,720	2,550	1,420	896
0.04	25	15,400	6,210	3,300	1,730	1,100
0.02	50	18,200	7,420	3,890	1,950	1,260
0.01	100	21,000	8,710	4,510	2,170	1,410

CHARITON RIVER BASIN
06903700 SOUTH FORK CHARITON RIVER NEAR PROMISE CITY, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.01	0.08	0.09	0.11	0.25	0.36	0.93
0.02	50	0.00	0.00	0.02	0.10	0.12	0.16	0.36	0.56	1.4
0.05	20	0.00	0.00	0.05	0.15	0.20	0.30	0.65	1.1	2.6
0.10	10	0.08	0.08	0.09	0.21	0.31	0.51	1.1	1.9	4.4
0.20	5	0.17	0.18	0.20	0.34	0.53	1.00	2.1	3.7	8.3
0.50	2	0.57	0.63	0.75	0.93	1.5	3.8	7.3	13	26
0.80	1.25	1.8	2.0	2.5	2.9	4.6	16	26	45	77
0.90	1.11	3.4	3.7	4.6	5.4	8.4	34	51	84	133
0.96	1.04	6.6	7.1	8.2	11	16	79	106	161	232
0.98	1.02	10	11	12	18	24	139	170	243	329
0.99	1.01	15	16	16	29	35	231	261	351	448

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.07	0.08	0.09	0.14	0.11	0.16	0.19	0.48
0.02	50	0.12	0.14	0.15	0.26	0.17	0.25	0.30	0.76
0.05	20	0.27	0.32	0.34	0.60	0.32	0.46	0.57	1.5
0.10	10	0.51	0.62	0.66	1.2	0.54	0.77	0.97	2.7
0.20	5	1.1	1.3	1.4	2.7	1.00	1.4	1.8	5.4
0.50	2	3.5	4.3	5.2	10	2.8	3.8	5.5	19
0.80	1.25	9.2	11	16	33	6.5	9.1	15	64
0.90	1.11	14	16	26	56	9.6	14	24	118
0.96	1.04	21	23	41	93	14	20	39	222
0.98	1.02	26	28	55	125	17	25	52	330
0.99	1.01	31	33	69	160	20	30	67	469
		July-August-September				October-November-December			
0.01	100	0.04	0.02	0.13	0.15	0.03	0.04	0.07	0.16
0.02	50	0.05	0.03	0.14	0.18	0.05	0.07	0.11	0.26
0.05	20	0.08	0.06	0.18	0.25	0.10	0.14	0.23	0.51
0.10	10	0.13	0.11	0.24	0.36	0.19	0.26	0.42	0.90
0.20	5	0.23	0.22	0.36	0.58	0.39	0.55	0.87	1.8
0.50	2	0.68	0.82	0.92	1.7	1.6	2.2	3.3	5.9
0.80	1.25	2.1	2.7	3.3	6.7	6.5	8.2	12	18
0.90	1.11	3.8	4.7	7.3	15	14	16	22	32
0.96	1.04	7.5	8.3	19	40	30	32	41	55
0.98	1.02	12	12	38	79	50	50	61	78
0.99	1.01	17	16	72	150	79	75	88	106

CHARITON RIVER BASIN
06903900 CHARITON RIVER NEAR RATHBUN, IA

LOCATION.--Lat 40°49'22", long 92°53'22", in SE1/4 NE1/4 sec.35, T.70 N., R.18 W., Appanoose County, Hydrologic Unit 10280201, on left bank 600 ft downstream from outlet of Rathbun Dam, 1.8 mi north of Rathbun and 3.7 mi upstream from Walnut Creek and at mile 142.1.

DRAINAGE AREA.--549 mi².

PERIOD OF RECORD.--October 1956 to September 1988.

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.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 21,800 ft³/s Mar. 31, 1960, gage height, 25.3 ft from floodmark, site and datum then in use; no flow Oct. 26, 1977.

REMARKS.--Flow regulated by Rathbun Reservoir (station 06903880) since Nov. 21, 1969.

Rating table number 12, developed February 1988

Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
2.0	6.6	6.0	334
2.5	32	8.0	590
3.0	60	10.0	903
4.0	132	12.0	1,260
5.0	225		

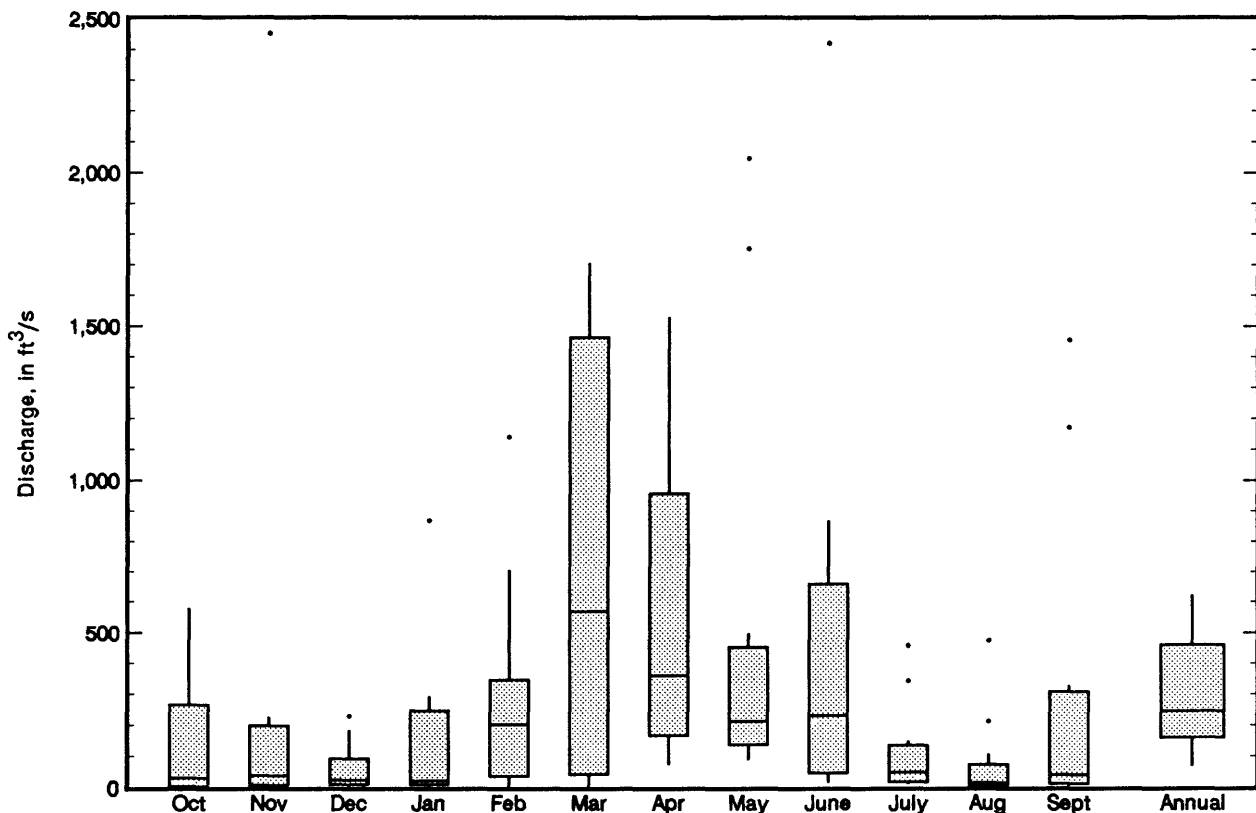
CHARITON RIVER BASIN
06903900 CHARITON RIVER NEAR RATHBUN, IA--Continued

Pre-regulation Period

Statistics of monthly and annual mean discharges, pre-regulation period

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	578	1962	0.32	1957	144	204	3.9
November	2,453	1962	0.70	1957	280	690	7.6
December	230	1966	1.83	1957	62.5	77.8	1.7
January	870	1960	0.86	1957	156	250	4.2
February	1,140	1962	2.86	1957	295	333	7.9
March	1,705	1961	1.72	1957	734	714	19.8
April	1,529	1965	74.5	1958	572	523	15.4
May	2,047	1959	89.9	1965	509	665	13.7
June	2,422	1967	15.7	1963	468	680	12.6
July	459	1958	11.3	1965	114	143	3.1
August	475	1958	2.68	1965	78.2	139	2.1
September	1,455	1965	4.82	1966	298	491	8.0
Annual	622	1962	69.8	1957	308	188	100.0

Boxplots of monthly and annual mean discharges, pre-regulation period



CHARITON RIVER BASIN
06903900 CHARITON RIVER NEAR RATHBUN, IA--Continued

Monthly and annual flow duration, pre-regulation period

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.67	0.56	0.18	23	6.0	3.0	0.39	1.2	1.1	0.11	0.49	1.3	0.32
95	0.87	3.2	1.9	35	13	5.0	2.3	1.9	2.3	0.16	0.74	1.6	1.1
90	1.1	4.9	7.1	47	22	6.7	3.5	2.4	3.0	0.32	1.0	1.9	2.4
85	1.6	6.1	12	61	31	8.3	4.6	2.9	3.4	0.39	1.4	2.3	4.1
80	3.7	7.1	21	77	38	11	5.5	3.3	3.9	0.58	2.1	2.7	6.1
75	12	8.1	38	95	46	14	7.1	3.7	4.7	1.1	6.5	6.4	8.6
70	14	15	49	113	55	18	9.0	4.2	5.5	2.3	9.4	9.2	12
65	16	20	69	131	63	21	11	4.8	6.8	4.1	11	12	16
60	18	27	90	149	72	25	14	5.4	8.1	7.3	14	17	22
55	20	39	109	173	88	33	17	6.3	10	10	17	20	28
50	22	65	136	198	105	43	21	7.6	13	15	28	24	36
45	23	96	179	225	134	59	25	9.5	17	21	35	27	47
40	28	130	239	274	172	89	31	12	25	29	42	30	64
35	36	170	312	326	218	145	40	16	33	37	49	33	89
30	62	220	510	426	314	228	53	22	47	46	59	38	126
25	121	288	1,040	569	430	367	67	33	71	65	70	47	180
20	175	410	1,430	826	635	523	100	49	133	110	100	65	265
15	242	696	1,710	1,160	904	792	145	73	238	189	220	89	441
10	398	1,160	2,000	1,620	1,350	1,570	290	143	446	425	546	130	896
5	765	1,590	2,900	2,580	2,240	2,800	708	320	1,400	1,060	1,250	196	1,670

Probability of annual high discharges, pre-regulation period

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	379	642	554	299	182
0.95	1.05	848	1,150	954	581	376
0.90	1.11	1,280	1,570	1,260	820	533
0.80	1.25	2,070	2,260	1,750	1,180	783
0.50	2	4,980	4,500	3,180	2,190	1,470
0.20	5	11,200	8,810	5,550	3,620	2,440
0.10	10	16,800	12,400	7,320	4,510	3,030
0.04	25	25,400	17,800	9,720	5,560	3,700
0.02	50	32,800	22,400	11,600	6,260	4,140
0.01	100	41,000	27,500	13,500	6,900	4,520

CHARITON RIVER BASIN
06903900 CHARITON RIVER NEAR RATHBUN, IA--Continued

Probability of annual low discharges, pre-regulation period

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.02	0.02	0.02	0.04	0.21	0.80	0.83	0.59	1.1
0.02	50	0.03	0.04	0.05	0.08	0.32	1.1	1.3	1.1	2.0
0.05	20	0.07	0.09	0.11	0.19	0.58	1.8	2.3	2.8	4.7
0.10	10	0.13	0.16	0.22	0.40	0.95	2.7	4.0	5.7	9.4
0.20	5	0.26	0.33	0.49	0.85	1.7	4.5	7.5	13	20
0.50	2	0.88	1.1	1.6	2.5	4.9	12	24	43	71
0.80	1.25	2.4	2.8	3.9	5.0	13	29	69	108	191
0.90	1.11	3.7	4.2	5.5	6.3	20	46	117	151	289
0.96	1.04	5.7	6.2	7.3	7.4	32	75	201	204	421
0.98	1.02	7.3	7.7	8.5	7.9	42	103	282	239	519
0.99	1.01	8.9	9.2	9.5	8.2	54	135	380	269	613

Probability of seasonal low discharges, pre-regulation period

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.08	0.09	0.15	0.30	1.4	2.9	3.4	7.5
0.02	50	0.12	0.17	0.27	0.54	1.6	3.1	3.9	9.2
0.05	20	0.32	0.42	0.60	1.2	2.1	3.6	4.9	13
0.10	10	0.74	0.91	1.2	2.5	2.6	4.1	6.2	18
0.20	5	1.9	2.2	2.7	5.7	3.6	5.2	8.5	27
0.50	2	9.4	9.8	12	25	7.0	9.5	18	64
0.80	1.25	36	37	44	94	15	22	44	169
0.90	1.11	65	68	84	179	24	36	77	296
0.96	1.04	114	126	161	343	41	69	149	556
0.98	1.02	158	181	242	513	59	110	235	852
0.99	1.01	207	246	345	726	82	171	364	1,270
		July-August-September				October-November-December			
0.01	100	0.11	0.28	0.87	1.4	0.01	0.01	0.02	0.06
0.02	50	0.17	0.39	1.0	1.5	0.02	0.02	0.03	0.13
0.05	20	0.32	0.63	1.3	1.8	0.04	0.06	0.10	0.35
0.10	10	0.51	0.91	1.5	2.2	0.10	0.16	0.26	0.82
0.20	5	0.85	1.4	2.0	3.0	0.26	0.48	0.76	2.1
0.50	2	1.7	2.8	3.5	6.5	1.5	3.1	5.0	11
0.80	1.25	2.5	4.9	6.5	19	8.8	16	28	44
0.90	1.11	2.8	6.3	9.2	36	21	36	63	82
0.96	1.04	3.0	7.9	14	81	54	79	143	149
0.98	1.02	3.1	8.9	18	145	99	127	237	212
0.99	1.01	3.2	9.9	23	253	168	190	365	285

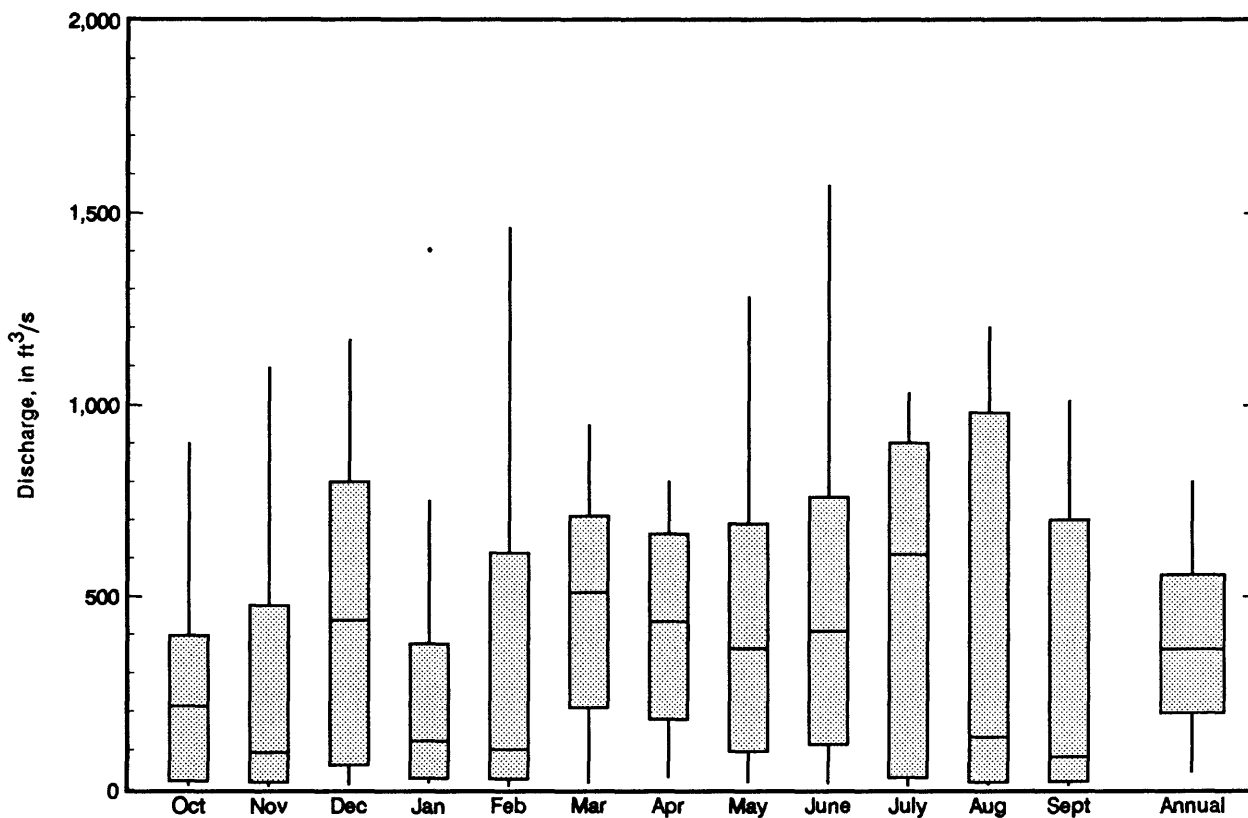
CHARITON RIVER BASIN
06903900 CHARITON RIVER NEAR RATHBUN, IA--Continued

Post-regulation Period

Statistics of monthly and annual mean discharges, post-regulation period

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	901	1983	11.5	1975	256	263	5.4
November	1,098	1983	9.97	1975	317	398	6.7
December	1,169	1978	11.8	1972	490	418	10.4
January	1,404	1983	17.5	1977	273	351	5.8
February	1,462	1983	8.65	1975	348	486	7.4
March	949	1983	17.5	1977	484	308	10.3
April	803	1984	30.8	1972	416	266	8.8
May	1,281	1973	19.3	1977	433	368	9.2
June	1,573	1973	16.6	1988	460	422	9.7
July	1,032	1973	8.50	1972	546	389	11.6
August	1,203	1982	12.0	1974	389	490	8.3
September	1,013	1978	11.0	1974	307	370	6.5
Annual	802	1973	44.7	1977	394	237	100.0

Boxplots of monthly and annual mean discharges, post-regulation period



CHARITON RIVER BASIN
06903900 CHARITON RIVER NEAR RATHBUN, IA--Continued

Monthly and annual flow duration, post-regulation period

Percentage of days discharge equaled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	8.9	8.1	7.9	12	7.9	9.3	8.1	8.6	9.1	8.5	9.5	11	8.5
95	13	9.6	13	14	17	14	9.4	10	11	10	12	14	12
90	16	14	17	20	20	17	12	12	13	12	13	17	15
85	18	15	23	25	22	19	17	14	15	14	15	19	17
80	20	19	36	41	23	21	20	16	19	15	16	21	20
75	22	22	43	57	27	23	22	18	20	18	18	24	22
70	29	25	64	64	30	27	24	20	22	20	21	28	25
65	31	28	114	87	40	34	27	21	23	22	24	34	28
60	33	30	172	124	65	95	44	23	24	24	26	51	33
55	34	32	221	180	193	193	303	26	26	26	28	221	44
50	39	34	287	217	310	357	500	28	27	28	38	351	100
45	49	42	448	385	447	435	692	44	29	33	89	488	201
40	94	89	537	520	571	572	786	123	34	39	126	571	345
35	125	180	694	671	673	681	866	310	210	54	292	677	493
30	210	237	802	746	742	754	965	640	470	280	424	816	660
25	310	516	893	782	783	808	1,080	909	605	461	515	1,020	778
20	492	1,100	1,000	819	822	862	1,160	1,120	758	572	746	1,150	863
15	813	1,250	1,120	855	863	1,050	1,230	1,200	871	766	865	1,230	1,070
10	1,060	1,390	1,270	892	955	1,240	1,300	1,280	1,150	851	1,170	1,310	1,220
5	1,370	1,550	1,450	1,190	1,320	1,410	1,370	1,360	1,280	1,180	1,280	1,390	1,360

Probability of annual high discharges, post-regulation period

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	--	468	471	330	215
0.95	1.05	--	744	719	575	400
0.90	1.11	--	902	861	725	526
0.80	1.25	--	1,080	1,030	909	698
0.50	2	--	1,340	1,280	1,200	1,040
0.20	5	--	1,460	1,410	1,350	1,310
0.10	10	--	1,480	1,440	1,390	1,400
0.04	25	--	1,490	1,460	1,400	1,470
0.02	50	--	1,490	1,460	1,400	1,490
0.01	100	--	1,490	1,460	1,400	1,510

CHARITON RIVER BASIN
06903900 CHARITON RIVER NEAR RATHBUN, IA--Continued

Probability of annual low discharges, post-regulation period

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	4.4	4.9	7.5	8.4	8.4	4.4	3.2	5.0
0.02	50	0.00	5.3	5.9	7.8	8.5	8.6	5.3	4.4	7.6
0.05	20	0.00	6.8	7.6	8.4	8.8	9.3	7.5	7.0	14
0.10	10	2.7	8.3	9.4	9.2	9.4	10	10	11	23
0.20	5	6.2	10	12	11	11	13	16	19	42
0.50	2	14	15	17	17	18	23	45	61	124
0.80	1.25	20	20	23	36	45	67	150	222	342
0.90	1.11	22	23	26	58	90	139	308	458	563
0.96	1.04	22	26	28	109	223	358	710	1,030	937
0.98	1.02	23	27	30	172	441	721	1,270	1,770	1,290
0.99	1.01	23	29	31	269	869	1,440	2,180	2,920	1,700

Probability of seasonal low discharges, post-regulation period

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	6.0	6.4	6.0	4.9	1.1	5.2	3.4	2.7
0.02	50	7.2	7.4	6.9	5.7	1.7	6.2	4.7	4.2
0.05	20	9.2	9.3	8.5	7.6	3.2	8.2	7.7	8.2
0.10	10	11	12	11	10	5.1	11	12	15
0.20	5	15	15	15	15	8.6	16	21	29
0.50	2	24	28	32	41	18	35	63	108
0.80	1.25	40	53	84	145	30	88	198	380
0.90	1.11	51	77	154	314	36	151	370	719
0.96	1.04	66	117	315	791	41	280	731	1,400
0.98	1.02	77	155	523	1,510	44	426	1,150	2,150
0.99	1.01	90	202	847	2,810	46	633	1,730	3,130
		July-August-September				October-November-December			
0.01	100	9.6	6.9	4.1	2.5	4.9	6.4	5.5	3.6
0.02	50	9.8	7.1	4.6	3.3	5.8	6.9	6.1	4.7
0.05	20	10	7.7	5.8	5.1	7.3	7.9	7.6	7.3
0.10	10	11	8.7	7.6	7.8	9.0	9.2	9.5	11
0.20	5	12	11	11	14	12	12	13	19
0.50	2	17	21	31	50	18	21	32	60
0.80	1.25	29	66	130	229	28	51	105	222
0.90	1.11	43	150	326	566	35	91	228	472
0.96	1.04	68	423	1,000	1,610	44	183	579	1,110
0.98	1.02	96	913	2,250	3,330	51	302	1,130	1,990
0.99	1.01	134	1,960	4,900	6,580	58	491	2,150	3,430

CHARITON RIVER BASIN
06904000 CHARITON RIVER NEAR CENTERVILLE, IA

LOCATION.--Lat 40°44'20", long 92°48'05", in SE1/4 NE1/4 sec.14, T.68N., R.17W., Appanoose County, Hydrologic Unit 10280201, on left bank 10 ft downstream from bridge on State highway 2, 3.0 mi east of Centerville and 3.5 mi downstream from Cooper Creek.

DRAINAGE AREA.--708 mi².

PERIOD OF RECORD--May 1938 to September 1959 (discontinued).

GAGE--Water stage recorder and concrete control. Datum of gage is 825.68 ft above National Geodetic Vertical Datum of 1929.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 21,700 ft³/s June 20, 1946, gage height, 24.20 ft, from floodmark; minimum daily discharge, 0.1 ft³/s Oct. 11, 1938, Sept. 30 and Oct 1-3, 1940.

Rating table number 2, developed October 1958
(A discharge measurement to validate this rating
has not been made since October 1965.)

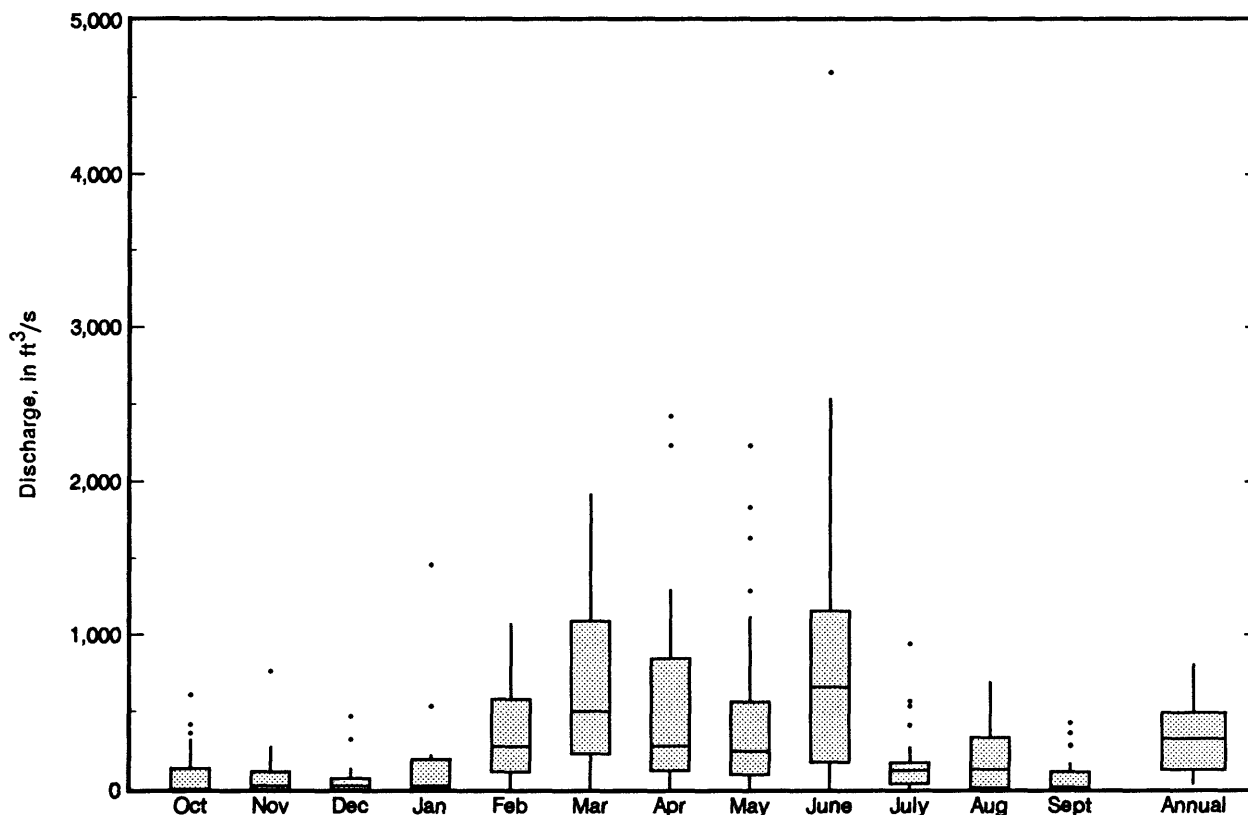
Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
2.5	8.5	10.0	2,360
3.0	36	12.0	3,220
3.5	158	14.0	4,200
4.0	370	16.0	5,380
5.0	760	18.0	6,900
6.0	1,080	20.0	9,000
8.0	1,630	22.0	11,600

CHARITON RIVER BASIN
06904000 CHARITON RIVER NEAR CENTERVILLE, IA--Continued

Statistics of monthly and annual mean discharges

Month	Maximum		Minimum		Mean		
	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Water year of occurrence	Discharge (ft ³ /s)	Standard deviation (ft ³ /s)	Percentage of annual discharge
October	610	1942	0.39	1957	108	174	2.7
November	761	1942	0.87	1957	94.9	174	2.4
December	468	1943	0.91	1956	87.3	146	2.2
January	1,461	1946	0.82	1956	151	326	3.8
February	1,071	1945	2.42	1954	347	318	8.7
March	1,920	1939	2.27	1956	693	617	17.3
April	2,429	1947	1.00	1956	594	692	14.8
May	2,234	1959	1.31	1956	541	666	13.5
June	4,665	1947	5.33	1956	907	1,098	22.7
July	939	1946	2.96	1954	187	233	4.7
August	694	1958	2.59	1953	202	219	5.0
September	427	1958	0.91	1953	89.6	129	2.2
Annual	807	1947	32.3	1954	336	231	100.0

Boxplots of monthly and annual mean discharges



CHARITON RIVER BASIN
06904000 CHARITON RIVER NEAR CENTERVILLE, IA--Continued

Monthly and annual flow duration

Percentage of days discharge equalled or exceeded	Discharge (ft ³ /s)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
99	0.66	0.62	1.1	0.69	0.38	1.5	0.53	0.50	0.33	0.15	0.56	0.85	0.43
95	0.89	1.5	1.9	3.5	3.9	5.1	1.4	1.1	0.52	0.38	0.94	1.3	1.0
90	1.2	2.4	2.8	29	14	9.3	2.7	2.2	0.96	0.55	1.3	2.0	1.8
85	1.7	3.5	27	44	24	13	4.2	3.8	1.6	1.0	1.6	2.4	2.6
80	2.5	6.3	46	57	32	18	6.2	5.6	2.5	1.4	1.9	2.7	4.0
75	4.8	8.0	67	70	41	23	9.3	7.2	3.5	1.8	2.4	3.2	6.5
70	6.8	10	89	85	52	28	13	8.9	4.4	2.1	3.1	3.7	9.8
65	9.1	15	116	103	68	34	16	11	5.3	2.4	4.2	4.7	14
60	13	24	145	123	86	47	21	14	6.6	2.7	5.8	7.2	20
55	19	39	184	145	109	76	26	17	8.1	3.4	9.1	11	28
50	24	68	228	169	135	101	33	23	10	4.5	12	15	39
45	30	92	292	195	162	144	42	31	13	6.6	16	21	54
40	38	121	385	220	194	211	54	44	15	9.5	20	27	73
35	47	156	501	281	227	297	69	61	17	15	32	34	97
30	58	212	658	361	289	471	84	83	24	22	50	44	136
25	70	316	930	476	377	732	102	119	35	33	74	55	191
20	94	489	1,230	695	507	1,190	157	186	53	52	109	69	281
15	134	714	1,620	1,080	753	1,970	257	291	82	94	144	86	456
10	214	1,300	2,130	1,770	1,380	2,780	460	524	176	244	198	120	880
5	525	1,940	2,760	2,970	2,580	4,560	911	1,260	450	681	376	280	1,870

Probability of annual high discharges

Exceedance probability	Recurrence interval (years)	Maximum instantaneous discharge (ft ³ /s)	Maximum average discharge (ft ³ /s)			
			3-day period	7-day period	15-day period	30-day period
0.99	1.01	645	529	322	218	133
0.95	1.05	1,270	1,030	694	474	293
0.90	1.11	1,800	1,440	1,010	690	430
0.80	1.25	2,700	2,140	1,550	1,050	661
0.50	2	5,670	4,380	3,230	2,120	1,370
0.20	5	11,300	8,510	6,040	3,760	2,500
0.10	10	15,900	11,800	8,040	4,850	3,280
0.04	25	22,600	16,500	10,600	6,150	4,230
0.02	50	28,100	20,300	12,500	7,040	4,900
0.01	100	34,100	24,300	14,300	7,870	5,540

CHARITON RIVER BASIN
06904000 CHARITON RIVER NEAR CENTERVILLE, IA--Continued

Probability of annual low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)								
		Number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.04	0.04	0.07	0.13	0.23	0.20	0.20	0.21	0.23
0.02	50	0.06	0.07	0.10	0.18	0.31	0.30	0.33	0.36	0.46
0.05	20	0.11	0.13	0.18	0.28	0.47	0.57	0.72	0.78	1.2
0.10	10	0.19	0.22	0.29	0.43	0.70	0.99	1.4	1.5	2.8
0.20	5	0.36	0.42	0.53	0.73	1.2	1.9	3.1	3.5	7.2
0.50	2	1.2	1.4	1.7	2.1	3.4	7.3	13	16	35
0.80	1.25	3.8	4.2	5.0	6.4	11	28	54	71	132
0.90	1.11	6.9	7.3	8.7	12	21	56	109	151	241
0.96	1.04	13	13	16	23	44	121	229	337	428
0.98	1.02	19	19	23	35	73	198	366	561	598
0.99	1.01	26	28	32	53	116	311	554	883	790

Probability of seasonal low discharges

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.15	0.18	0.19	0.18	0.29	0.32	0.35	0.68
0.02	50	0.25	0.29	0.31	0.33	0.48	0.57	0.70	1.4
0.05	20	0.50	0.61	0.66	0.79	0.99	1.3	1.8	4.0
0.10	10	0.92	1.1	1.3	1.7	1.9	2.7	4.1	9.2
0.20	5	1.9	2.4	2.7	4.0	3.9	5.8	9.7	23
0.50	2	7.3	8.9	11	20	14	22	40	109
0.80	1.25	26	31	39	87	48	66	118	373
0.90	1.11	51	58	73	180	85	108	187	635
0.96	1.04	100	109	140	378	153	172	282	1,040
0.98	1.02	153	162	210	599	219	226	353	1,360
0.99	1.01	224	229	299	895	300	284	421	1,700
		July-August-September				October-November-December			
0.01	100	0.04	0.14	0.18	0.41	0.03	0.09	0.14	0.17
0.02	50	0.07	0.21	0.26	0.58	0.05	0.13	0.19	0.25
0.05	20	0.15	0.35	0.45	0.98	0.10	0.23	0.31	0.44
0.10	10	0.27	0.57	0.73	1.6	0.20	0.38	0.50	0.74
0.20	5	0.57	1.0	1.3	2.9	0.45	0.74	0.93	1.4
0.50	2	2.1	2.9	4.2	9.4	2.0	2.7	3.3	5.7
0.80	1.25	6.6	8.4	14	33	8.6	11	14	26
0.90	1.11	11	14	26	65	18	24	30	61
0.96	1.04	20	25	51	137	39	54	74	155
0.98	1.02	28	37	78	224	63	95	134	293
0.99	1.01	38	51	117	352	97	157	234	525